

Including

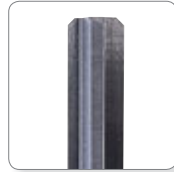


ADVANCED PRODUCT GROUP

Reamer Section 2018 Master Catalog



Where **high performance** is the **standard**®



Integrated Manufacturing Solutions



Product Catalog 2018

www.maford.com



Where **high performance** is the **standard**®



For more than 95 years, M.A. FORD® has been at the cutting edge of tooling design and manufacturing and has developed an enviable global reputation for performance and precision in advanced solid carbide tooling, serving over 60 countries worldwide.

Our innovative cutting geometries, materials and coating technologies are providing effective manufacturing solutions to an expanding and increasingly diverse range of industries from agriculture and construction to aerospace, power generation and automotive, to name but a few.

M.A. FORD® – Where high performance is the standard.®















⚠ WARNING: This product can expose you to chemicals including nickel, cobalt, and lead, which are known to the State of California to cause cancer, and chemicals including lead which are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

Series Number by Page








Reamers	
Series No.	Page No.
270	382
270L	382
270P	384
272	385

TrueSize® Reamer Page 382-407








Series	Tool Illustration	Z	Lead Cutting Angle	Material Group	Page
270 Straight Flute		4/6 RHC			382-383
270L Left Hand Spiral		4/6 LHS-RHC			382-383
270P Precision Tolerance OD		4 RHC			384
272		4/6 RHC			385-407
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Icon Glossary

Drill Icons




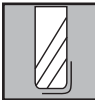



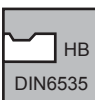



	Solid Carbide		Helix Angle 12°
	Coolant Fed		Coatings ALtima®
	Drill Length 3X		DIN Specs >3mm DIN 6537L
	Drill Point Angle 135°		

Workpiece Material Group




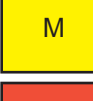


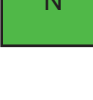
		Steels
		Hardened Steels (35-65Rc)
		Stainless Steels
		Cast Iron
		Special Alloys
		Non-Ferrous

HP Drill Selection Chart See Page 133.
Drill Terminology See Page 170.

End Mill Icons

	Number of Flutes Z3		Neck Relief N
	Center Cutting		Corner Radius
	Lengths		Shank
	Coatings ALtima®		Shank/DIN HB DIN6535
	Helix Angle 30°		Chipbreaker Chipbreaker
	Ball Nose		

Workpiece Material Group

		Steels
		Hardened Steels (35-65Rc)
		Stainless Steels
		Cast Iron
		Special Alloys
		Non-Ferrous

End Mill Terminology See Page 368.



TrueSize® Reamers

Solid Carbide TrueSize® Reamers Deliver High-Precision Hole Finishes

In applications that require high-precision hole finishes, or tighter diameter control, M.A. Ford® True Size® Reamers can be used with confidence. Solid Carbide Reamers are available in a wide range of sizes for virtually all materials, including cast iron, aluminum, stainless steel, exotic alloys, plastics and other non-ferrous materials.

Complete Family of Standard and Metric Sizes

M.A. Ford® stocks over 900 inch and metric size reamers in its product line, ranging from .013 inch to 16mm diameter. These products are available for immediate shipment. M.A. Ford® also maintains an inventory of pre-finished blanks, which can be finished to your precise specifications and shipped within 72 hours upon request. See Rapid Turn Around Service on page 382 for more information.

Material Removal Parameters

For proper finishing with a reamer, the correct amount of material must be left in the hole. If the hole is too close to the finish size, the reamer will tend to burnish the hole, and excessive tool wear will occur. If too much material is left, chips can clog the flutes of the reamer, resulting in a poor finish, poor size control, and possible tool breakage.

Refer to chart Total Stock Allowance on pages 409-410 as a starting point for reaming operations.

TrueSize® Reamer Series

TrueSize® Series 270

TrueSize® Series 270L

TrueSize® Series 270P

TrueSize® Series 272

TrueSize® XP = Xtreme Precision 270P Straight Flute

One week turnaround on 270P orders.
(25 piece max.)

All M.A. Ford® Reamers are ground between centers to assure maximum concentricity.



Made in USA

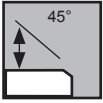
ISO 9001:2008 Certified



Where *high performance is the standard*®

TrueSize® Carbide Range Reamer Straight Flute Series 270

TrueSize® Carbide Range Reamer Left Hand Spiral Series 270L



Before you order a 270 Series - check our listing of standard diameters in the 272 Series. Competitors special sizes are our standards!

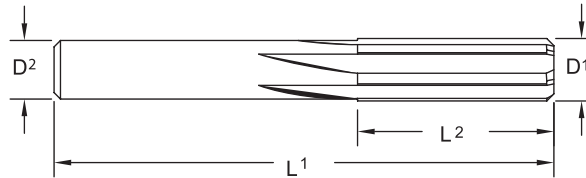
Recommended for general purpose reaming in most materials. Kept in stock as a semi-finished tool. When orders are received tools can be promptly finish ground to the desired diameter. Specify size when ordering.



Need a Reamer Fast?

Request Rapid Turn Around Service. Straight Flute sizes above .0433" (1.10mm) can be shipped within 72 hours upon request. 25 piece order maximum.

- Right hand cutting
- 45° lead cutting angle



Inch	
D1	Tolerance
≤ 3/8	+0.001/+0.003
> 3/8	+0.001/+0.004
D2	Tolerance
≤ 3/8	+0.000/-0.001
> 3/8	+0.000/-0.001
L1	Tolerance
≤ 3/8	+/- 1/16
> 3/8	+/- 1/16
L2	Tolerance
≤ 3/8	+/- 1/16
> 3/8	+/- 1/16

Metric (mm)	
D1	Tolerance
0.35 - 16.0	DIN1420 H7
D2	Tolerance
0.35 - 16.0	+0.00/-0.03
L1	Tolerance
0.35 - 16.0	+/- 1.5
L2	Tolerance
0.35 - 16.0	+/- 1.5

DIN1420 H7	
D1	Tolerance (mm)
≤ 3mm	+0.004/+0.008
>3mm - 6mm	+0.005/+0.010
>6mm - 10mm	+0.006/+0.012
>10mm - 16mm	+0.008/+0.015



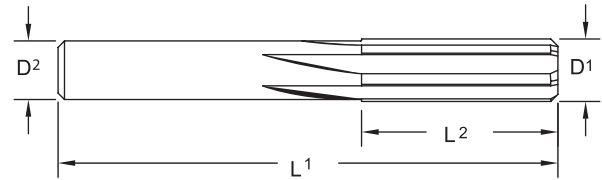
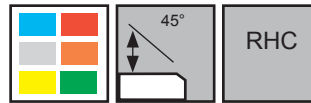
Series 270 / 270L Continued

