

DORMER PRAMET

ROUND TOOL CATALOG



 **DORMER**

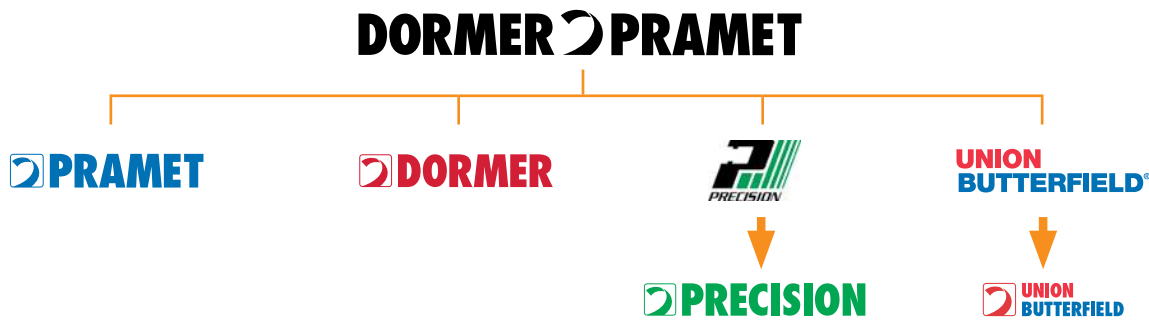
 **PRECISION**

 **UNION
BUTTERFIELD**

List Number Index

0860	0	160	2A	95	A977	84	C8R56CO	241	E808	270	M40CO	M	144	S138	414
1215	1	371	2AB	95	A978	84	C8R57	241	E809	261	M41CO		144	S139	415
1290		160	2ACO	123	ATR41	223	CO500-12	175	E810	273	M42CO		144	S146	416
1500		310					CO500-6	175	E811	264	M51CO		158	S206	397
1500A		313	3300	346	B100	B	CO501-12	175	E812	271	M52CO		158	S207	398
1500L		319	3300M	347	B101		CO501-6	175	E813	262				S208	400
1500OV		324	3306E	348	B121				E814	259	QC0860P	Q	167	S209	177
1505		325	3850	372	B122		D33F	D	E815	259	QC1290P		167	S211	403
1505.		325			B157		D33L		E816	265	QC21G		119	S212	404
1508		321	411	510	B170		D33M		E817	269	QC21GM		122	S213	405
1511		162	430	510	B301		D33W		E905	274	QC21P		119	S215	407
1519		366	4500	471	B334		D444		E906	278	QC21PM		122	S221	408
1528		310	4533	458	B335		DC		E908	270	QC41G		141	S223HA	418
1534		329	4535	462	B400		DS-120		E909	261	QC41P		141	S223HB	418
1534NE		338	4579	470	B411		DS-142		E910	273	QC91G		155	S234	410
1534NR		334	4587	474	B441		DS-90		E911	264	QC91GM		157	S235	411
1541		349	4588	466	B442				E912	271	QC91P		155	S236	412
1542		361	4591	475	B481		E000	E	E913	262	QC91PM		157	S237	413
1543		357	4600	476	B901		E000TIN		E914	259				S238	414
1544		352	4602	488			E001		E915	259	R10	R	87	S239	415
1545		353	4603	487	C110	C	E002		E916	265	R10A		108	S246	416
1545A		353	4608	480	C114COMB	227	E003		E917	269	R10B		111	S247	417
1548		354	4702	501	C114COMBC	235	E005		EP006H	286	R10CO		123	S248HA	419
1549		358	4703	504	C114COMBP	226	E006		EP016H	286	R10H		114	S248HB	419
1567		359	4704	505	C115COMB	227	E007		EP10	287	R10P		87	SPL-120	210
1568		355	4705	502	C115COMBC	235	E008		EP11	287	R15		87	SPL-90	210
1572		364	4706	502	C115COMBP	226	E011		EP20	282	R15A		108	SPLG-120	210
1578		364	4ASM	139	C123		E013		EP21	282	R15B		111	SPR-120	209
1580		344	4ASMC	147	C13R10CO	234	E016		EP30	282	R15CO		123	SPR-90	209
1580M		345	500-12	173	C15L10	231	E018		EP31	282	R18		87	SPRG-120	209
1582		340	500-6	170	C15R10	224	E021		EP40	306	R18A		108	SPS-120	208
1585		330	500-12	173	C15R10CO	234	E023		EP41	306	R18B		111	SPS-90	208
1585A		330	501-6	170	C15R10P	224	E025		EX006H	298	R18CO		123	SPSG-120	208
1585NR		336	501-12	173	C20R18	225	E026		EX016H	298	R18P		87	T400	T
1585OV		339	502-6	170	C20R18P	225	E027		EX10	299	R40C		136	TN1500	314
1586		340	5ATL	152	C21R10CO	234	E028		EX11	299	R41C		136	TN1534	329
1587		341	5ATS	180	C247		E031		EX20	294	R42		130	TN1541	349
1588		341			C252A	228	E033		EX21	294	R42C		136	TN1543	357
1590		342	6541	351	C252AB	228	E035		EX30	294	R453		56	TN1585	330
1591		342			C26M42CO	239	E036		EX31	294	R454		56	TN1785	333
1592		361	76HA	212	C26R15	226	E037		EX40	308	R457		47	TS10CO	219
1593		339			C26R15CO	234	E038		EX41	308	R458		47	TS10HS	215
1595		321			C26R15P	226	E041		F201	F	R459		63	TS15CO	219
1599		326	A002	95	C26R42	236	E043		F302	386	R463		60	TS15HS	215
1599M		327	A012	91	C273	441	E061		F312	387	R467		51	TS18CO	219
1599SB		327	A022	133	C29L10	231	E071		F320	379	R51	S	397	TS18HS	215
1600		326	A088	237	C29L10	231	E201		F330	379	R510		54	TS40CO	219
1634		332	A094	229	C29M40CO	239	E252		F370	382	R51FS		154	TS40HS	215
1641		301	A095	230	C29R10	224	E500		G132	G	R52		148	TS41CO	219
1671		302	A097	225	C29R10CO	234	E501		G135	489	R520		45	TS41HS	215
1672AP		279	A100	95	C29R10P	224	E504		G136	492	R55		148	TS42CO	219
1673AP		284	A101	103	C29R40	236	E513		G137	498	R56		194	TS42HS	215
1674		279	A108	114	C29R40C	238	E547		G142	493	R56CO		199	TS51CO	219
1675		284	A125	162	C29R51	240	E550		G149	491	R57		196	TS51HS	215
1675.		284	A160	202	C33R56	241	E620		G154	490	R58		198	TS52CO	219
1676AP		292	A170	192	C346	432	E621		G171	495	R88CO		128	TS52HS	215
1677AP		296	A190	228	C502AB	228	E624		G400	486	R89CO		128	TS55CO	219
1678		292	A191	228	C600	422	E625		G560	492	R950		21	TS55HS	215
1679		296	A217	213	C601	423	E626		G570	494	R970		27		
1681AP		303	A218	213	C602	424	E627		G600	496					
1687AP		305	A221	214	C603	425	E628		H851	H	S106		397		
1691AP		304	A225	213	C604	428	E629		H8512		S108		400		
1697AP		305	A243	169	C605	429	E630		H853	33	S109		401		
1700M		322	A244	169	C606	430	E631		H855	36	S110		402		
1785M		333	A287	232	C607	431	E650		H858	39	S111		403		
1785NR		337	A345	183	C608	433	E651		H860	44	S112		404		
1788M		343	A350	180	C609	433	E653		H861	44	S113		405		
1800		508	A510	73	C60M41CO	239	E654		HX10	105	S114		406		
1813		162	A520	66	C60R18	225	E710		HX15	105	S115		407		
1815		508	A530	180	C60R18CO	234	E711		HX18	105	S116		399		
1816		508	A553	76	C60R18P	225	E712		K520	K	S121		408		
1900		509	A720	143	C60R41	236	E721		K521		S129		409		
1985		291	A730	189	C60R41C	238	E764		L10	L	S134		410		
1994		367	A900	78	C610	434	E765				S135		411		
209	2	177	A901	78	C611	434	E766				S136		412		
2010		378	A920	69	C612	435	E767				S137		413		
2025		384	A921	69	C613	436	E768								
209CO		187	A940	81	C614	437	E769								
229CSET		373	A941	81	C615	438	E770								
2325M		385	A951	185	C617	443	E771								
2710M		381	A952	185	C618	444	E805								
			A976	84	C8R56	241	E806								

2020 VISION: CLARITY IN BRAND ALIGNMENT



We acknowledge a unified appearance of our product logos will show that Dormer Pramet manufactures all our product brands – Precision Twist Drill, Dormer, Union Butterfield and Pramet.

In 2020, we are educating on the evolution of the Precision Twist Drill and Union Butterfield logos. Beginning in 2021, these logos will adopt the chip - our unifying symbol across the company and product brands that communicates our promise of quality manufacturing, products and logistics.

The Union Butterfield and Precision Twist Drill brands are pioneer brands for the North American marketplace. Since launching in 1885 and 1952, respectively, they represent a legacy of local support and quality tooling. Adding the chip to these logos aligns all brands visually and confirms to customers that when they add any of our tools to their shop, they add our entire team, including quality production facilities, reliable delivery and nationwide support.

WORKPIECE MATERIAL GROUPS (WMG)

Available on our website www.dormerpramet.com or by downloading our NEW Machining Calculator App.

What is WMG?

Previous to 2019, we classified our tools according to WMG for indexable tools and AMG for round tools. We have begun to unify our technical data formats to only use WMG.

Workpiece material groups (“WMG”) are used to support easy and reliable selection of the right cutting tool and starting values for machining conditions in particular applications.

Dormer Pramet classifies workpiece materials into six different colored groups;

- **Blue:** Steel and cast steel (P-group)
- **Yellow:** Stainless steel (M-group)
- **Red:** Cast iron (K-group)
- **Green:** Non-ferrous metals (N-group)
- **Orange:** High-temperature alloys (S-group)
- **Grey:** Hardened materials (H-group)

Each of these are divided into subgroups based on their structure and/or composition. For example, P-group steel and cast steel is split into four subgroups, namely;

- P1 – **Free machining steel**
- P2 – **Plain carbon steel**
- P3 – **Alloy steel**
- P4 – **Tool steel**

A final division includes material properties, such as hardness and ultimate tensile strength. This is to provide our customers with a complete tool recommendation, including starting values for cutting speed and feed.

Speeds and feeds in the separate high performance catalogs are provided according to our new WMG groupings. The data in this catalog is still utilizing our traditional AMG groupings.

Table of Contents

005 - 008



Table of Contents

009 - 242



Drills

243 - 373



Taps

374 - 389



Dies

390 - 444



End Mills

445 - 480



Reamers

481 - 506



Countersinks/
Counterbores

507 - 511



Miscellaneous

512 - 576



Technical

577 - 646

Speed/Feed Info
EDP # Index

TABLE OF CONTENTS - DRILLS

Application Products

Hydra Replaceable Head

Heads	21
1.5 X D Bodies	30
3 X D Bodies	33
5 X D Bodies	36
8 X D Bodies	39
12 X D Bodies	42
Screws & Screw Drivers	44

Screw Machine Length (Stub)/Short Length

CDX Carbide	45
Force X Carbide	47
Force M Carbide	51
ADX HSS	66
PFX Cobalt Parabolic Flute	69

Jobber Length/Standard Length

CDX Carbide	54
Force X Carbide	56
Force M Carbide	60
ADX Solid Design	73
ADX Coolant Thru	76
PFX Cobalt Parabolic Flute	78

8xD Length

Force X Carbide	63

Taper Length

PFX Cobalt Parabolic Flute	81

Extra Length

PFX Cobalt Parabolic Flute	84

General Purpose

Jobber Length

HSS	
General Purpose	87
TiN Tipped	91
Left Hand	102
HX Heavy Duty, 135° Split Point	105
Aircraft Type A, 118° Split Point	108
Aircraft Type B, 135° Split Point	111
Quick Spiral	114
Parabolic Flute	119
Cobalt	
NAS Type J, 135° Split Point	123
NAS Type D, 135° Split Point	128
Sets	224

Screw Machine Length (Stub)

HSS	
General Purpose	130
TiN Tipped	133
NAS Type C, 135° Split Point	136
Parabolic Flute	141

Cobalt	
Micro	143
Heavy Duty, 135° Split Point	144
Sets	236

Taper Length

HSS	
General Purpose	148
High Helix	154
Parabolic	155

Cobalt	
Heavy Duty	158
Sets	240

Extra Length

HSS	
Overall Length - 8"	160
Overall Length - 12"	160
Overall Length - 10"	162
Overall Length - 15"	162
Parabolic	167

Aircraft Extension

HSS,	
Type A, Overall Length - 6"	169
Type B, Overall Length - 6"	169
Type B, Overall Length - 12"	173
Cobalt, Type J	
Overall Length - 6"	175
Overall Length - 12"	175

Taper Shank

HSS, General Purpose	
Regular	177
TiN coated	180
Small Taper	177
Long Series	180
Extra length	183
4-Flute Core Drill	191
Cobalt, Heavy Duty	187

Reduced Shank

HSS	
1/2" Shank	193
1/2" Shank with tri-flats	196
3/4" Shank	198
Cobalt	
1/2" Shank	199
Sets	241

Special Purpose Drills

Carbide Tipped	200
Combined Drill & Countersink	212
Threaded Shank	215
Tapered Aircraft Router	223

Solid Carbide

General Purpose	203
Spotting Drill	207
Combined Drill & Countersink	211

Sets

Jobber Length	224
Screw Machine Length	236
Taper Length	240
Reduced Shank	241

TABLE OF CONTENTS - TAPS

Application Products

Spiral Point Taps

Multi-Application	
Fractional/Machine Screw	261, 279
Internal Coolant - Inch	279
Metric	266, 284
Internal Coolant - Metric	284

Hard Materials

DDX - High Hook	291

Straight Flute Taps

For cast iron	259, 290

Spiral Flute Taps

Multi-Application	
Fractional/Machine Screw	270, 292
Internal Coolant - Inch	292
Metric	275
Internal Coolant, Metric	296

Thread Forming Taps

Fractional/Machine Screw	301, 303
Metric	302, 305

Pipe Taps

Straight Flute	306
Spiral Flute	308

General Purpose

Hand Taps (Straight Flute)

Fractional/Machine Screw	
Steam Tempered	313
Bright/Gold	310, 320
TiN Coated	314
Metric	315
8-Pitch	325
Left Hand	319, 323
Oversize	324
Optional Flute	321
For Cast Iron	326

Spiral Point Taps

Relieved Style	
Fractional/Machine Screw	329
Metric	333
Non-Relieved Style	
Fractional/Machine Screw	334
Metric	337
Oversize - Relieved Style	
Fractional/Machine Screw	339
Extension - Non-Relieved Style	
Fractional/Machine Screw	337

Spiral Flute Taps

30° Regular Spiral	
Fractional/Machine Screw	340
52° High Spiral	
Fractional/Machine Screw	341
Metric	343
40° Spiral - Heavy Duty	
Fractional/Machine Screw	342

Thread Forming Taps

Rol-Rite, Spiral Lobe	
Fractional/Machine Screw	344
Metric	345
Rol-Form, Lube Grooves	
Fractional/Machine Screw	346
Metric	347
Extension Rol-Form	
Fractional/ Machine Screw	348

Pipe Taps

NPT	
Medium Hook	349
High Hook	353
Low Rake	352
Spiral Flute	354
Interrupted Thread	355
NPTF (Dryseal)	
Medium Hook	357, 360
Spiral Flute	358
Interrupted Thread	359
NPS	
Straight Pipe	361
NPSF	
Straight Pipe, Dryseal	361
Rc (British Standard)	362
G (British Standard)	363

Special Purpose Taps

STI (Screw Thread Insert)	364
Pulley Style	366
Combination Drill & Tap	368

Miscellaneous

Tap Wrench	371
Drill & Tap Sets	373

TABLE OF CONTENTS - DIES

Round Adjustable, Split Type		Hex Rethreading Bolt Dies (Dienuts)	
Carbon Steel (NPT)	378	Carbon Steel(UNC,UNF,UNS,NPT,M)	384
HSS (BSP)	382	HSS (M, MF)	386
Gun Nosed Dies		Die Stocks	388
HSS, Left Hand (M)	383		

TABLE OF CONTENTS - END MILLS

General Purpose

Solid Carbide, Center Cutting

2-Flute

Square End, Single End	
Regular	400
Long	402
Extra-Long	403
Square End, Double End	
Regular	399
Ball Nose	
Regular	404
Long	406
Extra-Long	407

3-Flute

Square End, Single End	
Regular	408

4-Flute

Square End, Single End	
Regular	410
Long	412
Extra-Long	413
Square End, Double End	
Regular	409
Ball Nose	
Regular	414
Long	416
Extra-Long	417
Unequal Helix	418

5-Flute

Unequal Helix	419

HSS and Cobalt Finishing End Mills

2-Flute

Square End, Single End	
Stub Length	420
Regular	423
Regular, Keyway	424
Square End, Double End	
Regular	422
Ball Nose	
Regular	428
High Helix for Aluminum, Square End, Single End	
Regular	429
Long	430

3-Flute

Square End, Single End	
Regular	431
Long	432

4-Flute

Square End, Single End	
Regular	433
Square End, Double End	
Regular	437

Multi-Flute

Square End, Single End	
Regular	439
Long	441

Cobalt Roughing End Mills

Coarse Profile

Regular Length	
Bright	434
TiCN	434
Long Length	
Bright	436

TABLE OF CONTENTS - REAMERS

Application Products

Carbide Reamer

Machine Reamer, Unequal Spacing	449
Machine Reamer, Carbide Tip	451

High Precision, Centesimal	453

Cobalt Reamer

High Precision, Centesimal	455

General Purpose

High Speed Steel & Cobalt Reamers

Straight Shank

Chucking, Straight Flute	458
Chucking, Spiral Flute	462
Car	465

Taper Shank

Machine, Left Hand	467
Bridge	469

Taper Pin, Right Hand Cut

Straight Flute	474
Spiral Flute, Left Hand	475
High Spiral Flute, Left Hand	466
Hand Reamer, Straight Flute	479

Adjustable Hand Reamer	472

Taper Pipe	484

Hand	471

Center Reamer	480

TABLE OF CONTENTS - COUNTERSINKS & COUNTERBORES

Countersink

60°

Single Flute	487
3-Flute, Taper Shank	489
4-Flute	488

82°

Single Flute	487
3-Flute	490
4-Flute	488

90°

Single Flute	487,491
Carbide 3-Flute	486
HSS 3-Flute	492
HSCO 3-Flute	494
Long Reach 3-Flute	496
Multi-Flute	497
Taper Shank 3-Flute	498
Set 3-Flute	500

100°

3-Flute	495

Counterbore

Straight Shank, Interchangeable Pilot Type

Short	501

Aircraft Series

Short	502
Long	502

Taper Shank, Interchangeable Pilot Type

Short	504

Pilots, Detachable	505

TABLE OF CONTENTS - MISCELLANEOUS

MISCELLANEOUS

Screw Extractor	508

Drilling & Tapping Fluid	509

Drill Sleeves	510

Tool Bit Blanks	511

HYDRA DRILL

How to Use This Chart:

- 1) Determine your Workpiece Material from the Application Material Groups (AMG) below.
- 2) Use the icons to find Product Features.
- 3) Find the Surface Feet Per Minute (SFM) and Alpha Code.
example: 361 W
361 = SFM
W = Alpha Code used to find your Feed Rate (IPR)
- 4) To find Cutting Feed Rate, find your Alpha Code on the AMG Chart
(example: 279 U : U is the Alpha Code)
- 5) Find the closest diameter for your cutting application on the Feed Rate chart below to find your IPR

	Ø						
	1/2"	19/32"	5/8"	3/4"	1"	1.3/16"	1.1/2"
S	0.004	0.005	0.005	0.006	0.007	0.007	0.009
T	0.005	0.006	0.007	0.007	0.008	0.009	0.010
U	0.008	0.009	0.009	0.009	0.011	0.012	0.014
V	0.011	0.012	0.013	0.013	0.016	0.017	0.020
W	0.015	0.016	0.017	0.018	0.019	0.019	0.020

Application Material Groups (AMG)			Hardness HRC
1. Steel	1.1 Magnetic soft steel	12L14, 12L15	<120 HB
	1.2 Structural Steel/ case carburising steel	1005-1025, 1214, 1215, A36	<200 HB
	1.3 Plain Carbon steel	1030-1060, 1050-1060, 1144-1146	<24
	1.4 Alloy steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	<24
	1.5 Alloy steel/ Hardened and tempered steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	>24<38
	1.6 Alloy steel/ Hardened and tempered steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	>38
	1.7 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	49-55
	1.8 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	55-63
2. Stainless Steel	2.1 Free machining Stainless Steel	200, 303, 416, 420F, 430F, 440	<24
	2.2 Austenitic	301, 302, 304, 316, 321, 330, CUSTOM 455, AM-350	<24
	2.3 Ferritic + Austenitic, Martensitic	318-329, 400-446, DUPLEX	<32
	2.4 Precipitation Hardened	15-5PH, Custom 450 17-4PH	<32
3. Cast Iron	3.1 Lamellar graphite	Grey, G10, Gg40, J431C, A48 CLASS 20	<150 HB
	3.2 Lamellar graphite	Grey, GG25-Gg40, J158, A48 CLASS 40-60	>150 HB<32
	3.3 Nodular graphite/ Malleable Cast Iron	A220, A436, A439, A602, Black, GGG40-GGG70	<200 HB
	3.4 Nodular graphite/ Malleable Cast Iron	Black Gts/Gtw, J434C	>200 HB<32
4. Titanium	4.1 Titanium, unalloyed	Commercially Pure	<200 HB
	4.2 Titanium, alloyed	6Al4V, 6Al4V-2Sn, Monel, Monel K	<28
	4.3 Titanium, alloyed	6Al4V-4Mo, 7Al4V-4Mo, 4911-4967	>28<38
5. Nickel	5.1 Nickel, unalloyed	Commercially Pure, 17644, 200, 5553	<150 HB
	5.2 Nickel, alloyed	Monel 400, Hastelloy C, Inconel 625, Waspaloy	<28
	5.3 Nickel, alloyed	Inconel 718, Nimonic 75-95, Rene 41, Inconel 825, A286	>28<38
6. Copper	6.1 Copper	Commercially Pure	<100 HB
	6.2 β-Brass, Bronze	314-340, 350-370	<200 HB
	6.3 α-Brass	Alloyed Cu + Al + Fe, Long Chipping	<200 HB
	6.4 High Strength Bronze	Ampco 18-25	<49
7. Aluminium Magnesium	7.1 Al, Mg, unalloyed	Commercially Pure	<100 HB
	7.2 Al alloyed, Si<0.5%	6061 T6, 7075, 314-340	<150 HB
	7.3 Al alloyed, Si>0.5%<10%	6061 T6, 380-390	<120 HB
	7.4 Al alloyed, Si>10% Mg alloys	Magnesium Whisker Reinforced	<120 HB
8. Synthetic Materials	8.1 Thermoplastics	Ultrad, Polystrol	---
	8.2 Thermosetting plastics	Bakelit, Pertinax	---
	8.3 Reinforced plastic materials	CFK, GFKAFK	---
9. Hard Mat.	9.1 Cermets (Metal-ceramics)	Ferrotic	<54
10. Graphite	10.1 Standard graphite		---

Visual Index - Drills

Head Style:	R950					R960					R970						
																	
																	
Head Range:	15/32 - 42.00	15/32 - 42.00	15/32 - 42.00	13.5 - 42.00	15/32 - 42.00	15/32 - 30.50	15/32 - 30.50	15/32 - 30.50	15/32 - 30.50	15/32 - 30.50	15/32 - 42.00	15/32 - 42.00	15/32 - 42.00	15/32 - 42.00	15/32 - 42.00		
Body Style:	H851	H853	H855	H858	H8512	H851	H853	H855	H858	H8512	H851	H853	H855	H858	H8512		
																	
Tool Material:	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS		
Standard:																	
Depth of Cut:	1.5XD	3XD	5XD	8XD	12XD	1.5XD	3XD	5XD	8XD	12XD	1.5XD	3XD	5XD	8XD	12XD		
Finish/Coating:																	
Shank:	 	 	 	 	 	 	 	 	 	 	 	 	 	 	 		
Direction of Cut:																	
Coolant:																	
Range:	15/32 - 30.50	15/32 - 42.00	15/32 - 42.00	13.5 - 42.00	13.5 - 1.1/64	15/32 - 30.50	15/32 - 42.00	15/32 - 42.00	13.5 - 42.00	13.5 - 1.1/64	15/32 - 30.50	15/32 - 42.00	15/32 - 42.00	13.5 - 42.00	13.5 - 1.1/64		
	Page #	21,30	21,33	21,36	21,39	21,42	24,30	24,33	24,36	24,39	24,42	27,30	27,33	27,36	27,39	27,42	ISO
1.1							397W	361W	361V	328U	289U	397W	361W	361V	328U	289U	P 1
1.2							361W	328W	328V	295U	262U	361W	328W	328V	295U	262U	P 1
1.3	361W	328W	328V	295U	262U												P 2
1.4	307W	279W	279V	246U	223U												P 3
1.5	307W	279W	279V	246U	223U												P 4
1.6	217T	197T	197T	197S	158S												H 1
1.7																	H 3
1.8																	H 4
2.1							217V	197V	164V	148U	157U						M 1
2.2							180T	164T	164S	131S	131S						M 3
2.3							144T	131T	131S	115S	92S						M 2
2.4	127T	115T	115T	98S	92S												S 2
3.1							433V	394V	374V	346U	315U	433V	394V	374V	346U	315U	K 1
3.2							418V	380V	354V	328U	304U	418V	380V	354V	328U	304U	K 2
3.3	318U	289U	279V	262U	231U							318U	289U	279V	262U	231U	K 3
3.4	318U	289U	279V	262U	231U							318U	289U	279V	262U	231U	K 4
4.1							163T	148T	148T	115S	118S						S 1
4.2							127T	115T	115T	98S	92S						S 2
4.3							108S	98S	98S	82S	78S						S 3
5.1							127T	115T	115T	98S	92S						S 1
5.2							108S	98S	98S	82S	78S						S 2
5.3							90S	82S	82S	66S	66S						S 3
6.1																	N 3
6.2																	N 4
6.3																	N 3
6.4																	N 4
7.1																	N 1
7.2																	N 1
7.3																	N 1
7.4																	N 2
8.1																	O
8.2																	O
8.3																	O
9.1																	H
10.1																	O

Visual Index - Drills

Feed Rate Chart - Drills

Alpha Code	Feed in Inches per Revolution (IPR) ± 25%												Ø Diameter					
	1mm/ 1/32"	2mm/ 3/32"	3mm/ 1/8"	4mm/ 5/32"	5mm/ 3/16"	6mm/ 1/4"	8mm/ 5/16"	10mm/ 3/8"	12mm/ 1/2"	15mm/ 9/16"	16mm/ 5/8"	20mm/ 3/4"	25mm/ 1"	30mm/ 1.1/8"	40mm/ 1.5/8"	50mm/ 2"		
A	0.0004	0.0009	0.0011	0.0013	0.0014	0.0017	0.0021	0.0024	0.0027	0.0032	0.0034	0.0043	0.0049	0.0053	0.0061	0.0069		
B	0.0006	0.0011	0.0015	0.0016	0.0018	0.0021	0.0026	0.0031	0.0035	0.0041	0.0043	0.0053	0.0060	0.0065	0.0074	0.0082		
C	0.0006	0.0013	0.0017	0.0020	0.0022	0.0025	0.0031	0.0039	0.0043	0.0049	0.0051	0.0063	0.0071	0.0077	0.0087	0.0094		
D	0.0006	0.0015	0.0021	0.0024	0.0027	0.0031	0.0039	0.0047	0.0051	0.0059	0.0061	0.0074	0.0083	0.0090	0.0100	0.0108		
E	0.0007	0.0017	0.0024	0.0028	0.0031	0.0037	0.0045	0.0055	0.0059	0.0068	0.0071	0.0085	0.0094	0.0102	0.0112	0.0122		
F	0.0007	0.0020	0.0029	0.0033	0.0037	0.0043	0.0054	0.0065	0.0070	0.0080	0.0083	0.0098	0.0108	0.0116	0.0126	0.0135		
G	0.0007	0.0022	0.0033	0.0038	0.0043	0.0050	0.0063	0.0075	0.0081	0.0091	0.0094	0.0110	0.0122	0.0130	0.0140	0.0148		
H	0.0008	0.0026	0.0040	0.0046	0.0051	0.0059	0.0075	0.0090	0.0096	0.0107	0.0110	0.0126	0.0140	0.0148	0.0157	0.0165		
I	0.0008	0.0030	0.0047	0.0053	0.0059	0.0068	0.0087	0.0104	0.0110	0.0122	0.0126	0.0142	0.0157	0.0165	0.0173	0.0181		
J	0.0009	0.0033	0.0053	0.0060	0.0067	0.0078	0.0098	0.0117	0.0124	0.0137	0.0142	0.0159	0.0175	0.0183	0.0191	0.0198		
K	0.0010	0.0036	0.0059	0.0067	0.0075	0.0087	0.0110	0.0130	0.0138	0.0153	0.0157	0.0177	0.0193	0.0201	0.0209	0.0215		
L	0.0011	0.0040	0.0065	0.0073	0.0082	0.0094	0.0120	0.0142	0.0152	0.0165	0.0169	0.0191	0.0207	0.0215	0.0224	0.0231		
M	0.0012	0.0043	0.0071	0.0080	0.0089	0.0102	0.0130	0.0154	0.0165	0.0177	0.0181	0.0205	0.0220	0.0228	0.0238	0.0248		
N	0.0013	0.0047	0.0077	0.0086	0.0095	0.0110	0.0140	0.0165	0.0179	0.0189	0.0193	0.0219	0.0234	0.0242	0.0253	0.0265		
S	0.0003	0.0006	0.0008	0.0010	0.0012	0.0015	0.0020	0.0031	0.0039	0.0048	0.0051	0.0059	0.0070	0.0070	0.0090			
T	0.0006	0.0011	0.0016	0.0020	0.0024	0.0028	0.0035	0.0043	0.0051	0.0063	0.0067	0.0075	0.0080	0.0090	0.0100			
U	0.0010	0.0019	0.0028	0.0031	0.0035	0.0042	0.0055	0.0067	0.0079	0.0088	0.0091	0.0094	0.0110	0.0120	0.0140			
V	0.0015	0.0027	0.0039	0.0045	0.0051	0.0060	0.0079	0.0098	0.0110	0.0122	0.0126	0.0134	0.0160	0.0170	0.0200			
W	0.0019	0.0035	0.0051	0.0059	0.0067	0.0079	0.0102	0.0130	0.0150	0.0165	0.0169	0.0177	0.0190	0.0190	0.0200			
X	0.0022	0.0041	0.0059	0.0071	0.0083	0.0098	0.0130	0.0165	0.0189	0.0210	0.0217	0.0228						
Y	0.0027	0.0049	0.0071	0.0087	0.0102	0.0125	0.0169	0.0217	0.0276	0.0276	0.0276	0.0291						
Z	0.0037	0.0068	0.0098	0.0128	0.0157	0.0210	0.0315	0.0394	0.0433	0.0463	0.0472	0.0472						

How to Use This Chart:

- 1) Determine your Workpiece Material from the Application Material Groups (AMG) below.
- 2) Use the icons to find Product Features.
- 3) Find the Surface Feet Per Minute (SFM) and Alpha Code.
example: 361 W
361 = SFM
W = Alpha Code used to find your Feed Rate (IPR)
- 4) To find Cutting Feed Rate, find your Alpha Code on the AMG Chart (example: 279 U : U is the Alpha Code)
- 5) Find the closest diameter for your cutting application on the Feed Rate chart to find your IPR

Application Material Groups (AMG)			Hardness HRC	ISO
1. Steel	1.1 Magnetic soft steel	12L14, 12L15	<120 HB	P 1
	1.2 Structural Steel/ case carburising steel	1005-1025, 1214, 1215, A36	<200 HB	P 1
	1.3 Plain Carbon steel	1030-1060, 1050-1060, 1144-1146	<24	P 2
	1.4 Alloy steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	<24	P 3
	1.5 Alloy steel/ Hardened and tempered steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	>24<38	P 4
	1.6 Alloy steel/ Hardened and tempered steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	>38	H 1
	1.7 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	49-55	H 3
	1.8 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	55-63	H 4
2. Stainless Steel	2.1 Free machining Stainless Steel	200, 303, 416, 420F, 430F, 440	<24	M 1
	2.2 Austenitic	301, 302, 304, 316, 321, 330, CUSTOM 455, AM-350	<24	M 3
	2.3 Ferritic + Austenitic, Martensitic	318-329, 400-446, DUPLEX	<32	M 2
	2.4 Precipitation Hardened	15-5PH, Custom 450 17-4PH	<32	S 2
3. Cast Iron	3.1 Lamellar graphite	Grey, G10, Gg40, J431C, A48 CLASS 20	<150 HB	K 1
	3.2 Lamellar graphite	Grey, GG25-Gg40, J158, A48 CLASS 40-60	>150 HB<32	K 2
	3.3 Nodular graphite/ Malleable Cast Iron	A220, A436, A439, A602, Black, GGG40-GGG70	<200 HB	K 3
	3.4 Nodular graphite/ Malleable Cast Iron	Black Gts/Gtw, J434C	>200 HB<32	K 4
4. Titanium	4.1 Titanium, unalloyed	Commercially Pure	<200 HB	S 1
	4.2 Titanium, alloyed	6Al4V, 6Al4V-2Sn, Monel, Monel K	<28	S 2
	4.3 Titanium, alloyed	6Al4V-4Mo, 7Al4V-4Mo, 4911-4967	>28<38	S 3
5. Nickel	5.1 Nickel, unalloyed	Commercially Pure, 17644, 200, 5553	<150 HB	S 1
	5.2 Nickel, alloyed	Monel 400, Hastelloy C, Inconel 625, Waspaloy	<28	S 2
	5.3 Nickel, alloyed	Inconel 718, Nimonic 75-95, Rene 41, Inconel 825, A286	>28<38	S 3
6. Copper	6.1 Copper	Commercially Pure	<100 HB	N 3
	6.2 β-Brass, Bronze	314-340, 350-370	<200 HB	N 4
	6.3 α-Brass	Alloyed Cu + Al + Fe, Long Chipping	<200 HB	N 3
	6.4 High Strength Bronze	Ampco 18-25	<49	N 4
7. Aluminium Magnesium	7.1 Al, Mg, unalloyed	Commercially Pure	<100 HB	N 1
	7.2 Al alloyed, Si<0.5%	6061 T6, 7075, 314-340	<150 HB	N 1
	7.3 Al alloyed, Si>0.5%<10%	6061 T6, 380-390	<120 HB	N 1
	7.4 Al alloyed, Si>10% Mg alloys	Magnesium Whisker Reinforced	<120 HB	N 2
8. Synthetic Materials	8.1 Thermoplastics	Ultramid, Polystrol	---	O
	8.2 Thermosetting plastics	Bakelit, Pertinax	---	O
	8.3 Reinforced plastic materials	CFK, GFKAFK	---	O
9. Hard Mat.	9.1 Ceramets (Metal-ceramics)	Ferrotic	<54	H
10. Graphite	10.1 Standard graphite		---	O

Visual Index - Drills

Tool Material:	HM	HM	HM	HM	HM	HM	HM	HM	HM	HSS	HSS-E	HSS-E	HSS	HSS-E	HSS-E
Standard:	DIN 6539	DIN 6537 K	DIN 6537 K	DIN 6537 K	DIN 338	DIN 6537 L	DIN 6537 L	DIN 6537 L	DORMER	DIN 1897	DIN ANSI	DIN ANSI	DIN 338	DORMER	DIN ANSI
Depth of Cut:	2.5XD	3XD	3XD	3XD	4XD	5XD	5XD	5XD	8XD	2.5XD	3XD	3XD	4XD	5XD	6XD
Point Style:	130°	140°	140°	140°	130°	140°	140°	140°	140°	130°	130°	130°	130°	130°	130°
Finish/Coating:	TiN	TiAlN	TiAlN	TiAlN	TiN	TiAlN	TiAlN	TiAlN	TiAlN	TiN		Alcona Top	TiN	TiAlN Top	
Shank:		DIN 6535HA	DIN 6535HA	DIN 6535HA		DIN 6535HA	DIN 6535HA	DIN 6535HA	DIN 6535HA					DIN 6535HA	
Flute Form:	N	CFW	CFW	CFW	N	CFW	CFW	CFW	CFW		W	W			W
Direction of Cut:															
Coolant Through:															
															
Style:	R520	R458	R457	R467	R510	R454	R453	R463	R459	A520	A920	A921	A510	A553	A900
Range:	3.00 - 16.50	3.00 - 20.00	3.00 - 20.00	3.00 - 16.00	3.00 - 14.25	3.00 - 20.00	3.00 - 20.00	3.00 - 16.00	3.00 - 16.00	3.00 - 13.00	1.00 - 20.00	2.50 - 16.00	3.00 - 14.00	5.00 - 20.00	1.00 - 20.00
Page #	45	47	47	51	54	56	56	60	63	66	69	69	73	76	78
1.1	328X	510W	510W		328W	510V	510V		443V	187M	131J	197M	187M	279L	125H
1.2	295X	440W	460W		295W	440V	460V		394V	154M	112J	171M	154M	230L	108H
1.3	295X	360W	440W		295W	360V	440V		361U	131K	105I	174J	131K	197L	85H
1.4	262X	330V	375V		262W	330V	375V		328U	105I	105I	174J	98H	148H	85H
1.5	180X	245V	295V		180V	245V	295V		262U	69G	75E	125G	69F	92F	69E
1.6	148W	164U	213U		148V	164U	213U		180T	36E	62E	98G	36D	49D	52E
1.7	115U	98U	98U		115T	98U	98U								
1.8	98T	82U	82U		98S	82U	82U								
2.1	164W	148U	246V	279G	164V	148U	246V	279G	246V	98I	49F	56F	92G	131G	49E
2.2		131T	115V	246G		131T	115V	246G	115V	52I	23F	30F	46I	62I	23E
2.3		115T	98U	197F		115T	98U	197F	98U	66G	30D	36D	62G	89G	30C
2.4		115T				115T									
3.1	295Y	295W	394W		295X	295W	394W		394W	157M	112L	174L	138K	230K	79J
3.2	295Y	295W	394W		295X	295W	394W		394W	121K	85L	138L	105J	164J	62J
3.3	213X	230V	262V		213W	230V	262V		262V	98J	85L	138L	92J	148J	62J
3.4	213X	230V	262V		213W	230V	262V		262V	85F	62J	118J	82F	138F	46I
4.1	197W	164U	180V	180V	148V	164U	180V	180V		112I	98G	157I	105G	148G	72E
4.2	148V	131U	148V	148V		131U	148V	148V		66G	59G	95I	66H	98E	49E
4.3	115U	115T	131U	131U		115T	131U	131U		13B	33C	52E	13B	26C	20C
5.1	164W			180U	164V			180U		56I	49I	79L	56I	82I	46G
5.2				148U				148U		36G	30G	46I	30E	49E	23G
5.3				131U				131U		23E	20E	33G	20E	33G	20C
6.1		328V	410W			328V	410W		410V	131E	213H		131D	230G	213G
6.2		656V	722W			656V	722W		722V	164I	216J		164I	279I	174I
6.3		656V	722W			656V	722W		722V	148K	131J	233J	148I	262I	112H
6.4		262U	328V			262U	328V		328U	66F	102G	164I	66F	115G	98G
7.1	738Z	738W	820W		738Y	738W	820W		935W	180I	246L		164G	230H	197J
7.2	738Z	738W	820W		738Y	738W	820W		935W	164M	148N		164M	328M	148N
7.3	492Y	590V	656V		492X	590V	656V		623V	121K	131N		102I	180I	131N
7.4	213Y	394V	492V		213X	394V	492V		312V	115I	118J	157J	108I	180J	92I
8.1	246Z				246X					213G	180J		213G	295G	180I
8.2	377V				377V					164G	131H		164G		131G
8.3										115F			115F		
9.1															
10.1															

Visual Index - Drills

	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS
	DIN ANSI	DIN ANSI	DIN ANSI	DIN 1869/1	DIN 1869/2	DIN 1869/3	ANSI	ANSI	ANSI	ANSI	DIN 338	DIN 338	DIN 338	DIN 338	DIN 338	ANSI
	6XD	10XD	10XD	15XD	20XD	25XD	4XD	4XD	4XD	4XD	4XD	4XD	4XD	4XD	4XD	4XD
	130°	130°	130°	130°	130°	130°	118°	118°	118°	118°	118°	118°	118°	118°	118°	118°
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																
																

Visual Index - Drills

	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS-E	HSS-E	HSS-E	HSS
	DIN 338	ANSI	NAS 907	NAS 907	ANSI	DIN 338	ANSI	ANSI	DIN 338	DIN 338	NAS 907	DIN 338	NAS 907	ANSI
	4XD	4XD	4XD	4XD	4XD	4XD	4XD	4XD	4XD	4XD	4XD	4XD	3XD	2.5XD
	118°	135°	118°	135°	118°	135°	135°	135°	135°	135°	135°	135°	135°	118°
	ST	Purple Bronze	ST	ST		ST		TiN		TiN	Bronze	Bronze	Bronze	
	N				W	W						N		
						</								

Visual Index - Drills

	HSS	HSS	HSS	HSS	HSS	HSS-E	HSS-E	HSS-E	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS-E
	DIN ANSI	ANSI	DIN 1897	ANSI	ANSI	DIN 1899	ANSI	DIN 1897	ANSI	DIN 340	ANSI	ANSI	ANSI	DIN 340	DIN 340	ANSI
	2.5XD	2.5XD	2.5XD	3XD	3XD	2.5XD	2.5XD	2.5XD	6XD	6XD	6XD	6XD	6XD	6XD	6XD	6XD
	135°	135°	135°	135°	135°	118°	135°	135°	118°	118°	118°	135°	135°	135°	135°	135°
	TiN	ST	ST		TiN		Bronze	Bronze					TiN		TiN	Bronze
	N		N			N		N		N	W					

Visual Index - Drills

	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS-E	HSS-E	HSS	HSS	HSS	HSS	HSS	HSS	
	ANSI	ANSI	BS 328	ANSI	NAS 907	NAS 907	NAS 907	NAS 907	NAS 907	NAS 907	ANSI	DIN 345	DIN 345	DIN 341	DIN 1870/1	DIN 1870/1	
	12XD	15XD	10XD	10XD	4XD	4XD	4XD	4XD	4XD	4XD	4XD	4XD	4XD	4XD	6XD	10XD	15XD
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	
																	

Visual Index - Drills

	HSS	HSS-E	HSS-E	HSS	HSS	HSS	HSS	HSS	HSS-E	HSS HM	HSS HM	HM	HM	HM	HSS	HSS
	DIN 1870/2	ANSI	DIN 345	ANSI	DORMER	ANSI	ANSI	ANSI	ANSI	ANSI	DIN 338	ANSI		ANSI	ANSI	ANSI
	20XD	4XD	4XD	5XD	4XD	4XD	4XD	1.5XD	4XD	4XD	4XD	3XD	3XD	1XD	1XD	1XD
	130°	135°	118°		118°	118°	118°	118°	118°	118°	118°	118°	118°	90°	90°	90°
	ST	Bronze	Bronze	ST	ST	ST	ST	ST	ST Bronze		ST					TiN
	W		N		N						N					
	A952	209CO	A730	T400	A170	R56	R57	R58	R56CO	D444	A160	D33F D33W D33L	D33M	DS-90 DS-120 DS-142	SPS-90	SPSG-90
	8.00 - 40.00	1/4 - 1.1/2	10.00 - 32.00	1/2 - 1.5/8	13.00 - 1.1/2	33/64 - 1.1/2	33/64 - 1.1/2	1" - 2"	33/64 - 1"	N32 - 1/2	4.00 - 16.00	N68 - 1/2	1.00 - 12.00	1/8 - 1/2	1/4 - 1"	1/4 - 1"
	185	187	189	191	192	194	196	198	199	200	202	203	206	207	208	208
1.1	89G	115J	115J	75E	115H	115H	115H	98F	115H	197E	197E	279S	279S	279S	115E	115E
1.2	72G	98H	98H	46F	98H	98H	98H	59F	98H	197E	197E	246S	246S	246S	98E	98E
1.3	62E	89G	89G	49F	82F	82F	82F	66H	82F	180D	180D	246S	246S	246S	89C	89C
1.4	49D	75F	75F	49D	66E	66E	66E	59F	66E	164D	164D	230S	230S	230S	69C	69C
1.5	26C	56E	56E	36D	43D	43D	43D	46D	43D	131C	131C	148S	148S	148S	46C	46C
1.6	20B	33D	33D		30C	30C	30C		30C	121A	121A	148S	148S	148S	33B	33B
1.7												98S	98S	98S		
1.8												98S	98S	98S		
2.1	39C	79E	79E	66F	49D	49D	49D	89H	49D	131B	131B	98S	98S	174S	52C	52C
2.2	20E	36G	36G	39D	23F	23F	23F	49F	23F	115C	115C			148S	30D	30D
2.3	39A	56C	56C	39D	23B	23B	23B	49D	23B	115A	115A				33B	33B
2.4																
3.1	72G	115J	115J	108E	89H	89H	89H	151H	89H	164C	164C	246T	246T	246T	105E	105E
3.2	52D	92G	92G	59H	72E	72E	72E	79H	72E	131A	131A	246T	246T	246T	89C	89C
3.3	43C	72E	72E	59F	62D	62D	62D	79F	62D	115A	115A	180T	180T	180T	66C	66C
3.4	30C	56E	56E		39D	39D	39D		39D	98A	98A	180T	180T	180T	52B	52B
4.1	59D	92G	92G	69F	56E	56E	56E	89H	56E	115A	115A				148T	89C
4.2	33B	66D	66D	36D	30C	30C	30C	49F	30C	115A	115A				115T	39B
4.3	20A	36C	36C		16A	16A	16A		16A	82A	82A				82S	23A
5.1	23E	49G	49G	49D	26F	26F	26F	49F	26F	98A	98A				148T	43D
5.2	16C	23E	23E		13D	13D	13D	23F	13D	82A	82A				98S	26C
5.3	10A	20B	20B		10A	10A	10A	13B	10A	66A	66A				66S	13A
6.1	72D	125L	125L		115F	115F	115F	108F	115F	180D	180D				902V	89D
6.2	108G	131J	131J		108H	108H	108H	115H	108H	230G	230G	820V	820V	820V	108E	108E
6.3	72F	89H	89H		89G	89G	89G	115H	89G	197C	197C	820V	820V	820V	89D	89D
6.4	52D	69F	69F		52F	52F	52F	52F	52F	164C	164C				230T	52D
7.1	98H	108J	108J		108I	108I	108I	85I	108I	164I	164I	656V	656V	656V	108E	108E
7.2	89G	98I	98I		98H	98H	98H	98H	98H	148H	148H	656V	656V	656V	98E	98E
7.3	79F	98H	98H		89G	89G	89G	92H	89G	131G	131G	367V	367V	367V	98D	98D
7.4	72F	89F	89F		72G	72G	72G	75H	72G	115F	115F	197V	197V	197V	82D	82D
8.1	98J	115K	115K		98I	98I	98I	98I	98I			197X	197X	197X	98F	98F
8.2	98H	92J	92J		92G	92G	92G	92I	92G	197E	197E	328V	328V	328V	115E	115E
8.3	33F	66H	66H		46E	46E	46E	46H	46E						56D	56D
9.1	10A	16C	16C		10A	10A	10A	10B	10A	30C	30C				39A	39A
10.1																

Visual Index - Drills

	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HM	HSS	HSS	HSS
	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	BS 328	ANSI
	1XD	1XD	1XD	1XD	1XD	1XD	1XD	1XD	1XD	1XD	1XD	1XD	1XD	1XD
	120°	120°	90°	90°	120°	120°	90°	90°	120°	120°			120°	120°
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														

Visual Index - Drills

									
									
									
									
									
									
									
									
									
	A221	TS41HS TS40HS TS42HS	TS10HS TS15HS TS18HS	TS51HS TS52HS TS55HS	TS41CO TS40CO TS42CO	TS10CO TS15CO TS18CO	TS51CO TS52CO TS55CO	ATR41	Drill Sets
	N00 - N8	N50 - 3/8	N50 - 3/8	N50 - 3/8	N50 - 3/8	N50 - 3/8	N50 - 3/8	Size 1 - 4	
	214	215	215	215	219	219	219	223	224
1.1	115I	115J	115J	115J	125K	125K	125K		
1.2	98I	98J	98J	98J	108H	108H	108H		
1.3	82G	89G	89G	89G	98G	98G	98G	82F	
1.4	66F	69G	69G	69G	89G	89G	89G	66F	
1.5	43E	46F	46F	46F	59F	59F	59F	43E	
1.6	30D	33E	33E	33E	36E	36E	36E	30D	
1.7									
1.8									
2.1	49E	52F	52F	52F	72F	72F	72F	49E	
2.2	26G	30H	30H	30H	36H	36H	36H	26G	
2.3	33C	33D	33D	33D	49D	49D	49D	30C	
2.4									
3.1	98I	105J	105J	105J	112K	112K	112K	98I	
3.2	79F	89G	89G	89G	98F	98F	98F	79F	
3.3	66E	66F	66F	66F	72F	72F	72F	66E	
3.4	46E	52F	52F	52F	56F	56F	56F	46E	
4.1	79F	89G	89G	89G	98G	98G	98G	75F	
4.2	43D	52E	52E	52E	59F	59F	59F	39D	
4.3	23B	26C	26C	26C	33C	33C	33C	20B	
5.1	33G	43H	43H	43H	49H	49H	49H	33G	
5.2	16E	26F	26F	26F	30F	30F	30F	20E	
5.3	13A	13B	13B	13B	20C	20C	20C	10A	
6.1	115G	118H	118H	118H	125I	125I	125I		
6.2	108I	125J	125J	125J	131K	131K	131K		
6.3	89H	89I	89I	89I	89J	89J	89J	89H	
6.4	52G	52H	52H	52H	52I	52I	52I	52G	
7.1	108J	108K	108K	108K	115K	115K	115K		
7.2	98I	98J	98J	98J	108J	108J	108J		
7.3	89H	98I	98I	98I	102I	102I	102I		
7.4	72H	82I	82I	82I	98G	98G	98G	79F	
8.1	98J	98K	98K	98K	115M	115M	115M		
8.2	92H	115I	115I	115I	92K	92K	92K		
8.3	46F	56G	56G	56G	56I	56I	56I		
9.1	10B	13C	13C	13C	20C	20C	20C	10B	
10.1									

List Number Index - Drills



Pgs. 9 - 241

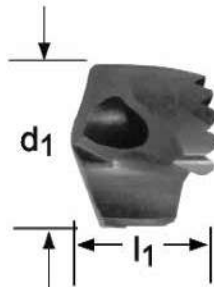
0860.....160	A951.....185	D444.....200	R42C.....136
209.....177	A952.....185	DC.....211	R453.....56
1290.....160	A976.....84	DS-90.....207	R454.....56
1511.....162	A977.....84	DS-120.....207	R457.....47
1813.....162	A978.....84	DS-142.....207	R458.....47
209CO.....187	ATR41.....223	H851.....30	R459.....63
2A.....95	C114COMB.....227	H853.....33	R463.....60
2AB.....95	C114COMBC.....235	H855.....36	R467.....51
2ACO.....123	C114COMBP.....226	H858.....39	R51.....148
4ASM.....139	C115COMB.....227	H8512.....42	R510.....54
4ASMCO.....147	C115COMBC.....235	H860.....44	R51FS.....154
500-12.....173	C115COMBP.....226	H861.....44	R52.....148
500-6.....170	C13R10CO.....234	HX10.....105	R520.....45
501-12.....173	C15L10.....231	HX15.....105	R55.....148
501-6.....170	C15R10.....224	HX18.....105	R56.....194
502-12.....173	C15R10CO.....234	L10.....102	R56CO.....199
502-6.....170	C15R10P.....224	M40CO.....144	R57.....196
5ATL.....152	C20R18.....225	M41CO.....144	R58.....198
5ATS.....180	C20R18P.....225	M42CO.....144	R88CO.....128
76HA.....212	C21R10CO.....234	M51CO.....158	R89CO.....128
A002.....95	C252A.....228	M52CO.....158	R950.....21
A012.....91	C252AB.....228	QC0860P.....167	R960.....24
A022.....133	C26M42CO.....239	QC1290P.....167	R970.....27
A088.....237	C26R15.....226	QC21G.....119	S209.....177
A094.....229	C26R15CO.....234	QC21GM.....122	SPL-120.....210
A095.....230	C26R15P.....226	QC21P.....119	SPL-90.....210
A097.....225	C26R42.....236	QC21PM.....122	SPLG-120.....210
A100.....95	C29HX10.....233	QC41G.....141	SPLG-90.....210
A101.....103	C29L10.....231	QC41P.....141	SPR-120.....209
A108.....114	C29M40CO.....239	QC91G.....155	SPR-90.....209
A125.....162	C29R10.....224	QC91GM.....157	SPRG-120.....209
A160.....202	C29R10CO.....234	QC91P.....155	SPRG-90.....209
A170.....192	C29R10P.....224	QC91PM.....157	SPS-120.....208
A190.....228	C29R40.....236	R10.....87	SPS-90.....208
A191.....228	C29R40C.....238	R10A.....108	SPSG-120.....208
A217.....213	C29R51.....240	R10B.....111	SPSG-90.....208
A218.....213	C33R56.....241	R10CO.....123	T400.....191
A221.....214	C502AB.....228	R10H.....114	TS10HS.....215
A225.....213	C60M41CO.....239	R10P.....87	TS15HS.....215
A243.....169	C60R18.....225	R15.....87	TS18HS.....215
A244.....169	C60R18CO.....234	R15A.....108	TS40HS.....215
A287.....232	C60R18P.....225	R15B.....111	TS41HS.....215
A345.....183	C60R41.....236	R15CO.....123	TS42HS.....215
A350.....180	C60R41C.....238	R15P.....87	TS51HS.....215
A510.....73	C8R56.....241	R18.....87	TS52HS.....215
A520.....66	C8R56CO.....241	R18A.....108	TS55HS.....215
A530.....180	C8R57.....241	R18B.....111	TS10CO.....219
A553.....76	CO500-12.....175	R18CO.....123	TS15CO.....219
A720.....143	CO500-6.....175	R18H.....114	TS18CO.....219
A730.....189	CO501-12.....175	R18P.....87	TS40CO.....219
A900.....78	CO501-6.....175	R40.....130	TS41CO.....219
A901.....78	D33F.....203	R40C.....136	TS42CO.....219
A920.....69	D33L.....203	R41.....130	TS51CO.....219
A921.....69	D33M.....206	R41C.....136	TS52CO.....219
A940.....81	D33W.....203	R42.....130	TS55CO.....219
A941.....81			

Hydra Drill Head

R950

1.3 1.4 1.5 1.6 2.4 3.3 3.4

Replaceable heads in tough micro-grain carbide for quick and easy tool changes. High productivity in a wide range of steels and harder materials. Superior hole accuracy and precise repeatable tolerances. Special Ti-phos coating for longer tool life.



R950



15/32 - 42.00

* For more information on Hydra, see page 539

d_1 $\varnothing h_7$ Inch	d_1 $\varnothing h_7$ mm	d_1 decimal Inch	l_1 mm	Pack Qty	R950
15/32	11.91	0.4688	9.1	1	5988695
	12.00	0.4724	9.1	1	5988624
	12.10	0.4764	9.1	1	5988627
	12.20	0.4803	9.1	1	5988630
31/64	12.30	0.4844	9.1	1	5988936
	12.50	0.4921	9.4	1	5988633
	12.60	0.4961	9.4	1	5988640
1/2	12.70	0.5000	9.4	1	5988620
	12.80	0.5039	9.4	1	5988641
	12.90	0.5079	9.4	1	5988642
	13.00	0.5118	9.7	1	5988643
33/64	13.10	0.5156	9.7	1	5988850
	13.20	0.5197	9.7	1	5988644
17/32	13.49	0.5313	9.7	1	5988697
	13.50	0.5315	10.3	1	5988645
	13.60	0.5354	10.3	1	5988646
	13.70	0.5394	10.3	1	5988647
	13.80	0.5433	10.3	1	5988648
35/64	13.89	0.5469	10.3	1	5988854
	14.00	0.5512	10.3	1	5988652
	14.10	0.5551	10.3	1	5988655
	14.20	0.5591	10.3	1	5988657
9/16	14.29	0.5625	10.3	1	5988904
	14.50	0.5709	10.3	1	5988660
	14.60	0.5748	11.0	1	5988663
37/64	14.68	0.5781	11.0	1	5988857
	14.70	0.5787	11.0	1	5988666
	14.80	0.5827	11.0	1	5988668
	15.00	0.5906	11.0	1	5988670
19/32	15.08	0.5938	11.0	1	5988779
	15.10	0.5945	11.0	1	5988672
	15.20	0.5984	11.0	1	5988674
	15.24	0.6000	11.0	1	5988678

HYDRA DRILL



d ₁ Øh ₇ Inch	d ₁ Øh ₇ mm	d ₁ decimal Inch	l ₁ mm	Pack Qty	R950
39/64	15.48	0.6094	11.0	1	5988860
	15.50	0.6102	11.0	1	5988680
	15.60	0.6142	11.6	1	5988683
	15.70	0.6181	11.6	1	5988687
5/8	15.88	0.6250	11.6	1	5988884
	16.00	0.6299	11.6	1	5988698
	16.08	0.6331	11.6	1	5988702
	16.10	0.6339	11.6	1	5988710
41/64	16.20	0.6378	11.6	1	5988715
	16.27	0.6406	11.6	1	5988864
	16.30	0.6417	11.6	1	5988725
	16.50	0.6496	11.6	1	5988690
21/32	16.60	0.6535	12.2	1	5988749
	16.67	0.6563	12.2	1	5988802
	16.70	0.6575	12.2	1	5988790
	17.00	0.6693	12.2	1	5988833
43/64	17.07	0.6719	12.2	1	5988867
	17.10	0.6732	12.2	1	5988873
	17.20	0.6772	12.2	1	5988881
11/16	17.46	0.6875	12.2	1	5988623
	17.50	0.6890	12.2	1	5988885
	17.60	0.6929	12.9	1	5988891
45/64	17.70	0.6969	12.9	1	5988894
	17.86	0.7031	12.9	1	5988872
	18.00	0.7087	12.9	1	5988701
	18.10	0.7126	12.9	1	5988706
23/32	18.20	0.7165	12.9	1	5988713
	18.26	0.7188	12.9	1	5988824
	18.50	0.7283	12.9	1	5988718
	18.60	0.7323	13.5	1	5988723
47/64	18.65	0.7344	13.5	1	5988877
	18.70	0.7362	13.5	1	5988728
	18.90	0.7441	13.5	1	5988733
	19.00	0.7480	13.5	1	5988740
3/4	19.05	0.7500	13.5	1	5988928
	19.10	0.7520	13.5	1	5988745
	19.20	0.7559	13.5	1	5988752
	19.25	0.7579	13.5	1	5988756
	19.30	0.7598	13.5	1	5988760
49/64	19.35	0.7618	13.5	1	5988764
	19.45	0.7656	13.5	1	5988880
	19.50	0.7677	13.5	1	5988767
	19.60	0.7717	14.1	1	5988771
	19.70	0.7756	14.1	1	5988775
25/32	19.84	0.7813	14.1	1	5988851
	20.00	0.7874	14.1	1	5988782
	20.24	0.7969	14.1	1	5988892
51/64	20.50	0.8071	14.1	1	5988786
	20.64	0.8125	14.8	1	5988649
13/16	21.00	0.8268	14.8	1	5988794
	21.03	0.8281	14.8	1	5988896
	21.43	0.8438	14.8	1	5988869
53/64	21.50	0.8465	14.8	1	5988798
	21.83	0.8594	15.0	1	5988898
	22.00	0.8661	15.0	1	5988806
7/8	22.22	0.8750	15.0	1	5988903
	22.50	0.8858	15.0	1	5988810
57/64	22.62	0.8906	15.0	1	5988899
	22.70	0.8937	15.0	1	5988814
	23.00	0.9055	15.1	1	5988816
29/32	23.02	0.9063	15.1	1	5988917
	23.42	0.9219	15.1	1	5988900
59/64	23.50	0.9252	15.1	1	5988820
	23.81	0.9375	15.4	1	5988691
15/16	24.00	0.9449	15.4	1	5988828

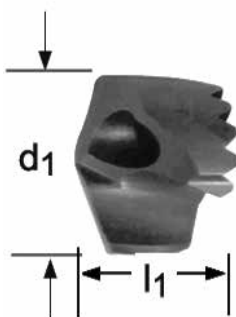
d ₁ Øh ₇ Inch	d ₁ Øh ₇ mm	d ₁ decimal Inch	l ₁ mm	Pack Qty	R950
61/64	24.21	0.9531	15.4	1	5988901
	24.50	0.9646	15.4	1	5988837
31/32	24.61	0.9688	15.4	1	5988934
	25.00	0.9844	15.8	1	5988840
63/64	25.00	0.9844	15.8	1	5988902
1"	25.40	1.0000	15.8	1	5988604
	25.50	1.0039	15.8	1	5988843
	25.65	1.0098	15.8	1	5988847
1.1/64	25.80	1.0156	15.8	1	5988676
	26.00	1.0236	16.4	1	5988855
1.1/32	26.19	1.0313	16.4	1	5988650
	26.50	1.0433	16.4	1	5988858
1.3/64	26.59	1.0469	16.4	1	5988744
1.1/16	26.99	1.0625	17.1	1	5988637
	27.00	1.0630	17.1	1	5988861
1.5/64	27.38	1.0781	17.1	1	5988611
	27.50	1.0827	17.1	1	5988865
1.3/32	27.78	1.0938	17.1	1	5988739
	28.00	1.1024	17.7	1	5988876
1.7/64	28.18	1.1094	17.7	1	5988614
	28.50	1.1220	17.7	1	5988844
1.1/8	28.58	1.1250	17.7	1	5988720
1.9/64	28.97	1.1406	18.3	1	5988617
	29.00	1.1417	18.3	1	5988888
1.5/32	29.37	1.1563	18.3	1	5988608
	29.50	1.1614	18.3	1	5988906
1.11/64	29.77	1.1719	18.3	1	5988730
	30.00	1.1811	19.0	1	5988930
1.3/16	30.16	1.1875	19.0	1	5988735
	30.50	1.2008	19.0	1	5988932
1.7/32	30.96	1.2188	21.0	1	6104481
	31.00	1.2205	21.0	1	6104482
1.1/4	31.75	1.2500	21.0	1	6104483
	32.00	1.2598	21.0	1	6104484
	32.50	1.2795	21.0	1	6104485
1.19/64	32.94	1.2969	21.0	1	6104486
	33.00	1.2992	21.0	1	6104487
	33.50	1.3189	21.0	1	6104488
	34.00	1.3386	23.0	1	6104489
1.11/32	34.13	1.3438	23.0	1	6104530
	34.50	1.3583	23.0	1	6104531
1.3/8	34.93	1.3750	23.0	1	6104532
	35.00	1.3780	23.0	1	6104533
	36.00	1.4173	23.0	1	6104534
1.27/64	36.12	1.4219	23.0	1	6104535
	36.50	1.4370	23.0	1	6104536
	37.00	1.4567	25.0	1	6104537
1.15/32	37.31	1.4688	25.0	1	6104538
	37.50	1.4764	25.0	1	6104539
	38.00	1.4961	25.0	1	6104540
1.1/2	38.10	1.5000	25.0	1	6104541
	38.50	1.5157	25.0	1	6104542
1.17/32	38.89	1.5313	25.0	1	6104543
	39.00	1.5354	25.0	1	6104544
	39.50	1.5551	25.0	1	6104545
1.9/16	39.69	1.5625	27.0	1	6104546
	40.00	1.5748	27.0	1	6104547
	41.00	1.6142	27.0	1	6104548
1.5/8	41.28	1.6250	27.0	1	6104549
	42.00	1.6535	27.0	1	6104550

Hydra Drill Head

R960

1.1 1.2 2.1 2.2 2.3 3.1 3.2 4.1 4.2 4.3 5.1 5.2 5.3

Replaceable heads in tough micro-grain carbide for quick and easy tool changes. High productivity across a wide range of stainless steel, cast iron & heat resistant materials. Superior hole accuracy and precise repeatable tolerances. Special Ti-phos coating for longer tool life.



R960



15/32 - 30.50

* For more information on Hydra, see page 539

d ₁ Øh ₇ Inch	d ₁ Øh ₇ mm	d ₁ decimal Inch	l ₁ mm	Pack Qty	R960
15/32	11.91	0.4688	9.1	1	5988758
	12.00	0.4724	9.1	1	5988922
	12.10	0.4764	9.1	1	5988923
	12.20	0.4803	9.1	1	5988924
31/64	12.30	0.4844	9.1	1	5988575
	12.50	0.4921	9.4	1	5988925
	12.60	0.4961	9.4	1	5988926
1/2	12.70	0.5000	9.4	1	5988920
	12.80	0.5039	9.4	1	5988927
	12.90	0.5079	9.4	1	5988929
	13.00	0.5118	9.7	1	5988685
33/64	13.10	0.5156	9.7	1	5988579
	13.20	0.5197	9.7	1	5988737
	13.49	0.5313	9.7	1	5988831
17/32	13.50	0.5315	10.3	1	5988791
	13.60	0.5354	10.3	1	5988839
	13.70	0.5394	10.3	1	5988883
	13.80	0.5433	10.3	1	5988889
	13.89	0.5469	10.3	1	5988583
35/64	14.00	0.5512	10.3	1	5988895
	14.10	0.5551	10.3	1	5988897
	14.20	0.5591	10.3	1	5988692
	14.29	0.5625	10.3	1	5988664
9/16	14.50	0.5709	10.3	1	5988696
	14.60	0.5748	11.0	1	5988700
	14.68	0.5781	11.0	1	5988591
37/64	14.70	0.5787	11.0	1	5988705
	14.80	0.5827	11.0	1	5988709
	15.00	0.5906	11.0	1	5988714
	15.08	0.5938	11.0	1	5988621
19/32	15.10	0.5945	11.0	1	5988719
	15.20	0.5984	11.0	1	5988724
	15.24	0.6000	11.0	1	5988729

d ₁ Øh ₇ Inch	d ₁ Øh ₇ mm	d ₁ decimal Inch	l ₁ mm	Pack Qty	R960
39/64	15.48	0.6094	11.0	1	5988595
	15.50	0.6102	11.0	1	5988734
	15.60	0.6142	11.6	1	5988742
5/8	15.70	0.6181	11.6	1	5988747
	15.88	0.6250	11.6	1	5988612
	16.00	0.6299	11.6	1	5988763
	16.08	0.6331	11.6	1	5988769
	16.10	0.6339	11.6	1	5988773
41/64	16.20	0.6378	11.6	1	5988777
	16.27	0.6406	11.6	1	5988599
	16.30	0.6417	11.6	1	5988783
	16.50	0.6496	11.6	1	5988787
	16.60	0.6535	12.2	1	5988795
21/32	16.67	0.6563	12.2	1	5988443
	16.70	0.6575	12.2	1	5988799
	17.00	0.6693	12.2	1	5988803
43/64	17.07	0.6719	12.2	1	5988601
	17.10	0.6732	12.2	1	5988807
	17.20	0.6772	12.2	1	5988811
11/16	17.46	0.6875	12.2	1	5988921
	17.50	0.6890	12.2	1	5988818
	17.60	0.6929	12.9	1	5988823
45/64	17.70	0.6969	12.9	1	5988827
	17.86	0.7031	12.9	1	5988603
	18.00	0.7087	12.9	1	5988835
	18.10	0.7126	12.9	1	5988841
	18.20	0.7165	12.9	1	5988845
23/32	18.26	0.7188	12.9	1	5988471
	18.50	0.7283	12.9	1	5988848
	18.60	0.7323	13.5	1	5988853
47/64	18.65	0.7344	13.5	1	5988606
	18.70	0.7362	13.5	1	5988856
	18.90	0.7441	13.5	1	5988863
	19.00	0.7480	13.5	1	5988868
	19.05	0.7500	13.5	1	5988559
3/4	19.10	0.7520	13.5	1	5988871
	19.20	0.7559	13.5	1	5988875
	19.25	0.7579	13.5	1	5988879
	19.30	0.7598	13.5	1	5988887
	19.35	0.7618	13.5	1	5988438
49/64	19.45	0.7656	13.5	1	5988609
	19.50	0.7677	13.5	1	5988495
	19.60	0.7717	14.1	1	5988544
	19.70	0.7756	14.1	1	5988587
	19.84	0.7813	14.1	1	5988511
25/32	20.00	0.7874	14.1	1	5988629
	20.24	0.7969	14.1	1	5988615
	20.50	0.8071	14.1	1	5988632
13/16	20.64	0.8125	14.8	1	5988893
	21.00	0.8268	14.8	1	5988635
	21.03	0.8281	14.8	1	5988618
27/32	21.43	0.8438	14.8	1	5988531
	21.50	0.8465	14.8	1	5988638
55/64	21.83	0.8594	15.0	1	5988626
	22.00	0.8661	15.0	1	5988448
7/8	22.22	0.8750	15.0	1	5988661
	22.50	0.8858	15.0	1	5988453
	22.62	0.8906	15.0	1	5988651
57/64	22.70	0.8937	15.0	1	5988458
	23.00	0.9055	15.1	1	5988462
	23.02	0.9063	15.1	1	5988556
29/32	23.42	0.9219	15.1	1	5988653
	23.50	0.9252	15.1	1	5988466
59/64	23.81	0.9375	15.4	1	5988754
	24.00	0.9449	15.4	1	5988476
61/64	24.21	0.9531	15.4	1	5988656

HYDRA DRILL



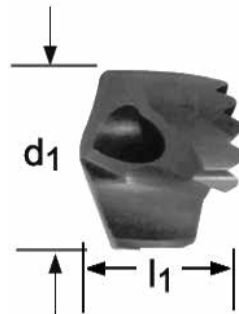
d ₁ Øh ₇ Inch	d ₁ Øh ₇ mm	d ₁ decimal Inch	l ₁ mm	Pack Qty	R960
	24.50	0.9646	15.4	1	5988483
31/32	24.61	0.9688	15.4	1	5988572
	25.00	0.9844	15.8	1	5988488
63/64	25.00	0.9844	15.8	1	5988658
1"	25.40	1.0000	15.8	1	5988905
	25.50	1.0039	15.8	1	5988499
	25.65	1.0098	15.8	1	5988506
1.1/64	25.80	1.0156	15.8	1	5988909
	26.00	1.0236	16.4	1	5988516
1.1/32	26.19	1.0312	16.4	1	5988908
	26.50	1.0433	16.4	1	5988519
1.3/64	26.59	1.0469	16.4	1	5988914
1.1/16	26.99	1.0625	17.1	1	5988907
	27.00	1.0630	17.1	1	5988523
1.5/64	27.38	1.0781	17.1	1	5988916
	27.50	1.0827	17.1	1	5988528
1.3/32	27.78	1.0938	17.1	1	5988913
	28.00	1.1024	17.7	1	5988535
1.7/64	28.18	1.1094	17.7	1	5988918
	28.50	1.1220	17.7	1	5988540
1.1/8	28.58	1.1250	17.7	1	5988910
1.9/64	28.97	1.1406	18.3	1	5988919
	29.00	1.1417	18.3	1	5988548
1.5/32	29.37	1.1563	18.3	1	5988915
	29.50	1.1614	18.3	1	5988552
1.11/64	29.77	1.1719	18.3	1	5988911
	30.00	1.1811	19.0	1	5988564
1.3/16	30.16	1.1875	19.0	1	5988912
	30.50	1.2008	19.0	1	5988568

Hydra Drill Head

R970

1.1 1.2 3.1 3.2 3.3 3.4

Replaceable heads in tough micro-grain carbide for quick and easy tool changes. Engineered for high productivity of cast iron materials. Superior hole accuracy and precise repeatable tolerances. Special Ti-phos coating for longer tool life.



R970



15/32 - 30.50

* For more information on Hydra, see page 539

d_1 $\varnothing h_7$ Inch	d_1 $\varnothing h_7$ mm	d_1 decimal Inch	l_1 mm	Pack Qty	R970
15/32		0.4689	9.1	1	7332946
	12.0	0.4724	9.1	1	7332947
	12.1	0.4764	9.1	1	7332948
	12.2	0.4803	9.1	1	7332949
31/64		0.4844	9.1	1	7332980
	12.5	0.4921	9.4	1	7332981
	12.6	0.4961	9.4	1	7332982
1/2		0.5000	9.4	1	7332983
	12.8	0.5039	9.4	1	7332984
	12.9	0.5079	9.4	1	7332985
	13.0	0.5118	9.7	1	7332986
33/64		0.5156	9.7	1	7332987
	13.2	0.5197	9.7	1	7332988
17/32		0.5313	9.7	1	7332989
	13.5	0.5315	10.3	1	7332990
	13.6	0.5354	10.3	1	7332991
	13.7	0.5394	10.3	1	7332992
	13.8	0.5433	10.3	1	7332993
35/64		0.5469	10.3	1	7332994
	14.0	0.5512	10.3	1	7332995
	14.1	0.5551	10.3	1	7332996
	14.2	0.5591	10.3	1	7332997
9/16		0.5625	10.3	1	7332998
	14.5	0.5709	10.3	1	7332999
	14.6	0.5748	11.0	1	7333000
37/64		0.5781	11.0	1	7333001
	14.7	0.5787	11.0	1	7333002
	14.8	0.5827	11.0	1	7333003
	15.0	0.5906	11.0	1	7333004
19/32		0.5938	11.0	1	7333005
	15.1	0.5945	11.0	1	7333006
	15.2	0.5984	11.0	1	7333007

HYDRA DRILL



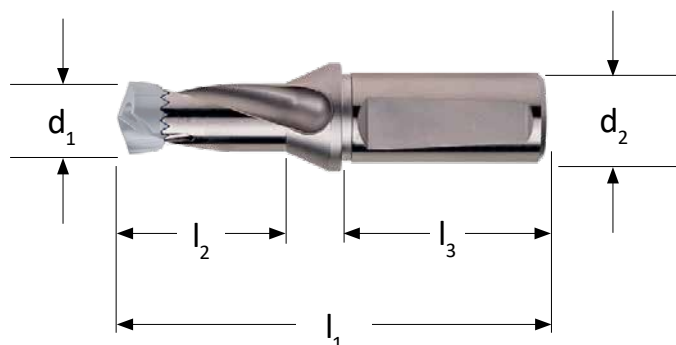
d ₁ Øh ₇ Inch	d ₁ Øh ₇ mm	d ₁ decimal Inch	l ₁ mm	Pack Qty	R970	
39/64	15.24	0.6000	11.0	1	7333008	
		0.6094	11.0	1	7333009	
		0.6102	11.6	1	7333010	
5/8	15.6	0.6142	11.6	1	7333011	
	15.7	0.6181	11.6	1	7333012	
	16.0	0.6250	11.6	1	7333013	
		0.6299	11.6	1	7333014	
		0.6331	11.6	1	7333015	
		0.6339	11.6	1	7333016	
		0.6378	11.6	1	7333017	
41/64	16.08	0.6406	11.6	1	7333018	
	16.1	0.6417	11.6	1	7333019	
	16.2	0.6496	11.6	1	7333020	
21/32	16.3	0.6496	11.6	1	7333020	
	16.5	0.6535	12.2	1	7333021	
	16.6	0.6563	12.2	1	7333022	
	16.7	0.6575	12.2	1	7333023	
43/64	17.0	0.6693	12.2	1	7333024	
	17.1	0.6719	12.2	1	7333025	
		0.6732	12.2	1	7333026	
11/16	17.2	0.6772	12.2	1	7333027	
	17.5	0.6875	12.2	1	7333028	
		0.6890	12.2	1	7333029	
45/64	17.6	0.6929	12.9	1	7333030	
	17.7	0.6969	12.9	1	7333031	
	18.0	0.7031	12.9	1	7333032	
		0.7087	12.9	1	7333033	
		0.7126	12.9	1	7333034	
23/32	18.1	0.7126	12.9	1	7333034	
	18.2	0.7165	12.9	1	7333035	
	18.5	0.7165	12.9	1	7333035	
		0.7188	12.9	1	7333036	
47/64	18.5	0.7283	12.9	1	7333037	
	18.6	0.7323	13.5	1	7333038	
	18.7	0.7344	13.5	1	7333039	
		0.7362	13.5	1	7333040	
		0.7441	13.5	1	7333041	
	3/4	18.9	0.7441	13.5	1	7333041
		19.0	0.7480	13.5	1	7333042
49/64		19.1	0.7500	13.5	1	7333043
	19.2	0.7520	13.5	1	7333044	
	19.2	0.7559	13.5	1	7333045	
	19.25	0.7579	13.5	1	7333046	
	19.3	0.7598	13.5	1	7333047	
51/64	19.35	0.7598	13.5	1	7333047	
	19.5	0.7618	13.5	1	7333048	
		0.7656	13.5	1	7333049	
		0.7677	13.5	1	7333050	
25/32	19.6	0.7717	14.1	1	7333051	
	19.7	0.7756	14.1	1	7333052	
	20.0	0.7813	14.1	1	7333053	
		0.7874	14.1	1	7333054	
53/64	20.5	0.7969	14.1	1	7333055	
		0.8071	14.1	1	7333056	
27/32	21.0	0.8125	14.8	1	7333057	
		0.8268	14.8	1	7333058	
		0.8281	14.8	1	7333059	
55/64	21.5	0.8438	14.8	1	7333060	
		0.8465	14.8	1	7333061	
		0.8594	15.0	1	7333062	
		0.8661	15.0	1	7333063	
7/8	22.0	0.8750	15.0	1	7333064	
		0.8858	15.0	1	7333065	
57/64	22.5	0.8906	15.0	1	7333066	
		0.8937	15.0	1	7333067	
		23.0	0.9055	15.1	1	7333068
29/32	23.5	0.9063	15.1	1	7333069	
0.9219		15.1	1	7333070		
0.9252		15.1	1	7333071		
15/16	24.0	0.9375	15.4	1	7333072	
		0.9449	15.4	1	7333073	

d ₁ Øh ₇ Inch	d ₁ Øh ₇ mm	d ₁ decimal Inch	l ₁ mm	Pack Qty	R970
61/64		0.9531	15.4	1	7333074
	24.5	0.9646	15.4	1	7333075
31/32		0.9688	15.4	1	7333076
	25.0	0.9843	15.8	1	7333077
63/64		0.9844	15.8	1	7333078
1		1.0000	15.8	1	7333079
	25.5	1.0039	15.8	1	7333080
	25.65	1.0098	15.8	1	7333081
1.1/64		1.0156	15.8	1	7333082
	26.0	1.0236	16.4	1	7333083
1.1/32		1.0313	16.4	1	7333084
	26.5	1.0433	16.4	1	7333085
1.3/64		1.0469	16.4	1	7333086
1.1/16		1.0625	17.1	1	7333087
	27.0	1.0630	17.1	1	7333088
1.5/64		1.0781	17.1	1	7333089
	27.5	1.0827	17.1	1	7333090
1.3/32		1.0938	17.1	1	7333091
	28.0	1.1024	17.7	1	7333092
1.7/64		1.1094	17.7	1	7333093
	28.5	1.1220	17.7	1	7333094
1.1/8		1.1250	17.7	1	7333095
1.9/64		1.1406	18.3	1	7333096
	29.0	1.1417	18.3	1	7333097
1.5/32		1.1563	18.3	1	7333098
	29.5	1.1614	18.3	1	7333099
1.11/64		1.1719	18.3	1	7333100
	30.0	1.1811	19.0	1	7333101
1.3/16		1.1875	19.0	1	7333102
	30.5	1.2008	19.0	1	7333103
1.7/32		1.2188	21.0	1	7333104
	31.0	1.2205	21.0	1	7333105
1.1/4		1.2500	21.0	1	7333106
	32.0	1.2598	21.0	1	7333107
	32.5	1.2795	21.0	1	7333108
1.19/64		1.2968	21.0	1	7333109
	33.0	1.2992	21.0	1	7333110
	33.5	1.3189	21.0	1	7333111
	34.0	1.3386	23.0	1	7333112
1.11/32		1.3438	23.0	1	7333113
	34.5	1.3583	23.0	1	7333114
1.3/8		1.3750	23.0	1	7333115
	35.0	1.3780	23.0	1	7333116
	36.0	1.4173	23.0	1	7333117
1.27/64		1.4219	23.0	1	7333118
	36.5	1.4370	23.0	1	7333119
	37.0	1.4567	25.0	1	7333120
1.15/32		1.4688	25.0	1	7333121
	37.5	1.4764	25.0	1	7333122
	38.0	1.4961	25.0	1	7333123
1.1/2		1.5000	25.0	1	7333124
	38.5	1.5157	25.0	1	7333125
1.17/32		1.5313	25.0	1	7333126
	39.0	1.5354	25.0	1	7333127
	39.5	1.5551	25.0	1	7333128
1.9/16		1.5625	27.0	1	7333129
	40.0	1.5748	27.0	1	7333130
	41.0	1.6142	27.0	1	7333131
1.5/8		1.6250	27.0	1	7333132
	42.0	1.6535	27.0	1	7333133

1.5xD Hydra Bodies

H851

Cylindrical shank with flat for multi-purpose tool holding. Allows accurate clamping for reliable use of internal coolant.



Four (4) screws and one (1) screwdriver are included with a drill body

- * Fractional bodies have cylindrical shank
- * Metric bodies have whistle notch on shank
- * For more information on Hydra, see page 539

H851
Coolant
Through



1.5XD

HSS

140°



NEW

31/64 – 30.5

Hydra Head d ₁ Ø	Hydra Head R950 EDP#	Hydra Head R960 EDP#	Hydra Head R970 EDP#	1.5xD Hydra Body - Fractional Shank					1.5xD Hydra Body - Metric Shank				
				d ₂ Øh ₆ inch	l ₂ mm	l ₁ mm	l ₃ mm	H851 EDP#	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	l ₃ mm	H851 EDP#
15/32	5988695	5988758	7332946	5/8	25.5	88.5	47.63	7833294	16.00	25.5	88.5	48.0	7833297
12.0	5988624	5988922	7332947	5/8	25.5	88.5	47.63	7833294	16.00	25.5	88.5	48.0	7833297
12.1	5988627	5988923	7332948	5/8	25.5	88.5	47.63	7833294	16.00	25.5	88.5	48.0	7833297
12.2	5988630	5988924	7332949	5/8	25.5	88.5	47.63	7833294	16.00	25.5	88.5	48.0	7833297
31/64	5988936	5988575	7332980	5/8	25.5	88.5	47.63	7833294	16.00	25.5	88.5	48.0	7833297
12.5	5988633	5988925	7332981	5/8	25.8	88.8	47.63	7833295	16.00	25.8	88.8	48.0	7833298
12.6	5988640	5988926	7332982	5/8	25.8	88.8	47.63	7833295	16.00	25.8	88.8	48.0	7833298
1/2	5988620	5988920	7332983	5/8	25.8	88.8	47.63	7833295	16.00	25.8	88.8	48.0	7833298
12.8	5988641	5988927	7332984	5/8	25.8	88.8	47.63	7833295	16.00	25.8	88.8	48.0	7833298
12.9	5988642	5988929	7332985	5/8	25.8	88.8	47.63	7833295	16.00	25.8	88.8	48.0	7833298
13.0	5988643	5988685	7332986	5/8	30.9	93.9	47.63	7833296	16.00	27.0	90.0	48.0	7833299
33/64	5988850	5988579	7332987	5/8	30.9	93.9	47.63	7833296	16.00	27.0	90.0	48.0	7833299
13.2	5988644	5988737	7332988	5/8	30.9	93.9	47.63	7833296	16.00	27.0	90.0	48.0	7833299
17/32	5988697	5988831	7332989	5/8	30.9	93.9	47.63	7833296	16.00	27.0	90.0	48.0	7833299
13.5	5988645	5988791	7332990	3/4	30.3	93.9	50.8	7833331	16.00	30.9	93.9	48.0	7833330
13.6	5988646	5988839	7332991	3/4	30.3	93.9	50.8	7833331	16.00	30.9	93.9	48.0	7833330
13.7	5988647	5988883	7332992	3/4	30.3	93.9	50.8	7833331	16.00	30.9	93.9	48.0	7833330
13.8	5988648	5988889	7332993	3/4	30.3	93.9	50.8	7833331	16.00	30.9	93.9	48.0	7833330
35/64	5988854	5988583	7332994	3/4	30.3	93.9	50.8	7833331	16.00	30.9	93.9	48.0	7833330
14.0	5988652	5988895	7332995	3/4	30.3	93.9	50.8	7833331	16.00	30.9	93.9	48.0	7833330
14.1	5988655	5988897	7332996	3/4	30.3	93.9	50.8	7833331	16.00	30.9	93.9	48.0	7833330
14.2	5988657	5988692	7332997	3/4	30.3	93.9	50.8	7833331	16.00	30.9	93.9	48.0	7833330
9/16	5988904	5988664	7332998	3/4	30.3	93.9	50.8	7833331	16.00	30.9	93.9	48.0	7833330
14.5	5988660	5988696	7332999	3/4	30.3	93.9	50.8	7833331	16.00	30.9	93.9	48.0	7833330
14.6	5988663	5988700	7333000	3/4	32.3	97.3	50.8	7833332	20.00	32.3	97.3	50.0	7833336
37/64	5988857	5988591	7333001	3/4	32.3	97.3	50.8	7833332	20.00	32.3	97.3	50.0	7833336
14.7	5988666	5988705	7333002	3/4	32.3	97.3	50.8	7833332	20.00	32.3	97.3	50.0	7833336
14.8	5988668	5988709	7333003	3/4	32.3	97.3	50.8	7833332	20.00	32.3	97.3	50.0	7833336
15.0	5988670	5988714	7333004	3/4	32.3	97.3	50.8	7833332	20.00	32.3	97.3	50.0	7833336
19/32	5988779	5988621	7333005	3/4	32.3	97.3	50.8	7833332	20.00	32.3	97.3	50.0	7833336
15.1	5988672	5988719	7333006	3/4	32.3	97.3	50.8	7833332	20.00	32.3	97.3	50.0	7833336

Hydra Head d ₁ Ø	Hydra Head R950 EDP#	Hydra Head R960 EDP#	Hydra Head R970 EDP#	1.5xD Hydra Body - Fractional Shank					1.5xD Hydra Body - Metric Shank				
				d ₂ Øh ₆ inch	l ₂ mm	l ₁ mm	l ₃ mm	H851 EDP#	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	l ₃ mm	H851 EDP#
15.2	5988674	5988724	7333007	3/4	32.3	97.3	50.8	7833332	20.00	32.3	97.3	50.0	7833336
15.24	5988678	5988729	7333008	3/4	32.3	97.3	50.8	7833332	20.00	32.3	97.3	50.0	7833336
39/64	5988860	5988595	7333009	3/4	32.3	97.3	50.8	7833332	20.00	32.3	97.3	50.0	7833336
15.5	5988680	5988734	7333010	3/4	32.3	97.3	50.8	7833332	20.00	32.3	97.3	50.0	7833336
15.6	5988683	5988742	7333011	3/4	34.9	99.9	50.8	7833333	20.00	34.9	99.9	50.0	7833337
15.7	5988687	5988747	7333012	3/4	34.9	99.9	50.8	7833333	20.00	34.9	99.9	50.0	7833337
5/8	5988884	5988612	7333013	3/4	34.9	99.9	50.8	7833333	20.00	34.9	99.9	50.0	7833337
16.0	5988698	5988763	7333014	3/4	34.9	99.9	50.8	7833333	20.00	34.9	99.9	50.0	7833337
16.08	5988702	5988769	7333015	3/4	34.9	99.9	50.8	7833333	20.00	34.9	99.9	50.0	7833337
16.1	5988710	5988773	7333016	3/4	34.9	99.9	50.8	7833333	20.00	34.9	99.9	50.0	7833337
16.2	5988715	5988777	7333017	3/4	34.9	99.9	50.8	7833333	20.00	34.9	99.9	50.0	7833337
41/64	5988864	5988599	7333018	3/4	34.9	99.9	50.8	7833333	20.00	34.9	99.9	50.0	7833337
16.3	5988725	5988783	7333019	3/4	34.9	99.9	50.8	7833333	20.00	34.9	99.9	50.0	7833337
16.5	5988690	5988787	7333020	3/4	34.9	99.9	50.8	7833333	20.00	34.9	99.9	50.0	7833337
16.6	5988749	5988795	7333021	3/4	36.4	101.4	50.8	7833334	20.00	36.4	101.4	50.0	7833338
21/32	5988802	5988443	7333022	3/4	36.4	101.4	50.8	7833334	20.00	36.4	101.4	50.0	7833338
16.7	5988790	5988799	7333023	3/4	36.4	101.4	50.8	7833334	20.00	36.4	101.4	50.0	7833338
17.0	5988833	5988803	7333024	3/4	36.4	101.4	50.8	7833334	20.00	36.4	101.4	50.0	7833338
43/64	5988867	5988601	7333025	3/4	36.4	101.4	50.8	7833334	20.00	36.4	101.4	50.0	7833338
17.1	5988873	5988807	7333026	3/4	36.4	101.4	50.8	7833334	20.00	36.4	101.4	50.0	7833338
17.2	5988881	5988811	7333027	3/4	36.4	101.4	50.8	7833334	20.00	36.4	101.4	50.0	7833338
11/16	5988623	5988921	7333028	3/4	36.4	101.4	50.8	7833334	20.00	36.4	101.4	50.0	7833338
17.5	5988885	5988818	7333029	3/4	36.4	101.4	50.8	7833334	20.00	36.4	101.4	50.0	7833338
17.6	5988891	5988823	7333030	3/4	39.0	104.0	50.8	7833335	20.00	39.0	104.0	50.0	7833339
17.7	5988894	5988827	7333031	3/4	39.0	104.0	50.8	7833335	20.00	39.0	104.0	50.0	7833339
45/64	5988872	5988603	7333032	3/4	39.0	104.0	50.8	7833335	20.00	39.0	104.0	50.0	7833339
18.0	5988701	5988835	7333033	3/4	39.0	104.0	50.8	7833335	20.00	39.0	104.0	50.0	7833339
18.1	5988706	5988841	7333034	3/4	39.0	104.0	50.8	7833335	20.00	39.0	104.0	50.0	7833339
18.2	5988713	5988845	7333035	3/4	39.0	104.0	50.8	7833335	20.00	39.0	104.0	50.0	7833339
23/32	5988824	5988471	7333036	3/4	39.0	104.0	50.8	7833335	20.00	39.0	104.0	50.0	7833339
18.5	5988718	5988848	7333037	3/4	39.0	104.0	50.8	7833335	20.00	39.0	104.0	50.0	7833339
18.6	5988723	5988853	7333038	1"	40.4	111.4	57.15	7833345	25.00	40.4	111.4	56.0	7833340
47/64	5988877	5988606	7333039	1"	40.4	111.4	57.15	7833345	25.00	40.4	111.4	56.0	7833340
18.7	5988728	5988856	7333040	1"	40.4	111.4	57.15	7833345	25.00	40.4	111.4	56.0	7833340
18.9	5988733	5988863	7333041	1"	40.4	111.4	57.15	7833345	25.00	40.4	111.4	56.0	7833340
19.0	5988740	5988868	7333042	1"	40.4	111.4	57.15	7833345	25.00	40.4	111.4	56.0	7833340
3/4	5988928	5988559	7333043	1"	40.4	111.4	57.15	7833345	25.00	40.4	111.4	56.0	7833340
19.1	5988745	5988871	7333044	1"	40.4	111.4	57.15	7833345	25.00	40.4	111.4	56.0	7833340
19.2	5988752	5988875	7333045	1"	40.4	111.4	57.15	7833345	25.00	40.4	111.4	56.0	7833340
19.25	5988756	5988879	7333046	1"	40.4	111.4	57.15	7833345	25.00	40.4	111.4	56.0	7833340
19.3	5988760	5988887	7333047	1"	40.4	111.4	57.15	7833345	25.00	40.4	111.4	56.0	7833340
19.35	5988764	5988438	7333048	1"	40.4	111.4	57.15	7833345	25.00	40.4	111.4	56.0	7833340
49/64	5988880	5988609	7333049	1"	40.4	111.4	57.15	7833345	25.00	40.4	111.4	56.0	7833340
19.5	5988767	5988495	7333050	1"	40.4	111.4	57.15	7833345	25.00	40.4	111.4	56.0	7833340
19.6	5988771	5988544	7333051	1"	43.0	114.0	57.15	7833346	25.00	43.0	114.0	56.0	7833341
19.7	5988775	5988587	7333052	1"	43.0	114.0	57.15	7833346	25.00	43.0	114.0	56.0	7833341
25/32	5988851	5988511	7333053	1"	43.0	114.0	57.15	7833346	25.00	43.0	114.0	56.0	7833341
20.0	5988782	5988629	7333054	1"	43.0	114.0	57.15	7833346	25.00	43.0	114.0	56.0	7833341
51/64	5988892	5988615	7333055	1"	43.0	114.0	57.15	7833346	25.00	43.0	114.0	56.0	7833341
20.5	5988786	5988632	7333056	1"	43.0	114.0	57.15	7833346	25.00	43.0	114.0	56.0	7833341
13/16	5988649	5988893	7333057	1"	44.5	115.5	57.15	7833347	25.00	44.5	115.5	56.0	7833342
21.0	5988794	5988635	7333058	1"	44.5	115.5	57.15	7833347	25.00	44.5	115.5	56.0	7833342
53/64	5988896	5988618	7333059	1"	44.5	115.5	57.15	7833347	25.00	44.5	115.5	56.0	7833342
27/32	5988869	5988531	7333060	1"	44.5	115.5	57.15	7833347	25.00	44.5	115.5	56.0	7833342
21.5	5988798	5988638	7333061	1"	44.5	115.5	57.15	7833347	25.00	44.5	115.5	56.0	7833342
55/64	5988898	5988626	7333062	1"	46.1	117.1	57.15	7833348	25.00	46.1	117.1	56.0	7833343
22.0	5988806	5988448	7333063	1"	46.1	117.1	57.15	7833348	25.00	46.1	117.1	56.0	7833343
7/8	5988903	5988661	7333064	1"	46.1	117.1	57.15	7833348	25.00	46.1	117.1	56.0	7833343
22.5	5988810	5988453	7333065	1"	46.1	117.1	57.15	7833348	25.00	46.1	117.1	56.0	7833343
57/64	5988899	5988651	7333066	1"	46.1	117.1	57.15	7833348	25.00	46.1	117.1	56.0	7833343
22.7	5988814	5988458	7333067	1"	46.1	117.1	57.15	7833348	25.00	46.1	117.1	56.0	7833343
23.0	5988816	5988462	7333068	1"	47.0	118.0	57.15	7833349	25.00	47.0	118.0	56.0	7833344
29/32	5988917	5988556	7333069	1"	47.0	118.0	57.15	7833349	25.00	47.0	118.0	56.0	7833344
59/64	5988900	5988653	7333070	1"	47.0	118.0	57.15	7833349	25.00	47.0	118.0	56.0	7833344
23.5	5988820	5988466	7333071	1"	47.0	118.0	57.15	7833349	25.00	47.0	118.0	56.0	7833344

HYDRA DRILL

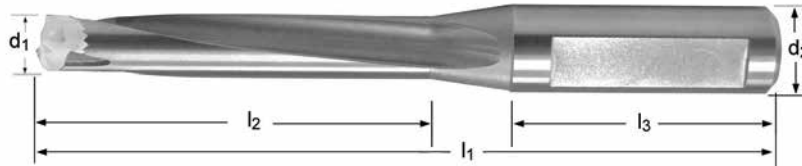


Hydra Head d ₁ Ø	Hydra Head R950 EDP#	Hydra Head R960 EDP#	Hydra Head R970 EDP#	1.5xD Hydra Body - Fractional Shank					1.5xD Hydra Body - Metric Shank				
				d ₂ Øh ₆ inch	l ₂ mm	l ₁ mm	l ₃ mm	H851 EDP#	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	l ₃ mm	H851 EDP#
15/16	5988691	5988754	7333072	1"	49.3	124.3	57.15	7833350	32.00	49.3	124.3	60.0	7833357
24.0	5988828	5988476	7333073	1"	49.3	124.3	57.15	7833350	32.00	49.3	124.3	60.0	7833357
61/64	5988901	5988656	7333074	1"	49.3	124.3	57.15	7833350	32.00	49.3	124.3	60.0	7833357
24.5	5988837	5988483	7333075	1"	49.3	124.3	57.15	7833350	32.00	49.3	124.3	60.0	7833357
31/32	5988934	5988572	7333076	1"	49.3	124.3	57.15	7833350	32.00	49.3	124.3	60.0	7833357
25.0	5988840	5988488	7333077	1.1/4	49.7	124.7	60.33	7833351	32.00	49.7	124.7	60.0	7833358
63/64	5988902	5988658	7333078	1.1/4	49.7	124.7	60.33	7833351	32.00	49.7	124.7	60.0	7833358
1	5988604	5988905	7333079	1.1/4	49.7	124.7	60.33	7833351	32.00	49.7	124.7	60.0	7833358
25.5	5988843	5988499	7333080	1.1/4	49.7	124.7	60.33	7833351	32.00	49.7	124.7	60.0	7833358
25.65	5988847	5988506	7333081	1.1/4	49.7	124.7	60.33	7833351	32.00	49.7	124.7	60.0	7833358
1.1/64	5988676	5988909	7333082	1.1/4	49.7	124.7	60.33	7833351	32.00	49.7	124.7	60.0	7833358
26.0	5988855	5988516	7333083	1.1/4	52.3	127.3	60.33	7833352	32.00	52.3	127.3	60.0	7833359
1.1/32	5988650	5988908	7333084	1.1/4	52.3	127.3	60.33	7833352	32.00	52.3	127.3	60.0	7833359
26.5	5988858	5988519	7333085	1.1/4	52.3	127.3	60.33	7833352	32.00	52.3	127.3	60.0	7833359
1.3/64	5988744	5988914	7333086	1.1/4	52.3	127.3	60.33	7833352	32.00	52.3	127.3	60.0	7833359
1.1/16	5988637	5988907	7333087	1.1/4	52.8	127.8	60.33	7833353	32.00	52.8	127.8	60.0	7833360
27.0	5988861	5988523	7333088	1.1/4	52.8	127.8	60.33	7833353	32.00	52.8	127.8	60.0	7833360
1.5/64	5988611	5988916	7333089	1.1/4	52.8	127.8	60.33	7833353	32.00	52.8	127.8	60.0	7833360
27.5	5988865	5988528	7333090	1.1/4	52.8	127.8	60.33	7833353	32.00	52.8	127.8	60.0	7833360
1.3/32	5988739	5988913	7333091	1.1/4	52.8	127.8	60.33	7833353	32.00	52.8	127.8	60.0	7833360
28.0	5988876	5988535	7333092	1.1/4	54.4	129.4	60.33	7833354	32.00	54.4	129.4	60.0	7833361
1.7/64	5988614	5988918	7333093	1.1/4	54.4	129.4	60.33	7833354	32.00	54.4	129.4	60.0	7833361
28.5	5988844	5988540	7333094	1.1/4	54.4	129.4	60.33	7833354	32.00	54.4	129.4	60.0	7833361
1.1/8	5988720	5988910	7333095	1.1/4	54.4	129.4	60.33	7833354	32.00	54.4	129.4	60.0	7833361
1.9/64	5988617	5988919	7333096	1.1/4	55.8	130.8	60.33	7833355	32.00	55.8	130.8	60.0	7833362
29.0	5988888	5988548	7333097	1.1/4	55.8	130.8	60.33	7833355	32.00	55.8	130.8	60.0	7833362
1.5/32	5988608	5988915	7333098	1.1/4	55.8	130.8	60.33	7833355	32.00	55.8	130.8	60.0	7833362
29.5	5988906	5988552	7333099	1.1/4	55.8	130.8	60.33	7833355	32.00	55.8	130.8	60.0	7833362
1.11/64	5988730	5988911	7333100	1.1/4	55.8	130.8	60.33	7833355	32.00	55.8	130.8	60.0	7833362
30.0	5988930	5988564	7333101	1.1/4	58.4	133.4	60.33	7833356	32.00	58.4	133.4	60.0	7833363
1.3/16	5988735	5988912	7333102	1.1/4	58.4	133.4	60.33	7833356	32.00	58.4	133.4	60.0	7833363
30.5	5988932	5988568	7333103	1.1/4	58.4	133.4	60.33	7833356	32.00	58.4	133.4	60.0	7833363

3xD Hydra Bodies

H853

Cylindrical shank with flat for multi-purpose tool holding. Allows accurate clamping for reliable use of internal coolant.



Four (4) screws and one (1) screwdriver are included with a drill body

- * Fractional bodies have straight flat on shank
- * Metric bodies have whistle notch on shank
- * For more information on Hydra, see page 539



Hydra Head d ₁ Ø	Hydra Head R950 EDP#	Hydra Head R960 EDP#	Hydra Head R970 EDP#	3xD Hydra Body - Fractional Shank					3xD Hydra Body - Metric Shank				
				d ₂ Øh ₆ inch	l ₂ mm	l ₁ mm	l ₃ mm	H853 EDP#	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	l ₃ mm	H853 EDP#
15/32	5988695	5988758	7332946	5/8	44.0	105.0	48.0	5988068	16.0	44.0	105.0	48.0	5988132
12.0	5988624	5988922	7332947	5/8	44.0	105.0	48.0	5988068	16.0	44.0	105.0	48.0	5988132
12.1	5988627	5988923	7332948	5/8	44.0	105.0	48.0	5988068	16.0	44.0	105.0	48.0	5988132
12.2	5988630	5988924	7332949	5/8	44.0	105.0	48.0	5988068	16.0	44.0	105.0	48.0	5988132
31/64	5988936	5988575	7332980	5/8	44.0	105.0	48.0	5988068	16.0	44.0	105.0	48.0	5988132
12.5	5988633	5988925	7332981	5/8	44.0	105.0	48.0	5988126	16.0	44.0	105.0	48.0	5987969
12.6	5988640	5988926	7332982	5/8	44.0	105.0	48.0	5988126	16.0	44.0	105.0	48.0	5987969
1/2	5988620	5988920	7332983	5/8	44.0	105.0	48.0	5988126	16.0	44.0	105.0	48.0	5987969
12.8	5988641	5988927	7332984	5/8	44.0	105.0	48.0	5988126	16.0	44.0	105.0	48.0	5987969
12.9	5988642	5988929	7332985	5/8	44.0	105.0	48.0	5988126	16.0	44.0	105.0	48.0	5987969
13.0	5988643	5988685	7332986	5/8	47.0	110.0	48.0	5987992	16.0	47.0	110.0	48.0	5987973
33/64	5988850	5988579	7332987	5/8	47.0	110.0	48.0	5987992	16.0	47.0	110.0	48.0	5987973
13.2	5988644	5988737	7332988	5/8	47.0	110.0	48.0	5987992	16.0	47.0	110.0	48.0	5987973
17/32	5988697	5988831	7332989	5/8	47.0	110.0	48.0	5987992	16.0	47.0	110.0	48.0	5987973
13.5	5988645	5988791	7332990	3/4	52.5	116.5	48.0	5988093	16.0	52.5	116.5	48.0	5987976
13.6	5988646	5988839	7332991	3/4	52.5	116.5	48.0	5988093	16.0	52.5	116.5	48.0	5987976
13.7	5988647	5988883	7332992	3/4	52.5	116.5	48.0	5988093	16.0	52.5	116.5	48.0	5987976
13.8	5988648	5988889	7332993	3/4	52.5	116.5	48.0	5988093	16.0	52.5	116.5	48.0	5987976
35/64	5988854	5988583	7332994	3/4	52.5	116.5	48.0	5988093	16.0	52.5	116.5	48.0	5987976
14.0	5988652	5988895	7332995	3/4	52.5	116.5	48.0	5988093	16.0	52.5	116.5	48.0	5987976
14.1	5988655	5988897	7332996	3/4	52.5	116.5	48.0	5988093	16.0	52.5	116.5	48.0	5987976
14.2	5988657	5988692	7332997	3/4	52.5	116.5	48.0	5988093	16.0	52.5	116.5	48.0	5987976
9/16	5988904	5988664	7332998	3/4	52.5	116.5	48.0	5988093	16.0	52.5	116.5	48.0	5987976
14.5	5988660	5988696	7332999	3/4	52.5	116.5	48.0	5988093	16.0	52.5	116.5	48.0	5987976
14.6	5988663	5988700	7333000	3/4	55.5	126.5	50.0	5988072	20.0	55.5	126.5	50.0	5987979
37/64	5988857	5988591	7333001	3/4	55.5	126.5	50.0	5988072	20.0	55.5	126.5	50.0	5987979
14.7	5988666	5988705	7333002	3/4	55.5	126.5	50.0	5988072	20.0	55.5	126.5	50.0	5987979
14.8	5988668	5988709	7333003	3/4	55.5	126.5	50.0	5988072	20.0	55.5	126.5	50.0	5987979
15.0	5988670	5988714	7333004	3/4	55.5	126.5	50.0	5988072	20.0	55.5	126.5	50.0	5987979
19/32	5988779	5988621	7333005	3/4	55.5	126.5	50.0	5988072	20.0	55.5	126.5	50.0	5987979
15.1	5988672	5988719	7333006	3/4	55.5	126.5	50.0	5988072	20.0	55.5	126.5	50.0	5987979
15.2	5988674	5988724	7333007	3/4	55.5	126.5	50.0	5988072	20.0	55.5	126.5	50.0	5987979
15.24	5988678	5988729	7333008	3/4	55.5	126.5	50.0	5988072	20.0	55.5	126.5	50.0	5987979
39/64	5988860	5988595	7333009	3/4	55.5	126.5	50.0	5988072	20.0	55.5	126.5	50.0	5987979
15.5	5988680	5988734	7333010	3/4	55.5	126.5	50.0	5988072	20.0	55.5	126.5	50.0	5987979

HYDRA DRILL



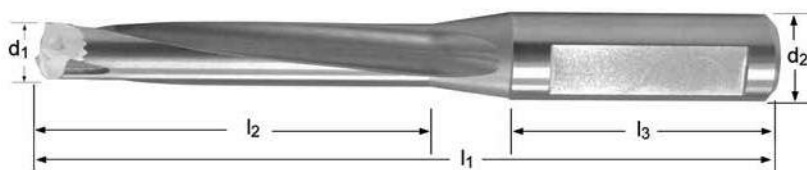
Hydra Head d ₁ Ø	Hydra Head R950 EDP#	Hydra Head R960 EDP#	Hydra Head R970 EDP#	3xD Hydra Body - Fractional Shank					3xD Hydra Body - Metric Shank				
				d ₂ Øh ₆ inch	l ₂ mm	l ₁ mm	l ₃ mm	H853 EDP#	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	l ₃ mm	H853 EDP#
15.6	5988683	5988742	7333011	3/4	59.5	131.5	50.0	5988076	20.0	59.5	131.5	50.0	5987983
15.7	5988687	5988747	7333012	3/4	59.5	131.5	50.0	5988076	20.0	59.5	131.5	50.0	5987983
5/8	5988884	5988612	7333013	3/4	59.5	131.5	50.0	5988076	20.0	59.5	131.5	50.0	5987983
16.0	5988698	5988763	7333014	3/4	59.5	131.5	50.0	5988076	20.0	59.5	131.5	50.0	5987983
16.08	5988702	5988769	7333015	3/4	59.5	131.5	50.0	5988076	20.0	59.5	131.5	50.0	5987983
16.1	5988710	5988773	7333016	3/4	59.5	131.5	50.0	5988076	20.0	59.5	131.5	50.0	5987983
16.2	5988715	5988777	7333017	3/4	59.5	131.5	50.0	5988076	20.0	59.5	131.5	50.0	5987983
41/64	5988864	5988599	7333018	3/4	59.5	131.5	50.0	5988076	20.0	59.5	131.5	50.0	5987983
16.3	5988725	5988783	7333019	3/4	59.5	131.5	50.0	5988076	20.0	59.5	131.5	50.0	5987983
16.5	5988690	5988787	7333020	3/4	59.5	131.5	50.0	5988076	20.0	59.5	131.5	50.0	5987983
16.6	5988749	5988795	7333021	3/4	62.5	136.5	50.0	5988129	20.0	62.5	136.5	50.0	5987987
21/32	5988802	5988443	7333022	3/4	62.5	136.5	50.0	5988129	20.0	62.5	136.5	50.0	5987987
16.7	5988790	5988799	7333023	3/4	62.5	136.5	50.0	5988129	20.0	62.5	136.5	50.0	5987987
17.0	5988833	5988803	7333024	3/4	62.5	136.5	50.0	5988129	20.0	62.5	136.5	50.0	5987987
43/64	5988867	5988601	7333025	3/4	62.5	136.5	50.0	5988129	20.0	62.5	136.5	50.0	5987987
17.1	5988873	5988807	7333026	3/4	62.5	136.5	50.0	5988129	20.0	62.5	136.5	50.0	5987987
17.2	5988881	5988811	7333027	3/4	62.5	136.5	50.0	5988129	20.0	62.5	136.5	50.0	5987987
11/16	5988623	5988921	7333028	3/4	62.5	136.5	50.0	5988129	20.0	62.5	136.5	50.0	5987987
17.5	5988885	5988818	7333029	3/4	62.5	136.5	50.0	5988129	20.0	62.5	136.5	50.0	5987987
17.6	5988891	5988823	7333030	3/4	66.5	141.5	50.0	5988025	20.0	66.5	141.5	50.0	5987996
17.7	5988894	5988827	7333031	3/4	66.5	141.5	50.0	5988025	20.0	66.5	141.5	50.0	5987996
45/64	5988872	5988603	7333032	3/4	66.5	141.5	50.0	5988025	20.0	66.5	141.5	50.0	5987996
18.0	5988701	5988835	7333033	3/4	66.5	141.5	50.0	5988025	20.0	66.5	141.5	50.0	5987996
18.1	5988706	5988841	7333034	3/4	66.5	141.5	50.0	5988025	20.0	66.5	141.5	50.0	5987996
18.2	5988713	5988845	7333035	3/4	66.5	141.5	50.0	5988025	20.0	66.5	141.5	50.0	5987996
23/32	5988824	5988471	7333036	3/4	66.5	141.5	50.0	5988025	20.0	66.5	141.5	50.0	5987996
18.5	5988718	5988848	7333037	3/4	66.5	141.5	50.0	5988025	20.0	66.5	141.5	50.0	5987996
18.6	5988723	5988853	7333038	1	69.5	156.5	56.0	5988079	25.0	69.5	156.5	56.0	5987999
47/64	5988877	5988606	7333039	1	69.5	156.5	56.0	5988079	25.0	69.5	156.5	56.0	5987999
18.7	5988728	5988856	7333040	1	69.5	156.5	56.0	5988079	25.0	69.5	156.5	56.0	5987999
18.9	5988733	5988863	7333041	1	69.5	156.5	56.0	5988079	25.0	69.5	156.5	56.0	5987999
19.0	5988740	5988868	7333042	1	69.5	156.5	56.0	5988079	25.0	69.5	156.5	56.0	5987999
3/4	5988928	5988559	7333043	1	69.5	156.5	56.0	5988079	25.0	69.5	156.5	56.0	5987999
19.1	5988745	5988871	7333044	1	69.5	156.5	56.0	5988079	25.0	69.5	156.5	56.0	5987999
19.2	5988752	5988875	7333045	1	69.5	156.5	56.0	5988079	25.0	69.5	156.5	56.0	5987999
19.25	5988756	5988879	7333046	1	69.5	156.5	56.0	5988079	25.0	69.5	156.5	56.0	5987999
19.3	5988760	5988887	7333047	1	69.5	156.5	56.0	5988079	25.0	69.5	156.5	56.0	5987999
19.35	5988764	5988438	7333048	1	69.5	156.5	56.0	5988079	25.0	69.5	156.5	56.0	5987999
49/64	5988880	5988609	7333049	1	69.5	156.5	56.0	5988079	25.0	69.5	156.5	56.0	5987999
19.5	5988767	5988495	7333050	1	69.5	156.5	56.0	5988079	25.0	69.5	156.5	56.0	5987999
19.6	5988771	5988544	7333051	1	73.5	156.5	56.0	5988083	25.0	73.5	156.5	56.0	5988003
19.7	5988775	5988587	7333052	1	73.5	156.5	56.0	5988083	25.0	73.5	156.5	56.0	5988003
25/32	5988851	5988511	7333053	1	73.5	156.5	56.0	5988083	25.0	73.5	156.5	56.0	5988003
20.0	5988782	5988629	7333054	1	73.5	156.5	56.0	5988083	25.0	73.5	156.5	56.0	5988003
51/64	5988892	5988615	7333055	1	73.5	156.5	56.0	5988083	25.0	73.5	156.5	56.0	5988003
20.5	5988786	5988632	7333056	1	73.5	156.5	56.0	5988083	25.0	73.5	156.5	56.0	5988003
13/16	5988649	5988893	7333057	1	76.5	156.5	56.0	5988045	25.0	76.5	156.5	56.0	5988013
21.0	5988794	5988635	7333058	1	76.5	156.5	56.0	5988045	25.0	76.5	156.5	56.0	5988013
53/64	5988896	5988618	7333059	1	76.5	156.5	56.0	5988045	25.0	76.5	156.5	56.0	5988013
27/32	5988869	5988531	7333060	1	76.5	156.5	56.0	5988045	25.0	76.5	156.5	56.0	5988013
21.5	5988798	5988638	7333061	1	76.5	156.5	56.0	5988045	25.0	76.5	156.5	56.0	5988013
55/64	5988898	5988626	7333062	1	80.1	161.5	56.0	5988086	25.0	80.1	161.5	56.0	5988017
22.0	5988806	5988448	7333063	1	80.1	161.5	56.0	5988086	25.0	80.1	161.5	56.0	5988017
7/8	5988903	5988661	7333064	1	80.1	161.5	56.0	5988086	25.0	80.1	161.5	56.0	5988017
22.5	5988810	5988453	7333065	1	80.1	161.5	56.0	5988086	25.0	80.1	161.5	56.0	5988017
57/64	5988899	5988651	7333066	1	80.1	161.5	56.0	5988086	25.0	80.1	161.5	56.0	5988017
22.7	5988814	5988458	7333067	1	80.1	161.5	56.0	5988086	25.0	80.1	161.5	56.0	5988017
23.0	5988816	5988462	7333068	1	82.5	160.5	56.0	5988089	25.0	82.5	160.5	56.0	5988021
29/32	5988917	5988556	7333069	1	82.5	160.5	56.0	5988089	25.0	82.5	160.5	56.0	5988021
59/64	5988900	5988653	7333070	1	82.5	160.5	56.0	5988089	25.0	82.5	160.5	56.0	5988021
23.5	5988820	5988466	7333071	1	82.5	160.5	56.0	5988089	25.0	82.5	160.5	56.0	5988021

Hydra Head d ₁ Ø	Hydra Head R950 EDP#	Hydra Head R960 EDP#	Hydra Head R970 EDP#	3xD Hydra Body - Fractional Shank					3xD Hydra Body - Metric Shank				
				d ₂ Øh ₆ inch	l ₂ mm	l ₁ mm	l ₃ mm	H853 EDP#	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	l ₃ mm	H853 EDP#
15/16	5988691	5988754	7333072	1	86.2	170.2	60.0	5988064	32.0	86.2	170.2	60.0	5988029
24.0	5988828	5988476	7333073	1	86.2	170.2	60.0	5988064	32.0	86.2	170.2	60.0	5988029
61/64	5988901	5988656	7333074	1	86.2	170.2	60.0	5988064	32.0	86.2	170.2	60.0	5988029
24.5	5988837	5988483	7333075	1	86.2	170.2	60.0	5988064	32.0	86.2	170.2	60.0	5988029
31/32	5988934	5988572	7333076	1	86.2	170.2	60.0	5988064	32.0	86.2	170.2	60.0	5988029
25.0	5988840	5988488	7333077	1.1/4	88.0	170.0	60.0	5987965	32.0	88.0	170.0	60.0	5988033
63/64	5988902	5988658	7333078	1.1/4	88.0	170.0	60.0	5987965	32.0	88.0	170.0	60.0	5988033
1	5988604	5988905	7333079	1.1/4	88.0	170.0	60.0	5987965	32.0	88.0	170.0	60.0	5988033
25.5	5988843	5988499	7333080	1.1/4	88.0	170.0	60.0	5987965	32.0	88.0	170.0	60.0	5988033
25.65	5988847	5988506	7333081	1.1/4	88.0	170.0	60.0	5987965	32.0	88.0	170.0	60.0	5988033
1.1/64	5988676	5988909	7333082	1.1/4	88.0	170.0	60.0	5987965	32.0	88.0	170.0	60.0	5988033
26.0	5988855	5988516	7333083	1.1/4	92.0	175.0	60.0	5988123	32.0	92.0	175.0	60.0	5988037
1.1/32	5988650	5988908	7333084	1.1/4	92.0	175.0	60.0	5988123	32.0	92.0	175.0	60.0	5988037
26.5	5988858	5988519	7333085	1.1/4	92.0	175.0	60.0	5988123	32.0	92.0	175.0	60.0	5988037
1.3/64	5988744	5988914	7333086	1.1/4	92.0	175.0	60.0	5988123	32.0	92.0	175.0	60.0	5988037
1.1/16	5988637	5988907	7333087	1.1/4	94.0	175.0	60.0	5988118	32.0	94.0	175.0	60.0	5988042
27.0	5988861	5988523	7333088	1.1/4	94.0	175.0	60.0	5988118	32.0	94.0	175.0	60.0	5988042
1.5/64	5988611	5988916	7333089	1.1/4	94.0	175.0	60.0	5988118	32.0	94.0	175.0	60.0	5988042
27.5	5988865	5988528	7333090	1.1/4	94.0	175.0	60.0	5988118	32.0	94.0	175.0	60.0	5988042
1.3/32	5988739	5988913	7333091	1.1/4	94.0	175.0	60.0	5988118	32.0	94.0	175.0	60.0	5988042
28.0	5988876	5988535	7333092	1.1/4	97.0	180.0	60.0	5988007	32.0	97.0	180.0	60.0	5988050
1.7/64	5988614	5988918	7333093	1.1/4	97.0	180.0	60.0	5988007	32.0	97.0	180.0	60.0	5988050
28.5	5988844	5988540	7333094	1.1/4	97.0	180.0	60.0	5988007	32.0	97.0	180.0	60.0	5988050
1.1/8	5988720	5988910	7333095	1.1/4	97.0	180.0	60.0	5988007	32.0	97.0	180.0	60.0	5988050
1.9/64	5988617	5988919	7333096	1.1/4	100.0	185.0	60.0	5988053	32.0	100.0	185.0	60.0	5988057
29.0	5988888	5988548	7333097	1.1/4	100.0	185.0	60.0	5988053	32.0	100.0	185.0	60.0	5988057
1.5/32	5988608	5988915	7333098	1.1/4	100.0	185.0	60.0	5988053	32.0	100.0	185.0	60.0	5988057
29.5	5988906	5988552	7333099	1.1/4	100.0	185.0	60.0	5988053	32.0	100.0	185.0	60.0	5988057
1.11/64	5988730	5988911	7333100	1.1/4	100.0	185.0	60.0	5988053	32.0	100.0	185.0	60.0	5988057
30.0	5988930	5988564	7333101	1.1/4	104.0	185.0	60.0	5988091	32.0	104.0	185.0	60.0	5988061
1.3/16	5988735	5988912	7333102	1.1/4	104.0	185.0	60.0	5988091	32.0	104.0	185.0	60.0	5988061
30.5	5988932	5988568	7333103	1.1/4	104.0	185.0	60.0	5988091	32.0	104.0	185.0	60.0	5988061
1.7/32	6104481	—	7333104	—	—	—	—	—	32.0	111.5	196.5	60.0	6111405
31.00	6104482	—	7333105	—	—	—	—	—	32.0	111.5	196.5	60.0	6111405
1.1/4	6104483	—	7333106	—	—	—	—	—	32.0	111.5	196.5	60.0	6111405
32.00	6104484	—	7333107	—	—	—	—	—	32.0	111.5	196.5	60.0	6111405
32.50	6104485	—	7333108	—	—	—	—	—	32.0	116.5	201.5	60.0	6111406
1.19/64	6104486	—	7333109	—	—	—	—	—	32.0	116.5	201.5	60.0	6111406
33.00	6104487	—	7333110	—	—	—	—	—	32.0	116.5	201.5	60.0	6111406
33.50	6104488	—	7333111	—	—	—	—	—	32.0	116.5	201.5	60.0	6111406
34.00	6104489	—	7333112	—	—	—	—	—	40.0	121.5	216.5	70.0	6111407
1.11/32	6104530	—	7333113	—	—	—	—	—	40.0	121.5	216.5	70.0	6111407
34.50	6104531	—	7333114	—	—	—	—	—	40.0	121.5	216.5	70.0	6111407
1.3/8	6104532	—	7333115	—	—	—	—	—	40.0	121.5	216.5	70.0	6111407
35.00	6104533	—	7333116	—	—	—	—	—	40.0	121.5	216.5	70.0	6111407
36.00	6104534	—	7333117	—	—	—	—	—	40.0	125.5	221.5	70.0	6111408
1.27/64	6104535	—	7333118	—	—	—	—	—	40.0	125.5	221.5	70.0	6111408
36.50	6104536	—	7333119	—	—	—	—	—	40.0	125.5	221.5	70.0	6111408
37.00	6104537	—	7333120	—	—	—	—	—	40.0	131.5	226.5	70.0	6111409
1.15/32	6104538	—	7333121	—	—	—	—	—	40.0	131.5	226.5	70.0	6111409
37.50	6104539	—	7333122	—	—	—	—	—	40.0	131.5	226.5	70.0	6111409
38.00	6104540	—	7333123	—	—	—	—	—	40.0	131.5	226.5	70.0	6111409
1.1/2	6104541	—	7333124	—	—	—	—	—	40.0	136.5	231.5	70.0	6111410
38.50	6104542	—	7333125	—	—	—	—	—	40.0	136.5	231.5	70.0	6111410
1.17/32	6104543	—	7333126	—	—	—	—	—	40.0	136.5	231.5	70.0	6111410
39.00	6104544	—	7333127	—	—	—	—	—	40.0	136.5	231.5	70.0	6111410
39.50	6104545	—	7333128	—	—	—	—	—	40.0	136.5	231.5	70.0	6111410
1.9/16	6104546	—	7333129	—	—	—	—	—	40.0	146.5	246.5	70.0	6111411
40.00	6104547	—	7333130	—	—	—	—	—	40.0	146.5	246.5	70.0	6111411
41.00	6104548	—	7333131	—	—	—	—	—	40.0	146.5	246.5	70.0	6111411
1.5/8	6104549	—	7333132	—	—	—	—	—	40.0	151.5	251.5	70.0	6111412
42.00	6104550	—	7333133	—	—	—	—	—	40.0	151.5	251.5	70.0	6111412

5xD Hydra Bodies

H855

Cylindrical shank with flat for multi-purpose tool holding. Allows accurate clamping for reliable use of internal coolant.



Four (4) screws and one (1) screwdriver are included with a drill body

- * Fractional bodies have straight flat on shank
- * Metric bodies have whistle notch on shank
- * For more information on Hydra, see page 539

H855
Coolant
Through



5XD

HSS



15/32 - 42.00

Hydra Head d ₁ Ø	Hydra Head R950 EDP#	Hydra Head R960 EDP#	Hydra Head R970 EDP#	5xD Hydra Body - Fractional Shank					5xD Hydra Body - Metric Shank				
				d ₂ Øh ₆ inch	l ₂ mm	l ₁ mm	l ₃ mm	H855 EDP#	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	l ₃ mm	H855 EDP#
15/32	5988695	5988758	7332946	5/8	69.0	130.0	48.0	5988755	16.0	69.0	130.0	48.0	5988115
12.0	5988624	5988922	7332947	5/8	69.0	130.0	48.0	5988755	16.0	69.0	130.0	48.0	5988115
12.1	5988627	5988923	7332948	5/8	69.0	130.0	48.0	5988755	16.0	69.0	130.0	48.0	5988115
12.2	5988630	5988924	7332949	5/8	69.0	130.0	48.0	5988755	16.0	69.0	130.0	48.0	5988115
31/64	5988936	5988575	7332980	5/8	69.0	130.0	48.0	5988755	16.0	69.0	130.0	48.0	5988115
12.5	5988633	5988925	7332981	5/8	69.0	130.0	48.0	5988109	16.0	69.0	130.0	48.0	5988120
12.6	5988640	5988926	7332982	5/8	69.0	130.0	48.0	5988109	16.0	69.0	130.0	48.0	5988120
1/2	5988620	5988920	7332983	5/8	69.0	130.0	48.0	5988109	16.0	69.0	130.0	48.0	5988120
12.8	5988641	5988927	7332984	5/8	69.0	130.0	48.0	5988109	16.0	69.0	130.0	48.0	5988120
12.9	5988642	5988929	7332985	5/8	69.0	130.0	48.0	5988109	16.0	69.0	130.0	48.0	5988120
13.0	5988643	5988685	7332986	5/8	74.0	140.0	48.0	5988878	16.0	74.0	140.0	48.0	5988681
33/64	5988850	5988579	7332987	5/8	74.0	140.0	48.0	5988878	16.0	74.0	140.0	48.0	5988681
13.2	5988644	5988737	7332988	5/8	74.0	140.0	48.0	5988878	16.0	74.0	140.0	48.0	5988681
17/32	5988697	5988831	7332989	5/8	74.0	140.0	48.0	5988878	16.0	74.0	140.0	48.0	5988681
13.5	5988645	5988791	7332990	3/4	81.5	146.5	48.0	5988785	16.0	81.5	146.5	48.0	5988738
13.6	5988646	5988839	7332991	3/4	81.5	146.5	48.0	5988785	16.0	81.5	146.5	48.0	5988738
13.7	5988647	5988883	7332992	3/4	81.5	146.5	48.0	5988785	16.0	81.5	146.5	48.0	5988738
13.8	5988648	5988889	7332993	3/4	81.5	146.5	48.0	5988785	16.0	81.5	146.5	48.0	5988738
35/64	5988854	5988583	7332994	3/4	81.5	146.5	48.0	5988785	16.0	81.5	146.5	48.0	5988738
14.0	5988652	5988895	7332995	3/4	81.5	146.5	48.0	5988785	16.0	81.5	146.5	48.0	5988738
14.1	5988655	5988897	7332996	3/4	81.5	146.5	48.0	5988785	16.0	81.5	146.5	48.0	5988738
14.2	5988657	5988692	7332997	3/4	81.5	146.5	48.0	5988785	16.0	81.5	146.5	48.0	5988738
9/16	5988904	5988664	7332998	3/4	81.5	146.5	48.0	5988785	16.0	81.5	146.5	48.0	5988738
14.5	5988660	5988696	7332999	3/4	81.5	146.5	48.0	5988785	16.0	81.5	146.5	48.0	5988738
14.6	5988663	5988700	7333000	3/4	86.5	156.5	50.0	5988759	20.0	86.5	156.5	50.0	5988781
37/64	5988857	5988591	7333001	3/4	86.5	156.5	50.0	5988759	20.0	86.5	156.5	50.0	5988781
14.7	5988666	5988705	7333002	3/4	86.5	156.5	50.0	5988759	20.0	86.5	156.5	50.0	5988781
14.8	5988668	5988709	7333003	3/4	86.5	156.5	50.0	5988759	20.0	86.5	156.5	50.0	5988781
15.0	5988670	5988714	7333004	3/4	86.5	156.5	50.0	5988759	20.0	86.5	156.5	50.0	5988781
19/32	5988779	5988621	7333005	3/4	86.5	156.5	50.0	5988759	20.0	86.5	156.5	50.0	5988781

Hydra Head d ₁ Ø	Hydra Head R950 EDP#	Hydra Head R960 EDP#	Hydra Head R970 EDP#	5xD Hydra Body - Fractional Shank					5xD Hydra Body - Metric Shank				
				d ₂ Øh ₆ inch	l ₂ mm	l ₁ mm	l ₃ mm	H855 EDP#	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	l ₃ mm	H855 EDP#
15.1	5988672	5988719	7333006	3/4	86.5	156.5	50.0	5988759	20.0	86.5	156.5	50.0	5988781
15.2	5988674	5988724	7333007	3/4	86.5	156.5	50.0	5988759	20.0	86.5	156.5	50.0	5988781
15.24	5988678	5988729	7333008	3/4	86.5	156.5	50.0	5988759	20.0	86.5	156.5	50.0	5988781
39/64	5988860	5988595	7333009	3/4	86.5	156.5	50.0	5988759	20.0	86.5	156.5	50.0	5988781
15.5	5988680	5988734	7333010	3/4	86.5	156.5	50.0	5988759	20.0	86.5	156.5	50.0	5988781
15.6	5988683	5988742	7333011	3/4	92.5	166.5	50.0	5988762	20.0	92.5	166.5	50.0	5988825
15.7	5988687	5988747	7333012	3/4	92.5	166.5	50.0	5988762	20.0	92.5	166.5	50.0	5988825
5/8	5988884	5988612	7333013	3/4	92.5	166.5	50.0	5988762	20.0	92.5	166.5	50.0	5988825
16.0	5988698	5988763	7333014	3/4	92.5	166.5	50.0	5988762	20.0	92.5	166.5	50.0	5988825
16.08	5988702	5988769	7333015	3/4	92.5	166.5	50.0	5988762	20.0	92.5	166.5	50.0	5988825
16.1	5988710	5988773	7333016	3/4	92.5	166.5	50.0	5988762	20.0	92.5	166.5	50.0	5988825
16.2	5988715	5988777	7333017	3/4	92.5	166.5	50.0	5988762	20.0	92.5	166.5	50.0	5988825
41/64	5988864	5988599	7333018	3/4	92.5	166.5	50.0	5988762	20.0	92.5	166.5	50.0	5988825
16.3	5988725	5988783	7333019	3/4	92.5	166.5	50.0	5988762	20.0	92.5	166.5	50.0	5988825
16.5	5988690	5988787	7333020	3/4	92.5	166.5	50.0	5988762	20.0	92.5	166.5	50.0	5988825
16.6	5988749	5988795	7333021	3/4	97.5	171.5	50.0	5988112	20.0	97.5	171.5	50.0	5988870
21/32	5988802	5988443	7333022	3/4	97.5	171.5	50.0	5988112	20.0	97.5	171.5	50.0	5988870
16.7	5988790	5988799	7333023	3/4	97.5	171.5	50.0	5988112	20.0	97.5	171.5	50.0	5988870
17.0	5988833	5988803	7333024	3/4	97.5	171.5	50.0	5988112	20.0	97.5	171.5	50.0	5988870
43/64	5988867	5988601	7333025	3/4	97.5	171.5	50.0	5988112	20.0	97.5	171.5	50.0	5988870
17.1	5988873	5988807	7333026	3/4	97.5	171.5	50.0	5988112	20.0	97.5	171.5	50.0	5988870
17.2	5988881	5988811	7333027	3/4	97.5	171.5	50.0	5988112	20.0	97.5	171.5	50.0	5988870
11/16	5988623	5988921	7333028	3/4	97.5	171.5	50.0	5988112	20.0	97.5	171.5	50.0	5988870
17.5	5988885	5988818	7333029	3/4	97.5	171.5	50.0	5988112	20.0	97.5	171.5	50.0	5988870
17.6	5988891	5988823	7333030	3/4	103.5	176.5	50.0	5988703	20.0	103.5	176.5	50.0	5988882
17.7	5988894	5988827	7333031	3/4	103.5	176.5	50.0	5988703	20.0	103.5	176.5	50.0	5988882
45/64	5988872	5988603	7333032	3/4	103.5	176.5	50.0	5988703	20.0	103.5	176.5	50.0	5988882
18.0	5988701	5988835	7333033	3/4	103.5	176.5	50.0	5988703	20.0	103.5	176.5	50.0	5988882
18.1	5988706	5988841	7333034	3/4	103.5	176.5	50.0	5988703	20.0	103.5	176.5	50.0	5988882
18.2	5988713	5988845	7333035	3/4	103.5	176.5	50.0	5988703	20.0	103.5	176.5	50.0	5988882
23/32	5988824	5988471	7333036	3/4	103.5	176.5	50.0	5988703	20.0	103.5	176.5	50.0	5988882
18.5	5988718	5988848	7333037	3/4	103.5	176.5	50.0	5988703	20.0	103.5	176.5	50.0	5988882
18.6	5988723	5988853	7333038	1	108.5	191.5	56.0	5988766	25.0	108.5	191.5	56.0	5988886
47/64	5988877	5988606	7333039	1	108.5	191.5	56.0	5988766	25.0	108.5	191.5	56.0	5988886
18.7	5988728	5988856	7333040	1	108.5	191.5	56.0	5988766	25.0	108.5	191.5	56.0	5988886
18.9	5988733	5988863	7333041	1	108.5	191.5	56.0	5988766	25.0	108.5	191.5	56.0	5988886
19.0	5988740	5988868	7333042	1	108.5	191.5	56.0	5988766	25.0	108.5	191.5	56.0	5988886
3/4	5988928	5988559	7333043	1	108.5	191.5	56.0	5988766	25.0	108.5	191.5	56.0	5988886
19.1	5988745	5988871	7333044	1	108.5	191.5	56.0	5988766	25.0	108.5	191.5	56.0	5988886
19.2	5988752	5988875	7333045	1	108.5	191.5	56.0	5988766	25.0	108.5	191.5	56.0	5988886
19.25	5988756	5988879	7333046	1	108.5	191.5	56.0	5988766	25.0	108.5	191.5	56.0	5988886
19.3	5988760	5988887	7333047	1	108.5	191.5	56.0	5988766	25.0	108.5	191.5	56.0	5988886
19.35	5988764	5988438	7333048	1	108.5	191.5	56.0	5988766	25.0	108.5	191.5	56.0	5988886
49/64	5988880	5988609	7333049	1	108.5	191.5	56.0	5988766	25.0	108.5	191.5	56.0	5988886
19.5	5988767	5988495	7333050	1	108.5	191.5	56.0	5988766	25.0	108.5	191.5	56.0	5988886
19.6	5988771	5988544	7333051	1	114.5	196.5	56.0	5988770	25.0	114.5	196.5	56.0	5988890
19.7	5988775	5988587	7333052	1	114.5	196.5	56.0	5988770	25.0	114.5	196.5	56.0	5988890
25/32	5988851	5988511	7333053	1	114.5	196.5	56.0	5988770	25.0	114.5	196.5	56.0	5988890
20.0	5988782	5988629	7333054	1	114.5	196.5	56.0	5988770	25.0	114.5	196.5	56.0	5988890
51/64	5988892	5988615	7333055	1	114.5	196.5	56.0	5988770	25.0	114.5	196.5	56.0	5988890
20.5	5988786	5988632	7333056	1	114.5	196.5	56.0	5988770	25.0	114.5	196.5	56.0	5988890
13/16	5988649	5988893	7333057	1	119.5	196.5	56.0	5988726	25.0	119.5	196.5	56.0	5988686
21.0	5988794	5988635	7333058	1	119.5	196.5	56.0	5988726	25.0	119.5	196.5	56.0	5988686
53/64	5988896	5988618	7333059	1	119.5	196.5	56.0	5988726	25.0	119.5	196.5	56.0	5988686
27/32	5988869	5988531	7333060	1	119.5	196.5	56.0	5988726	25.0	119.5	196.5	56.0	5988686
21.5	5988798	5988638	7333061	1	119.5	196.5	56.0	5988726	25.0	119.5	196.5	56.0	5988686
55/64	5988898	5988626	7333062	1	125.1	201.1	56.0	5988774	25.0	125.1	201.1	56.0	5988689
22.0	5988806	5988448	7333063	1	125.1	201.1	56.0	5988774	25.0	125.1	201.1	56.0	5988689
7/8	5988903	5988661	7333064	1	125.1	201.1	56.0	5988774	25.0	125.1	201.1	56.0	5988689
22.5	5988810	5988453	7333065	1	125.1	201.1	56.0	5988774	25.0	125.1	201.1	56.0	5988689
57/64	5988899	5988651	7333066	1	125.1	201.1	56.0	5988774	25.0	125.1	201.1	56.0	5988689
22.7	5988814	5988458	7333067	1	125.1	201.1	56.0	5988774	25.0	125.1	201.1	56.0	5988689
23.0	5988816	5988462	7333068	1	129.5	210.5	56.0	5988778	25.0	129.5	210.5	56.0	5988694
29/32	5988917	5988556	7333069	1	129.5	210.5	56.0	5988778	25.0	129.5	210.5	56.0	5988694

HYDRA DRILL

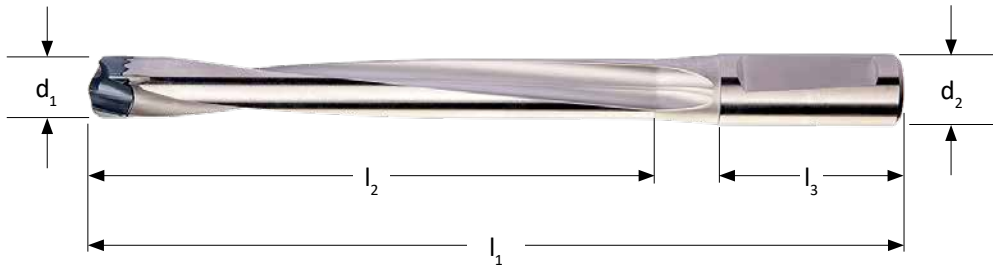


Hydra Head d ₁ Ø	Hydra Head R950 EDP#	Hydra Head R960 EDP#	Hydra Head R970 EDP#	5xD Hydra Body - Fractional Shank					5xD Hydra Body - Metric Shank				
				d ₂ Øh ₆ inch	l ₂ mm	l ₁ mm	l ₃ mm	H855 EDP#	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	l ₃ mm	H855 EDP#
59/64	5988900	5988653	7333070	1	129.5	210.5	56.0	5988778	25.0	129.5	210.5	56.0	5988694
23.5	5988820	5988466	7333071	1	129.5	210.5	56.0	5988778	25.0	129.5	210.5	56.0	5988694
15/16	5988691	5988754	7333072	1	135.2	220.2	60.0	5988751	32.0	135.2	220.2	60.0	5988707
24.0	5988828	5988476	7333073	1	135.2	220.2	60.0	5988751	32.0	135.2	220.2	60.0	5988707
61/64	5988901	5988656	7333074	1	135.2	220.2	60.0	5988751	32.0	135.2	220.2	60.0	5988707
24.5	5988837	5988483	7333075	1	135.2	220.2	60.0	5988751	32.0	135.2	220.2	60.0	5988707
31/32	5988934	5988572	7333076	1	135.2	220.2	60.0	5988751	32.0	135.2	220.2	60.0	5988707
25.0	5988840	5988488	7333077	1.1/4	140.0	225.0	60.0	5988095	32.0	140.0	225.0	60.0	5988711
63/64	5988902	5988658	7333078	1.1/4	140.0	225.0	60.0	5988095	32.0	140.0	225.0	60.0	5988711
1	5988604	5988905	7333079	1.1/4	140.0	225.0	60.0	5988095	32.0	140.0	225.0	60.0	5988711
25.5	5988843	5988499	7333080	1.1/4	140.0	225.0	60.0	5988095	32.0	140.0	225.0	60.0	5988711
25.65	5988847	5988506	7333081	1.1/4	140.0	225.0	60.0	5988095	32.0	140.0	225.0	60.0	5988711
1.1/64	5988676	5988909	7333082	1.1/4	140.0	225.0	60.0	5988095	32.0	140.0	225.0	60.0	5988711
26.0	5988855	5988516	7333083	1.1/4	146.0	230.0	60.0	5988106	32.0	146.0	230.0	60.0	5988716
1.1/32	5988650	5988908	7333084	1.1/4	146.0	230.0	60.0	5988106	32.0	146.0	230.0	60.0	5988716
26.5	5988858	5988519	7333085	1.1/4	146.0	230.0	60.0	5988106	32.0	146.0	230.0	60.0	5988716
1.3/64	5988744	5988914	7333086	1.1/4	146.0	230.0	60.0	5988106	32.0	146.0	230.0	60.0	5988716
1.1/16	5988637	5988907	7333087	1.1/4	151.0	235.0	60.0	5988104	32.0	151.0	235.0	60.0	5988722
27.0	5988861	5988523	7333088	1.1/4	151.0	235.0	60.0	5988104	32.0	151.0	235.0	60.0	5988722
1.5/64	5988611	5988916	7333089	1.1/4	151.0	235.0	60.0	5988104	32.0	151.0	235.0	60.0	5988722
27.5	5988865	5988528	7333090	1.1/4	151.0	235.0	60.0	5988104	32.0	151.0	235.0	60.0	5988722
1.3/32	5988739	5988913	7333091	1.1/4	151.0	235.0	60.0	5988104	32.0	151.0	235.0	60.0	5988722
28.0	5988876	5988535	7333092	1.1/4	157.0	240.0	60.0	5988097	32.0	157.0	240.0	60.0	5988732
1.7/64	5988614	5988918	7333093	1.1/4	157.0	240.0	60.0	5988097	32.0	157.0	240.0	60.0	5988732
28.5	5988844	5988540	7333094	1.1/4	157.0	240.0	60.0	5988097	32.0	157.0	240.0	60.0	5988732
1.1/8	5988720	5988910	7333095	1.1/4	157.0	240.0	60.0	5988097	32.0	157.0	240.0	60.0	5988732
1.9/64	5988617	5988919	7333096	1.1/4	162.0	245.0	60.0	5988099	32.0	162.0	245.0	60.0	5988743
29.0	5988888	5988548	7333097	1.1/4	162.0	245.0	60.0	5988099	32.0	162.0	245.0	60.0	5988743
1.5/32	5988608	5988915	7333098	1.1/4	162.0	245.0	60.0	5988099	32.0	162.0	245.0	60.0	5988743
29.5	5988906	5988552	7333099	1.1/4	162.0	245.0	60.0	5988099	32.0	162.0	245.0	60.0	5988743
1.11/64	5988730	5988911	7333100	1.1/4	162.0	245.0	60.0	5988099	32.0	162.0	245.0	60.0	5988743
30.0	5988930	5988564	7333101	1.1/4	167.0	255.0	60.0	5988101	32.0	167.0	255.0	60.0	5988748
1.3/16	5988735	5988912	7333102	1.1/4	167.0	255.0	60.0	5988101	32.0	167.0	255.0	60.0	5988748
30.5	5988932	5988568	7333103	1.1/4	167.0	255.0	60.0	5988101	32.0	167.0	255.0	60.0	5988748
1.7/32	6104481	—	7333104	—	—	—	—	—	32.0	176.5	261.5	60.0	6111413
31.00	6104482	—	7333105	—	—	—	—	—	32.0	176.5	261.5	60.0	6111413
1.1/4	6104483	—	7333106	—	—	—	—	—	32.0	176.5	261.5	60.0	6111413
32.00	6104484	—	7333107	—	—	—	—	—	32.0	176.5	261.5	60.0	6111413
32.50	6104485	—	7333108	—	—	—	—	—	32.0	186.5	271.5	60.0	6111414
1.19/64	6104486	—	7333109	—	—	—	—	—	32.0	186.5	271.5	60.0	6111414
33.00	6104487	—	7333110	—	—	—	—	—	32.0	186.5	271.5	60.0	6111414
33.50	6104488	—	7333111	—	—	—	—	—	32.0	186.5	271.5	60.0	6111414
34.00	6104489	—	7333112	—	—	—	—	—	40.0	196.5	291.5	70.0	6111415
1.11/32	6104530	—	7333113	—	—	—	—	—	40.0	196.5	291.5	70.0	6111415
34.50	6104531	—	7333114	—	—	—	—	—	40.0	196.5	291.5	70.0	6111415
1.3/8	6104532	—	7333115	—	—	—	—	—	40.0	196.5	291.5	70.0	6111415
35.00	6104533	—	7333116	—	—	—	—	—	40.0	196.5	291.5	70.0	6111415
36.00	6104534	—	7333117	—	—	—	—	—	40.0	201.5	296.5	70.0	6111416
1.27/64	6104535	—	7333118	—	—	—	—	—	40.0	201.5	296.5	70.0	6111416
36.50	6104536	—	7333119	—	—	—	—	—	40.0	201.5	296.5	70.0	6111416
37.00	6104537	—	7333120	—	—	—	—	—	40.0	211.5	306.5	70.0	6111417
1.15/32	6104538	—	7333121	—	—	—	—	—	40.0	211.5	306.5	70.0	6111417
37.50	6104539	—	7333122	—	—	—	—	—	40.0	211.5	306.5	70.0	6111417
38.00	6104540	—	7333123	—	—	—	—	—	40.0	211.5	306.5	70.0	6111417
1.1/2	6104541	—	7333124	—	—	—	—	—	40.0	211.5	316.5	70.0	6111418
38.50	6104542	—	7333125	—	—	—	—	—	40.0	211.5	316.5	70.0	6111418
1.17/32	6104543	—	7333126	—	—	—	—	—	40.0	211.5	316.5	70.0	6111418
39.00	6104544	—	7333127	—	—	—	—	—	40.0	211.5	316.5	70.0	6111418
39.50	6104545	—	7333128	—	—	—	—	—	40.0	211.5	316.5	70.0	6111418
1.9/16	6104546	—	7333129	—	—	—	—	—	40.0	226.5	325.5	70.0	6111419
40.00	6104547	—	7333130	—	—	—	—	—	40.0	226.5	325.5	70.0	6111419
41.00	6104548	—	7333131	—	—	—	—	—	40.0	226.5	325.5	70.0	6111419
1.5/8	6104549	—	7333132	—	—	—	—	—	40.0	236.5	336.5	70.0	6111420
42.00	6104550	—	7333133	—	—	—	—	—	40.0	236.5	336.5	70.0	6111420

8xD Hydra Bodies

H858

Cylindrical shank with flat for multi-purpose tool holding. Allows accurate clamping for reliable use of internal coolant.



Four (4) screws and one (1) screwdriver are included with a drill body

- * Metric bodies have whistle notch on shank
- * For more information on Hydra, see page 539



Hydra Head $d_1 \text{ } \varnothing$	Hydra Head R950 EDP#	Hydra Head R960 EDP#	Hydra Head R970 EDP#	8xD Hydra Body - Metric Shank					8xD Hydra Body - Metric Shank				
				$d_2 \text{ } \varnothing h_6$ mm	l_2 mm	l_1 mm	l_3 mm	H858 EDP#	$d_2 \text{ } \varnothing h_6$ mm	l_2 mm	l_1 mm	l_3 mm	H858 EDP#
13.5	5988645	5988791	7332990	—	—	—	—	—	16.0	124.5	191.5	48.0	5988789
13.6	5988646	5988839	7332991	—	—	—	—	—	16.0	124.5	191.5	48.0	5988789
13.7	5988647	5988883	7332992	—	—	—	—	—	16.0	124.5	191.5	48.0	5988789
13.8	5988648	5988889	7332993	—	—	—	—	—	16.0	124.5	191.5	48.0	5988789
35/64	5988854	5988583	7332994	—	—	—	—	—	16.0	124.5	191.5	48.0	5988789
14.0	5988652	5988895	7332995	—	—	—	—	—	16.0	124.5	191.5	48.0	5988789
14.1	5988655	5988897	7332996	—	—	—	—	—	16.0	124.5	191.5	48.0	5988789
14.2	5988657	5988692	7332997	—	—	—	—	—	16.0	124.5	191.5	48.0	5988789
9/16	5988904	5988664	7332998	—	—	—	—	—	16.0	124.5	191.5	48.0	5988789
14.5	5988660	5988696	7332999	—	—	—	—	—	16.0	124.5	191.5	48.0	5988789
14.6	5988663	5988700	7333000	—	—	—	—	—	20.0	133.5	201.5	50.0	5988793
37/64	5988857	5988591	7333001	—	—	—	—	—	20.0	133.5	201.5	50.0	5988793
14.7	5988666	5988705	7333002	—	—	—	—	—	20.0	133.5	201.5	50.0	5988793
14.8	5988668	5988709	7333003	—	—	—	—	—	20.0	133.5	201.5	50.0	5988793
15.0	5988670	5988714	7333004	—	—	—	—	—	20.0	133.5	201.5	50.0	5988793
19/32	5988779	5988621	7333005	—	—	—	—	—	20.0	133.5	201.5	50.0	5988793
15.1	5988672	5988719	7333006	—	—	—	—	—	20.0	133.5	201.5	50.0	5988793
15.2	5988674	5988724	7333007	—	—	—	—	—	20.0	133.5	201.5	50.0	5988793
15.24	5988678	5988729	7333008	—	—	—	—	—	20.0	133.5	201.5	50.0	5988793
39/64	5988860	5988595	7333009	—	—	—	—	—	20.0	133.5	201.5	50.0	5988793
15.5	5988680	5988734	7333010	—	—	—	—	—	20.0	133.5	201.5	50.0	5988793
15.6	5988683	5988742	7333011	—	—	—	—	—	20.0	141.5	211.5	50.0	5988797
15.7	5988687	5988747	7333012	—	—	—	—	—	20.0	141.5	211.5	50.0	5988797
5/8	5988884	5988612	7333013	—	—	—	—	—	20.0	141.5	211.5	50.0	5988797
16.0	5988698	5988763	7333014	—	—	—	—	—	20.0	141.5	211.5	50.0	5988797
16.08	5988702	5988769	7333015	—	—	—	—	—	20.0	141.5	211.5	50.0	5988797
16.1	5988710	5988773	7333016	—	—	—	—	—	20.0	141.5	211.5	50.0	5988797
16.2	5988715	5988777	7333017	—	—	—	—	—	20.0	141.5	211.5	50.0	5988797
41/64	5988864	5988599	7333018	—	—	—	—	—	20.0	141.5	211.5	50.0	5988797
16.3	5988725	5988783	7333019	—	—	—	—	—	20.0	141.5	211.5	50.0	5988797

HYDRA DRILL



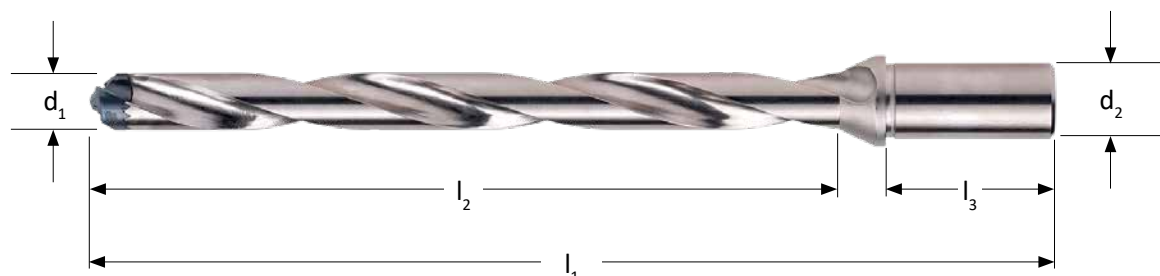
Hydra Head d ₁ Ø	Hydra Head R950 EDP#	Hydra Head R960 EDP#	Hydra Head R970 EDP#	8xD Hydra Body - Metric Shank					8xD Hydra Body - Metric Shank				
				d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	l ₃ mm	H858 EDP#	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	l ₃ mm	H858 EDP#
16.5	5988690	5988787	7333020	—	—	—	—	—	20.0	141.5	211.5	50.0	5988797
16.6	5988749	5988795	7333021	—	—	—	—	—	20.0	150.5	221.5	50.0	5988800
21/32	5988802	5988443	7333022	—	—	—	—	—	20.0	150.5	221.5	50.0	5988800
16.7	5988790	5988799	7333023	—	—	—	—	—	20.0	150.5	221.5	50.0	5988800
17.0	5988833	5988803	7333024	—	—	—	—	—	20.0	150.5	221.5	50.0	5988800
43/64	5988867	5988601	7333025	—	—	—	—	—	20.0	150.5	221.5	50.0	5988800
17.1	5988873	5988807	7333026	—	—	—	—	—	20.0	150.5	221.5	50.0	5988800
17.2	5988881	5988811	7333027	—	—	—	—	—	20.0	150.5	221.5	50.0	5988800
11/16	5988623	5988921	7333028	—	—	—	—	—	20.0	150.5	221.5	50.0	5988800
17.5	5988885	5988818	7333029	—	—	—	—	—	20.0	150.5	221.5	50.0	5988800
17.6	5988891	5988823	7333030	—	—	—	—	—	20.0	158.5	226.5	50.0	5988804
17.7	5988894	5988827	7333031	—	—	—	—	—	20.0	158.5	226.5	50.0	5988804
45/64	5988872	5988603	7333032	—	—	—	—	—	20.0	158.5	226.5	50.0	5988804
18.0	5988701	5988835	7333033	—	—	—	—	—	20.0	158.5	226.5	50.0	5988804
18.1	5988706	5988841	7333034	—	—	—	—	—	20.0	158.5	226.5	50.0	5988804
18.2	5988713	5988845	7333035	—	—	—	—	—	20.0	158.5	226.5	50.0	5988804
23/32	5988824	5988471	7333036	—	—	—	—	—	20.0	158.5	226.5	50.0	5988804
18.5	5988718	5988848	7333037	—	—	—	—	—	20.0	158.5	226.5	50.0	5988804
18.6	5988723	5988853	7333038	—	—	—	—	—	25.0	167.5	251.5	56.0	5988808
47/64	5988877	5988606	7333039	—	—	—	—	—	25.0	167.5	251.5	56.0	5988808
18.7	5988728	5988856	7333040	—	—	—	—	—	25.0	167.5	251.5	56.0	5988808
18.9	5988733	5988863	7333041	—	—	—	—	—	25.0	167.5	251.5	56.0	5988808
19.0	5988740	5988868	7333042	—	—	—	—	—	25.0	167.5	251.5	56.0	5988808
3/4	5988928	5988559	7333043	—	—	—	—	—	25.0	167.5	251.5	56.0	5988808
19.1	5988745	5988871	7333044	—	—	—	—	—	25.0	167.5	251.5	56.0	5988808
19.2	5988752	5988875	7333045	—	—	—	—	—	25.0	167.5	251.5	56.0	5988808
19.25	5988756	5988879	7333046	—	—	—	—	—	25.0	167.5	251.5	56.0	5988808
19.3	5988760	5988887	7333047	—	—	—	—	—	25.0	167.5	251.5	56.0	5988808
19.35	5988764	5988438	7333048	—	—	—	—	—	25.0	167.5	251.5	56.0	5988808
49/64	5988880	5988609	7333049	—	—	—	—	—	25.0	167.5	251.5	56.0	5988808
19.5	5988767	5988495	7333050	—	—	—	—	—	25.0	167.5	251.5	56.0	5988808
19.6	5988771	5988544	7333051	—	—	—	—	—	25.0	175.5	264.5	56.0	5988812
19.7	5988775	5988587	7333052	—	—	—	—	—	25.0	175.5	264.5	56.0	5988812
25/32	5988851	5988511	7333053	—	—	—	—	—	25.0	175.5	264.5	56.0	5988812
20.0	5988782	5988629	7333054	—	—	—	—	—	25.0	175.5	264.5	56.0	5988812
51/64	5988892	5988615	7333055	—	—	—	—	—	25.0	175.5	264.5	56.0	5988812
20.5	5988786	5988632	7333056	—	—	—	—	—	25.0	175.5	264.5	56.0	5988812
13/16	5988649	5988893	7333057	—	—	—	—	—	25.0	184.5	266.5	56.0	5988817
21.0	5988794	5988635	7333058	—	—	—	—	—	25.0	184.5	266.5	56.0	5988817
53/64	5988896	5988618	7333059	—	—	—	—	—	25.0	184.5	266.5	56.0	5988817
27/32	5988869	5988531	7333060	—	—	—	—	—	25.0	184.5	266.5	56.0	5988817
21.5	5988798	5988638	7333061	—	—	—	—	—	25.0	184.5	266.5	56.0	5988817
55/64	5988898	5988626	7333062	—	—	—	—	—	25.0	192.1	271.1	56.0	5988821
22.0	5988806	5988448	7333063	—	—	—	—	—	25.0	192.1	271.1	56.0	5988821
7/8	5988903	5988661	7333064	—	—	—	—	—	25.0	192.1	271.1	56.0	5988821
22.5	5988810	5988453	7333065	—	—	—	—	—	25.0	192.1	271.1	56.0	5988821
57/64	5988899	5988651	7333066	—	—	—	—	—	25.0	192.1	271.1	56.0	5988821
22.7	5988814	5988458	7333067	—	—	—	—	—	25.0	192.1	271.1	56.0	5988821
23.0	5988816	5988462	7333068	—	—	—	—	—	25.0	200.5	280.5	56.0	5988829
29/32	5988917	5988556	7333069	—	—	—	—	—	25.0	200.5	280.5	56.0	5988829
59/64	5988900	5988653	7333070	—	—	—	—	—	25.0	200.5	280.5	56.0	5988829
23.5	5988820	5988466	7333071	—	—	—	—	—	25.0	200.5	280.5	56.0	5988829
15/16	5988691	5988754	7333072	—	—	—	—	—	32.0	208.2	295.2	60.0	5988832
24.0	5988828	5988476	7333073	—	—	—	—	—	32.0	208.2	295.2	60.0	5988832
61/64	5988901	5988656	7333074	—	—	—	—	—	32.0	208.2	295.2	60.0	5988832
24.5	5988837	5988483	7333075	—	—	—	—	—	32.0	208.2	295.2	60.0	5988832
31/32	5988934	5988572	7333076	—	—	—	—	—	32.0	208.2	295.2	60.0	5988832
25.0	5988840	5988488	7333077	—	—	—	—	—	32.0	217.0	300.0	60.0	5988836
63/64	5988902	5988658	7333078	—	—	—	—	—	32.0	217.0	300.0	60.0	5988836
1	5988604	5988905	7333079	—	—	—	—	—	32.0	217.0	300.0	60.0	5988836
25.5	5988843	5988499	7333080	—	—	—	—	—	32.0	217.0	300.0	60.0	5988836
25.65	5988847	5988506	7333081	—	—	—	—	—	32.0	217.0	300.0	60.0	5988836
1.1/64	5988676	5988909	7333082	—	—	—	—	—	32.0	217.0	300.0	60.0	5988836
26.0	5988855	5988516	7333083	—	—	—	—	—	32.0	225.0	310.0	60.0	5988842
1.1/32	5988650	5988908	7333084	—	—	—	—	—	32.0	225.0	310.0	60.0	5988842

Hydra Head d ₁ Ø	Hydra Head R950 EDP#	Hydra Head R960 EDP#	Hydra Head R970 EDP#	8xD Hydra Body - Metric Shank					8xD Hydra Body - Metric Shank				
				d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	l ₃ mm	H858 EDP#	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	l ₃ mm	H858 EDP#
26.5	5988858	5988519	7333085	—	—	—	—	—	32.0	225.0	310.0	60.0	5988842
1.3/64	5988744	5988914	7333086	—	—	—	—	—	32.0	225.0	310.0	60.0	5988842
1.1/16	5988637	5988907	7333087	—	—	—	—	—	32.0	234.0	320.0	60.0	5988846
27.0	5988861	5988523	7333088	—	—	—	—	—	32.0	234.0	320.0	60.0	5988846
1.5/64	5988611	5988916	7333089	—	—	—	—	—	32.0	234.0	320.0	60.0	5988846
27.5	5988865	5988528	7333090	—	—	—	—	—	32.0	234.0	320.0	60.0	5988846
1.3/32	5988739	5988913	7333091	—	—	—	—	—	32.0	234.0	320.0	60.0	5988846
28.0	5988876	5988535	7333092	—	—	—	—	—	32.0	242.0	325.0	60.0	5988849
1.7/64	5988614	5988918	7333093	—	—	—	—	—	32.0	242.0	325.0	60.0	5988849
28.5	5988844	5988540	7333094	—	—	—	—	—	32.0	242.0	325.0	60.0	5988849
1.1/8	5988720	5988910	7333095	—	—	—	—	—	32.0	242.0	325.0	60.0	5988849
1.9/64	5988617	5988919	7333096	—	—	—	—	—	32.0	251.0	335.0	60.0	5988852
29.0	5988888	5988548	7333097	—	—	—	—	—	32.0	251.0	335.0	60.0	5988852
1.5/32	5988608	5988915	7333098	—	—	—	—	—	32.0	251.0	335.0	60.0	5988852
29.5	5988906	5988552	7333099	—	—	—	—	—	32.0	251.0	335.0	60.0	5988852
1.11/64	5988730	5988911	7333100	—	—	—	—	—	32.0	251.0	335.0	60.0	5988852
30.0	5988930	5988564	7333101	—	—	—	—	—	32.0	259.0	345.0	60.0	5988859
1.3/16	5988735	5988912	7333102	—	—	—	—	—	32.0	259.0	345.0	60.0	5988859
30.5	5988932	5988568	7333103	—	—	—	—	—	32.0	259.0	345.0	60.0	5988859
1.7/32	6104481	—	7333104	—	—	—	—	—	32.0	271.5	356.5	60.0	6111421
31.00	6104482	—	7333105	—	—	—	—	—	32.0	271.5	356.5	60.0	6111421
1.1/4	6104483	—	7333106	—	—	—	—	—	32.0	271.5	356.5	60.0	6111421
32.00	6104484	—	7333107	—	—	—	—	—	32.0	271.5	356.5	60.0	6111421
32.50	6104485	—	7333108	—	—	—	—	—	40.0	286.5	371.5	60.0	6111422
1.19/64	6104486	—	7333109	—	—	—	—	—	40.0	286.5	371.5	60.0	6111422
33.00	6104487	—	7333110	—	—	—	—	—	40.0	286.5	371.5	60.0	6111422
33.50	6104488	—	7333111	—	—	—	—	—	40.0	286.5	371.5	60.0	6111422
34.00	6104489	—	7333112	—	—	—	—	—	40.0	301.5	396.5	70.0	6111423
1.11/32	6104530	—	7333113	—	—	—	—	—	40.0	301.5	396.5	70.0	6111423
34.50	6104531	—	7333114	—	—	—	—	—	40.0	301.5	396.5	70.0	6111423
1.3/8	6104532	—	7333115	—	—	—	—	—	40.0	301.5	396.5	70.0	6111423
35.00	6104533	—	7333116	—	—	—	—	—	40.0	301.5	396.5	70.0	6111423
36.00	6104534	—	7333117	—	—	—	—	—	40.0	311.5	406.5	70.0	6111424
1.27/64	6104535	—	7333118	—	—	—	—	—	40.0	311.5	406.5	70.0	6111424
36.50	6104536	—	7333119	—	—	—	—	—	40.0	311.5	406.5	70.0	6111424
37.00	6104537	—	7333120	—	—	—	—	—	40.0	326.5	421.5	70.0	6111425
1.15/32	6104538	—	7333121	—	—	—	—	—	40.0	326.5	421.5	70.0	6111425
37.50	6104539	—	7333122	—	—	—	—	—	40.0	326.5	421.5	70.0	6111425
38.00	6104540	—	7333123	—	—	—	—	—	40.0	326.5	421.5	70.0	6111425
1.1/2	6104541	—	7333124	—	—	—	—	—	40.0	336.5	431.5	70.0	6111426
38.50	6104542	—	7333125	—	—	—	—	—	40.0	336.5	431.5	70.0	6111426
1.17/32	6104543	—	7333126	—	—	—	—	—	40.0	336.5	431.5	70.0	6111426
39.00	6104544	—	7333127	—	—	—	—	—	40.0	336.5	431.5	70.0	6111426
39.50	6104545	—	7333128	—	—	—	—	—	40.0	336.5	431.5	70.0	6111426
1.9/16	6104546	—	7333129	—	—	—	—	—	40.0	351.5	451.5	70.0	6111427
40.00	6104547	—	7333130	—	—	—	—	—	40.0	351.5	451.5	70.0	6111427
41.00	6104548	—	7333131	—	—	—	—	—	40.0	351.5	451.5	70.0	6111427
1.5/8	6104549	—	7333132	—	—	—	—	—	40.0	361.5	461.5	70.0	6111428
42.00	6104550	—	7333133	—	—	—	—	—	40.0	361.5	461.5	70.0	6111428

12xD Hydra Bodies

H8512

Metric body, Cylindrical shank



Four (4) screws and one (1) screwdriver are included with a drill body

* For more information on Hydra, see page 539

H851
Coolant
Through



12XD

HSS

140°



NEW

13.5 – 1.1/64

Hydra Head d_1 Ø	Hydra Head R950 EDP#	Hydra Head R960 EDP#	Hydra Head R970 EDP#	12xD Hydra Body - Fractional Shank					12xD Hydra Body - Metric Shank				
				d_2 Øh ₆ mm	l_2 mm	l_1 mm	l_3 mm	H8512 EDP#	d_2 Øh ₆ mm	l_2 mm	l_1 mm	l_3 mm	H8512 EDP#
13.5	5988645	5988791	7332990	—	—	—	—	—	16.00	168.0	236.0	48.0	7833364
13.6	5988646	5988839	7332991	—	—	—	—	—	16.00	168.0	236.0	48.0	7833364
13.7	5988647	5988883	7332992	—	—	—	—	—	16.00	168.0	236.0	48.0	7833364
13.8	5988648	5988889	7332993	—	—	—	—	—	16.00	168.0	236.0	48.0	7833364
35/64	5988854	5988583	7332994	—	—	—	—	—	16.00	168.0	236.0	48.0	7833364
14.0	5988652	5988895	7332995	—	—	—	—	—	16.00	168.0	236.0	48.0	7833364
14.1	5988655	5988897	7332996	—	—	—	—	—	16.00	168.0	236.0	48.0	7833364
14.2	5988657	5988692	7332997	—	—	—	—	—	16.00	168.0	236.0	48.0	7833364
9/16	5988904	5988664	7332998	—	—	—	—	—	16.00	168.0	236.0	48.0	7833364
14.5	5988660	5988696	7332999	—	—	—	—	—	16.00	168.0	236.0	48.0	7833364
14.6	5988663	5988700	7333000	—	—	—	—	—	20.00	180.0	250.3	50.0	7833365
37/64	5988857	5988591	7333001	—	—	—	—	—	20.00	180.0	250.3	50.0	7833365
14.7	5988666	5988705	7333002	—	—	—	—	—	20.00	180.0	250.3	50.0	7833365
14.8	5988668	5988709	7333003	—	—	—	—	—	20.00	180.0	250.3	50.0	7833365
15.0	5988670	5988714	7333004	—	—	—	—	—	20.00	180.0	250.3	50.0	7833365
19/32	5988779	5988621	7333005	—	—	—	—	—	20.00	180.0	250.3	50.0	7833365
15.1	5988672	5988719	7333006	—	—	—	—	—	20.00	180.0	250.3	50.0	7833365
15.2	5988674	5988724	7333007	—	—	—	—	—	20.00	180.0	250.3	50.0	7833365
15.24	5988678	5988729	7333008	—	—	—	—	—	20.00	180.0	250.3	50.0	7833365
39/64	5988860	5988595	7333009	—	—	—	—	—	20.00	180.0	250.3	50.0	7833365
15.5	5988680	5988734	7333010	—	—	—	—	—	20.00	180.0	250.3	50.0	7833365
15.6	5988683	5988742	7333011	—	—	—	—	—	20.00	192.0	262.6	50.0	7833366
15.7	5988687	5988747	7333012	—	—	—	—	—	20.00	192.0	262.6	50.0	7833366
5/8	5988884	5988612	7333013	—	—	—	—	—	20.00	192.0	262.6	50.0	7833366
16.0	5988698	5988763	7333014	—	—	—	—	—	20.00	192.0	262.6	50.0	7833366
16.08	5988702	5988769	7333015	—	—	—	—	—	20.00	192.0	262.6	50.0	7833366
16.1	5988710	5988773	7333016	—	—	—	—	—	20.00	192.0	262.6	50.0	7833366
16.2	5988715	5988777	7333017	—	—	—	—	—	20.00	192.0	262.6	50.0	7833366
41/64	5988864	5988599	7333018	—	—	—	—	—	20.00	192.0	262.6	50.0	7833366
16.3	5988725	5988783	7333019	—	—	—	—	—	20.00	192.0	262.6	50.0	7833366
16.5	5988690	5988787	7333020	—	—	—	—	—	20.00	192.0	262.6	50.0	7833366

Hydra Head d ₁ Ø	Hydra Head R950 EDP#	Hydra Head R960 EDP#	Hydra Head R970 EDP#	12xD Hydra Body - Fractional Shank					12xD Hydra Body - Metric Shank				
				d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	l ₃ mm	H8512 EDP#	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	l ₃ mm	H8512 EDP#
16.6	5988749	5988795	7333021	—	—	—	—	—	20.00	204.0	275.0	50.0	7833367
21/32	5988802	5988443	7333022	—	—	—	—	—	20.00	204.0	275.0	50.0	7833367
16.7	5988790	5988799	7333023	—	—	—	—	—	20.00	204.0	275.0	50.0	7833367
17.0	5988833	5988803	7333024	—	—	—	—	—	20.00	204.0	275.0	50.0	7833367
43/64	5988867	5988601	7333025	—	—	—	—	—	20.00	204.0	275.0	50.0	7833367
17.1	5988873	5988807	7333026	—	—	—	—	—	20.00	204.0	275.0	50.0	7833367
17.2	5988881	5988811	7333027	—	—	—	—	—	20.00	204.0	275.0	50.0	7833367
11/16	5988623	5988921	7333028	—	—	—	—	—	20.00	204.0	275.0	50.0	7833367
17.5	5988885	5988818	7333029	—	—	—	—	—	20.00	204.0	275.0	50.0	7833367
17.6	5988891	5988823	7333030	—	—	—	—	—	20.00	216.0	287.2	50.0	7833368
17.7	5988894	5988827	7333031	—	—	—	—	—	20.00	216.0	287.2	50.0	7833368
45/64	5988872	5988603	7333032	—	—	—	—	—	20.00	216.0	287.2	50.0	7833368
18.0	5988701	5988835	7333033	—	—	—	—	—	20.00	216.0	287.2	50.0	7833368
18.1	5988706	5988841	7333034	—	—	—	—	—	20.00	216.0	287.2	50.0	7833368
18.2	5988713	5988845	7333035	—	—	—	—	—	20.00	216.0	287.2	50.0	7833368
23/32	5988824	5988471	7333036	—	—	—	—	—	20.00	216.0	287.2	50.0	7833368
18.5	5988718	5988848	7333037	—	—	—	—	—	20.00	216.0	287.2	50.0	7833368
18.6	5988723	5988853	7333038	—	—	—	—	—	25.00	228.0	305.6	56.0	7833369
47/64	5988877	5988606	7333039	—	—	—	—	—	25.00	228.0	305.6	56.0	7833369
18.7	5988728	5988856	7333040	—	—	—	—	—	25.00	228.0	305.6	56.0	7833369
18.9	5988733	5988863	7333041	—	—	—	—	—	25.00	228.0	305.6	56.0	7833369
19.0	5988740	5988868	7333042	—	—	—	—	—	25.00	228.0	305.6	56.0	7833369
3/4	5988928	5988559	7333043	—	—	—	—	—	25.00	228.0	305.6	56.0	7833369
19.1	5988745	5988871	7333044	—	—	—	—	—	25.00	228.0	305.6	56.0	7833369
19.2	5988752	5988875	7333045	—	—	—	—	—	25.00	228.0	305.6	56.0	7833369
19.25	5988756	5988879	7333046	—	—	—	—	—	25.00	228.0	305.6	56.0	7833369
19.3	5988760	5988887	7333047	—	—	—	—	—	25.00	228.0	305.6	56.0	7833369
19.35	5988764	5988438	7333048	—	—	—	—	—	25.00	228.0	305.6	56.0	7833369
49/64	5988880	5988609	7333049	—	—	—	—	—	25.00	228.0	305.6	56.0	7833369
19.5	5988767	5988495	7333050	—	—	—	—	—	25.00	228.0	305.6	56.0	7833369
19.6	5988771	5988544	7333051	—	—	—	—	—	25.00	240.0	317.8	56.0	7833370
19.7	5988775	5988587	7333052	—	—	—	—	—	25.00	240.0	317.8	56.0	7833370
25/32	5988851	5988511	7333053	—	—	—	—	—	25.00	240.0	317.8	56.0	7833370
20.0	5988782	5988629	7333054	—	—	—	—	—	25.00	240.0	317.8	56.0	7833370
51/64	5988892	5988615	7333055	—	—	—	—	—	25.00	240.0	317.8	56.0	7833370
20.5	5988786	5988632	7333056	—	—	—	—	—	25.00	240.0	317.8	56.0	7833370
13/16	5988649	5988893	7333057	—	—	—	—	—	25.00	252.0	330.1	56.0	7833371
21.0	5988794	5988635	7333058	—	—	—	—	—	25.00	252.0	330.1	56.0	7833371
53/64	5988896	5988618	7333059	—	—	—	—	—	25.00	252.0	330.1	56.0	7833371
27/32	5988869	5988531	7333060	—	—	—	—	—	25.00	252.0	330.1	56.0	7833371
21.5	5988798	5988638	7333061	—	—	—	—	—	25.00	252.0	330.1	56.0	7833371
55/64	5988898	5988626	7333062	—	—	—	—	—	25.00	264.0	343.0	56.0	7833372
22.0	5988806	5988448	7333063	—	—	—	—	—	25.00	264.0	343.0	56.0	7833372
7/8	5988903	5988661	7333064	—	—	—	—	—	25.00	264.0	343.0	56.0	7833372
22.5	5988810	5988453	7333065	—	—	—	—	—	25.00	264.0	343.0	56.0	7833372
57/64	5988899	5988651	7333066	—	—	—	—	—	25.00	264.0	343.0	56.0	7833372
22.7	5988814	5988458	7333067	—	—	—	—	—	25.00	264.0	343.0	56.0	7833372
23.0	5988816	5988462	7333068	—	—	—	—	—	25.00	276.0	354.8	56.0	7833373
29/32	5988917	5988556	7333069	—	—	—	—	—	25.00	276.0	354.8	56.0	7833373
59/64	5988900	5988653	7333070	—	—	—	—	—	25.00	276.0	354.8	56.0	7833373
23.5	5988820	5988466	7333071	—	—	—	—	—	25.00	276.0	354.8	56.0	7833373
15/16	5988691	5988754	7333072	—	—	—	—	—	32.00	288.0	371.7	60.0	7833374
24.0	5988828	5988476	7333073	—	—	—	—	—	32.00	288.0	371.7	60.0	7833374
61/64	5988901	5988656	7333074	—	—	—	—	—	32.00	288.0	371.7	60.0	7833374
24.5	5988837	5988483	7333075	—	—	—	—	—	32.00	288.0	371.7	60.0	7833374
31/32	5988934	5988572	7333076	—	—	—	—	—	32.00	288.0	371.7	60.0	7833374
25.0	5988840	5988488	7333077	—	—	—	—	—	32.00	300.0	383.8	60.0	7833375
63/64	5988902	5988658	7333078	—	—	—	—	—	32.00	300.0	383.8	60.0	7833375
1	5988604	5988905	7333079	—	—	—	—	—	32.00	300.0	383.8	60.0	7833375
25.5	5988843	5988499	7333080	—	—	—	—	—	32.00	300.0	383.8	60.0	7833375
25.65	5988847	5988506	7333081	—	—	—	—	—	32.00	300.0	383.8	60.0	7833375
1.1/64	5988676	5988909	7333082	—	—	—	—	—	32.00	300.0	383.8	60.0	7833375

Screws & Screw Driver

H860

Set of 2 Hydra Screws

H861

Hydra Drill Screw Driver



NOTE: Four (4) screws and one (1) screwdriver are included with a drill body

* For more information on Hydra, see page 539

H860	H861
N1 - N7	N1 - N6

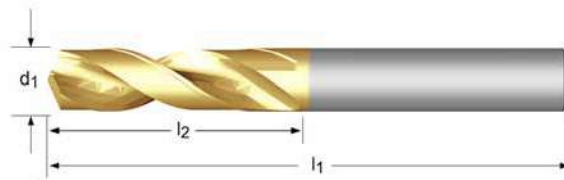
H860	H861	For Hydra Head Range	Wrench Size / Bit	Pack Qty	H860	H861
H860N1	H861N1	15/32 - 15.5	Torx 8IP	1	5988862	5987939
H860N2	H861N2	15.6 - 18.5	Torx 10IP	1	5988866	5987942
H860N3	H861N3	18.6 - 21.5	Torx 15IP	1	5988874	5987945
H860N4	H861N3	55/64 - 31/32	Torx 15IP	1	5987928	5987945
H860N5	H861N4	25.0 - 1.3/32	Torx 20IP	1	5987933	5987947
H860N6	H861N5	28.0 - 33.5	Torx 25IP	1	5987936	5987950
H860N7	H861N6	34.0 - 42.0	Torx 4mm	1	6111949	6260354

Multi-Application, Screw Machine Length, Parallel Shank

R520

1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 2.1 3.1 3.2 3.3 3.4 4.1 4.2
4.3 5.1 7.1 7.2 7.3 7.4 8.1 8.2

Heavy-Duty design. Self centering Split Point for easier penetration. TiN coating increases wear resistance and improves tool life.



R520

DIN
6539

2.5XD

HM

130°



3.00 - 16.50

d ₁ Øh ₇ Inch	d ₁ Øh ₇ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	R520
	3.00	0.1181	16	46	1	5981147
	3.10	0.1220	18	49	1	5981152
1/8	3.18	0.1250	18	49	1	5980549
	3.20	0.1260	18	49	1	5981155
	3.30	0.1299	18	49	1	5981161
	3.40	0.1339	20	52	1	5981164
	3.50	0.1378	20	52	1	5981167
	3.60	0.1417	20	52	1	5981171
	3.70	0.1457	20	52	1	5981174
	3.80	0.1496	22	55	1	5981178
	3.90	0.1535	22	55	1	5981182
	4.00	0.1575	22	55	1	5981201
	4.10	0.1614	22	55	1	5981204
	4.20	0.1654	22	55	1	5981208
	4.30	0.1693	24	58	1	5981212
	4.40	0.1732	24	58	1	5981216
	4.50	0.1772	24	58	1	5981220
	4.60	0.1811	24	58	1	5981225
	4.70	0.1850	24	58	1	5981227
	4.80	0.1890	26	62	1	5981230
	4.90	0.1929	26	62	1	5981236
	5.00	0.1969	26	62	1	5981242
	5.10	0.2008	26	62	1	5981244
	5.20	0.2047	26	62	1	5981247
	5.30	0.2087	26	62	1	5981252
	5.40	0.2126	28	66	1	5981254
	5.50	0.2165	28	66	1	5981257
	5.60	0.2205	28	66	1	5981260
	5.70	0.2244	28	66	1	5981263
	5.80	0.2283	28	66	1	5981266
	5.90	0.2323	28	66	1	5981269
	6.00	0.2362	28	66	1	5981142
	6.10	0.2402	31	70	1	5981176

CDX SOLID CARBIDE DRILL



d ₁ Øh ₇ Inch	d ₁ Øh ₇ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	R520
1/4	6.20	0.2441	31	70	1	5981218
	6.30	0.2480	31	70	1	5981226
	6.35	0.2500	31	70	1	5980546
	6.40	0.2520	31	70	1	5981229
	6.50	0.2559	31	70	1	5981233
	6.60	0.2598	31	70	1	5981237
	6.70	0.2638	31	70	1	5981073
	6.80	0.2677	34	74	1	5981077
	6.90	0.2717	34	74	1	5981080
	7.00	0.2756	34	74	1	5981084
	7.10	0.2795	34	74	1	5981088
	7.20	0.2835	34	74	1	5981092
	7.30	0.2874	34	74	1	5981096
	7.40	0.2913	34	74	1	5981099
	7.50	0.2953	34	74	1	5981102
	7.60	0.2992	37	79	1	5981105
5/16	7.70	0.3031	37	79	1	5981111
	7.80	0.3071	37	79	1	5981114
	7.90	0.3110	37	79	1	5981117
	7.94	0.3125	37	79	1	5981275
	8.00	0.3150	37	79	1	5981126
	8.10	0.3189	37	79	1	5981129
	8.20	0.3228	37	79	1	5981131
	8.30	0.3268	37	79	1	5981135
	8.40	0.3307	37	79	1	5981138
	8.50	0.3346	37	79	1	5981145
	8.60	0.3386	40	84	1	5981148
	8.70	0.3425	40	84	1	5981150
	8.80	0.3465	40	84	1	5981153
	8.90	0.3504	40	84	1	5981156
	9.00	0.3543	40	84	1	5981159
	9.10	0.3583	40	84	1	5981163
3/8	9.20	0.3622	40	84	1	5981166
	9.30	0.3661	40	84	1	5981169
	9.40	0.3701	40	84	1	5981173
	9.50	0.3740	40	84	1	5981180
	9.52	0.3750	43	89	1	5981189
	9.60	0.3780	43	89	1	5981184
	9.70	0.3819	43	89	1	5981190
	9.80	0.3858	43	89	1	5981194
	9.90	0.3898	43	89	1	5981196
	10.00	0.3937	43	89	1	5980551
	10.10	0.3976	43	89	1	5980554
	10.20	0.4016	43	89	1	5980557
	10.30	0.4055	43	89	1	5980560
	10.40	0.4094	43	89	1	5980563
	10.50	0.4134	43	89	1	5980566
	11.00	0.4331	47	95	1	5980569
7/16	11.11	0.4375	47	95	1	5981120
	11.20	0.4409	47	95	1	5980575
	11.50	0.4528	47	95	1	5980579
	12.00	0.4724	51	102	1	5980589
	12.50	0.4921	51	102	1	5980591
	12.70	0.5000	51	102	1	5980542
1/2	13.00	0.5118	51	102	1	5980595
	13.50	0.5315	54	107	1	5980598
	14.00	0.5512	54	107	1	5980612
	14.20	0.5591	56	111	1	5981124
	14.25	0.5610	56	111	1	5981158
	14.50	0.5709	56	111	1	5981198
	15.00	0.5906	56	111	1	5981238
	15.10	0.5945	58	115	1	5981272
5/8	15.88	0.6250	58	115	1	5981108
	16.00	0.6299	58	115	1	5981285
	16.50	0.6496	60	119	1	5981289

Multi-Application, Short Length, Reinforced Shank

R458

1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 2.1 2.2 2.3 2.4 3.1 3.2 3.3
3.4 4.1 4.2 4.3 6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4

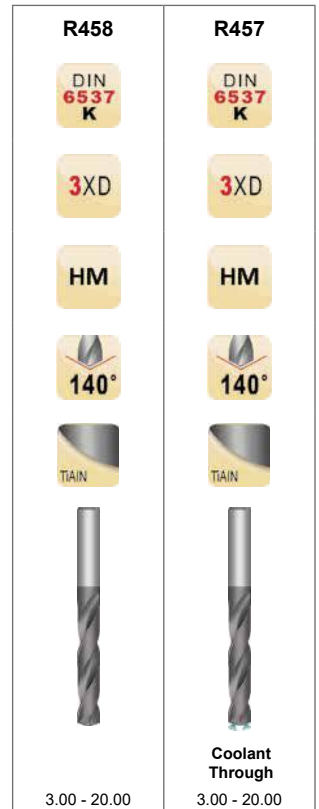
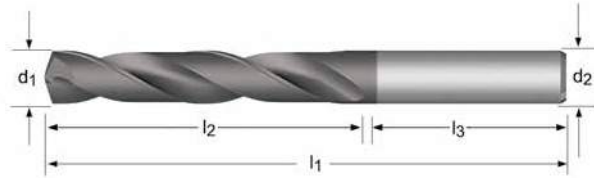
Self centering 4-facet split point and CTW flute construction for enhanced penetration rate. TiAlN coating increases wear resistance and improves tool life at high RPM.

R457

1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 2.1 2.2 2.3 3.1 3.2 3.3 3.4
4.1 4.2 4.3 6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4

Coolant through clears chips away from the cutting edge. Self centering 4-facet split point for enhanced penetration rates. TiAlN coating increases surface hardness and improves tool life at high RPM.

High productivity in a wide range of materials



d ₁ Ø " / Nr.	d ₁ Ø _{m7} mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Ø _{h6} mm	Pack Qty	R458	R457
	3.00	0.1181	20	62	36	6	1	5981063	5979225
	3.10	0.1220	20	62	36	6	1	5981066	5979229
1/8	3.18	0.1252	20	62	36	6	1	5980514	5979015
	3.20	0.1260	20	62	36	6	1	5981070	5979232
30	3.26	0.1283	20	62	36	6	1	5980227	5979343
	3.30	0.1299	20	62	36	6	1	5981074	5979236
	3.40	0.1339	20	62	36	6	1	5981081	5979240
29	3.45	0.1358	20	62	36	6	1	5980221	5979338
	3.50	0.1378	20	62	36	6	1	5981086	5979244
28	3.57	0.1406	20	62	36	6	1	5980216	5979335
9/64	3.57	0.1406	20	62	36	6	1	5980470	5980283
	3.60	0.1417	20	62	36	6	1	5981090	5979246
27	3.66	0.1441	20	62	36	6	1	5980213	5979331
	3.70	0.1457	20	62	36	6	1	5981093	5979249
26	3.73	0.1469	24	66	36	6	1	5981095	5979324
25	3.80	0.1496	24	66	36	6	1	5981098	5979321
24	3.86	0.1520	24	66	36	6	1	5980204	5979318
	3.90	0.1535	24	66	36	6	1	5981101	5979260
23	3.91	0.1539	24	66	36	6	1	5980201	5979315
5/32	3.97	0.1563	24	66	36	6	1	5980485	5980298
22	3.99	0.1571	24	66	36	6	1	5980198	5979312
	4.00	0.1575	24	66	36	6	1	5981132	5979285
21	4.04	0.1591	24	66	36	6	1	5980192	5979309
	4.05	0.1594	24	66	36	6	1	—	5979287
20	4.09	0.1610	24	66	36	6	1	5980188	5979306
	4.10	0.1614	24	66	36	6	1	5981134	5979292
	4.20	0.1654	24	66	36	6	1	5981137	5979295
19	4.22	0.1661	24	66	36	6	1	5980180	5979300
	4.30	0.1693	24	66	36	6	1	5981140	5979298
18	4.31	0.1697	24	66	36	6	1	5980176	5979297
11/64	4.37	0.1720	24	66	36	6	1	5980411	5979050
17	4.39	0.1728	24	66	36	6	1	5980172	5979291
	4.40	0.1732	24	66	36	6	1	5981143	5979301

FORCE X SOLID CARBIDE DRILL



d ₁ Ø "/Nr.	d ₁ Øm ₇ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Øh ₅ mm	Pack Qty	R458	R457
16	4.50	0.1772	24	66	36	6	1	5981149	5979289
15	4.57	0.1799	24	66	36	6	1	5980166	5979286
	4.60	0.1811	24	66	36	6	1	5981151	5979307
14	4.62	0.1819	24	66	36	6	1	5980163	5979284
	4.70	0.1850	24	66	36	6	1	5981154	5979310
13	4.70	0.1850	24	66	36	6	1	5980160	5979281
3/16	4.76	0.1875	28	66	36	6	1	5981103	5979263
12	4.80	0.1890	28	66	36	6	1	5981157	5979279
11	4.85	0.1909	28	66	36	6	1	5980153	5979277
	4.90	0.1929	28	66	36	6	1	5981160	5979319
10	4.92	0.1937	28	66	36	6	1	5980150	5979275
9	4.98	0.1961	28	66	36	6	1	5980253	5979369
	5.00	0.1969	28	66	36	6	1	5981175	5980432
	5.05	0.1988	28	66	36	6	1	—	5980440
8	5.06	0.1992	28	66	36	6	1	5980250	5979360
	5.10	0.2008	28	66	36	6	1	5981181	5980444
7	5.11	0.2012	28	66	36	6	1	5980247	5979357
13/64	5.16	0.2031	28	66	36	6	1	5980456	5979077
6	5.18	0.2039	28	66	36	6	1	5980243	5979353
	5.20	0.2047	28	66	36	6	1	5980322	5980447
5	5.22	0.2055	28	66	36	6	1	5980240	5979350
	5.30	0.2087	28	66	36	6	1	7361260	7361237
4	5.31	0.2091	28	66	36	6	1	5980237	5979346
	5.40	0.2126	28	66	36	6	1	7361261	7361238
3	5.41	0.2130	28	66	36	6	1	5980226	5979341
	5.50	0.2165	28	66	36	6	1	5980360	5980451
7/32	5.56	0.2189	28	66	36	6	1	5980394	5980386
	5.60	0.2205	28	66	36	6	1	5980397	5980287
2	5.61	0.2209	28	66	36	6	1	5980184	5979303
	5.70	0.2244	28	66	36	6	1	5980435	5980290
1	5.79	0.2280	28	66	36	6	1	5980146	5979273
	5.80	0.2283	28	66	36	6	1	5980474	5980293
	5.90	0.2323	28	66	36	6	1	7361262	7361239
A	5.94	0.2339	28	66	36	6	1	5980127	5979254
15/64	5.95	0.2343	28	66	36	6	1	5980494	5979114
	6.00	0.2362	28	66	36	6	1	5980492	5980303
B	6.03	0.2374	34	79	36	8	1	7361263	7361240
	6.05	0.2382	34	79	36	8	1	—	5980306
	6.10	0.2402	34	79	36	8	1	5980329	5980309
C	6.15	0.2421	34	79	36	8	1	7361264	7361241
	6.20	0.2441	34	79	36	8	1	5980333	5980312
D	6.25	0.2461	34	79	36	8	1	5980131	5979257
	6.30	0.2480	34	79	36	8	1	5980336	5980320
1/4	6.35	0.2500	34	79	36	8	1	5980479	5979135
E	6.35	0.2500	34	79	36	8	1	7361265	7361242
	6.40	0.2520	34	79	36	8	1	5980339	5980323
	6.50	0.2559	34	79	36	8	1	5980342	5980327
F	6.53	0.2571	34	79	36	8	1	7361266	7361243
	6.60	0.2598	34	79	36	8	1	5980345	5980331
G	6.63	0.2610	34	79	36	8	1	7361267	7361244
	6.70	0.2638	34	79	36	8	1	5980347	5980335
17/64	6.75	0.2657	34	79	36	8	1	5980517	5979316
H	6.76	0.2661	34	79	36	8	1	5980134	5979259
	6.80	0.2677	34	79	36	8	1	5980350	5980338
	6.90	0.2717	34	79	36	8	1	5980353	5980341
I	6.91	0.2720	34	79	36	8	1	7361268	7361245
	7.00	0.2756	34	79	36	8	1	5980356	5980344
J	7.04	0.2772	41	79	36	8	1	7361269	7361246
	7.10	0.2795	41	79	36	8	1	5980362	5980349
K	7.14	0.2811	41	79	36	8	1	7361270	7361247
9/32	7.14	0.2811	41	79	36	8	1	5980467	5980280
	7.20	0.2835	41	79	36	8	1	7361271	7361248
	7.30	0.2874	41	79	36	8	1	5980366	5980352
L	7.37	0.2902	41	79	36	8	1	5980136	5979262
	7.40	0.2913	41	79	36	8	1	5980369	5980358
M	7.49	0.2949	41	79	36	8	1	5980139	5979265

d ₁ Ø “/Nr.	d ₁ Ø _m mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Ø _h mm	Pack Qty	R458	R457
19/64	7.50	0.2953	41	79	36	8	1	5980373	5980363
	7.54	0.2969	41	79	36	8	1	5981188	5979192
	7.60	0.2992	41	79	36	8	1	5980377	5980367
N	7.67	0.3020	41	79	36	8	1	5980144	5979271
	7.70	0.3031	41	79	36	8	1	5980381	5980371
	7.80	0.3071	41	79	36	8	1	5980385	5980375
5/16	7.90	0.3110	41	79	36	8	1	5980388	5980379
	7.94	0.3126	41	79	36	8	1	5980480	5980296
	8.00	0.3150	41	79	36	8	1	5980400	5980389
O	8.03	0.3161	47	89	40	10	1	5980256	5979013
	8.05	0.3169	47	89	40	10	1	—	5980392
	8.10	0.3189	47	89	40	10	1	5980403	5980398
P	8.20	0.3228	47	89	40	10	1	5980406	5980401
	8.20	0.3228	47	89	40	10	1	7361272	7361249
	8.30	0.3268	47	89	40	10	1	7361273	7361250
21/64	8.33	0.3280	47	89	40	10	1	5981046	5979203
	8.40	0.3307	47	89	40	10	1	5980409	5980404
	8.43	0.3319	47	89	40	10	1	5980260	5979034
Q	8.50	0.3346	47	89	40	10	1	5980412	5980407
	8.60	0.3386	47	89	40	10	1	5980415	5980410
	8.61	0.3390	47	89	40	10	1	7361274	7361251
R	8.70	0.3425	47	89	40	10	1	5980418	5980413
	8.73	0.3437	47	89	40	10	1	5980408	5979048
	8.80	0.3465	47	89	40	10	1	5980421	5980416
S	8.84	0.3480	47	89	40	10	1	7361275	7361252
	8.90	0.3504	47	89	40	10	1	7361276	5980420
	9.00	0.3543	47	89	40	10	1	5980425	5980423
T	9.09	0.3579	47	89	40	10	1	5980263	5979055
	9.10	0.3583	47	89	40	10	1	5980428	5980429
	9.13	0.3594	47	89	40	10	1	5981051	5979209
23/64	9.20	0.3622	47	89	40	10	1	7361277	7361253
	9.30	0.3661	47	89	40	10	1	5980439	5980436
	9.35	0.3681	47	89	40	10	1	5980266	5979080
U	9.40	0.3701	47	89	40	10	1	5980443	5980122
	9.50	0.3740	47	89	40	10	1	5980445	5980159
	9.52	0.3748	47	89	40	10	1	5981109	5979269
3/8	9.58	0.3772	47	89	40	10	1	7361278	7361254
	9.60	0.3780	47	89	40	10	1	5980449	5980195
	9.70	0.3819	47	89	40	10	1	5980454	5980233
W	9.80	0.3858	47	89	40	10	1	5980457	5980268
	9.80	0.3858	47	89	40	10	1	7361279	7361255
	9.90	0.3898	47	89	40	10	1	5980461	5980274
25/64	9.92	0.3906	47	89	40	10	1	5981055	5979212
	10.00	0.3937	47	89	40	10	1	5980520	5979017
	10.05	0.3957	55	102	45	12	1	—	5979019
X	10.08	0.3969	55	102	45	12	1	5980271	5979117
	10.10	0.3976	55	102	45	12	1	5980523	5979021
	10.20	0.4016	55	102	45	12	1	5980524	5979023
Y	10.26	0.4039	55	102	45	12	1	5980359	5979125
	10.30	0.4055	55	102	45	12	1	5980527	5979025
	10.32	0.4063	55	102	45	12	1	5980453	5979075
13/32	10.40	0.4094	55	102	45	12	1	5980364	5979027
	10.49	0.4130	55	102	45	12	1	5980402	5979128
	10.50	0.4134	55	102	45	12	1	5980370	5979029
Z	10.60	0.4173	55	102	45	12	1	5980374	5979030
	10.70	0.4213	55	102	45	12	1	7361280	—
	10.72	0.4220	55	102	45	12	1	5981058	5979218
27/64	10.80	0.4252	55	102	45	12	1	5980378	7361256
	10.90	0.4291	55	102	45	12	1	7361281	—
	11.00	0.4331	55	102	45	12	1	5980384	5979032
7/16	11.10	0.4370	55	102	45	12	1	7361282	—
	11.11	0.4374	55	102	45	12	1	5980391	5980382
	11.20	0.4409	55	102	45	12	1	5980387	5979036
	11.30	0.4449	55	102	45	12	1	7361283	7361257

FORCE X SOLID CARBIDE DRILL



d ₁ Ø "/Nr.	d ₁ Øm ₇ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Øh ₆ mm	Pack Qty	R458	R457
	11.40	0.4488	55	102	45	12	1	5980390	5979038
	11.50	0.4528	55	102	45	12	1	5980393	5979040
29/64	11.51	0.4531	55	102	45	12	1	5981061	5979221
	11.60	0.4567	55	102	45	12	1	5980396	5979042
	11.70	0.4606	55	102	45	12	1	7361284	—
	11.80	0.4646	55	102	45	12	1	5980399	5979044
	11.90	0.4685	55	102	45	12	1	7361285	—
15/32	11.91	0.4689	55	102	45	12	1	5980490	5979110
	12.00	0.4724	55	102	45	12	1	5980414	5979052
	12.05	0.4744	60	107	45	14	1	—	5979053
	12.10	0.4764	60	107	45	14	1	5980419	5979057
	12.20	0.4803	60	107	45	14	1	5980422	5979060
31/64	12.30	0.4843	60	107	45	14	1	5981115	5979272
	12.50	0.4921	60	107	45	14	1	5980426	5979062
	12.70	0.5000	60	107	45	14	1	5980430	5979064
1/2	12.70	0.5000	60	107	45	14	1	5980442	5979132
	12.80	0.5039	60	107	45	14	1	5980433	5979066
	13.00	0.5118	60	107	45	14	1	5980438	5979068
33/64	13.10	0.5157	60	107	45	14	1	5981118	5979274
	13.30	0.5236	60	107	45	14	1	7361286	7361258
17/32	13.49	0.5311	60	107	45	14	1	5980511	5979282
	13.50	0.5315	60	107	45	14	1	5980446	5979070
	13.80	0.5433	60	107	45	14	1	5980450	5979072
35/64	13.89	0.5469	60	107	45	14	1	5981121	5979276
	14.00	0.5512	60	107	45	14	1	5980459	5979082
	14.25	0.5610	65	115	48	16	1	5980462	5979085
9/16	14.29	0.5626	65	115	48	16	1	5980464	5980276
	14.50	0.5709	65	115	48	16	1	5980465	5979088
37/64	14.68	0.5780	65	115	48	16	1	5981125	5979278
	14.80	0.5827	65	115	48	16	1	5980468	5979091
	15.00	0.5906	65	115	48	16	1	5980471	5979094
19/32	15.08	0.5937	65	115	48	16	1	5981185	5979188
	15.10	0.5945	65	115	48	16	1	5980475	5979098
	15.30	0.6024	65	115	48	16	1	7361287	7361259
39/64	15.48	0.6094	65	115	48	16	1	5981127	5979280
	15.50	0.6102	65	115	48	16	1	5980483	5979102
	15.80	0.6220	65	115	48	16	1	5980487	5979106
5/8	15.88	0.6252	65	115	48	16	1	5980489	5980301
	16.00	0.6299	65	115	48	16	1	5980496	5979120
41/64	16.27	0.6406	73	123	48	18	1	5981162	5980284
	16.50	0.6496	73	123	48	18	1	5980499	5979172
21/32	16.67	0.6563	73	123	48	18	1	5981197	5979200
	17.00	0.6693	73	123	48	18	1	5980503	5979215
43/64	17.07	0.6720	73	123	48	18	1	5981165	5980317
11/16	17.46	0.6874	73	123	48	18	1	5980405	5979046
	17.50	0.6890	73	123	48	18	1	5980506	5979253
	17.80	0.7008	73	123	48	18	1	5980509	—
45/64	17.86	0.7031	73	123	48	18	1	5981168	5980355
	18.00	0.7087	73	123	48	18	1	5981043	5979322
23/32	18.26	0.7189	79	131	50	20	1	5981049	5979206
	18.50	0.7283	79	131	50	20	1	5981078	5979325
47/64	18.65	0.7343	79	131	50	20	1	5981170	5980395
	18.80	0.7402	79	131	50	20	1	—	5979329
	19.00	0.7480	79	131	50	20	1	5981112	5979332
3/4	19.05	0.7500	79	131	50	20	1	5981106	5979266
	19.50	0.7677	79	131	50	20	1	5981146	5979180
	19.80	0.7795	79	131	50	20	1	5981177	5979184
	20.00	0.7874	79	131	50	20	1	5981192	5979196

Multi-Application, Short Length, Reinforced Shank

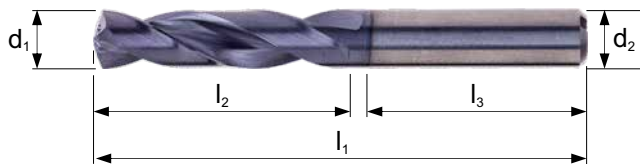
R467

2.1 2.2 2.3 2.4 4.1 4.2 4.3

5.1 5.2 5.3

Self-centering 4-facet split point and CTW flute construction for enhanced penetration rate specifically designed for Stainless Steel (ISO-M) materials. TiAlN coating increases wear resistance and improves tool life. Coolant through combined with an advanced point geometry prevents premature wear of the cutting edges. Length designed for 3 x Diameter drilling depths.

High productivity in a wide range of materials



R467

DIN
6537
K

3XD

HM

140°

TiAlN



Coolant
Through
3.00 - 16.00

d ₁ Ø "Nr.	d ₁ Øm ₇ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Øh ₆ mm	Pack Qty	R467
	3.00	0.1181	20	62	36	6	1	7625100
	3.10	0.1220	20	62	36	6	1	7625101
1/8	3.18	0.1250	20	62	36	6	1	7625102
	3.20	0.1260	20	62	36	6	1	7625103
	3.30	0.1299	20	62	36	6	1	7625104
	3.40	0.1339	20	62	36	6	1	7625105
29	3.45	0.1360	20	62	36	6	1	7625106
	3.50	0.1378	20	62	36	6	1	7625107
9/64	3.57	0.1406	20	62	36	6	1	7625108
	3.60	0.1417	20	62	36	6	1	7625109
	3.70	0.1457	20	62	36	6	1	7625110
	3.80	0.1496	24	66	36	6	1	7625111
	3.90	0.1535	24	66	36	6	1	7625112
5/32	3.97	0.1563	24	66	36	6	1	7625113
	4.00	0.1575	24	66	36	6	1	7625114
	4.05	0.1594	24	66	36	6	1	7625115
	4.10	0.1614	24	66	36	6	1	7625116
	4.20	0.1654	24	66	36	6	1	7625117
	4.30	0.1693	24	66	36	6	1	7625118
11/64	4.37	0.1719	24	66	36	6	1	7625119
	4.40	0.1732	24	66	36	6	1	7625120
	4.50	0.1772	24	66	36	6	1	7625121
	4.60	0.1811	24	66	36	6	1	7625122
	4.70	0.1850	24	66	36	6	1	7625123
3/16	4.76	0.1875	28	66	36	6	1	7625124
	4.80	0.1890	28	66	36	6	1	7625125
	4.90	0.1929	28	66	36	6	1	7625126
	5.00	0.1969	28	66	36	6	1	7625127
	5.05	0.1988	28	66	36	6	1	7625128
	5.10	0.2008	28	66	36	6	1	7625129
7	5.11	0.2010	28	66	36	6	1	7625130
13/64	5.16	0.2031	28	66	36	6	1	7625131
	5.20	0.2047	28	66	36	6	1	7625132

FORCE M SOLID CARBIDE DRILL



d ₁ Ø "/Nr.	d ₁ Øm ₇ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Øh ₆ mm	Pack Qty	R467
5	5.22	0.2055	28	66	36	6	1	7625133
	5.30	0.2087	28	66	36	6	1	7625134
	5.40	0.2126	28	66	36	6	1	7625135
	5.50	0.2165	28	66	36	6	1	7625136
7/32	5.56	0.2188	28	66	36	6	1	7625137
	5.60	0.2205	28	66	36	6	1	7625138
	5.70	0.2244	28	66	36	6	1	7625139
	5.80	0.2283	28	66	36	6	1	7625140
15/64	5.90	0.2323	28	66	36	6	1	7625141
	5.95	0.2344	28	66	36	6	1	7625142
	6.00	0.2362	28	66	36	6	1	7625143
	6.05	0.2382	34	79	36	8	1	7625144
	6.10	0.2402	34	79	36	8	1	7625145
	6.20	0.2441	34	79	36	8	1	7625146
	6.30	0.2480	34	79	36	8	1	7625147
	6.35	0.2500	34	79	36	8	1	7625148
1/4	6.40	0.2520	34	79	36	8	1	7625149
	6.50	0.2559	34	79	36	8	1	7625150
	6.60	0.2598	34	79	36	8	1	7625151
	6.70	0.2638	34	79	36	8	1	7625152
17/64	6.75	0.2656	34	79	36	8	1	7625153
	6.80	0.2677	34	79	36	8	1	7625154
	6.90	0.2717	34	79	36	8	1	7625155
	7.00	0.2756	34	79	36	8	1	7625156
	7.10	0.2795	41	79	36	8	1	7625157
	7.14	0.2813	41	79	36	8	1	7625158
	7.20	0.2835	41	79	36	8	1	7625159
	7.30	0.2874	41	79	36	8	1	7625160
9/32	7.40	0.2913	41	79	36	8	1	7625161
	7.50	0.2953	41	79	36	8	1	7625162
	7.54	0.2969	41	79	36	8	1	7625163
	7.60	0.2992	41	79	36	8	1	7625164
19/64	7.70	0.3031	41	79	36	8	1	7625165
	7.80	0.3071	41	79	36	8	1	7625166
	7.90	0.3110	41	79	36	8	1	7625167
	7.94	0.3125	41	79	36	8	1	7625168
5/16	8.00	0.3150	41	79	36	8	1	7625169
	8.05	0.3169	47	89	40	10	1	7625170
	8.10	0.3189	47	89	40	10	1	7625171
	8.20	0.3228	47	89	40	10	1	7625172
	8.30	0.3268	47	89	40	10	1	7625173
	8.33	0.3281	47	89	40	10	1	7625174
	8.40	0.3307	47	89	40	10	1	7625175
	8.50	0.3346	47	89	40	10	1	7625176
21/64	8.60	0.3386	47	89	40	10	1	7625177
	8.70	0.3425	47	89	40	10	1	7625178
	8.73	0.3438	47	89	40	10	1	7625179
	8.80	0.3465	47	89	40	10	1	7625180
11/32	8.90	0.3504	47	89	40	10	1	7625181
	9.00	0.3543	47	89	40	10	1	7625182
	9.10	0.3583	47	89	40	10	1	7625183
	9.13	0.3594	47	89	40	10	1	7625184
23/64	9.20	0.3622	47	89	40	10	1	7625185
	9.30	0.3661	47	89	40	10	1	7625186
	9.40	0.3701	47	89	40	10	1	7625187
	9.50	0.3740	47	89	40	10	1	7625188
3/8	9.53	0.3750	47	89	40	10	1	7625189
	9.60	0.3780	47	89	40	10	1	7625190
	9.70	0.3819	47	89	40	10	1	7625191
	9.80	0.3858	47	89	40	10	1	7625192
	9.90	0.3898	47	89	40	10	1	7625193
	9.92	0.3906	47	89	40	10	1	7625194
	10.00	0.3937	47	89	40	10	1	7625195
	10.05	0.3957	55	102	45	12	1	7625196
25/64	10.10	0.3976	55	102	45	12	1	7625197
	10.20	0.4016	55	102	45	12	1	7625198

d ₁ Ø "Nr.	d ₁ Øm ₇ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Øh ₆ mm	Pack Qty	R467
13/32	10.30	0.4055	55	102	45	12	1	7625199
	10.32	0.4063	55	102	45	12	1	7625200
	10.40	0.4094	55	102	45	12	1	7625201
	10.50	0.4134	55	102	45	12	1	7625202
27/64	10.60	0.4173	55	102	45	12	1	7625203
	10.72	0.4219	55	102	45	12	1	7625204
	10.80	0.4252	55	102	45	12	1	7625205
	10.90	0.4291	55	102	45	12	1	7625206
7/16	11.00	0.4331	55	102	45	12	1	7625207
	11.11	0.4375	55	102	45	12	1	7625208
	11.20	0.4409	55	102	45	12	1	7625209
	11.30	0.4449	55	102	45	12	1	7625210
29/64	11.40	0.4488	55	102	45	12	1	7625211
	11.50	0.4528	55	102	45	12	1	7625212
	11.51	0.4531	55	102	45	12	1	7625213
	11.60	0.4567	55	102	45	12	1	7625214
15/32	11.80	0.4646	55	102	45	12	1	7625215
	11.91	0.4688	55	102	45	12	1	7625216
	12.00	0.4724	55	102	45	12	1	7625217
	12.05	0.4744	60	107	45	14	1	7625218
31/64	12.10	0.4764	60	107	45	14	1	7625219
	12.20	0.4803	60	107	45	14	1	7625220
	12.30	0.4844	60	107	45	14	1	7625221
	12.50	0.4921	60	107	45	14	1	7625222
1/2	12.70	0.5000	60	107	45	14	1	7625223
	12.70	0.5000	60	107	45	14	1	7625224
	12.80	0.5039	60	107	45	14	1	7625225
	13.00	0.5118	60	107	45	14	1	7625226
33/64	13.10	0.5156	60	107	45	14	1	7625227
	13.30	0.5236	60	107	45	14	1	7625228
	13.49	0.5313	60	107	45	14	1	7625229
	13.50	0.5315	60	107	45	14	1	7625230
35/64	13.80	0.5433	60	107	45	14	1	7625231
	13.89	0.5469	60	107	45	14	1	7625232
	14.00	0.5512	60	107	45	14	1	7625233
	14.25	0.5610	65	115	48	16	1	7625234
9/16	14.29	0.5625	65	115	48	16	1	7625235
	14.50	0.5709	65	115	48	16	1	7625236
	14.68	0.5781	65	115	48	16	1	7625237
	14.80	0.5827	65	115	48	16	1	7625238
37/64	15.00	0.5906	65	115	48	16	1	7625239
	15.08	0.5938	65	115	48	16	1	7625240
	15.10	0.5945	65	115	48	16	1	7625241
	15.30	0.6024	65	115	48	16	1	7625242
39/64	15.48	0.6094	65	115	48	16	1	7625243
	15.50	0.6102	65	115	48	16	1	7625244
	15.80	0.6220	65	115	48	16	1	7625245
	15.88	0.6250	65	115	48	16	1	7625246
5/8	16.00	0.6299	65	115	48	16	1	7625247

CDX SOLID CARBIDE DRILL



Multi-Application, Jobber Length, Parallel Shank

R510

1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 2.1 3.1 3.2 3.3 3.4 4.1 5.1
7.1 7.2 7.3 7.4 8.1 8.2

Heavy-Duty design. Self centering Split Point for easier penetration.
TiN coating increases wear resistance and improves tool life.



R510

DIN
338

4XD

HM

130°



3.00 - 14.25

d ₁ Øh ₇ Inch	d ₁ Øh ₇ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	R510
1/8	3.00	0.1181	33	61	1	5980504
	3.18	0.1250	36	65	1	5980502
	3.20	0.1260	36	65	1	5980508
	3.30	0.1299	36	65	1	5980512
	3.40	0.1339	39	70	1	5980515
	3.50	0.1378	39	70	1	5980518
	3.70	0.1457	39	70	1	5980522
	3.90	0.1535	43	75	1	5980526
	4.00	0.1575	43	75	1	5980538
	4.10	0.1614	43	75	1	5980540
3/16	4.20	0.1654	43	75	1	5980543
	4.30	0.1693	47	80	1	5980545
	4.50	0.1772	47	80	1	5980548
	4.60	0.1811	47	80	1	5980553
	4.70	0.1850	47	80	1	5980556
	4.76	0.1875	52	86	1	5980529
	4.90	0.1929	52	86	1	5980559
	5.00	0.1969	52	86	1	5980562
	5.10	0.2008	52	86	1	5980565
	5.50	0.2165	57	93	1	5980571
1/4	5.60	0.2205	57	93	1	5980472
	5.70	0.2244	57	93	1	5980510
	6.00	0.2362	57	93	1	5980607
	6.35	0.2500	63	101	1	5980460
	6.50	0.2559	63	101	1	5980615
	6.60	0.2598	63	101	1	5980619
	6.80	0.2677	69	109	1	5980622
	6.90	0.2717	69	109	1	5980626
	7.00	0.2756	69	109	1	5980478
	7.30	0.2874	69	109	1	5980481
	7.40	0.2913	69	109	1	5980484
	7.50	0.2953	69	109	1	5980488
	7.80	0.3071	75	117	1	5980493

d ₁ Øh ₇ Inch	d ₁ Øh ₇ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	R510
5/16	7.90	0.3110	75	117	1	5980497
	7.94	0.3125	75	117	1	5980539
	8.00	0.3150	75	117	1	5980505
	8.50	0.3346	75	117	1	5980507
	8.70	0.3425	81	125	1	5980513
	8.80	0.3465	81	125	1	5980516
	9.00	0.3543	81	125	1	5980519
	9.20	0.3622	81	125	1	5980521
	9.30	0.3661	81	125	1	5980525
	9.40	0.3701	81	125	1	5980528
3/8	9.50	0.3740	81	125	1	5980531
	9.52	0.3750	87	133	1	5980530
	9.90	0.3898	87	133	1	5980533
	10.00	0.3937	87	133	1	5980534
	10.20	0.4016	87	133	1	5980568
	10.30	0.4055	87	133	1	5980574
	10.40	0.4094	87	133	1	5980577
	10.50	0.4134	87	133	1	5980581
	10.80	0.4252	94	142	1	5980585
	11.00	0.4331	94	142	1	5980424
7/16	11.11	0.4375	94	142	1	5980500
	11.20	0.4409	94	142	1	5980427
	11.50	0.4528	94	142	1	5980431
	12.00	0.4724	101	151	1	5980441
1/2	12.70	0.5000	101	151	1	5980417
	13.00	0.5118	101	151	1	5980448
	14.00	0.5512	108	160	1	5980458
	14.25	0.5610	114	169	1	5980463

FORCE X SOLID CARBIDE DRILL



Multi-Application, Standard Length, Reinforced Shank

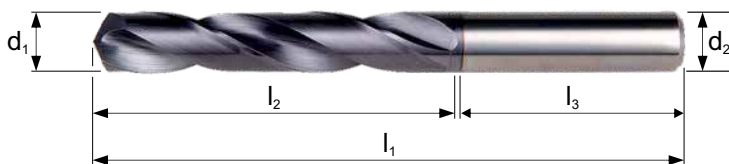
R454 Self centering 4-facet split point and CTW flute construction for enhanced penetration rate. TiAlN coating increases wear resistance, improves tool life at high RPM.

1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 2.1 2.2 2.3 2.4 3.1 3.2 3.3
3.4 4.1 4.2 4.3 6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4

R453 Coolant through clears chips away from the cutting edge. Self centering 4-facet split point and CTW flute construction for enhanced penetration rates. TiAlN coating increases surface hardness, improves tool life at high RPM.

1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 2.1 2.2 2.3 2.4 3.1 3.2 3.3
3.4 4.1 4.2 4.3 6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4

High productivity in a wide range of materials



R454	R453
3.00 - 20.00	3.00 - 20.00

d ₁ Ø Inch	d ₁ Ø _{m7} mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Ø _{h5} mm	Pack Qty	R454	R453
	3.00	0.1181	28	66	36	6	1	5979852	5979633
	3.10	0.1220	28	66	36	6	1	5979855	5979636
1/8	3.18	0.1252	28	66	36	6	1	5979974	5979930
	3.20	0.1260	28	66	36	6	1	5979858	5979642
30	3.26	0.1283	28	66	36	6	1	5980077	5979877
	3.30	0.1299	28	66	36	6	1	5979861	5979645
	3.40	0.1339	28	66	36	6	1	5979864	5979648
29	3.45	0.1358	28	66	36	6	1	5980006	5980039
	3.50	0.1378	28	66	36	6	1	5979868	5979651
28	3.57	0.1406	28	66	36	6	1	5979966	5980036
9/64	3.57	0.1406	28	66	36	6	1	5979250	5979488
	3.60	0.1417	28	66	36	6	1	5979871	5979654
27	3.66	0.1441	28	66	36	6	1	5979924	5980032
	3.70	0.1457	28	66	36	6	1	5979876	5979657
26	3.73	0.1469	36	74	36	6	1	5979572	5980028
25	3.80	0.1496	36	74	36	6	1	5979879	5979660
24	3.86	0.1520	36	74	36	6	1	5979561	5979982
	3.90	0.1535	36	74	36	6	1	5979885	5979663
23	3.91	0.1539	36	74	36	6	1	5979558	5979939
5/32	3.97	0.1563	36	74	36	6	1	5980068	5978954
22	3.99	0.1571	36	74	36	6	1	5979556	5979903
	4.00	0.1575	36	74	36	6	1	5979913	5978985
21	4.04	0.1591	36	74	36	6	1	5979553	5979867
	4.05	0.1594	36	74	36	6	1	—	5978987
20	4.09	0.1610	36	74	36	6	1	5979550	5979764
	4.10	0.1614	36	74	36	6	1	5979919	5978989
	4.20	0.1654	36	74	36	6	1	5980020	5978991
19	4.22	0.1661	36	74	36	6	1	5979544	5979757
	4.30	0.1693	36	74	36	6	1	5980061	5978932
18	4.31	0.1697	36	74	36	6	1	5979541	5979754
11/64	4.37	0.1720	36	74	36	6	1	5980033	5980001
17	4.39	0.1728	36	74	36	6	1	5979537	5979751
	4.40	0.1732	36	74	36	6	1	5980103	5978933

d ₁ Ø Inch	d ₁ Ø _m mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Ø _h mm	Pack Qty	R454	R453
	4.50	0.1772	36	74	36	6	1	5980137	5978934
16	4.50	0.1772	36	74	36	6	1	5979533	5979745
15	4.57	0.1799	36	74	36	6	1	5979531	5979740
	4.60	0.1811	36	74	36	6	1	5980170	5978935
14	4.62	0.1819	36	74	36	6	1	5979529	5979736
13	4.70	0.1850	36	74	36	6	1	5980178	5978936
3/16	4.76	0.1874	44	82	36	6	1	5979889	5979666
12	4.80	0.1890	44	82	36	6	1	5980182	5978937
11	4.85	0.1909	44	82	36	6	1	5979522	5979724
	4.90	0.1929	44	82	36	6	1	5980187	5978938
10	4.92	0.1937	44	82	36	6	1	5979519	5979717
9	4.98	0.1961	44	82	36	6	1	5979937	5979894
	5.00	0.1969	44	82	36	6	1	5980038	5978944
	5.05	0.1988	44	82	36	6	1	—	5978945
8	5.06	0.1992	44	82	36	6	1	5979934	5979891
	5.10	0.2008	44	82	36	6	1	5980042	5978946
7	5.11	0.2012	44	82	36	6	1	5980097	5979888
13/64	5.16	0.2031	44	82	36	6	1	5980070	5979672
6	5.18	0.2039	44	82	36	6	1	5980093	5979886
	5.20	0.2047	44	82	36	6	1	5980045	5978947
5	5.22	0.2055	44	82	36	6	1	5980089	5979883
	5.30	0.2087	44	82	36	6	1	—	7361201
4	5.31	0.2091	44	82	36	6	1	5980085	5979880
	5.40	0.2126	44	82	36	6	1	—	7361202
3	5.41	0.2130	44	82	36	6	1	5980044	5979873
	5.50	0.2165	44	82	36	6	1	5980048	5978948
7/32	5.56	0.2189	44	82	36	6	1	5980148	5979507
	5.60	0.2205	44	82	36	6	1	5980051	5978949
2	5.61	0.2209	44	82	36	6	1	5979547	5979760
	5.70	0.2244	44	82	36	6	1	5980055	5978950
1	5.79	0.2280	44	82	36	6	1	5979516	5979712
	5.80	0.2283	44	82	36	6	1	5980058	5978951
	5.90	0.2323	44	82	36	6	1	—	7361203
A	5.94	0.2339	44	82	36	6	1	5979491	5979694
15/64	5.95	0.2343	44	82	36	6	1	5979928	5979555
	6.00	0.2362	44	82	36	6	1	5980075	5978956
B	6.03	0.2374	53	91	36	8	1	7361224	7361204
	6.05	0.2382	53	91	36	8	1	—	5978957
	6.10	0.2402	53	91	36	8	1	5980080	5978958
C	6.15	0.2421	53	91	36	8	1	7361225	7361205
	6.20	0.2441	53	91	36	8	1	5980084	5978959
D	6.25	0.2461	53	91	36	8	1	5979495	5979697
	6.30	0.2480	53	91	36	8	1	5980088	5978960
1/4	6.35	0.2500	53	91	36	8	1	5979970	5979925
E	6.35	0.2500	53	91	36	8	1	7361226	7361206
	6.40	0.2520	53	91	36	8	1	5980092	5978961
	6.50	0.2559	53	91	36	8	1	5980096	5978962
F	6.53	0.2571	53	91	36	8	1	7361227	7361207
	6.60	0.2598	53	91	36	8	1	5980100	5978963
G	6.63	0.2610	53	91	36	8	1	7361228	7361208
	6.70	0.2638	53	91	36	8	1	5980106	5978965
17/64	6.75	0.2657	53	91	36	8	1	5979798	5979579
H	6.76	0.2661	53	91	36	8	1	5979499	5979700
	6.80	0.2677	53	91	36	8	1	5980109	5978966
	6.90	0.2717	53	91	36	8	1	5980111	5978967
I	6.91	0.2720	53	91	36	8	1	7361229	7361209
	7.00	0.2756	53	91	36	8	1	5980113	5978968
J	7.04	0.2772	53	91	36	8	1	7361230	7361210
	7.10	0.2795	53	91	36	8	1	5980116	5978970
K	7.14	0.2811	53	91	36	8	1	7361231	7361211
9/32	7.14	0.2811	53	91	36	8	1	5979241	5979484
	7.20	0.2835	53	91	36	8	1	—	7361212
	7.30	0.2874	53	91	36	8	1	5980119	5978971
L	7.37	0.2902	53	91	36	8	1	5979503	5979702
	7.40	0.2913	53	91	36	8	1	5980123	5978973

FORCE X SOLID CARBIDE DRILL



d ₁ Ø Inch	d ₁ Øm ₇ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Øh ₅ mm	Pack Qty	R454	R453
M	7.49	0.2949	53	91	36	8	1	5979510	5979705
	7.50	0.2953	53	91	36	8	1	5980126	5978975
19/64	7.54	0.2969	53	91	36	8	1	5979822	5979599
	7.60	0.2992	53	91	36	8	1	5980130	5978977
N	7.67	0.3020	53	91	36	8	1	5979513	5979708
	7.70	0.3031	53	91	36	8	1	5980133	5978979
	7.80	0.3071	53	91	36	8	1	5980140	5978983
	7.90	0.3110	53	91	36	8	1	5980142	5979424
5/16	7.94	0.3126	53	91	36	8	1	5980064	5978952
	8.00	0.3150	53	91	36	8	1	5980151	5979534
O	8.03	0.3161	61	103	40	10	1	5979940	5979897
	8.05	0.3169	61	103	40	10	1	—	5979568
	8.10	0.3189	61	103	40	10	1	5980155	5979575
	8.20	0.3228	61	103	40	10	1	5980157	5979578
P	8.20	0.3228	61	103	40	10	1	7361232	7361213
	8.30	0.3268	61	103	40	10	1	—	7361214
21/64	8.33	0.3280	61	103	40	10	1	5979831	5979612
	8.40	0.3307	61	103	40	10	1	5980162	5979581
Q	8.43	0.3319	61	103	40	10	1	5979944	5979900
	8.50	0.3346	61	103	40	10	1	5980164	5979584
	8.60	0.3386	61	103	40	10	1	5980167	5979429
R	8.61	0.3390	61	103	40	10	1	7361233	7361215
	8.70	0.3425	61	103	40	10	1	5980175	5979432
11/32	8.73	0.3437	61	103	40	10	1	5980029	5979998
	8.80	0.3465	61	103	40	10	1	5979222	5979436
S	8.84	0.3480	61	103	40	10	1	7361234	7361216
	8.90	0.3504	61	103	40	10	1	5979268	5979440
	9.00	0.3543	61	103	40	10	1	5979294	5979444
T	9.09	0.3579	61	103	40	10	1	5979947	5979906
	9.10	0.3583	61	103	40	10	1	5979327	5979448
23/64	9.13	0.3594	61	103	40	10	1	5979838	5979620
	9.20	0.3622	61	103	40	10	1	—	7361217
	9.30	0.3661	61	103	40	10	1	5979364	5979452
U	9.35	0.3681	61	103	40	10	1	5979949	5979909
	9.40	0.3701	61	103	40	10	1	5979372	5979454
	9.50	0.3740	61	103	40	10	1	5979376	5979458
3/8	9.52	0.3748	61	103	40	10	1	5979895	5979674
V	9.58	0.3772	61	103	40	10	1	7361235	7361218
	9.60	0.3780	61	103	40	10	1	5979381	5979461
	9.70	0.3819	61	103	40	10	1	5979385	5979467
	9.80	0.3858	61	103	40	10	1	5979228	5979472
W	9.80	0.3858	61	103	40	10	1	7361236	7361219
	9.90	0.3898	61	103	40	10	1	5979233	5979476
25/64	9.92	0.3906	61	103	40	10	1	5979840	5979624
	10.00	0.3937	61	103	40	10	1	5979978	5979933
	10.05	0.3957	70	118	45	12	1	—	5979936
X	10.08	0.3969	70	118	45	12	1	5979952	5979912
	10.10	0.3976	70	118	45	12	1	5979981	5979942
	10.20	0.4016	70	118	45	12	1	5979985	5979946
Y	10.26	0.4039	70	118	45	12	1	5979955	5979916
	10.30	0.4055	70	118	45	12	1	5979989	5979950
13/32	10.32	0.4063	70	118	45	12	1	5980067	5979639
	10.40	0.4094	70	118	45	12	1	5979993	5979953
Z	10.49	0.4130	70	118	45	12	1	5979959	5979918
	10.50	0.4134	70	118	45	12	1	5979996	5979956
	10.60	0.4173	70	118	45	12	1	5980000	5979960
27/64	10.72	0.4220	70	118	45	12	1	5979843	5979627
	10.80	0.4252	70	118	45	12	1	—	7361220
	11.00	0.4331	70	118	45	12	1	5980003	5979964
7/16	11.11	0.4374	70	118	45	12	1	5980145	5979464
	11.20	0.4409	70	118	45	12	1	5980009	5979968
	11.30	0.4449	70	118	45	12	1	—	7361221
	11.40	0.4488	70	118	45	12	1	5980012	5979972
	11.50	0.4528	70	118	45	12	1	5980015	5979976

d ₁ Ø Inch	d ₁ Øm ₇ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Øh ₆ mm	Pack Qty	R454	R453
29/64	11.51	0.4531	70	118	45	12	1	5979849	5979630
	11.60	0.4567	70	118	45	12	1	5980018	5979986
	11.80	0.4646	70	118	45	12	1	5980022	5979990
15/32	11.91	0.4689	70	118	45	12	1	5979926	5979552
	12.00	0.4724	70	118	45	12	1	5980037	5980005
	12.05	0.4744	76	124	45	14	1	—	5980008
	12.10	0.4764	76	124	45	14	1	5980040	—
	12.20	0.4803	76	124	45	14	1	5980047	5980011
	12.30	0.4843	76	124	45	14	1	5979898	5978931
31/64	12.50	0.4921	76	124	45	14	1	5980050	5980014
	12.70	0.5000	76	124	45	14	1	5980053	5980017
	12.70	0.5000	76	124	45	14	1	5979962	5979921
1/2	12.80	0.5039	76	124	45	14	1	5980057	5980023
	13.00	0.5118	76	124	45	14	1	5980060	5979536
	13.10	0.5157	76	124	45	14	1	5979901	5978942
33/64	13.30	0.5236	76	124	45	14	1	—	7361222
	13.49	0.5311	76	124	45	14	1	5979795	5979576
	13.50	0.5315	76	124	45	14	1	5980062	5979570
	13.80	0.5433	76	124	45	14	1	5980065	5979602
	13.89	0.5469	76	124	45	14	1	5979904	5978953
	14.00	0.5512	76	124	45	14	1	5980074	5979680
35/64	14.25	0.5610	82	133	48	16	1	5980081	5979684
	14.29	0.5626	82	133	48	16	1	5979237	5979480
	14.50	0.5709	82	133	48	16	1	5979778	5979688
37/64	14.68	0.5780	82	133	48	16	1	5979907	5978964
	14.80	0.5827	82	133	48	16	1	5979813	5979691
	15.00	0.5906	82	133	48	16	1	5979846	5979540
19/32	15.08	0.5937	82	133	48	16	1	5979820	5979596
	15.10	0.5945	82	133	48	16	1	5979882	5979543
	15.30	0.6024	82	133	48	16	1	—	7361223
39/64	15.48	0.6094	82	133	48	16	1	5979910	5978981
	15.50	0.6102	82	133	48	16	1	5979915	5979546
	15.80	0.6220	82	133	48	16	1	5979922	5979549
5/8	15.88	0.6252	82	133	48	16	1	5980071	5978955
	16.00	0.6299	82	133	48	16	1	5979931	5979559
	16.27	0.6406	91	143	48	18	1	5980189	5978939
41/64	16.50	0.6496	91	143	48	18	1	5979783	5979562
	16.67	0.6563	91	143	48	18	1	5979828	5979608
	17.00	0.6693	91	143	48	18	1	5979786	5979564
43/64	17.07	0.6720	91	143	48	18	1	5980026	5978940
11/16	17.46	0.6874	91	143	48	18	1	5980025	5979995
	17.50	0.6890	91	143	48	18	1	5979789	5979567
	17.80	0.7008	91	143	48	18	1	5979792	5979573
45/64	17.86	0.7031	91	143	48	18	1	5980030	5978941
	18.00	0.7087	91	143	48	18	1	5979801	5979582
	18.26	0.7189	99	153	50	20	1	5979834	5979616
23/32	18.50	0.7283	99	153	50	20	1	5979804	5979585
	18.65	0.7343	99	153	50	20	1	5980034	5978943
	19.00	0.7480	99	153	50	20	1	5979807	5979588
3/4	19.05	0.7500	99	153	50	20	1	5979892	5979669
	19.50	0.7677	99	153	50	20	1	5979810	5979590
	19.80	0.7795	99	153	50	20	1	5979816	5979593
	20.00	0.7874	99	153	50	20	1	5979824	5979605

FORCE M SOLID CARBIDE DRILL



Multi-Application, Standard Length, Reinforced Shank

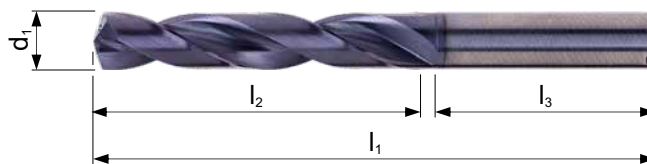
R463

2.1 2.2 2.3 2.4 4.1 4.2 4.3

5.1 5.2 5.3

Self-centering 4-facet split point and CTW flute construction for enhanced penetration rate specifically designed for Stainless Steel (ISO-M) materials. TiAlN coating increases wear resistance and improves tool life. Coolant through combined with an advanced point geometry prevents premature wear of the cutting edges. Length designed for 5 x Diameter drilling depths.

High productivity in a wide range of materials



R463

DIN
6537
L

5XD

HM

140°

TiAlN



Coolant
Through
3.00 - 16.00

d ₁ Ø Inch	d ₁ Ø _{m7} mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Ø _{h6} mm	Pack Qty	R463
1/8	3.00	0.1181	28	66	36	6	1	7624913
	3.10	0.1220	28	66	36	6	1	7624914
	3.18	0.1250	28	66	36	6	1	7624915
	3.20	0.1260	28	66	36	6	1	7624916
	3.30	0.1299	28	66	36	6	1	7624917
29	3.40	0.1339	28	66	36	6	1	7624918
	3.45	0.1360	28	66	36	6	1	7624919
	3.50	0.1378	28	66	36	6	1	7624960
	3.57	0.1406	28	66	36	6	1	7624961
	3.60	0.1417	28	66	36	6	1	7624962
9/64	3.70	0.1457	28	66	36	6	1	7624963
	3.80	0.1496	36	74	36	6	1	7624964
	3.90	0.1535	36	74	36	6	1	7624965
	3.97	0.1563	36	74	36	6	1	7624966
	4.00	0.1575	36	74	36	6	1	7624967
5/32	4.05	0.1594	36	74	36	6	1	7624968
	4.10	0.1614	36	74	36	6	1	7624969
	4.20	0.1654	36	74	36	6	1	7624970
	4.30	0.1693	36	74	36	6	1	7624971
	4.37	0.1719	36	74	36	6	1	7624972
11/64	4.40	0.1732	36	74	36	6	1	7624973
	4.50	0.1772	36	74	36	6	1	7624974
	4.60	0.1811	36	74	36	6	1	7624975
	4.70	0.1850	36	74	36	6	1	7624976
	4.76	0.1875	44	82	36	6	1	7624977
3/16	4.80	0.1890	44	82	36	6	1	7624978
	4.90	0.1929	44	82	36	6	1	7624979
	5.00	0.1969	44	82	36	6	1	7624980
	5.05	0.1988	44	82	36	6	1	7624981
	5.10	0.2008	44	82	36	6	1	7624982
7	5.11	0.2010	44	82	36	6	1	7624983
13/64	5.16	0.2031	44	82	36	6	1	7624984
	5.20	0.2047	44	82	36	6	1	7624985

d ₁ Ø Inch	d ₁ Øm ₇ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Øh ₆ mm	Pack Qty	R463
5	5.22	0.2055	44	82	36	6	1	7624986
	5.30	0.2087	44	82	36	6	1	7624987
	5.40	0.2126	44	82	36	6	1	7624988
	5.50	0.2165	44	82	36	6	1	7624989
7/32	5.56	0.2188	44	82	36	6	1	7624990
	5.60	0.2205	44	82	36	6	1	7624991
	5.70	0.2244	44	82	36	6	1	7624992
	5.80	0.2283	44	82	36	6	1	7624993
15/64	5.90	0.2323	44	82	36	6	1	7624994
	5.95	0.2344	44	82	36	6	1	7624995
	6.00	0.2362	44	82	36	6	1	7624996
	6.05	0.2382	53	91	36	8	1	7624997
1/4	6.10	0.2402	53	91	36	8	1	7624998
	6.20	0.2441	53	91	36	8	1	7624999
	6.30	0.2480	53	91	36	8	1	7625000
	6.35	0.2500	53	91	36	8	1	7625001
17/64	6.40	0.2520	53	91	36	8	1	7625002
	6.50	0.2559	53	91	36	8	1	7625003
	6.60	0.2598	53	91	36	8	1	7625004
	6.70	0.2638	53	91	36	8	1	7625005
9/32	6.75	0.2656	53	91	36	8	1	7625006
	6.80	0.2677	53	91	36	8	1	7625007
	6.90	0.2717	53	91	36	8	1	7625008
	7.00	0.2756	53	91	36	8	1	7625009
19/64	7.10	0.2795	53	91	36	8	1	7625010
	7.14	0.2813	53	91	36	8	1	7625011
	7.20	0.2835	53	91	36	8	1	7625012
	7.30	0.2874	53	91	36	8	1	7625013
5/16	7.40	0.2913	53	91	36	8	1	7625014
	7.50	0.2953	53	91	36	8	1	7625015
	7.54	0.2969	53	91	36	8	1	7625016
	7.60	0.2992	53	91	36	8	1	7625017
21/64	7.70	0.3031	53	91	36	8	1	7625018
	7.80	0.3071	53	91	36	8	1	7625019
	7.90	0.3110	53	91	36	8	1	7625020
	7.94	0.3125	53	91	36	8	1	7625021
11/32	8.00	0.3150	53	91	36	8	1	7625022
	8.05	0.3169	61	103	40	10	1	7625023
	8.10	0.3189	61	103	40	10	1	7625024
	8.20	0.3228	61	103	40	10	1	7625025
23/64	8.30	0.3268	61	103	40	10	1	7625026
	8.33	0.3281	61	103	40	10	1	7625027
	8.40	0.3307	61	103	40	10	1	7625028
	8.50	0.3346	61	103	40	10	1	7625029
3/8	8.60	0.3386	61	103	40	10	1	7625030
	8.70	0.3425	61	103	40	10	1	7625031
	8.73	0.3438	61	103	40	10	1	7625032
	8.80	0.3465	61	103	40	10	1	7625033
25/64	8.90	0.3504	61	103	40	10	1	7625034
	9.00	0.3543	61	103	40	10	1	7625035
	9.10	0.3583	61	103	40	10	1	7625036
	9.13	0.3594	61	103	40	10	1	7625037
5/8	9.20	0.3622	61	103	40	10	1	7625038
	9.30	0.3661	61	103	40	10	1	7625039
	9.40	0.3701	61	103	40	10	1	7625040
	9.50	0.3740	61	103	40	10	1	7625041
3/4	9.53	0.3750	61	103	40	10	1	7625042
	9.60	0.3780	61	103	40	10	1	7625043
	9.70	0.3819	61	103	40	10	1	7625044
	9.80	0.3858	61	103	40	10	1	7625045
7/8	9.90	0.3898	61	103	40	10	1	7625046
	9.92	0.3906	61	103	40	10	1	7625047
	10.00	0.3937	61	103	40	10	1	7625048
	10.05	0.3957	70	118	45	12	1	7625049
	10.10	0.3976	70	118	45	12	1	7625050

FORCE M SOLID CARBIDE DRILL



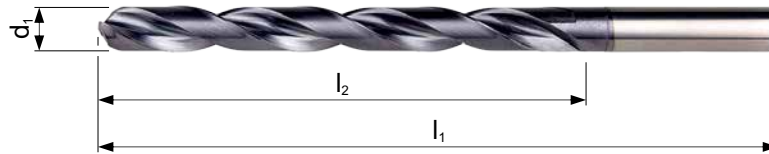
d ₁ Ø Inch	d ₁ Øm ₇ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Øh ₆ mm	Pack Qty	R463
	10.20	0.4016	70	118	45	12	1	7625051
	10.30	0.4055	70	118	45	12	1	7625052
13/32	10.32	0.4063	70	118	45	12	1	7625053
	10.40	0.4094	70	118	45	12	1	7625054
	10.50	0.4134	70	118	45	12	1	7625055
	10.60	0.4173	70	118	45	12	1	7625056
27/64	10.72	0.4219	70	118	45	12	1	7625057
	10.80	0.4252	70	118	45	12	1	7625058
	10.90	0.4291	70	118	45	12	1	7625059
	11.00	0.4331	70	118	45	12	1	7625060
7/16	11.11	0.4375	70	118	45	12	1	7625061
	11.20	0.4409	70	118	45	12	1	7625062
	11.30	0.4449	70	118	45	12	1	7625063
	11.40	0.4488	70	118	45	12	1	7625064
	11.50	0.4528	70	118	45	12	1	7625065
29/64	11.51	0.4531	70	118	45	12	1	7625066
	11.60	0.4567	70	118	45	12	1	7625067
	11.80	0.4646	70	118	45	12	1	7625068
15/32	11.91	0.4688	70	118	45	12	1	7625069
	12.00	0.4724	70	118	45	12	1	7625070
	12.05	0.4744	76	124	45	14	1	7625071
	12.20	0.4803	76	124	45	14	1	7625072
31/64	12.30	0.4844	76	124	45	14	1	7625073
	12.50	0.4921	76	124	45	14	1	7625074
1/2	12.70	0.5000	76	124	45	14	1	7625075
	12.70	0.5000	76	124	45	14	1	7625076
	12.80	0.5039	76	124	45	14	1	7625077
	13.00	0.5118	76	124	45	14	1	7625078
33/64	13.10	0.5156	76	124	45	14	1	7625079
	13.30	0.5236	76	124	45	14	1	7625080
17/32	13.49	0.5313	76	124	45	14	1	7625081
	13.50	0.5315	76	124	45	14	1	7625082
	13.80	0.5433	76	124	45	14	1	7625083
35/64	13.89	0.5469	76	124	45	14	1	7625084
	14.00	0.5512	76	124	45	14	1	7625085
	14.25	0.5610	82	133	48	16	1	7625086
9/16	14.29	0.5625	82	133	48	16	1	7625087
	14.50	0.5709	82	133	48	16	1	7625088
37/64	14.68	0.5781	82	133	48	16	1	7625089
	14.80	0.5827	82	133	48	16	1	7625090
	15.00	0.5906	82	133	48	16	1	7625091
19/32	15.08	0.5938	82	133	48	16	1	7625092
	15.10	0.5945	82	133	48	16	1	7625093
	15.30	0.6024	82	133	48	16	1	7625094
39/64	15.48	0.6094	82	133	48	16	1	7625095
	15.50	0.6102	82	133	48	16	1	7625096
	15.80	0.6220	82	133	48	16	1	7625097
5/8	15.88	0.6250	82	133	48	16	1	7625098
	16.00	0.6299	82	133	48	16	1	7625099

Multi-Application, 8xD, Reinforced Shank

R459 Coolant through clears chips away from the cutting edge. Self centering 4-facet split point and CTW flute construction for enhanced penetration rates. TiAlN coating increases surface hardness, improves tool life at high RPM.

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4
6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4

High productivity in a wide range of materials



R459



8xD

HM



Coolant Through

3.00 - 16.00

d ₁ Øm, Inch	d ₁ Øm, mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Øh ₆ mm	Pack Qty	R459
1/8	3.00	0.1181	37	79	36	6	1	6718973
	3.10	0.1220	37	79	36	6	1	6718974
	3.18	0.1252	37	79	36	6	1	6718975
	3.20	0.1260	37	79	36	6	1	6718976
	3.30	0.1299	37	79	36	6	1	6718977
9/64	3.40	0.1339	37	79	36	6	1	6718978
	3.50	0.1378	37	79	36	6	1	6718979
	3.57	0.1406	37	79	36	6	1	6718990
	3.60	0.1417	37	79	36	6	1	6718991
	3.70	0.1457	37	79	36	6	1	6718992
5/32	3.80	0.1496	48	90	36	6	1	6718993
	3.90	0.1535	48	90	36	6	1	6718994
	3.97	0.1563	48	90	36	6	1	6718995
	4.00	0.1575	48	90	36	6	1	6718996
	4.10	0.1614	48	90	36	6	1	6718997
11/64	4.20	0.1654	48	90	36	6	1	6718998
	4.30	0.1693	48	90	36	6	1	6718999
	4.37	0.1720	48	90	36	6	1	6719000
	4.40	0.1732	48	90	36	6	1	6719001
	4.50	0.1772	48	90	36	6	1	6719002
3/16	4.60	0.1811	48	90	36	6	1	6719003
	4.70	0.1850	62	104	36	6	1	6719004
	4.76	0.1874	62	104	36	6	1	6719005
	4.80	0.1890	62	104	36	6	1	6719006
	4.90	0.1929	62	104	36	6	1	6719007
13/64	5.00	0.1969	62	104	36	6	1	6719008
	5.10	0.2008	62	104	36	6	1	6719009
	5.16	0.2031	62	104	36	6	1	6719010
	5.20	0.2047	62	104	36	6	1	6719011
	5.30	0.2087	62	104	36	6	1	6719012
	5.40	0.2126	62	104	36	6	1	6719013
	5.50	0.2165	62	104	36	6	1	6719014

FORCE X SOLID CARBIDE DRILL



d ₁ Øm, Inch	d ₁ Øm, mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Øh ₆ mm	Pack Qty	R459
7/32	5.56	0.2189	62	104	36	6	1	6719015
	5.60	0.2205	62	104	36	6	1	6719016
	5.70	0.2244	62	104	36	6	1	6719017
	5.80	0.2283	62	104	36	6	1	6719018
	5.90	0.2323	62	104	36	6	1	6719019
15/64	5.95	0.2343	62	104	36	6	1	6719020
	6.00	0.2362	62	104	36	6	1	6719021
	6.10	0.2402	84	126	36	8	1	6719022
	6.20	0.2441	84	126	36	8	1	6719023
	6.30	0.2480	84	126	36	8	1	6719024
1/4	6.35	0.2500	84	126	36	8	1	6719025
	6.40	0.2520	84	126	36	8	1	6719026
	6.50	0.2559	84	126	36	8	1	6719027
	6.60	0.2598	84	126	36	8	1	6719028
	6.70	0.2638	84	126	36	8	1	6719029
17/64	6.75	0.2657	84	126	36	8	1	6719030
	6.80	0.2677	84	126	36	8	1	6719031
	6.90	0.2717	84	126	36	8	1	6719032
	7.00	0.2756	84	126	36	8	1	6719033
	7.10	0.2795	84	126	36	8	1	6719034
9/32	7.14	0.2811	84	126	36	8	1	6719035
	7.20	0.2835	84	126	36	8	1	6719036
	7.30	0.2874	84	126	36	8	1	6719037
	7.40	0.2913	84	126	36	8	1	6719038
	7.50	0.2953	84	126	36	8	1	6719039
19/64	7.54	0.2969	84	126	36	8	1	6719040
	7.60	0.2992	84	126	36	8	1	6719041
	7.70	0.3031	84	126	36	8	1	6719042
	7.80	0.3071	84	126	36	8	1	6719043
	7.90	0.3110	84	126	36	8	1	6719044
5/16	7.94	0.3126	84	126	36	8	1	6719045
	8.00	0.3150	84	126	36	8	1	6719046
	8.10	0.3189	106	152	40	10	1	6719047
	8.20	0.3228	106	152	40	10	1	6719048
	8.30	0.3268	106	152	40	10	1	6719049
21/64	8.33	0.3280	106	152	40	10	1	6719050
	8.40	0.3307	106	152	40	10	1	6719051
	8.50	0.3346	106	152	40	10	1	6719052
	8.60	0.3386	106	152	40	10	1	6719053
	8.70	0.3425	106	152	40	10	1	6719054
11/32	8.73	0.3437	106	152	40	10	1	6719055
	8.80	0.3465	106	152	40	10	1	6719056
	8.90	0.3504	106	152	40	10	1	6719057
	9.00	0.3543	106	152	40	10	1	6719058
	9.10	0.3583	106	152	40	10	1	6719059
23/64	9.13	0.3594	106	152	40	10	1	6719060
	9.20	0.3622	106	152	40	10	1	6719061
	9.30	0.3661	106	152	40	10	1	6719062
	9.40	0.3701	106	152	40	10	1	6719063
	9.50	0.3740	106	152	40	10	1	6719064
3/8	9.53	0.3748	106	152	40	10	1	6719065
	9.60	0.3780	106	152	40	10	1	6719066
	9.70	0.3819	106	152	40	10	1	6719067
	9.80	0.3858	106	152	40	10	1	6719068
	9.90	0.3898	106	152	40	10	1	6719069
25/64	9.92	0.3906	106	152	40	10	1	6719070
	10.00	0.3937	106	152	40	10	1	6719071
	10.20	0.4016	128	180	45	12	1	6719072
	10.30	0.4055	128	180	45	12	1	6719073
	10.32	0.4063	128	180	45	12	1	6719074
13/32	10.40	0.4094	128	180	45	12	1	6719075
	10.50	0.4134	128	180	45	12	1	6719076
	10.72	0.4220	128	180	45	12	1	6719077
27/64	10.80	0.4252	128	180	45	12	1	6719078

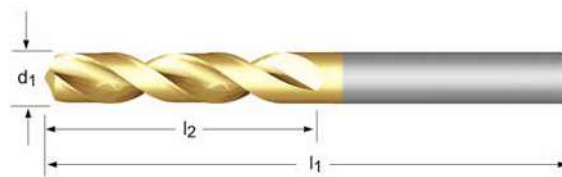
d ₁ Øm, Inch	d ₁ Øm, mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Øh ₆ mm	Pack Qty	R459
	11.00	0.4331	128	180	45	12	1	6719079
7/16	11.11	0.4374	128	180	45	12	1	6719080
	11.20	0.4409	128	180	45	12	1	6719081
	11.30	0.4449	128	180	45	12	1	6719082
	11.50	0.4528	128	180	45	12	1	6719083
29/64	11.51	0.4531	128	180	45	12	1	6719084
	11.80	0.4646	128	180	45	12	1	6719085
15/32	11.91	0.4689	128	180	45	12	1	6719086
	12.00	0.4724	128	180	45	12	1	6719087
	12.20	0.4803	151	202	48	14	1	6719088
31/64	12.30	0.4843	151	202	48	14	1	6719089
	12.50	0.4921	151	202	48	14	1	6719090
1/2	12.70	0.5000	151	202	48	14	1	6719091
	12.80	0.5039	151	202	48	14	1	6719092
	13.00	0.5118	151	202	48	14	1	6719093
33/64	13.10	0.5157	151	202	48	14	1	6719094
17/32	13.49	0.5311	151	202	48	14	1	6719095
	13.50	0.5315	151	202	48	14	1	6719096
35/64	13.89	0.5469	151	202	48	14	1	6719097
	14.00	0.5512	151	202	48	14	1	6719098
	14.25	0.5610	172	227	48	16	1	6719099
9/16	14.29	0.5626	172	227	48	16	1	6719100
	14.50	0.5709	172	227	48	16	1	6719101
37/64	14.68	0.5780	172	227	48	16	1	6719102
	15.00	0.5906	172	227	48	16	1	6719103
19/32	15.08	0.5937	172	227	48	16	1	6719104
	15.10	0.5945	172	227	48	16	1	6719105
39/64	15.48	0.6094	172	227	48	16	1	6719106
	15.50	0.6102	172	227	48	16	1	6719107
5/8	15.88	0.6252	172	227	48	16	1	6719108
	16.00	0.6299	172	227	48	16	1	6719109

Multi-Application, Screw Machine Length

A520

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4 4.1 4.2
4.3 5.1 5.2 5.3 6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4 8.1 8.2 8.3

Low thrust design. Notched point improves chip formation for enhanced penetration rate. TiN coating increases wear resistance and improves tool life.



A520

DIN
1897

2.5XD

HSS

130°



3.00 - 13.00

d_1 Ø _{h8} Inch	d_1 Ø _{h8} mm	d_1 decimal Inch	l_2 mm	l_1 mm	Pack Qty	A520
1/8	3.00	0.1181	16	46	1	5970286
	3.10	0.1220	18	49	1	5970447
	3.18	0.1250	18	49	1	5970282
	3.20	0.1260	18	49	1	5970483
	3.30	0.1299	18	49	1	5970513
9/64	3.40	0.1339	20	52	1	5970545
	3.50	0.1378	20	52	1	5970567
	3.57	0.1406	20	52	1	5970032
	3.60	0.1417	20	52	1	5970571
	3.70	0.1457	20	52	1	5970574
5/32	3.80	0.1496	22	55	1	5970576
	3.90	0.1535	22	55	1	5970578
	3.97	0.1563	22	55	1	5970528
	4.00	0.1575	22	55	1	5970462
	4.10	0.1614	22	55	1	5970466
11/64	4.20	0.1654	22	55	1	5970469
	4.30	0.1693	24	58	1	5970471
	4.37	0.1719	24	58	1	5970200
	4.40	0.1732	24	58	1	5970474
	4.50	0.1772	24	58	1	5970477
3/16	4.60	0.1811	24	58	1	5970480
	4.70	0.1850	24	58	1	5970485
	4.76	0.1875	26	62	1	5970451
	4.80	0.1890	26	62	1	5970488
	4.90	0.1929	26	62	1	5970490
13/64	5.00	0.1969	26	62	1	5970493
	5.10	0.2008	26	62	1	5970496
	5.16	0.2031	26	62	1	5970240
	5.20	0.2047	26	62	1	5970499
	5.30	0.2087	26	62	1	5970502
7/32	5.40	0.2126	28	66	1	5970505
	5.50	0.2165	28	66	1	5970508
	5.56	0.2188	28	66	1	5970139

d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A520
	5.60	0.2205	28	66	1	5970511
	5.70	0.2244	28	66	1	5970516
	5.80	0.2283	28	66	1	5970519
	5.90	0.2323	28	66	1	5970521
15/64	5.95	0.2344	28	66	1	5970248
	6.00	0.2362	28	66	1	5970532
	6.10	0.2402	31	70	1	5970537
	6.20	0.2441	31	70	1	5970539
	6.30	0.2480	31	70	1	5970541
1/4	6.35	0.2500	31	70	1	5970236
	6.40	0.2520	31	70	1	5970543
	6.50	0.2559	31	70	1	5970547
	6.60	0.2598	31	70	1	5970549
	6.70	0.2638	31	70	1	5970551
17/64	6.75	0.2656	34	74	1	5970254
	6.80	0.2677	34	74	1	5970553
	6.90	0.2717	34	74	1	5970555
	7.00	0.2756	34	74	1	5970557
	7.10	0.2795	34	74	1	5970559
9/32	7.14	0.2812	34	74	1	5970027
	7.20	0.2835	34	74	1	5970561
	7.30	0.2874	34	74	1	5970563
	7.40	0.2913	34	74	1	5970565
	7.50	0.2953	34	74	1	5970569
19/64	7.54	0.2969	37	79	1	5970258
	7.60	0.2992	37	79	1	5969952
	7.70	0.3031	37	79	1	5969987
	7.80	0.3071	37	79	1	5970042
	7.90	0.3110	37	79	1	5970092
5/16	7.94	0.3125	37	79	1	5970524
	8.00	0.3150	37	79	1	5970143
	8.10	0.3189	37	79	1	5970147
	8.20	0.3228	37	79	1	5970152
	8.30	0.3268	37	79	1	5969954
21/64	8.33	0.3281	37	79	1	5970261
	8.40	0.3307	37	79	1	5969957
	8.50	0.3346	37	79	1	5969960
	8.60	0.3386	40	84	1	5969963
	8.70	0.3425	40	84	1	5969966
11/32	8.73	0.3437	40	84	1	5970199
	8.80	0.3465	40	84	1	5969969
	8.90	0.3504	40	84	1	5969972
	9.00	0.3543	40	84	1	5969975
	9.10	0.3583	40	84	1	5969979
23/64	9.13	0.3594	40	84	1	5970265
	9.20	0.3622	40	84	1	5969983
	9.30	0.3661	40	84	1	5969990
	9.40	0.3701	40	84	1	5969997
	9.50	0.3740	40	84	1	5970004
3/8	9.52	0.3750	43	89	1	5970455
	9.60	0.3780	43	89	1	5970009
	9.70	0.3819	43	89	1	5970014
	9.80	0.3858	43	89	1	5970018
	9.90	0.3898	43	89	1	5970022
25/64	9.92	0.3906	43	89	1	5970269
	10.00	0.3937	43	89	1	5970290
	10.10	0.3976	43	89	1	5970294
	10.20	0.4016	43	89	1	5970298
	10.30	0.4055	43	89	1	5970302
13/32	10.32	0.4063	43	89	1	5970232
	10.40	0.4094	43	89	1	5970174
	10.50	0.4134	43	89	1	5970178
	10.60	0.4173	43	89	1	5970180
	10.70	0.4213	47	95	1	5970182
27/64	10.72	0.4219	47	95	1	5970274
	10.80	0.4252	47	95	1	5970184

ADX SCREW MACHINE DRILL



d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A520
	10.90	0.4291	47	95	1	5970186
	11.00	0.4331	47	95	1	5970188
	11.10	0.4370	47	95	1	5970189
7/16	11.11	0.4375	47	95	1	5970132
	11.20	0.4409	47	95	1	5970190
	11.30	0.4449	47	95	1	5970191
	11.40	0.4488	47	95	1	5970193
	11.50	0.4528	47	95	1	5970194
29/64	11.51	0.4531	47	95	1	5970278
	11.60	0.4567	47	95	1	5970195
	11.70	0.4606	47	95	1	5970196
	11.80	0.4646	47	95	1	5970197
	11.90	0.4685	51	102	1	5970198
15/32	11.91	0.4688	51	102	1	5970244
	12.00	0.4724	51	102	1	5970201
	12.10	0.4764	51	102	1	5970202
	12.20	0.4803	51	102	1	5970205
	12.30	0.4843	51	102	1	5970208
31/64	12.30	0.4843	51	102	1	5970458
	12.40	0.4882	51	102	1	5970210
	12.50	0.4921	51	102	1	5970213
	12.60	0.4961	51	102	1	5970216
	12.70	0.5000	51	102	1	5970219
1/2	12.70	0.5000	51	102	1	5970203
	12.80	0.5039	51	102	1	5970222
	12.90	0.5079	51	102	1	5970225
	13.00	0.5118	51	102	1	5970228

Multi-Application, Premium Cobalt Screw Machine Length - Parabolic Flute for Advanced Chip Removal

A920

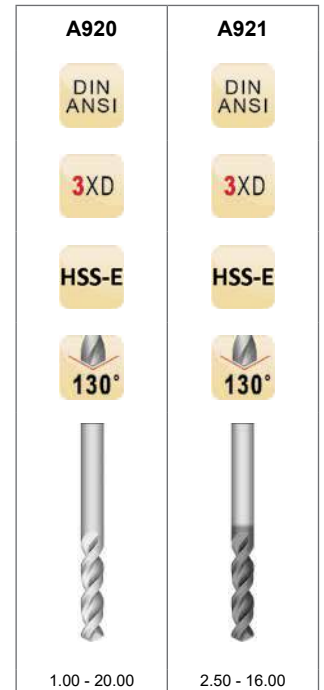
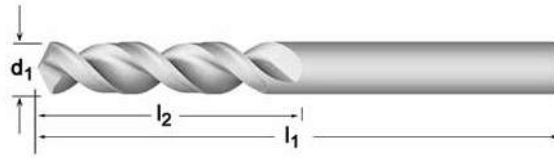
1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4 4.1 4.2
4.3 5.1 5.2 5.3 6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4 8.1 8.2

Heavy-Duty parabolic flute design allows greater drilling depths in one pass. Notched point improves chip formation. Premium cobalt base material increases wear resistance. Bright finish improves chip flow in soft or non-ferrous materials.

A921

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4 4.1 4.2
4.3 5.1 5.2 5.3 6.3 6.4 7.4

Heavy-Duty parabolic flute design allows greater drilling depths in one pass. Notched Point improves chip formation. Premium cobalt base material combined with AlCrN-Top coating increases lubricity and wear resistance which improves tool life.



d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A920	A921
3/64	1.00	0.0394	6	26	1	5972252	—
	1.10	0.0433	7	28	1	5972257	—
	1.19	0.0469	13	35	1	5972320	—
	1.20	0.0472	8	30	1	5972261	—
	1.25	0.0492	8	30	1	5972265	—
	1.30	0.0512	8	30	1	5972269	—
	1.35	0.0531	9	32	1	5972273	—
1/16	1.40	0.0551	9	32	1	5972277	—
	1.50	0.0591	9	32	1	5972292	—
	1.55	0.0610	10	34	1	5972352	—
	1.59	0.0625	16	41	1	5972536	—
	1.60	0.0630	10	34	1	5972389	—
	1.70	0.0669	10	34	1	5972434	—
	1.75	0.0689	11	36	1	5972481	—
5/64	1.80	0.0709	11	36	1	5972524	—
	1.90	0.0748	11	36	1	5972532	—
	1.98	0.0781	17	43	1	5972343	—
	2.00	0.0787	12	38	1	5972340	—
	2.10	0.0827	12	38	1	5972344	—
	2.15	0.0846	13	40	1	5972346	—
	2.20	0.0866	13	40	1	5972348	—
3/32	2.30	0.0906	13	40	1	5972350	—
	2.35	0.0925	14	43	1	5972208	—
	2.38	0.0937	19	41	1	5972313	—
	2.40	0.0945	14	43	1	5972212	—
	2.50	0.0984	14	43	1	5972216	5972616
	2.60	0.1024	14	43	1	5972220	5972620
	2.70	0.1063	16	46	1	5972229	5972624
7/64	2.78	0.1094	21	46	1	5972429	5972962
	2.80	0.1102	16	46	1	5972233	—
	2.90	0.1142	16	46	1	5972236	5972628
	3.00	0.1181	16	46	1	5972279	5972655
	3.10	0.1220	18	49	1	5972282	5972659

PFX SCREW MACHINE DRILL



d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A920	A921
1/8	3.18	0.1250	22	48	1	5972355	5971789
	3.20	0.1260	18	49	1	5972286	5972663
	3.30	0.1299	18	49	1	5972294	5972667
	3.40	0.1339	20	52	1	5972297	5972671
	3.50	0.1378	20	52	1	5972301	5972675
9/64	3.57	0.1406	24	49	1	5971669	5972558
	3.60	0.1417	20	52	1	5972304	5972683
	3.70	0.1457	20	52	1	5972306	5972688
	3.80	0.1496	22	55	1	5972308	5972691
	3.90	0.1535	22	55	1	5972310	5972696
5/32	3.97	0.1563	25	52	1	5972341	5972844
	4.00	0.1575	22	55	1	5972334	5972737
	4.10	0.1614	22	55	1	5972336	5972741
	4.20	0.1654	22	55	1	5972338	5972745
	4.30	0.1693	24	58	1	5972342	5972749
11/64	4.37	0.1719	27	54	1	5972413	5971828
	4.40	0.1732	24	58	1	5972311	5972753
	4.50	0.1772	24	58	1	5972333	5972756
	4.60	0.1811	24	58	1	5972354	5972760
	4.70	0.1850	24	58	1	5972391	5972764
3/16	4.76	0.1875	29	56	1	5972312	5972701
	4.80	0.1890	26	62	1	5972436	5972769
	4.90	0.1929	26	62	1	5972446	5972777
	5.00	0.1969	26	62	1	5972317	5972834
	5.10	0.2008	26	62	1	5972319	5972875
13/64	5.16	0.2031	30	57	1	5972459	5972679
	5.20	0.2047	26	62	1	5972321	5972928
	5.30	0.2087	26	62	1	5972323	5972977
	5.40	0.2126	28	66	1	5972325	5973023
	5.50	0.2165	28	66	1	5972327	5973030
7/32	5.56	0.2188	32	60	1	5972425	5972956
	5.60	0.2205	28	66	1	5972329	5973034
	5.70	0.2244	28	66	1	5972331	5973038
	5.80	0.2283	28	66	1	5972335	5973041
	5.90	0.2323	28	66	1	5972337	5972838
15/64	5.95	0.2344	33	62	1	5972492	5972605
	6.00	0.2362	28	66	1	5972347	5972852
	6.10	0.2402	31	70	1	5972349	5972854
	6.20	0.2441	31	70	1	5972351	5972858
	6.30	0.2480	31	70	1	5972353	5972863
1/4	6.35	0.2500	35	64	1	5972544	5971780
	6.40	0.2520	31	70	1	5972356	5972867
	6.50	0.2559	31	70	1	5972359	5972870
	6.60	0.2598	31	70	1	5972362	5972879
	6.70	0.2638	31	70	1	5972366	5972884
17/64	6.75	0.2656	37	67	1	5972516	5972609
	6.80	0.2677	34	74	1	5972369	5972889
	6.90	0.2717	34	74	1	5972373	5972894
	7.00	0.2756	34	74	1	5972377	5972899
	7.10	0.2795	34	74	1	5972381	5972902
9/32	7.14	0.2812	38	68	1	5971666	5972556
	7.20	0.2835	34	74	1	5972385	5972909
	7.30	0.2874	34	74	1	5972388	5972914
	7.40	0.2913	34	74	1	5972396	5972918
	7.50	0.2953	34	74	1	5972399	5972923
19/64	7.54	0.2969	40	70	1	5972318	5972614
	7.60	0.2992	37	79	1	5972403	5972932
	7.70	0.3031	37	79	1	5972407	5972937
	7.80	0.3071	37	79	1	5972411	5972943
	7.90	0.3110	37	79	1	5972418	5972948
5/16	7.94	0.3125	41	71	1	5972339	5972841
	8.00	0.3150	37	79	1	5972433	5972965
	8.10	0.3189	37	79	1	5972442	5972969
	8.20	0.3228	37	79	1	5971617	5972973
	8.30	0.3268	37	79	1	5971662	5972981
21/64	8.33	0.3281	43	75	1	5972253	5972632

d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A920	A921
	8.40	0.3307	37	79	1	5971709	5972987
	8.50	0.3346	37	79	1	5971753	5972991
	8.60	0.3386	40	84	1	5971796	5972995
	8.70	0.3425	40	84	1	5971803	5972999
11/32	8.73	0.3437	43	76	1	5972409	5971826
	8.80	0.3465	40	84	1	5971806	5973003
	8.90	0.3504	40	84	1	5971808	5973007
	9.00	0.3543	40	84	1	5971809	5973011
	9.10	0.3583	40	84	1	5971624	5973015
23/64	9.13	0.3594	44	78	1	5972260	5972640
	9.20	0.3622	40	84	1	5971628	5973019
	9.30	0.3661	40	84	1	5971632	5973026
	9.40	0.3701	40	84	1	5971634	5972358
	9.50	0.3740	40	84	1	5971638	5972404
3/8	9.52	0.3750	46	79	1	5972322	5972708
	9.60	0.3780	43	89	1	5971642	5972449
	9.70	0.3819	43	89	1	5971646	5972494
	9.80	0.3858	43	89	1	5971650	5972539
	9.90	0.3898	43	89	1	5971654	5972547
25/64	9.92	0.3906	48	83	1	5972267	5972644
	10.00	0.3937	43	89	1	5972357	5971794
	10.20	0.4016	43	89	1	5972360	5971798
	10.30	0.4055	43	89	1	5972361	5971802
13/32	10.32	0.4063	49	84	1	5972453	5972636
	10.50	0.4134	43	89	1	5972367	5971807
27/64	10.72	0.4219	51	86	1	5972271	5972648
	10.80	0.4252	47	95	1	5972374	5971812
	11.00	0.4331	47	95	1	5972378	5971814
7/16	11.11	0.4375	52	87	1	5972421	5972953
	11.50	0.4528	47	95	1	5972395	5971822
29/64	11.51	0.4531	54	90	1	5972275	5972652
	11.80	0.4646	47	95	1	5972401	5971824
15/32	11.91	0.4688	54	92	1	5972489	5972792
	12.00	0.4724	51	102	1	5972415	5971830
	12.20	0.4803	51	102	1	5972422	—
31/64	12.30	0.4843	56	94	1	5972324	5972712
	12.50	0.4921	51	102	1	5972426	5971834
1/2	12.70	0.5000	57	95	1	5972540	5971776
	13.00	0.5118	51	102	1	5972444	5971842
33/64	13.10	0.5156	60	98	1	5972326	5972715
	13.50	0.5315	54	107	1	5972450	5972603
35/64	13.89	0.5469	64	102	1	5972328	5972719
	14.00	0.5512	54	107	1	5972464	5972726
9/16	14.29	0.5625	64	102	1	5971658	5972553
	14.50	0.5709	56	111	1	5972468	5972772
37/64	14.68	0.5781	67	105	1	5972330	5972723
	14.75	0.5807	56	111	1	5972474	5972781
	15.00	0.5906	56	111	1	5972477	5972785
19/32	15.08	0.5937	67	105	1	5972290	5972611
39/64	15.48	0.6094	70	108	1	5972332	5972730
	15.50	0.6102	58	115	1	5972485	5972789
5/8	15.88	0.6250	70	108	1	5972345	5972847
	16.00	0.6299	58	115	1	5972496	5972607
41/64	16.27	0.6406	73	114	1	5972451	—
	16.50	0.6496	60	119	1	5972500	—
21/32	16.67	0.6563	73	114	1	5972245	—
	16.75	0.6594	60	119	1	5972504	—
	17.00	0.6693	60	119	1	5972508	—
43/64	17.07	0.6719	73	117	1	5972456	—
11/16	17.46	0.6875	73	117	1	5972405	—
	17.50	0.6890	62	123	1	5972512	—
45/64	17.86	0.7031	76	121	1	5972461	—
	18.00	0.7087	62	123	1	5972520	—
23/32	18.26	0.7188	76	121	1	5972256	—
	18.50	0.7283	64	127	1	5972528	—
47/64	18.65	0.7344	79	127	1	5972314	—

PFX SCREW MACHINE DRILL



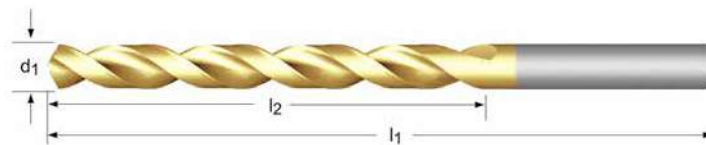
d_1 $\varnothing h_8$ Inch	d_1 $\varnothing h_8$ mm	d_1 decimal Inch	l_2 mm	l_1 mm	Pack Qty	A920	A921
	19.00	0.7480	64	127	1	5972202	—
3/4	19.05	0.7500	79	127	1	5972316	—
49/64	19.45	0.7656	83	130	1	5972315	—
	19.50	0.7677	66	131	1	5972249	—
25/32	19.84	0.7813	83	130	1	5972264	—
	20.00	0.7874	66	131	1	5972241	—

Multi-Application, Jobber Length

A510

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4 4.1 4.2
4.3 5.1 5.2 5.3 6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4 8.1 8.2 8.3

Low thrust design. Notched point improves chip formation for enhanced penetration rate. TiN coating increases wear resistance and improves tool life.



