



Chicago-Latrobe®



DRILLS, REAMERS, COUNTERSINKS, SETS


a product of **GREENFIELD
INDUSTRIES**

Style Number	Description	Page Number
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Jobber Length

150.	General-purpose, 118° point, black oxide.	10-17
150D	General-purpose, 118° point, bright finish	10-17
150-TN ^(150T)	General-purpose, 118° point, TiN-coated	10-17
150B	General-purpose, 118° point, fast spiral bright finish	18-20
150C	General-purpose, 118° point, slow spiral bright finish.	21-23
150K	General-purpose, 118° split point, black oxide finish	24
150L	General-purpose, 118° point, left-hand helix, bright finish	25-27
250AN	General-purpose, 118° point, automotive tanged shank.	28-30
150ASP	Heavy-duty, 135° split point, black oxide finish	31-35
150ASP-TN.	Heavy-duty, 135° split point, TiN-coated	31-35
150ASP-TC.	Heavy-duty, 135° split point, TiCN-coated	31-35
150ASP-TA.	Heavy-duty, 135° split point, TiAlN-coated	31-35
550.	Cobalt heavy-duty, 135° split point, straw finish.	36-40
550-TN ⁽²⁵⁵⁰⁾	Cobalt heavy-duty, 135° split point, TiN-coated	36-40
550-TA	Cobalt heavy-duty, 135° split point, TiAlN-coated	36-40
550ASP	Cobalt heavy-duty, 135° split point, straw finish.	41-44
550ASP-TN.	Cobalt heavy-duty, 135° split point, TiN-coated	41-44
150WLP	Wide land parabolic, 135° modified notch point, bright.	45-47
150WLP-TC ^(150WLPN)	Wide land parabolic, 135° modified notch point, TiCN-coated	45-47
150DH	Deep-hole parabolic, 135° K-notch split point, bright finish	48-50
150DH-TN ^(150DHT)	Deep-hole parabolic, 135° K-notch split point, TiN-coated	48-50
CTD	Carbide-tipped, 118° point, general-purpose bright finish.	51

Screw Machine Length

157.	General-purpose, 118° point, bright or black oxide finish	52-55
157-TN ⁽²¹⁵⁷⁾	General-purpose, 118° point, TiN-coated	52-55
157L	General-purpose, 118° point, left-hand helix, bright finish	56-58
159.	Heavy-duty, 135° split point, black oxide finish	59-61
159-TN ⁽²¹⁵⁹⁾	Heavy-duty, 135° split point, TiN-coated	59-61
559.	Cobalt heavy-duty, 135° split point, straw finish.	62-65
559-TN ⁽²⁵⁵⁹⁾	Cobalt heavy-duty, 135° split point, TiN-coated	62-65
559-TA	Cobalt heavy-duty, 135° split point, TiAlN-coated	62-65

Taper Length & Long Lengths

120.	General-purpose, 118° point, black oxide finish	66-69
120B	General-purpose, 118° point, fast spiral, bright finish	70-71
255AN	General-purpose, 118° point, automotive tang shank, black oxide finish.	72-73
120F.	Heavy-duty, 118° K-notch point, long flute, black oxide finish.	74
520.	Cobalt heavy-duty taper length, 135° split point, straw finish	75-77
120DH	Deep-hole parabolic, 135° K-notch split point, bright finish	78-79
120DH-TN ^(120DHT)	Deep-hole parabolic, 135° K-notch split point, TiN-coated	78-79
120X.	Extra-long heavy-duty, 118° K-notch point, multiple lengths, black oxide finish.	80-82
906.	6" NAS-type aircraft extension, 135° split point, jobber flute length, black oxide finish.	83-85
912.	12" NAS-type aircraft extension, 135° split point, jobber flute length, black oxide finish.	83-85

continued on next page



Style Number	Description	Page Number
Taper Shank Drills		
110.	General-purpose, 118° point, black oxide finish	86-88
110S	General-purpose, alternate taper shanks, 118° point, black oxide finish	86-88
510.	Cobalt heavy-duty, 135° point, straw finish	89
110X.	Extra length, heavy-duty, 118° K-notch point, black oxide finish.	90
Reduced Shank Drills		
190.	1/2" reduced shank S & D, 118° point, round shank, black oxide finish	91-93
190F.	1/2" reduced shank S & D, 118° point, flatted shank, black oxide finish	91-93
239.	1/4" reduced shank, 118° point, round shank, black oxide finish	93
190C	1/2" reduced shank S & D, 118° split point, round shank, straw finish	94-95
190C-TN.	1/2" reduced shank S & D, 118° split point, round shank, TiN-coated	94-95
Solid Carbide Drills		
759.	Stub length, slow spiral, 118° modified split point, uncoated	96-97
769.	Regular length, straight flute, 140° point, uncoated	98-100
780.	Spade drill, straight flutes, 118° point, uncoated	100
790.	Spotting drill, spiral flute, 90° or 120° point, uncoated	101
HSS Spotting Drills		
90SPS	HSS, short length, 90° point, bright finish	102
90SPR	HSS, regular length, 90° point, bright finish	102
Drill Technical Information		
Drill Tolerances		3
Morse Taper Shank Specifications		3
Tang Specifications.		3
Surface Treatments for Drills.		3
Drill Selection and Application — Ferrous and Non-Ferrous Materials		4
Determining Feed and Speed Operating Parameters		5
Drill Style by Geometry and Length/Construction.		5
Drill Cutting Speeds		6-8
Information for Special Drills.		9
Drill Nomenclature		103
Dimensions for Inch Size Drills		104-106
Dimensions for Metric Size Drills		107-110

Technical Information

Drill Tolerances

Drill Diameter Tolerances

Diameter Range (inches)	Plus (+) (inches)	Minus (-) (inches)
through 1/8	.0000	.0005
over 1/8 through 1/4	.0000	.0007
over 1/4 through 1/2	.0000	.0010
over 1/2 through 1	.0000	.0012
over 1 through 2	.0000	.0015
over 2 through 3-1/2	.0000	.0020

Drill Overall Length and Flute Length Tolerances

Diameter Range (inches)	Plus (+) (inches)	Minus (-) (inches)
#80 through 1/8	.1250	.0625
over 1/8 through 1/2	.1250	.1250
over 1/2 through 1	.2500	.1250
over 1 through 2	.2500	.2500
over 2 through 3-1/2	.3750	.3750

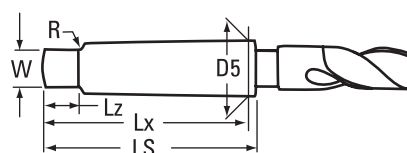
Drill Point Angle Tolerances

Diameter Range (inches)	Included Angle (degrees)	Tolerance (degrees)
1/16 through 1/2	118° / 135°	± 5°
over 1/2 through 1-1/2	118°	± 3°
over 1-1/2 through 3-1/2	118°	± 2°

Drill Lip Height Tolerances

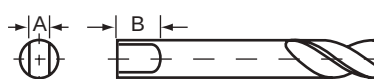
Diameter Range (inches)	Total Indicator Variation (inches)
1/16 through 1/8	.0020
over 1/8 through 1/4	.0030
over 1/4 through 1/2	.0040
over 1/2 through 1	.0050
over 1 through 3-1/2	.0060

Morse Taper Shank Specifications



Morse Taper Shank No.	Taper per Foot	Taper per Inch	D5 Max Shank Diameter	LS Length of Shank	Lx Shank Lngth to Gage Line	Lz Length of Tang	W Thickness of Tang	R Radius
1	.5985	.0498	.475	2.56	2.44	.37	.20	.19
2	.5994	.0499	.700	3.12	2.94	.44	.25	.25
3	.6023	.0501	.938	3.87	3.69	.56	.31	.28
4	.6232	.0519	1.231	4.87	4.62	.62	.47	.31
5	.6315	.0526	1.749	6.12	5.87	.75	.62	.37
6	.6256	.0521	2.494	8.56	8.25	1.12	.75	.50

Tang Specifications



Shank Diameter (inch)		Tang Dimensions (inch)	
From	To	Width A	Length B
1/8	3/16	.092	9/32
over 3/16	1/4	.120	5/16
over 1/4	5/16	.160	11/32
over 5/16	3/8	.201	3/8
over 3/8	15/32	.241	7/16
over 15/32	9/16	.300	1/2
over 9/16	21/32	.370	9/16
over 21/32	3/4	.440	5/8
over 3/4	7/8	.511	11/16
over 7/8	1	.605	3/4
over 1-3/16	1-3/8	.813	7/8

Surface Treatments for Drills

Surface Treatment	Recommended Applications	Precautions
Black Oxide	For ferrous materials; improves lubricity and increases wear resistance, improving chip flow.	Avoid in aluminum and other non-ferrous materials.
TiN (Titanium Nitride)	For ferrous and non-metallic materials: free-machining steels and irons, high tensile steels, tough machining steels, plastics, hard rubber, and fiber. The hard, smooth finish increases tool life, improves finish, and allows higher speeds.	Avoid titanium and titanium alloys due to tendency to gall.
TiCN (Titanium Carbonitride)	For ferrous and non-ferrous materials: cast iron, aluminum, stainless steel, brass, abrasive materials, high-silicon automotive aluminum, glass-filled plastics, and composites. The hard, smooth finish increases tool life and improves finish.	Use with caution in titanium, titanium alloys, and aluminum die casting due to tendency to gall.
TiAlN (Titanium Aluminum Nitride)	For ferrous materials, high-temperature alloys, and titanium; stainless steels, gray cast irons or nodular irons, and steels containing high-nickel, cobalt, chromium, and tungsten. Most effective where higher speeds are available.	Avoid in most non-ferrous materials.

Drills

Technical Information

Drill Selection and Application — Ferrous Materials

	Material	Hardness - Brinell	Geometry Class	Surface Feet per Minute (SFM)	Recommended Coolant
Carbon Steel	Low	85 - 125	General Purpose or Wide Land Parabolic	80 - 95	Soluble Oil
	Medium	125 - 175	General Purpose or Wide Land Parabolic	70 - 85	Soluble Oil
	High	175 - 225	Heavy-Duty or Wide Land Parabolic	45 - 65	Soluble Oil
Alloyed Steels		< 200	General Purpose or Wide Land Parabolic	60 - 90	Soluble Oil
		200 - 300	Heavy-Duty or Wide Land Parabolic	40 - 70	Soluble Oil
		> 300	Cobalt Heavy-Duty or Wide Land Parabolic	20 - 30	Soluble Oil
Steel Drop Forgings	Heat Treated	330 - 370	Cobalt Heavy-Duty or Wide Land Parabolic	30 - 40	Cutting Oil
		370 - 420	Cobalt Heavy-Duty	20 - 30	Cutting Oil
		> 420	Cobalt Heavy-Duty	10 - 20	Cutting Oil
Grey Cast Iron	Soft	125	General Purpose or Wide Land Parabolic	140 - 150	Dry
	Medium	120 - 200	Heavy-Duty or Wide Land Parabolic	50 - 80	Soluble Oil
	Hard	200 - 350	Heavy-Duty or Wide Land Parabolic	25 - 40	Soluble Oil
Titanium	Titanium Alloys Ti 75A	300 - 440	Cobalt Heavy-Duty	50 - 60	Cutting Oil
	Ti 150A, RS 120	300 - 440	Cobalt Heavy-Duty	40 - 50	Cutting Oil
	Ti 140A, RC 130B	300 - 440	Cobalt Heavy-Duty	30 - 40	Cutting Oil
	Ti 6AL 4V	300 - 440	Cobalt Heavy-Duty	20 - 30	Cutting Oil
Stainless Steel	300 Series	120 - 200	Cobalt Heavy-Duty	20 - 40	Cutting Oil
	400 Series	200 - 300	Cobalt Heavy-Duty or Wide Land Parabolic	40 - 70	Cutting Oil
	Martensitic 416, 420, F416 Plus K, 400F, 416SE, 440F	135 - 185	Cobalt Heavy-Duty or Wide Land Parabolic	40 - 50	Cutting Oil
	Precipitation Hardening, Cast	325 - 375	Cobalt Heavy-Duty	30	Cutting Oil
	Precipitation Hardening, Cast	400 - 450	Cobalt Heavy-Duty or Wide Land Parabolic	20	Cutting Oil
Steel	Heat-Resisting	175 - 225	Cobalt Heavy-Duty or Wide Land Parabolic	10 - 25	Cutting Oil
	Nimonic Alloys	200 - 300	Cobalt Heavy-Duty	10 - 20	Cutting Oil
Manganese	12% - 14% minimum	125 - 220	Heavy-Duty or Wide Land Parabolic	10 - 12	Cutting Oil
Spring Steels		402	Cobalt Heavy-Duty	15 - 30	Soluble Oil
Armor Plate		200 - 250	Cobalt Heavy-Duty	40	Soluble Oil
		250 - 300	Cobalt Heavy-Duty	35	Soluble Oil
		300 - 350	Cobalt Heavy-Duty	30	Cutting Oil

Drill Selection and Application — Non-Ferrous Materials

	Material	Hardness - Brinell	Geometry Class	Surface Feet per Minute (SFM)	Recommended Coolant
Aluminum	Pure	140 - 350	Fast Spiral	130 - 200	Soluble Oil
	Alloys	140 - 330	Fast Spiral	150 - 300	Soluble Oil
	Leaded	40 - 100	Fast Spiral	200 - 325	Soluble Oil
	Silicon Alloy Die Cast	40 - 100	Fast Spiral	25 - 50	Soluble Oil
Brass		190 - 210	Slow Spiral	200 - 250	Cutting Oil or Soluble Oil
Bronze		150 - 200	Slow Spiral	200 - 250	Soluble Oil
Copper	Nickel Copper Tin Alloy	65 - 100	General Purpose (bright only)	140 - 200	Cutting Oil or Soluble Oil
	Copper Aluminum Alloy	30 - 100	General Purpose (bright only)	120 - 200	Cutting Oil or Soluble Oil
Magnesium Alloys	Wrought	50 - 90	General Purpose (bright only)	140 - 330	Cutting Oil or Soluble Oil
	Cast	50 - 90	General Purpose (bright only) or Wide Land Parabolic	140 - 365	Cutting Oil or Soluble Oil
Nickel Alloys	Wrought and Cast	80 - 170	General Purpose or Wide Land Parabolic	70	Cutting Oil or Soluble Oil
	Monel	115 - 240	General Purpose or Wide Land Parabolic	55	Cutting Oil or Soluble Oil
	Beryllium Nickel	200 - 250	General Purpose	12	Cutting Oil or Soluble Oil
Plastic	Thermoplastic		Fast Spiral	60 - 80	Cold Air
	Thermo-setting Plastic		Slow Spiral	50 - 60	Cold Air
Zinc Alloy		112 - 126	General Purpose	200 - 250	Soluble Oil



Technical Information

Determining Feed and Speed Operating Parameters

- Look up the material to be drilled in the Drill Selection and Application tables on page 4 and determine the geometry class.
- Determine the drill style from the Drill Style by Geometry and Length/Construction table below based on recommended drill type and drill length desired.
- Review each drill style to understand the geometry differences. Select the appropriate geometry and check to ensure the desired size is available.
- Preliminary speed and feed recommendations for the drill can be determined from the formulae at right.
- Recommended operating parameters for high-performance drills are generally 20% faster than for conventional geometries.
- Feed rates for high performance drills are heavier than for conventional geometries by 50% or more.

Drill Definitions

RPM = revolutions per minute

SFM = surface feet per minute

FR = feed rate in inches per minute

IPR = inches per revolution

Drill Formulae

$RPM = 3.8 \times SFM / \text{drill diameter}$

$SFM = 0.26 \times RPM \times \text{drill diameter}$

$FR = RPM \times IPR$

Drill Feeds

Diameter Range (inches)	Normal Feeds IPR (inches per revolution)	Heavy Feed IPR (inches per revolution)
1/16 through 1/8	.001 - .002	.002 - .004
over 1/8 through 1/4	.002 - .004	.004 - .008
over 1/4 through 1/2	.004 - .008	.008 - .016
over 1/2 through 1	.008 - .016	.016 - .024
over 1	.016 - .024	.024 - .032

Drill Style by Geometry and Length/Construction

Drill Construction	Drill Length				
	Stub/Screw Machine	Regular	Jobber	Taper	Extra
General-Purpose	157	—	150 250AN (tanged shank) 150K (split point)	120 255AN (tanged shank)	—
Left-Hand	157L	—	150L	—	—
Heavy-Duty HSS	159	—	150ASP	120F	120X 906, 912 (extension)
Heavy-Duty Cobalt	559	—	550 550ASP	520	—
Fast Spiral	—	—	150B	120B	—
Slow Spiral	759 (carbide)	—	150C CTD (carbide-tipped)	—	—
Parabolic Flute	—	—	150WLP (wide land) 150DH (deep hole)	120WLP (wide land) 120DH (deep hole)	—
Taper Shank	—	—	—	110, 110S, 510 (cobalt)	110X
Reduced Shank	—	190, 190F, 239 190C (cobalt)	—	—	—
Spade	780 (carbide)	—	—	—	—
Spotting	90SPS	90SPR	—	—	—
Straight Flute	769 (carbide)	—	—	—	—

Drills

Technical Information

Drill Cutting Speeds

			<i>Feet per Minute</i>														
<i>Drill Size</i>			10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	110'	120'	130'	140'	150'
Fract	Wire/Let	Dec	<i>Revolutions Per Minute</i>														
#80	.0135		2830	5659	8490	11320	14150	16980	19810	22640	25470	28300	31123	33953	36782	39612	42441
#79	.0145		2634	5269	7902	10536	13170	15804	18438	21072	23706	26340	28988	31611	34246	36880	39514
#78	.0160		2388	4775	7161	9548	11935	14322	16709	19096	21483	23870	26260	28648	31035	33422	35810
#77	.0180		2122	4244	6366	8488	10610	12732	14854	16976	19098	21220	23343	25465	27587	29709	31831
#76	.0200		1910	3820	5730	7640	9550	11460	13370	15280	17190	19100	21008	22918	24828	26738	28648
#75	.0210		1819	3638	5457	7276	9095	10914	12733	14552	16371	18190	20008	21827	23646	25465	27284
#74	.0225		1698	3396	5106	6808	8510	10212	11914	13616	15318	17020	18674	20372	22069	23767	25465
#73	.0240		1592	3183	4776	6368	7960	9552	11144	12736	14328	15920	17507	19099	20690	22282	23873
#72	.0250		1528	3056	4584	6112	7640	9168	10696	12224	13752	15280	16807	18335	19863	21390	22918
#71	.0260		1469	2938	4419	5892	7365	8838	10311	11784	13257	14730	16160	17629	19099	20568	22037
#70	.0280		1364	2729	4091	5456	6820	8184	9548	10912	12276	13640	15006	16370	17734	19099	20463
#69	.0292		1308	2616	3918	5224	6530	7836	9142	1048	11754	13060	14389	15697	17006	18314	19622
#68	.0310		1232	2465	3696	4928	6160	7392	8624	9856	11088	12320	13554	14786	16018	17250	18482
#67	.0320		1194	2388	3582	4776	5970	7164	8358	9552	10746	11940	13130	14324	15517	16712	17905
#66	.0330		1158	2316	3474	4632	5790	6948	8106	9264	10422	11580	12732	13890	15047	16205	17362
#65	.0350		1091	2182	3273	4364	5455	6546	7637	8728	9819	10910	12005	13096	14187	15279	16370
#64	.0360		1061	2122	3183	4244	5305	6366	7427	8488	9549	10610	11671	12732	13793	14854	15915
#63	.0370		1032	2064	3096	4128	5160	6192	7224	8256	9288	10320	11366	12398	13421	14453	15485
#62	.0380		1005	2010	3015	4020	5025	6030	7035	8040	9045	10050	11057	12060	13068	14073	15078
#61	.0390		979	1959	2938	3918	4897	5876	6856	7835	8815	9794	10774	11753	12732	13712	14691
#60	.0400		955	1910	2865	3820	4775	5729	6684	7639	8594	9549	10504	11459	12414	13369	14324
#59	.0410		932	1863	2795	3726	4658	5590	6521	7453	8388	9316	10248	11180	12111	13043	13975
#58	.0420		910	1819	2729	3637	4547	5456	6367	7275	8186	9095	10004	10913	11823	12732	13642
#57	.0430		888	1777	2671	3561	4452	5342	6232	7122	8013	8903	9771	10660	11548	12436	13325
#56	.0465		821	1643	2465	3286	4108	4929	5751	6572	7394	8215	9036	9857	10678	11500	12322
#55	.0520		735	1469	2204	2938	3673	4408	5142	5877	6611	7346	8080	8815	9549	10284	11028
#54	.0550		694	1389	2084	2778	3473	4167	4862	5556	6251	6945	7639	8334	9028	9723	10417
#53	.0595		641	1283	1924	2566	3207	3848	4490	5131	5773	6414	7062	7704	8346	8988	9630
1/16	.0625		611	1222	1833	2445	3056	3667	4278	4889	5500	6111	6722	7334	7945	8556	9167
#52	.0635		602	1203	1805	2406	3008	3609	4211	4812	5414	6015	6619	7218	7820	8421	9023
#51	.0670		570	1140	1710	2280	2851	3421	3991	4561	5131	5701	6271	6841	7413	798	8552
#50	.0700		546	1091	1637	2183	2729	3274	3820	4366	4911	5457	6002	6548	7094	7640	8185
#49	.0730		523	1047	1570	2093	2617	3140	3663	4186	4710	5233	5756	6279	6808	7326	7849
#48	.0760		503	1005	1508	2010	2513	3016	3518	4021	4523	5026	5528	6031	6534	7036	7539
#47	.0785		487	973	1460	1946	2433	2920	3406	3893	4379	4866	5352	5839	6326	6812	7299
#46	.0810		472	943	1415	1886	2358	2830	3301	3773	4244	4716	5187	5659	6130	6602	7074
#45	.0820		466	932	1397	1863	2329	2795	3261	3726	4192	4658	5124	5590	6056	6522	6987
#44	.0860		444	888	1333	1777	2221	2665	3109	3554	3999	4442	4886	5330	5774	6218	6662
#43	.0890		429	858	1288	1717	2146	2575	3004	3434	3863	4292	4721	5150	5579	6008	6438
#42	.0935		408	817	1226	1634	2043	2451	2860	3268	3677	4085	4494	4902	5311	5719	6128
#41	.0960		398	796	1194	1592	1990	2387	2785	3183	3581	3979	4377	4775	5172	5570	5968
#40	.0980		390	780	1169	1559	1949	2339	2729	3118	3508	3898	4287	4677	5067	5457	5846
#39	.0995		384	768	1152	1536	1920	2303	2687	3071	3455	3839	4222	4607	4991	5374	5758
#38	.1015		376	753	1129	1505	1882	2258	2634	3010	3387	3763	4140	4516	4892	5269	5645
#37	.1040		367	735	1102	1469	1837	2204	2571	2938	3306	3673	4040	4407	4775	5142	5509

continued on next page



Technical Information

Drill Cutting Speeds (continued)

Drill Size			Feet per Minute														
			10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	110'	120'	130'	140'	150'
Fract Wire/Let Dec			Revolutions Per Minute														
#36	.1065		359	717	1076	1435	1794	2152	2511	2870	3228	3587	3945	4304	4663	5021	5380
#35	.1100		347	694	1042	1389	1736	2083	2430	2778	3125	3472	3821	4167	4514	4861	5209
#34	.1110		344	688	1032	1376	1721	2065	2409	2753	3097	3442	3785	4129	4474	4818	5162
#33	.1130		338	676	1014	1352	1690	2028	2366	2704	3042	3380	3718	4056	4394	4732	5070
#32	.1160		329	659	988	1317	1647	1976	2305	2634	2964	3293	3622	3951	4281	4610	4939
#31	.1200		318	637	955	1273	1592	1910	2228	2546	2865	3183	3501	3821	4138	4456	4775
1/8	.1250		306	611	917	1222	1528	1833	2139	2445	2750	3056	3361	3667	3973	4278	4584
#30	.1285		297	595	892	1189	1487	1784	2081	2378	2676	2973	3270	3567	3864	4162	4459
#29	.1360		281	562	843	1124	1405	1685	1966	2247	2528	2809	3090	33701	3651	3932	4213
#28	.1405		272	544	816	1088	1360	1631	1903	2175	2447	2719	2990	3262	3534	3806	4078
#27	.1440		265	531	796	1061	1327	1592	1857	2122	2388	2653	2919	3183	3448	3714	3979
#26	.1470		260	520	779	1039	1299	1559	1819	2078	2338	2598	2858	3118	3378	3638	3898
#25	.1495		256	511	767	1022	1276	1533	1789	2044	2300	2555	2810	3066	3322	3577	3832
#24	.1520		251	503	754	1005	1257	1508	1759	2010	2262	2513	2764	3016	3267	3518	3769
#23	.1540		248	496	744	992	1240	1488	1736	1984	2232	2480	2728	2976	3224	3472	3720
#22	.1570		243	487	730	973	1217	1460	1703	1946	2190	2433	2676	2920	3164	3406	3649
#21	.1590		240	480	721	961	1201	1441	1681	1922	2162	2402	2644	2883	3123	3363	3604
#20	.1610		237	475	712	949	1186	1423	1660	1898	2135	2372	2610	2847	3084	3322	3559
#19	.1660		230	460	690	920	1151	1381	1611	1841	2071	2301	2531	2761	2991	3222	3453
#18	.1695		226	452	678	904	1130	1356	1582	1808	2034	2260	2479	2704	2930	3155	3380
#17	.1730		221	442	662	883	1104	1325	1546	1766	1987	2208	2429	2650	2870	3091	3313
#16	.1770		216	432	647	863	1079	1295	1511	1726	1942	2158	2374	2590	2806	3021	3237
#15	.1800		213	425	638	851	1064	1276	1489	1702	1914	2127	2334	2546	2759	2971	3183
#14	.1820		210	420	630	840	1050	1259	1469	1679	1889	2099	2309	2518	2728	2938	3148
#13	.1850		206	413	620	826	1032	1239	1450	1652	1859	2065	2271	2479	2684	2891	3097
3/16	.1875		204	407	611	815	1019	1222	1426	1630	1833	2037	2241	2445	2648	2852	3056
#12	.1890		202	404	606	808	1010	1213	1415	1617	1819	2021	2223	2425	2627	2829	3032
#11	.1910		200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3001
#10	.1935		197	395	592	790	987	1184	1382	1579	1777	1974	2171	2369	2566	2764	2961
#9	.1960		195	390	585	780	975	1169	1364	1559	1754	1949	2144	2339	2534	2728	2923
#8	.1990		192	384	576	768	960	1151	1343	1535	1727	1919	2111	2303	2495	2687	2879
#7	.2010		190	380	570	760	950	1140	1330	1520	1710	1900	2090	2281	2470	2660	2850
#6	.2040		187	374	562	749	936	1123	1310	1498	1685	1872	2060	2247	2434	2621	2809
#5	.2055		186	372	558	744	930	1115	1301	1487	1673	1859	2045	2230	2416	2602	2788
#4	.2090		183	365	548	731	914	1097	1280	1462	1645	1828	2010	2193	2376	2560	2741
#3	.2130		179	359	538	717	897	1076	1255	1434	1614	1793	1974	2152	2331	2511	2690
#2	.2210		173	345	518	691	864	1037	1210	1382	1555	1728	1901	2074	2247	2420	2593
#1	.2280		168	335	503	670	838	1005	1173	1340	1508	1675	1843	2010	2179	2346	2513
A	.2340		163	326	491	654	818	982	1145	1309	1472	1636	1796	1959	2122	2285	2448
B	.2380		161	321	482	642	803	963	1124	1284	1445	1605	1765	1926	2086	2247	2407
C	.2420		158	316	473	631	789	947	1105	1262	1420	1578	1736	1894	2052	2210	2368
D	.2460		155	311	467	622	778	934	1089	1245	1400	1556	1708	1863	2018	2174	2329
1/4	.2500		153	306	458	611	764	917	1070	1222	1375	1528	1681	1833	1986	2139	2292
E	.2500		153	306	458	611	764	917	1070	1222	1375	1528	1681	1834	1968	2139	2292
F	.2570		149	297	446	594	743	892	1040	1189	1337	1486	1635	1784	1932	2081	2229

continued on next page

Drills

Technical Information

Drill Cutting Speeds (continued)

Drill Size			Feet per Minute														
			10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	110'	120'	130'	140'	150'
Fract	Wire/Let	Dec	Revolutions Per Minute														
	G	.2610	146	293	440	585	732	878	1024	1170	1317	1463	1610	1756	1903	2049	2195
	H	.2660	144	287	430	574	718	862	1005	1149	1292	1436	1580	1723	1867	2010	2154
	I	.2720	140	281	421	562	702	842	983	1123	1264	1404	1545	1685	1826	1966	2106
	J	.2770	138	276	414	552	690	827	965	1103	1241	1379	1517	1655	1793	1930	2068
	K	.2810	136	272	408	544	680	815	951	1087	1223	1359	1495	1631	1767	1903	2039
	L	.2900	132	263	395	527	659	790	922	1054	1185	1317	1449	1581	1712	1844	1976
	M	.2950	129	259	389	518	648	777	907	1036	1166	1295	1424	1554	1683	1813	1942
	N	.3020	126	253	380	506	633	759	886	1012	1139	1265	1391	1518	1644	1771	1897
5/16		.3125	122	244	367	489	611	733	856	978	1100	1222	1345	1467	1589	1711	1833
	O	.3160	121	242	363	484	605	725	846	967	1088	1209	1330	1450	1571	1692	1813
	P	.3230	118	237	355	473	592	710	828	946	1065	1183	1301	1419	1537	1657	1774
	Q	.3320	115	230	345	460	575	690	805	920	1035	1150	1266	1384	1496	1611	1726
	R	.3390	113	225	338	451	564	676	789	902	1014	1127	1239	1355	1465	1577	1690
	S	.3480	110	220	329	439	549	659	769	878	988	1098	1207	1317	1427	1537	1646
	T	.3580	107	213	320	426	533	640	746	853	959	1066	1173	1280	1387	1494	1600
	U	.3680	104	208	311	415	519	623	727	830	934	1038	1142	1246	1349	1453	1557
3/8		.3750	102	204	306	407	509	611	713	815	917	1019	1120	1222	1324	1426	1528
	V	.3770	101	203	304	405	507	608	709	810	912	1013	1114	1219	1317	1418	1520
	W	.3860	99	198	297	396	495	594	693	792	891	989	1088	1188	1286	1385	1484
	X	.3970	96	192	289	385	481	576	672	769	865	962	1058	1155	1251	1347	1443
	Y	.4040	95	189	284	378	473	567	662	756	851	945	1040	1135	1229	1324	1418
	Z	.4130	92	185	277	370	462	555	647	740	832	925	1017	1110	1202	1295	1387
7/16		.4375	87	175	262	349	437	524	611	698	786	873	960	1048	1135	1222	1310
1/2		.5000	76	153	229	306	382	458	535	611	688	764	840	917	993	1070	1146
5/8		.6250	61	122	183	244	306	367	428	489	550	611	672	733	794	856	917
3/4		.7500	51	102	153	203	255	306	357	407	458	509	560	611	662	713	764
7/8		.8750	44	87	131	175	218	262	306	349	393	436	480	524	568	611	655
1		1.0000	38	76	115	153	191	229	267	306	344	382	420	458	497	535	573
1 1/8		1.1250	34	68	102	136	170	204	238	272	306	340	373	407	441	475	509
1 1/4		1.2500	31	61	92	122	153	183	214	244	275	306	336	367	397	428	458
1 3/8		1.3750	28	56	83	111	139	167	194	222	250	278	306	333	361	389	417
1 1/2		1.5000	26	51	76	102	127	153	178	204	229	255	280	306	331	357	382
1 5/8		1.6250	24	47	70	94	117	141	165	188	212	235	259	282	306	329	353
1 3/4		1.7500	22	44	65	87	109	131	153	175	196	218	240	262	284	306	327
1 7/8		1.8750	20	41	61	81	102	122	143	163	183	204	224	244	265	285	306
2		2.0000	19	38	57	76	95	115	134	153	172	191	210	229	248	267	287
2 1/4		2.2500	17	34	51	68	85	102	119	136	153	170	187	204	221	238	255
2 1/2		2.5000	15	31	46	61	76	92	107	122	137	153	168	183	199	214	229
2 3/4		2.7500	14	28	42	56	69	83	97	111	125	139	153	167	181	194	208
3		3.0000	13	25	38	51	64	76	89	102	115	127	140	153	166	178	191

DRILLS

REAMERS

OTHER TOOLS

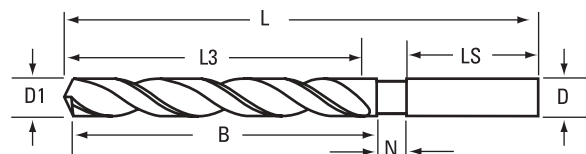
SETS

INDEX

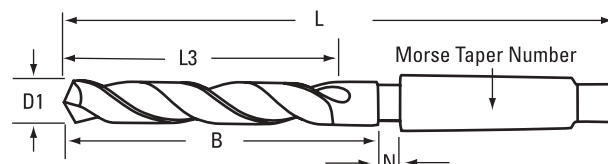


Special Drills

- If you know the specs for your special tool, please send a blueprint and/or provide this information:
 - Material/hardness to be drilled.
 - Shank diameter or size (D in drawing at right). If standard taper shank is ordered, specify as No. 2 American National Standard Taper, No. 3 American National Standard Taper, etc. If taper shank is special, give diameter at small end, length of shank, diameter at large end, taper per foot, and furnish a sample of gauge if possible. If tang is special, give thickness and length.
 - Body length (B in drawing).
 - Diameter of fluted section (D1). For multiple diameter drills, indicated the diameter of the large fluted section.
 - Flute length (L1).
 - Overall length (L). When ordering extra-length drills, specify type of material being drilled, depth of hole, whether drilling in a vertical or horizontal position, and whether feed is intermittent or with only occasional withdrawals.
 - Neck length (L3).
 - Shank length (LS).
- For multiple-diameter drills, provide:
 - The diameter of the small, fluted section.
 - The included angle of cutting shoulder. Note that this is measured as an angle between the two cutting edges (included angle) and not as an angle with the center line.
 - The length of small diameter. Note that this is measured from the outer corner of the point to the bottom or inner corner of the cutting shoulder.
- For special accuracy requirements, give tolerances on the important dimensions.
- For assistance in designing your special tool, provide
 - Workpiece material hardness — Hole diameter
 - Depth of hole — Thru hole or blind hole
 - Shank type — Coolant or non-coolant
 - Step length if necessary — Step angle
- Make sure that suitable allowance has been made for resharpener and for clearance for the spindle above the drill-brushings. If a particular style of flute-construction is desired, it should be specified by reference to the regular drill of the required flute-style.



Straight Shank Drill



Taper Shank Drill

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Drills
Jobber Length

General Purpose
Styles 150, 150D, 150-TN (150T)

- Features/Benefits:**
- General-purpose geometry for drilling in a wide range of operating conditions and materials.
 - Manufactured from premium high-speed steel.
 - 118° point.
 - The most popular drill for general-purpose applications.
 - Metric sizes are manufactured to DIN 338 specifications.
 - Bright, black oxide and titanium nitride (TiN) finishes standard from stock; alternate coatings available as stock modifications.

- Application Information:**
- carbon steel (TiN, black oxide)
 - cast iron (TiN, black oxide)
 - non-ferrous materials (bright)

- Surface Treatment Information:**
- Black oxide surface finish increases wear resistance and adds lubricity, improving chip flow.
 - Titanium nitride (TiN) PVD coating adds lubricity and hardness which enhances chip flow, finish hole quality, and drill life.



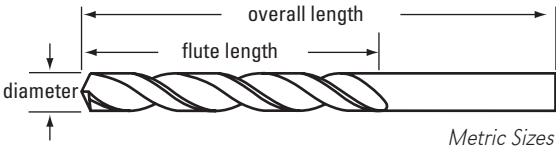
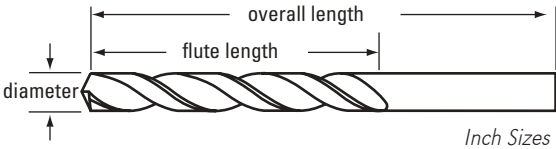
Style 150 Black Oxide



Style 150D Bright Finish



Style 150-TN TiN-Coated



INCH AND METRIC SIZES

Drill Diameter					Overall Length		Flute Length		Style 150	Style 150D	Style 150-TN
Fract	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	mm	Black Oxide	Bright*	TiN
1/64	80		.0135	0.34	.7500	19.05	.1250	3.18	44150	44350	70180
		0.35	.0138		.7480	19.00	.1575	4.00	—	47210	—
	79		.0145	0.37	.7500	19.05	.1250	3.18	44149	44349	70179
			.0156	0.40	.7500	19.05	.1875	4.76	44001	44201	70201
		0.40	.0157		.7874	20.00	.1969	5.00	—	47211	—
	78		.0160	0.41	.8750	22.23	.1875	4.76	44148	44348	70178
		0.45	.0177		.7874	20.00	.1969	5.00	—	47212	—
	77		.0180	0.46	.8750	22.23	.1875	4.76	44147	44347	70177
		0.50	.0197		.8661	22.00	.2362	6.00	—	47213	—
	76		.0200	0.51	.8750	22.23	.1875	4.76	44146	44346	70176
	75		.0210	0.53	1.0000	25.40	.2500	6.35	44145	44345	70175
		0.55	.0217		.9449	24.00	.2756	7.00	—	47214	—
	74		.0225	0.57	1.0000	25.40	.2500	6.35	44144	44344	70174
		0.60	.0236		.9449	24.00	.2756	7.00	—	47215	—
	73		.0240	0.61	1.1250	28.58	.3125	7.94	44143	44343	70173
	72		.0250	0.64	1.1250	28.58	.3125	7.94	44142	44342	70172
		0.65	.0256		1.0236	26.00	.3150	8.00	—	47216	—

*Bright metric sizes are non-stocked standards (minimum order quantity required).

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Jobber Length

General Purpose (continued)
Styles 150, 150D, 150-TN (150T)

INCH AND METRIC SIZES

Drill Diameter				Overall Length		Flute Length		Style 150	Style 150D	Style 150-TN	
Fract	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	Black Oxide	Bright*	TiN	
1/32	71	0.70	.0260	0.66	1.2500	31.75	.3750	9.53	44141	44341	70171
			.0276		1.1024	28.00	.3543	9.00	—	47217	—
	70		.0280	0.71	1.2500	31.75	.3750	9.53	44140	44340	70170
	69	0.75	.0292	0.74	1.3750	34.93	.5000	12.70	44139	44339	70169
			.0295		1.1024	28.00	.3543	9.00	—	47218	—
	68		.0310	0.79	1.3750	34.93	.5000	12.70	44138	44338	70168
			.0312	0.79	1.3750	34.93	.5000	12.70	44002	44202	70202
		0.80	.0315		1.1811	30.00	.3937	10.00	—	47219	—
	67		.0320	0.81	1.3750	34.93	.5000	12.70	44137	44337	70167
	66	0.85	.0330	0.84	1.3750	34.93	.5000	12.70	44136	44336	70166
	.0335			1.1811	30.00	.3937	10.00	—	47220	—	
	65		.0350	0.89	1.5000	38.10	.6250	15.88	44135	44335	70165
		0.90	.0354		1.2598	32.00	.4331	11.00	—	47221	—
	64		.0360	0.91	1.5000	38.10	.6250	15.88	44134	44334	70164
	63	0.95	.0370	0.94	1.5000	38.10	.6250	15.88	44133	44333	70163
			.0374		1.2598	32.00	.4331	11.00	—	47222	—
	62		.0380	0.97	1.5000	38.10	.6250	15.88	44132	44332	70162
	61	1.00	.0390	0.99	1.6250	41.28	.6875	17.46	44131	44331	70161
			.0394		1.3386	34.00	.4724	12.00	47223	45223	70331
	60		.0400	1.02	1.6250	41.28	.6875	17.46	44130	44330	70160
	59	1.05	.0410	1.04	1.6250	41.28	.6875	17.46	44129	44329	70159
			.0413		1.3386	34.00	.4724	12.00	47224	45224	—
	58		.0420	1.07	1.6250	41.28	.6875	17.46	44128	44328	70158
	57	1.10	.0430	1.09	1.7500	44.45	.7500	19.05	44127	44327	70157
			.0433		1.4173	36.00	.5512	14.00	47225	45225	—
		1.15	.0453		1.4173	36.00	.5512	14.00	47226	45226	—
3/64	56	1.18	.0465	1.18	1.7500	44.45	.7500	19.05	44126	44326	70156
			.0469	1.19	1.7500	44.45	.7500	19.05	44003	44203	70203
		1.20	.0472		1.4961	38.00	.6299	16.00	47227	45227	—
		1.25	.0492		1.4961	38.00	.6299	16.00	47228	45228	70344
		1.30	.0512		1.4961	38.00	.6299	16.00	47229	45229	70345
1/16	55	1.32	.0520	1.32	1.8750	47.63	.8750	22.23	44125	44325	70155
			1.35	.0531		1.5748	40.00	.7087	18.00	47230	45230
	54	1.40	.0550	1.40	1.8750	47.63	.8750	22.23	44124	44324	70154
			1.40	.0551		1.5748	40.00	.7087	18.00	47231	45231
		1.45	.0571		1.5748	40.00	.7087	18.00	47232	45232	70346
1/8	53	1.51	.0591		1.5748	40.00	.7087	18.00	47233	45233	70347
			.0595	1.51	1.8750	47.63	.8750	22.23	44123	44323	70153
		1.55	.0610		1.6929	43.00	.7874	20.00	47234	45234	70348
	52	1.59	.0625	1.59	1.8750	47.63	.8750	22.23	44004	44204	70204
				.0630		1.6929	43.00	.7874	20.00	47235	45235
	52	1.61	.0635	1.61	1.8750	47.63	.8750	22.23	44122	44322	70152
	1.65		.0650		1.6929	43.00	.7874	20.00	47236	45236	70349
		1.70	.0669		1.6929	43.00	.7874	20.00	47237	45237	—
1/4	51	1.70	.0670	1.70	2.0000	50.80	1.0000	25.40	44121	44321	70151
			1.75	.0689		1.8110	46.00	.8661	22.00	47238	45238
	50	1.78	.0700	1.78	2.0000	50.80	1.0000	25.40	44120	44320	70150
			1.80	.0709		1.8110	46.00	.8661	22.00	47239	45239
			1.85	.0728		1.8110	46.00	.8661	22.00	47240	45240
	49		.0730	1.85	2.0000	50.80	1.0000	25.40	44119	44319	70149

*Bright metric sizes are non-stocked standards
(minimum order quantity required).

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Drills

Jobber Length

General Purpose (continued) Styles 150, 150D, 150-TN (150T)

INCH AND METRIC SIZES

Fract	Drill Diameter			Overall Length		Flute Length		Style 150	Style 150D	Style 150-TN		
	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	mm	Black Oxide	Bright*	TiN	
5/64	48	1.90	.0748		1.8110	46.00	.8661	22.00	47241	45241	—	
			.0760	1.93	2.0000	50.80	1.0000	25.40	44118	44318	70148	
		1.95	.0768		1.9291	49.00	.9449	24.00	47242	45242	—	
			.0781	1.98	2.0000	50.80	1.0000	25.40	44005	44205	70205	
	47		.0785	1.99	2.0000	50.80	1.0000	25.40	44117	44317	70147	
		2.00	.0787		1.9291	49.00	.9449	24.00	47243	45243	70332	
		2.05	.0807		1.9291	49.00	.9449	24.00	47244	45244	70365	
	46		.0810	2.06	2.1250	53.98	1.1250	28.58	44116	44316	70146	
3/32	45		.0820	2.08	2.1250	53.98	1.1250	28.58	44115	44315	70145	
		2.10	.0827		1.9291	49.00	.9449	24.00	47245	45245	70366	
		2.15	.0846		2.0866	53.00	1.0630	27.00	47246	45246	—	
	44		.0860	2.18	2.1250	53.98	1.1250	28.58	44114	44314	70144	
		2.20	.0866		2.0866	53.00	1.0630	27.00	47247	45247	70367	
		2.25	.0886		2.0866	53.00	1.0630	27.00	47248	45248	—	
	43		.0890	2.26	2.2500	57.15	1.2500	31.75	44113	44313	70143	
		2.30	.0906		2.0866	53.00	1.0630	27.00	47249	45249	70368	
1/8		2.35	.0925		2.0866	53.00	1.0630	27.00	47250	45250	—	
		42		.0935	2.37	2.2500	57.15	1.2500	31.75	44112	44312	70142
			.0938	2.38	2.2500	57.15	1.2500	31.75	44006	44206	70206	
		2.40	.0945		2.2441	57.00	1.1811	30.00	47251	45251	—	
	41		.0960	2.44	2.3750	60.33	1.3750	34.93	44111	44311	70141	
		2.45	.0965		2.2441	57.00	1.1811	30.00	47252	45252	—	
	40		.0980	2.49	2.3750	60.33	1.3750	34.93	44110	44310	70140	
		2.50	.0984		2.2441	57.00	1.1811	30.00	47253	45253	70369	
7/64	39		.0995	2.53	2.3750	60.33	1.3750	34.93	44109	44309	70139	
	38		.1015	2.58	2.5000	63.50	1.4375	36.51	44108	44308	70138	
	37	2.60	.1024		2.2441	57.00	1.1811	30.00	47254	45254	—	
			.1040	2.64	2.5000	63.50	1.4375	36.51	44107	44307	70137	
		2.70	.1063		2.4016	61.00	1.2992	33.00	47255	45255	—	
		36		.1065	2.71	2.5000	63.50	1.4375	36.51	44106	44306	70136
			.1094	2.78	2.6250	66.68	1.5000	38.10	44007	44207	70207	
		35		.1100	2.79	2.6250	66.68	1.5000	38.10	44105	44305	70135
1/4		2.80	.1102		2.4016	61.00	1.2992	33.00	47257	45257	70370	
		34		.1110	2.82	2.6250	66.68	1.5000	38.10	44104	44304	70134
	33		.1130	2.87	2.6250	66.68	1.5000	38.10	44103	44303	70133	
		2.90	.1142		2.4016	61.00	1.2992	33.00	47258	45258	70371	
	32		.1160	2.95	2.7500	69.85	1.6250	41.28	44102	44302	70132	
		3.00	.1181		2.4016	61.00	1.2992	33.00	47259	45259	70333	
		31		.1200	3.05	2.7500	69.85	1.6250	41.28	44101	44301	70131
			3.10	.1220		2.5591	65.00	1.4173	36.00	47260	45260	70372
9/64			.1250	3.18	2.7500	69.85	1.6250	41.28	44008	44208	70208	
		3.20	.1260		2.5591	65.00	1.4173	36.00	47261	45261	70373	
	30		.1285	3.26	2.7500	69.85	1.6250	41.28	44100	44300	70130	
		3.30	.1299		2.5591	65.00	1.4173	36.00	47263	45263	70374	
		3.40	.1339		2.7559	70.00	1.5354	39.00	47264	45264	70375	
		29		.1360	3.45	2.8750	73.03	1.7500	44.45	44099	44299	70129
		3.50	.1378		2.7559	70.00	1.5354	39.00	47265	45265	70376	
		28		.1405	3.57	2.8750	73.03	1.7500	44.45	44098	44298	70128
		.1406	3.57	2.8750	73.03	1.7500	44.45	44009	44209	70209		
	3.60	.1417		2.7559	70.00	1.5354	39.00	47266	45266	—		

*Bright metric sizes are non-stocked standards
(minimum order quantity required).

continued on next page



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Jobber Length

General Purpose (continued) Styles 150, 150D, 150-TN (150T)

INCH AND METRIC SIZES

Fract	Drill Diameter			Overall Length		Flute Length		Style 150	Style 150D	Style 150-TN
	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	Black Oxide	Bright*	TiN
	27		.1440	3.66	3.0000	76.20	1.8750	44097	44297	70127
		3.70	.1457		2.7559	70.00	1.5354	47267	45267	70377
	26		.1470	3.73	3.0000	76.20	1.8750	44096	44296	70126
			.1495	3.80	3.0000	76.20	1.8750	44095	44295	70125
	25		.1496		2.9528	75.00	1.6929	47269	45269	—
		3.80	.1520	3.86	3.1250	79.38	2.0000	44094	44294	70124
	24		.1535		2.9528	75.00	1.6929	47270	45270	—
		3.90	.1540	3.91	3.1250	79.38	2.0000	44093	44293	70123
5/32			.1562	3.97	3.1250	79.38	2.0000	44010	44210	70210
			.1570	3.99	3.1250	79.38	2.0000	44092	44292	70122
	22		.1575		2.9528	75.00	1.6929	47271	45271	70334
		4.00	.1590	4.04	3.2500	82.55	2.1250	44091	44291	70121
	21		.1610	4.09	3.2500	82.55	2.1250	44090	44290	70120
			.1614		2.9528	75.00	1.6929	47272	45272	—
	20		.1654		2.9528	75.00	1.6929	47273	45273	70378
		4.20	.1660	4.22	3.2500	82.55	2.1250	44089	44289	70119
	19		.1693		3.1496	80.00	1.8504	47275	45275	—
		4.30	.1695	4.31	3.2500	82.55	2.1250	44088	44288	70118
11/64			.1719	4.37	3.2500	82.55	2.1250	44011	44211	70211
			.1730	4.39	3.3750	85.73	2.1875	44087	44287	70117
	18		.1732		3.1496	80.00	1.8504	47276	45276	—
		4.40	.1770	4.50	3.3750	85.73	2.1875	44086	44286	70116
	17		.1772		3.1496	80.00	1.8504	47277	45277	70379
		4.50	.1800	4.57	3.3750	85.73	2.1875	44085	44285	70115
	16		.1811		3.1496	80.00	1.8504	47278	45278	—
		4.60	.1820	4.62	3.3750	85.73	2.1875	44084	44284	70114
	15		.1850	4.70	3.5000	88.90	2.3125	44083	44283	70113
			.1850		3.1496	80.00	1.8504	47279	45279	—
3/16			.1875	4.76	3.5000	88.90	2.3125	44012	44212	70212
			.1890	4.80	3.5000	88.90	2.3125	44082	44282	70112
	14		.1890		3.3858	86.00	2.0472	47281	45281	—
		4.80	.1910	4.85	3.5000	88.90	2.3125	44081	44281	70111
	13		.1929		3.3858	86.00	2.0472	47282	45282	70380
		4.90	.1935	4.91	3.6250	92.08	2.4375	44080	44280	70110
	12		.1960	4.98	3.6250	92.08	2.4375	44079	44279	70109
			.1969		3.3858	86.00	2.0472	47283	45283	70335
	11		.1990	5.05	3.6250	92.08	2.4375	44078	44278	70108
		5.00	.2008		3.3858	86.00	2.0472	47284	45284	—
13/64			.2010	5.11	3.6250	92.08	2.4375	44077	44277	70107
			.2031	5.16	3.6250	92.08	2.4375	44013	44213	70213
	10		.2040	5.18	3.7500	95.25	2.5000	44076	44276	70106
			.2047		3.3858	86.00	2.0472	47285	45285	—
	9		.2055	5.22	3.7500	95.25	2.5000	44075	44275	70105
			.2087		3.3858	86.00	2.0472	47287	45287	—
	8		.2090	5.31	3.7500	95.25	2.5000	44074	44274	70104
			.2126		3.6614	93.00	2.2441	47288	45288	—
	7		.2130	5.41	3.7500	95.25	2.5000	44073	44273	70103
			.2165		3.6614	93.00	2.2441	47289	45289	70381
7/32			.2188	5.56	3.7500	95.25	2.5000	44014	44214	70214
			.2205		3.6614	93.00	2.2441	47290	45290	—

*Bright metric sizes are non-stocked standards
(minimum order quantity required).

continued on next page

Drills

Jobber Length

General Purpose (continued) Styles 150, 150D, 150-TN (150T)

INCH AND METRIC SIZES

Fract	Drill Diameter			Overall Length		Flute Length		Style 150	Style 150D	Style 150-TN	
	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	mm	Black Oxide	Bright*	TiN
	2		.2210	5.61	3.8750	98.43	2.6250	66.68	44072	44272	70102
		5.70	.2244		3.6614	93.00	2.2441	57.00	47291	45291	70382
	1		.2280	5.79	3.8750	98.43	2.6250	66.68	44071	44271	70101
		5.80	.2283		3.6614	93.00	2.2441	57.00	47293	45293	—
		5.90	.2323		3.6614	93.00	2.2441	57.00	47294	45294	—
	A		.2340	5.94	3.8750	98.43	2.6250	66.68	44171	44371	70301
	15/64		.2344	5.95	3.8750	98.43	2.6250	66.68	44015	44215	70215
		6.00	.2362		3.6614	93.00	2.2441	57.00	47295	45295	70336
	B		.2380	6.05	4.0000	101.60	2.7500	69.85	44172	44372	70302
		6.10	.2402		3.9764	101.00	2.4803	63.00	47296	45296	—
	C		.2420	6.15	4.0000	101.60	2.7500	69.85	44173	44373	70303
		6.20	.2441		3.9764	101.00	2.4803	63.00	47297	45297	—
	D		.2460	6.25	4.0000	101.60	2.7500	69.85	44174	44374	70304
		6.30	.2480		3.9764	101.00	2.4803	63.00	47299	45299	—
	1/4	E	.2500	6.35	4.0000	101.60	2.7500	69.85	44016	44216	70216
		6.40	.2520		3.9764	101.00	2.4803	63.00	47300	45300	70383
		6.50	.2559		3.9764	101.00	2.4803	63.00	47301	45301	70384
	F		.2570	6.53	4.1250	104.78	2.8750	73.03	44176	44376	70306
		6.60	.2598		3.9764	101.00	2.4803	63.00	47302	45302	—
	G		.2610	6.63	4.1250	104.78	2.8750	73.03	44177	44377	70307
		6.70	.2638		3.9764	101.00	2.4803	63.00	47303	45303	70385
	17/64		.2656	6.75	4.1250	104.78	2.8750	73.03	44017	44217	70217
	H		.2660	6.76	4.1250	104.78	2.8750	73.03	44178	44378	70308
		6.80	.2677		4.2913	109.00	2.7165	69.00	47305	45305	70386
		6.90	.2717		4.2913	109.00	2.7165	69.00	47306	45306	—
	I		.2720	6.91	4.1250	104.78	2.8750	73.03	44179	44379	70309
		7.00	.2756		4.2913	109.00	2.7165	69.00	47307	45307	70337
	J		.2770	7.04	4.1250	104.78	2.8750	73.03	44180	44380	70310
		7.10	.2795		4.2913	109.00	2.7165	69.00	47308	45308	—
	K		.2810	7.14	4.2500	107.95	2.9375	74.61	44181	44381	70311
	9/32		.2812	7.14	4.2500	107.95	2.9375	74.61	44018	44218	70218
		7.20	.2835		4.2913	109.00	2.7165	69.00	47309	45309	70387
		7.30	.2874		4.2913	109.00	2.7165	69.00	47311	45311	—
	L		.2900	7.37	4.2500	107.95	2.9375	74.61	44182	44382	70312
		7.40	.2913		4.2913	109.00	2.7165	69.00	47312	45312	—
	M		.2950	7.49	4.3750	111.13	3.0625	77.79	44183	44383	70313
		7.50	.2953		4.2913	109.00	2.7165	69.00	47313	45313	70388
	19/64		.2969	7.54	4.3750	111.13	3.0625	77.79	44019	44219	70219
		7.60	.2992		4.6063	117.00	2.9528	75.00	47314	45314	—
	N		.3020	7.67	4.3750	111.13	3.0625	77.79	44184	44384	70314
		7.70	.3031		4.6063	117.00	2.9528	75.00	47315	45315	—
		7.80	.3071		4.6063	117.00	2.9528	75.00	47317	45317	—
		7.90	.3110		4.6063	117.00	2.9528	75.00	47318	45318	—
	5/16		.3125	7.94	4.5000	114.30	3.1875	80.96	44020	44220	70220
		8.00	.3150		4.6063	117.00	2.9528	75.00	47319	45319	70338
	O		.3160	8.03	4.5000	114.30	3.1875	80.96	44185	44385	70315
		8.10	.3189		4.6063	117.00	2.9528	75.00	47320	45320	—
		8.20	.3228		4.6063	117.00	2.9528	75.00	47321	45321	—
	P		.3230	8.20	4.6250	117.48	3.3125	84.14	44186	44386	70316
		8.30	.3268		4.6063	117.00	2.9528	75.00	47323	45323	—

*Bright metric sizes are non-stocked standards
(minimum order quantity required).

continued on next page



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Jobber Length

General Purpose (continued) Styles 150, 150D, 150-TN (150T)

INCH AND METRIC SIZES

Drill Diameter				Overall Length		Flute Length		Style 150	Style 150D	Style 150-TN	
Fract	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	Black Oxide	Bright*	TiN	
21/64			.3281	8.33	4.6250	117.48	3.3125	84.14	44021	44221	70221
		8.40	.3307		4.6063	117.00	2.9528	75.00	47324	45324	—
	Q		.3320	8.43	4.7500	120.65	3.4375	87.31	44187	44387	70317
		8.50	.3346		4.6063	117.00	2.9528	75.00	47325	45325	70389
		8.60	.3386		4.9213	125.00	3.1890	81.00	47326	45326	—
	R		.3390	8.61	4.7500	120.65	3.4375	87.31	44188	44388	70318
		8.70	.3425		4.9213	125.00	3.1890	81.00	47327	45327	70390
11/32			.3438	8.73	4.7500	120.65	3.4375	87.31	44022	44222	70222
		8.80	.3465		4.9213	125.00	3.1890	81.00	47329	45329	—
	S		.3480	8.84	4.8750	123.83	3.5000	88.90	44189	44389	70319
		8.90	.3504		4.9213	125.00	3.1890	81.00	47330	45330	—
		9.00	.3543		4.9213	125.00	3.1890	81.00	47331	45331	70339
	T		.3580	9.09	4.8750	123.83	3.5000	88.90	44190	44390	70320
		9.10	.3583		4.9213	125.00	3.1890	81.00	47332	45332	—
23/64			.3594	9.13	4.8750	123.83	3.5000	88.90	44023	44223	70223
		9.20	.3622		4.9213	125.00	3.1890	81.00	47333	45333	—
		9.30	.3661		4.9213	125.00	3.1890	81.00	47335	45335	—
	U		.3680	9.35	5.0000	127.00	3.6250	92.08	44191	44391	70321
		9.40	.3701		4.9213	125.00	3.1890	81.00	47336	45336	—
		9.50	.3740		4.9213	125.00	3.1890	81.00	47337	45337	70391
3/8			.3750	9.53	5.0000	127.00	3.6250	92.08	44024	44224	70224
	V		.3770	9.58	5.0000	127.00	3.6250	92.08	44192	44392	70322
		9.60	.3780		5.2362	133.00	3.4252	87.00	47338	45338	—
		9.70	.3819		5.2362	133.00	3.4252	87.00	47339	45339	—
		9.80	.3858		5.2362	133.00	3.4252	87.00	47341	45341	—
	W		.3860	9.80	5.1250	130.18	3.7500	95.25	44193	44393	70323
		9.90	.3898		5.2362	133.00	3.4252	87.00	47342	45342	—
25/64			.3906	9.92	5.1250	130.18	3.7500	95.25	44025	44225	70225
		10.00	.3937		5.2362	133.00	3.4252	87.00	47343	45343	70340
	X		.3970	10.08	5.1250	130.18	3.7500	95.25	44194	44394	70324
		10.20	.4016		5.2362	133.00	3.4252	87.00	47354	45354	70392
	Y		.4040	10.26	5.2500	133.35	3.8750	98.43	44195	44395	70325
13/32			.4062	10.32	5.2500	133.35	3.8750	98.43	44026	44226	70226
	Z		.4130	10.49	5.2500	133.35	3.8750	98.43	44196	44396	70326
		10.50	.4134		5.2362	133.00	3.4252	87.00	47344	45344	70393
27/64			.4219	10.72	5.3750	136.53	3.9375	100.01	44027	44227	70227
		10.80	.4252		5.5905	142.00	3.7008	94.00	47356	45356	—
		11.00	.4331		5.5905	142.00	3.7008	94.00	47345	45345	70341
7/16			.4375	11.11	5.5000	139.70	4.0625	103.19	44028	44228	70228
		11.20	.4409		5.5905	142.00	3.7008	94.00	47357	45357	70394
		11.50	.4528		5.5905	142.00	3.7008	94.00	47346	45346	70395
29/64			.4531	11.51	5.6250	142.88	4.1875	106.36	44029	44229	70229
		11.80	.4646		5.5905	142.00	3.7008	94.00	47358	45358	—
15/32			.4688	11.91	5.7500	146.05	4.3125	109.54	44030	44230	70230
		12.00	.4724		5.9449	151.00	3.9764	101.00	47347	45347	70342
		12.20	.4803		5.9449	151.00	3.9764	101.00	47359	45359	70396
31/64			.4844	12.30	5.8750	149.23	4.3750	111.13	44031	44231	70231
		12.50	.4921		5.9449	151.00	3.9764	101.00	47348	45348	70397
1/2			.5000	12.70	6.0000	152.40	4.5000	114.30	44032	44232	70232
		12.80	.5039		5.9449	151.00	3.9764	101.00	47360	45360	—

*Bright metric sizes are non-stocked standards
(minimum order quantity required).

continued on next page

Drills

Jobber Length

General Purpose (continued) Styles 150, 150D, 150-TN (150T)

INCH AND METRIC SIZES

Fract	Drill Diameter				Overall Length		Flute Length		Style 150	Style 150D	Style 150-TN
	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	mm	Black Oxide	Bright*	TiN
33/64		13.00	.5118		5.9449	151.00	3.9764	101.00	47349	45349	70343
			.5156	13.10	6.6250	168.28	4.8125	122.24	44033	44233	70233
		13.20	.5197		5.9449	151.00	3.9764	101.00	47361	45361	—
17/32			.5312	13.49	6.6250	168.28	4.8125	122.24	44034	44234	70234
			.5315		6.2992	160.00	4.2520	108.00	47363	45363	—
			.5433		6.2992	160.00	4.2520	108.00	47364	45364	—
35/64			.5469	13.89	6.6250	168.28	4.8125	122.24	44035	44235	70235
			.5512		6.2992	160.00	4.2520	108.00	47362	45362	—
			.5610		6.2992	160.00	4.2520	108.00	47365	45365	—
9/16			.5625	14.29	6.6250	168.28	4.8125	122.24	44036	44236	70236
			.5709		6.6535	169.00	4.4882	114.00	47366	45366	—
			.5781	14.68	6.6250	168.28	4.8125	122.24	44037	44237	70237
37/64			.5807		6.6535	169.00	4.4882	114.00	47367	45367	—
			.5906		6.6535	169.00	4.4882	114.00	47369	45369	—
			.5938	15.08	7.1250	180.98	5.1875	131.76	44038	44238	70238
19/32			.6004		6.6535	169.00	4.4882	114.00	47370	45370	—
			.6094	15.48	7.1250	180.98	5.1875	131.76	44039	44239	70239
			.6102		7.0079	178.00	4.7244	120.00	47368	45368	—
5/8			.6201		7.0079	178.00	4.7244	120.00	47371	45371	—
			.6250	15.88	7.1250	180.98	5.1875	131.76	44040	44240	70240
			.6299		7.0079	178.00	4.7244	120.00	47372	45372	—
41/64			.6398		7.0079	178.00	4.7244	120.00	47373	45373	—
			.6406	16.27	7.1250	180.98	5.1875	131.76	44041	44241	70241
			.6496		7.2441	184.00	4.9213	125.00	47374	45374	—
21/32			.6562	16.67	7.1250	180.98	5.1875	131.76	44042	44242	70242
			.6594		7.2441	184.00	4.9213	125.00	47376	45376	—
			.6693		7.2441	184.00	4.9213	125.00	47377	45377	—
43/64			.6719	17.07	7.1250	180.98	5.1875	131.76	44043	44243	70243
			.6791		7.2441	184.00	4.9213	125.00	47378	45378	—
			.6875	17.46	7.6250	180.98	5.6250	131.76	44044	44244	70244
11/16			.6890		7.5197	191.00	5.1181	130.00	47375	45375	—

*Bright metric sizes are non-stocked standards
(minimum order quantity required).

sets listed on next page



Customer Service: 800.348.2885

Technical Support: 800.892.4281

General Purpose (continued) Styles 150, 150D, 150-TN (150T)

INCH AND METRIC SETS

Sets in Metal Index Cases

Number of Tools	Size Range	Style 150 Black Oxide	Style 150D Bright	Style 150-TN TiN
13	1/16 - 1/4 X 1/64	57711	49911	—
15	1/16 - 1/2 X 1/32	57713	49913	69862
21	1/16 - 3/8 X 1/64	57712	49912	—
29	1/16 - 1/2 X 1/64	57714	49914	69861
26	Letters A - Z	57718	49918	69883
60	#1 - #60 wire gauge	57716	49916	69863
80	#1 - #80 wire gauge	57717	—	—
20	#61 - #80 wire gauge	57720	57715	69897
115	1/16 - 1/2 X 1/64, A - Z, #1 - #60	57728	49928	—
114	1/16 - 1/2 X 1/64, #1 - #60, 1mm - 13mm X 0.5mm	57726	—	—
11	1mm - 6mm X 0.5mm	57723	—	—
13	1mm - 7mm X 0.5mm	57729	—	—
25	1mm - 13mm X 0.5mm	57725	—	—
118	1mm - 13mm X 0.1mm	57727	—	—



Set 57713



Set 57714



Set 69861

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

DRILL REGRINDING

Good tool management is knowing how to recognize drill wear in preparation for resharpener. Signs of wear start as soon as the drill starts to cut. All tool regrinding should be done by machine.

1. Removal of Worn Section: Wear on the outer corners will appear as a slight rounding. You will see wear on the cutting lips and on the chisel-edge. If the drill is used at this point, it will only rub in the hole rather than cut.

With this condition of wear on the point, the horsepower and thrust increases, which in turn increases wear at a faster rate. Wear will appear along the margins. This could result in loss of size. To sharpen a tool in this condition, you will have to remove all of this worn section. Assuming that you are cutting off 1/4" to 1/2" of worn material with an abrasive cutoff wheel, care is needed not to burn the high-speed steel. If this happens you will lower the hardness by about 5Rc points, softening the steel

and resulting in a dramatic loss of performance.

2. Web Thinning: Most standard drills have webs, which increase in diameter all the way to the shank end. As the drill is resharpener, the web will get thicker, and web thinning is necessary. Web thinning is done on a tool and cutter grinder or CNC for accurate control. The same amount of stock should be removed from both sides to ensure web centrality. If web centrality is incorrect you can cause rapid wear failure and an out-of-round hole. Free cutting wheels should be used to not burn the cutting edges. The contour of the flute should be blended in with the original web shape to not hinder chip flow.

3. Drill Pointing: This is the most critical operation in drill re-sharpener. The two cutting lips of a drill should be accurately ground to equal angles and equal length. If your drill point has lips of equal length but at unequal angles, or vice versa, one

cutting edge will do most of the cutting and will cause an oversize condition, excessive wear, and short tool life.

4. Lip Relief Angles: The lip relief angle is the angle measured across the margin at the periphery of the drill. This angle has a bearing on the amount of clearance to obtain the correct chisel edge angle. When grinding the lip relief angle, both sides should be on the same plane. In general, the diameter of the tool dictates what that angle should be. Fragile, small diameter tools require larger clearance angles to help them penetrate. For instance, a #80-#61 would have an angle of 24°, a 3/4" tool would be about 8° to 10°. Material hardness also plays here. If drilling harder materials, reduce angles by 2° and increase for softer materials by 2°.

For more information, see the USCTI brochure, "Tolerances for Twist Drills and Reamers."

TECH TIP



Chicago-Latrobe®

Drills

Jobber Length

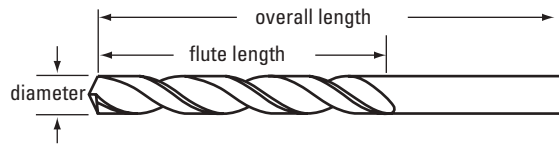
Fast Spiral Style 150B

Features/Benefits:

- Fast helix and wide flutes provide excellent chip ejection by lifting chips up and out of the workpiece more efficiently.
- Manufactured from premium high-speed steel.
- 118° point.
- Bright, finish standard from stock; alternate coatings available as stock modifications.

Application Information:

- carbon steel
- mild steel
- Recommended for drilling low-tensile materials such as aluminum, magnesium, copper, wood, slate, and some thermoplastics.



Style 150B Bright Finish

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 150B
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Bright
	80	.0135	0.34	.7500	19.05	.1250	3.18	46150
	79	.0145	0.37	.7500	19.05	.1250	3.18	46149
	78	.0160	0.41	.8750	22.23	.1875	4.76	46148
	77	.0180	0.46	.8750	22.23	.1875	4.76	46147
	76	.0200	0.51	.8750	22.23	.1875	4.76	46146
	75	.0210	0.53	1.0000	25.40	.2500	6.35	46145
	74	.0225	0.57	1.0000	25.40	.2500	6.35	46144
	73	.0240	0.61	1.1250	28.58	.3125	7.94	46143
	72	.0250	0.64	1.1250	28.58	.3125	7.94	46142
	71	.0260	0.66	1.2500	31.75	.3750	9.53	46141
	70	.0280	0.71	1.2500	31.75	.3750	9.53	46140
	69	.0292	0.74	1.3750	34.93	.5000	12.70	46139
	68	.0310	0.79	1.3750	34.93	.5000	12.70	46138
1/32		.0312	0.79	1.3750	34.93	.5000	12.70	46002
	67	.0320	0.81	1.3750	34.93	.5000	12.70	46137
	66	.0330	0.84	1.3750	34.93	.5000	12.70	46136
	65	.0350	0.89	1.5000	38.10	.6250	15.88	46135
	64	.0360	0.91	1.5000	38.10	.6250	15.88	46134
	63	.0370	0.94	1.5000	38.10	.6250	15.88	46133
	62	.0380	0.97	1.5000	38.10	.6250	15.88	46132
	61	.0390	0.99	1.6250	41.28	.6875	17.46	46131
	60	.0400	1.02	1.6250	41.28	.6875	17.46	46130
	59	.0410	1.04	1.6250	41.28	.6875	17.46	46129
	58	.0420	1.07	1.6250	41.28	.6875	17.46	46128
	57	.0430	1.09	1.7500	44.45	.7500	19.05	46127
	56	.0465	1.18	1.7500	44.45	.7500	19.05	46126
3/64		.0469	1.19	1.7500	44.45	.7500	19.05	46003
	55	.0520	1.32	1.8750	47.63	.8750	22.23	46125
	54	.0550	1.40	1.8750	47.63	.8750	22.23	46124
	53	.0595	1.51	1.8750	47.63	.8750	22.23	46123

continued on next page

Jobber Length

Fast Spiral (continued)
Style 150B

INCH SIZES

Drill Diameter			Overall Length		Flute Length		Style 150B	
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Bright
1/16		.0625	1.59	1.8750	47.63	.8750	22.23	46004
	52	.0635	1.61	1.8750	47.63	.8750	22.23	46122
	51	.0670	1.70	2.0000	50.80	1.0000	25.40	46121
	50	.0700	1.78	2.0000	50.80	1.0000	25.40	46120
	49	.0730	1.85	2.0000	50.80	1.0000	25.40	46119
	48	.0760	1.93	2.0000	50.80	1.0000	25.40	46118
5/64		.0781	1.98	2.0000	50.80	1.0000	25.40	46005
	47	.0785	1.99	2.0000	50.80	1.0000	25.40	46117
	46	.0810	2.06	2.1250	53.98	1.1250	28.58	46116
	45	.0820	2.08	2.1250	53.98	1.1250	28.58	46115
	44	.0860	2.18	2.1250	53.98	1.1250	28.58	46114
	43	.0890	2.26	2.2500	57.15	1.2500	31.75	46113
	42	.0935	2.37	2.2500	57.15	1.2500	31.75	46112
3/32		.0938	2.38	2.2500	57.15	1.2500	31.75	46006
	41	.0960	2.44	2.3750	60.33	1.3750	34.93	46111
	40	.0980	2.49	2.3750	60.33	1.3750	34.93	46110
	39	.0995	2.53	2.3750	60.33	1.3750	34.93	46109
	38	.1015	2.58	2.5000	63.50	1.4375	36.51	46108
	37	.1040	2.64	2.5000	63.50	1.4375	36.51	46107
	36	.1065	2.71	2.5000	63.50	1.4375	36.51	46106
7/64		.1094	2.78	2.6250	66.68	1.5000	38.10	46007
	35	.1100	2.79	2.6250	66.68	1.5000	38.10	46105
	34	.1110	2.82	2.6250	66.68	1.5000	38.10	46104
	33	.1130	2.87	2.6250	66.68	1.5000	38.10	46103
	32	.1160	2.95	2.7500	69.85	1.6250	41.28	46102
	31	.1200	3.05	2.7500	69.85	1.6250	41.28	46101
1/8		.1250	3.18	2.7500	69.85	1.6250	41.28	46008
	30	.1285	3.26	2.7500	69.85	1.6250	41.28	46100
	29	.1360	3.45	2.8750	73.03	1.7500	44.45	46099
	28	.1405	3.57	2.8750	73.03	1.7500	44.45	46098
9/64		.1406	3.57	2.8750	73.03	1.7500	44.45	46009
	27	.1440	3.66	3.0000	76.20	1.8750	47.63	46097
	26	.1470	3.73	3.0000	76.20	1.8750	47.63	46096
	25	.1495	3.80	3.0000	76.20	1.8750	47.63	46095
	24	.1520	3.86	3.1250	79.38	2.0000	50.80	46094
	23	.1540	3.91	3.1250	79.38	2.0000	50.80	46093
5/32		.1562	3.97	3.1250	79.38	2.0000	50.80	46010
	22	.1570	3.99	3.1250	79.38	2.0000	50.80	46092
	21	.1590	4.04	3.2500	82.55	2.1250	53.98	46091
	20	.1610	4.09	3.2500	82.55	2.1250	53.98	46090
	19	.1660	4.22	3.2500	82.55	2.1250	53.98	46089
	18	.1695	4.31	3.2500	82.55	2.1250	53.98	46088
11/64		.1719	4.37	3.2500	82.55	2.1250	53.98	46011
	17	.1730	4.39	3.3750	85.73	2.1875	55.56	46087
	16	.1770	4.50	3.3750	85.73	2.1875	55.56	46086
	15	.1800	4.57	3.3750	85.73	2.1875	55.56	46085
	14	.1820	4.62	3.3750	85.73	2.1875	55.56	46084
	13	.1850	4.70	3.5000	88.90	2.3125	58.74	46083
3/16		.1875	4.76	3.5000	88.90	2.3125	58.74	46012
	12	.1890	4.80	3.5000	88.90	2.3125	58.74	46082
	11	.1910	4.85	3.5000	88.90	2.3125	58.74	46081

continued on next page

Drills

Jobber Length

Fast Spiral (continued) Style 150B

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 150B
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Bright
	10	.1935	4.91	3.6250	92.08	2.4375	61.91	46080
	9	.1960	4.98	3.6250	92.08	2.4375	61.91	46079
	8	.1990	5.05	3.6250	92.08	2.4375	61.91	46078
	7	.2010	5.11	3.6250	92.08	2.4375	61.91	46077
13/64		.2031	5.16	3.6250	92.08	2.4375	61.91	46013
	6	.2040	5.18	3.7500	95.25	2.5000	63.50	46076
	5	.2055	5.22	3.7500	95.25	2.5000	63.50	46075
	4	.2090	5.31	3.7500	95.25	2.5000	63.50	46074
	3	.2130	5.41	3.7500	95.25	2.5000	63.50	46073
7/32		.2188	5.56	3.7500	95.25	2.5000	63.50	46014
	2	.2210	5.61	3.8750	98.43	2.6250	66.68	46072
	1	.2280	5.79	3.8750	98.43	2.6250	66.68	46071
15/64		.2344	5.95	3.8750	98.43	2.6250	66.68	46015
1/4	E	.2500	6.35	4.0000	101.60	2.7500	69.85	46016
	F	.2570	6.53	4.1250	104.78	2.8750	73.03	46176
17/64		.2656	6.75	4.1250	104.78	2.8750	73.03	46017
	I	.2720	6.91	4.1250	104.78	2.8750	73.03	46179
9/32		.2812	7.14	4.2500	107.95	2.9375	74.61	46018
19/64		.2969	7.54	4.3750	111.13	3.0625	77.79	46019
5/16		.3125	7.94	4.5000	114.30	3.1875	80.96	46020
21/64		.3281	8.33	4.6250	117.48	3.3125	84.14	46021
	Q	.3320	8.43	4.7500	120.65	3.4375	87.31	46187
11/32		.3438	8.73	4.7500	120.65	3.4375	87.31	46022
23/64		.3594	9.13	4.8750	123.83	3.5000	88.90	46023
	U	.3680	9.35	5.0000	127.00	3.6250	92.08	46191
3/8		.3750	9.53	5.0000	127.00	3.6250	92.08	46024
25/64		.3906	9.92	5.1250	130.18	3.7500	95.25	46025
13/32		.4062	10.32	5.2500	133.35	3.8750	98.43	46026
27/64		.4219	10.72	5.3750	136.53	3.9375	100.01	46027
7/16		.4375	11.11	5.5000	139.70	4.0625	103.19	46028
29/64		.4531	11.51	5.6250	142.88	4.1875	106.36	46029
15/32		.4688	11.91	5.7500	146.05	4.3125	109.54	46030
31/64		.4844	12.30	5.8750	149.23	4.3750	111.13	46031
1/2		.5000	12.70	6.0000	152.40	4.5000	114.30	46032

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

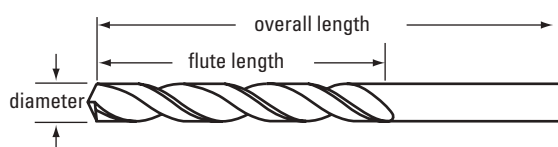
Slow Spiral Style 150C

Features/Benefits:

- Slow helix, wide flutes, and bright finish offer excellent chip ejection performance in non-ferrous materials.
- Manufactured from premium high-speed steel.
- 118° point.
- Bright, finish standard from stock; alternate coatings available as stock modifications.