Series 270		Series 270L		D2		L1		L2		Flutes	
D1 Diameter				Shank		OAL		Flute Length			
Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm		
.0135-.0200	00.34-0.50	.0135-.0200	00.34-0.50	.0135-.0433 are no longer a standard item. Contact customer service for price and availability as a special quoted item. 800-553-8024 or 563-391-6220							
.0201-.0400	00.51-1.01	.0201-.0400	00.51-1.01								
.0401-.0433	01.02-1.09	.0401-.0433	01.02-1.09								
.0434-.0519	01.10-1.31	.0434-.0519	01.10-1.31	.043	1.09	1-1/2	38	3/8	9.5	4	
.0520-.0590	01.32-1.49	.0520-.0590	01.32-1.49	.046	1.17	1-1/2	38	3/8	9.5	4	
.0591-.0660	01.50-1.67	.0591-.0660	01.50-1.67	.058	1.47	1-1/2	38	3/8	9.5	4	
.0661-.0740	01.68-1.87	.0661-.0740	01.68-1.87	.065	1.65	1-3/4	44	1/2	12.5	4	
.0741-.0810	01.88-2.05	.0741-.0810	01.88-2.05	.073	1.85	1-3/4	44	1/2	12.5	4	
.0811-.0890	02.06-2.26	.0811-.0890	02.06-2.26	.080	2.03	2	51	1/2	12.5	4	
.0891-.0970	02.27-2.46	.0891-.0970	02.27-2.46	.088	2.24	2	51	1/2	12.5	4	
.0971-.1050	02.47-2.66	.0971-.1050	02.47-2.66	.096	2.44	2-1/4	57	5/8	16	4	
.1051-.1130	02.67-2.87	.1051-.1130	02.67-2.87	.104	2.64	2-1/4	57	5/8	16	4	
.1131-.1210	02.88-3.07	.1131-.1210	02.88-3.07	.112	2.84	2-1/4	57	5/8	16	4	
.1211-.1280	03.08-3.25	.1211-.1280	03.08-3.25	.120	3.05	2-1/4	57	5/8	16	4	
.1281-.1360	03.26-3.45	.1281-.1360	03.26-3.45	.127	3.23	2-1/2	64	3/4	19	4	
.1361-.1440	03.46-3.65	.1361-.1440	03.46-3.65	.135	3.43	2-1/2	64	3/4	19	4	
.1441-.1520	03.66-3.86	.1441-.1520	03.66-3.86	.143	3.63	2-1/2	64	3/4	19	4	
.1521-.1590	03.87-4.03	.1521-.1590	03.87-4.03	.151	3.84	2-1/2	64	3/4	19	4	
.1591-.1670	04.04-4.24	.1591-.1670	04.04-4.24	.158	4.01	2-3/4	70	7/8	22	4	
.1671-.1750	04.25-4.44	.1671-.1750	04.25-4.44	.166	4.22	2-3/4	70	7/8	22	4	
.1751-.1830	04.45-4.64	.1751-.1830	04.45-4.64	.174	4.42	2-3/4	70	7/8	22	4	
.1831-.1910	04.65-4.85	.1831-.1910	04.65-4.85	.182	4.62	2-3/4	70	7/8	22	4	
.1911-.1990	04.86-5.05	.1911-.1990	04.86-5.05	.190	4.83	3	76	1	25.5	4	
.1991-.2060	05.06-5.23	.1991-.2060	05.06-5.23	.198	5.03	3	76	1	25.5	4	
.2061-.2140	05.24-5.43	.2061-.2140	05.24-5.43	.205	5.21	3	76	1	25.5	4	
.2141-.2220	05.44-5.63	.2141-.2220	05.44-5.63	.213	5.41	3	76	1	25.5	4	
.2221-.2300	05.64-5.84	.2221-.2300	05.64-5.84	.221	5.61	3	76	1	25.5	4	
.2301-.2370	05.85-6.01	.2301-.2370	05.85-6.01	.229	5.82	3	76	1	25.5	4	
.2371-.2450	06.02-6.22	.2371-.2450	06.02-6.22	.236	5.99	3	76	1	25.5	4	
.2451-.2530	06.23-6.42	.2451-.2530	06.23-6.42	.244	6.20	3	76	1	25.5	4	
.2531-.2710	06.43-6.88	.2531-.2710	06.43-6.88	.252	6.40	3-1/4	83	1-1/8	28.5	6	
.2711-.2860	06.89-7.26	.2711-.2860	06.89-7.26	.270	6.86	3-1/4	83	1-1/8	28.5	6	
.2861-.3020	07.27-7.67	.2861-.3020	07.27-7.67	.285	7.24	3-1/4	83	1-1/8	28.5	6	
.3021-.3180	07.68-8.07	.3021-.3180	07.68-8.07	.301	7.65	3-1/4	83	1-1/8	28.5	6	
.3181-.3330	08.08-8.45	.3181-.3330	08.08-8.45	.317	8.05	3-1/2	89	1-1/4	32	6	
.3331-.3490	08.46-8.86	.3331-.3490	08.46-8.86	.332	8.43	3-1/2	89	1-1/4	32	6	
.3491-.3640	08.87-9.24	.3491-.3640	08.87-9.24	.348	8.84	3-1/2	89	1-1/4	32	6	
.3641-.3860	09.25-9.80	.3641-.3860	09.25-9.80	.363	9.22	3-1/2	89	1-1/4	32	6	
.3861-.4150	09.81-10.54			.380	9.65	3-1/2	89	1-1/4	32	6	
.4151-.4450	10.55-11.30			.410	10.41	3-3/4	95	1-3/8	35	6	
.4451-.4750	11.31-12.06			.440	11.18	3-3/4	95	1-3/8	35	6	
.4751-.5100	12.07-12.95			.470	11.93	4	102	1-1/2	38	6	
.5101-.5400	12.96-13.71			.505	12.83	4	102	1-1/2	38	6	
.5401-.5700	13.72-14.47			.535	13.59	4	102	1-1/2	38	6	
.5701-.6000	14.48-15.24			.565	14.35	4	102	1-3/4	44.5	6	
.6001-.6350	15.25-16.13			.595	15.11	4	102	1-3/4	44.5	6	



TrueSize® Carbide Range Reamer Precision Tolerance OD Series 270P

TrueSize® XP = Xtreme Precision 270P Straight Flute



Series 270P		D2		L1		L2		Flutes
D1 Diameter		Shank		OAL		Flute Length		
Inch	mm	Inch	mm	Inch	mm	Inch	mm	
.0434-.0519	01.10-1.31	.043	1.09	1-1/2	38	3/8	9.5	4
.0520-.0590	01.32-1.49	.046	1.17	1-1/2	38	3/8	9.5	4
.0591-.0660	01.50-1.67	.058	1.47	1-1/2	38	3/8	9.5	4
.0661-.0740	01.68-1.87	.065	1.65	1-3/4	44	1/2	12.5	4
.0741-.0810	01.88-2.05	.073	1.85	1-3/4	44	1/2	12.5	4
.0811-.0890	02.06-2.26	.080	2.03	2	51	1/2	12.5	4
.0891-.0970	02.27-2.46	.088	2.24	2	51	1/2	12.5	4
.0971-.1050	02.47-2.66	.096	2.44	2-1/4	57	5/8	16	4
.1051-.1130	02.67-2.87	.104	2.64	2-1/4	57	5/8	16	4
.1131-.1210	02.88-3.07	.112	2.84	2-1/4	57	5/8	16	4
.1211-.1280	03.08-3.25	.120	3.05	2-1/4	57	5/8	16	4
.1281-.1360	03.26-3.45	.127	3.23	2-1/2	64	3/4	19	4
.1361-.1440	03.46-3.65	.135	3.43	2-1/2	64	3/4	19	4
.1441-.1520	03.66-3.86	.143	3.63	2-1/2	64	3/4	19	4
.1521-.1590	03.87-4.03	.151	3.84	2-1/2	64	3/4	19	4
.1591-.1670	04.04-4.24	.158	4.01	2-3/4	70	7/8	22	4
.1671-.1750	04.25-4.44	.166	4.22	2-3/4	70	7/8	22	4
.1751-.1830	04.45-4.64	.174	4.42	2-3/4	70	7/8	22	4
.1831-.1910	04.65-4.85	.182	4.62	2-3/4	70	7/8	22	4
.1911-.1990	04.86-5.05	.190	4.83	3	76	1	25.5	4
.1991-.2060	05.06-5.23	.198	5.03	3	76	1	25.5	4
.2061-.2140	05.24-5.43	.205	5.21	3	76	1	25.5	4
.2141-.2220	05.44-5.63	.213	5.41	3	76	1	25.5	4
.2221-.2300	05.64-5.84	.221	5.61	3	76	1	25.5	4
.2301-.2370	05.85-6.01	.229	5.82	3	76	1	25.5	4
.2371-.2450	06.02-6.22	.236	5.99	3	76	1	25.5	4
.2451-.2530	06.23-6.42	.244	6.20	3	76	1	25.5	4
.2531-.2710	06.43-6.88	.252	6.40	3-1/4	83	1-1/8	28.5	6
.2711-.2860	06.89-7.26	.270	6.86	3-1/4	83	1-1/8	28.5	6
.2861-.3020	07.27-7.67	.285	7.24	3-1/4	83	1-1/8	28.5	6
.3021-.3180	07.68-8.07	.301	7.65	3-1/4	83	1-1/8	28.5	6
.3181-.3330	08.08-8.45	.317	8.05	3-1/2	89	1-1/4	32	6
.3331-.3490	08.46-8.86	.332	8.43	3-1/2	89	1-1/4	32	6
.3491-.3640	08.87-9.24	.348	8.84	3-1/2	89	1-1/4	32	6
.3641-.3860	09.25-9.80	.363	9.22	3-1/2	89	1-1/4	32	6
.3861-.4150	09.81-10.54	.380	9.65	3-1/2	89	1-1/4	32	6
.4151-.4450	10.55-11.30	.410	10.41	3-3/4	95	1-3/8	35	6
.4451-.4750	11.31-12.06	.440	11.18	3-3/4	95	1-3/8	35	6
.4751-.5100	12.07-12.95	.470	11.93	4	102	1-1/2	38	6
.5101-.5400	12.96-13.71	.505	12.83	4	102	1-1/2	38	6
.5401-.5700	13.72-14.47	.535	13.59	4	102	1-1/2	38	6
.5701-.6000	14.48-15.24	.565	14.35	4	102	1-3/4	44.5	6
.6001-.6350	15.25-16.13	.595	15.11	4	102	1-3/4	44.5	6