A510

DIN
338

4XD

HSS

130°



3.00 - 14.00

d ₁ Ø _h Inch	d ₁ Ø _h mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A510
1/8	3.00	0.1181	33	61	1	5970433
	3.10	0.1220	36	65	1	5970435
	3.18	0.1250	36	65	1	5970041
	3.20	0.1260	36	65	1	5970437
	3.30	0.1299	36	65	1	5970439
9/64	3.40	0.1339	39	70	1	5970441
	3.50	0.1378	39	70	1	5970443
	3.57	0.1406	39	70	1	5970449
	3.60	0.1417	39	70	1	5970445
	3.70	0.1457	39	70	1	5970448
5/32	3.80	0.1496	43	75	1	5970453
	3.90	0.1535	43	75	1	5970457
	3.97	0.1563	43	75	1	5970452
	4.00	0.1575	43	75	1	5970472
	4.10	0.1614	43	75	1	5970475
11/64	4.20	0.1654	43	75	1	5970478
	4.30	0.1693	47	80	1	5970481
	4.37	0.1719	47	80	1	5970138
	4.40	0.1732	47	80	1	5970486
	4.50	0.1772	47	80	1	5970491
3/16	4.60	0.1811	47	80	1	5970494
	4.70	0.1850	47	80	1	5970497
	4.76	0.1875	52	86	1	5970461
	4.80	0.1890	52	86	1	5970500
	4.90	0.1929	52	86	1	5970504
13/64	5.00	0.1969	52	86	1	5970507
	5.10	0.2008	52	86	1	5970509
	5.16	0.2031	52	86	1	5970403
	5.20	0.2047	52	86	1	5970512
	5.30	0.2087	52	86	1	5970515
7/32	5.40	0.2126	57	93	1	5970518
	5.50	0.2165	57	93	1	5970525
	5.56	0.2188	57	93	1	5970389

ADX JOBBER LENGTH DRILL



d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A510
	5.60	0.2205	57	93	1	5970307
	5.70	0.2244	57	93	1	5970354
	5.80	0.2283	57	93	1	5970393
	5.90	0.2323	57	93	1	5970424
15/64	5.95	0.2344	57	93	1	5970412
	6.00	0.2362	57	93	1	5970456
	6.10	0.2402	63	101	1	5970459
	6.20	0.2441	63	101	1	5970463
	6.30	0.2480	63	101	1	5970313
1/4	6.35	0.2500	63	101	1	5970034
	6.40	0.2520	63	101	1	5970317
	6.50	0.2559	63	101	1	5970321
	6.60	0.2598	63	101	1	5970325
	6.70	0.2638	63	101	1	5970329
17/64	6.75	0.2656	69	109	1	5970415
	6.80	0.2677	69	109	1	5970332
	6.90	0.2717	69	109	1	5970336
	7.00	0.2756	69	109	1	5970340
	7.10	0.2795	69	109	1	5970345
9/32	7.14	0.2812	69	109	1	5970444
	7.20	0.2835	69	109	1	5970350
	7.30	0.2874	69	109	1	5970359
	7.40	0.2913	69	109	1	5970362
	7.50	0.2953	69	109	1	5970365
19/64	7.54	0.2969	75	117	1	5970418
	7.60	0.2992	75	117	1	5970369
	7.70	0.3031	75	117	1	5970372
	7.80	0.3071	75	117	1	5970379
	7.90	0.3110	75	117	1	5970383
5/16	7.94	0.3125	75	117	1	5970446
	8.00	0.3150	75	117	1	5970391
	8.10	0.3189	75	117	1	5970395
	8.20	0.3228	75	117	1	5970398
	8.30	0.3268	75	117	1	5970400
21/64	8.33	0.3281	75	117	1	5970421
	8.40	0.3307	75	117	1	5970404
	8.50	0.3346	75	117	1	5970406
	8.60	0.3386	81	125	1	5970410
	8.70	0.3425	81	125	1	5970413
11/32	8.73	0.3437	81	125	1	5970136
	8.80	0.3465	81	125	1	5970416
	8.90	0.3504	81	125	1	5970419
	9.00	0.3543	81	125	1	5970422
	9.10	0.3583	81	125	1	5970425
23/64	9.13	0.3594	81	125	1	5970423
	9.20	0.3622	81	125	1	5970428
	9.30	0.3661	81	125	1	5970430
	9.40	0.3701	81	125	1	5970432
	9.50	0.3740	81	125	1	5970434
3/8	9.52	0.3750	87	133	1	5970465
	9.60	0.3780	87	133	1	5970436
	9.70	0.3819	87	133	1	5970438
	9.80	0.3858	87	133	1	5970440
	9.90	0.3898	87	133	1	5970442
25/64	9.92	0.3906	87	133	1	5970426
	10.00	0.3937	87	133	1	5970046
	10.10	0.3976	87	133	1	5970051
	10.20	0.4016	87	133	1	5970055
	10.30	0.4055	87	133	1	5970066
13/32	10.32	0.4063	87	133	1	5970401
	10.40	0.4094	87	133	1	5970069
	10.50	0.4134	87	133	1	5970073
	10.60	0.4173	87	133	1	5970077
	10.70	0.4213	94	142	1	5970081
27/64	10.72	0.4219	94	142	1	5970429
	10.80	0.4252	94	142	1	5970085

d_1 $\varnothing h_8$ Inch	d_1 $\varnothing h_8$ mm	d_1 decimal Inch	l_2 mm	l_1 mm	Pack Qty	A510
	10.90	0.4291	94	142	1	5970089
	11.00	0.4331	94	142	1	5970093
	11.10	0.4370	94	142	1	5970097
7/16	11.11	0.4375	94	142	1	5970386
	11.20	0.4409	94	142	1	5970099
	11.30	0.4449	94	142	1	5970107
	11.40	0.4488	94	142	1	5970111
	11.50	0.4528	94	142	1	5970115
29/64	11.51	0.4531	94	142	1	5970431
	11.60	0.4567	94	142	1	5970119
	11.70	0.4606	94	142	1	5970124
	11.80	0.4646	94	142	1	5970128
	11.90	0.4685	101	151	1	5970131
15/32	11.91	0.4688	101	151	1	5970409
	12.00	0.4724	101	151	1	5970142
	12.10	0.4764	101	151	1	5970148
	12.20	0.4803	101	151	1	5970397
	12.30	0.4843	101	151	1	5970427
31/64	12.30	0.4843	101	151	1	5970467
	12.40	0.4882	101	151	1	5970450
	12.50	0.4921	101	151	1	5970489
	12.60	0.4961	101	151	1	5970522
	12.70	0.5000	101	151	1	5970527
1/2	12.70	0.5000	101	151	1	5970029
	12.80	0.5039	101	151	1	5970530
	12.90	0.5079	101	151	1	5970533
	13.00	0.5118	101	151	1	5970535
	14.00	0.5512	108	160	1	5970407

ADX STANDARD LENGTH DRILL

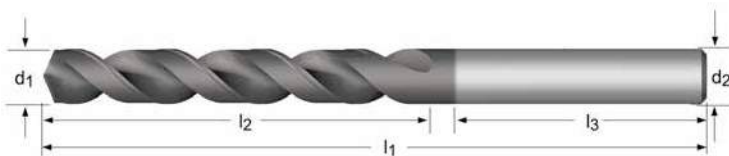


Multi-Application, Premium Cobalt Coolant Feed w/ Reinforced Shank

A553

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4 4.1 4.2
4.3 5.1 5.2 5.3 6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4 8.1

Notched point improves chip formation. Low thrust design. Cobalt base material & TiAlN-Top coating increases wear resistance and improves tool life.



A553



5.00 - 20.00

d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	l ₃ mm	d ₂ Øh ₆ mm	Pack Qty	A553
5.00	0.1969	36	79	36	6	1	5971370
5.20	0.2047	38	79	36	6	1	5971464
5.50	0.2165	40	79	36	6	1	5971554
6.00	0.2362	43	79	36	6	1	5971566
6.30	0.2480	46	87	36	8	1	5971376
6.50	0.2559	47	87	36	8	1	5971378
6.80	0.2677	48	87	36	8	1	5971386
6.90	0.2717	48	87	36	8	1	5971390
7.00	0.2756	48	87	36	8	1	5971395
7.40	0.2913	54	94	36	8	1	5971404
7.50	0.2953	54	94	36	8	1	5971409
8.00	0.3150	58	94	36	8	1	5971424
8.50	0.3346	75	130	40	10	1	5971428
8.70	0.3425	75	130	40	10	1	5971430
9.00	0.3543	75	130	40	10	1	5971434
9.50	0.3740	75	130	40	10	1	5971443
10.00	0.3937	75	130	40	10	1	5969984
10.20	0.4016	87	150	45	12	1	5969988
10.30	0.4055	87	150	45	12	1	5969993
10.50	0.4134	87	150	45	12	1	5969998
11.00	0.4330	94	150	45	12	1	5970005
11.30	0.4449	94	150	45	12	1	5970011
11.50	0.4528	94	150	45	12	1	5970017
12.00	0.4724	94	150	45	12	1	5970020
12.50	0.4921	101	160	45	14	1	5970030
13.00	0.5118	101	160	45	14	1	5970035
13.50	0.5315	101	160	45	14	1	5970048
14.00	0.5512	101	160	45	14	1	5970058
14.25	0.5610	108	170	48	16	1	5970063
14.50	0.5709	108	170	48	16	1	5970068
15.00	0.5906	108	170	48	16	1	5970080
15.25	0.6004	108	170	48	16	1	5970083
15.50	0.6102	108	170	48	16	1	5970088

d_1 $\varnothing_{h_8}$ mm	d_1 decimal Inch	l_2 mm	l_1 mm	l_3 mm	d_2 $\varnothing_{h_6}$ mm	Pack Qty	A553
16.00	0.6299	108	170	48	16	1	5970094
16.50	0.6496	125	190	48	18	1	5970104
17.00	0.6693	125	190	48	18	1	5970113
17.50	0.6890	130	190	48	18	1	5970127
17.75	0.6988	130	190	48	18	1	5970134
18.00	0.7087	130	190	48	18	1	5970137
19.00	0.7480	135	200	50	20	1	5970153
19.25	0.7579	140	200	50	20	1	5970156
20.00	0.7874	140	200	50	20	1	5970167

PFX JOBBER LENGTH DRILL



Premium Cobalt Jobber Length - Parabolic Flute for Advanced Chip Removal

A900

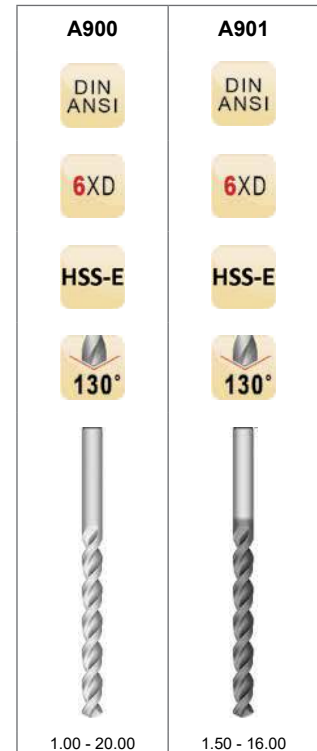
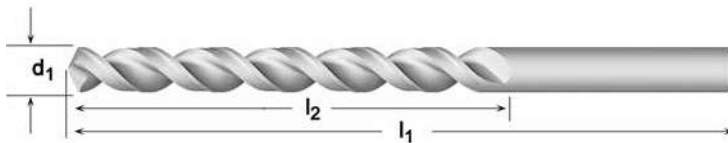
1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4 4.1 4.2
4.3 5.1 5.2 5.3 6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4 8.1 8.2

Heavy-Duty parabolic flute design allows greater drilling depths in one pass. Notched Point improves chip formation. Premium cobalt base material increases wear resistance. Bright finish improves chip flow in soft or non-ferrous materials.

A901

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4 4.1 4.2
4.3 5.1 5.2 5.3 6.3 6.4 7.4

Heavy-Duty parabolic flute design allows greater drilling depths in one pass. Notched point improves chip formation. Premium Cobalt base material combined with AlCrN-Top coating increases lubricity and wear resistance which improves tool life.



d_1 Øh ₈ Inch	d_1 Øh ₈ mm	d_1 decimal Inch	l_2 mm	l_1 mm	Pack Qty	A900	A901
3/64	1.00	0.0394	12	34	1	5970610	—
	1.10	0.0433	14	36	1	5970612	—
	1.19	0.0469	19	44	1	5971100	—
	1.20	0.0472	16	38	1	5970614	—
	1.25	0.0492	16	36	1	5970615	—
	1.30	0.0512	16	38	1	5970617	—
	1.40	0.0551	18	40	1	5970621	—
1/16	1.50	0.0591	18	40	1	5970627	5971575
	1.55	0.0610	20	43	1	5970628	5971576
	1.59	0.0625	22	48	1	5970644	5971586
	1.60	0.0630	20	43	1	5970630	5971578
	1.70	0.0669	20	43	1	5970633	—
	1.75	0.0689	22	46	1	5970635	5971580
	1.80	0.0709	22	46	1	5970638	5971582
5/64	1.90	0.0748	22	46	1	5970641	5971585
	1.98	0.0781	25	51	1	5971244	5971804
	2.00	0.0787	24	49	1	5971407	5971779
	2.10	0.0827	24	49	1	5971410	5971787
	2.15	0.0846	27	53	1	5971415	5971791
	2.20	0.0866	27	53	1	5971421	—
	2.30	0.0906	27	53	1	5971432	—
3/32	2.38	0.0937	32	57	1	5971289	5971688
	2.40	0.0945	30	57	1	5971442	5971799
	2.50	0.0984	30	57	1	5971445	5971606
	2.60	0.1024	30	57	1	5971450	5971609
	2.70	0.1063	33	61	1	5971455	5971611
	2.78	0.1094	38	67	1	5970898	5971718
	2.80	0.1102	33	61	1	5971460	—
7/64	2.90	0.1142	33	61	1	5971466	5971614
	3.00	0.1181	33	61	1	5971513	5971637
	3.10	0.1220	36	65	1	5971517	5971645
	3.18	0.1250	41	70	1	5970659	5971592
	3.20	0.1260	36	65	1	5971521	5971649
	3.30	0.1299	36	65	1	5971529	5971653
	3.30	0.1299	36	65	1	5971529	5971653

d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A900	A901
	3.40	0.1339	39	70	1	5971098	5971656
	3.50	0.1378	39	70	1	5971123	5971661
9/64	3.57	0.1406	44	73	1	5971016	5971934
	3.60	0.1417	39	70	1	5971164	5971665
	3.70	0.1457	39	70	1	5971223	5971670
	3.80	0.1496	43	75	1	5971273	5971674
	3.90	0.1535	43	75	1	5971281	5971677
5/32	3.97	0.1563	51	79	1	5971240	5971801
	4.00	0.1575	43	75	1	5971115	5971719
	4.10	0.1614	43	75	1	5971117	5971726
	4.20	0.1654	43	75	1	5971120	5971730
	4.30	0.1693	47	80	1	5971126	5971738
11/64	4.37	0.1719	54	83	1	5970728	5971616
	4.40	0.1732	47	80	1	5971129	5971741
	4.50	0.1772	47	80	1	5971132	5971746
	4.60	0.1811	47	80	1	5971136	5971750
	4.70	0.1850	47	80	1	5971140	5971756
3/16	4.76	0.1875	59	89	1	5971285	5971681
	4.80	0.1890	52	86	1	5971144	5971759
	4.90	0.1929	52	86	1	5971147	5971763
	5.00	0.1969	52	86	1	5971183	5971767
	5.10	0.2008	52	86	1	5971188	5971771
13/64	5.16	0.2031	62	92	1	5971534	5971657
	5.20	0.2047	52	86	1	5971192	5971775
	5.30	0.2087	52	86	1	5971197	5971783
	5.40	0.2126	57	93	1	5971202	5971608
	5.50	0.2165	57	93	1	5971207	5971651
7/32	5.56	0.2188	64	95	1	5970891	5971714
	5.60	0.2205	57	93	1	5971212	5971700
	5.70	0.2244	57	93	1	5971218	5971744
	5.80	0.2283	57	93	1	5971227	5971786
	5.90	0.2323	57	93	1	5971231	5971793
15/64	5.95	0.2344	67	98	1	5971360	5971687
	6.00	0.2362	57	93	1	5971253	5971615
	6.10	0.2402	63	101	1	5971256	5971619
	6.20	0.2441	63	101	1	5971260	5971622
	6.30	0.2480	63	101	1	5971264	5971627
1/4	6.35	0.2500	70	102	1	5970655	5971588
	6.40	0.2520	63	101	1	5971277	5971631
	6.50	0.2559	63	101	1	5970865	5971636
	6.60	0.2598	63	101	1	5970907	5971639
	6.70	0.2638	63	101	1	5970963	5971643
17/64	6.75	0.2656	73	105	1	5971377	5971641
	6.80	0.2677	69	109	1	5971005	5971647
	6.90	0.2717	69	109	1	5971044	5971655
	7.00	0.2756	69	109	1	5971050	5971659
	7.10	0.2795	69	109	1	5971053	5971663
9/32	7.14	0.2812	75	108	1	5971009	5971927
	7.20	0.2835	69	109	1	5971056	5971667
	7.30	0.2874	69	109	1	5971059	5971671
	7.40	0.2913	69	109	1	5970869	5971675
	7.50	0.2953	69	109	1	5970872	5971680
19/64	7.54	0.2969	78	111	1	5971405	5971734
	7.60	0.2992	75	117	1	5970875	5971684
	7.70	0.3031	75	117	1	5970878	5971691
	7.80	0.3071	75	117	1	5970882	5971695
	7.90	0.3110	75	117	1	5970885	5971705
5/16	7.94	0.3125	81	114	1	5971234	5971797
	8.00	0.3150	75	117	1	5970902	5971722
	8.10	0.3189	75	117	1	5970914	5971725
	8.20	0.3228	75	117	1	5970918	5971729
	8.30	0.3268	75	117	1	5970924	5971733
21/64	8.33	0.3280	84	117	1	5971483	5971618
	8.40	0.3307	75	117	1	5970928	5971737
	8.50	0.3346	75	117	1	5970932	5971742
	8.60	0.3386	81	125	1	5970937	5971748

PFX JOBBER LENGTH DRILL



d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A900	A901
11/32	8.70	0.3425	81	125	1	5970942	5971752
	8.73	0.3437	87	121	1	5970723	5971613
	8.80	0.3465	81	125	1	5970949	5971755
	8.90	0.3504	81	125	1	5970953	5971758
	9.00	0.3543	81	125	1	5970958	5971762
23/64	9.10	0.3583	81	125	1	5970967	5971766
	9.13	0.3594	89	124	1	5971492	5971621
	9.20	0.3622	81	125	1	5970972	5971770
	9.30	0.3661	81	125	1	5970973	5971774
	9.40	0.3701	81	125	1	5970978	5971778
3/8	9.50	0.3740	81	125	1	5970981	5971782
	9.52	0.3750	92	127	1	5971102	5971693
	9.60	0.3780	87	133	1	5970986	5971790
	9.70	0.3819	87	133	1	5970989	5971811
	9.80	0.3858	87	133	1	5970993	5971833
25/64	9.90	0.3898	87	133	1	5970997	5971853
	9.92	0.3906	95	130	1	5971500	5971625
	10.00	0.3937	87	133	1	5970663	5971594
	10.20	0.4016	87	133	1	5970667	5971595
	10.30	0.4055	87	133	1	5970671	5971596
13/32	10.32	0.4063	98	133	1	5971525	5971652
	10.40	0.4094	87	133	1	5970674	5971597
	10.50	0.4134	87	133	1	5970679	5971598
27/64	10.72	0.4219	100	137	1	5971505	5971629
	10.80	0.4252	94	142	1	5970689	5971600
	11.00	0.4331	94	142	1	5970692	5971601
7/16	11.11	0.4375	103	140	1	5970888	5971710
	11.50	0.4528	94	142	1	5970709	5971607
29/64	11.51	0.4531	106	143	1	5971510	5971633
	11.80	0.4646	94	142	1	5970713	5971610
15/32	11.91	0.4688	110	146	1	5971358	5971679
	12.00	0.4724	101	151	1	5970732	5971620
31/64	12.30	0.4843	111	149	1	5971104	5971698
	12.50	0.4921	101	151	1	5970741	5971626
1/2	12.70	0.5000	101	151	1	5970648	—
	13.00	0.5118	101	151	1	5971429	5971644
33/64	13.10	0.5156	122	168	1	5971106	5971703
	13.50	0.5315	108	160	1	5971479	5971648
35/64	13.89	0.5469	122	168	1	5971109	5971708
	14.00	0.5512	108	160	1	5971537	5971660
9/16	14.29	0.5625	122	168	1	5971001	5971882
	14.50	0.5709	114	169	1	5971541	5971664
37/64	14.68	0.5781	122	168	1	5971111	5971713
	15.00	0.5906	114	169	1	5971354	5971672
19/32	15.08	0.5937	132	181	1	5971401	5971685
39/64	15.48	0.6094	132	181	1	5971113	5971715
	15.50	0.6102	120	178	1	5971356	5971676
5/8	15.88	0.6250	132	181	1	5971248	5971612
	16.00	0.6299	120	178	1	5971362	5971604
41/64	16.27	0.6406	132	181	1	5971152	—
	16.50	0.6496	125	184	1	5971364	—
21/32	16.67	0.6562	132	181	1	5971476	—
	17.00	0.6693	125	184	1	5971369	—
43/64	17.07	0.6719	143	194	1	5971156	—
11/16	17.46	0.6875	143	194	1	5970717	—
	17.50	0.6890	130	191	1	5971373	—
45/64	17.86	0.7031	130	191	1	5971161	—
	18.00	0.7087	130	191	1	5971385	—
23/32	18.26	0.7187	130	191	1	5971490	—
	18.50	0.7283	135	198	1	5971389	—
47/64	18.65	0.7344	135	198	1	5971169	—
	19.00	0.7480	135	198	1	5971393	—
3/4	19.05	0.7500	135	198	1	5971293	—
49/64	19.45	0.7656	135	198	1	5971177	—
	19.50	0.7677	140	205	1	5971397	—
25/32	19.84	0.7812	140	205	1	5971496	—
	20.00	0.7874	140	205	1	5971472	—

Premium Cobalt, Taper Length - Parabolic Flute for Advanced Chip Removal

A940

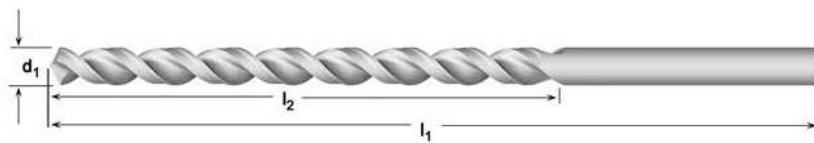
1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.2 3.3 3.4 4.1 4.2 4.3
6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4 8.1 8.2

Heavy-Duty parabolic flute design allows greater drilling depths in one pass. Notched point improves chip formation. Premium cobalt material increases wear resistance. Bright finish improves chip flow in soft or non-ferrous materials.

A941

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4 4.1 4.2
4.3 6.3 6.4 7.4

Heavy-Duty parabolic flute design allows greater drilling depths in one pass. Notched point improves chip formation. Premium cobalt base material combined with AlCrN-Top Coating increases lubricity and wear resistance which improves tool life.



d_1 $\varnothing h_8$ Inch	d_1 $\varnothing h_8$ mm	d_1 decimal Inch	l_2 mm	l_1 mm	Pack Qty	A940	A941
3/64	1.00	0.0394	33	56	1	5973055	5972873
	1.10	0.0433	37	60	1	5973058	—
	1.19	0.0469	29	57	1	5973218	5972521
	1.20	0.0472	41	65	1	5973059	—
	1.30	0.0512	41	65	1	5973060	—
1/16	1.40	0.0551	45	70	1	5973062	—
	1.50	0.0591	45	70	1	5972881	5972878
	1.59	0.0625	44	76	1	5972905	5972883
	1.60	0.0630	50	76	1	5972885	—
	1.70	0.0669	50	76	1	5972890	—
5/64	1.80	0.0709	53	80	1	5972895	—
	1.90	0.0748	53	80	1	5972900	—
	1.98	0.0781	51	95	1	5972177	5973006
	2.00	0.0787	56	85	1	5973278	5972594
	2.10	0.0827	56	85	1	5973282	—
3/32	2.20	0.0866	59	90	1	5973286	—
	2.30	0.0906	59	90	1	5973289	—
	2.38	0.0937	57	108	1	5973207	5972517
	2.40	0.0945	62	95	1	5973084	—
	2.50	0.0984	62	95	1	5973087	5972596
7/64	2.60	0.1024	62	95	1	5973090	—
	2.70	0.1063	66	100	1	5973092	—
	2.78	0.1094	64	117	1	5972281	5972945
	2.80	0.1102	66	100	1	5973095	—
	2.90	0.1142	66	100	1	5973098	—
1/8	3.00	0.1181	66	100	1	5973142	5972469
	3.10	0.1220	69	106	1	5973146	5972471
	3.18	0.1250	70	130	1	5972921	5972896
	3.20	0.1260	69	106	1	5973151	5972475
	3.30	0.1299	69	106	1	5973156	5972479
9/64	3.40	0.1339	73	112	1	5973161	5972483
	3.50	0.1378	73	112	1	5973170	5972487
	3.57	0.1406	76	137	1	5972865	5972365

PFX TAPER LENGTH DRILL



d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A940	A941
	3.60	0.1417	73	112	1	5973175	5972493
	3.70	0.1457	73	112	1	5973183	5972501
	3.80	0.1496	78	119	1	5973187	5972505
	3.90	0.1535	78	119	1	5973195	5972509
5/32	3.97	0.1563	76	137	1	5972173	5972958
	4.00	0.1575	78	119	1	5973252	5972551
	4.10	0.1614	78	119	1	5973256	5972554
	4.20	0.1654	78	119	1	5973259	5972557
	4.30	0.1693	82	126	1	5973263	5972559
11/64	4.37	0.1719	86	146	1	5972990	5972963
	4.40	0.1732	82	126	1	5973266	5972561
	4.50	0.1772	82	126	1	5973274	5972562
	4.60	0.1811	82	126	1	5972119	5972564
	4.70	0.1850	82	126	1	5972164	5972566
3/16	4.76	0.1875	86	146	1	5973202	5972513
	4.80	0.1890	87	132	1	5972210	5972570
	4.90	0.1929	87	132	1	5972254	5972572
	5.00	0.1969	87	132	1	5972125	5972574
	5.10	0.2008	87	132	1	5972129	5972576
13/64	5.16	0.2031	92	152	1	5973021	5972996
	5.20	0.2047	87	132	1	5972133	5972578
	5.30	0.2087	87	132	1	5972137	5972580
	5.40	0.2126	91	139	1	5972141	5972582
	5.50	0.2165	91	139	1	5972145	5972584
7/32	5.56	0.2188	92	152	1	5972278	5972940
	5.60	0.2205	91	139	1	5972148	5972586
	5.70	0.2244	91	139	1	5972152	5972588
	5.80	0.2283	91	139	1	5972156	5972592
	5.90	0.2323	91	139	1	5972160	5972850
15/64	5.95	0.2344	95	156	1	5973046	5972448
	6.00	0.2362	91	139	1	5972185	5973049
	6.10	0.2402	97	148	1	5972189	5973051
	6.20	0.2441	97	148	1	5972193	5973054
	6.30	0.2480	97	148	1	5972198	5973056
1/4	6.35	0.2500	95	156	1	5972916	5972892
	6.40	0.2520	97	148	1	5972203	5972856
	6.50	0.2559	97	148	1	5972206	5972860
	6.60	0.2598	97	148	1	5972214	5972864
	6.70	0.2638	97	148	1	5972218	5972868
17/64	6.75	0.2656	98	159	1	5973080	5972541
	6.80	0.2677	102	156	1	5972222	5972871
	6.90	0.2717	102	156	1	5972226	5972876
	7.00	0.2756	102	156	1	5972230	5972880
	7.10	0.2795	102	156	1	5972234	5972886
9/32	7.14	0.2812	98	159	1	5972861	5973047
	7.20	0.2835	102	156	1	5972238	5972891
	7.30	0.2874	102	156	1	5972243	5972897
	7.40	0.2913	102	156	1	5972247	5972906
	7.50	0.2953	102	156	1	5972250	5972910
19/64	7.54	0.2969	102	162	1	5973270	5972590
	7.60	0.2992	109	165	1	5972258	5972915
	7.70	0.3031	109	165	1	5972262	5972920
	7.80	0.3071	109	165	1	5972266	5972925
	7.90	0.3110	109	165	1	5972270	5972930
5/16	7.94	0.3125	102	162	1	5972167	5972901
	8.00	0.3150	109	165	1	5972285	5972950
	8.10	0.3189	109	165	1	5972289	5972961
	8.20	0.3228	109	165	1	5972293	5972966
	8.30	0.3268	109	165	1	5972299	5972972
21/64	8.33	0.3281	105	165	1	5973109	5972598
	8.40	0.3307	109	165	1	5972832	5972976
	8.50	0.3346	109	165	1	5972869	5972980
	8.60	0.3386	115	175	1	5972922	5972984
	8.70	0.3425	115	175	1	5972974	5972988
11/32	8.73	0.3438	105	165	1	5972986	5972957
	8.80	0.3465	115	175	1	5973017	5972992

d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A940	A941
	8.90	0.3504	115	175	1	5973027	5972997
	9.00	0.3543	115	175	1	5973031	5973001
	9.10	0.3583	115	175	1	5973035	5973009
23/64	9.13	0.3594	108	171	1	5973120	5972600
	9.20	0.3622	115	175	1	5973039	5973012
	9.30	0.3661	115	175	1	5972835	5973016
	9.40	0.3701	115	175	1	5972837	5973020
	9.50	0.3740	115	175	1	5972840	5973024
3/8	9.52	0.3750	108	171	1	5973223	5972525
	9.60	0.3780	121	184	1	5972843 ¹⁾	5973028 ¹⁾
	9.70	0.3819	121	184	1	5972846 ¹⁾	5973032 ¹⁾
	9.80	0.3858	121	184	1	5972849 ¹⁾	5973036 ¹⁾
	9.90	0.3898	121	184	1	5972853 ¹⁾	5973040 ¹⁾
25/64	9.92	0.3906	111	178	1	5973129 ¹⁾	5972455 ¹⁾
	10.00	0.3937	121	184	1	5972926 ¹⁾	5972904 ¹⁾
	10.20	0.4016	121	184	1	5972936 ¹⁾	5972908 ¹⁾
	10.30	0.4055	121	184	1	5972941 ¹⁾	5972913 ¹⁾
13/32	10.32	0.4063	111	178	1	5973018 ¹⁾	5972993 ¹⁾
	10.50	0.4134	121	184	1	5972954 ¹⁾	5972927 ¹⁾
27/64	10.72	0.4219	117	184	1	5973133 ¹⁾	5972460 ¹⁾
	11.00	0.4331	128	195	1	5972964 ¹⁾	5972938 ¹⁾
7/16	11.11	0.4375	117	184	1	5972274 ¹⁾	5972935 ¹⁾
	11.20	0.4409	128	195	1	5972968 ¹⁾	5972944 ¹⁾
	11.50	0.4528	128	195	1	5972971 ¹⁾	5972949 ¹⁾
29/64	11.51	0.4531	121	190	1	5973138 ¹⁾	5972465 ¹⁾
	11.80	0.4646	128	195	1	5972975 ¹⁾	5972952 ¹⁾
15/32	11.91	0.4688	121	190	1	5973044 ¹⁾	5973022 ¹⁾
	12.00	0.4724	134	205	1	5972994 ¹⁾	5972967 ¹⁾
	12.20	0.4803	134	205	1	5972998 ¹⁾	5972970 ¹⁾
31/64	12.30	0.4843	121	197	1	5973233 ¹⁾	5972529 ¹⁾
	12.50	0.4921	134	205	1	5973002 ¹⁾	5972978 ¹⁾
1/2	12.70	0.5000	121	197	1	5972911 ¹⁾	5972887 ¹⁾
	13.00	0.5118	134	205	1	5973010 ¹⁾	5972985 ¹⁾
33/64	13.10	0.5156	121	203	1	5973236 ¹⁾	5972533 ¹⁾
17/32	13.49	0.5311	121	203	1	5973057 ¹⁾	—
	13.50	0.5315	140	214	1	5973014 ¹⁾	5972989 ¹⁾
35/64	13.89	0.5469	124	210	1	5973240 ¹⁾	5972537 ¹⁾
	14.00	0.5512	140	214	1	5973029 ¹⁾	5973000 ¹⁾
9/16	14.29	0.5625	124	210	1	5972857 ¹⁾	5973043 ¹⁾
	14.50	0.5709	144	220	1	5973033 ¹⁾	5973004 ¹⁾
37/64	14.68	0.5781	124	222	1	5973244 ¹⁾	5972546 ¹⁾
	15.00	0.5906	144	220	1	5973037 ¹⁾	5973008 ¹⁾
19/32	15.08	0.5937	124	222	1	5973228 ¹⁾	5972568 ¹⁾
39/64	15.48	0.6094	124	222	1	5973248 ¹⁾	5972548 ¹⁾
	15.50	0.6102	149	227	1	5973042 ¹⁾	5973013 ¹⁾
5/8	15.88	0.6250	124	222	1	5972182 ¹⁾	5973045 ¹⁾
	16.00	0.6299	149	227	1	5973048 ¹⁾	5972497 ¹⁾
41/64	16.27	0.6406	130	229	1	5972296 ¹⁾	—
	16.50	0.6496	154	235	1	5973050 ¹⁾	—
21/32	16.67	0.6563	130	229	1	5973106 ¹⁾	—
	17.00	0.6693	154	235	1	5973052 ¹⁾	—
43/64	17.07	0.6719	137	235	1	5972302 ¹⁾	—
11/16	17.46	0.6875	137	235	1	5972979 ¹⁾	—
	17.50	0.6890	158	241	1	5973053 ¹⁾	—
45/64	17.86	0.7031	143	241	1	5972305 ¹⁾	—
	18.00	0.7087	158	241	1	5973116 ¹⁾	—
23/32	18.26	0.7188	143	241	1	5973113 ¹⁾	—
47/64	18.65	0.7344	149	248	1	5972307 ¹⁾	—
	19.00	0.7480	162	247	1	5973165 ¹⁾	—
3/4	19.05	0.7500	149	248	1	5973213 ¹⁾	—
49/64	19.45	0.7656	152	251	1	5972309 ¹⁾	—
25/32	19.84	0.7812	152	251	1	5973125 ¹⁾	—
	20.00	0.7874	166	254	1	5973101 ¹⁾	—

¹⁾ <10xD

PFX Premium Cobalt, Extra Length - Parabolic Flute for Advanced Chip Removal

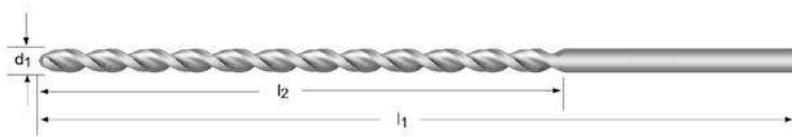
A976

A977

A978

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.2 3.3 3.4 4.1 4.2 4.3
6.3 6.4 7.4

Heavy-Duty parabolic flute design allows greater drilling depths in one pass. Notched point improves chip formation. Premium cobalt base material increases wear resistance. Bright finish improves chip flow in soft or non-ferrous materials.



A976	A977	A978
DIN 1869/1	DIN 1869/2	DIN 1869/3
15XD	20XD	25XD
HSS-E	HSS-E	HSS-E
130°	130°	130°
1.50 - 14.00	1.50 - 14.00	3.00 - 10.00

d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A976	A977	A978
	1.50	0.0591	100	150	1	—	5973247 ¹⁾	—
	1.50	0.0591	75	115	1	5972589	—	—
1/16	1.59	0.0625	100	150	1	—	5973251 ¹⁾	—
	2.00	0.0787	110	160	1	—	5973305 ¹⁾	—
	2.00	0.0787	85	125	1	5972618	—	—
	2.10	0.0827	85	125	1	5972622	—	—
	2.20	0.0866	90	135	1	5972625	—	—
	2.30	0.0906	90	135	1	5972629	—	—
3/32	2.38	0.0937	115	170	1	—	5973122 ¹⁾	—
	2.40	0.0945	95	140	1	5972633	—	—
	2.50	0.0984	95	140	1	5972642	—	—
	2.60	0.1024	95	140	1	5972646	—	—
	2.70	0.1063	100	150	1	5972650	—	—
	2.80	0.1102	100	150	1	5972654	—	—
	2.90	0.1142	100	150	1	5972658	—	—
	3.00	0.1181	100	150	1	5972662	—	—
	3.00	0.1181	130	190	1	—	5973110	—
	3.00	0.1181	160	240	1	—	—	5973199 ¹⁾
	3.10	0.1220	105	155	1	5972666	—	—
1/8	3.18	0.1250	105	155	1	5972595	—	—
1/8	3.18	0.1250	135	200	1	—	5973260	—
	3.20	0.1260	105	155	1	5972670	—	—
	3.30	0.1299	105	155	1	5972674	—	—
	3.40	0.1339	115	165	1	5972676	—	—
	3.50	0.1378	115	165	1	5972686	—	—
	3.50	0.1378	145	210	1	—	5973114	—
	3.50	0.1378	180	265	1	—	—	5973204
	3.60	0.1417	115	165	1	5973077	—	—
	3.70	0.1457	115	165	1	5973111	—	—

¹⁾ Dormer Standard

d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A976	A977	A978
	3.80	0.1496	120	175	1	5973167	—	—
	3.90	0.1535	120	175	1	5973215	—	—
5/32	3.97	0.1563	120	175	1	5973155	—	—
	4.00	0.1575	120	175	1	5973276	—	—
	4.00	0.1575	150	220	1	—	5973127	—
	4.00	0.1575	190	280	1	—	—	5973220
	4.10	0.1614	120	175	1	5973279	—	—
	4.20	0.1654	120	175	1	5973284	—	—
	4.30	0.1693	125	185	1	5973081	—	—
	4.40	0.1732	125	185	1	5973083	—	—
	4.50	0.1772	125	185	1	5973086	—	—
	4.50	0.1772	160	235	1	—	5973132	—
	4.50	0.1772	200	295	1	—	—	5973216
	4.60	0.1811	125	185	1	5973089	—	—
	4.70	0.1850	125	185	1	5973093	—	—
3/16	4.76	0.1875	135	195	1	5973264	—	—
3/16	4.76	0.1875	170	245	1	—	5973118	—
	4.80	0.1890	135	195	1	5973096	—	—
	4.90	0.1929	135	195	1	5973097	—	—
	5.00	0.1969	135	195	1	5973102	—	—
	5.00	0.1969	170	245	1	—	5973136	—
	5.00	0.1969	210	315	1	—	—	5973220
	5.10	0.2008	135	195	1	5973104	—	—
	5.20	0.2047	135	195	1	5973107	—	—
	5.30	0.2087	135	195	1	5973115	—	—
	5.40	0.2126	140	205	1	5973119	—	—
	5.50	0.2165	140	205	1	5973124	—	—
	5.50	0.2165	180	260	1	—	5973141	—
	5.50	0.2165	225	330	1	—	—	5973226
	5.60	0.2205	140	205	1	5973128	—	—
	5.70	0.2244	140	205	1	5973135	—	—
	5.80	0.2283	140	205	1	5973140	—	—
	5.90	0.2323	140	205	1	5973145	—	—
	6.00	0.2362	140	205	1	5973160	—	—
	6.00	0.2362	180	260	1	—	5973148	—
	6.00	0.2362	225	330	1	—	—	5973231
	6.10	0.2402	150	215	1	5973171	—	—
	6.20	0.2441	150	215	1	5973176	—	—
	6.30	0.2480	150	215	1	5973180	—	—
1/4	6.35	0.2500	150	215	1	5972593	—	—
1/4	6.35	0.2500	190	275	1	—	5973220	—
1/4	6.35	0.2500	235	350	1	—	—	5973220
	6.40	0.2520	150	215	1	5973185	—	—
	6.50	0.2559	150	215	1	5973190	—	—
	6.50	0.2559	190	275	1	—	5973153	—
	6.50	0.2559	235	350	1	—	—	5973238
	6.60	0.2598	150	215	1	5973193	—	—
	6.70	0.2638	150	215	1	5973197	—	—
	6.80	0.2677	155	225	1	5973201	—	—
	6.90	0.2717	155	225	1	5973205	—	—
	7.00	0.2756	155	225	1	5973210	—	—
	7.00	0.2756	200	290	1	—	5973163	—
	7.00	0.2756	250	370	1	—	—	5973242
	7.50	0.2953	155	225	1	5973220	—	—
	7.50	0.2953	200	290	1	—	5973220	—
	7.50	0.2953	250	370	1	—	—	5973220
5/16	7.94	0.3125	165	240	1	5973150	—	—
	8.00	0.3150	165	240	1	5973230	—	—
	8.00	0.3150	210	305	1	—	5973172	—
	8.00	0.3150	265	390	1	—	—	5973250
	8.50	0.3346	165	240	1	5973235	—	—
	8.50	0.3346	210	305	1	—	5973220	—
	8.50	0.3346	265	390	1	—	—	5973220
11/32	8.73	0.3437	175	250	1	5972606	—	—
11/32	8.73	0.3437	220	320	1	—	5973220	—
	9.00	0.3543	175	250	1	5973239	—	—

PFX EXTRA LENGTH DRILL



d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A976	A977	A978
	9.00	0.3543	220	320	1	—	5973181	—
	9.00	0.3543	280	410	1	—	—	5973262
	9.50	0.3740	175	250	1	5973220	—	—
	9.50	0.3740	220	320	1	—	5973220	—
	9.50	0.3740	280	410	1	—	—	5973220
3/8	9.52	0.3750	185	265	1	5973220	—	—
	10.00	0.3937	185	265	1	5972597	—	—
	10.00	0.3937	235	340	1	—	5973268	—
	10.00	0.3937	295	430	1	—	—	5973194
	10.50	0.4134	185	265	1	5973220	—	—
	10.50	0.4134	235	340	1	—	5973220	—
	11.00	0.4331	195	280	1	5972601	—	—
	11.00	0.4331	250	365	1	—	5973158	—
7/16	11.11	0.4375	195	280	1	5973225	—	—
	11.50	0.4528	195	280	1	5972602	—	—
	11.50	0.4528	250	365	1	—	5973220	—
	12.00	0.4724	205	295	1	5972608	—	—
	12.00	0.4724	260	375	1	—	5973295	—
	12.50	0.4921	205	295	1	5972610	—	—
	12.50	0.4921	260	375	1	—	5973299	—
1/2	12.70	0.5000	205	295	1	5972591	—	—
	13.00	0.5118	205	295	1	5972613	—	—
	13.00	0.5118	260	375	1	—	5973220	—
	14.00	0.5512	215	310	1	5972615	—	—
	14.00	0.5512	270	390	1	—	5973303 ¹⁾	—

General Purpose Jobber Length

* Sets Available on pgs. 224--227

R10P - Fractional Sizes

R15P - Letter Sizes

R18P - Wire Gauge Sizes

Bright Finish improves chip flow in soft or non-ferrous materials

R10 - Fractional Sizes

R15 - Letter Sizes

R18 - Wire Gauge Sizes

Steam tempered to reduce wear and chip welding in harder ferrous materials for increased wear resistance and lubricity.



R10P R15P R18P	R10 R15 R18
ANSI	ANSI
4XD	4XD
HSS	HSS
118°	118°
	
N97 - 11/16	N80 - 11/16

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R10P R15P R18P	R10 R15 R18
	97		0.0059	1/16	3/4	12	5999308	—
	96		0.0063	1/16	3/4	12	5999303	—
	95		0.0067	1/16	3/4	12	5999300	—
	94		0.0071	1/16	3/4	12	5999296	—
	93		0.0075	1/16	3/4	12	5999292	—
	92		0.0079	1/16	3/4	12	5999288	—
	91		0.0083	5/64	3/4	12	5999280	—
	90		0.0087	5/64	3/4	12	5999276	—
	89		0.0091	5/64	3/4	12	5999269	—
	88		0.0095	5/64	3/4	12	5999265	—
	87		0.0100	5/64	3/4	12	5999261	—
	86		0.0105	3/32	3/4	12	5999258	—
	85		0.0110	3/32	3/4	12	5999254	—
	84		0.0115	3/32	3/4	12	5999250	—
	83		0.0120	3/32	3/4	12	5999247	—
	82		0.0125	3/32	3/4	12	5999238	—
	81		0.0130	3/32	3/4	12	5999234	—
	80		0.0135	1/8	3/4	12	5999230	5999193
	79		0.0145	1/8	3/4	12	5999223	5999190
1/64			0.0156	3/16	3/4	12	5998515	5998664
	78		0.0160	3/16	7/8	12	5999220	5999189
	77		0.0180	3/16	7/8	12	5999217	5999188
	76		0.0200	3/16	7/8	12	5999214	5999187
	75		0.0210	1/4	1"	12	5999212	5999186
	74		0.0225	1/4	1"	12	5999209	5999184
	73		0.0240	5/16	1.1/8	12	5999393	5999180
	72		0.0250	5/16	1.1/8	12	5999389	5999178
	71		0.0260	3/8	1.1/4	12	5999385	5999176
	70		0.0280	3/8	1.1/4	12	5999382	5999174
	69		0.0292	1/2	1.3/8	12	5999328	5999170

JOBBER DRILL



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R10P R15P R18P	R10 R15 R18
1/32	68		0.0310	1/2	1.3/8	12	5999284	5999166
			0.0313	1/2	1.3/8	12	5998506	5998656
	67		0.0320	1/2	1.3/8	12	5999242	5999164
	66		0.0330	1/2	1.3/8	12	5999205	5999161
	65		0.0350	5/8	1.1/2	12	5999154	5999158
	64		0.0360	5/8	1.1/2	12	5999148	5999153
	63		0.0370	5/8	1.1/2	12	5999145	5999150
	62		0.0380	5/8	1.1/2	12	5999143	5999147
	61		0.0390	11/16	1.5/8	12	5999141	5999144
	60		0.0400	11/16	1.5/8	12	5999137	5999138
	59		0.0410	11/16	1.5/8	12	5999128	5999131
	58		0.0420	11/16	1.5/8	12	5999124	5999127
	57		0.0430	3/4	1.3/4	12	5999120	5999123
	56		0.0465	3/4	1.3/4	12	5999116	5999119
3/64			0.0469	3/4	1.3/4	12	5998282	5998725
	55		0.0520	7/8	1.7/8	12	5999109	5999251
	54		0.0550	7/8	1.7/8	12	5999106	5999246
	53		0.0595	7/8	1.7/8	12	5999103	5999243
			0.0625	7/8	1.7/8	12	5998498	5998648
	52		0.0635	7/8	1.7/8	12	5999100	5999239
1/16	51		0.0670	1"	2"	12	5999097	5999231
	50		0.0700	1"	2"	12	5999094	5999199
	49		0.0730	1"	2"	12	5999088	5999155
	48		0.0760	1"	2"	12	5999086	5999115
			0.0781	1"	2"	12	5998325	5998646
5/64			0.0785	1"	2"	12	5999083	5998437
	47		0.0810	1.1/8	2.1/8	12	5999077	5998432
	46		0.0820	1.1/8	2.1/8	12	5999073	5998428
	45		0.0860	1.1/8	2.1/8	12	5999070	5998424
	44		0.0890	1.1/4	2.1/4	12	5999067	5998418
	43		0.0890	1.1/4	2.1/4	12	5999067	5998418
3/32	42		0.0935	1.1/4	2.1/4	12	5999064	5998414
			0.0938	1.1/4	2.1/4	12	5998275	5998720
	41		0.0960	1.3/8	2.3/8	12	5999061	5998411
	40		0.0980	1.3/8	2.3/8	12	5999057	5998408
	39		0.0995	1.3/8	2.3/8	12	5999049	5998400
	38		0.1015	1.7/16	2.1/2	12	5999045	5998396
	37		0.1040	1.7/16	2.1/2	12	5999037	5998389
	36		0.1065	1.7/16	2.1/2	12	5999032	5998385
			0.1094	1.1/2	2.5/8	12	5998340	5998791
	7/64		0.1100	1.1/2	2.5/8	12	5999028	5998381
	35		0.1110	1.1/2	2.5/8	12	5999024	5998377
	34		0.1130	1.1/2	2.5/8	12	5999021	5998373
	33		0.1160	1.5/8	2.3/4	12	5999018	5998370
	32		0.1200	1.5/8	2.3/4	12	5999014	5998366
	31		0.1250	1.5/8	2.3/4	12	5998519	5998672
1/8			0.1285	1.5/8	2.3/4	12	5999010	5998363
	30		0.1360	1.3/4	2.7/8	12	5999001	5998357
	29		0.1405	1.3/4	2.7/8	12	5999167	5998351
	28		0.1406	1.3/4	2.7/8	12	5998350	5998809
			0.1440	1.7/8	3"	12	5999163	5998348
	9/64		0.1470	1.7/8	3"	12	5999160	5998345
	26		0.1495	1.7/8	3"	12	5999157	5998342
	25		0.1520	2"	3.1/8	12	5999151	5998339
	24		0.1540	2"	3.1/8	12	5999112	5998336
	23		0.1563	2"	3.1/8	12	5998323	5998764
	5/32		0.1570	2"	3.1/8	12	5999080	5998333
	22		0.1590	2.1/8	3.1/4	12	5999041	5998330
	21		0.1610	2.1/8	3.1/4	12	5998996	5998327
	20		0.1660	2.1/8	3.1/4	12	5999228	5998318
	19		0.1695	2.1/8	3.1/4	12	5999224	5998315
	18		0.1719	2.1/8	3.1/4	12	5998539	5998681
11/64			0.1730	2.3/16	3.3/8	12	5999221	5998312
	17		0.1770	2.3/16	3.3/8	12	5999218	5998309
	16							

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R10P R15P R18P	R10 R15 R18
	15		0.1800	2.3/16	3.3/8	12	5999215	5998306
	14		0.1820	2.3/16	3.3/8	12	5999211	5998302
	13		0.1850	2.5/16	3.1/2	12	5999208	5998297
3/16			0.1875	2.5/16	3.1/2	12	5998272	5998718
	12		0.1890	2.5/16	3.1/2	12	5999206	5998293
	11		0.1910	2.5/16	3.1/2	12	5999203	5998288
	10		0.1935	2.7/16	3.5/8	12	5999201	5998285
	9		0.1960	2.7/16	3.5/8	12	5999272	5999195
	8		0.1990	2.7/16	3.5/8	12	5999226	5999192
	7		0.2010	2.7/16	3.5/8	12	5999374	5999172
13/64			0.2031	2.7/16	3.5/8	12	5998296	5998687
	6		0.2040	2.1/2	3.3/4	12	5999132	5999134
	5		0.2055	2.1/2	3.3/4	12	5999091	5999182
	4		0.2090	2.1/2	3.3/4	12	5999053	5998404
	3		0.2130	2.1/2	3.3/4	12	5999005	5998360
7/32			0.2188	2.1/2	3.3/4	12	5998337	5998745
	2		0.2210	2.5/8	3.7/8	12	5999235	5998324
	1		0.2280	2.5/8	3.7/8	12	5999197	5998450
		A	0.2340	2.5/8	3.7/8	12	5998837	5998811
15/64			0.2344	2.5/8	3.7/8	12	5998365	5998693
		B	0.2380	2.3/4	4"	12	5998840	5998732
		C	0.2421	2.3/4	4"	12	5998843	5998988
		D	0.2461	2.3/4	4"	12	5998845	5999093
1/4			0.2500	2.3/4	4"	12	5998511	5998660
		F	0.2571	2.7/8	4.1/8	12	5998854	5999099
		G	0.2610	2.7/8	4.1/8	12	5998857	5999102
17/64			0.2656	2.7/8	4.1/8	12	5998417	5998699
		H	0.2661	2.7/8	4.1/8	12	5998860	5999105
		I	0.2720	2.7/8	4.1/8	12	5998863	5998810
		J	0.2772	2.7/8	4.1/8	12	5998866	5998814
		K	0.2811	2.15/16	4.1/4	12	5998869	5998819
9/32			0.2813	2.15/16	4.1/4	12	5998347	5998805
		L	0.2902	2.15/16	4.1/4	12	5998873	5998822
		M	0.2949	3.1/16	4.3/8	12	5998876	5998825
19/64			0.2969	3.1/16	4.3/8	12	5998425	5998704
		N	0.3020	3.1/16	4.3/8	12	5998882	5998828
5/16			0.3125	3.3/16	4.1/2	6	5998320	5998756
		O	0.3161	3.3/16	4.1/2	6	5998889	5998831
		P	0.3228	3.5/16	4.5/8	6	5998893	5998834
21/64			0.3281	3.5/16	4.5/8	6	5998252	5998708
		Q	0.3319	3.7/16	4.3/4	6	5998899	5999304
		R	0.3390	3.7/16	4.3/4	6	5998902	5999347
11/32			0.3437	3.7/16	4.3/4	6	5998530	5998678
		S	0.3480	3.1/2	4.7/8	6	5998906	5999396
		T	0.3580	3.1/2	4.7/8	6	5998912	5999426
23/64			0.3594	3.1/2	4.7/8	6	5998255	5998710
		U	0.3680	3.5/8	5"	6	5998916	5999430
3/8			0.3750	3.5/8	5"	6	5998287	5998728
		V	0.3772	3.5/8	5"	6	5998922	5999432
		W	0.3858	3.3/4	5.1/8	6	5998926	5999434
25/64			0.3906	3.3/4	5.1/8	6	5998259	5998712
		X	0.3969	3.3/4	5.1/8	6	5998929	5999436
		Y	0.4039	3.7/8	5.1/4	6	5998934	5999263
13/32			0.4063	3.7/8	5.1/4	6	5998248	5998684
		Z	0.4130	3.7/8	5.1/4	6	5999257	5999267
27/64			0.4219	3.15/16	5.3/8	6	5998264	5998714
7/16			0.4375	4.1/16	5.1/2	6	5998334	5998713
29/64			0.4531	4.3/16	5.5/8	6	5998268	5998716
15/32			0.4687	4.5/16	5.3/4	6	5998331	5998690
31/64			0.4844	4.3/8	5.7/8	6	5998292	5998731
1/2			0.5000	4.1/2	6"	6	5998502	5998653
33/64			0.5156	4.13/16	6.5/8	1	5998300	5998735
17/32			0.5313	4.13/16	6.5/8	1	5998409	5998696

JOBBER DRILL



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R10P R15P R18P	R10 R15 R18
35/64			0.5469	4.13/16	6.5/8	1	5998303	5998736
9/16			0.5625	4.13/16	6.5/8	1	5998343	5998800
37/64			0.5781	4.13/16	6.5/8	1	5998307	5998740
19/32			0.5937	5.3/16	7.1/8	1	5998421	5998703
39/64			0.6094	5.3/16	7.1/8	1	5998310	5998744
5/8			0.6250	5.3/16	7.1/8	1	5998328	5998686
41/64			0.6406	5.3/16	7.1/8	1	5998313	5998749
21/32			0.6563	5.3/16	7.1/8	1	5998429	5998706
43/64			0.6719	5.5/8	7.5/8	1	5998316	5998752
11/16			0.6875	5.5/8	7.5/8	1	5998525	5998675

General Purpose Jobber Length, Fractional

* Sets Available on pg. 225

A012

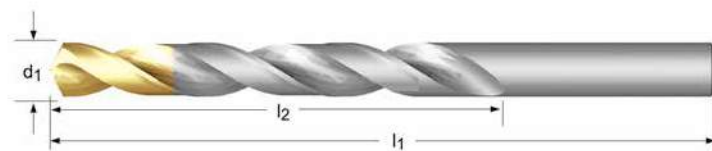
Low thrust design self centering Split Point for easier penetration.
TiN Coated Tip increases surface hardness and improves tool life.

A012S

Select A012 sizes available in a pouch pack.

1/16 thru 3/16 2 per pack

13/64 thru 1/2 1 per pack



* Bright / No split point Below N46



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ Ø mm	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	A012	A012S
	80		0.34	0.0135	1/8	3/4	10	5966768 *	—
	79		0.37	0.0145	1/8	3/4	10	5966762 *	—
1/64			0.40	0.0156	3/16	3/4	10	5966740 *	—
	78		0.41	0.0160	3/16	7/8	10	5966758 *	—
	77		0.46	0.0180	3/16	7/8	10	5966754 *	—
	76		0.51	0.0200	3/16	7/8	10	5966749 *	—
	75		0.53	0.0210	1/4	1"	10	5966746 *	—
	74		0.57	0.0225	1/4	1"	10	5966741 *	—
	73		0.61	0.0240	5/16	1.1/8	10	5966735 *	—
	72		0.64	0.0250	5/16	1.1/8	10	5966731 *	—
	71		0.66	0.0260	3/8	1.1/4	10	5966727 *	—
	70		0.71	0.0280	3/8	1.1/4	10	5966723 *	—
	69		0.742	0.0292	1/2	1.3/8	10	5966716 *	—
	68		0.79	0.0310	1/2	1.3/8	10	5966711 *	—
1/32			0.79	0.0313	1/2	1.3/8	10	5966639 *	—
	67		0.81	0.0320	1/2	1.3/8	10	5966708 *	—
	66		0.84	0.0330	1/2	1.3/8	10	5966703 *	—
	65		0.89	0.0350	5/8	1.1/2	10	5966697 *	—
	64		0.91	0.0360	5/8	1.1/2	10	5966687 *	—
	63		0.94	0.0370	5/8	1.1/2	10	5966682 *	—
	62		0.97	0.0380	5/8	1.1/2	10	5966677 *	—
	61		0.99	0.0390	11/16	1.5/8	10	5966672 *	—
	60		1.02	0.0400	11/16	1.5/8	10	5966668 *	—
	59		1.04	0.0410	11/16	1.5/8	10	5966662 *	—
	58		1.07	0.0420	11/16	1.5/8	10	5966658 *	—
	57		1.09	0.0430	3/4	1.3/4	10	5966654 *	—
	56		1.18	0.0465	3/4	1.3/4	10	5966650 *	—
3/64			1.19	0.0469	3/4	1.3/4	10	5966635 *	—
	55		1.32	0.0520	7/8	1.7/8	10	5966828 *	—
	54		1.40	0.0550	7/8	1.7/8	10	5966825 *	—
	53		1.51	0.0595	7/8	1.7/8	10	5966822 *	—
1/16			1.59	0.0625	7/8	1.7/8	2	—	6524892 *

JOBBER DRILL



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ Ø mm	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	A012	A012S
1/16			1.59	0.0625	7/8	1.7/8	10	5966594 *	—
	52		1.61	0.0635	7/8	1.7/8	10	5966819 *	—
	51		1.70	0.0669	1"	2"	10	5966812 *	—
	50		1.78	0.0700	1"	2"	10	5966778 *	—
	49		1.85	0.0730	1"	2"	10	5966692 *	—
	48		1.93	0.0760	1"	2"	10	5966642 *	—
5/64			1.98	0.0781	1"	2"	2	—	6524893 *
5/64			1.98	0.0781	1"	2"	10	5966684 *	—
	47		1.99	0.0785	1"	2"	10	5967082 *	—
	46		2.06	0.0810	1.1/8	2.1/8	10	5967070	—
	45		2.08	0.0820	1.1/8	2.1/8	10	5967067	—
	44		2.18	0.0860	1.1/8	2.1/8	10	5967063	—
	43		2.26	0.0890	1.1/4	2.1/4	10	5967061	—
	42		2.38	0.0935	1.1/4	2.1/4	10	5967056	—
3/32			2.38	0.0938	1.1/4	2.1/4	2	—	6524894
3/32			2.38	0.0938	1.1/4	2.1/4	10	5966631	—
	41		2.44	0.0960	1.3/8	2.3/8	10	5967053	—
	40		2.49	0.0980	1.3/8	2.3/8	10	5967049	—
	39		2.53	0.0995	1.3/8	2.3/8	10	5967043	—
	38		2.58	0.1015	1.7/16	2.1/2	10	5967040	—
	37		2.64	0.1040	1.7/16	2.1/2	10	5967034	—
	36		2.71	0.1065	1.7/16	2.1/2	10	5967031	—
7/64			2.78	0.1094	1.1/2	2.5/8	2	—	6524895
7/64			2.78	0.1094	1.1/2	2.5/8	10	5966707	—
	35		2.79	0.1100	1.1/2	2.5/8	10	5967029	—
	34		2.82	0.1110	1.1/2	2.5/8	10	5967026	—
	33		2.87	0.1130	1.1/2	2.5/8	10	5967023	—
	32		2.95	0.1160	1.5/8	2.3/4	10	5967017	—
	31		3.05	0.1200	1.5/8	2.3/4	10	5967014	—
1/8			3.18	0.1250	1.5/8	2.3/4	2	—	6524896
1/8			3.18	0.1250	1.5/8	2.3/4	10	5966747	—
	30		3.26	0.1285	1.5/8	2.3/4	10	5967011	—
	29		3.45	0.1360	1.3/4	2.7/8	10	5967005	—
	28		3.57	0.1405	1.3/4	2.7/8	10	5966999	—
9/64			3.57	0.1405	1.3/4	2.7/8	2	—	6524897
9/64			3.57	0.1406	1.3/4	2.7/8	10	5966724	—
	27		3.66	0.1440	1.7/8	3"	10	5966996	—
	26		3.73	0.1470	1.7/8	3"	10	5966992	—
	25		3.80	0.1495	1.7/8	3"	10	5966987	—
	24		3.86	0.1520	2"	3.1/8	10	5966983	—
	23		3.91	0.1540	2"	3.1/8	10	5966979	—
5/32	5/32		3.97	0.1563	2"	3.1/8	2	—	6524898
5/32			3.97	0.1563	2"	3.1/8	10	5966680	—
	22		3.99	0.1570	2"	3.1/8	10	5966975	—
	21		4.04	0.1590	2.1/8	3.1/4	10	5966971	—
	20		4.09	0.1610	2.1/8	3.1/4	10	5966969	—
	19		4.22	0.1660	2.1/8	3.1/4	10	5966952	—
	18		4.31	0.1695	2.1/8	3.1/4	10	5966948	—
11/64			4.37	0.1719	2.1/8	3.1/4	2	—	6524899
11/64			4.37	0.1719	2.1/8	3.1/4	10	5966759	—
	17		4.39	0.1730	2.3/16	3.3/8	10	5966943	—
	16		4.50	0.1770	2.3/16	3.3/8	10	5966938	—
	15		4.57	0.1800	2.3/16	3.3/8	10	5966933	—
	14		4.62	0.1820	2.3/16	3.3/8	10	5966928	—
	13		4.70	0.1850	2.5/16	3.1/2	10	5966923	—
3/16			4.76	0.1875	2.5/16	3.1/2	2	—	6524900
3/16			4.76	0.1875	2.5/16	3.1/2	10	5966629	—
	12		4.80	0.1890	2.5/16	3.1/2	10	5966919	—
	11		4.85	0.1910	2.5/16	3.1/2	10	5966915	—
	10		4.92	0.1935	2.7/16	3.5/8	10	5966910	—
	9		4.98	0.1960	2.7/16	3.5/8	10	5966771	—
	8		5.06	0.1990	2.7/16	3.5/8	10	5966765	—
	7		5.11	0.2010	2.7/16	3.5/8	10	5966720	—
13/64			5.16	0.2031	2.7/16	3.5/8	1	—	6524901
13/64			5.16	0.2031	2.7/16	3.5/8	10	5966599	—

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ Ø mm	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	A012	A012S
	6		5.18	0.2040	2.1/2	3.3/4	10	5966667	—
	5		5.22	0.2055	2.1/2	3.3/4	10	5966739	—
	4		5.31	0.2090	2.1/2	3.3/4	10	5967045	—
	3		5.41	0.2130	2.1/2	3.3/4	10	5967008	—
7/32			5.56	0.2188	2.1/2	3.3/4	1	—	6524902
7/32			5.56	0.2188	2.1/2	3.3/4	10	5966704	—
	2		5.61	0.2210	2.5/8	3.7/8	10	5966964	—
	1		5.79	0.2280	2.5/8	3.7/8	10	5967094	—
		A	5.94	0.2340	2.5/8	3.7/8	10	5967301	—
15/64			5.95	0.2344	2.5/8	3.7/8	1	—	6524903
15/64			5.95	0.2344	2.5/8	3.7/8	10	5966603	—
		B	6.03	0.2380	2.3/4	4"	10	5967304	—
		C	6.15	0.2420	2.3/4	4"	10	5967308	—
		D	6.25	0.2460	2.3/4	4"	10	5967312	—
1/4			6.35	0.2500	2.3/4	4"	1	—	6524904
1/4			6.35	0.2500	2.3/4	4"	10	5966688	—
		E	6.35	0.2500	2.3/4	4"	10	5967317	—
		F	6.53	0.2570	2.7/8	4.1/8	10	5967323	—
		G	6.63	0.2610	2.7/8	4.1/8	10	5966901	—
17/64			6.75	0.2656	2.7/8	4.1/8	1	—	6524905
17/64			6.75	0.2656	2.7/8	4.1/8	10	5966607	—
		H	6.76	0.2660	2.7/8	4.1/8	10	5966958	—
		I	6.91	0.2720	2.7/8	4.1/8	10	5967002	—
		J	7.04	0.2770	2.7/8	4.1/8	10	5967037	—
		K	7.14	0.2810	2.15/16	4.1/4	10	5967077	—
9/32			7.14	0.2813	2.15/16	4.1/4	1	—	6524906
9/32			7.14	0.2813	2.15/16	4.1/4	10	5966717	—
		L	7.37	0.2900	2.15/16	4.1/4	10	5967086	—
		M	7.49	0.2950	3.1/16	4.3/8	10	5967088	—
19/64			7.54	0.2968	3.1/16	4.3/8	1	—	6524907
19/64			7.54	0.2968	3.1/16	4.3/8	10	5966610	—
		N	7.67	0.3020	3.1/16	4.3/8	10	5967091	—
5/16			7.94	0.3125	3.3/16	4.1/2	1	—	6524908
5/16			7.94	0.3125	3.3/16	4.1/2	10	5966676	—
		O	8.03	0.3160	3.3/16	4.1/2	10	5966774	—
		P	8.20	0.3230	3.5/16	4.5/8	10	5966782	—
21/64			8.33	0.3281	3.5/16	4.5/8	1	—	6524909
21/64			8.33	0.3281	3.5/16	4.5/8	10	5966615	—
		Q	8.43	0.3320	3.7/16	4.3/4	10	5966785	—
		R	8.61	0.3390	3.7/16	4.3/4	10	5966788	—
11/32			8.73	0.3437	3.7/16	4.3/4	1	—	6524910
11/32			8.73	0.3437	3.7/16	4.3/4	10	5966755	—
		S	8.84	0.3480	3.1/2	4.7/8	10	5966792	—
		T	9.09	0.3580	3.1/2	4.7/8	10	5966795	—
23/64			9.13	0.3594	3.1/2	4.7/8	1	—	6524911
23/64			9.13	0.3594	3.1/2	4.7/8	10	5966621	—
		U	9.35	0.3680	3.5/8	5"	10	5966797	—
3/8			9.52	0.3750	3.5/8	5"	1	—	6524912
3/8			9.52	0.3750	3.5/8	5"	10	5966637	—
		V	9.58	0.3770	3.5/8	5"	10	5966800	—
		W	9.80	0.3860	3.3/4	5.1/8	10	5966803	—
25/64			9.92	0.3906	3.3/4	5.1/8	1	—	6524913
25/64			9.92	0.3906	3.3/4	5.1/8	10	5966623	—
		X	10.08	0.3970	3.3/4	5.1/8	5	5966806	—
		Y	10.26	0.4040	3.7/8	5.1/4	5	5966809	—
13/32			10.32	0.4063	3.7/8	5.1/4	1	—	6524914
13/32			10.32	0.4063	3.7/8	5.1/4	5	5966598	—
		Z	10.49	0.4130	3.7/8	5.1/4	5	5966814	—
27/64			10.72	0.4219	3.15/16	5.3/8	1	—	6524915
27/64			10.72	0.4219	3.15/16	5.3/8	5	5966625	—
7/16			11.11	0.4375	4.1/16	5.1/2	1	—	6524916
7/16			11.11	0.4375	4.1/16	5.1/2	5	5966699	—
29/64			11.51	0.4531	4.3/16	5.5/8	1	—	6524917
29/64			11.51	0.4531	4.3/16	5.5/8	5	5966627	—
15/32			11.91	0.4687	4.5/16	5.3/4	1	—	6524918
15/32			11.91	0.4687	4.5/16	5.3/4	5	5966601	—

JOBBER DRILL



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ Ø mm	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	A012	A012S
31/64			12.30	0.4844	4.3/8	5.7/8	1	—	6524919
31/64			12.30	0.4844	4.3/8	5.7/8	5	5966643	—
1/2			12.70	0.5000	4.1/2	6"	1	—	6524920
1/2			12.70	0.5000	4.1/2	6"	5	5966617	—
33/64			13.10	0.5156	4.13/16	6.5/8	1	5966645	—
17/32			13.49	0.5313	4.13/16	6.5/8	1	5966605	—
35/64			13.89	0.5469	4.13/16	6.5/8	1	5966647	—
9/16			14.29	0.5625	4.13/16	6.5/8	1	5966713	—
37/64			14.68	0.5781	4.13/16	6.5/8	1	5966651	—
19/32			15.08	0.5937	5.3/16	7.1/8	1	5966609	—
39/64			15.48	0.6094	5.3/16	7.1/8	1	5966655	—
5/8			15.88	0.6250	5.3/16	7.1/8	1	5966693	—
21/32			16.67	0.6563	5.3/16	7.1/8	1	5966613	—
11/16			17.46	0.6875	5.5/8	7.5/8	1	5966751	—
45/64			17.86	0.7031	5.5/8	7.5/8	1	5966660	—
23/32			18.26	0.7188	5.5/8	7.5/8	1	5966619	—
47/64			18.65	0.7344	6"	8"	1	5966664	—
3/4			19.05	0.7500	6"	8"	1	5966633	—

General Purpose Jobber Length, DIN Standard

* Sets Available on pg. 228-230

2A Bright Finish improves chip flow in soft or non-ferrous materials

2AB Steam tempered for increased wear resistance & lubricity.
A100

A002 Low thrust design self centering Split Point for easier penetration. TiN Coated Tip increases wear resistance and improves tool life.
A002S

* Bright Below 2mm

* No split point below 2mm



2A	2AB	A100	A002	A002S
0.15 - 15.00	1.00 - 17.50	0.20 - 20.00	1.00 - 16.00	1.00 - 16.00

d ₁ Øh ₈ mm	d ₁ Øh ₈ "/Nr./letter	d ₁ decimal Inch	l ₂ mm	l ₁ mm	2A	2AB	A100	A002	A002S
0.15		0.0059	1.5	19	6000290	—	—	—	—
0.16		0.0063	1.5	19	6000292	—	—	—	—
0.17		0.0067	1.5	19	6000294	—	—	—	—
0.18		0.0070	1.5	19	6000297	—	—	—	—
0.19		0.0075	1.5	19	6000300	—	—	—	—
0.20		0.0078	2.5	19	6000303	—	5967598	—	—
0.21		0.0083	2.5	19	6000308	—	—	—	—
0.22		0.0087	2.5	19	6000311	—	—	—	—
0.23		0.0091	2.5	19	6000314	—	—	—	—
0.24		0.0094	2.5	19	6000317	—	—	—	—
0.25		0.0098	3	19	6000320	—	5967601	—	—
0.26		0.0102	3	19	6000323	—	—	—	—
0.27		0.0106	3	19	6000326	—	—	—	—
0.28		0.0110	3	19	6000329	—	—	—	—
0.29		0.0114	3	19	6000332	—	—	—	—
0.30		0.0118	3	19	6000335	—	5967603	—	—
0.32		0.0126	4	19	6000339	—	5967605	—	—
	80	0.0135	4	19	—	—	5966767	—	—
0.34		0.0134	4	19	6000342	—	—	—	—
0.35		0.0138	4	19	6000345	—	5967609	—	—
0.36		0.0142	4	19	6000348	—	—	—	—
	79	0.0145	4	19	—	—	5966761	—	—
0.38		0.0150	4	19	6000351	—	5967611	—	—
	1/64	0.0156	5	20	—	—	5966604	—	—
0.40		0.0157	5	20	6000354	—	5967613	—	—
	78	0.0160	5	20	—	—	5966757	—	—
0.42		0.0165	5	20	6000357	—	5967614	—	—
0.44		0.0173	5	20	6000361	—	—	—	—
0.45		0.0177	5	20	6000365	—	5967616	—	—
	77	0.0180	5	20	—	—	5966753	—	—
0.46		0.0181	5	20	6000370	—	—	—	—

Package quantities: **2A and 2AB:** 0.15mm - 7.90mm = **12**; 8.00mm - 12.50mm = **6**; 12.70mm and above = **1**

A100 and A002: 0.20mm - 10.00mm = **10**; X - 13.00mm = **5**; 33/64 and above = **1**

A002S: 0.20mm - 5.00mm = **2**; 13/64 - 13.00mm = **1**

d ₁ Øh ₈ mm	d ₁ Øh ₈ "/Nr./letter	d ₁ decimal Inch	l ₂ mm	l ₁ mm	2A	2AB	A100	A002	A002S
0.48		0.0189	5	20	6000380	—	5967618	—	—
0.50		0.0197	6	22	6000385	—	5967619	—	—
	76	0.0200	6	22	—	—	5966750	—	—
0.52		0.0205	6	22	—	—	5967621	—	—
	75	0.0210	6	22	—	—	5966745	—	—
0.55		0.0217	7	24	6000389	—	5967623	—	—
	74	0.0225	7	24	—	—	5966742	—	—
0.58		0.0228	7	24	—	—	5967625	—	—
0.60		0.0236	7	24	6000393	—	5967628	—	—
	73	0.0240	8	26	—	—	5966738	—	—
0.62		0.0244	8	26	—	—	5967631	—	—
	72	0.0250	8	26	—	—	5966730	—	—
0.65		0.0256	8	26	6000397	—	5967633	—	—
	71	0.0260	8	26	—	—	5966726	—	—
0.68		0.0268	9	28	—	—	5967635	—	—
0.70		0.0276	9	28	6000401	—	5967637	—	—
	70	0.0280	9	28	—	—	5966722	—	—
0.72		0.0283	9	28	—	—	5967639	—	—
	69	0.0292	9	28	—	—	5966714	—	—
0.75		0.0295	9	28	6000404	—	5967641	—	—
0.78		0.0307	10	30	—	—	5967643	—	—
	68	0.0310	10	30	—	—	5966710	—	—
	1/32	0.0313	10	30	—	—	5966600	—	—
0.80		0.0315	10	30	6000408	—	5967645	—	—
	67	0.0320	10	30	—	—	5966706	—	—
0.82		0.0323	10	30	—	—	5967647	—	—
	66	0.0330	10	30	—	—	5966702	—	—
0.85		0.0335	10	30	6000412	—	5967651	—	—
0.88		0.0346	11	32	—	—	5967654	—	—
	65	0.0350	11	32	—	—	5966698	—	—
0.90		0.0354	11	32	6000416	—	5967655	—	—
	64	0.0360	11	32	—	—	5966694	—	—
0.92		0.0362	11	32	—	—	5967659	—	—
	63	0.0370	11	32	—	—	5966683	—	—
0.95		0.0374	11	32	6000423	—	5967662	—	—
	62	0.0380	12	34	—	—	5966678	—	—
0.98		0.0386	12	34	—	—	5967667	—	—
	61	0.0390	12	34	—	—	5966673	—	—
1.00		0.0394	12	34	6000604	6000475	5966592	5966835	—
	60	0.0400	12	34	—	—	5966669	—	—
	59	0.0410	12	34	—	—	5966661	—	—
1.05		0.0413	12	34	—	—	5966612	—	—
	58	0.0420	14	36	—	—	5966657	—	—
	57	0.0430	14	36	—	—	5966653	—	—
1.10		0.0433	14	36	6000607	6000506	5966634	5966837	—
1.15		0.0453	14	36	6000610	6000544	5966674	—	—
	56	0.0465	14	36	—	—	5966649	—	—
	3/64	0.0469	16	38	—	—	5967048	5967192	—
1.20		0.0472	16	38	6000613	6000582	5966686	5966839	—
1.25		0.0492	16	38	6000616	6000615	5966691	—	—
1.30		0.0512	16	38	6000620	6000624	5966696	5966841	—
	55	0.0520	16	38	—	—	5966646	—	—
1.35		0.0531	18	40	6000625	6000629	5966701	—	—
	54	0.0550	18	40	—	—	5966820	—	—
1.40		0.0551	18	40	6000630	6000633	5966572	5966842	—
1.45		0.0571	18	40	6000634	6000638	5966573	—	—
1.50		0.0591	18	40	6000637	6000478	5966574	5966846	—
	53	0.0595	20	43	—	—	5966817	—	—
1.55		0.0610	20	43	6000647	6000481	5966575	—	—
	1/16	0.0625	20	43	—	—	5966596	5966856	—
1.60		0.0630	20	43	6000652	6000485	5966576	5966848	—
	52	0.0635	20	43	—	—	5966813	—	—

Package quantities: **2A and 2AB:** 0.15mm - 7.90mm = **12**; 8.00mm - 12.50mm = **6**; 12.70mm and above = **1**
A100 and A002: 0.20mm - 10.00mm = **10**; X - 13.00mm = **5**; 33/64 and above = **1**
A002S: 0.20mm - 5.00mm = **2**; 13/64 - 13.00mm = **1**

d ₁ Øh ₈ mm	d ₁ Øh ₈ "/Nr./letter	d ₁ decimal Inch	l ₂ mm	l ₁ mm	2A	2AB	A100	A002	A002S
1.65		0.0650	20	43	6000655	—	5966577	—	—
1.70		0.0669	20	43	6000659	6000487	5966578	5966850	—
	51	0.0670	22	46	—	—	5966810	—	—
1.75		0.0689	22	46	6000663	6000490	5966579	—	—
	50	0.0700	22	46	—	—	5966805	—	—
1.80		0.0709	22	46	6000667	6000493	5966590	5966852	—
1.85		0.0728	22	46	—	—	5966591	—	—
	49	0.0730	22	46	—	—	5966734	—	—
1.90		0.0748	22	46	6000671	6000495	5966593	5966854	—
	48	0.0760	24	49	—	—	5966689	—	—
1.95		0.0768	24	49	6790303	6000498	5966595	—	—
	5/64	0.0781	24	49	—	—	5966763	5967299	—
	47	0.0785	24	49	—	—	5966640	—	—
2.00		0.0787	24	49	6000694	6000609	5967000	5967411	6524831
2.05		0.0807	24	49	—	—	5967030	—	—
	46	0.0810	24	49	—	—	5967060	—	—
	45	0.0820	24	49	—	—	5967055	—	—
2.10		0.0827	24	49	6000697	6000612	5967066	5967415	—
2.15		0.0846	27	53	6000700	—	5967075	—	—
	44	0.0860	27	53	—	—	5967052	—	—
2.20		0.0866	27	53	6000703	6000619	5967078	5967419	—
2.25		0.0886	27	53	6000705	—	5967080	—	—
	43	0.0890	27	53	—	—	5967050	—	—
2.30		0.0906	27	53	6000707	6000517	5967084	5967424	—
2.35		0.0925	27	53	6000711	6000554	5966904	—	—
	42	0.0935	30	57	—	—	5967047	—	—
	3/32	0.0937	30	57	—	—	5967046	5967187	—
2.40		0.0945	30	57	6000713	6000587	5966908	5967429	—
	41	0.0960	30	57	—	—	5967044	—	—
2.45		0.0965	30	57	—	—	5966912	—	—
	40	0.0980	30	57	—	—	5967041	—	—
2.50		0.0984	30	57	6000716	6000623	5966920	5967434	6524832
	39	0.0995	30	57	—	—	5967035	—	—
2.55		0.1004	30	57	—	—	5966925	—	—
	38	0.1015	30	57	—	—	5967032	—	—
2.60		0.1024	30	57	6000718	6000668	5966929	5967439	—
	37	0.1040	30	57	—	—	5967027	—	—
2.65		0.1043	30	57	—	—	5966935	—	—
2.70		0.1063	33	61	6000719	6000677	5966941	5967444	—
	36	0.1065	33	61	—	—	5967021	—	—
2.75		0.1083	33	61	6000722	—	5966946	—	—
	7/64	0.1093	33	61	—	—	5968101	5967216	—
	35	0.1100	33	61	—	—	5967019	—	—
2.82		0.1102	33	61	—	—	5966951	5967449	—
	34	0.1110	33	61	—	—	5967016	—	—
2.85		0.1122	33	61	—	—	5966961	—	—
	33	0.1130	33	61	—	—	5967013	—	—
2.90		0.1142	33	61	6000725	6000681	5966965	5967453	—
	32	0.1160	33	61	—	—	5967010	—	—
2.95		0.1161	33	61	—	—	5966968	—	—
3.00		0.1181	33	61	6000728	6000686	5967003	5967311	6524833
	31	0.1200	36	65	—	—	5967007	—	—
3.10		0.1220	36	65	6000730	6000690	5967006	5967320	—
3.15		0.1240	36	65	—	—	5967009	—	—
	1/8	0.1250	36	65	—	—	5966606	5966862	6524834
3.20		0.1260	36	65	6000732	6000522	5967012	5967325	6524835
3.25		0.1280	36	65	6000736	6000526	5967015	5967327	—
	30	0.1285	36	65	—	—	5967004	—	—
3.30		0.1299	36	65	6000738	6000530	5967018	5967331	6524836
3.40		0.1339	39	70	6000740	6000534	5967020	5967150	—
	29	0.1360	39	70	—	—	5966998	—	—
3.50		0.1378	39	70	6000742	6000537	5967022	5967154	6524837

Package quantities: **2A and 2AB:** 0.15mm - 7.90mm = **12**; 8.00mm - 12.50mm = **6**; 12.70mm and above = **1**
A100 and A002: 0.20mm - 10.00mm = **10**; X - 13.00mm = **5**; 33/64 and above = **1**
A002S: 0.20mm - 5.00mm = **2**; 13/64 - 13.00mm = **1**

d ₁ Øh ₈ mm	d ₁ Øh ₈ "/Nr./letter	d ₁ decimal Inch	l ₂ mm	l ₁ mm	2A	2AB	A100	A002	A002S
	28	0.1405	39	70	—	—	5966995	—	—
	9/64	0.1406	39	70	—	—	5968015	5967297	—
3.60		0.1417	39	70	6000744	6000540	5967025	5967160	—
	27	0.1440	39	70	—	—	5966988	—	—
3.70		0.1457	39	70	6000746	6000543	5967028	5967165	—
	26	0.1470	39	70	—	—	5966984	—	—
3.75		0.1476	39	70	—	—	5967033	—	—
	25	0.1495	43	75	—	—	5966980	—	—
3.80		0.1496	43	75	—	—	5967036	5967171	—
	24	0.1520	43	75	—	—	5966977	—	—
3.90		0.1535	43	75	—	—	5967039	5967175	—
	23	0.1540	43	75	—	—	5966973	—	—
	5/32	0.1562	43	75	—	—	5966756	5967296	6524838
	22	0.1570	43	75	—	—	5966970	—	—
4.00		0.1575	43	75	6000749	6000546	5966715	5967226	6524839
	21	0.1590	43	75	—	—	5966966	—	—
	20	0.1610	43	75	—	—	5966962	—	—
4.10		0.1614	43	75	6000751	6000549	5966760	5967230	6524860
4.20		0.1654	43	75	6000754	6000552	5966791	5967234	6524861
	19	0.1660	43	75	—	—	5966953	—	—
4.25		0.1673	43	75	—	—	5966827	—	—
4.30		0.1693	47	80	—	—	5966832	5967237	—
4.30		0.1693	47	80	6000757	6000557	5966832	5967237	—
	18	0.1695	47	80	—	—	5966942	—	—
	11/64	0.1719	47	80	—	—	5967389	5966940	—
	17	0.1730	47	80	—	—	5966937	—	—
4.40		0.1732	47	80	6000764	6000560	5966834	5967240	—
	16	0.1770	47	80	—	—	5966932	—	—
4.50		0.1772	47	80	6000747	6000563	5966836	5967246	6524862
	15	0.1800	47	80	—	—	5966927	—	—
4.60		0.1811	47	80	6000790	6000565	5966838	5967249	—
	14	0.1820	47	80	—	—	5966922	—	—
4.70		0.1850	47	80	—	—	5966671	5967251	—
	13	0.1850	47	80	—	—	5966918	—	—
4.75		0.1870	47	80	—	—	5966675	—	—
	3/16	0.1875	52	86	—	—	5967042	5967180	6524863
	12	0.1890	52	86	—	—	5966914	—	—
4.80		0.1890	52	86	6000824	6000568	5966679	5967254	—
	11	0.1910	52	86	—	—	5966909	—	—
4.90		0.1929	52	86	—	—	5966685	5967257	—
	10	0.1935	52	86	—	—	5966905	—	—
	9	0.1960	52	86	—	—	5966770	—	—
5.00		0.1968	52	86	6000861	6000571	5966700	5967260	6524864
	8	0.1990	52	86	—	—	5966764	—	—
5.10		0.2008	52	86	6000915	6000574	5966705	5967263	—
	7	0.2010	52	86	—	—	5966719	—	—
	13/64	0.2031	52	86	—	—	5967369	5967372	6524865
	6	0.2040	52	86	—	—	5966666	—	—
5.20		0.2047	52	86	6000922	6000578	5966709	5967266	—
	5	0.2055	52	86	—	—	5966773	—	—
5.25		0.2067	52	86	—	—	5966712	—	—
5.30		0.2087	52	86	6000927	6000580	5966718	5967269	—
	4	0.2090	57	93	—	—	5967038	—	—
5.40		0.2126	57	93	6000932	6000584	5966721	5967272	—
	3	0.2130	57	93	—	—	5967001	—	—
5.50		0.2165	57	93	6000936	6000590	5966725	5967278	6524866
	7/32	0.2187	57	93	—	—	5968097	5967212	6524867
5.60		0.2205	57	93	6000752	6000593	5966729	5967281	—
	2	0.2210	57	93	—	—	5966957	—	—
5.70		0.2244	57	93	6000755	6000596	5966733	5967285	—
5.75		0.2264	57	93	6000758	6000599	5966737	—	—
	1	0.2280	57	93	—	—	5966900	—	—

Package quantities: **2A and 2AB:** 0.15mm - 7.90mm = **12**; 8.00mm - 12.50mm = **6**; 12.70mm and above = **1**

A100 and A002: 0.20mm - 10.00mm = **10**; X - 13.00mm = **5**; 33/64 and above = **1**

A002S: 0.20mm - 5.00mm = **2**; 13/64 - 13.00mm = **1**

d ₁ Øh ₈ mm	d ₁ Øh ₈ " / Nr. / letter	d ₁ decimal Inch	l ₂ mm	l ₁ mm	2A	2AB	A100	A002	A002S
5.80		0.2283	57	93	6000761	6000602	5966744	5967288	—
5.90		0.2323	57	93	—	—	5966748	5967290	—
	A	0.2340	57	93	—	—	5967671	—	—
	15/64	0.2344	57	93	—	—	5967391	5967394	—
6.00		0.2362	57	93	6000765	6000605	5966769	5967307	6524868
	B	0.2380	63	101	—	—	5967676	—	—
6.10		0.2402	63	101	6000770	6000608	5966772	5967315	—
	C	0.2420	63	101	—	—	5967680	—	—
6.20		0.2441	63	101	6000775	6000611	5966775	5967151	—
	D	0.2460	63	101	—	—	5967685	—	—
6.25		0.2461	63	101	—	—	5966777	—	—
6.30		0.2480	63	101	6000780	6000614	5966780	5967208	—
	1/4	0.2500	63	101	—	—	5966602	5966860	6524869
	E	0.2500	63	101	—	—	5967694	—	—
6.40		0.2520	63	101	6000784	6000618	5966783	5967247	—
6.50		0.2559	63	101	6000787	6000626	5966786	5967282	6524870
	F	0.2570	63	101	—	—	5966895	—	—
6.60		0.2598	63	101	6000793	6000631	5966789	5967321	—
	G	0.2610	63	101	—	—	5966947	—	—
6.70		0.2638	63	101	6000796	6000636	5966794	5967328	—
	17/64	0.2656	69	109	—	—	5967404	5967400	6524871
6.75		0.2657	69	109	6000801	6000641	5966798	—	—
	H	0.2660	69	109	—	—	5966991	—	—
6.80		0.2677	69	109	6000804	6000645	5966801	5967332	6524872
6.90		0.2717	69	109	—	—	5966804	5967336	—
	I	0.2720	69	109	—	—	5967024	—	—
7.00		0.2756	69	109	6000807	6000649	5966807	5967340	6524873
	J	0.2770	69	109	—	—	5967057	—	—
7.10		0.2795	69	109	—	—	5966811	5967156	—
	K	0.2810	69	109	—	—	5967065	—	—
	9/32	0.2812	69	109	—	—	5968012	5967293	—
7.20		0.2835	69	109	6000809	6000653	5966815	5967161	—
7.25		0.2854	69	109	6000812	6000657	5966818	—	—
7.30		0.2874	69	109	6000815	6000661	5966821	5967164	—
	L	0.2900	69	109	—	—	5967069	—	—
7.40		0.2913	69	109	6000818	6000664	5966824	5967174	—
	M	0.2950	69	109	—	—	5967071	—	—
7.50		0.2953	69	109	6000821	6000672	5966830	5967181	6524874
	19/64	0.2968	75	117	—	—	5966955	5967406	—
7.60		0.2992	75	117	6000827	5999556	5967921	5967186	—
	N	0.3020	75	117	—	—	5967074	—	—
7.70		0.3031	75	117	—	—	5967965	5967191	—
7.75		0.3051	75	117	—	—	5967999	—	—
7.80		0.3071	75	117	6000831	5999592	5968028	5967196	—
7.85		0.3091	75	117	—	5999632	—	—	—
7.90		0.3110	75	117	6000833	5999678	5968081	5967201	—
	5/16	0.3125	75	117	—	—	5966752	5967294	6524875
8.00		0.3150	75	117	6000836	5999717	5968105	5967219	6524876
	O	0.3160	75	117	—	—	5966776	—	—
8.10		0.3189	75	117	6000839	5999724	5967926	5967222	—
	P	0.3230	75	117	—	—	5966779	—	—
8.20		0.3228	75	117	6000842	5999728	5967932	5967227	6524877
8.25		0.3248	75	117	6000846	5999732	5967935	—	—
8.30		0.3268	75	117	—	—	5967940	5967231	—
	21/64	0.3281	75	117	—	—	5966982	5967460	—
8.40		0.3307	75	117	6000850	5999735	5967944	5967235	—
	Q	0.3320	75	117	—	—	5966781	—	—
8.50		0.3346	75	117	6000853	5999561	5967950	5967239	6524878
8.60		0.3386	81	125	6000857	5999564	5967954	5967242	—
	R	0.3390	81	125	—	—	5966784	—	—
8.70		0.3425	81	125	6000864	5999565	5967956	—	—
	11/32	0.3437	81	125	—	—	5967367	5966930	—
8.75		0.3445	81	125	6000868	5999568	5967959	—	—

Package quantities: **2A and 2AB:** 0.15mm - 7.90mm = **12**; 8.00mm - 12.50mm = **6**; 12.70mm and above = **1**
A100 and A002: 0.20mm - 10.00mm = **10**; X - 13.00mm = **5**; 33/64 and above = **1**
A002S: 0.20mm - 5.00mm = **2**; 13/64 - 13.00mm = **1**

d ₁ Øh ₈ mm	d ₁ Øh ₈ "/Nr./letter	d ₁ decimal Inch	l ₂ mm	l ₁ mm	2A	2AB	A100	A002	A002S
8.80		0.3465	81	125	6000872	5999571	5967962	5967252	—
	S	0.3480	81	125	—	—	5966787	—	—
8.90		0.3504	81	125	6000877	5999574	5967967	5967255	—
9.00		0.3543	81	125	6000881	5999578	5967970	5967258	6524879
	T	0.3580	81	125	—	—	5966790	—	—
9.10		0.3583	81	125	—	—	5967973	5967261	—
	23/64	0.3594	81	125	—	—	5966986	5967145	—
9.20		0.3622	81	125	—	—	5967976	5967264	—
9.25		0.3642	81	125	—	—	5967979	—	—
9.30		0.3661	81	125	6000890	5999582	5967982	5967267	—
	U	0.3680	81	125	—	—	5966793	—	—
9.40		0.3701	81	125	6000895	5999586	5967985	5967270	—
9.50		0.3740	81	125	6000900	5999589	5967988	5967273	6524880
	3/8	0.3750	87	133	—	—	5967051	5967197	6524881
	V	0.3770	87	133	—	—	5966796	—	—
9.60		0.3780	87	133	6000905	5999596	5967993	5967276	—
9.70		0.3819	87	133	6000910	5999600	5967996	5967279	—
9.75		0.3839	87	133	—	—	5968001	—	—
9.80		0.3858	87	133	6000918	5999604	5968004	5967284	—
	W	0.3860	87	133	—	—	5966799	—	—
9.90		0.3898	87	133	6000867	5999608	5968007	5967287	—
	25/64	0.3906	87	133	—	—	5966990	5967199	—
10.00		0.3937	87	133	6000678	6000501	5966608	5966864	6524882
	X	0.3970	87	133	—	—	5966802	—	—
10.10		0.3976	87	133	—	—	5966611	5966868	—
10.20		0.4016	87	133	6000682	6000503	5966614	5966870	6524883
10.25		0.4035	87	133	—	—	5966616	—	—
	Y	0.4040	87	133	—	—	5966808	—	—
10.30		0.4055	87	133	6000689	6000510	5966618	5966872	—
	13/32	0.4062	87	133	—	—	5967365	5967370	—
10.40		0.4094	87	133	—	—	5966620	5966874	—
	Z	0.4130	87	133	—	—	5966571	—	—
10.50		0.4134	87	133	6000621	6000512	5966622	5966876	6524884
10.60		0.4173	87	133	6000675	—	5966624	5966878	—
10.70		0.4213	94	142	—	—	5966626	5966880	—
	27/64	0.4219	94	142	—	—	5966994	5967243	—
10.75		0.4232	94	142	—	—	5966628	—	—
10.80		0.4252	94	142	6000709	6000515	5966630	5966882	—
10.90		0.4291	94	142	6000734	6000519	5966632	5966884	—
11.00		0.4331	94	142	6000760	6000523	5966636	5966886	6524885
11.10		0.4370	94	142	—	—	5966638	5966890	—
	7/16	0.4375	94	142	—	—	5968091	5967205	—
11.20		0.4409	94	142	6000768	6000529	5966641	5966892	—
11.25		0.4429	94	142	—	—	5966644	—	—
11.30		0.4449	94	142	6000772	6000532	5966648	5966894	—
11.40		0.4488	94	142	6000778	6000535	5966652	5966898	—
11.50		0.4528	94	142	6000782	6000539	5966656	5966903	6524886
	29/64	0.4531	94	142	—	—	5966997	5967275	—
11.60		0.4567	94	142	—	—	5966659	5966907	—
11.70		0.4606	94	142	6000628	6000541	5966665	5966913	—
11.75		0.4626	94	142	—	—	5966670	—	—
11.80		0.4646	94	142	6000635	6000547	5966681	5966917	—
11.90		0.4685	101	151	—	—	5967300	5966924	—
	15/32	0.4687	101	151	—	—	5967387	5967392	—
12.00		0.4724	101	151	6000640	6000550	5967421	5967337	6524887
12.10		0.4764	101	151	6000644	6000555	5967431	5967362	—
12.20		0.4803	101	151	6000648	6000558	5967436	5967384	—
12.25		0.4823	101	151	—	—	5967441	—	—
12.30		0.4843	101	151	—	—	5967445	5967409	—
	31/64	0.4843	101	151	—	—	5967054	5967203	—
12.40		0.4882	101	151	—	—	5967306	5967457	—
12.50		0.4921	101	151	6000651	6000561	5967310	5967464	6524888

Package quantities: **2A and 2AB:** 0.15mm - 7.90mm = **12**; 8.00mm - 12.50mm = **6**; 12.70mm and above = **1**

A100 and A002: 0.20mm - 10.00mm = **10**; X - 13.00mm = **5**; 33/64 and above = **1**

A002S: 0.20mm - 5.00mm = **2**; 13/64 - 13.00mm = **1**

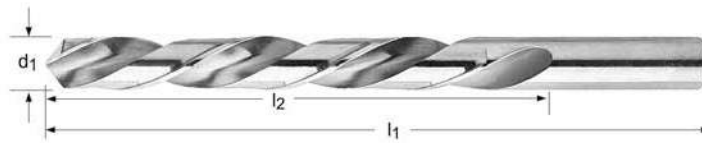
d ₁ Øh ₈ mm	d ₁ Øh ₈ "/Nr./letter	d ₁ decimal Inch	l ₂ mm	l ₁ mm	2A	2AB	A100	A002	A002S
12.60		0.4961	101	151	—	—	5967314	5967469	—
	1/2	0.5000	101	151	—	—	5966597	5966858	6524889
12.70		0.5000	101	151	—	6000566	5967318	5967473	—
12.75		0.5020	101	151	—	—	5967322	—	—
12.80		0.5039	101	151	6000660	6000569	5967326	5967476	—
12.90		0.5079	101	151	—	6000572	5967330	5967342	—
13.00		0.5118	101	151	6000670	6000575	5967334	5967345	6524890
	33/64	0.5156	101	151	—	—	5967058	5967209	—
13.10		0.5157	101	151	—	—	5967338	5967346	—
13.20		0.5197	101	151	—	—	5967341	5967348	—
13.25		0.5217	108	160	—	—	5967347	5967350	—
13.30		0.5236	108	160	—	—	5967349	5967352	—
13.40		0.5276	108	160	—	—	5967351	5967354	—
	17/32	0.5313	108	160	—	—	5967402	5967398	—
13.50		0.5315	108	160	6000679	6000579	5967353	5967356	—
13.60		0.5354	108	160	—	—	5967355	5967358	—
13.70		0.5394	108	160	—	—	5967357	5967360	—
13.75		0.5413	108	160	—	—	5967359	5967364	—
13.80		0.5433	108	160	—	—	5967361	5967366	—
	35/64	0.5469	108	160	—	—	5967062	5967215	—
13.90		0.5472	108	160	—	—	5967363	5967368	—
14.00		0.5512	108	160	6000683	6000585	5967371	5967374	—
14.25		0.5610	114	169	—	—	5967373	5967376	—
	9/16	0.5625	114	169	—	—	5968009	5967291	—
14.50		0.5709	114	169	6000687	6000588	5967375	5967378	—
	37/64	0.5781	114	169	—	—	5967072	5967220	—
14.75		0.5807	114	169	—	—	5967377	5967380	—
15.00		0.5906	114	169	6000691	6000591	5967379	5967382	—
	19/32	0.5937	120	178	—	—	5966897	5967403	—
15.25		0.6004	120	178	—	—	5967381	5967386	—
	39/64	0.6094	120	178	—	—	5966663	5967223	—
15.50		0.6102	120	178	—	6000594	5967383	5967388	—
15.75		0.6201	120	178	—	—	5967385	5967390	—
	5/8	0.6250	120	178	—	—	5966766	5967303	—
16.00		0.6299	120	178	—	6000597	5967393	5967396	—
	41/64	0.6406	125	184	—	—	5966690	—	—
16.50		0.6496	125	184	—	6000600	5967395	—	—
	21/32	0.6562	125	184	—	—	5966978	—	—
17.00		0.6693	125	184	—	6000603	5967397	—	—
	43/64	0.6719	130	191	—	—	5966695	—	—
	11/16	0.6875	130	191	—	—	5967344	—	—
17.50		0.6890	130	191	—	6000606	5967399	—	—
18.00		0.7087	130	191	—	—	5967408	—	—
18.50		0.7283	135	198	—	—	5967412	—	—
19.00		0.7480	135	198	—	—	5967417	—	—
19.50		0.7677	140	205	—	—	5967426	—	—
20.00		0.7874	140	205	—	—	5966974	—	—

Package quantities: **2A and 2AB:** 0.15mm - 7.90mm = **12**; 8.00mm - 12.50mm = **6**; 12.70mm and above = **1**
A100 and A002: 0.20mm - 10.00mm = **10**; X - 13.00mm = **5**; 33/64 and above = **1**
A002S: 0.20mm - 5.00mm = **2**; 13/64 - 13.00mm = **1**

General Purpose Jobber Length - Left Hand

* Sets Available on pg. 231

L10 Left hand helix for use in machines where spindle is counter-clockwise & can be used to remove broken parts without damaging threaded holes. Bright Finish improves chip flow in soft or non-ferrous materials



L10

ANSI

4XD

HSS

118°

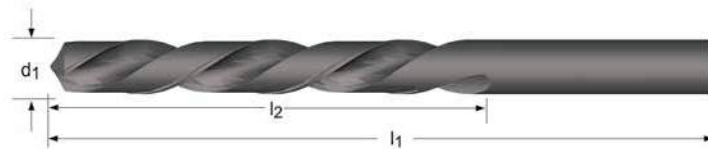


1/32 - 1/2

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	L10
1/32	0.0313	1/2	1.3/8	12	5995605
3/64	0.0469	3/4	1.3/4	12	5995489
1/16	0.0625	7/8	1.7/8	12	5995596
5/64	0.0781	1"	2"	12	5995508
3/32	0.0938	1.1/4	2.1/4	12	5995486
7/64	0.1094	1.1/2	2.5/8	12	5995519
1/8	0.1250	1.5/8	2.3/4	12	5995464
9/64	0.1406	1.3/4	2.7/8	12	5995527
5/32	0.1563	2"	3.1/8	12	5995504
11/64	0.1719	2.1/8	3.1/4	12	5995466
3/16	0.1875	2.5/16	3.1/2	12	5995484
13/64	0.2031	2.7/16	3.5/8	12	5995468
7/32	0.2188	2.1/2	3.3/4	12	5995515
15/64	0.2344	2.5/8	3.7/8	12	5995470
1/4	0.2500	2.3/4	4"	12	5995463
17/64	0.2656	2.7/8	4.1/8	12	5995471
9/32	0.2813	2.15/16	4.1/4	12	5995523
19/64	0.2969	3.1/16	4.3/8	12	5995472
5/16	0.3125	3.3/16	4.1/2	6	5995501
21/64	0.3281	3.5/16	4.5/8	6	5995475
11/32	0.3437	3.7/16	4.3/4	6	5995465
23/64	0.3594	3.1/2	4.7/8	6	5995477
3/8	0.3750	3.5/8	5"	6	5995492
25/64	0.3906	3.3/4	5.1/8	6	5995478
13/32	0.4063	3.7/8	5.1/4	6	5995467
27/64	0.4219	3.15/16	5.3/8	6	5995480
7/16	0.4375	4.1/16	5.1/2	6	5995511
29/64	0.4531	4.3/16	5.5/8	6	5995482
15/32	0.4687	4.5/16	5.3/4	6	5995469
31/64	0.4844	4.3/8	5.7/8	6	5995495
1/2	0.5000	4.1/2	6"	6	5995602

General Purpose Jobber Length - Left Hand

A101 Left hand helix for use in machines where spindle is counter-clockwise & can be used to remove broken parts without damaging threaded holes.



A101

DIN
338

4XD

HSS

118°



1.00 - 12.00

d_1 $\varnothing h_8$ mm	d_1 decimal Inch	l_2 mm	l_1 mm	A101
1.00	0.0394	12	34	5968016
1.10	0.0433	14	36	5968019
1.20	0.0472	16	38	5968022
1.25	0.0492	16	38	5968025
1.30	0.0512	16	38	5968032
1.40	0.0551	18	40	5968037
1.50	0.0591	18	40	5968042
1.60	0.0630	20	43	5968047
1.70	0.0669	20	43	5968052
1.80	0.0709	22	46	5968062
1.90	0.0748	22	46	5968067
2.00	0.0787	24	49	5967908
2.10	0.0827	24	49	5967955
2.20	0.0866	27	53	5967987
2.30	0.0906	27	53	5968021
2.40	0.0945	30	57	5968069
2.50	0.0984	30	57	5968082
2.60	0.1024	30	57	5968087
2.70	0.1063	33	61	5968093
2.80	0.1102	33	61	5968098
2.90	0.1142	33	61	5967912
3.00	0.1181	33	61	5967917
3.20	0.1260	36	65	5967920
3.30	0.1299	36	65	5967924
3.50	0.1378	39	70	5967928
3.80	0.1496	43	75	5967933
4.00	0.1575	43	75	5967939
4.20	0.1654	43	75	5967943
4.50	0.1772	47	80	5967948
4.80	0.1890	52	86	5967952
5.00	0.1969	52	86	5967958
5.10	0.2008	52	86	5967961
5.20	0.2047	52	86	5967964

JOBBER DRILL



d_1 $\varnothing h_8$ mm	d_1 decimal Inch	l_2 mm	l_1 mm	A101
5.50	0.2165	57	93	5967966
6.00	0.2362	57	93	5967969
6.50	0.2559	63	101	5967972
7.00	0.2756	69	109	5967975
7.50	0.2953	69	109	5967978
8.00	0.3150	75	117	5967981
8.50	0.3346	75	117	5967984
9.00	0.3543	81	125	5967990
10.00	0.3937	87	133	5968072
11.00	0.4331	94	142	5968077
12.00	0.4724	101	151	5968086

Heavy Duty Jobber Length (HX Series)

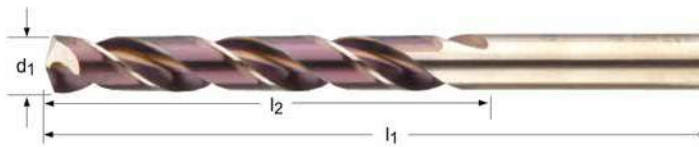
* HX10 set available on pg. 233

HX10 - Fractional Sizes

HX18 - Wire Gauge Sizes

HX15 - Letter Sizes

Low thrust design self centering Split Point for easier penetration. Stronger and more Rigid. Unique surface treatment for improved wear resistance in hard ferrous alloys.



HX10	HX18	HX15
ANSI	ANSI	ANSI
4XD	4XD	4XD
HSS	HSS	HSS
135°	135°	135°
		
1/16 - 1/2	N52 - N1	A - Z

d_1 Ø Inch	d_1 Ø Nr.	d_1 Ø letter	d_1 decimal Inch	l_2 Inch	l_1 Inch	Pack Qty	HX10	HX18	HX15
1/16			0.0625	7/8	1.7/8	12	5996242	—	—
	52		0.0635	7/8	1.7/8	12	—	5995473	—
	51		0.0670	1"	2"	12	—	5995462	—
	50		0.0700	1"	2"	12	—	5995923	—
	49		0.0730	1"	2"	12	—	5995914	—
	48		0.0760	1"	2"	12	—	5995910	—
5/64			0.0781	1"	2"	12	5996298	—	—
	47		0.0785	1"	2"	12	—	5995907	—
	46		0.0810	1.1/8	2.1/8	12	—	5995903	—
	45		0.0820	1.1/8	2.1/8	12	—	5995897	—
	44		0.0860	1.1/8	2.1/8	12	—	5995894	—
	43		0.0890	1.1/4	2.1/4	12	—	5995890	—
	42		0.0935	1.1/4	2.1/4	12	—	5995886	—
3/32			0.0938	1.1/4	2.1/4	12	5996274	—	—
	41		0.0960	1.3/8	2.3/8	12	—	5995881	—
	40		0.0980	1.3/8	2.3/8	12	—	5995872	—
	39		0.0995	1.3/8	2.3/8	12	—	5995864	—
	38		0.1015	1.7/16	2.1/2	12	—	5995860	—
	37		0.1040	1.7/16	2.1/2	12	—	5995857	—
	36		0.1065	1.7/16	2.1/2	12	—	5995853	—
7/64			0.1094	1.1/2	2.5/8	12	5996310	—	—
	35		0.1100	1.1/2	2.5/8	12	—	5995850	—
	34		0.1110	1.1/2	2.5/8	12	—	5995846	—
	33		0.1130	1.1/2	2.5/8	12	—	5995843	—
	32		0.1160	1.5/8	2.3/4	12	—	5995841	—
	31		0.1200	1.5/8	2.3/4	12	—	5995833	—
1/8			0.1250	1.5/8	2.3/4	12	5996326	—	—
	30		0.1285	1.5/8	2.3/4	12	—	5995829	—
	29		0.1360	1.3/4	2.7/8	12	—	5995823	—
	28		0.1405	1.3/4	2.7/8	12	—	5995819	—
9/64			0.1406	1.3/4	2.7/8	12	5996318	—	—
	27		0.1440	1.7/8	3"	12	—	5995815	—
	26		0.1470	1.7/8	3"	12	—	5995811	—

JOBBER DRILL



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	HX10	HX18	HX15
	25		0.1495	1.7/8	3"	12	—	5995807	—
	24		0.1520	2"	3.1/8	12	—	5995804	—
	23		0.1540	2"	3.1/8	12	—	5995800	—
5/32			0.1563	2"	3.1/8	12	5996295	—	—
	22		0.1570	2"	3.1/8	12	—	5995791	—
	21		0.1590	2.1/8	3.1/4	12	—	5995788	—
	20		0.1610	2.1/8	3.1/4	12	—	5995784	—
	19		0.1660	2.1/8	3.1/4	12	—	5995777	—
	18		0.1695	2.1/8	3.1/4	12	—	5995772	—
11/64			0.1719	2.1/8	3.1/4	12	5996397	—	—
	17		0.1730	2.3/16	3.3/8	12	—	5995768	—
	16		0.1770	2.3/16	3.3/8	12	—	5995765	—
	15		0.1800	2.3/16	3.3/8	12	—	5995760	—
	14		0.1820	2.3/16	3.3/8	12	—	5995756	—
	13		0.1850	2.5/16	3.1/2	12	—	5995932	—
3/16			0.1875	2.5/16	3.1/2	12	5996270	—	—
	12		0.1890	2.5/16	3.1/2	12	—	5995930	—
	11		0.1910	2.5/16	3.1/2	12	—	5995929	—
	10		0.1935	2.7/16	3.5/8	12	—	5995926	—
	9		0.1960	2.7/16	3.5/8	12	—	5995592	—
	8		0.1990	2.7/16	3.5/8	12	—	5995584	—
	7		0.2010	2.7/16	3.5/8	12	—	5995539	—
13/64			0.2031	2.7/16	3.5/8	12	5996407	—	—
	6		0.2040	2.1/2	3.3/4	12	—	5995498	—
	5		0.2055	2.1/2	3.3/4	12	—	5995917	—
	4		0.2090	2.1/2	3.3/4	12	—	5995868	—
	3		0.2130	2.1/2	3.3/4	12	—	5995825	—
7/32			0.2188	2.1/2	3.3/4	12	5996307	—	—
	2		0.2210	2.5/8	3.7/8	12	—	5995780	—
	1		0.2280	2.5/8	3.7/8	12	—	5995920	—
		A	0.2340	2.5/8	3.7/8	12	—	—	5996320
15/64			0.2344	2.5/8	3.7/8	12	5996413	—	—
		B	0.2374	2.3/4	4"	12	—	—	5996329
		C	0.2421	2.3/4	4"	12	—	—	5996332
		D	0.2461	2.3/4	4"	12	—	—	5996334
1/4			0.2500	2.3/4	4"	12	5996282	—	—
		E	0.2500	2.3/4	4"	12	—	—	—
		F	0.2571	2.7/8	4.1/8	12	—	—	5996340
		G	0.2610	2.7/8	4.1/8	12	—	—	5996342
17/64			0.2656	2.7/8	4.1/8	12	—	—	—
		H	0.2661	2.7/8	4.1/8	12	—	—	5996345
		I	0.2720	2.7/8	4.1/8	12	—	—	5996346
		J	0.2772	2.7/8	4.1/8	12	—	—	5996349
		K	0.2811	2.15/16	4.1/4	12	—	—	5996352
9/32			0.2813	2.15/16	4.1/4	12	5996314	—	—
		L	0.2902	2.15/16	4.1/4	12	—	—	5996359
		M	0.2949	3.1/16	4.3/8	12	—	—	5996362
19/64			0.2969	3.1/16	4.3/8	12	5996247	—	—
		N	0.3020	3.1/16	4.3/8	12	—	—	5996366
5/16			0.3125	3.3/16	4.1/2	6	5996290	—	—
		O	0.3161	3.3/16	4.1/2	6	—	—	5996370
		P	0.3228	3.5/16	4.5/8	6	—	—	5996374
21/64			0.3281	3.5/16	4.5/8	6	5996251	—	—
		Q	0.3319	3.7/16	4.3/4	6	—	—	5996378
		R	0.3390	3.7/16	4.3/4	6	—	—	5996381
11/32			0.3437	3.7/16	4.3/4	6	5996356	—	—
		S	0.3480	3.1/2	4.7/8	6	—	—	5996386
		T	0.3580	3.1/2	4.7/8	6	—	—	5996390
23/64			0.3594	3.1/2	4.7/8	6	5996254	—	—
		U	0.3680	3.5/8	5"	6	—	—	5996394
3/8			0.3750	3.5/8	5"	6	5996278	—	—
		V	0.3772	3.5/8	5"	6	—	—	5996399
		W	0.3858	3.3/4	5.1/8	6	—	—	5995751
25/64			0.3906	3.3/4	5.1/8	6	5996258	—	—
		X	0.3969	3.3/4	5.1/8	6	—	—	5995795
		Y	0.4039	3.7/8	5.1/4	6	—	—	5995837
13/32			0.4063	3.7/8	5.1/4	6	5996403	—	—

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	HX10	HX18	HX15
		Z	0.4130	3.7/8	5.1/4	6	—	—	5995876
27/64			0.4219	3.15/16	5.3/8	6	5996262	—	—
7/16			0.4375	4.1/16	5.1/2	6	5996303	—	—
29/64			0.4531	4.3/16	5.5/8	6	5996267	—	—
15/32			0.4687	4.5/16	5.3/4	6	5996410	—	—
31/64			0.4844	4.3/8	5.7/8	6	5996286	—	—
1/2			0.5000	4.1/2	6"	6	5996236	—	—

JOBBER DRILL



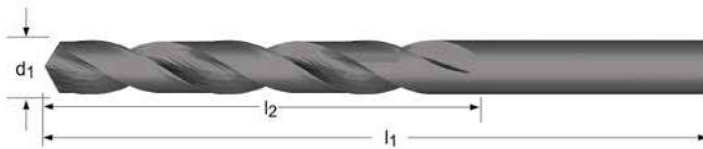
General Purpose Jobber Length (NAS 907 Type A)

R10A - Fractional Sizes

R18A - Wire Gauge Sizes

R15A - Letter Sizes

Low thrust design self centering Split Point for easier penetration.
Steam tempered surface treatment for increased wear resistance
& lubricity



R10A	R18A	R15A
ANSI	ANSI	ANSI
4XD	4XD	4XD
HSS	HSS	HSS
118°	118°	118°
		
1/16 - 1/2	N52 - N1	A - Z

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R10A	R18A	R15A
1/16			0.0625	7/8	1.7/8	12	5997500	—	—
	52		0.0635	7/8	1.7/8	12	—	5999185	—
	51		0.0670	1"	2"	12	—	5999183	—
	50		0.0700	1"	2"	12	—	5999181	—
	49		0.0730	1"	2"	12	—	5999175	—
	48		0.0760	1"	2"	12	—	5999146	—
5/64			0.0781	1"	2"	12	5997578	—	—
	47		0.0785	1"	2"	12	—	5999101	—
	46		0.0810	1.1/8	2.1/8	12	—	5999068	—
	45		0.0820	1.1/8	2.1/8	12	—	5999026	—
	44		0.0860	1.1/8	2.1/8	12	—	5999428	—
	43		0.0890	1.1/4	2.1/4	12	—	5999424	—
	42		0.0935	1.1/4	2.1/4	12	—	5999422	—
3/32			0.0938	1.1/4	2.1/4	12	5997565	—	—
	41		0.0960	1.3/8	2.3/8	12	—	5999419	—
	40		0.0980	1.3/8	2.3/8	12	—	5999416	—
	39		0.0995	1.3/8	2.3/8	12	—	5999410	—
	38		0.1015	1.7/16	2.1/2	12	—	5999407	—
	37		0.1040	1.7/16	2.1/2	12	—	5999404	—
	36		0.1065	1.7/16	2.1/2	12	—	5999401	—
7/64			0.1094	1.1/2	2.5/8	12	5997587	—	—
	35		0.1100	1.1/2	2.5/8	12	—	5999399	—
	34		0.1110	1.1/2	2.5/8	12	—	5999392	—
	33		0.1130	1.1/2	2.5/8	12	—	5999388	—
	32		0.1160	1.5/8	2.3/4	12	—	5999384	—
	31		0.1200	1.5/8	2.3/4	12	—	5999380	—
1/8			0.1250	1.5/8	2.3/4	12	5997510	—	—
	30		0.1285	1.5/8	2.3/4	12	—	5999376	—
	29		0.1360	1.3/4	2.7/8	12	—	5999368	—
	28		0.1405	1.3/4	2.7/8	12	—	5999363	—
9/64			0.1406	1.3/4	2.7/8	12	5997596	—	—
	27		0.1440	1.7/8	3"	12	—	5999359	—

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R10A	R18A	R15A
	26		0.1470	1.7/8	3"	12	—	5999352	—
	25		0.1495	1.7/8	3"	12	—	5999343	—
	24		0.1520	2"	3.1/8	12	—	5999339	—
	23		0.1540	2"	3.1/8	12	—	5999335	—
5/32			0.1563	2"	3.1/8	12	5997576	—	—
	22		0.1570	2"	3.1/8	12	—	5999331	—
	21		0.1590	2.1/8	3.1/4	12	—	5999327	—
	20		0.1610	2.1/8	3.1/4	12	—	5999323	—
	19		0.1660	2.1/8	3.1/4	12	—	5999313	—
	18		0.1695	2.1/8	3.1/4	12	—	5999311	—
11/64			0.1719	2.1/8	3.1/4	12	5997514	—	—
	17		0.1730	2.3/16	3.3/8	12	—	5999307	—
	16		0.1770	2.3/16	3.3/8	12	—	5999298	—
	15		0.1800	2.3/16	3.3/8	12	—	5999294	—
	14		0.1820	2.3/16	3.3/8	12	—	5999290	—
	13		0.1850	2.5/16	3.1/2	12	—	5999286	—
3/16			0.1875	2.5/16	3.1/2	12	5997560	—	—
	12		0.1890	2.5/16	3.1/2	12	—	5999282	—
	11		0.1910	2.5/16	3.1/2	12	—	5999278	—
	10		0.1935	2.7/16	3.5/8	12	—	5999275	—
	9		0.1960	2.7/16	3.5/8	12	—	5999042	—
	8		0.1990	2.7/16	3.5/8	12	—	5999039	—
	7		0.2010	2.7/16	3.5/8	12	—	5999035	—
13/64			0.2031	2.7/16	3.5/8	12	5997523	—	—
	6		0.2040	2.1/2	3.3/4	12	—	5999031	—
	5		0.2055	2.1/2	3.3/4	12	—	5999179	—
	4		0.2090	2.1/2	3.3/4	12	—	5999413	—
	3		0.2130	2.1/2	3.3/4	12	—	5999372	—
7/32			0.2188	2.1/2	3.3/4	12	5997584	—	—
	2		0.2210	2.5/8	3.7/8	12	—	5999317	—
	1		0.2280	2.5/8	3.7/8	12	—	5999271	—
		A	0.2340	2.5/8	3.7/8	12	—	—	5998650
15/64			0.2344	2.5/8	3.7/8	12	5997530	—	—
		B	0.2374	2.3/4	4"	12	—	—	5998654
		C	0.2421	2.3/4	4"	12	—	—	5998658
		D	0.2461	2.3/4	4"	12	—	—	5998662
1/4			0.2500	2.3/4	4"	12	5997506	—	—
		E	0.2571	2.7/8	4.1/8	12	—	—	5998670
		G	0.2610	2.7/8	4.1/8	12	—	—	5998674
17/64			0.2656	2.7/8	4.1/8	12	5997533	—	—
		H	0.2661	2.7/8	4.1/8	12	—	—	5998677
		I	0.2720	2.7/8	4.1/8	12	—	—	5998680
		J	0.2772	2.7/8	4.1/8	12	—	—	5998683
		K	0.2811	2.15/16	4.1/4	12	—	—	5998689
9/32			0.2813	2.15/16	4.1/4	12	5997593	—	—
		L	0.2902	2.15/16	4.1/4	12	—	—	5998692
		M	0.2949	3.1/16	4.3/8	12	—	—	5998695
19/64			0.2969	3.1/16	4.3/8	12	5997536	—	—
		N	0.3020	3.1/16	4.3/8	12	—	—	5998698
5/16			0.3125	3.3/16	4.1/2	6	5997573	—	—
		O	0.3161	3.3/16	4.1/2	6	—	—	5998700
		P	0.3228	3.5/16	4.5/8	6	—	—	5998702
21/64			0.3281	3.5/16	4.5/8	6	5997540	—	—
		Q	0.3319	3.7/16	4.3/4	6	—	—	5998705
		R	0.3390	3.7/16	4.3/4	6	—	—	5998707
11/32			0.3437	3.7/16	4.3/4	6	5997512	—	—
		S	0.3480	3.1/2	4.7/8	6	—	—	5998709
		T	0.3580	3.1/2	4.7/8	6	—	—	5998711
23/64			0.3594	3.1/2	4.7/8	6	5997544	—	—
		U	0.3680	3.5/8	5"	6	—	—	5998715
3/8			0.3750	3.5/8	5"	6	5997568	—	—
		V	0.3772	3.5/8	5"	6	—	—	5998717
		W	0.3858	3.3/4	5.1/8	6	—	—	5998719
25/64			0.3906	3.3/4	5.1/8	6	—	—	—
		X	0.3969	3.3/4	5.1/8	6	—	—	5998722

JOBBER DRILL



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R10A	R18A	R15A
		Y	0.4039	3.7/8	5.1/4	6	—	—	5998726
13/32			0.4063	3.7/8	5.1/4	6	5997517	—	—
		Z	0.4130	3.7/8	5.1/4	6	—	—	5998729
27/64			0.4219	3.15/16	5.3/8	6	5997552	—	—
7/16			0.4375	4.1/16	5.1/2	6	5997581	—	—
29/64			0.4531	4.3/16	5.5/8	6	5997555	—	—
15/32			0.4687	4.5/16	5.3/4	6	5997526	—	—
31/64			0.4844	4.3/8	5.7/8	6	5997571	—	—
1/2			0.5000	4.1/2	6"	6	5997503	—	—

Heavy Duty Jobber Length (NAS 907 Type B)

R10B - Fractional Sizes

R18B - Wire Gauge Sizes

R15B - Letter Sizes

Low thrust design self centering Split Point for easier penetration. Steam tempered surface treatment for increased wear resistance & lubricity. Recommended for tougher ferrous materials.



R10B	R18B	R15B
ANSI	ANSI	ANSI
4XD	4XD	4XD
HSS	HSS	HSS
135°	135°	135°
		
1/16 - 1/2	N52 - N1	A - Z

d_1 Ø Inch	d_1 Ø Nr.	d_1 Ø letter	d_1 decimal Inch	l_2 Inch	l_1 Inch	Pack Qty	R10B	R18B	R15B
1/16			0.0625	7/8	1.7/8	12	5997600	—	—
	52		0.0635	7/8	1.7/8	12	—	5997656	—
	51		0.0670	1"	2"	12	—	5997649	—
	50		0.0700	1"	2"	12	—	5997801	—
	49		0.0730	1"	2"	12	—	5997792	—
	48		0.0760	1"	2"	12	—	5997788	—
5/64			0.0781	1"	2"	12	5998027	—	—
	47		0.0785	1"	2"	12	—	5997778	—
	46		0.0810	1.1/8	2.1/8	12	—	5997739	—
	45		0.0820	1.1/8	2.1/8	12	—	5997715	—
	44		0.0860	1.1/8	2.1/8	12	—	5997686	—
	43		0.0890	1.1/4	2.1/4	12	—	5997643	—
	42		0.0935	1.1/4	2.1/4	12	—	5999177	—
3/32			0.0938	1.1/4	2.1/4	12	5998007	—	—
	41		0.0960	1.3/8	2.3/8	12	—	5999173	—
	40		0.0980	1.3/8	2.3/8	12	—	5999171	—
	39		0.0995	1.3/8	2.3/8	12	—	5999168	—
	38		0.1015	1.7/16	2.1/2	12	—	5999165	—
	37		0.1040	1.7/16	2.1/2	12	—	5999162	—
	36		0.1065	1.7/16	2.1/2	12	—	5999159	—
7/64			0.1094	1.1/2	2.5/8	12	5998037	—	—
	35		0.1100	1.1/2	2.5/8	12	—	5999156	—
	34		0.1110	1.1/2	2.5/8	12	—	5999152	—
	33		0.1130	1.1/2	2.5/8	12	—	5999149	—
	32		0.1160	1.5/8	2.3/4	12	—	5999139	—
	31		0.1200	1.5/8	2.3/4	12	—	5999135	—
1/8			0.1250	1.5/8	2.3/4	12	5997612	—	—
	30		0.1285	1.5/8	2.3/4	12	—	5999130	—
	29		0.1360	1.3/4	2.7/8	12	—	5999122	—
	28		0.1405	1.3/4	2.7/8	12	—	5999118	—
9/64			0.1406	1.3/4	2.7/8	12	5998049	—	—
	27		0.1440	1.7/8	3"	12	—	5999113	—

JOBBER DRILL



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R10B	R18B	R15B
	26		0.1470	1.7/8	3"	12	—	5999110	—
	25		0.1495	1.7/8	3"	12	—	5999107	—
	24		0.1520	2"	3.1/8	12	—	5999104	—
	23		0.1540	2"	3.1/8	12	—	5999098	—
5/32			0.1563	2"	3.1/8	12	5998023	—	—
	22		0.1570	2"	3.1/8	12	—	5999095	—
	21		0.1590	2.1/8	3.1/4	12	—	5999092	—
	20		0.1610	2.1/8	3.1/4	12	—	5999089	—
	19		0.1660	2.1/8	3.1/4	12	—	5999082	—
	18		0.1695	2.1/8	3.1/4	12	—	5999079	—
11/64			0.1719	2.1/8	3.1/4	12	5997620	—	—
	17		0.1730	2.3/16	3.3/8	12	—	5999076	—
	16		0.1770	2.3/16	3.3/8	12	—	5999074	—
	15		0.1800	2.3/16	3.3/8	12	—	5999071	—
	14		0.1820	2.3/16	3.3/8	12	—	5999065	—
	13		0.1850	2.5/16	3.1/2	12	—	5999062	—
3/16			0.1875	2.5/16	3.1/2	12	5998174	—	—
	12		0.1890	2.5/16	3.1/2	12	—	5999058	—
	11		0.1910	2.5/16	3.1/2	12	—	5999054	—
	10		0.1935	2.7/16	3.5/8	12	—	5999050	—
	9		0.1960	2.7/16	3.5/8	12	—	5997670	—
	8		0.1990	2.7/16	3.5/8	12	—	5997666	—
	7		0.2010	2.7/16	3.5/8	12	—	5997663	—
13/64			0.2031	2.7/16	3.5/8	12	5997625	—	—
	6		0.2040	2.1/2	3.3/4	12	—	5997660	—
	5		0.2055	2.1/2	3.3/4	12	—	5997796	—
	4		0.2090	2.1/2	3.3/4	12	—	5999169	—
	3		0.2130	2.1/2	3.3/4	12	—	5999126	—
7/32			0.2188	2.1/2	3.3/4	12	5998034	—	—
	2		0.2210	2.5/8	3.7/8	12	—	5999085	—
	1		0.2280	2.5/8	3.7/8	12	—	5999046	—
		A	0.2340	2.5/8	3.7/8	12	—	—	5998734
15/64			0.2344	2.5/8	3.7/8	12	5998001	—	—
		B	0.2380	2.3/4	4"	12	—	—	5998737
		C	0.2421	2.3/4	4"	12	—	—	5998741
		D	0.2461	2.3/4	4"	12	—	—	5998748
1/4		E	0.2500	2.3/4	4"	12	5997608	—	—
		F	0.2571	2.7/8	4.1/8	12	—	—	5998757
		G	0.2610	2.7/8	4.1/8	12	—	—	5998761
17/64			0.2656	2.7/8	4.1/8	12	5998045	—	—
		H	0.2661	2.7/8	4.1/8	12	—	—	5998765
		I	0.2720	2.7/8	4.1/8	12	—	—	5998768
		J	0.2772	2.7/8	4.1/8	12	—	—	5998773
		K	0.2811	2.15/16	4.1/4	12	—	—	5998777
9/32			0.2813	2.15/16	4.1/4	12	5998041	—	—
		L	0.2902	2.15/16	4.1/4	12	—	—	5998782
		M	0.2949	3.1/16	4.3/8	12	—	—	5998787
19/64			0.2969	3.1/16	4.3/8	12	5998080	—	—
		N	0.3020	3.1/16	4.3/8	12	—	—	5998795
5/16			0.3125	3.3/16	4.1/2	6	5998020	—	—
		O	0.3161	3.3/16	4.1/2	6	—	—	5998975
		P	0.3228	3.5/16	4.5/8	6	—	—	5999015
21/64			0.3281	3.5/16	4.5/8	6	5998114	—	—
		Q	0.3319	3.7/16	4.3/4	6	—	—	5999055
		R	0.3390	3.7/16	4.3/4	6	—	—	5999090
11/32			0.3437	3.7/16	4.3/4	6	5997616	—	—
		S	0.3480	3.1/2	4.7/8	6	—	—	5999125
		T	0.3580	3.1/2	4.7/8	6	—	—	5999133
23/64			0.3594	3.1/2	4.7/8	6	5998154	—	—
		U	0.3680	3.5/8	5"	6	—	—	5999136
3/8			0.3750	3.5/8	5"	6	5998011	—	—
		V	0.3772	3.5/8	5"	6	—	—	5999140
		W	0.3858	3.3/4	5.1/8	6	—	—	5999142
25/64			0.3906	3.3/4	5.1/8	6	5998162	—	—
		X	0.3969	3.3/4	5.1/8	6	—	—	5998979
		Y	0.4039	3.7/8	5.1/4	6	—	—	5998983

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R10B	R18B	R15B
13/32			0.4063	3.7/8	5.1/4	6	5997622	—	—
		Z	0.4130	3.7/8	5.1/4	6	—	—	5998986
27/64			0.4219	3.15/16	5.3/8	6	5998166	—	—
7/16			0.4375	4.1/16	5.1/2	6	5998031	—	—
29/64			0.4531	4.3/16	5.5/8	6	5998170	—	—
15/32			0.4687	4.5/16	5.3/4	6	5997632	—	—
31/64			0.4844	4.3/8	5.7/8	6	5998016	—	—
1/2			0.5000	4.1/2	6"	6	5997604	—	—

High Helix Jobber Length

* Sets Available on pg. 232

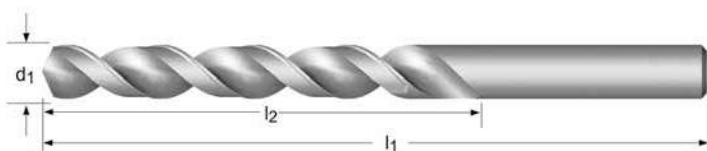
R10H - Fractional Sizes

R18H - Wire Gauge Sizes

High Helix and Bright Finish for better chip flow in soft or non-ferrous materials.

A108 - Fractional & Metric Sizes

Low thrust design self centering Split Point for easier penetration. Steam tempered for increased wear resistance & lubricity. Fast spiral for stainless.



R10H	R18H	A108
ANSI	ANSI	DIN 338
4XD	4XD	4XD
HSS	HSS	HSS
118°	118°	135°
		
1/32 - 1/2	N80 - N1	1.00 - 16.00

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø mm	d ₁ decimal Inch	l ₂ Inch	l ₂ mm	l ₁ Inch	l ₁ mm	Pack Qty	R10H	R18H	A108
	80		0.0135	1/8		3/4		12	—	5998444	—
	79		0.0145	1/8		3/4		12	—	5998435	—
	78		0.0160	3/16		7/8		12	—	5998392	—
	77		0.0180	3/16		7/8		12	—	5998354	—
	76		0.0200	3/16		7/8		12	—	5998321	—
	75		0.0210	1/4		1"		12	—	5998278	—
	74		0.0225	1/4		1"		12	—	5998119	—
	73		0.0240	5/16		1.1/8		12	—	5998112	—
	72		0.0250	5/16		1.1/8		12	—	5998109	—
	71		0.0260	3/8		1.1/4		12	—	5998106	—
	70		0.0280	3/8		1.1/4		12	—	5998103	—
	69		0.0292	1/2		1.3/8		12	—	5998097	—
	68		0.0310	1/2		1.3/8		12	—	5998094	—
1/32			0.0313	1/2		1.3/8		12	5998353	—	—
	67		0.0320	1/2		1.3/8		12	—	5998090	—
	66		0.0330	1/2		1.3/8		12	—	5998087	—
	65		0.0350	5/8		1.1/2		12	—	5998084	—
	64		0.0360	5/8		1.1/2		12	—	5998078	—
	63		0.0370	5/8		1.1/2		12	—	5998075	—
	62		0.0380	5/8		1.1/2		12	—	5998072	—
	61		0.0390	11/16		1.5/8		12	—	5998069	—
		1.00	0.0394		12		34	10	—	—	5968323
	60		0.0400	11/16		1.5/8		12	—	5998066	—
	59		0.0410	11/16		1.5/8		12	—	5998060	—
	58		0.0420	11/16		1.5/8		12	—	5998057	—
	57		0.0430	3/4		1.3/4		12	—	5998055	—
		1.10	0.0433		14		36	10	—	—	5968333
	56		0.0465	3/4		1.3/4		12	—	5998051	—
3/64			0.0469	3/4		1.3/4		12	5998386	—	—
		1.20	0.0472		16		38	10	—	—	5968338
		1.30	0.0512		16		38	10	—	—	5968343
	55		0.0520	7/8		1.7/8		12	—	5998043	—
	54		0.0550	7/8		1.7/8		12	—	5998039	—

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø mm	d ₁ decimal Inch	l ₂ Inch	l ₂ mm	l ₁ Inch	l ₁ mm	Pack Qty	R10H	R18H	A108
		1.40	0.0551		18		40	10	—	—	5968351
		1.50	0.0591		18		40	10	—	—	5968176
	53		0.0595	7/8		1.7/8		12	—	5998035	—
1/16			0.0625	7/8		1.7/8		12	5998346	—	—
1/16			0.0625		20		43	10	—	—	5968200
		1.60	0.0630		20		43	10	—	—	5968184
	52		0.0635	7/8		1.7/8		12	—	5998032	—
		1.70	0.0669		20		43	10	—	—	5968188
	51		0.0670	1"		2"		12	—	5998028	—
	50		0.0700	1"		2"		12	—	5998024	—
		1.80	0.0709		22		46	10	—	—	5968192
	49		0.0730	1"		2"		12	—	5998015	—
		1.90	0.0748		22		46	10	—	—	5968196
	48		0.0760	1"		2"		12	—	5998012	—
5/64			0.0781	1"		2"		12	5998406	—	—
5/64			0.0781		24		49	10	—	—	5968398
	47		0.0785	1"		2"		12	—	5998008	—
		2.00	0.0787		24		49	10	—	—	5968295
	46		0.0810	1.1/8		2.1/8		12	—	5998000	—
	45		0.0820	1.1/8		2.1/8		12	—	5997997	—
		2.10	0.0827		24		49	10	—	—	5968302
	44		0.0860	1.1/8		2.1/8		12	—	5997994	—
		2.20	0.0866		27		53	10	—	—	5968307
	43		0.0890	1.1/4		2.1/4		12	—	5997991	—
		2.30	0.0906		27		53	10	—	—	5968311
	42		0.0935	1.1/4		2.1/4		12	—	5997988	—
3/32			0.0938	1.1/4		2.1/4		12	5998382	—	—
3/32			0.0938		30		57	10	—	—	5968314
		2.40	0.0945		30		57	10	—	—	5968315
	41		0.0960	1.3/8		2.3/8		12	—	5997985	—
	40		0.0980	1.3/8		2.3/8		12	—	5997982	—
		2.50	0.0984		30		57	10	—	—	5968318
	39		0.0995	1.3/8		2.3/8		12	—	5997978	—
	38		0.1015	1.7/16		2.1/2		12	—	5997975	—
		2.60	0.1024		30		57	10	—	—	5968328
	37		0.1040	1.7/16		2.1/2		12	—	5998135	—
		2.70	0.1063		33		61	10	—	—	5968280
	36		0.1065	1.7/16		2.1/2		12	—	5998131	—
7/64			0.1094	1.1/2		2.5/8		12	5998422	—	—
7/64			0.1094		33		61	10	—	—	5968179
	35		0.1100	1.1/2		2.5/8		12	—	5998127	—
		2.80	0.1102		33		61	10	—	—	5968341
	34		0.1110	1.1/2		2.5/8		12	—	5998123	—
	33		0.1130	1.1/2		2.5/8		12	—	5998116	—
		2.90	0.1142		33		61	10	—	—	5968376
	32		0.1160	1.5/8		2.3/4		12	—	5998081	—
		3.00	0.1181		33		61	10	—	—	5968400
	31		0.1200	1.5/8		2.3/4		12	—	5998047	—
		3.10	0.1220		36		65	10	—	—	5968423
1/8			0.1250	1.5/8		2.3/4		12	5998358	—	—
1/8			0.1250		36		65	10	—	—	5968209
		3.20	0.1260		36		65	10	—	—	5968427
	30		0.1285	1.5/8		2.3/4		12	—	5998004	—
		3.30	0.1299		36		65	10	—	—	5968428
		3.40	0.1339		39		70	10	—	—	5968430
	29		0.1360	1.3/4		2.7/8		12	—	5998265	—
		3.50	0.1378		39		70	10	—	—	5968433
	28		0.1405	1.3/4		2.7/8		12	—	5998257	—
9/64			0.1406	1.3/4		2.7/8		12	5998430	—	—
9/64			0.1406		39		70	10	—	—	5968256
		3.60	0.1417		39		70	10	—	—	5968289
	27		0.1440	1.7/8		3"		12	—	5998253	—
		3.70	0.1457		39		70	10	—	—	5968294
	26		0.1470	1.7/8		3"		12	—	5998249	—
	25		0.1495	1.7/8		3"		12	—	5998245	—
		3.80	0.1496		43		75	10	—	—	5968299

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø mm	d ₁ decimal Inch	l ₂ Inch	l ₂ mm	l ₁ Inch	l ₁ mm	Pack Qty	R10H	R18H	A108
	24		0.1520	2"		3.1/8		12	—	5998242	—
		3.90	0.1535		43		75	10	—	—	5968304
	23		0.1540	2"		3.1/8		12	—	5998239	—
5/32			0.1563	2"		3.1/8		12	5998402	—	—
5/32			0.1563		43		75	10	—	—	5968396
	22		0.1570	2"		3.1/8		12	—	5998236	—
		4.00	0.1575		43		75	10	—	—	5968322
	21		0.1590	2.1/8		3.1/4		12	—	5998233	—
	20		0.1610	2.1/8		3.1/4		12	—	5998229	—
		4.10	0.1614		43		75	10	—	—	5968331
		4.20	0.1654		43		75	10	—	—	5968336
	19		0.1660	2.1/8		3.1/4		12	—	5998221	—
		4.30	0.1693		47		80	10	—	—	5968346
	18		0.1695	2.1/8		3.1/4		12	—	5998219	—
11/64			0.1719	2.1/8		3.1/4		12	5998364	—	—
11/64			0.1719		47		80	10	—	—	5968238
	17		0.1730	2.3/16		3.3/8		12	—	5998216	—
		4.40	0.1732		47		80	10	—	—	5968350
	16		0.1770	2.3/16		3.3/8		12	—	5998214	—
		4.50	0.1772		47		80	10	—	—	5968353
	15		0.1800	2.3/16		3.3/8		12	—	5998212	—
		4.60	0.1811		47		80	10	—	—	5968357
	14		0.1820	2.3/16		3.3/8		12	—	5998210	—
	13		0.1850	2.5/16		3.1/2		12	—	5998208	—
		4.70	0.1850		47		80	10	—	—	5968360
3/16			0.1875	2.5/16		3.1/2		12	5998378	—	—
3/16			0.1875		52		86	10	—	—	5968310
	12		0.1890	2.5/16		3.1/2		12	—	5998206	—
		4.80	0.1890		52		86	10	—	—	5968363
	11		0.1910	2.5/16		3.1/2		12	—	5998204	—
		4.90	0.1929		52		86	10	—	—	5968366
	10		0.1935	2.7/16		3.5/8		12	—	5998202	—
	10		0.1935		52		86	10	—	—	6305901
	9		0.1960	2.7/16		3.5/8		12	—	5998447	—
		5.00	0.1969		52		86	10	—	—	5968369
	8		0.1990	2.7/16		3.5/8		12	—	5998440	—
		5.10	0.2008		52		86	10	—	—	5968371
	7		0.2010	2.7/16		3.5/8		12	—	5998100	—
13/64			0.2031	2.7/16		3.5/8		12	5998369	—	—
13/64			0.2031		52		86	10	—	—	5968266
	6		0.2040	2.1/2		3.3/4		12	—	5998063	—
		5.20	0.2047		52		86	10	—	—	5968374
	5		0.2055	2.1/2		3.3/4		12	—	5998019	—
		5.30	0.2087		52		86	10	—	—	5968379
	4		0.2090	2.1/2		3.3/4		12	—	5997980	—
		5.40	0.2126		57		93	10	—	—	5968382
	3		0.2130	2.1/2		3.3/4		12	—	5997970	—
		5.50	0.2165		57		93	10	—	—	5968384
7/32			0.2188	2.1/2		3.3/4		12	5998419	—	—
7/32			0.2188					10	—	—	5968175
		5.60	0.2205		57		93	10	—	—	5968386
	2		0.2210	2.5/8		3.7/8		12	—	5998226	—
		5.70	0.2244		57		93	10	—	—	5968388
	1		0.2280	2.5/8		3.7/8		12	—	5998197	—
		5.80	0.2283		57		93	10	—	—	5968390
		5.90	0.2323		57		93	10	—	—	5968392
15/64			0.2344	2.5/8		3.7/8		12	5998451	—	—
15/64			0.2344		57		93	10	—	—	6305902
		6.00	0.2362		57		93	10	—	—	5968402
		6.10	0.2402		63		101	10	—	—	5968405
		6.20	0.2441		63		101	10	—	—	5968406
		6.30	0.2480		63		101	10	—	—	5968409
1/4			0.2500	2.3/4		4"		12	5998356	—	—
1/4			0.2500		63		101	10	—	—	5968206
		6.40	0.2520		63		101	10	—	—	5968411

d ₁ Inch	d ₁ Ø Nr.	d ₁ Ø mm	d ₁ decimal Inch	l ₂ Inch	l ₂ mm	l ₁ Inch	l ₁ mm	Pack Qty	R10H	R18H	A108
		6.50	0.2559		63		101	10	—	—	5968412
		6.60	0.2598		63		101	10	—	—	5968414
		6.70	0.2638		63		101	10	—	—	5968417
17/64			0.2656	2.7/8		4.1/8		12	5998476	—	—
17/64			0.2656		69		109	10	—	—	6305903
		6.80	0.2677		69		109	10	—	—	5968419
		6.90	0.2717		69		109	10	—	—	5968421
		7.00	0.2756		69		109	10	—	—	5968425
		7.10	0.2795		69		109	10	—	—	5968167
9/32			0.2813	2.15/16		4.1/4		12	5998426	—	—
9/32			0.2813		69		109	10	—	—	5968253
		7.20	0.2835		69		109	10	—	—	5968208
		7.30	0.2874		69		109	10	—	—	5968239
		7.40	0.2913		69		109	10	—	—	5968278
		7.50	0.2953		69		109	10	—	—	5968330
19/64			0.2969	3.1/16		4.3/8		12	5998512	—	—
19/64			0.2969		75		117	10	—	—	6305904
		7.60	0.2992		75		117	10	—	—	5968340
		7.70	0.3031		75		117	10	—	—	5968345
		7.80	0.3071		75		117	10	—	—	5968349
		7.90	0.3110		75		117	10	—	—	5968354
5/16			0.3125	3.3/16		4.1/2		6	5998398	—	—
5/16			0.3125		75		117	10	—	—	5968394
		8.00	0.3150		75		117	10	—	—	5968182
		8.10	0.3189		75		117	10	—	—	5968187
		8.20	0.3228		75		117	10	—	—	5968191
		8.30	0.3268		75		117	10	—	—	5968195
21/64			0.3281	3.5/16		4.5/8		6	5998520	—	—
21/64			0.3281		75		117	10	—	—	6305905
		8.40	0.3307		75		117	10	—	—	5968199
		8.50	0.3346		75		117	10	—	—	5968202
		8.60	0.3386		81		125	10	—	—	5968205
		8.70	0.3425		81		125	10	—	—	5968211
11/32			0.3437	3.7/16		4.3/4		6	5998361	—	—
11/32			0.3437		81		125	10	—	—	5968235
		8.80	0.3465		81		125	10	—	—	5968214
		8.90	0.3504		81		125	10	—	—	5968216
		9.00	0.3543		81		125	10	—	—	5968219
		9.10	0.3583		81		125	10	—	—	5968221
23/64			0.3594	3.1/2		4.7/8		6	5998524	—	—
23/64			0.3594		81		125	10	—	—	6305906
		9.20	0.3622		81		125	10	—	—	5968224
		9.30	0.3661		81		125	10	—	—	5968227
		9.40	0.3701		81		125	10	—	—	5968230
		9.50	0.3740		81		125	10	—	—	5968233
3/8			0.3750	3.5/8		5"		6	5998391	—	—
3/8			0.3750		87		133	10	—	—	5968317
		9.60	0.3780		87		133	10	—	—	5968236
		9.70	0.3819		87		133	10	—	—	5968242
		9.80	0.3858		87		133	10	—	—	5968245
		9.90	0.3898		87		133	10	—	—	5968250
25/64			0.3906	3.3/4		5.1/8		6	5998529	—	—
25/64			0.3906		87		133	10	—	—	6305907
		10.00	0.3937		87		133	10	—	—	5968213
		10.20	0.4016		87		133	5	—	—	5968217
13/32			0.4063	3.7/8		5.1/4		6	5998371	—	—
13/32			0.4063		87		133	5	—	—	5968263
		10.50	0.4134		87		133	5	—	—	5968220
27/64			0.4219	3.15/16		5.3/8		6	5998534	—	—
27/64			0.4219		94		142	5	—	—	6305908
		10.80	0.4252		94		142	5	—	—	5968223
		11.00	0.4331		94		142	5	—	—	5968226
7/16			0.4375	4.1/16		5.1/2		6	5998410	—	—
7/16			0.4375		94		142	5	—	—	5968172
		11.50	0.4528		94		142	5	—	—	5968229

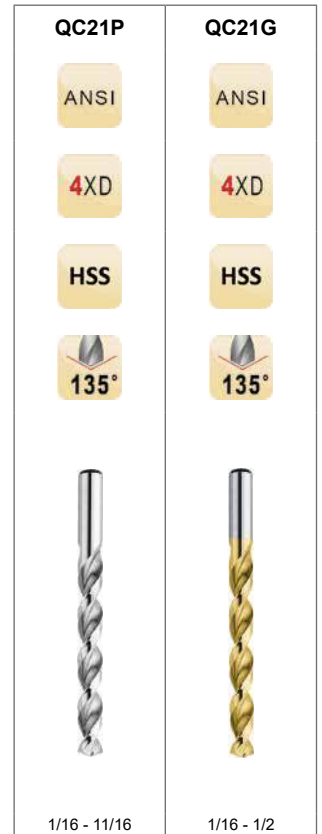
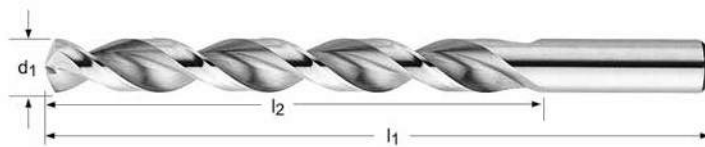
d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø mm	d ₁ decimal Inch	l ₂ Inch	l ₂ mm	l ₁ Inch	l ₁ mm	Pack Qty	R10H	R18H	A108
29/64			0.4531	4.3/16		5.5/8		6	5998374	—	—
29/64			0.4531		94		142	5	—	—	6305909
		11.80	0.4646		94		142	5	—	—	5968232
15/32			0.4687	4.5/16		5.3/4		6	5998415	—	—
15/32			0.4687		101		151	5	—	—	5968285
		12.00	0.4724		101		151	5	—	—	5968241
31/64			0.4844	4.3/8		5.7/8		6	5998394	—	—
31/64			0.4844		101		151	5	—	—	6305920
		12.50	0.4921		101		151	5	—	—	5968248
1/2			0.5000	4.1/2		6		5	5967881	—	—
1/2			0.5000		101		151	5	—	—	5968203
		12.80	0.5039		101		151	5	—	—	5968251
		12.90	0.5079		101		151	5	—	—	5968254
		13.00	0.5118		101		151	5	—	—	5968257
		13.50	0.5315		108		160	5	—	—	5968260
		14.00	0.5512		108		160	5	—	—	5968269
		14.50	0.5709		114		169	1	—	—	5968271
		15.00	0.5906		114		169	1	—	—	5968273
		15.25	0.6004		120		178	1	—	—	5968279
		15.50	0.6102		120		178	1	—	—	5968283
		16.00	0.6299		120		178	1	—	—	5968290

General Purpose Jobber Length Parabolic Flute

Heavy-Duty Parabolic Flute design for efficient chip removal.
Allows greater drilling depths in one pass. Low thrust design
self centering Split Point for easier penetration.

QC21P Bright Finish improves chip flow in soft or non-ferrous materials.

QC21G TiN Coating increases wear resistance and improves tool life.



d ₁ Ø " / Nr./letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	QC21P	QC21G
1/16	0.0625	7/8	1.7/8	12	5997086	5996259
52	0.0635	7/8	1.7/8	12	5997021	5996240
51	0.0670	1"	2"	12	5997017	5996237
50	0.0700	1"	2"	12	5997013	5996405
49	0.0730	1"	2"	12	5997008	5996396
48	0.0760	1"	2"	12	5997005	5996392
5/64	0.0781	1"	2"	12	5996799	5996341
47	0.0785	1"	2"	12	5997002	5996384
46	0.0810	1.1/8	2.1/8	12	5996999	5996344
45	0.0820	1.1/8	2.1/8	12	5997179	5996311
44	0.0860	1.1/8	2.1/8	12	5997175	5996272
43	0.0890	1.1/4	2.1/4	12	5997170	5996233
42	0.0935	1.1/4	2.1/4	12	5997166	5996301
3/32	0.0938	1.1/4	2.1/4	12	5996944	5996327
41	0.0960	1.3/8	2.3/8	12	5997155	5996294
40	0.0980	1.3/8	2.3/8	12	5997108	5996291
39	0.0995	1.3/8	2.3/8	12	5997032	5996281
38	0.1015	1.7/16	2.1/2	12	5996993	5996277
37	0.1040	1.7/16	2.1/2	12	5997040	5996273
36	0.1065	1.7/16	2.1/2	12	5997033	5996268
7/64	0.1094	1.1/2	2.5/8	12	5996818	5996353
35	0.1100	1.1/2	2.5/8	12	5997029	5996264
34	0.1110	1.1/2	2.5/8	12	5997025	5996261
33	0.1130	1.1/2	2.5/8	12	5997020	5996257
32	0.1160	1.5/8	2.3/4	12	5997016	5996250
31	0.1200	1.5/8	2.3/4	12	5997014	5996246
1/8	0.1250	1.5/8	2.3/4	12	5997097	5996269
30	0.1285	1.5/8	2.3/4	12	5997010	5996243
29	0.1360	1.3/4	2.7/8	12	5997004	5996235
28	0.1405	1.3/4	2.7/8	12	5997000	5996232
9/64	0.1406	1.3/4	2.7/8	12	5996829	5996360
27	0.1440	1.7/8	3"	12	5996995	5996229
26	0.1470	1.7/8	3"	12	5996992	5996227

JOBBER DRILL



d ₁ Ø "/Nr./letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	QC21P	QC21G
25	0.1495	1.7/8	3"	12	5996990	5996225
24	0.1520	2"	3.1/8	12	5996988	5996223
23	0.1540	2"	3.1/8	12	5996986	5996219
5/32	0.1563	2"	3.1/8	12	5996795	5996338
22	0.1570	2"	3.1/8	12	5996984	5996217
21	0.1590	2.1/8	3.1/4	12	5996982	5996216
20	0.1610	2.1/8	3.1/4	12	5996980	5996213
19	0.1660	2.1/8	3.1/4	12	5996976	5996210
18	0.1695	2.1/8	3.1/4	12	5996972	5996208
11/64	0.1719	2.1/8	3.1/4	12	5997112	5996279
17	0.1730	2.3/16	3.3/8	12	5996970	5996206
16	0.1770	2.3/16	3.3/8	12	5996968	5996204
15	0.1800	2.3/16	3.3/8	12	5996966	5996202
14	0.1820	2.3/16	3.3/8	12	5996964	5996198
13	0.1850	2.5/16	3.1/2	12	5996962	5996196
3/16	0.1875	2.5/16	3.1/2	12	5996938	5996325
12	0.1890	2.5/16	3.1/2	12	5996960	5996194
11	0.1910	2.5/16	3.1/2	12	5996958	5996192
10	0.1935	2.7/16	3.5/8	12	5996955	5996190
9	0.1960	2.7/16	3.5/8	12	5997039	5996255
8	0.1990	2.7/16	3.5/8	12	5997035	5996252
7	0.2010	2.7/16	3.5/8	12	5997028	5996248
13/64	0.2031	2.7/16	3.5/8	12	5997120	5996287
6	0.2040	2.1/2	3.3/4	12	5997024	5996244
5	0.2055	2.1/2	3.3/4	12	5997011	5996401
4	0.2090	2.1/2	3.3/4	12	5997071	5996285
3	0.2130	2.1/2	3.3/4	12	5997006	5996239
7/32	0.2188	2.1/2	3.3/4	12	5996814	5996351
2	0.2210	2.5/8	3.7/8	12	5996978	5996211
1	0.2280	2.5/8	3.7/8	12	5996952	5996187
A	0.2340	2.5/8	3.7/8	12	5996520	—
15/64	0.2344	2.5/8	3.7/8	12	5997128	5996293
B	0.2374	2.3/4	4"	12	5996524	—
C	0.2421	2.3/4	4"	12	5996531	—
D	0.2461	2.3/4	4"	12	5996535	—
1/4	0.2500	2.3/4	4"	12	5997093	5996265
F	0.2571	2.7/8	4.1/8	12	5996543	—
G	0.2610	2.7/8	4.1/8	12	5996547	—
17/64	0.2656	2.7/8	4.1/8	12	5997134	5996296
H	0.2661	2.7/8	4.1/8	12	5996551	—
I	0.2720	2.7/8	4.1/8	12	5996555	—
J	0.2772	2.7/8	4.1/8	12	5996559	—
K	0.2811	2.15/16	4.1/4	12	5996563	—
9/32	0.2813	2.15/16	4.1/4	12	5996825	5996357
L	0.2902	2.15/16	4.1/4	12	5996566	—
M	0.2949	3.1/16	4.3/8	12	5996571	—
19/64	0.2969	3.1/16	4.3/8	12	5997147	5996300
N	0.3020	3.1/16	4.3/8	12	5996946	—
5/16	0.3125	3.3/16	4.1/2	6	5996792	5996336
O	0.3161	3.3/16	4.1/2	6	5997043	—
P	0.3228	3.5/16	4.5/8	6	5997047	—
21/64	0.3281	3.5/16	4.5/8	6	5997161	5996304
Q	0.3319	3.7/16	4.3/4	6	5997051	—
R	0.3390	3.7/16	4.3/4	6	5997055	—
11/32	0.3437	3.7/16	4.3/4	6	5997105	5996276
S	0.3480	3.1/2	4.7/8	6	5997059	—
T	0.3580	3.1/2	4.7/8	6	5997062	—
23/64	0.3594	3.1/2	4.7/8	6	5996766	5996308
U	0.3680	3.5/8	5"	6	5997065	—
3/8	0.3750	3.5/8	5"	6	5996947	5996330
V	0.3772	3.5/8	5"	6	5997068	—
W	0.3858	3.3/4	5.1/8	6	5997074	—
25/64	0.3906	3.3/4	5.1/8	6	5996811	5996315
X	0.3969	3.3/4	5.1/8	6	5997077	—
Y	0.4039	3.7/8	5.1/4	6	5997080	—
13/32	0.4063	3.7/8	5.1/4	6	5997116	5996283

d ₁ Ø "/Nr./letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	QC21P	QC21G
Z	0.4130	3.7/8	5.1/4	6	5997083	—
27/64	0.4219	3.15/16	5.3/8	6	5996848	5996319
7/16	0.4375	4.1/16	5.1/2	6	5996806	5996347
29/64	0.4531	4.3/16	5.5/8	6	5996893	5996322
15/32	0.4687	4.5/16	5.3/4	6	5997124	5996289
31/64	0.4844	4.3/8	5.7/8	6	5996950	5996333
1/2	0.5000	4.1/2	6"	6	5997090	5996263
33/64	0.5156	4.13/16	6.5/8	1	5996953	—
17/32	0.5313	4.13/16	6.5/8	1	5997131	—
35/64	0.5469	4.13/16	6.5/8	1	5996771	—
9/16	0.5625	4.13/16	6.5/8	1	5996822	—
37/64	0.5781	4.13/16	6.5/8	1	5996775	—
19/32	0.5937	5.3/16	7.1/8	1	5997141	—
39/64	0.6094	5.3/16	7.1/8	1	5996778	—
5/8	0.6250	5.3/16	7.1/8	1	5996802	—
41/64	0.6406	5.3/16	7.1/8	1	5996782	—
21/32	0.6563	5.3/16	7.1/8	1	5997151	—
43/64	0.6719	5.5/8	7.5/8	1	5996787	—
11/16	0.6875	5.5/8	7.5/8	1	5997101	—

JOBBER DRILL

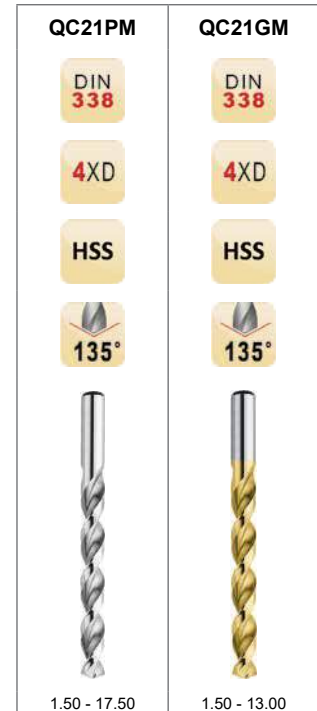
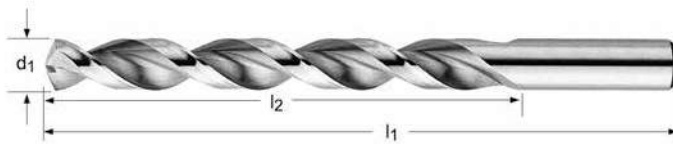


General Purpose Jobber Length Parabolic Flute, Metric

Heavy-Duty Parabolic Flute design for efficient chip removal. Allows greater drilling depths in one pass. Low thrust design self centering Split Point for easier penetration.

QC21PM Bright Finish improves chip flow in soft or non-ferrous materials.

QC21GM TiN Coating increases wear resistance and improves tool life.



d_1 Ø mm	d_1 decimal Inch	l_2 mm	l_1 mm	Pack Qty	QC21PM	QC21GM
1.50	0.0591	18	40	12	5996576	5996450
2.00	0.0787	24	49	12	5996644	5996467
2.50	0.0984	30	57	12	5996648	5996469
3.00	0.1181	33	61	12	5996655	5996471
3.50	0.1378	39	70	12	5996908	—
4.00	0.1575	43	75	12	5996949	5996475
4.50	0.1772	47	80	12	5996974	—
5.00	0.1969	52	86	12	5996997	5996479
5.20	0.2047	52	86	12	5997036	5996483
5.50	0.2165	57	93	12	5997044	5996167
5.60	0.2205	57	93	12	5997048	5996200
6.00	0.2362	57	93	12	5997052	5996221
6.50	0.2559	63	101	12	5997056	5996253
6.80	0.2677	69	109	12	5996914	5996297
7.00	0.2756	69	109	12	5996923	5996305
7.50	0.2953	69	109	12	5996926	5996309
8.00	0.3150	75	117	6	5996929	5996313
8.20	0.3228	75	117	6	5996931	5996317
8.50	0.3346	75	117	6	5996934	5996171
8.60	0.3386	81	125	6	5996937	5996174
9.00	0.3543	81	125	6	5996940	5996177
9.50	0.3740	81	125	6	5996943	5996180
10.00	0.3937	87	133	6	5996579	5996452
10.50	0.4134	87	133	6	5996582	5996454
11.00	0.4331	94	142	6	5996585	5996455
11.50	0.4528	94	142	6	5996588	—
12.00	0.4724	101	151	6	5996591	5996461
12.50	0.4921	101	151	6	5996594	5996463
13.00	0.5118	101	151	1	5996597	5996465
13.50	0.5315	108	160	1	5996601	—
14.00	0.5512	108	160	1	5996610	—
14.50	0.5709	114	169	1	5996615	—
15.00	0.5906	114	169	1	5996619	—
15.50	0.6102	120	178	1	5996623	—
16.00	0.6299	120	178	1	5996627	—
16.50	0.6496	125	184	1	5996631	—
17.00	0.6693	125	184	1	5996635	—
17.50	0.6890	130	191	1	5996640	—

Heavy Duty Jobber Length (NAS 907 Type J)

* Sets Available on pg. 234-235

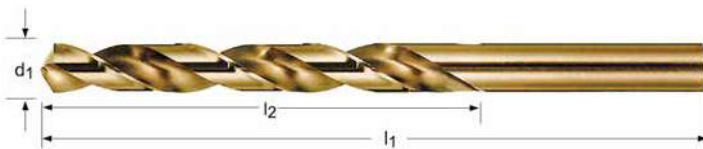
R10CO - Fractional Sizes

R18CO - Wire Gauge Sizes

R15CO - Letter Sizes

2ACO - Metric Sizes

Low thrust design self centering Split Point for easier penetration. Cobalt base material with Bronze tempered for wear resistance & lubricity. For enhanced tool life in ferrous materials



R10CO	R18CO	R15CO	2ACO
ANSI	ANSI	ANSI	DIN 338
4XD	4XD	4XD	4XD
HSS-E	HSS-E	HSS-E	HSS-E
135°	135°	135°	135°
1/64 - 11/16	N80 - N1	A - Z	1.00 - 13.00

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ Ø mm	d ₁ decimal Inch	l ₂ Inch	l ₂ mm	l ₁ Inch	l ₁ mm	Pack Qty	R10CO	R18CO	R15CO	2ACO
	80			0.0135	1/8		3/4		12	— ¹⁾	5997848	—	—
	79			0.0145	1/8		3/4		12	— ¹⁾	5997842	—	—
1/64				0.0156	3/16		3/4		12	5998146 ¹⁾	—	—	—
	78			0.0160	3/16		7/8		12	— ¹⁾	5997840	—	—
	77			0.0180	3/16		7/8		12	— ¹⁾	5997837	—	—
	76			0.0200	3/16		7/8		12	— ¹⁾	5997831	—	—
	75			0.0210	1/4		1"		12	— ¹⁾	5997828	—	—
	74			0.0225	1/4		1"		12	— ¹⁾	5997825	—	—
	73			0.0240	5/16		1.1/8		12	— ¹⁾	5997822	—	—
	72			0.0250	5/16		1.1/8		12	— ¹⁾	5997819	—	—
	71			0.0260	3/8		1.1/4		12	— ¹⁾	5997816	—	—
	70			0.0280	3/8		1.1/4		12	— ¹⁾	5997813	—	—
	69			0.0292	1/2		1.3/8		12	— ¹⁾	5997807	—	—
	68			0.0310	1/2		1.3/8		12	— ¹⁾	5997804	—	—
1/32				0.0313	1/2		1.3/8		12	5998139 ¹⁾	—	—	—
	67			0.0320	1/2		1.3/8		12	— ¹⁾	5997798	—	—
	66			0.0330	1/2		1.3/8		12	— ¹⁾	5997794	—	—
	65			0.0350	5/8		1.1/2		12	— ¹⁾	5997791	—	—
	64			0.0360	5/8		1.1/2		12	— ¹⁾	5997787	—	—
	63			0.0370	5/8		1.1/2		12	— ¹⁾	5997783	—	—
	62			0.0380	5/8		1.1/2		12	— ¹⁾	5997781	—	—
	61			0.0390	11/16		1.5/8		12	— ¹⁾	5997779	—	—
		1.00		0.0394		12		34	12	—	—	—	5999612
	60			0.0400	11/16		1.5/8		12	—	5997776	—	—
	59			0.0410	11/16		1.5/8		12	—	5997768	—	—
		1.05		0.0413		12		34	12	—	—	—	5999614
	58			0.0420	11/16		1.5/8		12	—	5997762	—	—
	57			0.0430	3/4		1.3/4		12	—	5997758	—	—
		1.10		0.0433		14		36	12	—	—	—	5999618
		1.15		0.0453		14		36	12	—	—	—	5999621
	56			0.0465	3/4		1.3/4		12	—	5997753	—	—
3/64				0.0469	3/4		1.3/4		12	5998182	—	—	—

¹⁾ No Split Point

COBALT JOBBER DRILL



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ Ø mm	d ₁ decimal Inch	l ₂ Inch	l ₂ mm	l ₁ Inch	l ₁ mm	Pack Qty	R10CO	R18CO	R15CO	2ACO
			1.20	0.0472		16		38	12	—	—	—	5999625
			1.25	0.0492		16		38	12	—	—	—	5999629
			1.30	0.0512		16		38	12	—	—	—	5999635
	55			0.0520	7/8		1.7/8		12	—	5997752	—	—
			1.35	0.0531		18		40	12	—	—	—	5999639
			1.40	0.0551		18		40	12	—	—	—	5999643
	54			0.0550	7/8		1.7/8		12	—	5997749	—	—
			1.45	0.0571		18		40	12	—	—	—	5999648
			1.50	0.0591		18		40	12	—	—	—	5999652
	53			0.0595	7/8		1.7/8		12	—	5997745	—	—
			1.55	0.0610		20		43	12	—	—	—	5999656
1/16				0.0625	7/8		1.7/8		12	5998132	—	—	—
			1.60	0.0630		20		43	12	—	—	—	5999660
	52			0.0635	7/8		1.7/8		12	—	5997743	—	—
			1.65	0.0650		20		43	12	—	—	—	5999666
			1.70	0.0669		20		43	12	—	—	—	5999671
	51			0.0670	1"		2"		12	—	5997740	—	—
			1.75	0.0689		22		46	12	—	—	—	5999674
	50			0.0700	1"		2"		12	—	5997737	—	—
			1.80	0.0709		22		46	12	—	—	—	5999682
			1.85	0.0728		22		46	12	—	—	—	5999686
	49			0.0730	1"		2"		12	—	5997888	—	—
			1.90	0.0748		22		46	12	—	—	—	5999689
	48			0.0760	1"		2"		12	—	5997883	—	—
			1.95	0.0768		24		49	12	—	—	—	5999694
5/64				0.0781	1"		2"		12	5998215	—	—	—
	47			0.0785	1"		2"		12	—	5997879	—	—
			2.00	0.0787		24		49	12	—	—	—	6000762
			2.05	0.0807		24		49	12	—	—	—	6000766
	46			0.0810	1.1/8		2.1/8		12	—	5997875	—	—
	45			0.0820	1.1/8		2.1/8		12	—	5997868	—	—
			2.10	0.0827		24		49	12	—	—	—	6000771
	44			0.0860	1.1/8		2.1/8		12	—	5997835	—	—
			2.20	0.0866		27		53	12	—	—	—	6000776
	43			0.0890	1.1/4		2.1/4		12	—	5997802	—	—
			2.30	0.0906		27		53	12	—	—	—	6000622
			2.35	0.0925		27		53	12	—	—	—	6000627
	42			0.0935	1.1/4		2.1/4		12	—	5997764	—	—
3/32				0.0938	1.1/4		2.1/4		12	5998179	—	—	—
			2.40	0.0945		30		57	12	—	—	—	6000632
	41			0.0960	1.3/8		2.3/8		12	—	5997730	—	—
	40			0.0980	1.3/8		2.3/8		12	—	5997784	—	—
			2.50	0.0984		30		57	12	—	—	—	6000639
	39			0.0995	1.3/8		2.3/8		12	—	5997772	—	—
	38			0.1015	1.7/16		2.1/2		12	—	5997770	—	—
			2.60	0.1024		30		57	12	—	—	—	6000642
	37			0.1040	1.7/16		2.1/2		12	—	5997767	—	—
			2.70	0.1063		33		61	12	—	—	—	6000646
	36			0.1065	1.7/16		2.1/2		12	—	5997763	—	—
7/64				0.1094	1.1/2		2.5/8		12	5998225	—	—	—
	35			0.1100	1.1/2		2.5/8		12	—	5997759	—	—
			2.80	0.1102		33		61	12	—	—	—	6000650
	34			0.1110	1.1/2		2.5/8		12	—	5997755	—	—
	33			0.1130	1.1/2		2.5/8		12	—	5997751	—	—
			2.90	0.1142		33		61	12	—	—	—	6000654
	32			0.1160	1.5/8		2.3/4		12	—	5997748	—	—
			3.00	0.1181		33		61	12	—	—	—	6000658
	31			0.1200	1.5/8		2.3/4		12	—	5997746	—	—
			3.10	0.1220		36		65	12	—	—	—	6000662
1/8				0.1250	1.5/8		2.3/4		12	5998150	—	—	—
			3.20	0.1260		36		65	12	—	—	—	6000669
			3.25	0.1280		36		65	12	—	—	—	6000673
	30			0.1285	1.5/8		2.3/4		12	—	5997736	—	—
			3.30	0.1299		36		65	12	—	—	—	6000676
			3.40	0.1339		39		70	12	—	—	—	6000680
	29			0.1360	1.3/4		2.7/8		12	—	5997731	—	—

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ Ø mm	d ₁ decimal Inch	l ₂ Inch	l ₂ mm	l ₁ Inch	l ₁ mm	Pack Qty	R10CO	R18CO	R15CO	2ACO
			3.50	0.1378		39		70	12	—	—	—	6000684
	28			0.1405	1.3/4		2.7/8		12	—	5997729	—	—
9/64				0.1406	1.3/4		2.7/8		12	5998234	—	—	—
			3.60	0.1417		39		70	12	—	—	—	6000688
	27			0.1440	1.7/8		3"		12	—	5997727	—	—
			3.70	0.1457		39		70	12	—	—	—	6000692
	26			0.1470	1.7/8		3"		12	—	5997725	—	—
			3.75	0.1476		39		70	12	—	—	—	6000695
			3.80	0.1496		43		75	12	—	—	—	6000698
	25			0.1495	1.7/8		3"		12	—	5997723	—	—
	24			0.1520	2"		3.1/8		12	—	5997721	—	—
	23			0.1540	2"		3.1/8		12	—	5997719	—	—
5/32				0.1563	2"		3.1/8		12	5998211	—	—	—
	22			0.1570	2"		3.1/8		12	—	5997717	—	—
			4.00	0.1575		43		75	12	—	—	—	6000701
	21			0.1590	2.1/8		3.1/4		12	—	5997713	—	—
	20			0.1610	2.1/8		3.1/4		12	—	5997711	—	—
			4.10	0.1614		43		75	12	—	—	—	6000706
			4.20	0.1654		43		75	12	—	—	—	6000708
	19			0.1660	2.1/8		3.1/4		12	—	5997706	—	—
			4.25	0.1673		43		75	12	—	—	—	6000710
			4.30	0.1693		47		80	12	—	—	—	6000712
	18			0.1695	2.1/8		3.1/4		12	—	5997703	—	—
11/64				0.1719	2.1/8		3.1/4		12	5998185	—	—	—
	17			0.1730	2.3/16		3.3/8		12	—	5997700	—	—
			4.40	0.1732		47		80	12	—	—	—	6000714
			4.50	0.1772		47		80	12	—	—	—	6000717
	16			0.1770	2.3/16		3.3/8		12	—	5997697	—	—
	15			0.1800	2.3/16		3.3/8		12	—	5997695	—	—
	14			0.1820	2.3/16		3.3/8		12	—	5997692	—	—
			4.70	0.1850		47		80	12	—	—	—	6000720
	13			0.1850	2.5/16		3.1/2		12	—	5997689	—	—
3/16				0.1875	2.5/16		3.1/2		12	5998176	—	—	—
			4.80	0.1890		52		86	12	—	—	—	6000723
	12			0.1890	2.5/16		3.1/2		12	—	5997683	—	—
	11			0.1910	2.5/16		3.1/2		12	—	5997680	—	—
	10			0.1935	2.7/16		3.5/8		12	—	5997678	—	—
	9			0.1960	2.7/16		3.5/8		12	—	5997851	—	—
			5.00	0.1969		52		86	12	—	—	—	6000726
	8			0.1990	2.7/16		3.5/8		12	—	5997845	—	—
			5.10	0.2008		52		86	12	—	—	—	6000729
	7			0.2010	2.7/16		3.5/8		12	—	5997810	—	—
13/64				0.2031	2.7/16		3.5/8		12	5998243	—	—	—
	6			0.2040	2.1/2		3.3/4		12	—	5997773	—	—
			5.20	0.2047		52		86	12	—	—	—	6000733
	5			0.2055	2.1/2		3.3/4		12	—	5997735	—	—
			5.25	0.2067		52		86	12	—	—	—	6000735
			5.30	0.2087		52		86	12	—	—	—	6000737
	4			0.2090	2.1/2		3.3/4		12	—	5997775	—	—
	3			0.2130	2.1/2		3.3/4		12	—	5997733	—	—
			5.50	0.2165		57		93	12	—	—	—	6000739
7/32				0.2188	2.1/2		3.3/4		12	5998222	—	—	—
			5.60	0.2205		57		93	12	—	—	—	6000741
	2			0.2210	2.5/8		3.7/8		12	—	5997709	—	—
			5.70	0.2244		57		93	12	—	—	—	6000743
	1			0.2280	2.5/8		3.7/8		12	—	5997674	—	—
			5.90	0.2323		57		93	12	—	—	—	6000745
	A			0.2340	2.5/8		3.7/8		12	—	—	5998992	—
15/64				0.2344	2.5/8		3.7/8		12	5998294	—	—	—
			6.00	0.2362		57		93	12	—	—	—	6000748
	B			0.2374	2.3/4		4"		12	—	—	5998995	—
			6.10	0.2402		63		101	12	—	—	—	6000750
	C			0.2421	2.3/4		4"		12	—	—	5998999	—
			6.20	0.2441		63		101	12	—	—	—	6000753
	D			0.2461	2.3/4		4"		12	—	—	5999003	—
			6.30	0.2480		63		101	12	—	—	—	6000759

COBALT JOBBER DRILL



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ Ø mm	d ₁ decimal Inch	l ₂ Inch	l ₂ mm	l ₁ Inch	l ₁ mm	Pack Qty	R10CO	R18CO	R15CO	2ACO
1/4		E		0.2500	2.3/4		4"		12	5998143	—	—	—
			6.40	0.2520		63		101	12	—	—	—	6000538
			6.50	0.2559		63		101	12	—	—	—	6000570
		F		0.2571	2.7/8		4.1/8		12	—	—	5999011	—
			6.60	0.2598		63		101	12	—	—	—	6000601
		G		0.2610	2.7/8		4.1/8		12	—	—	5999019	—
			6.70	0.2638		63		101	12	—	—	—	6000643
17/64				0.2656	2.7/8		4.1/8		12	5998301	—	—	—
		H		0.2661	2.7/8		4.1/8		12	—	—	5999022	—
			6.80	0.2677		69		109	12	—	—	—	6000685
			6.90	0.2717		69		109	12	—	—	—	6000693
		I		0.2720	2.7/8		4.1/8		12	—	—	5999025	—
			7.00	0.2756		69		109	12	—	—	—	6000696
		J		0.2772	2.7/8		4.1/8		12	—	—	5999029	—
			7.10	0.2795		69		109	12	—	—	—	6000699
		K		0.2811	2.15/16		4.1/4		12	—	—	5999033	—
9/32				0.2813	2.15/16		4.1/4		12	5998231	—	—	—
			7.20	0.2835		69		109	12	—	—	—	6000702
			7.25	0.2854		69		109	12	—	—	—	6000542
			7.30	0.2874		69		109	12	—	—	—	6000545
		L		0.2902	2.15/16		4.1/4		12	—	—	5999036	—
		M		0.2949	3.1/16		4.3/8		12	—	—	5999040	—
			7.50	0.2953		69		109	12	—	—	—	6000548
19/64				0.2969	3.1/16		4.3/8		12	5998148	—	—	—
		N		0.3020	3.1/16		4.3/8		12	—	—	5999044	—
			7.80	0.3071		75		117	12	—	—	—	6000551
			7.90	0.3110		75		117	12	—	—	—	6000553
5/16				0.3125	3.3/16		4.1/2		6	5998209	—	—	—
			8.00	0.3150		75		117	6	—	—	—	6000556
		O		0.3161	3.3/16		4.1/2		6	—	—	5999048	—
			8.20	0.3228		75		117	6	—	—	—	6000559
		P		0.3228	3.5/16		4.5/8		6	—	—	5999051	—
21/64				0.3281	3.5/16		4.5/8		6	5998156	—	—	—
			8.40	0.3307		75		117	6	—	—	—	6000562
		Q		0.3319	3.7/16		4.3/4		6	—	—	5999059	—
			8.50	0.3346		75		117	6	—	—	—	6000564
		R		0.3390	3.7/16		4.3/4		6	—	—	5999063	—
11/32				0.3437	3.7/16		4.3/4		6	5998141	—	—	—
			8.80	0.3465		81		125	6	—	—	—	6000567
		S		0.3480	3.1/2		4.7/8		6	—	—	5999066	—
			8.90	0.3504		81		125	6	—	—	—	6000573
			9.00	0.3543		81		125	6	—	—	—	6000576
		T		0.3580	3.1/2		4.7/8		6	—	—	5999069	—
			9.10	0.3583		81		125	6	—	—	—	6000577
23/64				0.3594	3.1/2		4.7/8		6	5998160	—	—	—
			9.20	0.3622		81		125	6	—	—	—	6000581
			9.30	0.3661		81		125	6	—	—	—	6000583
		U		0.3680	3.5/8		5"		6	—	—	5999072	—
			9.40	0.3701		81		125	6	—	—	—	6000586
			9.50	0.3740		81		125	6	—	—	—	6000589
3/8				0.3750	3.5/8		5"		6	5998188	—	—	—
		V		0.3772	3.5/8		5"		6	—	—	5999075	—
			9.60	0.3780		87		133	6	—	—	—	6000592
			9.70	0.3819		87		133	6	—	—	—	6000595
			9.80	0.3858		87		133	6	—	—	—	6000598
		W		0.3858	3.3/4		5.1/8		6	—	—	5999078	—
25/64				0.3906	3.3/4		5.1/8		6	5998164	—	—	—
			10.00	0.3937		87		133	6	—	—	—	5999696
		X		0.3969	3.3/4		5.1/8		6	—	—	5999081	—
			10.20	0.4016		87		133	6	—	—	—	5999699
		Y		0.4039	3.7/8		5.1/4		6	—	—	5999084	—
13/32				0.4063	3.7/8		5.1/4		6	5998213	—	—	—
		Z		0.4130	3.7/8		5.1/4		6	—	—	5999087	—
			10.50	0.4134		87		133	6	—	—	—	5999705
27/64				0.4219	3.15/16		5.3/8		6	5998168	—	—	—
			10.80	0.4252		94		142	6	—	—	—	5999708

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ Ø mm	d ₁ decimal Inch	l ₂ Inch	l ₂ mm	l ₁ Inch	l ₁ mm	Pack Qty	R10CO	R18CO	R15CO	2ACO
			11.00	0.4331		94		142	6	—	—	—	5999711
7/16				0.4375	4.1/16		5.1/2		6	5998220	—	—	—
			11.20	0.4409		94		142	6	—	—	—	5999714
			11.50	0.4528		94		142	6	—	—	—	5999721
29/64				0.4531	4.3/16		5.5/8		6	5998172	—	—	—
			11.80	0.4646		94		142	6	—	—	—	6000617
15/32				0.4687	4.5/16		5.3/4		6	5998286	—	—	—
			12.00	0.4724		101		151	6	—	—	—	6000665
			12.20	0.4803		101		151	6	—	—	—	6000704
31/64				0.4844	4.3/8		5.7/8		6	5998191	—	—	—
			12.50	0.4921		101		151	6	—	—	—	6000731
1/2				0.5000	4.1/2		6"		6	5998136	—	—	—
			13.00	0.5118		101		151	1	—	—	—	6000756
33/64				0.5156	4.13/16		6.5/8		1	5998195	—	—	—
17/32				0.5313	4.13/16		6.5/8		1	5998298	—	—	—
35/64				0.5469	4.13/16		6.5/8		1	5998198	—	—	—
9/16				0.5625	4.13/16		6.5/8		1	5998228	—	—	—
37/64				0.5781	4.13/16		6.5/8		1	5998201	—	—	—
19/32				0.5937	5.3/16		7.1/8		1	5998305	—	—	—
39/64				0.6094	5.3/16		7.1/8		1	5998203	—	—	—
5/8				0.6250	5.3/16		7.1/8		1	5998217	—	—	—
41/64				0.6406	5.3/16		7.1/8		1	5998205	—	—	—
21/32				0.6563	5.3/16		7.1/8		1	5998152	—	—	—
43/64				0.6719	5.5/8		7.5/8		1	5998207	—	—	—
11/16				0.6875	5.5/8		7.5/8		1	5998158	—	—	—

COBALT JOBBER DRILL

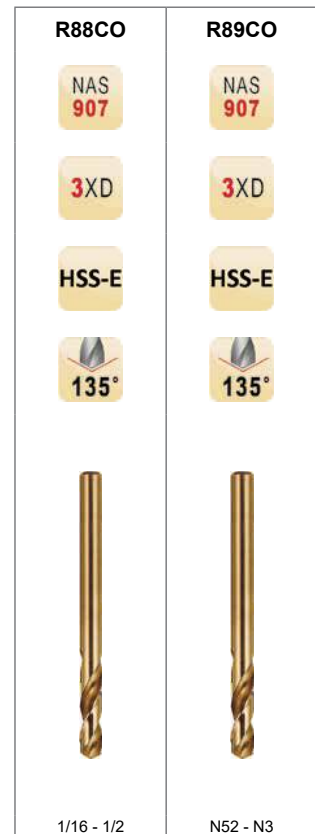
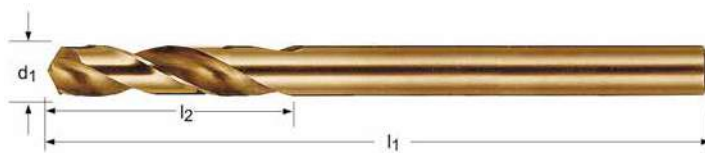


Heavy Duty Jobber Length (NAS 907 Type D)

R88CO - Fractional Sizes

R89CO - Wire Gauge Sizes

Low thrust design self centering Split Point for easier penetration. Shorter Flute Lengths. Cobalt base material with Bronze tempered for wear resistance and lubricity.



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R88CO	R89CO
1/16		0.0625	7/16	1.7/8	12	6000151	—
	52	0.0635	7/16	1.7/8	12	—	6000044
	51	0.0670	1/2	2"	12	—	6000011
	50	0.0700	1/2	2"	12	—	5999977
	49	0.0730	1/2	2"	12	—	5999855
5/64		0.0781	1/2	2"	12	5999756	—
	46	0.0810	9/16	2.1/8	12	—	5999850
	45	0.0820	9/16	2.1/8	12	—	5999846
	44	0.0860	9/16	2.1/8	12	—	5999844
	43	0.0890	5/8	2.1/4	12	—	5999839
	42	0.0935	5/8	2.1/4	12	—	5999836
3/32		0.0938	5/8	2.1/4	12	5999740	—
	41	0.0960	5/8	2.3/8	12	—	5999832
	40	0.0980	13/16	2.3/8	12	—	5999829
	39	0.0995	13/16	2.3/8	12	—	5999826
	36	0.1065	13/16	2.1/2	12	—	5999824
7/64		0.1094	13/16	2.5/8	12	5999767	—
	31	0.1200	7/8	2.3/4	12	—	5999818
1/8		0.1250	7/8	2.3/4	12	6000163	—
	30	0.1285	15/16	2.3/4	12	—	5999815
	29	0.1360	15/16	2.7/8	12	—	5999808
9/64		0.1406	15/16	2.7/8	12	5999774	—
	27	0.1440	1"	3"	12	—	5999806
	26	0.1470	1"	3"	12	—	5999803
	25	0.1495	1"	3"	12	—	5999801
	24	0.1520	1"	3.1/8	12	—	5999799
5/32		0.1563	1"	3.1/8	12	5999752	—
	22	0.1570	1.1/16	3.1/8	12	—	5999797
	21	0.1590	1.1/16	3.1/4	12	—	5999795
	20	0.1610	1.1/16	3.1/4	12	—	5999790
11/64		0.1719	1.1/16	3.1/4	12	6000176	—
	16	0.1770	1.1/8	3.3/8	12	—	5999788
	13	0.1850	1.1/8	3.1/2	12	—	5999785

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R88CO	R89CO
3/16		0.1875	1.1/8	3.1/2	12	5999738	—
	12	0.1890	1.1/8	3.1/2	12	—	5999782
	11	0.1910	1.3/16	3.1/2	12	—	5999779
	10	0.1935	1.3/16	3.5/8	12	—	5999775
	9	0.1960	1.3/16	3.5/8	12	—	6000120
	8	0.1990	1.3/16	3.5/8	12	—	6000115
	7	0.2010	1.3/16	3.5/8	12	—	6000109
13/64		0.2031	1.3/16	3.5/8	12	5999763	—
	6	0.2040	1.1/4	3.3/4	12	—	6000073
	5	0.2055	1.1/4	3.3/4	12	—	5999863
	3	0.2130	1.1/4	3.3/4	12	—	5999812
7/32		0.2188	1.1/4	3.3/4	12	5999765	—
15/64		0.2344	1.5/16	3.7/8	12	5999821	—
1/4		0.2500	1.3/8	4"	12	6000159	—
17/64		0.2656	1.7/16	4.1/8	12	5999859	—
9/32		0.2813	1.1/2	4.1/4	12	5999771	—
19/64		0.2969	1.9/16	4.3/8	12	5999867	—
5/16		0.3125	1.5/8	4.1/2	6	5999749	—
21/64		0.3281	1.11/16	4.5/8	6	5999874	—
11/32		0.3437	1.11/16	4.3/4	6	6000167	—
23/64		0.3594	1.3/4	4.7/8	6	5999879	—
3/8		0.3750	1.13/16	5"	6	5999744	—
25/64		0.3906	1.7/8	5.1/8	6	5999883	—
13/32		0.4063	1.15/16	5.1/4	6	5999720	—
27/64		0.4219	2"	5.3/8	6	5999727	—
7/16		0.4375	2.1/16	5.1/2	6	5999762	—
29/64		0.4531	2.1/8	5.5/8	6	5999731	—
15/32		0.4687	2.1/8	5.3/4	6	5999792	—
31/64		0.4844	2.3/16	5.7/8	6	5999746	—
1/2		0.5000	2.1/4	6"	6	6000155	—

SCREW MACHINE DRILL



General Purpose Screw Machine Length

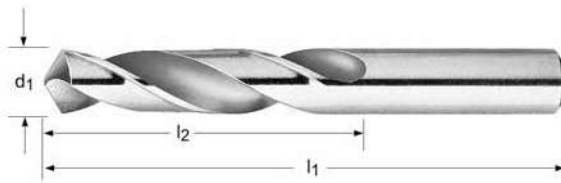
* Sets Available on pg. 236

R40 - Fractional Sizes

R41 - Wire Gauge Sizes

R42 - Letter Sizes

Bright Finish improves chip flow in soft or non-ferrous materials



¹⁾ Sizes 45/64 and larger are steam tempered

²⁾ 1" reduced shank

³⁾ 1-1/4" reduced shank

⁴⁾ 1-1/2" reduced shank

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R40	R41	R42
	60		0.0400	1/2	1.3/8	12	—	5999309	—
	59		0.0410	1/2	1.3/8	12	—	5999301	—
	58		0.0420	1/2	1.3/8	12	—	5999297	—
	57		0.0430	1/2	1.3/8	12	—	5999293	—
	56		0.0465	1/2	1.3/8	12	—	5999289	—
3/64			0.0469	1/2	1.3/8	12	5998475	—	—
	55		0.0520	5/8	1.5/8	12	—	5999285	—
	54		0.0550	5/8	1.5/8	12	—	5999281	—
	53		0.0595	5/8	1.5/8	12	—	5999277	—
1/16			0.0625	5/8	1.5/8	12	5998567	—	—
	52		0.0635	11/16	1.11/16	12	—	5999268	—
	51		0.0670	11/16	1.11/16	12	—	5999264	—
	50		0.0700	11/16	1.11/16	12	—	5999260	—
	49		0.0730	11/16	1.11/16	12	—	5999253	—
	48		0.0760	11/16	1.11/16	12	—	5999249	—
5/64			0.0781	11/16	1.11/16	12	5998532	—	—
	47		0.0785	11/16	1.11/16	12	—	5999245	—
	46		0.0810	3/4	1.3/4	12	—	5999241	—
	45		0.0820	3/4	1.3/4	12	—	5999237	—
	44		0.0860	3/4	1.3/4	12	—	5999233	—
	43		0.0890	3/4	1.3/4	12	—	5999420	—
	42		0.0935	3/4	1.3/4	12	—	5999417	—
3/32			0.0938	3/4	1.3/4	12	5998638	—	—
	41		0.0960	13/16	1.13/16	12	—	5999414	—
	40		0.0980	13/16	1.13/16	12	—	5999411	—
	39		0.0995	13/16	1.13/16	12	—	5999357	—
	38		0.1015	13/16	1.13/16	12	—	5999315	—
	37		0.1040	13/16	1.13/16	12	—	5999273	—
	36		0.1065	13/16	1.13/16	12	—	5999227	—
7/64			0.1094	13/16	1.13/16	12	5998576	—	—
	35		0.1100	7/8	1.7/8	12	—	5998883	—
	34		0.1110	7/8	1.7/8	12	—	5998875	—
	33		0.1130	7/8	1.7/8	12	—	5998872	—
	32		0.1160	7/8	1.7/8	12	—	5998868	—

R40	R41	R42
ANSI	ANSI	ANSI
2.5XD	2.5XD	2.5XD
HSS	HSS	HSS
118°	118°	118°
3/64 - 2"	N60 - N1	A - Z

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R40	R41	R42
1/8	31		0.1200	7/8	1.7/8	12	—	5998865	—
			0.1250	7/8	1.7/8	12	5998575	—	—
	30		0.1285	15/16	1.15/16	12	—	5998862	—
9/64	29		0.1360	15/16	1.15/16	12	—	5998855	—
	28		0.1405	15/16	1.15/16	12	—	5998852	—
			0.1406	15/16	1.15/16	12	5998592	—	—
5/32	27		0.1440	1"	2.1/16	12	—	5998849	—
	26		0.1470	1"	2.1/16	12	—	5998846	—
	25		0.1495	1"	2.1/16	12	—	5998839	—
11/64	24		0.1520	1"	2.1/16	12	—	5998836	—
	23		0.1540	1"	2.1/16	12	—	5998833	—
			0.1563	1"	2.1/16	12	5998527	—	—
3/16	22		0.1570	1.1/16	2.1/8	12	—	5998830	—
	21		0.1590	1.1/16	2.1/8	12	—	5998826	—
	20		0.1610	1.1/16	2.1/8	12	—	5998823	—
13/64	19		0.1660	1.1/16	2.1/8	12	—	5998817	—
	18		0.1695	1.1/16	2.1/8	12	—	5998813	—
			0.1719	1.1/16	2.1/8	12	5998587	—	—
7/32	17		0.1730	1.1/8	2.3/16	12	—	5998807	—
	16		0.1770	1.1/8	2.3/16	12	—	5998801	—
	15		0.1800	1.1/8	2.3/16	12	—	5998797	—
13/64	14		0.1820	1.1/8	2.3/16	12	—	5998793	—
	13		0.1850	1.1/8	2.3/16	12	—	5998789	—
			0.1875	1.1/8	2.3/16	12	5998634	—	—
7/32	12		0.1890	1.3/16	2.1/4	12	—	5998785	—
	11		0.1910	1.3/16	2.1/4	12	—	5998780	—
	10		0.1935	1.3/16	2.1/4	12	—	5998776	—
13/64	9		0.1960	1.3/16	2.1/4	12	—	5999322	—
	8		0.1990	1.3/16	2.1/4	12	—	5999319	—
	7		0.2010	1.3/16	2.1/4	12	—	5999312	—
7/32			0.2031	1.3/16	2.1/4	12	5998608	—	—
	6		0.2040	1.1/4	2.3/8	12	—	5999305	—
	5		0.2055	1.1/4	2.3/8	12	—	5999256	—
15/64	4		0.2090	1.1/4	2.3/8	12	—	5999405	—
	3		0.2130	1.1/4	2.3/8	12	—	5998858	—
			0.2188	1.1/4	2.3/8	12	5998574	—	—
15/64	2		0.2210	1.5/16	2.7/16	12	—	5998820	—
	1		0.2280	1.5/16	2.7/16	12	—	5998771	—
		A	0.2340	1.5/16	2.7/16	12	—	—	5999326
1/4			0.2344	1.5/16	2.7/16	12	5998619	—	—
		B	0.2374	1.3/8	2.1/2	12	—	—	5999330
		C	0.2421	1.3/8	2.1/2	12	—	—	5999334
17/64		D	0.2461	1.3/8	2.1/2	12	—	—	5998908
		E	0.2500	1.3/8	2.1/2	12	5998572	—	—
		F	0.2571	1.7/16	2.5/8	12	—	—	5998915
9/32		G	0.2610	1.7/16	2.5/8	12	—	—	5998919
			0.2656	1.7/16	2.5/8	12	5998625	—	—
		H	0.2661	1.1/2	2.11/16	12	—	—	5998923
19/64		I	0.2720	1.1/2	2.11/16	12	—	—	5998927
		J	0.2772	1.1/2	2.11/16	12	—	—	5998932
		K	0.2811	1.1/2	2.11/16	12	—	—	5998935
5/16			0.2813	1.1/2	2.11/16	12	5998585	—	—
		L	0.2902	1.9/16	2.3/4	12	—	—	5998938
		M	0.2949	1.9/16	2.3/4	12	—	—	5998944
11/32			0.2969	1.9/16	2.3/4	12	5998633	—	—
		N	0.3020	1.5/8	2.13/16	12	—	—	5998947
			0.3125	1.5/8	2.13/16	6	5998523	—	—
21/64		O	0.3161	1.11/16	2.15/16	6	—	—	5998950
		P	0.3228	1.11/16	2.15/16	6	—	—	5998951
			0.3281	1.11/16	2.15/16	6	5998645	—	—
11/32		Q	0.3319	1.11/16	3"	6	—	—	5998953
		R	0.3390	1.11/16	3"	6	—	—	5998955
			0.3437	1.11/16	3"	6	5998584	—	—
11/32		S	0.3480	1.3/4	3.1/16	6	—	—	5998957
		T	0.3580	1.3/4	3.1/16	6	—	—	5998959

SCREW MACHINE DRILL



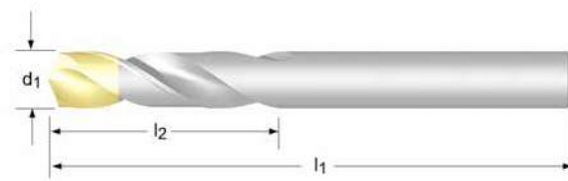
d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R40	R41	R42
23/64			0.3594	1.3/4	3.1/16	6	5998655	—	—
		U	0.3680	1.13/16	3.1/8	6	—	—	5998961
3/8			0.3750	1.13/16	3.1/8	6	5998478	—	—
		V	0.3772	1.7/8	3.1/4	6	—	—	5998963
		W	0.3858	1.7/8	3.1/4	6	—	—	5998968
25/64			0.3906	1.7/8	3.1/4	6	5998507	—	—
		X	0.3969	1.15/16	3.5/16	6	—	—	5998970
		Y	0.4039	1.15/16	3.5/16	6	—	—	5998972
13/32			0.4063	1.15/16	3.5/16	6	5998605	—	—
		Z	0.4130	2"	3.3/8	6	—	—	5998974
27/64			0.4219	2"	3.3/8	6	5998588	—	—
7/16			0.4375	2.1/16	3.7/16	6	5998571	—	—
29/64			0.4531	2.1/8	3.9/16	6	5998631	—	—
15/32			0.4687	2.1/8	3.5/8	6	5998616	—	—
31/64			0.4844	2.3/16	3.11/16	6	5998484	—	—
1/2			0.5000	2.1/4	3.3/4	6	5998570	—	—
33/64			0.5156	2.3/8	3.7/8	1	5998487	—	—
17/32			0.5313	2.3/8	3.7/8	1	5998621	—	—
35/64			0.5469	2.1/2	4"	1	5998490	—	—
9/16			0.5625	2.1/2	4"	1	5998582	—	—
37/64			0.5781	2.5/8	4.1/8	1	5998493	—	—
19/32			0.5937	2.5/8	4.1/8	1	5998629	—	—
39/64			0.6094	2.3/4	4.1/4	1	5998496	—	—
5/8			0.6250	2.3/4	4.1/4	1	5998538	—	—
41/64			0.6406	2.7/8	4.1/2	1	5998499	—	—
21/32			0.6563	2.7/8	4.1/2	1	5998641	—	—
43/64			0.6719	2.7/8	4.5/8	1	5998503	—	—
11/16			0.6875	2.7/8	4.5/8	1	5998578	—	—
45/64			0.7031	3"	4.3/4	1	5998510	¹⁾ —	—
23/32			0.7188	3"	4.3/4	1	5998649	¹⁾ —	—
47/64			0.7344	3.1/8	5"	1	5998514	¹⁾ —	—
3/4			0.7500	3.1/8	5"	1	5998644	¹⁾ —	—
49/64			0.7656	3.1/4	5.1/8	1	5998518	¹⁾ —	—
25/32			0.7813	3.1/4	5.1/8	1	5998471	¹⁾ —	—
51/64			0.7969	3.3/8	5.1/4	1	5998541	¹⁾ —	—
13/16			0.8125	3.3/8	5.1/4	1	5998602	¹⁾ —	—
53/64			0.8281	3.1/2	5.3/8	1	5998545	¹⁾ —	—
27/32			0.8438	3.1/2	5.3/8	1	5998553	¹⁾ —	—
55/64			0.8594	3.1/2	5.1/2	1	5998549	¹⁾ —	—
7/8			0.8750	3.1/2	5.1/2	1	5998579	¹⁾ —	—
57/64			0.8906	3.5/8	5.5/8	1	5998559	¹⁾ —	—
29/32			0.9063	3.5/8	5.5/8	1	5998624	¹⁾ —	—
59/64			0.9219	3.3/4	5.3/4	1	5998562	¹⁾ —	—
15/16			0.9375	3.3/4	5.3/4	1	5998611	¹⁾ —	—
61/64			0.9531	3.7/8	5.7/8	1	5998565	¹⁾ —	—
31/32			0.9688	3.7/8	5.7/8	1	5998481	¹⁾ —	—
63/64			0.9844	4"	6"	1	5998568	¹⁾ —	—
1"			1.0000	4"	6"	1	5998671	¹⁾ —	—
1.1/16			1.0625	4"	6.1/4	1	5998505	^{1) 2)} —	—
1.1/8			1.1250	4"	6.3/8	1	5998517	^{1) 2)} —	—
1.3/16			1.1875	4.1/4	6.5/8	1	5998536	^{1) 2)} —	—
1.1/4			1.2500	4.3/8	6.3/4	1	5998513	^{1) 2)} —	—
1.5/16			1.3125	4.3/8	7"	1	5998551	^{1) 3)} —	—
1.3/8			1.3750	4.1/2	7.1/8	1	5998544	^{1) 3)} —	—
1.7/16			1.4375	4.3/4	7.3/8	1	5998558	^{1) 3)} —	—
1.1/2			1.5000	4.7/8	7.1/2	1	5998509	^{1) 3)} —	—
1.9/16			1.5625	4.7/8	7.3/4	1	5998564	^{1) 4)} —	—
1.5/8			1.6250	4.7/8	7.3/4	1	5998555	^{1) 4)} —	—
1.3/4			1.7500	5.1/8	8"	1	5998540	^{1) 4)} —	—
1.13/16			1.8125	5.3/8	8.1/4	1	5998526	^{1) 4)} —	—
1.7/8			1.8750	5.3/8	8.1/4	1	5998561	^{1) 4)} —	—
1.15/16			1.9375	5.5/8	8.1/2	1	5998531	^{1) 4)} —	—
2"			2.0000	5.5/8	8.1/2	1	5998637	^{1) 4)} —	—

General Purpose Screw Machine Length

* Sets Available on pg. 237

A022 Low thrust design self centering Split Point for easier penetration. TiN Coated Tip increases wear resistance and improves tool life.

Metric sizes to DIN1897 lengths.
Fractional sizes to ANSI lengths.



A022

DIN
ANSI

2.5XD

HSS

135°



0.50 - 16.00

* 2mm and smaller are bright with no split point

d_1 $\varnothing h_8$ Inch	d_1 $\varnothing h_8$ mm	d_1 decimal Inch	l_2 mm	l_1 mm	Pack Qty	A022
	0.50	0.0197	3	20	10	5966728
	0.60	0.0236	3.5	21	10	5966732
	0.70	0.0276	4.5	23	10	5966736
1/32	0.79	0.0313	13	35	10	5967183
	0.80	0.0315	5	24	10	5966743
	0.90	0.0354	5.5	25	10	5967157
	1.00	0.0394	6	26	10	5967213
	1.10	0.0433	7	28	10	5967253
3/64	1.19	0.0469	13	35	10	5967112
	1.20	0.0472	8	30	10	5967286
	1.30	0.0512	8	30	10	5967324
	1.40	0.0551	9	32	10	5967333
	1.50	0.0591	9	32	10	5967335
1/16	1.59	0.0625	16	41	10	5967173
	1.60	0.0630	10	34	10	5967339
	1.70	0.0669	10	34	10	5967343
	1.80	0.0709	11	36	10	5967166
	1.90	0.0748	11	36	10	5967169
5/64	1.98	0.0781	17	43	10	5966840
	2.00	0.0787	12	38	10	5967096
	2.10	0.0827	12	38	10	5967118
	2.20	0.0866	13	40	10	5967140
	2.25	0.0886	13	40	10	5967179
	2.30	0.0906	13	40	10	5967189
3/32	2.38	0.0937	20	45	10	5967110
	2.40	0.0945	14	43	10	5967194
	2.50	0.0984	14	43	10	5967200
	2.60	0.1024	14	43	10	5967206
	2.65	0.1043	14	43	10	5967064
	2.70	0.1063	16	46	10	5967068
7/64	2.78	0.1094	22	47	10	5966875
	2.80	0.1102	16	46	10	5967073
	2.90	0.1142	16	46	10	5967076

SCREW MACHINE DRILL



d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A022
1/8	3.00	0.1181	16	46	10	5967079
	3.10	0.1220	18	49	10	5967081
	3.18	0.1250	23	49	10	5967193
	3.20	0.1260	18	49	10	5967083
	3.25	0.1280	18	49	10	5967087
	3.30	0.1299	18	49	10	5967090
9/64	3.40	0.1339	20	52	10	5967093
	3.50	0.1378	20	52	10	5967098
	3.57	0.1406	25	50	10	5966963
	3.60	0.1417	20	52	10	5967100
	3.70	0.1457	20	52	10	5967102
	3.80	0.1496	22	55	10	5967104
5/32	3.90	0.1535	22	55	10	5967106
	3.97	0.1563	26	53	10	5967184
	4.00	0.1575	22	55	10	5967116
	4.10	0.1614	22	55	10	5967120
	4.20	0.1654	22	55	10	5967122
	4.30	0.1693	24	58	10	5967124
11/64	4.37	0.1719	28	55	10	5967277
	4.40	0.1732	24	58	10	5967126
	4.50	0.1772	24	58	10	5967128
	4.60	0.1811	24	58	10	5967130
	4.70	0.1850	24	58	10	5967132
	4.76	0.1875	30	57	10	5967108
3/16	4.80	0.1890	26	62	10	5967134
	4.90	0.1929	26	62	10	5967136
	5.00	0.1969	26	62	10	5967138
	5.10	0.2008	26	62	10	5967142
	5.16	0.2031	31	58	10	5967305
	5.20	0.2047	26	62	10	5967144
13/64	5.30	0.2087	26	62	10	5967147
	5.40	0.2126	28	66	10	5967149
	5.50	0.2165	28	66	10	5967153
	5.56	0.2188	33	61	10	5966873
	5.60	0.2205	28	66	10	5967158
	5.70	0.2244	28	66	10	5967162
7/32	5.80	0.2283	28	66	10	5967167
	5.90	0.2323	28	66	10	5967170
	5.95	0.2344	34	63	10	5967329
	6.00	0.2362	28	66	10	5966885
	6.10	0.2402	31	70	10	5966921
	6.20	0.2441	31	70	10	5966972
15/64	6.30	0.2480	31	70	10	5966981
	6.35	0.2500	36	65	10	5967188
	6.40	0.2520	31	70	10	5966985
	6.50	0.2559	31	70	10	5966989
	6.60	0.2598	31	70	10	5966993
	6.70	0.2638	31	70	10	5966843
1/4	6.80	0.2677	34	74	10	5966845
	6.90	0.2717	34	74	10	5966847
	7.00	0.2756	34	74	10	5966849
	7.10	0.2795	34	74	10	5966851
	7.14	0.2813	40	70	10	5966960
	7.20	0.2835	34	74	10	5966853
9/32	7.30	0.2874	34	74	10	5966855
	7.40	0.2913	34	74	10	5966857
	7.50	0.2953	34	74	10	5966859
	7.60	0.2992	37	79	10	5966861
	7.70	0.3031	37	79	10	5966865
	7.80	0.3071	37	79	10	5966867
5/16	7.90	0.3110	37	79	10	5966869
	7.94	0.3125	43	73	10	5967176
	8.00	0.3150	37	79	10	5966877
	8.10	0.3189	37	79	10	5966879
	8.20	0.3228	37	79	10	5966881
	8.30	0.3268	37	79	10	5966883

d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	A022
	8.40	0.3307	37	79	10	5966887
	8.50	0.3346	37	79	10	5966889
	8.60	0.3386	40	84	10	5966891
	8.70	0.3425	40	84	10	5966893
11/32	8.73	0.3438	45	78	10	5967274
	8.80	0.3465	40	84	10	5966896
	8.90	0.3504	40	84	10	5966899
	9.00	0.3543	40	84	10	5966902
	9.10	0.3583	40	84	10	5966906
	9.20	0.3622	40	84	10	5966911
	9.30	0.3661	40	84	10	5966916
	9.40	0.3701	40	84	10	5966926
	9.50	0.3740	40	84	10	5966931
3/8	9.52	0.3750	48	81	10	5967114
	9.60	0.3780	43	89	10	5966934
	9.70	0.3819	43	89	10	5966939
	9.80	0.3858	43	89	10	5966944
	9.90	0.3898	43	89	10	5966949
	10.00	0.3937	43	89	10	5967198
	10.10	0.3976	43	89	5	5967207
	10.20	0.4016	43	89	5	5967211
	10.30	0.4055	43	89	5	5967217
13/32	10.32	0.4062	51	86	5	5967302
	10.40	0.4094	43	89	5	5967221
	10.50	0.4134	43	89	5	5967224
	10.60	0.4173	43	89	5	5967228
	10.70	0.4213	47	95	5	5967233
	10.80	0.4252	47	95	5	5967238
	10.90	0.4291	47	95	5	5967241
	11.00	0.4331	47	95	5	5967244
	11.10	0.4370	47	95	5	5967248
7/16	11.11	0.4375	54	89	5	5966871
	11.20	0.4409	47	95	5	5967250
	11.30	0.4449	47	95	5	5967256
	11.50	0.4528	47	95	5	5967259
	11.60	0.4567	47	95	5	5967262
	11.70	0.4606	47	95	5	5967265
	11.80	0.4646	47	95	5	5967268
	11.90	0.4685	51	102	5	5967271
	12.00	0.4724	51	102	5	5967280
	12.10	0.4764	51	102	5	5967283
	12.20	0.4803	51	102	5	5967289
	12.50	0.4921	51	102	5	5967292
1/2	12.70	0.5000	60	98	5	5967178
	13.00	0.5118	51	102	5	5967295
	13.50	0.5315	54	107	1	5967298
	14.00	0.5512	54	107	1	5967309
9/16	14.29	0.5625	67	105	1	5966956
	14.50	0.5709	56	111	1	5967313
	15.00	0.5906	56	111	1	5967316
	15.50	0.6102	58	115	1	5967319
5/8	15.88	0.6250	73	111	1	5966863
	16.00	0.6299	58	115	1	5967059

SCREW MACHINE DRILL



Heavy Duty Screw Machine Length (NAS 907 Type C)

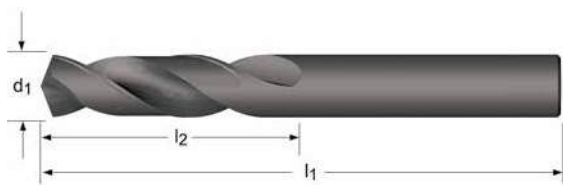
* Sets Available on pg. 238

R40C - Fractional Sizes

R41C - Wire Gauge Sizes

R42C - Letter Sizes

Low thrust design self centering Split Point for easier penetration. Steam tempered surface treatment for increased wear resistance and lubricity.



R40C	R41C	R42C
ANSI	ANSI	ANSI
2.5XD	2.5XD	2.5XD
HSS	HSS	HSS
135°	135°	135°
1/16 - 1/2	N60 - N1	A - Z

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R40C	R41C	R42C
	60		0.0400	1/2	1.3/8	12	—	5998673 ¹⁾	—
	59		0.0410	1/2	1.3/8	12	—	5998665 ¹⁾	—
	58		0.0420	1/2	1.3/8	12	—	5998661 ¹⁾	—
	57		0.0430	1/2	1.3/8	12	—	5998657 ¹⁾	—
	56		0.0465	1/2	1.3/8	12	—	5998651 ¹⁾	—
	55		0.0520	5/8	1.5/8	12	—	5998647 ¹⁾	—
	54		0.0550	5/8	1.5/8	12	—	5998642 ¹⁾	—
	53		0.0595	5/8	1.5/8	12	—	5998635 ¹⁾	—
1/16			0.0625	5/8	1.5/8	12	5999397	—	—
	52		0.0635	11/16	1.11/16	12	—	5998630	—
	51		0.0670	11/16	1.11/16	12	—	5998626	—
	50		0.0700	11/16	1.11/16	12	—	5998623	—
	49		0.0730	11/16	1.11/16	12	—	5998615	—
	48		0.0760	11/16	1.11/16	12	—	5998612	—
5/64			0.0781	11/16	1.11/16	12	5999447	—	—
	47		0.0785	11/16	1.11/16	12	—	5998610	—
	46		0.0810	3/4	1.3/4	12	—	5998607	—
	45		0.0820	3/4	1.3/4	12	—	5998604	—
	44		0.0860	3/4	1.3/4	12	—	5998598	—
	43		0.0890	3/4	1.3/4	12	—	5998594	—
	42		0.0935	3/4	1.3/4	12	—	5998591	—
3/32			0.0938	3/4	1.3/4	12	5999441	—	—
	41		0.0960	13/16	1.13/16	12	—	5998589	—
	40		0.0980	13/16	1.13/16	12	—	5998586	—
	39		0.0995	13/16	1.13/16	12	—	5998580	—
	38		0.1015	13/16	1.13/16	12	—	5998577	—
	37		0.1040	13/16	1.13/16	12	—	5998573	—
	36		0.1065	13/16	1.13/16	12	—	5998569	—
7/64			0.1094	13/16	1.13/16	12	5999450	—	—
	35		0.1100	7/8	1.7/8	12	—	5998563	—
	34		0.1110	7/8	1.7/8	12	—	5998560	—

¹⁾ Not Split Point

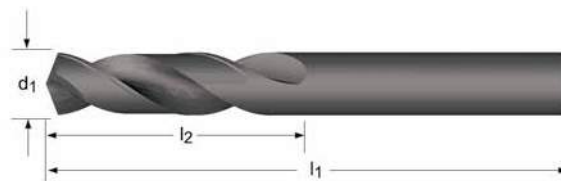
d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R40C	R41C	R42C
	33		0.1130	7/8	1.7/8	12	—	5998557	—
	32		0.1160	7/8	1.7/8	12	—	5998554	—
	31		0.1200	7/8	1.7/8	12	—	5998550	—
1/8			0.1250	7/8	1.7/8	12	5999409	—	—
	30		0.1285	15/16	1.15/16	12	—	5998547	—
	29		0.1360	15/16	1.15/16	12	—	5998537	—
	28		0.1405	15/16	1.15/16	12	—	5998533	—
9/64			0.1406	15/16	1.15/16	12	5999452	—	—
	27		0.1440	1"	2.1/16	12	—	5998528	—
	26		0.1470	1"	2.1/16	12	—	5998697	—
	25		0.1495	1"	2.1/16	12	—	5998694	—
	24		0.1520	1"	2.1/16	12	—	5998691	—
	23		0.1540	1"	2.1/16	12	—	5998688	—
5/32			0.1563	1"	2.1/16	12	5999446	—	—
	22		0.1570	1.1/16	2.1/8	12	—	5998682	—
	21		0.1590	1.1/16	2.1/8	12	—	5998639	—
	20		0.1610	1.1/16	2.1/8	12	—	5998601	—
	19		0.1660	1.1/16	2.1/8	12	—	5998521	—
	18		0.1695	1.1/16	2.1/8	12	—	5998628	—
11/64			0.1719	1.1/16	2.1/8	12	5999415	—	—
	17		0.1730	1.1/8	2.3/16	12	—	5998620	—
	16		0.1770	1.1/8	2.3/16	12	—	5998617	—
	15		0.1800	1.1/8	2.3/16	12	—	5998613	—
	14		0.1820	1.1/8	2.3/16	12	—	5998609	—
	13		0.1850	1.1/8	2.3/16	12	—	5998606	—
3/16			0.1875	1.1/8	2.3/16	12	5999440	—	—
	12		0.1890	1.3/16	2.1/4	12	—	5998603	—
	11		0.1910	1.3/16	2.1/4	12	—	5998600	—
	10		0.1935	1.3/16	2.1/4	12	—	5998597	—
	9		0.1960	1.3/16	2.1/4	12	—	5998685	—
	8		0.1990	1.3/16	2.1/4	12	—	5998679	—
	7		0.2010	1.3/16	2.1/4	12	—	5998676	—
13/64			0.2031	1.3/16	2.1/4	12	5999421	—	—
	6		0.2040	1.1/4	2.3/8	12	—	5998669	—
	5		0.2055	1.1/4	2.3/8	12	—	5998618	—
	4		0.2090	1.1/4	2.3/8	12	—	5998583	—
	3		0.2130	1.1/4	2.3/8	12	—	5998543	—
7/32			0.2188	1.1/4	2.3/8	12	5999449	—	—
	2		0.2210	1.5/16	2.7/16	12	—	5998566	—
	1		0.2280	1.5/16	2.7/16	12	—	5998595	—
		A	0.2340	1.5/16	2.7/16	12	—	—	5999338
15/64			0.2344	1.5/16	2.7/16	12	5999425	—	—
		B	0.2380	1.3/8	2.1/2	12	—	—	5999342
		C	0.2420	1.3/8	2.1/2	12	—	—	5999346
		D	0.2460	1.3/8	2.1/2	12	—	—	5999350
1/4		E	0.2500	1.3/8	2.1/2	12	5999406	—	—
		F	0.2570	1.7/16	2.5/8	12	—	—	5999362
		G	0.2610	1.7/16	2.5/8	12	—	—	5999367
17/64			0.2656	1.7/16	2.5/8	12	5999427	—	—
		H	0.2660	1.1/2	2.11/16	12	—	—	5999373
		I	0.2720	1.1/2	2.11/16	12	—	—	5999377
		J	0.2770	1.1/2	2.11/16	12	—	—	5999381
		K	0.2810	1.1/2	2.11/16	12	—	—	5999386
9/32			0.2813	1.1/2	2.11/16	12	5999451	—	—
		L	0.2900	1.9/16	2.3/4	12	—	—	5999390
		M	0.2950	1.9/16	2.3/4	12	—	—	5999395
19/64			0.2969	1.9/16	2.3/4	12	5999429	—	—
		N	0.3020	1.5/8	2.13/16	12	—	—	5999398
5/16			0.3125	1.5/8	2.13/16	6	5999444	—	—
		O	0.3160	1.11/16	2.15/16	6	—	—	5999402
		P	0.3230	1.11/16	2.15/16	6	—	—	5999408
21/64			0.3281	1.11/16	2.15/16	6	5999433	—	—
		Q	0.3320	1.11/16	3"	6	—	—	5998896
		R	0.3390	1.11/16	3"	6	—	—	5998941
11/32			0.3437	1.11/16	3"	6	5999412	—	—
		S	0.3480	1.3/4	3.1/16	6	—	—	5998965

SCREW MACHINE DRILL



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R40C	R41C	R42C
		T	0.3580	1.3/4	3.1/16	6	—	—	5998994
23/64			0.3594	1.3/4	3.1/16	6	5999435	—	—
		U	0.3680	1.13/16	3.1/8	6	—	—	5999038
3/8			0.3750	1.13/16	3.1/8	6	5999442	—	—
		V	0.3770	1.7/8	3.1/4	6	—	—	5999047
		W	0.3860	1.7/8	3.1/4	6	—	—	5999052
25/64			0.3906	1.7/8	3.1/4	6	5999437	—	—
		X	0.3970	1.15/16	3.5/16	6	—	—	5999056
		Y	0.4040	1.15/16	3.5/16	6	—	—	5999060
13/32			0.4063	1.15/16	3.5/16	6	5999418	—	—
		Z	0.4130	2"	3.3/8	6	—	—	5998903
27/64			0.4219	2"	3.3/8	6	5999438	—	—
7/16			0.4375	2.1/16	3.7/16	6	5999448	—	—
29/64			0.4531	2.1/8	3.9/16	6	5999439	—	—
15/32			0.4687	2.1/8	3.5/8	6	5999423	—	—
31/64			0.4844	2.3/16	3.11/16	6	5999443	—	—
1/2			0.5000	2.1/4	3.3/4	6	5999400	—	—

4ASM Low thrust design self centering Split Point for easier penetration.
Steam tempered surface treatment for increased wear resistance & lubricity.



4ASM

DIN
1897

2.5XD

HSS

135°



1.00 - 12.50

d_1 Ø mm	d_1 decimal Inch	l_2 mm	l_1 mm	Pack Qty	4ASM
1.00	0.0394	6	22	12	6000967 ¹⁾
1.25	0.0492	8	30	12	6000969 ¹⁾
1.30	0.0512	8	30	12	6000971 ¹⁾
1.65	0.0650	11	34	12	6000973
2.00	0.0787	12	38	12	6001002
2.30	0.0906	13	40	12	6001010
2.40	0.0945	14	43	12	6000362
2.50	0.0984	14	43	12	6000414
3.00	0.1181	16	46	12	6000456
3.10	0.1220	18	49	12	6000483
3.20	0.1260	18	49	12	6000514
3.30	0.1299	18	49	12	6000521
3.40	0.1339	20	52	12	6000524
3.50	0.1378	20	52	12	6000527
3.70	0.1457	20	52	12	6000531
4.00	0.1575	22	55	12	6000368
4.20	0.1654	22	55	12	6000373
4.50	0.1772	24	58	12	6000379
5.00	0.1969	26	62	12	6000384
5.50	0.2165	28	66	12	6000388
5.70	0.2244	28	66	12	6000392
5.80	0.2283	28	66	12	6000396
6.00	0.2362	28	66	12	6000400
6.20	0.2441	31	70	12	6000406
6.40	0.2520	31	70	12	6000410
6.50	0.2559	31	70	12	6000418
6.60	0.2598	31	70	12	6000422
6.80	0.2677	34	74	12	6000426
6.90	0.2717	34	74	12	6000431
7.00	0.2756	34	74	12	6000437
7.20	0.2835	34	74	12	6000441
7.50	0.2953	37	79	12	6000444

¹⁾ Not Split Point

SCREW MACHINE DRILL



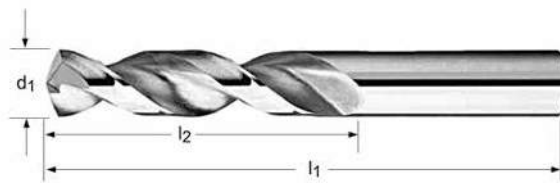
d_1 Ø mm	d_1 decimal Inch	l_2 mm	l_1 mm	Pack Qty	4ASM
8.00	0.3150	37	79	6	6000447
8.10	0.3189	37	79	6	6000450
8.40	0.3307	37	79	6	6000453
8.50	0.3346	37	79	6	6000460
8.70	0.3425	40	84	6	6000462
9.00	0.3543	40	84	6	6000464
9.10	0.3583	40	84	6	6000466
9.20	0.3622	40	84	6	6000468
9.30	0.3661	40	84	6	6000470
9.50	0.3740	40	84	6	6000472
9.70	0.3819	43	89	6	6000474
10.00	0.3937	43	89	6	6000975
10.20	0.4016	43	89	6	6000977
10.50	0.4134	43	89	6	6000981
10.80	0.4252	47	95	6	6000982
11.00	0.4331	47	95	6	6000984
11.20	0.4409	47	95	6	6000986
11.50	0.4528	47	95	6	6000988
11.80	0.4646	47	95	6	6000990
12.00	0.4724	51	102	6	6000993
12.20	0.4803	51	102	6	6000995
12.50	0.4921	51	102	6	6000997

General Purpose Screw Machine Length Parabolic Flute

Heavy-Duty Parabolic Flute design for efficient chip removal.
Allows greater drilling depths in one pass. Low thrust design self centering Split Point for easier penetration.

QC41P Bright Finish improves chip flow in soft or non-ferrous materials.

QC41G TiN Coating increases wear resistance and improves tool life.



QC41P	QC41G
ANSI	ANSI
3XD	3XD
HSS	HSS
135°	135°
	
1/16 - 11/16	1/16 - 1/2

d_1 Ø "Nr.	d_1 decimal Inch	l_2 Inch	l_1 Inch	Pack Qty	QC41P	QC41G
1/16	0.0625	5/8	1.5/8	12	5997255	5996945
5/64	0.0781	11/16	1.11/16	12	5997589	5997492
3/32	0.0938	3/4	1.3/4	12	5997553	5997338
40	0.0980	13/16	1.13/16	12	5997238	5996924
39	0.0995	13/16	1.13/16	12	5997234	5996917
38	0.1015	13/16	1.13/16	12	5997231	5996912
37	0.1040	13/16	1.13/16	12	5997228	5996909
36	0.1065	13/16	1.13/16	12	5997226	5996904
7/64	0.1094	13/16	1.13/16	12	5997602	5997502
35	0.1100	7/8	1.7/8	12	5997224	5996900
34	0.1110	7/8	1.7/8	12	5997220	5996896
33	0.1130	7/8	1.7/8	12	5997218	5996889
32	0.1160	7/8	1.7/8	12	5997216	5996886
31	0.1200	7/8	1.7/8	12	5997214	5996882
1/8	0.1250	7/8	1.7/8	12	5997265	5996954
30	0.1285	15/16	1.15/16	12	5997212	5996874
29	0.1360	15/16	1.15/16	12	5997208	5996869
28	0.1405	15/16	1.15/16	12	5997206	5996865
9/64	0.1406	15/16	1.15/16	12	5997618	5997349
27	0.1440	1"	2.1/16	12	5997203	5996861
26	0.1470	1"	2.1/16	12	5997200	5996857
25	0.1495	1"	2.1/16	12	5997194	5996853
24	0.1520	1"	2.1/16	12	5997191	5996996
23	0.1540	1"	2.1/16	12	5997188	5996991
5/32	0.1563	1"	2.1/16	12	5997586	5997487
22	0.1570	1.1/16	2.1/8	12	5997185	5996989
21	0.1590	1.1/16	2.1/8	12	5997182	5996987
20	0.1610	1.1/16	2.1/8	12	5997178	5996983
19	0.1660	1.1/16	2.1/8	12	5997168	5996933
18	0.1695	1.1/16	2.1/8	12	5997163	5996892
11/64	0.1719	1.1/16	2.1/8	12	5997274	5996957
17	0.1730	1.1/8	2.3/16	12	5997158	5996846
16	0.1770	1.1/8	2.3/16	12	5997304	5997410

SCREW MACHINE DRILL



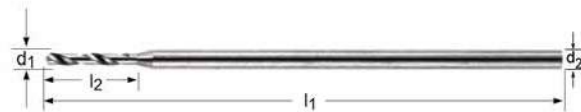
d ₁ Ø "/Nr.	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	QC41P	QC41G
15	0.1800	1.1/8	2.3/16	12	5997300	5997402
14	0.1820	1.1/8	2.3/16	12	5997296	5997394
13	0.1850	1.1/8	2.3/16	12	5997292	5997390
3/16	0.1875	1.1/8	2.3/16	12	5997550	5996985
12	0.1890	1.3/16	2.1/4	12	5997282	5997386
11	0.1910	1.3/16	2.1/4	12	5997247	5997382
10	0.1935	1.3/16	2.1/4	12	5997222	5997378
9	0.1960	1.3/16	2.1/4	12	5997252	5996942
8	0.1990	1.3/16	2.1/4	12	5997249	5996939
7	0.2010	1.3/16	2.1/4	12	5997245	5996936
13/64	0.2031	1.3/16	2.1/4	12	5997286	5996963
6	0.2040	1.1/4	2.3/8	12	5997243	5996930
5	0.2055	1.1/4	2.3/8	12	5997241	5996927
4	0.2090	1.1/4	2.3/8	12	5997236	5996922
3	0.2130	1.1/4	2.3/8	12	5997210	5996871
7/32	0.2188	1.1/4	2.3/8	12	5997599	5997498
2	0.2210	1.5/16	2.7/16	12	5997173	5996961
1	0.2280	1.5/16	2.7/16	12	5997197	5997375
15/64	0.2344	1.5/16	2.7/16	12	5997570	5996967
1/4	0.2500	1.3/8	2.1/2	12	5997262	5996951
17/64	0.2656	1.7/16	2.5/8	12	5997651	5996969
9/32	0.2812	1.1/2	2.11/16	12	5997615	5997345
19/64	0.2969	1.9/16	2.3/4	12	5997699	5996971
5/16	0.3125	1.5/8	2.13/16	6	5997583	5997463
21/64	0.3281	1.11/16	2.15/16	6	5997705	5996973
11/32	0.3437	1.11/16	3"	6	5997271	5996956
23/64	0.3594	1.3/4	3.1/16	6	5997707	5996975
3/8	0.3750	1.13/16	3.1/8	6	5997556	5997383
25/64	0.3906	1.7/8	3.1/4	6	5997539	5996977
13/32	0.4063	1.15/16	3.5/16	6	5997278	5996959
27/64	0.4219	2"	3.3/8	6	5997543	5996979
7/16	0.4375	2.1/16	3.7/16	6	5997595	5997495
29/64	0.4531	2.1/8	3.9/16	6	5997546	5996981
15/32	0.4687	2.1/8	3.5/8	6	5997535	5996965
31/64	0.4844	2.3/16	3.3/4	6	5997559	5997431
1/2	0.5000	2.1/4	3.3/4	6	5997259	5996948
33/64	0.5156	2.3/8	3.7/8	1	5997562	—
17/32	0.5313	2.3/8	3.7/8	1	5997606	—
35/64	0.5469	2.1/2	4"	1	5997564	—
9/16	0.5625	2.1/2	4"	1	5997610	—
37/64	0.5781	2.5/8	4.1/8	1	5997567	—
19/32	0.5937	2.5/8	4.1/8	1	5997694	—
5/8	0.6250	2.3/4	4.1/4	1	5997592	—
11/16	0.6875	2.7/8	4.5/8	1	5997268	—

MICRO - Screw Machine Length Drills

A720

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4 4.1 4.2
4.3 5.1 5.2 5.3 6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4 8.1 8.2

Smallest size range available. Bright finish improves chip flow in soft or non-ferrous materials. Good wear resistance in abrasive or hard materials.



A720

DIN
1899

2.5XD

HSS-E

118°



0.15 - 1.40

d ₁ Ø mm	d ₁ decimal inch	l ₂ mm	l ₁ mm	d ₂ Ø mm	Pack Qty	A720
0.15	0.0059	1.0	25	1	10	5971007
0.16	0.0063	1.4	25	1	10	5971119
0.17	0.0067	1.4	25	1	10	5971157
0.18	0.0070	1.4	25	1	10	5971205
0.20	0.0078	1.8	25	1	10	5971249
0.22	0.0087	1.8	25	1	10	5971292
0.25	0.0098	2.2	25	1	10	5971298
0.27	0.0106	2.2	25	1	10	5971301
0.28	0.0110	2.2	25	1	10	5971303
0.30	0.0118	2.2	25	1	10	5971306
0.35	0.0138	2.8	25	1	10	5971122
0.38	0.0150	2.8	25	1	10	5971125
0.39	0.0154	3.6	25	1	10	5971128
0.40	0.0157	3.6	25	1	10	5971131
0.45	0.0177	3.6	25	1	10	5971135
0.50	0.0197	4.0	25	1	10	5971139
0.55	0.0217	4.5	25	1	10	5971143
0.60	0.0236	4.5	25	1	10	5971148
0.62	0.0244	5.0	25	1	10	5971150
0.65	0.0256	5.0	25	1	10	5971154
0.70	0.0276	5.6	25	1	10	5971160
0.75	0.0295	5.6	25	1	10	5971163
0.80	0.0315	6.3	25	1.5	10	5971167
0.85	0.0335	6.3	25	1.5	10	5971171
0.90	0.0354	7.1	25	1.5	10	5971176
0.95	0.0374	7.1	25	1.5	10	5971181
1.00	0.0394	8.0	25	1.5	10	5971186
1.05	0.0413	8.0	25	1.5	10	5971191
1.10	0.0433	9.0	25	1.5	10	5971195
1.20	0.0472	10.0	25	1.5	10	5971200
1.30	0.0512	10.0	25	1.5	10	5971210
1.40	0.0551	11.2	25	1.5	10	5971214

Heavy Duty Screw Machine Length

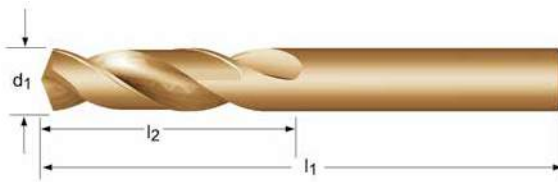
* Sets Available on pg. 239

M40CO - Fractional Sizes

M41CO - Wire Gauge Sizes

M42CO - Letter Sizes

Low thrust design self centering Split Point for easier penetration. Cobalt base material with Bronze tempered for wear resistance and lubricity.



M40CO	M41CO	M42CO
ANSI	ANSI	ANSI
2.5XD	2.5XD	2.5XD
HSS-E	HSS-E	HSS-E
135°	135°	135°
1/16 - 3/4	N60 - N1	A - Z

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	M40CO	M41CO	M42CO
	60		0.0400	1/2	1.3/8	12	—	5996169 ¹⁾	—
	59		0.0410	1/2	1.3/8	12	—	5996164 ¹⁾	—
	58		0.0420	1/2	1.3/8	12	—	5996162 ¹⁾	—
	57		0.0430	1/2	1.3/8	12	—	5996158 ¹⁾	—
	56		0.0465	1/2	1.3/8	12	—	5996154 ¹⁾	—
	55		0.0520	5/8	1.5/8	12	—	5996150 ¹⁾	—
	54		0.0550	5/8	1.5/8	12	—	5996146 ¹⁾	—
	53		0.0595	5/8	1.5/8	12	—	5996142 ¹⁾	—
1/16			0.0625	5/8	1.5/8	12	5996129	—	—
	52		0.0635	11/16	1.11/16	12	—	5996134	—
	51		0.0670	11/16	1.11/16	12	—	5996130	—
	50		0.0700	11/16	1.11/16	12	—	5996126	—
	49		0.0730	11/16	1.11/16	12	—	5996118	—
	48		0.0760	11/16	1.11/16	12	—	5996114	—
5/64			0.0781	11/16	1.11/16	12	5995991	—	—
	47		0.0785	11/16	1.11/16	12	—	5996109	—
	46		0.0810	3/4	1.3/4	12	—	5996106	—
	45		0.0820	3/4	1.3/4	12	—	5996103	—
	44		0.0860	3/4	1.3/4	12	—	5996101	—
	43		0.0890	3/4	1.3/4	12	—	5996095	—
	42		0.0935	3/4	1.3/4	12	—	5996091	—
3/32			0.0938	3/4	1.3/4	12	5995958	—	—
	41		0.0960	13/16	1.13/16	12	—	5996089	—
	40		0.0980	13/16	1.13/16	12	—	5996085	—
	39		0.0995	13/16	1.13/16	12	—	5996079	—
	38		0.1015	13/16	1.13/16	12	—	5996076	—
	37		0.1040	13/16	1.13/16	12	—	5996073	—
	36		0.1065	13/16	1.13/16	12	—	5996069	—
7/64			0.1094	13/16	1.13/16	12	5996005	—	—
	35		0.1100	7/8	1.7/8	12	—	5996065	—
	34		0.1110	7/8	1.7/8	12	—	5996057	—
	33		0.1130	7/8	1.7/8	12	—	5996052	—

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	M40CO	M41CO	M42CO
	32		0.1160	7/8	1.7/8	12	—	5996049	—
	31		0.1200	7/8	1.7/8	12	—	5996045	—
1/8			0.1250	7/8	1.7/8	12	5996145	—	—
	30		0.1285	15/16	1.15/16	12	—	5996041	—
	29		0.1360	15/16	1.15/16	12	—	5996031	—
	28		0.1405	15/16	1.15/16	12	—	5996027	—
9/64			0.1406	15/16	1.15/16	12	5996019	—	—
	27		0.1440	1"	2.1/16	12	—	5996021	—
	26		0.1470	1"	2.1/16	12	—	5996017	—
	25		0.1495	1"	2.1/16	12	—	5996188	—
	24		0.1520	1"	2.1/16	12	—	5996185	—
	23		0.1540	1"	2.1/16	12	—	5996183	—
5/32			0.1563	1"	2.1/16	12	5995987	—	—
	22		0.1570	1.1/16	2.1/8	12	—	5996181	—
	21		0.1590	1.1/16	2.1/8	12	—	5996175	—
	20		0.1610	1.1/16	2.1/8	12	—	5996138	—
	19		0.1660	1.1/16	2.1/8	12	—	5996061	—
	18		0.1695	1.1/16	2.1/8	12	—	5996012	—
11/64			0.1719	1.1/16	2.1/8	12	5995976	—	—
	17		0.1730	1.1/8	2.3/16	12	—	5996058	—
	16		0.1770	1.1/8	2.3/16	12	—	5996050	—
	15		0.1800	1.1/8	2.3/16	12	—	5996046	—
	14		0.1820	1.1/8	2.3/16	12	—	5996042	—
	13		0.1850	1.1/8	2.3/16	12	—	5996038	—
3/16			0.1875	1.1/8	2.3/16	12	5995954	—	—
	12		0.1890	1.3/16	2.1/4	12	—	5996034	—
	11		0.1910	1.3/16	2.1/4	12	—	5996030	—
	10		0.1935	1.3/16	2.1/4	12	—	5996026	—
	9		0.1960	1.3/16	2.1/4	12	—	5996489	—
	8		0.1990	1.3/16	2.1/4	12	—	5996178	—
	7		0.2010	1.3/16	2.1/4	12	—	5996172	—
13/64			0.2031	1.3/16	2.1/4	12	5996054	—	—
	6		0.2040	1.1/4	2.3/8	12	—	5996166	—
	5		0.2055	1.1/4	2.3/8	12	—	5996122	—
	4		0.2090	1.1/4	2.3/8	12	—	5996081	—
	3		0.2130	1.1/4	2.3/8	12	—	5996035	—
7/32			0.2188	1.1/4	2.3/8	12	5996002	—	—
	2		0.2210	1.5/16	2.7/16	12	—	5996098	—
	1		0.2280	1.5/16	2.7/16	12	—	5996023	—
		A	0.2340	1.5/16	2.7/16	12	—	—	5996525
15/64			0.2344	1.5/16	2.7/16	12	5996068	—	—
		B	0.2380	1.3/8	2.1/2	12	—	—	5996569
		C	0.2420	1.3/8	2.1/2	12	—	—	5996603
		D	0.2460	1.3/8	2.1/2	12	—	—	5996646
1/4			0.2500	1.3/8	2.1/2	12	5996137	—	—
		F	0.2570	1.7/16	2.5/8	12	—	—	5996657
		G	0.2610	1.7/16	2.5/8	12	—	—	5996661
17/64			0.2656	1.7/16	2.5/8	12	5996075	—	—
		H	0.2660	1.1/2	2.11/16	12	—	—	5996664
		I	0.2720	1.1/2	2.11/16	12	—	—	5996493
		J	0.2770	1.1/2	2.11/16	12	—	—	5996497
		K	0.2810	1.1/2	2.11/16	12	—	—	5996500
9/32			0.2813	1.1/2	2.11/16	12	5996015	—	—
		L	0.2900	1.9/16	2.3/4	12	—	—	5996503
		M	0.2950	1.9/16	2.3/4	12	—	—	5996506
19/64			0.2969	1.9/16	2.3/4	12	5995938	—	—
		N	0.3020	1.5/8	2.13/16	12	—	—	5996509
5/16			0.3125	1.5/8	2.13/16	6	5995983	—	—
		O	0.3160	1.11/16	2.15/16	6	—	—	5996512
		P	0.3230	1.11/16	2.15/16	6	—	—	5996515
21/64			0.3281	1.11/16	2.15/16	6	5995942	—	—
		Q	0.3320	1.11/16	3"	6	—	—	5996518
		R	0.3390	1.11/16	3"	6	—	—	5996521
11/32			0.3437	1.11/16	3"	6	5995956	—	—
		S	0.3480	1.3/4	3.1/16	6	—	—	5996529
		T	0.3580	1.3/4	3.1/16	6	—	—	5996532

COBALT SCREW MACHINE DRILL

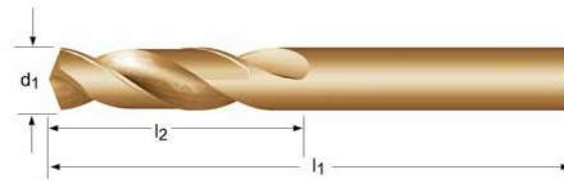


d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	M40CO	M41CO	M42CO
23/64			0.3594	1.3/4	3.1/16	6	5995946	—	—
		U	0.3680	1.13/16	3.1/8	6	—	—	5996536
3/8			0.3750	1.13/16	3.1/8	6	5995962	—	—
		V	0.3770	1.7/8	3.1/4	6	—	—	5996540
		W	0.3860	1.7/8	3.1/4	6	—	—	5996544
25/64			0.3906	1.7/8	3.1/4	6	5995948	—	—
		X	0.3970	1.15/16	3.5/16	6	—	—	5996548
		Y	0.4040	1.15/16	3.5/16	6	—	—	5996553
13/32			0.4063	1.15/16	3.5/16	6	5996011	—	—
		Z	0.4130	2"	3.3/8	6	—	—	5996557
27/64			0.4219	2"	3.3/8	6	5995950	—	—
7/16			0.4375	2.1/16	3.7/16	6	5995998	—	—
29/64			0.4531	2.1/8	3.9/16	6	5995952	—	—
15/32			0.4687	2.1/8	3.5/8	6	5996063	—	—
31/64			0.4844	2.3/16	3.11/16	6	5995964	—	—
1/2			0.5000	2.1/4	3.3/4	6	5996133	—	—
33/64			0.5156	2.3/8	3.7/8	1	5995966	—	—
17/32			0.5313	2.3/8	3.7/8	1	5996071	—	—
35/64			0.5469	2.1/2	4"	1	5995968	—	—
9/16			0.5625	2.1/2	4"	1	5996008	—	—
37/64			0.5781	2.5/8	4.1/8	1	5995969	—	—
19/32			0.5937	2.5/8	4.1/8	1	5995936	—	—
39/64			0.6094	2.3/4	4.1/4	1	5995970	—	—
5/8			0.6250	2.3/4	4.1/4	1	5995994	—	—
41/64			0.6406	2.7/8	4.1/2	1	5995972	—	—
21/32			0.6563	2.7/8	4.1/2	1	5995940	—	—
43/64			0.6719	2.7/8	4.5/8	1	5995974	—	—
11/16			0.6875	2.7/8	4.5/8	1	5995934	—	—
45/64			0.7031	3"	4.3/4	1	5995978	—	—
23/32			0.7188	3"	4.3/4	1	5995944	—	—
47/64			0.7344	3.1/8	5"	1	5995981	—	—
3/4			0.7500	3.1/8	5"	1	5995960	—	—

Heavy Duty Screw Machine Length, Metric

4ASMCO

Low thrust design self centering Split Point for easier penetration.
Cobalt base material with Bronze tempered for wear resistance and lubricity.



4ASMCO

DIN
1897

2.5XD

HSS-E

135°



2.30 - 12.00

d_1 Ø mm	d_1 decimal Inch	l_2 mm	l_1 mm	Pack Qty	4ASMCO
2.30	0.0906	13	40	12	6001006
2.50	0.0984	14	43	12	6001014
3.00	0.1181	16	46	12	6001019
3.10	0.1220	18	49	12	6001024
3.20	0.1260	18	49	12	6001030
3.30	0.1299	18	49	12	6000870
3.40	0.1339	20	52	12	6000875
3.50	0.1378	20	52	12	6000884
3.60	0.1417	20	52	12	6000888
3.70	0.1457	20	52	12	6000893
4.00	0.1575	22	55	12	6000899
4.10	0.1614	22	55	12	6000904
4.20	0.1654	22	55	12	6000909
4.70	0.1850	24	58	12	6000914
4.80	0.1890	26	62	12	6000920
4.90	0.1929	26	62	12	6000930
5.00	0.1969	26	62	12	6000935
5.10	0.2008	26	62	12	6000940
5.50	0.2165	28	66	12	6000944
5.70	0.2244	28	66	12	6000946
6.00	0.2362	28	66	12	6000947
6.40	0.2520	31	70	12	6000950
6.50	0.2559	31	70	12	6000953
6.80	0.2677	34	74	12	6000955
7.00	0.2756	34	74	12	6000957
8.00	0.3150	37	79	6	6000960
8.50	0.3346	37	79	6	6000962
9.50	0.3740	40	84	6	6000964
9.80	0.3858	43	89	6	6000966
10.00	0.3937	43	89	6	6001166
10.20	0.4016	43	89	6	6001170
10.50	0.4134	43	89	6	6001182
11.00	0.4331	47	95	6	6000863
11.20	0.4409	47	95	6	6000925
11.50	0.4528	47	95	6	6000959
12.00	0.4724	51	102	6	6000979

TAPER LENGTH DRILL



General Purpose Taper Length

* Sets Available on pg. 240

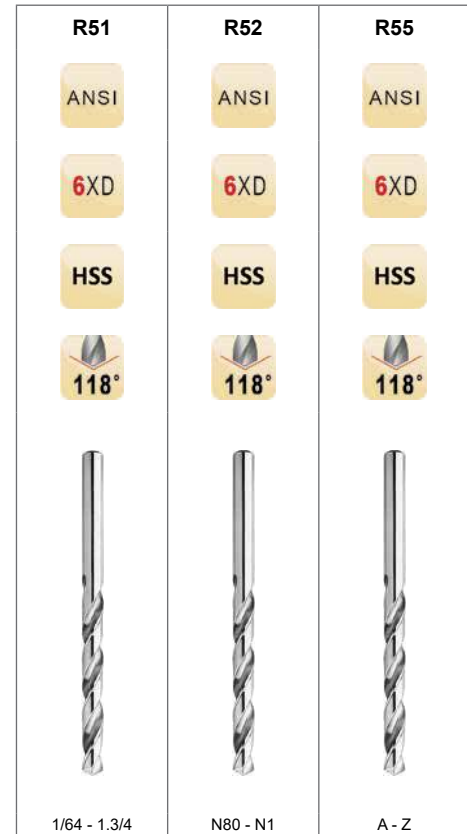
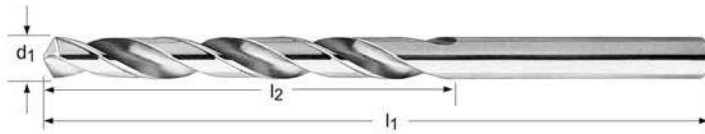
R51 - Fractional Sizes

R52 - Wire Gauge Sizes

R55 - Letter Sizes

Bright finish improves chip flow in soft or non-ferrous materials.
Longer flute and Overall length for depth and reach.

* Sizes 45/64 and larger are steam tempered



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R51	R52	R55
1/64	80		0.0135	5/16	1.1/2	12	—	5999626	—
	79		0.0145	5/16	1.1/2	12	—	5999617	—
			0.0156	5/16	1.1/2	12	5999668	—	—
	78		0.0160	5/16	1.1/2	12	—	5999613	—
	77		0.0180	5/16	1.1/2	12	—	5999607	—
	76		0.0200	5/16	1.1/2	12	—	5999567	—
	75		0.0210	5/16	1.1/2	12	—	5999541	—
	74		0.0225	5/16	1.1/2	12	—	5999519	—
	73		0.0240	5/16	1.1/2	12	—	5999496	—
	72		0.0250	5/16	1.1/2	12	—	6000270	—
1/32	71		0.0260	3/4	2"	12	—	6000264	—
	70		0.0280	3/4	2"	12	—	6000262	—
	69		0.0292	3/4	2"	12	—	6000257	—
	68		0.0310	3/4	2"	12	—	6000254	—
			0.0313	3/4	2"	12	5999661	—	—
	67		0.0320	3/4	2"	12	—	6000250	—
	66		0.0330	3/4	2"	12	—	6000248	—
	65		0.0350	3/4	2"	12	—	6000245	—
	64		0.0360	3/4	2"	12	—	6000242	—
	63		0.0370	3/4	2"	12	—	6000239	—
3/64	62		0.0380	3/4	2"	12	—	6000232	—
	61		0.0390	1.1/8	2.1/4	12	—	6000229	—
	60		0.0400	1.1/8	2.1/4	12	—	6000226	—
	59		0.0410	1.1/8	2.1/4	12	—	6000221	—
	58		0.0420	1.1/8	2.1/4	12	—	6000218	—
	57		0.0430	1.1/8	2.1/4	12	—	6000215	—
	56		0.0465	1.1/8	2.1/4	12	—	6000212	—
			0.0469	1.1/8	2.1/4	12	5999764	—	—
	55		0.0520	1.3/4	3"	12	—	6000209	—
	54		0.0550	1.3/4	3"	12	—	6000206	—
1/16	53		0.0595	1.3/4	3"	12	—	6000200	—
			0.0625	1.3/4	3"	12	5999654	—	—

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R51	R52	R55
	52		0.0635	2"	3.3/4	12	—	6000197	—
	51		0.0670	2"	3.3/4	12	—	6000194	—
	50		0.0700	2"	3.3/4	12	—	6000191	—
	49		0.0730	2"	3.3/4	12	—	6000183	—
	48		0.0760	2"	3.3/4	12	—	6000179	—
5/64			0.0781	2"	3.3/4	12	6000231	—	—
	47		0.0785	2.1/4	4.1/4	12	—	6000177	—
	46		0.0810	2.1/4	4.1/4	12	—	6000173	—
	45		0.0820	2.1/4	4.1/4	12	—	6000170	—
	44		0.0860	2.1/4	4.1/4	12	—	6000164	—
	43		0.0890	2.1/4	4.1/4	12	—	6000160	—
	42		0.0935	2.1/4	4.1/4	12	—	6000157	—
3/32			0.0938	2.1/4	4.1/4	12	5999759	—	—
	41		0.0960	2.1/2	4.5/8	12	—	6000153	—
	40		0.0980	2.1/2	4.5/8	12	—	6000149	—
	39		0.0995	2.1/2	4.5/8	12	—	6000141	—
	38		0.1015	2.1/2	4.5/8	12	—	6000136	—
	37		0.1040	2.1/2	4.5/8	12	—	6000132	—
	36		0.1065	2.1/2	4.5/8	12	—	6000128	—
7/64			0.1094	2.1/2	4.5/8	12	6000266	—	—
	35		0.1100	2.3/4	5.1/8	12	—	6000283	—
	34		0.1110	2.3/4	5.1/8	12	—	6000280	—
	33		0.1130	2.3/4	5.1/8	12	—	6000277	—
	32		0.1160	2.3/4	5.1/8	12	—	6000273	—
	31		0.1200	2.3/4	5.1/8	12	—	6000267	—
1/8			0.1250	2.3/4	5.1/8	12	5999672	—	—
	30		0.1285	3"	5.3/8	12	—	6000235	—
	29		0.1360	3"	5.3/8	12	—	6000168	—
	28		0.1405	3"	5.3/8	12	—	6000121	—
9/64			0.1406	3"	5.3/8	12	6000279	—	—
	27		0.1440	3"	5.3/8	12	—	5999750	—
	26		0.1470	3"	5.3/8	12	—	5999743	—
	25		0.1495	3"	5.3/8	12	—	5999741	—
	24		0.1520	3"	5.3/8	12	—	5999737	—
	23		0.1540	3"	5.3/8	12	—	5999734	—
5/32			0.1563	3"	5.3/8	12	6000228	—	—
	22		0.1570	3.3/8	5.3/4	12	—	5999730	—
	21		0.1590	3.3/8	5.3/4	12	—	5999726	—
	20		0.1610	3.3/8	5.3/4	12	—	5999723	—
	19		0.1660	3.3/8	5.3/4	12	—	5999716	—
	18		0.1695	3.3/8	5.3/4	12	—	5999712	—
11/64			0.1719	3.3/8	5.3/4	12	5999688	—	—
	17		0.1730	3.3/8	5.3/4	12	—	5999706	—
	16		0.1770	3.3/8	5.3/4	12	—	5999703	—
	15		0.1800	3.3/8	5.3/4	12	—	5999701	—
	14		0.1820	3.3/8	5.3/4	12	—	5999697	—
	13		0.1850	3.3/8	5.3/4	12	—	5999693	—
3/16			0.1875	3.3/8	5.3/4	12	5999757	—	—
	12		0.1890	3.5/8	6"	12	—	5999691	—
	11		0.1910	3.5/8	6"	12	—	5999687	—
	10		0.1935	3.5/8	6"	12	—	5999683	—
	9		0.1960	3.5/8	6"	12	—	5999499	—
	8		0.1990	3.5/8	6"	12	—	5999622	—
	7		0.2010	3.5/8	6"	12	—	6000259	—
13/64			0.2031	3.5/8	6"	12	5999698	—	—
	6		0.2040	3.5/8	6"	12	—	6000223	—
	5		0.2055	3.5/8	6"	12	—	6000187	—
	4		0.2090	3.5/8	6"	12	—	6000145	—
	3		0.2130	3.5/8	6"	12	—	6000203	—
7/32			0.2188	3.5/8	6"	12	6000263	—	—
	2		0.2210	3.3/4	6.1/8	12	—	5999719	—
	1		0.2280	3.3/4	6.1/8	12	—	5999679	—
		A	0.2340	3.3/4	6.1/8	12	—	—	5999547
15/64			0.2344	3.3/4	6.1/8	12	5999704	—	—
		B	0.2380	3.3/4	6.1/8	12	—	—	5999549
		C	0.2420	3.3/4	6.1/8	12	—	—	5999551

TAPER LENGTH DRILL



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R51	R52	R55
		D	0.2460	3.3/4	6.1/8	12	—	—	5999553
1/4		E	0.2500	3.3/4	6.1/8	12	5999664	—	—
		F	0.2570	3.7/8	6.1/4	12	—	—	5999558
		G	0.2610	3.7/8	6.1/4	6	—	—	6000451
17/64			0.2656	3.7/8	6.1/4	6	5999713	—	—
		H	0.2660	3.7/8	6.1/4	6	—	—	6000454
		I	0.2720	3.7/8	6.1/4	6	—	—	6000457
		J	0.2770	3.7/8	6.1/4	6	—	—	6000459
		K	0.2810	3.7/8	6.1/4	6	—	—	6000298
9/32			0.2813	3.7/8	6.1/4	6	6000276	—	—
		L	0.2900	4"	6.3/8	6	—	—	6000301
		M	0.2950	4"	6.3/8	6	—	—	6000304
19/64			0.2969	4"	6.3/8	6	5999718	—	—
		N	0.3020	4"	6.3/8	6	—	—	6000307
5/16			0.3125	4"	6.3/8	6	6000381	—	—
		O	0.3161	4.1/8	6.1/2	6	—	—	6000310
		P	0.3230	4.1/8	6.1/2	6	—	—	6000313
21/64			0.3281	4.1/8	6.1/2	6	5999725	—	—
		Q	0.3320	4.1/8	6.1/2	6	—	—	6000316
		R	0.3390	4.1/8	6.1/2	6	—	—	6000319
11/32			0.3437	4.1/8	6.1/2	6	5999684	—	—
		S	0.3480	4.1/4	6.3/4	6	—	—	6000322
		T	0.3580	4.1/4	6.3/4	6	—	—	6000325
23/64			0.3594	4.1/4	6.3/4	6	5999733	—	—
		U	0.3680	4.1/4	6.3/4	6	—	—	6000331
3/8			0.3750	4.1/4	6.3/4	6	5999766	—	—
		V	0.3770	4.3/8	7"	6	—	—	6000333
		W	0.3860	4.3/8	7"	6	—	—	6000336
25/64			0.3906	4.3/8	7"	6	5999739	—	—
		X	0.3970	4.3/8	7"	6	—	—	6000338
		Y	0.4040	4.3/8	7"	6	—	—	6000341
13/32			0.4063	4.3/8	7"	6	5999695	—	—
		Z	0.4130	4.5/8	7.1/4	6	—	—	6000344
27/64			0.4219	4.5/8	7.1/4	6	5999748	—	—
7/16			0.4375	4.5/8	7.1/4	6	6000261	—	—
29/64			0.4531	4.3/4	7.1/2	6	5999754	—	—
15/32			0.4687	4.3/4	7.1/2	6	5999702	—	—
31/64			0.4844	4.3/4	7.3/4	6	5999770	—	—
1/2			0.5000	4.3/4	7.3/4	6	5999657	—	—
33/64			0.5156	4.3/4	8"	1	5999776	—	—
17/32			0.5313	4.3/4	8"	1	5999707	—	—
35/64			0.5469	4.7/8	8.1/4	1	6000225	—	—
9/16			0.5625	4.7/8	8.1/4	1	6000272	—	—
37/64			0.5781	4.7/8	8.3/4	1	6000258	—	—
19/32			0.5937	4.7/8	8.3/4	1	5999715	—	—
39/64			0.6094	4.7/8	8.3/4	1	6000289	—	—
5/8			0.6250	4.7/8	8.3/4	1	6000234	—	—
41/64			0.6406	5.1/8	9"	1	6000321	—	—
21/32			0.6563	5.1/8	9"	1	5999722	—	—
43/64			0.6719	5.3/8	9.1/4	1	6000358	—	—
11/16			0.6875	5.3/8	9.1/4	1	5999680	—	—
45/64			0.7031	5.5/8	9.1/2	1	6000366	¹⁾ —	—
23/32			0.7188	5.5/8	9.1/2	1	5999729	¹⁾ —	—
47/64			0.7344	5.7/8	9.3/4	1	6000371	¹⁾ —	—
3/4			0.7500	5.7/8	9.3/4	1	5999761	¹⁾ —	—
49/64			0.7656	6"	9.7/8	1	6000376	¹⁾ —	—
25/32			0.7813	6"	9.7/8	1	5999736	¹⁾ —	—
51/64			0.7969	6.1/8	10"	1	6000237	¹⁾ —	—
13/16			0.8125	6.1/8	10"	1	5999692	¹⁾ —	—
53/64			0.8281	6.1/8	10"	1	6000240	¹⁾ —	—
27/32			0.8438	6.1/8	10"	1	5999742	¹⁾ —	—
55/64			0.8594	6.1/8	10"	1	6000243	¹⁾ —	—
7/8			0.8750	6.1/8	10"	1	6000269	¹⁾ —	—
57/64			0.8906	6.1/8	10"	1	6000246	¹⁾ —	—
29/32			0.9063	6.1/8	10"	1	5999751	¹⁾ —	—

¹⁾ steam tempered

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	R51	R52	R55
59/64			0.9219	6.1/8	10.3/4	1	6000251 ¹⁾	—	—
15/16			0.9375	6.1/8	10.3/4	1	5999700 ¹⁾	—	—
61/64			0.9531	6.3/8	11"	1	6000253 ¹⁾	—	—
31/32			0.9688	6.3/8	11"	1	5999768 ¹⁾	—	—
63/64			0.9844	6.3/8	11"	1	6000255 ¹⁾	—	—
1"			1.0000	6.3/8	11"	1	5998971 ¹⁾	—	—
1.1/64			1.0156	6.1/2	11.1/8	1	5998984 ¹⁾	—	—
1.1/32			1.0312	6.1/2	11.1/8	1	5998978 ¹⁾	—	—
1.3/64			1.0469	6.5/8	11.1/4	1	5999710 ¹⁾	—	—
1.1/16			1.0625	6.5/8	11.1/4	1	5998973 ¹⁾	—	—
1.5/64			1.0781	6.7/8	11.1/2	1	5999781 ¹⁾	—	—
1.3/32			1.0937	6.7/8	11.1/2	1	5999633 ¹⁾	—	—
1.7/64			1.1094	7.1/8	11.3/4	1	5999641 ¹⁾	—	—
1.1/8			1.1250	7.1/8	11.3/4	1	5998987 ¹⁾	—	—
1.9/64			1.1406	7.1/4	11.7/8	1	5999649 ¹⁾	—	—
1.5/32			1.1563	7.1/4	11.7/8	1	5999778 ¹⁾	—	—
1.11/64			1.1719	7.3/8	12"	1	5998990 ¹⁾	—	—
1.3/16			1.1875	7.3/8	12"	1	5999004 ¹⁾	—	—
1.13/64			1.2031	7.1/2	12.1/8	1	5998993 ¹⁾	—	—
1.7/32			1.2187	7.1/2	12.1/8	1	5999637 ¹⁾	—	—
1.15/64			1.2344	7.7/8	12.1/2	1	5998997 ¹⁾	—	—
1.1/4			1.2500	7.7/8	12.1/2	1	5998981 ¹⁾	—	—
1.5/16			1.3125	8.5/8	14.1/4	1	5999773 ¹⁾	—	—
1.3/8			1.3750	8.7/8	14.1/2	1	5999745 ¹⁾	—	—
1.7/16			1.4375	9.1/8	14.3/4	1	5999787 ¹⁾	—	—
1.1/2			1.5000	9.3/8	15"	1	5998976 ¹⁾	—	—
1.9/16			1.5625	9.5/8	15.1/4	1	5999645 ¹⁾	—	—
1.5/8			1.6250	9.7/8	15.5/8	1	5999784 ¹⁾	—	—
1.3/4			1.7500	10.1/2	16.1/4	1	5999676 ¹⁾	—	—

¹⁾ steam tempered

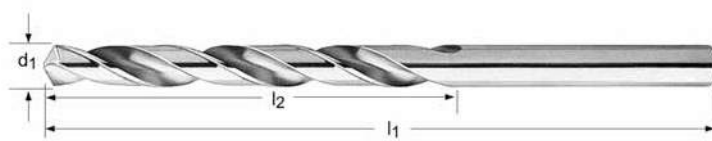
TAPER LENGTH DRILL



General Purpose Taper Length, Metric

5ATL Bright Finish improves chip flow in soft or non-ferrous materials. Longer Flute and Overall length for depth and reach.

* 18mm and larger are steam tempered



5ATL

DIN
340

6XD

HSS

118°



1.00 - 31.00

d ₁ Ø mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	5ATL
1.00	0.0394	33	56	12	6000480
1.20	0.0472	41	65	12	6000486
1.25	0.0492	41	65	12	6000489
1.30	0.0512	41	65	12	6000492
1.40	0.0551	45	70	12	6000494
1.50	0.0591	45	70	12	6000496
1.60	0.0630	50	76	12	6000499
1.70	0.0669	50	76	12	6000502
1.80	0.0709	53	80	12	6000505
1.90	0.0748	53	80	12	6000508
2.00	0.0787	56	85	12	6000810
2.10	0.0827	56	85	12	6000813
2.15	0.0846	59	90	12	6000816
2.20	0.0866	59	90	12	6000819
2.30	0.0906	59	90	12	6000822
2.40	0.0945	62	95	12	6000825
2.50	0.0984	62	95	12	6000828
3.00	0.1181	66	100	12	6000912
3.10	0.1220	69	106	12	6000917
3.20	0.1260	69	106	12	6000926
3.30	0.1299	69	106	12	6001365
3.40	0.1339	73	112	12	6001416
3.50	0.1378	73	112	12	6001458
3.60	0.1417	73	112	12	6001480
3.70	0.1457	73	112	12	6001504
3.80	0.1496	78	119	12	6001508
4.00	0.1575	78	119	12	6001370
4.20	0.1654	78	119	12	6001374
4.30	0.1693	82	126	12	6001379
4.50	0.1772	82	126	12	6001384
4.60	0.1811	82	126	12	6001389
4.80	0.1890	87	132	12	6001392

d ₁ Ø mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	5ATL
5.00	0.1969	87	132	12	6001399
5.50	0.2165	91	139	12	6001404
5.60	0.2205	91	139	12	6001407
5.70	0.2244	91	139	12	6001411
6.00	0.2362	91	139	12	6001421
6.40	0.2520	97	148	6	6001426
6.50	0.2559	97	148	6	6001431
6.80	0.2677	102	156	6	6001435
7.00	0.2756	102	156	6	6001440
7.20	0.2835	102	156	6	6001444
7.50	0.2953	102	156	6	6001450
7.80	0.3071	109	165	6	6001452
8.00	0.3150	109	165	6	6001454
8.20	0.3228	109	165	6	6001456
8.50	0.3346	109	165	6	6001460
9.00	0.3543	115	175	6	6001462
9.20	0.3622	115	175	6	6001464
9.50	0.3740	115	175	6	6001466
9.80	0.3858	121	184	6	6001468
10.00	0.3937	121	184	6	6000511
10.20	0.4016	121	184	6	6000518
10.50	0.4134	121	184	6	6000763
11.00	0.4331	128	195	6	6000802
11.20	0.4409	128	195	6	6000834
11.50	0.4528	128	195	6	6000871
12.00	0.4724	134	205	6	6000921
12.50	0.4921	134	205	6	6000931
13.00	0.5118	134	205	1	6000939
13.50	0.5315	140	214	1	6000943
13.80	0.5433	140	214	1	6000945
14.00	0.5512	140	214	1	6000769
14.50	0.5709	144	220	1	6000773
15.00	0.5906	144	220	1	6000777
15.50	0.6102	149	227	1	6000781
16.00	0.6299	149	227	1	6000785
16.50	0.6496	154	235	1	6000788
17.00	0.6693	154	235	1	6000791
17.50	0.6890	158	241	1	6000794
18.00	0.7087	158	241	1	6000797 ¹⁾
18.50	0.7283	162	247	1	6000799 ¹⁾
19.00	0.7480	162	247	1	6000805 ¹⁾
19.50	0.7677	166	254	1	6000808 ¹⁾
20.00	0.7874	166	254	1	6000830 ¹⁾
20.50	0.8071	171	261	1	6000837 ¹⁾
21.00	0.8268	171	261	1	6000840 ¹⁾
21.50	0.8465	176	268	1	6000844 ¹⁾
22.00	0.8661	176	268	1	6000845 ¹⁾
22.50	0.8858	180	275	1	6000848 ¹⁾
23.00	0.9055	180	275	1	6000852 ¹⁾
23.50	0.9252	180	275	1	6000855 ¹⁾
24.00	0.9449	185	282	1	6000858 ¹⁾
24.50	0.9646	185	282	1	6000860 ¹⁾
25.00	0.9843	185	282	1	6000866 ¹⁾
25.50	1.0039	190	290	1	6000876 ¹⁾
26.00	1.0236	190	290	1	6000880 ¹⁾
26.50	1.0433	190	290	1	6000885 ¹⁾
27.00	1.0630	195	298	1	6000889 ¹⁾
28.00	1.1024	195	298	1	6000894 ¹⁾
28.50	1.1220	201	307	1	6000898 ¹⁾
29.00	1.1417	201	307	1	6000902 ¹⁾
29.50	1.1614	201	307	1	6000907 ¹⁾
30.00	1.1811	201	307	1	6001510 ¹⁾
30.50	1.2008	207	316	1	6001512 ¹⁾
31.00	1.2205	207	316	1	6001514 ¹⁾

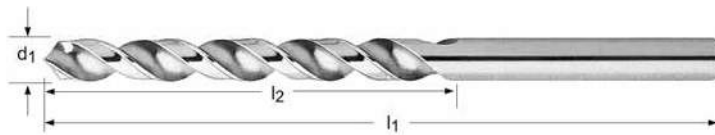
¹⁾ steam tempered

TAPER LENGTH DRILL



High Helix Taper Length

R51FS High Helix and Bright Finish for better chip flow in soft or non-ferrous materials. Longer Flute and Overall length for depth and reach.



R51FS

ANSI

6XD

HSS

118°



1/16 - 1/2

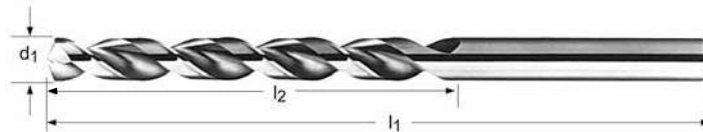
d_1 Ø Inch	d_1 decimal Inch	l_2 Inch	l_1 Inch	Pack Qty	R51FS
1/16	0.0625	1.3/4	3"	12	5998977
5/64	0.0781	2"	3.3/4	12	5998917
3/32	0.0938	2.1/4	4.1/4	12	5998788
7/64	0.1094	2.1/2	4.5/8	12	5998747
1/8	0.1250	2.3/4	5.1/8	12	5998985
9/64	0.1406	3"	5.3/8	12	5998755
5/32	0.1563	3"	5.3/8	12	5998913
11/64	0.1719	3.3/8	5.3/4	12	5998991
3/16	0.1875	3.3/8	5.3/4	12	5998743
13/64	0.2031	3.5/8	6"	12	5999002
7/32	0.2188	3.5/8	6"	12	5998924
15/64	0.2344	3.3/4	6.1/8	12	5999009
1/4	0.2500	3.3/4	6.1/8	12	5998982
17/64	0.2656	3.7/8	6.1/4	6	5999013
9/32	0.2813	3.7/8	6.1/4	6	5998751
19/64	0.2969	4"	6.3/8	6	5999017
5/16	0.3125	4"	6.3/8	6	5998905
21/64	0.3281	4.1/8	6.1/2	6	5999023
11/32	0.3437	4.1/8	6.1/2	6	5998989
23/64	0.3594	4.1/4	6.3/4	6	5999027
3/8	0.3750	4.1/4	6.3/4	6	5998829
25/64	0.3906	4.3/8	7"	6	5999030
13/32	0.4063	4.3/8	7"	6	5998998
27/64	0.4219	4.5/8	7.1/4	6	5999034
7/16	0.4375	4.5/8	7.1/4	6	5998920
29/64	0.4531	4.3/4	7.1/2	6	5999043
15/32	0.4687	4.3/4	7.1/2	6	5999006
31/64	0.4844	4.3/4	7.3/4	6	5998861
1/2	0.5000	4.3/4	7.3/4	6	5998980

General Purpose Taper Length Parabolic Flute

Heavy-Duty Parabolic Flute design for efficient chip removal. Allows greater drilling depths in one pass. Low thrust design self centering Split Point for easier penetration.

QC91P Bright Finish improves chip flow in soft or non-ferrous materials.

QC91G TiN Coating increases wear resistance and improves tool life.