Application Information:

- brass, bronze
- non-ferrous materials
- Recommended for drilling hard rubber, fiber, dura-plastics, and thermoplastics.



Style 150C Bright Finish

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 150C
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Bright
	80	.0135	0.34	.7500	19.05	.1250	3.18	46350
	79	.0145	0.37	.7500	19.05	.1250	3.18	46349
	78	.0160	0.41	.8750	22.23	.1875	4.76	46348
	77	.0180	0.46	.8750	22.23	.1875	4.76	46347
	76	.0200	0.51	.8750	22.23	.1875	4.76	46346
	75	.0210	0.53	1.0000	25.40	.2500	6.35	46345
	74	.0225	0.57	1.0000	25.40	.2500	6.35	46344
	73	.0240	0.61	1.1250	28.58	.3125	7.94	46343
	72	.0250	0.64	1.1250	28.58	.3125	7.94	46342
	71	.0260	0.66	1.2500	31.75	.3750	9.53	46341
	70	.0280	0.71	1.2500	31.75	.3750	9.53	46340
	69	.0292	0.74	1.3750	34.93	.5000	12.70	46339
	68	.0310	0.79	1.3750	34.93	.5000	12.70	46338
	67	.0320	0.81	1.3750	34.93	.5000	12.70	46337
	66	.0330	0.84	1.3750	34.93	.5000	12.70	46336
	65	.0350	0.89	1.5000	38.10	.6250	15.88	46335
	64	.0360	0.91	1.5000	38.10	.6250	15.88	46334
	63	.0370	0.94	1.5000	38.10	.6250	15.88	46333
	62	.0380	0.97	1.5000	38.10	.6250	15.88	46332
	61	.0390	0.99	1.6250	41.28	.6875	17.46	46331
	60	.0400	1.02	1.6250	41.28	.6875	17.46	46330
	59	.0410	1.04	1.6250	41.28	.6875	17.46	46329
	58	.0420	1.07	1.6250	41.28	.6875	17.46	46328
	57	.0430	1.09	1.7500	44.45	.7500	19.05	46327
	56	.0465	1.18	1.7500	44.45	.7500	19.05	46326
	55	.0520	1.32	1.8750	47.63	.8750	22.23	46325
	54	.0550	1.40	1.8750	47.63	.8750	22.23	46324
	53	.0595	1.51	1.8750	47.63	.8750	22.23	46323
1/16		.0625	1.59	1.8750	47.63	.8750	22.23	46204
	52	.0635	1.61	1.8750	47.63	.8750	22.23	46322
	51	.0670	1.70	2.0000	50.80	1.0000	25.40	46321

continued on next page

Jobber Length

Slow Spiral (continued)
Style 150C

INCH SIZES

Fract	Drill Diameter			Overall Length		Flute Length		Style 150C Bright
	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	
5/64	50		.0700	1.78	2.0000	50.80	1.0000	46320
	49		.0730	1.85	2.0000	50.80	1.0000	46319
	48		.0760	1.93	2.0000	50.80	1.0000	46318
			.0781	1.98	2.0000	50.80	1.0000	46205
	47		.0785	1.99	2.0000	50.80	1.0000	46317
3/32	46		.0810	2.06	2.1250	53.98	1.1250	46316
	45		.0820	2.08	2.1250	53.98	1.1250	46315
	44		.0860	2.18	2.1250	53.98	1.1250	46314
	43		.0890	2.26	2.2500	57.15	1.2500	46313
	42		.0935	2.37	2.2500	57.15	1.2500	46312
7/64			.0938	2.38	2.2500	57.15	1.2500	46206
	41		.0960	2.44	2.3750	60.33	1.3750	46311
	40		.0980	2.49	2.3750	60.33	1.3750	46310
	39		.0995	2.53	2.3750	60.33	1.3750	46309
	38		.1015	2.58	2.5000	63.50	1.4375	46308
1/8	37		.1040	2.64	2.5000	63.50	1.4375	46307
	36		.1065	2.71	2.5000	63.50	1.4375	46306
			.1094	2.78	2.6250	66.68	1.5000	46207
	35		.1100	2.79	2.6250	66.68	1.5000	46305
	34		.1110	2.82	2.6250	66.68	1.5000	46304
9/64	33		.1130	2.87	2.6250	66.68	1.5000	46303
	32		.1160	2.95	2.7500	69.85	1.6250	46302
	31		.1200	3.05	2.7500	69.85	1.6250	46301
			.1250	3.18	2.7500	69.85	1.6250	46208
	30		.1285	3.26	2.7500	69.85	1.6250	46300
5/32	29		.1360	3.45	2.8750	73.03	1.7500	46299
	28		.1405	3.57	2.8750	73.03	1.7500	46298
			.1406	3.57	2.8750	73.03	1.7500	46209
	27		.1440	3.66	3.0000	76.20	1.8750	46297
	26		.1470	3.73	3.0000	76.20	1.8750	46296
3/16	25		.1495	3.80	3.0000	76.20	1.8750	46295
	24		.1520	3.86	3.1250	79.38	2.0000	46294
	23		.1540	3.91	3.1250	79.38	2.0000	46293
			.1562	3.97	3.1250	79.38	2.0000	46210
	22		.1570	3.99	3.1250	79.38	2.0000	46292
11/64	21		.1590	4.04	3.2500	82.55	2.1250	46291
	20		.1610	4.09	3.2500	82.55	2.1250	46290
	19		.1660	4.22	3.2500	82.55	2.1250	46289
	18		.1695	4.31	3.2500	82.55	2.1250	46288
			.1719	4.37	3.2500	82.55	2.1250	46211
3/8	17		.1730	4.39	3.3750	85.73	2.1875	46287
	16		.1770	4.50	3.3750	85.73	2.1875	46286
	15		.1800	4.57	3.3750	85.73	2.1875	46285
	14		.1820	4.62	3.3750	85.73	2.1875	46284
	13		.1850	4.70	3.5000	88.90	2.3125	46283
1/2			.1875	4.76	3.5000	88.90	2.3125	46212
	12		.1890	4.80	3.5000	88.90	2.3125	46282
	11		.1910	4.85	3.5000	88.90	2.3125	46281
5/8	10		.1935	4.91	3.6250	92.08	2.4375	46280
	9		.1960	4.98	3.6250	92.08	2.4375	46279

continued on next page

Slow Spiral (continued)
Style 150C

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 150C	
Fract	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	Bright	
	8		.1990	5.05	3.6250	92.08	2.4375	61.91	46278
	7		.2010	5.11	3.6250	92.08	2.4375	61.91	46277
13/64			.2031	5.16	3.6250	92.08	2.4375	61.91	46213
	6		.2040	5.18	3.7500	95.25	2.5000	63.50	46276
	5		.2055	5.22	3.7500	95.25	2.5000	63.50	46275
	4		.2090	5.31	3.7500	95.25	2.5000	63.50	46274
	3		.2130	5.41	3.7500	95.25	2.5000	63.50	46273
7/32			.2188	5.56	3.7500	95.25	2.5000	63.50	46214
	2		.2210	5.61	3.8750	98.43	2.6250	66.68	46272
	1		.2280	5.79	3.8750	98.43	2.6250	66.68	46271
15/64			.2344	5.95	3.8750	98.43	2.6250	66.68	46215
1/4			.2500	6.35	4.0000	101.60	2.7500	69.85	46216
17/64			.2656	6.75	4.1250	104.78	2.8750	73.03	46217
9/32			.2812	7.14	4.2500	107.95	2.9375	74.61	46218
19/64			.2969	7.54	4.3750	111.13	3.0625	77.79	46219
5/16			.3125	7.94	4.5000	114.30	3.1875	80.96	46220
21/64			.3281	8.33	4.6250	117.48	3.3125	84.14	46221
11/32			.3438	8.73	4.7500	120.65	3.4375	87.31	46222
23/64			.3594	9.13	4.8750	123.83	3.5000	88.90	46223
3/8			.3750	9.53	5.0000	127.00	3.6250	92.08	46224
25/64			.3906	9.92	5.1250	130.18	3.7500	95.25	46225
13/32			.4062	10.32	5.2500	133.35	3.8750	98.43	46226
27/64			.4219	10.72	5.3750	136.53	3.9375	100.01	46227
7/16			.4375	11.11	5.5000	139.70	4.0625	103.19	46228
29/64			.4531	11.51	5.6250	142.88	4.1875	106.36	46229
15/32			.4688	11.91	5.7500	146.05	4.3125	109.54	46230
31/64			.4844	12.30	5.8750	149.23	4.3750	111.13	46231
1/2			.5000	12.70	6.0000	152.40	4.5000	114.30	46232

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Drills

Jobber Length

118° Split Point Style 150K

Features/Benefits:

- General-purpose geometry with split point for drilling in a wide range of operating conditions and materials.
- Manufactured from premium high-speed steel.
- 118° split point is self-centering for reduced thrust and easier penetration.
- Black oxide finish standard from stock.

Application Information:

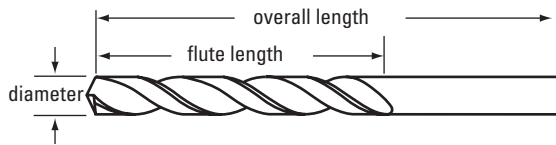
- medium steel
- soft steel
- magnesium and magnesium alloys
- Ideal for use in sheet metal and portable drilling.

Surface Treatment Information:

- Black oxide surface finish increases wear resistance and adds lubricity, improving chip flow.



Style 150K Black Oxide Finish



INCH SIZES

Drill Diameter			Overall Length		Flute Length		Style 150K Black Oxide
Fract	Decimal	mm	Inch	mm	Inch	mm	
1/16	.0625	1.59	1.8750	47.63	.8750	22.23	57204
5/64	.0781	1.98	2.0000	50.80	1.0000	25.40	57205
3/32	.0938	2.38	2.2500	57.15	1.2500	31.75	57206
7/64	.1094	2.78	2.6250	66.68	1.5000	38.10	57207
1/8	.1250	3.18	2.7500	69.85	1.6250	41.28	57208
9/64	.1406	3.57	2.8750	73.03	1.7500	44.45	57209
5/32	.1562	3.97	3.1250	79.38	2.0000	50.80	57210
11/64	.1719	4.37	3.2500	82.55	2.1250	53.98	57211
3/16	.1875	4.76	3.5000	88.90	2.3125	58.74	57212
13/64	.2031	5.16	3.6250	92.08	2.4375	61.91	57213
7/32	.2188	5.56	3.7500	95.25	2.5000	63.50	57214
15/64	.2344	5.95	3.8750	98.43	2.6250	66.68	57215
1/4	.2500	6.35	4.0000	101.60	2.7500	69.85	57216
17/64	.2656	6.75	4.1250	104.78	2.8750	73.03	57217
9/32	.2812	7.14	4.2500	107.95	2.9375	74.61	57218
19/64	.2969	7.54	4.3750	111.13	3.0625	77.79	57219
5/16	.3125	7.94	4.5000	114.30	3.1875	80.96	57220
21/64	.3281	8.33	4.6250	117.48	3.3125	84.14	57221
11/32	.3438	8.73	4.7500	120.65	3.4375	87.31	57222
23/64	.3594	9.13	4.8750	123.83	3.5000	88.90	57223
3/8	.3750	9.53	5.0000	127.00	3.6250	92.08	57224
25/64	.3906	9.92	5.1250	130.18	3.7500	95.25	57225
13/32	.4062	10.32	5.2500	133.35	3.8750	98.43	57226
27/64	.4219	10.72	5.3750	136.53	3.9375	100.01	57227
7/16	.4375	11.11	5.5000	139.70	4.0625	103.19	57228
29/64	.4531	11.51	5.6250	142.88	4.1875	106.36	57229
15/32	.4688	11.91	5.7500	146.05	4.3125	109.54	57230
31/64	.4844	12.30	5.8750	149.23	4.3750	111.13	57231
1/2	.5000	12.70	6.0000	152.40	4.5000	114.30	57232

Left-Hand Helix Style 150L

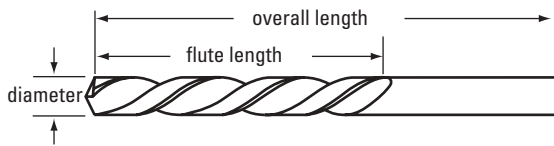
Features/Benefits:

- General-purpose geometry for drilling in a wide range of operating conditions and materials.
- Manufactured from premium high-speed steel.
- 118° point.
- Left-hand helix is ideal for use in screw machines where machine spindle rotation is counter-clockwise.

Application Information:

- Can substitute for screw extractors to remove broken parts without damaging threaded holes.
- Bright finish standard from stock; alternate coatings available as stock modifications.

- carbon steel
- alloy steel
- cast iron



Style 150L Bright Finish

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 150L Bright
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	
	69	.0292	0.74	1.3750	34.93	.5000	12.70	44539
	68	.0310	0.79	1.3750	34.93	.5000	12.70	44538
1/32		.0312	0.79	1.3750	34.93	.5000	12.70	44402
	67	.0320	0.81	1.3750	34.93	.5000	12.70	44537
	66	.0330	0.84	1.3750	34.93	.5000	12.70	44536
	65	.0350	0.89	1.5000	38.10	.6250	15.88	44535
	64	.0360	0.91	1.5000	38.10	.6250	15.88	44534
	63	.0370	0.94	1.5000	38.10	.6250	15.88	44533
	62	.0380	0.97	1.5000	38.10	.6250	15.88	44532
	61	.0390	0.99	1.6250	41.28	.6875	17.46	44531
	60	.0400	1.02	1.6250	41.28	.6875	17.46	44530
	59	.0410	1.04	1.6250	41.28	.6875	17.46	44529
	58	.0420	1.07	1.6250	41.28	.6875	17.46	44528
	57	.0430	1.09	1.7500	44.45	.7500	19.05	44527
	56	.0465	1.18	1.7500	44.45	.7500	19.05	44526
3/64		.0469	1.19	1.7500	44.45	.7500	19.05	44403
	55	.0520	1.32	1.8750	47.63	.8750	22.23	44525
	54	.0550	1.40	1.8750	47.63	.8750	22.23	44524
	53	.0595	1.51	1.8750	47.63	.8750	22.23	44523
1/16		.0625	1.59	1.8750	47.63	.8750	22.23	44404
	52	.0635	1.61	1.8750	47.63	.8750	22.23	44522
	51	.0670	1.70	2.0000	50.80	1.0000	25.40	44521
	50	.0700	1.78	2.0000	50.80	1.0000	25.40	44520
	49	.0730	1.85	2.0000	50.80	1.0000	25.40	44519
	48	.0760	1.93	2.0000	50.80	1.0000	25.40	44518
5/64		.0781	1.98	2.0000	50.80	1.0000	25.40	44405
	47	.0785	1.99	2.0000	50.80	1.0000	25.40	44517
	46	.0810	2.06	2.1250	53.98	1.1250	28.58	44516
	45	.0820	2.08	2.1250	53.98	1.1250	28.58	44515
	44	.0860	2.18	2.1250	53.98	1.1250	28.58	44514
	43	.0890	2.26	2.2500	57.15	1.2500	31.75	44513
	42	.0935	2.37	2.2500	57.15	1.2500	31.75	44512

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Drills

Jobber Length

Left-Hand Helix (continued) Style 150L

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 150K	
Fract	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	Bright	
3/32			.0938	2.38	2.2500	57.15	1.2500	31.75	44406
	41		.0960	2.44	2.3750	60.33	1.3750	34.93	44511
	40		.0980	2.49	2.3750	60.33	1.3750	34.93	44510
	39		.0995	2.53	2.3750	60.33	1.3750	34.93	44509
	38		.1015	2.58	2.5000	63.50	1.4375	36.51	44508
	37		.1040	2.64	2.5000	63.50	1.4375	36.51	44507
	36		.1065	2.71	2.5000	63.50	1.4375	36.51	44506
7/64			.1094	2.78	2.6250	66.68	1.5000	38.10	44407
	35		.1100	2.79	2.6250	66.68	1.5000	38.10	44505
	34		.1110	2.82	2.6250	66.68	1.5000	38.10	44504
	33		.1130	2.87	2.6250	66.68	1.5000	38.10	44503
	32		.1160	2.95	2.7500	69.85	1.6250	41.28	44502
	31		.1200	3.05	2.7500	69.85	1.6250	41.28	44501
1/8			.1250	3.18	2.7500	69.85	1.6250	41.28	44408
	30		.1285	3.26	2.7500	69.85	1.6250	41.28	44500
	29		.1360	3.45	2.8750	73.03	1.7500	44.45	44499
	28		.1405	3.57	2.8750	73.03	1.7500	44.45	44498
9/64			.1406	3.57	2.8750	73.03	1.7500	44.45	44409
	27		.1440	3.66	3.0000	76.20	1.8750	47.63	44497
	26		.1470	3.73	3.0000	76.20	1.8750	47.63	44496
	25		.1495	3.80	3.0000	76.20	1.8750	47.63	44495
	24		.1520	3.86	3.1250	79.38	2.0000	50.80	44494
	23		.1540	3.91	3.1250	79.38	2.0000	50.80	44493
5/32			.1562	3.97	3.1250	79.38	2.0000	50.80	44410
	22		.1570	3.99	3.1250	79.38	2.0000	50.80	44492
	21		.1590	4.04	3.2500	82.55	2.1250	53.98	44491
	20		.1610	4.09	3.2500	82.55	2.1250	53.98	44490
	19		.1660	4.22	3.2500	82.55	2.1250	53.98	44489
	18		.1695	4.31	3.2500	82.55	2.1250	53.98	44488
11/64			.1719	4.37	3.2500	82.55	2.1250	53.98	44411
	17		.1730	4.39	3.3750	85.73	2.1875	55.56	44487
	16		.1770	4.50	3.3750	85.73	2.1875	55.56	44486
	15		.1800	4.57	3.3750	85.73	2.1875	55.56	44485
	14		.1820	4.62	3.3750	85.73	2.1875	55.56	44484
	13		.1850	4.70	3.5000	88.90	2.3125	58.74	44483
3/16			.1875	4.76	3.5000	88.90	2.3125	58.74	44412
	12		.1890	4.80	3.5000	88.90	2.3125	58.74	44482
	11		.1910	4.85	3.5000	88.90	2.3125	58.74	44481
	10		.1935	4.91	3.6250	92.08	2.4375	61.91	44480
	9		.1960	4.98	3.6250	92.08	2.4375	61.91	44479
	8		.1990	5.05	3.6250	92.08	2.4375	61.91	44478
	7		.2010	5.11	3.6250	92.08	2.4375	61.91	44477
13/64			.2031	5.16	3.6250	92.08	2.4375	61.91	44413
	6		.2040	5.18	3.7500	95.25	2.5000	63.50	44476
	5		.2055	5.22	3.7500	95.25	2.5000	63.50	44475
	4		.2090	5.31	3.7500	95.25	2.5000	63.50	44474
	3		.2130	5.41	3.7500	95.25	2.5000	63.50	44473
7/32			.2188	5.56	3.7500	95.25	2.5000	63.50	44414
	2		.2210	5.61	3.8750	98.43	2.6250	66.68	44472
	1		.2280	5.79	3.8750	98.43	2.6250	66.68	44471
15/64			.2344	5.95	3.8750	98.43	2.6250	66.68	44415

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Customer Service: 800.348.2885

Technical Support: 800.892.4281

Left-Hand Helix (continued) Style 150L

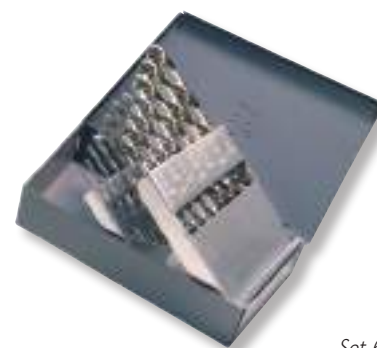
INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 150L
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Bright
1/4		.2500	6.35	4.0000	101.60	2.7500	69.85	44416
17/64		.2656	6.75	4.1250	104.78	2.8750	73.03	44417
9/32		.2812	7.14	4.2500	107.95	2.9375	74.61	44418
19/64		.2969	7.54	4.3750	111.13	3.0625	77.79	44419
5/16		.3125	7.94	4.5000	114.30	3.1875	80.96	44420
21/64		.3281	8.33	4.6250	117.48	3.3125	84.14	44421
11/32		.3438	8.73	4.7500	120.65	3.4375	87.31	44422
23/64		.3594	9.13	4.8750	123.83	3.5000	88.90	44423
3/8		.3750	9.53	5.0000	127.00	3.6250	92.08	44424
25/64		.3906	9.92	5.1250	130.18	3.7500	95.25	44425
13/32		.4062	10.32	5.2500	133.35	3.8750	98.43	44426
27/64		.4219	10.72	5.3750	136.53	3.9375	100.01	44427
7/16		.4375	11.11	5.5000	139.70	4.0625	103.19	44428
29/64		.4531	11.51	5.6250	142.88	4.1875	106.36	44429
15/32		.4688	11.91	5.7500	146.05	4.3125	109.54	44430
31/64		.4844	12.30	5.8750	149.23	4.3750	111.13	44431
1/2		.5000	12.70	6.0000	152.40	4.5000	114.30	44432

INCH SETS

Sets in Metal Index Cases

Number of Tools	Size Range	Style 150L
		Bright
15	1/16 - 1/2 X 1/32	69881
21	1/16 - 3/8 X 1/64	69882
29	1/16 - 1/2 X 1/64	69876



Set 69881

TECH TIP

WHY LEFT-HAND DRILLS?

Obviously because some people are left-handed! But actually, drills are also made with a left-hand flute spiral as opposed to the customary right hand spiral. Normally, these are seen in the jobbers and screw machine style and have the same flute and overall dimensions as their right-handed mirror image. They are normally in the general-purpose design to drill a wide range of materials and are available in other styles as specials.

Initially, left hand drills were primarily made for multi spindle (two or more) gear driven drilling heads, where the spindles rotated in opposite directions. They also are used in screw machines whose spindle may be rotated counterclockwise. Screw machines are used to manufacture smaller parts made from bar stock or tubing. Screw machines are multi-tasking and may turn, cut-off, drill and tap using multiple cutting tools with different holders.

Left hand drills are often used today to help extract a broken bolt or screw from a threaded hole. In some cases a left hand drill can be used counterclockwise to bring the right hand threaded fastener without damaging the part. This is sometimes done when a preferred screw extractor is not available.

Drills

Jobber Length

Automotive Tanged Shank Style 250AN

Features/Benefits:

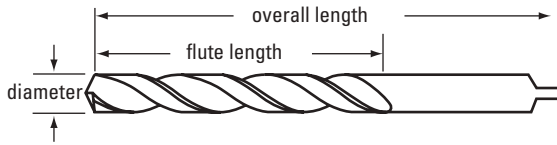
- General-purpose geometry conforming to automotive industry standards.
- Manufactured from premium high-speed steel.
- 118° point.
- Tanged shank for use with positive split sleeve drivers.
- Black oxide surface standard from stock.

Application Information:

- carbon steel
- alloy steel
- cast iron

Surface Treatment Information:

- Black oxide surface finish increases wear resistance and adds lubricity, improving chip flow.



Tang specifications listed on page 30.



Style 250AN Black Oxide Finish

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 250AN Black Oxide
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	
1/8		.1250	3.18	2.7500	69.85	1.6250	41.28	47458
	30	.1285	3.26	2.7500	69.85	1.6250	41.28	47459
	29	.1360	3.45	2.8750	73.03	1.7500	44.45	47462
	28	.1405	3.57	2.8750	73.03	1.7500	44.45	47550
9/64		.1406	3.57	2.8750	73.03	1.7500	44.45	47464
	27	.1440	3.66	3.0000	76.20	1.8750	47.63	47465
	26	.1470	3.73	3.0000	76.20	1.8750	47.63	47466
	25	.1495	3.80	3.0000	76.20	1.8750	47.63	47551
	24	.1520	3.86	3.1250	79.38	2.0000	50.80	47467
5/32		.1562	3.97	3.1250	79.38	2.0000	50.80	47468
	22	.1570	3.99	3.1250	79.38	2.0000	50.80	47552
	21	.1590	4.04	3.2500	82.55	2.1250	53.98	47553
	20	.1610	4.09	3.2500	82.55	2.1250	53.98	47469
	19	.1660	4.22	3.2500	82.55	2.1250	53.98	47470
	18	.1695	4.31	3.2500	82.55	2.1250	53.98	47471
11/64		.1719	4.37	3.2500	82.55	2.1250	53.98	47472
	17	.1730	4.39	3.3750	85.73	2.1875	55.56	47473
	16	.1770	4.50	3.3750	85.73	2.1875	55.56	47474
	15	.1800	4.57	3.3750	85.73	2.1875	55.56	47475
	13	.1850	4.70	3.5000	88.90	2.3125	58.74	47476
3/16		.1875	4.76	3.5000	88.90	2.3125	58.74	47477
	11	.1910	4.85	3.5000	88.90	2.3125	58.74	47478
	10	.1935	4.91	3.6250	92.08	2.4375	61.91	47479
	9	.1960	4.98	3.6250	92.08	2.4375	61.91	47480
	8	.1990	5.05	3.6250	92.08	2.4375	61.91	47481
	7	.2010	5.11	3.6250	92.08	2.4375	61.91	47554
13/64		.2031	5.16	3.6250	92.08	2.4375	61.91	47482

continued on next page

Jobber Length

Automotive Tanged Shank (continued)
Style 250AN

INCH SIZES

Fract	Drill Diameter		mm	Overall Length		Flute Length		Style 250AN Black Oxide
	Wire/Let	Decimal		Inch	mm	Inch	mm	
	6	.2040	5.18	3.7500	95.25	2.5000	63.50	47555
	5	.2055	5.22	3.7500	95.25	2.5000	63.50	47556
	4	.2090	5.31	3.7500	95.25	2.5000	63.50	47483
	3	.2130	5.41	3.7500	95.25	2.5000	63.50	47484
7/32		.2188	5.56	3.7500	95.25	2.5000	63.50	47485
	1	.2280	5.79	3.8750	98.43	2.6250	66.68	47487
	A	.2340	5.94	3.8750	98.43	2.6250	66.68	47560
15/64		.2344	5.95	3.8750	98.43	2.6250	66.68	47488
	B	.2380	6.05	4.0000	101.60	2.7500	69.85	47561
	C	.2420	6.15	4.0000	101.60	2.7500	69.85	47562
	D	.2460	6.25	4.0000	101.60	2.7500	69.85	47490
1/4		.2500	6.35	4.0000	101.60	2.7500	69.85	47491
	E	.2500	6.35	4.0000	101.60	2.7500	69.85	47491
	F	.2570	6.53	4.1250	104.78	2.8750	73.03	47493
	G	.2610	6.63	4.1250	104.78	2.8750	73.03	47494
17/64		.2656	6.75	4.1250	104.78	2.8750	73.03	47495
	H	.2660	6.76	4.1250	104.78	2.8750	73.03	47563
	I	.2720	6.91	4.1250	104.78	2.8750	73.03	47496
	J	.2770	7.04	4.1250	104.78	2.8750	73.03	47497
9/32		.2812	7.14	4.2500	107.95	2.9375	74.61	47498
	L	.2900	7.37	4.2500	107.95	2.9375	74.61	47564
19/64		.2969	7.54	4.3750	111.13	3.0625	77.79	47501
	N	.3020	7.67	4.3750	111.13	3.0625	77.79	47502
5/16		.3125	7.94	4.5000	114.30	3.1875	80.96	47504
	O	.3160	8.03	4.5000	114.30	3.1875	80.96	47505
	P	.3230	8.20	4.6250	117.48	3.3125	84.14	47506
21/64		.3281	8.33	4.6250	117.48	3.3125	84.14	47507
	Q	.3320	8.43	4.7500	120.65	3.4375	87.31	47508
	R	.3390	8.61	4.7500	120.65	3.4375	87.31	47509
11/32		.3438	8.73	4.7500	120.65	3.4375	87.31	47510
	S	.3480	8.84	4.8750	123.83	3.5000	88.90	47511
23/64		.3594	9.13	4.8750	123.83	3.5000	88.90	47513
	U	.3680	9.35	5.0000	127.00	3.6250	92.08	47514
3/8		.3750	9.53	5.0000	127.00	3.6250	92.08	47515
	V	.3770	9.58	5.0000	127.00	3.6250	92.08	47565
	W	.3860	9.80	5.1250	130.18	3.7500	95.25	47516
25/64		.3906	9.92	5.1250	130.18	3.7500	95.25	47517
	X	.3970	10.08	5.1250	130.18	3.7500	95.25	47518
13/32		.4062	10.32	5.2500	133.35	3.8750	98.43	47519
27/64		.4219	10.72	5.3750	136.53	3.9375	100.01	47520
7/16		.4375	11.11	5.5000	139.70	4.0625	103.19	47521
29/64		.4531	11.51	5.6250	142.88	4.1875	106.36	47522
15/32		.4688	11.91	5.7500	146.05	4.3125	109.54	47523
31/64		.4844	12.30	5.8750	149.23	4.3750	111.13	47524
1/2		.5000	12.70	6.0000	152.40	4.5000	114.30	47525
33/64		.5156	13.10	6.6250	168.28	4.8125	122.24	47526
17/32		.5312	13.49	6.6250	168.28	4.8125	122.24	47527
35/64		.5469	13.89	6.6250	168.28	4.8125	122.24	47528
9/16		.5625	14.29	6.6250	168.28	4.8125	122.24	47529
37/64		.5781	14.68	6.6250	168.28	4.8125	122.24	47530

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Drills

Jobber Length

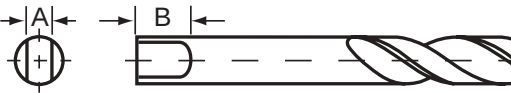
Automotive Tanged Shank (continued)

Style 250AN

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 250AN Black Oxide
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	
19/32		.5938	15.08	7.1250	180.98	5.1875	131.76	47531
39/64		.6094	15.48	7.1250	180.98	5.1875	131.76	47532
5/8		.6250	15.88	7.1250	180.98	5.1875	131.76	47533
41/64		.6406	16.27	7.1250	180.98	5.1875	131.76	47534
21/32		.6562	16.67	7.1250	180.98	5.1875	131.76	47535
11/16		.6875	17.46	7.6250	193.68	5.6250	142.88	47537

Tang Specifications



Shank Diameter (inches)	Tang Dimensions (inches)	
	Width (A)	Length (B)
1/8 through 3/16	.092	9/32
Over 3/16 through 1/4	.120	5/16
Over 1/4 through 5/16	.160	11/32
Over 5/16 through 3/8	.201	3/8
Over 3/8 through 15/32	.241	7/16
Over 15/32 through 9/16	.300	1/2
Over 9/16 through 21/32	.370	9/16
Over 21/32 through 3/4	.440	5/8
Over 3/4 through 7/8	.511	11/16
Over 7/8 through 1	.605	3/4
Over 1 through 1-3/16	.696	13/16
Over 1-3/16 through 1-3/8	.813	7/8

NAS-Type Heavy-Duty Styles 150ASP, 150ASP-TN, 150ASP-TC, 150ASP-TA

Features/Benefits:

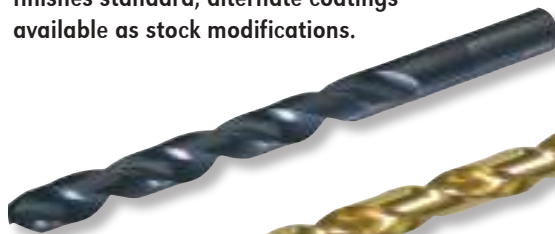
- Manufactured to NAS 907 Type B geometry aerospace specifications.
- Heavy-duty construction for drilling in tougher materials.
- Manufactured from premium high-speed steel.
- 135° P3 split point is self-centering for reduced thrust and easier penetration. Sizes smaller than .0625" do not have split point.
- Black oxide, titanium nitride (TiN), titanium carbonitride (TiCN), and titanium aluminum nitride (TiAlN) finishes standard; alternate coatings available as stock modifications.

Application Information:

- stainless steel (TiAlN, TiCN, TiN, black oxide)
- tool steel (TiAlN, TiCN, TiN, black oxide)
- alloy steel (TiAlN, TiCN, TiN, black oxide)
- titanium (TiAlN)
- cast iron (TiAlN, TiCN, TiN, black oxide)

Surface Treatment Information:

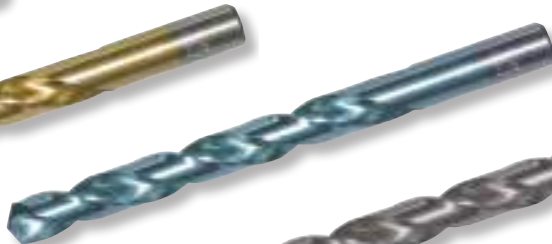
- Black oxide surface finish increases wear resistance and adds lubricity to improve chip flow.
- Titanium nitride (TiN) coating adds lubricity and hardness, enhancing chip flow, finish hole quality, and drill life.
- Titanium carbonitride (TiCN) coating increases cutting surface hardness, making the tool highly resistant to abrasive wear.
- Titanium aluminum nitride (TiAlN) coating combines the ability to work in high temperatures with added hardness to increase drill life.



Style 150ASP
Black Oxide Finish



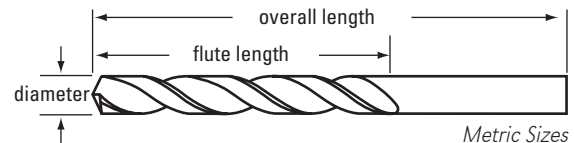
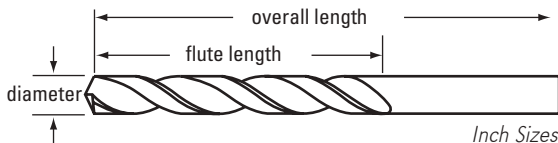
Style 150ASP-TN
TiN Coated



Style 150ASP-TC
TiCN Coated



Style 150ASP-TA
TiAlN Coated



INCH AND METRIC SIZES

Drill Diameter					Overall Length		Flute Length		Style 150ASP	Style 150ASP-TN	Style 150ASP-TC	Style 150ASP-TA
Fract	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	mm	Black Oxide	TiN	TiCN	TiAlN
80*			.0135	0.34	.7500	19.05	.1250	3.18	44750	41750	—	—
79*			.0145	0.37	.7500	19.05	.1250	3.18	44749	41749	—	—
1/64*			.0156	0.40	.7500	19.05	.1875	4.76	44601	—	—	—
78*			.0160	0.41	.8750	22.23	.1875	4.76	44748	41748	—	—
77*			.0180	0.46	.8750	22.23	.1875	4.76	44747	41747	—	—
76*			.0200	0.51	.8750	22.23	.1875	4.76	44746	41746	—	—
75*			.0210	0.53	1.0000	25.40	.2500	6.35	44745	41745	—	—
74*			.0225	0.57	1.0000	25.40	.2500	6.35	44744	41744	—	—
73*			.0240	0.61	1.1250	28.58	.3125	7.94	44743	41743	—	—
72*			.0250	0.64	1.1250	28.58	.3125	7.94	44742	41742	—	—
71*			.0260	0.66	1.2500	31.75	.3750	9.53	44741	41741	—	—
70*			.0280	0.71	1.2500	31.75	.3750	9.53	44740	41740	—	—
69*			.0292	0.74	1.3750	34.93	.5000	12.70	44739	41739	—	—
68*			.0310	0.79	1.3750	34.93	.5000	12.70	44738	41738	—	—

*Sizes smaller than .0625 do not have split point.

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Drills

Jobber Length

NAS-Type Heavy-Duty (continued) Styles 150ASP, 150ASP-TN, 150ASP-TC, 150ASP-TA

INCH AND METRIC SIZES

NCH AND METRIC SIZES								Style	Style	Style	Style	
Drill Diameter				Overall Length		Flute Length		150ASP	150ASP-TN	150ASP-TC	150ASP-TA	
Fract	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	Black Oxide	TiN	TiCN	TiAlN	
1/32*			.0312	0.79	1.3750	34.93	.5000	12.70	44602	41602	43602	42602
	67*		.0320	0.81	1.3750	34.93	.5000	12.70	44737	41737	—	—
	66*		.0330	0.84	1.3750	34.93	.5000	12.70	44736	41736	—	—
	65*		.0350	0.89	1.5000	38.10	.6250	15.88	44735	41735	—	—
	64*		.0360	0.91	1.5000	38.10	.6250	15.88	44734	41734	—	—
	63*		.0370	0.94	1.5000	38.10	.6250	15.88	44733	41733	—	—
	62*		.0380	0.97	1.5000	38.10	.6250	15.88	44732	41732	—	—
	61*		.0390	0.99	1.6250	41.28	.6875	17.46	44731	41731	—	—
		1.00*	.0394		1.3386	34.00	.4724	12.00	45800	—	—	—
	60*		.0400	1.02	1.6250	41.28	.6875	17.46	44730	41730	—	—
	59*		.0410	1.04	1.6250	41.28	.6875	17.46	44729	41729	—	—
	58*		.0420	1.07	1.6250	41.28	.6875	17.46	44728	41728	—	—
	57*		.0430	1.09	1.7500	44.45	.7500	19.05	44727	41727	—	—
		1.10*	.0433		1.4173	36.00	.5512	14.00	45801	—	—	—
	56*		.0465	1.18	1.7500	44.45	.7500	19.05	44726	41726	—	—
3/64*			.0469	1.19	1.7500	44.45	.7500	19.05	44603	41603	43603	42603
		1.20*	.0472		1.4961	38.00	.6299	16.00	45802	—	—	—
	55*		.0520	1.32	1.8750	47.63	.8750	22.23	44725	41725	—	—
	54*		.0550	1.40	1.8750	47.63	.8750	22.23	44724	41724	—	—
		1.40*	.0551		1.5748	40.00	.7087	18.00	45804	—	—	—
		1.50*	.0591		1.5748	40.00	.7087	18.00	45805	—	—	—
	53*		.0595	1.51	1.8750	47.63	.8750	22.23	44723	41723	—	—
1/16			.0625	1.59	1.8750	47.63	.8750	22.23	45604	41604	43604	42604
		1.60	.0630		1.6929	43.00	.7874	20.00	45806	—	—	—
	52		.0635	1.61	1.8750	47.63	.8750	22.23	45722	41722	43722	42722
		1.70	.0669		1.6929	43.00	.7874	20.00	45807	—	—	—
	51		.0670	1.70	2.0000	50.80	1.0000	25.40	45721	41721	43721	42721
	50		.0700	1.78	2.0000	50.80	1.0000	25.40	45720	41720	43720	42720
	49		.0730	1.85	2.0000	50.80	1.0000	25.40	45719	41719	43719	42719
		1.90	.0748		1.8110	46.00	.8661	22.00	45810	—	—	—
	48		.0760	1.93	2.0000	50.80	1.0000	25.40	45718	41718	43718	42718
5/64			.0781	1.98	2.0000	50.80	1.0000	25.40	45605	41605	43605	42605
	47		.0785	1.99	2.0000	50.80	1.0000	25.40	45717	41717	43717	42717
		2.00	.0787		1.9291	49.00	.9449	24.00	45811	—	—	—
	46		.0810	2.06	2.1250	53.98	1.1250	28.58	45716	41716	43716	42716
	45		.0820	2.08	2.1250	53.98	1.1250	28.58	45715	41715	43715	42715
		2.10	.0827		1.9291	49.00	.9449	24.00	45812	—	—	—
	44		.0860	2.18	2.1250	53.98	1.1250	28.58	45714	41714	43714	42714
		2.20	.0866		2.0866	53.00	1.0630	27.00	45813	—	—	—
	43		.0890	2.26	2.2500	57.15	1.2500	31.75	45713	41713	43713	42713
	42		.0935	2.37	2.2500	57.15	1.2500	31.75	45712	41712	43712	42712
3/32			.0938	2.38	2.2500	57.15	1.2500	31.75	45606	41606	43606	42606
		2.40	.0945		2.2441	57.00	1.1811	30.00	45816	—	—	—
	41		.0960	2.44	2.3750	60.33	1.3750	34.93	45711	41711	43711	42711
	40		.0980	2.49	2.3750	60.33	1.3750	34.93	45710	41710	43710	42710
		2.50	.0984		2.2441	57.00	1.1811	30.00	45817	—	—	—
	39		.0995	2.53	2.3750	60.33	1.3750	34.93	45709	41709	43709	42709
	38		.1015	2.58	2.5000	63.50	1.4375	36.51	45708	41708	43708	42708
		2.60	.1024		2.2441	57.00	1.1811	30.00	45818	—	—	—
	37		.1040	2.64	2.5000	63.50	1.4375	36.51	45707	41707	43707	42707
		2.70	.1062		2.4016	61.00	1.2992	33.00	45819	—	—	—

*Sizes smaller than .0625 do not have split point.

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Customer Service: 800.348.2885

Technical Support: 800.892.4281

Jobber Length

NAS-Type Heavy-Duty (continued)
Styles 150ASP, 150ASP-TN, 150ASP-TC, 150ASP-TA

INCH AND METRIC SIZES

Fract	Drill Diameter			mm	Overall Length		Flute Length		Style	Style	Style	Style
	Wire/Let	Metric	Decimal		Inch	mm	Inch	mm	150ASP Black Oxide	150ASP-TN TiN	150ASP-TC TiCN	150ASP-TA TiAlN
7/64	36		.1065	2.71	2.5000	63.50	1.4375	36.51	45706	41706	43706	42706
			.1094	2.78	2.6250	66.68	1.5000	38.10	45607	41607	43607	42607
	35		.1100	2.79	2.6250	66.68	1.5000	38.10	45705	41705	43705	42705
		2.80	.1102		2.4016	61.00	1.2992	33.00	45820	—	—	—
	34		.1110	2.82	2.6250	66.68	1.5000	38.10	45704	41704	43704	42704
	33		.1130	2.87	2.6250	66.68	1.5000	38.10	45703	41703	43703	42703
		2.90	.1142		2.4016	61.00	1.2992	33.00	45821	—	—	—
	32		.1160	2.95	2.7500	69.85	1.6250	41.28	45702	41702	43702	42702
		3.00	.1181		2.4016	61.00	1.2992	33.00	45822	—	—	—
	31		.1200	3.05	2.7500	69.85	1.6250	41.28	45701	41701	43701	42701
1/8		3.10	.1220		2.5591	65.00	1.4173	36.00	45823	—	—	—
			.1250	3.18	2.7500	69.85	1.6250	41.28	45608	41608	43608	42608
		3.20	.1260		2.5591	65.00	1.4173	36.00	45824	—	—	—
		3.25	.1279		2.5591	65.00	1.4173	36.00	45825	—	—	—
	30		.1285	3.26	2.7500	69.85	1.6250	41.28	45700	41700	43700	42700
		3.30	.1299		2.5591	65.00	1.4173	36.00	45826	—	—	—
	29		.1360	3.45	2.8750	73.03	1.7500	44.45	45699	41699	43699	42699
		3.50	.1378		2.7559	70.00	1.5354	39.00	45828	—	—	—
	28		.1405	3.57	2.8750	73.03	1.7500	44.45	45698	41698	43698	42698
9/64			.1406	3.57	2.8750	73.03	1.7500	44.45	45609	41609	43609	42609
		3.60	.1417		2.7559	70.00	1.5354	39.00	45829	—	—	—
	27		.1440	3.66	3.0000	76.20	1.8750	47.63	45697	41697	43697	42697
		3.70	.1457		2.7559	70.00	1.5354	39.00	45830	—	—	—
	26		.1470	3.73	3.0000	76.20	1.8750	47.63	45696	41696	43696	42696
	25		.1495	3.80	3.0000	76.20	1.8750	47.63	45695	41695	43695	42695
		3.80	.1496		2.9528	75.00	1.6929	43.00	45831	—	—	—
	24		.1520	3.86	3.1250	79.38	2.0000	50.80	45694	41694	43694	42694
		3.90	.1535		2.9528	75.00	1.6929	43.00	45832	—	—	—
	23		.1540	3.91	3.1250	79.38	2.0000	50.80	45693	41693	43693	42693
5/32			.1562	3.97	3.1250	79.38	2.0000	50.80	45610	41610	43610	42610
	22		.1570	3.99	3.1250	79.38	2.0000	50.80	45692	41692	43692	42692
		4.00	.1575		2.9528	75.00	1.6929	43.00	45833	—	—	—
	21		.1590	4.04	3.2500	82.55	2.1250	53.98	45691	41691	43691	42691
	20		.1610	4.09	3.2500	82.55	2.1250	53.98	45690	41690	43690	42690
		4.10	.1614		2.9528	75.00	1.6929	43.00	45834	—	—	—
		4.20	.1654		2.9528	75.00	1.6929	43.00	45835	—	—	—
	19		.1660	4.22	3.2500	82.55	2.1250	53.98	45689	41689	43689	42689
		4.30	.1692		3.1496	80.00	1.8504	47.00	45836	—	—	—
	18		.1695	4.31	3.2500	82.55	2.1250	53.98	45688	41688	43688	42688
11/64			.1719	4.37	3.2500	82.55	2.1250	53.98	45611	41611	43611	42611
	17		.1730	4.39	3.3750	85.73	2.1875	55.56	45687	41687	43687	42687
	16		.1770	4.50	3.3750	85.73	2.1875	55.56	45686	41686	43686	42686
		4.50	.1772		3.1496	80.00	1.8504	47.00	45838	—	—	—
	15		.1800	4.57	3.3750	85.73	2.1875	55.56	45685	41685	43685	42685
		4.60	.1811		3.1496	80.00	1.8504	47.00	45839	—	—	—
	14		.1820	4.62	3.3750	85.73	2.1875	55.56	45684	41684	43684	42684
	13		.1850	4.70	3.5000	88.90	2.3125	58.74	45683	41683	43683	42683
3/16			.1875	4.76	3.5000	88.90	2.3125	58.74	45612	41612	43612	42612
	12		.1890	4.80	3.5000	88.90	2.3125	58.74	45682	41682	43682	42682
		4.80	.1890		3.3858	86.00	2.0472	52.00	45841	—	—	—

continued on next page

Drills

Jobber Length

NAS-Type Heavy-Duty (continued) Styles 150ASP, 150ASP-TN, 150ASP-TC, 150ASP-TA

INCH AND METRIC SIZES

Fract	Drill Diameter			Overall Length		Flute Length		Style 150ASP	Style 150ASP-TN	Style 150ASP-TC	Style 150ASP-TA
	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	Black Oxide	TiN	TiCN	TiAlN
11			.1910	4.85	3.5000	88.90	2.3125	45681	41681	43681	42681
		4.90	.1929		3.3858	86.00	2.0472	45842	—	—	—
10			.1935	4.91	3.6250	92.08	2.4375	45680	41680	43680	42680
			.1960	4.98	3.6250	92.08	2.4375	45679	41679	43679	42679
9		5.00	.1969		3.3858	86.00	2.0472	45843	—	—	—
			.1990	5.05	3.6250	92.08	2.4375	45678	41678	43678	42678
8			.2008		3.3858	86.00	2.0472	45845	—	—	—
			.2010	5.11	3.6250	92.08	2.4375	45677	41677	43677	42677
13/64			.2031	5.16	3.6250	92.08	2.4375	45613	41613	43613	42613
			.2040	5.18	3.7500	95.25	2.5000	45676	41676	43676	42676
7		5.20	.2047		3.3858	86.00	2.0472	45846	—	—	—
			.2055	5.22	3.7500	95.25	2.5000	45675	41675	43675	42675
6			.2090	5.31	3.7500	95.25	2.5000	45674	41674	43674	42674
		5.40	.2125		3.6614	93.00	2.2441	45849	—	—	—
5			.2130	5.41	3.7500	95.25	2.5000	45673	41673	43673	42673
		5.50	.2165		3.6614	93.00	2.2441	45850	—	—	—
7/32			.2188	5.56	3.7500	95.25	2.5000	45614	41614	43614	42614
			.2205		3.6614	93.00	2.2441	45851	—	—	—
4			.2210	5.61	3.8750	98.43	2.6250	45672	41672	43672	42672
		5.70	.2244		3.6614	93.00	2.2441	45852	—	—	—
3			.2280	5.79	3.8750	98.43	2.6250	45671	41671	43671	42671
			.2340	5.94	3.8750	98.43	2.6250	45771	41771	43771	42771
15/64			.2344	5.95	3.8750	98.43	2.6250	45615	41615	43615	42615
		6.00	.2362		3.6614	93.00	2.2441	45855	—	—	—
2			.2380	6.05	4.0000	101.60	2.7500	45772	41772	43772	42772
		6.10	.2401		3.9764	101.00	2.4803	45856	—	—	—
1			.2420	6.15	4.0000	101.60	2.7500	45773	41773	43773	42773
		6.20	.2440		3.9764	101.00	2.4803	45857	—	—	—
A			.2460	6.25	4.0000	101.60	2.7500	45774	41774	43774	42774
			.2500	6.35	4.0000	101.60	2.7500	45616	41616	43616	42616
15/64		6.40	.2520		3.9764	101.00	2.4803	45859	—	—	—
		6.50	.2559		3.9764	101.00	2.4803	45860	—	—	—
F			.2570	6.53	4.1250	104.78	2.8750	45776	41776	43776	42776
		6.60	.2598		3.9764	101.00	2.4803	45861	—	—	—
G			.2610	6.63	4.1250	104.78	2.8750	45777	41777	43777	42777
		6.70	.2638		3.9764	101.00	2.4803	45862	—	—	—
17/64			.2656	6.75	4.1250	104.78	2.8750	45617	41617	43617	42617
			.2660	6.76	4.1250	104.78	2.8750	45778	41778	43778	42778
H		6.80	.2677		4.2913	109.00	2.7165	45863	—	—	—
		6.90	.2717		4.2913	109.00	2.7165	45864	—	—	—
I			.2720	6.91	4.1250	104.78	2.8750	45779	41779	43779	42779
		7.00	.2756		4.2913	109.00	2.7165	45865	—	—	—
J			.2770	7.04	4.1250	104.78	2.8750	45780	41780	43780	42780
			.2810	7.14	4.2500	107.95	2.9375	45781	41781	43781	42781
9/32			.2812	7.14	4.2500	107.95	2.9375	45618	41618	43618	42618
			.2900	7.37	4.2500	107.95	2.9375	45782	41782	43782	42782
M			.2950	7.49	4.3750	111.13	3.0625	45783	41783	43783	42783
		7.50	.2953		4.2913	109.00	2.7165	45870	—	—	—
19/64			.2969	7.54	4.3750	111.13	3.0625	45619	41619	43619	42619
			.3020	7.67	4.3750	111.13	3.0625	45784	41784	43784	42784
5/16			.3125	7.94	4.5000	114.30	3.1875	45620	41620	43620	42620

continued on next page



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Jobber Length

NAS-Type Heavy-Duty (continued)
Styles 150ASP, 150ASP-TN, 150ASP-TC, 150ASP-TA

INCH AND METRIC SIZES

Fract	Wire/Let	Drill Diameter Metric	Decimal	mm	Overall Length Inch	mm	Flute Length Inch	mm	Style 150ASP Black Oxide	Style 150ASP-TN TiN	Style 150ASP-TC TiCN	Style 150ASP-TA TiAlN
		8.00	.3150		4.6063	117.00	2.9528	75.00	45875	—	—	—
	O		.3160	8.03	4.5000	114.30	3.1875	80.96	45785	41785	43785	42785
	P		.3230	8.20	4.6250	117.48	3.3125	84.14	45786	41786	43786	42786
21/64			.3281	8.33	4.6250	117.48	3.3125	84.14	45621	41621	43621	42621
	Q		.3320	8.43	4.7500	120.65	3.4375	87.31	45787	41787	43787	42787
		8.50	.3346		4.6063	117.00	2.9528	75.00	45880	—	—	—
	R		.3390	8.61	4.7500	120.65	3.4375	87.31	45788	41788	43788	42788
11/32			.3438	8.73	4.7500	120.65	3.4375	87.31	45622	41622	43622	42622
	S		.3480	8.84	4.8750	123.83	3.5000	88.90	45789	41789	43789	42789
		9.00	.3543		4.9213	125.00	3.1890	81.00	45885	—	—	—
	T		.3580	9.09	4.8750	123.83	3.5000	88.90	45790	41790	43790	42790
23/64			.3594	9.13	4.8750	123.83	3.5000	88.90	45623	41623	43623	42623
	U		.3680	9.35	5.0000	127.00	3.6250	92.08	45791	41791	43791	42791
		9.50	.3740		4.9213	125.00	3.1890	81.00	45890	—	—	—
3/8			.3750	9.53	5.0000	127.00	3.6250	92.08	45624	41624	43624	42624
	V		.3770	9.58	5.0000	127.00	3.6250	92.08	45792	41792	43792	42792
	W		.3860	9.80	5.1250	130.18	3.7500	95.25	45793	41793	43793	42793
25/64			.3906	9.92	5.1250	130.18	3.7500	95.25	45625	41625	43625	42625
		10.00	.3937		5.2362	133.00	3.4252	87.00	45895	—	—	—
	X		.3970	10.08	5.1250	130.18	3.7500	95.25	45794	41794	43794	42794
		10.20	.4016		5.2362	133.00	3.4252	87.00	45896	—	—	—
	Y		.4040	10.26	5.2500	133.35	3.8750	98.43	45795	41795	43795	42795
13/32			.4062	10.32	5.2500	133.35	3.8750	98.43	45626	41626	43626	42626
	Z		.4130	10.49	5.2500	133.35	3.8750	98.43	45796	41796	43796	42796
		10.50	.4134		5.2362	133.00	3.4252	87.00	45897	—	—	—
27/64			.4219	10.72	5.3750	136.53	3.9375	100.01	45627	41627	43627	42627
		11.00	.4331		5.5905	142.00	3.7008	94.00	45899	—	—	—
7/16			.4375	11.11	5.5000	139.70	4.0625	103.19	45628	41628	43628	42628
		11.50	.4527		5.5905	142.00	3.7008	94.00	45900	—	—	—
29/64			.4531	11.51	5.6250	142.88	4.1875	106.36	45629	41629	43629	42629
15/32			.4688	11.91	5.7500	146.05	4.3125	109.54	45630	41630	43630	42630
		12.00	.4724		5.9449	151.00	3.9764	101.00	45902	—	—	—
31/64			.4844	12.30	5.8750	149.23	4.3750	111.13	45631	41631	43631	42631
		12.50	.4921		5.9449	151.00	3.9764	101.00	45904	—	—	—
1/2			.5000	12.70	6.0000	152.40	4.5000	114.30	45632	41632	43632	42632
		13.00	.5118		5.9449	151.00	3.9764	101.00	45905	—	—	—

INCH AND METRIC SETS**Sets in Metal Index Cases**

Number of Tools	Size Range	Style 150ASP Black Oxide	Style 150ASP-TN TiN	Style 150ASP-TC TiCN	Style 150ASP-TA TiAlN
13	1/16 - 1/4 X 1/64	69847	41798	43638	42801
15	1/16 - 1/2 X 1/32	69850	41797	43637	42800
21	1/16 - 3/8 X 1/64	69851	41799	43639	—
29	1/16 - 1/2 X 1/64	45640	41800	43640	—
26	Letters A - Z	45638	41801	—	—
60	#1 - #60 wire gauge	45639	41802	—	—
20	#61 - #80 wire gauge	45656	41803	—	—
115	1/16 - 1/2 X 1/64, A - Z, #1 - #60	45650	41804	—	—
25	1mm - 13mm X 0.5mm	45925	—	—	—



Set 42800



Chicago-Latrobe®

Customer Service: 800.348.2885

Technical Support: 800.892.4281

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Drills

Jobber Length

NAS-Type Cobalt Heavy-Duty Styles 550, 550-TN (2550), 550-TA

Features/Benefits:

- Manufactured to NAS 907 Type J geometry aerospace specifications.
- Heavy-duty construction for drilling in tough, high-tensile, and work-hardening materials under extreme operating conditions.
- Manufactured from premium cobalt high-speed steel, increasing hot hardness and extending drill wear life.
- 135° P3 split point is self-centering for reduced thrust and easier penetration.

- Metric drills are manufactured to DIN 338 OAL and flute length specifications.
- Straw, titanium nitride (TiN), and titanium aluminum nitride (TiAlN) finishes standard; alternate coatings available as stock modifications.

Application Information:

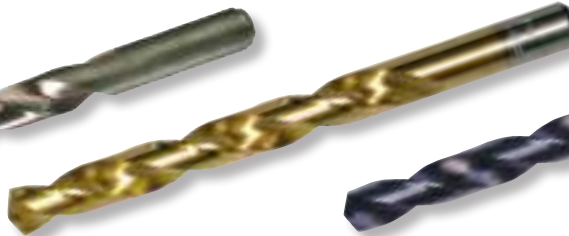
- stainless steel (TiAlN, TiN, straw)
- tool steel (TiAlN, TiCN, TiN, straw)
- alloy steel (TiAlN, TiCN, TiN, straw)
- titanium (TiAlN, straw)

Surface Treatment Information:

- Straw finish adds lubricity and easily identifies cobalt drills.
- Titanium nitride (TiN) coating adds lubricity and hardness, enhancing chip flow, finish hole quality, and drill life.
- Titanium aluminum nitride (TiAlN) coating combines the ability to work in high-temperatures with added hardness to increase drill life.



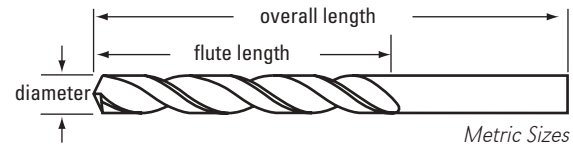
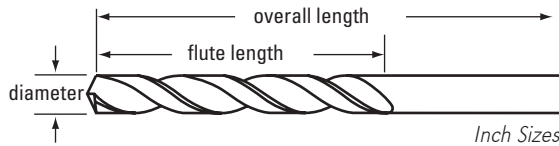
Style 550
Straw Finish



Style 550-TN
TiN Coated



Style 550-TA
TiAlN Coated



INCH AND METRIC SIZES

Drill Diameter					Overall Length		Flute Length		Style 550	Style 550-TN	Style 550-TA
Fract	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	mm	Straw	TiN	TiAlN
1/64	80		.0135	0.34	.7500	19.05	.1250	3.18	46750	—	—
	79		.0145	0.37	.7500	19.05	.1250	3.18	46749	—	—
			.0156	0.40	.7500	19.05	.1875	4.76	46601	—	—
	78		.0160	0.41	.8750	22.23	.1875	4.76	46748	—	—
	77		.0180	0.46	.8750	22.23	.1875	4.76	46747	—	—
1/32	76		.0200	0.51	.8750	22.23	.1875	4.76	46746	—	—
	75		.0210	0.53	1.0000	25.40	.2500	6.35	46745	—	—
	74		.0225	0.57	1.0000	25.40	.2500	6.35	46744	—	—
	73		.0240	0.61	1.1250	28.58	.3125	7.94	46743	—	—
	72		.0250	0.64	1.1250	28.58	.3125	7.94	46742	—	—
	71		.0260	0.66	1.2500	31.75	.3750	9.53	46741	—	—
	70		.0280	0.71	1.2500	31.75	.3750	9.53	46740	—	—
	69		.0292	0.74	1.3750	34.93	.5000	12.70	46739	—	—
	68		.0310	0.79	1.3750	34.93	.5000	12.70	46738	—	—
			.0312	0.79	1.3750	34.93	.5000	12.70	46602	—	44902
1/16	67		.0320	0.81	1.3750	34.93	.5000	12.70	46737	—	—
	66		.0330	0.84	1.3750	34.93	.5000	12.70	46736	—	—
	65		.0350	0.89	1.5000	38.10	.6250	15.88	46735	—	—

continued on next page

Jobber Length

NAS-Type Cobalt Heavy-Duty (continued)
Styles 550, 550-TN (2550), 550-TA

INCH AND METRIC SIZES

Standard Metric Sizes									Style 550	Style 550-TN	Style 550-TA
Fract	Drill Diameter			Overall Length		Flute Length		Straw	TiN	TiAlN	
	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch				mm
	64		.0360	0.91	1.5000	38.10	.6250	15.88	46734	—	—
	63		.0370	0.94	1.5000	38.10	.6250	15.88	46733	—	—
	62		.0380	0.97	1.5000	38.10	.6250	15.88	46732	—	—
	61		.0390	0.99	1.6250	41.28	.6875	17.46	46731	—	—
		1.00	.0394		1.3386	34.00	.4724	12.00	46430	—	—
	60		.0400	1.02	1.6250	41.28	.6875	17.46	46730	—	—
	59		.0410	1.04	1.6250	41.28	.6875	17.46	46729	—	—
	58		.0420	1.07	1.6250	41.28	.6875	17.46	46728	—	—
	57		.0430	1.09	1.7500	44.45	.7500	19.05	46727	—	—
	56		.0465	1.18	1.7500	44.45	.7500	19.05	46726	—	—
3/64			.0469	1.19	1.7500	44.45	.7500	19.05	46603	—	44903
		1.20	.0472		1.4961	38.00	.6299	16.00	46433	—	—
		1.25	.0492		1.4961	38.00	.6299	16.00	46434	—	—
		1.30	.0512		1.4961	38.00	.6299	16.00	46435	—	—
	55		.0520	1.32	1.8750	47.63	.8750	22.23	46725	—	—
	54		.0550	1.40	1.8750	47.63	.8750	22.23	46724	—	—
		1.45	.0571		1.5748	40.00	.7087	18.00	46436	—	—
		1.50	.0591		1.5748	40.00	.7087	18.00	46437	—	—
	53		.0595	1.51	1.8750	47.63	.8750	22.23	46723	—	—
		1.55	.0610		1.6929	43.00	.7874	20.00	46438	—	—
1/16			.0625	1.59	1.8750	47.63	.8750	22.23	46604	54007	44904
	52		.0635	1.61	1.8750	47.63	.8750	22.23	46722	54092	45022
		1.65	.0650		1.6929	43.00	.7874	20.00	46440	—	—
	51		.0670	1.70	2.0000	50.80	1.0000	25.40	46721	54091	45021
	50		.0700	1.78	2.0000	50.80	1.0000	25.40	46720	54090	45020
		1.80	.0709		1.8110	46.00	.8661	22.00	46442	—	—
	49		.0730	1.85	2.0000	50.80	1.0000	25.40	46719	54089	45019
		1.90	.0748		1.8110	46.00	.8661	22.00	46443	—	—
	48		.0760	1.93	2.0000	50.80	1.0000	25.40	46718	54088	45018
5/64			.0781	1.98	2.0000	50.80	1.0000	25.40	46605	54008	44905
	47		.0785	1.99	2.0000	50.80	1.0000	25.40	46717	54087	45017
		2.00	.0787		1.9291	49.00	.9449	24.00	46444	—	—
		2.05	.0807		1.9291	49.00	.9449	24.00	46445	—	—
	46		.0810	2.06	2.1250	53.98	1.1250	28.58	46716	54081	45016
	45		.0820	2.08	2.1250	53.98	1.1250	28.58	46715	54080	45015
		2.10	.0827		1.9291	49.00	.9449	24.00	46446	—	—
	44		.0860	2.18	2.1250	53.98	1.1250	28.58	46714	54079	45014
		2.20	.0866		2.0866	53.00	1.0630	27.00	46448	—	—
	43		.0890	2.26	2.2500	57.15	1.2500	31.75	46713	54078	45013
		2.30	.0906		2.0866	53.00	1.0630	27.00	46450	—	—
	42		.0935	2.37	2.2500	57.15	1.2500	31.75	46712	54077	45012
3/32			.0938	2.38	2.2500	57.15	1.2500	31.75	46606	54009	44906
		2.40	.0945		2.2441	57.00	1.1811	30.00	46452	—	—
	41		.0960	2.44	2.3750	60.33	1.3750	34.93	46711	54076	45011
	40		.0980	2.49	2.3750	60.33	1.3750	34.93	46710	54075	45010
		2.50	.0984		2.2441	57.00	1.1811	30.00	46453	—	—
	39		.0995	2.53	2.3750	60.33	1.3750	34.93	46709	54049	45009
	38		.1015	2.58	2.5000	63.50	1.4375	36.51	46708	54048	45008
		2.60	.1024		2.2441	57.00	1.1811	30.00	46454	—	—
	37		.1040	2.64	2.5000	63.50	1.4375	36.51	46707	54047	45007
	36		.1065	2.71	2.5000	63.50	1.4375	36.51	46706	54046	45006

continued on next page

Drills

Jobber Length

NAS-Type Cobalt Heavy-Duty (continued) Styles 550, 550-TN (2550), 550-TA

INCH AND METRIC SIZES

NOSH AND METRIC SIZES									Style 550	Style 550-TN	Style 550-TA
Drill Diameter					Overall Length		Flute Length				
Fract	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	mm	Straw	TiN	TiAlN
7/64			.1094	2.78	2.6250	66.68	1.5000	38.10	46607	54010	44907
	35		.1100	2.79	2.6250	66.68	1.5000	38.10	46705	54045	45005
		2.80	.1102		2.4016	61.00	1.2992	33.00	46455	—	—
	34		.1110	2.82	2.6250	66.68	1.5000	38.10	46704	54044	45004
	33		.1130	2.87	2.6250	66.68	1.5000	38.10	46703	54043	45003
		2.90	.1142		2.4016	61.00	1.2992	33.00	46456	—	—
	32		.1160	2.95	2.7500	69.85	1.6250	41.28	46702	54042	45002
		3.00	.1181		2.4016	61.00	1.2992	33.00	46457	—	—
	31		.1200	3.05	2.7500	69.85	1.6250	41.28	46701	54041	45001
		3.10	.1220		2.5591	65.00	1.4173	36.00	46458	—	—
1/8			.1250	3.18	2.7500	69.85	1.6250	41.28	46608	54050	44908
		3.20	.1260		2.5591	65.00	1.4173	36.00	46459	—	—
	30		.1285	3.26	2.7500	69.85	1.6250	41.28	46700	54040	45000
		3.30	.1299		2.5591	65.00	1.4173	36.00	46460	—	—
		3.40	.1339		2.7559	70.00	1.5354	39.00	46461	—	—
	29		.1360	3.45	2.8750	73.03	1.7500	44.45	46699	54039	44999
		3.50	.1378		2.7559	70.00	1.5354	39.00	46462	—	—
	28		.1405	3.57	2.8750	73.03	1.7500	44.45	46698	54038	44998
9/64			.1406	3.57	2.8750	73.03	1.7500	44.45	46609	54051	44909
	27		.1440	3.66	3.0000	76.20	1.8750	47.63	46697	54037	44997
		3.70	.1457		2.7559	70.00	1.5354	39.00	46463	—	—
	26		.1470	3.73	3.0000	76.20	1.8750	47.63	46696	54036	44996
	25		.1495	3.80	3.0000	76.20	1.8750	47.63	46695	54035	44995
	24		.1520	3.86	3.1250	79.38	2.0000	50.80	46694	54034	44994
	23		.1540	3.91	3.1250	79.38	2.0000	50.80	46693	54033	44993
5/32			.1562	3.97	3.1250	79.38	2.0000	50.80	46610	54052	44910
	22		.1570	3.99	3.1250	79.38	2.0000	50.80	46692	54032	44992
		4.00	.1575		2.9528	75.00	1.6929	43.00	46464	—	—
	21		.1590	4.04	3.2500	82.55	2.1250	53.98	46691	54031	44991
	20		.1610	4.09	3.2500	82.55	2.1250	53.98	46690	54030	44990
		4.20	.1654		2.9528	75.00	1.6929	43.00	46466	—	—
	19		.1660	4.22	3.2500	82.55	2.1250	53.98	46689	54029	44989
	18		.1695	4.31	3.2500	82.55	2.1250	53.98	46688	54028	44988
11/64			.1719	4.37	3.2500	82.55	2.1250	53.98	46611	54053	44911
	17		.1730	4.39	3.3750	85.73	2.1875	55.56	46687	54027	44987
	16		.1770	4.50	3.3750	85.73	2.1875	55.56	46686	54026	44986
		4.50	.1772		3.1496	80.00	1.8504	47.00	46467	—	—
	15		.1800	4.57	3.3750	85.73	2.1875	55.56	46685	54025	44985
	14		.1820	4.62	3.3750	85.73	2.1875	55.56	46684	54024	44984
	13		.1850	4.70	3.5000	88.90	2.3125	58.74	46683	54023	44983
3/16			.1875	4.76	3.5000	88.90	2.3125	58.74	46612	54054	44912
	12		.1890	4.80	3.5000	88.90	2.3125	58.74	46682	54022	44982
		4.80	.1890		3.3858	86.00	2.0472	52.00	46468	—	—
	11		.1910	4.85	3.5000	88.90	2.3125	58.74	46681	54021	44981
	10		.1935	4.91	3.6250	92.08	2.4375	61.91	46680	54020	44980
	9		.1960	4.98	3.6250	92.08	2.4375	61.91	46679	54019	44979
		5.00	.1968		3.3858	86.00	2.0472	52.00	46469	—	—
	8		.1990	5.05	3.6250	92.08	2.4375	61.91	46678	54018	44978
	7		.2010	5.11	3.6250	92.08	2.4375	61.91	46677	54017	44977
13/64			.2031	5.16	3.6250	92.08	2.4375	61.91	46613	54055	44913
	6		.2040	5.18	3.7500	95.25	2.5000	63.50	46676	54016	44976

continued on next page



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Jobber Length

NAS-Type Cobalt Heavy-Duty (continued)
Styles 550, 550-TN (2550), 550-TA

INCH AND METRIC SIZES

SIZES									Style 550	Style 550-TN	Style 550-TA
Drill Diameter					Overall Length		Flute Length				
Fract	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	mm	Straw	TiN	TiAlN
	5		.2055	5.22	3.7500	95.25	2.5000	63.50	46675	54015	44975
	4		.2090	5.31	3.7500	95.25	2.5000	63.50	46674	54014	44974
	3		.2130	5.41	3.7500	95.25	2.5000	63.50	46673	54013	44973
	5.50		.2165		3.6614	93.00	2.2441	57.00	46471	—	—
7/32			.2188	5.56	3.7500	95.25	2.5000	63.50	46614	54056	44914
	2		.2210	5.61	3.8750	98.43	2.6250	66.68	46672	54012	44972
	5.70		.2244		3.6614	93.00	2.2441	57.00	46472	—	—
	1		.2280	5.79	3.8750	98.43	2.6250	66.68	46671	54011	44971
	A		.2340	5.94	3.8750	98.43	2.6250	66.68	46771	54101	44945
15/64			.2344	5.95	3.8750	98.43	2.6250	66.68	46615	54057	44915
	6.00		.2362		3.6614	93.00	2.2441	57.00	46473	—	—
	B		.2380	6.05	4.0000	101.60	2.7500	69.85	46772	54102	44946
	C		.2420	6.15	4.0000	101.60	2.7500	69.85	46773	54103	44947
	D		.2460	6.25	4.0000	101.60	2.7500	69.85	46774	54104	44948
1/4	E		.2500	6.35	4.0000	101.60	2.7500	69.85	46616	54058	44916
	6.40		.2520		3.9764	101.00	2.4803	63.00	46474	—	—
	6.50		.2559		3.9764	101.00	2.4803	63.00	46475	—	—
	F		.2570	6.53	4.1250	104.78	2.8750	73.03	46776	54105	44950
	6.60		.2598		3.9764	101.00	2.4803	63.00	46476	—	—
	G		.2610	6.63	4.1250	104.78	2.8750	73.03	46777	54106	44951
	6.70		.2638		3.9764	101.00	2.4803	63.00	46477	—	—
17/64			.2656	6.75	4.1250	104.78	2.8750	73.03	46617	54059	44917
	H		.2660	6.76	4.1250	104.78	2.8750	73.03	46778	54107	44952
	6.80		.2677		4.2913	109.00	2.7165	69.00	46478	—	—
	I		.2720	6.91	4.1250	104.78	2.8750	73.03	46779	54108	44953
	7.00		.2756		4.2913	109.00	2.7165	69.00	46479	—	—
	J		.2770	7.04	4.1250	104.78	2.8750	73.03	46780	54109	44954
	K		.2810	7.14	4.2500	107.95	2.9375	74.61	46781	54110	44955
9/32			.2812	7.14	4.2500	107.95	2.9375	74.61	46618	54060	44918
	L		.2900	7.37	4.2500	107.95	2.9375	74.61	46782	54111	44956
	M		.2950	7.49	4.3750	111.13	3.0625	77.79	46783	54112	44957
	7.50		.2953		4.2913	109.00	2.7165	69.00	46481	—	—
19/64			.2969	7.54	4.3750	111.13	3.0625	77.79	46619	54061	44919
	N		.3020	7.67	4.3750	111.13	3.0625	77.79	46784	54113	44958
5/16			.3125	7.94	4.5000	114.30	3.1875	80.96	46620	54062	44920
	8.00		.3150		4.6063	117.00	2.9528	75.00	46482	—	—
	O		.3160	8.03	4.5000	114.30	3.1875	80.96	46785	54114	44959
	8.10		.3189		4.6063	117.00	2.9528	75.00	46483	—	—
	P		.3230	8.20	4.6250	117.48	3.3125	84.14	46786	54115	44960
21/64			.3281	8.33	4.6250	117.48	3.3125	84.14	46621	54063	44921
	Q		.3320	8.43	4.7500	120.65	3.4375	87.31	46787	54116	44961
	8.50		.3346		4.6063	117.00	2.9528	75.00	46484	—	—
	R		.3390	8.61	4.7500	120.65	3.4375	87.31	46788	54117	44962
11/32			.3438	8.73	4.7500	120.65	3.4375	87.31	46622	54064	44922
	S		.3480	8.84	4.8750	123.83	3.5000	88.90	46789	54118	44963
	9.00		.3543		4.9213	125.00	3.1890	81.00	46486	—	—
	T		.3580	9.09	4.8750	123.83	3.5000	88.90	46790	54119	44964
23/64			.3594	9.13	4.8750	123.83	3.5000	88.90	46623	54065	44923
	U		.3680	9.35	5.0000	127.00	3.6250	92.08	46791	54120	44965
	9.50		.3740		4.9213	125.00	3.1890	81.00	46487	—	—
3/8			.3750	9.53	5.0000	127.00	3.6250	92.08	46624	54066	44924

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Drills

Jobber Length

NAS-Type Cobalt Heavy-Duty (continued) Styles 550, 550-TN (2550), 550-TA

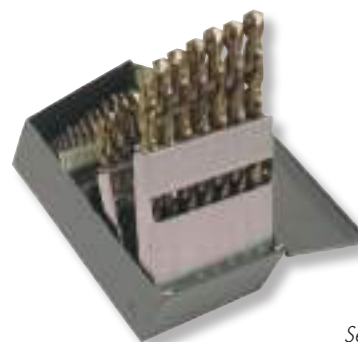
INCH AND METRIC SIZES

INCH AND METRIC SIZES									Style 550	Style 550-TN	Style 550-TA
Fract	Drill Diameter			Overall Length		Flute Length		Straw	TiN	TiAlN	
	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch				mm
25/64	V		.3770	9.58	5.0000	127.00	3.6250	92.08	46792	54121	44966
	W		.3860	9.80	5.1250	130.18	3.7500	95.25	46793	54122	44967
			.3906	9.92	5.1250	130.18	3.7500	95.25	46625	54070	44925
		10.00	.3937		5.2362	133.00	3.4252	87.00	46488	—	—
	X		.3970	10.08	5.1250	130.18	3.7500	95.25	46794	54123	44968
		10.20	.4016		5.2362	133.00	3.4252	87.00	46489	—	—
	Y		.4040	10.26	5.2500	133.35	3.8750	98.43	46795	54124	44969
			.4062	10.32	5.2500	133.35	3.8750	98.43	46626	54067	44926
13/32	Z		.4130	10.49	5.2500	133.35	3.8750	98.43	46796	54125	44970
27/64		10.50	.4134		5.2362	133.00	3.4252	87.00	46490	—	—
			.4219	10.72	5.3750	136.53	3.9375	100.01	46627	54071	44927
		10.80	.4252		5.5905	142.00	3.7008	94.00	46491	—	—
		11.00	.4331		5.5905	142.00	3.7008	94.00	46492	—	—
7/16			.4375	11.11	5.5000	139.70	4.0625	103.19	46628	54068	44928
			.4409		5.5905	142.00	3.7008	94.00	46493	—	—
			.4528		5.5905	142.00	3.7008	94.00	46495	—	—
			.4531	11.51	5.6250	142.88	4.1875	106.36	46629	54072	44929
29/64			.4688	11.91	5.7500	146.05	4.3125	109.54	46630	54073	44930
15/32		12.00	.4724		5.9449	151.00	3.9764	101.00	46496	—	—
		12.20	.4803		5.9449	151.00	3.9764	101.00	46497	—	—
			.4844	12.30	5.8750	149.23	4.3750	111.13	46631	54074	44931
		12.50	.4921		5.9449	151.00	3.9764	101.00	46498	—	—
	1/2		.5000	12.70	6.0000	152.40	4.5000	114.30	46632	54069	44932
		13.00	.5118		5.9449	151.00	3.9764	101.00	46499	—	—
			.5156	13.10	6.6250	168.28	4.8125	122.24	50075	—	—
	33/64		.5312	13.49	6.6250	168.28	4.8125	122.24	50076	—	—
			.5469	13.89	6.6250	168.28	4.8125	122.24	50077	—	—
9/16		.5625	14.29	6.6250	168.28	4.8125	122.24	50078	—	—	
37/64		.5781	14.68	6.6250	168.28	4.8125	122.24	50079	—	—	
19/32		.5938	15.08	7.1250	180.98	5.1875	131.76	50080	—	—	
39/64		.6094	15.48	7.1250	180.98	5.1875	131.76	50081	—	—	
5/8		.6250	15.88	7.1250	180.98	5.1875	131.76	50082	—	—	
41/64		.6406	16.27	7.1250	180.98	5.1875	131.76	50083	—	—	
21/32		.6562	16.67	7.1250	180.98	5.1875	131.76	50084	—	—	
43/64		.6719	17.07	7.1250	180.98	5.1875	131.76	50085	—	—	
11/16		.6875	17.46	7.1250	180.98	5.1875	131.76	50086	—	—	

INCH AND METRIC SETS

Sets in Metal Index Cases

Number of Tools	Size Range	Style 550	Style 550-TN
		Straw	TiN
13	1/16 - 1/4 X 1/64	57851	69891
15	1/16 - 1/2 X 1/32	57852	69871
21	1/16 - 3/8 X 1/64	69887	69892
29	1/16 - 1/2 X 1/64	57850	69870
26	Letters A - Z	69886	—
60	#1 - #60 wire gauge	57853	—
20	#61 - #80 wire gauge	45657	—
115	1/16 - 1/2 X 1/64, A - Z, #1 - #60	46650	—
11	1mm - 6mm X 0.5mm	54126	—
25	1mm - 13mm X 0.5mm	54127	—



Set 57850



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Jobber Length

Cobalt Heavy-Duty Styles 550ASP, 550ASP-TN

Features/Benefits:

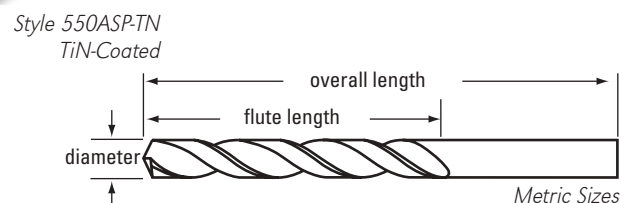
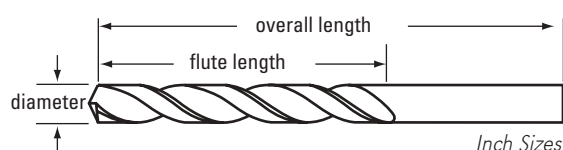
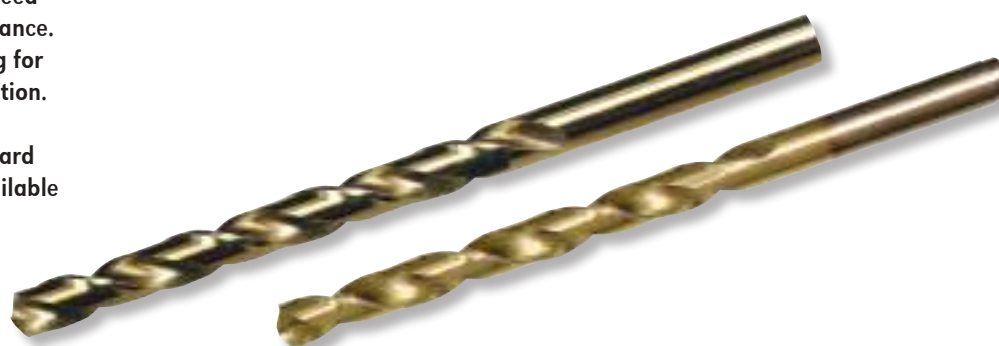
- Manufactured to NAS 907 Type B geometry aerospace specifications
- Heavy-duty construction for drilling in tough, high-tensile, and work-hardening materials.
- Manufactured from cobalt high-speed steel for increased abrasion resistance.
- 135° P3 split point is self-centering for reduced thrust and easier penetration.
- Straw finish and selected sizes of titanium nitride (TiN), finish standard from stock; alternate coatings available as stock modifications.