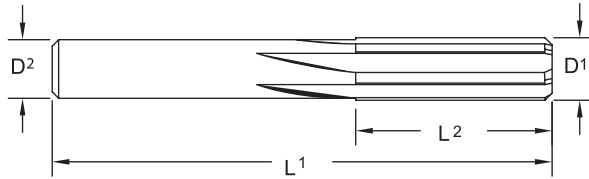
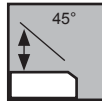
- Recommended for precision reaming in most materials.
- Kept in stock as a semi-finished tool. When orders are received tools can be promptly finish ground to the desired diameter. 1 week turn around. (25 piece order maximum)
- Specify size when ordering.
- Right hand cutting
- 45° lead cutting angle.

Inch	
D1	Tolerance
.0434 - .6350	+ .0001/+ .0000
D2	Tolerance
.0434 - .6350	+ .000/- .001
L1/L2	Tolerance
.0434 - .6350	+/- 1/16

Metric	
D1	Tolerance
1.10 - 16.13	+ .0025/+ .0000
D2	Tolerance
1.10 - 16.13	+ .000/- 0.03
L1/L2	Tolerance
1.10 - 16.13	+/- 1.5



TrueSize® Carbide Reamer Series 272



- Recommended for general purpose reaming.
- Straight flutes.
- Well suited for most materials.
- Special sizes, shank diameters, flute lengths, step reamers, coating, etc. available as specials. Call Customer Service at 800-553-8024 for a quote.

If you don't see
the size you need -
Just Ask
Most special sizes
shipped within 72 hours
upon request.

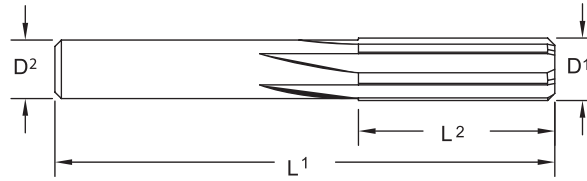
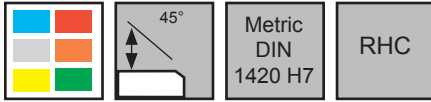
Inch	
D1	Tolerance
≤ 3/8	+0.001/+0.003
> 3/8	+0.001/+0.004
D2	Tolerance
≤ 3/8	+0.000/-0.001
> 3/8	+0.000/-0.001
L1	Tolerance
≤ 3/8	+/- 1/16
> 3/8	+/- 1/16
L2	Tolerance
≤ 3/8	+/- 1/16
> 3/8	+/- 1/16

Metric (mm)	
D1	Tolerance
0.35 - 16.0	DIN1420 H7
D2	Tolerance
0.35 - 16.0	+0.00/-0.03
L1	Tolerance
0.35 - 16.0	+/- 1.5
L2	Tolerance
0.35 - 16.0	+/- 1.5

DIN1420 H7	
D1	Tolerance (mm)
≤ 3mm	+0.004/+0.008
>3mm - 6mm	+0.005/+0.010
>6mm - 10mm	+0.006/+0.012
>10mm - 16mm	+0.008/+0.015



Series 272 Continued



Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes	
		D1				D2		L1		L2			
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm		
27201300	03000				0.0130	0.0130			1-1/2		3/16		4
27201350	01001		80		0.0135	0.0135			1-1/2		3/16		4
27201380	01005			0.35	0.0138	0.0138	0.35		38		5.0		4
27201400	03001				0.0140	0.0140			1-1/2		3/16		4
27201450	01009		79		0.0145	0.0145			1-1/2		3/16		4
27201500	03002				0.0150	0.0150			1-1/2		3/16		4
27201550	03003				0.0155	0.0155			1-1/2		3/16		4
27201560	01013	1/64			0.0156	0.0156			1-1/2		3/16		4
27201570	01017			0.40	0.0157	0.0157	0.40		38		5.0		4
27201600	01021		78		0.0160	0.0160			1-1/2		3/16		4
27201650	03004				0.0165	0.0165			1-1/2		3/16		4
27201700	03005				0.0170	0.0170			1-1/2		3/16		4
27201750	03006				0.0175	0.0175			1-1/2		3/16		4
27201770	01025			0.45	0.0177	0.0177	0.45		38		5.0		4
27201800	01029		77		0.0180	0.0180			1-1/2		3/16		4
27201850	03007				0.0185	0.0185			1-1/2		3/16		4
27201900	03008				0.0190	0.0190			1-1/2		3/16		4
27201950	03009				0.0195	0.0195			1-1/2		3/16		4
27201970	01033			0.50	0.0197	0.0197	0.50		38		5.0		4
27202000	01037		76		0.0200	0.0200			1-1/2		3/16		4
27202050	03010				0.0205	0.0205			1-1/2		1/4		4
27202100	01041		75		0.0210	0.0210			1-1/2		1/4		4
27202150	03011				0.0215	0.0215			1-1/2		1/4		4
27202170	01045			0.55	0.0217	0.0217	0.55		38		6.5		4
27202200	03012				0.0220	0.0220			1-1/2		1/4		4
27202250	01049		74		0.0225	0.0225			1-1/2		1/4		4
27202300	03013				0.0230	0.0230			1-1/2		1/4		4
27202350	03014				0.0235	0.0235			1-1/2		1/4		4
27202360	01053			0.60	0.0236	0.0236	0.60		38		6.5		4
27202400	01057		73		0.0240	0.0240			1-1/2		1/4		4
27202450	03015				0.0245	0.0245			1-1/2		1/4		4
27202500	01061		72		0.0250	0.0250			1-1/2		1/4		4
27202550	03016				0.0255	0.0255			1-1/2		1/4		4
27202560	01065			0.65	0.0256	0.0256	0.65		38		6.5		4
27202600	01069		71		0.0260	0.0260			1-1/2		1/4		4
27202650	03017				0.0265	0.0265			1-1/2		1/4		4
27202700	03018				0.0270	0.0270			1-1/2		1/4		4
27202750	03019				0.0275	0.0275			1-1/2		1/4		4
27202760	01073			0.70	0.0276	0.0276	0.70		38		6.5		4
27202800	01077		70		0.0280	0.0280			1-1/2		1/4		4
27202850	03020				0.0285	0.0285			1-1/2		1/4		4
27202900	03021				0.0290	0.0290			1-1/2		1/4		4

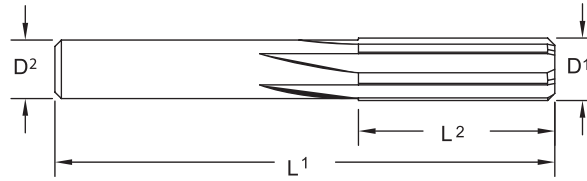
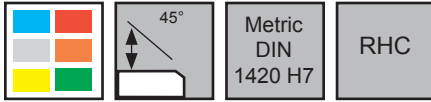