QC91P	QC91G
1/16 - 11/16	1/16 - 1/2

d ₁ Ø " / Nr.	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	QC91P	QC91G
1/16	0.0625	1.3/4	3"	12	5997190	5996826
52	0.0635	2"	3.3/4	12	5997169	5996809
51	0.0670	2"	3.3/4	12	5997164	5996805
50	0.0700	2"	3.3/4	12	5997159	5996801
49	0.0730	2"	3.3/4	12	5997149	5996794
48	0.0760	2"	3.3/4	12	5997145	—
5/64	0.0781	2"	3.3/4	12	5997426	5997143
47	0.0785	2.1/4	4.1/4	12	5997142	5996788
46	0.0810	2.1/4	4.1/4	12	5997135	5996780
45	0.0820	2.1/4	4.1/4	12	5997132	5996777
44	0.0860	2.1/4	4.1/4	12	5997126	5996773
43	0.0890	2.1/4	4.1/4	12	5997122	5996769
42	0.0935	2.1/4	4.1/4	12	5997118	5996765
3/32	0.0938	2.1/4	4.1/4	12	5997472	5996895
41	0.0960	2.1/2	4.5/8	12	5997114	5996762
40	0.0980	2.1/2	4.5/8	12	5997109	5996759
39	0.0995	2.1/2	4.5/8	12	5997099	5996753
38	0.1015	2.1/2	4.5/8	12	5997095	5996750
37	0.1040	2.1/2	4.5/8	12	5997242	5996920
36	0.1065	2.1/2	4.5/8	12	5997240	5996916
7/64	0.1094	2.1/2	4.5/8	12	5997439	5997198
35	0.1100	2.3/4	5.1/8	12	5997239	5996911
34	0.1110	2.3/4	5.1/8	12	5997237	5996907
33	0.1130	2.3/4	5.1/8	12	5997233	—
32	0.1160	2.3/4	5.1/8	12	5997213	5996855
31	0.1200	2.3/4	5.1/8	12	5997184	5996820
1/8	0.1250	2.3/4	5.1/8	12	5997199	5996834
30	0.1285	3"	5.3/8	12	5997138	5996784
29	0.1360	3"	5.3/8	12	5998036	5996793
28	0.1405	3"	5.3/8	12	5998029	5996785
9/64	0.1406	3"	5.3/8	12	5997451	5997204
27	0.1440	3"	5.3/8	12	5998026	—
26	0.1470	3"	5.3/8	12	5998021	5996774

TAPER LENGTH DRILL



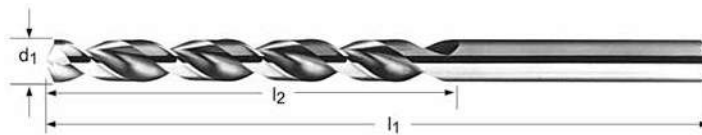
d ₁ Ø "/Nr.	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	QC91P	QC91G
25	0.1495	3"	5.3/8	12	5998017	5996770
24	0.1520	3"	5.3/8	12	5998013	5996767
23	0.1540	3"	5.3/8	12	5998009	—
5/32	0.1563	3"	5.3/8	12	5997421	5997098
22	0.1570	3.3/8	5.3/4	12	5998006	—
21	0.1590	3.3/8	5.3/4	12	5998002	5996757
20	0.1610	3.3/8	5.3/4	12	5997998	5996754
19	0.1660	3.3/8	5.3/4	12	5997989	5996745
18	0.1695	3.3/8	5.3/4	12	5997986	5996743
11/64	0.1719	3.3/8	5.3/4	12	5997207	5996840
17	0.1730	3.3/8	5.3/4	12	5997983	5996741
16	0.1770	3.3/8	5.3/4	12	5997979	5996739
15	0.1800	3.3/8	5.3/4	12	5997976	5996737
14	0.1820	3.3/8	5.3/4	12	5997973	5996735
13	0.1850	3.3/8	5.3/4	12	5997971	5996733
3/16	0.1875	3.3/8	5.3/4	12	5997445	5996891
12	0.1890	3.5/8	6"	12	5997968	—
11	0.1910	3.5/8	6"	12	5997966	5996729
10	0.1935	3.5/8	6"	12	5997964	—
9	0.1960	3.5/8	6"	12	5997187	5996823
8	0.1990	3.5/8	6"	12	5997181	5996817
7	0.2010	3.5/8	6"	12	5997177	5996815
13/64	0.2031	3.5/8	6"	12	5997211	5996847
6	0.2040	3.5/8	6"	12	5997174	5996812
5	0.2055	3.5/8	6"	12	5997154	5996798
4	0.2090	3.5/8	6"	12	5997103	5996756
3	0.2130	3.5/8	6"	12	5997089	5996746
7/32	0.2188	3.5/8	6"	12	5997435	5997195
2	0.2210	3.3/4	6.1/8	12	5997995	5996751
1	0.2280	3.3/4	6.1/8	12	5997960	—
15/64	0.2344	3.3/4	6.1/8	12	5997217	5996859
1/4	0.2500	3.3/4	6.1/8	12	5997196	5996831
17/64	0.2656	3.7/8	6.1/4	6	5997221	5996863
9/32	0.2813	3.7/8	6.1/4	6	5997448	5997201
19/64	0.2969	4"	6.3/8	6	5997225	5996867
5/16	0.3125	4"	6.3/8	6	5997416	5997063
21/64	0.3281	4.1/8	6.1/2	6	5997229	5996870
11/32	0.3437	4.1/8	6.1/2	6	5997205	5996837
23/64	0.3594	4.1/4	6.3/4	6	5997230	—
3/8	0.3750	4.1/4	6.3/4	6	5997497	5996903
25/64	0.3906	4.3/8	7"	6	5997232	5996878
13/32	0.4063	4.3/8	7"	6	5997209	5996844
27/64	0.4219	4.5/8	7.1/4	6	5997235	5996881
7/16	0.4375	4.5/8	7.1/4	6	5997432	5997189
29/64	0.4531	4.3/4	7.1/2	6	5997398	5996884
15/32	0.4687	4.3/4	7.1/2	6	5997215	—
31/64	0.4844	4.3/4	7.3/4	6	5997531	—
1/2	0.5000	4.3/4	7.3/4	6	5997193	5996828
33/64	0.5156	4.3/4	8"	1	5997538	—
17/32	0.5313	4.3/4	8"	1	5997219	—
35/64	0.5469	4.7/8	8.1/4	1	5997541	—
9/16	0.5625	4.7/8	8.1/4	1	5997442	—
37/64	0.5781	4.7/8	8.3/4	1	5997545	—
19/32	0.5937	4.7/8	8.3/4	1	5997223	—
5/8	0.6250	4.7/8	8.3/4	1	5997429	—
21/32	0.6563	5.1/8	9"	1	5997227	—
11/16	0.6875	5.3/8	9.1/4	1	5997202	—

General Purpose Taper Length Parabolic Flute, Metric

Heavy-Duty Parabolic Flute design for efficient chip evacuation. Allows greater drilling depths in one pass.
Low thrust design self centering Split Point for easier penetration.

QC91PM Bright Finish improves chip flow in soft or non-ferrous materials.

QC91GM TiN Coating increases wear resistance and improves tool life.



QC91PM	QC91GM
1.50 - 17.00	1.50 - 12.50

d ₁ Ø mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	Pack Qty	QC91PM	QC91GM
1.50	0.0591	45	70	12	5997412	5996902
2.00	0.0787	56	85	12	5998048	5996804
2.50	0.0984	62	95	12	5998052	5996808
3.00	0.1181	66	100	12	5997892	5996673
3.50	0.1378	73	112	12	5997896	5996675
4.00	0.1575	78	119	12	5997899	5996679
4.50	0.1772	82	126	12	5997904	5996681
5.00	0.1969	87	132	12	5997907	5996685
5.20	0.2047	87	132	12	5997911	5996687
5.50	0.2165	91	139	12	5997915	5996690
6.00	0.2362	91	139	12	5997921	5996696
6.50	0.2559	97	148	6	5997926	5996700
6.80	0.2677	102	156	6	5997933	—
7.00	0.2756	102	156	6	5997936	5996706
8.00	0.3150	109	165	6	5997941	5996710
8.20	0.3228	109	165	6	5997944	—
8.50	0.3346	109	165	6	5997948	5996714
8.60	0.3386	115	175	6	5997952	5996716
9.00	0.3543	115	175	6	5997955	5996718
9.50	0.3740	115	175	6	5997958	—
10.00	0.3937	121	184	6	5997417	5996668
10.50	0.4134	121	184	6	5997422	5996702
11.00	0.4331	128	195	6	5997425	—
12.00	0.4724	134	205	6	5997433	5996789
12.50	0.4921	134	205	6	5997436	5996796
13.00	0.5118	134	205	1	5997438	—
13.50	0.5315	140	214	1	5997441	—
14.00	0.5512	140	214	1	5997447	—
15.00	0.5906	144	220	1	5997929	—
15.50	0.6102	149	227	1	5997962	—
16.00	0.6299	149	227	1	5997992	—
17.00	0.6693	154	235	1	5998040	—

COBALT TAPER LENGTH DRILL

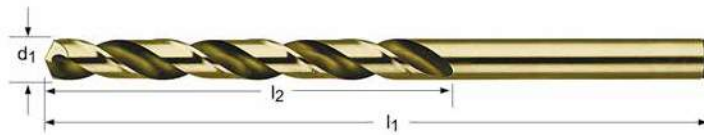


Heavy Duty Taper Length

M51CO - Fractional Sizes

M52CO - Wire Gauge Sizes

Low thrust design Heavy Duty self centering Split Point for easier penetration.
Cobalt base material with Bronze tempered for wear resistance and lubricity.



M51CO	M52CO
ANSI	ANSI
6XD	6XD
HSS-E	HSS-E
135°	135°
	
1/16 - 1"	N40 - N1

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	M51CO	M52CO
1/16		0.0625	1.3/4	3"	12	5996565	—
5/64		0.0781	2"	3.3/4	12	5996328	—
3/32		0.0938	2.1/4	4.1/4	12	5996444	—
	40	0.0980	2.1/2	4.5/8	12	—	5995712
	39	0.0995	2.1/2	4.5/8	12	—	5995706
	36	0.1065	2.1/2	4.5/8	12	—	5995704
7/64		0.1094	2.1/2	4.5/8	12	5996373	—
	35	0.1100	2.3/4	5.1/8	12	—	5995702
	34	0.1110	2.3/4	5.1/8	12	—	5995701
	33	0.1130	2.3/4	5.1/8	12	—	5995699
	32	0.1160	2.3/4	5.1/8	12	—	5995697
	31	0.1200	2.3/4	5.1/8	12	—	5995695
1/8		0.1250	2.3/4	5.1/8	12	5996577	—
	30	0.1285	3"	5.3/8	12	—	5995693
	29	0.1360	3"	5.3/8	12	—	5995838
	28	0.1405	3"	5.3/8	12	—	5995834
9/64		0.1406	3"	5.3/8	12	5996391	—
	27	0.1440	3"	5.3/8	12	—	5995830
	26	0.1470	3"	5.3/8	12	—	5995827
	25	0.1495	3"	5.3/8	12	—	5995817
	24	0.1520	3"	5.3/8	12	—	5995774
5/32		0.1563	3"	5.3/8	12	5996324	—
	22	0.1570	3.3/8	5.3/4	12	—	5995737
	21	0.1590	3.3/8	5.3/4	12	—	5995710
	20	0.1610	3.3/8	5.3/4	12	—	5995688
	19	0.1660	3.3/8	5.3/4	12	—	5996431
	18	0.1695	3.3/8	5.3/4	12	—	5996427
11/64		0.1719	3.3/8	5.3/4	12	5996586	—
	17	0.1730	3.3/8	5.3/4	12	—	5996425
	16	0.1770	3.3/8	5.3/4	12	—	5996421
	15	0.1800	3.3/8	5.3/4	12	—	5996419
	14	0.1820	3.3/8	5.3/4	12	—	5996416

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	M51CO	M52CO
3/16	13	0.1850	3.3/8	5.3/4	12	—	5996414
		0.1875	3.3/8	5.3/4	12	5996440	—
		0.1890	3.5/8	6"	12	—	5996411
	11	0.1910	3.5/8	6"	12	—	5996408
	10	0.1935	3.5/8	6"	12	—	5996404
	9	0.1960	3.5/8	6"	12	—	5995720
	8	0.1990	3.5/8	6"	12	—	5995718
	7	0.2010	3.5/8	6"	12	—	5995716
		0.2031	3.5/8	6"	12	5996596	—
	5	0.2055	3.5/8	6"	12	—	5995714
13/64	4	0.2090	3.5/8	6"	12	—	5995708
	3	0.2130	3.5/8	6"	12	—	5995691
		0.2188	3.5/8	6"	12	5996369	—
7/32	2	0.2210	3.3/4	6.1/8	12	—	5996437
	1	0.2280	3.3/4	6.1/8	12	—	5996395
15/64		0.2344	3.3/4	6.1/8	12	5996609	—
1/4		0.2500	3.3/4	6.1/8	12	5996574	—
17/64		0.2656	3.7/8	6.1/4	6	5996618	—
9/32		0.2813	3.7/8	6.1/4	6	5996387	—
19/64		0.2969	4"	6.3/8	6	5996626	—
5/16		0.3125	4"	6.3/8	6	5996323	—
21/64		0.3281	4.1/8	6.1/2	6	5996634	—
11/32		0.3437	4.1/8	6.1/2	6	5996583	—
23/64		0.3594	4.1/4	6.3/4	6	5996642	—
3/8		0.3750	4.1/4	6.3/4	6	5996449	—
25/64		0.3906	4.3/8	7"	6	5996266	—
13/32		0.4063	4.3/8	7"	6	5996592	—
27/64		0.4219	4.5/8	7.1/4	6	5996354	—
7/16		0.4375	4.5/8	7.1/4	6	5996365	—
29/64		0.4531	4.3/4	7.1/2	6	5996434	—
15/32		0.4687	4.3/4	7.1/2	6	5996607	—
31/64		0.4844	4.3/4	7.3/4	6	5996275	—
1/2		0.5000	4.3/4	7.3/4	6	5996572	—
33/64		0.5156	4.3/4	8"	1	5996280 ¹⁾	—
17/32		0.5313	4.3/4	8"	1	5996613 ¹⁾	—
35/64		0.5469	4.7/8	8.1/4	1	5996284 ¹⁾	—
9/16		0.5625	4.7/8	8.1/4	1	5996383 ¹⁾	—
37/64		0.5781	4.7/8	8.3/4	1	5996288 ¹⁾	—
19/32		0.5937	4.7/8	8.3/4	1	5996621 ¹⁾	—
39/64		0.6094	4.7/8	8.3/4	1	5996292 ¹⁾	—
5/8		0.6250	4.7/8	8.3/4	1	5996331 ¹⁾	—
41/64		0.6406	5.1/8	9"	1	5996299 ¹⁾	—
21/32		0.6563	5.1/8	9"	1	5996630 ¹⁾	—
43/64		0.6719	5.3/8	9.1/4	1	5996302 ¹⁾	—
11/16		0.6875	5.3/8	9.1/4	1	5996580 ¹⁾	—
45/64		0.7031	5.5/8	9.1/2	1	5996306 ¹⁾	—
23/32		0.7188	5.5/8	9.1/2	1	5996638 ¹⁾	—
47/64		0.7344	5.7/8	9.3/4	1	5996312 ¹⁾	—
3/4		0.7500	5.7/8	9.3/4	1	5996446 ¹⁾	—
49/64		0.7656	6"	9.7/8	1	5996321 ¹⁾	—
25/32		0.7813	6"	9.7/8	1	5996650 ¹⁾	—
51/64		0.7969	6.1/8	10"	1	5996335 ¹⁾	—
13/16		0.8125	6.1/8	10"	1	5996589 ¹⁾	—
53/64		0.8281	6.1/8	10"	1	5996339 ¹⁾	—
27/32		0.8438	6.1/8	10"	1	5996316 ¹⁾	—
55/64		0.8594	6.1/8	10"	1	5996343 ¹⁾	—
7/8		0.8750	6.1/8	10"	1	5996377 ¹⁾	—
57/64		0.8906	6.1/8	10"	1	5996348 ¹⁾	—
29/32		0.9063	6.1/8	10"	1	5996400 ¹⁾	—
59/64		0.9219	6.1/8	10.3/4	1	5996350 ¹⁾	—
15/16		0.9375	6.1/8	10.3/4	1	5996599 ¹⁾	—
61/64		0.9531	6.3/8	11"	1	5996358 ¹⁾	—
31/32		0.9688	6.3/8	11"	1	5996271 ¹⁾	—
63/64		0.9844	6.3/8	11"	1	5996361 ¹⁾	—
1"		1.0000	6.3/8	11"	1	5996560 ¹⁾	—

¹⁾ Notched Point

EXTRA LENGTH DRILL



General Purpose Extra Length

0860 8" Overall length

1290 12" Overall length

Bright Finish improves chip flow in soft or non-ferrous materials



0860	1290
ANSI	ANSI
12XD	12XD
HSS	HSS
118°	118°
	
1/8 - 1/2	1/8 - 3/4

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	0860	1290
1/8	0.1250	6"	8"	1	6000278	—
1/8	0.1250	9"	12"	1	—	6000178
9/64	0.1406	9"	12"	1	—	5999809
5/32	0.1563	6"	8"	1	6000129	—
5/32	0.1563	9"	12"	1	—	5999924
11/64	0.1719	9"	12"	1	—	6000189
3/16	0.1875	6"	8"	1	6000117	—
3/16	0.1875	9"	12"	1	—	6000244
13/64	0.2031	9"	12"	1	—	6000199
7/32	0.2188	6"	8"	1	6000137	—
7/32	0.2188	9"	12"	1	—	5999971
15/64	0.2344	9"	12"	1	—	6000205
1/4	0.2500	6"	8"	1	6000274	—
1/4	0.2500	9"	12"	1	—	6000174
17/64	0.2656	9"	12"	1	—	6000211
9/32	0.2813	6"	8"	1	6000140	—
9/32	0.2813	9"	12"	1	—	5999978
19/64	0.2969	9"	12"	1	—	6000217
5/16	0.3125	6"	8"	1	6000124	—
5/16	0.3125	9"	12"	1	—	5999880
21/64	0.3281	9"	12"	1	—	6000224
11/32	0.3437	6"	8"	1	6000099	—
11/32	0.3437	9"	12"	1	—	6000186
23/64	0.3594	9"	12"	1	—	6000233
3/8	0.3750	6"	8"	1	6000119	—
3/8	0.3750	9"	12"	1	—	6000249
25/64	0.3906	9"	12"	1	—	6000236
13/32	0.4063	6"	8"	1	6000103	—
13/32	0.4063	9"	12"	1	—	6000196
27/64	0.4219	9"	12"	1	—	6000238
7/16	0.4375	6"	8"	1	6000134	—
7/16	0.4375	9"	12"	1	—	5999969

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	0860	1290
29/64	0.4531	9"	12"	1	—	6000241
15/32	0.4687	6"	8"	1	6000106	—
15/32	0.4687	9"	12"	1	—	6000202
31/64	0.4844	9"	12"	1	—	6000252
1/2	0.5000	6"	8"	1	6000271	—
1/2	0.5000	9"	12"	1	—	6000165
33/64	0.5156	9"	12"	1	—	6000256 ¹⁾
17/32	0.5313	9"	12"	1	—	6000208 ¹⁾
35/64	0.5469	9"	12"	1	—	6000265 ¹⁾
9/16	0.5625	9"	12"	1	—	5999974 ¹⁾
37/64	0.5781	9"	12"	1	—	5999804 ¹⁾
19/32	0.5937	9"	12"	1	—	6000214 ¹⁾
39/64	0.6094	9"	12"	1	—	5999840 ¹⁾
5/8	0.6250	9"	12"	1	—	5999964 ¹⁾
21/32	0.6563	9"	12"	1	—	6000220 ¹⁾
11/16	0.6875	9"	12"	1	—	6000181 ¹⁾
23/32	0.7188	9"	12"	1	—	6000230 ¹⁾
3/4	0.7500	9"	12"	1	—	6000247 ¹⁾

1) 33/64 and larger are steam tempered

General Purpose Extra Length

1511 Bright Finish improves chip flow in soft or
1813 non-ferrous materials

A125 Steam tempered for increased wear
 resistance & lubricity.



1813 Series - 33/64 and larger are steam tempered
 1511 Series - 17/32 and larger are steam tempered
 A125 Series - under 3/32 are bright

1511	1813	A125
ANSI	ANSI	BS 328
15XD	15XD	10XD
HSS	HSS	HSS
118°	118°	118°
		
3/16 - 1"	1/4 - 1"	1.4mm - 1"

d ₁ Ø Inch	d ₁ decimal Inch	d ₁ Øh ₈ mm	l ₂ Inch	l ₁ Inch	l ₂ mm	l ₁ mm	Pack Qty	1511	1813	A125
	0.0551	1.40			100	160	1	—	—	5968821
	0.0591	1.50			100	160	1	—	—	5968831
	0.0591	1.50			80	125	1	—	—	5968826
1/16	0.0625	1.59			100	160	1	—	—	5968847
1/16	0.0625	1.59			80	125	1	—	—	5968843
	0.0709	1.80			100	160	1	—	—	5968837
5/64	0.0781	1.98			100	160	1	—	—	5968859
5/64	0.0781	1.98			80	125	1	—	—	5968854
	0.0787	2.00			100	160	1	—	—	5968519
	0.0787	2.00			80	125	1	—	—	5968514
	0.0866	2.20			100	160	1	—	—	5968523
3/32	0.0938	2.38			100	160	1	—	—	5968651
3/32	0.0938	2.38			80	125	1	—	—	5968649
	0.0984	2.50			100	160	1	—	—	5968533
	0.0984	2.50			80	125	1	—	—	5968528
7/64	0.1094	2.78			100	160	1	—	—	5968960
7/64	0.1094	2.78			80	125	1	—	—	5969172
	0.1181	3.00			100	160	1	—	—	5968611
	0.1181	3.00			150	200	1	—	—	5968616
	0.1181	3.00			200	250	1	—	—	5968620
1/8	0.1250	3.18			100	160	1	—	—	5968186
1/8	0.1250	3.18			150	200	1	—	—	5968038
1/8	0.1250	3.18			200	250	1	—	—	5968043
1/8	0.1250	3.18			250	310	1	—	—	5968048
	0.1299	3.30			100	160	1	—	—	5968624
	0.1378	3.50			100	160	1	—	—	5968627
	0.1378	3.50			150	200	1	—	—	5968630
	0.1378	3.50			200	250	1	—	—	5968633
9/64	0.1406	3.57			100	160	1	—	—	5969048
9/64	0.1406	3.57			150	200	1	—	—	5969052
9/64	0.1406	3.57			250	310	1	—	—	5969063
5/32	0.1563	3.97			100	160	1	—	—	5968834

d ₁ Ø Inch	d ₁ decimal Inch	d ₁ Øh ₈ mm	l ₂ Inch	l ₁ Inch	l ₂ mm	l ₁ mm	Pack Qty	1511	1813	A125
5/32	0.1563	3.97			150	200	1	—	—	5968839
5/32	0.1563	3.97			200	250	1	—	—	5968844
5/32	0.1563	3.97			250	310	1	—	—	5968849
	0.1575	4.00			100	160	1	—	—	5968727
	0.1575	4.00			150	200	1	—	—	5968731
	0.1575	4.00			200	250	1	—	—	5968737
	0.1575	4.00			250	310	1	—	—	5968740
11/64	0.1719	4.37			100	160	1	—	—	5968123
11/64	0.1719	4.37			150	200	1	—	—	5968127
11/64	0.1719	4.37			250	310	1	—	—	5968129
	0.1772	4.50			100	160	1	—	—	5968743
	0.1772	4.50			150	200	1	—	—	5968747
	0.1772	4.50			200	250	1	—	—	5968751
	0.1772	4.50			250	310	1	—	—	5968756
3/16	0.1875	4.76			100	160	1	—	—	5968636
3/16	0.1875	4.76			150	200	1	—	—	5968638
3/16	0.1875	4.76			200	250	1	—	—	5968643
3/16	0.1875	4.76			250	310	1	—	—	5968645
3/16	0.1875	4.76			300	400	1	—	—	5968647
3/16	0.1875		11"	15"			1	5999851	—	—
	0.1969	5.00			100	160	1	—	—	5968762
	0.1969	5.00			150	200	1	—	—	5968767
	0.1969	5.00			200	250	1	—	—	5968777
	0.1969	5.00			250	310	1	—	—	5968781
	0.1969	5.00			300	400	1	—	—	5968786
13/64	0.2031	5.16			150	200	1	—	—	5968151
13/64	0.2031	5.16			200	250	1	—	—	5968153
13/64	0.2031	5.16			250	310	1	—	—	5968154
	0.2165	5.50			150	200	1	—	—	5968791
	0.2165	5.50			200	250	1	—	—	5968797
	0.2165	5.50			250	310	1	—	—	5968802
7/32	0.2188	5.56			150	200	1	—	—	5969164
7/32	0.2188	5.56			200	250	1	—	—	5969167
7/32	0.2188	5.56			250	310	1	—	—	5969170
15/64	0.2344	5.95			150	200	1	—	—	5968170
15/64	0.2344	5.95			200	250	1	—	—	5968500
15/64	0.2344	5.95			250	310	1	—	—	5968546
	0.2362	6.00			150	200	1	—	—	5968874
	0.2362	6.00			200	250	1	—	—	5968883
	0.2362	6.00			250	310	1	—	—	5968886
	0.2362	6.00			300	400	1	—	—	5968890
1/4	0.2500	6.35			150	200	1	—	—	5968146
1/4	0.2500	6.35			200	250	1	—	—	5968169
1/4	0.2500	6.35			250	310	1	—	—	5968174
1/4	0.2500	6.35			300	400	1	—	—	5968178
1/4	0.2500	6.35			400	460	1	—	—	5968181
1/4	0.2500		11"	15"			1	5999817	—	—
1/4	0.2500		13"	18"			1	—	5999892	—
	0.2559	6.50			150	200	1	—	—	5968894
	0.2559	6.50			200	250	1	—	—	5968897
	0.2559	6.50			250	310	1	—	—	5968899
17/64	0.2656	6.75			150	200	1	—	—	5968660
17/64	0.2656	6.75			200	250	1	—	—	5968665
17/64	0.2656	6.75			400	460	1	—	—	5968667
17/64	0.2656		13"	18"			1	—	5999928	—
	0.2756	7.00			150	200	1	—	—	5968902
	0.2756	7.00			200	250	1	—	—	5968904
	0.2756	7.00			250	310	1	—	—	5968906
9/32	0.2813	7.14			150	200	1	—	—	5969030
9/32	0.2813	7.14			200	250	1	—	—	5969034
9/32	0.2813	7.14			250	310	1	—	—	5969039
9/32	0.2813	7.14			400	460	1	—	—	5969043
9/32	0.2813		13"	18"			1	—	6000288	—
	0.2953	7.50			150	200	1	—	—	5968908
	0.2953	7.50			200	250	1	—	—	5968912
	0.2953	7.50			250	310	1	—	—	5968954

d ₁ Ø Inch	d ₁ decimal Inch	d ₁ Øh ₈ mm	l ₂ Inch	l ₁ Inch	l ₂ mm	l ₁ mm	Pack Qty	1511	1813	A125
19/64	0.2969	7.54			250	310	1	—	—	5968507
19/64	0.2969	7.54			400	460	1	—	—	5968510
19/64	0.2969		13"	18"			1	—	5999937	—
5/16	0.3125	7.94			150	200	1	—	—	5968807
5/16	0.3125	7.94			200	250	1	—	—	5968811
5/16	0.3125	7.94			250	310	1	—	—	5968815
5/16	0.3125	7.94			300	400	1	—	—	5968820
5/16	0.3125	7.94			400	460	1	—	—	5968829
5/16	0.3125		11"	15"			1	5999862	—	—
5/16	0.3125		13"	18"			1	—	6000434	—
	0.3150	8.00			200	250	1	—	—	5968970
	0.3150	8.00			250	310	1	—	—	5968974
	0.3150	8.00			300	400	1	—	—	5968977
21/64	0.3281	8.33			250	310	1	—	—	5968542
21/64	0.3281	8.33			400	460	1	—	—	5968551
21/64	0.3281		13"	18"			1	—	5999945	—
	0.3346	8.50			200	250	1	—	—	5968981
	0.3346	8.50			250	310	1	—	—	5968985
11/32	0.3437	8.73			200	250	1	—	—	5968113
11/32	0.3437	8.73			250	310	1	—	—	5968116
11/32	0.3437	8.73			300	400	1	—	—	5968119
11/32	0.3437	8.73			400	460	1	—	—	5968122
11/32	0.3437		11"	15"			1	5999823	—	—
11/32	0.3437		13"	18"			1	—	5999900	—
	0.3543	9.00			200	250	1	—	—	5968990
	0.3543	9.00			250	310	1	—	—	5968995
	0.3543	9.00			300	400	1	—	—	5969000
23/64	0.3594	9.13			250	310	1	—	—	5968569
23/64	0.3594	9.13			400	460	1	—	—	5968574
23/64	0.3594		13"	18"			1	—	5999951	—
	0.3740	9.50			200	250	1	—	—	5969010
	0.3740	9.50			250	310	1	—	—	5969015
3/8	0.3750	9.52			200	250	1	—	—	5968657
3/8	0.3750	9.52			250	310	1	—	—	5968658
3/8	0.3750	9.52			300	400	1	—	—	5968659
3/8	0.3750	9.52			400	460	1	—	—	5968662
3/8	0.3750		11"	15"			1	5999858	—	—
3/8	0.3750		13"	18"			1	—	6000306	—
25/64	0.3906	9.92			250	310	1	—	—	5968584
25/64	0.3906	9.92			400	460	1	—	—	5968589
25/64	0.3906		13"	18"			1	—	5999957	—
	0.3937	10.00			200	250	1	—	—	5968061
	0.3937	10.00			250	310	1	—	—	5968066
	0.3937	10.00			300	400	1	—	—	5968071
13/32	0.4063	10.32			200	250	1	—	—	5968142
13/32	0.4063	10.32			250	310	1	—	—	5968144
13/32	0.4063	10.32			400	460	1	—	—	5968148
13/32	0.4063		13"	18"			1	—	5999909	—
	0.4134	10.50			200	250	1	—	—	5968076
	0.4134	10.50			250	310	1	—	—	5968080
	0.4134	10.50			300	400	1	—	—	5968085
27/64	0.4219	10.72			250	310	1	—	—	5968594
27/64	0.4219		13"	18"			1	—	5999960	—
	0.4331	11.00			200	250	1	—	—	5968094
	0.4331	11.00			250	310	1	—	—	5968099
	0.4331	11.00			300	400	1	—	—	5968102
7/16	0.4375	11.11			200	250	1	—	—	5969004
7/16	0.4375	11.11			250	310	1	—	—	5969057
7/16	0.4375	11.11			300	400	1	—	—	5969113
7/16	0.4375	11.11			400	460	1	—	—	5969158
7/16	0.4375		11"	15"			1	5999869	—	—
7/16	0.4375		13"	18"			1	—	6000281	—
29/64	0.4531	11.51			250	310	1	—	—	5968597
29/64	0.4531	11.51			400	460	1	—	—	5968606
29/64	0.4531		13"	18"			1	—	5999967	—
15/32	0.4688	11.91			200	250	1	—	—	5968162

d ₁ Ø Inch	d ₁ decimal Inch	d ₁ Øh ₈ mm	l ₂ Inch	l ₁ Inch	l ₂ mm	l ₁ mm	Pack Qty	1511	1813	A125
15/32	0.4687	11.91			250	310	1	—	—	5968164
15/32	0.4687	11.91			400	460	1	—	—	5968166
15/32	0.4687		13"	18"			1	—	5999917	—
	0.4724	12.00			200	250	1	—	—	5968130
	0.4724	12.00			250	310	1	—	—	5968132
	0.4724	12.00			300	400	1	—	—	5968134
31/64	0.4844	12.30			250	310	1	—	—	5968720
31/64	0.4844	12.30			400	460	1	—	—	5968772
31/64	0.4844		13"	18"			1	—	6000337	—
1/2	0.5000	12.70			200	250	1	—	—	5968857
1/2	0.5000	12.70			250	310	1	—	—	5968030
1/2	0.5000	12.70			300	400	1	—	—	5968089
1/2	0.5000	12.70			400	460	1	—	—	5968125
1/2	0.5000		11"	15"			1	5999814	—	—
1/2	0.5000		13"	18"			1	—	5999888	—
	0.5118	13.00			250	310	1	—	—	5968136
	0.5118	13.00			300	400	1	—	—	5968138
33/64	0.5156	13.10			250	310	1	—	—	5968825
33/64	0.5156	13.10			400	460	1	—	—	5968879
33/64	0.5156		13"	18"			1	—	6000375	—
17/32	0.5313	13.49			250	310	1	—	—	5968603
17/32	0.5313	13.49			400	460	1	—	—	5968641
17/32	0.5313		11"	15"			1	5999833	—	—
17/32	0.5313		13"	18"			1	—	5999920	—
35/64	0.5469	13.89			250	310	1	—	—	5968910
35/64	0.5469	13.89			400	460	1	—	—	5968914
35/64	0.5469		13"	18"			1	—	6000419	—
	0.5512	14.00			250	310	1	—	—	5968156
	0.5512	14.00			300	400	1	—	—	5968158
9/16	0.5625	14.29			250	310	1	—	—	5969020
9/16	0.5625	14.29			400	460	1	—	—	5969025
9/16	0.5625		11"	15"			1	5999875	—	—
9/16	0.5625		13"	18"			1	—	6000286	—
37/64	0.5781	14.68			250	310	1	—	—	5968916
37/64	0.5781		13"	18"			1	—	6000427	—
19/32	0.5937	15.08			250	310	1	—	—	5968669
19/32	0.5937	15.08			400	460	1	—	—	5968671
19/32	0.5937		13"	18"			1	—	5999933	—
39/64	0.6094	15.48			250	310	1	—	—	5968918
39/64	0.6094	15.48			400	460	1	—	—	5968920
39/64	0.6094		13"	18"			1	—	6000430	—
5/8	0.6250	15.88			250	310	1	—	—	5968864
5/8	0.6250	15.88			400	460	1	—	—	5968869
5/8	0.6250		11"	15"			1	5999865	—	—
5/8	0.6250		13"	18"			1	—	6000438	—
21/32	0.6563	16.67			250	310	1	—	—	5968536
21/32	0.6563	16.67			400	460	1	—	—	5968540
21/32	0.6563		11"	15"			1	5999835	—	—
21/32	0.6563		13"	18"			1	—	5999940	—
11/16	0.6875	17.46			250	310	1	—	—	5968107
11/16	0.6875	17.46			400	460	1	—	—	5968110
11/16	0.6875		11"	15"			1	5999820	—	—
11/16	0.6875		13"	18"			1	—	5999896	—
23/32	0.7188	18.26			250	310	1	—	—	5968556
23/32	0.7188	18.26			400	460	1	—	—	5968562
23/32	0.7188		11"	15"			1	5999843	—	—
23/32	0.7188		13"	18"			1	—	5999948	—
3/4	0.7500	19.05			250	310	1	—	—	5968653
3/4	0.7500	19.05			400	460	1	—	—	5968655
3/4	0.7500		11"	15"			1	5999854	—	—
3/4	0.7500		13"	18"			1	—	6000275	—
25/32	0.7813	19.84			400	460	1	—	—	5968579
25/32	0.7813		11"	15"			1	5999848	—	—
25/32	0.7813		13"	18"			1	—	5999954	—
13/16	0.8125	20.64			400	460	1	—	—	5968140
13/16	0.8125		11"	15"			1	5999827	—	—

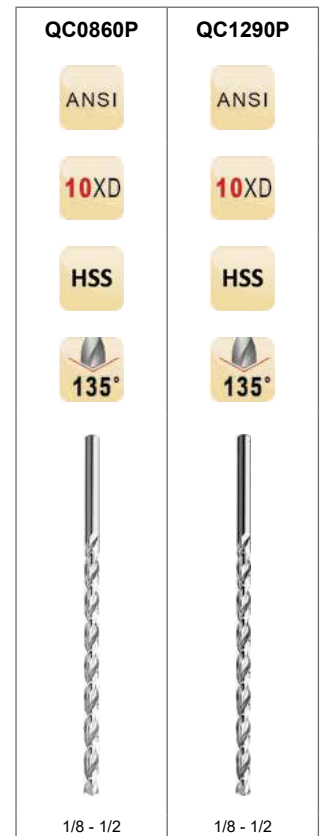
d ₁ Ø Inch	d ₁ decimal Inch	d ₁ Øh ₈ mm	l ₂ Inch	l ₁ Inch	l ₂ mm	l ₁ mm	Pack Qty	1511	1813	A125
13/16	0.8125		13"	18"			1	—	5999904	—
7/8	0.8750	22.22			400	460	1	—	—	5968965
7/8	0.8750		11"	15"			1	5999872	—	—
7/8	0.8750		13"	18"			1	—	6000284	—
15/16	0.9375	23.81			400	460	1	—	—	5968160
15/16	0.9375		11"	15"			1	5999830	—	—
15/16	0.9375		13"	18"			1	—	5999912	—
1"	1.0000	25.40			400	460	1	—	—	5968053
1"	1.0000		11"	15"			1	5999811	—	—
1"	1.0000		13"	18"			1	—	5999885	—

General Purpose Extra Length Parabolic Flute

QC0860P 8" Overall length

QC1290P 12" Overall length

Heavy-Duty Parabolic Flute design for efficient chip removal. Allows greater drilling depths in one pass. Low thrust design self centering Split Point for easier penetration. Bright Finish improves chip flow in soft or non-ferrous materials.



d_1 Ø Inch	d_1 decimal Inch	l_2 Inch	l_1 Inch	Pack Qty	QC0860P	QC1290P
1/8	0.1250	6"	8"	1	5995727	—
1/8	0.1250	9"	12"	1	—	5996453
9/64	0.1406	6"	8"	1	5995814	—
9/64	0.1406	9"	12"	1	—	5996464
5/32	0.1563	6"	8"	1	5995797	—
5/32	0.1563	9"	12"	1	—	5996456
11/64	0.1719	6"	8"	1	5995734	—
11/64	0.1719	9"	12"	1	—	5996504
3/16	0.1875	6"	8"	1	5995781	—
3/16	0.1875	9"	12"	1	—	5996441
13/64	0.2031	6"	8"	1	5995744	—
13/64	0.2031	9"	12"	1	—	5996550
7/32	0.2188	6"	8"	1	5995806	—
7/32	0.2188	9"	12"	1	—	5996460
15/64	0.2344	6"	8"	1	5995748	—
15/64	0.2344	9"	12"	1	—	5996558
1/4	0.2500	6"	8"	1	5995725	—
1/4	0.2500	9"	12"	1	—	5996417
17/64	0.2656	6"	8"	1	5995752	—
17/64	0.2656	9"	12"	1	—	5996562
9/32	0.2813	6"	8"	1	5995810	—
9/32	0.2813	9"	12"	1	—	5996462
19/64	0.2969	6"	8"	1	5995754	—
19/64	0.2969	9"	12"	1	—	5996422
5/16	0.3125	6"	8"	1	5995794	—
5/16	0.3125	9"	12"	1	—	5996451
21/64	0.3281	6"	8"	1	5995758	—
21/64	0.3281	9"	12"	1	—	5996426
11/32	0.3437	6"	8"	1	5995730	—
11/32	0.3437	9"	12"	1	—	5996476
23/64	0.3594	6"	8"	1	5995762	—
23/64	0.3594	9"	12"	1	—	5996429
3/8	0.3750	6"	8"	1	5995786	—

EXTRA LENGTH DRILL

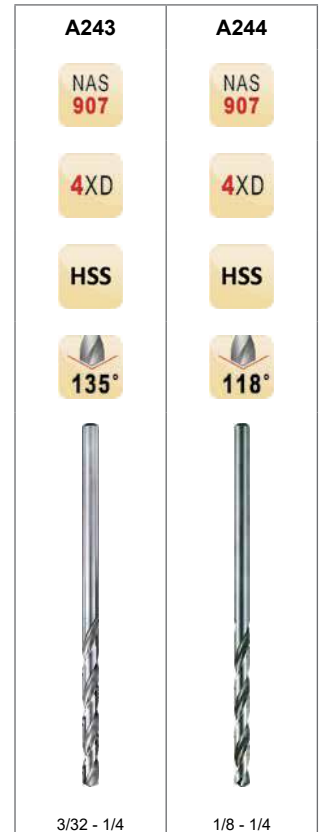
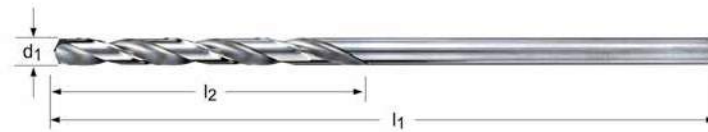


d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	QC0860P	QC1290P
3/8	0.3750	9"	12"	1	—	5996445
25/64	0.3906	6"	8"	1	5995766	—
25/64	0.3906	9"	12"	1	—	5996430
13/32	0.4063	6"	8"	1	5995740	—
13/32	0.4063	9"	12"	1	—	5996542
27/64	0.4219	6"	8"	1	5995770	—
27/64	0.4219	9"	12"	1	—	5996433
7/16	0.4375	6"	8"	1	5995803	—
7/16	0.4375	9"	12"	1	—	5996458
29/64	0.4531	6"	8"	1	5995778	—
15/32	0.4687	6"	8"	1	5995746	—
15/32	0.4687	9"	12"	1	—	5996554
31/64	0.4844	6"	8"	1	5995790	—
1/2	0.5000	6"	8"	1	5995722	—
1/2	0.5000	9"	12"	1	—	5995821

Aircraft Extension (NAS 907)

A243 (NAS 907 Type B) Low thrust design self centering 135° Split Point for easier penetration. Bright Finish improves chip flow in soft or non-ferrous materials.

A244 (NAS 907 Type A) Low thrust design self centering 118° Split Point for easier penetration. Bright Finish improves chip flow in soft or non-ferrous materials.



d_1 $\varnothing h_8$ Inch	d_1 decimal Inch	l_2 Inch	l_1 Inch	Pack Qty	A243	A244
3/32	0.0938	1.1/4	6"	10	5968855	—
40	0.0980	1.3/8	6"	10	5968835	—
1/8	0.1250	1.5/8	6"	10	5968845	5968875
30	0.1285	1.5/8	6"	10	5968830	—
5/32	0.1563	2"	6"	10	5968861	5968884
21	0.1590	2.1/8	6"	10	5968822	—
20	0.1610	2.1/8	6"	10	5968818	—
3/16	0.1875	2.5/16	6"	10	5968850	5968880
11	0.1910	2.5/16	6"	10	5968813	—
10	0.1935	2.7/16	6"	10	5968803	—
1/4	0.2500	2.3/4	6"	10	5968840	5968870

AIRCRAFT EXTENSION DRILL



Aircraft Extension (NAS 907 Type B)

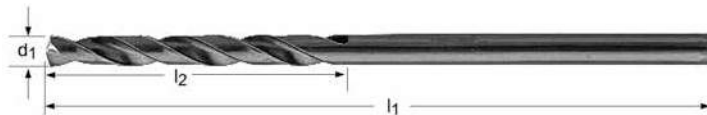
500-6 - Fractional Sizes

501-6 - Wire Gauge Sizes

502-6 - Letter Sizes

Low thrust design self centering 135° Split Point for easier penetration. Steam tempered for increased wear resistance & lubricity.

6" overall length.



500-6	501-6	502-6
NAS 907	NAS 907	NAS 907
4XD	4XD	4XD
HSS	HSS	HSS
135°	135°	135°
3/64 - 1/2	N60 - N1	A - Z

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	500-6	501-6	502-6
	60		0.0400	11/16	6"	12	—	6001340 ¹⁾	—
	59		0.0410	11/16	6"	12	—	6001332 ¹⁾	—
	58		0.0420	11/16	6"	12	—	6001329 ¹⁾	—
	57		0.0430	3/4	6"	12	—	6001326 ¹⁾	—
	56		0.0465	3/4	6"	12	—	6001323 ¹⁾	—
3/64			0.0469	3/4	6"	12	6001203	—	—
	55		0.0520	7/8	6"	12	—	6001320 ¹⁾	—
	54		0.0550	7/8	6"	12	—	6001317 ¹⁾	—
	53		0.0595	7/8	6"	12	—	6001314 ¹⁾	—
1/16			0.0625	7/8	6"	12	6001270	—	—
	52		0.0635	7/8	6"	12	—	6001311	—
	51		0.0670	1"	6"	12	—	6001309	—
	50		0.0700	1"	6"	12	—	6001302	—
	49		0.0730	1"	6"	12	—	6001296	—
	48		0.0760	1"	6"	12	—	6001293	—
5/64			0.0781	1"	6"	12	6001212	—	—
	47		0.0785	1"	6"	12	—	6001289	—
	46		0.0810	1.1/8	6"	12	—	6001285	—
	45		0.0820	1.1/8	6"	12	—	6001282	—
	44		0.0860	1.1/8	6"	12	—	6001276	—
	43		0.0890	1.1/4	6"	12	—	6001271	—
	42		0.0935	1.1/4	6"	12	—	6001268	—
3/32			0.0938	1.1/4	6"	12	6001201	—	—
	41		0.0960	1.3/8	6"	12	—	6001448	—
	40		0.0980	1.3/8	6"	12	—	6001446	—
	39		0.0995	1.3/8	6"	12	—	6001439	—
	38		0.1015	1.7/16	6"	12	—	6001427	—
	37		0.1040	1.7/16	6"	12	—	6001371	—
	36		0.1065	1.7/16	6"	12	—	6001337	—
7/64			0.1094	1.1/2	6"	12	6001220	—	—
	35		0.1100	1.1/2	6"	12	—	6001305	—

d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	500-6	501-6	502-6
	34		0.1110	1.1/2	6"	12	—	6001261	—
	33		0.1130	1.1/2	6"	12	—	6001507	—
	32		0.1160	1.5/8	6"	12	—	6001503	—
	31		0.1200	1.5/8	6"	12	—	6001502	—
1/8			0.1250	1.5/8	6"	12	6001288	—	—
	30		0.1285	1.5/8	6"	12	—	6001500	—
	29		0.1360	1.3/4	6"	12	—	6001496	—
	28		0.1405	1.3/4	6"	12	—	6001494	—
9/64			0.1406	1.3/4	6"	12	6001224	—	—
	27		0.1440	1.7/8	6"	12	—	6001492	—
	26		0.1470	1.7/8	6"	12	—	6001490	—
	25		0.1495	1.7/8	6"	12	—	6001489	—
	24		0.1520	2"	6"	12	—	6001487	—
	23		0.1540	2"	6"	12	—	6001483	—
5/32			0.1563	2"	6"	12	6001211	—	—
	22		0.1570	2"	6"	12	—	6001481	—
	21		0.1590	2.1/8	6"	12	—	6001479	—
	20		0.1610	2.1/8	6"	12	—	6001477	—
	19		0.1660	2.1/8	6"	12	—	6001473	—
	18		0.1695	2.1/8	6"	12	—	6001471	—
11/64			0.1719	2.1/8	6"	12	6001142	—	—
	17		0.1730	2.3/16	6"	12	—	6001469	—
	16		0.1770	2.3/16	6"	12	—	6001467	—
	15		0.1800	2.3/16	6"	12	—	6001465	—
	14		0.1820	2.3/16	6"	12	—	6001461	—
	13		0.1850	2.5/16	6"	12	—	6001459	—
3/16			0.1875	2.5/16	6"	12	6001199	—	—
	12		0.1890	2.5/16	6"	12	—	6001457	—
	11		0.1910	2.5/16	6"	12	—	6001455	—
	10		0.1935	2.7/16	6"	12	—	6001453	—
	9		0.1960	2.7/16	6"	12	—	6001349	—
	8		0.1990	2.7/16	6"	12	—	6001346	—
	7		0.2010	2.7/16	6"	12	—	6001343	—
13/64			0.2031	2.7/16	6"	12	6001150	—	—
	6		0.2040	2.1/2	6"	12	—	6001334	—
	5		0.2055	2.1/2	6"	12	—	6001299	—
	4		0.2090	2.1/2	6"	12	—	6001443	—
	3		0.2130	2.1/2	6"	12	—	6001498	—
7/32			0.2188	2.1/2	6"	12	6001218	—	—
	2		0.2210	2.5/8	6"	12	—	6001475	—
	1		0.2280	2.5/8	6"	12	—	6001451	—
		A	0.2340	2.5/8	6"	12	—	—	6001257
15/64			0.2344	2.5/8	6"	12	6001160	—	—
		B	0.2380	2.3/4	6"	12	—	—	6001260
		C	0.2420	2.3/4	6"	12	—	—	6001265
		D	0.2460	2.3/4	6"	12	—	—	6001272
1/4		E	0.2500	2.3/4	6"	12	6001284	—	—
		F	0.2570	2.7/8	6"	12	—	—	6001281
		G	0.2610	2.7/8	6"	6	—	—	6001286
17/64			0.2656	2.7/8	6"	6	6001167	—	—
		H	0.2660	2.7/8	6"	6	—	—	6001290
		I	0.2720	2.7/8	6"	6	—	—	6001294
		J	0.2770	2.7/8	6"	6	—	—	6001297
		K	0.2810	2.15/16	6"	6	—	—	6001303
9/32			0.2813	2.15/16	6"	6	6001222	—	—
		L	0.2900	2.15/16	6"	6	—	—	6001306
		M	0.2950	3.1/16	6"	6	—	—	6001308
19/64			0.2969	3.1/16	6"	6	6001172	—	—
		N	0.3020	3.1/16	6"	6	—	—	6001310
5/16			0.3125	3.3/16	6"	6	6001209	—	—
		O	0.3160	3.3/16	6"	6	—	—	6001313
		P	0.3230	3.5/16	6"	6	—	—	6001316
21/64			0.3281	3.5/16	6"	6	6001177	—	—
		Q	0.3320	3.7/16	6"	6	—	—	6001319
		R	0.3390	3.7/16	6"	6	—	—	6001322
11/32			0.3437	3.7/16	6"	6	6001292	—	—

AIRCRAFT EXTENSION DRILL



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	500-6	501-6	502-6
		S	0.3480	3.1/2	6"	6	—	—	6001325
		T	0.3580	3.1/2	6"	6	—	—	6001328
23/64			0.3594	3.1/2	6"	6	6001180	—	—
		U	0.3680	3.5/8	6"	6	—	—	6001336
3/8			0.3750	3.5/8	6"	6	6001204	—	—
		V	0.3770	3.5/8	6"	6	—	—	6001339
		W	0.3860	3.3/4	6"	6	—	—	6001342
25/64			0.3906	3.3/4	6"	6	6001185	—	—
		X	0.3970	3.3/4	6"	6	—	—	6001345
		Y	0.4040	3.7/8	6"	6	—	—	6001348
13/32			0.4063	3.7/8	6"	6	6001146	—	—
		Z	0.4130	3.7/8	6"	6	—	—	6001351
27/64			0.4219	3.15/16	6"	6	6001192	—	—
7/16			0.4375	4.1/16	6"	6	6001216	—	—
29/64			0.4531	4.3/16	6"	6	6001195	—	—
15/32			0.4687	4.5/16	6"	6	6001155	—	—
31/64			0.4844	4.3/8	6"	6	6001207	—	—
1/2			0.5000	4.1/2	6"	6	6001280	—	—

Aircraft Extension (NAS 907 Type B)

500-12 - Fractional Sizes

501-12 - Wire Gauge Sizes

502-12 - Letter Sizes

Low thrust design self centering 135° Split Point for easier penetration.
Steam tempered for increased wear resistance & lubricity.
12" Over All Length



500-12	501-12	502-12
3/64 - 1/2	N50 - N1	A - Z

d_1 Ø Inch	d_1 Ø Nr.	d_1 Ø letter	d_1 decimal Inch	l_2 Inch	l_1 Inch	Pack Qty	500-12	501-12	502-12
3/64			0.0469	3/4	12"	12	6001382 ¹⁾	—	—
1/16			0.0625	7/8	12"	12	6001315	—	—
	50		0.0700	1"	12"	12	—	6001441	—
	49		0.0730	1"	12"	12	—	6001425	—
	48		0.0760	1"	12"	12	—	6001420	—
5/64			0.0781	1"	12"	12	6001408	—	—
	47		0.0785	1"	12"	12	—	6001415	—
	46		0.0810	1.1/8	12"	12	—	6001410	—
	45		0.0820	1.1/8	12"	12	—	6001406	—
	44		0.0860	1.1/8	12"	12	—	6001401	—
	43		0.0890	1.1/4	12"	12	—	6001396	—
	42		0.0935	1.1/4	12"	12	—	6001394	—
3/32			0.0938	1.1/4	12"	12	6001377	—	—
	41		0.0960	1.3/8	12"	12	—	6001386	—
	40		0.0980	1.3/8	12"	12	—	6001381	—
	37		0.1040	1.7/16	12"	12	—	6001509	—
	36		0.1065	1.7/16	12"	12	—	6001506	—
7/64			0.1094	1.1/2	12"	12	6001189	—	—
	31		0.1200	1.5/8	12"	12	—	6001485	—
1/8			0.1250	1.5/8	12"	12	6001324	—	—
	30		0.1285	1.5/8	12"	12	—	6001463	—
	29		0.1360	1.3/4	12"	12	—	6001375	—
9/64			0.1406	1.3/4	12"	12	6001236	—	—
	27		0.1440	1.7/8	12"	12	—	6001275	—
	26		0.1470	1.7/8	12"	12	—	6001266	—
	25		0.1495	1.7/8	12"	12	—	6001262	—
	23		0.1540	2"	12"	12	—	6001258	—
5/32			0.1563	2"	12"	12	6001402	—	—
	22		0.1570	2"	12"	12	—	6001254	—
	21		0.1590	2.1/8	12"	12	—	6001250	—
	20		0.1610	2.1/8	12"	12	—	6001247	—
	19		0.1660	2.1/8	12"	12	—	6001245	—

¹⁾ Not Split Point

AIRCRAFT EXTENSION DRILL



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	500-12	501-12	502-12
11/64	18		0.1695	2.1/8	12"	12	—	6001242	—
			0.1719	2.1/8	12"	12	6001333	—	—
			0.1730	2.3/16	12"	12	—	6001240	—
3/16	16		0.1770	2.3/16	12"	12	—	6001238	—
	13		0.1850	2.5/16	12"	12	—	6001234	—
			0.1875	2.5/16	12"	6	6001372	—	—
	12		0.1890	2.5/16	12"	6	—	6001232	—
	11		0.1910	2.5/16	12"	6	—	6001231	—
13/64	10		0.1935	2.7/16	12"	6	—	6001229	—
	9		0.1960	2.7/16	12"	6	—	6001449	—
	7		0.2010	2.7/16	12"	6	—	6001445	—
			0.2031	2.7/16	12"	6	6001338	—	—
	5		0.2055	2.1/2	12"	6	—	6001436	—
7/32	4		0.2090	2.1/2	12"	6	—	6001515	—
	3		0.2130	2.1/2	12"	6	—	6001430	—
			0.2188	2.1/2	12"	6	6001134	—	—
	1		0.2280	2.5/8	12"	6	—	6001226	—
15/64		A	0.2340	2.5/8	12"	6	—	—	6001352
			0.2344	2.5/8	12"	6	6001344	—	—
		B	0.2380	2.3/4	12"	6	—	—	6001355
		C	0.2420	2.3/4	12"	6	—	—	6001358
1/4		D	0.2460	2.3/4	12"	6	—	—	6001361
		E	0.2500	2.3/4	12"	6	6001321	—	—
		F	0.2570	2.7/8	12"	6	—	—	6001368
		G	0.2610	2.7/8	12"	6	—	—	6001376
17/64			0.2656	2.7/8	12"	6	6001347	—	—
		H	0.2660	2.7/8	12"	6	—	—	6001380
		I	0.2720	2.7/8	12"	6	—	—	6001385
		J	0.2770	2.7/8	12"	6	—	—	6001390
9/32		K	0.2810	2.15/16	12"	6	—	—	6001395
			0.2813	2.15/16	12"	6	6001214	—	—
		L	0.2900	2.15/16	12"	6	—	—	6001400
		M	0.2950	3.1/16	12"	6	—	—	6001405
19/64			0.2969	3.1/16	12"	6	6001350	—	—
		N	0.3020	3.1/16	12"	6	—	—	6001414
5/16			0.3125	3.3/16	12"	6	6001397	—	—
		O	0.3160	3.3/16	12"	6	—	—	6001419
21/64		P	0.3230	3.5/16	12"	6	—	—	6001424
			0.3281	3.5/16	12"	6	6001353	—	—
		Q	0.3320	3.7/16	12"	6	—	—	6001434
		R	0.3390	3.7/16	12"	6	—	—	6001251
11/32			0.3437	3.7/16	12"	6	6001327	—	—
		S	0.3480	3.1/2	12"	3	—	—	6001300
23/64		T	0.3580	3.1/2	12"	3	—	—	6001331
			0.3594	3.1/2	12"	3	6001356	—	—
		U	0.3680	3.5/8	12"	3	—	—	6001367
3/8			0.3750	3.5/8	12"	3	6001388	—	—
		V	0.3770	3.5/8	12"	3	—	—	6001423
25/64		W	0.3860	3.3/4	12"	3	—	—	6001432
			0.3906	3.3/4	12"	3	6001359	—	—
		X	0.3970	3.3/4	12"	3	—	—	6001438
		Y	0.4040	3.7/8	12"	3	—	—	6001442
13/32			0.4063	3.7/8	12"	3	6001335	—	—
		Z	0.4130	3.7/8	12"	3	—	—	6001447
27/64			0.4219	3.15/16	12"	3	6001366	—	—
7/16			0.4375	4.1/16	12"	3	6001417	—	—
29/64			0.4531	4.3/16	12"	3	6001369	—	—
15/32			0.4687	4.5/16	12"	3	6001341	—	—
31/64			0.4844	4.3/8	12"	3	6001393	—	—
1/2			0.5000	4.1/2	12"	3	6001318	—	—

Heavy Duty Cobalt Aircraft Extension (NAS 907 Type J)

CO500-6 - Fractional Sizes, 6" Over All Length

CO501-6 - Wire Gauge Sizes, 6" Over All Length

CO500-12 - Fractional Sizes, 12" Over All Length

CO501-12 - Wire Gauge Sizes, 12" Over All Length

Low thrust design self centering 135° Split Point for easier penetration. Low thrust design. Cobalt base material with Bronze tempered for wear resistance and lubricity. For enhanced tool life in ferrous materials.



CO500-6	CO501-6	CO500-12	CO501-12
1/16 - 1/4	N52 - N1	1/16 - 1/4	N40 - N2

d ₁ Ø Inch	d ₁	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	CO500-6	CO501-6	CO500-12	CO501-12
1/16		0.0625	7/8	12"	12	—	—	5995755	—
1/16		0.0625	7/8	6"	12	5995809	—	—	—
	52	0.0635	7/8	6"	12	—	5996131	—	—
	51	0.0670	1"	6"	12	—	5996127	—	—
	50	0.0700	1"	6"	12	—	5996123	—	—
	49	0.0730	1"	6"	12	—	5996116	—	—
	48	0.0760	1"	6"	12	—	5996113	—	—
5/64		0.0781	1"	12"	12	—	—	5995796	—
5/64		0.0781	1"	6"	12	5995848	—	—	—
	47	0.0785	1"	6"	12	—	5996110	—	—
	46	0.0810	1.1/8	6"	12	—	5996107	—	—
	45	0.0820	1.1/8	6"	12	—	5996104	—	—
	44	0.0860	1.1/8	6"	12	—	5996097	—	—
	43	0.0890	1.1/4	6"	12	—	5996094	—	—
	42	0.0935	1.1/4	6"	12	—	5996092	—	—
3/32		0.0938	1.1/4	12"	12	—	—	5995787	—
3/32		0.0938	1.1/4	6"	12	5995842	—	—	—
	41	0.0960	1.3/8	6"	12	—	5996088	—	—
	40	0.0980	1.3/8	12"	12	—	—	—	5995909
	40	0.0980	1.3/8	6"	12	—	5996086	—	—
	39	0.0995	1.3/8	6"	12	—	5996080	—	—
	38	0.1015	1.7/16	6"	12	—	5996077	—	—
	37	0.1040	1.7/16	6"	12	—	5996072	—	—
	36	0.1065	1.7/16	6"	12	—	5996067	—	—
7/64		0.1094	1.1/2	12"	12	—	—	5995802	—
7/64		0.1094	1.1/2	6"	12	5995854	—	—	—
	35	0.1100	1.1/2	6"	12	—	5996060	—	—
	34	0.1110	1.1/2	6"	12	—	5996056	—	—
	33	0.1130	1.1/2	6"	12	—	5996053	—	—
	32	0.1160	1.5/8	6"	12	—	5996047	—	—
	31	0.1200	1.5/8	6"	12	—	5996044	—	—
1/8		0.1250	1.5/8	12"	12	—	—	5995763	—
1/8		0.1250	1.5/8	6"	12	5995818	—	—	—

AIRCRAFT EXTENSION DRILL



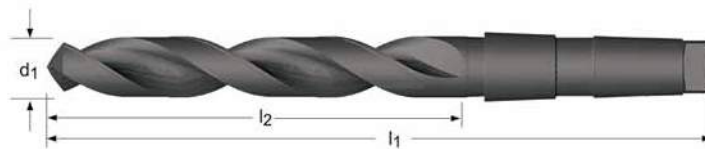
d ₁ Ø Inch	d ₁	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	CO500-6	CO501-6	CO500-12	CO501-12
	30	0.1285	1.5/8	12"	12	—	—	—	5995899
	30	0.1285	1.5/8	6"	12	—	5996040	—	—
	29	0.1360	1.3/4	12"	12	—	—	—	5995895
	29	0.1360	1.3/4	6"	12	—	5996033	—	—
	28	0.1405	1.3/4	6"	12	—	5996029	—	—
9/64		0.1406	1.3/4	12"	12	—	—	5995805	—
9/64		0.1406	1.3/4	6"	12	5995858	—	—	—
	27	0.1440	1.7/8	12"	12	—	—	—	5995891
	27	0.1440	1.7/8	6"	12	—	5996024	—	—
	26	0.1470	1.7/8	6"	12	—	5996018	—	—
	25	0.1495	1.7/8	6"	12	—	5996014	—	—
	24	0.1520	2"	6"	12	—	5996010	—	—
	23	0.1540	2"	6"	12	—	5996007	—	—
5/32		0.1563	2"	12"	12	—	—	5995792	—
5/32		0.1563	2"	6"	12	5995845	—	—	—
	22	0.1570	2"	6"	12	—	5996004	—	—
	21	0.1590	2.1/8	12"	12	—	—	—	5995887
	21	0.1590	2.1/8	6"	12	—	5996000	—	—
	20	0.1610	2.1/8	12"	12	—	—	—	5995883
	20	0.1610	2.1/8	6"	12	—	5995996	—	—
	19	0.1660	2.1/8	12"	12	—	—	—	5995877
	19	0.1660	2.1/8	6"	12	—	5995988	—	—
	18	0.1695	2.1/8	6"	12	—	5995984	—	—
11/64		0.1719	2.1/8	12"	12	—	—	5995767	—
11/64		0.1719	2.1/8	6"	12	5995822	—	—	—
	17	0.1730	2.3/16	6"	12	—	5996159	—	—
	16	0.1770	2.3/16	12"	12	—	—	—	5995873
	16	0.1770	2.3/16	6"	12	—	5996155	—	—
	15	0.1800	2.3/16	6"	12	—	5996151	—	—
	14	0.1820	2.3/16	6"	12	—	5996147	—	—
	13	0.1850	2.5/16	6"	12	—	5996139	—	—
3/16		0.1875	2.5/16	12"	6	—	—	5995779	—
3/16		0.1875	2.5/16	6"	12	5995839	—	—	—
	12	0.1890	2.5/16	6"	12	—	5996100	—	—
	11	0.1910	2.5/16	12"	12	—	—	—	5995869
	11	0.1910	2.5/16	6"	12	—	5996064	—	—
	10	0.1935	2.7/16	12"	6	—	—	—	5995861
	10	0.1935	2.7/16	6"	12	—	5996022	—	—
	9	0.1960	2.7/16	6"	12	—	5995556	—	—
	8	0.1990	2.7/16	6"	12	—	5995507	—	—
	7	0.2010	2.7/16	6"	12	—	5996143	—	—
13/64		0.2031	2.7/16	12"	6	—	—	5995771	—
13/64		0.2031	2.7/16	6"	12	5995831	—	—	—
	6	0.2040	2.1/2	6"	12	—	5996135	—	—
	5	0.2055	2.1/2	6"	12	—	5996119	—	—
	4	0.2090	2.1/2	6"	12	—	5996083	—	—
	3	0.2130	2.1/2	6"	12	—	5996037	—	—
7/32		0.2188	2.1/2	12"	6	—	—	5995799	—
7/32		0.2188	2.1/2	6"	12	5995851	—	—	—
	2	0.2210	2.5/8	12"	6	—	—	—	5995880
	2	0.2210	2.5/8	6"	12	—	5995992	—	—
	1	0.2280	2.5/8	6"	12	—	5995980	—	—
15/64		0.2344	2.5/8	12"	6	—	—	5995775	—
15/64		0.2344	2.5/8	6"	12	5995835	—	—	—
1/4		0.2500	2.3/4	12"	6	—	—	5995759	—
1/4		0.2500	2.3/4	6"	12	5995813	—	—	—

General Purpose Taper Shank

209 Standard Taper Type

S209 Small Taper Type

Steam tempered for increased tool life & lubricity.



209	S209
ANSI	ANSI
4XD	4XD
HSS	HSS
118°	118°
	
1/8 - 2"	1/2 - 2"

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	MTS	Pack Qty	209	S209
1/8	0.1250	1.7/8	5.1/8	1	1	6001003	—
9/64	0.1406	2.1/8	5.3/8	1	1	6001068	—
5/32	0.1563	2.1/8	5.3/8	1	1	6001011	—
11/64	0.1719	2.1/2	5.3/4	1	1	6001018	—
3/16	0.1875	2.1/2	5.3/4	1	1	6001135	—
13/64	0.2031	2.3/4	6"	1	1	6001032	—
7/32	0.2188	2.3/4	6"	1	1	6001056	—
15/64	0.2344	2.7/8	6.1/8	1	1	6001048	—
1/4	0.2500	2.7/8	6.1/8	1	1	6001000	—
17/64	0.2656	3"	6.1/4	1	1	6001054	—
9/32	0.2813	3"	6.1/4	1	1	6001065	—
19/64	0.2969	3.1/8	6.3/8	1	1	6001060	—
5/16	0.3125	3.1/8	6.3/8	1	1	6001196	—
21/64	0.3281	3.1/4	6.1/2	1	1	6001095	—
11/32	0.3437	3.1/4	6.1/2	1	1	6001012	—
23/64	0.3594	3.1/2	6.3/4	1	1	6001101	—
3/8	0.3750	3.1/2	6.3/4	1	1	6001144	—
25/64	0.3906	3.5/8	7"	1	1	6001112	—
13/32	0.4063	3.5/8	7"	1	1	6001027	—
27/64	0.4219	3.7/8	7.1/4	1	1	6001118	—
7/16	0.4375	3.7/8	7.1/4	1	1	6001050	—
29/64	0.4531	4.1/8	7.1/2	1	1	6001125	—
15/32	0.4687	4.1/8	7.1/2	1	1	6001046	—
31/64	0.4844	4.3/8	8.1/4	2	1	6001152	—
1/2	0.5000	4.3/8	7.3/4	1	1	—	5999934
1/2	0.5000	4.3/8	8.1/4	2	1	6000998	—
33/64	0.5156	4.5/8	8"	1	1	—	5999791
33/64	0.5156	4.5/8	8.1/2	2	1	6001161	—
17/32	0.5313	4.5/8	8"	1	1	—	5999777
17/32	0.5313	4.5/8	8.1/2	2	1	6001051	—
35/64	0.5469	4.7/8	8.1/4	1	1	—	5999793
35/64	0.5469	4.7/8	8.3/4	2	1	6001005	—
9/16	0.5625	4.7/8	8.1/4	1	1	—	5999807

TAPER SHANK DRILL



d ₁ Ø	d ₁ decimal	l ₂	l ₁	MTS	Pack Qty	209	S209
Inch	Inch	Inch	Inch				
9/16	0.5625	4.7/8	8.3/4	2	1	6001062	—
37/64	0.5781	4.7/8	8.3/4	2	1	6001053	—
19/32	0.5937	4.7/8	8.3/4	2	1	6001057	—
39/64	0.6094	4.7/8	8.3/4	2	1	6001086	—
5/8	0.6250	4.7/8	8.3/4	2	1	6001015	—
41/64	0.6406	5.1/8	9"	2	1	6001120	—
21/32	0.6563	5.1/8	9"	2	1	6001093	—
43/64	0.6719	5.3/8	9.1/4	2	1	6001175	—
11/16	0.6875	5.3/8	9.1/4	2	1	6001008	—
45/64	0.7031	5.5/8	9.1/2	2	1	6001186	—
23/32	0.7188	5.5/8	9.1/2	2	1	6001098	—
47/64	0.7344	5.7/8	9.3/4	2	1	6001190	—
3/4	0.7500	5.7/8	9.3/4	2	1	6001139	—
49/64	0.7656	6"	9.7/8	2	1	6001193	—
25/32	0.7813	6"	9.7/8	2	1	6001104	—
51/64	0.7969	6.1/8	10"	2	1	—	5999794
51/64	0.7969	6.1/8	10.3/4	3	1	6001021	—
13/16	0.8125	6.1/8	10"	2	1	—	5999772
13/16	0.8125	6.1/8	10.3/4	3	1	6001023	—
53/64	0.8281	6.1/8	10"	2	1	—	5999796
53/64	0.8281	6.1/8	10.3/4	3	1	6001025	—
27/32	0.8438	6.1/8	10"	2	1	—	5999783
27/32	0.8438	6.1/8	10.3/4	3	1	6001115	—
55/64	0.8594	6.1/8	10.3/4	3	1	6001031	—
7/8	0.8750	6.1/8	10"	2	1	—	5999805
7/8	0.8750	6.1/8	10.3/4	3	1	6001059	—
57/64	0.8906	6.1/8	10.3/4	3	1	6001035	—
29/32	0.9063	6.1/8	10"	2	1	—	5999786
29/32	0.9063	6.1/8	10.3/4	3	1	6001122	—
59/64	0.9219	6.1/8	10.3/4	3	1	6001039	—
15/16	0.9375	6.1/8	10.3/4	3	1	6001037	—
61/64	0.9531	6.3/8	11"	3	1	6001043	—
31/32	0.9688	6.3/8	11"	3	1	6001148	—
63/64	0.9844	6.3/8	11"	3	1	6001047	—
1"	1.0000	6.3/8	11"	3	1	5999465	—
1.1/64	1.0156	6.1/2	11.1/8	3	1	5999470	—
1.1/32	1.0312	6.1/2	11.1/8	3	1	5999468	—
1.3/64	1.0469	6.5/8	11.1/4	3	1	5999506	—
1.1/16	1.0625	6.5/8	11.1/4	3	1	5999466	—
1.5/64	1.0781	6.7/8	12.1/2	4	1	6000992	—
1.3/32	1.0937	6.7/8	11.1/2	3	1	—	6000482
1.3/32	1.0937	6.7/8	12.1/2	4	1	5999502	—
1.7/64	1.1094	7.1/8	11.3/4	3	1	—	5999914
1.7/64	1.1094	7.1/8	12.3/4	4	1	6001157	—
1.1/8	1.1250	7.1/8	11.3/4	3	1	—	6000436
1.1/8	1.1250	7.1/8	12.3/4	4	1	5999471	—
1.9/64	1.1406	7.1/4	11.7/8	3	1	—	5999930
1.9/64	1.1406	7.1/4	12.7/8	4	1	6001181	—
1.5/32	1.1563	7.1/4	11.7/8	3	1	—	5999769
1.5/32	1.1563	7.1/4	12.7/8	4	1	5999518	—
1.11/64	1.1719	7.3/8	12"	3	1	—	6000443
1.11/64	1.1719	7.3/8	13"	4	1	5999475	—
1.3/16	1.1875	7.3/8	12"	3	1	—	6000476
1.3/16	1.1875	7.3/8	13"	4	1	5999500	—
1.13/64	1.2031	7.1/2	12.1/8	3	1	—	6000449
1.7/32	1.2187	7.1/2	12.1/8	3	1	—	5999870
1.7/32	1.2187	7.1/2	13.1/8	4	1	6001109	—
1.15/64	1.2344	7.7/8	13.1/2	4	1	5999481	—
1.1/4	1.2500	7.7/8	12.1/2	3	1	—	6000433
1.1/4	1.2500	7.7/8	13.1/2	4	1	5999469	—
1.17/64	1.2656	8.1/2	14.1/8	4	1	5999483	—
1.9/32	1.2813	8.1/2	14.1/8	4	1	6001178	—
1.19/64	1.2969	8.5/8	14.1/4	4	1	5999486	—
1.5/16	1.3125	8.5/8	14.1/4	4	1	5999514	—
1.21/64	1.3281	8.3/4	14.3/8	4	1	5999488	—
1.11/32	1.3437	8.3/4	14.3/8	4	1	5999474	—

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	MTS	Pack Qty	209	S209
1.3/8	1.3750	8.7/8	14.1/2	4	1	5999508	—
1.13/32	1.4063	9"	14.5/8	4	1	5999477	—
1.27/64	1.4219	9.1/8	14.3/4	4	1	5999494	—
1.7/16	1.4375	9.1/8	14.3/4	4	1	6001075	—
1.15/32	1.4687	9.1/4	14.7/8	4	1	5999480	—
1.31/64	1.4844	9.3/8	15"	4	1	5999512	—
1.1/2	1.5000	9.3/8	15"	4	1	5999467	—
1.33/64	1.5156	9.3/8	15"	4	1	—	6000491
1.17/32	1.5313	9.3/8	15"	4	1	—	6000461
1.17/32	1.5313	9.3/8	16.3/8	5	1	5999482	—
1.35/64	1.5469	9.5/8	15.1/4	4	1	—	6000497
1.9/16	1.5625	9.5/8	15.1/4	4	1	—	5999926
1.9/16	1.5625	9.5/8	16.5/8	5	1	6001173	—
1.19/32	1.5937	9.7/8	15.1/2	4	1	—	6000463
1.39/64	1.6094	10"	15.5/8	4	1	—	6000504
1.5/8	1.6250	10"	15.5/8	4	1	—	5999828
1.5/8	1.6250	10"	17"	5	1	6001042	—
1.21/32	1.6563	10.1/8	15.3/4	4	1	—	6000465
1.11/16	1.6875	10.1/8	15.3/4	4	1	—	6000440
1.11/16	1.6875	10.1/8	17.1/8	5	1	5999472	—
1.47/64	1.7344	10.3/8	16.1/4	4	1	—	6000520
1.3/4	1.7500	10.1/8	17.1/8	5	1	5999504	—
1.3/4	1.7500	10.3/8	16.1/4	4	1	—	6000484
1.25/32	1.7813	10.3/8	16.1/4	4	1	—	6000469
1.13/16	1.8125	10.1/8	17.1/8	5	1	5999476	—
1.13/16	1.8125	10.3/8	16.1/4	4	1	—	6000446
1.7/8	1.8750	10.1/2	16.1/2	4	1	—	5999922
1.7/8	1.8750	10.3/8	17.3/8	5	1	6001164	—
1.15/16	1.9375	10.3/8	17.3/8	5	1	5999479	—
1.15/16	1.9375	10.5/8	16.5/8	4	1	—	6000455
1.31/32	1.9687	10.5/8	16.5/8	4	1	—	6000488
2"	2.0000	10.3/8	17.3/8	5	1	6001063	—
2"	2.0000	10.5/8	16.5/8	4	1	—	5999780

General Purpose Taper Shank, Metric

5ATS Steam tempered for increased wear resistance & lubricity.

A350 Long series. Steam tempered for increased wear resistance & lubricity.

A530 TiN Coating increases wear resistance and improves tool life. Thinned Point design above 14mm diameter to reduce thrust and improve chip formation.



5ATS	A350	A530
5.00 - 50.00	5.00 - 50.00	8.50 - 40.00

d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	MTS	Pack Qty	5ATS	A350	A530
5.00	0.1969	74	155	1	1	—	5969914	—
5.00	0.1969	52	133	1	1	6001263	—	—
5.50	0.2165	80	161	1	1	—	5969918	—
5.50	0.2165	57	138	1	1	6001267	—	—
6.00	0.2362	80	161	1	1	—	5970237	—
6.00	0.2362	57	138	1	1	6001278	—	—
6.50	0.2559	63	144	1	1	6001283	—	—
6.70	0.2638	86	167	1	1	—	5970279	—
6.80	0.2677	93	174	1	1	—	5970322	—
6.80	0.2677	69	150	1	1	6001287	—	—
7.00	0.2756	93	174	1	1	—	5970363	—
7.00	0.2756	69	150	1	1	6001291	—	—
7.50	0.2953	93	174	1	1	—	5970371	—
7.50	0.2953	69	150	1	1	6001298	—	—
8.00	0.3150	100	181	1	1	—	5970375	—
8.00	0.3150	75	156	1	1	6001301	—	—
8.40	0.3307	100	181	1	1	—	5970378	—
8.50	0.3346	100	181	1	1	—	5970382	—
8.50	0.3346	75	156	1	1	6001304	—	5970277
8.75	0.3445	107	188	1	1	—	5970207	—
9.00	0.3543	107	188	1	1	—	5970209	—
9.00	0.3543	81	162	1	1	6001307	—	5970281
9.50	0.3740	107	188	1	1	—	5970211	—
9.50	0.3740	81	162	1	1	6001312	—	—
9.80	0.3858	116	197	1	1	—	5970215	—
10.00	0.3937	116	197	1	1	—	5969555	—
10.00	0.3937	87	168	1	1	6001470	—	5970037
10.20	0.4016	116	197	1	1	—	5969559	—
10.20	0.4016	87	168	1	1	6001472	—	5970047
10.50	0.4134	116	197	1	1	—	5969564	—
10.50	0.4134	87	168	1	1	6001474	—	5970052
10.70	0.4213	125	206	1	1	—	5969571	—
11.00	0.4331	125	206	1	1	—	5969575	—

d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	MTS	Pack Qty	5ATS	A350	A530
11.00	0.4331	94	175	1	1	6001476	—	5970057
11.50	0.4528	125	206	1	1	—	5969581	—
11.50	0.4528	94	175	1	1	6001478	—	5970062
11.75	0.4626	125	206	1	1	—	5969585	—
11.75	0.4626	94	175	1	1	—	—	5970067
11.80	0.4646	125	206	1	1	—	5969590	—
12.00	0.4724	134	215	1	1	—	5969595	—
12.00	0.4724	101	182	1	1	6001482	—	5970071
12.20	0.4803	101	182	1	1	6001484	—	—
12.50	0.4921	134	215	1	1	—	5969600	—
12.50	0.4921	101	182	1	1	6001486	—	5970075
12.80	0.5039	101	182	1	1	6001488	—	—
13.00	0.5118	134	215	1	1	—	5969605	—
13.00	0.5118	101	182	1	1	6001491	—	5970079
13.50	0.5315	142	223	1	1	—	5969609	—
13.50	0.5315	108	189	1	1	6001493	—	5970084
13.80	0.5433	108	189	1	1	6001495	—	—
14.00	0.5512	142	223	1	1	—	5969613	—
14.00	0.5512	108	189	1	1	6001497	—	5970087
14.25	0.5610	147	245	2	1	—	5969621	—
14.25	0.5610	114	212	2	1	6001499	—	—
14.50	0.5709	147	245	2	1	—	5969625	—
14.50	0.5709	114	212	2	1	6001501	—	5970095
14.75	0.5807	147	245	2	1	—	5969630	—
14.75	0.5807	114	212	2	1	6001505	—	—
15.00	0.5906	147	245	2	1	—	5969635	—
15.00	0.5906	114	212	2	1	6001009	—	5970098
15.25	0.6004	120	218	2	1	—	—	5970101
15.25	0.6004	153	251	2	1	—	5969638	—
15.50	0.6102	153	251	2	1	—	5969642	—
15.50	0.6102	120	218	2	1	6001088	—	5970105
15.75	0.6201	153	251	2	1	—	5969647	—
15.75	0.6201	120	218	2	1	6001119	—	—
16.00	0.6299	153	251	2	1	—	5969651	—
16.00	0.6299	120	218	2	1	6001165	—	5970108
16.25	0.6398	159	257	2	1	—	5969655	—
16.50	0.6496	159	257	2	1	—	5969657	—
16.50	0.6496	125	223	2	1	6001179	—	5970114
16.75	0.6594	159	257	2	1	—	5969663	—
17.00	0.6693	159	257	2	1	—	5969717	—
17.00	0.6693	125	223	2	1	6001187	—	5970117
17.25	0.6791	165	263	2	1	—	5969775	—
17.50	0.6890	165	263	2	1	—	5969834	—
17.50	0.6890	130	228	2	1	6001020	—	5970121
18.00	0.7087	165	263	2	1	—	5969878	—
18.00	0.7087	130	228	2	1	6001026	—	5970125
18.50	0.7283	171	269	2	1	—	5969916	—
18.50	0.7283	135	233	2	1	6001029	—	5970129
19.00	0.7480	171	269	2	1	—	5969920	—
19.00	0.7480	135	233	2	1	6001034	—	5970135
19.50	0.7677	177	275	2	1	—	5969922	—
19.50	0.7677	140	238	2	1	6001038	—	5970206
19.75	0.7776	177	275	2	1	—	5969924	—
20.00	0.7874	177	275	2	1	—	5969927	—
20.00	0.7874	140	238	2	1	6001041	—	5970243
20.25	0.7972	184	282	2	1	—	5969723	—
20.50	0.8071	184	282	2	1	—	5969727	—
20.50	0.8071	145	243	2	1	6001045	—	5970284
21.00	0.8268	184	282	2	1	—	5969731	—
21.00	0.8268	145	243	2	1	6001049	—	5970327
21.50	0.8465	191	289	2	1	—	5969737	—
21.50	0.8465	150	248	2	1	6001052	—	5970368
22.00	0.8661	191	289	2	1	—	5969742	—
22.00	0.8661	150	248	2	1	6001058	—	5970377
22.50	0.8858	198	296	2	1	—	5969746	—
22.50	0.8858	155	253	2	1	6001061	—	5970381

d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	MTS	Pack Qty	5ATS	A350	A530
23.00	0.9055	198	296	2	1	—	5969751	—
23.00	0.9055	155	253	2	1	6001064	—	5970384
23.50	0.9252	198	319	3	1	—	5969756	—
23.50	0.9252	155	276	3	1	6001067	—	5970387
24.00	0.9449	206	327	3	1	—	5969764	—
24.00	0.9449	160	281	3	1	6001070	—	5970212
24.50	0.9646	206	327	3	1	—	5969770	—
24.50	0.9646	160	281	3	1	6001073	—	5970214
25.00	0.9843	206	327	3	1	—	5969780	—
25.00	0.9843	160	281	3	1	6001076	—	5970217
25.50	1.0039	165	286	3	1	—	—	5970220
25.50	1.0039	214	335	3	1	—	5969786	—
26.00	1.0236	214	335	3	1	—	5969791	—
26.00	1.0236	165	286	3	1	6001082	—	5970223
26.50	1.0433	214	335	3	1	—	5969796	—
26.50	1.0433	165	286	3	1	6001085	—	5970226
27.00	1.0630	222	343	3	1	—	5969802	—
27.00	1.0630	170	291	3	1	6001091	—	5970229
27.50	1.0827	170	291	3	1	—	—	5970231
27.50	1.0827	222	343	3	1	—	5969805	—
28.00	1.1024	222	343	3	1	—	5969808	—
28.00	1.1024	170	291	3	1	6001099	—	5970235
28.50	1.1220	175	296	3	1	—	—	5970238
29.00	1.1417	230	351	3	1	—	5969813	—
29.00	1.1417	175	296	3	1	6001105	—	5970246
29.50	1.1614	175	296	3	1	—	—	5970250
30.00	1.1811	230	351	3	1	—	5969817	—
30.00	1.1811	175	296	3	1	6001107	—	5970253
30.50	1.2008	239	360	3	1	—	5969826	—
31.00	1.2205	239	360	3	1	—	5969838	—
31.00	1.2205	180	301	3	1	6001113	—	5970257
31.50	1.2402	239	360	3	1	—	5969844	—
32.00	1.2598	248	397	4	1	—	5969848	—
32.00	1.2598	185	334	4	1	6001123	—	5970262
33.00	1.2992	185	334	4	1	—	—	5970266
33.00	1.2992	248	397	4	1	—	5969852	—
34.00	1.3386	257	406	4	1	—	5969855	—
34.00	1.3386	190	339	4	1	6001137	—	—
35.00	1.3780	257	406	4	1	—	5969859	—
35.00	1.3780	190	339	4	1	6001147	—	5970270
36.00	1.4173	267	416	4	1	—	5969863	—
36.00	1.4173	195	344	4	1	6001156	—	—
37.00	1.4567	267	416	4	1	—	5969867	—
37.00	1.4567	195	344	4	1	6001169	—	—
38.00	1.4961	277	426	4	1	—	5969871	—
38.00	1.4961	200	349	4	1	6001295	—	—
39.00	1.5354	277	426	4	1	—	5969874	—
40.00	1.5748	277	426	4	1	—	5969882	—
40.00	1.5748	200	349	4	1	6001362	—	5970275
41.00	1.6142	287	436	4	1	—	5969886	—
42.00	1.6535	287	436	4	1	—	5969889	—
42.00	1.6535	205	354	4	1	6001422	—	—
43.00	1.6929	298	447	4	1	—	5969893	—
44.00	1.7323	298	447	4	1	—	5969897	—
44.00	1.7323	210	359	4	1	6001433	—	—
45.00	1.7717	298	447	4	1	—	5969902	—
46.00	1.8110	310	459	4	1	—	5969905	—
47.00	1.8504	310	459	4	1	—	5969909	—
48.00	1.8898	321	470	4	1	—	5969912	—
50.00	1.9685	321	470	4	1	—	5970204	—
50.00	1.9685	220	369	4	1	6001273	—	—

General Purpose Taper Shank - Extra Length

A345 Steam tempered for increase wear resistance & lubricity.

A345

DIN
1870/1

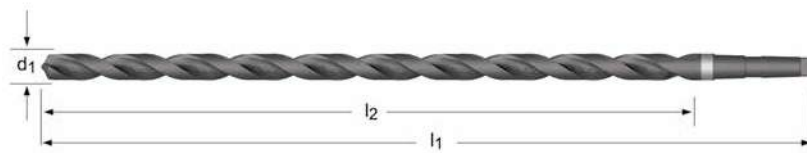
10XD

HSS

118°



8.00 - 40.00



d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	MTS	Pack Qty	A345
	8.00	0.3150	165	265	1	1	5969532
	8.50	0.3346	165	265	1	1	5969538
	9.00	0.3543	175	275	1	1	5969541
	9.50	0.3740	175	275	1	1	5969546
3/8	9.52	0.3750	185	285	1	1	5969149
	10.00	0.3937	185	285	1	1	5969159
13/32	10.32	0.4063	185	285	1	1	5968967
	10.50	0.4134	185	285	1	1	5969162
	11.00	0.4331	195	300	1	1	5969165
7/16	11.11	0.4375	195	300	1	1	5969520
	11.50	0.4528	195	300	1	1	5969168
29/64	11.51	0.4531	205	310	1	1	5969141
	12.00	0.4724	205	310	1	1	5968952
	12.50	0.4921	205	310	1	1	5968956
1/2	12.70	0.5000	205	310	1	1	5969153
	13.00	0.5118	205	310	1	1	5968959
17/32	13.49	0.5313	220	325	1	1	5969012
	13.50	0.5315	220	325	1	1	5968963
	14.00	0.5512	220	325	1	1	5968971
9/16	14.29	0.5625	220	340	2	1	5969550
37/64	14.68	0.5781	220	340	2	1	5969669
	15.00	0.5906	220	340	2	1	5968979
39/64	15.48	0.6094	230	355	2	1	5969479
	15.50	0.6102	230	355	2	1	5968983
5/8	15.88	0.6250	230	355	2	1	5969505
	16.00	0.6299	230	355	2	1	5968992
41/64	16.27	0.6406	230	355	2	1	5969489
	16.50	0.6496	230	355	2	1	5968997
21/32	16.67	0.6563	230	355	2	1	5969062
	17.00	0.6693	230	355	2	1	5969002
11/16	17.46	0.6875	245	370	2	1	5968949
	17.50	0.6890	245	370	2	1	5969007

TAPER SHANK DRILL



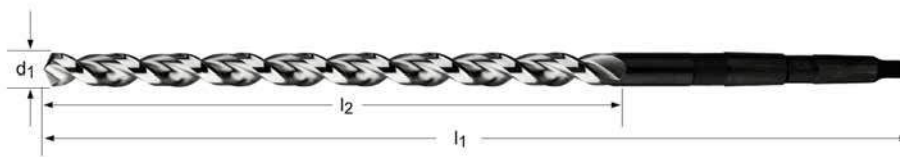
d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	MTS	Pack Qty	A345
3/4	18.00	0.7087	245	370	2	1	5969018
	18.50	0.7283	245	370	2	1	5969023
	19.00	0.7480	245	370	2	1	5969028
	19.05	0.7500	260	385	2	1	5969145
	19.50	0.7677	260	385	2	1	5969033
	20.00	0.7874	260	385	2	1	5969038
	20.50	0.8071	260	385	2	1	5969046
	21.00	0.8268	260	385	2	1	5969051
7/8	21.50	0.8465	270	405	2	1	5969056
	22.00	0.8661	270	405	2	1	5969067
	22.22	0.8750	270	405	2	1	5969525
	22.50	0.8858	270	405	2	1	5969074
	23.00	0.9055	270	405	2	1	5969076
	23.50	0.9252	270	425	3	1	5969082
	24.00	0.9449	290	440	3	1	5969090
	24.50	0.9646	290	440	3	1	5969095
1"	25.00	0.9843	290	440	3	1	5969105
	25.40	1.0000	290	440	3	1	5968945 ¹⁾
	25.50	1.0039	290	440	3	1	5969110 ¹⁾
	26.00	1.0236	290	440	3	1	5969114 ¹⁾
	26.50	1.0433	290	440	3	1	5969119 ¹⁾
	27.00	1.0630	305	460	3	1	5969125 ¹⁾
	28.00	1.1024	305	460	3	1	5969133 ¹⁾
	29.00	1.1417	305	460	3	1	5969138 ¹⁾
1.1/4	30.00	1.1811	305	460	3	1	5969156 ¹⁾
	31.75	1.2500	320	480	3	1	5969042 ¹⁾
	31.00	1.2205	320	480	3	1	5969468 ¹⁾
	32.00	1.2598	320	505	4	1	5969515 ¹⁾
	33.00	1.2992	320	505	4	1	5969567 ¹⁾
	34.00	1.3386	340	530	4	1	5969617 ¹⁾
	35.00	1.3780	340	530	4	1	5969661 ¹⁾
	36.00	1.4173	340	530	4	1	5969665 ¹⁾
1.1/2	37.00	1.4567	340	530	4	1	5969667 ¹⁾
	38.00	1.4961	360	555	4	1	5969671 ¹⁾
	38.10	1.5000	360	555	4	1	5968988 ¹⁾
	39.00	1.5354	360	555	4	1	5969475 ¹⁾
	40.00	1.5748	360	555	4	1	5969483 ¹⁾

¹⁾ < 10xD

General Purpose Parabolic Flute Taper Shank - Extra Length, Metric

- A951** Parabolic Flute design for efficient chip removal. Allows greater drilling depths in one pass. Bright Finish in flutes improves chip flow for soft or non-ferrous materials.
- A952** Parabolic Flute design for efficient chip removal. Allows greater drilling depths in one pass. Bright Finish in flutes improves chip flow for soft or non-ferrous materials.

* Lands are steam tempered for increased wear resistance & lubricity.



A951	A952
10.00 - 30.00	8.00 - 40.00

d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	MTS	Pack Qty	A951	A952
8.00	0.3150	210	330	1	1	—	5972581
8.50	0.3346	210	330	1	1	—	5972585
9.00	0.3543	220	345	1	1	—	5972587
10.00	0.3937	185	285	1	1	5972410	—
10.00	0.3937	235	360	1	1	—	5972462
10.50	0.4134	235	360	1	1	—	5972466
11.00	0.4331	195	300	1	1	5972452	—
11.00	0.4331	250	375	1	1	—	5972470
11.50	0.4528	250	375	1	1	—	5972473
12.00	0.4724	205	310	1	1	5972499	—
12.00	0.4724	260	395	1	1	—	5972478
12.50	0.4921	205	310	1	1	5972542	—
12.50	0.4921	260	395	1	1	—	5972484
13.00	0.5118	205	310	1	1	5972549	—
13.00	0.5118	260	395	1	1	—	5972488
13.50	0.5315	220	325	1	1	5972550	—
13.50	0.5315	275	410	1	1	—	5972491
14.00	0.5512	220	325	1	1	5972552	—
14.00	0.5512	275	410	1	1	—	5972495
14.50	0.5709	220	340	2	1	5972555 ¹⁾	—
14.50	0.5709	275	425	2	1	—	5972503 ²⁾
15.00	0.5906	220	340	2	1	5972372 ¹⁾	—
15.00	0.5906	275	425	2	1	—	5972507 ²⁾
15.50	0.6102	230	355	2	1	5972376 ¹⁾	—
15.50	0.6102	295	445	2	1	—	5972511 ²⁾
16.00	0.6299	230	355	2	1	5972380 ¹⁾	—
16.00	0.6299	295	445	2	1	—	5972515 ²⁾
16.50	0.6496	230	355	2	1	5972384 ¹⁾	—
16.50	0.6496	295	445	2	1	—	5972518 ²⁾
17.00	0.6693	230	355	2	1	5972387 ¹⁾	—
17.00	0.6693	295	445	2	1	—	5972522 ²⁾

¹⁾ < 15xD

²⁾ < 20xD

TAPER SHANK DRILL



d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ mm	l ₁ mm	MTS	Pack Qty	A951	A952
17.50	0.6890	245	370	2	1	5972390 ¹⁾	—
17.50	0.6890	310	465	2	1	—	5972526 ²⁾
18.00	0.7087	245	370	2	1	5972394 ¹⁾	—
18.00	0.7087	310	465	2	1	—	5972530 ²⁾
18.50	0.7283	245	370	2	1	5972398 ¹⁾	—
18.50	0.7283	310	465	2	1	—	5972534 ²⁾
19.00	0.7480	245	370	2	1	5972402 ¹⁾	—
19.00	0.7480	310	465	2	1	—	5972538 ²⁾
19.50	0.7677	260	385	2	1	5972406 ¹⁾	—
19.50	0.7677	325	490	2	1	—	5972545 ²⁾
20.00	0.7874	260	385	2	1	5972414 ¹⁾	—
20.00	0.7874	325	490	2	1	—	5972560 ²⁾
21.00	0.8268	260	385	2	1	5972416 ¹⁾	—
21.00	0.8268	325	490	2	1	—	5972583 ²⁾
22.00	0.8661	270	405	2	1	5972420 ¹⁾	—
22.00	0.8661	345	515	2	1	—	5972604 ²⁾
23.00	0.9055	270	405	2	1	5972424 ¹⁾	—
23.00	0.9055	345	515	2	1	—	5972638 ²⁾
24.00	0.9449	290	440	3	1	5972428 ¹⁾	—
24.00	0.9449	365	555	3	1	—	5972681 ²⁾
25.00	0.9843	290	440	3	1	5972432 ¹⁾	—
25.00	0.9843	365	555	3	1	—	5972690 ²⁾
26.00	1.0236	290	440	3	1	5972435 ¹⁾	—
26.00	1.0236	365	555	3	1	—	5972695 ²⁾
27.00	1.0630	305	460	3	1	5972439 ¹⁾	—
27.00	1.0630	385	580	3	1	—	5972699 ²⁾
28.00	1.1024	305	460	3	1	5972443 ¹⁾	—
28.00	1.1024	385	580	3	1	—	5972705 ²⁾
29.00	1.1417	305	460	3	1	5972447 ¹⁾	—
29.00	1.1417	385	580	3	1	—	5972563 ²⁾
30.00	1.1811	305	460	3	1	5972457 ¹⁾	—
30.00	1.1811	385	580	3	1	—	5972565 ²⁾
31.00	1.2205	410	610	3	1	—	5972567 ²⁾
32.00	1.2598	410	635	4	1	—	5972569 ²⁾
33.00	1.2992	410	635	4	1	—	5972571 ²⁾
34.00	1.3386	430	665	4	1	—	5972573 ²⁾
35.00	1.3780	430	665	4	1	—	5972575 ²⁾
38.00	1.4961	460	695	4	1	—	5972577 ²⁾
40.00	1.5748	460	695	4	1	—	5972579 ²⁾

¹⁾ < 15xD

²⁾ < 20xD

Cobalt Heavy Duty Taper Shank

209CO Notched Point reduces thrust. Cobalt base material with Bronze tempered for wear resistance and lubricity. Suitable for ferrous materials.



209CO

ANSI

4XD

HSS-E

135°



1/4 - 1.1/2

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	MTS	Pack Qty	209CO
1/4	0.2500	2.7/8	6.1/8	1	1	6000767
9/32	0.2813	3"	6.1/4	1	1	6000887
5/16	0.3125	3.1/8	6.3/8	1	1	6000843
11/32	0.3437	3.1/4	6.1/2	1	1	6000841
3/8	0.3750	3.1/2	7.3/8	2	1	6000800
13/32	0.4063	3.5/8	7.1/2	2	1	6000929
27/64	0.4219	3.7/8	7.3/4	2	1	6000789
7/16	0.4375	3.7/8	7.3/4	2	1	6000869
29/64	0.4531	4.1/8	8"	2	1	6000795
15/32	0.4687	4.1/8	8"	2	1	6000942
31/64	0.4844	4.3/8	8.1/4	2	1	6000811
1/2	0.5000	4.3/8	8.1/4	2	1	6001028
33/64	0.5156	4.5/8	8.1/2	2	1	6000814
17/32	0.5313	4.5/8	8.1/2	2	1	6000948
35/64	0.5469	4.7/8	8.3/4	2	1	6000817
9/16	0.5625	4.7/8	8.3/4	2	1	6000882
37/64	0.5781	4.7/8	8.3/4	2	1	6000820
19/32	0.5937	4.7/8	8.3/4	2	1	6000951
39/64	0.6094	4.7/8	8.3/4	2	1	6000823
5/8	0.6250	4.7/8	8.3/4	2	1	6000847
41/64	0.6406	5.1/8	9"	2	1	6000826
21/32	0.6563	5.1/8	9.3/4	3	1	6000774
43/64	0.6719	5.3/8	10"	3	1	6000829
11/16	0.6875	5.3/8	10"	3	1	6000806
45/64	0.7031	5.5/8	10.1/4	3	1	6000832
23/32	0.7188	5.5/8	10.1/4	3	1	6000779
47/64	0.7344	5.7/8	10.1/2	3	1	6000835
3/4	0.7500	5.7/8	10.1/2	3	1	6000798
49/64	0.7656	6"	10.5/8	3	1	6000838
25/32	0.7813	6"	10.5/8	3	1	6000783
51/64	0.7969	6.1/8	10.3/4	3	1	6000849
13/16	0.8125	6.1/8	10.3/4	3	1	6000873
53/64	0.8281	6.1/8	10.3/4	3	1	6000851

COBALT TAPER SHANK DRILL



d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	MTS	Pack Qty	209CO
27/32	0.8438	6.1/8	10.3/4	3	1	6000786
55/64	0.8594	6.1/8	10.3/4	3	1	6000854
7/8	0.8750	6.1/8	10.3/4	3	1	6000878
57/64	0.8906	6.1/8	10.3/4	3	1	6000856
29/32	0.9062	6.1/8	10.3/4	3	1	6000792
59/64	0.9219	6.1/8	10.3/4	3	1	6000859
15/16	0.9375	6.1/8	10.3/4	3	1	6000938
61/64	0.9531	6.3/8	11"	3	1	6000862
31/32	0.9688	6.3/8	11"	3	1	6000803
63/64	0.9844	6.3/8	11"	3	1	6000865
1"	1.0000	6.3/8	11"	3	1	6000952
1.1/64	1.0156	6.1/2	12.1/8	4	1	6000965
1.1/32	1.0312	6.1/2	12.1/8	4	1	6000958
1.1/16	1.0625	6.5/8	12.1/4	4	1	6000954
1.3/32	1.0937	6.7/8	12.1/2	4	1	6000989
1.7/64	1.1094	7.1/8	12.3/4	4	1	6001007
1.1/8	1.1250	7.1/8	12.3/4	4	1	6000968
1.11/64	1.1719	7.3/8	13"	4	1	6000972
1.3/16	1.1875	7.3/8	13"	4	1	6000985
1.7/32	1.2188	7.1/2	13.1/8	4	1	6001004
1.1/4	1.2500	7.7/8	13.1/2	4	1	6000961
1.9/32	1.2813	8.1/2	14.1/8	4	1	6001013
1.11/32	1.3437	8.3/4	14.3/8	4	1	6000970
1.3/8	1.3750	8.7/8	14.1/2	4	1	6000991
1.7/16	1.4375	9.1/8	14.3/4	4	1	6001001
1.1/2	1.5000	9.3/8	15"	4	1	6000956

Metric Cobalt Heavy Duty Taper Shank

A730 Notched Point reduces thrust. Cobalt base material with Bronze tempered for wear resistance and lubricity. Suitable for ferrous materials.



A730

DIN
345

4XD

HSS-E

118°



1/4 - 1 1/2

d ₁ Ø mm	d ₁ decimal mm	l ₂ mm	l ₁ mm	MTS	Pack Qty	A730
10.00	0.3937	87	168	1	1	5971219
10.20	0.4016	87	168	1	1	5971222
10.50	0.4134	87	168	1	1	5971226
10.80	0.4252	94	175	1	1	5971230
11.00	0.4331	94	175	1	1	5971235
11.50	0.4528	94	175	1	1	5971237
11.80	0.4646	94	175	1	1	5971242
12.00	0.4724	101	182	1	1	5971246
12.20	0.4803	101	182	1	1	5971252
12.50	0.4921	101	182	1	1	5971257
12.80	0.5039	101	182	1	1	5971262
13.00	0.5118	101	182	1	1	5971266
13.50	0.5315	108	189	1	1	5971269
13.80	0.5433	108	189	1	1	5971272
14.00	0.5512	108	189	1	1	5971276
14.25	0.5610	114	212	2	1	5971280
14.50	0.5709	114	212	2	1	5971284
14.75	0.5807	114	212	2	1	5971288
15.00	0.5906	114	212	2	1	5971296
15.25	0.6004	120	218	2	1	5971165
15.50	0.6102	120	218	2	1	5971221
15.75	0.6201	120	218	2	1	5971265
16.00	0.6299	120	218	2	1	5971305
16.25	0.6398	120	218	2	1	5971331
16.50	0.6496	125	223	2	1	5971335
17.00	0.6693	125	223	2	1	5971337
17.25	0.6791	130	228	2	1	5971339
17.50	0.6890	130	228	2	1	5971341
17.75	0.6988	130	228	2	1	5971174
18.00	0.7087	130	228	2	1	5971179
18.25	0.7185	135	233	2	1	5971184
18.50	0.7283	135	233	2	1	5971190
18.75	0.7382	135	233	2	1	5971194

COBALT TAPER SHANK DRILL



d ₁ Ø mm	d ₁ decimal mm	l ₂ mm	l ₁ mm	MTS	Pack Qty	A730
19.00	0.7480	135	233	2	1	5971199
19.25	0.7579	140	238	2	1	5971203
19.50	0.7677	140	238	2	1	5971208
19.75	0.7776	140	238	2	1	5971213
20.00	0.7874	140	238	2	1	5971217
20.25	0.7972	145	243	2	1	5971225
20.50	0.8071	145	243	2	1	5971229
20.75	0.8169	145	243	2	1	5971233
21.00	0.8268	145	243	2	1	5971238
21.50	0.8465	150	248	2	1	5971241
22.00	0.8661	150	248	2	1	5971245
22.50	0.8858	155	253	2	1	5971250
23.00	0.9055	155	253	2	1	5971254
23.50	0.9252	155	276	3	1	5971258
24.00	0.9449	160	281	3	1	5971261
24.50	0.9646	160	281	3	1	5971268
25.00	0.9843	160	281	3	1	5971271
25.50	1.0039	165	286	3	1	5971275
26.00	1.0236	165	286	3	1	5971279
26.50	1.0433	165	286	3	1	5971283
27.00	1.0630	170	291	3	1	5971286
27.50	1.0827	170	291	3	1	5971290
28.00	1.1024	170	291	3	1	5971294
28.50	1.1220	175	296	3	1	5971299
29.00	1.1417	175	296	3	1	5971302
30.00	1.1811	175	296	3	1	5971310
31.00	1.2205	180	301	3	1	5971314
32.00	1.2598	185	334	4	1	5971319

Taper Shank - 4-Flute

T400

Core drill with taper shank for enlarging pre-drilled or cast holes in a wide range of materials.



T400

HSS

ST

ANSI



1/2 - 1.5/8

d_1 Ø	d_1 decimal	l_2	l_1	MTS	Pack Qty	T400
Inch	Inch	Inch	Inch			
1/2	0.5000	4.3/8	8.1/4	2	1	5999981
17/32	0.5312	4.5/8	8.1/2	2	1	5999997
9/16	0.5625	4.7/8	8.3/4	2	1	6000268
5/8	0.6250	4.7/8	8.3/4	2	1	6000227
21/32	0.6562	5.1/8	9"	2	1	6000018
3/4	0.7500	5.7/8	9.3/4	2	1	6000144
25/32	0.7812	6"	9.7/8	2	1	6000024
7/8	0.8750	6.1/8	10.3/4	3	1	6000260
1"	1.0000	6.3/8	11"	3	1	5999994
1.1/32	1.0312	6.1/2	11.1/8	3	1	6000036
1.1/16	1.0625	6.5/8	11.1/4	3	1	6000027
1.1/8	1.1250	7.1/8	12.3/4	4	1	6000042
1.5/32	1.1562	7.1/4	12.7/8	4	1	5999955
1.1/4	1.2500	7.7/8	13.1/2	4	1	6000039
1.5/16	1.3125	8.5/8	14.1/4	4	1	5999952
1.11/32	1.3438	8.3/4	14.3/8	4	1	5999889
1.3/8	1.3750	8.7/8	14.1/2	4	1	5999946
1.1/2	1.5000	9.3/8	15"	4	1	6000033
1.9/16	1.5625	9.5/8	16.5/8	5	1	5999975
1.5/8	1.6250	10"	17"	5	1	5999961

REDUCED SHANK DRILL



General Purpose Reduced Shank - 1/2" Shank

A170 Silver & Deming Drills. Steam tempered for increased wear resistance & lubricity.



A170



13.00 - 1.1/2

d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	l ₂ mm	l ₁ mm	Pack Qty	A170
	13.00	0.5118					1	5968873
33/64	13.10	0.5157	3.1/8	6"			1	5968798
17/32	13.49	0.5313	3.1/8	6"			1	5968708
	13.50	0.5315			83	156	1	5968882
35/64	13.89	0.5469	3.1/8	6"			1	5968804
	14.00	0.5512			83	156	1	5968889
9/16	14.29	0.5625	3.1/8	6"			1	5969849
	14.50	0.5709			83	156	1	5968893
37/64	14.68	0.5781	3.1/8	6"			1	5968809
	15.00	0.5906			83	156	1	5968688
19/32	15.08	0.5937	3.1/8	6"			1	5968725
39/64	15.48	0.6094	3.1/8	6"			1	5968814
	15.50	0.6102			83	156	1	5968690
5/8	15.88	0.6250	3.1/8	6"			1	5968848
	16.00	0.6299			84	157	1	5968695
41/64	16.27	0.6406	3.1/8	6"			1	5968823
	16.50	0.6496			84	157	1	5968699
21/32	16.67	0.6563	3.1/8	6"			1	5968738
	17.00	0.6693			84	157	1	5968702
43/64	17.07	0.6719	3.1/8	6"			1	5968828
11/16	17.46	0.6875	3.1/8	6"			1	5968819
	17.50	0.6890			84	157	1	5968705
45/64	17.86	0.7031	3.1/8	6"			1	5968833
	18.00	0.7087			84	157	1	5968711
23/32	18.26	0.7188	3.1/8	6"			1	5968754
	18.50	0.7283			84	157	1	5968713
47/64	18.65	0.7344	3.1/8	6"			1	5968838
	19.00	0.7480			84	157	1	5968719
3/4	19.05	0.7500	3.1/8	6"			1	5968788
49/64	19.45	0.7656	3"	6"			1	5968842
	19.50	0.7677			81	158	1	5968722
25/32	19.84	0.7812	3"	6"			1	5968771
	20.00	0.7874			81	158	1	5968729

d ₁ Øh ₈ Inch	d ₁ Øh ₈ mm	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	l ₂ mm	l ₁ mm	Pack Qty	A170
51/64	20.24	0.7969	3"	6"			1	5968853
13/16	20.64	0.8125	3"	6"			1	5968885
	21.00	0.8268			82	158	1	5968733
53/64	21.03	0.8281	3"	6"			1	5968858
27/32	21.43	0.8437	3"	6"			1	5968776
55/64	21.83	0.8594	3"	6"			1	5968862
	22.00	0.8661			82	158	1	5968745
7/8	22.22	0.8750	3"	6"			1	5969793
57/64	22.62	0.8906	3"	6"			1	5968868
	23.00	0.9055			82	158	1	5968749
29/32	23.02	0.9062	3"	6"			1	5968783
59/64	23.42	0.9220	3"	6"			1	5968878
15/16	23.81	0.9375	3"	6"			1	5968692
	24.00	0.9449			83	159	1	5968758
61/64	24.21	0.9531	3"	6"			1	5969699
31/32	24.61	0.9688	3"	6"			1	5968793
	25.00	0.9843			83	159	1	5968766
63/64	25.00	0.9844	3"	6"			1	5969741
1"	25.40	1.0000	3"	6"			1	5969709
1.1/32	26.19	1.0312	3"	6"			1	5969721
1.1/16	26.99	1.0625	3"	6"			1	5969714
1.7/64	28.18	1.1094	3"	6"			1	5968685
1.1/8	28.58	1.1250	3"	6"			1	5969733
1.9/64	28.97	1.1406	3"	6"			1	5968761
1.5/32	29.37	1.1563	3"	6"			1	5969794
1.3/16	30.16	1.1875	3"	6"			1	5969769
1.7/32	30.96	1.2188	3"	6"			1	5969818
1.1/4	31.75	1.2500	3"	6"			1	5969725
1.5/16	33.34	1.3125	3"	6"			1	5969789
1.3/8	34.93	1.3750	3"	6"			1	5969784
1.7/16	36.51	1.4375	3"	6"			1	5969809
1.1/2	38.10	1.5000	3"	6"			1	5969718

REDUCED SHANK DRILL



General Purpose Reduced Shank - 1/2" Shank

* Sets Available on pg. 241

R56 Silver & Deming Drills. Steam tempered for increased wear resistance & lubricity.



R56

ANSI

4XD

HSS

118°



33/64 - 1.1/2

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	Pack Qty	R56
33/64	0.5156	3"	6"	1/2	1	5999983
17/32	0.5313	3"	6"	1/2	1	5999953
35/64	0.5469	3"	6"	1/2	1	5999986
9/16	0.5625	3"	6"	1/2	1	5999536
37/64	0.5781	3"	6"	1/2	1	5999989
19/32	0.5937	3"	6"	1/2	1	5999956
39/64	0.6094	3"	6"	1/2	1	5999992
5/8	0.6250	3"	6"	1/2	1	5999628
41/64	0.6406	3"	6"	1/2	1	5999995
21/32	0.6563	3"	6"	1/2	1	5999959
43/64	0.6719	3"	6"	1/2	1	6000001
11/16	0.6875	3"	6"	1/2	1	5999944
45/64	0.7031	3"	6"	1/2	1	5999527
23/32	0.7188	3"	6"	1/2	1	5999962
47/64	0.7344	3"	6"	1/2	1	5999550
3/4	0.7500	3"	6"	1/2	1	5999976
49/64	0.7656	3"	6"	1/2	1	5999584
25/32	0.7813	3"	6"	1/2	1	5999968
51/64	0.7969	3"	6"	1/2	1	5999670
13/16	0.8125	3"	6"	1/2	1	5999947
53/64	0.8281	3"	6"	1/2	1	5999677
27/32	0.8438	3"	6"	1/2	1	5999970
55/64	0.8594	3"	6"	1/2	1	5999681
7/8	0.8750	3"	6"	1/2	1	5999534
57/64	0.8906	3"	6"	1/2	1	5999685
29/32	0.9063	3"	6"	1/2	1	5999973
59/64	0.9219	3"	6"	1/2	1	5999690
15/16	0.9375	3"	6"	1/2	1	5999950
61/64	0.9531	3"	6"	1/2	1	5999530
31/32	0.9688	3"	6"	1/2	1	5999980
63/64	0.9844	3"	6"	1/2	1	5999532
1"	1.0000	3"	6"	1/2	1	6000010
1.1/64	1.0156	3"	6"	1/2	1	5999856

d_1 Ø Inch	d_1 decimal Inch	l_2 Inch	l_1 Inch	d_2 Ø Inch	Pack Qty	R56
1.1/32	1.0312	3"	6"	1/2	1	5999847
1.3/64	1.0469	3"	6"	1/2	1	5999903
1.1/16	1.0625	3"	6"	1/2	1	6000013
1.5/64	1.0781	3"	6"	1/2	1	5999919
1.3/32	1.0937	3"	6"	1/2	1	5999899
1.7/64	1.1094	3"	6"	1/2	1	5999935
1.1/8	1.1250	3"	6"	1/2	1	5999860
1.9/64	1.1406	3"	6"	1/2	1	5999941
1.5/32	1.1563	3"	6"	1/2	1	5999915
1.11/64	1.1719	3"	6"	1/2	1	5999868
1.3/16	1.1875	3"	6"	1/2	1	5999895
1.13/64	1.2031	3"	6"	1/2	1	5999876
1.7/32	1.2187	3"	6"	1/2	1	5999927
1.15/64	1.2344	3"	6"	1/2	1	5999891
1.1/4	1.2500	3"	6"	1/2	1	5999852
1.9/32	1.2813	3"	6"	1/2	1	5999938
1.5/16	1.3125	3"	6"	1/2	1	5999911
1.11/32	1.3437	3"	6"	1/2	1	5999864
1.3/8	1.3750	3"	6"	1/2	1	5999908
1.13/32	1.4063	3"	6"	1/2	1	5999871
1.7/16	1.4375	3"	6"	1/2	1	5999923
1.15/32	1.4687	3"	6"	1/2	1	5999881
1.1/2	1.5000	3"	6"	1/2	1	5999842

REDUCED SHANK DRILL



General Purpose Reduced Shank - 1/2" Shank with 3-Flats

* Sets Available on pg. 241

R57 Silver & Deming Drills with 3-Flat Shank. Steam tempered for increased wear resistance & lubricity.



R57

ANSI

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118°



33/64 - 1.1/2

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	Pack Qty	R57
33/64	0.5156	3"	6"	1/2	1	6000017
17/32	0.5313	3"	6"	1/2	1	5999640
35/64	0.5469	3"	6"	1/2	1	6000047
9/16	0.5625	3"	6"	1/2	1	6000045
37/64	0.5781	3"	6"	1/2	1	6000080
19/32	0.5937	3"	6"	1/2	1	5999644
39/64	0.6094	3"	6"	1/2	1	6000123
5/8	0.6250	3"	6"	1/2	1	6000021
41/64	0.6406	3"	6"	1/2	1	6000171
21/32	0.6563	3"	6"	1/2	1	5999647
43/64	0.6719	3"	6"	1/2	1	6000180
11/16	0.6875	3"	6"	1/2	1	5999624
45/64	0.7031	3"	6"	1/2	1	6000184
23/32	0.7188	3"	6"	1/2	1	5999651
47/64	0.7344	3"	6"	1/2	1	6000188
3/4	0.7500	3"	6"	1/2	1	5999667
49/64	0.7656	3"	6"	1/2	1	6000192
25/32	0.7813	3"	6"	1/2	1	5999655
51/64	0.7969	3"	6"	1/2	1	6000023
13/16	0.8125	3"	6"	1/2	1	5999631
53/64	0.8281	3"	6"	1/2	1	6000026
27/32	0.8438	3"	6"	1/2	1	5999659
55/64	0.8594	3"	6"	1/2	1	6000029
7/8	0.8750	3"	6"	1/2	1	6000043
57/64	0.8906	3"	6"	1/2	1	6000032
29/32	0.9063	3"	6"	1/2	1	5999663
59/64	0.9219	3"	6"	1/2	1	6000035
15/16	0.9375	3"	6"	1/2	1	5999636
61/64	0.9531	3"	6"	1/2	1	6000038
31/32	0.9688	3"	6"	1/2	1	5999675
63/64	0.9844	3"	6"	1/2	1	6000041
1"	1.0000	3"	6"	1/2	1	5999538
1.1/64	1.0156	3"	6"	1/2	1	5999548

d_1 Ø Inch	d_1 decimal Inch	l_2 Inch	l_1 Inch	d_2 Ø Inch	Pack Qty	R57
1.1/32	1.0312	3"	6"	1/2	1	5999545
1.3/64	1.0469	3"	6"	1/2	1	5999580
1.1/16	1.0625	3"	6"	1/2	1	5999540
1.5/64	1.0781	3"	6"	1/2	1	5999598
1.3/32	1.0937	3"	6"	1/2	1	5999577
1.7/64	1.1094	3"	6"	1/2	1	5999610
1.1/8	1.1250	3"	6"	1/2	1	5999552
1.9/64	1.1406	3"	6"	1/2	1	5999620
1.5/32	1.1563	3"	6"	1/2	1	5999594
1.11/64	1.1719	3"	6"	1/2	1	5999557
1.3/16	1.1875	3"	6"	1/2	1	5999573
1.13/64	1.2031	3"	6"	1/2	1	5999562
1.7/32	1.2187	3"	6"	1/2	1	5999606
1.15/64	1.2344	3"	6"	1/2	1	5999570
1.1/4	1.2500	3"	6"	1/2	1	5999546
1.9/32	1.2813	3"	6"	1/2	1	5999616
1.5/16	1.3125	3"	6"	1/2	1	5999590
1.11/32	1.3437	3"	6"	1/2	1	5999554
1.3/8	1.3750	3"	6"	1/2	1	5999588
1.13/32	1.4063	3"	6"	1/2	1	5999559
1.7/16	1.4375	3"	6"	1/2	1	5999602
1.15/32	1.4687	3"	6"	1/2	1	5999566
1.1/2	1.5000	3"	6"	1/2	1	5999543

REDUCED SHANK DRILL



General Purpose Reduced Shank - 3/4" Shank

R58 Silver & Deming Drills. Steam tempered for increased wear resistance & lubricity



R58

ANSI

1.5XD

HSS

118°



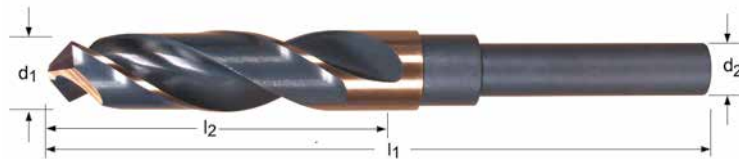
1" - 2"

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	Pack Qty	R58
1"	1.0000	3"	6"	3/4"	1	6000049
1.1/32	1.0312	3"	6"	3/4"	1	6000058
1.1/16	1.0625	3"	6"	3/4"	1	6000052
1.3/32	1.0937	3"	6"	3/4"	1	6000092
1.1/8	1.1250	3"	6"	3/4"	1	6000064
1.5/32	1.1563	3"	6"	3/4"	1	6000111
1.3/16	1.1875	3"	6"	3/4"	1	6000089
1.7/32	1.2187	3"	6"	3/4"	1	6000126
1.1/4	1.2500	3"	6"	3/4"	1	6000061
1.9/32	1.2813	3"	6"	3/4"	1	6000143
1.5/16	1.3125	3"	6"	3/4"	1	6000107
1.11/32	1.3437	3"	6"	3/4"	1	6000070
1.3/8	1.3750	3"	6"	3/4"	1	6000102
1.13/32	1.4063	3"	6"	3/4"	1	6000077
1.7/16	1.4375	3"	6"	3/4"	1	6000118
1.15/32	1.4687	3"	6"	3/4"	1	6000086
1.1/2	1.5000	3"	6"	3/4"	1	6000054
1.9/16	1.5625	3"	6"	3/4"	1	6000138
1.5/8	1.6250	3"	6"	3/4"	1	6000114
1.11/16	1.6875	3"	6"	3/4"	1	6000067
1.3/4	1.7500	3"	6"	3/4"	1	6000096
1.13/16	1.8125	3"	6"	3/4"	1	6000074
1.7/8	1.8750	3"	6"	3/4"	1	6000131
1.15/16	1.9375	3"	6"	3/4"	1	6000083
2"	2.0000	3"	6"	3/4"	1	6000147

Cobalt, Heavy Duty, Reduced Shank - 1/2" Shank

* Sets Available on pg. 241

R56CO Silver & Deming Drills. Self centering Split Point reduces thrust. Cobalt base material with Bronze/Steam tempered for wear resistance and lubricity. Suitable for ferrous materials.



R56CO

ANSI

4XD

HSS-E

118°



33/64 - 1"

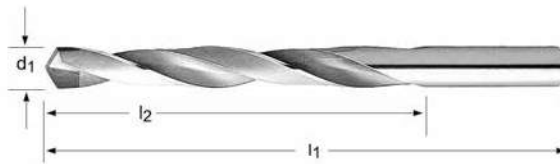
d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	Pack Qty	R56CO
33/64	0.5156	3"	6"	1/2	1	6000402
17/32	0.5313	3"	6"	1/2	1	6000364
35/64	0.5469	3"	6"	1/2	1	6000409
9/16	0.5625	3"	6"	1/2	1	6000007
37/64	0.5781	3"	6"	1/2	1	6000413
19/32	0.5937	3"	6"	1/2	1	6000367
39/64	0.6094	3"	6"	1/2	1	6000417
5/8	0.6250	3"	6"	1/2	1	6000439
41/64	0.6406	3"	6"	1/2	1	6000420
21/32	0.6563	3"	6"	1/2	1	6000372
43/64	0.6719	3"	6"	1/2	1	6000424
11/16	0.6875	3"	6"	1/2	1	6000350
45/64	0.7031	3"	6"	1/2	1	6000428
23/32	0.7188	3"	6"	1/2	1	6000377
47/64	0.7344	3"	6"	1/2	1	6000432
3/4	0.7500	3"	6"	1/2	1	6000394
49/64	0.7656	3"	6"	1/2	1	6000435
25/32	0.7813	3"	6"	1/2	1	6000382
51/64	0.7969	3"	6"	1/2	1	6000442
13/16	0.8125	3"	6"	1/2	1	6000353
53/64	0.8281	3"	6"	1/2	1	6000448
27/32	0.8438	3"	6"	1/2	1	6000386
55/64	0.8594	3"	6"	1/2	1	5999837
7/8	0.8750	3"	6"	1/2	1	6000004
57/64	0.8906	3"	6"	1/2	1	5999886
29/32	0.9063	3"	6"	1/2	1	6000390
59/64	0.9219	3"	6"	1/2	1	5999931
15/16	0.9375	3"	6"	1/2	1	6000356
61/64	0.9531	3"	6"	1/2	1	5999965
31/32	0.9688	3"	6"	1/2	1	6000398
63/64	0.9844	3"	6"	1/2	1	5999998
1"	1.0000	3"	6"	1/2	1	6000347

SPECIAL PURPOSE DRILL



Jobber Length Carbide Tipped

D444 Heavy-Duty Braze Carbide Tipped for abrasive materials or non-ferrous materials.



D444

ANSI

4XD

HSS
HM

118°



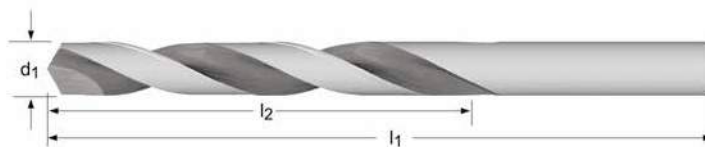
N32 - 1/2

d_1 Ø "/Nr./letter	d_1 decimal Inch	l_2 Inch	l_1 Inch	Pack Qty	D444
32	0.1160	1.5/8	2.3/4	1	6001915
1/8	0.1250	1.5/8	2.3/4	1	6001948
30	0.1285	1.5/8	2.3/4	1	6001912
29	0.1360	1.3/4	2.7/8	1	6001904
9/64	0.1406	1.3/4	2.7/8	1	6001721
25	0.1495	1.7/8	3"	1	6001901
5/32	0.1563	2"	3.1/8	1	6001707
21	0.1590	2.1/8	3.1/4	1	6001898
20	0.1610	2.1/8	3.1/4	1	6001895
19	0.1660	2.1/8	3.1/4	1	6001892
18	0.1695	2.1/8	3.1/4	1	6001886
11/64	0.1719	2.1/8	3.1/4	1	6001953
17	0.1730	2.3/16	3.3/8	1	6001882
15	0.1800	2.3/16	3.3/8	1	6001879
14	0.1820	2.3/16	3.3/8	1	6001875
13	0.1850	2.5/16	3.1/2	1	6001865
3/16	0.1875	2.5/16	3.1/2	1	6001853
11	0.1910	2.5/16	3.1/2	1	6001861
10	0.1935	2.7/16	3.5/8	1	6001856
9	0.1960	2.7/16	3.5/8	1	6001920
7	0.2010	2.7/16	3.5/8	1	6001918
13/64	0.2031	2.7/16	3.5/8	1	6001959
3	0.2130	2.1/2	3.3/4	1	6001907
7/32	0.2188	2.1/2	3.3/4	1	6001714
1	0.2280	2.5/8	3.7/8	1	6001851
15/64	0.2344	2.5/8	3.7/8	1	6001969
B	0.2380	2.3/4	4"	1	6001966
C	0.2420	2.3/4	4"	1	6001972
1/4 (E)	0.2500	2.3/4	4"	1	6001945
F	0.2570	2.7/8	4.1/8	1	6001978
G	0.2610	2.7/8	4.1/8	1	6001981
17/64	0.2656	2.7/8	4.1/8	1	6001697
H	0.2660	2.7/8	4.1/8	1	6001821

d_1 Ø "Nr./letter	d_1 decimal Inch	l_2 Inch	l_1 Inch	Pack Qty	D444
I	0.2720	2.7/8	4.1/8	1	6001826
J	0.2770	2.7/8	4.1/8	1	6001831
K	0.2810	2.15/16	4.1/4	1	6001838
9/32	0.2813	2.15/16	4.1/4	1	6001718
L	0.2900	2.15/16	4.1/4	1	6001842
19/64	0.2969	3.1/16	4.3/8	1	6001732
N	0.3020	3.1/16	4.3/8	1	6001847
5/16	0.3125	3.3/16	4.1/2	1	6001703
O	0.3160	3.3/16	4.1/2	1	6001924
P	0.3230	3.5/16	4.5/8	1	6001926
21/64	0.3281	3.5/16	4.5/8	1	6001756
Q	0.3320	3.7/16	4.3/4	1	6001928
R	0.3390	3.7/16	4.3/4	1	6001930
11/32	0.3437	3.7/16	4.3/4	1	6001950
S	0.3480	3.1/2	4.7/8	1	6001932
T	0.3580	3.1/2	4.7/8	1	6001934
23/64	0.3594	3.1/2	4.7/8	1	6001789
U	0.3680	3.5/8	5"	1	6001938
3/8	0.3750	3.5/8	5"	1	6001859
25/64	0.3906	3.3/4	5.1/8	1	6001834
13/32	0.4063	3.7/8	5.1/4	1	6001956
Z	0.4130	3.7/8	5.1/4	1	6001940
27/64	0.4219	3.15/16	5.3/8	1	6001843
7/16	0.4375	4.1/16	5.1/2	1	6001711
29/64	0.4531	4.3/16	5.5/8	1	6001849
15/32	0.4687	4.5/16	5.3/4	1	6001962
31/64	0.4844	4.3/8	5.7/8	1	6001700
1/2	0.5000	4.1/2	6"	1	6001942

Jobber Length Carbide Tipped

A160 Heavy-Duty Brazed Carbide Tipped for abrasive materials or non-ferrous materials.



A160

DIN
338

4XD

HSS
HM

118°



4.00 - 16.00

d_1 $\varnothing h_8$ mm	d_1 decimal Inch	l_2 mm	l_1 mm	Pack Qty	A160
4.00	0.1575	43	75	1	5969608
4.50	0.1772	47	80	1	5969616
5.00	0.1969	52	86	1	5969620
5.50	0.2165	57	93	1	5969624
6.00	0.2362	57	93	1	5969628
6.50	0.2559	63	101	1	5969632
6.80	0.2677	69	109	1	5969636
7.00	0.2756	69	109	1	5969639
7.50	0.2953	69	109	1	5969643
8.00	0.3150	75	117	1	5969646
8.50	0.3346	75	117	1	5969650
9.00	0.3543	81	125	1	5969658
9.50	0.3740	81	125	1	5969659
10.00	0.3937	87	133	1	5969553
10.20	0.4016	87	133	1	5969561
10.50	0.4134	87	133	1	5969566
11.00	0.4331	94	142	1	5969572
11.50	0.4528	94	142	1	5969578
12.00	0.4724	101	151	1	5969582
13.00	0.5118	101	151	1	5969586
14.00	0.5512	108	160	1	5969594
15.00	0.5906	114	169	1	5969599
16.00	0.6299	120	178	1	5969604

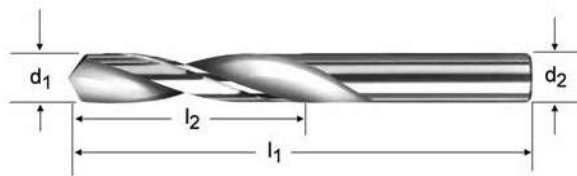
General Purpose Solid Carbide Jobber Length

D33F - Fractional Sizes

D33W - Wire Gauge Sizes

D33L - Letter Sizes

4-Facet Self Centering Point. Low thrust design. For abrasive or non-ferrous materials.



D33F	D33W	D33L
ANSI	ANSI	ANSI
3XD	3XD	3XD
HM	HM	HM
118°	118°	118°
1/32 - 1/2	N68 - N1	A - Z

d_1 Ø Inch	d_1 Ø Nr.	d_1 Ø letter	d_1 decimal Inch	l_2 Inch	l_1 Inch	Pack Qty	D33F	D33W	D33L
1/32	68		0.0310	5/16	1.1/4	1	—	6001815	—
			0.0313	5/16	1.1/4	1	6002760	—	—
	67		0.0320	5/16	1.1/4	1	—	6002214	—
	66		0.0330	5/16	1.1/4	1	—	6002208	—
	65		0.0350	5/8	1.3/8	1	—	6002205	—
	64		0.0360	5/8	1.3/8	1	—	6002202	—
	63		0.0370	5/8	1.3/8	1	—	6002199	—
	62		0.0380	5/8	1.3/8	1	—	6002197	—
	61		0.0390	5/8	1.3/8	1	—	6002194	—
	60		0.0400	3/4	1.1/2	1	—	6002192	—
3/64	59		0.0410	3/4	1.1/2	1	—	6002188	—
	58		0.0420	3/4	1.1/2	1	—	6002186	—
	57		0.0430	3/4	1.1/2	1	—	6002182	—
	56		0.0465	3/4	1.1/2	1	—	6002180	—
			0.0469	3/4	1.1/2	1	6002731	—	—
	55		0.0520	3/4	1.1/2	1	—	6002178	—
	54		0.0550	3/4	1.1/2	1	—	6002175	—
	53		0.0595	3/4	1.1/2	1	—	6002172	—
			0.0625	3/4	1.1/2	1	6002738	—	—
	52		0.0635	3/4	1.1/2	1	—	6002169	—
1/16	51		0.0670	3/4	1.1/2	1	—	6002166	—
	50		0.0700	7/8	1.3/4	1	—	6002163	—
	49		0.0730	7/8	1.3/4	1	—	6002157	—
	48		0.0760	7/8	1.3/4	1	—	6002151	—
			0.0781	7/8	1.3/4	1	6002736	—	—
	47		0.0785	7/8	1.3/4	1	—	6002147	—
	46		0.0810	7/8	1.3/4	1	—	6002145	—
	45		0.0820	7/8	1.3/4	1	—	6002140	—
	44		0.0860	1"	2"	1	—	6002136	—
	43		0.0890	1"	2"	1	—	6002132	—
3/32	42		0.0935	1"	2"	1	—	6002128	—
			0.0938	1"	2"	1	6002730	—	—
	41		0.0960	1"	2"	1	—	6002124	—

SOLID CARBIDE DRILL



d ₁ Ø Inch	d ₁ Ø Nr.	d ₁ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	D33F	D33W	D33L
	40		0.0980	1"	2"	1	—	6002120	—
	39		0.0995	1.1/4	2.1/4	1	—	6002106	—
	38		0.1015	1.1/4	2.1/4	1	—	6002103	—
	37		0.1040	1.1/4	2.1/4	1	—	6002098	—
	36		0.1065	1.1/4	2.1/4	1	—	6002091	—
7/64			0.1094	1.1/4	2.1/4	1	6002740	—	—
	35		0.1100	1.1/4	2.1/4	1	—	6002086	—
	34		0.1110	1.1/4	2.1/4	1	—	6002082	—
	33		0.1130	1.1/4	2.1/4	1	—	6002077	—
	32		0.1160	1.1/4	2.1/4	1	—	6002073	—
	31		0.1200	1.1/4	2.1/4	1	—	6002069	—
1/8			0.1250	1.1/4	2.1/4	1	6002763	—	—
	30		0.1285	1.3/8	2.1/2	1	—	6002064	—
	29		0.1360	1.3/8	2.1/2	1	—	6002224	—
	28		0.1405	1.3/8	2.1/2	1	—	6002221	—
9/64			0.1406	1.3/8	2.1/2	1	6002742	—	—
	27		0.1440	1.3/8	2.1/2	1	—	6002217	—
	26		0.1470	1.3/8	2.1/2	1	—	6002211	—
	25		0.1495	1.3/8	2.1/2	1	—	6002184	—
	24		0.1520	1.3/8	2.1/2	1	—	6002154	—
	23		0.1540	1.3/8	2.1/2	1	—	6002112	—
5/32			0.1563	1.3/8	2.1/2	1	6002735	—	—
	22		0.1570	1.3/8	2.1/2	1	—	6002055	—
	21		0.1590	1.3/8	2.1/2	1	—	6002473	—
	20		0.1610	1.3/8	2.1/2	1	—	6002468	—
	19		0.1660	1.5/8	2.3/4	1	—	6002460	—
	18		0.1695	1.5/8	2.3/4	1	—	6002457	—
11/64			0.1719	1.5/8	2.3/4	1	6002765	—	—
	17		0.1730	1.5/8	2.3/4	1	—	6002454	—
	16		0.1770	1.5/8	2.3/4	1	—	6002451	—
	15		0.1800	1.5/8	2.3/4	1	—	6002448	—
	14		0.1820	1.5/8	2.3/4	1	—	6002444	—
	13		0.1850	1.5/8	2.3/4	1	—	6002441	—
3/16			0.1875	1.5/8	2.3/4	1	6002729	—	—
	12		0.1890	1.5/8	2.3/4	1	—	6002438	—
	11		0.1910	1.5/8	2.3/4	1	—	6002432	—
	10		0.1935	1.5/8	2.3/4	1	—	6002429	—
	9		0.1960	1.3/4	3"	1	—	6001936	—
	8		0.1990	1.3/4	3"	1	—	6001909	—
	7		0.2010	1.3/4	3"	1	—	6001872	—
13/64			0.2031	1.3/4	3"	1	6002704	—	—
	6		0.2040	1.3/4	3"	1	—	6002190	—
	5		0.2055	1.3/4	3"	1	—	6002160	—
	4		0.2090	1.3/4	3"	1	—	6002117	—
	3		0.2130	1.3/4	3"	1	—	6002227	—
7/32			0.2188	1.3/4	3"	1	6002739	—	—
	2		0.2210	1.3/4	3"	1	—	6002463	—
	1		0.2280	1.3/4	3"	1	—	6002426	—
		A	0.2340	2"	3.1/4	1	—	—	6002743
15/64			0.2344	2"	3.1/4	1	6002711	—	—
		B	0.2380	2"	3.1/4	1	—	—	6002744
		C	0.2420	2"	3.1/4	1	—	—	6002745
		D	0.2460	2"	3.1/4	1	—	—	6002746
1/4			0.2500	2"	3.1/4	1	6002762	—	—
		F	0.2570	2"	3.1/4	1	—	—	6002747
		G	0.2610	2.1/8	3.1/2	1	—	—	6002748
17/64			0.2656	2.1/8	3.1/2	1	6002714	—	—
		H	0.2660	2.1/8	3.1/2	1	—	—	6002750
		I	0.2720	2.1/8	3.1/2	1	—	—	6002751
		J	0.2770	2.1/8	3.1/2	1	—	—	6002752
		K	0.2810	2.1/8	3.1/2	1	—	—	6002753
9/32			0.2813	2.1/8	3.1/2	1	6002741	—	—
		L	0.2900	2.1/8	3.1/2	1	—	—	6002754
		M	0.2950	2.3/8	4"	1	—	—	6002755
19/64			0.2969	2.3/8	4"	1	6002718	—	—
		N	0.3020	2.3/8	4"	1	—	—	6002756

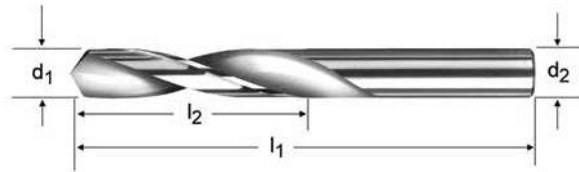
d ₁ Ø Inch	d ₂ Ø Nr.	d ₃ Ø letter	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	D33F	D33W	D33L
5/16			0.3125	2.3/8	4"	1	6002734	—	—
		O	0.3160	2.3/8	4"	1	—	—	6002757
		P	0.3230	2.3/8	4"	1	—	—	6002758
21/64			0.3281	2.3/8	4"	1	6002723	—	—
		Q	0.3320	2.3/8	4"	1	—	—	6002759
		R	0.3390	2.3/8	4"	1	—	—	6002761
11/32			0.3437	2.3/8	4"	1	6002764	—	—
		S	0.3480	2.3/8	4"	1	—	—	6002301
		T	0.3580	2.3/4	4.1/4	1	—	—	6002360
23/64			0.3594	2.3/4	4.1/4	1	6002724	—	—
		U	0.3680	2.3/4	4.1/4	1	—	—	6002403
3/8			0.3750	2.3/4	4.1/4	1	6002732	—	—
		V	0.3770	2.3/4	4.1/4	1	—	—	6002435
		W	0.3860	2.7/8	4.1/2	1	—	—	6002470
25/64			0.3906	2.7/8	4.1/2	1	6002725	—	—
		X	0.3970	2.7/8	4.1/2	1	—	—	6002477
		Y	0.4040	2.7/8	4.1/2	1	—	—	6002480
13/32			0.4063	2.7/8	4.1/2	1	6002702	—	—
		Z	0.4130	2.7/8	4.1/2	1	—	—	6002483
27/64			0.4219	2.7/8	4.1/2	1	6002726	—	—
7/16			0.4375	2.7/8	4.1/2	1	6002737	—	—
29/64			0.4531	3"	4.3/4	1	6002728	—	—
15/32			0.4687	3"	4.3/4	1	6002707	—	—
31/64			0.4844	3"	4.3/4	1	6002733	—	—
1/2			0.5000	3"	4.3/4	1	6002749	—	—

SOLID CARBIDE DRILL



General Purpose Solid Carbide Jobber Length, Metric

D33M Self Centering Point. Low thrust design. For abrasive or non-ferrous materials.



D33M

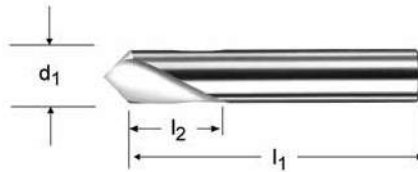


1.00 - 12.00

d_1 Ø mm	d_1 decimal Inch	l_2 inch	l_1 inch	Pack Qty	D33M
1.00	0.0394	5/8	1.1/2	1	6002316
1.50	0.0591	3/4	1.1/2	1	6002320
2.00	0.0787	7/8	1.3/4	1	6002353
2.05	0.0807	7/8	1.3/4	1	6002364
2.50	0.0984	1"	2"	1	6002368
3.00	0.1181	1.1/4	2.1/4	1	6002373
3.30	0.1299	1.3/8	2.1/2	1	6002378
3.50	0.1378	1.3/8	2.1/2	1	6002382
4.00	0.1575	1.3/8	2.1/2	1	6002386
4.50	0.1772	1.5/8	2.3/4	1	6002390
5.00	0.1969	1.3/4	3"	1	6002394
5.50	0.2165	1.3/4	3"	1	6002397
6.00	0.2362	2"	3.1/4	1	6002400
6.50	0.2559	2"	3.1/4	1	6002406
7.00	0.2756	2.1/8	3.1/2	1	6002409
7.50	0.2953	2.3/8	4"	1	6002412
8.00	0.3150	2.3/8	4"	1	6002415
8.50	0.3346	2.3/8	4"	1	6002418
9.00	0.3543	2.3/4	4.1/4	1	6002420
9.50	0.3740	2.3/4	4.1/4	1	6002423
10.00	0.3937	2.7/8	4.1/2	1	6002324
10.50	0.4134	2.7/8	4.1/2	1	6002328
10.75	0.4232	2.7/8	4.1/2	1	6002333
11.00	0.4331	2.7/8	4.1/2	1	6002338
11.50	0.4528	3"	4.3/4	1	6002342
12.00	0.4724	3"	4.3/4	1	6002347

General Purpose Solid Carbide Standard Length - Spotting Drill

DS-90 Provides 90°, 120° or 142° included angle spot locations or chamfers for follow-up drilling & tapping operations.
DS-120
DS-142



DS-90	DS-120	DS-142
ANSI	ANSI	ANSI
1XD	1XD	1XD
HM	HM	HM
90°	120°	142°
		
1/8 - 1/2	1/8 - 1/2	1/8 - 1/2

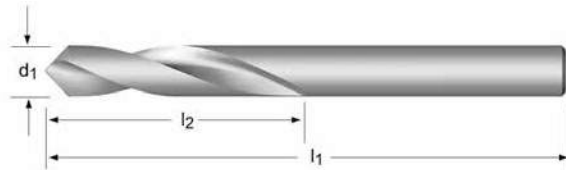
d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty	DS-90	DS-120	DS-142
1/8	0.1250	3/8	2"	1	6002225	7378063	7378069
3/16	0.1875	3/4	3"	1	6002228	7378064	7378970
1/4	0.2500	3/4	3"	1	6002392	7378068	7378974
5/16	0.3125	1"	2.1/2	1	6002232	7378066	7378972
3/8	0.3750	1"	3"	1	6002230	7378065	7378971
1/2	0.5000	1"	4"	1	6002389	7378067	7378973

SPECIAL PURPOSE DRILL



Spotting Drill - Short Length

- SPS-90** Bright Finish improves chip flow in soft or non-ferrous materials
- SPSG-90** TiN Coating for increased wear resistance and improved tool life.
- SPS-120** Bright Finish improves chip flow in soft or non-ferrous materials
- SPSG-120** TiN Coating for increased wear resistance and improved tool life.

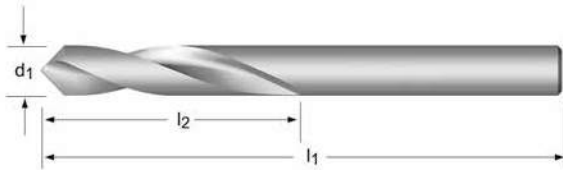


SPS-90	SPSG-90	SPS-120	SPSG-120
ANSI	ANSI	ANSI	ANSI
1XD	1XD	1XD	1XD
HSS	HSS	HSS	HSS
90°	90°	120°	120°
1/4 - 1"	1/4 - 1"	1/4 - 1"	1/4 - 1"
SPS-90	SPSG-90	SPS-120	SPSG-120
6000094	6000142	6000072	6000113
6000100	6000150	6000078	6000127
6000090	6000139	6000069	6000110
6000104	6000154	6000081	6000133
6000097	6000146	6000075	6000116
6000087	6000135	6000066	6000108

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty
1/4	0.2500	3/4	2.1/2	1
3/8	0.3750	1.1/8	3.1/8	1
1/2	0.5000	1.3/8	3.3/4	1
5/8	0.6250	1.5/8	4.3/8	1
3/4	0.7500	1.7/8	5"	1
1"	1.0000	2.1/4	6"	1

Spotting Drill - Regular Length

- SPR-90** Bright Finish improves chip flow in soft or non-ferrous materials
- SPRG-90** TiN Coating for increased wear resistance and improved tool life.
- SPR-120** Bright Finish improves chip flow in soft or non-ferrous materials
- SPRG-120** TiN Coating for increased wear resistance and improved tool life.



SPR-90	SPRG-90	SPR-120	SPRG-120
ANSI	ANSI	ANSI	ANSI
1XD	1XD	1XD	1XD
HSS	HSS	HSS	HSS
90°	90°	120°	120°
1/4 - 1"	1/4 - 1"	1/4 - 1"	1/4 - 1/2
SPR-90	SPRG-90	SPR-120	SPRG-120
6000101	6000055	6000082	6000166
6000112	6000060	6000088	6000213
6000098	6000222	6000079	6000122
6000050	6000063	6000091	—
6000105	6000057	6000085	—
6000095	6000219	6000076	—

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty
1/4	0.2500	3/4	4"	1
3/8	0.3750	1.1/8	5"	1
1/2	0.5000	1.3/8	6"	1
5/8	0.6250	1.5/8	7"	1
3/4	0.7500	1.7/8	8"	1
1"	1.0000	2.1/4	8"	1

SPECIAL PURPOSE DRILL



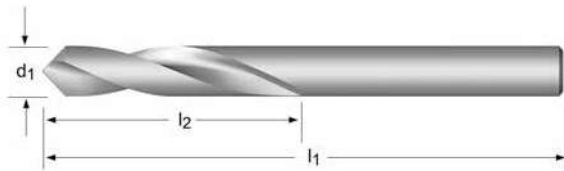
Spotting Drill - Long Length

SPL-90 Bright Finish improves chip flow in soft or non-ferrous materials

SPLG-90 TiN Coating for increased wear resistance and improved tool life.

SPL-120 Bright Finish improves chip flow in soft or non-ferrous materials

SPLG-120 TiN Coating for increased wear resistance and improved tool life.



SPL-90	SPLG-90	SPL-120	SPLG-120
ANSI	ANSI	ANSI	ANSI
1XD	1XD	1XD	1XD
HSS	HSS	HSS	HSS
90°	90°	120°	120°
1/4 - 1"	1/4 - 1"	1/4 - 5/8	1/4 - 1/2
SPL-90	SPLG-90	SPL-120	SPLG-120
6000025	6000062	6000005	6000046
6000031	6000068	6000014	6000051
6000022	6000059	6000002	6000040
6000034	—	6000016	—
6000028	6000065	—	—
6000019	6000056	—	—

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	Pack Qty
1/4	0.2500	3/4	6"	1
3/8	0.3750	1.1/8	7"	1
1/2	0.5000	1.3/8	8"	1
5/8	0.6250	1.5/8	9"	1
3/4	0.7500	1.7/8	10"	1
1"	1.0000	2.1/4	10"	1

General Purpose Combined Drill and Countersink (Center Drill)

DC 60° C'sink. Better abrasion resistance / Longer tool life. Bright Finish improves chip flow in soft or non-ferrous materials



DC

ANSI

1XD

HM



N0 - N6

Nr.	d ₁ Ø Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	Pack Qty	DC
0	1/32	1/32	1.1/2	1/8	1	6002219
1	3/64	3/64	1.1/2	1/8	1	6002246
2	5/64	5/64	2"	3/16	1	6002278
3	7/64	7/64	2"	1/4	1	6002325
4	1/8	1/8	2.1/8	5/16	1	6002372
5	3/16	3/16	2.3/4	7/16	1	6002380
6	7/32	7/32	3"	1/2	1	6002384

SPECIAL PURPOSE DRILL



General Purpose Combined Drill and Countersink (Center Drill)

76HA 60° C'sink. Bright Finish improves chip flow in soft or non-ferrous materials



76HA

ANSI

1XD

HSS



N000 - N8

Nr.	d ₁ Ø Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	Pack Qty	76HA
000	0.0200	0.0300	1.1/4	1/8	12	6001210
00	0.0250	0.0300	1.1/8	1/8	12	6001208
0	1/32	0.0380	1.1/8	1/8	12	6001205
1	3/64	3/64	1.1/4	1/8	12	6001213
2	5/64	5/64	1.7/8	3/16	12	6001215
3	7/64	7/64	2"	1/4	12	6001217
4	1/8	1/8	2.1/8	5/16	12	6001219
5	3/16	3/16	2.3/4	7/16	6	6001221
6	7/32	7/32	3"	1/2	6	6001223
7	1/4	1/4	3.1/4	5/8	1	6001225
8	5/16	5/16	3.1/2	3/4	1	6001227

General Purpose Combined Drill and Countersink (Center Drill)

A225 60° C'sink. Bright Finish improves chip flow in soft or non-ferrous materials

A217 82° C'sink. Bright Finish improves chip flow in soft or non-ferrous materials

A217SET 5 pc. set consists of N1, N2, N3, N4 & N5

A218 90° C'sink. Bright Finish improves chip flow in soft or non-ferrous materials

A218SET 5 pc. set consists of N1, N2, N3, N4 & N5



A225	A217	A218
3/64 - 5/16	N1 - N8	N1 - N8

Nr.	d ₁ Ø Inch	d ₁ decimal Inch	l ₂ max/min Inch	l ₁ Inch	d ₂ Ø Inch	Pack Qty	A225	A217	A218
BS1	3/64	0.0469	5/64 - 1/16	1.1/2	1/8	1	5969157	—	—
BS2	1/16	0.0625	3/32 - 5/64	1.3/4	3/16	1	5969160	—	—
BS3	3/32	0.0938	5/32 - 1/8	2"	1/4	1	5969163	—	—
BS4	1/8	0.1250	3/16 - 5/32	2.1/4	5/16	1	5969166	—	—
BS5	3/16	0.1875	9/32 - 1/4	2.1/2	7/16	1	5969169	—	—
BS5A	7/32	0.2188	5/16 - 9/32	2.3/4	1/2	1	5969171	—	—
BS6	1/4	0.2500	3/8 - 5/16	3"	5/8	1	5969173	—	—
BS7	5/16	0.3125	15/32 - 13/32	3.1/2	3/4	1	5969174	—	—
1		0.0469	.055-.067	1.1/4	1/8	1	—	5969408	—
1		0.0469	.055-.067	1.1/4	1/8	1	—	—	5968986
2		0.0781	.094-.106	1.7/8	3/16	1	—	5969412	—
2		0.0781	.094-.106	1.7/8	3/16	1	—	—	5969045
3		0.1094	.130-.154	2"	1/4	1	—	5969415	—
3		0.1094	.130-.154	2"	1/4	1	—	—	5969099
4		0.1250	.150-.173	2.1/8	5/16	1	—	5969418	—
4		0.1250	.150-.173	2.1/8	5/16	1	—	—	5969147
5		0.1875	.232-.256	2.3/4	7/16	1	—	5969420	—
5		0.1875	.232-.256	2.3/4	7/16	1	—	—	5969175
6		0.2188	.272-.295	3"	1/2	1	—	5969422	—
6		0.2188	.272-.295	3"	1/2	1	—	—	5969177
7		0.2500	.315-.339	3.1/4	5/8	1	—	5969423	—
7		0.2500	.315-.339	3.1/4	5/8	1	—	—	5969178
8		0.3125	.394-.417	3.1/2	3/4	1	—	5969424	—
8		0.3125	.394-.417	3.1/2	3/4	1	—	—	5969179

Set	Style	Pieces per set	Contents of set	Pack Qty	A217 set	A218 set
A217SET	A217	5	N1, N2, N3, N4, N5	1	5969426	—
A218SET	A218	5	N1, N2, N3, N4, N5	1	—	5969180

SPECIAL PURPOSE DRILL



Cobalt Combined Drill and Countersink (Center Drill)

A221 60° C'sink. Cobalt base material for wear resistance. Bright Finish improves chip flow in soft or non-ferrous materials

A221SET

5 peice set includes N1, N2, N3, N4 & N5



A221	A221SET
ANSI	ANSI
1.5XD	1.5XD
HSS-E	HSS-E
N00 - N8	Set

Nr.	Set	d ₁ Ø Inch	Style	d ₁ decimal Inch	Pieces per Set	l ₂ Inch	Contents of set	l ₁ Inch	d ₂ Ø Inch	Pack Qty	A221	A221SET
00		0.025		0.0250		1/32		1.1/8	1/8	1	5969071 ¹⁾	—
0		1/32		0.0313		1/32		1.1/8	1/8	1	5969065 ¹⁾	—
1		3/64		0.0469		3/64		1.1/4	1/8	1	5969075	—
2		5/64		0.0781		5/64		1.7/8	3/16	1	5969079	—
3		7/64		0.1094		7/64		2"	1/4	1	5969085	—
4		1/8		0.1250		1/8		2.1/8	5/16	1	5969089	—
5		3/16		0.1875		3/16		2.3/4	7/16	1	5969094	—
6		7/32		0.2188		7/32		3"	1/2	1	5969104	—
7		1/4		0.2500		1/4		3.1/4	5/8	1	5969109	—
8		5/16		0.3125		5/16		3.1/2	3/4	1	5969115	—
	A221SET		A221		5		N1, N2, N3, N4, N5			1	—	5969120

¹⁾ single ended only

HSS, Threaded Hex Shank Drills

TS41HS - Stub, Wire Gauge Sizes

TS40HS - Stub, Fractional Sizes

TS42HS - Stub, Letter Sizes

TS18HS - Short, Wire Gauge Sizes

TS10HS - Short, Fractional Sizes

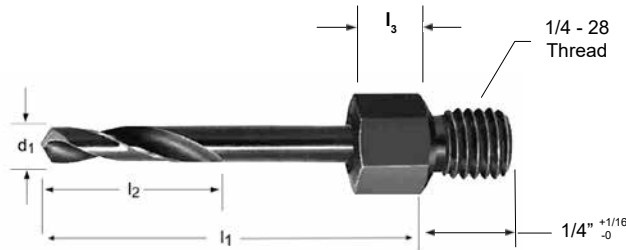
TS15HS - Short, Letter Sizes

TS52HS - Long, Wire Gauge Sizes

TS51HS - Long, Fractional Sizes

TS55HS - Long, Letter Sizes

NAS-965 Type B Steam tempered for increased wear resistance & lubricity. Shank design for drilling in confined spaces. Low thrust design self centering Split Point for easier penetration.
1/4-28 thread



TS41HS TS40HS TS42HS	TS18HS TS10HS TS15HS	TS52HS TS51HS TS55HS
HSS	HSS	HSS
135°	135°	135°
N50 - N1 3/32 - 3/8 A - G	N50 - N1 3/32 - 3/8 A - G	N50 - N1 3/32 - 3/8 A - G

d ₁ Ø Nr.	l ₂ Inch	l ₁ Inch	l ₃ Inch	Pack Qty	TS41HS TS40HS TS42HS	TS18HS TS10HS TS15HS	TS52HS TS51HS TS55HS
N50	5/16	1/2	1/8	1	7877827	—	—
N50	9/16	1"	1/4	1	—	7877968	—
N50	7/8	2 1/8	1/4	1	—	—	7878029
3/32	5/16	1/2	1/8	1	7877828	—	—
3/32	9/16	1"	1/4	1	—	7877969	—
3/32	7/8	2 1/8	1/4	1	—	—	7878030
N40	5/16	1/2	1/8	1	7877829	—	—
N40	9/16	1"	1/4	1	—	7877970	—
N40	7/8	2 1/8	1/4	1	—	—	7878031
N39	5/16	1/2	1/8	1	7877910	—	—
N39	9/16	1"	1/4	1	—	7877971	—
N39	7/8	2 1/8	1/4	1	—	—	7878032
N38	5/16	1/2	1/8	1	7877911	—	—
N38	9/16	1"	1/4	1	—	7877972	—
N38	7/8	2 1/8	1/4	1	—	—	7878033
N37	5/16	1/2	1/8	1	7877912	—	—
N37	9/16	1"	1/4	1	—	7877973	—
N37	7/8	2 1/8	1/4	1	—	—	7878034
N36	5/16	1/2	1/8	1	7877913	—	—
N36	9/16	1"	1/4	1	—	7877974	—
N36	7/8	2 1/8	1/4	1	—	—	7878035
7/64	5/16	1/2	1/8	1	7877914	—	—
7/64	9/16	1"	1/4	1	—	7877975	—
7/64	7/8	2 1/8	1/4	1	—	—	7878036
N35	5/16	1/2	1/8	1	7877915	—	—
N35	9/16	1"	1/4	1	—	7877976	—
N35	7/8	2 1/8	1/4	1	—	—	7878037
N34	5/16	1/2	1/8	1	7877916	—	—
N34	9/16	1"	1/4	1	—	7877977	—
N34	7/8	2 1/8	1/4	1	—	—	7878038
N33	5/16	1/2	1/8	1	7877917	—	—

SPECIAL PURPOSE DRILL



d ₁ Ø Nr.	l ₂ Inch	l ₁ Inch	l ₃ Inch	Pack Qty	TS41HS TS40HS TS42HS	TS18HS TS10HS TS15HS	TS52HS TS51HS TS55HS
N33	9/16	1"	1/4	1	—	7877978	—
N33	7/8	2 1/8	1/4	1	—	—	7878039
N32	5/16	1/2	1/8	1	7877918	—	—
N32	9/16	1"	1/4	1	—	7877979	—
N32	7/8	2 1/8	1/4	1	—	—	7878040
N31	5/16	1/2	1/8	1	7877919	—	—
N31	9/16	1"	1/4	1	—	7877980	—
N31	7/8	2 1/8	1/4	1	—	—	7878041
1/8	5/16	1/2	1/8	1	7877920	—	—
1/8	9/16	1"	1/4	1	—	7877981	—
1/8	7/8	2 1/8	1/4	1	—	—	7878042
N30	5/16	9/16	1/8	1	7877921	—	—
N30	9/16	1 1/4	1/4	1	—	7877982	—
N30	1 1/8	2 1/8	1/4	1	—	—	7878043
N29	5/16	9/16	1/8	1	7877922	—	—
N29	9/16	1 1/4	1/4	1	—	7877983	—
N29	1 1/8	2 1/8	1/4	1	—	—	7878044
N28	5/16	9/16	1/8	1	7877923	—	—
N28	9/16	1 1/4	1/4	1	—	7877984	—
N28	1 1/8	2 1/8	1/4	1	—	—	7878045
9/64	5/16	9/16	1/8	1	7877924	—	—
9/64	9/16	1 1/4	1/4	1	—	7877985	—
9/64	1 1/8	2 1/8	1/4	1	—	—	7878046
N27	5/16	9/16	1/8	1	7877925	—	—
N27	9/16	1 1/4	1/4	1	—	7877986	—
N27	1 1/8	2 1/8	1/4	1	—	—	7878047
N26	5/16	9/16	1/8	1	7877926	—	—
N26	9/16	1 1/4	1/4	1	—	7877987	—
N26	1 1/8	2 1/8	1/4	1	—	—	7878048
N25	5/16	9/16	1/8	1	7877927	—	—
N25	9/16	1 1/4	1/4	1	—	7877988	—
N25	1 1/8	2 1/8	1/4	1	—	—	7878049
N24	5/16	9/16	1/8	1	7877928	—	—
N24	9/16	1 1/4	1/4	1	—	7877989	—
N24	1 1/8	2 1/8	1/4	1	—	—	7878050
N23	5/16	9/16	1/8	1	7877929	—	—
N23	9/16	1 1/4	1/4	1	—	7877990	—
N23	1 1/8	2 1/8	1/4	1	—	—	7878051
5/32	5/16	9/16	1/8	1	7877930	—	—
5/32	9/16	1 1/4	1/4	1	—	7877991	—
5/32	1 1/8	2 1/8	1/4	1	—	—	7878052
N22	5/16	9/16	1/8	1	7877931	—	—
N22	9/16	1 1/4	1/4	1	—	7877992	—
N22	1 1/8	2 1/8	1/4	1	—	—	7878053
N21	5/16	9/16	1/8	1	7877932	—	—
N21	9/16	1 1/4	1/4	1	—	7877993	—
N21	1 1/8	2 1/8	1/4	1	—	—	7878054
N20	5/16	9/16	1/8	1	7877933	—	—
N20	9/16	1 1/4	1/4	1	—	7877994	—
N20	1 1/8	2 1/8	1/4	1	—	—	7878055
N19	5/16	9/16	1/8	1	7877934	—	—
N19	9/16	1 1/4	1/4	1	—	7877995	—
N19	1 1/8	2 1/8	1/4	1	—	—	7878056
N18	5/16	9/16	1/8	1	7877935	—	—
N18	9/16	1 1/4	1/4	1	—	7877996	—
N18	1 1/8	2 1/8	1/4	1	—	—	7878057
11/64	5/16	9/16	1/8	1	7877936	—	—
11/64	9/16	1 1/4	1/4	1	—	7877997	—
11/64	1 1/8	2 1/8	1/4	1	—	—	7878357
N17	5/16	9/16	1/8	1	7877937	—	—
N17	9/16	1 1/4	1/4	1	—	7877998	—
N17	1 1/8	2 1/8	1/4	1	—	—	7878059

d ₁ Ø Nr.	l ₂ Inch	l ₁ Inch	l ₃ Inch	Pack Qty	TS41HS TS40HS TS42HS	TS18HS TS10HS TS15HS	TS52HS TS51HS TS55HS
N16	5/16	9/16	1/8	1	7877938	—	—
N16	9/16	1 1/4	1/4	1	—	7877999	—
N16	1 1/8	2 1/8	1/4	1	—	—	7878060
N15	5/16	9/16	1/8	1	7877939	—	—
N15	9/16	1 1/4	1/4	1	—	7878000	—
N15	1 1/8	2 1/8	1/4	1	—	—	7878061
N14	5/16	9/16	1/8	1	7877940	—	—
N14	9/16	1 1/4	1/4	1	—	7878001	—
N14	1 1/8	2 1/8	1/4	1	—	—	7878062
N13	5/16	9/16	1/8	1	7877941	—	—
N13	9/16	1 1/4	1/4	1	—	7878002	—
N13	1 1/8	2 1/8	1/4	1	—	—	7878063
3/16	5/16	9/16	1/8	1	7877942	—	—
3/16	9/16	1 1/4	1/4	1	—	7878003	—
3/16	1 1/8	2 1/8	1/4	1	—	—	7878064
N12	5/16	9/16	1/8	1	7877943	—	—
N12	9/16	1 1/4	1/4	1	—	7878004	—
N12	1 1/8	2 1/8	1/4	1	—	—	7878065
N11	5/16	9/16	1/8	1	7877944	—	—
N11	9/16	1 1/4	1/4	1	—	7878005	—
N11	1 1/8	2 1/8	1/4	1	—	—	7878066
N10	5/16	9/16	1/8	1	7877945	—	—
N10	9/16	1 1/4	1/4	1	—	7878006	—
N10	1 1/8	2 1/8	1/4	1	—	—	7878067
N9	5/16	5/8	1/4	1	7877946	—	—
N9	9/16	1 1/4	5/16	1	—	7878007	—
N9	1 1/8	2 1/8	5/16	1	—	—	7878068
N8	5/16	5/8	1/4	1	7877947	—	—
N8	9/16	1 1/4	5/16	1	—	7878008	—
N8	1 1/8	2 1/8	5/16	1	—	—	7878069
N7	5/16	5/8	1/4	1	7877948	—	—
N7	9/16	1 1/4	5/16	1	—	7878009	—
N7	1 1/8	2 1/8	5/16	1	—	—	7878070
13/64	5/16	5/8	1/4	1	7877949	—	—
13/64	9/16	1 1/4	5/16	1	—	7878010	—
13/64	1 1/8	2 1/8	5/16	1	—	—	7878071
N6	5/16	5/8	1/4	1	7877950	—	—
N6	9/16	1 1/4	5/16	1	—	7878011	—
N6	1 1/8	2 1/8	5/16	1	—	—	7878072
N5	5/16	5/8	1/4	1	7877951	—	—
N5	9/16	1 1/4	5/16	1	—	7878012	—
N5	1 1/8	2 1/8	5/16	1	—	—	7878073
N4	5/16	5/8	1/4	1	7877952	—	—
N4	9/16	1 1/4	5/16	1	—	7878013	—
N4	1 1/8	2 1/8	5/16	1	—	—	7878074
N3	5/16	5/8	1/4	1	7877953	—	—
N3	9/16	1 1/4	5/16	1	—	7878014	—
N3	1 1/8	2 1/8	5/16	1	—	—	7878075
7/32	5/16	5/8	1/4	1	7877954	—	—
7/32	9/16	1 1/4	5/16	1	—	7878015	—
7/32	1 1/8	2 1/8	5/16	1	—	—	7878076
N2	5/16	5/8	1/4	1	7877955	—	—
N2	9/16	1 1/4	5/16	1	—	7878016	—
N2	1 1/8	2 1/8	5/16	1	—	—	7878077
N1	5/16	5/8	1/4	1	7877956	—	—
N1	9/16	1 1/4	5/16	1	—	7878017	—
N1	1 1/8	2 1/8	5/16	1	—	—	7878078
A	5/16	5/8	1/4	1	7877957	—	—
A	9/16	1 1/4	5/16	1	—	7878018	—
A	1 1/8	2 1/8	5/16	1	—	—	7878079
15/64	5/16	5/8	1/4	1	7877958	—	—
15/64	9/16	1 1/4	5/16	1	—	7878019	—
15/64	1 1/8	2 1/8	5/16	1	—	—	7878080
B	5/16	5/8	1/4	1	7877959	—	—

SPECIAL PURPOSE DRILL



d ₁ Ø Nr.	l ₂ Inch	l ₁ Inch	l ₃ Inch	Pack Qty	TS41HS TS40HS TS42HS	TS18HS TS10HS TS15HS	TS52HS TS51HS TS55HS
B	9/16	1 1/4	5/16	1	—	7878020	—
B	1 1/8	2 1/8	5/16	1	—	—	7878081
C	5/16	5/8	1/4	1	7877960	—	—
C	9/16	1 1/4	5/16	1	—	7878021	—
C	1 1/8	2 1/8	5/16	1	—	—	7878082
D	5/16	5/8	1/4	1	7877961	—	—
D	9/16	1 1/4	5/16	1	—	7878022	—
D	1 1/8	2 1/8	5/16	1	—	—	7878083
1/4	5/16	5/8	1/4	1	7877962	—	—
1/4	9/16	1 1/4	5/16	1	—	7878023	—
1/4	1 1/8	2 1/8	5/16	1	—	—	7878084
F	5/16	5/8	1/4	1	7877963	—	—
F	9/16	1 1/4	5/16	1	—	7878024	—
F	1 1/8	2 1/8	5/16	1	—	—	7878085
G	5/16	5/8	1/4	1	7877964	—	—
G	9/16	1 1/4	5/16	1	—	7878025	—
G	1 1/8	2 1/8	5/16	1	—	—	7878086
9/32	5/16	5/8	1/4	1	7877965	—	—
9/32	9/16	1 1/4	5/16	1	—	7878026	—
9/32	1 1/8	2 1/8	5/16	1	—	—	7878087
5/16	5/16	5/8	1/4	1	7877966	—	—
5/16	9/16	1 1/4	5/16	1	—	7878027	—
5/16	1 1/8	2 1/8	5/16	1	—	—	7878088
3/8	5/16	5/8	1/4	1	7877967	—	—
3/8	9/16	1 1/4	5/16	1	—	7878028	—
3/8	1 1/8	2 1/8	5/16	1	—	—	7878089

Cobalt, Threaded Square Shank Drills

TS41CO - Stub, Wire Gauge Sizes

TS40CO - Stub, Fractional Sizes

TS42CO - Stub, Letter Sizes

TS18CO - Short, Wire Gauge Sizes

TS10CO - Short, Fractional Sizes

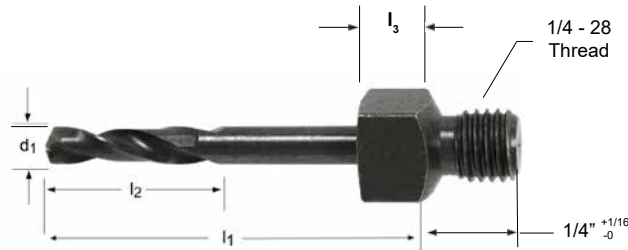
TS15CO - Short, Letter Sizes

TS52CO - Long, Wire Gauge Sizes

TS51CO - Long, Fractional Sizes

TS55CO - Long, Wire Gauge Sizes

NAS-965 Type D Steam tempered for increased wear resistance & lubricity. Shank design for drilling in confined spaces. Low thrust design self centering Split Point for easier penetration.
1/4-28 thread



TS41CO TS40CO TS42CO	TS18CO TS10CO TS15CO	TS52CO TS51CO TS55CO
HSS-E	HSS-E	HSS-E
135°	135°	135°
N50 - N1 3/32 - 3/8 A - G	N50 - N1 3/32 - 3/8 A - G	N50 - N1 3/32 - 3/8 A - G

d ₁ Ø Nr.	l ₂ Inch	l ₁ Inch	l ₃ Inch	Pack Qty	TS41CO TS40CO TS42CO	TS18CO TS10CO TS15CO	TS52CO TS51CO TS55CO
N50	5/16	1/2	1/8	1	7878110	—	—
N50	9/16	1"	1/4	1	—	7878171	—
N50	7/8	2 1/8	1/4	1	—	—	7878232
3/32	5/16	1/2	1/8	1	7878111	—	—
3/32	9/16	1"	1/4	1	—	7878172	—
3/32	7/8	2 1/8	1/4	1	—	—	7878233
N40	5/16	1/2	1/8	1	7878112	—	—
N40	9/16	1"	1/4	1	—	7878173	—
N40	7/8	2 1/8	1/4	1	—	—	7878234
N39	5/16	1/2	1/8	1	7878113	—	—
N39	9/16	1"	1/4	1	—	7878174	—
N39	7/8	2 1/8	1/4	1	—	—	7878235
N38	5/16	1/2	1/8	1	7878114	—	—
N38	9/16	1"	1/4	1	—	7878175	—
N38	7/8	2 1/8	1/4	1	—	—	7878236
N37	5/16	1/2	1/8	1	7878115	—	—
N37	9/16	1"	1/4	1	—	7878176	—
N37	7/8	2 1/8	1/4	1	—	—	7878237
N36	5/16	1/2	1/8	1	7878116	—	—
N36	9/16	1"	1/4	1	—	7878177	—
N36	7/8	2 1/8	1/4	1	—	—	7878238
7/64	5/16	1/2	1/8	1	7878117	—	—
7/64	9/16	1"	1/4	1	—	7878178	—
7/64	7/8	2 1/8	1/4	1	—	—	7878239
N35	5/16	1/2	1/8	1	7878118	—	—
N35	9/16	1"	1/4	1	—	7878179	—
N35	7/8	2 1/8	1/4	1	—	—	7878240
N34	5/16	1/2	1/8	1	7878119	—	—
N34	9/16	1"	1/4	1	—	7878180	—
N34	7/8	2 1/8	1/4	1	—	—	7878241
N33	5/16	1/2	1/8	1	7878120	—	—

SPECIAL PURPOSE DRILL



d ₁ Ø Nr.	l ₂ Inch	l ₁ Inch	l ₃ Inch	Pack Qty	TS41CO TS40CO TS42CO	TS18CO TS10CO TS15CO	TS52CO TS51CO TS55CO
N33	9/16	1"	1/4	1	—	7878181	—
N33	7/8	2 1/8	1/4	1	—	—	7878242
N32	5/16	1/2	1/8	1	7878121	—	—
N32	9/16	1"	1/4	1	—	7878182	—
N32	7/8	2 1/8	1/4	1	—	—	7878243
N31	5/16	1/2	1/8	1	7878122	—	—
N31	9/16	1"	1/4	1	—	7878183	—
N31	7/8	2 1/8	1/4	1	—	—	7878244
1/8	5/16	1/2	1/8	1	7878123	—	—
1/8	9/16	1"	1/4	1	—	7878184	—
1/8	7/8	2 1/8	1/4	1	—	—	7878245
N30	5/16	9/16	1/8	1	7878124	—	—
N30	9/16	1 1/4	1/4	1	—	7878185	—
N30	1 1/8	2 1/8	1/4	1	—	—	7878246
N29	5/16	9/16	1/8	1	7878125	—	—
N29	9/16	1 1/4	1/4	1	—	7878186	—
N29	1 1/8	2 1/8	1/4	1	—	—	7878247
N28	5/16	9/16	1/8	1	7878126	—	—
N28	9/16	1 1/4	1/4	1	—	7878187	—
N28	1 1/8	2 1/8	1/4	1	—	—	7878248
9/64	5/16	9/16	1/8	1	7878127	—	—
9/64	9/16	1 1/4	1/4	1	—	7878188	—
9/64	1 1/8	2 1/8	1/4	1	—	—	7878249
N27	5/16	9/16	1/8	1	7878128	—	—
N27	9/16	1 1/4	1/4	1	—	7878189	—
N27	1 1/8	2 1/8	1/4	1	—	—	7878250
N26	5/16	9/16	1/8	1	7878129	—	—
N26	9/16	1 1/4	1/4	1	—	7878190	—
N26	1 1/8	2 1/8	1/4	1	—	—	7878251
N25	5/16	9/16	1/8	1	7878130	—	—
N25	9/16	1 1/4	1/4	1	—	7878191	—
N25	1 1/8	2 1/8	1/4	1	—	—	7878252
N24	5/16	9/16	1/8	1	7878131	—	—
N24	9/16	1 1/4	1/4	1	—	7878192	—
N24	1 1/8	2 1/8	1/4	1	—	—	7878253
N23	5/16	9/16	1/8	1	7878132	—	—
N23	9/16	1 1/4	1/4	1	—	7878193	—
N23	1 1/8	2 1/8	1/4	1	—	—	7878254
5/32	5/16	9/16	1/8	1	7878133	—	—
5/32	9/16	1 1/4	1/4	1	—	7878194	—
5/32	1 1/8	2 1/8	1/4	1	—	—	7878255
N22	5/16	9/16	1/8	1	7878134	—	—
N22	9/16	1 1/4	1/4	1	—	7878195	—
N22	1 1/8	2 1/8	1/4	1	—	—	7878256
N21	5/16	9/16	1/8	1	7878135	—	—
N21	9/16	1 1/4	1/4	1	—	7878196	—
N21	1 1/8	2 1/8	1/4	1	—	—	7878257
N20	5/16	9/16	1/8	1	7878136	—	—
N20	9/16	1 1/4	1/4	1	—	7878197	—
N20	1 1/8	2 1/8	1/4	1	—	—	7878258
N19	5/16	9/16	1/8	1	7878137	—	—
N19	9/16	1 1/4	1/4	1	—	7878198	—
N19	1 1/8	2 1/8	1/4	1	—	—	7878259
N18	5/16	9/16	1/8	1	7878138	—	—
N18	9/16	1 1/4	1/4	1	—	7878199	—
N18	1 1/8	2 1/8	1/4	1	—	—	7878260
11/64	5/16	9/16	1/8	1	7878139	—	—
11/64	9/16	1 1/4	1/4	1	—	7878200	—
11/64	1 1/8	2 1/8	1/4	1	—	—	7878261
N17	5/16	9/16	1/8	1	7878140	—	—
N17	9/16	1 1/4	1/4	1	—	7878201	—
N17	1 1/8	2 1/8	1/4	1	—	—	7878262

d ₁ Ø Nr.	l ₂ Inch	l ₁ Inch	l ₃ Inch	Pack Qty	TS41CO TS40CO TS42CO	TS18CO TS10CO TS15CO	TS52CO TS51CO TS55CO
N16	5/16	9/16	1/8	1	7878141	—	—
N16	9/16	1 1/4	1/4	1	—	7878202	—
N16	1 1/8	2 1/8	1/4	1	—	—	7878263
N15	5/16	9/16	1/8	1	7878142	—	—
N15	9/16	1 1/4	1/4	1	—	7878203	—
N15	1 1/8	2 1/8	1/4	1	—	—	7878264
N14	5/16	9/16	1/8	1	7878143	—	—
N14	9/16	1 1/4	1/4	1	—	7878204	—
N14	1 1/8	2 1/8	1/4	1	—	—	7878265
N13	5/16	9/16	1/8	1	7878144	—	—
N13	9/16	1 1/4	1/4	1	—	7878205	—
N13	1 1/8	2 1/8	1/4	1	—	—	7878266
3/16	5/16	9/16	1/8	1	7878145	—	—
3/16	9/16	1 1/4	1/4	1	—	7878206	—
3/16	1 1/8	2 1/8	1/4	1	—	—	7878267
N12	5/16	9/16	1/8	1	7878146	—	—
N12	9/16	1 1/4	1/4	1	—	7878207	—
N12	1 1/8	2 1/8	1/4	1	—	—	7878268
N11	5/16	9/16	1/8	1	7878147	—	—
N11	9/16	1 1/4	1/4	1	—	7878208	—
N11	1 1/8	2 1/8	1/4	1	—	—	7878269
N10	5/16	9/16	1/8	1	7878148	—	—
N10	9/16	1 1/4	1/4	1	—	7878209	—
N10	1 1/8	2 1/8	1/4	1	—	—	7878270
N9	5/16	5/8	1/4	1	7878149	—	—
N9	9/16	1 1/4	5/16	1	—	7878210	—
N9	1 1/8	2 1/8	5/16	1	—	—	7878271
N8	5/16	5/8	1/4	1	7878150	—	—
N8	9/16	1 1/4	5/16	1	—	7878211	—
N8	1 1/8	2 1/8	5/16	1	—	—	7878272
N7	5/16	5/8	1/4	1	7878151	—	—
N7	9/16	1 1/4	5/16	1	—	7878212	—
N7	1 1/8	2 1/8	5/16	1	—	—	7878273
13/64	5/16	5/8	1/4	1	7878152	—	—
13/64	9/16	1 1/4	5/16	1	—	7878213	—
13/64	1 1/8	2 1/8	5/16	1	—	—	7878274
N6	5/16	5/8	1/4	1	7878153	—	—
N6	9/16	1 1/4	5/16	1	—	7878214	—
N6	1 1/8	2 1/8	5/16	1	—	—	7878275
N5	5/16	5/8	1/4	1	7878154	—	—
N5	9/16	1 1/4	5/16	1	—	7878215	—
N5	1 1/8	2 1/8	5/16	1	—	—	7878276
N4	5/16	5/8	1/4	1	7878155	—	—
N4	9/16	1 1/4	5/16	1	—	7878216	—
N4	1 1/8	2 1/8	5/16	1	—	—	7878277
N3	5/16	5/8	1/4	1	7878156	—	—
N3	9/16	1 1/4	5/16	1	—	7878217	—
N3	1 1/8	2 1/8	5/16	1	—	—	7878278
7/32	5/16	5/8	1/4	1	7878157	—	—
7/32	9/16	1 1/4	5/16	1	—	7878218	—
7/32	1 1/8	2 1/8	5/16	1	—	—	7878279
N2	5/16	5/8	1/4	1	7878158	—	—
N2	9/16	1 1/4	5/16	1	—	7878219	—
N2	1 1/8	2 1/8	5/16	1	—	—	7878280
N1	5/16	5/8	1/4	1	7878159	—	—
N1	9/16	1 1/4	5/16	1	—	7878220	—
N1	1 1/8	2 1/8	5/16	1	—	—	7878281
A	5/16	5/8	1/4	1	7878160	—	—
A	9/16	1 1/4	5/16	1	—	7878221	—
A	1 1/8	2 1/8	5/16	1	—	—	7878079
15/64	5/16	5/8	1/4	1	7878161	—	—
15/64	9/16	1 1/4	5/16	1	—	7878222	—
15/64	1 1/8	2 1/8	5/16	1	—	—	7878283
B	5/16	5/8	1/4	1	7878162	—	—

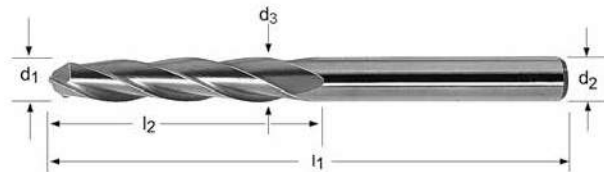
SPECIAL PURPOSE DRILL



d ₁ Ø Nr.	l ₂ Inch	l ₁ Inch	l ₃ Inch	Pack Qty	TS41CO TS40CO TS42CO	TS18CO TS10CO TS15CO	TS52CO TS51CO TS55CO
B	9/16	1 1/4	5/16	1	—	7878223	—
B	1 1/8	2 1/8	5/16	1	—	—	7878081
C	5/16	5/8	1/4	1	7878163	—	—
C	9/16	1 1/4	5/16	1	—	7878224	—
C	1 1/8	2 1/8	5/16	1	—	—	7878082
D	5/16	5/8	1/4	1	7878164	—	—
D	9/16	1 1/4	5/16	1	—	7878225	—
D	1 1/8	2 1/8	5/16	1	—	—	7878083
1/4	5/16	5/8	1/4	1	7878165	—	—
1/4	9/16	1 1/4	5/16	1	—	7878226	—
1/4	1 1/8	2 1/8	5/16	1	—	—	7878287
F	5/16	5/8	1/4	1	7878166	—	—
F	9/16	1 1/4	5/16	1	—	7878227	—
F	1 1/8	2 1/8	5/16	1	—	—	7878085
G	5/16	5/8	1/4	1	7878167	—	—
G	9/16	1 1/4	5/16	1	—	7878228	—
G	1 1/8	2 1/8	5/16	1	—	—	7878086
9/32	5/16	5/8	1/4	1	7878168	—	—
9/32	9/16	1 1/4	5/16	1	—	7878229	—
9/32	1 1/8	2 1/8	5/16	1	—	—	7878290
5/16	5/16	5/8	1/4	1	7878169	—	—
5/16	9/16	1 1/4	5/16	1	—	7878230	—
5/16	1 1/8	2 1/8	5/16	1	—	—	7878291
3/8	5/16	5/8	1/4	1	7878170	—	—
3/8	9/16	1 1/4	5/16	1	—	7878231	—
3/8	1 1/8	2 1/8	5/16	1	—	—	7878292

3-Flute Tapered Aircraft Router

ATR41 For cutting, trimming and routing without pre-drilling. 1/4" Taper per foot. Bright Finish improves chip flow in soft or non-ferrous materials



ATR41



N1 - N4

Router Nr.	d ₁ Ø Inch	d ₂ Ø Inch	l ₂ Inch	l ₁ Inch	d ₃ Ø Inch	# of Flutes	Pack Qty	ATR41
1	0.0810	0.0980	13/16	2"	0.0980	3	12	5989076
2	0.1100	0.1280	7/8	2.1/4	0.1280	3	12	5995742
3	0.1650	0.1875	1.1/16	2.1/2	0.1875	3	12	5995783
4	0.2240	0.2500	1.1/4	2.3/4	0.2500	4	12	5995826

JOBBER DRILL SETS



General Purpose Jobber Length Sets

C15R10P Bright Finish improves chip flow in
C29R10P soft or non-ferrous materials



C15R10 Steam tempered reduces wear
C29R10 and chip welding in harder ferrous materials.



C15R10P C29R10P	C15R10 C29R10
ANSI	ANSI
4XD	4XD
HSS	HSS
118°	118°
Set	Set

Set	Style	Pieces per Set	Sizes	Pack Qty	R10P Sets	R10 Sets
C15R10	R10	15	1/16 - 1/2 x 32nds	1	—	5995533
C29R10	R10	29	1/16 - 1/2 x 64ths	1	—	5995628
C15R10P	R10P	15	1/16-1/2 x 32nds	1	5995528	—
C29R10P	R10P	29	1/16 - 1/2 x 64ths	1	5995624	—

General Purpose Jobber Length Sets

A097 Self centering Split Point, low thrust design. TiN Coated Tip increases surface hardness and improves tool life.



C20R18P Bright Finish improves chip flow in soft or non-ferrous materials
C60R18P



C20R18 Steam tempered for increased wear resistance & lubricity.
C60R18



A097	C20R18 C60R18	C20R18P C60R18P
Set	Set	Set

Set	Style	Pieces per Set	Sizes	Pack Qty	A097	R18 sets	R18P sets
12	A012	60	Nr.1 - Nr.60	1	5967709	—	—
14	A012	26	A - Z	1	5967714	—	—
18	A012	29	1/16 - 1/2 x 1/64	1	5967571	—	—
20	A012	15	1/16 - 1/2 x 1/32	1	5967576	—	—
30	A012	115	1/16 - 1/2 x 1/64, Nr.1 - Nr.60, A-Z	1	5967581	—	—
60	A012	13	1/16 - 1/4 x 1/64	1	5967586	—	—
C20R18	R18	20	N61 - N80	1	—	5995552	—
C60R18	R18	60	N1 - N60	1	—	5995674	—
C20R18P	R18P	20	N61 - N80	1	—	—	5995547
C60R18P	R18P	60	N1 - N60	1	—	—	5995672

JOBBER DRILL SETS



General Purpose Jobber Length and Combination Sets

C26R15P

Bright Finish improves chip flow in soft or non-ferrous materials



C26R15

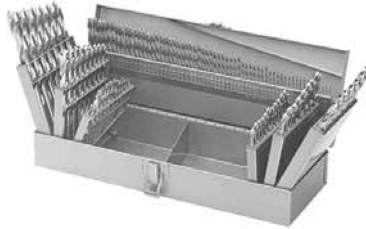
Steam tempered for increased wear resistance & lubricity.



C114COMBP

C115COMBP

Bright Finish improves chip flow in soft or non-ferrous materials



C26R15P	C26R15	C115COMBP	C114COMBP
ANSI	ANSI	ANSI	ANSI
4XD	4XD	4XD	4XD
HSS	HSS	HSS	HSS
118°	118°	118°	118°
Set	Set	Set	Set

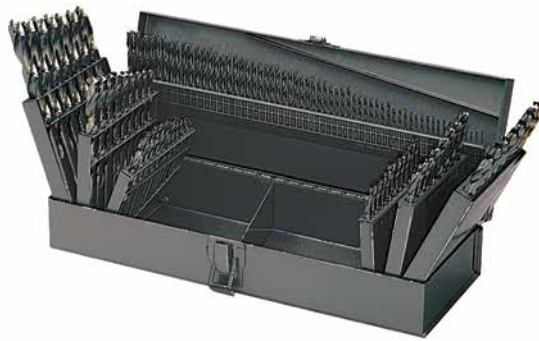
Set	Style	Pieces per Set	Sizes	Pack Qty	C26R15P	C26R15	C115COMBP	C114COMBP
C114COMBP	R10P, R18P, 2A	114	1/16-1/2 x 64ths, N1-N60, 1-13mm x 5 mm	1	—	—	—	5995643
C115COMBP	R10P, R18P, R15P	115	1/16-1/2 x 64ths, N1-6N0, A-Z	1	—	—	5995681	—
C26R15	R15	26	A - Z	1	—	5995597	—	—
C26R15P	R15P	26	A - Z	1	5995593	—	—	—

General Purpose Jobber Length Combination Sets

C114COMB

Steam tempered for increased wear resistance & lubricity.

C115COMB



C114COMB	C115COMB
ANSI	ANSI
4XD	4XD
HSS	HSS
118°	118°
Set	Set

Set	Style	Pieces per Set	Sizes	Pack Qty	C114COMB	C115COMB
C114COMB	R10, R18, 2AB	114	1/16-1/2 x 64ths, N1-N60, 1-13mm x .5 mm	1	5995676	—
C115COMB	R10, R18, R15	115	1/16-1/2 x 64ths, N1-N60, A-Z	1	—	5995683

General Purpose Jobber Length Metric Sets

A191 Steam tempered for increased wear resistance & lubricity.
A190



C252A Bright Finish improves chip flow in soft or non-ferrous materials



C252AB Steam tempered for increased wear resistance & lubricity.
C502AB



A191	A190	C252A	C252AB C502AB
Set	Set	Set	Set

Set	Style	Pieces per Set	Sizes	Pack Qty	A191	A190	C252A	C252AB C502AB
12	A100	60	No.1 - No.60	1	—	5969705	—	—
18	A100	29	1/16 inch - 1/2 inch x 1/64 inch	1	—	5969712	—	—
20	A100	15	1/16 inch - 1/2 inch x 1/32 inch	1	—	5969715	—	—
201	A100	19	1.0 mm - 10.0 mm x 0.5 mm	1	—	5969724	—	—
202	A100	51	1.0 mm - 6.0 mm x 0.1 mm	1	—	5969728	—	—
203	A100	41	6.0 mm - 10.0 mm x 0.1 mm	1	—	5969732	—	—
204	A100	25	1.0 mm - 13.0 mm x 0.5 mm	1	—	5969738	—	—
206	A100	29	1.0 mm - 13.0 mm x 0.5 mm + 3.3 mm, 4.2 mm, 6.8 mm, 10.2 mm	1	—	5969747	—	—
209	A100	91	1.0 mm - 10.0 mm x 0.1 mm	1	—	5969752	—	—
3	A100	21	1/16 inch - 3/8 inch x 1/64 inch	1	—	5969754	—	—
31M	A100	20	0.3 mm - 1.0 mm x 0.05 mm + 0.38 mm, 0.52 mm, 0.58 mm, 0.78 mm, 0.82 mm	1	5969762	—	—	—
413	A100	13	1.5 mm - 6.5 mm x 0.5 mm + 3.3 mm, 4.2 mm	1	5969772	—	—	—
419	A100	19	1.0 mm - 10.0 mm x 0.5 mm	1	5969777	—	—	—
61-80	A100	20	No.61 - No. 80	1	5969782	—	—	—
C252A	2A	25	1.0mm - 13mm x .5mm	1	—	—	5995581	—
C252AB	2AB	25	1.0mm - 13mm x .5mm	1	—	—	—	5995577
C502AB	2AB	50	1.0mm - 5.9mm x .1mm	1	—	—	—	5995661

General Purpose Jobber Length Metric Sets

A094 Low thrust design self centering Split Point for easier penetration.
TiN Coated Tip increases wear resistance and improves tool life.



A094

DIN
338

4XD

HSS

118°



Set

Set	Sizes	Pieces per Set	Sizes	Pack Qty	A094
413	A002	13	1.5 mm - 6.5 mm x 0.5 mm + 3.3 mm, 4.2 mm	1	6610302
419	A002	19	1.0 mm - 10.0 mm x 0.5 mm	1	6610303

General Purpose Jobber Length Metric Sets

A095 Low thrust design self centering Split Point for easier penetration.
TiN Coated Tip increases wear resistance and improves tool life.



A095

DIN
338

4XD

HSS

118°



Set

Set	Style	Pieces per Set	C	Pack Qty	A095
18	A002	29	1/16 inch - 1/2 inch x 1/64 inch	1	5967564
20	A002	15	1/16 inch - 1/2 inch x 1/32 inch	1	6610305
200	A002	24	1.0 mm - 10.5 mm x 0.5 mm + 3.3 mm, 4.2 mm, 6.8 mm, 10.2 mm	1	6610306
201	A002	19	1.0 mm - 10.0 mm x 0.5 mm	1	5967607
202	A002	51	1.0 mm - 6.0 mm x 0.1 mm	1	5967627
203	A002	41	6.0 mm - 10.0 mm x 0.1 mm	1	5967649
204	A002	25	1.0 mm - 13.0 mm x 0.5 mm	1	5967689
206	A002	29	1.0 mm - 13.0 mm x 0.5 mm + 3.3 mm, 4.2 mm, 6.8 mm, 10.2 mm	1	5967699
209	A002	91	1.0 mm - 10.0 mm x 0.1 mm	1	5967704

General Purpose Jobber Length Left Hand Sets

C15L10 Bright Finish improves chip flow in soft or
C29L10 non-ferrous materials



C15L10	C29L10
ANSI	ANSI
4XD	4XD
HSS	HSS
118°	118°
Set	Set

Set	Style	Pieces per Set	Sizes	Pack Qty	C15L10	C29L10
C15L10	L10	15	1/16-1/2 x 32nds, Left Hand	1	5995520	—
C29L10	L10	29	1/16 - 1/2 x 64ths, Left Hand	1	—	5995612

High Helix Jobber Length Set

A287 Low thrust design self centering Split Point for easier penetration. Steam tempered surface treatment for increased wear resistance & lubricity. Fast spiral helix for improved chip flow when drilling stainless steel.



A287

ANSI

4XD

HSS

135°



Set

Set	Style	Pieces per Set	C	Pack Qty	A287
18	A108	29	1/16 - 1/2 x 1/64	1	5969853

Heavy Duty Jobber Length Set

C29HX10 Low thrust design self centering Split Point for easier penetration. Stronger and more Rigid. Unique surface treatment for improved wear resistance.



C29HX10

ANSI

4XD

HSS

 135°



Set

Set	Style	Pieces per Set	Sizes	Pack Qty	C29HX10
C29HX10	HX10	29	1/16 - 1/2 x 64ths	1	5995609

JOBBER DRILL SETS



Heavy Duty Cobalt Jobber Length Sets (NAS 907 Type J)

C13R10CO

C15R10CO

C21R10CO

C29R10CO

C60R18CO

C26R15CO

Low thrust design self centering 135° Split Point for easier penetration. Cobalt base material with Bronze tempered for wear resistance and lubricity. Suitable for ferrous materials.



C13R10CO
C15R10CO
C21R10CO
C29R10CO

ANSI

4XD

HSS-E

135°



Set

C26R15CO

ANSI

4XD

HSS-E

135°



Set

C60R18CO

ANSI

4XD

HSS-E

135°



Set

Set	Style	Pieces per Set	Sizes	Pack Qty	C29R10CO	C26R15CO	C60R18CO
C13R10CO	R10CO	13	1/16-1/4 x 64ths	1	5995685	—	—
C15R10CO	R10CO	15	1/16-1/2 x 32nds	1	5995524	—	—
C21R10CO	R10CO	21	1/16-3/8 x 64ths	1	5995560	—	—
C26R15CO	R15CO	26	A - Z	1	—	5995589	—
C29R10CO	R10CO	29	1/16 - 1/2 x 64ths	1	5995620	—	—
C60R18CO	R18CO	60	N1 - N60	1	—	—	5995670

Heavy Duty Cobalt Jobber Length Combination Sets (NAS 907 Type J)

C115COMBC

C114COMBC

Low thrust design self centering 135° Split Point for easier penetration. Cobalt base material with Bronze tempered for wear resistance and lubricity. Suitable for ferrous materials.



C115COMBC	C114COMBC
Set	Set

Set	Style	Pieces per Set	Sizes	Pack Qty	C115COMBC	C114COMBC
C114COMBC	R10CO, R18CO, 2ACO	114	1/16-1/2 x 64ths, N1-N60, 1-13mm x .5 mm	1	—	5995600
C115COMBC	R10CO, R18CO, R15CO	115	1/16-1/2 x 64ths, N1-N60, A-Z	1	5995679	—

SCREW MACHINE DRILL SETS



General Purpose Screw Machine Drill Sets

C29R40

C60R41

C26R42

Bright Finish improves chip flow in soft or non-ferrous materials



C29R40



Set

C60R41



Set

C26R42



Set

Set	Style	Pieces per Set	Sizes	Pack Qty	C29R40	C60R41	C26R42
C26R42	R42	26	A - Z	1	—	—	5995604
C29R40	R40	29	1/16-1/2 x 64ths	1	5995635	—	—
C60R41	R41	60	N1 - N60	1	—	5995608	—

General Purpose Screw Machine Drill Set

A088

Low thrust design self centering Split Point for easier penetration. TiN Coated Tip increases wear resistance and improves tool life.



A088

DIN
ANSI

2.5XD

HSS

135°



Set

Set	Style	Pieces per Set	Sizes	Pack Qty	A088
200S	A022	24	1.0 mm - 10.5 mm x 0.5 mm + 3.3 mm, 4.2 mm, 6.8 mm, 10.2 mm	1	5966976

SCREW MACHINE DRILL SETS



Heavy Duty Screw Machine Drill Set

C29R40C

C60R41C

Low thrust design self centering Split Point for easier penetration. Steam tempered for increased wear resistance & lubricity.



C29R40C

C60R41C

ANSI

ANSI

2.5XD

2.5XD

HSS

HSS

135°

135°



Set

Set

Set	Style	Pieces per Set	Sizes	Pack Qty	C29R40C	C60R41C
C29R40C	R40C	29	1/16 - 1/2 x 64ths	1	5995632	—
C60R41C	R41C	60	N1 - N60	1	—	5995677

Cobalt Heavy Duty Screw Machine Drill Sets

C29M40CO Low thrust design self centering Split Point for easier penetration. Cobalt base material with Bronze tempered for wear resistance and lubricity. Suitable for ferrous materials.

C60M41CO

C26M42CO



C29M40CO	C60M41CO	C26M42CO
Set	Set	Set

Set	Style	Pieces per Set	Sizes	Pack Qty	C29M40CO	C60M41CO	C26M42CO
C26M42CO	M42CO	26	A - Z	1	—	—	5995585
C29M40CO	M40CO	29	1/16 - 1/2 x 64ths	1	5995616	—	—
C60M41CO	M41CO	60	N1 - N60	1	—	5995667	—

TAPER LENGTH DRILL SETS



General Purpose Taper Length Drill Sets

C29R51 Bright Finish improves chip flow in soft or non-ferrous materials. Longer Flute and Overall length for depth and reach.



C29R51

ANSI

6XD

HSS

118°



Set

Set	Style	Pieces per Set	Sizes	Pack Qty	C29R51
C29R51	R51	29	1/16 - 1/2 x 64ths	1	5995639

Reduced Shank Drill Sets

C8R56 Silver & Deming Drills. Steam tempered for increased wear resistance & lubricity.
C33R56

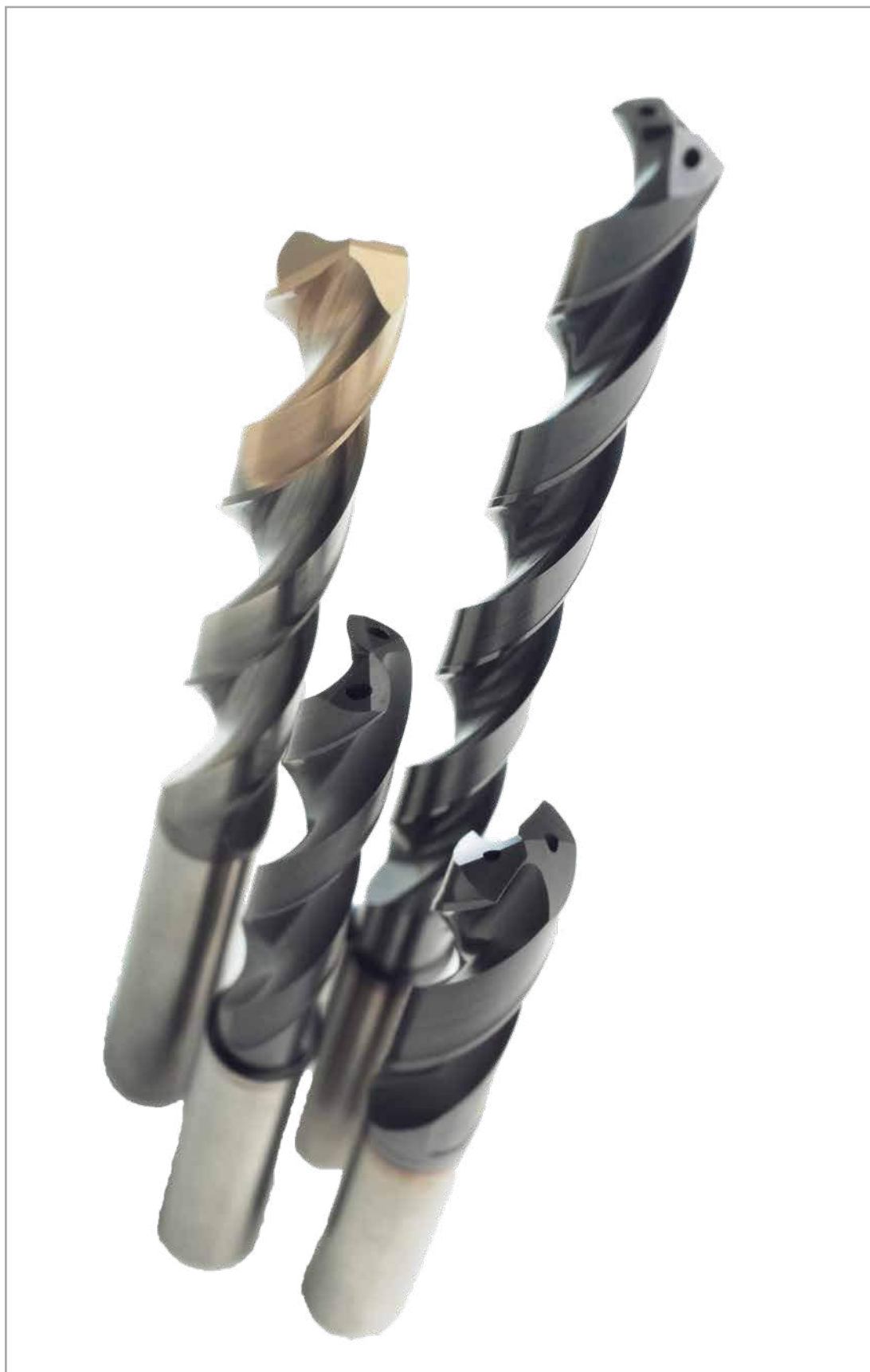
C8R57 Silver & Deming Drills with **Tri-Flat** Shank. Steam tempered for increased wear resistance & lubricity.

C8R56CO Heavy Duty Cobalt Silver & Deming Drills. Self centering 118° Split Point reduces thrust. Cobalt base material with Bronze/Steam tempered for wear resistance and lubricity. Suitable for ferrous materials.

C8R56 C33R56	C8R57	C8R56CO
Set	Set	Set

Set	Style	Pieces per Set	Sizes	Pack Qty	C8R56 C33R56	C8R57	C8R56CO
C33R56	R56	33	1/2" Reduced Shank*, 1/2 - 1"x 64ths, S&D	1	5995647	—	—
C8R56	R56	8	1/2" Reduced Shank, 9/16 - 1" x 16ths, S&D	1	5995703	—	—
C8R56CO	R56CO	8	1/2" Reduced Shank, 9/16 - 1" x 16ths, S&D	1	—	—	5995682
C8R57	R57	8	1/2" Reduced Shank, 9/16 - 1" x 16ths, S&D	1	—	5995726	—

*1/2" R56 drill is a straight shank, not a reduced shank



Visual Index - Taps

How to Use This Chart:

- 1) Determine your Workpiece Material from the Application Material Groups (AMG) below.
- 2) Use the icons to find Product Features.
- 3) Find the Surface Feet Per Minute (SFM)
example: 361 = SFM

Application Material Groups (AMG)			Hardness HRC	ISO
1. Steel	1.1 Magnetic soft steel	12L14, 12L15	<120 HB	P 1
	1.2 Structural Steel/ case carburising steel	1005-1025, 1214, 1215, A36	<200 HB	P 1
	1.3 Plain Carbon steel	1030-1060, 1050-1060, 1144-1146	<24	P 2
	1.4 Alloy steel	4140, 4340, 52100, 8620 H11-H41, A2, D2, 01, P20, 420	<24	P 3
	1.5 Alloy steel/ Hardened and tempered steel	4140, 4340, 52100, 8620 H11-H41, A2, D2, 01, P20, 420	>24<38	P 4
	1.6 Alloy steel/ Hardened and tempered steel	4140, 4340, 52100, 8620 H11-H41, A2, D2, 01, P20, 420	>38	H 1
	1.7 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	49-55	H 3
	1.8 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	55-63	H 4
2. Stainless Steel	2.1 Free machining Stainless Steel	200, 303, 416, 420F, 430F, 440	<24	M 1
	2.2 Austenitic	301, 302, 304, 316, 321, 330, CUSTOM 455, AM-350	<24	M 3
	2.3 Ferritic + Austenitic, Martensitic	318-329, 400-446, DUPLEX	<32	M 2
	2.4 Precipitation Hardened	15-5PH, Custom 450 17-4PH	<32	S 2
3. Cast Iron	3.1 Lamellar graphite	Grey, G10, Gg40, J431C, A48 CLASS 20	<150 HB	K 1
	3.2 Lamellar graphite	Grey, GG25-Gg40, J158, A48 CLASS 40-60	>150 HB<32	K 2
	3.3 Nodular graphite/ Malleable Cast Iron	A220, A436, A439, A602, Black, GGG40-GGG70	<200 HB	K 3
	3.4 Nodular graphite/ Malleable Cast Iron	Black Gts/Gtw, J434C	>200 HB<32	K 4
4. Titanium	4.1 Titanium, unalloyed	Commercially Pure	<200 HB	S 1
	4.2 Titanium, alloyed	6Al4V, 6A14V-2Sn, Monel, Monel K	<28	S 2
	4.3 Titanium, alloyed	6Al4V-4Mo, 7A14V-4Mo, 4911-4967	>28<38	S 3
5. Nickel	5.1 Nickel, unalloyed	Commercially Pure, 17644, 200, 5553	<150 HB	S 1
	5.2 Nickel, alloyed	Monel 400, Hastelloy C, Inconel 625, Waspaloy	<28	S 2
	5.3 Nickel, alloyed	Inconel 718, Nimonic 75-95, Rene 41, Inconel 825, A286	>28<38	S 3
6. Copper	6.1 Copper	Commercially Pure	<100 HB	N 3
	6.2 β-Brass, Bronze	314-340, 350-370	<200 HB	N 4
	6.3 α-Brass	Alloyed Cu + Al + Fe, Long Chipping	<200 HB	N 3
	6.4 High Strength Bronze	Ampco 18-25	<49	N 4
7. Aluminium Magnesium	7.1 Al, Mg, unalloyed	Commercially Pure	<100 HB	N 1
	7.2 Al alloyed, Si<0.5%	6061 T6, 7075, 314-340	<150 HB	N 1
	7.3 Al alloyed, Si>0.5%<10%	6061 T6, 380-390	<120 HB	N 1
	7.4 Al alloyed, Si>10% Mg alloys	Magnesium Whisker Reinforced	<120 HB	N 2
8. Synthetic Materials	8.1 Thermoplastics	Ultradid, Polystrol	---	O
	8.2 Thermosetting plastics	Bakelit, Pertinax	---	O
	8.3 Reinforced plastic materials	CFK, GFKAFK	---	O
9. Hard Mat.	9.1 Cermets (Metal-ceramics)	Ferrotic	<54	H
10. Graphite	10.1 Standard graphite		---	O

244

Visual Index - Taps

	UNF	M	MF	M	MF	M	MF	M	MF	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF	M	
	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	
	2BX	6H	6H	6H	6H	6H	6H	6H	6H	2B	2B	2B 3B	2B 3B	2B	2B	2BX	2BX	6H	
																			
	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2XD	2XD	2.5XD	2.5XD	2.5XD	2.5XD	1.5XD	1.5XD	2XD	
	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	
	B 3.5-5	B 3.5-5	B 3.5-5	B 3.5-5	B 3.5-5	B 3.5-5	B 3.5-5	B 3.5-5	B 3.5-5	C 3	C 3	C 3	C 3	C 3	C 3	C 3	C 3	C 3	
																			
																			
	TIAIN Top	TIAIN Top	TIAIN Top	Super B	Super B	TIAIN Top	TIAIN Top	TIAIN Top	TIAIN Top	TIAIN Top	TIAIN Top	Super B	Super B	TIAIN Top	TIAIN Top	TIAIN Top	TIAIN Top	TIAIN Top	
																			
	E916	E625	E765	E629	E769	E627	E767	E817	E917	E808	E908	E812	E912	E810	E910	E805	E905	E624	
	No. 10 - 3/4	M4 - M24	M8 - M18	M4 - M24	M8 - M18	M3 - M24	M8 - M14	M3 - M12	M3 - M12	No. 4 - 1"	No. 10 - 1"	No. 4 - 1"	No. 10 - 1"	No. 4 - 1"	No. 10 - 1"	No. 4 - 3/4	No. 10 - 3/4	M4 - M24	
	265	266	266	267	267	268	268	269	269	270	270	271	271	273	273	274	274	275	
AMG																			ISO
1.1		■ 108	■ 108							■ 108	■ 108							■ 108	P 1
1.2		■ 95	■ 95	● 72	● 72					■ 95	■ 95	● 72	● 72					■ 95	P 1
1.3		■ 75	■ 75	● 59	● 59					■ 75	■ 75	● 59	● 59					■ 75	P 2
1.4		● 69	● 69	● 52	● 52	■ 98	■ 98			● 69	● 69	● 52	● 52	■ 98	■ 98			● 69	P 3
1.5	● 55	● 43	● 43	● 33	● 33	■ 66	■ 66	● 55	● 55	● 43	● 43	● 33	● 33	■ 66	■ 66	● 55	● 55	● 43	P 4
1.6	■ 42					● 36	● 36	■ 42	■ 42					● 36	● 36	■ 42	■ 42		H 1
1.7	● 22							● 22	● 22							● 22	● 22		H 3
1.8																			H 4
2.1				■ 46	■ 46							■ 46	■ 46						M 1
2.2				■ 33	■ 33							■ 33	■ 33						M 3
2.3				■ 20	■ 20							■ 20	■ 20						M 2
2.4																			S 2
3.1																			K 1
3.2																			K 2
3.3																			K 3
3.4																			K 4
4.1																			S 1
4.2	● 42					● 33	● 33	● 42	● 42					● 33	● 33	● 42	● 42		S 2
4.3	■ 26							■ 26	■ 26							■ 26	■ 26		S 3
5.1																			S 1
5.2	● 16					● 33	● 33	● 16	● 16					● 33	● 33	● 16	● 16		S 2
5.3	■ 10							■ 10	■ 10							■ 10	■ 10		S 3
6.1		■ 39	■ 39							■ 39	■ 39							■ 39	N 3
6.2		● 98	● 98							● 98	● 98							● 98	N 3
6.3		■ 66	■ 66							■ 66	■ 66							■ 66	N 3
6.4																			N 4
7.1																			N 1
7.2																			N 1
7.3																			N 1
7.4																			N 2
8.1																			O
8.2																			O
8.3																			O
9.1																			H
10.1																			O

Visual Index - Taps

	MF	M	MF	M	MF	M	MF	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF
	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	ANSI	ANSI	ANSI	ANSI	DIN 2184-1	DIN 2184-1
	6H	6H	6H	6H	6H	6H	6H	2B	2B	2B	2B	3B	3B	3B	3B	2B	2B
	2XD	2.5XD	2.5XD	2.5XD	2.5XD	1.5XD	1.5XD	3XD	3XD	3XD	3XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD
	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM	HSS PM	HSS PM	HSS PM	HSS PM	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E
	C 2-3	C 2-3	C 2-3	C 2-3	C 2-3	C 2-3	C 2-3	P	P	P	P	B 3.5-5	B 3.5-5	B 3.5-5	B 3.5-5	B 3.5-5	C 2-3
	TiAIN Top	Super B	Super B	TiAIN Top	TiAIN Top	TiAIN Top	TiAIN Top	TiCN	TiCN	TiCN	TiCN						
	E764	E628	E768	E626	E766	E806	E906	1672AP (UNC)	1672AP (UNF)	1674 (UNC)	1674 (UNF)	E025	E035	E026	E036	EP20	EP30
	M8 - M18	M4 - M24	M8 - M18	M3 - M24	M8 - M14	M3 - M12	M8 - M12	No.4 - 1"	No.10 - 3/4	1/4 - 1"	1/4 - 1"	No.6 - 1"	No.6 - 1"	No.2 - 1"	No.10 - 1"	No.4 - 1"	No.8 - 1"
	275	276	276	277	277	278	278	279	279	279	279	280	280	280	280	282	278
1.1	■ 108							110	110	120	120	82	82	82	82	82	82
1.2	■ 95	● 72	● 72					90	90	100	100	72	72	72	72	72	72
1.3	■ 75	● 59	● 59					55	55	65	65	59	59	59	59	59	59
1.4	● 69	● 52	● 52	■ 98	■ 98			55	55	65	65	52	52	52	52	52	52
1.5	● 43	● 33	● 33	■ 66	■ 66	● 55	● 55	45	45	50	50	33	33	33	33	33	33
1.6				● 36	● 36	■ 42	■ 42					16	16	16	16	16	16
1.7						● 22	● 22										
1.8																	
2.1		■ 46	■ 46					50	50	60	60			26	26		
2.2		■ 33	■ 33					40	40	40	40			23	23		
2.3		■ 20	■ 20					40	40	45	45			16	16		
2.4																	
3.1												49	49	49	49	49	49
3.2												26	26	26	26	26	26
3.3												49	49	49	49	49	49
3.4												26	26	26	26	26	26
4.1								35	35	40	40	33	33			33	33
4.2				● 33	● 33	● 42	● 42	25	25	30	30	16	16			16	16
4.3						■ 26	■ 26										
5.1								35	35	40	40	39	39			39	39
5.2				● 33	● 33	● 16	● 16	20	20	25	25	16	16			16	16
5.3						■ 10	■ 10										
6.1	■ 39							45	45	50	50	39	39			39	39
6.2	● 98							120	120	125	125	98	98			98	98
6.3	■ 66							100	100	110	110	66	66			66	66
6.4																	
7.1								85	85	95	95	52	52			52	52
7.2								100	100	120	120	115	115			115	115
7.3								85	85	95	95	66	66			66	66
7.4								30	30	40	40	49	49			49	49
8.1												98	98			98	98
8.2																	
8.3																	
9.1																	
10.1																	

Visual Index - Taps

	UNC	UNF	UNC	UNF	M	MF	M	M	M	MF	M	M	MF	MF	M	M	MF
	DIN 2184-1	DIN 2184-1	ISO 529	ISO 529	DIN ANSI	DIN ANSI	DIN ANSI	ANSI	ANSI	ANSI	DIN 3714-10 3763-12	DIN 3714-10 3763-12	DIN 374	DIN 374	ISO 529	ISO 529	ISO 529
	2B	2B	2B	2B	6H	6H	6H	6H	6H	6H	6H	6H	6H	6H	6H	6H	6H
																	
	2.5XD	2.5XD	2.5XD	2.5XD	3XD	3XD	3XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD
	HSS-E	HSS-E	HSS-E	HSS-E	HSS PM	HSS PM	HSS PM	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E
	B 3.5-5	C 2-3	B 3.5-5	B 3.5-5	P	P	P	B 3.5-5	B 3.5-5	B 3.5-5	B 3.5-5	B 3.5-5	B 3.5-5	B 3.5-5	B 3.5-5	B 3.5-5	B 3.5-5
																	
	ST	ST	ST	ST	TICN	TICN	TICN		ST	ST		ST		ST		ST	ST
																	
	EP21	EP31	E021	E031	1673AP (M)	1673AP (MF)	1675 (M)	E005	E006	E016	EP006H	EP016H	EP10	EP11	E000	E001	E011
	No.4 - 1"	No.8 - 1"	No.2 - 1"	No.8 - 1"	M4 - M24	M8 - M24	M12 - M20	M4 - M20	M4 - M20	M8 - M14	M2 - M30	M2 - M30	M4 - M30	M4 - M30	M1.6 - M24	M1.6 - M24	M4 - M24
	282	282	283	283	284	284	284	285	285	285	286	286	287	287	288	288	288
1.1	82	82	82	82	110	110	120	82	82	82	82	82	82	82	82	82	82
1.2	72	72	72	72	90	90	100	72	72	72	72	72	72	72	72	72	72
1.3	59	59	59	59	55	55	65	59	59	59	59	59	59	59	59	59	59
1.4	52	52	52	52	55	55	65	52	52	52	52	52	52	52	52	52	52
1.5	33	33	33	33	45	45	50	33	33	33	33	33	33	33	33	33	33
1.6	16	16	16	16				16	16	16	16	16	16	16	16	16	16
1.7																	
1.8																	
2.1	23	23	23	23	50	50	60		26	26		23		23		23	23
2.2	20	20	20	20	40	40	40		23	23		20		20		20	20
2.3	13	13	13	13	40	40	45		16	16		13		13		13	13
2.4																	
3.1	49	49	49	49				49	49	49	49	49	49	49	49	49	49
3.2	26	26	26	26				26	26	26	26	26	26	26	26	26	26
3.3	49	49	49	49				49	49	49	49	49	49	49	49	49	49
3.4	26	26	26	26				26	26	26	26	26	26	26	26	26	26
4.1					35	35	40	33			33		33		33		
4.2					25	25	30	16			16		16		16		
4.3																	
5.1					35	35	40	39			39		39		39		
5.2					20	20	25	16			16		16		16		
5.3																	
6.1					45	45	50	39			39		39		39		
6.2					120	120	125	98			98		98		98		
6.3					100	100	110	66			66		66		66		
6.4																	
7.1					85	85	95	52			52		52		52		
7.2					100	100	120	115			115		115		115		
7.3					85	85	95	66			66		66		66		
7.4					30	30	40	49			49		49		49		
8.1								98			98		98		98		
8.2																	
8.3																	
9.1																	
10.1																	

Visual Index - Taps

	M	M	M	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF
	ISO 529	DIN 371	DIN 376	ANSI	ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	ANSI	ANSI	ANSI	ANSI	DIN 2184-1	DIN 2184-1	DIN 2184-1	DIN 2184-1
	6H	6HX	6HX	2B	2B	2B	2B	2B	2B	3B	3B	3B	3B	2B	2B	2B	2B
																	
	HSS-E	HSS-E PM	HSS-E PM	HSS	HSS	HSS PM	HSS PM	HSS PM	HSS PM	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E
	B 3.5-5	C 2-3	C 2-3			Semi-B	Semi-B	Semi-B	Semi-B	C 2-3	C 2-3	C 2-3	C 2-3	C 2-3	C 2-3	C 2-3	C 2-3
																	
	TIN	ST	ST	ST	ST	TICN	TICN	TICN	TICN			ST	ST			ST	ST
																	
	E000TIN	E201	E252	1985 (UNC)	1985 (UNF)	1676AP (UNC)	1676AP (UNF)	1678 (UNC)	1678 (UNF)	E027	E037	E028	E038	EX20	EX30	EX21	EX31
	M3 - M20	M3 - M10	M8 - M24	No.4 - 1"	No.4 - 7/8	No.4 - 1"	No.10 - 7/8	1/4 - 1"	1/4 - 7/8	No.6 - 1"	No.10 - 1"	No.4 - 1"	No.10 - 1"	No.4 - 1"	No.8 - 1"	No.4 - 1"	No.8 - 1"
	288	290	290	291	291	292	292	292	292	293	293	293	293	294	294	294	294
1.1	131			75	75	100	100	110	110	82	82	82	82	82	82	82	82
1.2	131			69	69	80	80	90	90	72	72	72	72	72	72	72	72
1.3	105			49	49	50	50	55	55	59	59	59	59	59	59	59	59
1.4	89			49	49	50	50	55	55	52	52	52	52	52	52	52	52
1.5	43			30	30	40	40	45	45	33	33	33	33	33	33	33	33
1.6	36			16	16						16		16				
1.7																	
1.8																	
2.1	26			36	36	45	45	50	50			23	23			23	23
2.2	23			20	20	30	30	35	35			20	20			20	20
2.3	16					35	35	40	40			13	13			13	13
2.4																	
3.1	72	49	49														
3.2	59	26	26														
3.3	82	49	49														
3.4	59	26	26														
4.1	49			20	20	30	30	35	35	33	33			33	33		
4.2	23			16	16	20	20	25	25	16	16			16	16		
4.3				7	7												
5.1	59			30	30	30	30	35	35	39	39			39	39		
5.2	26			16	16	15	15	20	20	16	16			16	16		
5.3				10	10												
6.1	59					40	40	45	45	39							
6.2	148	66	66			100	100	120	120	98							
6.3	115					90	90	100	100	66							
6.4		16	16														
7.1						80	80	90	90	52	52			52	52		
7.2						95	95	115	115	115	115			115	115		
7.3	98					80	80	90	90	66	66			66	66		
7.4	72	49	49			30	30	35	35	49	49			49	49		
8.1										98	98						
8.2	148	33	33														
8.3																	
9.1																	
10.1																	

Visual Index - Taps

	UNC	UNF	M	MF	M	M	M	MF	M	M	MF	MF	M	M	MF	UNC	UNF
	ISO 529	ISO 529	DIN ANSI	DIN ANSI	DIN ANSI	ANSI	ANSI	ANSI	DIN 3714/10 3763/12	DIN 3714/10 3763/12	DIN 374	DIN 374	ISO 529	ISO 529	ISO 529	ANSI	ANSI
	2B	2B	6H	6H	6H	6H	6H	6H	6H	6H	6H	6H	6H	6H	6H	2B 3B	2B 3B
																	
	2.5XD	2.5XD	3XD	3XD	3XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD		
	HSS-E	HSS-E	HSS PM	HSS PM	HSS PM	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS PM	HSS PM
	C 2-3	C 2-3	Semi-B	Semi-B	Semi-B	C 2-3	C 2-3	C 2-3	C 2-3	C 2-3	C 2-3	C 2-3	C 2-3	C 2-3	C 2-3	E 1.5-2	E 1.5-2
	λ45°	λ45°	λ50°	λ50°	λ50°	λ45°	λ45°	λ45°	λ45°	λ45°	λ45°	λ45°	λ45°	λ45°	λ45°		
																	
	ST	ST	TiCN	TiCN	TiCN		ST	ST		ST		ST		ST	ST	TiN	TiN
																	
																	
	E023	E033	1677AP (M)	1677AP (MF)	1679 (M)(MF)	E007	E008	E018	EX006H	EX016H	EX10	EX11	E002	E003	E013	1641 (UNC)	1641 (UNF)
	No.2 - 1"	No.8 - 1"	M4 - M24	M8 - M24	M6 - M24	M4 - M16	M4 - M20	M8 - M14	M2 - M64	M2 - M64	M4 - M30	M4 - M30	M2 - M24	M2 - M24	M4 - M22	No.4 - 1/2	No.10 - 3/8
	295	295	296	296	296	297	297	297	298	298	299	299	300	300	300	301	301
1.1	82	82	100	100	110	82	82	82	82	82	82	82	82	82	82	150	150
1.2	72	72	80	80	90	72	72	72	72	72	72	72	72	72	72	125	125
1.3	59	59	50	50	55	59	59	59	59	59	59	59	59	59	59	90	90
1.4	52	52	50	50	55	52	52	52	52	52	52	52	52	52	52	90	90
1.5	33	33	40	40	45	33	33	33	33	33	33	33	33	33	33		
1.6		16															
1.7																	
1.8																	
2.1	23	23	45	45	50		23	23		23		23		23	23	70	70
2.2	20	20	30	30	35		20	20		20		20		20	20	60	60
2.3	13	13	35	35	40		13	13		13		13		13	13	50	50
2.4																	
3.1																	
3.2																	
3.3																	
3.4																	
4.1			30	30	35	33			33		33		33			60	60
4.2			20	20	25	16			16		16		16				
4.3																	
5.1			30	30	35	39			39		39		39			45	45
5.2			15	15	20	16			16		16		16				
5.3																	
6.1			40	40	45											55	55
6.2			100	100	120											180	180
6.3			90	90	100											130	130
6.4																	
7.1			80	80	89	52			52		52		52			180	180
7.2			95	95	115	115			115		115		115			200	200
7.3			80	80	90	66			66		66		66			230	230
7.4			30	30	35	49			49		49		49				
8.1																	
8.2																	
8.3																	
9.1																	
10.1																	

Visual Index - Taps

	M	UNC	UNF	UNC	UNF	M	MF	M	G	G	G	G	G	G	UNC	UNF	UNS
	ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI	DIN 5156	DIN 5156	DORMER ISO	DIN 5156	DIN 5156	DORMER ISO	ANSI	ANSI	ANSI
	6H	2B	2B	2B	2B	6H	6H	6H	Normal	Normal	Normal	Normal	Normal	Normal	2B 3B	2B 3B	3B
		3XD	3XD	3XD	3XD	3XD	3XD	3XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	1.5XD	1.5XD	1.5XD
	HSS PM	HSS PM	HSS PM	HSS PM	HSS PM	HSS PM	HSS PM	HSS PM	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS	HSS	HSS
	E 1.5-2	Semi-B	Semi-B	Semi-B	Semi-B	Semi-B	Semi-B	Semi-B	B 3.5-5	B 3.5-5	B 3.5-5	C 2-3	C 2-3	C 2-3			
	TIN	TIN Top	TIN Top	TIN Top	TIN Top	TIN Top	TIN Top	TIN Top		ST	ST		ST	ST			
	1671 (M)	1681AP (UNC)	1681AP (UNF)	1691AP (UNC)	1691AP (UNF)	1687AP (M)	1687AP (MF)	1697AP (M)	EP40	EP41	E041	EX40	EX41	E043	1500 (UNC)	1500 (UNF)	1500 (UNS)
	M3 - M10	No.4 - 1"	No.10 - 7/8	1/4 - 1"	5/16 - 1/2	M4 - M20	M10 - M16	M6 - M20	1/8 - 1"	1/8 - 1"	1/8 - 3/4	1/8 - 1.1/2	1/8 - 1.1/2	1/8 - 3/4	1/4 - 1.1/2	1/4 - 1.1/2	11/16 - 1"
	302	303	303	304	304	305	305	305	306	306	307	308	308	309	310	310	310
1.1	150	150	150	165	165	150	150	165	82	82	82	82	82	82	60	60	60
1.2	125	125	125	135	135	125	125	135	72	72	72	72	72	72	45	45	45
1.3	90	90	90	100	100	90	90	100	59	59	59	59	59	59	30	30	30
1.4	90	90	90	100	100	90	90	100	52	52	52	52	52	52	30	30	30
1.5									33	33	33	33	33	33	20	20	20
1.6									16	16	16			16	10	10	10
1.7																	
1.8																	
2.1	70	70	70	80	80	70	70	80		23	23		23	23	25	25	25
2.2	60	60	60	70	70	60	60	70		20	20		20	20	15	15	15
2.3	50	50	50	60	60	50	50	60		13	13		13	13	15	15	15
2.4																	
3.1									49	49	49				50	50	50
3.2									26	26	26				30	30	30
3.3									49	49	49				30	30	30
3.4									26	26	26				15	15	15
4.1	60	60	60	70	70	60	60	70	33			33			20	20	20
4.2									16			16			15	15	15
4.3																	
5.1	45	45	45	55	55	45	45	55	39			39			20	20	20
5.2									16			16			10	10	10
5.3																	
6.1	55	55	55	70	70	55	55	70	39						25	25	25
6.2	180	180	180	200	200	180	180	200	98						80	80	80
6.3	130	130	130	160	160	130	130	160	66						60	60	60
6.4															10	10	10
7.1	180	180	180	200	200	180	180	200	52			52			50	50	50
7.2	200	200	200	240	240	200	200	240	115			115			100	100	100
7.3	230	230	230	260	260	230	230	260	66			66			75	75	75
7.4									49			49			20	20	20
8.1									98			98			25	25	25
8.2															15	15	15
8.3																	
9.1																	
10.1																	

Visual Index - Taps

	UNC	UNF	UNC	UNF	UNC	UNF	M	MF	UNC	UNF	UNS	UNC	UNF	UNC	UNF	UNC	UNF
	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ISO 529	ISO 529	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI
	2B 3B	2B 3B	3B	3B	3B	3B	6H	6H	3B	3B	3B	2B 3B	2B 3B	3B	2B 3B	3B	3B
	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS
	1528 (UNC)	1528 (UNF)	1500A (UNC)	1500A (UNF)	TN1500 (UNC)	TN1500 (UNF)	E500	E513	1500L (UNC)	1500L (UNF)	1500L (UNS)	E061	E071	1508 (UNC)	1508 (UNF)	1595 (UNC)	1595 (UNF)
	No.1 - No.12	No.0 - No.12	1/4 - 1"	1/4 - 7/8	1/4 - 7/8	1/4 - 3/4	M1 - M56	M3 - M50	1/4 - 1"	1/4 - 1"	1"	No.6 - 1.1/2	No.6 - 1.1/2	1/4 - 1/2	1/4 - 1/2	1/4 - 5/16	1/4 - 1/4
	310	310	313	313	314	314	315	317	319	319	319	320	320	321	321	321	321
1.1	60	60	60	60	59	59	23	23	60	60	60	72	72	60	60	66	66
1.2	45	45	45	45	46	46	20	20	45	45	45	66	66	45	45	59	59
1.3	30	30	30	30	30	30	16	16	30	30	30	52	52	30	30	39	39
1.4	30	30	30	30	30	30	13	13	30	30	30	39	39	30	30	39	39
1.5	20	20	20	20	20	20	10	10	20	20	20	23	23	20	20	26	26
1.6	10	10	10	10	10	10			10	10	10	13	13	10	10	16	16
1.7																	
1.8																	
2.1	25	25	25	25	26	26			25	25	25			25	25	30	30
2.2	15	15	15	15	26	26			15	15	15			15	15	20	20
2.3	15	15	15	15	16	16			15	15	15			15	15	20	20
2.4																	
3.1	50	50	50	50	49	49	39	39	50	50	50	39	39	50	50	46	46
3.2	30	30	30	30	30	30	23	23	30	30	30	23	23	30	30	26	26
3.3	30	30	30	30	30	30	33	33	30	30	30	33	33	30	30	26	26
3.4	15	15	15	15	16	16	16	16	15	15	15	16	16	15	15	16	16
4.1	20	20	20	20	20	20			20	20	20			20	20	20	20
4.2	15	15	15	15	16	16			15	15	15			15	15	16	16
4.3																7	7
5.1	20	20	20	20	20	20			20	20	20			20	20	26	26
5.2	10	10	10	10	10	10			10	10	10			10	10	10	10
5.3																	
6.1	25	25	25	25	26	26	13	13	25	25	25	39	39	25	25	30	30
6.2	80	80	80	80	79	79	33	33	80	80	80	98	98	80	80	89	89
6.3	60	60	60	60	59	59	23	23	60	60	60	66	66	60	60	69	69
6.4	10	10	10	10	10	10	7	7	10	10	10			10	10	10	10
7.1	50	50	50	50	49	49			50	50	50			50	50	49	49
7.2	100	100	100	100	98	98	39	39	100	100	100			100	100	98	98
7.3	75	75	75	75	75	75	23	23	75	75	75	66	66	75	75	66	66
7.4	20	20	20	20	20	20	16	16	20	20	20	49	49	20	20	20	20
8.1	25	25	25	25	30	30			25	25	25			25	25	98	98
8.2	15	15	15	15	16	16	16	16	15	15	15	39	39	15	15	26	26
8.3							10	10				23	23				
9.1																	
10.1																	

Visual Index - Taps

	M	M	UNC	UNS	UNC	UNF	UNC	UNF	M	M	M	UNC	UNF	UNC	UNF	UNC	UNF
	ANSI	ISO 529	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ISO 529	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI
	6H	6H		2B	3B	3B	2B	2B	6H	6H	6H	2B 3B	2B 3B	2B	2B	3B	3B
																	
	1.5XD	1.5XD	1.5XD	1.5XD	1.5XD	1.5XD	1.5XD	1.5XD	1.5XD	1.5XD	1.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD
	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS
			P														
																	
																	
					N	N	N/ST	N/ST	N	N	TIN			TIN	TIN		
																	
	1700 (M)	E501	1500OV (UNC)	1505 (UNS)	1599 (UNC)	1599 (UNF)	1600 (UNC)	1600 (UNF)	1599 (M)	1599SB (M)	E504	1534 (UNC)	1534 (UNF)	TN1534 (UNC)	TN1534 (UNF)	1585 (UNC)	1585 (UNF)
	M1.6 - M36	M3 - M24	1/4 - 5/8	1.1/8 - 2"	1/4 - 3/4	1/4 - 3/4	1/4 - 3/4	1/4 - 3/4	M6 - M14	M6 - M12	M3 - M24	No.5 - No.12	No.5 - No.12	No.4 - No.12	No.10	1/4 - 3/4	1/4 - 3/4
	322	323	324	325	326	326	326	326	327	327	328	329	329	329	329	330	330
1.1	49	23	49	49							46	66	66	79	79	66	66
1.2	36	20	36	36							39	66	66	75	75	66	66
1.3	26	16	26	26							33	39	39	49	49	39	39
1.4	26	13	26	26							26	39	39	49	49	39	39
1.5	16	10	16	16							20	26	26	30	30	26	26
1.6	7		7	7								16	16	20	20	16	16
1.7																	
1.8																	
2.1	20		20	20								30	30	39	39	30	30
2.2	13		13	13								20	20	26	26	20	20
2.3	13		13	13								20	20	26	26	20	20
2.4																	
3.1	39	39	39	39	49	49	49	49	49	49	59	46	46	49	49	46	46
3.2	26	23	26	26	36	36	36	36	36	36	39	26	26	30	30	26	26
3.3	26	33	26	26	36	36	36	36	36	36	72	26	26	30	30	26	26
3.4	13	16	13	13	20	20	20	20	20	20	39	16	16	20	20	16	16
4.1	16		16	16								20	20			20	20
4.2	13		13	13								16	16			16	16
4.3												7	7			7	7
5.1	16		16	16								26	26	30	30	26	26
5.2	7		7	7								10	10	13	13	10	10
5.3																	
6.1	20	13	20	20								30	30	39	39	30	30
6.2	66	33	66	66							66	89	89	115	115	89	89
6.3	49	23	49	49							46	69	69	89	89	69	69
6.4	7	7	7	7	13	13	13	13	13	13	13	10	10	13	13	10	10
7.1	39		39	39								49	49	66	66	49	49
7.2	79	39	79	79							79	98	98	125	125	98	98
7.3	59	23	59	59							46	66	66	79	79	66	66
7.4	16	16	16	16							33	20	20	26	26	20	20
8.1	26		26	26								98	98	121	121	98	98
8.2	13	16	13	13	13	13	13	13	13	13	33	26	26	30	30	26	26
8.3		10									20						
9.1																	
10.1																	

Visual Index - Taps

	UNC	UNF	UNC	UNF	UNC	UNF	M	M	UNC	UNF	UNS	UNC	UNF	M	UNC	UNF	UNC
	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI
	2B 3B	2B 3B	2B 3B	3B	3B	3B	6H	6H	2B 3B	2B 3B	3B	2B 3B	2B 3B	6H	3B	2B 3B	2B 3B
	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	1.25XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD
	HSS	HSS	HSS	HSS	HSS-E	HSS-E	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS
					P	P									P	P	
	ST	ST	TIN	TIN				TIN									
	1585A (UNC)	1585A (UNF)	TN1585 (UNC)	TN1585 (UNF)	1634 (UNC)	1634 (UNF)	1785M	TN1785	1534NR (UNC)	1534NR (UNF)	1534NR (UNS)	1585NR (UNC)	1585NR (UNF)	1785NR	1534NE (UNC)	1534NE (UNF)	1593 (UNC)
	1/4 - 3/4	1/4 - 3/4	1/4 - 1/2	1/4 - 1/2	No.4 - No.8	No.10	M2 - M18	M4 - M12	No.1 - No.12	No.0 - No.12	No.4	1/4 - 3/4	1/4 - 3/4	M1.6 - M20	No.4 - 1/2	No.10 - 1/2	No.6 - No.10
	330	330	330	330	332	332	333	333	334	334	334	336	336	337	338	338	339
1.1	66	66	79	79	66	66	66	79	66	66	66	66	66	66	66	66	66
1.2	66	66	75	75	66	66	66	75	66	66	66	59	59	59	66	66	66
1.3	39	39	49	49	39	39	39	49	39	39	39	46	46	46	39	39	39
1.4	39	39	49	49	39	39	39	49	39	39	39	33	33	33	39	39	39
1.5	26	26	30	30	26	26	26	30	26	26	26	16	16	16	26	26	26
1.6	16	16	20	20	16	16	16	20	16	16	16	10	10	10	16	16	16
1.7																	
1.8																	
2.1	30	30	39	39	30	30	30	39	30	30	30	20	20	20	30	30	30
2.2	20	20	26	26	20	20	20	26	20	20	20	13	13	13	20	20	20
2.3	20	20	26	26	20	20	20	26	20	20	20	10	10	10	20	20	20
2.4																	
3.1	46	46	49	49	46	46	46	49	46	46	46			46	46	46	46
3.2	26	26	30	30	26	26	26	30	26	26	26			26	26	26	26
3.3	26	26	30	30	26	26	26	30	26	26	26			26	26	26	26
3.4	16	16	20	20	16	16	16	20	16	16	16			16	16	16	16
4.1	20	20			20	20	20		20	20	20				20	20	20
4.2	16	16			16	16	16		16	16	16				16	16	16
4.3	7	7			7	7	7		7	7	7	10	10	10	7	7	7
5.1	26	26	30	30	26	26	26	30	26	26	26	33	33	33	26	26	26
5.2	10	10	13	13	10	10	10	13	10	10	10	13	13	13	10	10	10
5.3																	
6.1	30	30	39	39	30	30	30	39	30	30	30	33	33	33	30	30	30
6.2	89	89	115	115	89	89	89	115	89	89	89				89	89	89
6.3	69	69	89	89	69	69	69	89	69	69	69	49	49	49	69	69	69
6.4	10	10	13	13	10	10	10	13	10	10	10				10	10	10
7.1	49	49	66	66	49	49	49	66	49	49	49	33	33	33	49	49	49
7.2	98	98	125	125	98	98	98	125	98	98	98	82	82	82	98	98	98
7.3	66	66	79	79	66	66	66	79	66	66	66	43	43	43	66	66	66
7.4	20	20	26	26	20	20	20	26	20	20	20	33	33	33	20	20	20
8.1	98	98	121	121	98	98	98	121	98	98	98	66	66	66	98	98	98
8.2	26	26	30	30	26	26	26	30	26	26	26				26	26	26
8.3																	
9.1																	
10.1																	

Visual Index - Taps

	UNF	UNC	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF	M	UNC	UNF
	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI
	2B 3B	2B	3B	3B	3B	3B	3B	3B	2B 3B	2B 3B	3B	3B	3B	3B	6H	2B 3B	2B 3B
	2.5XD	2XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	2.5XD	1.25XD	2.5XD
	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS

Visual Index - Taps

	M	UNC	UNF	M	UNC	UNF	NPT	NPT	NPT	NPT	NPT	NPT	NPT	NPT
	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI	ANSI B94.9	ANSI B94.9	ANSI B94.9	ANSI B94.9	ANSI	ANSI
	6H	2B 3B	2B 3B	6H	2B	2B	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
														
	2.5XD	3XD	3XD	3XD	2.5XD	2.5XD	2XD	1.5XD	1.5XD	1.5XD	1.5XD	1.5XD	1.5XD	1.5XD
	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														

Visual Index - Taps

	NPT	NPT	NPT	NPTF	NPTF	NPTF	NPTF	NPTF	NPSM	NPSF	Rc	G	UNC	UNF
	ANSI	ANSI	ANSI B94.9	ANSI	ANSI	ANSI	ANSI	ANSI B94.9	ANSI	ANSI	ISO 2284	ISO 2284	ANSI	ANSI
	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	3B	3B
														
	2XD	2XD	1.5XD	2XD	1.5XD	2XD	2XD	1.5XD	2XD	2XD	1.5XD	1.5XD	1.5XD	1.5XD
	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS
			C 2-3					C 2-3			C 2-3			
														
														
														
	1548 (NPT)	1568 (NPT)	E711	1543 (NPTF)	TN1543	1549 (NPTF)	1567 (NPTF)	E712	1542 (NPS)	1592 (NPSF)	E550	E547	1572 (UNC)	1572 (UNF)
	1/16 - 1"	1/8 - 1.1/2"	1/8 - 1.1/2"	1/16 - 1"	1/8 - 3/4	1/16 - 3/4	1/8 - 1"	1/16 - 1.1/4	1/8 - 1"	1/8 - 3/4	1/8 - 2"	1/8 - 2"	No.4 - 1/2	No.10 - 1/4
		354	355	356	357	358	359	360	361	361	362	363	364	364
1.1	13	13	13	13	16	13	13	13	13	13	72	23	49	49
1.2	13	13	13	13	16	13	13	13	13	13	66	20	30	30
1.3	20	20	20	20	23	20	20	20	20	20	52	16	26	26
1.4	16	16	16	16	20	16	16	16	16	16	39	13	26	26
1.5	10	10	10	10	13	10	10	10	10	10	23	10		
1.6											13			
1.7														
1.8														
2.1											23		16	16
2.2											16		7	7
2.3											23			
2.4														
3.1	20	20	20	20	23	20	20	20	20	20	39	39		
3.2	13	13	13	13	16	13	13	13	13	13	23	23		
3.3	20	20	20	20	23	20	20	20	20	20	33	33		
3.4	13	13	13	13	16	13	13	13	13	13	16	16		
4.1														
4.2														
4.3														
5.1														
5.2														
5.3														
6.1											39	13	26	26
6.2	36	36	36	36	39	36	36	36	36	36	98	33	66	66
6.3											66	23	49	49
6.4											13	7		
7.1													39	39
7.2											115	39	79	79
7.3	36	36	36	36	39	36	36	36	36	36	66	23	59	59
7.4	23	23	23	23	26	23	23	23	23	23	49	16	16	16
8.1	13	13	13	13	16	13	13	13	13	13				
8.2											39	16		
8.3											23	10		
9.1														
10.1														

Visual Index - Taps

	UNC	UNF	EGM	EGM	UNC	UNC	UNF	UNC	UNF	M	NPT
	ANSI	ANSI	DORMER ISO	DORMER ISO	ANSI	ANSI	ANSI	DORMER DIN	DORMER DIN	DORMER ISO	ANSI
	2B 3B	2B 3B	6H	6H	3B	2B	2B	2B	Medium	6H	Normal
	1.5XD	1.5XD	1.5XD	2XD	1.5XD	1.5XD	1.5XD	1.5XD	1.5XD	1.5XD	1.5XD
	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS
			C 2-3	C 2-3	P			C 2-3	C 2-3	C 2-3	

List Number Index - Taps



Pgs. 243 - 373

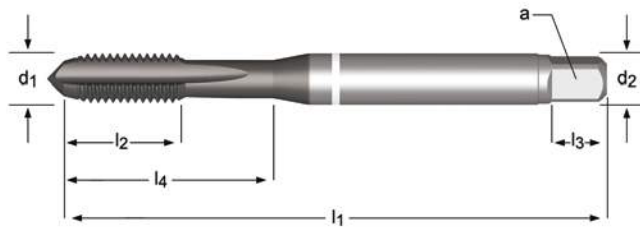
1215.....	371	1674.....	279	E043.....	309	E817.....	269
1500.....	310	1675.....	284	E061.....	320	E905.....	274
1500A.....	313	1676AP.....	292	E071.....	320	E906.....	278
1500L.....	319	1677AP.....	296	E201.....	290	E908.....	270
1500OV.....	324	1678.....	292	E252.....	290	E909.....	261
1505.....	325	1679.....	296	E500.....	315	E910.....	273
1508.....	321	1681AP.....	303	E501.....	323	E911.....	264
1519.....	366	1687AP.....	305	E504.....	328	E912.....	271
1528.....	310	1691AP.....	304	E513.....	317	E913.....	262
1534.....	329	1697AP.....	305	E547.....	363	E914.....	259
1534NE.....	338	1700M.....	322	E550.....	362	E915.....	259
1534NR.....	334	1785M.....	333	E620.....	365	E916.....	265
1541.....	349	1785NR.....	337	E621.....	365	E917.....	269
1542.....	361	1788M.....	343	E624.....	275	EP006H.....	286
1543.....	357	1985.....	291	E625.....	266	EP016H.....	286
1544.....	352	1994.....	367	E626.....	277	EP10.....	287
1545.....	353	229CSET.....	373	E627.....	268	EP11.....	287
1545A.....	353	3300.....	346	E628.....	276	EP20.....	282
1548.....	354	3300M.....	347	E629.....	267	EP21.....	282
1549.....	358	3306E.....	348	E630.....	260	EP30.....	282
1567.....	359	3850.....	372	E631.....	260	EP31.....	282
1568.....	355	6541.....	351	E650.....	369	EP40.....	306
1572.....	364	E000.....	288	E651.....	368	EP41.....	306
1578.....	364	E000TIN.....	288	E653.....	370	EX006H.....	298
1580.....	344	E001.....	288	E654.....	368	EX016H.....	298
1580M.....	345	E002.....	300	E710.....	350	EX10.....	299
1582.....	340	E003.....	300	E711.....	356	EX11.....	299
1585.....	330	E005.....	285	E712.....	360	EX20.....	294
1585A.....	330	E006.....	285	E721.....	350	EX21.....	294
1585NR.....	336	E007.....	297	E764.....	275	EX30.....	294
1585OV.....	339	E008.....	297	E765.....	266	EX31.....	294
1586.....	340	E011.....	288	E766.....	277	EX40.....	308
1587.....	341	E013.....	300	E767.....	268	EX41.....	308
1588.....	341	E016.....	285	E768.....	276	TN1500.....	314
1590.....	342	E018.....	297	E769.....	267	TN1534.....	329
1591.....	342	E021.....	283	E770.....	260	TN1541.....	349
1592.....	361	E023.....	295	E771.....	260	TN1543.....	357
1593.....	339	E025.....	280	E805.....	274	TN1585.....	330
1595.....	321	E026.....	280	E806.....	278	TN1785.....	333
1599.....	326	E027.....	293	E808.....	270		
1599M.....	327	E028.....	293	E809.....	261		
1599SB.....	327	E031.....	283	E810.....	273		
1600.....	326	E033.....	295	E811.....	264		
1634.....	332	E035.....	280	E812.....	271		
1641.....	301	E036.....	280	E813.....	262		
1671.....	302	E037.....	293	E814.....	259		
1672AP.....	279	E038.....	293	E815.....	259		
1673AP.....	284	E041.....	307	E816.....	265		

DIN ANSI Machine Tap, White Shark for Cast Iron

E814 Designed for semi-bottoming or through hole tapping in Cast Iron applications. Premium HSCo Powder Metal substrate with TiAlN-Top Coating combine to offer superior abrasion resistance, higher operating speeds, improved thread quality, reduced cycle times and longer tool life.

E815 Coolant through design allows for higher tapping speeds and better tool life. This design eliminates the problems associated with inadequate coolant supply in some applications. Full Bottoming.

■ 3.1 3.2 3.3 8.2
● 3.4 6.2 6.4 7.4



Pack Qty = 1 pc

E814	E815	E914	E915
UNC	UNC	UNF	UNF
DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI
2BX	2BX	2BX	2BX
2XD	2.5XD	2XD	2.5XD
HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM
C 2-3	E 1.5-2	C 2-3	E 1.5-2
TiAlN Top	TiAlN Top	TiAlN Top	TiAlN Top
1/4 - 1"	1/4 - 1"	No.10 - 7/8	1/4 - 1"

UNC	UNF	TPI	l_1 Inch	l_2 Inch	l_4 Inch	d_2 Inch	$\square$ a Inch	l_3 Inch	No. of flutes	Limits	E814	E815	E914	E915
	10	32	2.756	0.551	1.102	0.194	0.150	0.250	4	4.10 N21 H4	—	—	7350222	—
1/4	20	3.150	0.591	0.984	0.255	0.189	0.310	4	5.10 N7 H5	7350203	7350231	—	—	—
	1/4	28	3.150	0.591	0.984	0.255	0.189	0.310	4	5.50 N3 H5	—	—	7350223	—
	1/4	28	3.150	0.591	0.984	0.255	0.189	0.310	4	5.50 N3 H4	—	—	—	7350240
5/16	18	3.543	0.709	1.339	0.318	0.236	0.380	4	6.60 F H5	7350204	—	—	—	—
5/16	18	3.543	0.787	1.339	0.318	0.236	0.380	4	6.60 F H5	—	7350232	—	—	—
	5/16	24	3.543	0.709	1.339	0.318	0.236	0.380	4	6.90 I H5	—	—	7350224	—
	5/16	24	3.543	0.787	1.339	0.318	0.236	0.380	4	6.90 I H5	—	—	—	7350241
3/8	16	3.937	0.787	1.535	0.381	0.284	0.440	4	8.00 5/16 H5	7350205	7350233	—	—	—
	3/8	24	3.543	0.787	1.476	0.381	0.284	0.440	4	8.50 Q H5	—	—	7350225	7350242
7/16	14	3.937	0.787	—	0.323	0.240	0.410	4	9.40 U H5	7350206	7350234	—	—	—
	7/16	20	3.937	0.787	—	0.323	0.240	0.410	4	9.90 25/64 H5	—	—	7350226	7350243
1/2	13	4.331	0.906	—	0.367	0.273	0.440	4	10.80 27/64 H5	7350207	7350235	—	—	—
	1/2	20	3.937	0.827	—	0.367	0.273	0.440	4	11.50 29/64 H5	—	—	7350227	7350244
5/8	11	4.331	0.906	—	0.480	0.358	0.560	4	13.50 17/32 H5	7350208	7350236	—	—	—
	5/8	18	3.937	0.827	—	0.480	0.358	0.560	4	14.50 37/64 H5	—	—	7350228	7350245
3/4	10	4.921	1.181	—	0.590	0.439	0.690	4	16.50 21/32 H5	7350209	7350237	—	—	—
	3/4	16	4.331	0.906	—	0.590	0.439	0.690	4	17.50 11/16 H6	—	—	7350229	—
	3/4	16	4.331	0.906	—	0.590	0.439	0.690	4	17.50 11/16 H5	—	—	—	7350246
7/8	9	5.512	1.339	—	0.697	0.520	0.750	4	19.50 49/64 H6	7350220	7350238	—	—	—
	7/8	14	4.921	0.906	—	0.697	0.520	0.750	4	20.40 13/16 H6	—	—	7350230	7350247
1"	8	6.299	1.417	—	0.800	0.597	0.810	4	22.25 7/8 H6	7350221	7350239	—	—	—
	1"	12	5.512	1.063	—	0.800	0.597	0.810	4	23.25 59/64 H6	—	—	—	7350248

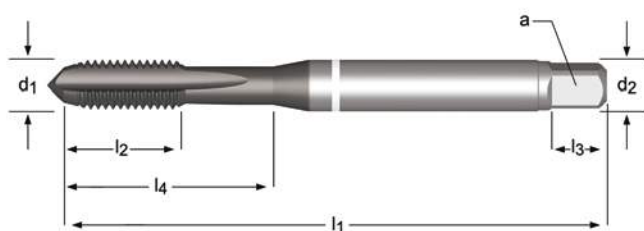
Note: Sizes up to 3/8" have male centers on both ends • Sizes over 3/8" have female centers on both ends.

DIN ANSI Machine Tap, White Shark for Cast Iron

E630 Designed for semi-bottoming or through hole tapping in Cast Iron applications. Premium HSCo Powder Metal substrate with TiAlN-Top Coating combine to offer superior abrasion resistance, higher operating speeds, improved thread quality, reduced cycle times and longer tool life.

E631 Coolant through design allows for higher tapping speeds and better tool life. This design eliminates the problems associated with inadequate coolant supply in some applications. Full Bottoming.

- 3.1 3.2 3.3 8.2
- 3.4 6.2 6.4 7.4



Pack Qty = 1 pc

M	MF	P mm	l ₁ mm	l ₂ mm	l ₄ mm	d ₂ Inch	□ a Inch	l ₃ mm	No. of flutes	Limits	E630	E631	E770	E771
5		0.80	70	13	25	0.194	0.150	6	4	4.20 N19	7350249	—	—	—
6		1.00	80	15	25	0.255	0.189	8	4	5.00 N9	—	7350265	—	—
6		1.00	80	15	30	0.255	0.189	8	4	5.00 N9	7350250	—	—	—
	8	1.00	90	18	35	0.318	0.236	10	4	7.00 J	—	—	7350259	—
8		1.25	90	18	35	0.318	0.236	10	4	6.80 H	7350251	—	—	—
8		1.25	90	20	34	0.318	0.236	10	4	6.80 H	—	7350266	—	—
	10	1.00	90	20	35	0.381	0.284	11	4	9.00 T	—	—	7350260	—
	10	1.25	100	20	39	0.381	0.284	11	4	8.80 11/32	—	—	7350261	7350274
10		1.50	100	20	39	0.381	0.284	11	4	8.50 Q	7350252	7350267	—	—
	12	1.25	100	21	—	0.367	0.273	11	4	10.80 27/64	—	—	7350262	7350275
	12	1.50	100	21	—	0.367	0.273	11	4	10.50 Z	—	—	7350263	7350276
12		1.75	110	23	—	0.367	0.273	11	4	10.30 Y	7350253	7350268	—	—
	14	1.50	100	21	—	0.429	0.320	13	4	12.50 31/64	—	—	7350264	7350277
14		2.00	110	23	—	0.429	0.320	13	4	12.00 15/32	7350254	7350269	—	—
16		2.00	110	23	—	0.480	0.358	14	4	14.00 35/64	7350255	7350270	—	—
18		2.50	125	30	—	0.542	0.404	16	4	15.50 39/64	7350256	7350271	—	—
20		2.50	140	30	—	0.652	0.487	18	4	17.50 11/16	7350257	7350272	—	—
24		3.00	160	38	—	0.760	0.567	19	4	21.00 53/64	7350258	7350273	—	—

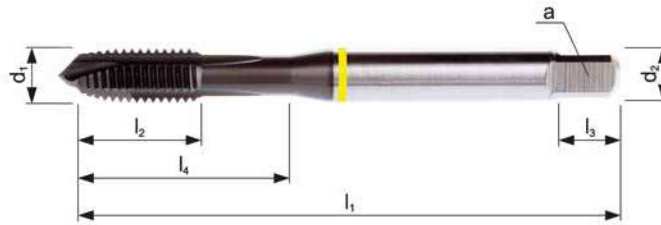
Note: Sizes up to M10 have male centers on both ends • Sizes over M10 have female centers on both ends.

E630	E631	E770	E771
M	M	MF	MF
DIN ANSI	DIN ANSI	DIN ANSI	DIN ANSI
6HX	6HX	6HX	6HX
2XD	2.5XD	2XD	2.5XD
HSS-E PM	HSS-E PM	HSS-E PM	HSS-E PM
C 2-3	E 1.5-2	C 2-3	E 1.5-2
TiAlN Top	TiAlN Top	TiAlN Top	TiAlN Top
M5—M24	M6—M24	M8—M14	M10—M14

DIN ANSI Machine Tap, Yellow Shark for Low Alloy Steels

E809 Designed for through hole tapping in low Alloy Steel applications.
E909 Premium HSCo Powder Metal substrate with TiAlN-Top Coating combine to offer superior abrasion resistance, higher operating speeds, improved thread quality, reduced cycle times and longer tool life.

- 1.1 1.2 1.3 6.1 6.3
- 1.4 1.5 6.2



Pack Qty = 1 pc

UNC	UNF	TPI	l_1 Inch	l_2 Inch	l_4 Inch	d_2 Inch	a Inch	l_3 Inch	No. of flutes			Limits	E809	E909
4		40	2.205	0.354	0.709	0.141	0.108	0.190	3	2.35	N43	H2	7350469	—
6		32	2.205	0.433	0.787	0.141	0.108	0.190	3	2.85	N36	H2	7350470	—
8		32	2.480	0.512	0.827	0.168	0.129	0.250	3	3.50	N29	H3	7350471	—
10		24	2.756	0.551	1.102	0.194	0.150	0.250	3	3.90	N25	H3	7350472	—
	10	32	2.756	0.551	1.102	0.194	0.150	0.250	3	4.10	N21	H3	—	7350482
1/4		20	3.150	0.591	0.984	0.255	0.189	0.310	3	5.10	N7	H5	7350473	—
	1/4	28	3.150	0.591	0.984	0.255	0.189	0.310	3	5.50	N3	H4	—	7350483
5/16		18	3.543	0.709	1.339	0.318	0.236	0.380	3	6.60	F	H5	7350474	—
	5/16	24	3.543	0.709	1.339	0.318	0.236	0.380	3	6.90	I	H4	—	7350484
3/8		16	3.937	0.787	1.535	0.381	0.284	0.440	3	8.00	5/16	H4	7350475	—
	3/8	24	3.543	0.787	1.476	0.381	0.284	0.440	3	8.50	Q	H4	—	7350485
7/16		14	3.937	0.787	—	0.323	0.240	0.410	3	9.40	U	H5	7350476	—
	7/16	20	3.937	0.787	—	0.323	0.240	0.410	3	9.90	25/64	H5	—	7350486
1/2		13	4.331	0.906	—	0.367	0.273	0.440	3	10.80	27/64	H5	7350477	—
	1/2	20	3.937	0.827	—	0.367	0.273	0.440	3	11.50	29/64	H5	—	7350487
5/8		11	4.331	0.906	—	0.480	0.358	0.560	3	13.50	17/32	H5	7350478	—
	5/8	18	3.937	0.827	—	0.480	0.358	0.560	3	14.50	37/64	H5	—	7350488
3/4		10	4.921	1.181	—	0.590	0.439	0.690	3	16.50	21/32	H5	7350479	—
	3/4	16	4.331	0.906	—	0.590	0.439	0.690	3	17.50	11/16	H5	—	7350489
7/8		9	5.512	1.339	—	0.697	0.520	0.750	4	19.50	49/64	H6	7350480	—
	7/8	14	4.921	0.906	—	0.697	0.520	0.750	4	20.40	13/16	H6	—	7350490
1"		8	6.299	1.417	—	0.800	0.597	0.810	4	22.25	7/8	H6	7350481	—
	1"	12	5.512	1.063	—	0.800	0.597	0.810	4	23.25	59/64	H6	—	7350491

Note: Sizes up to 3/8" have male centers on both ends • Sizes over 3/8" have female centers on both ends.

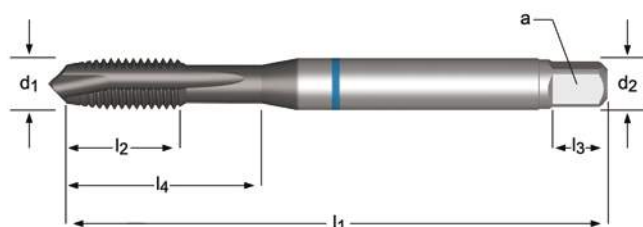
DIN ANSI Machine Tap, Blue Shark for Stainless Steel

E813 Designed for superior performance through hole tapping in a wide range of Stainless Steel types. Premium HSCo Powder Metal substrate with Super-B (TiAlN+WC/C) Coating combined with an additional edge treatment to offer improved thread quality and longer tool life. Available in both 2B and 3B Class of Fit to cover a wide range of applications.

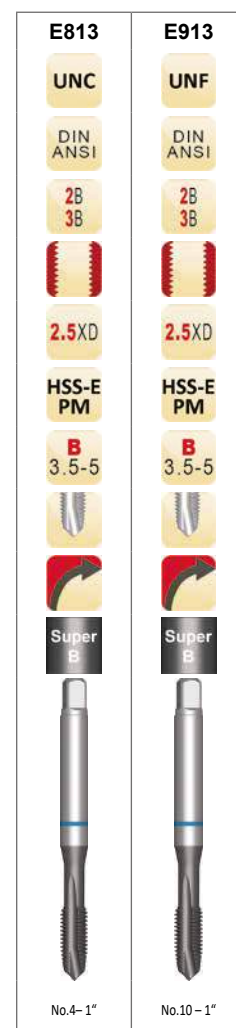
E913

■ 2.1 2.2 2.3

● 1.2 1.3 1.4 1.5



Pack Qty = 1 pc



UNC	UNF	TPI	l_1 Inch	l_2 Inch	l_4 Inch	d_2 Ø Inch	a Inch	l_3 Inch	No. of flutes			Limits	E813	E913
4		40	2.205	0.354	0.709	0.141	0.108	0.190	3	2.35	N43	H2	7350278	—
6		32	2.205	0.433	0.787	0.141	0.108	0.190	3	2.85	N36	H3	7350279	—
8		32	2.480	0.512	0.827	0.168	0.129	0.250	3	3.50	N29	H3	7350280	—
10		24	2.756	0.551	1.102	0.194	0.150	0.250	3	3.90	N25	H3	7350281	—
	10	32	2.756	0.551	1.102	0.194	0.150	0.250	3	4.10	N21	H3	—	7350299
1/4		20	3.150	0.591	0.984	0.255	0.189	0.310	3	5.10	N7	H5	7350282	—
1/4		20	3.150	0.591	0.984	0.255	0.189	0.310	3	5.10	N7	H3	7350283	—
	1/4	28	3.150	0.591	0.984	0.255	0.189	0.310	3	5.50	N3	H5	—	7350300
	1/4	28	3.150	0.591	0.984	0.255	0.189	0.310	3	5.50	N3	H3	—	7350301
5/16		18	3.543	0.709	1.339	0.318	0.236	0.380	3	6.60	F	H5	7350284	—
5/16		18	3.543	0.709	1.339	0.318	0.236	0.380	3	6.60	F	H3	7350285	—
	5/16	24	3.543	0.709	1.339	0.318	0.236	0.380	3	6.90	I	H4	—	7350302
	5/16	24	3.543	0.709	1.339	0.318	0.236	0.380	3	6.90	I	H3	—	7350303
3/8		16	3.937	0.787	1.535	0.381	0.284	0.440	3	8.00	5/16	H3	7350287	—
3/8		16	3.937	0.787	1.535	0.381	0.284	0.440	3	8.00	5/16	H5	7350286	—
	3/8	24	3.543	0.787	1.476	0.381	0.284	0.440	3	8.50	Q	H4	—	7350304
	3/8	24	3.543	0.787	1.476	0.381	0.284	0.440	3	8.50	Q	H3	—	7350305
5/8		11	4.331	0.906	—	0.480	0.358	0.560	4	13.50	17/32	H5	7350291	—
5/8		11	4.331	0.906	—	0.480	0.358	0.560	4	13.50	17/32	H3	7350292	—
7/16		14	3.937	0.787	—	0.323	0.240	0.410	4	9.40	U	H5	7350288	—
	7/16	20	3.937	0.787	—	0.323	0.240	0.410	4	9.90	25/64	H5	—	7350306
1/2		13	4.331	0.906	—	0.367	0.273	0.440	4	10.80	27/64	H5	7350289	—
1/2		13	4.331	0.906	—	0.367	0.273	0.440	4	10.80	27/64	H3	7350290	—
	1/2	20	3.937	0.827	—	0.367	0.273	0.440	4	11.50	29/64	H5	—	7350307
	1/2	20	3.937	0.827	—	0.367	0.273	0.440	4	11.50	29/64	H3	—	7350308

Note: Sizes up to 3/8" have male centers on both ends • Sizes over 3/8" have female centers on both ends.

UNC	UNF	TPI	l_1 Inch	l_2 Inch	l_4 Inch	d_2 Ø Inch	a Inch	l_3 Inch	No. of flutes			Limits	E813	E913
	5/8	18	3.937	0.827	—	0.480	0.358	0.560	4	14.50	37/64	H5	—	7350309
	5/8	18	3.937	0.827	—	0.480	0.358	0.560	4	14.50	37/64	H3	—	7350310
3/4		10	4.921	1.181	—	0.590	0.439	0.690	4	16.50	21/32	H5	7350293	—
3/4		10	4.921	1.181	—	0.590	0.439	0.690	4	16.50	21/32	H3	7350294	—
	3/4	16	4.331	0.906	—	0.590	0.439	0.690	4	17.50	11/16	H5	—	7350311
	3/4	16	4.331	0.906	—	0.590	0.439	0.690	4	17.50	11/16	H3	—	7350312
7/8		9	5.512	1.339	—	0.697	0.520	0.750	4	19.50	49/64	H6	7350295	—
7/8		9	5.512	1.339	—	0.697	0.520	0.750	4	19.50	49/64	H4	7350296	—
	7/8	14	4.921	0.906	—	0.697	0.520	0.750	4	20.40	13/16	H6	—	7350313
	7/8	14	4.921	0.906	—	0.697	0.520	0.750	4	20.40	13/16	H4	—	7350314
		8	6.299	1.417	—	0.800	0.597	0.810	4	22.25	7/8	H6	7350297	—
1"		8	6.299	1.417	—	0.800	0.597	0.810	4	22.25	7/8	H4	7350298	—
	1"	12	5.512	1.063	—	0.800	0.597	0.810	4	23.25	59/64	H6	—	7350315
	1"	12	5.512	1.063	—	0.800	0.597	0.810	4	23.25	59/64	H4	—	7350316

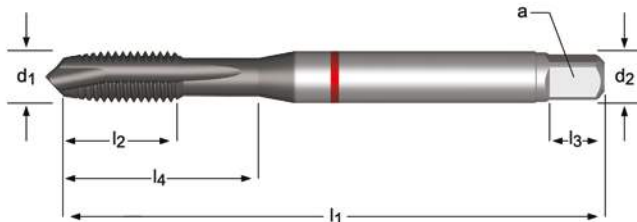
Note: Sizes up to 3/8" have male centers on both ends • Sizes over 3/8" have female centers on both ends.

DIN ANSI Machine Tap, Red Shark for Alloy Steels

E811 Designed for high performance through hole tapping in most medium Alloy Steels. The TiAlN-Top Coating combined with an additional edge treatment provides excellent performance and consistency in high production applications.

E911

- 1.4 1.5
- 1.6 4.2 5.2



Pack Qty = 1 pc

UNC	UNF	TPI	l_1 Inch	l_2 Inch	l_4 Inch	d_2 Ø Inch	$\square$ a Inch	l_3 Inch	No. of flutes			Limits	E811	E911
4		40	2.205	0.354	0.709	0.141	0.108	0.190	3	2.35	N43	H2	7350391	—
6		32	2.205	0.433	0.787	0.141	0.108	0.190	3	2.85	N36	H2	7350392	—
8		32	2.480	0.512	0.827	0.168	0.129	0.250	3	3.50	N29	H3	7350393	—
	10	32	2.756	0.551	1.102	0.194	0.150	0.250	3	4.10	N21	H3	—	7350404
10		24	2.756	0.551	1.102	0.194	0.150	0.250	3	3.90	N25	H3	7350394	—
	1/4	28	3.150	0.591	0.984	0.255	0.189	0.310	3	5.50	N3	H4	—	7350405
1/4		20	3.150	0.591	0.984	0.255	0.189	0.310	3	5.10	N7	H5	7350395	—
	5/16	24	3.543	0.709	1.339	0.318	0.236	0.380	3	6.90	I	H4	—	7350406
5/16		18	3.543	0.709	1.339	0.318	0.236	0.380	3	6.60	F	H5	7350396	—
	3/8	24	3.543	0.787	1.476	0.318	0.284	0.440	3	8.50	Q	H4	—	7350407
3/8		16	3.543	0.787	1.535	0.381	0.284	0.440	3	8.00	5/16	H4	7350397	—
	7/16	20	3.937	0.787	—	0.323	0.240	0.410	3	9.90	25/64	H5	—	7350408
7/16		14	3.937	0.787	—	0.323	0.240	0.410	3	9.40	U	H5	7350398	—
	1/2	20	3.937	0.827	—	0.367	0.273	0.440	3	11.50	29/64	H5	—	7350409
1/2		13	4.331	0.906	—	0.367	0.273	0.440	3	10.80	27/64	H5	7350399	—
	5/8	18	3.937	0.827	—	0.480	0.358	0.560	3	14.50	37/64	H5	—	7350410
5/8		11	4.331	0.906	—	0.480	0.358	0.560	3	13.50	17/32	H5	7350400	—
	3/4	16	4.331	0.906	—	0.590	0.439	0.690	4	17.50	11/16	H5	—	7350411
3/4		10	4.921	1.181	—	0.590	0.439	0.690	4	16.50	21/32	H5	7350401	—
	7/8	14	4.921	0.906	—	0.697	0.520	0.750	4	20.40	13/16	H6	—	7350412
7/8		9	5.512	1.339	—	0.697	0.520	0.750	4	19.50	49/64	H6	7350402	—
	1"	12	5.512	1.063	—	0.800	0.597	0.810	4	23.25	59/64	H6	—	7350413
1"		8	6.299	1.417	—	0.800	0.597	0.810	4	22.25	7/8	H6	7350403	—

E811	E911
UNC	UNF
DIN ANSI	DIN ANSI
2B	2B
2.5XD	2.5XD
HSS-E PM	HSS-E PM
B 3.5-5	B 3.5-5
No.4-1"	No.10-1"

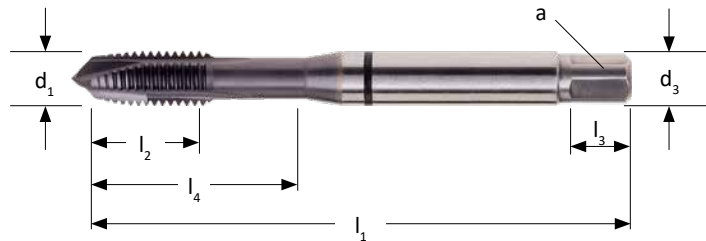
Note: Sizes up to 3/8" have male centers on both ends • Sizes over 3/8" have female centers on both ends.

DIN-ANSI Machine Tap Black Shark for Hard Alloys, Plug Style

E816 Designed for high performance through hole tapping in high strength and heat resistant work-materials with hardness up to 45HRC. The TiAlN-Top coating combined with geometry that significantly increases cutting edge strength, provides excellent performance and consistency in hard and difficult to machine materials.

E916

- 1.6 4.3 5.3
- 1.5 1.7 4.2 5.2



Pack Qty = 1 pc

E816	E916
UNC	UNF
DIN ANSI	DIN ANSI
2BX	2BX
2.5XD	2.5XD
HSS-E PM	HSS-E PM
B 3.5-5	B 3.5-5
TiAlN Top	TiAlN Top
No.4-3/4	No.10-3/4

UNC	UNF	TPI	l_1 Inch	l_2 Inch	l_4 Inch	d_2 Inch	$\square$ a Inch	l_3 Inch	No. of flutes			Limits	E816	E916
4		40	2.205	0.472	0.827	0.141	0.108	0.190	3	2.35	N43	H2	7812046	—
6		32	2.480	0.551	0.866	0.168	0.129	0.250	3	2.85	N36	H3	7812047	—
8		32	2.756	0.610	1.102	0.194	0.150	0.250	3	3.50	N29	H3	7812048	—
10		24	3.150	0.669	1.024	0.255	0.189	0.310	3	3.90	N25	H3	7812049	—
	10	32	3.150	0.669	1.024	0.255	0.189	0.310	3	4.10	N21	H3	—	7812107
1/4		20	3.543	0.807	1.378	0.318	0.236	0.380	3	5.10	N7	H5	7812100	—
	1/4	28	3.543	0.807	1.339	0.318	0.236	0.380	3	5.50	N3	H4	—	7812108
5/16		18	3.937	0.906	1.535	0.381	0.236	0.440	3	6.60	F	H5	7812101	—
	5/16	24	3.937	0.906	1.535	0.381	0.284	0.440	3	6.90	I	H4	—	7812109
3/8		16	3.937	0.787	1.535	0.381	0.236	0.440	3	8.00	5/16	H5	7812102	—
	3/8	24	3.937	0.787	1.535	0.381	0.284	0.440	3	8.50	Q	H4	—	7812110
7/16		14	3.937	0.787	—	0.323	0.240	0.410	4	9.40	U	H5	7812103	—
	7/16	20	3.937	0.787	—	0.323	0.240	0.440	4	9.90	25/64	H5	—	7812111
1/2		13	4.331	0.906	—	0.367	0.273	0.440	4	10.80	27/64	H5	7812104	—
	1/2	20	4.331	0.906	—	0.367	0.273	0.440	4	11.50	29/64	H5	—	7812112
5/8		11	4.331	0.906	—	0.480	0.358	0.560	4	13.50	17/32	H5	7812105	—
	5/8	18	4.331	0.906	—	0.480	0.358	0.560	4	14.50	37/64	H5	—	7812113
3/4		10	4.921	1.181	—	0.590	0.440	0.690	4	16.50	21/32	H5	7812106	—
	3/4	16	4.921	1.181	—	0.590	0.440	0.690	4	17.50	11/16	H5	—	7812114

Note: Sizes up to 3/8" have male centers on both ends • Sizes over 3/8" have female centers on both ends.