Application Information:

- stainless steel
- alloy steel
- titanium

Surface Treatment Information:

- Straw finish adds lubricity and easily identifies cobalt drills.
- Titanium nitride (TiN) coating adds lubricity and hardness, enhancing chip flow, finish hole quality, and drill life.



INCH AND METRIC SIZES

Drill Diameter					Overall Length		Flute Length		Style 550ASP	Style 550ASP-TN
Fract	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	mm	Straw	TiN
		1.00	.0394		1.3386	34.00	.4724	12.00	47820	47930
		1.10	.0433		1.4173	36.00	.5512	14.00	47821	—
		1.20	.0472		1.4961	38.00	.6299	16.00	47822	—
		1.30	.0512		1.4961	38.00	.6299	16.00	47823	—
		1.40	.0551		1.5748	40.00	.7087	18.00	47824	47934
		1.50	.0591		1.5748	40.00	.7087	18.00	47825	47935
1/16			.0625	1.59	1.8750	47.63	.8750	22.23	47704	47630
		1.60	.0630		1.6929	43.00	.7874	20.00	47826	—
	52		.0635	1.61	1.8750	47.63	.8750	22.23	47786	—
		1.70	.0669		1.6929	43.00	.7874	20.00	47827	—
	51		.0670	1.70	2.0000	50.80	1.0000	25.40	47785	—
	50		.0700	1.78	2.0000	50.80	1.0000	25.40	47784	—
		1.80	.0709		1.8110	46.00	.8661	22.00	47828	—
	49		.0730	1.85	2.0000	50.80	1.0000	25.40	47783	—
		1.90	.0748		1.8110	46.00	.8661	22.00	47829	—
	48		.0760	1.93	2.0000	50.80	1.0000	25.40	47782	—
5/64			.0781	1.98	2.0000	50.80	1.0000	25.40	47705	47631
	47		.0785	1.99	2.0000	50.80	1.0000	25.40	47781	—
		2.00	.0787		1.9291	49.00	.9449	24.00	47830	47940
	46		.0810	2.06	2.1250	53.98	1.1250	28.58	47780	—
	45		.0820	2.08	2.1250	53.98	1.1250	28.58	47779	—
		2.10	.0827		1.9291	49.00	.9449	24.00	47831	—
	44		.0860	2.18	2.1250	53.98	1.1250	28.58	47778	—
		2.20	.0866		2.0866	53.00	1.0630	27.00	47832	—
	43		.0890	2.26	2.2500	57.15	1.2500	31.75	47777	—

continued on next page

Drills

Jobber Length

Heavy-Duty Cobalt (continued) Styles 550ASP, 550ASP-TN

INCH AND METRIC SIZES

NCH AND METRIC SIZES									Style	Style
Drill Diameter					Overall Length		Flute Length		550ASP	550ASP-TN
Fract	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	mm	Straw	TiN
3/32	42	2.3	.0906		2.0866	53.00	1.0630	27.00	47833	—
			.0935	2.37	2.2500	57.15	1.2500	31.75	47776	—
		.0938	2.38	2.2500	57.15	1.2500	31.75	47706	47632	
		2.40	.0945		2.2441	57.00	1.1811	30.00	47834	47944
	41		.0960	2.44	2.3750	60.33	1.3750	34.93	47775	—
	40		.0980	2.49	2.3750	60.33	1.3750	34.93	47774	—
	2.50		.0984		2.2441	57.00	1.1811	30.00	47835	47945
39			.0995	2.53	2.3750	60.33	1.3750	34.93	47773	—
	38		.1015	2.58	2.5000	63.50	1.4375	36.51	47772	—
	2.60		.1024		2.2441	57.00	1.1811	30.00	47836	—
37			.1040	2.64	2.5000	63.50	1.4375	36.51	47771	—
	2.70		.1062		2.4016	61.00	1.2992	33.00	47837	—
36			.1065	2.71	2.5000	63.50	1.4375	36.51	47770	—
7/64			.1094	2.78	2.6250	66.68	1.5000	38.10	47707	47633
	35		.1100	2.79	2.6250	66.68	1.5000	38.10	47769	—
	2.80		.1102		2.4016	61.00	1.2992	33.00	47838	47948
34			.1110	2.82	2.6250	66.68	1.5000	38.10	47768	—
	33		.1130	2.87	2.6250	66.68	1.5000	38.10	47767	—
	2.90		.1142		2.4016	61.00	1.2992	33.00	47839	—
32			.1160	2.95	2.7500	69.85	1.6250	41.28	47766	—
	3.00		.1181		2.4016	61.00	1.2992	33.00	47840	47950
31			.1200	3.05	2.7500	69.85	1.6250	41.28	47765	—
	3.10		.1220		2.5591	65.00	1.4173	36.00	47841	—
1/8			.1250	3.18	2.7500	69.85	1.6250	41.28	47708	47634
	3.20		.1260		2.5591	65.00	1.4173	36.00	47842	47952
30			.1285	3.26	2.7500	69.85	1.6250	41.28	47764	—
	3.30		.1299		2.5591	65.00	1.4173	36.00	47843	47953
	3.4		.1339		2.7559	70.00	1.5354	39.00	47844	—
29			.1360	3.45	2.8750	73.03	1.7500	44.45	47763	—
	3.50		.1378		2.7559	70.00	1.5354	39.00	47845	47955
28			.1405	3.57	2.8750	73.03	1.7500	44.45	47762	—
9/64			.1406	3.57	2.8750	73.03	1.7500	44.45	47709	47635
	3.60		.1417		2.7559	70.00	1.5354	39.00	47846	47956
27			.1440	3.66	3.0000	76.20	1.8750	47.63	47761	—
	3.70		.1457		2.7559	70.00	1.5354	39.00	47847	47957
26			.1470	3.73	3.0000	76.20	1.8750	47.63	47760	—
	25		.1495	3.80	3.0000	76.20	1.8750	47.63	47759	—
		3.80		.1496		2.9528	75.00	1.6929	43.00	47848
	24		.1520	3.86	3.1250	79.38	2.0000	50.80	47758	—
		3.90		.1535		2.9528	75.00	1.6929	43.00	47849
5/32	23		.1540	3.91	3.1250	79.38	2.0000	50.80	47757	—
			.1562	3.97	3.1250	79.38	2.0000	50.80	47710	47636
	22		.1570	3.99	3.1250	79.38	2.0000	50.80	47756	—
		4.00		.1575		2.9528	75.00	1.6929	43.00	47850
	21		.1590	4.04	3.2500	82.55	2.1250	53.98	47755	—
20			.1610	4.09	3.2500	82.55	2.1250	53.98	47754	—
	4.10		.1614		2.9528	75.00	1.6929	43.00	47851	47961
		4.20		.1654		2.9528	75.00	1.6929	43.00	47852
	19		.1660	4.22	3.2500	82.55	2.1250	53.98	47753	—
		4.30		.1692		3.1496	80.00	1.8504	47.00	47853
	18		.1695	4.31	3.2500	82.55	2.1250	53.98	47752	—
11/64			.1719	4.37	3.2500	82.55	2.1250	53.98	47711	47637

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Customer Service: 800.348.2885

Technical Support: 800.892.4281

Jobber Length

Heavy-Duty Cobalt (continued)
Styles 550ASP, 550ASP-TN

INCH AND METRIC SIZES

Fract	Drill Diameter			Overall Length		Flute Length		Style 550ASP	Style 550ASP-TN
	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	Straw	TiN
17			.1730	4.39	3.3750	85.73	2.1875	55.56	47751
		4.40	.1732		3.1496	80.00	1.8504	47.00	47854
16			.1770	4.50	3.3750	85.73	2.1875	55.56	47750
		4.50	.1772		3.1496	80.00	1.8504	47.00	47855
15			.1800	4.57	3.3750	85.73	2.1875	55.56	47749
		4.60	.1811		3.1496	80.00	1.8504	47.00	47856
14			.1820	4.62	3.3750	85.73	2.1875	55.56	47748
			.1850	4.70	3.5000	88.90	2.3125	58.74	47747
13			.1850		3.1496	80.00	1.8504	47.00	47857
		4.70	.1850		3.1496	80.00	1.8504	47.00	47967
3/16			.1875	4.76	3.5000	88.90	2.3125	58.74	47712
			.1890	4.80	3.5000	88.90	2.3125	58.74	47746
12			.1890		3.3858	86.00	2.0472	52.00	47858
		4.80	.1890		3.3858	86.00	2.0472	52.00	47968
11			.1910	4.85	3.5000	88.90	2.3125	58.74	47745
		4.90	.1929		3.3858	86.00	2.0472	52.00	47859
10			.1935	4.91	3.6250	92.08	2.4375	61.91	47744
			.1960	4.98	3.6250	92.08	2.4375	61.91	47743
9			.1969		3.3858	86.00	2.0472	52.00	47860
		5.00	.1969		3.3858	86.00	2.0472	52.00	47970
8			.1990	5.05	3.6250	92.08	2.4375	61.91	47742
		5.10	.2008		3.3858	86.00	2.0472	52.00	47861
7			.2010	5.11	3.6250	92.08	2.4375	61.91	47741
			.2031	5.16	3.6250	92.08	2.4375	61.91	47713
13/64			.2040	5.18	3.7500	95.25	2.5000	63.50	47740
		5.20	.2047		3.3858	86.00	2.0472	52.00	47862
5			.2055	5.22	3.7500	95.25	2.5000	63.50	47739
		5.30	.2087		3.3858	86.00	2.0472	52.00	47863
4			.2090	5.31	3.7500	95.25	2.5000	63.50	47738
		5.40	.2125		3.6614	93.00	2.2441	57.00	47864
3			.2130	5.41	3.7500	95.25	2.5000	63.50	47737
		5.50	.2165		3.6614	93.00	2.2441	57.00	47865
7/32			.2188	5.56	3.7500	95.25	2.5000	63.50	47714
		5.60	.2205		3.6614	93.00	2.2441	57.00	47866
2			.2210	5.61	3.8750	98.43	2.6250	66.68	47736
		5.70	.2244		3.6614	93.00	2.2441	57.00	47867
1			.2280	5.79	3.8750	98.43	2.6250	66.68	47735
		5.80	.2283		3.6614	93.00	2.2441	57.00	47868
15/64			.2323		3.6614	93.00	2.2441	57.00	47869
		5.90	.2344	5.95	3.8750	98.43	2.6250	66.68	47715
6			.2362		3.6614	93.00	2.2441	57.00	47870
		6.00	.2362		3.6614	93.00	2.2441	57.00	47980
6.10			.2401		3.9764	101.00	2.4803	63.00	47871
		6.20	.2440		3.9764	101.00	2.4803	63.00	47872
6.30			.2480		3.9764	101.00	2.4803	63.00	47873
		6.30	.2480		3.9764	101.00	2.4803	63.00	47873
1/4			.2500	6.35	4.0000	101.60	2.7500	69.85	47716
		6.40	.2520		3.9764	101.00	2.4803	63.00	47874
6.50			.2559		3.9764	101.00	2.4803	63.00	47875
		6.60	.2598		3.9764	101.00	2.4803	63.00	47876
6.70			.2638		3.9764	101.00	2.4803	63.00	47877
		6.70	.2638		3.9764	101.00	2.4803	63.00	47877
17/64			.2656	6.75	4.1250	104.78	2.8750	73.03	47717
		6.80	.2677		4.2913	109.00	2.7165	69.00	47878
6.90			.2717		4.2913	109.00	2.7165	69.00	47879
		7.00	.2756		4.2913	109.00	2.7165	69.00	47880
J			.2770	7.04	4.1250	104.78	2.8750	73.03	47809
		7.10	.2795		4.2913	109.00	2.7165	69.00	47881

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Drills

Jobber Length

Heavy-Duty Cobalt (continued) Styles 550ASP, 550ASP-TN

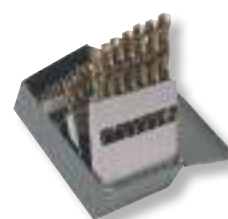
INCH AND METRIC SIZES

Fract	Drill Diameter		Decimal	mm	Overall Length		Flute Length		Style 550ASP	Style 550ASP-TN
	Wire/Let	Metric			Inch	mm	Inch	mm	Straw	TiN
9/32			.2812	7.14	4.2500	107.95	2.9375	74.61	47718	47644
		7.20	.2835		4.2913	109.00	2.7165	69.00	47882	—
		7.40	.2913		4.2913	109.00	2.7165	69.00	47884	—
		7.50	.2953		4.2913	109.00	2.7165	69.00	47885	47994
19/64			.2969	7.54	4.3750	111.13	3.0625	77.79	47719	—
		7.80	.3071		4.6063	117.00	2.9528	75.00	47888	—
		7.90	.3110		4.6063	117.00	2.9528	75.00	47889	—
5/16			.3125	7.94	4.5000	114.30	3.1875	80.96	47720	47646
		8.00	.3150		4.6063	117.00	2.9528	75.00	47890	47997
		8.10	.3189		4.6063	117.00	2.9528	75.00	47891	—
		8.20	.3228		4.6063	117.00	2.9528	75.00	47892	—
		8.30	.3268		4.6063	117.00	2.9528	75.00	47893	—
21/64			.3281	8.33	4.6250	117.48	3.3125	84.14	47721	—
		8.40	.3307		4.6063	117.00	2.9528	75.00	47894	—
		8.50	.3346		4.6063	117.00	2.9528	75.00	47895	48001
		8.60	.3386		4.9213	125.00	3.1890	81.00	47896	—
		8.70	.3425		4.9213	125.00	3.1890	81.00	47897	48002
11/32			.3438	8.73	4.7500	120.65	3.4375	87.31	47722	47648
		8.80	.3465		4.9213	125.00	3.1890	81.00	47898	—
		8.90	.3504		4.9213	125.00	3.1890	81.00	47899	—
		9.00	.3543		4.9213	125.00	3.1890	81.00	47900	48005
		9.30	.3661		4.9213	125.00	3.1890	81.00	47903	—
		9.40	.3701		4.9213	125.00	3.1890	81.00	47904	—
23/64			.3594	9.13	4.8750	123.83	3.5000	88.90	47723	—
		9.50	.3740		4.9213	125.00	3.1890	81.00	47905	48006
3/8			.3750	9.53	5.0000	127.00	3.6250	92.08	47724	47650
		9.60	.3780		5.2362	133.00	3.1890	81.00	47906	—
		9.80	.3858		5.2362	133.00	3.1890	81.00	47908	—
25/64			.3906	9.92	5.1250	130.18	3.7500	95.25	47725	—
		10.00	.3937		5.2362	133.00	3.4252	87.00	47910	48009
		10.20	.4016		5.2362	133.00	3.4252	87.00	47911	48010
13/32			.4062	10.32	5.2500	133.35	3.8750	98.43	47726	47652
		10.50	.4134		5.2362	133.00	3.4252	87.00	47912	48011
27/64			.4219	10.72	5.3750	136.53	3.9375	100.01	47727	—
		11.00	.4331		5.5905	142.00	3.7008	94.00	47913	48012
7/16			.4375	11.11	5.5000	139.70	4.0625	103.19	47728	47654
		11.50	.4527		5.5905	142.00	3.7008	94.00	47914	48013
29/64			.4531	11.51	5.6250	142.88	4.1875	106.36	47729	—
15/32			.4688	11.91	5.7500	146.05	4.3125	109.54	47730	47656
		12.00	.4724		5.9449	151.00	3.9764	101.00	47915	48014
31/64			.4844	12.30	5.8750	149.23	4.3750	111.13	47731	47657
		12.50	.4921		5.9449	151.00	3.9764	101.00	47916	48015
1/2			.5000	12.70	6.0000	152.40	4.5000	114.30	47732	47658
		13.00	.5118		5.9449	151.00	3.9764	101.00	47917	48016

INCH AND METRIC SETS

Sets in Metal Index Cases

		Style 550
Number of Tools	Size Range	Straw
15	1/16 - 1/2 x 1/32	47795
29	1/16 - 1/2 X 1/64	47796
19	1mm - 10mm x 0.5mm	47924
25	1mm - 13mm X 0.5mm	47925



Set 47796



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Wide Land Parabolic Styles 150WLP, 150WLP-TC (150WLPN)

Features/Benefits:

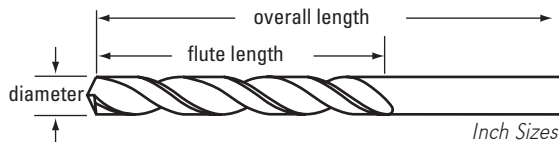
- Combination of parabolic flute form and point design produces tighter hole tolerances, heightened chip-breaking action, and improved coolant flow for deep-hole drilling.
- Wide flute spacing disperses chips away from the cutting edge more rapidly than conventional parabolic drills, resulting in tighter, more manageable chips and less chip packing.
- Manufactured from high-speed steel.
- 135° modified notch point is self-centering, provides greater stability, prevents walking, and lessens work-hardening.
- TiCN and bright finishes standard from stock; alternate coatings available as stock modifications.

Application Information:

- carbon steel (TiCN, bright)
- tool steel (TiCN, bright)
- alloy steel (TiCN, bright)
- free-machining steel (TiCN, bright)

Surface Treatment Information

- Titanium-carbonitride (TiCN) coating increases cutting surface hardness, making the tool highly resistant to abrasive wear.



INCH SIZES

								Style	Style
Drill Diameter				Overall Length		Flute Length		150WLP	150WLP-TC
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Bright	TiCN
1/16		.0625	1.59	1.8750	47.63	.8750	22.23	41004	42004
	52	.0635	1.61	1.8750	47.63	.8750	22.23	41122	42122
	51	.0670	1.70	2.0000	50.80	1.0000	25.40	41121	42121
	50	.0700	1.78	2.0000	50.80	1.0000	25.40	41120	42120
	49	.0730	1.85	2.0000	50.80	1.0000	25.40	41119	42119
	48	.0760	1.93	2.0000	50.80	1.0000	25.40	41118	42118
5/64		.0781	1.98	2.0000	50.80	1.0000	25.40	41005	42005
	47	.0785	1.99	2.0000	50.80	1.0000	25.40	41117	42117
	46	.0810	2.06	2.1250	53.98	1.1250	28.58	41116	42116
	45	.0820	2.08	2.1250	53.98	1.1250	28.58	41115	42115
	44	.0860	2.18	2.1250	53.98	1.1250	28.58	41114	42114
	43	.0890	2.26	2.2500	57.15	1.2500	31.75	41113	42113
	42	.0935	2.37	2.2500	57.15	1.2500	31.75	41112	42112
3/32		.0938	2.38	2.2500	57.15	1.2500	31.75	41006	42006
	41	.0960	2.44	2.3750	60.33	1.3750	34.93	41111	42111
	40	.0980	2.49	2.3750	60.33	1.3750	34.93	41110	42110
	39	.0995	2.53	2.3750	60.33	1.3750	34.93	41109	42109
	38	.1015	2.58	2.5000	63.50	1.4375	36.51	41108	42108
	37	.1040	2.64	2.5000	63.50	1.4375	36.51	41107	42107
	36	.1065	2.71	2.5000	63.50	1.4375	36.51	41106	42106
7/64		.1094	2.78	2.6250	66.68	1.5000	38.10	41007	42007

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Drills

Jobber Length

Wide Land Parabolic (continued) Styles 150WLP, 150WLP-TC (150WLPN)

INCH SIZES

Fract	Drill Diameter		mm	Overall Length		Flute Length		Style 150WLP	Style 150WLP-TC
	Wire/Let	Decimal		Inch	mm	Inch	mm	Bright	TiCN
	35	.1100	2.79	2.6250	66.68	1.5000	38.10	41105	42105
	34	.1110	2.82	2.6250	66.68	1.5000	38.10	41104	42104
	33	.1130	2.87	2.6250	66.68	1.5000	38.10	41103	42103
	32	.1160	2.95	2.7500	69.85	1.6250	41.28	41102	42102
	31	.1200	3.05	2.7500	69.85	1.6250	41.28	41101	42101
1/8		.1250	3.18	2.7500	69.85	1.6250	41.28	41008	42008
	30	.1285	3.26	2.7500	69.85	1.6250	41.28	41100	42100
	29	.1360	3.45	2.8750	73.03	1.7500	44.45	41099	42099
	28	.1405	3.57	2.8750	73.03	1.7500	44.45	41098	42098
9/64		.1406	3.57	2.8750	73.03	1.7500	44.45	41009	42009
	27	.1440	3.66	3.0000	76.20	1.8750	47.63	41097	42097
	26	.1470	3.73	3.0000	76.20	1.8750	47.63	41096	42096
	25	.1495	3.80	3.0000	76.20	1.8750	47.63	41095	42095
	24	.1520	3.86	3.1250	79.38	2.0000	50.80	41094	42094
	23	.1540	3.91	3.1250	79.38	2.0000	50.80	41093	42093
5/32		.1562	3.97	3.1250	79.38	2.0000	50.80	41010	42010
	22	.1570	3.99	3.1250	79.38	2.0000	50.80	41092	42092
	21	.1590	4.04	3.2500	82.55	2.1250	53.98	41091	42091
	20	.1610	4.09	3.2500	82.55	2.1250	53.98	41090	42090
	19	.1660	4.22	3.2500	82.55	2.1250	53.98	41089	42089
	18	.1695	4.31	3.2500	82.55	2.1250	53.98	41088	42088
11/64		.1719	4.37	3.2500	82.55	2.1250	53.98	41011	42011
	17	.1730	4.39	3.3750	85.73	2.1875	55.56	41087	42087
	16	.1770	4.50	3.3750	85.73	2.1875	55.56	41086	42086
	15	.1800	4.57	3.3750	85.73	2.1875	55.56	41085	42085
	14	.1820	4.62	3.3750	85.73	2.1875	55.56	41084	42084
	13	.1850	4.70	3.5000	88.90	2.3125	58.74	41083	42083
3/16		.1875	4.76	3.5000	88.90	2.3125	58.74	41012	42012
	12	.1890	4.80	3.5000	88.90	2.3125	58.74	41082	42082
	11	.1910	4.85	3.5000	88.90	2.3125	58.74	41081	42081
	10	.1935	4.91	3.6250	92.08	2.4375	61.91	41080	42080
	9	.1960	4.98	3.6250	92.08	2.4375	61.91	41079	42079
	8	.1990	5.05	3.6250	92.08	2.4375	61.91	41078	42078
	7	.2010	5.11	3.6250	92.08	2.4375	61.91	41077	42077
13/64		.2031	5.16	3.6250	92.08	2.4375	61.91	41013	42013
	6	.2040	5.18	3.7500	95.25	2.5000	63.50	41076	42076
	5	.2055	5.22	3.7500	95.25	2.5000	63.50	41075	42075
	4	.2090	5.31	3.7500	95.25	2.5000	63.50	41074	42074
	3	.2130	5.41	3.7500	95.25	2.5000	63.50	41073	42073
7/32		.2188	5.56	3.7500	95.25	2.5000	63.50	41014	42014
	2	.2210	5.61	3.8750	98.43	2.6250	66.68	41072	42072
	1	.2280	5.79	3.8750	98.43	2.6250	66.68	41071	42071
	A	.2340	5.94	3.8750	98.43	2.6250	66.68	41171	42171
15/64		.2344	5.95	3.8750	98.43	2.6250	66.68	41015	42015
	B	.2380	6.05	4.0000	101.60	2.7500	69.85	41172	42172
	C	.2420	6.15	4.0000	101.60	2.7500	69.85	41173	42173
	D	.2460	6.25	4.0000	101.60	2.7500	69.85	41174	42174
1/4	E	.2500	6.35	4.0000	101.60	2.7500	69.85	41016	42016
	F	.2570	6.53	4.1250	104.78	2.8750	73.03	41176	42176
	G	.2610	6.63	4.1250	104.78	2.8750	73.03	41177	42177
17/64		.2656	6.75	4.1250	104.78	2.8750	73.03	41017	42017

continued on next page



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Wide Land Parabolic (continued)
Styles 150WLP, 150WLP-TC (150WLPN)

INCH SIZES

								Style	Style
Drill Diameter				Overall Length		Flute Length		150WLP	150WLP-TC
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Bright	TiCN
	H	.2660	6.76	4.1250	104.78	2.8750	73.03	41178	42178
	I	.2720	6.91	4.1250	104.78	2.8750	73.03	41179	42179
	J	.2770	7.04	4.1250	104.78	2.8750	73.03	41180	42180
	K	.2810	7.14	4.2500	107.95	2.9375	74.61	41181	42181
9/32		.2812	7.14	4.2500	107.95	2.9375	74.61	41018	42018
	L	.2900	7.37	4.2500	107.95	2.9375	74.61	41182	42182
	M	.2950	7.49	4.3750	111.13	3.0625	77.79	41183	42183
19/64		.2969	7.54	4.3750	111.13	3.0625	77.79	41019	42019
	N	.3020	7.67	4.3750	111.13	3.0625	77.79	41184	42184
5/16		.3125	7.94	4.5000	114.30	3.1875	80.96	41020	42020
	O	.3160	8.03	4.5000	114.30	3.1875	80.96	41185	42185
	P	.3230	8.20	4.6250	117.48	3.3125	84.14	41186	42186
21/64		.3281	8.33	4.6250	117.48	3.3125	84.14	41021	42021
	Q	.3320	8.43	4.7500	120.65	3.4375	87.31	41187	42187
	R	.3390	8.61	4.7500	120.65	3.4375	87.31	41188	42188
11/32		.3438	8.73	4.7500	120.65	3.4375	87.31	41022	42022
	S	.3480	8.84	4.8750	123.83	3.5000	88.90	41189	42189
	T	.3580	9.09	4.8750	123.83	3.5000	88.90	41190	42190
23/64		.3594	9.13	4.8750	123.83	3.5000	88.90	41023	42023
	U	.3680	9.35	5.0000	127.00	3.6250	92.08	41191	42191
3/8		.3750	9.53	5.0000	127.00	3.6250	92.08	41024	42024
	V	.3770	9.58	5.0000	127.00	3.6250	92.08	41192	42192
	W	.3860	9.80	5.1250	130.18	3.7500	95.25	41193	42193
25/64		.3906	9.92	5.1250	130.18	3.7500	95.25	41025	42025
	X	.3970	10.08	5.1250	130.18	3.7500	95.25	41194	42194
	Y	.4040	10.26	5.2500	133.35	3.8750	98.43	41195	42195
13/32		.4062	10.32	5.2500	133.35	3.8750	98.43	41026	42026
	Z	.4130	10.49	5.2500	133.35	3.8750	98.43	41196	42196
27/64		.4219	10.72	5.3750	136.53	3.9375	100.01	41027	42027
7/16		.4375	11.11	5.5000	139.70	4.0625	103.19	41028	42028
29/64		.4531	11.51	5.6250	142.88	4.1875	106.36	41029	42029
15/32		.4688	11.91	5.7500	146.05	4.3125	109.54	41030	42030
31/64		.4844	12.30	5.8750	149.23	4.3750	111.13	41031	42031
1/2		.5000	12.70	6.0000	152.40	4.5000	114.30	41032	42032

TECH TIP**Deep Hole Drilling**

There are several factors to look at when drilling a deep hole. (defined as 4 or more times drill diameter). Those factors include the type of workpiece material and it's hardness. Softer materials are best drilled with a deep hole parabolic (narrow lands, wide flutes for extra chip space) design. These drills are normally used to 14 diameters without peck drilling and are available

with 118 or 135° split or notched points.

Harder materials require a wide land (wider lands, narrow flutes) design. Used to 8 diameters without pecking, these drills are 135° split pointed for hard materials, are made of cobalt material and are available as standards bright or with TiAlN coatings.

Speeds and feeds can also play a big part

in deep-hole drilling. The deeper the hole, the more likely the chips will pack and clog the flutes, not allowing for ample coolant. This increases the amount of heat generated and could result in early failure. Follow the manufacturers recommended operating ranges.

Drills

Jobber Length

Deep-Hole Parabolic Styles 150DH, 150DH-TN (150DHT)

Features/Benefits:

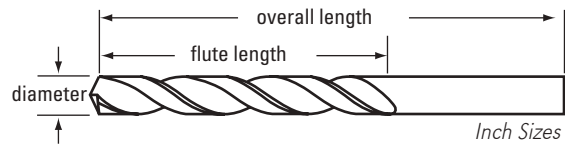
- Parabolic flute configuration with proprietary Convoflute flute design offers wider flute space, dispersing chips away from the cutting edges more rapidly and increasing coolant flow.
- Engineered for deep-hole drilling up to 8 to 12 X diameter depth, depending on drill diameter.
- Manufactured from premium high-speed steel.
- 135° K-notch notch split point is self-centering, and uses reduced thrust for easier penetration.
- TiN and bright finishes standard from stock; alternate coatings available as stock modifications.

Application Information:

- low carbon steel (TiN, bright)
- soft alloy steel (TiN, bright)
- aluminum (TiCN as a modification)
- non-ferrous materials (bright)

Surface Treatment Information

- Titanium-nitride (TiN) coating adds lubricity and hardness, enhancing chip flow, finished hole quality, and drill life.



INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 150DH	Style 150DH-TN
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Bright	TiN
1/16		.0625	1.59	1.8750	47.63	.8750	22.23	68904	54083
	52	.0635	1.61	1.8750	47.63	.8750	22.23	69052	53981
	51	.0670	1.70	2.0000	50.80	1.0000	25.40	69051	53980
	50	.0700	1.78	2.0000	50.80	1.0000	25.40	69050	53979
	49	.0730	1.85	2.0000	50.80	1.0000	25.40	69049	53978
	48	.0760	1.93	2.0000	50.80	1.0000	25.40	69048	53977
5/64		.0781	1.98	2.0000	50.80	1.0000	25.40	68905	54084
	47	.0785	1.99	2.0000	50.80	1.0000	25.40	69047	53976
	46	.0810	2.06	2.1250	53.98	1.1250	28.58	69046	53975
	45	.0820	2.08	2.1250	53.98	1.1250	28.58	69045	53974
	44	.0860	2.18	2.1250	53.98	1.1250	28.58	69044	53973
	43	.0890	2.26	2.2500	57.15	1.2500	31.75	69043	53972
	42	.0935	2.37	2.2500	57.15	1.2500	31.75	69042	53971
3/32		.0938	2.38	2.2500	57.15	1.2500	31.75	68906	54085
	41	.0960	2.44	2.3750	60.33	1.3750	34.93	69041	53970
	40	.0980	2.49	2.3750	60.33	1.3750	34.93	69040	53969
	39	.0995	2.53	2.3750	60.33	1.3750	34.93	69039	53968
	38	.1015	2.58	2.5000	63.50	1.4375	36.51	69038	53967
	37	.1040	2.64	2.5000	63.50	1.4375	36.51	69037	53966
	36	.1065	2.71	2.5000	63.50	1.4375	36.51	69036	53965
7/64		.1094	2.78	2.6250	66.68	1.5000	38.10	68907	54086
	35	.1100	2.79	2.6250	66.68	1.5000	38.10	69035	53964
	34	.1110	2.82	2.6250	66.68	1.5000	38.10	69034	53963

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Jobber Length

Deep-Hole Parabolic (continued)
Styles 150DH, 150DH-TN (150DHT)

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style	Style
	Wire/Let	Decimal	mm	Inch	mm	Inch	150DH Bright	150DH-TN TiN
	33	.1130	2.87	2.6250	66.68	1.5000	38.10	69033 53962
	32	.1160	2.95	2.7500	69.85	1.6250	41.28	69032 53961
	31	.1200	3.05	2.7500	69.85	1.6250	41.28	69031 53960
1/8		.1250	3.18	2.7500	69.85	1.6250	41.28	68908 53901
	30	.1285	3.26	2.7500	69.85	1.6250	41.28	69030 53959
	29	.1360	3.45	2.8750	73.03	1.7500	44.45	69029 53958
	28	.1405	3.57	2.8750	73.03	1.7500	44.45	69028 53957
9/64		.1406	3.57	2.8750	73.03	1.7500	44.45	68909 53902
	27	.1440	3.66	3.0000	76.20	1.8750	47.63	69027 53956
	26	.1470	3.73	3.0000	76.20	1.8750	47.63	69026 53955
	25	.1495	3.80	3.0000	76.20	1.8750	47.63	69025 53954
	24	.1520	3.86	3.1250	79.38	2.0000	50.80	69024 53953
	23	.1540	3.91	3.1250	79.38	2.0000	50.80	69023 53952
5/32		.1562	3.97	3.1250	79.38	2.0000	50.80	68910 53903
	22	.1570	3.99	3.1250	79.38	2.0000	50.80	69022 53951
	21	.1590	4.04	3.2500	82.55	2.1250	53.98	69021 53950
	20	.1610	4.09	3.2500	82.55	2.1250	53.98	69020 53949
	19	.1660	4.22	3.2500	82.55	2.1250	53.98	69019 53948
	18	.1695	4.31	3.2500	82.55	2.1250	53.98	69018 53947
11/64		.1719	4.37	3.2500	82.55	2.1250	53.98	68911 53904
	17	.1730	4.39	3.3750	85.73	2.1875	55.56	69017 53946
	16	.1770	4.50	3.3750	85.73	2.1875	55.56	69016 53945
	15	.1800	4.57	3.3750	85.73	2.1875	55.56	69015 53944
	14	.1820	4.62	3.3750	85.73	2.1875	55.56	69014 53943
	13	.1850	4.70	3.5000	88.90	2.3125	58.74	69013 53942
3/16		.1875	4.76	3.5000	88.90	2.3125	58.74	68912 53905
	12	.1890	4.80	3.5000	88.90	2.3125	58.74	69012 53941
	11	.1910	4.85	3.5000	88.90	2.3125	58.74	69011 53940
	10	.1935	4.91	3.6250	92.08	2.4375	61.91	69010 53939
	9	.1960	4.98	3.6250	92.08	2.4375	61.91	69009 53938
	8	.1990	5.05	3.6250	92.08	2.4375	61.91	69008 53937
	7	.2010	5.11	3.6250	92.08	2.4375	61.91	69007 53936
13/64		.2031	5.16	3.6250	92.08	2.4375	61.91	68913 53906
	6	.2040	5.18	3.7500	95.25	2.5000	63.50	69006 53935
	5	.2055	5.22	3.7500	95.25	2.5000	63.50	69005 53934
	4	.2090	5.31	3.7500	95.25	2.5000	63.50	69004 53933
	3	.2130	5.41	3.7500	95.25	2.5000	63.50	69003 53932
7/32		.2188	5.56	3.7500	95.25	2.5000	63.50	68914 53907
	2	.2210	5.61	3.8750	98.43	2.6250	66.68	69002 53931
	1	.2280	5.79	3.8750	98.43	2.6250	66.68	69001 53930
	A	.2340	5.94	3.8750	98.43	2.6250	66.68	68970 53869
15/64		.2344	5.95	3.8750	98.43	2.6250	66.68	68915 53908
	B	.2380	6.05	4.0000	101.60	2.7500	69.85	68971 53870
	C	.2420	6.15	4.0000	101.60	2.7500	69.85	68972 53871
	D	.2460	6.25	4.0000	101.60	2.7500	69.85	68973 53872
1/4		.2500	6.35	4.0000	101.60	2.7500	69.85	68916 53909
	F	.2570	6.53	4.1250	104.78	2.8750	73.03	68975 53873
	G	.2610	6.63	4.1250	104.78	2.8750	73.03	68976 53874
17/64		.2656	6.75	4.1250	104.78	2.8750	73.03	68917 53910
	H	.2660	6.76	4.1250	104.78	2.8750	73.03	68977 53875
	I	.2720	6.91	4.1250	104.78	2.8750	73.03	68978 53876

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Drills

Jobber Length

Deep-Hole Parabolic (continued) Styles 150DH, 150DH-TN (150DHT)

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style 150DH	Style 150DH-TN
	Wire/Let	Decimal	mm	Inch	mm	Inch	Bright	TIN
9/32	J	.2770	7.04	4.1250	104.78	2.8750	68979	53877
	K	.2812	7.14	4.2500	107.95	2.9375	68918	53911
	L	.2900	7.37	4.2500	107.95	2.9375	68980	53879
19/64	M	.2950	7.49	4.3750	111.13	3.0625	68981	53880
		.2969	7.54	4.3750	111.13	3.0625	68919	53912
	N	.3020	7.67	4.3750	111.13	3.0625	68982	53881
5/16		.3125	7.94	4.5000	114.30	3.1875	68920	53913
	O	.3160	8.03	4.5000	114.30	3.1875	68983	53882
	P	.3230	8.20	4.6250	117.48	3.3125	68984	53883
21/64		.3281	8.33	4.6250	117.48	3.3125	68921	53914
	Q	.3320	8.43	4.7500	120.65	3.4375	68985	53884
	R	.3390	8.61	4.7500	120.65	3.4375	68986	53885
11/32		.3438	8.73	4.7500	120.65	3.4375	68922	53915
	S	.3480	8.84	4.8750	123.83	3.5000	68987	53886
	T	.3580	9.09	4.8750	123.83	3.5000	68988	53887
23/64		.3594	9.13	4.8750	123.83	3.5000	68923	53916
	U	.3680	9.35	5.0000	127.00	3.6250	68989	53888
		.3750	9.53	5.0000	127.00	3.6250	68924	53917
3/8	V	.3770	9.58	5.0000	127.00	3.6250	68990	53889
	W	.3860	9.80	5.1250	130.18	3.7500	68991	53890
		.3906	9.92	5.1250	130.18	3.7500	68925	53918
25/64	X	.3970	10.08	5.1250	130.18	3.7500	68992	53891
	Y	.4040	10.26	5.2500	133.35	3.8750	68993	53892
		.4062	10.32	5.2500	133.35	3.8750	68926	53919
13/32	Z	.4130	10.49	5.2500	133.35	3.8750	68994	53893
		.4219	10.72	5.3750	136.53	3.9375	68927	53920
	7/16	.4375	11.11	5.5000	139.70	4.0625	68928	53921
29/64		.4531	11.51	5.6250	142.88	4.1875	68929	53922
	15/32	.4688	11.91	5.7500	146.05	4.3125	68930	53923
	31/64	.4844	12.30	5.8750	149.23	4.3750	68931	53924
1/2		.5000	12.70	6.0000	152.40	4.5000	68932	53925

INCH SET

Sets in Metal Index Cases

Number of Tools	Size Range	Style 150DH-TN
		TIN
29	1/16 - 1/2 X 1/64	57734



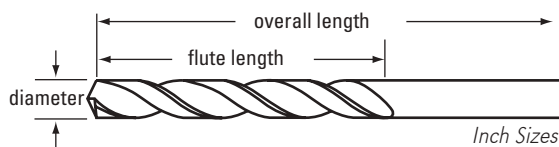
Carbide-Tipped Styles CTD

Features/Benefits:

- General-purpose geometry for drilling in a wide range of operating conditions and materials.
- Manufactured from high-speed steel with brazed carbide tip.
- 118° point.
- Can be run at speeds and feeds equivalent to general-purpose carbide drills.
- Bright finish provides good chip ejection; alternate coatings available as stock modifications.

Application Information:

- non-ferrous materials
- cast iron
- Effective in abrasive materials.



Style CTD bright finish

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style CTD Bright
	Decimal	mm	Inch	mm	Inch	mm	
1/8	.1250	3.18	2.7500	69.85	1.6250	41.28	77645
5/32	.1562	3.97	3.1250	79.38	2.0000	50.80	77647
3/16	.1875	4.76	3.5000	88.90	2.3125	58.74	77649
7/32	.2188	5.56	3.7500	95.25	2.5000	63.50	77651
1/4	.2500	6.35	4.0000	101.60	2.7500	69.85	77653
9/32	.2812	7.14	4.2500	107.95	2.9375	74.61	77655
5/16	.3125	7.94	4.5000	114.30	3.1875	80.96	77657
11/32	.3438	8.73	4.7500	120.65	3.4375	87.31	77659
3/8	.3750	9.53	5.0000	127.00	3.6250	92.08	77661
13/32	.4062	10.32	5.2500	133.35	3.8750	98.43	77663
7/16	.4375	11.11	5.5000	139.70	4.0625	103.19	77665
15/32	.4688	11.91	5.7500	146.05	4.3125	109.54	77667
1/2	.5000	12.70	6.0000	152.40	4.5000	114.30	77669

Drills

Screw Machine Length

General Purpose Styles 157, 157-TN (2157)

Features/Benefits:

- General-purpose geometry for drilling in a wide range of operating conditions and materials.
- Manufactured from premium high-speed steel.
- 118° point.
- Shorter flute and overall length provide superior rigidity to minimize deflection when using heavy feed rates.
- Extra rigidity is ideal for portable drilling.
- Bright finish standard from stock up to .5000"; black oxide standard from stock over .5000"; titanium-nitride (TiN) coated available from stock in selected sizes.

Application Information:

- carbon steel (bright, black oxide)
- alloy steel (bright, black oxide)
- cast iron (bright, black oxide)
- non-ferrous materials (bright)

Surface Treatment Information:

- Black oxide surface finish increases wear resistance and adds lubricity, improving chip flow.
- Titanium nitride (TiN) PVD coating adds lubricity and hardness which enhances chip flow, finish hole quality, and drill life.



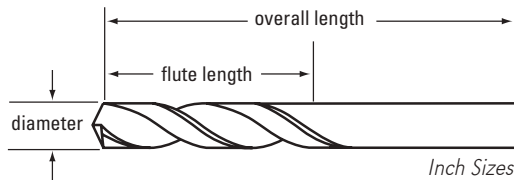
Style 157 Bright Finish



Style 157 Black Oxide



Style 157-TN TiN-Coated



Inch Sizes

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 157	Style 157-TN
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Bright	TiN
	60	.0400	1.02	1.3750	34.93	.5000	12.70	48760	—
	59	.0410	1.04	1.3750	34.93	.5000	12.70	48759	—
	58	.0420	1.07	1.3750	34.93	.5000	12.70	48758	—
	57	.0430	1.09	1.3750	34.93	.5000	12.70	48757	—
	56	.0465	1.18	1.3750	34.93	.5000	12.70	48756	—
3/64		.0469	1.19	1.3750	34.93	.5000	12.70	48503	—
	55	.0520	1.32	1.6250	41.28	.6250	15.88	48755	—
	54	.0550	1.40	1.6250	41.28	.6250	15.88	48754	—
	53	.0595	1.51	1.6250	41.28	.6250	15.88	48753	—
1/16		.0625	1.59	1.6250	41.28	.6250	15.88	48504	55096
	52	.0635	1.61	1.6875	42.86	.6875	17.46	48752	—
	51	.0670	1.70	1.6875	42.86	.6875	17.46	48751	—
	50	.0700	1.78	1.6875	42.86	.6875	17.46	48750	—
	49	.0730	1.85	1.6875	42.86	.6875	17.46	48749	—
	48	.0760	1.93	1.6875	42.86	.6875	17.46	48748	—
5/64		.0781	1.98	1.6875	42.86	.6875	17.46	48505	55087
	47	.0785	1.99	1.7500	44.45	.7500	19.05	48747	—
	46	.0810	2.06	1.7500	44.45	.7500	19.05	48746	—
	45	.0820	2.08	1.7500	44.45	.7500	19.05	48745	—
	44	.0860	2.18	1.7500	44.45	.7500	19.05	48744	—
	43	.0890	2.26	1.7500	44.45	.7500	19.05	48743	—
	42	.0935	2.37	1.7500	44.45	.7500	19.05	48742	—
3/32		.0938	2.38	1.7500	44.45	.7500	19.05	48506	55098
	41	.0960	2.44	1.8125	46.04	.8125	20.64	48741	—

continued on next page



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Screw Machine Length

General Purpose (continued)
Styles 157, 157-TN (2157)

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 157	Style 157-TN
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Bright	TiN
	40	.0980	2.49	1.8125	46.04	.8125	20.64	48740	—
	39	.0995	2.53	1.8125	46.04	.8125	20.64	48739	—
	38	.1015	2.58	1.8125	46.04	.8125	20.64	48738	—
	37	.1040	2.64	1.8125	46.04	.8125	20.64	48737	—
	36	.1065	2.71	1.8125	46.04	.8125	20.64	48736	—
7/64		.1094	2.78	1.8125	46.04	.8125	20.64	48507	55099
	35	.1100	2.79	1.8750	47.63	.8750	22.23	48735	—
	34	.1110	2.82	1.8750	47.63	.8750	22.23	48734	—
	33	.1130	2.87	1.8750	47.63	.8750	22.23	48733	—
	32	.1160	2.95	1.8750	47.63	.8750	22.23	48732	—
	31	.1200	3.05	1.8750	47.63	.8750	22.23	48731	—
1/8		.1250	3.18	1.8750	47.63	.8750	22.23	48508	55100
	30	.1285	3.26	1.9375	49.21	.9375	23.81	48730	—
	29	.1360	3.45	1.9375	49.21	.9375	23.81	48729	—
	28	.1405	3.57	1.9375	49.21	.9375	23.81	48728	—
9/64		.1406	3.57	1.9375	49.21	.9375	23.81	48509	55101
	27	.1440	3.66	2.0625	52.39	1.0000	25.40	48727	—
	26	.1470	3.73	2.0625	52.39	1.0000	25.40	48726	—
	25	.1495	3.80	2.0625	52.39	1.0000	25.40	48725	—
	24	.1520	3.86	2.0625	52.39	1.0000	25.40	48724	—
	23	.1540	3.91	2.0625	52.39	1.0000	25.40	48723	—
5/32		.1562	3.97	2.0625	52.39	1.0000	25.40	48510	55102
	22	.1570	3.99	2.1250	53.98	1.0625	26.99	48722	—
	21	.1590	4.04	2.1250	53.98	1.0625	26.99	48721	—
	20	.1610	4.09	2.1250	53.98	1.0625	26.99	48720	—
	19	.1660	4.22	2.1250	53.98	1.0625	26.99	48719	—
	18	.1695	4.31	2.1250	53.98	1.0625	26.99	48718	—
11/64		.1719	4.37	2.1250	53.98	1.0625	26.99	48511	55103
	17	.1730	4.39	2.1875	55.56	1.2500	31.75	48717	—
	16	.1770	4.50	2.1875	55.56	1.2500	31.75	48716	—
	15	.1800	4.57	2.1875	55.56	1.2500	31.75	48715	—
	14	.1820	4.62	2.1875	55.56	1.2500	31.75	48714	—
	13	.1850	4.70	2.1875	55.56	1.2500	31.75	48713	—
3/16		.1875	4.76	2.1875	55.56	1.2500	31.75	48512	55104
	12	.1890	4.80	2.2500	57.15	1.1875	30.16	48712	—
	11	.1910	4.85	2.2500	57.15	1.1875	30.16	48711	—
	10	.1935	4.91	2.2500	57.15	1.1875	30.16	48710	—
	9	.1960	4.98	2.2500	57.15	1.1875	30.16	48709	—
	8	.1990	5.05	2.2500	57.15	1.1875	30.16	48708	—
	7	.2010	5.11	2.2500	57.15	1.1875	30.16	48707	—
13/64		.2031	5.16	2.2500	57.15	1.1875	30.16	48513	55105
	6	.2040	5.18	2.3750	60.33	1.2500	31.75	48706	—
	5	.2055	5.22	2.3750	60.33	1.2500	31.75	48705	—
	4	.2090	5.31	2.3750	60.33	1.2500	31.75	48704	—
	3	.2130	5.41	2.3750	60.33	1.2500	31.75	48703	—
7/32		.2188	5.56	2.3750	60.33	1.2500	31.75	48514	55106
	2	.2210	5.61	2.4375	61.91	1.3125	33.34	48702	—
	1	.2280	5.79	2.4375	61.91	1.3125	33.34	48701	—
	A	.2340	5.94	2.4375	61.91	1.3125	33.34	48801	—
15/64		.2344	5.95	2.4375	61.91	1.3125	33.34	48515	55107
	B	.2380	6.05	2.5000	63.50	1.3750	34.93	48802	—

continued on next page

Drills

Screw Machine Length

General Purpose (continued) Styles 157, 157-TN (2157)

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 157	Style 157-TN
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Bright	TiN
	C	.2420	6.15	2.5000	63.50	1.3750	34.93	48803	—
	D	.2460	6.25	2.5000	63.50	1.3750	34.93	48804	—
1/4	E	.2500	6.35	2.5000	63.50	1.3750	34.93	48516	55108
	F	.2570	6.53	2.6250	66.68	1.4375	36.51	48806	—
	G	.2610	6.63	2.6250	66.68	1.4375	36.51	48807	—
17/64		.2656	6.75	2.6250	66.68	1.4375	36.51	48517	55109
	H	.2660	6.76	2.6875	68.26	1.5000	38.10	48808	—
	I	.2720	6.91	2.6875	68.26	1.5000	38.10	48809	—
	J	.2770	7.04	2.6875	68.26	1.5000	38.10	48810	—
	K	.2812	7.14	2.6875	68.26	1.5000	38.10	48811	—
9/32		.2812	7.14	2.6875	68.26	1.5000	38.10	48518	55110
	L	.2900	7.37	2.7500	69.85	1.5625	39.69	48812	—
	M	.2950	7.49	2.7500	69.85	1.5625	39.69	48813	—
19/64		.2969	7.54	2.7500	69.85	1.5625	39.69	48519	55111
	N	.3020	7.67	2.8125	71.44	1.6250	41.28	48814	—
5/16		.3125	7.94	2.8125	71.44	1.6250	41.28	48520	55112
	O	.3160	8.03	2.9375	74.61	1.6875	42.86	48815	—
	P	.3230	8.20	2.9375	74.61	1.6875	42.86	48816	—
21/64		.3281	8.33	2.9375	74.61	1.6875	42.86	48521	55113
	Q	.3320	8.43	3.0000	76.20	1.6875	42.86	48817	—
	R	.3390	8.61	3.0000	76.20	1.6875	42.86	48818	—
11/32		.3438	8.73	3.0000	76.20	1.6875	42.86	48522	55114
	S	.3480	8.84	3.0625	77.79	1.7500	44.45	48819	—
	T	.3580	9.09	3.0625	77.79	1.7500	44.45	48820	—
23/64		.3594	9.13	3.0625	77.79	1.7500	44.45	48523	55115
	U	.3680	9.35	3.1250	79.38	1.8125	46.04	48821	—
3/8		.3750	9.53	3.1250	79.38	1.8125	46.04	48524	55116
	V	.3770	9.58	3.2500	82.55	1.8750	47.63	48822	—
	W	.3860	9.80	3.2500	82.55	1.8750	47.63	48823	—
25/64		.3906	9.92	3.2500	82.55	1.8750	47.63	48525	55117
	X	.3970	10.08	3.3125	84.14	1.9375	49.21	48824	—
	Y	.4040	10.26	3.3125	84.14	1.9375	49.21	48825	—
13/32		.4062	10.32	3.3125	84.14	1.9375	49.21	48526	55118
	Z	.4130	10.49	3.3750	85.73	2.0000	50.80	48826	—
27/64		.4219	10.72	3.3750	85.73	2.0000	50.80	48527	55119
7/16		.4375	11.11	3.4375	87.31	2.0625	52.39	48528	55120
29/64		.4531	11.51	3.5625	90.49	2.1250	53.98	48529	55121
15/32		.4688	11.91	3.6250	92.08	2.1250	53.98	48530	55122
31/64		.4844	12.30	3.6875	93.66	2.1875	55.56	48531	55123
1/2		.5000	12.70	3.7500	95.25	2.2500	57.15	48532	55124

drills over 1/2" diameter are black oxide finish
continued on next page

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Screw Machine Length

General Purpose (continued)
Styles 157, 157-TN (2157)

INCH SIZES

Drill Diameter			Overall Length		Flute Length		Style 157
Fract	Decimal	mm	Inch	mm	Inch	mm	Black Oxide
33/64	.5156	13.10	3.8750	98.43	2.3750	60.33	48533
17/32	.5312	13.49	3.8750	98.43	2.3750	60.33	48534
35/64	.5469	13.89	4.0000	101.60	2.5000	63.50	48535
9/16	.5625	14.29	4.0000	101.60	2.5000	63.50	48536
37/64	.5781	14.68	4.1250	104.78	2.6250	66.68	48537
19/32	.5938	15.08	4.1250	104.78	2.6250	66.68	48538
39/64	.6094	15.48	4.2500	107.95	2.7500	69.85	48539
5/8	.6250	15.88	4.2500	107.95	2.7500	69.85	48540
41/64	.6406	16.27	4.5000	114.30	2.8750	73.03	48541
21/32	.6562	16.67	4.5000	114.30	2.8750	73.03	48542
43/64	.6719	17.07	4.6250	117.48	2.8750	73.03	48543
11/16	.6875	17.46	4.6250	117.48	2.8750	73.03	48544
45/64	.7031	17.86	4.7500	120.65	3.0000	76.20	48545
23/32	.7188	18.26	4.7500	120.65	3.0000	76.20	48546
47/64	.7344	18.65	5.0000	127.00	3.1250	79.38	48547
3/4	.7500	19.05	5.0000	127.00	3.1250	79.38	48548
49/64	.7656	19.45	5.1250	130.18	3.2500	82.55	48549
25/32	.7812	19.84	5.1250	130.18	3.2500	82.55	48550
51/64	.7969	20.24	5.2500	133.35	3.3750	85.73	48551
13/16	.8125	20.64	5.2500	133.35	3.3750	85.73	48552
53/64	.8281	21.03	5.3750	136.53	3.5000	88.90	48553
27/32	.8438	21.43	5.3750	136.53	3.5000	88.90	48554
55/64	.8594	21.83	5.5000	139.70	3.5000	88.90	48555
7/8	.8750	22.23	5.5000	139.70	3.5000	88.90	48556
57/64	.8906	22.62	5.6250	142.88	3.6250	92.08	48557
29/32	.9062	23.02	5.6250	142.88	3.6250	92.08	48558
59/64	.9219	23.42	5.7500	146.05	3.7500	95.25	48559
15/16	.9375	23.81	5.7500	146.05	3.7500	95.25	48560
61/64	.9531	24.21	5.8750	149.23	3.8750	98.43	48561
31/32	.9688	24.61	5.8750	149.23	3.8750	98.43	48562
63/64	.9844	25.00	6.0000	152.40	4.0000	101.60	48563
1	1.0000	25.40	6.0000	152.40	4.0000	101.60	48564
1-1/16*	1.0625	26.99	6.2500	158.75	4.0000	101.60	48568
1-1/8*	1.1250	28.58	6.3750	161.93	4.0000	101.60	48572
1-3/16*	1.1875	30.16	6.6250	168.28	4.2500	107.95	48576
1-1/4*	1.2500	31.75	6.7500	171.45	4.3750	111.13	48580

*Shank diameter for these sizes is 1.0000" (25.4mm).

INCH SETS

Sets in Metal Index Cases

Number of Tools	Size Range	Style 157 Bright
29	1/16 - 1/2 X 1/64	69900
26	Letters A - Z	69901
60	#1 - #60 wire gauge	69902



Set 69901

Drills

Screw Machine Length

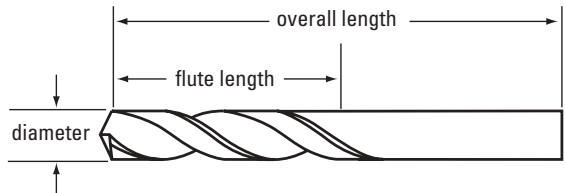
Left-Hand Helix Style 157L

Features/Benefits:

- Left-hand flute configuration provides excellent chip ejection by lifting chips up and out of the workpiece more efficiently.
- Manufactured from premium high-speed steel.
- 118° point.
- Bright, finish standard from stock; alternate coatings available as stock modifications.

Application Information:

- carbon steel
- mild steel
- non-ferrous materials
- Recommended for drilling low-tensile materials such as aluminum, magnesium, copper, wood, slate, and some thermoplastics.



Style 157L Bright Finish

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 157L
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Bright
	60	.0400	1.02	1.3750	34.93	.5000	12.70	49130
	59	.0410	1.04	1.3750	34.93	.5000	12.70	49129
	58	.0420	1.07	1.3750	34.93	.5000	12.70	49128
	57	.0430	1.09	1.3750	34.93	.5000	12.70	49127
	56	.0465	1.18	1.3750	34.93	.5000	12.70	49126
3/64		.0469	1.19	1.3750	34.93	.5000	12.70	48903
	55	.0520	1.32	1.6250	41.28	.6250	15.88	49125
	54	.0550	1.40	1.6250	41.28	.6250	15.88	49124
	53	.0595	1.51	1.6250	41.28	.6250	15.88	49123
1/16		.0625	1.59	1.6250	41.28	.6250	15.88	48904
	52	.0635	1.61	1.6875	42.86	.6875	17.46	49122
	51	.0670	1.70	1.6875	42.86	.6875	17.46	49121
	50	.0700	1.78	1.6875	42.86	.6875	17.46	49120
	49	.0730	1.85	1.6875	42.86	.6875	17.46	49119
	48	.0760	1.93	1.6875	42.86	.6875	17.46	49118
5/64		.0781	1.98	1.6875	42.86	.6875	17.46	48905
	47	.0785	1.99	1.7500	44.45	.7500	19.05	49117
	46	.0810	2.06	1.7500	44.45	.7500	19.05	49116
	45	.0820	2.08	1.7500	44.45	.7500	19.05	49115
	44	.0860	2.18	1.7500	44.45	.7500	19.05	49114
	43	.0890	2.26	1.7500	44.45	.7500	19.05	49113
	42	.0935	2.37	1.7500	44.45	.7500	19.05	49112
3/32		.0938	2.38	1.7500	44.45	.7500	19.05	48906
	41	.0960	2.44	1.8125	46.04	.8125	20.64	49111
	40	.0980	2.49	1.8125	46.04	.8125	20.64	49110
	39	.0995	2.53	1.8125	46.04	.8125	20.64	49109
	38	.1015	2.58	1.8125	46.04	.8125	20.64	49108
	37	.1040	2.64	1.8125	46.04	.8125	20.64	49107
	36	.1065	2.71	1.8125	46.04	.8125	20.64	49106
7/64		.1094	2.78	1.8125	46.04	.8125	20.64	48907
	35	.1100	2.79	1.8750	47.63	.8750	22.23	49105

continued on next page



Screw Machine Length

Left-Hand Helix (continued)
Style 157L

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 157L
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Bright
	34	.1110	2.82	1.8750	47.63	.8750	22.23	49104
	33	.1130	2.87	1.8750	47.63	.8750	22.23	49103
	32	.1160	2.95	1.8750	47.63	.8750	22.23	49102
	31	.1200	3.05	1.8750	47.63	.8750	22.23	49101
1/8		.1250	3.18	1.8750	47.63	.8750	22.23	48908
	30	.1285	3.26	1.9375	49.21	.9375	23.81	49100
	29	.1360	3.45	1.9375	49.21	.9375	23.81	49099
	28	.1405	3.57	1.9375	49.21	.9375	23.81	49098
9/64		.1406	3.57	1.9375	49.21	.9375	23.81	48909
	27	.1440	3.66	2.0625	52.39	1.0000	25.40	49097
	26	.1470	3.73	2.0625	52.39	1.0000	25.40	49096
	25	.1495	3.80	2.0625	52.39	1.0000	25.40	49095
	24	.1520	3.86	2.0625	52.39	1.0000	25.40	49094
	23	.1540	3.91	2.0625	52.39	1.0000	25.40	49093
5/32		.1562	3.97	2.0625	52.39	1.0000	25.40	48910
	22	.1570	3.99	2.1250	53.98	1.0625	26.99	49092
	21	.1590	4.04	2.1250	53.98	1.0625	26.99	49091
	20	.1610	4.09	2.1250	53.98	1.0625	26.99	49090
	19	.1660	4.22	2.1250	53.98	1.0625	26.99	49089
	18	.1695	4.31	2.1250	53.98	1.0625	26.99	49088
11/64		.1719	4.37	2.1250	53.98	1.0625	26.99	48911
	17	.1730	4.39	2.1875	55.56	1.2500	31.75	49087
	16	.1770	4.50	2.1875	55.56	1.2500	31.75	49086
	15	.1800	4.57	2.1875	55.56	1.2500	31.75	49085
	14	.1820	4.62	2.1875	55.56	1.2500	31.75	49084
	13	.1850	4.70	2.1875	55.56	1.2500	31.75	49083
3/16		.1875	4.76	2.1875	55.56	1.2500	31.75	48912
	12	.1890	4.80	2.2500	57.15	1.1875	30.16	49082
	11	.1910	4.85	2.2500	57.15	1.1875	30.16	49081
	10	.1935	4.91	2.2500	57.15	1.1875	30.16	49080
	9	.1960	4.98	2.2500	57.15	1.1875	30.16	49079
	8	.1990	5.05	2.2500	57.15	1.1875	30.16	49078
	7	.2010	5.11	2.2500	57.15	1.1875	30.16	49077
13/64		.2031	5.16	2.2500	57.15	1.1875	30.16	48913
	6	.2040	5.18	2.3750	60.33	1.2500	31.75	49076
	5	.2055	5.22	2.3750	60.33	1.2500	31.75	49075
	4	.2090	5.31	2.3750	60.33	1.2500	31.75	49074
	3	.2130	5.41	2.3750	60.33	1.2500	31.75	49073
7/32		.2188	5.56	2.3750	60.33	1.2500	31.75	48914
	2	.2210	5.61	2.4375	61.91	1.3125	33.34	49072
	1	.2280	5.79	2.4375	61.91	1.3125	33.34	49071
15/64		.2344	5.95	2.4375	61.91	1.3125	33.34	48915
1/4	E	.2500	6.35	2.5000	63.50	1.3750	34.93	48916
17/64		.2656	6.75	2.6250	66.68	1.4375	36.51	48917
9/32		.2812	7.14	2.6875	68.26	1.5000	38.10	48918
19/64		.2969	7.54	2.7500	69.85	1.5625	39.69	48919
5/16		.3125	7.94	2.8125	71.44	1.6250	41.28	48920
21/64		.3281	8.33	2.9375	74.61	1.6875	42.86	48921
11/32		.3438	8.73	3.0000	76.20	1.6875	42.86	48922
23/64		.3594	9.13	3.0625	77.79	1.7500	44.45	48923
3/8		.3750	9.53	3.1250	79.38	1.8125	46.04	48924

continued on next page

Screw Machine Length

Left-Hand Helix (continued) Style 157L

INCH SIZES

Drill Diameter		Overall Length		Flute Length		Style 157L	
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm
25/64		.3906	9.92	3.2500	82.55	1.8750	47.63
13/32		.4062	10.32	3.3125	84.14	1.9375	49.21
27/64		.4219	10.72	3.3750	85.73	2.0000	50.80
7/16		.4375	11.11	3.4375	87.31	2.0625	52.39
29/64		.4531	11.51	3.5625	90.49	2.1250	53.98
15/32		.4688	11.91	3.6250	92.08	2.1250	53.98
31/64		.4844	12.30	3.6875	93.66	2.1875	55.56
1/2		.5000	12.70	3.7500	95.25	2.2500	57.15

TECH TIP

“OFFHAND” HSS DRILLING VS. RIGID SETUPS

Many operations require the ability to take the drill to the workpiece as opposed to bringing the workpiece to a stationary machine with a rigid set-up. At this point many variables come into play, perhaps the lack of control over speeds and feeds is the most challenging. Obviously the workpiece material dictates a range of proper speeds and feeds based upon hardness, thickness, and even curved surfaces may come into play. Additionally, the lack of lubrication or coolant will alter the effectiveness of off-hand drilling.

Consider these general guidelines:

- Support your workpiece as best you can.
- The tendency with offhand drilling is to overspeed and under feed, creating heat and premature drill wear and failure. Drills must be fed relatively hard to take a chip.
- If your tool is variable speed, do your best to keep the speed constant.
- Proper alignment is also important. Al-

low the drill to cut evenly on both cutting lips without deflection.

- Split points will stop the tendency of the point to “walk” and not center properly.
- Shorter style drills such as screw machine or stub lengths will work better than longer jobbers length drills.
- Drills containing cobalt and 135° split points are valuable over 32 Rc hardness.

Screw Machine Length

Heavy-Duty Style 159, 159-TN (2159)

Features/Benefits:

- Heavy-duty geometry for drilling tougher materials by hand or machine.
- Shorter flute and overall length provide superior rigidity to minimize deflection when using heavy feed rates.
- Manufactured from premium high-speed steel.
- 135° P3 split point is self-centering for reduced thrust and easier penetration. Sizes under .0625" do not have split points.
- Black oxide and titanium nitride (TiN) finishes standard from stock; alternate coatings available as stock modifications.

Application Information:

- tool steel (black oxide, TiN)
- alloy steel (black oxide, TiN)
- carbon steel (black oxide, TiN)
- cast iron (black oxide, TiN)

Surface Treatment Information:

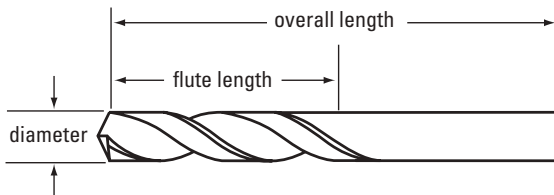
- Black oxide surface finish increases wear resistance and adds lubricity, improving chip flow.
- Titanium nitride (TiN) PVD coating adds lubricity and hardness which enhances chip flow, finish hole quality, and drill life.



Style 159 Black Oxide



Style 159-TN TiN-Coated



INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 159	Style 159-TN
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Black Oxide	TiN
1/32		.0312	0.79	1.3750	34.93	.5000	12.70	49202	48202
	60	.0400	1.02	1.3750	34.93	.5000	12.70	49430	48430
	59	.0410	1.04	1.3750	34.93	.5000	12.70	49429	48429
	58	.0420	1.07	1.3750	34.93	.5000	12.70	49428	48428
	57	.0430	1.09	1.3750	34.93	.5000	12.70	49427	48427
	56	.0465	1.18	1.3750	34.93	.5000	12.70	49426	48426
3/64		.0469	1.19	1.3750	34.93	.5000	12.70	49203	48203
	55	.0520	1.32	1.6250	41.28	.6250	15.88	49425	48425
	54	.0550	1.40	1.6250	41.28	.6250	15.88	49424	48424
	53	.0595	1.51	1.6250	41.28	.6250	15.88	49423	48423
1/16		.0625	1.59	1.6250	41.28	.6250	15.88	49204	48204
	52	.0635	1.61	1.6875	42.86	.6875	17.46	49422	48422
	51	.0670	1.70	1.6875	42.86	.6875	17.46	49421	48421
	50	.0700	1.78	1.6875	42.86	.6875	17.46	49420	48420
	49	.0730	1.85	1.6875	42.86	.6875	17.46	49419	48419
	48	.0760	1.93	1.6875	42.86	.6875	17.46	49418	48418
5/64		.0781	1.98	1.6875	42.86	.6875	17.46	49205	48205
	47	.0785	1.99	1.7500	44.45	.7500	19.05	49417	48417
	46	.0810	2.06	1.7500	44.45	.7500	19.05	49416	48416
	45	.0820	2.08	1.7500	44.45	.7500	19.05	49415	48415
	44	.0860	2.18	1.7500	44.45	.7500	19.05	49414	48414
	43	.0890	2.26	1.7500	44.45	.7500	19.05	49413	48413
	42	.0935	2.37	1.7500	44.45	.7500	19.05	49412	48412
3/32		.0938	2.38	1.7500	44.45	.7500	19.05	49206	48206

Sizes smaller than .0625" do not have split points.

continued on next page

Drills

Screw Machine Length

Heavy-Duty (continued) Style 159, 159-TN (2159)

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 159	Style 159-TN
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Black Oxide	TiN
	41	.0960	2.44	1.8125	46.04	.8125	20.64	49411	48411
	40	.0980	2.49	1.8125	46.04	.8125	20.64	49410	48410
	39	.0995	2.53	1.8125	46.04	.8125	20.64	49409	48409
	38	.1015	2.58	1.8125	46.04	.8125	20.64	49408	48408
	37	.1040	2.64	1.8125	46.04	.8125	20.64	49407	48407
	36	.1065	2.71	1.8125	46.04	.8125	20.64	49406	48406
7/64		.1094	2.78	1.8125	46.04	.8125	20.64	49207	48207
	35	.1100	2.79	1.8750	47.63	.8750	22.23	49405	48405
	34	.1110	2.82	1.8750	47.63	.8750	22.23	49404	48404
	33	.1130	2.87	1.8750	47.63	.8750	22.23	49403	48403
	32	.1160	2.95	1.8750	47.63	.8750	22.23	49402	48402
	31	.1200	3.05	1.8750	47.63	.8750	22.23	49401	48401
1/8		.1250	3.18	1.8750	47.63	.8750	22.23	49208	48208
	30	.1285	3.26	1.9375	49.21	.9375	23.81	49400	48400
	29	.1360	3.45	1.9375	49.21	.9375	23.81	49399	48399
	28	.1405	3.57	1.9375	49.21	.9375	23.81	49398	48398
9/64		.1406	3.57	1.9375	49.21	.9375	23.81	49209	48209
	27	.1440	3.66	2.0625	52.39	1.0000	25.40	49397	48397
	26	.1470	3.73	2.0625	52.39	1.0000	25.40	49396	48396
	25	.1495	3.80	2.0625	52.39	1.0000	25.40	49395	48395
	24	.1520	3.86	2.0625	52.39	1.0000	25.40	49394	48394
	23	.1540	3.91	2.0625	52.39	1.0000	25.40	49393	48393
5/32		.1562	3.97	2.0625	52.39	1.0000	25.40	49210	48210
	22	.1570	3.99	2.1250	53.98	1.0625	26.99	49392	48392
	21	.1590	4.04	2.1250	53.98	1.0625	26.99	49391	48391
	20	.1610	4.09	2.1250	53.98	1.0625	26.99	49390	48390
	19	.1660	4.22	2.1250	53.98	1.0625	26.99	49389	48389
	18	.1695	4.31	2.1250	53.98	1.0625	26.99	49388	48388
11/64		.1719	4.37	2.1250	53.98	1.0625	26.99	49211	48211
	17	.1730	4.39	2.1875	55.56	1.2500	31.75	49387	48387
	16	.1770	4.50	2.1875	55.56	1.2500	31.75	49386	48386
	15	.1800	4.57	2.1875	55.56	1.2500	31.75	49385	48385
	14	.1820	4.62	2.1875	55.56	1.2500	31.75	49384	48384
	13	.1850	4.70	2.1875	55.56	1.2500	31.75	49383	48383
3/16		.1875	4.76	2.1875	55.56	1.2500	31.75	49212	48212
	12	.1890	4.80	2.2500	57.15	1.1875	30.16	49382	48382
	11	.1910	4.85	2.2500	57.15	1.1875	30.16	49381	48381
	10	.1935	4.91	2.2500	57.15	1.1875	30.16	49380	48380
	9	.1960	4.98	2.2500	57.15	1.1875	30.16	49379	48379
	8	.1990	5.05	2.2500	57.15	1.1875	30.16	49378	48378
	7	.2010	5.11	2.2500	57.15	1.1875	30.16	49377	48377
13/64		.2031	5.16	2.2500	57.15	1.1875	30.16	49213	48213
	6	.2040	5.18	2.3750	60.33	1.2500	31.75	49376	48376
	5	.2055	5.22	2.3750	60.33	1.2500	31.75	49375	48375
	4	.2090	5.31	2.3750	60.33	1.2500	31.75	49374	48374
	3	.2130	5.41	2.3750	60.33	1.2500	31.75	49373	48373
7/32		.2188	5.56	2.3750	60.33	1.2500	31.75	49214	48214
	2	.2210	5.61	2.4375	61.91	1.3125	33.34	49372	48372
	1	.2280	5.79	2.4375	61.91	1.3125	33.34	49371	48371
	A	.2340	5.94	2.4375	61.91	1.3125	33.34	49233	48233
15/64		.2344	5.95	2.4375	61.91	1.3125	33.34	49215	48215

continued on next page



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Screw Machine Length

Heavy-Duty (continued)
Style 159, 159-TN (2159)

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style 159	Style 159-TN
	Wire/Let	Decimal	mm	Inch	mm	Inch	Black Oxide	TiN
	B	.2380	6.05	2.5000	63.50	1.3750	49234	48234
	C	.2420	6.15	2.5000	63.50	1.3750	49235	48235
	D	.2460	6.25	2.5000	63.50	1.3750	49236	48236
1/4	E	.2500	6.35	2.5000	63.50	1.3750	49216	48216
	F	.2570	6.53	2.6250	66.68	1.4375	49237	48237
	G	.2610	6.63	2.6250	66.68	1.4375	49238	48238
17/64		.2656	6.75	2.6250	66.68	1.4375	49217	48217
	H	.2660	6.76	2.6875	68.26	1.5000	49239	48239
	I	.2720	6.91	2.6875	68.26	1.5000	49240	48240
	J	.2770	7.04	2.6875	68.26	1.5000	49241	48241
	K	.2812	7.14	2.6875	68.26	1.5000	49242	48242
9/32		.2812	7.14	2.6875	68.26	1.5000	49218	48218
	L	.2900	7.37	2.7500	69.85	1.5625	49243	48243
	M	.2950	7.49	2.7500	69.85	1.5625	49244	48244
19/64		.2969	7.54	2.7500	69.85	1.5625	49219	48219
	N	.3020	7.67	2.8125	71.44	1.6250	49245	48245
5/16		.3125	7.94	2.8125	71.44	1.6250	49220	48220
	O	.3160	8.03	2.9375	74.61	1.6875	49246	48246
	P	.3230	8.20	2.9375	74.61	1.6875	49247	48247
21/64		.3281	8.33	2.9375	74.61	1.6875	49221	48221
	Q	.3320	8.43	3.0000	76.20	1.6875	49248	48248
	R	.3390	8.61	3.0000	76.20	1.6875	49249	48249
11/32		.3438	8.73	3.0000	76.20	1.6875	49222	48222
	S	.3480	8.84	3.0625	77.79	1.7500	49250	48250
	T	.3580	9.09	3.0625	77.79	1.7500	49251	48251
23/64		.3594	9.13	3.0625	77.79	1.7500	49223	48223
	U	.3680	9.35	3.1250	79.38	1.8125	49252	48252
3/8		.3750	9.53	3.1250	79.38	1.8125	49224	48224
	V	.3770	9.58	3.2500	82.55	1.8750	49253	48253
	W	.3860	9.80	3.2500	82.55	1.8750	49254	48254
25/64		.3906	9.92	3.2500	82.55	1.8750	49225	48225
	X	.3970	10.08	3.3125	84.14	1.9375	49255	48255
	Y	.4040	10.26	3.3125	84.14	1.9375	49256	48256
13/32		.4062	10.32	3.3125	84.14	1.9375	49226	48226
	Z	.4130	10.49	3.3750	85.73	2.0000	49257	48257
27/64		.4219	10.72	3.3750	85.73	2.0000	49227	48227
7/16		.4375	11.11	3.4375	87.31	2.0625	49228	48228
29/64		.4531	11.51	3.5625	90.49	2.1250	49229	48229
15/32		.4688	11.91	3.6250	92.08	2.1250	49230	48230
31/64		.4844	12.30	3.6875	93.66	2.1875	49231	48231
1/2		.5000	12.70	3.7500	95.25	2.2500	49232	48232

INCH SETS

Sets in Metal Index Cases

Number of Tools	Size Range	Style 159	Style 159-TN
		Bright	TiN
15	1/16 - 1/2 X 1/32	69889	—
21	1/16 - 3/8 X 1/64	69852	—
29	1/16 - 1/2 X 1/64	57719	54128
60	#1 - #60 wire gauge	69885	—



Set 57719

Drills

Screw Machine Length

Cobalt Heavy-Duty Style 559, 559-TN (2559), 559-TA

Features/Benefits:

- Heavy-duty geometry for drilling tougher materials by hand or machine.
- Shorter flute and overall length provide superior rigidity to minimize deflection when using heavy feed rates.
- Manufactured from premium cobalt high-speed steel.
- 135° P3 split point is self-centering for reduced thrust and easier penetration. Sizes under .0625" do not have split points.
- Straw and titanium nitride (TiN) finishes standard from stock; titanium aluminum nitride (TiAlN) is a non-stocked standard; alternate coatings available as stock modifications.