Series 272 Continued

Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27202920	01081		69		0.0292	0.0292		1-1/2		1/4		4
27202950	01085			0.75	0.0295	0.0295	0.75		38		6.5	4
27202951	03620				0.0295	0.0295		1-1/2		1/4		4
27203000	03022				0.0300	0.0300		1-1/2		1/4		4
27203050	03023				0.0305	0.0305		1-1/2		1/4		4
27203100	01089		68		0.0310	0.0310		1-1/2		1/4		4
27203120	01093	1/32			0.0312	0.0312		1-1/2		1/4		4
27203150	01097			0.80	0.0315	0.0315	0.80		38		6.5	4
27203151	03621				0.0315	0.0315		1-1/2		1/4		4
27203200	01101		67		0.0320	0.0320		1-1/2		1/4		4
27203250	03024				0.0325	0.0325		1-1/2		1/4		4
27203300	01105		66		0.0330	0.0330		1-1/2		1/4		4
27203350	01109			0.85	0.0335	0.0335	0.85		38		6.5	4
27203351	03622				0.0335	0.0335		1-1/2		1/4		4
27203400	03025				0.0340	0.0340		1-1/2		1/4		4
27203450	03026				0.0345	0.0345		1-1/2		1/4		4
27203500	01113		65		0.0350	0.0350		1-1/2		1/4		4
27203540	01117			0.90	0.0354	0.0354	0.90		38		6.5	4
27203550	03027				0.0355	0.0355		1-1/2		1/4		4
27203600	01121		64		0.0360	0.0360		1-1/2		1/4		4
27203650	03028				0.0365	0.0365		1-1/2		1/4		4
27203700	01125		63		0.0370	0.0370		1-1/2		1/4		4
27203740	01129			0.95	0.0374	0.0374	0.95		38		6.5	4
27203750	03029				0.0375	0.0375		1-1/2		1/4		4
27203800	01133		62		0.0380	0.0380		1-1/2		1/4		4
27203850	03030				0.0385	0.0385		1-1/2		1/4		4
27203900	01137		61		0.0390	0.0390		1-1/2		1/4		4
27203940	01141			1.00	0.0394	0.0394	1.00		38		6.5	4
27203950	03031				0.0395	0.0395		1-1/2		1/4		4
27204000	01145		60		0.0400	0.0400		1-1/2		1/4		4
27204050	03032				0.0405	0.0405		1-1/2		3/8		4
27204100	01149		59		0.0410	0.0410		1-1/2		3/8		4
27204130	01153			1.05	0.0413	0.0413	1.05		38		9.5	4
27204150	03033				0.0415	0.0415		1-1/2		3/8		4
27204200	01157		58		0.0420	0.0420		1-1/2		3/8		4
27204250	03034				0.0425	0.0425		1-1/2		3/8		4
27204300	01161		57		0.0430	0.0430		1-1/2		3/8		4
27204330	01165			1.10	0.0433	0.0433	1.10		38		9.5	4
27204350	03035				0.0435	0.0430		1-1/2		3/8		4
27204400	03036				0.0440	0.0430		1-1/2		3/8		4
27204450	03037				0.0445	0.0430		1-1/2		3/8		4
27204500	03038				0.0450	0.0430		1-1/2		3/8		4
27204520	01169			1.15	0.0452	0.0430	1.09		38		9.5	4
27204550	03039				0.0455	0.0430		1-1/2		3/8		4
27204600	03040				0.0460	0.0430		1-1/2		3/8		4
27204650	01173		56		0.0465	0.0430		1-1/2		3/8		4



Series 272 Continued



Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27204680	01177	3/64			0.0468	0.0430		1-1/2		3/8		4
27204700	03041				0.0470	0.0430		1-1/2		3/8		4
27204720	01181			1.20	0.0472	0.0430	1.09		38		9.5	4
27204750	03042				0.0475	0.0430		1-1/2		3/8		4
27204800	03043				0.0480	0.0430		1-1/2		3/8		4
27204850	03044				0.0485	0.0430		1-1/2		3/8		4
27204900	03045				0.0490	0.0430		1-1/2		3/8		4
27204920	01185			1.25	0.0492	0.0430	1.09		38		9.5	4
27204950	03046				0.0495	0.0430		1-1/2		3/8		4
27205000	03047				0.0500	0.0430		1-1/2		3/8		4
27205050	03048				0.0505	0.0430		1-1/2		3/8		4
27205100	03049				0.0510	0.0430		1-1/2		3/8		4
27205110	01189			1.30	0.0511	0.0430	1.09		38		9.5	4
27205150	03050				0.0515	0.0430		1-1/2		3/8		4
27205200	01193		55		0.0520	0.0460		1-1/2		3/8		4
27205250	03051				0.0525	0.0460		1-1/2		3/8		4
27205300	03052				0.0530	0.0460		1-1/2		3/8		4
27205310	01197			1.35	0.0531	0.0460	1.17		38		9.5	4
27205350	03053				0.0535	0.0460		1-1/2		3/8		4
27205400	03054				0.0540	0.0460		1-1/2		3/8		4
27205450	03055				0.0545	0.0460		1-1/2		3/8		4
27205500	01201		54		0.0550	0.0460		1-1/2		3/8		4
27205510	01205			1.40	0.0551	0.0460	1.17		38		9.5	4
27205550	03056				0.0555	0.0460		1-1/2		3/8		4
27205600	03057				0.0560	0.0460		1-1/2		3/8		4
27205650	03058				0.0565	0.0460		1-1/2		3/8		4
27205700	03059				0.0570	0.0460		1-1/2		3/8		4
27205710	01209			1.45	0.0571	0.0460	1.17		38		9.5	4
27205750	03060				0.0575	0.0460		1-1/2		3/8		4
27205800	03061				0.0580	0.0460		1-1/2		3/8		4
27205850	03062				0.0585	0.0460		1-1/2		3/8		4
27205900	01213			1.50	0.0590	0.0460	1.17		38		9.5	4
27205901	03623				0.0590	0.0460		1-1/2		3/8		4
27205950	01217		53		0.0595	0.0580		1-1/2		3/8		4
27206000	03063				0.0600	0.0580		1-1/2		3/8		4
27206050	03064				0.0605	0.0580		1-1/2		3/8		4
27206100	01221			1.55	0.0610	0.0580	1.47		38		9.5	4
27206101	03624				0.0610	0.0580		1-1/2		3/8		4
27206150	03065				0.0615	0.0580		1-1/2		3/8		4
27206200	03066				0.0620	0.0580		1-1/2		3/8		4
27206250	01225	1/16			0.0625	0.0580		1-1/2		3/8		4
27206300	01229			1.60	0.0630	0.0580	1.47		38		9.5	4

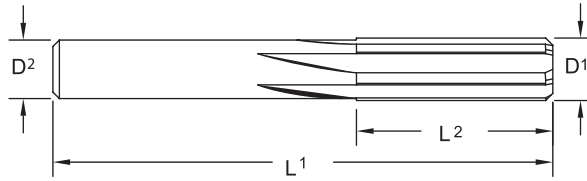
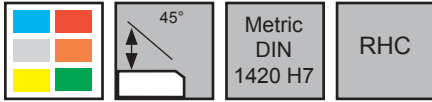


Series 272 Continued

Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27206301	03625				0.0630	0.0580		1-1/2		3/8		4
27206350	01233		52		0.0635	0.0580		1-1/2		3/8		4
27206400	03067				0.0640	0.0580		1-1/2		3/8		4
27206450	03068				0.0645	0.0580		1-1/2		3/8		4
27206490	01237			1.65	0.0649	0.0580	1.47		38		9.5	4
27206500	03069				0.0650	0.0580		1-1/2		3/8		4
27206550	03070				0.0655	0.0580		1-1/2		3/8		4
27206600	03071				0.0660	0.0580		1-1/2		3/8		4
27206650	03072				0.0665	0.0650		1-3/4		1/2		4
27206690	01241			1.70	0.0669	0.0650	1.65		44		12.5	4
27206700	01245		51		0.0670	0.0650		1-3/4		1/2		4
27206750	03073				0.0675	0.0650		1-3/4		1/2		4
27206800	03074				0.0680	0.0650		1-3/4		1/2		4
27206850	03075				0.0685	0.0650		1-3/4		1/2		4
27206890	01249			1.75	0.0689	0.0650	1.65		44		12.5	4
27206900	03076				0.0690	0.0650		1-3/4		1/2		4
27206950	03077				0.0695	0.0650		1-3/4		1/2		4
27207000	01253		50		0.0700	0.0650		1-3/4		1/2		4
27207050	03078				0.0705	0.0650		1-3/4		1/2		4
27207080	01257			1.80	0.0708	0.0650	1.65		44		12.5	4
27207100	03079				0.0710	0.0650		1-3/4		1/2		4
27207150	03080				0.0715	0.0650		1-3/4		1/2		4
27207200	03081				0.0720	0.0650		1-3/4		1/2		4
27207250	03082				0.0725	0.0650		1-3/4		1/2		4
27207280	01261			1.85	0.0728	0.0650	1.65		44		12.5	4
27207300	01265		49		0.0730	0.0650		1-3/4		1/2		4
27207350	03083				0.0735	0.0650		1-3/4		1/2		4
27207400	03084				0.0740	0.0650		1-3/4		1/2		4
27207450	03085				0.0745	0.0730		1-3/4		1/2		4
27207480	01269			1.90	0.0748	0.0730	1.85		44		12.5	4
27207500	03086				0.0750	0.0730		1-3/4		1/2		4
27207550	03087				0.0755	0.0730		1-3/4		1/2		4
27207600	01273		48		0.0760	0.0730		1-3/4		1/2		4
27207650	03088				0.0765	0.0730		1-3/4		1/2		4
27207670	01277			1.95	0.0767	0.0730	1.85		44		12.5	4
27207700	03089				0.0770	0.0730		1-3/4		1/2		4
27207750	03090				0.0775	0.0730		1-3/4		1/2		4
27207800	03091				0.0780	0.0730		1-3/4		1/2		4
27207810	01281	5/64			0.0781	0.0730		1-3/4		1/2		4
27207850	01285		47		0.0785	0.0730		1-3/4		1/2		4
27207870	01289			2.00	0.0787	0.0730	1.85		44		12.5	4
27207900	03092				0.0790	0.0730		1-3/4		1/2		4
27207950	03093				0.0795	0.0730		1-3/4		1/2		4
27208000	03094				0.0800	0.0730		1-3/4		1/2		4