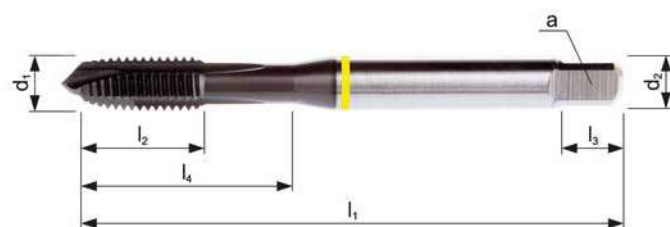
DIN ANSI Machine Tap, Yellow Shark for Low Alloy Steels

E625 Designed for through hole tapping in low Alloy Steel applications.

E765 Premium HSCo Powder Metal substrate with TiAlN-Top Coating combine to offer superior abrasion resistance, higher operating speeds, improved thread quality, reduced cycle times and longer tool life.

■ 1.1 1.2 1.3 6.1 6.3

● 1.4 1.5 6.2



E625	E765
M	MF
DIN ANSI	DIN ANSI
6H	6H
2.5XD	2.5XD
HSS-E PM	HSS-E PM
B 3.5-5	B 3.5-5
TiAlN Top	TiAlN Top
M4 - M24	M8 - M18

Pack Qty = 1 pc

M	MF	P mm	l ₁ mm	l ₂ mm	l ₄ mm	d ₂ Ø Inch	a Inch	l ₃ mm	No. of flutes	↔	↔	Limits	E625	E765
4		0.70	63	12	21	0.168	0.129	6	3	3.30	N30	D4	7350492	—
5		0.80	70	13	25	0.194	0.150	6	3	4.20	N19	D4	7350493	—
6		1.00	80	15	30	0.255	0.189	8	3	5.00	N9	D5	7350494	—
	8	1.00	90	18	35	0.318	0.236	10	3	7.00	J	D5	—	7350503
8		1.25	90	18	35	0.318	0.236	10	3	6.80	H	D5	7350495	—
	10	1.25	100	20	39	0.381	0.284	11	3	8.80	11/32	D6	—	7350504
10		1.50	100	20	39	0.381	0.284	11	3	8.50	Q	D6	7350496	—
	12	1.25	100	21	—	0.367	0.273	11	3	10.80	27/64	D6	—	7350505
	12	1.50	100	21	—	0.367	0.273	11	3	10.50	Z	D6	—	7350506
12		1.75	110	23	—	0.367	0.273	11	3	10.30	Y	D6	7350497	—
	14	1.50	100	21	—	0.429	0.320	13	3	12.50	31/64	D7	—	7350507
14		2.00	110	23	—	0.429	0.320	13	3	12.00	15/32	D7	7350498	—
	16	1.50	100	21	—	0.480	0.358	14	3	14.50	9/16	D7	—	7350508
16		2.00	110	23	—	0.480	0.358	14	3	14.00	35/64	D7	7350499	—
	18	1.50	110	24	—	0.542	0.404	16	3	16.50	41/64	D7	—	7350509
18		2.50	125	30	—	0.542	0.404	16	3	15.50	39/64	D7	7350500	—
20		2.50	140	30	—	0.652	0.487	18	3	17.50	11/16	D7	7350501	—
24		3.00	160	38	—	0.760	0.567	19	4	21.00	53/64	D8	7350502	—

Note: Sizes up to M10 have male centers on both ends • Sizes over M10 have female centers on both ends.

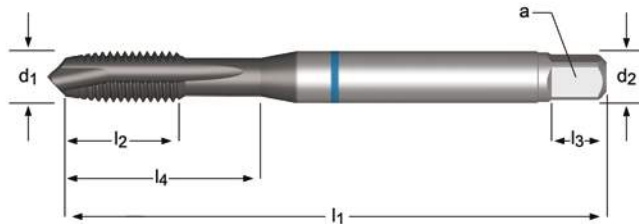
DIN ANSI Machine Tap, Blue Shark for Stainless Steel

E629 Designed for superior performance through hole tapping in a wide range of Stainless Steel types. Premium HSCo Powder Metal substrate with Super-B (TiAlN+WC/C) Coating combined with an additional edge treatment to offer improved thread quality and longer tool life. Available in both 2B and 3B Class of Fit to cover a wide range of applications.

E769

■ **2.1 2.2 2.3**

● **1.2 1.3 1.4 1.5**



Pack Qty = 1 pc

M	MF	P mm	l ₁ mm	l ₂ mm	l ₄ mm	d ₂ Ø Inch	□ a Inch	l ₃ mm	No. of flutes	↔	↔	Limits	E629	E769
4		0.70	63	12	21	0.168	0.129	6	3	3.30	N30	D4	7350317	—
5		0.80	70	13	25	0.194	0.150	6	3	4.20	N19	D4	7350318	—
6		1.00	80	15	30	0.255	0.189	8	3	5.00	N9	D5	7350319	—
	8	1.00	90	18	35	0.318	0.236	10	3	7.00	J	D5	—	7350328
8		1.25	90	18	35	0.318	0.236	10	3	6.80	H	D5	7350320	—
	10	1.25	100	20	39	0.381	0.284	11	3	8.80	11/32	D6	—	7350329
10		1.50	100	20	39	0.381	0.284	11	3	8.50	Q	D6	7350321	—
	12	1.25	100	21	—	0.367	0.273	11	4	10.80	27/64	D6	—	7350330
	12	1.50	100	21	—	0.367	0.273	11	4	10.50	Z	D6	—	7350331
12		1.75	110	23	—	0.367	0.273	11	4	10.30	Y	D6	7350322	—
	14	1.50	100	21	—	0.429	0.320	13	4	12.50	31/64	D7	—	7350332
14		2.00	110	23	—	0.429	0.320	13	4	12.00	15/32	D7	7350323	—
	16	1.50	100	21	—	0.480	0.358	14	4	14.50	9/16	D7	—	7350333
16		2.00	110	23	—	0.480	0.358	14	4	14.00	35/64	D7	7350324	—
	18	1.50	110	24	—	0.542	0.404	16	4	16.50	41/64	D7	—	7350334
18		2.50	125	30	—	0.542	0.404	16	4	15.50	39/64	D7	7350325	—
20		2.50	140	30	—	0.652	0.487	18	4	17.50	11/16	D7	7350326	—
24		3.00	160	38	—	0.760	0.567	19	4	21.00	53/64	D8	7350327	—

Note: Sizes up to M10 have male centers on both ends • Sizes over M10 have female centers on both ends.

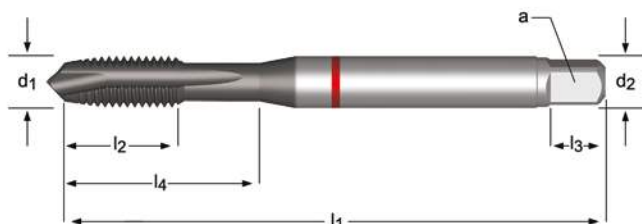
E629	E769
M	MF
DIN ANSI	DIN ANSI
6H	6H
2.5XD	2.5XD
HSS-E PM	HSS-E PM
B 3.5-5	B 3.5-5
Super B	Super B
M4 – M24	M8 – M18

DIN ANSI Machine Tap, Red Shark for Alloy Steels

E627 Designed for high performance through hole tapping in most medium Alloy Steels. The TiAIN-Top Coating combined with an additional edge treatment provides excellent performance and consistency in high production applications.

E767

- 1.4 1.5
- 1.6 4.2 5.2



Pack Qty = 1 pc

E627	E767
M	MF
DIN ANSI	DIN ANSI
6H	6H
2.5XD	2.5XD
HSS-E PM	HSS-E PM
B 3.5-5	B 3.5-5
TiAIN Top	TiAIN Top
M3 - M24	M8 - M14

M	MF	P mm	l ₁ mm	l ₂ mm	l ₄ mm	d ₂ Ø Inch	□ a Inch	l ₃ mm	No. of flutes			Limits	E627	E767
3		0.50	56	9	18	0.141	0.108	5	3	2.50	N40	D3	7350414	—
4		0.70	63	12	21	0.168	0.129	6	3	3.30	N30	D4	7350415	—
5		0.80	70	13	25	0.194	0.150	6	3	4.20	N19	D4	7350416	—
6		1.00	80	15	30	0.255	0.189	8	3	5.00	N9	D5	7350417	—
	8	1.00	90	18	35	0.318	0.236	10	3	7.00	J	D5	—	7350426
8		1.25	90	18	35	0.318	0.236	10	3	6.80	H	D5	7350418	—
	10	1.25	100	20	39	0.381	0.284	11	3	8.80	11/32	D6	—	7350427
10		1.50	100	20	39	0.381	0.284	11	3	8.50	Q	D6	7350419	—
	12	1.50	100	21	—	0.367	0.273	11	3	10.50	Z	D6	—	7350428
12		1.75	110	23	—	0.367	0.273	11	3	10.30	Y	D6	7350420	—
	14	1.50	100	21	—	0.429	0.320	13	3	12.50	31/64	D7	—	7350429
14		2.00	110	23	—	0.429	0.320	13	3	12.00	15/32	D7	7350421	—
16		2.00	110	23	—	0.480	0.358	14	3	14.00	35/64	D7	7350422	—
18		2.50	125	30	—	0.542	0.404	16	4	15.50	39/64	D7	7350423	—
20		2.50	140	30	—	0.652	0.487	18	4	17.50	11/16	D7	7350424	—
24		3.00	160	38	—	0.760	0.567	19	4	21.00	53/64	D8	7350425	—

Note: Sizes up to M10 have male centers on both ends • Sizes over M10 have female centers on both ends.

DIN-ANSI Machine Tap Black Shark for Hard Alloys, Plug Style

E817 Designed for high performance through hole tapping in high strength and heat resistant work-materials with hardness up to 45HRC. The TiAlN-Top coating combined with geometry that significantly increases cutting edge strength, provides excellent performance and consistency in hard and difficult to machine materials.

E917

- 1.6 4.3 5.3
- 1.5 1.7 4.2 5.2



E816	E916
M	MF
DIN ANSI	DIN ANSI
6H	6H
2.5XD	2.5XD
HSS-E PM	HSS-E PM
B 3.5-5	B 3.5-5
TiAlN Top	TiAlN Top
M3-M12	M8-M12

Pack Qty = 1 pc

M	MF	P mm	l ₁ mm	l ₂ mm	l ₄ mm	d ₂ Ø Inch	□ a Inch	l ₃ mm	No. of flutes			Limits	E817	E917
3		0.50	63	15	22	0.168	0.129	6	3	2.50	N40	D3	7812115	—
4		0.70	70	16	28	0.194	0.150	6	3	3.30	N30	D4	7812116	—
5		0.80	80	17	26	0.255	0.189	8	3	4.20	N19	D4	7812117	—
6		1.00	90	21	35	0.318	0.236	10	3	5.00	N9	D5	7812118	—
8		1.25	100	23	39	0.381	0.284	11	3	6.80	H	D5	7812119	—
	8	1.00	100	23	39	0.381	0.284	11	3	7.00	J	D5	—	7812122
10		1.50	100	20	38	0.381	0.284	11	3	8.50	Q	D6	7812120	—
	10	1.25	100	20	38	0.381	0.284	11	3	8.80	11/32	D5	—	7812123
12		1.75	110	23	-	0.367	0.273	11	4	10.30	Y	D6	7812121	—
	12	1.25	110	23	-	0.367	0.273	11	4	10.80	27/64	D5	—	7812124
	12	1.50	110	23	-	0.367	0.273	11	4	10.50	Z	D5	—	7812125

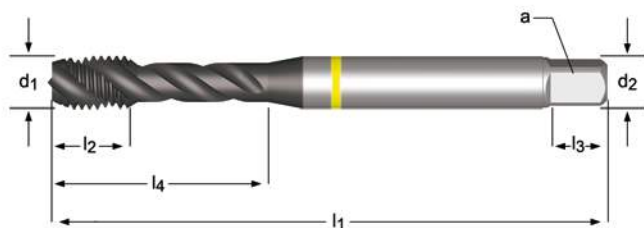
Note: Sizes up to M10 have male centers on both ends • Sizes over M10 have female centers on both ends.

DIN ANSI Machine Tap, Yellow for Low Alloy Steels

E808 Designed for blind hole tapping in low Alloy Steel applications. Premium HSCo Powder Metal substrate with TiAlN-Top Coating combined with a special 40° Spiral Flute geometry prevents nesting and reduces the risk of re-cutting chips on reversal allowing taps to operate at higher speeds while providing improved thread quality.

E908

- 1.1 1.2 1.3 6.1 6.3
 ● 1.4 1.5 6.2



Pack Qty = 1 pc

UNC	UNF	TPI	l_1 Inch	l_2 Inch	l_4 Inch	d_2 Ø Inch	$\square$ a Inch	l_3 Inch	No. of flutes			Limits	E808	E908
4		40	2.205	0.256	0.709	0.141	0.108	0.236	3	2.35	N43	H2	7350510	—
6		32	2.205	0.256	0.787	0.141	0.108	0.190	3	2.85	N36	H2	7350511	—
8		32	2.480	0.276	0.827	0.168	0.129	0.250	3	3.50	N29	H3	7350512	—
10		24	2.756	0.315	1.102	0.194	0.150	0.250	3	3.90	N25	H3	7350513	—
	10	32	2.756	0.315	1.102	0.194	0.150	0.250	3	4.10	N21	H3	—	7350523
1/4		20	3.150	0.394	0.984	0.255	0.189	0.310	3	5.10	N7	H5	7350514	—
	1/4	28	3.150	0.394	0.984	0.255	0.189	0.310	3	5.50	N3	H4	—	7350524
5/16		18	3.543	0.472	1.339	0.318	0.236	0.380	3	6.60	F	H5	7350515	—
	5/16	24	3.543	0.472	1.339	0.318	0.236	0.380	3	6.90	I	H4	—	7350525
3/8		16	3.937	0.591	1.535	0.381	0.284	0.440	3	8.00	5/16	H4	7350516	—
	3/8	24	3.543	0.591	1.476	0.381	0.284	0.440	3	8.50	Q	H4	—	7350526
7/16		14	3.937	0.591	—	0.323	0.240	0.410	3	9.40	U	H5	7350517	—
	7/16	20	3.937	0.591	—	0.323	0.240	0.410	3	9.90	25/64	H5	—	7350527
1/2		13	4.331	0.709	—	0.367	0.273	0.440	3	10.80	27/64	H5	7350518	—
	1/2	20	3.937	0.709	—	0.367	0.273	0.440	3	11.50	29/64	H5	—	7350528
5/8		11	4.331	0.787	—	0.480	0.358	0.560	4	13.50	17/32	H5	7350519	—
	5/8	18	3.937	0.591	—	0.480	0.358	0.560	4	14.50	37/64	H5	—	7350529
3/4		10	4.921	0.984	—	0.590	0.439	0.690	4	16.50	21/32	H5	7350520	—
	3/4	16	4.331	0.984	—	0.590	0.439	0.690	4	17.50	11/16	H5	—	7350530
7/8		9	5.512	0.984	—	0.697	0.520	0.750	4	19.50	49/64	H6	7350521	—
	7/8	14	4.921	0.984	—	0.697	0.520	0.750	4	20.40	13/16	H6	—	7350531
1"		8	6.299	1.181	—	0.800	0.597	0.810	4	22.25	7/8	H6	7350522	—
	1"	12	5.512	1.063	—	0.800	0.597	0.810	4	23.25	59/64	H6	—	7350532

E808	E908
UNC	UNF
DIN ANSI	DIN ANSI
2B	2B
2XD	2XD
HSS-E PM	HSS-E PM
C 2-3	C 2-3
λ 40°	λ 40°
TiAlN Top	TiAlN Top
No.4 - 1"	No.10 - 1"

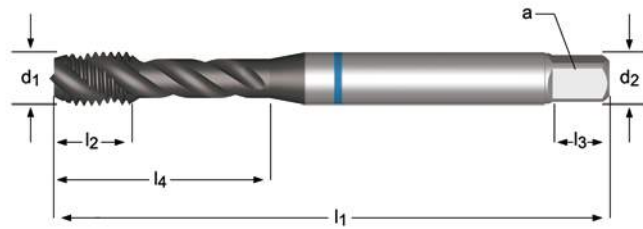
Note: Sizes up to 3/8" have male centers on both ends • Sizes over 3/8" have female centers on both ends.

DIN ANSI Machine Tap, Blue Shark for Stainless Steel

E812 Designed for superior performance blind hole tapping in a wide range of Stainless Steel types. Premium HSCo Powder Metal substrate with Super-B (TiAlN+WC/C) Coating combined with an additional edge treatment and a 40° Flute angle facilitates better chip evacuation offering improved thread quality and longer tool life. Available in both 2B and 3B Class of Fit to cover a wide range of applications.

E912

- 2.1 2.2 2.3
- 1.2 1.3 1.4 1.5



Pack Qty = 1 pc

UNC	UNF	TPI	l_1 Inch	l_2 Inch	l_4 Inch	d_2 Ø Inch	$\square$ a Inch	l_3 Inch	No. of flutes			Limits	E812	E912
4		40	2.205	0.256	0.709	0.141	0.108	0.236	3	2.35	N43	H2	7350335	—
6		32	2.205	0.256	0.787	0.141	0.108	0.190	3	2.80	N36	H3	7350336	—
8		32	2.480	0.276	0.827	0.168	0.129	0.250	3	3.50	N29	H3	7350337	—
10		24	2.756	0.315	1.102	0.194	0.150	0.250	3	3.90	N25	H3	7350338	—
	10	32	2.756	0.315	1.102	0.194	0.150	0.250	3	4.10	N21	H3	—	7350356
1/4		20	3.150	0.394	0.984	0.255	0.189	0.310	3	5.10	N7	H5	7350339	—
1/4		20	3.150	0.394	0.984	0.255	0.189	0.310	3	5.10	N7	H3	7350340	—
	1/4	28	3.150	0.394	0.984	0.255	0.189	0.310	3	5.50	N3	H5	—	7350357
	1/4	28	3.150	0.394	0.984	0.255	0.189	0.310	3	5.50	N3	H3	—	7350358
5/16		18	3.543	0.472	1.339	0.318	0.236	0.380	3	6.60	F	H5	7350341	—
5/16		18	3.543	0.472	1.339	0.318	0.236	0.380	3	6.60	F	H3	7350342	—
	5/16	24	3.543	0.472	1.339	0.318	0.236	0.380	3	6.90	I	H4	—	7350359
	5/16	24	3.543	0.472	1.339	0.318	0.236	0.380	3	6.90	I	H3	—	7350360
3/8		16	3.937	0.591	1.535	0.381	0.284	0.440	3	8.00	5/16	H5	7350343	—
3/8		16	3.937	0.591	1.535	0.381	0.284	0.440	3	8.00	5/16	H3	7350344	—
	3/8	24	3.543	0.591	1.476	0.318	0.284	0.440	3	8.50	Q	H4	—	7350361
	3/8	24	3.543	0.591	1.476	0.318	0.284	0.440	3	8.50	Q	H3	—	7350362
7/16		14	3.937	0.591	—	0.323	0.240	0.410	4	9.40	U	H5	7350345	—
	7/16	20	3.937	0.591	—	0.323	0.240	0.410	4	9.90	25/64	H5	—	7350363
1/2		13	4.331	0.709	—	0.367	0.273	0.440	4	10.70	27/64	H5	7350346	—
1/2		13	4.331	0.709	—	0.367	0.273	0.440	4	10.70	27/64	H3	7350347	—
	1/2	20	3.937	0.709	—	0.367	0.273	0.440	4	11.50	29/64	H5	—	7350364
	1/2	20	3.937	0.709	—	0.367	0.273	0.440	4	11.50	29/64	H3	—	7350365
5/8		11	4.331	0.787	—	0.480	0.358	0.560	4	13.50	17/32	H5	7350348	—
5/8		11	4.331	0.787	—	0.480	0.358	0.560	4	13.50	17/32	H3	7350349	—
	5/8	18	3.937	0.591	—	0.480	0.358	0.560	4	14.50	37/64	H5	—	7350366
	5/8	18	3.937	0.591	—	0.480	0.358	0.560	4	14.50	37/64	H3	—	7350367

E812

UNC

DIN ANSI

2B 3B

2.5XD

HSS-E PM

C 2-3

λ40°

TiAlN Top

No.4-1"

E912

UNF

DIN ANSI

2B 3B

2.5XD

HSS-E PM

C 2-3

λ40°

TiAlN Top

No.10-1"

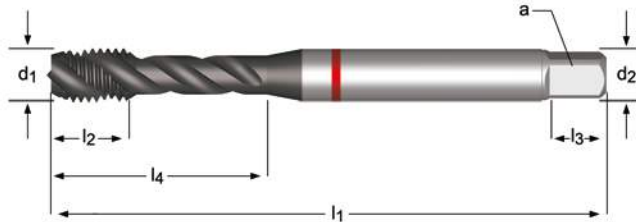
UNC	UNF	TPI	l_1 Inch	l_2 Inch	l_4 Inch	d_2 Ø Inch	a Inch	l_3 Inch	No. of flutes			Limits	E812	E912
3/4		10	4.921	0.984	—	0.590	0.439	0.690	4	16.50	21/32	H5	7350350	—
3/4		10	4.921	0.984	—	0.590	0.439	0.690	4	16.50	21/32	H3	7350351	—
	3/4	16	4.331	0.984	—	0.590	0.439	0.690	4	17.50	11/16	H5	—	7350368
	3/4	16	4.331	0.984	—	0.590	0.439	0.690	4	17.50	11/16	H3	—	7350369
7/8		9	5.512	0.984	—	0.697	0.520	0.750	4	19.50	49/64	H6	7350352	—
7/8		9	5.512	0.984	—	0.697	0.520	0.750	4	19.50	49/64	H4	7350353	—
	7/8	14	4.921	0.984	—	0.697	0.520	0.750	4	20.40	13/16	H6	—	7350370
	7/8	14	4.921	0.984	—	0.697	0.520	0.750	4	20.40	13/16	H4	—	7350371
1"		8	6.299	1.181	—	0.800	0.597	0.810	4	22.25	7/8	H6	7350354	—
1"		8	6.299	1.181	—	0.800	0.597	0.810	4	22.25	7/8	H4	7350355	—
	1"	12	5.512	1.063	—	0.800	0.597	0.810	4	23.25	59/64	H6	—	7350372
	1"	12	5.512	1.063	—	0.800	0.597	0.810	4	23.25	59/64	H4	—	7350373

Note: Sizes up to 3/8" have male centers on both ends • Sizes over 3/8" have female centers on both ends.

DIN ANSI Machine Tap, Red Shark for Alloy Steels

E810 Designed for high performance blind hole tapping in most medium Alloy Steels.
E910 The TiAlN-Top Coating combined with a special 45° Flute Geometry and an additional edge treatment provides excellent performance and consistency in high production applications. The back taper built into this design further facilitates chip evacuation and reduces torque when the tap reverses. It is recommended to use a toolholder with minimal float or soft start.

- 1.4 1.5
- 1.6 4.2 5.2



Pack Qty = 1 pc

UNC	UNF	TPI	l_1 Inch	l_2 Inch	l_4 Inch	d_2 Ø Inch	$\square$ a Inch	l_3 Inch	No. of flutes			Limits	E810	E910
4		40	2.205	0.256	0.709	0.141	0.108	0.236	3	2.35	N43	H2	7350430	—
6		32	2.205	0.256	0.787	0.141	0.108	0.190	3	2.85	N36	H2	7350431	—
8		32	2.480	0.276	0.827	0.168	0.129	0.250	3	3.50	N29	H3	7350432	—
10		24	2.756	0.315	1.102	0.194	0.150	0.250	3	3.90	N25	H3	7350433	—
	10	32	2.756	0.315	1.102	0.194	0.150	0.250	3	4.10	N21	H3	—	7350443
1/4		20	3.150	0.394	0.984	0.255	0.189	0.310	3	5.10	N7	H5	7350434	—
	1/4	28	3.150	0.394	0.984	0.255	0.189	0.310	3	5.50	N3	H4	—	7350444
5/16		18	3.543	0.472	1.339	0.318	0.236	0.380	3	6.60	F	H5	7350435	—
	5/16	24	3.543	0.472	1.339	0.318	0.236	0.380	3	6.9	I	H4	—	7350445
3/8		16	3.937	0.591	1.535	0.381	0.284	0.440	3	8.00	5/16	H4	7350436	—
	3/8	24	3.543	0.591	1.476	0.381	0.284	0.440	3	8.50	Q	H4	—	7350446
7/16		14	3.937	0.591	—	0.323	0.240	0.410	3	9.40	U	H5	7350437	—
	7/16	20	3.937	0.591	—	0.323	0.240	0.410	3	9.90	25/64	H5	—	7350447
1/2		13	4.331	0.709	—	0.367	0.273	0.440	3	10.80	27/64	H5	7350438	—
	1/2	20	3.937	0.709	—	0.367	0.273	0.440	3	11.50	29/64	H5	—	7350448
5/8		11	4.331	0.787	—	0.480	0.358	0.560	4	13.50	17/32	H5	7350439	—
	5/8	18	3.937	0.591	—	0.480	0.358	0.560	4	14.50	37/64	H5	—	7350449
3/4		10	4.921	0.984	—	0.590	0.439	0.690	4	16.50	21/32	H5	7350440	—
	3/4	16	4.331	0.984	—	0.590	0.439	0.690	4	17.50	11/16	H5	—	7350450
7/8		9	5.512	0.984	—	0.697	0.520	0.750	4	19.50	49/64	H6	7350441	—
	7/8	14	4.921	0.984	—	0.697	0.520	0.750	4	20.40	13/16	H6	—	7350451
1"		8	6.299	1.181	—	0.800	0.597	0.810	4	22.25	7/8	H6	7350442	—
	1"	12	5.512	1.063	—	0.800	0.597	0.810	4	23.25	59/64	H6	—	7350452

Note: Sizes up to 3/8" have male centers on both ends • Sizes over 3/8" have female centers on both ends.

E810	E910
UNC	UNF
DIN ANSI	DIN ANSI
2B	2B
2.5XD	2.5XD
HSS-E PM	HSS-E PM
C 2-3	C 2-3
λ 45°	λ 45°
TiAlN Top	TiAlN Top
No.4-1"	No.10-1"

DIN-ANSI Machine Tap Black Shark for Hard Alloys, Spiral Flute

E805 Designed for high performance blind hole tapping in high strength and heat-resistant work-materials with hardness up to 45HRC. The TiAlN-Top coating combined with geometry what significantly increases cutting edge strength, provides excellent performance and consistency in hard and difficult to machine materials.

E905

- 1.6 4.3 5.3
- 1.5 1.7 4.2 5.2



Pack Qty = 1 pc

UNC	UNF	TPI	l_1 Inch	l_2 Inch	l_4 Inch	d_2 Inch	$\square$ Inch	l_3 Inch	No. of flutes			Limits	E805	E905
4		40	2.205	0.472	0.827	0.141	0.108	0.190	3	2.35	N43	H2	7812126	—
6		32	2.480	0.551	0.866	0.168	0.129	0.250	3	2.85	N36	H2	7812127	—
8		32	2.756	0.610	1.102	0.194	0.150	0.250	3	3.50	N29	H3	7812128	—
10		24	3.150	0.669	1.024	0.255	0.189	0.310	3	3.90	N25	H3	7812129	—
	10	32	3.150	0.669	1.024	0.255	0.189	0.310	3	4.10	N21	H3	—	7812137
1/4		20	3.543	0.807	1.378	0.318	0.236	0.380	3	5.10	N7	H5	7812130	—
	1/4	28	3.543	0.807	1.339	0.318	0.236	0.380	3	5.50	N3	H4	—	7812138
5/16		18	3.937	0.906	1.535	0.381	0.236	0.440	3	6.60	F	H5	7812131	—
	5/16	24	3.937	0.906	1.535	0.381	0.284	0.440	3	6.90	I	H4	—	7812139
3/8		16	3.937	0.787	1.535	0.381	0.236	0.440	3	8.00	5/16	H5	7812132	—
	3/8	24	3.937	0.787	1.535	0.381	0.284	0.440	3	8.50	Q	H4	—	7812140
7/16		14	3.937	0.787	-	0.323	0.240	0.410	4	9.40	U	H5	7812133	—
	7/16	20	3.937	0.787	-	0.325	0.240	0.440	4	9.90	25/64	H5	—	7812141
1/2		13	4.331	0.906	-	0.367	0.273	0.440	4	10.80	27/64	H5	7812134	—
	1/2	20	4.331	0.906	-	0.367	0.273	0.440	4	11.50	29/64	H5	—	7812142
5/8		11	4.331	0.906	-	0.480	0.358	0.560	4	13.50	17/32	H5	7812135	—
	5/8	18	4.331	0.906	-	0.480	0.358	0.560	4	14.50	37/64	H5	—	7812143
3/4		10	4.921	1.181	-	0.590	0.440	0.690	4	16.50	21/32	H5	7812136	—
	3/4	16	4.921	1.181	-	0.590	0.440	0.690	4	17.50	11/16	H5	—	7812144

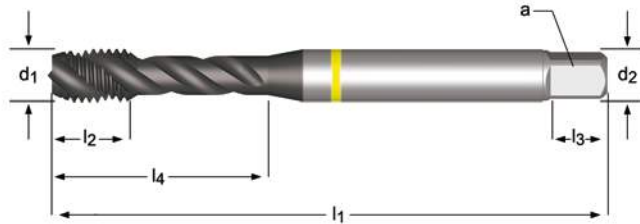
Note: Sizes up to 3/8" have male centers on both ends • Sizes over 3/8" have female centers on both ends.

DIN ANSI Machine Tap, Yellow for Low Alloy Steels

E624 Designed for blind hole tapping in low Alloy Steel applications. Premium HSCo Powder Metal substrate with TiAlN-Top Coating combined with a special 40° Spiral Flute geometry prevents nesting and reduces the risk of re-cutting chips on reversal allowing taps to operate at higher speeds while providing improved thread quality.

E764

- 1.1 1.2 1.3 6.1 6.3
- 1.4 1.5 6.2



Pack Qty = 1 pc

M	MF	P mm	l ₁ mm	l ₂ mm	l ₄ mm	d ₂ Ø Inch	a Inch	l ₃ mm	No. of flutes			Limits	E624	E764
4		0.70	63	7	21	0.168	0.129	6	3	3.30	N30	D4	7350533	—
5		0.80	70	8	25	0.194	0.150	6	3	4.20	N19	D4	7350534	—
6		1.00	80	10	30	0.255	0.189	8	3	5.00	N9	D5	7350535	—
	8	1.00	90	13	35	0.318	0.236	10	3	7.00	J	D5	—	7350544
8		1.25	90	13	35	0.318	0.236	10	3	6.80	H	D5	7350536	—
	10	1.25	100	15	39	0.381	0.284	11	3	8.80	11/32	D6	—	7350545
10		1.50	100	15	39	0.381	0.284	11	3	8.50	Q	D6	7350537	—
	12	1.25	100	15	—	0.367	0.273	11	3	10.80	27/64	D6	—	7350546
	12	1.50	100	15	—	0.367	0.273	11	3	10.50	Z	D6	—	7350547
12		1.75	110	18	—	0.367	0.273	11	3	10.30	Y	D6	7350538	—
	14	1.50	100	15	—	0.429	0.320	13	3	12.50	31/64	D7	—	7350548
14		2.00	110	20	—	0.429	0.320	13	3	12.00	15/32	D7	7350539	—
	16	1.50	100	15	—	0.480	0.358	14	4	14.50	9/16	D7	—	7350549
16		2.00	110	20	—	0.480	0.358	14	4	14.00	35/64	D7	7350540	—
	18	1.50	110	17	—	0.542	0.404	16	4	16.50	41/64	D7	—	7350550
18		2.50	125	25	—	0.542	0.404	16	4	15.50	39/64	D7	7350541	—
20		2.50	140	25	—	0.652	0.487	18	4	17.50	11/16	D7	7350542	—
24		3.00	160	30	—	0.760	0.567	19	4	21.00	53/64	D8	7350543	—

Note: Sizes up to M10 have male centers on both ends • Sizes over M10 have female centers on both ends.

E624	E764
M	MF
DIN ANSI	DIN ANSI
6H	6H
2XD	2XD
HSS-E PM	HSS-E PM
C 2-3	C 2-3
λ 40°	λ 40°
TiAlN Top	TiAlN Top
M4 – M24	M8 – M18

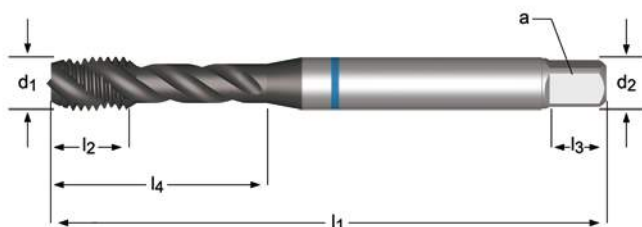
DIN ANSI Machine Tap, Blue Shark for Stainless Steel

E628 Designed for superior performance blind hole tapping in a wide range of Stainless Steel types. Premium HSCo Powder Metal substrate with Super-B (TiAlN+WC/C) Coating combined with an additional edge treatment and a 40° Flute angle facilitates better chip evacuation offering improved thread quality and longer tool life. Available in both 2B and 3B Class of Fit to cover a wide range of applications.

E768

■ 2.1 2.2 2.3

● 1.2 1.3 1.4 1.5



E628

M

DIN
ANSI

6H



2.5XD

HSS-E
PM

C
2-3



TiAlN Top



M4 - M24

E768

MF

DIN
ANSI

6H



2.5XD

HSS-E
PM

C
2-3



TiAlN Top



M8 - M18

Pack Qty = 1 pc

M	MF	P mm	l ₁ mm	l ₂ mm	l ₄ mm	d ₂ Ø Inch	□ a Inch	l ₃ mm	No. of flutes	↔	↔	Limits	E628	E768
4		0.70	63	7	21	0.168	0.129	6	3	3.30	N30	D4	7350374	—
5		0.80	70	8	25	0.194	0.150	6	3	4.20	N19	D4	7350375	—
6		1.00	80	10	30	0.255	0.189	8	3	5.00	N9	D5	7350376	—
	8	1.00	90	13	35	0.318	0.236	10	3	7.00	J	D5	—	7350385
8		1.25	90	13	35	0.318	0.236	10	3	6.80	H	D5	7350377	—
	10	1.25	100	15	39	0.381	0.284	11	3	8.80	11/32	D6	—	7350386
10		1.50	100	15	39	0.381	0.284	11	3	8.50	Q	D6	7350378	—
	12	1.50	100	15	—	0.367	0.273	11	4	10.50	Z	D6	—	7350387
12		1.75	110	18	—	0.367	0.273	11	4	10.30	Y	D6	7350379	—
	14	1.50	100	15	—	0.429	0.320	13	4	12.50	31/64	D7	—	7350388
14		2.00	110	20	—	0.429	0.320	13	4	12.00	15/32	D7	7350380	—
	16	1.50	100	15	—	0.480	0.358	14	4	14.50	9/16	D7	—	7350389
16		2.00	110	20	—	0.480	0.358	14	4	14.00	35/64	D7	7350381	—
	18	1.50	110	17	—	0.542	0.404	16	4	16.50	41/64	D7	—	7350390
18		2.50	125	25	—	0.542	0.404	16	4	15.50	39/64	D7	7350382	—
20		2.50	140	25	—	0.652	0.487	18	4	17.50	11/16	D7	7350383	—
24		3.00	160	30	—	0.760	0.567	19	4	21.00	53/64	D8	7350384	—

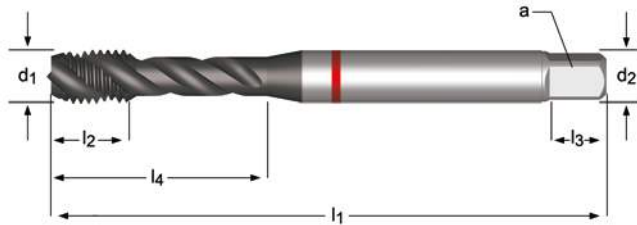
Note: Sizes up to M10 have male centers on both ends • Sizes over M10 have female centers on both ends.

DIN ANSI Machine Tap, Red Shark for Alloy Steels

E626 Designed for high performance blind hole tapping in most medium Alloy Steels. The TiAlN-Top Coating combined with a special 45° Flute Geometry and an additional edge treatment provides excellent performance and consistency in high production applications. The back taper built into this design further facilitates chip evacuation and reduces torque when the tap reverses. It is recommended to use a toolholder with minimal float or soft start.

E766

- 1.4 1.5
- 1.6 4.2 5.2



E626	E766
M	MF
DIN ANSI	DIN ANSI
6H	6H
2.5XD	2.5XD
HSS-E PM	HSS-E PM
C 2-3	C 2-3
M3 – M24	M8 – M14

Pack Qty = 1 pc

M	MF	P mm	l ₁ mm	l ₂ mm	l ₄ mm	d ₂ Ø Inch	a Inch	l ₃ mm	No. of flutes			Limits	E626	E766
3		0.50	56	6	18	0.141	0.108	5	3	2.50	N40	D3	7350453	—
4		0.70	63	7	21	0.168	0.129	6	3	3.30	N30	D4	7350454	—
5		0.80	70	8	25	0.194	0.150	6	3	4.20	N19	D4	7350455	—
6		1.00	80	10	30	0.255	0.189	8	3	5.00	N9	D5	7350456	—
	8	1.00	90	13	35	0.318	0.236	10	3	7.00	J	D5	—	7350465
8		1.25	90	13	35	0.318	0.236	10	3	6.80	H	D5	7350457	—
	10	1.25	100	15	39	0.381	0.284	11	3	8.80	11/32	D6	—	7350466
10		1.50	100	15	39	0.381	0.284	11	3	8.50	Q	D6	7350458	—
	12	1.25	100	15	—	0.367	0.273	11	3	10.80	27/64	D6	—	7350467
12		1.75	110	18	—	0.367	0.273	11	3	10.30	Y	D6	7350459	—
	14	1.50	100	15	—	0.429	0.320	13	3	12.50	31/64	D7	—	7350468
14		2.00	110	20	—	0.429	0.320	13	3	12.00	15/32	D7	7350460	—
16		2.00	110	20	—	0.480	0.358	14	4	14.00	35/64	D7	7350461	—
18		2.50	125	25	—	0.542	0.404	16	4	15.50	39/64	D7	7350462	—
20		2.50	140	25	—	0.652	0.487	18	4	17.50	11/16	D7	7350463	—
24		3.00	160	30	—	0.760	0.567	19	4	21.00	53/64	D8	7350464	—

Note: Sizes up to M10 have male centers on both ends • Sizes over M10 have female centers on both ends.

DIN-ANSI Machine Tap Black Shark for Hard Alloys, Plug Style

E806 Designed for high performance blind hole tapping in high strength and heat-resistant work-materials with hardness up to 45HRC. The TiAlN-Top coating combined with geometry what significantly increases cutting edge strength, provides excellent performance and consistency in hard and difficult to machine materials.

E906

- 1.6 4.3 5.3
- 1.5 1.7 4.2 5.2



E806	E906
M	MF
DIN ANSI	DIN ANSI
6H	6H
1.5XD	1.5XD
HSS-E PM	HSS-E PM
C 2-3	C 2-3
λ 15°	λ 15°
TiAlN Top	TiAlN Top
M3-M12	M8-M12

Pack Qty = 1 pc

M	MF	P mm	l ₁ mm	l ₂ mm	l ₄ mm	d ₂ Ø Inch	□ a Inch	l ₃ mm	No. of flutes			Limits	E806	E906
3		0.50	63	15	22	0.168	0.129	6	3	2.50	N40	D3	7812145	—
4		0.70	70	16	28	0.194	0.150	6	3	3.30	N30	D4	7812146	—
5		0.80	80	17	26	0.255	0.189	8	3	4.20	N19	D4	7812147	—
6		1.00	90	21	35	0.318	0.236	10	3	5.00	N9	D5	7812148	—
8		1.25	100	23	39	0.381	0.284	11	3	6.80	H	D5	7812149	—
	8	1.00	100	23	39	0.381	0.284	11	3	7.00	J	D5	—	7812152
10		1.50	100	20	38	0.381	0.284	11	3	8.50	Q	D6	7812150	—
12		1.75	110	23	-	0.367	0.273	11	4	10.30	Y	D6	7812151	—
	10	1.25	100	20	38	0.381	0.284	11	3	8.80	11/32	D5	—	7812153
	12	1.25	110	23	-	0.367	0.273	11	4	10.80	27/64	D5	—	7812155
	12	1.50	110	23	-	0.367	0.273	11	4	10.50	Z	D5	—	7812154

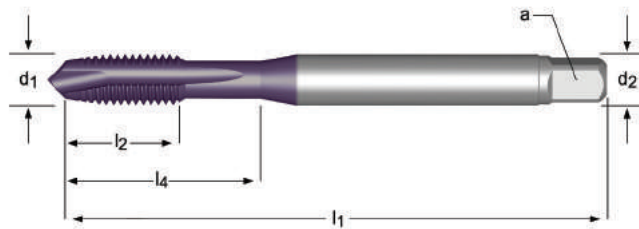
Note: Sizes up to M10 have male centers on both ends • Sizes over M10 have female centers on both ends.

MXP Multi-Application, Plug Chamfer

1672AP Designed for through hole tapping in a variety of materials with a hardness up to 36 Rc. The premium substrate and TiCN coating combine to offer superior abrasion resistance, higher operating speeds, improved thread quality, reduced cycle times, and longer tool life.

1674 Coolant thru design allows higher tapping speeds and eliminates the problems associated with inadequate coolant in horizontal or deep hole applications.

1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3 2.4 4.1 4.2 5.1 5.2 6.1 6.2
6.3 7.1 7.2 7.3 7.4



1672AP		1674 Coolant Through	
UNC	UNF	UNC	UNF
DIN ANSI		DIN ANSI	
2B		2B	
HSS PM		HSS PM	
No. 4 - 1"		1/4 - 1"	

			l_1	l_2	l_4	d_2	$\square$	# of Flutes	Limits	Pack Qty	1672AP	1674
UNC	UNF	TPI	Inch	Inch	Inch (Neck Length)	Ø Inch	a Inch					
4		40	2.205	0.433	0.709	0.141	0.110	2	H2	1	6204859	¹⁾ —
6		32	2.205	0.472	0.787	0.141	0.110	2	H3	1	6204864	¹⁾ —
8		32	2.480	0.512	0.827	0.168	0.131	3	H3	1	6204869	¹⁾ —
	10	32	2.756	0.512	0.984	0.194	0.152	3	H3	1	6204852	¹⁾ —
10		24	2.756	0.591	0.984	0.194	0.152	3	H3	1	6204851	¹⁾ —
	1/4	28	3.150	0.669	1.181	0.255	0.191	3	H4	1	6204850	¹⁾ 6007893 ¹⁾
1/4		20	3.150	0.669	1.181	0.255	0.191	3	H5	1	6204849	¹⁾ 6007890 ¹⁾
	5/16	24	3.543	0.669	1.378	0.318	0.238	3	H4	1	6204861	¹⁾ —
5/16		18	3.543	0.787	1.378	0.318	0.238	3	H5	1	6204860	¹⁾ 6007922 ¹⁾
	3/8	24	3.937	0.709	1.535	0.381	0.286	3	H4	1	6204858	¹⁾ —
3/8		16	3.937	0.866	1.535	0.381	0.286	3	H5	1	6204857	¹⁾ 6007914 ¹⁾
	7/16	20	3.937	0.866		0.323	0.242	3	H5	1	6204866	²⁾ —
7/16		14	3.937	0.866		0.323	0.242	3	H5	1	6204865	²⁾ —
	1/2	20	3.937	0.866		0.367	0.275	3	H5	1	—	—
	1/2	20	3.937	0.866		0.397	0.275	3	H5	1	6204848	²⁾ —
1/2		13	4.331	0.984		0.367	0.275	3	H5	1	6204847	²⁾ 6008101 ²⁾
	5/8	18	3.937	0.866		0.480	0.360	4	H5	1	6204863	²⁾ —
5/8		11	4.331	1.063		0.480	0.360	4	H5	1	6204862	²⁾ 6007931 ²⁾
	3/4	16	4.331	0.984		0.590	0.442	4	H5	1	6204856	²⁾ —
3/4		10	4.921	1.181		0.590	0.442	4	H5	1	6204855	²⁾ —
3/4		10	4.921	1.181		0.590	0.442	4	H5	1	—	6007905 ²⁾
7/8		9	5.512	1.260		0.697	0.523	4	H6	1	6204868	²⁾ —
1"		8	6.299	1.417		0.800	0.600	4	H6	1	6204854	²⁾ — ²⁾

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

SPIRAL POINT TAPS



Multi-Application, Plug Chamfer

E025 Premium substrate for through hole tapping in tough or
E035 abrasive materials. Bronze tempered body and shank
 reduces rust and corrosion. Bright finish flutes improve
 chip flow in soft or non-ferrous materials.

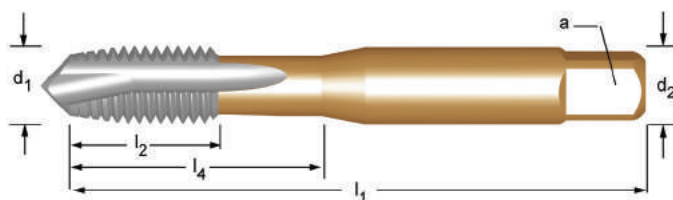
E025 = UNC Sizes, E035 = UNF Sizes

1.1 1.2 1.3 1.4 1.5 1.6 3.1 3.2 3.3 3.4 4.1 4.2 5.1 5.2 6.1
 6.2 6.3 7.1 7.2 7.3 7.4 8.1

E026 Premium substrate with steam tempered surface treatment
E036 reduces wear and prevents chip welding in abrasive or
 harder ferrous materials.

E026 = UNC Sizes, E036 = UNF Sizes

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4



E025 E035		E026 E036	
UNC	UNF	UNC	UNF
ANSI		ANSI	
3B		3B	
HSS-E		HSS-E	
No.6 - 1"		No.10 - 1"	

			l_1	l_2	d_2	a	# of	Limits			l_4	Pack	E025	E026
UNC	UNF	TPI	Inch	Inch	Inch	Inch	Flutes				Inch	Qty	E035	E036
2		56	1.3/4	0.3140	0.1410	0.1100	2	H2	N50	1.80	0.3140	1	—	5974126 ¹⁾
4		40	1.7/8	0.6091	0.1410	0.1100	2	H2	N43	2.35	0.6091	1	—	5974153 ¹⁾
5		40	1.15/16	0.7404	0.1410	0.1100	2	H2	N38	2.65	0.7404	1	—	5974159 ¹⁾
	6	40	2"	0.2610	0.1410	0.1100	2	H2	N33	2.95	0.5938	1	5974546 ¹⁾	—
6		32	2"	0.2610	0.1410	0.1100	2	H2	N36	2.85	0.5938	1	5974057 ¹⁾	5974184 ¹⁾
	8	36	2.1/8	0.2484	0.1680	0.1310	2	H2	N29	3.50	0.6526	1	5974557	—
8		32	2.1/8	0.2484	0.1680	0.1310	2	H2	N29	3.50	0.6526	1	5974068 ¹⁾	5974203 ¹⁾
	10	32	2.3/8	0.4303	0.1940	0.1520	2	H2	N21	4.10	0.8434	1	5974585 ¹⁾	5974592 ¹⁾
10		24	2.3/8	0.4303	0.1940	0.1520	2	H3	N25	3.90	0.8434	1	5974031 ¹⁾	5974116 ¹⁾
	12	28	2.3/8	0.4173	0.2200	0.1650	2	H3	N14	4.70	0.8848	1	— ¹⁾	5974596 ¹⁾
12		24	2.3/8	0.4173	0.2200	0.1650	2	H3	N16	4.50	0.8848	1	5974034 ¹⁾	5974121 ¹⁾
	1/4	28	2.1/2	0.5075	0.2550	0.1910	2	H3	N3	5.50	1.0073	1	5973974 ¹⁾	5974581 ¹⁾
	1/4	28	2.1/2	0.5075	0.2550	0.1910	3	H3	N3	5.50	1.0073	1	5974542 ¹⁾	5974589 ¹⁾
1/4		20	2.1/2	0.5075	0.2550	0.1910	2	H3	N7	5.10	1.0073	1	5974027 ¹⁾	5974097 ¹⁾
1/4		20	2.1/2	0.5075	0.2550	0.1910	3	H3	N7	5.10	1.0073	1	5974029 ¹⁾	5974110 ¹⁾
1/4		20	2.1/2	0.5075	0.2550	0.1910	3	H11	N7	5.10	1.0073	1	—	5974106 ¹⁾³⁾
	5/16	24	2.23/32	0.5939	0.3180	0.2380	2	H3	I	6.90	1.1891	1	5974736 ¹⁾	5974618 ¹⁾
	5/16	24	2.23/32	0.5939	0.3180	0.2380	3	H3	I	6.90	1.1891	1	5974740 ¹⁾	5974624 ¹⁾
5/16		18	2.23/32	0.5939	0.3180	0.2380	2	H3	F	6.60	1.1891	1	5974044 ¹⁾	5974164 ¹⁾
5/16		18	2.23/32	0.5939	0.3180	0.2380	3	H3	F	6.60	1.1891	1	5974047 ¹⁾	5974173 ¹⁾
5/16		18	2.23/32	0.5939	0.3180	0.2380	3	H11	F	6.60	1.1891	1	—	5974169 ¹⁾³⁾
	3/8	24	2.15/16	0.6020	0.3810	0.2860	2	H3	Q	8.50	1.2915	1	5974725 ¹⁾	5974608 ¹⁾
	3/8	24	2.15/16	0.6020	0.3810	0.2860	3	H3	Q	8.50	1.2915	1	5974732 ¹⁾	5974613 ¹⁾
3/8		16	2.15/16	0.6020	0.3810	0.2860	2	H3	5/16	8.00	1.2915	1	5974039 ¹⁾	5974135 ¹⁾
3/8		16	2.15/16	0.6020	0.3810	0.2860	3	H3	5/16	8.00	1.2915	1	5974041 ¹⁾	5974145 ¹⁾
3/8		16	2.15/16	0.6020	0.3810	0.2860	3	H11	5/16	8.00	1.2915	1	—	5974140 ¹⁾³⁾
	7/16	20	3.5/32	0.9055	0.3230	0.2420	3	H3	25/64	9.90	—	1	5974549 ²⁾	5974633 ²⁾
7/16		14	3.5/32	0.9055	0.3230	0.2420	3	H3	U	9.40	—	1	5974060 ²⁾	5974188 ²⁾
	1/2	20	3.3/8	0.9055	0.3670	0.2750	2	H3	29/64	11.50	—	1	5973965 ²⁾	5974573 ²⁾

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

³⁾ Oversize +.005", not 3B

UNC	UNF	TPI	l_1	l_2	d_2	$\square$	# of Flutes	Limits			l_4	Pack Qty	E025 E035	E026 E036
			Inch	Inch	Inch	a					Inch			
	1/2	20	3.3/8	0.9055	0.3670	0.2750	3	H3	29/64	11.50	—	1	5973968 ²⁾	5974577 ²⁾
1/2		13	3.3/8	0.9055	0.3670	0.2750	2	H3	27/64	10.80	—	1	5974219 ²⁾	5974081 ²⁾
1/2		13	3.3/8	0.9055	0.3670	0.2750	3	H3	27/64	10.80	—	1	5974025 ²⁾	5974090 ²⁾
1/2		13	3.3/8	0.9055	0.3670	0.2750	3	H11	27/64	10.80	—	1	—	5974085 ²⁾³⁾
	9/16	18	3.19/32	0.9843	0.4290	0.3220	3	H3	33/64	12.90	—	1	5974561 ²⁾	5974648 ²⁾
9/16		12	3.19/32	0.9843	0.4290	0.3220	3	H3	31/64	12.20	—	1	5974072 ²⁾	5974009 ²⁾
	5/8	18	3.13/16	0.9843	0.4800	0.3600	3	H3	37/64	14.50	—	1	5974743 ²⁾	5974628 ²⁾
5/8		11	3.13/16	0.9843	0.4800	0.3600	3	H3	17/32	13.50	—	1	5974053 ²⁾	5974177 ²⁾
5/8		11	3.13/16	0.9843	0.4800	0.3600	3	H11	17/32	13.50	—	1	—	5974181 ²⁾³⁾
	3/4	16	4.1/4	1.1614	0.5900	0.4420	3	H3	11/16	17.50	—	1	5974686 ²⁾	5974605 ²⁾
3/4		10	4.1/4	1.1614	0.5900	0.4420	3	H4	21/32	16.50	—	1	5974036 ²⁾	5974130 ²⁾
	7/8	14	4.11/16	1.1614	0.6970	0.5230	3	H4	13/16	20.40	—	1	5974553 ²⁾	5974643 ²⁾
7/8		9	4.11/16	1.1614	0.6970	0.5230	3	H4	49/64	19.50	—	1	5974064 ²⁾	5974192 ²⁾
	1"	12	5.1/8	1.3976	0.8000	0.6000	3	H4	59/64	23.25	—	1	—	5974565 ²⁾
	1"	14	5.1/8	1.3976	0.8000	0.6000	3	H4	59/64	23.50	—	1	5973962 ²⁾	5974569 ²⁾
1"		8	5.1/8	1.3976	0.8000	0.6000	3	H4	7/8	22.25	—	1	5974215 ²⁾	5974078 ²⁾

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

³⁾ Oversize +.005", not 3B

SPIRAL POINT TAPS



Multi-Application, Plug Chamfer

**EP20/
EP30** Premium substrate for through hole tapping in tough or abrasive materials. Bronze tempered body and shank reduces rust and corrosion. Bright finish flutes improve chip flow in soft or non-ferrous materials.

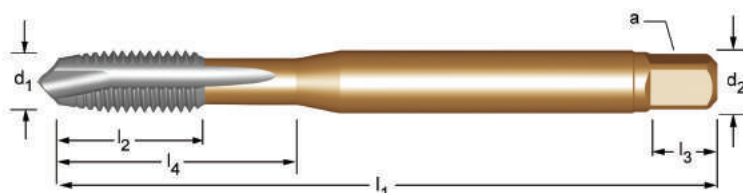
EP20 = UNC Sizes, EP30 = UNF Sizes

1.1 1.2 1.3 1.4 1.5 1.6 3.1 3.2 3.3 3.4 4.1 4.2 5.1 5.2 6.1
6.2 6.3 7.1 7.2 7.3 7.4 8.1

**EP21/
EP31** Premium substrate with steam tempered surface treatment reduces wear and chip welding in abrasive or harder ferrous materials.

EP21 = UNC Sizes, EP31 = UNF Sizes

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4



EP20/EP30		EP21/EP31	
UNC	UNF	UNC	UNF
DIN 2184-1		DIN 2184-1	
2B		2B	
HSS-E		HSS-E	
No.4 - 1"		No.4 - 1"	

			d ₁ nom mm	l ₁ mm	l ₂ mm	d ₂ Ø mm	□ a mm	l ₃ mm	# of Flutes		l ₄ mm	Limits	Pack Qty	EP20/EP30	EP21/ EP31
UNC	UNF	TPI													
4		40	2.845	56	9	3.5	2.7	6	3	2.35	18	H2	1	5973735	¹⁾ 5973914
5		40	3.175	56	10	3.5	2.7	6	3	2.65	18	H2	1	5973737	¹⁾ 5973957
6		32	3.505	56	11	4.0	3.0	6	3	2.85	20	H2	1	5973745	¹⁾ 5973995
	8	36	4.166	63	12	4.5	3.4	8	3	3.5	21	H3	1	5973871	¹⁾ 5973927
8		32	4.166	63	12	4.5	3.4	8	3	3.5	21	H3	1	5973752	¹⁾ 5973818
	10	32	4.826	70	13	6.0	4.9	8	3	4.1	25	H3	1	5973834	¹⁾ 5973889
10		24	4.826	70	13	6.0	4.9	8	3	3.9	25	H3	1	5973723	¹⁾ 5973760
12		24	5.486	80	15	6.0	4.9	8	3	4.5	30	H3	1	5973725	¹⁾ 5973764
	1/4	28	6.350	80	15	7.0	5.5	8	3	5.5	30	H4	1	5973829	¹⁾ 5973884
1/4		20	6.350	80	15	7.0	5.5	8	3	5.1	30	H5	1	5973720	¹⁾ 5973758
	5/16	24	7.938	90	18	8.0	6.2	9	3	6.9	35	H4	1	5973844	¹⁾ 5973904
5/16		18	7.938	90	18	8.0	6.2	9	3	6.6	35	H5	1	5973741	¹⁾ 5973989
	3/8	24	9.525	100	20	10.0	8.0	11	3	8.5	39	H4	1	5973841	¹⁾ 5973899
3/8		16	9.525	100	20	10.0	8.0	11	3	8	39	H5	1	5973732	¹⁾ 5973858
	7/16	20	11.112	100	20	8.0	6.2	9	3	9.9	-	H5	1	5973853	²⁾ 5973919
7/16		14	11.112	100	20	8.0	6.2	9	3	9.4	-	H5	1	5973747	²⁾ 5973997
	1/2	20	12.700	110	23	9.0	7.0	10	3	11.5	-	H5	1	5973826	²⁾ 5973879
1/2		13	12.700	110	23	9.0	7.0	10	3	10.8	-	H5	1	5973716	²⁾ 5973756
	5/8	18	15.875	110	25	12.0	9.0	12	3	14.5	-	H5	1	5973848	²⁾ 5973909
5/8		11	15.875	110	25	12.0	9.0	12	3	13.5	-	H5	1	5973743	²⁾ 5973993
	3/4	16	19.050	125	30	14.0	11.0	14	4	17.5	-	H5	1	5973837	²⁾ 5973894
3/4		10	19.050	125	30	14.0	11.0	14	4	16.5	-	H5	1	5973729	²⁾ 5973810
	7/8	14	22.225	140	34	18.0	14.5	17	4	20.4	-	H6	1	5973866	²⁾ 5973923
7/8		9	22.225	140	34	18.0	14.5	17	4	19.5	-	H6	1	5973749	²⁾ 5973999
	1"	12	25.400	160	38	18.0	14.5	17	4	23.25	-	H6	1	5973822	²⁾ 5973874
1"		8	25.400	160	38	18.0	14.5	17	4	22.25	-	H6	1	5973714	²⁾ 5973754

Note: DIN shank and square dimensions will necessitate metric holders

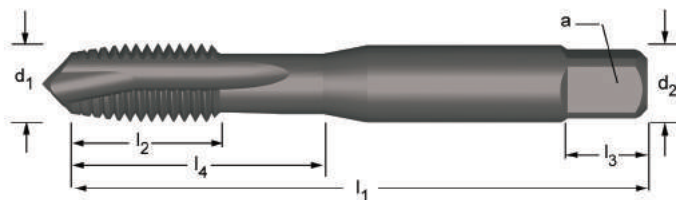
¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

Multi-Application, PLUG CHAMFER

E021 Premium substrate with steam tempered surface
E031 treatment reduces wear and prevents chip welding
 in abrasive or harder ferrous materials.
E021 = UNC Sizes, E031 = UNF Sizes

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4



E021	E031
UNC	UNF
ISO 529	ISO 529
2B	2B
HSS-E	HSS-E
No.2 - 1"	No.8 - 1"

UNC	UNF	TPI	d ₁ nom mm	l ₁ mm	l ₂ mm	d ₂ Ø mm	□ a mm	l ₃ mm	# of Flutes		l ₄ mm	Limits	Pack Qty	E021	E031
2		56	2.184	44.5	9.5	2.80	2.24	5	2	1.85	9.5	H2	1	5974319 ¹⁾	—
4		40	2.845	48	14	3.15	2.50	5	3	2.35	14	H2	1	5974331 ¹⁾	—
5		40	3.175	48	12.5	3.15	2.50	5	3	2.65	12.5	H2	1	5974336 ¹⁾	—
6		32	3.505	50	16	3.55	2.80	5	3	2.85	16	H3	1	5974354 ¹⁾	—
	8	36	4.166	53	9.5	4.5	3.55	6	3	3.50	17	H3	1	—	5973839 ¹⁾
8		32	4.166	53	9.5	4.50	3.55	6	3	3.50	17	H3	1	5974369 ¹⁾	—
	10	32	4.826	58	11	5.0	4.00	7	3	4.10	20	H3	1	—	5973806 ¹⁾
10		24	4.826	58	11	5.00	4.00	7	3	3.90	20	H3	1	5974311 ¹⁾	—
12		24	5.486	62	12	5.60	4.50	7	3	4.50	21	H3	1	5974315 ¹⁾	—
	1/4	28	6.350	66	13	6.3	5.00	8	3	5.50	26	H4	1	—	5973803 ¹⁾
1/4		20	6.350	66	13	6.30	5.00	8	3	5.10	26	H5	1	5974305 ¹⁾	—
	5/16	24	7.938	72	16	8.0	6.30	9	3	6.90	29	H4	1	—	5973819 ¹⁾
5/16		18	7.938	72	16	8.00	6.30	9	3	6.60	29	H5	1	5974346 ¹⁾	—
	3/8	24	9.525	80	18	10.0	8.00	11	3	8.50	32	H4	1	—	5973815 ¹⁾
3/8		16	9.525	80	18	10.00	8.00	11	3	8.00	32	H5	1	5974327 ¹⁾	—
	7/16	20	11.112	85	19	8.0	6.30	9	3	9.90	-	H5	1	—	5973827 ²⁾
7/16		14	11.112	85	19	8.00	6.30	9	3	9.40	-	H5	1	5974359 ²⁾	—
	1/2	20	12.700	89	22	9.0	7.10	10	3	11.50	-	H5	1	—	5973800 ²⁾
1/2		13	12.700	89	22	9.00	7.10	10	3	10.80	-	H5	1	5974301 ²⁾	—
	9/16	18	14.288	95	24	11.2	9.00	12	3	12.90	-	H5	1	—	5973842 ²⁾
	5/8	18	15.875	102	24	12.5	10.00	13	3	14.50	-	H5	1	—	5973823 ²⁾
5/8		11	15.875	102	24	12.50	10.00	13	3	13.50	-	H5	1	5974350 ²⁾	—
	3/4	16	19.050	112	29	14.0	11.20	14	4	17.50	-	H5	1	—	5973813 ²⁾
3/4		10	19.050	112	29	14.00	11.20	14	4	16.50	-	H5	1	5974323 ²⁾	—
	7/8	14	22.225	118	29	16.0	12.50	16	4	20.40	-	H6	1	—	5973831 ²⁾
7/8		9	22.225	118	29	16.00	12.50	16	4	19.50	-	H6	1	5974364 ²⁾	—
	1"	12	25.400	130	35	18.0	14.00	18	4	23.25	-	H6	1	—	5973798 ²⁾
1"		8	25.400	130	35	18.00	14.00	18	4	22.25	-	H6	1	5974297 ²⁾	—

Note: ISO shank and square dimensions will necessitate metric holders

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

SPIRAL POINT TAPS



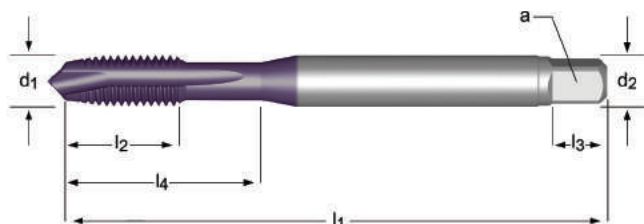
MXP Multi-Application, Plug Chamfer, Metric

APPLIX®

1673AP Designed for through hole tapping in a variety of materials with a hardness up to 36 Rc. The premium substrate and TiCN coating combine to offer superior abrasion resistance, higher operating speeds, improved thread quality, reduced cycle times, and longer tool life.

1675 Coolant thru design allows higher tapping speeds and eliminates the problems associated with inadequate coolant in horizontal or deep hole applications.

1.1 1.2 1.3 1.4 1.5 2.1 2.2 4.1 4.2 5.1 5.2 6.1 6.2 6.3
7.1 7.2 7.3 7.4



1673AP		1675 Coolant Through	
M	MF	M	
DIN ANSI		DIN ANSI	
6H		6H	
HSS PM		HSS PM	
M4 - M24		M12 - M20	

M	MF	P mm	l ₁ mm	l ₂ mm	l ₄ Inch (Neck Length)	d ₂ Ø Inch	a Inch	# of Flutes	Limits	Pack Qty	1673AP	1675
4		0.70	63	13	21	0.168	0.131	3	D4	1	6204884 ¹⁾	—
5		0.80	70	15	25	0.194	0.152	3	D4	1	6204885 ¹⁾	—
6		1.00	80	17	30	0.255	0.191	3	D5	1	6204886 ¹⁾	—
	8	1.00	90	17	35	0.318	0.238	3	D5	1	6205008 ¹⁾	—
8		1.25	90	20	35	0.318	0.238	3	D5	1	6204887 ¹⁾	—
	10	1.25	100	16	39	0.381	0.286	3	D6	1	6204870 ¹⁾	—
10		1.50	100	22	39	0.381	0.286	3	D6	1	6204871 ¹⁾	—
	12	1.25	100	21		0.367	0.275	3	D6	1	6205009 ²⁾	—
	12	1.50	100	22		0.367	0.275	3	D6	1	6204872 ²⁾	—
12		1.75	110	24		0.367	0.275	3	D6	1	6204873 ²⁾	6007959 ²⁾
	14	1.50	100	22		0.429	0.322	4	D7	1	6204874 ²⁾	—
14		2.00	110	26		0.429	0.322	4	D7	1	6204875 ²⁾	—
	16	1.50	100	22		0.480	0.360	4	D7	1	6204876 ²⁾	—
16		2.00	110	27		0.480	0.360	4	D7	1	6204877 ²⁾	6007991 ²⁾
	18	1.50	110	25		0.542	0.406	4	D7	1	6204878 ²⁾	—
20		2.50	140	32		0.652	0.489	4	D7	1	6204881 ²⁾	6008013 ²⁾
	24	2.00	140	27		0.760	0.570	4	D8	1	6204882 ²⁾	—
24		3.00	160	34		0.760	0.570	4	D8	1	6204883 ²⁾	—

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

Multi-Application, Plug Chamfer

E005 Premium substrate for through hole tapping in tough or abrasive materials. Bronze tempered body and shank reduces rust and corrosion. Bright finish flutes improve chip flow in soft or non-ferrous materials.

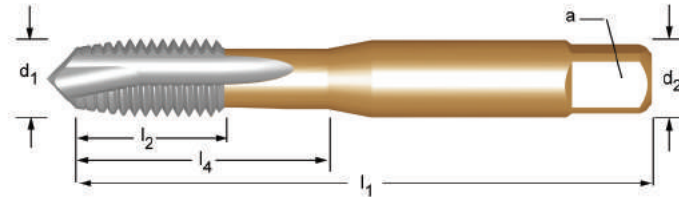
E005 = Metric Coarse

1.1 1.2 1.3 1.4 1.5 1.6 3.1 3.2 3.3 3.4 4.1 4.2 5.1 5.2 6.1
6.2 6.3 7.1 7.2 7.3 7.4 8.1

**E006/
E016** Premium substrate with steam tempered surface treatment reduces wear and prevents chip welding in abrasive or harder ferrous materials.

E006 = Metric Coarse, E016 = Metric Fine

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4



E005	E006 E016
M	M MF
ANSI	ANSI
6H	6H
HSS-E	HSS-E
M4 - M20	M4 - M20

M	MF	P	l ₁	l ₂	d ₂	a	# of Flutes			l ₄	Limits	Pack Qty	E005	E006 E016
mm		Inch	Inch	Inch	Inch	Inch				Inch				
4		0.70	2.1/8	0.2484	0.1680	0.1310	2	3.30	N30	0.6526	D4	1	5974453 ¹⁾	5973941 ¹⁾
4		0.70	2.1/8	0.2484	0.1680	0.1310	3	3.30	N30	0.6526	D4	1	5974457 ¹⁾	5973945 ¹⁾
5		0.80	2.3/8	0.4303	0.1940	0.1520	2	4.20	N19	0.8434	D4	1	5974461 ¹⁾	5973949 ¹⁾
5		0.80	2.3/8	0.4303	0.1940	0.1520	3	4.20	N19	0.8434	D4	1	5974465 ¹⁾	5973777 ¹⁾
6		1.00	2.1/2	0.5075	0.2550	0.1910	2	5.00	N9	1.0073	D5	1	5974469 ¹⁾	5973778 ¹⁾
6		1.00	2.1/2	0.5075	0.2550	0.1910	3	5.00	N9	1.0073	D5	1	5974473 ¹⁾	5973780 ¹⁾
	8	1.00	2.23/32	0.5939	0.3180	0.2380	3	7.00	J	1.1891	D5	1	—	5973568 ¹⁾
8		1.25	2.23/32	0.5939	0.3180	0.2380	2	6.80	H	1.1891	D5	1	5974476 ¹⁾	5973782 ¹⁾
8		1.25	2.23/32	0.5939	0.3180	0.2380	3	6.80	H	1.1891	D5	1	5974479 ¹⁾	5973784 ¹⁾
	10	1.00	2.15/16	0.6020	0.3810	0.2860	3	9.00	T	1.2915	D6	1	—	5973557 ¹⁾
10		1.50	2.15/16	0.6020	0.3810	0.2860	2	8.50	Q	1.2915	D6	1	5974418 ¹⁾	5974482 ¹⁾
10		1.50	2.15/16	0.6020	0.3810	0.2860	3	8.50	Q	1.2915	D6	1	5974422 ¹⁾	5974488 ¹⁾
12		1.75	3.3/8	0.9055	0.3670	0.2750	2	10.30	Y		D6	1	5974426 ²⁾	5973774 ²⁾
12		1.75	3.3/8	0.9055	0.3670	0.2750	3	10.30	Y		D6	1	5974430 ²⁾	5973796 ²⁾
	14	1.50	3.19/32	0.9843	0.4290	0.3220	3	12.50	31/64		D7	1	—	5973561 ²⁾
14		2.00	3.19/32	0.9843	0.4290	0.3220	3	12.00	15/32		D7	1	5974434 ²⁾	5973832 ²⁾
16		2.00	3.13/16	0.9843	0.4800	0.3600	3	14.00	35/64		D7	1	5974438 ²⁾	5973878 ²⁾
18		2.50	4.1/32	1.1614	0.5420	0.4060	3	15.50	39/64		D7	1	5974442 ²⁾	5973929 ²⁾
20		2.50	4.15/32	1.1614	0.6520	0.4890	3	17.50	11/16		D7	1	5974450 ²⁾	5973937 ²⁾

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

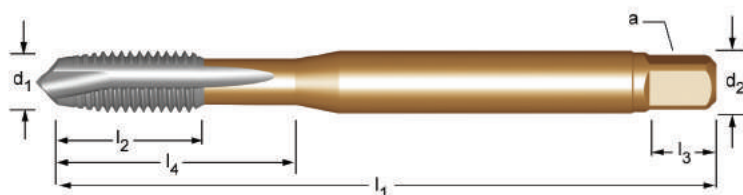
Multi-Application, Plug Chamfer

EP006H Premium substrate for through hole tapping in tough or abrasive materials. Bronze tempered body and shank reduces rust and corrosion. Bright finish flutes improve chip flow in soft or non-ferrous materials.

1.1 1.2 1.3 1.4 1.5 1.6 3.1 3.2 3.3 3.4 4.1 4.2 5.1 5.2 6.1
6.2 6.3 7.1 7.2 7.3 7.4 8.1

EP016H Premium substrate with steam tempered surface treatment reduces wear and prevents chip welding in abrasive or harder ferrous materials.

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4



EP006H	EP016H
M	M
DIN 371 ≤ 10 376 ≥ 12	DIN 371 ≤ 10 376 ≥ 12
6H	6H
HSS-E	HSS-E
M2 - M30	M2 - M30

M	P mm	l ₁ mm	l ₂ mm	d ₂ Ø mm	a mm	l ₃ mm	# of Flutes	l ₄ mm	Limits	Pack Qty	EP006H	EP016H
2	0.40	50	6	2.8	2.1	5	2	1.6	9 D3	1	5973413 ¹⁾	5973473 ¹⁾
2.5	0.45	50	8	2.8	2.1	5	2	2.1	12.5 D3	1	5973414 ¹⁾	5973475 ¹⁾
3	0.50	56	10	2.2	1.8	4	3	2.5	18 D3	1	5973422 ²⁾	5973495 ²⁾
3	0.50	56	9	3.5	2.7	6	3	2.5	18 D3	1	5973420 ¹⁾	5973452 ¹⁾
3.5	0.60	56	11	4.0	3.0	6	3	2.9	20 D4	1	5973421 ¹⁾	5973474 ¹⁾
4	0.70	63	12	2.8	2.1	5	3	3.3	21 D4	1	5973428 ²⁾	5973515 ²⁾
4	0.70	63	12	4.5	3.4	6	3	3.3	21 D4	1	5973426 ¹⁾	5973511 ¹⁾
4.5	0.75	70	13	6.0	4.9	8	3	3.8	25 D4	1	5973427 ¹⁾	5973513 ¹⁾
5	0.80	70	13	3.5	2.7	6	3	4.2	25 D4	1	5973433 ²⁾	5973436 ²⁾
5	0.80	70	13	6.0	4.9	8	3	4.2	25 D4	1	5973431 ¹⁾	5973434 ¹⁾
6	1.00	80	15	4.5	3.4	6	3	5	30 D5	1	5973441 ²⁾	5973442 ²⁾
6	1.00	80	15	6.0	4.9	8	3	5	30 D5	1	5973437 ¹⁾	5973440 ¹⁾
7	1.00	80	15	7.0	5.5	8	3	6	30 D5	1	5973445 ¹⁾	5973446 ¹⁾
8	1.25	90	18	6.0	4.9	8	3	6.8	35 D5	1	5973449 ²⁾	5973450 ²⁾
8	1.25	90	18	8.0	6.2	9	3	6.8	35 D5	1	5973447 ¹⁾	5973448 ¹⁾
10	1.50	100	20	7.0	5.5	8	3	8.5	- D6	1	5973423 ²⁾	5973455 ²⁾
10	1.50	100	20	10.0	8.0	11	3	8.5	39 D6	1	5973412 ¹⁾	5973453 ¹⁾
12	1.75	110	23	9.0	7.0	10	3	10.3	- D6	1	5973461 ²⁾	5973459 ²⁾
14	2.00	110	25	11.0	9.0	12	3	12	- D7	1	5973486 ²⁾	5973465 ²⁾
16	2.00	110	25	12.0	9.0	12	3	14	- D7	1	5973489 ²⁾	5973467 ²⁾
18	2.50	125	30	14.0	11.0	14	4	15.5	- D7	1	5973493 ²⁾	5973471 ²⁾
20	2.50	140	30	16.0	12.0	15	4	17.5	- D7	1	5973415 ²⁾	5973477 ²⁾
22	2.50	140	34	18.0	14.5	17	4	19.5	- D8	1	5973417 ²⁾	5973480 ²⁾
24	3.00	160	38	18.0	14.5	17	4	21	- D8	1	5973418 ²⁾	5973484 ²⁾
27	3.00	160	38	20.0	16.0	19	4	24	- D8	1	5973419 ²⁾	5973429 ²⁾
30	3.50	180	45	22.0	18.0	21	4	26.5	- D9	1	5973424 ²⁾	5973506 ²⁾

Note: DIN shank and square dimensions will necessitate metric holders

¹⁾ Reinforced Shanks (DIN 371)

²⁾ Reduced Shanks (DIN 376)

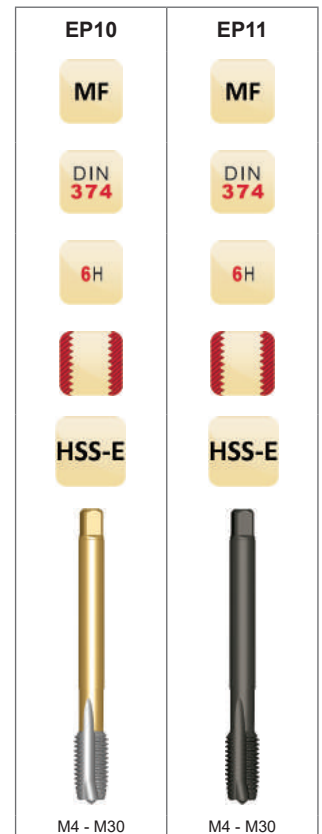
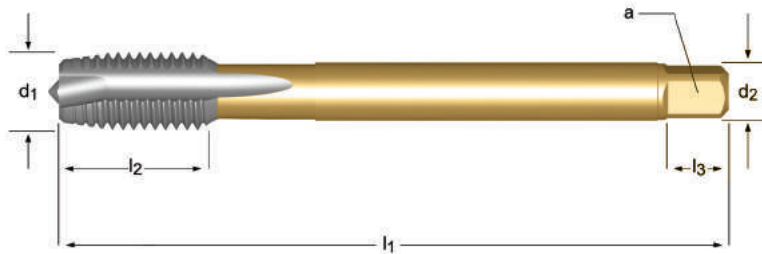
Multi-Application, Plug Chamfer

EP10 Premium substrate for through hole tapping in tough or abrasive materials. Bronze tempered body and shank reduces rust and corrosion. Bright finish flutes improve chip flow in soft or non-ferrous materials.

1.1 1.2 1.3 1.4 1.5 1.6 3.1 3.2 3.3 3.4 4.1 4.2 5.1 5.2 6.1
6.2 6.3 7.1 7.2 7.3 7.4 8.1

EP11 Premium substrate with steam tempered surface treatment reduces wear and prevents chip welding in abrasive or harder ferrous materials.

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4



		l_1	l_2	d_2	$\square$	l_3	# of			Pack	EP10	EP11
MF	P	mm	mm	Ø	a	mm	Flutes	Limits	Qty			
4	0.50	63	12	2.8	2.1	5	3	3.5	D4	1	5973502	5973691
5	0.50	70	13	3.5	2.7	6	3	4.5	D4	1	5973503	5973695
6	0.75	80	15	4.5	3.4	6	3	5.3	D5	1	5973504	5973699
8	0.75	80	15	6.0	4.9	8	3	7.3	D5	1	5973505	5973703
8	1.00	90	18	6.0	4.9	8	3	7	D5	1	5973507	5973711
10	0.75	90	18	7.0	5.5	8	3	9.3	D6	1	5973456	5973600
10	1.00	90	18	7.0	5.5	8	3	9	D6	1	5973458	5973663
10	1.25	100	20	7.0	5.5	8	3	8.8	D6	1	5973460	5973707
12	1.00	100	21	9.0	7.0	10	3	11	D6	1	5973462	5973738
12	1.25	100	21	9.0	7.0	10	3	10.8	D6	1	5973464	5973762
12	1.50	100	21	9.0	7.0	10	3	10.5	D6	1	5973466	5973766
14	1.00	100	21	11.0	9.0	12	3	13	D7	1	5973468	5973768
14	1.25	100	21	11.0	9.0	12	3	13	D7	1	5973470	5973770
14	1.50	100	21	11.0	9.0	12	3	12.5	D7	1	5973472	5973772
16	1.00	100	21	12.0	9.0	12	3	15	D7	1	5973476	5973606
16	1.50	100	21	12.0	9.0	12	3	14.5	D7	1	5973478	5973610
18	1.00	110	24	14.0	11.0	14	4	17	D7	1	5973481	5973615
18	1.50	110	24	14.0	11.0	14	4	16.5	D7	1	5973483	5973623
20	1.00	125	24	16.0	12.0	15	4	19	D7	1	5973485	5973628
20	1.50	125	24	16.0	12.0	15	4	18.5	D7	1	5973487	5973632
22	1.50	125	25	18.0	14.5	17	4	20.5	D8	1	5973488	5973637
24	1.50	140	28	18.0	14.5	17	4	22.5	D8	1	5973490	5973642
24	2.00	140	28	18.0	14.5	17	4	22	D8	1	5973492	5973654
25	1.50	140	28	18.0	14.5	17	4	23.5	D8	1	5973494	5973659
26	1.50	140	28	18.0	14.5	17	4	24.5	D8	1	5973496	5973668
27	1.50	140	28	20.0	16.0	19	4	25.5	D8	1	5973497	5973672
27	2.00	140	28	20.0	16.0	19	4	25	D8	1	5973498	5973676
28	1.50	140	28	20.0	16.0	19	4	26.5	D9	1	5973499	5973679
30	1.50	150	28	22.0	18.0	21	4	28.5	D9	1	5973500	5973683
30	2.00	150	28	22.0	18.0	21	4	28	D9	1	5973501	5973687

Note: DIN shank and square dimensions will necessitate metric holders

SPIRAL POINT TAPS



Multi-Application, Plug Chamfer

E000 Premium substrate for through hole tapping in tough or abrasive materials. Bronze tempered body and shank reduces rust and corrosion. Bright finish flutes improve chip flow in soft or non-ferrous materials.

E000 = Metric Coarse, E000TIN = TiN Coated

1.1 1.2 1.3 1.4 1.5 1.6 3.1 3.2 3.3 3.4 4.1 4.2 5.1 5.2 6.1
6.2 6.3 7.1 7.2 7.3 7.4 8.1

E000TIN E000 with a TiN coat

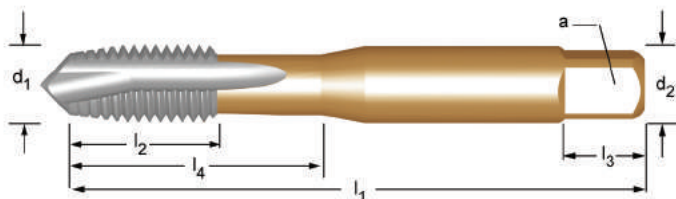
1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4 4.1 4.2
5.1 5.2 6.1 6.2 6.3 7.3 7.4 8.2

E001 Premium substrate with steam tempered surface treatment reduces wear and prevents chip welding in abrasive or harder ferrous materials.

E011

E001 = Metric Coarse, E011 = Metric Fine

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4



E000	E001 E011	E000TIN
M	MF	M
ISO 529	ISO 529	ISO 529
6H	6H	6H
HSS-E	HSS-E	HSS-E
M1.6 - M24	M1.6 - M24	M3 - M20

M	MF	P	mm	mm	mm	mm	mm	mm	# of Flutes	mm	Limits	Pack Qty	E000	E001 E011	E000TIN
1.6		0.35	41	7	2.50	2.00	4	2	1.25	7	D3	1	5973759	5973804	—
2		0.40	41	8	2.50	2.00	4	2	1.6	8	D3	1	5973771	5973825	—
2.5		0.45	44.5	9.5	2.80	2.24	5	2	2.05	9.5	D3	1	5973775	5973830	—
3		0.50	48	15	3.15	2.50	5	3	2.5	15	D3	1	5973783	5973852	6196635
3.5		0.60	50	16	3.55	2.80	5	3	2.9	16	D4	1	5973785	5973857	—
4		0.50	53	17	4.0	3.15	6	3	3.5	17	D4	1	—	5974474	—
4		0.70	53	17	4.00	3.15	6	3	3.3	17	D4	1	5973788	5973861	6196636
5		0.50	58	11	5.0	4.00	7	3	4.5	22	D4	1	—	5974477	—
5		0.80	58	11	5.00	4.00	7	3	4.2	22	D4	1	5973790	5973865	6196637
6		0.50	66	13	6.3	5.00	8	3	5.5	26	D5	1	—	5974483	—
6		0.75	66	13	6.3	5.00	8	3	5.3	26	D5	1	—	5974486	—
6		1.00	66	13	6.30	5.00	8	3	5.0	26	D5	1	5973792	5973870	6196638
8		0.75	72	16	8.0	6.30	9	3	7.3	29	D5	1	—	5974489	—
8		1.00	72	16	8.0	6.30	9	3	7.0	29	D5	1	—	5974492	—
8		1.25	72	16	8.00	6.30	9	3	6.8	29	D5	1	5973802	5973880	6196693
10		1.00	80	18	10.0	8.00	11	3	9.0	34	D6	1	—	5974395	—
10		1.25	80	18	10.0	8.00	11	3	8.8	34	D6	1	—	5974400	—
10		1.50	80	18	10.00	8.00	11	3	8.5	34	D6	1	5973761	5973807	6196690
12		1.00	89	22	9.0	7.10	10	3	11.0	-	D6	1	—	5974405	—
12		1.25	89	22	9.0	7.10	10	3	10.8	-	D6	1	—	5974410	—
12		1.50	89	22	9.0	7.10	10	3	10.5	-	D6	1	—	5974415	—
12		1.75	89	22	9.00	7.10	10	3	10.3	-	D6	1	5973763	5973809	6196691
14		1.00	95	24	11.2	9.00	12	3	13.0	-	D7	1	—	5974419	—
14		1.25	95	24	11.2	9.00	12	3	12.8	-	D7	1	—	5974423	—
14		1.50	95	24	11.2	9.00	12	3	12.5	-	D7	1	—	5974427	—
14		2.00	95	24	11.20	9.00	12	3	12.0	-	D7	1	5973765	5973812	—
16		1.00	102	24	12.5	10.00	13	3	15.0	-	D7	1	—	5974431	—
16		1.50	102	24	12.5	10.00	13	3	14.5	-	D7	1	—	5974435	—
16		2.00	102	24	12.50	10.00	13	3	14.0	-	D7	1	5973767	5973817	6196692

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

M	MF	P mm	l ₁ mm	l ₂ mm	d ₂ Ø mm	□ a mm	l ₃ mm	# of Flutes		l ₄ mm	Limits	Pack Qty	E000	E001 E011	E000TIN
	18	1.00	112	29	14.0	11.20	14	4	17.0	-	D7	1	—	5974443 ²⁾	—
	18	1.50	112	29	14.0	11.20	14	4	16.5	-	D7	1	—	5974447 ²⁾	—
18		2.50	112	29	14.00	11.20	14	4	15.5	-	D7	1	5973769 ²⁾	5973821 ²⁾	—
	20	1.00	112	29	14.0	11.20	14	4	19.0	-	D7	1	—	5974452 ²⁾	—
	20	1.50	112	29	14.0	11.20	14	4	18.5	-	D7	1	—	5974456 ²⁾	—
	20	2.00	112	29	14.0	11.20	14	4	18.0	-	D7	1	—	5974459 ²⁾	—
20		2.50	112	29	14.00	11.20	14	4	17.5	-	D7	1	5973776 ²⁾	5973833 ²⁾	6196639 ²⁾
	22	1.50	118	29	16.0	12.50	16	4	20.5	-	D8	1	—	5974463 ²⁾	—
22		2.50	118	29	16.00	12.50	16	4	19.5	-	D8	1	5973779 ²⁾	5973845 ²⁾	—
	24	1.50	130	35	18.0	14.00	18	4	22.5	-	D8	1	—	5974467 ²⁾	—
	24	2.00	130	35	18.0	14.00	18	4	22.0	-	D8	1	—	5974470 ²⁾	—
24		3.00	130	35	18.00	14.00	18	4	21.0	-	D8	1	5973781 ²⁾	5973849 ²⁾	—

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

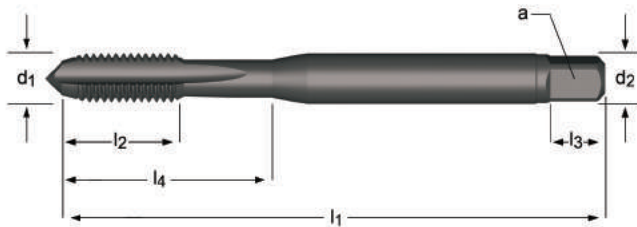
STRAIGHT FLUTE TAPS



For Cast Iron, Plug Chamfer

E201 Designed for through or blind hole tapping with a
E252 specific geometry for cast iron and those materials
 producing broken, powdery chips. Also ideal for
 non-metallics, cast brass, and other brass materials.
 Nitride and steam tempered coating reduces wear
 and chip welding in abrasive materials.

3.1 3.2 3.3 3.4 6.2 6.4 7.4 8.2



E201	E252
M	M
DIN 371	DIN 376
6HX	6HX
HSS PM	HSS PM
M3 - M10	M8 - M24

		I ₁	I ₂	d ₂ Ø	☐ a	I ₃	# of Flutes		I ₄	Pack Qty	E201	E252
M	P mm	mm	mm	mm	mm	mm			mm Limits			
3	0.50	56	9	3.5	2.7	6	3	2.5	18 D3	1	5975842 ¹⁾	—
4	0.70	63	12	4.5	3.4	6	4	3.3	21 D4	1	5975692 ¹⁾	—
5	0.80	70	13	6.0	4.9	8	4	4.2	25 D4	1	5975694 ¹⁾	—
6	1.00	80	15	6.0	4.9	8	4	5.0	30 D5	1	5975696 ¹⁾	—
8	1.25	90	18	6.0	4.9	8	4	6.8	D5	1	—	5975463 ¹⁾
8	1.25	90	18	8.0	6.2	9	4	6.8	35 D5	1	5975698 ¹⁾	—
10	1.50	100	20	10.0	8.0	11	4	8.5	39 D6	1	5975838 ¹⁾	—
10	1.50	100	20	7.0	5.5	8	4	8.5	D6	1	—	5975917 ²⁾
12	1.75	110	23	9.0	7.0	10	4	10.3	D6	1	—	5975921 ²⁾
14	2.00	110	25	11.0	9.0	12	4	12.0	D7	1	—	5975929 ²⁾
16	2.00	110	25	12.0	9.0	12	4	14.0	D7	1	—	5975258 ²⁾
18	2.50	125	30	14.0	11.0	14	4	15.5	D7	1	—	5975304 ²⁾
20	2.50	140	30	16.0	12.0	15	4	17.5	D7	1	—	5975347 ²⁾
22	2.50	140	34	18.0	14.5	17	4	19.5	D8	1	—	5975394 ²⁾
24	3.00	160	38	18.0	14.5	17	4	21.0	D8	1	—	5975449 ²⁾

Note: DIN shank and square dimensions will necessitate metric holders

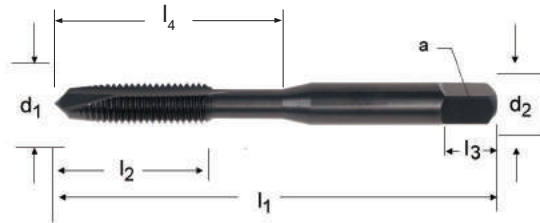
¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

DDX, High Hook, Plug Chamfer

1985 Type DDX taps feature a special O.D. and P.D. relief and increased back taper. Intended for use in through hole applications where a free cutting action is desirable. Designed to produce a class 2B fit. Sizes No.4 - 3/8" are 'necked' to allow for use in deep hole applications. Steam tempered reduces wear and prevents chip welding when through hole tapping in abrasive or harder ferrous materials.

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 4.1 4.2 4.3 5.1 5.2 5.3



UNC	UNF	TPI	l_1 Inch	l_2 Inch	d_2 Ø Inch	$\square$ a Inch	l_3 Inch	# of Flutes	l_4 Inch	Pack Qty	1985
	4	48	1.7/8	9/16	0.1410	0.1100	3/16	2	0.69	1	6008789 ¹⁾
4		40	1.7/8	9/16	0.1410	0.1100	3/16	2	0.69	1	6008784 ¹⁾
	5	44	1.15/16	5/8	0.1410	0.1100	3/16	2	0.75	1	6008797 ¹⁾
5		40	1.15/16	5/8	0.1410	0.1100	3/16	2	0.75	1	6008793 ¹⁾
	6	40	2"	11/16	0.1410	0.1100	3/16	2	0.78	1	6008939 ¹⁾
6		32	2"	11/16	0.1410	0.1100	3/16	2	0.78	1	6008889 ¹⁾
	8	36	2.1/8	3/4	0.1680	0.1310	1/4	2	0.81	1	6009104 ¹⁾
8		32	2.1/8	3/4	0.1680	0.1310	1/4	2	0.81	1	6009102 ¹⁾
	10	32	2.3/8	7/8	0.1940	0.1520	1/4	2	0.94	1	6008748 ¹⁾
10		24	2.3/8	7/8	0.1940	0.1520	1/4	2	0.94	1	6008744 ¹⁾
	1/4	28	2.1/2	1"	0.2550	0.1910	5/16	2	1.19	1	6008734 ¹⁾
1/4		20	2.1/2	1"	0.2550	0.1910	5/16	2	1.19	1	6008729 ¹⁾
	5/16	24	2.23/32	1.1/8	0.3180	0.2380	3/8	3	1.31	1	6008807 ¹⁾
5/16		18	2.23/32	1.1/8	0.3180	0.2380	3/8	3	1.31	1	6008802 ¹⁾
	3/8	24	2.15/16	1.1/4	0.3810	0.2860	7/16	3	1.44	1	6008780 ¹⁾
3/8		16	2.15/16	1.1/4	0.3810	0.2860	7/16	3	1.44	1	6008774 ¹⁾
	7/16	20	3.5/32	1.7/16	0.3230	0.2420	13/32	3	—	1	6009058 ²⁾
7/16		14	3.5/32	1.7/16	0.3230	0.2420	13/32	3	—	1	6009000 ²⁾
	1/2	20	3.3/8	1.21/32	0.3670	0.2750	7/16	3	—	1	6008724 ²⁾
1/2		13	3.3/8	1.21/32	0.3670	0.2750	7/16	3	—	1	6008719 ²⁾
	9/16	18	3.19/32	1.21/32	0.4290	0.3220	1/2	4	—	1	6008894 ²⁾
9/16		12	3.19/32	1.21/32	0.4290	0.3220	1/2	4	—	1	6009106 ²⁾
	5/8	18	3.13/16	1.13/16	0.4800	0.3600	9/16	4	—	1	6008824 ²⁾
5/8		11	3.13/16	1.13/16	0.4800	0.3600	9/16	4	—	1	6008811 ²⁾
	3/4	16	4.1/4	2"	0.5900	0.4420	11/16	4	—	1	6008770 ²⁾
3/4		10	4.1/4	2"	0.5900	0.4420	11/16	4	—	1	6008760 ²⁾
	7/8	14	4.11/16	2.7/32	0.6970	0.5230	3/4	4	—	1	6009096 ²⁾
7/8		9	4.11/16	2.7/32	0.6970	0.5230	3/4	4	—	1	6009100 ²⁾
1"		8	5.1/8	2.1/2	0.8000	0.6000	13/16	4	—	1	6008739 ²⁾

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

APPLIX SPIRAL FLUTE TAP (48°-52°)



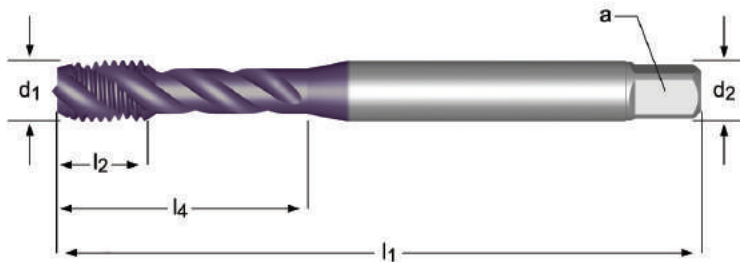
APPLIX®

MXL Multi-Application, Semi-Bottoming

1676AP Designed for blind hole tapping in a variety of materials with a hardness up to 36 Rc. The premium substrate and TiCN coating combine to offer superior abrasion resistance, higher operating speeds, improved thread quality, reduced cycle times, and longer tool life.

1678 Coolant thru design allows higher tapping speeds and eliminates the problems associated with inadequate coolant in horizontal or deep hole applications.

1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3 4.1 4.2 5.1 5.2 6.1 6.2 6.3
7.1 7.2 7.3 7.4



1676AP(UNF)		1678(UNF)	
UNC	UNF	UNC	UNF
DIN	ANSI	DIN	ANSI
2B		2B	
HSS	PM	HSS	PM
No.4 - 1"		1/4 - 1"	

UNC	UNF	TPI	l_1 Inch	l_2 Inch	l_4 Inch (Neck Length)	d_2 Ø Inch	a Inch	# of Flutes	Limits	Pack Qty	1676AP	1678
4		40	2.205	0.236	0.709	0.141	0.110	3	H2	1	6204902	¹⁾ —
6		32	2.205	0.236	0.787	0.141	0.110	3	H2	1	6204907	¹⁾ —
8		32	2.480	0.236	0.827	0.168	0.131	3	H3	1	6204912	¹⁾ —
	10	32	2.756	0.354	0.984	0.194	0.152	3	H3	1	6204895	¹⁾ —
10		24	2.756	0.354	0.984	0.194	0.152	3	H3	1	6204894	¹⁾ —
	1/4	28	3.150	0.433	1.181	0.255	0.191	3	H4	1	6204893	¹⁾ 6008758 ¹⁾
1/4		20	3.150	0.433	1.181	0.255	0.191	3	H5	1	6204892	¹⁾ 6008750 ¹⁾
	5/16	24	3.543	0.472	1.378	0.318	0.238	3	H4	1	6204904	¹⁾ —
5/16		18	3.543	0.472	1.378	0.318	0.238	3	H5	1	6204903	¹⁾ 6008795 ¹⁾
	3/8	24	3.937	0.551	1.535	0.381	0.286	3	H4	1	6204901	¹⁾ —
3/8		16	3.937	0.551	1.535	0.381	0.286	3	H5	1	6204900	¹⁾ 6008781 ¹⁾
	7/16	20	3.937	0.591		0.323	0.242	3	H5	1	6204909	²⁾ 6008825 ²⁾
7/16		14	3.937	0.591		0.323	0.242	3	H5	1	6204908	²⁾ 6008820 ²⁾
	1/2	20	3.937	0.630		0.367	0.275	3	H5	1	6204891	²⁾ —
1/2		13	4.331	0.630		0.367	0.275	3	H5	1	6204890	²⁾ 6008735 ²⁾
	5/8	18	3.937	0.745		0.480	0.360	3	H5	1	6204906	²⁾ —
5/8		11	4.331	0.745		0.480	0.360	3	H5	1	6204905	²⁾ 6008812 ²⁾
	3/4	16	4.331	0.820		0.590	0.442	3	H5	1	6204899	²⁾ —
3/4		10	4.921	0.820		0.590	0.442	3	H5	1	6204898	²⁾ 6008771 ²⁾
	7/8	14	4.921	0.910		0.697	0.523	4	H6	1	6204910	²⁾ —
7/8		9	5.512	0.910		0.697	0.523	4	H6	1	6204911	²⁾ 6204932 ²⁾
1"		8	6.299	1.025		0.800	0.600	4	H6	1	6204897	²⁾ 6008767 ²⁾

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

Multi-Application, Semi-Bottoming

**E027
E037**

Premium substrate for blind hole tapping in tough or abrasive materials. Bronze tempered body and shank reduces rust and corrosion. Bright finish flutes improve chip flow in soft and non-ferrous materials.

E027 = UNC Sizes, E037 = UNF Sizes

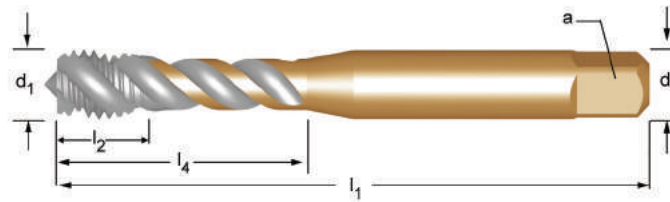
1.1 1.2 1.3 1.4 1.5 4.1 4.2 5.1 5.2 6.1 6.2 6.3 7.1 7.2 7.3
7.4 8.1

**E028
E038**

Premium substrate with Steam tempered surface treatment reduces wear and prevents chip welding in abrasive or harder ferrous materials.

E028 = UNC Sizes, E038 = UNF Sizes

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3



E027/E037		E028/E038	
UNC	UNF	UNC	UNF
ANSI		ANSI	
3B		3B	
HSS-E		HSS-E	
No.6- 1"		No.4 - 1"	

			I ₁	I ₂	d ₂ Ø	☐ a	# of Flutes	Limits			I ₄	Pack Qty	E027 E037	E028 E038
UNC	UNF	TPI	Inch	Inch	Inch	Inch			↔	↔	Inch			
4		40	1.7/8	0.6091	0.1410	0.1100	3	H2	N43	2.35	0.6091	1	—	5974035 ¹⁾
5		40	1.15/16	0.7404	0.1410	0.1100	3	H2	N38	2.65	0.7404	1	—	5974037 ¹⁾
6		32	2"	0.2610	0.1410	0.1100	3	H2	N36	2.85	0.5938	1	5974013	5974046 ¹⁾
8		32	2.1/8	0.2484	0.1680	0.1310	3	H2	N29	3.50	0.6526	1	5974017	5974058 ¹⁾
	10	32	2.3/8	0.2650	0.1940	0.1520	3	H2	N21	4.10	0.8434	1	5974670	5974718 ¹⁾
10		24	2.3/8	0.2650	0.1940	0.1520	3	H3	N25	3.90	0.8434	1	5974150	5974023 ¹⁾
12		24	2.3/8	0.2520	0.2200	0.1650	3	H3	N16	4.50	0.8848	1	5974158	5974026 ¹⁾
	1/4	28	2.1/2	0.3937	0.2550	0.1910	3	H3	N3	5.50	1.0993	1	5974666	5974715 ¹⁾
1/4		20	2.1/2	0.3937	0.2550	0.1910	3	H3	N7	5.10	1.0993	1	5974095	5974021 ¹⁾
	5/16	24	2.23/32	0.4567	0.3180	0.2380	3	H3	I	6.90	1.3094	1	5974682	5973856 ¹⁾
5/16		18	2.23/32	0.4567	0.3180	0.2380	3	H3	F	6.60	1.3094	1	5974171	5974040 ¹⁾
	3/8	24	2.15/16	0.5315	0.3810	0.2860	3	H3	Q	8.50	1.4415	1	5974677	5974729 ¹⁾
3/8		16	2.15/16	0.5315	0.3810	0.2860	3	H3	5/16	8.00	1.4415	1	5974168	5974030 ¹⁾
3/8		16	2.15/16	0.5315	0.3810	0.2860	3	H5	5/16	8.00	1.4415	1	—	5974032 ¹⁾³⁾
	7/16	20	3.5/32	0.6299	0.3230	0.2420	3	H3	25/64	9.90	-	1	5974693	5973958 ²⁾
7/16		14	3.5/32	0.6299	0.3230	0.2420	3	H3	U	9.40	-	1	5974015	5974049 ²⁾
	1/2	20	3.3/8	0.6890	0.3670	0.2750	3	H3	29/64	11.50	-	1	5974662	5974712 ²⁾
1/2		13	3.3/8	0.6890	0.3670	0.2750	3	H3	27/64	10.80	-	1	5974052	5974020 ²⁾
	9/16	18	3.19/32	0.7087	0.4290	0.3220	3	H3	33/64	12.90	-	1	5974700	5974006 ²⁾
9/16		12	3.19/32	0.7087	0.4290	0.3220	3	H3	31/64	12.20	-	1	5974018	5974061 ²⁾
	5/8	18	3.13/16	0.7087	0.4800	0.3600	3	H3	37/64	14.50	-	1	5974690	5973916 ²⁾
5/8		11	3.13/16	0.7087	0.4800	0.3600	3	H3	17/32	13.50	-	1	5974011	5974043 ²⁾
	3/4	16	4.1/4	0.8858	0.5900	0.4420	3	H3	11/16	17.50	-	1	5974673	5974721 ²⁾
3/4		10	4.1/4	0.8858	0.5900	0.4420	3	H4	21/32	16.50	-	1	5974163	5974028 ²⁾
	7/8	14	4.11/16	0.9843	0.6970	0.5230	3	H4	13/16	20.40	-	1	5974697	5973990 ²⁾
7/8		9	4.11/16	0.9843	0.6970	0.5230	3	H4	49/64	19.50	-	1	5974016	5974055 ²⁾
	1"	14	5.1/8	1.1811	0.8000	0.6000	3	H4	59/64	23.50	-	1	5974658	5974707 ²⁾
1"		8	5.1/8	1.1811	0.8000	0.6000	3	H4	7/8	22.25	-	1	5974024	5974019 ²⁾

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

³⁾ Class of fit: 2B

SPIRAL FLUTE TAPS (45°)



Multi-Application, Semi-Bottoming

EX20 Premium substrate for blind hole tapping in tough or abrasive materials. Bronze tempered body and shank reduces rust and corrosion. Bright finish flutes improve chip flow in soft and non-ferrous materials.

EX30

EX20 = UNC Sizes, EX30 = UNF Sizes

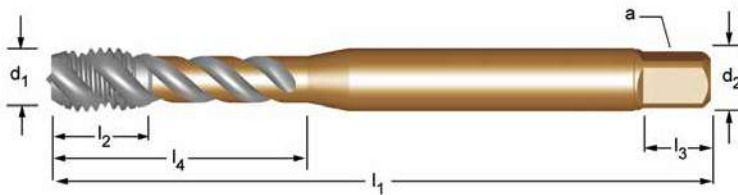
1.1 1.2 1.3 1.4 1.5 4.1 4.2 5.1 5.2 7.1 7.2 7.3 7.4

EX21 Premium substrate with Steam tempered surface treatment reduces wear and prevents chip welding in abrasive or harder ferrous materials.

EX31

EX21 = UNC Sizes, EX31 = UNF Sizes

1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3



EX20/EX30		EX21/EX31	
UNC	UNF	UNC	UNF
DIN 2184-1		DIN 2184-1	
2B		2B	
HSS-E		HSS-E	
No.4 - 1"		No.4 - 1"	

UNC	UNF	TPI	d ₁ nom mm	l ₁ mm	l ₂ mm	d ₂ Ø mm	□ a mm	l ₃ mm	# of Flutes	Limits	l ₄ mm	Pack Qty	EX20 EX30	EX21 EX31
4		40	2.845	56	6	3.5	2.7	6	3	2.35 H2	18	1	5973704 ¹⁾	5974042 ¹⁾
5		40	3.175	56	6	3.5	2.7	6	3	2.65 H2	18	1	5973708 ¹⁾	5974045 ¹⁾
6		32	3.505	56	7	4.0	3.0	6	3	2.85 H2	20	1	5973724 ¹⁾	5974054 ¹⁾
	8	36	4.166	63	7	4.5	3.4	8	3	3.5 H3	21	1	5974125 ¹⁾	5974191 ¹⁾
8		32	4.166	63	7	4.5	3.4	8	3	3.5 H3	21	1	5974132 ¹⁾	5974066 ¹⁾
	10	32	4.826	70	8	6.0	4.9	8	3	4.1 H3	25	1	5974087 ¹⁾	5974151 ¹⁾
10		24	4.826	70	8	6.0	4.9	8	3	3.9 H3	25	1	5973688 ¹⁾	5974238 ¹⁾
12		24	5.486	80	10	6.0	4.9	8	3	4.5 H3	30	1	5973692 ¹⁾	5974242 ¹⁾
	1/4	28	6.350	80	10	7.0	5.5	8	3	5.5 H4	30	1	5974083 ¹⁾	5974146 ¹⁾
1/4		20	6.350	80	10	7.0	5.5	8	3	5.1 H5	30	1	5973684 ¹⁾	5974234 ¹⁾
	5/16	24	7.938	90	12	8.0	6.2	9	3	6.9 H4	35	1	5974103 ¹⁾	5974167 ¹⁾
5/16		18	7.938	90	12	8.0	6.2	9	3	6.6 H5	35	1	5973713 ¹⁾	5974048 ¹⁾
	3/8	24	9.525	100	15	10.0	8.0	11	3	8.5 H4	39	1	5974098 ¹⁾	5974160 ¹⁾
3/8		16	9.525	100	15	10.0	8.0	11	3	8 H5	39	1	5973700 ¹⁾	5974038 ¹⁾
	7/16	20	11.112	100	15	8.0	6.2	9	3	9.9 H5	-	1	5974115 ²⁾	5974176 ²⁾
7/16		14	11.112	100	15	8.0	6.2	9	3	9.4 H5	-	1	5974033 ²⁾	5974056 ²⁾
	1/2	20	12.700	110	18	9.0	7.0	10	3	11.5 H5	-	1	5974076 ²⁾	5974141 ²⁾
1/2		13	12.700	110	18	9.0	7.0	10	3	10.8 H5	-	1	5973680 ²⁾	5974228 ²⁾
	5/8	18	15.875	110	20	12.0	9.0	12	4	14.5 H5	-	1	5974111 ²⁾	5974172 ²⁾
5/8		11	15.875	110	20	12.0	9.0	12	4	13.5 H5	-	1	5973718 ²⁾	5974051 ²⁾
	3/4	16	19.050	125	25	14.0	11.0	14	4	17.5 H5	-	1	5974092 ²⁾	5974155 ²⁾
3/4		10	19.050	125	25	14.0	11.0	14	4	16.5 H5	-	1	5973696 ²⁾	5974245 ²⁾
	7/8	14	22.225	140	25	18.0	14.5	17	4	20.4 H6	-	1	5974120 ²⁾	5974180 ²⁾
7/8		9	22.225	140	25	18.0	14.5	17	4	19.5 H6	-	1	5974074 ²⁾	5974062 ²⁾
	1"	12	25.400	160	30	18.0	14.5	17	4	23.25 H6	-	1	5974070 ²⁾	5974137 ²⁾
1"		8	25.400	160	30	18.0	14.5	17	4	22.25 H6	-	1	5973671 ²⁾	5974187 ²⁾

Note: DIN shank and square dimensions will necessitate metric holders

¹⁾ Reinforced Shanks

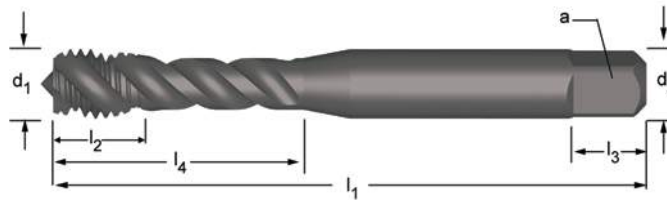
²⁾ Reduced Shanks

Multi-Application, Semi-Bottoming

E023 Premium substrate with Steam tempered surface treatment
E033 reduces wear and prevents chip welding in abrasive or harder ferrous materials.

E023 = UNC Sizes, E033 = UNF Sizes

1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3



E023/E033

UNC UNF

ISO
529

2B



HSS-E



No.2 - 1"

UNC	UNF	TPI	d ₁ nom mm	l ₁ mm	l ₂ mm	d ₂ Ø mm	a mm	l ₃ mm	# of Flutes	l ₄ mm	Limits	Pack Qty	E023 E033
2		56	2.184	44.5	9.5	2.80	2.24	5	2	1.85	H2	1	5974478 ¹⁾
4		40	2.845	48	6	3.15	2.50	5	3	2.35	H2	1	5974490 ¹⁾
5		40	3.175	48	6	3.15	2.50	5	3	2.65	H2	1	5974022 ¹⁾
6		32	3.505	50	6	3.55	2.80	5	3	2.85	H2	1	5974149 ¹⁾
	8	36	4.166	53	7	4.5	3.55	6	3	3.50	H3	1	5973953 ¹⁾
8		32	4.166	53	7	4.50	3.55	6	3	3.50	H3	1	5974211 ¹⁾
	10	32	4.826	58	8	5.0	4.00	7	3	4.10	H3	1	5973922 ¹⁾
10		24	4.826	58	8	5.00	4.00	7	3	3.90	HH3	1	5974471 ¹⁾
12		24	5.486	62	12	5.60	4.50	7	3	4.50	H3	1	5974475 ¹⁾
	1/4	28	6.350	66	10	6.3	5.00	8	3	5.50	H4	1	5973918 ¹⁾
1/4		20	6.350	66	10	6.30	5.00	8	3	5.10	H5	1	5974466 ¹⁾
	5/16	24	7.938	72	12	8.0	6.30	9	3	6.90	H4	1	5973938 ¹⁾
5/16		18	7.938	72	12	8.00	6.30	9	3	6.60	H5	1	5974050 ¹⁾
	3/8	24	9.525	80	15	10.0	8.00	11	3	8.50	H4	1	5973930 ¹⁾
3/8		16	9.525	80	15	10.00	8.00	11	3	8.00	H5	1	5974484 ¹⁾
	7/16	20	11.112	85	19	8.0	6.30	9	3	9.90	-	1	5973946 ²⁾
7/16		14	11.112	85	19	8.00	6.30	9	3	9.40	-	1	5974196 ²⁾
	1/2	20	12.700	89	22	9.0	7.10	10	3	11.50	-	1	5973913 ²⁾
1/2		13	12.700	89	19	9.00	7.10	10	3	10.80	-	1	5974462 ²⁾
	9/16	18	14.288	95	24	11.2	9.00	12	3	12.90	-	1	5973956 ²⁾
	5/8	18	15.875	102	24	12.5	10.00	13	4	14.50	-	1	5973942 ²⁾
5/8		11	15.875	102	24	12.50	10.00	13	4	13.50	-	1	5974093 ²⁾
	3/4	16	19.050	112	29	14.0	11.20	14	4	17.50	-	1	5973926 ²⁾
3/4		10	19.050	112	29	14.00	11.20	14	4	16.50	-	1	5974481 ²⁾
	7/8	14	22.225	118	29	16.0	12.50	16	4	20.40	-	1	5973950 ²⁾
7/8		9	22.225	118	29	16.00	12.50	16	4	19.50	-	1	5974207 ²⁾
	1"	12	25.400	130	35	18.0	14.00	18	4	23.25	-	1	5973908 ²⁾
1"		8	25.400	130	35	18.00	14.00	18	4	22.25	-	1	5974458 ²⁾

Note: ISO shank and square dimensions will necessitate metric holders

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

SPIRAL FLUTE TAP (48°-52°)

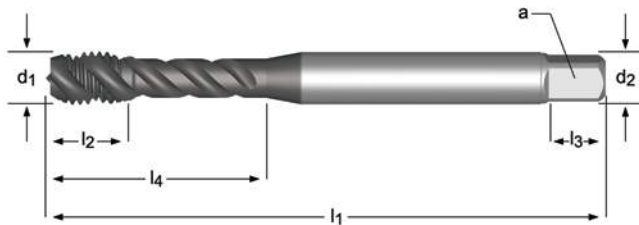


MXL Multi-Application, Semi-Bottoming

1677AP Designed for blind hole tapping in a variety of materials with a hardness up to 36 Rc. The premium substrate and TiCN coating combine to offer superior abrasion resistance, higher operating speeds, improved thread quality, reduced cycle times, and longer tool life.

1679 Coolant thru design allows higher tapping speeds and eliminates the problems associated with inadequate coolant in horizontal or deep hole applications.

1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3 4.1 4.2 5.1 5.2 6.1 6.2 6.3
7.1 7.2 7.3 7.4



APPLIX

1677AP(M)		1679(M)	
M	MF	M	MF
DIN ANSI		DIN ANSI	
6H		6H	
HSS PM		HSS PM	
M4 - M24		M6 - M24	

M	MF	TPI	l_1 mm	l_2 mm	l_4 Inch (Neck Length)	Limits	d_2 Inch	a Inch	# of Flutes	Pack Qty	1677AP	1679(M)
4		0.70	63	6	21	D4	0.168	0.131	3	1	6204927 ¹⁾	—
5		0.80	70	9	25	D4	0.194	0.152	3	1	6204928 ¹⁾	—
6		1.00	80	11	30	D5	0.255	0.191	3	1	6204929 ¹⁾	6008613 ¹⁾
	8	1.00	90	12	35	D5	0.318	0.238	3	1	6205010 ¹⁾	—
8		1.25	90	12	35	D5	0.318	0.238	3	1	6204930 ¹⁾	6008380 ¹⁾
	10	1.25	100	14	39	D6	0.381	0.286	3	1	6204913 ¹⁾	6008830
10		1.50	100	14	39	D6	0.381	0.286	3	1	6204914 ¹⁾	6008835 ¹⁾
	12	1.50	100	16		D6	0.367	0.275	3	1	6204915 ²⁾	—
12		1.75	110	16		D6	0.367	0.275	3	1	6204916 ²⁾	6008845 ²⁾
	14	1.50	100	18		D7	0.429	0.322	3	1	6204917 ²⁾	—
14		2.00	110	18		D7	0.429	0.322	3	1	6204918 ²⁾	6008856 ²⁾
16		2.00	110	19		D7	0.480	0.360	3	1	6204920 ²⁾	6008422 ²⁾
	18	1.50	110	21		D7	0.542	0.406	3	1	6204921 ²⁾	—
18		2.50	125	21		D7	0.542	0.406	3	1	6204922 ²⁾	6008537 ²⁾
	20	1.50	125	21		D7	0.652	0.489	3	1	6204923 ²⁾	—
20		2.50	140	21		D7	0.652	0.489	3	1	6204924 ²⁾	6008606 ²⁾
24		3.00	160	26		D8	0.760	0.570	4	1	6204926 ²⁾	6008611 ²⁾

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

Multi-Application, Semi-Bottoming

E007 Premium substrate for blind hole tapping in tough or abrasive materials. Bronze tempered body and shank reduces rust and corrosion. Bright finish flutes improve chip flow in soft and non-ferrous materials.

E007 = Metric Coarse, E017 = Metric Fine

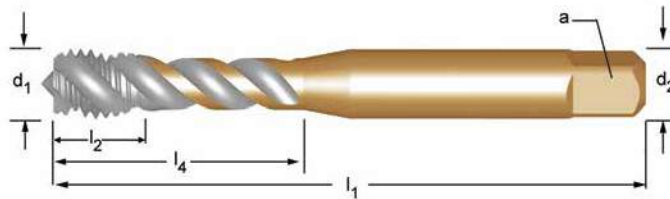
1.1 1.2 1.3 1.4 1.5 4.1 4.2 5.1 5.2 7.1 7.2 7.3 7.4

E008 Premium substrate with Steam tempered surface treatment reduces wear and prevents chip welding in abrasive or harder ferrous materials.

E018

E008 = Metric Coarse, E018 = Metric Fine

1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3



E007	E008/E018
M	M MF
ANSI	ANSI
6H	6H
HSS-E	HSS-E
M4 - M20	M4 - M20

			I ₁	I ₂	d ₂ Ø		# of flutes		I ₄	Pack Qty	E007	E008 E018		
M	MF	P mm	Inch	Inch	Inch	a Inch		Limits		Inch				
4		0.70	2.1/8	0.2484	0.1680	0.1310	3	D4	3.30	N30	0.6526	1	5973801 ¹⁾	5973840 ¹⁾
5		0.80	2.3/8	0.2650	0.1940	0.1520	3	D4	4.20	N19	0.8434	1	5973805 ¹⁾	5973843 ¹⁾
6		1.00	2.1/2	0.3937	0.2550	0.1910	3	D5	5.00	N9	1.0993	1	5973808 ¹⁾	5973846 ¹⁾
	8	1.00	2.23/32	0.4567	0.3180	0.2380	3	D5	7.00	J	1.3094	1	—	5973601 ¹⁾
8		1.25	2.23/32	0.4567	0.3180	0.2380	3	D5	6.80	H	1.3094	1	5973811 ¹⁾	5973850 ¹⁾
	10	1.00	2.15/16	0.5315	0.3810	0.2860	3	D6	9.00	T	1.4415	1	—	5973589 ¹⁾
10		1.50	2.15/16	0.5315	0.3810	0.2860	3	D6	8.50	Q	1.4415	1	5973786 ¹⁾	5973814 ¹⁾
12		1.75	3.3/8	0.6890	0.3670	0.2750	3	D6	10.30	Y		1	5973787 ²⁾	5973816 ²⁾
	14	1.50	3.19/32	0.7087	0.4290	0.3220	3	D7	12.50	31/64		1	—	5973593 ²⁾
14		2.00	3.19/32	0.7087	0.4290	0.3220	3	D7	12.00	15/32		1	— ²⁾	5973820 ²⁾
16		2.00	3.13/16	0.7087	0.4800	0.3600	3	D7	14.00	35/64		1	5973791 ²⁾	5973824 ²⁾
20		2.50	4.15/32	0.8858	0.6520	0.4890	3	D7	17.50	11/16		1	— ²⁾	5973836 ²⁾

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

SPIRAL FLUTE TAPS (45°)



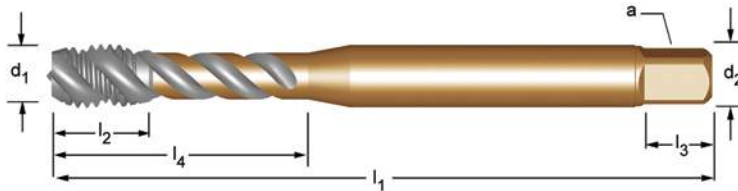
Multi-Application, Semi-Bottoming

EX006H Premium substrate for blind hole tapping in tough or abrasive materials. Bronze tempered body and shank reduces rust and corrosion. Bright finish flutes improve chip flow in soft and non-ferrous materials.

1.1 1.2 1.3 1.4 1.5 4.1 4.2 5.1 5.2 7.1 7.2 7.3 7.4

EX016H Premium substrate with Steam tempered surface treatment reduces wear and prevents chip welding in abrasive or harder ferrous materials.

1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3



EX006H	EX016H
M	M
DIN 371≤10 376≥12	DIN 371≤10 376≥12
6H	6H
HSS-E	HSS-E
M2 - M64	M2 - M64

M	P mm	l ₁ mm	l ₂ mm	d ₂ Ø mm	a mm	l ₃ mm	# of Flutes	l ₄ mm	Limits	Pack Qty	EX006H	EX016H
2	0.40	45	4	2.8	2.1	5	3	1.6	9 D3	1	5973751 ¹⁾	5973739 ¹⁾
2.5	0.45	50	4	2.8	2.1	5	3	2.05	12.5 D3	1	5973567 ¹⁾	5973742 ¹⁾
3	0.50	56	6	3.5	2.7	6	3	2.5	18 D3	1	5973590 ¹⁾	5973698 ¹⁾
3.5	0.60	56	7	4.0	3.0	6	3	2.9	20 D4	1	5973595 ¹⁾	5973702 ¹⁾
4	0.70	63	7	4.5	3.4	6	3	3.3	21 D4	1	5973630 ¹⁾	5973532 ¹⁾
5	0.80	70	8	6.0	4.9	8	3	4.2	25 D4	1	5973649 ¹⁾	5973544 ¹⁾
6	1.00	80	10	4.5	3.4	6	3	5	31 D5	1	5973677 ²⁾	5973562 ²⁾
6	1.00	80	10	6.0	4.9	8	3	5	31 D5	1	5973673 ¹⁾	5973559 ¹⁾
7	1.00	80	10	7.0	5.5	8	3	6	31 D5	1	5973690 ¹⁾	5973576 ¹⁾
8	1.25	90	13	6.0	4.9	8	3	6.8	35 D5	1	5973697 ²⁾	5973584 ²⁾
8	1.25	90	12	8.0	6.2	9	3	6.8	35 D5	1	5973694 ¹⁾	5973580 ¹⁾
10	1.50	100	15	7.0	5.5	8	3	8.5	39 D6	1	5973991 ²⁾	5973712 ²⁾
10	1.50	100	15	10.0	8.0	11	3	8.5	39 D6	1	5973986 ¹⁾	5973705 ¹⁾
12	1.75	110	16	9.0	7.0	10	3	10.3	- D6	1	5973611 ²⁾	5973717 ²⁾
14	2.00	110	20	11.0	9.0	12	3	12	- D7	1	5973709 ²⁾	5973722 ²⁾
16	2.00	110	20	12.0	9.0	12	4	14	- D7	1	5973744 ²⁾	5973730 ²⁾
18	2.50	125	25	14.0	11.0	14	4	15.5	- D7	1	5973748 ²⁾	5973736 ²⁾
20	2.50	140	25	16.0	12.0	15	4	17.5	- D7	1	5973571 ²⁾	5973524 ²⁾
22	2.50	140	25	18.0	14.5	17	4	19.5	- D8	1	5973578 ²⁾	5973594 ²⁾
24	3.00	160	30	18.0	14.5	17	4	21	- D8	1	5973583 ²⁾	5973644 ²⁾
27	3.00	160	30	20.0	16.0	19	4	24	- D8	1	5973586 ²⁾	5973689 ²⁾
30	3.50	180	36	22.0	18.0	21	4	26.5	- D9	1	5973599 ²⁾	5973706 ²⁾
33	3.50	180	36	25.0	20.0	23	4	29.5	- D9	1	5973604 ²⁾	5973710 ²⁾
36	4.00	200	40	28.0	22.0	25	4	32	- D9	1	5973616 ²⁾	5973526 ²⁾
39	4.00	200	40	32.0	24.0	27	4	35	- D9	1	5973624 ²⁾	5973530 ²⁾
42	4.50	200	45	32.0	24.0	27	4	37.5	- D10	1	5973634 ²⁾	5973534 ²⁾
48	5.00	250	50	36.0	29.0	32	4	43	- D11	1	5973646 ²⁾	5973539 ²⁾
52	5.00	250	50	40.0	32.0	35	5	47	- D11	1	5973653 ²⁾	5973547 ²⁾
56	5.50	250	55	40.0	32.0	35	5	50.5	- D11	1	5973658 ²⁾	5973550 ²⁾
64	6.00	315	60	50.0	39.0	42	6	58	- D12	1	5973682 ²⁾	5973565 ²⁾

Note: DIN shank and square dimensions will necessitate metric holders

¹⁾ Reinforced Shanks (DIN 371)

²⁾ Reduced Shanks (DIN 376)

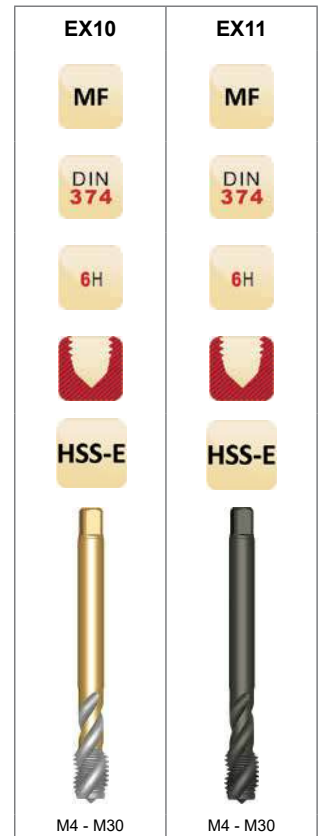
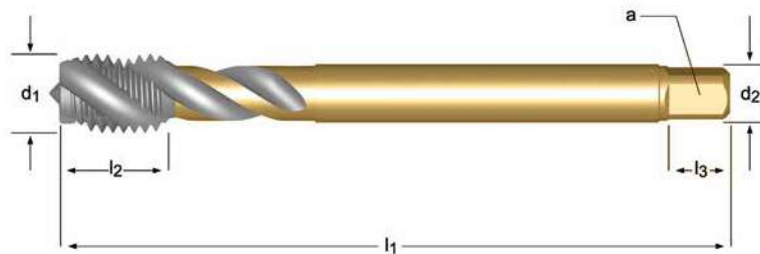
Multi-Application, Semi-Bottoming

EX10 Premium substrate for blind hole tapping in tough or abrasive materials. Bronze tempered body and shank reduces rust and corrosion. Bright finish flutes improve chip flow in soft and non-ferrous materials.

1.1 1.2 1.3 1.4 1.5 4.1 4.2 5.1 5.2 7.1 7.2 7.3 7.4

EX11 Premium substrate with Steam tempered surface treatment reduces wear and prevents chip welding in abrasive or harder ferrous materials.

1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3



		l_1	l_2	d_2		l_3	# of		Limits	Pack		
MF	P	mm	mm	mm	a	mm	Flutes			Qty	EX10	EX11
4	0.50	63	7	2.8	2.1	5	3	3.5	D4	1	5973675	5973648
5	0.50	70	8	3.5	2.7	6	3	4.5	D4	1	5973721	5973652
6	0.75	80	10	4.5	3.4	6	3	5.3	D5	1	5973726	5973656
8	0.75	80	13	6.0	4.9	8	3	7.3	D5	1	5973728	5973662
8	1.00	90	13	6.0	4.9	8	3	7	D5	1	5973731	5973667
10	0.75	90	13	7.0	5.5	8	3	9.3	D6	1	5973591	5973733
10	1.00	90	13	7.0	5.5	8	3	9	D6	1	5973598	5973540
10	1.25	100	15	7.0	5.5	8	3	8.8	D6	1	5973603	5973543
12	1.00	100	15	9.0	7.0	10	3	11	D6	1	5973608	5973546
12	1.25	100	15	9.0	7.0	10	3	10.8	D6	1	5973613	5973549
12	1.50	100	15	9.0	7.0	10	3	10.5	D6	1	5973618	5973552
14	1.00	100	15	11.0	9.0	12	3	13	D7	1	5973621	5973555
14	1.25	100	15	11.0	9.0	12	3	12.8	D7	1	5973626	5973558
14	1.50	100	15	11.0	9.0	12	3	12.5	D7	1	5973631	5973563
16	1.00	100	15	12.0	9.0	12	4	15	D7	1	5973635	5973566
16	1.50	100	15	12.0	9.0	12	4	14.5	D7	1	5973639	5973570
18	1.00	110	17	14.0	11.0	14	4	17	D7	1	5973647	5973577
18	1.50	110	17	14.0	11.0	14	4	16.5	D7	1	5973651	5973582
20	1.00	125	17	16.0	12.0	15	4	19	D7	1	5973657	5973588
20	1.50	125	17	16.0	12.0	15	4	18.5	D7	1	5973661	5973592
22	1.50	125	17	18.0	14.5	17	4	20.5	D8	1	5973665	5973597
24	1.50	140	20	18.0	14.5	17	4	22.5	D8	1	5973670	5973602
24	2.00	140	20	18.0	14.5	17	4	22	D8	1	5973674	5973605
25	1.50	140	20	18.0	14.5	17	4	23.5	D8	1	5973678	5973609
26	1.50	140	20	18.0	14.5	17	4	24.5	D8	1	5973681	5973614
27	1.50	140	20	20.0	16.0	19	4	25.5	D8	1	5973685	5973619
27	2.00	140	20	20.0	16.0	19	4	25	D8	1	5973693	5973627
28	1.50	140	20	20.0	16.0	19	4	26.5	D9	1	5973535	5973636
30	1.50	150	20	22.0	18.0	21	4	28.5	D9	1	5973573	5973640
30	2.00	150	20	22.0	18.0	21	4	28	D9	1	5973622	5973645

Note: DIN shank and square dimensions will necessitate metric holders

SPIRAL FLUTE TAPS (45°)



Multi-Application, Semi-Bottoming

E002 Premium substrate for blind hole tapping in tough or abrasive materials. Bronze tempered body and shank reduces rust and corrosion. Bright finish flutes improve chip flow in soft and non-ferrous materials.

E002 = Metric Coarse

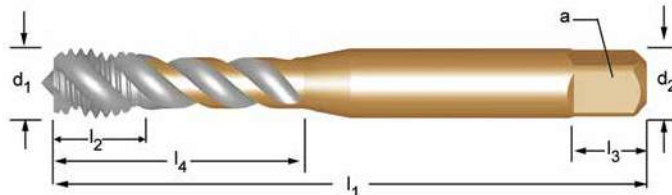
1.1 1.2 1.3 1.4 1.5 4.1 4.2 5.1 5.2 7.1 7.2 7.3 7.4

E003 Premium substrate with Steam tempered surface treatment reduces wear and prevents chip welding in abrasive or harder ferrous materials.

E013

E003 = Metric Coarse, E013 = Metric Fine

1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3



Note: ISO shank and square dimensions will necessitate metric holders

E002	E003 / E013	
M	M	MF
ISO 529	ISO 529	
6H	6H	
HSS-E	HSS-E	
M2 - M24	M2 - M24	

M	MF	P mm	l ₁ mm	l ₂ mm	d ₂ Ø mm	a mm	l ₃ mm	# of Flutes	Limits		l ₄ mm	Pack Qty	E002	E003 E013
2		0.40	41	8	2.50	2.00	4	2	D3	1.6	8	1	5974446 ¹⁾	5974357 ¹⁾
2.5		0.45	44.5	9.5	2.80	2.24	5	2	D3	2.05	9.5	1	5974485 ¹⁾	5974361 ¹⁾
3		0.50	48	6	3.15	2.50	5	3	D3	2.5	12.5	1	5974500 ¹⁾	5974380 ¹⁾
	4	0.50	53	7	4.0	3.15	6	3	D4	3.5	19	1	—	5973529 ¹⁾
4		0.70	53	7	4.00	3.15	6	3	D4	3.3	19	1	5974312 ¹⁾	5974390 ¹⁾
	5	0.50	58	8	5.0	4.0	7	3	D4	4.5	22	1	—	5973531 ¹⁾
5		0.80	58	8	5.00	4.00	7	3	D4	4.2	22	1	5974316 ¹⁾	5974394 ¹⁾
	6	0.50	66	10	6.3	5.0	8	3	D5	5.5	27	1	—	5973533 ¹⁾
	6	0.75	66	10	6.3	5.0	8	3	D5	5.3	27	1	—	5973536 ¹⁾
6		1.00	66	10	6.30	5.00	8	3	D5	5.0	27	1	5974320 ¹⁾	5974404 ¹⁾
	8	0.75	72	12	8.0	6.3	9	3	D5	7.3	31	1	—	5973538 ¹⁾
	8	1.00	72	12	8.0	6.3	9	3	D5	7.0	31	1	—	5973541 ¹⁾
8		1.25	72	12	8.00	6.30	9	3	D5	6.8	31	1	5974325 ¹⁾	5974414 ¹⁾
	10	1.00	80	15	10.0	8.0	11	3	D6	9.0	35	1	—	5973512 ¹⁾
	10	1.25	80	15	10.0	8.0	11	3	D6	8.8	35	1	—	5973514 ¹⁾
10		1.50	80	15	10.00	8.00	11	3	D6	8.5	35	1	5973886 ¹⁾	5974329 ¹⁾
	12	1.00	89	16	9.0	7.1	10	3	D6	11.0	-	1	—	5973516 ²⁾
	12	1.25	89	16	9.0	7.1	10	3	D6	10.8	-	1	—	5973517 ²⁾
	12	1.50	89	16	9.0	7.1	10	3	D6	10.5	-	1	—	5973518 ²⁾
12		1.75	89	16	9.00	7.10	10	3	D6	10.3	-	1	5973895 ²⁾	5974334 ²⁾
	14	1.50	95	18	11.2	9.0	12	3	D7	12.5	-	1	—	5973519 ²⁾
14		2.00	95	18	11.20	9.00	12	3	D7	12.0	-	1	5974304 ²⁾	5974339 ²⁾
	16	1.00	102	18	12.5	10.0	13	4	D7	15.0	-	1	—	5973520 ²⁾
	16	1.50	102	18	12.5	10.0	13	4	D7	14.5	-	1	—	5973521 ²⁾
16		2.00	102	18	12.50	10.00	13	4	D7	14.0	-	1	5974349 ²⁾	5974344 ²⁾
	18	1.50	112	29	14.0	11.2	14	4	D7	16.5	-	1	—	5973522 ²⁾
18		2.50	112	29	14.00	11.20	14	4	D7	15.5	-	1	5974399 ²⁾	5974352 ²⁾
	20	1.50	112	29	14.0	11.2	14	4	D7	18.5	-	1	—	5973525 ²⁾
20		2.50	112	29	14.00	11.20	14	4	D7	17.5	-	1	5974491 ²⁾	5974366 ²⁾
	22	1.50	118	29	16.0	12.5	16	4	D8	20.5	-	1	—	5973527 ²⁾
22		2.50	118	29	16.00	12.50	16	4	D8	19.5	-	1	5974494 ²⁾	5974371 ²⁾
24		3.00	130	35	18.00	14.00	18	4	D8	21.0	-	1	5974497 ²⁾	5974376 ²⁾

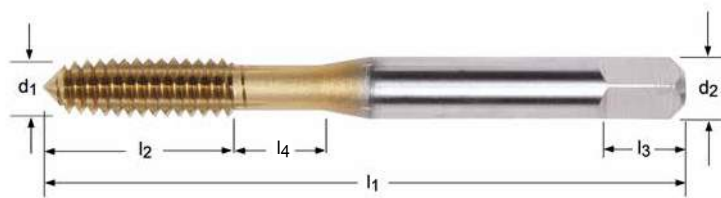
¹⁾ Reinforced Shanks, ²⁾ Reduced Shanks

Multi-Application / Lube Grooves, Full-Bottoming

1641 Premium PM substrate provides superior abrasion resistance and edge strength. Multiple Lube Groove design assures lubrication in the forming zone and eliminates the build up of hydraulic pressure in blind holes. TiN coated for enhanced performance. The hard, smooth coating provides a greater lubricity, increases tool life, and improves thread flank finish.

The entry taper is full bottoming style (1-2 thread chamfer) for blind hole tapping.

1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3 4.1 5.1 6.1 6.2 6.3 7.1 7.2
7.3



1641(UNC)	1641(UNF)
UNC	UNF
ANSI	ANSI
2B 3B	2B 3B
	
HSS PM	HSS PM
	
No.4 - 1/2	No.10 - 3/8

UNC	UNF	TPI	l_1 Inch	l_2 Inch	l_4 Inch (Neck Length)	l_3 Inch	d_2 Ø Inch	$\square$ a Inch	Limits	Pack Qty	1641(UNC)	1641(UNF)
4		40	1.7/8	5/16	9/16	3/16	0.141	0.110	H3	1	6008526	—
4		40	1.7/8	5/16	9/16	3/16	0.141	0.110	H5	1	6008585	—
6		32	2"	3/8	11/16	3/16	0.141	0.110	H3	1	6008387	—
6		32	2"	3/8	11/16	3/16	0.141	0.110	H5	1	6008391	—
8		32	2.1/8	3/8	3/4	1/4	0.141	0.110	H3	1	6008411	—
8		32	2.1/8	3/8	3/4	1/4	0.141	0.110	H5	1	6008416	—
	10	32	2.3/8	1/2	7/8	1/4	0.194	0.152	H4	1	—	6008114
	10	32	2.3/8	1/2	7/8	1/4	0.194	0.152	H6	1	—	6008115
10		24	2.3/8	1/2	7/8	1/4	0.194	0.152	H6	1	6008113	—
	1/4	28	2.1/2	5/8	1"	5/16	0.255	0.191	H4	1	—	6008110
	1/4	28	2.1/2	5/8	1"	5/16	0.255	0.191	H6	1	—	6008111
1/4		20	2.1/2	5/8	1"	5/16	0.255	0.191	H4	1	6008108	—
1/4		20	2.1/2	5/8	1"	5/16	0.255	0.191	H6	1	6008109	—
	5/16	24	2.23/32	11/16	1.1/8	3/8	0.318	0.238	H7	1	—	6008383
5/16		18	2.23/32	11/16	1.1/8	3/8	0.318	0.238	H5	1	6008605	—
5/16		18	2.23/32	11/16	1.1/8	3/8	0.318	0.238	H7	1	6008608	—
	3/8	24	2.15/16	3/4	1.1/4	7/16	0.381	0.286	H7	1	—	6008476
3/8		16	2.15/16	3/4	1.1/4	7/16	0.381	0.286	H5	1	6008117	—
3/8		16	2.15/16	3/4	1.1/4	7/16	0.381	0.286	H7	1	6008374	—
1/2		13	3.3/8	15/16	1.21/32	7/16	0.367	0.275	H5	1	6008102	—
1/2		13	3.3/8	15/16	1.21/32	7/16	0.367	0.275	H8	1	6008104	—

THREAD FORMING TAPS



Multi-Application / Lube Grooves, Full-Bottoming

1671 Premium PM substrate provides superior abrasion resistance and edge strength. Multiple Lube Groove design assures lubrication in the forming zone and eliminates the build up of hydraulic pressure in blind holes. TiN coated for enhanced performance. The hard, smooth coating provides a greater lubricity, increases tool life, and improves thread flank finish.

The entry taper is full bottoming style for blind hole tapping.

1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3 4.1 5.1 6.1 6.2 6.3 7.1 7.2
7.3



1671(M)

M

ANSI

6H



HSS
PM



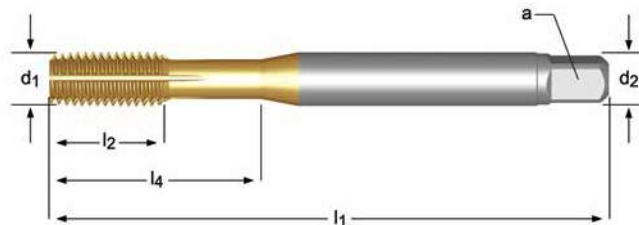
M3 - M10

M	P mm	l_1 Inch	l_2 Inch	l_4 Inch (Neck Length)	l_3 Inch	d_2 Ø Inch	⊠ a Inch	Limits	Pack Qty	1671(M)
3	0.50	1.15/16	5/16	1/2	3/16	0.141	0.110	D5	1	6008385
4	0.70	2.1/8	3/8	3/4	1/4	0.168	0.131	D6	1	6008389
5	0.80	2.3/8	1/2	7/8	1/4	0.194	0.152	D7	1	6008393
6	1.00	2.1/2	5/8	1"	5/16	0.255	0.191	D8	1	6008397
8	1.00	2.23/32	11/16	1.1/8	3/8	0.318	0.238	D9	1	6008401
8	1.25	2.23/32	11/16	1.1/8	3/8	0.318	0.238	D9	1	6008405
10	1.50	2.15/16	3/4	1.1/4	7/16	0.381	0.286	D10	1	6008375

MXR Multi-Application / Lube Grooves, Semi-Bottoming

1681AP Premium PM substrate provides superior abrasion resistance and edge strength. Multiple Lube Groove design assures lubrication in the forming zone and eliminates the build up of hydraulic pressure in blind holes. The TiN-Top coating process reduces friction, prevents chip welding and improves chip flow.

1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3 4.1 5.1 6.1 6.2 6.3 7.1 7.2
7.3



APPLIX

1681AP(UNC)	1681AP(UNF)
UNC	UNF
DIN ANSI	DIN ANSI
2B	2B
	
HSS PM	HSS PM
	
No.4 - 1"	No.10 - 7/8

UNC	UNF	TPI	l_1 Inch	l_2 Inch	l_4 Inch (Neck Length)	Limits	d_2 Inch	a Inch	Pack Qty	1681AP (UNC)	1681AP (UNF)
4		40	2.205	0.433	0.709	H5	0.141	0.110	1	6204945 ¹⁾	—
6		32	2.205	0.472	0.787	H5	0.141	0.110	1	6204950 ¹⁾	—
8		32	2.480	0.512	0.827	H5	0.168	0.131	1	6204955 ¹⁾	—
	10	32	2.756	0.512	0.984	H6	0.194	0.152	1	—	6204938 ¹⁾
10		24	2.756	0.591	0.984	H6	0.194	0.152	1	6204937 ¹⁾	—
12		24	3.150	0.630	1.142	H6	0.220	0.165	1	6371643 ¹⁾	—
	1/4	28	3.150	0.669	1.181	H6	0.255	0.191	1	—	6204936 ¹⁾
1/4		20	3.150	0.669	1.181	H6	0.255	0.191	1	6204935 ¹⁾	—
	5/16	24	3.543	0.669	1.378	H7	0.318	0.238	1	—	6204947 ¹⁾
5/16		18	3.546	0.787	1.378	H7	0.318	0.238	1	6204946 ¹⁾	—
	3/8	24	3.937	0.709	1.535	H7	0.381	0.286	1	—	6204944 ¹⁾
3/8		16	3.937	0.866	1.535	H7	0.381	0.286	1	6204943 ¹⁾	—
	7/16	20	3.937	0.866	—	H8	0.323	0.242	1	—	6204952 ²⁾
7/16		14	3.937	0.866	—	H8	0.323	0.242	1	6204951 ²⁾	—
	1/2	20	3.937	0.866	—	H8	0.397	0.275	1	—	6204934 ²⁾
1/2		13	4.331	0.984	—	H8	0.367	0.275	1	6204933 ²⁾	—
5/8		11	4.331	1.063	—	H8	0.480	0.360	1	6204948 ²⁾	—
	3/4	16	4.331	0.984	—	H8	0.590	0.442	1	—	6204942 ²⁾
3/4		10	4.921	1.181	—	H8	0.590	0.442	1	6204941 ²⁾	—
	7/8	14	4.921	1.024	—	H9	0.697	0.523	1	—	6204953 ²⁾
7/8		9	5.512	1.260	—	H9	0.697	0.523	1	6204954 ²⁾	—
1"		8	6.299	1.417	—	H9	0.800	0.600	1	6204940 ²⁾	—

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

THREAD FORMING TAPS

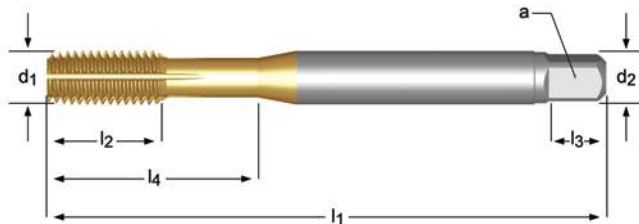


APPLIX

MXR Multi-Application / Lube Grooves, Semi-Bottoming

1691AP Coolant thru premium PM substrate allows higher tapping speeds in soft ferrous or non-ferrous materials. The TiN-Top coating process reduces friction, prevents chip welding and improves chip flow.

1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3 4.1 5.1 6.1 6.2 6.3 7.1 7.2
7.3



1691AP(UNC)	1691AP(UNF)
UNC	UNF
DIN ANSI	DIN ANSI
2B	2B
HSS PM	HSS PM
1/4 - 1"	5/16 - 1/2

UNC	UNF	TPI	l_1 Inch	l_2 Inch	l_4 Inch (Neck Length)	Limits	d_2 Ø Inch	a Inch	Pack Qty	1691AP (UNC)	1691AP (UNF)
1/4		20	3.150	0.669	1.181	H6	0.255	0.191	1	6204976 ¹⁾	—
	5/16	24	3.543	0.669	1.378	H7	0.318	0.238	1	—	6204985 ¹⁾
5/16		18	3.546	0.787	1.378	H7	0.318	0.238	1	6204984 ¹⁾	—
	3/8	24	3.937	0.709	1.535	H7	0.381	0.286	1	—	6204983 ¹⁾
3/8		16	3.937	0.866	1.535	H7	0.381	0.286	1	6204982 ¹⁾	—
	7/16	20	3.937	0.866	—	H8	0.323	0.242	1	—	6204989 ²⁾
	1/2	20	3.937	0.866	—	H8	0.397	0.275	1	—	6204975 ²⁾
1/2		13	4.331	0.984	—	H8	0.367	0.275	1	6204974 ²⁾	—
5/8		11	4.331	1.063	—	H8	0.480	0.360	1	6204986 ²⁾	—
3/4		10	4.921	1.181	—	H8	0.590	0.442	1	6204980 ²⁾	—
1"		8	6.299	1.417	—	H9	0.800	0.600	1	6204979 ²⁾	—

¹⁾ Reinforced Shanks

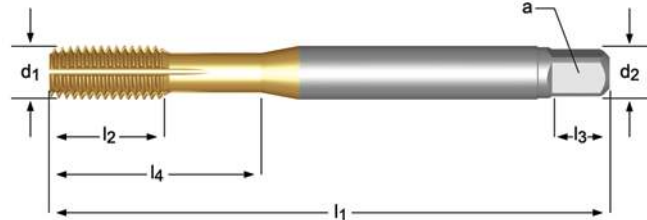
²⁾ Reduced Shanks

MXR Multi-Application / Lube Grooves, Semi-Bottoming

1687AP Premium PM substrate provides superior abrasion resistance and edge strength. Multiple Lube Groove design assures lubrication in the forming zone and eliminates the build up of hydraulic pressure in blind holes. The TiN-Top coating process reduces friction, prevents chip welding and improves chip flow. Features a semi-bottoming lead for improved performance and longer tool life. Can be used for through or blind holes.

1697AP Coolant thru premium PM substrate allows higher tapping speeds in soft ferrous or non-ferrous materials. The TiN-Top coating process reduces friction, prevents chip welding and improves chip flow.

1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3 4.1 5.1 6.1 6.2 6.3 7.1 7.2
7.3



APPLIX

1687AP	1697AP
M MF	M
DIN ANSI	DIN ANSI
6H	6H
	
HSS PM	HSS PM
	
M4 - M20	M6 - M20

M	MF	P mm	l ₁ mm	l ₂ mm	l ₂ Inch	l ₄ Inch (Neck Length)	Limits	d ₂ Ø Inch	□ a Inch	Pack Qty	1687AP	1697AP
4		0.70	63	13		21	D6	0.168	0.131	1	6204970 ¹⁾	—
5		0.80	70	15		25	D7	0.194	0.152	1	6204971 ¹⁾	—
6		1.00	80	17		30	D8	0.255	0.191	1	6204972 ¹⁾	6205004 ¹⁾
8		1.25	90	20		25	D9	0.318	0.238	1	6204973 ¹⁾	—
8		1.25	90	20		35	D9	0.318	0.238	1	—	6205005 ¹⁾
	10	1.25	100	16		39	D10	0.381	0.286	1	6204956 ¹⁾	—
10		1.50	100	22		39	D10	0.381	0.286	1	6204957 ¹⁾	6204991 ¹⁾
	12	1.50	100	22			D11	0.367	0.275	1	6204958 ²⁾	—
12		1.75	110	24			D11	0.367	0.275	1	6204959 ²⁾	6204993 ²⁾
	14	1.50	100	22			D10	0.429	0.322	1	6204960 ²⁾	—
14		2.00	110	26			D11	0.429	0.322	1	6204961 ²⁾	— ²⁾
	16	1.50	100	22			D10	0.480	0.360	1	6204962 ²⁾	—
16		2.00	110	27			D11	0.480	0.360	1	6204963 ²⁾	6204997 ²⁾
	20	1.50	125		25		D11	0.652	0.489	1	—	6205000 ²⁾
20		2.50	140	32			D12	0.652	0.489	1	6204967 ²⁾	— ²⁾

¹⁾ Reinforced Shanks

²⁾ Reduced Shanks

PIPE TAPS, STRAIGHT FLUTE



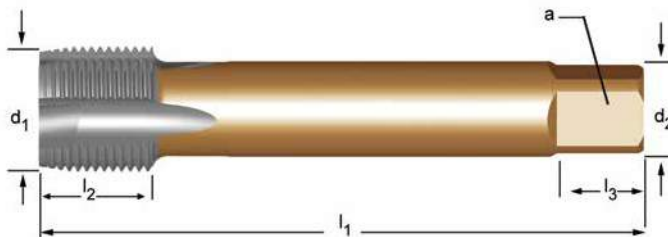
Parallel Thread, G (BSP), Plug Style

EP40 Bronze tempered body and shank reduces rust and corrosion. Bright flutes improve chip flow in soft or non-ferrous materials.

1.1 1.2 1.3 1.4 1.5 1.6 3.1 3.2 3.3 3.4 4.1 4.2 5.1 5.2 6.1
6.2 6.3 7.1 7.2 7.3 7.4 8.1

EP41 Steam tempered surface treatment reduces wear and chip welding in abrasive or harder ferrous materials.

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4



EP40	EP41
G	G
DIN 5156	DIN 5156
Normal	Normal
HSS-E	HSS-E
1/8 - 1"	1/8 - 1"

G(BSP)	TPI	d ₁ nom mm	l ₁ mm	l ₂ mm	d ₂ Ø mm	□ a mm	l ₃ mm	# of flutes		Pack Qty	EP40	EP41
1/8	28	9.728	90	18	7.0	5.5	8	3	8.8	1	5973943	5973972
1/4	19	13.157	100	21	11.0	9.0	12	3	11.8	1	5973939	5973969
3/8	19	16.662	100	21	12.0	9.0	12	4	15.25	1	5973951	5973978
1/2	14	20.955	125	24	16.0	12.0	15	4	19	1	5973935	5973966
5/8	14	22.911	125	24	18.0	14.5	17	4	21	1	5973954	5973981
3/4	14	26.441	140	28	20.0	16.0	19	4	24.5	1	5973947	5973975
7/8	14	30.201	150	28	22.0	18.0	21	4	28.25	1	5973960	5973984
1"	11	33.249	160	30	25.0	20.0	23	4	30.75	1	5973931	5973963

Note: DIN shank and square dimensions will necessitate metric holders

Parallel Thread, G(BSP), Plug Style

E041 Steam tempered surface treatment reduces wear and chip welding in abrasive or harder ferrous materials.

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4



E041

G

DORMER
ISO

Normal



HSS-E



1/8 - 3/4

G(BSP)	TPI	d ₁ nom mm	l ₁ mm	l ₂ mm	d ₂ Ø mm	□ a mm	l ₃ mm	# of Flutes		Pack Qty	E041
1/8	28	9.728	90	15	8.0	6.3	9	3	8.80	1	5973928
1/4	19	13.157	100	19	10.0	8.0	11	3	11.80	1	5973924
3/8	19	16.662	100	21	12.5	10.0	13	3	15.25	1	5973936
1/2	14	20.955	125	26	16.0	12.5	16	4	19.00	1	5973920
3/4	14	26.441	140	28	20.0	16.0	20	4	24.50	1	5973932

Note: ISO shank and square dimensions will necessitate metric holders

PIPE TAPS, SPIRAL FLUTE



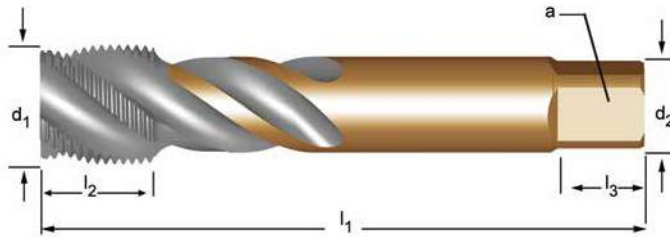
Parallel Thread, G(BSP), Semi- Bottoming

EX40 Bronze tempered body and shank reduces rust and corrosion. Bright flutes improve chip flow in soft or non-ferrous materials.

1.1 1.2 1.3 1.4 1.5 4.1 4.2 5.1 5.2 7.1 7.2 7.3 7.4 8.1

EX41 Steam tempered surface treatment reduces wear and chip welding in abrasive or harder ferrous materials.

1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3



EX40	EX41
G	G
DIN 5156	DIN 5156
Normal	Normal
HSS-E	HSS-E
1/8 - 1.1/2	1/8 - 1.1/2

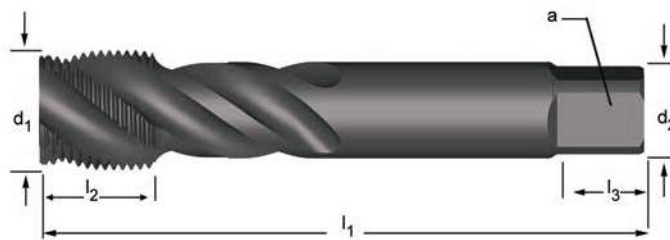
G(BSP)	TPI	d ₁ nom mm	l ₁ mm	l ₂ mm	d ₂ Ø mm	□ a mm	l ₃ mm	# of flutes		Pack Qty	EX40	EX41
1/8	28	9.728	90	13	7.0	5.5	8	3	8.8	1	5974218	5973910
1/4	19	13.157	100	15	11.0	9.0	12	3	11.8	1	5974214	5973905
3/8	19	16.662	100	15	12.0	9.0	12	4	15.25	1	5974225	5973753
1/2	14	20.955	125	18	16.0	12.0	15	4	19	1	5974210	5973900
5/8	14	22.911	125	18	18.0	14.5	17	4	21	1	5974232	5973755
3/4	14	26.441	140	20	20.0	16.0	19	4	24.5	1	5974222	5973915
7/8	14	30.201	150	20	22.0	18.0	21	4	28.25	1	5973750	5973757
1"	11	33.249	160	22	25.0	20.0	23	4	30.75	1	5974195	5973773
1.1/8	11	37.897	170	22	28.0	22.0	25	4	35	1	5974206	5973890
1.1/4	11	41.910	170	22	32.0	24.0	27	4	39.5	1	5974202	5973838
1.1/2	11	47.803	190	23	36.0	29.0	32	4	45	1	5974199	5973797

Note: DIN shank and square dimensions will necessitate metric holders

Parallel Thread, G(BSP), Semi-Bottoming

E043 Steam tempered surface treatment reduces wear and chip welding in abrasive or harder ferrous materials.

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3



E043

G

DORMER
ISO

Normal



HSS-E



1/8 - 3/4

G(BSP)	TPI	d ₁ nom mm	l ₁ mm	l ₂ mm	d ₂ Ø mm	□ a mm	l ₃ mm	# of flutes		Pack Qty	E043
1/8	28	9.728	90	15	8.0	6.3	9	3	8.80	1	5973967
1/4	19	13.157	100	19	10.0	8.0	11	3	11.80	1	5973964
3/8	19	16.662	100	21	12.5	10.0	13	4	15.25	1	5973973
1/2	14	20.955	125	26	16.0	12.5	16	4	19.00	1	5973961
3/4	14	26.441	140	28	20.0	16.0	20	4	24.50	1	5973970

Note: ISO shank and square dimensions will necessitate metric holders

HAND TAPS



General Purpose

1500
1500S
1528
1528S

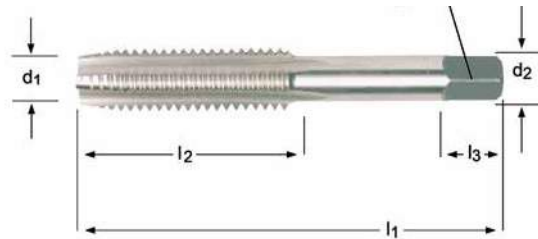
The most versatile taps for hand use or machine tapping in a wide variety of materials in through or blind hole applications. Available in 3 chamfer lengths - taper, plug, and bottoming.

Taper - 7-10 pitch chamfer length
Plug - 3-5 pitch chamfer length
Bottoming - 1-2 pitch chamfer length

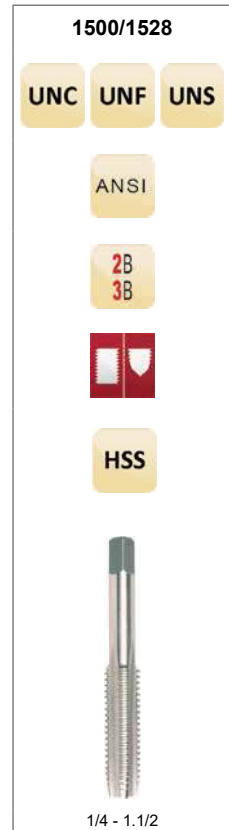
1500 - Fractional sizes

1528 - Machine screw sizes

1500S / 1528S - Sets include 1 of each tap (Taper, Plug, and Bottoming)



- Sizes 0 thru 3/8 have male centers on thread end
- Sizes larger than 3/8 all have female centers / flat ends



Nominal d_1	TPI UNC	TPI UNF	TPI UNS	l_1 Inch	l_2 Inch	d_2 Ø Inch /	$\square$ a Inch	l_3 Inch	# of Flutes	Limits	Pack Qty	Taper	Plug	Bottoming	Sets
0		80		1.5/8	5/16	0.1410	0.1100	3/16	2	H1	1	6007279	6007342	6007366	6006774
0		80		1.5/8	5/16	0.1410	0.1100	3/16	2	H2	1	—	6007368	6007369	—
1	64			1.11/16	3/8	0.1410	0.1100	3/16	2	H1	1	6007370	6007371	6007167	6006781
1		72		1.11/16	3/8	0.1410	0.1100	3/16	2	H1	1	6007181	6007184	6007189	6006785
2	56			1.3/4	7/16	0.1410	0.1100	3/16	2	H2	1	—	6007357	6007359	—
2	56			1.3/4	7/16	0.1410	0.1100	3/16	3	H1	1	6007341	6007350	6007354	—
2	56			1.3/4	7/16	0.1410	0.1100	3/16	3	H2	1	6007143	6007148	6007151	6006808
2		64		1.3/4	7/16	0.1410	0.1100	3/16	3	H2	1	—	—	—	6006811
3	48			1.13/16	1/2	0.1410	0.1100	3/16	2	H2	1	—	6007174	—	—
3	48			1.13/16	1/2	0.1410	0.1100	3/16	3	H2	1	6007178	6007180	6007190	6006817
3		56		1.13/16	1/2	0.1410	0.1100	3/16	3	H2	1	6007195	6007200	6007205	6006820
4	40			1.7/8	9/16	0.1410	0.1100	3/16	2	H2	1	—	6007250	6007255	—
4	40			1.7/8	9/16	0.1410	0.1100	3/16	3	H1	1	6007229	6007235	6007245	—
4	40			1.7/8	9/16	0.1410	0.1100	3/16	3	H2	1	6007260	6007265	6007270	6006826
4		48		1.7/8	9/16	0.1410	0.1100	3/16	3	H2	1	6007275	6007277	6007284	6006829
5	40			1.15/16	5/8	0.1410	0.1100	3/16	3	H2	1	6007298	6007303	6007307	6006832
5		44		1.15/16	5/8	0.1410	0.1100	3/16	3	H2	1	6007315	6007318	6007322	6006838
6	32			2"	11/16	0.1410	0.1100	3/16	2	H2	1	—	6006942	6007002	—
6	32			2"	11/16	0.1410	0.1100	3/16	2	H3	1	—	6007109	6007112	—
6	32			2"	11/16	0.1410	0.1100	3/16	3	H1	1	6007331	6007336	6007346	—
6	32			2"	11/16	0.1410	0.1100	3/16	3	H2	1	6007042	6007074	6007104	6006844
6	32			2"	11/16	0.1410	0.1100	3/16	3	H3	1	6007114	6007116	6006947	6006848
6		40		2"	11/16	0.1410	0.1100	3/16	3	H2	1	6006965	6006970	6006974	6006852

Nominal d ₁	TPI UNC	TPI UNF	TPI UNS	l ₁ Inch	l ₂ Inch	d ₂ Ø Inch /	□ a Inch	l ₃ Inch	# of Flutes	Limits	Pack Qty	Taper	Plug	Bottoming	Sets
8	32			2.1/8	3/4	0.1680	0.1310	1/4	2	H2	1	—	6006984	6006988	—
8	32			2.1/8	3/4	0.1680	0.1310	1/4	2	H3	1	—	6007018	6007022	—
8	32			2.1/8	3/4	0.1680	0.1310	1/4	3	H2	1	—	6006991	6006999	—
8	32			2.1/8	3/4	0.1680	0.1310	1/4	3	H3	1	—	6007026	6007031	—
8	32			2.1/8	3/4	0.1680	0.1310	1/4	4	H1	1	—	6006980	—	—
8	32			2.1/8	3/4	0.1680	0.1310	1/4	4	H2	1	6007006	6007010	6007014	6006860
8	32			2.1/8	3/4	0.1680	0.1310	1/4	4	H3	1	6007034	6007037	6007039	6007159
8		36		2.1/8	3/4	0.1680	0.1310	1/4	4	H2	1	6007045	6007048	6007051	6007221
10	24			2.3/8	7/8	0.1940	0.1520	1/4	2	H2	1	—	6007216	6007225	—
10	24			2.3/8	7/8	0.1940	0.1520	1/4	2	H3	1	—	6007253	6007259	—
10	24			2.3/8	7/8	0.1940	0.1520	1/4	3	H2	1	—	6007233	—	—
10	24			2.3/8	7/8	0.1940	0.1520	1/4	3	H3	1	—	6007263	6007267	—
10	24			2.3/8	7/8	0.1940	0.1520	1/4	4	H1	1	—	6007209	—	—
10	24			2.3/8	7/8	0.1940	0.1520	1/4	4	H2	1	6007238	6007243	6007247	6006789
10	24			2.3/8	7/8	0.1940	0.1520	1/4	4	H3	1	6007273	6007285	6007294	6006792
10		32		2.3/8	7/8	0.1940	0.1520	1/4	2	H2	1	—	6007309	6007313	—
10		32		2.3/8	7/8	0.1940	0.1520	1/4	2	H3	1	—	6007351	6007355	—
10		32		2.3/8	7/8	0.1940	0.1520	1/4	3	H2	1	—	6007324	6007328	—
10		32		2.3/8	7/8	0.1940	0.1520	1/4	3	H3	1	—	6007358	6007360	—
10		32		2.3/8	7/8	0.1940	0.1520	1/4	4	H2	1	6007333	6007338	6007347	6006796
10		32		2.3/8	7/8	0.1940	0.1520	1/4	4	H3	1	6007361	6007362	6007363	6006799
12	24			2.3/8	15/16	0.2200	0.1650	9/32	4	H3	1	6007364	6007365	6007367	6006802
12		28		2.3/8	15/16	0.2200	0.1650	9/32	4	H3	1	6007136	6007186	6007240	6006805
1/4	20			2.1/2	1"	0.2550	0.1910	5/16	4	H1	1	6006971	6006976	6006987	—
1/4	20			2.1/2	1"	0.2550	0.1910	5/16	4	H2	1	6006993	6006995	6006997	—
1/4	20			2.1/2	1"	0.2550	0.1910	5/16	4	H3	1	6007003	6007007	6007011	6006718
1/4	20			2.1/2	1"	0.2550	0.1910	5/16	4	H5	1	—	6007015	6007019	—
1/4		28		2.1/2	1"	0.2550	0.1910	5/16	4	H2	1	—	6007035	6007038	—
1/4		28		2.1/2	1"	0.2550	0.1910	5/16	4	H3	1	6007041	6007044	6007047	6006949
1/4		28		2.1/2	1"	0.2550	0.1910	5/16	4	H4	1	—	6007050	6007054	—
5/16	18			2.23/32	1.1/8	0.3180	0.2380	3/8	4	H2	1	6007244	6007248	6007254	—
5/16	18			2.23/32	1.1/8	0.3180	0.2380	3/8	4	H3	1	6007257	6007262	6007274	6006960
5/16		24		2.23/32	1.1/8	0.3180	0.2380	3/8	4	H3	1	6007301	6007306	6007317	6006964
3/8	16			2.15/16	1.1/4	0.3810	0.2860	7/16	4	H2	1	6007156	6007166	6007172	—
3/8	16			2.15/16	1.1/4	0.3810	0.2860	7/16	4	H3	1	6007176	6007182	6007185	6007121
3/8	16			2.15/16	1.1/4	0.3810	0.2860	7/16	4	H5	1	—	6007193	6007198	—
3/8		24		2.15/16	1.1/4	0.3810	0.2860	7/16	4	H3	1	6007212	6007222	6007227	6006957
7/16	14			3.5/32	1.7/16	0.3230	0.2420	13/32	4	H3	1	6007402	6007406	6007410	6006979
7/16		20		3.5/32	1.7/16	0.3230	0.2420	13/32	4	H3	1	6007431	6007436	6007441	6006990
1/2	13			3.3/8	1.21/32	0.3670	0.2750	7/16	4	H2	1	—	6007063	6007095	—
1/2	13			3.3/8	1.21/32	0.3670	0.2750	7/16	4	H3	1	6007100	6007103	6007107	6006703
1/2	13			3.3/8	1.21/32	0.3670	0.2750	7/16	4	H5	1	—	6007110	6006941	—
1/2		20		3.3/8	1.21/32	0.3670	0.2750	7/16	4	H3	1	6006948	6006953	6006956	6006707
9/16	12			3.19/32	1.21/32	0.4290	0.3220	1/2	4	H3	1	6007512	6007517	6007522	6007000
9/16		18		3.19/32	1.21/32	0.4290	0.3220	1/2	4	H3	1	6007541	6007546	6007550	6007008
5/8	11			3.13/16	1.13/16	0.4800	0.3600	9/16	4	H3	1	6007476	6007532	6007584	6006966
5/8		18		3.13/16	1.13/16	0.4800	0.3600	9/16	4	H3	1	6007607	6007380	6007384	6006975
3/4	10			4.1/4	2"	0.5900	0.4420	11/16	4	H3	1	6007344	6007349	6007353	6007119
3/4		16		4.1/4	2"	0.5900	0.4420	11/16	4	H3	1	6007133	6007138	6007141	6007120
7/8	9			4.11/16	2.7/32	0.6970	0.5230	3/4	4	H4	1	6007492	6007497	6007502	6006996
7/8		14		4.11/16	2.7/32	0.6970	0.5230	3/4	4	H4	1	6007468	6007473	6007481	6006994

HAND TAPS



Nominal d ₁	TPI UNC	TPI UNF	TPI UNS	l ₁ Inch	l ₂ Inch	d ₂ Ø Inch /	□ a Inch	l ₃ Inch	# of Flutes	Limits	Pack Qty	Taper	Plug	Bottoming	Sets
1"	8			5.1/8	2.1/2	0.8000	0.6000	13/16	4	H4	1	6007084	1010170	6007087	6007079
1"		12		5.1/8	2.1/2	0.8000	0.6000	13/16	4	H4	1	6007057	1010174	6007060	6007004
1"			14	5.1/8	2.1/2	0.8000	0.6000	13/16	4	H4	1	6007072	1010178	6007075	—
1.1/8	7			5.7/16	2.9/16	0.8960	0.6720	7/8	4	H4	1	6007086	1010183	6007089	6006691
1.1/8		12		5.7/16	2.9/16	0.8960	0.6720	7/8	4	H4	1	6007070	1010186	6007073	6006687
1.1/4	7			5.3/4	2.9/16	1.0210	0.7660	1"	4	H4	1	6007058	1010189	6007061	6006683
1.1/4		12		5.3/4	2.9/16	1.0210	0.7660	1"	6	H4	1	6007043	1010192	6007049	6006680
1.3/8	6			6.1/16	3"	1.1000	0.8310	1.1/16	4	H4	1	6007117	1010195	6006937	6006699
1.3/8		12		6.1/16	3"	1.1000	0.8310	1.1/16	6	H4	1	6007102	1010198	6007105	6006695
1.1/2	6			6.3/8	3"	1.2300	0.9250	1.1/8	4	H4	1	6007033	1010201	6007036	6006677
1.1/2		12		6.3/8	3"	1.2300	0.9250	1.1/8	6	H4	1	6007012	1010204	6007016	6006675

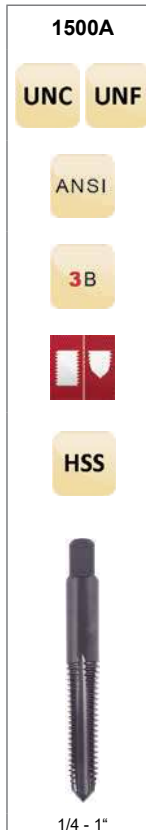
General Purpose

1500A Similar in design to the standard 1500 series, but steam tempered to reduce wear and chip welding in harder ferrous materials. Not recommended for non-ferrous applications. For through or blind hole tapping.



¹⁾ Male centers on thread end

²⁾ Female centers / flat ends



			l_1	l_2	d_2	$\square$	l_3	# of	Limits	Chamfer	Pack	1500A
UNC	UNF	TPI	Inch	Inch	Ø Inch	a Inch	Inch	Flutes			Qty	
1/4		20	2.1/2	1.000	0.2550	0.1910	5/16	4	H3	Plug	1	6006633 ¹⁾
	1/4	28	2.1/2	1.000	0.2550	0.1910	5/16	4	H3	Bottoming	1	6006651 ¹⁾
	5/16	24	2.23/32	1.1/8	0.3180	0.2380	3/8	4	H3	Plug	1	6006623 ¹⁾
5/16		18	2.23/32	1.1/8	0.3180	0.2380	3/8	4	H3	Plug	1	6006738 ¹⁾
	3/8	24	2.15/16	1.1/4	0.3810	0.2860	7/16	4	H3	Plug	1	6006733 ¹⁾
3/8		16	2.15/16	1.1/4	0.3810	0.2860	7/16	4	H3	Plug	1	6006728 ¹⁾
	7/16	20	3.5/32	1.7/16	0.3230	0.2420	13/32	4	H3	Plug	1	6006627 ²⁾
7/16		14	3.5/32	1.7/16	0.3230	0.2420	13/32	4	H3	Plug	1	6006626 ²⁾
	1/2	20	3.3/8	1.21/32	0.3670	0.2750	7/16	4	H3	Plug	1	6006622 ²⁾
1/2		13	3.3/8	1.21/32	0.3670	0.2750	7/16	4	H3	Plug	1	6007592 ²⁾
	9/16	18	3.19/32	1.21/32	0.4290	0.3220	1/2	4	H3	Plug	1	6006631 ²⁾
9/16		12	3.19/32	1.21/32	0.4290	0.3220	1/2	4	H3	Plug	1	6006630 ²⁾
	5/8	18	3.13/16	1.13/16	0.4800	0.3600	9/16	4	H3	Plug	1	6006625 ²⁾
5/8		11	3.13/16	1.13/16	0.4800	0.3600	9/16	4	H3	Plug	1	6006624 ²⁾
	3/4	16	4.1/4	2"	0.5900	0.4420	11/16	4	H3	Plug	1	6006723 ²⁾
3/4		10	4.1/4	2"	0.5900	0.4420	11/16	4	H3	Plug	1	6006713 ²⁾
	7/8	14	4.11/16	2.7/32	0.6970	0.5230	3/4	4	H4	Plug	1	6006628 ²⁾
7/8		9	4.11/16	2.7/32	0.6970	0.5230	3/4	4	H4	Plug	1	6006629 ²⁾
1"		8	5.1/8	2.1/2	0.8000	0.6000	13/16	4	H4	Plug	1	6006673 ²⁾

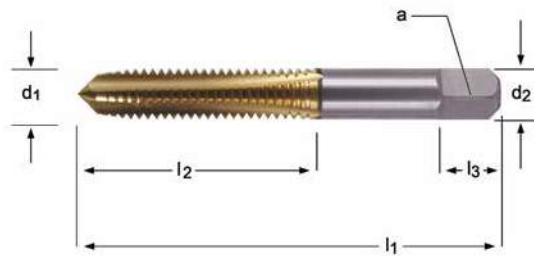
HAND TAPS



General Purpose

TN1500

Similar in design to the 1500 series but TiN coated for enhanced performance. The hard, smooth finish provides greater lubricity, increases tool life, improves thread flank finish, and allows higher tapping speeds. For through or blind hole tapping.



¹⁾ Male centers on thread end

²⁾ Female centers / flat ends

TN1500

UNC

UNF

ANSI

3B



HSS



1/4 - 7/8

			l_1	l_2	d_2	$\square$	l_3	# of Flutes	Limits	Chamfer	Pack Qty	TN1500
UNC	UNF	TPI	Inch	Inch	Ø Inch	a Inch	Inch					
	1/4	28	2.1/2	1.0000	0.2550	0.1910	5/16	4	H3	Plug	1	6006700 ¹⁾
1/4		20	2.1/2	1.0000	0.2550	0.1910	5/16	4	H3	Plug	1	6006696 ¹⁾
	5/16	24	2.23/32	1.1/8	0.3180	0.2380	3/8	4	H3	Plug	1	6006731 ¹⁾
5/16		18	2.23/32	1.1/8	0.3180	0.2380	3/8	4	H3	Plug	1	6006722 ¹⁾
	3/8	24	2.15/16	1.1/4	0.3810	0.2860	7/16	4	H3	Plug	1	6006717 ¹⁾
3/8		16	2.15/16	1.1/4	0.3810	0.2860	7/16	4	H3	Plug	1	6006712 ¹⁾
	7/16	20	3.5/32	1.7/16	0.3230	0.2420	13/32	4	H3	Plug	1	6006752 ²⁾
7/16		14	3.5/32	1.7/16	0.3230	0.2420	13/32	4	H3	Plug	1	6006748 ²⁾
	1/2	20	3.3/8	1.21/32	0.3670	0.2750	7/16	4	H3	Plug	1	6006692 ²⁾
1/2		13	3.3/8	1.21/32	0.3670	0.2750	7/16	4	H3	Plug	1	6006686 ²⁾
		13	3.3/8	1.21/32	0.3670	0.2750	7/16	4	H3	Bottoming	1	6006688 ²⁾
5/8		11	3.13/16	1.13/16	0.4800	0.3600	9/16	4	H3	Plug	1	6006736 ²⁾
	5/8	18	3.13/16	1.13/16	0.4800	0.3600	9/16	4	H3	Bottoming	1	6006745 ²⁾
5/8		11	3.13/16	1.13/16	0.4800	0.3600	9/16	4	H3	Bottoming	1	6006741 ²⁾
	3/4	16	4.1/4	2"	0.5900	0.4420	11/16	4	H3	Bottoming	1	6006708 ²⁾
3/4		10	4.1/4	2"	0.5900	0.4420	11/16	4	H3	Bottoming	1	6006704 ²⁾
7/8		9	4.11/16	2.7/32	0.6970	0.5230	3/4	4	H4	Plug	1	6006756 ²⁾

General Purpose

E500

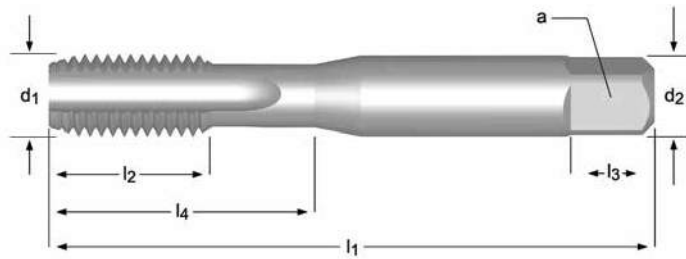
The most versatile taps for hand use or machine tapping in a wide variety of materials in through or blind hole applications. Available in 3 chamfer lengths - taper, plug, and semi-bottoming.

Taper - 7-10 pitch chamfer length

Plug - 3-5 pitch chamfer length

Semi-Bottoming - 1-2 pitch chamfer length

Sets include 1 of each tap (Taper, Plug, and Bottoming)



Note: ISO shank and square dimensions will necessitate metric holders

Nominal d ₁	Pitch M	l ₁ mm	l ₂ mm	d ₂ mm	 a mm	l ₃ mm	# of Flutes	 l ₄ mm	Pack Qty	Taper	Plug	Semi - Bottoming	Sets	
1	0.25	38	4.5	2.50	2.00	4	2	0.75	4.5	1	5977027	5977031	5977035	—
1.2	0.25	38	4.5	2.50	2.00	4	2	0.95	4.5	1	5976974	5976976	5976978	—
1.4	0.30	40	6	2.50	2.00	4	2	0.95	6	1	5976982	5976983	5976985	—
1.6	0.35	41	8	2.50	2.00	4	2	1.25	8	1	5976987	5976988	5976989	5976990
1.7	0.35	41	8	2.50	2.00	4	2	1.35	8	1	5976993	5976994	5976995	5977001
1.8	0.35	41	8	2.50	2.00	4	2	1.45	8	1	5977007	5977011	5977015	—
2	0.40	41	8	2.50	2.00	4	3	1.6	8	1	5975724	5975728	5975730	5975732
2	0.45	41	8	2.50	2.00	4	3	1.55	8	1	5975593	5975597	5975603	—
2.2	0.45	44.5	9.5	2.80	2.24	5	3	1.75	9.5	1	5975398	5975404	5975410	—
2.3	0.45	44.5	9.5	2.80	2.24	5	3	1.85	9.5	1	5975432	5975437	5975442	—
2.5	0.45	44.5	9.5	2.80	2.24	5	3	2.05	9.5	1	5975452	5975456	5975461	5975466
2.6	0.45	44.5	9.5	2.80	2.24	5	3	2.15	9.5	1	5975584	5975631	5975674	—
3	0.50	48	12.5	3.15	2.50	5	3	2.5	12.5	1	5975703	5975705	5975707	5975709
3	0.60	48	12.5	3.15	2.50	5	3	2.4	12.5	1	5975715	5975717	5975720	—
3.5	0.60	50	14	3.55	2.80	5	3	2.9	14	1	5975690	5975691	5975693	5975695
4	0.70	53	14	4.00	3.15	6	3	3.3	14	1	5976765	5976770	5976774	5976783
4	0.75	53	14	4.00	3.15	6	3	3.25	14	1	5976795	5976798	5976802	—
4.5	0.75	53	9.5	4.50	3.55	6	3	3.8	18	1	5976749	5976752	5976754	5976757
5	0.80	58	11	5.00	4.00	7	3	4.2	22	1	5976871	5976878	5976886	5976890
5	0.90	58	11	5.00	4.00	7	3	4.1	22	1	5976902	5976907	5976910	—
5.5	0.90	62	12	5.60	4.50	7	3	4.6	21	1	5976854	5976858	5976862	—
6	1.00	66	13	6.30	5.00	8	3	5	26	1	5977074	5977116	5977162	5977173
7	1.00	66	13	7.10	5.60	8	3	6	26	1	5977183	5976997	5976999	5977002
8	1.25	72	16	8.00	6.30	9	3	6.8	29	1	5977012	5977016	5977020	5977024
9	1.25	72	16	9.00	7.10	10	3	7.8	29	1	5977040	5977043	5977047	5977051
10	1.50	80	18	10.00	8.00	11	3	8.5	34	1	5975273	5975320	5975367	5975419
11	1.50	85	19	8.00	6.30	9	3	9.5		1	5975482	5975484	5975486	5975281
12	1.75	89	22	9.00	7.10	10	3	10.3		1	5975288	5975293	5975296	5975302
14	2.00	95	24	11.20	9.00	12	4	12		1	5975313	5975317	5975324	5975328
16	2.00	102	24	12.50	10.00	13	4	14		1	5975340	5975344	5975349	5975355
18	2.50	112	29	14.00	11.20	14	4	15.5		1	5975371	5975375	5975380	5975385
20	2.50	112	29	14.00	11.20	14	4	17.5		1	5975607	5975610	5975614	5975619

E500

M

ISO
529

6H



HSS



M1 - M56

HAND TAPS



Nominal d ₁	Pitch M	l ₁ mm	l ₂ mm	d ₂ Ø mm	 a mm	l ₃ mm	# of Flutes		l ₄ mm	Pack Qty	Taper	Plug	Semi - Bottoming	Sets
22	2.50	118	29	16.00	12.50	16	4	19.5		1	5975634	5975639	5975645	5975648
24	3.00	130	35	18.00	14.00	18	4	21		1	5975656	5975659	5975663	5975667
27	3.00	135	35	20.00	16.00	20	4	24		1	5975684	5975687	5975688	—
30	3.50	138	41	20.00	16.00	20	4	26.5		1	5975722	5975727	5976741	—
33	3.50	151	41	22.40	18.00	22	4	29.5		1	5976778	5976831	5976875	—
36	4.00	162	47	25.00	20.00	24	4	32		1	5976923	5976933	5976938	—
39	4.00	170	47	28.00	22.40	26	4	35		1	5976941	5976944	5976746	—
42	4.50	170	53	28.00	22.40	26	6	37.5		1	5976807	5976812	5976815	—
45	4.50	187	54	31.50	25.00	28	6	40.5		1	5976826	5976837	5976841	—
48	5.00	187	60	31.50	25.00	28	6	43		1	5976844	5976847	5976850	—
52	5.00	200	60	35.50	28.00	31	6	47		1	—	—	5976992	—
56	5.50	200	60	35.50	28.00	31	6	50.5		1	—	—	5977032	—

Note: ISO shank and square dimensions will necessitate metric holders

General Purpose

E513 The most versatile taps for hand use or machine tapping in a wide variety of materials in through or blind hole applications. Available in 3 chamfer lengths - taper, plug, and semi-bottoming.

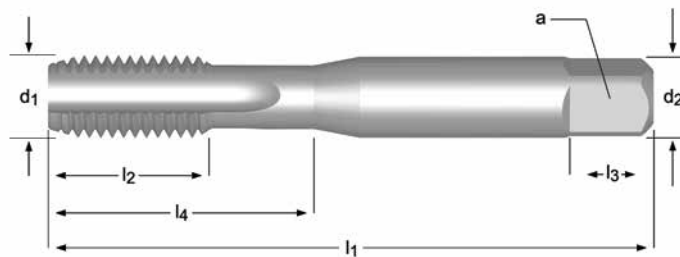
Taper - 7-10 pitch chamfer length

Plug - 3-5 pitch chamfer length

Semi-Bottoming - 1-2 pitch chamfer length

3 pc.(No.6) sets include 1 of each tap (Taper, Plug and Bottoming)

2 pc.(No.7) sets include 1 of each tap (Plug and Bottoming)



Note: ISO shank and square dimensions will necessitate metric holders

E513

MF

ISO
529

6H



HSS



M3 - M50

Nominal d ₁	Pitch MF	l ₁ mm	l ₂ mm	d ₂ Ø mm	a mm	# of Flutes	l ₃ mm	l ₄ mm	Pack Qty	Taper	Plug	Semi - Bottoming	2 Pc Sets	3 Pc Sets
3	0.35	48	12.5	3.15	2.50	3	5	2.65	12.5	1	5977029	5977033	5977041	—
3.5	0.35	48	12.5	3.15	2.50	3	5	3.2	12.5	1	—	—	5977025	—
4	0.50	53	14	4.00	3.15	3	6	3.5	14	1	5977117	5977125	5977128	5977133
5	0.50	58	11	5.00	4.00	3	7	4.5	22	1	5977153	5977196	5977223	5977227
5	0.75	58	11	5.00	4.00	3	7	4.3	22	1	5977229	5977231	5977233	—
6	0.50	66	13	6.30	5.00	3	8	5.5	26	1	5977076	5977080	5977083	—
6	0.75	66	13	6.30	5.00	3	8	5.3	26	1	5977087	5977094	5977098	5977102
7	0.75	66	13	7.10	5.60	3	8	6.3	26	1	5977106	5977114	5977118	—
8	0.50	72	16	8.00	6.30	3	9	7.5	29	1	5977122	5977126	5977130	—
8	0.75	72	16	8.00	6.30	3	9	7.3	29	1	5977134	5977136	5977141	5977145
8	1.00	72	16	8.00	6.30	3	9	7	29	1	5977149	5977155	5977161	5977163
9	0.75	72	16	9.00	7.10	3	10	8.3	29	1	—	—	5977168	—
9	1.00	72	16	9.00	7.10	3	10	8	29	1	5977172	5977177	5977182	—
10	0.50	80	18	10.00	8.00	3	11	9.5	34	1	—	—	5977390	—
10	0.75	80	18	10.00	8.00	3	11	9.3	34	1	5977393	5977396	5977398	—
10	1.00	80	18	10.00	8.00	3	11	9	34	1	5977402	5977404	5977407	5976716
10	1.25	80	18	10.00	8.00	3	11	8.8	34	1	5976737	5976768	5976817	5976833
11	0.75	85	19	8.00	6.30	3	9	10.3	—	1	5976838	5976843	5976686	—
11	1.00	85	19	8.00	6.30	3	9	10	—	1	5976690	5976693	5976696	—
11	1.25	85	19	8.00	6.30	3	9	9.8	—	1	—	—	5976699	—
12	0.75	89	22	9.00	7.10	3	10	11.3	—	1	—	—	5976702	—
12	1.00	89	22	9.00	7.10	3	10	11	—	1	5976704	5976707	5976710	5976713
12	1.25	89	22	9.00	7.10	3	10	10.8	—	1	5976718	5976719	5976721	5976725
12	1.50	89	22	9.00	7.10	3	10	10.5	—	1	5976727	5976729	5976731	5976735
13	1.50	89	22	9.00	7.10	3	10	11.5	—	1	—	—	5976739	—
14	1.00	95	24	11.20	9.00	4	12	13	—	1	5976742	5976744	5976747	5976751
14	1.25	95	24	11.20	9.00	4	12	12.8	—	1	5976755	5976758	5976760	—
14	1.50	95	24	11.20	9.00	4	12	12.5	—	1	5976773	5976777	5976780	5976788
15	1.50	95	24	11.20	9.00	4	12	13.5	—	1	—	5976793	5976797	—
16	1.00	102	24	12.50	10.00	4	13	15	—	1	5976806	5976813	5976823	5977250
16	1.25	102	24	12.50	10.00	4	13	14.8	—	1	—	—	5977291	—
16	1.50	102	24	12.50	10.00	4	13	14.5	—	1	5977327	5977362	5977395	5977401

HAND TAPS

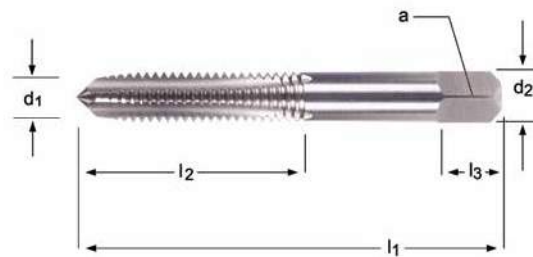


Nominal d ₁	Pitch MF	l ₁ mm	l ₂ mm	d ₂ Ø mm	□ a mm	# of Flutes	l ₃ mm	 l ₄ mm	Pack Qty	Taper	Plug	Semi - Bottoming	2 Pc Sets	3 Pc Sets
18	1.00	112	29	14.00	11.20	4	14	17	1	5977403	5977405	5977255	5977258	—
18	1.50	112	29	14.00	11.20	4	14	16.5	1	5977261	5977264	5977267	5977275	5977271
18	2.00	112	29	14.00	11.20	4	14	16	1	5977279	5977283	5977287	5977295	—
20	1.00	112	29	14.00	11.20	4	14	19	1	5977299	5977302	5977305	5977308	—
20	1.50	112	29	14.00	11.20	4	14	18.5	1	5977311	5977314	5977318	5977324	5977322
20	2.00	112	29	14.00	11.20	4	14	18	1	5977330	5977333	5977336	5977341	—
22	1.00	118	29	16.00	12.50	4	16	21	1	—	5977344	5977347	5977350	—
22	1.50	118	29	16.00	12.50	4	16	20.5	1	5977353	5977356	5977359	5977365	—
22	2.00	118	29	16.00	12.50	4	16	20	1	5977369	5977372	5977375	5977378	—
24	1.00	130	35	18.00	14.00	4	18	23	1	—	5977381	5977383	—	—
24	1.50	130	35	18.00	14.00	4	18	22.5	1	5977386	5977389	5977392	5977399	—
24	2.00	130	35	18.00	14.00	4	18	22	1	5976996	5977038	5977079	5977121	—
25	1.50	130	35	18.00	14.00	4	18	23.5	1	5977166	5977175	5977179	5977193	5977187
26	1.50	130	35	18.00	14.00	4	18	24.5	1	—	5977000	5977003	—	—
27	1.50	135	35	20.00	16.00	4	20	25.5	1	—	5977006	5977010	—	—
27	2.00	135	35	20.00	16.00	4	20	25	1	—	—	5977013	—	—
28	1.50	138	35	20.00	16.00	4	20	26.5	1	—	5977017	5977021	—	—
30	1.50	138	41	20.00	16.00	4	20	28.5	1	—	5977045	5977049	—	—
30	2.00	138	41	20.00	16.00	4	20	28	1	—	5977053	5977057	—	—
32	1.50	151	41	22.40	18.00	4	22	30.5	1	5977062	5977065	5977068	—	—
33	2.00	151	41	22.40	18.00	4	22	31	1	—	5977071	5977075	—	—
35	1.50	162	47	25.00	20.00	4	24	33.5	1	—	5977082	5977086	—	—
36	1.50	162	47	25.00	20.00	4	24	34.5	1	—	—	5977090	—	—
36	2.00	162	47	25.00	20.00	4	24	34	1	—	5977093	5977097	—	—
36	3.00	162	47	25.00	20.00	4	24	33	1	—	5977101	5977105	—	—
39	3.00	170	47	28.00	22.40	4	26	36	1	—	5977109	5977113	—	—
40	1.50	170	53	28.00	22.40	6	26	38.5	1	—	5977137	5977140	—	—
42	1.50	170	53	28.00	22.40	6	26	40.5	1	—	5977144	5977151	—	—
42	3.00	170	53	28.00	22.40	6	26	39	1	—	—	5977156	—	—
45	1.50	187	54	31.50	25.00	6	28	43.5	1	—	5977160	5977164	—	—
48	1.50	187	60	31.50	25.00	6	28	46.5	1	—	—	5977170	—	—
48	2.00	187	60	31.50	25.00	6	28	46	1	—	—	5977058	—	—
48	3.00	187	60	31.50	25.00	6	28	45	1	—	—	5977110	—	—
50	1.50	187	60	31.50	25.00	6	28	48.5	1	—	5977067	5977072	—	—

Note: ISO shank and square dimensions will necessitate metric holders

General Purpose, Left Hand

1500L Left Hand. Similar in design to the standard 1500 series but finished with left hand threads, which when viewed axially, wind in a counter-clockwise and receding direction. Available in plug chamfer. For through or blind hole applications.



1500L

UNC

UNF

UNS

ANSI

3B



HSS



1/4 - 1"

			I ₁	I ₂	d ₂ Ø	☐ a	I ₃					Pack Qty	1500L
UNC	UNF	UNS	TPI	Inch	Inch	Inch	Inch	# of Flutes	Limits	Chamfer			
	1/4	28	2.1/2	1"	0.2550	0.1910	5/16	4	H3	Plug	1		6006636
1/4		20	2.1/2	1"	0.2550	0.1910	5/16	4	H3	Plug	1		6006635
	5/16	24	2.23/32	1.1/8	0.3180	0.2380	3/8	4	H3	Plug	1		6006655
5/16		18	2.23/32	1.1/8	0.3180	0.2380	3/8	4	H3	Plug	1		6006653
	3/8	24	2.15/16	1.1/4	0.3810	0.2860	7/16	4	H3	Plug	1		6006649
3/8		16	2.15/16	1.1/4	0.3810	0.2860	7/16	4	H3	Plug	1		6006647
	7/16	20	3.5/32	1.7/16	0.3230	0.2420	13/32	4	H3	Plug	1		6006663
7/16		14	3.5/32	1.7/16	0.3230	0.2420	13/32	4	H3	Plug	1		6006661
	1/2	20	3.3/8	1.21/32	0.3670	0.2750	7/16	4	H3	Plug	1		6006634
1/2		13	3.3/8	1.21/32	0.3670	0.2750	7/16	4	H3	Plug	1		6006632
	9/16	18	3.19/32	1.21/32	0.4290	0.3220	1/2	4	H3	Plug	1		6006671
9/16		12	3.19/32	1.21/32	0.4290	0.3220	1/2	4	H3	Plug	1		6006669
	5/8	18	3.13/16	1.13/16	0.4800	0.3600	9/16	4	H3	Plug	1		6006659
5/8		11	3.13/16	1.13/16	0.4800	0.3600	9/16	4	H3	Plug	1		6006657
	3/4	16	4.1/4	2"	0.5900	0.4420	11/16	4	H3	Plug	1		6006645
3/4		10	4.1/4	2"	0.5900	0.4420	11/16	4	H3	Plug	1		6006643
	7/8	14	4.11/16	2.7/32	0.6970	0.5230	3/4	4	H4	Plug	1		6006665
7/8		9	4.11/16	2.7/32	0.6970	0.5230	3/4	4	H4	Plug	1		6006667
	1"	12	5.1/8	2.1/2	0.8000	0.6000	13/16	4	H4	Plug	1		6006637
1"		8	5.1/8	2.1/2	0.8000	0.6000	13/16	4	H4	Plug	1		6006641

HAND TAPS



General Purpose

E061 The most versatile taps for hand use or machine tapping in a wide variety of materials in through or blind hole applications.
E071 Available in 3 chamfer lengths - taper, plug, and semi-bottoming.

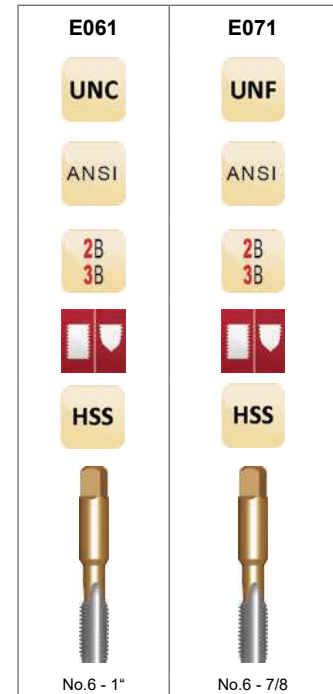
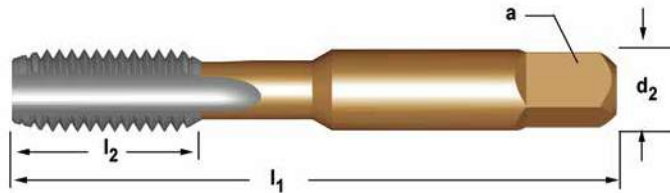
Taper - 7-10 pitch chamfer length

Plug - 3-5 pitch chamfer length

Semi-Bottoming - 1-2 pitch chamfer length

Premium substrate with bronze tempered body and shank reduces rust and corrosion. Bright finish flutes improve chip flow in soft or non-ferrous materials.

E061 = UNC Sizes, E071 = UNF Sizes



Nominal d ₁	TP UNC	TPI UNF	l_1 Inch	l_2 Inch	d_2 Ø Inch /	$\square$ a Inch	# of Flutes	Limits			l_4 Inch	Pack Qty	Taper	Plug	Semi - Bottoming	Sets
6	32		2"	0.5800	0.1410	0.1100	3	H3	36	2.85	0.5800	1	5974286	5974288	5974290	5974295
6		40	2"	0.5800	0.1410	0.1100	3	H2	33	2.90	0.5800	1	5974142	5974147	5974152	5974162
8	32		2.1/8	0.6500	0.1680	0.1310	4	H3	29	3.50	0.6500	1	5974326	5974335	5974337	5974342
8		36	2.1/8	0.6500	0.1680	0.1310	4	H2	29	3.50	0.6500	1	5974198	5974205	5974209	5974213
10	24		2.3/8	0.7600	0.1940	0.1520	4	H3	25	3.90	0.7600	1	5974292	5974330	5974387	5974396
10		32	2.3/8	0.7600	0.1940	0.1520	4	H3	21	4.10	0.7600	1	5974157	5974201	5974239	5974244
12	24		2.3/8	0.8100	0.2200	0.1650	4	H3	16	4.50	0.8100	1	5974402	5974406	5974412	5974257
12		28	2.3/8	0.8100	0.2200	0.1650	4	H3	15	4.70	0.8100	1	5974247	5974249	5974250	5974063
1/4	20		2.1/2	0.6500	0.2550	0.1910	4	H3	7	5.10	1.0630	1	5974924	5974927	5974930	5974933
1/4		28	2.1/2	0.6500	0.2550	0.1910	4	H3	3	5.50	1.0630	1	5974681	5974685	5974689	5974694
5/16	18		2.23/32	0.7700	0.3180	0.2380	4	H3	F	6.60	1.2598	1	5974272	5974274	5974275	5974277
5/16		24	2.23/32	0.7700	0.3180	0.2380	4	H3	I	6.90	1.2598	1	5974100	5974108	5974114	5974118
3/8	16		2.15/16	0.8100	0.3810	0.2860	4	H3	5/16	8.00	1.3780	1	5974267	5974269	5974270	5974271
3/8		24	2.15/16	0.8100	0.3810	0.2860	4	H3	Q	8.50	1.3780	1	5974082	5974086	5974091	5974094
7/16	14		3.5/32	0.9055	0.3230	0.2420	4	H3	U	9.40		1	5974298	5974300	5974303	5974307
7/16		20	3.5/32	0.9055	0.3230	0.2420	4	H3	25/64	9.90		1	5974166	5974170	5974175	5974179
1/2	13		3.3/8	0.9055	0.3670	0.2750	4	H3	27/64	10.80		1	5974912	5974915	5974918	5974921
1/2		20	3.3/8	0.9055	0.3670	0.2750	4	H3	29/64	11.50		1	5974659	5974664	5974668	5974679
9/16	12		3.19/32	0.9843	0.4290	0.3220	4	H3	27/64	12.20		1	5974347	5974355	5974363	5974368
9/16		18	3.19/32	0.9843	0.4290	0.3220	4	H3	33/64	12.90		1	5974217	5974221	5974224	5974227
5/8	11		3.13/16	0.9843	0.4800	0.3600	4	H3	17/32	13.50		1	5974278	5974280	5974282	5974284
5/8		18	3.13/16	0.9843	0.4800	0.3600	4	H3	37/64	14.50		1	5974123	5974128	5974133	5974138
3/4	10		4.1/4	1.1811	0.5900	0.4420	4	H3	21/32	16.50		1	5974259	5974261	5974263	5974265
3/4		16	4.1/4	1.1811	0.5900	0.4420	4	H3	11/16	17.50		1	5974067	5974071	5974075	5974079
7/8	9		4.11/16	1.1811	0.6970	0.5230	4	H4	49/64	19.50		1	5974310	5974314	5974318	—
7/8		14	4.11/16	1.1811	0.6970	0.5230	4	H4	13/16	20.40		1	5974182	5974185	5974190	5974194
1"	8		5.1/8	1.4173	0.8000	0.6000	4	H4	7/8	22.25		1	5974936 ¹⁾	—	—	—

¹⁾ Bright Finish

General Purpose, Optional Flutes

1508 - *Optional 3 Flute*

1595 - *Optional 2 Flute*

Fewer flutes than standard, providing more space for chip evacuation and particularly when tapping holes greater than 1.5 tap diameters in depth. For through or blind hole applications.



1508 (UNC)	1508 (UNF)	1595
UNC	UNF	UNF UNC
ANSI	ANSI	ANSI
3B	2B 3B	3B
		
HSS	HSS	HSS
		
1/4 - 1/2	1/4 - 5/16	1/4 - 5/16

		l_1	l_2	d_2	$\square$	l_3	# of Flutes	Limits	Chamfer	Pack Qty	1508(UNC)	1508(UNF)	1595
UNC	UNF TPI	Inch	Inch	Ø Inch	a Inch	Inch							
	1/4 28	2.1/2	1"	0.2550	0.1910	5/16	3	H3	Plug	1	—	6007576	—
	1/4 28	2.1/2	1"	0.2550	0.1910	5/16	2	H3	Plug	1	—	—	6007668
1/4	20	2.1/2	1"	0.2550	0.1910	5/16	3	H3	Plug	1	6007567	—	—
1/4	20	2.1/2	1"	0.2550	0.1910	5/16	2	H3	Plug	1	—	—	6007870
	1/4 28	2.1/2	1"	0.2550	0.1910	5/16	3	H3	Bottoming	1	—	—	—
	1/4 28	2.1/2	1"	0.2550	0.1910	5/16	2	H3	Bottoming	1	—	—	6007672
1/4	20	2.1/2	1"	0.2550	0.1910	5/16	3	H3	Bottoming	1	6007572	—	—
1/4	20	2.1/2	1"	0.2550	0.1910	5/16	2	H3	Bottoming	1	—	—	6007871
	5/16 24	2.23/32	1.1/8	0.3180	0.2380	3/8	3	H3	Plug	1	—	6006862	—
	5/16 18	2.23/32	1.1/8	0.3180	0.2380	3/8	3	H3	Plug	1	6006814	—	—
5/16	18	2.23/32	1.1/8	0.3180	0.2380	3/8	2	H3	Plug	1	—	—	6007677
	5/16 24	2.23/32	1.1/8	0.3180	0.2380	3/8	3	H3	Bottoming	1	—	6006866	—
5/16	18	2.23/32	1.1/8	0.3180	0.2380	3/8	3	H3	Bottoming	1	6006856	—	—
5/16	18	2.23/32	1.1/8	0.3180	0.2380	3/8	2	H3	Bottoming	1	—	—	6007682
	3/8 24	2.15/16	1.1/4	0.3810	0.2860	7/16	3	H3	Plug	1	—	6006730	—
3/8	16	2.15/16	1.1/4	0.3810	0.2860	7/16	3	H3	Plug	1	6007591	—	—
	3/8 24	2.15/16	1.1/4	0.3810	0.2860	7/16	3	H3	Bottoming	1	—	6006777	—
3/8	16	2.15/16	1.1/4	0.3810	0.2860	7/16	3	H3	Bottoming	1	6006681	—	—
	7/16 20	3.5/32	1.7/16	0.3230	0.2420	13/32	3	H3	Plug	1	—	6006874	—
7/16	14	3.5/32	1.7/16	0.3230	0.2420	13/32	3	H3	Plug	1	6006870	—	—
	1/2 20	3.3/8	1.21/32	0.3670	0.2750	7/16	3	H3	Plug	1	—	6007562	—
1/2	13	3.3/8	1.21/32	0.3670	0.2750	7/16	3	H3	Plug	1	6007553	—	—
1/2	13	3.3/8	1.21/32	0.3670	0.2750	7/16	3	H3	Bottoming	1	6007558	—	—

HAND TAPS



General Purpose

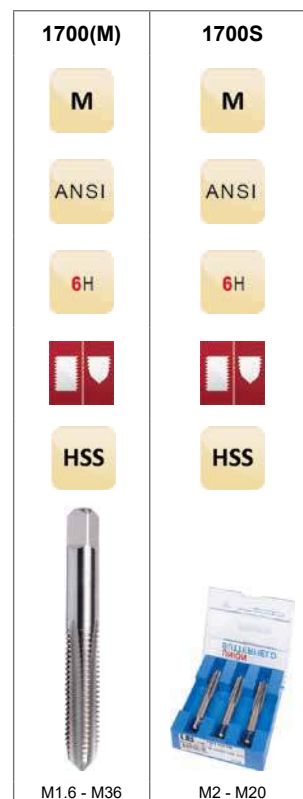
1700(M) The most versatile taps for hand use or machine tapping in a wide variety of materials in through or blind hole applications. Available in 3 chamfer lengths - taper, plug, and bottoming.

Taper - 7-10 pitch chamfer length

Plug - 3-5 pitch chamfer length

Bottoming - 1-2 pitch chamfer length

1700S Sets include 1 of each tap (Taper, Plug, and Bottoming).

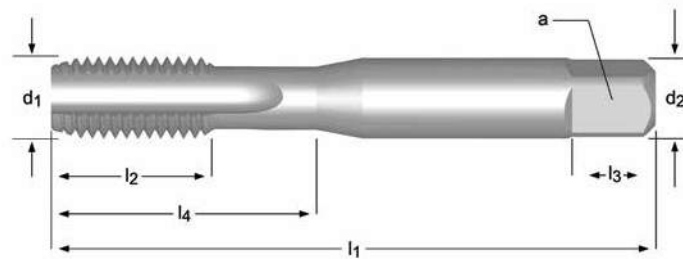


Nominal d ₁	Pitch M	l ₁ Inch	l ₂ Inch	d ₂ Ø Inch /	l ₃ Inch	□ a Inch	# of Flutes	Limits	Pack Qty	Taper	Plug	Bottoming	Sets
M1.6	0.35	1.5/8	5/16	0.1410	3/16	0.1100	2	D3	1	6008954	6009005	6009064	—
M1.8	0.35	1.11/16	3/8	0.1410	3/16	0.1100	2	D3	1	6009078	6009080	—	—
M2	0.40	1.3/4	7/16	0.1410	3/16	0.1100	3	D3	1	6009056	6009071	6008657	6008649
M2.3	0.40	1.3/4	7/16	0.1410	3/16	0.1100	3	D3	1	—	6009014	6009024	—
M2.5	0.45	1.13/16	1/2	0.1410	3/16	0.1100	3	D3	1	6009028	6009033	6009038	6008642
M2.6	0.45	1.13/16	1/2	0.1410	3/16	0.1100	3	D3	1	6009042	6009047	—	—
M3	0.50	1.15/16	5/8	0.1410	3/16	0.1100	3	D3	1	6008727	6008732	6008737	6008660
M3.5	0.60	2"	11/16	0.1410	3/16	0.1100	3	D4	1	6008712	6008717	6008723	6008655
M4	0.70	2.1/8	3/4	0.1680	1/4	0.1310	4	D4	1	6008787	6008790	6008794	6008666
M4.5	0.75	2.3/8	7/8	0.1940	1/4	0.1520	4	D4	1	6008772	6008777	—	—
M5	0.80	2.3/8	7/8	0.1940	1/4	0.1520	4	D4	1	6008798	6008801	6008814	6008673
M6	1.00	2.1/2	1"	0.2550	5/16	0.1910	4	D5	1	6008818	6008822	6008828	6008687
M7	1.00	2.23/32	1.1/8	0.3180	3/8	0.2380	4	D5	1	6008833	6008837	6008842	6008696
M8	1.00	2.23/32	1.1/8	0.3180	3/8	0.2380	4	D5	1	6008847	6008851	6008854	6008700
M8	1.25	2.23/32	1.1/8	0.3180	3/8	0.2380	4	D5	1	6008861	6008630	6008678	6008708
M9	1.25	2.15/16	1.1/4	0.3810	7/16	0.2860	4	D5	1	—	6008743	6008800	—
M10	1.25	2.15/16	1.1/4	0.3810	7/16	0.2860	4	D5	1	6009088	6008877	6008879	6008855
M10	1.50	2.15/16	1.1/4	0.3810	7/16	0.2860	4	D6	1	6008880	6008882	6008884	6008860
M11	1.50	3.5/32	1.7/16	0.3230	13/32	0.2420	4	D6	1	—	6008886	6008888	—
M12	1.25	3.3/8	1.21/32	0.3670	7/16	0.2750	4	D5	1	6008891	6008895	6008899	6008864
M12	1.75	3.3/8	1.21/32	0.3670	7/16	0.2750	4	D6	1	6008907	6008911	6008919	6008867
M14	1.50	3.19/32	1.21/32	0.4290	1/2	0.3220	4	D6	1	6008922	6008926	6008930	—
M14	2.00	3.19/32	1.21/32	0.4290	1/2	0.3220	4	D7	1	6008935	6008938	6008943	6008870
M16	1.50	3.13/16	1.13/16	0.4800	9/16	0.3600	4	D6	1	6008947	6008959	6008964	—
M16	2.00	3.13/16	1.13/16	0.4800	9/16	0.3600	4	D7	1	6008967	6008971	6008976	6008633
M18	1.50	4.1/32	1.13/16	0.5420	5/8	0.4060	4	D6	1	6008981	6008985	6008990	—
M18	2.50	4.1/32	1.13/16	0.5420	5/8	0.4060	4	D7	1	6008995	6008999	6009009	6008636
M20	1.50	4.15/32	2"	0.6520	11/16	0.4890	4	D6	1	6008707	6008759	6008806	—
M20	2.50	4.15/32	2"	0.6520	11/16	0.4890	4	D7	1	6008858	6008863	6008866	6008652
M22	1.50	4.11/16	2.7/32	0.6970	3/4	0.5230	4	D6	1	6008869	6008871	6008663	—
M22	2.50	4.11/16	2.7/32	0.6970	3/4	0.5230	4	D7	1	6008668	6008672	6008676	—
M24	2.00	4.29/32	2.7/32	0.7600	3/4	0.5700	4	D7	1	6008681	6008685	6008691	—
M24	3.00	4.29/32	2.7/32	0.7600	3/4	0.5700	4	D8	1	6008695	6008698	6008703	—
M30	3.50	5.7/16	2.9/16	1.0210	1"	0.7660	4	D9	1	6008742	6008746	6008751	—
M36	4.00	6.1/16	3"	1.2330	1.1/8	0.9250	4	D9	1	—	6008763	6008768	—

General Purpose, Left Hand

E501

Left Hand. Similar in design to the standard E500 series but finished with left hand threads, which when viewed axially, wind in a counter-clockwise and receding direction. Available in taper, plug, and semi-bottoming chamfer. For through or blind hole applications.



E501

M

ISO
529

6H



HSS



M3 - M24

Nominal d ₁	Pitch M	l ₁ mm	l ₂ mm	d ₂ Ø mm	 a mm	l ₃ mm	# of Flutes	 ↔	l ₄ mm	Limits	Pack Qty	Taper	Plug	Semi - Bottoming
3	0.50	48	12.5	3.15	2.50	5	3	2.5	12.5	D3	1	5977154	5977158	5977169
4	0.70	53	14	4.00	3.15	6	3	3.3	14	D4	1	5976769	5976814	5976856
5	0.80	58	11	5.00	4.00	7	3	4.2	22	D4	1	—	5976942	5976949
6	1.00	66	13	6.30	5.00	8	3	5	26	D5	1	5976952	5976955	5976958
8	1.25	72	16	8.00	6.30	9	3	6.8	29	D5	1	5976771	5976775	5976779
10	1.50	80	18	10.00	8.00	11	3	8.5	34	D6	1	5977063	5977066	5977070
12	1.75	89	22	9.00	7.10	10	3	10.3		D6	1	5977078	5977081	5977085
14	2.00	95	24	11.20	9.00	12	4	12		D7	1	5977089	5977092	5977096
16	2.00	102	24	12.50	10.00	13	4	14		D7	1	5977100	5977104	5977108
18	2.50	112	29	14.00	11.20	14	4	15.5		D7	1	—	—	5977120
20	2.50	112	29	14.00	11.20	14	4	17.5		D7	1	5977124	5977129	5977132
22	2.50	118	29	16.00	12.50	16	4	19.5		D7	1	—	—	5977142
24	3.00	130	35	18.00	14.00	18	4	21		D8	1	—	5977147	5977150

Note: ISO shank and square dimensions will necessitate metric holders

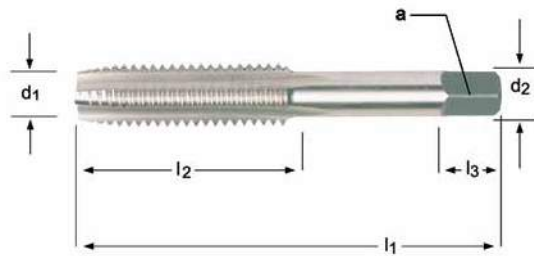
HAND TAPS



General Purpose, Oversize

1500OV(UNC)

0.005" oversize. Similar in design to the standard 1500 series, but with a pitch diameter which is 0.0050" to 0.0055" larger than the basic pitch diameter. Used primarily where a part will be plated or treated after tapping. Available as a standard with a plug chamfer. Oversize P.D. limits are equivalent to H11. For through or blind hole applications.



1500OV(UNC)

UNC

ANSI



HSS

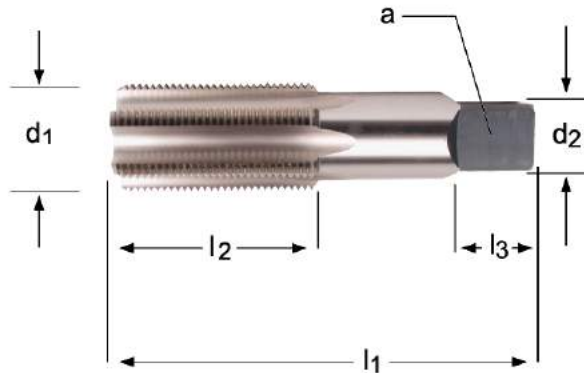


1/4 - 5/8

UNC	TPI	l_1 Inch	l_2 Inch	d_2 Ø Inch	$\square$ a Inch	l_3 Inch	# of Flutes	Limits	Chamfer	Pack Qty	1500OV(UNC)
1/4	20	2.1/2	1.000	0.2550	0.1910	5/16	4	H11	Plug	1	6006967
5/16	18	2.23/32	1.1/8	0.3180	0.2380	3/8	4	H11	Plug	1	6007239
3/8	16	2.15/16	1.1/4	0.3810	0.2860	7/16	4	H11	Plug	1	6007152
1/2	13	3.3/8	1.21/32	0.3670	0.2750	7/16	4	H11	Plug	1	6007027
5/8	11	3.13/16	1.13/16	0.4800	0.3600	9/16	4	H11	Plug	1	6007375

General Purpose, 8-Pitch

1505 Proven performers for manufacturers of oil field equipment, large valves, electric utilities, power generation machinery, and general construction. For through or blind hole applications.



1505(UNS)

UNS

ANSI

2B



HSS



1.1/8 - 2"

Nominal d_1	TPI UNS	l_1 Inch	l_2 Inch	d_2 Ø Inch /	a Inch	l_3 Inch	# of Flutes	Limits	Pack Qty	Taper	Plug	Bottoming
1.1/8	8	5.7/16	2.9/16	0.8960	0.6720	7/8	4	H5	1	6007424	6007478	6007534
1.1/4	8	5.3/4	2.9/16	1.0210	0.7660	1"	4	H5	1	6007579	6007589	6007378
1.3/8	8	6.1/16	3"	1.1080	0.8310	1.1/16	4	H5	1	6007605	6007610	6007383
1.1/2	8	6.3/8	3"	1.2330	0.9250	1.1/8	6	H5	1	6007565	6007570	6007575
1.5/8	8	6.11/16	3.3/16	1.3050	0.9780	1.1/8	6	H6	1	6007387	6007391	6007396
1.3/4	8	7"	3.3/16	1.4300	1.0720	1.1/4	6	H6	1	6007586	6007596	6007601
1.7/8	8	7.5/16	3.9/16	1.5190	1.1390	1.1/4	6	H6	1	6007400	6007403	6007407
2"	8	7.5/8	3.9/16	1.6440	1.2330	1.3/8	6	H6	1	6009511	6007524	6007529

HAND TAPS

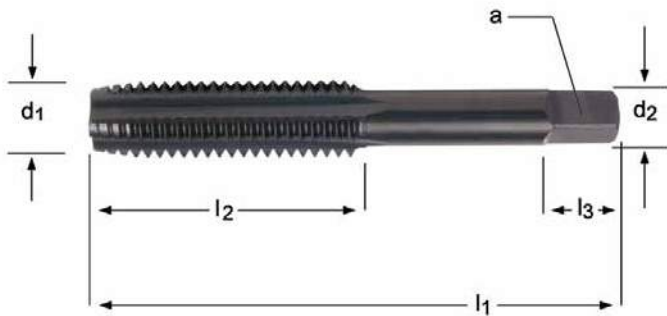


For Cast Iron

1599 Designed for through or blind hole tapping with a specific cutting geometry for gray cast irons and those materials producing broken, powdery chips. Also ideal for non-metallics, cast brass, and other brass materials producing broken powdery chips. Nitride and steam tempered coating reduces wear and chip welding in abrasive materials. For through or blind hole applications.

1600

1599 - H3
1600 - H5



Nominal d ₁	TPI UNC	TPI UNF	l ₁ Inch	l ₂ Inch	d ₂ Ø Inch /	□ a Inch	l ₃ Inch	# of Flutes	Limits	Pack Qty	1599 Plug	1599 Bottoming	1600 Plug	1600 Bottoming
1/4	20		2.1/2	1"	0.2550	0.1910	5/16	4	H3	1	6007787	6007791	—	—
1/4	20		2.1/2	1"	0.2550	0.1910	5/16	4	H5	1	—	—	6008145	6008149
1/4		28	2.1/2	1"	0.2550	0.1910	5/16	4	H5	1	—	—	6008153	6008158
5/16	18		2.23/32	1.1/8	0.3180	0.2380	3/8	4	H3	1	6007853	6007856	—	—
5/16	18		2.23/32	1.1/8	0.3180	0.2380	3/8	4	H5	1	—	—	—	6008209
5/16		24	2.23/32	1.1/8	0.3180	0.2380	3/8	4	H3	1	—	6007861	—	—
5/16		24	2.23/32	1.1/8	0.3180	0.2380	3/8	4	H5	1	—	—	6008212	6008217
3/8	16		2.15/16	1.1/4	0.3810	0.2860	7/16	4	H3	1	6007835	6007840	—	—
3/8	16		2.15/16	1.1/4	0.3810	0.2860	7/16	4	H5	1	—	—	6008182	6008187
3/8		24	2.15/16	1.1/4	0.3810	0.2860	7/16	4	H3	1	6007845	6007849	—	—
3/8		24	2.15/16	1.1/4	0.3810	0.2860	7/16	4	H5	1	—	—	6008191	6008199
7/16	14		3.5/32	1.7/16	0.3230	0.2420	13/32	4	H5	1	—	—	6008245	6008254
7/16		20	3.5/32	1.7/16	0.3230	0.2420	13/32	4	H3	1	—	6008330	—	—
7/16		20	3.5/32	1.7/16	0.3230	0.2420	13/32	4	H5	1	—	—	6008260	6008266
1/2	13		3.3/8	1.21/32	0.3670	0.2750	7/16	4	H3	1	6007763	6007767	—	—
1/2	13		3.3/8	1.21/32	0.3670	0.2750	7/16	4	H5	1	—	—	—	6008136
1/2		20	3.3/8	1.21/32	0.3670	0.2750	7/16	4	H3	1	6007776	6007782	—	—
1/2		20	3.3/8	1.21/32	0.3670	0.2750	7/16	4	H5	1	—	—	6008138	6008141
9/16	12		3.19/32	1.21/32	0.4290	0.3220	1/2	4	H5	1	—	—	6008268	6008270
9/16		18	3.19/32	1.21/32	0.4290	0.3220	1/2	4	H3	1	—	6008354	—	—
9/16		18	3.19/32	1.21/32	0.4290	0.3220	1/2	4	H5	1	—	—	—	6008285
5/8	11		3.13/16	1.13/16	0.4800	0.3600	9/16	4	H3	1	6007863	6007865	—	—
5/8	11		3.13/16	1.13/16	0.4800	0.3600	9/16	4	H5	1	—	—	6008226	6008231
3/4	10		4.1/4	2"	0.5900	0.4420	11/16	4	H3	1	—	6007814	—	—
3/4	10		4.1/4	2"	0.5900	0.4420	11/16	4	H5	1	—	—	—	6008165
3/4		16	4.1/4	2"	0.5900	0.4420	11/16	4	H3	1	6007819	6007824	—	—
3/4		16	4.1/4	2"	0.5900	0.4420	11/16	4	H5	1	—	—	—	6008178

For Cast Iron

- 1599(M)** Designed for through or blind hole tapping with a specific cutting geometry for gray cast irons and those materials producing broken chips. Also ideal for non-metallics, cast brass, and other brass materials producing broken powdery chips. Nitride and steam tempered coating reduces wear and chip welding in abrasive materials. For through or blind hole applications.
- 1599SB(M)**



1599(M)

M

ANSI

6H



HSS



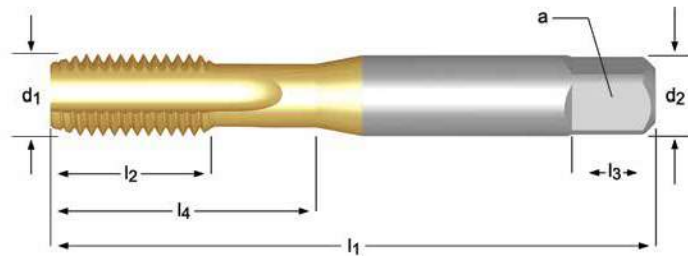
M6 - M14

Nominal d_1	Pitch M	l_1 Inch	l_2 Inch	d_2 Inch / Ø	a Inch	l_3 Inch	# of Flutes	Limits	Pack Qty	1599M Plug	1599M Bottoming
M6	1.00	2.1/2	1"	0.2550	0.1910	5/16	4	D5	1	6007738	6007742
M8	1.25	2.23/32	1.1/8	0.3180	0.2380	3/8	4	D5	1	6007754	6007759
M10	1.50	2.15/16	1.1/4	0.3810	0.2860	7/16	4	D6	1	6007695	6007699
M12	1.75	3.3/8	1.21/32	0.3670	0.2750	7/16	4	D6	1	6007708	6007712
M14	1.25	3.19/32	1.21/32	0.4290	0.3220	1/2	4	D4	1	6007722	—

For Cast Iron, Semi-Bottoming

E504

Designed for through or blind hole tapping with a specific cutting geometry for gray cast irons and those materials producing broken chips. Also ideal for non-metallics, cast brass, and other brass materials producing broken powdery chips. TiN coating increases the surface hardness and improves tool life.



E504

M

ISO
529

6H



HSS



M3 - M24

M	P mm	l_1 mm	l_2 mm	d_2 Ø mm	a mm	l_3 mm	# of Flutes	l_4 mm	Limits	Pack Qty	E504
3	0.50	48	12.5	3.15	2.50	5	3	2.5	D3	1	5976834
4	0.70	53	14	4.00	3.15	6	3	3.3	D4	1	5976842
5	0.80	58	11	5.00	4.00	7	3	4.2	D4	1	5976848
6	1.00	66	13	6.30	5.00	8	3	5	D5	1	5976860
8	1.25	72	16	8.00	6.30	9	3	6.8	D5	1	5976868
10	1.50	80	18	10.00	8.00	11	3	8.5	D6	1	5976786

Note: ISO shank and square dimensions will necessitate metric holders

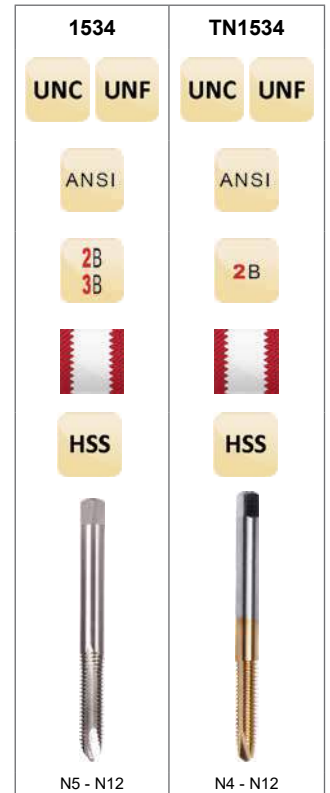
Relieved Style, Machine Screw Sizes

1534 TN1534

Spiral point taps are designed to solve the problem of tap breakage in through hole applications in a variety of materials. The angular flutes in the cutting face propel the chips ahead of the cutting zone, thus reducing loading and clogging in the flutes.

The 1534 style features eccentrically relieved threads with full pitch diameter relief. These taps are extremely free cutting, resulting in longer tool life. The use of rigid tapping equipment is highly recommended with this style of tap.

Bright finish - improves chip flow in soft or non-ferrous materials.
TiN Coating - increases surface hardness and improves tool life.



				l_1	l_2	d_2	$\square$	l_3			Pack	1534	TN1534
UNC	UNF	TPI	Inch	Inch	Inch	Inch	Inch	Inch	# of	Limits	Chamfer	Qty	
4		40	1.7/8	9/16	0.1410	0.1100	3/16	2	H2	Plug	1	—	6006775
	5	44	1.15/16	5/8	0.1410	0.1100	3/16	2	H2	Plug	1	6006760	—
5		40	1.15/16	5/8	0.1410	0.1100	3/16	2	H2	Plug	1	6006753	—
	6	40	2"	11/16	0.1410	0.1100	3/16	2	H2	Bottoming	1	6006757	—
6		32	2"	11/16	0.1410	0.1100	3/16	2	H2	Plug	1	6006790	—
	6	32	2"	11/16	0.1410	0.1100	3/16	2	H1	Plug	1	6006764	—
6		32	2"	11/16	0.1410	0.1100	3/16	2	H2	Plug	1	6006768	—
	6	32	2"	11/16	0.1410	0.1100	3/16	2	H3	Plug	1	6006778	6007377
6		40	2"	11/16	0.1410	0.1100	3/16	2	H2	Bottoming	1	6006794	—
	6	32	2"	11/16	0.1410	0.1100	3/16	2	H2	Bottoming	1	6006772	—
6		32	2"	11/16	0.1410	0.1100	3/16	2	H3	Bottoming	1	6006786	—
	8	36	2.1/8	3/4	0.1680	0.1310	1/4	2	H2	Plug	1	6006812	—
8		32	2.1/8	3/4	0.1680	0.1310	1/4	2	H1	Plug	1	6006798	—
	8	32	2.1/8	3/4	0.1680	0.1310	1/4	2	H2	Plug	1	6006801	—
8		32	2.1/8	3/4	0.1680	0.1310	1/4	2	H3	Plug	1	6006806	6007420
	8	32	2.1/8	3/4	0.1680	0.1310	1/4	2	H2	Bottoming	1	6006803	—
8		32	2.1/8	3/4	0.1680	0.1310	1/4	2	H3	Bottoming	1	6006809	—
	10	32	2.3/8	7/8	0.1940	0.1520	1/4	2	H1	Plug	1	6006706	—
	10	32	2.3/8	7/8	0.1940	0.1520	1/4	2	H2	Plug	1	6006711	—
	10	32	2.3/8	7/8	0.1940	0.1520	1/4	2	H3	Plug	1	6006719	6006763
10		24	2.3/8	7/8	0.1940	0.1520	1/4	2	H2	Plug	1	6006690	—
	10	24	2.3/8	7/8	0.1940	0.1520	1/4	2	H3	Plug	1	6006698	6006759
	10	32	2.3/8	7/8	0.1940	0.1520	1/4	2	H2	Bottoming	1	6006714	—
	10	32	2.3/8	7/8	0.1940	0.1520	1/4	2	H3	Bottoming	1	6006724	—
10		24	2.3/8	7/8	0.1940	0.1520	1/4	2	H2	Bottoming	1	6006694	—
10		24	2.3/8	7/8	0.1940	0.1520	1/4	2	H3	Bottoming	1	6006702	—
	12	28	2.3/8	15/16	0.2200	0.1650	9/32	2	H3	Plug	1	6006743	—
12		24	2.3/8	15/16	0.2200	0.1650	9/32	2	H3	Plug	1	6006729	6006767
12		24	2.3/8	15/16	0.2200	0.1650	9/32	2	H3	Bottoming	1	6006739	—

SPIRAL POINT TAPS



Relieved Style, Fractional Sizes

- 1585** Spiral point taps are designed to solve the problem of tap breakage in through hole applications in a variety of materials.
- 1585A** The angular flutes in the cutting face propel the chips ahead of the cutting zone, thus reducing loading and clogging in the flutes.
- TN1585**

The 1585 style features eccentrically relieved threads with full pitch diameter relief. These taps are extremely free cutting, resulting in longer tool life. The use of rigid tapping equipment is highly recommended with this style of tap.

Bright Finish - improves chip flow in soft or non-ferrous materials.

Steam tempered - reduces wear and prevents chip welding in harder ferrous materials.

TiN Coating - increases surface hardness and improves tool life.



1585		1585A		TN1585	
UNC	UNF	UNC	UNF	UNC	UNF
ANSI		ANSI		ANSI	
3B		2B 3B		3B	
HSS		HSS		HSS	
1/4 - 3/4		1/4 - 3/4		1/4 - 1/2	

			I ₁	I ₂	Ø ₂	I ₃	□ _a				Pack Qty	1585	1585A	TN1585
UNC	UNF	TPI	Inch	Inch	Inch	Inch	Inch	# of Flutes	Limits	Chamfer				
1/4	20	2.1/2	1"	0.2550	5/16	0.1910	2	H1	Plug	1	6007168	—	—	
1/4	20	2.1/2	1"	0.2550	5/16	0.1910	2	H2	Plug	1	6007226	—	—	
1/4	20	2.1/2	1"	0.2550	5/16	0.1910	2	H3	Plug	1	6007283	6007698	6007401	
1/4	20	2.1/2	1"	0.2550	5/16	0.1910	3	H3	Plug	1	6007343	—	6007405	
1/4	20	2.1/2	1"	0.2550	5/16	0.1910	3	H5	Plug	1	6007352	—	6007413	
1/4	20	2.1/2	1"	0.2550	5/16	0.1910	2	H5	Plug	1	6007348	—	6007409	
1/4	20	2.1/2	1"	0.2550	5/16	0.1910	2	H3	Bottoming	1	6007332	—	—	
	1/4	28	2.1/2	1"	0.2550	5/16	0.1910	2	H2	Plug	1	6007129	—	—
	1/4	28	2.1/2	1"	0.2550	5/16	0.1910	3	H2	Plug	1	6007132	—	—
	1/4	28	2.1/2	1"	0.2550	5/16	0.1910	2	H3	Plug	1	6007135	6007702	6007416
	1/4	28	2.1/2	1"	0.2550	5/16	0.1910	2	H4	Plug	1	6007142	—	—
	1/4	28	2.1/2	1"	0.2550	5/16	0.1910	3	H4	Plug	1	6007146	—	—
	1/4	28	2.1/2	1"	0.2550	5/16	0.1910	2	H3	Bottoming	1	6007139	—	—
5/16	18	2.23/32	1.1/8	0.3180	3/8	0.2380	2	H1	Plug	1	6007220	—	—	
5/16	18	2.23/32	1.1/8	0.3180	3/8	0.2380	2	H2	Plug	1	6007230	—	—	
5/16	18	2.23/32	1.1/8	0.3180	3/8	0.2380	2	H3	Plug	1	6007234	6007727	6007443	
5/16	18	2.23/32	1.1/8	0.3180	3/8	0.2380	3	H3	Plug	1	6007249	—	6007446	
5/16	18	2.23/32	1.1/8	0.3180	3/8	0.2380	3	H5	Plug	1	6007258	—	6007448	
5/16	18	2.23/32	1.1/8	0.3180	3/8	0.2380	2	H5	Plug	1	6007252	—	—	
5/16	18	2.23/32	1.1/8	0.3180	3/8	0.2380	2	H3	Bottoming	1	6007242	—	—	
	5/16	24	2.23/32	1.1/8	0.3180	3/8	0.2380	3	H2	Plug	1	6007272	—	—
	5/16	24	2.23/32	1.1/8	0.3180	3/8	0.2380	2	H3	Plug	1	6007280	6007731	6007453
	5/16	24	2.23/32	1.1/8	0.3180	3/8	0.2380	3	H4	Plug	1	6007297	—	—
	5/16	24	2.23/32	1.1/8	0.3180	3/8	0.2380	2	H3	Bottoming	1	6007288	—	—
3/8	16	2.15/16	1.1/4	0.3810	7/16	0.2860	3	H1	Plug	1	6007173	—	—	
3/8	16	2.15/16	1.1/4	0.3810	7/16	0.2860	3	H3	Plug	1	6007188	6007715	6007425	
3/8	16	2.15/16	1.1/4	0.3810	7/16	0.2860	3	H2	Plug	1	6007177	—	—	
3/8	16	2.15/16	1.1/4	0.3810	7/16	0.2860	3	H5	Plug	1	6007192	—	6007432	
	3/8	24	2.15/16	1.1/4	0.3810	7/16	0.2860	3	H3	Plug	1	6007206	6007719	6007438
	3/8	24	2.15/16	1.1/4	0.3810	7/16	0.2860	3	H4	Plug	1	6007211	—	—

SPIRAL POINT TAPS

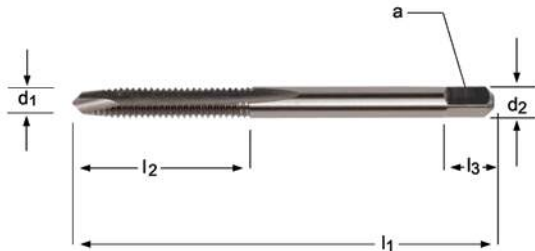
			I ₁	I ₂	d ₂ Ø	I ₃	□ a	# of			Pack			
UNC	UNF	TPI	Inch	Inch	Inch	Inch	Inch	Flutes	Limits	Chamfer	Qty	1585	1585A	TN1585
7/16		14	3.5/32	1.7/16	0.3230	13/32	0.2420	3	H2	Plug	1	6007323	—	—
7/16		14	3.5/32	1.7/16	0.3230	13/32	0.2420	3	H3	Plug	1	6007327	6007748	6007457
7/16		14	3.5/32	1.7/16	0.3230	13/32	0.2420	3	H5	Plug	1	6007337	—	—
	7/16	20	3.5/32	1.7/16	0.3230	13/32	0.2420	3	H2	Plug	1	6007622	—	—
	7/16	20	3.5/32	1.7/16	0.3230	13/32	0.2420	3	H3	Plug	1	6007651	6007752	6007461
1/2		13	3.3/8	1.21/32	0.3670	7/16	0.2750	3	H1	Plug	1	6007817	—	—
1/2		13	3.3/8	1.21/32	0.3670	7/16	0.2750	3	H2	Plug	1	6007821	—	—
1/2		13	3.3/8	1.21/32	0.3670	7/16	0.2750	3	H3	Plug	1	6007826	6007685	6007393
1/2		13	3.3/8	1.21/32	0.3670	7/16	0.2750	3	H5	Plug	1	6007832	—	—
	1/2	20	3.3/8	1.21/32	0.3670	7/16	0.2750	3	H1	Plug	1	6007837	—	—
	1/2	20	3.3/8	1.21/32	0.3670	7/16	0.2750	3	H2	Plug	1	6007843	—	—
	1/2	20	3.3/8	1.21/32	0.3670	7/16	0.2750	3	H3	Plug	1	6007846	6007690	6007397
	1/2	20	3.3/8	1.21/32	0.3670	7/16	0.2750	3	H5	Plug	1	6007854	—	—
5/8		11	3.13/16	1.13/16	0.4800	9/16	0.3600	3	H3	Plug	1	6007308	6007737	—
5/8		11	3.13/16	1.13/16	0.4800	9/16	0.3600	3	H5	Plug	1	6007312	—	—
	5/8	18	3.13/16	1.13/16	0.4800	9/16	0.3600	3	H3	Plug	1	6007316	—	—
3/4		10	4.1/2	2"	0.5900	11/16	0.4420	3	H3	Plug	1	—	6007706	—
3/4		10	4.1/4	2"	0.5900	11/16	0.4420	3	H3	Plug	1	6007150	—	—
3/4		10	4.1/4	2"	0.5900	11/16	0.4420	3	H5	Plug	1	6007154	—	—
	3/4	16	4.1/2	2"	0.5900	11/16	0.4420	3	H3	Plug	1	—	6007709	—
	3/4	16	4.1/4	2"	0.5900	11/16	0.4420	3	H3	Plug	1	6007158	—	—

SPIRAL POINT TAPS



Relieved Style, Machine Screw Sizes

1634 Premium Cobalt substrate. Designed for tough jobs in high temperature alloys, stainless steel, cast iron, abrasive non-ferrous materials and other similar materials. Due to their premium steel content and special design, this range will effectively increase productivity through longer tool life. Ideally suited for through hole tapping.



1634(UNF)

UNC

UNF

ANSI

3B

HSS-E

N4 - N10

			l_1	l_2	d_2	$\square$	l_3	# of Flutes	Limits	Chamfer	Pack Qty	1634
UNC	UNF	TPI	Inch	Inch	Ø Inch	a Inch	Inch					
4		40	1.7/8	9/16	0.1410	0.1100	3/16	2	H2	Plug	1	6008081
6		32	2"	11/16	0.1410	0.1100	3/16	2	H2	Plug	1	6008001
8		32	2.1/8	3/4	0.1680	0.1310	1/4	2	H2	Plug	1	6008058
	10	32	2.3/8	7/8	0.1940	0.1520	1/4	2	H2	Plug	1	6008074

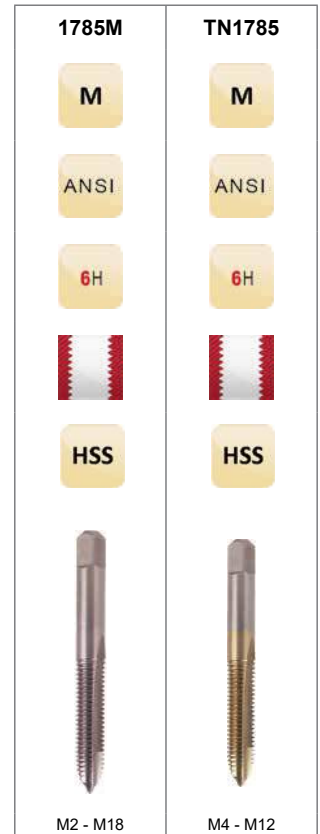
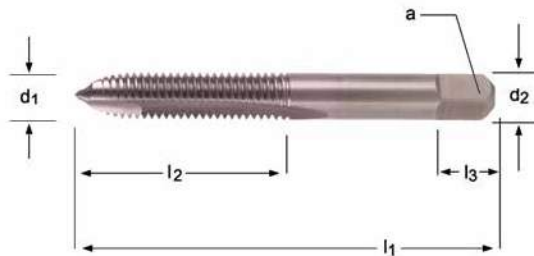
Relieved Style, Metric

1785M TN1785

Spiral point taps are designed to solve the problem of tap breakage in through hole applications in a variety of materials. The angular flutes in the cutting face propel the chips ahead of the cutting zone, thus reducing loading and clogging in the flutes.

The 1785M style features eccentrically relieved threads with full pitch diameter relief. These taps are extremely free cutting, resulting in longer tool life. The use of rigid tapping equipment is highly recommended with this style of tap.

Bright Finish - improves chip flow in soft or non-ferrous materials.
TiN Coating - increases surface hardness and improves tool life.



M	P mm	l ₁ Inch	l ₂ Inch	d ₂ Ø Inch	l ₃ Inch	a Inch	# of Flutes	Limits	Chamfer	Pack Qty	1785M	TN1785
M2	0.40	1.3/4	7/16	0.1410	3/16	0.1100	2	D3	Plug	1	6008747	—
M2.5	0.45	1.13/16	1/2	0.1410	3/16	0.1100	2	D3	Plug	1	6008764	—
M3	0.50	1.15/16	5/8	0.1410	3/16	0.1100	2	D3	Plug	1	6008773	—
M3.5	0.60	2"	11/16	0.1410	3/16	0.1100	2	D4	Plug	1	6008778	—
M4	0.70	2.1/8	3/4	0.1680	1/4	0.1310	2	D4	Plug	1	—	6007488
M4	0.70	2.1/8	3/4	0.1680	1/4	0.1310	2	D4	Plug	1	6008782	—
M4.5	0.75	2.3/8	7/8	0.1940	1/4	0.1520	2	D4	Plug	1	6008786	—
M5	0.80	2.3/8	7/8	0.1940	1/4	0.1520	2	D4	Plug	1	—	6007491
M5	0.80	2.3/8	7/8	0.1940	1/4	0.1520	2	D4	Plug	1	6008791	—
M6	1.00	2.1/2	1"	0.2550	5/16	0.1910	2	D5	Plug	1	—	6007496
M6	1.00	2.1/2	1"	0.2550	5/16	0.1910	2	D5	Plug	1	6008796	—
M7	1.00	2.23/32	1.1/8	0.3180	3/8	0.2380	2	D5	Plug	1	6008805	—
M8	1.25	2.23/32	1.1/8	0.3180	3/8	0.2380	2	D5	Plug	1	—	6007501
M8	1.25	2.23/32	1.1/8	0.3180	3/8	0.2380	2	D5	Plug	1	6008810	—
M9	1.25	2.15/16	1.1/4	0.3810	7/16	0.2860	3	D5	Plug	1	6008819	—
M10	1.50	2.15/16	1.1/4	0.3810	7/16	0.2860	3	D6	Plug	1	—	6007466
M10	1.50	2.15/16	1.1/4	0.3810	7/16	0.2860	3	D6	Plug	1	6008714	—
M11	1.50	3.5/32	1.7/16	0.3230	13/32	0.2420	3	D6	Plug	1	6008718	—
M12	1.75	3.3/8	1.21/32	0.3670	7/16	0.2750	3	D6	Plug	1	—	6007480
M12	1.75	3.3/8	1.21/32	0.3670	7/16	0.2750	3	D6	Plug	1	6008722	—
M14	2.00	3.19/32	1.21/32	0.4290	1/2	0.3220	3	D7	Plug	1	6008728	—
M16	2.00	3.13/16	1.13/16	0.4800	9/16	0.3600	3	D7	Plug	1	6008733	—
M18	2.50	4.1/32	1.13/16	0.5420	5/8	0.4060	3	D7	Plug	1	6008738	—

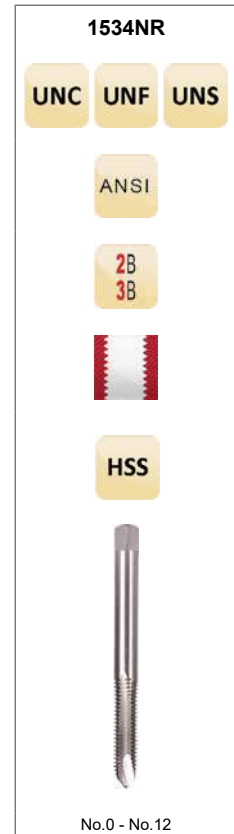
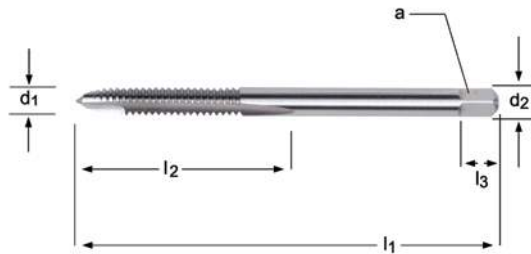
SPIRAL POINT TAPS



Non-Relieved Style, Machine Screw Sizes

1534NR

Feature concentric threads with no pitch diameter relief. These taps are particularly recommended for applications requiring close gauging fits and in older equipment that is not sufficiently rigid to accommodate the free cutting action of the 1534/1585 series. For through hole applications. Sizes in bold font indicate the most commonly used flute and 'H' limit for that size.



				l_1	l_2	d_2	$\square$	l_3	# of	Limits	Chamfer	Pack	1534NR
UNC	UNF	UNS	TPI	Inch	Inch	Inch	a	Inch	Flutes			Qty	
	0		80	1.5/8	5/16	0.1410	0.1100	3/16	2	H1	Plug	1	6007593
	0		80	1.5/8	5/16	0.1410	0.1100	3/16	2	H2	Plug	1	6007598
	0		80	1.5/8	5/16	0.1410	0.1100	3/16	2	H2	Bottoming	1	6007373
	1		72	1.11/16	3/8	0.1410	0.1100	3/16	2	H1	Plug	1	6007379
	1		72	1.11/16	3/8	0.1410	0.1100	3/16	2	H2	Plug	1	6007382
1			64	1.11/16	3/8	0.1410	0.1100	3/16	2	H1	Plug	1	6007374
1			64	1.11/16	3/8	0.1410	0.1100	3/16	2	H2	Plug	1	6007376
	2		64	1.3/4	7/16	0.1410	0.1100	3/16	2	H1	Plug	1	6007472
	2		64	1.3/4	7/16	0.1410	0.1100	3/16	2	H2	Plug	1	6007477
2			56	1.3/4	7/16	0.1410	0.1100	3/16	2	H1	Plug	1	6007451
2			56	1.3/4	7/16	0.1410	0.1100	3/16	2	H2	Plug	1	6007459
2			56	1.3/4	7/16	0.1410	0.1100	3/16	2	H2	Bottoming	1	6007467
	3		56	1.13/16	1/2	0.1410	0.1100	3/16	2	H1	Plug	1	6007490
	3		56	1.13/16	1/2	0.1410	0.1100	3/16	2	H2	Plug	1	6007495
3			48	1.13/16	1/2	0.1410	0.1100	3/16	2	H2	Plug	1	6007482
3			48	1.13/16	1/2	0.1410	0.1100	3/16	2	H2	Bottoming	1	6007486
	4		48	1.7/8	9/16	0.1410	0.1100	3/16	2	H2	Plug	1	6007526
4			40	1.7/8	9/16	0.1410	0.1100	3/16	2	H1	Plug	1	6007505
4			40	1.7/8	9/16	0.1410	0.1100	3/16	2	H2	Plug	1	6007510
	4		48	1.7/8	9/16	0.1410	0.1100	3/16	2	H2	Bottoming	1	6007531
4			40	1.7/8	9/16	0.1410	0.1100	3/16	2	H2	Bottoming	1	6007521
	5		44	1.15/16	5/8	0.1410	0.1100	3/16	2	H2	Plug	1	6007547
5			40	1.15/16	5/8	0.1410	0.1100	3/16	2	H2	Plug	1	6007537
5			40	1.15/16	5/8	0.1410	0.1100	3/16	2	H2	Bottoming	1	6007542
	6		40	2"	11/16	0.1410	0.1100	3/16	2	H2	Plug	1	6006685
6			32	2"	11/16	0.1410	0.1100	3/16	2	H1	Plug	1	6007554
6			32	2"	11/16	0.1410	0.1100	3/16	2	H2	Plug	1	6007559
6			32	2"	11/16	0.1410	0.1100	3/16	2	H3	Plug	1	6007569
	6		40	2"	11/16	0.1410	0.1100	3/16	2	H2	Bottoming	1	6006734
6			32	2"	11/16	0.1410	0.1100	3/16	2	H2	Bottoming	1	6007564
6			32	2"	11/16	0.1410	0.1100	3/16	2	H3	Bottoming	1	6007578
	8		36	2.1/8	3/4	0.1680	0.1310	1/4	2	H2	Plug	1	6006877

SPIRAL POINT TAPS

				I ₁	I ₂	d ₂ Ø	□ a	I ₃	# of Flutes	Limits	Chamfer	Pack Qty	1534NR
UNC	UNF	UNS	TPI	Inch	Inch	Inch	Inch	Inch					
8			32	2.1/8	3/4	0.1680	0.1310	1/4	2	H1	Plug	1	6006782
8			32	2.1/8	3/4	0.1680	0.1310	1/4	2	H2	Plug	1	6006818
8			32	2.1/8	3/4	0.1680	0.1310	1/4	2	H3	Plug	1	6006867
8			32	2.1/8	3/4	0.1680	0.1310	1/4	2	H2	Bottoming	1	6006859
8			32	2.1/8	3/4	0.1680	0.1310	1/4	2	H3	Bottoming	1	6006871
	10		32	2.3/8	7/8	0.1940	0.1520	1/4	2	H1	Plug	1	6007412
	10		32	2.3/8	7/8	0.1940	0.1520	1/4	2	H2	Plug	1	6007417
	10		32	2.3/8	7/8	0.1940	0.1520	1/4	2	H3	Plug	1	6007426
	10		32	2.3/8	7/8	0.1940	0.1520	1/4	2	H2	Bottoming	1	6007421
	10		32	2.3/8	7/8	0.1940	0.1520	1/4	2	H3	Bottoming	1	6007430
10			24	2.3/8	7/8	0.1940	0.1520	1/4	2	H1	Plug	1	6007386
10			24	2.3/8	7/8	0.1940	0.1520	1/4	2	H2	Plug	1	6007390
10			24	2.3/8	7/8	0.1940	0.1520	1/4	2	H3	Plug	1	6007399
10			24	2.3/8	7/8	0.1940	0.1520	1/4	2	H2	Bottoming	1	6007394
10			24	2.3/8	7/8	0.1940	0.1520	1/4	2	H3	Bottoming	1	6007404
	12		28	2.3/8	15/16	0.2200	0.1650	9/32	2	H3	Plug	1	6007445
12			24	2.3/8	15/16	0.2200	0.1650	9/32	2	H3	Plug	1	6007435
12			24	2.3/8	15/16	0.2200	0.1650	9/32	2	H3	Bottoming	1	6007440

SPIRAL POINT TAPS



Non-Relieved Style, Fractional Sizes

1585NR

Feature concentric threads with no pitch diameter relief. These taps are particularly recommended for applications requiring close gauging fits and in older equipment that is not sufficiently rigid to accommodate the free cutting action of the regular 1534/1585 series. For through hole applications. Sizes in bold font indicate the most commonly used flute and 'H' limit for that size.



1585NR

UNC UNF

ANSI

2B
3B



HSS

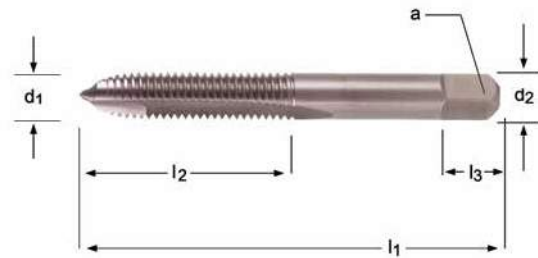


1/4 - 3/4

Nominal d ₁	TPI UNC	TPI UNF	l ₁ Inch	l ₂ Inch	d ₂ Ø Inch /	□ a Inch	l ₃ Inch	# of Flutes	Limits	Pack Qty	Plug	Bottoming
1/4	20		2.1/2	1"	0.2550	0.1910	5/16	2	H1	1	6007801	—
1/4	20		2.1/2	1"	0.2550	0.1910	5/16	2	H2	1	6007806	—
1/4	20		2.1/2	1"	0.2550	0.1910	5/16	2	H3	1	6007811	6007815
1/4	20		2.1/2	1"	0.2550	0.1910	5/16	2	H5	1	6007825	—
1/4	20		2.1/2	1"	0.2550	0.1910	5/16	3	H3	1	6007820	—
1/4		28	2.1/2	1"	0.2550	0.1910	5/16	2	H1	1	6007635	—
1/4		28	2.1/2	1"	0.2550	0.1910	5/16	2	H2	1	6007687	—
1/4		28	2.1/2	1"	0.2550	0.1910	5/16	2	H3	1	6007799	6007850
5/16	18		2.23/32	1.1/8	0.3180	0.2380	3/8	2	H2	1	6007692	—
5/16	18		2.23/32	1.1/8	0.3180	0.2380	3/8	2	H3	1	6007696	7197820
5/16	18		2.23/32	1.1/8	0.3180	0.2380	3/8	2	H5	1	6007716	—
5/16	18		2.23/32	1.1/8	0.3180	0.2380	3/8	3	H3	1	6007703	—
5/16		24	2.23/32	1.1/8	0.3180	0.2380	3/8	2	H3	1	6007741	—
3/8	16		2.15/16	1.1/4	0.3810	0.2860	7/16	3	H2	1	6007648	—
3/8	16		2.15/16	1.1/4	0.3810	0.2860	7/16	3	H3	1	6007652	—
3/8	16		2.15/16	1.1/4	0.3810	0.2860	7/16	3	H5	1	6007659	—
3/8		24	2.15/16	1.1/4	0.3810	0.2860	7/16	3	H3	1	6007673	—
7/16	14		3.5/32	1.7/16	0.3230	0.2420	13/32	3	H2	1	6007777	—
7/16	14		3.5/32	1.7/16	0.3230	0.2420	13/32	3	H3	1	6007781	—
7/16	14		3.5/32	1.7/16	0.3230	0.2420	13/32	3	H5	1	6007786	—
7/16		20	3.5/32	1.7/16	0.3230	0.2420	13/32	3	H3	1	6007802	—
1/2	13		3.3/8	1.21/32	0.3670	0.2750	7/16	3	H2	1	6007762	—
1/2	13		3.3/8	1.21/32	0.3670	0.2750	7/16	3	H3	1	6007768	—
1/2	13		3.3/8	1.21/32	0.3670	0.2750	7/16	3	H5	1	6007773	—
1/2		20	3.3/8	1.21/32	0.3670	0.2750	7/16	3	H3	1	6007792	—
5/8	11		3.13/16	1.13/16	0.4800	0.3600	9/16	3	H3	1	6007761	—
5/8	11		3.13/16	1.13/16	0.4800	0.3600	9/16	3	H5	1	6007766	—
5/8		18	3.13/16	1.13/16	0.4800	0.3600	9/16	3	H3	1	6007771	—
3/4	10		4.1/2	2"	0.5900	0.4420	11/16	3	H3	1	6007862	—
3/4	10		4.1/2	2"	0.5900	0.4420	11/16	3	H5	1	6007864	—
3/4		16	4.1/2	2"	0.5900	0.4420	11/16	3	H3	1	6007639	—

Non-Relieved, Metric Sizes

1785NR Feature concentric threads with no pitch diameter relief. These taps are particularly recommended for applications requiring close gauging fits and in older equipment that is not sufficiently rigid to accommodate the free cutting action of the regular 1785 series. For through hole applications.



1785NR

M

ANSI

6H



HSS



M1.6 - M20

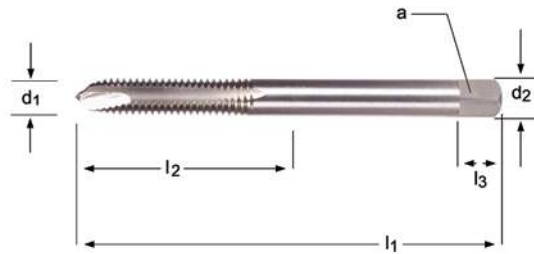
M	P mm	l_1 Inch	l_2 Inch	l_3 Inch	d_2 Ø Inch	$\square$ a Inch	# of Flutes	Limits	Chamfer	Pack Qty	1785NR
1.6	0.35	1.5/8	5/16	0.1410	0.1100	3/16	2	D3	Plug	1	6008823
2	0.40	1.3/4	7/16	0.1410	0.1100	3/16	2	D3	Plug	1	6008852
2.5	0.45	1.13/16	1/2	0.1410	0.1100	3/16	2	D3	Plug	1	6008622
3	0.50	1.15/16	5/8	0.1410	0.1100	3/16	2	D3	Plug	1	6008765
3.5	0.60	2"	11/16	0.1410	0.1100	3/16	2	D4	Plug	1	6008815
4	0.70	2.1/8	3/4	0.1680	0.1310	1/4	2	D4	Plug	1	6008829
4.5	0.75	2.3/8	7/8	0.1940	0.1520	1/4	2	D4	Plug	1	6008834
5	0.80	2.3/8	7/8	0.1940	0.1520	1/4	2	D4	Plug	1	6008839
6	1.00	2.1/2	1"	0.2550	0.1910	5/16	2	D5	Plug	1	6008844
7	1.00	2.23/32	1.1/8	0.3180	0.2380	3/8	2	D5	Plug	1	6008623
8	1.25	2.23/32	1.1/8	0.3180	0.2380	3/8	2	D5	Plug	1	6008625
10	1.50	2.15/16	1.1/4	0.3810	0.2860	7/16	3	D6	Plug	1	6008827
12	1.75	3.3/8	1.21/32	0.3670	0.2750	7/16	3	D6	Plug	1	6008832
14	2.00	3.19/32	1.21/32	0.4290	0.3220	1/2	3	D7	Plug	1	6008838
16	2.00	3.13/16	1.13/16	0.4800	0.3600	9/16	3	D7	Plug	1	6008843
20	2.50	4.15/32	2"	0.6520	0.4890	11/16	3	D7	Plug	1	6008713

SPIRAL POINT TAPS



Extension / Non-Relieved Style

1534NE Similar in design and thread geometries to the standard 1534NR series, but with a longer shank length. Bright finish improves chip flow in soft or non-ferrous materials. For through hole applications.



1534NE(UNC)

UNC UNF

ANSI

3B



HSS



No.4 - 1/2

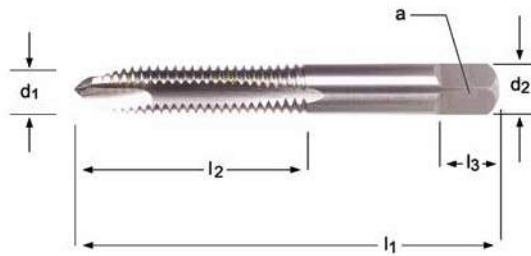
UNC	UNF	TPI	l_1 Inch	l_2 Inch	d_2 Ø Inch	$\square$ a Inch	l_3 Inch	# of Flutes	Limits	Pack Qty	Chamfer	1534NE
4		40	4"	9/16	0.1410	0.1100	3/16	2	H2	1	Plug	6007097
6		32	4"	11/16	0.1410	0.1100	3/16	2	H3	1	Plug	6007408
6		32	6"	11/16	0.1410	0.1100	3/16	2	H3	1	Plug	6007462
8		32	4"	3/4	0.1680	0.1310	1/4	2	H3	1	Plug	6007583
8		32	6"	3/4	0.1680	0.1310	1/4	2	H3	1	Plug	6007588
	10	32	4"	7/8	0.1940	0.1520	1/4	2	H3	1	Plug	6007080
	10	32	6"	7/8	0.1940	0.1520	1/4	2	H3	1	Plug	6007083
10		24	4"	7/8	0.1940	0.1520	1/4	2	H3	1	Plug	6007071
10		24	6"	7/8	0.1940	0.1520	1/4	2	H3	1	Plug	6007077
	1/4	28	4"	1"	0.2550	0.1910	5/16	2	H3	1	Plug	6007065
	1/4	28	6"	1"	0.2550	0.1910	5/16	2	H3	1	Plug	6007068
1/4		20	4"	1"	0.2550	0.1910	5/16	2	H3	1	Plug	6007059
1/4		20	6"	1"	0.2550	0.1910	5/16	2	H3	1	Plug	6007062
5/16		18	4"	1.1/8	0.3180	0.2380	3/8	2	H3	1	Plug	6007099
5/16		18	6"	1.1/8	0.3180	0.2380	3/8	2	H3	1	Plug	6007101
	3/8	24	6"	1.1/4	0.3810	0.2860	7/16	3	H3	1	Plug	6007094
3/8		16	4"	1.1/4	0.3810	0.2860	7/16	3	H3	1	Plug	6007085
3/8		16	6"	1.1/4	0.3810	0.2860	7/16	3	H3	1	Plug	6007088
	7/16	20	6"	1.7/16	0.3230	0.2420	13/32	3	H3	1	Plug	6007574
7/16		14	6"	1.7/16	0.3230	0.2420	13/32	3	H3	1	Plug	6007515
	1/2	20	6"	1.21/32	0.3670	0.2750	7/16	3	H3	1	Plug	6007056
1/2		13	6"	1.21/32	0.3670	0.2750	7/16	3	H3	1	Plug	6007053

Override / Relieved Style

1593 Similar in design to the standard 1534/1585 series
1585OV but with a pitch diameter larger than the basic pitch diameter. Used primarily where a part will be plated or treated after tapping. For through hole applications.

1593: 0.003" - 0.0035" Override

1585OV: 0.005" Override



1593		1585OV
UNC	UNF	UNC
ANSI		ANSI
2B	3B	2B
		
HSS		HSS
		
N6 - N10		1/4 - 5/8

			l_1	l_2	d_2	a	l_3	# of	Limits	Chamfer	Pack	1593	1585OV
UNC	UNF	TPI	Inch	Inch	Ø Inch	° Inch	Inch	Flutes			Qty		
6		32	2"	11/16	0.1410	0.1100	3/16	2	H7	Plug	1	6007868	—
8		32	2.1/8	3/4	0.1680	0.1310	1/4	2	H7	Plug	1	6007869	—
	10	32	2.3/8	7/8	0.1940	0.1520	1/4	2	H7	Plug	1	6007866	—
10		24	2.3/8	7/8	0.1940	0.1520	1/4	2	H7	Plug	1	6007830	—
1/4		20	2.1/2	1"	0.2550	0.1910	5/16	2	H11	Plug	1	—	6007124
5/16		18	2.23/32	1.1/8	0.3180	0.2380	3/8	2	H11	Plug	1	—	6007215
3/8		16	2.15/16	1.1/4	0.3810	0.2860	7/16	3	H11	Plug	1	—	6007163
7/16		14	3.5/32	1.7/16	0.3230	0.2420	13/32	3	H11	Plug	1	—	6007319
1/2		13	3.3/8	1.21/32	0.3670	0.2750	7/16	3	H11	Plug	1	—	6007812
5/8		11	3.13/16	1.13/16	0.4800	0.3600	9/16	3	H11	Plug	1	—	6007304

SPIRAL FLUTE TAPS

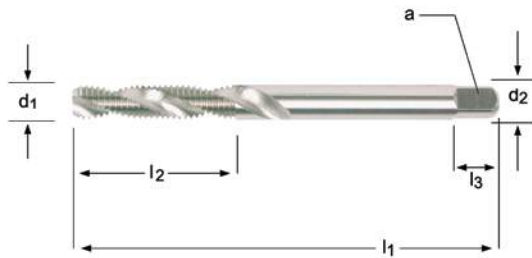


Regular Spiral 30°

1582 - Machine Screw Sizes

1586 - Fractional Sizes

Generally used where chip disposal is a problem. The spiral flute design effectively draws chips out of the hole. Recommended for use when tapping blind or through holes in a variety of materials. Excellent choice for non-ferrous applications.



1582 / 1586

UNC

UNF

ANSI

3B



HSS



No. 4 - 1/2

Nominal d_1	TPI UNC	TPI UNF	l_1 Inch	l_2 Inch	d_2 Inch /	$\square$ a Inch	l_3 Inch	# of Flutes	Limits	Pack Qty	Plug	Bottoming
4	40		1.7/8	9/16	0.1410	0.1100	3/16	2	H2	1	6007645	6007650
6	32		2"	11/16	0.1410	0.1100	3/16	2	H3	1	6007661	6007665
8	32		2.1/8	3/4	0.1680	0.1310	1/4	2	H3	1	6007675	6007680
10	24		2.3/8	7/8	0.1940	0.1520	1/4	2	H3	1	6007630	6007633
10		32	2.3/8	7/8	0.1940	0.1520	1/4	2	H3	1	6007637	6007641
1/4	20		2.1/2	1"	0.2550	0.1910	5/16	2	H3	1	6007836	6007841
1/4	20		2.1/2	1"	0.2550	0.1910	5/16	3	H3	1	6007623	6007624
1/4		28	2.1/2	1"	0.2550	0.1910	5/16	2	H3	1	6007625	6007627
1/4		28	2.1/2	1"	0.2550	0.1910	5/16	3	H3	1	6007629	6007632
5/16	18		2.23/32	1.1/8	0.3180	0.2380	3/8	3	H3	1	6007655	6007662
5/16		24	2.23/32	1.1/8	0.3180	0.2380	3/8	3	H3	1	6007666	6007671
3/8	16		2.15/16	1.1/4	0.3810	0.2860	7/16	3	H3	1	6007636	6007640
3/8		24	2.15/16	1.1/4	0.3810	0.2860	7/16	3	H3	1	6007644	6007647
7/16	14		3.5/32	1.7/16	0.3230	0.2420	13/32	3	H3	1	6007676	6007681
1/2	13		3.3/8	1.21/32	0.3670	0.2750	7/16	3	H3	1	6007760	6007816
1/2		20	3.3/8	1.21/32	0.3670	0.2750	7/16	3	H3	1	6007827	6007831

High Spiral Helicut 52°

1587 - Machine Screw Sizes

1588 - Fractional Sizes

Similar to the regular spiral flute design of 1582/1586 except that the faster spiral improves the chip drawing action and permits the bridging of larger gaps inside a hole. For blind or through hole applications. Excellent choice for non-ferrous applications.



1587 / 1588

UNC UNF

ANSI

2B
3B



HSS



N4 - 1/2

Nominal d ₁	TPI UNC	TPI UNF	l ₁ Inch	l ₂ Inch	d ₂ Ø Inch /	□ a Inch	l ₃ Inch	# of Flutes	Limits	Pack Qty	Plug	Bottoming
4	40		1.7/8	9/16	0.1410	0.1100	3/16	2	H2	1	6007730	6007735
6	32		2"	11/16	0.1410	0.1100	3/16	2	H3	1	6007750	6007755
8	32		2.1/8	3/4	0.1680	0.1310	1/4	3	H3	1	6007765	6007770
10	24		2.3/8	7/8	0.1940	0.1520	1/4	3	H3	1	6007686	6007691
10		32	2.3/8	7/8	0.1940	0.1520	1/4	3	H3	1	6007694	6007700
1/4	20		2.1/2	1.000	0.2550	0.1910	5/16	3	H3	1	6007796	6007800
1/4		28	2.1/2	1.000	0.2550	0.1910	5/16	3	H3	1	6007805	6007810
5/16	18		2.23/32	1.1/8	0.3180	0.2380	3/8	3	H3	1	6007784	6007838
5/16		24	2.23/32	1.1/8	0.3180	0.2380	3/8	3	H3	1	6007847	6007851
3/8	16		2.15/16	1.1/4	0.3810	0.2860	7/16	3	H3	1	6007822	6007628
3/8		24	2.15/16	1.1/4	0.3810	0.2860	7/16	3	H3	1	6007669	6007721
7/16	14		3.5/32	1.7/16	0.3230	0.2420	13/32	3	H3	1	6007855	6007858
7/16		20	3.5/32	1.7/16	0.3230	0.2420	13/32	3	H3	1	6007631	6007634
1/2	13		3.3/8	1.21/32	0.3670	0.2750	7/16	3	H3	1	6007775	6007780
1/2		20	3.3/8	1.21/32	0.3670	0.2750	7/16	3	H3	1	6007785	6007790

SPIRAL FLUTE TAPS

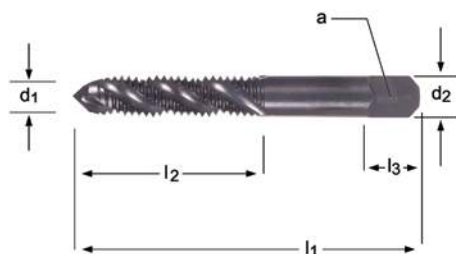


Heavy Duty Spiral 40°

1590 - Machine Screw Sizes

1591 - Fractional Sizes

A slower helix angle, larger core diameter, three flutes and wider throat dimensions than the regular 1587/1588 series. Designed for tough blind or through hole tapping. Chip ejection is more efficient and problems such as chipping and breakage are largely eliminated. A steam tempered finish makes this tap ideal for use in ferrous materials and higher strength alloys.