Application Information:

- tool steel (TiAlN, TiN, straw)
- alloy steel (TiAlN, straw)
- carbon steel (TiAlN, TiN, straw)
- cast iron (TiAlN, TiN, straw)

Surface Treatment Information:

- Straw finish allows for easy identification of cobalt tools.
- Titanium nitride (TiN) PVD coating adds lubricity and hardness which enhances chip flow, finish hole quality, and drill life.
- Titanium aluminum nitride (TiAlN) PVD coating combines the ability to work in high temperatures with added hardness to increase drill life.



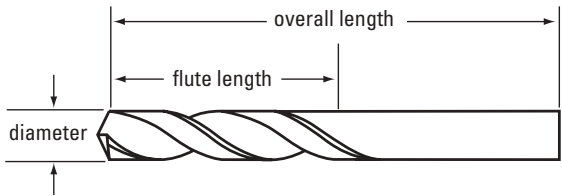
Style 559 Straw Finish



Style 559-TN TiN-Coated



Style 559-TA TiAlN-Coated



INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 559	Style 559-TN	Style 559-TA
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Straw	TiN	TiAlN
	60	.0400	1.02	1.3750	34.93	.5000	12.70	50915	—	—
	59	.0410	1.04	1.3750	34.93	.5000	12.70	50914	—	—
	58	.0420	1.07	1.3750	34.93	.5000	12.70	50913	—	—
	57	.0430	1.09	1.3750	34.93	.5000	12.70	50912	—	—
	56	.0465	1.18	1.3750	34.93	.5000	12.70	50911	—	—
	55	.0520	1.32	1.6250	41.28	.6250	15.88	50910	—	—
	54	.0550	1.40	1.6250	41.28	.6250	15.88	50909	—	—
	53	.0595	1.51	1.6250	41.28	.6250	15.88	50908	—	—
1/16		.0625	1.59	1.6250	41.28	.6250	15.88	50801	51801	52804
	52	.0635	1.61	1.6875	42.86	.6875	17.46	50907	—	—
	51	.0670	1.70	1.6875	42.86	.6875	17.46	50906	—	—
	50	.0700	1.78	1.6875	42.86	.6875	17.46	50905	—	—
	49	.0730	1.85	1.6875	42.86	.6875	17.46	50904	—	—
	48	.0760	1.93	1.6875	42.86	.6875	17.46	50903	—	—
5/64		.0781	1.98	1.6875	42.86	.6875	17.46	50802	51802	52805
	47	.0785	1.99	1.7500	44.45	.7500	19.05	50902	—	—

Sizes smaller than .0625" do not have split points.

continued on next page



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Screw Machine Length

Cobalt Heavy-Duty (continued)
Style 559, 559-TN (2559), 559-TA

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style 559	Style 559-TN	Style 559-TA
	Wire/Let	Decimal	mm	Inch	mm	Inch	Straw	TiN	TiAIN
	46	.0810	2.06	1.7500	44.45	.7500	19.05	50901	—
	45	.0820	2.08	1.7500	44.45	.7500	19.05	50900	—
	44	.0860	2.18	1.7500	44.45	.7500	19.05	50899	—
	43	.0890	2.26	1.7500	44.45	.7500	19.05	50898	—
	42	.0935	2.37	1.7500	44.45	.7500	19.05	50897	—
3/32		.0938	2.38	1.7500	44.45	.7500	19.05	50803	51803 52806
	41	.0960	2.44	1.8125	46.04	.8125	20.64	50896	—
	40	.0980	2.49	1.8125	46.04	.8125	20.64	50895	—
	39	.0995	2.53	1.8125	46.04	.8125	20.64	50894	—
	38	.1015	2.58	1.8125	46.04	.8125	20.64	50893	—
	37	.1040	2.64	1.8125	46.04	.8125	20.64	50892	—
	36	.1065	2.71	1.8125	46.04	.8125	20.64	50891	—
7/64		.1094	2.78	1.8125	46.04	.8125	20.64	50804	51804 52807
	35	.1100	2.79	1.8750	47.63	.8750	22.23	50890	—
	34	.1110	2.82	1.8750	47.63	.8750	22.23	50889	—
	33	.1130	2.87	1.8750	47.63	.8750	22.23	50888	—
	32	.1160	2.95	1.8750	47.63	.8750	22.23	50887	—
	31	.1200	3.05	1.8750	47.63	.8750	22.23	50886	—
1/8		.1250	3.18	1.8750	47.63	.8750	22.23	50805	51805 52808
	30	.1285	3.26	1.9375	49.21	.9375	23.81	50885	—
	29	.1360	3.45	1.9375	49.21	.9375	23.81	50884	—
	28	.1405	3.57	1.9375	49.21	.9375	23.81	50883	—
9/64		.1406	3.57	1.9375	49.21	.9375	23.81	50806	51806 52809
	27	.1440	3.66	2.0625	52.39	1.0000	25.40	50882	—
	26	.1470	3.73	2.0625	52.39	1.0000	25.40	50881	—
	25	.1495	3.80	2.0625	52.39	1.0000	25.40	50880	—
	24	.1520	3.86	2.0625	52.39	1.0000	25.40	50879	—
	23	.1540	3.91	2.0625	52.39	1.0000	25.40	50878	—
5/32		.1562	3.97	2.0625	52.39	1.0000	25.40	50807	51807 52810
	22	.1570	3.99	2.1250	53.98	1.0625	26.99	50877	—
	21	.1590	4.04	2.1250	53.98	1.0625	26.99	50876	—
	20	.1610	4.09	2.1250	53.98	1.0625	26.99	50875	—
	19	.1660	4.22	2.1250	53.98	1.0625	26.99	50874	—
	18	.1695	4.31	2.1250	53.98	1.0625	26.99	50873	—
11/64		.1719	4.37	2.1250	53.98	1.0625	26.99	50808	51808 52811
	17	.1730	4.39	2.1875	55.56	1.2500	31.75	50872	—
	16	.1770	4.50	2.1875	55.56	1.2500	31.75	50871	—
	15	.1800	4.57	2.1875	55.56	1.2500	31.75	50870	—
	14	.1820	4.62	2.1875	55.56	1.2500	31.75	50869	—
	13	.1850	4.70	2.1875	55.56	1.2500	31.75	50868	—
3/16		.1875	4.76	2.1875	55.56	1.2500	31.75	50809	51809 52812
	12	.1890	4.80	2.2500	57.15	1.1875	30.16	50867	—
	11	.1910	4.85	2.2500	57.15	1.1875	30.16	50866	—
	10	.1935	4.91	2.2500	57.15	1.1875	30.16	50865	—
	9	.1960	4.98	2.2500	57.15	1.1875	30.16	50864	—
	8	.1990	5.05	2.2500	57.15	1.1875	30.16	50863	—
	7	.2010	5.11	2.2500	57.15	1.1875	30.16	50862	—
13/64		.2031	5.16	2.2500	57.15	1.1875	30.16	50810	51810 52813
	6	.2040	5.18	2.3750	60.33	1.2500	31.75	50861	—
	5	.2055	5.22	2.3750	60.33	1.2500	31.75	50860	—

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

continued on next page

Drills

Screw Machine Length

Cobalt Heavy-Duty (continued) Style 559, 559-TN (2559), 559-TA

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style 559	Style 559-TN	Style 559-TA
	Wire/Let	Decimal	mm	Inch	mm	Inch	Straw	TiN	TiAlN
	4	.2090	5.31	2.3750	60.33	1.2500	31.75	50859	—
	3	.2130	5.41	2.3750	60.33	1.2500	31.75	50858	—
7/32		.2188	5.56	2.3750	60.33	1.2500	31.75	50811	51811
	2	.2210	5.61	2.4375	61.91	1.3125	33.34	50857	—
	1	.2280	5.79	2.4375	61.91	1.3125	33.34	50856	—
	A	.2340	5.94	2.4375	61.91	1.3125	33.34	50830	—
15/64		.2344	5.95	2.4375	61.91	1.3125	33.34	50812	51812
	B	.2380	6.05	2.5000	63.50	1.3750	34.93	50831	—
	C	.2420	6.15	2.5000	63.50	1.3750	34.93	50832	—
	D	.2460	6.25	2.5000	63.50	1.3750	34.93	50833	—
1/4		.2500	6.35	2.5000	63.50	1.3750	34.93	50813	51813
	F	.2570	6.53	2.6250	66.68	1.4375	36.51	50835	—
	G	.2610	6.63	2.6250	66.68	1.4375	36.51	50836	—
17/64		.2656	6.75	2.6250	66.68	1.4375	36.51	50814	51814
	H	.2660	6.76	2.6875	68.26	1.5000	38.10	50837	—
	I	.2720	6.91	2.6875	68.26	1.5000	38.10	50838	—
	J	.2770	7.04	2.6875	68.26	1.5000	38.10	50839	—
	K	.2812	7.14	2.6875	68.26	1.5000	38.10	50840	—
9/32		.2812	7.14	2.6875	68.26	1.5000	38.10	50815	51815
	L	.2900	7.37	2.7500	69.85	1.5625	39.69	50841	—
	M	.2950	7.49	2.7500	69.85	1.5625	39.69	50842	—
19/64		.2969	7.54	2.7500	69.85	1.5625	39.69	50816	51816
	N	.3020	7.67	2.8125	71.44	1.6250	41.28	50843	—
5/16		.3125	7.94	2.8125	71.44	1.6250	41.28	50817	51817
	O	.3160	8.03	2.9375	74.61	1.6875	42.86	50844	—
	P	.3230	8.20	2.9375	74.61	1.6875	42.86	50845	—
21/64		.3281	8.33	2.9375	74.61	1.6875	42.86	50818	51818
	Q	.3320	8.43	3.0000	76.20	1.6875	42.86	50846	—
	R	.3390	8.61	3.0000	76.20	1.6875	42.86	50847	—
11/32		.3438	8.73	3.0000	76.20	1.6875	42.86	50819	51819
	S	.3480	8.84	3.0625	77.79	1.7500	44.45	50848	—
	T	.3580	9.09	3.0625	77.79	1.7500	44.45	50849	—
23/64		.3594	9.13	3.0625	77.79	1.7500	44.45	50820	51820
	U	.3680	9.35	3.1250	79.38	1.8125	46.04	50850	—
3/8		.3750	9.53	3.1250	79.38	1.8125	46.04	50821	51821
	V	.3770	9.58	3.2500	82.55	1.8750	47.63	50851	—
	W	.3860	9.80	3.2500	82.55	1.8750	47.63	50852	—
25/64		.3906	9.92	3.2500	82.55	1.8750	47.63	50822	51822
	X	.3970	10.08	3.3125	84.14	1.9375	49.21	50853	—
	Y	.4040	10.26	3.3125	84.14	1.9375	49.21	50854	—
13/32		.4062	10.32	3.3125	84.14	1.9375	49.21	50823	51823
	Z	.4130	10.49	3.3750	85.73	2.0000	50.80	50855	—
27/64		.4219	10.72	3.3750	85.73	2.0000	50.80	50824	51824
7/16		.4375	11.11	3.4375	87.31	2.0625	52.39	50825	51825
29/64		.4531	11.51	3.5625	90.49	2.1250	53.98	50826	51826
15/32		.4688	11.91	3.6250	92.08	2.1250	53.98	50827	51827
31/64		.4844	12.30	3.6875	93.66	2.1875	55.56	50828	51828
1/2		.5000	12.70	3.7500	95.25	2.2500	57.15	50829	51829

sets on next page



Customer Service: 800.348.2885

Technical Support: 800.892.4281

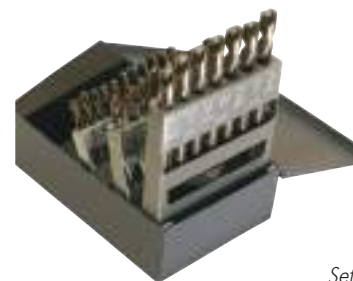
Screw Machine Length

Cobalt Heavy-Duty (continued) Style 559, 559-TN (2559), 559-TA

INCH SETS

Sets in Metal Index Cases

Number of Tools	Size Range	Style 559 Straw
15	1/16 - 1/2 X 1/32	69856
29	1/16 - 1/2 X 1/64	69853
26	Letter A - Z	69855
60	#1 - #60 wire gauge	69854



Set 69855

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

TECH TIP

DRILL POINT ANGLES

118° point angles are used primarily in softer materials such as mild steels and cast irons. The advantages of a 118° point in these materials include control over chips, which are wide and thin.

135° split points should be engaged to cut harder steel materials, especially in deep holes over 4 times drill diameter. A 135°

point cutting harder materials will produce narrower chips.

The length of the lips on a 135° point measured from the axis to the outer corners is relatively short and thus penetrates much quicker into the work piece reducing thrust and abrasion along the cutting edges.

If re-pointing a standard 118° point to 135° you must make a lip correction to reduce the hook of the cutting face. In drills, the cutting rake angles are generated by the flute shape. Reducing the hook adjusts the rake cutting angles for a 135° point.

Drills

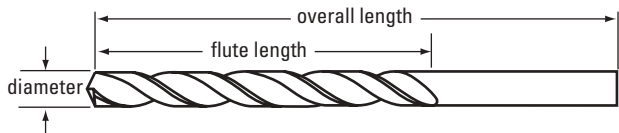
Taper Length

General Purpose
Style 120

- Features/Benefits:**
- General-purpose geometry for drilling in a wide range of operating conditions and materials.
 - Taper length provides longer overall length and flute length for deeper drilling.
 - Peck cycles may be appropriate for deep-hole drilling.
 - Manufactured from premium high-speed steel.
 - 118° point.
 - Black oxide standard from stock; bright drills and alternate coatings available as stock modifications.

- Application Information:**
- carbon steel
 - alloy steel
 - cast iron

- Surface Treatment Information:**
- Black oxide finish provides increased wear resistance and added lubricity



INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 120 Black Oxide
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	
1/64	80	.0135	0.34	1.5000	38.10	.3125	7.94	50370
	79	.0145	0.37	1.5000	38.10	.3125	7.94	50369
		.0156	0.40	1.5000	38.10	.3125	7.94	49701
	78	.0160	0.41	1.5000	38.10	.3125	7.94	50368
	77	.0180	0.46	1.5000	38.10	.3125	7.94	50367
	76	.0200	0.51	1.5000	38.10	.3125	7.94	50366
	75	.0210	0.53	1.5000	38.10	.3125	7.94	50365
	74	.0225	0.57	1.5000	38.10	.3125	7.94	50364
	73	.0240	0.61	1.5000	38.10	.3125	7.94	50363
	72	.0250	0.64	1.5000	38.10	.3125	7.94	50362
	71	.0260	0.66	2.0000	50.80	.7500	19.05	50361
	70	.0280	0.71	2.0000	50.80	.7500	19.05	50360
	69	.0292	0.74	2.0000	50.80	.7500	19.05	50359
	68	.0310	0.79	2.0000	50.80	.7500	19.05	50358
	1/32	.0312	0.79	2.0000	50.80	.7500	19.05	49702
	67	.0320	0.81	2.0000	50.80	.7500	19.05	50357
	66	.0330	0.84	2.0000	50.80	.7500	19.05	50356
	65	.0350	0.89	2.0000	50.80	.7500	19.05	50355
	64	.0360	0.91	2.0000	50.80	.7500	19.05	50354
	63	.0370	0.94	2.0000	50.80	.7500	19.05	50353
	62	.0380	0.97	2.0000	50.80	.7500	19.05	50352
	61	.0390	0.99	2.2500	57.15	1.1250	28.58	50351
	60	.0400	1.02	2.2500	57.15	1.1250	28.58	50350
	59	.0410	1.04	2.2500	57.15	1.1250	28.58	50349

continued on next page



Taper Length

General Purpose (continued)
Style 120

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style 120	
	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Black Oxide
	58	.0420	1.07	2.2500	57.15	1.1250	28.58	50348
	57	.0430	1.09	2.2500	57.15	1.1250	28.58	50347
	56	.0465	1.18	2.2500	57.15	1.1250	28.58	50346
3/64		.0469	1.19	2.2500	57.15	1.1250	28.58	49703
	55	.0520	1.32	3.0000	76.20	1.7500	44.45	50345
	54	.0550	1.40	3.0000	76.20	1.7500	44.45	50344
	53	.0595	1.51	3.0000	76.20	1.7500	44.45	50343
1/16		.0625	1.59	3.0000	76.20	1.7500	44.45	49704
	52	.0635	1.61	3.7500	95.25	2.0000	50.80	50342
	51	.0670	1.70	3.7500	95.25	2.0000	50.80	50341
	50	.0700	1.78	3.7500	95.25	2.0000	50.80	50340
	49	.0730	1.85	3.7500	95.25	2.0000	50.80	50339
	48	.0760	1.93	3.7500	95.25	2.0000	50.80	50338
5/64		.0781	1.98	3.7500	95.25	2.0000	50.80	49705
	47	.0785	1.99	4.2500	107.95	2.2500	57.15	50337
	46	.0810	2.06	4.2500	107.95	2.2500	57.15	50336
	45	.0820	2.08	4.2500	107.95	2.2500	57.15	50335
	44	.0860	2.18	4.2500	107.95	2.2500	57.15	50334
	43	.0890	2.26	4.2500	107.95	2.2500	57.15	50333
	42	.0935	2.37	4.2500	107.95	2.2500	57.15	50332
3/32		.0938	2.38	4.2500	107.95	2.2500	57.15	49706
	41	.0960	2.44	4.6250	117.48	2.5000	63.50	50331
	40	.0980	2.49	4.6250	117.48	2.5000	63.50	50330
	39	.0995	2.53	4.6250	117.48	2.5000	63.50	50329
	38	.1015	2.58	4.6250	117.48	2.5000	63.50	50328
	37	.1040	2.64	4.6250	117.48	2.5000	63.50	50327
	36	.1065	2.71	4.6250	117.48	2.5000	63.50	50326
7/64		.1094	2.78	4.6250	117.48	2.5000	63.50	49707
	35	.1100	2.79	5.1250	130.18	2.7500	69.85	50325
	34	.1110	2.82	5.1250	130.18	2.7500	69.85	50324
	33	.1130	2.87	5.1250	130.18	2.7500	69.85	50323
	32	.1160	2.95	5.1250	130.18	2.7500	69.85	50322
	31	.1200	3.05	5.1250	130.18	2.7500	69.85	50321
1/8		.1250	3.18	5.1250	130.18	2.7500	69.85	49708
	30	.1285	3.26	5.3750	136.53	3.0000	76.20	50320
	29	.1360	3.45	5.3750	136.53	3.0000	76.20	50319
	28	.1405	3.57	5.3750	136.53	3.0000	76.20	50318
9/64		.1406	3.57	5.3750	136.53	3.0000	76.20	49709
	27	.1440	3.66	5.3750	136.53	3.0000	76.20	50317
	26	.1470	3.73	5.3750	136.53	3.0000	76.20	50316
	25	.1495	3.80	5.3750	136.53	3.0000	76.20	50315
	24	.1520	3.86	5.3750	136.53	3.0000	76.20	50314
	23	.1540	3.91	5.3750	136.53	3.0000	76.20	50313
5/32		.1562	3.97	5.3750	136.53	3.0000	76.20	49710
	22	.1570	3.99	5.7500	146.05	3.3750	85.73	50312
	21	.1590	4.04	5.7500	146.05	3.3750	85.73	50311
	20	.1610	4.09	5.7500	146.05	3.3750	85.73	50310
	19	.1660	4.22	5.7500	146.05	3.3750	85.73	50309
	18	.1695	4.31	5.7500	146.05	3.3750	85.73	50308
11/64		.1719	4.37	5.7500	146.05	3.3750	85.73	49711
	17	.1730	4.39	5.7500	146.05	3.3750	85.73	50307

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Drills

Taper Length

General Purpose (continued) Style 120

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style 120	
	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Black Oxide
	16	.1770	4.50	5.7500	146.05	3.3750	85.73	50306
	15	.1800	4.57	5.7500	146.05	3.3750	85.73	50305
	14	.1820	4.62	5.7500	146.05	3.3750	85.73	50304
	13	.1850	4.70	5.7500	146.05	3.3750	85.73	50303
3/16		.1875	4.76	5.7500	146.05	3.3750	85.73	49712
	12	.1890	4.80	6.0000	152.40	3.6250	92.08	50302
	11	.1910	4.85	6.0000	152.40	3.6250	92.08	50301
	10	.1935	4.91	6.0000	152.40	3.6250	92.08	50300
	9	.1960	4.98	6.0000	152.40	3.6250	92.08	50299
	8	.1990	5.05	6.0000	152.40	3.6250	92.08	50298
	7	.2010	5.11	6.0000	152.40	3.6250	92.08	50297
13/64		.2031	5.16	6.0000	152.40	3.6250	92.08	49713
	6	.2040	5.18	6.0000	152.40	3.6250	92.08	50296
	5	.2055	5.22	6.0000	152.40	3.6250	92.08	50295
	4	.2090	5.31	6.0000	152.40	3.6250	92.08	50294
	3	.2130	5.41	6.0000	152.40	3.6250	92.08	50293
7/32		.2188	5.56	6.0000	152.40	3.6250	92.08	49714
	2	.2210	5.61	6.1250	155.58	3.7500	95.25	50292
	1	.2280	5.79	6.1250	155.58	3.7500	95.25	50291
	A	.2340	5.94	6.1250	155.58	3.7500	95.25	50401
15/64		.2344	5.95	6.1250	155.58	3.7500	95.25	49715
	B	.2380	6.05	6.1250	155.58	3.7500	95.25	50402
	C	.2420	6.15	6.1250	155.58	3.7500	95.25	50403
	D	.2460	6.25	6.1250	155.58	3.7500	95.25	50404
1/4		.2500	6.35	6.1250	155.58	3.7500	95.25	49716
	F	.2570	6.53	6.1250	155.58	3.7500	95.25	50406
	G	.2610	6.63	6.1250	155.58	3.7500	95.25	50407
17/64		.2656	6.75	6.2500	158.75	3.8750	98.43	49717
	H	.2660	6.76	6.2500	158.75	3.8750	98.43	50408
	I	.2720	6.91	6.2500	158.75	3.8750	98.43	50409
	J	.2770	7.04	6.2500	158.75	3.8750	98.43	50410
	K	.2812	7.14	6.2500	158.75	3.8750	98.43	50411
9/32		.2812	7.14	6.2500	158.75	3.8750	98.43	49718
	L	.2900	7.37	6.2500	158.75	3.8750	98.43	50412
	M	.2950	7.49	6.3750	161.93	4.0000	101.60	50413
19/64		.2969	7.54	6.3750	161.93	4.0000	101.60	49719
	N	.3020	7.67	6.3750	161.93	4.0000	101.60	50414
5/16		.3125	7.94	6.3750	161.93	4.0000	101.60	49720
	O	.3160	8.03	6.3750	161.93	4.0000	101.60	50415
	P	.3230	8.20	6.3750	161.93	4.0000	101.60	50416
21/64		.3281	8.33	6.5000	165.10	4.1250	104.78	49721
	Q	.3320	8.43	6.5000	165.10	4.1250	104.78	50417
	R	.3390	8.61	6.5000	165.10	4.1250	104.78	50418
11/32		.3438	8.73	6.5000	165.10	4.1250	104.78	49722
	S	.3480	8.84	6.7500	171.45	4.2500	107.95	50419
	T	.3580	9.09	6.7500	171.45	4.2500	107.95	50420
23/64		.3594	9.13	6.7500	171.45	4.2500	107.95	49723
	U	.3680	9.35	6.7500	171.45	4.2500	107.95	50421
3/8		.3750	9.53	6.7500	171.45	4.2500	107.95	49724
	V	.3770	9.58	6.7500	171.45	4.2500	107.95	50422
	W	.3860	9.80	6.7500	171.45	4.2500	107.95	50423

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Customer Service: 800.348.2885

Technical Support: 800.892.4281

General Purpose (continued) Style 120

INCH SIZES

Drill Diameter		Overall Length		Flute Length		Style 120		
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Black Oxide
25/64		.3906	9.92	7.0000	177.80	4.3750	111.13	49725
	X	.3970	10.08	7.0000	177.80	4.3750	111.13	50424
	Y	.4040	10.26	7.0000	177.80	4.3750	111.13	50425
13/32		.4062	10.32	7.0000	177.80	4.3750	111.13	49726
	Z	.4130	10.49	7.2500	184.15	4.6250	117.48	50426
27/64		.4219	10.72	7.2500	184.15	4.6250	117.48	49727
7/16		.4375	11.11	7.2500	184.15	4.6250	117.48	49728
29/64		.4531	11.51	7.5000	190.50	4.7500	120.65	49729
15/32		.4688	11.91	7.5000	190.50	4.7500	120.65	49730
31/64		.4844	12.30	7.7500	196.85	4.7500	120.65	49731
1/2		.5000	12.70	7.7500	196.85	4.7500	120.65	49732
33/64		.5156	13.10	8.0000	203.20	4.7500	120.65	49733
17/32		.5312	13.49	8.0000	203.20	4.7500	120.65	49734
35/64		.5469	13.89	8.2500	209.55	4.8750	123.83	49735
9/16		.5625	14.29	8.2500	209.55	4.8750	123.83	49736
37/64		.5781	14.68	8.7500	222.25	4.8750	123.83	49737
19/32		.5938	15.08	8.7500	222.25	4.8750	123.83	49738
39/64		.6094	15.48	8.7500	222.25	4.8750	123.83	49739
5/8		.6250	15.88	8.7500	222.25	4.8750	123.83	49740
41/64		.6406	16.27	9.0000	228.60	5.1250	130.18	49741
21/32		.6562	16.67	9.0000	228.60	5.1250	130.18	49742
43/64		.6719	17.07	9.2500	234.95	5.3750	136.53	49743
11/16		.6875	17.46	9.2500	234.95	5.3750	136.53	49744
45/64		.7031	17.86	9.5000	241.30	5.6250	142.88	49745
23/32		.7188	18.26	9.5000	241.30	5.6250	142.88	49746
47/64		.7344	18.65	9.7500	247.65	5.8750	149.23	49747
3/4		.7500	19.05	9.7500	247.65	5.8750	149.23	49748
49/64		.7656	19.45	9.8750	250.83	6.0000	152.40	49749
25/32		.7812	19.84	9.8750	250.83	6.0000	152.40	49750
51/64		.7969	20.24	10.0000	254.00	6.1250	155.58	49751
13/16		.8125	20.64	10.0000	254.00	6.1250	155.58	49752
53/64		.8281	21.03	10.0000	254.00	6.1250	155.58	49753
27/32		.8438	21.43	10.0000	254.00	6.1250	155.58	49754
55/64		.8594	21.83	10.0000	254.00	6.1250	155.58	49755
7/8		.8750	22.23	10.0000	254.00	6.1250	155.58	49756
57/64		.8906	22.62	10.0000	254.00	6.1250	155.58	49757
29/32		.9062	23.02	10.0000	254.00	6.1250	155.58	49758
59/64		.9219	23.42	10.7500	273.05	6.1250	155.58	49759
15/16		.9375	23.81	10.7500	273.05	6.1250	155.58	49760
61/64		.9531	24.21	11.0000	279.40	6.3750	161.93	49761
31/32		.9688	24.61	11.0000	279.40	6.3750	161.93	49762
63/64		.9844	25.00	11.0000	279.40	6.3750	161.93	49763
1		1.0000	25.40	11.0000	279.40	6.3750	161.93	49764

INCH SETS

Sets in Metal Index Cases

Number of Tools	Size Range	Style 120 Black Oxide
15	1/16 - 1/2 X 1/32	69884
29	1/16 - 1/2 X 1/64	69864
60	#1 - #60 wire gauge	69865



Set 69884

Drills

Taper Length

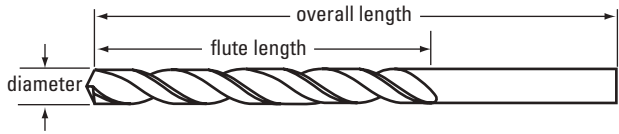
Fast Spiral Style 120B

- Features/Benefits:**
- Fast helix and wide flutes provide excellent chip ejection.
 - Taper length provides longer overall length and flute length for deeper drilling.
 - Peck cycles may be appropriate for deep-hole drilling.
 - Manufactured from premium high-speed steel.
 - 118° point.
 - Bright finish standard from stock; alternate coatings available as stock modifications.

- Application Information:**
- carbon steel
 - alloy steel
 - non-ferrous materials including aluminum, copper, and plastics



Style 120B Bright



INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 120B Bright
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	
3/64	60	.0400	1.02	2.2500	57.15	1.1250	28.58	50270
		.0469	1.19	2.2500	57.15	1.1250	28.58	50103
	55	.0520	1.32	3.0000	76.20	1.7500	44.45	50265
	54	.0550	1.40	3.0000	76.20	1.7500	44.45	50264
1/16	53	.0595	1.51	3.0000	76.20	1.7500	44.45	50263
		.0625	1.59	3.0000	76.20	1.7500	44.45	50104
	51	.0670	1.70	3.7500	95.25	2.0000	50.80	50261
	50	.0700	1.78	3.7500	95.25	2.0000	50.80	50260
5/64	49	.0730	1.85	3.7500	95.25	2.0000	50.80	50259
	48	.0760	1.93	3.7500	95.25	2.0000	50.80	50258
		.0781	1.98	3.7500	95.25	2.0000	50.80	50105
	47	.0785	1.99	4.2500	107.95	2.2500	57.15	50257
3/32	46	.0810	2.06	4.2500	107.95	2.2500	57.15	50256
	45	.0820	2.08	4.2500	107.95	2.2500	57.15	50255
	44	.0860	2.18	4.2500	107.95	2.2500	57.15	50254
	43	.0890	2.26	4.2500	107.95	2.2500	57.15	50253
7/64	42	.0935	2.37	4.2500	107.95	2.2500	57.15	50252
		.0938	2.38	4.2500	107.95	2.2500	57.15	50106
	41	.0960	2.44	4.6250	117.48	2.5000	63.50	50251
	40	.0980	2.49	4.6250	117.48	2.5000	63.50	50250
1/8	39	.0995	2.53	4.6250	117.48	2.5000	63.50	50249
	38	.1015	2.58	4.6250	117.48	2.5000	63.50	50248
	37	.1040	2.64	4.6250	117.48	2.5000	63.50	50247
	36	.1065	2.71	4.6250	117.48	2.5000	63.50	50246
1/4		.1094	2.78	4.6250	117.48	2.5000	63.50	50107
	35	.1100	2.79	5.1250	130.18	2.7500	69.85	50245
	33	.1130	2.87	5.1250	130.18	2.7500	69.85	50243
	32	.1160	2.95	5.1250	130.18	2.7500	69.85	50242
	31	.1200	3.05	5.1250	130.18	2.7500	69.85	50241

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Fast Spiral (continued) Style 120B

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style 120B Bright
	Wire/Let	Decimal	mm	Inch	mm	Inch	
1/8		.1250	3.18	5.1250	130.18	2.7500	50108
	30	.1285	3.26	5.3750	136.53	3.0000	50240
	29	.1360	3.45	5.3750	136.53	3.0000	50239
9/64		.1406	3.57	5.3750	136.53	3.0000	50109
	27	.1440	3.66	5.3750	136.53	3.0000	50237
	26	.1470	3.73	5.3750	136.53	3.0000	50236
5/32		.1562	3.97	5.3750	136.53	3.0000	50110
	21	.1590	4.04	5.7500	146.05	3.3750	50231
	20	.1610	4.09	5.7500	146.05	3.3750	50230
11/64		.1719	4.37	5.7500	146.05	3.3750	50111
	16	.1770	4.50	5.7500	146.05	3.3750	50226
	15	.1800	4.57	5.7500	146.05	3.3750	50225
3/16		.1875	4.76	5.7500	146.05	3.3750	50112
	11	.1910	4.85	6.0000	152.40	3.6250	50221
	10	.1935	4.91	6.0000	152.40	3.6250	50220
	8	.1990	5.05	6.0000	152.40	3.6250	50218
	7	.2010	5.11	6.0000	152.40	3.6250	50217
13/64		.2031	5.16	6.0000	152.40	3.6250	50113
	3	.2130	5.41	6.0000	152.40	3.6250	50213
7/32		.2188	5.56	6.0000	152.40	3.6250	50114
	1	.2280	5.79	6.1250	155.58	3.7500	50211
15/64		.2344	5.95	6.1250	155.58	3.7500	50115
1/4	E	.2500	6.35	6.1250	155.58	3.7500	50116
5/16		.3125	7.94	6.3750	161.93	4.0000	50120
3/8		.3750	9.53	6.7500	171.45	4.2500	50124
7/16		.4375	11.11	7.2500	184.15	4.6250	50128
1/2		.5000	12.70	7.7500	196.85	4.7500	50132

TECH TIP

Peck Feeding

Drilling of holes 2 to 3 diameters deep can usually be accomplished with one step. When the need arises to drill 4, 5, or more diameters deep, it becomes much more difficult to evacuate chips, especially with non-coolant hole drills. The deeper the hole, the greater the tendency of the chips to become jammed in the flutes preventing coolant from reaching the drill tip. This buildup of heat at the drill tip will eventu-

ally result in premature failure.

This problem can be overcome by introducing a peck cycle. In a peck cycle, the entire drill is periodically withdrawn from the hole to remove chips, and then re-inserted in the hole to drill a small distance and withdrawn again until the full hole depth is reached. The first 2 diameters can usually be drilled before initiating a peck

drilling cycle. Obviously, peck feeding would not be very efficient for any kind of production work.

The use of coolant hole drills and high-pressure coolant systems will in most cases eliminate the need for peck drilling. Special purpose drills, including parabolic flute forms can also be used to drill deeper holes without peck drilling.

Drills

Taper Length

Automotive Tanged Shank Style 255AN

Features/Benefits:

- General-purpose geometry conforming to automotive industry standards.
- Tanged shank for use with positive split sleeve drivers.
- Taper length provides longer overall length and flute length for deeper drilling
- Manufactured from premium high-speed steel.
- 118° point.
- Black oxide finish standard from stock except sizes over 1/2" are non-stock standards.

Application Information:

- carbon steel
- alloy steel
- cast iron

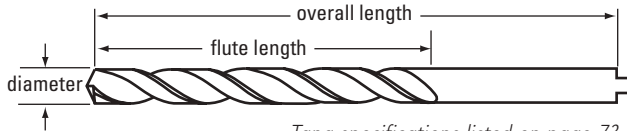
Surface Treatment Information:

- Black oxide surface treatment increases wear resistance and improves chip flow.

Tang specifications listed on page 73.



Style 255AN Black Oxide Finish



Tang specifications listed on page 73.

INCH SIZES

Drill Diameter			Overall Length		Flute Length		Style 255AN Black Oxide
Fract	Decimal	mm	Inch	mm	Inch	mm	
1/8	.1250	3.18	5.1250	130.18	2.7500	69.85	49508
9/64	.1406	3.57	5.3750	136.53	3.0000	76.20	49509
5/32	.1562	3.97	5.3750	136.53	3.0000	76.20	49510
11/64	.1719	4.37	5.7500	146.05	3.3750	85.73	49511
3/16	.1875	4.76	5.7500	146.05	3.3750	85.73	49512
13/64	.2031	5.16	6.0000	152.40	3.6250	92.08	49513
7/32	.2188	5.56	6.0000	152.40	3.6250	92.08	49514
15/64	.2344	5.95	6.1250	155.58	3.7500	95.25	49515
1/4	.2500	6.35	6.1250	155.58	3.7500	95.25	49516
17/64	.2656	6.75	6.2500	158.75	3.8750	98.43	49517
9/32	.2812	7.14	6.2500	158.75	3.8750	98.43	49518
19/64	.2969	7.54	6.3750	161.93	4.0000	101.60	49519
5/16	.3125	7.94	6.3750	161.93	4.0000	101.60	49520
21/64	.3281	8.33	6.5000	165.10	4.1250	104.78	49521
11/32	.3438	8.73	6.5000	165.10	4.1250	104.78	49522
23/64	.3594	9.13	6.7500	171.45	4.2500	107.95	49523
3/8	.3750	9.53	6.7500	171.45	4.2500	107.95	49524
25/64	.3906	9.92	7.0000	177.80	4.3750	111.13	49525
13/32	.4062	10.32	7.0000	177.80	4.3750	111.13	49526
27/64	.4219	10.72	7.2500	184.15	4.6250	117.48	49527
7/16	.4375	11.11	7.2500	184.15	4.6250	117.48	49528
29/64	.4531	11.51	7.5000	190.50	4.7500	120.65	49529
15/32	.4688	11.91	7.5000	190.50	4.7500	120.65	49530
31/64	.4844	12.30	7.7500	196.85	4.7500	120.65	49531
1/2	.5000	12.70	7.7500	196.85	4.7500	120.65	49532

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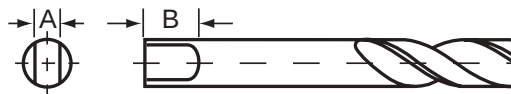
Automotive Tanged Shank (continued) Style 255AN

INCH SIZES

Fract*	Drill Diameter		Overall Length		Flute Length		Style 255AN Black Oxide
	Decimal	mm	Inch	mm	Inch	mm	
33/64	.5156	13.10	8.0000	203.20	4.7500	120.65	49533
17/32	.5312	13.49	8.0000	203.20	4.7500	120.65	49534
35/64	.5469	13.89	8.2500	209.55	4.8750	123.83	49535
9/16	.5625	14.29	8.2500	209.55	4.8750	123.83	49536
37/64	.5781	14.68	8.7500	222.25	4.8750	123.83	49537
19/32	.5938	15.08	8.7500	222.25	4.8750	123.83	49538
39/64	.6094	15.48	8.7500	222.25	4.8750	123.83	49539
5/8	.6250	15.88	8.7500	222.25	4.8750	123.83	49540
41/64	.6406	16.27	9.0000	228.60	5.1250	130.18	49541
21/32	.6562	16.67	9.0000	228.60	5.1250	130.18	49542
43/64	.6719	17.07	9.2500	234.95	5.3750	136.53	49543
11/16	.6875	17.46	9.2500	234.95	5.3750	136.53	49544

*Sizes over 1/2" are non-stock standards.

Tang Specifications



Shank Diameter (inches)	Tang Dimensions (inches)	
	Width (A)	Length (B)
1/8 through 3/16	.092	9/32
Over 3/16 through 1/4	.120	5/16
Over 1/4 through 5/16	.160	11/32
Over 5/16 through 3/8	.201	3/8
Over 3/8 through 15/32	.241	7/16
Over 15/32 through 9/16	.300	1/2
Over 9/16 through 21/32	.370	9/16
Over 21/32 through 3/4	.440	5/8
Over 3/4 through 7/8	.511	11/16
Over 7/8 through 1	.605	3/4
Over 1 through 1-3/16	.696	13/16
Over 1-3/16 through 1-3/8	.813	7/8

Drills

Taper Length

Heavy-Duty Long Flute

Style 120F

Features/Benefits:

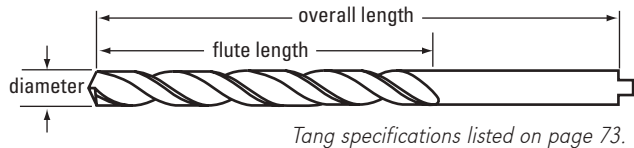
- Heavy-duty geometry conforms to automotive industry standards.
- 20% longer flutes offer more regrinds and deeper holes than conventional taper length drills.
- Taper length provides longer overall length for deeper drilling.
- Reduced 1/2" shank on drills over 1/2" diameter for use in 1/2" drill chucks.
- Tanged shanks for use with split-sleeve drivers.
- Manufactured from premium high-speed steel.
- 118° K-notch point.
- Black oxide finish standard from stock.

Application Information:

- carbon steel
- alloy steel
- tool steel
- cast iron
- Recommended for drilling steel forgings, castings, and tough alloy steels.
- Recommended for use with bushings.

Surface Treatment Information:

- Black oxide surface finish increases wear resistance and adds lubricity to improve chip flow.



Style 120F Black Oxide

INCH SIZES

Drill Diameter			Overall Length		Flute Length		Style 120F Black Oxide
Fract	Decimal	mm	Inch	mm	Inch	mm	
1/8	.1250	3.18	5.1250	130.18	3.3750	85.73	49608
9/64	.1406	3.57	5.3750	136.53	3.6250	92.08	49609
5/32	.1562	3.97	5.3750	136.53	3.7500	95.25	49610
11/64	.1719	4.37	5.7500	146.05	4.1250	104.78	49611
3/16	.1875	4.76	5.7500	146.05	4.1250	104.78	49612
13/64	.2031	5.16	6.0000	152.40	4.3750	111.13	49613
7/32	.2188	5.56	6.0000	152.40	4.3750	111.13	49614
15/64	.2344	5.95	6.1250	155.58	4.8125	122.24	49615
1/4	.2500	6.35	6.1250	155.58	4.8125	122.24	49616
17/64	.2656	6.75	6.2500	158.75	5.0000	127.00	49617
9/32	.2812	7.14	6.2500	158.75	5.0000	127.00	49618
19/64	.2969	7.54	6.3750	161.93	5.1250	130.18	49619
5/16	.3125	7.94	6.3750	161.93	5.1250	130.18	49620
21/64	.3281	8.33	6.5000	165.10	5.2500	133.35	49621
11/32	.3438	8.73	6.5000	165.10	5.2500	133.35	49622
23/64	.3594	9.13	6.7500	171.45	5.3750	136.53	49623
3/8	.3750	9.53	6.7500	171.45	5.3750	136.53	49624
13/32	.4062	10.32	7.0000	177.80	5.6250	142.88	49626
7/16	.4375	11.11	7.2500	184.15	5.6875	144.46	49628
15/32	.4688	11.91	7.5000	190.50	5.7500	146.05	49630
1/2	.5000	12.70	7.7500	196.85	5.7500	146.05	49632
33/64	.5156	13.10	8.0000	203.20	6.0000	152.40	49633

Size 33/64 has 1/2" reduced shank.

Cobalt Heavy-Duty Style 520

Features/Benefits:

- Heavy-duty geometry for drilling in tough, high-tensile, and work-hardening materials under extreme operating conditions.
- Manufactured from premium cobalt high-speed steel for increased red hardness.
- 135° split point is self-centering for reduced thrust and easier penetration. Sizes smaller than .0625" do not have split point.
- Straw finish standard from stock; alternate coatings available as stock modifications.

Application Information:

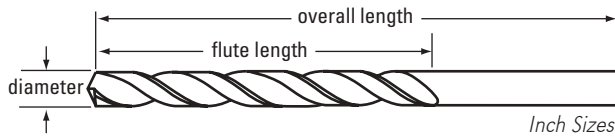
- high-tensile steels
- titanium
- manganese steel
- armour plate
- inconel
- cast iron

Surface Treatment Information:

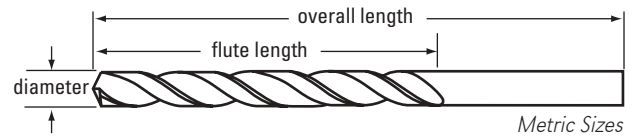
- Straw finish easily identifies cobalt tooling.



Style 520 Straw Finish



Inch Sizes



Metric Sizes

INCH AND METRIC SIZES

Fract	Drill Diameter				Overall Length		Flute Length		Style 520 Straw
	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	mm	
		1.00	.0394		2.2047	56.00	1.2992	33.00	45050
		1.20	.0472		2.5591	65.00	1.6142	41.00	45052
		1.50	.0591		2.7559	70.00	1.7717	45.00	45055
1/16			.0625	1.59	3.0000	76.20	1.7500	44.45	44804
		1.60	.0630		2.9921	76.00	1.9685	50.00	45056
		1.70	.0669		2.9921	76.00	1.9685	50.00	45057
		1.80	.0709		3.1496	80.00	2.0866	53.00	45058
5/64			.0781	1.98	3.7500	95.25	2.0000	50.80	44805
		2.00	.0787		3.3465	85.00	2.2047	56.00	45060
3/32			.0938	2.38	4.2500	107.95	2.2500	57.15	44807
	40		.0980	2.49	4.6250	117.48	2.5000	63.50	44890
		2.50	.0984		3.7402	95.00	2.4409	62.00	45065
	38		.1015	2.58	4.6250	117.48	2.5000	63.50	44888
	37		.1040	2.64	4.6250	117.48	2.5000	63.50	44887
	36		.1065	2.71	4.6250	117.48	2.5000	63.50	44886
7/64			.1094	2.78	4.6250	117.48	2.5000	63.50	44806
	33		.1130	2.87	5.1250	130.18	2.7500	69.85	44883
		3.00	.1181		3.9370	100.00	2.5984	66.00	45070
1/8			.1250	3.18	5.1250	130.18	2.7500	69.85	44808
		3.20	.1260		4.1732	106.00	2.7165	69.00	45072
	30		.1285	3.26	5.3750	136.53	3.0000	76.20	44880
		3.30	.1299		4.1732	106.00	2.7165	69.00	45073
	29		.1360	3.45	5.3750	136.53	3.0000	76.20	44879
		3.50	.1378		4.4094	112.00	2.8740	73.00	45075
9/64			.1406	3.57	5.3750	136.53	3.0000	76.20	44809
		3.60	.1417		4.4094	112.00	2.8740	73.00	45076

Sizes smaller than .0625 do not have split point.

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Drills

Taper Length

Cobalt Heavy-Duty (continued) Style 520

INCH AND METRIC SIZES

Fract	Drill Diameter			Overall Length		Flute Length		Style 520 Straw
	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch	
	27		.1440	3.66	5.3750	136.53	3.0000	44877
	26		.1470	3.73	5.3750	136.53	3.0000	44876
5/32			.1562	3.97	5.3750	136.53	3.0000	44810
	4.00		.1575		4.6850	119.00	3.0709	45080
	21		.1590	4.04	5.7500	146.05	3.3750	44871
	20		.1610	4.09	5.7500	146.05	3.3750	44870
		4.10	.1614		4.6850	119.00	3.0709	45081
		4.20	.1654		4.6850	119.00	3.0709	45082
11/64			.1719	4.37	5.7500	146.05	3.3750	44811
			.1732		4.9606	126.00	3.2283	45084
	16		.1770	4.50	5.7500	146.05	3.3750	44866
		4.50	.1772		4.9606	126.00	3.2283	45085
	15		.1800	4.57	5.7500	146.05	3.3750	44865
		4.60	.1811		4.9606	126.00	3.2283	45086
3/16			.1875	4.76	5.7500	146.05	3.3750	44812
			.1890		5.1968	132.00	2.2441	45088
		4.80	.1890		5.1968	132.00	2.2441	45088
		4.90	.1929		5.1968	132.00	3.4252	45089
		5.00	.1969		5.1968	132.00	3.4252	45090
	7		.2010	5.11	6.0000	152.40	3.6250	44857
13/64			.2031	5.16	6.0000	152.40	3.6250	44813
		5.20	.2047		5.1968	132.00	3.4252	45092
		5.30	.2087		5.1968	132.00	3.4252	45093
	3		.2130	5.41	6.0000	152.40	3.6250	44853
		5.50	.2165		5.4724	139.00	3.5827	45095
7/32			.2188	5.56	6.0000	152.40	3.6250	44814
	1		.2280	5.79	6.1250	155.58	3.7500	44851
15/64			.2344	5.95	6.1250	155.58	3.7500	44815
		6.00	.2362		5.4724	139.00	3.5827	45100
1/4	E		.2500	6.35	6.1250	155.58	3.7500	44816
		6.50	.2559		5.8268	148.00	3.8189	45105
17/64			.2656	6.75	6.2500	158.75	3.8750	44817
		6.80	.2677		6.1417	156.00	4.0157	45108
		7.00	.2756		6.1417	156.00	4.0157	45110
9/32			.2812	7.14	6.2500	158.75	3.8750	44818
		7.50	.2953		6.1417	156.00	4.0157	45115
19/64			.2969	7.54	6.3750	161.93	4.0000	44819
5/16			.3125	7.94	6.3750	161.93	4.0000	44820
		8.00	.3150		6.4961	165.00	4.2913	45120
21/64			.3281	8.33	6.5000	165.10	4.1250	44821
		8.50	.3346		6.4961	165.00	4.2913	45125
11/32			.3438	8.73	6.5000	165.10	4.1250	44822
		9.00	.3543		6.8898	175.00	4.5276	45130
23/64			.3594	9.13	6.7500	171.45	4.2500	44823
		9.50	.3740		6.8898	175.00	4.5276	45135
3/8			.3750	9.53	6.7500	171.45	4.2500	44824
25/64			.3906	9.92	7.0000	177.80	4.3750	44825
		10.00	.3937		7.2441	184.00	4.7638	45140
13/32			.4062	10.32	7.0000	177.80	4.3750	44826
		10.50	.4134		7.2441	184.00	4.7638	45143
27/64			.4219	10.72	7.2500	184.15	4.6250	44827
		11.00	.4331		7.6772	195.00	5.0394	45145

continued on next page



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Cobalt Heavy-Duty (continued) Style 520

INCH AND METRIC SIZES

Fract	Drill Diameter			Overall Length		Flute Length		Style 520 Straw	
	Wire/Let	Metric	Decimal	mm	Inch	mm	Inch		mm
7/16			.4375	11.11	7.2500	184.15	4.6250	117.48	44828
		11.50	.4528		7.6772	195.00	5.0394	128.00	45147
29/64			.4531	11.51	7.5000	190.50	4.7500	120.65	44829
15/32			.4688	11.91	7.5000	190.50	4.7500	120.65	44830
		12.00	.4724		8.0709	205.00	5.2756	134.00	45149
31/64			.4844	12.30	7.7500	196.85	4.7500	120.65	44831
		12.50	.4921		8.0709	205.00	5.2756	134.00	45151
1/2			.5000	12.70	7.7500	196.85	4.7500	120.65	44832

TECH TIP

Deep Hole Tips

Drilling deep holes in some cases requires drilling to depths of 20 times drill diameter. Drilling to these depths causes concern for chip evacuation and heat build up on the tool, generating excessive wear at the point. Consider the following factors when drilling to these depths.

- Material to be cut and its hardness will determine whether to use high-speed steel M-2 or the cobalt grade M-42. Although M-2 is the most frequently used HSS, M-42 is the choice when machining in the Brinell range 296 and above.
- Tool construction must be of a heavy-duty style, with typical web thickness of 40%

to 45% of the drill diameter to maintain rigidity over the long flute length.

- Helix angles of 36° to 38° are common to efficiently evacuate chips up the flutes.
- Points are generally 135° heavy-duty and split, sometimes referred to as crank-shaft drill points.
- Consider other flute styles including parabolic.
- When calculating OAL consider the reach length, amount of re-sharpening required, bushing or fixture length and part thickness.
- Minimize excessive overhang.

- Drill points should always be kept sharp.
- Proper lubrication is critical and coolant should be well filtered.
- The most critical machining function is the evacuation of chips, drilling depth and the critical path of chip evacuation as well as knowing when to withdraw the tool before the chips get hot and anneal the tool.
- For controlling the chip, chose the right feeds and speeds. In general, 50 to 65 SFM is standard. The feed will depend on the tool diameter. If the chip is long and stringy, increase feeds until chip is broken into smaller pieces.

Drills

Taper Length

Deep Hole Parabolic Styles 120DH, 120DH-TN (120DHT)

Features/Benefits:

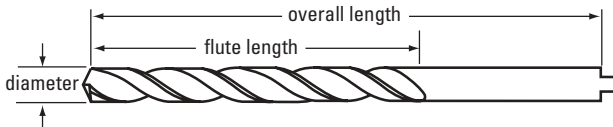
- Parabolic flute configuration with proprietary Convolute flute design offers wider flute space, dispersing chips away from the cutting edges more rapidly and increasing coolant flow.
- Engineered for deep-hole drilling up to 8 to 12 X diameter depth, depending on drill diameter.
- Manufactured from premium high-speed steel.
- 135° K-notch split point is self-centering, and uses reduced thrust for easier penetration.
- Tanged shank; see page 73 for tang specifications.
- TiN and bright finishes standard from stock; alternate coatings available as stock modifications.

Application Information:

- low carbon steel (TiN, bright)
- soft alloy steel (TiN, bright)
- aluminum (TiCN as a modification)
- non-ferrous materials (bright)

Surface Treatment Information

- Bright finish provides good chip ejection.
- Titanium-nitride (TiN) coating adds lubricity and hardness, enhancing chip flow, finished hole quality, and drill life.



INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 120DH	Style 120DH-TN
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Bright	TiN
1/16		.0625	1.59	3.0000	76.20	2.0000	50.80	68804	55236
5/64		.0781	1.98	3.7500	95.25	2.2500	57.15	68805	55237
3/32		.0938	2.38	4.2500	107.95	2.2500	57.15	68806	55238
	41	.0960	2.44	4.6250	117.48	3.1250	79.38	68881	—
	40	.0980	2.49	4.6250	117.48	3.1250	79.38	68880	—
	38	.1015	2.58	4.6250	117.48	3.1250	79.38	68878	—
	37	.1040	2.64	4.6250	117.48	3.1250	79.38	68877	—
	36	.1065	2.71	4.6250	117.48	3.1250	79.38	68876	—
7/64		.1094	2.78	4.6250	117.48	3.1250	79.38	68807	55239
	33	.1130	2.87	5.1250	130.18	3.6250	92.08	68873	—
1/8		.1250	3.18	5.1250	130.18	3.3750	85.73	68808	55240
	30	.1285	3.26	5.3750	136.53	3.6250	92.08	68870	—
	29	.1360	3.45	5.3750	136.53	3.6250	92.08	68869	—
9/64		.1406	3.57	5.3750	136.53	3.6250	92.08	68809	55241
	26	.1470	3.73	5.3750	136.53	3.7500	95.25	68866	—
	25	.1495	3.80	5.3750	136.53	3.7500	95.25	68865	—
5/32		.1562	3.97	5.3750	136.53	3.7500	95.25	68810	55242
	21	.1590	4.04	5.7500	146.05	4.1250	104.78	68861	—

continued on next page



Taper Length

Deep Hole Parabolic (continued)
Styles 120DH, 120DH-TN (120DHT)

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style	Style
	Wire/Let	Decimal	mm	Inch	mm	Inch	120DH Bright	120DH-TN TiN
11/64	20	.1610	4.09	5.7500	146.05	4.1250	104.78	68860 —
		.1719	4.37	5.7500	146.05	4.1250	104.78	68811 55243
	16	.1770	4.50	5.7500	146.05	4.1250	104.78	68856 —
3/16	15	.1800	4.57	5.7500	146.05	4.1250	104.78	68855 —
		.1875	4.76	5.7500	146.05	4.1250	104.78	68812 55244
	10	.1935	4.91	6.0000	152.40	4.3750	111.13	68850 —
13/64	9	.1960	4.98	6.0000	152.40	4.3750	111.13	68849 —
	7	.2010	5.11	6.0000	152.40	4.3750	111.13	68847 —
		.2031	5.16	6.0000	152.40	4.3750	111.13	68813 55245
7/32	3	.2130	5.41	6.0000	152.40	4.3750	111.13	68843 —
		.2188	5.56	6.0000	152.40	4.3750	111.13	68814 55246
		.2344	5.95	6.1250	155.58	4.8125	122.24	68815 55247
15/64	E	.2500	6.35	6.1250	155.58	4.8125	122.24	68816 55248
17/64		.2656	6.75	6.2500	158.75	5.0000	127.00	68817 55249
9/32		.2812	7.14	6.2500	158.75	5.0000	127.00	68818 55250
19/64		.2969	7.54	6.3750	161.93	5.1250	130.18	68819 55251
5/16		.3125	7.94	6.3750	161.93	5.1250	130.18	68820 55252
21/64		.3281	8.33	6.5000	165.10	5.2500	133.35	68821 55253
11/32		.3438	8.73	6.5000	165.10	5.2500	133.35	68822 55254
23/64		.3594	9.13	6.7500	171.45	5.3750	136.53	68823 55255
3/8		.3750	9.53	6.7500	171.45	5.3750	136.53	68824 55256
25/64		.3906	9.92	7.0000	177.80	5.6250	142.88	68825 55257
13/32		.4062	10.32	7.0000	177.80	5.6250	142.88	68826 55258
27/64		.4219	10.72	7.2500	184.15	5.6875	144.46	68827 55259
7/16		.4375	11.11	7.2500	184.15	5.6875	144.46	68828 55260
29/64		.4531	11.51	7.5000	190.50	5.7500	146.05	68829 55261
15/32		.4688	11.91	7.5000	190.50	5.7500	146.05	68830 55262
31/64		.4844	12.30	7.7500	196.85	5.7500	146.05	68831 55263
1/2		.5000	12.70	7.7500	196.85	5.7500	146.05	68832 55264
33/64		.5156	13.10	8.0000	203.20	6.0000	152.40	68833 55265
17/32		.5312	13.49	8.0000	203.20	6.0000	152.40	68834 55266
35/64		.5469	13.89	8.2500	209.55	6.2500	158.75	68835 55267
9/16		.5625	14.29	8.2500	209.55	6.2500	158.75	68836 55268
37/64		.5781	14.68	8.7500	222.25	6.5000	165.10	68837 55269
19/32		.5938	15.08	8.7500	222.25	6.5000	165.10	68838 55270
39/64		.6094	15.48	8.7500	222.25	6.5000	165.10	68839 55271
5/8		.6250	15.88	8.7500	222.25	6.5000	165.10	68840 55272

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Drills
Extra Length

Heavy-Duty Extra-Long
Style 120X

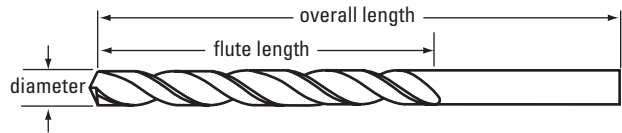
- Features/Benefits:**
- Heavy-duty construction and extra length to drill in a wide range of applications where extra reach is needed.
 - Multiple lengths offered for popular drill diameters.
 - Manufactured from premium high-speed steel.
 - 118° K-notch point.
 - Black oxide finish standard from stock.

- Application Information:**
- carbon steel
 - alloy steel
 - cast iron
 - Designed for long reach applications.

- Surface Treatment Information**
- Black oxide finish provides increased wear resistance and added lubricity in ferrous materials.



Style 120X Black Oxide



INCH SIZES

Drill Diameter			Overall Length		Flute Length		Style 120X Black Oxide
Fract	Decimal	mm	Inch	mm	Inch	mm	
3/32	.0938	2.38	8.0000	203.20	5.5000	139.70	50448
7/64	.1094	2.78	8.0000	203.20	5.5000	139.70	50455
1/8	.1250	3.18	8.0000	203.20	5.5000	139.70	50458
1/8	.1250	3.18	10.0000	254.00	7.5000	190.50	50460
1/8	.1250	3.18	12.0000	304.80	9.0000	228.60	50461
9/64	.1406	3.57	8.0000	203.20	5.5000	139.70	50463
9/64	.1406	3.57	10.0000	254.00	7.5000	190.50	50465
9/64	.1406	3.57	12.0000	304.80	9.0000	228.60	50466
5/32	.1562	3.97	8.0000	203.20	5.5000	139.70	50468
5/32	.1562	3.97	10.0000	254.00	7.5000	190.50	50717
5/32	.1562	3.97	12.0000	304.80	9.0000	228.60	50718
11/64	.1719	4.37	8.0000	203.20	5.5000	139.70	50471
11/64	.1719	4.37	10.0000	254.00	7.5000	190.50	50473
11/64	.1719	4.37	12.0000	304.80	9.0000	228.60	50719
3/16	.1875	4.76	8.0000	203.20	5.5000	139.70	50720
3/16	.1875	4.76	10.0000	254.00	7.5000	190.50	50722
3/16	.1875	4.76	12.0000	304.80	9.0000	228.60	50723
13/64	.2031	5.16	8.0000	203.20	5.5000	139.70	50476
13/64	.2031	5.16	10.0000	254.00	7.5000	190.50	50725
13/64	.2031	5.16	12.0000	304.80	9.0000	228.60	50726
7/32	.2188	5.56	8.0000	203.20	5.5000	139.70	50479
7/32	.2188	5.56	10.0000	254.00	7.5000	190.50	50728
7/32	.2188	5.56	12.0000	304.80	9.0000	228.60	50729
15/64	.2344	5.95	8.0000	203.20	5.5000	139.70	50730
15/64	.2344	5.95	10.0000	254.00	7.5000	190.50	50731
15/64	.2344	5.95	12.0000	304.80	9.0000	228.60	50732

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Heavy-Duty Extra-Long (continued) Style 120X

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style 120X Black Oxide
	Decimal	mm	Inch	mm	Inch	mm	
1/4	.2500	6.35	8.0000	203.20	5.5000	139.70	50485
1/4	.2500	6.35	10.0000	254.00	7.5000	190.50	50734
1/4	.2500	6.35	12.0000	304.80	9.0000	228.60	50735
17/64	.2656	6.75	8.0000	203.20	5.5000	139.70	50489
17/64	.2656	6.75	10.0000	254.00	7.5000	190.50	50736
17/64	.2656	6.75	12.0000	304.80	9.0000	228.60	50737
9/32	.2812	7.14	8.0000	203.20	5.5000	139.70	50493
9/32	.2812	7.14	10.0000	254.00	7.5000	190.50	50495
9/32	.2812	7.14	12.0000	304.80	9.0000	228.60	50738
19/64	.2969	7.54	8.0000	203.20	5.5000	139.70	50498
19/64	.2969	7.54	10.0000	254.00	7.5000	190.50	50500
19/64	.2969	7.54	12.0000	304.80	9.0000	228.60	50739
5/16	.3125	7.94	8.0000	203.20	5.5000	139.70	50503
5/16	.3125	7.94	10.0000	254.00	7.5000	190.50	50505
5/16	.3125	7.94	12.0000	304.80	9.0000	228.60	50740
21/64	.3281	8.33	8.0000	203.20	5.5000	139.70	50509
21/64	.3281	8.33	10.0000	254.00	7.5000	190.50	50511
21/64	.3281	8.33	12.0000	304.80	9.0000	228.60	50741
11/32	.3438	8.73	8.0000	203.20	5.5000	139.70	50514
11/32	.3438	8.73	10.0000	254.00	7.5000	190.50	50516
11/32	.3438	8.73	12.0000	304.80	9.0000	228.60	50742
23/64	.3594	9.13	8.0000	203.20	5.5000	139.70	50520
23/64	.3594	9.13	10.0000	254.00	7.5000	190.50	50522
23/64	.3594	9.13	12.0000	304.80	9.0000	228.60	50523
3/8	.3750	9.53	8.0000	203.20	5.5000	139.70	50527
3/8	.3750	9.53	10.0000	254.00	7.5000	190.50	50529
3/8	.3750	9.53	12.0000	304.80	9.0000	228.60	50743
25/64	.3906	9.92	8.0000	203.20	5.5000	139.70	50534
25/64	.3906	9.92	10.0000	254.00	7.5000	190.50	50536
25/64	.3906	9.92	12.0000	304.80	9.0000	228.60	50745
13/32	.4062	10.32	8.0000	203.20	5.5000	139.70	50540
13/32	.4062	10.32	10.0000	254.00	7.5000	190.50	50746
13/32	.4062	10.32	12.0000	304.80	9.0000	228.60	50747
27/64	.4219	10.72	10.0000	254.00	7.5000	190.50	50546
27/64	.4219	10.72	12.0000	304.80	9.0000	228.60	50749
7/16	.4375	11.11	8.0000	203.20	5.5000	139.70	50550
7/16	.4375	11.11	10.0000	254.00	7.5000	190.50	50552
7/16	.4375	11.11	12.0000	304.80	9.0000	228.60	50750
29/64	.4531	11.51	10.0000	254.00	7.5000	190.50	50557
29/64	.4531	11.51	12.0000	304.80	9.0000	228.60	50558
15/32	.4688	11.91	8.0000	203.20	5.5000	139.70	50561
15/32	.4688	11.91	10.0000	254.00	7.5000	190.50	50563
15/32	.4688	11.91	12.0000	304.80	9.0000	228.60	50751
31/64	.4844	12.30	10.0000	254.00	7.5000	190.50	50568
31/64	.4844	12.30	12.0000	304.80	9.0000	228.60	50752
1/2	.5000	12.70	8.0000	203.20	5.5000	139.70	50570
1/2	.5000	12.70	10.0000	254.00	7.5000	190.50	50571
1/2	.5000	12.70	12.0000	304.80	9.0000	228.60	50572
33/64	.5156	13.10	10.0000	254.00	7.5000	190.50	50580
33/64	.5156	13.10	12.0000	304.80	9.0000	228.60	50581

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Drills

Extra Length

Heavy-Duty Extra-Long (continued) Style 120X

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style 120X Black Oxide
	Decimal	mm	Inch	mm	Inch	mm	
17/32	.5312	13.49	10.0000	254.00	7.5000	190.50	50585
17/32	.5312	13.49	12.0000	304.80	9.0000	228.60	50586
35/64	.5469	13.89	12.0000	304.80	9.0000	228.60	50591
9/16	.5625	14.29	12.0000	304.80	9.0000	228.60	50596
37/64	.5781	14.68	12.0000	304.80	9.0000	228.60	50602
19/32	.5938	15.08	12.0000	304.80	9.0000	228.60	50608
39/64	.6094	15.48	12.0000	304.80	9.0000	228.60	50613
5/8	.6250	15.88	12.0000	304.80	9.0000	228.60	50619
41/64	.6406	16.27	12.0000	304.80	9.0000	228.60	50624
21/32	.6562	16.67	12.0000	304.80	9.0000	228.60	50629
43/64	.6719	17.07	12.0000	304.80	9.0000	228.60	50634
11/16	.6875	17.46	12.0000	304.80	9.0000	228.60	50639
45/64	.7031	17.86	12.0000	304.80	9.0000	228.60	50644
23/32	.7188	18.26	12.0000	304.80	9.0000	228.60	50648
47/64	.7344	18.65	12.0000	304.80	9.0000	228.60	50654
3/4	.7500	19.05	12.0000	304.80	9.0000	228.60	50659

INCH SETS

Set in Plastic Pouch

Number of Tools	Size Range	Style 120X Black Oxide
25	1/8 - 1/2 X 1/64 (12" length)	69869



Set 69869

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

NAS-Type Aircraft Extension Styles 906, 912

Features/Benefits:

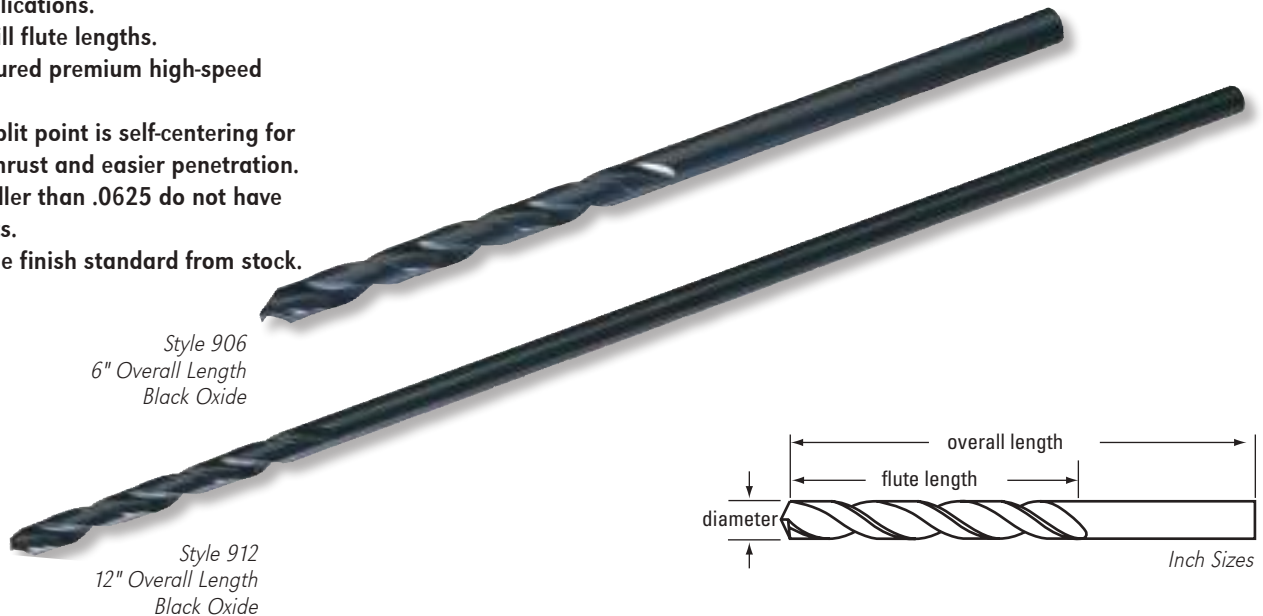
- Manufactured to NAS 907 Type B geometry aerospace specifications.
- 6" and 12" extended shanks for long-reach applications.
- Jobber drill flute lengths.
- Manufactured premium high-speed steel.
- 135° P3 split point is self-centering for reduced thrust and easier penetration. Sizes smaller than .0625 do not have split points.
- Black oxide finish standard from stock.

Application Information:

- carbon steel
- alloy steel
- cast iron

Surface Treatment Information:

- Black oxide finish provides increased wear resistance and added lubricity in ferrous materials.



INCH SIZES

Drill Diameter				Flute Length		Style 906 6" OAL Black Oxide	Style 912 12" OAL Black Oxide
Fract	Wire/Let	Decimal	mm	Inch	mm		
	60	.0400	1.02	.6875	17.46	11090	11184
	59	.0410	1.04	.6875	17.46	11089	11183
	58	.0420	1.07	.6875	17.46	11088	11182
	57	.0430	1.09	.7500	19.05	11087	11181
	56	.0465	1.18	.7500	19.05	11086	11180
3/64		.0469	1.19	.7500	19.05	11000	11095
	55	.0520	1.32	.8750	22.23	11085	11179
	54	.0550	1.40	.8750	22.23	11084	11178
	53	.0595	1.51	.8750	22.23	11083	11177
1/16		.0625	1.59	.8750	22.23	11001	11096
	52	.0635	1.61	.8750	22.23	11082	11176
	51	.0670	1.70	1.0000	25.40	11081	11175
	50	.0700	1.78	1.0000	25.40	11080	11174
	49	.0730	1.85	1.0000	25.40	11079	11173
	48	.0760	1.93	1.0000	25.40	11078	11172
5/64		.0781	1.98	1.0000	25.40	11002	11097
	47	.0785	1.99	1.0000	25.40	11077	11171
	46	.0810	2.06	1.1250	28.58	11076	11170
	45	.0820	2.08	1.1250	28.58	11075	11169
	44	.0860	2.18	1.1250	28.58	11074	11168
	43	.0890	2.26	1.2500	31.75	11073	11167
	42	.0935	2.37	1.2500	31.75	11072	11166
3/32		.0938	2.38	1.2500	31.75	11003	11098

Sizes smaller than .0625 do not have split points.

continued on next page

Drills

Extra Length

NAS-Type Aircraft Extension (continued) Styles 906, 912

INCH SIZES

Fract	Drill Diameter		Flute Length		Style 906	Style 912
	Wire/Let	Decimal	mm	Inch	6" OAL Black Oxide	12" OAL Black Oxide
	41	.0960	2.44	1.3750	34.93	11071 11165
	40	.0980	2.49	1.3750	34.93	11070 11164
	39	.0995	2.53	1.3750	34.93	11069 11163
	38	.1015	2.58	1.4375	36.51	11068 11162
	37	.1040	2.64	1.4375	36.51	11067 11161
	36	.1065	2.71	1.4375	36.51	11066 11160
7/64		.1094	2.78	1.5000	38.10	11004 11099
	35	.1100	2.79	1.5000	38.10	11065 11159
	34	.1110	2.82	1.5000	38.10	11064 11158
	33	.1130	2.87	1.5000	38.10	11063 11157
	32	.1160	2.95	1.6250	41.28	11062 11156
	31	.1200	3.05	1.6250	41.28	11061 11155
1/8		.1250	3.18	1.6250	41.28	11005 11100
	30	.1285	3.26	1.6250	41.28	11060 11154
	29	.1360	3.45	1.7500	44.45	11059 11153
	28	.1405	3.57	1.7500	44.45	11058 11152
9/64		.1406	3.57	1.7500	44.45	11006 11101
	27	.1440	3.66	1.8750	47.63	11057 11151
	26	.1470	3.73	1.8750	47.63	11056 11150
	25	.1495	3.80	1.8750	47.63	11055 11149
	24	.1520	3.86	2.0000	50.80	11054 11148
	23	.1540	3.91	2.0000	50.80	11053 11147
5/32		.1562	3.97	2.0000	50.80	11007 11102
	22	.1570	3.99	2.0000	50.80	11052 11146
	21	.1590	4.04	2.1250	53.98	11051 11145
	20	.1610	4.09	2.1250	53.98	11050 11144
	19	.1660	4.22	2.1250	53.98	11049 11143
	18	.1695	4.31	2.1250	53.98	11048 11142
11/64		.1719	4.37	2.1250	53.98	11008 11103
	17	.1730	4.39	2.1875	55.56	11047 11141
	16	.1770	4.50	2.1875	55.56	11046 11140
	15	.1800	4.57	2.1875	55.56	11045 11139
	14	.1820	4.62	2.1875	55.56	11044 11138
	13	.1850	4.70	2.3125	58.74	11043 11137
3/16		.1875	4.76	2.3125	58.74	11009 11104
	12	.1890	4.80	2.3125	58.74	11042 11136
	11	.1910	4.85	2.3125	58.74	11041 11135
	10	.1935	4.91	2.4375	61.91	11040 11134
	9	.1960	4.98	2.4375	61.91	11039 11133
	8	.1990	5.05	2.4375	61.91	11038 11132
	7	.2010	5.11	2.4375	61.91	11037 11131
13/64		.2031	5.16	2.4375	61.91	11010 11105
	6	.2040	5.18	2.5000	63.50	11036 11130
	5	.2055	5.22	2.5000	63.50	11035 11129
	4	.2090	5.31	2.5000	63.50	11034 11128
	3	.2130	5.41	2.5000	63.50	11033 11127
7/32		.2188	5.56	2.5000	63.50	11011 11106
	2	.2210	5.61	2.6250	66.68	11032 11126
	1	.2280	5.79	2.6250	66.68	11031 11125
15/64		.2344	5.95	2.6250	66.68	11012 11107
1/4	E	.2500	6.35	2.7500	69.85	11013 11108
	F	.2570	6.53	2.8750	73.03	11255 11225

continued on next page



Customer Service: 800.348.2885

Technical Support: 800.892.4281

NAS-Type Aircraft Extension (continued) Styles 906, 912

INCH SIZES

						Style 906	Style 912
Drill Diameter				Flute Length		6" OAL	12" OAL
Fract	Wire/Let	Decimal	mm	Inch	mm	Black Oxide	Black Oxide
17/64		.2656	6.75	2.8750	73.03	11014	11109
	I	.2720	6.91	2.8750	73.03	—	11228
9/32		.2812	7.14	2.9375	74.61	11016	11110
19/64		.2969	7.54	3.0625	77.79	11017	11111
5/16		.3125	7.94	3.1875	80.96	11018	11112
	O	.3160	8.03	3.1875	80.96	—	11234
21/64		.3281	8.33	3.3125	84.14	11019	11113
11/32		.3438	8.73	3.4375	87.31	11020	11114
23/64		.3594	9.13	3.5000	88.90	11021	11115
3/8		.3750	9.53	3.6250	92.08	11022	11116
	V	.3770	9.58	3.6250	92.08	11271	11241
25/64		.3906	9.92	3.7500	95.25	11023	11117
	Y	.4040	10.26	3.8750	98.43	—	11243
13/32		.4062	10.32	3.8750	98.43	11024	11118
27/64		.4219	10.72	3.9375	100.01	11025	11119
7/16		.4375	11.11	4.0625	103.19	11026	11120
29/64		.4531	11.51	4.1875	106.36	11027	11121
15/32		.4688	11.91	4.3125	109.54	11028	11122
31/64		.4844	12.30	4.3750	111.13	11029	11123
1/2		.5000	12.70	4.5000	114.30	11030	11124

TECH TIP

Drill Specifications

More different specifications are showing up in manufacturing prints in the USA. To help clarify abbreviations see the explanations below.

- ASME/USCTI

USA tool standards. American Society of Mechanical Engineering / United States Cutting Tool Institute, all standards are specified in the imperial measurement (inches).