Series 272 Continued



Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27208050	03095				0.0805	0.0730		1-3/4		1/2		4
27208070	01293			2.05	0.0807	0.0730	1.85		44		12.5	4
27208100	01297		46		0.0810	0.0730		1-3/4		1/2		4
27208150	03096				0.0815	0.0800		2		1/2		4
27208200	01301		45		0.0820	0.0800		2		1/2		4
27208250	03097				0.0825	0.0800		2		1/2		4
27208270	01305			2.10	0.0827	0.0800	2.03		51		12.5	4
27208300	03098				0.0830	0.0800		2		1/2		4
27208350	03099				0.0835	0.0800		2		1/2		4
27208400	03100				0.0840	0.0800		2		1/2		4
27208450	03101				0.0845	0.0800		2		1/2		4
27208460	01309			2.15	0.0846	0.0800	2.03		51		12.5	4
27208500	03102				0.0850	0.0800		2		1/2		4
27208550	03103				0.0855	0.0800		2		1/2		4
27208600	01313		44		0.0860	0.0800		2		1/2		4
27208650	03104				0.0865	0.0800		2		1/2		4
27208660	01317			2.20	0.0866	0.0800	2.03		51		12.5	4
27208700	03105				0.0870	0.0800		2		1/2		4
27208750	03106				0.0875	0.0800		2		1/2		4
27208800	03107				0.0880	0.0800		2		1/2		4
27208850	03108				0.0885	0.0800		2		1/2		4
27208860	01321			2.25	0.0886	0.0800	2.03		51		12.5	4
27208900	01325		43		0.0890	0.0800		2		1/2		4
27208950	03109				0.0895	0.0880		2		1/2		4
27209000	03110				0.0900	0.0880		2		1/2		4
27209050	03111				0.0905	0.0880		2		1/2		4
27209060	01329			2.30	0.0906	0.0880	2.24		51		12.5	4
27209100	03112				0.0910	0.0880		2		1/2		4
27209150	03113				0.0915	0.0880		2		1/2		4
27209200	03114				0.0920	0.0880		2		1/2		4
27209250	01333			2.35	0.0925	0.0880	2.24		51		12.5	4
27209251	03626				0.0925	0.0880		2		1/2		4
27209300	03115				0.0930	0.0880		2		1/2		4
27209350	01337		42		0.0935	0.0880		2		1/2		4
27209370	01341	3/32			0.0937	0.0880		2		1/2		4
27209400	03116				0.0940	0.0880		2		1/2		4
27209450	01345			2.40	0.0945	0.0880	2.24		51		12.5	4
27209451	03627				0.0945	0.0880		2		1/2		4
27209500	03117				0.0950	0.0880		2		1/2		4
27209550	03118				0.0955	0.0880		2		1/2		4
27209600	01349		41		0.0960	0.0880		2		1/2		4
27209650	01353			2.45	0.0965	0.0880	2.24		51		12.5	4

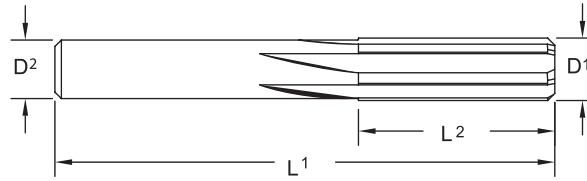
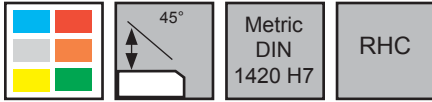


Series 272 Continued

Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27209651	03628				0.0965	0.0880		2		1/2		4
27209700	03119				0.0970	0.0880		2		1/2		4
27209750	03120				0.0975	0.0960		2-1/4		5/8		4
27209800	01357		40		0.0980	0.0960		2-1/4		5/8		4
27209840	01361			2.50	0.0984	0.0960	2.44		57		16.0	4
27209850	03121				0.0985	0.0960		2-1/4		5/8		4
27209900	03122				0.0990	0.0960		2-1/4		5/8		4
27209950	01365		39		0.0995	0.0960		2-1/4		5/8		4
27210000	03123				0.1000	0.0960		2-1/4		5/8		4
27210040	01366			2.55	0.1004	0.0960	2.44		57		16.0	4
27210050	03124				0.1005	0.0960		2-1/4		5/8		4
27210100	03125				0.1010	0.0960		2-1/4		5/8		4
27210150	01369		38		0.1015	0.0960		2-1/4		5/8		4
27210200	03126				0.1020	0.0960		2-1/4		5/8		4
27210240	01373			2.60	0.1024	0.0960	2.44		57		16.0	4
27210250	03127				0.1025	0.0960		2-1/4		5/8		4
27210300	03128				0.1030	0.0960		2-1/4		5/8		4
27210350	03129				0.1035	0.0960		2-1/4		5/8		4
27210400	01377		37		0.1040	0.0960		2-1/4		5/8		4
27210430	01378			2.65	0.1043	0.0960	2.44		57		16.0	4
27210450	03130				0.1045	0.0960		2-1/4		5/8		4
27210500	03131				0.1050	0.0960		2-1/4		5/8		4
27210550	03132				0.1055	0.1040		2-1/4		5/8		4
27210600	03133				0.1060	0.1040		2-1/4		5/8		4
27210630	01381			2.70	0.1063	0.1040	2.64		57		16.0	4
27210650	01385		36		0.1065	0.1040		2-1/4		5/8		4
27210700	03134				0.1070	0.1040		2-1/4		5/8		4
27210750	03135				0.1075	0.1040		2-1/4		5/8		4
27210800	03136				0.1080	0.1040		2-1/4		5/8		4
27210830	01389			2.75	0.1083	0.1040	2.64		57		16.0	4
27210850	03137				0.1085	0.1040		2-1/4		5/8		4
27210900	03138				0.1090	0.1040		2-1/4		5/8		4
27210940	01393	7/64			0.1094	0.1040		2-1/4		5/8		4
27210950	03139				0.1095	0.1040		2-1/4		5/8		4
27211000	01397		35		0.1100	0.1040		2-1/4		5/8		4
27211020	01401			2.80	0.1102	0.1040	2.64		57		16.0	4
27211050	03140				0.1105	0.1040		2-1/4		5/8		4
27211100	01405		34		0.1110	0.1040		2-1/4		5/8		4
27211150	03141				0.1115	0.1040		2-1/4		5/8		4
27211200	03142				0.1120	0.1040		2-1/4		5/8		4
27211220	01406			2.85	0.1122	0.1040	2.64		57		16.0	4
27211250	03143				0.1125	0.1040		2-1/4		5/8		4
27211300	01409		33		0.1130	0.1040		2-1/4		5/8		4
27211350	03144				0.1135	0.1120		2-1/4		5/8		4