1590 / 1591

UNC UNF

ANSI

3B



HSS

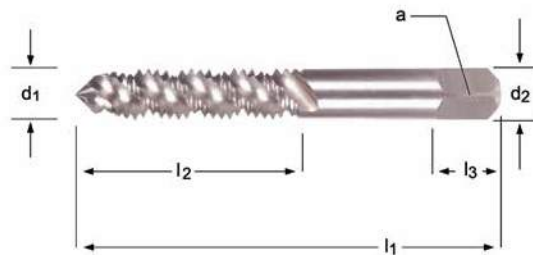


N6 - 1/2

Nominal d_1	TPI UNC	TPI UNF	l_1 Inch	l_2 Inch	d_2 Ø Inch /	$\square$ a Inch	l_3 Inch	# of Flutes	Limits	Pack Qty	Plug	Bottoming
6	32		2"	11/16	0.1410	0.1100	3/16	2	H3	1	6007674	6007679
6		40	2"	11/16	0.1410	0.1100	3/16	2	H3	1	—	6007689
10	24		2.3/8	7/8	0.1940	0.1520	1/4	3	H3	1	6007638	6007642
10		32	2.3/8	7/8	0.1940	0.1520	1/4	3	H3	1	6007646	6007649
1/4	20		2.1/2	1"	0.2550	0.1910	5/16	3	H3	1	6007736	6007746
1/4		28	2.1/2	1"	0.2550	0.1910	5/16	3	H3	1	6007751	6007756
5/16	18		2.23/32	1.1/8	0.3180	0.2380	3/8	3	H3	1	6007789	6007793
3/8	16		2.5/16	1.1.4	0.3810	0.2860	7/16	3	H3	1	6007764	6007769
7/16	14		3.5/32	1.7/16	0.3230	0.2420	13/32	3	H3	1	6007808	6007813
1/2	13		3.3/8	1.21/32	0.3670	0.2750	7/16	3	H3	1	6007713	6007718

High Spiral Helicut 52°, Metric

1788(M) Similar to the regular spiral flute design of 1582/1586 except that the faster spiral improves the chip drawing action and permits the bridging of larger gaps inside a hole. For blind or through hole applications. Excellent choice for non-ferrous applications.



1788(M)

M

ANSI

6H



HSS



M3 - M12

Nominal d_1	Pitch M	l_1 Inch	l_2 Inch	d_2 Ø Inch /	a Inch	l_3 Inch	No. of Flutes	Limits	Pack Qty	Plug	Bottoming
M3	0.50	1.15/16	5/8	0.1410	0.1100	3/16	2	D3	1	6008645	6008650
M4	0.70	2.1/8	3/4	0.1680	0.1310	1/4	3	D4	1	6008669	6008674
M5	0.80	2.3/8	7/8	0.1940	0.1520	1/4	3	D4	1	6008679	6008683
M6	1.00	2.1/2	1"	0.2550	0.1910	5/16	3	D5	1	6008688	6008692
M8	1.25	2.23/32	1.1/8	0.3180	0.2380	3/8	3	D5	1	6008704	6008709
M10	1.50	2.15/16	1.1/4	0.3810	0.2860	7/16	3	D6	1	6008626	6008628
M12	1.75	3.3/8	1.21/32	0.3670	0.2750	7/16	3	D6	1	6008631	6008634

THREAD FORMING TAPS



Rol-Rite / Spiral Lobe

1580 The Rol-Rite style has a spiral lobe pattern and no oil or lubrication grooves. It is designed for general purpose applications and is particularly suited for through holes in thin sections and for interrupted holes. For through or blind hole applications.



1580

UNC

UNF

ANSI

2B
3B



HSS

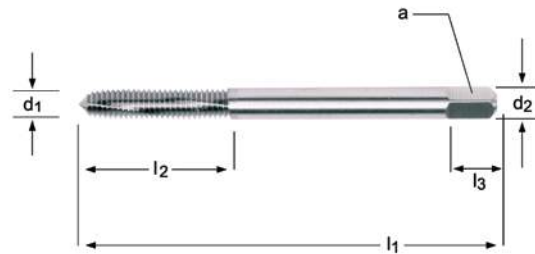


N2 - 3/8

Nominal d_1	TPI UNC	TPI UNF	l_1 Inch	l_2 Inch	d_2 Ø Inch /	$\square$ a Inch	l_3 Inch	Limits	Pack Qty	Plug	Bottoming
2	56		1.3/4	7/16	0.1410	0.1100	3/16	H2	1	—	6006727
2	56		1.3/4	7/16	0.1410	0.1100	3/16	H3	1	—	6006732
4	40		1.7/8	9/16	0.1410	0.1100	3/16	H3	1	6006780	6006784
4	40		1.7/8	9/16	0.1410	0.1100	3/16	H5	1	—	6006791
5	40		1.15/16	5/8	0.1410	0.1100	3/16	H3	1	—	6006807
6	32		2"	11/16	0.1410	0.1100	3/16	H3	1	6006843	6006847
6	32		2"	11/16	0.1410	0.1100	3/16	H5	1	6006849	—
8	32		2.1/8	3/4	0.1680	0.1310	1/4	H3	1	6007778	6007829
8	32		2.1/8	3/4	0.1680	0.1310	1/4	H5	1	6007839	6007844
10	24		2.3/8	7/8	0.1940	0.1520	1/4	H4	1	6007005	6007009
10		32	2.3/8	7/8	0.1940	0.1520	1/4	H4	1	—	6006800
10		32	2.3/8	7/8	0.1940	0.1520	1/4	H6	1	6006834	6006873
1/4	20		2.1/2	1"	0.2550	0.1910	5/16	H4	1	6006982	6006985
1/4	20		2.1/2	1"	0.2550	0.1910	5/16	H6	1	6006989	—
1/4		28	2.1/2	1"	0.2550	0.1910	5/16	H4	1	6006998	6007001
5/16	18		2.23/32	1.1/8	0.3180	0.2380	7/16	H5	1	6006822	6006825
5/16	18		2.23/32	1.1/8	0.3180	0.2380	7/16	H7	1	—	6006828
5/16		24	2.23/32	1.1/8	0.3180	0.2380	7/16	H5	1	6006831	—
3/8	16		2.15/16	1.1/4	0.3810	0.2860	1/2	H5	1	6006765	6006769
3/8		24	2.15/16	1.1/4	0.3810	0.2860	1/2	H5	1	—	6006776

Rol-Rite, Spiral Lobe

1580(M) The Rol-Rite style has a spiral lobe pattern and no oil or lubrication grooves. It is designed for general purpose applications and is particularly suited for through holes in thin sections and for interrupted holes.



1580(M)

M

ANSI

6H



HSS



M3 - M12

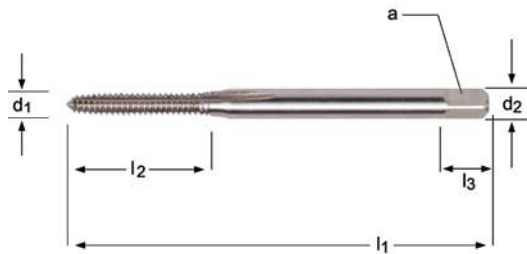
Nominal d_1	Pitch M	l_1 Inch	l_2 Inch	d_2 Ø Inch /	$\square$ a Inch	l_3 Inch	Limits	Pack Qty	Plug	Bottoming
M3	0.50	1.15/16	5/8	0.1410	0.1100	3/16	D5	1	6006922	6006924
M4	0.70	2.1/8	3/4	0.1680	0.1310	1/4	D6	1	6006926	6006928
M5	0.80	2.3/8	7/8	0.1940	0.1520	1/4	D7	1	6006930	6006933
M6	1.00	2.1/2	1"	0.2550	0.1910	5/16	D8	1	6006935	6006938
M8	1.25	2.23/32	1.1/8	0.3180	0.2380	3/8	D9	1	6006939	6006943
M10	1.50	2.15/16	1.1/4	0.3810	0.2860	7/16	D10	1	6006913	6006915
M12	1.75	3.3/8	1.21/32	0.3670	0.2750	7/16	D11	1	6006917	6006919

THREAD FORMING TAPS



Rol-Form / Lube Grooves

3300 The Rol-Form style has 2-4 grooves (depending on size) extending the full length of thread to assure lubrication in the forming zone and to eliminate build up of the hydraulic pressure in blind holes. They are particularly suited to blind holes in thin walled die castings.



3300

UNC

UNF

ANSI

2B
3B



HSS



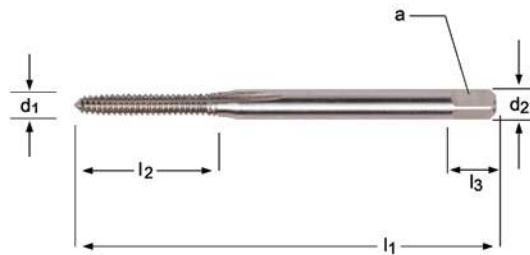
N0 - 1/2

Nominal d_1	TPI UNC	TPI UNF	l_1 Inch	l_2 Inch	d_2 Ø Inch /	$\square$ a Inch	l_3 Inch	Limits	Pack Qty	Plug	Bottoming
0		80	1.5/8	5/16	0.1410	0.1100	3/16	H2	1	—	6009413
1	64		1.11/16	3/8	0.1410	0.1100	3/16	H2	1	—	6009416
1		72	1.11/16	3/8	0.1410	0.1100	3/16	H2	1	—	6009419
2	56		1.3/4	7/16	0.1410	0.1100	3/16	H2	1	—	6009492
2	56		1.3/4	7/16	0.1410	0.1100	3/16	H3	1	—	6009496
4	40		1.7/8	9/16	0.1410	0.1100	3/16	H3	1	6009383	6009386
4	40		1.7/8	9/16	0.1410	0.1100	3/16	H5	1	6009389	—
5	40		1.15/16	5/8	0.1410	0.1100	3/16	H3	1	—	6009409
5	40		1.15/16	5/8	0.1410	0.1100	3/16	H5	1	—	6009415
6	32		2"	11/16	0.1410	0.1100	3/16	H3	1	6009454	6009457
6	32		2"	11/16	0.1410	0.1100	3/16	H5	1	6009459	6009462
8	32		2.1/8	3/4	0.1680	0.1310	1/4	H3	1	6009491	6009493
8	32		2.1/8	3/4	0.1680	0.1310	1/4	H5	1	6009495	6009497
10	24		2.3/8	7/8	0.1940	0.1520	1/4	H4	1	6009453	6009455
10	24		2.3/8	7/8	0.1940	0.1520	1/4	H6	1	6009458	6009460
10		32	2.3/8	7/8	0.1940	0.1520	1/4	H4	1	6009468	6009471
10		32	2.3/8	7/8	0.1940	0.1520	1/4	H6	1	6009474	6009476
12	24		2.3/8	15/16	0.2200	0.1650	9/32	H4	1	6009480	—
1/4	20		2.1/2	1"	0.2550	0.1910	5/16	H4	1	6009435	6009438
1/4	20		2.1/2	1"	0.2550	0.1910	5/16	H6	1	6009441	6009444
1/4		28	2.1/2	1"	0.2550	0.1910	5/16	H4	1	6009447	6009450
5/16	18		2.23/32	1.1/8	0.3180	0.2380	7/16	H5	1	6009424	6009427
5/16	18		2.23/32	1.1/8	0.3180	0.2380	7/16	H7	1	6009432	6009437
3/8	16		2.15/16	1.1/4	0.3810	0.2860	1/2	H5	1	6009502	6009506
3/8	16		2.15/16	1.1/4	0.3810	0.2860	1/2	H7	1	6009507	6009508
3/8		24	2.15/16	1.1/4	0.3810	0.2860	1/2	H7	1	6009378	6009381
1/2	13		3.3/8	1.21/32	0.3670	0.2750	23/32	H5	1	6009422	—

Rol-Form, Lube Grooves

3300(M)

The Rol-Form style has 1-2 lube grooves (depending on size) extending the full length of thread to assure lubrication in the forming zone and to eliminate build up of the hydraulic pressure in blind holes. They are particularly suited to blind holes in thin walled die castings.



3300(M)

M

ANSI

6H



HSS



M3 - M10

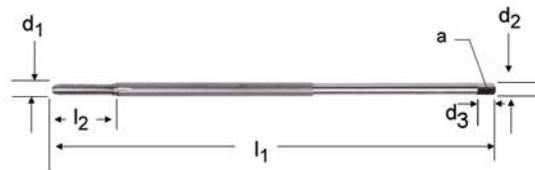
Nominal d_1	Pitch M	l_1 Inch	l_2 Inch	d_2 Ø Inch /	a Inch	l_3 Inch	Limits	Grooves	Pack Qty	Plug	Bottoming
M3	0.50	1.15/16	5/8	0.1410	0.1100	3/16	D5	1	1	6009382	6009384
M4	0.70	2.1/8	3/4	0.1680	0.1310	1/4	D6	1	1	6009387	6009390
M5	0.80	2.3/8	7/8	0.1940	0.1520	1/4	D7	1	1	6009393	6009396
M6	1.00	2.1/2	1"	0.2550	0.1910	5/16	D8	2	1	6009399	6009404
M8	1.25	2.23/32	1.1/8	0.3180	0.2380	3/8	D9	2	1	6009407	6009410
M10	1.50	2.15/16	1.1/4	0.3810	0.2860	7/16	D10	2	1	6009505	6009373

THREAD FORMING TAPS



Extension Rol-Form / Lube Grooves

3306E Similar in design and thread geometries to the standard 3300 series but with longer shank lengths than standard.



3306E(UNF)

UNC UNF

ANSI

2B



HSS



N4 - 5/16

UNC	UNF	TPI	l_1 Inch	l_2 Inch	d_2 Ø Inch	$\square$ a Inch	l_3 Inch	Limits	Chamfer	Pack Qty	3306E
4		40	4"	9/16	0.1410	0.1100	3/16	H3	Bottoming	1	6009250
4		40	4"	9/16	0.1410	0.1100	3/16	H5	Bottoming	1	6009255
6		32	4"	11/16	0.1410	0.1100	3/16	H3	Bottoming	1	6009326
8		32	4"	3/4	0.1680	0.1310	1/4	H3	Bottoming	1	6009339
10		24	4"	7/8	0.1940	0.1520	1/4	H4	Bottoming	1	6009175
1/4		20	4"	1"	0.2550	0.1910	5/16	H4	Bottoming	1	6009504
5/16		18	4"	1.1/8	0.3180	0.2380	3/8	H5	Bottoming	1	6009260

General Purpose, Medium Hook, NPT

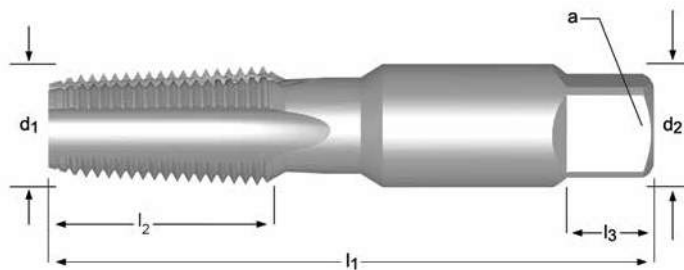
1541

TN1541

Straight Flute. Medium hook for multi-material tapping. Generally used for pipe fittings and couplings in most ferrous and non-ferrous materials. The nominal size of a pipe tap is that of the pipe fitting to be tapped and not the actual size of the tap. NPT threads require the use of a 'sealant' such as teflon tape or pipe compound to ensure a tight joint.

TiN coating increases surface hardness and improves tool life.

Made to Metal Cutting Tool Institute Standards, table 311



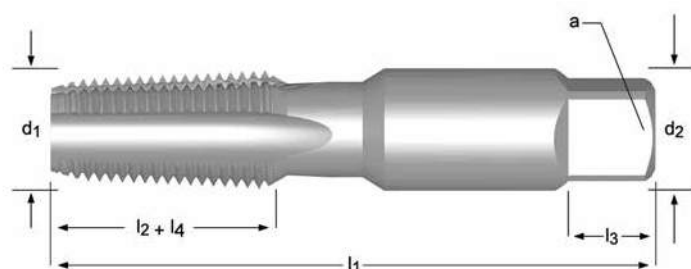
1541(NPT)	TN1541
NPT	NPT
ANSI	ANSI
Normal	Normal
	
HSS	HSS
	
1/16 - 2"	1/8 - 3/4

Nominal d ₁	TPI	l ₁ Inch	l ₂ Inch	d ₂ Ø Inch /	□ a Inch	l ₃ Inch	# of Flutes	Pack Qty	1541	TN1541
1/16	27	2.1/8	11/16	0.3130	0.2340	3/8	4	1	6006824	—
1/8	27	2.1/8	3/4	0.3130	0.2340	3/8	4	1	6006837	—
1/8	27	2.1/8	3/4	0.4380	0.3280	3/8	4	1	6006833	6007587
1/4	18	2.7/16	1.1/16	0.5630	0.4210	7/16	4	1	6006830	6007530
3/8	18	2.9/16	1.1/16	0.7000	0.5310	1/2	4	1	6006855	6007602
1/2	14	3.1/8	1.3/8	0.6880	0.5150	5/8	4	1	6006827	6007471
3/4	14	3.1/4	1.3/8	0.9060	0.6790	11/16	5	1	6006851	6007597
1"	11.5	3.3/4	1.3/4	1.1250	0.8430	13/16	5	1	6006841	—
1.1/4	11.5	4"	1.3/4	1.3130	0.9840	15/16	5	1	6006821	—
1.1/2	11.5	4.1/4	1.3/4	1.5000	1.1250	1"	7	1	6006815	—
2"	11.5	4.1/2	1.3/4	1.8750	1.4060	1.1/8	7	1	6006846	—

General Purpose, Medium Hook, NPT

- E710** Straight Flute. Medium hook for multi-material tapping.
- E721** Generally used for pipe fittings and couplings in most ferrous and non-ferrous materials. The nominal size of a pipe tap is that of the pipe fitting to be tapped and not the actual size of the tap. NPT threads require the use of a 'sealant' such as teflon tape or pipe compound to ensure a tight joint.

TiN coating increases surface hardness and improves tool life.



E710	E721
NPT	NPT
ANSI B94.9	ANSI B94.9
Normal	Normal
HSS	HSS
1/16 - 2"	1/8 - 1"

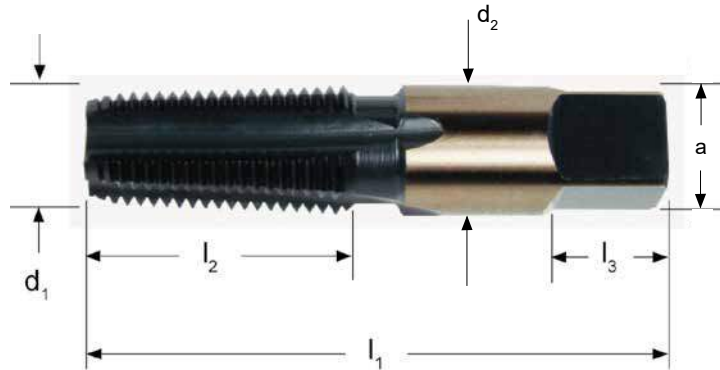
Nominal d ₁	TPI	l ₁ mm	l ₂ mm	d ₂ Ø mm	a mm	l ₃ mm		# of Flutes	l ₄ mm	Pack Qty	E710	E721
1/16	27	65	17	7.9	5.9	8	6.3	4	11.7	1	5977618	—
1/8	27	70	19	11.1	8.3	10	8.5	4	11.9	1	5977634	5977601
1/8	27	70	19	11.1	8.3	10	8.5	4	11.9	Set of 2	5977637 ¹⁾	—
1/4	18	75	27	14.3	10.7	11	11	4	17.6	1	5977628	5977598
1/4	18	75	27	14.3	10.7	11	11	4	17.6	Set of 2	5977631 ¹⁾	—
3/8	18	80	27	17.8	13.5	13	14.5	4	19.5	1	5977652	5977607
3/8	18	80	27	17.8	13.5	13	14.5	4	19.5	Set of 2	5977653 ¹⁾	—
1/2	14	100	35	17.5	13.1	16	18	4	22.7	1	5977622	5977595
1/2	14	100	35	17.5	13.1	16	18	4	22.7	Set of 2	5977625 ¹⁾	—
3/4	14	105	35	23.0	17.2	17	23	5	24.4	1	5977646	5977604
3/4	14	105	35	23.0	17.2	17	23	5	24.4	Set of 2	5977649 ¹⁾	—
1"	11.5	115	43	28.6	21.4	21	29	5	29.4	1	5977609	5977592
1.1/4	11.5	125	43	33.3	25.0	24	38	5	27.7	1	5977615	—
1.1/2	11.5	135	43	38.1	28.6	25	44	7	28.9	1	5977612	—
2"	11.5	145	43	47.6	35.7	29	56	7	26.6	1	5977643	—

¹⁾ Sets (No.7) include: 1pc. semi-bottoming + 1 pc. semi-bottoming (truncated)

General Purpose / Work-Rite, NPT

6541

Straight Flute. Medium hook for multi-material tapping.
Generally used for pipe fittings and couplings in most ferrous and non-ferrous materials.
The nominal size of a pipe tap is that of the pipe fitting to be tapped and not the actual size of the tap. NPT threads require the use of a 'sealant' such as teflon tape or pipe compound to ensure a tight joint.



6541

NPT

ANSI
B94.9

Normal



1/8 - 2"

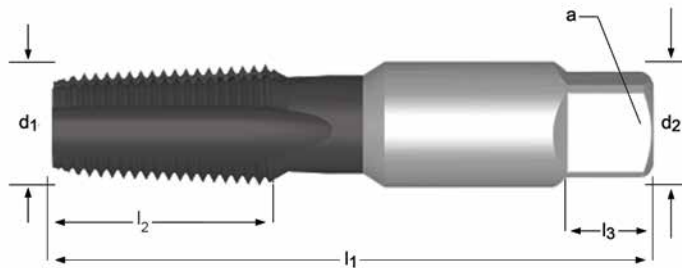
NPT	TPI	l_1 Inch	l_2 Inch	d_2 Ø Inch	$\square$ a Inch	l_3 Inch	# of Flutes	Pack Qty	6541
1/8	27	2.1/8	3/4	0.4380	0.3280	3/8	4	1	6008958
1/4	18	2.7/16	1.1/16	0.5630	0.4210	7/16	4	1	6008949
3/8	18	2.9/16	1.1/16	0.7000	0.5310	1/2	4	1	6008970
1/2	14	3.1/8	1.3/8	0.6880	0.5150	5/8	4	1	6008944
3/4	14	3.1/4	1.3/8	0.9060	0.6790	11/16	5	1	6008965
1"	11.5	3.3/4	1.3/4	1.1250	0.8430	13/16	5	1	6008928
1.1/4	11.5	4"	1.3/4	1.3130	0.9840	15/16	5	1	6008941
1.1/2	11.5	4.1/4	1.3/4	1.5000	1.1250	1	7	1	6008932
2"	11.5	4.1/2	1.3/4	1.8750	1.4060	1.1/8	7	1	6008963

PIPE TAPS

Low Rake for Cast Iron, NPT

1544

Straight Flute. Low rake heavy-duty for cast iron and heat treated alloy steels. Nitride surface treatment reduces wear and chip welding. Manufactured with a cutting geometry specifically for gray cast irons producing broken chips. The design makes these taps also appropriate for non-metallics, cast brass and other brass materials producing broken, powdery chips.



1544

NPT

ANSI
B94.9

Normal



HSS



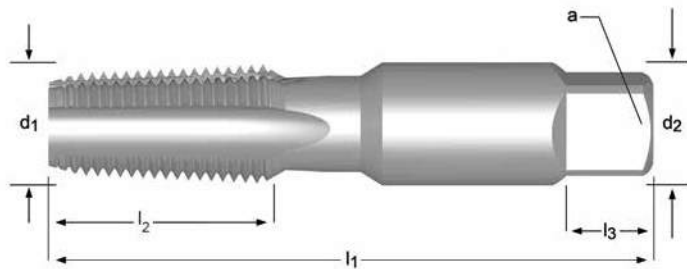
1/16 - 1.1/4

		l_1	l_2	d_2 Ø	$\square$ a	l_3	# of Flutes	Pack Qty	1544
NPT	TPI	Inch	Inch	Inch	Inch	Inch			
1/16	27	2.1/8	11/16	0.3130	0.2340	3/8	4	1	6007157
1/8	27	2.1/8	3/4	0.4380	0.3280	3/8	4	1	6007175
1/4	18	2.7/16	1.1/16	0.5630	0.4210	7/16	4	1	6007170
3/8	18	2.9/16	1.1/16	0.7000	0.5310	1/2	4	1	6007197
1/2	14	3.1/8	1.3/8	0.6880	0.5150	5/8	4	1	6007165
3/4	14	3.1/4	1.3/8	0.9060	0.6790	11/16	5	1	6007191
1"	11.5	3.3/4	1.3/4	1.1250	0.8430	13/16	5	1	6007183
1.1/4	11.5	4"	1.3/4	1.3130	0.9840	15/16	5	1	6007153

High Hook, NPT

1545 Designed with a high hook and deep flutes to handle the tough curly chips of free cutting materials such as low carbon and leaded steels, boiler plate, aluminum and die castings.

1545A Identical to the 1545 series but with steam tempered surface treatment to prevent galling and chipping.



1545	1545A
NPT	NPT
ANSI	ANSI
Normal	Normal
	
HSS	HSS
	
1/18 - 1"	1/16 - 3/4

NPT	TPI	l_1 Inch	l_2 Inch	d_2 Ø Inch	a Inch	l_3 Inch	# of Flutes	Pack Qty	1545	1545A
1/16	27	2.1/8	11/16	0.3130	0.2340	3/8	4	1	—	6007202
1/8	27	2.1/8	3/4	0.3130	0.2340	3/8	4	1	6007271	—
1/8	27	2.1/8	3/4	0.4380	0.3280	3/8	4	1	6007261	6007223
1/4	18	2.7/16	1.1/16	0.5630	0.4210	7/16	4	1	6007256	6007218
3/8	18	2.9/16	1.1/16	0.7000	0.5310	1/2	4	1	6007290	6007232
1/2	14	3.1/8	1.3/8	0.6880	0.5150	5/8	4	1	6007251	6007207
3/4	14	3.1/4	1.3/8	0.9060	0.6790	11/16	5	1	6007286	6007228
1"	11.5	3.3/4	1.3/4	1.1250	0.8430	13/16	5	1	6007276	—

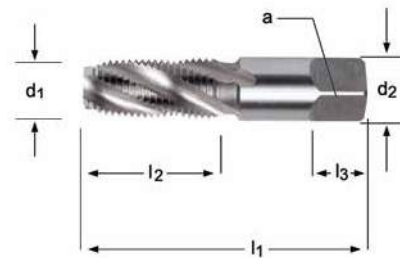
PIPE TAPS



Spiral Flute, 30°, NPT

1548

Designed with a medium hook. Most effective when used in applications that produce, long, stringy chips. The spiral flute design effectively draws the chips from the hole being tapped.



1548

NPT

ANSI

Normal



HSS



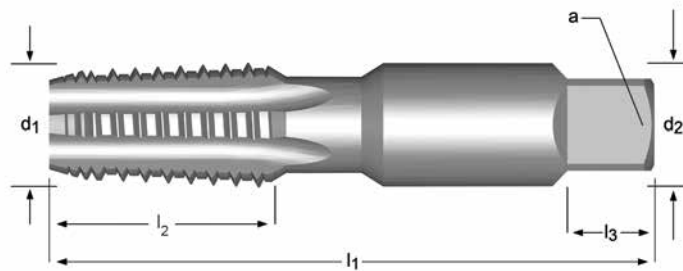
1/16 - 1"

NPT	TPI	l_1 Inch	l_2 Inch	d_2 Ø Inch	$\square$ a Inch	l_3 Inch	# of Flutes	Pack Qty	1548
1/16	27	2.1/8	11/16	0.3130	0.2340	3/8	4	1	6006902
1/8	27	2.1/8	3/4	0.3130	0.2340	3/8	4	1	6006978
1/8	27	2.1/8	3/4	0.4380	0.3280	3/8	4	1	6006973
1/4	18	2.7/16	1.1/16	0.5630	0.4210	7/16	4	1	6006961
3/8	18	2.9/16	1.1/16	0.7000	0.5310	1/2	4	1	6006839
1/2	14	3.1/8	1.3/8	0.6880	0.5150	5/8	4	1	6006923
3/4	14	3.1/4	1.3/8	0.9060	0.6790	11/16	5	1	6006986
1"	11.5	3.3/4	1.3/4	1.1250	0.8430	13/16	5	1	6006983

Interrupted Thread, NPT

1568

Interrupted thread design for chip evacuation. Removal of every other thread allows more coolant deeper into the hole. Helps to eliminate torn threads and re-cutting of chips. Ideal for use in soft, ductile materials or those producing long, continuous chips.



1568

NPT

ANSI

Normal



HSS



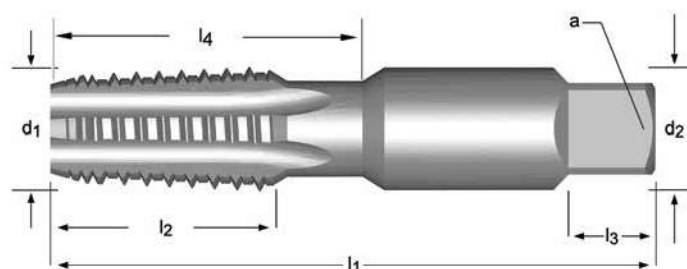
1/8 - 1.1/2

		l_1	l_2	d_2	$\square$	l_3	# of Flutes	Pack Qty	1568
NPT	TPI	Inch	Inch	Ø Inch	a Inch	Inch			
1/8	27	2.1/8	3/4	0.3130	0.2340	3/8	5	1	6006908
1/8	27	2.1/8	3/4	0.4380	0.3280	3/8	5	1	6006906
1/4	18	2.7/16	1.1/16	0.5630	0.4210	7/16	5	1	6006904
3/8	18	2.9/16	1.1/16	0.7000	0.5310	1/2	5	1	6006916
1/2	14	3.1/8	1.3/8	0.6880	0.5150	5/8	5	1	6006900
3/4	14	3.1/4	1.3/8	0.9060	0.6790	11/16	5	1	6006914
1"	11.5	3.3/4	1.3/4	1.1250	0.8430	13/16	5	1	6006910
1.1/4	11.5	4"	1.3/4	1.3130	0.9840	15/16	5	1	6006898
1.1/2	11.5	4.1/4	1.3/4	1.5000	1.1250	1"	7	1	6006896

Interrupted Thread, NPT

E711

Interrupted thread design for chip evacuation. Removal of every other thread allows more coolant deeper into the hole. Helps to eliminate torn threads and re-cutting of chips. Ideal for use in soft, ductile materials or those producing long, continuous chips.



E711

NPT

ANSI
B94.9

Normal



HSS



1/8 - 1.1/2

NPT	TPI	d ₁ nom mm	l ₁ mm	l ₂ mm	l ₄ mm	d ₂ Ø mm	□ a mm	l ₃ mm	# of Flutes	Pack Qty	E711
1/8	27	10.29	70	19	309	11.1	8.3	10	5	1	5977664
1/4	18	13.72	75	27	44.6	14.3	10.7	11	5	1	5977662
3/8	18	17.15	80	27	46.5	17.8	13.5	13	5	1	5977542
1/2	14	21.33	100	35	57.7	17.5	13.1	16	5	1	5977660
3/4	14	26.67	105	35	59.4	23.0	17.2	17	5	1	5977669
1"	11.5	33.40	115	43	72.4	28.6	21.4	21	5	1	5977656
1.1/2	11.5	48.26	135	43	71.9	38.1	28.6	25	7	1	5977658

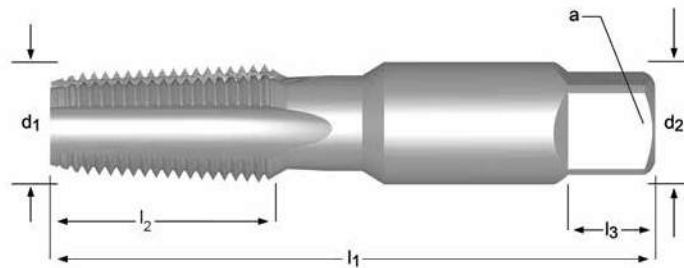
Dryseal, NPTF, Medium Hook

1543

Similar in design to the 1541 series but manufactured to Dryseal American National Standard Taper Pipe Thread (NPTF) specifications. Used where a leak proof pressure tight joint is required without the use of a sealing compound.

TN1543

TiN coated option increases surface hardness and improves tool life.



1543(NPTF)	TN1543
NPTF	NPTF
ANSI	ANSI
Normal	Normal
	
HSS	HSS
	
1/16 - 1"	1/8 - 3/4

NPTF	TPI	l_1 Inch	l_2 Inch	d_2 Ø Inch	$\square$ a Inch	l_3 Inch	# of Flutes	Pack Qty	1543(NPTF)	TN1543
1/16	27	2.1/8	11/16	0.3130	0.2340	3/8	4	1	6007345	—
1/8	27	2.1/8	3/4	0.4380	0.3280	3/8	4	1	—	6007381
1/8	27	2.1/8	3/4	0.3130	0.2340	3/8	4	1	6007134	—
1/8	27	2.1/8	3/4	0.4380	0.3280	3/8	4	1	6007131	—
1/4	18	2.7/16	1.1/16	0.5630	0.4210	7/16	4	1	—	6007609
1/4	18	2.7/16	1.1/16	0.5630	0.4210	7/16	4	1	6007128	—
3/8	18	2.9/16	1.1/16	0.7000	0.5310	1/2	4	1	—	6007389
3/8	18	2.9/16	1.1/16	0.7000	0.5310	1/2	4	1	6007144	—
1/2	14	3.1/8	1.3/8	0.6880	0.5150	5/8	4	1	—	6007606
1/2	14	3.1/8	1.3/8	0.6880	0.5150	5/8	4	1	6007126	—
3/4	14	3.1/4	1.3/8	0.9060	0.6790	11/16	5	1	—	6007385
3/4	14	3.1/4	1.3/8	0.9060	0.6790	11/16	5	1	6007140	—
1"	11.5	3.3/4	1.3/4	1.1250	0.8430	13/16	5	1	6007137	—

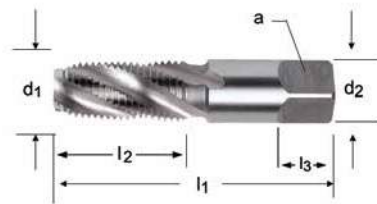
PIPE TAPS



Spiral Flute, Dryseal, NPTF

1549

Spiral Flute 30°. Medium hook for evacuation of long, stringy chips. Similar in design to the 1548 series but manufactured to Dryseal American National Standard Taper Pipe Thread (NPTF) specifications. Used where a leak proof pressure tight joint is required without the use of a sealing compound.



1549

NPTF

ANSI

Normal



HSS



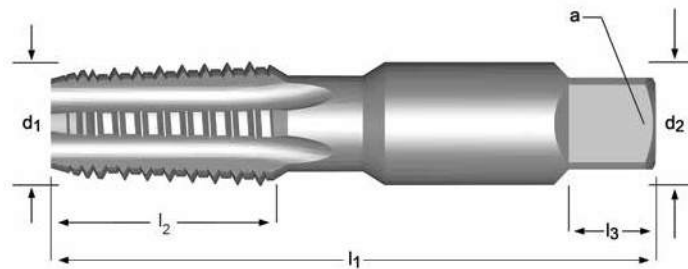
1/16 - 3/4

		l_1	l_2	d_2	$\square$	l_3	# of Flutes	Pack Qty	1549
NPTF	TPI	Inch	Inch	Ø Inch	a Inch	Inch			
1/16	27	2.1/8	11/16	0.3130	0.2340	3/8	4	1	6006842
1/8	27	2.1/8	3/4	0.3130	0.2340	3/8	4	1	6006858
1/8	27	2.1/8	3/4	0.4380	0.3280	3/8	4	1	6006854
1/4	18	2.7/16	1.1/16	0.5630	0.4210	7/16	4	1	6006850
3/8	18	2.9/16	1.1/16	0.7000	0.5310	1/2	4	1	6006872
1/2	14	3.1/8	1.3/8	0.6880	0.5150	5/8	4	1	6006845
3/4	14	3.1/4	1.3/8	0.9060	0.6790	11/16	5	1	6006868

Interrupted Thread, Dryseal, NPTF

1567 Interrupted thread design for chip evacuation. Removal of every other thread allows more coolant deeper into the hole. Helps to eliminate torn threads and re-cutting of chips.

Similar in design to the 1568 series but manufactured to Dryseal American National Standard Taper Pipe Thread (NPTF) specifications. Used where a leak proof pressure tight joint is required without the use of a sealing compound.



1567

NPTF

ANSI

Normal



HSS

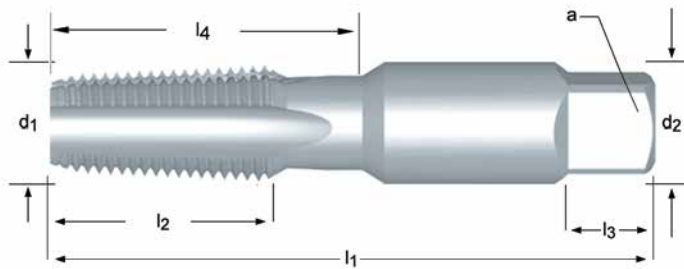


1/8 - 1"

NPTF	TPI	l_1 Inch	l_2 Inch	d_2 Ø Inch	$\square$ a Inch	l_3 Inch	# of Flutes	Pack Qty	1567
1/8	27	2.1/8	3/4	0.3130	0.2340	3/8	5	1	6006888
1/8	27	2.1/8	3/4	0.4380	0.3280	3/8	5	1	6006885
1/4	18	2.7/16	1.1/16	0.5630	0.4210	7/16	5	1	6006883
3/8	18	2.9/16	1.1/16	0.7000	0.5310	1/2	5	1	6006894
1/2	14	3.1/8	1.3/8	0.6880	0.5150	5/8	5	1	6006881
3/4	14	3.1/4	1.3/8	0.9060	0.6790	11/16	5	1	6006892
1"	11.5	3.3/4	1.3/4	1.1250	0.8430	13/16	5	1	6006890

General Purpose, Medium Hook, Dryseal, NPTF

E712 Medium hook for multi-material tapping. Similar in design to the E710 series but manufactured to Dryseal American National Standard Taper Pipe Thread (NPTF) specifications. Used where a leak proof pressure tight joint is required without the use of a sealing compound.



E712

NPTF

ANSI
B94.9

Normal



HSS

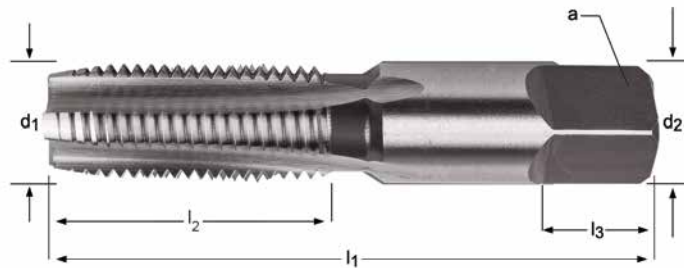


1/16 - 1.1/4

NPTF	TPI	d ₁ nom mm	l ₁ mm	l ₂ mm	l ₄ mm	d ₂ Ø mm	□ a mm	l ₃ mm	# of Flutes		Pack Qty	E712
1/16	27	7.94	65	17	11.7	8.1	6.0	8	4	6.20	1	5977651
1/8	27	10.29	70	19	11.9	11.1	8.3	10	4	8.40	1	5977688
1/4	18	13.72	75	27	17.6	14.3	10.7	11	4	10.90	1	5977685
3/8	18	17.15	80	27	19.5	17.8	13.5	13	4	14.25	1	5977694
1/2	14	21.34	100	35	22.7	17.5	13.1	16	4	17.75	1	5977677
3/4	14	26.67	105	35	24.4	23.0	17.2	17	5	23.00	1	5977691
1"	11.5	33.40	115	43	29.4	28.6	21.4	21	5	29.00	1	5977585
1.1/4	11.5	42.16	125	43	27.7	33.4	24.9	23	5	37.75	1	5977619

Straight Pipe Taps, NPS & NPSF

- 1542** NPSM (Mechanical) - Suitable for tapping holes for low pressure work, and then assemble with either taper threaded or straight threaded pipe or fitting and secure a tight joint with lubricant or sealer.
- 1592** NPSF (Dryseal) - Similar in design to the 1542 series but manufactured to Dryseal American National Standard Pipe Thread NPSF specifications. Intended for low pressure work where a sealer is not used such as fuel and oil lines. When assembling with a dryseal taper-threaded part there will not be any clearance between the crest and roof of the threads.

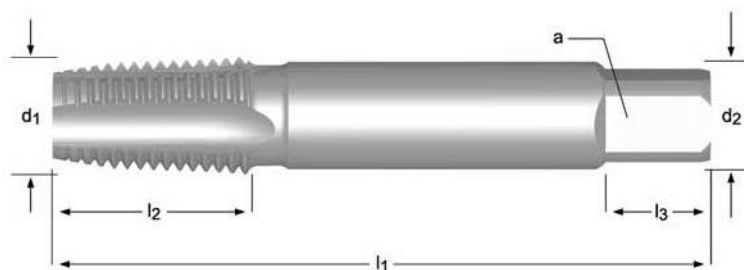


1542	1592
NPSM	NPSF
ANSI	ANSI
Normal	Normal
	
HSS	HSS
	
1/8 - 1"	1/8 - 3/4"

Nominal d_1	TPI	l_1 Inch	l_2 Inch	d_2 Ø Inch /	a Inch	l_3 Inch	# of Flutes	Pack Qty	1542	1592
1/8	27	2.1/8	3/4	0.3130	0.2340	3/8	4	1	6007213	6007658
1/8	27	2.1/8	3/4	0.4380	0.3280	3/8	4	1	6007161	6007842
1/4	18	2.7/16	1.1/16	0.5630	0.4210	7/16	4	1	6007122	6007833
3/8	18	2.9/16	1.1/16	0.7000	0.5310	1/2	4	1	6007329	6007772
1/2	14	3.1/8	1.3/8	0.6880	0.5150	5/8	4	1	6006863	6007828
3/4	14	3.1/4	1.3/8	0.9060	0.6790	11/16	5	1	6007320	6007717
1"	11.5	3.3/4	1.3/4	1.1250	0.8430	13/16	5	1	6007266	—

Taper Pipe Taps, British Standard

E550 Similar to the E710 but manufactured to British Standard Taper Pipe Thread specification (BSPT).



E550

Rc

ISO
2284

Normal



HSS



1/8 - 2"

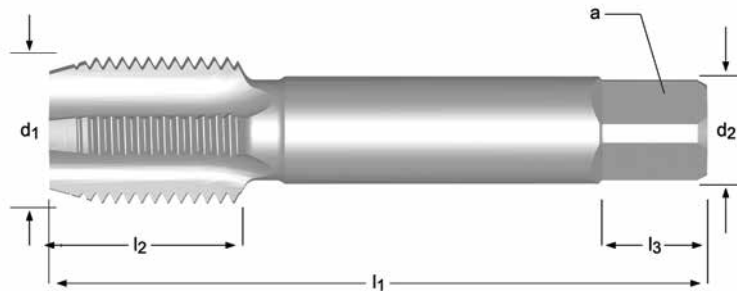
Rc	TPI	d ₁ nom mm	l ₁ mm	l ₂ mm	d ₂ Ø mm	□ a mm	l ₃ mm	# of Flutes	Pack Qty	E550
1/8	28	9.728	59	15	8.0	6.3	9	3	1	5976468
1/8	28	9.728	59	15	8.0	6.3	9	3	Set of 2	5976472 ¹⁾
1/4	19	13.157	67	19	10.0	8.0	11	3	1	5976464
1/4	19	13.157	67	19	10.0	8.0	11	3	Set of 2	5976466 ¹⁾
3/8	19	16.662	75	21	12.5	10.0	13	3	1	5977464
3/8	19	16.662	75	21	12.5	10.0	13	3	Set of 2	5977475 ¹⁾
1/2	14	20.955	87	26	16.0	12.5	16	5	1	5976459
1/2	14	20.955	87	26	16.0	12.5	16	5	Set of 2	5976462 ¹⁾
3/4	14	26.441	96	28	20.0	16.0	20	5	1	5977442
3/4	14	26.441	96	28	20.0	16.0	20	5	Set of 2	5977453 ¹⁾
1"	11	33.249	109	33	25.0	20.0	24	5	1	5976452
1.1/4	11	41.910	119	36	31.5	25.0	28	5	1	5976457
1.1/2	11	47.803	125	37	35.5	28.0	31	7	1	5976455
2"	11	59.614	140	41	40.0	31.5	34	7	1	5977431

Note: ISO shank and square dimensions will necessitate metric holders

¹⁾ Sets (No.7) include: 1pc. semi-bottoming + 1 pc. semi-bottoming (truncated)

Straight Pipe Taps, British Standard

E547 Similar to the NPS pipe taps, but manufactured to British Standard Parallel Pipe Thread specifications (BSPP).



E547

G

ISO
2284

Normal



HSS



1/8 - 2"

Nominal d ₁	TPI	l_1	l_2	d_2 Ø	 a	l_3	# of Flutes		Pack Qty	Taper	Plug	Bottoming
		mm	mm	mm	mm	mm						
1/8	28	59	15	8.0	8.0	9	4	8.8	1	5976343	5976346	5976349
1/4	19	67	19	10.0	8.0	11	4	11.8	1	5976327	5976330	5976335
3/8	19	75	21	12.5	10.0	13	4	15.25	1	5976408	5976412	5976416
1/2	14	87	26	16.0	12.5	16	4	19	1	5976474	5976477	5976480
5/8	14	91	26	18.0	14.0	18	4	21	1	5976423	5976427	5976430
3/4	14	96	28	20.0	16.0	20	4	24.5	1	5976389	5976392	5976397
7/8	14	102	29	22.4	18.0	22	4	28.25	1	5976438	5976445	5976448
1"	11	109	33	25.0	20.0	24	4	30.75	1	5976357	5976361	5976369
1.1/4	11	119	36	31.5	25.0	28	6	39.5	1	5976365	5976404	5976442
1.1/2	11	125	37	35.5	28.0	31	6	45	1	5976717	5976722	5976322
2"	11	140	41	40.0	31.5	34	6	57	1	5976379	5976382	5976385

Note: ISO shank and square dimensions will necessitate metric holders

SPECIAL PURPOSE TAPS

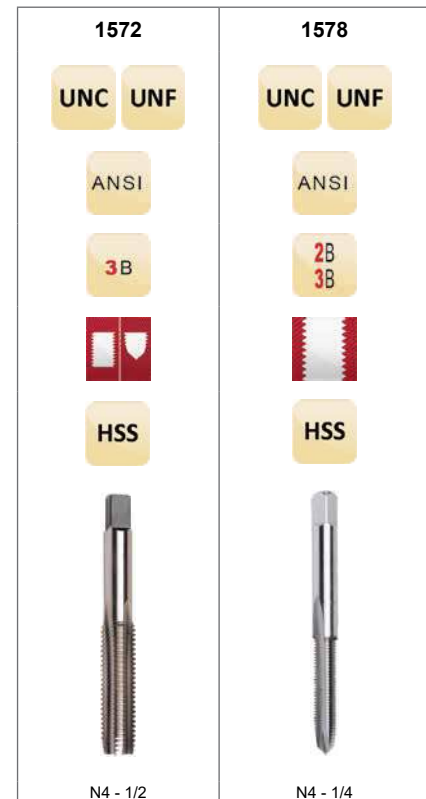
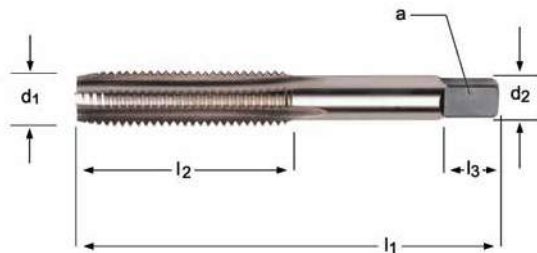


Screw Thread Insert, STI

1572 - Straight flute, hand tap

1578 - Spiral point, machine tap

Designed for use in aluminum, magnesium, and other non-ferrous materials where taps of this type are most commonly used. Taps suitable for other materials can be furnished on request. STI taps are dimensionally oversize and utilize a larger tap drill size so that the thread they produce will accept a helical coil wire screw thread insert of the same nominal size and pitch. For a particular size and pitch the lower H-Limit number is suggested for class 2B and 3B threads, while the higher H-Limit is suggested for class 2B.



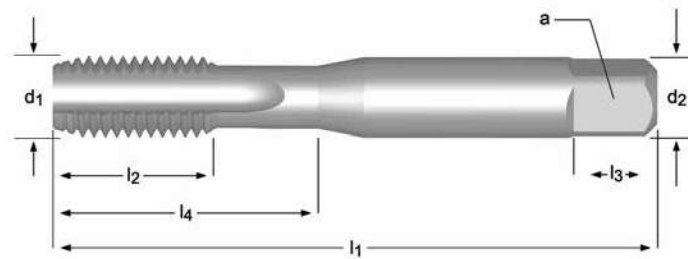
Nominal d ₁	TPI UNC	TPI UNF	l ₁ Inch	l ₂ Inch	d ₂ Ø Inch /	□ a Inch	l ₃ Inch	# of Flutes	Limits	Pack Qty	1572 - Plug	1572 Bottoming	1578 - Plug
4	40		2"	11/16	0.1410	0.1100	3/16	2	H2	1	—	—	6006901
4	40		2"	11/16	0.1410	0.1100	3/16	3	H2	1	6006887	6006909	—
6	32		2.3/8	7/8	0.1940	0.1520	1/4	2	H2	1	—	—	6006903
6	32		2.3/8	7/8	0.1940	0.1520	1/4	2	H3	1	—	—	6006905
6	32		2.3/8	7/8	0.1940	0.1520	1/4	3	H3	1	6007013	6007020	—
8	32		2.3/8	15/16	0.2200	0.1650	9/32	2	H2	1	—	—	6006907
8	32		2.3/8	15/16	0.2200	0.1650	9/32	2	H3	1	—	—	6006911
8	32		2.3/8	15/16	0.2200	0.1650	9/32	3	H3	1	6007032	6006889	—
10	24		2.1/2	1"	0.2550	0.1910	5/16	3	H2	1	6006932	6006934	—
10		32	2.1/2	1"	0.2550	0.1910	9/32	2	H2	1	—	—	6006899
10		32	2.1/2	1"	0.2550	0.1910	5/16	3	H2	1	6006936	6006940	—
10		32	2.1/2	1"	0.2550	0.1910	5/16	3	H3	1	6006945	6006950	—
1/4	20		2.23/32	1.1/8	0.3180	0.2380	5/16	2	H2	1	—	—	6006891
1/4	20		2.23/32	1.1/8	0.3180	0.2380	5/16	2	H3	1	—	—	6006893
1/4	20		2.23/32	1.1/8	0.3180	0.2380	3/8	3	H3	1	6006921	6006925	—
1/4		28	2.23/32	1.1/8	0.3180	0.2380	5/16	2	H2	1	—	—	6006895
1/4		28	2.23/32	1.1/8	0.3180	0.2380	5/16	2	H3	1	—	—	6006897
1/4		28	2.23/32	1.1/8	0.3180	0.2380	3/8	2	H2	1	—	6006929	—
5/16	18		2.15/16	1.1/4	0.3810	0.2860	7/16	4	H3	1	6006931	—	—
3/8	16		3.3/8	1.21/32	0.3670	0.2750	7/16	4	H3	1	6006955	6006969	—
7/16	14		3.19/32	1.21/32	0.4290	0.3220	1/2	4	H3	1	6007024	—	—
7/16		20	3.3/8	1.21/32	0.3670	0.2750	7/16	4	H3	1	—	—	—
1/2	13		3.13/16	1.13/16	0.4800	0.3600	9/16	4	H3	1	6006918	—	—
1/2		20	3.19/32	1.21/32	0.4290	0.3220	1/2	4	H3	1	—	—	—

Screw Thread Insert, STI, Semi-Bottoming

E620 - Straight flute

E621 - Spiral flute

Designed for use in aluminum, magnesium, and other non-ferrous materials where taps of this type are most commonly used. Taps suitable for other materials can be furnished on request. STI taps are dimensionally oversize and utilize a larger tap drill size so that the thread they produce will accept a helical coil wire screw thread insert of the same nominal size and pitch.



E620	E621
EGM	EGM
DORMER ISO	DORMER ISO
6H	6H
HSS	HSS
M3 - M16	M3 - M16

Nominal	P	l ₁	l ₂	d ₂ Ø	 a	l ₃	# of Flutes		l ₄	Pack Qty	E620	E621
d ₁	mm	mm	mm	mm	mm	mm			mm			
3	0.50	53	14	4.00	3.15	6	3	3.2	14	1	5978063	5978441
4	0.70	58	11	5.00	4.00	7	3	4.2	20	1	5978072	5978446
5	0.80	66	13	6.30	5.00	8	3	5.2	26	1	5978280	5978285
6	1.00	72	16	8.00	6.30	9	3	6.3	29	1	5978336	—
6	1.00	72	16	8.00	6.30	9	3	6.3	31	1	—	5978290
8	1.25	80	18	10.00	8.00	11	3	8.4	32	1	5978371	—
8	1.25	80	18	10.00	8.00	11	3	8.4	34	1	—	5978295
10	1.50	89	22	9.00	7.10	10	3	10.5		1	5978043	5978401
12	1.75	95	24	11.20	9.00	12	4	12.5		1	5978049	—
12	1.75	95	24	11.20	9.00	12	3	12.5		1	—	5978428
14	2.00	112	29	14.00	11.20	14	4	14.5		1	5978053	—
14	2.00	112	29	14.00	11.20	14	3	14.5		1	—	5978435
16	2.00	112	29	14.00	11.20	14	4	16.5		1	5978059	—
16	2.00	112	29	14.00	11.20	14	3	16.5		1	—	5978439

SPECIAL PURPOSE TAPS



Pulley Style

1519 These taps have the same major diameters and pitch diameters as standard fractional size taps, but with extended shanks for reaching locations inaccessible to regular hand taps. Although originally designed for tapping pulley holes, the long shank permits tapping other long reach applications.



1519

UNC

ANSI

3B



HSS



1/4 - 3/4

		l_1	l_2	d_2	$\square$	l_3	# of Flutes	Limits	Chamfer	Pack Qty	1519
UNC	TPI	Inch	Inch	Ø Inch	a Inch	Inch					
1/4	20	6"	1.000	0.2550	0.1910	5/16	4	H3	Plug	1	6006701
1/4	20	8"	1.000	0.2550	0.1910	5/16	4	H3	Plug	1	6006705
5/16	18	6"	1.1/8	0.3180	0.2380	3/8	4	H3	Plug	1	6006740
5/16	18	8"	1.1/8	0.3180	0.2380	3/8	4	H3	Plug	1	6006744
3/8	16	6"	1.1/4	0.3810	0.2860	7/16	4	H3	Plug	1	6006725
3/8	16	8"	1.1/4	0.3810	0.2860	7/16	4	H3	Plug	1	6006735
3/8	16	10"	1.1/4	0.3810	0.2860	7/16	4	H3	Plug	1	6006720
1/2	13	6"	1.21/32	0.5070	0.3800	9/16	4	H3	Plug	1	6006693
1/2	13	8"	1.21/32	0.5070	0.3800	9/16	4	H3	Plug	1	6006697
1/2	13	10"	1.21/32	0.5070	0.3800	9/16	4	H3	Plug	1	6006684
5/8	11	6"	1.13/16	0.6330	0.4750	11/16	4	H3	Plug	1	6006755
5/8	11	8"	1.13/16	0.6330	0.4750	11/16	4	H3	Plug	1	6006762
5/8	11	10"	1.13/16	0.6330	0.4750	11/16	4	H3	Plug	1	6006749
3/4	10	10"	2.000	0.7590	0.5690	3/4	4	H3	Plug	1	6006710

Combination Drill & Tap

1994 Spiral Flute 15°. Drills and taps in a single pass, reducing cycle time. Commonly used in multi-spindle operations with reversing capacity. Designed to provide 65% thread engagement and a 2B class of fit.

Bright finish improves chip flow in soft or non-ferrous materials.



1994(UNF)

UNC UNF

ANSI

2B



HSS



No.4 - 1/2

UNC	UNF	TPI	d ₁ Ø Inch	l ₁ Inch	l ₂ Inch	d ₂ Ø Inch	a Inch	l ₃ Inch	l ₄ Inch	# of Flutes	Pack Qty	1994
4		40	0.0890	1.7/8	3/8	0.1410	0.1100	3/16	1/4	2	1	6008951
5		40	0.1015	1.15/16	13/32	0.1410	0.1100	3/16	9/32	2	1	6008961
6		32	0.1110	2"	7/16	0.1410	0.1100	3/16	5/16	2	1	6008987
8		32	0.1360	2.1/8	1/2	0.1680	0.1310	1/4	3/8	2	1	6009013
10		24	0.1540	2.3/8	5/8	0.1940	0.1520	1/4	13/32	2	1	6008914
	10	32	0.1610	2.3/8	5/8	0.1940	0.1520	1/4	13/32	2	1	6008918
12		24	0.1800	2.3/8	21/32	0.2200	0.1650	9/32	15/32	2	1	6008921
	12	28	0.1850	2.3/8	21/32	0.2200	0.1650	9/32	15/32	2	1	6008925
1/4		20	0.2055	2.1/2	25/32	0.2550	0.1910	5/16	17/32	2	1	6008905
	1/4	28	0.2188	2.1/2	25/32	0.2550	0.1910	5/16	17/32	2	1	6008909
5/16		18	0.2660	2.27/32	15/16	0.3180	0.2380	3/8	11/16	2	1	6008975
	5/16	24	0.2770	2.27/32	15/16	0.3180	0.2380	3/8	11/16	2	1	6008980
3/8		16	0.3230	3.3/8	1.1/16	0.3810	0.2860	7/16	13/16	2	1	6008934
	3/8	24	0.3390	3.3/8	1.1/16	0.3810	0.2860	7/16	13/16	2	1	6008946
7/16		14	0.3770	3.3/4	1.1/4	0.3230	0.2420	13/32	1"	2	1	6008996
	7/16	20	0.3937	3.3/4	1.1/4	0.3230	0.2420	13/32	1"	2	1	6009006
1/2		13	0.4331	4.1/16	1.3/8	0.3670	0.2750	7/16	1.1/8	2	1	6008897
	1/2	20	0.4531	4.1/16	1.3/8	0.3670	0.2750	7/16	1.1/8	2	1	6008901

SPECIAL PURPOSE TAPS

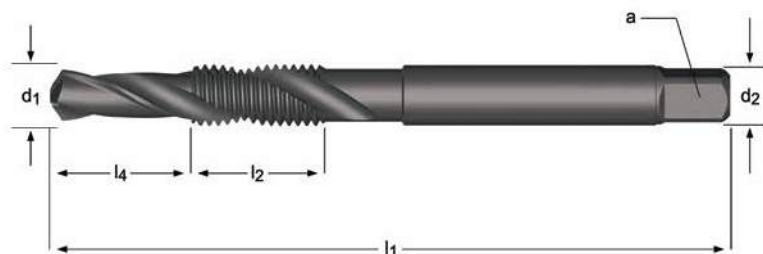


Combination Drill & Tap

E651
E654

Spiral Flute 30°. Drills and taps in a single pass, reducing cycle time. Commonly used in multi-spindle operations with reversing capacity. Designed to provide 65% thread engagement and a 2B class of fit.

Steam tempered finish reduces wear and chip welding in harder ferrous materials.



E651 / E654

UNC UNF

DORMER
DIN

2B



HSS



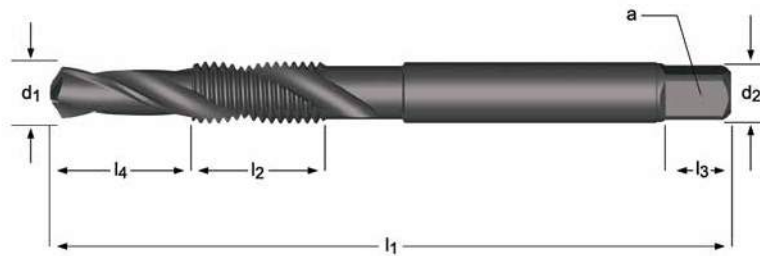
No.6 - 5/8

UNC	UNF	TPI	d ₁ nom mm	l ₁ mm	l ₂ mm	l ₄ mm	d ₂ Ø mm	a mm	# of Flutes	Pack Qty	E651 / E654
6		32	2.85	56.9	12	6.0	3.50	2.90	2	1	5978374
8		32	3.50	64.0	12	8.0	4.50	3.55	2	1	5978380
	8	36	3.50	64.0	13	8.0	4.50	3.55	2	1	5978426
10		24	3.90	72.0	15	10.0	5.00	4.00	2	1	5978357
	10	32	4.10	72.0	16	10.0	5.00	4.00	2	1	5978409
12		24	4.50	77.0	15	11.0	5.60	4.50	2	1	5978360
	12	28	4.70	77.0	17	11.0	5.60	4.50	2	1	5978411
1/4		20	5.10	83.0	17	13.0	6.30	5.00	2	1	5978353
	1/4	28	5.50	83.0	19	13.0	6.30	5.00	2	1	5978407
5/16		18	6.60	94.0	21	16.0	8.00	6.30	2	1	5978365
	5/16	24	6.90	94.0	22	16.0	8.00	6.30	2	1	5978417
3/8		16	8.00	104.0	23	19.0	10.00	8.00	2	1	5978362
	3/8	24	8.50	104.0	24	19.0	10.00	8.00	2	2	5978414
7/16		14	9.40	107.0	25	22.0	8.00	6.30	2	1	5978377
	7/16	20	9.90	107.0	25	22.0	8.00	6.30	2	1	5978423
1/2		13	10.80	114.0	29	25.0	9.00	7.10	2	1	5978350
	1/2	20	11.50	114.0	29	25.0	9.00	7.10	2	1	5978405
9/16		12	12.20	124.0	29	28.0	11.20	9.00	2	1	5978383
5/8		11	13.50	134.0	31	32.5	12.50	10.00	2	1	5978368
	5/8	18	14.50	134.0	32	32.0	12.50	10.00	2	1	5978420

Combination Drill & Tap

E650 Spiral Flute 30°. Drills and taps in a single pass, reducing cycle time. Commonly used in multi-spindle operations with reversing capacity. Designed to provide 65% thread engagement and a 2B class of fit.

Steam tempered finish reduces wear and chip welding in harder ferrous materials.



E650

M

DORMER
ISO

6H



HSS



M3 - M16

M	P mm	d ₁ Ø mm	l ₁ mm	l ₂ mm	l ₄ mm	d ₂ Ø mm	□ a mm	l ₃ mm	# of Flutes	Pack Qty	E650
3	0.50	2.5	56	10	6	3.15	2.5	5.0	2	1	5978325
4	0.70	3.3	65	12	8	4.0	3.15	6.0	2	1	5978330
5	0.80	4.2	69	15	10	5.0	4.00	7.0	2	1	5978339
6	1.00	5.0	84	18	12	6.3	5.00	8.0	2	1	5978342
8	1.25	6.8	96	21	16	8.0	6.30	9.0	2	1	5978347
10	1.50	8.5	108	22	20	10.0	8.00	11.0	2	1	5978304
12	1.75	10.2	113	29	24	9.0	7.10	10.0	2	1	5978308
14	2.00	12.0	123	30	28	11.2	9.00	12.0	2	1	5978313
16	2.00	14.0	134	32	32	12.5	10.00	13.0	2	1	5978320

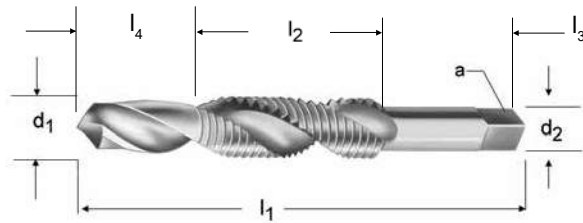
SPECIAL PURPOSE TAPS



Combination Drill & Tap, NPT Pipe Threads

E653 Spiral Flute 27°. Drills and taps in a single pass, reducing cycle time. Commonly used in multi-spindle operations with reversing capacity.

Bright finish improves chip flow in soft or non-ferrous materials.



E653

NPT

ANSI

Normal



HSS



1/8 - 1"

NPT	TPI	d ₁ nom Inch	l ₁ Inch	l ₂ Inch	l ₃ Inch	l ₄ Inch	d ₂ Ø Inch	□ a Inch	# of Flutes	Pack Qty	E653
1/8	27	0.3346	2.7/8	3/4	3/8	3/4	0.4370	0.3280	2	1	5978397
1/4	18	0.4331	3.5/16	1.1/16	7/16	7/8	0.5620	0.4210	2	1	5978395
3/8	18	0.5709	3.1/2	1.1/16	1/2	15/16	0.7000	0.5310	2	1	5978403
1/2	14	0.7087	4.3/8	1.3/8	5/8	1.1/4	0.6870	0.5150	2	1	5978392
3/4	14	0.9055	4.9/16	1.3/8	11/16	1.5/16	0.9060	0.6790	2	1	5978399
1"	11.5	1.1417	5.3/8	1.3/4	13/16	1.5/8	1.1250	0.8430	2	1	5978386

Tap Wrench, T-Handle

- 1215** T-Handle tap wrenches have a sliding handle and chuck. Designed for hand tapping in tight places and can also be used with any tool that can be turned by hand.



1215

T0-T2

Tap Wrench #	Hand Reamer Capacity Inch	Hand Reamer Capacity mm	Hand Tap Capacity Inch	Hand Tap Capacity mm	Pack Qty	1215
T0	1/8 - 3/16	M3 - M5	1/16 - 5/32	M1 - M4	1	6007552
T1	3/16 - 5/16	M4 - M7	3/16 - 7/16	M4 - M10	1	6007557
T2	1/4 - 15/32	M6 - M14	1/4 - 9/16	M6 - M14	1	6007563

Tap Wrench, Straight Handle

3850 Straight handle tap wrenches are ideal for hand tapping. The straight handle design provides greater leverage, particularly suited for use with larger diameters. Simple to operate. Hardened steel jaws are opened and closed by simply twisting one hand which is knurled for side gripping.



3850



No. 8 - No. 14

Number	Hand Reamer Capacity Inch	Hand Reamer Capacity mm	Hand Tap Capacity Inch	Hand Tap Capacity mm	l_1 Length	Pack Qty	3850
8	1/8 - 5/16	M3 - M8	1/16 - 5/16	M1 - M8	7"	1	6009196
9	3/16 - 3/8	M5 - M9	3/16 - 1/2	M4 - M12	10.1/2"	1	6009254
10	1/4 - 9/16	M6 - M14	1/4 - 3/4	M3 - M8	15"	1	6009347
11	3/8 - 3/4	M9 - M19	3/8 - 1"	M10 - M25	20"	1	6009350
12	3/8 - 7/8	M9 - M22	3/8 - 1.1/8	M10 - M27	25.5/8"	1	6009353
14	5/8 - 1.1/2	M16 - M39	7/8 - 1.7/8	M22 - M42	40.1/2"	1	6009143

Tap & Drill Combination Sets

229CSET 18 piece tap (styles 1500 and 1528) with corresponding drills (styles R10P & R18P). Metal index.



229CSET

UNC

ANSI

HSS



Set

Set	Style	Pieces per Set	UNC Tap Sizes	Tap Drill Sizes	Pack Qty	229CSET
229C	1500,1528 Taps; R10P,R15P,R18P Drills	18	6-32,8-32,10-24,10-32,1/4-20,5/16-18,3/8-16,7/16-14,1/2-13	#36,#29,#25,#21,#7,F,5/16,U,27/64	1	6009137

Visual Index - Dies

How to Use This Chart:

- 1) Determine your Workpiece Material from the Application Material Groups (AMG) below.
- 2) Use the icons to find Product Features.
- 3) Find the Surface Feet Per Minute (SFM)
example: 361 = SFM

Application Material Groups (AMG)			Hardness HRC
1. Steel	1.1 Magnetic soft steel	12L14, 12L15	<120 HB
	1.2 Structural Steel/ case carburising steel	1005-1025, 1214, 1215, A36	<200 HB
	1.3 Plain Carbon steel	1030-1060, 1050-1060, 1144-1146	<24
	1.4 Alloy steel	4140, 4340, 52100, 8620 H11-H41, A2, D2, 01, P20, 420	<24
	1.5 Alloy steel/ Hardened and tempered steel	4140, 4340, 52100, 8620 H11-H41, A2, D2, 01, P20, 420	>24<38
	1.6 Alloy steel/ Hardened and tempered steel	4140, 4340, 52100, 8620 H11-H41, A2, D2, 01, P20, 420	>38
	1.7 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	49-55
	1.8 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	55-63
2. Stainless Steel	2.1 Free machining Stainless Steel	200, 303, 416, 420F, 430F, 440	<24
	2.2 Austenitic	301, 302, 304, 316, 321, 330, CUSTOM 455, AM-350	<24
	2.3 Ferritic + Austenitic, Martensitic	318-329, 400-446, DUPLEX	<32
	2.4 Precipitation Hardened	15-5PH, Custom 450 17-4PH	<32
3. Cast Iron	3.1 Lamellar graphite	Grey, G10, Gg40, J431C, A48 CLASS 20	<150 HB
	3.2 Lamellar graphite	Grey, GG25-Gg40, J158, A48 CLASS 40-60	>150 HB<32
	3.3 Nodular graphite/ Malleable Cast Iron	A220, A436, A439, A602, Black, GGG40-GGG70	<200 HB
	3.4 Nodular graphite/ Malleable Cast Iron	Black Gts/Gtw, J434C	>200 HB<32
4. Titanium	4.1 Titanium, unalloyed	Commercially Pure	<200 HB
	4.2 Titanium, alloyed	6Al4V, 6Al4V-2Sn, Monel, Monel K	<28
	4.3 Titanium, alloyed	6Al4V-4Mo, 7Al4V-4Mo, 4911-4967	>28<38
5. Nickel	5.1 Nickel, unalloyed	Commercially Pure, 17644, 200, 5553	<150 HB
	5.2 Nickel, alloyed	Monel 400, Hastelloy C, Inconel 625, Waspaloy	<28
	5.3 Nickel, alloyed	Inconel 718, Nimonic 75-95, Rene 41, Inconel 825, A286	>28<38
6. Copper	6.1 Copper	Commercially Pure	<100 HB
	6.2 ß-Brass, Bronze	314-340, 350-370	<200 HB
	6.3 α-Brass	Alloyed Cu + Al + Fe, Long Chipping	<200 HB
	6.4 High Strength Bronze	Ampco 18-25	<49
7. Aluminium Magnesium	7.1 Al, Mg, unalloyed	Commercially Pure	<100 HB
	7.2 Al alloyed, Si<0.5%	6061 T6, 7075, 314-340	<150 HB
	7.3 Al alloyed, Si>0.5%<10%	6061 T6, 380-390	<120 HB
	7.4 Al alloyed, Si>10% Mg alloys	Magnesium Whisker Reinforced	<120 HB
8. Synthetic Materials	8.1 Thermoplastics	Ultramid, Polystrol	---
	8.2 Thermosetting plastics	Bakelit, Pertinax	---
	8.3 Reinforced plastic materials	CFK, GFKAFK	---
9. Hard Mat.	9.1 Cermets (Metal-ceramics)	Ferrotic	<54
10. Graphite	10.1 Standard graphite		---

Visual Index - Dies

Thread Form:	NPT	UNC	UNF	M	G	M
Standard:	ANSI	BS 1127: 1950	BS 1127: 1950	ANSI	BS 1127: 1950	ISO 2568
Tolerance:						6g
Chamfer:		1.75XP	1.75XP		1.75XP	1.75XP
Tool Material:	CS	HSS	HSS	HSS	HSS	HSS
Direction of Cut:						
Finish/Coating:						
						
Style:	2010(NPT)	F320	F330	2710M	F370	F201
Range:	1/8 - 1/2	No.4 - 1.1/4	No.4 - 1.1/2	M2 - M20	1/8 - 1.1/2	M3 - M20
Page #	378	379	379	381	382	383
1.1	26	26	26	26	26	26
1.2	23	23	23	23	23	23
1.3	20	20	20	20	20	20
1.4	16	16	16	16	16	16
1.5						
1.6						
1.7						
1.8						
2.1	13	13	13	13	13	13
2.2	7	7	7	7	7	7
2.3						
2.4						
3.1	26	26	26	26	26	26
3.2	23	23	23	23	23	23
3.3	20	20	20	20	20	20
3.4	16	16	16	16	16	16
4.1						
4.2						
4.3	7	7	7	7	7	7
5.1	30	30	30	30	30	30
5.2	7	7	7	7	7	7
5.3	7	7	7	7	7	7
6.1	30	30	30	30	30	30
6.2	26	26	26	26	26	26
6.3	23	23	23	23	23	23
6.4						
7.1	33	33	33	33	33	33
7.2	49	49	49	49	49	49
7.3	49	49	49	49	49	49
7.4	33	33	33	33	33	33
8.1	49	49	49	49	49	49
8.2	33	33	33	33	33	33
8.3	16	16	16	16	16	16
9.1						
10.1						

Visual Index - Dies

	UNC	UNF	UNS	NPT	M	M	MF
	ANSI	ANSI	ANSI	ANSI	ANSI	BS 1127: 1950	BS 1127: 1950
						6g	6g
						1.75XP	1.75XP
	CS	CS	CS	CS	CS	HSS	HSS
							
							
							
	2025(UNC)	2025(UNF)	2025(UNS)	2025(NPT)	2325M	F302	F312
	1/4 - 1.1/2	1/4 - 1.1/2	11/16 - 1"	1/8 - 1"	M6 - M20	M3 - M36	M8 - M24
	384	384	384	384	385	386	387
1.1	26	26	26	26	26	26	26
1.2	23	23	23	23	23	23	23
1.3	20	20	20	20	20	20	20
1.4	16	16	16	16	16	16	16
1.5							
1.6							
1.7							
1.8							
2.1	13	13	13	13	13	13	13
2.2	7	7	7	7	7	7	7
2.3							
2.4							
3.1	26	26	26	26	26	26	26
3.2	23	23	23	23	23	23	23
3.3	20	20	20	20	20	20	20
3.4	16	16	16	16	16	16	16
4.1							
4.2							
4.3	7	7	7	7	7	7	7
5.1	30	30	30	30	30	30	30
5.2	7	7	7	7	7	7	7
5.3	7	7	7	7	7	7	7
6.1	30	30	30	30	30	30	30
6.2	26	26	26	26	26	26	26
6.3	23	23	23	23	23	23	23
6.4							
7.1	33	33	33	33	33	33	33
7.2	49	49	49	49	49	49	49
7.3	49	49	49	49	49	49	49
7.4	33	33	33	33	33	33	33
8.1	49	49	49	49	49	49	49
8.2	33	33	33	33	33	33	33
8.3	16	16	16	16	16	16	16
9.1							
10.1							

List Number Index - Dies



Pgs. 378-388

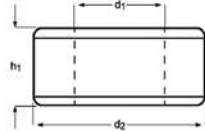
2010.....	378
2025.....	384
2325M.....	385
2710M.....	381
F201	383
F302	386
F312	387
F320	379
F330	379
F370	382
L110.....	388

Round Adjustable, Split Type

2010 Round adjustable dies can be closed down by approximately 0.006" on diameter. Bright finish improves chip flow in soft or non-ferrous materials.

Note: Die pictured has 4 clearance holes. The number of clearance holes will increase or decrease depending on the size of the die. NPT type dies are not split

Thread Size



2010(NPT)

NPT

CS



ANSI



1/8 - 1/2

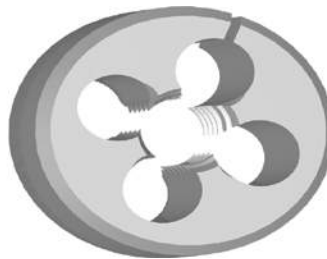
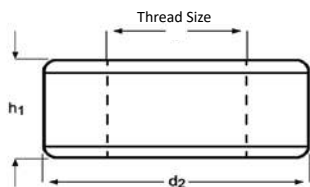
NPT	TPI	d ₂ Ø Inch	h ₁ Inch	Pack Qty	2010 (NPT)
1/8	27	1"	3/8	1	6008629
1/8	27	1.1/2	1/2	1	6008632
1/4	18	1.1/2	1/2	1	6009094
1/4	18	2"	5/8	1	6009098
3/8	18	1.1/2	1/2	1	6008726
3/8	18	2"	5/8	1	6008731
1/2	14	2"	5/8	1	6009086

Round Adjustable, Split Type

F320 Round adjustable dies can be closed down by approximately 0.006" on diameter. Bright finish improves chip flow in soft or non-ferrous materials.

F330

Note: Die pictured has 4 clearance holes.
The number of clearance holes will increase or decrease depending on the size of the die



F320	F330
UNC	UNF
HSS	HSS
BS 1127: 1950	BS 1127: 1950
2B	2B
N4 - 1.1/4	N4 - 1.1/2

UNC	UNF	TPI	d ₁ nom mm	d ₂ Ø Inch	h ₁ Inch	Pack Qty	F320	F330
	4	48	2.85	13/16	1/4	1	—	5978804
4		40	2.85	13/16	1/4	1	5978041	—
	5	44	3.18	13/16	1/4	1	—	5978807
5		40	3.18	13/16	1/4	1	5978045	—
	6	40	3.51	13/16	1/4	1	—	5978830
6		32	3.51	13/16	1/4	1	5978080	—
	8	36	4.17	13/16	1/4	1	—	5978840
8		32	4.17	1"	3/8	1	5978846	—
8		32	4.17	13/16	1/4	1	5978869	—
	10	32	4.83	13/16	1/4	1	—	5978776
	10	32	4.83	1"	3/8	1	—	5978772
10		24	4.83	1"	3/8	1	5978004	—
10		24	4.83	13/16	1/4	1	5978007	—
	12	28	5.49	13/16	1/4	1	—	5978779
12		24	5.49	13/16	1/4	1	5978010	—
	1/4	28	6.35	1"	3/8	1	—	5978757
	1/4	28	6.35	1.1/2	1/2	1	—	5978761
	1/4	28	6.35	13/16	1/4	1	—	5978765
1/4		20	6.35	1"	3/8	1	5977987	—
1/4		20	6.35	1.1/2	1/2	1	5977990	—
1/4		20	6.35	1.5/16	7/16	1	5977993	—
1/4		20	6.35	13/16	1/4	1	5977996	—
	5/16	24	7.94	1"	3/8	1	—	5978810
	5/16	24	7.94	1.1/2	1/2	1	—	5978813
	5/16	24	7.94	1.5/16	7/16	1	—	5978816
5/16		18	7.94	1"	3/8	1	5978050	—
5/16		18	7.94	1.1/2	1/2	1	5978055	—
	3/8	24	9.53	1"	3/8	1	—	5978794
	3/8	24	9.53	1.1/2	1/2	1	—	5978798
	3/8	24	9.53	1.5/16	7/16	1	—	5978801
3/8		16	9.53	1"	3/8	1	5978027	—
3/8		16	9.53	1.1/2	1/2	1	5978031	—
3/8		16	9.53	1.5/16	7/16	1	5978036	—

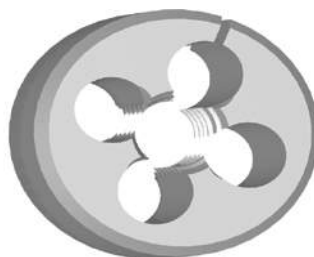
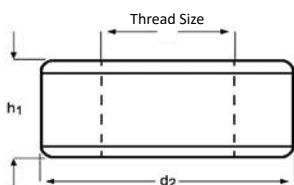
UNC	UNF	TPI	d ₁ nom mm	d ₂ Ø Inch	h ₁ Inch	Pack Qty	F320	F330
	7/16	20	11.11	1"	3/8	1	—	5978832
	7/16	20	11.11	1.1/2	1/2	1	—	5978834
	7/16	20	11.11	1.5/16	7/16	1	—	5978836
7/16		14	11.11	1.1/2	1/2	1	5978746	—
7/16		14	11.11	1.5/16	7/16	1	5978787	—
	1/2	20	12.70	1.1/2	1/2	1	—	5978750
	1/2	20	12.70	1.5/16	7/16	1	—	5978753
1/2		13	12.70	1.1/2	1/2	1	5977975	—
1/2		13	12.70	1.5/16	7/16	1	5977978	—
1/2		13	12.70	2"	5/8	1	5977981	—
	9/16	18	14.29	1.1/2	1/2	1	—	5978842
	9/16	18	14.29	1.5/16	7/16	1	—	5978844
9/16		12	14.29	1.1/2	1/2	1	5978875	—
	5/8	18	15.88	1.1/2	1/2	1	—	5978825
	5/8	18	15.88	2"	5/8	1	—	5978827
5/8		11	15.88	1.1/2	1/2	1	5978065	—
5/8		11	15.88	2"	5/8	1	5978069	—
	3/4	16	19.05	1.1/2	1/2	1	—	5978783
	3/4	16	19.05	2"	5/8	1	—	5978791
3/4		10	19.05	1.1/2	1/2	1	5978013	—
3/4		10	19.05	2"	5/8	1	5978016	—
	7/8	14	22.23	2"	5/8	1	—	5978838
7/8		9	22.23	2"	5/8	1	5978821	—
	1"	12	25.40	2"	5/8	1	—	5978768
1"		8	25.40	2"	5/8	1	5978001	—
	1.1/8	12	28.58	3"	7/8	1	—	5978884
1.1/8		7	28.58	3"	7/8	1	5977972	—
	1.1/4	12	31.75	3"	7/8	1	—	5978881
1.1/4		7	31.75	3"	7/8	1	5977968	—
	1.1/2	12	38.10	3"	7/8	1	—	5978878

Round Adjustable, Split Type

2710M

Round adjustable dies can be closed down by approximately 0.006" on diameter. Bright finish improves chip flow in soft or non-ferrous materials.

Note: Die pictured has 4 clearance holes.
The number of clearance holes will increase or decrease depending on the size of the die



2710M

M

HSS



ANSI

6H



M2 - M20

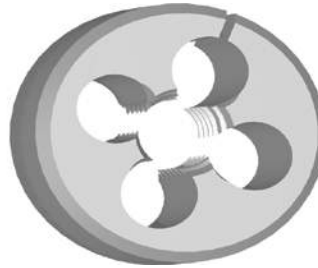
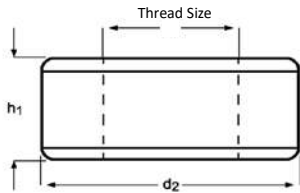
M	P mm	d ₂ Ø Inch	h ₁ Inch	Pack Qty	2710M
2	0.40	13/16	1/4	1	6009431
2.5	0.45	13/16	1/4	1	6009426
3	0.50	13/16	1/4	1	6009442
4	0.70	13/16	1/4	1	6009448
4.5	0.75	13/16	1/4	1	6009445
5	0.80	13/16	1/4	1	6009451
6	1.00	1"	3/8	1	6009456
8	1.25	1"	3/8	1	6009463
9	1.25	1"	3/8	1	6009466
10.0	1.50	1"	3/8	1	6009401
12	1.75	1"	3/8	1	6009405
12	1.75	1.1/2	1/2	1	6009412
14	2.00	1.1/2	1/2	1	6009414
16	2.00	1.1/2	1/2	1	6009417
18	2.50	2"	5/8	1	6009420
20	2.50	2"	5/8	1	6009434

Round Adjustable, Split Type

F370

Round adjustable dies can be closed down by approximately 0.006" on diameter. Bright finish improves chip flow in soft or non-ferrous materials.

Note: Die pictured has 4 clearance holes. The number of clearance holes will increase or decrease depending on the size of the die.



F370

G

HSS

BS
1127:
1950

1/8 - 1.1/2

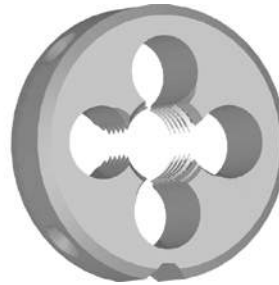
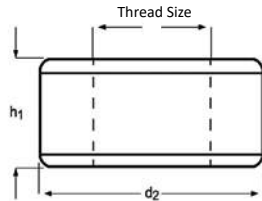
G(BSP)	TPI	d ₁ nom mm	d ₂ Ø Inch	h ₁ Inch	Pack Qty	F370
1/8	28	9.73	1"	3/8	1	5978453
1/4	19	13.16	1.5/16	7/16	1	5978451
3/8	19	16.66	1.1/2	1/2	1	5978464
1/2	14	20.96	2"	5/8	1	5978449
5/8	14	22.91	2"	5/8	1	5978467
3/4	14	26.44	2"	5/8	1	5978458
7/8	14	30.20	2.1/4	11/16	1	5978470
1"	11	33.25	2.1/4	11/16	1	5978455
1.1/4	11	41.91	3"	7/8	1	5978447
1.1/2	11	47.80	4"	1"	1	5978444

Gun Nosed Dies (Left Hand)

F201

Left hand gun nosed dies have a chamfer length similar to semi-bottoming taps to lead the threads. This design direct chips away from the cutting area. Bright finish improves chip flow in soft or non-ferrous materials.

Note: Die pictured has 4 clearance holes.
The number of clearance holes will increase or decrease depending on the size of the die



F201

M

HSS

ISO 2568

6H

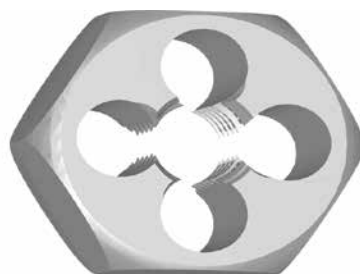
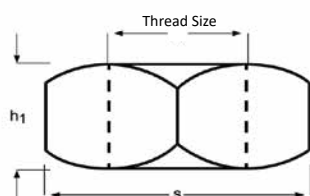
M3 - M20

M	P mm	d ₂ Ø mm	h ₁ mm	Pack Qty	F201
3	0.50	20	5	1	5977853
4	0.70	20	5	1	5977857
5	0.80	20	7	1	5977860
6	1.00	20	7	1	5977863
8	1.25	25	9	1	5977866
10	1.50	30	11	1	5977822
12	1.75	38	14	1	5977826
14	2.00	38	14	1	5977831
16	2.00	45	18	1	5977836
18	2.50	45	18	1	5977840
20	2.50	45	18	1	5977845

Hexagon Rethreading Bolt Dies (Dienuts)

2025 Rethreading bolt dies (dienuts) are used for reclaiming or cleaning up threads by hand. They are not normally used for cutting threads from solid. Bright finish improves chip flow in soft or non-ferrous materials.

Note: Die pictured has 4 clearance holes.
The number of clearance holes will increase or decrease depending on the size of the die



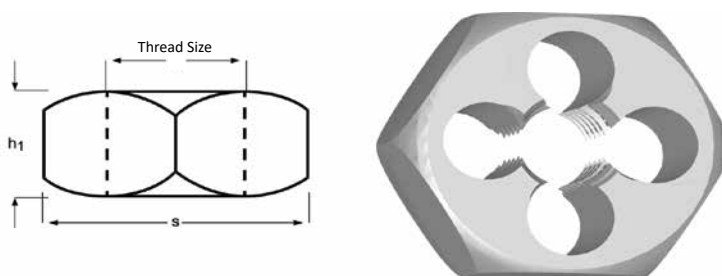
2025(UNC)	2025(UNF)	2025(UNS)	2025(NPT)
UNC	UNF	UNS	NPT
CS	CS	CS	CS
ANSI	ANSI	ANSI	ANSI
2B	2B	2B	
1/4 - 1.1/2	1/4 - 1.1/2	11/16 - 1"	1/8 - 1"

h ₁						Pack Qty	2025(UNC)	2025(UNF)	2025(UNS)	2025(NPT)
UNC	UNF	UNS	NPT	TPI	S Inch	Inch				
			1/8	27	1.1/16	3/8	1	—	—	6009081
	1/4			28	5/8	1/2	1	—	6009075	—
1/4				20	5/8	1/2	1	6009069	—	—
			1/4	18	1.1/4	5/8	1	—	—	6009060
	5/16			24	11/16	5/16	1	—	6009324	—
5/16				18	11/16	5/16	1	6009316	—	—
	3/8			24	13/16	3/8	1	—	6009261	—
3/8				16	13/16	3/8	1	6009155	—	—
			3/8	18	1.7/16	5/8	1	—	—	6009208
	7/16			20	7/8	7/16	1	—	6009122	—
7/16				14	7/8	7/16	1	6009335	—	—
	1/2			20	1.1/16	1/2	1	—	6009055	—
1/2				13	1.1/16	1/2	1	6009045	—	—
			1/2	14	1.5/8	3/4	1	—	—	6009050
	9/16			18	1.1/16	1/2	1	—	6009134	—
9/16				12	1.1/16	1/2	1	6009131	—	—
	5/8			18	1.1/4	5/8	1	—	6009331	—
5/8				11	1.1/4	5/8	1	6009328	—	—
			11/16	11	1.7/16	3/4	1	—	—	6009095
			11/16	16	1.7/16	3/4	1	—	—	6009097
	3/4			16	1.7/16	3/4	1	—	6009119	—
3/4				10	1.7/16	3/4	1	6009099	—	—
			3/4	14	2"	13/16	1	—	—	6009103
	7/8			14	1.5/8	7/8	1	—	6009125	—
7/8				9	1.5/8	7/8	1	6009128	—	—
			1"	14	1.13/16	1"	1	—	—	6009091
	1"			12	1.13/16	1"	1	—	6009089	—
1"				8	1.13/16	1"	1	6009093	—	—
			1"	11.5	2.3/8	1"	1	—	—	6009085
	1.1/8			12	2"	1"	1	—	6009025	—
1.1/8				7	2"	1"	1	6009030	—	—
	1.1/4			12	2.3/16	1"	1	—	6009017	—
1.1/4				7	2.3/16	1"	1	6009021	—	—
	1.3/8			12	2.3/8	1"	1	—	6009035	—
1.3/8				6	2.3/8	1"	1	6009040	—	—
	1.1/2			12	2.9/16	1"	1	—	6009003	—
1.1/2				6	2.5/8	1"	1	6009008	—	—

Hexagon Rethreading Bolt Dies (Dienuts)

2325M Rethreading bolt dies (dienuts) are used for reclaiming or cleaning up threads by hand. They are not normally used for cutting threads from solid. Bright finish improves chip flow in soft or non-ferrous materials.

Note: Die pictured has 4 clearance holes. The number of clearance holes will increase or decrease depending on the size of the die.



2325M

M

CS



ANSI

6H



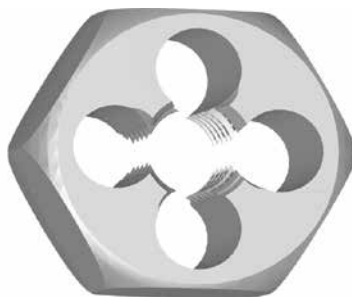
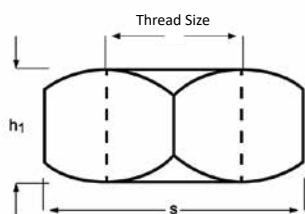
M6 - M20

M	P	S Inch	h ₁	Pack Qty	2325M
	mm		Inch		
6	1.00	5/8	3/8	1	6009183
8	1.25	1	3/8	1	6009193
9	1.25	1	3/8	1	6009202
10	1.50	1	3/8	1	6009144
12	1.75	1	3/8	1	6009151
14	2.00	1.7/16	1/2	1	6009164
16	2.00	1.7/16	1/2	1	6009169
18	1.50	1.7/16	1/2	1	6009174
18	2.50	1.7/16	1/2	1	6009197
20	2.50	1.13/16	3/4	1	6009179

Hexagon Rethreading Bolt Dies (Dienuts)

F302 Rethreading bolt dies (dienuts) are used for reclaiming or cleaning up threads by hand. They are not normally used for cutting threads from solid. Bright finish improves chip flow in soft or non-ferrous materials.

Note: Die pictured has 4 clearance holes. The number of clearance holes will increase or decrease depending on the size of the die.



F302

M

HSS

BS
1127:
1950

6H



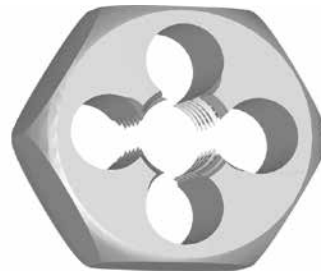
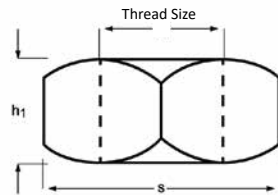
M3 - M36

M	P mm	S decimal Inch	h ₁ Inch	Pack Qty	F302
3	0.50	0.7100	1/4	1	5978496
4	0.70	0.7100	1/4	1	5978508
5	0.80	0.7100	1/4	1	5978510
6	1.00	0.7100	1/4	1	5978513
7	1.00	0.8200	5/16	1	5978517
8	1.25	0.8200	5/16	1	5978521
10	1.50	0.9200	3/8	1	5978465
11	1.50	1.0100	7/16	1	5978468
12	1.75	1.1000	1/2	1	5978471
14	2.00	1.3000	5/8	1	5978473
16	2.00	1.3000	5/8	1	5978476
18	2.50	1.4800	11/16	1	5978479
20	2.50	1.4800	11/16	1	5978482
22	2.50	1.6700	13/16	1	5978484
24	3.00	2.0500	15/16	1	5978487
27	3.00	2.2200	1.1/16	1	5978493
30	3.50	2.2200	1.1/16	1	5978499
33	3.50	2.5800	1.1/8	1	5978502
36	4.00	2.7600	1.1/4	1	5978505

Hexagon Rethreading Bolt Dies (Dienuts)

F312 Rethreading bolt dies (dienuts) are used for reclaiming or cleaning up threads by hand. They are not normally used for cutting threads from solid. Bright finish improves chip flow in soft or non-ferrous materials.

Note: Die pictured has 4 clearance holes.
The number of clearance holes will increase or decrease depending on the size of the die



F312

MF

HSS

BS
**1127:
1950**

6H

M8 - M24

MF	P mm	S decimal Inch	h ₁ Inch	Pack Qty	F312
8	0.75	0.8200	5/16	1	5977961
8	1.00	0.8200	5/16	1	5977964
10	1.00	0.9200	3/8	1	5977930
10	1.25	0.9200	3/8	1	5977934
12	1.00	1.0100	7/16	1	5977937
12	1.25	1.0100	7/16	1	5977939
12	1.50	1.0100	7/16	1	5977941
14	1.50	1.3000	5/8	1	5977944
16	1.50	1.3000	5/8	1	5977946
18	1.50	1.4800	11/16	1	5977948
20	1.50	1.4800	11/16	1	5977950
22	1.50	1.6700	13/16	1	5977954
24	1.50	2.0500	15/16	1	5977956
24	2.00	2.0500	15/16	1	5977959

Die Stocks, Straight Handle

L110 Designed for use with Dormer gun nosed dies.
The die is held in place by two opposed cone point screws in the stock which locate in two indents in the die. When this is effected, the split in the die lines up opposite a third pointed set screw which can be run in to spread the die slightly for minute adjustment.



L110



16.00 - 4"

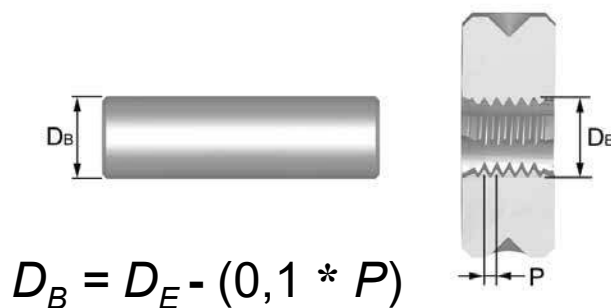
Nr.	Die Size Ø x H	Pack Qty	L110
1"	16 x 5	1	5978506
2a	20 x 5	1	5978542
2b	20 x 7	1	5978547
3	25 x 9	1	5978556
4"	30 x 11	1	5978566
5	38 x 14	1	5978576
5f	38 x 10	1	5978581
6	45 x 18	1	5978589
6f	45 x 14	1	5978749
7	55 x 22	1	5978792
7f	55 x 16	1	5978826
8	65 x 25	1	5978850
8f	65 x 18	1	5978876
9	75 x 30	1	5978882
9f	75 x 20	1	5978885
10	90 x 36	1	5978522
10f	90 x 22	1	5978526
	13/16 x 1/4	1	5978531
	1 x 3/8	1	5978518
	1.5/16 x 7/16	1	5978514
	1.1/2 x 1/2	1	5978511
	2 x 5/8	1	5978552
	2.1/4 x 11/16	1	5978539
	3 x 7/8	1	5978562
	4 x 1	1	5978571

TECHNICAL TIPS ON THREADING WITH DIES

1. Before starting the die or dienut, chamfer the end of the bar at an angle of 45 degrees to eliminate sudden loading of the leading edges. Ensure the die or dienut is presented to the bolt squarely.
2. Make use of the large tolerances associated with the major diameter of the bolt, by reducing the diameter of the bar (see below). This will reduce the cutting force to a minimum.
3. Use the gun nose type of die, as this ensures the chips are directed away from the cutting area.
4. Ensure a good supply of the correct lubricant is aimed at the cutting area.
5. When adjusting split dies, avoid opening out as this will cause rubbing. Split dies may be closed down by approximately 0.15mm, by turning the adjustment screws equally. Pressure on one side of the die only may cause breakage.
6. Generally speaking, dienuts are used for reclaiming or cleaning out existing threads by hand. They tend to be of a more robust construction and should only be used in exceptional circumstances to cut a thread from solid.

PRE-MACHINING DIMENSIONS

The diameter of the bolt blank must be smaller than the max. external diameter of the screw thread.



Visual Index - End Mills

HSS End Mill - Feed Rate Chart

		Feed per Tooth (Ft) Dia Inches															
Type of Cut	Alpha Code	0.078	1/8	5/32	3/16	1/4	5/16	13/32	1/2	9/16	5/8	11/16	3/4	7/8	1"	1.1/4	1.1/2
 ↑ 0,5D ↔ D	A	0.0003	0.0005	0.0007	0.0009	0.0011	0.0017	0.0024	0.0028	0.0033	0.0038	0.0038	0.0038	0.0039	0.0041	0.0042	0.0043
	B	0.0003	0.0005	0.0006	0.0009	0.0010	0.0015	0.0021	0.0026	0.0030	0.0034	0.0034	0.0034	0.0035	0.0037	0.0037	0.0038
	C	0.0003	0.0004	0.0006	0.0007	0.0009	0.0014	0.0019	0.0023	0.0027	0.0031	0.0031	0.0031	0.0031	0.0033	0.0034	0.0034
	D	0.0003	0.0004	0.0006	0.0008	0.0009	0.0015	0.0020	0.0024	0.0028	0.0032	0.0032	0.0032	0.0033	0.0035	0.0038	0.0040
	E	0.0005	0.0007	0.0009	0.0014	0.0017	0.0025	0.0034	0.0041	0.0048	0.0055	0.0056	0.0066	0.0057	0.0060	0.0066	0.0069
	F	0.0004	0.0005	0.0007	0.0008	0.0010	0.0013	0.0016	0.0020	0.0022	0.0025	0.0028	0.0031	0.0031	0.0033	0.0033	0.0033
 ↑ D ↔ 0,8D	G					0.0010	0.0013	0.0014	0.0017	0.0020	0.0022	0.0025	0.0028	0.0028	0.0021	0.0021	0.0022
	H					0.0009	0.0012	0.0013	0.0015	0.0018	0.0020	0.0023	0.0025	0.0021	0.0019	0.0019	0.0020
	I					0.0008	0.0011	0.0011	0.0014	0.0016	0.0018	0.0020	0.0023	0.0023	0.0017	0.0017	0.0018
	J					0.0009	0.0012	0.0013	0.0015	0.0018	0.0020	0.0023	0.0026	0.0026	0.0019	0.0019	0.0020
	K					0.0014	0.0019	0.0026	0.0031	0.0036	0.0059	0.0035	0.0039	0.0038	0.0043	0.0043	0.0046
	L					0.0004	0.0005	0.0007	0.0008	0.0010	0.0011	0.0012	0.0013	0.0013	0.0013	0.0015	0.0017
 ↑ 1,5D ↔ 0,25D	M	0.0003	0.0005	0.0007	0.0009	0.0012	0.0016	0.0022	0.0027	0.0031	0.0036	0.0041	0.0045	0.0035	0.0041	0.0038	0.0042
	N	0.0003	0.0004	0.0006	0.0008	0.0011	0.0015	0.0020	0.0024	0.0028	0.0032	0.0037	0.0041	0.0024	0.0037	0.0034	0.0038
	O	0.0002	0.0004	0.0006	0.0007	0.0010	0.0013	0.0018	0.0022	0.0026	0.0029	0.0033	0.0036	0.0029	0.0033	0.0031	0.0034
	P	0.0003	0.0004	0.0006	0.0008	0.0011	0.0014	0.0019	0.0023	0.0027	0.0031	0.0015	0.0039	0.0031	0.0035	0.0033	0.0036
	Q	0.0004	0.0006	0.0008	0.0010	0.0015	0.0019	0.0026	0.0031	0.0036	0.0041	0.0035	0.0039	0.0039	0.0044	0.0050	0.0055
	R	0.0005	0.0006	0.0008	0.0010	0.0011	0.0015	0.0019	0.0022	0.0026	0.0029	0.0033	0.0036	0.0036	0.0036	0.0041	0.0043
 ↑ 1,5D ↔ 0,1D	S	0.0004	0.0006	0.0009	0.0011	0.0015	0.0020	0.0028	0.0034	0.0039	0.0045	0.0051	0.0056	0.0044	0.0051	0.0048	0.0052
	T	0.0004	0.0006	0.0008	0.0010	0.0014	0.0018	0.0025	0.0030	0.0035	0.0051	0.0046	0.0051	0.0040	0.0046	0.0043	0.0047
	U	0.0003	0.0005	0.0007	0.0009	0.0013	0.0016	0.0023	0.0028	0.0032	0.0036	0.0041	0.0046	0.0036	0.0041	0.0039	0.0043
	V	0.0004	0.0005	0.0008	0.0010	0.0013	0.0017	0.0024	0.0029	0.0034	0.0039	0.0043	0.0048	0.0038	0.0043	0.0041	0.0045
	X	0.0005	0.0007	0.0010	0.0013	0.0018	0.0023	0.0032	0.0039	0.0045	0.0052	0.0044	0.0049	0.0048	0.0055	0.0062	0.0068
	Y	0.0006	0.0008	0.0010	0.0012	0.0014	0.0019	0.0023	0.0028	0.0024	0.0036	0.0041	0.0045	0.0045	0.0045	0.0051	0.0054

Carbide End Mill - Feed Rate Chart

# of Flutes	Type of Cut	Depth/Width of Cut	Alpha Code	Feed Per Tooth (Ft) Dia Inches										
				1/8	5/32	3/16	1/4	5/16	13/32	1/2	9/16	5/8	11/16	3/4
>4		↑ 1,5 ↔ 0,05	A				0.0010	0.0015	0.0015	0.0015	0.0015	0.0020	0.0020	0.0025
			B				0.0020	0.0020	0.0025	0.0030	0.0035	0.0040	0.0040	0.0045
			C				0.0030	0.0035	0.0040	0.0045	0.0050	0.0055	0.0060	0.0070
3-4		↑ 1,5 ↔ 0,1	A	0.0010	0.0015	0.0020	0.0020	0.0025	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050
			B	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050	0.0055	0.0060	0.0070
			C	0.0015	0.0020	0.0025	0.0030	0.0040	0.0050	0.0060	0.0065	0.0070	0.0080	0.0090
3-4		↑ 1 ↔ 0,5	A	0.0005	0.0005	0.0005	0.0010	0.0010	0.0015	0.0015	0.0020	0.0020	0.0025	0.0025
			B	0.0005	0.0005	0.0010	0.0015	0.0015	0.0020	0.0020	0.0025	0.0030	0.0035	0.0040
			C	0.0005	0.0010	0.0015	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050
2-3		↑ 0,5 ↔ 1	A	0.0005	0.0010	0.0010	0.0010	0.0015	0.0015	0.0020	0.0020	0.0025	0.0025	0.0030
			B	0.0010	0.0010	0.0010	0.0015	0.0015	0.0020	0.0025	0.0030	0.0035	0.0035	0.0040
			C	0.0015	0.0015	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050	0.0050
3-4		↑ 0,5 ↔ 1 ↑ 1 ↔ 0,5												
			B				0.0010	0.0020	0.0030	0.0030	0.0035	0.0040	0.0040	0.0040
2 & 4		↑ 0,1 - 0,5mm ↔ 0,1 - 0,5mm	A	0.0010	0.0010	0.0015	0.0015	0.0020	0.0020	0.0025	0.0030	0.0030		
			BC	0.0010	0.0010	0.0015	0.0020	0.0020	0.0025	0.0030	0.0035	0.0040		
4		↑ 0,01 - 0,1 ↔ ≤ 1	A				0.0020	0.0020	0.0025	0.0030		0.0030		
			BC				0.0020	0.0025	0.0030	0.0035		0.0040		

Visual Index - End Mills

How to Use This Chart:

- 1) Determine your Workpiece Material from the Application Material Groups (AMG) below.
- 2) Use the icons to find Product Features.
- 3) Find the Surface Feet Per Minute (SFM) and Alpha Code.
example: 361 W
361 = SFM
W = Alpha Code used to find your Feed Rate (IPR)
- 4) To find Cutting Feed Rate, find your Alpha Code on the AMG Chart
(example: 279 U : U is the Alpha Code)
- 5) Find the closest diameter for your cutting application on the Feed Rate chart to find your Ft
- 6) Select the type of cut and # of flutes to find your Ft Range

Application Material Groups (AMG)			Hardness HRC	ISO
1. Steel	1.1 Magnetic soft steel	12L14, 12L15	<120 HB	P 1
	1.2 Structural Steel/ case carburising steel	1005-1025, 1214, 1215, A36	<200 HB	P 1
	1.3 Plain Carbon steel	1030-1060, 1050-1060, 1144-1146	<24	P 2
	1.4 Alloy steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	<24	P 3
	1.5 Alloy steel/ Hardened and tempered steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	>24<38	P 4
	1.6 Alloy steel/ Hardened and tempered steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	>38	H 1
	1.7 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	49-55	H 3
	1.8 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	55-63	H 4
2. Stainless Steel	2.1 Free machining Stainless Steel	200, 303, 416, 420F, 430F, 440	<24	M 1
	2.2 Austenitic	301, 302, 304, 316, 321, 330, CUSTOM 455, AM-350	<24	M 3
	2.3 Ferritic + Austenitic, Martensitic	318-329, 400-446, DUPLEX	<32	M 2
	2.4 Precipitation Hardened	15-5PH, Custom 450 17-4PH	<32	S 2
3. Cast Iron	3.1 Lamellar graphite	Grey, G10, Gg40, J431C, A48 CLASS 20	<150 HB	K 1
	3.2 Lamellar graphite	Grey, GG25-Gg40, J158, A48 CLASS 40-60	>150 HB<32	K 2
	3.3 Nodular graphite/ Malleable Cast Iron	A220, A436, A439, A602, Black, GGG40-GGG70	<200 HB	K 3
	3.4 Nodular graphite/ Malleable Cast Iron	Black Gts/Gtw, J434C	>200 HB<32	K 4
4. Titanium	4.1 Titanium, unalloyed	Commercially Pure	<200 HB	S 1
	4.2 Titanium, alloyed	6Al4V, 6Al4V-2Sn, Monel, Monel K	<28	S 2
	4.3 Titanium, alloyed	6Al4V-4Mo, 7Al4V-4Mo, 4911-4967	>28<38	S 3
5. Nickel	5.1 Nickel, unalloyed	Commercially Pure, 17644, 200, 5553	<150 HB	S 1
	5.2 Nickel, alloyed	Monel 400, Hastelloy C, Inconel 625, Waspaloy	<28	S 2
	5.3 Nickel, alloyed	Inconel 718, Nimonic 75-95, Rene 41, Inconel 825, A286	>28<38	S 3
6. Copper	6.1 Copper	Commercially Pure	<100 HB	N 3
	6.2 β-Brass, Bronze	314-340, 350-370	<200 HB	N 4
	6.3 α-Brass	Alloyed Cu + Al + Fe, Long Chipping	<200 HB	N 3
	6.4 High Strength Bronze	Ampco 18-25	<49	N 4
7. Aluminium Magnesium	7.1 Al, Mg, unalloyed	Commercially Pure	<100 HB	N 1
	7.2 Al alloyed, Si<0.5%	6061 T6, 7075, 314-340	<150 HB	N 1
	7.3 Al alloyed, Si>0.5%<10%	6061 T6, 380-390	<120 HB	N 1
	7.4 Al alloyed, Si>10% Mg alloys	Magnesium Whisker Reinforced	<120 HB	N 2
8. Synthetic Materials	8.1 Thermoplastics	Ultramid, Polystrol	---	O
	8.2 Thermosetting plastics	Bakelit, Pertinax	---	O
	8.3 Reinforced plastic materials	CFK, GFKAFK	---	O
9. Hard Mat.	9.1 Cermets (Metal-ceramics)	Ferrotic	<54	H
10. Graphite	10.1 Standard graphite		---	O

Visual Index - End Mills

Tool Material:	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM
Application:															
Type:	W	W	W												
Number of Flutes:	Z 2	Z 2	Z 2	Z 2	Z 2	Z 2	Z 2	Z 2	Z 2	Z 2	Z 2	Z 2	Z 2	Z 2	Z 2
Cut Length:															
Helix:	 λ45°	 λ45°	 λ37°	 λ30°	 λ30°	 λ30°	 λ30°	 λ30°	 λ30°	 λ30°	 λ30°	 λ30°	 λ30°	 λ30°	 λ30°
Shank:															
Finish/Coating:															
Tolerance:				Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Direction:															
Style:	S106	S206	S207	S116	S108	S208	S109	S110	S111	S211	S112	S212	S113	S213	S114
Range:	1/4 - 1"	1/4 - 1"	1/8 - 1"	1/8 - 1/2	1/16 - 5/8	1/16 - 5/8	2.00 - 25.00	1/8 - 1/2	1/8 - 1/2	1/8 - 1/2	1/16 - 1/2	1/16 - 1/2	2.00 - 20.00	2.00 - 12.00	1/8 - 5/8
Page #	397	397	398	399	400	400	401	402	403	403	404	404	405	405	406
1.1				289B	289B	400B	289B	269B	249B	361B	289B	400B	289B	400B	269B
1.2				223B	223B	298B	223B	212B	200B	269B	223B	298B	223B	298B	212B
1.3				223B	223B	298B	223B	212B	200B	269B	223B	298B	223B	298B	212B
1.4				180B	180B	259B	180B	171B	161B	239B	180B	259B	180B	259B	170B
1.5				161B	161B	230B	161B	152B	144B	200B	161B	230B	161B	230B	152B
1.6				148B	148B	200B	148B	140B	131B	180B	148B	200B	148B	200B	140B
1.7															
1.8															
2.1				200A	200A	325A	200A	190A	180A	298A	200A	325A	200A	325A	190A
2.2				141A	141A	223A	141A	125A	108A	180A	141A	223A	141A	223A	125A
2.3				108A	108A	174A	108A	103A	98A	171A	108A	174A	108A	174A	103A
2.4				89A	89A	131A	89A	78A	66A	131A	89A	131A	89A	131A	78A
3.1				374B	374B	551B	374B	336A	298B	499B	374B	551B	374B	551B	336A
3.2				318B	318B	525B	318B	284B	249B	400B	318B	525B	318B	525B	284B
3.3				318B	318B	525B	318B	284B	249B	400B	318B	525B	318B	525B	284B
3.4				249B	249B	374B	249B	225B	200B	341B	249B	374B	249B	374B	225B
4.1						230B				200B		230B		230B	
4.2						200B				180B		200B		200B	
4.3						190B				174B		190B		190B	
5.1						230B				200B		230B		230B	
5.2						161A				141A		161A		161A	
5.3						98A				85A		98A		98A	
6.1				649C	649C		649C	617C	584C		649C		649C		617C
6.2				499C	499C		499C	474C	449C		499C		499C		474C
6.3				499C	499C		499C	474C	449C		499C		499C		474C
6.4				125B	125B		125B	117B	108B		125B		125B		117B
7.1	2326C	2326C	2093C	1499C	1499C		1499C	1424C	1348C		1499C		1499C		1424C
7.2	1749C	1749C	1575C	1499C	1499C		1499C	1424C	1348C		1499C		1499C		1424C
7.3	1171C	1171C	1056C	649C	649C		649C	617C	584C		649C		649C		617C
7.4	751B	751B	676B	400B	400B		400B	380B	361B		400B		400B		380B
8.1															
8.2															
8.3															
9.1															
10.1															

Visual Index - End Mills

	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM	HM
	Z 2	Z 2	Z 3	Z 3	Z 4	Z 4	Z 4	Z 4	Z 4	Z 4	Z 4	Z 4	Z 4	Z 4	Z 4	Z 4
	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$
	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
	S115	S215	S121	S221	S129	S134	S234	S135	S235	S136	S236	S137	S237	S138	S238	S139
	1/8 - 1/2	1/8 - 1/2	1/16 - 1/2	1/16 - 1/2	1/8 - 1/2	1/16 - 1"	1/16 - 1"	2.00 - 25.00	2.00 - 20.00	1/8 - 3/4	1/8 - 3/4	1/8 - 1"	1/8 - 1"	1/16 - 3/4	1/16 - 3/4	2.00 - 12.00
	407	407	408	408	409	410	410	411	411	412	412	413	413	414	414	415
1.1	249B	361B	289B	400B	361B	361B	499B	361B	499B	343B	474B	325B	449B	361B	499B	361B
1.2	200B	269B	223B	298B	325B	325B	449B	325B	449B	312B	425B	298B	400B	325B	449B	325B
1.3	200B	269B	223B	298B	325B	325B	449B	325B	449B	312B	425B	298B	400B	325B	449B	325B
1.4	161B	239B	180B	259B	298B	298B	423B	298B	423B	287B	406B	276B	390B	298B	423B	298B
1.5	144B	200B	161B	230B	249B	249B	400B	249B	400B	238B	380B	226B	361B	249B	400B	249B
1.6	131B	180B	148B	200B	230B	230B	328B	230B	328B	205B	313B	180B	298B	230B	328B	230B
1.7																
1.8																
2.1	180A	298A	200A	325A	239A	239A	351A	239A	351A	220A	338A	200A	325A	239A	351A	239A
2.2	108A	180A	141A	223A	171A	171A	276A	171A	276A	156A	251A	141A	226A	171A	276A	171A
2.3	98A	171A	108A	174A	131A	131A	200A	131A	200A	123A	182A	115A	164A	131A	200A	131A
2.4	82A	89A			105A	105A	164A	105A	164A	97A	140A	89A	115A	98A	148A	98A
3.1	298B	499B	374B	551B	449B	449B	699B	449B	699B	405B	650B	361B	600B	449B	699B	449B
3.2	249B	400B	318B	525B	377B	377B	649B	377B	649B	338B	578B	298B	508B	377B	649B	377B
3.3	249B	400B	318B	525B	377B	377B	649B	377B	649B	338B	578B	298B	508B	377B	649B	377B
3.4	200B	341B	249B	374B	279B	279B	430B	279B	430B	254B	415B	230B	400B	279B	430B	279B
4.1		200B		230B			259B		259B		245B		230B		259B	
4.2		180B		200B			230B		230B		220B		210B		230B	
4.3		174B		190B			200B		200B		190B		180B		200B	
5.1	148B	200B		230B			266B		266B		251B		236B		266B	
5.2		141A		161A			200A		200A		190A		180A		200A	
5.3		85A		98A			131A		131A		123A		115A		131A	
6.1	584C		649C		679C	679C		679C		646C		613C		679C		679C
6.2	449C		499C		574C	574C		574C		546C		518C		574C		574C
6.3	449C		499C		574C	574C		574C		546C		518C		574C		574C
6.4	108B		125B		144B	144B		144B		138B		131B		144B		144B
7.1	1348C		1499C		1601C	1601C		1601C		1525C		1450C		1601C		1601C
7.2	1348C		1499C		1601C	1601C		1601C		1525C		1450C		1601C		1601C
7.3	584C		649C		708C	708C		708C		674C		640C		708C		708C
7.4	361B		400B		479B	479B		479B		455B		430B		479B		479B
8.1																
8.2																
8.3																
9.1																
10.1																

Visual Index - End Mills

	HM	HM	HM	HM	HM	HM	HM	HM	HSS-E PM	HSS	HSS	HSS	HSS-E	HSS-E PM	HSS	HSS
					N	N	N	N	N					N		
	Z 4	Z 4	Z 4	Z 4	Z 4	Z 4	Z 5	Z 5	Z 2	Z 2	Z 2	Z 2	Z 2	Z 2	Z 2	Z 2
	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	λ^*	λ^*	λ^*	λ^*	$\lambda 30^\circ$ $\gamma 12^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$	$\lambda 30^\circ$ $\gamma 12^\circ$	$\lambda 30^\circ$	$\lambda 38^\circ$
			Normal	Normal					DIN 1835B e8					DIN 1835B e8		
	S146	S246	S147	S247	S223HAS	S223HB	S248HAS	S248HB	C110	C600	C601	C602	C603	C123	C604	C605
	1/4 - 5/8	1/4 - 5/8	1/8 - 5/8	1/8 - 5/8	1/8 - 1"	1/8 - 1"	5/16 - 1"	5/16 - 1"	1.00 - 50.00	1/8 - 3/4	1/8 - 1.1/2	1/8 - 1"	1/8 - 1"	1/16 - 40.00	1/8 - 3/4	1/4 - 1"
	416	416	417	417	418	418	419	419	420	422	423	424	425	426	428	429
1.1	343B	450B	325B	400B	801C	801C	801C	801C	197A	98A	98A	98A	164A	180A	112S	164A
1.2	312B	412B	298B	374B	778C	778C	778C	778C	164A	89A	89A	89A	131A	148A	89S	131A
1.3	312B	412B	298B	374B	522C	522C	522C	522C	131B	75B	75B	75B	115B	131B	79T	115B
1.4	287B	387B	276B	351B	463B	463B	463B	463B	115B				98B	115B		
1.5	238B	363B	226B	325B	328B	328B	328B	328B								
1.6	205B	288B	180B	249B	285A	285A	285A	285A								
1.7					187A	187A	364A	364A								
1.8					125A	125A	240A	240A								
2.1	220A	288A	200A	226A	489B	489B	489B	489B	98F				75F	82F		75F
2.2	156A	233A	141A	190A	400B	400B	400B	400B								62F
2.3	123A	176A	115A	151A	302B	302B	302B	302B								
2.4		135A		121A	256A	256A	256A	256A								
3.1	405B	500B	361B	499B	456C	456C	771C	771C	115A	82A	82A	82A	92A	98A	89S	
3.2	338B	540N	298B	430B	381B	381B	571B	571B	98A	66A	66A	66A	75A	82A	72S	
3.3	338B	540B	298B	430B	305B	305B	538B	538B	164B	82B	82B	82B	131B	148B	89T	
3.4	255B	384B	230B	338B	256B	256B	433B	433B	98B				82B	98B		
4.1		230B		200B	522B	522B	1017B	1017B	115D	59D	59D	59D	92D	98D	62V	92D
4.2		210B		190B	463B	463B	902B	902B	82D	49D	49D	49D	75D	82D	49V	
4.3		180B			387A	387A	755B	755B								
5.1		238B		210B	358B	358B	614B	614B	197D	98D	98D	98D	157D	164D	108V	157D
5.2		176A			269A	269A	525A	525A	49C	20C	20C	20C	43C	49C	20U	
5.3					223A	223A	436A	436A								
6.1	646C		613C	699C					279C	180C	180C	180C	410C	262C	200U	410C
6.2	602C		518C	571C					279C	197C	197C	197C	410C	262C	223U	
6.3	546C		518C	571C					279C	197C	197C	197C	410C	262C	223U	
6.4	137B		131B	180B												
7.1	1526C		1450C	1650C					722E	197E	197E	197E	984E	656E	243X	984E
7.2	1526C		1450C	1650C					722E	180E	180E	180E	984E	656E	194X	984E
7.3	674C		640C	708C					279E	115E	115E	115E	295E	262E	144X	295E
7.4	455B		430B	410B												
8.1									295C	197C	197C	197C	410C	262C	200U	410C
8.2																
8.3																
9.1																
10.1																

Visual Index - End Mills

	HSS	HSS	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS	HSS	HSS-E PM	HSS-E PM	HSS	HSS-E
	Z 2	Z 3	Z 3	Z 4-8	Z 4-8	Z 4-8	Z 4-8	Z 4-8	Z 4-8	Z 4	Z 4	Z 4-8	Z 4-8	Z 4-8	Z 4-8
	λ38°	λ30°	λ30° γ12°	λ30°	λ30°	λ30°	λ30°	λ30°	λ30°	λ30°	λ30°	λ30° γ12°	λ30° γ12°	λ30°	λ30°
	+0.003 +0.000	+0.003 +0.000	e8	+0.005 +0.000	+0.005 +0.000	+0.005 +0.000	+0.005 +0.000	+0.005 +0.000	+0.005 +0.000	Normal	+0.003 +0.000	k10	k10	+0.003 +0.000	+0.003 +0.000
	C606	C607	C346	C608	C609	C610	C611	C612	C613	C614	C615	C247	C273	C617	C618
	1/4 - 3/4	1/8 - 1"	3.00 - 20.00	1/4 - 1"	1/4 - 1"	1/4 - 1"	1/4 - 1"	1/4 - 1"	1/4 - 3/4	1/8 - 3/4	1/8 - 1"	2.00 - 50.00	2.00 - 40.00	1/8 - 1"	1/8 - 1"
	430	431	432	433	433	434	434	435	436	437	438	439	441	443	444
1.1	148A		148A	164G	197G	164G	197G	148G	148G	115S	164S	180S	164S	115S	164S
1.2	118A	131A	115A	131G	184G	131G	184G	118G	118G	92S	131S	148S	164S	92S	131S
1.3	102B	115B	98B	115H	161H	115H	161H	102H	102H	79T	115T	131T	115T	79T	115T
1.4		98B	82B	98H	138H	98H	138H	89H	89H	69T	98T	115T	98T	69T	98T
1.5		66C													
1.6															
1.7															
1.8															
2.1	66F		66F	75L	105L	75L	105L	66L	66L	52Y	75Y	82Y	33Y	52Y	75Y
2.2	56F	62F													
2.3															
2.4															
3.1			82A	92G	128G	92G	128G	82G	82G	92S	92S	98S	82S	92S	92S
3.2		75A	66A	75G	105G	75G	105G	66G	66G	75S	75S	82S	66S	75S	75S
3.3		131B	115B	131H	184H	131H	184H	118H	118H	92T	131T	148T	131T	92T	131T
3.4		82B	66B	82H	128H	82H	128H	72H	72H	56T	82T	82T	82T	56T	82T
4.1	82D	92D	82D	92J	128J	92J	128J	82J	82J	62V	92V	98V	82V	62V	92V
4.2		75D	66D	75J	105J	75J	105J	66J	66J	52V	75V	82V	66V	52V	75V
4.3		33D													
5.1	141D		148D	157J	220J	157J	220J	141J	141J	108V	157V	164V	148V	108V	157V
5.2		43C	33C	43I	59I	43I	59I	36I	36I	20U	43U	49U	33U	20U	43U
5.3		20D													
6.1	367C		230C	410I	574I	410I	574I	367I	367I	203U	410U	262U	230U	203U	410U
6.2		410C	230C	410I	574I	410I	574I	367I	367I	223U	410U	262U	230U	223U	410U
6.3		410C	230C	410I	574I	410I	574I	367I	367I	223U	410U	262U	230U	223U	410U
6.4		49C													
7.1	886E		590E								984X	656X	590X		984X
7.2	886E		590E	984K	1378K	984K	1378K	886K	886K	197X	984X	656X	590X	197X	984X
7.3	266E	295E		295K	413K	295K	413K	266K	266K	148X	295X	262X	230X	148X	295X
7.4		197A													
8.1	367C		230C	410I	574I	410I	574I	367I	367I	203U	410U	262U	230U	203U	410U
8.2		410C													
8.3															
9.1															
10.1															

List Number Index - End Mills

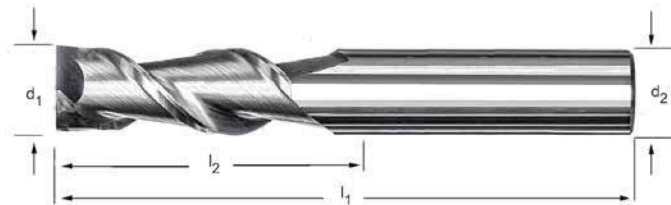


Pgs. 390-444

C110	420	S111.....	403	S235.....	411
C123.....	426	S112.....	404	S236.....	412
C247.....	439	S113.....	405	S237.....	413
C273.....	441	S114.....	406	S238.....	414
C346.....	432	S115.....	407	S239.....	415
C600.....	422	S116.....	399	S246.....	416
C601.....	423	S121.....	408	S247.....	417
C602.....	424	S129.....	409	S248HA.....	419
C603.....	425	S134.....	410	S248HB.....	419
C604.....	428	S135.....	411		
C605.....	429	S136.....	412		
C606.....	430	S137.....	413		
C607.....	431	S138.....	414		
C608.....	433	S139.....	415		
C609.....	433	S146.....	416		
C610.....	434	S147.....	417		
C611.....	434	S206.....	397		
C612.....	435	S207.....	398		
C613.....	436	S208.....	400		
C614.....	437	S211.....	403		
C615.....	438	S212.....	404		
C617.....	443	S213.....	405		
C618.....	444	S215.....	407		
S106.....	397	S221.....	408		
S108.....	400	S223HA.....	418		
S109.....	401	S223HB.....	418		
S110.....	402	S234.....	410		

Regular Length, Square End, 45° Helix

- S106** Double gullet flute design allows for fast, efficient evacuation of chips in soft and non-ferrous materials
- S206** Zirconium coating increases surface hardness, improves chip evacuation and tool life allowing for higher removal rates in soft and non-ferrous materials



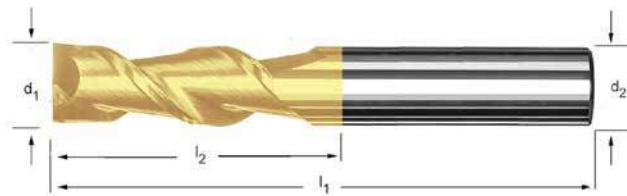
d_1 Ø Inch	d_1 decimal Inch	d_2 Ø Inch	l_2 Inch	l_1 Inch	# of Flutes	Pack Qty	S106	S206
1/4	0.2500	1/4	1"	2-1/2	2	1	7648490	7648497
5/16	0.3125	5/16	1"	3"	2	1	7648491	7648498
3/8	0.3750	3/8	1"	2-1/2	2	1	7648492	7648499
1/2	0.5000	1/2	1-1/4	3"	2	1	7648493	7648500
5/8	0.6250	5/8	1-5/8	3-1/2	2	1	7648494	7648501
3/4	0.7500	3/4	1-3/4	4"	2	1	7648495	7648502
1"	1.0000	1"	1-1/2	4"	2	1	7648496	7648503

Solid Carbide 2-Flute End Mill



Regular Length, Square End, 37° Helix

S207 Unique flute design along with the Zirconium coating allow for faster speeds and feeds in soft and non-ferrous materials



S207

HM

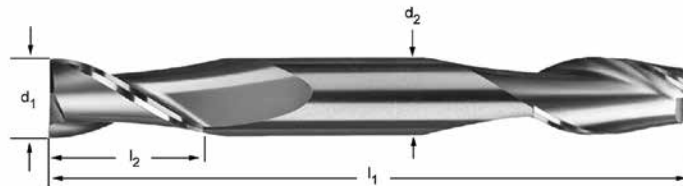


1/8 - 1"

d ₁ Ø Inch	d ₁ decimal Inch	d ₂ Ø Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	S207
1/8	0.1250	1/8	1/2	1-1/2	2	1	7648504
1/8	0.1250	1/8	3/4	2"	2	1	7648505
5/32	0.1563	5/32	9/16	2"	2	1	7648506
3/16	0.1875	3/16	3/4	2"	2	1	7648507
3/16	0.1875	3/16	1-1/8	3"	2	1	7648508
1/4	0.2500	1/4	1"	2-1/2	2	1	7648509
1/4	0.2500	1/4	1-1/2	4"	2	1	7648510
5/16	0.3125	5/16	3/4	2-1/2	2	1	7648511
5/16	0.3125	5/16	1-5/8	4"	2	1	7648512
3/8	0.3750	3/8	1"	2-1/2	2	1	7648513
3/8	0.3750	3/8	2"	4"	2	1	7648514
7/16	0.4375	7/16	1"	2-1/2	2	1	7648515
7/16	0.4375	7/16	2"	4"	2	1	7648516
1/2	0.5000	1/2	1"	3"	2	1	7648517
1/2	0.5000	1/2	3"	6"	2	1	7648518
9/16	0.5625	9/16	1-1/4	3"	2	1	7648519
5/8	0.6250	5/8	1-5/8	3-1/2	2	1	7648520
5/8	0.6250	5/8	2-1/4	5"	2	1	7648521
3/4	0.7500	3/4	1-3/4	4"	2	1	7648522
3/4	0.7500	3/4	3"	6"	2	1	7648523
1"	1.0000	1"	1-1/2	4"	2	1	7648524
1"	1.0000	1"	4"	6"	2	1	7648525

Regular Length, Square End, Double End, 30° Helix

S116 Double end provides two cutting ends in one tool. Bright finish improves chip flow in soft and non-ferrous materials



S116

HM



Z
2



1/8 - 1/2

d ₁ Ø Inch	d ₁ decimal Inch	d ₂ Ø Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	S116
1/8	0.1250	3/8	3/8	3"	2	1	7648650
5/32	0.1562	3/8	7/16	3"	2	1	7648651
3/16	0.1875	3/8	1/2	3"	2	1	7648652
1/4	0.2500	3/8	5/8	3"	2	1	7648653
5/16	0.3125	3/8	3/4	3.1/2	2	1	7648654
3/8	0.3750	3/8	3/4	3.1/2	2	1	7648655
1/2	0.5000	1/2	1"	4"	2	1	7648656

Solid Carbide 2-Flute End Mill



Regular Length, Square End, 30° Helix

- S108** Bright finish improves chip flow in soft and non-ferrous materials.
- S208** ALTiN coating increases surface hardness, improves chip flow and tool life allowing higher metal removal rates.

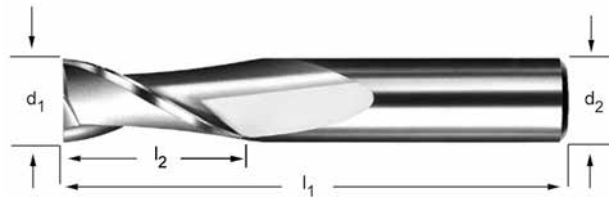


S108	S208
HM	HM
Z 2	Z 2
1/16 - 1"	1/16 - 1"

d_1 Ø Inch	d_1 decimal Inch	d_2 Ø Inch	l_2 Inch	l_1 Inch	# of Flutes	Pack Qty	S108	S208
1/16	0.0625	1/8	1/4	1.1/2	2	1	7648526	7648544
5/64	0.0781	1/8	1/4	1.1/2	2	1	7648527	7648545
3/32	0.0938	1/8	3/8	1.1/2	2	1	7648528	7648546
1/8	0.1250	1/8	1/2	1.1/2	2	1	7648529	7648547
9/64	0.1406	3/16	9/16	2"	2	1	7648530	—
5/32	0.1562	3/16	9/16	2"	2	1	7648531	7648548
11/64	0.1719	3/16	9/16	2"	2	1	7648532	—
3/16	0.1875	3/16	5/8	2"	2	1	7648533	7648549
7/32	0.2188	1/4	5/8	2.1/2	2	1	7648534	7648550
1/4	0.2500	1/4	3/4	2.1/2	2	1	7648535	7648551
5/16	0.3125	5/16	7/8	2.1/2	2	1	7648536	7648552
3/8	0.3750	3/8	7/8	2.1/2	2	1	7648537	7648553
7/16	0.4375	7/16	1"	2.1/2	2	1	7648538	7648554
1/2	0.5000	1/2	1"	3"	2	1	7648539	7648555
9/16	0.5625	9/16	1.1/4	3.1/2	2	1	7648540	7648556
5/8	0.6250	5/8	1.1/4	3.1/2	2	1	7648541	7648557
3/4	0.7500	3/4	1.1/2	4"	2	1	7648542	—
1"	1.0000	1"	1.1/2	4"	2	1	7648543	—

Regular Length, Square End, 30° Helix

S109 Bright finish improves chip flow in soft and non-ferrous materials.



S109

HM



2.00 - 25.00

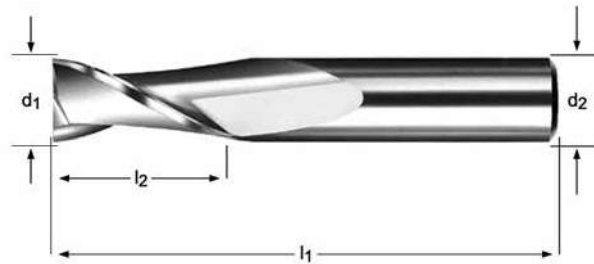
d_1 Ø mm	d_1 decimal Inch	d_2 Ø mm	l_2 mm	l_1 mm	# of Flutes	Pack Qty	S109
2.00	0.0787	3.0	6.0	38.0	2	1	7648558
2.50	0.0984	3.0	7.0	38.0	2	1	7648559
3.00	0.1181	3.0	12.0	38.0	2	1	7648560
4.00	0.1575	4.0	14.0	50.0	2	1	7648561
4.50	0.1772	5.0	14.0	50.0	2	1	7648562
5.00	0.1969	5.0	16.0	50.0	2	1	7648563
6.00	0.2362	6.0	19.0	63.0	2	1	7648564
7.00	0.2756	8.0	19.0	63.0	2	1	7648565
8.00	0.3150	8.0	20.0	63.0	2	1	7648566
9.00	0.3543	10.0	22.0	70.0	2	1	7648567
10.00	0.3937	10.0	22.0	70.0	2	1	7648568
11.00	0.4331	11.0	25.0	70.0	2	1	7648569
12.00	0.4724	12.0	25.0	75.0	2	1	7648570
14.00	0.5512	14.0	30.0	88.0	2	1	7648571
16.00	0.6299	16.0	32.0	88.0	2	1	7648572
20.00	0.7874	20.0	38.0	100.0	2	1	7648573
25.00	0.9843	25.0	38.0	100.0	2	1	7648574

Solid Carbide 2-Flute End Mill



Long Length, Square End, 30° Helix

S110 Bright finish improves chip flow in soft and non-ferrous materials.



S110

HM

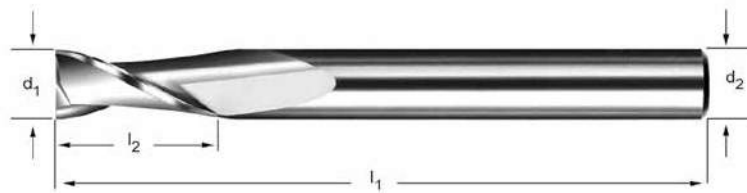


1/8 - 1/2

d_1 Ø Inch	d_1 decimal Inch	d_2 Ø Inch	l_2 Inch	l_1 Inch	# of Flutes	Pack Qty	S110
1/8	0.1250	1/8	3/4	2"	2	1	7648575
3/16	0.1875	3/16	3/4	2.1/2	2	1	7648576
1/4	0.2500	1/4	1.1/8	3"	2	1	7648577
3/8	0.3750	3/8	1.1/8	3"	2	1	7648578
1/2	0.5000	1/2	2"	4"	2	1	7648579

Extra Long Length, Square End, 30° Helix

- S111** Bright finish improves chip flow in soft and non-ferrous materials.
- S211** ALTiN coating increases surface hardness, improves chip flow and tool life allowing higher metal removal rates.



S111	S211
HM	HM
Z 2	Z 2
1/8 - 1/2	1/8 - 1/2

d ₁ Ø Inch	d ₁ decimal Inch	d ₂ Ø Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	S111	S211
1/8	0.1250	1/8	1"	3"	2	1	7648580	7648586
3/16	0.1875	3/16	1.1/8	3"	2	1	7648581	7648587
1/4	0.2500	1/4	1.1/2	4"	2	1	7648582	7648588
5/16	0.3125	5/16	1.5/8	4"	2	1	7648583	—
3/8	0.3750	3/8	1.3/4	4"	2	1	7648584	7648589
1/2	0.5000	1/2	3"	6"	2	1	7648585	7648590

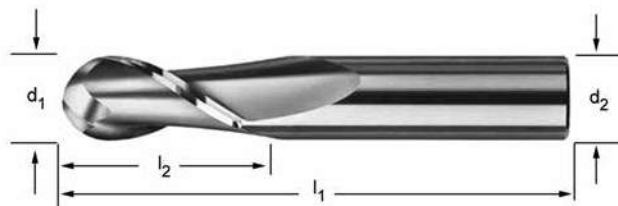
Solid Carbide 2-Flute End Mill



Regular Length, Ball Nose, 30° Helix

S112 Ball nose for cutting internal part radius. Bright finish improves chip flow in soft or non-ferrous materials.

S212 Ball nose for cutting internal part radius. ALTiN coating increases surface hardness, improves chip flow and tool life, allowing higher metal removal rates.



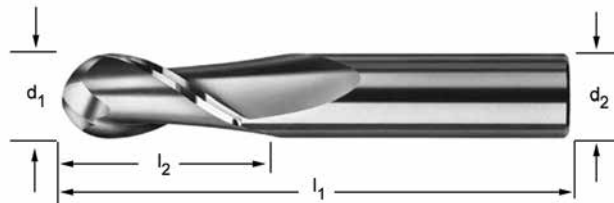
S112	S212
HM	HM
Z 2	Z 2
1/16 - 1/2	1/16 - 1/2

d_1 Ø Inch	d_1 decimal Inch	d_2 Ø Inch	l_2 Inch	l_1 Inch	# of Flutes	Pack Qty	S112	S212
1/16	0.0625	1/8	1/4	1.1/2	2	1	7648591	7648601
3/32	0.0938	1/8	3/8	1.1/2	2	1	7648592	—
1/8	0.1250	1/8	1/2	1.1/2	2	1	7648593	7648602
5/32	0.1562	3/16	9/16	2"	2	1	7648594	—
3/16	0.1875	3/16	5/8	2"	2	1	7648595	7648603
7/32	0.2188	1/4	5/8	2.1/2	2	1	7648596	7648604
1/4	0.2500	1/4	3/4	2.1/2	2	1	7648597	7648605
5/16	0.3125	5/16	7/8	2.1/2	2	1	7648598	7648606
3/8	0.3750	3/8	7/8	2.1/2	2	1	7648599	7648607
1/2	0.5000	1/2	1"	3"	2	1	7648600	7648608

Regular Length, Ball Nose, 30° Helix

S113 Ball nose for cutting internal part radius. Bright finish improves chip flow in soft or non-ferrous materials.

S213 Ball nose for cutting internal part radius. ALTiN coating increases surface hardness, improves chip flow and tool life, allowing higher metal removal rates.



S113	S213
HM	HM
Z 2	Z 2
2.00 - 20.00	2.00 - 20.00

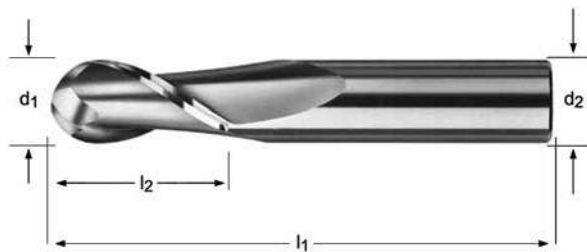
d_1 Ø mm	d_1 decimal Inch	d_2 Ø mm	l_2 mm	l_1 mm	# of Flutes	Pack Qty	S113	S213
2.00	0.0787	3.0	6.0	38.0	2	1	7648609	—
2.50	0.0984	3.0	6.0	38.0	2	1	7648610	—
3.00	0.1181	3.0	12.0	38.0	2	1	7648611	7648622
4.00	0.1575	4.0	14.0	50.0	2	1	7648612	7648623
5.00	0.1969	5.0	16.0	50.0	2	1	7648613	7648624
6.00	0.2362	6.0	19.0	63.0	2	1	7648614	7648625
7.00	0.2756	8.0	19.0	63.0	2	1	7648615	7648626
8.00	0.3150	8.0	19.0	63.0	2	1	7648616	7648627
9.00	0.3543	10.0	22.0	70.0	2	1	7648617	7648628
10.00	0.3937	10.0	22.0	70.0	2	1	7648618	7648629
12.00	0.4724	12.0	25.0	75.0	2	1	7648619	7648630
16.00	0.6299	16.0	32.0	88.0	2	1	7648620	—
20.00	0.7874	20.0	38.0	100.0	2	1	7648621	—

Solid Carbide 2-Flute End Mill



Long Length, Ball Nose, 30° Helix

S114 Ball nose for cutting internal part radius. Bright finish improves chip flow in soft or non-ferrous materials.



S114

HM



1/8 - 5/8

d_1 Ø Inch	d_1 decimal Inch	d_2 Ø Inch	l_2 Inch	l_1 Inch	# of Flutes	Pack Qty	S114
1/8	0.1250	1/8	3/4	2"	2	1	7648631
3/16	0.1875	3/16	3/4	2.1/2	2	1	7648632
1/4	0.2500	1/4	1.1/8	3"	2	1	7648633
5/16	0.3125	5/16	1.1/8	3"	2	1	7648634
3/8	0.3750	3/8	1.1/8	3"	2	1	7648635
1/2	0.5000	1/2	2"	4"	2	1	7648636
5/8	0.6250	5/8	2.1/4	5"	2	1	7648637

Extra Long Length, Ball Nose, 30° Helix

S115 Ball nose for cutting internal part radius. Bright finish improves chip flow in soft or non-ferrous materials.

S215 Ball nose for cutting internal part radius. ALTiN coating increases surface hardness, improves chip flow and tool life, allowing higher metal removal rates.



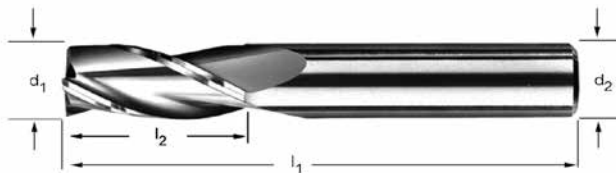
d_1 Ø Inch	d_1 decimal Inch	d_2 Ø Inch	l_2 Inch	l_1 Inch	# of Flutes	Pack Qty	S115	S215
1/8	0.1250	1/8	1"	3"	2	1	7648638	7648644
3/16	0.1875	3/16	1.1/8	3"	2	1	7648639	7648645
1/4	0.2500	1/4	1.1/2	4"	2	1	7648640	7648646
5/16	0.3125	5/16	1.5/8	4"	2	1	7648641	7648647
3/8	0.3750	3/8	1.3/4	4"	2	1	7648642	7648648
1/2	0.5000	1/2	3"	6"	2	1	7648643	7648649

Solid Carbide 3-Flute End Mill



Regular Length, Square End, 30° Helix

- S121** 3-flute design for less chatter. Bright finish improves chip flow in soft or non-ferrous materials.
- S221** 3-flute design for less chatter. ALTiN coating increases surface hardness, improves chip flow and tool life allowing higher metal removal rates.

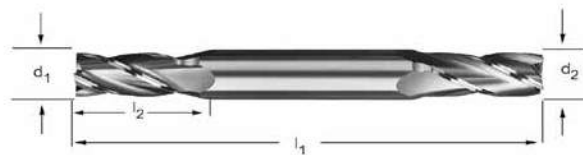


S121	S221
HM	HM
Z 3	Z 3
1/16 - 1/2	1/16 - 1/2

d ₁ Ø Inch	d ₁ decimal Inch	d ₂ Ø Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	S121	S221
1/16	0.0625	1/8	1/4	1.1/2	3	1	7648657	7648666
3/32	0.0938	1/8	3/8	1.1/2	3	1	7648658	7648667
1/8	0.1250	1/8	1/2	1.1/2	3	1	7648659	7648668
5/32	0.1562	3/16	9/16	2"	3	1	7648660	7648669
3/16	0.1875	3/16	5/8	2"	3	1	7648661	7648670
1/4	0.2500	1/4	3/4	2.1/2	3	1	7648662	7648671
5/16	0.3125	5/16	7/8	2.1/2	3	1	7648663	7648672
3/8	0.3750	3/8	7/8	2.1/2	3	1	7648664	7648673
1/2	0.5000	1/2	1"	3"	3	1	7648665	7648674

Square End, Double End , 30° Helix

S129 **Regular Length.** Double end provides two cutting ends in one tool. Bright finish improves chip flow in soft and non-ferrous materials.



S129

HM



Z
4



1/8 - 1/2

d_1 Ø Inch	d_1 decimal Inch	d_2 Ø Inch	l_2 Inch	l_1 Inch	# of Flutes	Pack Qty	S129
1/8	0.1250	3/8	3/8	3"	4	1	7648719
5/32	0.1562	3/8	7/16	3"	4	1	7648720
3/16	0.1875	3/8	1/2	3"	4	1	7648721
1/4	0.2500	3/8	5/8	3"	4	1	7648722
5/16	0.3125	3/8	3/4	3.1/2	4	1	7648723
3/8	0.3750	3/8	3/4	3.1/2	4	1	7648724
1/2	0.5000	1/2	1"	4"	4	1	7648725

Solid Carbide 4-Flute End Mill



Regular Length, Square End , 30° Helix

- S134** Bright finish improves chip flow in soft or non-ferrous materials.
- S234** ALTiN coating increases surface hardness, improves chip flow and tool life allowing higher metal removal rates.

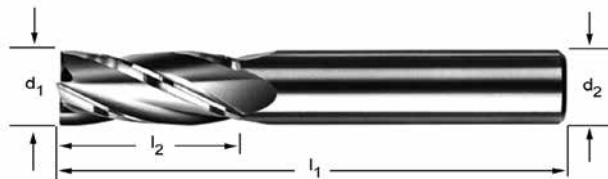


d ₁ Ø Inch	d ₁ decimal Inch	d ₂ Ø Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	S124	S234
1/16	0.0625	1/8	1/4	1.1/2	4	1	7648726	7648748
5/64	0.0781	1/8	1/4	1.1/2	4	1	7648727	7648749
3/32	0.0938	1/8	3/8	1.1/2	4	1	7648728	7648750
7/64	0.1094	1/8	3/8	1.1/2	4	1	7648729	7648751
1/8	0.1250	1/8	1/2	1.1/2	4	1	7648730	7648752
9/64	0.1406	3/16	9/16	2"	4	1	7648731	7648753
5/32	0.1562	3/16	9/16	2"	4	1	7648732	7648754
11/64	0.1719	3/16	9/16	2"	4	1	7648733	7648755
3/16	0.1875	3/16	5/8	2"	4	1	7648734	7648756
13/64	0.2031	1/4	5/8	2.1/2	4	1	7648735	7648757
7/32	0.2188	1/4	5/8	2.1/2	4	1	7648736	7648758
1/4	0.2500	1/4	3/4	2.1/2	4	1	7648737	7648759
5/16	0.3125	5/16	7/8	2.1/2	4	1	7648738	7648760
3/8	0.3750	3/8	7/8	2.1/2	4	1	7648739	7648761
7/16	0.4375	7/16	1"	2.1/2	4	1	7648740	7648762
1/2	0.5000	1/2	1"	3"	4	1	7648741	7648763
9/16	0.5625	9/16	1.1/4	3.1/2	4	1	7648742	7648764
5/8	0.6250	5/8	1.1/4	3.1/2	4	1	7648743	7648765
11/16	0.6875	3/4	1.1/2	4"	4	1	7648744	7648766
3/4	0.7500	3/4	1.1/2	4"	4	1	7648745	7648767
7/8	0.8750	7/8	1.1/2	4"	4	1	7648746	7648768
1"	1.0000	1"	1.1/2	4"	4	1	7648747	7648769

Regular Length, Square End , 30° Helix

S135 Bright finish improves chip flow in soft or non-ferrous materials.

S235 AlTiN coating increases surface hardness, improves chip flow and tool life allowing higher metal removal rates.



S135	S235
2.00 - 25.00	2.00 - 20.00

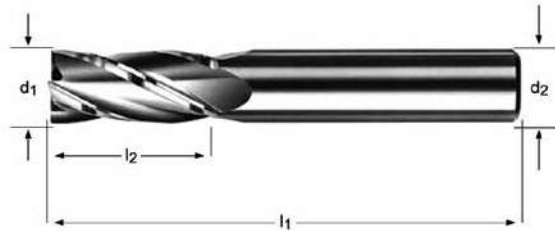
d_1 Ø mm	d_1 decimal Inch	d_2 Ø mm	l_2 mm	l_1 mm	# of Flutes	Pack Qty	S135	S235
2.00	0.0787	3.0	6.0	38.0	4	1	7648770	7648789
2.50	0.0984	3.0	7.0	38.0	4	1	7648771	7648790
3.00	0.1181	3.0	12.0	38.0	4	1	7648772	7648791
3.50	0.1378	4.0	12.0	50.0	4	1	7648773	7648792
4.00	0.1575	4.0	14.0	50.0	4	1	7648774	7648793
4.50	0.1772	5.0	14.0	50.0	4	1	7648775	7648794
5.00	0.1969	5.0	16.0	50.0	4	1	7648776	7648795
6.00	0.2362	6.0	19.0	63.0	4	1	7648777	7648796
7.00	0.2756	8.0	19.0	63.0	4	1	7648778	7648797
8.00	0.3150	8.0	19.0	63.0	4	1	7648779	7648798
9.00	0.3543	10.0	22.0	70.0	4	1	7648780	7648799
10.00	0.3937	10.0	22.0	70.0	4	1	7648781	7648800
11.00	0.4331	11.0	25.0	70.0	4	1	7648782	7648801
12.00	0.4724	12.0	25.0	75.0	4	1	7648783	7648802
14.00	0.5512	14.0	30.0	88.0	4	1	7648784	7648803
16.00	0.6299	16.0	32.0	88.0	4	1	7648785	7648804
18.00	0.7087	18.0	36.0	100.0	4	1	7648786	7648805
20.00	0.7874	20.0	38.0	100.0	4	1	7648787	7648806
25.00	0.9843	25.0	38.0	100.0	4	1	7648788	—

Solid Carbide 4-Flute End Mill



Long Length, Square End , 30° Helix

- S136** Bright finish improves chip flow in soft or non-ferrous materials.
- S236** AlTiN coating increases surface hardness, improves chip flow and tool life allowing higher metal removal rates.

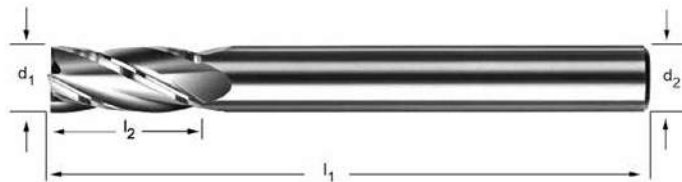


S136	S236
HM	HM
Z 4	Z 4
1/8 - 3/4	1/8 - 3/4

d ₁ Ø Inch	d ₁ decimal Inch	d ₂ Ø Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	S136	S236
1/8	0.1250	1/8	3/4	2"	4	1	7648807	7648816
3/16	0.1875	3/16	3/4	2.1/2	4	1	7648808	7648817
1/4	0.2500	1/4	1.1/8	3"	4	1	7648809	7648818
5/16	0.3125	5/16	1.1/8	3"	4	1	7648810	7648819
3/8	0.3750	3/8	1.1/8	3"	4	1	7648811	7648820
7/16	0.4375	7/16	2"	4"	4	1	7648812	7648821
1/2	0.5000	1/2	2"	4"	4	1	7648813	7648822
5/8	0.6250	5/8	2.1/4	5"	4	1	7648814	7648823
3/4	0.7500	3/4	2.1/4	5"	4	1	7648815	7648824

Extra Long Length, Square End , 30° Helix

- S137** Bright finish improves chip flow in soft or non-ferrous materials.
- S237** AlTiN coating increases surface hardness, improves chip flow and tool life allowing higher metal removal rates.



S137	S237
HM	HM
Z 4	Z 4
1/8 - 1"	1/8 - 1"

d ₁ Ø Inch	d ₁ decimal Inch	d ₂ Ø Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	S137	S237
1/8	0.1250	1/8	1"	3"	4	1	7648825	7648835
3/16	0.1875	3/16	1.1/8	3"	4	1	7648826	7648836
1/4	0.2500	1/4	1.1/2	4"	4	1	7648827	7648837
5/16	0.3125	5/16	1.5/8	4"	4	1	7648828	7648838
3/8	0.3750	3/8	1.3/4	4"	4	1	7648829	7648839
7/16	0.4375	7/16	3"	6"	4	1	7648830	7648840
1/2	0.5000	1/2	3"	6"	4	1	7648831	7648841
5/8	0.6250	5/8	3"	6"	4	1	7648832	7648842
3/4	0.7500	3/4	3"	6"	4	1	7648833	7648843
1"	1.0000	1"	3"	6"	4	1	7648834	7648844

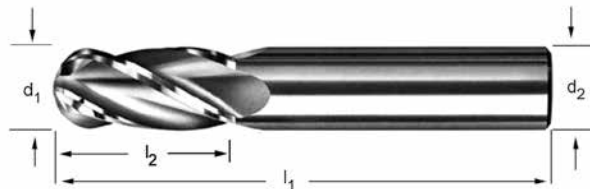
Solid Carbide 4-Flute End Mill



Regular Length, Ball Nose , 30° Helix

S138 Ball nose for cutting internal part radius. Bright finish improves chip flow in soft or non-ferrous materials.

S238 Ball nose for cutting internal part radius. AlTiN coating increases surface hardness, improves chip flow and tool life allowing higher metal removal rates.

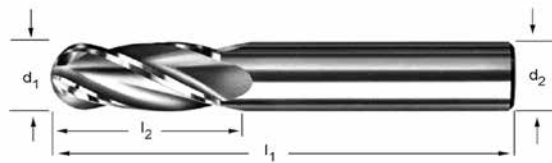


d ₁ Ø Inch	d ₁ decimal Inch	d ₂ Ø Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	S138	S238
1/16	0.0625	1/8	1/4	1.1/2	4	1	7648845	7648857
3/32	0.0938	1/8	3/8	1.1/2	4	1	7648846	7648858
1/8	0.1250	1/8	1/2	1.1/2	4	1	7648847	7648859
5/32	0.1562	3/16	9/16	2"	4	1	7648848	7648860
3/16	0.1875	3/16	5/8	2"	4	1	7648849	7648861
1/4	0.2500	1/4	3/4	2.1/2	4	1	7648850	7648862
5/16	0.3125	5/16	7/8	2.1/2	4	1	7648851	7648863
3/8	0.3750	3/8	7/8	2.1/2	4	1	7648852	7648864
7/16	0.4375	7/16	1"	2.1/2	4	1	7648853	7648865
1/2	0.5000	1/2	1"	3"	4	1	7648854	7648866
5/8	0.6250	5/8	1.1/4	3.1/2	4	1	7648855	7648867
3/4	0.7500	3/4	1.1/2	4"	4	1	7648856	7648868

Regular Length, Ball Nose, 30° Helix

S139 Ball nose for cutting internal part radius. Bright finish improves chip flow in soft or non-ferrous materials.

S239 Ball nose for cutting internal part radius. AlTiN coating increases surface hardness, improves chip flow and tool life allowing higher metal removal rates.



d ₁ Ø mm	d ₁ decimal Inch	d ₂ Ø mm	l ₂ mm	l ₁ mm	# of Flutes	Pack Qty	S139	S239
2.00	0.0787	3.0	6.0	38.0	4	1	7648877	7648878
3.00	0.1181	3.0	12.0	38.0	4	1	7648876	7648879
4.00	0.1575	4.0	14.0	50.0	4	1	7648875	7648880
4.50	0.1772	5.0	14.0	50.0	4	1	7648874	—
5.00	0.1969	5.0	16.0	50.0	4	1	7648873	7648881
6.00	0.2362	6.0	19.0	63.0	4	1	7648872	7648882
8.00	0.3150	8.0	19.0	63.0	4	1	7648871	7648883
10.00	0.3937	10.0	22.0	70.0	4	1	7648870	7648884
12.00	0.4724	12.0	25.0	75.0	4	1	7648869	7648885

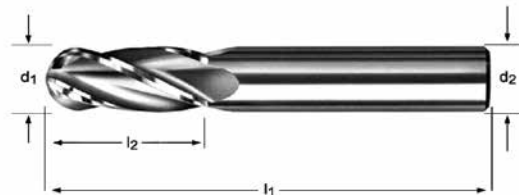
Solid Carbide 4-Flute End Mill



Long Length, Ball Nose, 30° Helix

S146 Ball nose for cutting internal part radius. Bright finish improves chip flow in soft or non-ferrous materials.

S246 Ball nose for cutting internal part radius. AlTiN coating increases surface hardness, improves chip flow and tool life allowing higher metal removal rates.



S146	S246
HM	HM
Z 4	Z 4
1/4 - 5/8	1/4 - 5/8

d ₁ Ø Inch	d ₁ decimal Inch	d ₂ Ø Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	S146	S246
1/4	0.2500	1/4	1.1/8	3"	4	1	7648886	7648890
3/8	0.3750	3/8	1.1/8	3"	4	1	7648887	7648891
1/2	0.5000	1/2	2"	4"	4	1	7648888	7648892
5/8	0.6250	5/8	2.1/4	5"	4	1	7648889	7648893

Extra Long Length, Ball Nose, 30° Helix

S147 Ball nose for cutting internal part radius. Bright finish improves chip flow in soft or non-ferrous materials.

S247 Ball nose for cutting internal part radius. AlTiN coating increases surface hardness, improves chip flow and tool life allowing higher metal removal rates.



d_1 Ø Inch	d_1 decimal Inch	d_2 Ø Inch	l_2 Inch	l_1 Inch	# of Flutes	Pack Qty	S147	S247
1/8	0.1250	1/8	1"	3"	4	1	7648894	7648901
3/16	0.1875	3/16	1.1/8	3"	4	1	7648895	7648902
1/4	0.2500	1/4	1.1/2	4"	4	1	7648896	7648903
5/16	0.3125	5/16	1.5/8	4"	4	1	7648897	7648904
3/8	0.3750	3/8	1.3/4	4"	4	1	7648898	7648905
1/2	0.5000	1/2	3"	6"	4	1	7648899	7648906
5/8	0.6250	5/8	3"	6"	4	1	7648900	7648907

Solid Carbide 4-Flute End Mill



Regular Length, Corner Radius, Unequal Helix

S223HA ALTiN coating increases hardness, and improves tool life allowing higher metal removal rates. These unequal helix cutters with corner radii are designed for higher speeds and deeper cuts. Provides superior workpiece finishes by eliminating vibrations and harmonics. Excellent for milling tough alloys and hardened steels.

S223HB has a Weldon shank.



d ₁ Ø Inch	d ₁ decimal Inch	d ₂ Ø Inch	l ₂ Inch	l ₁ Inch	R Radius	# of Flutes	Pack Qty	S223HA	S223HB
1/8	0.1250	1/8	3/8	1-1/2	.015	4	1	7648675	7648697
1/8	0.1250	1/8	3/8	1-1/2	.030	4	1	7648676	7648698
3/16	0.1875	3/16	7/16	2"	.015	4	1	7648677	7648699
3/16	0.1875	3/16	7/16	2"	.030	4	1	7648678	7648700
1/4	0.2500	1/4	5/8	2-1/2	.015	4	1	7648679	7648701
1/4	0.2500	1/4	5/8	2-1/2	.030	4	1	7648680	7648702
5/16	0.3125	1/4	1/2	2"	.015	4	1	7648681	7648703
5/16	0.3125	1/4	1/2	2"	.030	4	1	7648682	7648704
3/8	0.3750	3/8	7/8	2-1/2	.015	4	1	7648683	7648705
3/8	0.3750	3/8	7/8	2-1/2	.030	4	1	7648684	7648706
7/16	0.4375	7/16	5/8	2-1/2	.020	4	1	7648685	7648707
7/16	0.4375	7/16	5/8	2-1/2	.045	4	1	7648686	7648708
1/2	0.5000	1/2	1-1/4	3"	.030	4	1	7648687	7648709
1/2	0.5000	1/2	1-1/4	3"	.060	4	1	7648688	7648710
9/16	0.5625	9/16	1-1/8	3-1/2	.045	4	1	7648689	7648711
9/16	0.5625	9/16	1-1/8	3-1/2	.060	4	1	7648690	7648712
5/8	0.6250	5/8	1-1/4	3-1/2	.060	4	1	7648691	7648713
5/8	0.6250	5/8	1-1/4	5"	.090	4	1	7648692 *	7648714 *
3/4	0.7500	3/4	1-1/2	4"	.030	4	1	7648693	7648715
3/4	0.7500	3/4	1-1/2	4"	.060	4	1	7648694	7648716
1"	1.0000	1"	2-1/4	5"	.030	4	1	7648695 *	7648717 *
1"	1.0000	1"	2-1/4	5"	.090	4	1	7648696 *	7648718 *

* Will require a reduction of 30% - 60% in cutting speed.

Regular Length, Corner Radius, Unequal Helix

S248HA ALTiN coating increases hardness, and improves tool life allowing higher metal removal rates. These unequal helix cutters with corner radii are designed for higher speeds and deeper cuts. Provides superior workpiece finishes by eliminating vibrations and harmonics. Excellent for milling tough alloys and hardened steels.

S248HB

S248HB has a Weldon shank.



d ₁ Ø Inch	d ₁ decimal Inch	d ₂ Ø Inch	l ₂ Inch	l ₁ Inch	R Radius	# of Flutes	Pack Qty	S248HA	S248HB
5/16	0.3125	5/16	13/16	2-1/2	.015	5	1	7648908	7648927
5/16	0.3125	5/16	13/16	2-1/2	.030	5	1	7648909	7648928
3/8	0.3750	3/8	7/8	2-1/2	.015	5	1	7648910	7648929
3/8	0.3750	3/8	7/8	2-1/2	.030	5	1	7648911	7648930
7/16	0.4375	7/16	5/8	2-1/2	.020	5	1	7648912	7648931
7/16	0.4375	7/16	5/8	2-1/2	.045	5	1	7648913	7648932
1/2	0.5000	1/2	1"	3"	.030	5	1	7648914	7648933
1/2	0.5000	1/2	1-1/4	3"	.030	5	1	7648915	7648934
1/2	0.5000	1/2	1-1/4	3"	.060	5	1	7648916	7648935
9/16	0.5625	9/16	1-1/8	3-1/2	.020	5	1	7648917	7648936
9/16	0.5625	9/16	1-1/8	3-1/2	.045	5	1	7648918	7648937
9/16	0.5625	9/16	1-1/8	3-1/2	.060	5	1	7648919	7648938
5/8	0.6250	5/8	1-1/4	3-1/2	.045	5	1	7648920	7648939
5/8	0.6250	5/8	1-1/4	3-1/2	.060	5	1	7648921	7648940
5/8	0.6250	5/8	1-1/4	3-1/2	.090	5	1	7648922	7648941
3/4	0.7500	3/4	1-1/2	4"	.030	5	1	7648923	7648942
3/4	0.7500	3/4	1-1/2	4"	.060	5	1	7648924	7648943
1"	1.0000	1"	2-1/4	5"	.030	5	1	7648925 *	7648944 *
1"	1.0000	1"	2-1/4	5"	.090	5	1	7648926 *	7648945 *

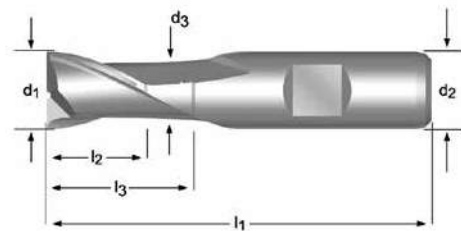
* Will require a reduction of 30% - 60% in cutting speed.

HSS-PM 2-Flute End Mill



Stub Length, Square End, Weldon Shank, 30° Helix

C110 Powdered Metal. P9 slotting tolerance.



C110

HSS-E
PM

P9



Z
2



1.00 - 50.00

d ₁ Ø Inch	d ₁ Ø mm	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	# of Flutes	l ₃ mm	d ₃ Ø mm	Pack Qty	C110
	1.00	6	2.5	47	2	-	-	1	5983761
	1.50	6	3	47	2	-	-	1	5983771
1/16	1.59	6	3	47	2	-	-	1	5983776
	1.80	6	4	48	2	-	-	1	5983773
	2.00	6	4	48	2	-	-	1	5983863
3/32	2.38	6	5	49	2	-	-	1	5983902
	2.50	6	5	49	2	-	-	1	5983866
	2.80	6	5	49	2	-	-	1	5983869
	3.00	6	5	49	2	-	-	1	5984089
1/8	3.18	6	6	50	2	-	-	1	5983788
	3.50	6	6	50	2	-	-	1	5984094
	3.80	6	7	51	2	-	-	1	5984099
	4.00	6	7	51	2	-	-	1	5983914
	4.50	6	7	51	2	-	-	1	5983917
3/16	4.76	6	8	52	2	-	-	1	5984103
	4.80	6	8	52	2	-	-	1	5983919 ¹⁾²⁾
	5.00	6	8	52	2	-	-	1	5983933
	5.50	6	8	52	2	-	-	1	5983937
	5.75	6	8	52	2	-	-	1	5983941 ¹⁾²⁾
	6.00	6	8	52	2	-	-	1	5983958
1/4	6.35	10	10	60	2	-	-	1	5983785
	6.50	10	10	60	2	-	-	1	5983962
	7.00	10	10	60	2	-	-	1	5983976
	7.50	10	10	60	2	-	-	1	5983981
	7.75	10	11	61	2	-	-	1	5983986 ¹⁾²⁾
5/16	7.94	10	11	61	2	-	-	1	5983946
	8.00	10	11	61	2	-	-	1	5984003
	8.50	10	11	61	2	-	-	1	5984007
	9.00	10	11	61	2	-	-	1	5984012

¹⁾ Diameter tolerance h10

²⁾ Slot not in P9 tolerance

³⁾ Available in HSCo only

d ₁ Ø Inch	d ₁ Ø mm	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	# of Flutes	l ₃ mm	d ₃ Ø mm	Pack Qty	C110
3/8	9.50	10	11	61	2	-	-	1	5984017
	9.52	10	13	63	2	22.5	9.5	1	5983905
	10.00	10	13	63	2	22.5	9.5	1	5983791
13/32	10.32	12	13	70	2	-	-	1	5983827
	10.50	12	13	70	2	-	-	1	5983794
	11.00	12	13	70	2	-	-	1	5983797
7/16	11.11	12	13	70	2	-	-	1	5983991
	11.50	12	13	70	2	-	-	1	5983800
	12.00	12	16	73	2	27.5	11.5	1	5983811
1/2	12.50	12	16	73	2	27.5	11.5	1	5983816
	12.70	12	16	73	2	27.5	11.5	1	5983782
	13.00	12	16	73	2	27.5	11.5	1	5983821
17/32	13.49	12	16	73	2	27.5	11.5	1	5983852
	14.00	12	16	73	2	27.5	11.5	1	5983831
	14.29	12	16	73	2	27.5	11.5	1	5984032
9/16	15.00	12	16	73	2	27.5	11.5	1	5983834
	15.88	16	19	79	2	30.5	15.5	1	5983949
	16.00	16	19	79	2	30.5	15.5	1	5983840
11/16	17.00	16	19	79	2	30.5	15.5	1	5983843
	17.46	16	19	79	2	30.5	15.5	1	5983808
	18.00	16	19	79	2	30.5	15.5	1	5983855
3/4	19.00	16	19	79	2	30.5	15.5	1	5983857
	19.05	20	22	88	2	37.5	18.5	1	5983903
	20.00	20	22	88	2	37.5	19.5	1	5983872
7/8	22.00	20	22	88	2	37.5	19.5	1	5983881
	22.22	20	22	88	2	37.5	19.5	1	5983996
	24.00	25	26	102	2	45.5	23.5	1	5983901
1"	25.00	25	26	102	2	45.5	24.5	1	5983967
	25.40	25	26	102	2	45.5	24.5	1	5983749
	26.00	25	26	102	2	45.5	24.5	1	5984022
	28.00	25	26	102	2	45.5	24.5	1	5984079
	30.00	25	26	102	2	45.5	24.5	1	5983906
	32.00	32	32	112	2	51.5	31.5	1	5983908
	35.00	32	32	112	2	51.5	31.5	1	5983910 ¹⁾³⁾
	36.00	32	32	112	2	51.5	31.5	1	5983912 ¹⁾³⁾
	40.00	40	38	130	2	59.5	39.0	1	5983925 ¹⁾³⁾

¹⁾ Diameter tolerance h10

²⁾ Slot not in P9 tolerance

³⁾ Available in HSCo only

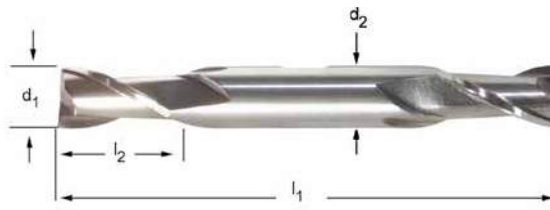
HSS 2-Flute End Mill



Regular Length, Square End, Weldon Shank, 30° Helix

C600

Double end provides two cutting ends in one tool. Bright finish improves chip flow in soft or non-ferrous materials.



C600

HSS

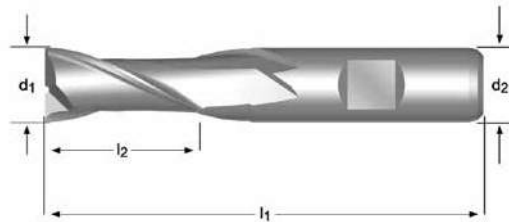


1/8 - 3/4

d_1 Ø Inch	d_1 decimal Inch	l_2 Inch	l_1 Inch	d_2 Ø Inch	# of Flutes	Pack Qty	C600
1/8	0.1250	3/8	3.1/16	3/8	2	1	7647759
5/32	0.1562	7/16	3.1/8	3/8	2	1	7647820
3/16	0.1875	7/16	3.1/4	3/8	2	1	7647821
1/4	0.2500	1/2	3.3/8	3/8	2	1	7647822
9/32	0.2812	9/16	3.3/8	3/8	2	1	7647823
5/16	0.3125	9/16	3.1/2	3/8	2	1	7647824
11/32	0.3437	9/16	3.1/2	3/8	2	1	7647825
3/8	0.3750	9/16	3.1/2	3/8	2	1	7647826
13/32	0.4062	13/16	4.1/8	1/2	2	1	7647827
7/16	0.4375	13/16	4.1/8	1/2	2	1	7647828
1/2	0.5000	13/16	4.1/8	1/2	2	1	7647829
5/8	0.6250	1.1/8	5"	5/8	2	1	7647830
3/4	0.7500	1.5/16	5.5/8	3/4	2	1	7647831

Regular Length, Square End, Weldon Shank, 30° Helix

C601 Bright finish improves chip flow in soft or non-ferrous materials.



C601

HSS



Z
2



1/8 - 1/2

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	# of Flutes	Pack Qty	C601
1/8	0.1250	3/8	2.5/16	3/8	2	1	7647832
3/16	0.1875	7/16	2.3/8	3/8	2	1	7647833
1/4	0.2500	1/2	2.7/16	3/8	2	1	7647834
5/16	0.3125	9/16	2.1/2	3/8	2	1	7647835
3/8	0.3750	9/16	2.1/2	3/8	2	1	7647836
7/16	0.4375	13/16	2.11/16	3/8	2	1	7647837
1/2	0.5000	13/16	2.11/16	3/8	2	1	7647838
1/2	0.5000	1"	3.1/4	1/2	2	1	7647839
9/16	0.5625	1.1/8	3.3/8	1/2	2	1	7647840
5/8	0.6250	1.1/8	3.3/8	1/2	2	1	7647841
5/8	0.6250	1.5/16	3.3/4	5/8	2	1	7647844
11/16	0.6875	1.5/16	3.5/8	1/2	2	1	7647842
11/16	0.6875	1.5/16	3.3/4	5/8	2	1	7647845
3/4	0.7500	1.5/16	3.5/8	1/2	2	1	7647843
3/4	0.7500	1.5/16	3.3/4	5/8	2	1	7647846
3/4	0.7500	1.5/16	3.7/8	3/4	2	1	7647859
13/16	0.8125	1.1/2	4"	5/8	2	1	7647847
7/8	0.8750	1.1/2	4"	5/8	2	1	7647848
7/8	0.8750	1.1/2	4.1/8	3/4	2	1	7647860
7/8	0.8750	1.1/2	4.1/8	7/8	2	1	7647851
15/16	0.9375	1.1/2	4"	5/8	2	1	7647849
1"	1.0000	1.1/2	4"	5/8	2	1	7647850
1"	1.0000	1.1/2	4.1/8	3/4	2	1	7647861
1"	1.0000	1.1/2	4.1/8	7/8	2	1	7647852
1"	1.0000	1.5/8	4.1/2	1"	2	1	7647853
1.1/8	1.1250	1.5/8	4.1/4	3/4	2	1	7647862
1.1/8	1.1250	1.5/8	4.1/2	1"	2	1	7647854
1.1/4	1.2500	1.5/8	4.1/2	1"	2	1	7647855
1.1/4	1.2500	1.5/8	4.1/2	1.1/4	2	1	7647857
1.1/2	1.5000	1.5/8	4.1/4	3/4	2	1	7647863
1.1/2	1.5000	1.5/8	4.1/2	1"	2	1	7647856
1.1/2	1.5000	1.5/8	4.1/2	1.1/4	2	1	7647858

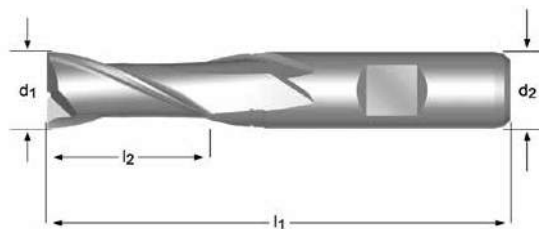
HSS 2-Flute End Mill



Regular Length, Square End, Keyway, Weldon Shank, 30° Helix

C602

Keyway cutter, close tolerance (+0.0000"/-0.0015").
Bright finish improves chip flow in soft or non-ferrous materials.



C602

HSS

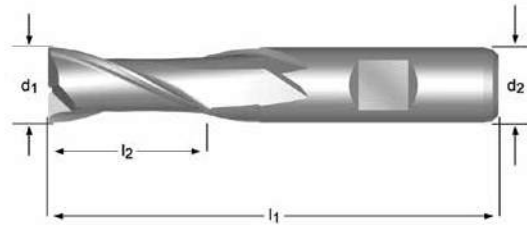


1/8 - 1"

d_1 Ø Inch	d_1 decimal Inch	l_2 Inch	l_1 Inch	d_2 Ø Inch	# of Flutes	Pack Qty	C602
1/8	0.1250	3/8	2.5/16	3/8	2	1	7647864
3/16	0.1875	7/16	2.3/8	3/8	2	1	7647865
1/4	0.2500	1/2	2.7/16	3/8	2	1	7647866
5/16	0.3125	9/16	2.1/2	3/8	2	1	7647867
3/8	0.3750	9/16	2.1/2	3/8	2	1	7647868
1/2	0.5000	1"	3.1/4	1/2	2	1	7647869
5/8	0.6250	1.5/16	3.3/4	5/8	2	1	7647870
3/4	0.7500	1.5/16	3.7/8	3/4	2	1	7647871
7/8	0.8750	1.1/2	4.1/8	7/8	2	1	7647872
1"	1.0000	1.5/8	4.1/2	1"	2	1	7647873

Regular Length, Square End, Weldon Shank, 30° Helix

C603 Bright finish improves chip flow in soft or non-ferrous materials.



C603

HSS-E



1/8 - 1"

d_1 Ø Inch	d_1 decimal Inch	l_2 Inch	l_1 Inch	d_2 Ø Inch	# of Flutes	Pack Qty	C603
1/8	0.1250	3/8	2.5/16	3/8	2	1	7647874
3/16	0.1875	7/16	2.3/8	3/8	2	1	7647875
1/4	0.2500	1/2	2.7/16	3/8	2	1	7647876
5/16	0.3125	9/16	2.1/2	3/8	2	1	7647877
3/8	0.3750	9/16	2.1/2	3/8	2	1	7647878
1/2	0.5000	1"	3.1/4	1/2	2	1	7647879
5/8	0.6250	1.5/16	3.3/4	5/8	2	1	7647880
3/4	0.7500	1.5/16	3.7/8	3/4	2	1	7647881
1"	1.0000	1.5/8	4.1/2	1"	2	1	7647882

HSS-PM 2-Flute End Mill



Regular Length, Square End, Weldon Shank, 30° Helix

C123 Powdered Metal. P9 slotting tolerance.

C123

HSS-E
PM

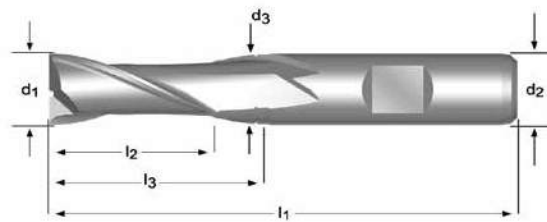
P9



Z
2



1/16 - 40.00



d ₁ Ø Inch	d ₁ Ø mm	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	# of Flutes	l ₃ mm	d ₃ Ø mm	Pack Qty	C123
1/16	1.59	6	7	51	2	—	—	1	5984309 ¹⁾
	2.00	6	7	51	2	—	—	1	5984368
	2.50	6	8	52	2	—	—	1	5984375
	3.00	6	8	52	2	—	—	1	5984385
1/8	3.18	6	10	54	2	—	—	1	5984329 ¹⁾
	3.50	6	10	54	2	—	—	1	5984387
5/32	3.97	6	11	55	2	—	—	1	5983899 ¹⁾
	4.00	6	11	55	2	—	—	1	5983807
	4.50	6	11	55	2	—	—	1	5983844
3/16	4.76	6	13	57	2	—	—	1	5984389 ¹⁾
	5.00	6	13	57	2	—	—	1	5983895
	5.50	6	13	57	2	—	—	1	5983897
	6.00	6	13	57	2	—	—	1	5983778
1/4	6.35	10	16	66	2	—	—	1	5984319 ¹⁾
	6.50	10	16	66	2	—	—	1	5983781
	7.00	10	16	66	2	—	—	1	5983784
	7.50	10	16	66	2	—	—	1	5983787
5/16	7.94	10	19	69	2	—	—	1	5983898 ¹⁾
	8.00	10	19	69	2	—	—	1	5983790
	8.50	10	19	69	2	—	—	1	5983793
	9.00	10	19	69	2	—	—	1	5983796
	9.50	10	19	69	2	—	—	1	5983799
3/8	9.52	10	22	72	2	31.5	9.5	1	5984393 ¹⁾
	10.00	10	22	72	2	31.5	9.5	1	5984334
	11.00	12	22	79	2	—	—	1	5984339
	12.00	12	26	83	2	37.5	11.5	1	5984343
1/2	12.70	12	26	83	2	37.5	11.5	1	5984314 ¹⁾
	13.00	12	26	83	2	37.5	11.5	1	5984348
	14.00	12	26	83	2	37.5	11.5	1	5984352
	15.00	12	26	83	2	37.5	11.5	1	5984356

¹⁾ Diameter tolerance -.0005 inches / -.0013 inches

d_1 Ø Inch	d_1 Ø mm	d_2 Ø _{h₅} mm	l_2 mm	l_1 mm	# of Flutes	l_3 mm	d_3 Ø mm	Pack Qty	C123
	16.00	16	32	92	2	43.5	15.5	1	5984360
	18.00	16	32	92	2	43.5	15.5	1	5984364
	20.00	20	38	104	2	53.5	19.5	1	5984378
	22.00	20	38	104	2	53.5	19.5	1	5984381
	25.00	25	45	121	2	64.5	24.5	1	5984384
	30.00	25	45	121	2	64.5	24.5	1	5984394

¹⁾ Diameter tolerance -.0005 inches / -.0013 inches

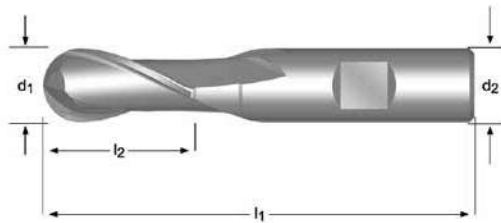
HSS 2-Flute End Mill



Regular Length, Ball Nose, Weldon Shank, 30° Helix

C604

Ball nose for cutting internal radius. Bright finish improves chip flow in soft or non-ferrous materials.



C604

HSS

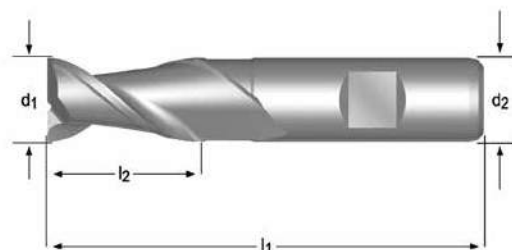


1/8 - 3/4

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ inch	d ₂ Ø Inch	# of Flutes	Pack Qty	C604
1/8	0.1250	3/8	2.5/16	3/8	2	1	7647883
3/16	0.1875	1/2	2.3/8	3/8	2	1	7647884
1/4	0.2500	5/8	2.7/16	3/8	2	1	7647885
5/16	0.3125	3/4	2.1/2	3/8	2	1	7647886
3/8	0.3750	3/4	2.1/2	3/8	2	1	7647887
7/16	0.4375	1"	3.1/4	1/2	2	1	7647888
1/2	0.5000	1"	3.1/4	1/2	2	1	7647889
9/16	0.5625	1.1/8	3.3/8	1/2	2	1	7647890
5/8	0.6250	1.1/8	3.3/8	1/2	2	1	7647891
3/4	0.7500	1.5/16	3.5/8	1/2	2	1	7647892

Regular Length, Square End, Weldon Shank, 37° Helix

C605 High Helix design for aluminum and other non-ferrous materials.



C605

HSS



1/4 - 1"

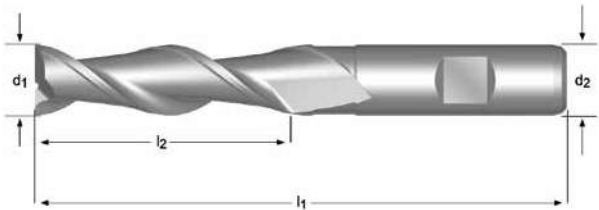
d_1 Ø Inch	d_1 decimal Inch	l_2 Inch	l_1 Inch	d_2 Ø Inch	# of Flutes	Pack Qty	C605
1/4	0.2500	5/8	2.7/16	3/8	2	1	7647893
3/8	0.3750	3/4	2.1/2	3/8	2	1	7647895
1/2	0.5000	1.1/4	3.1/4	1/2	2	1	7647896
3/4	0.7500	1.5/8	3.7/8	3/4	2	1	7647897

HSS 2-Flute End Mill



Long Length, Square End, Weldon Shank, 37° Helix

C606 High Helix design for aluminum and other non-ferrous materials.



C606

HSS

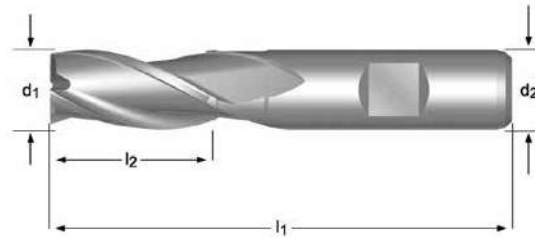
Z
2

1/4 - 3/4

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	# of Flutes	Pack Qty	C606
1/4	0.2500	1.1/4	3.1/16	3/8	2	1	7647899
5/16	0.3125	1.3/8	3.1/8	3/8	2	1	7647900
3/8	0.3750	1.1/2	3.1/4	3/8	2	1	7647901
1/2	0.5000	2"	4"	1/2	2	1	7647902
3/4	0.7500	3"	5.1/4	3/4	2	1	7647903

Regular Length, Square End, Weldon Shank, 30° Helix

C607 3-flute design for less chatter. Bright finish improves chip flow in soft or non-ferrous materials.



C607

HSS



1/8 - 1"

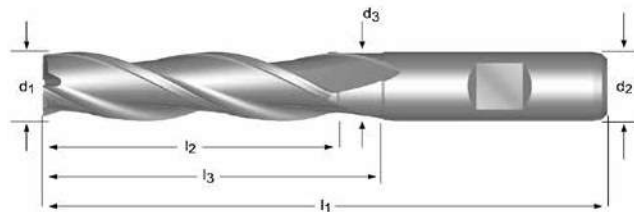
d_1 Ø Inch	d_1 decimal Inch	l_2 Inch	l_1 Inch	d_2 Ø Inch	# of Flutes	Pack Qty	C607
1/8	0.1250	3/8	2.5/16	3/8	3	1	7647904
3/16	0.1875	1/2	2.3/8	3/8	3	1	7647905
1/4	0.2500	5/8	2.7/16	3/8	3	1	7647906
5/16	0.3125	3/4	2.1/2	3/8	3	1	7647907
3/8	0.3750	3/4	2.1/2	3/8	3	1	7647908
7/16	0.4375	1"	2.11/16	3/8	3	1	7647909
1/2	0.5000	1.1/4	3.1/4	1/2	3	1	7647910
9/16	0.5625	1.3/8	3.3/8	1/2	3	1	7658817
5/8	0.6250	1.5/8	3.3/4	5/8	3	1	7647912
3/4	0.7500	1.5/8	3.3/4	5/8	3	1	7647913
3/4	0.7500	1.5/8	3.7/8	3/4	3	1	7647916
1"	1.0000	1.7/8	4"	5/8	3	1	7647914
1"	1.0000	2"	4.1/2	1"	3	1	7647915

Cobalt 3-Flute End Mill



Long Length, Square End, Weldon Shank, 30° Helix

C346 P9 slotting tolerance. 3 flute design provides less chatter.



C346

HSS-E

P9

3

Z
3

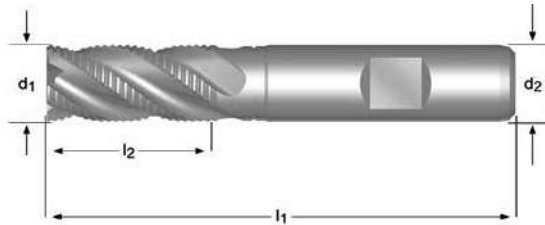


3.00 - 20.00

d_1 Ø mm	d_2 Ø _{h6} mm	l_2 mm	l_1 mm	# of Flutes	l_3 mm	d_3 Ø mm	Pack Qty	C346
3.00	6	12	56	3	-	-	1	5984057
4.00	6	19	63	3	-	-	1	5984062
5.00	6	24	68	3	-	-	1	5984067
6.00	6	24	68	3	-	-	1	5984075
7.00	10	30	80	3	-	-	1	5984080
8.00	10	38	88	3	-	-	1	5984085
9.00	10	38	88	3	-	-	1	5984090
10.00	10	45	95	3	-	-	1	5984009
11.00	12	45	102	3	-	-	1	5984014
12.00	12	53	110	3	-	-	1	5984019
13.00	12	53	110	3	64.5	11.5	1	5984024
15.00	12	53	110	3	64.5	11.5	1	5984034
16.00	16	63	123	3	74.5	15.5	1	5984044
20.00	20	75	141	3	90.5	19.5	1	5984052

Regular Length, Square End, Roughing, Weldon Shank, 30° Helix

- C608** Roughing, Fine Profile, provides a stronger edge and runs longer than conventional coarse profile roughers. Bright finish.
- C609** TiCN coating lowers the coefficient of friction and improves wear resistance on the end mill.



d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	# of Flutes	Pack Qty	C608	C609
1/4	0.2500	5/8	2.7/16	3/8	4	1	7647917	7647927
5/16	0.3125	3/4	2.1/2	3/8	4	1	7647918	7647928
3/8	0.3750	3/4	2.1/2	3/8	4	1	7647919	7647929
7/16	0.4375	1.1/4	3.1/4	1/2	4	1	7647920	7647930
1/2	0.5000	1.1/4	3.1/4	1/2	4	1	7647921	7647931
9/16	0.5625	1.3/8	3.3/8	1/2	4	1	7647922	—
5/8	0.6250	1.5/8	3.3/4	5/8	4	1	7647923	7647932
3/4	0.7500	1.5/8	3.7/8	3/4	4	1	7647924	7647933
7/8	0.8750	1.7/8	4.1/8	3/4	5	1	7647925	—
1"	1.0000	2"	4.1/2	1"	5	1	7647926	7647934

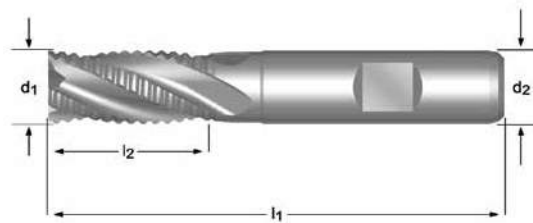
Cobalt Multi-Flute End Mill



Regular Length, Square End, Roughing, Weldon Shank, 30° Helix

C610 Roughing, Coarse Profile, for maximum metal removal in one pass. Bright finish.

C611 TiCN coating lowers the coefficient of friction and improves wear resistance on the end mill.

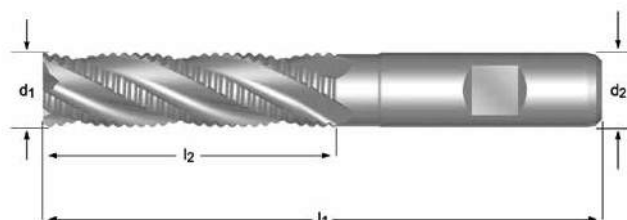


C610	C611
HSS-E	HSS-E
Z 4-8	Z 4-8
1/4 - 1"	1/4 - 1"

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	# of Flutes	Pack Qty	C610	C611
1/4	0.2500	5/8	2.7/16	3/8	4	1	7647935	7647945
5/16	0.3125	3/4	2.1/2	3/8	4	1	7647936	7647946
3/8	0.3750	3/4	2.1/2	3/8	4	1	7647937	7647947
7/16	0.4375	1.1/4	3.1/4	1/2	4	1	7647938	7647948
1/2	0.5000	1.1/4	3.1/4	1/2	4	1	7647939	7647949
9/16	0.5625	1.3/8	3.3/8	1/2	4	1	7647940	—
5/8	0.6250	1.5/8	3.3/4	5/8	4	1	7647941	7647950
3/4	0.7500	1.5/8	3.7/8	3/4	4	1	7647942	7647951
7/8	0.8750	1.7/8	4.1/8	3/4	5	1	7647943	7647952
1"	1.0000	2"	4.1/2	1"	5	1	7647944	7647953

Long Length, Square End, Roughing, Weldon Shank, 30° Helix

C612 Roughing, Coarse Profile, for maximum metal removal in one pass. Bright finish.



C612

HSS-E



1/4 - 1"

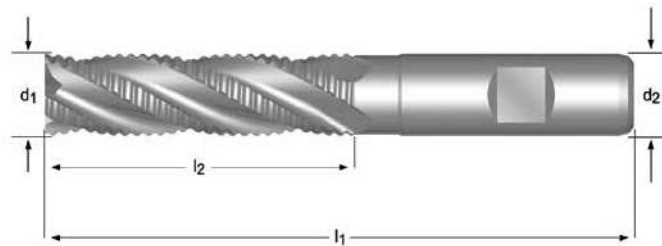
d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	# of Flutes	Pack Qty	C612
1/4	0.2500	1.1/4	3.1/8	3/8	4	1	7647954
3/8	0.3750	1.1/2	3.1/4	3/8	4	1	7647955
1/2	0.5000	2"	4"	1/2	4	1	7647956
5/8	0.6250	2.1/2	4.5/8	5/8	4	1	7647957
3/4	0.7500	3"	5.1/4	3/4	4	1	7647958
7/8	0.8750	3.1/2	5.3/4	3/4	6	1	7647959
1"	1.0000	4"	6.1/2	1"	5	1	7647960

Cobalt 4-Flute End Mill



Long Length, Square End, Roughing, Weldon Shank, 30° Helix

C613 Roughing, Fine Profile, provides a stronger edge and runs longer than conventional coarse profile roughers. Bright finish.



C613

HSS-E



Z
4-8

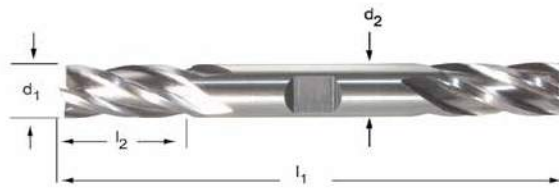


1/4 - 3/4

d_1 Ø Inch	d_1 decimal Inch	l_2 Inch	l_1 Inch	d_2 Ø Inch	# of Flutes	Pack Qty	C613
1/4	0.2500	1.1/4	3.1/8	3/8	4	1	7647961
3/8	0.3750	1.1/2	3.1/4	3/8	4	1	7647962
1/2	0.5000	2"	4"	1/2	4	1	7647963
3/4	0.7500	3"	5.1/4	3/4	4	1	7647964

Regular Length, Square End, Weldon Shank, 30° Helix

C614 Double end provides two cutting ends in one tool. Bright finish improves chip flow in soft or non-ferrous materials.



C614

HSS



1/8 - 3/4

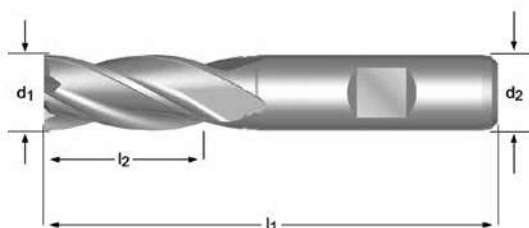
d_1 Ø Inch	d_1 decimal Inch	l_2 Inch	l_1 Inch	d_2 Ø Inch	# of Flutes	Pack Qty	C614
1/8	0.1250	3/8	3.1/16	3/8	4	1	7647965
3/16	0.1875	1/2	3.1/4	3/8	4	1	7647966
1/4	0.2500	5/8	3.3/8	3/8	4	1	7647967
5/16	0.3125	3/4	3.1/2	3/8	4	1	7647968
3/8	0.3750	3/4	3.1/2	3/8	4	1	7647969
1/2	0.5000	1"	4.1/8	1/2	4	1	7647970
5/8	0.6250	1.3/8	5"	5/8	4	1	7647971
3/4	0.7500	1.5/8	5.5/8	3/4	4	1	7647972

HSS 4-Flute End Mill



Regular Length, Square End, Weldon Shank, 30° Helix

C615 Bright finish improves chip flow in soft or non-ferrous materials.



C615

HSS

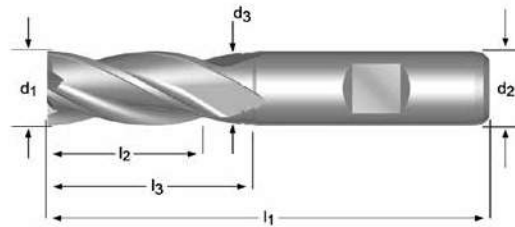


1/8 - 1"

d_1 Ø Inch	d_1 decimal Inch	l_2 Inch	l_1 Inch	d_2 Ø Inch	# of Flutes	Pack Qty	C615
1/8	0.1250	3/8	2.5/16	3/8	4	1	7647973
3/16	0.1875	1/2	2.3/8	3/8	4	1	7647974
1/4	0.2500	5/8	2.7/16	3/8	4	1	7647975
5/16	0.3125	3/4	2.1/2	3/8	4	1	7647976
3/8	0.3750	3/4	2.1/2	3/8	4	1	7647977
1/2	0.5000	1.1/4	3.1/4	1/2	4	1	7647978
5/8	0.6250	1.5/8	3.3/4	5/8	4	1	7647979
11/16	0.6875	1.5/8	3.3/4	5/8	4	1	7647980
3/4	0.7500	1.5/8	3.7/8	3/4	4	1	7647981
7/8	0.8750	1.7/8	4.1/8	7/8	4	1	7647982
1"	1.0000	2"	4.1/2	1"	4	1	7647983

Regular Length, Square End, Weldon Shank, 30° Helix

C247 Powdered Metal. Bright finish improves chip flow in soft or non-ferrous materials.



C247

HSS-E
PM



N

Z
4-8



2.00 - 50.00

d ₁ Ø Inch	d ₁ Ø mm	d ₂ Ø _{h₆} mm	l ₂ mm	l ₁ mm	# of Flutes	l ₃ mm	d ₃ Ø mm	Pack Qty	C247
	2.00	6	7	51	4	—	—	1	5984300
	2.50	6	8	52	4	—	—	1	5984305
	3.00	6	8	52	4	—	—	1	5984880
1/8	3.18	6	10	54	4	—	—	1	5984242 ¹⁾
	3.50	6	10	54	4	—	—	1	5984882
	4.00	6	11	55	4	—	—	1	5984712
	4.50	6	11	55	4	—	—	1	5984716
3/16	4.76	6	13	57	4	—	—	1	5984884 ¹⁾
	5.00	6	13	57	4	—	—	1	5984724
	5.50	6	13	57	4	—	—	1	5984728
	6.00	6	13	57	4	—	—	1	5984747
1/4	6.35	10	16	66	4	—	—	1	5984237 ¹⁾
	6.50	10	16	66	4	—	—	1	5984752
	7.00	10	16	66	4	—	—	1	5984757
	7.50	10	16	66	4	—	—	1	5984762
5/16	7.94	10	19	69	4	—	—	1	5984731 ¹⁾
	8.00	10	19	69	4	—	—	1	5984775
	8.50	10	19	69	4	—	—	1	5984780
	9.00	10	19	69	4	—	—	1	5984785
	9.50	10	19	69	4	—	—	1	5984794
3/8	9.52	10	22	72	4	31.5	9.5	1	5984696 ¹⁾
	10.00	10	22	72	4	31.5	9.5	1	5984245
	11.00	12	22	79	4	—	—	1	5984250
	12.00	12	26	83	4	37.5	11.5	1	5984256
1/2	12.70	12	26	83	4	37.5	11.5	1	5984233 ¹⁾
	13.00	12	26	83	4	37.5	11.5	1	5984261
	14.00	12	26	83	4	37.5	11.5	1	5984271
9/16	14.29	12	26	83	4	37.5	11.5	1	5984799 ¹⁾
	15.00	12	26	83	4	37.5	11.5	1	5984275
5/8	15.88	16	32	92	4	43.5	15.5	1	5984738 ¹⁾

¹⁾ Diameter tolerance +.0025 inches / -.0005 inches

²⁾ Not center Cutting

³⁾ Available in HSCo only

Cobalt-PM Multi-Flute End Mill



d ₁ Ø Inch	d ₁ Ø mm	d ₂ Øh ₆ mm	l ₂ mm	l ₁ mm	# of Flutes	l ₃ mm	d ₃ Ø mm	Pack Qty	C247
	16.00	16	32	92	4	43.5	15.5	1	5984280
	17.00	16	32	92	4	43.5	15.5	1	5984285
	18.00	16	32	92	4	43.5	15.5	1	5984290
	19.00	16	32	92	4	43.5	15.5	1	5984296
3/4	19.05	20	38	104	4	53.5	18.5	1	5984886 ¹⁾
	20.00	20	38	104	4	53.5	19.5	1	5984310
	21.00	20	38	104	4	53.5	19.5	1	5984315
	22.00	20	38	104	5	53.5	19.5	1	5984325
7/8	22.22	20	38	104	5	53.5	19.5	1	5984767 ¹⁾
	23.00	20	38	104	5	53.5	19.5	1	5984690
	24.00	25	45	121	5	64.5	23.5	1	5984734
	25.00	25	45	121	5	64.5	24.5	1	5984789
1"	25.40	25	45	121	5	64.5	24.5	1	5984228 ¹⁾
	26.00	25	45	121	6	64.5	24.5	1	5984840
	28.00	25	45	121	6	64.5	24.5	1	5984876
	30.00	25	45	121	6	64.5	24.5	1	5984700
	32.00	32	53	133	6	72.5	31.5	1	5984703
	36.00	32	53	133	6	72.5	31.5	1	5984707 ²⁾³⁾
	40.00	40	63	155	6	84.5	39.0	1	5984720 ²⁾³⁾
	50.00	50	75	177	8	96.5	48.0	1	5984742 ²⁾³⁾

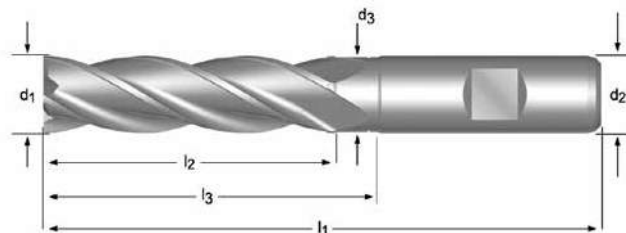
¹⁾ Diameter tolerance +.0025 inches / -.0005 inches

²⁾ Not center Cutting

³⁾ Available in HSCo only

Long Length, Square End, Weldon Shank

C273 Powdered Metal. Bright finish improves chip flow in soft or non-ferrous materials.



C273

HSS-E
PM



Z
4-6



2.00 - 40.00

d_1 Ø Inch	d_1 Ø mm	d_2 Ø _{h6} mm	l_2 mm	l_1 mm	# of Flutes	l_3 mm	d_3 Ø mm	Pack Qty	C273
	2.00	6	10	54	4	—	—	1	5984621
	2.50	6	12	56	4	—	—	1	5984625
	3.00	6	12	56	4	—	—	1	5984695
1/8	3.18	6	15	59	4	—	—	1	5984576 ¹⁾
	3.50	6	15	59	4	—	—	1	5984736
	4.00	6	19	63	4	—	—	1	5984662
	4.50	6	19	63	4	—	—	1	5984665
3/16	4.76	6	24	68	4	—	—	1	5984791 ¹⁾
	5.00	6	24	68	4	—	—	1	5984670
	5.50	6	24	68	4	—	—	1	5984673
	6.00	6	24	68	4	—	—	1	5984680
1/4	6.35	10	30	80	4	—	—	1	5984571 ¹⁾
	7.00	10	30	80	4	—	—	1	5984683
	8.00	10	38	88	4	—	—	1	5984692
	9.00	10	38	88	4	—	—	1	5984699
3/8	9.52	10	45	95	4	54.5	9.5	1	5984850 ¹⁾
	10.00	10	45	95	4	54.5	9.5	1	5984584
	11.00	12	45	102	4	—	—	1	5984588
	12.00	12	53	110	4	64.5	11.5	1	5984597
1/2	12.70	12	53	110	4	64.5	11.5	1	5984566 ¹⁾
	13.00	12	53	110	4	64.5	11.5	1	5984603
	14.00	12	53	110	4	64.5	11.5	1	5984606
	15.00	12	53	110	4	64.5	11.5	1	5984610
5/8	15.88	16	63	123	4	74.5	15.5	1	5984677 ¹⁾
	16.00	16	63	123	4	74.5	15.5	1	5984614
	18.00	16	63	123	4	74.5	15.5	1	5984618
3/4	19.05	20	75	141	4	90.5	18.5	1	5984843 ¹⁾
	20.00	20	75	141	4	90.5	19.5	1	5984626
	22.00	20	75	141	5	90.5	19.5	1	5984628
	25.00	25	90	166	5	109.5	24.5	1	5984632

¹⁾ Diameter tolerance +.0025 inches / -.0005 inches

²⁾ Available in HSCo only

³⁾ Not Center Cutting

Cobalt-PM Multi-Flute End Mill



d_1 Ø Inch	d_1 Ø mm	d_2 Ø _{h₆} mm	l_2 mm	l_1 mm	# of Flutes	l_3 mm	d_3 Ø mm	Pack Qty	C273
1"	25.40	25	90	166	5	109.5	24.5	1	5984556 ¹⁾
	28.00	25	90	166	6	109.5	24.5	1	5984660
	30.00	25	90	166	6	109.5	24.5	1	5984854
	32.00	32	106	186	6	125.5	31.5	1	5984857
	40.00	40	125	217	6	146.5	39.0	1	5984667 ²⁾³⁾

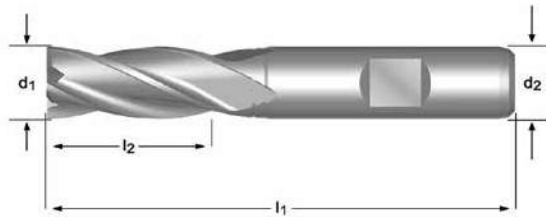
¹⁾ Diameter tolerance +.0025 inches / -.0005 inches

²⁾ Available in HSCo only

³⁾ Not Center Cutting

Regular Length, Square End, Weldon Shank, 30° Helix

C617 Multi-flute finishing. Bright finish improves chip flow in soft or non-ferrous materials.



C617

HSS



Z
4-8



1/8 - 1"

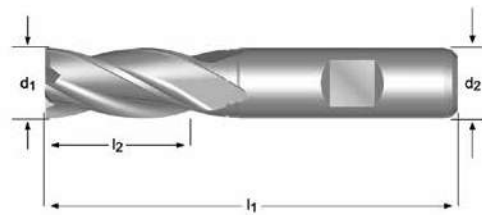
d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	# of Flutes	Pack Qty	C617
1/8	0.1250	3/8	2.5/16	3/8	4	1	7647984
3/16	0.1875	1/2	2.3/8	3/8	4	1	7647985
1/4	0.2500	5/8	2.7/16	3/8	4	1	7647986
5/16	0.3125	3/4	2.1/2	3/8	4	1	7647987
3/8	0.3750	3/4	2.1/2	3/8	4	1	7647988
7/16	0.4375	1"	2.11/16	3/8	4	1	7647989
1/2	0.5000	1"	2.11/16	3/8	4	1	7647990
1/2	0.5000	1.1/4	3.1/4	1/2	4	1	7647991
9/16	0.5625	1.3/8	3.3/8	1/2	4	1	7647992
5/8	0.6250	1.3/8	3.3/8	1/2	4	1	7647993
5/8	0.6250	1.5/8	3.3/4	5/8	4	1	7647996
11/16	0.6875	1.5/8	3.5/8	1/2	4	1	7647994
11/16	0.6875	1.5/8	3.3/4	5/8	4	1	7647997
3/4	0.7500	1.5/8	3.5/8	1/2	4	1	7647995
3/4	0.7500	1.5/8	3.3/4	5/8	4	1	7647998
3/4	0.7500	1.5/8	3.7/8	3/4	4	1	7648005
13/16	0.8125	1.7/8	4"	5/8	6	1	7647999
7/8	0.8750	1.7/8	4"	5/8	6	1	7648000
7/8	0.8750	1.7/8	4.1/8	3/4	4	1	7648006
7/8	0.8750	1.7/8	4.1/8	7/8	4	1	7648002
1"	1.0000	1.7/8	4"	5/8	6	1	7648001
1"	1.0000	1.7/8	4.1/8	3/4	4	1	7648007
1"	1.0000	1.7/8	4.1/8	7/8	4	1	7648003
1"	1.0000	2"	4.1/2	1"	4	1	7648004

Cobalt 4-Flute End Mill



Regular Length, Square End, Weldon Shank, 30° Helix

C618 Multi-flute finishing for high strength heat resistant materials, stainless and alloy steel, super alloys, and titanium alloys.



C618

HSS-E



Z
4-6



1/8 - 1"

d ₁ Ø Inch	d ₁ decimal Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	# of Flutes	Pack Qty	C618
1/8	0.1250	3/8	2.5/16	3/8	4	1	7648008
3/16	0.1875	1/2	2.3/8	3/8	4	1	7648009
1/4	0.2500	5/8	2.7/16	3/8	4	1	7648010
5/16	0.3125	3/4	2.1/2	3/8	4	1	7648011
3/8	0.3750	3/4	2.1/2	3/8	4	1	7648012
1/2	0.5000	1.1/4	3.1/4	1/2	4	1	7648013
5/8	0.6250	1.5/8	3.3/4	5/8	4	1	7648014
3/4	0.7500	1.5/8	3.7/8	3/4	4	1	7648015
1"	1.0000	2"	4.1/2	1"	4	1	7648016

Visual Index - Reamers

How to Use This Chart:

- 1) Determine your Workpiece Material from the Application Material Groups (AMG) below.
- 2) Use the icons to find Product Features.
- 3) Find the Surface Feet Per Minute (SFM) and Alpha Code.
example: 361 W
361 = SFM
W = Alpha Code used to find your Feed Rate (IPR)
- 4) To find Cutting Feed Rate, find your Alpha Code on the AMG Chart
(example: 279 U : U is the Alpha Code)
- 5) Find the closest diameter for your cutting application on the Feed Rate chart below to find your IPR

Feed Rate Chart - Reamers

Alpha Code	Reamers - Feed in Inches per Revolution										Ø Diameter		
	1/16	5/64	1/8	3/16	5/16	25/64	1/2	5/8	25/32	1"	1-13/16	1-1/2	2"
A	0.002	0.002	0.003	0.004	0.006	0.007	0.007	0.009	0.010	0.011	0.013	0.015	0.017
B	0.002	0.003	0.004	0.006	0.007	0.008	0.009	0.011	0.012	0.014	0.016	0.020	0.022
C	0.003	0.003	0.005	0.007	0.009	0.010	0.011	0.013	0.015	0.017	0.019	0.024	0.027
D	0.031	0.004	0.006	0.008	0.011	0.013	0.014	0.016	0.019	0.021	0.024	0.029	0.033
E	0.004	0.006	0.007	0.010	0.014	0.015	0.017	0.020	0.021	0.025	0.030	0.036	0.043
F	0.006	0.007	0.010	0.014	0.017	0.020	0.022	0.025	0.028	0.031	0.037	0.047	0.059

Application Material Groups (AMG)			Hardness HRC	ISO
1. Steel	1.1 Magnetic soft steel	12L14, 12L15	<120 HB	P 1
	1.2 Structural Steel/ case carburising steel	1005-1025, 1214, 1215, A36	<200 HB	P 1
	1.3 Plain Carbon steel	1030-1060, 1050-1060, 1144-1146	<24	P 2
	1.4 Alloy steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	<24	P 3
	1.5 Alloy steel/ Hardened and tempered steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	>24<38	P 4
	1.6 Alloy steel/ Hardened and tempered steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	>38	H 1
	1.7 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	49-55	H 3
	1.8 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	55-63	H 4
2. Stainless Steel	2.1 Free machining Stainless Steel	200, 303, 416, 420F, 430F, 440	<24	M 1
	2.2 Austenitic	301, 302, 304, 316, 321, 330, CUSTOM 455, AM-350	<24	M 3
	2.3 Ferritic + Austenitic, Martensitic	318-329, 400-446, DUPLEX	<32	M 2
	2.4 Precipitation Hardened	15-5PH, Custom 450 17-4PH	<32	S 2
3. Cast Iron	3.1 Lamellar graphite	Grey, G10, Gg40, J431C, A48 CLASS 20	<150 HB	K 1
	3.2 Lamellar graphite	Grey, GG25-Gg40, J158, A48 CLASS 40-60	>150 HB<32	K 2
	3.3 Nodular graphite/ Malleable Cast Iron	A220, A436, A439, A602, Black, GGG40-GGG70	<200 HB	K 3
	3.4 Nodular graphite/ Malleable Cast Iron	Black Gts/Gtw, J434C	>200 HB<32	K 4
4. Titanium	4.1 Titanium, unalloyed	Commercially Pure	<200 HB	S 1
	4.2 Titanium, alloyed	6Al4V, 6Al4V-2Sn, Monel, Monel K	<28	S 2
	4.3 Titanium, alloyed	6Al4V-4Mo, 7Al4V-4Mo, 4911-4967	>28<38	S 3
5. Nickel	5.1 Nickel, unalloyed	Commercially Pure, 17644, 200, 5553	<150 HB	S 1
	5.2 Nickel, alloyed	Monel 400, Hastelloy C, Inconel 625, Waspaloy	<28	S 2
	5.3 Nickel, alloyed	Inconel 718, Nimonic 75-95, Rene 41, Inconel 825, A286	>28<38	S 3
6. Copper	6.1 Copper	Commercially Pure	<100 HB	N 3
	6.2 β-Brass, Bronze	314-340, 350-370	<200 HB	N 4
	6.3 α-Brass	Alloyed Cu + Al + Fe, Long Chipping	<200 HB	N 3
	6.4 High Strength Bronze	Ampco 18-25	<49	N 4
7. Aluminium Magnesium	7.1 Al, Mg, unalloyed	Commercially Pure	<100 HB	N 1
	7.2 Al alloyed, Si<0.5%	6061 T6, 7075, 314-340	<150 HB	N 1
	7.3 Al alloyed, Si>0.5%<10%	6061 T6, 380-390	<120 HB	N 1
	7.4 Al alloyed, Si>10% Mg alloys	Magnesium Whisker Reinforced	<120 HB	N 2
8. Synthetic Materials	8.1 Thermoplastics	Ultramid, Polystrol	---	O
	8.2 Thermosetting plastics	Bakelit, Pertinax	---	O
	8.3 Reinforced plastic materials	CFK, GFKAFK	---	O
9. Hard Mat.	9.1 Cermets (Metal-ceramics)	Ferrotic	<54	H
10. Graphite	10.1 Standard graphite		---	O

Visual Index - Reamers

Tool Material:	HM	HM	HM	HM	HM	HSS-E	HSS	HSS	HSS-E	HSS-E	HSS	HSS
Finish/Coating:												
Standard:	DIN 8050	DIN 8093	DIN 8051	DIN 8094	DIN 8093	DIN 212	ANSI	ANSI	BS 328	DIN 212	ANSI	ANSI
Direction of Cut:												
Shank:												
Tolerance:	H7	H7	H7	H7	Ø .25-.5 0, +0.004 0.51.12 0, +0.005	Ø .25-.5 0, +0.004 0.51.12 0, +0.005	USCTI	USCTI	H7	H7		USCTI
Tolerance:												
Countersink Angle:												
Taper Gradient:												1:48
												
Style:	B441	B400	B442	B411	B481	B170	B610	B620	B901	B157	B122	B630
Range:	10.00 - 20.00	1.00 - 20.00	10.00 - 20.00	5.00 - 30.00	0.98 - 12.05	0.98 - 12.00	N60 - 1.1/2	1/16 - 1"	1.50 - 1/2	2.00 - 20.00	3/8 - 1.1/16	7/0 - 10
Page #	449	450	451	452	453	455	458	462	463	464	465	466
1.1	59B	59B	59B	59B	59B	82C	82C	82C	59C	82C	59C	59C
1.2	59B	59B	59B	59B	59B	66C	66C	66C	46C	66C	46C	46C
1.3	46B	46B	46B	46B	46B	52C	52C	52C	36C	52C	36C	36C
1.4	46B	46B	46B	46B	46B	49B	49B	49B	33B	49B	33B	33B
1.5	33C	33C	33C	33C	33C	30B	30B	30B	16B	30B	16B	16B
1.6	33C	33C	33C	33C	33C	16A	16A	16A	13A	16A	13A	13A
1.7												
1.8												
2.1						36C	36C	36C	26C	36C	26C	26C
2.2						20B	20B	20B		20B	16B	16B
2.3						26B	26B	26B		26B	20B	20B
2.4							20B	20B				
3.1	56D	56D	56D	56D	56D	52E	52E	52E	46E		46E	46E
3.2	56D	56D	56D	56D	56D	49D	49D	49D	36D		36D	36D
3.3	56D	56D	56D	56D	56D	43C	43C	43C	33C		33C	33C
3.4	46D	46D	46D	46D	46D	36C	36C	36C	30C		30C	30C
4.1	46C	46C	46C	46C	46C	49C	49C	49C	36C	49C	36C	36C
4.2	46C	46C	46C	46C	46C	30B	30B	30B	16B	30B	16B	16B
4.3	33B	33B	33B	33B	33B	16B	16B	16B	13B	16B	13B	13B
5.1	33C	33C	33C	33C	33C	26D	26D	26D	16D	26D	16D	16D
5.2	33B	33B	33B	33B	33B	16C	16C	16C	10C	16C		
5.3	33B	33B	33B	33B	33B	10C	10C	10C	7C	10C		
6.1	125E	125E	125E	125E	125E	82D	82D	82D	59D	82D	59D	59D
6.2	125E	125E	125E	125E	125E	92E	92E	92E	66E	92E	66E	66E
6.3	125E	125E	125E	125E	125E	82D	82D	82D	59D		59D	59D
6.4	125D	125D	125D	125D	125D	46D	46D	46D	36D		36D	36D
7.1	197D	197D	197D	197D	197D				75F	92F	75F	75F
7.2	197D	197D	197D	197D	197D				59F	82F	59F	59F
7.3	82D	82D	82D	82D	82D					66E	49E	49E
7.4	82D	82D	82D	82D	82D					52D	46D	46D
8.1	82C	82C	82C	82C	82C					98B		
8.2	43C	43C	43C	43C	43C				69B		69B	69B
8.3												
9.1										10A		
10.1												

Visual Index - Reamers

	HSS-E	HSS	HSS	HSS	HSS		HSS	HSS	HSS	HSS	HSS	HSS
												
	ST	ST	ST							ST	ST	
	BS 328	DIN 311	ANSI	ANSI	OBORMER		ANSI	ANSI	ANSI	DIN 206	BS 328	ANSI
												
												
	H7	k11	USCTI	USCTI			USCTI	USCTI	USCTI	H7		USCTI
												60°
												↓
												100°
							1:48	1:48			1:48	
												
	B101	B121	B640	B650	B334	B335	B660	B670	B680	B100	B301	B690
	3.00 - 2"	10.00 - 30.00	7/16 - 1.1/16	1/8 - 1"	N000 N16	Blades Nuts	N0 - N10	N0 - N10	1/8 - 1"	1.50 - 50.00	1/16 - 1/2	1/4 - 1"
	467	469	470	471	472	473	474	475	476	477	479	480
1.1	59C	59C	59C	82C	59C		59C	59C	59C	59C	59C	98F
1.2	46C	46C	46C	66C	46C		46C	46C	46C	46C	46C	82E
1.3	36C	36C	36C	52C	36C		36C	36C	36C	36C	36C	66D
1.4	33B	33B	33B	49B	33B		33B	33B	33B	33B	33B	49D
1.5	16B	16B	16B	30B	16B		16B	16B	16B	16B	16B	33B
1.6	13A	13A	13A	16A	13A		13A	13A	13A	13A	13A	20A
1.7												
1.8												
2.1	26C		26C	36C	26F		26C	26C	26C	26F	26C	26C
2.2			16B	20B			16B	16B	16B		16B	20B
2.3			20B	26B			20B	20B	20B		20B	13A
2.4				20B					20B			
3.1	46E	46E	46E	52E	46E		46E	46E	46E	46E	46E	82F
3.2	36D	36D	36D	49D	36D		36D	36D	36D	36D	36D	49D
3.3	33C	33C	33C	43C	33C		33C	33C	33C	33C	33C	39C
3.4	30C	30C	30C	36C	30C		30C	30C	30C	30C	30C	26C
4.1	36C	36C	36C	49C	36C		36C	36C	36C	36C	36C	39C
4.2	16B		16B	30B	16B		16B	16B	16B	16B	16B	33A
4.3	13B		13B	16B	13B		13B	13B	13B	13B	13B	26A
5.1	16D		16D	26D	16D		16D	16D	16D	16D	16D	39C
5.2	10C			16C	10C					10C		20B
5.3	7C			10C	7C					7C		13A
6.1	59D		59D	82D	59D		59D	59D	59D	59D	59D	82D
6.2	66E		66E	92E	66E		66E	66E	66E	66E	66E	66F
6.3	59D		59D	82D	59D		59D	59D	59D	59D	59D	82F
6.4	36D		36D	46D	36D		36D	36D	36D	36D	36D	33D
7.1	75F		75F		75F		75F	75F	75F	75F	75F	98G
7.2	59F		59F		59F		59F	59F	59F	59F	59F	82F
7.3			49E				49E	49E	49E		49E	66F
7.4			46D				46D	46D	46D		46D	33F
8.1												98G
8.2	69B	69B	69B		69B		69B	69B	69B	69B	69B	66G
8.3												
9.1												
10.1												

List Number Index - Reamers



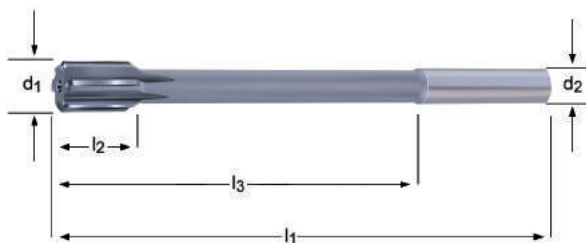
Pgs. 449 - 480

B100	477	B481	453
B101	467	B650	471
B121	469	B610	458
B122	465	B620	462
B157	464	B640	470
B170	455	B660	474
B301	479	B630	466
B334	472	B670	475
B335	473	B680	476
B400	450	B690	480
B411	452	B901	463
B441	449		
B442	451		

Machine Reamer, Straight Shank, Brazed Carbide Tipped

B441 Extremely unequal flute spacing. Straight flute.
For machine reaming of abrasive, hard ferrous,
and non-ferrous materials.

1.1 1.2 1.3 1.4 1.5 1.6 3.1 3.2 3.3 3.4 4.1 4.2 4.3 5.1 5.2
5.3 6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4 8.1 8.2



B441

HM



DIN
8050



10.00 - 20.00

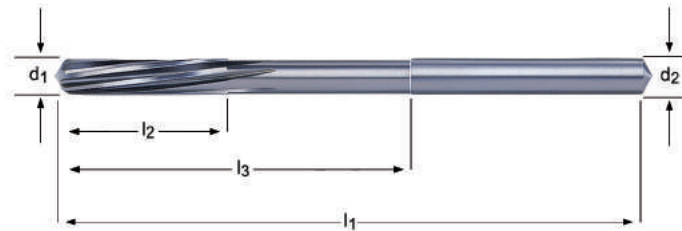
d_1 Ø mm	l_1 mm	l_2 mm	l_3 mm	# of Flutes	d_2 Ø h_9 mm	Pack Qty	B441
10.0	133	19	87	6	10	1	5987160
11.0	142	19	96	6	10	1	5987164
12.0	151	19	105	6	10	1	5987167
13.0	151	19	105	6	10	1	5987170
14.0	160	19	110	6	12.5	1	5987173
15.0	162	19	112	6	12.5	1	5987176
16.0	170	22	120	6	12.5	1	5987179
17.0	175	22	123	6	14	1	5987185
18.0	182	22	130	6	14	1	5987189
19.0	189	22	131	6	16	1	5987193
20.0	195	22	137	6	16	1	5987196

Machine Reamer, Straight Shank

B400

Extremely unequal flute spacing with left hand slow spiral, right hand cut. For machine reaming of abrasive, hard ferrous, and non-ferrous materials.

1.1 1.2 1.3 1.4 1.5 1.6 3.1 3.2 3.3 3.4 4.1 4.2 4.3 5.1 5.2
5.3 6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4 8.1 8.2



B400

HM



DIN
8093



1.00 - 20.00

d_1 Ø mm	l_1 mm	l_2 mm	l_3 mm	# of Flutes	d_2 Øh ₉ mm	Pack Qty	B400
1.0	34	5.5	15	3	1.0	1	5987088 ¹⁾
1.2	38	7.5	16.5	3	1.2	1	5987126 ¹⁾
1.4	40	8	18	3	1.5	1	5987163 ¹⁾
1.5	40	8	18	3	1.5	1	5987198 ¹⁾
1.6	43	9	20	3	1.6	1	5987237 ¹⁾
1.8	46	10	22	4	1.8	1	5987244 ¹⁾
2.0	49	11	24	4	2.0	1	5987100 ¹⁾
2.2	53	12	25	4	2.2	1	5987103 ¹⁾
2.5	57	14	29	4	2.5	1	5987107 ¹⁾
2.8	61	15	33	6	3.0	1	5987111 ¹⁾
3.0	61	15	33	6	3.0	1	5987117 ¹⁾
3.2	65	16	37	6	3.2	1	5987120 ¹⁾
3.5	70	18	42	6	3.5	1	5987123 ¹⁾
4.0	75	19	47	6	4.0	1	5987129 ¹⁾
4.5	80	21	52	6	4.5	1	5987132 ¹⁾
5.0	86	23	58	6	5.0	1	5987134 ¹⁾
5.5	93	26	57	6	5.6	1	5987137 ¹⁾
6.0	93	26	57	6	5.6	1	5987141 ¹⁾
6.5	101	28	65	6	6.3	1	5987144 ²⁾
7.0	109	31	73	6	7.1	1	5987148 ²⁾
8.0	117	33	81	6	8.0	1	5987152 ²⁾
9.0	125	36	85	6	9.0	1	5987155 ²⁾
10.0	133	38	93	6	10.0	1	5987247 ²⁾
12.0	151	44	111	6	10.0	1	5987250 ²⁾
14.0	160	47	115	6	12.5	1	5987253 ²⁾
16.0	170	52	125	6	12.5	1	5987094 ²⁾
18.0	182	56	137	6	14.0	1	5987097 ³⁾
20.0	195	60	147	6	16.0	1	5987114 ³⁾

¹⁾ Solid Carbide

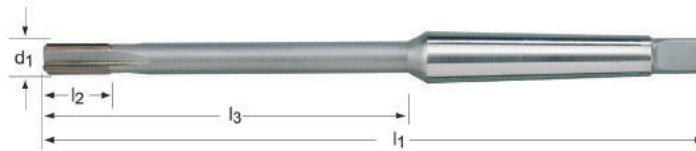
²⁾ Carbide Head

³⁾ Carbide Tipped

Machine Reamer, Taper Shank, Brazed Carbide Tipped

B442 Extremely unequal flute spacing with straight flute. For machine reaming of abrasive, hard ferrous, and non-ferrous materials.

1.1 1.2 1.3 1.4 1.5 1.6 3.1 3.2 3.3 3.4 4.1 4.2 4.3 5.1 5.2
5.3 6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4 8.1 8.2



B442

HM



DIN
8051



10.00 - 20.00

d ₁ Ø mm	l ₁ mm	l ₂ mm	l ₃ mm	# of Flutes	MTS	Pack Qty	B442
10.0	168	19	102.5	6	1	1	5987200
12.0	182	19	116.5	6	1	1	5987204
14.0	189	19	123.5	6	1	1	5987208
15.0	204	19	124	6	2	1	5987212
16.0	210	22	130	6	2	1	5987216
17.0	214	22	134	6	2	1	5987220
18.0	219	22	139	6	2	1	5987228
19.0	223	22	143	6	2	1	5987230
20.0	228	22	148	6	2	1	5987233

Machine Reamer, Taper Shank

B411 Extremely unequal spacing with left hand spiral, and right hand cut. For machine reaming of abrasive, hard ferrous, and non-ferrous materials.

1.1 1.2 1.3 1.4 1.5 1.6 3.1 3.2 3.3 3.4 4.1 4.2 4.3 5.1 5.2
5.3 6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4 8.1 8.2



B411

HM



DIN
8094



5.00 - 30.00

d ₁ Ø mm	l ₁ mm	l ₂ mm	l ₃ mm	# of Flutes	MTS	Pack Qty	B411
5.0	133	23	67.5	6	1	1	5987213 ¹⁾
6.0	138	26	72.5	6	1	1	5987217 ¹⁾
7.0	150	31	84.5	6	1	1	5987221 ¹⁾
8.0	156	33	90.5	6	1	1	5987226 ¹⁾
9.0	162	36	96.5	6	1	1	5987229 ¹⁾
10.0	168	38	102.5	6	1	1	5987159 ¹⁾
12.0	182	44	116.5	6	1	1	5987166 ¹⁾
14.0	189	47	123.5	8	1	1	5987169 ¹⁾
15.0	204	50	124	8	2	1	5987172 ¹⁾
16.0	210	52	130	8	2	1	5987175 ¹⁾
17.0	214	54	134	6	2	1	5987178 ²⁾
18.0	219	56	139	6	2	1	5987181 ²⁾
19.0	223	58	143	6	2	1	5987184 ²⁾
20.0	228	60	148	6	2	1	5987187 ²⁾
22.0	237	64	157	6	2	1	5987190 ²⁾
24.0	268	68	169	8	3	1	5987194 ²⁾
25.0	268	68	169	8	3	1	5987202 ²⁾
26.0	273	70	174	8	3	1	5987206 ²⁾
30.0	281	73	182	8	3	1	5987209 ²⁾

¹⁾ Carbide Head

²⁾ Carbide Tipped

High Precision, Straight Shank

B481 High Precision NC Centesimal Reamers are offered in 0.01mm increments. Extremely unequal flute spacing with left hand slow spiral, right hand cut. For machining reaming of abrasive, hard ferrous, and non-ferrous materials. Ideal for hydraulic and heat shrink tool holding systems.

1.1 1.2 1.3 1.4 1.5 1.6 3.1 3.2 3.3 3.4 4.1 4.2 4.3 5.1 5.2
5.3 6.1 6.2 6.3 6.4 7.1 7.2 7.3 7.4 8.1 8.2



B481

HM



DIN
8093



0.98 - 12.05

d_1 Ø mm	l_1 mm	l_2 mm	l_3 mm	# of Flutes	d_2 Ø h_6 mm	Pack Qty	B481
0.98	49.5	6	21.5	3	4	1	5987462
0.99	49.5	6	21.5	3	4	1	5987467
1.00	49.5	6	21.5	3	4	1	5987475
1.01	49.5	6	21.5	3	4	1	5987478
1.02	49.5	6	21.5	3	4	1	5987482
1.03	49.5	9	21.5	3	4	1	5987485
1.48	49	9	21	3	4	1	5987488
1.49	49	9	21	3	4	1	5987491
1.50	49	9	21	3	4	1	5987494
1.51	49	9	21	3	4	1	5987497
1.52	49	9	21	3	4	1	5987499
1.53	49	9	21	3	4	1	5987501
1.98	49	12	21	4	4	1	5987506
1.99	49	12	21	4	4	1	5987509
2.00	49	12	21	4	4	1	5987602
2.01	49	12	21	4	4	1	5987603
2.02	49	12	21	4	4	1	5987604
2.03	49	12	21	4	4	1	5987507
2.48	59	16	31	4	4	1	5987510
2.49	59	16	31	4	4	1	5987513
2.50	59	16	31	4	4	1	5987516
2.51	59	16	31	4	4	1	5987519
2.52	59	16	31	4	4	1	5987522
2.53	59	16	31	4	4	1	5987524
2.97	62.5	17	35	6	4	1	5987526
2.98	62.5	17	35	6	4	1	5987529
2.99	62.5	17	35	6	4	1	5987534
3.00	62.5	17	35	6	4	1	5987540
3.01	62.5	17	35	6	4	1	5987543
3.02	62.5	17	35	6	4	1	5987546
3.03	62.5	17	35	6	4	1	5987549
3.97	75	19	47	6	4	1	5987551
3.98	75	19	47	6	4	1	5987553

APPLICATION CARBIDE REAMER



d ₁ Ø mm	l ₁ mm	l ₂ mm	l ₃ mm	# of Flutes	d ₂ Øh ₆ mm	Pack Qty	B481
3.99	75	19	47	6	4	1	5987556
4.00	75	19	47	6	4	1	5987558
4.01	75	19	47	6	4	1	5987560
4.02	75	19	47	6	4	1	5987562
4.03	75	19	47	6	4	1	5987565
4.97	86	23	50	6	6	1	5987567
4.98	86	23	50	6	6	1	5987569
4.99	86	23	50	6	6	1	5987571
5.00	86	23	50	6	6	1	5987573
5.01	86	23	50	6	6	1	5987575
5.02	86	23	50	6	6	1	5987577
5.03	86	23	50	6	6	1	5987578
5.97	93	26	57	6	6	1	5987580
5.98	93	26	57	6	6	1	5987582
5.99	93	26	57	6	6	1	5987586
6.00	93	26	57	6	6	1	5987588
6.01	93	26	57	6	6	1	5987590
6.02	93	26	57	6	6	1	5987592
6.03	93	26	57	6	6	1	5987593
7.97	117	33	81	6	8	1	5987594
7.98	117	33	81	6	8	1	5987595
7.99	117	33	81	6	8	1	5987596
8.00	117	33	81	6	8	1	5987597
8.01	117	33	81	6	8	1	5987598
8.02	117	33	81	6	8	1	5987600
8.03	117	33	81	6	8	1	5986965
8.04	117	33	81	6	8	1	5986973
9.97	133	38	93	6	10	1	5986978
9.98	133	38	93	6	10	1	5986981
9.99	133	38	93	6	10	1	5986985
10.00	133	38	93	6	10	1	5987511
10.01	133	38	93	6	10	1	5987514
10.02	133	38	93	6	10	1	5987517
10.03	133	38	93	6	10	1	5987520
10.04	133	38	93	6	10	1	5987525
10.05	133	38	93	6	10	1	5987528
11.97	151	44	106	6	12	1	5987531
11.98	151	44	106	6	12	1	5987533
11.99	151	44	106	6	12	1	5987538
12.00	151	44	106	6	12	1	5987503
12.01	151	44	106	6	12	1	5987537
12.02	151	44	106	6	12	1	5987563
12.03	151	44	106	6	12	1	5987584
12.04	151	44	106	6	12	1	5987599
12.05	151	44	106	6	12	1	5987601

High Precision, Straight Shank

B170 Centesimal Reamer by 0.01mm increments.
Left hand slow spiral, right hand cut. For machine reaming of abrasive, hard ferrous, and non-ferrous materials.

1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2 2.3 3.1 3.2 3.3 3.4 4.1 4.2
4.3 5.1 5.2 5.3 6.1 6.2 6.3 6.4



B170

HSS-E



DIN
212



0.98 - 12.00

d_1 Ø mm	l_1 mm	l_2 mm	l_3 mm	# of Flutes	d_2 Ø _{h9} mm	Pack Qty	B170
0.98	34	5.5	15	3	1.0	1	5986212
0.99	34	5.5	15	3	1.0	1	5986213
1.00	34	5.5	15	3	1.0	1	5986214
1.01	34	5.5	15	3	1.0	1	5986215
1.02	34	5.5	15	3	1.0	1	5986216
1.03	34	5.5	15	3	1.0	1	5986217
1.04	34	5.5	15	3	1.0	1	5986219
1.05	34	5.5	15	3	1.0	1	5986221
1.49	40	8.0	18	3	1.5	1	5986223
1.50	40	8.0	18	3	1.5	1	5986225
1.51	43	9.0	20	3	1.6	1	5986229
1.52	43	9.0	20	3	1.6	1	5986232
1.98	49	11.0	24	4	2.0	1	5986235
1.99	49	11.0	24	4	2.0	1	5986238
2.00	49	11.0	24	4	2.0	1	5986940
2.01	49	11.0	24	4	2.0	1	5986795
2.02	49	11.0	24	4	2.0	1	5986798
2.03	49	11.0	24	4	2.0	1	5986801
2.04	49	11.0	24	4	2.0	1	5986805
2.05	49	11.0	24	4	2.0	1	5986809
2.49	57	14.0	28	4	2.5	1	5986813
2.50	57	14.0	28	4	2.5	1	5986817
2.51	57	14.0	28	4	2.5	1	5986821
2.52	57	14.0	28	4	2.5	1	5986825
2.98	61	15.0	32	6	3.0	1	5986829
2.99	61	15.0	32	6	3.0	1	5986836
3.00	61	15.0	32	6	3.0	1	5986839
3.01	65	16.0	35	6	3.2	1	5986842
3.02	65	16.0	35	6	3.2	1	5986845
3.03	65	16.0	35	6	3.2	1	5986848
3.04	65	16.0	35	6	3.2	1	5986851
3.05	65	16.0	35	6	3.2	1	5986852
3.49	70	18.0	40	6	3.5	1	5986855

APPLICATION COBALT REAMER



d ₁ Ø mm	l ₁ mm	l ₂ mm	l ₃ mm	# of Flutes	d ₂ Øh ₉ mm	Pack Qty	B170
3.50	70	18.0	40	6	3.5	1	5986858
3.51	70	18.0	40	6	3.5	1	5986860
3.52	70	18.0	40	6	3.5	1	5986865
3.98	75	19.0	43	6	4.0	1	5986867
3.99	75	19.0	43	6	4.0	1	5986872
4.00	75	19.0	43	6	4.0	1	5986875
4.01	75	19.0	43	6	4.0	1	5986878
4.02	75	19.0	43	6	4.0	1	5986881
4.03	75	19.0	43	6	4.0	1	5986884
4.04	75	19.0	43	6	4.0	1	5986887
4.05	75	19.0	43	6	4.0	1	5986890
4.49	80	21.0	47	6	4.5	1	5986892
4.50	80	21.0	47	6	4.5	1	5986896
4.51	80	21.0	47	6	4.5	1	5986898
4.52	80	21.0	47	6	4.5	1	5986901
4.98	86	23.0	52	6	5.0	1	5986903
4.99	86	23.0	52	6	5.0	1	5986906
5.00	86	23.0	52	6	5.0	1	5986909
5.01	86	23.0	52	6	5.0	1	5986912
5.02	86	23.0	52	6	5.0	1	5986915
5.03	86	23.0	52	6	5.0	1	5986918
5.04	86	23.0	52	6	5.0	1	5986921
5.05	86	23.0	52	6	5.0	1	5986927
5.49	93	26.0	57	6	5.6	1	5986545
5.50	93	26.0	57	6	5.6	1	5986586
5.51	93	26.0	57	6	5.6	1	5986616
5.52	93	26.0	57	6	5.6	1	5986647
5.98	93	26.0	57	6	5.6	1	5986682
5.99	93	26.0	57	6	5.6	1	5986689
6.00	93	26.0	57	6	5.6	1	5986693
6.01	101	28.0	63	6	6.3	1	5986696
6.02	101	28.0	63	6	6.3	1	5986700
6.03	101	28.0	63	6	6.3	1	5986550
6.04	101	28.0	63	6	6.3	1	5986554
6.05	101	28.0	63	6	6.3	1	5986558
6.49	101	28.0	63	6	6.3	1	5986562
6.50	101	28.0	63	6	6.3	1	5986566
6.51	101	28.0	63	6	6.3	1	5986570
6.52	101	28.0	63	6	6.3	1	5986573
6.98	109	31.0	69	6	7.1	1	5986578
6.99	109	31.0	69	6	7.1	1	5986581
7.00	109	31.0	69	6	7.1	1	5986584
7.01	109	31.0	69	6	7.1	1	5986590
7.02	109	31.0	69	6	7.1	1	5986593
7.03	109	31.0	69	6	7.1	1	5986596
7.04	109	31.0	69	6	7.1	1	5986598
7.05	109	31.0	69	6	7.1	1	5986602
7.49	109	31.0	69	6	7.1	1	5986603
7.50	109	31.0	69	6	7.1	1	5986606
7.51	117	33.0	75	6	8.0	1	5986609
7.52	117	33.0	75	6	8.0	1	5986612
7.98	117	33.0	75	6	8.0	1	5986614
7.99	117	33.0	75	6	8.0	1	5986620
8.00	117	33.0	75	6	8.0	1	5986622
8.01	117	33.0	75	6	8.0	1	5986626
8.02	117	33.0	75	6	8.0	1	5986629
8.03	117	33.0	75	6	8.0	1	5986632
8.04	117	33.0	75	6	8.0	1	5986637
8.05	117	33.0	75	6	8.0	1	5986639
8.49	117	33.0	75	6	8.0	1	5986641
8.50	117	33.0	75	6	8.0	1	5986643
8.51	125	36.0	81	6	9.0	1	5986645
8.52	125	36.0	81	6	9.0	1	5986650
8.98	125	36.0	81	6	9.0	1	5986652
8.99	125	36.0	81	6	9.0	1	5986655
9.00	125	36.0	81	6	9.0	1	5986658

d ₁ Ø mm	l ₁ mm	l ₂ mm	l ₃ mm	# of Flutes	d ₂ Øh ₉ mm	Pack Qty	B170
9.01	125	36.0	81	6	9.0	1	5986663
9.02	125	36.0	81	6	9.0	1	5986666
9.03	125	36.0	81	6	9.0	1	5986669
9.04	125	36.0	81	6	9.0	1	5986672
9.05	125	36.0	81	6	9.0	1	5986675
9.49	125	36.0	81	6	9.0	1	5986678
9.50	125	36.0	81	6	9.0	1	5986685
9.51	133	38.0	87	6	10.0	1	5986611
9.52	133	38.0	87	6	10.0	1	5986642
9.98	133	38.0	87	6	10.0	1	5986671
9.99	133	38.0	87	6	10.0	1	5986709
10.00	133	38.0	87	6	10.0	1	5986241
10.01	133	38.0	87	6	10.0	1	5986244
10.02	133	38.0	87	6	10.0	1	5986246
10.03	133	38.0	87	6	10.0	1	5986249
10.04	133	38.0	87	6	10.0	1	5986253
10.05	133	38.0	87	6	10.0	1	5986256
10.49	133	38.0	87	6	10.0	1	5986261
10.51	133	38.0	87	6	10.0	1	5986267
10.52	133	38.0	87	6	10.0	1	5986270
10.98	142	41.0	96	6	10.0	1	5986273
10.99	142	41.0	96	6	10.0	1	5986276
11.00	142	41.0	96	6	10.0	1	5986279
11.01	142	41.0	96	6	10.0	1	5986282
11.02	142	41.0	96	6	10.0	1	5986285
11.03	142	41.0	96	6	10.0	1	5986288
11.04	142	41.0	96	6	10.0	1	5986292
11.05	142	41.0	96	6	10.0	1	5986789
11.49	142	41.0	96	6	10.0	1	5986832
11.50	142	41.0	96	6	10.0	1	5986862
11.51	142	41.0	96	6	10.0	1	5986894
11.52	142	41.0	96	6	10.0	1	5986924
11.98	151	44.0	105	6	10.0	1	5986930
11.99	151	44.0	105	6	10.0	1	5986933
12.00	151	44.0	105	6	10.0	1	5986937

HSS REAMER



Chucking Reamer, Straight Shank

4533 Straight Flute, Right Hand Cut. Chucking reamers have shorter and deeper flutes than hand reamers and are specifically designed for accurate machine reaming in most materials and equipment including screw machines, turret lathes, drill presses, and machining centers. Recommended for most general purpose reaming.

Produced per ASME B94.2-1995 Standards.



4533

HSS



ANSI



N60 - 1.1/2

d ₁ Ø "/Nr./letter	d ₁ decimal Inch	d ₂ decimal Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	4533
N60	0.0400	0.0390	1/2	2.1/2	4	1	6009742
N59	0.0410	0.0390	1/2	2.1/2	4	1	6009730
N58	0.0420	0.0390	1/2	2.1/2	4	1	6009687
N57	0.0430	0.0390	1/2	2.1/2	4	1	6009640
N56	0.0465	0.0455	1/2	2.1/2	4	1	6009596
3/64	0.0469	0.0455	1/2	2.1/2	4	1	6009652
N55	0.0520	0.0510	1/2	2.1/2	4	1	6009565
N54	0.0550	0.0510	1/2	2.1/2	4	1	6009966
N53	0.0595	0.0585	1/2	2.1/2	4	1	6009960
1/16	0.0625	0.0585	1/2	2.1/2	4	1	6009644
N52	0.0635	0.0585	1/2	2.1/2	4	1	6009958
N51	0.0670	0.0660	3/4	3"	4	1	6009955
N50	0.0700	0.0660	3/4	3"	4	1	6009952
N49	0.0730	0.0660	3/4	3"	4	1	6009947
N48	0.0760	0.0720	3/4	3"	4	1	6009944
5/64	0.0781	0.0720	3/4	3"	4	1	6009716
N47	0.0785	0.0720	3/4	3"	4	1	6009941
N46	0.0810	0.0771	3/4	3"	4	1	6009938
N45	0.0820	0.0771	3/4	3"	4	1	6009935
N44	0.0860	0.0810	3/4	3"	4	1	6009927
N43	0.0890	0.0810	3/4	3"	4	1	6009925
N42	0.0935	0.0880	3/4	3"	4	1	6009922
3/32	0.0938	0.0880	3/4	3"	4	1	6009811
N41	0.0960	0.0928	7/8	3.1/2	4	1	6009918
N40	0.0980	0.0928	7/8	3.1/2	4	1	6009915
N39	0.0995	0.0928	7/8	3.1/2	4	1	6009910
N38	0.1015	0.0950	7/8	3.1/2	4	1	6009906
N37	0.1040	0.0950	7/8	3.1/2	4	1	6009903
N36	0.1065	0.1030	7/8	3.1/2	4	1	6009901
7/64	0.1094	0.1030	7/8	3.1/2	4	1	6009765
N35	0.1100	0.1030	7/8	3.1/2	4	1	6009892
N34	0.1110	0.1055	7/8	3.1/2	4	1	6009887
N33	0.1130	0.1055	7/8	3.1/2	4	1	6009883

d ₁ Ø "/Nr./letter	d ₁ decimal Inch	d ₂ decimal Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	4533
N32	0.1160	0.1120	7/8	3.1/2	4	1	6009879
N31	0.1200	0.1120	7/8	3.1/2	4	1	6009875
	0.1230	0.1120	7/8	3.1/2	4	1	6009898
	0.1240	0.1190	7/8	3.1/2	4	1	6009763
	0.1247	0.1190	7/8	3.1/2	4	1	6009767
1/8	0.1250	0.1190	7/8	3.1/2	4	1	6009659
	0.1260	0.1190	7/8	3.1/2	4	1	6009770
N30	0.1285	0.1190	7/8	3.1/2	4	1	6009871
N29	0.1360	0.1275	1"	4"	4	1	6009864
N28	0.1405	0.1350	1"	4"	4	1	6009860
9/64	0.1410	0.1350	1"	4"	4	1	6009781
N27	0.1440	0.1350	1"	4"	4	1	6009856
N26	0.1470	0.1430	1"	4"	4	1	6009847
N25	0.1495	0.1430	1"	4"	4	1	6009844
N24	0.1520	0.1460	1"	4"	4	1	6009841
N23	0.1540	0.1460	1"	4"	4	1	6009836
5/32	0.1562	0.1510	1"	4"	6	1	6009713
N22	0.1570	0.1510	1"	4"	6	1	6009832
N21	0.1590	0.1530	1.1/8	4.1/2	6	1	6009829
N20	0.1610	0.1530	1.1/8	4.1/2	6	1	6009827
N19	0.1660	0.1595	1.1/8	4.1/2	6	1	6009822
N18	0.1695	0.1595	1.1/8	4.1/2	6	1	6009820
11/64	0.1719	0.1645	1.1/8	4.1/2	6	1	6009671
N17	0.1730	0.1645	1.1/8	4.1/2	6	1	6009978
N16	0.1770	0.1700	1.1/8	4.1/2	6	1	6009975
N15	0.1800	0.1755	1.1/8	4.1/2	6	1	6009972
N14	0.1820	0.1755	1.1/8	4.1/2	6	1	6009969
N13	0.1850	0.1800	1.1/8	4.1/2	6	1	6009963
	0.1855	0.1800	1.1/8	4.1/2	6	1	6009773
	0.1865	0.1800	1.1/8	4.1/2	6	1	6009776
	0.1870	0.1800	1.1/8	4.1/2	6	1	6009779
3/16	0.1875	0.1800	1.1/8	4.1/2	6	1	6009809
	0.1885	0.1800	1.1/8	4.1/2	6	1	6009782
N12	0.1890	0.1800	1.1/8	4.1/2	6	1	6009932
N11	0.1910	0.1860	1.1/4	5"	6	1	6009895
N10	0.1935	0.1860	1.1/4	5"	6	1	6009852
N9	0.1960	0.1895	1.1/4	5"	6	1	6009568
N8	0.1990	0.1895	1.1/4	5"	6	1	6009750
N7	0.2010	0.1945	1.1/4	5"	6	1	6009746
13/64	0.2031	0.1945	1.1/4	5"	6	1	6009683
N6	0.2040	0.1945	1.1/4	5"	6	1	6009738
N5	0.2055	0.2016	1.1/4	5"	6	1	6009949
N4	0.2090	0.2016	1.1/4	5"	6	1	6009913
N3	0.2130	0.2075	1.1/4	5"	6	1	6009868
7/32	0.2188	0.2075	1.1/4	5"	6	1	6009761
N2	0.2210	0.2173	1.1/2	6"	6	1	6009824
N1	0.2280	0.2173	1.1/2	6"	6	1	6009817
A	0.2340	0.2265	1.1/2	6"	6	1	6009826
15/64	0.2344	0.2265	1.1/2	6"	6	1	6009698
B	0.2380	0.2329	1.1/2	6"	6	1	6009828
C	0.2420	0.2329	1.1/2	6"	6	1	6009831
D	0.2460	0.2329	1.1/2	6"	6	1	6009837
	0.2480	0.2329	1.1/2	6"	6	1	6009784
	0.2490	0.2400	1.1/2	6"	6	1	6009787
	0.2495	0.2400	1.1/2	6"	6	1	6009788
1/4	0.2500	0.2400	1.1/2	6"	6	1	6009653
	0.2510	0.2400	1.1/2	6"	6	1	6009792
F	0.2570	0.2485	1.1/2	6"	6	1	6009842
G	0.2610	0.2485	1.1/2	6"	6	1	6009845
17/64	0.2656	0.2485	1.1/2	6"	6	1	6009706
H	0.2660	0.2485	1.1/2	6"	6	1	6009850
I	0.2720	0.2485	1.1/2	6"	6	1	6009867
J	0.2770	0.2485	1.1/2	6"	6	1	6009853
K	0.2810	0.2485	1.1/2	6"	6	1	6009858
9/32	0.2812	0.2485	1.1/2	6"	6	1	6009775
L	0.2900	0.2792	1.1/2	6"	6	1	6009861

HSS REAMER



d ₁ Ø "/Nr./letter	d ₁ decimal Inch	d ₂ decimal Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	4533
M	0.2950	0.2792	1.1/2	6"	6	1	6009873
19/64	0.2969	0.2792	1.1/2	6"	6	1	6009715
N	0.3020	0.2792	1.1/2	6"	6	1	6009881
	0.3105	0.2792	1.1/2	6"	6	1	6009794
	0.3115	0.2792	1.1/2	6"	6	1	6009796
	0.3120	0.2792	1.1/2	6"	6	1	6009798
5/16	0.3125	0.2792	1.1/2	6"	6	1	6009709
	0.3135	0.2792	1.1/2	6"	6	1	6009800
O	0.3160	0.2792	1.1/2	6"	6	1	6009570
P	0.3230	0.2792	1.1/2	6"	6	1	6009573
21/64	0.3281	0.2792	1.1/2	6"	6	1	6009723
Q	0.3320	0.2792	1.1/2	6"	6	1	6009575
R	0.3390	0.2792	1.1/2	6"	6	1	6009578
11/32	0.3438	0.2792	1.1/2	6"	6	1	6009667
S	0.3480	0.3100	1.3/4	7"	6	1	6009581
T	0.3580	0.3100	1.3/4	7"	6	1	6009584
23/64	0.3594	0.3100	1.3/4	7"	6	1	6009734
U	0.3680	0.3100	1.3/4	7"	6	1	6009587
	0.3730	0.3100	1.3/4	7"	6	1	6009802
	0.3740	0.3100	1.3/4	7"	6	1	6009804
	0.3745	0.3100	1.3/4	7"	6	1	6009806
3/8	0.3750	0.3100	1.3/4	7"	6	1	6009657
	0.3760	0.3100	1.3/4	7"	6	1	6009808
V	0.3770	0.3100	1.3/4	7"	6	1	6009590
W	0.3860	0.3100	1.3/4	7"	6	1	6009593
25/64	0.3906	0.3100	1.3/4	7"	6	1	6009692
X	0.3970	0.3100	1.3/4	7"	6	1	6009600
Y	0.4040	0.3100	1.3/4	7"	6	1	6009604
13/32	0.4062	0.3100	1.3/4	7"	6	1	6009679
Z	0.4130	0.3730	1.3/4	7"	6	1	6009608
27/64	0.4219	0.3730	1.3/4	7"	6	1	6009778
	0.4355	0.3730	1.3/4	7"	6	1	6009810
	0.4365	0.3730	1.3/4	7"	6	1	6009814
	0.4370	0.3730	1.3/4	7"	6	1	6009815
7/16	0.4375	0.3730	1.3/4	7"	6	1	6009758
	0.4385	0.3730	1.3/4	7"	6	1	6009816
29/64	0.4531	0.3730	1.3/4	7"	6	1	6009807
15/32	0.4688	0.3730	1.3/4	7"	6	1	6009694
31/64	0.4844	0.4355	2"	8"	6	1	6009665
	0.4980	0.4355	2"	8"	6	1	6009818
	0.4990	0.4355	2"	8"	6	1	6009819
	0.4995	0.4355	2"	8"	6	1	6009821
1/2	0.5000	0.4355	2"	8"	6	1	6009648
	0.5010	0.4355	2"	8"	6	1	6009823
33/64	0.5156	0.4355	2"	8"	6	1	6009669
17/32	0.5312	0.4355	2"	8"	6	1	6009702
35/64	0.5469	0.4355	2"	8"	8	1	6009673
9/16	0.5625	0.4355	2"	8"	8	1	6009772
37/64	0.5781	0.4355	2"	8"	8	1	6009677
19/32	0.5938	0.4355	2"	8"	8	1	6009712
39/64	0.6094	0.5620	2.1/4	9"	8	1	6009681
5/8	0.6250	0.5620	2.1/4	9"	8	1	6009722
41/64	0.6406	0.5620	2.1/4	9"	8	1	6009684
21/32	0.6562	0.5620	2.1/4	9"	8	1	6009719
43/64	0.6719	0.5620	2.1/4	9"	8	1	6009688
11/16	0.6875	0.5620	2.1/4	9"	8	1	6009663
45/64	0.7031	0.5620	2.1/4	9"	8	1	6009697
23/32	0.7188	0.5620	2.1/4	9"	8	1	6009727
47/64	0.7344	0.6245	2.1/2	9.1/2	8	1	6009701
3/4	0.7500	0.6245	2.1/2	9.1/2	8	1	6009813
49/64	0.7656	0.6245	2.1/2	9.1/2	8	1	6009705
25/32	0.7812	0.6245	2.1/2	9.1/2	8	1	6009645
51/64	0.7969	0.6245	2.1/2	9.1/2	8	1	6009726
13/16	0.8125	0.6245	2.1/2	9.1/2	8	1	6009675
53/64	0.8281	0.6245	2.1/2	9.1/2	8	1	6009731
27/32	0.8438	0.6245	2.1/2	9.1/2	8	1	6009739

HSS REAMER

d ₁ Ø "/Nr./letter	d ₁ decimal Inch	d ₂ decimal Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	4533
55/64	0.8594	0.7495	2.5/8	10"	8	1	6009735
7/8	0.8750	0.7495	2.5/8	10"	8	1	6009769
57/64	0.8906	0.7495	2.5/8	10"	8	1	6009743
29/32	0.9062	0.7495	2.5/8	10"	8	1	6009803
59/64	0.9219	0.7495	2.5/8	10"	8	1	6009747
15/16	0.9375	0.7495	2.5/8	10"	8	1	6009690
61/64	0.9531	0.7495	2.5/8	10"	8	1	6009751
31/32	0.9688	0.7495	2.5/8	10"	8	1	6009661
63/64	0.9844	0.8745	2.3/4	10.1/2	8	1	6009754
1"	1.0000	0.8745	2.3/4	10.1/2	8	1	6009612
1.1/16	1.0625	0.8745	2.3/4	10.1/2	8	1	6009616
1.1/8	1.1250	0.8745	2.7/8	11"	8	1	6009630
1.3/16	1.1875	0.9995	2.7/8	11"	8	1	6009634
1.1/4	1.2500	0.9995	3"	11.1/2	8	1	6009626
1.3/8	1.3750	0.9995	3.1/4	12"	8	1	6009636
1.1/2	1.5000	1.2495	3.1/2	12.1/2	8	1	6009620

HSS REAMER



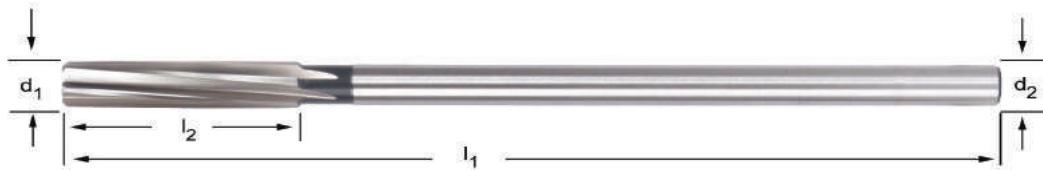
Chucking Reamer, Straight Shank

4535

Slow Right Hand Spiral Flute, Right Hand Cut. Cuts with a smoother, chatter free action than straight flute reamers. Recommended for more difficult to ream materials, better surface finish requirements, applications with an interruption, and to aid in chip evacuation in blind holes.

Designed for accurate machine reaming using all types of equipment and incorporating all other design features of the straight flute style.

Produced per ASME B94.2-1995 standards.



4535

HSS



ANSI



1/16 - 1"

d ₁ Ø Inch	d ₁ decimal Inch	d ₂ Ø Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	4535
1/16	0.0625	0.0585	1/2	2.1/2	4	1	6009805
5/64	0.0781	0.0720	3/4	3"	4	1	6009708
3/32	0.0938	0.0880	3/4	3"	4	1	6009676
7/64	0.1094	0.1030	7/8	3.1/2	4	1	6009721
1/8	0.1250	0.1190	7/8	3.1/2	4	1	6009685
5/32	0.1562	0.1510	1"	4"	6	1	6009704
11/64	0.1719	0.1645	1.1/8	4.1/2	6	1	6009774
3/16	0.1875	0.1800	1.1/8	4.1/2	6	1	6009672
13/64	0.2031	0.1945	1.1/4	5"	6	1	6009785
7/32	0.2188	0.2075	1.1/4	5"	6	1	6009718
1/4	0.2500	0.2400	1.1/2	6"	6	1	6009639
17/64	0.2656	0.2485	1.1/2	6"	6	1	6009615
9/32	0.2812	0.2485	1.1/2	6"	6	1	6009737
5/16	0.3125	0.2792	1.1/2	6"	6	1	6009700
11/32	0.3438	0.2792	1.1/2	6"	6	1	6009768
3/8	0.3750	0.3100	1.3/4	7"	6	1	6009689
25/64	0.3906	0.3100	1.3/4	7"	6	1	6009651
13/32	0.4062	0.3100	1.3/4	7"	6	1	6009780
7/16	0.4375	0.3730	1.3/4	7"	6	1	6009714
31/64	0.4844	0.4355	2"	8"	6	1	6009696
1/2	0.5000	0.4355	2"	8"	6	1	6009594
17/32	0.5312	0.4355	2"	8"	6	1	6009611
9/16	0.5625	0.4355	2"	8"	8	1	6009733
5/8	0.6250	0.5620	2.1/4	9"	8	1	6009711
11/16	0.6875	0.5620	2.1/4	9"	8	1	6009725
3/4	0.7500	0.6245	2.1/2	9.1/2	8	1	6009680
7/8	0.8750	0.7495	2.5/8	10"	8	1	6009729
1"	1.0000	0.8745	2.3/4	10.1/2	8	1	6009783

Machine Reamer, Straight Shank

B901 Left Hand Slow Spiral, Right Hand Cut. Steam tempered in flutes reduces wear and chip welding in soft ferrous materials.



B901

HSS-E



**BS
328**



1.50mm - 1/2

d_1 Ø Inch	d_1 Ø mm	l_1 mm	l_2 mm	# of Flutes	Pack Qty	B901
	1.50	44	21	4	1	5986427
1/16	1.59	44	21	4	1	5986431
	2.00	50	25	4	1	5986481
3/32	2.38	58	29	4	1	5986504
	2.50	58	29	4	1	5986485
	3.00	62	31	4	1	5986489
1/8	3.18	66	33	4	1	5986444
	3.50	71	35	4	1	5986493
5/32	3.97	76	38	6	1	5986528
	4.00	76	38	6	1	5986512
	4.50	81	41	6	1	5986514
3/16	4.76	87	44	6	1	5986500
	5.00	87	44	6	1	5986520
13/64	5.16	87	44	6	1	5986469
	5.50	93	47	6	1	5986523
7/32	5.56	93	47	6	1	5986540
15/64	5.95	93	47	6	1	5986477
	6.00	93	47	6	1	5986531
1/4	6.35	100	50	6	1	5986440
	7.00	107	54	6	1	5986534
9/32	7.14	107	54	6	1	5986555
5/16	7.94	115	58	6	1	5986525
	8.00	115	58	6	1	5986543
	9.00	124	62	6	1	5986547
3/8	9.52	133	66	6	1	5986508
	10.00	133	66	6	1	5986448
	11.00	142	71	6	1	5986453
7/16	11.11	142	71	6	1	5986537
	12.00	152	76	6	1	5986461
1/2	12.70	152	76	6	1	5986437

Machine Reamer, Straight Shank

B157 Left Hand Fast Spiral, Right Hand Cut.
Designed for Stainless Steel, Titanium, and
Nickel Alloy applications.



B157

HSS-E



**DIN
212**

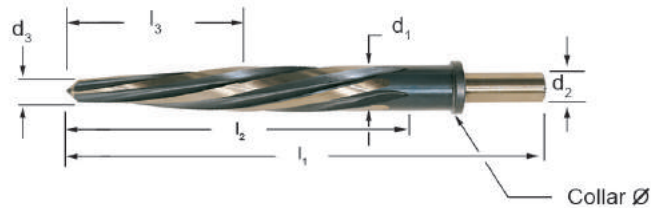


2.00 - 20.00

d_1 Ø mm	l_1 mm	l_2 mm	l_3 mm	l_4 mm	# of Flutes	d_2 Øh ₉ mm	Pack Qty	B157
2.0	49	11	3.5	24	3	2.0	1	5986889
3.0	61	15	4.0	32	3	3.0	1	5986732
4.0	75	19	4.0	43	3	4.0	1	5986736
5.0	86	23	4.5	52	3	5.0	1	5986739
6.0	93	26	6.0	57	3	5.6	1	5986743
7.0	109	31	7.0	69	3	7.1	1	5986747
8.0	117	33	9.0	75	3	8.0	1	5986751
9.0	125	36	9.5	81	3	9.0	1	5986755
10.0	133	38	10.0	87	3	10.0	1	5986588
11.0	142	41	10.5	96	3	10.0	1	5986594
12.0	151	44	11.0	105	3	10.0	1	5986724
13.0	151	44	11.5	105	3	10.0	1	5986765
14.0	160	47	12.0	110	3	12.5	1	5986804
15.0	162	50	12.5	112	3	12.5	1	5986841
16.0	170	52	13.0	120	3	12.5	1	5986874
17.0	175	54	13.5	123	3	14.0	1	5986880
18.0	182	56	14.0	130	3	14.0	1	5986883
19.0	189	58	14.5	131	3	16.0	1	5986886
20.0	195	60	15.0	137	3	16.0	1	5986728

Car Reamer (Alignment Reamer), Reduced Shank

B122 Left Hand Helical Flute, Right Hand Cut. 1/2" Reduced Shank with Tri-Flats. Combination Bronze and Steam tempered in flutes reduces wear and chip welding in harder ferrous materials. Used to align or enlarge holes.



Note: Collar diameter = $d_1 + 1/8"$
 Collar thickness = $3/16"$
 Shank Length = $1.1/2"$

d_1 Ø Inch	d_1 decimal Inch	l_1 Inch	l_2 Inch	l_3 Inch	# of Flutes	d_2 Ø Inch	d_3 Ø Inch	Pack Qty	B122
3/8	0.3750	5.1/4	3.1/16	2	5	3/8	7/32	1	5986460
1/2	0.5000	5.5/16	3.3/4	2.5/8	5	1/2	1/4	1	5986446
9/16	0.5625	6.9/16	4.5/16	3.3/16	5	1/2	5/16	1	5986471
5/8	0.6250	6.9/16	4.5/16	3.3/16	5	1/2	3/8	1	5986463
11/16	0.6875	7	4.13/16	3.9/16	5	1/2	7/16	1	5986449
3/4	0.7500	7	4.13/16	3.9/16	5	1/2	1/2	1	5986457
13/16	0.8125	7.1/4	5.1/8	3.7/8	5	1/2	9/16	1	5986451
7/8	0.8750	7.1/4	5.1/8	3.7/8	5	1/2	5/8	1	5986467
15/16	0.9375	7.1/4	5.1/8	3.7/8	5	1/2	11/16	1	5986454
1"	1.0000	7.1/4	5.1/8	3.7/8	5	1/2	3/4	1	5986605
1.1/16	1.0625	7.1/4	5.1/4	3.7/8	5	1/2	13/16	1	5986608

B122

HSS

ST Bronze

ANSI



3/8 - 1.1/16

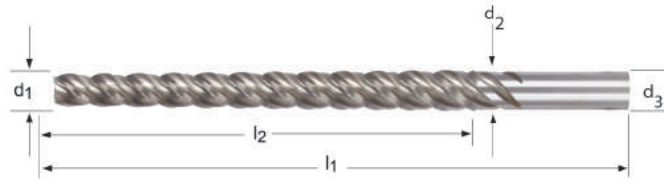
HSS REAMER



Machine Reamer, Taper Pin Type, Straight Shank

4588

Left hand high spiral. Right hand cut taper pin (1/4" per foot). Designed to convert a straight hole into a tapered hole into which standard taper pins (ASA B5.20-1958) will fit. Ideal geometry for the machine reaming of pin holes on a production basis. Helical construction prevents chips from packing in flutes and reduces breakage.



4588

HSS



ANSI



1.48



7/0 - 10

nom Ø	d_1 Ø Inch	d_2 Ø Inch	d_3 Ø Inch	l_2 Inch	l_1 Inch	# of Flutes	Pack Qty	4588
7/0	0.0497	0.0666	5/64	13/16	1.13/16	2	1	6009536
6/0	0.0611	0.0810	3/32	15/16	1.15/16	2	1	6009535
5/0	0.0719	0.0966	7/64	1.3/16	2.3/16	2	1	6009534
4/0	0.0869	0.1142	1/8	1.5/16	2.5/16	2	1	6009523
3/0	0.1029	0.1300	9/64	1.5/16	2.5/16	2	1	6009512
2/0	0.1137	0.1462	5/32	1.9/16	2.9/16	3	1	6009970
1	0.1447	0.1798	3/16	1.11/16	2.15/16	3	1	6009933
2	0.1600	0.2010	13/64	1.15/16	3.3/16	3	1	6009939
3	0.1813	0.2294	15/64	2.5/16	3.11/16	3	1	6009942
4	0.2071	0.2600	17/64	2.9/16	4.1/16	3	1	6009945
5	0.2410	0.2994	5/16	2.13/16	4.5/16	3	1	6009950
6	0.2773	0.3540	23/64	3.11/16	5.7/16	3	1	6009953
7	0.3297	0.4220	13/32	4.7/16	6.5/16	3	1	6009956
8	0.3971	0.5050	7/16	5.3/16	7.3/16	3	1	6009961
9	0.4800	0.6066	9/16	6.1/16	8.5/16	4	1	6009964
10	0.5799	0.7216	5/8	6.13/16	9.5/16	4	1	6009936

Note: Nom Ø is the Taper Pin number
Per American Standard Taper Pin Specification (ASA B5.20-1958)

Machine Reamer, Taper Shank

B101 Left hand slow spiral, right hand. Steam tempered in flutes reduces wear chip welding harder ferrous materials.