- DIN

German standard. Deutsches Institut Fur Normung / German Institute for Standard, all measurements are to the metric system.

- JIS

Japanese standard. Japanese Industrial Standard, all measurements are to the metric system

- ISO

Global standard. International Standardization Organization, all measurements are to the metric system.

Other countries have their own standards that would relate to specific products such as aircraft and automotive. In the USA other standards, including NAS (National Aero Space) and SAE (Society of Automotive Engineers), are related to those types of industries.

Here are some examples of differences in metric jobber drills versus inch jobber drills.

1) A metric drill OAL is measured from back of shank to point tip; an inch drill is measured from back of shank to point shoulder.

2) OAL and flute length of a standard DIN 338 jobber drill can be shorter than an inch jobber drill. The flute length in

particular should be noted when using an inch drill bushing. The shorter flutes could end inside the bushing, preventing chip evacuation.

3) Metric drill OD tolerances are measured in lower case letters such as h8; inch sizes would be +. 0 to a minus tolerance.

4) Metric tangs are sized differently and will not fit into an inch collet.

Drills

Taper Shank

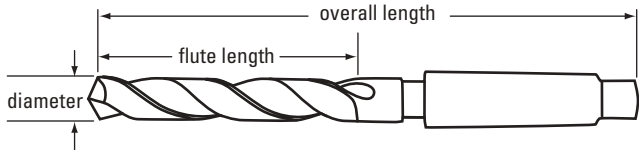
General Purpose Styles 110, 110S

- Features/Benefits:**
- General-purpose geometry for drilling in a wide range of operating conditions and materials.
 - Taper shank made to American National Standard (Morse) dimensions for use in corresponding Morse taper holders. Standard Morse dimensions listed on page 88.
 - Alternate shanks (Style 110S) available in selected sizes.
 - Manufactured from premium high-speed steel.
 - 118° point.
 - Black oxide finish standard from stock.

- Application Information:**
- carbon steel
 - tool steel
 - alloy steel
 - cast iron
- Surface Treatment Information:**
- Black oxide surface finish increases wear resistance and adds lubricity, improving chip flow.



Style 110, 110S Black Oxide



INCH SIZES

Drill Diameter			Morse Taper Shank Number	Overall Length		Flute Length		Style 110, 110S Black Oxide
Fract	Decimal	mm		Inch	mm	Inch	mm	
1/8	.1250	3.18	1	5.1250	130.18	1.8750	47.63	53108
5/32	.1562	3.97	1	5.3750	136.53	2.1250	53.98	53310
3/16	.1875	4.76	1	5.7500	146.05	2.5000	63.50	53112
13/64	.2031	5.16	1	6.0000	152.40	2.7500	69.85	53113
7/32	.2188	5.56	1	6.0000	152.40	2.7500	69.85	53114
15/64	.2344	5.95	1	6.1250	155.58	2.8750	73.03	53115
1/4-E	.2500	6.35	1	6.1250	155.58	2.8750	73.03	53116
17/64	.2656	6.75	1	6.2500	158.75	3.0000	76.20	53117
9/32	.2812	7.14	1	6.2500	158.75	3.0000	76.20	53118
19/64	.2969	7.54	1	6.3750	161.93	3.1250	79.38	53119
5/16	.3125	7.94	1	6.3750	161.93	3.1250	79.38	53120
21/64	.3281	8.33	1	6.5000	165.10	3.2500	82.55	53121
11/32	.3438	8.73	1	6.5000	165.10	3.2500	82.55	53122
23/64	.3594	9.13	1	6.7500	171.45	3.5000	88.90	53123
3/8	.3750	9.53	1	6.7500	171.45	3.5000	88.90	53124
3/8	.3750	9.53	2	7.3750	187.33	3.5000	88.90	53824
25/64	.3906	9.92	1	7.0000	177.80	3.6250	92.08	53125
13/32	.4062	10.32	1	7.0000	177.80	3.6250	92.08	53126
27/64	.4219	10.72	1	7.2500	184.15	3.8750	98.43	53127
7/16	.4375	11.11	1	7.2500	184.15	3.8750	98.43	53128
29/64	.4531	11.51	1	7.5000	190.50	4.1250	104.78	53129
15/32	.4688	11.91	1	7.5000	190.50	4.1250	104.78	53130
31/64	.4844	12.30	2	8.2500	209.55	4.3750	111.13	53131
1/2	.5000	12.70	2	8.2500	209.55	4.3750	111.13	53132

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General Purpose (continued) Styles 110, 110S

INCH SIZES

Fract	Drill Diameter		Morse Taper Shank Number	Overall Length		Flute Length		Style 110, 110S Black Oxide
	Decimal	mm		Inch	mm	Inch	mm	
33/64	.5156	13.10	2	8.5000	215.90	4.6250	117.48	53133
17/32	.5312	13.49	2	8.5000	215.90	4.6250	117.48	53134
35/64	.5469	13.89	2	8.7500	222.25	4.8750	123.83	53135
9/16	.5625	14.29	2	8.7500	222.25	4.8750	123.83	53136
37/64	.5781	14.68	2	8.7500	222.25	4.8750	123.83	53137
19/32	.5938	15.08	2	8.7500	222.25	4.8750	123.83	53138
39/64	.6094	15.48	2	8.7500	222.25	4.8750	123.83	53139
5/8	.6250	15.88	2	8.7500	222.25	4.8750	123.83	53140
41/64	.6406	16.27	2	9.0000	228.60	5.1250	130.18	53141
21/32	.6562	16.67	2	9.0000	228.60	5.1250	130.18	53142
43/64	.6719	17.07	2	9.2500	234.95	5.3750	136.53	53143
11/16	.6875	17.46	2	9.2500	234.95	5.3750	136.53	53144
45/64	.7031	17.86	2	9.5000	241.30	5.6250	142.88	53145
23/32	.7188	18.26	2	9.5000	241.30	5.6250	142.88	53146
47/64	.7344	18.65	2	9.7500	247.65	5.8750	149.23	53147
3/4	.7500	19.05	2	9.7500	247.65	5.8750	149.23	53148
3/4	.7500	19.05	3	10.5000	266.70	5.8750	149.23	53848
49/64	.7656	19.45	2	9.8750	250.83	6.0000	152.40	53149
25/32	.7812	19.84	2	9.8750	250.83	6.0000	152.40	53150
51/64	.7969	20.24	3	10.7500	273.05	6.1250	155.58	53151
13/16	.8125	20.64	3	10.7500	273.05	6.1250	155.58	53152
53/64	.8281	21.03	3	10.7500	273.05	6.1250	155.58	53153
27/32	.8438	21.43	3	10.7500	273.05	6.1250	155.58	53154
55/64	.8594	21.83	3	10.7500	273.05	6.1250	155.58	53155
7/8	.8750	22.23	2	10.0000	254.00	6.1250	155.58	53556
7/8	.8750	22.23	3	10.7500	273.05	6.1250	155.58	53156
57/64	.8906	22.62	3	10.7500	273.05	6.1250	155.58	53157
29/32	.9062	23.02	3	10.7500	273.05	6.1250	155.58	53158
59/64	.9219	23.42	3	10.7500	273.05	6.1250	155.58	53159
15/16	.9375	23.81	3	10.7500	273.05	6.1250	155.58	53160
61/64	.9531	24.21	3	11.0000	279.40	6.3750	161.93	53161
31/32	.9688	24.61	3	11.0000	279.40	6.3750	161.93	53162
63/64	.9844	25.00	3	11.0000	279.40	6.3750	161.93	53163
1	1.0000	25.40	2	12.0000	304.80	6.3750	161.93	53559
1	1.0000	25.40	3	11.0000	279.40	6.3750	161.93	53164
1 1/64	1.0156	25.80	3	11.1250	282.58	6.5000	165.10	53165
1 1/32	1.0312	26.19	3	11.1250	282.58	6.5000	165.10	53166
1 1/16	1.0625	26.99	3	11.2500	285.75	6.6250	168.28	53168
1 7/64	1.1094	28.18	4	12.7500	323.85	7.1250	180.98	53171
1 1/8	1.1250	28.58	3	11.7500	298.45	7.1250	180.98	53572
1 1/8	1.1250	28.58	4	12.7500	323.85	7.1250	180.98	53172
1 3/16	1.1875	30.16	4	13.0000	330.20	7.3750	187.33	53176
1 1/4	1.2500	31.75	3	12.5000	317.50	7.8750	200.03	53580
1 1/4	1.2500	31.75	4	13.5000	342.90	7.8750	200.03	53180
1 5/16	1.3125	33.34	4	14.2500	361.95	8.6250	219.08	53184
1 11/32	1.3438	34.13	4	14.3750	365.13	8.7500	222.25	53186
1 3/8	1.3750	34.93	4	14.5000	368.30	8.8750	225.43	53188
1 7/16	1.4375	36.51	4	14.7500	374.65	9.1250	231.78	53192
1 15/32	1.4688	37.31	4	14.8750	377.83	9.2500	234.95	53194
1 1/2	1.5000	38.10	4	15.0000	381.00	9.3750	238.13	53196
1 9/16	1.5625	39.69	5	16.6250	422.28	9.6250	244.48	53200

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Drills
Taper Shank

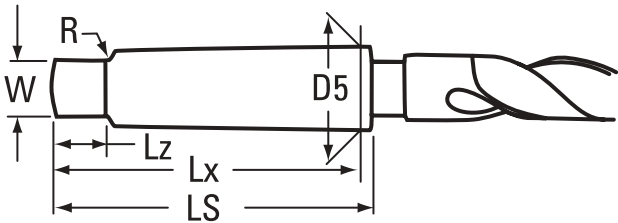
General Purpose (continued)
Styles 110, 110S

INCH SIZES

Fract	Drill Diameter		Morse Taper Shank Number	Overall Length		Flute Length		Style 110, 110S Black Oxide
	Decimal	mm		Inch	mm	Inch	mm	
1 5/8	1.6250	41.28	5	17.0000	431.80	10.0000	254.00	53204
1 11/16	1.6875	42.86	5	17.1250	434.98	10.1250	257.18	53208
1 3/4	1.7500	44.45	4	16.2500	412.75	10.3750	263.53	53612
1 3/4	1.7500	44.45	5	17.1250	434.98	10.1250	257.18	53212
1 13/16	1.8125	46.04	5	17.1250	434.98	10.1250	257.18	53216
1 7/8	1.8750	47.63	5	17.3750	441.33	10.3750	263.53	53220
2	2.0000	50.80	4	16.6250	422.28	10.6250	269.88	53628
2	2.0000	50.80	5	17.3750	441.33	10.3750	263.53	53228
2 13/16	2.8125	71.44	5	21.1250	536.58	13.3750	339.73	53280
2 15/16	2.9375	74.61	5	21.7500	552.45	14.0000	355.60	53288

Morse Taper Shank Specifications

All measurements in inches



Morse Taper Shank Number	Taper per Foot	Taper per Inch	DS Maximum Shank Diameter	LS Length of Shank	Lx Length of Shank to Gage Line	Lz Length of Tang	W Thickness of Tang	R Radius
1	.5985	.0498	.475	2.56	2.44	.37	.20	.19
2	.5994	.0499	.700	3.12	2.94	.44	.25	.25
3	.6023	.0501	.938	3.87	3.69	.56	.31	.28
4	.6232	.0519	1.231	4.87	4.62	.62	.47	.31
5	.6315	.0526	1.748	6.12	5.87	.75	.62	.37
6	.6256	.0521	2.494	8.56	8.25	1.12	.75	.50

Cobalt Heavy-Duty
Style 510

Features/Benefits:

- Heavy-duty geometry for drilling in tough, high-tensile materials under extreme operating conditions.
- Taper shank made to American National Standard (Morse) dimensions for use in corresponding Morse taper holders. Standard Morse dimensions listed on page 88.
- Manufactured from premium 8% cobalt (M42) high-speed steel for increased hot hardness.
- 135° notch point reduces thrust forces and allows easier penetration.
- Straw finish standard from stock.

Application Information:

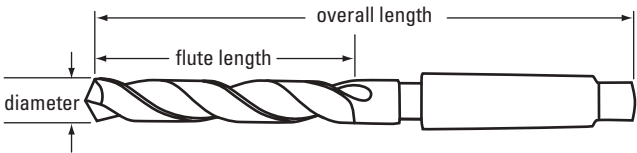
- carbon steel
- tool steel
- stainless steel
- cast iron

Surface Treatment Information:

- Straw finish easily identifies cobalt tooling.



Style 510 Straw Finish



INCH SIZES

Fract	Drill Diameter		Morse Taper Shank Number	Overall Length		Flute Length		Style 510 Straw Finish
	Decimal	mm		Inch	mm	Inch	mm	
5/16	.3125	7.94	1	6.3750	161.93	3.1250	79.38	53020
3/8	.3750	9.53	2	7.3750	187.33	3.5000	88.90	53024
7/16	.4375	11.11	2	7.7500	196.85	3.8750	98.43	53028
1/2	.5000	12.70	2	8.2500	209.55	4.3750	111.13	53032
9/16	.5625	14.29	2	8.7500	222.25	4.8750	123.83	53036
5/8	.6250	15.88	2	8.7500	222.25	4.8750	123.83	53040
41/64	.6406	16.27	3	9.0000	228.60	5.1250	130.18	53041
11/16	.6875	17.46	3	10.0000	254.00	5.3750	136.53	53044

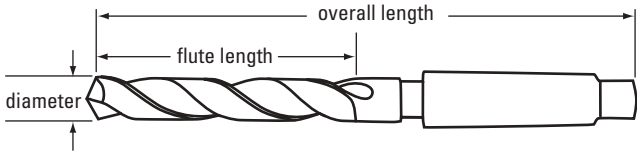
Drills
Taper Shank

Heavy-Duty Extra Length
Style 110X

- Features/Benefits:**
- Heavy-duty geometry for drilling in tough, high-tensile, and work-hardening materials under extreme operating conditions.
 - Extra length for long-reach applications.
 - Taper shank made to American National Standard (Morse) dimensions for use in corresponding Morse taper holders. Standard Morse dimensions listed on page 88.
 - Manufactured from premium high-speed steel.
 - 118° K-notch point.
 - Black oxide finish standard from stock.

- Application Information:**
- carbon steel
 - tool steel
 - alloy steel
 - cast iron

- Surface Treatment Information:**
- Black oxide surface finish increases wear resistance and adds lubricity, improving chip flow.



INCH SIZES

Drill Diameter			Morse Taper Shank Number	Overall Length		Flute Length		Style 110X Black Oxide
Fract	Decimal	mm		Inch	mm	Inch	mm	
7/16	.4375	11.11	2	12.0000	304.80	8.0000	203.20	51347
15/32	.4688	11.91	2	12.0000	304.80	8.0000	203.20	51361
1/2	.5000	12.70	2	12.0000	304.80	8.0000	203.20	51371
33/64	.5156	13.10	2	12.0000	304.80	8.0000	203.20	51375
17/32	.5312	13.49	2	12.0000	304.80	8.0000	203.20	51379
9/16	.5625	14.29	2	12.0000	304.80	8.0000	203.20	51386
37/64	.5781	14.68	2	12.0000	304.80	8.0000	203.20	51390
19/32	.5938	15.08	2	12.0000	304.80	8.0000	203.20	51395
39/64	.6094	15.48	2	12.0000	304.80	8.0000	203.20	51400
5/8	.6250	15.88	2	12.0000	304.80	8.0000	203.20	51404
21/32	.6562	16.67	2	12.0000	304.80	8.0000	203.20	51413
11/16	.6875	17.46	2	12.0000	304.80	8.0000	203.20	51423
23/32	.7188	18.26	2	12.0000	304.80	8.0000	203.20	51433
47/64	.7344	18.65	2	12.0000	304.80	8.0000	203.20	51439
3/4	.7500	19.05	2	12.0000	304.80	8.0000	203.20	51444
25/32	.7812	19.84	2	12.0000	304.80	8.0000	203.20	51456

Reduced Shank

1/2" Reduced Shank Silver & Deming
Styles 190, 190F

Features/Benefits:

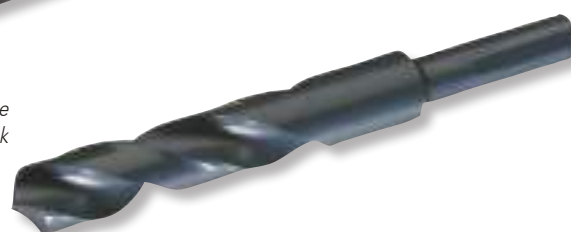
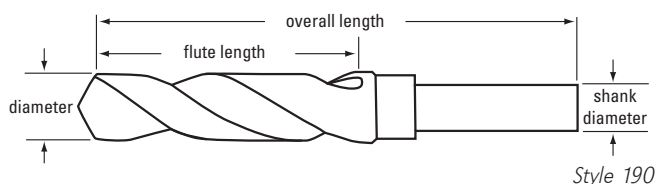
- Larger size general-purpose drills with 1/2" reduced shank.
- Manufactured from premium high-speed steel.
- 118° point; style 190F features 118° split point through 1-1/4" size.
- Round shank or shank with three flats for a more positive grip in the drill chuck; flats reduce drill slippage under high load.
- Standard 6" overall length and 3-1/8" flute length for increased rigidity, less deflection, and better hole accuracy.
- Standardized lengths result in minimal adjustment during tool changes in screw machines and machining centers.
- Ideal for portable drilling due to increased rigidity.
- Black oxide finish standard from stock.

Application Information:

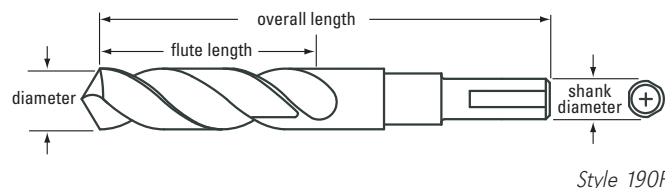
- carbon steel
- cast iron
- alloy steel
- wood
- Use wherever maximum chuck capacity is 1/2".

Surface Treatment Information:

- Black oxide surface finish increases wear resistance and adds lubricity, improving chip flow.

Style 190 Black Oxide
with Round ShankStyle 190F Black Oxide
with Flatted Shank

Style 190



Style 190F

INCH SIZES

Drill Diameter			Shank Diameter		Overall Length		Flute Length		Style 190	Style 190F
Fract	Decimal	mm	Inch	mm	Inch	mm	inch	mm	Round	Flatted
1/2	.5000	12.70	.5000	12.70	6.0000	152.40	3.1250	79.38	55432	52432
33/64	.5156	13.10	.5000	12.70	6.0000	152.40	3.1250	79.38	55433	52433
17/32	.5312	13.49	.5000	12.70	6.0000	152.40	3.1250	79.38	55434	52434
35/64	.5469	13.89	.5000	12.70	6.0000	152.40	3.1250	79.38	55435	52435
9/16	.5625	14.29	.5000	12.70	6.0000	152.40	3.1250	79.38	55436	52436
37/64	.5781	14.68	.5000	12.70	6.0000	152.40	3.1250	79.38	55437	52437
19/32	.5938	15.08	.5000	12.70	6.0000	152.40	3.1250	79.38	55438	52438
39/64	.6094	15.48	.5000	12.70	6.0000	152.40	3.1250	79.38	55439	52439
5/8	.6250	15.88	.5000	12.70	6.0000	152.40	3.1250	79.38	55440	52440
41/64	.6406	16.27	.5000	12.70	6.0000	152.40	3.1250	79.38	55441	52441
21/32	.6562	16.67	.5000	12.70	6.0000	152.40	3.1250	79.38	55442	52442
43/64	.6719	17.07	.5000	12.70	6.0000	152.40	3.1250	79.38	55443	52443
11/16	.6875	17.46	.5000	12.70	6.0000	152.40	3.1250	79.38	55444	52444
45/64	.7031	17.86	.5000	12.70	6.0000	152.40	3.1250	79.38	55445	52445
23/32	.7188	18.26	.5000	12.70	6.0000	152.40	3.1250	79.38	55446	52446
47/64	.7344	18.65	.5000	12.70	6.0000	152.40	3.1250	79.38	55447	52447
3/4	.7500	19.05	.5000	12.70	6.0000	152.40	3.1250	79.38	55448	52448

continued on next page

Drills

Reduced Shank

1/2" Reduced Shank Silver & Deming (continued) Styles 190, 190F

INCH SIZES

Fract	Drill Diameter		Shank Diameter		Overall Length		Flute Length		Style 190	Style 190F
	Decimal	mm	Inch	mm	Inch	mm	inch	mm	Round	Flatted
49/64	.7656	19.45	.5000	12.70	6.0000	152.40	3.1250	79.38	55449	52449
25/32	.7812	19.84	.5000	12.70	6.0000	152.40	3.1250	79.38	55450	52450
51/64	.7969	20.24	.5000	12.70	6.0000	152.40	3.1250	79.38	55451	52451
13/16	.8125	20.64	.5000	12.70	6.0000	152.40	3.1250	79.38	55452	52452
53/64	.8281	21.03	.5000	12.70	6.0000	152.40	3.1250	79.38	55453	52453
27/32	.8438	21.43	.5000	12.70	6.0000	152.40	3.1250	79.38	55454	52454
55/64	.8594	21.83	.5000	12.70	6.0000	152.40	3.1250	79.38	55455	52455
7/8	.8750	22.23	.5000	12.70	6.0000	152.40	3.1250	79.38	55456	52456
57/64	.8906	22.62	.5000	12.70	6.0000	152.40	3.1250	79.38	55457	52457
29/32	.9062	23.02	.5000	12.70	6.0000	152.40	3.1250	79.38	55458	52458
59/64	.9219	23.42	.5000	12.70	6.0000	152.40	3.1250	79.38	55459	52459
15/16	.9375	23.81	.5000	12.70	6.0000	152.40	3.1250	79.38	55460	52460
61/64	.9531	24.21	.5000	12.70	6.0000	152.40	3.1250	79.38	55461	52461
31/32	.9688	24.61	.5000	12.70	6.0000	152.40	3.1250	79.38	55462	52462
63/64	.9844	25.00	.5000	12.70	6.0000	152.40	3.1250	79.38	55463	52463
1	.0000	25.40	.5000	12.70	6.0000	152.40	3.1250	79.38	55464	52464
1 1/64	.0156	25.80	.5000	12.70	6.0000	152.40	3.1250	79.38	55465	52465
1 1/32	.0312	26.19	.5000	12.70	6.0000	152.40	3.1250	79.38	55466	52466
1 3/64	.0469	26.59	.5000	12.70	6.0000	152.40	3.1250	79.38	55467	52467
1 1/16	.0625	26.99	.5000	12.70	6.0000	152.40	3.1250	79.38	55468	52468
1 5/64	.0781	27.38	.5000	12.70	6.0000	152.40	3.1250	79.38	55469	52469
1 3/32	.0938	27.78	.5000	12.70	6.0000	152.40	3.1250	79.38	55470	52470
1 7/64	.1094	28.18	.5000	12.70	6.0000	152.40	3.1250	79.38	55471	52471
1 1/8	.1250	28.58	.5000	12.70	6.0000	152.40	3.1250	79.38	55472	52472
1 9/64	.1406	28.97	.5000	12.70	6.0000	152.40	3.1250	79.38	55473	52473
1 5/32	.1562	29.37	.5000	12.70	6.0000	152.40	3.1250	79.38	55474	52474
1 11/64	.1719	29.77	.5000	12.70	6.0000	152.40	3.1250	79.38	55475	52475
1 3/16	.1875	30.16	.5000	12.70	6.0000	152.40	3.1250	79.38	55476	52476
1 13/64	.2031	30.56	.5000	12.70	6.0000	152.40	3.1250	79.38	55477	52477
1 7/32	.2188	30.96	.5000	12.70	6.0000	152.40	3.1250	79.38	55478	52478
1 15/64	.2344	31.35	.5000	12.70	6.0000	152.40	3.1250	79.38	55479	52479
1 1/4	.2500	31.75	.5000	12.70	6.0000	152.40	3.1250	79.38	55480	52480
1 17/64	.2656	32.15	.5000	12.70	6.0000	152.40	3.1250	79.38	55481	52481
1 9/32	.2812	32.54	.5000	12.70	6.0000	152.40	3.1250	79.38	55482	52482
1 19/64	.2969	32.94	.5000	12.70	6.0000	152.40	3.1250	79.38	55483	52483
1 5/16	.3125	33.34	.5000	12.70	6.0000	152.40	3.1250	79.38	55484	52484
1 21/64	.3281	33.73	.5000	12.70	6.0000	152.40	3.1250	79.38	55485	52485
1 11/32	.3438	34.13	.5000	12.70	6.0000	152.40	3.1250	79.38	55486	52486
1 23/64	.3594	34.53	.5000	12.70	6.0000	152.40	3.1250	79.38	55487	52487
1 3/8	.3750	34.93	.5000	12.70	6.0000	152.40	3.1250	79.38	55488	52488
1 25/64	.3906	35.32	.5000	12.70	6.0000	152.40	3.1250	79.38	55489	52489
1 13/32	.4062	35.72	.5000	12.70	6.0000	152.40	3.1250	79.38	55490	52490
1 27/64	.4219	36.12	.5000	12.70	6.0000	152.40	3.1250	79.38	55491	52491
1 7/16	.4375	36.51	.5000	12.70	6.0000	152.40	3.1250	79.38	55492	52492
1 29/64	.4531	36.91	.5000	12.70	6.0000	152.40	3.1250	79.38	55493	52493
1 15/32	.4688	37.31	.5000	12.70	6.0000	152.40	3.1250	79.38	55494	52494
1 31/64	.4844	37.70	.5000	12.70	6.0000	152.40	3.1250	79.38	55495	52495
1 1/2	.5000	38.10	.5000	12.70	6.0000	152.40	3.1250	79.38	55496	52496

sets on next page



Customer Service: 800.348.2885

Technical Support: 800.892.4281

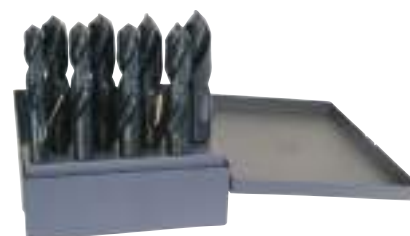
Reduced Shank

1/2" Reduced Shank Silver & Deming (continued) Styles 190, 190F

INCH SETS

Sets in Various Cases

Number of Tools	Size Range	Case Style	Style 190	Style 190F
			Round	Flatted
8	9/16 - 1 X 1/16	plastic	57840	69860
8	9/16 - 1 X 1/16	metal	69857	69859
16	17/32 - 1 X 1/32	pouch	69890	69849
33	1/2 - 1 X 1/64	metal stand	69858	69848



Set 69859

1/4" Reduced Shank Silver & Deming Style 239

Features/Benefits:

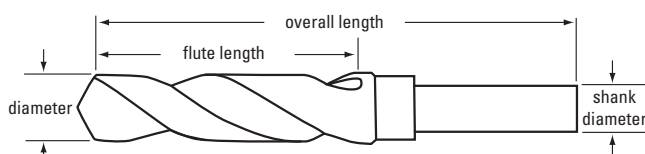
- General-purpose drills with 1/4" reduced round shank.
- Manufactured from high-speed steel.
- 118° point.
- Ideal for portable drilling due to increased rigidity.
- Black oxide finish standard from stock.

Application Information:

- wood
- sheet metal
- aluminum
- mild steels
- Ideal for use in portable electric drills where chuck capacity is 1/4".

Surface Treatment Information:

- Black oxide surface finish increases wear resistance and adds lubricity, improving chip flow.



Style 239 Black Oxide

INCH SIZES

Fract	Drill Diameter		Shank Diameter		Overall Length		Flute Length		Style 239 black oxide
	Decimal	mm	Inch	mm	Inch	mm	inch	mm	
1/4	.2500	6.35	.2500	6.35	2.5000	63.50	1.3750	34.93	56316
5/16	.3125	7.94	.2500	6.35	2.8125	71.44	1.3750	34.93	56320
3/8	.3750	9.53	.2500	6.35	3.1250	79.38	1.6875	42.86	56324
7/16	.4375	11.11	.2500	6.35	3.4375	87.31	2.0000	50.80	56328
1/2	.5000	12.70	.2500	6.35	3.7500	95.25	2.2500	57.15	56332

INCH SETS

Sets in Metal Case

Number of Tools	Size Range	Case Style	Style 239
			Round
5	1/4 - 1/2 X 1/16	metal	56340

Drills
Reduced Shank

Cobalt Split Point 1/2" Reduced Shank Silver & Deming
Styles 190C, 190C-TN

Features/Benefits:

- Larger size general-purpose drills with 1/2" reduced shank.
- Manufactured from cobalt premium high-speed steel for use in highly abrasive applications.
- 118° split point for easier, more precise penetration.
- Three flats on shank for tighter chucking.
- Standard 6" overall length and 3-1/8" flute length for increased rigidity, less deflection, and better hole accuracy.
- Standardized lengths result in minimal adjustment during tool changes in screw machines and machining centers.
- Ideal for portable drilling due to increased rigidity.
- Straw finish and TiN coating standard from stock.

Application Information:

- carbon steel
- alloy steel
- cast iron
- Use wherever maximum chuck capacity is 1/2".

Surface Treatment Information:

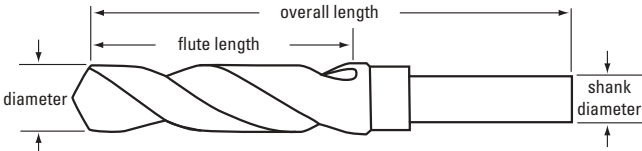
- Straw finish adds lubricity and easily identifies cobalt drills.
- Titanium nitride (TiN) coating adds lubricity and hardness, enhancing chip flow, finish hole quality, and drill life.



Style 190C Straw Finish



Style 190C-TN TiN-coated



INCH SIZES

Drill Diameter			Shank Diameter		Overall Length		Flute Length		Style 190C	Style 190C-TN
Fract	Decimal	mm	Inch	mm	Inch	mm	inch	mm	Straw	TiN
1/2	.5000	12.70	.5000	12.70	6.0000	152.40	3.1250	79.38	53432	—
33/64	.5156	13.10	.5000	12.70	6.0000	152.40	3.1250	79.38	53433	—
17/32	.5312	13.49	.5000	12.70	6.0000	152.40	3.1250	79.38	53434	53634
35/64	.5469	13.89	.5000	12.70	6.0000	152.40	3.1250	79.38	53435	—
9/16	.5625	14.29	.5000	12.70	6.0000	152.40	3.1250	79.38	53436	53636
37/64	.5781	14.68	.5000	12.70	6.0000	152.40	3.1250	79.38	53437	—
19/32	.5938	15.08	.5000	12.70	6.0000	152.40	3.1250	79.38	53438	53638
39/64	.6094	15.48	.5000	12.70	6.0000	152.40	3.1250	79.38	53439	—
5/8	.6250	15.88	.5000	12.70	6.0000	152.40	3.1250	79.38	53440	53640
41/64	.6406	16.27	.5000	12.70	6.0000	152.40	3.1250	79.38	53441	—
21/32	.6562	16.67	.5000	12.70	6.0000	152.40	3.1250	79.38	53442	53642
43/64	.6719	17.07	.5000	12.70	6.0000	152.40	3.1250	79.38	53443	—
11/16	.6875	17.46	.5000	12.70	6.0000	152.40	3.1250	79.38	53444	53644
45/64	.7031	17.86	.5000	12.70	6.0000	152.40	3.1250	79.38	53445	—
23/32	.7188	18.26	.5000	12.70	6.0000	152.40	3.1250	79.38	53446	53646
47/64	.7344	18.65	.5000	12.70	6.0000	152.40	3.1250	79.38	53447	—
3/4	.7500	19.05	.5000	12.70	6.0000	152.40	3.1250	79.38	53448	53648

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Reduced Shank

Cobalt Split Point 1/2" Reduced Shank Silver & Deming (continued)
Styles 190C, 190C-TN

INCH SIZES

Fract	Drill Diameter		Shank Diameter		Overall Length		Flute Length		Style 190C	Style 190C-TN
	Decimal	mm	Inch	mm	Inch	mm	inch	mm	Straw	TiN
49/64	.7656	19.45	.5000	12.70	6.0000	152.40	3.1250	79.38	53449	—
25/32	.7812	19.84	.5000	12.70	6.0000	152.40	3.1250	79.38	53450	53650
51/64	.7969	20.24	.5000	12.70	6.0000	152.40	3.1250	79.38	53451	—
13/16	.8125	20.64	.5000	12.70	6.0000	152.40	3.1250	79.38	53452	53652
53/64	.8281	21.03	.5000	12.70	6.0000	152.40	3.1250	79.38	53453	—
27/32	.8438	21.43	.5000	12.70	6.0000	152.40	3.1250	79.38	53454	53654
55/64	.8594	21.83	.5000	12.70	6.0000	152.40	3.1250	79.38	53455	—
7/8	.8750	22.23	.5000	12.70	6.0000	152.40	3.1250	79.38	53456	53656
57/64	.8906	22.62	.5000	12.70	6.0000	152.40	3.1250	79.38	53457	—
29/32	.9062	23.02	.5000	12.70	6.0000	152.40	3.1250	79.38	53458	53658
59/64	.9219	23.42	.5000	12.70	6.0000	152.40	3.1250	79.38	53459	—
15/16	.9375	23.81	.5000	12.70	6.0000	152.40	3.1250	79.38	53460	53660
61/64	.9531	24.21	.5000	12.70	6.0000	152.40	3.1250	79.38	53461	—
31/32	.9688	24.61	.5000	12.70	6.0000	152.40	3.1250	79.38	53462	53662
63/64	.9844	25.00	.5000	12.70	6.0000	152.40	3.1250	79.38	53463	—
1	1.0000	25.40	.5000	12.70	6.0000	152.40	3.1250	79.38	53464	53664
1 1/16	1.0625	26.99	.5000	12.70	6.0000	152.40	3.1250	79.38	53468	—
1 1/8	1.1250	28.58	.5000	12.70	6.0000	152.40	3.1250	79.38	53472	—
1 3/16	1.1875	30.16	.5000	12.70	6.0000	152.40	3.1250	79.38	53475	—
1 1/4	1.2500	31.75	.5000	12.70	6.0000	152.40	3.1250	79.38	53480	—
1 3/8	1.3750	34.93	.5000	12.70	6.0000	152.40	3.1250	79.38	53488	—
1 1/2	1.5000	38.10	.5000	12.70	6.0000	152.40	3.1250	79.38	53496	—

INCH SETS

Sets in Metal Case

Number of Tools	Size Range	Case Style	Style 190C
			Straw
8	9/16 - 1 X 1/16	metal	69868



Set 69868

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Drills

Solid Carbide

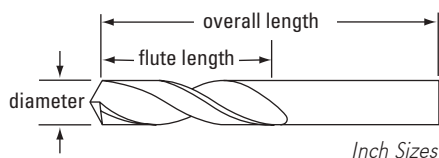
Solid Carbide Stub Length Style 759

Features/Benefits:

- 2 flutes, right-hand spiral, right-hand cut.
- Manufactured from solid submicron grain carbide.
- 118° 4-facet point.
- Stub length for rigid setups.
- Uncoated drills standard from stock.

Application Information:

- cast iron
- stainless steel
- high-temp alloys
- hardened material



Style 759

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style 759	
	Wire	Decimal	mm	Inch	mm	Inch	mm	Uncoated
1/16	53	.0595	1.51	1.5000	38.10	.3750	9.53	78692
		.0625	1.59	1.5000	38.10	.3750	9.53	78700
	52	.0635	1.61	1.5000	38.10	.3750	9.53	78691
	51	.0670	1.70	1.5000	38.10	.3750	9.53	78690
	50	.0700	1.78	1.5000	38.10	.3750	9.53	78689
5/64	49	.0730	1.85	1.5000	38.10	.3750	9.53	78688
	48	.0760	1.93	1.5000	38.10	.5000	12.70	78687
		.0781	1.98	1.5000	38.10	.5000	12.70	78701
	47	.0785	1.99	1.5000	38.10	.5000	12.70	78686
	46	.0810	2.06	1.5000	38.10	.5000	12.70	78685
3/32	45	.0820	2.08	1.5000	38.10	.5000	12.70	78684
	44	.0860	2.18	2.0000	50.80	.5000	12.70	78683
	43	.0890	2.26	2.0000	50.80	.5000	12.70	78682
	42	.0935	2.37	2.0000	50.80	.5000	12.70	78681
		.0938	2.38	2.0000	50.80	.5000	12.70	78702
7/64	41	.0960	2.44	2.0000	50.80	.5000	12.70	78680
	40	.0980	2.49	2.0000	50.80	.6250	15.88	78679
	39	.0995	2.53	2.0000	50.80	.6250	15.88	78678
	38	.1015	2.58	2.0000	50.80	.6250	15.88	78677
	37	.1040	2.64	2.0000	50.80	.6250	15.88	78676
1/8	36	.1065	2.71	2.0000	50.80	.6250	15.88	78675
		.1094	2.78	2.0000	50.80	.6250	15.88	78703
	35	.1100	2.79	2.0000	50.80	.6250	15.88	78674
	34	.1110	2.82	2.0000	50.80	.6250	15.88	78673
	33	.1130	2.87	2.0000	50.80	.6250	15.88	78672
9/64	32	.1160	2.95	2.0000	50.80	.6250	15.88	78671
	31	.1200	3.05	2.0000	50.80	.6250	15.88	78670
		.1250	3.18	2.0000	50.80	.6250	15.88	78704
	30	.1285	3.26	2.0000	50.80	.6250	15.88	78669
	29	.1360	3.45	2.0000	50.80	.6250	15.88	78668
	28	.1405	3.57	2.0000	50.80	.6250	15.88	78667
		.1406	3.57	2.0000	50.80	.6250	15.88	78705
	27	.1440	3.66	2.0000	50.80	.6250	15.88	78666

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**Solid Carbide Stub Length (continued)
Style 759****INCH AND METRIC SIZES**

Drill Diameter				Overall Length		Flute Length		Style 759
Fract	Wire	Decimal	mm	Inch	mm	Inch	mm	Uncoated
	26	.1470	3.73	2.0000	50.80	.6250	15.88	78665
	25	.1495	3.80	2.0000	50.80	.6250	15.88	78664
	24	.1520	3.86	2.0000	50.80	.6250	15.88	78663
	23	.1540	3.91	2.0000	50.80	.6250	15.88	78662
5/32		.1563	3.97	2.0000	50.80	.7500	19.05	78706
	22	.1570	3.99	2.0000	50.80	.7500	19.05	78661
	21	.1590	4.04	2.0000	50.80	.7500	19.05	78660
	20	.1610	4.09	2.0000	50.80	.7500	19.05	78659
	19	.1660	4.22	2.1250	53.98	.7500	19.05	78658
	18	.1695	4.31	2.1250	53.98	.7500	19.05	78657
11/64		.1719	4.37	2.1250	53.98	.7500	19.05	78707
	17	.1730	4.39	2.1250	53.98	.7500	19.05	78656
	16	.1770	4.50	2.1250	53.98	.7500	19.05	78655
	15	.1800	4.57	2.1875	55.56	.7500	19.05	78654
	14	.1820	4.62	2.1875	55.56	.7500	19.05	78653
	13	.1850	4.70	2.1875	55.56	.7500	19.05	78652
3/16		.1875	4.76	2.1875	55.56	.7500	19.05	78708
	12	.1890	4.80	2.1875	55.56	.7500	19.05	78651
	11	.1910	4.85	2.1875	55.56	.7500	19.05	78650
	10	.1935	4.91	2.1875	55.56	.7500	19.05	78649
	9	.1960	4.98	2.2500	57.15	.7500	19.05	78648
	8	.1990	5.05	2.2500	57.15	.7500	19.05	78647
	7	.2010	5.11	2.2500	57.15	.7500	19.05	78646
13/64		.2031	5.16	2.2500	57.15	.7500	19.05	78709
	6	.2040	5.18	2.2500	57.15	.7500	19.05	78645
	5	.2055	5.22	2.2500	57.15	.7500	19.05	78644
	4	.2090	5.31	2.2500	57.15	.7500	19.05	78643
	3	.2130	5.41	2.5000	63.50	1.0000	25.40	78642
7/32		.2188	5.56	2.5000	63.50	1.0000	25.40	78710
	2	.2210	5.61	2.5000	63.50	1.0000	25.40	78641
	1	.2280	5.79	2.5000	63.50	1.0000	25.40	78640
15/64		.2344	5.95	2.5000	63.50	1.0000	25.40	78711
1/4		.2500	6.35	2.5000	63.50	1.0000	25.40	78712
17/64		.2656	6.75	2.5000	63.50	1.0000	25.40	78713
9/32		.2813	7.14	2.5000	63.50	1.0000	25.40	78714
19/64		.2969	7.54	2.5000	63.50	1.2500	31.75	78715
5/16		.3125	7.94	2.5000	63.50	1.2500	31.75	78716
21/64		.3281	8.33	2.5000	63.50	1.2500	31.75	78717
11/32		.3438	8.73	2.5000	63.50	1.2500	31.75	78718
23/64		.3594	9.13	2.5000	63.50	1.2500	31.75	78719
3/8		.3750	9.53	2.7500	69.85	1.2500	31.75	78720
25/64		.3906	9.92	2.7500	69.85	1.2500	31.75	78721
13/32		.4063	10.32	2.7500	69.85	1.2500	31.75	78722
27/64		.4219	10.72	2.7500	69.85	1.2500	31.75	78723
7/16		.4375	11.11	2.7500	69.85	1.2500	31.75	78724
29/64		.4531	11.51	3.0000	76.20	1.2500	31.75	78725
15/32		.4688	11.91	3.0000	76.20	1.2500	31.75	78726
31/64		.4844	12.30	3.0000	76.20	1.2500	31.75	78727
1/2		.5000	12.70	3.0000	76.20	1.2500	31.75	78728

Drills

Solid Carbide

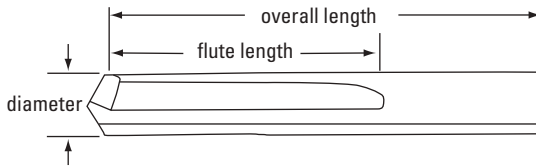
Solid Carbide Straight Flute Style 769

Features/Benefits:

- 2 straight flutes, right-hand cut.
- Manufactured from solid submicron grain carbide.
- 140° point.
- Regular length.
- Uncoated drills standard from stock.

Application Information:

- non-ferrous materials
- hardened materials
- stainless steel
- Normally limited to 2 x diameter drilling depths.



Style 769

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 769
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Uncoated
	60	.0400	1.02	1.5000	38.10	.5000	12.70	78560
	59	.0410	1.04	1.5000	38.10	.5000	12.70	78559
	58	.0420	1.07	1.5000	38.10	.5000	12.70	78558
	57	.0430	1.09	1.5000	38.10	.5000	12.70	78557
	56	.0465	1.18	1.5000	38.10	.5000	12.70	78556
3/64		.0469	1.19	1.5000	38.10	.5000	12.70	78587
	55	.0520	1.32	1.5000	38.10	.5000	12.70	78555
	54	.0550	1.40	1.5000	38.10	.5000	12.70	78554
	53	.0595	1.51	1.5000	38.10	.5000	12.70	78553
1/16		.0625	1.59	1.6250	41.28	.6250	15.88	78588
	52	.0635	1.61	1.6875	42.86	.6875	17.46	78552
	51	.0670	1.70	1.6875	42.86	.6875	17.46	78551
	50	.0700	1.78	1.6875	42.86	.6875	17.46	78550
	49	.0730	1.85	1.6875	42.86	.6875	17.46	78549
	48	.0760	1.93	1.6875	42.86	.6875	17.46	78548
5/64		.0781	1.98	1.6875	42.86	.6875	17.46	78589
	47	.0785	1.99	1.7500	44.45	.7500	19.05	78547
	46	.0810	2.06	1.7500	44.45	.7500	19.05	78546
	45	.0820	2.08	1.7500	44.45	.7500	19.05	78545
	44	.0860	2.18	1.7500	44.45	.7500	19.05	78544
	43	.0890	2.26	1.7500	44.45	.7500	19.05	78543
	42	.0935	2.37	1.7500	44.45	.7500	19.05	78542
3/32		.0938	2.38	1.7500	44.45	.7500	19.05	78590
	41	.0960	2.44	1.8125	46.04	.8125	20.64	78541
	40	.0980	2.49	1.8125	46.04	.8125	20.64	78540
	39	.0995	2.53	1.8125	46.04	.8125	20.64	78539
	38	.1015	2.58	1.8125	46.04	.8125	20.64	78538
	37	.1040	2.64	1.8125	46.04	.8125	20.64	78537
	36	.1065	2.71	1.8125	46.04	.8125	20.64	78536
7/64		.1094	2.78	1.8125	46.04	.8125	20.64	78591
	35	.1100	2.79	1.8750	47.63	.8750	22.23	78535
	34	.1110	2.82	1.8750	47.63	.8750	22.23	78534
	33	.1130	2.87	1.8750	47.63	.8750	22.23	78533
	32	.1160	2.95	1.8750	47.63	.8750	22.23	78532

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Solid Carbide Straight Flute (continued)
Style 769

INCH SIZES

Drill Diameter				Overall Length		Flute Length		Style 769
Fract	Wire/Let	Decimal	mm	Inch	mm	Inch	mm	Uncoated
1/8	31	.1200	3.05	1.8750	47.63	.8750	22.23	78531
		.1250	3.18	1.8750	47.63	.8750	22.23	78592
	30	.1285	3.26	1.9375	49.21	.9375	23.81	78530
	29	.1360	3.45	1.9375	49.21	.9375	23.81	78529
9/64	28	.1405	3.57	1.9375	49.21	.9375	23.81	78528
		.1406	3.57	1.9375	49.21	.9375	23.81	78593
	27	.1440	3.66	2.0625	52.39	1.0000	25.40	78527
	26	.1470	3.73	2.0625	52.39	1.0000	25.40	78526
5/32	25	.1495	3.80	2.0625	52.39	1.0000	25.40	78525
	24	.1520	3.86	2.0625	52.39	1.0000	25.40	78524
	23	.1540	3.91	2.0625	52.39	1.0000	25.40	78523
		.1563	3.97	2.0625	52.39	1.0000	25.40	78594
11/64	22	.1570	3.99	2.1250	53.98	1.0625	26.99	78522
	21	.1590	4.04	2.1250	53.98	1.0625	26.99	78521
	20	.1610	4.09	2.1250	53.98	1.0625	26.99	78520
	19	.1660	4.22	2.1250	53.98	1.0625	26.99	78519
3/16	18	.1695	4.31	2.1250	53.98	1.0625	26.99	78518
		.1719	4.37	2.1250	53.98	1.0625	26.99	78595
	17	.1730	4.39	2.1875	55.56	1.1250	28.58	78517
	16	.1770	4.50	2.1875	55.56	1.1250	28.58	78516
7/32	15	.1800	4.57	2.1875	55.56	1.1250	28.58	78515
	14	.1820	4.62	2.1875	55.56	1.1250	28.58	78514
	13	.1850	4.70	2.1875	55.56	1.1250	28.58	78513
		.1875	4.76	2.1875	55.56	1.1250	28.58	78596
13/64	12	.1890	4.80	2.2500	57.15	1.1875	30.16	78512
	11	.1910	4.85	2.2500	57.15	1.1875	30.16	78511
	10	.1935	4.91	2.2500	57.15	1.1875	30.16	78510
	9	.1960	4.98	2.2500	57.15	1.1875	30.16	78509
5/16	8	.1990	5.05	2.2500	57.15	1.1875	30.16	78508
	7	.2010	5.11	2.2500	57.15	1.1875	30.16	78507
		.2031	5.16	2.2500	57.15	1.1875	30.16	78597
	6	.2040	5.18	2.3750	60.33	1.2500	31.75	78506
3/8	5	.2055	5.22	2.3750	60.33	1.2500	31.75	78505
	4	.2090	5.31	2.3750	60.33	1.2500	31.75	78504
	3	.2130	5.41	2.3750	60.33	1.2500	31.75	78503
		.2188	5.56	2.3750	60.33	1.2500	31.75	78598
7/16	2	.2210	5.61	2.4375	61.91	1.4375	36.51	78502
	1	.2280	5.79	2.4375	61.91	1.4375	36.51	78501
		.2344	5.95	2.4375	61.91	1.3125	33.34	78599
	1/4	.2500	6.35	2.5000	63.50	1.3750	34.93	78600
17/64		.2656	6.75	2.6250	66.68	1.4375	36.51	78601
9/32		.2813	7.14	2.6875	68.26	1.5000	38.10	78602
19/64		.2969	7.54	2.7500	69.85	1.5625	39.69	78603
5/16		.3125	7.94	2.8125	71.44	1.6250	41.28	78604
21/64		.3281	8.33	2.9375	74.61	1.6845	42.79	78605
11/32		.3438	8.73	3.0000	76.20	1.6875	42.86	78606
23/64		.3594	9.13	3.0625	77.79	1.7500	44.45	78607
3/8		.3750	9.53	3.1250	79.38	1.8125	46.04	78608
25/64		.3906	9.92	3.2500	82.55	1.8750	47.63	78609
13/32		.4063	10.32	3.3125	84.14	1.9375	49.21	78610
27/64		.4219	10.72	3.3750	85.73	2.0000	50.80	78611

continued on next page

Drills
Solid Carbide

Solid Carbide Straight Flute (continued)
Style 769

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style 769 Uncoated	
	Wire/Let	Decimal	mm	Inch	mm	Inch		mm
7/16		.4375	11.11	3.4375	87.31	2.0625	52.39	78612
29/64		.4531	11.51	3.5625	90.49	2.1250	53.98	78613
15/32		.4688	11.91	3.6250	92.08	2.1250	53.98	78614
31/64		.4844	12.30	3.6875	93.66	2.1875	55.56	78615
1/2		.5000	12.70	3.7500	95.25	2.2500	57.15	78616

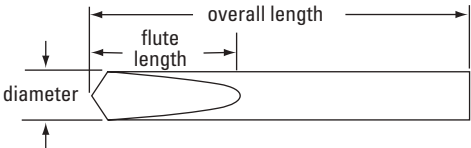
Solid Carbide Spade Drill
Style 780

Features/Benefits:

- 2 straight flutes.
- Manufactured from solid submicron grain carbide.
- 118° point.
- Stub length for rigid setups.
- Uncoated drills standard from stock.

Application Information:

- non-ferrous materials
- hardened materials
- stainless steel
- Ideal for shallow-hole and thin-sheet applications.



Style 780

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style 780 Uncoated
	Decimal	mm	Inch	mm	Inch	mm	
1/32	.0313	0.80	1.5000	38.10	.1875	4.76	78481
1/16	.0625	1.59	1.5000	38.10	.3125	7.94	78482
3/32	.0938	2.38	1.5000	38.10	.4375	11.11	78483
1/8	.1250	3.18	1.5000	38.10	.4375	11.11	78484
5/32	.1563	3.97	2.0000	50.80	.4688	11.91	78485
3/16	.1875	4.76	2.0000	50.80	.5625	14.29	78486
7/32	.2188	5.56	2.0000	50.80	.5938	15.08	78487
1/4	.2500	6.35	2.0000	50.80	.6875	17.46	78488
9/32	.2813	7.15	2.5000	63.50	.7500	19.05	78489
5/16	.3125	7.94	2.5000	63.50	.8750	22.23	78490
11/32	.3438	8.73	2.5000	63.50	.9375	23.81	78491
3/8	.3750	9.53	2.5000	63.50	1.0000	25.40	78492

Solid Carbide Spotting

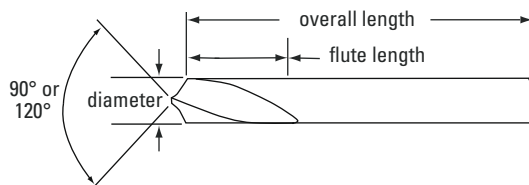
Solid Carbide Spotting Drill Style 790

Features/Benefits:

- 2 flutes, right-hand spiral, right-hand cut.
- Manufactured from solid submicron grain carbide.
- Available in 90° and 120° point.
- Stub length for rigid setups.
- Uncoated drills standard from stock.

Application Information:

- steel
- non-ferrous materials
- high-temp alloys
- Designed for general-purpose applications in a wide variety of materials.



Style 790

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Style 790	
	Decimal	mm	Inch	mm	Inch	mm	90°	120°
1/4	.2500	6.35	2.5000	63.50	.7500	19.05	78220	78221
3/8	.3750	9.53	3.1250	79.38	.8750	22.23	78222	78223
1/2	.5000	12.70	3.7500	95.25	1.1250	28.58	78224	78225
5/8	.6250	15.88	4.2500	107.95	1.1875	30.16	78226	78227
3/4	.7500	19.05	5.0000	127.00	1.3125	33.34	78228	78229

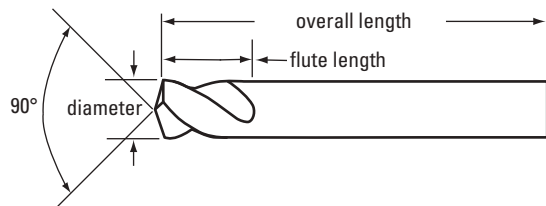
High-speed steel spotting drills are listed on page 102.

Drills
Spotting

Short Length and Regular Length Spotting Drill
Style 90SPS, 90SPR

- Features/Benefits:
- Short flute length results in accurate location of spotting hole for 118° drills.
 - Manufactured from premium high-speed steel.
 - Standard 90° point.
 - Short overall length for applications with restricted clearance space.
 - Bright drills standard from stock.
 - carbon steel
 - tool steel
 - alloy steel

Application Information:



INCH SIZES – SHORT LENGTH

Fract	Drill Diameter		Overall Length		Flute Length		Style 90SPS Bright
	Decimal	mm	Inch	mm	Inch	mm	
1/4	.2500	6.35	2.5000	101.60	1.0000	25.40	49490
3/8	.3750	9.53	3.1250	127.00	1.1250	28.58	49491
1/2	.5000	12.70	3.7500	152.40	1.5000	38.10	49492
5/8	.6250	15.88	4.2500	180.98	1.6250	41.28	49493
3/4	.7500	19.05	5.0000	203.20	1.7500	44.45	49494
1	1.0000	25.40	6.0000	203.20	1.7500	44.45	49495

INCH SIZES – REGULAR LENGTH

Fract	Drill Diameter		Overall Length		Flute Length		Style 90SPR Bright
	Decimal	mm	Inch	mm	Inch	mm	
1/4	.2500	6.35	4.0000	101.60	1.0000	25.40	49496
3/8	.3750	9.53	5.0000	127.00	1.1250	28.58	49497
1/2	.5000	12.70	6.0000	152.40	1.5000	38.10	49498
5/8	.6250	15.88	7.1250	180.98	1.6250	41.28	49499
3/4	.7500	19.05	8.0000	203.20	1.7500	44.45	49500
1	1.0000	25.40	8.0000	203.20	1.7500	44.45	49501



Drill Nomenclature

Axis

The imaginary straight line which forms the longitudinal centerline of the drill.

Back Taper

A slight decrease in diameter, from front to back in the body of the drill.

Body

The portion of the drill extending from the shank or neck to the outer corners of the cutting lips.

Body Diameter Clearance

That portion of the land that has been cut away so it will not rub against the walls of the hole.

Chisel Edge

The edge at the end of the web that connects the cutting lips.

Drill Diameter

The diameter over the margins of the drill measured at the point.

Flutes

Helical or straight grooves cut or formed in the body of the drill to provide cutting lips, to permit removal of chips, and to allow cutting fluid to reach the cutting lips.

Flute Length

The length from the outer corners of the cutting lips to the extreme back end of the flutes. However, metric drills are measured from the extreme end of the shank to the end of the flute at the point.

Land

The peripheral portion of the body between adjacent flutes.

Land Width

The distance between the leading edge and the heel of the land measured at a right angle to the leading edge.

Lip Relief

The axial relief on the drill point.

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 lips. However, metric drills are measured from the extreme end of the shank to the end of the flute at the point.

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.

Point Angle

The angle included between the cutting lips projected upon a plane parallel to the drill axis and parallel to the two cutting lips.

Shank

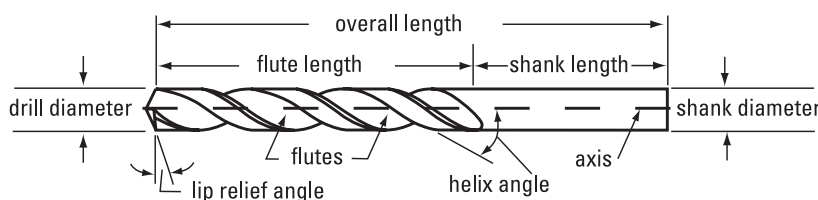
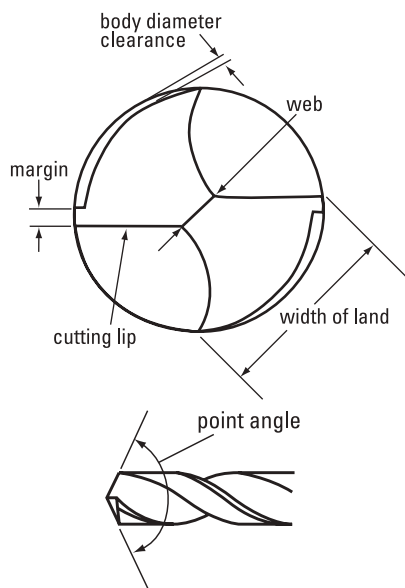
The part of the drill by which it is held and driven.

Tang

The flattened end of a taper shank, intended to fit into a driving slot in a socket.

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.



Drills

Technical Information

Dimensions for Inch Size Drills (inches)

Drill Size	Decimal Equivalent	Screw Machine Length				Jobbers Length				Taper Length			
		Flute Length		Overall Length		Flute Length		Overall Length		Flute Length		Overall Length	
		fraction	decimal	fraction	decimal	fraction	decimal	fraction	decimal	fraction	decimal	fraction	decimal
1/64	.0156	—	—	—	—	3/16	.1875	3/4	.7500	5/16	.3125	1-1/2	1.5000
80	.0135	—	—	—	—	1/8	.1250	3/4	.7500	5/16	.3125	1-1/2	1.5000
79	.0145	—	—	—	—	1/8	.1250	3/4	.7500	5/16	.3125	1-1/2	1.5000
78	.0160	—	—	—	—	3/16	.1875	7/8	.8750	5/16	.3125	1-1/2	1.5000
77	.0180	—	—	—	—	3/16	.1875	7/8	.8750	5/16	.3125	1-1/2	1.5000
76	.0200	—	—	—	—	3/16	.1875	7/8	.8750	5/16	.3125	1-1/2	1.5000
75	.0210	—	—	—	—	1/4	.2500	1	1.0000	5/16	.3125	1-1/2	1.5000
74	.0225	—	—	—	—	1/4	.2500	1	1.0000	5/16	.3125	1-1/2	1.5000
73	.0240	—	—	—	—	5/16	.3125	1-1/8	1.1250	5/16	.3125	1-1/2	1.5000
72	.0250	—	—	—	—	5/16	.3125	1-1/8	1.1250	5/16	.3125	1-1/2	1.5000
71	.0260	—	—	—	—	3/8	.3750	1-1/4	1.2500	3/4	.7500	2	2.0000
70	.0280	—	—	—	—	3/8	.3750	1-1/4	1.2500	3/4	.7500	2	2.0000
69	.0292	—	—	—	—	1/2	.5000	1-3/8	1.3750	3/4	.7500	2	2.0000
68	.0310	—	—	—	—	1/2	.5000	1-3/8	1.3750	3/4	.7500	2	2.0000
1/32	.0312	1/2	.5000	1-3/8	1.3750	1/2	.5000	1-3/8	1.3750	3/4	.7500	2	2.0000
67	.0320	—	—	—	—	1/2	.5000	1-3/8	1.3750	3/4	.7500	2	2.0000
66	.0330	—	—	—	—	1/2	.5000	1-3/8	1.3750	3/4	.7500	2	2.0000
65	.0350	—	—	—	—	5/8	.6250	1-1/2	1.5000	3/4	.7500	2	2.0000
64	.0360	—	—	—	—	5/8	.6250	1-1/2	1.5000	3/4	.7500	2	2.0000
63	.0370	—	—	—	—	5/8	.6250	1-1/2	1.5000	3/4	.7500	2	2.0000
62	.0380	—	—	—	—	5/8	.6250	1-1/2	1.5000	3/4	.7500	2	2.0000
61	.0390	—	—	—	—	11/16	.6875	1-5/8	1.6250	1-1/8	1.1250	2-1/4	2.2500
60	.0400	1/2	.5000	1-3/8	1.3750	11/16	.6875	1-5/8	1.6250	1-1/8	1.1250	2-1/4	2.2500
59	.0410	1/2	.5000	1-3/8	1.3750	11/16	.6875	1-5/8	1.6250	1-1/8	1.1250	2-1/4	2.2500
58	.0420	1/2	.5000	1-3/8	1.3750	11/16	.6875	1-5/8	1.6250	1-1/8	1.1250	2-1/4	2.2500
57	.0430	1/2	.5000	1-3/8	1.3750	3/4	.7500	1-3/4	1.7500	1-1/8	1.1250	2-1/4	2.2500
56	.0465	1/2	.5000	1-3/8	1.3750	3/4	.7500	1-3/4	1.7500	1-1/8	1.1250	2-1/4	2.2500
3/64	.0469	1/2	.5000	1-3/8	1.3750	3/4	.7500	1-3/4	1.7500	1-1/8	1.1250	2-1/4	2.2500
55	.0520	5/8	.6250	1-5/8	1.6250	7/8	.8750	1-7/8	1.8750	1-3/4	1.7500	3	3.0000
54	.0550	5/8	.6250	1-5/8	1.6250	7/8	.8750	1-7/8	1.8750	1-3/4	1.7500	3	3.0000
53	.0595	5/8	.6250	1-5/8	1.6250	7/8	.8750	1-7/8	1.8750	1-3/4	1.7500	3	3.0000
1/16	.0625	5/8	.6250	1-5/8	1.6250	7/8	.8750	1-7/8	1.8750	1-3/4	1.7500	3	3.0000
52	.0635	11/16	.6875	1-11/16	1.6875	7/8	.8750	1-7/8	1.8750	2	2.0000	3-3/4	3.7500
51	.0670	11/16	.6875	1-11/16	1.6875	1	1.0000	2	2.0000	2	2.0000	3-3/4	3.7500
50	.0700	11/16	.6875	1-11/16	1.6875	1	1.0000	2	2.0000	2	2.0000	3-3/4	3.7500
49	.0730	11/16	.6875	1-11/16	1.6875	1	1.0000	2	2.0000	2	2.0000	3-3/4	3.7500
48	.0760	11/16	.6875	1-11/16	1.6875	1	1.0000	2	2.0000	2	2.0000	3-3/4	3.7500
5/64	.0781	11/16	.6875	1-11/16	1.6875	1	1.0000	2	2.0000	2	2.0000	3-3/4	3.7500
47	.0785	3/4	.7500	1-3/4	1.7500	1	1.0000	2	2.0000	2-1/4	2.2500	4-1/4	4.2500
46	.0810	3/4	.7500	1-3/4	1.7500	1-1/8	1.1250	2-1/8	2.1250	2-1/4	2.2500	4-1/4	4.2500
45	.0820	3/4	.7500	1-3/4	1.7500	1-1/8	1.1250	2-1/8	2.1250	2-1/4	2.2500	4-1/4	4.2500
44	.0860	3/4	.7500	1-3/4	1.7500	1-1/8	1.1250	2-1/8	2.1250	2-1/4	2.2500	4-1/4	4.2500
43	.0890	3/4	.7500	1-3/4	1.7500	1-1/4	1.2500	2-1/4	2.2500	2-1/4	2.2500	4-1/4	4.2500
42	.0935	3/4	.7500	1-3/4	1.7500	1-1/4	1.2500	2-1/4	2.2500	2-1/4	2.2500	4-1/4	4.2500
3/32	.0938	3/4	.7500	1-3/4	1.7500	1-1/4	1.2500	2-1/4	2.2500	2-1/4	2.2500	4-1/4	4.2500
41	.0960	13/16	.8125	1-13/16	1.8125	1-3/8	1.3750	2-3/8	2.3750	2-1/2	2.5000	4-5/8	4.6250
40	.0980	13/16	.8125	1-13/16	1.8125	1-3/8	1.3750	2-3/8	2.3750	2-1/2	2.5000	4-5/8	4.6250
39	.0995	13/16	.8125	1-13/16	1.8125	1-3/8	1.3750	2-3/8	2.3750	2-1/2	2.5000	4-5/8	4.6250
38	.1015	13/16	.8125	1-13/16	1.8125	1-7/16	1.4375	2-1/2	2.5000	2-1/2	2.5000	4-5/8	4.6250
37	.1040	13/16	.8125	1-13/16	1.8125	1-7/16	1.4375	2-1/2	2.5000	2-1/2	2.5000	4-5/8	4.6250
36	.1065	13/16	.8125	1-13/16	1.8125	1-7/16	1.4375	2-1/2	2.5000	2-1/2	2.5000	4-5/8	4.6250
7/64	.1094	13/16	.8125	1-13/16	1.8125	1-1/2	1.5000	2-5/8	2.6250	2-1/2	2.5000	4-5/8	4.6250
35	.1100	7/8	.8750	1-7/8	1.8750	1-1/2	1.5000	2-5/8	2.6250	2-3/4	2.7500	5-1/8	5.1250
34	.1110	7/8	.8750	1-7/8	1.8750	1-1/2	1.5000	2-5/8	2.6250	2-3/4	2.7500	5-1/8	5.1250
33	.1130	7/8	.8750	1-7/8	1.8750	1-1/2	1.5000	2-5/8	2.6250	2-3/4	2.7500	5-1/8	5.1250
32	.1160	7/8	.8750	1-7/8	1.8750	1-5/8	1.6250	2-3/4	2.7500	2-3/4	2.7500	5-1/8	5.1250

continued on next page



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Technical Information

Dimensions for Inch Size Drills (inches) (continued)

Drill Size	Decimal Equivalent	Screw Machine Length				Jobbers Length				Taper Length			
		Flute Length		Overall Length		Flute Length		Overall Length		Flute Length		Overall Length	
		fraction	decimal	fraction	decimal	fraction	decimal	fraction	decimal	fraction	decimal	fraction	decimal
31	.1200	7/8	.8750	1-7/8	1.8750	1-5/8	1.6250	2-3/4	2.7500	2-3/4	2.7500	5-1/8	5.1250
1/8	.1250	7/8	.8750	1-7/8	1.8750	1-5/8	1.6250	2-3/4	2.7500	2-3/4	2.7500	5-1/8	5.1250
30	.1285	15/16	.9375	1-15/16	1.9375	1-5/8	1.6250	2-3/4	2.7500	3	3.0000	5-3/8	5.3750
29	.1360	15/16	.9375	1-15/16	1.9375	1-3/4	1.7500	2-7/8	2.8750	3	3.0000	5-3/8	5.3750
28	.1405	15/16	.9375	1-15/16	1.9375	1-3/4	1.7500	2-7/8	2.8750	3	3.0000	5-3/8	5.3750
9/64	.1406	15/16	.9375	1-15/16	1.9375	1-3/4	1.7500	2-7/8	2.8750	3	3.0000	5-3/8	5.3750
27	.1440	1	1.0000	2-1/16	2.0625	1-7/8	1.8750	3	3.0000	3	3.0000	5-3/8	5.3750
26	.1470	1	1.0000	2-1/16	2.0625	1-7/8	1.8750	3	3.0000	3	3.0000	5-3/8	5.3750
25	.1495	1	1.0000	2-1/16	2.0625	1-7/8	1.8750	3	3.0000	3	3.0000	5-3/8	5.3750
24	.1520	1	1.0000	2-1/16	2.0625	2	2.0000	3-1/8	3.1250	3	3.0000	5-3/8	5.3750
23	.1540	1	1.0000	2-1/16	2.0625	2	2.0000	3-1/8	3.1250	3	3.0000	5-3/8	5.3750
5/32	.1562	1	1.0000	2-1/16	2.0625	2	2.0000	3-1/8	3.1250	3	3.0000	5-3/8	5.3750
22	.1570	1-1/16	1.0625	2-1/8	2.1250	2	2.0000	3-1/8	3.1250	3-3/8	3.3750	5-3/4	5.7500
21	.1590	1-1/16	1.0625	2-1/8	2.1250	2-1/8	2.1250	3-1/4	3.2500	3-3/8	3.3750	5-3/4	5.7500
20	.1610	1-1/16	1.0625	2-1/8	2.1250	2-1/8	2.1250	3-1/4	3.2500	3-3/8	3.3750	5-3/4	5.7500
19	.1660	1-1/16	1.0625	2-1/8	2.1250	2-1/8	2.1250	3-1/4	3.2500	3-3/8	3.3750	5-3/4	5.7500
18	.1695	1-1/16	1.0625	2-1/8	2.1250	2-1/8	2.1250	3-1/4	3.2500	3-3/8	3.3750	5-3/4	5.7500
11/64	.1719	1-1/16	1.0625	2-1/8	2.1250	2-1/8	2.1250	3-1/4	3.2500	3-3/8	3.3750	5-3/4	5.7500
17	.1730	1-1/8	1.2500	2-3/16	2.1875	2-3/16	2.1875	3-3/8	3.3750	3-3/8	3.3750	5-3/4	5.7500
16	.1770	1-1/8	1.2500	2-3/16	2.1875	2-3/16	2.1875	3-3/8	3.3750	3-3/8	3.3750	5-3/4	5.7500
15	.1800	1-1/8	1.2500	2-3/16	2.1875	2-3/16	2.1875	3-3/8	3.3750	3-3/8	3.3750	5-3/4	5.7500
14	.1820	1-1/8	1.2500	2-3/16	2.1875	2-3/16	2.1875	3-3/8	3.3750	3-3/8	3.3750	5-3/4	5.7500
13	.1850	1-1/8	1.2500	2-3/16	2.1875	2-5/16	2.3125	3-1/2	3.5000	3-3/8	3.3750	5-3/4	5.7500
3/16	.1875	1-1/8	1.2500	2-3/16	2.1875	2-5/16	2.3125	3-1/2	3.5000	3-3/8	3.3750	5-3/4	5.7500
12	.1890	1-3/16	1.1875	2-1/4	2.2500	2-5/16	2.3125	3-1/2	3.5000	3-5/8	3.6250	6	6.0000
11	.1910	1-3/16	1.1875	2-1/4	2.2500	2-5/16	2.3125	3-1/2	3.5000	3-5/8	3.6250	6	6.0000
10	.1935	1-3/16	1.1875	2-1/4	2.2500	2-7/16	2.4375	3-5/8	3.6250	3-5/8	3.6250	6	6.0000
9	.1960	1-3/16	1.1875	2-1/4	2.2500	2-7/16	2.4375	3-5/8	3.6250	3-5/8	3.6250	6	6.0000
8	.1990	1-3/16	1.1875	2-1/4	2.2500	2-7/16	2.4375	3-5/8	3.6250	3-5/8	3.6250	6	6.0000
7	.2010	1-3/16	1.1875	2-1/4	2.2500	2-7/16	2.4375	3-5/8	3.6250	3-5/8	3.6250	6	6.0000
13/64	.2031	1-3/16	1.1875	2-1/4	2.2500	2-7/16	2.4375	3-5/8	3.6250	3-5/8	3.6250	6	6.0000
6	.2040	1-1/4	1.2500	2-3/8	2.3750	2-1/2	2.5000	3-3/4	3.7500	3-5/8	3.6250	6	6.0000
5	.2055	1-1/4	1.2500	2-3/8	2.3750	2-1/2	2.5000	3-3/4	3.7500	3-5/8	3.6250	6	6.0000
4	.2090	1-1/4	1.2500	2-3/8	2.3750	2-1/2	2.5000	3-3/4	3.7500	3-5/8	3.6250	6	6.0000
3	.2130	1-1/4	1.2500	2-3/8	2.3750	2-1/2	2.5000	3-3/4	3.7500	3-5/8	3.6250	6	6.0000
7/32	.2188	1-1/4	1.2500	2-3/8	2.3750	2-1/2	2.5000	3-3/4	3.7500	3-5/8	3.6250	6	6.0000
2	.2210	1-5/16	1.3125	2-7/16	2.4375	2-5/8	2.6250	3-7/8	3.8750	3-3/4	3.7500	6-1/8	6.1250
1	.2280	1-5/16	1.3125	2-7/16	2.4375	2-5/8	2.6250	3-7/8	3.8750	3-3/4	3.7500	6-1/8	6.1250
A	.2340	1-5/16	1.3125	2-7/16	2.4375	2-5/8	2.6250	3-7/8	3.8750	3-3/4	3.7500	6-1/8	6.1250
15/64	.2344	1-5/16	1.3125	2-7/16	2.4375	2-5/8	2.6250	3-7/8	3.8750	3-3/4	3.7500	6-1/8	6.1250
B	.2380	1-3/8	1.3750	2-1/2	2.5000	2-3/4	2.7500	4	4.0000	3-3/4	3.7500	6-1/8	6.1250
C	.2420	1-3/8	1.3750	2-1/2	2.5000	2-3/4	2.7500	4	4.0000	3-3/4	3.7500	6-1/8	6.1250
D	.2460	1-3/8	1.3750	2-1/2	2.5000	2-3/4	2.7500	4	4.0000	3-3/4	3.7500	6-1/8	6.1250
1/4-E	.2500	1-3/8	1.3750	2-1/2	2.5000	2-3/4	2.7500	4	4.0000	3-3/4	3.7500	6-1/8	6.1250
F	.2570	1-7/16	1.4375	2-5/8	2.6250	2-7/8	2.8750	4-1/8	4.1250	3-3/4	3.7500	6-1/8	6.1250
G	.2610	1-7/16	1.4375	2-5/8	2.6250	2-7/8	2.8750	4-1/8	4.1250	3-3/4	3.7500	6-1/8	6.1250
17/64	.2656	1-7/16	1.4375	2-5/8	2.6250	2-7/8	2.8750	4-1/8	4.1250	3-7/8	3.8750	6-1/4	6.2500
H	.2660	1-1/2	1.5000	2-11/16	2.6875	2-7/8	2.8750	4-1/8	4.1250	3-7/8	3.8750	6-1/4	6.2500
I	.2720	1-1/2	1.5000	2-11/16	2.6875	2-7/8	2.8750	4-1/8	4.1250	3-7/8	3.8750	6-1/4	6.2500
J	.2770	1-1/2	1.5000	2-11/16	2.6875	2-7/8	2.8750	4-1/8	4.1250	3-7/8	3.8750	6-1/4	6.2500
9/32	.2812	1-1/2	1.5000	2-11/16	2.6875	2-15/16	2.9375	4-1/4	4.2500	3-7/8	3.8750	6-1/4	6.2500
K	.2812	1-1/2	1.5000	2-11/16	2.6875	2-15/16	2.9375	4-1/4	4.2500	3-7/8	3.8750	6-1/4	6.2500
L	.2900	1-9/16	1.5625	2-3/4	2.7500	2-15/16	2.9375	4-1/4	4.2500	3-7/8	3.8750	6-1/4	6.2500
M	.2950	1-9/16	1.5625	2-3/4	2.7500	3-1/16	3.0625	4-3/8	4.3750	4	4.0000	6-3/8	6.3750
19/64	.2969	1-9/16	1.5625	2-3/4	2.7500	3-1/16	3.0625	4-3/8	4.3750	4	4.0000	6-3/8	6.3750
N	.3020	1-5/8	1.6250	2-13/16	2.8125	3-1/16	3.0625	4-3/8	4.3750	4	4.0000	6-3/8	6.3750

continued on next page



Drills

Technical Information

Dimensions for Inch Size Drills (inches) (continued)