Series 272 Continued



Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27211400	03145				0.1140	0.1120		2-1/4		5/8		4
27211420	01413			2.90	0.1142	0.1120	2.84		57		16.0	4
27211450	03146				0.1145	0.1120		2-1/4		5/8		4
27211500	03147				0.1150	0.1120		2-1/4		5/8		4
27211550	03148				0.1155	0.1120		2-1/4		5/8		4
27211600	01417		32		0.1160	0.1120		2-1/4		5/8		4
27211610	01418			2.95	0.1161	0.1120	2.84		57		16.0	4
27211650	03149				0.1165	0.1120		2-1/4		5/8		4
27211700	03150				0.1170	0.1120		2-1/4		5/8		4
27211750	03151				0.1175	0.1120		2-1/4		5/8		4
27211800	03152				0.1180	0.1120		2-1/4		5/8		4
27211810	01421			3.00	0.1181	0.1120	2.84		57		16.0	4
27211850	03153				0.1185	0.1120		2-1/4		5/8		4
27211900	03154				0.1190	0.1120		2-1/4		5/8		4
27211950	03155				0.1195	0.1120		2-1/4		5/8		4
27212000	01425		31		0.1200	0.1120		2-1/4		5/8		4
27212010	01426			3.05	0.1201	0.1120	2.84		57		16.0	4
27212050	03156				0.1205	0.1120		2-1/4		5/8		4
27212100	03157				0.1210	0.1120		2-1/4		5/8		4
27212150	03158				0.1215	0.1200		2-1/4		5/8		4
27212200	01429			3.10	0.1220	0.1200	3.05		57		16.0	4
27212201	03629				0.1220	0.1200		2-1/4		5/8		4
27212250	03159				0.1225	0.1200		2-1/4		5/8		4
27212300	03160				0.1230	0.1200		2-1/4		5/8		4
27212350	03161				0.1235	0.1200		2-1/4		5/8		4
27212400	03162				0.1240	0.1200		2-1/4		5/8		4
27212401	01436			3.15	0.1240	0.1200	3.05		57		16.0	4
27212450	03163	1/8 DP2			0.1245	0.1200		2-1/4		5/8		4
27212470	01434				0.1247	0.1200		2-1/4		5/8		4
27212480	03164	1/8 DP1			0.1248	0.1200		2-1/4		5/8		4
27212490	03165	1/8 US			0.1249	0.1200		2-1/4		5/8		4
27212500	01433	1/8			0.1250	0.1200		2-1/4		5/8		4
27212550	03166				0.1255	0.1200		2-1/4		5/8		4
27212600	01437			3.20	0.1260	0.1200	3.05		57		16.0	4
27212601	03167	1/8 OS			0.1260	0.1200		2-1/4		5/8		4
27212650	03168				0.1265	0.1200		2-1/4		5/8		4
27212700	03169				0.1270	0.1200		2-1/4		5/8		4
27212750	03170				0.1275	0.1200		2-1/4		5/8		4
27212800	01441			3.25	0.1280	0.1200	3.05		57		16.0	4
27212801	03630				0.1280	0.1200		2-1/4		5/8		4
27212850	01445		30		0.1285	0.1270		2-1/2		3/4		4
27212900	03171				0.1290	0.1270		2-1/2		3/4		4

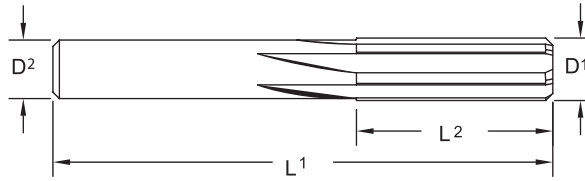
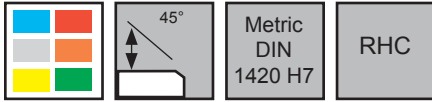


Series 272 Continued

Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27212950	03172				0.1295	0.1270		2-1/2		3/4		4
27212990	01449			3.30	0.1299	0.1270	3.23		63		19.0	4
27213000	03173				0.1300	0.1270		2-1/2		3/4		4
27213050	03174				0.1305	0.1270		2-1/2		3/4		4
27213100	03175				0.1310	0.1270		2-1/2		3/4		4
27213150	03176				0.1315	0.1270		2-1/2		3/4		4
27213190	01453			3.35	0.1319	0.1270	3.23		63		19.0	4
27213200	03177				0.1320	0.1270		2-1/2		3/4		4
27213250	03178				0.1325	0.1270		2-1/2		3/4		4
27213300	03179				0.1330	0.1270		2-1/2		3/4		4
27213350	03180				0.1335	0.1270		2-1/2		3/4		4
27213390	01457			3.40	0.1339	0.1270	3.23		63		19.0	4
27213400	03181				0.1340	0.1270		2-1/2		3/4		4
27213450	03182				0.1345	0.1270		2-1/2		3/4		4
27213500	03183				0.1350	0.1270		2-1/2		3/4		4
27213550	03184				0.1355	0.1270		2-1/2		3/4		4
27213580	01461			3.45	0.1358	0.1270	3.23		63		19.0	4
27213600	01465		29		0.1360	0.1270		2-1/2		3/4		4
27213650	03185				0.1365	0.1350		2-1/2		3/4		4
27213700	03186				0.1370	0.1350		2-1/2		3/4		4
27213750	03187				0.1375	0.1350		2-1/2		3/4		4
27213780	01469			3.50	0.1378	0.1350	3.43		63		19.0	4
27213800	03188				0.1380	0.1350		2-1/2		3/4		4
27213850	03189				0.1385	0.1350		2-1/2		3/4		4
27213900	03190				0.1390	0.1350		2-1/2		3/4		4
27213950	03191				0.1395	0.1350		2-1/2		3/4		4
27213980	01473			3.55	0.1398	0.1350	3.43		63		19.0	4
27214000	03192				0.1400	0.1350		2-1/2		3/4		4
27214050	01477		28		0.1405	0.1350		2-1/2		3/4		4
27214060	01481	9/64			0.1406	0.1350		2-1/2		3/4		4
27214100	03193				0.1410	0.1350		2-1/2		3/4		4
27214150	03194				0.1415	0.1350		2-1/2		3/4		4
27214170	01485			3.60	0.1417	0.1350	3.43		63		19.0	4
27214200	03195				0.1420	0.1350		2-1/2		3/4		4
27214250	03196				0.1425	0.1350		2-1/2		3/4		4
27214300	03197				0.1430	0.1350		2-1/2		3/4		4
27214350	03198				0.1435	0.1350		2-1/2		3/4		4
27214370	01489			3.65	0.1437	0.1350	3.43		63		19.0	4
27214400	01493		27		0.1440	0.1350		2-1/2		3/4		4
27214450	03199				0.1445	0.1430		2-1/2		3/4		4
27214500	03200				0.1450	0.1430		2-1/2		3/4		4
27214550	03201				0.1455	0.1430		2-1/2		3/4		4
27214570	01497			3.70	0.1457	0.1430	3.63		63		19.0	4
27214600	03202				0.1460	0.1430		2-1/2		3/4		4



Series 272 Continued



Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes	
		D1				D2		L1		L2			
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm		
27214650	03203				0.1465	0.1430			2-1/2		3/4		4
27214700	01501		26		0.1470	0.1430			2-1/2		3/4		4
27214750	03204				0.1475	0.1430			2-1/2		3/4		4
27214760	01505			3.75	0.1476	0.1430	3.63		63		19.0		4
27214800	03205				0.1480	0.1430			2-1/2		3/4		4
27214850	03206				0.1485	0.1430			2-1/2		3/4		4
27214900	03207				0.1490	0.1430			2-1/2		3/4		4
27214950	01509		25		0.1495	0.1430			2-1/2		3/4		4
27214960	01513			3.80	0.1496	0.1430	3.63		63		19.0		4
27215000	03208				0.1500	0.1430			2-1/2		3/4		4
27215050	03209				0.1505	0.1430			2-1/2		3/4		4
27215100	03210				0.1510	0.1430			2-1/2		3/4		4
27215150	03211				0.1515	0.1430			2-1/2		3/4		4
27215160	01518			3.85	0.1516	0.1430	3.63		63		19.0		4
27215200	01517		24		0.1520	0.1430			2-1/2		3/4		4
27215250	03213				0.1525	0.1510			2-1/2		3/4		4
27215300	03214				0.1530	0.1510			2-1/2		3/4		4
27215350	01521			3.90	0.1535	0.1510	3.84		63		19.0		4
27215351	03631				0.1535	0.1510			2-1/2		3/4		4
27215400	01525		23		0.1540	0.1510			2-1/2		3/4		4
27215450	03215				0.1545	0.1510			2-1/2		3/4		4
27215500	03216				0.1550	0.1510			2-1/2		3/4		4
27215550	01529			3.95	0.1555	0.1510	3.84		63		19.0		4
27215551	03632				0.1555	0.1510			2-1/2		3/4		4
27215600	03217				0.1560	0.1510			2-1/2		3/4		4
27215620	01533	5/32			0.1562	0.1510			2-1/2		3/4		4
27215650	03218				0.1565	0.1510			2-1/2		3/4		4
27215700	01537		22		0.1570	0.1510			2-1/2		3/4		4
27215750	01541			4.00	0.1575	0.1510	3.84		63		19.0		4
27215751	03633				0.1575	0.1510			2-1/2		3/4		4
27215800	03219				0.1580	0.1510			2-1/2		3/4		4
27215850	03220				0.1585	0.1510			2-1/2		3/4		4
27215900	01545		21		0.1590	0.1510			2-1/2		3/4		4
27215940	01549			4.05	0.1594	0.1580	4.01		70		22.0		4
27215950	03221				0.1595	0.1580			2-3/4		7/8		4
27216000	03222				0.1600	0.1580			2-3/4		7/8		4
27216050	03223				0.1605	0.1580			2-3/4		7/8		4
27216100	01553		20		0.1610	0.1580			2-3/4		7/8		4
27216140	01557			4.10	0.1614	0.1580	4.01		70		22.0		4
27216150	03224				0.1615	0.1580			2-3/4		7/8		4
27216200	03225				0.1620	0.1580			2-3/4		7/8		4
27216250	03226				0.1625	0.1580			2-3/4		7/8		4