Note: All sizes have 1mm x 45 chamfer (lead).
Cutting diameters are produced to H7 tolerance

B101

HSS-E



**BS
328**



3.00mm - 2"

d ₁ Ø Inch	d ₁ Ø mm	l ₁ mm	l ₂ mm	# of Flutes	MTS	Pack Qty	B101
1/8	3.00	112	33	4	1	1	5986595
	3.18	112	33	4	1	1	5986589
	3.50	115	35	6	1	1	5986599
	4.00	117	38	6	1	1	5986814
3/16	4.50	120	41	6	1	1	5986818
	4.76	124	44	6	1	1	5986601
	5.00	124	44	6	1	1	5986673
	5.50	127	47	6	1	1	5986676
1/4	6.00	127	47	6	1	1	5986699
	6.35	130	50	6	1	1	5986548
	6.50	130	50	6	1	1	5986703
	7.00	134	54	6	1	1	5986705
5/16	7.94	138	58	6	1	1	5986679
	8.00	138	58	6	1	1	5986727
	8.50	138	58	6	1	1	5986731
	9.00	142	62	6	1	1	5986735
3/8	9.50	142	62	6	1	1	5986740
	9.52	146	66	6	1	1	5986607
	10.00	146	66	6	1	1	5986621
	10.50	146	66	6	1	1	5986627
7/16	11.00	151	71	6	1	1	5986630
	11.11	151	71	6	1	1	5986711
	12.00	156	76	6	1	1	5986479
	12.50	156	76	6	1	1	5986483
1/2	12.70	156	76	6	1	1	5986513
	13.00	156	76	6	1	1	5986486
	13.50	161	81	6	1	1	5986490
	14.00	161	81	8	1	1	5986501
9/16	14.29	181	81	8	2	1	5986744
	14.50	181	81	8	2	1	5986505
	15.00	181	81	8	2	1	5986509
	15.50	187	87	8	2	1	5986516
5/8	15.88	187	87	8	2	1	5986688

COBALT REAMER



d ₁ Ø Inch	d ₁ Ø mm	l ₁ mm	l ₂ mm	# of Flutes	MTS	Pack Qty	B101
	16.00	187	87	8	2	1	5986526
	16.50	187	87	8	2	1	5986529
	17.00	187	87	8	2	1	5986532
	18.00	193	93	8	2	1	5986538
	19.00	193	93	8	2	1	5986541
3/4	19.05	200	100	8	2	1	5986604
	20.00	200	100	8	2	1	5986556
13/16	20.64	200	100	8	2	1	5986494
	21.00	200	100	8	2	1	5986560
	22.00	207	107	8	2	1	5986564
7/8	22.22	207	107	8	2	1	5986719
	23.00	207	107	8	2	1	5986568
	24.00	242	115	8	3	1	5986574
	25.00	242	115	10	3	1	5986576
1"	25.40	242	115	10	3	1	5986328
	26.00	242	115	10	3	1	5986579
	27.00	251	124	10	3	1	5986582
	28.00	251	124	10	3	1	5986585
1.1/8	28.58	251	124	10	3	1	5986339
	29.00	251	124	10	3	1	5986592
	30.00	251	124	10	3	1	5986610
	31.00	260	133	10	3	1	5986613
1.1/4	31.75	260	133	10	3	1	5986336
	32.00	293	133	10	4	1	5986615
	34.00	302	142	10	4	1	5986624
1.3/8	34.93	302	142	10	4	1	5986470
	35.00	302	142	10	4	1	5986649
	36.00	302	142	10	4	1	5986681
	37.00	302	142	10	4	1	5986723
	38.00	312	152	10	4	1	5986768
1.1/2	38.10	312	152	10	4	1	5986333
	39.00	312	152	10	4	1	5986807
	40.00	312	152	10	4	1	5986823
	41.00	312	152	10	4	1	5986827
	42.00	312	152	10	4	1	5986653
	43.00	323	163	10	4	1	5986656
	44.00	323	163	10	4	1	5986659
1.3/4	44.45	323	163	10	4	1	5986348
	45.00	323	163	12	4	1	5986661
	46.00	323	163	12	4	1	5986664
	47.00	323	163	12	4	1	5986667
	48.00	334	174	12	4	1	5986670
	50.00	334	174	12	4	1	5986692
2"	50.80	334	174	12	4	1	5986552

Bridge Reamer, Taper Shank

B121 Left hand fast spiral, right hand cut tapered bridge reamer. Used in structural iron and steel applications for badly misaligned holes. The l_3 length has a 1:10 starting taper.



B121

HSS



DIN
311



10.00 - 30.00

d_1 Ø	l_1	l_2	l_3	# of Flutes	MTS	Pack Qty	B121
mm	mm	mm	mm				
10.0	171	95	30	4	1	1	5986764
11.0	176	100	33	4	1	1	5986772
12.0	199	105	39	4	2	1	5986775
13.0	199	105	39	4	2	1	5986778
14.0	209	115	42	4	2	1	5986781
15.0	219	125	45	4	2	1	5986784
16.0	229	135	48	4	2	1	5986787
17.0	251	135	51	4	3	1	5986791
18.0	261	145	58	4	3	1	5986794
19.0	261	145	58	4	3	1	5986797
20.0	271	155	62	4	3	1	5986803
21.0	271	155	62	4	3	1	5986810
22.0	281	165	66	4	3	1	5986442
23.0	281	165	66	4	3	1	5986478
24.0	296	180	72	4	3	1	5986521
25.0	296	180	72	4	3	1	5986557
26.0	296	180	72	4	3	1	5986591
30.0	311	195	78	5	3	1	5986597

HSS REAMER



Bridge Reamer, Taper Shank

4579 Left hand slow spiral, right hand cut tapered bridge reamer. Used in structural iron and steel applications for badly misaligned holes.

Produced per ASME B94.2-1995 standards.



4579

HSS



ANSI



7/16 - 1.1/16

nom Ø	d ₁ Ø (min)	d ₂ Ø (max)	MTS	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	4579
7/16	1/4	7/16	2	4.3/8	8.1/4	4	1	6009884
1/2	9/32	1/2	2	5.1/8	9"	4	1	6009857
9/16	11/32	9/16	2	5.1/8	9"	4	1	6009891
5/8	3/8	5/8	2	6.1/8	10"	4	1	6009880
11/16	25/64	11/16	3	7.1/8	11.3/4	4	1	6009865
3/4	7/16	3/4	3	7.3/8	12"	4	1	6009876
13/16	1/2	13/16	3	7.3/8	12"	4	1	6009869
7/8	9/16	7/8	3	7.3/8	12"	4	1	6009888
15/16	5/8	15/16	3	7.3/8	12"	4	1	6009872
1"	11/16	1"	3	7.3/8	12"	4	1	6009838
1.1/16	3/4	1.1/16	3	7.3/8	12"	4	1	6009840

Hand Reamer, Square Drive

4500

Straight flute hand reamer with square drive, right hand cut. Widely used by hand for the final sizing of drilled holes. The square on the shank allows it to be held in either a tap wrench or a vise depending on whether it is the reamer or the part that is rotating. A long starting taper allows for ease of entry and accurate alignment. The straight flute style is recommended for most general purpose hand reaming applications.



4500

HSS



ANSI



1/8 - 1"

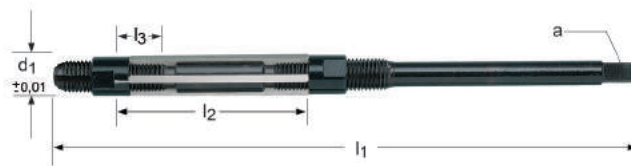
d_1 Ø Inch	d_1 decimal Inch	l_2 Inch	l_1 Inch	# of Flutes	Pack Qty	4500
1/8	0.1250	1.1/2	3"	4	1	6009989
3/16	0.1875	1.3/4	3.1/2	6	1	6009878
1/4	0.2500	2"	4"	6	1	6009988
5/16	0.3125	2.1/4	4.1/2	6	1	6009894
3/8	0.3750	2.1/2	5"	6	1	6009886
7/16	0.4375	2.3/4	5.1/2	6	1	6009905
1/2	0.5000	3"	6"	6	1	6009987
9/16	0.5625	3.1/4	6.1/2	8	1	6009916
5/8	0.6250	3.1/2	7"	8	1	6009900
3/4	0.7500	4.3/16	8.3/8	8	1	6009882
7/8	0.8750	4.7/8	9.3/4	8	1	6009912
1"	1.0000	5.7/16	10.7/8	8	1	6009848

HSS REAMER



Adjustable Hand Reamer, Replaceable Blade Type

B334 For light duty sizing of uninterrupted holes.



B334

HSS

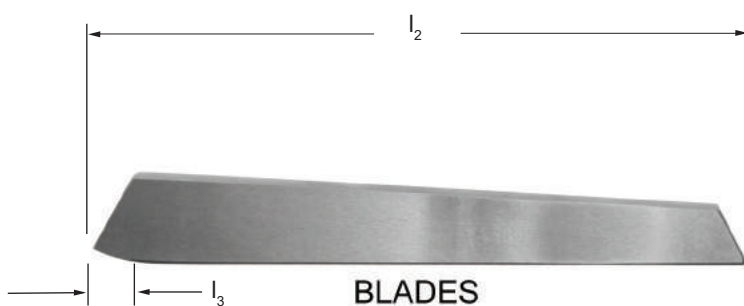


N000 - N16

Nr.	d min-max mm	l ₁ mm	l ₂ mm	l ₃ mm	# of Flutes	□ a mm	Pack Qty	B334
000	6.4 - 7.2	110	32	7	4	3.0	1	5987076
00	7.2 - 8.0	110	32	7	4	3.4	1	5987047
0	8.0 - 9.0	115	34	9	5	3.8	1	5987015
1	9.0 - 10.0	115	34	9	5	4.3	1	5987081
2	10.0 - 11.0	115	34	9	5	4.9	1	5986955
3	11.0 - 12.0	125	35	9	5	4.9	1	5986958
4	12.0 - 13.5	135	41	9	5	6.2	1	5986963
5	13.5 - 15.5	146	50	12	5	7.0	1	5986968
6	15.5 - 18.0	166	60	12	5	8.0	1	5986972
7	18.0 - 21.0	178	65	15	5	9.0	1	5986975
8	21.0 - 24.0	195	76	15	5	11.0	1	5986983
9	24.0 - 27.5	218	82	18	5	12.0	1	5986987
10	27.5 - 31.5	245	86	18	5	14.5	1	5987084
11	31.5 - 37.0	280	98	18	6	18.0	1	5987087
12	37.0 - 45.0	325	108	20	6	20.0	1	5987091
13	45.0 - 55.0	370	118	20	6	26.0	1	5986943
14	55.0 - 67.0	400	125	20	6	32.0	1	5986946
15	67.0 - 80.0	435	140	23	8	39.0	1	5986949
16	80.0 - 95.0	475	155	23	8	49.0	1	5986952

Adjustable Hand Reamer, Replaceable Blade Type

B335 Replace blades & nuts for use with B334



BLADES



NUT

B335

HSS

DORMER



N000 BLADES -
N16 NUTS

Nr.	l_2 mm	l_3 mm	Nuts Pack Qty	B335 Nuts	Blades Pack Qty	B335 Blades
000	32	7	1	5987006	4	5987003
00	32	7	1	5987000	4	5986997
0	34	9	1	5986993	5	5986990
1	34	9	1	5987012	5	5987009
2	34	9	1	5987062	5	5987060
3	35	9	1	5987067	5	5987064
4	41	9	1	5987073	5	5987070
5	50	12	1	5986401	5	5987078
6	60	12	1	5986473	5	5986434
7	65	15	1	5986551	5	5986517
8	76	15	1	5986563	5	5986559
9	82	18	1	5986571	5	5986567
10	86	18	1	5987020	5	5987017
11	98	18	1	5987027	6	5987023
12	108	20	1	5987032	6	5987029
13	118	20	1	5987038	6	5987035
14	125	20	1	5987044	6	5987041
15	140	23	1	5987053	8	5987050
16	155	23	1	5987058	8	5987056

HSS REAMER



Hand Reamer, Taper Pin Type, Square Drive

4587 Straight flute taper pin (1/4" per foot), right hand cut. Designed to convert a straight hole into a tapered hole into which standard taper pins (ASA B5.20-1958) will fit. The square on the shank is suitable for holding a tap wrench or vise, depending on whether the reamer or part is rotating, making them ideal for hand use. Recommended for most materials.

Produced per ASME B94.2-1995 standards.



4587

HSS



ANSI



1:48



N0 - N10

nom Ø	d_1 Ø Inch	d_2 Ø Inch	d_3 Ø Inch	l_2 Inch	l_1 Inch	# of Flutes	Pack Qty	4587
0	0.1287	0.1638	11/64	1.11/16	2.15/16	6	1	6009896
1	0.1447	0.1798	3/16	1.11/16	2.15/16	6	1	6009899
2	0.1600	0.2010	13/64	1.15/16	3.3/16	6	1	6009907
3	0.1813	0.2294	15/64	2.5/16	3.11/16	6	1	6009908
4	0.2071	0.2600	17/64	2.9/16	4.1/16	6	1	6009911
5	0.2410	0.2994	5/16	2.13/16	4.5/16	6	1	6009914
6	0.2773	0.3540	23/64	3.11/16	5.7/16	6	1	6009917
7	0.3297	0.4220	13/32	4.7/16	6.5/16	6	1	6009919
8	0.3971	0.5050	7/16	5.3/16	7.3/16	6	1	6009921
9	0.4800	0.6066	9/16	6.1/16	8.5/16	8	1	6009924
10	0.5799	0.7216	5/8	6.13/16	9.5/16	8	1	6009904

Note: Nom Ø is the Taper Pin number
Per American Standard Taper Pin Specification (ASA B5.20-1958)

Hand Reamer, Taper Pin, Square Drive

4591 Left hand slow spiral flute, right hand cut taper pin (1/4" per foot) hand reamer with square drive.
Designed to convert a straight hole into a tapered hole into which standard taper pins (ASA B5.20-1958) will fit. The square on the shank is suitable for holding a tap wrench or vise, depending on whether the reamer or part is rotating, making them ideal for hand use.
Recommended for most materials.

Produced per ASME B94.2-1995 standards.



4591

HSS



ANSI



1:48



N0 - N10

nom Ø	d ₁ Ø Inch	d ₂ Ø Inch	d ₃ Ø Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	4591
0	0.1287	0.1638	11/64	1.11/16	2.15/16	6	1	6009537
1	0.1447	0.1798	3/16	1.11/16	2.15/16	6	1	6009538
2	0.1600	0.2010	13/64	1.15/16	3.3/16	6	1	6009540
3	0.1813	0.2294	15/64	2.5/16	3.11/16	6	1	6009513
4	0.2071	0.2600	17/64	2.9/16	4.1/16	6	1	6009514
5	0.2410	0.2994	5/16	2.13/16	4.5/16	6	1	6009515
6	0.2773	0.3540	23/64	3.11/16	5.7/16	6	1	6009516
7	0.3297	0.4220	13/32	4.7/16	6.5/16	6	1	6009517
8	0.3971	0.5050	7/16	5.3/16	7.3/16	6	1	6009518
9	0.4800	0.6066	9/16	6.1/16	8.5/16	8	1	6009519
10	0.5799	0.7216	5/8	6.13/16	9.5/16	8	1	6009539

Note: Nom Ø is the Taper Pin number
Per American Standard Taper Pin Specification (ASA B5.20-1958)

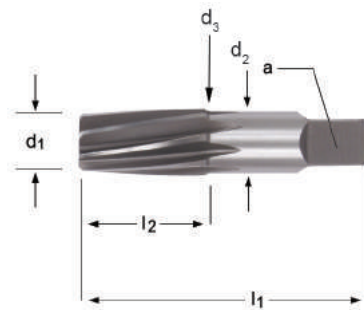
HSS REAMER



Hand Reamer, Taper Pipe Type, Square Drive

4600 Left hand spiral flute, right hand cut taper (3/4" per foot) taper pipe reamer. Intended for reaming holes to be tapped with American Standard taper pipe taps. Generally used by hand with a tap wrench.

Produced per ASME B94.2-1995 standards.



4600

HSS



ANSI



1/8 - 1"

nom Ø	d ₁ Ø Inch	d ₂ Ø Inch	d ₃ Ø Inch	l ₂ Inch	l ₁ Inch	□ a mm	# of Flutes	Pack Qty	4600
1/8	0.3160	0.3620	0.4375	3/4	2.1/8	0.3280	6	1	6009526
1/4	0.4060	0.4720	0.5625	1.1/16	2.7/16	0.4210	6	1	6009525
3/8	0.5400	0.6060	0.7000	1.1/16	2.9/16	0.5310	8	1	6009529
1/2	0.6650	0.7510	0.6875	1.3/8	3.1/8	0.5150	8	1	6009524
3/4	0.8760	0.9620	0.9063	1.3/8	3.1/4	0.6790	10	1	6009528
1"	1.1030	1.2120	1.1250	1.3/4	3.3/4	0.8430	10	1	6009520

Note: Nom Ø (column 1) is the NPT pipe thread size.
This is not the tool diameter.

Hand Reamer, Square Drive

B100

Left hand spiral flute, right hand cut.

Widely used by hand for the final sizing of drilled holes. The square on the shank allows it to be held in either a tap wrench or a vise depending on whether it is the reamer or the part that is rotating. A long starting taper allows for ease of entry and accurate alignment.



Produced per DIN206 Form B.

Cutting diameters are produced to H7 tolerance.

Shank diameters (same as cutting diameters) but produced to e9 tolerance.

B100

HSS



DIN 206



1.50 - 50.00

d ₁ Ø Inch	d ₁ Ø mm	l ₁ mm	l ₂ mm	l ₃ mm	# of Flutes	☐ a mm	Pack Qty	B100
	1.50	41	20	5	3	1.12	1	5986266
1/16	1.59	41	20	5	3	1.12	1	5986338
	1.60	44	21	5	3	1.25	1	5986300
5/64	1.98	47	23	6	4	1.40	1	5986265
	2.00	50	25	6	4	1.60	1	5986320
3/32	2.38	54	27	7	4	1.80	1	5986312
	2.50	58	29	7	4	2.10	1	5986323
7/64	2.78	62	31	8	6	2.10	1	5986296
	3.00	62	31	8	6	2.40	1	5986378
1/8	3.18	66	33	8	6	2.40	1	5986385
	3.20	66	33	8	6	2.40	1	5986218
	3.50	71	35	9	6	2.70	1	5986245
9/64	3.57	71	35	9	6	2.70	1	5986325
5/32	3.97	76	38	10	6	3.00	1	5986263
	4.00	76	38	10	6	3.00	1	5986236
11/64	4.37	81	41	10	6	3.40	1	5986247
	4.50	81	41	10	6	3.40	1	5986239
3/16	4.76	87	44	11	6	3.80	1	5986277
	5.00	87	44	11	6	3.80	1	5986254
13/64	5.16	87	44	11	6	3.80	1	5986272
	5.50	93	47	12	6	4.30	1	5986257
7/32	5.56	93	47	12	6	4.30	1	5986293
15/64	5.95	93	47	12	6	4.90	1	5986287
	6.00	93	47	12	6	4.90	1	5986274
1/4	6.35	100	50	13	6	4.90	1	5986381
	6.50	100	50	13	6	4.90	1	5986280
17/64	6.75	107	54	14	6	5.50	1	5986304
	7.00	107	54	14	6	5.50	1	5986284
9/32	7.14	107	54	14	6	6.20	1	5986321
	7.50	107	54	14	6	6.20	1	5986286
19/64	7.54	115	58	15	6	6.20	1	5986317
5/16	7.94	115	58	15	6	6.20	1	5986260
	8.00	115	58	15	6	6.20	1	5986303

HSS REAMER

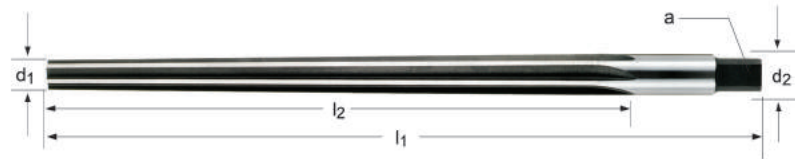


d ₁ Ø Inch	d ₁ Ø mm	l ₁ mm	l ₂ mm	l ₃ mm	# of Flutes	□ a mm	Pack Qty	B100
21/64	8.33	115	58	15	6	7.00	1	5986334
	8.50	115	58	15	6	7.00	1	5986307
11/32	8.73	124	62	16	6	7.00	1	5986243
	9.00	124	62	16	6	7.00	1	5986310
23/64	9.13	124	62	16	6	8.00	1	5986347
	9.50	124	62	16	6	8.00	1	5986315
3/8	9.52	124	62	17	6	8.00	1	5986351
25/64	9.92	133	66	17	6	8.00	1	5986356
	10.00	133	66	17	6	8.00	1	5986388
13/32	10.32	133	66	17	6	8.00	1	5986268
	10.50	133	66	17	6	8.00	1	5986391
	11.00	142	71	18	6	9.00	1	5986234
7/16	11.11	142	71	18	6	9.00	1	5986289
	11.50	142	71	18	6	9.00	1	5986237
	12.00	152	76	19	6	9.00	1	5986250
	12.50	152	76	19	6	10.00	1	5986252
1/2	12.70	152	76	19	6	10.00	1	5986375
	13.00	152	76	19	6	10.00	1	5986255
17/32	13.49	163	81	20	8	11.00	1	5986297
	13.50	163	81	20	8	11.00	1	5986259
	14.00	163	81	20	8	11.00	1	5986275
9/16	14.29	163	81	20	8	11.00	1	5986318
	14.50	163	81	20	8	11.00	1	5986278
	15.00	163	81	20	8	12.00	1	5986281
19/32	15.08	163	81	22	8	12.00	1	5986314
5/8	15.88	175	87	22	8	12.00	1	5986269
	16.00	175	87	22	8	12.00	1	5986291
	17.00	175	87	22	8	13.00	1	5986294
11/16	17.46	188	93	23	8	14.50	1	5986240
	18.00	188	93	23	8	14.50	1	5986308
	19.00	188	93	23	8	14.50	1	5986311
3/4	19.05	188	93	25	8	14.50	1	5986345
	20.00	201	100	25	8	16.00	1	5986327
13/16	20.64	201	100	25	8	16.00	1	5986262
	21.00	201	100	25	8	16.00	1	5986330
	22.00	215	107	27	8	18.00	1	5986341
7/8	22.22	215	107	27	8	18.00	1	5986299
	23.00	215	107	27	8	18.00	1	5986344
	24.00	231	115	29	8	18.00	1	5986349
	25.00	231	115	29	8	20.00	1	5986353
1"	25.40	231	115	29	8	20.00	1	5986230
	26.00	231	115	29	8	20.00	1	5986360
	27.00	247	124	31	10	22.00	1	5986364
	28.00	247	124	31	10	22.00	1	5986367
	29.00	247	124	31	10	22.00	1	5986373
	30.00	247	124	31	10	24.00	1	5986355
	31.00	265	133	33	10	24.00	1	5986358
	32.00	265	133	33	10	24.00	1	5986362
	33.00	265	133	33	10	26.00	1	5986220
	34.00	284	142	36	10	26.00	1	5986222
	35.00	284	142	36	10	29.00	1	5986224
	36.00	284	142	36	10	29.00	1	5986226
	37.00	284	142	36	10	29.00	1	5986228
	38.00	305	152	38	10	29.00	1	5986231
	39.00	305	152	38	10	32.00	1	5986233
	40.00	305	152	38	10	32.00	1	5986242
	45.00	326	163	41	12	35.00	1	5986251
	50.00	347	174	44	12	39.00	1	5986271

Hand Reamer, Taper Pin Type, Square Drive

B301

Straight flute taper pin (1/4" per foot), straight shank reamer. Designed to convert a straight hole into a tapered hole into which standard taper pins will fit. The square on the shank is suitable for holding a tap wrench or vise, depending on whether the reamer or part is rotating, making them ideal for hand use. Recommended for most materials.



B301

HSS



BS
328



1:48



1/16 - 1/2

nom Ø	d ₁ Ø mm	l ₁ mm	l ₂ mm	# of Flutes	□ a mm	d ₂ Ø mm	Pack Qty	B301
1/16	1.10	51	25	4	1.2	1.63	1	5986376 ¹⁾
5/64	1.50	51	25	4	1.6	2.03	1	5986412 ¹⁾
3/32	1.75	57	32	4	2.0	2.41	1	5986397 ¹⁾
7/64	2.03	64	38	4	2.2	2.82	1	5986424 ¹⁾
1/8	2.30	70	44	4	2.5	3.23	1	5986384 ¹⁾
9/64	2.64	73	48	4	2.8	3.63	1	5986979 ¹⁾
5/32	2.95	76	51	4	3.1	4.01	1	5986409 ¹⁾
11/64	3.23	89	57	4	3.6	4.42	1	5986390 ¹⁾
3/16	3.50	102	70	4	4.0	4.95	1	5986395 ¹⁾
7/32	4.13	102	70	6	4.5	5.59	1	5986421 ¹⁾
1/4	4.64	117	86	6	5.0	6.43	1	5986382 ²⁾
9/32	5.23	143	105	6	5.6	7.42	1	5986936 ²⁾
5/16	5.84	143	105	6	6.3	8.03	1	5986406 ²⁾
11/32	6.43	152	114	6	7.1	8.81	1	5986387 ²⁾
3/8	7.03	165	127	6	8.0	9.68	1	5986404 ²⁾
13/32	7.42	191	146	6	8.0	10.46	1	5986393 ²⁾
7/16	8.21	191	146	6	9.0	11.25	1	5986418 ²⁾
1/2	9.41	210	165	6	10.0	12.85	1	5986379 ²⁾

¹⁾ Limit of tolerance +0.0030

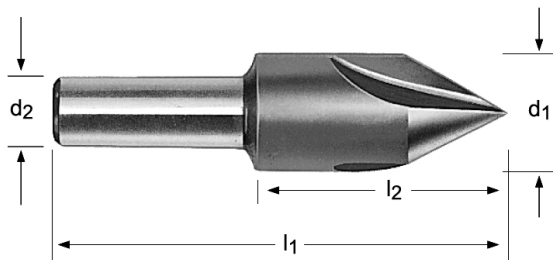
²⁾ Limit of tolerance +0.0050

HSS REAMER



Straight Shank, 3-Flute

4608 Center Reamer, Available in 60°, 82°, 90°, or 100° angles. Widely used to finish ream lathe centers in shafts, and countersink angles for screw heads and rivets. The odd number of flutes promotes smooth reamed finishes while eliminating chatter and providing better accuracy in most applications.



4608

HSS



ANSI



1/4 - 1"

d ₁ Ø Inch	Angle	d ₂ Ø Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	4608
1/4	60°	3/16	3/4	1.1/2	3	1	6004826
1/4	82°	3/16	3/4	1.1/2	3	1	6004872
1/4	90°	3/16	3/4	1.1/2	3	1	6004913
1/4	100°	3/16	3/4	1.1/2	3	1	6005726
3/8	60°	1/4	7/8	1.3/4	3	1	6004996
3/8	82°	1/4	7/8	1.3/4	3	1	6004830
3/8	90°	1/4	7/8	1.3/4	3	1	6004834
3/8	100°	1/4	7/8	1.3/4	3	1	6004994
1/2	60°	3/8	1"	2"	3	1	6005717
1/2	82°	3/8	1"	2"	3	1	6005720
1/2	90°	3/8	1"	2"	3	1	6005722
1/2	100°	3/8	1"	2"	3	1	6005714
5/8	60°	3/8	1"	2.1/4	3	1	6004842
5/8	82°	3/8	1"	2.1/4	3	1	6004846
5/8	90°	3/8	1"	2.1/4	3	1	6004850
5/8	100°	3/8	1"	2.1/4	3	1	6004838
3/4	60°	1/2	1.1/4	2.5/8	3	1	6004986
3/4	82°	1/2	1.1/4	2.5/8	3	1	6004990
3/4	90°	1/2	1.1/4	2.5/8	3	1	6004992
3/4	100°	1/2	1.1/4	2.5/8	3	1	6004959
1"	60°	1/2	1"	3"	3	1	6262132
1"	82°	1/2	1"	3"	3	1	6262133
1"	90°	1/2	1"	3"	3	1	6262134
1"	100°	1/2	1"	3"	3	1	6262135

Visual Index - Countersinks & Counterbores



Visual Index - Countersinks & Counterbores

How to Use This Chart:

- 1) Determine your Workpiece Material from the Application Material Groups (AMG) below.
- 2) Use the icons to find Product Features.
- 3) Find the Surface Feet Per Minute (SFM) and Alpha Code.
example: 361 W
361 = SFM
W = Alpha Code used to find your Feed Rate (IPR)
- 4) To find Cutting Feed Rate, find your Alpha Code on the AMG Chart
(example: 279 U : U is the Alpha Code)
- 5) Find the closest diameter for your cutting application on the Feed Rate chart below to find your IPR

Alpha Code	Countersinks, Counterbores - Feed in Inches per Revolution										Ø Diameter
	1/4	5/16	5/64	5/8	25/32	1"	1-1/4	1-1/2	2-3/8	3"	
A	0.001	0.002	0.002	0.002	0.003	0.004	0.004	0.005	0.006	0.006	
B	0.002	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.007	0.008	
C	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.007	0.008	0.009	
D	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010	0.011	
E	0.003	0.004	0.005	0.006	0.007	0.008	0.010	0.011	0.012	0.013	
F	0.004	0.004	0.005	0.006	0.007	0.008	0.010	0.011	0.013	0.014	
G	0.004	0.005	0.006	0.007	0.008	0.009	0.011	0.013	0.014	0.016	
H	0.005	0.006	0.007	0.008	0.009	0.010	0.012	0.014	0.016	0.018	

Application Material Groups (AMG)			Hardness HRC	ISO
1. Steel	1.1 Magnetic soft steel	12L14, 12L15	<120 HB	P 1
	1.2 Structural Steel/ case carburising steel	1005-1025, 1214, 1215, A36	<200 HB	P 1
	1.3 Plain Carbon steel	1030-1060, 1050-1060, 1144-1146	<24	P 2
	1.4 Alloy steel	4140, 4340, 52100, 8620 H11-H41, A2, D2, 01, P20, 420	<24	P 3
	1.5 Alloy steel/ Hardened and tempered steel	4140, 4340, 52100, 8620 H11-H41, A2, D2, 01, P20, 420	>24<38	P 4
	1.6 Alloy steel/ Hardened and tempered steel	4140, 4340, 52100, 8620 H11-H41, A2, D2, 01, P20, 420	>38	H 1
	1.7 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	49-55	H 3
	1.8 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	55-63	H 4
2. Stainless Steel	2.1 Free machining Stainless Steel	200, 303, 416, 420F, 430F, 440	<24	M 1
	2.2 Austenitic	301, 302, 304, 316, 321, 330, CUSTOM 455, AM-350	<24	M 3
	2.3 Ferritic + Austenitic, Martensitic	318-329, 400-446, DUPLEX	<32	M 2
	2.4 Precipitation Hardened	15-5PH, Custom 450 17-4PH	<32	S 2
3. Cast Iron	3.1 Lamellar graphite	Grey, G10, Gg40, J431C, A48 CLASS 20	<150 HB	K 1
	3.2 Lamellar graphite	Grey, GG25-Gg40, J158, A48 CLASS 40-60	>150 HB<32	K 2
	3.3 Nodular graphite/ Malleable Cast Iron	A220, A436, A439, A602, Black, GGG40-GGG70	<200 HB	K 3
	3.4 Nodular graphite/ Malleable Cast Iron	Black Gts/Gtw, J434C	>200 HB<32	K 4
4. Titanium	4.1 Titanium, unalloyed	Commercially Pure	<200 HB	S 1
	4.2 Titanium, alloyed	6Al4V, 6Al4V-2Sn, Monel, Monel K	<28	S 2
	4.3 Titanium, alloyed	6Al4V-4Mo, 7Al4V-4Mo, 4911-4967	>28<38	S 3
5. Nickel	5.1 Nickel, unalloyed	Commercially Pure, 17644, 200, 5553	<150 HB	S 1
	5.2 Nickel, alloyed	Monel 400, Hastelloy C, Inconel 625, Waspaloy	<28	S 2
	5.3 Nickel, alloyed	Inconel 718, Nimonic 75-95, Rene 41, Inconel 825, A286	>28<38	S 3
6. Copper	6.1 Copper	Commercially Pure	<100 HB	N 3
	6.2 β-Brass, Bronze	314-340, 350-370	<200 HB	N 4
	6.3 α-Brass	Alloyed Cu + Al + Fe, Long Chipping	<200 HB	N 3
	6.4 High Strength Bronze	Ampco 18-25	<49	N 4
7. Aluminium Magnesium	7.1 Al, Mg, unalloyed	Commercially Pure	<100 HB	N 1
	7.2 Al alloyed, Si<0.5%	6061 T6, 7075, 314-340	<150 HB	N 1
	7.3 Al alloyed, Si>0.5%<10%	6061 T6, 380-390	<120 HB	N 1
	7.4 Al alloyed, Si>10% Mg alloys	Magnesium Whisker Reinforced	<120 HB	N 2
8. Synthetic Materials	8.1 Thermoplastics	Ultrad, Polystrol	---	O
	8.2 Thermosetting plastics	Bakelitt, Pertinax	---	O
	8.3 Reinforced plastic materials	CFK, GFKAFK	---	O
9. Hard Mat.	9.1 Cermets (Metal-ceramics)	Ferrotic	<54	H
10. Graphite	10.1 Standard graphite		---	O

Visual Index - Countersinks & Counterbores

Tool Material:	HM	HSS	HSS	HSS	HSS	HSS	HSS-E	HSS	HSS	HSS	HSS-E	HSS
Finish/Coating:					TN				TAIN		AITON	TAIN
Standard:	DIN 335C	ANSI	ANSI	DIN 334C	DIN 334C	DIN 335C	DORMER	DIN 335C	DIN 335C	DIN 335C	DIN 335C	DIN 335C
Direction of Cut:												
Application:												
Shank:												
Countersink Angle:	90°	60°	60°	60°	60°	82°	90°	90°	90°	90°	90°	100°
		↓	↓									
		90°	82°									
												
Style:	G400	4603	4602	G135	G335	G154	G149	G136	G560	G142	G570	G171
Range:	6.30 - 31.00	1/4 - 1.1/2	1/2 - 1"	6.30 - 25.00	6.30 - 25.00	6.30 - 25.00	5.00 - 50.00	4.30 - 31.00	6.30 - 31.00	4.80 - 31.00	6.30 - 31.00	6.30 - 25.00
Page #	486	487	488	489	489	490	491	492	492	493	494	495
1.1	98F	98F	98F	98F	164E	98F	98D	98F	164E	98F	148E	164E
1.2	82E	82E	82E	82E	131E	82E	82D	82E	131E	82E	118E	131E
1.3	66D	66D	66D	66D	98D	66D	66C	66D	98D	66D	89D	98D
1.4	49D	49D	49D	49D	66D	49D	49B	49D	66D	49D	72D	66D
1.5	33B	33B	33B	33B	49B	33B	33A	33B	49B		56B	49B
1.6	20A	20A	20A	20A	33B	20A	20A	20A	33B		39B	33B
1.7												
1.8												
2.1	26C	26C	26C	26C		26C	26B	26C		26C	56C	
2.2	20B	20B	20B	20B		20B	20A	20B		20B	39B	
2.3	13A	13A	13A	13A		13A		13A		13A	49A	
2.4											33A	
3.1	82F	82F	82F	82F	148F	82F	82D	82F	148F		131C	148F
3.2	49D	49D	49D	49D	115D	49D	49C	49D	115D		105C	115D
3.3	39C	39C	39C	39C	98C	39C	39A	39C	98C		89C	98C
3.4	26C	26C	26C	26C	98C	26C	26A	26C	98C		79C	98C
4.1	39C	39C	39C	39C	66C	39C	39B	39C	66C	39C		66C
4.2	33A	33A	33A	33A	49A	33A	33A	33A	49A	33A		49A
4.3	26A	26A	26A	26A	33A	26A	26A	26A	33A			33A
5.1	39C	39C	39C	39C	66C	39C	39B	39C	66C	39C		66C
5.2	20B	20B	20B	20B	33B	20B	20A	20B	33B	20B	20A	33B
5.3	13A	13A	13A	13A	20A	13A	13A	13A	20A		13A	20A
6.1	82D	82D	82D	82D	131D	82D	82B	82D	131D	82D	131D	131D
6.2	66F	66F	66F	66F	98F	66F	66C	66F	98F	66F	98F	98F
6.3	82F	82F	82F	82F	131F	82F	82C	82F	131F	82F	131F	131F
6.4	33D	33D	33D	33D	49D	33D	33B	33D	49D		49D	49D
7.1	98G	98G	98G	98G	164G	98G	98D	98G	164G	98G	148G	164G
7.2	82F	82F	82F	82F	131F	82F	82C	82F	131F	82F	118F	131F
7.3	66F	66F	66F	66F	98F	66F	66C	66F	98F	66F	89F	98F
7.4	33F	33F	33F	33F	49F	33F	33C	33F	49F	33F	43F	49F
8.1	98G	98G	98G	98G	164G	98G	98D	98G	164G	98G		164G
8.2	66G	66G	66G	66G	98G	66G	66D	66G	98G	66G		98G
8.3												
9.1												
10.1												

Visual Index - Countersinks & Counterbores

	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS
		DIN 335A	DIN 334D	DIN 335D	DIN 335D	DIN 335C	ANSI	ANSI	ANSI	ANSI	ANSI
											
											
	G600	G132	G137	G138	G338	G236	G702	G706	G705	G703	G704
	6.30 - 25.00	8.00 - 20.00	16.00 - 80.00	25.00 - 80.00	25.00 - 63.00	Set	1/4 - 2"	1/4 - 1"	1/4 - 1"	1/4 - 2.1/2	3/32 - 2"
	496	497	498	499	499	500	501	502	502	504	505
1.1	72F		98F	98F	164F		82C	82C	82C	82C	
1.2	56E		82E	82E	131E		66C	66C	66C	66C	
1.3	49D	66E	66D	66D	98D		52C	52C	52C	52C	
1.4	39D	49D	49D	49D	66D		49B	49B	49B	49B	
1.5	26B	33D	33B	33B	49B		30B	30B	30B	30B	
1.6	20A	20B	20A	20A	33A		16A	16A	16A	16A	
1.7											
1.8											
2.1	26C		26C	26C			36C	36C	36C	36C	
2.2	20B		20B	20B			20B	20B	20B	20B	
2.3	13A	13B	13A	13A			26B	26B	26B	26B	
2.4											
3.1	82F		82F	82F	148F		52E	52E	52E	52E	
3.2	49D		49D	49D	115D		49D	49D	49D	49D	
3.3	39C		39C	39C	98C		43C	43C	43C	43C	
3.4		26D	26C	26C	98C		36C	36C	36C	36C	
4.1			39C	39C	66C		49C	49C	49C	49C	
4.2		26A	33A	33A	49A		30B	30B	30B	30B	
4.3		26A	26A	26A	33A		16B	16B	16B	16B	
5.1			39C	39C	66C		26D	26D	26D	26D	
5.2		20C	20B	20B	33B		16C	16C	16C	16C	
5.3		13B	13A	13A	20A		10C	10C	10C	10C	
6.1	82D		82D	82D	131D		82D	82D	82D	82D	
6.2	66F		66F	66F	98F		92E	92E	92E	92E	
6.3	82F		82F	82F	131F		82D	82D	82D	82D	
6.4	33D	33F	33D	33D	49D		46D	46D	46D	46D	
7.1	98G		98G	98G	164G						
7.2	82F		82F	82F	131F						
7.3	66F		66F	66F	98F						
7.4	33F		33F	33F	49F						
8.1			98G	98G	164G						
8.2			66G	66G	98G						
8.3		16G									
9.1											
10.1											

List Number Index - Countersinks/Counterbores



Pgs. 486-506

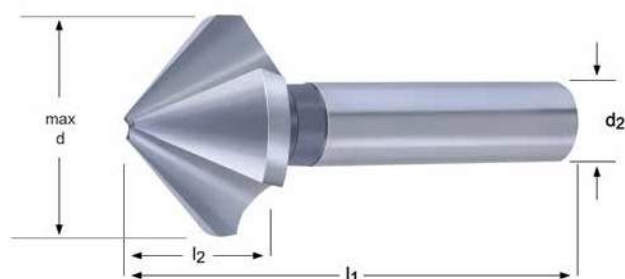
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4603.....	487
G132.....	497
G135.....	489
G136.....	492
G137.....	498
G138.....	499
G142.....	493
G149.....	491
G154.....	490
G171.....	495
G236.....	500
G335.....	489
G338.....	499
G400.....	486
G560.....	492
G570.....	494
G600.....	496
G702.....	501
G703.....	504
G704.....	505
G705.....	502
G706.....	502

MULTI-APPLICATION CARBIDE COUNTERSINK

Solid Carbide, Straight Shank, 3-Flute

G400 90° Countersink with Straight Shank. Recommended for abrasive, hard ferrous, and non-ferrous materials.

1.1	1.2	1.3	1.4	1.5	1.6	2.1	2.2	2.3	3.1	3.2	3.3	3.4	4.1	4.2
4.3	5.1	5.2	5.3	6.1	6.2	6.3	6.4	7.1	7.2	7.3	7.4	8.1	8.2	



G400

HM



DIN
335C



6.30 - 31.00

max d mm	min d mm	l_2 mm	l_1 mm	d_2 $\varnothing h_6$ mm	# of Flutes	Pack Qty	G400
6.3 (1/4)	1.5	5.0	45	5	3	1	5979252
8.3 (5/16)	2.0	6.0	50	6	3	1	5979084
10.4 (3/8)	2.5	7.1	50	6	3	1	5979159
12.4 (1/2)	2.8	8.0	56	8	3	1	5979199
16.5 (5/8)	3.2	10.0	60	10	3	1	5979234
20.5 (3/4)	3.5	12.5	63	10	3	1	5979242
25.0 (1")	3.8	15.0	67	10	3	1	5979245
31.0 (1.1/4)	4.2	18.0	71	12	3	1	5979248

Countersink, Straight Shank, Single-Flute

4603 Available in 60°, 82°, or 90° angles. Engineered for machine use and light portable work. Single flute construction and low controlled relief assure the user of chatterless operation.

Best results obtained using high speeds and low feed. Recommended that the predrilled hole be at least 10% of the countersink diameter.



4603

HSS



ANSI



1/4 - 1.1/2

d ₁ Ø Inch	angle	d ₂ Ø Inch	l ₂ Inch	l ₁ Inch	# of Flutes	Pack Qty	4603
1/4	82°	3/16	11/16	1.7/16	1	1	6005665
1/4	90°	3/16	11/16	1.7/16	1	1	6005669
3/8	60°	1/4	7/8	1.3/4	1	1	6005698
3/8	82°	1/4	25/32	1.21/32	1	1	6005702
3/8	90°	1/4	3/4	1.5/8	1	1	6005705
1/2	60°	1/4	1"	2"	1	1	6005655
1/2	82°	1/4	27/32	1.27/32	1	1	6005659
1/2	90°	1/4	13/32	1.13/16	1	1	6005662
5/8	82°	3/8	1.3/32	2.3/32	1	1	6005708
5/8	90°	3/8	1"	2"	1	1	6005711
3/4	60°	3/8	1.13/32	2.21/32	1	1	6005682
3/4	82°	3/8	1.5/32	2.13/32	1	1	6005685
3/4	90°	3/8	1.1/16	2.5/16	1	1	6005694
1"	60°	1/2	1.9/16	3.1/8	1	1	6005673
1"	82°	1/2	1.1/4	2.13/16	1	1	6005677
1"	90°	1/2	1.1/4	2.13/16	1	1	6005679
1.1/4	60°	1/2	1.3/4	3.3/4	1	1	6005639
1.1/4	82°	1/2	1.1/2	3.1/2	1	1	6005644
1.1/4	90°	1/2	1.9/16	3.9/16	1	1	6005648
1.1/2	60°	1/2	2.5/16	4.1/4	1	1	6005624
1.1/2	82°	1/2	1.15/16	3.7/8	1	1	6005629
1.1/2	90°	1/2	1.13/16	3.3/4	1	1	6005634

HSS COUNTERSINK



Countersink, Straight Shank, 4-Flute

4602

Countersink with angles of 60° for centers or 82° for flat head screws. Bright finish improves chip flow in soft ferrous or non-ferrous materials.



4602

HSS



ANSI



1/2 - 1"

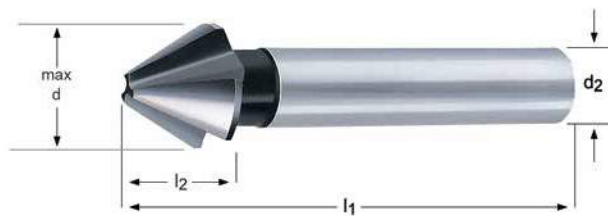
d_1 Ø Inch	Angle	d_2 Ø Inch	l_2 Inch	l_1 Inch	# of Flutes	Pack Qty	4602
1/2	60°	1/2	1.5/8	3.7/8	4	1	6005567
1/2	82°	1/2	1.5/8	3.7/8	4	1	6005571
5/8	60°	1/2	1.3/4	4"	4	1	6005600
5/8	82°	1/2	1.3/4	4"	4	1	6005605
3/4	60°	1/2	1.7/8	4.1/8	4	1	6005586
3/4	82°	1/2	1.7/8	4.1/8	4	1	6005591
7/8	60°	1/2	2"	4.1/4	4	1	6005614
7/8	82°	1/2	2"	4.1/4	4	1	6005619
1"	60°	1/2	2.1/8	4.3/8	4	1	6005576
1"	82°	1/2	2.1/8	4.3/8	4	1	6005581

Straight Shank, 3-Flute

60° countersink with straight shank for multiple materials.

G135 Bright finish improves chip flow in soft ferrous or non-ferrous materials.

G335 TiN coated for improved wear resistance.

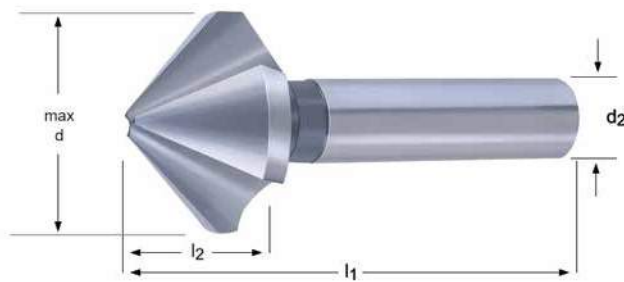


G135	G335
6.30 - 25.00	6.30 - 25.00

max d mm	min d mm	l ₂ mm	l ₁ mm	d ₂ Øh ₉ mm	# of Flutes	Pack Qty	G135	G335
6.3 (1/4)	1.6	6.8	45	5	3	1	5973354	5972779
8.0 (5/16)	2.0	8.5	50	6	3	1	5973356	5972782
10.0 (3/8)	2.5	7.6	50	6	3	1	5973342	5972759
12.5 (1/2)	3.2	11.7	56	8	3	1	5973344	5972763
16.0 (5/8)	4.0	14.5	63	10	3	1	5973346	5972767
20.0 (3/4)	5.0	17.5	67	10	3	1	5973350	5972771
25.0 (1")	6.3	20.5	71	10	3	1	5973352	5972775

Straight Shank, 3-Flute

G154 82° countersink for multiple materials. Bright finish improves chip flow in soft ferrous or non-ferrous materials.



G154

HSS



DIN 335C

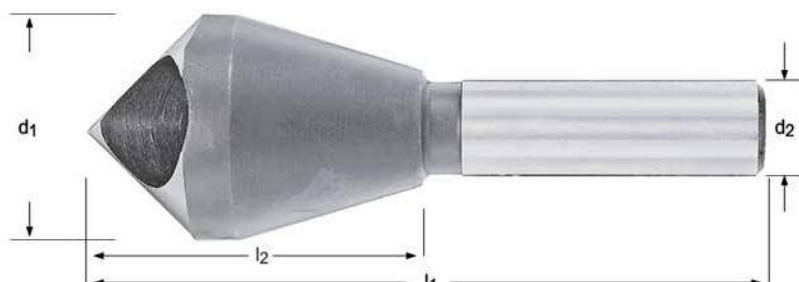


6.30 - 25.00

max d mm	min d mm	l ₂ mm	l ₁ mm	d ₂ Øh ₉ mm	# of Flutes	Pack Qty	G154
6.3 (1/4)	1.5	5.5	45	5	3	1	5972617
8.3 (5/16)	2.0	6.5	50	6	3	1	5972621
10.4 (3/8)	2.5	7.6	50	6	3	1	5972788
12.4 (1/2)	2.8	8.5	56	8	3	1	5972795
16.5 (5/8)	3.2	10.5	60	10	3	1	5972798
20.5 (3/4)	3.5	13.0	63	10	3	1	5972801
25.0 (1")	3.8	15.5	67	10	3	1	5972804

Straight Shank, Single Flute

G149 90° Countersink, single flute, for multiple materials. Bright finish improves chip flow in soft ferrous or non-ferrous materials.



G149

HSS-E



5.00 - 50.00

max d mm	min d mm	l_2 mm	l_1 mm	d_2 Ø mm	d_1 Ø mm	# of Flutes	Pack Qty	G149
5	2	19.0	45	6	10	1	1	5972702
10	5	23.0	48	8	14	1	1	5973182
15	10	34.0	65	10	21	1	1	5973188
20	15	43.0	84	12	28	1	1	5973198
25	20	48.0	102	15	35	1	1	5973203
30	25	61.0	115	15	44	1	1	5973211
35	30	65.0	127	15	48	1	1	5972612
40	35	66.0	136	15	53	1	1	5972656
50	40	85.0	166	20	60	1	1	5972744

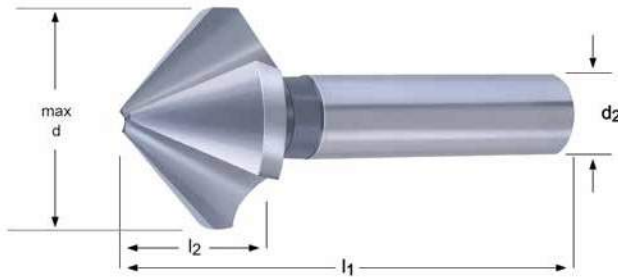
HSS COUNTERSINK



Straight Shank, 3-Flute

G136 90° Countersink with straight shank for multiple materials. Bright finish improves chip flow in soft ferrous or non-ferrous materials.

G560 90° Countersink with straight shank for multiple materials. TiAIN coating increases surface hardness, improves chip flow, and increases tool life.

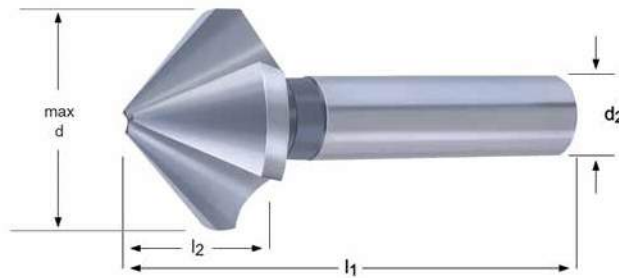


G136	G560
HSS	HSS
DIN 335C	DIN 335C
4.30 - 31.00	6.30 - 31.00

max d mm	min d mm	l ₂ mm	l ₁ mm	d ₂ Øh ₉ mm	# of Flutes	Pack Qty	G136	G560
4.3	1.3	4.0	40	4	3	1	5973389	—
5.0	1.5	4.5	40	4	3	1	5973393	—
5.3	1.5	4.5	40	4	3	1	5973395	—
5.8	1.5	5.0	45	5	3	1	5973398	—
6.0	1.5	5.0	45	5	3	1	5973399	—
6.3	1.5	5.5	45	5	3	1	5973400	5973351
7.0	1.8	5.5	50	6	3	1	5973401	—
7.3	1.8	6.1	50	6	3	1	5973402	—
8.0	2.0	6.1	50	6	3	1	5973403	5973353
8.3	2.0	6.5	50	6	3	1	5973404	5973355
9.4	2.2	7.2	50	6	3	1	5973405	—
10.0	2.5	7.6	50	6	3	1	5973358	5973336
10.4	2.5	7.6	50	6	3	1	5973360	5973337
11.5	2.8	8.0	56	8	3	1	5973362	—
12.4	2.8	8.5	56	8	3	1	5973364	5973339
13.4	2.9	9.0	56	8	3	1	5973366	—
15.0	3.2	9.5	60	10	3	1	5973368	—
16.5	3.2	10.5	60	10	3	1	5973371	5973341
19.0	3.5	11.7	63	10	3	1	5973373	—
20.5	3.5	13.0	63	10	3	1	5973375	5973345
23.0	3.8	13.7	67	10	3	1	5973377	—
25.0	3.8	15.5	67	10	3	1	5973379	5973347
26.0	3.8	15.5	67	10	3	1	5973381	—
28.0	4.0	16.5	71	12	3	1	5973383	—
30.0	4.2	18.5	71	12	3	1	5973386	—
31.0	4.2	18.5	71	12	3	1	5973387	5973349

Straight Shank, 3-Flute

G142 90° Countersink with extra radial relief for soft or gummy materials. Bright finish improves chip flow in these materials.



G142

HSS



DIN
335C

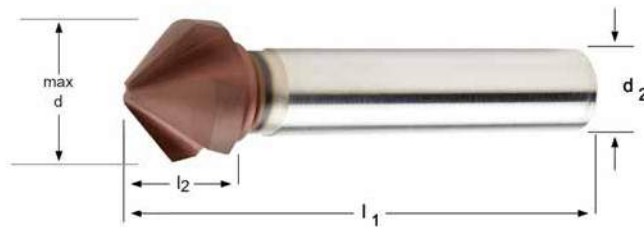


4.80 - 31.00

max d mm	min d mm	l ₂ mm	l ₁ mm	d ₂ Øh ₉ mm	# of Flutes	Pack Qty	G142
4.8	1.3	4.5	40	4	3	1	5973137
5.0	1.5	4.5	40	4	3	1	5973143
6.0	1.5	5.0	45	5	3	1	5973152
6.3	1.5	5.5	45	5	3	1	5973157
7.0	1.8	5.5	50	6	3	1	5973162
7.3	1.8	6.1	50	6	3	1	5973166
8.0	2.0	6.1	50	6	3	1	5973173
8.3	2.0	6.5	50	6	3	1	5973178
10.0	2.5	7.6	50	6	3	1	5973088
10.4	2.5	7.6	50	6	3	1	5973091
11.5	2.8	8.0	56	8	3	1	5973094
12.4	2.8	8.5	56	8	3	1	5973100
15.0	3.2	9.5	60	10	3	1	5973105
16.5	3.2	10.5	60	10	3	1	5973108
19.0	3.5	11.7	63	10	3	1	5973112
20.5	3.5	13.0	63	10	3	1	5973117
23.0	3.8	13.7	67	10	3	1	5973121
25.0	3.8	15.5	67	10	3	1	5973126
31.0	4.2	18.5	71	12	3	1	5973131

Straight Shank, 3-Flute

G570 90° Countersink with AlTiCN coating designed primarily for Alloy Steels and Stainless Steels. Special PVD coating increases surface hardness and temperature resistance while maintaining a high level of toughness even in dry cutting conditions.



G570

HSS-E



DIN
335C

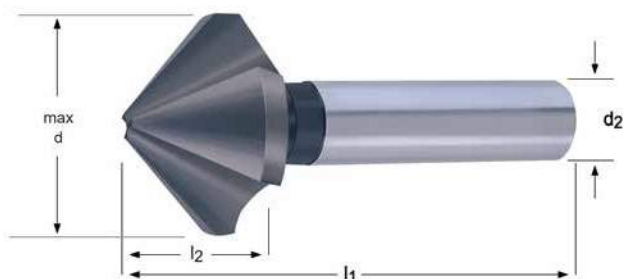


6.30 - 31.00

max d mm	min d mm	l ₂ mm	l ₁ mm	d ₂ Øh ₉ mm	# of Flutes	Pack Qty	G570
6.3	1.5	6.5	45	5	3	1	6381760
8.3	2.0	8.2	50	6	3	1	6381761
10.4	2.5	9.7	50	6	3	1	6381762
12.4	2.8	10.6	56	8	3	1	6381763
16.5	3.2	13.9	60	10	3	1	6381764
20.5	3.5	17.1	63	10	3	1	6381765
25.0	3.8	21.4	67	10	3	1	6381766
31.0	4.2	24.4	71	12	3	1	6381767

Straight Shank, 3-Flute

G171 100° Countersink with straight shank design for cast iron, soft steels & aluminum. TiAlN coating increases surface hardness and improves tool life at higher speeds.



G171

HSS



DIN 335C

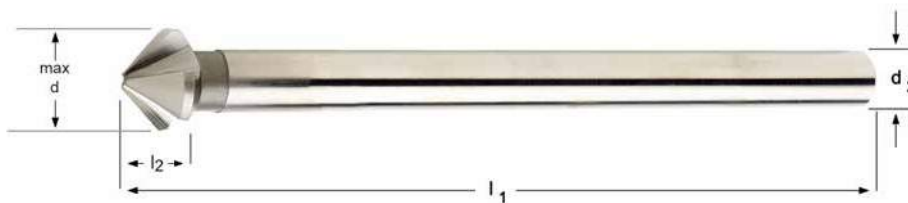


6.30 - 25.00

max d mm	min d mm	l ₂ mm	l ₁ mm	d ₂ Øh ₉ mm	# of Flutes	Pack Qty	G171
6.3	1.5	4.5	44.0	5.0	3	1	5972697
8.3	2.0	5.5	49.0	6.0	3	1	5972706
10.4	2.5	6.6	49.0	6.0	3	1	5972677
12.4	2.8	7.0	53.0	6.0	3	1	5972680
16.5	3.2	9.0	56.0	6.0	3	1	5972684
20.5	3.5	11.0	61.0	10.0	3	1	5972689
25.0	3.8	13.5	65.0	10.0	3	1	5972693

Straight Shank, 3-Flute

G600 90° Countersink with straight shank for long reach applications. Multi-material type excellent for soft to medium steels. Bright finish improves chip flow in softer materials.



G600

HSS

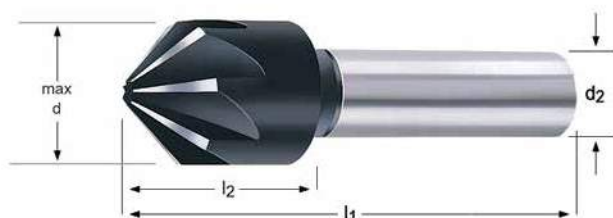


6.30 - 25.00

max d mm	min d mm	l ₂ mm	l ₁ mm	d ₂ Øh ₉ mm	# of Flutes	Pack Qty	G600
6.3	1.3	6.4	154	5	3	1	6381768
8.3	1.8	8.3	155	6	3	1	6381769
10.4	2.2	9.7	157	6	3	1	6381770
12.4	2.5	10.6	158	8	3	1	6381771
15.0	2.8	12.6	159	10	3	1	6381772
16.5	2.8	13.9	161	10	3	1	6381773
20.5	3.0	17.1	164	10	3	1	6381774
25.0	3.2	21.4	168	10	3	1	6381775

Straight Shank, Multi-Flute

G132 90° Multi-flute countersink for better stability in harder materials.
More flutes to share the load when cutting at slower speeds.



G132

HSS



DIN 335A



8.00 - 20.00

max d mm	min d mm	l ₂ mm	l ₁ mm	d ₂ Øh ₉ mm	# of Flutes	Pack Qty	G132
8.0	-	0.0	48	8	5	1	5973340
12.5	2.0	15.5	48	8	5	1	5973334
16.0	3.2	19.5	56	10	7	1	5973335
20.0	5.0	23.0	60	10	7	1	5973338

Taper Shank, 3-Flute

G137 60° Countersink with MorseTaper Shank for multiple materials. Bright finish improves chip flow in soft ferrous and non-ferrous materials.



G137

HSS



DIN
334D



16.00 - 80.00

max d mm	min d mm	l ₂ mm	l ₁ mm	MTS	# of Flutes	Pack Qty	G137
16.0 (5/8)	4.0	14.5	90	1	3	1	5973407
20.0 (3/4)	5.0	17.5	106	2	3	1	5973061
25.0 (1")	6.3	20.0	112	2	3	1	5973073
31.5 (1.1/4)	10.0	23.0	118	2	3	1	5973099
40.0 (1.1/2)	12.5	28.5	150	3	3	1	5973147
50.0 (2")	16.0	36.0	160	3	3	1	5973208
63.0 (2.1/2)	20.0	43.0	190	4	3	1	5973217
80.0 (3")	25.0	54.0	200	4	3	1	5973222

Taper Shank, 3-Flute

G138 90° Countersink with Morse Taper Shank for multiple materials. Excellent for steel, titanium & nickle alloys. Bright finish improves chip flow in soft ferrous and non-ferrous materials.

G338 90° Countersink with Morse Taper Shank for multiple materials. TiN coating increases surface hardness and improves chip flow in steel, cast iron and aluminum alloys.



G138	G338
HSS	HSS
DIN 335D	DIN 335D
25.00 - 80.00	25.00 - 63.00

max d mm	min d mm	l ₂ mm	l ₁ mm	MTS	# of Flutes	Pack Qty	G138	G338
25.0	3.8	15.5	106	2	3	1	5973066	5973321
30.0	4.2	18.5	112	2	3	1	5973069	—
31.0	4.2	20.0	112	2	3	1	5973070	5973322
34.0	4.5	19.5	118	2	3	1	5973071	—
37.0	4.8	21.7	118	2	3	1	5973072	5973324
40.0	10.0	20.5	140	3	3	1	5973074	5973326
50.0	14.0	24.1	150	3	3	1	5973075	5973327
63.0	16.0	28.5	180	4	3	1	5973076	5973329
80.0	22.0	36.0	190	4	3	1	5973078	—

Straight Shank, 3-Flute

G236 90° Countersink sets in 4 or 6 pcs. Sets 1&2 in bright finish improves chip flow in soft ferrous & non-ferrous materials. Set 3 in TiAIN coating increases surface hardness and improves tool life.



G236

HSS



DIN 335C



Set

Set	Styles in set	Pieces per Set	Diameters in set	Pack Qty	G236
1	G136	6	6.30 mm, 8.30 mm, 10.40 mm, 12.40 mm, 16.50 mm, 20.50 mm	1	5972710
2	G136	4	6.30 mm, 10.40 mm, 16.50 mm, 20.50 mm	1	5972714
3	G560	6	6.30 mm, 8.30 mm, 10.40 mm, 12.40 mm, 16.50 mm, 20.50 mm	1	6521338

Counterbore Body - Interchangeable Pilot Type

G702 Short Length

Used to enlarge the end of a preformed hole when a flat bottom is required. The counterbore is an end cutting tool which utilizes and interchangeable pilot to align the enlarged hole being machined with the preformed hole. The 3 and 5 flute counterbore reduces chatter and improves finish.



G702

HSS



ANSI



1/4 - 2"

d ₁ Ø Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	# of Flutes	Pilot (p) Mounting Ø Inch	Pilot Ø min	Pilot Ø max	Pack Qty	G702
1/4	3/4	3.13/16	15/64	3	3/32	1/8	3/16	1	8203127
9/32	3/4	3.13/16	17/64	3	3/32	1/8	7/32	1	8203128
5/16	3/4	3.13/16	19/64	3	3/32	1/8	1/4	1	8203183
11/32	3/4	3.13/16	5/16	3	3/32	1/8	9/32	1	8203180
3/8	1"	4.1/16	5/16	3	5/32	3/16	5/16	1	8203181
13/32	1"	4.1/16	3/8	3	5/32	3/16	11/32	1	8203182
7/16	1"	4.1/16	3/8	3	5/32	3/16	3/8	1	8203129
15/32	1.1/4	4.5/16	7/16	3	3/16	3/16	13/32	1	8203184
1/2	1.1/4	4.5/16	7/16	3	3/16	3/16	7/16	1	8203185
9/16	1.1/4	4.5/16	1/2	3	3/16	3/16	1/2	1	8203186
19/32	1.1/4	5.1/8	1/2	3	3/16	3/16	17/32	1	8203187
5/8	1.1/4	5.1/8	1/2	3	3/16	3/16	9/16	1	8203188
11/16	1.1/4	5.1/8	1/2	3	3/16	3/16	5/8	1	8203189
3/4	1.1/2	5.3/8	1/2	3	1/4	5/16	11/16	1	8203190
25/32	1.1/2	5.3/8	5/8	3	1/4	5/16	23/32	1	8203191
13/16	1.1/2	5.3/8	5/8	3	1/4	5/16	3/4	1	8203192
27/32	1.1/2	5.3/8	3/4	3	1/4	5/16	25/32	1	8203193
7/8	1.1/2	5.3/8	3/4	3	1/4	5/16	13/16	1	8203194
1"	1.3/4	6.3/8	3/4	3	5/16	3/8	15/16	1	8203195
2"	2.1/2	8.3/8	1.1/2	5	1/2	9/16	1.15/16	1	8203196

HSS COUNTERBORE



Counterbore Body, Aircraft Series - Interchangeable Pilot Type

G705 Long Series, 3-flute

G706 Short Series (Aircraft) 4-flute with corner radius

Used for the facing of bosses, and counterboring recesses for spring pockets and screw heads. Supplied with corner radius to produce the fillets necessary for this type of work. Designed for pneumatic or electric drills.



d ₁ Ø Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	l ₃ Inch	d ₃ Ø Inch	# of Flutes	Pilot (p) Moun- ting Ø Inch	Pilot Ø min	Pilot Ø max	Pack Qty	G705	4706
1/4	1/2	2.3/8	1/4	1.1/8	15/64	4	3/32	1/8	3/16	1	—	8203307 ¹⁾
1/4	3/4	3.13/16	15/64	3.1/16	15/64	3	3/32	1/8	3/16	1	8203291	—
5/16	1/2	2.3/8	1/4	7/8	17/64	4	3/32	1/8	1/4	1	—	8203308 ¹⁾
5/16	3/4	3.13/16	19/64	3.1/16	19/64	3	3/32	1/8	1/4	1	8203292	—
11/32	1/2	2.3/8	1/4	7/8	19/64	4	3/32	1/8	9/32	1	—	8203309 ¹⁾
3/8	1/2	2.3/8	1/4	7/8	5/16	4	3/32	3/16	5/16	1	—	8203310 ²⁾
3/8	3/4	3.13/16	5/16	3.1/16	5/16	3	3/32	3/16	5/16	1	8203293	—
13/32	1/2	2.13/16	1/4	7/8	5/16	4	1/8	3/16	11/32	1	—	8203311 ²⁾
7/16	1/2	2.13/16	1/4	7/8	5/16	4	1/8	3/16	3/8	1	—	8203312 ²⁾
7/16	3/4	3.13/16	3/8	3.1/16	3/8	3	1/8	3/16	3/8	1	8203294	—
15/32	1/2	2.13/16	1/4	7/8	5/16	4	1/8	1/4	13/32	1	—	8203313 ²⁾
1/2	1/2	2.13/16	1/4	7/8	3/8	4	1/8	1/4	7/16	1	—	8203314 ²⁾
1/2	3/4	3.13/16	7/16	3.1/16	7/16	3	1/8	1/4	7/16	1	8203295	—
17/32	1/2	2.13/16	1/4	7/8	3/8	4	1/8	1/4	15/32	1	—	8203315 ²⁾
17/32	3/4	5.3/8	1/2	4.5/8	1/2	3	1/8	1/4	15/32	1	8203296	—
9/16	1/2	2.13/16	1/4	7/8	3/8	4	1/8	1/4	1/2	1	—	8203316 ²⁾
9/16	3/4	5.3/8	1/2	4.5/8	1/2	3	1/8	1/4	1/2	1	8203297	—
19/32	3/4	5.3/8	1/2	4.3/16	9/16	3	1/8	1/4	17/32	1	8203298	—
5/8	3/4	5.3/8	1/2	4.3/16	9/16	3	1/8	1/4	9/16	1	8203299	—
11/16	1/2	2.13/16	1/4	7/8	1/2	4	1/8	1/4	5/8	1	—	8203317 ³⁾
21/32	1.1/4	5.3/8	1/2	3.5/8	9/16	3	3/16	1/4	19/32	1	8203300	—
11/16	1.1/4	5.3/8	1/2	3.5/8	5/8	3	3/16	1/4	5/8	1	8203301	—
3/4	1.1/4	5.3/8	1/2	3.5/8	11/16	3	3/16	5/16	11/16	1	8203302	—

¹⁾ 1/32 Corner Radius

²⁾ 3/64 Corner Radius

³⁾ 0.0550" Corner Radius

d ₁ Ø Inch	l ₂ Inch	l ₁ Inch	d ₂ Ø Inch	l ₃ Inch	d ₃ Ø Inch	# of Flutes	Pilot Mounting Ø Inch	Pilot Ø min	Pilot Ø max	Pack Qty	G705	G706
3/4	1/2	2.13/16	1/4	7/8	1/2	4	3/16	5/16	11/16	1	—	8203318 ³⁾
25/32	1.1/4	5.3/8	1/2	3.5/8	11/16	3	3/16	5/16	23/32	1	8203303	—
13/16	1.1/4	5.3/8	1/2	3.5/8	3/4	3	3/16	5/16	3/4	1	8203304	—
13/16	1/2	2.13/16	1/4	7/8	1/2	4	3/16	5/16	3/4	1	—	8203319 ³⁾
7/8	1.1/4	5.3/8	1/2	3.5/8	3/4	3	3/16	5/16	13/16	1	8203305	—
7/8	1/2	2.13/16	1/4	7/8	1/2	4	3/16	5/16	13/16	1	—	8203320 ³⁾
15/16	1.1/4	5.3/8	1/2	3.5/8	3/4	3	3/16	5/16	7/8	1	8203306	—
1"	1/2	2.13/16	1/4	7/8	1/2	4	3/16	3/8	15/16	1	—	8203321 ³⁾

¹⁾ 1/32 Corner Radius

²⁾ 3/64 Corner Radius

³⁾ 0.0550" Corner Radius

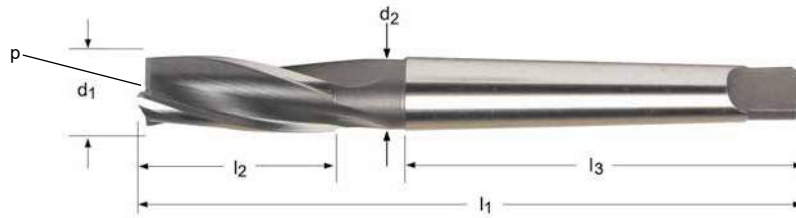
HSS COUNTERBORE



Counterbore Body, Taper Shank, Short Series - Interchangeable Pilot Type

G703

Short counterbore body, with taper shank for use with detachable pilots which align counterbore to existing drilled hole. 3 & 5 Flute designs for less chatter.



G703

HSS



ANSI



1/4 - 2.1/2

d ₁ Ø Inch	l ₂ Inch	l ₁ Inch	MTS	d ₂ Neck Dia. Inch	l ₃ Shank Length Inch	# of Flutes	pilot (p) mounting Ø Inch	pilot Ø min	pilot Ø max	Pack Qty	G703
1/2	1.1/4	4.5/16	1	29/64	2.9/16	3	3/16	1/4	7/16	1	8203197
11/16	1.1/4	5.1/8	2	5/8	3.1/8	3	3/16	1/4	5/8	1	8203198
3/4	1.1/2	5.3/8	2	21/32	3.1/8	3	1/4	5/16	11/16	1	8203199
13/16	1.1/2	5.3/8	2	21/32	3.1/8	3	1/4	5/16	3/4	1	8203200
7/8	1.1/2	5.3/8	2	21/32	3.1/8	3	1/4	5/16	13/16	1	8203201
15/16	1.1/2	6.1/8	2	7/8	3.7/8	3	1/4	5/16	7/8	1	8203202
1"	1.3/4	6.3/8	3	7/8	3.7/8	3	5/16	3/8	15/16	1	8203203
1.1/16	1.3/4	6.3/8	3	7/8	3.7/8	3	5/16	3/8	1"	1	8203204
1.1/8	1.3/4	6.3/8	3	7/8	3.7/8	3	5/16	3/8	1.1/16	1	8203205
1.3/16	1.3/4	6.3/8	3	7/8	3.7/8	3	5/16	3/8	1.1/8	1	8203206
1.1/4	2"	6.5/8	3	7/8	3.7/8	5	3/8	7/16	1.3/16	1	8203207
1.3/8	2"	6.5/8	3	7/8	3.7/8	5	3/8	7/16	1.5/16	1	8203208
1.1/2	2"	7.7/8	4	1.3/16	4.7/8	5	3/8	7/16	1.7/16	1	8203209
1.5/8	2.1/4	8.1/8	4	1.3/8	4.7/8	5	7/16	1/2	1.9/16	1	8203210
2"	2.1/2	8.3/8	4	1.1/2	4.7/8	5	1/2	9/16	1.5/16	1	8203211
2.1/8	2.1/2	9.7/8	5	1.3/4	6.1/8	5	1/2	9/16	2.1/16	1	8203212

Counterbore Pilot, Detachable

G704 Interchangeable detachable pilots for use with counterbore bodies. Pilot shank diameters must match counterbore body "pilot diameter" for proper match.



G704

HSS



ANSI



3/32 - 2"

pilot Ø Inch	d ₁ Ø Inch	l ₂ Inch	l ₁ Inch	Pack Qty	G704
1/8	3/32	1/8	1.1/4	1	8203213
5/32	3/32	3/16	1.5/16	1	8203214
3/16	3/32	3/16	1.5/16	1	8203215
7/32	3/32	1/4	1.3/8	1	8203216
1/4	3/32	1/4	1.3/8	1	8203217
1/8	1/8	1/8	1.7/16	1	8203218
5/32	1/8	3/16	1.1/2	1	8203219
3/16	1/8	3/16	1.1/2	1	8203220
7/32	1/8	1/4	1.9/16	1	8203221
1/4	1/8	1/4	1.9/16	1	8203222
9/32	1/8	5/16	1.5/8	1	8203223
5/16	1/8	5/16	1.5/8	1	8203224
3/8	1/8	3/8	1.11/16	1	8203225
7/16	1/8	7/16	1.3/4	1	8203226
1/2	1/8	1/2	1.13/16	1	8203227
3/16	5/32	3/16	1.9/16	1	8203228
7/32	5/32	1/4	1.5/8	1	8203229
1/4	5/32	1/4	1.5/8	1	8203230
9/32	5/32	5/16	1.11/16	1	8203231
5/16	5/32	5/16	1.11/16	1	8203232
3/8	5/32	3/8	1.3/4	1	8203233
3/16	3/16	1/4	1.7/8	1	8203234
7/32	3/16	1/4	1.7/8	1	8203235
1/4	3/16	1/4	1.7/8	1	8203236
9/32	3/16	5/16	1.15/16	1	8203237
5/16	3/16	5/16	1.15/16	1	8203238
11/32	3/16	3/8	2"	1	8203239
3/8	3/16	3/8	2"	1	8203240
13/32	3/16	7/16	2.1/16	1	8203241
7/16	3/16	7/16	2.1/16	1	8203242
15/32	3/16	1/2	2.1/8	1	8203243
1/2	3/16	1/2	2.1/8	1	8203244
9/16	3/16	9/16	2.3/16	1	8203245
5/8	3/16	9/16	2.3/16	1	8203246
13/16	3/16	13/16	2.7/16	1	8203247

HSS COUNTERBORE



pilot Ø Inch	d ₁ Ø Inch	l ₂ Inch	l ₁ Inch	Pack Qty	G704
7/8	3/16	7/8	2.1/2	1	8203248
1/4	1/4	1/4	1.11/16	1	8203249
9/32	1/4	5/16	1.3/4	1	8203250
5/16	1/4	5/16	1.3/4	1	8203251
3/8	1/4	3/8	1.13/16	1	8203252
7/16	1/4	7/16	1.7/8	1	8203253
1/2	1/4	1/2	1.15/16	1	8203254
17/32	1/4	9/16	2"	1	8203255
9/16	1/4	9/16	2"	1	8203256
5/8	1/4	5/8	2.1/16	1	8203257
11/16	1/4	11/16	2.1/8	1	8203258
3/4	1/4	3/4	2.3/16	1	8203259
13/16	1/4	7/8	2.5/16	1	8203260
1"	1/4	1"	2.7/16	1	8203261
3/8	5/16	3/8	2"	1	8203262
7/16	5/16	7/16	2.1/16	1	8203263
1/2	5/16	1/2	2.1/8	1	8203264
9/16	5/16	9/16	2.3/16	1	8203265
5/8	5/16	5/8	2.1/4	1	8203266
11/16	5/16	11/16	2.5/16	1	8203267
3/4	5/16	3/4	2.3/8	1	8203268
13/16	5/16	7/8	2.1/2	1	8203269
15/16	5/16	1"	2.5/8	1	8203270
1"	5/16	1"	2.5/8	1	8203271
7/16	3/8	7/16	2.5/16	1	8203272
1/2	3/8	1/2	2.3/8	1	8203273
9/16	3/8	9/16	2.7/16	1	8203274
5/8	3/8	5/8	2.1/2	1	8203275
11/16	3/8	11/16	2.9/16	1	8203276
3/4	3/8	3/4	2.5/8	1	8203277
13/16	3/8	7/8	2.3/4	1	8203278
7/8	3/8	7/8	2.3/4	1	8203279
15/16	3/8	1"	2.5/8	1	8203280
9/16	7/16	5/8	2.7/8	1	8203281
11/16	7/16	3/4	3"	1	8203282
3/4	7/16	3/4	3"	1	8203283
13/16	7/16	7/8	3.1/8	1	8203284
7/8	7/16	7/8	3.1/8	1	8203285
15/16	7/16	1"	3.1/4	1	8203286
1"	7/16	1"	3.1/4	1	8203287
9/16	1/2	5/8	3.1/8	1	8203288
1"	1/2	1"	3.1/2	1	8203289
1.1/2	1/2	1.1/2	4"	1	8203290

List Number Index - Miscellaneous



Pgs. 507-511

411.....	510
430.....	510
K520.....	511
K521.....	511
1800.....	508
1815.....	508
1816.....	508
1900.....	509

SCREW EXTRACTOR

- 1800** Screw Extractor
- 1815** Screw Extractor Set, 5 piece
- 1816** Screw Extractor Set, 6 piece



1800	1815	1816
CS	CS	CS
.054 - 1.27/32	Set	Set

Nr.	d ₁ Ø Inch	Sizes in Set	d ₂ Ø Inch	Pieces per Set	l ₁ Inch	Capacity For Screws & Bolts	Pipe Sizes	Pack Qty	1800	1815set	1816set
801	0.0540		5/32		2"	3/16 - 1/4		12	6005042	—	—
802	0.0860		3/16		2.3/8	1/4 - 5/16		12	6005058	—	—
803	1/8		1/4		2.3/4	5/16 - 7/16		12	6005062	—	—
804	11/64		5/16		3"	7/16 - 9/16		6	6005066	—	—
805	1/4		7/16		3.3/8	9/16 - 3/4	1/8 - 1/4	6	6005068	—	—
806	3/8		5/8		3.3/4	3/4 - 1"	3/8	1	6005072	—	—
807	31/64		3/4		4.1/8	1 - 1.3/8	1/2	1	6005084	—	—
808	47/64		1"		4.3/8	1.3/8 - 1.3/4	3/4	1	6005089	—	—
809	31/32		1.1/4		4.5/8	1.3/4 - 2.1/8	1	1	6005093	—	—
1815		801 - 805		5		3/16 - 3/4	1/8 - 1/4	1	—	6005098	—
1816		801 - 806		6		3/16 - 1	1/8 - 3/8	1	—	—	6005103

DRILLING & TAPPING FLUID

1900 Drilling & Tapping Fluid - A heavy oil for drilling & tapping all ferrous and non-ferrous materials. Increases productivity and extends tool life. Environmentally safe.

Wax Stick - Multi-purpose wax that sticks to the tool and effectively removes heat while adding lubrication. Withstands tremendous pressure. Can be used in lieu of drilling/tapping fluids and cutting oils.

Foam - Heavy duty aerosol foam coats the tools as it foams on contact. Will not contaminate existing coolant.

Light Tapping Fluid - A light viscosity heavy duty drilling & tapping fluid for reducing torque. Ideal for use with a re-circulation system. Can be added to existing cutting oils to increase lubricity. Will not contaminate existing coolant as it will float to the surface for easy skimming.



Sizes	Style	Description	Pack Qty	1900
1/2 oz	Trial Size	Drilling & Tapping Fluid	1	6009993
4 oz	Squirt Bottle	Drilling & Tapping Fluid	24	6010002
16 oz	Squirt Bottle	Drilling & Tapping Fluid	12	8106244
16 oz	Squirt Bottle	Drilling & Tapping Fluid (single)	1	8106246
1 gal	Bottle	Drilling & Tapping Fluid	4	8106242
5 gal	Dispenser	Drilling & Tapping Fluid	1	6010003
5 gal	Pail	Drilling & Tapping Fluid	1	6009994
1 lb	Stick	Wax	24	6009998
1 lb	Stick	Wax (single)	1	6437430
20 oz	Aerosol Can	Foam	12	6010001
20 oz	Aerosol Can	Foam (single)	1	6437349
1 gal	Bottle	Light Drilling & Tapping Fluid	4	8106243
16 oz	Squirt Bottle	Light Tapping Fluid	12	8106245
16 oz	Squirt Bottle	Light Tapping Fluid (single)	1	8106247

MISCELLANEOUS



SLEEVES & KEYS

411 Taper shank (internal and external) adapters. Heat treated and externally ground. Steam tempered surface finish prevents corrosion.

430 Drill Drift. Dropped forged steel keys used for removing taper shank tools from adapting sleeves and machine spindles.

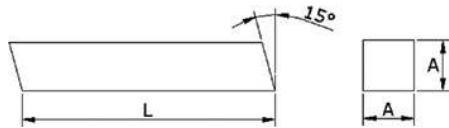


411	430
MTS #1 - #5	MTS #1 - #5

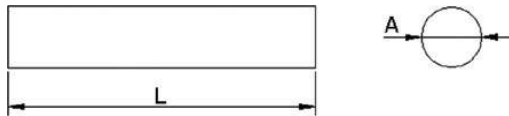
430	411	411		Pack		
MTS #	Inside	Outside	Length	Qty	411	430
Taper	Taper					
1			4.1/2	1	—	6005736
2			5.1/2	1	—	6005552
3			7	1	—	6005555
4			8	1	—	6005558
5			9.7/8	1	—	6005562
	1	2	3.1/2	1	6004701	—
	1	3	3.15/16	1	6005545	—
	1	4	4.13/16	1	6005595	—
	2	3	4.3/8	1	6005651	—
	2	4	4.13/16	1	6005690	—
	3	4	5.5/16	1	6005724	—
	3	5	6.1/16	1	6005728	—
	4	5	6.1/2	1	6005731	—
	5	6	8.1/2	1	6005733	—

TOOL BIT BLANKS

K520 Cobalt ground blank with 15° beveled ends



K521 Cobalt round blank



K522 Cobalt rectangular blank



Sizes	Overall Length	K520
4	100	5982467
5	160	5982472
6	100	5982327
6	160	5982332
6	200	5982336
8	100	5982358
8	160	5982361
8	200	5982365
10	100	5982322
10	160	5982330
10	200	5982333
12	100	5982344
12	160	5982348
12	200	5982355
14	160	5982363
14	200	5982367
16	100	5982371
16	160	5982374
16	200	5982378
20	160	5982387
20	200	5982392
25	200	5982403
3/16	2.1/2	5982304
1/4	2.1/2	5982311
1/4	4"	5982314
5/16	2.1/2	5982309
5/16	3"	5982313
5/16	4"	5982316
3/8	3"	5982427
3/8	4"	5982458
3/8	6"	5982464
7/16	3.1/2	5982354
1/2	4"	5982303
1/2	6"	5982305
5/8	4.1/2	5982319
5/8	6"	5982323

Sizes	Overall Length	K521
3	100	5982442
4	100	5982451
5	160	5982461
6	100	5982357
6	160	5982400
8	100	5982474
8	160	5982478
8	200	5982480
10	100	5982386
10	200	5982397
12	100	5982401
12	200	5982408
14	200	5982416
16	200	5982430
20	200	5982439

A Height	B Width	Overall Length	K522
10	3	200	5982321
12	3	200	5982342
10	4	200	5982331
16	4	200	5982398
20	4	200	5982438
18	5	200	5982417
20	5	200	5982444
10	6	200	5982335
12	6	200	5982366
16	6	200	5982404
20	6	200	5982447
25	6	200	5982460
12	8	200	5982373
16	8	200	5982413
20	8	200	5982450
12	10	200	5982338
16	10	200	5982385
20	10	200	5982426
25	12	200	5982455
25	16	200	5982457

Technical Section - Icon Descriptions

Material



Carbide



High Speed Steel



High Speed Cobalt



High Speed Powder
Metallurgy Steel



High Speed Cobalt
Powder Metallurgy Steel



High Speed Steel
and Carbide



Chromium Steel

Coating



Bright



Steam Tempered



Nitride



Nitride/ Steam Tempered



Bronze



Titanium Aluminium Nitride



Titanium Carbo-Nitride



Titanium Nitride



Bright/ Steam Tempered



Bright/ Titanium Nitride



Steam Tempered/ Bronze



Titanium Aluminium Nitride - Top



Titanium Nitride - Top



Ti-phon
(TiAlCrSiN)



Purple / Bronze
(Dual oxide surface treatment)



Alcrona Top
(AlCrN - Top)



Aluminium Titanium Carbo-Nitride



Aluminium Titanium Nitride



Zirconium Coating

Technical Section - Icon Descriptions

Common Icons

Direction



Right hand rotation



Left hand rotation

Depth



Drilling icons

Point Angle



Countersink °



60° Countersink



82° Countersink



90° Countersink

Form



Normal Helix



Quick Helix



Continuously Thinned Web

Coolant



Internal Coolant

Technical Section - Icon Descriptions

Drilling icons

Shank



Straight Shank



Morse taper shank



DIN 6535 HA
(cylindrical)



DIN 6535 HE



Reduced shank



Threaded Hex Shank



DIN 6535 HB / HE



DIN 6535 HB
(Weldon Shank)

Manufacturing Standards



Technical Section - Icon Descriptions

Reaming - Countersink Icons

Taper Gradient



Imperial
Standard
Taper



Metric
Standard
Taper

Tolerance



Industry standard
hole tolerance



Specific
Reamer
Tolerance



ISO Tolerance
for shafts

Application



Countersink



Counterbore

Countersink °



60°



82°



90°



100°

Shank



Straight



Morse taper

Manufacturing Standards



DORMER



DIN
206



DIN
212



DIN
311



BS
328



DIN
334C



DIN
334D



DIN
335A



DIN
335C



DIN
373



DIN
8050



DIN
8051



DIN
8093



DIN
8094



ANSI

Technical Section - Icon Descriptions

Threading icons

Thread form



Metric coarse



Metric fine



Unified Coarse



Unified Fine



Unified Special



British standard pipe fastening - G series



National taper pipe



National taper pipe dryseal



National straight pipe dryseal



National straight pipe mechanical



ISO Metric Coarse to DIN8140-2



British standard pipe taper - Rc Series

Flute Geometry



Straight Flute



Spiral Point



Fluteless - thread forming



15° Helix



17° Helix



27° Helix



30° Helix



40° Helix



45° Helix



50° Helix



52° Helix



Straight Flute (hand tap)

Hole Type



Through hole



Blind hole



Through or blind hole

Technical Section - Icon Descriptions

Threading icons

Chamfer



Plug chamfer



Semi-bottoming



Full-bottoming



Semi-bottoming



Plug



Taper

Tolerance



Common Class of fit



Multiple Classes of fit



Closer class of fit for accuracy



Common metric class of fit



Class of fit outside Std. for high strength or abrasive materials



Normal

Standards



Technical Section - Icon Descriptions

Milling icons

Type



For steels with low to high resistance



For soft and malleable materials

Application



Slotting P9 tolerance



Slotting



Finishing (side cutting)



Roughing



Ball nose



Corner radius inside



Corner rounding outside

Direction



Slotting, ramping, plunging



Slotting, ramping



Finishing (side cutting)

Cut Length



Extra short



Short



Medium



Long



Extra long

Technical Section - Icon Descriptions

Milling icons

Diameter
tolerance



Industry standard shaft tolerances

Helix Angle



Unequal
Helix

of teeth
or flutes



Shank



Straight Shank



Weldon Shank



Technical Section - General

TOOL MATERIALS

High Speed Steel

HSS

A medium-alloyed high speed steel that has good machinability and good performance. HSS exhibits hardness, toughness and wear resistance characteristics that make it attractive in a wide range of applications, for example in drills and taps.

Cobalt High Speed Steel

HSS-E

This high speed steel contains cobalt for increased hot hardness. The composition of HSCo is a good combination of toughness and hardness. It has good machinability and good wear resistance, which makes it usable for drills, taps, milling cutters and reamers.

Non Cobalt Powder Metallurgy Steel

HSS PM

Has a finer and more consistent grain structure than HSCo resulting in a tougher product. Tool life and wear resistance is normally higher than HSCo and this grade has superior edge strength and rigidity. Mainly used for milling cutters and taps.

Sintered Cobalt High Speed Steel

HSS-E PM

HSCo-XP is a Cobalt high speed steel which has been produced using powder metallurgy technology. High speed steel produced by this method exhibits superior toughness and grindability. Taps and milling cutters find particular advantage when manufactured from XP grade steel.

Chromium Steel

CS

Chromium steel is a tool steel in which the principal alloying element is Chromium. It is used only for the manufacture of taps and dies. This steel has lower hot hardness properties in comparison with high speed steels. Suited for hand tap applications.

	Grade	Hardness (HV10)	C %	W %	Mo %	Cr %	V %	Co %	Tool Material
HSS	M2	810-850	0.9	6.4	5.0	4.2	1.8	-	HSS
HSS-E	M35	830-870	0.93	6.4	5.0	4.2	1.8	4.8	HSCO
	M42	870-960	1.08	1.5	9.4	3.9	1.2	8.0	
HSS PM	-	830-870	0.9	6.25	5.0	4.2	1.9	-	HSS Powder Metal
HSS-E PM	ASP 2017	860-900	0.8	3.0	3.0	4.0	1.0	8.0	HSCO Powder Metal
	ASP 2030	870-910	1.28	6.4	5.0	4.2	3.1	8.5	
	ASP 2052	870-910	1.6	10.5	2.0	4.8	5.0	8.0	
CS	-	775-825	1.03	-	-	1.5	-	-	Chromium Steel

Technical Section - General

CARBIDE MATERIALS

Carbide Materials (or Hard Materials)

HM

A sintered powder metallurgy steel, consisting of a metallic carbide composite with binder metal. The most central raw material is tungsten carbide (WC). Tungsten carbide contributes to the hardness of the material. Tantalum carbide (TaC), titanium carbide (TiC) and niobium carbide (NbC) complements WC and adjusts the properties to what is desired. These three materials are called cubic carbides. Cobalt (Co) acts as a binder and keeps the material together.

Carbide materials are often characterised by high compression strength, high hardness and therefore high wear resistance, but also by limited flexural strength and toughness. Carbide is used in taps, reamers, milling cutters, drills and thread milling cutters.

Properties	HSS materials	Carbide materials	K10/30F (often used for solid tools)
Hardness (HV30)	800-950	1300-1800	1600
Density (g/cm ³)	8.0-9.0	7.2-15	14.45
Compressive strength (N/mm ²)	3000-4000	3000-8000	6250
Flexural strength, (bending) (N/mm ²)	2500-4000	1000-4700	4300
Heat resistance (°C)	550	1000	900
E-module (KN/mm ²)	260-300	460-630	580
Grain size (µm)	-	0.2-10	0.8

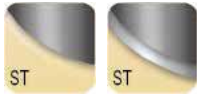
The combination of hard particle (WC) and binder metal (Co) give the following changes in characteristics.

Characteristic	Higher WC content give	Higher Co content give
Hardness	Higher hardness	Lower hardness
Compressive strength (CS)	Higher CS	Lower CS
Bending strength (BS)	Lower BS	Higher BS

Grain size also influences the material properties. Small grain sizes means higher hardness and coarse grains give more toughness.

Technical Section - General

SURFACE TREATMENTS



Steam Tempering

Steam tempering gives a strongly adhering blue oxide surface that acts to retain cutting fluid and prevent chip to tool welding, thereby counteracting the formation of a built-up edge. Steam tempering can be applied to any bright tool but is most effective on drills and taps.



Bronze Finish

The bronze finish is a thin oxide layer formed on the tool surface and it is applied principally to Cobalt and Vanadium high speed steels.



Nitriding (FeN)

Nitriding is a process that is used to increase the hardness and wear resistance of the surface of a tool. It is particularly suitable for taps that are used on abrasive materials such as cast iron, bakelite, etc. Nitriding is used on twist drills when it is desirable to increase the strength and wear resistance of the cylindrical lands.

SURFACE COATINGS



Titanium Nitride Coating (TiN)

Titanium Nitride is a gold colored ceramic coating applied by physical vapour deposition (PVD). High hardness combined with low friction properties ensures considerably longer tool life, or alternatively, better cutting performance from tools which have not been coated. TiN coating is used mainly for drills and taps.



Titanium Carbon Nitride Coating (TiCN)

Titanium Carbon Nitride is a ceramic coating applied by PVD coating technology. TiCN is harder than TiN and has a lower coefficient of friction. Its hardness and toughness in combination with good wear resistance ensures that it finds its principal application in the field of milling to enhance the performance of milling cutters.



Titanium Aluminum Nitride Coating (TiAlN)

Titanium Aluminium Nitride is a multi layer ceramic coating applied by PVD coating technology, which exhibits high toughness and oxidation stability. These properties make it ideal for higher speeds and feeds, whilst at the same time improving tool life TiAlN is suitable for drilling and tapping. It is recommended to use TiAlN when machining dry.

Technical Section - General



Chromium Nitride Coating (CrN)

CrN is an excellent coating for aluminum alloys, copper alloys and low alloyed steel materials. CrN can also be used as an alternative on Titanium and Nickel alloys. This coating has a low tendency for built-up edges.



Alcrona Top (AlCrN Top)

Alcrona Top is an aluminum chromium nitride coating mostly used for milling cutters. The coatings hot hardness and high oxidation resistance are two unique properties. When machining applications involving heavy mechanical and thermal stresses, these properties translate into supreme wear resistance.



Hardlube (TiAlN/WC/C)

Super B is a Titanium Aluminum Nitride + Tungsten Carbide + Carbon Coating used for wet and minimal lubrication machining in drilling, milling and tapping applications. Very effective for cast iron, hardened steels and heat resistant super alloys.

SURFACE TREATMENT / COATING PROPERTIES

Surface Treatments	Color	Coating material	Hardness (HV)	Thick-ness (µm)	Coating structure	Frict. coeff. against steel	Max. appl. temp. (°C)
ST	Dark grey	Fe 304	400	Max. 5	Conversion into the surface	–	550
Bronze	Bronze	Fe 304	400	Max. 5	Conversion into the surface	–	550
N	Grey	FeN	1300	20	Diffusion zone	–	550
TiN	Gold	TiN	2300	1-4	Mono-layer	0.4	600
TiCN	Blue grey	TiCN	3000	1-4	Multi-layer gradient	0.4	500
TiAlN	Black grey	TiAlN	3300	3	Nano structured	0.3-0.35	900
CrN	Silver grey	CrN	1750	3-4	Mono-layer	0.5	700
Alcrona Top	Blue grey	AlCrN Top	3200		Mono-layer	0.35	1100
Super B	Black	TiAlN+ WC/C	3000	2-6	Multi-layer lamellar	0.2	800

Technical Section - General

DECIMAL EQUIVALENTS

Size	Decimal Equivalent	Size	Decimal Equivalent	Size	Decimal Equivalent	Size	Decimal Equivalent	Size	Decimal Equivalent	Size	Decimal Equivalent
80	.0135	1/16	.0625	3.3 mm	.1299	5.4 mm	.2126	O	.3160	13.50 mm	.5315
0.35 mm	.0138	1.6 mm	.0630	3.4 mm	.1339	3	.2130	8.1 mm	.3189	35/64	.5469
79	.0145	52	.0635	29	.1360	5.5 mm	.2165	8.2 mm	.3228	14.00 mm	.5512
1/64	.0156	1.65 mm	.0650	3.5 mm	.1378	7/32	.2188	P	.3230	9/16	.5625
.4 mm	.0157	1.7 mm	.0669	28	.1405	5.6 mm	.2205	8.25 mm	.3248	14.50 mm	.5709
78	.0160	51	.0670	9/64	.1406	2	.2210	8.3 mm	.3268	37/64	.5781
.45 mm	.0177	1.75 mm	.0689	3.6 mm	.1417	5.7 mm	.2244	21/64	.3281	15.00 mm	.5906
77	.0180	50	.0700	27	.1440	5.75 mm	.2264	8.4 mm	.3307	19/32	.5938
.5 mm	.0197	1.8 mm	.0709	3.7 mm	.1457	1	.2280	Q	.3320	39/64	.6094
76	.0200	1.85 mm	.0728	26	.1470	5.8 mm	.2283	8.5 mm	.3346	15.50 mm	.6102
75	.0210	49	.0730	3.75 mm	.1476	5.9 mm	.2323	8.6 mm	.3386	5/8	.6250
.55 mm	.0217	1.9 mm	.0748	25	.1495	A	.2340	R	.3390	16.00 mm	.6299
74	.0225	48	.0760	3.8 mm	.1496	15/64	.2344	8.7 mm	.3425	41/64	.6406
.6 mm	.0236	1.95 mm	.0768	24	.1520	6 mm	.2362	11/32	.3438	16.50 mm	.6496
73	.0240	5/64	.0781	3.9 mm	.1535	B	.2380	8.75 mm	.3445	21/32	.6562
72	.0250	47	.0785	23	.1540	6.1 mm	.2402	8.8 mm	.3465	17.00 mm	.6693
.65 mm	.0256	2 mm	.0787	5/32	.1562	C	.2420	S	.3480	43/64	.6719
71	.0260	2.05 mm	.0807	22	.1570	6.2 mm	.2441	8.90 mm	.3504	11/16	.6875
.7 mm	.0276	46	.0810	4 mm	.1575	D	.2460	9.00 mm	.3543	17.50 mm	.6890
70	.0280	45	.0820	21	.1590	6.25 mm	.2461	T	.3580	45/64	.7031
.69	.0292	2.1 mm	.0827	20	.1610	6.3 mm	.2480	9.10 mm	.3583	18.00 mm	.7087
.75 mm	.0295	2.15 mm	.0846	4.1 mm	.1614	E	.2500	23/64	.3594	23/32	.7188
68	.0310	44	.0860	4.2 mm	.1654	1/4	.2500	9.20 mm	.3622	18.50 mm	.7283
1/32	.0312	2.2 mm	.0866	19	.1660	6.4 mm	.2520	9.25 mm	.3642	47/64	.7344
.8 mm	.0315	2.25 mm	.0886	4.25 mm	.1673	6.5 mm	.2559	9.30 mm	.3661	19.00 mm	.7480
67	.0320	43	.0890	4.3 mm	.1693	F	.2570	U	.3680	3/4	.7500
66	.0330	2.3 mm	.0906	18	.1695	6.6 mm	.2598	9.40 mm	.3701	49/64	.7656
.85 mm	.0335	2.35 mm	.0925	11/64	.1719	G	.2610	9.50 mm	.3740	19.50 mm	.7677
65	.0350	42	.0935	17	.1730	6.7 mm	.2638	3/8	.3750	25/32	.7812
.9 mm	.0354	3/32	.0938	4.4 mm	.1732	17/64	.2656	V	.3770	20.00 mm	.7874
64	.0360	2.4 mm	.0945	16	.1770	6.75 mm	.2657	9.60 mm	.3780	51/64	.7969
63	.0370	41	.0960	4.5 mm	.1772	H	.2660	9.70 mm	.3819	20.50 mm	.8071
.95 mm	.0374	2.45 mm	.0965	15	.1800	6.8 mm	.2677	9.75 mm	.3839	13/16	.8125
62	.0380	40	.0980	4.6 mm	.1811	6.9 mm	.2717	9.80 mm	.3858	21.00 mm	.8268
61	.0390	2.5 mm	.0984	14	.1820	I	.2720	W	.3860	53/64	.8281
1 mm	.0394	39	.0995	13	.1850	7 mm	.2756	9.90 mm	.3898	27/32	.8438
60	.0400	38	.1015	4.7 mm	.1850	J	.2770	25/64	.3906	21.50 mm	.8465
59	.0410	2.60 mm	.1024	4.75 mm	.1870	7.1 mm	.2795	10.00 mm	.3937	55/64	.8594
1.05 mm	.0413	37	.1040	3/16	.1875	K	.2810	X	.3970	22.00 mm	.8661
58	.0420	2.7 mm	.1063	4.8 mm	.1890	9/32	.2812	Y	.4040	7/8	.8750
57	.0430	36	.1065	12	.1890	7.2 mm	.2835	13/32	.4062	22.50 mm	.8858
1.1 mm	.0433	2.75 mm	.1083	11	.1910	7.25 mm	.2854	Z	.4130	57/64	.8906
1.15 mm	.0453	7/64	.1094	4.9 mm	.1929	7.3 mm	.2874	10.50 mm	.4134	23.00 mm	.9055
56	.0465	35	.1100	10	.1935	L	.2900	27/64	.4219	29/32	.9062
3/64	.0469	2.8 mm	.1102	9	.1960	7.4 mm	.2913	11.00 mm	.4331	59/64	.9219
1.2 mm	.0472	34	.1110	5 mm	.1969	M	.2950	7/16	.4375	23.50 mm	.9252
1.25 mm	.0492	33	.1130	8	.1990	7.5 mm	.2953	11.50 mm	.4528	15/16	.9375
1.3 mm	.0512	2.9 mm	.1142	5.1 mm	.2008	19/64	.2969	29/64	.4531	24.00 mm	.9449
55	.0520	32	.1160	7	.2010	7.6 mm	.2992	15/32	.4688	61/64	.9531
1.35 mm	.0531	3 mm	.1181	13/64	.2031	N	.3020	12.00 mm	.4724	24.50 mm	.9646
54	.0550	31	.1200	6	.2040	7.7 mm	.3031	31/64	.4844	31/32	.9688
1.4 mm	.0551	3.1 mm	.1220	5.2 mm	.2047	7.75 mm	.3051	12.50 mm	.4921	25.00 mm	.9843
1.45 mm	.0571	1/8	.1250	5	.2055	7.8 mm	.3071	1/2	.5000	63/64	.9844
1.5 mm	.0591	3.2 mm	.1260	5.25 mm	.2067	7.9 mm	.3110	13.00 mm	.5118	1.0000	1.0000
53	.0595	3.25 mm	.1280	5.3 mm	.2087	5/16	.3125	33/64	.5156		
1.55 mm	.0610	30	.1285	4	.2090	8 mm	.3150	17/32	.5312		

Technical Section - General

HARDNESS CONVERSION TABLE

Rockwell Hardness			Brinell	Tensile Strength
C	B	A	Hardness	(Lbs./Sq.In.)
70	—	86.5	780	—
69	—	86.0	762	—
68	—	85.5	745	—
67	—	85.0	728	—
66	—	84.5	712	—
65	—	84.0	697	—
64	—	83.5	682	—
63	—	83.0	668	—
62	—	82.5	653	—
61	—	82.0	640	—
60	—	81.0	627	314,000
59	—	80.5	614	307,000
58	—	80.0	601	299,000
57	—	79.5	578	291,000
56	—	79.0	567	284,000
55	—	78.5	555	277,000
54	—	78.0	545	270,000
53	—	77.5	534	263,000
52	—	77.0	514	256,000
51	—	76.5	505	250,000
50	—	76.0	495	243,000
49	—	75.5	477	236,000
48	—	75.0	469	230,000
47	—	74.0	461	223,000
46	115	73.5	444	217,000
45	115	73.0	429	211,000
44	114	72.5	415	205,000
43	114	72.0	408	200,000
42	113	71.5	401	195,000
41	112	71.0	388	188,000
40	112	70.5	375	182,000
39	111	70.0	369	176,000

Rockwell Hardness			Brinell	Tensile Strength
C	B	A	Hardness	(Lbs./Sq.In.)
38	110	69.5	363	171,000
37	110	69.0	352	167,000
36	109	68.5	341	162,000
35	109	68.0	331	158,000
34	108	67.5	321	153,000
33	108	67.0	311	148,000
32	107	66.5	302	144,000
31	106	66.0	293	140,000
30	105	65.5	285	136,000
29	104	65.0	277	133,000
28	104	64.5	269	131,000
27	103	64.0	265	130,000
26	103	63.5	262	128,000
25	102	63.0	255	125,000
24	102	62.5	248	122,000
23	101	62.0	241	119,000
22	100	61.5	235	116,000
21	99	61.0	229	113,000
20	98	60.0	223	110,000
19	97	59.5	220	108,000
18	97	59.0	217	107,000
17	96	58.0	212	104,000
16	96	57.5	207	101,000
15	95	57.0	202	99,000
14	94	56.5	200	98,000
13	93	56.0	197	97,000
12	92	55.5	192	95,000
11	92	55.0	189	94,000
10	91	54.0	187	93,000
9	90	53.5	183	91,000
8	89	53.0	179	89,000
7	88	52.5	174	87,000

LUBRICANTS

Lubricants or coolants are used on cutting tools to reduce friction or to reduce heat.

Type of Lubricant	Description	Advantages	Disadvantages
Emulsion	Emulsions or water-soluble cutting oils give lubrication properties combined with good cooling property. The oil concentrate in emulsion contains additives that give different properties like lubricators, preservatives and EP additives to improve bearing strength.	Reduces heat. Flushes away chips.	Disposal cost. Environment
Minimal lubrication	Minimal lubrication is a small amount of oil distributed with compressed air to lubricate the cutting or forming process.	Low cost. Good	Bad chip removal. Requires good set up of nozzle positioning
Oil	Cutting oils have good lubrication properties but do not provide such good cooling as water-based cutting fluids.	Good	High cost. Environment.
Dry / compressed air	Compressed air directed to the cutting process.	Clean process. Remove Chips. Low cost.	Works in a limited no. of applications.

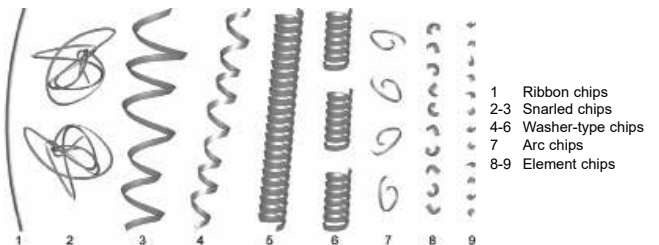


TYPES OF CHIPS

Chip formation is mostly caused by plastic deformation. This process, due to the friction generated during machining, generates heat. Heat has the positive effect of increasing the plasticity of the workpiece material, but the negative effect of increasing the wear on the tool. When workpiece material reaches its breakage point, then the chip is generated. Its form and development depend on different factors, such as:

- Chemical-physical compatibility between tool and workpiece materials
- Cutting operation
- Cutting conditions (speed, feed, material removal rate)
- Tool geometry
- Friction coefficient (with or without coating)
- Lubrication

Depending on different combinations of the above mentioned factors, the chips can turn out in many different ways (see figure below).



Chips that are shaped as small "6's & 9's" are desirable in most machining applications. This will allow for the best possible chip evacuation from the deepest cavities. Tool life is also increased dramatically when chips are kept small and manageable. When the heat generated from cutting is kept in the chip instead of the tool, wear is kept to minimum.

Technical Section - General

INDUSTRY STANDARD TOLERANCES FOR SHAFTS & HOLES

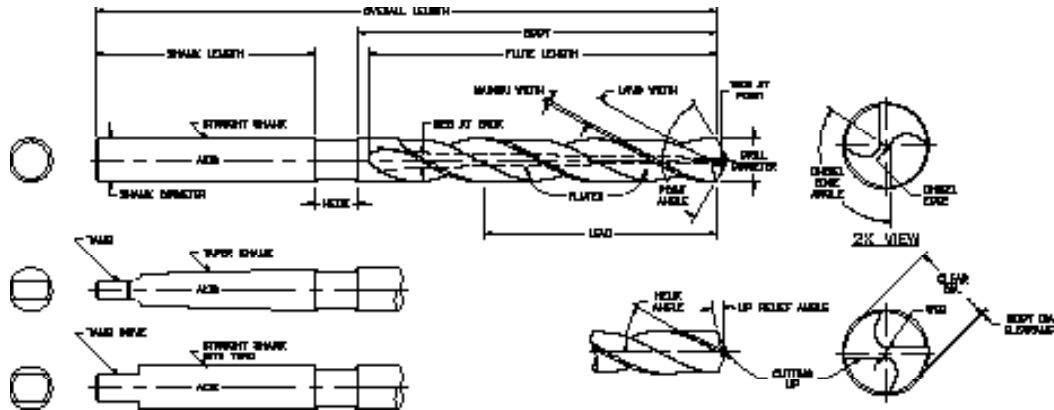
Tolerance values are shown in Microns (μm)

Formula for Microns ...1 μm = 0.001 mm / 0.000039

Tolerance	Diameter (mm)							
	$> 1 \leq 3$	$> 3 \leq 6$	$> 6 \leq 10$	$> 10 \leq 18$	$> 18 \leq 30$	$> 30 \leq 50$	$> 50 \leq 80$	$> 80 \leq 120$
	Diameter (inch)							
	> 0.039 ≤ 0.118	> 0.118 ≤ 0.236	> 0.236 ≤ 0.394	> 0.394 ≤ 0.709	> 0.709 ≤ 1.181	> 1.181 ≤ 1.968	> 1.968 ≤ 3.149	> 3.149 ≤ 4.724
	Tolerance values (μm)							
e8	-14 / -28	-20 / -38	-25 / -47	-32 / -59	-40 / -73	-50 / -89	-60 / -106	-72 / -126
f6	-6 / -12	-10 / -18	-13 / -22	-16 / -27	-20 / -33	-25 / -41	-30 / -49	-36 / -58
f7	-6 / -16	-10 / -22	-13 / -28	-16 / -34	-20 / -41	-25 / -50	-30 / -60	-36 / -71
h6	0 / -6	0 / -8	0 / -9	0 / -11	0 / -13	0 / -16	0 / -19	0 / -22
h7	0 / -10	0 / -12	0 / -15	0 / -18	0 / -21	0 / -25	0 / -30	0 / -35
h8	0 / -14	0 / -18	0 / -22	0 / -27	0 / -33	0 / -39	0 / -46	0 / -54
h9	0 / -25	0 / -30	0 / -36	0 / -43	0 / -52	0 / -62	0 / -74	0 / -87
h10	0 / -40	0 / -48	0 / -58	0 / -70	0 / -84	0 / -100	0 / -120	0 / -140
h11	0 / -60	0 / -75	0 / -90	0 / -110	0 / -130	0 / -160	0 / -190	0 / -220
h12	0 / -100	0 / -120	0 / -150	0 / -180	0 / -210	0 / -250	0 / -300	0 / -350
k10	+40 / 0	+48 / 0	+58 / 0	+70 / 0	+84 / 0	+100 / 0	+120 / 0	+140 / 0
k12	+100 / 0	+120 / 0	+150 / 0	+180 / 0	+210 / 0	+250 / 0	+300 / 0	+350 / 0
m7	+2 / +12	+4 / +16	+6 / +21	+7 / +25	+8 / +29	+9 / +34	+11 / +41	+13 / +48
js14	+/- 125	+/- 150	+/- 180	+/- 215	+/- 260	+/- 310	+/- 370	+/- 435
js16	+/- 300	+/- 375	+/- 450	+/- 550	+/- 650	+/- 800	+/- 950	+/- 1100
H7	+10 / 0	+12 / 0	+15 / 0	+18 / 0	+21 / 0	+25 / 0	+30 / 0	+35 / 0
H8	+14 / 0	+18 / 0	+22 / 0	+27 / 0	+33 / 0	+39 / 0	+46 / 0	+54 / 0
H9	+25 / 0	+30 / 0	+36 / 0	+43 / 0	+52 / 0	+62 / 0	+74 / 0	+87 / 0
H12	+100 / 0	+120 / 0	+150 / 0	+180 / 0	+210 / 0	+250 / 0	+300 / 0	+350 / 0
P9	-6 / -31	-12 / -42	-15 / -51	-18 / -61	-22 / -74	-26 / -86	-32 / -106	-37 / -124
S7	-13 / -22	-15 / -27	-17 / -32	-21 / -39	-27 / -48	-34 / -59	-42 / -72	-58 / -93

Technical Section - Drilling

DRILL NOMENCLATURE



Axis—The imaginary straight line which forms the longitudinal center line of a drill.

Backtaper—A slight decrease in diameter from front to back in the body of a drill.

Body—The portion of a drill extending from the shank or neck to the outer corners of the cutting lips.

Body Clearance Diameter—The portion of the land that has been cut away so it will not bind against the walls of the hole.

Chisel-Edge—The edge at the end of the web that connects the cutting lips.

Chisel-Edge Angle—The included angle between the chisel-edge and cutting lip, as viewed from the end of a drill.

Clearance Diameter—The diameter over the cut away portion of the drill lands.

Drill—A rotary end cutting tool having one or more cutting lips, and having one or more helical or straight flutes for the passage of chips and the admission of a cutting fluid.

Drill Diameter—The diameter over the margins of a drill measured at the point.

Flute Length—The length from the outer corners of the cutting lips to the extreme back of the flutes. Includes the sweep of the tool used to generate the flutes and therefore does not indicate the usable length of flutes.

Flutes—Helical or straight grooves cut or formed in the body of a drill to provide cutting lips, permit removal of chips, and allow cutting fluid to reach the cutting lips.

Helix Angle—The angle formed by the leading edge of the land with a plane containing the axis of a drill.

Land—The peripheral portion of the body between adjacent flutes.

Land Width—The distance between the leading edge and heel of the land; measured at a right angle to the leading edge.

Lead—The axial advance of a leading edge of the land in one turn around the circumference.

Lip Relief Angle—The axial relief angle at the outer corner of the lip; measured by projection to a plane tangent to the periphery at the outer corner of the lip.

Lips—The cutting edges of a two flute drill extending from the chisel-edge to the periphery.

Margin—The cylindrical portion of the land, which is not cut away, to provide clearance.

Neck—The section of reduced diameter between the body and the shank of a drill.

Overall Length—The length from the extreme end of the shank to the outer corners of the cutting lip. It does not include the conical shank end often used on straight shank drills, nor the conical cutting point used on both straight and taper shank drills.

Point—The cutting end of a drill, made up of the ends of the lands and the web. In form, it resembles a cone, but departs from a true cone to furnish clearance behind the cutting lips.

Conventional—Conventional Points with 118° included point angles are the most commonly used because they provide satisfactory results in a wide variety of materials. A possible limitation is that the straight chisel edge contributes to walking at the drill point, often making it necessary to spot the hole for improved accuracy.



Technical Section - Drilling

(CONTINUED FROM PRIOR PAGE)

DRILL NOMENCLATURE

Split — Split-Points (commonly called Crankshaft Points) were originally developed for use on drills designed for deep oil holes in automotive crankshafts. Since its inception, the split-point has gained widespread use and is applied to both 118° and 135° included point angles. Its main advantages are the ability to reduce thrust and eliminate walking at the drill point. This is a distinct advantage when the drill is used in a portable drill or in drilling applications where bushings cannot be used. The split-point also has two positive rake cutting edges extending to the center of the drill, which can assist as a chipbreaker to produce small chips which can readily be ejected.



Notched — Notched Points were developed for drilling tough alloys. Commonly incorporated on heavy web drills, which allow the point to withstand the higher thrust loads required in drilling these materials. As with the split-point, the Notched Point contains two additional positive rake cutting edges extending toward the center of the drill. These secondary cutting lips, which extend no further than half the original cutting lip, can assist in chip control and reduce the torque required in drilling tough materials. Notched Points can be incorporated on both 118° and 135° included point angles, making them suitable for drilling a wide variety of materials.



Point Angle—The included angle between the cutting lips projected upon a plane parallel to the drill axis and parallel to the two cutting lips.

Relative Lip Height—The difference in indicator reading between the cutting lips of a drill. Measured at a right angle to the cutting lip at a specific distance from the axis of the tool.

Shank—The part of a drill by which it is held and driven.

Tang—The flattened end of a taper shank, intended to fit into a driving slot in a socket.

Tang Drive—Two opposite parallel driving flats on the extreme end of a straight shank.

Taper Shank—Drills having conical shanks suitable for direct fitting in machine spindles, driving sleeves, or sockets. Tapered shanks generally have a tang.

Web—The central portion of the body that joins the lands. The extreme end of the web forms the chisel-edge on a two flute drill.

Web Thickness—The thickness of the web at the point, unless another specific location is indicated.

DRILLING TERMINOLOGY/ OPERATING FORMULAS

Speed — The speed of a drill is determined by the rate at which the outer periphery of the tool rotates in relation to material being cut. In general, the SFM at which a drill will operate is within a range based upon the workpiece material, its condition, hardness, and depth of hole. The deeper the hole, the greater tendency there is for more heat to be generated, due to length of drill engagement, as well as chip compaction. Thus, speed reduction is often recommended to minimize the amount of heat being generated. By increasing the SFM, fewer holes will result. Therefore, it is usually advisable to start the drilling process at a slower SFM and then increase to the maximum.

Feed — Feed rates for drilling are governed by the drill diameter machinability of materials and depth of hole. Small drills, harder materials, and deeper holes require additional considerations in selecting the proper feed rates.

The following terms and formulas can be used to determine the appropriate operating parameters.

Terms		Formulas	
IPM =	Inches Per Minute	$\text{IPR} \times \text{RPM}$	= IPM
IPR =	Inches Per Revolution	$\frac{\text{IPM}}{\text{RPM}}$	= IPR
RPM =	Revolutions Per Minute	$\frac{\text{SFM} \times 3.82}{D}$	= RPM
SFM =	Surface Feet Per Minute	$D \times \text{RPM} \times .26$	= SFM
D =	Drill Diameter		

Note: For element and tolerance information, see specific technical sections on Solid Carbide or High Speed Steel.

Technical Section - Drilling

OPTIMIZING THE DRILLING OPERATION/TROUBLESHOOTING

Drill Selection

Use the shortest drill the application will permit in order to achieve maximum tool rigidity.

Holders

Tool holders and collets must provide good concentricity between the drill and the machine spindle. Use a positive back stop to prevent the tool from backing up into the holder. Never collet the tool over the flutes or over-tighten the holder. Static runout in the tool assembly must be accurately checked and maintained.

Workpiece

A secure and rigid workpiece to minimize deflection is needed, particularly on through-hole applications.

Coolants

Coolants are recommended when drilling mild steel and high temperature alloys. The purpose of the coolant media is to direct the chips away from the cutting tool and workpiece. Excessive coolant pressure and/or too much volume can negatively affect performance. When using coolant fed drills, the coolant pressure that is required should be higher than normal. Suggested pressure for coolant fed drills is minimally 150 PSI. As the diameter of the drill is reduced, the higher the pressure. This is to assist the chip in evacuating from a more confined area.

DRILLING TROUBLESHOOTING GUIDE

Problem	Solution
Wear on Outer Corners	• Reduce cutting speed • Increase feed (IPR) • Improve direction of coolant flow • Increase coolant pressure • Add corner break
Chipping of Chisel Edge	• Check accuracy of drill runout • Check workpiece clamping accuracy and movement • Check point centrality and lip height • Increase feed rate
Chipping of Cutting Lips	• Check accuracy of drill runout • Check workpiece clamping accuracy and movement • Reduce speed • Reduce point clearance • Increase hone
Cracking of Lands	• Check movement of workpiece • Increase back taper • Check accuracy of drill runout • Chip packing; increase flute form opening or peck drill (HSS or HSCO only) • Slow down helix, horizontal drilling • Increase feed • When spot drilling, reduce feed • Improve direction of coolant flow • Increase coolant pressure
Oversize Hole	• Increase speed, reduce feed • Check workpiece clamping accuracy and movement • Check accuracy of drill runout • Chip packing, increase flute form opening or peck drill (HSS or HSCO only) • Check point centrality and lip height
Undersize Hole	• Improve direction of coolant flow • Reduce cutting speed, increase feed • Check drill diameter
Hole Not Round	• Check accuracy of drill runout • Check workpiece clamping accuracy and movement • Check point centrality and lip height • Chip packing, increase flute form opening or peck drill (HSS or HSCO only)
Drill Breakage	• Chip packing, increase flute form opening or peck drill (HSS or HSCO only) • Check workpiece clamping accuracy and movement • Check accuracy of drill runout • Reduce feed rate, increase feed rate • Improve direction of coolant flow • Increase coolant pressure

Technical Section - Drilling

HOLE SIZE/ACHIEVABLE HOLE TOLERANCES

As geometric, substrate and coating configurations become more advanced, the ability of a drill to produce a more accurate hole size increases. In general, a standard geometry tool will achieve a hole size to H12. However as the configuration of the drill becomes more complex the achievable hole size, under favorable conditions, can be as good as H8.

To offer a better insight, listed below are the product types and their achievable hole tolerances:

HSS General Purpose drills – H12

HSS / HSCo Parabolic Flute Deep Hole Drills (PFX) – H10

HSS / HSCo High performance TiN/ TiALN coated (ADX) – H9

Solid Carbide High Performance TiN / TiALN coated (CDX) – H8

NOMINAL HOLE DIAMETER (MM)

Ø (mm)	H8	H9	H10	H12
≤ 3	0 / +0.014	0 / +0.025	0 / +0.040	0 / +0.100
> 3 ≤ 6	0 / +0.018	0 / +0.030	0 / +0.048	0 / +0.120
> 6 ≤ 10	0 / +0.022	0 / +0.036	0 / +0.058	0 / +0.150
> 10 ≤ 18	0 / +0.027	0 / +0.043	0 / +0.070	0 / +0.180
> 18 ≤ 30	0 / +0.033	0 / +0.052	0 / +0.084	0 / +0.210

NOMINAL HOLE DIAMETER (INCHES)

Ø (inch)	H8	H9	H10	H12
≤ .1181	0 / +0.0006	0 / +0.0010	0 / +0.0016	0 / +0.0040
>.1181≤.2362	0 / +0.0007	0 / +0.0012	0 / +0.0019	0 / +0.0048
>.2362 ≤.3937	0 / +0.0009	0 / +0.0015	0 / +0.0023	0 / +0.0059
>.3937≤.7087	0 / +0.0011	0 / +0.0017	0 / +0.0028	0 / +0.0071
>.7087≤1.1811	0 / +0.0013	0 / +0.0021	0 / +0.0033	0 / +0.0083

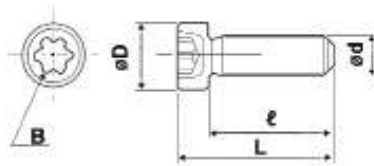
In view of the ability of some drills to produce a much tighter hole tolerance, due consideration should be given to drilled holes which are subject to secondary operations, eg. tapping, reaming. The diameter of the drill will need to be increased from what is recommended to account for the fact that the hole size produced will be smaller.

Technical Section - Drilling - Hydra

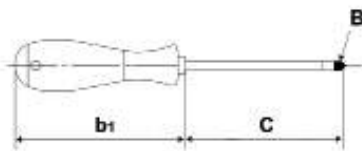
Torque Table

					TORQUE VALUES Nm (metric System)	TORQUE VALUES in/lbs (inch System)
H860	H861	H853 3xD	H855 5xD	H858 8xD		
H860N1	H861N1	12.0mm-15.0mm 31/64"-39/64"	12.0mm-15.0mm 31/64"-39/64"	14.0mm-15.0mm	0.75-0.99	6.6-8.8
H860N2	H861N2	16.0mm-18.0mm 41/64"-23/32"	16.0mm-18.0mm 41/64"-23/32"	16.0mm-18.0mm	0.93-1.24	8.2-11.0
H860N3	H861N3	19.0mm-21.0mm 49/64"-27/32"	19.0mm-21.0mm 49/64"-27/32"	19.0mm-21.0mm	1.84-2.44	16.3-21.6
H860N4	H861N3	22.0mm-24.0mm 57/64"-31/32"	22.0mm-24.0mm 57/64"-31/32"	22.0mm-24.0mm	2.73-3.72	24.2-32.9
H860N5	H861N4	25.0mm-27.0mm 1.1/64"-1.3/32"	25.0mm-27.0mm 1.1/64"-1.3/32"	25.0mm-27.0mm	4.14-5.52	36.6-48.8
H860N6	H861N5	28.0mm-33.5mm 1.1/8"-1.3/16"	28.0mm-33.5mm 1.1/8"-1.3/16"	28.0mm-33.5mm	4.97-6.63	44.0-58.7
H860N7	H861N6	35.0mm-42.5mm	35.0mm-42.5mm	35.0mm-42.5mm	7.20	63.7

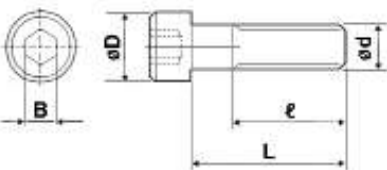
Screws and screw-drivers data



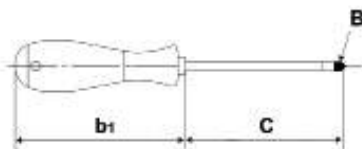
e-code	d	Pitch	L (mm)	l (mm)	D (mm)	B
H860N1	M2.2	0.45	7.5	5.7	3.5	8IP
H860N2	M2.5	0.45	9.0	7.0	4.1	10IP
H860N3	M3.0	0.50	10.5	8.0	4.9	15IP
H860N4	M3.5	0.60	11.5	8.8	5.5	15IP
H860N5	M4.0	0.70	12.5	9.5	6.0	20IP
H860N6	M4.5	0.75	14.3	10.8	6.8	25IP



code	B	C	b1
H861N1	8IP	60	104
H861N2	10IP	80	111
H861N3	15IP	80	111
H861N4	20IP	100	118
H861N5	25IP	100	118



e-code	d	Pitch	L (mm)	l (mm)	D (mm)	B
H860N7	M5.0	0.8	15	FULL	8.5	4



e-code	B	C	b1
H861N6	4	75	111

Technical Section - Drilling - Hydra

Drilling Hints & Tips with the Hydra Drill

COOLANTS

For maximum chip evacuation and tool performance, coolant use is recommended.

Emulsion coolant concentration of 6 – 8% is recommended for most applications, at a coolant pressure of 20 bar or higher. For high strength steel, stainless steels and tougher drilling applications, use a higher concentration of 10-12%. In these applications, particularly in stainless steels, it is recommended to use the maximum coolant pressure on the machine.

The Hydra-drill coolant holes provide improved web strength and reduce heat at the cutting edges for increased productivity and longer tool life.

HOLDERS

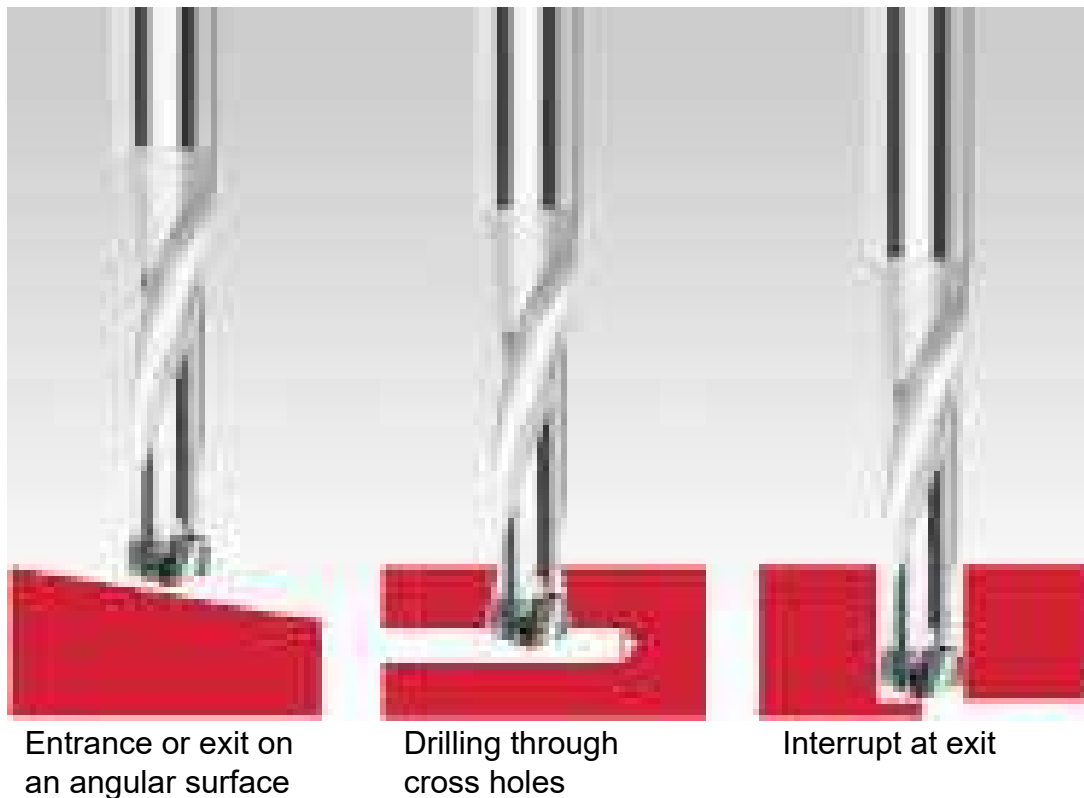
Always use tool holders and collets that provide good concentricity between the drill and the machine spindle. Use a positive stop to prevent the tool from backing up into the holder. Radial runout in the tool assembly must be accurately checked and maintained.

WORKPIECE

A secure and rigid workpiece will minimise deflection, and allow for better accuracy and true position of the hole.

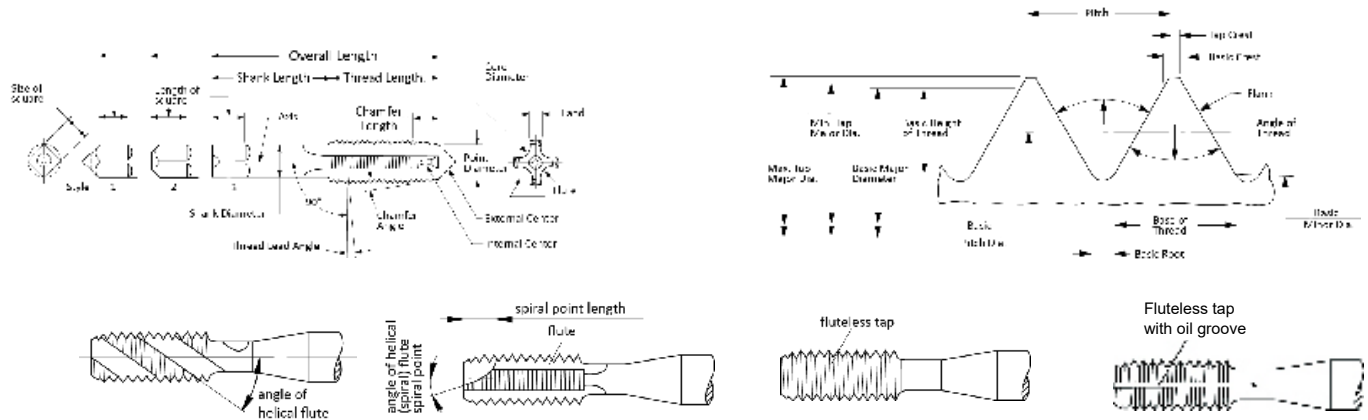
FEEDS

It is important not to underfeed the drill which will cause it to dwell and dull. This is particularly true in work hardening materials. Feed rates should be high enough for proper chip formation.



In these drilling scenarios, reducing feed rate to 1/3 (33%) is generally recommended. Drilling into an entry angle of more than 10° is NOT recommended – surface should be milled flat first.

Technical Section - Threading



Allowance: The minimum clearance or maximum interference which is intended between mating parts.

Angle of Thread: The angle included between the flanks of a thread measured in an axial plane.

Back Taper: A slight taper on the threaded portion of the tap making the pitch diameter near the shank smaller than that at the chamfer.

Basic: The theoretical or nominal standard size from which all variations are made.

Chamfer: The tapered and relieved cutting teeth at the front end of the threaded section. Common types of chamfer are taper, 8 to 10 pitches long, plug, 3 to 5 pitches and bottoming, 1 to 2 pitches.

Crest: The top surface joining the two sides or flanks of a thread.

Cutting Face: The leading side of the land.

Flute: The longitudinal channels formed on a tap to create cutting edges on the thread profile.

Heel: The following side of the land.

Height of Thread: In profile, distance between crest and bottom section of thread measured normal to the axis.

Hook Face: A concave cutting face of the land. This may be varied for different materials and conditions.

Interrupted Thread: Alternate teeth are removed in the thread helix on a tap; usually restricted to those having an odd number of flutes.

Land: One of the threaded sections between the flutes of a tap.

Lead of Thread: The distance a screw thread advances axially in one turn.

Major Diameter: The largest diameter of the screw or nut on a straight screw thread.

Minor Diameter: The smallest diameter of the screw or nut on a straight screw thread.

Neck: The reduced diameter, on some taps, between the threaded portion and the shank.

Pitch: The distance from a point on one thread to a corresponding point on the next thread, measured parallel to the axis.

Pitch Diameter: On a straight screw thread, the diameter of an imaginary cylinder where the width of the thread and the width of the space between threads is equal.

Point Diameter: The diameter at the leading end of the chamfered portion.

Radial: The straight face of a land, the plane of which passes through the axis of the tap.

Rake: The angle of the cutting face of the land in relation to an axial plane intersecting the cutting face at the major diameter.

Relief: The removal of metal behind the cutting edge to provide clearance between the part being threaded and a portion of the threaded land. Also, see back taper.

CHAMFER RELIEF: The gradual decrease in land height from cutting edge to heel on the chamfered portion of the tap land to provide radial clearance for the cutting edge.

CON-ECCENTRIC RELIEF: Radial relief in the thread form starting at the back of a concentric margin.

ECCENTRIC THREAD RELIEF: Radial relief in the thread form starting at the cutting edge and continuing to the heel.

Root: The bottom surface joining the flanks of two adjacent threads.

Side or flank of thread: The surface of the thread which connects the crest with the root.

Shank: The portion of the tap by which it is held and driven.

Spiral Point: An oblique cutting edge ground into the lands to provide a shear cutting action on the first few threads.

Square: The squared end of the tap shank.

Thread: The helical formed tooth of the tap which produces the thread in a tapped hole.

Thread Lead Angle: The angle made by the helix of the thread at the pitch diameter, with a plane perpendicular to the axis.

Threads Per Inch: The number of threads in one inch of length.

Thread:

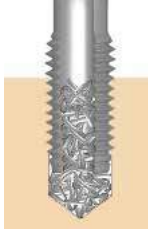
SINGLE: A thread in which lead is equal to pitch.

DOUBLE: A thread in which lead is equal to twice the pitch.

TRIPLE: A thread in which lead is equal to triple the pitch.

Technical Section - Threading

TAP GEOMETRIES & APPLICATIONS

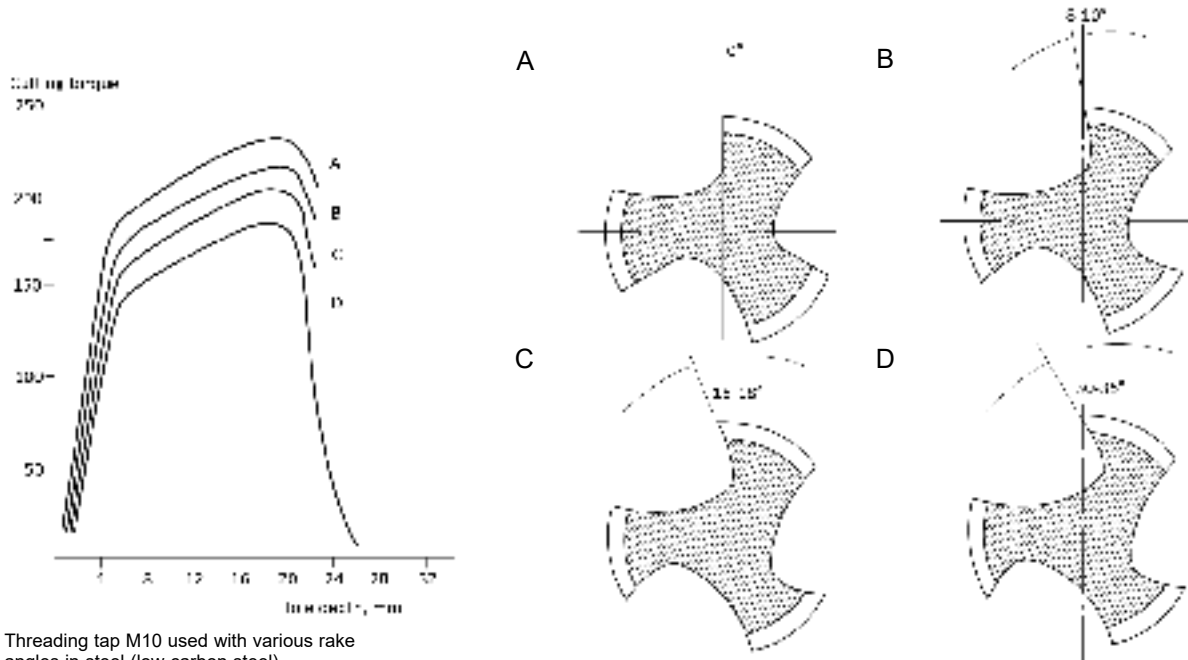
Description	Chips
Taps with straight flutes Straight flutes are the most commonly used type of tap. Suitable for use on most materials, mainly short chipping steel and cast iron, they form the basis of the program.	
Taps with interrupted thread The interrupted thread ensures less friction and therefore less resistance, which is particularly important when threading material which is resilient and difficult to machine (e.g. aluminium, bronze). It is also easier for lubricant to penetrate to the cutting edges, thus helping to minimize the torque generated	
Spiral point taps The tap has a straight fairly shallow flute and is often referred to as a gun nose or spiral point tap. The gun nose or spiral point is designed to drive the chips forward. The relatively shallow flutes ensure that the sectional strength is maximised. They also act to allow lubricant to reach the cutting edges. This type of tap is recommended for threading through holes.	
Nut taps These taps are generally used to thread nuts but can be used also on deep through holes. They have a shank diameter smaller than the nominal and a longer overall length, because their function is to accumulate nuts. They are used on special machines designed to thread huge amounts of nuts. They can work in steel and stainless steel. The first serial tap has a very long chamfer, in order to spread the cutting load on almost two thirds of the thread length.	

Description	Chips
Taps with flutes only on the chamfer lead The cutting part of the tap is formed by gun nosing in the same manner as for a spiral point tap, the function being to drive the chips forward ahead of the cutting edges. This design is extremely rigid which facilitates good machining results. However, the short length of the gun nosing limits its application to a depth of hole less than about $1.5 \times \varnothing$.	
Taps with spiral flutes Taps with spiral flutes are intended primarily for threading in blind holes. The helical flute transports the chips back away from the cutting edges and out of the hole, thus avoiding packing of chips in the flutes or at the bottom of the hole. In this way, danger of breaking the tap or damaging the thread is minimised.	
Cold forming taps Cold forming taps differ from cutting taps in that the thread is produced by plastic deformation of the component material rather than by the traditional cutting action. This means that no chips are produced by their action. The application range is materials with good formability. Tensile strength (R_m) should not exceed 1200 N/mm^2 and the elongation factor (A_5) should not be less than 10%. Cold forming taps without flutes are suitable for normal machining and are especially suitable when vertically tapping blind holes. They are also available with through coolant.	
Through coolant taps The performance of taps with through coolant holes is higher than the same taps used with external lubrication. These kinds of taps allow better evacuation of the chip, which is transported away from the cutting area itself. Wear on the cutting edge is reduced, since the cooling effect on the cutting zone is higher than the heat generation. Lubrication can be oil, emulsion or air pressurised with oil mist. Working pressure not less than 15 bar is required, but good results can be obtained with minimal lubrication.	

Technical Section - Threading

TAPPING TECHNICAL DATA

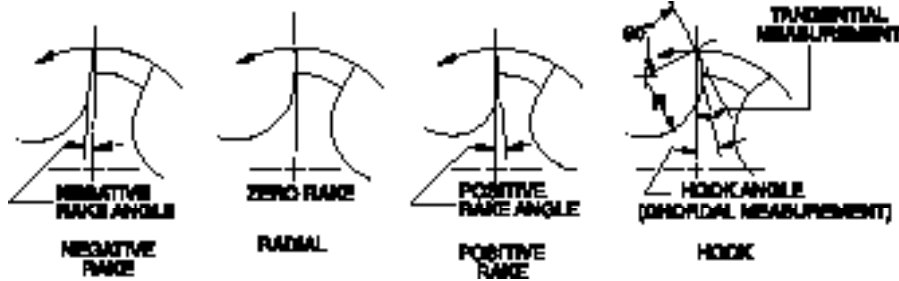
Rake Angles



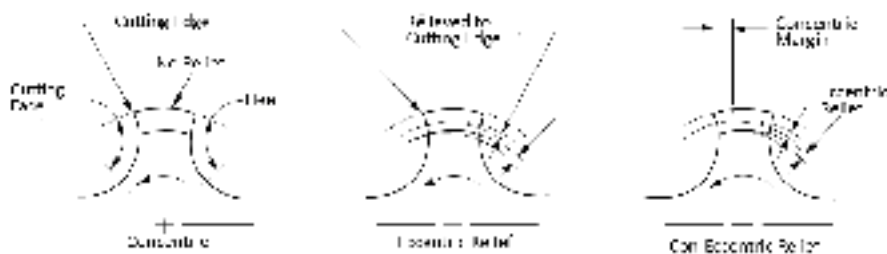
Threading tap M10 used with various rake angles in steel (low carbon steel)

The rake angle has a primary influence on cutting forces and consequently the cutting torque and surface finish of the thread. Test results made with different rake angles are shown in the above diagram, illustrating how cutting torque

decreases with a larger rake angle. There is, however, a limit. A large rake angle means lower strength of the cutting edge.



Relief Angles

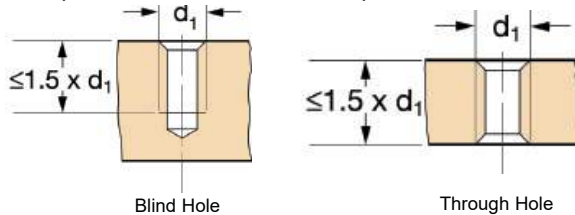


Technical Section - Threading

CUTTING CHAMFERS

The cutting part of a tap is the teeth of the chamfer on the leading end of the tap. The rest of the thread length is the cylindrical guiding part, which is slightly back-tapered for clearance. A decision on the best type of chamfer form has to be carefully made as both the tap life and quality of thread are greatly affected.

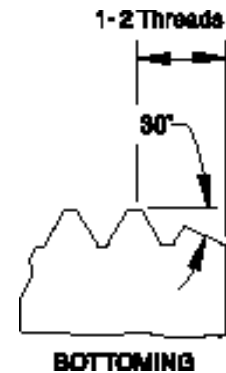
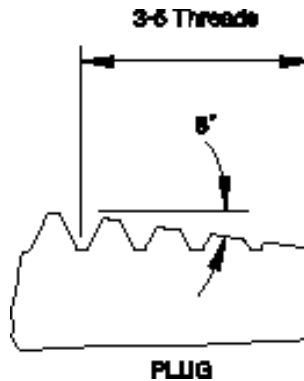
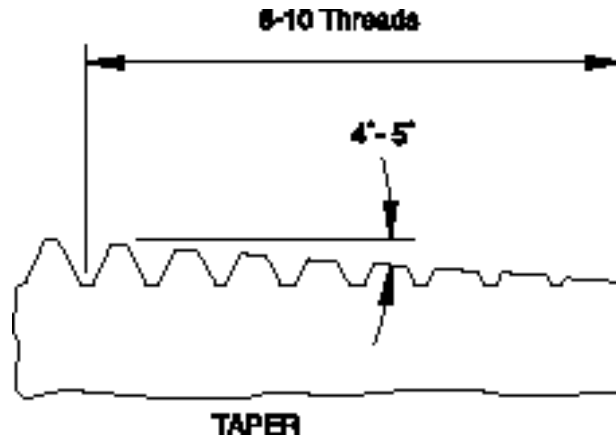
Generally, the form and length of chamfer depend on the type of hole to be tapped. Though holes do not normally cause difficulties whereas the tapping of blind holes can create certain problems associated with chip evacuation.



The length of the chamfer is determined by careful consideration of the following factors:

- The number of chamfer cutting teeth cannot be kept too low so as to avoid overloading, premature dulling and oversized or rough threads.
- A chamfer lead that is too long, however, increases the torque and the danger of breakage.

Commonly used chamfers are taper, plug and bottoming. Eight to ten cutting teeth per land are produced by a taper chamfer. A plug chamfer produces three to five cutting teeth per land and a bottoming chamfer one to two cutting teeth per land. The recommended radial relief behind the cutting edge of the chamfer portion is .004" to .005" relief per 1/16 of land width.



Tapping Speeds

Correct tapping speeds are very important in obtaining efficient tapping results. There are many factors which affect tapping speeds, some of which are listed below:

Material Factors:

- Thermo-conductivity of the material and wall thickness as it affects heat dispersion.
- Variations in carbon content of steel.
- Hard spots in material.
- Depth of hole to be tapped.
- Percentage of full thread to be tapped.

Tap Factors:

- Major diameters, pitch and lead.
- Style of tap.
- Width of lands.
- Amount of hook or rake.
- Length of chamfer. Bottoming taps normally require slower speeds than plug chamfered taps

Mechanical Factors:

- Type of tapping machine and holder; Speeds for small diameter taps are often governed by the limitation of the machine.
- Condition of tapping machine and spindle.
- Type of fixture.
- Vertical or horizontal tapping (faster speeds for vertical tapping).
- Method of feeding the tap.
- Cutting fluid used and method of application.

The optimum speed for tapping is the highest speed that conditions permit, consistent with economic tool life.

Proper tapping speeds are determined best by experiment. In the table below the speeds shown should be used as a guide only, and the suggested surface feet per minute adjusted upward or downward until the best results are obtained.

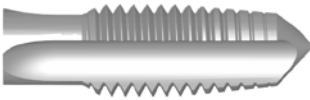
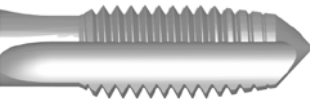
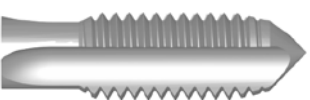
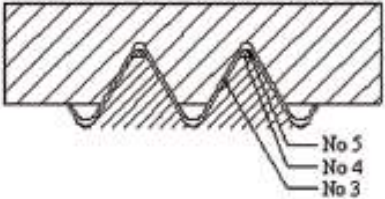
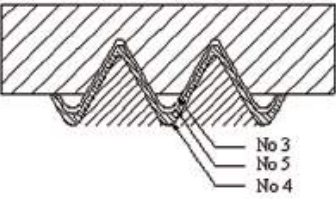
$$\text{RPM} = \frac{3.82 \times \text{SFM}}{D}$$

$$\text{SFM} = .26 \times \text{RPM} \times D$$

Technical Section - Threading

CHAMFER LENGTHS AND SERIAL TAPS

The first group (No. 1, No. 2, No. 3) includes taps with complete thread profile and the difference is in the chamfer length. The second group (No. 4, No. 5) includes taps with incomplete thread profile. They have lower pitch and outer diameter, compared to the complete standard, and longer chamfer. After using them, a finishing tap No. 3, must be used.

No. 1 =		6-8 x P	
No. 2 =		4-6 x P	
No. 3 =		2-3 x P	
No. 4 =		6-8 x P	
No. 5 =		3,5-5 x P	
 Ø ≤ M10  Ø ≥ M12			

ISO	Set code number	Including tap number
	No. 6	No. 1 + No. 2 + No. 3
	No. 7	No. 2 + No. 3
	No. 8	No. 4 + No. 5 + No. 3
	No. 9	No. 5 + No. 3
DIN	Set code number	Including tap number
	No. 8	No.3 (form C) + No.4 (form A) + No.5 (form B)
	No. 9	No.3 (form C) + No.5 (form B)
ANSI	Set code number	Including tap number
	Hand Tap (No. 6)	Taper(No.1) + Plug(No.2) + Bottoming(No.3)

Technical Section - Threading

TAPPING TECHNICAL DATA

The Relationship Between H-Limit and Class of Fit

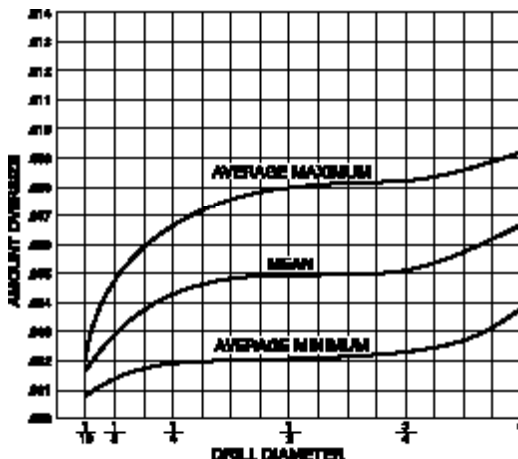
H-limits are used to properly size a tap for the threaded hole to be produced. They are selected based upon the tolerance required for the part. These tolerances are defined by the symbols class 1B, 2B, or 3B. Class 1B has the broadest tolerance and is generally applied to DIY (Do It Yourself) type nuts and bolts. Class 2B is the most common and is used for general fasteners and threaded parts. Class 3B is the tightest tolerance and used for close fit and high strength fastening applications, primarily in the automotive and aerospace industry.

Once the class of thread and part tolerance has been defined, an H-limit is selected to produce a thread that is within the minimum and maximum limits for that class of fit. These limits are the same as the Go and No Go thread plug gage dimensions. The goal is to select a tap with an H-limit that is near the middle of the part tolerance. For instance, if the total tolerance was .005", the tap should be approximately .0025" larger than the minimum limit of the part and .0025" smaller than the maximum. However, to handle the widest variety of tapping conditions, the "40% rule" is commonly used. Using this rule, the tap is placed at 40% of the part tolerance. For example, if the part tolerance is .005", multiplying .005" by 0.40 equals .002". Thus, the tap would be .002" larger than the minimum limit of the part or Go thread gage.

With the position of the tap in relationship to the part tolerance established, the selection of an H-limit number, such as H3, H4, H5, etc. is possible. H-limits are a sequence of size "steps" in .0005" increments beginning at the minimum size limit of the part, starting with H1. In other words, an H1 limit is one .0005" increment larger than the minimum limit of Go gage, an H2 is two .0005" increments (or .001) larger than the minimum limit, an H3 is three .0005" increments (or .0015") and so on. In the example above, a tap that is .002" larger than minimum limit, is four .0005" increments larger, or an H4. This would be the tap H-limit recommendation for this tolerance.

If after selecting the proper H-limit, an oversize or undersized thread exists, or if shrinkage due to heat treating or plating will occur, larger or smaller H-limits may be required to adjust to the condition.

Probable Oversize Values For Drilled Holes



Drills will normally cut a hole larger in diameter than the drill itself. The amount depends upon the rigidity of the equipment, stiffness of the drill, accuracy of the point, the material being drilled, and many other contributing factors. However, averaging all factors, the chart below shows what might be expected with standard drills without guide bushings in steel or cast iron using good drilling practices and reasonable care in the resharpening of the drills.

Drills as received from our factory will usually drill hole sizes between the minimum and mean lines. Reconditioned drills, however, may produce hole sizes between the minimum and maximum lines depending upon drill wear, margin pick-up, and accuracy of resharpening.

PROBABLE OVERSIZE DIAMETERS IN DRILLING

Drill Dia., Inch	Amount Oversize, Inch		
	Average Max	Mean	Average Min.
1/16	.002	.0015	.001
1/8	.0045	.003	.001
1/4	.0065	.004	.002

Drill Dia., Inch	Amount Oversize, Inch		
	Average Max	Mean	Average Min.
1/2	.008	.005	.002
3/4	.008	.005	.003
1	.004	.009	.007

Technical Section - Threading

PITCH DIAMETER LIMITS

Fractional and Machine Screw

All standard Ground Thread Taps will be marked with the letter G to designate Ground Thread. The letter G will be followed by the letter H to designate above basic (L below basic) and a numeral to designate the pitch diameter limits.

Example: G H3 indicates a Ground Thread Tap with pitch diameter limits .0010 to .0015 over basic

Pitch diameter limits for Taps to 1" diameter inclusive:

L1 = Basic to Basic minus .0005

H1 = Basic to Basic plus .0005

H2 = Basic plus .0005 to Basic plus .0010

H3 = Basic plus .0010 to Basic plus .0015

H4 = Basic plus .0015 to Basic plus .0020

H5 = Basic plus .0020 to Basic plus .0025

H6 = Basic plus .0025 to Basic plus .0030

Pitch Diameter limits for Taps over 1" diameter to 1-1/2" diameter inclusive:

H4 = Basic plus .0010 to Basic plus .0020

Pitch Diameter limit numbers for taps not shown above or those over 1-1/2" diameter.

For taps with H or L limit numbers not shown above or over 1-1/2" diameter for example H12 or L10, the H or L limit number divided by 2 indicates in thousandths of an inch the amount the maximum tap pitch diameter is over basic in the H series or the amount the minimum tap pitch diameter is under basic on the L series.

Metric I.S.O

Where the tap pitch diameter is over or under basic thread pitch diameter by even multiples of .00052", the tap will be marked with the letter "D" or "DU" respectively, followed by a limit number. The limit number is determined as follows:

D Limit No. = $\frac{\text{Amt. Tap PD High Limit Is Over Basic PD}}{.00052''}$

DU Limit No. = $\frac{\text{Amt. Tap PD Low Limit Is Under Basic PD}}{.00052''}$

Examples:

M1.6 x .035 - for D3 limit, max. tap PD = basic plus .0015"
Tap PD tolerance = minus .0006"

M12 x 1.75-for D6 limit, max. tap PD = basic plus .0030"
Tap PD tolerance = minus .0012"

M39 x 4-for D10 limit, max. tap PD = basic plus .0050"
Tap PD tolerance = minus .0020"

M6 x 1-for DU 4 limit, min. tap PD = basic minus .0020"
Tap PD tolerance = plus .0010"

Metric taps will be marked with a capital M followed by the nominal size in millimeters and the pitch in millimeters separated by the sign "x." For example, M1.6 x 0.35; M6 x 1; M10 x 1.5.

Specials

Special taps are to be marked with the nominal diameter and number of threads per inch and form of thread as specified by the purchaser on his order or blue print provided such specifications are reasonably correct.

Special Ground Thread taps made to the pitch diameter limits shown will also be marked with the corresponding limit number.

When taps are specified to be a certain amount oversize or undersized, it is standard practice to add or subtract this amount from the basic pitch diameter of the nominal size tap. This dimension then becomes the new minimum pitch diameter for the special tap to which Standard Tolerance for the nominal size is added.

Undersize or oversize taps will be marked with the nominal size and pitch, followed by the amount the minimum pitch diameter is over or under basic. For example, 1/2-13+.010".

Whenever possible, in the case of oversize, undersize, or other special taps, orders should specify the minimum and maximum tap pitch diameter desired.

Left hand taps will be marked "Left Hand" or "LH."

Technical Section - Threading

The limits and tolerances of external threads for unified screws are designated by the letter "A", which results in class 1A, class 2A, and class 3A screws. The nut (internal thread) limits and tolerances are designated by the letter "B" resulting in class 1B, class 2B, and class 3B.

Tolerances: The tolerance of the tapped hole in the unified series is always 1.3 times the tolerance of the screw for the same class of fit. In the American National Standard, pitch diameter tolerances on both the nut and the screw were equal with the nut above basic and the screw below basic.

Class 1A and 1B: This class of fit is intended to cover the manufacture of threaded parts where quick and easy assembly is necessary or desired and an allowance is provided to permit ready assembly.

Class 2A and 2B: This class of fit is intended to cover screws, bolts and nuts, but it is also suitable for a variety of other applications. An allowance is provided to minimize galling and seizure in assembling and use. It will also accommodate limited amount of plating, coating or finish.

Class 3A and 3B: This class of fit is provided for those applications where closeness of fit, accuracy of lead and angle of thread is important. No allowance is provided and these threads are obtained consistently only by use of high quality production equipment and checked by a very efficient system of gaging and inspection.

Unified and American standard threads have substantially the same thread form. Threads of both standards are mechanically interchangeable. The main difference between the two standards are: Variation of tolerance with size, differences in amounts of pitch diameter tolerance for external and internal threads, and differences in thread designations.

Caution: Select the proper percent of thread for the material to be tapped.

Remember: As the drilled hole becomes smaller the amount of chips to be removed becomes so great that the friction generated may require as much power as does the actual cutting.

Technical Section - Threading

TABLE OVER TAP TOLERANCE VS TOLERANCE ON INTERNAL THREAD (NUT)

Tolerance class, Tap			Tolerance, Internal thread (Nut)					Application
ISO	DIN	ANSI BS						
ISO 1	4 H	3 B	4 H	5 H				Fit without allowance
ISO 2	6 H	2 B	4 G	5 G	6 H			Normal fit
ISO 3	6 G	1 B			6 G	7 H	8 H	Fit with large allowance
-	7 G	-				7 G	8 G	Loose fit for following treatment or coating

Thread tolerances for taps are collected in standard reference DIN 13.

Normal tolerance is ISO 2 (6H) on taps, which generates an average quality fit between screw and nut. Lower tolerance (ISO 1) generates a fine fit without a gap on the flanks between screw and nut. Higher tolerance (ISO 3) generates a rough fit, with large gap. It is used in the case of a nut which will later be coated or if a loose fit is preferred.

Between tolerances 6H (ISO2) and 6G (ISO3), as well as between 6G and 7G, the tap manufacturer produces taps with tolerance 6HX and 6GX. "X" means the tolerance is outside standard and it is used for taps working high strength material or abrasive material such as cast iron. These materials do not cause oversize problems, so higher tolerance can be used in order to increase tool life. The width of the tolerance is equal between, for example, 6H and 6HX.

Forming taps are usually produced with a 6HX or 6GX tolerance.

The tolerance icon for BSW and BSF is medium. This refers to BS 84 "medium fit".

Pipe threads with the tolerance icon "Normal" refer to the following standards:

G threads to ISO 228-1. One class for internal thread (tap), and class A and B for external thread (die).

R, Rc and R threads to ISO 7-1.

NPT and NPSM to ANSI B1.20.1.

NPTF and NPSF to ANSI B1.20.3.

PG to DIN 40 430.

Technical Section - Threading

SELF-LOCKING THREAD FORM

Concept

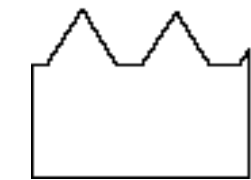
Designed to produce threads for self-locking operations and put a lock on fastener costs.

This is not to be confused as just another range of taps for a specific application. It is a thread form. Utilizing the latest generation CNC equipment this thread form can be produced on straight flute, spiral flute, spiral point, roll form and even the range of Applix high performance taps.

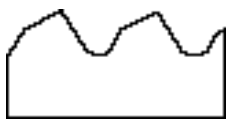
Although this is a made-to-order program, quantities of up to 48 pieces of any style would be delivered in no greater than 10 working days.

The relatively small quantities being produced and the additional thread grinding required does mean that taps featuring this thread form can be marginally more expensive than conventionally ground taps. Depending on the size, quantity, and/or the type of tool being compared, the additional cost will vary. However, before making a pure price decision we recommend a review of the added benefits of the concepts featured in this catalog and how they help in offsetting costs in other areas.

Self-Locking Threads and How They Work



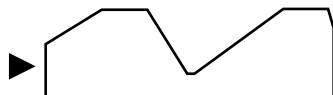
Standard Thread Form



Self-Locking Thread Form

Taps ground to the adjacent self-locking thread form produce a highly efficient female thread form with a 30° inclined wedge that provides optimum locking contact with the crests of the male threads of a standard bolt or screw. The thread form produced is ideal for a wide variety of applications where vibration resistance is a must. Clamping forces are evenly distributed along the entire length of thread engagement providing a capability to resist the forces created by vibration that can loosen ordinary threaded fasteners. The end result is a standard male fastener locked firmly in place without having to resort to the use of costly adhesives, locking devices or inserts.

On the smaller diameters, <8-32 but including 8-36, because of their size, the taps are ground with a modified ramp form.



Key Features and Benefits

Improves Holding Power

A 30° wedge lock on the female thread creates a continuous spiral contact along the entire thread length for improved holding power versus standard thread forms.

Clamp Load More Evenly Distributed

Clamp load forces are spread evenly across all threads versus conventional 60° thread forms that

put the clamping force on the first few threads only with the other threads receiving limited or no contact at all.

Reduces Fastener Costs

Utilizing this thread form converts standard male fasteners into highly efficient self-locking ones and may eliminate the necessity for costly locking fasteners, chemical bonds, nylon plugs or other devices to maintain tightness.

Faster Assembly Operations

The larger tap drill size creates greater clearance with the male fastener than conventionally produced threads. In assembling fasteners produced with this thread form it is clearly noticeable that the fasteners turn more freely irrespective of whether by hand or utilizing assembly machinery. Assembly costs are lower and assembly related rejects are additionally reduced.

Holding Power that Lasts and Lasts

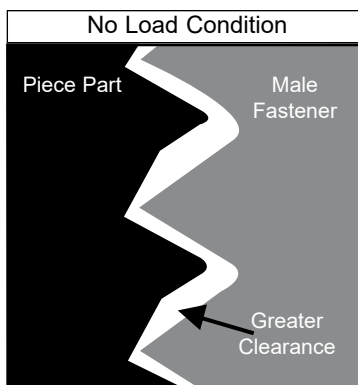
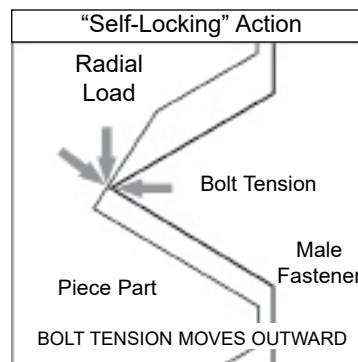
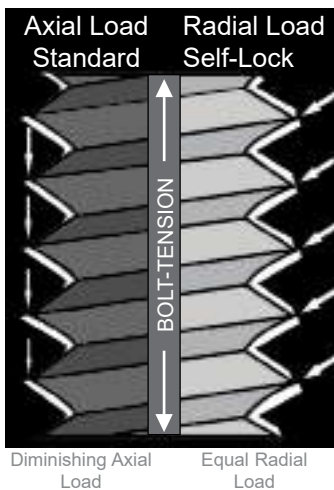
There is no loss of locking power in those applications requiring frequent loosening and tightening of the male fastener. This eliminates time intensive disassembly and assembly procedures. Conventional locking fasteners would be either destroyed or their locking power severely diminished.

Threading Solution for Soft Materials

The optimum load distribution provided by this thread form eliminates thread stripping that is typical with thread forms that concentrate clamping load on fewer threads. Ideal for aluminum and other lightweight, soft materials in applications where stripping is frequent.

Environmentally Friendly

Because the threads produced permit the male fastener to be locked in place by simply tightening, there is no necessity for bonding materials or chemical agents which eliminates the need for using potentially environmentally harmful products plus saving valuable time and cost.



Technical Section - Threading

SELF-LOCKING THREAD FORM

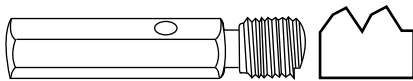
Gaging for Self-Locking Threads

How to Order

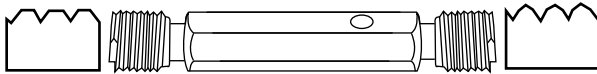
An essential element in high quality thread production is an accurate gaging capability. To facilitate the latter Precision offers a complete gaging system for self-locking threads, which consists of the following:

LARGER DIAMETERS

Go-Pitch Diameter and Ramp Gage

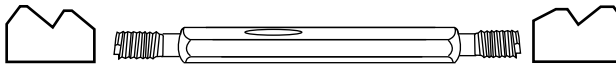


Hi-Pitch Diameter and Ramp Gage



SMALLER DIAMETERS

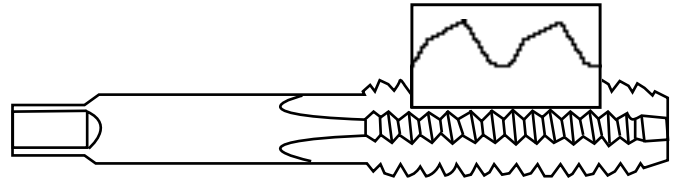
Go-Pitch Diameter and Ramp Gage Hi-Limit Gage



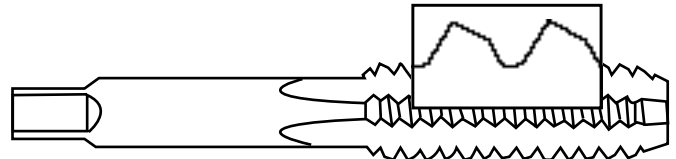
Precision certifies all new gages for self-locking threads to insure their functional accuracy. A certificate of compliance can be provided for a nominal charge. It is highly recommended that they be returned on a periodic basis for recertification.

When placing your inquiry for a self-locking tap, simply advise the type of gage(s) you require and one consistent with whatever size is ordered will be quoted and supplied.

Style 'RW'



Style 'LW'



Unless otherwise specified, the taps will be provided featuring a ramp angle in the direction detailed and referred to as style "RW."

When tapping is to be effected from the opposite end of a through hole, the style "LW" must be special ordered. This style features the ramp angle in the opposite direction as detailed, and is generally used in the production of nuts.

There is no requirement to specify an H or D limit. Basically, one size fits all because contact is not made on the thread flanks but on the wedge ramp.

To place an order call or fax Customer Service at:
TEL: 1-800-877-3745 • FAX: 1-815-459-2804

Simply identify the following:

- The List No. or description of the standard tap.
- The size, number of flutes and chamfer requirements.
- The ramp style (RW or LW).

Should a gage be required, simply indicate the type when placing the order.

Technical Section - Threading

TAP DRILL SIZES FOR UNIVERSAL AND M-PROFILE SCREW THREADS

Tap Size	Tap Drill Size	Decimal Equiv. of Tap Drill (inches)	Theoretical Percent of Thread	Probable Mean Oversize (inches)	Probable Hole Size (inches)	Probable % of Thread (inches)	Tap Size	Tap Drill Size	Decimal Equiv. of Tap Drill (inches)	Theoretical Percent of Thread	Probable Mean Oversize (inches)	Probable Hole Size (inches)	Probable % of Thread (inches)
0-80	.56	.0465	83	.0015	.0480	74	8-36	.29	.1360	78	.0029	.1389	70
—	3/64	.0469	81	.0015	.0484	71	—	3.5mm	.1378	72	.0029	.1407	65
—	1.20mm	.0472	79	.0015	.0487	69	10-24	.27	.1440	85	.0032	.1472	79
—	1.25mm	.0492	67	.0015	.0507	57	—	3.70mm	.1457	82	.0032	.1489	76
1-64	.54	.0550	89	.0015	.0565	81	—	.26	.1470	79	.0032	.1502	74
—	1.45mm	.0571	78	.0015	.0586	71	—	.25	.1495	75	.0032	.1527	69
—	.53	.0595	67	.0015	.0610	59	—	.24	.1520	70	.0032	.1552	64
1-72	1.5mm	.0591	77	.0015	.0606	68	10-32	5/32	.1563	83	.0032	.1595	75
—	.53	.0595	75	.0015	.0610	67	—	.22	.1570	81	.0032	.1602	73
—	1.55mm	.0610	67	.0015	.0606	68	—	.21	.1590	76	.0032	.1622	68
2-56	.51	.0670	82	.0017	.0687	74	12-24	11/64	.1719	82	.0035	.1754	75
—	1.75mm	.0689	73	.0017	.0706	66	—	.17	.1730	79	.0035	.1765	73
—	.50	.0700	69	.0017	.0717	62	—	.16	.1770	72	.0035	.1805	66
—	1.80mm	.0709	65	.0017	.0726	58	12-28	.16	.1770	84	.0035	.1805	77
2-64	.50	.0700	79	.0017	.0717	70	—	.15	.1800	78	.0035	.1835	70
—	1.80mm	.0709	74	.0017	.0726	66	—	4.60mm	.1811	75	.0035	.1846	67
—	.49	.0730	64	.0017	.0747	56	—	.14	.1820	73	.0035	.1855	66
3-48	.48	.0760	85	.0019	.0779	78	1/4-20	.09	.1960	83	.0038	.1998	77
—	5/64	.0781	77	.0019	.0800	70	—	.08	.1990	79	.0038	.2028	73
—	.47	.0785	76	.0019	.0804	69	—	.07	.2010	75	.0038	.2048	70
—	2.00mm	.0787	75	.0019	.0806	68	—	13/64	.2031	72	.0038	.2069	66
—	.46	.0810	67	.0019	.0829	60	1/4-28	5.40mm	.2126	81	.0038	.2164	72
—	.45	.0820	63	.0019	.0839	56	—	.03	.2130	80	.0038	.2168	72
3-56	.46	.0810	78	.0019	.0829	69	5/16-18	F	.2570	77	.0038	.2608	72
—	.45	.0820	73	.0019	.0839	65	—	6.60mm	.2598	73	.0038	.2636	68
—	2.10mm	.0827	70	.0019	.0846	62	—	G	.2610	71	.0041	.2651	66
—	2.15mm	.0846	62	.0019	.0865	54	5/16-24	H	.2660	86	.0041	.2701	78
4-40	.44	.0860	80	.0020	.0880	74	—	6.80mm	.2677	83	.0041	.2718	75
—	2.20mm	.0866	78	.0020	.0886	72	—	.1	.2720	75	.0041	.2761	67
—	.43	.0890	71	.0020	.0910	65	3/8-16	7.80mm	.3071	84	.0044	.3115	78
—	2.30mm	.0906	66	.0020	.0926	60	—	.09	.3110	79	.0044	.3154	73
4-48	2.35mm	.0925	72	.0020	.0926	72	—	5/16	.3125	77	.0044	.3169	72
—	.42	.0935	68	.0020	.0955	61	—	O	.3160	73	.0044	.3204	68
—	3/32	.0938	68	.0020	.0958	60	3/8-24	21/64	.3281	87	.0044	.3325	79
—	2.40mm	.0945	65	.0020	.0965	57	—	.08	.3307	82	.0044	.3351	74
5-40	.40	.0980	83	.0023	.1003	76	—	Q	.3320	79	.0044	.3364	71
—	.39	.0995	79	.0023	.1018	71	—	8.50mm	.3346	75	.0044	.3390	67
—	.38	.1015	72	.0023	.1038	65	7/16-14	T	.3580	86	.0046	.3626	81
—	2.60mm	.1024	70	.0023	.1047	63	—	23/64	.3594	84	.0046	.3640	79
5-44	.38	.1015	79	.0023	.1038	72	—	9.20mm	.3622	81	.0046	.3668	76
—	2.60mm	.1024	77	.0023	.1047	69	—	9.30mm	.3661	77	.0046	.3707	72
—	.37	.1040	71	.0023	.1063	63	—	.09	.3680	75	.0046	.3726	70
6-32	.37	.1040	84	.0023	.1063	78	—	9.40mm	.3701	73	.0046	.3747	68
—	.36	.1065	78	.0023	.1088	72	7/16-20	W	.3860	79	.0046	.3906	72
—	7/64	.1094	70	.0026	.1120	64	—	25/64	.3906	72	.0046	.3952	65
—	.35	.1100	69	.0026	.1126	63	1/2-13	10.50mm	.4134	87	.0047	.4181	82
—	.34	.1100	67	.0026	.1136	60	—	27/64	.4219	78	.0047	.4266	73
6-40	.34	.1110	83	.0026	.1136	75	1/2-20	29/64	.4531	72	.0047	.4578	65
—	.33	.1130	77	.0026	.1156	69							
—	2.90mm	.1142	73	.0026	.1168	65							
—	.32	.1160	68	.0026	.1186	60							
8-32	3.40mm	.1339	74	.0029	.1368	67							
—	.29	.1360	69	.0029	.1389	62							

TAP DRILL SIZES FOR METRIC M-PROFILE SCREW THREADS

Metric of Tap	Tap Drill	Decimal Equiv. of Tap Drill	Theoretical Percent of Thread	Probable Mean Oversize	Probable Hole Size	Probable Percent Thread	Metric of Tap	Tap Drill	Decimal Equiv. of Tap Drill	Theoretical Percent of Thread	Probable Mean Oversize	Probable Hole Size	Probable Percent Thread
M1.6 x 0.35	1.20mm	.0472	88	.0014	.0486	80	M5 x 0.8	4.2mm	.1654	77	.0032	.1686	69
—	1.25mm	.0492	77	.0014	.0506	69	—	.19	.1660	75	.0032	.1692	68
M2 x 0.4	1/16	.0625	79	.0015	.0640	72	M6 x 1	.10	.1935	84	.0038	.1973	76
—	1.60mm	.0630	77	.0017	.0647	69	—	.09	.1960	79	.0038	.1998	71
—	.52	.0635	74	.0017	.0652	66	—	5mm	.1969	77	.0038	.2006	70
M2.5 x 0.45	2.05mm	.0807	77	.0019	.0826	69	—	.08	.1990	73	.0038	.2028	65
—	.46	.0810	76	.0019	.0829	67	M7 x 1	A	.2340	81	.0038	.2378	74
—	.45	.0820	71	.0019	.0839	63	—	6mm	.2362	77	.0038	.2400	70
M3 x 0.5	.40	.0980	79	.0023	.1003	70	—	B	.2380	74	.0038	.2418	66
—	2.5mm	.0984	77	.0023	.1007	68	M8 x 1.25	6.7mm	.2638	80	.0041	.2679	74
—	.39	.0995	73	.0023	.1018	64	—	17/64	.2656	77	.0041	.2697	71
M3.5 x 0.6	.33	.1130	81	.0026	.1156	72	—	H	.2660	77	.0041	.2701	70
—	2.9mm	.1142	77	.0026	.1168	68	—	6.8mm	.2677	74	.0041	.2718	68
—	.32	.1160	71	.0026	.1186	63	M10 x 1.5	8.4mm	.3307	82	.0044	.3364	75
M4 x 0.7	3.2mm	.1260	88	.0029	.1289	80	—	Q	.3320	80	.0044	.3390	71
—	.30	.1285	81	.0029	.1314	73	—	8.5mm	.3346	77	.0044	.3390	71
—	3.3mm	.1299	77	.0029	.1328	69	M12 x 1.5	10.4mm	.4094	81	.0047	.4141	71
M4.5 x 0.75	3.7mm	.1457	82	.0032	.1489	74	—	Z	.4130	77	.0047	.4177	71
—	.26	.1470	79	.0032	.1502	70	M12 x 1.75	10.20mm	.4016	79	.0047	.4047	69
—	.25	.1495	72	.0032	.1527	64	—	Y	.4040	76	.0047	.4087	71
							—	13/32	.4062	74	.0047	.4109	69

Note: "Probable Hole Size" columns listed above apply to HSS/HSCo Drills ONLY. When using Solid Carbide Drills as Tap-Drills you must ADD the average Oversize amount per diameter to the size listed in these "Probable Hole Size" columns.

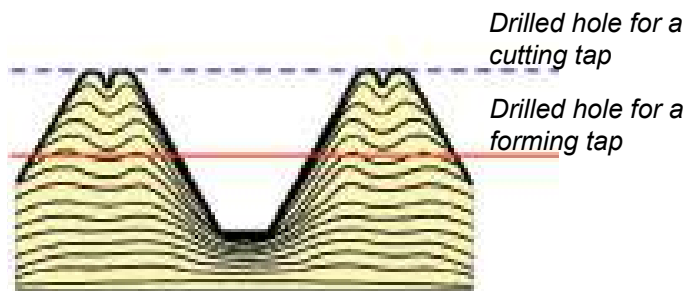
Technical Section - Threading

FLOW OF MATERIAL WHEN FORMING A THREAD

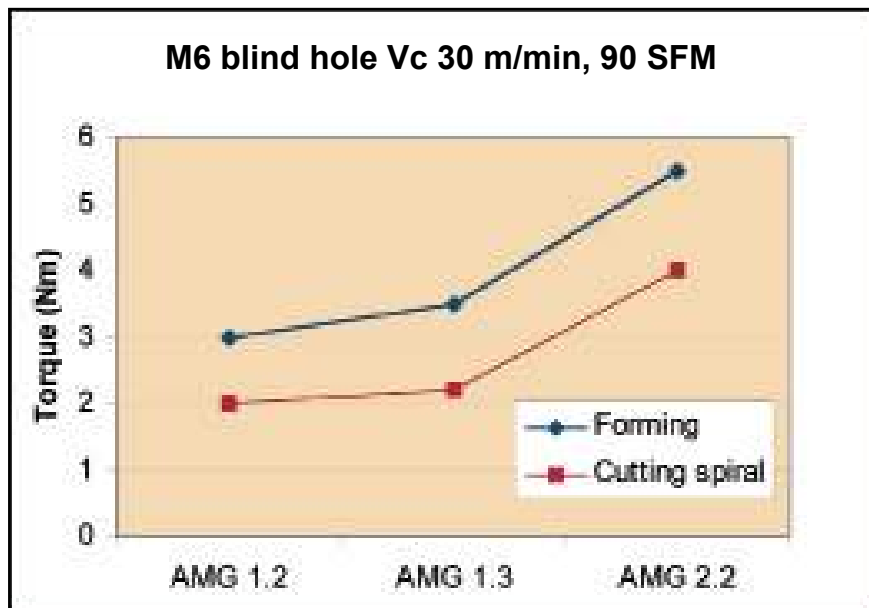
The tapping hole size depends upon the material being drilled, the cutting conditions selected and the condition of the equipment being used. If material is pushed up at the thread entry by the tap and/or the life of the tap is too short, select a slightly larger drill diameter. If on the other hand the profile of the thread formed is insufficient, then select a slightly smaller drill diameter.



Section of thread obtained by forming tap on steel C45



Cold forming taps require more power on the spindle, compared to a cutting tap of the same size, since it generates higher torque.



Torque comparison between forming and cutting taps in different material groups.

Technical Section - Threading

Note: Recommended thread percentage for various (Inch standard) tap sizes is shown in the “60% Thread “ columns below. This is also the average percentage that is desirable for metric sizes. Use the “Probable Percent of Thread” column in the “Metric Sizes” tables below.

TAP DRILL SIZES FOR FORMING TAPS

Machine Screw Sizes

Tap Size	75% Thread		70% Thread		65% Thread		60% Thread		55% Thread		50% Thread	
	Theor. Hole Size	Nearest Drill Size	Theor. Hole Size	Nearest Drill Size	Theor. Hole Size	Nearest Drill Size	Theor. Hole Size	Nearest Drill Size	Theor. Hole Size	Nearest Drill Size	Theor. Hole Size	Nearest Drill Size
0-80	0.0536	1.35mm	0.0540	1.35mm	0.0545	—	0.0549	54	0.0554	54	0.0558	1.0mm
1-64	0.0650	1.65mm	0.0655	1.65mm	0.0661	—	0.0666	—	0.0672	51	0.0677	51
1-72	0.0659	1.65mm	0.0663	—	0.0669	1.7mm	0.0673	51	0.0679	51	0.0683	—
2-56	0.0769	1.95mm	0.0774	1.95mm	0.0781	23498	0.0787	47	0.0794	2.0mm	0.0799	—
2-64	0.0780	5/64	0.0785	47	0.0791	2.0mm	0.0796	2.0mm	0.0802	—	0.0807	2.05mm
3-48	0.0884	2.25mm	0.0890	43	0.0898	43	0.0905	2.3mm	0.0913	2.3mm	0.0919	—
3-56	0.0899	43	0.0904	—	0.0911	2.3mm	0.0917	2.3mm	0.0924	2.35mm	0.0929	2.35mm
4-40	0.0993	2.5mm	0.1000	39	0.1010	39	0.1018	38	0.1028	2.6mm	0.1035	2.6mm
4-48	0.1014	38	0.1020	38	0.1028	2.6mm	0.1035	2.6mm	0.1043	37	0.1049	37
5-40	0.1123	34	0.1130	33	0.1140	33	0.1148	2.9mm	0.1158	32	0.1165	32
5-44	0.1134	33	0.1141	2.9mm	0.1150	2.9mm	0.1157	—	0.1166	32	0.1173	32
6-32	0.1221	3.1mm	0.1230	3.1mm	0.1243	—	0.1252	40916	0.1264	3.2mm	0.1274	—
6-40	0.1253	1/8	0.1260	3.2mm	0.1270	3.2mm	0.1278	3.25mm	0.1288	30	0.1295	30
8-32	0.1481	3.75mm	0.1490	—	0.1503	25	0.1512	3.8mm	0.1524	24	0.1534	3.9mm
8-36	0.1498	25	0.1507	3.8mm	0.1518	24	0.1526	24	0.1537	3.9mm	0.1546	23
10-24	0.1688	—	0.1700	18	0.1717	23682	0.1729	23682	0.1746	—	0.1758	—
10-32	0.1741	17	0.1750	—	0.1763	—	0.1772	16	0.1784	4.5mm	0.1794	—
12-24	0.1948	10	0.1960	9	0.1977	5.0mm	0.1989	8	0.2006	5.1mm	0.2018	7
12-28	0.1978	5.0mm	0.1989	8	0.2003	8	0.2014	7	0.2028	—	0.2039	13/64

Fractional Sizes

Tap Size	75% Thread		70% Thread		65% Thread		60% Thread		55% Thread		50% Thread	
	Theor. Hole Size	Nearest Drill Size	Theor. Hole Size	Nearest Drill Size	Theor. Hole Size	Nearest Drill Size	Theor. Hole Size	Nearest Drill Size	Theor. Hole Size	Nearest Drill Size	Theor. Hole Size	Nearest Drill Size
1/4-20	.2245	5.7mm	.2260	—	.2280	1	.2295	1	.2315	—	.2330	5.9mm
1/4-28	.2318	—	.2329	5.9mm	.2343	A	.2354	15/64	.2368	6.0mm	.2379	B
5/16-18	0.2842	7.2mm	.2861	7.25mm	.2879	7.3mm	.2898	L	.2917	7.4mm	.2936	—
5/16-24	0.2912	7.4mm	.2927	—	.2941	M	.2955	7.5mm	.2969	19/64	.2983	7.6mm
3/8-16	.3431	11/32	.3452	8.75mm	.3474	S	.3495	8.9mm	.3516	—	.3537	9.0mm
3/8-24	.3537	9.0mm	.3552	9.0mm	.3566	—	.3580	T	.3594	23/64	.3608	—
7/16-14	.4011	—	.4035	Y	.4059	13/32	.4084	—	.4108	—	.4132	Z
7/16-20	0.4120	Z	.4137	10.5mm	.4154	—	.4171	—	.4188	—	.4205	—
1/2-13	.4608	—	.4634	—	.4660	—	.4686	15/32	.4712	12mm	.4738	12mm
1/2-20	.4745	—	.4762	—	.4779	—	.4796	—	.4813	—	.4830	31/64

Metric Sizes

Metric Tap Size	Tap Drill Size	Decimal Equiv. of Tap Drill (inches)	Theoretical Percentage of thread %	Probable Mean Oversize (inches)	Probable Hole Size (inches)	Probable Percent of Thread %	Metric Tap Size	Tap Drill Size	Decimal Equiv. of Tap Drill (inches)	Theoretical Percentage of thread %	Probable Mean Oversize (inches)	Probable Hole Size (inches)	Probable Percent of Thread %
M3 x 0.5	36	0.1065	86	.0026	.1091	67	M8 x 1.25	7.4mm	0.2910	71	.0042	.2952	59
—	2.7mm	0.1062	88	.0026	.1088	70	—	L	0.2900	75	.0042	.2942	62
M4 x 0.7	27	0.1440	72	.0032	.1472	54	—	7.3mm	.2874	82	.0042	.2916	70
—	3.6mm	.1417	84	.0032	.1449	67	M10 x 1.5	U	0.3680	64	.0046	.3726	53
—	9/64	.1406	90	.0032	.1438	73	—	9.3mm	0.3660	69	.0046	.3706	58
M5 x 0.8	14	0.1820	69	.0035	.1855	53	—	9.2mm	0.3620	78	.0046	.3666	67
—	4.6mm	.1811	74	.0035	.1846	57	—	23/64	.3594	85	.0046	.3640	74
—	15	.1800	79	.0035	.1835	62	M12 x 1.5	11.3mm	.4449	70	.0047	.4496	57
—	16	0.1770	92	.0035	.1805	76	—	7/16	.4375	86	.0047	.4422	75
M6 x 1	7/32	.2188	65	.0038	.2226	51	M12 x 1.75	7/16	.4375	75	.0047	.4422	65
—	5.4mm	.2126	88	.0038	.2164	74	—	11mm	.4331	84	.0047	.4378	73

*Probable percent of full thread produced in tapped hole using standard drill sizes.

Technical Section - Threading

Tap Projection and Hole Size for Pipe Taps

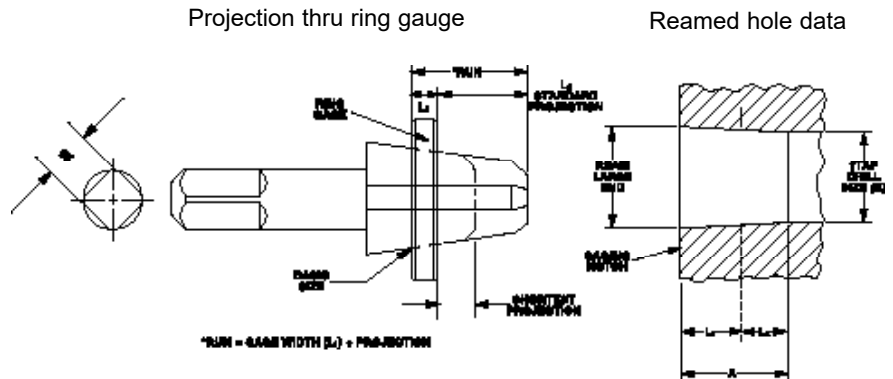
Nominal Size	Tap Thread Limits				Projection				Ream Dia. Large End	Gage Width L ₁	L ₃	A	Tap Drill Size B	Tap Drill Size BB
	L ₂	L ₂ Tolerance	Taper Per Ft. Limits		NPT & NPTF		SAE - Short							
			Min.	Max.	Min.	Max.	Min.	Max.						
1/16 - 27	0.3120	±1/16	23/32	25/32	.250	0.3750	.222	.259	.2515	0.1600	.1111	.2711	15/64	C
1/8 - 27	0.3120	±1/16	23/32	25/32	.250	.375	.222	.259	.3440	0.1615	.1111	.2726	21/64	Q
1/4 - 18	0.4590	±1/16	23/32	25/32	.397	0.5210	.333	.389	.4472	0.2278	.1667	.3945	27/64	7/16
3/8 - 18	0.4540	±1/16	23/32	25/32	.392	.516	.333	0.3890	.5826	0.2400	.1667	.4067	9/16	37/64
1/2 - 14	0.5790	±1/16	23/32	25/32	.517	.641	.429	0.5000	.7213	0.3200	.2143	.5343	11/16	45/64
3/4 - 14	0.5650	±1/16	23/32	25/32	.503	0.6270	.429	.500	.9317	0.3390	.2143	.5533	57/64	29/32
1 - 11-1/2	0.6780	±3/32	23/32	25/32	.584	.772	—	—	1.1691	0.4000	.2609	.6609	1-1/8	1-9/64
1-1/4 - 11-1/2	0.6860	±3/32	23/32	25/32	.592	0.7800	—	—	1.5138	0.4200	.2609	.6809	1-15/32	1-31/64
1-1/2 - 11-1/2	0.6990	±3/32	23/32	25/32	.606	0.7920	—	—	1.7528	0.4200	.2609	.6809	1-45/64	1-23/32
2 - 11-1/2	0.6670	±3/32	23/32	25/32	.574	.760	—	—	2.2267	0.4360	.2609	.6909	2-11/64	2-3/16

TOLERANCES

Ground Thread = A maximum lead deviation of plus or minus .0005" within any two threads no further apart than 1" is permitted.

Threads per inch	Angle Tolerance
	Half Angle
	Ground Thread
8	25' Plus or Minus
11-1/2 to 27 inclusive	30' Plus or minus

*Distance small end of tap projects through L_1 Taper Thread Ring Gage.
 **Recommended sizes given permit direct tapping without reaming the hole, but only give a full thread for approx. L_1 distance.
 ***TAP DRILL SIZE (B) is size for use with a taper reamer. The tap drill size for use without a taper reamer is shown in column BB



Recommended Minor Diameters and Tap Drills for STI Spiral Point and Hand Taps

T.R.I.			Aluminum				Plastic - Steel - Magnesium			
			Diameter of Tapped Holes		Recommended Minor/ Drill Size		Diameter of Tapped Holes		Recommended Minor/ Drill Size	
Nominal Diameter	UNC	UNF	Min.	Max.	Tap Drill Size	Dec Eq.	Min.	Max.	Tap Drill Size	Dec. Eq
4	40	—	.1160	.1210	31	.1200	.1190	.1240	31	.1200
6	32	—	.1440	.1500	26	.1470	.1480	.1540	25	.1495
8	32	—	.1700	.1760	17	.1730	.1740	.1800	16	.1770
10	24	—	.1990	.2050	13/64	.2031	.2030	.2090	5	.2055
10	—	32	.1960	.2020	7	.2010	.2000	.2060	13/64	.2031
1/4	20	—	.2610	.2670	H	.2660	.2650	.2710	H	.2660
1/4	—	28	.2570	.2640	G	.2610	.2610	.2680	6.7MM	.2638
5/16	18	—	.3280	.3340	Q	.3320	.3310	.3370	Q	.3320
5/16	—	24	.3230	.3300	21/64	.3281	.3270	.3340	21/64	.3281
3/8	16	—	.3900	.3980	X	.3970	.3960	.4020	X	.3970
3/8	—	24	.3850	.3920	25/64	.3906	.3890	.3960	25/64	.3906
7/16	14	—	.4530	.4630	29/64	.4531	.4610	.4710	29/64	.4531
7/16	—	20	.4500	.4580	29/64	.4531	.4530	.4610	29/64	.4531
1/2	13	—	.5150	.5250	33/64	.5156	.5230	.5330	17/32	.5312
1/2	—	20	.5130	.5220	33/64	.5156	.5150	.5240	17/32	.5312

Technical Section - Threading

TAP SIZE RECOMMENDATIONS FOR CLASSES 2B AND 3B

Machine Screw Sizes

Size	Threads Per Inch		Recommended Tap for Class of Thread		Pitch Diameter Limits for Class of Thread		
	NC	NF	Class 2B	Class 3B	Min. All Classes (Basic)	Max Class 2B	Max Class 3B
0	—	80	H2	H1	.0519	.0542	.0536
1	64	—	H2	H1	.0629	.0655	.0648
1	—	72	H2	H1	.0640	.0665	.0659
2	56	—	H2	H1	.0744	.0772	.0765
2	—	64	H2	H1	.0759	.0786	.0779
3	48	—	H2	H1	.0855	.0885	.0877
3	—	56	H2	H1	.0874	.0902	.0895
4	40	—	H2	H2	.0958	.0991	.0982
4	—	48	H2	H1	.0985	.1016	.1008
5	40	—	H2	H2	.1088	.1121	.1113
5	—	44	H2	H1	.1102	.1134	.1126
6	32	—	H3	H2	.1177	.1214	.1204
6	—	40	H2	H2	.1218	.1252	.1243
8	32	—	H3	H2	.1437	.1475	.1465
8	—	36	H2	H2	.1460	.1496	.1487
10	24	—	H3	H3	.1629	.1672	.1661
10	—	32	H3	H2	.1697	.1736	.1726
12	24	—	H3	H3	.1889	.1933	.1922
12	—	28	H3	H3	.1928	.1970	.1959

Fractional Sizes

Size	Threads Per Inch		Recommended Tap For Class of Thread		Pitch Diameter Limits For Class of Thread		
	NC	NF	Class 2B	Class 3B	Min. All Classes (Basic)	Max Class 2B	Max Class 3B
1/4	20	—	H5	H3	.2175	.2223	.2211
1/4	—	28	*H4	H3	.2268	.2311	.2300
5/16	18	—	H5	H3	.2764	.2817	.2803
5/16	—	24	*H4	H3	.2854	.2902	.2890
3/8	16	—	H5	H3	.3344	.3401	.3387
3/8	—	24	*H4	H3	.3479	.3528	.3516
7/16	14	—	H5	H3	.3911	.3972	.3957
7/16	—	20	H5	H3	.4050	.4104	.4091
1/2	13	—	H5	H3	.4500	.4565	.4548
1/2	—	20	H5	H3	.4675	.4731	.4717
9/16	12	—	H5	H3	.5084	.5152	.5135
9/16	—	18	H5	H3	.5264	.5323	.5308
5/8	11	—	H5	H3	.5660	.5732	.5714
5/8	—	18	H5	H3	.5889	.5949	.5934
3/4	10	—	H5	H5	.6850	.6927	.6907
3/4	—	16	H5	H3	.7094	.7159	.7143
7/8	9	—	H6	H4	.8028	.8110	.8089
7/8	—	14	H6	H4	.8286	.8356	.8339
1	8	—	H6	H4	.9188	.9276	.9254
1	—	12	H6	H4	.9459	.9535	.9516

* Note: In cast iron applications we recommend style 1600 (H5 limit) for class 2B fit.

Metric Sizes for Class 6H

Thread Size		Internal Thread-Class 6H (Inches)				Recommended Tap		
Nominal Dia. (mm)	Pitch (mm)	Minor Dia.		Pitch Dia.		Major Dia.	Tap Size	Limit Number
		Min.	Max.	Min.	Max.			
1.6	0.35	.0481	.0520	.0541	.0574	.0630	M1.6 x 0.35	D-3
2	0.4	.0617	.0661	.0686	.0720	.0788	M2 x 0.4	D-3
2.5	0.45	.0793	.0841	.0870	.0906	.0985	M2.5 x 0.45	D-3
3	0.5	.0969	.1023	.1054	.1092	.1182	M3 x 0.5	D-3
3.5	0.6	.1123	.1185	.1225	.1268	.1378	M3.5 x 0.6	D-4
4	0.7	.1277	.1347	.1396	.1442	.1575	M4 x 0.7	D-4
4.5	0.75	.1452	.1526	.1580	.1626	.1772	M4.5 x 0.75	D-4
5	0.8	.1628	.1706	.1764	.1812	.1969	M5 x 0.8	D-4
6	1.0	.1936	.2028	.2107	.2165	.2363	M6 x 1	D-5
7	1.0	.2330	.2422	.2500	.2559	.2756	M7 x 1	D-5
8	1.25	.2617	.2721	.2830	.2892	.3150	M8 x 1.25	D-5
10	1.5	.3298	.3415	.3554	.3624	.3937	M10 x 1.5	D-6
12	1.75	.3979	.4110	.4277	.4355	.4725	M12 x 1.75	D-6
14	2.0	.4660	.4807	.5001	.5083	.5512	M14 x 2	D-7
16	2.0	.5447	.5594	.5788	.5871	.6300	M16 x 2	D-7
20	2.5	.6809	.6985	.7235	.7322	.7875	M20 x 2.5	D-7
24	3.0	.8171	.8366	.8682	.8785	.9449	M24 x 3	D-8
30	3.5	1.0320	1.0539	1.0917	1.1026	1.1812	M30 x 3.5	D-9
36	4.0	1.2469	1.2704	1.3151	1.3268	1.4174	M36 x 4	D-9

Forming Type Taps Machine Screw and Fractional Sizes

Tap Size	Basic	Tap Recommendations For Class 2B Fit		Tap Recommendations For Class 3B Fit		Oversize Forming Taps		Tap Size	Basic	Tap Recommendations For Class 2B Fit		Tap Recommendations For Class 3B Fit		Oversize Forming Taps	
		Styles	Max. PD. Thread	Styles	Max. PD. Thread	Styles	Max. PD. Thread			Styles	Max. PD. Thread	Styles	Max. PD. Thread	Styles	Max. PD. Thread
0-80	.0519	—	—	H-2	.0536	—	—	10-24	.1629	H-6	.1672	H-4	.1661	—	—
1-64	.0629	—	—	H-2	.0648	—	—	10-32	.1697	H-6	.1736	H-4	.1762	—	—
1-72	.0640	—	—	H-2	.0659	—	—	12-24	.1889	H-6	.1933	H-4	.1922	—	—
2-56	.0744	H-3	.0772	H-2	.0765	—	—	12-2 8	.1928	H-6	.1970	H-4	.1959	—	—
2-64	.0759	H-3	.0786	H-2	.0779	—	—	1/4-20	.2175	H-6	.2223	H-4	.2211	H-8	.2215
3-48	.0855	H-3	.0885	H-2	.0877	—	—	1/4-28	.2268	H-6	.2311	H-4	.2300	H-8	.2308
3-56	.0874	H-3	.0902	H-2	.0895	—	—	5/16-18	.2764	H-7	.2817	H-5	.2803	H-9	.2809
4-40	.0958	H-5	.0991	H-3	.0982	—	—	5/16-24	.2854	H-7	.2902	H-5	.2890	H-9	.2899
4-48	.0985	H-5	.1016	H-3	.1008	—	—	3/8-16	.3344	H-7	.3401	H-5	.3387	H-9	.3389
5-40	.1088	H-5	.1121	H-3	.1113	—	—	3/8-24	.3479	H-7	.3528	H-5	.3516	H-9	.3524
5-44	.1102	H-5	.1134	H-3	.1126	—	—	7/16-14	.3911	H-8	.3972	H-5	.3957	—	—
6-32	.1177	H-5	.1214	H-3	.1204	—	—	7/16-20	.4050	H-8	.4104	H-5	.4091	—	—
6-40	.1218	H-5	.1252	H-3	.1243	—	—	1/2-13	.4500	H-8	.4565	H-5	.4548	H-10	.4550
8-32	.1437	H-5	.1475	H-3	.1465	—	—	1/2-20	.4675	H-8	.4731	H-5	.4717	H-10	.4725
8-36	.1460	H-5	.1496	H-3	.1487	—	—								

Technical Section - Threading

UNIFIED SCREW THREAD LIMITS

Diameter - Pitch Combinations for Class of Fit

Nominal Size Threads Per Inch and Series Designation	Class	Internal				Major Diameter Min.
		Minor Diameter		Pitch Diameter		
		Min.	Max.	Min.	Max.	
0–80 UNF	2B	.0465	.0514	.0519	.0542	.0600
—	3B	.0465	.0514	.0519	.0536	.0600
1–64 UNC	2B	.0561	.0623	.0629	.0655	.0730
—	3B	.0561	.0623	.0629	.0648	.0730
1–72 UNF	2B	.0580	.0635	.0640	.0665	.0730
—	3B	.0580	.0635	.0640	.0659	.0730
2–56 UNC	2B	.0667	.0737	.0744	.0772	.0860
—	3B	.0667	.0737	.0744	.0765	.0860
2–64 UNF	2B	.0691	.0753	.0759	.0786	.0860
—	3B	.0691	.0753	.0759	.0779	.0860
3–48 UNC	2B	.0764	.0845	.0855	.0885	.0990
—	3B	.0764	.0845	.0855	.0877	.0990
3–56 UNF	2B	.0797	.0865	.0874	.0902	.0990
—	3B	.0797	.0865	.0874	.0895	.0990
4–40 UNC	2B	.0849	.0939	.0958	.0991	.1120
—	3B	.0849	.0939	.0958	.0982	.1120
4–48 UNF	2B	.0894	.0968	.0985	.1016	.1120
—	3B	.0894	.0968	.0985	.1008	.1120
5–40 UNC	2B	.0979	.1062	.1088	.1121	.1250

Nominal Size Threads Per Inch and Series Designation	Class	Internal				Major Diameter Min.
		Minor Diameter		Pitch Diameter		
		Min.	Max.	Min.	Max.	
—	3B	.0979	.1062	.1088	.1113	.1250
5-44 UNF	2B	.1004	.1079	.1102	.1134	.1250
—	3B	.1004	.1079	.1102	.1126	.1250
6-32 UNC	2B	.1040	.1140	.1177	.1214	.1380
—	3B	.1040	.1140	.1177	.1204	.1380
6-40 UNF	2B	.1110	.1190	.1218	.1252	.1380
—	3B	.1110	.1186	.1218	.1243	.1380
8-32 UNC	2B	.1300	.1390	.1437	.1475	.1640
—	3B	.1300	.1389	.1437	.1465	.1640
8-36 UNF	2B	.1340	.1420	.1460	.1496	.1640
—	3B	.1340	.1416	.1460	.1487	.1640
10-24 UNC	2B	.1450	.1560	.1629	.1672	.1900
—	3B	.1450	.1555	.1629	.1661	.1900
10-32 UNF	2B	.1560	.1640	.1697	.1736	.1900
—	3B	.1560	.1641	.1697	.1726	.1900
12-24 UNC	2B	.1710	.1810	.1889	.1933	.2160
—	3B	.1710	.1807	.1889	.1922	.2160
12-28 UNF	2B	.1770	.1860	.1928	.1970	.2160
—	3B	.1770	.1857	.1928	.1959	.2160

Fractional Sizes

Nominal Size Threads Per Inch and Series Designation	Class	Internal				Major Diameter Min.
		Minor Diameter		Pitch Diameter		
		Min.	Max.	Min.	Max.	
1/4—20 UNC	1B	.1960	.2070	.2175	.2248	.2500
—	2B	.1960	.2070	.2175	.2224	.2500
—	3B	.1960	.2067	.2175	.2211	.2500
1/4—28 UNF	1B	.2110	.2200	.2268	.2333	.2500
—	2B	.2110	.2200	.2268	.2311	.2500
—	3B	.2110	.2190	.2268	.2300	.2500
5/16—18 UNC	1B	.2520	.2650	.2764	.2843	.3125
—	2B	.2520	.2650	.2764	.2817	.3125
—	3B	.2520	.2630	.2764	.2803	.3125
5/16—24 UNF	1B	.2670	.2770	.2854	.2925	.3125
—	2B	.2670	.2770	.2854	.2902	.3125
—	3B	.2670	.2754	.2854	.2890	.3125
3/8—16 UNC	1B	.3070	.3210	.3344	.3429	.3750
—	2B	.3070	.3210	.3344	.3401	.3750
—	3B	.3070	.3182	.3344	.3387	.3750

Nominal Size Threads Per Inch and Series Designation	Class	Internal				Major Diameter Min.
		Minor Diameter		Pitch Diameter		
		Min.	Max.	Min.	Max.	
3/8–24 UNF	1B	.3300	.3400	.3479	.3553	.3750
—	2B	.3300	.3400	.3479	.3528	.3750
—	3B	.3300	.3372	.3479	.3516	.3750
7/16–14 UNC	1B	.3600	.3760	.3911	.4003	.4375
—	2B	.3600	.3760	.3911	.3972	.4375
—	3B	.3600	.3717	.3911	.3957	.4375
7/16–20 UNF	1B	.3830	.3950	.4050	.4131	.4375
—	2B	.3830	.3950	.4050	.4104	.4375
—	3B	.3830	.3916	.4050	.4091	.4375
1/2–13 UNC	1B	.4170	.4340	.4500	.4597	.5000
—	2B	.4170	.4340	.4500	.4565	.5000
—	3B	.4170	.4284	.4500	.4548	.5000
1/2–20 UNF	1B	.4460	.4570	.4675	.4759	.5000
—	2B	.4460	.4570	.4675	.4731	.5000
—	3B	.4460	.4537	.4675	.4717	.5000

Metric Sizes (ANSA B1.13M-1983) All dimensions are in millimeters.

Basic Thread Description	Tol. Class	Minor Diameter		Pitch Diameter			Major Diameter Min.	
		Min.	Max.	Min.	Max.	Tol.	Min.	Max.
M1.6 x 0.35	6H	1.221	1.321	1.373	1.458	.085	1.600	1.736
M2 x 0.4	6H	1.567	1.679	1.740	1.830	.090	2.000	2.148
M2.5 x 0.45	6H	2.013	2.138	2.208	2.303	.095	2.500	2.660
M3 x 0.5	6H	2.459	2.599	2.675	2.775	.100	3.000	3.172
M3.5 x 0.6	6H	2.850	3.010	3.110	3.222	.112	3.500	3.699
M4 x 0.7	6H	3.242	3.422	3.545	3.663	.118	4.000	4.219
M5 x 0.8	6H	4.134	4.334	4.480	4.605	.125	5.000	5.240
M6 x 1	6H	4.917	5.153	5.350	5.500	.150	6.000	6.294
M8 x 1.25	6H	6.647	6.912	7.188	7.348	.160	8.000	8.340

Basic Thread Description	Tol. Class	Minor Diameter		Pitch Diameter			Major Diameter Min.	
		Min.	Max.	Min.	Max.	Tol.	Min.	Max.
M8 x 1	6H	6.917	7.153	7.350	7.500	.150	8.000	8.294
M10 x 1.5	6H	8.376	8.676	9.026	9.206	.180	10.000	10.396
M10 x 1.25	6H	8.647	8.912	9.188	9.348	.160	10.000	10.340
M10 x 0.75	6H	9.188	9.378	9.513	9.645	.132	10.000	10.240
M12 x 1.75	6H	10.106	10.441	10.863	11.063	.200	12.000	12.453
M12 x 1.5	6H	10.376	10.676	11.026	11.216	.190	12.000	12.406
M12 x 1.25	6H	10.647	10.912	11.188	11.368	.180	12.000	12.360
M12 x 1	6H	10.917	11.153	11.350	11.510	.160	12.000	12.304

*Internal Thread Minor Diameter Tolerances. Internal thread minor diameter tolerances are based on a length of engagement equal to the nominal diameter. For general applications these tolerances are suitable for lengths of engagement up to 1-1/2 diameters. However, some thread applications have lengths of engagement which are greater than 1-1/2 diameters or less than the nominal diameter. For such applications it may be advantageous to increase or decrease the tolerance, respectively.

Technical Section - Threading

TAPPING SPEEDS

Conventional Table (Surface Feet Per Minute to Revolutions Per Minute)

		Surface Feet Per Minute																	
Tap Sizes		5'	10'	15'	20'	25'	30'	40'	50'	60'	70'	80'	90'	100'	110'	120'	130'	140'	150'
UNC/ UNF	Pipe	Revolutions Per Minute																	
0	—	318	637	955	1273	1592	1910	2546	3183	3820	4456	5093	5729	6366	7003	7639	8276	8913	9549
1	—	273	546	819	1046	1308	1570	2093	2617	3140	3663	4186	4710	5233	5756	6279	6805	7326	7849
2	—	212	424	637	888	1110	1333	1777	2221	2665	3109	3554	3999	4442	4886	5330	5774	6218	6662
3	—	191	382	573	772	964	1157	1543	1929	2315	2701	3086	3472	3858	4244	4629	5015	5401	5787
4	—	174	347	521	682	853	1023	1364	1705	2046	2387	2728	3069	3411	3751	4092	4434	4775	5116
5	—	147	294	441	611	764	917	1222	1528	1833	2139	2445	2750	3056	3361	3667	3973	4278	4584
6	—	136	273	409	553	691	829	1106	1382	1659	1935	2212	2488	2766	3042	3318	3595	3871	4148
8	—	119	239	358	466	583	699	932	1165	1398	1631	1864	2097	2330	2563	2796	3029	3262	3495
10	—	101	201	302	402	502	603	804	1005	1205	1406	1607	1808	2009	2210	2411	2612	2813	3014
12	—	87	174	260	354	442	531	707	884	1061	1238	1415	1592	1769	1945	2122	2300	2476	2653
1/4	—	76	153	229	306	382	458	611	764	917	1070	1222	1375	1528	1681	1833	1986	2139	2292
5/16	—	62	123	185	245	306	367	489	611	733	856	978	1100	1222	1345	1467	1589	1711	1833
3/8	—	50	101	151	204	255	305	407	509	611	713	815	917	1019	1120	1222	1324	1426	1528
7/16	1/8	43	87	130	175	219	262	349	437	524	611	698	786	873	960	1048	1135	1222	1310
1/2	—	38	76	115	153	191	229	305	382	458	535	611	688	764	840	917	993	1070	1146
9/16	1/4	34	68	102	137	172	206	274	342	410	478	547	616	683	752	820	888	952	1020
5/8	—	32	64	96	122	153	183	244	306	367	428	489	550	611	672	733	794	856	917
11/16	3/8	28	55	83	111	138	167	222	278	333	389	444	500	556	611	667	722	778	833
3/4	—	25	51	76	102	128	153	203	255	305	357	407	458	509	560	611	662	713	764
7/8	1/2	22	43	65	87	109	131	175	218	262	306	350	392	437	480	524	568	611	655
1	—	19	38	57	76	96	115	153	191	230	268	305	344	382	420	458	497	535	573
1-1/8	3/4	17	34	51	68	84	102	136	170	204	238	272	306	340	373	407	441	475	509
1-1/4	—	15	31	46	61	76	92	122	153	183	214	244	275	305	336	367	397	428	458
1-3/8	1	14	28	42	56	69	83	111	139	167	194	222	250	278	306	333	361	389	417
1-1/2	—	13	25	38	51	63	76	102	127	153	178	204	229	255	280	305	331	356	382
1-5/8	—	12	23	35	47	59	71	94	118	141	165	188	212	235	259	282	306	329	353
1-3/4	—	11	22	33	44	55	65	87	109	131	153	175	196	218	240	262	284	306	327
1-7/8	—	10	20	30	41	51	61	81	102	122	143	163	183	204	224	244	265	285	306
2	—	9	19	29	38	48	57	76	96	115	134	153	172	191	210	229	248	267	287

Metric Sizes

Tap Sizes	Surface Feet Per Minute																	
	5'	10'	15'	20'	25'	30'	40'	50'	60'	70'	80'	90'	100'	110'	120'	130'	140'	150'
Metric	Revolutions Per Minute																	
M 1	490	979	1469	1959	2449	2938	3918	4897	5877	6856	7836	8815	9795	10774	11754	12733	13713	14692
M 2	242	484	725	967	1209	1451	1934	2418	2901	3385	3868	4352	4835	5319	5803	6286	6770	7253
M 3	162	324	486	647	809	971	1295	1619	1942	2266	2590	2914	3237	3561	3885	4208	4532	4856
M 3.5	138	277	415	554	692	830	1107	1384	1661	1938	2214	2491	2768	3045	3322	3599	3875	4152
M 4	122	243	365	487	608	730	973	1217	1460	1703	1946	2190	2433	2676	2920	3163	3406	3650
M 5	97	194	291	388	485	582	776	970	1163	1357	1551	1745	1939	2133	2327	2521	2715	2909
M 6	81	162	243	324	405	486	647	809	971	1133	1295	1457	1619	1781	1942	2104	2266	2428
M 7	69	138	208	277	346	415	554	692	830	969	1107	1246	1384	1522	1661	1799	1938	2076
M 8	61	121	182	243	303	364	485	606	728	849	970	1091	1213	1334	1455	1577	1698	1819
M 10	48	97	145	194	242	291	388	485	582	679	776	873	970	1067	1163	1260	1357	1454
M 12	40	81	121	162	202	243	324	405	486	567	647	728	809	890	971	1052	1133	1214
M 14	35	69	104	139	173	208	277	347	416	485	555	624	693	763	832	901	971	1040
M 16	30	61	91	121	152	182	243	303	364	424	485	546	606	667	728	788	849	910
M 18	27	54	81	108	135	162	216	269	323	377	431	485	539	593	647	700	754	808
M 20	24	49	73	97	121	146	194	243	291	340	388	437	485	534	582	631	680	728
M 22	22	44	66	88	110	132	176	221	265	309	353	397	441	485	529	573	618	662
M 24	20	40	61	81	101	121	162	202	243	283	323	364	404	445	485	526	566	606
M 27	18	36	54	72	90	108	144	180	216	252	287	323	359	395	431	467	503	539
M 30	16	32	49	65	81	97	129	162	194	226	259	291	323	356	388	420	453	485

Technical Section - Threading

TYPICAL TAPPING PROBLEMS

<i>Problem</i>	<i>Cause</i>	<i>Solution</i>
DIMENSIONAL ACCURACY		
Oversize Pitch Diameter		
	Incorrect Tap	1. Use correct H limit 2. Use longer chamfered taps 3. Consider less free cutting NR style
	Chip packing	1. Use spiral pointed or spiral fluted taps 2. Reduce number of flutes to create extra chip space 3. Use larger drill size 4. In blind hole applications, allow deeper holes where applicable or shorten the thread length of the parts 5. Use recommended lubricant
	Galling	1. Apply surface treatment such as steam tempered, TiN, TiCN or CrN 2. Use recommended lubricant 3. Reduce tapping speed 4. Use correct tap for the material being tapped
	Operating Conditions	1. Ensure correct tapping speeds to avoid torn threads 2. Check alignment of tap and drilled hole 3. Use lead screw tapper 4. Use tapping machine with adequate horsepower 5. Check misalignment of tap and drilled hole due to loose spindle or worn holder
	Tool Condition	1. Check accuracy of chamfer lead grinding 2. Ensure correct cutting angles 3. Land widths too narrow 4. Check burrs from regrinding not present
Oversize Internal Diameter		
	Hole Size	1. Use smaller drill size 2. Avoid tapered hole 3. Use taps with correct chamfer
	Galling	See solutions prescribed under Oversize Pitch Diameter
Undersized Pitch Diameter		
	Incorrect Tap	1. Use oversize taps » For cutting materials such as copper alloy, aluminum alloy and cast iron » For cutting tubing which will have "spring back" action after tapping 2. Use taps with correct chamfer angle 3. Use taps with higher cutting angle
	Damaged Thread	Use proper reversing speed to avoid damaging tapped thread on the existing hole
	Leftover Chips	1. Improve operating conditions to eliminate leftover chips in the hole 2. Remove left over chips prior to gage checking
Undersized Internal Diameter		
	Hole Size	Use larger drill size
SURFACE FINISH		
Torn or Rough Threads		
	Dull Tap	Resharpen
	Chamfer too short	Increase chamfer length
	Incorrect rake angle	Use correct rake angle suitable for material tapped
	Galling	1. Use thread relieved taps 2. Reduce land width 3. Apply surface treatment such as steam tempered, TiN, or chrome 4. Use recommended lubricant 5. Reduce tapping speed 6. Use larger drill size 7. Check alignment between tap and hole

Technical Section - Threading

Problem	Cause	Solution
	Chip Packing	1. Use spiral pointed or spiral fluted taps 2. Use larger drill size
Chattering on Tapped Thread		
	Too Positive	1. Use lower rake angle 2. Reduce amount of thread relief - consider NR style 3. Use taps with wider land
	Tool Condition	Use taps with wider land
TOOL LIFE		
Breakage		
	Incorrect Tap Selection	1. Tapping too deep. Avoid chip packing in the flutes or bottom of the hole. Use spiral pointed, spiral fluted or cold forming tap. 2. Use correct surface treatment such as steam tempered, TiN, TiCN or CrN
	Excessive Tapping Torque	1. Hole too small - use correct size drill 2. Shorten thread length 3. Increase rake angle 4. Use a tap with more thread relief and reduced land width 5. Use spiral pointed or spiral fluted taps
	Operating Conditions	1. Reduce tapping speed 2. Avoid misalignment between tap and the hole and tapered hole 3. Use floating type of tapping holder 4. Use tapping holder with torque adjustment 5. Avoid hitting bottom of the hole
	Tool Condition	1. Use taps with wider land width 2. Remove all worn sections when regrinding the flutes 3. Regrind tool more frequently
Chipping		
	Incorrect Tap Selection	1. Use tap with lower rake angle 2. Consider different tool steel 3. Reduce hardness of the tap 4. Increase chamfer length 5. Avoid chip packing in the flutes or in the bottom of the hole by using spiral fluted or spiral pointed taps
	Operating Conditions	1. Reduce tapping speed 2. Avoid misalignment between tap and hole 3. Avoid sudden reverse in blind hole tapping 4. Avoid galling 5. Use larger drill size 6. Ensure adequate lubricant 7. Check for hard spots in the workpiece
Excessive Wear		
	Incorrect Tap Selection	1. Consider specially designed taps 2. Change to an Applix style of tap made from PM material 3. Apply special surface treatment such as steam tempered, TiN, TiCN or CrN 4. Increase chamfer length
	Operating Conditions	1. Reduce tapping speed 2. Apply adequate lubrication 3. Avoid work hardening the material being tapped 4. Use larger drill size
	Tool Condition	1. Ensure correct rake angle 2. Minimize heat in grinding process to avoid de-tempering

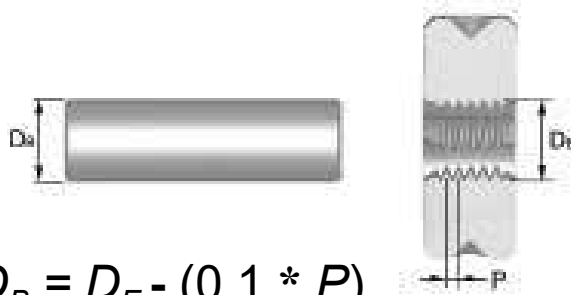
Technical Section - Threading

TECHNICAL TIPS ON THREADING WITH DIES

1. Before starting the die or dienut, chamfer the end of the bar at an angle of 45 degrees to eliminate sudden loading of the leading edges. Ensure the die or dienut is presented to the bolt squarely.
2. Make use of the large tolerances associated with the major diameter of the bolt, by reducing the diameter of the bar (see below). This will reduce the cutting force to a minimum.
3. Use the gun nose type of die, as this ensures the chips are directed away from the cutting area.
4. Ensure a good supply of the correct lubricant is aimed at the cutting area.
5. When adjusting split dies, avoid opening out as this will cause rubbing. Split dies may be closed down by approximately 0.15mm, by turning the adjustment screws equally. Pressure on one side of the die only may cause breakage.
6. Generally speaking, dienuts are used for reclaiming or cleaning out existing threads by hand. They tend to be of a more robust construction and should only be used in exceptional circumstances to cut a thread from solid.

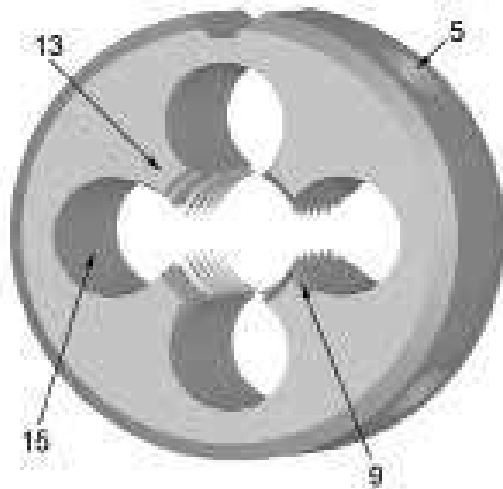
PRE-MACHINING DIMENSIONS

The diameter of the bolt blank must be smaller than the max. external diameter of the screw thread.

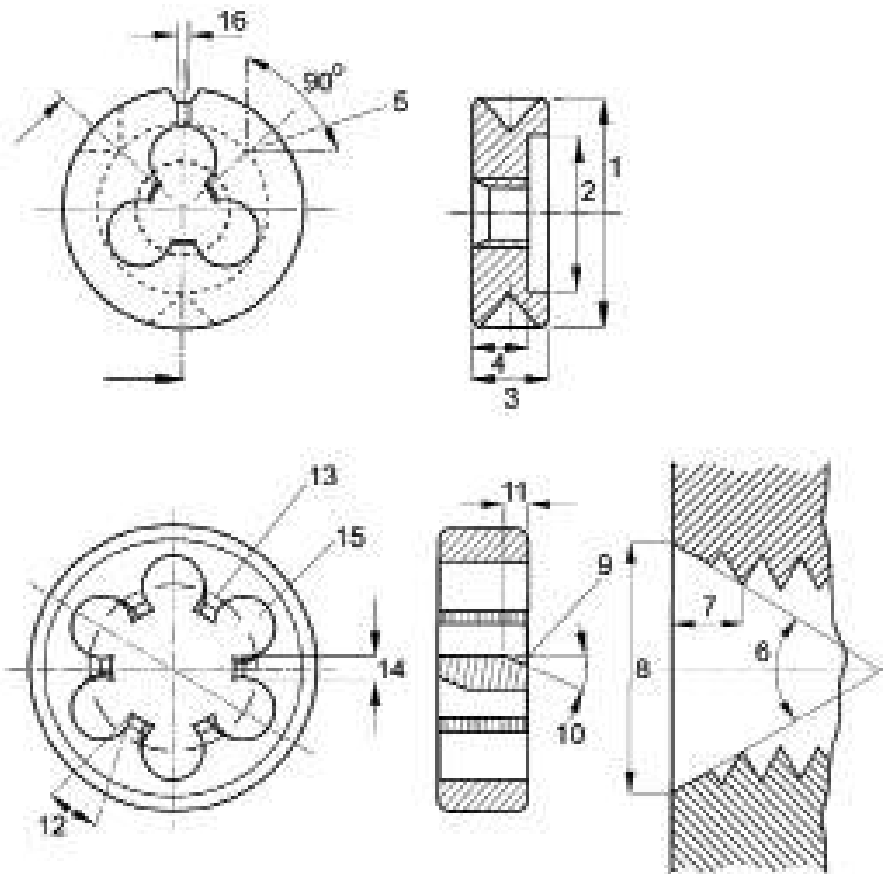


Technical Section - Threading

DIE DEFINITIONS/NOMENCLATURE



- 1 Outside Diameter
- 2 Recess Diameter
- 3 Thickness
- 4 Thread Length
- 5 Conical Hole for Fixing Screw
- 6 Chamfer Angle
- 7 Chamfer Length
- 8 Chamfer Diameter
- 9 Gun-nose
- 10 Spiral Angle
- 11 Spiral Length
- 12 Rake Angle
- 13 Land
- 14 Width of Land
- 15 Clearance Hole
- 16 Split of Adjustment



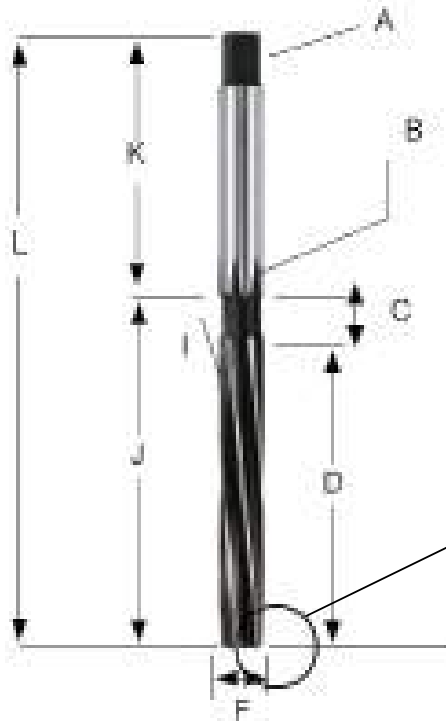
Technical Section - Threading

TROUBLE SHOOTING WHEN THREADING WITH DIES

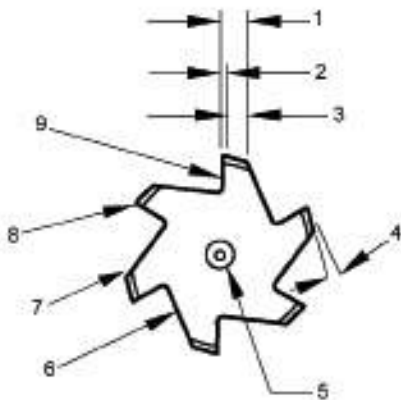
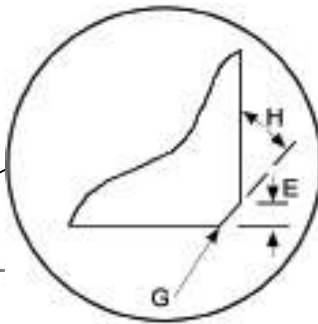
<i>Problem</i>	<i>Cause</i>	<i>Solution</i>
Oversize / Undersize		
	Misalignment	Correct alignment, ensure cleanliness
	Incorrect axial feed rate	Ensure axial feed rate is controlled accurately
Poor finish		
	Incorrect rake angle for the material	Try alternative dies or special die
	Incorrect/lack of lubricant	See lubricants section
	Incorrect speed	Follow recommendations in Catalog
	Bar diameter too large	Reduce to appropriate size
	Bar end not chamfered	Ensure bar end is chamfered
Chipping / Breakage		
	Wrong type of die	Follow recommendations in Catalog
	Speed too high	Follow recommendations in Catalog
	Bar diameter too large	Reduce to appropriate size
	Bar end not chamfered	Ensure bar end is chamfered
	Misalignment	Correct alignment, ensure cleanliness
Rapid wear		
	Incorrect/lack of lubricant	See lubricants section
	Speed too high	Follow recommendations in Catalog
Built up edge		
	Incorrect/lack of lubricant	See section lubricants
	Bar diameter too large	Reduce to appropriate size
	Speed too low	Follow recommendations in Catalog

Technical Section - Reaming

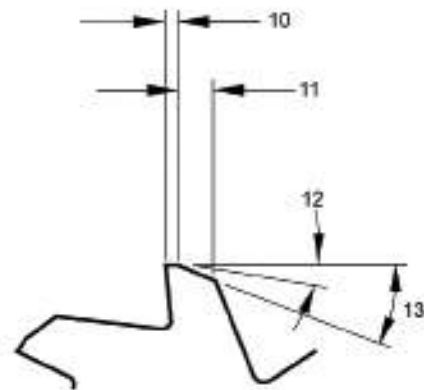
REAMER DEFINITIONS / NOMENCLATURE



- A Tang
- B Recess
- C Recess Length
- D Cut Length
- E Bevel Lead Length
- F Diameter
- G Bevel Lead
- H Bevel Lead Angle
- I Helix Angle
- J Body Length
- K Shank Length
- L Overall Length



- 1 Width of Land
- 2 Circular Land
- 3 Clearance
- 4 Clearance Angle
- 5 Centre Hole
- 6 Flute
- 7 Heel
- 8 Cutting Edge
- 9 Face



- 10 Width of Primary Clearance
- 11 Width of Secondary Clearance
- 12 Primary Clearance Angle
- 13 Secondary Clearance Angle

Technical Section - Reaming

TECHNICAL TIPS ON REAMING

To obtain the best results when using reamers it is essential to make them 'work'. It is a common fault to prepare holes for reaming with too little stock left in. If insufficient stock is left in the hole before reaming, then the reamer will rub, quickly show wear and will result in loss of diameter. It is equally important for performance not to leave too much stock in the hole. (See Stock Removal on next page).

1. Select the optimum type of reamer and the optimum speeds and feeds for the application. Ensure that pre-drilled holes are the correct diameter.
2. The workpiece must be held rigid and the machine spindle should have no play.
3. The chuck in which a straight shank reamer is held must be good quality. If the reamer slips in the chuck and the feed is automatic, breakage of the reamer may occur.
4. When driving a Morse Taper Shank reamer into a socket, sleeve or machine spindle, always use a soft faced hammer. Make sure there is a good fit between the reamer shank and the sleeve or socket otherwise misalignment will occur and the reamer may cut oversize.
5. Keep tool overhang from machine spindle to a minimum.
6. Use recommended lubricants to enhance the life of the reamer and ensure the fluid reaches the cutting edges. As reaming is not a heavy cutting operation, soluble oil 40:1 dilution is normally satisfactory. Air blasting may be used with grey cast iron, if dry machining.
7. Do not allow the flutes of a reamer to become blocked with chips.
8. Before the reamer is reground, check concentricity between centers. In most instances only the bevel lead will need regrinding.
9. Keep reamers sharp. Frequent regrinding is good economy, but it is important to understand that reamers cut only on the bevel and taper leads and not on the lands. Consequently only these leads need regrinding. Accuracy of regrinding is important to hole quality and tool life.

HAND / MACHINE REAMERS

Although both hand and machine reamers offer the same capability regarding finished hole size, the use of each must be considered according to application. A hand reamer, for reasons of alignment, has a long taper lead, whereas a machine reamer has only a 45 degree bevel lead. A machine reamer cuts only on the bevel lead, a hand reamer cuts on the bevel lead and also on the taper lead.

Technical Section - Reaming

APPLICATIONS

The results obtained in reaming are to a great extent dependent upon the condition of the drilled hole. If deep scores or form deviations are inherent in the hole, reaming is probably not going to rectify these inaccuracies or produce a finish within tolerance requirements. A reamer can also be mounted in a floating holder with enough clearance to permit the reamer to move freely along the existing hole.

Suggested Stock Removal

Material ≥	Core-Drilled Hole Diameter (inches)					
	5/32	> 5/32 – 3/8	> 3/8 – 5/8	> 5/8 – 1	> 1 – 1-1/2	> 1-1/2 – 2-1/2
Steel*	.004	.004 – .008	.006 – .010	.008 – .014	.010 – .018	.016 – .025
Hard cast-iron						
Soft cast-iron						
Light alloys*	.005	.005 – .012	.008 – .016	.010 – .020	.016 – .024	.024 – .031
Copper, soft						
Copper, alloys						
Plastics (Duro plastics)	.007	.007 – .012	.010 – .016	.013 – .020	.016 – .024	.020 – .031

* For soft materials and quick spiral machine reamers add 50% of allowance.

Table of Speeds and Feeds

Type of Material	Speed Range (sfm)		Type of Feed
	HSS	Carbide	
Magnesium	200 – 400	500 – 1000	M-H
Aluminum	150 – 300	500 – 1000	M-H
Brass and Bronze – Free Mach.	125 – 200	250 – 400	M
– Tough	75 – 125	150 – 250	M
Copper and Hard Bronze	50 – 75	100 – 150	L
Cast Iron – Soft (Ferritic)	50 – 100	150 – 250	H
– Medium (Pearlitic)	25 – 50	75 – 150	L-M
– Hard (Mart. or Acicular)	15 – 25	50 – 75	L
Steel – Under 200 BHN	55 – 80	200 – 300	M-H
– 200 - 300 BHN	30 – 55	125 – 200	M
– 300 - 400 BHN	20 – 30	50 – 125	L
– 400 - 500 BHN	10 – 20	35 – 50	L
– 500 - BHN Plus	—	15 – 35	L
Stainless – Free Mach. and 400 Ann.	40 – 60	150 – 250	M
– 300 Series	20 – 30	80 – 120	M
– P.H. and H.T. 400 series	15 – 25	60 – 100	L-M
High Temp Alloy – Nickel Base	10 – 20	40 – 70	L
– Cobalt Base	10 – 15	30 – 45	L
Titanium – Pure	35 – 50	50 – 100	M
– Alloys	10 – 20	35 – 50	L-M

Diameter Range	Feed (ipr) for Diameter Range		
	Light (L)	Medium (M)	Heavy (H)
≥ 1/16"	.0002" – .001"	.0005" – .002"	.001" – .003"
> 1/16" – 1/8"	.001" – .002"	.002" – .004"	.003" – .006"
> 1/8" – 1/4"	.002" – .004"	.004" – .006"	.006" – .010"
> 1/4" – 1/2"	.004" – .006"	.006" – .010"	.010" – .015"
> 1/2" – 1"	.006" – .010"	.010" – .020"	.015" – .030"
> 1"	.010" – .020"	.020" – .040"	.030" – .050"

Technical Section - Reaming

APPLICATION REAMERS

As with most cutting tools, the substrate and geometric configuration of reamers differs, dependent on the material they are intended to cut. As such, care should be taken to ensure that the correct choice of reamer is made.

CNC reamers are manufactured with a shank tolerance of h6. This enables the reamer to be used in hydraulic and heat shrink tool holding systems, offering enhanced accuracy and concentricity.

ADJUSTABLE REAMERS

Several types of adjustable reamers are available, all offering varying degrees of diameter adjustment. It is an important aspect of adjustable reamers to follow this set procedure:

- Adjust the reamer to the required diameter.
- Check the reamer between centers for concentricity and lip height variation.
- If required, grind the reamer to eliminate any eccentricity or lip height variation.
- Re-check the diameter.

STOCK REMOVAL

The recommended stock removal in reaming is dependent on the application material and the surface finish of the pre-drilled hole. General guidelines for stock removal are shown in the following tables:

Size of reamed hole (mm)	When pre-drilled	When pre-core-drilled	Size of reamed hole (inches)	When pre-drilled	When Pre-core-drilled
Below 4	0.1	0.1	Below 3/16	0.004	0.004
Over 4 to 11	0.2	0.15	3/16 to ½	0.008	0.006
Over 11 to 3	0.3	0.2	½ to 1. ½	0.010	0.008
Over 39 to 50	0.4	0.3	1. ½ to 2	0.016	0.010

SELECTION OF REAMER TYPES

Reaming is a recognized method of producing dimensionally accurate holes of fine surface finish. Dormer offers a range of reamers for producing holes to H7 tolerance.

Reamers are classified into various types:

- Solid - available in two shank types, Straight (cylindrical) and Morse Taper.
- Shell - for use on arbors.
- Expanding - with adjustable HSS blades and used for light work.

Technical Section - Reaming

Applications - Reamer Selection

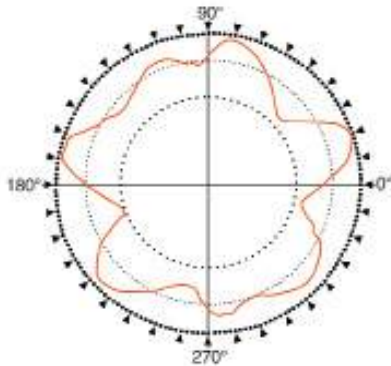
The most common types of reamers have a left-hand spiral because the main applications involve through holes requiring chips to be pushed forward. For blind holes, reamers with straight flutes or right hand spirals are recommended.

The most efficient reaming conditions depend on the application, material, quality of hole required, stock removal, lubrication and other factors. A general guide to surface speeds and feeds for machine reamers is shown in the reamer AMG and feed charts (see Dormer catalogue or Product Selector) and stock removal tables.

Extremely unequal spacing on reamers means that the divide is not the same for each tooth. As there are no two teeth diametrically opposite each other, the reamer produces a hole with a roundness variance of between 1 and 2 μm . This compared with a variance of up to 10 μm with unequal spacing.

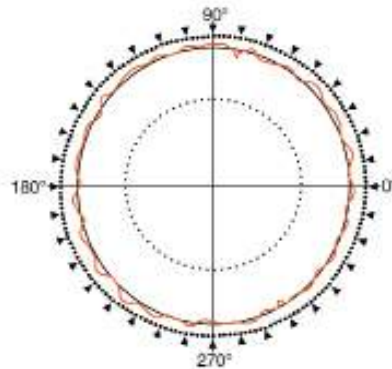
CARBIDE REAMERS - COMPARISON SPACING / EU SPACING

unequal spacing
roundness error up to 10 μm



Results of roundness

extremely unequal spacing
roundness error up to 1 - 2 μm



Results of roundness

Technical Section - Reaming

TROUBLE SHOOTING WHEN REAMING

<i>Problem</i>	<i>Cause</i>	<i>Solution</i>
Broken or twisted tangs		
Incorrect fit between shank and socket		Ensure the shank and the socket are clean and free from damage
Rapid Tool Wear		
Insufficient stock to remove		Increase the amount of stock to be removed
Oversize Hole		
Excessive lip height variation		Regrind to correct specification
Displacement in the machine spindle		Repair and rectify spindle displacement
Defects on the tool holder		Replace tool holder
Tool shank is damaged		Replace or regrind the shank
Ovality of the tool		Replace or regrind the tool
Asymmetric bevel lead angle		Regrind to correct specification
Too high feed or cutting speed		Adjust cutting conditions in accordance with Catalog or Product Selector
Undersize hole		
Insufficient stock to remove		Increase the amount of stock to be removed
Too much heat generated while reaming. The hole widens and shrinks.		Increase coolant flow
The tool diameter is worn and is undersize.		Regrind to correct specification.
Too low feed or cutting speed		Adjust cutting conditions in accordance with the Dormer Product Selector.
Pre-drilled hole is too small		Decrease the amount of stock to be removed.
Oval and conical holes		
Displacement in the machine spindle		Repair and rectify spindle displacement
Misalignment between tool and hole		Use a bridge reamer
Asymmetric bevel lead angle		Regrind to correct specification
Bad Hole finish		
Excessive stock to remove		Decrease the amount of stock to be removed
Worn out tool		Regrind to specification
Too small cutting rake angle		Regrind to specification
Too diluted emulsion or cutting oil		Increase % concentration
Feed and/or speed too low		Adjust cutting conditions in accordance with Catalog/ Product Selector
Cutting speed too high		Adjust cutting conditions in accordance with Catalog/ Product Selector
The tool clamps and breaks		
Worn out tool		Regrind to correct specification
Back taper of the tool is too small		Check and replace / modify the tool
The width of the land is too wide		Check and replace / modify the tool
Workpiece material tend to squeeze		Use an adjustable reamer to compensate for the displacement
Pre-drilled hole is too small		Decrease the amount of stock to be removed
Heterogeneous material with hard inclusions		Use solid carbide reamer

Technical Section -

Counterboring and Countersinking

GENERAL HINTS ON COUNTERBORING AND COUNTERSINKING

COUNTERBORING

The counterbore is an end cutting tool which is used to enlarge a preformed hole when a flat bottom is required or to spotface when a machine finish is required. It may have a fixed pilot (solid pattern) Fig.1 or be designed Fig.2 for an interchangeable pilot Fig. 3.



Fig.1



Fig.2



Fig. 3

COUNTERSINKING

The countersink is an conical cutting tool, usually made with angular relief, having one or more flutes with specific size angle cutting edges. It is used for chamfering and countersinking holes. The countersink may have a straight shank, tapered shank, bit stock shank or special shank requiring a special holder, for holding in a power or hand operated machine.



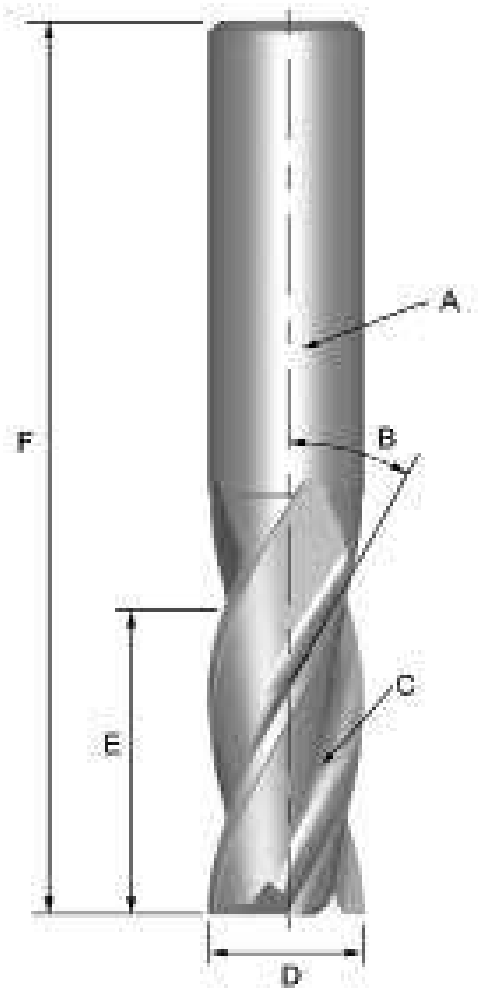
Technical Section - Counterboring and Countersinking

TROUBLE SHOOTING WHEN COUNTERBORING

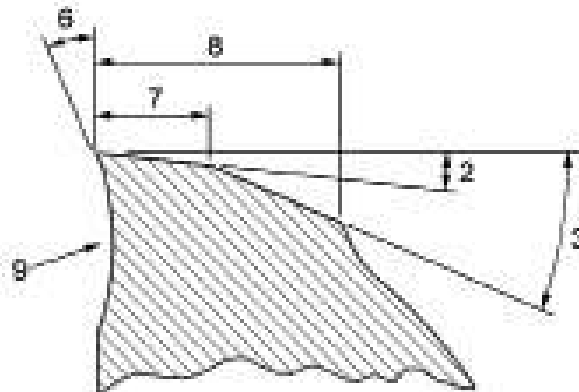
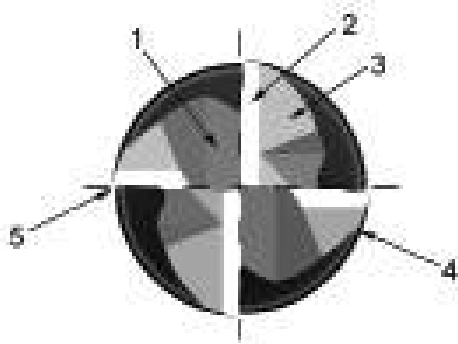
<i>Problem</i>	<i>Cause</i>	<i>Solution</i>
Excessive Cutting Edge Wear		
	Incorrect feeds & speeds	Increase feed - especially when machining ductile or free machining materials. Also try reducing speed
	Rough cutting edge	Lightly hone cutting edge with fine grit diamond hone
	Insufficient coolant	Increase coolant flow - review type of coolant
Chipping		
	Poor chip removal	Use tool with larger flute space - larger diameter or fewer flutes
	Recutting work hardened chips	Increase coolant flow
	Vibration	Increase rigidity of set-up, especially worn tool holders
Short Tool Life		
	Excessive cratering	Increase speed or decrease feed
	Abrasive material	Decrease speed and increase feed Increase coolant flow
	Hard materials	Reduce speed - rigidity very important
	Insufficient chip room	Use larger diameter tool
	Delayed resharpening	Prompt resharpening to original geometry will increase tool life
Glazed Finish		
	Feed too light	Increase feed
	Dull cutting edge	Resharpen tool to original geometry
	Insufficient clearance	Resharpen tool with more clearance
Rough Finish		
	Dull cutting edge	Resharpen to original tool geometry
	Wrong feeds & speeds	Increase speed - also try reducing feed
Chattering		
	Insufficient machine horsepower	Use tool with fewer flutes as correct feeds & speeds must be maintained
	Vibration	Resharpen tool with more clearance

Technical Section - Milling

NOMENCLATURE



- A Shank
- B Helix Angle
- C Flute
- D Outside Diameter
- E Cutting Length
- F Overall Length



- 1 Gash
- 2 Primary Relief Angle
- 3 Secondary Relief Angle
- 4 Heel
- 5 Cutting Edge

- 6 Rake Angle
- 7 Width of Primary Relief Land
- 8 Width of Secondary Relief Land
- 9 Undercut Face

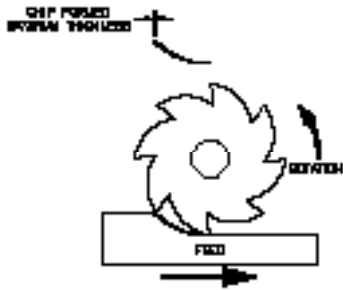
Technical Section - Milling

MILLING EFFECTIVELY

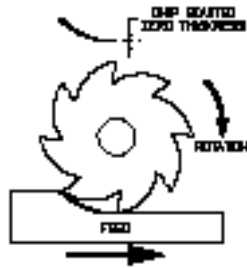
Types Of Cuts

Climb Milling Versus Conventional Milling

CLIMB MILLING



CONVENTIONAL MILLING



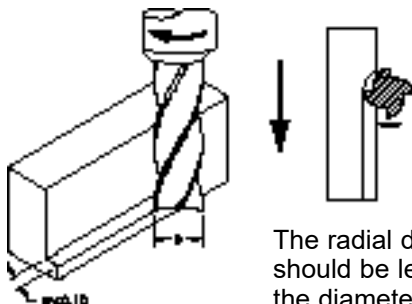
In conventional milling, the cutter revolves opposite to the direction of table feed. Therefore the width of the chip starts at zero and increases to a maximum at the end of the cut. This can lead to accelerated tool wear under some conditions. Conventional milling may be advantageous when milling hot rolled steel, surface hardened and steels with a surface scale.

In climb milling, the cutter revolves in the same direction as the table feed. The tooth meets the work at the top of the cut, producing the thickest part of the chip first. In horizontal applications the resultant force created by climb milling can act as a clamping force, acting towards the machine table.

It is important to make sure that the machine tool has no leadscrew backlash. Normally climb milling improves product surface finish and increases tool life.

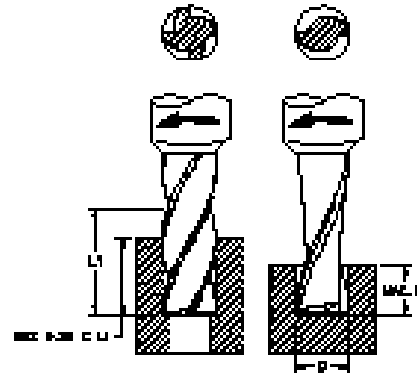
Peripheral Milling The milling of a surface which is parallel to the end mill axis.

Peripheral (Cylindrical, Slab) Milling



The radial depth of cut should be less than 0.1 of the diameter of the mill:
 $a_r < 0.1 D$.

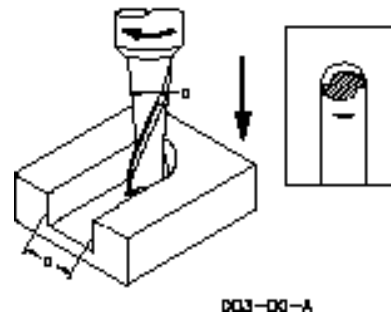
Plunge Milling The direct movement between the workpiece and the center line of the end mill when the end mill sinks directly into the workpiece.



In order to be able to "drill," i.e. mill with axial feed, an end mill must have an end face cutting edge that goes all the way to the center. An example of such a solid drilling operation is keyway milling in the middle of a shaft.

In boring, the depth of a hole may be up to 75% of the cutting edge length. In solid drilling, however, it should not exceed 0.5-1 D.

Slot Milling



The radial depth of cut is equal to the diameter of the mill: $a_r = D$.

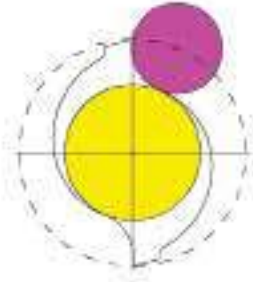
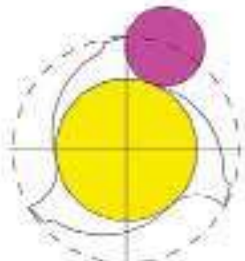
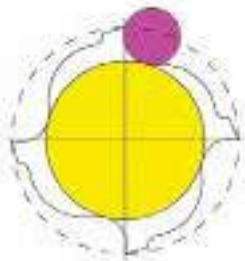
All slotting applications are a combination of conventional and climb milling. Refer to adjacent section.

Technical Section - Milling

FEATURES OF THE END MILL - CHOOSING THE NUMBER OF FLUTES

Number of flutes should be determined by:

- Milled material
- Dimension of workpiece
- Milling conditions

2 Flutes	3 Flutes	4 Flutes (or multi-flutes)
		
Flexural strength Low ←————→ High		
Chip space Big ←————→ Small		
• Large chip space. • Easy chip ejection. • Good for slot milling. • Good for heavy duty milling. • Less rigidity due to small section area. • Lower quality surface finish	• Chip space almost as large as for 2 flutes. • Larger section area - higher rigidity than 2 flutes • Improved surface finish	• Highest rigidity. • Largest section area – small chip space. • Gives best surface finish. • Recommended for profiling, side milling and shallow slotting.

FEATURES OF THE END MILL – HELIX ANGLE

Increasing the number of flutes makes the load on the single tooth more homogeneous and consequently, this allows for a better finish. But with a high helix angle, the load (FV) along the cutter axis is increased too. A high FV can give:

- Load problems on the bearings
- Cutter movement along the spindle axis. To avoid this problem it is necessary to use Weldon or screwed shanks.



Technical Section - Milling

DIRECTION OF USE OF THE CUTTER

We can split the range of the cutters in relationship to the possible working directions to the workpiece surface. There are three different types:

3 Directions	2 Directions	1 Direction
		

Please note that the axial direction is possible only with center cutting end mills.

MRR (MATERIAL REMOVAL RATE) Q

We can calculate material removal rate Q as the volume of material removed divided by the time taken to cut. The volume removed is the initial volume of the workpiece minus the final volume. The cutting time is the time needed for the tool to move through the length of the workpiece. This parameter strongly influences the finishing grade of the workpiece.

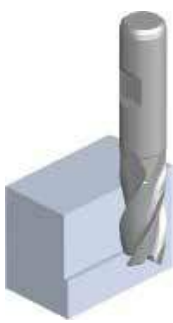
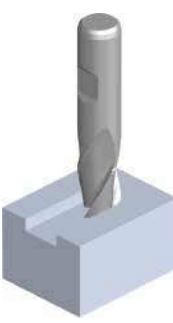
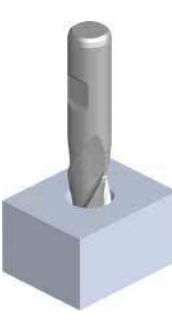
$$Q = \frac{a_p * a_e * v_f}{1000}$$

Q = MRR (cm³/min) a_e = radial depth (mm)

a_p = axial depth (mm) v_f = feed rate mm/min

APPLICATIONS

The MRR and the applications are strongly related. For each different application we have a different MRR that increases with the engagement section of the cutter on the workpiece. The recent Dormer Catalogue was produced with simple icons that show the different applications.

Side Milling	Face Milling	Slot Milling	Plunge Milling	Ramping
				
The radial depth of cut should be less than 0.25 of the diameter of the end mill.	The radial depth of cut should be no more than 0.9 of the diameter, axial depth of cut less than 0.1 of the diameter.	Machining of a slot for keyways. The radial depth of cut is equal to the diameter on the end mill.	It is possible to drill the workpiece with an end mill only with the cutting centre. In this operation the feed has to be halved.	Both axial and radial entering into the workpiece.

Technical Section - Milling

MILLING EFFECTIVELY

End Mill Selection

Utilize the shortest possible tool available for the application with the largest diameter permissible and the shortest flute length as depth of cut allows. Extra length end mills have excessive overhang, thus a reduction in feed up to 25% may be required. Stub length end mills, due to their short overall and flute length, have more rigidity, thus an increase in feed rates of up to 25% may be required.

Speeds

Solid Carbide end mills must be run at higher speeds than High Speed Steel end mills. Many times, lighter cuts at higher speeds can improve the finish of the workpiece.

When the application is a slotting cut, the speed should be reduced by approximately 20%. Speeds should be decreased when milling hard or tough materials or when taking heavy cuts. Speeds should be increased when milling softer materials or when taking lighter cuts. Speeds should also be increased for finishing cuts.

Coolants

Coolants are recommended when milling mild steel and high temperature alloys. The purpose of the coolant media is to direct the chips away from the cutting tool and workpiece. This prevents damage to the cutting edges due to recutting the chips. When machining titanium, coolant flow must be heavy and directed at the area of cut to prevent overheating and assist in chip removal.

Milling Terminology/Operating Formulas

The following terms and formulas can be used to determine the appropriate operating parameters.

Terms	Formulas
SFM = Surface Feet Per Minute	$D \times \text{RPM} \times .26 = \text{SFM}$
RPM = Revolutions Per Minute	$\frac{\text{SFM} \times 3.82}{D} = \text{RPM}$
F = Feed in Inches Per Minute	$F_t \times T \times \text{RPM} = F$
Ft = Feed Per Tooth	$\frac{F}{T \times \text{RPM}} = F_t$
D = Cutting Diameter	
T = Number of Teeth	

Technical Section - Milling

TABLE OF CUTTING SPEEDS

Conversion Table (Surface Feet Per Minute to Revolutions Per Minute)

Surface Feet Per Minute																		
DIA. In Inches	15'	20'	25'	30'	35'	40'	45'	50'	60'	70'	80'	90'	100'	110'	120'	130'	140'	DIA. In Inches
	Revolutions Per Minute																	
1/64	3667	4890	6112	7334	8559	9779	11002	12224	14669	17114	19558	22003	24448	26893	29338	31782	34227	1/64
1/32	1834	2445	3056	3667	4278	4890	5501	6112	7334	8557	9779	11002	12224	13446	14669	15891	17114	1/32
3/64	1222	1630	2037	2445	2852	3260	3667	4075	4890	5705	6519	7334	8149	8964	9779	10594	11409	3/64
1/16	917	1222	1528	1833	2139	2445	2750	3056	3667	4278	4889	5500	6112	6723	7333	7945	8556	1/16
3/32	611	815	1019	1222	1426	1630	1834	2037	2445	2852	3260	3667	4075	4482	4890	5297	5705	3/32
1/8	458	611	764	917	1070	1222	1375	1528	1833	2139	2445	2750	3056	3361	3667	3973	4278	1/8
5/32	367	489	611	733	856	978	1100	1222	1467	1711	1956	2200	2445	2689	2934	3178	3423	5/32
3/16	306	407	509	611	713	815	917	1019	1222	1426	1620	1833	2037	2241	2445	2648	2852	3/16
1/4	229	306	382	458	535	611	688	764	917	1070	1222	1375	1528	1681	1833	1986	2139	1/4
5/16	183	244	306	367	428	489	550	611	733	856	978	1100	1222	1345	1467	1589	1711	5/16
3/8	153	204	255	306	357	407	458	509	611	713	815	917	1019	1120	1222	1324	1426	3/8
7/16	131	175	218	262	306	349	393	437	524	611	698	786	873	960	1048	1135	1222	7/16
1/2	115	153	191	229	267	306	344	382	458	535	611	688	764	840	917	993	1070	1/2
5/8	92	122	153	183	214	244	275	306	367	428	489	550	611	672	733	794	856	5/8
3/4	76	102	127	153	178	204	229	255	306	357	407	458	509	560	611	662	713	3/4
7/8	66	87	109	131	153	175	196	218	262	306	349	393	473	480	524	568	611	7/8
1	57	76	96	115	134	153	172	191	229	267	306	344	382	420	458	479	535	1
1-1/8	51	68	85	102	119	136	153	170	204	238	272	306	340	373	407	441	475	1-1/8
1-1/4	46	61	76	92	107	122	138	153	183	214	244	275	306	336	367	397	428	1-1/4
1-3/8	42	56	70	83	97	111	125	139	167	194	222	250	278	306	333	361	389	1-3/8
1-1/2	38	51	64	76	89	102	115	127	153	178	204	229	255	280	309	331	357	1-1/2
1-5/8	35	47	59	71	82	94	106	118	141	165	188	212	235	259	282	306	329	1-5/8
1-3/4	33	44	55	66	76	87	98	109	131	153	175	196	218	240	262	284	306	1-3/4
1-7/8	31	41	51	61	71	82	92	102	122	143	163	183	204	224	244	265	285	1-7/8
2	29	38	48	57	67	76	86	96	115	134	153	172	191	210	229	248	267	2
2-1/4	26	34	42	51	59	68	76	85	102	119	136	153	170	187	204	221	238	2-1/4
2-1/2	23	31	38	46	54	61	69	76	92	107	122	138	153	168	183	199	214	2-1/2
2-3/4	21	28	35	42	49	56	62	70	83	97	111	125	139	153	167	181	194	2-3/4
3	19	26	32	38	45	51	57	64	76	89	102	115	127	140	153	166	178	3
3-1/4	18	24	29	35	41	47	53	59	71	82	94	106	118	129	141	153	165	3-1/4
3-1/2	16	22	27	33	38	44	49	55	66	76	87	98	109	120	131	142	153	3-1/2
3-3/4	15	20	26	31	36	41	46	51	61	71	81	92	102	112	122	132	143	3-3/4
4	14	19	24	29	33	38	43	48	57	67	76	86	96	105	115	124	134	4
4-1/2	13	17	21	26	30	34	38	42	51	59	68	76	85	93	102	110	119	4-1/2
5	12	15	19	23	27	31	34	38	46	54	61	69	76	84	92	99	107	5
5-1/2	10	14	17	21	24	28	31	35	42	49	56	63	70	76	83	90	97	5-1/2
6	10	13	16	19	22	26	29	32	38	45	51	57	64	70	76	83	89	6
6-1/2	9	12	15	18	21	24	26	29	35	41	47	53	59	65	71	76	82	6-1/2
7	8	11	14	16	19	22	25	27	33	38	44	49	55	60	66	71	76	7
7-1/2	8	10	13	15	18	20	23	26	31	36	41	46	51	56	61	66	71	7-1/2
8	7	10	12	14	17	19	22	24	29	33	38	43	48	53	57	62	67	8
8-1/2	7	9	11	14	16	18	20	23	27	32	36	40	45	49	54	58	63	8-1/2
9	6	9	11	13	15	17	19	21	26	30	34	38	42	47	51	55	59	9
9-1/2	6	8	10	12	14	16	18	20	24	28	32	36	40	44	48	52	56	9-1/2
10	6	8	10	12	13	15	17	19	23	27	31	34	38	42	46	50	54	10
11	5	7	9	10	12	14	16	17	21	24	28	31	35	38	42	45	49	11
12	5	6	8	10	11	13	14	16	19	22	26	29	32	35	38	41	45	12
	15'	20'	25'	30'	35'	40'	45'	50'	60'	70'	80'	90'	100'	110'	120'	130'	140'	

Technical Section - Milling

CUTTING DATA

S400HA SLOTING

Materials:	AMG 7.1 - 7.4 Aluminum & Non-Ferrous Metals			
"D" Tool Dia.	RPM	IPM	SFM	IPR
1/16	15,600	29.44	255	0.0019
3/32	15,600	35.98	383	0.0039
1/8	15,600	42.52	511	0.0027
3/16	15,600	61.42	766	0.0039
1/4	15,600	70.87	1022	0.0045
5/16	12,000	85.05	983	0.0071
3/8	12,000	103.93	1179	0.0087
1/2	12,000	127.56	1572	0.0106
5/8	9,600	118.12	1572	0.0123
3/4	6,000	89.76	1179	0.0150
Axial DOC (maximum) = 0.5 x D				
Using Table Above...				
For AMG 6.1 & 6.4 — Use RPM & SFM x 0.3				
For AMG 8.1 - 8.3 — Use RPM & SFM x 0.3				

S401HA SLOTING

Materials:	AMG 7.1 - 7.4 Aluminum & Non-Ferrous Metals			
"D" Tool Dia.	RPM	IPM	SFM	IPR
5/32	12,400	36.4	508	0.0029
1/4	12,400	45.4	812	0.0037
5/16	9,920	54.5	812	0.0055
3/8	9,920	66.6	975	0.0067
1/2	9,920	81.8	1300	0.0082
5/8	7,440	75.7	1218	0.0102
3/4	4,960	60.6	975	0.0122
Axial DOC (maximum) = 0.5 x D				
Using Table Above...				
For AMG 8.1 - 8.3 — Use RPM & SFM x 0.3				

Materials:	AMG 6.1 - 6.4 Copper Alloys			
"D" Tool Dia.	RPM	IPM	SFM	IPR
5/32	3,720	9.1	152	0.0024
1/4	3,720	11.5	244	0.0031
5/16	2,852	13.6	234	0.0048
3/8	2,852	16.6	280	0.0058
1/2	2,852	20.5	374	0.0072
5/8	2,232	19.1	365	0.0086
3/4	1,426	15.2	280	0.0107
Axial DOC (maximum) = 0.5 x D				

S400HA SIDE CUTTING

Materials	AMG 7.1 - 7.4 Aluminum & Non-Ferrous Metals			
"D" Tool Dia.	RPM	IPM	SFM	IPR
1/16	12,000	40.01	197	0.0033
3/32	12,000	48.35	295	0.0040
1/8	12,000	56.69	393	0.0047
3/16	12,000	80.32	590	0.0067
1/4	12,000	94.49	786	0.0079
5/16	9,600	108.66	786	0.0113
3/8	9,600	127.56	943	0.0133
1/2	9,600	160.56	1258	0.0167
5/8	7,200	146.52	1179	0.0204
3/4	4,800	113.39	943	0.0236
Axial DOC (maximum) = 1.0 x D				
Radial DOC (maximum) = 0.25 x D (up to ø 3/8)				
Radial DOC (maximum) = 0.5 x D (ø 1/2 - ø 3/4)				

S401HA SIDE CUTTING

Materials	AMG 7.1 - 7.4 Aluminum & Non-Ferrous Metals			
"D" Tool Dia.	RPM	IPM	SFM	IPR
5/32	12,400	42.4	508	0.0034
1/4	12,400	60.6	812	0.0049
5/16	9,920	69.6	812	0.0070
3/8	9,920	81.8	975	0.0082
1/2	9,920	103	1300	0.0104
5/8	7,440	93.9	1218	0.0126
3/4	4,960	75.7	975	0.0153
Axial DOC (maximum) = 1.0 x D				
Radial DOC (maximum) = 0.25 x D (up to ø 3/8)				
Radial DOC (maximum) = 0.5 x D (ø 1/2 - ø 3/4)				

Materials	AMG 6.1 - 6.4 Copper Alloys			
"D" Tool Dia.	RPM	IPM	SFM	IPR
5/32	3,720	10.6	152	0.0028
1/4	3,720	15.2	244	0.0041
5/16	2,852	17.6	234	0.0062
3/8	2,852	20.6	280	0.0072
1/2	2,852	25.8	374	0.0090
5/8	2,232	23.6	365	0.0106
3/4	1,426	19.1	280	0.0134
Axial DOC (maximum) = 1.0 x D				
Radial DOC (maximum) = 0.25 x D (up to ø 3/8)				
Radial DOC (maximum) = 0.5 x D (ø 1/2 - ø 3/4)				

RPM = Revolutions per Minute
 IPM = Inches per Minute
 SFM = Surface Feet per Minute
 IPR = Inches per Revolution
 DOC = Depth of Cut
 FT (Feet per Tooth) = IPR / # of Teeth

Technical Section - Milling

CUTTING DATA

S402HA PROFILING

Materials:	AMG 7.1 - 7.4 Aluminum & Non-Ferrous Metals			
"D" Tool Dia.	RPM	IPM	SFM	IPR
1/4	14,500	71.65	950	0.0049
5/16	11,200	81.9	917	0.0073
3/8	11,200	96.2	1100	0.0086
1/2	11,200	122.85	1467	0.0110
5/8	8,800	110.5	1441	0.0126
3/4	5,600	104	1100	0.0186
Using Table Above...				
For AMG 6.1 & 6.4 — Use RPM & SFM x 0.3				
For AMG 8.1 - 8.3 — Use RPM & SFM x 0.3				

Axial Depth of Cut (DOC) recommendation = $0.2 \times D$
 Radial Depth of Cut (DOC) recommendation = $0.5 \times D$
 Note: Reduce the Feed in "Long Length" options by 50%

S403HA & S404HA SLOTING

Materials:	AMG 7.1 - 7.4 Aluminum & Non-Ferrous Metals			
"D" Tool Dia.	RPM	IPM	SFM	IPR
1/8	15,600	43	511	0.0028
3/16	15,600	61.4	766	0.0039
1/4	15,600	73.7	1022	0.0047
5/16	12,000	86	983	0.0072
3/8	12,000	104.4	1179	0.0087
7/16	12,000	116.65	1376	0.0097
1/2	12,000	128.9	1572	0.0107
5/8	9,600	116.65	1572	0.0122
3/4	6,000	92.15	1179	0.0154
1"	6,000	98.3	1572	0.0164
Axial DOC (maximum) = $0.5 \times D$				
Using Table Above...				
For AMG 6.1 & 6.4 — Use RPM & SFM x 0.3				
For AMG 8.1 - 8.3 — Use RPM & SFM x 0.3				

S403HA & S404HA SIDE CUTTING

Materials:	AMG 7.1 - 7.4 Aluminum & Non-Ferrous Metals			
"D" Tool Dia.	RPM	IPM	SFM	IPR
1/8	12,000	55.25	393	0.0046
3/16	12,000	79.8	590	0.0067
1/4	12,000	92.2	786	0.0077
5/16	9,600	110.55	786	0.0115
3/8	9,600	129	943	0.0134
7/16	9,600	144.4	1100	0.0150
1/2	9,600	159.8	1258	0.0166
5/8	7,200	147.4	1179	0.0205
3/4	4,800	113.6	943	0.0237
1"	4,800	116.65	1258	0.0243
Axial DOC (maximum) = $1.0 \times D$				
Radial DOC (maximum) = $0.25 \times D$ (up to $\phi 3/8$)				
Radial DOC (maximum) = $0.5 \times D$ ($\phi 1/2 - \phi 1"$)				

S405HA

HIGH SPEED CUTTING (FINISHING)

Materials:	AMG 1.3-1.6 Carbon Steels, Alloy Steels			
	AMG 3.4 Cast Iron (up to 50 HRC)			
"D" Tool Dia.	RPM	IPM	SFM	IPR
1/4	16,800	240	1100	0.0143
5/16	12,600	240	1032	0.0190
3/8	10,000	235	983	0.0235
1/2	8,400	200	1100	0.0238
5/8	6,300	150	1032	0.0238
3/4	5,000	120	983	0.0240
Axial DOC (maximum) = $1.5 \times D$				
Radial DOC (maximum) = $0.05 \times D$				

Materials:	AMG 1.7 - 1.8 Alloy Steels & Tool Steels (from 50 HRC up to 60 HRC)			
"D" Tool Dia.	RPM	IPM	SFM	IPR
1/4	8,400	120	550	0.0143
5/16	6,300	120	516	0.0190
3/8	5,000	120	491	0.0240
1/2	4,200	100	550	0.0238
5/8	3,150	75	516	0.0238
3/4	2,500	58	491	0.0232
Axial DOC (maximum) = $1.5 \times D$				
Radial DOC (maximum) = $0.05 \times D$				

Materials:	AMG 1.8 Hardened Steels (from 60 HRC up to 65 HRC)			
"D" Tool Dia.	RPM	IPM	SFM	IPR
1/4	4,200	58	275	0.0138
5/16	3,200	58	262	0.0181
3/8	2,500	58	246	0.0232
1/2	2,100	50	275	0.0238
5/8	1,600	37	262	0.0231
3/4	1,260	30	248	0.0238
Axial DOC (maximum) = $1.5 \times D$				
Radial DOC (maximum) = $0.05 \times D$				

RPM = Revolutions per Minute
 IPM = Inches per Minute
 SFM = Surface Feet per Minute
 IPR = Inches per Revolution
 DOC = Depth of Cut
 FT (Feet per Tooth) = IPR / # of Teeth

Technical Section - Milling

S406HA & S406HB

SLOTING & SIDE CUTTING

Materials:	AMG 1.1-1.5 Carbon Steels, Alloy Steels, and Cast Iron (under 40 HRC)			
"D" Tool Dia.	RPM	IPM	SFM	IPR
1/8	12,735	10.2	417	0.0008
3/16	8,490	10.9	417	0.0013
1/4	6,370	11.5	417	0.0018
5/16	5,100	13	418	0.0025
3/8	4,245	18.4	417	0.0043
7/16	4,010	24.5	460	0.0061
1/2	3,500	25.9	459	0.0074
9/16	3,110	26	458	0.0084
5/8	2,800	26.1	459	0.0093
3/4	2,340	24	460	0.0103
1"	1,755	17.4	460	0.0099
Axial DOC (maximum) = 1 x D (Slotting) Axial DOC (maximum) = 1.5 x D (Side Cutting) Radial DOC (maximum) = 0.5 x D (Side Cutting)				

SLOTING & SIDE CUTTING

Materials:	AMG 2.2-2.4 Stainless Steels (300 Series)			
"D" Tool Dia.	RPM	IPM	SFM	IPR
1/8	9,625	7.3	315	0.0008
3/16	6,385	8.3	314	0.0013
1/4	4,810	9.6	315	0.0020
5/16	3,850	10.7	315	0.0028
3/8	3,210	15.4	315	0.0048
7/16	2,750	20.9	315	0.0076
1/2	2,400	21	314	0.0088
9/16	2,140	21.2	315	0.0099
5/8	1,925	21.2	315	0.0110
3/4	1,600	19.4	314	0.0121
1"	1,200	14.7	314	0.0123
Axial DOC (maximum) = 1 x D (Slotting) Axial DOC (maximum) = 1.5 x D (Side Cutting) Radial DOC (maximum) = 0.5 x D (Side Cutting)				

SLOTING & SIDE CUTTING

Materials:	AMG 2.1-2.3 Stainless Steels (400 Series)			
"D" Tool Dia.	RPM	IPM	SFM	IPR
1/8	13,475	7.6	441	0.0006
3/16	12,000	8.4	590	0.0007
1/4	6,815	9.6	446	0.0014
5/16	5,390	10.7	441	0.0020
3/8	4,490	15.4	441	0.0034
7/16	3,850	20.9	441	0.0054
1/2	3,370	21	441	0.0062
9/16	2,990	21.2	441	0.0071
5/8	2,700	21.2	442	0.0079
3/4	2,250	19.4	442	0.0086
1"	1,685	15.1	441	0.0090
Axial DOC (maximum) = 1 x D (Slotting) Axial DOC (maximum) = 1.5 x D (Side Cutting) Radial DOC (maximum) = 0.5 x D (Side Cutting)				

SLOTING & SIDE CUTTING

Materials:	AMG 4.1-4.3 Titanium			
"D" Tool Dia.	RPM	IPM	SFM	IPR
1/8	8,320	7.6	272	0.0009
3/16	5,550	8.4	273	0.0015
1/4	4,160	9.6	272	0.0023
5/16	3,330	10.7	273	0.0032
3/8	2,770	15.4	272	0.0056
7/16	2,380	20.7	273	0.0087
1/2	2,080	21	272	0.0101
9/16	1,850	21.2	273	0.0115
5/8	1,660	21.2	272	0.0128
3/4	1,390	19.4	273	0.0140
1"	1,040	15.1	272	0.0145
Axial DOC (maximum) = 1 x D (Slotting) Axial DOC (maximum) = 1.5 x D (Side Cutting) Radial DOC (maximum) = 0.5 x D (Side Cutting)				

SLOTING & SIDE CUTTING

Materials:	AMG 5.1-5.3 Nickel Alloys, Inconel, Hastelloy			
"D" Tool Dia.	RPM	IPM	SFM	IPR
1/8	2,565	2.1	84	0.0008
3/16	1,685	1.8	83	0.0011
1/4	1,285	2.5	84	0.0019
5/16	1,025	2.8	84	0.0027
3/8	855	4.1	84	0.0048
7/16	735	5.5	84	0.0075
1/2	640	5.6	84	0.0088
9/16	570	5.7	84	0.0100
5/8	510	5.6	84	0.0110
3/4	425	5.2	84	0.0122
1"	315	4.3	83	0.0137
Axial DOC (maximum) = 0.5 x D (Slotting) Axial DOC (maximum) = 1.0 x D (Side Cutting) Radial DOC (maximum) = 0.35 x D (Side Cutting)				

RPM = Revolutions per Minute
 IPM = Inches per Minute
 SFM = Surface Feet per Minute
 IPR = Inches per Revolution
 DOC = Depth of Cut
 FT (Feet per Tooth) = IPR / # of Teeth

Technical Section - Milling

CUTTING DATA

S407HA

SLOTING & SIDE CUTTING

Materials:	AMG 1.1-1.4 Alloy Steels			
	AMG 3.1-3.3 Cast Iron (up to 30 HRC)			
"D" Tool Dia.	RPM	IPM	SFM	IPR
1/8	12,735	10.2	417	0.0008
3/16	8,490	10.9	417	0.0013
1/4	6,370	11.5	417	0.0018
5/16	5,100	13	418	0.0025
3/8	4,245	18.4	417	0.0043
7/16	4,010	24.5	460	0.0061
1/2	3,500	25.9	459	0.0074
9/16	3,110	26	458	0.0084
5/8	2,800	26.1	459	0.0093
3/4	2,340	24	460	0.0103
1"	1,755	17.4	460	0.0099
Axial DOC (maximum) = 1 x D (Slotting) Axial DOC (maximum) = 1.5 x D (Side Cutting) Radial DOC (maximum) = 0.5 x D (Side Cutting)				

SLOTING & SIDE CUTTING

Materials:	AMG 1.4-1.6 Alloy Steels			
	AMG 3.2-3.4 Cast Iron (from 30 HRC to 40 HRC)			
"D" Tool Dia.	RPM	IPM	SFM	IPR
1/8	8,910	7.1	292	0.0008
3/16	5,940	7.6	292	0.0013
1/4	4,460	8.1	292	0.0018
5/16	3,560	9.1	291	0.0026
3/8	2,970	12.7	292	0.0043
7/16	2,800	17	321	0.0061
1/2	2,460	18	322	0.0073
9/16	2,180	18.1	321	0.0083
5/8	1,960	18.3	321	0.0093
3/4	1,640	16.7	322	0.0102
1"	1,230	12.2	322	0.0099
Axial DOC (maximum) = 1 x D (Slotting) Axial DOC (maximum) = 1.5 x D (Side Cutting) Radial DOC (maximum) = 0.5 x D (Side Cutting)				

Technical Section - Milling

MILLING TROUBLESHOOTING GUIDE

<i>Problem</i>	<i>Solution</i>	
Chipping of the Cutting Edge	• Apply hone .0005" to .001" • Try air blow or coolant • Reduce depth of cut • Check amount of wear on collet	• Reduce feed per tooth • If wet cutting, change to dry cutting • Check tool runout • Improve the stability of the work-holding
Extreme Flank Wear	• Use coated end mill • If conventional milling, change to climb • If using water soluble cutting fluid, change to non-water soluble cutting fluid	• Increase helix angle • If conventional milling, change to climb
Vibration / Chattering	• Use larger diameter end mill • Increase feed per tooth • Increase helix angle • Reduce length of flutes or overhang	• Reduce cutting speed • Check or change the holder • Increase number of flutes • Tighten chuck or use stronger chuck
Deflection	• Reduce depth of cut • Increase feed per tooth • Increase helix angle • If using water soluble cutting fluid, change to non-water soluble cutting fluid	• Use larger diameter end mill • Reduce length of flutes or overhang • If using 2-flute type, change to 4-flute type • If climb milling, change to conventional milling
Poor Surface Finish	• Reduce end mill runout • Increase cutting speed • Reduce feed per tooth • Use small hone .0003" to .0006" • Increase helix angle	• Increase number of flutes • Increase volume of air or cutting fluid • Reduce depth of cut • If dry cutting, change to wet cutting
Waviness	• Reduce helix angle • Check end mill runout	• Reduce depth of cut • Check or change the holder
End Mill Fracturing	• Reduce depth of cut • Reduce feed per tooth	• Reduce length of flutes or overhang • If chip jamming occurs, reduce the number of flutes
Poor Chip Disposal	• Use air blow • Reduce depth of cut • Reduce feed per tooth	• Reduce the number of flutes • Increase volume of air or cutting fluid • Increase cutting speed
Burring Workpiece Chipping	• Reduce helix angle • Reduce feed per tooth	• Reduce depth of cut
Chip Welding	• Use coolant • Use coated end mill	• Increase volume of cutting fluid • Increase helix angle

Technical Section - General



Technical Section - General

APPLICATION MATERIAL GROUP (AMG) CHART WITH MATERIAL EXAMPLES

Application Material Groups (AMG)			Hardness HRC
1. Steel	1.1 Magnetic soft steel	12L14, 12L15	<120 HB
	1.2 Structural Steel/ case carburising steel	1005-1025, 1214, 1215, A36	<200 HB
	1.3 Plain Carbon steel	1030-1060, 1050-1060, 1144-1146	<24
	1.4 Alloy steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	<24
	1.5 Alloy steel/ Hardened and tempered steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	>24<38
	1.6 Alloy steel/ Hardened and tempered steel	4140,4340,52100,8620 H11-H41,A2,D2,01,P20,420	>38
	1.7 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	49-55
	1.8 Alloy steel Hardened	A2-D2, H10-H41, L1-L6, M1-M42, T1	55-63
2. Stainless Steel	2.1 Free machining Stainless Steel	200, 303, 416, 420F, 430F, 440	<24
	2.2 Austenitic	301, 302, 304, 316, 321, 330, CUSTOM 455, AM-350	<24
	2.3 Ferritic + Austenitic, Martensitic	318-329, 400-446, DUPLEX	<32
	2.4 Precipitation Hardened	15-5PH, Custom 450 17-4PH	<32
3. Cast Iron	3.1 Lamellar graphite	Grey, G10, Gg40, J431C, A48 CLASS 20	<150 HB
	3.2 Lamellar graphite	Grey, GG25-Gg40, J158, A48 CLASS 40-60	>150 HB<32
	3.3 Nodular graphite/ Malleable Cast Iron	A220, A436, A439, A602, Black, GGG40-GGG70	<200 HB
	3.4 Nodular graphite/ Malleable Cast Iron	Black Gts/Gtw, J434C	>200 HB<32
4. Titanium	4.1 Titanium, unalloyed	Commercially Pure	<200 HB
	4.2 Titanium, alloyed	6Al4V, 6A14V-2Sn, Monel, Monel K	<28
	4.3 Titanium, alloyed	6Al4V-4Mo, 7A14V-4Mo, 4911-4967	>28<38
5. Nickel	5.1 Nickel, unalloyed	Commercially Pure, 17644, 200, 5553	<150 HB
	5.2 Nickel, alloyed	Monel 400, Hastelloy C, Inconel 625, Waspaloy	<28
	5.3 Nickel, alloyed	Inconel 718, Nimonic 75-95, Rene 41, Inconel 825, A286	>28<38
6. Copper	6.1 Copper	Commercially Pure	<100 HB
	6.2 β -Brass, Bronze	314-340, 350-370	<200 HB
	6.3 α -Brass	Alloyed Cu + Al + Fe, Long Chipping	<200 HB
	6.4 High Strength Bronze	Ampco 18-25	<49
7. Aluminium Magnesium	7.1 Al, Mg, unalloyed	Commercially Pure	<100 HB
	7.2 Al alloyed, Si<0.5%	6061 T6, 7075, 314-340	<150 HB
	7.3 Al alloyed, Si>0.5%<10%	6061 T6, 380-390	<120 HB
	7.4 Al alloyed, Si>10% Mg alloys	Magnesium Whisker Reinforced	<120 HB
8. Synthetic Materials	8.1 Thermoplastics	Ultramid, Polystrol	---
	8.2 Thermosetting plastics	Bakelit, Pertinax	---
	8.3 Reinforced plastic materials	CFK, GFKAFK	---
9. Hard Mat.	9.1 Cermets (Metal-ceramics)	Ferrotic	<54
10. Graphite	10.1 Standard graphite		---

APPLICATION MATERIAL GROUPS - DRILLS

SURFACE FEET PER MINUTE (SFM)

Feed Rate Chart - Drills

How To Use This Chart to Find Cutting Feed Rate (IPR):

1. Find your Alpha Code on the AMG Chart (example: 279 U : U is the Alpha Code)
2. Find the closest diameter for your cutting application on the chart to find your IPR

Alpha Code	Feed in Inches per Revolution (IPR) ± 25%											Ø Diameter					
	1mm/ 1/32"	2mm/ 3/32"	3mm/ 1/8"	4mm/ 5/32"	5mm/ 3/16"	6mm/ 1/4"	8mm/ 5/16"	10mm/ 3/8"	12mm/ 1/2"	15mm/ 9/16"	16mm/ 5/8"	20mm/ 3/4"	25mm/ 1"	30mm/ 1.1/8"	40mm/ 1.5/8"	50mm/ 2"	
A	0.0004	0.0009	0.0011	0.0013	0.0014	0.0017	0.0021	0.0024	0.0027	0.0032	0.0034	0.0043	0.0049	0.0053	0.0061	0.0069	
B	0.0006	0.0011	0.0015	0.0016	0.0018	0.0021	0.0026	0.0031	0.0035	0.0041	0.0043	0.0053	0.0060	0.0065	0.0074	0.0082	
C	0.0006	0.0013	0.0017	0.0020	0.0022	0.0025	0.0031	0.0039	0.0043	0.0049	0.0051	0.0063	0.0071	0.0077	0.0087	0.0094	
D	0.0006	0.0015	0.0021	0.0024	0.0027	0.0031	0.0039	0.0047	0.0051	0.0059	0.0061	0.0074	0.0083	0.0090	0.0100	0.0108	
E	0.0007	0.0017	0.0024	0.0028	0.0031	0.0037	0.0045	0.0055	0.0059	0.0068	0.0071	0.0085	0.0094	0.0102	0.0112	0.0122	
F	0.0007	0.0020	0.0029	0.0033	0.0037	0.0043	0.0054	0.0065	0.0070	0.0080	0.0083	0.0098	0.0108	0.0116	0.0126	0.0135	
G	0.0007	0.0022	0.0033	0.0038	0.0043	0.0050	0.0063	0.0075	0.0081	0.0091	0.0094	0.0110	0.0122	0.0130	0.0140	0.0148	
H	0.0008	0.0026	0.0040	0.0046	0.0051	0.0059	0.0075	0.0090	0.0096	0.0107	0.0110	0.0126	0.0140	0.0148	0.0157	0.0165	
I	0.0008	0.0030	0.0047	0.0053	0.0059	0.0068	0.0087	0.0104	0.0110	0.0122	0.0126	0.0142	0.0157	0.0165	0.0173	0.0181	
J	0.0009	0.0033	0.0053	0.0060	0.0067	0.0078	0.0098	0.0117	0.0124	0.0137	0.0142	0.0159	0.0175	0.0183	0.0191	0.0198	
K	0.0010	0.0036	0.0059	0.0067	0.0075	0.0087	0.0110	0.0130	0.0138	0.0153	0.0157	0.0177	0.0193	0.0201	0.0209	0.0215	
L	0.0011	0.0040	0.0065	0.0073	0.0082	0.0094	0.0120	0.0142	0.0152	0.0165	0.0169	0.0191	0.0207	0.0215	0.0224	0.0231	
M	0.0012	0.0043	0.0071	0.0080	0.0089	0.0102	0.0130	0.0154	0.0165	0.0177	0.0181	0.0205	0.0220	0.0228	0.0238	0.0248	
N	0.0013	0.0047	0.0077	0.0086	0.0095	0.0110	0.0140	0.0165	0.0179	0.0189	0.0193	0.0219	0.0234	0.0242	0.0253	0.0265	
S	0.0003	0.0006	0.0008	0.0010	0.0012	0.0015	0.0020	0.0031	0.0039	0.0048	0.0051	0.0059	0.0070	0.0070	0.0090		
T	0.0006	0.0011	0.0016	0.0020	0.0024	0.0028	0.0035	0.0043	0.0051	0.0063	0.0067	0.0075	0.0080	0.0090	0.0100		
U	0.0010	0.0019	0.0028	0.0031	0.0035	0.0042	0.0055	0.0067	0.0079	0.0088	0.0091	0.0094	0.0110	0.0120	0.0140		
V	0.0015	0.0027	0.0039	0.0045	0.0051	0.0060	0.0079	0.0098	0.0110	0.0122	0.0126	0.0134	0.0160	0.0170	0.0200		
W	0.0019	0.0035	0.0051	0.0059	0.0067	0.0079	0.0102	0.0130	0.0150	0.0165	0.0169	0.0177	0.0190	0.0190	0.0200		
X	0.0022	0.0041	0.0059	0.0071	0.0083	0.0098	0.0130	0.0165	0.0189	0.0210	0.0217	0.0228					
Y	0.0027	0.0049	0.0071	0.0087	0.0102	0.0125	0.0169	0.0217	0.0276	0.0276	0.0276	0.0291					
Z	0.0037	0.0068	0.0098	0.0128	0.0157	0.0210	0.0315	0.0394	0.0433	0.0463	0.0472	0.0472					

Calculations: (inch)

$$\begin{aligned} \text{RPM} &= \text{SFM}/D \times 3.82 \\ \text{SFM} &= \text{RPM} \times D \times .262 \\ \text{IPM} &= \text{IPR} \times \text{RPM} \\ \text{IPR} &= \text{IPM} \div \text{RPM} \\ \text{Inch} &= \text{mm} \times .0394 \end{aligned}$$

Terms:

$$\begin{aligned} D &= \text{Drill Diameter} \\ \text{RPM} &= \text{Revolutions Per Minute} \\ \text{SFM} &= \text{Surface Feet per Minute} \\ \text{IPM} &= \text{Inches Per Minute} \\ \text{IPR} &= \text{Inches Per Revolution} \end{aligned}$$

APPLICATION MATERIAL GROUPS - DRILLS

SURFACE FEET PER MINUTE (SFM)

*Feed rate chart - see page 573. For material examples, see page 567.