Drill Size	Decimal Equivalent	Screw Machine Length				Jobbers Length				Taper Length			
		Flute Length		Overall Length		Flute Length		Overall Length		Flute Length		Overall Length	
		fraction	decimal	fraction	decimal	fraction	decimal	fraction	decimal	fraction	decimal	fraction	decimal
5/16	.3125	1-5/8	1.6250	2-13/16	2.8125	3-3/16	3.1875	4-1/2	4.5000	4	4.0000	6-3/8	6.3750
O	.3160	1-11/16	1.6875	2-15/16	2.9375	3-3/16	3.1875	4-1/2	4.5000	4	4.0000	6-3/8	6.3750
P	.3230	1-11/16	1.6875	2-15/16	2.9375	3-5/16	3.1875	4-5/8	4.6250	4	4.0000	6-3/8	6.3750
21/64	.3281	1-11/16	1.6875	2-15/16	2.9375	3-5/16	3.1875	4-5/8	4.6250	4-1/8	4.1250	6-1/2	6.5000
Q	.3320	1-11/16	1.6875	3	3.0000	3-7/16	3.4375	4-3/4	4.7500	4-1/8	4.1250	6-1/2	6.5000
R	.3390	1-11/16	1.6875	3	3.0000	3-7/16	3.4375	4-3/4	4.7500	4-1/8	4.1250	6-1/2	6.5000
11/32	.3438	1-11/16	1.6875	3	3.0000	3-7/16	3.4375	4-3/4	4.7500	4-1/8	4.1250	6-1/2	6.5000
S	.3480	1-3/4	1.7500	3-1/16	3.0625	3-1/2	3.5000	4-7/8	4.8750	4-1/4	4.2500	6-3/4	6.7500
T	.3580	1-3/4	1.7500	3-1/16	3.0625	3-1/2	3.5000	4-7/8	4.8750	4-1/4	4.2500	6-3/4	6.7500
23/64	.3594	1-3/4	1.7500	3-1/16	3.0625	3-1/2	3.5000	4-7/8	4.8750	4-1/4	4.2500	6-3/4	6.7500
U	.3680	1-13/16	1.8125	3-1/8	3.1250	3-5/8	3.6250	5	5.0000	4-1/4	4.2500	6-3/4	6.7500
3/8	.3750	1-13/16	1.8125	3-1/8	3.1250	3-5/8	3.6250	5	5.0000	4-1/4	4.2500	6-3/4	6.7500
V	.3770	1-7/8	1.8750	3-1/4	3.2500	3-5/8	3.6250	5	5.0000	4-1/4	4.2500	6-3/4	6.7500
W	.3860	1-7/8	1.8750	3-1/4	3.2500	3-3/4	3.7500	5-1/8	5.1250	4-1/4	4.2500	6-3/4	6.7500
25/64	.3906	1-7/8	1.8750	3-1/4	3.2500	3-3/4	3.7500	5-1/8	5.1250	4-3/8	4.3750	7	7.0000
X	.3970	1-15/16	1.9375	3-5/16	3.3125	3-3/4	3.7500	5-1/8	5.1250	4-3/8	4.3750	7	7.0000
Y	.4040	1-15/16	1.9375	3-5/16	3.3125	3-7/8	3.8750	5-1/4	5.2500	4-3/8	4.3750	7	7.0000
13/32	.4062	1-15/16	1.9375	3-5/16	3.3125	3-7/8	3.8750	5-1/4	5.2500	4-3/8	4.3750	7	7.0000
Z	.4130	2	2.0000	3-3/8	3.3750	3-7/8	3.8750	5-1/4	5.2500	4-5/8	4.6250	7-1/4	7.2500
27/64	.4219	2	2.0000	3-3/8	3.3750	3-15/16	3.9375	5-3/8	5.3750	4-5/8	4.6250	7-1/4	7.2500
7/16	.4375	2-1/16	2.0625	3-7/16	3.4375	4-1/16	4.0625	5-1/2	5.5000	4-5/8	4.6250	7-1/4	7.2500
29/64	.4531	2-1/8	2.1250	3-9/16	3.5625	4-3/16	4.1875	5-5/8	5.6250	4-3/4	4.7500	7-1/2	7.5000
15/32	.4688	2-1/8	2.1250	3-5/8	3.6250	4-5/16	4.3125	5-3/4	5.7500	4-3/4	4.7500	7-1/2	7.5000
31/64	.4844	2-3/16	2.1875	3-11/16	3.6875	4-3/8	4.3750	5-7/8	5.8750	4-3/4	4.7500	7-3/4	7.7500
1/2	.5000	2-1/4	2.2500	3-3/4	3.7500	4-1/2	4.5000	6	6.0000	4-3/4	4.7500	7-3/4	7.7500
33/64	.5156	2-3/8	2.3750	3-7/8	3.8750	4-13/16	4.8125	6-5/8	6.6250	4-3/4	4.7500	8	8.0000
17/32	.5312	2-3/8	2.3750	3-7/8	3.8750	4-13/16	4.8125	6-5/8	6.6250	4-3/4	4.7500	8	8.0000
35/64	.5469	2-1/2	2.5000	4	4.0000	4-13/16	4.8125	6-5/8	6.6250	4-7/8	4.8750	8-1/4	8.2500
9/16	.5625	2-1/2	2.5000	4	4.0000	4-13/16	4.8125	6-5/8	6.6250	4-7/8	4.8750	8-1/4	8.2500
37/64	.5781	2-5/8	2.6250	4-1/8	4.1250	4-13/16	4.8125	6-5/8	6.6250	4-7/8	4.8750	8-3/4	8.7500
19/32	.5938	2-5/8	2.6250	4-1/8	4.1250	5-3/16	5.1875	7-1/8	7.1250	4-7/8	4.8750	8-3/4	8.7500
39/64	.6094	2-3/4	2.7500	4-1/4	4.2500	5-3/16	5.1875	7-1/8	7.1250	4-7/8	4.8750	8-3/4	8.7500
5/8	.6250	2-3/4	2.7500	4-1/4	4.2500	5-3/16	5.1875	7-1/8	7.1250	4-7/8	4.8750	8-3/4	8.7500
41/64	.6406	2-7/8	2.8750	4-1/2	4.5000	5-3/16	5.1875	7-1/8	7.1250	5-1/8	5.1250	9	9.0000
21/32	.6562	2-7/8	2.8750	4-1/2	4.5000	5-3/16	5.1875	7-1/8	7.1250	5-1/8	5.1250	9	9.0000
43/64	.6719	2-7/8	2.8750	4-5/8	4.6250	5-5/8	5.6250	7-5/8	7.6250	5-3/8	5.3750	9-1/4	9.2500
11/16	.6875	2-7/8	2.8750	4-5/8	4.6250	5-5/8	5.6250	7-5/8	7.6250	5-3/8	5.3750	9-1/4	9.2500
45/64	.7031	3	3.0000	4-3/4	4.7500	—	—	—	—	5-5/8	5.6250	9-1/2	9.5000
23/32	.7188	3	3.0000	4-3/4	4.7500	—	—	—	—	5-5/8	5.6250	9-1/2	9.5000
47/64	.7344	3-1/8	3.1250	5	5.0000	—	—	—	—	5-7/8	5.8750	9-3/4	9.7500
3/4	.7500	3-1/8	3.1250	5	5.0000	—	—	—	—	5-7/8	5.8750	9-3/4	9.7500
49/64	.7656	3-1/4	3.2500	5-1/8	5.1250	—	—	—	—	6	6.0000	9-7/8	9.8750
25/32	.7812	3-1/4	3.2500	5-1/8	5.1250	—	—	—	—	6	6.0000	9-7/8	9.8750
51/64	.7969	3-3/8	3.3750	5-1/4	5.2500	—	—	—	—	6-1/8	6.1250	10	10.0000
13/16	.8125	3-3/8	3.3750	5-1/4	5.2500	—	—	—	—	6-1/8	6.1250	10	10.0000
53/64	.8281	3-1/2	3.5000	5-3/8	5.3750	—	—	—	—	6-1/8	6.1250	10	10.0000
27/32	.8438	3-1/2	3.5000	5-3/8	5.3750	—	—	—	—	6-1/8	6.1250	10	10.0000
55/64	.8594	3-1/2	3.5000	5-1/2	5.5000	—	—	—	—	6-1/8	6.1250	10	10.0000
7/8	.8750	3-1/2	3.5000	5-1/2	5.5000	—	—	—	—	6-1/8	6.1250	10	10.0000
57/64	.8906	3-5/8	3.6250	5-5/8	5.6250	—	—	—	—	6-1/8	6.1250	10	10.0000
29/32	.9062	3-5/8	3.6250	5-5/8	5.6250	—	—	—	—	6-1/8	6.1250	10	10.0000
59/64	.9219	3-3/4	3.7500	5-3/4	5.7500	—	—	—	—	6-1/8	6.1250	10-3/4	10.7500
15/16	.9375	3-3/4	3.7500	5-3/4	5.7500	—	—	—	—	6-1/8	6.1250	10-3/4	10.7500
61/64	.9531	3-7/8	3.8750	5-7/8	5.8750	—	—	—	—	6-3/8	6.3750	11	11.0000
31/32	.9688	3-7/8	3.8750	5-7/8	5.8750	—	—	—	—	6-3/8	6.3750	11	11.0000
63/64	.9844	4	4.0000	6	6.0000	—	—	—	—	6-3/8	6.3750	11	11.0000
1	1.0000	4	4.0000	6	6.0000	—	—	—	—	6-3/8	6.3750	11	11.0000



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Technical Information

Dimensions for Metric Size Drills (millimeters)

Drill Size (mm)	Decimal Equivalent (in)	<i>Screw Machine Length DIN 1897</i>		<i>Jobbers Length DIN 338</i>		<i>Taper Length DIN 340</i>	
		Flute Length mm	Overall Length mm	Flute Length mm	Overall Length mm	Flute Length mm	Overall Length mm
0.2	.0079	1.5	19	2.5	19	—	—
0.22	.0087	1.5	19	2.5	19	—	—
0.25	.0098	1.5	19	3	19	—	—
0.28	.0110	1.5	19	3	19	—	—
0.3	.0118	1.5	19	3	19	—	—
0.32	.0126	2	19	4	19	—	—
0.35	.0138	2	19	4	19	—	—
0.38	.0150	2	19	4	19	—	—
0.4	.0157	2.5	19	5	20	—	—
0.42	.0165	2.5	19	5	20	—	—
0.45	.0177	2.5	19	5	20	—	—
0.48	.0189	2.5	19	5	20	—	—
0.5	.0197	3	20	6	22	—	—
0.52	.0205	3	20	6	22	—	—
0.55	.0217	3.5	21	7	24	—	—
0.58	.0228	3.5	21	7	24	—	—
0.6	.0236	3.5	21	7	24	—	—
0.62	.0244	4	22	8	26	—	—
0.65	.0256	4	22	8	26	—	—
0.68	.0268	4.5	23	9	28	—	—
0.7	.0276	4.5	23	9	28	—	—
0.72	.0283	4.5	23	9	28	—	—
0.75	.0295	4.5	23	9	28	—	—
0.78	.0307	5	24	10	30	—	—
0.8	.0315	5	24	10	30	—	—
0.82	.0322	5	24	10	30	—	—
0.85	.0335	5	24	10	30	—	—
0.88	.0346	5.5	25	11	32	—	—
0.9	.0354	5.5	25	11	32	—	—
0.92	.0362	5.5	25	11	32	—	—
0.95	.0374	5.5	25	11	32	—	—
0.98	.0385	6	26	12	34	—	—
1.0	.0394	6	26	12	34	33	56
1.05	.0413	6	26	12	34	—	—
1.1	.0433	7	28	14	36	37	60
1.15	.0453	7	28	14	36	—	—
1.2	.0472	8	30	16	38	41	65
1.25	.0492	8	30	16	38	—	—
1.3	.0512	8	30	16	38	41	65
1.35	.0531	9	32	18	40	—	—
1.4	.0551	9	32	18	40	45	70
1.45	.0571	9	32	18	40	—	—
1.5	.0591	9	32	18	40	45	70
1.55	.0610	10	34	20	43	—	—
1.6	.0630	10	34	20	43	50	76
1.65	.0650	10	34	20	43	—	—
1.7	.0669	10	34	20	43	50	76
1.75	.0689	11	36	22	46	—	—
1.8	.0709	11	36	22	46	53	80
1.85	.0728	11	36	22	46	—	—
1.9	.0748	11	36	22	46	53	80
1.95	.0767	12	38	24	49	—	—
2.0	.0787	12	38	24	49	56	85
2.05	.0807	12	38	24	49	—	—
2.1	.0827	12	38	24	49	56	85
2.15	.0846	13	40	27	53	—	—

continued on next page

Drills

Technical Information

Dimensions for Metric Size Drills (millimeters) (continued)

Drill Size (mm)	Decimal Equivalent (in)	Screw Machine Length DIN 1897		Jobbers Length DIN 338		Taper Length DIN 340	
		Flute Length mm	Overall Length mm	Flute Length mm	Overall Length mm	Flute Length mm	Overall Length mm
2.2	.0866	13	40	27	53	59	90
2.25	.0886	13	40	27	53	—	—
2.3	.0906	13	40	27	53	59	90
2.35	.0925	13	40	27	53	—	—
2.4	.0945	14	43	30	57	62	95
2.45	.0964	14	43	30	57	—	—
2.5	.0984	14	43	30	57	62	95
2.55	.1003	14	43	30	57	—	—
2.6	.1024	14	43	30	57	62	95
2.65	.1043	14	43	30	57	—	—
2.7	.1062	16	46	33	61	66	100
2.75	.1082	16	46	33	61	—	—
2.8	.1102	16	46	33	61	66	100
2.85	.1122	16	46	33	61	—	—
2.9	.1142	16	46	33	61	66	100
2.95	.1161	16	46	33	61	—	—
3.0	.1181	16	46	33	61	66	100
3.1	.1220	18	49	36	65	69	106
3.2	.1260	18	49	36	65	69	106
3.3	.1299	18	49	36	65	69	106
3.4	.1339	20	52	39	70	73	112
3.5	.1378	20	52	39	70	73	112
3.6	.1417	20	52	39	70	73	112
3.7	.1457	20	52	39	70	73	112
3.8	.1496	22	55	43	75	78	119
3.9	.1535	22	55	43	75	78	119
4.0	.1575	22	55	43	75	78	119
4.1	.1614	22	55	43	75	78	119
4.2	.1654	22	55	43	75	78	119
4.3	.1692	24	58	47	80	82	126
4.4	.1732	24	58	47	80	82	126
4.5	.1772	24	58	47	80	82	126
4.6	.1811	24	58	47	80	82	126
4.7	.1850	24	58	47	80	82	126
4.8	.1890	26	62	52	86	87	132
5.0	.1969	26	62	52	86	87	132
5.1	.2008	26	62	52	86	87	132
5.2	.2047	26	62	52	86	87	132
5.3	.2086	26	62	52	86	87	132
5.4	.2125	28	66	57	93	91	139
5.5	.2165	28	66	57	93	91	139
5.6	.2205	28	66	57	93	91	139
5.7	.2244	28	66	57	93	91	139
5.8	.2283	28	66	57	93	91	139
5.9	.2322	28	66	57	93	91	139
6.0	.2362	28	66	57	93	91	139
6.1	.2401	31	70	63	101	97	148
6.2	.2440	31	70	63	101	97	148
6.3	.2480	31	70	63	101	97	148
6.4	.2520	31	70	63	101	97	148
6.5	.2559	31	70	63	101	97	148
6.6	.2598	31	70	63	101	97	148
6.7	.2638	31	70	63	101	97	148
6.8	.2677	34	74	69	109	102	156
6.9	.2717	34	74	69	109	102	156
7.0	.2756	34	74	69	109	102	156

continued on next page



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Technical Information

Dimensions for Metric Size Drills (millimeters) (continued)

Drill Size (mm)	Decimal Equivalent (in)	Screw Machine Length DIN 1897		Jobbers Length DIN 338		Taper Length DIN 340	
		Flute Length mm	Overall Length mm	Flute Length mm	Overall Length mm	Flute Length mm	Overall Length mm
7.1	.2795	34	74	69	109	102	156
7.2	.2835	34	74	69	109	102	156
7.3	.2874	34	74	69	109	102	156
7.4	.2913	34	74	69	109	102	156
7.5	.2953	34	74	69	109	102	156
7.6	.2992	37	79	75	117	109	165
7.7	.3031	37	79	75	117	109	165
7.8	.3070	37	79	75	117	109	165
7.9	.3110	37	79	75	117	109	165
8.0	.3150	37	79	75	117	109	165
8.1	.3189	37	79	75	117	109	165
8.2	.3228	37	79	75	117	109	165
8.5	.3346	37	79	75	117	109	165
8.6	.3386	40	84	81	125	115	175
8.7	.3425	40	84	81	125	115	175
8.8	.3464	40	84	81	125	115	175
8.9	.3503	40	84	81	125	115	175
9.0	.3543	40	84	81	125	115	175
9.1	.3582	40	84	81	125	115	175
9.2	.3622	40	84	81	125	115	175
9.3	.3661	40	84	81	125	115	175
9.4	.3700	40	84	81	125	115	175
9.5	.3740	40	84	81	125	115	175
9.6	.3779	43	89	87	133	121	184
9.7	.3817	43	89	87	133	121	184
9.8	.3858	43	89	87	133	121	184
9.	.3897	43	89	87	133	121	184
10.0	.3937	43	89	87	133	121	184
10.1	.3976	43	89	87	133	121	184
10.2	.4016	43	89	87	133	121	184
10.3	.4055	43	89	87	133	121	184
10.4	.4094	43	89	87	133	121	184
10.5	.4134	43	89	87	133	121	184
10.6	.4173	43	89	87	133	121	184
10.7	.4212	47	95	94	142	128	195
10.8	.4252	47	95	94	142	128	195
10.9	.4291	47	95	94	142	128	195
11.0	.4331	47	95	94	142	128	195
11.1	.4370	47	95	94	142	128	195
11.2	.4409	47	95	94	142	128	195
11.3	.4448	47	95	94	142	128	195
11.4	.4488	47	95	94	142	128	195
11.5	.4527	47	95	94	142	128	195
11.6	.4566	47	95	94	142	128	195
11.7	.4606	47	95	94	142	128	195
11.8	.4645	47	95	94	142	128	195
11.9	.4685	51	102	101	151	134	205
12.0	.4724	51	102	101	151	134	205
12.1	.4763	51	102	101	151	134	205
12.2	.4823	51	102	101	151	134	205
12.3	.4842	51	102	101	151	134	205
12.4	.4881	51	102	101	151	134	205
12.5	.4921	51	102	101	151	134	205
12.6	.4960	51	102	101	151	134	205
12.7	.5000	51	102	101	151	134	205
12.8	.5039	51	102	101	151	134	205

continued on next page

Technical Information

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Dimensions for Metric Size Drills (millimeters) (continued)

Drill Size (mm)	Decimal Equivalent (in)	Screw Machine Length DIN 1897		Jobbers Length DIN 338		Taper Length DIN 340	
		Flute Length mm	Overall Length mm	Flute Length mm	Overall Length mm	Flute Length mm	Overall Length mm
12.9	.5078	51	102	101	151	134	205
13.0	.5118	51	102	101	151	134	205
13.1	.5157	51	102	101	151	134	205
13.2	.5197	51	102	101	151	134	205
13.3	.5236	54	107	108	160	140	214
13.4	.5118	54	107	108	160	140	214
13.5	.5315	54	107	108	160	140	214
13.6	.5354	54	107	108	160	140	214
13.7	.5394	54	107	108	160	140	214
13.8	.5433	54	107	108	160	140	214
13.9	.5472	54	107	108	160	140	214
14.0	.5512	54	107	108	160	140	214
14.25	.5610	56	111	114	169	144	220
14.5	.5709	56	111	114	169	144	220
14.75	.5807	56	111	114	169	144	220
15.0	.5906	56	111	114	169	144	220
15.25	.6004	58	115	120	178	149	227
15.5	.6102	58	115	120	178	149	227
15.75	.6201	58	115	120	178	149	227
16.0	.6299	58	115	120	178	149	227





Style Number	Description	Page Number
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Reamers

4001 (405) . . .	Chuckling, straight shank, straight flute, bright finish.	113-116
4030 (405RS) .	Chuckling, straight shank, right-hand spiral flute, bright finish. . . .	113-116
4005 (400) . . .	Chuckling, Morse taper shank, straight flute, bright finish	117
1730.	Solid Carbide, straight shank, straight flute, bright finish.	118
4703.	Carbide-tipped, straight shank, straight flute, bright finish	119
616 (340) . . .	Heavy-duty, taper shank bridge, black oxide finish	120
618.	Heavy-duty, taper shank car, black oxide finish	121
642 (853) . . .	Taper pipe, left-hand helix, right hand cut, bright finish.	122
650 (231) . . .	Taper pin, left-hand high spiral, bright finish.	123
657 (245) . . .	Taper pin, straight shank, straight flute, bright finish.	124
659 (245RS) . .	Taper pin, straight shank, helical flute, bright finish	124

Technical Information

How to Choose the Correct Reamer Style	111
General Information	112
Reamer Tolerances	112
Reamer Regrinding	118-119
Reamer Speeds and Feeds	125
Reamer Stock Removal.	125
Reamer Cutting Speeds	126-127

TECH TIP

How to Choose the Correct Reamer Style

- Straight flute reamers, styles 4001, 4005, 1730, and 4703, are for use in through hole applications.
- Spiral flute reamers, style 4030, are for use in blind holes. They produce a smoother finish than straight flute reamers.
- Use reamer style 616, bridge reamer and style 618, car reamer, for aligning mis-aligned holes.
- Style 642 taper pipe reamers are used to ream a tapered hole before tapping only in soft, stringy materials.
- High spiral taper pin reamers, style 650 are used to produce taper pin holes; the high spiral prevents chip packing.
- Taper pin reamers styles 657 and 659 are used to produce taper pin holes primarily by hand reaming; drill the starting hole a few thousands of an inch smaller than the desired small diameter of the finished hole.

Technical Information

Reamer Technical Information

Reaming Speeds

Speeds for machine reaming may vary considerably depending in part on the material to be reamed, type of machine, and required finish and accuracy. In general most machine reaming is done at about 2/3 the speed used for drilling the same material. Speeds for reaming are shown on pages 125-126.

Reaming Feeds

Feeds for reaming are usually much higher than those used for drilling, often running 200% to 300% of drill feeds. Too low a feed may result in excessive reamer wear. At all times it is necessary that the feed be high enough to permit the reamer to cut rather than to rub or burnish. Too high a feed may tend to reduce the accuracy of the hole and may also lower the quality of the finish. The basic idea is to use as high a feed as possible and still produce the required finish and accuracy.

Stock to be Removed

For the same reason, insufficient stock for reaming may result in a burnishing rather than a cutting action. It is difficult to generalize on this phase as it is tied in closely with type of material, feed, finish required, depth of hole, and chip capacity of the reamer. For machine reaming, 0.010" on a 1/4" hole, 0.015" on a 1/2" hole, up to 0.025" on a 1-1/2" hole, seems a good starting point. For hand reaming, stock allowances are much smaller, partly because of the difficulty in forcing the reamer through greater stock. A common allowance is 0.001" to 0.003".

Alignment

In the ideal reaming job, the spindle, reamer, bushing, and hole to be machined are all in perfect alignment. Any variation from this tends to increase reamer wear and detracts from the accuracy of the hole. Tapered, oversize, or bell-mouthed holes should call for a check of alignment. Sometimes the bad effects of misalignment can be reduced through the use of floating or adjustable holders. Quite often if the user will grind a slight back taper on the reamer it will also be of help in overcoming the effects of misalignment.

Chatter

Chatter while reaming has a very bad effect on reamer life and on the finish in the hole. Chatter may be the result of one of several causes, listed below. Correcting the cause can materially increase both reamer life and the quality of the reamed holes.

- Excessive speed.
- Too light a feed.
- Too much clearance on reamer.
- Insecure holding of work.
- Lack of rigidity in jig or machine.
- Excessive looseness in floating holder.
- Excessive overhang of reamer or spindle.

Coolant

In reaming, the emphasis is usually on finish, and a coolant is normally chosen for this purpose rather than for cooling. Quite often this means a change from that recommended for drilling.

Reamer Diameter Tolerances

Reamer Diameter inches	+	+
	inches	inches
through 1/2	.0001	.0004
over 1/2 through 1	.0001	.0005
over 1	.0002	.0006
dowel pin sizes	+	-
	.0000	(.0002)

Reamer Overall Length and Flute Length Tolerances

Reamer Diameter inches	+	-
	inches	inches
3/64 through 1	.0625	.0625
over 1 through 2	.0938	.0938
over 2 through 3	.1250	.1250

Reamer Lip Height Tolerances

Reamer Diameter inches	Total Indicator Variation inches
through 1/8	.0010
1/8 through 1/4	.0012
over 1/4 through 1/2	.0015
over 1/2 through 1	.0020
over 1 through 3-1/2	.0025

Reamer Straight Shank Diameter Tolerances

Reamer Diameter inches	+	-
	inches	inches
Tool Style 4001, 4030		
.0390 to .4335	.0000	.0010
.4396 to 1.2495	.0000	.0015
Tool Style 657, 659		
.0781 to .6250	.0010	.0050
Tool Style 650		
.0781 to .6250	.0005	.0020

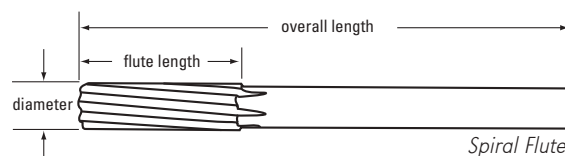
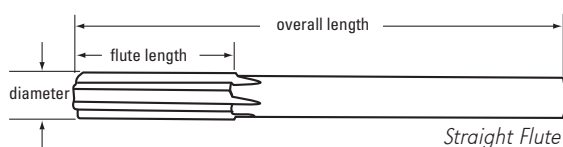
Straight Shank — Straight Flute and Spiral Flute Styles 4001 (405) and 4030 (405RS)

Features/Benefits:

- General-purpose for a wide range of operating conditions and materials.
- Manufactured from premium high-speed steel.
- Use straight flute reamers in through holes; use spiral flute reamers in blind holes.
- Bright finish.

Application Information:

- tool steel
- alloy steel
- cast iron
- aluminum
- plastic
- free-machining stainless steel



INCH AND METRIC SIZES

Fract	Dowel Pin	Drill Diameter				Overall Length		Flute Length		Number of Flutes	Style 4001	Style 4030
		W/L	Metric	Decimal	mm	Inch	mm	Inch	mm		Straight Flute	Spiral Flute
		60		.0400	1.02	2.5000	63.50	.5000	12.70	4	C25003	—
		59		.0410	1.04	2.5000	63.50	.5000	12.70	4	C25005	—
		58		.0420	1.07	2.5000	63.50	.5000	12.70	4	C25008	—
		57		.0430	1.09	2.5000	63.50	.5000	12.70	4	C25010	—
		56		.0465	1.18	2.5000	63.50	.5000	12.70	4	C25019	—
3/64				.0469	1.19	2.5000	63.50	.5000	12.70	4	C25020	—
		55		.0520	1.32	2.5000	63.50	.5000	12.70	4	C25034	—
		54		.0550	1.40	2.5000	63.50	.5000	12.70	4	C25041	—
			1.5	.0591	1.50	2.5000	63.50	.5000	12.70	4	C25059	—
		53		.0595	1.51	2.5000	63.50	.5000	12.70	4	C25053	—
1/16				.0625	1.59	2.5000	63.50	.5000	12.70	4	C25060	C29273
		52		.0635	1.61	2.5000	63.50	.5000	12.70	4	C25063	—
		51		.0670	1.70	3.0000	76.20	.7500	19.05	4	C25072	—
		50		.0700	1.78	3.0000	76.20	.7500	19.05	4	C25079	—
		49		.0730	1.85	3.0000	76.20	.7500	19.05	4	C25087	—
		48		.0760	1.93	3.0000	76.20	.7500	19.05	4	C25094	—
5/64				.0781	1.98	3.0000	76.20	.7500	19.05	4	C25100	C29311
		47		.0785	1.99	3.0000	76.20	.7500	19.05	4	C25101	—
			2.0	.0787	2.00	3.0000	76.20	.7500	19.05	4	C25095	—
		46		.0810	2.06	3.0000	76.20	.7500	19.05	4	C25108	—
		45		.0820	2.08	3.0000	76.20	.7500	19.05	4	C25110	—
		44		.0860	2.18	3.0000	76.20	.7500	19.05	4	C25120	—
		43		.0890	2.26	3.0000	76.20	.7500	19.05	4	C25128	—
		42		.0935	2.37	3.0000	76.20	.7500	19.05	4	C25139	—
3/32				.0938	2.38	3.0000	76.20	.7500	19.05	4	C25140	C29350
		41		.0960	2.44	3.5000	88.90	.8750	22.23	4	C25146	—
		40		.0980	2.49	3.5000	88.90	.8750	22.23	4	C25151	—
		39		.0995	2.53	3.5000	88.90	.8750	22.23	4	C25155	—
		38		.1015	2.58	3.5000	88.90	.8750	22.23	4	C25159	—

continued on next page

Reamers

Chucking

Straight Flute and Spiral Flute (continued) Styles 4001 (405) and 4030 (405RS)

INCH AND METRIC SIZES

Drill Diameter				Overall Length		Flute Length		Number	Style 4001	Style 4030		
Fract	Dowel Pin	W/L	Metric	Decimal	mm	Inch	mm	Inch	mm	of Flutes	Straight Flute	Spiral Flute
7/64		37		.1040	2.64	3.5000	88.90	.8750	22.23	4	C25165	—
		36		.1065	2.71	3.5000	88.90	.8750	22.23	4	C25171	—
				.1094	2.78	3.5000	88.90	.8750	22.23	4	C25178	C29386
		35		.1100	2.79	3.5000	88.90	.8750	22.23	4	C25180	—
		34		.1110	2.82	3.5000	88.90	.8750	22.23	4	C25183	—
		33		.1130	2.87	3.5000	88.90	.8750	22.23	4	C25187	—
		32		.1160	2.95	3.5000	88.90	.8750	22.23	4	C25194	—
		3.0		.1181	3.00	3.5000	88.90	.8750	22.23	4	C25185	—
	31			.1200	3.05	3.5000	88.90	.8750	22.23	6	C25203	—
	.1230			.1230	3.12	3.5000	88.90	.8750	22.23	6	C25210	—
				.1240	3.15	3.5000	88.90	.8750	22.23	6	C25212	—
	.1247			.1247	3.17	3.5000	88.90	.8750	22.23	6	C25215	—
1/8				.1250	3.18	3.5000	88.90	.8750	22.23	6	C25216	C29421
				.1260	3.20	3.5000	88.90	.8750	22.23	6	C25220	—
	30			.1285	3.26	3.5000	88.90	.8750	22.23	6	C25226	—
	29			.1360	3.45	4.0000	101.60	1.0000	25.40	6	C25243	—
	28			.1405	3.57	4.0000	101.60	1.0000	25.40	6	C25253	—
9/64				.1406	3.57	4.0000	101.60	1.0000	25.40	6	C25254	C29457
	27			.1440	3.66	4.0000	101.60	1.0000	25.40	6	C25262	—
	26			.1470	3.73	4.0000	101.60	1.0000	25.40	6	C25269	—
	25			.1495	3.80	4.0000	101.60	1.0000	25.40	6	C25275	—
	24			.1520	3.86	4.0000	101.60	1.0000	25.40	6	C25281	—
	23			.1540	3.91	4.0000	101.60	1.0000	25.40	6	C25285	—
5/32				.1562	3.97	4.0000	101.60	1.0000	25.40	6	C25290	C29493
	22			.1570	3.99	4.0000	101.60	1.0000	25.40	6	C25292	—
		4.0		.1575	4.00	4.0000	101.60	1.0000	25.40	6	C25291	—
	21			.1590	4.04	4.5000	114.30	1.1250	28.58	6	C25297	—
	20			.1610	4.09	4.5000	114.30	1.1250	28.58	6	C25301	—
	19			.1660	4.22	4.5000	114.30	1.1250	28.58	6	C25313	—
	18			.1695	4.31	4.5000	114.30	1.1250	28.58	6	C25322	—
11/64				.1719	4.37	4.5000	114.30	1.1250	28.58	6	C25327	—
	17			.1730	4.39	4.5000	114.30	1.1250	28.58	6	C25330	—
	16			.1770	4.50	4.5000	114.30	1.1250	28.58	6	C25339	—
	15			.1800	4.57	4.5000	114.30	1.1250	28.58	6	C25346	—
	14			.1820	4.62	4.5000	114.30	1.1250	28.58	6	C25351	—
	13			.1850	4.70	4.5000	114.30	1.1250	28.58	6	C25357	—
	.1855			.1855	4.71	4.5000	114.30	1.1250	28.58	6	C25360	—
				.1865	4.74	4.5000	114.30	1.1250	28.58	6	C25362	—
	.1870			.1870	4.75	4.5000	114.30	1.1250	28.58	6	C25365	—
3/16				.1875	4.76	4.5000	114.30	1.1250	28.58	6	C25366	C29565
				.1885	4.79	4.5000	114.30	1.1250	28.58	6	C25368	—
	12			.1890	4.80	4.5000	114.30	1.1250	28.58	6	C25369	—
	11			.1910	4.85	5.0000	127.00	1.2500	31.75	6	C25374	—
	10			.1935	4.91	5.0000	127.00	1.2500	31.75	6	C25380	—
	9			.1960	4.98	5.0000	127.00	1.2500	31.75	6	C25385	—
		5.0		.1969	5.00	5.0000	127.00	1.2500	31.75	6	C25314	—
	8			.1990	5.05	5.0000	127.00	1.2500	31.75	6	C25392	—
	7			.2010	5.11	5.0000	127.00	1.2500	31.75	6	C25397	—
13/64				.2031	5.16	5.0000	127.00	1.2500	31.75	6	C25402	C29601
	6			.2040	5.18	5.0000	127.00	1.2500	31.75	6	C25404	—
	5			.2055	5.22	5.0000	127.00	1.2500	31.75	6	C25408	—
	4			.2090	5.31	5.0000	127.00	1.2500	31.75	6	C25417	—

continued on next page



Straight Flute and Spiral Flute (continued) Styles 4001 (405) and 4030 (405RS)

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

INCH AND METRIC SIZES

Fract	Drill Diameter			Overall Length		Flute Length		Number of Flutes	Style 4001 Straight Flute	Style 4030 Spiral Flute
	Dowel Pin	W/L	Metric	Decimal	mm	Inch	mm			
7/32		3		.2130	5.41	5.0000	127.00	6	C25426	—
				.2188	5.56	5.0000	127.00	6	C25438	C29637
		2		.2210	5.61	6.0000	152.40	6	C25443	—
		1		.2280	5.79	6.0000	152.40	6	C25459	—
15/64		A		.2340	5.94	6.0000	152.40	6	C25473	—
				.2344	5.95	6.0000	152.40	6	C25474	—
			6.0	.2362	6.00	6.0000	152.40	6	C25475	—
		B		.2380	6.05	6.0000	152.40	6	C25483	—
		C		.2420	6.15	6.0000	152.40	6	C25492	—
		D		.2460	6.25	6.0000	152.40	6	C25501	—
	.2480			.2480	6.30	6.0000	152.40	6	C25508	—
				.2490	6.32	6.0000	152.40	6	C25510	—
	.2495			.2495	6.32	6.0000	152.40	6	C25512	—
	1/4	E		.2500	6.35	6.0000	152.40	6	C25513	C29709
				.2510	6.38	6.0000	152.40	6	C25516	—
		F		.2570	6.53	6.0000	152.40	6	C25530	—
17/64		G		.2610	6.63	6.0000	152.40	6	C25539	—
				.2656	6.75	6.0000	152.40	6	C25550	C29745
		H		.2660	6.76	6.0000	152.40	6	C25552	—
		I		.2720	6.91	6.0000	152.40	6	C25566	—
			7.0	.2756	7.00	6.0000	152.40	6	C25567	—
		J		.2770	7.04	6.0000	152.40	6	C25577	—
		K		.2810	7.14	6.0000	152.40	6	C25585	—
	9/32			.2812	7.14	6.0000	152.40	6	C25608	C29803
		L		.2900	7.37	6.0000	152.40	6	C25605	—
		M		.2950	7.49	6.0000	152.40	6	C25617	—
	19/64			.2969	7.54	6.0000	152.40	6	C25622	—
		N		.3020	7.67	6.0000	152.40	6	C25634	—
	.3105			.3105	7.89	6.0000	152.40	6	C25655	—
	.3115			.3115	7.91	6.0000	152.40	6	C25658	—
				.3120	7.92	6.0000	152.40	6	C25660	—
	5/16			.3125	7.94	6.0000	152.40	6	C25661	C29853
				.3135	7.96	6.0000	152.40	6	C25663	—
			8.0	.3150	8.00	6.0000	152.40	6	C25668	—
		O		.3160	8.03	6.0000	152.40	6	C25669	—
		P		.3230	8.20	6.0000	152.40	6	C25685	—
21/64				.3281	8.33	6.0000	152.40	6	C25698	C29890
		Q		.3320	8.43	6.0000	152.40	6	C25707	—
		R		.3390	8.61	6.0000	152.40	6	C25723	—
	11/32			.3438	8.73	6.0000	152.40	6	C25733	C29925
		S		.3480	8.84	7.0000	177.80	6	C25742	—
			9.0	.3543	9.00	7.0000	177.80	6	C25743	—
		T		.3580	9.09	7.0000	177.80	6	C25764	—
	23/64			.3594	9.13	7.0000	177.80	6	C25768	C29960
		U		.3680	9.35	7.0000	177.80	6	C25789	—
	.3730			.3730	9.47	7.0000	177.80	6	C25801	—
				.3740	9.50	7.0000	177.80	6	C25804	—
	.3745			.3745	9.51	7.0000	177.80	6	C25806	—
3/8				.3750	9.53	7.0000	177.80	6	C25807	C29997
				.3760	9.55	7.0000	177.80	6	C25809	—
		V		.3770	9.58	7.0000	177.80	6	C25811	—
		W		.3860	9.80	7.0000	177.80	6	C25833	—

continued on next page

Reamers Chucking

Straight Flute and Spiral Flute (continued) Styles 4001 (405) and 4030 (405RS)

INCH AND METRIC SIZES

Fract	Drill Diameter		Decimal	mm	Overall Length		Flute Length		Number of Flutes	Style 4001 Straight Flute	Style 4030 Spiral Flute
	Dowel Pin	W/L Metric			Inch	mm	Inch	mm			
25/64			.3906	9.92	7.0000	177.80	1.7500	44.45	6	C25844	C30033
		10.0	.3937	10.00	7.0000	177.80	1.7500	44.45	6	C25845	—
	X		.3970	10.08	7.0000	177.80	1.7500	44.45	6	C25858	—
	Y		.4040	10.26	7.0000	177.80	1.7500	44.45	6	C25873	—
13/32			.4062	10.32	7.0000	177.80	1.7500	44.45	6	C25878	C30067
	Z		.4130	10.49	7.0000	177.80	1.7500	44.45	6	C25892	—
27/64			.4219	10.72	7.0000	177.80	1.7500	44.45	6	C25911	—
		11.0	.4331	11.00	7.0000	177.80	1.7500	44.45	6	C25912	—
	.4355		.4355	11.06	7.0000	177.80	1.7500	44.45	6	C25942	—
			.4365	11.09	7.0000	177.80	1.7500	44.45	6	C25944	—
	.4370		.4370	11.10	7.0000	177.80	1.7500	44.45	6	C25946	—
7/16			.4375	11.11	7.0000	177.80	1.7500	44.45	6	C25947	C30134
			.4385	11.14	7.0000	177.80	1.7500	44.45	6	C25949	—
29/64			.4531	11.51	7.0000	177.80	1.7500	44.45	6	C25981	C30168
15/32			.4688	11.91	7.0000	177.80	1.7500	44.45	6	C26014	C30201
		12.0	.4724	12.00	7.0000	177.80	1.7500	44.45	6	C26015	—
31/64			.4844	12.30	8.0000	203.20	2.0000	50.80	6	C26048	C30235
	.4990		.4990	12.67	8.0000	203.20	2.0000	50.80	6	C26080	—
1/2			.5000	12.70	8.0000	203.20	2.0000	50.80	6	C26083	C30268
	.5010		.5010	12.73	8.0000	203.20	2.0000	50.80	8	C26085	—
		13.0	.5118	13.00	8.0000	203.20	2.0000	50.80	8	C26086	—
17/32			.5312	13.49	8.0000	203.20	2.0000	50.80	8	C26150	C30335
		14.0	.5512	14.00	8.0000	203.20	2.0000	50.80	8	C26151	—
9/16			.5625	14.29	8.0000	203.20	2.0000	50.80	8	C26217	C30402
		15.0	.5906	15.00	8.0000	203.20	2.0000	50.80	8	C26218	—
19/32			.5938	15.08	8.0000	203.20	2.0000	50.80	8	C26284	C30469
5/8			.6250	15.88	9.0000	228.60	2.2500	57.15	8	C26351	C30536
		16.0	.6299	16.00	9.0000	228.60	2.2500	57.15	8	C26352	—
21/32			.6562	16.67	9.0000	228.60	2.2500	57.15	8	C26418	C30603
11/16			.6875	17.46	9.0000	228.60	2.2500	57.15	8	C26485	C30670
23/32			.7188	18.26	9.0000	228.60	2.2500	57.15	8	C26550	C30735
3/4			.7500	19.05	9.5000	241.30	2.5000	63.50	8	C26615	C30800
25/32			.7812	19.84	9.5000	241.30	2.5000	63.50	8	C26680	C30865
13/16			.8125	20.64	9.5000	241.30	2.5000	63.50	8	C26746	C30931
27/32			.8438	21.43	9.5000	241.30	2.5000	63.50	8	C26811	—
7/8			.8750	22.23	10.0000	254.00	2.6250	66.68	8	C26876	C31061
29/32			.9062	23.02	10.0000	254.00	2.6250	66.68	8	C26941	—
15/16			.9375	23.81	10.0000	254.00	2.6250	66.68	8	C27006	C31191
31/32			.9688	24.61	10.0000	254.00	2.6250	66.68	8	C27072	—
1IN			1.0000	25.40	10.5000	266.70	2.7500	69.85	8	C27137	C31322
1-1/16			1.0625	26.99	10.5000	266.70	2.7500	69.85	10	C27144	—
1-1/8			1.1250	28.58	11.0000	279.40	2.8750	73.03	10	C27152	C31337
1-3/16			1.1875	30.16	11.0000	279.40	2.8750	73.03	10	C27159	—
1-1/4			1.2500	31.75	11.5000	292.10	3.0000	76.20	10	C27166	C31351
1-3/8			1.3750	34.93	12.0000	304.80	3.2500	82.55	10	C27180	C31365
1-1/2			1.5000	38.10	12.5000	317.50	3.5000	88.90	12	C27195	C31380

INCH SETS

Number of Tools	Size Range	Case Style	Style 4001 Straw
29	1/16 - 1/2 X 1/64	plastic pouch	C00964



Set C00964



Customer Service: 800.348.2885

Technical Support: 800.892.4281

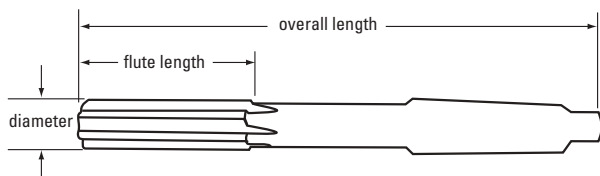
Taper Shank — Straight Flute Style 4005 (400)

Features/Benefits:

- General-purpose for a wide range of operating conditions and materials.
- Manufactured from premium high-speed steel.
- Straight flute reamers for through holes.
- Bright finish.

Application Information:

- tool steel
- alloy steel
- cast iron
- aluminum
- plastic
- free-machining stainless steel



Style 4005 Straight Flute

INCH SIZES

Fract	Drill Diameter		Overall Length		Flute Length		Morse Taper	Number of Flutes	Style 4005 Straight Flute
	Decimal	mm	Inch	mm	Inch	mm			
1/4	.2500	6.35	6.0000	152.40	1.5000	38.10	1	6	C33842
5/16	.3125	7.94	6.0000	152.40	1.5000	38.10	1	6	C33986
3/8	.3750	9.53	7.0000	177.80	1.7500	44.45	1	6	C34129
7/16	.4375	11.11	7.0000	177.80	1.7500	44.45	1	6	C34266
1/2	.5000	12.70	8.0000	203.20	2.0000	50.80	1	6	C34400
17/32	.5312	13.49	8.0000	203.20	2.0000	50.80	1	6	C34467
9/16	.5625	14.29	8.0000	203.20	2.0000	50.80	1	8	C34534
19/32	.5938	15.08	8.0000	203.20	2.0000	50.80	1	8	C34601
5/8	.6250	15.88	9.0000	228.60	2.2500	57.15	2	8	C34668
21/32	.6562	16.67	9.0000	228.60	2.2500	57.15	2	8	C34735
11/16	.6875	17.46	9.0000	228.60	2.2500	57.15	2	8	C34802
23/32	.7188	18.26	9.0000	228.60	2.2500	57.15	2	8	C34867
3/4	.7500	19.05	9.5000	241.30	2.5000	63.50	2	8	C34932
25/32	.7812	19.84	9.5000	241.30	2.5000	63.50	2	8	C34997
13/16	.8125	20.64	9.5000	241.30	2.5000	63.50	2	8	C35063
27/32	.8438	21.43	9.5000	241.30	2.5000	63.50	2	8	C35128
7/8	.8750	22.23	10.0000	254.00	2.6250	66.68	2	8	C35193
29/32	.9062	23.02	10.0000	254.00	2.6250	66.68	2	8	C35258
15/16	.9375	23.81	10.0000	254.00	2.6250	66.68	3	8	C35323
31/32	.9688	24.61	10.0000	254.00	2.6250	66.68	3	8	C35389
1IN	1.0000	25.40	10.5000	266.70	2.7500	69.85	3	8	C35454
1-1/16	1.0625	26.99	10.5000	266.70	2.7500	69.85	3	10	C35461
1-1/8	1.1250	28.58	11.0000	279.40	2.8750	73.03	3	10	C35469
1-3/16	1.1875	30.16	11.0000	279.40	2.8750	73.03	3	10	C35476
1-1/4	1.2500	31.75	11.5000	292.10	3.0000	76.20	4	10	C35483
1-5/16	1.3125	33.34	11.5000	292.10	3.0000	76.20	4	10	C35490
1-3/8	1.3750	34.93	12.0000	304.80	3.2500	82.55	4	10	C35497
1-7/16	1.4375	36.51	12.0000	304.80	3.2500	82.55	4	10	C35505
1-1/2	1.5000	38.10	12.5000	317.50	3.5000	88.90	4	12	C35512

For Morse Taper shank specifications, see page 3.

Reamer Chucking

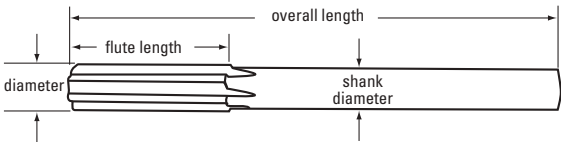
Solid Carbide — Straight Shank — Straight Flute Style 1730

Features/Benefits:

- General-purpose for a wide range of operating conditions and materials.
- High red hardness for extended wear life in high-heat conditions.
- Manufactured from premium high-speed steel.
- Straight flute reamers for through holes.
- Bright finish.

Application Information:

- tool steel
- alloy steel
- cast iron
- aluminum
- plastic
- free-machining stainless steel



Style 1730 Solid Carbide

INCH SIZES

Fract	Drill Diameter		Shank Diameter		Overall Length		Flute Length		Number of Flutes	Style 1730 Straight Flute
	Decimal	mm	Inch	mm	Inch	mm	Inch	mm		
1/16	.0625	1.59	.058	1.47	1.5000	38.10	.3750	9.53	4	C50103
3/32	.0938	2.38	.088	2.24	2.0000	50.80	.5000	12.70	4	C50121
1/8	.1250	3.18	.120	3.05	2.2500	57.15	.6250	15.88	4	C50133
5/32	.1562	3.97	.151	3.84	2.5000	63.50	.7500	19.05	4	C50145
3/16	.1875	4.76	.182	4.62	2.7500	69.85	.8750	22.23	4	C50157
7/32	.2188	5.56	.213	5.41	3.0000	76.20	1.0000	25.40	4	C50168
1/4	.2500	6.35	.244	6.20	3.0000	76.20	1.0000	25.40	4	C50180
9/32	.2812	7.14	.270	6.86	3.2500	82.55	1.1250	28.58	6	C50194
5/16	.3125	7.94	.301	7.65	3.2500	82.55	1.1250	28.58	6	C50203
11/32	.3438	8.73	.332	8.43	3.5000	88.90	1.2500	31.75	6	C50214
3/8	.3750	9.53	.363	9.22	3.5000	88.90	1.2500	31.75	6	C50226

Reamer Regrinding

In obtaining maximum economy from reamers the same principles apply as in the case of most other cutting tools. One of these principles is not to allow a tool to become too dull. It is best to regrind the chamfer on a reamer long before it exhibits excessive wear or refuses to cut. This sharpening is usually restricted to the entering taper or chamfer. It can be done on almost any tool and cutter grinder. Care must be taken so that each flute is ground exactly even or the tool is apt to cut oversize.

Sharpening the chamfer on a reamer by hand is not recommended as it is practically impossible to keep the cutting edges even.

The following figures show three common types of grinds used on reamers:

In grinding down a reamer to special size it is usually necessary to relieve or clear the lands. No hard or fast rule may be given as to the amount of this clearance but the following table may be of help:

Size of Reamer	Circular Land Width	Primary Clearance
1/4"	.007	14°
1/2"	.009	11°
1"	.013	9°
1-1/2"	.016	7°
2"	.023	7°

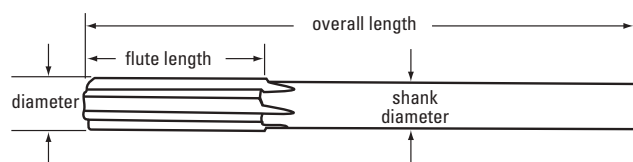
Carbide-Tipped — Straight Shank — Straight Flute Style 4703

Features/Benefits:

- Runs at carbide speeds for increased productivity.
- Manufactured from high-speed steel body and shank for extra strength with brazed carbide tips.
- Straight flute reamers for through holes.
- Bright finish.

Application Information:

- alloy steel
- carbon steel
- titanium alloys
- aluminum
- free-machining stainless steel



Style 4703 Straight Flute

INCH SIZES

Fract	Drill Diameter		Shank Diameter		Overall Length		Flute Length		Number of Flutes	Style 4703 Straight Flute
	Decimal	mm	Inch	mm	Inch	mm	Inch	mm		
1/4	.2500	6.35	.2405	6.11	6.0000	152.40	1.5000	38.10	4	C50368
9/32	.2812	7.14	.2485	6.31	6.0000	152.40	1.5000	38.10	4	C50382
5/16	.3125	7.94	.2792	7.09	6.0000	152.40	1.5000	38.10	4	C50391
11/32	.3438	8.73	.2792	7.09	6.0000	152.40	1.5000	38.10	4	C50402
3/8	.3750	9.53	.3105	7.89	7.0000	177.80	1.7500	44.45	4	C50414
13/32	.4062	10.32	.3105	7.89	7.0000	177.80	1.7500	44.45	4	C50423
7/16	.4375	11.11	.3730	9.47	7.0000	177.80	1.7500	44.45	6	C50428
15/32	.4688	11.91	.3730	9.47	7.0000	177.80	1.7500	44.45	6	C50433
1/2	.5000	12.70	.4355	11.06	8.0000	203.20	2.0000	50.80	6	C50438
17/32	.5312	13.49	.4355	11.06	8.0000	203.20	2.0000	50.80	6	C50443
9/16	.5625	14.29	.4355	11.06	8.0000	203.20	2.0000	50.80	6	C50449
5/8	.6250	15.88	.5620	14.27	9.0000	228.60	2.2500	57.15	6	C50459

Reamer Regrinding (continued)

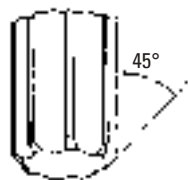


Figure A

Ordinary reamer grind for most jobs.

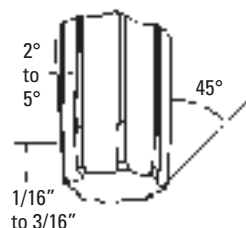


Figure B

Hand reamer grind also used on some machine reamer applications to obtain required finish or tolerance.



Figure C

Semi-finish reamer grind to straighten out bent or misaligned holes. Corners must be kept sharp.

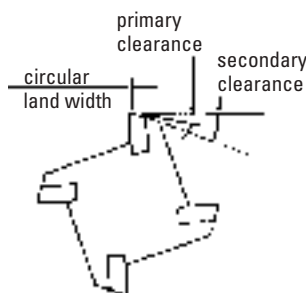


Figure D

A secondary clearance is often ground on reamers as shown in Fig. D. This clearance is only to insure the back of the land being well away from the wall of the reamed hole in order to prevent rubbing.

Reamers

Heavy-Duty

Taper Shank Bridge Reamer Style 616 (340)

Features/Benefits:

- Designed for hard service, especially suited for use in structural iron or steel bridgework and ship construction.
- Manufactured from premium high-speed steel.
- Left-hand helix, right-hand cut for difficult materials and applications.
- Sharp point and long taper for easy entry in badly misaligned holes.
- Commonly used in electric and pneumatic portable equipment.
- Black oxide finish standard from stock.

Application Information:

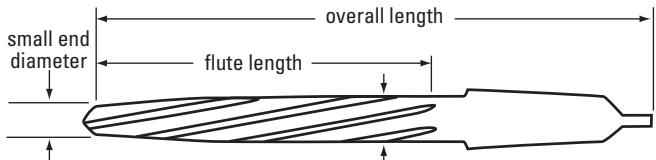
- structural steel
- carbon steel
- cast iron

Surface Treatment Information:

- Black oxide surface finish increases wear resistance and adds lubricity, improving chip flow.



Style 616 Black Oxide



INCH SIZES

Reamer Diameter			Small End Diameter		Overall Length		Flute Length		Morse Taper	Number of Flutes	Style 616 Black Oxide
Fract	Decimal	mm	Inch	mm	Inch	mm	inch	mm			
7/16	.4375	11.11	.2656	6.75	8.2500	209.55	4.3750	111.13	2	4	C23812
1/2	.5000	12.70	.3125	7.94	9.0000	228.60	5.1250	130.18	2	4	C23813
9/16	.5625	14.29	.3750	9.53	9.0000	228.60	5.1250	130.18	2	4	C23814
5/8	.6250	15.88	.3906	9.92	10.0000	254.00	6.1250	155.58	2	4	C23815
11/16	.6875	17.46	.4062	10.32	11.7500	298.45	7.1250	180.98	3	4	C23816
3/4	.7500	19.05	.4688	11.91	12.0000	304.80	7.3750	187.33	3	4	C23817
13/16	.8125	20.64	.5469	13.89	12.0000	304.80	7.3750	187.33	3	4	C23818
7/8	.8750	22.23	.6094	15.48	12.0000	304.80	7.3750	187.33	3	4	C23819
15/16	.9375	23.81	.6719	17.07	12.0000	304.80	7.3750	187.33	3	4	C23820
1	1.0000	25.40	.7344	18.65	12.0000	304.80	7.3750	187.33	3	4	C23821
1-1/16	1.0625	26.99	.8125	20.64	12.0000	304.80	7.3750	187.33	3	4	C23822
1-1/8	1.1250	28.58	.8594	21.83	12.0000	304.80	7.3750	187.33	3	4	C23823
1-3/16	1.1875	30.16	.9219	23.42	12.0000	304.80	7.3750	187.33	3	4	C23824

For Morse Taper shank specifications, see page 3.

Taper Shank Car Reamer Style 618

Features/Benefits:

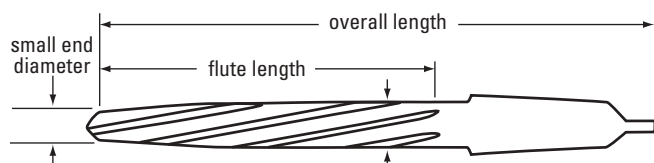
- Designed for hard service, especially suited for use in structural iron or steel.
- Manufactured from high-speed steel.
- Left-hand helix, right-hand cut for difficult materials and applications.
- Sharp point and long taper for easy entry in badly misaligned holes.
- Commonly used in electric and pneumatic portable equipment.
- Black oxide finish standard from stock.

Application Information:

- carbon steel
- cast iron
- Use for aligning misaligned holes.

Surface Treatment Information:

- Black oxide surface finish increases wear resistance and adds lubricity, improving chip flow.



Style 618 Black Oxide

INCH SIZES

Reamer Diameter			Small End Diameter		Overall Length		Flute Length		Morse Taper	Number of Flutes	Style 618 Black Oxide
Fract	Decimal	mm	Inch	mm	Inch	mm	inch	mm			
9/16	.5625	14.290	.3125	7.94	7.5625	192.09	3.9375	100.01	2	5	C23957
5/8	.6250	15.880	.3281	8.33	8.0625	204.79	4.4375	112.71	2	5	C23958
11/16	.6875	17.460	.3594	9.13	8.8125	223.84	4.4375	112.71	3	5	C23959
3/4	.7500	19.050	.4219	10.72	9.5000	241.30	5.0000	127.00	3	5	C23960
13/16	.8125	20.640	.4688	11.91	9.5000	241.30	5.0000	127.00	3	5	C23961
15/16	.9375	23.810	.5625	14.29	9.5000	241.30	5.0000	127.00	3	5	C23962

For Morse Taper shank specifications, see page 3.

Reamers
Pipe

Taper Pipe Reamer
Style 642 (853)

Features/Benefits:

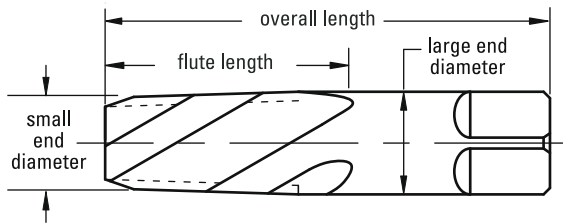
- Designed to ream holes to be tapped with American National Standard taper pipe taps.
- Manufactured from premium high-speed steel.
- 3/4-inch taper per foot.
- Left-hand spiral flutes impart smoother, easier cutting action and longer wear life.
- Right-hand cut pushes chip forward.
- Square on shank for use with tap wrench in hand reaming applications.
- Bright finish standard from stock.

Application Information:

- carbon steel
- alloy steel
- cast iron



Style 642



INCH SIZES

Nominal Pipe Diameter			Small End Diameter		Large End Diameter		Overall Length		Flute Length		Number of Flutes	Style 642 Bright
Fract	Decimal	mm	Inch	mm	Inch	mm	inch	mm	inch	mm		
1/8	.1250	3.18	.3160	8.03	.3620	9.19	2.1250	53.98	.7500	19.05	6	C24982
1/4	.2500	6.35	.4060	10.31	.4720	11.99	2.4375	61.91	1.0625	26.99	6	C24983
3/8	.3750	9.53	.5400	13.72	.6060	15.39	2.5625	65.09	1.0625	26.99	6	C24984
1/2	.5000	12.70	.6650	16.89	.7510	19.08	3.1250	79.38	1.3750	34.93	6	C24985
3/4	.7500	19.50	.8760	22.25	.9620	24.43	3.7500	95.25	1.3750	34.93	8	C24986
1	1.0000	25.40	1.1030	28.02	1.2120	30.78	3.7500	95.25	1.7500	44.45	8	C24987
1-1/4	1.2500	31.75	1.4440	36.68	1.5530	39.45	4.0000	101.60	1.7500	44.45	10	C24988
1-1/2	1.5000	38.10	1.6840	42.77	1.7930	45.54	4.2500	107.95	1.7500	44.45	10	C24989

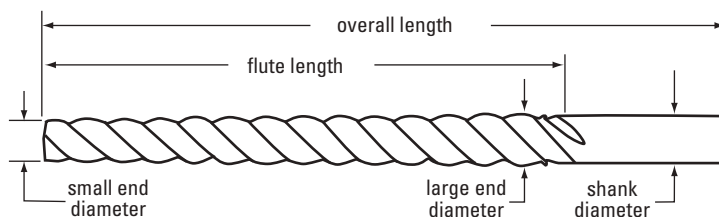
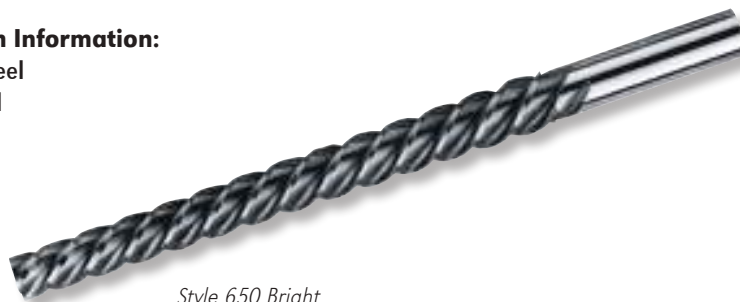
High Spiral Taper Pin Reamer Style 650 (231)

Features/Benefits:

- Designed to ream a hole for standard taper pins by machine.
- Free cutting action at high speeds produces a good finish and minimizes chip packing in flutes.
- Left-hand spiral, right-hand cut helical flute design for difficult applications.
- Manufactured from premium high-speed steel.
- 1/4" taper per foot.
- Dimensions match taper pin specifications.
- Bright finish standard from stock.

Application Information:

- carbon steel
- alloy steel
- cast iron
- aluminum



INCH SIZES

Size Number	Small End Diameter inch	Small End Diameter mm	Large End Diameter Inch	Large End Diameter mm	Shank Diameter Inch	Shank Diameter mm	Overall Length inch	Overall Length mm	Flute Length inch	Flute Length mm	Style 650 Bright
#7/0	.0497	1.26	.0666	1.69	.0781	1.98	1.8125	46.04	.8125	20.64	C24229
#6/0	.0611	1.55	.0806	2.05	.0938	2.38	1.9375	49.21	.9375	23.81	C24230
#5/0	.0719	1.83	.0966	2.45	.1094	2.78	2.1875	55.56	1.1875	30.16	C24231
#4/0	.0869	2.21	.1142	2.90	.1250	3.18	2.3125	58.74	1.3125	33.34	C24232
#3/0	.1029	2.61	.1302	3.31	.1406	3.57	2.3125	58.74	1.3125	33.34	C24233
#2/0	.1137	2.89	.1462	3.71	.1562	3.97	2.5625	65.09	1.5625	39.69	C24234
#0	.1287	3.27	.1638	4.16	.1719	4.37	2.9375	74.61	1.6875	42.86	C24235
#1	.1447	3.68	.1798	4.57	.1875	4.76	2.9375	74.61	1.6875	42.86	C24236
#2	.1605	4.08	.2008	5.10	.2031	5.16	3.1875	80.96	1.9375	49.21	C24237
#3	.1813	4.61	.2294	5.83	.2344	5.95	3.6875	93.66	2.3125	58.74	C24238
#4	.2071	5.26	.2604	6.61	.2656	6.75	4.0625	103.19	2.5625	65.09	C24239
#5	.2409	6.12	.2994	7.60	.3125	7.94	4.3125	109.54	2.8125	71.44	C24240
#6	.2773	7.04	.3540	8.99	.3594	9.13	5.4375	138.11	3.6875	93.66	C24241
#7	.3297	8.37	.4220	10.72	.4062	10.32	6.3125	160.34	4.4375	112.71	C24242
#8	.3971	10.09	.5050	12.83	.4375	11.11	7.1875	182.56	5.1875	131.76	C24243
#9	.4805	12.20	.6066	15.41	.5625	14.29	8.3125	211.14	6.0625	153.99	C24244
#10	.5799	14.73	.7216	18.41	.6250	15.88	9.3125	236.54	6.8125	173.04	C24245

Reamers

Taper Pin

Taper Pin Reamers — Straight Shank Styles 657 (245) and 659 (245RS)

Features/Benefits:

- Designed to turn a straight hole into a tapered hole for standard taper pins.
- Straight flute design is recommended for most materials and applications.
- Left-hand spiral, right-hand cut helical flute design is recommended for applications where the reamer tends to wedge itself.
- Manufactured from premium high-speed steel.
- Dimensions match taper pin specifications.
- Square on shank for use with tap wrench in hand reaming applications.
- Bright finish standard from stock.

Application Information:

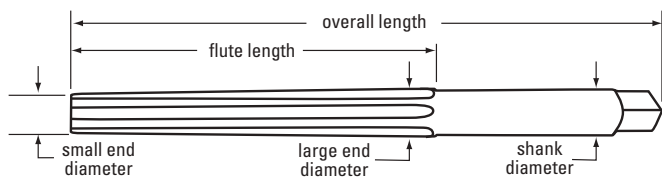
- carbon steel
- alloy steel
- tool steel
- aluminum



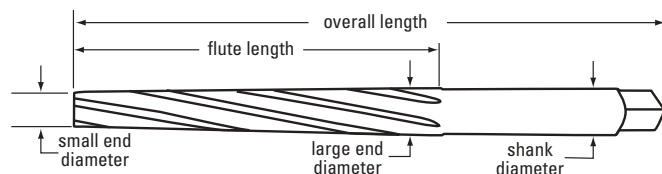
Style 657 Straight Flute



Style 659 Helical Flute



Straight Flutes



Helical Flutes

INCH SIZES

Size Number	Small End Diameter		Large End Diameter		Shank Diameter		Overall Length		Flute Length		Style 657 Straight	Style 659 Helical
	inch	mm	Inch	mm	Inch	mm	inch	mm	inch	mm		
#6/0	.0611	1.55	.0806	2.05	.0938	2.38	1.9375	49.21	.9375	23.81	C24250	C24271
#5/0	.0719	1.83	.0966	2.45	.1094	2.78	2.1875	55.56	1.1875	30.16	C24251	C24272
#4/0	.0869	2.21	.1142	2.90	.1250	3.18	2.3125	58.74	1.3125	33.34	C24252	C24273
#3/0	.1029	2.61	.1302	3.31	.1406	3.57	2.3125	58.74	1.3125	33.34	C24253	C24274
#2/0	.1137	2.89	.1462	3.71	.1562	3.97	2.5625	65.09	1.5625	39.69	C24254	C24275
#0	.1287	3.27	.1638	4.16	.1719	4.37	2.9375	74.61	1.6875	42.86	C24255	C24276
#1	.1447	3.68	.1798	4.57	.1875	4.76	2.9375	74.61	1.6875	42.86	C24256	C24277
#2	.1605	4.08	.2008	5.10	.2031	5.16	3.1875	80.96	1.9375	49.21	C24257	C24278
#3	.1813	4.61	.2294	5.83	.2344	5.95	3.6875	93.66	2.3125	58.74	C24258	C24279
#4	.2071	5.26	.2604	6.61	.2656	6.75	4.0625	103.19	2.5625	65.09	C24259	C24280
#5	.2409	6.12	.2994	7.60	.3125	7.94	4.3125	109.54	2.8125	71.44	C24260	C24281
#6	.2773	7.04	.3540	8.99	.3594	9.13	5.4375	138.11	3.6875	93.66	C24261	C24282
#7	.3297	8.37	.4220	10.72	.4062	10.32	6.3125	160.34	4.4375	112.71	C24262	C24283
#8	.3971	10.09	.5050	12.83	.4375	11.11	7.1875	182.56	5.1875	131.76	C24263	C24284
#9	.4805	12.20	.6066	15.41	.5625	14.29	8.3125	211.14	6.0625	153.99	C24264	C24285
#10	.5799	14.73	.7216	18.33	.6250	15.88	9.3125	236.54	6.8125	173.04	C24265	C24286

Reamer Speeds and Feeds — Ferrous Materials

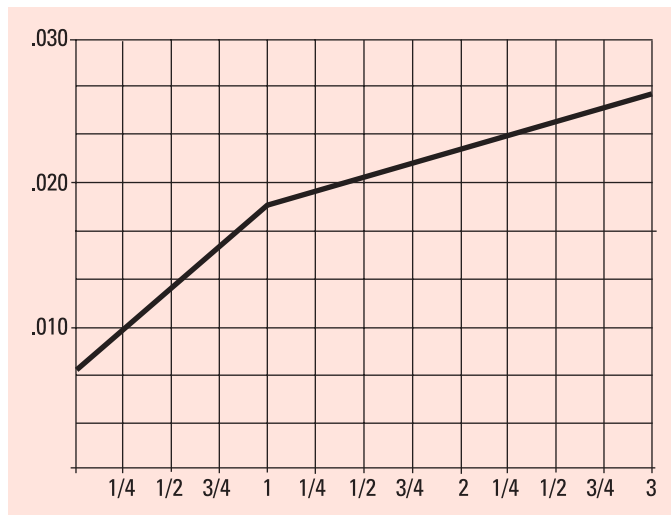
			Feed (ipr) for Diameter (inches)					
Material		Speed (sfm)	<1/16	> 1/16 - 1/8	>1/8 - 1/4	> 1/4 - 1/2	> 1/2 - 1	> 1
Steel	under 200 BHN	55-80	.0005-.003	.002-.006	.004-.010	.006-.015	.010-.030	.020-.050
	200-300 BHN	30-55	.005-.002	.002-.004	.004-.006	.006-.010	.010-.020	.020-.040
	300-400 BHN	20-30	.0002-.001	.001-.002	.002-.004	.004-.006	.006-.010	.010-.020
	400-500 BHN	10-20	.0002-.001	.001-.002	.002-.004	.004-.006	.006-.010	.010-.020
	500 BHN +	—	.0002-.001	.001-.002	.002-.004	.004-.006	.006-.010	.010-.020
Cast Iron	Soft (Ferritic)	50-100	.001-.003	.003-.006	.006-.010	.010-.015	.015-.030	.030-.050
	Medium (Pearlitic)	25-50	.0002-.002	.001-.004	.002-.006	.004-.010	.006-.020	.010-.040
	Hard (Martensitic orAcicular)	15-25	.0002-.001	.001-.002	.002-.004	.004-.006	.006-.010	.010-.020
Stainless Steel	Free Machining & 400 Ann	40-60	.0005-.002	.002-.004	.004-.006	.006-.010	.010-.020	.020-.040
	300 Series	20-30	.0005-.002	.002-.004	.004-.006	.006-.010	.010-.020	.020-.040
	PH and HT 400Series	15-25	.0002-.002	.001-.004	.002-.006	.004-.010	.006-.020	.010-.040
High-Temp Alloys	Nickel-base	10-20	.0002-.001	.001-.002	.002-.004	.004-.006	.006-.010	.010-.020
	Cobalt-base	10-15	.0002-.001	.001-.002	.002-.004	.004-.006	.006-.010	.010-.020
Titanium	Pure	35-50	.0005-.002	.002-.004	.004-.006	.006-.010	.010-.020	.020-.040
	Alloys	10-20	.0002-.002	.001-.004	.002-.006	.004-.010	.006-.020	.010-.04

Reamer Speeds and Feeds — Non-Ferrous Materials

		Feed (ipr) for Diameter (inches)						
Material	Speed (sfm)	<1/16	> 1/16 - 1/8	>1/8 - 1/4	> 1/4 - 1/2	> 1/2 - 1	> 1	
Aluminum		150-300	.0005-.003	.002-.006	.004-.010	.006-.015	.010-.030	.020-.050
Brass/	Free Machining	125-200	.0005-.002	.002-.004	.004-.006	.006-.010	.010-.020	.020-.040
Bronze		Tough	75-125	.0005-.002	.002-.004	.004-.006	.006-.010	.010-.020
Copper/ Hard Bronze		50-75	.0002-.001	.001-.002	.002-.004	.004-.006	.006-.010	.010-.020
Magnesium		200-400	.005-.003	.002-.006	.004-.010	.006-.015	.010-.030	.020-.050

Reamer Stock Removal

Stock removal is dependent on material, feed, and finish required. The stock removal chart below illustrates starting points for various diameters when using machine and chucking reamers. See reamer speed chart on pages 127-128.



Reamers

Cutting Speeds

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Reamer Size		Feet per Minute														
Fract/Wire/ Letter	Decimal	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
		Revolutions per Minute														
#60	.0400	630	1261	1891	2521	3152	3781	4411	5042	5672	6302	6933	7563	8193	8824	9454
#59	.0410	615	1230	1845	2459	3074	3689	4304	4919	5536	6149	6764	7379	7993	8608	9224
#58	.0420	601	1201	1801	2400	3001	3601	4202	4802	5403	6003	6603	7203	7803	8403	9004
#57	.0430	586	1173	1763	2350	2938	3526	4113	4701	5289	5876	6449	7036	7622	8208	8795
#56	.0465	542	1084	1627	2169	2711	3253	3796	4338	4880	5422	5964	6506	7047	7590	8133
#55	.0520	485	970	1455	1939	2424	2909	3394	3879	4363	4848	5333	5818	6302	6787	7278
#54	.0550	458	917	1375	1833	2292	2750	3209	3667	4126	4584	5042	5500	5958	6417	6875
#53	.0595	423	847	1270	1694	2117	2540	2963	3386	3810	4233	4661	5085	5508	5932	6356
1/16	.0625	403	807	1210	1614	2017	2420	2823	3227	3663	4033	4437	4840	5244	5647	6050
#52	.0635	397	794	1191	1588	1985	2382	2779	3176	3573	3970	4369	4764	5161	5558	5955
#51	.0670	376	752	1129	1505	1882	2258	2634	3010	3386	3763	4139	4515	4893	5272	5644
#50	.0700	360	720	1080	1441	1801	2161	2521	2882	3241	3602	3961	4322	4682	5042	5402
#49	.0730	345	691	1036	1381	1727	2072	2418	2763	3109	3454	3799	4144	4493	4835	5180
#48	.0760	332	663	995	1327	1659	1991	2322	2654	2985	3317	3648	3980	4312	4644	4976
#47	.0785	321	642	964	1284	1606	1927	2248	2569	2890	3212	3532	3854	4175	4496	4817
#46	.0810	312	622	934	1245	1556	1868	2179	2490	2801	3113	3423	3735	4046	4357	4669
#45	.0820	308	615	922	1230	1537	1845	2152	2459	2767	3074	3382	3689	3997	4305	4611
#44	.0860	293	586	880	1173	1466	1759	2052	2346	2639	2932	3225	3518	3811	4104	4397
#43	.0890	283	566	850	1133	1416	1700	1983	2266	2550	2833	3116	3399	3682	3965	4249
#42	.0935	269	539	809	1078	1348	1618	1888	2157	2427	2696	2966	3235	3505	3775	4044
#41	.0960	263	525	788	1051	1313	1575	1838	2101	2363	2626	2889	3152	3414	3676	3939
#40	.0980	257	515	772	1029	1286	1544	1801	2058	2315	2573	2829	3087	3344	3602	3858
#39	.0995	253	507	760	1014	1267	1520	1773	2027	2280	2534	2787	3041	3294	3547	3800
#38	.1015	248	497	745	993	1242	1490	1738	1987	2235	2484	2732	2981	3229	3478	3726
#37	.1040	242	485	727	970	1212	1455	1697	1939	2182	2424	2666	2909	3152	3394	3636
#36	.1065	237	473	710	947	1184	1420	1657	1894	2130	2367	2604	2841	3078	3314	3551
#35	.1100	229	458	688	917	1146	1375	1604	1833	2063	2292	2522	2750	2979	3208	3438
#34	.1110	227	454	681	908	1136	1363	1590	1817	2044	2272	2498	2725	2953	3180	3407
#33	.1130	223	446	669	892	1115	1338	1562	1785	2008	2231	2454	2677	2900	3123	3346
#32	.1160	217	435	652	869	1087	1304	1521	1738	1956	2173	2391	2608	2825	3043	3260
#31	.1200	210	420	630	840	1051	1261	1470	1680	1891	2101	2311	2522	2731	2941	3152
1/8	.1250	202	403	605	807	1008	1210	1412	1614	1815	2017	2218	2420	2622	2823	3025
#30	.1285	196	393	589	785	981	1177	1373	1569	1766	1962	2158	2354	2550	2747	2943
#29	.1360	185	371	556	742	927	1112	1298	1483	1668	1854	2039	22243	2410	2595	2781
#28	.1405	180	359	539	718	898	1076	1256	1436	1615	1795	1973	2153	2332	2512	2691
#27	.1440	175	350	525	700	876	1051	1226	1401	1576	1751	1927	2101	2276	2451	2626
#26	.1470	172	343	514	686	857	1029	1201	1371	1543	1715	1886	2058	2229	2401	2573
#25	.1495	169	337	506	675	842	1012	1181	1349	1518	1686	1855	2024	2193	2361	2529
#24	.1520	166	332	498	663	830	995	1161	1327	1493	1659	1824	1991	2156	2322	2488
#23	.1540	164	327	491	655	818	982	1146	1309	1473	1637	1800	1964	2128	2292	2455
#22	.1570	160	321	482	642	803	964	1124	1284	1445	1606	1766	1927	2088	2248	2408
#21	.1590	158	317	476	634	793	951	1109	1269	1427	1585	1745	1903	2061	2220	2379
#20	.1610	156	314	470	626	783	939	1096	1253	1409	1566	1723	1879	2035	2193	2349
#19	.1660	152	304	455	607	760	911	1063	1215	1367	1519	1670	1822	1974	2127	2279
#18	.1695	149	298	447	597	746	895	1044	1193	1342	1492	1636	1785	1934	2082	2231
#17	.1730	146	292	437	583	729	875	1020	1166	1311	1457	1603	1749	1894	2040	2187
#16	.1770	143	285	427	570	712	855	997	1139	1282	1424	1567	1709	1852	1994	2136
#15	.1800	141	281	421	562	702	842	983	1123	1263	1404	1540	1680	1821	1961	2101
#14	.1820	139	277	416	554	693	831	970	1108	1247	1385	1524	1662	1800	1939	2078
#13	.1850	136	273	409	545	681	818	957	1090	1227	1363	1499	1636	1771	1908	2044
3/16	.1875	135	269	403	538	673	807	941	1076	1210	1344	1479	1614	1748	1882	2017
#12	.1890	133	267	400	533	667	801	934	1067	1201	1334	1467	1601	1734	1867	2001
#11	.1910	132	264	396	528	660	792	924	1056	1188	1320	1452	1584	1716	1848	1981
#10	.1935	130	261	391	521	651	781	912	1042	1173	1303	1433	1564	1694	1824	1954
#9	.1960	129	257	386	515	644	772	900	1029	1158	1286	1415	1544	1672	1800	1929

continued on next page



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Reamers

Cutting Speeds

Reamer Size		Feet per Minute														
Fract/Wire/ Letter	Decimal	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
		Revolutions per Minute														
#8	.1990	127	253	380	507	634	760	886	1013	1140	1267	1393	1520	1647	1773	1900
#7	.2010	125	251	376	502	627	752	878	1003	1129	1254	1379	1505	1630	1756	1881
#6	.2040	123	247	371	494	618	741	865	989	1112	1236	1360	1483	1606	1730	1854
#5	.2055	123	246	368	491	614	736	859	981	1104	1227	1350	1472	1595	1717	1840
#4	.2090	121	241	362	482	603	724	845	965	1086	1206	1327	1447	1568	1690	1809
#3	.2130	118	237	355	473	592	710	828	946	1065	1183	1303	1420	1538	1657	1775
#2	.2210	114	228	342	456	570	684	799	912	1026	1140	1255	1369	1483	1597	1711
#1	.2280	111	221	332	442	553	663	774	884	995	1106	1216	1327	1438	1548	1659
A	.2340	108	215	324	432	540	648	756	864	972	1080	1185	1293	1401	1508	1616
B	.2380	106	212	318	424	530	636	742	847	954	1059	1165	1271	1377	1483	1589
C	.2420	104	209	312	416	521	625	729	833	937	1041	1146	1250	1354	1459	1563
D	.2460	102	205	308	411	513	616	719	822	924	1027	1127	1230	1332	1435	1537
1/4	.2500	101	202	302	403	504	605	706	807	908	1008	1109	1210	1311	1412	1513
E	.2500	101	202	302	403	504	605	706	807	908	1008	1109	1210	1299	1412	1513
F	.2570	98	196	294	392	490	589	686	785	882	981	1079	1177	1275	1373	1471
G	.2610	96	193	290	386	483	579	676	772	869	966	1063	1159	1256	1352	1449
H	.2660	95	189	284	379	474	569	663	758	853	948	1043	1137	1232	1327	1422
I	.2720	92	185	278	371	463	556	649	741	834	927	1020	1112	1205	1298	1390
J	.2770	91	182	273	364	455	546	637	728	819	910	1001	1092	1183	1274	1365
K	.2810	90	180	269	359	449	538	628	717	807	897	987	1076	1166	1256	1346
L	.2900	87	174	261	348	435	521	609	696	782	869	956	1043	1130	1217	1304
M	.2950	85	171	257	342	428	513	599	684	770	855	940	1026	1111	1197	1282
N	.3020	83	167	251	334	418	501	585	668	752	835	918	1002	1085	1169	1252
5/16	.3125	81	161	242	323	403	484	565	645	726	807	888	968	1049	1129	1210
O	.3160	80	160	240	319	399	479	558	638	718	798	878	957	1037	1117	1197
P	.3230	78	156	234	312	391	469	546	624	703	781	859	937	1014	1094	1171
Q	.3320	76	152	228	304	380	455	531	607	683	759	836	913	987	1063	1139
R	.3390	75	149	223	298	372	446	521	595	669	744	818	894	967	1041	1115
S	.3480	73	145	217	290	362	435	508	579	652	725	797	869	942	1014	1086
T	.3580	71	141	211	281	352	422	492	563	633	704	774	845	915	986	1056
U	.3680	69	137	205	274	343	411	480	548	616	685	754	822	890	959	1028
3/8	.3750	67	135	202	269	336	403	471	538	605	673	739	807	874	941	1008
V	.3770	67	134	201	267	335	401	468	535	602	669	735	805	869	936	1003
W	.3860	65	131	196	261	327	392	457	523	588	653	718	784	849	914	979
X	.3970	63	127	191	254	317	380	444	508	571	635	698	762	826	889	952
Y	.4040	63	125	187	249	312	374	437	499	562	624	686	749	811	874	936
Z	.4130	61	122	183	244	305	366	427	488	549	611	671	733	793	855	915
7/16	.4375	57	116	173	230	288	346	403	461	519	576	634	692	749	807	865
1/2	.5000	50	101	151	202	252	302	353	403	454	504	554	605	655	706	756
5/8	.6250	40	81	121	161	202	242	282	323	363	403	444	484	524	565	605
3/4	.7500	34	67	101	134	168	202	236	269	302	336	370	403	437	471	504
7/8	.8750	29	57	86	116	144	173	202	230	259	288	317	346	375	403	432
1	1.0000	25	50	76	101	126	151	176	202	227	252	277	302	328	353	378
1-1/8	1.1250	22	45	67	90	112	135	157	180	202	224	246	269	291	314	336
1-1/4	1.2500	20	40	61	81	101	121	141	161	182	202	222	242	262	282	302
1-3/8	1.3750	18	37	55	73	92	110	128	147	165	183	202	220	238	257	275
1-1/2	1.5000	17	34	50	67	84	101	117	135	151	168	185	202	218	236	252
1-5/8	1.6250	16	31	46	62	77	93	109	124	140	155	171	186	202	217	233
1-3/4	1.7500	15	29	43	57	72	86	101	116	129	144	158	173	187	202	216
1-7/8	1.8750	13	27	40	53	67	81	94	108	121	135	148	161	175	188	202
2	2.0000	13	25	38	50	63	76	88	101	114	126	139	151	164	176	189
2-1/4	2.2500	11	22	34	45	56	67	79	90	101	112	123	135	146	157	168
2-1/2	2.5000	10	20	30	40	50	61	71	81	90	101	111	121	131	141	151
2-3/4	2.7500	9	18	28	37	46	55	64	73	83	92	101	110	119	128	137
3	3.0000	9	17	25	34	42	50	59	67	76	84	92	101	110	117	126

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Other Tools
Contents

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX



Style Number	Description	Page Number
Other tools		
209SF	Countersink, single-flute	130
213	Countersink, three-flute	130
217	Drill and countersink, plain type	131
217B	Drill and countersink, bell type	131
165	Drill blanks	132-134
800	Screw extractors	135
100C	Drill drifts	136
100D	Reducing sleeves	136
N/A	Drill Set Cases	136
Technical Information		
Enlarging Existing Holes		128
Countersinks		129
Using Screw Extractors to Remove Broken Screws and Bolts		129
Combined Drill and Countersinks		129
Drill Blanks		129

TECH TIP

ENLARGING EXISTING HOLES

Often, we become aware of avoidable injuries suffered from the improper use of cutting tools. One very common injury occurs from attempting to enlarge an existing hole with either one or successively larger drill bits to achieve the desired hole size. This injury is most common when using a portable electric, air or cordless drill. The problem occurs when a 2-fluted drill grabs and wedges itself in the existing hole and

the torque of the drill will pull it out of your closed hand. As the drill body continues to rotate at very high RPMs, it normally strikes the user on the hand and broken bones are the usual result. This happens very quickly and is very violent. Occasionally, if the power tool is large, like a 1/2" or 3/4" chuck capacity, an arm or leg bone can be easily broken.