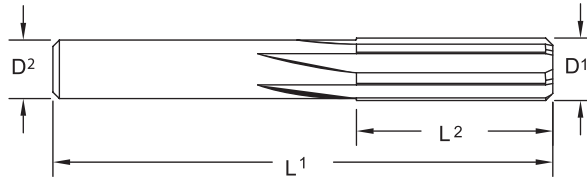
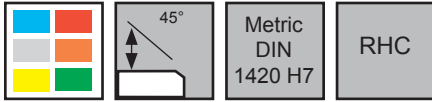


Series 272 Continued

Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27216300	03227				0.1630	0.1580		2-3/4		7/8		4
27216340	01561			4.15	0.1634	0.1580	4.01		70		22.0	4
27216350	03228				0.1635	0.1580		2-3/4		7/8		4
27216400	03229				0.1640	0.1580		2-3/4		7/8		4
27216450	03230				0.1645	0.1580		2-3/4		7/8		4
27216500	03231				0.1650	0.1580		2-3/4		7/8		4
27216540	01565			4.20	0.1654	0.1580	4.01		70		22.0	4
27216550	03232				0.1655	0.1580		2-3/4		7/8		4
27216600	01569		19		0.1660	0.1580		2-3/4		7/8		4
27216650	03233				0.1665	0.1580		2-3/4		7/8		4
27216700	03234				0.1670	0.1580		2-3/4		7/8		4
27216730	01573			4.25	0.1673	0.1660	4.22		70		22.0	4
27216750	03235				0.1675	0.1660		2-3/4		7/8		4
27216800	03236				0.1680	0.1660		2-3/4		7/8		4
27216850	03237				0.1685	0.1660		2-3/4		7/8		4
27216900	03238				0.1690	0.1660		2-3/4		7/8		4
27216930	01577			4.30	0.1693	0.1660	4.22		70		22.0	4
27216950	01581		18		0.1695	0.1660		2-3/4		7/8		4
27217000	03239				0.1700	0.1660		2-3/4		7/8		4
27217050	03240				0.1705	0.1660		2-3/4		7/8		4
27217100	03241				0.1710	0.1660		2-3/4		7/8		4
27217130	01585			4.35	0.1713	0.1660	4.22		70		22.0	4
27217150	03242				0.1715	0.1660		2-3/4		7/8		4
27217190	01589	11/64			0.1719	0.1660		2-3/4		7/8		4
27217200	03243				0.1720	0.1660		2-3/4		7/8		4
27217250	03244				0.1725	0.1660		2-3/4		7/8		4
27217300	01593		17		0.1730	0.1660		2-3/4		7/8		4
27217320	01597			4.40	0.1732	0.1660	4.22		70		22.0	4
27217350	03245				0.1735	0.1660		2-3/4		7/8		4
27217400	03246				0.1740	0.1660		2-3/4		7/8		4
27217450	03247				0.1745	0.1660		2-3/4		7/8		4
27217500	03248				0.1750	0.1660		2-3/4		7/8		4
27217520	01601			4.45	0.1752	0.1740	4.42		70		22.0	4
27217550	03249				0.1755	0.1740		2-3/4		7/8		4
27217600	03250				0.1760	0.1740		2-3/4		7/8		4
27217650	03251				0.1765	0.1740		2-3/4		7/8		4
27217700	01605		16		0.1770	0.1740		2-3/4		7/8		4
27217720	01609			4.50	0.1772	0.1740	4.42		70		22.0	4
27217750	03252				0.1775	0.1740		2-3/4		7/8		4
27217800	03253				0.1780	0.1740		2-3/4		7/8		4
27217850	03254				0.1785	0.1740		2-3/4		7/8		4
27217900	03255				0.1790	0.1740		2-3/4		7/8		4
27217910	01613			4.55	0.1791	0.1740	4.42		70		22.0	4
27217950	03256				0.1795	0.1740		2-3/4		7/8		4



Series 272 Continued



Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27218000	01617		15		0.1800	0.1740		2-3/4		7/8		4
27218050	03257				0.1805	0.1740		2-3/4		7/8		4
27218100	03258				0.1810	0.1740		2-3/4		7/8		4
27218110	01621			4.60	0.1811	0.1740	4.42		70		22.0	4
27218150	03259				0.1815	0.1740		2-3/4		7/8		4
27218200	01625		14		0.1820	0.1740		2-3/4		7/8		4
27218250	03260				0.1825	0.1740		2-3/4		7/8		4
27218300	03261				0.1830	0.1740		2-3/4		7/8		4
27218310	01629			4.65	0.1831	0.1820	4.62		70		22.0	4
27218350	03262				0.1835	0.1820		2-3/4		7/8		4
27218400	03263				0.1840	0.1820		2-3/4		7/8		4
27218450	03264				0.1845	0.1820		2-3/4		7/8		4
27218500	01633			4.70	0.1850	0.1820	4.62		70		22.0	4
27218501	03265		13		0.1850	0.1820		2-3/4		7/8		4
27218550	03266				0.1855	0.1820		2-3/4		7/8		4
27218600	03267				0.1860	0.1820		2-3/4		7/8		4
27218650	03268				0.1865	0.1820		2-3/4		7/8		4
27218700	01637			4.75	0.1870	0.1820	4.62		70		22.0	4
27218701	03269	3/16 DP2			0.1870	0.1820		2-3/4		7/8		4
27218730	03270	3/16 DP1			0.1873	0.1820		2-3/4		7/8		4
27218740	03271	3/16 US			0.1874	0.1820		2-3/4		7/8		4
27218750	01641	3/16			0.1875	0.1820		2-3/4		7/8		4
27218800	03272				0.1880	0.1820		2-3/4		7/8		4
27218850	03273	3/16 OS			0.1885	0.1820		2-3/4		7/8		4
27218890	01645			4.80	0.1889	0.1820	4.62		70		22.0	4
27218900	01649		12		0.1890	0.1820		2-3/4		7/8		4
27218950	03274				0.1895	0.1820		2-3/4		7/8		4
27219000	03275				0.1900	0.1820		2-3/4		7/8		4
27219050	03276				0.1905	0.1820		2-3/4		7/8		4
27219090	01653			4.85	0.1909	0.1820	4.62		70		22.0	4
27219100	01657		11		0.1910	0.1820		2-3/4		7/8		4
27219150	03277				0.1915	0.1900		3		1		4
27219200	03278				0.1920	0.1900		3		1		4
27219250	03279				0.1925	0.1900		3		1		4
27219290	01661			4.90	0.1929	0.1900	4.83		76		25.5	4
27219300	03280				0.1930	0.1900		3		1		4
27219350	01665		10		0.1935	0.1900		3		1		4
27219400	03281				0.1940	0.1900		3		1		4
27219450	03282				0.1945	0.1900		3		1		4
27219490	01669			4.95	0.1949	0.1900	4.83		76		25.5	4
27219500	03283				0.1950	0.1900		3		1		4
27219550	03284				0.1955	0.1900		3		1		4