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1
209	115I	98I	82F	66F	39E	30D			49E	30G	33C		98I	79E	66E	46E	75F
0860	79E	72E	52C	49C	20A	16A			30C	13E	26A		72G	59D	43C	30C	36D
1290	79E	72E	52C	49C	20A	16A			30C	13E	26A		72G	59D	43C	30C	36D
1511	79E	72E	52C	49C	20A	16A			30C	13E	26A		72G	59D	43C	30C	36D
1813	79E	72E	52C	49C	20A	16A			30C	13E	26A		72G	59D	43C	30C	36D
209CO	115J	98H	89G	75F	56E	33D			79E	36G	56C		115J	92G	72E	56E	92G
2A	115H	98H	82F	66F	43E	30D			49E	26G	30C		98H	79F	66E	46E	75E
2AB	115H	98H	82F	66F	43E	30D			49E	26G	30C		98H	79F	66E	46E	75E
2ACO	115J	98H	89G	79F	56E	33D			72E	36G	49C		115H	92D	72E	56E	92F
4ASM	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G
4ASMC0	125K	108H	98G	89G	59F	36E			72F	36H	49D		112K	98F	72F	56F	98G
500-12			82F	66F	43E	30D			49E	26G	30C		98I	79F	66E	46E	75F
500-6			82F	66F	43E	30D			49E	26G	30C		98I	79F	66E	46E	75F
501-12			82F	66F	43E	30D			49E	26G	30C		98I	79F	66E	46E	75F
501-6			82F	66F	43E	30D			49E	26G	30C		98I	79F	66E	46E	75F
502-12			82F	66F	43E	30D			49E	26G	30C		98I	79F	66E	46E	75F
502-6			82F	66F	43E	30D			49E	26G	30C		98I	79F	66E	46E	75F
5ATL	89G	82G	66E	52E	30D	20B			33D	20F	13B		92H	69E	49D	43D	56E
5ATS	115I	98I	82F	66F	39E	30D			49E	30G	33C		98I	79E	66E	46E	75F
76HA	115I	98I	82G	66F	43E	30D			49E	26G	33C		98I	79F	66E	46E	79F
A002	154J	131J	115F	98F	59F	33E			66F	39G	52C		131J	98E	92E	85E	75F
A012	154J	131J	115F	98F	59F	33E			66F	39G	52C		131J	98E	92E	85E	75F
A022	115K	105K	82I	75H	52G	33E			49G	26I	30E		105K	82I	66G	52G	82I
A100	115H	98H	82F	66F	43E	30D			49E	26G	30C		98H	79F	66E	46E	75E
A101	35H	30H	25F	20F	13E	9D			15E	8G	9C		30H	24F	20E	14E	23E
A108	115I	98I	82G	66F	43E	30D			49E	30G	33D		98H	79F	66E	46E	82G
A125	79E	72E	52C	49C	20A	16A			30C	13E	26A		72G	59D	43C	30C	36D
A160	197E	197E	180D	164D	131C	121A			131B	115C	115A		164C	131A	115A	98A	115A
A170	115H	98H	82F	66E	43D	30C			49D	23F	23B		89H	72E	62D	39D	56E
A217	115I	98I	82G	66F	43E	30D			49E	26G	33C		98I	79F	66E	46E	79F
A218	115I	98I	82G	66F	43E	30D			49E	26G	33C		98I	79F	66E	46E	79F
A221	115I	98I	82G	66F	43E	30D			49E	26G	33C		98I	79F	66E	46E	79F
A225	115I	98I	82G	66F	43E	30D			49E	26G	33C		98I	79F	66E	46E	79F
A243			82F	66F	43E	30D			49E	26G	30C		98I	79F	66E	46E	75F
A244			82F	66F	43E	30D			49E	26G	30C		98I	79F	66E	46E	75F
A345	79G	72G	56E	49D	20C	16B			39C	13E	26A		72G	59D	43C	30C	49D
A350	89I	82I	66G	52F	33E	20D			43E	13G	26C		85I	66F	59E	36E	52F
A510	187M	154M	131K	98H	69F	36D			92G	46I	62G		138K	105J	92J	82F	105G
A520	187M	154M	131K	105I	69G	36E			98I	52I	66G		157M	121K	98J	85F	112I
A530	154I	131I	98F	89F	66E	33D			79E	43G	66C		118I	92E	89E	72E	105F
A553	279L	230L	197L	148H	92F	49D			131G	62I	89G		230K	164J	148J	138F	148G
A720	115A	98A	89A	75A	56A	33A			72A	33A	49A		98A	79A	66A	46A	75A
A730	115J	98H	89G	75F	56E	33D			79E	36G	56C		115J	92G	72E	56E	92G
A900	125H	108H	85H	85H	69E	52E			49E	23E	30C		79J	62J	62J	46I	72E
A901	197J	164J	144I	144I	108G	85G			56E	30E	36C		190I	154I	112J	92I	115G
A920	131J	112J	105I	105I	75E	62E			49F	23F	30D		112L	85L	85L	62J	98G
A921	197M	171M	174J	174J	125G	98G			56F	30F	36D		174L	138L	138L	118J	157I
A940	125F	108F	72G	72G	56C	39C			49C	23E	30B			52I	52I	39H	59E
A941	174G	151G	118G	118G	75D	56D			56C	30E	36B		118I	98I	98I	79H	82F
A951	89G	72G	62E	49D	26C	20B			39C	20E	39A		72G	52D	43C	30C	59D
A952	89G	72G	62E	49D	26C	20B			39C	20E	39A		72G	52D	43C	30C	59D
A976	102C	85C	72C	72C	39A	33A			39B	23C	26A			75C	52C	36A	49C
A977	102B	85B	72B	72B	39A	33A			39B	23B	26A			75B	52B	36A	49B
A978	102A	85A	72A	72A	39A	33A			39A	23A	26A			75A	52A	36A	49A
ATR41			82F	66F	43E	30D			49E	26G	30C		98I	79F	66E	46E	75F
CO500-12						20B			95H	56F	56D	30D	161H	85H	85F	56D	
CO500-6						20B			95H	56F	56D	30D	161H	85H	85F	56D	
CO501-12						20B			95H	56F	56D	30D	161H	85H	85F	56D	
CO501-6						20B			95H	56F	56D	30D	161H	85H	85F	56D	
D33F	279S	246S	246S	230S	148S	148S	98S	98S	98S				246T	246T	180T	180T	
D33L	279S	246S	246S	230S	148S	148S	98S	98S	98S				246T	246T	180T	180T	
D33M	279S	246S	246S	230S	148S	148S	98S	98S	98S				246T	246T	180T	180T	
D33W	279S	246S	246S	230S	148S	148S	98S	98S	98S				246T	246T	180T	180T	
D444	197E	197E	180D	164D	131C	121A			131B	115C	115A		164C	131A	115A	98A	115A
DC	279S	246S	246S	230S	148S	148S	98S	98S					246T	246T	180T	180T	
DS-90	279S	246S	246S	230S	148S	148S	98S	98S	174S	148S			246T	246T	180T	180T	148T
DS-120	279S	246S	246S	230S	148S	148S	98S	98S	174S	148S			246T	246T	180T	180T	148T

APPLICATION MATERIAL GROUPS - DRILLS

SURFACE FEET PER MINUTE (SFM)

*Feed rate chart - see page 573. For material examples, see page 567.

	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3	6.4	7.1	7.2	7.3	7.4	8.1	8.2	8.3	9.1	10.1
209	43D	23B	33G	23E	13A	108F	115I	115H	52F	85J	98I	92H	75H	98K	92J	46H	10B	
0860	30B	16A	16E	13C	10A	79D	108G	72F	52D	79H	72G	72F	66E	98H	85F	33D	10A	
1290	30B	16A	16E	13C	10A	79D	108G	72F	52D	79H	72G	72F	66E	98H	85F	33D	10A	
1511	30B	16A	16E	13C	10A	79D	108G	72F	52D	79H	72G	72F	66E	98H	85F	33D	10A	
1813	30B	16A	16E	13C	10A	79D	108G	72F	52D	79H	72G	72F	66E	98H	85F	33D	10A	
209CO	66D	36C	49G	23E	20B	125L	131J	89H	69F	108J	98I	98H	89F	115K	92J	66H	16C	
2A	39D	20B	33G	20E	10A	108G	115I	89H	52G	108J	98I	89H	79F	98J	92H	46F	10B	
2AB	39D	20B	33G	20E	10A	108G	115I	89H	52G	108J	98I	89H	79F	98J	92H	46F	10B	
2ACO	66D	36C	49G	23E	20B	125H	131F	89H	69F	108J	98I	98H	89F				20C	
4ASM	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	
4ASMCO	59F	33C	49H	30F	20C	125I	131K	89J	52I	115K	108J	102I	98G	115M	92K	56I	20C	
500-12	39D	20B	33G	20E	10A			89H	52G				79F				10B	
500-6	39D	20B	33G	20E	10A			89H	52G				79F				10B	
501-12	39D	20B	33G	20E	10A			89H	52G				79F				10B	
501-6	39D	20B	33G	20E	10A			89H	52G				79F				10B	
502-12	39D	20B	33G	20E	10A			89H	52G				79F				10B	
502-6	39D	20B	33G	20E	10A			89H	52G				79F				10B	
5ATL	30C	13A	26F	13D	10A	98E	105H	89G	52E	105I	89H	89G	82E	115I	85G	39E	10A	
5ATS	43D	23B	33G	23E	13A	108F	115I	115H	52F	85J	98I	92H	75H	98K	92J	46H	10B	
76HA	43D	23B	33G	16E	13A	115G	108I	89H	52G	108J	98I	89H	72H	98J	92H	46F	10B	
A002	43D	23B	43G	23E	10A	164G	108I	128H	98G	134K	125J	108I	108I	98I	164H	115F	10B	
A012	43D	23B	43G	23E	10A	164G	108I	128H	98G	134K	125J	108I	108I	98I	164H	115F	10B	
A022	46F	26C	43H	26F	13B	118H	125K	89I	52I	131F	105K	105J	82J	98K	115I	56G	13C	
A100	39D	20B	33G	20E	10A	108G	115I	89H	52G	108J	98I	89H	79F	98J	92H	46F	10B	
A101	12D	6B	10G	6E	3A	33G	35I	27H	16G	33J	30I	27H	24F	30J	28H	14F	3B	
A108	52E	23B	39G	23G	20E	108G	115I	102H	52G	108J	98I	89H	79F	98J	92H	46F	10B	
A125	30B	16A	16E	13C	10A	79D	108G	72F	52D	79H	72G	72F	66E	98H	85F	33D	10A	
A160	115A	82A	98A	82A	66A	180D	230G	197C	164C	164I	148H	131G	115F		197E		30C	
A170	30C	16A	26F	13D	10A	115F	108H	89G	52F	108I	98H	89G	72G	98I	92G	46E	10A	
A217	43D	23B	33G	16E	13A	115G	108I	89H	52G	108J	98I	89H	72H	98J	92H	46F	10B	
A218	43D	23B	33G	16E	13A	115G	108I	89H	52G	108J	98I	89H	72H	98J	92H	46F	10B	
A221	43D	23B	33G	16E	13A	115G	108I	89H	52G	108J	98I	89H	72H	98J	92H	46F	10B	
A225	43D	23B	33G	16E	13A	115G	108I	89H	52G	108J	98I	89H	72H	98J	92H	46F	10B	
A243	39D	20B	33G	20E	10A			89H	52G				79F				10B	
A244	39D	20B	33G	20E	10A			89H	52G				79F				10B	
A345	30B	16A	26E	13C	10A	89D	108G	89F	52D	108H	89G	89F	79F	98J	98H	33F	10A	
A350	30D	16B	26G	13E	10A	108F	115I	115H	52F	108J	82I	89H	82H	115L	85J	39H	10B	
A510	66H	13B	56I	30E	20E	131D	164I	148I	66F	164G	164M	102I	108I	213G	164G	115F		
A520	66G	13B	56I	36G	23E	131E	164I	148K	66F	180I	164M	121K	115I	213G	164G	115F		
A530	59D	43B	43G	20E	10A	197G	180I	131G	115E	180I	148I	115G	92G	164J	164H	115F	10B	
A553	98E	26C	82I	49E	33G	230G	279I	262I	115G	230H	328M	180I	180J	295G				
A720	56A	26A	33A	23A	13A	115A	131A	115A	89A	115A	98A	89A	89A	157A	82A			
A730	66D	36C	49G	23E	20B	125L	131J	89H	69F	108J	98I	98H	89F	115K	92J	66H	16C	
A900	49E	20C	46G	23G	20C	213G	174I	112H	98G	197J	148N	131N	92I	180I	131G			
A901	79G	33E	72I	36I	33E			184I	157I				157I					
A920	59G	33C	49I	30G	20E	213H	216J	131J	102G	246L	148N	131N	118J	180J	131H			
A921	95I	52E	79L	46I	33G			233J	164I				157J					
A940	43C	20C				213F	230F	112G	98G	174H	148N	131N	98G	180H	131F			
A941	59D	26D						157H	138H				138H					
A951	33B	20A	23E	16C	10A	72D	108G	72F	52D	98H	89G	79F	72F	98J	98H	33F	10A	
A952	33B	20A	23E	16C	10A	72D	108G	72F	52D	98H	89G	79F	72F	98J	98H	33F	10A	
A976	36A	16A						98D	89D				89D					
A977	36A	16A						98C	89C				89C					
A978	36A	16A						98B	89B				89B					
ATR41	39D	20B	33G	20E	10A			89H	52G				79F				10B	
CO500-12		20D		20B	16B													
CO500-6		20D		20B	16B													
CO501-12		20D		20B	16B													
CO501-6		20D		20B	16B													
D33F							820V	820V		656V	656V	367V	197V	197X	328V			
D33L							820V	820V		656V	656V	367V	197V	197X	328V			
D33M							820V	820V		656V	656V	367V	197V	197X	328V			
D33W							820V	820V		656V	656V	367V	197V	197X	328V			
D444	115A	82A	98A	82A	66A	180D	230G	197C	164C	164I	148H	131G	115F		197E		30C	
DC							820V	820V		656V	656V	367V	197V	197X	328V			
DS-90	115T	82S	148T	98S	66S	902V	820V	820V	230T	656V	656V	367V	197V	197X	328V			
DS-120	115T	82S	148T	98S	66S	902V	820V	820V	230T	656V	656V	367V	197V	197X	328V			

APPLICATION MATERIAL GROUPS - DRILLS

SURFACE FEET PER MINUTE (SFM)

*Feed rate chart - see page 573. For material examples, see page 567.

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1
DS-142	279S	246S	246S	230S	148S	148S	98S	98S	174S	148S			246T	246T	180T	180T	148T
HX10	115H	69H	75I	69H	56F				105I	59H	56F		171L	89I	95H	59F	95H
HX15	115H	69H	75I	69H	56F				105I	59H	56F		171L	89I	95H	59F	95H
HX18	115H	69H	75I	69H	56F				105I	59H	56F		171L	89I	95H	59F	95H
L10	115H	98H	82F	66F	43E	30D			49E	26G	30C		98H	79F	66E	46E	75E
M40CO	125K	108H	98G	89G	59F	36E			72F	36H	49D		112K	98F	72F	56F	98G
M41CO	125K	108H	98G	89G	59F	36E			72F	36H	49D		112K	98F	72F	56F	98G
M42CO	125K	108H	98G	89G	59F	36E			72F	36H	49D		112K	98F	72F	56F	98G
M51CO	89G	82G	66E	52E	30D	20B			33D	20F	13B		92H	69E	49D	43D	56E
M52CO	89G	82G	66E	52E	30D	20B			33D	20F	13B		92H	69E	49D	43D	56E
QC0860P	98F	59F	66H	59F	46D				89H	49F	49D		151H	79H	79F		
QC1290P	98F	59F	66H	59F	46D				89H	49F	49D		151H	79H	79F		
QC21G	115F	69F	75H	69F	56D				105H	59F	59D		171H	89H	95F	59D	
QC21GM	115F	69F	75H	69F	56D				105H	59F	59D		171H	89H	95F	59D	
QC21P	98F	59F	66H	59F	46D				89H	49F	49D		151H	79H	79F		89H
QC21PM	98F	59F	66H	59F	46D				89H	49F	49D		151H	79H	79F		89H
QC41G	115F	69F	75H	69F	56D				105H	59F	59D		171H	89H	95F	59D	
QC41P	98F	59F	66H	59F	46D				89H	49F	49D		151H	79H	79F		89H
QC91G	115F	69F	75H	69F	56D				105H	59F	59D		171H	89H	95F	59D	
QC91GM	115F	69F	75H	69F	56D				105H	59F	59D		171H	89H	95F	59D	
QC91P	98F	59F	66H	59F	46D				89H	49F	49D		151H	79H	79F		89H
QC91PM	98F	59F	66H	59F	46D				89H	49F	49D		151H	79H	79F		89H
R10	115H	98H	82F	66F	43E	30D			49E	26G	30C		98H	79F	66E	46E	75E
R10A	115J	98H	89G	79F	56E	33D			72E	36G	49C		115H	92D	72E	56E	92F
R10B	115J	98H	89G	79F	56E	33D			72E	36G	49C		115H	92D	72E	56E	92F
R10CO	115J	98H	89G	79F	56E	33D			72E	36G	49C		115H	92D	72E	56E	92F
R10H	108I	92I											82F	66D	52C	33C	49C
R10P	115H	98H	82F	66F	43E	30D			49E	26G	30C		98H	79F	66E	46E	75E
R15	115H	98H	82F	66F	43E	30D			49E	26G	30C		98H	79F	66E	46E	75E
R15A	115J	98H	89G	79F	56E	33D			72E	36G	49C		115H	92D	72E	56E	92F
R15B	115J	98H	89G	79F	56E	33D			72E	36G	49C		115H	92D	72E	56E	92F
R15CO	115J	98H	89G	79F	56E	33D			72E	36G	49C		115H	92D	72E	56E	92F
R15P	115H	98H	82F	66F	43E	30D			49E	26G	30C		98H	79F	66E	46E	75E
R18	115H	98H	82F	66F	43E	30D			49E	26G	30C		98H	79F	66E	46E	75E
R18A	115J	98H	89G	79F	56E	33D			72E	36G	49C		115H	92D	72E	56E	92F
R18B	115J	98H	89G	79F	56E	33D			72E	36G	49C		115H	92D	72E	56E	92F
R18CO	115J	98H	89G	79F	56E	33D			72E	36G	49C		115H	92D	72E	56E	92F
R18H	108I	92I											82F	66D	52C	33C	49C
R18P	115H	98H	82F	66F	43E	30D			49E	26G	30C		98H	79F	66E	46E	75E
R40	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G
R40C	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G
R41	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G
R41C	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G
R42	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G
R42C	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G
R453	443V	394V	361V	328V	262V	213U	98U	82U	246V	115V	98U		394W	394W	262V	262V	180V
R454	410V	361V	295V	262V	197V	164U	98U	82U	148U	131T	115T	115T	295W	295W	230V	230V	164U
R457	443W	394W	361W	328W	262W	213U	98U	82U	246V	115V	98U		394W	394W	262V	262V	180V
R458	410W	361W	295W	262V	197V	164U	98U	82U	148U	131T	115T	115T	295W	295W	230V	230V	164U
R459	443V	394V	361U	328U	262U	180T			246V	115V	98U		394W	394W	262V	262V	
R463									279G	246G	197F						180V
R467									279G	246G	197F						180V
R51	89G	82G	66E	52E	30D	20B			33D	20F	13B		92H	69E	49D	43D	56E
R510	328W	295W	295W	262W	180V	148V	115T	98S	164V				295X	295X	213W	213W	148V
R51FS																	
R52	89G	82G	66E	52E	30D	20B			33D	20F	13B		92H	69E	49D	43D	56E
R520	328X	295X	295X	262X	180X	148W	115U	98T	164W				295Y	295Y	213X	213X	197W
R55	89G	82G	66E	52E	30D	20B			33D	20F	13B		92H	69E	49D	43D	56E
R56	115H	98H	82F	66E	43D	30C			49D	23F	23B		89H	72E	62D	39D	56E
R56CO	115H	98H	82F	66E	43D	30C			49D	23F	23B		89H	72E	62D	39D	56E
R57	115H	98H	82F	66E	43D	30C			49D	23F	23B		89H	72E	62D	39D	56E
R58	98F	59F	66H	59F	46D				89H	49F	49D		151H	79H	79F		89H
R88CO	115J	98H	89G	79F	56E	33D			72E	36G	49C		115H	92D	72E	56E	92F
R89CO	115J	98H	89G	79F	56E	33D			72E	36G	49C		115H	92D	72E	56E	92F
R950 1.5x			361W	307W	307W	217T						127T			318U	318U	
R950 3x			328W	279W	279W	230U						115T			289V	289V	
R950 5x			328V	279V	279V	213U						115S			279V	279V	
R950 8x			295U	246U	246U	197T						98S			262U	262U	

APPLICATION MATERIAL GROUPS - DRILLS

SURFACE FEET PER MINUTE (SFM)

*Feed rate chart - see page 573. For material examples, see page 567.

	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3	6.4	7.1	7.2	7.3	7.4	8.1	8.2	8.3	9.1	10.1
DS-142	115T	82S	148T	98S	66S	902V	820V	820V	230T	656V	656V	367V	197V	197X	328V			
HX10	75H		59H															
HX15	75H		59H															
HX18	75H		59H															
L10	39D	20B	33G	20E	10A	108G	115I	89H	52G	108J	98I	89H	79F	98J	92H	46F	10B	
M40CO	59F	33C	49H	30F	20C	125I	131K	89J	52I	115K	108J	102I	98G	115M	92K	56I	20C	
M41CO	59F	33C	49H	30F	20C	125I	131K	89J	52I	115K	108J	102I	98G	115M	92K	56I	20C	
M42CO	59F	33C	49H	30F	20C	125I	131K	89J	52I	115K	108J	102I	98G	115M	92K	56I	20C	
M51CO	30C	13A	26F	13D	10A	98E	105H	89G	52E	105I	89H	89G	82E	115I	85G	39E	10A	
M52CO	30C	13A	26F	13D	10A	98E	105H	89G	52E	105I	89H	89G	82E	115I	85G	39E	10A	
QC0860P			49F				79H	75H		348H	325H		276H	151D	125D			
QC1290P			49F				79H	75H		348H	325H		276H	151D	125D			
QC21G			59H			98I	89H	89H		400H	351H		315H					
QC21GM			59H			98I	89H	89H		400H	351H		315H					
QC21P	49F		49F			89I	79H	79H		351H	325H		276H					
QC21PM	49F		49F			89I	79H	79H		351H	325H		276H					
QC41G			59H			98I	89H	89H										
QC41P	49F		49F			89I	79H	79H		351H	325H		276H					
QC91G			59H			98I	89H	89H		400H	351H		315H					
QC91GM			59H			98I	89H	89H		400H	351H		315H					
QC91P	49F		49F			89I	79H	79H		351H	325H		276H					
QC91PM	49F		49F			89I	79H	79H		351H	325H		276H					
R10	39D	20B	33G	20E	10A	108G	115I	89H	52G	108J	98I	89H	79F	98J	92H	46F	10B	
R10A	66D	36C	49G	23E	20B	125H	131F	89H	69F	108J	98I	98H	89F				20C	
R10B	66D	36C	49G	23E	20B	125H	131F	89H	69F	108J	98I	98H	89F				20C	
R10CO	66D	36C	49G	23E	20B	125H	131F	89H	69F	108J	98I	98H	89F				20C	
R10H			23E			115H	118G			148J	115J	98G	95G	138J	131I	66G		
R10P	39D	20B	33G	20E	10A	108G	115I	89H	52G	108J	98I	89H	79F	98J	92H	46F	10B	
R15	39D	20B	33G	20E	10A	108G	115I	89H	52G	108J	98I	89H	79F	98J	92H	46F	10B	
R15A	66D	36C	49G	23E	20B	125H	131F	89H	69F	108J	98I	98H	89F				20C	
R15B	66D	36C	49G	23E	20B	125H	131F	89H	69F	108J	98I	98H	89F				20C	
R15CO	66D	36C	49G	23E	20B	125H	131F	89H	69F	108J	98I	98H	89F				20C	
R15P	39D	20B	33G	20E	10A	108G	115I	89H	52G	108J	98I	89H	79F	98J	92H	46F	10B	
R18	39D	20B	33G	20E	10A	108G	115I	89H	52G	108J	98I	89H	79F	98J	92H	46F	10B	
R18A	66D	36C	49G	23E	20B	125H	131F	89H	69F	108J	98I	98H	89F				20C	
R18B	66D	36C	49G	23E	20B	125H	131F	89H	69F	108J	98I	98H	89F				20C	
R18CO	66D	36C	49G	23E	20B	125H	131F	89H	69F	108J	98I	98H	89F				20C	
R18H			23E			115H	118G			148J	115J	98G	95G	138J	131I	66G		
R18P	39D	20B	33G	20E	10A	108G	115I	89H	52G	108J	98I	89H	79F	98J	92H	46F	10B	
R40	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	
R40C	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	
R41	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	
R41C	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	
R42	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	
R42C	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	
R453	148V	131U				410W	722W	722W	328V	820W	820W	656V	492V					
R454	131U	115T				328V	656V	656V	262U	738W	738W	590V	394V					
R457	148V	131U				410W	722W	722W	328V	820W	820W	656V	492V					
R458	131U	115T				328V	656V	656V	262U	738W	738W	590V	394V					
R459						410V	722V	722V	328U	935W	935W	623V	312V					
R463	148V	131U	180U	148U	131U													
R467	148V	131U	180U	148U	131U													
R51	30C	13A	26F	13D	10A	98E	105H	89G	52E	105I	89H	89G	82E	115I	85G	39E	10A	
R510			164V							738Y	738Y	492X	213X	246X	377V			
R51FS						89I				348H	325H		276H					
R52	30C	13A	26F	13D	10A	98E	105H	89G	52E	105I	89H	89G	82E	115I	85G	39E	10A	
R520	148V	115U	164W							738Z	738Z	492Y	213Y	246Z	377V			
R55	30C	13A	26F	13D	10A	98E	105H	89G	52E	105I	89H	89G	82E	115I	85G	39E	10A	
R56	30C	16A	26F	13D	10A	115F	108H	89G	52F	108I	98H	89G	72G	98I	92G	46E	10A	
R56CO	30C	16A	26F	13D	10A	115F	108H	89G	52F	108I	98H	89G	72G	98I	92G	46E	10A	
R57	30C	16A	26F	13D	10A	115F	108H	89G	52F	108I	98H	89G	72G	98I	92G	46E	10A	
R58	49F		49F	23F	13B	108F	115H	115H	52F	85I	98H	92H	75H	98I	92I	46H	10B	
R88CO	66D	36C	49G	23E	20B	125H	131F	89H	69F	108J	98I	98H	89F				20C	
R89CO	66D	36C	49G	23E	20B	125H	131F	89H	69F	108J	98I	98H	89F				20C	
R950 1.5x																		
R950 3x																		
R950 5x																		
R950 8x																		

APPLICATION MATERIAL GROUPS - DRILLS

SURFACE FEET PER MINUTE (SFM)

*Feed rate chart - see page 573. For material examples, see page 567.

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1
R950 12x			262U	223U	223U	158S						92S			231U	231U	
R960 1.5x	397W	361W							217V	180T	144T		433V	418V			163T
R960 3x	361W	328W							197V	164T	131T		394V	380V			148T
R960 5x	361V	328V							164V	164S	131S		374V	354V			148T
R960 8x	328U	295U							148U	131S	115S		348U	328U			115S
R960 12x	289U	262U							157U	131S	92S		315U	304U			118S
R970 1.5x	397W	361W											433V	418V	318U	318U	
R970 3x	361W	328W											394V	380V	289U	289U	
R970 5x	361V	328V											374V	354V	279V	279V	
R970 8x	328U	295U											346U	328U	262U	262U	
R970 12x	289U	262U											315U	314U	231U	231U	
S209	115I	98I	82F	66F	39E	30D			49E	30G	33C		98I	79E	66E	46E	75F
SPL-120	115E	98E	89C	69C	46C	33B			52C	30D	33B		105E	89C	66C	52B	89C
SPL-90	115E	98E	89C	69C	46C	33B			52C	30D	33B		105E	89C	66C	52B	89C
SPLG-120	115E	98E	89C	69C	46C	33B			52C	30D	33B		105E	89C	66C	52B	89C
SPLG-90	115E	98E	89C	69C	46C	33B			52C	30D	33B		105E	89C	66C	52B	89C
SPR-120	115E	98E	89C	69C	46C	33B			52C	30D	33B		105E	89C	66C	52B	89C
SPR-90	115E	98E	89C	69C	46C	33B			52C	30D	33B		105E	89C	66C	52B	89C
SPRG-120	115E	98E	89C	69C	46C	33B			52C	30D	33B		105E	89C	66C	52B	89C
SPRG-90	115E	98E	89C	69C	46C	33B			52C	30D	33B		105E	89C	66C	52B	89C
SPS-120	115E	98E	89C	69C	46C	33B			52C	30D	33B		105E	89C	66C	52B	89C
SPS-90	115E	98E	89C	69C	46C	33B			52C	30D	33B		105E	89C	66C	52B	89C
SPSG-120	115E	98E	89C	69C	46C	33B			52C	30D	33B		105E	89C	66C	52B	89C
SPSG-90	115E	98E	89C	69C	46C	33B			52C	30D	33B		105E	89C	66C	52B	89C
T400	75F	46F	49F	49D	36D				66F	39D	39D		108E	59H	59F		69F
TS10CO	125K	108H	98G	89G	59F	36E			72F	36H	49D		112K	98F	72F	56F	98G
TS15CO	125K	108H	98G	89G	59F	36E			72F	36H	49D		112K	98F	72F	56F	98G
TS18CO	125K	108H	98G	89G	59F	36E			72F	36H	49D		112K	98F	72F	56F	98G
TS40CO	125K	108H	98G	89G	59F	36E			72F	36H	49D		112K	98F	72F	56F	98G
TS41CO	125K	108H	98G	89G	59F	36E			72F	36H	49D		112K	98F	72F	56F	98G
TS42CO	125K	108H	98G	89G	59F	36E			72F	36H	49D		112K	98F	72F	56F	98G
TS51CO	125K	108H	98G	89G	59F	36E			72F	36H	49D		112K	98F	72F	56F	98G
TS52CO	125K	108H	98G	89G	59F	36E			72F	36H	49D		112K	98F	72F	56F	98G
TS55CO	125K	108H	98G	89G	59F	36E			72F	36H	49D		112K	98F	72F	56F	98G
TS10HS	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G
TS15HS	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G
TS18HS	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G
TS40HS	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G
TS41HS	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G
TS42HS	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G
TS51HS	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G
TS52HS	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G
TS55HS	115J	98J	89G	69G	46F	33E			52F	30H	33D		105J	89G	66F	52F	89G

APPLICATION MATERIAL GROUPS - DRILLS

SURFACE FEET PER MINUTE (SFM)

*Feed rate chart - see page 573. For material examples, see page 567.

	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3	6.4	7.1	7.2	7.3	7.4	8.1	8.2	8.3	9.1	10.1
R950 12x																		
R960 1.5x	127T	108S	127T	108S	90S													
R960 3x	115T	98S	115T	98S	82S													
R960 5x	115T	98S	115T	98S	82S													
R960 8x	98S	82S	98S	82S	66S													
R960 12x	92S	78S	92S	78S	66S													
R970 1.5x																		
R970 3x																		
R970 5x																		
R970 8x																		
R970 12x																		
S209	43D	23B	33G	23E	13A	108F	115I	115H	52F	85J	98I	92H	75H	98K	92J	46H	10B	
SPL-120	39B	23A	43D	26C	13A	89D	108E	89D	52D	108E	98E	98D	82D	98F	115E	56D	39A	
SPL-90	39B	23A	43D	26C	13A	89D	108E	89D	52D	108E	98E	98D	82D	98F	115E	56D	39A	
SPLG-120	39B	23A	43D	26C	13A	89D	108E	89D	52D	108E	98E	98D	82D	98F	115E	56D	39A	
SPLG-90	39B	23A	43D	26C	13A	89D	108E	89D	52D	108E	98E	98D	82D	98F	115E	56D	39A	
SPR-120	39B	23A	43D	26C	13A	89D	108E	89D	52D	108E	98E	98D	82D	98F	115E	56D	39A	
SPR-90	39B	23A	43D	26C	13A	89D	108E	89D	52D	108E	98E	98D	82D	98F	115E	56D	39A	
SPRG-120	39B	23A	43D	26C	13A	89D	108E	89D	52D	108E	98E	98D	82D	98F	115E	56D	39A	
SPRG-90	39B	23A	43D	26C	13A	89D	108E	89D	52D	108E	98E	98D	82D	98F	115E	56D	39A	
SPS-120	39B	23A	43D	26C	13A	89D	108E	89D	52D	108E	98E	98D	82D	98F	115E	56D	39A	
SPS-90	39B	23A	43D	26C	13A	89D	108E	89D	52D	108E	98E	98D	82D	98F	115E	56D	39A	
SPSG-120	39B	23A	43D	26C	13A	89D	108E	89D	52D	108E	98E	98D	82D	98F	115E	56D	39A	
SPSG-90	39B	23A	43D	26C	13A	89D	108E	89D	52D	108E	98E	98D	82D	98F	115E	56D	39A	
T400	36D		49D															
TS10CO	59F	33C	49H	30F	20C	125I	131K	89J	52I	115K	108J	102I	98G	115M	92K	56I	20C	
TS15CO	59F	33C	49H	30F	20C	125I	131K	89J	52I	115K	108J	102I	98G	115M	92K	56I	20C	
TS18CO	59F	33C	49H	30F	20C	125I	131K	89J	52I	115K	108J	102I	98G	115M	92K	56I	20C	
TS40CO	59F	33C	49H	30F	20C	125I	131K	89J	52I	115K	108J	102I	98G	115M	92K	56I	20C	
TS41CO	59F	33C	49H	30F	20C	125I	131K	89J	52I	115K	108J	102I	98G	115M	92K	56I	20C	
TS42CO	59F	33C	49H	30F	20C	125I	131K	89J	52I	115K	108J	102I	98G	115M	92K	56I	20C	
TS51CO	59F	33C	49H	30F	20C	125I	131K	89J	52I	115K	108J	102I	98G	115M	92K	56I	20C	
TS52CO	59F	33C	49H	30F	20C	125I	131K	89J	52I	115K	108J	102I	98G	115M	92K	56I	20C	
TS55CO	59F	33C	49H	30F	20C	125I	131K	89J	52I	115K	108J	102I	98G	115M	92K	56I	20C	
TS10HS	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	
TS15HS	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	
TS18HS	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	
TS40HS	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	
TS41HS	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	
TS42HS	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	
TS51HS	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	
TS52HS	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	
TS55HS	52E	26C	43H	26F	13B	118H	125J	89I	52H	108K	98J	98I	82I	98K	115I	56G	13C	

APPLICATION MATERIAL GROUPS - TAPS

SURFACE FEET PER MINUTE (SFM)

For material examples, see page 567.

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1
1500	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1500A	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1500L	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1500OV	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1505	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1508	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1519	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1528	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1534	65	60	40	40	25	15			30	20	20		50	30	30	20	20
1534NE	65	60	40	40	25	15			30	20	20		50	30	30	20	20
1534NR	65	60	40	40	25	15			30	20	20		50	30	30	20	20
1541	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1542	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1543	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1544													65	40	40	25	
1545	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1545A	60	45	30	30	20	10			25	15	15						20
1548	60	50	35	35					25	20	20						20
1549	60	50	35	35					25	20	20						20
1567	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1568	45	35	25	15	10				25	15	15						20
1572	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1578	65	60	40	40	25	15			30	20	20		50	30	30	20	20
1580	120	100	60	60	40				50	30	40						40
1582	60	50	35	35					25	20	20						20
1585	65	60	40	40	25	15			30	20	20		50	30	30	20	20
1585A	65	60	40	40	25	15			30	20	20		50	30	30	20	20
1585NR	65	60	40	40	25	15			20	13	10		50	30	30	20	20
1585OV	65	60	40	40	25	15			30	20	20		50	30	30	20	20
1586	60	50	35	35					26	20	20						20
1587																	
1588																	
1590	70	60	40	40	30				30	26	20						20
1591	70	60	40	40	30				30	26	20						20
1592	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1593	65	60	40	40	25	15			30	20	20		50	30	30	20	20
1595	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1599													65	40	40	25	
1599SB													65	40	40	25	
1600													65	40	40	25	
1634	65	60	40	40	25	15			30	20	20		50	30	30	20	20
1641	150	125	90	90					70	60	50						60
1671	150	125	90	90					70	60	50						60
1672AP	110	90	55	55	45				50	40	40						35
1673AP	110	90	55	55	45				50	40	40						35
1674	120	100	65	65	50				60	40	45						40
1675	120	100	65	65	50				60	40	45						40
1676AP	100	80	50	50	40				45	30	35						30
1677AP	100	80	50	50	40				45	30	35						30
1678	110	90	55	55	45				50	40	40						35
1679	110	90	55	55	45				50	40	40						35
1681AP	150	125	90	90					70	50	60						60
1687AP	150	125	90	90					70	50	60						60
1691AP	165	135	100	100					80	70	60						70
1697AP	165	135	100	100					80	70	60						70
1700M	60	45	30	30	20	10			25	15	15		50	30	30	15	20
1785M	65	60	40	40	25	15			30	20	20		50	30	30	20	20
1785NR	66	59	46	33	16	10			20	13	10		46	26	26	16	
1788(M)																	
1985	75	69	49	49	30	16			36	20							20
1994	82	72	59	49									26				
3300	98	79	49	49	30				39	30							30

APPLICATION MATERIAL GROUPS - TAPS

SURFACE FEET PER MINUTE (SFM)

For material examples, see page 567.

	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3	6.4	7.1	7.2	7.3	7.4	8.1	8.2	8.3	9.1	10.1
1500	15		20	10		25	80	60	10	50	100	75	20	25	15			
1500A	15		20	10		25	80	60	10	50	100	75	20	25	15			
1500L	15		20	10		25	80	60	10	50	100	75	20	25	15			
1500OV	15		20	10		25	80	60	10	50	100	75	20	25	15			
1505	15		20	10		25	80	60	10	50	100	75	20	25	15			
1508	15		20	10		25	80	60	10	50	100	75	20	25	15			
1519	15		20	10		25	80	60	10	50	100	75	20	25	15			
1528	15		20	10		25	80	60	10	50	100	75	20	25	15			
1534	15	5	25	10		30	90	70	10	70	100	75	20	90	25			
1534NE	15	5	25	10		30	90	70	10	70	100	75	20	90	25			
1534NR	15	5	25	10		30	90	70	10	70	100	75	20	90	25			
1541	15		20	10		25	80	60	10	50	100	75	20	25	15			
1542	15		20	10		25	80	60	10	50	100	75	20	25	15			
1543	15		20	10		25	80	60	10	50	100	75	20	25	15			
1544									15									
1545	15		20	10		25	80	60	10	50	100	75	20	25	15			
1545A	15		20	10		25	80	60	10	50	100	75	20	25	15			
1548	15	5	20	15														
1549	15	5	20	15														
1567	15		20	10		25	80	60	10	50	100	75	20	25	15			
1568	10		20	10		30	50	50		50	75	50		25	15			
1572	15		20	10		25	80	60	10	50	100	75	20	25	15			
1578	15	5	25	10		30	90	70	10	70	100	75	20	90	25			
1580	30		40			50	150	120		100	200	125						
1582	15	5	20	15														
1585	15	5	25	10		30	90	70	10	70	100	75	20	90	25			
1585A	15	5	25	10		30	90	70	10	70	100	75	20	90	25			
1585NR	15	5	25	10		30	90	70	10	70	100	75	20	90	25			
1585OV	15	5	25	10		30	90	70	10	70	100	75	20	90	25			
1586	15	5	20	15														
1587						30	80	60		50	60	60						
1588						30	80	60		50	60	60						
1590	15	5			10													
1591	15	5			10													
1592	15		20	10		25	80	60	10	50	100	75	20	25	15			
1593	15	5	25	10		30	90	70	10	70	100	75	20	90	25			
1595	15		20	10		25	80	60	10	50	100	75	20	25	15			
1599									15									
1599SB									15									
1600									15									
1634	16	7	26	10		30	89	69	10	49	98	66	20	98	26			
1641			45			55	180	130		180	200	230						
1671			45			55	180	130		180	200	230						
1672AP	25		35	20		45	120	100		85	100	85	30					
1673AP	25		35	20		45	120	100		85	100	85	30					
1674	30		40	25		50	125	110		95	120	95	40					
1675	30		40	25		50	125	110		95	120	95	40					
1676AP	20		30	15		40	100	90		80	95	80	30					
1677AP	20		30	15		40	100	90		80	95	80	30					
1678	25		35	20		45	120	100		85	100	85	30					
1679	25		35	20		45	120	100		85	100	85	30					
1681AP			45			55	180	130		180	200	230						
1687AP			45			55	180	130		180	200	230						
1691AP			55			70	200	160		200	240	260						
1697AP			55			70	200	160		200	240	260						
1700M	15		20	10		25	80	60	10	50	100	75	20	25	15			
1785M	15	5	25	10		30	90	70	10	70	100	75	20	90	25			
1785NR		10	33	13		33		49		33	82	43	33	66				
1788(M)						30	79	79		49	66	66						
1985	16	7	30	16	10													
1994							98	66		59	115			98				
3300	26		30			39	121	98		79	161	98						

APPLICATION MATERIAL GROUPS - TAPS

SURFACE FEET PER MINUTE (SFM)

For material examples, see page 567.

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1
3306E	98	79	49	49	30				39	30							30
6541	16	16	23	20	13								23	16	23	16	
E000	82	72	59	52	33	16							49	26	49	26	33
E000TIN	131	131	105	89	43	36			26	23	16		72	23	16		49
E001	82	72	59	52	33	16			23	20	13		49	26	49	26	
E002	82	72	59	52	33												33
E003	82	72	59	52	33				23	20	13						
E005	82	72	59	52	33	16							49	26	49	26	33
E006	82	72	59	52	33	16			26	23	16		49	26	49	26	
E007	82	72	59	52	33												33
E008	82	72	59	52	33				23	20	13						
E011	82	72	59	52	33	16			23	20	13		49	26	49	26	
E013	82	72	59	52	33				23	20	13						
E016	82	72	59	52	33	16			26	23	16		49	26	49	26	
E018	82	72	59	52	33				23	20	13						
E021	82	72	59	52	33	16			23	20	13		49	26	49	26	
E023	82	72	59	52	33				23	20	13						
E025	82	72	59	52	33	16							49	26	49	26	33
E026	82	72	59	52	33	16			26	23	16		49	26	49	26	
E027	82	72	59	52	33												33
E028	82	72	59	52	33				23	20	13						
E033	82	72	59	52	33	16			23	20	13						
E035	82	72	59	52	33	16							49	26	49	26	33
E036	82	72	59	52	33	16			26	23	16		49	26	49	26	
E037	82	72	59	52	33	16											33
E038	82	72	59	52	33	16			23	20	13						
E061	72	66	52	39	23	13							39	23	33	16	
E071	72	66	52	39	23	13							39	23	33	16	
E201													49	26	49	26	
E252													49	26	49	26	
E500	23	20	16	13	10								39	23	33	16	
E501	23	20	16	13	10								39	23	33	16	
E504	46	39	33	26	20								59	39	72	39	
E513	23	20	16	13	10								39	23	33	16	
E547	23	20	16	13	10								39	23	33	16	
E550	72	66	52	39	23	13			23	16	23		39	23	33	16	
E620	23	20	16	13	10								39	23	33	16	
E621		59	46	33	16				20	13	10						
E624	108	95	75	69	43												
E625	108	95	75	69	43												
E626				98	66	36											
E627				98	66	36											
E628		72	59	52	33				46	33	20						
E629		72	59	52	33				46	33	20						
E630													98	82	115	82	
E631													98	82	115	82	
E650	82	72	59	49										26			
E651	82	72	59	49										26			
E653	82	72	59	49										26			
E654	82	72	59	49										26			
E710	13	13	20	16	10								20	13	20	13	
E711	13	13	20	16	10								20	13	20	13	
E712	13	13	20	16	10								20	13	20	13	
E721	13	13	20	16	10								20	13	20	13	
E764	108	95	75	69	43												
E765	108	95	75	69	43												
E766				98	66	36											
E767				98	66	36											
E768		72	59	52	33				46	33	20						
E769		72	59	52	33				46	33	20						
E770													98	82	115	82	
E771													98	82	115	82	
E805					55	42	22										

APPLICATION MATERIAL GROUPS - TAPS

SURFACE FEET PER MINUTE (SFM)

For material examples, see page 567.

	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3	6.4	7.1	7.2	7.3	7.4	8.1	8.2	8.3	9.1	10.1
3306E	26		30			39	121	98		79	161	98						
6541							39					39	26	16				
E000	16		39	16		39	98	66		52	115	66	49	98				
E000TIN	23		59	26		59	148	115				98	72		148			
E001																		
E002	16		39	16						52	115	66	49					
E003																		
E005	16		39	16		39	98	66		52	115	66	49	98				
E006																		
E007	16		39	16						52	115	66	49					
E008																		
E011																		
E013																		
E016																		
E018																		
E021																		
E023																		
E025	16		39	16		39	98	66		52	115	66	49	98				
E026																		
E027	16		39	16		39	98	66		52	115	66	49	98				
E028																		
E033																		
E035	16		39	16		39	98	66		52	115	66	49	98				
E036																		
E037	16		39	16						52	115	66	49	98				
E038																		
E061						39	98	66				66	49		39	23		
E071						39	98	66				66	49		39	23		
E201							66		16				49		33			
E252							66		16				49		33			
E500						13	33	23	7		39	23	16		16	10		
E501						13	33	23	7		39	23	16		16	10		
E504							66	46	13		79	46	33		33	20		
E513						13	33	23	7		39	23	16		16	10		
E547						13	33	23	7		39	23	16		16	10		
E550						39	98	66	13		115	66	49		39	23		
E620						13	33	23	7		39	23	16		16	10		
E621			13							33	82	43	33					
E624						39	98	66										
E625						39	98	66										
E626	33			33														
E627	33			33														
E628																		
E629																		
E630							98		16				66		49			
E631							98		16				66		49			
E650							98	66		59	115			98				
E651							98	66		59	115			98				
E653							98	66		59	115			98				
E654							98	66		59	115			98				
E710							36					36	23	13				
E711							36					36	23	13				
E712							36					36	23	13				
E721							36					36	23	13				
E764						39	98	66										
E765						39	98	66										
E766	33			33														
E767	33			33														
E768																		
E769																		
E770							98		16				66		49			
E771							98		16				66		49			
E805	42	26		16	10													

APPLICATION MATERIAL GROUPS - TAPS

SURFACE FEET PER MINUTE (SFM)

For material examples, see page 567.

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1
E806					55	42	22										
E808	108	95	75	69	43												
E809	108	95	75	69	43												
E810				98	66	36											
E811				98	66	36											
E812		72	59	52	33				46	33	20						
E813		72	59	52	33				46	33	20						
E814													98	82	115	82	
E815													98	82	115	82	
E816					55	42	22										
E817					55	42	22										
E905					55	42	22										
E906					55	42	22										
E908	108	95	75	69	43												
E909	108	95	75	69	43												
E910				98	66	36											
E911				98	66	36											
E912		72	59	52	33				46	33	20						
E913		72	59	52	33				46	33	20						
E914													98	82	115	82	
E915													98	82	115	82	
E916					55	42	22										
E917					55	42	22										
EP006H	82	72	59	52	33	16							49	26	49	26	33
EP016H	82	72	59	52	33	16			23	20	13		49	26	49	26	
EP10	82	72	59	52	33	16							49	26	49	26	33
EP11	82	72	59	52	33	16			23	20	13		49	26	49	26	
EP20	82	72	59	52	33	16							49	26	49	26	33
EP21	82	72	59	52	33	16			23	20	13		49	26	49	26	
EP30	82	72	59	52	33	16							49	26	49	26	33
EP31	82	72	59	52	33	16			23	20	13		49	26	49	26	
EP40	82	72	59	52	33	16							49	26	49	26	33
EP41	82	72	59	52	33	16			23	20	13		49	26	49	26	
EX006H	82	72	59	52	33												33
EX016H	82	72	59	52	33				23	20	13						
EX10	82	72	59	52	33												33
EX11	82	72	59	52	33				23	20	13						
EX20	82	72	59	52	33												33
EX21	82	72	59	52	33				23	20	13						
EX30	82	72	59	52	33												33
EX31	82	72	59	52	33				23	20	13						
EX40	82	72	59	52	33												33
EX41	82	72	59	52	33				23	20	13						
TN1500	59	46	30	30	20	10			26	26	16		49	30	30	16	20
TN1534	79	75	49	49	30	20			39	26	26		49	30	30	20	
TN1541	16	16	23	20	13								23	16	23	16	
TN1543	16	16	23	20	13								23	16	23	16	
TN1585	79	75	49	49	30	20			39	26	26		49	30	30	20	
TN1785	79	75	49	49	30	20			39	26	26		49	30	30	20	

APPLICATION MATERIAL GROUPS - TAPS

SURFACE FEET PER MINUTE (SFM)

For material examples, see page 567.

	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3	6.4	7.1	7.2	7.3	7.4	8.1	8.2	8.3	9.1	10.1
E806	42	26		16	10													
E808						39	98	66										
E809						39	98	66										
E810	33			33														
E811	33			33														
E812																		
E813																		
E814							98		16				66		49			
E815							98		16				66		49			
E816	42	26		16	10													
E817	42	26		16	10													
E905	42	26		16	10													
E906	42	26		16	10													
E908						39	98	66										
E909						39	98	66										
E910	33			33														
E911	33			33														
E912																		
E913																		
E914							98		16				66		49			
E915							98		16				66		49			
E916	42	26		16	10													
E917	42	26		16	10													
EP006H	16		39	16		39	98	66		52	115	66	49	98				
EP016H																		
EP10	16		39	16		39	98	66		52	115	66	49	98				
EP11																		
EP20	16		39	16		39	98	66		52	115	66	49	98				
EP21																		
EP30	16		39	16		39	98	66		52	115	66	49	98				
EP31																		
EP40	16		39	16		39	98	66		52	115	66	49	98				
EP41																		
EX006H	16		39	16						52	115	66	49					
EX016H																		
EX10	16		39	16						52	115	66	49					
EX11																		
EX20	16		39	16						52	115	66	49					
EX21																		
EX30	16		39	16						52	115	66	49					
EX31																		
EX40	16		39	16						52	115	66	49	98				
EX41																		
TN1500	16		20	10		26	79	59	10	49	98	75	20	30	16			
TN1534			30	13		39	115	89	13	66	125	79	26	121	30			
TN1541							39					39	26	16				
TN1543							39					39	26	16				
TN1585			30	13		39	115	89	13	66	125	79	26	121	30			
TN1785			30	13		39	115	89	13	66	125	79	26	121	30			

APPLICATION MATERIAL GROUPS - DIES

SURFACE FEET PER MINUTE (SFM)

For material examples, see page 567.

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1
2010	26	23	20	16					13	7			26	23	20	16	
2025	26	23	20	16					13	7			26	23	20	16	
2325M	26	23	20	16					13	7			26	23	20	16	
2510	26	23	20	16					13	7			26	23	20	16	
2710M	26	23	20	16					13	7			26	23	20	16	
F201	26	23	20	16					13	7			26	23	20	16	
F302	26	23	20	16					13	7			26	23	20	16	
F312	26	23	20	16					13	7			26	23	20	16	
F320	26	23	20	16					13	7			26	23	20	16	
F330	26	23	20	16					13	7			26	23	20	16	
F370	26	23	20	16					13	7			26	23	20	16	

APPLICATION MATERIAL GROUPS - DIES

SURFACE FEET PER MINUTE (SFM)

For material examples, see page 567.

	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3	6.4	7.1	7.2	7.3	7.4	8.1	8.2	8.3	9.1	10.1
2010	7		30	7	7	30	26	23		33	49	49	33	49	33	16		
2025	7		30	7	7	30	26	23		33	49	49	33	49	33	16		
2325M	7		30	7	7	30	26	23		33	49	49	33	49	33	16		
2510	7		30	7	7	30	26	23		33	49	49	33	49	33	16		
2710M	7		30	7	7	30	26	23		33	49	49	33	49	33	16		
F201	7		30	7	7	30	26	23		33	49	49	33	49	33	16		
F302	7		30	7	7	30	26	23		33	49	49	33	49	33	16		
F312	7		30	7	7	30	26	23		33	49	49	33	49	33	16		
F320	7		30	7	7	30	26	23		33	49	49	33	49	33	16		
F330	7		30	7	7	30	26	23		33	49	49	33	49	33	16		
F370	7		30	7	7	30	26	23		33	49	49	33	49	33	16		

APPLICATION MATERIAL GROUPS - END MILLS

SURFACE FEET PER MINUTE (SFM)

*Feed rate chart - see pages 582 & 583. For material examples, see page 567.

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1
C110	197A	164A	131B	115B					98F				115A	98A	164B	98B	115D
C123	180A	148A	131B	115B					82F				98A	82A	148B	98B	98D
C247	180S	148S	131T	115T					82Y				98S	82S	148T	82T	98V
C273	164S	164S	115T	98T					33Y				82S	66S	131T	82T	82V
C346	148A	115A	98B	82B					66F				82A	66A	115B	66B	82D
C600	98A	89A	75B										82A	66A	82B		59D
C601	98A	89A	75B										82A	66A	82B		59D
C602	98A	89A	75B										82A	66A	82B		59D
C603	164A	131A	115B	98B					75F				92A	75A	131B	82B	92D
C604	112S	89S	79T										89S	72S	89T		62V
C605	164A	131A	115B						75F	62F							92D
C606	148A	118A	102B						66F	56F							82D
C607		131A	115B	98B	66C					62F				75A	131B	82B	92D
C608	164G	131G	115H	98H					75L				92G	75G	131H	82H	92J
C609	197G	184G	161H	138H					105L				128G	105G	184H	128H	128J
C610	164G	131G	115H	98H					75L				92G	75G	131H	82H	92J
C611	197G	184G	161H	138H					105L				128G	105G	184H	128H	128J
C612	148G	118G	102H	89H					66L				82G	66G	118H	72H	82J
C613	148G	118G	102H	89H					66L				82G	66G	118H	72H	82J
C614	115S	92S	79T	69T					52Y				92S	75S	92T	56T	62V
C615	164S	131S	115T	98T					75Y				92S	75S	131T	82T	92V
C617	115S	92S	79T	69T					52Y				92S	75S	92T	56T	62V
C618	164S	131S	115T	98T					75Y				92S	75S	131T	82T	92V
S106																	
S108	289B	223B	223B	180B	161B	148B			200A	141A	108A	89A	374B	318B	318B	249B	
S109	289B	223B	223B	180B	161B	148B			200A	141A	108A	89A	374B	318B	318B	249B	
S110	269B	212B	212B	171B	152B	140B			190A	125A	103A	78A	336B	284B	284B	225B	
S111	249B	200B	200B	161B	144B	131B			180A	108A	98A	66A	298B	249B	249B	200B	
S112	289B	223B	223B	180B	161B	148B			200A	141A	108A	89A	374B	318B	318B	249B	
S113	289B	223B	223B	180B	161B	148B			200A	141A	108A	89A	374B	318B	318B	249B	
S114	269B	212B	212B	171B	152B	140B			190A	125A	103A	78A	336B	284B	284B	225B	
S115	249B	200B	200B	161B	144B	131B			180A	108A	98A	82A	298B	249B	249B	200B	
S116	289B	223B	223B	180B	161B	148B			200A	141A	108A	89A	374B	318B	318B	249B	
S121	289B	223B	223B	180B	161B	148B			200A	141A	108A		374B	318B	318B	249B	
S129	361B	325B	325B	298B	249B	230B			239A	171A	131A	105A	449B	377B	377B	279B	
S134	361B	325B	325B	298B	249B	230B			239A	171A	131A	105A	449B	377B	377B	279B	
S135	361B	325B	325B	298B	249B	230B			239A	171A	131A	105A	449B	377B	377B	279B	
S136	343B	312B	312B	287B	238B	205B			220A	156A	123A	97A	405B	338B	338B	254B	
S137	325B	298B	298B	276B	226B	180B			200A	141A	115A	89A	361B	298B	298B	230B	
S138	361B	325B	325B	298B	249B	230B			239A	171A	131A	98A	449B	377B	377B	279B	
S139	361B	325B	325B	298B	249B	230B			239A	171A	131A	98A	449B	377B	377B	279B	
S146	343B	312B	312B	287B	238B	205B			220A	156A	123A	97A	405B	338B	338B	254B	
S147	325B	298B	298B	276B	226B	180B			200A	141A	115A		361B	298B	298B	230B	
S206																	
S207																	
S208	400B	298B	298B	259B	230B	200B			325A	223A	174A	131A	551B	525B	525B	374B	230B
S211	361B	269B	269B	239B	200B	180B			298A	180A	171A	131A	499B	400B	400B	341B	200B
S212	400B	298B	298B	259B	230B	200B			325A	223A	174A	131A	551B	525B	525B	374B	230B
S213	400B	298B	298B	259B	230B	200B			325A	223A	174A	131A	551B	525B	525B	374B	230B
S215	361B	269B	269B	239B	200B	180B			298A	180A	171A	89A	499B	400B	400B	341B	200B
S221	400B	298B	298B	259B	230B	200B			325A	223A	174A		551B	525B	525B	374B	230B
S223HA	801C	778C	522C	463B	328B	285A	187A	125A	489B	400B	302B	256B	456C	381B	305B	256B	255B
S223HB	801C	778C	522C	463B	328B	285A	187A	125A	489B	400B	302B	256B	456C	381B	305B	256B	255B
S234	499B	449B	449B	423B	400B	328B			351A	276A	200A	164A	699B	649B	649B	430B	259B
S235	499B	449B	449B	423B	400B	328B			351A	276A	200A	164A	699B	649B	649B	430B	259B
S236	474B	425B	425B	406B	380B	313B			338A	251A	182A	140A	650B	578B	578B	415B	245B

APPLICATION MATERIAL GROUPS - END MILLS

SURFACE FEET PER MINUTE (SFM)

*Feed rate chart - see pages 582 & 583. For material examples, see page 567.

	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3	6.4	7.1	7.2	7.3	7.4	8.1	8.2	8.3	9.1	10.1
C110	82D		197D	49C		279C	279C	279C		722E	722E	279E		295C				
C123	82D		164D	49C		262C	262C	262C		656E	656E	262E		262C				
C247	82V		164V	49U		262U	262U	262U		656X	656X	262X		262U				
C273	66V		148V	33U		230U	230U	230U		590X	590X	230X		230U				
C346	66D		148D	33C		230C	230C	230C		590E	590E			230C				
C600	49D		98D	20C		180C	197C	197C		197E	180E	115E		197C				
C601	49D		98D	20C		180C	197C	197C		197E	180E	115E		197C				
C602	49D		98D	20C		180C	197C	197C		197E	180E	115E		197C				
C603	75D		157D	43C		410C	410C	410C		984E	984E	295E		410C				
C604	49V		108V	20U		200U	223U	223U		243X	194X	144X		200U				
C605			157D			410C				984E	984E	295E		410C				
C606			141D			367C				886E	886E	266E		367C				
C607	75D	33D		43C	20D		410C	410C	49C			295E	197A		410C			
C608	75J		157J	43I		410I	410I	410I			984K	295K		410I				
C609	105J		220J	59I		574I	574I	574I			1378K	413K		574I				
C610	75J		157J	43I		410I	410I	410I			984K	295K		410I				
C611	105J		220J	59I		574I	574I	574I			1378K	413K		574I				
C612	66J		141J	36I		367I	367I	367I			886K	266K		367I				
C613	66J		141J	36I		367I	367I	367I			886K	266K		367I				
C614	52V		108V	20U		203U	223U	223U			197X	148X		203U				
C615	75V		157V	43U		410U	410U	410U		984X	984X	295X		410U				
C617	52V		108V	20U		203U	223U	223U			197X	148X		203U				
C618	75V		157V	43U		410U	410U	410U		984X	984X	295X		410U				
S106										2326C	1749C	1171C	751B					
S108						649C	499C	499C	125B	1499C	1499C	649C	400B					
S109						649C	499C	499C	125B	1499C	1499C	649C	400B					
S110						617C	474C	474C	117B	1424C	1424C	617C	380B					
S111						584C	449C	449C	108B	1348C	1348C	584C	361B					
S112						649C	499C	499C	125B	1499C	1499C	649C	400B					
S113						649C	499C	499C	125B	1499C	1499C	649C	400B					
S114						617C	474C	474C	117B	1424C	1424C	617C	380B					
S115			148B			584C	449C	449C	108B	1348C	1348C	584C	361B					
S116						649C	499C	499C	125B	1499C	1499C	649C	400B					
S121						649C	499C	499C	125B	1499C	1499C	649C	400B					
S129						679C	574C	574C	144B	1601C	1601C	708C	479B					
S134						679C	574C	574C	144B	1601C	1601C	708C	479B					
S135						679C	574C	574C	144B	1601C	1601C	708C	479B					
S136						646C	546C	546C	138B	1525C	1525C	674C	455B					
S137						613C	518C	518C	131B	1450C	1450C	640C	430B					
S138						679C	574C	574C	144B	1601C	1601C	708C	479B					
S139						679C	574C	574C	144B	1601C	1601C	708C	479B					
S146						646C	546C	546C	138B	1525C	1525C	674C	455B					
S147						613C	518C	518C	131B	1450C	1450C	640C	430B					
S206										2326C	1749C	1171C	751B					
S207										2093C	1575C	1056C	676B					
S208	200B	190B	230B	161A	98A													
S211	180B	174B	200B	141A	85A													
S212	200B	190B	230B	161A	98A													
S213	200B	190B	230B	161A	98A													
S215	180B	174B	200B	141A	85A													
S221	200B	190B	230B	161A	98A													
S223HA	463B	387A	358B	269A	223A													
S223HB	463B	387A	358B	269A	223A													
S234	230B	200B	266B	200A	131A													
S235	230B	200B	266B	200A	131A													
S236	220B	190B	251B	190A	123A													
S237	210B	180B	236B	180A	115A													

APPLICATION MATERIAL GROUPS - END MILLS

SURFACE FEET PER MINUTE (SFM)

*Feed rate chart - see pages 582 & 583. For material examples, see page 567.

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1
S237	449B	400B	400B	390B	361B	298B			325A	226A	164A	115A	600B	508B	508B	400B	230B
S238	499B	449B	449B	423B	400B	328B			351A	276A	200A	148A	699B	649B	649B	430B	259B
S239	499B	449B	449B	423B	400B	328B			351A	276A	200A	148A	699B	649B	649B	430B	259B
S246	450B	412B	412B	387B	363B	288B			288A	233A	176A	135A	500B	540B	540B	384B	230B
S247	400B	374B	374B	351B	325B	249B			226A	190A	151A	121A	499B	430B	430B	338B	200B
S248HA	801C	778C	522C	463B	328B	285A	364A	240A	489B	400B	302B	256A	771C	571B	538B	433B	1017B
S248HB	801C	778C	522C	463B	328B	285A	364A	240A	489B	400B	302B	256A	771C	571B	538B	433B	1017B

Feed Rate Chart - Solid Carbide End Mills

How To Use This Chart to Find Cutting Feed Rate (IPR):

1. Find your Alpha Code on the AMG Chart (example: 279 U : U is the Alpha Code).
2. Find the closest diameter for your cutting application on the chart.
3. Select the type of cut and # Flutes to find your Ft Range.

# of Flutes	Type of Cut	Depth/ Width of Cut	Alpha Code	Feed Per Tooth (Ft) Dia Inches											
				1/8	5/32	3/16	1/4	5/16	13/32	1/2	9/16	5/8	11/16	3/4	
>4		↑ 1,5 ↔ 0,05	A				0.0010	0.0015	0.0015	0.0015	0.0015	0.0020	0.0020	0.0025	
			B				0.0020	0.0020	0.0025	0.0030	0.0035	0.0040	0.0040	0.0045	
			C				0.0030	0.0035	0.0040	0.0045	0.0050	0.0055	0.0060	0.0070	
3-4		↑ 1,5 ↔ 0,1	A	0.0010	0.0015	0.0020	0.0020	0.0025	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050	
			B	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050	0.0055	0.0060	0.0070	
			C	0.0015	0.0020	0.0025	0.0030	0.0040	0.0050	0.0060	0.0065	0.0070	0.0080	0.0090	
3-4		↑ 1 ↔ 0,5	A	0.0005	0.0005	0.0005	0.0010	0.0010	0.0015	0.0015	0.0020	0.0020	0.0025	0.0025	
			B	0.0005	0.0005	0.0010	0.0015	0.0015	0.0020	0.0020	0.0025	0.0030	0.0035	0.0040	
			C	0.0005	0.0010	0.0015	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050	
2-3		↑ 0,5 ↔ 1	A	0.0005	0.0010	0.0010	0.0010	0.0015	0.0015	0.0020	0.0020	0.0025	0.0025	0.0030	
			B	0.0010	0.0010	0.0010	0.0015	0.0015	0.0020	0.0025	0.0030	0.0035	0.0035	0.0040	
			C	0.0015	0.0015	0.0015	0.0020	0.0025	0.0030	0.0035	0.0040	0.0045	0.0050	0.0050	
3-4		↑ 0,5 ↔ 1 ↑ 1 ↔ 0,5													
			B				0.0010	0.0020	0.0030	0.0030	0.0035	0.0040	0.0040	0.0040	
2 & 4		↑ 0,1 - 0,5mm ↔ 0,1 - 0,5mm	A	0.0010	0.0010	0.0015	0.0015	0.0020	0.0020	0.0025	0.0030	0.0030			
			BC	0.0010	0.0010	0.0015	0.0020	0.0020	0.0025	0.0030	0.0035	0.0040			
4		↑ 0,01 - 0,1 ↔ ≤ 1	A				0.0020	0.0020	0.0025	0.0030		0.0030			
			BC				0.0020	0.0025	0.0030	0.0035		0.0040			

APPLICATION MATERIAL GROUPS - END MILLS

SURFACE FEET PER MINUTE (SFM)

*Feed rate chart - see pages 582 & 583. For material examples, see page 567.

	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3	6.4	7.1	7.2	7.3	7.4	8.1	8.2	8.3	9.1	10.1
S238	230B	200B	266B	200A	131A													
S239	230B	200B	266B	200A	131A													
S246	210B	180B	238B	176A														
S247	190B		210B			699C	571C	571C	180B	1650C	1650C	708C	410B					
S248HA	902B	755B	614B	525A	436A													
S248HB	902B	755B	614B	525A	436A													

Feed Rate Chart - HSS End Mills

How To Use This Chart to Find Cutting Feed Rate (IPR):

1. Find your Alpha Code on the AMG Chart (example: 279 U : U is the Alpha Code).
2. Find the closest diameter for your cutting application on the chart.
3. Select the type of cut and # Flutes to find your Ft Range.

Feed per Tooth (Ft) Dia Inches																	
Type of Cut	Alpha Code	0.078	1/8	5/32	3/16	1/4	5/16	13/32	1/2	9/16	5/8	11/16	3/4	7/8	1"	1.1/4	1.1/2
 ↑ 0,5D ↔ D	A	0.0003	0.0005	0.0007	0.0009	0.0011	0.0017	0.0024	0.0028	0.0033	0.0038	0.0038	0.0038	0.0039	0.0041	0.0042	0.0043
	B	0.0003	0.0005	0.0006	0.0009	0.0010	0.0015	0.0021	0.0026	0.0030	0.0034	0.0034	0.0034	0.0035	0.0037	0.0037	0.0038
	C	0.0003	0.0004	0.0006	0.0007	0.0009	0.0014	0.0019	0.0023	0.0027	0.0031	0.0031	0.0031	0.0031	0.0033	0.0034	0.0034
	D	0.0003	0.0004	0.0006	0.0008	0.0009	0.0015	0.0020	0.0024	0.0028	0.0032	0.0032	0.0032	0.0033	0.0035	0.0038	0.0040
	E	0.0005	0.0007	0.0009	0.0014	0.0017	0.0025	0.0034	0.0041	0.0048	0.0055	0.0056	0.0066	0.0057	0.0060	0.0066	0.0069
	F	0.0004	0.0005	0.0007	0.0008	0.0010	0.0013	0.0016	0.0020	0.0022	0.0025	0.0028	0.0031	0.0031	0.0033	0.0033	0.0033
 ↑ D ↔ 0,8D	G					0.0010	0.0013	0.0014	0.0017	0.0020	0.0022	0.0025	0.0028	0.0028	0.0021	0.0021	0.0022
	H					0.0009	0.0012	0.0013	0.0015	0.0018	0.0020	0.0023	0.0026	0.0026	0.0019	0.0019	0.0020
	I					0.0008	0.0011	0.0011	0.0014	0.0016	0.0018	0.0020	0.0023	0.0023	0.0017	0.0017	0.0018
	J					0.0009	0.0012	0.0013	0.0015	0.0018	0.0020	0.0023	0.0026	0.0026	0.0019	0.0019	0.0020
	K					0.0014	0.0019	0.0026	0.0031	0.0036	0.0059	0.0035	0.0039	0.0038	0.0043	0.0043	0.0046
	L					0.0004	0.0005	0.0007	0.0008	0.0010	0.0011	0.0012	0.0013	0.0013	0.0013	0.0015	0.0017
 ↑ 1,5D ↔ 0,25D	M	0.0003	0.0005	0.0007	0.0009	0.0012	0.0016	0.0022	0.0027	0.0031	0.0036	0.0041	0.0045	0.0035	0.0041	0.0038	0.0042
	N	0.0003	0.0004	0.0006	0.0008	0.0011	0.0015	0.0020	0.0024	0.0028	0.0032	0.0037	0.0041	0.0024	0.0037	0.0034	0.0038
	O	0.0002	0.0004	0.0006	0.0007	0.0010	0.0013	0.0018	0.0022	0.0026	0.0029	0.0033	0.0036	0.0029	0.0033	0.0031	0.0034
	P	0.0003	0.0004	0.0006	0.0008	0.0011	0.0014	0.0019	0.0023	0.0027	0.0031	0.0015	0.0039	0.0031	0.0035	0.0033	0.0036
	Q	0.0004	0.0006	0.0008	0.0010	0.0015	0.0019	0.0026	0.0031	0.0036	0.0041	0.0035	0.0039	0.0039	0.0044	0.0050	0.0055
	R	0.0005	0.0006	0.0008	0.0010	0.0011	0.0015	0.0019	0.0022	0.0026	0.0029	0.0033	0.0036	0.0036	0.0036	0.0041	0.0043
 ↑ 1,5D ↔ 0,1D	S	0.0004	0.0006	0.0009	0.0011	0.0015	0.0020	0.0028	0.0034	0.0039	0.0045	0.0051	0.0056	0.0044	0.0051	0.0048	0.0052
	T	0.0004	0.0006	0.0008	0.0010	0.0014	0.0018	0.0025	0.0030	0.0035	0.0051	0.0046	0.0051	0.0040	0.0046	0.0043	0.0047
	U	0.0003	0.0005	0.0007	0.0009	0.0013	0.0016	0.0023	0.0028	0.0032	0.0036	0.0041	0.0046	0.0036	0.0041	0.0039	0.0043
	V	0.0004	0.0005	0.0008	0.0010	0.0013	0.0017	0.0024	0.0029	0.0034	0.0039	0.0043	0.0048	0.0038	0.0043	0.0041	0.0045
	X	0.0005	0.0007	0.0010	0.0013	0.0018	0.0023	0.0032	0.0039	0.0045	0.0052	0.0044	0.0049	0.0048	0.0055	0.0062	0.0068
	Y	0.0006	0.0008	0.0010	0.0012	0.0014	0.0019	0.0023	0.0028	0.0024	0.0036	0.0041	0.0045	0.0045	0.0045	0.0051	0.0054

Easy Calculations: (inch)

$$\text{RPM} = \text{SFM/D} \times 3.82 \quad \text{F} = \text{Ft} \times \text{T} \times \text{RPM}$$

$$\text{RPM} = [(\text{m/min.}) \times 1000] \div (3.14 \times \text{D})$$

Terms: RPM = Revolutions Per Minute F = Feed Inches Per Minute

Ft = Feed Per Tooth T = Number of Teeth D = Cutting Dia.

SFM = Surface Feet per Minute

APPLICATION MATERIAL GROUPS - REAMERS

SURFACE FEET PER MINUTE (SFM)

For material examples, see page 567.

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1
4500	82C	66C	52C	49B	30B	16A			36C	20B	26B	20B	52E	49D	43C	36C	49C
4531	82C	66C	52C	49B	30B	16A			36C	20B	26B	20B	52E	49D	43C	36C	49C
4532	82C	66C	52C	49B	30B	16A			36C	20B	26B	20B	52E	49D	43C	36C	49C
4533	82C	66C	52C	49B	30B	16A			36C	20B	26B	20B	52E	49D	43C	36C	49C
4535	82C	66C	52C	49B	30B	16A			36C	20B	26B	20B	52E	49D	43C	36C	49C
4536	82C	66C	52C	49B	30B	16A			36C	20B	26B	20B	52E	49D	43C	36C	49C
4537	82C	66C	52C	49B	30B	16A			36C	20B	26B		52E	49D	43C	36C	49C
4579	59C	46C	36C	33B	16B	13A			26C	16B	20B		46E	36D	33C	30C	36C
4587	59C	46C	36C	33B	16B	13A			26C	16B	20B		46E	36D	33C	30C	36C
4588	59C	46C	36C	33B	16B	13A			26C	16B	20B		46E	36D	33C	30C	36C
4591	59C	46C	36C	33B	16B	13A			26C	16B	20B		46E	36D	33C	30C	36C
4600	59C	46C	36C	33B	16B	13A			26C	16B	20B	20B	46E	36D	33C	30C	36C
4608	82C	66C	52C	49B	30B	16A			36C	20B	26B		52E	49D	43C	36C	49C
B100	59C	46C	36C	33B	16B	13A			26F				46E	36D	33C	30C	36C
B101	59C	46C	36C	33B	16B	13A			26C				46E	36D	33C	30C	36C
B121	59C	46C	36C	33B	16B	13A							46E	36D	33C	30C	36C
B122	59C	46C	36C	33B	16B	13A			26C	16B	20B		46E	36D	33C	30C	36C
B157	82C	66C	52C	49B	30B	16A			36C	20B	26B						49C
B170	82C	66C	52C	49B	30B	16A			36C	20B	26B		52E	49D	43C	36C	49C
B301	59C	46C	36C	33B	16B	13A			26C	16B	20B		46E	36D	33C	30C	36C
B334	59C	46C	36C	33B	16B	13A			26F				46E	36D	33C	30C	36C
B400	59B	59B	46B	46B	33C	33C							56D	56D	56D	46D	46C
B411	59B	59B	46B	46B	33C	33C							56D	56D	56D	46D	46C
B441	59B	59B	46B	46B	33C	33C							56D	56D	56D	46D	46C
B442	59B	59B	46B	46B	33C	33C							56D	56D	56D	46D	46C
B481	59B	59B	46B	46B	33C	33C							56D	56D	56D	46D	46C
B901	59C	46C	36C	33B	16B	13A			26C				46E	36D	33C	30C	36C

APPLICATION MATERIAL GROUPS - COUNTERSINKS

Feed rate chart see page 584. **SURFACE FEET PER MINUTE (SFM)**

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1
4602	98F	82E	66D	49D	33B	20A			26C	20B	13A		82F	49D	39C	26C	39C
4603	98F	82E	66D	49D	33B	20A			26C	20B	13A		82F	49D	39C	26C	39C
4702	82C	66C	52C	49B	30B	16A			36C	20B	26B		52E	49D	43C	36C	49C
4703	82C	66C	52C	49B	30B	16A			36C	20B	26B		52E	49D	43C	36C	49C
4705	82C	66C	52C	49B	30B	16A			36C	20B	26B		52E	49D	43C	36C	49C
4706	82C	66C	52C	49B	30B	16A			36C	20B	26B		52E	49D	43C	36C	49C
G171	164E	131E	98D	66D	49B	33B							148F	115D	98C	98C	66C
G132			66E	49D	33D	20B					13B					26D	
G135	98F	82E	66D	49D	33B	20A			26C	20B	13A		82F	49D	39C	26C	39C
G136	98F	82E	66D	49D	33B	20A			26C	20B	13A		82F	49D	39C	26C	39C
G137	98F	82E	66D	49D	33B	20A			26C	20B	13A		82F	49D	39C	26C	39C
G138	98F	82E	66D	49D	33B	20A			26C	20B	13A		82F	49D	39C	26C	39C
G142	98F	82E	66D	49D					26C	20B	13A						39C
G149	98D	82D	66C	49B	33A	20A			26B	20A			82D	49C	39A	26A	39B
G154	98F	82E	66D	49D	33B	20A			26C	20B	13A		82F	49D	39C	26C	39C
G335	164E	131E	98D	66D	49B	33B							148F	115D	98C	98C	66C
G338	164F	131E	98D	66D	49B	33A							148F	115D	98C	98C	66C
G400	98F	82E	66D	49D	33B	20A			26C	20B	13A		82F	49D	39C	26C	39C
G560	164E	131E	98D	66D	49B	33B							148F	115D	98C	98C	66C
G570	148E	118E	89D	72D	56B	39B			56C	39B	49A	33A	131C	105C	89C	79C	
G600	72F	56E	49D	39D	26B	20A			26C	20B	13A		82F	49D	39C		

Feed Rate Chart - Reamers

Alpha Code	Reamers - Feed in Inches per Revolution									Ø Diameter			
	1/16	5/64	1/8	3/16	5/16	25/64	1/2	5/8	25/32	1"	1-13/16	1-1/2	2"
A	0.002	0.002	0.003	0.004	0.006	0.007	0.007	0.009	0.010	0.011	0.013	0.015	0.017
B	0.002	0.003	0.004	0.006	0.007	0.008	0.009	0.011	0.012	0.014	0.016	0.020	0.022
C	0.003	0.003	0.005	0.007	0.009	0.010	0.011	0.013	0.015	0.017	0.019	0.024	0.027
D	0.031	0.004	0.006	0.008	0.011	0.013	0.014	0.016	0.019	0.021	0.024	0.029	0.033
E	0.004	0.006	0.007	0.010	0.014	0.015	0.017	0.020	0.021	0.025	0.030	0.036	0.043
F	0.006	0.007	0.010	0.014	0.017	0.020	0.022	0.025	0.028	0.031	0.037	0.047	0.059

APPLICATION MATERIAL GROUPS - REAMERS

SURFACE FEET PER MINUTE (SFM)

*Feed rate chart - see pages 584. For material examples, see page 567

	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3	6.4	7.1	7.2	7.3	7.4	8.1	8.2	8.3	9.1	10.1
4500	30B	16B	26D	16C	10C	82D	92E	82D	46D									
4531	30B	16B	26D	16C	10C	82D	92E	82D	46D									
4532	30B	16B	26D	16C	10C	82D	92E	82D	46D									
4533	30B	16B	26D	16C	10C	82D	92E	82D	46D									
4535	30B	16B	26D	16C	10C	82D	92E	82D	46D									
4536	30B	16B	26D	16C	10C	82D	92E	82D	46D									
4537	30B	16B	26D	16C	10C	82D	92E	82D	46D									
4579	16B	13B	16D			59D	66E	59D	36D	75F	59F	49E	46D		69B			
4587	16B	13B	16D			59D	66E	59D	36D	75F	59F	49E	46D		69B			
4588	16B	13B	16D			59D	66E	59D	36D	75F	59F	49E	46D		69B			
4591	16B	13B	16D			59D	66E	59D	36D	75F	59F	49E	46D		69B			
4600	16B	13B	16D			59D	66E	59D	36D	75F	59F	49E	46D		69B			
4608	30B	16B	26D	16C	10C	82D	92E	82D	46D									
B100	16B	13B	16D	10C	7C	59D	66E	59D	36D	75F	59F				69B			
B101	16B	13B	16D	10C	7C	59D	66E	59D	36D	75F	59F				69B			
B121															69B			
B122	16B	13B	16D			59D	66E	59D	36D	75F	59F	49E	46D		69B			
B157	30B	16B	26D	16C	10C	82D	92E			92F	82F	66E	52D	98B			10A	
B170	30B	16B	26D	16C	10C	82D	92E	82D	46D									
B301	16B	13B	16D			59D	66E	59D	36D	75F	59F	49E	46D		69B			
B334	16B	13B	16D	10C	7C	59D	66E	59D	36D	75F	59F				69B			
B400	46C	33B	33C	33B	33B	125E	125E	125E	125D	197D	197D	82D	82D	82C	43C			
B411	46C	33B	33C	33B	33B	125E	125E	125E	125D	197D	197D	82D	82D	82C	43C			
B441	46C	33B	33C	33B	33B	125E	125E	125E	125D	197D	197D	82D	82D	82C	43C			
B442	46C	33B	33C	33B	33B	125E	125E	125E	125D	197D	197D	82D	82D	82C	43C			
B481	46C	33B	33C	33B	33B	125E	125E	125E	125D	197D	197D	82D	82D	82C	43C			
B901	16B	13B	16D	10C	7C	59D	66E	59D	36D	75F	59F				69B			

APPLICATION MATERIAL GROUPS - COUNTERSINKS

Material examples page 585. **SURFACE FEET PER MINUTE (SFM)**

	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3	6.4	7.1	7.2	7.3	7.4	8.1	8.2	8.3	9.1	10.1
4602	33A	26A	39C	20B	13A	82D	66F	82F	33D	98G	82F	66F	33F	98G	66G			
4603	33A	26A	39C	20B	13A	82D	66F	82F	33D	98G	82F	66F	33F	98G	66G			
4702	30B	16B	26D	16C	10C	82D	92E	82D	46D									
4703	30B	16B	26D	16C	10C	82D	92E	82D	46D									
4705	30B	16B	26D	16C	10C	82D	92E	82D	46D									
4706	30B	16B	26D	16C	10C	82D	92E	82D	46D									
G171	49A	33A	66C	33B	20A	131D	98F	131F	49D	164G	131F	98F	49F	164G	98G			
G132	26A	26A		20C	13B				33F							16G		
G135	33A	26A	39C	20B	13A	82D	66F	82F	33D	98G	82F	66F	33F	98G	66G			
G136	33A	26A	39C	20B	13A	82D	66F	82F	33D	98G	82F	66F	33F	98G	66G			
G137	33A	26A	39C	20B	13A	82D	66F	82F	33D	98G	82F	66F	33F	98G	66G			
G138	33A	26A	39C	20B	13A	82D	66F	82F	33D	98G	82F	66F	33F	98G	66G			
G142	33A		39C	20B		82D	66F	82F		98G	82F	66F	33F	98G	66G			
G149	33A	26A	39B	20A	13A	82B	66C	82C	33B	98D	82C	66C	33C	98D	66D			
G154	33A	26A	39C	20B	13A	82D	66F	82F	33D	98G	82F	66F	33F	98G	66G			
G335	49A	33A	66C	33B	20A	131D	98F	131F	49D	164G	131F	98F	49F	164G	98G			
G338	49A	33A	66C	33B	20A	131D	98F	131F	49D	164G	131F	98F	49F	164G	98G			
G400	33A	26A	39C	20B	13A	82D	66F	82F	33D	98G	82F	66F	33F	98G	66G			
G560	49A	33A	66C	33B	20A	131D	98F	131F	49D	164G	131F	98F	49F	164G	98G			
G570				20A	13A	131D	98F	131F	49D	148G	118F	89F	43F					
G600						82D	66F	82F	33D	98G	82F	66F	33F					

Feed Rate Chart - Countersinks, Counterbores

Alpha Code	Countersinks, Counterbores - Feed in Inches per Revolution										Ø Diameter	
	1/4	5/16	5/64	5/8	25/32	1"	1-1/4	1-1/2	2-3/8	3"		
A	0.001	0.002	0.002	0.002	0.003	0.004	0.004	0.005	0.006	0.006		
B	0.002	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.007	0.008		
C	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.007	0.008	0.009		
D	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010	0.011		
E	0.003	0.004	0.005	0.006	0.007	0.008	0.010	0.011	0.012	0.013		
F	0.004	0.004	0.005	0.006	0.007	0.008	0.010	0.011	0.013	0.014		
G	0.004	0.005	0.006	0.007	0.008	0.009	0.011	0.013	0.014	0.016		
H	0.005	0.006	0.007	0.008	0.009	0.010	0.012	0.014	0.016	0.018		

EDP NUMBER INDEX - 000021 - 003342

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0000021.....	A1002.....	5967598.....	95	0000816.....	A100120.....	5967421.....	100	0001608.....	A10030.....	5967003.....	97	0002391.....	A10080.....	5968105.....	99
0000038.....	A10025.....	5967601.....	95	0000823.....	A100121.....	5967431.....	100	0001615.....	A10031.....	5967006.....	97	0002407.....	A10081.....	5967926.....	99
0000045.....	A1003.....	5967603.....	95	0000830.....	A100122.....	5967436.....	100	0001622.....	A100315.....	5967009.....	97	0002414.....	A10082.....	5967932.....	99
0000052.....	A10032.....	5967605.....	95	0000847.....	A1001225.....	5967441.....	100	0001639.....	A10032.....	5967012.....	97	0002421.....	A100825.....	5967935.....	99
0000069.....	A10035.....	5967609.....	95	0000854.....	A100123.....	5967445.....	100	0001646.....	A100325.....	5967015.....	97	0002438.....	A10083.....	5967940.....	99
0000076.....	A10038.....	5967611.....	95	0000861.....	A100124.....	5967306.....	100	0001653.....	A10033.....	5967018.....	97	0002445.....	A10084.....	5967944.....	99
0000083.....	A1004.....	5967613.....	95	0000878.....	A100125.....	5967310.....	101	0001660.....	A10034.....	5967020.....	97	0002452.....	A10085.....	5967950.....	99
0000090.....	A10042.....	5967614.....	95	0000885.....	A100126.....	5967314.....	101	0001677.....	A10035.....	5967022.....	98	0002469.....	A10086.....	5967954.....	99
0000106.....	A10045.....	5967616.....	95	0000892.....	A100127.....	5967318.....	101	0001684.....	A10036.....	5967025.....	98	0002476.....	A10087.....	5967956.....	99
0000113.....	A10048.....	5967618.....	96	0000908.....	A1001275.....	5967322.....	101	0001691.....	A10037.....	5967028.....	98	0002483.....	A100875.....	5967959.....	100
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0000182.....	A10065.....	5967633.....	96	0000977.....	A100133.....	5967349.....	101	0001769.....	A10033/64.....	5967058.....	101	0002551.....	A10093.....	5967982.....	100
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0000267.....	A10085.....	5967651.....	96	0001059.....	A1001/32.....	5966600.....	96	0001844.....	A10042.....	5966791.....	98	0002636.....	A1009/16.....	5968009.....	101
0000274.....	A10088.....	5967654.....	96	0001066.....	A10013/32.....	5967365.....	100	0001851.....	A100425.....	5966827.....	98	0002643.....	A1009/32.....	5968012.....	99
0000281.....	A1009.....	5967655.....	96	0001073.....	A10013/64.....	5967369.....	98	0001868.....	A10043.....	5966832.....	98	0002650.....	A1009/64.....	5968015.....	98
0000298.....	A10092.....	5967659.....	96	0001080.....	A1001/4.....	5966602.....	99	0001875.....	A10044.....	5966834.....	98	0002667.....	A10110.....	5968016.....	103
0000304.....	A10095.....	5967662.....	96	0001097.....	A100140.....	5967371.....	101	0001882.....	A10045.....	5966836.....	98	0002674.....	A10111.....	5968019.....	103
0000311.....	A10098.....	5967667.....	96	0001103.....	A1001425.....	5967373.....	101	0001899.....	A10046.....	5966838.....	98	0002681.....	A10112.....	5968022.....	103
0000328.....	A1010.....	5966592.....	96	0001110.....	A100145.....	5967375.....	101	0001905.....	A10047.....	5966671.....	98	0002698.....	A101125.....	5968025.....	103
0000335.....	A100105.....	5966612.....	96	0001127.....	A1001475.....	5967377.....	101	0001912.....	A100475.....	5966675.....	98	0002704.....	A10113.....	5968032.....	103
0000342.....	A10011.....	5966634.....	96	0001134.....	A100150.....	5967379.....	101	0001929.....	A10048.....	5966679.....	98	0002711.....	A10114.....	5968037.....	103
0000359.....	A100115.....	5966674.....	96	0001141.....	A1001525.....	5967381.....	101	0001936.....	A10049.....	5966685.....	98	0002728.....	A10115.....	5968042.....	103
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0000373.....	A100125.....	5966691.....	96	0001165.....	A1001575.....	5967385.....	101	0001950.....	A10043/64.....	5966695.....	101	0002742.....	A10117.....	5968052.....	103
0000380.....	A10013.....	5966696.....	96	0001172.....	A10015/32.....	5967387.....	100	0001967.....	A10050.....	5966700.....	98	0002766.....	A10118.....	5968062.....	103
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0000403.....	A10014.....	5966572.....	96	0001196.....	A100160.....	5967393.....	101	0001981.....	A10052.....	5966709.....	98	0002780.....	A101100.....	5968072.....	104
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0000427.....	A10015.....	5966574.....	96	0001219.....	A1001/64.....	5966604.....	95	0002001.....	A10053.....	5966718.....	98	0002803.....	A10120.....	5967908.....	103
0000434.....	A100155.....	5966575.....	96	0001226.....	A100170.....	5967397.....	101	0002018.....	A10054.....	5966721.....	98	0002810.....	A10121.....	5967955.....	103
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0000458.....	A100165.....	5966577.....	97	0001240.....	A10017/32.....	5967402.....	101	0002032.....	A10056.....	5966729.....	98	0002834.....	A10123.....	5968021.....	103
0000465.....	A10017.....	5966578.....	97	0001257.....	A10017/64.....	5967404.....	99	0002049.....	A10057.....	5966733.....	98	0002841.....	A10124.....	5968069.....	103
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0000489.....	A10018.....	5966590.....	97	0001271.....	A100180.....	5967408.....	101	0002063.....	A10058.....	5966744.....	99	0002865.....	A10126.....	5968087.....	103
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0000502.....	A10019.....	5966593.....	97	0001295.....	A100190.....	5967417.....	101	0002087.....	A1005/16.....	5966752.....	99	0002889.....	A10128.....	5968098.....	103
0000519.....	A100195.....	5966595.....	97	0001301.....	A100195.....	5967426.....	101	0002094.....	A1005/32.....	5966756.....	98	0002896.....	A10129.....	5967912.....	103
0000526.....	A100100.....	5966608.....	100	0001318.....	A10019/32.....	5966897.....	101	0002100.....	A1005/64.....	5966763.....	97	0002902.....	A10130.....	5967917.....	103
0000533.....	A100101.....	5966611.....	100	0001325.....	A10019/64.....	5966955.....	101	0002117.....	A1005/8.....	5966766.....	97	0002919.....	A10132.....	5967920.....	103
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0000663.....	A100112.....	5966641.....	100	0001455.....	A10026.....	5966929.....	97	0002247.....	A10070.....	5966807.....	99	0003046.....	A10165.....	5967972.....	104
0000670.....	A1001125.....	5966644.....	100	0001462.....	A100265.....	5966935.....	97	0002254.....	A10071.....	5966811.....					

EDP NUMBER INDEX - 0003472 - 010036

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
003336	DS901/4	6002392	207	003552	D33WN24	6002154	204	0007563	A10812	5968338	114	0008430	A10858	5968390	116
003338	DS905/16	6002232	207	003553	D33WN23	6002112	204	0007570	A10813	5968343	114	0008447	A10859	5968392	116
003340	DS903/8	6002230	207	003554	D33F5/32	6002735	204	0007587	A10814	5968351	115	0008454	A1085/16	5968394	117
003342	DS901/2	6002389	207	003555	D33WN22	6002055	204	0007594	A10815	5968176	115	0008461	A1085/32	5968396	116
003472	D33M10	6002316	206	003556	D33WN21	6002473	204	0007600	A10816	5968184	115	0008478	A1085/64	5968398	115
003473	D33M15	6002320	206	003557	D33WN20	6002468	204	0007617	A10817	5968188	115	0008485	A10860	5968402	116
003474	D33M20	6002353	206	003558	D33WN19	6002460	204	0007624	A10818	5968192	115	0008492	A10861	5968405	116
003475	D33M205	6002364	206	003559	D33WN18	6002457	204	0007631	A10819	5968196	115	0008508	A10862	5968406	116
003476	D33M25	6002368	206	003560	D33F11/64	6002765	204	0007648	A108100	5968213	117	0008515	A10863	5968409	116
003477	D33M30	6002373	206	003561	D33WN17	6002454	204	0007655	A108102	5968217	117	0008522	A10864	5968411	116
003478	D33M35	6002382	206	003562	D33WN16	6002451	204	0007662	A108105	5968220	117	0008539	A10865	5968412	117
003479	D33M45	6002390	206	003563	D33WN15	6002448	204	0007679	A108108	5968223	117	0008546	A10866	5968414	117
003480	D33M55	6002397	206	003564	D33WN14	6002444	204	0007686	A108110	5968226	117	0008553	A10867	5968417	117
003481	D33M60	6002400	206	003565	D33WN13	6002441	204	0007693	A108115	5968229	117	0008560	A10868	5968419	117
003482	D33M65	6002406	206	003566	D33F3/16	6002729	204	0007709	A108118	5968232	118	0008577	A10869	5968421	117
003483	D33M70	6002409	206	003567	D33WN12	6002438	204	0007716	A10811/32	5968235	117	0008584	A10870	5968425	117
003484	D33M75	6002412	206	003568	D33WN11	6002432	204	0007723	A108116	5968200	115	0008591	A10871	5968167	117
003485	D33M80	6002415	206	003569	D33WN10	6002429	204	0007730	A10811/64	5968238	116	0008607	A10872	5968208	117
003486	D33M85	6002418	206	003570	D33WN9	6001936	204	0007747	A10812	5968203	118	0008614	A10873	5968239	117
003487	D33M90	6002420	206	003571	D33WN8	6001909	204	0007754	A108120	5968241	118	0008621	A10874	5968278	117
003488	D33M95	6002423	206	003572	D33WN7	6001872	204	0007761	A108122	5968244	118	0008638	A10875	5968330	117
003489	D33M105	6002328	206	003573	D33F13/64	6002704	204	0007778	A108125	5968248	118	0008645	A10876	5968340	117
003490	D33M1075	6002333	206	003574	D33WN6	6002190	204	0007785	A108128	5968251	118	0008652	A10877	5968345	117
003491	D33M110	6002338	206	003575	D33WN5	6002160	204	0007792	A108129	5968254	118	0008669	A10878	5968349	117
003492	D33M115	6002342	206	003576	D33WN4	6002117	204	0007808	A108130	5968257	118	0008676	A10879	5968354	117
003493	D33M120	6002347	206	003577	D33WN3	6002227	204	0007815	A108135	5968260	118	0008683	A1087/16	5968172	117
003500	D33WN68	6001815	203	003578	D33F7/32	6002739	204	0007822	A10813/32	5968263	117	0008690	A1087/32	5968175	116
003501	D33F1/32	6002760	203	003579	D33WN2	6002463	204	0007839	A10813/64	5968266	116	0008706	A1087/64	5968179	115
003502	D33WN67	6002214	203	003580	D33WN1	6002426	204	0007846	A1081/4	5968206	116	0008713	A10880	5968182	117
003503	D33WN66	6002208	203	003581	D33LA	6002743	204	0007853	A108140	5968269	118	0008720	A10881	5968187	117
003504	D33WN65	6002205	203	003582	D33F15/64	6002711	204	0007860	A108145	5968271	118	0008737	A10882	5968191	117
003505	D33WN64	6002202	203	003583	D33LB	6002744	204	0007877	A108150	5968273	118	0008744	A10883	5968195	117
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003510	D33WN59	6002188	203	003588	D33LG	6002748	204	0007945	A1081/8	5968209	115	0008799	A10888	5968214	117
003511	D33WN58	6002186	203	003589	D33F17/64	6002714	204	0007969	A10820	5968295	115	0008805	A10889	5968216	117
003512	D33WN57	6002182	203	003590	D33LH	6002750	204	0007976	A10821	5968302	115	0008812	A10890	5968219	117
003513	D33WN56	6002180	203	003591	D33LI	6002751	204	0007983	A10822	5968307	115	0008829	A10891	5968221	117
003514	D33F3/64	6002731	203	003592	D33LJ	6002752	204	0007990	A10823	5968311	115	0008836	A10892	5968224	117
003515	D33WN55	6002178	203	003593	D33LK	6002753	204	0008003	A10824	5968315	115	0008843	A10893	5968227	117
003516	D33WN54	6002175	203	003594	D33F9/32	6002741	204	0008010	A10825	5968318	115	0008850	A10894	5968230	117
003517	D33WN53	6002172	203	003595	D33LL	6002754	204	0008027	A10826	5968328	115	0008867	A10895	5968233	117
003518	D33F1/16	6002738	203	003596	D33LM	6002755	204	0008034	A10827	5968280	115	0008874	A10896	5968236	117
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003522	D33WN49	6002157	203	003600	D33LO	6002757	205	0008126	A10831	5968423	115	0008911	A1089/32	5968253	117
003523	D33WN48	6002151	203	003601	D33LP	6002758	205	0008133	A10832	5968427	115	0008928	A1089/64	5968256	115
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003525	D33WN47	6002147	203	003603	D33LQ	6002759	205	0008157	A10834	5968430	115	010002	R101/32	5998665	88
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003532	D33WN41	6002124	203	003610	D33F3/8	6002732	205	0008232	A1083/32	5968314	115	010009	R109/64	5998809	88
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EDP NUMBER INDEX - 010037 - 0013427

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
010029	R1029/64	5998716	89	010305	R10CO5/64	5998215	124	010604	R10P1/16	5998498	88	0010938	R95033/64	5988850	21
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010032	R101/2	5998653	89	010308	R10CO1/8	5998150	124	010607	R10P7/64	5998340	88	0010969	R95035/64	5988854	21
010033	R1033/64	5998735	89	010309	R10CO9/64	5998234	125	010608	R10P1/8	5998519	88	0010983	R950140	5988652	21
010034	R1017/32	5998696	90	010310	R10CO5/32	5998211	125	010609	R10P9/64	5998350	88	0011003	R9509/16	5988904	21
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010215	R10B15/64	5998001	112	010514	R10H7/32	5998419	116	010913	L1013/64	5995468	102	0013120	R95011/32	5988650	23
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010221	R10B21/64	5998114	112	010520	R10H5/16	5998398	117	010918	L109/32	5995523	102	013145	QC21PM45	5996974	122
010222	R10B11/32	5997616	112	010521	R10H21/64	5998520	117	010919	L1019/64	5995472	102	013150	QC21PM50	5996997	122
010223	R10B23/64	5998154	112	010522	R10H11/32	5998361	117	010920	L105/16	5995501	102	013152	QC21PM52	5997036	122
010224	R10B3/8	5998011	112	010523	R10H23/64	5998524	117	0010921	R950130	5988643	21	013155	QC21PM55	5997044	122
010225	R10B25/64	5998162	112	010524	R10H3/8	5998391	117	010921	L1021/64	5995475	102	013156	QC21PM56	5997048	122
010226	R10B13/32	5997622	113	010525	R10H25/64	5998529	117	010922	L1011/32	5995465	102	013160	QC21PM60	5997052	122
010227	R10B27/64	5998166	113	010526	R10H13/32	5998371	117	010923	L1023/64	5995477	102	013165	QC21PM65	599705	

EDP NUMBER INDEX - 0013434 - 016150

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0013229	R95013/64	5988744	23	015116	R15AP	5998702	109	015619	R15PS	5998906	89	016031	2A31	6000730	97
0013243	R95011/16	5988637	23	015117	R15AQ	5998705	109	015620	R15PT	5998912	89	016032	2A32	6000732	97
0013267	R950270	5988861	23	015118	R15AR	5998707	109	015621	R15PU	5998916	89	016033	2A33	6000738	97
0013274	R95015/64	5988611	23	015119	R15AS	5998709	109	015622	R15PV	5998922	89	016034	2A34	6000740	97
0013281	R95013/32	5988739	23	015120	R15AT	5998711	109	015623	R15PW	5998926	89	016035	2A35	6000742	98
0013304	R950280	5988876	23	015121	R15AU	5998715	109	015624	R15PX	5998929	89	016036	2A36	6000744	98
0013311	R95017/64	5988614	23	015122	R15AV	5998717	109	015625	R15PY	5998934	89	016037	2A37	6000746	98
0013328	R95011/8	5988720	23	015123	R15AW	5998719	109	015626	R15PZ	5999257	89	0016039	R96035/64	5988583	24
0013342	R95019/64	5988617	23	015124	R15AX	5998722	110	015804	QC21P1/16	5997086	119	016040	2A40	6000749	98
0013366	R950290	5988888	23	015125	R15AY	5998726	110	015805	QC21P5/64	5996799	119	016041	2A41	6000751	98
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0013427	R950111/64	5988730	23	015201	R15BA	5998734	112	015807	QC21P7/64	5996818	119	016043	2A43	6000757	98
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0013441	R95013/16	5988735	23	015203	R15BC	5998741	112	015809	QC21P9/64	5996829	119	016045	2A45	6000747	98
0013465	R950305	5988932	23	015204	R15BD	5998748	112	015810	QC21P5/32	5996795	120	0016046	R960140	5988895	24
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0013540	R96033/64	5988579	24	015212	R15BL	5998782	112	015817	QC21P17/64	5997134	120	016053	2A53	6000927	98
0013557	R96017/32	5988831	24	015213	R15BM	5998787	112	015818	QC21P9/32	5996825	120	016054	2A54	6000932	98
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015															

EDP NUMBER INDEX - 0016152 - 018137

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
016115	2A115	6000782	100	016315	2ACO115	5999721	127	016470	2ACO70	6000696	126	018020	R18N20	5998327	88
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016300	2ACO100	5999696	126	016464	2ACO64	6000538	126	018014	R18N14	5998302	89	018112	R18AN12	5999282	1

EDP NUMBER INDEX - 018138 - 018653

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
018118	R18AN18	5999311	109	018244	R18BN44	5997686	111	018363	R18CON63	5997783	123	018362	R18CON62	5997781	123
018119	R18AN19	5999313	109	018245	R18BN45	5997715	111	018364	R18CON64	5997787	123	018363	R18CON63	5997783	123
018120	R18AN20	5999323	109	018246	R18BN46	5997739	111	018365	R18CON65	5997791	123	018364	R18CON64	5997787	123
018121	R18AN21	5999327	109	018247	R18BN47	5997778	111	018366	R18CON66	5997794	123	018365	R18CON65	5997791	123
018122	R18AN22	5999331	109	018248	R18BN48	5997788	111	018367	R18CON67	5997798	123	018366	R18CON66	5997794	123
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018124	R18AN24	5999339	109	018250	R18BN50	5997801	111	018369	R18CON69	5997807	123	018368	R18CON68	5997804	123
018125	R18AN25	5999343	109	018251	R18BN51	5997649	111	018370	R18CON70	5997813	123	018369	R18CON69	5997807	123
018126	R18AN26	5999352	109	018252	R18BN52	5997656	111	018371	R18CON71	5997816	123	018370	R18CON70	5997813	123
018127	R18AN27	5999359	108	0018293	H853150	5987979	33	018372	R18CON72	5997819	123	018371	R18CON71	5997816	123
018128	R18AN28	5999363	108	018301	R18CON1	5997674	125	018373	R18CON73	5997822	123	018372	R18CON72	5997819	123
018129	R18AN29	5999368	108	018302	R18CON2	5997709	125	018374	R18CON74	5997825	123	018373	R18CON73	5997822	123
018130	R18AN30	5999376	108	018303	R18CON3	5997733	125	018375	R18CON75	5997828	123	018374	R18CON74	5997825	123
018131	R18AN31	5999380	108	018304	R18CON4	5997775	125	018376	R18CON76	5997831	123	018375	R18CON75	5997828	123
018132	R18AN32	5999384	108	018305	R18CON5	5997735	125	018377	R18CON77	5997837	123	018376	R18CON76	5997831	123
018133	R18AN33	5999388	108	018306	R18CON6	5997773	125	0018378	H853220	5988017	34	018377	R18CON77	5997837	123
018134	R18AN34	5999392	108	018307	R18CON7	5997810	125	018378	R18CON78	5997840	123	0018378	H853220	5988017	34
018135	R18AN35	5999399	108	018308	R18CON8	5997845	125	018379	R18CON79	5997842	123	018378	R18CON78	5997840	123
018136	R18AN36	5999401	108	018309	R18CON9	5997851	125	018380	R18CON80	5997848	123	018379	R18CON79	5997842	123
018137	R18AN37	5999404	108	018310	R18CON10	5997678	125	0018385	H853230	5988021	34	018380	R18CON80	5997848	123
018138	R18AN38	5999407	108	018311	R18CON11	5997680	125	0018392	H853240	5988029	35	0018385	H853230	5988021	34
018139	R18AN39	5999410	108	018312	R18CON12	5997683	125	0018408	H853250	5988033	35	0018392	H853240	5988029	35
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018141	R18AN41	5999419	108	018314	R18CON14	5997692	125	018313	R18CON13	5997689	125	0018415	H853260	5988037	35
018142	R18AN42	5999422	108	018315	R18CON15	5997695	125	018314	R18CON14	5997692	125	0018422	H853270	5988042	35
018143	R18AN43	5999424	108	0018316	H853160	5987983	34	018315	R18CON15	5997695	125	0018439	H853280	5988050	35
018144	R18AN44	5999428	108	018316	R18CON16	5997697	125	0018316	H853160	5987983	34	0018446	H853290	5988057	35
018145	R18AN45	5999026	108	018317	R18CON17	5997700	125	018316	R18CON16	5997697	125	0018453	H853300	5988061	35
018146	R18AN46	5999068	108	018318	R18CON18	5997703	125	018317	R18CON17	5997700	125	0018460	H855120	5988115	36
018147	R18AN47	5999101	108	018319	R18CON19	5997706	125	018318	R18CON18	5997703	125	0018477	H855125	5988120	36
018148	R18AN48	5999146	108	018320	R18CON20	5997711	125	018319	R18CON19	5997706	125	0018484	H855130	5988681	36
018149	R18AN49	5999175	108	018321	R18CON21	5997713	125	018320	R18CON20	5997711	125	0018491	H855140	5988738	36
018150	R18AN50	5999181	108	018322	R18CON22	5997717	125	018321	R18CON21	5997713	125	018501	R18HN1	5998197	116
018151	R18AN51	5999183	108	0018323	H853170	5987987	34	018322	R18CON22	5997717	125	018502	R18HN2	5998226	116
018152	R18AN52	5999185	108	018323	R18CON23	5997719	125	0018323	H853170	5987987	34	018503	R18HN3	5997970	116
018201	R18BN1	5999046	112	018324	R18CON24	5997721	125	018323	R18CON23	5997719	125	018504	R18HN4	5997980	116
018202	R18BN2	5999085	112	018325	R18CON25	5997723	125	018324	R18CON24	5997721	125	018505	R18HN5	5998019	116
018203	R18BN3	5999126	112	018326	R18CON26	5997725	125	018325	R18CON25	5997723	125	018506	R18HN6	5998063	116
018204	R18BN4	5999169	112	018327	R18CON27	5997727	125	018326	R18CON26	5997725	125	0018507	H855150	5988781	36
018205	R18BN5	5997796	112	018328	R18CON28	5997729	125	018327	R18CON27	5997727	125	018507	R18HN7	5998100	116
018206	R18BN6	5997660	112	018329	R18CON29	5997731	124	018328	R18CON28	5997729	125	018508	R18HN8	5998440	116
018207	R18BN7	5997663	112	0018330	H853180	5987996	34	018329	R18CON29	5997731	124	018509	R18HN9	5998447	116
018208	R18BN8	5997666	112	018330	R18CON30	5997736	124	0018330	H853180	5987996	34	018510	R18HN10	5998202	116
018209	R18BN9	5997670	112	018331	R18CON31	5997746	124	018331	R18CON30	5997736	124	018511	R18HN11	5998204	116
018210	R18BN10	5999050	112	018332	R18CON32	5997748	124	018331	R18CON31	5997746	124	018512	R18HN12	5998206	116
018211	R18BN11	5999054	112	018333	R18CON33	5997751	124	018332	R18CON32	5997748	124	018513	R18HN13	5998208	116
018212	R18BN12	5999058	112	018334	R18CON34	5997755	124	018333	R18CON33	5997751	124	0018514	H855160	5988825	37
018213	R18BN13	5999062	112	018335	R18CON35	5997759	124	018334	R18CON34	5997755	124	018514	R18HN14	5998210	116
018214	R18BN14	5999065	112	018336	R18CON36	5997763	124	018335	R18CON35	5997759	124	018515	R18HN15	5998212	116
018215	R18BN15	5999071	112	018337	R18CON37	5997767	124	018336	R18CON36	5997763	124	018516	R18HN16	5998214	116
018216	R18BN16	5999074	112	018338	R18CON38	5997770	124	018337	R18CON37	5997767	124	018517	R18HN17	5998216	116
018217	R18BN17	5999076	112	018339	R18CON39	5997772	124	018338	R18CON38	5997770	124	018518	R18HN18	5998219	116
018218	R18BN18	5999079	112	018340	R18CON40	5997784	124	018339	R18CON39	5997772	124	018519	R18HN19	5998221	116
018219	R18BN19	5999082	112	018341	R18CON41	5997784	124	018340	R18CON40	5997784	124	018520	R18HN20	5998229	116
018220	R18BN20	5999089	112	018342	R18CON42	5997784	124	018341	R18CON41	5997784	124	0018521	H855170	5988870	37
018221	R18BN21	5999092	112	018343	R18CON43	5997802	124	018342	R18CON42	5997784	124	018521	R18HN21	5998233	116
018222	R18BN22	5999095	112	018344	R18CON44	5997835	124	018343	R18CON43	5997802	124	018522	R18HN22	5998236	116
018223	R18BN23	5999098	112	018345	R18CON45	5997868	124	018344	R18CON44	5997835	124	018523	R18HN23	5998239	116
018224	R18BN24	5999104	112	018346	R18CON46	5997875	124	018345	R18CON45	5997868	124	018524	R18HN24	5998242	116
018225	R18BN25	5999107	112	0018347	H853190	5987999	34	018346	R18CON46	5997875	124	018525	R18HN25	5998245	115
018226	R18BN26	5999110	112	018347	R18CON47	5997879	124	0018347	H853190	5987999	34	018526	R18HN26	5998249	115
018227	R18BN27	5999113	111	018348	R18CON48	5997883	124	018347	R18CON47	5997879	124	018527	R18HN27	5998253	115
018228	R18BN28	5999118	111	018349	R18CON49	5997888	124	018348	R18CON48	5997883	124	018528	R18HN28	5998257	115
018229	R18BN29	5999122	111	018350	R18CON50	5997737	124	018349	R18CON49	5997888	124	018529	R18HN29	5998265	115
018230	R18BN30	5999130	111	018351	R18CON51	5997740	124	018350	R18CON50	5997737	124	018530	R18HN30	5998004	115
018231	R18BN31	5999135	111	018352	R18CON52	5997743	124	018351	R18CON51	5997740	124	018531	R18HN31	5998047	115
018232	R18BN32	5999139	111	018353	R18CON53	5997745	124	018352	R18CON52	5997743	124	018532	R18HN32	5998081	115
018233	R18BN33	5999149	111	0018354	H853200	5988003	34	018353	R18CON53	5997745	124	018533	R18HN33	5998116	115
018234	R18BN34	5999152	111	018354	R18CON54	5997749	124	0018354	H853200	5988003	34	018534	R18HN34	5998123	115
018235	R18BN35	5999156	111	018355	R18CON55	5997752	124	018354	R18CON54	5997749	124	018535	R18HN35	5998127	115
018236	R18BN36	5999159	111	018356	R18CON56	5997753	123	018355	R18CON55	5997752	124	018536	R18HN36	5998131	115
018237	R18BN37	5999162	111	018357	R18CON57	5997758	123	018356	R18CON56	5997753	123	018537	R18HN37	5998135	115

EDP NUMBER INDEX - 018654 - 020152

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
018543	R18HN43	5997991	115	0018767	H858240	5988832	40	019418	QC21PN18	5996972	120	0020005	A125130X400	5968138	165
018544	R18HN44	5997994	115	0018774	H858250	5988836	40	019419	QC21PN19	5996976	120	020008	2091/8	6001003	177
0018545	H855190	5988886	37	0018781	H858260	5988842	40	019420	QC21PN20	5996980	120	020009	2099/64	6001068	177
0018538	R18HN45	5988882	115	0018798	H858270	5988846	41	019421	QC21PN21	5996982	120	020010	2095/32	6001011	177
018539	R18HN39	5997978	115	0018804	H858280	5988849	41	019422	QC21PN22	5996984	120	020011	20911/64	6001018	177
018540	R18HN40	5997982	115	0018811	H858290	5988852	41	019423	QC21PN23	5996986	120	0020012	A125140X315	5968156	165
018541	R18HN41	5997985	115	0018828	H858300	5988859	41	019424	QC21PN24	5996988	120	020012	2093/16	6001135	177
018542	R18HN42	5997988	115	0018835	H860N1	5988862	44	019425	QC21PN25	5996990	120	020013	20913/64	6001032	177
018543	R18HN43	5997991	115	0018842	H860N2	5988866	44	019426	QC21PN26	5996992	119	020014	2097/32	6001056	177
018544	R18HN44	5997994	115	0018859	H860N3	5988874	44	019427	QC21PN27	5996995	119	020015	20915/64	6001048	177
0018552	H855200	5988890	37	0018866	H860N4	5987928	44	019428	QC21PN28	5997000	119	020016	2091/4	6001000	177
018552	R18HN52	5998032	115	0018873	H860N5	5987933	44	019429	QC21PN29	5997004	119	020017	20917/64	6001054	177
018553	R18HN53	5998035	115	0018880	H860N6	5987936	44	019430	QC21PN30	5997010	119	020018	2099/32	6001065	177
018554	R18HN54	5998039	114	0018897	H861N1	5987939	44	019431	QC21PN31	5997014	119	020019	20919/64	6001060	177
018555	R18HN55	5998043	114	0018903	H861N2	5987942	44	019432	QC21PN32	5997016	119	020020	2095/16	6001196	177
018556	R18HN56	5998051	114	0018910	H861N3	5987945	44	019433	QC21PN33	5997020	119	020021	20921/64	6001095	177
018557	R18HN57	5998055	114	0018927	H861N4	5987947	44	019434	QC21PN34	5997025	119	020022	20911/32	6001012	177
018558	R18HN58	5998057	114	0018934	H861N5	5987950	44	019435	QC21PN35	5997029	119	020023	20923/64	6001101	177
018559	R18HN59	5998060	114	0018958	R96011/64	5988909	26	019436	QC21PN36	5997033	119	020024	2093/8	6001144	177
018560	R18HN60	5998066	114	0018965	R960260	5988516	26	019437	QC21PN37	5997040	119	020025	20925/64	6001112	177
018561	R18HN61	5998069	114	0018972	R96011/32	5988908	26	019438	QC21PN38	5996993	119	020026	20913/32	6001027	177
018562	R18HN62	5998072	114	0018989	R96013/64	5988914	26	019439	QC21PN39	5997032	119	020027	20927/64	6001118	177
018563	R18HN63	5998075	114	0018996	R96011/16	5988907	26	019440	QC21PN40	5997108	119	020028	2097/16	6001050	177
018564	R18HN64	5998078	114	0019009	R960270	5988523	26	019441	QC21PN41	5997155	119	0020029	A125140X400	5968158	165
018654	R18PN54	5999106	88	0019016	R96015/64	5988916	26	019442	QC21PN42	5997166	119	020029	20929/64	6001125	177
018655	R18PN55	5999109	88	0019023	R96013/32	5988913	26	019443	QC21PN43	5997170	119	020030	20915/32	6001046	177
018656	R18PN56	5999116	88	0019030	R960280	5988535	26	019444	QC21PN44	5997175	119	020031	20931/64	6001152	177
018657	R18PN57	5999120	88	0019047	R96017/64	5988918	26	019445	QC21PN45	5997179	119	020032	2091/2	6000998	177
018658	R18PN58	5999124	88	0019054	R96011/8	5988910	26	019446	QC21PN46	5996999	119	020033	20933/64	6001161	177
018659	R18PN59	5999128	88	0019061	R96019/64	5988919	26	019447	QC21PN47	5997002	119	020034	20917/32	6001051	177
018660	R18PN60	5999137	88	0019078	R960290	5988548	26	019448	QC21PN48	5997005	119	020035	20935/64	6001005	177
018661	R18PN61	5999141	88	0019085	R96015/32	5988915	26	019449	QC21PN49	5997008	119	0020036	A12522X160	5968523	162
018662	R18PN62	5999143	88	0019092	R960111/64	5988911	26	019450	QC21PN50	5997013	119	020036	2099/16	6001062	178
018663	R18PN63	5999145	88	0019108	R960300	5988564	26	019451	QC21PN51	5997017	119	020037	20937/64	6001053	178
018664	R18PN64	5999148	88	0019115	R96013/16	5988912	26	019452	QC21PN52	5997021	119	020038	20919/32	6001057	178
018665	R18PN65	5999154	88	0019122	R960305	5988568	26	019815	QC21GM15	5996450	122	020039	20939/64	6001086	178
018666	R18PN66	5999205	88	019301	QC21PA	5996520	120	019820	QC21GM20	5996467	122	020040	2095/8	6001015	178
018667	R18PN67	5999242	88	019302	QC21PB	5996524	120	019825	QC21GM25	5996469	122	020041	20941/64	6001120	178
0018668	H858140	5988789	39	019303	QC21PC	5996531	120	019830	QC21GM30	5996471	122	020042	20921/32	6001093	178
018668	R18PN68	5999284	88	019304	QC21PD	5996535	120	0019832	A12514X160	5968821	162	0020043	A12525X125	5968528	162
018669	R18PN69	5999328	87	019306	QC21PF	5996543	120	019840	QC21GM40	5996475	122	020043	20943/64	6001175	178
018670	R18PN70	5999382	87	019307	QC21PG	5996547	120	0019849	A12515X125	5968826	162	020044	20911/16	6001008	178
018671	R18PN71	5999385	87	019308	QC21PH	5996551	120	019850	QC21GM50	5996479	122	020045	20945/64	6001186	178
018672	R18PN72	5999389	87	019309	QC21PI	5996555	120	019852	QC21GM52	5996483	122	020046	20923/32	6001098	178
018673	R18PN73	5999393	87	019310	QC21PJ	5996559	120	019855	QC21GM55	5996167	122	020047	20947/64	6001190	178
018674	R18PN74	5999209	87	019311	QC21PK	5996563	120	0019856	A12515X160	5968831	162	020048	2093/4	6001139	178
0018675	H858150	5988793	39	019312	QC21PL	5996566	120	019856	QC21GM56	5996200	122	020049	20949/64	6001193	178
018675	R18PN75	5999212	87	019313	QC21PM	5996571	120	019860	QC21GM60	5996221	122	0020050	A12525X160	5968533	162
018676	R18PN76	5999214	87	019314	QC21PN	5996946	120	0019863	A12518X160	5968837	162	020050	20925/32	6001104	178
018677	R18PN77	5999217	87	019315	QC21PO	5997043	120	019865	QC21GM65	5996253	122	020051	20951/64	6001021	178
018678	R18PN78	5999220	87	019316	QC21PP	5997047	120	019868	QC21GM68	5996297	122	020052	20913/16	6001023	178
018679	R18PN79	5999223	87	019317	QC21PQ	5997051	120	0019870	A125105X250	5968076	164	020053	20953/64	6001025	178
018680	R18PN80	5999230	87	019318	QC21PR	5997055	120	019870	QC21GM70	5996305	122	020054	20927/32	6001115	178
018681	R18PN81	5999234	87	019319	QC21PS	5997059	120	019875	QC21GM75	5996309	122	020055	20955/64	6001031	178
0018682	H858160	5988797	39	019320	QC21PT	5997062	120	019880	QC21GM80	5996313	122	020056	2097/8	6001059	178
018682	R18PN82	5999238	87	019321	QC21PU	5997065	120	019882	QC21GM82	5996317	122	020057	20957/64	6001035	178
018683	R18PN83	5999247	87	019322	QC21PV	5997068	120	019885	QC21GM85	5996171	122	020058	20929/32	6001122	178
018684	R18PN84	5999250	87	019323	QC21PW	5997074	120	019886	QC21GM86	5996174	122	020059	20959/64	6001039	178
018685	R18PN85	5999254	87	019324	QC21PX	5997077	120	0019887	A125105X315	5968080	164	020060	20915/16	6001037	178
018686	R18PN86	5999258	87	019325	QC21PY	5997080	120	019890	QC21GM90	5996177	122	020061	20961/64	6001043	178
018687	R18PN87	5999261	87	019326	QC21PZ	5997083	121	0019894	A125105X400	5968085	164	020062	20931/32	6001148	178
018688	R18PN88	5999265	87	019401	QC21PN1	5996952	120	019895	QC21GM95	5996180	122	020063	20963/64	6001047	178
018689	R18PN89	5999269	87	019402	QC21PN2	5996978	120	0019900	A125100X250	5968061	164	0020067	A12520X125	5968514	162
018690	R18PN90	5999276	87	019403	QC21PN3	5997006	120	019900	QC21GM100	5996452	122	0020074	A12520X160	5968519	162
018691	R18PN91	5999280	87	019404	QC21PN4	5997071	120	019905	QC21GM105	5996454	122	0200081	A12533X160	5968624	162
018692	R18PN92	5999288	87	019405	QC21PN5	5997071	120	019910	QC21GM110	5996455	122	0020098	A12535X160	5968627	162
018693	R18PN93	5999292	87	019406	QC21PN6	5997024	120	0019917	A125100X315	5968066	164	020100	2091	5999465	178
018694	R18PN94	5999296	87	019407	QC21PN7	5997028	120	019920	QC21GM120	5996461	122	020101	20911/64	5999470	178
018695	R18PN95	5999300	87	019408	QC21PN8	5997035	120	0019924	A125100X400	5968071	164	020102	20911/32	5999468	178
018696	R18PN96	5999303	87	019409	QC21PN9	5997039	120	019925	QC21GM125	5996463	122	020103	20913/64	5999506	178
018697	R18PN97	599													

EDP NUMBER INDEX - 020156 - 026250

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0202111	A12535X250	5968633	162	021329	209CO29/64	6000795	187	022031	HX1031/64	5996286	107	022226	HX15Z	5995876	107
0202111	209111/64	5999475	178	021330	209CO15/32	6000942	187	022032	HX101/2	5996236	107	023032	S2091/2	5999934	177
0202112	20913/16	5999500	178	021331	209CO31/64	6000811	187	022101	HX18N1	5995920	106	023033	S20933/64	5999791	177
0202114	20917/32	6001109	178	021332	209CO1/2	6001028	187	022102	HX18N2	5995780	106	023034	S20917/32	5999777	177
0202115	209115/64	5999481	178	021333	209CO33/64	6000814	187	022103	HX18N3	5995825	106	023035	S20935/64	5999793	177
0202116	20911/4	5999469	178	021334	209CO17/32	6000948	187	022104	HX18N4	5995868	106	023036	S20917/64	5999807	177
0202117	209117/64	5999483	178	021335	209CO35/64	6000817	187	022105	HX18N5	5995917	106	023051	S20951/64	5999794	178
0202118	20919/32	6001178	178	021336	209CO9/16	6000882	187	022106	HX18N6	5995498	106	023052	S20913/16	5999772	178
0202119	209119/64	5999486	178	021337	209CO37/64	6000820	187	022107	HX18N7	5995539	106	023053	S20953/64	5999796	178
0202120	20915/16	5999514	178	021338	209CO19/32	6000951	187	022108	HX18N8	5995584	106	023054	S20927/32	5999783	178
0202121	209121/64	5999488	178	021339	209CO39/64	6000823	187	022109	HX18N9	5995592	106	023056	S2097/8	5999805	178
0202122	209111/32	5999474	178	021340	209CO5/8	6000847	187	022110	HX18N10	5995926	106	023058	S20929/32	5999786	178
0202124	20913/8	5999508	179	021341	209CO41/64	6000826	187	022111	HX18N11	5995929	106	023106	S20913/32	6000482	178
0202126	209113/32	5999477	179	021342	209CO2/16	6000774	187	022112	HX18N12	5995930	106	023107	S20917/64	5999914	178
0202127	209127/64	5999494	179	021343	209CO43/64	6000829	187	022113	HX18N13	5995932	106	023108	S20911/8	6000436	178
0202128	A12530X160	5968611	162	021344	209CO11/16	6000806	187	022114	HX18N14	5995756	106	023109	S20919/64	5999930	178
0202128	20917/16	6001075	179	021345	209CO45/64	6000832	187	022115	HX18N15	5995760	106	023110	S20915/32	5999769	178
0202130	209115/32	5999480	179	021347	209CO47/64	6000835	187	022116	HX18N16	5995765	106	023111	S20911/64	6000443	178
0202131	209131/64	5999512	179	021348	209CO23/32	6000779	187	022117	HX18N17	5995768	106	023112	S20913/16	6000476	178
0202132	20911/2	5999467	179	021349	209CO49/64	6000838	187	022118	HX18N18	5995772	106	023113	S20911/32	6000449	178
0202134	209117/32	5999482	179	021350	209CO3/8	6000798	187	022119	HX18N19	5995777	106	023114	S20917/32	5999870	178
0202135	A12530X200	5968616	162	021351	209CO51/64	6000849	187	022120	HX18N20	5995784	106	023115	S209115/64	6000458	178
0202136	20919/16	6001173	179	021352	209CO25/32	6000783	187	022121	HX18N21	5995788	106	023116	S20911/4	6000433	178
0202140	20915/8	6001042	179	021353	209CO53/64	6000851	187	022122	HX18N22	5995791	106	023133	S209133/64	6000491	179
0202142	A12530X250	5968620	162	021354	209CO13/16	6000873	187	022123	HX18N23	5995800	106	023134	S209117/32	6000461	179
0202144	209111/16	5999472	179	021355	209CO27/32	6000786	188	022124	HX18N24	5995804	106	023135	S209135/64	6000497	179
0202148	20913/4	5999504	179	021356	209CO7/8	6000878	188	022125	HX18N25	5995807	106	023136	S20919/16	5999926	179
0202152	209113/16	5999476	179	021357	209CO55/64	6000854	188	022126	HX18N26	5995811	105	023138	S209119/32	6000463	179
0202156	20917/8	6001164	179	021358	209CO57/64	6000856	188	022127	HX18N27	5995815	105	023139	S209139/64	6000504	179
0202159	A12545X160	5968743	163	021359	209CO29/32	6000792	188	022128	HX18N28	5995819	105	023140	S20915/8	5999828	179
0202160	209115/16	5999479	179	021360	209CO15/16	6000938	188	022129	HX18N29	5995823	105	023142	S209121/32	6000465	179
0202166	A12545X200	5968747	163	021362	209CO59/64	6000859	188	022130	HX18N30	5995829	105	023144	S209111/16	6000440	179
0202173	A12545X250	5968751	163	021363	209CO61/64	6000862	188	022131	HX18N31	5995833	105	023147	S209147/64	6000520	179
0202180	A12545X315	5968756	163	021364	209CO3/32	6000803	188	022132	HX18N32	5995841	105	023148	S20913/4	6000484	179
0202197	A12540X160	5968727	163	021365	209CO63/64	6000865	188	022133	HX18N33	5995843	105	023150	S209125/32	6000469	179
0202200	2092	6001063	179	021400	209CO1	6000952	188	022134	HX18N34	5995846	105	023152	S20913/16	6000446	179
0202203	A12540X200	5968731	163	021401	209CO11/64	6000965	188	022135	HX18N35	5995850	105	023156	S20917/8	5999922	179
0202210	A12540X250	5968737	163	021402	209CO11/32	6000958	188	022136	HX18N36	5995853	105	023160	S209115/16	6000455	179
0202227	A12540X315	5968740	163	021404	209CO11/16	6000954	188	022137	HX18N37	5995857	105	023162	S209131/32	6000488	179
0202234	A12555X200	5968791	163	021406	209CO13/32	6000989	188	022138	HX18N38	5995860	105	023200	S2092	5999780	179
0202241	A12555X250	5968797	163	021407	209CO17/64	6001007	188	022139	HX18N39	5995864	105	024532	T4001/2	5999981	191
0202258	A12555X315	5968802	163	021408	209CO11/8	6000968	188	022140	HX18N40	5995872	105	024534	T40017/32	5999997	191
0202265	A12550X160	5968762	163	021411	209CO111/64	6000972	188	022141	HX18N41	5995881	105	024536	T4009/16	6000268	191
0202272	A12550X200	5968767	163	021412	209CO13/16	6000985	188	022142	HX18N42	5995886	105	024540	T4005/8	6000227	191
0202289	A12550X250	5968777	163	021414	209CO17/32	6001004	188	022143	HX18N43	5995890	105	024542	T40021/32	6000018	191
0202296	A12550X315	5968781	163	021416	209CO11/4	6000961	188	022144	HX18N44	5995894	105	024548	T4003/4	6000144	191
0202302	A12550X400	5968786	163	021418	209CO19/32	6001013	188	022145	HX18N45	5995897	105	024550	T40025/32	6000024	191
0202319	A12565X200	5968894	163	021422	209CO111/32	6000970	188	022146	HX18N46	5995903	105	024556	T4007/8	6000260	191
0202326	A12565X250	5968897	163	021424	209CO13/8	6000991	188	022147	HX18N47	5995907	105	024600	T4001	5999994	191
0202333	A12565X315	5968899	163	021428	209CO17/16	6001001	188	022148	HX18N48	5995910	105	024602	T40011/32	6000036	191
0202340	A12560X200	5968874	163	021432	209CO11/2	6000956	188	022149	HX18N49	5995914	105	024604	T40011/16	6000027	191
0202357	A12560X250	5968883	163	022004	HX101/16	5996242	105	022150	HX18N50	5995923	105	024608	T40011/8	6000042	191
0202364	A12560X315	5968886	163	022005	HX105/64	5996298	105	022151	HX18N51	5995926	105	024610	T40015/32	5999955	191
0202371	A12560X400	5968890	163	022006	HX103/32	5996274	105	022152	HX18N52	5995930	105	024616	T40011/4	6000039	191
0202388	A12575X200	5968908	163	022007	HX107/64	5996310	105	022201	HX15A	5996320	106	024620	T40015/16	5999952	191
0202395	A12575X250	5968912	163	022008	HX101/8	5996326	105	022202	HX15B	5996329	106	024622	T400111/32	5999889	191
0202401	A12575X315	5968954	163	022009	HX109/64	5996318	105	022203	HX15C	5996332	106	024624	T40013/8	5999946	191
0202418	A12570X200	5968902	163	022010	HX105/32	5996295	106	022204	HX15D	5996334	106	024632	T40011/2	6000033	191
0202425	A12570X250	5968904	163	022011	HX1011/64	5996397	106	022206	HX15F	5996340	106	024636	T40019/16	5999975	191
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0202449	A12585X250	5968981	164	022013	HX1013/64	5996407	106	022208	HX15H	5996345	106	026050	5ATS50	6001263	180
0202456	A12585X315	5968985	164	022014	HX107/32	5996307	106	022209	HX15I	5996346	106	026055	5ATS55	6001267	180
0202463	A12580X250	5968970	164	022015	HX1015/64	5996413	106	022210	HX15J	5996349	106	026060	5ATS60	6001278	180
0202470	A12580X315	5968974	164	022016	HX101/4	5996282	106	022211	HX15K	5996352	106	026065	5ATS65	6001283	180
0202487	A12580X400	5968977	164	022017	HX1017/64	5996241	106	022212	HX15L	5996359	106	026068	5ATS68	6001287	180
0202494	A12595X250	5969010	164	022018	HX109/32	5996314	106	022213	HX15M	5996362	106	026070	5ATS70	6001291	180
0202500	A12595X315	5969015	164	022019	HX1019/64	5996247	106	022214	HX15N	5996366	106	026075	5ATS75	6001298	180
0202517	A12590X250	5968990	164	022020	HX105/16	5996290	106	022215	HX15O	5996370	106				

EDP NUMBER INDEX - 026260 - 032310

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
026125	5ATS125	6001486	181	0028841	A100N22	5966970	98	029073	2AB73	6000661	99	0029282	A100N62	5966678	96
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026138	5ATS138	6001495	181	0028889	A100N26	5966984	98	0029077	A100N43	5967050	97	0029305	A100N64	5966694	96
026140	5ATS140	6001497	181	0028896	A100N27	5966988	98	029078	2AB78	5999592	99	029312	A100N65	5966698	96
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026145	5ATS145	6001501	181	0028919	A100N29	5966998	97	029080	2AB80	5999717	99	0029336	A100N67	5966706	96
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0028742	A100N13	5966918	98	029061	2AB61	6000608	99	029262	2AB175	6000490	97	0030233	A17015/16	5968892	193
0028759	A100N14	5966922	98	029062	2AB62	6000611	99	029264	2AB195	6000498	97	0030240	A170160	5968895	192
0028766	A100N15	5966927	98	029063	2AB63	6000614	99	0029268	A100N60	5966669	96	0030257	A170165	5968899	192
0028773	A100N16	5966932	98	029064	2AB64	6000618	99	029268	2AB235	6000554	97	0030264	A170170	5968702	192
0028780	A100N17	5966937													

EDP NUMBER INDEX - 0032312 - 0036952

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0030332	A170195	5968722	192	0033050	H8531/2	5988126	33	0033883	A350315	5969844	182	034519	D444S	6001932	201
0030349	A17019/32	5968725	192	0033067	H85317/32	5987992	33	0033890	A350320	5969848	182	034520	D444T	6001934	201
0030356	A170200	5968729	192	0033074	H8539/16	5988093	33	0033906	A350330	5969852	182	034521	D444U	6001938	201
0030363	A170210	5968733	193	0033081	H85339/64	5988072	33	0033913	A350340	5969855	182	034526	D444Z	6001940	201
0030370	A17021/32	5968738	192	0033098	H85341/64	5988076	34	0033920	A350350	5969859	182	034601	D444N1	6001851	200
0030387	A170220	5968745	193	0033104	H85311/16	5988129	34	0033937	A350360	5969863	182	034603	D444N3	6001907	200
0030394	A170230	5968749	193	0033110	4ASMC0110	6000863	147	0033944	A350370	5969867	182	034607	D444N7	6001918	200
0030400	A17023/32	5968754	192	0033111	H85323/32	5988025	34	0033951	A350380	5969871	182	034609	D444N9	6001920	200
0030417	A170240	5968758	193	0033112	4ASMC0112	6000925	147	0033968	A350390	5969874	182	034610	D444N10	6001856	200
0030424	A170250	5968766	193	0033115	4ASMC0115	6000959	147	0033975	A350400	5969882	182	034611	D444N11	6001861	200
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0030448	A17027/32	5968776	193	0033135	H85351/64	5988083	34	0033999	A350420	5969889	182	034614	D444N14	6001875	200
0030455	A17031/32	5968793	193	0033142	H85327/32	5988045	34	0034002	A350430	5969893	182	034615	D444N15	6001879	200
0030462	A1703/4	5968788	192	0033159	H85357/64	5988086	34	0034019	A350440	5969897	182	034617	D444N17	6001882	200
0030479	A17041/64	5968823	192	0033166	H85359/64	5988089	34	0034026	A350450	5969902	182	034618	D444N18	6001886	200
0030486	A17051/64	5968853	193	0033173	H85331/32	5988064	35	0034033	A350460	5969905	182	034619	D444N19	6001892	200
0030493	A17057/64	5968868	193	0033180	H85311/64	5987965	35	0034040	A350470	5969909	182	034620	D444N20	6001895	200
0030509	A1705/8	5968848	192	0033197	H85313/64	5988123	35	0034057	A350480	5969912	182	034621	D444N21	6001898	200
0030516	A1707/8	5969793	193	0033200	4ASMC0120	6000979	147	0034071	A35050	5969914	180	034625	D444N25	6001901	200
0030523	A1709/16	5969849	192	0033210	H85313/32	5988118	35	0034088	A35055	5969918	180	034629	D444N29	6001904	200
0030547	A190201	5969724	228	0033227	H85311/8	5988007	35	0034095	H8551/2	5988109	36	034630	D444N30	6001912	200
0030554	A190202	5969728	228	0033234	H853111/64	5988053	35	0034101	A350500	5970204	182	034632	D444N32	6001915	200
0030561	A190203	5969732	228	0033241	A350100	5969555	180	0034118	A35060	5970237	180	0034699	H8559/16	5988785	36
0030578	A190204	5969738	228	0033265	A350102	5969559	180	0034125	A35067	5970279	180	0034705	H85539/64	5988759	36
0030585	A190206	5969747	228	0033289	A350105	5969564	180	0034132	H85517/32	5988878	36	0034712	H85541/64	5988762	37
0030608	A191413	5969772	228	0033296	A350107	5969571	180	0034135	2A135	6000679	101	0034736	H85511/16	5988112	37
0030615	A191419	5969777	228	0033319	A350110	5969575	180	0034140	2A140	6000683	101	0034743	H85523/32	5988703	37
0032230	4ASMC023	6001006	147	0033333	A350115	5969581	181	0034145	2A145	6000687	101	0034798	H85549/64	5988766	37
0032250	4ASMC025	6001014	147	0033340	A3501175	5969585	181	0034149	A35068	5970322	180	0034804	H85551/64	5988770	37
0032268	R9501524	5988678	21	0033357	A350118	5969590	181	0034150	2A150	6000691	101	0034811	H85527/32	5988726	37
0032275	R9501608	5988702	22	0033364	A350120	5969595	181	0034156	A35070	5970363	180	0034835	H85557/64	5988774	37
0032282	R950163	5988725	22	0033395	A350125	5969600	181	0034163	A35075	5970371	180	0034842	H85559/64	5988778	37
0032299	R950176	5988891	22	0033401	A350130	5969605	181	0034187	A35080	5970375	180	0034859	H85531/32	5988751	38
0032300	4ASMC030	6001019	147	0033418	A350135	5969609	181	0034200	A35084	5970378	180	0034866	H85511/64	5988095	38
0032305	R9501925	5988756	22	0033425	H85313/16	5988091	35	0034217	A35085	5970382	180	0034873	H85513/64	5988106	38
0032310	4ASMC031	6001024	147	0033432	A350140	5969613	181	0034224	A350875	5970207	180	0034897	H85513/32	5988104	38
0032312	R950193	5988760	22	0033449	A3501425	5969621	181	0034248	A35090	5970209	180	0034903	H85511/8	5988097	38
0032320	4ASMC032	6001030	147	0033456	A350145	5969625	181	0034279	A35095	5970211	180	0034934	H85511/64	5988099	38
0032329	R9501935	5988764	22	0033463	A3501475	5969630	181	0034293	A35098	5970215	180	0034965	H85513/16	5988101	38
0032330	4ASMC033	6000870	147	0033470	A350150	5969635	181	0034408	D4441/8	6001948	200	0036174	A510100	5970046	74
0032336	R950225	5988810	22	0033487	A3501525	5969638	181	0034409	D4449/64	6001721	200	0036181	A510101	5970051	74
0032340	4ASMC034	6000875	147	0033494	A350155	5969642	181	0034410	D4445/32	6001707	200	0036198	A510102	5970055	74
0032343	R9502565	5988847	23	0033500	A3501575	5969647	181	0034411	D44411/64	6001953	200	0036204	A510103	5970066	74
0032350	R9601524	5988729	24	0033517	A350160	5969651	181	0034412	D4443/16	6001853	200	0036211	A510104	5970069	74
0032350	4ASMC035	6000884	147	0033524	A3501625	5969655	181	0034413	D44413/64	6001959	200	0036228	A510105	5970073	74
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0032367	R9601608	5988769	25	0033548	A3501675	5969663	181	0034415	D44415/64	6001969	200	0036242	A510107	5970081	74
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0032570	4ASMC057	6000946	147	0033746	A350235	5969756	182	0034502	D444B	6001966	200	0036426	A510125	5970489	75
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0032650	4ASMC065	6000953	147	0033777	A350250	5969780	182	0034507	D444G	6001981	200	0036457	A510128	5970530	75
0032680	4ASMC068	6000955	147	0033784	A350255	5969786	182	0034508	D444H	6001821	201	00			

EDP NUMBER INDEX - 0036969 - 040563

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0036563.....	A51037.....	5970448.....	73	0038055.....	R950152.....	5988674.....	21	0038987.....	A52038.....	5970576.....	66	0039762.....	R960187.....	5988856.....	25
0036570.....	A51038.....	5970453.....	73	0038062.....	R950156.....	5988683.....	22	0038994.....	A52039.....	5970578.....	66	0039779.....	R960189.....	5988863.....	25
0036587.....	A51039.....	5970457.....	73	0038079.....	R950157.....	5988687.....	22	0039007.....	A52040.....	5970462.....	66	0039786.....	R960191.....	5988871.....	25
0036594.....	A51040.....	5970472.....	73	0038086.....	R950161.....	5988710.....	22	0039014.....	A52041.....	5970466.....	66	0039793.....	R960192.....	5988875.....	25
0036600.....	A51041.....	5970475.....	73	0038093.....	R950162.....	5988715.....	22	0039021.....	A52042.....	5970469.....	66	0039809.....	R960196.....	5988544.....	25
0036617.....	A51042.....	5970478.....	73	0038109.....	R950166.....	5988749.....	22	0039038.....	A52043.....	5970471.....	66	0039816.....	R960197.....	5988587.....	25
0036624.....	A51043.....	5970481.....	73	0038116.....	R950167.....	5988790.....	22	0039045.....	A52044.....	5970474.....	66	0039823.....	R960227.....	5988458.....	25
0036631.....	A51044.....	5970486.....	73	0038123.....	R950171.....	5988873.....	22	0039052.....	A52045.....	5970477.....	66	0039830.....	R960235.....	5988466.....	25
0036648.....	A51045.....	5970491.....	73	0038130.....	R950172.....	5988881.....	22	0039069.....	A52046.....	5970480.....	66	0039847.....	R960245.....	5988483.....	26
0036655.....	A51046.....	5970494.....	73	0038147.....	R950177.....	5988894.....	22	0039076.....	A52047.....	5970485.....	66	0039854.....	R960255.....	5988499.....	26
0036662.....	A51047.....	5970497.....	73	0038154.....	R950181.....	5988706.....	22	0039083.....	A52048.....	5970488.....	66	0039878.....	R960265.....	5988519.....	26
0036679.....	A51048.....	5970500.....	73	0038161.....	R950182.....	5988713.....	22	0039090.....	A52049.....	5970490.....	66	0039885.....	R960275.....	5988528.....	26
0036686.....	A51049.....	5970504.....	73	0038178.....	R950186.....	5988723.....	22	0039106.....	A52050.....	5970493.....	66	0039892.....	R960285.....	5988540.....	26
0036693.....	A51050.....	5970507.....	73	0038185.....	R950187.....	5988728.....	22	0039113.....	A52051.....	5970496.....	66	0039908.....	R960295.....	5988552.....	26
0036709.....	A51051.....	5970509.....	73	0038192.....	R950189.....	5988733.....	22	0039120.....	A52052.....	5970499.....	66	040003.....	R403/64.....	5998475.....	130
0036716.....	A51052.....	5970512.....	73	0038208.....	R950191.....	5988745.....	22	0039137.....	A52053.....	5970502.....	66	040004.....	R401/16.....	5998567.....	130
0036723.....	A51053.....	5970515.....	73	0038215.....	R950192.....	5988752.....	22	0039144.....	A52054.....	5970505.....	66	040005.....	R405/64.....	5998532.....	130
0036730.....	A51054.....	5970518.....	73	0038222.....	R950196.....	5988771.....	22	0039151.....	A52055.....	5970508.....	66	040006.....	R403/32.....	5998638.....	130
0036747.....	A51055.....	5970525.....	73	0038239.....	R950197.....	5988775.....	22	0039168.....	A52056.....	5970511.....	67	040007.....	R407/64.....	5998576.....	130
0036754.....	A51056.....	5970307.....	74	0038246.....	R950227.....	5988814.....	22	0039175.....	A52057.....	5970516.....	67	040008.....	R401/8.....	5998575.....	131
0036761.....	A51057.....	5970354.....	74	0038253.....	R950235.....	5988820.....	22	0039182.....	A52058.....	5970519.....	67	040009.....	R409/64.....	5998592.....	131
0036778.....	A51058.....	5970393.....	74	0038260.....	R950245.....	5988837.....	23	0039199.....	A52059.....	5970521.....	67	040010.....	R405/32.....	5998527.....	131
0036785.....	A51059.....	5970424.....	74	0038277.....	R950255.....	5988843.....	23	0039205.....	A52060.....	5970532.....	67	040011.....	R401/64.....	5998587.....	131
0036792.....	A51060.....	5970456.....	74	0038284.....	R950265.....	5988858.....	23	0039212.....	A52061.....	5970537.....	67	040012.....	R403/16.....	5998634.....	131
0036808.....	A51061.....	5970459.....	74	0038291.....	R950275.....	5988865.....	23	0039229.....	A52062.....	5970539.....	67	040013.....	R4013/64.....	5998608.....	131
0036815.....	A51062.....	5970463.....	74	0038307.....	R950285.....	5988844.....	23	0039236.....	A52063.....	5970541.....	67	040014.....	R407/32.....	5998574.....	131
0036822.....	A51063.....	5970313.....	74	0038314.....	R950295.....	5988906.....	23	0039243.....	A52064.....	5970543.....	67	040015.....	R4015/64.....	5998619.....	131
0036839.....	A51064.....	5970317.....	74	0038338.....	R960121.....	5988923.....	24	0039250.....	A52065.....	5970547.....	67	040016.....	R401/4.....	5998572.....	131
0036846.....	A51065.....	5970321.....	74	0038376.....	R960122.....	5988924.....	24	0039267.....	A52066.....	5970549.....	67	040017.....	R4017/64.....	5998625.....	131
0036853.....	A51066.....	5970325.....	74	0038413.....	R960126.....	5988926.....	24	0039274.....	A52067.....	5970551.....	67	040018.....	R409/32.....	5998585.....	131
0036860.....	A51067.....	5970329.....	74	0038437.....	R960128.....	5988927.....	24	0039281.....	A52068.....	5970553.....	67	040019.....	R4019/64.....	5998633.....	131
0036877.....	A51068.....	5970332.....	74	0038451.....	R960129.....	5988929.....	24	0039298.....	A52069.....	5970555.....	67	040020.....	R405/16.....	5998523.....	131
0036884.....	A51069.....	5970336.....	74	0038468.....	R960132.....	5988737.....	24	0039304.....	A52070.....	5970557.....	67	040021.....	R4021/64.....	5998645.....	131
0036891.....	A51070.....	5970340.....	74	0038499.....	R960136.....	5988839.....	24	0039311.....	A52071.....	5970559.....	67	040022.....	R4011/32.....	5998584.....	131
0036907.....	A51071.....	5970345.....	74	0038529.....	R960137.....	5988883.....	24	0039328.....	A52072.....	5970561.....	67	040023.....	R4023/64.....	5998655.....	132
0036914.....	A51072.....	5970350.....	74	0038543.....	R960138.....	5988889.....	24	0039335.....	A52073.....	5970563.....	67	040024.....	R403/8.....	5998478.....	132
0036921.....	A51073.....	5970359.....	74	0038567.....	R960141.....	5988897.....	24	0039342.....	A52074.....	5970565.....	67	040025.....	R4025/64.....	5998507.....	132
0036938.....	A51074.....	5970362.....	74	0038574.....	R960142.....	5988692.....	24	0039359.....	A52075.....	5970569.....	67	040026.....	R4013/32.....	5998605.....	132
0036945.....	A51075.....	5970365.....	74	0038581.....	R960146.....	5988700.....	24	0039366.....	A52076.....	5969952.....	67	040027.....	R4027/64.....	5998588.....	132
0036952.....	A51076.....	5970369.....	74	0038598.....	A520100.....	5970290.....	68	0039373.....	A52077.....	5969987.....	67	040028.....	R407/16.....	5998571.....	132
0036969.....	A51077.....	5970372.....	74	0038604.....	A520101.....	5970294.....	68	0039380.....	A52078.....	5970042.....	67	040029.....	R4029/64.....	5998631.....	132
0036976.....	A51078.....	5970379.....	74	0038611.....	A520102.....	5970298.....	68	0039397.....	A52079.....	5970092.....	67	040030.....	R4015/32.....	5998616.....	132
0036983.....	A51079.....	5970383.....	74	0038628.....	A520103.....	5970302.....	68	0039403.....	A52080.....	5970143.....	67	040031.....	R4031/64.....	5998484.....	132
0036990.....	A51080.....	5970391.....	74	0038635.....	A520104.....	5970174.....	68	0039410.....	A52081.....	5970147.....	67	040032.....	R401/2.....	5998570.....	132
0037003.....	A51081.....	5970395.....	74	0038642.....	A520105.....	5970178.....	68	0039427.....	A52082.....	5970152.....	67	040033.....	R4033/64.....	5998487.....	132
0037010.....	A51082.....	5970398.....	74	0038659.....	A520106.....	5970180.....	68	0039434.....	A52083.....	5969954.....	67	040034.....	R4017/32.....	5998621.....	132
0037027.....	A51083.....	5970400.....	74	0038666.....	A520107.....	5970182.....	68	0039441.....	A52084.....	5969957.....	67	040035.....	R4035/64.....	5998490.....	132
0037034.....	A51084.....	5970404.....	74	0038673.....	A520108.....	5970184.....	68	0039458.....	A52085.....	5969960.....	67	040036.....	R409/16.....	5998582.....	132
0037041.....	A51085.....	5970406.....	74	0038680.....	A520109.....	5970186.....	68	0039465.....	A52086.....	5969963.....	67	040037.....	R4037/64.....	5998493.....	132
0037058.....	A51086.....	5970410.....	74	0038697.....	A520110.....	5970188.....	68	0039472.....	A52087.....	5969966.....	67	040038.....	R4019/32.....	5998629.....	132
0037065.....	A51087.....	5970413.....	74	0038703.....	A520111.....	5970189.....	68	0039489.....	A52088.....	5969969.....	67	040039.....	R4039/64.....	5998496.....	132
0037072.....	A51088.....	5970416.....	74	0038710.....	A520112.....	5970190.....	68	0039496.....	A52089.....	5969972.....	67	040040.....	R405/8.....	5998538.....	132
0037089.....	A51089.....	5970419.....	74	0038727.....	A520113.....	5970191.....	68	0039502.....	A52090.....	5969975.....	67	040041.....	R4041/64.....	5998499.....	132
0037096.....	A51090.....	5970422.....	74	0038734.....	A520114.....	5970193.....	68	0039519.....	A52091.....	5969979.....	67	040042.....	R4021/32.....	5998641.....	132
0037102.....	A51091.....	5970425.....	74	0038741.....	A520115.....	5970194.....	68	0039526.....	A52092.....	5969983.....	67	040043.....	R4043/64.....	5998503.....	132
0037119.....	A51092.....	5970428.....	74	0038758.....	A520116.....	5970195.....	68	0039533.....	A52093.....	5969990.....	67	040044.....	R4011/16.....	5998578.....	132
0037126.....	A51093.....	5970430.....	74	0038765.....	A520117.....	5970196.....	68	0039540.....	A52094.....	5969997.....	67	040304.....	M40CO1/16.....	5996129.....	144
0037133.....	A51094.....	5970432.....	74	0038772.....	A520118.....	5970197.....	68	0039557.....	A52095.....	5970004.....	67	040305.....	M40CO5/64.....	5995991.....	144
0037140.....	A51095.....	5970434.....	74	0038789.....	A520119.....	5970198.....	68	0039564.....	A52096.....	5970009.....	67	040306.....	M40CO3/32.....	5995958.....	144
0037157.....	A51096.....	5970436.....	74	0038796.....	A520120.....	5970201.....	68	0039571.....	A52097.....	5970014.....	67	040307.....	M40CO7/64.....	5996005.....	144
0037164.....	A51097.....	5970438.....	74	0038802.....	A520121.....	5970202.....	68	0039588.....	A52098.....	5970018.....	67	040308.....	M40CO1/8.....	5996145.....	145
0037171.....	A51098.....	5970440.....	74	0038819.....	A520122.....	5970205.....	68	0039595.....	A52099.....	5970022.....	67	040309.....	M40CO9/64.....	5996019.....	145
0037188.....	A51099.....	5970442.....	74	0038826.....	A520123.....	5970208.....	68	0039601.....	R960147.....	5988705.....	24	040310.....	M40CO5/32.....	5995987.....	145
0037904.....	R950121.....	5988627.....	21	0038833.....	A520124.....	5970210.....	68	0039618.....	R960148.....	5988709.....	24	040311.....	M40CO11/64.....	5995976.....	145
0037911.....	R950122.....	5988630.....	21	0038840.....	A520125.....	5970213.....	68	0039625.....	R960151.....	5988719.....	24	040312.....	M40CO3/16.....	5995954.....	145
0037928.....	R950126.....	5988640.....	21	0038857.....	A520126.....	5970216.....	68	0039632.....	R960152.....	5988724.....	24	040313.....	M40CO13/64.....	5996054.....	145
0037935.....	R950128.....	5988641.....	21	0038864.....											

EDP NUMBER INDEX - 0040577 - 041831

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
040326	M40CO13/32	5996011	146	040751	A530115	5970062	181	041031	R41N31	5998865	131	0041321	R453N	5979708	58
040327	M40CO27/64	5995950	146	040768	A5301175	5970067	181	041032	R41N32	5998868	130	041321	M41CON21	5996175	145
040328	M40CO7/16	5995998	146	040775	A530120	5970071	181	041033	R41N33	5998872	130	041322	M41CON22	5996181	145
040329	M40CO29/64	5995952	146	040799	A530125	5970075	181	041034	R41N34	5998875	130	041323	M41CON23	5996183	145
040330	M40CO15/32	5996063	146	040804	R40C1/16	5999397	136	041035	R41N35	5998883	130	041324	M41CON24	5996185	145
040331	M40CO31/64	5995964	146	040805	R40C5/64	5999447	136	041036	R41N36	5999227	130	041325	M41CON25	5996188	145
040332	M40CO1/2	5996133	146	040806	R40C3/32	5999441	136	041037	R41N37	5999273	130	041326	M41CON26	5996017	145
0040393	R453N30	5979877	56	040807	R40C7/64	5999450	136	041038	R41N38	5999315	130	041327	M41CON27	5996021	145
0040409	R453N29	5980039	56	040808	R40C1/8	5999409	137	041039	R41N39	5999357	130	041328	M41CON28	5996027	145
0040416	R453N28	5980036	56	040809	R40C9/64	5999452	137	041040	R41N40	5999411	130	041329	M41CON29	5996031	145
0040423	R453N27	5980032	56	040810	R40C5/32	5999446	137	041041	R41N41	5999414	130	041330	M41CON30	5996041	145
0040430	R453N26	5980028	56	040811	R40C11/64	5999415	137	041042	R41N42	5999417	130	041331	M41CON31	5996045	145
0040447	R453N25	5980021	56	040812	A530130	5970079	181	041043	R41N43	5999420	130	041332	M41CON32	5996049	145
0040454	R453N24	5979982	56	040812	R40C3/16	5999440	137	041044	R41N44	5999233	130	041333	M41CON33	5996052	144
0040461	R453N23	5979939	56	040813	R40C13/64	5999421	137	041045	R41N45	5999237	130	041334	M41CON34	5996057	144
0040478	R453N22	5979903	56	040814	R40C7/32	5999449	137	041046	R41N46	5999241	130	041335	M41CON35	5996065	144
0040485	R453N21	5979867	56	040815	R40C15/64	5999425	137	041047	R41N47	5999245	130	041336	M41CON36	5996069	144
0040492	R453N20	5979764	56	040816	R40C1/4	5999406	137	041048	A530200	5970243	181	041337	M41CON37	5996073	144
0040508	R453N19	5979757	56	040817	R40C17/64	5999427	137	041048	R41N48	5999249	130	0041338	R453O	5979897	58
0040515	R453N18	5979754	56	040818	R40C9/32	5999451	137	041049	R41N49	5999253	130	041338	M41CON38	5996076	144
0040522	R453N17	5979751	56	040819	R40C19/64	5999429	137	041050	R41N50	5999260	130	041339	M41CON39	5996079	144
0040539	R453N16	5979745	57	040820	R40C5/16	5999444	137	041051	R41N51	5999264	130	041340	M41CON40	5996085	144
0040545	R4045/64	5998510	132	040821	R40C21/64	5999433	137	041052	R41N52	5999268	130	041341	M41CON41	5996089	144
0040546	R453N15	5979740	57	040822	R40C11/32	5999412	137	041053	R41N53	5999277	130	041342	M41CON42	5996091	144
0040546	R4023/32	5998649	132	040823	R40C23/64	5999435	138	041054	R41N54	5999281	130	041343	M41CON43	5996095	144
0040547	R4047/64	5998514	132	040824	R40C3/8	5999442	138	0041055	A530205	5970284	181	041344	M41CON44	5996101	144
0040548	R403/4	5998644	132	040825	R40C25/64	5999437	138	041055	R41N55	5999285	130	0041345	R453Q	5979900	58
0040549	R4049/64	5998518	132	040826	R40C13/32	5999418	138	041056	R41N56	5999289	130	041345	M41CON45	5996103	144
0040550	R4025/32	5998471	132	040827	R40C27/64	5999438	138	041057	R41N57	5999293	130	041346	M41CON46	5996106	144
0040551	R4051/64	5998541	132	040828	R40C7/16	5999448	138	041058	R41N58	5999297	130	041347	M41CON47	5996109	144
0040552	R4013/16	5998602	132	0040829	A530135	5970084	181	041059	R41N59	5999301	130	041348	M41CON48	5996114	144
0040553	R453N14	5979736	57	040829	R40C29/64	5999439	138	041060	R41N60	5999309	130	041349	M41CON49	5996118	144
0040553	R4053/64	5998545	132	040830	R40C15/32	5999423	138	041062	A530210	5970327	181	041350	M41CON50	5996126	144
0040554	R4027/32	5998553	132	040831	R40C31/64	5999443	138	0041079	A530215	5970368	181	041351	M41CON51	5996130	144
0040555	R4055/64	5998549	132	040832	R40C1/2	5999400	138	041086	A530220	5970377	181	0041352	R453T	5979906	58
0040556	R407/8	5998579	132	0040836	A530140	5970087	181	041093	A530225	5970381	181	041352	M41CON52	5996134	144
0040557	R4057/64	5998559	132	0040850	A530145	5970095	181	0041109	A530230	5970384	182	041353	M41CON53	5996142	144
0040558	R4029/32	5998624	132	0040874	A530150	5970098	181	0041116	A530235	5970387	182	041354	M41CON54	5996146	144
0040559	R4059/64	5998562	132	0040881	A5301525	5970101	181	0041123	A530240	5970212	182	041355	M41CON55	5996150	144
0040560	R453N13	5979732	57	0040898	A530155	5970105	181	0041130	A530245	5970214	182	041356	M41CON56	5996154	144
0040560	R4015/16	5998611	132	0040911	A530160	5970108	181	0041147	A530250	5970217	182	041357	M41CON57	5996158	144
0040561	R4061/64	5998565	132	0040935	A530165	5970114	181	0041154	A530255	5970220	182	041358	M41CON58	5996162	144
0040562	R4031/32	5998481	132	0040942	A530170	5970117	181	0041161	A530260	5970223	182	041359	M41CON59	5996164	144
0040563	R4063/64	5998568	132	0040966	A530175	5970121	181	0041178	A530265	5970226	182	041360	M41CON60	5996169	144
0040577	R453N12	5979729	57	0040980	A530180	5970125	181	0041185	A530270	5970229	182	0041369	R453U	5979909	58
0040584	R453N11	5979724	57	0040997	A530185	5970129	181	0041192	A530275	5970231	182	0041376	R453X	5979912	58
0040591	R453N10	5979717	57	041001	R41N1	5998771	131	041208	A530280	5970235	182	0041383	R453Y	5979916	58
040600	R401	5998671	132	041002	R41N2	5998820	131	0041215	A530285	5970238	182	0041390	R453Z	5979918	58
040604	R4011/16	5998505	132	041003	R41N3	5998858	131	0041222	A530290	5970246	182	0041406	R454N30	5980077	56
0040607	R453N9	5979894	57	041004	R41N4	5999405	131	0041239	A530295	5970250	182	0041413	R454N29	5980086	56
040608	R4011/8	5998517	132	041005	R41N5	5999256	131	0041246	A530300	5970253	182	0041420	R454N28	5979966	56
040612	R4013/16	5998536	132	041006	R41N6	5999305	131	0041253	A530310	5970257	182	0041437	R454N27	5979924	56
0040614	R453N8	5979891	57	041007	R41N7	5999312	131	0041260	A530320	5970262	182	0041444	R454N26	5979572	56
040616	R4011/4	5998513	132	041008	R41N8	5999319	131	0041277	A53085	5970277	180	0041451	R454N25	5979565	56
040620	R4015/16	5998551	132	041009	R41N9	5999322	131	0041284	A53090	5970281	180	041468	R454N24	5979561	56
0040621	R453N7	5979888	57	041010	R41N10	5998776	131	0041291	R453H	5979700	57	0041475	R454N23	5979558	56
040624	R4013/8	5998544	132	041011	R41N11	5998780	131	041301	M41CON1	5996023	145	0041482	R454N22	5979556	56
040628	R4017/16	5998558	132	041012	R41N12	5998785	131	041302	M41CON2	5996098	145	0041499	R454N21	5979553	56
040632	R4011/2	5998509	132	041013	R41N13	5998789	131	041303	M41CON3	5996035	145	0041505	R454N20	5979550	56
040636	R4019/16	5998564	132	041014	R41N14	5998793	131	041304	M41CON4	5996081	145	0041512	R454N19	5979544	56
0040638	R453N6	5979886	57	041015	R41N15	5998797	131	041305	M41CON5	5996122	145	0041529	R454N18	5979541	56
040640	R4015/8	5998555	132	041016	R41N16	5998801	131	041306	M41CON6	5996166	145	0041536	R454N17	5979537	56
0040645	R453N5	5979883	57	0041017	A530190	5970135	181	0041307	R453L	5979702	57	0041543	R454N16	5979533	57
040648	R4013/4	5998540	132	041017	R41N17	5998807	131	041307	M41CON7	5996172	145	0041550	R454N15	5979531	57
0040652	R453N4	5979880	57	041018	R41N18	5998813	131	041308	M41CON8	5996178	145	0041567	R454N14	5979529	57
040652	R40113/16	5998526	132	041019	R41N19	5998817	131	041309	M41CON9	5996489	145	0041574	R454N13	5979527	57
040656	R4017/8	5998561	132	041020	R41N20	5998823	131	041310	M41CON10	5996026	145	0041581	R454N12	5979525	57
040660	R40115/16	5998531	132	041021	R41N21	5998826	131	041311	M41CON11	5996030	145	0041598	R454N11	5979522	57
0040669	R453N3	5979873	57	041022	R41N22	5998830	131	041312	M41CON12	5996034	145	0041604	R454N10	5979519	57
0040676	R453N2	5979760	57	041023	R41N23	5998833	131	041313	M41CON13	5996038	145	0041611	R454N9	5979937	57
0040683	R453N1	5979712	57	0041024	A530195	5970206	181	0041314							

EDP NUMBER INDEX - 041832 - 0046449

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
041701.....	ATR41N1.....	5989076	223	041859.....	R41CN59.....	5998665	136	042308.....	M42COH.....	5996664	145	042822.....	R42CV.....	5999047	138
041702.....	ATR41N2.....	5995742	223	041860.....	R41CN60.....	5998673	136	042309.....	M42COI.....	5996493	145	042823.....	R42CW.....	5999052	138
0041703.....	R454A.....	5979491	57	0041864.....	R457N27.....	5979331	47	042310.....	M42COJ.....	5996497	145	042824.....	R42CX.....	5999056	138
041703.....	ATR41N3.....	5995783	223	0041871.....	R457N26.....	5979324	47	0042311.....	R458N25.....	5980207	47	042825.....	R42CY.....	5999060	138
041704.....	ATR41N4.....	5995826	223	0041888.....	R457N25.....	5979321	47	042311.....	M42COK.....	5996500	145	042826.....	R42CZ.....	5998903	138
0041710.....	R454D.....	5979495	57	0041895.....	R457N24.....	5979318	47	042312.....	M42COL.....	5996503	145	0044988.....	A72015.....	5971007	143
0041727.....	R454H.....	5979499	57	0041901.....	R457N23.....	5979315	47	042313.....	M42COM.....	5996506	145	0044995.....	A72018.....	5971205	143
0041734.....	R454L.....	5979503	57	0041918.....	R457N22.....	5979312	47	042314.....	M42CON.....	5996509	145	0045008.....	A7202.....	5971249	143
0041741.....	R454M.....	5979510	58	0041925.....	R457N21.....	5979309	47	042315.....	M42COO.....	5996512	145	0045015.....	A72022.....	5971292	143
0041758.....	R454N.....	5979513	58	0041932.....	R457N20.....	5979306	47	042316.....	M42COP.....	5996515	145	0045022.....	A72025.....	5971298	143
0041765.....	R454O.....	5979940	58	0041949.....	R457N19.....	5979300	47	042317.....	M42COQ.....	5996518	145	0045039.....	A72028.....	5971303	143
0041772.....	R454Q.....	5979944	58	0041956.....	R457N18.....	5979297	47	042318.....	M42COR.....	5996521	145	0045046.....	A7203.....	5971306	143
0041789.....	R454T.....	5979947	58	0041963.....	R457N17.....	5979291	47	042319.....	M42COS.....	5996529	145	0045053.....	A72035.....	5971122	143
0041796.....	R454U.....	5979949	58	0041970.....	R457N16.....	5979289	48	042320.....	M42COT.....	5996532	146	0045060.....	A72038.....	5971125	143
041801.....	R41CN1.....	5998595	137	0041987.....	R457N15.....	5979286	48	042321.....	M42COU.....	5996536	146	0045077.....	A72039.....	5971128	143
0041802.....	R454X.....	5979952	58	0041994.....	R457N14.....	5979284	48	042322.....	M42COV.....	5996540	146	0045084.....	A7204.....	5971131	143
041802.....	R41CN2.....	5998566	137	042001.....	R42A.....	5999326	131	042323.....	M42COW.....	5996544	146	0045107.....	A72045.....	5971135	143
041803.....	R41CN3.....	5998543	137	042002.....	R42B.....	5999330	131	042324.....	M42COX.....	5996548	146	0045114.....	A7205.....	5971139	143
041804.....	R41CN4.....	5998583	137	042003.....	R42C.....	5999334	131	042325.....	M42COY.....	5996553	146	0045121.....	A7206.....	5971148	143
041805.....	R41CN5.....	5998618	137	042004.....	R42D.....	5998908	131	042326.....	M42COZ.....	5996557	146	0045190.....	A730100.....	5971219	189
041806.....	R41CN6.....	5998669	137	042006.....	R42F.....	5998915	131	0042328.....	R458N24.....	5980204	47	0045206.....	A730102.....	5971222	189
041807.....	R41CN7.....	5998676	137	0042007.....	R457N13.....	5979281	48	0042335.....	R458N23.....	5980201	47	0045213.....	A730105.....	5971226	189
041808.....	R41CN8.....	5998679	137	042007.....	R42G.....	5998919	131	0042342.....	R458N22.....	5980198	47	0045220.....	A730108.....	5971230	189
041809.....	R41CN9.....	5998685	137	042008.....	R42H.....	5998923	131	0042359.....	R458N21.....	5980192	47	0045237.....	A730110.....	5971235	189
041810.....	R41CN10.....	5998597	137	042009.....	R42I.....	5998927	131	0042366.....	R458N20.....	5980188	47	0045244.....	A730115.....	5971237	189
041811.....	R41CN11.....	5998600	137	042010.....	R42J.....	5998932	131	0042373.....	R458N19.....	5980180	47	0045251.....	A730118.....	5971242	189
041812.....	R41CN12.....	5998603	137	042011.....	R42K.....	5998935	131	0042380.....	R458N18.....	5980176	47	0045268.....	A730120.....	5971246	189
041813.....	R41CN13.....	5998606	137	042012.....	R42L.....	5998938	131	0042397.....	R458N17.....	5980172	47	0045275.....	A730122.....	5971252	189
041814.....	R41CN14.....	5998609	137	042013.....	R42M.....	5998944	131	0042403.....	R458N16.....	5980169	48	0045282.....	A730125.....	5971257	189
041815.....	R41CN15.....	5998613	137	042014.....	R457N12.....	5979279	48	0042410.....	R458N15.....	5980166	48	0045299.....	A730128.....	5971262	189
041816.....	R41CN16.....	5998617	137	042014.....	R42N.....	5998947	131	0042427.....	R458N14.....	5980163	48	0045305.....	A730130.....	5971266	189
041817.....	R41CN17.....	5998620	137	042015.....	R42O.....	5998950	131	0042434.....	R458N13.....	5980160	48	0045312.....	A730135.....	5971269	189
041818.....	R41CN18.....	5998628	137	042016.....	R42P.....	5998951	131	0042441.....	R458N12.....	5980156	48	0045329.....	A730138.....	5971272	189
0041819.....	R454Y.....	5979955	58	042017.....	R42Q.....	5998953	131	0042458.....	R458N11.....	5980153	48	0045336.....	A730140.....	5971276	189
041819.....	R41CN19.....	5998521	137	042018.....	R42R.....	5998955	131	0042465.....	R458N10.....	5980150	48	0045343.....	A7301425.....	5971280	189
041820.....	R41CN20.....	5998601	137	042019.....	R42S.....	5998957	131	0042472.....	R458N9.....	5980253	48	0045350.....	A730145.....	5971284	189
041821.....	R41CN21.....	5998639	137	042020.....	R42T.....	5998959	132	0042489.....	R458N8.....	5980250	48	0045367.....	A7301475.....	5971288	189
041822.....	R41CN22.....	5998682	137	0042021.....	R457N11.....	5979277	48	0042496.....	R458N7.....	5980247	48	0045374.....	A730150.....	5971296	189
041823.....	R41CN23.....	5998688	137	042021.....	R42U.....	5998961	132	0042502.....	R458N6.....	5980243	48	0045381.....	A7301525.....	5971165	189
041824.....	R41CN24.....	5998691	137	042022.....	R42V.....	5998963	132	0042519.....	R458N5.....	5980240	48	0045398.....	A730155.....	5971221	189
041825.....	R41CN25.....	5998694	137	042023.....	R42W.....	5998968	132	0042526.....	R458N4.....	5980237	48	0045404.....	A7301575.....	5971265	189
0041826.....	R454Z.....	5979959	58	042024.....	R42X.....	5998970	132	0042533.....	R458N3.....	5980226	48	0045411.....	A730160.....	5971305	189
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041828.....	R41CN28.....	5998533	137	0042038.....	R457N10.....	5979275	48	0042564.....	R458A.....	5980127	48	0045459.....	A730170.....	5971337	189
041829.....	R41CN29.....	5998537	137	0042045.....	R457N9.....	5979369	48	0042571.....	R458D.....	5980131	48	0045466.....	A7301725.....	5971339	189
041830.....	R41CN30.....	5998547	137	0042052.....	R457N8.....	5979360	48	0042588.....	R458H.....	5980134	48	0045473.....	A730175.....	5971341	189
041831.....	R41CN31.....	5998550	137	0042069.....	R457N7.....	5979357	48	0042595.....	R458L.....	5980136	48	0045480.....	A7301775.....	5971174	189
041832.....	R41CN32.....	5998554	137	0042076.....	R457N6.....	5979353	48	0042601.....	R458M.....	5980139	48	0045497.....	A730180.....	5971179	189
0041833.....	R457N30.....	5979343	47	0042083.....	R457N5.....	5979350	48	0042618.....	R458N.....	5980144	49	0045503.....	A7301825.....	5971184	189
041833.....	R41CN33.....	5998557	137	0042090.....	R457N4.....	5979346	48	0042625.....	R458O.....	5980256	49	0045510.....	A730185.....	5971190	189
041834.....	R41CN34.....	5998560	136	0042106.....	R457N3.....	5979341	48	0042632.....	R458Q.....	5980260	49	0045527.....	A7301875.....	5971194	190
041835.....	R41CN35.....	5998563	136	0042113.....	R457N2.....	5979303	48	0042649.....	R458T.....	5980263	49	0045534.....	A730190.....	5971199	190
041836.....	R41CN36.....	5998569	136	0042120.....	R457N1.....	5979273	48	0042656.....	R458U.....	5980266	49	0045541.....	A7301925.....	5971203	190
041837.....	R41CN37.....	5998573	136	0042137.....	R457A.....	5979254	48	0042663.....	R458X.....	5980271	49	0045558.....	A730195.....	5971208	190
041838.....	R41CN38.....	5998577	136	0042144.....	R457D.....	5979257	48	0042670.....	R458Y.....	5980359	49	0045565.....	A7301975.....	5971213	190
041839.....	R41CN39.....	5998580	136	0042151.....	R457H.....	5979259	48	0042687.....	R458Z.....	5980402	49	0045572.....	A730200.....	5971217	190
0041840.....	R457N29.....	5979338	47	0042168.....	R457L.....	5979262	48	0042694.....	R458108.....	5980378	50	0045589.....	A7302025.....	5971225	190
041840.....	R41CN40.....	5998586	136	0042175.....	R457M.....	5979265	48	042801.....	R42CA.....	5999338	137	0045596.....	A730205.....	5971229	190
041841.....	R41CN41.....	5998589	136	0042182.....	R457N.....	5979271	49	042802.....	R42CB.....	5999342	137	0045602.....	A7302075.....	5971233	190
041842.....	R41CN42.....	5998591	136	0042199.....	R457O.....	5979013	49	042803.....	R42CC.....	5999346	137	0045619.....	A730210.....	5971238	190
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041844.....	R41CN44.....	5998598	136	0042212.....	R457T.....	5979055	49	042806.....	R42CF.....	5999362	137	0045640.....	A730220.....	5971245	190
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041846.....	R41CN46.....	5998607	136	0042236.....	R457X.....	5979117	49	042808.....	R42CH.....	5999373	137	0045688.....	A730230.....	5971254	190
041847.....	R41CN47.....	5998610	136	0042243.....	R457Y.....	5979125	49	042809.....	R42CI.....	5999377	137	0045695.....	A730235.....	5971258	190
041848.....	R41CN48.....	5998612	136	0042250.....	R457Z.....	5979128	49	042810.....	R42CJ.....	5999381	137	0045701.....	A730240.....	5971261	190
041849.....	R41CN49.....	5998615	136	0042267.....	R458N30.....	5980227	47	042811.....	R42CK.....	5999386	137	0045718.....	A730245.....	5971268	190
041850.....	R41CN50.....	5998623	136	0042274.....	R458N29.....	5980221	47	042812.....	R42CL.....	5999390	137				

EDP NUMBER INDEX - 046450 - 0049730

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0045848	A730310	5971314	190	046640	4ASM64	6000410	139	047187	A90080	5970902	79	0047989	A90146	5971750	79
0045862	A730320	5971319	190	046647	A900532	5971240	79	047194	A90081	5970914	79	047996	A90147	5971756	79
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046037	M40CO37/64	5995969	146	046678	A90042	5971120	79	047224	A90021/64	5971483	79	048047	A90152	5971775	79
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046039	M40CO39/64	5995970	146	046685	A90043	5971126	79	047250	4ASM125	6000997	140	048061	A90154	5971608	79
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046041	M40CO41/64	5995972	146	046692	A90011/64	5970728	79	047262	A90086	5970937	79	048085	A90156	5971700	79
046042	M40CO21/32	5995940	146	046700	4ASM70	6000437	139	047286	A90087	5970942	80	048092	A90157	5971744	79
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EDP NUMBER INDEX - 0049747 - 051357

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0048764	B100340	5986222	477	050100	QC91PM100	5997417	157	050914	QC91GN14	5996735	156	051034	R5117/32	5999707	150
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0048887	B10050	5986254	477	050155	QC91PM155	5997962	157	050926	QC91GN26	5996774	155	051044	R5111/16	5999680	150
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0049013	A901105	5971598	80	050230	QC91GM30	5996673	157	050934	QC91GN34	5996907	155	051051	R5151/64	6000237	150
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0049129	B121200	5986803	469	050280	QC91GM80	5996710	157	050944	QC91GN44	5996773	155	051061	A92045	5972333	70
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0049143	B121220	5986442	469	050286	QC91GM86	5996716	157	050946	QC91GN46	5996780	155	051062	R5131/32	5999768	151
0049150	B121230	5986478	469	050290	QC91GM90	5996718	157	050947	QC91GN47	5996788	155	051063	R5163/64	6000255	151
0049167	B121240	5986521	469	050300	QC91GM100	5996668	157	050949	QC91GN49	5996794	155	051078	A92046	5972354	70
0049174	B121250	5986557	469	050305	QC91GM105	5996702	157	050950	QC91GN50	5996801	155	051085	A92047	5972391	70
0049181	B121260	5986591	469	050309	A92012	5972261	69	050951	QC91GN51	5996805	155	051092	A9203/16	5972312	70
0049198	A901108	5971600	80	050316	A92013	5972269	69	050952	QC91GN52	5996809	155	051100	R511	5998971	151
0049211	B121300	5986597	469	050320	QC91GM120	5996789	157	050958	A92037	5972306	70	051101	R5111/64	5998984	151
0049235	A901110	5971601	80	050323	A92014	5972277	69	050965	A92038	5972308	70	051102	R5111/32	5998978	151
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0049303	A901120	5971620	80	050392	B170151	5986229	455	051001	R511/64	5999668	148	051105	R5115/64	5999781	151
0049594	A901125	5971626	80	050491	B170301	5986684	455	051002	R511/32	5999661	148	051106	R5113/32	5999633	151
0049617	B157100	5986588	464	050590	B170851	5986645	455	051003	QC91GN43	5999764	148	051107	R5117/64	5999641	151
0049624	B157110	5986594	464	050644	A9201/16	5972536	69	051004	R511/16	5999654	148	051108	A92048	5972436	70
0049631	B157120	5986724	464	050668	A92016	5972389	69	051005	R515/64	6000231	149	051108	R5111/8	5998987	151
0049648	B15720	5986889	464	050675	A92017	5972434	69	051006	R513/32	5999759	149	051109	R5119/64	5999649	151
0049655	A901130	5971644	80	050682	A92018	5972524	69	051007	R517/64	6000266	149	051110	R5115/32	5999778	151
0049662	A901135	5971648	80	050699	A92019	5972532	69	051008	R511/8	5999672	149	051111	R5111/64	5998990	151
0049679	B15740	5986736	464	050705	A9205/64	5972343	69	051009	A92040	5972334	70	051112	R5113/16	5999004	151
0049686	A901140	5971660	80	050712	A92020	5972340	69	051009	R519/64	6000279	149	051113	R51113/64	5998993	151
0049693	B15750	5986739	464	050729	A92021	5972344	69	051010	R515/32	6000228	149	051114	R5117/32	5999637	151
0049709	A901145	5971664	80	050743	A92022	5972348	69	051011	R5111/64	5999688	149	051115	A92049	5972446	70
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0049723	A901150	5971672	80	050767	A9203/32	5972313	69	051013	R5113/64	5999698	149	051116	R5111/4	5998981	151
0049730	B15770	5986747	464	050781	A92024	5972212	69	051014	R517/32	6000263	149	051120	R5115/16	5999773	151
0049747	B15780	5986751	464	050804	A92025	5972216	69	051015	R5115/64	5999704	149	051122	A92050	5972317	70
0049754	B15790	5986755	464	050811	A92026	5972220	69	051016	A92041	5972336	70	051124	R5113/8	5999745	151
050015	QC91PM15	5997412	157	050828	A92027	5972229	69	051016	R511/4	5999664	150	051128	R5117/16	5999787	151
050020	QC91PM20	5998048	157	050835	A9207/64	5972429	69	051017	R5117/64	5999713	150	051132	R5111/2	5998976	151
050025	QC91PM25	5998052	157	050842	A92028	5972233	69	051018	R519/32	6000276	150	051136	R5119/16	5999645	151
050030	QC91PM30	5997892	157	050859	A92029	5972236	69	051019	R5119/64	5999718	150	051139	A92051	5972319	70
050035	QC91PM35	5997896	157	050866	A92030	5972279	69	051020	R515/16	6000381	150	051140	R5115/8	5999784	151
050040	QC91PM40	5997899	157	050873	A92031	5972282	69	051021	R5121/64	5999725	150	051146	A92013/64	5972459	70
050045	QC91PM45	5997904	157	050880	A9201/8	5972355	70	051022	R5111/32	5999684	150	051148	R5113/4	5999676	151
050050	QC91PM50	5997907	157	050897	A92032	5972286	70	051023	A92042	5972338	70	051153	A92052	5972321	70
050052	QC91PM52	5997911	157	050902	QC91GN2	5996751	156	051023	R5123/64	5999733	150	051160	A92053	5972323	70
050055	QC91PM55	5997915	157	050903	A92033	5972294	70	051024	R513/8	5999766	150	051177	A92054	5972325	70
050060	QC91PM60	5997921	157	050903	QC91GN3	5996746	156	051025	R5125/64	5999739	150	051191	A92055	5972327	70
050065	QC91PM65	5997926	157	050904	QC91GN4	5996756	156	051026	R5113/32	5999695	150	051207	A9207/32	5972425	70
050068	QC91PM68	5997933	157	050905	QC91GN5										

EDP NUMBER INDEX - 051358 - 0052860

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
051304.....	M51CO1/16.....	5996565	158	0051504.....	A92076.....	5972403	70	052006.....	R52N6.....	6000223	149	052078.....	R52N78.....	5999613	148
051305.....	M51CO5/64.....	5996328	158	051504.....	R51FS1/16.....	5998977	154	052007.....	R52N7.....	6000259	149	052079.....	R52N79.....	5999617	148
0051306.....	A92063.....	5972353	70	051505.....	R51FS5/64.....	5998917	154	052008.....	R52N8.....	5999622	149	052080.....	R52N80.....	5999626	148
051306.....	M51CO3/32.....	5996444	158	051506.....	R51FS3/32.....	5998788	154	052009.....	R52N9.....	5999499	149	0052082.....	A920140.....	5972464	71
051307.....	M51CO7/64.....	5996373	158	051507.....	R51FS7/64.....	5998747	154	052010.....	R52N10.....	5999683	149	0052099.....	A920145.....	5972468	71
051308.....	M51CO1/8.....	5996577	158	051508.....	R51FS1/8.....	5998985	154	052011.....	R52N11.....	5999687	149	0052105.....	A920150.....	5972477	71
051309.....	M51CO9/64.....	5996391	158	051509.....	R51FS9/64.....	5998755	154	052012.....	R52N12.....	5999691	149	0052112.....	A920155.....	5972485	71
051310.....	M51CO5/32.....	5996324	158	051510.....	R51FS5/32.....	5998913	154	0052013.....	A920122.....	5972422	71	0052129.....	A920160.....	5972496	71
051311.....	M51CO11/64.....	5996586	158	0051511.....	A92077.....	5972407	70	052013.....	R52N13.....	5999693	149	0052136.....	A920170.....	5972508	71
051312.....	M51CO3/16.....	5996440	159	051511.....	R51FS11/64.....	5998991	154	052014.....	R52N14.....	5999697	149	0052143.....	A920175.....	5972512	71
0051313.....	A9201/4.....	5972544	70	051512.....	R51FS3/16.....	5998743	154	052015.....	R52N15.....	5999701	149	0052150.....	B3340.....	5987015	472
051313.....	M51CO13/64.....	5996596	159	051513.....	R51FS13/64.....	5999002	154	052016.....	R52N16.....	5999703	149	0052167.....	B33400.....	5987047	472
051314.....	M51CO7/32.....	5996369	159	051514.....	R51FS7/32.....	5998924	154	052017.....	R52N17.....	5999706	149	0052174.....	B334000.....	5987076	472
051315.....	M51CO15/64.....	5996609	159	051515.....	R51FS15/64.....	5999009	154	052018.....	R52N18.....	5999712	149	0052181.....	B3341.....	5987081	472
051316.....	M51CO1/4.....	5996574	159	051516.....	R51FS1/4.....	5998982	154	052019.....	R52N19.....	5999716	149	0052198.....	B33410.....	5987084	472
051317.....	M51CO17/64.....	5996618	159	051517.....	R51FS17/64.....	5999013	154	0052020.....	A92031/64.....	5972324	71	0052204.....	B33411.....	5987087	472
051318.....	M51CO9/32.....	5996387	159	051518.....	R51FS9/32.....	5998751	154	052020.....	R52N20.....	5999723	149	0052211.....	B33412.....	5987091	472
051319.....	M51CO19/64.....	5996626	159	051519.....	R51FS19/64.....	5999017	154	052021.....	R52N21.....	5999726	149	0052228.....	B3342.....	5986955	472
0051320.....	A92064.....	5972356	70	051520.....	R51FS5/16.....	5998905	154	052022.....	R52N22.....	5999730	149	0052235.....	B3343.....	5986958	472
051320.....	M51CO5/16.....	5996323	159	051521.....	R51FS21/64.....	5999023	154	052023.....	R52N23.....	5999734	149	0052242.....	B3344.....	5986963	472
051321.....	M51CO21/64.....	5996634	159	051522.....	R51FS11/32.....	5998989	154	052024.....	R52N24.....	5999737	149	0052259.....	B3345.....	5986968	472
051322.....	M51CO11/32.....	5996583	159	051523.....	R51FS23/64.....	5999027	154	052025.....	R52N25.....	5999741	149	0052266.....	B3346.....	5986972	472
051323.....	M51CO23/64.....	5996642	159	051524.....	R51FS3/8.....	5998829	154	052026.....	R52N26.....	5999743	149	0052273.....	B3347.....	5986975	472
051324.....	M51CO3/8.....	5996449	159	051525.....	R51FS25/64.....	5999030	154	052027.....	R52N27.....	5999750	149	0052280.....	B3348.....	5986983	472
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051326.....	M51CO13/32.....	5996592	159	051527.....	R51FS27/64.....	5999034	154	052029.....	R52N29.....	6000168	149	052301.....	M52CON1.....	5996395	159
051327.....	M51CO27/64.....	5996354	159	0051528.....	A92078.....	5972411	70	052030.....	R52N30.....	6000235	149	052302.....	M52CON2.....	5996437	159
051328.....	M51CO7/16.....	5996365	159	051528.....	R51FS7/16.....	5998920	154	052031.....	R52N31.....	6000267	149	0052303.....	B3350BLADES.....	5986990	473
051329.....	M51CO29/64.....	5996434	159	051529.....	R51FS29/64.....	5999043	154	052032.....	R52N32.....	6000273	149	052303.....	M52CON3.....	5995691	159
051330.....	M51CO15/32.....	5996607	159	051530.....	R51FS15/32.....	5999006	154	052033.....	R52N33.....	6000277	149	052304.....	M52CON4.....	5995708	159
051331.....	M51CO31/64.....	5996275	159	051531.....	R51FS31/64.....	5998861	154	052034.....	R52N34.....	6000280	149	052305.....	M52CON5.....	5995714	159
051332.....	M51CO1/2.....	5996572	159	051532.....	R51FS1/2.....	5998980	154	052035.....	R52N35.....	6000283	149	052307.....	M52CON7.....	5995716	159
051333.....	M51CO33/64.....	5996280	159	0051535.....	A92079.....	5972418	70	052036.....	R52N36.....	6000128	149	052308.....	M52CON8.....	5995718	159
051334.....	M51CO17/32.....	5996613	159	0051542.....	A9205/16.....	5972339	70	0052037.....	A920125.....	5972426	71	052309.....	M52CON9.....	5995720	159
051335.....	M51CO35/64.....	5996284	159	0051566.....	A92080.....	5972433	70	052037.....	R52N37.....	6000132	149	0052310.....	B33500BLADES.....	5986997	473
051336.....	M51CO9/16.....	5996383	159	0051580.....	A92081.....	5972442	70	052038.....	R52N38.....	6000136	149	052310.....	M52CON10.....	5996404	159
0051337.....	A92065.....	5972359	70	0051603.....	A92082.....	5971617	70	052039.....	R52N39.....	6000141	149	052311.....	M52CON11.....	5996408	159
051337.....	M51CO37/64.....	5996288	159	0051610.....	A92083.....	5971662	70	052040.....	R52N40.....	6000149	149	052312.....	M52CON12.....	5996411	159
051338.....	M51CO19/32.....	5996621	159	0051627.....	A92021/64.....	5972253	70	052041.....	R52N41.....	6000153	149	052313.....	M52CON13.....	5996414	159
051339.....	M51CO39/64.....	5996292	159	0051634.....	A92084.....	5971709	71	052042.....	R52N42.....	6000157	149	052314.....	M52CON14.....	5996416	158
051340.....	M51CO5/8.....	5996331	159	0051658.....	A92085.....	5971753	71	052043.....	R52N43.....	6000160	149	052315.....	M52CON15.....	5996419	158
051341.....	M51CO41/64.....	5996299	159	0051665.....	A92086.....	5971796	71	0052044.....	A9201/2.....	5972540	71	052316.....	M52CON16.....	5996421	158
051342.....	M51CO21/32.....	5996630	159	0051672.....	A92087.....	5971803	71	052044.....	R52N44.....	6000164	149	052317.....	M52CON17.....	5996425	158
051343.....	M51CO43/64.....	5996302	159	0051689.....	A92011/32.....	5972409	71	052045.....	R52N45.....	6000170	149	052318.....	M52CON18.....	5996427	158
0051344.....	A92066.....	5972362	70	0051702.....	A92088.....	5971806	71	052046.....	R52N46.....	6000173	149	052319.....	M52CON19.....	5996431	158
051344.....	M51CO11/16.....	5996580	159	0051719.....	A92089.....	5971808	71	052047.....	R52N47.....	6000177	149	052320.....	M52CON20.....	5995688	158
051345.....	M51CO45/64.....	5996306	159	0051726.....	A92090.....	5971809	71	052048.....	R52N48.....	6000179	149	052321.....	M52CON21.....	5995710	158
051346.....	M51CO23/32.....	5996638	159	0051733.....	A92091.....	5971624	71	052049.....	R52N49.....	6000183	149	052322.....	M52CON22.....	5995737	158
051347.....	M51CO47/64.....	5996312	159	0051740.....	A92023/64.....	5972260	71	052050.....	R52N50.....	6000191	149	052324.....	M52CON24.....	5995774	158
051348.....	M51CO3/4.....	5996446	159	0051757.....	A92092.....	5971628	71	052051.....	R52N51.....	6000194	149	052325.....	M52CON25.....	5995817	158
051349.....	M51CO49/64.....	5996321	159	0051764.....	A92093.....	5971632	71	052052.....	R52N52.....	6000197	149	052326.....	M52CON26.....	5995827	158
051350.....	M51CO25/32.....	5996650	159	0051771.....	A92094.....	5971634	71	052053.....	R52N53.....	6000200	148	0052327.....	B335000BLADES.....	5987003	473
0051351.....	A92067.....	5972366	70	0051788.....	A92095.....	5971638	71	052054.....	R52N54.....	6000206	148	052327.....	M52CON27.....	5995830	158
051351.....	M51CO51/64.....	5996335	159	0051795.....	A9203/8.....	5972322	71	052055.....	R52N55.....	6000209	148	052328.....	M52CON28.....	5995834	158
051352.....	M51CO13/16.....	5996589	159	0051801.....	A92096.....	5971642	71	052056.....	R52N56.....	6000212	148	052329.....	M52CON29.....	5995838	158
051353.....	M51CO53/64.....	5996339	159	0051818.....	A92097.....	5971646	71	052057.....	R52N57.....	6000215	148	052330.....	M52CON30.....	5995693	158
051354.....	M51CO27/32.....	5996316	159	0051825.....	A92098.....	5971650	71	052058.....	R52N58.....	6000218	148	052331.....	M52CON31.....	5995695	158
051355.....	M51CO55/64.....	5996343	159	0051832.....	A92099.....	5971654	71	052059.....	R52N59.....	6000221	148	052332.....	M52CON32.....	5995697	158
051356.....	M51CO7/8.....	5996377	159	0051849.....	A92025/64.....	5972267	71	052060.....	R52N60.....	6000226	148	052333.....	M52CON33.....	5995699	158
051357.....	M51CO57/64.....	5996348	159	0051856.....	A920100.....	5972357	71	052061.....	R52N61.....	6000229	148	0052334.....	B3351BLADES.....	5987009	473
051358.....	M51CO29/32.....	5996400	159	0051863.....	A920102.....	5972360	71	052062.....	R52N62.....	6000232	148	052334.....	M52CON34.....	5995701	158
051359.....	M51CO59/64.....	5996350	159	0051870.....	A920103.....	5972361	71	052063.....	R52N63.....	6000239	148	052335.....	M52CON35.....	5995702	158
051360.....	M51CO15/16.....	5996599	159	0051887.....	A92013/32.....	5972453	71	052064.....	R52N64.....	6000242	148	052336.....	M52CON36.....	5995704	158
051361.....	M51CO61/64.....	5996358	159	0051900.....	A920105.....	5972367	71	052065.....	R52N65.....	6000245	148	052339.....	M52CON39.....	5995706	158
051362.....	M51CO31/32.....	5996271	159	0051917.....	A92027/64.....	5972271	71	052066.....	R52N66.....	6000248	148	052340.....	M52CON40.....	5995712	158
051363.....	M51CO63/64.....	5996361	159	0051924.....	A920108.....	5972374	71	052067.....	R52N67.....	6000250	148	0052341.....	B33510BLADES.....	5987017	473
051364.....	M51CO1.....	5996560	159	0051931.....	A920110.....	5972378	71	0052068.....	A920130.....	5972444	71	0052358.....	B33511BLADES.....	5987023	473
0051368.....	A92017/64.....	5972													

EDP NUMBER INDEX - 0052877 - 0057001

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0052471	A920200	5972241	62	0053010	B40015	5987198	450	053706	CO501-6N6	5996135	176	055012	R55L	6000301	150
0052488	A92125	5972616	79	0053027	B40016	5987237	450	053707	CO501-6N7	5996143	176	055013	R55M	6000304	150
0052495	A92126	5972620	69	0053034	B40018	5987244	450	053708	CO501-6N8	5995507	176	055014	R55N	6000307	150
0052501	A92130	5972655	69	0053041	B40020	5987100	450	053709	CO501-6N9	5995556	176	055015	R55O	6000310	150
0052518	A92131	5972659	69	0053058	B40022	5987103	450	053710	CO501-6N10	5996022	176	055016	R55P	6000313	150
0052525	A92132	5972663	70	0053065	B40025	5987107	450	053711	CO501-6N11	5996064	176	055017	R55Q	6000316	150
0052532	A92133	5972667	70	0053072	B40028	5987111	450	053712	CO501-6N12	5996100	176	055018	R55R	6000319	150
0052549	A92134	5972671	70	0053089	A92178	5972943	70	053713	CO501-6N13	5996139	176	055019	R55S	6000322	150
0052556	A92135	5972675	70	0053096	A92179	5972948	70	053714	CO501-6N14	5996147	176	055020	R55T	6000325	150
0052563	A92136	5972683	70	0053102	A92180	5972965	70	053715	CO501-6N15	5996151	176	055021	R55U	6000331	150
0052570	A92137	5972688	70	0053119	A92181	5972969	70	053716	CO501-6N16	5996155	176	055022	R55V	6000333	150
0052587	A92138	5972691	70	0053126	B411100	5987159	452	053717	CO501-6N17	5996159	176	055023	R55W	6000336	150
0052594	A92139	5972696	70	0053133	A92182	5972973	70	053718	CO501-6N18	5995984	176	055024	R55X	6000338	150
0052600	A92140	5972737	70	0053140	B411120	5987166	452	053719	CO501-6N19	5995988	176	055025	R55Y	6000341	150
052604	CO500-121/16	5995755	175	0053157	A92183	5972981	70	053720	CO501-6N20	5995996	176	055026	R55Z	6000344	150
052605	CO500-125/64	5995796	175	0053164	B411140	5987169	452	053721	CO501-6N21	5996000	176	0055465	A94031	5973146	81
052606	CO500-123/32	5995787	175	0053171	B411150	5987172	452	053722	CO501-6N22	5996004	176	0055472	A94018	5972921	81
052607	CO500-127/64	5995802	175	0053188	B411160	5987175	452	053723	CO501-6N23	5996007	176	0055533	A94032	5973151	81
052608	CO500-121/8	5995763	175	0053195	B411150	5987213	452	053724	CO501-6N24	5996010	176	0055540	A94033	5973156	81
052609	CO500-129/64	5995805	176	0053201	B411160	5987217	452	053725	CO501-6N25	5996014	176	0055588	A94034	5973161	81
052610	CO500-125/32	5995792	176	0053218	B411170	5987221	452	053726	CO501-6N26	5996018	176	0055595	A94035	5973170	81
052611	CO500-1211/64	5995767	176	0053225	B411180	5987226	452	053727	CO501-6N27	5996024	176	055608	QC0860P1/8	5995727	167
052612	CO500-123/16	5995779	176	0053232	B411190	5987229	452	053728	CO501-6N28	5996029	176	055609	QC0860P9/64	5995814	167
052613	CO500-1213/64	5995771	176	0053249	A92184	5972987	71	053729	CO501-6N29	5996033	176	055610	QC0860P5/32	5995797	167
052614	CO500-127/32	5995799	176	0053256	A92185	5972991	71	053730	CO501-6N30	5996040	176	055611	QC0860P11/64	5995734	167
052615	CO500-1215/64	5995775	176	0053263	A92186	5972995	71	053731	CO501-6N31	5996044	175	055612	QC0860P3/16	5995781	167
052616	CO500-121/4	5995759	176	0053270	A92187	5972999	71	053732	CO501-6N32	5996047	175	055613	QC0860P13/64	5995744	167
0052617	A92141	5972741	70	0053287	A92188	5973003	71	053733	CO501-6N33	5996053	175	055614	QC0860P7/32	5995806	167
0052624	A92142	5972745	70	0053294	A92189	5973007	71	053734	CO501-6N34	5996056	175	055615	QC0860P15/64	5995748	167
0052631	A92143	5972749	70	0053300	A92190	5973011	71	053735	CO501-6N35	5996060	175	055616	QC0860P1/4	5995725	167
0052648	A92144	5972753	70	0053317	A92191	5973015	71	053736	CO501-6N36	5996067	175	055617	QC0860P17/64	5995752	167
0052655	A92145	5972756	70	0053324	A92192	5973019	71	053737	CO501-6N37	5996072	175	0055618	A9409/64	5972865	81
0052662	A92146	5972760	70	0053331	A92193	5973026	71	053738	CO501-6N38	5996077	175	055618	QC0860P9/32	5995810	167
0052679	A92147	5972764	70	0053348	A92194	5972358	71	053739	CO501-6N39	5996080	175	055619	QC0860P19/64	5995754	167
0052686	A92148	5972769	70	0053355	A92195	5972404	71	053740	CO501-6N40	5996086	175	055620	QC0860P5/16	5995794	167
0052693	A92149	5972777	70	0053362	A92196	5972449	71	053741	CO501-6N41	5996088	175	055621	QC0860P21/64	5995758	167
0052709	A92150	5972834	70	0053379	A92197	5972494	71	053742	CO501-6N42	5996092	175	055622	QC0860P11/32	5995730	167
0052716	A92151	5972875	70	0053386	A92198	5972539	71	053743	CO501-6N43	5996094	175	055623	QC0860P23/64	5995762	167
0052723	A92152	5972928	70	0053393	A92199	5972547	71	053744	CO501-6N44	5996097	175	055624	QC0860P3/8	5995786	167
0052730	A92153	5972977	70	0053409	A921100	5971794	71	053745	CO501-6N45	5996104	175	0055625	A94036	5973175	82
0052747	A92154	5973023	70	0053416	A921102	5971798	71	053746	CO501-6N46	5996107	175	055625	QC0860P25/64	5995766	168
0052754	A92155	5973030	70	0053423	A921103	5971802	71	053747	CO501-6N47	5996110	175	055626	QC0860P13/32	5995740	168
0052761	A92156	5973034	70	0053447	A921105	5971807	71	053748	CO501-6N48	5996113	175	055627	QC0860P27/64	5995703	168
0052778	A92157	5973038	70	0053454	A921108	5971812	71	053749	CO501-6N49	5996116	175	055628	QC0860P7/16	5995807	168
0052785	A92158	5973041	70	0053461	A921110	5971814	71	053750	CO501-6N50	5996123	175	055629	QC0860P29/64	5995778	168
0052792	A92159	5972838	70	0053485	A921115	5971822	71	0053751	A94014	5973062	81	055630	QC0860P15/32	5995746	168
052802	CO501-12N2	5995880	176	0053492	A921118	5971824	71	053751	CO501-6N51	5996127	175	055631	QC0860P31/64	5995790	168
0052808	A92160	5972852	70	0053508	A921120	5971830	71	053752	CO501-6N52	5996131	175	0055632	A94037	5973183	82
052810	CO501-12N10	5995861	176	0053522	A921125	5971834	71	0053768	A94015	5972881	81	055632	QC0860P1/2	5995722	168
052811	CO501-12N11	5995869	176	0053546	A921130	5971842	71	0053775	A94016	5972905	81	055904	QC91G1/16	5996826	155
0052815	A92161	5972854	70	0053553	A921135	5972603	71	0054253	A94016	5972885	81	055905	QC91G5/64	5997143	155
052816	CO501-12N16	5995873	176	0053560	A921140	5972726	71	0054260	A94017	5972890	81	055906	QC91G3/32	5996895	155
052819	CO501-12N19	5995877	176	0053577	A921145	5972772	71	0054383	A94018	5972895	81	055907	QC91G7/64	5997198	155
052820	CO501-12N20	5995883	176	0053584	A921150	5972785	71	0054390	A94019	5972900	81	055908	QC91G1/8	5996834	155
052821	CO501-12N21	5995887	176	0053591	A921155	5972789	71	0054406	A9405/64	5972177	81	055909	QC91G16/64	5997204	155
0052822	A92162	5972858	70	053604	CO500-61/16	5995809	175	0054604	A94020	5973278	81	055910	QC91G5/32	5997098	156
052827	CO501-12N27	5995891	176	053605	CO500-65/64	5995848	175	0054611	A94021	5973282	81	055911	QC91G11/64	5996840	156
052829	CO501-12N29	5995895	176	053606	CO500-63/32	5995842	175	0054628	A94022	5973286	81	055912	QC91G3/16	5996891	156
052830	CO501-12N30	5995899	176	0053607	A921160	5972607	71	0054710	A94023	5973289	81	055913	QC91G13/64	5996847	156
0052839	A92163	5972863	70	053607	CO500-67/64	5995854	175	0054727	A9403/32	5973207	81	055914	QC91G7/32	5997195	156
052840	CO501-12N40	5995909	175	053608	CO500-61/8	5995818	175	0054734	A94024	5973084	81	055915	QC91G15/64	5996859	156
0052846	A92164	5972867	70	053609	CO500-69/64	5995858	176	0054789	A94025	5973087	81	055916	QC91G1/4	5996831	156
0052853	A92165	5972870	70	053610	CO500-65/32	5995845	176	0054796	A94026	5973090	81	055917	QC91G17/64	5996863	156
0052860	A92166	5972879	70	053611	CO500-611/64	5995822	176	0054802	A94027	5973092	81	055918	QC91G9/32	5997201	156
0052877	A92167	5972884	70	053612	CO500-63/16	5995839	176	0054833	A9407/64	5972281	81	055919	QC91G19/64	5996867	156
0052884	A92168	5972889	70	053613	CO500-613/64	5995831	176	0054840	A94028	5973095	81	055920	QC91G5/16	5997063	156
0052891	A92169	5972894	70	0053614	A94010	5973055	81	0054857	A94029	5973098	81	055921	QC91G21/64	5996870	156
0052907	A92170	5972899	70	053614	CO500-67/32	5995851	176	0054871	A94030	5973142	81	055922	QC91G11/32	5996837	156
0052914	A92171	5972902	70	053615	CO500-615/64	5995835	176								

EDP NUMBER INDEX - 0057056 - 058717

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
056120.....	5ATL12.....	6000486	152	057135.....	5ATL135.....	6000943	153	057924.....	QC91P3/8.....	5997497	156	058131.....	501-6N31.....	6001502	171
056125.....	5ATL125.....	6000489	152	057138.....	5ATL138.....	6000945	153	057925.....	QC91P25/64.....	5997232	156	058132.....	501-6N32.....	6001503	171
056130.....	5ATL13.....	6000492	152	057140.....	5ATL140.....	6000769	153	057926.....	QC91P13/32.....	5997209	156	058133.....	501-6N33.....	6001507	171
056140.....	5ATL14.....	6000494	152	057145.....	5ATL145.....	6000773	153	057927.....	QC91P27/64.....	5997235	156	058134.....	501-6N34.....	6001261	170
056150.....	5ATL15.....	6000496	152	057150.....	5ATL150.....	6000777	153	057928.....	QC91P7/16.....	5997432	156	058135.....	501-6N35.....	6001305	170
056160.....	5ATL16.....	6000499	152	057155.....	5ATL155.....	6000781	153	057929.....	QC91P29/64.....	5997398	156	058136.....	501-6N36.....	6001337	170
0056165.....	A9405/32.....	5972173	82	057160.....	5ATL160.....	6000785	153	057930.....	QC91P15/32.....	5997215	156	058137.....	501-6N37.....	6001371	170
056170.....	5ATL17.....	6000502	152	057165.....	5ATL165.....	6000788	153	057931.....	QC91P31/64.....	5997531	156	058138.....	501-6N38.....	6001427	170
0056172.....	A9404.....	5973252	82	057170.....	5ATL170.....	6000791	153	057932.....	QC91P1/2.....	5997193	156	058139.....	501-6N39.....	6001439	170
056180.....	5ATL18.....	6000505	152	057175.....	5ATL175.....	6000794	153	057933.....	QC91P33/64.....	5997538	156	058140.....	501-6N40.....	6001446	170
056190.....	5ATL19.....	6000508	152	057180.....	5ATL180.....	6000797	153	057934.....	QC91P17/32.....	5997219	156	058141.....	501-6N41.....	6001448	170
056200.....	5ATL20.....	6000810	152	057185.....	5ATL185.....	6000799	153	057935.....	QC91P35/64.....	5997541	156	058142.....	501-6N42.....	6001268	170
056210.....	5ATL21.....	6000813	152	057190.....	5ATL190.....	6000805	153	057936.....	QC91P9/16.....	5997442	156	058143.....	501-6N43.....	6001271	170
056215.....	5ATL215.....	6000816	152	057195.....	5ATL195.....	6000808	153	057937.....	QC91P37/64.....	5997545	156	058144.....	501-6N44.....	6001276	170
056220.....	5ATL22.....	6000819	152	057200.....	5ATL200.....	6000830	153	057938.....	QC91P19/32.....	5997223	156	0058145.....	A94062.....	5972193	82
0056226.....	A94041.....	5973256	82	057205.....	5ATL205.....	6000837	153	057940.....	QC91P5/8.....	5997429	156	058145.....	501-6N45.....	6001282	170
056230.....	5ATL23.....	6000822	152	057210.....	5ATL210.....	6000840	153	057942.....	QC91P21/32.....	5997227	156	058146.....	501-6N46.....	6001285	170
0056233.....	A94042.....	5973259	82	057215.....	5ATL215.....	6000844	153	057944.....	QC91P11/16.....	5997202	156	058147.....	501-6N47.....	6001289	170
056240.....	5ATL24.....	6000825	152	057220.....	5ATL220.....	6000845	153	058003.....	500-63/64.....	6001203	170	058148.....	501-6N48.....	6001293	170
056250.....	5ATL25.....	6000828	152	057225.....	5ATL225.....	6000848	153	058004.....	500-61/16.....	6001270	170	058149.....	501-6N49.....	6001296	170
0056257.....	A94043.....	5973263	82	057230.....	5ATL230.....	6000852	153	058005.....	500-65/64.....	6001212	170	058150.....	501-6N50.....	6001302	170
0056264.....	A94011/64.....	5972990	82	057235.....	5ATL235.....	6000855	153	058006.....	500-63/32.....	6001201	170	058151.....	501-6N51.....	6001309	170
0056271.....	A94044.....	5973266	82	057240.....	5ATL240.....	6000858	153	058007.....	500-67/64.....	6001220	170	0058152.....	A94063.....	5972198	82
0056288.....	A94045.....	5973274	82	057245.....	5ATL245.....	6000860	153	058008.....	500-61/8.....	6001288	171	058152.....	501-6N52.....	6001311	170
0056295.....	A94046.....	5972119	82	057250.....	5ATL250.....	6000866	153	058009.....	500-69/64.....	6001224	171	058153.....	501-6N53.....	6001314	170
056300.....	5ATL30.....	6000912	152	057255.....	5ATL255.....	6000876	153	058010.....	500-65/32.....	6001211	171	058154.....	501-6N54.....	6001317	170
0056301.....	A94047.....	5972164	82	057260.....	5ATL260.....	6000880	153	058011.....	500-611/64.....	6001142	171	058155.....	501-6N55.....	6001320	170
056310.....	5ATL31.....	6000917	152	057265.....	5ATL265.....	6000885	153	058012.....	500-63/16.....	6001199	171	058156.....	501-6N56.....	6001323	170
0056318.....	A9403/16.....	5973202	82	057270.....	5ATL270.....	6000889	153	058013.....	500-613/64.....	6001150	171	058157.....	501-6N57.....	6001326	170
056320.....	5ATL32.....	6000926	152	057280.....	5ATL280.....	6000894	153	058014.....	500-67/32.....	6001218	171	058158.....	501-6N58.....	6001329	170
056330.....	5ATL33.....	6001365	152	057285.....	5ATL285.....	6000898	153	058015.....	500-615/64.....	6001160	171	058159.....	501-6N59.....	6001332	170
056340.....	5ATL34.....	6001416	152	057290.....	5ATL290.....	6000902	153	058016.....	500-61/4.....	6001284	171	058160.....	501-6N60.....	6001340	170
056350.....	5ATL35.....	6001458	152	057295.....	5ATL295.....	6000907	153	058017.....	500-617/64.....	6001167	171	0058169.....	A9401/4.....	5972916	82
056360.....	5ATL36.....	6001480	152	057300.....	5ATL300.....	6001510	153	058018.....	500-69/32.....	6001222	171	0058176.....	A94064.....	5972203	82
056370.....	5ATL37.....	6001504	152	057305.....	5ATL305.....	6001512	153	058019.....	500-619/64.....	6001172	171	0058183.....	A94065.....	5972206	82
056380.....	5ATL38.....	6001508	152	057310.....	5ATL310.....	6001514	153	058020.....	500-65/16.....	6001209	171	0058190.....	A94066.....	5972214	82
056400.....	5ATL40.....	6001370	152	057408.....	08601/8.....	6000278	160	058021.....	500-621/64.....	6001177	171	058201.....	502-6A.....	6001257	171
056420.....	5ATL42.....	6001374	152	057410.....	08605/32.....	6000129	160	058022.....	500-611/32.....	6001292	171	058202.....	502-6B.....	6001260	171
056430.....	5ATL43.....	6001379	152	057412.....	08603/16.....	6000117	160	058023.....	500-623/64.....	6001180	172	058203.....	502-6C.....	6001265	171
056450.....	5ATL45.....	6001384	152	057414.....	08607/32.....	6000137	160	058024.....	500-63/8.....	6001204	172	058204.....	502-6D.....	6001272	171
056460.....	5ATL46.....	6001389	152	057416.....	08601/4.....	6000274	160	058025.....	500-625/64.....	6001185	172	0058206.....	A94067.....	5972218	82
056480.....	5ATL48.....	6001392	152	057418.....	08609/32.....	6000140	160	058026.....	500-613/32.....	6001146	172	058206.....	502-6F.....	6001281	171
056500.....	5ATL50.....	6001399	153	057420.....	08605/16.....	6000124	160	058027.....	500-627/64.....	6001192	172	058207.....	502-6G.....	6001286	171
056550.....	5ATL55.....	6001404	153	057422.....	086011/32.....	6000099	160	058028.....	500-67/16.....	6001216	172	058208.....	502-6H.....	6001290	171
056560.....	5ATL56.....	6001407	153	057424.....	08603/8.....	6000119	160	058029.....	500-629/64.....	6001195	172	058209.....	502-6I.....	6001294	171
0056561.....	A94048.....	5972210	82	057426.....	086013/32.....	6000103	160	058030.....	500-615/32.....	6001155	172	058210.....	502-6J.....	6001297	171
056570.....	5ATL57.....	6001411	153	057428.....	08607/16.....	6000134	160	058031.....	500-631/64.....	6001207	172	058211.....	502-6K.....	6001303	171
056600.....	5ATL60.....	6001421	153	057430.....	086015/32.....	6000106	161	058032.....	500-61/2.....	6001280	172	058212.....	502-6L.....	6001306	171
0056615.....	A94049.....	5972254	82	057432.....	08601/2.....	6000271	161	058101.....	501-6N1.....	6001451	171	0058213.....	A94017/64.....	5973080	82
056640.....	5ATL64.....	6001426	153	0057780.....	A94055.....	5972145	82	058102.....	501-6N2.....	6001475	171	058213.....	502-6M.....	6001308	171
0056646.....	A94050.....	5972125	82	0057797.....	A9407/32.....	5972278	82	058103.....	501-6N3.....	6001498	171	058214.....	502-6N.....	6001310	171
056650.....	5ATL65.....	6001431	153	0057810.....	A94056.....	5972148	82	058104.....	501-6N4.....	6001443	171	058215.....	502-6O.....	6001313	171
056680.....	5ATL68.....	6001435	153	0057827.....	A94057.....	5972152	82	058105.....	501-6N5.....	6001299	171	058216.....	502-6P.....	6001316	171
056720.....	5ATL72.....	6001444	153	0057834.....	A94058.....	5972156	82	058106.....	501-6N6.....	6001334	171	058217.....	502-6Q.....	6001319	171
056750.....	5ATL75.....	6001450	153	0057841.....	A94059.....	5972160	82	058107.....	501-6N7.....	6001343	171	058218.....	502-6R.....	6001322	171
056770.....	5ATL70.....	6001440	153	0057858.....	A94015/64.....	5973046	82	058108.....	501-6N8.....	6001346	171	058219.....	502-6S.....	6001325	172
056780.....	5ATL78.....	6001452	153	0057865.....	A94060.....	5972185	82	058109.....	501-6N9.....	6001349	171	0058220.....	A94068.....	5972222	82
056800.....	5ATL80.....	6001454	153	0057872.....	A94061.....	5972189	82	058110.....	501-6N10.....	6001453	171	058220.....	502-6T.....	6001328	172
0056820.....	A94051.....	5972129	82	057904.....	QC91P1/16.....	5997190	155	058111.....	501-6N11.....	6001455	171	058221.....	502-6U.....	6001336	172
056820.....	5ATL82.....	6001456	153	057905.....	QC91P5/64.....	5997426	155	058112.....	501-6N12.....	6001457	171	058222.....	502-6V.....	6001339	172
056850.....	5ATL85.....	6001460	153	057906.....	QC91P3/32.....	5997472	155	058113.....	501-6N13.....	6001459	171	058223.....	502-6W.....	6001342	172
0056882.....	A94013/64.....	5973021	82	057907.....	QC91P7/64.....	5997439	155	058114.....	501-6N14.....	6001461	171	058224.....	502-6X.....	6001345	172
056900.....	5ATL90.....	6001462	153	057908.....	QC91P1/8.....	5997199	155	058115.....	501-6N15.....	6001465	171	058225.....	502-6Y.....	6001348	172
056920.....	5ATL92.....	6001464	153	057909.....	QC91P9/64.....	5997451	155	058116.....	501-6N16.....	6001467	171	058226.....	502-6Z.....	6001351	172
056950.....	5ATL95.....	6001466	153	057910.....	QC91P5/32.....	5997421	156	058117.....	501-6N17.....	6001469	171	0058237.....	A94069.....	5972226	82
0056974.....	A94052.....	5972133	82	057911.....	QC91P11/64.....	5997207	156	058118.....	501-6N18.....	6001471	171	0058244.....	A94070.....	5972230	82
056980.....	5ATL9														

EDP NUMBER INDEX - 0058718 - 059726

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
058310.....	QC41P5/32	5997586	141	058723.....	R88CO23/64	5999879	129	059015.....	500-1215/64	6001344	174	059215.....	502-120	6001419	174
058311.....	QC41P11/64	5997274	141	058724.....	R88CO3/8	5999744	129	059016.....	500-121/4	6001321	174	059216.....	502-12P	6001424	174
0058312.....	A94019/64	5973270	82	0058725.....	A94098	5972849	83	059017.....	500-1217/64	6001347	174	059217.....	502-12Q	6001434	174
058312.....	QC41P3/16	5997550	142	058725.....	R88CO25/64	5999883	129	059018.....	500-129/32	6001214	174	059218.....	502-12R	6001251	174
058313.....	QC41P13/64	5997286	142	058726.....	R88CO13/32	5999720	129	059019.....	500-1219/64	6001350	174	059219.....	502-12S	6001300	174
058314.....	QC41P7/32	5997599	142	058727.....	R88CO27/64	5999727	129	059020.....	500-125/16	6001397	174	059220.....	502-12T	6001331	174
058315.....	QC41P15/64	5997570	142	058728.....	R88CO7/16	5999762	129	059021.....	500-1221/64	6001353	174	059221.....	502-12U	6001367	174
058316.....	QC41P1/4	5997262	142	058729.....	R88CO29/64	5999731	129	059022.....	500-1211/32	6001327	174	059222.....	502-12V	6001423	174
058317.....	QC41P17/64	5997651	142	058730.....	R88CO15/32	5999792	129	059023.....	500-1223/64	6001356	174	059223.....	502-12W	6001432	174
058318.....	QC41P9/32	5997615	142	058731.....	R88CO31/64	5999746	129	059024.....	500-123/8	6001388	174	059224.....	502-12X	6001438	174
058319.....	QC41P19/64	5997699	142	0058732.....	A94099	5972853	83	059025.....	500-1225/64	6001359	174	059225.....	502-12Y	6001442	174
058320.....	QC41P5/16	5997583	142	058732.....	R88CO1/2	6000155	129	059026.....	500-1213/32	6001335	174	059226.....	502-12Z	6001447	174
058321.....	QC41P21/64	5997705	142	0058749.....	A94025/64	5973129	83	059027.....	500-1227/64	6001366	174	0059227.....	A9405/8	5972182	83
058322.....	QC41P71/32	5997271	142	0058756.....	A940100	5972926	83	059028.....	500-127/16	6001417	174	0059234.....	A940160	5973048	83
058323.....	QC41P23/64	5997707	142	0058763.....	A940102	5972936	83	059029.....	500-1229/64	6001369	174	0059241.....	A940165	5973050	83
058324.....	QC41P3/8	5997556	142	0058770.....	A940103	5972941	83	059030.....	500-1215/32	6001341	174	0059258.....	A94021/32	5973106	83
058325.....	QC41P25/64	5997539	142	0058787.....	A94013/32	5973018	83	059031.....	500-1231/64	6001393	174	0059265.....	A940170	5973052	83
058326.....	QC41P13/32	5997278	142	0058800.....	A940105	5972954	83	059032.....	500-121/2	6001318	174	0059272.....	A94011/16	5972979	83
058327.....	QC41P27/64	5997543	142	058803.....	R89CON3	5999812	129	0059043.....	A94033/64	5973236	83	0059289.....	A940175	5973053	83
058328.....	QC41P7/16	5997595	142	058805.....	R89CON5	5999863	129	0059050.....	A9401732	5973057	83	0059296.....	A94045/64	5972305	83
058329.....	QC41P29/64	5997546	142	058806.....	R89CON6	6000073	129	0059067.....	A940135	5973014	83	0059302.....	A940180	5973116	83
058330.....	QC41P15/32	5997535	142	058807.....	R89CON7	6000109	129	0059081.....	A940140	5973029	83	0059326.....	A94023/32	5973113	83
058331.....	QC41P31/64	5997559	142	058808.....	R89CON8	6000115	129	059101.....	501-12N1	6001226	174	0059333.....	A94047/64	5972307	83
058332.....	QC41P1/2	5997259	142	058809.....	R89CON9	6000120	129	059103.....	501-12N3	6001430	174	0059340.....	A940190	5973165	83
058333.....	QC41P33/64	5997562	142	058810.....	R89CON10	5999775	129	059104.....	501-12N4	6001515	174	0059357.....	A9403/4	5973213	83
058334.....	QC41P17/32	5997606	142	058811.....	R89CON11	5999779	129	059105.....	501-12N5	6001436	174	0059364.....	A940200	5973101	83
058335.....	QC41P35/64	5997564	142	058812.....	R89CON12	5999782	129	059107.....	501-12N7	6001445	174	0059371.....	A94110	5972873	81
058336.....	QC41P9/16	5997610	142	058813.....	R89CON13	5999785	128	059109.....	501-12N9	6001449	174	0059388.....	A94115	5972878	81
058337.....	QC41P37/64	5997567	142	058816.....	R89CON16	5999788	128	059110.....	501-12N10	6001229	174	0059401.....	A94120	5972594	81
058338.....	QC41P19/32	5997694	142	0058817.....	A94027/64	5973133	83	0059111.....	A9409/16	5972857	83	059401.....	QC91PN1	5997960	156
058340.....	QC41P5/8	5997592	142	058820.....	R89CON20	5999790	128	059111.....	501-12N11	6001231	174	059402.....	QC91PN2	5997995	156
0058343.....	A94076	5972258	82	058821.....	R89CON21	5999795	128	059112.....	501-12N12	6001232	174	059403.....	QC91PN3	5997089	156
058344.....	QC41P11/16	5997268	142	058822.....	R89CON22	5999797	128	059113.....	501-12N13	6001234	174	059404.....	QC91PN4	5997103	156
0058350.....	A94077	5972262	82	058824.....	R89CON24	5999799	128	059116.....	501-12N16	6001238	174	059405.....	QC91PN5	5997154	156
0058374.....	A94078	5972266	82	058825.....	R89CON25	5999801	128	059117.....	501-12N17	6001240	174	059406.....	QC91PN6	5997174	156
0058381.....	A94079	5972270	82	058826.....	R89CON26	5999803	128	059118.....	501-12N18	6001242	174	059407.....	QC91PN7	5997177	156
0058398.....	A9405/16	5972167	82	058827.....	R89CON27	5999806	128	059119.....	501-12N19	6001245	173	059408.....	QC91PN8	5997181	156
0058404.....	A94080	5972285	82	058829.....	R89CON29	5999808	128	059120.....	501-12N20	6001247	173	059409.....	QC91PN9	5997187	156
0058411.....	A94081	5972289	82	058830.....	R89CON30	5999815	128	059121.....	501-12N21	6001250	173	059410.....	QC91PN10	5997964	156
0058435.....	A94082	5972293	82	0058831.....	A940110	5972964	83	059122.....	501-12N22	6001254	173	059411.....	QC91PN11	5997966	156
0058442.....	A94083	5972299	82	058831.....	R89CON31	5999818	128	059123.....	501-12N23	6001258	173	059412.....	QC91PN12	5997968	156
0058473.....	A94021/64	5973109	82	058836.....	R89CON36	5999824	128	059125.....	501-12N25	6001262	173	059413.....	QC91PN13	5997971	156
0058503.....	A94084	5972832	82	058839.....	R89CON39	5999826	128	059126.....	501-12N26	6001266	173	059414.....	QC91PN14	5997973	156
0058510.....	A94085	5972869	82	058840.....	R89CON40	5999829	128	059127.....	501-12N27	6001275	173	059415.....	QC91PN15	5997976	156
0058558.....	A94086	5972922	82	058841.....	R89CON41	5999832	128	0059128.....	A940145	5973033	83	059416.....	QC91PN16	5997979	156
0058572.....	A94087	5972974	82	058842.....	R89CON42	5999836	128	059129.....	501-12N29	6001375	173	059417.....	QC91PN17	5997983	156
0058589.....	A94011/32	5972986	82	058843.....	R89CON43	5999839	128	059130.....	501-12N30	6001463	173	0059418.....	A94125	5972596	81
0058596.....	A94088	5973017	82	058844.....	R89CON44	5999844	128	059131.....	501-12N31	6001485	173	059418.....	QC91PN18	5997986	156
0058602.....	A94089	5973027	83	058845.....	R89CON45	5999846	128	059136.....	501-12N36	6001506	173	059419.....	QC91PN19	5997989	156
0058626.....	A94090	5973031	83	058846.....	R89CON46	5999850	128	059137.....	501-12N37	6001509	173	059420.....	QC91PN20	5997998	156
0058633.....	A94091	5973035	83	058849.....	R89CON49	5999855	128	059140.....	501-12N40	6001381	173	059421.....	QC91PN21	5998002	156
0058640.....	A94023/64	5973120	83	058850.....	R89CON50	5999977	128	059141.....	501-12N41	6001386	173	059422.....	QC91PN22	5998006	156
0058657.....	A94092	5973039	83	058851.....	R89CON51	6000011	128	059142.....	501-12N42	6001394	173	059423.....	QC91PN23	5998009	156
0058664.....	A94093	5972835	83	058852.....	R89CON52	6000044	128	059143.....	501-12N43	6001396	173	059424.....	QC91PN24	5998013	156
0058671.....	A94094	5972837	83	0058855.....	A9407/16	5972274	83	059144.....	501-12N44	6001401	173	059425.....	QC91PN25	5998017	156
0058688.....	A94095	5972840	83	0058862.....	A940112	5972968	83	059145.....	501-12N45	6001406	173	059426.....	QC91PN26	5998021	155
0058695.....	A9403/8	5973223	83	0058886.....	A940115	5972971	83	059146.....	501-12N46	6001410	173	059427.....	QC91PN27	5998026	155
0058701.....	A94096	5972843	83	0058893.....	A94029/64	5973138	83	059147.....	501-12N47	6001415	173	059428.....	QC91PN28	5998029	155
058704.....	R88CO1/16	6000151	128	0058909.....	A940118	5972975	83	059148.....	501-12N48	6001420	173	059429.....	QC91PN29	5998036	155
058705.....	R88CO5/64	5999756	128	0058916.....	A94015/32	5973044	83	059149.....	501-12N49	6001425	173	059430.....	QC91PN30	5997138	155
058706.....	R88CO3/32	5999740	128	0058923.....	A940120	5972994	83	059150.....	501-12N50	6001441	173	059431.....	QC91PN31	5997184	155
058707.....	R88CO7/64	5999767	128	0058930.....	A940122	5972998	83	0059166.....	A94037/64	5973244	83	0059432.....	A94130	5972469	81
058708.....	R88CO1/8	6000163	128	0058978.....	A94031/64	5973233	83	0059180.....	A940150	5973037	83	059432.....	QC91PN32	5997213	155
058709.....	R88CO9/64	5999774	128	0058985.....	A940125	5973002	83	059201.....	502-12A	6001352	174	059433.....	QC91PN33	5997233	155
058710.....	R88CO5/32	5999752	128	0058992.....	A9401/2	5972911	83	059202.....	502-12B	6001355	174	059434.....	QC91PN34	5997237	155
058711.....	R88CO11/64	6000176	128	059003.....	500-123/64	6001382	173	0059203.....	A94019/32	5973228	83	059435.....	QC91PN35	5997239	155
058712.....	R88CO3/16	5999738	129	059004.....	500-121/16	6001315	173	059203.....	502-12C	6001358	174	059436.....	QC91PN36	5997240	155
058713.....	R88CO13/64	5999763													

EDP NUMBER INDEX - 059727 - 081725

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
059448.....	QC91PN48.....	5997145	155	059729.....	181329/64.....	5999967	164	0600315.....	A94141.....	5972554	82	061405.....	QC41GN5.....	5996927	142
0059449.....	A94131.....	5972471	81	059730.....	181315/32.....	5999917	165	060315.....	QC1290P15/64.....	5996558	167	061406.....	QC41GN6.....	5996930	142
059449.....	QC91PN49.....	5997149	155	059731.....	181331/64.....	6000337	165	060316.....	QC1290P1/4.....	5996417	167	061407.....	QC41GN7.....	5996936	142
059450.....	QC91PN50.....	5997159	155	059732.....	18131/2.....	5999888	165	060317.....	QC1290P17/64.....	5996562	167	061408.....	QC41GN8.....	5996939	142
059451.....	QC91PN51.....	5997164	155	059733.....	181333/64.....	6000375	165	060318.....	QC1290P9/32.....	5996462	167	061409.....	QC41GN9.....	5996942	142
059452.....	QC91PN52.....	5997169	155	059734.....	181317/32.....	5999920	165	060319.....	QC1290P19/64.....	5996422	167	061410.....	QC41GN10.....	5997378	142
0059463.....	A94132.....	5972475	81	059735.....	181335/64.....	6000419	165	060320.....	QC1290P5/16.....	5996451	167	0061411.....	A94199.....	5973040	83
059512.....	15113/16.....	5999851	163	059736.....	18139/16.....	6000286	165	060321.....	QC1290P21/64.....	5996426	167	061411.....	QC41GN11.....	5997382	142
059516.....	15111/4.....	5999817	163	059737.....	181337/64.....	6000427	165	060322.....	A94142.....	5972557	82	061412.....	QC41GN12.....	5997386	142
059520.....	15115/16.....	5999862	164	059738.....	181319/32.....	5999933	165	060323.....	QC1290P11/32.....	5996476	167	061413.....	QC41GN13.....	5997390	142
059522.....	151111/32.....	5999823	164	059739.....	181339/64.....	6000430	165	060324.....	QC1290P23/64.....	5996429	167	061414.....	QC41GN14.....	5997394	142
059524.....	15113/8.....	5999858	164	059740.....	18135/8.....	6000438	165	060325.....	QC1290P3/8.....	5996445	168	061415.....	QC41GN15.....	5997402	142
059528.....	15117/16.....	5999869	164	059742.....	181321/32.....	5999940	165	060326.....	QC1290P25/64.....	5996430	168	061416.....	QC41GN16.....	5997410	141
059532.....	15111/2.....	5999814	165	059744.....	181311/16.....	5999896	165	060327.....	QC1290P13/32.....	5996542	168	061417.....	QC41GN17.....	5996846	141
059534.....	151117/32.....	5999833	165	059746.....	181323/32.....	5999948	165	060328.....	QC1290P27/64.....	5996433	168	061418.....	QC41GN18.....	5996892	141
059536.....	15119/16.....	5999875	165	059748.....	18133/4.....	6000275	165	060329.....	QC1290P7/16.....	5996458	168	061419.....	QC41GN19.....	5996933	141
059540.....	15115/8.....	5999865	165	059750.....	181325/32.....	5999954	165	060330.....	QC1290P15/32.....	5996554	168	061420.....	QC41GN20.....	5996983	141
059542.....	151121/32.....	5999835	165	059752.....	181313/16.....	5999904	166	060332.....	QC1290P1/2.....	5995821	168	061421.....	QC41GN21.....	5996987	141
059544.....	151111/16.....	5999820	165	059756.....	18137/8.....	6000284	166	060337.....	A94143.....	5972559	82	061422.....	QC41GN22.....	5996989	141
059546.....	151123/32.....	5999843	165	059760.....	181315/16.....	5999912	166	060384.....	A94144.....	5972561	82	061423.....	QC41GN23.....	5996991	141
059548.....	15113/4.....	5999854	165	059764.....	18131.....	5999885	166	0604014.....	A94145.....	5972562	82	061424.....	QC41GN24.....	5996996	141
059550.....	151125/32.....	5999848	165	0059838.....	A94135.....	5972487	81	0060421.....	A94146.....	5972564	82	061425.....	QC41GN25.....	5996853	141
059552.....	151113/16.....	5999827	165	0059883.....	C167100.....	5984414	306	0060445.....	A94147.....	5972566	82	061426.....	QC41GN26.....	5996857	141
059554.....	15117/8.....	5999872	166	0059890.....	C167120.....	5984420	306	0060452.....	A94148.....	5972570	82	061427.....	QC41GN27.....	5996861	141
059556.....	151115/16.....	5999830	166	0059906.....	C167160.....	5984422	306	0060476.....	A94149.....	5972572	82	0061428.....	A941100.....	5972904	83
059558.....	15111.....	5999811	166	0059920.....	C16780.....	5984428	294	0060490.....	A94150.....	5972574	82	061428.....	QC41GN28.....	5996865	141
059608.....	12901/8.....	6000178	160	0059944.....	A94136.....	5972493	82	0060513.....	A94151.....	5972576	82	061429.....	QC41GN29.....	5996869	141
059609.....	12909/64.....	5999809	160	0059968.....	A94137.....	5972501	82	0060605.....	A94152.....	5972578	82	061430.....	QC41GN30.....	5996874	141
059610.....	12905/32.....	5999924	160	0059982.....	A94138.....	5972505	82	0060612.....	A94153.....	5972580	82	061431.....	QC41GN31.....	5996882	141
059611.....	129011/64.....	6000189	160	060001.....	QC41PN1.....	5997197	142	0060674.....	A94154.....	5972582	82	061432.....	QC41GN32.....	5996886	141
059612.....	12903/16.....	6000244	160	060002.....	QC41PN2.....	5997173	142	0060681.....	A94155.....	5972584	82	061433.....	QC41GN33.....	5996889	141
059613.....	129013/64.....	6000199	160	060003.....	QC41PN3.....	5997210	142	0060728.....	A94156.....	5972586	82	061434.....	QC41GN34.....	5996896	141
059614.....	12907/32.....	5999971	160	060004.....	QC41PN4.....	5997236	142	0060735.....	A94157.....	5972588	82	0061435.....	A941102.....	5972908	83
059615.....	129015/64.....	6000205	160	060005.....	QC41PN5.....	5997241	142	0060766.....	A94158.....	5972592	82	061435.....	QC41GN35.....	5996900	141
059616.....	12901/4.....	6000174	160	060006.....	QC41PN6.....	5997243	142	0060773.....	A94159.....	5972850	82	061436.....	QC41GN36.....	5996904	141
059617.....	129017/64.....	6000211	160	060007.....	QC41PN7.....	5997245	142	0060797.....	A94160.....	5973049	82	061437.....	QC41GN37.....	5996909	141
059618.....	12909/32.....	5999978	160	060008.....	QC41PN8.....	5997249	142	0060889.....	A94161.....	5973051	82	061438.....	QC41GN38.....	5996912	141
059619.....	129019/64.....	6000217	160	060009.....	QC41PN9.....	5997252	142	0060940.....	A94162.....	5973054	82	061439.....	QC41GN39.....	5996917	141
059620.....	12905/16.....	5999880	160	060010.....	QC41PN10.....	5997222	142	0060995.....	A94163.....	5973056	82	061440.....	QC41GN40.....	5996924	141
059621.....	129021/64.....	6000224	160	060011.....	QC41PN11.....	5997247	142	0061022.....	A94164.....	5972856	82	0061442.....	A941103.....	5972913	83
059622.....	129011/32.....	6000186	160	060012.....	QC41PN12.....	5997282	142	0061046.....	A94165.....	5972860	82	0061466.....	A941105.....	5972927	83
059623.....	129023/64.....	6000233	160	060013.....	QC41PN13.....	5997292	142	0061053.....	A94166.....	5972864	82	0061480.....	A941110.....	5972938	83
059624.....	12903/8.....	6000249	160	060014.....	QC41PN14.....	5997296	142	0061091.....	A94167.....	5972868	82	0061497.....	A941112.....	5972944	83
059625.....	129025/64.....	6000236	160	060015.....	QC41PN15.....	5997300	142	0061107.....	A94168.....	5972871	82	0061633.....	A941115.....	5972949	83
059626.....	129013/32.....	6000196	160	060016.....	QC41PN16.....	5997304	141	0061114.....	A94169.....	5972876	82	0061657.....	A941118.....	5972952	83
059627.....	129027/64.....	6000238	160	060017.....	QC41PN17.....	5997158	141	0061121.....	A94170.....	5972880	82	0061688.....	A941120.....	5972967	83
059628.....	12907/16.....	5999969	160	060018.....	QC41PN18.....	5997163	141	0061138.....	A94171.....	5972886	82	0061718.....	A941122.....	5972970	83
059629.....	129029/64.....	6000241	161	060019.....	QC41PN19.....	5997168	141	0061145.....	A94172.....	5972891	82	0061749.....	A941125.....	5972978	83
059630.....	129015/32.....	6000202	161	060020.....	QC41PN20.....	5997178	141	0061152.....	A94173.....	5972897	82	0061817.....	A941130.....	5972985	83
059631.....	129031/64.....	6000252	161	060021.....	QC41PN21.....	5997182	141	0061169.....	A94174.....	5972906	82	0061848.....	A941135.....	5972989	83
059632.....	12901/2.....	6000165	161	060022.....	QC41PN22.....	5997185	141	0061176.....	A94175.....	5972910	82	0061862.....	A941140.....	5973000	83
059633.....	129033/64.....	6000256	161	060023.....	QC41PN23.....	5997188	141	0061183.....	A94176.....	5972915	82	0061886.....	A941145.....	5973004	83
059634.....	129017/32.....	6000208	161	060024.....	QC41PN24.....	5997191	141	0061190.....	A94177.....	5972920	82	0061909.....	A941150.....	5973008	83
059635.....	129035/64.....	6000265	161	060025.....	QC41PN25.....	5997194	141	0061206.....	A94178.....	5972925	82	0061916.....	A941155.....	5973013	83
059636.....	12909/16.....	5999974	161	060026.....	QC41PN26.....	5997200	141	0061213.....	A94179.....	5972930	82	0061930.....	A941160.....	5972947	83
059637.....	129037/64.....	5999804	161	060027.....	QC41PN27.....	5997203	141	0061220.....	A94180.....	5972950	82	062304.....	QC41G1/16.....	5996945	141
059638.....	129019/32.....	6000214	161	060028.....	QC41PN28.....	5997206	141	0061237.....	A94181.....	5972961	82	062305.....	QC41G5/64.....	5997492	141
059639.....	129039/64.....	5999840	161	060029.....	QC41PN29.....	5997208	141	0061244.....	A94182.....	5972966	82	062306.....	QC41G3/32.....	5997338	141
059640.....	12905/8.....	5999964	161	060030.....	QC41PN30.....	5997212	141	0061251.....	A94183.....	5972972	82	062307.....	QC41G7/64.....	5997502	141
059642.....	129021/32.....	6000220	161	060031.....	QC41PN31.....	5997214	141	0061268.....	A94184.....	5972976	82	062308.....	QC41G1/8.....	5996954	141
059644.....	129011/16.....	6000181	161	060032.....	QC41PN32.....	5997216	141	0061275.....	A94185.....	5972980	82	062309.....	QC41G9/64.....	5997349	141
059646.....	129023/32.....	6000230	161	060033.....	QC41PN33.....	5997218	141	0061282.....	A94186.....	5972984	82	062310.....	QC41G5/32.....	5997487	141
059648.....	12903/4.....	6000247	161	060034.....	QC41PN34.....	5997220	141	0061299.....	A94187.....	5972988	82	062311.....	QC41G11/64.....	5996957	141
0059654.....	A94133.....	5972479	81	060035.....	QC41PN35.....	5997224	141	0061305.....	A94188.....	5972992	82	062312.....	QC41G3/16.....	5996985	142
0059661.....	A94134.....	5972483	81	060036.....	QC41PN36.....	5997226	141	0061312.....	A94189.....	5972997	83	062313.....	QC41G13/64.....	5996963	142
059716.....	18131/4.....	5999892	163	060037.....	QC41PN37.....	5997228	141	0061329.....	A94190.....	5973001	83	062314.....	QC41G7/32.....	5997498	142
059717.....	181317/64.....														