Solution? Never attempt to enlarge an existing hole with a drill bit. To enlarge an existing hole, use only: a) a countersink in very thin gauge material; b) a core drill for enlarging to 60% of the hole diameter; or c) a reamer for very slight and precise hole enlarging.



Countersinks

Countersinks are multi-functional tools that can accomplish many more tasks than the obvious countersinking for screw heads. Countersinks can also be single fluted or multi-fluted. Tapping: A slightly countersunk hole will help the tap center in the hole.

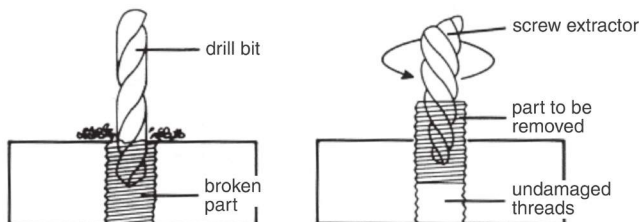
- Deburring: After drilling a hole use a countersink to clean up any unwanted burrs at the top or bottom of the hole.
- Enlarging holes: In very thin gauge material, a countersink can enlarge a pre-existing hole.
- Countersinking: When using flat head screws use the countersink to seat the screws.
- Centerdrill: Combination drill and countersinks are sometimes used to locate a precise hole location. The appropriate drill size then follows.

Tips for using countersinks:

- The pre-drilled hole for countersinking should not be less than 10% of the countersink diameter.
- Use single-flute countersinks for smaller holes; multi-flute tools countersink much larger holes.
- Run countersinks at 50% to 66% of recommended drill speeds.
- Single flute countersinks are used in portable and machine work at high speeds. These tools will countersink smaller holes because of the single flute. The hole should be no less than 10% of the countersink diameter.
- Multi-flute countersinks are also used in portable and machine work. They are free cutting and should be operated at 1/2 to 2/3 the speed of drills. They give much better finish than single flute.
- Machine countersinks are made with added shank length for use in lathes and screw machines.

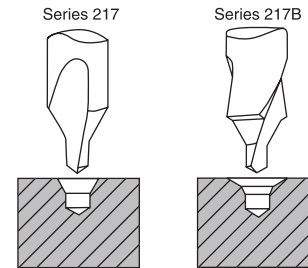
Using Screw Extractors to Remove Broken Screws and Bolts

- Drill a hole into the broken screw using the recommended drill size from the table above.
- Insert the proper screw extractor into the hole and start a counter-clockwise (left-hand) rotation using a tap wrench on the square on the shank.
- The extractor will grip the wall of the hole in the screw and back the screw out without damaging the threads.
- A penetrating oil can be helpful in removing rusty or corroded parts.



Combined Drill and Countersink: Plain or Bell Type?

- Combined drill and countersinks produce the center hole in a part to serve as the seat or bearing surface for the center on a machine.
- Plain type drill and countersinks, Chicago-Latrobe Series 217, will produce an ordinary 60° included angle center, which is satisfactory for most applications.
- Bell type drill and countersinks, C-L Series 217B are recommended for parts passing through several operations where there is a danger of marring the edges of the center hole, thereby destroying the accuracy of the center. They produce a 60° included angle center and bevel the outer edges to 120° included angle to prevent damage to the center hole. In addition, their use ensures proper width of the bearing surface.



Drill Blanks

- Drill and reamer blanks are ideal for use as drifts of dowel pins for gauging purpose, and for making punches.
- They can also be used for round tool bit, countersinks, boring, or burring tools.

Other Tools

Countersinks

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Single-Flute and Three-Flute Countersink Styles 209SF and 213

Features/Benefits:

- Designed to countersink, chamfer, deburr, and enlarge holes in sheet metal.
- Use single flute countersinks in holes too small for multi-flute countersinks. Use multi-flute countersinks in much larger size holes.
- Manufactured from premium high-speed steel.
- Single-flute available with 82° and 90° point angles; three-flute available with 82°, 90° and 100° point angles.
- Black finish with bright point.

Application Information:

- tool steel
- alloy steel
- cast iron
- Recommended for portable applications and machine work.
- Operate at high speeds and light feeds for best results.

Surface Treatment Information:

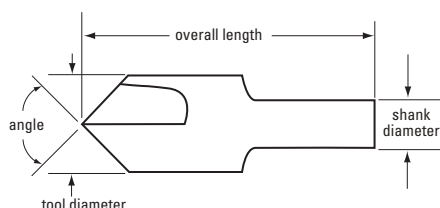
- Black oxide surface finish increases wear resistance and adds lubricity, improving chip flow.



Style 209SF Single-Flute



Style 213 Three-Flute



STYLE 209SF SINGLE-FLUTE — INCH SIZES

Fract	Diameter		Shank Diameter		Overall Length		Style 209SF	
	Decimal	mm	inch	mm	inch	mm	82° Angle	90° Angle
1/4	.2500	6.35	.1875	4.76	1.5000	38.10	56736	56756
3/8	.3750	9.53	.2500	6.35	1.7500	44.45	56738	56758
1/2	.5000	12.70	.2500	6.35	2.0000	50.80	56740	56760
3/4	.7500	19.05	.5000	12.70	2.6250	66.68	56744	56774
1	1.0000	25.40	.5000	12.70	2.7500	69.85	56748	56778

STYLE 213 THREE-FLUTE — INCH SIZES

Fract	Diameter		Shank Diameter		Overall Length		Shank Length		Style 213		
	Decimal	mm	inch	mm	inch	mm	inch	mm	82° Angle	90° Angle	100° Angle
1/4	.2500	6.35	.1875	4.76	1.5000	38.10	.7500	19.05	56836	56856	56876
3/8	.3750	9.53	.2500	6.35	1.7500	44.45	.8750	22.23	56838	56858	56878
1/2	.5000	12.70	.2500	6.35	2.0000	50.80	1.0000	25.40	56839	56859	56879
1/2	.5000	12.70	.3750	9.53	2.0000	50.80	1.0000	25.40	56840	56860	56880
5/8	.6250	15.88	.3750	9.53	2.2500	57.15	1.0000	25.40	56842	56862	56882
3/4	.7500	19.05	.5000	12.70	2.6250	66.68	1.2500	31.75	56844	56864	56884

INCH SET

Number of Tools	Size Range	Case Style	Style 213 82° Angle
5	1/4 - 3/4 X 1/8	plastic pouch	64216



Set 64216



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Combined Drill and Countersink — Plain and Bell Type Styles 217, 217B

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Features/Benefits:

- Designed to produce center hole that serves as the seat or bearing surface for center on a machine.
- Style 217 produces an ordinary 60° included angle center.
- Style 217B produces the same 60° included angle center and bevels the outer edges to 120° included angle.
- Manufactured from premium high-speed steel.
- Bright finish.

Application Information:

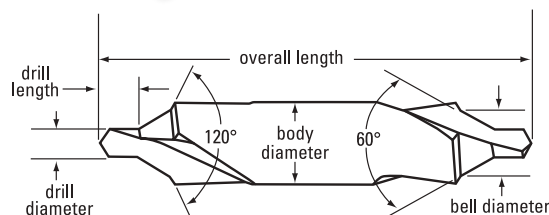
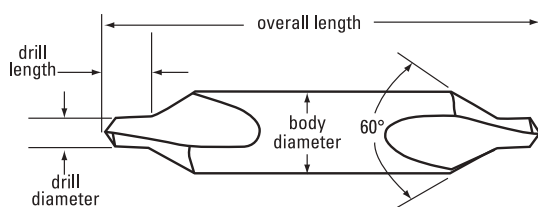
- carbon steel
- tool steel
- alloy steel
- cast iron
- Use Style 217 plain type for most applications.
- Use Style 217B bell type for parts passing through several operations where there is a danger of marring the edges of the center hole and destroying the accuracy of the center.



Style 217 Plain Type



Style 217B Bell Type



STYLE 217 PLAIN TYPE — INCH SIZES

Size Number	Drill Diameter			Body Diameter		Overall Length		Drill Length		Style 217 Plain Type
	Fract	Decimal	Metric	inch	mm	inch	mm	inch	mm	
#00	.025	.0250	0.64	.1250	3.18	1.2500	31.75	.0300	0.76	56699
#0	1/32	.0312	0.79	.1250	3.18	1.2500	31.75	.0380	0.97	56700
#1	3/64	.0469	1.19	.1250	3.18	1.2500	31.75	.0469	1.19	56701
#2	5/64	.0781	1.98	.1875	4.76	1.8750	47.63	.0781	1.98	56702
#3	7/64	.1094	2.78	.2500	6.35	2.0000	50.80	.1094	2.78	56703
#4	1/8	.1250	3.18	.3125	7.94	2.1250	53.98	.1250	3.18	56704
#5	3/16	.1875	4.76	.4375	11.11	2.7500	69.85	.1875	4.76	56705
#6	7/32	.2188	5.56	.5000	12.70	3.0000	76.20	.2188	5.56	56706
#7	1/4	.2500	6.35	.6250	15.88	3.2500	82.55	.2500	6.35	56707
#8	5/16	.3125	7.94	.7500	19.05	3.5000	88.90	.3125	7.94	56708

STYLE 217B BELL TYPE — INCH SIZES

Size Number	Drill Diameter			Bell Diameter		Body Diameter		Overall Length		Drill Length		Style 217B Bell Type
	Fract	Decimal	Metric	inch	mm	inch	mm	inch	mm	inch	mm	
#11	3/64	.0469	1.19	.1000	2.54	.1250	3.18	1.2500	31.75	.0469	1.19	56761
#12	1/16	.0625	1.59	.1500	3.81	.1875	4.76	1.8750	47.63	.0625	1.59	56762
#13	3/32	.0938	2.38	.2000	5.08	.2500	6.35	2.0000	50.80	.0938	2.38	56763
#14	7/64	.1094	2.78	.2500	6.35	.3125	7.94	2.1250	53.98	.1094	2.78	56764
#15	5/32	.1562	3.97	.3500	8.89	.4375	11.11	2.7500	69.85	.1562	3.97	56765
#16	3/16	.1875	4.76	.4000	10.16	.5000	12.70	3.0000	76.20	.1875	4.76	56766
#17	7/32	.2188	5.56	.5000	12.70	.6250	15.88	3.2500	82.55	.2188	5.56	56767
#18	1/4	.2500	6.35	.6000	15.24	.7500	19.05	3.5000	88.90	.2500	6.35	56768

INCH SETS

Number of Tools	Size Numbers	Case Style	Style 217 Plain Type	Style 217B Bell Type
5	#1, #2, #3, #4, #5	plastic pouch	56710	—
8	#1, #2, #3, #4, #5, #6, #7, #8	plastic pouch	69878	—
8	#11, #12, #13, #14, #15, #16, #17, #18	plastic pouch	—	69879



Set 56710

Other Tools

Blanks

Drill Blanks Style 165

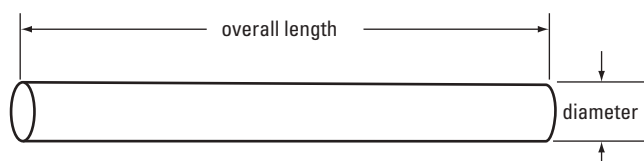
Features/Benefits:

- Manufactured from premium high-speed steel.
- Hardened and ground to a diameter tolerance of $+.0000$ to $-.0002$.
- Jobber length.
- Bright finish.

Application Information:

- alloy steel
- tool steel
- nickel alloys
- cobalt alloys

- Commonly used for the sizing of holes, diameter gages, punches, knockout pins or rollers, and as stock for small cutting tools.



Style 165 Bright Finish

INCH SIZES

Fract	Drill Diameter			Overall Length		Style 165 Bright
	Wire	Decimal	mm	inch	mm	
1/64	80	.0135	0.34	0.7500	19.05	46950
	79	.0145	0.37	0.7500	19.05	46949
		.0156	0.40	0.7500	19.05	46801
	78	.0160	0.41	0.8750	22.23	46948
	77	.0180	0.46	0.8750	22.23	46947
	76	.0200	0.51	0.8750	22.23	46946
	75	.0210	0.53	1.0000	25.40	46945
	74	.0225	0.57	1.0000	25.40	46944
	73	.0240	0.61	1.0000	25.40	46943
	72	.0250	0.64	1.1250	28.58	46942
1/32	71	.0260	0.66	1.2500	31.75	46941
	70	.0280	0.71	1.2500	31.75	46940
	69	.0292	0.74	1.3750	34.93	46939
	68	.0310	0.79	1.3750	34.93	46938
		.0313	0.79	1.3750	34.93	46802
	67	.0320	0.81	1.3750	34.93	46937
	66	.0330	0.84	1.3750	34.93	46936
	65	.0350	0.89	1.5000	38.10	46935
	64	.0360	0.91	1.5000	38.10	46934
	63	.0370	0.94	1.5000	38.10	46933
3/64	62	.0380	0.97	1.5000	38.10	46932
	61	.0390	0.99	1.6250	41.28	46931
	60	.0400	1.02	1.6250	41.28	46930
	59	.0410	1.04	1.6250	41.28	46929
	58	.0420	1.07	1.6250	41.28	46928
	57	.0430	1.09	1.7500	44.45	46927
	56	.0465	1.18	1.7500	44.45	46926
		.0469	1.19	1.7500	44.45	46803
	55	.0520	1.32	1.8750	47.63	46925
	54	.0550	1.40	1.8750	47.63	46924
1/16	53	.0595	1.51	1.8750	47.63	46923
		.0625	1.59	1.8750	47.63	46804
	52	.0635	1.61	1.8750	47.63	46922
	51	.0670	1.70	2.0000	50.80	46921

continued on next page

Drill Blanks (continued)
Style 165

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

INCH SIZES

Fract	Wire	Drill Diameter		Overall Length		Style 165 Bright
		Decimal	mm	inch	mm	
	50	.0700	1.78	2.0000	50.80	46920
	49	.0730	1.85	2.0000	50.80	46919
	48	.0760	1.93	2.0000	50.80	46918
5/64		.0781	1.98	2.0000	50.80	46805
	47	.0785	1.99	2.0000	50.80	46917
	46	.0810	2.06	2.1250	53.98	46916
	45	.0820	2.08	2.1250	53.98	46915
	44	.0860	2.18	2.1250	53.98	46914
	43	.0890	2.26	2.2500	57.15	46913
	42	.0935	2.37	2.2500	57.15	46912
3/32		.0938	2.38	2.2500	57.15	46806
	41	.0960	2.44	2.3750	60.33	46911
	40	.0980	2.49	2.3750	60.33	46910
	39	.0995	2.53	2.3750	60.33	46909
	38	.1015	2.58	2.5000	63.50	46908
	37	.1040	2.64	2.5000	63.50	46907
	36	.1065	2.71	2.5000	63.50	46906
7/64		.1094	2.78	2.6250	66.68	46807
	35	.1100	2.79	2.6250	66.68	46905
	34	.1110	2.82	2.6250	66.68	46904
	33	.1130	2.87	2.6250	66.68	46903
	32	.1160	2.95	2.7500	69.85	46902
	31	.1200	3.05	2.7500	69.85	46901
1/8		.1250	3.18	2.7500	69.85	46808
	30	.1285	3.26	2.7500	69.85	46900
	29	.1360	3.45	2.8750	73.03	46899
	28	.1405	3.57	2.8750	73.03	46898
9/64		.1406	3.57	2.8750	73.03	46809
	27	.1440	3.66	3.0000	76.20	46897
	26	.1470	3.73	3.0000	76.20	46896
	25	.1495	3.80	3.0000	76.20	46895
	24	.1520	3.86	3.1250	79.38	46894
	23	.1540	3.91	3.1250	79.38	46893
5/32		.1563	3.97	3.1250	79.38	46810
	22	.1570	3.99	3.1250	79.38	46892
	21	.1590	4.04	3.2500	82.55	46891
	20	.1610	4.09	3.2500	82.55	46890
	19	.1660	4.22	3.2500	82.55	46889
	18	.1695	4.31	3.2500	82.55	46888
11/64		.1719	4.37	3.2500	82.55	46811
	17	.1730	4.39	3.3750	85.73	46887
	16	.1770	4.50	3.3750	85.73	46886
	15	.1800	4.57	3.3750	85.73	46885
	14	.1820	4.62	3.3750	85.73	46884
	13	.1850	4.70	3.5000	88.90	46883
3/16		.1875	4.76	3.5000	88.90	46812
	12	.1890	4.80	3.5000	88.90	46882
	11	.1910	4.85	3.5000	88.90	46881
	10	.1935	4.91	3.6250	92.08	46880
	9	.1960	4.98	3.6250	92.08	46879
	8	.1990	5.05	3.6250	92.08	46878
	7	.2010	5.11	3.6250	92.08	46877

continued on next page

Other Tools Blanks

Drill Blanks (continued) Style 165

INCH SIZES

Fract	Wire	Drill Diameter		Overall Length		Style 165 Bright
		Decimal	mm	inch	mm	
13/64		.2031	5.16	3.6250	92.08	46813
	6	.2040	5.18	3.7500	95.25	46876
	5	.2055	5.22	3.7500	95.25	46875
	4	.2090	5.31	3.7500	95.25	46874
	3	.2130	5.41	3.7500	95.25	46873
7/32		.2188	5.56	3.7500	95.25	46814
	2	.2210	5.61	3.8750	98.43	46872
	1	.2280	5.79	3.8750	98.43	46871
	A	.2340	5.94	3.8750	98.43	46971
15/64		.2344	5.95	3.8750	98.43	46815
	B	.2380	6.05	4.0000	101.60	46972
	C	.2420	6.15	4.0000	101.60	46973
	D	.2460	6.25	4.0000	101.60	46974
1/4		.2500	6.35	4.0000	101.60	46816
	F	.2570	6.53	4.1250	104.78	46976
	G	.2610	6.63	4.1250	104.78	46977
17/64		.2656	6.75	4.1250	104.78	46817
	H	.2660	6.76	4.1250	104.78	46978
	I	.2720	6.91	4.1250	104.78	46979
	J	.2770	7.04	4.1250	104.78	46980
	K	.2810	7.14	4.2500	107.95	46981
9/32		.2813	7.14	4.2500	107.95	46818
	L	.2900	7.37	4.2500	107.95	46982
	M	.2950	7.49	4.3750	111.13	46983
19/64		.2969	7.54	4.3750	111.13	46819
	N	.3020	7.67	4.3750	111.13	46984
5/16		.3125	7.94	4.5000	114.30	46820
	O	.3160	8.03	4.5000	114.30	46985
	P	.3230	8.20	4.6250	117.48	46986
21/64		.3281	8.33	4.6250	117.48	46821
	Q	.3320	8.43	4.7500	120.65	46987
	R	.3390	8.61	4.7500	120.65	46988
11/32		.3438	8.73	4.7500	120.65	46822
	S	.3480	8.84	4.8750	123.83	46989
	T	.3580	9.09	4.8750	123.83	46990
23/64		.3594	9.13	4.8750	123.83	46823
	U	.3680	9.35	5.0000	127.00	46991
3/8		.3750	9.53	5.0000	127.00	46824
	V	.3770	9.58	5.0000	127.00	46992
	W	.3860	9.80	5.1250	130.18	46993
25/64		.3906	9.92	5.1250	130.18	46825
	X	.3970	10.08	5.1250	130.18	46994
	Y	.4040	10.26	5.2500	133.35	46995
13/32		.4063	10.32	5.2500	133.35	46826
	Z	.4130	10.49	5.2500	133.35	46996
27/64		.4219	10.72	5.3750	136.53	46827
7/16		.4375	11.11	5.5000	139.70	46828
29/64		.4531	11.51	5.6250	142.88	46829
15/32		.4688	11.91	5.7500	146.05	46830
31/64		.4844	12.30	5.8750	149.23	46831
1/2		.5000	12.70	6.0000	152.40	46832

INCH SETS IN METAL INDEX CASE

Number of Tools	Size Range	Style 165 Bright
29	1/16 - 1/2 X 1/64	57833
26	Letters A - Z	57832
60	#1 - #60 wire gauge	57831
20	#61 - #80 wire gauge	57830



Set 57833



Chicago-Latrobe®

Customer Service: 800.348.2885

Technical Support: 800.892.4281

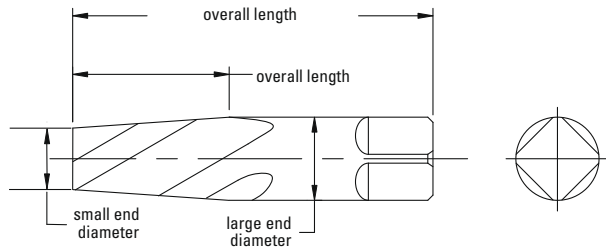
**Screw Extractors
Style 800**

Features/Benefits:

- Manufactured with alloy steel substrate.
- Bright finish.

Application Information:

- alloy steel
- tool steel
- low and medium carbon steel
- cast iron



Style 800 bright

INCH SIZES

Size Number	Small End Diameter		Large End Diameter		Overall Length		Flute Length		Use for these sizes bolts or screws		pipe	Recom Drill Size	Style 800 Bright
	inch	mm	inch	mm	inch	mm	inch	mm	in	mm	in		
1	.0625	1.59	.1562	3.97	2.0000	50.80	.7500	19.05	MS 8 to 1/4	2.5 to 6	—	5/64	65001
2	.0860	2.18	.1800	4.57	2.3750	60.33	.7500	19.05	MS 12 to 5/16	6 to 8	—	7/64	65003
3	.1250	3.18	.2500	6.35	2.7500	69.85	1.0000	25.40	5/16 to 7/16	8 to 12	—	5/32	65005
4	.1875	4.76	.3125	7.94	3.0000	76.20	1.0000	25.40	7/16 to 9/16	12 to 14	1/8	1/4	65007
5	.2500	6.35	.4375	11.11	3.3750	85.73	1.5000	38.10	9/16 to 3/4	14 to 20	1/8	17/64	65009
5 1/4	.3438	8.73	.5312	13.49	3.3750	85.73	1.5000	38.10	11/16 to 15/16	—	1/4	23/64	65011
6	.3750	9.53	.5938	15.08	3.7500	95.25	1.7500	44.45	3/4 to 1	—	3/8	13/32	65013
6 3/8	.4688	11.91	.6875	17.46	3.7500	95.25	1.6875	42.86	15/16 to 1 1/8	—	3/8	31/64	65015
7	.5000	12.70	.7812	19.84	4.1250	104.78	2.2500	57.15	1 to 1 3/8	24 to 35	—	17/32	65017
7 1/2	.5938	15.08	.8750	22.23	4.1250	104.78	2.2500	57.15	1 1/8 to 1 1/2	—	1/2	39/64	65019
8	.7500	19.05	1.0312	26.19	4.3750	111.13	2.2500	57.15	1 3/8 to 1 3/4	35 to 44	3/4	13/16	65021
9	1.0000	25.40	1.2812	32.54	4.6250	117.48	2.2500	57.15	1 3/4 to 2 1/8	44 to 54	1	1 1/16	65023
10	1.2500	31.75	1.5625	39.69	5.0000	127.00	2.5000	63.50	2 1/8 to 2 1/2	54 to 63	1 1/4	1 5/16	65025
11	1.5000	38.10	1.8750	47.63	5.6250	142.88	3.0000	76.20	2 1/2 to 3	63 to 76	1 1/2	1 9/16	65027
12	1.8438	46.83	2.2812	57.94	6.2500	158.75	3.5000	88.90	3 to 3 1/2	76 to 88	2	1 15/16	65029

INCH SETS

Number of Tools	Size Range	Case Style	Style 800 Bright
5	extractor numbers 1, 2, 3, 4, 5	pouch in tube	65035
6	extractor numbers 1, 2, 3, 4, 5, 6	pouch in tube	65036
9	extractor numbers 1, 2, 3, 4, 5, 6, 7, 8, 9	pouch only	65039
3	extractor numbers 4, 5, 6	tube only	65037
4	extractor numbers 5, 5 1/4, 6 3/8, 7 1/2	pouch in tube	65041
6	extractor numbers 5, 5 1/4, 6 3/8, 7 1/2, 8, 9	wood block	65042
4	extractor numbers 6, 7, 8, 9	wood block	65038
12	extractor numbers 1, 2, 3, 4, 5, 6; 150 drill sizes 5/64, 7/64, 5/32, 1/4, 17/64, 13/32	pouch only	65040
12	extractor numbers 1, 2, 3, 4, 5, 6; 550ASP drill sizes 5/64, 7/64, 5/32, 1/4, 17/64, 13/32	pouch only	65043



Set 65040

Other Tools

Drill Accessories

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Drill Drifts Style 100C

Features/Benefits:

- Used to safely drive taper shank tools from the holder or spindle.
- Manufactured from alloy steel.
- Bright finish.

INCH SIZES

Drift Size	Overall Length		Thickness		Width at Hole		Style 100C Bright
	inch	mm	Inch	mm	Inch	mm	
1	4.5000	114.30	.2031	5.16	.6875	17.46	57121
2	5.1250	130.18	.2500	6.35	.8125	20.64	57122
3	6.7500	171.45	.3125	7.94	1.0625	26.99	57123
4	7.1250	180.98	.4688	11.91	1.1250	28.58	57124
5	8.5000	215.90	.5980	15.19	1.3750	34.93	57125



Style 100C Bright

Reducing Sleeves Style 100D

Features/Benefits:

- Designed to allow a Morse taper spindle to use a taper shank tool with a smaller taper.
- Manufactured from alloy steel.
- Bright finish

MORSE TAPER SIZES

Tool Morse Taper (Inside) Size	Spindle Morse Taper (Outside) Size	Overall Length		Style 100D Bright
		mm	Inch	
No. 1	No. 2	3.5625	90.49	57000
No. 2	No. 3	4.4375	112.71	57004
No. 3	No. 4	5.3750	136.53	57007
No. 4	No. 5	6.6250	168.28	57009



Style 100D Bright

For Morse Taper shank specifications, see page 3.

Drill Set Cases (no drills)

Features/Benefits:

- Metal index cases.
- Use to build your own drill sets.

SIZES

Number of Drill Holes	Drill Size Range	Order Number
15	1/16 - 1/2 x 1/32	57803
21	1/16 - 3/8 x 1/64	57802
29	1/16 - 1/2 x 1/64	57804
26	Let A - Let Z	57808
60	#1 - #60	57806
20	#61 - #80	57805
25	1mm - 13mm x .5mm	57809
115	1/16 - 1/2 x 1/64, Let A - Let Z, #1 - #60	57810



115-piece Case Number 57810

Jobber Drill Sets High-Speed Steel and Cobalt

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

HIGH-SPEED STEEL SETS IN METAL INDEX CASES

No of Tools	Sizes in Set	Style	General Purpose			Left-Hand 150L Bright	Heavy-Duty				Parabolic
			150 Blk Oxide	150D Bright	150-TN TiN		150ASP Blk Oxide	150ASP-TN TiN	150ASP-TC TiCN	150ASP-TA TiAlN	150DH-TN TiN
Inch Sizes											
13	1/16 - 1/4 x 1/64		57711	49911			69847	41798	43638	42801	
15	1/16 - 1/2 x 1/32		57713	49913	69862	69881	69850	41797	43637	42800	
21	1/16 - 3/8 x 1/64		57712	49912		69882	69851	41799	43639		
29	1/16 - 1/2 x 1/64		57714	49914	69861	69876	45640	41800	43640		57734
26	Let A - Let Z		57718	49918	69883		45638	41801			
60	#1 - #60		57716	49916	69863		45639	41802			
20	#61 - #80		57720	57715	69897		45656	41803			
80	#1 - #80		57717								
115	1/16 - 1/2 x 1/64, Let A - Let Z, #1 - #60		57728	49928			45650	41804			
114	1/16 - 1/2 x 1/64, #1 - #60, 1mm - 13mm x .5mm		57726								
Metric Sizes											
11	1mm - 6mm x .5mm		57723								
13	1mm - 7mm x .5mm		57729								
25	1mm - 13mm x .5mm		57725				45925				
118	1mm - 13mm x .1mm		57727								

COBALT SETS IN METAL INDEX CASES

		Heavy-Duty		
		Style 550	550-TN	550ASP
No of Tools	Sizes in Set	Straw	TiN	Straw
Inch Sizes				
13	1/16 - 1/4 x 1/64	57851	69891	
15	1/16 - 1/2 x 1/32	57852	69871	47795
21	1/16 - 3/8 x 1/64	69887	69892	
29	1/16 - 1/2 x 1/64	57850	69870	47796
26	Let A - Let Z	69886		
60	#1 - #60	57853		
20	#61 - #80	45657		
115	1/16 - 1/2 x 1/64, Let A - Let Z, #1 - #60	46650		
Metric Sizes				
11	1mm - 6mm x .5mm	54126		
19	1mm - 10mm x .5mm			47924
25	1mm - 13mm x .5mm	54127		47925

JOBBER DRILL SETS STYLE SUMMARY

Drill Style	Material	Point	Finish	Description
150	HSS	118°	Black Oxide	General Purpose
150D	HSS	118°	Bright	General Purpose
150T	HSS	118°	TiN-coated	General Purpose
150L	HSS	118°	Bright	Left-Hand Spiral
150ASP	HSS	135° Split	Black Oxide	Heavy-duty
150ASP-TN	HSS	135° Split	TiN-coated	Heavy-duty
150ASP-TC	HSS	135° Split	TiCN-coated	Heavy-duty
150ASP-TA	HSS	135° Split	TiAlN-coated	Heavy-duty
150DHT	HSS	135° K-Notch	TiN-coated	Parabolic Deep-Hole
550	Cobalt	135° Split	Straw	Heavy-duty
2550	Cobalt	135° Split	TiN-coated	Heavy-duty
550ASP	Cobalt	135° Split	Straw	Heavy-duty



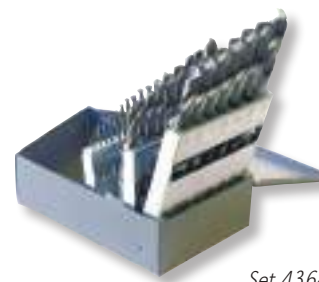
Set 57725



Set 69883



Set 47795



Set 43640

more sets on next page

Sets

Drill Sets

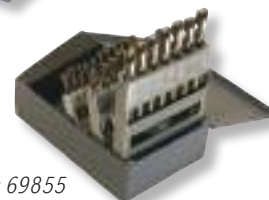
Screw Machine Length Drill Sets High-Speed Steel and Cobalt

SETS IN METAL INDEX CASES

		General Purpose	Heavy-Duty		Cobalt Heavy-Duty
Number of Tools	Sizes in Set	Style 157	Style 159	Style 159-TN	Style 559
		Bright	Black Oxide	TiN	Straw
Inch Sizes					
15	1/16 - 1/2 x 1/32		69889		69856
21	1/16 - 3/8 x 1/64		69852		
29	1/16 - 1/2 x 1/64	69900	57719	54128	69853
26	Let A - Let Z	69901			69855
60	#1 - #60	69902	69885		69854



Set 54128

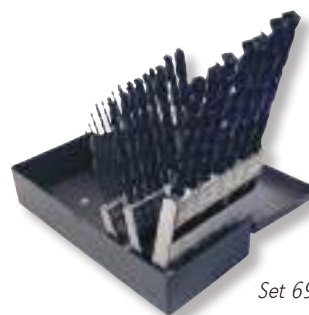


Set 69855

Long Length Drill Sets High-Speed Steel

SETS IN METAL INDEX OR PLASTIC CASES

Number of Tools	Sizes in Set	Case	General Purpose Taper Length	General Purpose 12" Overall Length
			Style 120 Black Oxide	Style 120X Black Oxide
Inch Sizes				
15	1/16 - 1/2 x 1/32	metal	69884	
25	1/8 - 1/2 x 1/64	plastic		69869
29	1/16 - 1/2 x 1/64	metal	69864	
60	#1 - #60	metal	69865	



Set 69864



Set 69869

Reduced Shank Drill Sets High-Speed Steel and Cobalt

SETS IN METAL INDEX OR PLASTIC CASES

			1/2" Shank High-Speed Steel		1/2" Shank Cobalt
Number of Tools	Sizes in Set	Case	Round Shanks	Flatted Shanks	Round Shanks
			Style 190	Style 190F	Style 190C
			Black Oxide	Black Oxide	Straw
Inch Sizes					
8	9/16 - 1 x 1/16	pouch	57840	69860	
8	9/16 - 1 x 1/16	metal index	69857	69859	69868
16	17/32 - 1 x 1/32	pouch	69890	69849	
33	1/2 - 1 x 1/64	metal stand	69858	69848	



Set 69859

1/4" Shank High-Speed Steel Style 239

Number of Tools	Sizes in Set	Case	Black Oxide
Inch Sizes			
5	1/4 - 1/2 x 1/16	metal index	56340

more sets on next page

Customer Service: 800.348.2885



Technical Support: 800.892.4281

Drill and Tap Sets Styles 150, 150-TN, 150D, 157 Drills

SETS IN METAL INDEX CASES

Number of Tools	Size Range	Set Number	Order No.
Inch Sizes			
18	Jobber Drill Style 150D, HSS, bright #36, #29, #25, #21, #7, F, 5/16, U, 27/64 Hand Taps, industrial-quality, HSS, plug chamfer 6-32NC, 8-32NC, 10-24NC, 10-32NF, 1/4-20NC, 5/16-18NC, 3/8-16NC, 7/16-14NC, 1/2-13NC	HT18	52580
18	Jobber Drill Style 150-TN, HSS, TiN-coated #36, #29, #25, #21, #7, F, 5/16, U, 27/64 Hand Taps, industrial-quality, HSS, plug chamfer 6-32NC, 8-32NC, 10-24NC, 10-32NF, 1/4-20NC, 5/16-18NC, 3/8-16NC, 7/16-14NC, 1/2-13NC	HT18T	52590
18	Jobber Drill Style 150D, HSS, bright #36, #29, #25, #21, #7, F, 5/16, U, 27/64 Spiral Point Taps, industrial-quality, HSS, plug chamfer 6-32NC, 8-32NC, 10-24NC, 10-32NF, 1/4-20NC, 5/16-18NC, 3/8-16NC, 7/16-14NC, 1/2-13NC	GT18	52581
36	Jobber Drill Style 150D, HSS, bright #36, #33, #29 (2 pcs), #25, #21, #16, #15, #7, #3, F, I, 5/16, Q, U, 25/64, 27/64, 39/64 Hand Taps, industrial-quality, HSS, plug chamfer 6-32NC, 6-40NF, 8-32NC, 8-36NF, 10-24NC, 10-32NF, 12-24NC, 12-28NF, 1/4-20NC, 1/4-28NF, 5/16-18NC, 5/16-24NF, 3/8-16NC, 3/8-24NF, 7/16-14NC, 7/16-20NF, 1/2-13NC, 1/2-20NF	HT36	55305
20	Screw Machine Length Drill Style 157, HSS, bright #44, #39, #36, #29, #25, #7, F, 5/16, U, 27/64 Hand Taps, industrial-quality, HSS, plug chamfer 4-40NC, 5-40NC, 6-32NC, 8-32NC, 10-24NC, 1/4-20NC, 5/16-18NC, 3/8-16NC, 7/16-14NC, 1/2-13NC	68	12910
Metric Sizes			
18	Jobber Drill Style 150, HSS, black oxide 2.05, 2.5, 2.9, 3.3, 4.2, 5.0, 6.7, 8.5, 10.2 Hand Taps, industrial-quality, HSS, plug chamfer M2.5x0.45, M3x0.5, M3.5x0.6, M4x0.7, M5x0.8, M6x1, M8x1.25, M10x1.5, M12x1.75	HM18	52541



Set HT18 52580



Set GT18 52581



Set HT36 55305

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

more sets on next page

Sets

Other Sets

DRILLS

Reamer Set
High-Speed Steel

SET IN PLASTIC POUCH

Number of Tools	Size Range	Style 4001 Bright
Inch Set		
29	1/16 - 1/2 X 1/64	C00964



Set C00964

REAMERS

Countersink Set
High-Speed Steel

SET IN PLASTIC POUCH

Number of Tools	Size Range	Style 213 82° Angle
Inch Set		
5	1/4 - 3/4 X 1/8	64216



Set 64216

OTHER TOOLS

Combined Drill and Countersink Sets
High-Speed Steel

SETS IN PLASTIC POUCH

Number of Tools	Size Numbers	Style 217 Plain Type	Style 217B Bell Type
Number Size Sets			
5	#1, #2, #3, #4, #5	56710	—
8	#1, #2, #3, #4, #5, #6, #7, #8	69878	—
8	#11, #12, #13, #14, #15, #16, #17, #18	—	69879



Set 56710

SETS

INDEX

more sets on next page

Drill Blank Sets
High-Speed Steel

SET IN METAL INDEX CASE

Number of Tools	Size Range	Style 165 Bright
Inch Set		
29	1/16 - 1/2 X 1/64	57833
26	Letters A - Z	57832
60	#1 - #60 wire gauge	57831
20	#61 - #80 wire gauge	57830



Set 57833

DRILLS

Screw Extractor Sets
Style 800

SETS IN PLASTIC POUCH

Number of Tools	Size Range	Style 800 Bright
5	extractor numbers 1, 2, 3, 4, 5	65035
6	extractor numbers 1, 2, 3, 4, 5, 6	65036
9	extractor numbers 1, 2, 3, 4, 5, 6, 7, 8, 9	65039
3	extractor numbers 4, 5, 6	65037
4	extractor numbers 5, 5 1/4, 6 3/8, 7 1/2	65041
6	extractor numbers 5, 5 1/4, 6 3/8, 7 1/2, 8, 9	65042
4	extractor numbers 6, 7, 8, 9	65038
12	extractor numbers 1, 2, 3, 4, 5, 6; 150 drill sizes 5/64, 7/64, 5/32, 1/4, 17/64, 13/32	65040
12	extractor numbers 1, 2, 3, 4, 5, 6; 550ASP drill sizes 5/64, 7/64, 5/32, 1/4, 17/64, 13/32	65043



Set 65038



Set 65040

REAMERS

OTHER TOOLS

SETS

INDEX

Index

Index by Order Number

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Order No.	Style No.	Page No.
11000	906	83
11001	906	83
11002	906	83
11003	906	83
11004	906	84
11005	906	84
11006	906	84
11007	906	84
11008	906	84
11009	906	84
11010	906	84
11011	906	84
11012	906	84
11013	906	84
11014	906	85
11016	906	85
11017	906	85
11018	906	85
11019	906	85
11020	906	85
11021	906	85
11022	906	85
11023	906	85
11024	906	85
11025	906	85
11026	906	85
11027	906	85
11028	906	85
11029	906	85
11030	906	85
11031	906	84
11032	906	84
11033	906	84
11034	906	84
11035	906	84
11036	906	84
11037	906	84
11038	906	84
11039	906	84
11040	906	84
11041	906	84
11042	906	84
11043	906	84
11044	906	84
11045	906	84
11046	906	84
11047	906	84
11048	906	84
11049	906	84
11050	906	84
11051	906	84
11052	906	84
11053	906	84
11054	906	84
11055	906	84
11056	906	84
11057	906	84
11058	906	84
11059	906	84
11060	906	84
11061	906	84
11062	906	84
11063	906	84
11064	906	84
11065	906	84
11066	906	84

Order No.	Style No.	Page No.
11067	906	84
11068	906	84
11069	906	84
11070	906	84
11071	906	84
11072	906	83
11073	906	83
11074	906	83
11075	906	83
11076	906	83
11077	906	83
11078	906	83
11079	906	83
11080	906	83
11081	906	83
11082	906	83
11083	906	83
11084	906	83
11085	906	83
11086	906	83
11087	906	83
11088	906	83
11089	906	83
11090	906	83
11095	912	83
11096	912	83
11097	912	83
11098	912	83
11099	912	84
11100	912	84
11101	912	84
11102	912	84
11103	912	84
11104	912	84
11105	912	84
11106	912	84
11107	912	84
11108	912	84
11109	912	85
11110	912	85
11111	912	85
11112	912	85
11113	912	85
11114	912	85
11115	912	85
11116	912	85
11117	912	85
11118	912	85
11119	912	85
11120	912	85
11121	912	85
11122	912	85
11123	912	85
11124	912	85
11125	912	84
11126	912	84
11127	912	84
11128	912	84
11129	912	84
11130	912	84
11131	912	84
11132	912	84
11133	912	84
11134	912	84
11135	912	84
11136	912	84

Order No.	Style No.	Page No.
11137	912	84
11138	912	84
11139	912	84
11140	912	84
11141	912	84
11142	912	84
11143	912	84
11144	912	84
11145	912	84
11146	912	84
11147	912	84
11148	912	84
11149	912	84
11150	912	84
11151	912	84
11152	912	84
11153	912	84
11154	912	84
11155	912	84
11156	912	84
11157	912	84
11158	912	84
11159	912	84
11160	912	84
11161	912	84
11162	912	84
11163	912	84
11164	912	84
11165	912	84
11166	912	83
11167	912	83
11168	912	83
11169	912	83
11170	912	83
11171	912	83
11172	912	83
11173	912	83
11174	912	83
11175	912	83
11176	912	83
11177	912	83
11178	912	83
11179	912	83
11180	912	83
11181	912	83
11182	912	83
11183	912	83
11184	912	83
11225	912	84
11228	912	85
11234	912	85
11241	912	85
11243	912	85
11255	906	84
11271	906	85
12910	68	139
41004	150WLP	45
41005	150WLP	45
41006	150WLP	45
41007	150WLP	45
41008	150WLP	46
41009	150WLP	46
41010	150WLP	46
41011	150WLP	46
41012	150WLP	46

Order No.	Style No.	Page No.
41013	150WLP	46
41014	150WLP	46
41015	150WLP	46
41016	150WLP	46
41017	150WLP	46
41018	150WLP	47
41019	150WLP	47
41020	150WLP	47
41021	150WLP	47
41022	150WLP	47
41023	150WLP	47
41024	150WLP	47
41025	150WLP	47
41026	150WLP	47
41027	150WLP	47
41028	150WLP	47
41029	150WLP	47
41030	150WLP	47
41031	150WLP	47
41032	150WLP	47
41071	150WLP	46
41072	150WLP	46
41073	150WLP	46
41074	150WLP	46
41075	150WLP	46
41076	150WLP	46
41077	150WLP	46
41078	150WLP	46
41079	150WLP	46
41080	150WLP	46
41081	150WLP	46
41082	150WLP	46
41083	150WLP	46
41084	150WLP	46
41085	150WLP	46
41086	150WLP	46
41087	150WLP	46
41088	150WLP	46
41089	150WLP	46
41090	150WLP	46
41091	150WLP	46
41092	150WLP	46
41093	150WLP	46
41094	150WLP	46
41095	150WLP	46
41096	150WLP	46
41097	150WLP	46
41098	150WLP	46
41099	150WLP	46
41100	150WLP	46
41101	150WLP	46
41102	150WLP	46
41103	150WLP	46
41104	150WLP	46
41105	150WLP	46
41106	150WLP	45
41107	150WLP	45
41108	150WLP	45
41109	150WLP	45
41110	150WLP	45
41111	150WLP	45
41112	150WLP	45
41113	150WLP	45
41114	150WLP	45
41115	150WLP	45
41116	150WLP	45

Order No.	Style No.	Page No.
41117	150WLP	45
41118	150WLP	45
41119	150WLP	45
41120	150WLP	45
41121	150WLP	45
41122	150WLP	45
41171	150WLP	46
41172	150WLP	46
41173	150WLP	46
41174	150WLP	46
41176	150WLP	46
41177	150WLP	46
41178	150WLP	47
41179	150WLP	47
41180	150WLP	47
41181	150WLP	47
41182	150WLP	47
41183	150WLP	47
41184	150WLP	47
41185	150WLP	47
41186	150WLP	47
41187	150WLP	47
41188	150WLP	47
41189	150WLP	47
41190	150WLP	47
41191	150WLP	47
41192	150WLP	47
41193	150WLP	47
41194	150WLP	47
41195	150WLP	47
41196	150WLP	47
41602	150ASP-TN	32
41603	150ASP-TN	32
41604	150ASP-TN	32
41605	150ASP-TN	32
41606	150ASP-TN	32
41607	150ASP-TN	33
41608	150ASP-TN	33
41609	150ASP-TN	33
41610	150ASP-TN	33
41611	150ASP-TN	33
41612	150ASP-TN	33
41613	150ASP-TN	34
41614	150ASP-TN	34
41615	150ASP-TN	34
41616	150ASP-TN	34
41617	150ASP-TN	34
41618	150ASP-TN	34
41619	150ASP-TN	34
41620	150ASP-TN	34
41621	150ASP-TN	35
41622	150ASP-TN	35
41623	150ASP-TN	35
41624	150ASP-TN	35
41625	150ASP-TN	35
41626	150ASP-TN	35
41627	150ASP-TN	35
41628	150ASP-TN	35
41629	150ASP-TN	35
41630	150ASP-TN	35
41631	150ASP-TN	35
41632	150ASP-TN	35
41671	150ASP-TN	34
41672	150ASP-TN	34
41673	150ASP-TN	34
41674	150ASP-TN	34



INDEX

Index

Index by Order Number

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.
43607	.150ASP-TC	33	43707	.150ASP-TC	32	44026	...150	15	44118	...150	12	44209	...150D	12
43608	.150ASP-TC	33	43708	.150ASP-TC	32	44027	...150	15	44119	...150	11	44210	...150D	13
43609	.150ASP-TC	33	43709	.150ASP-TC	32	44028	...150	15	44120	...150	11	44211	...150D	13
43610	.150ASP-TC	33	43710	.150ASP-TC	32	44029	...150	15	44121	...150	11	44212	...150D	13
43611	.150ASP-TC	33	43711	.150ASP-TC	32	44030	...150	15	44122	...150	11	44213	...150D	13
43612	.150ASP-TC	33	43712	.150ASP-TC	32	44031	...150	15	44123	...150	11	44214	...150D	13
43613	.150ASP-TC	34	43713	.150ASP-TC	32	44032	...150	15	44124	...150	11	44215	...150D	14
43614	.150ASP-TC	34	43714	.150ASP-TC	32	44033	...150	16	44125	...150	11	44216	...150D	14
43615	.150ASP-TC	34	43715	.150ASP-TC	32	44034	...150	16	44126	...150	11	44217	...150D	14
43616	.150ASP-TC	34	43716	.150ASP-TC	32	44035	...150	16	44127	...150	11	44218	...150D	14
43617	.150ASP-TC	34	43717	.150ASP-TC	32	44036	...150	16	44128	...150	11	44219	...150D	14
43618	.150ASP-TC	34	43718	.150ASP-TC	32	44037	...150	16	44129	...150	11	44220	...150D	14
43619	.150ASP-TC	34	43719	.150ASP-TC	32	44038	...150	16	44130	...150	11	44221	...150D	15
43620	.150ASP-TC	34	43720	.150ASP-TC	32	44039	...150	16	44131	...150	11	44222	...150D	15
43621	.150ASP-TC	35	43721	.150ASP-TC	32	44040	...150	16	44132	...150	11	44223	...150D	15
43622	.150ASP-TC	35	43722	.150ASP-TC	32	44041	...150	16	44133	...150	11	44224	...150D	15
43623	.150ASP-TC	35	43723	.150ASP-TC	34	44042	...150	16	44134	...150	11	44225	...150D	15
43624	.150ASP-TC	35	43724	.150ASP-TC	34	44043	...150	16	44135	...150	11	44226	...150D	15
43625	.150ASP-TC	35	43725	.150ASP-TC	34	44044	...150	16	44136	...150	11	44227	...150D	15
43626	.150ASP-TC	35	43726	.150ASP-TC	34	44071	...150	14	44137	...150	11	44228	...150D	15
43627	.150ASP-TC	35	43727	.150ASP-TC	34	44072	...150	14	44138	...150	11	44229	...150D	15
43628	.150ASP-TC	35	43728	.150ASP-TC	34	44073	...150	13	44139	...150	11	44230	...150D	15
43629	.150ASP-TC	35	43729	.150ASP-TC	34	44074	...150	13	44140	...150	11	44231	...150D	15
43630	.150ASP-TC	35	43730	.150ASP-TC	34	44075	...150	13	44141	...150	11	44232	...150D	15
43631	.150ASP-TC	35	43731	.150ASP-TC	34	44076	...150	13	44142	...150	10	44233	...150D	16
43632	.150ASP-TC	35	43732	.150ASP-TC	34	44077	...150	13	44143	...150	10	44234	...150D	16
43637	.150ASP-TC 35, 137		43782	.150ASP-TC	34	44078	...150	13	44144	...150	10	44235	...150D	16
43638	.150ASP-TC 35, 137		43783	.150ASP-TC	34	44079	...150	13	44145	...150	10	44236	...150D	16
43639	.150ASP-TC 35, 137		43784	.150ASP-TC	34	44080	...150	13	44146	...150	10	44237	...150D	16
43640	.150ASP-TC 35, 137		43785	.150ASP-TC	35	44081	...150	13	44147	...150	10	44238	...150D	16
43671	.150ASP-TC	34	43786	.150ASP-TC	35	44082	...150	13	44148	...150	10	44239	...150D	16
43672	.150ASP-TC	34	43787	.150ASP-TC	35	44083	...150	13	44149	...150	10	44240	...150D	16
43673	.150ASP-TC	34	43788	.150ASP-TC	35	44084	...150	13	44150	...150	10	44241	...150D	16
43674	.150ASP-TC	34	43789	.150ASP-TC	35	44085	...150	13	44171	...150	14	44242	...150D	16
43675	.150ASP-TC	34	43790	.150ASP-TC	35	44086	...150	13	44172	...150	14	44243	...150D	16
43676	.150ASP-TC	34	43791	.150ASP-TC	35	44087	...150	13	44173	...150	14	44244	...150D	16
43677	.150ASP-TC	34	43792	.150ASP-TC	35	44088	...150	13	44174	...150	14	44271	...150D	14
43678	.150ASP-TC	34	43793	.150ASP-TC	35	44089	...150	13	44176	...150	14	44272	...150D	14
43679	.150ASP-TC	34	43794	.150ASP-TC	35	44090	...150	13	44177	...150	14	44273	...150D	13
43680	.150ASP-TC	34	43795	.150ASP-TC	35	44091	...150	13	44178	...150	14	44274	...150D	13
43681	.150ASP-TC	34	43796	.150ASP-TC	35	44092	...150	13	44179	...150	14	44275	...150D	13
43682	.150ASP-TC	33	44001	...150	10	44093	...150	13	44180	...150	14	44276	...150D	13
43683	.150ASP-TC	33	44002	...150	11	44094	...150	13	44181	...150	14	44277	...150D	13
43684	.150ASP-TC	33	44003	...150	11	44095	...150	13	44182	...150	14	44278	...150D	13
43685	.150ASP-TC	33	44004	...150	11	44096	...150	13	44183	...150	14	44279	...150D	13
43686	.150ASP-TC	33	44005	...150	12	44097	...150	13	44184	...150	14	44280	...150D	13
43687	.150ASP-TC	33	44006	...150	12	44098	...150	12	44185	...150	14	44281	...150D	13
43688	.150ASP-TC	33	44007	...150	12	44099	...150	12	44186	...150	14	44282	...150D	13
43689	.150ASP-TC	33	44008	...150	12	44100	...150	12	44187	...150	15	44283	...150D	13
43690	.150ASP-TC	33	44009	...150	12	44101	...150	12	44188	...150	15	44284	...150D	13
43691	.150ASP-TC	33	44010	...150	13	44102	...150	12	44189	...150	15	44285	...150D	13
43692	.150ASP-TC	33	44011	...150	13	44103	...150	12	44190	...150	15	44286	...150D	13
43693	.150ASP-TC	33	44012	...150	13	44104	...150	12	44191	...150	15	44287	...150D	13
43694	.150ASP-TC	33	44013	...150	13	44105	...150	12	44192	...150	15	44288	...150D	13
43695	.150ASP-TC	33	44014	...150	13	44106	...150	12	44193	...150	15	44289	...150D	13
43696	.150ASP-TC	33	44015	...150	14	44107	...150	12	44194	...150	15	44290	...150D	13
43697	.150ASP-TC	33	44016	...150	14	44108	...150	12	44195	...150	15	44291	...150D	13
43698	.150ASP-TC	33	44017	...150	14	44109	...150	12	44196	...150	15	44292	...150D	13
43699	.150ASP-TC	33	44018	...150	14	44110	...150	12	44201	...150D	10	44293	...150D	13
43700	.150ASP-TC	33	44019	...150	14	44111	...150	12	44202	...150D	11	44294	...150D	13
43701	.150ASP-TC	33	44020	...150	14	44112	...150	12	44203	...150D	11	44295	...150D	13
43702	.150ASP-TC	33	44021	...150	15	44113	...150	12	44204	...150D	12	44296	...150D	13
43703	.150ASP-TC	33	44022	...150	15	44114	...150	12	44205	...150D	12	44297	...150D	13
43704	.150ASP-TC	33	44023	...150	15	44115	...150	12	44206	...150D	12	44298	...150D	12
43705	.150ASP-TC	33	44024	...150	15	44116	...150	12	44207	...150D	12	44299	...150D	12
43706	.150ASP-TC	33	44025	...150	15	44117	...150	12	44208	...150D	12	44300	...150D	12



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Index by Order Number

Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.
44301	150D	12	44388	150D	15	44497	150L	26	44743	150ASP	31	44915	550-TA	39
44302	150D	12	44389	150D	15	44498	150L	26	44744	150ASP	31	44916	550-TA	39
44303	150D	12	44390	150D	15	44499	150L	26	44745	150ASP	31	44917	550-TA	39
44304	150D	12	44391	150D	15	44500	150L	26	44746	150ASP	31	44918	550-TA	39
44305	150D	12	44392	150D	15	44501	150L	26	44747	150ASP	31	44919	550-TA	39
44306	150D	12	44393	150D	15	44502	150L	26	44748	150ASP	31	44920	550-TA	39
44307	150D	12	44394	150D	15	44503	150L	26	44749	150ASP	31	44921	550-TA	39
44308	150D	12	44395	150D	15	44504	150L	26	44750	150ASP	31	44922	550-TA	39
44309	150D	12	44396	150D	15	44505	150L	26	44804	520	75	44923	550-TA	39
44310	150D	12	44402	150L	25	44506	150L	26	44805	520	75	44924	550-TA	39
44311	150D	12	44403	150L	25	44507	150L	26	44806	520	75	44925	550-TA	40
44312	150D	12	44404	150L	25	44508	150L	26	44807	520	75	44926	550-TA	40
44313	150D	12	44405	150L	25	44509	150L	26	44808	520	75	44927	550-TA	40
44314	150D	12	44406	150L	26	44510	150L	26	44809	520	75	44928	550-TA	40
44315	150D	12	44407	150L	26	44511	150L	26	44810	520	76	44929	550-TA	40
44316	150D	12	44408	150L	26	44512	150L	25	44811	520	76	44930	550-TA	40
44317	150D	12	44409	150L	26	44513	150L	25	44812	520	76	44931	550-TA	40
44318	150D	12	44410	150L	26	44514	150L	25	44813	520	76	44932	550-TA	40
44319	150D	11	44411	150L	26	44515	150L	25	44814	520	76	44945	550-TA	39
44320	150D	11	44412	150L	26	44516	150L	25	44815	520	76	44946	550-TA	39
44321	150D	11	44413	150L	26	44517	150L	25	44816	520	76	44947	550-TA	39
44322	150D	11	44414	150L	26	44518	150L	25	44817	520	76	44948	550-TA	39
44323	150D	11	44415	150L	26	44519	150L	25	44818	520	76	44950	550-TA	39
44324	150D	11	44416	150L	27	44520	150L	25	44819	520	76	44951	550-TA	39
44325	150D	11	44417	150L	27	44521	150L	25	44820	520	76	44952	550-TA	39
44326	150D	11	44418	150L	27	44522	150L	25	44821	520	76	44953	550-TA	39
44327	150D	11	44419	150L	27	44523	150L	25	44822	520	76	44954	550-TA	39
44328	150D	11	44420	150L	27	44524	150L	25	44823	520	76	44955	550-TA	39
44329	150D	11	44421	150L	27	44525	150L	25	44824	520	76	44956	550-TA	39
44330	150D	11	44422	150L	27	44526	150L	25	44825	520	76	44957	550-TA	39
44331	150D	11	44423	150L	27	44527	150L	25	44826	520	76	44958	550-TA	39
44332	150D	11	44424	150L	27	44528	150L	25	44827	520	76	44959	550-TA	39
44333	150D	11	44425	150L	27	44529	150L	25	44828	520	77	44960	550-TA	39
44334	150D	11	44426	150L	27	44530	150L	25	44829	520	77	44961	550-TA	39
44335	150D	11	44427	150L	27	44531	150L	25	44830	520	77	44962	550-TA	39
44336	150D	11	44428	150L	27	44532	150L	25	44831	520	77	44963	550-TA	39
44337	150D	11	44429	150L	27	44533	150L	25	44832	520	77	44964	550-TA	39
44338	150D	11	44430	150L	27	44534	150L	25	44851	520	76	44965	550-TA	39
44339	150D	11	44431	150L	27	44535	150L	25	44853	520	76	44966	550-TA	39
44340	150D	11	44432	150L	27	44536	150L	25	44857	520	76	44967	550-TA	40
44341	150D	11	44471	150L	26	44537	150L	25	44865	520	76	44968	550-TA	40
44342	150D	10	44472	150L	26	44538	150L	25	44866	520	76	44969	550-TA	40
44343	150D	10	44473	150L	26	44539	150L	25	44870	520	76	44970	550-TA	40
44344	150D	10	44474	150L	26	44601	150ASP	31	44871	520	76	44971	550-TA	39
44345	150D	10	44475	150L	26	44602	150ASP	32	44876	520	76	44972	550-TA	39
44346	150D	10	44476	150L	26	44603	150ASP	32	44877	520	76	44973	550-TA	39
44347	150D	10	44477	150L	26	44723	150ASP	32	44879	520	75	44974	550-TA	39
44348	150D	10	44478	150L	26	44724	150ASP	32	44880	520	75	44975	550-TA	39
44349	150D	10	44479	150L	26	44725	150ASP	32	44883	520	75	44976	550-TA	38
44350	150D	10	44480	150L	26	44726	150ASP	32	44886	520	75	44977	550-TA	38
44371	150D	14	44481	150L	26	44727	150ASP	32	44887	520	75	44978	550-TA	38
44372	150D	14	44482	150L	26	44728	150ASP	32	44888	520	75	44979	550-TA	38
44373	150D	14	44483	150L	26	44729	150ASP	32	44890	520	75	44980	550-TA	38
44374	150D	14	44484	150L	26	44730	150ASP	32	44902	550-TA	36	44981	550-TA	38
44376	150D	14	44485	150L	26	44731	150ASP	32	44903	550-TA	37	44982	550-TA	38
44377	150D	14	44486	150L	26	44732	150ASP	32	44904	550-TA	37	44983	550-TA	38
44378	150D	14	44487	150L	26	44733	150ASP	32	44905	550-TA	37	44984	550-TA	38
44379	150D	14	44488	150L	26	44734	150ASP	32	44906	550-TA	37	44985	550-TA	38
44380	150D	14	44489	150L	26	44735	150ASP	32	44907	550-TA	38	44986	550-TA	38
44381	150D	14	44490	150L	26	44736	150ASP	32	44908	550-TA	38	44987	550-TA	38
44382	150D	14	44491	150L	26	44737	150ASP	32	44909	550-TA	38	44988	550-TA	38
44383	150D	14	44492	150L	26	44738	150ASP	31	44910	550-TA	38	44989	550-TA	38
44384	150D	14	44493	150L	26	44739	150ASP	31	44911	550-TA	38	44990	550-TA	38
44385	150D	14	44494	150L	26	44740	150ASP	31	44912	550-TA	38	44991	550-TA	38
44386	150D	14	44495	150L	26	44741	150ASP	31	44913	550-TA	38	44992	550-TA	38
44387	150D	15	44496	150L	26	44742	150ASP	31	44914	550-TA	39	44993	550-TA	38

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Index

Index by Order Number

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.
44994	550-TA	38	45147	520	77	45293	150D	14	45372	150D	16	45695	150ASP	33
44995	550-TA	38	45149	520	77	45294	150D	14	45373	150D	16	45696	150ASP	33
44996	550-TA	38	45151	520	77	45295	150D	14	45374	150D	16	45697	150ASP	33
44997	550-TA	38	45223	150D	11	45296	150D	14	45375	150D	16	45698	150ASP	33
44998	550-TA	38	45224	150D	11	45297	150D	14	45376	150D	16	45699	150ASP	33
44999	550-TA	38	45225	150D	11	45299	150D	14	45377	150D	16	45700	150ASP	33
45000	550-TA	38	45226	150D	11	45300	150D	14	45378	150D	16	45701	150ASP	33
45001	550-TA	38	45227	150D	11	45301	150D	14	45604	150ASP	32	45702	150ASP	33
45002	550-TA	38	45228	150D	11	45302	150D	14	45605	150ASP	32	45703	150ASP	33
45003	550-TA	38	45229	150D	11	45303	150D	14	45606	150ASP	32	45704	150ASP	33
45004	550-TA	38	45230	150D	11	45305	150D	14	45607	150ASP	33	45705	150ASP	33
45005	550-TA	38	45231	150D	11	45306	150D	14	45608	150ASP	33	45706	150ASP	33
45006	550-TA	37	45232	150D	11	45307	150D	14	45609	150ASP	33	45707	150ASP	32
45007	550-TA	37	45233	150D	11	45308	150D	14	45610	150ASP	33	45708	150ASP	32
45008	550-TA	37	45234	150D	11	45309	150D	14	45611	150ASP	33	45709	150ASP	32
45009	550-TA	37	45235	150D	11	45311	150D	14	45612	150ASP	33	45710	150ASP	32
45010	550-TA	37	45236	150D	11	45312	150D	14	45613	150ASP	34	45711	150ASP	32
45011	550-TA	37	45237	150D	11	45313	150D	14	45614	150ASP	34	45712	150ASP	32
45012	550-TA	37	45238	150D	11	45314	150D	14	45615	150ASP	34	45713	150ASP	32
45013	550-TA	37	45239	150D	11	45315	150D	14	45616	150ASP	34	45714	150ASP	32
45014	550-TA	37	45240	150D	11	45317	150D	14	45617	150ASP	34	45715	150ASP	32
45015	550-TA	37	45241	150D	12	45318	150D	14	45618	150ASP	34	45716	150ASP	32
45016	550-TA	37	45242	150D	12	45319	150D	14	45619	150ASP	34	45717	150ASP	32
45017	550-TA	37	45243	150D	12	45320	150D	14	45620	150ASP	34	45718	150ASP	32
45018	550-TA	37	45244	150D	12	45321	150D	14	45621	150ASP	35	45719	150ASP	32
45019	550-TA	37	45245	150D	12	45323	150D	14	45622	150ASP	35	45720	150ASP	32
45020	550-TA	37	45246	150D	12	45324	150D	15	45623	150ASP	35	45721	150ASP	32
45021	550-TA	37	45247	150D	12	45325	150D	15	45624	150ASP	35	45722	150ASP	32
45022	550-TA	37	45248	150D	12	45326	150D	15	45625	150ASP	35	45771	150ASP	34
45050	520	75	45249	150D	12	45327	150D	15	45626	150ASP	35	45772	150ASP	34
45052	520	75	45250	150D	12	45329	150D	15	45627	150ASP	35	45773	150ASP	34
45055	520	75	45251	150D	12	45330	150D	15	45628	150ASP	35	45774	150ASP	34
45056	520	75	45252	150D	12	45331	150D	15	45629	150ASP	35	45776	150ASP	34
45057	520	75	45253	150D	12	45332	150D	15	45630	150ASP	35	45777	150ASP	34
45058	520	75	45254	150D	12	45333	150D	15	45631	150ASP	35	45778	150ASP	34
45060	520	75	45255	150D	12	45335	150D	15	45632	150ASP	35	45779	150ASP	34
45065	520	75	45257	150D	12	45336	150D	15	45638	150ASP	35, 137	45780	150ASP	34
45070	520	75	45258	150D	12	45337	150D	15	45639	150ASP	35, 137	45781	150ASP	34
45072	520	75	45259	150D	12	45338	150D	15	45640	150ASP	35, 137	45782	150ASP	34
45073	520	75	45260	150D	12	45339	150D	15	45650	150ASP	35, 137	45783	150ASP	34
45075	520	75	45261	150D	12	45341	150D	15	45656	150ASP	35, 137	45784	150ASP	34
45076	520	75	45263	150D	12	45342	150D	15	45657	550	40, 137	45785	150ASP	35
45080	520	76	45264	150D	12	45343	150D	15	45671	150ASP	34	45786	150ASP	35
45081	520	76	45265	150D	12	45344	150D	15	45672	150ASP	34	45787	150ASP	35
45082	520	76	45266	150D	12	45345	150D	15	45673	150ASP	34	45788	150ASP	35
45084	520	76	45267	150D	13	45346	150D	15	45674	150ASP	34	45789	150ASP	35
45085	520	76	45269	150D	13	45347	150D	15	45675	150ASP	34	45790	150ASP	35
45086	520	76	45270	150D	13	45348	150D	15	45676	150ASP	34	45791	150ASP	35
45088	520	76	45271	150D	13	45349	150D	15	45677	150ASP	34	45792	150ASP	35
45089	520	76	45272	150D	13	45354	150D	15	45678	150ASP	34	45793	150ASP	35
45090	520	76	45273	150D	13	45356	150D	15	45679	150ASP	34	45794	150ASP	35
45092	520	76	45275	150D	13	45357	150D	15	45680	150ASP	34	45795	150ASP	35
45093	520	76	45276	150D	13	45358	150D	15	45681	150ASP	34	45796	150ASP	35
45095	520	76	45277	150D	13	45359	150D	15	45682	150ASP	33	45800	150ASP	32
45100	520	76	45278	150D	13	45360	150D	15	45683	150ASP	33	45801	150ASP	32
45105	520	76	45279	150D	13	45361	150D	16	45684	150ASP	33	45802	150ASP	32
45108	520	76	45281	150D	13	45362	150D	16	45685	150ASP	33	45804	150ASP	32
45110	520	76	45282	150D	13	45363	150D	16	45686	150ASP	33	45805	150ASP	32
45115	520	76	45283	150D	13	45364	150D	16	45687	150ASP	33	45806	150ASP	32
45120	520	76	45284	150D	13	45365	150D	16	45688	150ASP	33	45807	150ASP	32
45125	520	76	45285	150D	13	45366	150D	16	45689	150ASP	33	45810	150ASP	32
45130	520	76	45287	150D	13	45367	150D	16	45690	150ASP	33	45811	150ASP	32
45135	520	76	45288	150D	13	45368	150D	16	45691	150ASP	33	45812	150ASP	32
45140	520	76	45289	150D	13	45369	150D	16	45692	150ASP	33	45813	150ASP	32
45143	520	76	45290	150D	13	45370	150D	16	45693	150ASP	33	45816	150ASP	32
45145	520	76	45291	150D	14	45371	150D	16	45694	150ASP	33	45817	150ASP	32



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Index by Order Number

Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.
45818...	150ASP	32	46015...	150B	20	46119...	150B	19	46272...	150C	23	46338...	150C	21
45819...	150ASP	32	46016...	150B	20	46120...	150B	19	46273...	150C	23	46339...	150C	21
45820...	150ASP	33	46017...	150B	20	46121...	150B	19	46274...	150C	23	46340...	150C	21
45821...	150ASP	33	46018...	150B	20	46122...	150B	19	46275...	150C	23	46341...	150C	21
45822...	150ASP	33	46019...	150B	20	46123...	150B	18	46276...	150C	23	46342...	150C	21
45823...	150ASP	33	46020...	150B	20	46124...	150B	18	46277...	150C	23	46343...	150C	21
45824...	150ASP	33	46021...	150B	20	46125...	150B	18	46278...	150C	23	46344...	150C	21
45825...	150ASP	33	46022...	150B	20	46126...	150B	18	46279...	150C	22	46345...	150C	21
45826...	150ASP	33	46023...	150B	20	46127...	150B	18	46280...	150C	22	46346...	150C	21
45828...	150ASP	33	46024...	150B	20	46128...	150B	18	46281...	150C	22	46347...	150C	21
45829...	150ASP	33	46025...	150B	20	46129...	150B	18	46282...	150C	22	46348...	150C	21
45832...	150ASP	33	46026...	150B	20	46130...	150B	18	46283...	150C	22	46349...	150C	21
45833...	150ASP	33	46027...	150B	20	46131...	150B	18	46284...	150C	22	46350...	150C	21
45834...	150ASP	33	46028...	150B	20	46132...	150B	18	46285...	150C	22	46430...	550	37
45835...	150ASP	33	46029...	150B	20	46133...	150B	18	46286...	150C	22	46433...	550	37
45836...	150ASP	33	46030...	150B	20	46134...	150B	18	46287...	150C	22	46434...	550	37
45838...	150ASP	33	46031...	150B	20	46135...	150B	18	46288...	150C	22	46435...	550	37
45839...	150ASP	33	46032...	150B	20	46136...	150B	18	46289...	150C	22	46436...	550	37
45841...	150ASP	33	46071...	150B	20	46137...	150B	18	46290...	150C	22	46437...	550	37
45842...	150ASP	34	46072...	150B	20	46138...	150B	18	46291...	150C	22	46438...	550	37
45843...	150ASP	34	46073...	150B	20	46139...	150B	18	46292...	150C	22	46440...	550	37
45845...	150ASP	34	46074...	150B	20	46140...	150B	18	46293...	150C	22	46442...	550	37
45846...	150ASP	34	46075...	150B	20	46141...	150B	18	46294...	150C	22	46443...	550	37
45849...	150ASP	34	46076...	150B	20	46142...	150B	18	46295...	150C	22	46444...	550	37
45850...	150ASP	34	46077...	150B	20	46143...	150B	18	46296...	150C	22	46445...	550	37
45851...	150ASP	34	46078...	150B	20	46144...	150B	18	46297...	150C	22	46446...	550	37
45852...	150ASP	34	46079...	150B	20	46145...	150B	18	46298...	150C	22	46448...	550	37
45855...	150ASP	34	46080...	150B	20	46146...	150B	18	46299...	150C	22	46450...	550	37
45856...	150ASP	34	46081...	150B	19	46147...	150B	18	46300...	150C	22	46452...	550	37
45857...	150ASP	34	46082...	150B	19	46148...	150B	18	46301...	150C	22	46453...	550	37
45859...	150ASP	34	46083...	150B	19	46149...	150B	18	46302...	150C	22	46454...	550	37
45860...	150ASP	34	46084...	150B	19	46150...	150B	18	46303...	150C	22	46455...	550	38
45861...	150ASP	34	46085...	150B	19	46176...	150B	20	46304...	150C	22	46456...	550	38
45862...	150ASP	34	46086...	150B	19	46179...	150B	20	46305...	150C	22	46457...	550	38
45863...	150ASP	34	46087...	150B	19	46187...	150B	20	46306...	150C	22	46458...	550	38
45864...	150ASP	34	46088...	150B	19	46191...	150B	20	46307...	150C	22	46459...	550	38
45865...	150ASP	34	46089...	150B	19	46204...	150C	21	46308...	150C	22	46460...	550	38
45870...	150ASP	34	46090...	150B	19	46205...	150C	22	46309...	150C	22	46461...	550	38
45875...	150ASP	35	46091...	150B	19	46206...	150C	22	46310...	150C	22	46462...	550	38
45880...	150ASP	35	46092...	150B	19	46207...	150C	22	46311...	150C	22	46463...	550	38
45885...	150ASP	35	46093...	150B	19	46208...	150C	22	46312...	150C	22	46464...	550	38
45890...	150ASP	35	46094...	150B	19	46209...	150C	22	46313...	150C	22	46466...	550	38
45895...	150ASP	35	46095...	150B	19	46210...	150C	22	46314...	150C	22	46467...	550	38
45896...	150ASP	35	46096...	150B	19	46211...	150C	22	46315...	150C	22	46468...	550	38
45897...	150ASP	35	46097...	150B	19	46212...	150C	22	46316...	150C	22	46469...	550	38
45899...	150ASP	35	46098...	150B	19	46213...	150C	23	46317...	150C	22	46471...	550	39
45900...	150ASP	35	46099...	150B	19	46214...	150C	23	46318...	150C	22	46472...	550	39
45902...	150ASP	35	46100...	150B	19	46215...	150C	23	46319...	150C	22	46473...	550	39
45904...	150ASP	35	46101...	150B	19	46216...	150C	23	46320...	150C	22	46474...	550	39
45905...	150ASP	35	46102...	150B	19	46217...	150C	23	46321...	150C	21	46475...	550	39
45925...	150ASP	35, 137	46103...	150B	19	46218...	150C	23	46322...	150C	21	46476...	550	39
45930...	150ASP	33	46104...	150B	19	46219...	150C	23	46323...	150C	21	46477...	550	39
45931...	150ASP	33	46105...	150B	19	46220...	150C	23	46324...	150C	21	46478...	550	39
46002...	150B	18	46106...	150B	19	46221...	150C	23	46325...	150C	21	46479...	550	39
46003...	150B	18	46107...	150B	19	46222...	150C	23	46326...	150C	21	46481...	550	39
46004...	150B	19	46108...	150B	19	46223...	150C	23	46327...	150C	21	46482...	550	39
46005...	150B	19	46109...	150B	19	46224...	150C	23	46328...	150C	21	46483...	550	39
46006...	150B	19	46110...	150B	19	46225...	150C	23	46329...	150C	21	46484...	550	39
46007...	150B	19	46111...	150B	19	46226...	150C	23	46330...	150C	21	46486...	550	39
46008...	150B	19	46112...	150B	19	46227...	150C	23	46331...	150C	21	46487...	550	39
46009...	150B	19	46113...	150B	19	46228...	150C	23	46332...	150C	21	46488...	550	40
46010...	150B	19	46114...	150B	19	46229...	150C	23	46333...	150C	21	46489...	550	40
46011...	150B	19	46115...	150B	19	46230...	150C	23	46334...	150C	21	46490...	550	40
46012...	150B	19	46116...	150B	19	46231...	150C	23	46335...	150C	21	46491...	550	40
46013...	150B	20	46117...	150B	19	46232...	150C	23	46336...	150C	21	46492...	550	40
46014...	150B	20	46118...	150B	19	46271...	150C	23	46337...	150C	21	46493...	550	40

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Index

Index by Order Number

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.
46495	550	40	46699	550	38	46786	550	39	46894	165	133	46981	165	134
46496	550	40	46700	550	38	46787	550	39	46895	165	133	46982	165	134
46497	550	40	46701	550	38	46788	550	39	46896	165	133	46983	165	134
46498	550	40	46702	550	38	46789	550	39	46897	165	133	46984	165	134
46499	550	40	46703	550	38	46790	550	39	46898	165	133	46985	165	134
46601	550	36	46704	550	38	46791	550	39	46899	165	133	46986	165	134
46602	550	36	46705	550	38	46792	550	40	46900	165	133	46987	165	134
46603	550	37	46706	550	37	46793	550	40	46901	165	133	46988	165	134
46604	550	37	46707	550	37	46794	550	40	46902	165	133	46989	165	134
46605	550	37	46708	550	37	46795	550	40	46903	165	133	46990	165	134
46606	550	37	46709	550	37	46796	550	40	46904	165	133	46991	165	134
46607	550	38	46710	550	37	46801	165	132	46905	165	133	46992	165	134
46608	550	38	46711	550	37	46802	165	132	46906	165	133	46993	165	134
46609	550	38	46712	550	37	46803	165	132	46907	165	133	46994	165	134
46610	550	38	46713	550	37	46804	165	132	46908	165	133	46995	165	134
46611	550	38	46714	550	37	46805	165	133	46909	165	133	46996	165	134
46612	550	38	46715	550	37	46806	165	133	46910	165	133	47210	150D	10
46613	550	38	46716	550	37	46807	165	133	46911	165	133	47211	150D	10
46614	550	39	46717	550	37	46808	165	133	46912	165	133	47212	150D	10
46615	550	39	46718	550	37	46809	165	133	46913	165	133	47213	150D	10
46616	550	39	46719	550	37	46810	165	133	46914	165	133	47214	150D	10
46617	550	39	46720	550	37	46811	165	133	46915	165	133	47215	150D	10
46618	550	39	46721	550	37	46812	165	133	46916	165	133	47216	150D	10
46619	550	39	46722	550	37	46813	165	134	46917	165	133	47217	150D	11
46620	550	39	46723	550	37	46814	165	134	46918	165	133	47218	150D	11
46621	550	39	46724	550	37	46815	165	134	46919	165	133	47219	150D	11
46622	550	39	46725	550	37	46816	165	134	46920	165	133	47220	150D	11
46623	550	39	46726	550	37	46817	165	134	46921	165	132	47221	150D	11
46624	550	39	46727	550	37	46818	165	134	46922	165	132	47222	150D	11
46625	550	40	46728	550	37	46819	165	134	46923	165	132	47223	150	11
46626	550	40	46729	550	37	46820	165	134	46924	165	132	47224	150	11
46627	550	40	46730	550	37	46821	165	134	46925	165	132	47225	150	11
46628	550	40	46731	550	37	46822	165	134	46926	165	132	47226	150	11
46629	550	40	46732	550	37	46823	165	134	46927	165	132	47227	150	11
46630	550	40	46733	550	37	46824	165	134	46928	165	132	47228	150	11
46631	550	40	46734	550	37	46825	165	134	46929	165	132	47229	150	11
46632	550	40	46735	550	36	46826	165	134	46930	165	132	47230	150	11
46650	550	40, 137	46736	550	36	46827	165	134	46931	165	132	47231	150	11
46671	550	39	46737	550	36	46828	165	134	46932	165	132	47232	150	11
46672	550	39	46738	550	36	46829	165	134	46933	165	132	47233	150	11
46673	550	39	46739	550	36	46830	165	134	46934	165	132	47234	150	11
46674	550	39	46740	550	36	46831	165	134	46935	165	132	47235	150	11
46675	550	39	46741	550	36	46832	165	134	46936	165	132	47236	150	11
46676	550	38	46742	550	36	46871	165	134	46937	165	132	47237	150	11
46677	550	38	46743	550	36	46872	165	134	46938	165	132	47238	150	11
46678	550	38	46744	550	36	46873	165	134	46939	165	132	47239	150	11
46679	550	38	46745	550	36	46874	165	134	46940	165	132	47240	150	11
46680	550	38	46746	550	36	46875	165	134	46941	165	132	47241	150	12
46681	550	38	46747	550	36	46876	165	134	46942	165	132	47242	150	12
46682	550	38	46748	550	36	46877	165	133	46943	165	132	47243	150	12
46683	550	38	46749	550	36	46878	165	133	46944	165	132	47244	150	12
46684	550	38	46750	550	36	46879	165	133	46945	165	132	47245	150	12
46685	550	38	46771	550	39	46880	165	133	46946	165	132	47246	150	12
46686	550	38	46772	550	39	46881	165	133	46947	165	132	47247	150	12
46687	550	38	46773	550	39	46882	165	133	46948	165	132	47248	150	12
46688	550	38	46774	550	39	46883	165	133	46949	165	132	47249	150	12
46689	550	38	46776	550	39	46884	165	133	46950	165	132	47250	150	12
46690	550	38	46777	550	39	46885	165	133	46971	165	134	47251	150	12
46691	550	38	46778	550	39	46886	165	133	46972	165	134	47252	150	12
46692	550	38	46779	550	39	46887	165	133	46973	165	134	47253	150	12
46693	550	38	46780	550	39	46888	165	133	46974	165	134	47254	150	12
46694	550	38	46781	550	39	46889	165	133	46976	165	134	47255	150	12
46695	550	38	46782	550	39	46890	165	133	46977	165	134	47257	150	12
46696	550	38	46783	550	39	46891	165	133	46978	165	134	47258	150	12
46697	550	38	46784	550	39	46892	165	133	46979	165	134	47259	150	12
46698	550	38	46785	550	39	46893	165	133	46980	165	134	47260	150	12



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Index by Order Number

Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.
47261	150	12	47341	150	15	47497	250AN	29	47656	550ASP-TN	44	47769	550ASP	42
47263	150	12	47342	150	15	47498	250AN	29	47657	550ASP-TN	44	47770	550ASP	42
47264	150	12	47343	150	15	47501	250AN	29	47658	550ASP-TN	44	47771	550ASP	42
47265	150	12	47344	150	15	47502	250AN	29	47704	550ASP	41	47772	550ASP	42
47266	150	12	47345	150	15	47504	250AN	29	47705	550ASP	41	47773	550ASP	42
47267	150	13	47346	150	15	47505	250AN	29	47706	550ASP	42	47774	550ASP	42
47269	150	13	47347	150	15	47506	250AN	29	47707	550ASP	42	47775	550ASP	42
47270	150	13	47348	150	15	47507	250AN	29	47708	550ASP	42	47776	550ASP	42
47271	150	13	47349	150	16	47508	250AN	29	47709	550ASP	42	47777	550ASP	41
47272	150	13	47354	150	15	47509	250AN	29	47710	550ASP	42	47778	550ASP	41
47273	150	13	47356	150	15	47510	250AN	29	47711	550ASP	43	47779	550ASP	41
47275	150	13	47357	150	15	47511	250AN	29	47712	550ASP	43	47780	550ASP	41
47276	150	13	47358	150	15	47513	250AN	29	47713	550ASP	43	47781	550ASP	41
47277	150	13	47359	150	15	47514	250AN	29	47714	550ASP	43	47782	550ASP	41
47278	150	13	47360	150	15	47515	250AN	29	47715	550ASP	43	47783	550ASP	41
47279	150	13	47361	150	16	47516	250AN	29	47716	550ASP	43	47784	550ASP	41
47281	150	13	47362	150	16	47517	250AN	29	47717	550ASP	43	47785	550ASP	41
47282	150	13	47363	150	16	47518	250AN	29	47718	550ASP	44	47786	550ASP	41
47283	150	13	47364	150	16	47519	250AN	29	47719	550ASP	44	47795	550ASP	44, 137
47284	150	13	47365	150	16	47520	250AN	29	47720	550ASP	44	47796	550ASP	44, 137
47285	150	13	47366	150	16	47521	250AN	29	47721	550ASP	44	47809	550ASP	43
47287	150	13	47367	150	16	47522	250AN	29	47722	550ASP	44	47820	550ASP	41
47288	150	13	47368	150	16	47523	250AN	29	47723	550ASP	44	47821	550ASP	41
47289	150	13	47369	150	16	47524	250AN	29	47724	550ASP	44	47822	550ASP	41
47290	150	13	47370	150	16	47525	250AN	29	47725	550ASP	44	47823	550ASP	41
47291	150	14	47371	150	16	47526	250AN	29	47726	550ASP	44	47824	550ASP	41
47293	150	14	47372	150	16	47527	250AN	29	47727	550ASP	44	47825	550ASP	41
47294	150	14	47373	150	16	47528	250AN	29	47728	550ASP	44	47826	550ASP	41
47295	150	14	47374	150	16	47529	250AN	29	47729	550ASP	44	47827	550ASP	41
47296	150	14	47375	150	16	47530	250AN	29	47730	550ASP	44	47828	550ASP	41
47297	150	14	47376	150	16	47531	250AN	30	47731	550ASP	44	47829	550ASP	41
47299	150	14	47377	150	16	47532	250AN	30	47732	550ASP	44	47830	550ASP	41
47300	150	14	47378	150	16	47533	250AN	30	47735	550ASP	43	47831	550ASP	41
47301	150	14	47458	250AN	28	47534	250AN	30	47736	550ASP	43	47832	550ASP	41
47302	150	14	47459	250AN	28	47535	250AN	30	47737	550ASP	43	47833	550ASP	42
47303	150	14	47462	250AN	28	47537	250AN	30	47738	550ASP	43	47834	550ASP	42
47305	150	14	47464	250AN	28	47550	250AN	28	47739	550ASP	43	47835	550ASP	42
47306	150	14	47465	250AN	28	47551	250AN	28	47740	550ASP	43	47836	550ASP	42
47307	150	14	47466	250AN	28	47552	250AN	28	47741	550ASP	43	47837	550ASP	42
47308	150	14	47467	250AN	28	47553	250AN	28	47742	550ASP	43	47838	550ASP	42
47309	150	14	47468	250AN	28	47554	250AN	28	47743	550ASP	43	47839	550ASP	42
47311	150	14	47469	250AN	28	47555	250AN	29	47744	550ASP	43	47840	550ASP	42
47312	150	14	47470	250AN	28	47556	250AN	29	47745	550ASP	43	47841	550ASP	42
47313	150	14	47471	250AN	28	47560	250AN	29	47746	550ASP	43	47842	550ASP	42
47314	150	14	47472	250AN	28	47561	250AN	29	47747	550ASP	43	47843	550ASP	42
47315	150	14	47473	250AN	28	47562	250AN	29	47748	550ASP	43	47844	550ASP	42
47317	150	14	47474	250AN	28	47563	250AN	29	47749	550ASP	43	47845	550ASP	42
47318	150	14	47475	250AN	28	47564	250AN	29	47750	550ASP	43	47846	550ASP	42
47319	150	14	47476	250AN	28	47565	250AN	29	47751	550ASP	43	47847	550ASP	42
47320	150	14	47477	250AN	28	47630	550ASP-TN	41	47752	550ASP	42	47848	550ASP	42
47321	150	14	47478	250AN	28	47631	550ASP-TN	41	47753	550ASP	42	47849	550ASP	42
47323	150	14	47479	250AN	28	47632	550ASP-TN	42	47754	550ASP	42	47850	550ASP	42
47324	150	15	47480	250AN	28	47633	550ASP-TN	42	47755	550ASP	42	47851	550ASP	42
47325	150	15	47481	250AN	28	47634	550ASP-TN	42	47756	550ASP	42	47852	550ASP	42
47326	150	15	47482	250AN	28	47635	550ASP-TN	42	47757	550ASP	42	47853	550ASP	42
47327	150	15	47483	250AN	29	47636	550ASP-TN	42	47758	550ASP	42	47854	550ASP	43
47329	150	15	47484	250AN	29	47637	550ASP-TN	42	47759	550ASP	42	47855	550ASP	43
47330	150	15	47485	250AN	29	47638	550ASP-TN	43	47760	550ASP	42	47856	550ASP	43
47331	150	15	47487	250AN	29	47640	550ASP-TN	43	47761	550ASP	42	47857	550ASP	43
47332	150	15	47488	250AN	29	47642	550ASP-TN	43	47762	550ASP	42	47858	550ASP	43
47333	150	15	47490	250AN	29	47644	550ASP-TN	44	47763	550ASP	42	47859	550ASP	43
47335	150	15	47491	250AN	29	47646	550ASP-TN	44	47764	550ASP	42	47860	550ASP	43
47336	150	15	47493	250AN	29	47648	550ASP-TN	44	47765	550ASP	42	47861	550ASP	43
47337	150	15	47494	250AN	29	47650	550ASP-TN	44	47766	550ASP	42	47862	550ASP	43
47338	150	15	47495	250AN	29	47652	550ASP-TN	44	47767	550ASP	42	47863	550ASP	43
47339	150	15	47496	250AN	29	47654	550ASP-TN	44	47768	550ASP	42	47864	550ASP	43

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Index

Index by Order Number

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.
47865	.550ASP	43	47969	.550ASP-TN	43	48240	159-TN	61	48419	159-TN	59	48557	157	55
47866	.550ASP	43	47970	.550ASP-TN	43	48241	159-TN	61	48420	159-TN	59	48558	157	55
47867	.550ASP	43	47971	.550ASP-TN	43	48242	159-TN	61	48421	159-TN	59	48559	157	55
47868	.550ASP	43	47972	.550ASP-TN	43	48243	159-TN	61	48422	159-TN	59	48560	157	55
47869	.550ASP	43	47975	.550ASP-TN	43	48244	159-TN	61	48423	159-TN	59	48561	157	55
47870	.550ASP	43	47977	.550ASP-TN	43	48245	159-TN	61	48424	159-TN	59	48562	157	55
47871	.550ASP	43	47978	.550ASP-TN	43	48246	159-TN	61	48425	159-TN	59	48563	157	55
47872	.550ASP	43	47980	.550ASP-TN	43	48247	159-TN	61	48426	159-TN	59	48564	157	55
47873	.550ASP	43	47981	.550ASP-TN	43	48248	159-TN	61	48427	159-TN	59	48568	157	55
47874	.550ASP	43	47982	.550ASP-TN	43	48249	159-TN	61	48428	159-TN	59	48572	157	55
47875	.550ASP	43	47985	.550ASP-TN	43	48250	159-TN	61	48429	159-TN	59	48576	157	55
47876	.550ASP	43	47987	.550ASP-TN	43	48251	159-TN	61	48430	159-TN	59	48580	157	55
47877	.550ASP	43	47988	.550ASP-TN	43	48252	159-TN	61	48503	157	52	48701	157	53
47878	.550ASP	43	47990	.550ASP-TN	43	48253	159-TN	61	48504	157	52	48702	157	53
47879	.550ASP	43	47994	.550ASP-TN	44	48254	159-TN	61	48505	157	52	48703	157	53
47880	.550ASP	43	47997	.550ASP-TN	44	48255	159-TN	61	48506	157	52	48704	157	53
47881	.550ASP	43	48001	.550ASP-TN	44	48256	159-TN	61	48507	157	53	48705	157	53
47882	.550ASP	44	48002	.550ASP-TN	44	48257	159-TN	61	48508	157	53	48706	157	53
47884	.550ASP	44	48005	.550ASP-TN	44	48371	159-TN	60	48509	157	53	48707	157	53
47885	.550ASP	44	48006	.550ASP-TN	44	48372	159-TN	60	48510	157	53	48708	157	53
47888	.550ASP	44	48009	.550ASP-TN	44	48373	159-TN	60	48511	157	53	48709	157	53
47889	.550ASP	44	48010	.550ASP-TN	44	48374	159-TN	60	48512	157	53	48710	157	53
47890	.550ASP	44	48011	.550ASP-TN	44	48375	159-TN	60	48513	157	53	48711	157	53
47892	.550ASP	44	48012	.550ASP-TN	44	48376	159-TN	60	48514	157	53	48712	157	53
47893	.550ASP	44	48013	.550ASP-TN	44	48377	159-TN	60	48515	157	53	48713	157	53
47894	.550ASP	44	48014	.550ASP-TN	44	48378	159-TN	60	48516	157	54	48714	157	53
47895	.550ASP	44	48015	.550ASP-TN	44	48379	159-TN	60	48517	157	54	48715	157	53
47897	.550ASP	44	48016	.550ASP-TN	44	48380	159-TN	60	48518	157	54	48716	157	53
47898	.550ASP	44	48202	159-TN	59	48381	159-TN	60	48519	157	54	48717	157	53
47899	.550ASP	44	48203	159-TN	59	48382	159-TN	60	48520	157	54	48718	157	53
47900	.550ASP	44	48204	159-TN	59	48383	159-TN	60	48521	157	54	48719	157	53
47905	.550ASP	44	48205	159-TN	59	48384	159-TN	60	48522	157	54	48720	157	53
47906	.550ASP	44	48206	159-TN	59	48385	159-TN	60	48523	157	54	48721	157	53
47908	.550ASP	44	48207	159-TN	60	48386	159-TN	60	48524	157	54	48722	157	53
47910	.550ASP	44	48208	159-TN	60	48387	159-TN	60	48525	157	54	48723	157	53
47911	.550ASP	44	48209	159-TN	60	48388	159-TN	60	48526	157	54	48724	157	53
47912	.550ASP	44	48210	159-TN	60	48389	159-TN	60	48527	157	54	48725	157	53
47913	.550ASP	44	48211	159-TN	60	48390	159-TN	60	48528	157	54	48726	157	53
47914	.550ASP	44	48212	159-TN	60	48391	159-TN	60	48529	157	54	48727	157	53
47915	.550ASP	44	48213	159-TN	60	48392	159-TN	60	48530	157	54	48728	157	53
47916	.550ASP	44	48214	159-TN	60	48393	159-TN	60	48531	157	54	48729	157	53
47917	.550ASP	44	48215	159-TN	60	48394	159-TN	60	48532	157	54	48730	157	53
47924	.550ASP	44, 137	48216	159-TN	61	48395	159-TN	60	48533	157	55	48731	157	53
47925	.550ASP	44, 137	48217	159-TN	61	48396	159-TN	60	48534	157	55	48732	157	53
47930	.550ASP-TN	41	48218	159-TN	61	48397	159-TN	60	48535	157	55	48733	157	53
47934	.550ASP-TN	41	48219	159-TN	61	48398	159-TN	60	48536	157	55	48734	157	53
47935	.550ASP-TN	41	48220	159-TN	61	48399	159-TN	60	48537	157	55	48735	157	53
47940	.550ASP-TN	41	48221	159-TN	61	48400	159-TN	60	48538	157	55	48736	157	53
47944	.550ASP-TN	42	48222	159-TN	61	48401	159-TN	60	48539	157	55	48737	157	53
47945	.550ASP-TN	42	48223	159-TN	61	48402	159-TN	60	48540	157	55	48738	157	53
47948	.550ASP-TN	42	48224	159-TN	61	48403	159-TN	60	48541	157	55	48739	157	53
47950	.550ASP-TN	42	48225	159-TN	61	48404	159-TN	60	48542	157	55	48740	157	53
47952	.550ASP-TN	42	48226	159-TN	61	48405	159-TN	60	48543	157	55	48741	157	52
47953	.550ASP-TN	42	48227	159-TN	61	48406	159-TN	60	48544	157	55	48742	157	52
47955	.550ASP-TN	42	48228	159-TN	61	48407	159-TN	60	48545	157	55	48743	157	52
47956	.550ASP-TN	42	48229	159-TN	61	48408	159-TN	60	48546	157	55	48744	157	52
47957	.550ASP-TN	42	48230	159-TN	61	48409	159-TN	60	48547	157	55	48745	157	52
47959	.550ASP-TN	42	48231	159-TN	61	48410	159-TN	60	48548	157	55	48746	157	52
47960	.550ASP-TN	42	48232	159-TN	61	48411	159-TN	60	48549	157	55	48747	157	52
47961	.550ASP-TN	42	48233	159-TN	60	48412	159-TN	59	48550	157	55	48748	157	52
47962	.550ASP-TN	42	48234	159-TN	61	48413	159-TN	59	48551	157	55	48749	157	52
47963	.550ASP-TN	42	48235	159-TN	61	48414	159-TN	59	48552	157	55	48750	157	52
47965	.550ASP-TN	43	48236	159-TN	61	48415	159-TN	59	48553	157	55	48751	157	52
47966	.550ASP-TN	43	48237	159-TN	61	48416	159-TN	59	48554	157	55	48752	157	52
47967	.550ASP-TN	43	48238	159-TN	61	48417	159-TN	59	48555	157	55	48753	157	52
47968	.550ASP-TN	43	48239	159-TN	61	48418	159-TN	59	48556	157	55	48754	157	52



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Index by Order Number

Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.
48755	157	52	49076	157L	57	49213	159	60	49392	159	60	49523	255AN	72
48756	157	52	49077	157L	57	49214	159	60	49393	159	60	49524	255AN	72
48757	157	52	49078	157L	57	49215	159	60	49394	159	60	49525	255AN	72
48758	157	52	49079	157L	57	49216	159	61	49395	159	60	49526	255AN	72
48759	157	52	49080	157L	57	49217	159	61	49396	159	60	49527	255AN	72
48760	157	52	49081	157L	57	49218	159	61	49397	159	60	49528	255AN	72
48801	157	53	49082	157L	57	49219	159	61	49398	159	60	49529	255AN	72
48802	157	53	49083	157L	57	49220	159	61	49399	159	60	49530	255AN	72
48803	157	54	49084	157L	57	49221	159	61	49400	159	60	49531	255AN	72
48804	157	54	49085	157L	57	49222	159	61	49401	159	60	49532	255AN	72
48806	157	54	49086	157L	57	49223	159	61	49402	159	60	49533	255AN	73
48807	157	54	49087	157L	57	49224	159	61	49403	159	60	49534	255AN	73
48808	157	54	49088	157L	57	49225	159	61	49404	159	60	49535	255AN	73
48809	157	54	49089	157L	57	49226	159	61	49405	159	60	49536	255AN	73
48810	157	54	49090	157L	57	49227	159	61	49406	159	60	49537	255AN	73
48811	157	54	49091	157L	57	49228	159	61	49407	159	60	49538	255AN	73
48812	157	54	49092	157L	57	49229	159	61	49408	159	60	49539	255AN	73
48813	157	54	49093	157L	57	49230	159	61	49409	159	60	49540	255AN	73
48814	157	54	49094	157L	57	49231	159	61	49410	159	60	49541	255AN	73
48815	157	54	49095	157L	57	49232	159	61	49411	159	60	49542	255AN	73
48816	157	54	49096	157L	57	49233	159	60	49412	159	59	49543	255AN	73
48817	157	54	49097	157L	57	49234	159	61	49413	159	59	49544	255AN	73
48818	157	54	49098	157L	57	49235	159	61	49414	159	59	49608	120F	74
48819	157	54	49099	157L	57	49236	159	61	49415	159	59	49609	120F	74
48820	157	54	49100	157L	57	49237	159	61	49416	159	59	49610	120F	74
48821	157	54	49101	157L	57	49238	159	61	49417	159	59	49611	120F	74
48822	157	54	49102	157L	57	49239	159	61	49418	159	59	49612	120F	74
48823	157	54	49103	157L	57	49240	159	61	49419	159	59	49613	120F	74
48824	157	54	49104	157L	57	49241	159	61	49420	159	59	49614	120F	74
48825	157	54	49105	157L	56	49242	159	61	49421	159	59	49615	120F	74
48826	157	54	49106	157L	56	49243	159	61	49422	159	59	49616	120F	74
48903	157L	56	49107	157L	56	49244	159	61	49423	159	59	49617	120F	74
48904	157L	56	49108	157L	56	49245	159	61	49424	159	59	49618	120F	74
48905	157L	56	49109	157L	56	49246	159	61	49425	159	59	49619	120F	74
48906	157L	56	49110	157L	56	49247	159	61	49426	159	59	49620	120F	74
48907	157L	56	49111	157L	56	49248	159	61	49427	159	59	49621	120F	74
48908	157L	57	49112	157L	56	49249	159	61	49428	159	59	49622	120F	74
48909	157L	57	49113	157L	56	49250	159	61	49429	159	59	49623	120F	74
48910	157L	57	49114	157L	56	49251	159	61	49430	159	59	49624	120F	74
48911	157L	57	49115	157L	56	49252	159	61	49490	90SPR	102	49626	120F	74
48912	157L	57	49116	157L	56	49253	159	61	49491	90SPR	102	49628	120F	74
48913	157L	57	49117	157L	56	49254	159	61	49492	90SPR	102	49630	120F	74
48914	157L	57	49118	157L	56	49255	159	61	49493	90SPR	102	49632	120F	74
48915	157L	57	49119	157L	56	49256	159	61	49494	90SPR	102	49633	120F	74
48916	157L	57	49120	157L	56	49257	159	61	49495	90SPR	102	49701	120	66
48917	157L	57	49121	157L	56	49371	159	60	49496	90SPS	102	49702	120	66
48918	157L	57	49122	157L	56	49372	159	60	49497	90SPS	102	49703	120	67
48919	157L	57	49123	157L	56	49373	159	60	49498	90SPS	102	49704	120	67
48920	157L	57	49124	157L	56	49374	159	60	49499	90SPS	102	49705	120	67
48921	157L	57	49125	157L	56	49375	159	60	49500	90SPS	102	49706	120	67
48922	157L	57	49126	157L	56	49376	159	60	49501	90SPS	102	49707	120	67
48923	157L	57	49127	157L	56	49377	159	60	49508	255AN	72	49708	120	67
48924	157L	57	49128	157L	56	49378	159	60	49509	255AN	72	49709	120	67
48925	157L	58	49129	157L	56	49379	159	60	49510	255AN	72	49710	120	67
48926	157L	58	49130	157L	56	49380	159	60	49511	255AN	72	49711	120	67
48927	157L	58	49202	159	59	49381	159	60	49512	255AN	72	49712	120	68
48928	157L	58	49203	159	59	49382	159	60	49513	255AN	72	49713	120	68
48929	157L	58	49204	159	59	49383	159	60	49514	255AN	72	49714	120	68
48930	157L	58	49205	159	59	49384	159	60	49515	255AN	72	49715	120	68
48931	157L	58	49206	159	59	49385	159	60	49516	255AN	72	49716	120	68
48932	157L	58	49207	159	60	49386	159	60	49517	255AN	72	49717	120	68
49071	157L	57	49208	159	60	49387	159	60	49518	255AN	72	49718	120	68
49072	157L	57	49209	159	60	49388	159	60	49519	255AN	72	49719	120	68
49073	157L	57	49210	159	60	49389	159	60	49520	255AN	72	49720	120	68
49074	157L	57	49211	159	60	49390	159	60	49521	255AN	72	49721	120	68
49075	157L	57	49212	159	60	49391	159	60	49522	255AN	72	49722	120	68

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Index

Index by Order Number

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.
49723	120	68	50108	120B	71	50306	120	68	50402	120	68	50571	120X	81
49724	120	68	50109	120B	71	50307	120	67	50403	120	68	50572	120X	81
49725	120	69	50110	120B	71	50308	120	67	50404	120	68	50580	120X	81
49726	120	69	50111	120B	71	50309	120	67	50406	120	68	50581	120X	81
49727	120	69	50112	120B	71	50310	120	67	50407	120	68	50585	120X	82
49728	120	69	50113	120B	71	50311	120	67	50408	120	68	50586	120X	82
49729	120	69	50114	120B	71	50312	120	67	50409	120	68	50591	120X	82
49730	120	69	50115	120B	71	50313	120	67	50410	120	68	50596	120X	82
49731	120	69	50116	120B	71	50314	120	67	50411	120	68	50602	120X	82
49732	120	69	50120	120B	71	50315	120	67	50412	120	68	50608	120X	82
49733	120	69	50124	120B	71	50316	120	67	50413	120	68	50613	120X	82
49734	120	69	50128	120B	71	50317	120	67	50414	120	68	50619	120X	82
49735	120	69	50132	120B	71	50318	120	67	50415	120	68	50624	120X	82
49736	120	69	50211	120B	71	50319	120	67	50416	120	68	50629	120X	82
49737	120	69	50213	120B	71	50320	120	67	50417	120	68	50634	120X	82
49738	120	69	50217	120B	71	50321	120	67	50418	120	68	50639	120X	82
49739	120	69	50218	120B	71	50322	120	67	50419	120	68	50644	120X	82
49740	120	69	50220	120B	71	50323	120	67	50420	120	68	50648	120X	82
49741	120	69	50221	120B	71	50324	120	67	50421	120	68	50654	120X	82
49742	120	69	50225	120B	71	50325	120	67	50422	120	68	50659	120X	82
49743	120	69	50226	120B	71	50326	120	67	50423	120	68	50717	120X	80
49744	120	69	50230	120B	71	50327	120	67	50424	120	69	50718	120X	80
49745	120	69	50231	120B	71	50328	120	67	50425	120	69	50719	120X	80
49746	120	69	50236	120B	71	50329	120	67	50426	120	69	50720	120X	80
49747	120	69	50237	120B	71	50330	120	67	50448	120X	80	50722	120X	80
49748	120	69	50239	120B	71	50331	120	67	50455	120X	80	50723	120X	80
49749	120	69	50240	120B	71	50332	120	67	50458	120X	80	50725	120X	80
49750	120	69	50241	120B	70	50333	120	67	50460	120X	80	50726	120X	80
49751	120	69	50242	120B	70	50334	120	67	50461	120X	80	50728	120X	80
49752	120	69	50243	120B	70	50335	120	67	50463	120X	80	50729	120X	80
49753	120	69	50245	120B	70	50336	120	67	50465	120X	80	50730	120X	80
49754	120	69	50246	120B	70	50337	120	67	50466	120X	80	50731	120X	80
49755	120	69	50247	120B	70	50338	120	67	50468	120X	80	50732	120X	80
49756	120	69	50248	120B	70	50339	120	67	50471	120X	80	50734	120X	81
49757	120	69	50249	120B	70	50340	120	67	50473	120X	80	50735	120X	81
49758	120	69	50250	120B	70	50341	120	67	50476	120X	80	50736	120X	81
49759	120	69	50251	120B	70	50342	120	67	50479	120X	80	50737	120X	81
49760	120	69	50252	120B	70	50343	120	67	50485	120X	81	50738	120X	81
49761	120	69	50253	120B	70	50344	120	67	50489	120X	81	50739	120X	81
49762	120	69	50254	120B	70	50345	120	67	50493	120X	81	50740	120X	81
49763	120	69	50255	120B	70	50346	120	67	50495	120X	81	50741	120X	81
49764	120	69	50256	120B	70	50347	120	67	50498	120X	81	50742	120X	81
49911	150D	17, 137	50257	120B	70	50348	120	67	50500	120X	81	50743	120X	81
49912	150D	17, 137	50258	120B	70	50349	120	66	50503	120X	81	50745	120X	81
49913	150D	17, 137	50259	120B	70	50350	120	66	50505	120X	81	50746	120X	81
49914	150D	17, 137	50260	120B	70	50351	120	66	50509	120X	81	50747	120X	81
49916	150D	17, 137	50261	120B	70	50352	120	66	50511	120X	81	50749	120X	81
49918	150D	17, 137	50263	120B	70	50353	120	66	50514	120X	81	50750	120X	81
49928	150D	17, 137	50264	120B	70	50354	120	66	50516	120X	81	50751	120X	81
50075	550	40	50265	120B	70	50355	120	66	50520	120X	81	50752	120X	81
50076	550	40	50270	120B	70	50356	120	66	50522	120X	81	50801	559	62
50077	550	40	50291	120	68	50357	120	66	50523	120X	81	50802	559	62
50078	550	40	50292	120	68	50358	120	66	50527	120X	81	50803	559	63
50079	550	40	50293	120	68	50359	120	66	50529	120X	81	50804	559	63
50080	550	40	50294	120	68	50360	120	66	50534	120X	81	50805	559	63
50081	550	40	50295	120	68	50361	120	66	50536	120X	81	50806	559	63
50082	550	40	50296	120	68	50362	120	66	50540	120X	81	50807	559	63
50083	550	40	50297	120	68	50363	120	66	50546	120X	81	50808	559	63
50084	550	40	50298	120	68	50364	120	66	50550	120X	81	50809	559	63
50085	550	40	50299	120	68	50365	120	66	50552	120X	81	50810	559	63
50086	550	40	50300	120	68	50366	120	66	50557	120X	81	50811	559	64
50103	120B	70	50301	120	68	50367	120	66	50558	120X	81	50812	559	64
50104	120B	70	50302	120	68	50368	120	66	50561	120X	81	50813	559	64
50105	120B	70	50303	120	68	50369	120	66	50563	120X	81	50814	559	64
50106	120B	70	50304	120	68	50370	120	66	50568	120X	81	50815	559	64
50107	120B	70	50305	120	68	50401	120	68	50570	120X	81	50816	559	64



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Index by Order Number

Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.
50817	559	64	50884	559	63	51819	559-TN	64	52487	190F	92	53126	110	86
50818	559	64	50885	559	63	51820	559-TN	64	52488	190F	92	53127	110	86
50819	559	64	50886	559	63	51821	559-TN	64	52489	190F	92	53128	110	86
50820	559	64	50887	559	63	51822	559-TN	64	52490	190F	92	53129	110	86
50821	559	64	50888	559	63	51823	559-TN	64	52491	190F	92	53130	110	86
50822	559	64	50889	559	63	51824	559-TN	64	52492	190F	92	53131	110	86
50823	559	64	50890	559	63	51825	559-TN	64	52493	190F	92	53132	110	86
50824	559	64	50891	559	63	51826	559-TN	64	52494	190F	92	53133	110	87
50825	559	64	50892	559	63	51827	559-TN	64	52495	190F	92	53134	110	87
50826	559	64	50893	559	63	51828	559-TN	64	52496	190F	92	53135	110	87
50827	559	64	50894	559	63	51829	559-TN	64	52541	HM18	139	53136	110	87
50828	559	64	50895	559	63	52432	190F	91	52580	HT18	139	53137	110	87
50829	559	64	50896	559	63	52433	190F	91	52581	GT18	139	53138	110	87
50830	559	64	50897	559	63	52434	190F	91	52590	HT18T	139	53139	110	87
50831	559	64	50898	559	63	52435	190F	91	52804	559-TA	62	53140	110	87
50832	559	64	50899	559	63	52436	190F	91	52805	559-TA	62	53141	110	87
50833	559	64	50900	559	63	52437	190F	91	52806	559-TA	63	53142	110	87
50835	559	64	50901	559	63	52438	190F	91	52807	559-TA	63	53143	110	87
50836	559	64	50902	559	62	52439	190F	91	52808	559-TA	63	53144	110	87
50837	559	64	50903	559	62	52440	190F	91	52809	559-TA	63	53145	110	87
50838	559	64	50904	559	62	52441	190F	91	52810	559-TA	63	53146	110	87
50839	559	64	50905	559	62	52442	190F	91	52811	559-TA	63	53147	110	87
50840	559	64	50906	559	62	52443	190F	91	52812	559-TA	63	53148	110	87
50841	559	64	50907	559	62	52444	190F	91	52813	559-TA	63	53149	110	87
50842	559	64	50908	559	62	52445	190F	91	52814	559-TA	64	53150	110	87
50843	559	64	50909	559	62	52446	190F	91	52815	559-TA	64	53151	110	87
50844	559	64	50910	559	62	52447	190F	91	52816	559-TA	64	53152	110	87
50845	559	64	50911	559	62	52448	190F	91	52817	559-TA	64	53153	110	87
50846	559	64	50912	559	62	52449	190F	92	52818	559-TA	64	53154	110	87
50847	559	64	50913	559	62	52450	190F	92	52819	559-TA	64	53155	110	87
50848	559	64	50914	559	62	52451	190F	92	52820	559-TA	64	53156	110	87
50849	559	64	50915	559	62	52452	190F	92	52821	559-TA	64	53157	110	87
50850	559	64	51347	110X	90	52453	190F	92	52822	559-TA	64	53158	110	87
50851	559	64	51361	110X	90	52454	190F	92	52823	559-TA	64	53159	110	87
50852	559	64	51371	110X	90	52455	190F	92	52824	559-TA	64	53160	110	87
50853	559	64	51375	110X	90	52456	190F	92	52825	559-TA	64	53162	110	87
50854	559	64	51379	110X	90	52457	190F	92	52826	559-TA	64	53163	110	87
50855	559	64	51386	110X	90	52458	190F	92	52827	559-TA	64	53164	110	87
50856	559	64	51390	110X	90	52459	190F	92	52828	559-TA	64	53165	110	87
50857	559	64	51395	110X	90	52460	190F	92	52829	559-TA	64	53166	110	87
50858	559	64	51400	110X	90	52461	190F	92	52830	559-TA	64	53168	110	87
50859	559	64	51404	110X	90	52462	190F	92	52831	559-TA	64	53172	110	87
50860	559	63	51413	110X	90	52463	190F	92	52832	559-TA	64	53176	110	87
50861	559	63	51423	110X	90	52464	190F	92	53020	510	89	53180	110	87
50862	559	63	51433	110X	90	52465	190F	92	53024	510	89	53184	110	87
50863	559	63	51439	110X	90	52466	190F	92	53028	510	89	53186	110	87
50864	559	63	51444	110X	90	52467	190F	92	53032	510	89	53188	110	87
50865	559	63	51456	110X	90	52468	190F	92	53036	510	89	53192	110	87
50866	559	63	51801	559-TN	62	52469	190F	92	53040	510	89	53194	110	87
50867	559	63	51802	559-TN	62	52470	190F	92	53041	510	89	53196	110	87
50868	559	63	51803	559-TN	63	52471	190F	92	53044	510	89	53200	110	87
50869	559	63	51804	559-TN	63	52472	190F	92	53108	110	86	53204	110	88
50870	559	63	51805	559-TN	63	52473	190F	92	53112	110	86	53208	110	88
50871	559	63	51806	559-TN	63	52474	190F	92	53113	110	86	53212	110	88
50872	559	63	51807	559-TN	63	52475	190F	92	53114	110	86	53216	110	88
50873	559	63	51808	559-TN	63	52476	190F	92	53115	110	86	53218	110	88
50874	559	63	51809	559-TN	63	52477	190F	92	53116	110	86	53220	110	88
50875	559	63	51810	559-TN	63	52478	190F	92	53117	110	86	53228	110	88
50876	559	63	51811	559-TN	64	52479	190F	92	53118	110	86	53280	110	88
50877	559	63	51812	559-TN	64	52480	190F	92	53119	110	86	53288	110	88
50878	559	63	51813	559-TN	64	52481	190F	92	53120	110	86	53310	110	86
50879	559	63	51814	559-TN	64	52482	190F	92	53121	110	86	53432	190C	94
50880	559	63	51815	559-TN	64	52483	190F	92	53122	110	86	53433	190C	94
50881	559	63	51816	559-TN	64	52484	190F	92	53123	110	86	53434	190C	94
50882	559	63	51817	559-TN	64	52485	190F	92	53124	110	86	53435	190C	94
50883	559	63	51818	559-TN	64	52486	190F	92	53125	110	86	53436	190C	94

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Index

Index by Order Number

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.
53437	190C	94	53877	150DH-TN	50	53955	150DH-TN	49	54046	550-TN	38	54121	550-TN	40
53438	190C	94	53879	150DH-TN	50	53956	150DH-TN	49	54047	550-TN	38	54122	550-TN	40
53439	190C	94	53880	150DH-TN	50	53957	150DH-TN	49	54048	550-TN	38	54123	550-TN	40
53440	190C	94	53881	150DH-TN	50	53958	150DH-TN	49	54049	550-TN	38	54124	550-TN	40
53441	190C	94	53882	150DH-TN	50	53959	150DH-TN	49	54050	550-TN	38	54125	550-TN	40
53442	190C	94	53883	150DH-TN	50	53960	150DH-TN	49	54051	550-TN	38	54126	550	40, 137
53443	190C	94	53884	150DH-TN	50	53961	150DH-TN	49	54052	550-TN	38	54127	550	40, 137
53444	190C	94	53885	150DH-TN	50	53962	150DH-TN	49	54053	550-TN	38	54128	159-TN	61, 138
53445	190C	94	53886	150DH-TN	50	53963	150DH-TN	48	54054	550-TN	38	55087	157-TN	52
53446	190C	94	53887	150DH-TN	50	53964	150DH-TN	48	54055	550-TN	38	55096	157-TN	52
53447	190C	94	53888	150DH-TN	50	53965	150DH-TN	48	54056	550-TN	39	55098	157-TN	52
53448	190C	94	53889	150DH-TN	50	53966	150DH-TN	48	54057	550-TN	39	55099	157-TN	53
53449	190C	95	53890	150DH-TN	50	53967	150DH-TN	48	54058	550-TN	39	55100	157-TN	53
53450	190C	95	53891	150DH-TN	50	53968	150DH-TN	48	54059	550-TN	39	55101	157-TN	53
53451	190C	95	53892	150DH-TN	50	53969	150DH-TN	48	54060	550-TN	39	55102	157-TN	53
53452	190C	95	53893	150DH-TN	50	53970	150DH-TN	48	54061	550-TN	39	55103	157-TN	53
53453	190C	95	53901	150DH-TN	49	53971	150DH-TN	48	54062	550-TN	39	55104	157-TN	53
53454	190C	95	53902	150DH-TN	49	53972	150DH-TN	48	54063	550-TN	39	55105	157-TN	53
53455	190C	95	53903	150DH-TN	49	53973	150DH-TN	48	54064	550-TN	39	55106	157-TN	53
53456	190C	95	53904	150DH-TN	49	53974	150DH-TN	48	54065	550-TN	39	55107	157-TN	53
53457	190C	95	53905	150DH-TN	49	53975	150DH-TN	48	54066	550-TN	39	55108	157-TN	54
53458	190C	95	53906	150DH-TN	49	53976	150DH-TN	48	54067	550-TN	40	55109	157-TN	54
53459	190C	95	53907	150DH-TN	49	53977	150DH-TN	48	54068	550-TN	40	55110	157-TN	54
53460	190C	95	53908	150DH-TN	49	53978	150DH-TN	48	54069	550-TN	40	55111	157-TN	54
53461	190C	95	53909	150DH-TN	49	53979	150DH-TN	48	54070	550-TN	40	55112	157-TN	54
53462	190C	95	53910	150DH-TN	49	53980	150DH-TN	48	54071	550-TN	40	55113	157-TN	54
53463	190C	95	53911	150DH-TN	50	53981	150DH-TN	48	54072	550-TN	40	55114	157-TN	54
53464	190C	95	53912	150DH-TN	50	54007	550-TN	37	54073	550-TN	40	55115	157-TN	54
53468	190C	95	53913	150DH-TN	50	54008	550-TN	37	54074	550-TN	40	55116	157-TN	54
53472	190C	95	53914	150DH-TN	50	54009	550-TN	37	54075	550-TN	37	55117	157-TN	54
53475	190C	95	53915	150DH-TN	50	54010	550-TN	38	54076	550-TN	37	55118	157-TN	54
53480	190C	95	53916	150DH-TN	50	54011	550-TN	38	54077	550-TN	37	55119	157-TN	54
53488	190C	95	53917	150DH-TN	50	54012	550-TN	39	54078	550-TN	37	55120	157-TN	54
53496	190C	95	53918	150DH-TN	50	54013	550-TN	39	54079	550-TN	37	55121	157-TN	54
53556	110S	87	53919	150DH-TN	50	54014	550-TN	39	54080	550-TN	37	55122	157-TN	54
53559	110S	87	53920	150DH-TN	50	54015	550-TN	39	54081	550-TN	37	55123	157-TN	54
53572	110S	87	53921	150DH-TN	50	54016	550-TN	38	54083	150DH-TN	48	55124	157-TN	54
53580	110S	87	53922	150DH-TN	50	54017	550-TN	38	54084	150DH-TN	48	55236	120DH-TN	78
53612	110S	88	53923	150DH-TN	50	54018	550-TN	38	54085	150DH-TN	48	55237	120DH-TN	78
53628	110S	88	53924	150DH-TN	50	54019	550-TN	38	54086	150DH-TN	48	55238	120DH-TN	78
53634	190C-TN	94	53925	150DH-TN	50	54020	550-TN	38	54087	550-TN	37	55239	120DH-TN	78
53636	190C-TN	94	53930	150DH-TN	49	54021	550-TN	38	54088	550-TN	37	55240	120DH-TN	78
53638	190C-TN	94	53931	150DH-TN	49	54022	550-TN	38	54089	550-TN	37	55241	120DH-TN	78
53640	190C-TN	94	53932	150DH-TN	49	54023	550-TN	38	54090	550-TN	37	55242	120DH-TN	78
53642	190C-TN	94	53933	150DH-TN	49	54024	550-TN	38	54091	550-TN	37	55243	120DH-TN	79
53644	190C-TN	94	53934	150DH-TN	49	54025	550-TN	38	54092	550-TN	37	55244	120DH-TN	79
53646	190C-TN	94	53935	150DH-TN	49	54026	550-TN	38	54101	550-TN	39	55245	120DH-TN	79
53648	190C-TN	94	53936	150DH-TN	49	54027	550-TN	38	54102	550-TN	39	55246	120DH-TN	79
53650	190C-TN	95	53937	150DH-TN	49	54028	550-TN	38	54103	550-TN	39	55247	120DH-TN	79
53652	190C-TN	95	53938	150DH-TN	49	54029	550-TN	38	54104	550-TN	39	55248	120DH-TN	79
53654	190C-TN	95	53939	150DH-TN	49	54030	550-TN	38	54105	550-TN	39	55249	120DH-TN	79
53656	190C-TN	95	53940	150DH-TN	49	54031	550-TN	38	54106	550-TN	39	55250	120DH-TN	79
53658	190C-TN	95	53941	150DH-TN	49	54032	550-TN	38	54107	550-TN	39	55251	120DH-TN	79
53660	190C-TN	95	53942	150DH-TN	49	54033	550-TN	38	54108	550-TN	39	55252	120DH-TN	79
53662	190C-TN	95	53943	150DH-TN	49	54034	550-TN	38	54109	550-TN	39	55253	120DH-TN	79
53664	190C-TN	95	53944	150DH-TN	49	54035	550-TN	38	54110	550-TN	39	55254	120DH-TN	79
53824	110S	86	53945	150DH-TN	49	54036	550-TN	38	54111	550-TN	39	55255	120DH-TN	79
53848	110S	87	53946	150DH-TN	49	54037	550-TN	38	54112	550-TN	39	55256	120DH-TN	79
53869	150DH-TN	49	53947	150DH-TN	49	54038	550-TN	38	54113	550-TN	39	55257	120DH-TN	79
53870	150DH-TN	49	53948	150DH-TN	49	54039	550-TN	38	54114	550-TN	39	55258	120DH-TN	79
53871	150DH-TN	49	53949	150DH-TN	49	54040	550-TN	38	54115	550-TN	39	55259	120DH-TN	79
53872	150DH-TN	49	53950	150DH-TN	49	54041	550-TN	38	54116	550-TN	39	55260	120DH-TN	79
53873	150DH-TN	49	53951	150DH-TN	49	54042	550-TN	38	54117	550-TN	39	55261	120DH-TN	79
53874	150DH-TN	49	53952	150DH-TN	49	54043	550-TN	38	54118	550-TN	39	55262	120DH-TN	79
53875	150DH-TN	49	53953	150DH-TN	49	54044	550-TN	38	54119	550-TN	39	55263	120DH-TN	79
53876	150DH-TN	49	53954	150DH-TN	49	54045	550-TN	38	54120	550-TN	39	55264	120DH-TN	79



Customer Service: 800.348.2885

Technical Support: 800.892.4281

Index by Order Number

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.
55265	120DH-TN	79	55489	190	92	57123	100C	136	64216	213	130	68850	120DH	79
55266	120DH-TN	79	55490	190	92	57124	100C	136	65001	800	135	68855	120DH	79
55267	120DH-TN	79	55491	190	92	57125	100C	136	65003	800	135	68856	120DH	79
55268	120DH-TN	79	55492	190	92	57204	150K	24	65005	800	135	68860	120DH	79
55269	120DH-TN	79	55493	190	92	57205	150K	24	65007	800	135	68861	120DH	78
55270	120DH-TN	79	55494	190	92	57206	150K	24	65009	800	135	68865	120DH	78
55271	120DH-TN	79	55495	190	92	57207	150K	24	65011	800	135	68866	120DH	78
55272	120DH-TN	79	55496	190	92	57208	150K	24	65013	800	135	68869	120DH	78
55305	HT36	139	56316	239	93	57209	150K	24	65015	800	135	68870	120DH	78
55432	190	91	56320	239	93	57210	150K	24	65017	800	135	68873	120DH	78
55433	190	91	56324	239	93	57211	150K	24	65019	800	135	68876	120DH	78
55434	190	91	56328	239	93	57212	150K	24	65021	800	135	68877	120DH	78
55435	190	91	56332	239	93	57213	150K	24	65023	800	135	68878	120DH	78
55436	190	91	56340	239	93, 138	57214	150K	24	65025	800	135	68880	120DH	78
55437	190	91	56699	217	131	57215	150K	24	65027	800	135	68881	120DH	78
55438	190	91	56700	217	131	57216	150K	24	65029	800	135	68904	150DH	48
55439	190	91	56701	217	131	57217	150K	24	65035	800	135, 141	68905	150DH	48
55440	190	91	56702	217	131	57218	150K	24	65036	800	135, 141	68906	150DH	48
55441	190	91	56703	217	131	57219	150K	24	65037	800	135, 141	68907	150DH	48
55442	190	91	56704	217	131	57220	150K	24	65038	800	135, 141	68908	150DH	49
55443	190	91	56705	217	131	57221	150K	24	65039	800	135, 141	68909	150DH	49
55444	190	91	56706	217	131	57222	150K	24	65040	800	135, 141	68910	150DH	49
55445	190	91	56707	217	131	57223	150K	24	65041	800	135, 141	68911	150DH	49
55446	190	91	56708	217	131	57224	150K	24	65042	800	135, 141	68912	150DH	49
55447	190	91	56710	217	131	57225	150K	24	65043	800	135, 141	68913	150DH	49
55448	190	91	56738	209SF	130	57226	150K	24	66736	209SF	130	68914	150DH	49
55449	190	92	56740	209SF	130	57227	150K	24	68804	120DH	78	68915	150DH	49
55450	190	92	56744	209SF	130	57228	150K	24	68805	120DH	78	68916	150DH	49
55451	190	92	56748	209SF	130	57229	150K	24	68806	120DH	78	68917	150DH	49
55452	190	92	56756	209SF	130	57230	150K	24	68807	120DH	78	68918	150DH	50
55453	190	92	56758	209SF	130	57231	150K	24	68808	120DH	78	68919	150DH	50
55454	190	92	56760	209SF	130	57232	150K	24	68809	120DH	78	68920	150DH	50
55455	190	92	56761	217B	131	57711	150	17, 137	68810	120DH	78	68921	150DH	50
55456	190	92	56762	217B	131	57712	150	17, 137	68811	120DH	79	68922	150DH	50
55457	190	92	56763	217B	131	57713	150	17, 137	68812	120DH	79	68923	150DH	50
55458	190	92	56764	217B	131	57714	150	17, 137	68813	120DH	79	68924	150DH	50
55459	190	92	56765	217B	131	57715	150D	17, 137	68814	120DH	79	68925	150DH	50
55460	190	92	56766	217B	131	57716	150	17, 137	68815	120DH	79	68926	150DH	50
55461	190	92	56767	217B	131	57717	150	17, 137	68816	120DH	79	68927	150DH	50
55462	190	92	56768	217B	131	57718	150	17, 137	68817	120DH	79	68928	150DH	50
55463	190	92	56774	209SF	130	57719	159	61, 138	68818	120DH	79	68929	150DH	50
55464	190	92	56778	209SF	130	57720	150	17, 137	68819	120DH	79	68930	150DH	50
55465	190	92	56836	213	130	57723	150	17, 137	68820	120DH	79	68931	150DH	50
55466	190	92	56838	213	130	57725	150	17, 137	68821	120DH	79	68932	150DH	50
55467	190	92	56839	213	130	57726	150	17, 137	68822	120DH	79	68970	150DH	49
55468	190	92	56840	213	130	57727	150	17, 137	68823	120DH	79	68971	150DH	49
55469	190	92	56842	213	130	57728	150	17, 137	68824	120DH	79	68972	150DH	49
55470	190	92	56844	213	130	57729	150	17, 137	68825	120DH	79	68973	150DH	49
55471	190	92	56856	213	130	57734	150DH-TN	50, 137	68826	120DH	79	68975	150DH	49
55472	190	92	56858	213	130	57802	CASE	136	68827	120DH	79	68976	150DH	49
55473	190	92	56859	213	130	57803	CASE	136	68828	120DH	79	68977	150DH	49
55474	190	92	56860	213	130	57804	CASE	136	68829	120DH	79	68978	150DH	49
55475	190	92	56862	213	130	57805	CASE	136	68830	120DH	79	68979	150DH	50
55476	190	92	56864	213	130	57806	CASE	136	68831	120DH	79	68980	150DH	50
55477	190	92	56876	213	130	57808	CASE	136	68832	120DH	79	68981	150DH	50
55478	190	92	56878	213	130	57809	CASE	136	68833	120DH	79	68982	150DH	50
55479	190	92	56879	213	130	57810	CASE	136	68834	120DH	79	68983	150DH	50
55480	190	92	56880	213	130	57830	165	134, 141	68835	120DH	79	68984	150DH	50
55481	190	92	56882	213	130	57831	165	134, 141	68836	120DH	79	68985	150DH	50
55482	190	92	56884	213	130	57832	165	134, 141	68837	120DH	79	68986	150DH	50
55483	190	92	57000	100D	136	57833	165	134, 141	68838	120DH	79	68987	150DH	50
55484	190	92	57004	100D	136	57840	190	93, 138	68839	120DH	79	68988	150DH	50
55485	190	92	57007	100D	136	57850	550	40, 137	68840	120DH	79	68989	150DH	50
55486	190	92	57009	100D	136	57851	550	40, 137	68843	120DH	79	68990	150DH	50
55487	190	92	57121	100C	136	57852	550	40, 137	68847	120DH	79	68991	150DH	50
55488	190	92	57122	100C	136	57853	550	40, 137	68849	120DH	79	68992	150DH	50

Index

Index by Order Number

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.
68993 ..	150DH	50	69858	190 ... 93, 138		70138... ..	150-TN	12	70224... ..	150-TN	15	70365 ..	150-TN	12
68994 ..	150DH	50	69859	190F... 93, 138		70139... ..	150-TN	12	70225 ..	150-TN	15	70366 ..	150-TN	12
69001 ..	150DH	49	69860	190F... 93, 138		70140... ..	150-TN	12	70226... ..	150-TN	15	70367 ..	150-TN	12
69002 ..	150DH	49	69861... ..	150-TN .. 17, 137		70141... ..	150-TN	12	70227... ..	150-TN	15	70368 ..	150-TN	12
69003 ..	150DH	49	69862	150-TN .. 17, 137		70142... ..	150-TN	12	70228... ..	150-TN	15	70369 ..	150-TN	12
69004 ..	150DH	49	69863	150-TN .. 17, 137		70143... ..	150-TN	12	70229 ..	150-TN	15	70370... ..	150-TN	12
69005 ..	150DH	49	69864	120... 69, 138		70144... ..	150-TN	12	70230 ..	150-TN	15	70371... ..	150-TN	12
69006 ..	150DH	49	69865	120... 69, 138		70145... ..	150-TN	12	70231... ..	150-TN	15	70372... ..	150-TN	12
69007 ..	150DH	49	69868	190C... 95, 138		70146... ..	150-TN	12	70232... ..	150-TN	15	70373... ..	150-TN	12
69008 ..	150DH	49	69869	120X... 82, 138		70147... ..	150-TN	12	70233 ..	150-TN	16	70374... ..	150-TN	12
69009 ..	150DH	49	69870... ..	550-TN .. 40, 137		70148... ..	150-TN	12	70234 ..	150-TN	16	70375... ..	150-TN	12
69010 ..	150DH	49	69871... ..	550-TN .. 40, 137		70149... ..	150-TN	11	70235 ..	150-TN	16	70376... ..	150-TN	12
69011... ..	150DH	49	69876... ..	150L... 27, 137		70150... ..	150-TN	11	70236 ..	150-TN	16	70377... ..	150-TN	13
69012... ..	150DH	49	69878... ..	217... 131		70151... ..	150-TN	11	70237... ..	150-TN	16	70378... ..	150-TN	13
69013... ..	150DH	49	69879... ..	217B... 131		70152... ..	150-TN	11	70238 ..	150-TN	16	70379... ..	150-TN	13
69014... ..	150DH	49	69881... ..	150L... 27, 137		70153... ..	150-TN	11	70239... ..	150-TN	16	70380 ..	150-TN	13
69015... ..	150DH	49	69882	150L... 27, 137		70154... ..	150-TN	11	70240 ..	150-TN	16	70381... ..	150-TN	13
69016... ..	150DH	49	69883 ..	150-TN .. 17, 137		70155... ..	150-TN	11	70241... ..	150-TN	16	70382 ..	150-TN	14
69017... ..	150DH	49	69884	120... 69, 138		70156... ..	150-TN	11	70242... ..	150-TN	16	70383 ..	150-TN	14
69018... ..	150DH	49	69885	159... 61, 138		70157... ..	150-TN	11	70243 ..	150-TN	16	70384 ..	150-TN	14
69019... ..	150DH	49	69886	550... 40, 137		70158... ..	150-TN	11	70244 ..	150-TN	16	70385 ..	150-TN	14
69020 ..	150DH	49	69887	550... 40, 137		70159... ..	150-TN	11	70301 ..	150-TN	14	70386 ..	150-TN	14
69021... ..	150DH	49	69890	190 ... 93, 138		70160... ..	150-TN	11	70302 ..	150-TN	14	70387... ..	150-TN	14
69022 ..	150DH	49	69891... ..	550-TN .. 40, 137		70161... ..	150-TN	11	70303 ..	150-TN	14	70388 ..	150-TN	14
69023 ..	150DH	49	69892 ..	550-TN .. 40, 137		70162... ..	150-TN	11	70304 ..	150-TN	14	70389 ..	150-TN	15
69024 ..	150DH	49	69897... ..	150-TN .. 17, 137		70163... ..	150-TN	11	70306 ..	150-TN	14	70390 ..	150-TN	15
69025 ..	150DH	49	69900	157... 55, 138		70164... ..	150-TN	11	70307 ..	150-TN	14	70391... ..	150-TN	15
69026 ..	150DH	49	69901	157... 55, 138		70165... ..	150-TN	11	70308 ..	150-TN	14	70392... ..	150-TN	15
69027 ..	150DH	49	69902	157... 55, 138		70166... ..	150-TN	11	70309 ..	150-TN	14	70393... ..	150-TN	15
69028 ..	150DH	49	70101... ..	150-TN	14	70167... ..	150-TN	11	70310... ..	150-TN	14	70394... ..	150-TN	15
69029 ..	150DH	49	70102... ..	150-TN	14	70168... ..	150-TN	11	70311... ..	150-TN	14	70395... ..	150-TN	15
69030 ..	150DH	49	70103... ..	150-TN	13	70169... ..	150-TN	11	70312... ..	150-TN	14	70396 ..	150-TN	15
69031... ..	150DH	49	70104 ..	150-TN	13	70170... ..	150-TN	11	70313... ..	150-TN	14	70397... ..	150-TN	15
69032 ..	150DH	49	70105... ..	150-TN	13	70171... ..	150-TN	11	70314... ..	150-TN	14	77645 ..	CTD	51
69033 ..	150DH	49	70106 ..	150-TN	13	70172... ..	150-TN	10	70315... ..	150-TN	14	77647... ..	CTD	51
69034 ..	150DH	48	70107... ..	150-TN	13	70173... ..	150-TN	10	70316... ..	150-TN	14	77649... ..	CTD	51
69035 ..	150DH	48	70108 ..	150-TN	13	70174... ..	150-TN	10	70317... ..	150-TN	15	77651... ..	CTD	51
69036 ..	150DH	48	70109... ..	150-TN	13	70175... ..	150-TN	10	70318... ..	150-TN	15	77653... ..	CTD	51
69037 ..	150DH	48	70110... ..	150-TN	13	70176... ..	150-TN	10	70319... ..	150-TN	15	77655... ..	CTD	51
69038 ..	150DH	48	70111... ..	150-TN	13	70177... ..	150-TN	10	70320... ..	150-TN	15	77657... ..	CTD	51
69039 ..	150DH	48	70112... ..	150-TN	13	70178... ..	150-TN	10	70321... ..	150-TN	15	77659... ..	CTD	51
69040 ..	150DH	48	70113... ..	150-TN	13	70179... ..	150-TN	10	70322... ..	150-TN	15	77661... ..	CTD	51
69041 ..	150DH	48	70114... ..	150-TN	13	70180... ..	150-TN	10	70323... ..	150-TN	15	77663... ..	CTD	51
69042 ..	150DH	48	70115... ..	150-TN	13	70201... ..	150-TN	10	70324... ..	150-TN	15	77665... ..	CTD	51
69043 ..	150DH	48	70116... ..	150-TN	13	70202... ..	150-TN	11	70325... ..	150-TN	15	77667... ..	CTD	51
69044 ..	150DH	48	70117... ..	150-TN	13	70203... ..	150-TN	11	70326... ..	150-TN	15	77669... ..	CTD	51
69045 ..	150DH	48	70118... ..	150-TN	13	70204... ..	150-TN	11	70331... ..	150-TN	11	78220... ..	790	101
69046 ..	150DH	48	70119... ..	150-TN	13	70205... ..	150-TN	12	70332... ..	150-TN	12	78221... ..	790	101
69047 ..	150DH	48	70120... ..	150-TN	13	70206... ..	150-TN	12	70333 ..	150-TN	12	78222... ..	790	101
69048 ..	150DH	48	70121... ..	150-TN	13	70207... ..	150-TN	12	70334 ..	150-TN	13	78223... ..	790	101
69049 ..	150DH	48	70122... ..	150-TN	13	70208... ..	150-TN	12	70335 ..	150-TN	13	78224... ..	790	101
69050 ..	150DH	48	70123... ..	150-TN	13	70209... ..	150-TN	12	70336 ..	150-TN	14	78225... ..	790	101
69051... ..	150DH	48	70124... ..	150-TN	13	70210... ..	150-TN	13	70337... ..	150-TN	14	78226... ..	790	101
69052 ..	150DH	48	70125... ..	150-TN	13	70211... ..	150-TN	13	70338 ..	150-TN	14	78227... ..	790	101
69339... ..	159... 61, 138		70126... ..	150-TN	13	70212... ..	150-TN	13	70339... ..	150-TN	15	78228... ..	790	101
69847 ..	150ASP... 35, 137		70127... ..	150-TN	13	70213... ..	150-TN	13	70340 ..	150-TN	15	78229... ..	790	101
69848 ..	190F... 93, 138		70128... ..	150-TN	12	70214... ..	150-TN	13	70341... ..	150-TN	15	78481 ...	780	100
69849 ..	190F... 93, 138		70129... ..	150-TN	12	70215... ..	150-TN	14	70342 ..	150-TN	15	78482 ...	780	100
69850 ..	150ASP... 35, 137		70130... ..	150-TN	12	70216... ..	150-TN	14	70343 ..	150-TN	16	78483 ...	780	100
69851... ..	150ASP... 35, 137		70131... ..	150-TN	12	70217... ..	150-TN	14	70344 ..	150-TN	11	78484 ...	780	100
69852	159... 61, 138		70132... ..	150-TN	12	70218... ..	150-TN	14	70345 ..	150-TN	11	78485 ...	780	100
69853	559 ... 65, 138		70133... ..	150-TN	12	70219... ..	150-TN	14	70346 ..	150-TN	11	78486 ...	780	100
69854	559 ... 65, 138		70134... ..	150-TN	12	70220... ..	150-TN	14	70347... ..	150-TN	11	78487 ...	780	100
69855	559 ... 65, 138		70135... ..	150-TN	12	70221... ..	150-TN	15	70348 ..	150-TN	11	78488 ...	780	100
69856	559 ... 65, 138		70136... ..	150-TN	12	70222... ..	150-TN	15	70349 ..	150-TN	11	78489 ...	780	100
69857	190 ... 93, 138		70137... ..	150-TN	12	70223 ..	150-TN	15	70364 ..	150-TN	11	78490 ...	780	100



Customer Service: 800.348.2885

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Index by Order Number

Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.	Order No.	Style No.	Page No.
78491	780	100	78591	769	98	78680	759	96	C24233	650	123	C25079	4001	113
78492	780	100	78592	769	99	78681	759	96	C24234	650	123	C25087	4001	113
78501	769	99	78593	769	99	78682	759	96	C24235	650	123	C25094	4001	113
78502	769	99	78594	769	99	78683	759	96	C24236	650	123	C25095	4001	113
78503	769	99	78595	769	99	78684	759	96	C24237	650	123	C25100	4001	113
78504	769	99	78596	769	99	78685	759	96	C24238	650	123	C25101	4001	113
78505	769	99	78597	769	99	78686	759	96	C24239	650	123	C25108	4001	113
78506	769	99	78598	769	99	78687	759	96	C24240	650	123	C25110	4001	113
78507	769	99	78599	769	99	78688	759	96	C24241	650	123	C25120	4001	113
78508	769	99	78600	769	99	78689	759	96	C24242	650	123	C25128	4001	113
78509	769	99	78601	769	99	78690	759	96	C24243	650	123	C25139	4001	113
78510	769	99	78602	769	99	78691	759	96	C24244	650	123	C25140	4001	113
78511	769	99	78603	769	99	78692	759	96	C24245	650	123	C25146	4001	113
78512	769	99	78604	769	99	78700	759	96	C24250	657	124	C25151	4001	113
78513	769	99	78605	769	99	78701	759	96	C24251	657	124	C25155	4001	113
78514	769	99	78606	769	99	78702	759	96	C24252	657	124	C25159	4001	113
78515	769	99	78607	769	99	78703	759	96	C24253	657	124	C25165	4001	114
78516	769	99	78608	769	99	78704	759	96	C24254	657	124	C25171	4001	114
78517	769	99	78609	769	99	78705	759	96	C24255	657	124	C25178	4001	114
78518	769	99	78610	769	99	78706	759	97	C24256	657	124	C25180	4001	114
78519	769	99	78611	769	99	78707	759	97	C24257	657	124	C25183	4001	114
78520	769	99	78612	769	100	78708	759	97	C24258	657	124	C25185	4001	114
78521	769	99	78613	769	100	78709	759	97	C24259	657	124	C25187	4001	114
78522	769	99	78614	769	100	78710	759	97	C24260	657	124	C25194	4001	114
78523	769	99	78615	769	100	78711	759	97	C24261	657	124	C25203	4001	114
78524	769	99	78616	769	100	78712	759	97	C24262	657	124	C25210	4001	114
78525	769	99	78640	759	97	78713	759	97	C24263	657	124	C25212	4001	114
78526	769	99	78641	759	97	78714	759	97	C24264	657	124	C25215	4001	114
78527	769	99	78642	759	97	78715	759	97	C24265	657	124	C25216	4001	114
78528	769	99	78643	759	97	78716	759	97	C24271	659	124	C25220	4001	114
78529	769	99	78644	759	97	78717	759	97	C24272	659	124	C25226	4001	114
78530	769	99	78645	759	97	78718	759	97	C24273	659	124	C25243	4001	114
78531	769	99	78646	759	97	78719	759	97	C24274	659	124	C25253	4001	114
78532	769	98	78647	759	97	78720	759	97	C24275	659	124	C25254	4001	114
78533	769	98	78648	759	97	78721	759	97	C24276	659	124	C25262	4001	114
78534	769	98	78649	759	97	78722	759	97	C24277	659	124	C25269	4001	114
78535	769	98	78650	759	97	78723	759	97	C24278	659	124	C25275	4001	114
78536	769	98	78651	759	97	78724	759	97	C24279	659	124	C25281	4001	114
78537	769	98	78652	759	97	78725	759	97	C24280	659	124	C25285	4001	114
78538	769	98	78653	759	97	78726	759	97	C24281	659	124	C25290	4001	114
78539	769	98	78654	759	97	78727	759	97	C24282	659	124	C25291	4001	114
78540	769	98	78655	759	97	78728	759	97	C24283	659	124	C25292	4001	114
78541	769	98	78656	759	97	C00964	4001	116, 140	C24284	659	124	C25297	4001	114
78542	769	98	78657	759	97	C23812	616	120	C24285	659	124	C25301	4001	114
78543	769	98	78658	759	97	C23813	616	120	C24286	659	124	C25313	4001	114
78544	769	98	78659	759	97	C23814	616	120	C24982	642	122	C25314	4001	114
78545	769	98	78660	759	97	C23815	616	120	C24983	642	122	C25322	4001	114
78546	769	98	78661	759	97	C23816	616	120	C24984	642	122	C25327	4001	114
78547	769	98	78662	759	97	C23817	616	120	C24985	642	122	C25330	4001	114
78548	769	98	78663	759	97	C23818	616	120	C24986	642	122	C25339	4001	114
78549	769	98	78664	759	97	C23819	616	120	C24987	642	122	C25346	4001	114
78550	769	98	78665	759	97	C23820	616	120	C24988	642	122	C25351	4001	114
78551	769	98	78666	759	96	C23821	616	120	C24989	642	122	C25357	4001	114
78552	769	98	78667	759	96	C23822	616	120	C25003	4001	113	C25360	4001	114
78553	769	98	78668	759	96	C23823	616	120	C25005	4001	113	C25362	4001	114
78554	769	98	78669	759	96	C23824	616	120	C25008	4001	113	C25365	4001	114
78555	769	98	78670	759	96	C23957	618	121	C25010	4001	113	C25366	4001	114
78556	769	98	78671	759	96	C23958	618	121	C25019	4001	113	C25368	4001	114
78557	769	98	78672	759	96	C23959	618	121	C25020	4001	113	C25369	4001	114
78558	769	98	78673	759	96	C23960	618	121	C25034	4001	113	C25374	4001	114
78559	769	98	78674	759	96	C23961	618	121	C25041	4001	113	C25380	4001	114
78560	769	98	78675	759	96	C23962	618	121	C25053	4001	113	C25385	4001	114
78587	769	98	78676	759	96	C24229	650	123	C25059	4001	113	C25392	4001	114
78588	769	98	78677	759	96	C24230	650	123	C25060	4001	113	C25397	4001	114
78589	769	98	78678	759	96	C24231	650	123	C25063	4001	113	C25402	4001	114
78590	769	98	78679	759	96	C24232	650	123	C25072	4001	113	C25404	4001	114

DRILLS

REAMERS

OTHER TOOLS

SETS

INDEX

Index

Index by Order Number

DRILLS

Order No.	Style No.	Page No.
C25408	.. 4001	114
C25417	.. 4001	114
C25426	.. 4001	115
C25438	.. 4001	115
C25443	.. 4001	115
C25459	.. 4001	115
C25473	.. 4001	115
C25474	.. 4001	115
C25475	.. 4001	115
C25483	.. 4001	115
C25492	.. 4001	115
C25501	.. 4001	115
C25508	.. 4001	115
C25510	.. 4001	115
C25512	.. 4001	115
C25513	.. 4001	115
C25516	.. 4001	115
C25530	.. 4001	115
C25539	.. 4001	115
C25550	.. 4001	115
C25552	.. 4001	115
C25566	.. 4001	115
C25567	.. 4001	115
C25577	.. 4001	115
C25585	.. 4001	115
C25605	.. 4001	115
C25608	.. 4001	115
C25617	.. 4001	115
C25622	.. 4001	115
C25634	.. 4001	115
C25655	.. 4001	115
C25658	.. 4001	115
C25660	.. 4001	115
C25661	.. 4001	115
C25663	.. 4001	115
C25668	.. 4001	115
C25669	.. 4001	115
C25685	.. 4001	115
C25698	.. 4001	115
C25707	.. 4001	115
C25723	.. 4001	115
C25733	.. 4001	115
C25742	.. 4001	115
C25743	.. 4001	115
C25764	.. 4001	115
C25768	.. 4001	115
C25789	.. 4001	115
C25801	.. 4001	115
C25804	.. 4001	115
C25806	.. 4001	115
C25807	.. 4001	115
C25809	.. 4001	115
C25811	.. 4001	115
C25833	.. 4001	115
C25844	.. 4001	116
C25845	.. 4001	116
C25858	.. 4001	116
C25873	.. 4001	116
C25878	.. 4001	116
C25892	.. 4001	116
C25911	.. 4001	116
C25912	.. 4001	116
C25942	.. 4001	116
C25944	.. 4001	116
C25946	.. 4001	116
C25947	.. 4001	116

REAMERS

Order No.	Style No.	Page No.
C25949	.. 4001	116
C25981	.. 4001	116
C26014	.. 4001	116
C26015	.. 4001	116
C26048	.. 4001	116
C26080	.. 4001	116
C26083	.. 4001	116
C26085	.. 4001	116
C26086	.. 4001	116
C26150	.. 4001	116
C26151	.. 4001	116
C26217	.. 4001	116
C26218	.. 4001	116
C26284	.. 4001	116
C26351	.. 4001	116
C26352	.. 4001	116
C26418	.. 4001	116
C26485	.. 4001	116
C26550	.. 4001	116
C26615	.. 4001	116
C26680	.. 4001	116
C26746	.. 4001	116
C26811	.. 4001	116
C26876	.. 4001	116
C26941	.. 4001	116
C27006	.. 4001	116
C27072	.. 4001	116
C27137	.. 4001	116
C27144	.. 4001	116
C27152	.. 4001	116
C27159	.. 4001	116
C27166	.. 4001	116
C27180	.. 4001	116
C27195	.. 4001	116
C29273	.. 4030	113
C29311	.. 4030	113
C29350	.. 4030	113
C29386	.. 4030	114
C29421	.. 4030	114
C29457	.. 4030	114
C29493	.. 4030	114
C29565	.. 4030	114
C29601	.. 4030	114
C29637	.. 4030	115
C29709	.. 4030	115
C29745	.. 4030	115
C29803	.. 4030	115
C29853	.. 4030	115
C29890	.. 4030	115
C29925	.. 4030	115
C29960	.. 4030	115
C29997	.. 4030	115
C30033	.. 4030	116
C30067	.. 4030	116
C30134	.. 4030	116
C30168	.. 4030	116
C30201	.. 4030	116
C30235	.. 4030	116
C30268	.. 4030	116
C30335	.. 4030	116
C30402	.. 4030	116
C30469	.. 4030	116
C30536	.. 4030	116
C30603	.. 4030	116
C30670	.. 4030	116
C30735	.. 4030	116

OTHER TOOLS

Order No.	Style No.	Page No.
C30800	.. 4030	116
C30865	.. 4030	116
C30931	.. 4030	116
C31061	.. 4030	116
C31191	.. 4030	116
C31322	.. 4030	116
C31337	.. 4030	116
C31351	.. 4030	116
C31365	.. 4030	116
C31380	.. 4030	116
C33842	.. 4005	117
C33986	.. 4005	117
C34129	.. 4005	117
C34266	.. 4005	117
C34400	.. 4005	117
C34467	.. 4005	117
C34534	.. 4005	117
C34601	.. 4005	117
C34668	.. 4005	117
C34735	.. 4005	117
C34802	.. 4005	117
C34867	.. 4005	117
C34932	.. 4005	117
C34997	.. 4005	117
C35063	.. 4005	117
C35128	.. 4005	117
C35193	.. 4005	117
C35258	.. 4005	117
C35323	.. 4005	117
C35389	.. 4005	117
C35454	.. 4005	117
C35461	.. 4005	117
C35469	.. 4005	117
C35476	.. 4005	117
C35483	.. 4005	117
C35490	.. 4005	117
C35497	.. 4005	117
C35505	.. 4005	117
C35512	.. 4005	117
C50103	.. 1730	118
C50121	.. 1730	118
C50133	.. 1730	118
C50145	.. 1730	118
C50157	.. 1730	118
C50168	.. 1730	118
C50180	.. 1730	118
C50194	.. 1730	118
C50203	.. 1730	118
C50214	.. 1730	118
C50226	.. 1730	118
C50368	.. 4703	119
C50382	.. 4703	119
C50391	.. 4703	119
C50402	.. 4703	119
C50414	.. 4703	119
C50423	.. 4703	119
C50428	.. 4703	119
C50433	.. 4703	119
C50438	.. 4703	119
C50443	.. 4703	119
C50449	.. 4703	119
C50459	.. 4703	119

SETS

INDEX