EDP NUMBER INDEX - 081726 - 0094419

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
062327	QC41G27/64	5996979	142	081724	QC21G3/8	5996330	120	087970	SPLG-1201/2	6000122	209	091458	R5629/32	5999973	194
062328	QC41G7/16	5997495	142	081725	QC21G25/64	5996315	120	087974	SPL-1201/4	6000005	210	091459	R5659/64	5999690	194
062329	QC41G29/64	5996981	142	081726	QC21G13/32	5996283	120	087975	SPL-1203/8	6000014	210	091460	R5615/16	5999950	194
062330	QC41G15/32	5996965	142	081727	QC21G27/64	5996319	121	087976	SPL-1201/2	6000002	210	091461	R5661/64	5999530	194
062331	QC41G31/64	5997431	142	081728	QC21G7/16	5996347	121	087977	SPL-1205/8	6000016	210	091462	R5631/32	5999980	194
062332	QC21G1/2	5996948	141	081729	QC21G29/64	5996322	121	087980	SPLG-1201/4	6000046	210	091463	R5663/64	5999532	194
080501	QC21GN1	5996187	120	081730	QC21G15/32	5996289	121	087981	SPLG-1203/8	6000051	210	091464	R561	6000010	194
080502	QC21GN2	5996211	120	081731	QC21G31/64	5996333	121	087982	SPLG-1201/2	6000040	210	091465	R5611/64	5999856	194
080503	QC21GN3	5996239	120	081732	QC21G1/2	5996263	121	090101	C60R18PSET	5995672	225	091467	R5613/64	5999903	195
080504	QC21GN4	5996285	120	0085189	E201M10	5975838	290	090114	C114COMBPSET	5995643	226	091468	R5611/16	6000013	195
080505	QC21GN5	5996401	120	0085196	E201M4	5975692	290	090123	C115COMBPSET	5995681	226	091469	R5615/64	5999919	195
080506	QC21GN6	5996244	120	0085202	E201M5	5975694	290	090126	C26R15PSET	5995593	226	091470	R5613/32	5999899	195
080507	QC21GN7	5996248	120	0085219	E201M6	5975696	290	090154	C29R15SET	5995639	240	091471	R5617/64	5999935	195
080508	QC21GN8	5996252	120	0085226	E201M8	5975698	290	090161	C20R18PSET	5995547	225	091472	R5611/8	5999860	195
080509	QC21GN9	5996255	120	0087268	E252M10	5975917	290	090162	C29R10PSET	5995624	224	091473	R5619/64	5999941	195
080510	QC21GN10	5996190	120	0087275	E252M12	5975921	290	090163	C15R10PSET	5995528	224	091474	R5611/64	5999868	195
080511	QC21GN11	5996192	120	0087282	E252M14	5975929	290	090170	C29R40SET	5995635	236	091475	R56113/64	5999876	195
080512	QC21GN12	5996194	120	0087299	E252M16	5975258	290	090173	C26R42SET	5995604	236	091476	R5613/16	5999895	195
080513	QC21GN13	5996196	120	0087305	E252M18	5975304	290	090174	C60R41SET	5995608	236	091477	R56115/64	5999891	195
080514	QC21GN14	5996198	120	0087312	E252M20	5975347	290	090231	C33R56SET	5995647	241	091479	R5619/32	5999938	195
080515	QC21GN15	5996202	120	0087329	E252M22	5975394	290	090290	C29R10COSET	5995620	234	091480	R5611/4	5999852	195
080516	QC21GN16	5996204	120	0087336	E252M24	5975449	290	090291	C15R10COSET	5995524	234	091482	R5615/16	5999911	195
080517	QC21GN17	5996206	120	0087343	E252M8	5975463	290	090292	C26R15COSET	5995589	234	091483	R5613/8	5999908	195
080518	QC21GN18	5996208	120	087900	SPS-901/4	6000094	208	090328	C8R56COSET	5995682	241	091484	R5617/16	5999923	195
080519	QC21GN19	5996210	120	087901	SPS-903/8	6000100	208	090556	C29R56SET	5995703	241	091485	R5611/2	5999842	195
080520	QC21GN20	5996213	120	087902	SPS-901/2	6000090	208	090558	C8R57SET	5995726	241	091486	R5611/32	5999847	195
080521	QC21GN21	5996216	120	087903	SPS-905/8	6000104	208	090600	C60R18COSET	5995670	234	091487	R5615/32	5999915	195
080522	QC21GN22	5996217	120	087904	SPS-903/4	6000097	208	090100	C29HX10SET	5995609	233	091488	R5617/32	5999927	195
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080524	QC21GN24	5996223	120	087906	SPSG-901/4	6000142	208	091266	R5811/32	6000058	198	091495	R56115/32	5999881	195
080525	QC21GN25	5996225	120	087907	SPSG-903/8	6000150	208	091268	R5811/16	6000052	198	091497	R56111/32	5999864	195
080526	QC21GN26	5996227	119	087908	SPSG-901/2	6000139	208	091270	R5813/32	6000092	198	091533	R5733/64	5999817	196
080527	QC21GN27	5996229	119	087909	SPSG-905/8	6000154	208	091272	R5811/8	6000064	198	091534	R5717/32	5999640	196
080528	QC21GN28	5996232	119	087910	SPSG-903/4	6000146	208	091274	R5815/32	6000111	198	091535	R5735/64	6000047	196
080529	QC21GN29	5996235	119	087911	SPSG-901	6000135	208	091276	R5813/16	6000089	198	091536	R579/16	6000045	196
080530	QC21GN30	5996243	119	087912	SPR-901/4	6000101	209	091278	R5817/32	6000126	198	091537	R5737/64	6000080	196
080531	QC21GN31	5996246	119	087913	SPR-903/8	6000112	209	091280	R5811/4	6000061	198	091538	R5719/32	5999644	196
080532	QC21GN32	5996250	119	087914	SPR-901/2	6000098	209	091282	R5819/32	6000143	198	091539	R5739/64	6000123	196
080533	QC21GN33	5996257	119	087915	SPR-905/8	6000050	209	091284	R5815/16	6000107	198	091540	R575/8	6000021	196
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080535	QC21GN35	5996264	119	087917	SPR-901	6000095	209	091288	R5813/8	6000102	198	091542	R5721/32	5999647	196
080536	QC21GN36	5996268	119	087918	SPRG-901/4	6000055	209	091290	R58113/32	6000077	198	091543	R5743/64	6000180	196
080537	QC21GN37	5996273	119	087919	SPRG-903/8	6000060	209	091292	R5817/16	6000118	198	091544	R5711/64	5999624	196
080538	QC21GN38	5996277	119	087920	SPRG-901/2	6000222	209	091294	R58115/32	6000086	198	091545	R5745/64	6000184	196
080539	QC21GN39	5996281	119	087921	SPRG-905/8	6000063	209	091296	R5811/2	6000054	198	091546	R5723/32	5999651	196
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080541	QC21GN41	5996294	119	087923	SPRG-901	6000219	209	091300	R5815/8	6000114	198	091548	R573/64	5999667	196
080542	QC21GN42	5996301	119	087924	SPL-901/4	6000025	210	091302	R58111/16	6000067	198	091549	R5749/64	6000192	196
080543	QC21GN43	5996233	119	087925	SPL-903/8	6000031	210	091304	R5813/4	6000096	198	091550	R5725/32	5999655	196
080544	QC21GN44	5996272	119	087926	SPL-901/2	6000022	210	091306	R58113/16	6000074	198	091551	R5751/64	6000023	196
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080552	QC21GN52	5996240	119	087935	SPLG-901	6000056	210	091437	R5637/64	5999989	194	091559	R5759/64	6000035	196
081704	QC21G1/16	5996259	119	087950	SPS-1201/4	6000072	208	091438	R5619/32	5999956	194	091560	R5715/16	5999636	196
081705	QC21G5/64	5996341	119	087951	SPS-1203/8	6000078	208	091439	R5639/64	5999992	194	091561	R5761/64	6000038	196
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081707	QC21G7/64	5996353	119	087953	SPS-1205/8	6000081	208	091441	R5641/64	5999995	194	091563	R5763/64	6000041	196
081708	QC21G1/8	5996269	119	087954	SPS-1203/4	6000075	208	091442	R5621/32	5999959	194	091564	R571	5999538	196
081709	QC21G9/64	5996360	119	087955	SPS-1201	6000066	208	091443	R5643/64	6000001	194	091565	R5711/64	5999548	196
081710	QC21G5/32	5996338	120	087956	SPSG-1201/4	6000113	208	091444	R5611/16	5999944	194	091567	R5713/64	5999580	197
081711	QC21G11/64	5996279	120	087957	SPSG-1203/8	6000127	208	091445	R5645/64	5999527	194	091568	R5711/16	5999540	197
081712	QC21G3/16	5996325	120	087958	SPSG-1201/2	6000110	208	091446	R5623/32	5999962	194	091569	R5715/64	5999598	197
081713	QC21G13/64	5996287	120	087959	SPSG-1205/8	6000133	208	091447	R5647/64	5999550	194	091570	R5713/32	5999577	197
081714	QC21G7/32	5996351	120	087960	SPSG-1203/4	6000116	208	091448	R563/4	5999976	194	091571	R5717/64	59996	

EDP NUMBER INDEX - 0094426 - 0110195

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
091584	R57117/16	5999602	197	0094341	E500M24NO2	5975659	315	0096239	E513M16X15NO7	5977401	317	0099278	E5471/4NO3	5976335	363
091585	R5711/2	5999543	197	0094358	E500M24NO2	5975663	315	0096246	E513M16X10NO3	5976823	317	0099285	E5471/8NO3	5976349	363
091586	R5711/32	5999545	197	0094365	E500M27NO2	5975687	315	0096253	E513M16X10NO7	5977250	317	0099292	E5472NO3	5976385	363
091587	R5715/32	5999594	197	0094372	E500M27NO3	5975688	315	0096260	E513M18X15NO3	5977267	318	0099308	E5473/4NO3	5976397	363
091588	R5717/32	5999606	197	0094402	E500M35NO1	5975690	315	0096277	E513M18X10NO2	5977405	318	0099315	E5473/8NO3	5976416	363
091589	R5719/32	5999616	197	0094419	E500M35NO2	5975691	315	0096284	E513M18X10NO3	5977255	318	0099322	E5475/8NO2	5976427	363
091592	R57111/32	5999554	197	0094426	E500M35NO3	5975693	315	0096291	E513M18X10NO7	5977258	318	0099339	E5475/8NO3	5976430	363
091595	R57113/32	5999559	197	0094440	E500M3NO2	5975705	315	0096307	E513M18X20NO2	5977283	318	0099353	E5477/8NO2	5976445	363
091598	R57115/32	5999566	197	0094457	E500M3NO3	5975707	315	0096314	E513M18X20NO3	5977287	318	0099360	E5477/8NO3	5976448	363
092333	R56CO33/64	6000402	199	0094464	E500M3NO6	5975709	315	0096321	E513M18X20NO7	5977295	318	0099445	E5501	5976452	362
092334	R56CO17/32	6000364	199	0094471	E500M3NO8	5975713	315	0096338	E513M20X15NO3	5977318	318	0099452	E55011/2	5976455	362
092335	R56CO35/64	6000409	199	0094488	E500M30NO2	5975727	315	0096345	E513M20X10NO2	5977302	318	0099469	E55011/4	5976457	362
092336	R56CO9/16	6000007	199	0094495	E500M30NO3	5976741	315	0096352	E513M20X10NO3	5977305	318	0099476	E5501/2	5976459	362
092337	R56CO37/64	6000413	199	0094525	E500M33NO3	5976875	315	0096369	E513M20X10NO7	5977308	318	0099483	E55015/4	5976464	362
092338	R56CO19/32	6000367	199	0094549	E500M36NO2	5976933	315	0096376	E513M20X20NO2	5977333	318	0099490	E5501/8	5976468	362
092339	R56CO39/64	6000417	199	0094556	E500M36NO3	5976938	315	0096383	E513M20X20NO3	5977336	318	0099506	E5502	5977431	362
092340	R56CO5/8	6000439	199	0094587	E500M39NO3	5976746	315	0096390	E513M22X15NO3	5977359	318	0099513	E5503/4	5977442	362
092341	R56CO41/64	6000420	199	0094617	E500M45NO2	5976752	315	0096406	E513M22X10NO2	5977344	318	0099520	E5503/8	5977464	362
092342	R56CO21/32	6000372	199	0094624	E500M45NO3	5976754	315	0096413	E513M22X10NO3	5977347	318	099701	C21R10COSET	5995560	234
092343	R56CO43/64	6000424	199	0094648	E500M4NO2	5976770	315	0096420	E513M22X20NO2	5977372	318	099705	C114COMBCSET	5995600	235
092344	R56CO11/16	6000350	199	0094655	E500M4NO3	5976774	315	0096437	E513M22X20NO3	5977375	318	099706	C115COMBCSET	5995679	235
092345	R56CO45/64	6000428	199	0094662	E500M4NO6	5976783	315	0096444	E513M22X20NO7	5977378	318	0099834	E7101	5977609	350
092346	R56CO23/32	6000377	199	0094679	E500M4NO8	5976791	315	0096451	E513M24X15NO3	5977392	318	0099841	E71011/2	5977612	350
092347	R56CO47/64	6000432	199	0094686	E500M42NO3	5976815	315	0096468	E513M24X15NO7	5977399	318	0099858	E71011/4	5977615	350
092348	R56CO3/4	6000394	199	0094709	E500M45NO3	5976841	315	0096475	E513M24X10NO2	5977381	318	0099865	E7101/2	5977622	350
092349	R56CO49/64	6000435	199	0094730	E500M48NO3	5976850	315	0096482	E513M24X10NO3	5977383	318	0099872	E7101/4	5977628	350
092350	R56CO25/32	6000382	199	0094761	E500M5NO2	5976878	315	0096499	E513M24X20NO2	5977038	318	0099889	E7101/8	5977634	350
092351	R56CO51/64	6000442	199	0094778	E500M5NO3	5976886	315	0096505	E513M24X20NO3	5977079	318	0099896	E7102	5977643	350
092352	R56CO13/16	6000353	199	0094785	E500M5NO8	5976898	315	0096512	E513M25X15NO3	5977179	318	0099902	E7103/4	5977646	350
092353	R56CO53/64	6000448	199	0094792	E500M52NO3	5976992	315	0096529	E513M26X15NO2	5977000	318	099903	C29R40CSET	5995632	238
092354	R56CO27/32	6000386	199	0094808	E500M6NO1	5977074	315	0096536	E513M26X15NO3	5977003	318	0099919	E7103/8	5977652	350
092355	R56CO55/64	5999837	199	0094815	E500M6NO2	5977116	315	0096543	E513M28X15NO2	5977017	318	0099926	E7111	5977656	356
092356	R56CO7/8	6000004	199	0094822	E500M6NO3	5977162	315	0096550	E513M28X15NO3	5977021	318	099930	C60R41CSET	5995677	238
092357	R56CO57/64	5999886	199	0094839	E500M6NO8	5977180	315	0096567	E513M30X35NO3	5977041	318	0099933	E7111/2	5977660	356
092358	R56CO29/32	6000390	199	0094846	E500M7NO3	5976999	315	0096574	E513M30X15NO2	5977045	318	099935	C29L10SET	5995612	231
092359	R56CO59/64	5999931	199	0094853	E500M7NO6	5977002	315	0096581	E513M30X15NO3	5977049	318	0099940	E7111/4	5977662	356
092360	R56CO15/16	6000356	199	0094877	E500M8NO2	5977016	315	0096598	E513M32X15NO3	5977068	318	099944	C13R10COSET	5995685	234
092361	R56CO61/64	5999965	199	0094884	E500M8NO3	5977020	315	0096604	E513M33X20NO2	5977071	318	099955	C15L10SET	5995520	231
092362	R56CO31/32	6000398	199	0094891	E500M8NO6	5977024	315	0096611	E513M33X20NO3	5977075	318	0099957	E7111/8	5977664	356
092363	R56CO63/64	5999998	199	0094907	E500M8NO8	5977036	315	0096628	E513M35X15NO2	5977082	318	099960	C60M41COSET	5995667	239
092364	R56CO1	6000347	199	0094914	E500M9NO3	5977047	315	0096635	E513M35X15NO3	5977086	318	099961	C26M42COSET	5995585	239
093900	E500M16NO3	5976989	315	0094938	E501M10NO2	5977066	323	0096642	E513M36X20NO3	5977097	318	099962	C29M40COSET	5995616	239
093924	E500M17NO2	5976994	315	0094945	E501M10NO3	5977070	323	0096659	E513M36X30NO2	5977101	318	009964	E7113/4	5977669	356
093931	E500M17NO3	5976995	315	0094952	E501M12NO2	5977081	323	0096666	E513M36X30NO3	5977105	318	009971	E7113/8	5977542	356
093948	E500M18NO2	5977011	315	0094969	E501M12NO3	5977085	323	0096673	E513M39X30NO3	5977113	318	099976	C60R18SET	5995674	225
093955	E500M18NO3	5977015	315	0094976	E501M14NO2	5977092	323	0096680	E513M4X5NO3	5977128	318	099977	C29R10SET	5995628	224
093979	E500M10NO2	5975320	315	0094983	E501M14NO3	5977096	323	0096697	E513M40X15NO3	5977140	318	099978	C15R10SET	5995533	224
093986	E500M10NO3	5975367	315	0094990	E501M16NO2	5977104	323	0096703	E513M42X15NO3	5977151	318	099981	C20R18SET	5995552	225
093993	E500M10NO8	5975480	315	0095003	E501M16NO3	5977108	323	0096710	E513M45X15NO3	5977164	318	099982	C115COMBSET	5995683	227
094006	E500M11NO2	5975484	315	0095010	E501M18NO3	5977120	323	0096727	E513M5X5NO2	5977196	318	099983	C26R15SET	5995597	226
094013	E500M11NO3	5975486	315	0095027	E501M20NO2	5977129	323	0096734	E513M5X5NO3	5977223	318	099985	C502ABSET	5995661	228
094037	E500M12NO2	5975293	315	0095034	E501M20NO3	5977132	323	0096741	E513M5X5NO7	5977227	318	099987	C252ASET	5995581	228
094044	E500M12NO3	5975296	315	0095041	E501M24NO3	5977150	323	0096758	E513M50X15NO3	5977072	318	0099988	E7121	5977585	360
094051	E500M12NO6	5975302	315	0095058	E501M3NO2	5977158	323	0096765	E513M6X75NO3	5977098	317	099988	C252ABSET	5995577	228
094068	E500M12NO3	5975309	315	0095065	E501M3NO3	5977169	323	0096772	E513M6X75NO7	5977102	317	099990	C114COMBSET	5995676	227
094075	E500M14NO2	5975317	315	0095072	E501M4NO2	5976814	323	0096789	E513M7X75NO2	5977114	317	009995	E71211/4	5977619	360
094082	E500M14NO3	5975324	315	0095089	E501M4NO3	5976856	323	0096796	E513M7X75NO3	5977118	317	010004	E7121/16	5977651	360
094099	E500M14NO8	5975336	315	0095096	E501M5NO2	5976942	323	0096802	E513M8X75NO3	5977141	317	0100011	E7121/2	5977677	360
094105	E500M16NO2	5975344	315	0095102	E501M5NO3	5976949	323	0096819	E513M8X75NO7	5977145	317	0100028	E7121/4	5977685	360
094112	E500M16NO3	5975349	315	0095119	E501M6NO2	5976955	323	0096826	E513M8X10NO3	5977161	317	0100035	E7121/8	5977688	360
094129	E500M16NO8	5975363	315	0095126	E501M6NO3	5976958	323	0096833	E513M9X10NO3	5977182	317	0100042	E7123/4	5977691	360
094136	E500M18NO2	5975375	315	0095133	E501M8NO2	5976775	323	097601	76HAN1	6001213	212	0100059	E7123/8	5977694	360
094143	E500M18NO3	5975380	315	0095140	E501M8NO3	5976779	323	097602	76HAN2	6001215	212	0104996	F201M10	5977822	383
094167	E500M22NO2	5975404	315	0096079	E513M10X125NO3	5976817	317	097603	76HAN3	6001217	212	0105009	F201M12	5977826	383
094174	E500M22NO3	5975410	315	0096086	E513M10X10NO3	5977407	317	097604	76HAN4	6001219	212	0105016	F201M14	5977831	383
094198	E500M23NO2	5975437	315	0096093	E513M11X10NO2	5976693	317	097605	76HAN5	6001221	212	0105023	F201M16	5977836	383
094204	E500M23NO3	5975442	315	0096109	E513M11X10										

EDP NUMBER INDEX - 0110201 - 0134405

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0105603...	F302M24	5978487	386	0109557...	G338630	5973329	499	0115756...	R51050	5980562	54	0116531...	R52093	5981169	46
0105610...	F302M27	5978493	386	0109632...	G560100	5973336	492	0115763...	R51051	5980565	54	0116548...	R52095	5981180	46
0105627...	F302M3	5978496	386	0109649...	G560104	5973337	492	0115770...	R51055	5980571	54	0121863...	A17029/32	5968783	193
0105634...	F302M30	5978499	386	0109656...	G560124	5973339	492	0115787...	R51060	5980607	54	0121870...	A17033/64	5968798	192
0105641...	F302M33	5978502	386	0109663...	G560165	5973341	492	0115794...	R51065	5980615	54	0121887...	A17035/64	5968804	192
0105658...	F302M36	5978505	386	0109670...	G560205	5973345	492	0115800...	R51068	5980622	54	0121894...	A17037/64	5968809	192
0105672...	F302M4	5978508	386	0109687...	G560250	5973347	492	0115817...	R51069	5980626	54	0121900...	A17039/64	5968814	192
0105719...	F302M5	5978510	386	0109694...	G56063	5973351	492	0115824...	R51070	5980478	54	0121917...	A17043/64	5968828	192
0105733...	F302M6	5978513	386	0110171...	K520100X1000	5982322	511	0115831...	R51073	5980481	54	0121924...	A17047/64	5968838	192
0105740...	F302M7	5978517	386	0110195...	K520100X1600	5982330	511	0115848...	R51074	5980484	54	0121931...	A17049/64	5968842	192
0105757...	F302M8	5978521	386	0110201...	K520100X2000	5982333	511	0115855...	R51075	5980488	54	0121948...	A17053/64	5968858	193
0108260...	G132125	5973334	497	0110225...	K520120X1000	5982344	511	0115862...	R51080	5980505	55	0121955...	A17055/64	5968862	193
0108277...	G132160	5973335	497	0110249...	K520120X1600	5982348	511	0115879...	R51085	5980507	55	0121962...	A17059/64	5968878	193
0108284...	G132200	5973338	497	0110256...	K520120X2000	5982355	511	0115886...	R51090	5980519	55	0121979...	A17061/64	5968899	193
0108291...	G13280	5973340	497	0110294...	K520140X1600	5982363	511	0115893...	R51092	5980521	55	0121986...	A17063/64	5968974	193
0108444...	G135125	5973344	489	0110300...	K520140X2000	5982367	511	0115909...	R51093	5980525	55	0122198...	B15730	5986732	464
0108451...	G135160	5973346	489	0110317...	K520160X1000	5982371	511	0115916...	R51095	5980531	55	0122297...	C34630	5984057	432
0108468...	G135200	5973350	489	0110324...	K520160X1600	5982374	511	0115923...	R520100	5980551	46	0122303...	C34640	5984062	432
0108475...	G135250	5973352	489	0110331...	K520160X2000	5982378	511	0115930...	R520102	5980557	46	0122310...	C34650	5984067	432
0108482...	G13563	5973354	489	0110379...	K520200X1600	5982387	511	0115947...	R520104	5980563	46	0122327...	C34660	5984075	432
0108499...	G13580	5973356	489	0110386...	K520200X2000	5982392	511	0115954...	R520105	5980566	46	0122440...	E500M26NO3	5975674	315
0108505...	G136100	5973358	492	0110409...	K520250X2000	5982403	511	0115961...	R520110	5980569	46	0122457...	E500M56NO3	5977032	315
0108512...	G136104	5973360	492	0110478...	K52060X1000	5982327	511	0115978...	R520115	5980579	46	0122464...	E500M1NO3	5977035	315
0108529...	G136115	5973362	492	0110485...	K52060X1600	5982332	511	0115985...	R520120	5980589	46	0122471...	E500M12NO3	5976978	315
0108536...	G136124	5973364	492	0110492...	K52060X2000	5982336	511	0115992...	R520125	5980591	46	0122488...	E500M14NO3	5976985	315
0108543...	G136134	5973366	492	0110546...	K52080X1000	5982358	511	0116005...	R520130	5980595	46	0122495...	E501M22NO3	5977142	323
0108550...	G136150	5973368	492	0110553...	K52080X1600	5982361	511	0116012...	R520140	5980612	46	0122501...	E504M5NO3	5976848	328
0108567...	G136165	5973371	492	0110560...	K52080X2000	5982365	511	0116029...	R520145	5981198	46	0122518...	E504M6NO3	5976860	328
0108574...	G136190	5973373	492	0110607...	K521100X1000	5982386	511	0116036...	R520150	5981238	46	0122525...	E504M8NO3	5976868	328
0108581...	G136205	5973375	492	0110638...	K521100X2000	5982397	511	0116043...	R520160	5981285	46	0122532...	E504M10NO3	5976786	328
0108598...	G136230	5973377	492	0110645...	K521120X1000	5982401	511	0116050...	R520165	5981289	46	0122556...	E504M4NO3	5976842	328
0108604...	G136250	5973379	492	0110669...	K521120X2000	5982408	511	0116067...	R52030	5981147	45	0122563...	E504M3NO3	5976834	328
0108611...	G136260	5973381	492	0110720...	K521160X2000	5982430	511	0116074...	R52031	5981152	45	0123003...	E513M30X20NO3	5977057	318
0108628...	G136280	5973383	492	0110782...	K521200X2000	5982439	511	0116081...	R52032	5981155	45	0123010...	E513M27X15NO3	5977010	318
0108635...	G136300	5973386	492	0110799...	K52130X1000	5982442	511	0116098...	R52033	5981161	45	0123027...	E513M5X75NO3	5977233	317
0108642...	G136310	5973387	492	0110805...	K52140X1000	5982451	511	0116104...	R52034	5981164	45	0123034...	E513M6X5NO3	5977083	317
0108659...	G13643	5973389	492	0110843...	K52160X1000	5982357	511	0116111...	R52035	5981167	45	0123041...	E513M27X20NO3	5977013	318
0108666...	G13650	5973393	492	0110850...	K52160X1600	5982400	511	0116128...	R52036	5981171	45	0123058...	E513M8X5NO3	5977130	317
0108673...	G13653	5973395	492	0110881...	K52180X1000	5982474	511	0116135...	R52037	5981174	45	0123065...	E513M10X75NO3	5977398	317
0108680...	G13658	5973398	492	0110904...	K52180X1600	5982478	511	0116142...	R52038	5981178	45	0123072...	E513M11X75NO3	5976866	317
0108697...	G13660	5973399	492	0110911...	K52180X2000	5982480	511	0116159...	R52039	5981182	45	0124079...	E71111/2	5977658	356
0108703...	G13663	5973400	492	0111604...	L1101	5978506	388	0116166...	R52040	5981201	45	0126233...	C346100	5984009	432
0108710...	G13670	5973401	492	0111611...	L1102A	5978542	388	0116173...	R52041	5981204	45	0126240...	C346110	5984014	432
0108727...	G13673	5973402	492	0111628...	L1102B	5978547	388	0116180...	R52042	5981208	45	0126257...	C346120	5984019	432
0108734...	G13680	5973403	492	0111635...	L1103	5978556	388	0116197...	R52043	5981212	45	0126264...	C346130	5984024	432
0108741...	G13683	5973404	492	0111642...	L1104	5978566	388	0116203...	R52044	5981216	45	0126288...	C346150	5984034	432
0108758...	G13694	5973405	492	0111659...	L1105F	5978581	388	0116210...	R52045	5981220	45	0126295...	C346160	5984044	432
0108765...	G137160	5973407	498	0111666...	L1105	5978576	388	0116227...	R52046	5981225	45	0126318...	C346200	5984052	432
0108772...	G137200	5973061	498	0111673...	L1106F	5978749	388	0116234...	R52047	5981227	45	0126325...	C34670	5984080	432
0108789...	G137250	5973073	498	0111680...	L1106	5978589	388	0116241...	R52048	5981230	45	0126332...	C34680	5984085	432
0108796...	G137315	5973099	498	0111697...	L1107F	5978826	388	0116258...	R52049	5981236	45	0126349...	C34690	5984090	432
0108802...	G137400	5973147	498	0111703...	L1107	5978792	388	0116265...	R52050	5981242	45	0127513...	E650M10	5978304	369
0108819...	G137500	5973208	498	0111710...	L1108F	5978876	388	0116272...	R52051	5981244	45	0127520...	E650M12	5978308	369
0108826...	G137630	5973217	498	0111727...	L1108	5978850	388	0116289...	R52052	5981247	45	0127537...	E650M14	5978313	369
0108833...	G137800	5973222	498	0111734...	L1109F	5978885	388	0116296...	R52053	5981252	45	0127544...	E650M16	5978320	369
0108895...	G138250	5973066	499	0111741...	L1109	5978882	388	0116302...	R52054	5981254	45	0127551...	E650M4	5978330	369
0108925...	G138300	5973069	499	0111758...	L11010F	5978526	388	0116319...	R52055	5981257	45	0127568...	E650M5	5978339	369
0108932...	G138310	5973070	499	0111765...	L11010	5978522	388	0116326...	R52056	5981260	45	0127575...	E650M6	5978342	369
0108949...	G138340	5973071	499	0115558...	R510100	5980534	55	0116333...	R52057	5981263	45	0127582...	E650M8	5978347	369
0108956...	G138370	5973072	499	0115565...	R510102	5980568	55	0116340...	R52058	5981266	45	0127711...	G56080	5973353	492
0108963...	G138400	5973074	499	0115572...	R510104	5980577	55	0116357...	R52059	5981269	45	0127728...	G56083	5973355	492
0108970...	G138500	5973075	499	0115589...	R510105	5980581	55	0116364...	R52060	5981142	45	0127735...	G560310	5973349	492
0108987...	G138630	5973076	499	0115596...	R510110	5980424	55	0116371...	R52061	5981176	45	0127957...	B17098	5986212	455
0108994...	G138800	5973078	499	0115602...	R510115	5980431	55	0116388...	R52062	5981218	46	0127964...	B17099	5986213	455
0109038...	G14910	5973182	491	0115619...	R510120	5980441	55	0116395...	R52063	5981226	46	0127971...	B17010	5986214	455
0109045...	G14915	5973188	491	0115626...	R510130	5980448	55	0116401...	R52064	5981229	46	0127988...	B170101	5986215	455
0109052...	G14920	5973198	491	0115633...	R510140	5980458	55	0116418...	R52065	5981233	46	0127995...	B170102	5986216	455
0109069...	G14925	5973203	491	0115640...	R5101425	5980463	55	0116425...	R52068	5981077	46	0128008...	B170103	5986217	455
0109076...	G14930	5973211	491	0115657...	R51030	5980504	54	0116432...	R52069						

EDP NUMBER INDEX - 0134412 - 0138205

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0128770..	G400310	5979248	486	0134276..	B170551	5986586	455	0135051..	R45852	5980322	48	0136270..	B170749	5986603	455
0128787..	G40063	5979252	486	0134283..	B170551	5986616	455	0135068..	R45862	5980333	48	0136287..	B17075	5986606	455
0128794..	G40083	5979084	486	0134290..	B170552	5986647	455	0135075..	R45864	5980339	48	0136294..	B170751	5986609	455
0128916..	B170198	5986235	455	0134306..	R45377	5978979	58	0135082..	R45867	5980347	48	0136300..	B170752	5986612	455
0128923..	B170199	5986238	455	0134313..	R45379	5979424	58	0135099..	R45877	5980381	49	0136317..	EP01M14	5973465	286
0128930..	B170100	5986241	455	0134320..	R45382	5979578	58	0135105..	R45879	5980388	49	0136324..	EP01M16	5973467	286
0128947..	B1701001	5986244	455	0134337..	R45384	5979581	58	0135112..	R45882	5980406	49	0136331..	EP01M18	5973471	286
0128954..	B1701002	5986246	455	0134344..	R45389	5979440	58	0135129..	R45884	5980409	49	0136348..	EP01M20	5973477	286
0128961..	B1701003	5986249	455	0134351..	R45394	5979454	58	0135136..	R45894	5980443	49	0136355..	EP01M22	5973480	286
0128978..	B1701004	5986253	455	0134368..	R45399	5979476	58	0135143..	R45897	5980454	49	0136362..	EP01M24	5973484	286
0128985..	B1701005	5986256	455	0134375..	R453114	5979972	58	0135150..	R45899	5980461	49	0136379..	EP01M27	5973429	286
0129463..	B1701049	5986261	455	0134382..	R453116	5979986	59	0135167..	R458114	5980390	50	0136386..	EP01M30	5973506	286
0129470..	B1701051	5986267	455	0134399..	R453128	5980023	59	0135174..	R458116	5980396	50	0136591..	EX00M3	5973590	298
0129487..	B1701052	5986270	455	0134405..	R453138	5979602	59	0135181..	R458128	5980433	50	0136607..	EX00M35	5973595	298
0129883..	B1701098	5986273	455	0134412..	R453148	5979691	59	0135198..	R458138	5980450	50	0136614..	EX00M4	5973630	298
0129890..	B1701099	5986276	455	0134429..	R453158	5979549	59	0135204..	R458158	5980487	50	0136621..	EX00M5	5973649	298
0129906..	B170110	5986279	455	0134436..	R453178	5979573	59	0135211..	R458165	5980499	50	0136638..	EX00M6	5973673	298
0129913..	B1701101	5986282	455	0134443..	R453198	5979593	59	0135228..	R458170	5980503	50	0136645..	EX00M6DIN376	5973677	298
0129920..	B1701102	5986285	455	0134450..	R45444	5980103	56	0135235..	R458175	5980506	50	0136652..	EX00M7	5973690	298
0129937..	B1701103	5986288	455	0134467..	R45448	5980182	57	0135242..	B170649	5986562	455	0136669..	EX00M8	5973694	298
0129944..	B1701104	5986292	455	0134474..	R45449	5980187	57	0135259..	B17065	5986566	455	0136676..	EX00M8DIN376	5973697	298
0129951..	B1701105	5986789	455	0134481..	R45452	5980045	57	0135273..	R458178	5980509	50	0136683..	EX00M10	5973986	298
0130384..	B1701149	5986832	455	0134498..	R45462	5980084	57	0135280..	R458180	5981043	50	0136690..	EX00M10DIN376	5973991	298
0130391..	B170115	5986862	455	0134504..	R45464	5980092	57	0135297..	R458185	5981078	50	0136706..	EX00M12	5973611	298
0130407..	B1701151	5986884	455	0134511..	R45477	5980133	58	0135303..	B170651	5986570	455	0136713..	EX00M14	5973709	298
0130414..	B1701152	5986924	455	0134528..	R45479	5980142	58	0135310..	B170652	5986573	455	0136720..	EX00M16	5973744	298
0130865..	B1701198	5986930	455	0134535..	R45482	5980157	58	0135327..	R458190	5981112	50	0136737..	EX00M18	5973748	298
0130872..	B1701199	5986933	455	0134542..	R45484	5980162	58	0135334..	R458195	5981146	50	0136744..	EX00M20	5973571	298
0130889..	B170120	5986937	455	0134559..	R45489	5979268	58	0135341..	R458198	5981177	50	0136751..	B170798	5986614	455
0130896..	B17020	5986940	455	0134566..	R45494	5979372	58	0135358..	R458200	5981192	50	0136768..	B170799	5986620	455
0130902..	B170201	5986795	455	0134573..	R45497	5979385	58	0135709..	EP00M3	5973420	286	0136775..	B170801	5986626	455
0130919..	B170202	5986798	455	0134580..	R45499	5979233	58	0135716..	EP00M3DIN376	5973422	286	0136782..	B170802	5986629	455
0130926..	B170203	5986801	455	0134597..	R454114	5980012	58	0135723..	EP00M35	5973421	286	0136799..	B170803	5986632	455
0130933..	B170204	5986805	455	0134603..	R454116	5980018	59	0135730..	EP00M4	5973426	286	0136805..	B170804	5986637	455
0130940..	B170205	5986809	455	0134610..	R454128	5980057	59	0135747..	EP00M4DIN376	5973428	286	0136812..	B170805	5986639	455
0131367..	B170249	5986813	455	0134627..	R454138	5980065	59	0135754..	EP00M45	5973427	286	0136829..	EX00M22	5973578	298
0131374..	B17025	5986817	455	0134634..	R454148	5979813	59	0135761..	B170698	5986578	455	0136836..	EX00M24	5973583	298
0131381..	B170251	5986821	455	0134641..	R454158	5979922	59	0135778..	B170699	5986581	455	0136843..	EX00M27	5973586	298
0131398..	B170252	5986825	455	0134658..	R454165	5979783	59	0135785..	B17070	5986584	455	0136850..	EX00M30	5973599	298
0131848..	B170298	5986829	455	0134665..	R454170	5979786	59	0135792..	B170701	5986590	455	0136867..	EX00M33	5973604	298
0131855..	B170299	5986836	455	0134672..	R454175	5979789	59	0135808..	B170702	5986593	455	0136874..	EX00M36	5973616	298
0131862..	B17030	5986839	455	0134689..	R454178	5979792	59	0135815..	B170703	5986596	455	0136881..	EX00M39	5973624	298
0131879..	B170302	5986845	455	0134696..	R454180	5979801	59	0135822..	B170704	5986598	455	0136898..	EX00M42	5973634	298
0131886..	B170303	5986848	455	0134702..	R454185	5979804	59	0135839..	B170705	5986602	455	0136904..	EX00M48	5973646	298
0131893..	B170304	5986851	455	0134719..	R454190	5979807	59	0135846..	EP00M5	5973431	286	0136911..	EX00M52	5973653	298
0131909..	B170305	5986852	455	0134726..	R454195	5979810	59	0135853..	EP00M5DIN376	5973433	286	0136928..	EX00M56	5973658	298
0132302..	B170349	5986855	455	0134733..	R454198	5979816	59	0135860..	EP00M6	5973437	286	0136935..	EX00M64	5973682	298
0132319..	B17035	5986858	455	0134740..	R454200	5979824	59	0135877..	EP00M6DIN376	5973441	286	0136942..	EX01M3	5973698	298
0132326..	B170351	5986860	455	0134757..	B170598	5986682	455	0135884..	EP00M7	5973445	286	0136959..	B17080	5986622	455
0132333..	B170352	5986865	455	0134764..	B170599	5986689	455	0135891..	EP00M8	5973447	286	0136966..	EX01M35	5973702	298
0132784..	B170398	5986867	455	0134771..	B17060	5986693	455	0135907..	EP00M8DIN376	5973449	286	0136973..	EX01M4	5973532	298
0132791..	B170399	5986872	455	0134788..	B170601	5986696	455	0135914..	EP00M10	5973412	286	0136980..	EX01M5	5973544	298
0132807..	B17040	5986875	455	0134795..	B170602	5986700	455	0135921..	EP00M10DIN376	5973423	286	0136997..	EX01M6	5973559	298
0132814..	B170401	5986878	455	0134801..	B170603	5986650	455	0135938..	EP00M12	5973461	286	0137000..	EX01M6DIN376	5973562	298
0132821..	B170402	5986881	455	0134818..	B170604	5986654	455	0135945..	EP00M14	5973486	286	0137017..	EX01M7	5973576	298
0132838..	B170403	5986884	455	0134825..	B170605	5986658	455	0135952..	EP00M16	5973489	286	0137024..	EX01M8	5973580	298
0132845..	B170404	5986887	455	0134832..	R45744	5979301	48	0135969..	EP00M18	5973493	286	0137031..	EX01M8DIN376	5973584	298
0132852..	B170405	5986890	455	0134849..	R45748	5979313	48	0135976..	EP00M20	5973415	286	0137048..	EX01M10	5973705	298
0133286..	B170449	5986892	455	0134856..	R45752	5980447	48	0135983..	EP00M22	5973417	286	0137055..	EX01M10DIN376	5973712	298
0133293..	B17045	5986896	455	0134863..	R45762	5980312	48	0135990..	EP00M24	5973418	286	0137062..	EX01M12	5973717	298
0133309..	B170451	5986898	455	0134870..	R45764	5980323	48	0136003..	EP00M27	5973419	286	0137079..	EX01M14	5973722	298
0133316..	B170452	5986901	455	0134887..	R45767	5980335	48	0136010..	EP00M30	5973424	286	0137086..	EX01M16	5973730	298
0133767..	B170498	5986903	455	0134894..	R45777	5980371	49	0136119..	EP01M3	5973452	286	0137093..	EX01M18	5973736	298
0133774..	B170499	5986906	455	0134900..	R45779	5980379	49	0136126..	EP01M3DIN376	5973495	286	0137109..	EX01M20	5973524	298
0133781..	B17050	5986909	455	0134917..	R45782	5980401	49	0136133..	EP01M35	5973474	286	0137116..	EX01M22	5973594	298
0133798..	B170501	5986912	455	0134924..	R45784	5980404	49	0136140..	EP01M4	5973511	286	0137123..	EX01M24	5973644	298
0133804..	B170502	5986915	455	0134931..	R45789	5980420	49	0136157..	EP01M4DIN376	5973515	286	0137130..	EX01M27	5973689	298
0133811..	B170503	5986918	455	0134948..	R45794	5980122	49	0136164..	EP01M45	5973513					

EDP NUMBER INDEX - 0138212 - 0152645

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0137253	EP01M2	5973473	286	0138038	EP205-40	5973737	282	0140376	B157150	5986841	464	0148631	A97670X225	5973210	85
0137260	B170849	5986641	455	0138045	EP206-32	5973745	282	0140383	B157160	5986874	464	0148648	A97675X225	5973220	85
0137277	B17085	5986643	455	0138052	EP208-32	5973752	282	0140390	B157170	5986880	464	0148655	A97680X240	5973230	85
0137284	B170852	5986650	455	0138069	EP2010-24	5973723	282	0140406	B157180	5986883	464	0148662	A97685X240	5973235	85
0137291	EP01M25	5973475	286	0138076	EP2012-24	5973725	282	0140413	B157190	5986886	464	0148679	A97690X250	5973239	85
0137307	EX00M2	5973751	298	0138083	EP201-4	5973720	282	0140420	B157200	5986728	464	0148686	A97695X250	5973243	86
0137314	EX00M25	5973567	298	0138090	EP205/16	5973741	282	0140819	B33413	5986943	472	0148693	A976100X265	5972597	86
0137321	EX01M2	5973739	298	0138106	EP203/8	5973732	282	0140826	B33414	5986946	472	0148709	A97730X190	5973110	84
0137338	EX01M25	5973742	298	0138113	EP207/16	5973747	282	0140833	B33415	5986949	472	0148716	A97735X210	5973114	84
0137345	EP10M4X5	5973502	287	0138120	EP201/2	5973716	282	0140840	B33416	5986952	472	0148723	A97740X220	5973127	85
0137352	EP10M5X5	5973503	287	0138137	EP205/8	5973743	282	0144152	B40030	5987117	450	0148730	A97745X235	5973132	85
0137369	EP10M6X75	5973504	287	0138144	EP203/4	5973729	282	0144169	B40032	5987120	450	0148747	A97750X245	5973136	85
0137376	EP10M8X75	5973505	287	0138151	EP207/8	5973749	282	0144176	B40035	5987123	450	0148754	A97755X260	5973141	85
0137383	EP10M8X10	5973507	287	0138168	EP201	5973714	282	0144183	B40040	5987129	450	0148761	A97760X260	5973148	85
0137390	EP10M10X75	5973456	287	0138175	EP214-40	5973914	282	0144190	B40045	5987132	450	0148778	A97765X275	5973153	85
0137406	EP10M10X10	5973458	287	0138182	EP215-40	5973957	282	0144206	B40050	5987134	450	0148785	A97770X290	5973163	85
0137413	EP10M10X125	5973460	287	0138199	EP216-32	5973995	282	0144213	B40055	5987137	450	0148792	A97775X290	5973168	85
0137420	EP10M12X10	5973462	287	0138205	EP218-32	5973818	282	0144220	B40060	5987141	450	0148808	A97780X305	5973172	85
0137437	EP10M12X125	5973464	287	0138212	EP2110-24	5973760	282	0144237	B40065	5987144	450	0148815	A97785X305	5973177	85
0137444	EP10M12X15	5973466	287	0138229	EP2112-24	5973764	282	0144244	B40070	5987148	450	0148822	A97790X320	5973181	85
0137451	EP10M14X10	5973468	287	0138236	B170949	5986678	455	0144251	B40080	5987152	450	0148839	A97795X320	5973186	86
0137468	EP10M14X125	5973470	287	0138243	B17095	5986685	455	0144268	B40090	5987155	450	0148846	A977100X340	5973268	86
0137475	EP10M14X15	5973472	287	0138250	B170951	5986611	455	0144275	B400100	5987247	450	0148853	A97835X265	5973204	84
0137482	EP10M16X10	5973476	287	0138267	B170952	5986642	455	0144282	B400120	5987250	450	0148860	A97840X280	5973212	85
0137499	EP10M16X15	5973478	287	0138274	EP211/4	5973758	282	0144299	B400140	5987253	450	0148877	A97845X295	5973216	85
0137505	EP10M18X10	5973481	287	0138281	EP215/16	5973989	282	0144305	B400160	5987094	450	0148884	A97850X315	5973221	85
0137512	EP10M18X15	5973483	287	0138298	EP213/8	5973858	282	0144312	B400180	5987097	450	0148891	A97855X330	5973226	85
0137529	EP10M20X10	5973485	287	0138304	EP217/16	5973997	282	0144329	B400200	5987114	450	0148907	A97860X330	5973231	85
0137536	EP10M20X15	5973487	287	0138311	EP211/2	5973756	282	0144336	B411170	5987178	452	0148914	A97865X350	5973238	85
0137543	EP10M22X15	5973488	287	0138328	EP215/8	5973993	282	0144343	B411180	5987181	452	0148921	A97870X370	5973242	85
0137550	EP10M24X15	5973490	287	0138335	EP213/4	5973810	282	0144350	B411190	5987184	452	0148938	A97875X370	5973246	85
0137567	EP10M24X20	5973492	287	0138342	EP217/8	5973999	282	0144367	B411200	5987187	452	0148945	A97880X390	5973250	85
0137574	EP10M25X15	5973494	287	0138359	EP211	5973754	282	0144374	B411220	5987190	452	0148952	A97885X390	5973254	85
0137581	EP10M26X15	5973496	287	0138366	EP308-36	5973871	282	0144381	B411240	5987194	452	0148969	A97890X410	5973262	86
0137598	EP10M27X15	5973497	287	0138373	EP3010-32	5973834	282	0144398	B411250	5987202	452	0148976	A97895X410	5973265	86
0137604	EP10M27X20	5973498	287	0138380	EP301/4	5973829	282	0144404	B411260	5987206	452	0148983	A978100X430	5973194	86
0137611	EP10M28X15	5973499	287	0138397	EP305/16	5973844	282	0144411	B411300	5987209	452	0148990	R51032	5980508	54
0137628	EP10M30X15	5973500	287	0138403	EP303/8	5973841	282	0144589	B33513BLADES	5987035	473	0149003	R51087	5980513	55
0137635	EP10M30X20	5973501	287	0138410	EP307/16	5973853	282	0144596	B33514BLADES	5987041	473	0149027	A101110	5968077	104
0137642	EP11M4X5	5973691	287	0138427	EP301/2	5973826	282	0144602	B33515BLADES	5987050	473	0149133	A19131M	5969762	228
0137659	EP11M5X5	5973695	287	0138434	EP305/8	5973848	282	0144619	B33516BLADES	5987056	473	0149270	G14263	5973157	493
0137666	EP11M6X75	5973699	287	0138441	EP303/4	5973837	282	0144626	B3350NUT	5986993	473	0149287	G142104	5973091	493
0137673	EP11M8X75	5973703	287	0138458	EP307/8	5973866	282	0144633	B33500NUT	5987000	473	0149294	G142124	5973100	493
0137680	EP11M8X10	5973711	287	0138465	EP301	5973822	282	0144640	B335000NUT	5987006	473	0149300	G142165	5973108	493
0137697	EP11M10X75	5973600	287	0138472	EP318-36	5973927	282	0144657	B3351NUT	5987012	473	0149317	G142205	5973117	493
0137703	EP11M10X10	5973663	287	0138489	EP3110-32	5973889	282	0144664	B3352NUT	5987062	473	0149324	G142250	5973126	493
0137710	EP11M10X125	5973707	287	0138496	EP311/4	5973884	282	0144671	B3353NUT	5987067	473	0149331	G142310	5973131	493
0137727	EP11M12X10	5973738	287	0138502	EP315/16	5973904	282	0144688	B3354NUT	5987073	473	0149348	G15463	5972617	490
0137734	B170898	5986652	455	0138519	EP313/8	5973899	282	0144695	B3355NUT	5986401	473	0149355	G15483	5972621	490
0137741	B170899	5986655	455	0138526	EP317/16	5973919	282	0144701	B3356NUT	5986473	473	0149362	G154104	5972788	490
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0137802	B170905	5986675	455	0138588	EP401/8	5973943	306	0144763	B33512NUT	5987032	473	0149553	G33580	5972782	489
0137819	EP11M12X125	5973762	287	0138595	EP401/4	5973939	306	0144770	B33513NUT	5987038	473	0149560	G335100	5972759	489
0137826	EP11M12X15	5973766	287	0138601	EP403/8	5973951	306	0144787	B33514NUT	5987044	473	0149577	G335125	5972763	489
0137833	EP11M14X10	5973768	287	0138618	EP401/2	5973935	306	0144794	B33515NUT	5987053	473	0149584	G335160	5972767	489
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0137864	EP11M16X10	5973606	287	0138649	EP407/8	5973960	306	0147054	EP413/4	5973975	306	0149645	EP417/8	5973984	306
0137871	EP11M16X15	5973610	287	0138656	EP401	5973931	306	0148433	A530330	5970266	182	0149652	EP411	5973963	306
0137888	EP11M18X10	5973615	287	0138663	EP411/8	5973972	306	0148457	A530350	5970270	182	0149669	EX10M4X50	5973675	299
0137895	EP11M18X15	5973623	287	0138670	EP411/4	5973969	306	0148471	A530400	5970275	182	0149676	EX10M5X50	5973721	299
0137901	EP11M20X10	5973628	287	0138687	EP413/8	5973978	306	0148501	A97620X125	5972618	84	0149683	EX10M6X75	5973726	299
0137918	EP11M20X15	5973632	287	0138694	EP411/2	5973966	306	0148518	A97622X135	5972625	84	0149690	EX10M8X75	5973728	299
0137925	EP11M22X15	5973637	287	0138700	EP415/8	5973981</									

EDP NUMBER INDEX - 0152980 - 0171370

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0149812.....	EX10M16X15	5973639	299	0152256.....	E500M45NO2	5976837	315	0154991.....	E500M17NO6	5977001	315	0157251.....	E5471/2NO1	5976474	363
0149829.....	EX10M18X10	5973647	299	0152263.....	E500M48NO2	5976847	315	0155004.....	E500M17NO1	5976993	315	0157268.....	E5471/2NO2	5976477	363
0149836.....	EX10M18X15	5973651	299	0152447.....	E501M24NO2	5977147	323	0155028.....	E500M16NO6	5976990	315	0157275.....	E5471/2NO7	5976484	363
0149843.....	EX10M20X10	5973657	299	0152454.....	E513M4X5NO2	5977125	317	0155035.....	E500M16NO1	5976987	315	0157282.....	E5475/8NO1	5976423	363
0149850.....	EX10M20X15	5973661	299	0152461.....	E513M6X75NO2	5977094	317	0155431.....	E513M22X15NO7	5977365	318	0157299.....	E5473/4NO1	5976389	363
0149867.....	EX10M22X15	5973665	299	0152478.....	E513M8X75NO2	5977136	317	0155448.....	E513M22X10NO7	5977350	318	0157305.....	E5477/8NO1	5976438	363
0149874.....	EX10M24X15	5973670	299	0152485.....	E513M8X10NO2	5977155	317	0155455.....	E513M20X20NO7	5977341	318	0157312.....	E5471NO1	5976357	363
0149881.....	EX10M24X20	5973674	299	0152492.....	E513M10X10NO2	5977404	317	0155462.....	E513M20X15NO7	5977324	318	0157329.....	E5471NO2	5976361	363
0149898.....	EX10M25X15	5973678	299	0152508.....	E513M10X125NO2	5976768	317	0155479.....	E513M18X15NO7	5977275	318	0157336.....	E54711/4NO1	5976365	363
0149904.....	EX10M26X15	5973681	299	0152515.....	E513M12X10NO2	5976707	317	0155486.....	E513M14X15NO7	5976788	317	0157343.....	E54711/2NO1	5976717	363
0149911.....	EX10M27X15	5973685	299	0152522.....	E513M12X125NO2	5976719	317	0155509.....	E513M14X10NO7	5976751	317	0157367.....	E5472NO1	5976379	363
0149928.....	EX10M27X20	5973693	299	0152539.....	E513M14X10NO2	5976744	317	0155516.....	E513M12X15NO7	5976735	317	0157374.....	E5472NO2	5976382	363
0149935.....	EX10M28X15	5973535	299	0152546.....	E513M14X125NO2	5976758	317	0155523.....	E513M12X10NO7	5976713	317	0159408.....	E5501/8NO7	5976472	362
0149942.....	EX10M30X15	5973535	299	0152553.....	E513M14X15NO2	5976777	317	0155530.....	E513M10X125NO7	5976833	317	0159422.....	E5501/4NO7	5976466	362
0149959.....	EX10M30X20	5973622	299	0152560.....	E513M16X10NO2	5976813	317	0155547.....	E513M10X10NO7	5976716	317	0159446.....	E5503/8NO7	5977475	362
0149966.....	EX11M4X50	5973648	299	0152577.....	E513M16X15NO2	5977362	317	0155554.....	E513M8X10NO7	5977163	317	0159460.....	E5501/2NO7	5976462	362
0149973.....	EX11M5X50	5973652	299	0152584.....	E513M18X15NO2	5977264	318	0155561.....	E513M4X5NO7	5977133	317	0159484.....	E5503/4NO7	5977453	362
0149980.....	EX11M6X75	5973656	299	0152591.....	E513M20X15NO2	5977314	318	0155578.....	E513M32X15NO2	5977065	318	0159491.....	E7101/16NO3	5977618	350
0149997.....	EX11M8X75	5973662	299	0152607.....	E513M22X15NO2	5977356	318	0155660.....	E513M50X15NO2	5977067	318	0159507.....	EX217/16	5974056	294
0150009.....	EX11M8X10	5973667	299	0152614.....	E513M24X15NO2	5977389	318	0155677.....	E513M45X15NO2	5977160	318	0159514.....	EX211/2	5974228	294
0150016.....	EX11M10X75	5973733	299	0152621.....	E513M25X15NO2	5977175	318	0155684.....	E513M42X15NO2	5977144	318	0159552.....	EX215/8	5974051	294
0150023.....	EX11M10X10	5973540	299	0152638.....	E513M36X20NO2	5977093	318	0155691.....	E513M40X15NO2	5977137	318	0159576.....	EX213/4	5974245	294
0150030.....	EX11M10X125	5973543	299	0152645.....	E513M39X30NO2	5977109	318	0155721.....	E513M30X20NO2	5977053	318	0159590.....	EX217/8	5974062	294
0150047.....	EX11M12X10	5973546	299	0152980.....	E500M14NO1	5975313	315	0155738.....	E513M27X15NO2	5977006	318	0159644.....	E513M9X10NO1	5977172	317
0150054.....	EX11M12X125	5973549	299	0153246.....	E500M10NO1	5975273	315	0155745.....	E513M24X20NO7	5977121	318	0159651.....	E513M11X10NO1	5976690	317
0150061.....	EX11M12X15	5973552	299	0154298.....	E500M48NO1	5976844	315	0155752.....	E513M9X10NO2	5977177	317	0159828.....	E501M3NO1	5977154	323
0150078.....	EX11M14X10	5973555	299	0154304.....	E500M45NO1	5976826	315	0156728.....	E513M5X5NO1	5977153	317	0159835.....	E501M4NO1	5976769	323
0150085.....	EX11M14X125	5973558	299	0154311.....	E500M42NO1	5976807	315	0156735.....	E500M26NO1	5975584	315	0159859.....	E501M6NO1	5976952	323
0150092.....	EX11M14X15	5973563	299	0154328.....	E500M39NO1	5976941	315	0156742.....	E500M26NO2	5975631	315	0159866.....	E501M8NO1	5976771	323
0150108.....	EX11M16X10	5973566	299	0154335.....	E500M36NO1	5976923	315	0156766.....	E513M4X5NO1	5977117	317	0159873.....	E501M10NO1	5977063	323
0150115.....	EX11M16X15	5973570	299	0154342.....	E500M33NO1	5976778	315	0156773.....	E513M5X75NO2	5977231	317	0159880.....	E501M12NO1	5977078	323
0150122.....	EX11M18X10	5973577	299	0154359.....	E500M30NO1	5975722	315	0156780.....	E513M6X5NO1	5977076	317	0159897.....	E501M14NO1	5977089	323
0150139.....	EX11M18X15	5973582	299	0154366.....	E500M27NO1	5975684	315	0156797.....	E513M6X5NO2	5977080	317	0159903.....	E501M16NO1	5977100	323
0150146.....	EX11M20X10	5973588	299	0154380.....	E500M24NO7	5975671	315	0156803.....	E513M6X75NO1	5977087	317	0159910.....	E501M20NO1	5977124	323
0150153.....	EX11M20X15	5973592	299	0154397.....	E500M24NO6	5975667	315	0156810.....	E513M14X10NO1	5976742	317	0159927.....	E500M3X6NO1	5975715	315
0150160.....	EX11M22X15	5973597	299	0154403.....	E500M24NO1	5975656	315	0156827.....	E513M14X125NO1	5976755	317	0159934.....	E500M3X6NO2	5975717	315
0150177.....	EX11M24X15	5973602	299	0154427.....	E500M22NO6	5975648	315	0156834.....	E513M14X125NO6	5976763	317	0159941.....	E500M3X6NO3	5975720	315
0150184.....	EX11M24X20	5973605	299	0154434.....	E500M22NO1	5975634	315	0156841.....	E513M14X15NO1	5976773	317	0159958.....	E500M5X9NO1	5976902	315
0150191.....	EX11M25X15	5973609	299	0154441.....	E500M20NO7	5975623	315	0156858.....	E513M14X15NO6	5976784	317	0159965.....	E500M5X9NO2	5976907	315
0150207.....	EX11M26X15	5973614	299	0154458.....	E500M20NO6	5975619	315	0156865.....	E513M16X10NO1	5976806	317	0159972.....	E500M5X9NO3	5976910	315
0150214.....	EX11M27X15	5973619	299	0154465.....	E500M20NO1	5975607	315	0156872.....	E513M16X15NO1	5977327	317	0159996.....	E500M55X9NO1	5976854	315
0150221.....	EX11M27X20	5973627	299	0154489.....	E500M18NO6	5975385	315	0156889.....	E513M16X15NO6	5977400	317	0160008.....	E500M55X9NO2	5976858	315
0150238.....	EX11M28X15	5973636	299	0154496.....	E500M18NO1	5975371	315	0156896.....	E513M18X10NO1	5977403	318	0160015.....	E500M55X9NO3	5976862	315
0150245.....	EX11M30X15	5973640	299	0154502.....	E500M16NO7	5975359	315	0156902.....	E513M18X15NO1	5977261	318	0160039.....	E513M3X35NO1	5977029	317
0150252.....	EX11M30X20	5973645	299	0154519.....	E500M16NO6	5975355	315	0156919.....	E513M18X15NO6	5977271	318	0160046.....	E513M3X35NO2	5977033	317
0150269.....	EX204-40	5973704	294	0154526.....	E500M16NO1	5975340	315	0156926.....	E513M18X20NO1	5977279	318	0160053.....	E513M7X75NO1	5977106	317
0150276.....	EX205-40	5973708	294	0154533.....	E500M14NO7	5975333	315	0156933.....	E513M20X10NO1	5977299	318	0160060.....	E513M8X5NO1	5977122	317
0150283.....	EX206-32	5973724	294	0154540.....	E500M14NO6	5975328	315	0156940.....	E513M20X15NO1	5977311	318	0160077.....	E513M8X5NO2	5977126	317
0150290.....	EX208-32	5974132	294	0154557.....	E500M12NO7	5975305	315	0156957.....	E513M20X15NO6	5977322	318	0160084.....	E513M10X75NO1	5977393	317
0150306.....	EX2010-24	5973688	294	0154564.....	E500M12NO1	5975288	315	0156964.....	E513M20X20NO1	5977330	318	0160091.....	E513M10X75NO2	5977396	317
0150313.....	EX2012-24	5973692	294	0154588.....	E500M11NO6	5975281	315	0156971.....	E513M22X15NO1	5977353	318	0160107.....	E513M11X75NO1	5976838	317
0150320.....	EX201/4	5973684	294	0154595.....	E500M11NO1	5975482	315	0156988.....	E513M22X20NO1	5977369	318	0160114.....	E513M11X75NO2	5976843	317
0150337.....	EX205/16	5973713	294	0154601.....	E500M10NO7	5975475	315	0156995.....	E513M24X15NO1	5977386	318	0160152.....	E500M1NO1	5977027	315
0150344.....	EX203/8	5973700	294	0154618.....	E500M10NO6	5975419	315	0157008.....	E513M24X20NO1	5976996	318	0160169.....	E500M1NO2	5977031	315
0150351.....	EX207/16	5973733	294	0154632.....	E500M9NO6	5977051	315	0157015.....	E513M25X15NO1	5977166	318	0160176.....	E500M12NO1	5976974	315
0150368.....	EX201/2	5973680	294	0154649.....	E500M9NO1	5977040	315	0157022.....	E513M25X15NO6	5977187	318	0160183.....	E500M12NO2	5976976	315
0150375.....	EX205/8	5973718	294	0154656.....	E500M8NO7	5977028	315	0157039.....	E513M32X15NO1	5977062	318	0160190.....	E500M14NO1	5976982	315
0150382.....	EX203/4	5973696	294	0154663.....	E500M8NO1	5977012	315	0157046.....	E513M5X75NO1	5977229	317	0160206.....	E500M14NO2	5976983	315
0150399.....	EX207/8	5974074	294	0154687.....	E500M7NO1	5977183	315	0157053.....	E513M8X75NO1	5977134	317	0160213.....	E500M4X75NO1	5976795	315
0150405.....	EX201	5973671	294	0154694.....	E500M6NO7	5977178	315	0157060.....	E513M8X10NO1	5977149	317	0160220.....	E500M4X75NO2	5976798	315
0150412.....	EX214-40	5974042	294	0154700.....	E500M6NO6	5977173	315	0157077.....	E513M10X10NO1	5977402	317	0160237.....	E500M4X75NO3	5976802	315
0150429.....	EX215-40	5974045	294	0154717.....	E500M5NO7	5976894	315	0157084.....	E513M10X10NO6	5976682	317	0160244.....	E500M2X45NO1	5975593	315
0150436.....	EX216-32	5974054	294	0154724.....	E500M5NO6	5976890	315	0157091.....	E513M10X125NO1	5976737	317	0160251.....	E500M2X45NO2	5975597	315
0150443.....															

EDP NUMBER INDEX - 0171387 - 0206799

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0165607	E201M3	5975842	290	0169070	A5109/32	5970444	74	0173848A12511/64X200	5968127	163	0179826	B1007/16	5986289	477	
0167861	E650M3	5978325	369	0169087	A51019/64	5970418	74	0173855A1253/16X160	5968636	163	0179840	B1001/2	5986375	477	
0168059	G14248	5973137	493	0169094	A5105/16	5970446	74	0173862A1253/16X200	5968638	163	0179857	B10017/32	5986297	477	
0168066	G14250	5973143	493	0169100	A51021/64	5970421	74	0173879A1253/16X250	5968643	163	0179864	B1009/16	5986318	477	
0168073	G14260	5973152	493	0169117	A51011/32	5970136	74	0173886A1253/16X315	5968645	163	0179871	B10019/32	5986314	477	
0168080	G14270	5973162	493	0169124	A51023/64	5970423	74	0173893A1253/16X400	5968647	163	0179888	B1005/8	5986269	477	
0168097	G14273	5973166	493	0169131	A5103/8	5970465	74	0173909A12513/64X200	5968151	163	0179895	B10011/16	5986240	477	
0168103	G14280	5973173	493	0169148	A51025/64	5970426	74	0173916A12513/64X250	5968153	163	0179901	B1003/4	5986345	477	
0168110	G142100	5973088	493	0169155	A51013/32	5970401	74	0173923A12513/64X315	5968154	163	0179925	B10013/16	5986262	477	
0168127	G142115	5973094	493	0169162	A51027/64	5970429	74	0173930A1257/32X200	5969164	163	0179949	B1007/8	5986299	477	
0168134	G142150	5973105	493	0169179	A5107/16	5970386	75	0173947A1257/32X250	5969167	163	0179970	B1001	5986230	477	
0168141	G142190	5973112	493	0169186	A51029/64	5970431	75	0173954A1257/32X315	5969170	163	0179987	B10015	5986266	477	
0168158	G142230	5973121	493	0169193	A51015/32	5970409	75	0173961A12515/64X200	5968170	163	0179994	B10016	5986300	477	
0168318	EX211	5974187	294	0169209	A51031/64	5970467	75	0173978A12515/64X250	5968500	163	0180006	B100105	5986391	477	
0168325	EX308-36	5974125	294	0169216	A5101/2	5970029	75	0173985A12514X200	5968146	163	0180013	B100115	5986237	477	
0168332	EX3010-32	5974087	294	0171264	A5201/8	5970282	66	0173992A12514X250	5968169	163	0180020	B100125	5986252	477	
0168349	EX301/4	5974083	294	0171271	A5209/64	5970032	66	0174005A12517/4X315	5968174	163	0180037	B100135	5986259	477	
0168356	EX305/16	5974103	294	0171288	A5205/32	5970528	66	0174012A12514X400	5968178	163	0180044	B100145	5986278	477	
0168363	EX303/8	5974098	294	0171295	A52011/64	5970200	66	0174029A12514X500	5968181	163	0180051	B100210	5986330	477	
0168370	EX307/16	5974115	294	0171301	A5203/16	5970451	66	0174036A12517/64X200	5968660	163	0180068	B100230	5986344	477	
0168387	EX301/2	5974076	294	0171318	A52013/64	5970240	66	0174043A12517/64X250	5968665	163	0180075	B100270	5986364	477	
0168394	EX305/8	5974111	294	0171325	A5207/32	5970139	66	0174050A1259/32X200	5969030	163	0180082	B100290	5986373	477	
0168400	EX303/4	5974092	294	0171332	A52015/64	5970248	67	0174067A1259/32X250	5969034	163	0180099	B100310	5986358	477	
0168417	EX307/8	5974120	294	0171349	A5201/4	5970236	67	0174074A1259/32X315	5969039	163	0180105	B100330	5986220	477	
0168424	EX301	5974070	294	0171356	A52017/64	5970254	67	0174081A12517/64X200	5968807	164	0180112	B100370	5986228	477	
0168431	EX318-36	5974191	294	0171363	A5209/32	5970027	67	0174098A1255/16X250	5968811	164	0180129	B100390	5986233	477	
0168448	EX3110-32	5974151	294	0171370	A52019/64	5970258	67	0174104A1255/16X315	5968815	164	0180808	B90115	5986427	463	
0168455	EX311/4	5974146	294	0171387	A5205/16	5970524	67	0174111A1255/16X400	5968820	164	0180815	B9011/16	5986431	463	
0168462	EX315/16	5974167	294	0171394	A52021/64	5970261	67	0174128A1255/16X500	5968829	164	0180822	B90120	5986481	463	
0168479	EX313/8	5974160	294	0171400	A52011/32	5970199	67	0174135A12521/64X315	5968542	164	0180839	B9013/32	5986504	463	
0168486	EX317/16	5974176	294	0171417	A52023/64	5970265	67	0174142A12511/32X250	5968813	164	0180846	B90125	5986485	463	
0168493	EX311/2	5974141	294	0171424	A5203/8	5970455	67	0174159A12511/32X315	5968116	164	0180853	B90130	5986489	463	
0168509	EX315/8	5974172	294	0171431	A52025/64	5970269	67	0174166A12511/32X400	5968119	164	0180860	B9011/8	5986444	463	
0168516	EX313/4	5974155	294	0171448	A52013/32	5970232	67	0174180A12523/64X315	5968569	164	0180877	B90135	5986493	463	
0168523	EX317/8	5974180	294	0171455	A52027/64	5970274	67	0174197A1253/8X250	5968657	164	0180891	B9015/32	5986528	463	
0168530	EX311	5974137	294	0171462	A5207/16	5970132	68	0174203A1253/8X315	5968658	164	0180907	B90140	5986512	463	
0168547	EX401/8	5974218	308	0171479	A52029/64	5970278	68	0174210A1253/8X400	5968659	164	0180921	B90145	5986514	463	
0168554	EX401/4	5974214	308	0171486	A52015/32	5970244	68	0174227A1253/8X500	5968662	164	0180938	B9013/16	5986500	463	
0168561	EX403/8	5974225	308	0171493	A52031/64	5970458	68	0174234A12513/32X250	5968142	164	0180945	B90150	5986520	463	
0168578	EX401/2	5974210	308	0171509	A5201/2	5970203	68	0174241A12513/32X315	5968144	164	0180952	B90113/64	5986469	463	
0168585	EX405/8	5974232	308	0172728	A17011/32	5969721	193	0174265A1257/16X250	5969004	164	0180969	B90155	5986523	463	
0168592	EX403/4	5974222	308	0172735	A17011/16	5969714	193	0174272A1257/16X315	5969057	164	0180976	B9017/32	5986540	463	
0168608	EX407/8	5973750	308	0172759	A17011/8	5969733	193	0174289A1257/16X400	5969113	164	0180983	B90115/64	5986477	463	
0168615	EX401	5974195	308	0172766	A17015/32	5969794	193	0174296A12515/32X250	5968162	164	0180990	B90160	5986531	463	
0168622	EX4011/8	5974206	308	0172773	A17013/16	5969769	193	0174302A12515/32X315	5968164	165	0181003	B9011/4	5986440	463	
0168639	EX4011/4	5974202	308	0172780	A17017/32	5969818	193	0174319	A1251/2X250	5968857	165	0181010	B90170	5986534	463
0168646	EX4011/2	5974199	308	0172797	A17011/4	5969725	193	0174326	A1251/2X315	5968030	165	0181027	B9019/32	5986555	463
0168653	EX411/8	5973910	308	0172803	A17015/16	5969789	193	0174333	A1251/2X400	5968089	165	0181034	B9015/16	5986525	463
0168660	EX411/4	5973905	308	0172810	A17013/8	5969784	193	0174340	A1251/2X500	5968125	165	0181041	B90180	5986543	463
0168677	EX413/8	5973753	308	0172827	A17017/16	5969809	193	0179413	A1903	5969754	228	0181065	B90190	5986547	463
0168684	EX411/2	5973900	308	0172834	A17011/2	5969718	193	0179437	A19012	5969705	228	0181072	B9013/8	5986508	463
0168691	EX415/8	5973755	308	0172988	A225BS1	5969157	213	0179451	A19018	5969712	228	0181089	B901100	5986448	463
0168707	EX413/4	5973915	308	0172995	A225BS2	5969160	213	0179468	A19020	5969715	228	0181102	B901110	5986453	463
0168714	EX417/8	5973757	308	0173008	A225BS3	5969163	213	0179482	A190209	5969752	228	0181119	B9017/16	5986537	463
0168721	EX411	5973773	308	0173015	A225BS4	5969166	213	0179499	A19161-80	5969782	228	0181126	B901120	5986461	463
0168738	EX4111/8	5973890	308	0173022	A225BS5	5969169	213	0179598	B1001/16	5986338	477	0181133	B9011/2	5986437	463
0168745	EX4111/4	5973838	308	0173039	A225BS5A	5969171	213	0179604	B1005/64	5986265	477	0181140	B1011/8	5986589	467
0168752	EX4111/2	5973797	308	0173046	A225BS6	5969173	213	0179611	B1003/32	5986312	477	0181164	B1013/16	5986601	467
0168769	E000M16	5973759	288	0173053	A225BS7	5969174	213	0179628	B1007/64	5986296	477	0181188	B1011/4	5986548	467
0168776	E000M2	5973771	288	0173657	A1251/16X1255968843	162	0179635	B1001/8	5986385	477	0181201	B1015/16	5986679	467	
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0168820	E002M2	5974446	300	0173701	A1253/32X1605968651	162	0179680	B10013/64	5986272	477	0181300	B1015/8	5986688	467	
0168837	E002M25	5974485	300	0173718	A1257/64X1255969172	162	0179697	B1007/32	5986293	477	0181348	B1013/4	5986604	467	
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0168851	E003M25	5974361	300	0173732	A1251/8X160	5968186	162	0179710	B1001/4	5986381	477	0181386	B1017/8	5986719	467
0168974	A5101/														

EDP NUMBER INDEX - 0206805 - 0347102

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0181584..	B10140	5986814	467	0197981..	K5201/2X6	5982305	511	0212271..	A9209/16	5971658	71	0216828..	R51057	5980510	54
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0181607..	B10150	5986673	467	0206331..	F312M8X75	5977961	387	0212295..	A9201475	5972474	71	0216842..	R510103	5980574	55
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0181676..	B10185	5986731	467	0206416..	F312M12X15	5977941	387	0212356..	A92021/32	5972245	71	0216903..	R520135	5980598	46
0181683..	B10190	5986735	467	0206430..	F312M14X15	5977944	387	0212363..	A9201675	5972504	71	0216910..	R520142	5981124	46
0181690..	B10195	5986740	467	0206454..	F312M16X15	5977946	387	0212370..	A92043/64	5972456	71	0216927..	R5201425	5981158	46
0181706..	B101100	5986621	467	0206461..	F312M18X15	5977948	387	0212387..	A92011/16	5972405	71	0216934..	R520151	5981272	46
0181713..	B101105	5986627	467	0206485..	F312M20X15	5977950	387	0212394..	A92045/64	5972461	71	0217887..	G2361	5972710	500
0181720..	B101110	5986630	467	0206508..	F312M22X15	5977954	387	0212400..	A92023/32	5972256	71	0218013..	L11013/16	5978531	388
0181744..	B101120	5986479	467	0206522..	F312M24X15	5977956	387	0212417..	A920185	5972528	71	0218020..	L1101INCH	5978518	388
0181751..	B101125	5986483	467	0206539..	F312M24X20	5977959	387	0212424..	A92047/64	5972314	71	0218037..	L11015/16	5978514	388
0181768..	B101130	5986486	467	0206614..	F3204-40X13/16	5978041	379	0212431..	A9203/4	5972316	72	0218044..	L11011/2	5978511	388
0181775..	B101135	5986490	467	0206621..	F3205-40X13/16	5978045	379	0212448..	A92049/64	5972315	72	0218051..	L1102INCH	5978552	388
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0181799..	B101145	5986505	467	0206669..	F3208-32X13/16	5978869	379	0212462..	A92025/32	5972264	72	0218075..	L1103INCH	5978562	388
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0181812..	B101155	5986516	467	0206683..	F32010-24X13/16	5978007	379	0212523..	A9217/64	5972962	69	0238288..	A17017/64	5968685	193
0181829..	B101160	5986526	467	0206690..	F32010-24X1	5978004	379	0212561..	A92129	5972628	69	0238301..	A17019/64	5968761	193
0181836..	B101165	5986529	467	0206706..	F32012-24X13/16	5978010	379	0212592..	A9211/8	5971789	70	0239216..	A217N1	5969408	213
0181843..	B101170	5986532	467	0206720..	F3201/4X13/16	5977996	379	0212622..	A9219/64	5972558	70	0239223..	A217N2	5969412	213
0181850..	B101180	5986538	467	0206737..	F3201/4X1	5977987	379	0212677..	A9215/32	5972844	70	0239230..	A217N3	5969415	213
0181867..	B101190	5986541	467	0206744..	F3201/4X15/16	5977993	379	0214398..	A1259/64X315	5968063	162	0239247..	A217N4	5969418	213
0181874..	B101200	5986556	467	0206751..	F3201/4X11/2	5977990	379	0214404..	A12511/64X315	5968129	163	0239254..	A217N5	5969420	213
0181881..	B101210	5986560	467	0206768..	F3205/16X1	5978050	379	0214442..	A12515/64X315	5968546	163	0239261..	A217N6	5969422	213
0181898..	B101220	5986564	467	0206782..	F3205/16X11/2	5978055	379	0214466..	A12517/64X500	5968667	163	0239278..	A217N7	5969423	213
0181904..	B101230	5986568	467	0206799..	F3203/8X1	5978027	379	0214473..	A1259/32X500	5969043	163	0239285..	A217N8	5969424	213
0181911..	B101240	5986574	467	0206805..	F3203/8X15/16	5978036	379	0214480..	A12519/64X315	5968507	164	0239292..	A218N1	5968986	213
0181928..	B101250	5986576	467	0206812..	F3203/8X11/2	5978031	379	0214497..	A12519/64X500	5968510	164	0239308..	A218N2	5969045	213
0181935..	B101260	5986579	467	0206843..	F3207/16X15/16	5978787	379	0214503..	A12521/64X500	5968551	164	0239315..	A218N3	5969099	213
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0181959..	B101280	5986585	467	0206867..	F3201/2X15/16	5977978	379	0214527..	A12523/64X500	5968574	164	0239339..	A218N5	5969175	213
0181966..	B101290	5986592	467	0206874..	F3201/2X11/2	5977975	379	0214534..	A12525/64X315	5968584	164	0239346..	A218N6	5969177	213
0181973..	B101300	5986610	467	0206881..	F3201/2X2	5977981	379	0214541..	A12525/64X500	5968589	164	0239353..	A218N7	5969178	213
0181980..	B101310	5986613	467	0206904..	F3209/16X11/2	5978875	379	0214558..	A12513/32X500	5968148	164	0239360..	A218N8	5969179	213
0181997..	B101320	5986615	467	0206928..	F3205/8X11/2	5978065	379	0214565..	A12527/64X315	5968594	164	0240410..	A2431/4X6	5968840	169
0182017..	B101340	5986624	467	0206935..	F3205/8X2	5978069	379	0214589..	A1257/16X500	5969158	164	0240434..	A2431/8X6	5968845	169
0182024..	B101350	5986649	467	0206959..	F3203/4X11/2	5978013	379	0214596..	A12529/64X315	5968597	164	0240441..	A2433/16X6	5968850	169
0182031..	B101360	5986681	467	0206966..	F3203/4X2	5978016	379	0214602..	A12529/64X500	5968606	164	0240458..	A2433/32X6	5968855	169
0182048..	B101370	5986723	467	0206973..	F3207/8X2	5978821	379	0214619..	A12515/32X500	5968166	165	0240465..	A2435/32X6	5968861	169
0182055..	B101380	5986768	467	0206980..	F3201X2	5978001	379	0214626..	A12531/64X315	5968720	165	0240816..	A243N10X6	5968803	169
0182062..	B101390	5986807	467	0206997..	F32011/8X3	5977972	379	0214633..	A12531/64X500	5968772	165	0240823..	A243N11X6	5968813	169
0182079..	B101400	5986823	467	0207000..	F32011/4X3	5977968	379	0214640..	A12533/64X315	5968825	165	0240922..	A243N20X6	5968818	169
0182086..	B101410	5986827	467	0209325..	F3701/8X1	5978453	382	0214657..	A12533/64X500	5968879	165	0240939..	A243N21X6	5968822	169
0182093..	B101420	5986653	467	0209332..	F3701/4X15/16	5978451	382	0214664..	A12517/32X315	5968603	165	0241035..	A243N30X6	5968830	169
0182109..	B101430	5986656	467	0209349..	F3703/8X11/2	5978464	382	0214671..	A12517/32X500	5968641	165	0241141..	A243N40X6	5968835	169
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0182130..	B101460	5986664	467	0209370..	F3703/4X2	5978458	382	0214701..	A1259/16X315	5969020	165	0241868..	A221N1	5969075	214
0182147..	B101470	5986667	467	0209387..	F3707/8X21/4	5978470	382	0214718..	A1259/16X500	5969025	165	0241875..	A221N2	5969079	214
0182154..	B101480	5986670	467	0209394..	F3701X21/4	5978455	382	0214725..	A12537/64X315	5968916	165	0241882..	A221N3	5969085	214
0182178..	B101500	5986692	467	0209400..	F37011/4X3	5978447	382	0214749..	A12519/32X315	5968669	165	0241899..	A221N4	5969089	214
0182277..	B3011/16	5986376	479	0209417..	F37011/2X4	5978444	382	0214756..	A12519/32X500	5968671	165	0241905..	A221N5	5969094	214
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0182314..	B3011/8	5986384	479	0210345..	E7101/2NO7	5977625	350	0214794..	A1255/8X500	5968869	165	0252345..	B1221	5986605	465
0182321..	B3019/64	5986979	479	0210352..	E7103/4NO7	5977649	350	0214800..	A12521/32X315	5968536	165	0252352..	B12211/16	5986608	465
0182338..	B3015/32	5986409	479	0210666..	R5201/8	5980549	45	0214817..	A12521/32X500	5968540	165	0252369..	B12211/16	5986449	465
0182345..	B30111/64	5986390	479	0210741..	R5201/4	5980546	46	0214824..	A12511/16X315	5968107	165	0252376..	B1221/2	5986446	465
0182352..	B3013/16	5986395	479	0210789..	R5205/16	5981275	46	0214831..	A12511/16X500	5968110	165				

EDP NUMBER INDEX - 0347119 - 0353592

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0259702	E06111/4NO6	5974875	320	0343333	E513M48X15NO3	5977170	318	0348413	E06112-24NO2	5974406	320	0349786	E0719/16NO1	5974217	320
0259719	E06111/8NO6	5974889	320	0343340	E513M48X20NO3	5977058	318	0348420	E06112-24NO3	5974412	320	0349793	E0719/16NO2	5974221	320
0273197	E65110-24	5978357	368	0343357	E513M48X30NO3	5977110	318	0348437	E06112-24NO6	5974257	320	0349809	E0719/16NO3	5974224	320
0273203	E6511/2	5978350	368	0344750	G2362	5972714	500	0348444	E0611/4NO1	5974924	320	0349816	E0719/16NO6	5974227	320
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0273265	E6517/16	5978377	368	0345290	R51099	5980533	55	0348505	E0615/16NO3	5974275	320	0349878	E0713/4NO2	5974071	320
0273272	E6518-32	5978380	368	0345306	R510108	5980585	55	0348512	E0615/16NO6	5974277	320	0349885	E0713/4NO3	5974075	320
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0279717	A97623X135	5972629	84	0346419	R52067	5981073	46	0348536	E0613/8NO2	5974269	320	0349908	E0717/8NO2	5974185	320
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0279731	A97624X140	5972633	84	0346433	R52072	5981092	46	0348550	E0613/8NO6	5974271	320	0349922	E0717/8NO6	5974194	320
0279748	A97626X140	5972646	84	0346440	R52076	5981105	46	0348567	E0617/16NO1	5974298	320	0349939	E0711X12NO1	5974698	320
0279755	A97627X150	5972650	84	0346457	R52077	5981111	46	0348574	E0617/16NO2	5974300	320	0349946	E0711X12NO2	5974702	320
0279762	A97628X150	5972654	84	0346464	R52079	5981117	46	0348581	E0617/16NO3	5974303	320	0349953	E0711X12NO3	5974706	320
0279779	A97629X150	5972658	84	0346471	R52081	5981129	46	0348598	E0617/16NO6	5974307	320	0349960	E0711X12NO6	5974711	320
0279786	A97631X155	5972666	84	0346488	R52082	5981131	46	0348604	E0611/2NO1	5974912	320	0349977	E0711X14NO1	5974711	320
0279793	A97632X155	5972670	84	0346495	R52083	5981135	46	0348611	E0611/2NO2	5974915	320	0349984	E0711X14NO2	5974723	320
0279809	A97634X165	5972676	84	0346501	R52084	5981138	46	0348628	E0611/2NO3	5974918	320	0349991	E0711X14NO3	5974059	320
0279816	A97636X165	5973077	84	0346518	R52086	5981148	46	0348635	E0611/2NO6	5974921	320	0350003	E0711X14NO6	5974104	320
0279823	A97638X175	5973167	85	0346525	R52088	5981153	46	0348642	E0619/16NO2	5974355	320	0350577	A00230	5967311	97
0279830	A97639X175	5973215	85	0346532	R52089	5981156	46	0348659	E0619/16NO3	5974363	320	0350584	A00231	5967320	97
0279847	A97641X175	5973279	85	0346549	R52091	5981163	46	0348666	E0619/16NO6	5974368	320	0350591	A00218	5966862	97
0279854	A97642X175	5973284	85	0346556	R52096	5981184	46	0348673	E0615/8NO1	5974278	320	0350607	A00232	5967325	97
0279861	A97643X185	5973081	85	0346563	R52097	5981190	46	0348680	E0615/8NO2	5974280	320	0350614	A00233	5967331	97
0279878	A97644X185	5973083	85	0346570	R52098	5981194	46	0348697	E0615/8NO3	5974282	320	0350621	A00234	5967150	97
0279885	A97646X185	5973089	85	0346587	R52099	5981196	46	0348703	E0615/8NO6	5974284	320	0350638	A00235	5967154	98
0279892	A97647X185	5973093	85	0346778	R520101	5980554	46	0348710	E0613/4NO1	5974259	320	0350645	A0029/64	5967297	98
0279908	A97648X195	5973096	85	0347072	A9761/8	5972595	84	0348727	E0613/4NO2	5974261	320	0350652	A00236	5967160	98
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0279939	A97652X195	5973107	85	0347102	A9765/16	5973150	85	0348758	E0617/8NO1	5974310	320	0350683	A00239	5967175	98
0279946	A97653X195	5973115	85	0347119	A97611/32	5972606	85	0348765	E0617/8NO2	5974314	320	0350690	A0025/32	5967296	98
0279953	A97654X205	5973119	85	0347126	A9763/8	5973272	86	0348772	E0617/8NO3	5974318	320	0350706	A00240	5967226	98
0279960	A97656X205	5973128	85	0347133	A976105	5972599	86	0348789	E0617/8NO6	5974324	320	0350713	A00241	5967230	98
0279977	A97657X205	5973135	85	0347140	A976110	5972601	86	0348796	E0611/1NO1	5974936	320	0350720	A00242	5967234	98
0279984	A97658X205	5973140	85	0347157	A976115	5972602	86	0348802	E0611/1NO2	5974942	320	0350737	A00243	5967237	98
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EDP NUMBER INDEX - 0353608 - 0419601

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
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0351819	A002129														

EDP NUMBER INDEX - 0419618 - 0569702

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0388310.....	E07113/8NO3.	5974649	320	0418338.....	A34539/64	5969479	183	0420010.....	A952175	5972526	186	0421833.....	B4811204	5987599	453
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0391204.....	A55350	5971370	76	0418642.....	A951240	5972428	186	0421192.....	B442120	5987204	451	0422120.....	B481500	5987573	453
0391228.....	A55352	5971464	76	0418659.....	A951250	5972432	186	0421208.....	B442140	5987208	451	0422137.....	B481501	5987575	453
0391242.....	A55355	5971554	76	0418666.....	A951260	5972435	186	0421215.....	B442150	5987212	451	0422144.....	B481502	5987577	453
0391280.....	A55360	5971566	76	0418673.....	A951270	5972439	186	0421222.....	B442160	5987216	451	0422151.....	B481503	5987578	453
0391297.....	A55363	5971376	76	0418680.....	A951280	5972443	186	0421239.....	B442170	5987220	451	0422168.....	B481597	5987580	453
0391303.....	A55365	5971378	76	0418697.....	A951290	5972447	186	0421246.....	B442180	5987228	451	0422175.....	B481598	5987582	453
0391327.....	A55368	5971386	76	0418703.....	A951300	5972457	186	0421253.....	B442200	5987233	451	0422182.....	B481599	5987586	453
0391334.....	A55369	5971390	76	0419540.....	A34511/2	5968988	184	0421567.....	B481098	5987462	453	0422199.....	B481600	5987588	453
0391341.....	A55370	5971395	76	0419564.....	A345115	5969168	183	0421574.....	B481099	5987467	453	0422205.....	B481601	5987590	453
0391365.....	A55374	5971404	76	0419571.....	A345125	5968956	183	0421581.....	B481100	5987475	453	0422212.....	B481602	5987592	453
0391372.....	A55375	5971409	76	0419588.....	A345135	5968963	183	0421598.....	B481101	5987478	453	0422229.....	B481603	5987593	453
0391402.....	A55380	5971424	76	0419601.....	A345155	5968983	183	0421604.....	B481102	5987482	453	0422236.....	B481797	5987594	453
0391419.....	A55385	5971428	76	0419618.....	A345165	5968997	183	0421611.....	B481103	5987485	453	0422243.....	B481798	5987595	453
0391426.....	A55387	5971430	76	0419625.....	A345175	5969007	183	0421628.....	B481148	5987488	453	0422250.....	B481799	5987596	453
0391433.....	A55390	5971434	76	0419632.....	A345185	5969023	184	0421635.....	B481149	5987491	453	0422267.....	B481800	5987597	453
0391457.....	A55395	5971443	76	0419649.....	A345195	5969033	184	0421642.....	B481150	5987494	453	0422274.....	B481801	5987598	453
0392331.....	A095206	5967699	230	0419656.....	A345205	5969046	184	0421659.....	B481151	5987497	453	0422281.....	B481802	5987600	453
0418031.....	A3451	5968945	184	0419663.....	A345215	5969056	184	0421666.....	B481152	5987499	453	0422298.....	B481803	5986965	453
0418048.....	A34511/4	5969042	184	0419670.....	A345225	5969074	184	0421673.....	B481153	5987501	453	0422304.....	B481804	5986973	453
0418055.....	A3451/2	5969153	183	0419687.....	A345230	5969076	184	0421680.....	B481198	5987506	453	0422311.....	B481997	5986978	453
0418062.....	A345100	5969159	183	0419694.....	A345235	5969082	184	0421697.....	B481199	5987509	453	0422328.....	B481998	5986981	453
0418079.....	A345110	5969165	183	0419700.....	A345245	5969095	184	0421703.....	B4811000	5987511	453	0422335.....	B481999	5986985	453
0418086.....	A34511/16	5968949	183	0419717.....	A345255	5969110	184	0421703.....	B4811000	5987511	453	0422564.....	A345330	5969567	184
0418093.....	A345120	5968952	183	0419724.....	A345265	5969119	184	0421710.....	B4811001	5987514	453	0423585.....	A952310	5972567	186
0418109.....	A345130	5968959	183	0419731.....	A345290	5969138	184	0421710.....	B4811001	5987514	453	0423592.....	A952320	5972569	186
0418116.....	A34513/32	5968967	183	0419748.....	A345310	5969468	184	0421727.....	B4811002	5987517	453	0423608.....	A952330	5972571	186
0418123.....	A345140	5968971	183	0419755.....	A345320	5969515	184	0421727.....	B4811002	5987517	453	0423615.....	A952380	5972577	186
0418130.....	A345150	5968979	183	0419762.....	A345340	5969617	184	0421734.....	B4811003	5987520	453	0423622.....	A952400	5972579	186
0418147.....	A345160	5968992	183	0419779.....	A345350	5969661	184	0421734.....	B4811003	5987520	453	0423639.....	A95280	5972581	185
0418154.....	A345170	5969002	183	0419786.....	A345360	5969665	184	0421741.....	B4811004	5987525	453	0423646.....	A95285	5972585	185
0418161.....	A34517/32	5969012	183	0419793.....	A345370	5969667	184	0421741.....	B4811004	5987525	453	0423653.....	A95290	5972587	185
0418178.....	A345180	5969018	184	0419809.....	A345380	5969671	184	0421758.....	B4811005	5987528	453	0423660.....	A952340	5972573	186
0418185.....	A345190	5969028	184	0419816.....	A345390	5969475	184	0421758.....	B4811005	5987528	453	0423677.....	A952350	5972575	186
0418192.....	A345200	5969038	184	0419823.....	A345400	5969483	184	0421765.....	B4811197	5987531	453	0423912.....	A217SET	5969426	213
0418208.....	A345210	5969051	184	0419885.....	A952100	5972462	185	0421765.....	B4811197	5987531	453	0423929.....	A218SET	5969180	213
0418215.....	A34521/32	5969062	183	0419892.....	A952105	5972466	185	0421772.....	B4811198	5987533	453	0423936.....	A221SET	5969120	214
0418222.....	A345220	5969067	184	0419908.....	A952110										

EDP NUMBER INDEX - 0569719 - 0581957

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0567630.....	E000M8.....	5973802	288	0568842.....	E013M8X10.....	5973541	300	0571194.....	A012D.....	5967312	93	0571972.....	A01217/64.....	5966607	93
0567647.....	E000M10.....	5973761	288	0568859.....	E013M10X10.....	5973512	300	0571200.....	A012E.....	5967317	93	0571989.....	A01219/32.....	5966609	94
0567654.....	E000M12.....	5973763	288	0568866.....	E013M10X1255973514	300	300	0571217.....	A012F.....	5967323	93	0571996.....	A01219/64.....	5966610	93
0567661.....	E000M14.....	5973765	288	0568873.....	E013M12X10.....	5973516	300	0571224.....	A012G.....	5966901	93	0572009.....	A01221/64.....	5966615	93
0567678.....	E000M16.....	5973767	288	0568880.....	E013M12X1255973517	300	300	0571231.....	A012H.....	5966958	93	0572016.....	A01223/64.....	5966621	93
0567685.....	E000M18.....	5973769	289	0568897.....	E013M12X15.....	5973518	300	0571248.....	A012I.....	5967002	93	0572023.....	A01225/64.....	5966623	93
0567692.....	E000M20.....	5973776	289	0568903.....	E013M14X15.....	5973519	300	0571255.....	A012J.....	5967037	93	0572030.....	A01227/64.....	5966625	93
0567708.....	E000M22.....	5973779	289	0568910.....	E013M16X10.....	5973520	300	0571262.....	A012K.....	5967077	93	0572047.....	A01229/64.....	5966627	93
0567715.....	E000M24.....	5973781	289	0568927.....	E013M16X15.....	5973521	300	0571279.....	A012L.....	5967086	93	0572054.....	A0123/16.....	5966629	92
0567722.....	E001M3.....	5973852	288	0568934.....	E013M18X15.....	5973522	300	0571286.....	A012M.....	5967088	93	0572061.....	A0123/32.....	5966631	92
0567739.....	E001M35.....	5973857	288	0568941.....	E013M20X15.....	5973525	300	0571293.....	A012N.....	5967091	93	0572078.....	A0123/8.....	5966637	93
0567746.....	E001M4.....	5973861	288	0568958.....	E013M22X15.....	5973527	300	0571309.....	A012N1.....	5967094	93	0572085.....	A01231/64.....	5966643	94
0567753.....	E001M5.....	5973865	288	0569108.....	E0214-40.....	5974331	283	0571316.....	A012N10.....	5966910	92	0572092.....	A01233/64.....	5966645	94
0567760.....	E001M6.....	5973870	288	0569115.....	E0216-32.....	5974354	283	0571323.....	A012N11.....	5966915	92	0572108.....	A01235/64.....	5966647	94
0567777.....	E001M8.....	5973880	288	0569122.....	E0218-32.....	5974369	283	0571330.....	A012N12.....	5966919	92	0572115.....	A01237/64.....	5966651	94
0567784.....	E001M10.....	5973807	288	0569139.....	E02110-24.....	5974311	283	0571347.....	A012N13.....	5966923	92	0572122.....	A01239/64.....	5966655	94
0567791.....	E001M12.....	5973809	288	0569146.....	E02112-24.....	5974315	283	0571354.....	A012N14.....	5966928	92	0572139.....	A0125/16.....	5966676	93
0567807.....	E001M14.....	5973812	288	0569153.....	E0211/4.....	5974305	283	0571361.....	A012N15.....	5966933	92	0572146.....	A0125/32.....	5966680	92
0567814.....	E001M16.....	5973817	288	0569160.....	E0215/16.....	5974346	283	0571378.....	A012N16.....	5966938	92	0572153.....	A0125/8.....	5966693	94
0567821.....	E001M18.....	5973821	288	0569177.....	E0213/8.....	5974327	283	0571385.....	A012N17.....	5966943	92	0572160.....	A0127/16.....	5966699	93
0567838.....	E001M20.....	5973833	288	0569184.....	E0217/16.....	5974359	283	0571392.....	A012N18.....	5966948	92	0572177.....	A0127/32.....	5966704	93
0567845.....	E001M22.....	5973845	288	0569191.....	E0211/2.....	5974301	283	0571408.....	A012N19.....	5966952	92	0572184.....	A0127/64.....	5966707	92
0567852.....	E001M24.....	5973849	288	0569207.....	E0215/8.....	5974350	283	0571415.....	A012N2.....	5966964	93	0572191.....	A0129/16.....	5966713	94
0567869.....	E002M3.....	5974500	300	0569214.....	E0213/4.....	5974323	283	0571422.....	A012N20.....	5966969	92	0572207.....	A0129/32.....	5966717	93
0567883.....	E002M4.....	5974312	300	0569221.....	E0217/8.....	5974364	283	0571439.....	A012N21.....	5966971	92	0572214.....	A0129/64.....	5966724	92
0567890.....	E002M5.....	5974316	300	0569238.....	E0211.....	5974297	283	0571446.....	A012N22.....	5966975	92	0573433.....	C110115.....	5983800	420
0567906.....	E002M6.....	5974320	300	0569382.....	E0234-40.....	5974490	295	0571453.....	A012N23.....	5966979	92	0573457.....	C110125.....	5983816	420
0567913.....	E002M8.....	5974325	300	0569399.....	E0236-32.....	5974149	295	0571460.....	A012N24.....	5966983	92	0573488.....	C110240.....	5983901	420
0567920.....	E002M10.....	5973886	300	0569405.....	E0238-32.....	5974211	295	0571477.....	A012N25.....	5966987	92	0573495.....	C110775.....	5983986	420
0567937.....	E002M12.....	5973895	300	0569412.....	E02310-24.....	5974471	295	0571484.....	A012N26.....	5966992	92	0573952.....	A0121/64.....	5966740	91
0567944.....	E002M14.....	5974304	300	0569429.....	E02312-24.....	5974475	295	0571491.....	A012N27.....	5966996	92	0573969.....	A0121/32.....	5966639	91
0567951.....	E002M16.....	5974349	300	0569436.....	E0231/4.....	5974466	295	0571507.....	A012N28.....	5966999	92	0573976.....	A0123/64.....	5966635	91
0567968.....	E002M18.....	5974399	300	0569443.....	E0235/16.....	5974050	295	0571514.....	A012N29.....	5967005	92	0573983.....	A012N53.....	5966822	91
0567975.....	E002M20.....	5974491	300	0569450.....	E0233/8.....	5974484	295	0571521.....	A012N3.....	5967008	93	0573990.....	A012N54.....	5966825	91
0567982.....	E002M22.....	5974494	300	0569467.....	E0237/16.....	5974196	295	0571538.....	A012N30.....	5967011	92	0574003.....	A012N55.....	5966828	91
0567999.....	E002M24.....	5974497	300	0569474.....	E0231/2.....	5974462	295	0571545.....	A012N31.....	5967014	92	0574010.....	A012N56.....	5966850	91
0568002.....	E003M3.....	5974380	300	0569481.....	E0235/8.....	5974093	295	0571552.....	A012N32.....	5967017	92	0574027.....	A012N57.....	5966854	91
0568026.....	E003M4.....	5974390	300	0569498.....	E0233/4.....	5974481	295	0571569.....	A012N33.....	5967023	92	0574034.....	A012N58.....	5966858	91
0568033.....	E003M5.....	5974394	300	0569504.....	E0237/8.....	5974207	295	0571576.....	A012N34.....	5967026	92	0574041.....	A012N59.....	5966862	91
0568040.....	E003M6.....	5974404	300	0569511.....	E0231.....	5974458	295	0571583.....	A012N35.....	5967029	92	0574058.....	A012N60.....	5966868	91
0568057.....	E003M8.....	5974414	300	0569641.....	E0318-36.....	5973839	283	0571590.....	A012N36.....	5967031	92	0574065.....	A012N61.....	5966872	91
0568064.....	E003M10.....	5974329	300	0569658.....	E03110-32.....	5973806	283	0571606.....	A012N37.....	5967034	92	0574072.....	A012N62.....	5966877	91
0568071.....	E003M12.....	5974334	300	0569665.....	E0311/4.....	5973803	283	0571613.....	A012N38.....	5967040	92	0574089.....	A012N63.....	5966882	91
0568088.....	E003M14.....	5974339	300	0569672.....	E0315/16.....	5973819	283	0571620.....	A012N39.....	5967043	92	0574096.....	A012N64.....	5966887	91
0568095.....	E003M16.....	5974344	300	0569689.....	E0313/8.....	5973815	283	0571637.....	A012N4.....	5967045	93	0574102.....	A012N65.....	5966897	91
0568101.....	E003M18.....	5974352	300	0569696.....	E0317/16.....	5973827	283	0571644.....	A012N40.....	5967049	92	0574119.....	A012N66.....	5966703	91
0568118.....	E003M20.....	5974366	300	0569702.....	E0311/2.....	5973800	283	0571651.....	A012N41.....	5967053	92	0574126.....	A012N67.....	5966708	91
0568125.....	E003M22.....	5974371	300	0569719.....	E0319/16.....	5973842	283	0571668.....	A012N42.....	5967056	92	0574133.....	A012N68.....	5966711	91
0568132.....	E003M24.....	5974376	300	0569726.....	E0315/8.....	5973823	283	0571675.....	A012N43.....	5967061	92	0574140.....	A012N69.....	5966716	91
0568385.....	E011M4X5.....	5974474	288	0569733.....	E0313/4.....	5973813	283	0571682.....	A012N44.....	5967063	92	0574157.....	A012N70.....	5966723	91
0568392.....	E011M5X5.....	5974477	288	0569740.....	E0317/8.....	5973831	283	0571699.....	A012N45.....	5967067	92	0574164.....	A012N71.....	5966727	91
0568408.....	E011M6X5.....	5974483	288	0569757.....	E0311.....	5973798	283	0571705.....	A012N46.....	5967070	92	0574171.....	A012N72.....	5966731	91
0568415.....	E011M6X75.....	5974486	288	0569818.....	E0411/8.....	5973928	307	0571712.....	A012N5.....	5966739	93	0574188.....	A012N73.....	5966735	91
0568422.....	E011M8X75.....	5974489	288	0569825.....	E0411/4.....	5973924	307	0571729.....	A012N6.....	5966667	93	0574195.....	A012N74.....	5966741	91
0568439.....	E011M8X10.....	5974492	288	0569832.....	E0413/8.....	5973936	307	0571736.....	A012N7.....	5966720	92	0574201.....	A012N75.....	5966746	91
0568446.....	E011M10X10.....	5974395	288	0569849.....	E0411/2.....	5973920	307	0571743.....	A012N8.....	5966765	92	0574218.....	A012N76.....	5966749	91
0568453.....	E011M10X1255974400	288	288	0569856.....	E0413/4.....	5973932	307	0571750.....	A012N9.....	5966771	92	0574225.....	A012N77.....	5966754	91
0568460.....	E011M12X10.....	5974405	288	0569917.....	E0431/8.....	5973967	309	0571767.....	A012O.....	5966774	93	0574232.....	A012N78.....	5966758	91
0568477.....	E011M12X1255974410	288	288	0569924.....	E0431/4.....	5973964	309	0571774.....	A012P.....	5966782	93	0574249.....	A012N79.....	5966762	91
0568484.....	E011M12X15.....	5974415	288	0569931.....	E0433/8.....	5973973	309	0571781.....	A012Q.....	5966785	93	0574256.....	A012N80.....	5966768	91
0568491.....	E011M14X10.....	5974419	288	0569948.....	E0431/2.....	5973961	309	0571798.....	A012R.....	5966788	93	0574317.....	A09718.....	5967571	225
0568507.....	E011M14X1255974423	288	288	0569955.....	E0433/4.....	5973970	309	0571804.....	A012S.....	5966792	93	0574324.....	A09712.....	5967709	225
0568514.....	E011M14X15.....	5974427	288	0570081.....	E0338-36.....	5973953	295	0571811.....	A012T.....	5966795	93	0574331.....	A09714.....	5967714	225
0568521.....	E011M16X10.....	5974431	288	0570098.....	E03310-32.....	5973922	295	0571828.....	A012U.....	5966797	93	0574348.....	A09720.....	5967576	225
0568538.....	E011M16X15.....	5974435	288	0570104.....	E0331/4.....	5973918	295	0571835.....	A012V.....	5966800	93	0574355.....	A09760.....	5967586	225
0568545.....	E011M18X10.....	5974443	289	0570111.....	E0335/16.....	5973938	295	0571842.....	A012W.....	5966803	93	0574362.....	A09730.....	5967581	225

EDP NUMBER INDEX - 0581964 - 0614747

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0578759.....	A0123/4.....	5966633	94	0581315.....	E0261/4.....	5974097	280	0582251.....	E0369/16.....	5974648	281	0589168.....	A02238.....	5967104	134
0578766.....	A01247/64.....	5966664	94	0581322.....	E0261/4H11.....	5974106	280	0582268.....	E0365/8.....	5974628	281	0589175.....	A02239.....	5967106	134
0580301.....	E005M4.....	5974453	285	0581339.....	E0261/43FL.....	5974110	280	0582275.....	E0363/4.....	5974605	281	0589182.....	A0223/16.....	5967108	134
0580318.....	E005M43FL.....	5974457	285	0581346.....	E0265/16.....	5974164	280	0582282.....	E0367/8.....	5974643	281	0589199.....	A0223/8.....	5967114	135
0580325.....	E005M5.....	5974461	285	0581353.....	E0265/16H11.....	5974169	280	0582299.....	E0361-12.....	5974565	281	0589205.....	A02240.....	5967116	134
0580332.....	E005M53FL.....	5974465	285	0581360.....	E0265/163FL.....	5974173	280	0582305.....	E0361-14.....	5974569	281	0589212.....	A02241.....	5967120	134
0580349.....	E005M6.....	5974469	285	0581377.....	E0263/8.....	5974135	280	0582312.....	E03710-32.....	5974670	293	0589229.....	A02242.....	5967122	134
0580356.....	E005M63FL.....	5974473	285	0581384.....	E0263/8H11.....	5974140	280	0582329.....	E0371/4.....	5974666	293	0589236.....	A02243.....	5967124	134
0580363.....	E005M8.....	5974476	285	0581391.....	E0263/83FL.....	5974145	280	0582336.....	E0375/16.....	5974682	293	0589243.....	A02244.....	5967126	134
0580370.....	E005M83FL.....	5974479	285	0581407.....	E0267/16.....	5974188	280	0582343.....	E0373/8.....	5974677	293	0589250.....	A02245.....	5967128	134
0580387.....	E005M10.....	5974418	285	0581414.....	E0261/2.....	5974081	281	0582350.....	E0377/16.....	5974693	293	0589267.....	A02246.....	5967130	134
0580394.....	E005M103FL.....	5974422	285	0581421.....	E0261/2H11.....	5974085	281	0582367.....	E0371/2.....	5974662	293	0589274.....	A02247.....	5967132	134
0580400.....	E005M12.....	5974426	285	0581438.....	E0261/23FL.....	5974090	281	0582374.....	E0379/16.....	5974700	293	0589281.....	A02248.....	5967134	134
0580417.....	E005M123FL.....	5974430	285	0581445.....	E0269/16.....	5974009	281	0582381.....	E0375/8.....	5974690	293	0589298.....	A02249.....	5967136	134
0580424.....	E005M14.....	5974434	285	0581452.....	E0265/8H11.....	5974181	281	0582398.....	E0373/4.....	5974673	293	0589304.....	A02250.....	5967138	134
0580431.....	E005M16.....	5974438	285	0581469.....	E0265/8.....	5974177	281	0582404.....	E0377/8.....	5974697	293	0589311.....	A02251.....	5967142	134
0580448.....	E005M18.....	5974442	285	0581476.....	E0263/4.....	5974130	281	0582428.....	E0371-14.....	5974658	293	0589328.....	A02252.....	5967144	134
0580455.....	E005M20.....	5974450	285	0581483.....	E0267/8.....	5974192	281	0582435.....	E03810-32.....	5974718	293	0589335.....	A02253.....	5967147	134
0580462.....	E006M4.....	5973941	285	0581490.....	E0261.....	5974078	281	0582442.....	E0381/4.....	5974715	293	0589342.....	A02254.....	5967149	134
0580479.....	E006M5.....	5973949	285	0581506.....	E0276-32.....	5974013	293	0582459.....	E0385/16.....	5973856	293	0589359.....	A02255.....	5967153	134
0580486.....	E006M53FL.....	5973777	285	0581513.....	E0278-32.....	5974017	293	0582466.....	E0383/8.....	5974729	293	0589366.....	A02256.....	5967158	134
0580493.....	E006M6.....	5973778	285	0581520.....	E02710-24.....	5974150	293	0582473.....	E0387/16.....	5973958	293	0589373.....	A02257.....	5967162	134
0580509.....	E006M63FL.....	5973780	285	0581537.....	E02712-24.....	5974158	293	0582480.....	E0381/2.....	5974712	293	0589380.....	A02258.....	5967167	134
0580516.....	E006M8.....	5973782	285	0581544.....	E0271/4.....	5974095	293	0582497.....	E0389/16.....	5974006	293	0589397.....	A02259.....	5967170	134
0580523.....	E006M10.....	5974482	285	0581551.....	E0275/16.....	5974171	293	0582503.....	E0385/8.....	5973916	293	0589403.....	A0225/16.....	5967176	134
0580530.....	E006M103FL.....	5974488	285	0581568.....	E0273/8.....	5974168	293	0582510.....	E0383/4.....	5974721	293	0589410.....	A0225/32.....	5967184	134
0580547.....	E006M12.....	5973774	285	0581575.....	E0277/16.....	5974015	293	0582527.....	E0387/8.....	5973990	293	0589427.....	A0225/8.....	5966863	135
0580554.....	E006M123FL.....	5973796	285	0581582.....	E0271/2.....	5974052	293	0582541.....	E0381-14.....	5974707	293	0589434.....	A02260.....	5966885	134
0580561.....	E006M14.....	5973832	285	0581599.....	E0279/16.....	5974018	293	0583180.....	E006M43FL.....	5973945	285	0589441.....	A02261.....	5966921	134
0580578.....	E006M16.....	5973878	285	0581605.....	E0275/8.....	5974011	293	0583197.....	E006M83FL.....	5973784	285	0589458.....	A02262.....	5966972	134
0580585.....	E006M18.....	5973929	285	0581612.....	E0273/4.....	5974163	293	0583203.....	E0262-56.....	5974126	281	0589465.....	A02263.....	5966981	134
0580592.....	E006M20.....	5973937	285	0581629.....	E0277/8.....	5974016	293	0583697.....	A02230.....	5967079	134	0589472.....	A02264.....	5966985	134
0580608.....	E007M4.....	5973801	297	0581636.....	E0271.....	5974024	293	0588703.....	A0221/2.....	5967178	135	0589489.....	A02265.....	5966989	134
0580615.....	E007M5.....	5973805	297	0581643.....	E0284-40.....	5974035	293	0588710.....	A0221/4.....	5967188	134	0589496.....	A02266.....	5966993	134
0580622.....	E007M6.....	5973808	297	0581650.....	E0285-40.....	5974037	293	0588727.....	A0221/8.....	5967193	134	0589502.....	A02267.....	5966843	134
0580639.....	E007M8.....	5973811	297	0581667.....	E0286-32.....	5974046	293	0588734.....	A022100.....	5967198	135	0589519.....	A02268.....	5966845	134
0580646.....	E007M10.....	5973786	297	0581674.....	E0288-32.....	5974058	293	0588741.....	A022101.....	5967207	135	0589526.....	A02269.....	5966847	134
0580653.....	E007M12.....	5973787	297	0581681.....	E02810-24.....	5974023	293	0588758.....	A022102.....	5967211	135	0589533.....	A02270.....	5966849	134
0580677.....	E007M16.....	5973791	297	0581698.....	E02812-24.....	5974026	293	0588765.....	A022103.....	5967217	135	0589540.....	A02271.....	5966851	134
0580707.....	E008M4.....	5973840	297	0581704.....	E0281/4.....	5974021	293	0588772.....	A022104.....	5967221	135	0589557.....	A02272.....	5966853	134
0580714.....	E008M5.....	5973843	297	0581711.....	E0285/16.....	5974040	293	0588789.....	A022105.....	5967224	135	0589564.....	A02273.....	5966855	134
0580721.....	E008M6.....	5973846	297	0581728.....	E0283/8.....	5974030	293	0588796.....	A022106.....	5967228	135	0589571.....	A02274.....	5966857	134
0580738.....	E008M8.....	5973850	297	0581735.....	E0283/8H5.....	5974032	293	0588802.....	A022107.....	5967233	135	0589588.....	A02275.....	5966859	134
0580745.....	E008M10.....	5973814	297	0581742.....	E0287/16.....	5974049	293	0588819.....	A022108.....	5967238	135	0589595.....	A02276.....	5966861	134
0580752.....	E008M12.....	5973816	297	0581759.....	E0281/2.....	5974020	293	0588826.....	A022109.....	5967241	135	0589601.....	A02277.....	5966865	134
0580769.....	E008M14.....	5973820	297	0581766.....	E0289/16.....	5974061	293	0588833.....	A022110.....	5967244	135	0589618.....	A02278.....	5966867	134
0580776.....	E008M16.....	5973824	297	0581773.....	E0285/8.....	5974043	293	0588840.....	A022111.....	5967248	135	0589625.....	A02279.....	5966869	134
0580790.....	E008M20.....	5973836	297	0581780.....	E0283/4.....	5974028	293	0588857.....	A022112.....	5967250	135	0589632.....	A0227/16.....	5966871	135
0580950.....	E016M8X10.....	5973568	285	0581797.....	E0287/8.....	5974055	293	0588864.....	A022113.....	5967256	135	0589649.....	A0227/32.....	5966873	134
0580967.....	E016M10X10.....	5973557	285	0581803.....	E0281.....	5974019	293	0588871.....	A022115.....	5967259	135	0589656.....	A02280.....	5966877	134
0580974.....	E016M14X15.....	5973561	285	0581957.....	E0356-40.....	5974546	280	0588888.....	A022116.....	5967262	135	0589663.....	A02281.....	5966879	134
0581032.....	E018M8X10.....	5973601	297	0581964.....	E0358-36.....	5974557	280	0588895.....	A022117.....	5967265	135	0589670.....	A02282.....	5966881	134
0581049.....	E018M10X10.....	5973589	297	0581971.....	E03510-32.....	5974585	280	0588901.....	A022118.....	5967268	135	0589687.....	A02283.....	5966883	134
0581056.....	E018M14X15.....	5973593	297	0581995.....	E0351/4.....	5973974	280	0588918.....	A022119.....	5967271	135	0589694.....	A02284.....	5966887	135
0581070.....	E0256-32.....	5974057	280	0582008.....	E0351/43FL.....	5974542	280	0588925.....	A02211/32.....	5967274	135	0589700.....	A02285.....	5966889	135
0581087.....	E0258-32.....	5974068	280	0582015.....	E0355/16.....	5974736	280	0588932.....	A02211/64.....	5967277	134	0589717.....	A02286.....	5966891	135
0581094.....	E02510-24.....	5974031	280	0582022.....	E0355/163FL.....	5974740	280	0588949.....	A022120.....	5967280	135	0589724.....	A02287.....	5966893	135
0581100.....	E02512-24.....	5974034	280	0582039.....	E0353/8.....	5974725	280	0588956.....	A022121.....	5967283	135	0589731.....	A02288.....	5966896	135
0581117.....	E0251/4.....	5974027	280	0582046.....	E0353/83FL.....	5974732	280	0588963.....	A022122.....	5967289	135	0589748.....	A02289.....	5966899	135
0581124.....	E0251/43FL.....	5974029	280	0582053.....	E0357/163FL.....	5974549	280	0588970.....	A022125.....	5967292	135	0589755.....	A02290.....	5966902	135
0581131.....	E0255/16.....	5974044	280	0582060.....	E0351/2.....	5973965	280	0588987.....	A022130.....	5967295	135	0589762.....	A02291.....	5966906	135
0581148.....	E0255/163FL.....	5974047	280	0582077.....	E0351/23FL.....	5973968	281	0588994.....	A022135.....	5967298	135	0589779.....	A02292.....	5966911	135
0581155.....	E0253/8.....	5974039	280	0582084.....	E0359/16.....	5974561	281	0589007.....	A02213/32.....	5967302	135	0589786.....	A02293.....	5966916	135
0581162.....	E0253/83FL.....	5974041	280	0582091.....	E0355/8.....	5974743	281	0589014.....	A02213/64.....	5967305	134	0589793.....	A02294.....	5966926	135
0581179.....	E0257/16.....	5974060	280	0582107.....	E0353/4.....	5974686	281	0589021.....	A022140.....	5967309	135	0589809.....	A02295.....	5966931	135
0581186.....	E0251/2.....	5974219	281	0582114.....	E0357/8.....	5974553									

EDP NUMBER INDEX - 0614754 - 0625705

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0600177	A02225	5967200	133	0614204	R45385	5979584	58	0614983	R45755	5980451	48	0622056	R457188	5979329	50
0600184	A02226	5967206	133	0614211	R45387	5979432	58	0614990	R45760	5980303	48	0622063	R457198	5979184	50
0600191	A022265	5967064	133	0614228	R45390	5979444	58	0615003	R45765	5980327	48	0622070	R45749	5979319	50
0600207	A02227	5967068	133	0614235	R45395	5979458	58	0615010	R45768	5980338	48	0623596	R4531/2	5979921	59
0600214	A02228	5967073	133	0614242	R454100	5979978	58	0615027	R45769	5980341	48	0623602	R4531/4	5979925	57
0600221	A02229	5967076	133	0614259	R454102	5979985	58	0615034	R45770	5980344	48	0623619	R4531/8	5979930	56
0600238	A0223/32	5967110	133	0614266	R454103	5979989	58	0615041	R45774	5980358	48	0623626	R45311/16	5979995	59
0600245	A0227/64	5966875	133	0614273	R454104	5979993	58	0615058	R45775	5980363	49	0623633	R45311/32	5979998	58
0600382	A0225	5966728	133	0614280	R454105	5979996	58	0615065	R45780	5980389	49	0623640	R45311/64	5980001	56
0600399	A0226	5966732	133	0614297	R454110	5980003	58	0615072	R45785	5980407	49	0623657	R45313/32	5979639	58
0600405	A0227	5966736	133	0614303	R454112	5980009	58	0615089	R45786	5980410	49	0623664	R45313/64	5979672	57
0600412	A0228	5966743	133	0614310	R454115	5980015	58	0615096	R45787	5980413	49	0623671	R45315/32	5979552	59
0600429	A0229	5967157	133	0614327	R454120	5980037	59	0615102	R45790	5980423	49	0623688	R45315/64	5979555	57
0600436	A02210	5967213	133	0614334	R454122	5980047	59	0615119	R45793	5980436	49	0623695	R45317/32	5979576	59
0600443	A02211	5967253	133	0614341	R454125	5980050	59	0615126	R45795	5980159	49	0623701	R45317/64	5979579	57
0600450	A02212	5967286	133	0614358	R454130	5980060	59	0615133	R458100	5980520	49	0623718	R45319/32	5979596	59
0600467	A02213	5967324	133	0614365	R454135	5980062	59	0615140	R458102	5980524	49	0623725	R45319/64	5979599	58
0600474	A02214	5967333	133	0614372	R454140	5980074	59	0615157	R458103	5980527	49	0623732	R45321/32	5979608	59
0600481	A02215	5967335	133	0614389	R4541425	5980081	59	0615164	R458104	5980364	49	0623749	R45321/64	5979612	58
0600498	A02216	5967339	133	0614396	R454145	5979778	59	0615171	R458105	5980370	49	0623756	R45323/32	5979616	59
0600504	A02217	5967343	133	0614402	R454150	5979846	59	0615188	R458110	5980384	49	0623763	R45323/64	5979620	58
0600511	A02218	5967166	133	0614419	R454155	5979915	59	0615195	R458112	5980387	49	0623770	R45325/64	5979624	58
0600528	A02219	5967169	133	0614426	R454160	5979931	59	0615201	R458115	5980393	50	0623787	R45327/64	5979627	58
0600535	A0221/16	5967173	133	0614433	R45430	5979852	56	0615218	R458120	5980414	50	0623794	R45329/64	5979630	59
0600542	A0221/32	5967183	133	0614440	R45433	5979861	56	0615225	R458122	5980422	50	0623800	R4533/16	5979666	57
0600559	A0223/64	5967112	133	0614457	R45434	5979864	56	0615232	R458125	5980426	50	0623817	R4533/4	5979669	59
0600566	A0225/64	5966840	133	0614464	R45435	5979868	56	0615249	R458130	5980438	50	0623824	R4533/8	5979674	58
0605356	A002325	5967327	97	0614471	R45440	5979913	56	0615256	R458135	5980446	50	0623831	R45331/64	5978931	59
0609309	C273400	5984667	441	0614488	R45442	5980020	56	0615263	R458140	5980459	50	0623848	R45333/64	5978942	59
0609316	C247170	5984285	439	0614495	R45443	5980061	56	0615270	R4581425	5980462	50	0623855	R45335/64	5978953	59
0609323	C247190	5984296	439	0614501	R45445	5980137	57	0615287	R458145	5980465	50	0623862	R45337/64	5978964	59
0609330	C247210	5984315	439	0614518	R45450	5980038	57	0615294	R458150	5980471	50	0623879	R45339/64	5978981	59
0609347	C247230	5984690	439	0614525	R45451	5980042	57	0615300	R458155	5980483	50	0623886	R45341/64	5978939	59
0609354	C247240	5984734	439	0614532	R45455	5980048	57	0615317	R458160	5980496	50	0623893	R45343/64	5978940	59
0609361	C247260	5984840	439	0614549	R45460	5980075	57	0615324	R45830	5981063	47	0623909	R45345/64	5978941	59
0609378	C247360	5984707	439	0614556	R45465	5980096	57	0615331	R45833	5981074	47	0623916	R45347/64	5978943	59
0609385	C247400	5984720	439	0614563	R45467	5980106	57	0615348	R45834	5981081	47	0623923	R4535/16	5978952	58
0612057	A72017	5971157	143	0614570	R45468	5980109	57	0615355	R45835	5981086	47	0623930	R4535/32	5978954	56
0612064	A72055	5971143	143	0614587	R45469	5980111	57	0615362	R45840	5981132	47	0623947	R4535/8	5978955	59
0612071	A72062	5971150	143	0614594	R45470	5980113	57	0615379	R45842	5981137	47	0623954	R4537/16	5979464	58
0612088	A72065	5971154	143	0614600	R45474	5980123	57	0615386	R45843	5981140	47	0623961	R4537/32	5979507	57
0612101	A72075	5971163	143	0614617	R45475	5980126	58	0615393	R45845	5981149	48	0623978	R4539/16	5979480	59
0612125	A72085	5971171	143	0614624	R45480	5980151	58	0615409	R45850	5981175	48	0623985	R4539/32	5979484	57
0612149	A72095	5971181	143	0614631	R45485	5980164	58	0615416	R45851	5981181	48	0623992	R4539/64	5979488	56
0612163	A720105	5971191	143	0614648	R45486	5980167	58	0615423	R45855	5980360	48	0624005	R4541/2	5979962	59
0613870	R453100	5979933	58	0614655	R45487	5980175	58	0615430	R45860	5980492	48	0624012	R4541/4	5979970	57
0613887	R453102	5979946	58	0614662	R45490	5979294	58	0615447	R45865	5980342	48	0624029	R4541/8	5979974	56
0613894	R453103	5979950	58	0614679	R45493	5979364	58	0615454	R45868	5980350	48	0624036	R45411/16	5980025	59
0613900	R453105	5979956	58	0614686	R45495	5979376	58	0615461	R45869	5980353	48	0624043	R45411/32	5980029	58
0613917	R453110	5979964	58	0614693	R457100	5979017	49	0615478	R45870	5980356	48	0624050	R45411/64	5980033	56
0613924	R453112	5979968	58	0614709	R457102	5979023	49	0615485	R45874	5980369	48	0624067	R45413/32	5980067	58
0613931	R453115	5979976	58	0614716	R457103	5979025	49	0615492	R45875	5980373	49	0624074	R45413/64	5980070	57
0613948	R453120	5980005	59	0614723	R457104	5979027	49	0615508	R45880	5980400	49	0624081	R45415/32	5979926	59
0613955	R453122	5980011	59	0614730	R457105	5979029	49	0615515	R45885	5980412	49	0624098	R45415/64	5979928	57
0613962	R453125	5980014	59	0614747	R457110	5979032	49	0615522	R45886	5980415	49	0624104	R45417/32	5979795	59
0613979	R453130	5979536	59	0614754	R457112	5979036	49	0615539	R45887	5980418	49	0624111	R45417/64	5979798	57
0613986	R453135	5979570	59	0614761	R457115	5979040	50	0615546	R45890	5980425	49	0624128	R45419/32	5979820	59
0613993	R453140	5979680	59	0614778	R457120	5979052	50	0615553	R45893	5980439	49	0624135	R45419/64	5979822	58
0614006	R4531425	5979684	59	0614785	R457122	5979060	50	0615560	R45895	5980445	49	0624142	R45421/32	5979828	59
0614013	R453145	5979688	59	0614792	R457125	5979062	50	0615577	A7207	5971160	143	0624159	R45421/64	5979831	58
0614020	R453150	5979540	59	0614808	R457130	5979068	50	0615584	A7208	5971167	143	0624166	R45423/32	5979834	59
0614037	R453155	5979546	59	0614815	R457135	5979070	50	0615591	A7209	5971176	143	0624173	R45423/64	5979838	58
0614044	R453160	5979559	59	0614822	R457140	5979082	50	0615607	A72010	5971186	143	0624180	R45425/64	5979840	58
0614051	R45330	5979633	56	0614839	R4571425	5979085	50	0615614	A72011	5971195	143	0624197	R45427/64	5979843	58
0614068	R45334	5979648	56	0614846	R457145	5979088	50	0615621	A72012	5971200	143	0624203	R45429/64	5979849	59
0614075	R45335	5979651	56	0614853	R457150	5979094	50	0615638	A72013	5971210	143	0624210	R4543/16	5979889	57
0614082	R45340	5979885	56	0614860	R457155	5979102	50	0615645	A72014	5971214	143	0624227	R4543/4	5979892	59
0614099	R45343	5979892	56	0614877	R457160	5979120	50	0616116	R45368	5978966	57	0624234	R4543/8	5979895	58
0614105	R45345	5979894	57	0614884	R45730	5979225	47	0616123	R45393	5979452	58	0624241	R45431/64	5979898	59
0614112	R45350	5979894	57	0614891	R45733	5979236	47	0616130	R453104	5979953	58	0624258	R45433/64	5979901	59
0614129	R45351														

EDP NUMBER INDEX - 0625712 - 1010039

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0624340.	R4545/32.	5980068	56	0625125.	R45843/64.	5981165	50	0625903.	R45481.	5980155	58	0626689.	R45781.	5980398	49
0624357.	R4545/8.	5980071	59	0625132.	R45845/64.	5981168	50	0625910.	R45488.	5979222	58	0626891.	R45339.	5979663	58
0624364.	R4547/16.	5980145	58	0625149.	R45847/64.	5981170	50	0625927.	R45491.	5979327	58	0626890.	C110260.	5984022	420
0624371.	R4547/32.	5980148	57	0625156.	R4585/16.	5980480	49	0625934.	R45496.	5979381	58	0626897.	C110360.	5983912	420
0624388.	R4549/16.	5979237	59	0625163.	R4585/32.	5980485	47	0625941.	R45498.	5979228	58	0629000.	C110400.	5983925	420
0624395.	R4549/32.	5979241	57	0625170.	R4585/8.	5980489	50	0625958.	R4571005.	5979019	49	0629055.	R45397.	5979467	58
0624401.	R4549/64.	5979250	56	0625187.	R4587/16.	5980391	49	0625965.	R457101.	5979021	49	0629062.	R45797.	5980233	49
0624418.	R4571/2.	5979132	50	0625194.	R4587/32.	5980394	48	0625972.	R457106.	5979030	49	0632956.	A9217/32.	5972956	70
0624425.	R4571/4.	5979135	48	0625200.	R4589/16.	5980464	50	0625989.	R457118.	5979044	50	0632994.	A92115/64.	5972605	70
0624432.	R4571/8.	5979015	50	0625217.	R4589/32.	5980467	48	0625996.	R4571205.	5979053	50	0633038.	A9211/4.	5971780	70
0624449.	R45711/16.	5979046	50	0625224.	R4589/64.	5980470	47	0626009.	R457121.	5979057	50	0633069.	A92117/64.	5972609	70
0624456.	R45711/32.	5979048	49	0625231.	R4531005.	5979936	58	0626016.	R457127.	5979064	50	0633106.	A9219/32.	5972556	70
0624463.	R45711/64.	5979050	47	0625248.	R453101.	5979942	58	0626023.	R457151.	5979098	50	0633137.	A92119/64.	5972614	70
0624470.	R45713/32.	5979075	49	0625255.	R453106.	5979960	58	0626030.	R457165.	5979172	50	0633151.	A9215/16.	5972841	70
0624487.	R45713/64.	5979077	48	0625262.	R453118.	5979990	59	0626047.	R457170.	5979215	50	0633175.	A92121/64.	5972632	70
0624494.	R45715/32.	5979110	50	0625279.	R4531205.	5980008	59	0626054.	R457175.	5979253	50	0633205.	A92111/32.	5971826	71
0624500.	R45715/64.	5979114	48	0625286.	R453127.	5980017	59	0626061.	R457180.	5979322	50	0633236.	A92123/64.	5972640	71
0624517.	R45717/32.	5979282	50	0625293.	R453151.	5979543	59	0626078.	R457185.	5979325	50	0633250.	A9213/8.	5972708	71
0624524.	R45717/64.	5979316	48	0625309.	R453165.	5979562	59	0626085.	R457190.	5979332	50	0633274.	A92125/64.	5972644	71
0624531.	R45719/32.	5979188	50	0625316.	R453170.	5979564	59	0626092.	R457195.	5979180	50	0633304.	A92113/32.	5972636	71
0624548.	R45719/64.	5979192	49	0625323.	R453175.	5979567	59	0626108.	R457200.	5979196	50	0633328.	A92127/64.	5972648	71
0624555.	R45721/32.	5979200	50	0625330.	R453180.	5979582	59	0626115.	R45731.	5979229	47	0633342.	A9217/16.	5972953	71
0624562.	R45721/64.	5979203	49	0625347.	R453185.	5979585	59	0626122.	R45732.	5979232	47	0633366.	A92129/64.	5972652	71
0624579.	R45723/32.	5979206	50	0625354.	R453190.	5979588	59	0626139.	R45736.	5979246	47	0633373.	A92115/32.	5972792	71
0624586.	R45723/64.	5979209	49	0625361.	R453195.	5979590	59	0626146.	R45737.	5979249	47	0633380.	A92131/64.	5972712	71
0624593.	R45725/64.	5979212	49	0625378.	R453200.	5979605	59	0626153.	R45738.	5979256	47	0633397.	A9211/2.	5971776	71
0624609.	R45727/64.	5979218	49	0625385.	R45331.	5979636	56	0626160.	R45739.	5979260	47	0633410.	A92133/64.	5972715	71
0624616.	R45729/64.	5979221	50	0625392.	R45332.	5979642	56	0626177.	R457405.	5979287	47	0633427.	A92135/64.	5972719	71
0624623.	R4573/16.	5979263	48	0625408.	R45336.	5979654	56	0626184.	R45741.	5979292	47	0633434.	A9219/16.	5972553	71
0624630.	R4573/4.	5979266	50	0625415.	R45337.	5979657	56	0626191.	R45746.	5979307	48	0633441.	A92137/64.	5972723	71
0624647.	R4573/8.	5979269	49	0625422.	R45338.	5979660	56	0626207.	R45747.	5979310	48	0633458.	A9211475.	5972781	71
0624654.	R45731/64.	5979272	50	0625439.	R453405.	5978987	56	0626214.	R457505.	5980440	48	0633465.	A92119/32.	5972611	71
0624661.	R45733/64.	5979274	50	0625446.	R45341.	5978989	56	0626221.	R45756.	5980287	48	0633472.	A92139/64.	5972730	71
0624678.	R45735/64.	5979276	50	0625453.	R45346.	5978935	57	0626238.	R45757.	5980290	48	0633489.	A9215/8.	5972847	71
0624685.	R45737/64.	5979278	50	0625460.	R45347.	5978936	57	0626245.	R45758.	5980293	48	0633540.	A9003/64.	5971100	78
0624692.	R45739/64.	5979280	47	0625477.	R453505.	5978945	57	0626252.	R457605.	5980306	48	0633557.	A900125.	5970615	78
0624708.	R45741/64.	5980284	50	0625484.	R45356.	5978949	57	0626269.	R45761.	5980309	48	0633601.	A900155.	5970628	78
0624715.	R45743/64.	5980317	50	0625491.	R45357.	5978950	57	0626276.	R45763.	5980320	48	0633625.	A900175.	5970635	78
0624722.	R45745/64.	5980355	50	0625507.	R45358.	5978951	57	0626283.	R45766.	5980331	48	0633694.	A900215.	5971415	78
0624739.	R45747/64.	5980395	50	0625514.	R453605.	5978957	57	0626290.	R45771.	5980349	48	0634318.	A90033/64.	5971106	80
0624746.	R4575/16.	5980296	49	0625521.	R45361.	5978958	57	0626306.	R45773.	5980352	48	0634325.	A90035/64.	5971109	80
0624753.	R4575/32.	5980298	47	0625538.	R45363.	5978960	57	0626313.	R45776.	5980367	49	0634332.	A9009/16.	5971001	80
0624760.	R4575/8.	5980301	50	0625545.	R45366.	5978963	57	0626320.	R45778.	5980375	49	0634349.	A90037/64.	5971111	80
0624777.	R4577/16.	5980382	49	0625552.	R45371.	5978970	57	0626337.	R457805.	5980392	49	0634363.	A90019/32.	5971401	80
0624784.	R4577/32.	5980386	48	0625569.	R45373.	5978971	57	0626344.	R45788.	5980416	49	0634370.	A90039/64.	5971113	80
0624791.	R4579/16.	5980276	50	0625576.	R45376.	5978977	58	0626351.	R45791.	5980429	49	0634387.	A9005/8.	5971248	80
0624807.	R4579/32.	5980280	48	0625583.	R45378.	5978983	58	0626368.	R45796.	5980195	49	0634394.	A90041/64.	5971152	80
0624814.	R4579/64.	5980283	50	0625590.	R453805.	5979568	58	0626375.	R45798.	5980268	49	0634400.	A900165.	5971364	80
0624821.	R4581/2.	5980442	50	0625606.	R45381.	5979575	58	0626382.	R458101.	5980523	49	0634417.	A90021/32.	5971476	80
0624838.	R4581/4.	5980479	48	0625613.	R45388.	5979436	58	0626399.	R458106.	5980374	49	0634431.	A90043/64.	5971156	80
0624845.	R4581/8.	5980514	47	0625620.	R45391.	5979448	58	0626405.	R458118.	5980399	50	0634448.	A90011/16.	5970717	80
0624852.	R45811/16.	5980405	50	0625637.	R45396.	5979461	58	0626412.	R458121.	5980419	50	0634455.	A90045/64.	5971161	80
0624869.	R45811/32.	5980408	49	0625644.	R45398.	5979472	58	0626429.	R458127.	5980430	50	0634462.	A90023/32.	5971490	80
0624876.	R45811/64.	5980411	47	0625651.	R454101.	5979981	58	0626436.	R458151.	5980475	50	0634479.	A900185.	5971389	80
0624883.	R45813/32.	5980453	49	0625668.	R454106.	5980000	58	0626443.	R45831.	5981066	47	0634486.	A90047/64.	5971169	80
0624890.	R45813/64.	5980456	48	0625675.	R454118.	5980022	59	0626450.	R45832.	5981070	47	0634493.	A9003/4.	5971293	80
0624906.	R45815/32.	5980490	50	0625682.	R454121.	5980040	59	0626467.	R45836.	5981090	47	0634509.	A90049/64.	5971177	80
0624913.	R45815/64.	5980494	48	0625699.	R454127.	5980053	59	0626474.	R45837.	5981093	47	0634516.	A900195.	5971397	80
0624920.	R45817/32.	5980511	50	0625705.	R454151.	5979982	59	0626481.	R458373.	5981095	47	0634523.	A90025/32.	5971496	80
0624937.	R45817/64.	5980517	48	0625712.	R45431.	5979855	56	0626498.	R45838.	5981098	47	0634547.	A901155.	5971576	78
0624944.	R45819/32.	5981185	50	0625729.	R45432.	5979858	56	0626504.	R45839.	5981101	47	0634554.	A901116.	5971586	78
0624951.	R45819/64.	5981188	49	0625736.	R45436.	5979871	56	0626511.	R45841.	5981134	47	0634561.	A90116.	5971578	78
0624968.	R45821/32.	5981197	50	0625743.	R45437.	5979876	56	0626528.	R45846.	5981151	47	0634592.	A901175.	5971580	78
0624975.	R45821/64.	5981046	49	0625750.	R45438.	5979879	56	0626535.	R45856.	5980397	47	0634615.	A90118.	5971582	78
0624982.	R45823/32.	5981049	50	0625767.	R45439.	5979885	56	0626542.	R45857.	5980435	47	0634639.	A90119.	5971585	78
0624999.	R45823/64.	5981051	49	0625774.	R45441.	5979919	56	0626559.	R45858.	5980474	47	0634653.	A9015/64.	5971804	78
0625002.	R45825/64.	5981055	49	0625781.	R45446.	5980170	57	0626566.	R45861.	5980329	47	0634691.	A90121.	5971787	78
0625019.	R45827/64.	5981058	49	0625798.	R45447.	5980178	57	0626573.	R45863.	5980336	47	0634707.	A901215.	5971791	78
0625026.	R45829/64.	5981061	50	0625804.	R45456.	5980051	57	0626580.	R45866.	5980345	47	0634752.	A9013/32.	5971688	78
0625033.	R4583/16.	5981103	48	0625811.	R45457.	5980055	57	0626597.	R45871.	5980362	4				

EDP NUMBER INDEX - 1010043 - 1010671

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
0635155.....A90113/64.....	5971657	79	0639870.....C1107/16.....	5983991	420	1010076..15007/16X20H3NO1	6007431	310	1010287..15993/4X16NO3.....	6007824	326	1010288..1599M14NO2.....	6007722	327	
0635209.....A9017/32.....	5971714	79	0639887.....C1101/2.....	5983782	420	1010079..15007/16X20H3NO2	6007436	310	1010290 15851/4X20H12FLNO2..	6007168...	330	1010291 15851/4X20H22FLNO2..	6007226...	330	
0635247.....A90115/64.....	5971687	79	0639894.....C11017/32.....	5983852	420	1010083..15007/16X20H3NO3	6007441	310	1010292 15851/4X20H32FLNO2..	6007283...	330	1010293 15851/4X20H52FLNO2..	6007348...	330	
0635285.....A9011/4.....	5971588	79	0639900.....C1109/16.....	5984032	420	1010085..15001/2X13H3NO1..	6007100	310	1010294 15851/4X20H32FLNO3..	6007332...	330	1010295 15851/4X20H33FLNO2..	6007343...	330	
0635315.....A90117/64.....	5971641	79	0639917.....C1105/8.....	5983949	420	1010087..15001/2X13H2NO2..	6007063	310	1010296 15851/4X20H53FLNO2..	6007352...	330	1010297 15851/4X20H33FLNO2..	6007352...	330	
0635353.....A9019/32.....	5971927	79	0639924.....C11011/16.....	5983808	420	1010088..15001/2X13H3NO2..	6007103	310	1010298 15851/4X28H22FLNO2..	6007129...	330	1010299 15851/4X28H32FLNO2..	6007135...	330	
0635384.....A90119/64.....	5971734	79	0639931.....C1103/4.....	5983903	420	1010089..15001/2X13H5NO2..	6007110	310	1010300 15851/4X28H42FLNO2..	6007142...	330	1010301 15851/4X28H32FLNO3..	6007139...	330	
0635407.....A9015/16.....	5971797	79	0639948.....C1107/8.....	5983996	420	1010091..15001/2X13H2NO3..	6007095	310	1010302 15851/4X28H23FLNO2..	6007132...	330	1010303 15851/4X28H43FLNO2..	6007146...	330	
0635421.....A90121/64.....	5971618	79	0639986.....C110350.....	5983910	420	1010092..15001/2X13H3NO3..	6007107	310	1010304 15855/16X18H12FLNO2	6007220...	330	1010305 15855/16X18H22FLNO2	6007230...	330	
0635452.....A90111/32.....	5971613	79	0640012.....C1231/16.....	5984309	426	1010093..15001/2X13H5NO3..	6006941	310	1010306 15855/16X18H32FLNO2	6007234...	330	1010307 15855/16X18H52FLNO2	6007252...	330	
0635483.....A90123/64.....	5971621	79	0640029.....C1231/8.....	5984329	426	1010094..15001/2X20H3NO1..	6006948	310	1010308 15855/16X18H33FLNO3	6007242...	330	1010309 15855/16X18H33FLNO2	6007249...	330	
0635506.....A9013/8.....	5971693	79	0640036.....C1235/32.....	5983899	426	1010097..15001/2X20H3NO2..	6006953	310	1010310 15855/16X18H33FLNO2	6007258...	330	1010311 15855/16X24H32FLNO2	6007272...	330	
0635520.....A90125/64.....	5971625	79	0640043.....C1233/16.....	5984389	426	1010101..15001/2X20H3NO3..	6006956	310	1010312 15855/16X24H33FLNO2	6007277...	330	1010313 15855/16X24H33FLNO2	6007287...	330	
0635551.....A90113/32.....	5971652	79	0640050.....C1231/4.....	5984319	426	1010103..15009/16X12H3NO1	6007512	310	1010314 15855/16X24H33FLNO2	6007287...	330	1010315 15855/16X24H33FLNO2	6007287...	330	
0635575.....A90127/64.....	5971629	79	0640067.....C1235/16.....	5983898	426	1010106..15009/16X12H3NO2	6007517	310	1010316 15855/16X24H33FLNO2	6007287...	330	1010317 15855/16X24H33FLNO2	6007287...	330	
0635599.....A9017/16.....	5971710	79	0640074.....C1233/8.....	5984393	426	1010108..15009/16X12H3NO3	6007522	310	1010318 15855/16X24H33FLNO2	6007287...	330	1010319 15855/16X24H33FLNO2	6007287...	330	
0635612.....A90129/64.....	5971633	79	0640081.....C1231/2.....	5984314	426	1010110..15009/16X18H3NO1	6007541	310	1010320 15855/16X24H33FLNO2	6007287...	330	1010321 15855/16X24H33FLNO2	6007287...	330	
0635629.....A90115/32.....	5971679	79	0640142.....C2471/8.....	5984242	439	1010113..15009/16X18H3NO2	6007546	310	1010322 15855/16X24H33FLNO2	6007287...	330	1010323 15855/16X24H33FLNO2	6007287...	330	
0635636.....A90131/64.....	5971698	79	0640159.....C2473/16.....	5984884	439	1010116..15009/16X18H3NO3	6007550	310	1010324 15855/16X24H33FLNO2	6007287...	330	1010325 15855/16X24H33FLNO2	6007287...	330	
0635650.....A90133/64.....	5971703	79	0640166.....C2471/4.....	5984237	439	1010118..15005/8X11H3NO1..	6007476	310	1010326 15855/16X24H33FLNO2	6007287...	330	1010327 15855/16X24H33FLNO2	6007287...	330	
0635667.....A90135/64.....	5971708	79	0640173.....C2475/16.....	5984731	439	1010121..15005/8X11H3NO2..	6007532	310	1010328 15855/16X24H33FLNO2	6007287...	330	1010329 15855/16X24H33FLNO2	6007287...	330	
0635674.....A9019/16.....	5971882	79	0640180.....C2473/8.....	5984696	439	1010123..15005/8X11H3NO3..	6007584	310	1010330 15855/16X24H33FLNO2	6007287...	330	1010331 15855/16X24H33FLNO2	6007287...	330	
0635681.....A90137/64.....	5971713	79	0640197.....C2471/2.....	5984233	439	1010125..15005/8X18H3NO1..	6007607	310	1010332 15855/16X24H33FLNO2	6007287...	330	1010333 15855/16X24H33FLNO2	6007287...	330	
0635704.....A90119/32.....	5971685	79	0640203.....C2479/16.....	5984799	439	1010128..15005/8X18H3NO2..	6007380	310	1010334 15855/16X24H33FLNO2	6007287...	330	1010335 15855/16X24H33FLNO2	6007287...	330	
0635711.....A90139/64.....	5971715	79	0640210.....C2475/8.....	5984732	439	1010131..15005/8X18H3NO3..	6007384	310	1010336 15855/16X24H33FLNO2	6007287...	330	1010337 15855/16X24H33FLNO2	6007287...	330	
0635728.....A9015/8.....	5971612	79	0640227.....C2473/4.....	5984886	439	1010139..15003/4X10H3NO1..	6007344	310	1010338 15855/16X24H33FLNO2	6007287...	330	1010339 15855/16X24H33FLNO2	6007287...	330	
0635735.....A9403/64.....	5973218	81	0640234.....C2477/8.....	5984767	439	1010142..15003/4X10H3NO2..	6007349	310	1010340 15855/16X24H33FLNO2	6007287...	330	1010341 15855/16X24H33FLNO2	6007287...	330	
0635742.....A94035/64.....	5973240	83	0640241.....C2471.....	5984228	439	1010144..15003/4X10H3NO3..	6007353	310	1010342 15855/16X24H33FLNO2	6007287...	330	1010343 15855/16X24H33FLNO2	6007287...	330	
0635759.....A94039/64.....	5973248	83	0640258.....C247500.....	5984742	439	1010146..15003/4X16H3NO1..	6007133	310	1010344 15855/16X24H33FLNO2	6007287...	330	1010345 15855/16X24H33FLNO2	6007287...	330	
0635766.....A94041/64.....	5972296	83	0640265.....C2731/8.....	5984576	441	1010149..15003/4X16H3NO2..	6007138	310	1010346 15855/16X24H33FLNO2	6007287...	330	1010347 15855/16X24H33FLNO2	6007287...	330	
0635773.....A94043/64.....	5972302	83	0640272.....C2733/16.....	5984791	441	1010152..15003/4X16H3NO3..	6007141	310	1010348 15855/16X24H33FLNO2	6007287...	330	1010349 15855/16X24H33FLNO2	6007287...	330	
0635780.....A94049/64.....	5972309	83	0640289.....C2731/4.....	5984571	441	1010154..15007/8X9H4NO1..	6007492	310	1010350 15855/16X24H33FLNO2	6007287...	330	1010351 15855/16X24H33FLNO2	6007287...	330	
0635797.....A94025/32.....	5973125	83	0640296.....C2733/8.....	5984850	441	1010157..15007/8X9H4NO2..	6007497	310	1010352 15855/16X24H33FLNO2	6007287...	330	1010353 15855/16X24H33FLNO2	6007287...	330	
0635803.....A9413/64.....	5972521	81	0640302.....C2731/2.....	5984566	441	1010159..15007/8X9H4NO3..	6007502	310	1010354 15855/16X24H33FLNO2	6007287...	330	1010355 15855/16X24H33FLNO2	6007287...	330	
0635810.....A9411/16.....	5972883	81	0640319.....C2735/8.....	5984677	441	1010160..15007/8X14H4NO1..	6007468	310	1010356 15855/16X24H33FLNO2	6007287...	330	1010357 15855/16X24H33FLNO2	6007287...	330	
0635827.....A9415/64.....	5973006	81	0640326.....C2733/4.....	5984843	441	1010163..15007/8X14H4NO2..	6007473	310	1010358 15855/16X24H33FLNO2	6007287...	330	1010359 15855/16X24H33FLNO2	6007287...	330	
0635834.....A9413/32.....	5972517	81	0640340.....C2731.....	5984556	441	1010166..15007/8X14H4NO3..	6007481	310	1010360 15855/16X24H33FLNO2	6007287...	330	1010361 15855/16X24H33FLNO2	6007287...	330	
0635841.....A9417/64.....	5972945	81	1010001..15001/4X20H1NO1..	6006971	310	1010206..15951/4X20NO2.....	6007870	321	1010362 15855/16X24H33FLNO2	6007287...	330	1010363 15855/16X24H33FLNO2	6007287...	330	
0635858.....A9411/8.....	5972896	81	1010002..15001/4X20H2NO1..	6006993	310	1010207..15951/4X20NO3.....	6007871	321	1010364 15855/16X24H33FLNO2	6007287...	330	1010365 15855/16X24H33FLNO2	6007287...	330	
0635865.....A9419/64.....	5972365	81	1010003..15001/4X20H3NO1..	6007003	310	1010208..15951/4X28NO2.....	6007668	321	1010366 15855/16X24H33FLNO2	6007287...	330	1010367 15855/16X24H33FLNO2	6007287...	330	
0635872.....A9415/32.....	5972958	82	1010004..15001/4X20H1NO2..	6006976	310	1010209..15951/4X28NO3.....	6007672	321	1010368 15855/16X24H33FLNO2	6007287...	330	1010369 15855/16X24H33FLNO2	6007287...	330	
0635889.....A94111/64.....	5972963	82	1010005..15001/4X20H2NO2..	6006995	310	1010210..15955/16X18NO2.....	6007677	321	1010370 15855/16X24H33FLNO2	6007287...	330	1010371 15855/16X24H33FLNO2	6007287...	330	
0635896.....A9413/16.....	5972513	82	1010006..15001/4X20H3NO2..	6007007	310	1010211..15955/16X18NO3.....	6007682	321	1010372 15855/16X24H33FLNO2	6007287...	330	1010373 15855/16X24H33FLNO2	6007287...	330	
0635902.....A94113/64.....	5972996	82	1010007..15001/4X20H5NO2..	6007015	310	1010216..15081/4X20NO2.....	6007567	321	1010374 15855/16X24H33FLNO2	6007287...	330	1010375 15855/16X24H33FLNO2	6007287...	330	
0635919.....A9417/32.....	5972940	82	1010008..15001/4X20H1NO3..	6006987	310	1010219..15081/4X20NO3.....	6007572	321	1010376 15855/16X24H33FLNO2	6007287...	330	1010377 15855/16X24H33FLNO2	6007287...	330	
0635926.....A94115/64.....	5972448	82	1010009..15001/4X20H2NO3..	6006997	310	1010223..15081/4X28NO2.....	6007576	321	1010378 15855/16X24H33FLNO2	6007287...	330	1010379 15855/16X24H33FLNO2	6007287...	330	
0635933.....A9411/4.....	5972892	82	1010010..15001/4X20H3NO3..	6007011	310	1010230..15085/16X18NO2.....	6006814	321	1010380 15855/16X24H33FLNO2	6007287...	330	1010381 15855/16X24H33FLNO2	6007287...	330	
0635940.....A94117/64.....	5972541	82	1010011..15001/4X20H5NO3..	6007019	310	1010233..15085/16X18NO3.....	6006856	321	1010382 15855/16X24H33FLNO2	6007287...	330	1010383 15855/16X24H33FLNO2	6007287...	330	
0635957.....A9419/32.....	5973047	82	1010014..15001/4X28H3NO1..	6007041	310	1010236..15085/16X24NO2.....	6006862	321	1010384 15855/16X24H33FLNO2	6007287...	330	1010385 15855/16X24H33FLNO2	6007287...	330	
0635964.....A94119/64.....	5972590	82	1010016..15001/4X28H2NO2..	6007035	310	1010237..15085/16X24NO3.....	6006866	321	1010386 15855/16X24H33FLNO2	6007287...	330	1010387 15855/16X24H33FLNO2	6007287...	330	
0635971.....A9415/16.....	5972901	82	1010017..15001/4X28H3NO2..	6007044	310	1010240..15083/8X16NO2.....	6007591	321	1010388 15855/16X24H33FLNO2	6007287...	330	1010389 15855/16X24H33FLNO2	6007287...	330	
0635988.....A94121/64.....	5972598	82	1010018..15001/4X28H4NO2..	6007050	310										

EDP NUMBER INDEX - 1010672 - 1012378

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
330				1010413..	15887/16X20NO3.....	6007634	341	1010589...	15921/4X18	6007833	361	1010717...	15288-36H24FLNO1..	6007045	310
1010338	15851/2X20H13FLNO2..	6007837	...	1010414..	15881/2X13NO2.....	6007775	341	1010590...	15923/8X18	6007772	361	1010719...	15288-36H24FLNO1..	6007048	310
330				1010415..	15881/2X13NO3.....	6007780	341	1010591...	15921/2X14	6007828	361	1010720...	15288-36H24FLNO3..	6007051	310
1010339	15851/2X20H23FLNO2..	6007843	...	1010416..	15881/2X20NO2.....	6007785	341	1010592...	15921/8X27X0313.....	6007658	361	1010724...	152810-24H24FLNO1	6007238	10
330				1010417..	15881/2X20NO3.....	6007790	341	1010593...	15280-80H12FLNO1..	6007279	310	1010725...	152810-24H34FLNO1	6007273	10
1010340	15851/2X20H33FLNO2..	6007846	...	1010419..	15724-40H2NO2.....	6006887	364	1010594...	15280-80H12FLNO2..	6007342	310	1010726...	152810-24H14FLNO2	6007209	10
330				1010421..	15724-40H2NO3.....	6006909	364	1010595...	15280-80H22FLNO2..	6007368	310	1010727...	152810-24H24FLNO2	6007243	10
1010341	15851/2X20H53FLNO2..	6007854	...	1010427...	15726-32H3NO2.....	6007013	364	1010596...	15280-80H12FLNO3..	6007366	310	1010728...	152810-24H34FLNO2	6007285	10
330				1010429...	15726-32H3NO3.....	6007020	364	1010597...	15280-80H22FLNO3..	6007369	310	1010730...	152810-24H24FLNO3	6007247	10
1010342	15855/8X11H33FLNO2..	6007308	...	1010435...	15728-32H3NO2.....	6007032	364	1010598...	15281-64H12FLNO1..	6007370	310	1010731...	152810-24H34FLNO3	6007294	10
330				1010437...	15728-32H3NO3.....	6006889	364	1010599...	15281-64H12FLNO2..	6007371	310	1010733...	152810-24H22FLNO2	6007216	10
1010343	15855/8X11H53FLNO2..	6007312	...	1010438...	157210-24H2NO2.....	6006932	364	1010601...	15281-64H12FLNO3..	6007167	310	1010734...	152810-24H32FLNO2	6007253	10
330				1010440...	157210-24H2NO3.....	6006934	364	1010603...	15281-72H12FLNO1..	6007181	310	1010736...	152810-24H22FLNO3	6007225	10
1010344	15853/4X10H33FLNO2..	6007150	...	1010442...	157210-32H2NO2.....	6006936	364	1010604...	15281-72H12FLNO2..	6007184	310	1010737...	152810-24H32FLNO3	6007259	10
330				1010443...	157210-32H3NO2.....	6006945	364	1010606...	15281-72H12FLNO3..	6007189	310	1010739...	152810-24H23FLNO2	6007233	10
1010345	15853/4X10H53FLNO2..	6007154	...	1010444...	157210-32H2NO3.....	6006940	364	1010608...	15282-56H13FLNO1..	6007341	310	1010740...	152810-24H33FLNO2	6007263	10
330				1010445...	157210-32H3NO3.....	6006950	364	1010609...	15282-56H23FLNO1..	6007143	310	1010743...	152810-24H33FLNO3	6007267	10
1010346...	15861/4X202FLNO2	6007836	340	1010451...	15721/4X20H3NO2..	6006921	364	1010610...	15282-56H13FLNO2..	6007350	310	1010745...	152810-32H24FLNO1	6007333	10
1010347...	15861/4X202FLNO3	6007841	340	1010453...	15721/4X20H3NO3..	6006925	364	1010611...	15282-56H23FLNO2..	6007148	310	1010746...	152810-32H34FLNO1	6007361	10
1010348...	15861/4X203FLNO2	6007623	340	1010456...	15721/4X28H3NO3..	6006929	364	1010612...	15282-56H13FLNO3..	6007354	310	1010748...	152810-32H24FLNO2	6007338	10
1010349...	15861/4X203FLNO2	6007624	340	1010458...	15725/16X18H3NO2	6006931	364	1010613...	15282-56H23FLNO3..	6007151	310	1010749...	152810-32H34FLNO2	6007362	10
1010350...	15861/4X282FLNO2	6007625	340	1010466...	15723/8X16H3NO2..	6006955	364	1010615...	15282-56H22FLNO2..	6007357	310	1010751...	152810-32H24FLNO3	6007347	10
1010351...	15861/4X282FLNO3	6007627	340	1010468...	15723/8X16H3NO3..	6006969	364	1010617...	15282-56H22FLNO3..	6007359	310	1010752...	152810-32H34FLNO3	6007363	10
1010352...	15861/4X283FLNO2	6007629	340	1010474...	15727/16X14H3NO2	6007024	364	1010625...	15283-48H23FLNO1..	6007178	310	1010754...	152810-32H22FLNO2	6007309	10
1010353...	15861/4X283FLNO3	6007632	340	1010482...	15721/2X13H3NO2..	6006918	364	1010627...	15283-48H23FLNO2..	6007180	310	1010755...	152810-32H32FLNO2	6007351	10
1010354...	15865/16X183FLNO2	6007655	...	1010491...	15784-40H2.....	6006901	364	1010629...	15283-48H23FLNO3..	6007190	310	1010757...	152810-32H22FLNO3	6007313	10
340				1010494...	15786-32H2.....	6006903	364	1010631...	15283-48H22FLNO2..	6007174	310	1010758...	152810-32H32FLNO3	6007355	10
1010355...	15865/16X183FLNO3	6007662	...	1010495...	15786-32H3.....	6006905	364	1010634...	15283-56H23FLNO1..	6007195	310	1010760...	152810-32H23FLNO2	6007324	10
340				1010498...	15788-32H2.....	6006907	364	1010636...	15283-56H23FLNO2..	6007200	310	1010761...	152810-32H33FLNO2	6007358	10
1010356...	15865/16X243FLNO2	6007666	...	1010499...	15788-32H3.....	6006911	364	1010637...	15283-56H23FLNO3..	6007205	310	1010763...	152810-32H23FLNO3	6007328	10
340				1010502...	157810-32H2.....	6006899	364	1010643...	15284-40H13FLNO1..	6007229	310	1010764...	152810-32H33FLNO3	6007360	10
1010357...	15865/16X243FLNO3	6007671	...	1010506...	15781/4X20H2.....	6006891	364	1010644...	15284-40H23FLNO1..	6007260	310	1010765...	152812-24H34FLNO1	6007364	10
340				1010507...	15781/4X20H3.....	6006893	364	1010645...	15284-40H13FLNO2..	6007235	310	1010767...	152812-24H34FLNO2	6007365	10
1010358...	15863/8X163FLNO2..	6007636	...	1010508...	15781/4X28H2.....	6006895	364	1010646...	15284-40H23FLNO2..	6007265	310	1010768...	152812-24H34FLNO3	6007367	10
340				1010509...	15781/4X28H3.....	6006897	364	1010647...	15284-40H13FLNO3..	6007245	310	1010769...	152812-28H34FLNO1	6007136	10
1010359...	15863/8X163FLNO3..	6007640	...	1010518...	15411/16X27.....	6006824	349	1010648...	15284-40H23FLNO3..	6007270	310	1010771...	152812-28H34FLNO2	6007186	10
340				1010519...	15411/8X27.....	6006833	349	1010650...	15284-40H22FLNO2..	6007250	310	1010772...	152812-28H34FLNO3	6007240	10
1010360...	15863/8X243FLNO2..	6007644	...	1010520...	15411/4X18.....	6006830	349	1010652...	15284-40H22FLNO3..	6007255	310	1010775...	1534NR0-80H1NO2...	6007593	334
340				1010521...	15413/8X18.....	6006855	349	1010653...	15284-48H23FLNO1..	6007275	310	1010776...	1534NR0-80H2NO2...	6007598	334
1010361...	15863/8X243FLNO3..	6007647	...	1010522...	15411/2X14.....	6006827	349	1010655...	15284-48H23FLNO2..	6007277	310	1010777...	1534NR0-80H2NO2...	6007373	334
340				1010523...	15413/4X14.....	6006851	349	1010656...	15284-48H23FLNO3..	6007284	310	1010779...	1534NR1-64H1NO2...	6007374	334
1010362...	15867/16X143FLNO2	6007676	...	1010524...	15411X111/2.....	6006841	349	1010660...	15285-40H23FLNO1..	6007298	310	1010780...	1534NR1-64H2NO2...	6007376	334
340				1010525...	15411/4X111/2.....	6006821	349	1010662...	15285-40H23FLNO2..	6007303	310	1010783...	1534NR1-72H1NO2...	6007379	334
1010363...	15867/16X143FLNO3	6007681	...	1010526...	15411/2X111/2.....	6006815	349	1010664...	15285-40H23FLNO3..	6007307	310	1010784...	1534NR1-72H2NO2...	6007382	334
340				1010527...	15412X111/2.....	6006846	349	1010669...	15285-44H23FLNO1..	6007315	310	1010787...	1534NR2-56H1NO2...	6007451	334
1010366...	15861/2X133FLNO2	6007760	340	1010528...	15411/8X27X0313.....	6006837	349	1010671...	15285-44H23FLNO2..	6007318	310	1010788...	1534NR2-56H2NO2...	6007459	334
1010367...	15861/2X133FLNO3	6007816	340	1010529...	15431/16X27.....	6007345	357	1010672...	15285-44H23FLNO3..	6007322	310	1010790...	1534NR2-56H2NO3...	6007467	334
1010368...	15861/2X203FLNO2	6007827	340	1010530...	15431/8X27.....	6007131	357	1010675...	15286-32H13FLNO1..	6007331	310	1010791...	1534NR2-64H1NO2...	6007472	334
1010369...	15861/2X203FLNO3	6007831	340	1010531...	15431/4X18.....	6007128	357	1010676...	15286-32H23FLNO1..	6007042	310	1010792...	1534NR2-64H2NO2...	6007477	334
1010379...	15191/4X20X6.....	6006701	366	1010532...	15433/8X18.....	6007144	357	1010677...	15286-32H33FLNO1..	6007114	310	1010796...	1534NR3-48H2NO2...	6007482	334
1010380...	15191/4X20X8.....	6006705	366	1010533...	15431/2X14.....	6007126	357	1010678...	15286-32H13FLNO2..	6007336	310	1010798...	1534NR3-48H2NO3...	6007486	334
1010381...	15195/16X18X6.....	6006740	366	1010534...	15433/4X14.....	6007140	357	1010679...	15286-32H23FLNO2..	6007074	310	1010799...	1534NR3-56H1NO2...	6007490	334
1010382...	15195/16X18X8.....	6006744	366	1010535...	15431X111/2.....	6007137	357	1010680...	15286-32H33FLNO2..	6007116	310	1010800...	1534NR3-56H2NO2...	6007495	334
1010383...	15193/8X16X6.....	6006725	366	1010539...	15431/8X27X0313.....	6007134	357	1010681...	15286-32H13FLNO3..	6007346	310	1010804...	1534NR4-40H1NO2...	6007505	334
1010384...	15193/8X16X8.....	6006735	366	1010551...	15681/8X27.....	6006906	355	1010682...	15286-32H33FLNO3..	6007104	310	1010805...	1534NR4-40H2NO2...	6007510	334
1010385...	15193/8X16X10.....	6006720	366	1010552...	15681/4X18.....	6006904	355	1010683...	15286-32H33FLNO3..	6006947	310	1010807...	1534NR4-40H2NO3...	6007521	334
1010388...	15191/2X13X6.....	6006693	366	1010553...	15683/8X18.....	6006916	355	1010685...	15286-32H22FLNO2..	6006942	310	1010809...	1534NR4-48H2NO2...	6007526	334
1010389...	15191/2X13X8.....	6006697	366	1010554...	15681/2X14.....	6006900	355	1010686...	15286-32H32FLNO2..	6007109	310	1010811...	1534NR4-48H2NO3...	6007531	334
1010390...	15191/2X13X10.....	6006684	366	1010555...	15683/4X14.....	6006914	355	1010688...	15286-32H13FLNO3..	6007002	310	1010813...	1534NR5-40H2NO2...	6007537	334
1010392...	15195/8X11X6.....	6006755	366	1010556...	15681X111/2.....	6006910	355	1010689...	15286-32H32FLNO3..	6007112	310	1010815...	1534NR5-40H2NO3...	6007542	334
1010393...	15195/8X11X8.....	6006762	366	1010557...	15681/4X111/2.....	6006898	355	1010690...	15286-40H23FLNO1..	6006965	310	1010817...	1534NR5-44H2NO2...	6007547	334
1010394...	15195/8X11X10.....	6006749	366	1010558...	15681/2X111/2.....										

EDP NUMBER INDEX - 1012379 - 1050328

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
1010842...	1534NR10-24H3NO3	6007404	34	1011017.....	1528S8-32H3	6007159	310	1011764.....	15441/2X14	6007165	352	1012436..	1700M35X6NO2	6008717	322
1010843..	1534NR10-32H1NO2	6007412	34	1011018.....	1528S8-36H2	6007221	310	1011765.....	15443/4X14	6007191	352	1012437..	1700M35X6NO3	6008723	322
1010844..	1534NR10-32H2NO2	6007417	34	1011020..	1528S10-24H2	6006789	310	1011766.....	15441X111/2	6007183	352	1012441..	1700M4X7NO1	6008787	322
1010845..	1534NR10-32H3NO2	6007426	34	1011021..	1528S10-24H3	6006792	310	1011767.....	154411/4X111/2	6007153	352	1012442..	1700M4X7NO2	6008790	322
1010847..	1534NR10-32H2NO3	6007421	34	1011023..	1528S10-32H2	6006796	310	1011772.....	1500L1/4X20	6006635	319	1012443..	1700M4X7NO3	6008794	322
1010848..	1534NR10-32H3NO3	6007430	34	1011024..	1528S10-32H3	6006799	310	1011775.....	1500L1/4X28	6006636	319	1012444..	1700M45X75NO1	6008772	322
1010853..	1534NR12-28H3NO2	6007445	34	1011025..	1528S12-24H3	6006802	310	1011778.....	1500L5/16X18	6006653	319	1012445..	1700M45X75NO2	6008777	322
1010877.....	15936-32	6007868	339	1011026..	1528S12-28H3	6006805	310	1011781.....	1500L5/16X24	6006655	319	1012453..	1700M5X8NO1	6008798	322
1010879.....	15938-32	6007869	339	1011029.....	1500S1/4X20	6006718	310	1011784.....	1500L3/8X16	6006647	319	1012454..	1700M5X8NO2	6008801	322
1010881.....	159310-24	6007830	339	1011032.....	1500S1/4X28	6006949	310	1011787.....	1500L3/8X24	6006649	319	1012455..	1700M5X8NO3	6008814	322
1010883.....	159310-32	6007866	339	1011035.....	1500S5/16X186006960	6006703	310	1011790.....	1500L7/16X14	6006661	319	1012459..	1700M6X10NO1	6008818	322
1010887.....	15874-40NO2	6007730	341	1011038.....	1500S5/16X246006964	6006707	310	1011793.....	1500L7/16X20	6006663	319	1012460..	1700M6X10NO2	6008822	322
1010888.....	15874-40NO3	6007735	341	1011041.....	1500S3/8X16	6007121	310	1011796.....	1500L1/2X13	6006632	319	1012461..	1700M6X10NO3	6008828	322
1010891.....	15876-32NO2	6007750	341	1011044.....	1500S3/8X24	6006957	310	1011799.....	1500L1/2X20	6006634	319	1012465..	1700M7X10NO1	6008833	322
1010892.....	15876-32NO3	6007755	341	1011045.....	1500S7/16X146006979	6006719	310	1011802.....	1500L9/16X12	6006669	319	1012466..	1700M7X10NO2	6008837	322
1010895.....	15878-32NO2	6007765	341	1011046.....	1500S7/16X206006990	6006703	310	1011805.....	1500L9/16X18	6006671	319	1012467..	1700M7X10NO3	6008842	322
1010896.....	15878-32NO3	6007770	341	1011047.....	1500S1/2X13	6006703	310	1011808.....	1500L5/8X11	6006657	319	1012468..	1700M8X10NO1	6008847	322
1010897..	158710-24NO2	6007686	341	1011048.....	1500S1/2X20	6006707	310	1011811.....	1500L5/8X18	6006659	319	1012469..	1700M8X10NO2	6008851	322
1010898..	158710-24NO3	6007691	341	1011049.....	1500S9/16X126007000	6006719	310	1011820.....	1500L3/4X10	6006643	319	1012470..	1700M8X10NO3	6008854	322
1010899..	158710-32NO2	6007694	341	1011050.....	1500S9/16X186007008	6006719	310	1011823.....	1500L3/4X16	6006645	319	1012471..	1700M8X125NO1	6008861	322
1010900..	158710-32NO3	6007700	341	1011051.....	1500S5/8X11	6006966	310	1011826.....	1500L7/8X9	6006667	319	1012472..	1700M8X125NO2	6008860	322
1010905.....	15824-40NO2	6007645	340	1011052.....	1500S5/8X18	6006975	310	1011829.....	1500L7/8X14	6006665	319	1012473..	1700M8X125NO3	6008867	322
1010906.....	15824-40NO3	6007650	340	1011055.....	1500S3/4X10	6007119	310	1011832.....	1500L1X8	6006641	319	1012478..	1700M9X125NO2	6008874	322
1010909.....	15826-32NO2	6007661	340	1011056.....	1500S3/4X16	6007120	310	1011835.....	1500L1X12	6006637	319	1012479..	1700M9X125NO3	6008880	322
1010910.....	15826-32NO3	6007665	340	1011057.....	1500S7/8X9	6006996	310	1012256.....	1599M6NO2	6007738	327	1012480..	1700M10X125NO1	6009088	322
1010913.....	15828-32NO2	6007675	340	1011058.....	1500S7/8X14	6006994	310	1012258.....	1599M8NO2	6007754	327	1012481..	1700M10X125NO2	6008877	322
1010914.....	15828-32NO3	6007680	340	1011070.....	15923/4X14	6007717	361	1012260.....	1599M10NO2	6007695	327	1012482..	1700M10X125NO3	6008879	322
1010915..	158210-24NO2	6007630	340	1011071..	1534NR12-24H3NO2	6007435	334	1012262.....	1599M12NO2	6007708	327	1012483..	1700M10X15NO1	6008880	322
1010916..	158210-24NO3	6007633	340	1011072..	1534NR12-24H3NO3	6007440	334	1012266.....	1599M6NO3	6007742	327	1012484..	1700M10X15NO2	6008882	322
1010917..	158210-32NO2	6007637	340	1011073.....	1528S2-64H2	6006811	310	1012268.....	1599M8NO3	6007759	327	1012485..	1700M10X15NO3	6008884	322
1010918..	158210-32NO3	6007641	340	1011074.....	1528S3-56H2	6006820	310	1012270.....	1599M10NO3	6007699	327	1012493..	1700M11X15NO2	6008886	322
1010920.....	15481/16X27	6006902	354	1011075.....	1528S4-48H2	6006829	310	1012272.....	1599M12NO3	6007712	327	1012494..	1700M11X15NO3	6008888	322
1010921.....	15491/16X27	6006842	358	1011076.....	1528S5-44H2	6006838	310	1012356..	15345-40H2NO2	6006753	329	1012495..	1700M12X175NO1	6008907	322
1010922.....	15481/8X27	6006973	354	1011102.....	16344-40	6008081	332	1012357..	15345-40H2NO3	6006757	329	1012496..	1700M12X175NO2	6008911	322
1010923.....	15491/8X27	6006854	358	1011104.....	16346-32	6008001	332	1012358..	15345-44H2NO2	6006760	329	1012497..	1700M12X175NO3	6008919	322
1010924..	15481/8X27X0313	6006978	354	1011105.....	16348-32	6008058	332	1012359..	15346-32H1NO2	6006764	329	1012498..	1700M12X125NO1	6008991	322
1010925..	15491/8X27X0313	6006858	358	1011106.....	163410-32	6008074	332	1012360..	15346-32H2NO2	6006768	329	1012499..	1700M12X125NO2	6008995	322
1010926..	15481/4X18	6006961	354	1011256..	16001/4X20NO2	6008145	326	1012361..	15346-32H3NO2	6006778	329	1012500..	1700M12X125NO3	6008999	322
1010927..	15491/4X18	6006850	358	1011257..	16001/4X20NO3	6008149	326	1012363..	15346-32H2NO3	6006772	329	1012501..	1700M14X15NO1	6008922	322
1010928..	15483/8X18	6006839	354	1011258..	16001/4X28NO2	6008153	326	1012364..	15346-32H3NO3	6006786	329	1012502..	1700M14X15NO2	6008926	322
1010929..	15493/8X18	6006872	358	1011259..	16001/4X28NO3	6008158	326	1012366..	15346-40H2NO2	6006790	329	1012503..	1700M14X15NO3	6008930	322
1010930..	15481/2X14	6006923	354	1011261..	16005/16X18NO3	6008209	326	1012367..	15346-40H2NO3	6006794	329	1012504..	1700M14X20NO1	6008935	322
1010931..	15491/2X14	6006845	358	1011262..	16005/16X24NO2	6008212	326	1012368..	15348-32H1NO2	6006798	329	1012505..	1700M14X20NO2	6008938	322
1010932..	15483/4X14	6006986	354	1011263..	16005/16X24NO3	6008217	326	1012369..	15348-32H2NO2	6006801	329	1012506..	1700M14X20NO3	6008943	322
1010933..	15493/4X14	6006868	358	1011264..	16003/8X16NO2	6008182	326	1012370..	15348-32H3NO2	6006806	329	1012513..	1700M16X15NO1	6008947	322
1010934..	15481X111/2	6006983	354	1011265..	16003/8X16NO3	6008187	326	1012372..	15348-32H2NO3	6006803	329	1012514..	1700M16X15NO2	6008959	322
1010937..	15906-32NO2	6007674	342	1011266..	16003/8X24NO2	6008191	326	1012373..	15348-32H3NO3	6006809	329	1012515..	1700M16X15NO3	6008964	322
1010938..	15906-32NO3	6007679	342	1011267..	16003/8X24NO3	6008199	326	1012375..	15348-36H2NO2	6006812	329	1012516..	1700M16X20NO1	6008967	322
1010940..	15906-40NO3	6007689	342	1011268..	16007/16X14NO2	6008245	326	1012377..	153410-24H2NO2	6006690	329	1012517..	1700M16X20NO2	6008971	322
1010941..	15908-32NO2	6007693	342	1011269..	16007/16X14NO3	6008254	326	1012378..	153410-24H3NO2	6006698	329	1012518..	1700M16X20NO3	6008976	322
1010942..	15908-32NO3	6007697	342	1011270..	16007/16X20NO2	6008260	326	1012379..	153410-24H2NO3	6006694	329	1012522..	1700M16X15NO1	6008981	322
1010945..	159010-24NO2	6007638	342	1011271..	16007/16X20NO3	6008266	326	1012380..	153410-24H3NO3	6006702	329	1012523..	1700M18X15NO2	6008985	322
1010946..	159010-24NO3	6007642	342	1011273..	16001/2X13NO3	6008136	326	1012381..	153410-32H1NO2	6006706	329	1012524..	1700M18X15NO3	6008990	322
1010947..	159010-32NO2	6007646	342	1011274..	16001/2X20NO2	6008138	326	1012382..	153410-32H2NO2	6006711	329	1012525..	1700M18X25NO1	6008995	322
1010948..	159010-32NO3	6007649	342	1011275..	16001/2X20NO3	6008141	326	1012383..	153410-32H3NO2	6006719	329	1012526..	1700M18X25NO2	6008999	322
1010953..	15911/4X20NO2	6007736	342	1011276..	16009/16X12NO2	6008268	326	1012385..	153410-32H2NO3	6006714	329	1012527..	1700M18X25NO3	6009009	322
1010954..	15911/4X20NO3	6007746	342	1011277..	16009/16X12NO3	6008270	326	1012386..	153410-32H3NO3	6006724	329	1012534..	1700M20X15NO1	6008707	322
1010955..	15911/4X28NO2	6007751	342	1011279..	16009/16X18NO3	6008285	326	1012388..	153412-28H3NO2	6006743	329	1012535..	1700M20X15NO2	6008759	322
1010956..	15911/4X28NO3	6007756	342	1011280..	16005/8X11NO2	6008226	326	1012389..	153412-24H3NO2	6006729	329	1012536..	1700M20X15NO3	6008806	322
1010957..	15915/16X18NO2	6007789	342	1011281..	16005/8X11NO3	6008231	326	1012408..	1700M16X35NO1	6008954	322	1012537..	1700M20X25NO1		

EDP NUMBER INDEX - 1050332 - 1717546

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #								
1012563.....	1700SM4X7	.....	6008666	...	322	1012879..	15451/8X27X0313..	6007271..	353	1013328.....	150517/8NO1..	6007400	...	325	1060123..	TN15005/8X11NO3..	6006741	314					
1012564.....	1700SM5X8	.....	6008673	...	322	1012890..	1785NRM16	.....	6008823	...	337	1013329.....	150517/8NO2..	6007403	...	325	1060131..	TN15005/8X18NO3..	6006745	314			
1012565.....	1700SM6X10	.....	6008687	...	322	1012891.....	1785NRM2	.....	6008852	...	337	1013330.....	150517/8NO3..	6007407	...	325	1060144..	TN15003/4X10NO3..	6006704	314			
1012566.....	1700SM8X125	.....	6008708	...	322	1012893.....	1785NRM25	.....	6008622	...	337	1013331.....	15052NO1	.....	6009511	...	325	1060152..	TN15003/4X16NO3..	6006708	314		
1012567.....	1700SM10X15	.....	6008860	...	322	1012896.....	1785NRM3	.....	6008765	...	337	1013332.....	15052NO2	.....	6007524	...	325	1060157..	TN15007/8X9NO2	.....	6006756	314	
1012568.....	1700SM12X175	.....	6008867	...	322	1012897.....	1785NRM35	.....	6008815	...	337	1013333.....	15052NO3	.....	6007529	...	325	1060292	TN15851/4-20H32FL	.....	6007401	330	
1012570.....	1700M30X35NO1	.....	6008742	...	322	1012898.....	1785NRM4	.....	6008829	...	337	1020002..	1534NE4-40X4	.....	6007097	...	338	1060293	TN15851/4-20H52FL	.....	6007409	330	
1012571.....	1700M30X35NO2	.....	6008746	...	322	1012899.....	1785NRM45	.....	6008834	...	337	1020004..	1534NE6-32X4	.....	6007408	...	338	1060295	TN15851/4-20H33FL	.....	6007405	330	
1012572.....	1700M30X35NO3	.....	6008751	...	322	1012900.....	1785NRM5	.....	6008839	...	337	1020006..	1534NE6-32X6	.....	6007462	...	338	1060296	TN15851/4-20H53FL	.....	6007413	330	
1012574.....	1700M36X40NO2	.....	6008763	...	322	1012901.....	1785NRM6	.....	6008844	...	337	1020008..	1534NE8-32X4	.....	6007583	...	338	1060299	TN15851/4-28H32FL	.....	6007416	330	
1012575.....	1700M36X40NO3	.....	6008768	...	322	1012902.....	1785NRM7	.....	6008623	...	337	1020010..	1534NE8-32X6	.....	6007588	...	338	1060306	TN15855/16-18H32FL	.....	6007443	330	
1012576.....	1700SM7X10	.....	6008696	...	322	1012903.....	1785NRM8	.....	6008625	...	337	1020012..	1534NE10-24X4	.....	6007071	...	338	1060309	TN15855/16-18H33FL	.....	6007446	330	
1012577.....	1700SM8X10	.....	6008700	...	322	1012904.....	1785NRM10	.....	6008827	...	337	1020014..	1534NE10-24X6	.....	6007077	...	338	1060310	TN15855/16-18H53FL	.....	6007448	330	
1012578.....	1700SM10X125	.....	6008855	...	322	1012905.....	1785NRM12	.....	6008832	...	337	1020016..	1534NE10-32X4	.....	6007080	...	338	1060313	TN15855/16-24H32FL	.....	6007453	330	
1012579.....	1700SM12X125	.....	6008864	...	322	1012906.....	1785NRM14	.....	6008838	...	337	1020018..	1534NE10-32X6	.....	6007083	...	338	1060320	TN15853/8-16H33FL	.....	6007425	330	
1012580.....	1700SM14X20	.....	6008870	...	322	1012907.....	1785NRM16	.....	6008843	...	337	1020020..	1534NE1/4X20X4	.....	6007059	...	338	1060321	TN15853/8-16H53FL	.....	6007432	330	
1012581.....	1700SM16X20	.....	6008633	...	322	1012909.....	1785NRM20	.....	6008713	...	337	1020022..	1534NE1/4X20X6	.....	6007062	...	338	1060324	TN15853/8-24H33FL	.....	6007438	330	
1012582.....	1700SM18X25	.....	6008636	...	322	1012920..	1788M3X5NO2	.....	6008645	...	343	1020024..	1534NE1/4X28X4	.....	6007065	...	338	1060328	TN15857/16-14H33FL	.....	6007457	330	
1012583.....	1700SM20X25	.....	6008652	...	322	1012923..	1788M4X7NO2	.....	6008669	...	343	1020026..	1534NE1/4X28X6	.....	6007068	...	338	1060332	TN15857/16-20H33FL	.....	6007461	330	
1012659.....	1785M2	.....	6008747	...	333	1012925..	1788M5X8NO2	.....	6008679	...	343	1020028..	1534NE5/16X18X4	.....	6007099	...	338	1060336	TN15851/2-13H33FL	.....	6007393	330	
1012662.....	1785M25	.....	6008764	...	333	1012926..	1788M6X10NO2	.....	6008688	...	343	1020030..	1534NE5/16X18X6	.....	6007101	...	338	1060340	TN15851/2-20H33FL	.....	6007397	330	
1012664.....	1785M3	.....	6008773	...	333	1012928..	1788M8X125NO2	.....	6008704	...	343	1020036..	1534NE3/8X16X4	.....	6007085	...	338	1060519	TN15411/8	.....	6007587	...	349
1012666.....	1785M35	.....	6008778	...	333	1012930..	1788M10X15NO2	.....	6008626	...	343	1020038..	1534NE3/8X16X6	.....	6007088	...	338	1060520	TN15411/4	.....	6007530	...	349
1012668.....	1785M4	.....	6008782	...	333	1012932..	1788M12X175NO2	.....	6008631	...	343	1020042..	1534NE3/8X24X6	.....	6007094	...	338	1060521	TN15413/8	.....	6007602	...	349
1012669.....	1785M45	.....	6008786	...	333	1012940..	1788M3X5NO3	.....	6008650	...	343	1020044..	1534NE7/16X14X6	.....	6007515	...	338	1060522	TN15411/2	.....	6007471	...	349
1012672.....	1785M5	.....	6008791	...	333	1012943..	1788M4X7NO3	.....	6008674	...	343	1020046..	1534NE7/16X20X6	.....	6007574	...	338	1060523	TN15413/4	.....	6007597	...	349
1012674.....	1785M6	.....	6008796	...	333	1012945..	1788M5X8NO3	.....	6008683	...	343	1020048..	1534NE1/2X13X6	.....	6007053	...	338	1060530	TN15431/8	.....	6007381	...	357
1012676.....	1785M7	.....	6008805	...	333	1012946..	1788M6X10NO3	.....	6008692	...	343	1020050..	1534NE1/2X20X6	.....	6007056	...	338	1060531	TN15431/4	.....	6007609	...	357
1012678.....	1785M8	.....	6008810	...	333	1012948..	1788M8X125NO3	.....	6008709	...	343	1050006..	1500A1/4X20	.....	6006633	...	313	1060532	TN15433/8	.....	6007389	...	357
1012680.....	1785M9	.....	6008819	...	333	1012950..	1788M10X15NO3	.....	6008628	...	343	1050021..	1500A1/4X28	.....	6006651	...	313	1060533	TN15431/2	.....	6007606	...	357
1012682.....	1785M10	.....	6008714	...	333	1012952..	1788M12X175NO3	.....	6008634	...	343	1050028..	1500A5/16X18	.....	6006738	...	313	1060534	TN15433/4	.....	6007385	...	357
1012685.....	1785M11	.....	6008718	...	333	1013037..	19854-40	.....	6008784	...	291	1050039..	1500A5/16X24	.....	6006623	...	313	1060805	TN15344-40	.....	6006775	...	329
1012686.....	1785M12	.....	6008722	...	333	1013038..	19854-48	.....	6008789	...	291	1050050..	1500A3/8X16	.....	6006728	...	313	1062361	TN15346-32	.....	6007377	...	329
1012689.....	1785M14	.....	6008728	...	333	1013039..	19855-40	.....	6008793	...	291	1050061..	1500A3/8X24	.....	6006733	...	313	1062370	TN15348-32	.....	6007420	...	329
1012693.....	1785M16	.....	6008733	...	333	1013040..	19855-44	.....	6008797	...	291	1050070..	1500A7/16X14	.....	6006626	...	313	1062378	TN153410-24	.....	6006759	...	329
1012696.....	1785M18	.....	6008738	...	333	1013041..	19856-32	.....	6008889	...	291	1050079..	1500A7/16X20	.....	6006627	...	313	1062383	TN153410-32	.....	6006763	...	329
1012699.....	153412-24H3NO3	.....	6006739	...	329	1013042..	19856-40	.....	6008939	...	291	1050088..	1500A1/2X13	.....	6007592	...	313	1062389..	TN153412-24	.....	6006767	...	329
1012774	15855/8X18H33FLNO2	.....	60073160			1013043..	19858-32	.....	6009102	...	291	1050097..	1500A1/2X20	.....	6006622	...	313	1062668..	TN1785M4	.....	6007488	...	333
1012775	15853/4X16H33FLNO2	.....	60071580			1013044..	19858-36	.....	6009104	...	291	1050106..	1500A9/16X12	.....	6006630	...	313	1062672..	TN1785M5	.....	6007491	...	333
1012813	1585NR1/4X20H12FLNO2	.....	6007801			1013045..	198510-24	.....	6008744	...	291	1050113..	1500A9/16X18	.....	6006631	...	313	1062674..	TN1785M6	.....	6007496	...	333
1012814	1585NR1/4X20H22FLNO2	.....	6007806			1013046..	198510-32	.....	6008748	...	291	1050121..	1500A5/8X11	.....	6006624	...	313	1062678..	TN1785M8	.....	6007501	...	333
1012815	1585NR1/4X20H32FLNO2	.....	6007811			1013049..	19851/4X20	.....	6008729	...	291	1050128..	1500A5/8X18	.....	6006625	...	313	1062682..	TN1785M10	.....	6007466	...	333
1012816	1585NR1/4X20H52FLNO2	.....	6007825			1013050..	19851/4X28	.....	6008734	...	291	1050142..	1500A3/4X10	.....	6006713	...	313	1062686..	TN1785M12	.....	6007480	...	333
1012817	1585NR1/4X20H32FLNO2	.....	6007815			1013051..	19855/16X18	.....	6008802	...	291	1050149..	1500A5/4X16	.....	6006723	...	313	1110010..	19944-40	.....	6008951	...	367
1012818	1585NR1/4X20H33FLNO2	.....	6007820			1013052..	19855/16X24	.....	6008807	...	291	1050157..	1500A7/8X9	.....	6006629	...	313	1110020..	19945-40	.....	6008961	...	367
1012820	1585NR1/4X28H12FLNO2	.....	6007635			1013053..	19853/8X16	.....	6008774	...	291	1050163..	1500A7/8X14	.....	6006628	...	313	1110030..	19946-32	.....	6008987	...	367
1012821	1585NR1/4X20H22FLNO2	.....	6007687			1013054..	19853/8X24	.....	6008780	...	291	1050170..	1500A1X8	.....	6006673	...	313	1110040..	19948-32	.....	6009013	...	367
1012822	1585NR1/4X28H32FLNO2	.....	6007799			1013055..	19857/16X14	.....	6009000	...	291	1050292..	1585A1/4X20	.....	6007698	...	330	1110050..	199410-24	.....	6008914	...	367
1012824	1585NR1/4X28H32FLNO3	.....	6007850			1013056..	19857/16X20	.....	6009058	...	291	1050299..	1585A1/4X28	.....	6007702	...	330	1110054..	199410-32	.....	6008918	...	367
1012828	1585NR5/16X18H22FLNO2	.....	6007692			1013057..	19851/2X13	.....	6008719	...	291	1050306..	1585A5/16X18	.....	6007727	...	330	1110060..	199412-24	.....	6008921	...	367
1012829	1585NR5/16X18H32FLNO2	.....	6007696			1013058..	19851/2X20	.....	6008724	...	291	1050313..	1585A5/16X24	.....	6007731	...	330	1110064..	199412-28	.....	6008925	...	367
1																							

EDP NUMBER INDEX - 1717704 - 5010660

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
1310058..	158010-32H6NO3.....	6006873	...	1310169..	330012-24H4NO2.....	6009480	346	1410253.....	202511/16X11	6009095	...	1716512.....	16741/4X28.....	6007893	...
344				1310177..	330014/4X28H4NO2.....	6009435	346	1410254.....	202511/16X16	6009097	...	1716514.....	16745/16X18.....	6007922	...
1310068..	15801/4X20H4NO2.....	6006982	...	1310178..	330014/4X20H6NO2.....	6009441	346	1410255.....	20253/4X10.....	6009099	...	1716518.....	16743/8X16.....	6007914	...
344				1310180..	330014/4X20H4NO3.....	6009438	346	1410256.....	20253/4X16.....	6009119	...	1716534.....	16741/2X13.....	6008010	...
1310069..	15801/4X20H6NO2.....	6006989	...	1310181..	330014/4X20H6NO3.....	6009444	346	1410257.....	20257/8X9.....	6009128	...	1716538.....	16745/8X11.....	6007931	...
344				1310183..	330014/4X28H4NO2.....	6009447	346	1410258.....	20257/8X14.....	6009125	...	1716542.....	16743/4X10.....	6007905	...
1310071..	15801/4X20H4NO3.....	6006985	...	1310185..	330014/4X28H4NO3.....	6009450	346	1410259.....	20251X8.....	6009093	...	1716722.....	1675M12X175	6007959	...
344				1310187..	33005/16X18H5NO2.....	6009424	346	1410260.....	20251X12.....	6009089	...	1716730.....	1675M16X20.....	6007991	...
1310074..	15801/4X28H4NO2.....	6006998	...	1310188..	33005/16X18H7NO2.....	6009432	346	1410261.....	20251X14.....	6009091	...	1716738.....	1675M20X25.....	6008013	...
344				1310189..	33005/16X18H5NO3.....	6009427	346	1410262.....	202511/8X7.....	6009030	...	1717510.....	16781/4X20.....	6008750	...
1310076..	15801/4X28H4NO3.....	6007001	...	1310190..	33005/16X18H7NO3.....	6009437	346	1410263.....	202511/8X12.....	6009025	...	1717512.....	16781/4X28.....	6008758	...
344				1310195..	33003/8X16H5NO2.....	6009502	346	1410264.....	202511/4X7.....	6009021	...	1717514.....	16785/16X18.....	6008795	...
1310078..	15805/16X18H5NO2.....	6006822	...	1310196..	33003/8X16H7NO2.....	6009507	346	1410265.....	202511/4X12.....	6009017	...	1717518.....	16783/8X16.....	6008781	...
344				1310197..	33003/8X16H5NO3.....	6009506	346	1410266.....	202513/8X6.....	6009040	...	1717530.....	16787/16X14.....	6008820	...
1310080..	15805/16X18H5NO3.....	6006825	...	1310198..	33003/8X16H7NO3.....	6009508	346	1410267.....	202513/8X12.....	6009035	...	1717532.....	16787/16X20.....	6008825	...
344				1310200..	33003/8X24H7NO2.....	6009378	346	1410268.....	202511/2X6.....	6009008	...	1717534.....	16781/2X13.....	6008735	...
1310081..	15805/16X18H7NO3.....	6006828	...	1310202..	33003/8X24H7NO3.....	6009381	346	1410269.....	202511/2X12.....	6009003	...	1717538.....	16785/8X11.....	6008812	...
344				1310211..	33001/2X13H5NO2.....	6009422	346	1410270.....	20251/8X27.....	6009081	...	1717542.....	16783/4X10.....	6008771	...
1310082..	15805/16X24H5NO2.....	6006831	...	1310400..	1580M3X5NO2.....	6006922	345	1410271.....	20251/4X18.....	6009060	...	1717546.....	16781X8.....	6008767	...
344				1310401..	1580M3X5NO3.....	6006924	345	1410272.....	20253/8X18.....	6009208	...	1717704.....	1679M6X10.....	6008613	...
1310086..	15803/8X16H5NO2.....	6006765	...	1310402..	1580M4X7NO2.....	6006926	345	1410273.....	20251/2X14.....	6009050	...	1717706.....	1679M8X125.....	6008380	...
344				1310403..	1580M4X7NO3.....	6006928	345	1410274.....	20253/4X14.....	6009103	...	1717708.....	1679M10X125	6008830	...
1310088..	15803/8X16H5NO3.....	6006769	...	1310404..	1580M5X8NO2.....	6006930	345	1410275.....	20251X11/2.....	6009085	...	1717710.....	1679M10X15.....	6008835	...
344				1310405..	1580M5X8NO3.....	6006933	345	1410573.....	2710M2X4X13/16.....	6009431	381	1717722.....	1679M12X175	6008845	...
1310092..	15803/8X24H5NO3.....	6006776	...	1310406..	1580M6X10NO2.....	6006935	345	1410575.....	2710M25X45X13/16.....	6009426	381	1717726.....	1679M14X20.....	6008856	...
344				1310407..	1580M6X10NO3.....	6006938	345	1410577.....	2710M3X5X13/16.....	6009442	381	1717730.....	1679M16X20.....	6008422	...
1310110..	33000-80H2NO3.....	6009413	...	1310408..	1580M8X125NO2.....	6006939	345	1410579.....	2710M4X7X13/16.....	6009448	381	1717734.....	1679M18X25.....	6008537	...
346				1310409..	1580M8X125NO3.....	6006943	345	1410580.....	2710M45X75X13/16.....	6009445	381	1717738.....	1679M20X25.....	6008606	...
1310111..	33001-64H2NO3.....	6009416	...	1310410..	1580M10X15NO2.....	6006913	345	1410581.....	2710M5X8X1.....	6009451	381	1717742.....	1679M24X30.....	6008611	...
346				1310411..	1580M10X15NO3.....	6006915	345	1410582.....	2710M6X10X1.....	6009456	381	1810007.....	B6801/8.....	8157407	...
1310112..	33001-72H2NO3.....	6009419	...	1310412..	1580M12X175NO2.....	6006917	345	1410584.....	2710M8X125X1.....	6009463	381	1810008.....	B6801/4.....	8157408	...
346				1310413..	1580M12X175NO3.....	6006919	345	1410585.....	2710M9X125X1.....	6009466	381	1810009.....	B6803/8.....	8157409	...
1310113..	33002-56H2NO3.....	6009492	...	1310500..	3300M3X5NO2.....	6009382	347	1410586.....	2710M10X15X1.....	6009401	381	1810010.....	B6801/2.....	8157410	...
346				1310501..	3300M3X5NO3.....	6009384	347	1410588.....	2710M12X175X11/2.....	6009412	381	1810011.....	B6803/4.....	8157411	...
1310114..	33002-56H3NO3.....	6009496	...	1310502..	3300M4X7NO2.....	6009387	347	1410589.....	2710M14X20X11/2.....	6009414	381	1810012.....	B6801.....	8157412	...
346				1310503..	3300M4X7NO3.....	6009390	347	1410590.....	2710M16X20X11/2.....	6009417	381	1810017.....	3850N8.....	6009196	...
1310121..	33004-40H3NO2.....	6009383	...	1310504..	3300M5X8NO2.....	6009393	347	1410591.....	2710M18X25X2.....	6009420	381	1810018.....	3850N9.....	6009254	...
346				1310505..	3300M5X8NO3.....	6009396	347	1410592.....	2710M20X25X2.....	6009434	381	1810019.....	3850N10.....	6009347	...
1310122..	33004-40H5NO2.....	6009389	...	1310506..	3300M6X10NO2.....	6009399	347	1410609.....	2325M6X10.....	6009183	...	1810020.....	3850N11.....	6009350	...
346				1310507..	3300M6X10NO3.....	6009404	347	1410611.....	2325M8X125.....	6009193	...	1810021.....	3850N12.....	6009353	...
1310123..	33004-40H3NO3.....	6009386	...	1310508..	3300M8X125NO2.....	6009407	347	1410612.....	2325M9X125.....	6009202	...	1810022.....	3850N14.....	6009143	...
346				1310509..	3300M8X125NO3.....	6009410	347	1410613.....	2325M10X15.....	6009144	...	1810372.....	1215T0.....	6007552	...
1310131..	33005-40H3NO3.....	6009409	...	1310510..	3300M10X15NO2.....	6009505	347	1410615.....	2325M12X175	6009151	...	1810373.....	1215T1.....	6007557	...
346				1310511..	3300M10X15NO3.....	6009373	347	1410616.....	2325M14X20.....	6009164	...	1810374.....	1215T2.....	6007563	...
1310132..	33005-40H5NO3.....	6009415	...	1321002..	3306E4-40X4H3.....	6009250	348	1410618.....	2325M16X20.....	6009169	...	1910501.....	19004OZ.....	6010002	...
346				1321004..	3306E4-40X4H5.....	6009255	348	1410619.....	2325M8X25.....	6009197	...	1910504.....	19005GALP.....	6009994	...
1310137..	33006-32H3NO2.....	6009454	...	1321006..	3306E6-32X4H3.....	6009326	348	1410620.....	2325M18X15.....	6009174	...	1910506.....	19005GALD.....	6010003	...
346				1321014..	3306E8-32X4H3.....	6009339	348	1410621.....	2325M20X25.....	6009179	...	1910509.....	19002OZ.....	6010001	...
1310138..	33006-32H5NO2.....	6009459	...	1321022..	3306E10-24X4H4.....	6009175	348	1410630.....	2710M12X175X1.....	6009405	...	1910512.....	19001/2OZ.....	6009993	...
346				1321038..	3306E1/4X20X4H4.....	6009504	348	1712221.....	16414-40H3.....	6008526	...	1930503.....	19001GAL.....	6009996	...
1310140..	33006-32H3NO3.....	6009457	...	1321062..	3306E5/16X18X4H5.....	6009260	348	1712223.....	16414-40H5.....	6008585	...	1950501.....	19001LB.....	6009998	...
346				1410145.....	201011/8X7X3.....	6009054	378	1712233.....	16416-32H3.....	6008387	...	3210001.....	1800N1.....	6005042	...
1310141..	33006-32H5NO3.....	6009462	...	1410147.....	201011/4X7X3.....	6009044	378	1712235.....	16416-32H5.....	6008391	...	3210002.....	1800N2.....	6005058	...
346				1410148.....	201011/4X12X3.....	6009036	378	1712239.....	16418-32H3.....	6008411	...	3210003.....	1800N3.....	6005062	...
1310147..	33008-32H3NO2.....	6009491	...	1410149.....	201013/8X6X3.....	6009067	378	1712241.....	16418-32H5.....	6008416	...	3210004.....	1800N4.....	6005066	...
346				1410151.....	201011/2X6X3.....	6009031	378	1712254.....	164110-24H6.....	6008113	...	3210005.....	1800N5.....	6005068	...
1310148..	33008-32H5NO2.....	6009495	...	1410152.....	201011/2X12X3.....	6009026	378	1712258.....	164110-32H4.....	6008114	...	3210006.....	1800N6.....	6005072	...
346				1410203.....	20101/8X27X1.....	6008629	378	1712260.....	164110-32H6.....	6008115	...	3210007.....	1800N7.....	6005084	...
1310150..	33008-32H3NO3.....	6009493	...	1410204.....	20101/8X27X11/2.....	6008632	378	1712264.....	16411/4X20H4	6008108	...	3210008.....	1800N8.....	6005089	...
346				1410205.....	20101/4X18X11/2.....	6009094	378	1712266.....	16411/4X20H6	6008109	...	3210009.....	1800N9.....	6005093	...
1310151..	33008-32H5NO3.....	6009497	...	1410206.....	20101/4X18X2.....	6009098	378	1712270.....	16411/4X28H4	6008110	...	3210013.....	1815SET.....	6005098	...
346				1410207.....	20103/8X18X11/2.....	6008726	378	1712272.....	16411/4X28H6	6008111	...	3210014.....	1816SET.....	6005103	...
1310157..	330010-24H4NO2.....	6009453	...	1410208.....	20103/8X18X26008731.....	378	378	1712277.....	16415/16X18H5.....	6008605	...	3210046.....	4111-2.....	6004701	...
346				1410209.....	20101/2X14X26009086.....	378	378	1712279.....	16415/16X18H7.....	6008608	...	3210047.....	4111-3.....	6005545	...
1310158..	330010-24H6NO2.....	6009458	...	1410239.....	20251/4X20.....	6009069	384	1712285.....	16415/16X24H7.....	6008383	...	3210048.....	4111-4.....	6005595	...
346				1410240.....	20251/4X28.....	6009075	384	1712289.....	16413/8X16H5.....	6008117	...	3210050.....	4112-3.....	6005651	...
1310160..	330010-24H4NO3.....	6009455	...	1410241.....	20255/16X18.....	6009316	384	1712291							

EDP NUMBER INDEX - 5010661 - 7333082

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
3210121.....G7041/4X5/32.....	8203230	505	4710589.....46025/8X60.....	6005600	488	5010267.....B610N44.....	8157168	458	5010629.....B6109/32.....	8157246	458	5010630.....B610L.....	8157247	458	
3210122.....G7049/32X5/32.....	8203231	505	4710590.....46023/4X60.....	6005586	488	5010273.....B610N43.....	8157169	458	5010631.....B610M.....	8157248	458	5010632.....B61019/64.....	8157249	458	
3210123.....G7045/16X5/32.....	8203232	505	4710591.....46027/8X60.....	6005614	488	5010282.....B610N42.....	8157170	458	5010633.....B610N.....	8157250	458	5010636.....B610.3105.....	8157251	458	
3210124.....G7043/8X5/32.....	8203233	505	4710592.....46021X60.....	6005576	488	5010283.....B6103/32.....	8157171	458	5010638.....B610.3115.....	8157252	458	5010639.....B610.3120.....	8157253	458	
3210125.....G7041/4X3/16.....	8203236	505	4710593.....46021/2X82.....	6005571	488	5010288.....B610N41.....	8157172	458	5010640.....B6105/16.....	8157254	458	5010642.....B610.3135.....	8157255	458	
3210126.....G7045/16X3/16.....	8203238	505	4710594.....46025/8X82.....	6005605	488	5010292.....B610N40.....	8157173	458	5010645.....B610O.....	8157256	458	5010647.....B610P.....	8157257	458	
3210127.....G7043/8X3/16.....	8203240	505	4710595.....46023/4X82.....	6005591	488	5010295.....B610N39.....	8157174	458	5010648.....B61021/64.....	8157258	458	5010649.....B610Q.....	8157259	458	
3210128.....G7047/16X3/16.....	8203242	505	4710596.....46027/8X82.....	6005619	488	5010299.....B610N38.....	8157175	458	5010650.....B610R.....	8157260	458	5010651.....B61011/32.....	8157261	458	
3210129.....G7041/2X3/16.....	8203244	505	4710597.....46021X82.....	6005581	488	5010304.....B610N37.....	8157176	458	5010652.....B610S.....	8157262	458	5010653.....B610T.....	8157263	458	
3210130.....G7049/16X3/16.....	8203245	505	4710790.....46033/8X60.....	6005698	487	5010309.....B610N36.....	8157177	458	5010654.....B61023/64.....	8157264	458	5010655.....B610U.....	8157265	458	
3210131.....G7045/8X3/16.....	8203246	505	4710791.....46031/2X60.....	6005655	487	5010316.....B6107/64.....	8157178	458	5010658.....B610.3730.....	8157266	458	5010659.....B610.3740.....	8157267	458	
3210132.....G7045/16X1/4.....	8203251	505	4710793.....46033/4X60.....	6005682	487	5010318.....B610N35.....	8157179	458	5010660.....B610.3745.....	8157268	458	5010661.....B6103/8.....	8157269	458	
3210133.....G7043/8X1/4.....	8203252	505	4710794.....46031X60.....	6005673	487	5010320.....B610N34.....	8157180	458	5010662.....B610.3760.....	8157270	458	5010663.....B610V.....	8157271	458	
3210134.....G7047/16X1/4.....	8203253	505	4710795.....460311/4X60.....	6005639	487	5010324.....B610N33.....	8157181	458	5010665.....B610W.....	8157272	458	5010666.....B61025/64.....	8157273	458	
3210135.....G7041/2X1/4.....	8203254	505	4710796.....460311/2X60.....	6005624	487	5010330.....B610N32.....	8157182	458	5010667.....B610X.....	8157274	458	5010668.....B610Y.....	8157275	458	
3210136.....G7049/16X1/4.....	8203256	505	4710797.....46031/4X82.....	6005665	487	5010338.....B610N31.....	8157183	458	5010670.....B61013/32.....	8157276	458	5010671.....B610Z.....	8157277	458	
3210137.....G7045/8X1/4.....	8203257	505	4710798.....46033/8X82.....	6005702	487	5010344.....B610.1230.....	8157184	458	5010672.....B61027/64.....	8157278	458	5010673.....B610.4355.....	8157279	458	
3210138.....G70411/16X1/4.....	8203258	505	4710799.....46031/2X82.....	6005659	487	5010346.....B610.1240.....	8157185	458	5010674.....B610.4365.....	8157280	458	5010675.....B610.4370.....	8157281	458	
3210139.....G7043/4X1/4.....	8203259	505	4710800.....46035/8X82.....	6005708	487	5010349.....B610.1247.....	8157186	458	5010676.....B6107/16.....	8157282	458	5010677.....B610.4385.....	8157283	458	
3210140.....G70413/16X1/4.....	8203260	505	4710801.....46033/4X82.....	6005685	487	5010350.....B6101/8.....	8157187	458	5010678.....B61029/64.....	8157284	458	5010679.....B61015/32.....	8157285	458	
3210142.....G7043/8X5/16.....	8203262	505	4710802.....46031X82.....	6005677	487	5010354.....B610.1260.....	8157188	458	5010680.....B61031/64.....	8157286	458	5010685.....B610.5010.....	8157291	458	
3210143.....G7047/16X5/16.....	8203263	505	4710803.....460311/4X82.....	6005644	487	5010359.....B610N30.....	8157189	458	5010682.....B610.4990.....	8157288	458	5010683.....B610.4995.....	8157289	458	
3210144.....G7041/2X5/16.....	8203264	505	4710804.....460311/2X82.....	6005629	487	5010374.....B610N29.....	8157190	458	5010684.....B6101/2.....	8157290	458	5010685.....B610.5010.....	8157291	458	
3210145.....G7049/16X5/16.....	8203265	505	4710805.....46031/4X90.....	6005669	487	5010383.....B610N28.....	8157191	458	5010686.....B61033/64.....	8157292	458	5010689.....B61033/64.....	8157293	458	
3210146.....G7045/8X5/16.....	8203266	505	4710806.....46033/8X90.....	6005670	487	5010384.....B6109/64.....	8157192	458	5010692.....B61035/64.....	8157294	458	5010693.....B6109/16.....	8157295	458	
3210147.....G70411/16X5/16.....	8203267	505	4710807.....46031/2X90.....	6005662	487	5010391.....B610N27.....	8157193	458	5010694.....B61037/64.....	8157296	458	5010695.....B61019/32.....	8157297	458	
3210148.....G7043/4X5/16.....	8203268	505	4710808.....46035/8X90.....	6005711	487	5010397.....B610N26.....	8157194	458	5010696.....B61039/64.....	8157298	458	5010698.....B6105/8.....	8157299	458	
3210149.....G70413/16X5/16.....	8203269	505	4710809.....46033/4X90.....	6005694	487	5010402.....B610N25.....	8157195	458	5010700.....B61041/64.....	8157300	458	5010701.....B61021/32.....	8157301	458	
3210151.....G70415/16X5/16.....	8203270	505	4710810.....46031X90.....	6005679	487	5010407.....B610N24.....	8157196	458	5010702.....B61043/64.....	8157302	458	5010703.....B61011/16.....	8157303	458	
3210152.....G7041X5/16.....	8203271	505	4710811.....460311/4X90.....	6005648	487	5010411.....B610N23.....	8157197	458	5010704.....B61045/64.....	8157304	458	5010705.....B61023/32.....	8157305	458	
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3210156.....G7041/2X3/8.....	8203273	505	5010054.....B6201/16.....	8157330	462	5010418.....B610N22.....	8157199	458	5010708.....B61034.....	8157307	458	5010710.....B61049/64.....	8157308	458	
3210157.....G7049/16X3/8.....	8203274	505	5010055.....B6205/64.....	8157331	462	5010422.....B610N21.....	8157200	458	5010711.....B61025/32.....	8157309	458	5010712.....B61051/64.....	8157310	458	
3210158.....G7045/8X3/8.....	8203275	505	5010056.....B6203/32.....	8157332	462	5010426.....B610N20.....	8157201	458	5010713.....B61013/16.....	8157311	458	5010714.....B61053/64.....	8157312	458	
3210159.....G70411/16X3/8.....	8203276	505	5010057.....B6207/64.....	8157333	462	5010436.....B610N19.....	8157202	458	5010715.....B61027/32.....	8157313	458	5010716.....B61055/64.....	8157314	458	
3210160.....G7043/4X3/8.....	8203277	505	5010058.....B6201/8.....	8157334	462	5010443.....B610N18.....	8157203	458	5010717.....B61017/64.....	8157315	458	5010718.....B61057/64.....	8157316	458	
3210161.....G70413/16X3/8.....	8203278	505	5010060.....B6205/32.....	8157335	462	5010448.....B61011/64.....	8157204	458	5010719.....B61015/16.....	8157317	458	5010720.....B61059/64.....	8157318	458	
3210162.....G7047/8X3/8.....	8203279	505	5010061.....B62011/64.....	8157336	462	5010451.....B610N17.....	8157205	458	5010721.....B61015/16.....	8157319	458	5010722.....B61061/64.....	8157320	458	
3210163.....G70415/16X3/8.....	8203280	505	5010062.....B6203/16.....	8157337	462	5010459.....B610N16.....	8157206	458	5010723.....B61031/32.....	8157321	458	5010724.....B61063/64.....	8157322	458	
3210173.....G7049/16X7/16.....	8203281	505	5010063.....B62013/64.....	8157338	462	5010465.....B610N15.....	8157207	458	5010725.....B6101.....	8157323	458				
3210175.....G70411/16X7/16.....	8203282	505	5010064.....B6207/32.....	8157339	462	5010469.....B610N14.....	8157208	458							
3210176.....G7043/4X7/16.....	8203283	505	5010066.....B6201/4.....	8157340	462	5010475.....B610N13.....	8157209	458							
3210177.....G70413/16X7/16.....	8203284	505	5010067.....B62017/64.....	8157341	462	5010476.....B610.1855.....	8157210	458							
3210178.....G7047/8X7/16.....	8203285	505	5010068.....B6209/32.....	8157342	462	5010478.....B610.1865.....	8157211	458							
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3210180.....G7041X7/16.....	8203287	505	5010072.....B62011/32.....	8157344	462	5010480.....B6103/16.....	8157213	458							
3210195.....G7049/16X1/2.....	8203288	505	5010074.....B6203/8.....	8157345	462	5010482.....B610.1885.....	8157214	458							
3210202.....G7041X1/2.....	8203289	505	5010075.....B62025/64.....	8157346	462	5010483.....B610N12.....	8157215	458							
3210210.....G7041.1/2X1/2.....	8203290	505	5010076.....B62013/32.....	8157347	462	5010487.....B610N11.....	8157216	458							
3210249.....G7041/8X1/8.....	8203218	505	5010078.....B6207/16.....	8157348	462	5010492.....B610N10.....	8157217	458							
3210251.....G7045/32X1/8.....	8203219	505	5010081.....B62031/64.....	8157349	462	5010498.....B610N9.....	8157218	458							
3210255.....G7043/16X1/8.....	8203220	505	5010082.....B6201/2.....	8157350	462	5010504.....B610N8.....	8157219	458							
3210258.....G7047/32X1/8.....	8203221	505	5010083.....B62017/32.....	8157351	462	5010508.....B610N7.....	8157220	458							
3210259.....G7041/4X1/8.....	8203222	505	5010084.....B6209/16.....	8157352	462	5010513.....B61013/64.....	8157221	458							
3210261.....G7049/32X1/8.....	8203223	505	5010086.....B6205/8.....	8157353	462	5010515.....B610N6.....	8157222	458							
3210262.....G7045/16X1/8.....	8203224	505	5010088.....B62011/16.....	8157354	462	5010518.....B610N5.....	8157223	458							
3210263.....G7043/8X1/8.....	8203225	505	5010090.....B6203/4.....	8157355	462	5010525.....B610N4.....	8157224	458							
3210264.....G7047/16X1/8.....	8203226	505	5010094.....B6207/8.....	8157356	462	5010533.....B610N3.....	8157225	458							
3210265.....G7041/2X1/8.....	8203227	505	5010098.....B6201.....	8157357	462	5010545.....B6107/32.....	8157226	458							
3210281.....G7043/16X3/16.....	8203234	505	5010173.....B610N60.....	8157149	458	5010550.....B610N2.....	8157227	458							
3210284.....G7047/32X3/16.....	8203235	505	5010175.....B610N59.....	8157150	458	5010564.....B610N1.....	8157228	458							
3210287.....G7049/32X3/16.....	8203237	505	5010177.....B610N58.....	8157151											

EDP NUMBER INDEX - 7333083 - 7350477

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
5010726	B6101.1/16	8157324	458	5011165	B630N2	8157387	466	7332948	R970121	7332948	27	7333056	R970205	7333056	28
5010727	B6101.1/8	8157325	458	5011166	B630N3	8157388	466	7332949	R970122	7332949	27	7333057	R97013/16	7333057	28
5010728	B6101.3/16	8157326	458	5011167	B630N4	8157389	466	7332980	R97031/64	7332980	27	7333058	R970210	7333058	28
5010729	B6101.1/4	8157327	458	5011168	B630N5	8157390	466	7332981	R970125	7332981	27	7333059	R97053/64	7333059	28
5010731	B6101.3/8	8157328	458	5011169	B630N6	8157391	466	7332982	R970126	7332982	27	7333060	R97027/32	7333060	28
5010733	B6101.1/2	8157329	458	5011170	B630N7	8157392	466	7332983	R97012	7332983	27	7333061	R970215	7333061	28
5010928	B6501/8	8157057	471	5011171	B630N8	8157393	466	7332984	R970128	7332984	27	7333062	R97055/64	7333062	28
5010930	B6503/16	8157058	471	5011172	B630N9	8157394	466	7332985	R970129	7332985	27	7333063	R970220	7333063	28
5010932	B6501/4	8157059	471	5011173	B630N10	8157395	466	7332986	R970130	7332986	27	7333064	R9707/8	7333064	28
5010934	B6505/16	8157140	471	6210031	G7021/4	8203127	501	7332987	R97033/64	7332987	27	7333065	R970225	7333065	28
5010936	B6503/8	8157141	471	6210032	G7029/32	8203128	501	7332988	R970132	7332988	27	7333066	R97057/64	7333066	28
5010938	B6507/16	8157142	471	6210033	G7025/16	8203129	501	7332989	R97017/32	7332989	27	7333067	R970227	7333067	28
5010940	B6501/2	8157143	471	6210034	G70211/32	8203180	501	7332990	R970135	7332990	27	7333068	R970230	7333068	28
5010942	B6509/16	8157144	471	6210035	G7023/8	8203181	501	7332991	R970136	7332991	27	7333069	R97029/32	7333069	28
5010944	B6505/8	8157145	471	6210036	G70213/32	8203182	501	7332992	R970137	7332992	27	7333070	R97059/64	7333070	28
5010948	B6503/4	8157146	471	6210037	G7027/16	8203183	501	7332993	R970138	7332993	27	7333071	R970235	7333071	28
5010950	B6507/8	8157147	471	6210038	G70215/32	8203184	501	7332994	R97035/64	7332994	27	7333072	R97015/16	7333072	28
5010952	B6501	8157148	471	6210039	G7021/2	8203185	501	7332995	R970140	7332995	27	7333073	R970240	7333073	28
5011055	B6407/16	8157358	470	6210041	G7029/16	8203186	501	7332996	R970141	7332996	27	7333074	R97061/64	7333074	29
5011056	B6401/2	8157359	470	6210042	G70219/32	8203187	501	7332997	R970142	7332997	27	7333075	R970245	7333075	29
5011057	B6409/16	8157360	470	6210043	G7025/8	8203188	501	7332998	R9709/16	7332998	27	7333076	R97031/32	7333076	29
5011058	B6405/8	8157361	470	6210045	G70211/16	8203189	501	7332999	R970145	7332999	27	7333077	R970250	7333077	29
5011059	B64011/16	8157362	470	6210047	G7023/4	8203190	501	7333000	R970146	7333000	27	7333078	R97063/64	7333078	29
5011060	B6403/4	8157363	470	6210048	G70225/32	8203191	501	7333001	R97037/64	7333001	27	7333079	R9701	7333079	29
5011061	B64013/16	8157364	470	6210049	G70213/16	8203192	501	7333002	R970147	7333002	27	7333080	R970255	7333080	29
5011062	B6407/8	8157365	470	6210050	G70227/32	8203193	501	7333003	R970148	7333003	27	7333081	R9702565	7333081	29
5011063	B64015/16	8157366	470	6210051	G7027/8	8203194	501	7333004	R970150	7333004	27	7333082	R97011/64	7333082	29
5011064	B6401	8157367	470	6210055	G7021	8203195	501	7333005	R97019/32	7333005	27	7333083	R970260	7333083	29
5011065	B6401.1/16	8157368	470	6210065	G7022	8203196	501	7333006	R970151	7333006	27	7333084	R97011/32	7333084	29
5011093	B6901/4X60	8157413	480	6210074	G7031/2	8203197	504	7333007	R970152	7333007	27	7333085	R970265	7333085	29
5011094	B6903/8X60	8157417	480	6210080	G70311/16	8203198	504	7333008	R9701524	7333008	28	7333086	R97013/64	7333086	29
5011095	B6901/2X60	8157421	480	6210082	G7033/4	8203199	504	7333009	R97039/64	7333009	28	7333087	R97011/16	7333087	29
5011096	B6905/8X60	8157425	480	6210084	G70313/16	8203200	504	7333010	R970155	7333010	28	7333088	R970270	7333088	29
5011097	B6903/4X60	8157429	480	6210085	G7037/8	8203201	504	7333011	R970156	7333011	28	7333089	R97015/64	7333089	29
5011098	B6901/4X82	8157414	480	6210086	G70315/16	8203202	504	7333012	R970157	7333012	28	7333090	R970275	7333090	29
5011099	B6903/8X82	8157418	480	6210087	G7031	8203203	504	7333013	R9705/8	7333013	28	7333091	R97013/32	7333091	29
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5011101	B6905/8X82	8157426	480	6210089	G7031.1/8	8203205	504	7333015	R9701608	7333015	28	7333093	R97017/64	7333093	29
5011102	B6903/4X82	8157430	480	6210090	G7031.3/16	8203206	504	7333016	R970161	7333016	28	7333094	R970285	7333094	29
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5011104	B6903/8X90	8157419	480	6210093	G7031.3/8	8203208	504	7333018	R97041/64	7333018	28	7333096	R97019/64	7333096	29
5011105	B6901/2X90	8157423	480	6210094	G7031.1/2	8203209	504	7333019	R970163	7333019	28	7333097	R970290	7333097	29
5011106	B6905/8X90	8157427	480	6210095	G7031.5/8	8203210	504	7333020	R970165	7333020	28	7333098	R97015/32	7333098	29
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5011108	B6901/4X100	8157416	480	6210099	G7032.1/8	8203212	504	7333022	R97021/32	7333022	28	7333100	R97011/64	7333100	29
5011109	B6903/8X100	8157420	480	6210107	G7051/4	8203291	502	7333023	R970167	7333023	28	7333101	R970300	7333101	29
5011110	B6901/2X100	8157424	480	6210109	G7055/16	8203292	502	7333024	R970170	7333024	28	7333102	R97013/16	7333102	29
5011111	B6905/8X100	8157428	480	6210111	G7053/8	8203293	502	7333025	R97043/64	7333025	28	7333103	R970305	7333103	29
5011112	B6903/4X100	8157432	480	6210113	G7057/16	8203294	502	7333026	R970171	7333026	28	7333104	R97017/32	7333104	29
5011129	B660N0	8157369	474	6210115	G7051/2	8203295	502	7333027	R970172	7333027	28	7333105	R970310	7333105	29
5011130	B660N1	8157370	474	6210116	G70517/32	8203296	502	7333028	R97011/16	7333028	28	7333106	R97011/4	7333106	29
5011131	B660N2	8157371	474	6210117	G7059/16	8203297	502	7333029	R970175	7333029	28	7333107	R970320	7333107	29
5011132	B660N3	8157372	474	6210118	G70519/32	8203298	502	7333030	R970176	7333030	28	7333108	R970325	7333108	29
5011133	B660N4	8157373	474	6210119	G7055/8	8203299	502	7333031	R970177	7333031	28	7333109	R970119/64	7333109	29
5011134	B660N5	8157374	474	6210120	G70521/32	8203300	502	7333032	R97045/64	7333032	28	7333110	R970330	7333110	29
5011135	B660N6	8157375	474	6210121	G70511/16	8203301	502	7333033	R970180	7333033	28	7333111	R970335	7333111	29
5011136	B660N7	8157376	474	6210123	G7053/4	8203302	502	7333034	R970181	7333034	28	7333112	R970340	7333112	29
5011137	B660N8	8157377	474	6210124	G70525/32	8203303	502	7333035	R970182	7333035	28	7333113	R970111/32	7333113	29
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5011139	B660N10	8157379	474	6210126	G7057/8	8203305	502	7333037	R970185	7333037	28	7333115	R97013/8	7333115	29
5011146	B670N0	8157396	475	6210127	G70515/16	8203306	502	7333038	R970186	7333038	28	7333116	R970350	7333116	29
5011147	B670N1	8157397	475	6210137	G7061/4	8203307	502	7333039	R97047/64	7333039	28	7333117	R970360	7333117	29
5011148	B670N2	8157398	475	6210139	G7065/16	8203308	502	7333040	R970187	7333040	28	7333118	R970127/64	7333118	29
5011149	B670N3	8157399	475	6210140	G70611/32	8203309	502	7333041	R970189	7333041	28	7333119	R970365	7333119	29
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5011151	B670N5	8157401	475	6210142	G70613/32	8203311	502	7333043	R9703/4	7333043	28	7333121	R970115/32	7333121	29
5011152	B670N6	8157402	475	6210143	G7067/16	8203312	502	7333044	R970191	7333044	28	7333122	R970375	7333122	29
5011153	B670N7	8157403	475	6210144	G70615/32	8203313	502	7333045	R970192	7333045	28	7333123	R970380	7333123	29
5011154	B670N8	8157404	475	6210145	G										

EDP NUMBER INDEX - 7350478 - 7625095

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
7350203.....	E8141/4.....	7350203.....	259	7350291.....	E8135/8H5.....	7350291.....	263	7350369.....	E9123/4H3.....	7350369.....	272	7350447.....	E9107/16.....	7350447.....	273
7350204.....	E8145/16.....	7350204.....	259	7350292.....	E8135/8H3.....	7350292.....	263	7350370.....	E9127/8H6.....	7350370.....	272	7350448.....	E9101/2.....	7350448.....	273
7350205.....	E8143/8.....	7350205.....	259	7350293.....	E8133/4H5.....	7350293.....	263	7350371.....	E9127/8H4.....	7350371.....	272	7350449.....	E9105/8.....	7350449.....	273
7350206.....	E8147/16.....	7350206.....	259	7350294.....	E8133/4H3.....	7350294.....	263	7350372.....	E9121H6.....	7350372.....	272	7350450.....	E9103/4.....	7350450.....	273
7350207.....	E8141/2.....	7350207.....	259	7350295.....	E8137/8H6.....	7350295.....	263	7350373.....	E9121H4.....	7350373.....	272	7350451.....	E9107/8.....	7350451.....	273
7350208.....	E8145/8.....	7350208.....	259	7350296.....	E8137/8H4.....	7350296.....	263	7350374.....	E628M4.....	7350374.....	276	7350452.....	E9101.....	7350452.....	273
7350209.....	E8143/4.....	7350209.....	259	7350297.....	E8131H6.....	7350297.....	263	7350375.....	E628M5.....	7350375.....	276	7350453.....	E626M3.....	7350453.....	277
7350220.....	E8147/8.....	7350220.....	259	7350298.....	E8131H4.....	7350298.....	263	7350376.....	E628M6.....	7350376.....	276	7350454.....	E626M4.....	7350454.....	277
7350221.....	E8141.....	7350221.....	259	7350299.....	E91310-32.....	7350299.....	262	7350377.....	E628M8.....	7350377.....	276	7350455.....	E626M5.....	7350455.....	277
7350222.....	E91410-32.....	7350222.....	259	7350300.....	E9131/4H5.....	7350300.....	262	7350378.....	E628M10.....	7350378.....	276	7350456.....	E626M6.....	7350456.....	277
7350223.....	E9141/4.....	7350223.....	259	7350301.....	E9131/4H3.....	7350301.....	262	7350379.....	E628M12.....	7350379.....	276	7350457.....	E626M8.....	7350457.....	277
7350224.....	E9145/16.....	7350224.....	259	7350302.....	E9135/16H4.....	7350302.....	262	7350380.....	E628M14.....	7350380.....	276	7350458.....	E626M10.....	7350458.....	277
7350225.....	E9143/8.....	7350225.....	259	7350303.....	E9135/16H3.....	7350303.....	262	7350381.....	E628M16.....	7350381.....	276	7350459.....	E626M12.....	7350459.....	277
7350226.....	E9147/16.....	7350226.....	259	7350304.....	E9133/8H4.....	7350304.....	262	7350382.....	E628M18.....	7350382.....	276	7350460.....	E626M14.....	7350460.....	277
7350227.....	E9141/2.....	7350227.....	259	7350305.....	E9133/8H3.....	7350305.....	262	7350383.....	E628M20.....	7350383.....	276	7350461.....	E626M16.....	7350461.....	277
7350228.....	E9145/8.....	7350228.....	259	7350306.....	E9137/16.....	7350306.....	262	7350384.....	E628M24.....	7350384.....	276	7350462.....	E626M18.....	7350462.....	277
7350229.....	E9143/4.....	7350229.....	259	7350307.....	E9131/2H5.....	7350307.....	262	7350385.....	E768M8X10.....	7350385.....	276	7350463.....	E626M20.....	7350463.....	277
7350230.....	E9147/8.....	7350230.....	259	7350308.....	E9131/2H3.....	7350308.....	262	7350386.....	E768M10X1257350386.....	7350386.....	276	7350464.....	E626M24.....	7350464.....	277
7350231.....	E8151/4.....	7350231.....	259	7350309.....	E9135/8H5.....	7350309.....	263	7350387.....	E768M12X15.....	7350387.....	276	7350465.....	E766M8X10.....	7350465.....	277
7350232.....	E8155/16.....	7350232.....	259	7350310.....	E9135/8H3.....	7350310.....	263	7350388.....	E768M14X15.....	7350388.....	276	7350466.....	E766M10X1257350466.....	7350466.....	277
7350233.....	E8153/8.....	7350233.....	259	7350311.....	E9133/4H5.....	7350311.....	263	7350389.....	E768M16X15.....	7350389.....	276	7350467.....	E766M12X1257350467.....	7350467.....	277
7350234.....	E8157/16.....	7350234.....	259	7350312.....	E9133/4H3.....	7350312.....	263	7350390.....	E768M18X15.....	7350390.....	276	7350468.....	E766M14X15.....	7350468.....	277
7350235.....	E8151/2.....	7350235.....	259	7350313.....	E9137/8H6.....	7350313.....	263	7350391.....	E8114-40.....	7350391.....	264	7350469.....	E8094-40.....	7350469.....	261
7350236.....	E8155/8.....	7350236.....	259	7350314.....	E9137/8H4.....	7350314.....	263	7350392.....	E8116-32.....	7350392.....	264	7350470.....	E8096-32.....	7350470.....	261
7350237.....	E8153/4.....	7350237.....	259	7350315.....	E9131H6.....	7350315.....	263	7350393.....	E8118-32.....	7350393.....	264	7350471.....	E8098-32.....	7350471.....	261
7350238.....	E8157/8.....	7350238.....	259	7350316.....	E9131H4.....	7350316.....	263	7350394.....	E81110-24.....	7350394.....	264	7350472.....	E80910-24.....	7350472.....	261
7350239.....	E8151.....	7350239.....	259	7350317.....	E629M4.....	7350317.....	267	7350395.....	E8111/4.....	7350395.....	264	7350473.....	E8091/4.....	7350473.....	261
7350240.....	E9151/4.....	7350240.....	259	7350318.....	E629M5.....	7350318.....	267	7350396.....	E8115/16.....	7350396.....	264	7350474.....	E8095/16.....	7350474.....	261
7350241.....	E9155/16.....	7350241.....	259	7350319.....	E629M6.....	7350319.....	267	7350397.....	E8113/8.....	7350397.....	264	7350475.....	E8093/8.....	7350475.....	261
7350242.....	E9153/8.....	7350242.....	259	7350320.....	E629M8.....	7350320.....	267	7350398.....	E8117/16.....	7350398.....	264	7350476.....	E8097/16.....	7350476.....	261
7350243.....	E9157/16.....	7350243.....	259	7350321.....	E629M10.....	7350321.....	267	7350399.....	E8111/2.....	7350399.....	264	7350477.....	E8091/2.....	7350477.....	261
7350244.....	E9151/2.....	7350244.....	259	7350322.....	E629M12.....	7350322.....	267	7350400.....	E8115/8.....	7350400.....	264	7350478.....	E8095/8.....	7350478.....	261
7350245.....	E9155/8.....	7350245.....	259	7350323.....	E629M14.....	7350323.....	267	7350401.....	E8113/4.....	7350401.....	264	7350479.....	E8093/4.....	7350479.....	261
7350246.....	E9153/4.....	7350246.....	259	7350324.....	E629M16.....	7350324.....	267	7350402.....	E8117/8.....	7350402.....	264	7350480.....	E8097/8.....	7350480.....	261
7350247.....	E9157/8.....	7350247.....	259	7350325.....	E629M18.....	7350325.....	267	7350403.....	E8111.....	7350403.....	264	7350481.....	E8091.....	7350481.....	261
7350248.....	E9151.....	7350248.....	259	7350326.....	E629M20.....	7350326.....	267	7350404.....	E91110-32.....	7350404.....	264	7350482.....	E90910-32.....	7350482.....	261
7350249.....	E630M5.....	7350249.....	260	7350327.....	E629M24.....	7350327.....	267	7350405.....	E9111/4.....	7350405.....	264	7350483.....	E9091/4.....	7350483.....	261
7350250.....	E630M6.....	7350250.....	260	7350328.....	E769M8X10.....	7350328.....	267	7350406.....	E9115/16.....	7350406.....	264	7350484.....	E9095/16.....	7350484.....	261
7350251.....	E630M8.....	7350251.....	260	7350329.....	E769M10X1257350329.....	7350329.....	267	7350407.....	E9113/8.....	7350407.....	264	7350485.....	E9093/8.....	7350485.....	261
7350252.....	E630M10.....	7350252.....	260	7350330.....	E769M12X1257350330.....	7350330.....	267	7350408.....	E9117/16.....	7350408.....	264	7350486.....	E9097/16.....	7350486.....	261
7350253.....	E630M12.....	7350253.....	260	7350331.....	E769M12X15.....	7350331.....	267	7350409.....	E9111/2.....	7350409.....	264	7350487.....	E9091/2.....	7350487.....	261
7350254.....	E630M14.....	7350254.....	260	7350332.....	E769M14X15.....	7350332.....	267	7350410.....	E9115/8.....	7350410.....	264	7350488.....	E9095/8.....	7350488.....	261
7350255.....	E630M16.....	7350255.....	260	7350333.....	E769M16X15.....	7350333.....	267	7350411.....	E9113/4.....	7350411.....	264	7350489.....	E9093/4.....	7350489.....	261
7350256.....	E630M18.....	7350256.....	260	7350334.....	E769M18X15.....	7350334.....	267	7350412.....	E9117/8.....	7350412.....	264	7350490.....	E9097/8.....	7350490.....	261
7350257.....	E630M20.....	7350257.....	260	7350335.....	E8124-40.....	7350335.....	271	7350413.....	E9111.....	7350413.....	264	7350491.....	E9091.....	7350491.....	261
7350258.....	E630M24.....	7350258.....	260	7350336.....	E8126-32.....	7350336.....	271	7350414.....	E627M3.....	7350414.....	268	7350492.....	E625M4.....	7350492.....	266
7350259.....	E770M8X10.....	7350259.....	260	7350337.....	E8128-32.....	7350337.....	271	7350415.....	E627M4.....	7350415.....	268	7350493.....	E625M5.....	7350493.....	266
7350260.....	E770M10X10.....	7350260.....	260	7350338.....	E81210-24.....	7350338.....	271	7350416.....	E627M5.....	7350416.....	268	7350494.....	E625M6.....	7350494.....	266
7350261.....	E770M10X1257350261.....	7350261.....	260	7350339.....	E8121/4H5.....	7350339.....	271	7350417.....	E627M6.....	7350417.....	268	7350495.....	E625M8.....	7350495.....	266
7350262.....	E770M12X1257350262.....	7350262.....	260	7350340.....	E8121/4H3.....	7350340.....	271	7350418.....	E627M8.....	7350418.....	268	7350496.....	E625M10.....	7350496.....	266
7350263.....	E770M12X15.....	7350263.....	260	7350341.....	E8125/16H5.....	7350341.....	271	7350419.....	E627M10.....	7350419.....	268	7350497.....	E625M12.....	7350497.....	266
7350264.....	E770M14X15.....	7350264.....	260	7350342.....	E8125/16H3.....	7350342.....	271	7350420.....	E627M12.....	7350420.....	268	7350498.....	E625M14.....	7350498.....	266
7350265.....	E631M6.....	7350265.....	260	7350343.....	E8123/8H5.....	7350343.....	271	7350421.....	E627M14.....	7350421.....	268	7350499.....	E625M16.....	7350499.....	266
7350266.....	E631M8.....	7350266.....	260	7350344.....	E8123/8H3.....	7350344.....	271	7350422.....	E627M16.....	7350422.....	268	7350500.....	E625M18.....	7350500.....	266
7350267.....	E631M10.....	7350267.....	260	7350345.....	E8127/16.....	7350345.....	271	7350423.....	E627M18.....	7350423.....	268	7350501.....	E625M20.....	7350501.....	266
7350268.....	E631M12.....	7350268.....	260	7350346.....	E8121/2H5.....	7350346.....	271	7350424.....	E627M20.....	7350424.....	268	7350502.....	E625M24.....	7350502.....	266
7350269.....	E631M14.....	7350269.....	260	7350347.....	E8121/2H3.....	7350347.....	271	7350425.....	E627M24.....	7350425.....	268	7350503.....	E765M8X10.....	7350503.....	266
7350270.....	E631M16.....	7350270.....	260	7350348.....	E8125/8H5.....	7350348.....	271	7350426.....	E767M8X10.....	7350426.....	268	7350504.....	E765M10X1257350504.....	7350504.....	266
7350271.....	E631M18.....	7350271.....	260	7350349.....	E8125/8H3.....	7350349.....	271	7350427.....	E767M10X1257350427.....	7350427.....	268	7350505.....	E765M12X1257350505.....	7350505.....	266
7350272.....	E631M20.....	7350272.....	260	7350350.....	E8123/4H5.....	7350350.....	272	7350428.....	E767M12X15.....	7350428.....	268	7350506.....	E765M12X15.....	7350506.....	266
7350273.....	E631M24.....	7350273.....	260	7350351.....	E8123/4H3.....	7350351.....	272	7350429.....	E767M14X15.....	7350429.....	268	7350507.....	E765M14X15.....	7350507.....	266
7350274.....	E771M10X1257350274.....	7350274.....	260	7350352.....	E8127/8H6.....	7350352.....	272	7350430.....	E8104-40.....	7350430.....	273	7350508.....	E765M16X15.....	7350508.....	266
7350275.....	E771M12X1257350275.....	7350275.....	260	7350353.....	E8127/8H4.....	7350353.....	272	7350431.....	E8106-32.....	7350431.....	273	7350509.....	E765M18X15.....	7350509.....	

EDP NUMBER INDEX - 7625096 - 7647834

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
7350525.....	E9085/16.....	7350525	270	7361253.....	R45792.....	7361253	49	7624983.....	R463N7.....	7624983	60	7625061.....	R4637/16.....	7625061	62
7350526.....	E9083/8.....	7350526	270	7361254.....	R457V.....	7361254	49	7624984.....	R46313/64.....	7624984	60	7625062.....	R463112.....	7625062	62
7350527.....	E9087/16.....	7350527	270	7361255.....	R457W.....	7361255	49	7624985.....	R46352.....	7624985	60	7625063.....	R463113.....	7625063	62
7350528.....	E9081/2.....	7350528	270	7361256.....	R457108.....	7361256	49	7624986.....	R463N5.....	7624986	61	7625064.....	R463114.....	7625064	62
7350529.....	E9085/8.....	7350529	270	7361257.....	R457113.....	7361257	49	7624987.....	R46353.....	7624987	61	7625065.....	R463115.....	7625065	62
7350530.....	E9083/4.....	7350530	270	7361258.....	R457133.....	7361258	50	7624988.....	R46354.....	7624988	61	7625066.....	R46329/64.....	7625066	62
7350531.....	E9087/8.....	7350531	270	7361259.....	R457153.....	7361259	50	7624989.....	R46355.....	7624989	61	7625067.....	R463116.....	7625067	62
7350532.....	E9081.....	7350532	270	7361260.....	R45853.....	7361260	47	7624990.....	R4637/32.....	7624990	61	7625068.....	R463118.....	7625068	62
7350533.....	E624M4.....	7350533	275	7361261.....	R45854.....	7361261	47	7624991.....	R46356.....	7624991	61	7625069.....	R46315/32.....	7625069	62
7350534.....	E624M5.....	7350534	275	7361262.....	R45859.....	7361262	47	7624992.....	R46357.....	7624992	61	7625070.....	R463120.....	7625070	62
7350535.....	E624M6.....	7350535	275	7361263.....	R458B.....	7361263	48	7624993.....	R46358.....	7624993	61	7625071.....	R4631205.....	7625071	62
7350536.....	E624M8.....	7350536	275	7361264.....	R458C.....	7361264	48	7624994.....	R46359.....	7624994	61	7625072.....	R463122.....	7625072	62
7350537.....	E624M10.....	7350537	275	7361265.....	R458E.....	7361265	48	7624995.....	R46315/64.....	7624995	61	7625073.....	R46331/64.....	7625073	62
7350538.....	E624M12.....	7350538	275	7361266.....	R458F.....	7361266	48	7624996.....	R46360.....	7624996	61	7625074.....	R463125.....	7625074	62
7350539.....	E624M14.....	7350539	275	7361267.....	R458G.....	7361267	48	7624997.....	R463605.....	7624997	61	7625075.....	R4631/2.....	7625075	62
7350540.....	E624M16.....	7350540	275	7361268.....	R458I.....	7361268	48	7624998.....	R46361.....	7624998	61	7625076.....	R463127.....	7625076	62
7350541.....	E624M18.....	7350541	275	7361269.....	R458J.....	7361269	48	7624999.....	R46362.....	7624999	61	7625077.....	R463128.....	7625077	62
7350542.....	E624M20.....	7350542	275	7361270.....	R458K.....	7361270	48	7625000.....	R46363.....	7625000	61	7625078.....	R463130.....	7625078	62
7350543.....	E624M24.....	7350543	275	7361271.....	R45872.....	7361271	48	7625001.....	R4631/4.....	7625001	61	7625079.....	R46333/64.....	7625079	62
7350544.....	E764M8X10.....	7350544	275	7361272.....	R458P.....	7361272	49	7625002.....	R46364.....	7625002	61	7625080.....	R463133.....	7625080	62
7350545.....	E764M10X1257350545	7350545	275	7361273.....	R45883.....	7361273	49	7625003.....	R46365.....	7625003	61	7625081.....	R46317/32.....	7625081	62
7350546.....	E764M12X1257350546	7350546	275	7361274.....	R458R.....	7361274	49	7625004.....	R46366.....	7625004	61	7625082.....	R463135.....	7625082	62
7350547.....	E764M12X15.....	7350547	275	7361275.....	R458S.....	7361275	49	7625005.....	R46367.....	7625005	61	7625083.....	R463138.....	7625083	62
7350548.....	E764M14X15.....	7350548	275	7361276.....	R45889.....	7361276	49	7625006.....	R46317/64.....	7625006	61	7625084.....	R46335/64.....	7625084	62
7350549.....	E764M16X15.....	7350549	275	7361277.....	R45892.....	7361277	49	7625007.....	R46368.....	7625007	61	7625085.....	R463140.....	7625085	62
7350550.....	E764M18X15.....	7350550	275	7361278.....	R458V.....	7361278	49	7625008.....	R46369.....	7625008	61	7625086.....	R4631425.....	7625086	62
7361201.....	R45353.....	7361201	57	7361279.....	R458W.....	7361279	49	7625009.....	R46370.....	7625009	61	7625087.....	R4639/16.....	7625087	62
7361202.....	R45354.....	7361202	57	7361280.....	R458107.....	7361280	49	7625010.....	R46371.....	7625010	61	7625088.....	R463145.....	7625088	62
7361203.....	R45359.....	7361203	57	7361281.....	R458109.....	7361281	49	7625011.....	R4639/32.....	7625011	61	7625089.....	R46337/64.....	7625089	62
7361204.....	R453B.....	7361204	57	7361282.....	R458111.....	7361282	49	7625012.....	R46372.....	7625012	61	7625090.....	R463148.....	7625090	62
7361205.....	R453C.....	7361205	57	7361283.....	R458113.....	7361283	49	7625013.....	R46373.....	7625013	61	7625091.....	R463150.....	7625091	62
7361206.....	R453E.....	7361206	57	7361284.....	R458117.....	7361284	50	7625014.....	R46374.....	7625014	61	7625092.....	R46319/32.....	7625092	62
7361207.....	R453F.....	7361207	57	7361285.....	R458119.....	7361285	50	7625015.....	R46375.....	7625015	61	7625093.....	R463151.....	7625093	62
7361208.....	R453G.....	7361208	57	7361286.....	R458133.....	7361286	50	7625016.....	R46319/64.....	7625016	61	7625094.....	R463153.....	7625094	62
7361209.....	R453I.....	7361209	57	7361287.....	R458153.....	7361287	50	7625017.....	R46376.....	7625017	61	7625095.....	R46339/64.....	7625095	62
7361210.....	R453J.....	7361210	57	7378063.....	DS1201/8.....	7378063	207	7625018.....	R46377.....	7625018	61	7625096.....	R463155.....	7625096	62
7361211.....	R453K.....	7361211	57	7378064.....	DS1203/16.....	7378064	207	7625019.....	R46378.....	7625019	61	7625097.....	R463158.....	7625097	62
7361212.....	R45372.....	7361212	57	7378065.....	DS1203/8.....	7378065	207	7625020.....	R46379.....	7625020	61	7625098.....	R4635/8.....	7625098	62
7361213.....	R453P.....	7361213	58	7378066.....	DS1205/16.....	7378066	207	7625021.....	R4635/16.....	7625021	61	7625099.....	R463160.....	7625099	62
7361214.....	R45383.....	7361214	58	7378067.....	DS1201/2.....	7378067	207	7625022.....	R46380.....	7625022	61	7625100.....	R46730.....	7625100	51
7361215.....	R453R.....	7361215	58	7378068.....	DS1201/4.....	7378068	207	7625023.....	R463805.....	7625023	61	7625100.....	R46730.....	7625100	51
7361216.....	R453S.....	7361216	58	7378069.....	DS1421/8.....	7378069	207	7625024.....	R46381.....	7625024	61	7625101.....	R46731.....	7625101	51
7361217.....	R45392.....	7361217	58	7378970.....	DS1423/16.....	7378970	207	7625025.....	R46382.....	7625025	61	7625101.....	R46731.....	7625101	51
7361218.....	R453V.....	7361218	58	7378971.....	DS1423/8.....	7378971	207	7625026.....	R46383.....	7625026	61	7625102.....	R4671/8.....	7625102	51
7361219.....	R453W.....	7361219	58	7378972.....	DS1425/16.....	7378972	207	7625027.....	R46321/64.....	7625027	61	7625102.....	R4671/8.....	7625102	51
7361220.....	R453108.....	7361220	58	7378973.....	DS1421/2.....	7378973	207	7625028.....	R46384.....	7625028	61	7625103.....	R46732.....	7625103	51
7361221.....	R453113.....	7361221	58	7378974.....	DS1421/4.....	7378974	207	7625029.....	R46385.....	7625029	61	7625103.....	R46732.....	7625103	51
7361222.....	R453133.....	7361222	59	7573297.....	R950256.....	7573297	23	7625030.....	R46386.....	7625030	61	7625104.....	R46733.....	7625104	51
7361223.....	R453153.....	7361223	59	7624913.....	R46330.....	7624913	60	7625031.....	R46387.....	7625031	61	7625104.....	R46733.....	7625104	51
7361224.....	R454B.....	7361224	57	7624914.....	R46331.....	7624914	60	7625032.....	R46311/32.....	7625032	61	7625105.....	R46734.....	7625105	51
7361225.....	R454C.....	7361225	57	7624915.....	R4631/8.....	7624915	60	7625033.....	R46388.....	7625033	61	7625105.....	R46734.....	7625105	51
7361226.....	R454E.....	7361226	57	7624916.....	R46332.....	7624916	60	7625034.....	R46389.....	7625034	61	7625106.....	R467N29.....	7625106	51
7361227.....	R454F.....	7361227	57	7624917.....	R46333.....	7624917	60	7625035.....	R46390.....	7625035	61	7625106.....	R467N29.....	7625106	51
7361228.....	R454G.....	7361228	57	7624918.....	R46334.....	7624918	60	7625036.....	R46391.....	7625036	61	7625107.....	R46735.....	7625107	51
7361229.....	R454I.....	7361229	57	7624919.....	R463N29.....	7624919	60	7625037.....	R46323/64.....	7625037	61	7625107.....	R46735.....	7625107	51
7361230.....	R454J.....	7361230	57	7624960.....	R46335.....	7624960	60	7625038.....	R46392.....	7625038	61	7625108.....	R4679/64.....	7625108	51
7361231.....	R454K.....	7361231	57	7624961.....	R4639/64.....	7624961	60	7625039.....	R46393.....	7625039	61	7625108.....	R4679/64.....	7625108	51
7361232.....	R454P.....	7361232	58	7624962.....	R46336.....	7624962	60	7625040.....	R46394.....	7625040	61	7625109.....	R46736.....	7625109	51
7361233.....	R454R.....	7361233	58	7624963.....	R46337.....	7624963	60	7625041.....	R46395.....	7625041	61	7625109.....	R46736.....	7625109	51
7361234.....	R454S.....	7361234	58	7624964.....	R46338.....	7624964	60	7625042.....	R4633/8.....	7625042	61	7625110.....	R46737.....	7625110	51
7361235.....	R454V.....	7361235	58	7624965.....	R46339.....	7624965	60	7625043.....	R46396.....	7625043	61	7625110.....	R46737.....	7625110	51
7361236.....	R454W.....	7361236	58	7624966.....	R4635/32.....	7624966	60	7625044.....	R46397.....	7625044	61	7625111.....	R46738.....	7625111	51
7361237.....	R45753.....	7361237	48	7624967.....	R46340.....	7624967	60	7625045.....	R46398.....	7625045	61	7625111.....	R46738.....	7625111	51
7361238.....	R45754.....	7361238	48	7624968.....	R463405.....	7624968	60	7625046.....	R46399.....	7625046	61	7625112.....	R46739.....	7625112	51
7361239.....	R45759.....	7361239	48	7624969.....	R46341.....	7624969	60	7625047.....	R46325/64.....	7625047	61	7625112.....	R46739.....	7625112	51
7361240.....	R457B.....	7361240	48	7624970.....	R46342.....	7624970	60	7625048.....	R463100.....	7625048	61	7625113.....	R4675/32.....	7625113	51
7361241.....	R457C.....	7361241	48	7624971.....	R46343.....	7624971	60	7625049.....	R4631005.....	7625049	61	7625113.....	R4675/32.....	7625113	51
7361242.....	R457E.....	7361242	48	7624972.....	R46311/64.....	7624972	60	7625050.....</							

EDP NUMBER INDEX - 7647835 - 7648624

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
7625119	R46711/64	7625119	51	7625158	R4679/32	7625158	52	7625197	R467101	7625197	52	7625236	R467145	7625236	53
7625120	R46744	7625120	51	7625159	R46772	7625159	52	7625198	R467102	7625198	52	7625237	R46737/64	7625237	53
7625120	R46744	7625120	51	7625160	R46773	7625160	52	7625198	R467102	7625198	52	7625237	R46737/64	7625237	53
7625121	R46745	7625121	51	7625160	R46773	7625160	52	7625199	R467103	7625199	53	7625238	R467148	7625238	53
7625121	R46745	7625121	51	7625160	R46773	7625160	52	7625199	R467103	7625199	53	7625238	R467148	7625238	53
7625122	R46746	7625122	51	7625161	R46774	7625161	52	7625200	R46713/32	7625200	53	7625239	R467150	7625239	53
7625122	R46746	7625122	51	7625161	R46774	7625161	52	7625200	R46713/32	7625200	53	7625239	R467150	7625239	53
7625123	R46747	7625123	51	7625162	R46775	7625162	52	7625201	R467104	7625201	53	7625240	R46719/32	7625240	53
7625123	R46747	7625123	51	7625162	R46775	7625162	52	7625201	R467104	7625201	53	7625240	R46719/32	7625240	53
7625124	R4673/16	7625124	51	7625163	R46719/64	7625163	52	7625202	R467105	7625202	53	7625241	R467151	7625241	53
7625124	R4673/16	7625124	51	7625163	R46719/64	7625163	52	7625202	R467105	7625202	53	7625241	R467151	7625241	53
7625125	R46748	7625125	51	7625164	R46776	7625164	52	7625203	R467106	7625203	53	7625242	R467153	7625242	53
7625125	R46748	7625125	51	7625164	R46776	7625164	52	7625203	R467106	7625203	53	7625242	R467153	7625242	53
7625126	R46749	7625126	51	7625165	R46777	7625165	52	7625204	R46727/64	7625204	53	7625243	R46739/64	7625243	53
7625126	R46749	7625126	51	7625165	R46777	7625165	52	7625204	R46727/64	7625204	53	7625243	R46739/64	7625243	53
7625127	R46750	7625127	51	7625166	R46778	7625166	52	7625205	R467108	7625205	53	7625244	R467155	7625244	53
7625127	R46750	7625127	51	7625166	R46778	7625166	52	7625205	R467108	7625205	53	7625244	R467155	7625244	53
7625128	R467505	7625128	51	7625167	R46779	7625167	52	7625206	R467109	7625206	53	7625245	R467158	7625245	53
7625128	R467505	7625128	51	7625167	R46779	7625167	52	7625206	R467109	7625206	53	7625245	R467158	7625245	53
7625129	R46751	7625129	51	7625168	R4675/16	7625168	52	7625207	R467110	7625207	53	7625246	R4675/8	7625246	53
7625129	R46751	7625129	51	7625168	R4675/16	7625168	52	7625207	R467110	7625207	53	7625246	R4675/8	7625246	53
7625130	R467N7	7625130	51	7625169	R46780	7625169	52	7625208	R467111	7625208	53	7625247	R467160	7625247	53
7625130	R467N7	7625130	51	7625169	R46780	7625169	52	7625208	R467111	7625208	53	7625247	R467160	7625247	53
7625131	R46713/64	7625131	51	7625170	R467805	7625170	52	7625209	R467112	7625209	53	7647759	C6001/8	7647759	422
7625131	R46713/64	7625131	51	7625170	R467805	7625170	52	7625209	R467112	7625209	53	7647820	C6005/32	7647820	422
7625132	R46752	7625132	51	7625171	R46781	7625171	52	7625210	R467113	7625210	53	7647821	C6003/16	7647821	422
7625132	R46752	7625132	51	7625171	R46781	7625171	52	7625210	R467113	7625210	53	7647821	C6003/16	7647821	422
7625132	R46752	7625132	51	7625171	R46781	7625171	52	7625210	R467113	7625210	53	7647822	C6001/4	7647822	422
7625133	R467N5	7625133	52	7625172	R46782	7625172	52	7625211	R467114	7625211	53	7647823	C6009/32	7647823	422
7625133	R467N5	7625133	52	7625172	R46782	7625172	52	7625211	R467114	7625211	53	7647823	C6009/32	7647823	422
7625134	R46753	7625134	52	7625173	R46783	7625173	52	7625212	R467115	7625212	53	7647824	C6005/16	7647824	422
7625134	R46753	7625134	52	7625173	R46783	7625173	52	7625212	R467115	7625212	53	7647824	C6005/16	7647824	422
7625135	R46754	7625135	52	7625174	R46721/64	7625174	52	7625212	R467115	7625212	53	7647825	C60011/32	7647825	422
7625135	R46754	7625135	52	7625174	R46721/64	7625174	52	7625213	R46729/64	7625213	53	7647826	C6003/8	7647826	422
7625136	R46755	7625136	52	7625175	R46784	7625175	52	7625213	R46729/64	7625213	53	7647827	C60013/32	7647827	422
7625136	R46755	7625136	52	7625175	R46784	7625175	52	7625214	R467116	7625214	53	7647828	C6007/16	7647828	422
7625137	R4677/32	7625137	52	7625176	R46785	7625176	52	7625214	R467116	7625214	53	7647829	C6001/2	7647829	422
7625137	R4677/32	7625137	52	7625176	R46785	7625176	52	7625215	R467118	7625215	53	7647830	C6005/8	7647830	422
7625138	R46756	7625138	52	7625177	R46786	7625177	52	7625215	R467118	7625215	53	7647831	C6003/4	7647831	422
7625138	R46756	7625138	52	7625177	R46786	7625177	52	7625216	R46715/32	7625216	53	7647832	C6011/8X3/8	7647832	423
7625139	R46757	7625139	52	7625178	R46787	7625178	52	7625216	R46715/32	7625216	53	7647833	C6013/16X3/8	7647833	423
7625139	R46757	7625139	52	7625178	R46787	7625178	52	7625217	R467120	7625217	53	7647834	C6011/4X3/8	7647834	423
7625140	R46758	7625140	52	7625179	R46711/32	7625179	52	7625217	R467120	7625217	53	7647835	C6015/16X3/8	7647835	423
7625140	R46758	7625140	52	7625179	R46711/32	7625179	52	7625218	R4671205	7625218	53	7647836	C6013/8X3/8	7647836	423
7625141	R46759	7625141	52	7625180	R46788	7625180	52	7625218	R4671205	7625218	53	7647837	C6017/16X3/8	7647837	423
7625141	R46759	7625141	52	7625180	R46788	7625180	52	7625219	R467121	7625219	53	7647838	C6011/2X3/8	7647838	423
7625142	R46715/64	7625142	52	7625181	R46789	7625181	52	7625219	R467121	7625219	53	7647839	C6011/2X1/2	7647839	423
7625142	R46715/64	7625142	52	7625181	R46789	7625181	52	7625220	R467122	7625220	53	7647840	C6019/16X1/2	7647840	423
7625143	R46760	7625143	52	7625182	R46790	7625182	52	7625220	R467122	7625220	53	7647841	C6015/8X1/2	7647841	423
7625143	R46760	7625143	52	7625182	R46790	7625182	52	7625221	R46731/64	7625221	53	7647842	C6011/16X1/2	7647842	423
7625144	R467605	7625144	52	7625183	R46791	7625183	52	7625221	R46731/64	7625221	53	7647843	C6013/4X1/2	7647843	423
7625144	R467605	7625144	52	7625183	R46791	7625183	52	7625222	R467125	7625222	53	7647844	C6015/8X5/8	7647844	423
7625145	R46761	7625145	52	7625184	R46723/64	7625184	52	7625222	R467125	7625222	53	7647845	C6011/16X5/8	7647845	423
7625145	R46761	7625145	52	7625184	R46723/64	7625184	52	7625223	R46712	7625223	53	7647846	C6013/4X5/8	7647846	423
7625146	R46762	7625146	52	7625185	R46792	7625185	52	7625223	R46712	7625223	53	7647847	C6011/16X5/8	7647847	423
7625146	R46762	7625146	52	7625185	R46792	7625185	52	7625224	R467127	7625224	53	7647848	C6017/8X5/8	7647848	423
7625147	R46763	7625147	52	7625186	R46793	7625186	52	7625224	R467127	7625224	53	7647849	C60115/16X5/8	7647849	423
7625147	R46763	7625147	52	7625186	R46793	7625186	52	7625225	R467128	7625225	53	7647850	C6011X5/8	7647850	423
7625148	R4671/4	7625148	52	7625187	R46794	7625187	52	7625225	R467128	7625225	53	7647851	C6017/8X7/8	7647851	423
7625148	R4671/4	7625148	52	7625187	R46794	7625187	52	7625226	R467130	7625226	53	7647852	C6011X7/8	7647852	423
7625149	R46764	7625149	52	7625188	R46795	7625188	52	7625226	R467130	7625226	53	7647853	C6011X1	7647853	423
7625149	R46764	7625149	52	7625188	R46795	7625188	52	7625227	R46733/64	7625227	53	7647854	C6011/8X1	7647854	423
7625150	R46765	7625150	52	7625189	R4673/8	7625189	52	7625227	R46733/64	7625227	53	7647855	C6011/4X1	7647855	423
7625150	R46765	7625150	52	7625189	R4673/8	7625189	52	7625228	R467133	7625228	53	7647856	C6011/2X1	7647856	423
7625151	R46766	7625151	52	7625190	R46796	7625190	52	7625228	R467133	7625228	53	7647857	C6011/4X11/4	7647857	423
7625151	R46766	7625151	52	7625190	R46796	7625190	52	7625229	R46717/32	7625229	53	7647858	C6011/2X11/4	7647858	423
7625152	R46767	7625152	52	7625191	R46797	7625191	52	7625229	R46717/32	7625229	53	7647859	C6013/4X3/4	7647859	423
7625152	R46767	7625152	52	7625191	R46797	7625191	52	7625230	R467135	7625230	53	7647860	C6017/8X3/4	7647860	423
7625153	R46717/64	7625153	52	7625192	R46798	7625192	52	7625230	R467135	7625230	53	7647861	C6011X3/4	7647861	423
7625153	R46717/64	7625153	52	7625192	R46798	7625192	52	762523							

EDP NUMBER INDEX - 7648625 - 7648940

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
7647874.....	C6031/8.....	7647874	425	7647953.....	C6111.....	7647953	434	7648504.....	S2071/8X1/2.....	7648504	398	7648582.....	S1111/4.....	7648582	403
7647875.....	C6033/16.....	7647875	425	7647954.....	C6121/4.....	7647954	435	7648505.....	S2071/8X3/4.....	7648505	398	7648583.....	S1115/16.....	7648583	403
7647876.....	C6031/8.....	7647876	425	7647955.....	C6123/8.....	7647955	435	7648506.....	S2075/32X9/16.....	7648506	398	7648584.....	S1113/8.....	7648584	403
7647877.....	C6035/16.....	7647877	425	7647956.....	C6121/2.....	7647956	435	7648507.....	S2073/16X3/4.....	7648507	398	7648585.....	S1111/2.....	7648585	403
7647878.....	C6033/8.....	7647878	425	7647957.....	C6125/8.....	7647957	435	7648508.....	S2073/16X11/8.....	7648508	398	7648586.....	S2111/8.....	7648586	403
7647879.....	C6031/2.....	7647879	425	7647958.....	C6123/4.....	7647958	435	7648509.....	S2071/4X1.....	7648509	398	7648587.....	S2113/16.....	7648587	403
7647880.....	C6035/8.....	7647880	425	7647959.....	C6127/8.....	7647959	435	7648510.....	S2071/4X11/2.....	7648510	398	7648588.....	S2111/4.....	7648588	403
7647881.....	C6033/4.....	7647881	425	7647960.....	C6121.....	7647960	435	7648511.....	S2075/16X3/4.....	7648511	398	7648589.....	S2113/8.....	7648589	403
7647882.....	C6031.....	7647882	425	7647961.....	C6131/4.....	7647961	436	7648512.....	S2075/16X15/8.....	7648512	398	7648590.....	S2111/2.....	7648590	403
7647883.....	C6041/8.....	7647883	428	7647962.....	C6133/8.....	7647962	436	7648513.....	S2073/8X1.....	7648513	398	7648591.....	S1121/16.....	7648591	404
7647884.....	C6043/16.....	7647884	428	7647963.....	C6131/2.....	7647963	436	7648514.....	S2073/8X2.....	7648514	398	7648592.....	S1123/32.....	7648592	404
7647885.....	C6041/4.....	7647885	428	7647964.....	C6133/4.....	7647964	436	7648515.....	S2077/16X1.....	7648515	398	7648593.....	S1121/8.....	7648593	404
7647886.....	C6045/16.....	7647886	428	7647965.....	C6141/8.....	7647965	437	7648516.....	S2077/16X2.....	7648516	398	7648594.....	S1125/32.....	7648594	404
7647887.....	C6043/8.....	7647887	428	7647966.....	C6143/16.....	7647966	437	7648517.....	S2071/2X1.....	7648517	398	7648595.....	S1123/16.....	7648595	404
7647888.....	C6047/16.....	7647888	428	7647967.....	C6141/4.....	7647967	437	7648518.....	S2071/2X3.....	7648518	398	7648596.....	S1127/32.....	7648596	404
7647889.....	C6041/2.....	7647889	428	7647968.....	C6145/16.....	7647968	437	7648519.....	S2079/16X11/4.....	7648519	398	7648597.....	S1121/4.....	7648597	404
7647890.....	C6049/16.....	7647890	428	7647969.....	C6143/8.....	7647969	437	7648520.....	S2075/8X15/8.....	7648520	398	7648598.....	S1125/16.....	7648598	404
7647891.....	C6045/8.....	7647891	428	7647970.....	C6141/2.....	7647970	437	7648521.....	S2075/8X21/4.....	7648521	398	7648599.....	S1123/8.....	7648599	404
7647892.....	C6043/4.....	7647892	428	7647971.....	C6145/8.....	7647971	437	7648522.....	S2073/4X13/4.....	7648522	398	7648600.....	S1121/2.....	7648600	404
7647893.....	C6051/4.....	7647893	429	7647972.....	C6143/4.....	7647972	437	7648523.....	S2073/4X3.....	7648523	398	7648601.....	S1211/16.....	7648601	404
7647894.....	C6055/16.....	7647894	429	7647973.....	C6151/8.....	7647973	438	7648524.....	S2071X11/2.....	7648524	398	7648602.....	S1212/16.....	7648602	404
7647895.....	C6053/8.....	7647895	429	7647974.....	C6153/16.....	7647974	438	7648525.....	S2071X4.....	7648525	398	7648603.....	S1213/16.....	7648603	404
7647896.....	C6051/2.....	7647896	429	7647975.....	C6151/4.....	7647975	438	7648526.....	S1081/16.....	7648526	400	7648604.....	S1217/32.....	7648604	404
7647897.....	C6053/4.....	7647897	429	7647976.....	C6155/16.....	7647976	438	7648527.....	S1085/64.....	7648527	400	7648605.....	S1212/4.....	7648605	404
7647898.....	C6051.....	7647898	429	7647977.....	C6153/8.....	7647977	438	7648528.....	S1083/32.....	7648528	400	7648606.....	S1215/16.....	7648606	404
7647899.....	C6061/4.....	7647899	430	7647978.....	C6151/2.....	7647978	438	7648529.....	S1081/8.....	7648529	400	7648607.....	S1213/8.....	7648607	404
7647900.....	C6065/16.....	7647900	430	7647979.....	C6155/8.....	7647979	438	7648530.....	S1089/64.....	7648530	400	7648608.....	S1212/2.....	7648608	404
7647901.....	C6063/8.....	7647901	430	7647980.....	C61511/16.....	7647980	438	7648531.....	S1085/32.....	7648531	400	7648609.....	S11320.....	7648609	405
7647902.....	C6061/2.....	7647902	430	7647981.....	C6153/4.....	7647981	438	7648532.....	S10811/64.....	7648532	400	7648610.....	S11325.....	7648610	405
7647903.....	C6063/4.....	7647903	430	7647982.....	C6157/8.....	7647982	438	7648533.....	S1083/16.....	7648533	400	7648611.....	S11330.....	7648611	405
7647904.....	C6071/8X3/8.....	7647904	431	7647983.....	C6151.....	7647983	438	7648534.....	S1087/32.....	7648534	400	7648612.....	S11340.....	7648612	405
7647905.....	C6073/16X3/8.....	7647905	431	7647984.....	C6171/8X3/8.....	7647984	443	7648535.....	S1081/4.....	7648535	400	7648613.....	S11350.....	7648613	405
7647906.....	C6071/4X3/8.....	7647906	431	7647985.....	C6173/16X3/8.....	7647985	443	7648536.....	S1085/16.....	7648536	400	7648614.....	S11360.....	7648614	405
7647907.....	C6075/16X3/8.....	7647907	431	7647986.....	C6171/4X3/8.....	7647986	443	7648537.....	S1083/8.....	7648537	400	7648615.....	S11370.....	7648615	405
7647908.....	C6073/8X3/8.....	7647908	431	7647987.....	C6175/16X3/8.....	7647987	443	7648538.....	S1087/16.....	7648538	400	7648616.....	S11380.....	7648616	405
7647909.....	C6077/16X3/8.....	7647909	431	7647988.....	C6173/8X3/8.....	7647988	443	7648539.....	S1081/2.....	7648539	400	7648617.....	S11390.....	7648617	405
7647910.....	C6071/2X1/2.....	7647910	431	7647989.....	C6177/16X3/8.....	7647989	443	7648540.....	S1089/16.....	7648540	400	7648618.....	S113100.....	7648618	405
7647912.....	C6075/8X5/8.....	7647912	431	7647990.....	C6171/2X3/8.....	7647990	443	7648541.....	S1085/8.....	7648541	400	7648619.....	S113120.....	7648619	405
7647913.....	C6073/4X5/8.....	7647913	431	7647991.....	C6171/2X1/2.....	7647991	443	7648542.....	S1083/4.....	7648542	400	7648620.....	S113160.....	7648620	405
7647914.....	C6071X5/8.....	7647914	431	7647992.....	C6179/16X1/2.....	7647992	443	7648543.....	S1081.....	7648543	400	7648621.....	S113200.....	7648621	405
7647915.....	C6071X1.....	7647915	431	7647993.....	C6175/8X1/2.....	7647993	443	7648544.....	S2081/16.....	7648544	400	7648622.....	S2133.0.....	7648622	405
7647916.....	C6073/4X3/4.....	7647916	431	7647994.....	C61711/16X1/2.....	7647994	443	7648545.....	S2085/64.....	7648545	400	7648623.....	S2134.0.....	7648623	405
7647917.....	C6081/4.....	7647917	433	7647995.....	C6173/4X1/2.....	7647995	443	7648546.....	S2083/32.....	7648546	400	7648624.....	S2135.0.....	7648624	405
7647918.....	C6085/16.....	7647918	433	7647996.....	C6175/8X5/8.....	7647996	443	7648547.....	S2081/8.....	7648547	400	7648625.....	S21360.....	7648625	405
7647919.....	C6083/8.....	7647919	433	7647997.....	C61711/16X5/8.....	7647997	443	7648548.....	S2085/32.....	7648548	400	7648626.....	S21370.....	7648626	405
7647920.....	C6087/16.....	7647920	433	7647998.....	C6173/4X5/8.....	7647998	443	7648549.....	S2083/16.....	7648549	400	7648627.....	S21380.....	7648627	405
7647921.....	C6081/2.....	7647921	433	7647999.....	C61713/16X5/8.....	7647999	443	7648550.....	S2087/32.....	7648550	400	7648628.....	S21390.....	7648628	405
7647922.....	C6089/16.....	7647922	433	7648000.....	C6177/8X5/8.....	7648000	443	7648551.....	S2081/4.....	7648551	400	7648629.....	S213100.....	7648629	405
7647923.....	C6085/8.....	7647923	433	7648001.....	C6171X5/8.....	7648001	443	7648552.....	S2085/16.....	7648552	400	7648630.....	S213120.....	7648630	405
7647924.....	C6083/4.....	7647924	433	7648002.....	C6177/8X7/8.....	7648002	443	7648553.....	S2083/8.....	7648553	400	7648631.....	S1141/8.....	7648631	406
7647925.....	C6087/8.....	7647925	433	7648003.....	C6171X7/8.....	7648003	443	7648554.....	S2087/16.....	7648554	400	7648632.....	S1143/16.....	7648632	406
7647926.....	C6081.....	7647926	433	7648004.....	C6171X1.....	7648004	443	7648555.....	S2081/2.....	7648555	400	7648633.....	S1141/4.....	7648633	406
7647927.....	C6091/4.....	7647927	433	7648005.....	C6173/4X3/4.....	7648005	443	7648556.....	S2089/16.....	7648556	400	7648634.....	S1145/16.....	7648634	406
7647928.....	C6095/16.....	7647928	433	7648006.....	C6177/8X3/4.....	7648006	443	7648557.....	S2085/8.....	7648557	400	7648635.....	S1143/8.....	7648635	406
7647929.....	C6093/8.....	7647929	433	7648007.....	C6171X3/4.....	7648007	443	7648558.....	S10920.....	7648558	401	7648636.....	S1141/2.....	7648636	406
7647930.....	C6097/16.....	7647930	433	7648008.....	C6181/8.....	7648008	444	7648559.....	S10925.....	7648559	401	7648637.....	S1145/8.....	7648637	406
7647931.....	C6091/2.....	7647931	433	7648009.....	C6183/16.....	7648009	444	7648560.....	S10930.....	7648560	401	7648638.....	S1151/8.....	7648638	407
7647932.....	C6095/8.....	7647932	433	7648010.....	C6181/4.....	7648010	444	7648561.....	S10940.....	7648561	401	7648639.....	S1153/16.....	7648639	407
7647933.....	C6093/4.....	7647933	433	7648011.....	C6185/16.....	7648011	444	7648562.....	S10945.....	7648562	401	7648640.....	S1151/4.....	7648640	407
7647934.....	C6091.....	7647934	433	7648012.....	C6183/8.....	7648012	444	7648563.....	S10950.....	7648563	401	7648641.....	S1155/16.....	7648641	407
7647935.....	C6101/4.....	7647935	434	7648013.....	C6181/2.....	7648013	444	7648564.....	S10960.....	7648564	401	7648642.....	S1153/8.....	7648642	407
7647936.....	C6105/16.....	7647936	434	7648014.....	C6185/8.....	7648014	444	7648565.....	S10970.....	7648565	401	7648643.....	S1151/2.....	7648643	407
7647937.....	C6103/8.....	7647937	434	7648015.....	C6183/4.....	7648015	444	7648566.....	S10980.....	7648566	401	7648644.....	S2151/8.....	7648644	407
7647938.....	C6107/16.....	7647938	434	7648016.....	C6181.....	7648016	444	7648567.....	S10990.....	7648567	401	7648645.....	S2153/16.....	7648645	407
7647939.....	C6101/2.....	7647939	434	7648490.....	S1061/4.....	7648490	39								

EDP NUMBER INDEX - 7648941 - 7878122

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
7648660.....	S1215/32.....	7648660	408	7648738.....	S1345/16.....	7648738	410	7648816.....	S2361/8.....	7648816	412	7648894.....	S1471/8.....	7648894	417
7648661.....	S1213/16.....	7648661	408	7648739.....	S1343/8.....	7648739	410	7648817.....	S2363/16.....	7648817	412	7648895.....	S1473/16.....	7648895	417
7648662.....	S1211/4.....	7648662	408	7648740.....	S1347/16.....	7648740	410	7648818.....	S2361/4.....	7648818	412	7648896.....	S1471/4.....	7648896	417
7648663.....	S1215/16.....	7648663	408	7648741.....	S1341/2.....	7648741	410	7648819.....	S2365/16.....	7648819	412	7648897.....	S1475/16.....	7648897	417
7648664.....	S1213/8.....	7648664	408	7648742.....	S1349/16.....	7648742	410	7648820.....	S2363/8.....	7648820	412	7648898.....	S1473/8.....	7648898	417
7648665.....	S1211/2.....	7648665	408	7648743.....	S1345/8.....	7648743	410	7648821.....	S2367/16.....	7648821	412	7648899.....	S1471/2.....	7648899	417
7648666.....	S2211/16.....	7648666	408	7648744.....	S1341/16.....	7648744	410	7648822.....	S2361/2.....	7648822	412	7648900.....	S1475/8.....	7648900	417
7648667.....	S2213/32.....	7648667	408	7648745.....	S1343/4.....	7648745	410	7648823.....	S2365/8.....	7648823	412	7648901.....	S2471/8.....	7648901	417
7648668.....	S2211/8.....	7648668	408	7648746.....	S1347/8.....	7648746	410	7648824.....	S2363/4.....	7648824	412	7648902.....	S2473/16.....	7648902	417
7648669.....	S2215/32.....	7648669	408	7648747.....	S1341.....	7648747	410	7648825.....	S1371/8.....	7648825	413	7648903.....	S2471/4.....	7648903	417
7648670.....	S2213/16.....	7648670	408	7648748.....	S2341/16.....	7648748	410	7648826.....	S1373/16.....	7648826	413	7648904.....	S2475/16.....	7648904	417
7648671.....	S2211/4.....	7648671	408	7648749.....	S2345/64.....	7648749	410	7648827.....	S1371/4.....	7648827	413	7648905.....	S2473/8.....	7648905	417
7648672.....	S2215/16.....	7648672	408	7648750.....	S2343/32.....	7648750	410	7648828.....	S1375/16.....	7648828	413	7648906.....	S2471/2.....	7648906	417
7648673.....	S2213/8.....	7648673	408	7648751.....	S2347/64.....	7648751	410	7648829.....	S1373/8.....	7648829	413	7648907.....	S2475/8.....	7648907	417
7648674.....	S2211/2.....	7648674	408	7648752.....	S2341/8.....	7648752	410	7648830.....	S1377/16.....	7648830	413	7648908.....	S248HA5/16XR015.....	7648908	419
7648675.....	S223HA1/8XR015.....	7648675	418	7648753.....	S2349/64.....	7648753	410	7648831.....	S1371/2.....	7648831	413	7648909.....	S248HA5/16XR030.....	7648909	419
7648676.....	S223HA1/8XR030.....	7648676	418	7648754.....	S2345/32.....	7648754	410	7648832.....	S1375/8.....	7648832	413	7648910.....	S248HA3/8XR015.....	7648910	419
7648677.....	S223HA3/16XR015.....	7648677	418	7648755.....	S2341/64.....	7648755	410	7648833.....	S1373/4.....	7648833	413	7648911.....	S248HA3/8XR030.....	7648911	419
7648678.....	S223HA3/16XR030.....	7648678	418	7648756.....	S2343/16.....	7648756	410	7648834.....	S1371.....	7648834	413	7648912.....	S248HA7/16XR020.....	7648912	419
7648679.....	S223HA1/4XR015.....	7648679	418	7648757.....	S2341/64.....	7648757	410	7648835.....	S2371/8.....	7648835	413	7648913.....	S248HA7/16XR045.....	7648913	419
7648680.....	S223HA1/4XR030.....	7648680	418	7648758.....	S2347/32.....	7648758	410	7648836.....	S2373/16.....	7648836	413	7648914.....	S248HA1/2X1XR030.....	7648914	419
7648681.....	S223HA3/16XR015.....	7648681	418	7648759.....	S2341/4.....	7648759	410	7648837.....	S2371/4.....	7648837	413	7648915.....	S248HA1/2X11/4XR030.....	7648915	419
7648682.....	S223HA5/16XR030.....	7648682	418	7648760.....	S2345/16.....	7648760	410	7648838.....	S2375/16.....	7648838	413	7648916.....	S248HA1/2X11/4XR060.....	7648916	419
7648683.....	S223HA3/8XR015.....	7648683	418	7648761.....	S2343/8.....	7648761	410	7648839.....	S2373/8.....	7648839	413	7648917.....	S248HA9/16XR020.....	7648917	419
7648684.....	S223HA3/8XR030.....	7648684	418	7648762.....	S2347/16.....	7648762	410	7648840.....	S2377/16.....	7648840	413	7648918.....	S248HA9/16XR045.....	7648918	419
7648685.....	S223HA7/16XR020.....	7648685	418	7648763.....	S2341/2.....	7648763	410	7648841.....	S2371/2.....	7648841	413	7648919.....	S248HA9/16XR060.....	7648919	419
7648686.....	S223HA7/16XR045.....	7648686	418	7648764.....	S2349/16.....	7648764	410	7648842.....	S2375/8.....	7648842	413	7648920.....	S248HA5/8XR045.....	7648920	419
7648687.....	S223HA1/2XR030.....	7648687	418	7648765.....	S2345/8.....	7648765	410	7648843.....	S2373/4.....	7648843	413	7648921.....	S248HA5/8XR060.....	7648921	419
7648688.....	S223HA1/2XR060.....	7648688	418	7648766.....	S2341/16.....	7648766	410	7648844.....	S2371.....	7648844	413	7648922.....	S248HA5/8XR090.....	7648922	419
7648689.....	S223HA9/16XR045.....	7648689	418	7648767.....	S2343/4.....	7648767	410	7648845.....	S1381/16.....	7648845	414	7648923.....	S248HA3/4XR030.....	7648923	419
7648690.....	S223HA9/16XR060.....	7648690	418	7648768.....	S2347/8.....	7648768	410	7648846.....	S1383/32.....	7648846	414	7648924.....	S248HA3/4XR060.....	7648924	419
7648691.....	S223HA5/8XR060.....	7648691	418	7648769.....	S2341.....	7648769	410	7648847.....	S1381/8.....	7648847	414	7648925.....	S248HA1XR030.....	7648925	419
7648692.....	S223HA5/8XR090.....	7648692	418	7648770.....	S13520.....	7648770	411	7648848.....	S1385/32.....	7648848	414	7648926.....	S248HA1XR090.....	7648926	419
7648693.....	S223HA3/4XR030.....	7648693	418	7648771.....	S13525.....	7648771	411	7648849.....	S1383/16.....	7648849	414	7648927.....	S248HB5/16XR015.....	7648927	419
7648694.....	S223HA3/4XR060.....	7648694	418	7648772.....	S13530.....	7648772	411	7648850.....	S1381/4.....	7648850	414	7648928.....	S248HB5/16XR030.....	7648928	419
7648695.....	S223HA1XR030.....	7648695	418	7648773.....	S13535.....	7648773	411	7648851.....	S1385/16.....	7648851	414	7648929.....	S248HB3/8XR015.....	7648929	419
7648696.....	S223HB1/16XR090.....	7648696	418	7648774.....	S13540.....	7648774	411	7648852.....	S1383/8.....	7648852	414	7648930.....	S248HB3/8XR030.....	7648930	419
7648697.....	S223HB1/8XR015.....	7648697	418	7648775.....	S13545.....	7648775	411	7648853.....	S1387/16.....	7648853	414	7648931.....	S248HB7/16XR020.....	7648931	419
7648698.....	S223HB1/8XR030.....	7648698	418	7648776.....	S13550.....	7648776	411	7648854.....	S1381/2.....	7648854	414	7648932.....	S248HB7/16XR045.....	7648932	419
7648699.....	S223HB3/16XR015.....	7648699	418	7648777.....	S13560.....	7648777	411	7648855.....	S1385/8.....	7648855	414	7648933.....	S248HB1/2X1XR030.....	7648933	419
7648700.....	S223HB3/16XR030.....	7648700	418	7648778.....	S13570.....	7648778	411	7648856.....	S1383/4.....	7648856	414	7648934.....	S248HB1/2X11/4XR030.....	7648934	419
7648701.....	S223HB1/4XR015.....	7648701	418	7648779.....	S13580.....	7648779	411	7648857.....	S2381/16.....	7648857	414	7648935.....	S248HB1/2X11/4XR060.....	7648935	419
7648702.....	S223HB1/4XR030.....	7648702	418	7648780.....	S13590.....	7648780	411	7648858.....	S2383/32.....	7648858	414	7648936.....	S248HB9/16XR020.....	7648936	419
7648703.....	S223HB5/16XR015.....	7648703	418	7648781.....	S135100.....	7648781	411	7648859.....	S2381/8.....	7648859	414	7648937.....	S248HB9/16XR045.....	7648937	419
7648704.....	S223HB5/16XR030.....	7648704	418	7648782.....	S135110.....	7648782	411	7648860.....	S2385/32.....	7648860	414	7648938.....	S248HB9/16XR060.....	7648938	419
7648705.....	S223HB3/8XR015.....	7648705	418	7648783.....	S135120.....	7648783	411	7648861.....	S2383/16.....	7648861	414	7648939.....	S248HB5/8XR045.....	7648939	419
7648706.....	S223HB3/8XR030.....	7648706	418	7648784.....	S135140.....	7648784	411	7648862.....	S2381/4.....	7648862	414	7648940.....	S248HB5/8XR060.....	7648940	419
7648707.....	S223HB7/16XR020.....	7648707	418	7648785.....	S135160.....	7648785	411	7648863.....	S2385/16.....	7648863	414	7648941.....	S248HB5/8XR090.....	7648941	419
7648708.....	S223HB7/16XR045.....	7648708	418	7648786.....	S135180.....	7648786	411	7648864.....	S2383/8.....	7648864	414	7648942.....	S248HB3/4XR030.....	7648942	419
7648709.....	S223HB1/2XR030.....	7648709	418	7648787.....	S135200.....	7648787	411	7648865.....	S2387/16.....	7648865	414	7648943.....	S248HB3/4XR060.....	7648943	419
7648710.....	S223HB1/2XR060.....	7648710	418	7648788.....	S135250.....	7648788	411	7648866.....	S2381/2.....	7648866	414	7648944.....	S248HB1XR030.....	7648944	419
7648711.....	S223HB9/16XR045.....	7648711	418	7648789.....	S23520.....	7648789	411	7648867.....	S2385/8.....	7648867	414	7648945.....	S248HB1XR090.....	7648945	419
7648712.....	S223HB9/16XR060.....	7648712	418	7648790.....	S23525.....	7648790	411	7648868.....	S2383/4.....	7648868	414	7652368.....	QC21G9/64-T.....	7652368	119
7648713.....	S223HB5/8XR060.....	7648713	418	7648791.....	S23530.....	7648791	411	7648869.....	S139120.....	7648869	415	7652369.....	QC21GM40-T.....	7652369	122
7648714.....	S223HB5/8XR090.....	7648714	418	7648792.....	S23535.....	7648792	411	7648870.....	S139100.....	7648870	415	7652518.....	A01213/32-T.....	7652518	94
7648715.....	S223HB3/4XR030.....	7648715	418	7648793.....	S23540.....	7648793	411	7648871.....	S13980.....	7648871	415	7658817.....	C6079/16X1/2.....	7658817	431
7648716.....	S223HB3/4XR060.....	7648716	418	7648794.....	S23545.....	7648794	411	7648872.....	S13960.....	7648872	415	7812046.....	E8164-40.....	7812046	265
7648717.....	S223HB1XR030.....	7648717	418	7648795.....	S23550.....	7648795	411	7648873.....	S13950.....	7648873	415	7812047.....	E8166-32.....	7812047	265
7648718.....	S223HB1XR090.....	7648718	418	7648796.....	S23560.....	7648796	411	7648874.....	S13945.....	7648874	415	7812048.....	E8168-32.....	7812048	265
7648719.....	S1291/8.....	7648719	409	7648797.....	S23570.....	7648797	411	7648875.....	S13940.....	7648875	415	7812049.....	E81610-24.....	7812049	265
7648720.....	S1295/32.....	7648720	409	7648798.....	S23580.....	7648798	411	7648876.....	S13930.....	7648876	415	7812100.....	E8161/4.....	7812100	265
7648721.....	S1293/16.....	7648721	409	7648799.....	S23590.....	7648799	411	7648877.....	S13920.....	7648877	415	7812101.....	E8165/16.....	7812101	265
7648722.....	S1291/4.....	7648722	409	7648800.....	S235100.....	7648800	411	7648878.....	S23920.....	7648878	415	7812102.....	E8163/8.....	7812102	265
7648723.....	S1295/16.....	76487													

EDP NUMBER INDEX - 7878123 - 47197820

EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #	EDP#	E-Code	MID#	Page #
7812118.....	E817M6.....	7812118.....	269	7833364.....	H8512135.....	7833364.....	42	7877973.....	TS18HSN37.....	7877973.....	215	7878051.....	TS52HSN23.....	7878051.....	216
7812119.....	E817M8.....	7812119.....	269	7833365.....	H8512146.....	7833365.....	42	7877974.....	TS18HSN36.....	7877974.....	215	7878052.....	TS51HS5/32.....	7878052.....	216
7812120.....	E817M10.....	7812120.....	269	7833366.....	H8512156.....	7833366.....	42	7877975.....	TS10HS7/64.....	7877975.....	215	7878053.....	TS52HSN22.....	7878053.....	216
7812121.....	E817M12.....	7812121.....	269	7833367.....	H8512166.....	7833367.....	43	7877976.....	TS18HSN35.....	7877976.....	215	7878054.....	TS52HSN21.....	7878054.....	216
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7833331.....	H8519/16.....	7833331.....	30	7877940.....	TS41HSN14.....	7877940.....	217	7878018.....	TS15HSA.....	7878018.....	217	7878117.....	TS40CO7/64.....	7878117.....	219
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7833345.....	H85149/64.....	7833345.....	31	7877954.....	TS40HS7/32.....	7877954.....	217	7878032.....	TS52HSN39.....	7878032.....	215	7878131.....	TS41CON24.....	7878131.....	220
7833346.....	H85151/64.....	7833346.....	31	7877955.....	TS41HSN2.....	7877955.....	217	7878033.....	TS52HSN38.....	7878033.....	215	7878132.....	TS41CON23.....	7878132.....	220
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7833348.....	H85157/64.....	7833348.....	31	7877957.....	TS42HSA.....	7877957.....	217	7878035.....	TS52HSN36.....	7878035.....	215	7878134.....	TS41CON22.....	7878134.....	220
7833349.....	H85159/64.....	7833349.....	31	7877958.....	TS40HS15/64.....	7877958.....	217	7878036.....	TS51						

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