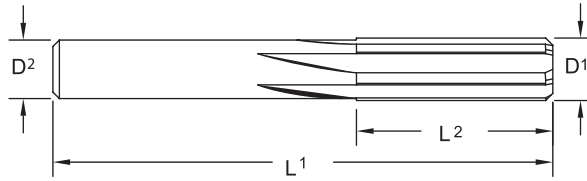
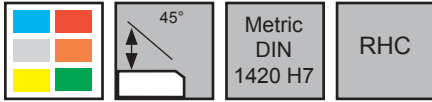


Series 272 Continued

Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27219600	01673		9		0.1960	0.1900		3		1		4
27219650	03285				0.1965	0.1900		3		1		4
27219690	01677			5.00	0.1969	0.1900	4.83		76		25.5	4
27219700	03286				0.1970	0.1900		3		1		4
27219750	03287				0.1975	0.1900		3		1		4
27219800	03288				0.1980	0.1900		3		1		4
27219850	03289				0.1985	0.1900		3		1		4
27219880	01681			5.05	0.1988	0.1900	4.83		76		25.5	4
27219900	01685		8		0.1990	0.1900		3		1		4
27219950	03290				0.1995	0.1980		3		1		4
27220000	03291				0.2000	0.1980		3		1		4
27220050	03292				0.2005	0.1980		3		1		4
27220080	01689			5.10	0.2008	0.1980	5.03		76		25.5	4
27220100	01693		7		0.2010	0.1980		3		1		4
27220150	03293				0.2015	0.1980		3		1		4
27220200	03294				0.2020	0.1980		3		1		4
27220250	03295				0.2025	0.1980		3		1		4
27220280	01697			5.15	0.2028	0.1980	5.03		76		25.5	4
27220300	03296				0.2030	0.1980		3		1		4
27220310	01701	13/64			0.2031	0.1980		3		1		4
27220350	03297				0.2035	0.1980		3		1		4
27220400	01705		6		0.2040	0.1980		3		1		4
27220450	03298				0.2045	0.1980		3		1		4
27220470	01709			5.20	0.2047	0.1980	5.03		76		25.5	4
27220500	03299				0.2050	0.1980		3		1		4
27220550	01713		5		0.2055	0.1980		3		1		4
27220600	03300				0.2060	0.1980		3		1		4
27220650	03301				0.2065	0.2050		3		1		4
27220670	01717			5.25	0.2067	0.2050	5.21		76		25.5	4
27220700	03302				0.2070	0.2050		3		1		4
27220750	03303				0.2075	0.2050		3		1		4
27220800	03304				0.2080	0.2050		3		1		4
27220850	03305				0.2085	0.2050		3		1		4
27220870	01721			5.30	0.2087	0.2050	5.21		76		25.5	4
27220900	01725		4		0.2090	0.2050		3		1		4
27220950	03306				0.2095	0.2050		3		1		4
27221000	03307				0.2100	0.2050		3		1		4
27221050	03308				0.2105	0.2050		3		1		4
27221060	01729			5.35	0.2106	0.2050	5.21		76		25.5	4
27221100	03309				0.2110	0.2050		3		1		4
27221150	03310				0.2115	0.2050		3		1		4
27221200	03311				0.2120	0.2050		3		1		4
27221250	03312				0.2125	0.2050		3		1		4
27221260	01733			5.40	0.2126	0.2050	5.21		76		25.5	4



Series 272 Continued



Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27221300	01737		3		0.2130	0.2050		3		1		4
27221350	03313				0.2135	0.2050		3		1		4
27221400	03314				0.2140	0.2050		3		1		4
27221450	03315				0.2145	0.2130		3		1		4
27221460	01741			5.45	0.2146	0.2130	5.41		76		25.5	4
27221500	03316				0.2150	0.2130		3		1		4
27221550	03317				0.2155	0.2130		3		1		4
27221600	03318				0.2160	0.2130		3		1		4
27221650	01745			5.50	0.2165	0.2130	5.41		76		25.5	4
27221651	03634				0.2165	0.2130		3		1		4
27221700	03319				0.2170	0.2130		3		1		4
27221750	03320				0.2175	0.2130		3		1		4
27221800	03321				0.2180	0.2130		3		1		4
27221850	01749			5.55	0.2185	0.2130	5.41		76		25.5	4
27221851	03635				0.2185	0.2130		3		1		4
27221870	01753	7/32			0.2187	0.2130		3		1		4
27221900	03322				0.2190	0.2130		3		1		4
27221950	03323				0.2195	0.2130		3		1		4
27222000	03324				0.2200	0.2130		3		1		4
27222050	01757			5.60	0.2205	0.2130	5.41		76		25.5	4
27222051	03636				0.2205	0.2130		3		1		4
27222100	01761		2		0.2210	0.2130		3		1		4
27222150	03325				0.2215	0.2130		3		1		4
27222200	03326				0.2220	0.2130		3		1		4
27222240	01765			5.65	0.2224	0.2210	5.61		76		25.5	4
27222250	03327				0.2225	0.2210		3		1		4
27222300	03328				0.2230	0.2210		3		1		4
27222350	03329				0.2235	0.2210		3		1		4
27222400	03330				0.2240	0.2210		3		1		4
27222440	01769			5.70	0.2244	0.2210	5.61		76		25.5	4
27222450	03331				0.2245	0.2210		3		1		4
27222500	03332				0.2250	0.2210		3		1		4
27222550	03333				0.2255	0.2210		3		1		4
27222600	03334				0.2260	0.2210		3		1		4
27222640	01773			5.75	0.2264	0.2210	5.61		76		25.5	4
27222650	03335				0.2265	0.2210		3		1		4
27222700	03336				0.2270	0.2210		3		1		4
27222750	03337				0.2275	0.2210		3		1		4
27222800	01777		1		0.2280	0.2210		3		1		4
27222830	01781			5.80	0.2283	0.2210	5.61		76		25.5	4
27222850	03338				0.2285	0.2210		3		1		4
27222900	03339				0.2290	0.2210		3		1		4

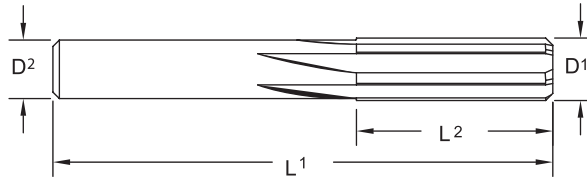
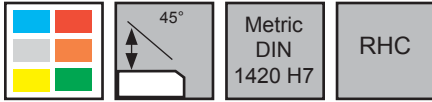


Series 272 Continued

Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27222950	03340				0.2295	0.2210		3		1		4
27223000	03341				0.2300	0.2210		3		1		4
27223030	01785			5.85	0.2303	0.2290	5.82		76		25.5	4
27223050	03342				0.2305	0.2290		3		1		4
27223100	03343				0.2310	0.2290		3		1		4
27223150	03344				0.2315	0.2290		3		1		4
27223200	03345				0.2320	0.2290		3		1		4
27223230	01789			5.90	0.2323	0.2290	5.82		76		25.5	4
27223250	03346				0.2325	0.2290		3		1		4
27223300	03347				0.2330	0.2290		3		1		4
27223350	03348				0.2335	0.2290		3		1		4
27223400	01793		A		0.2340	0.2290		3		1		4
27223430	01797			5.95	0.2343	0.2290	5.82		76		25.5	4
27223440	01801	15/64			0.2344	0.2290		3		1		4
27223450	03349				0.2345	0.2290		3		1		4
27223500	03350				0.2350	0.2290		3		1		4
27223550	03351				0.2355	0.2290		3		1		4
27223600	03352				0.2360	0.2290		3		1		4
27223620	01805			6.00	0.2362	0.2290	5.82		76		25.5	4
27223650	03353				0.2365	0.2290		3		1		4
27223700	03354				0.2370	0.2290		3		1		4
27223750	03355				0.2375	0.2360		3		1		4
27223800	01809		B		0.2380	0.2360		3		1		4
27223820	01810			6.05	0.2382	0.2360	5.99		76		25.5	4
27223850	03356				0.2385	0.2360		3		1		4
27223900	03357				0.2390	0.2360		3		1		4
27223950	03358				0.2395	0.2360		3		1		4
27224000	03359				0.2400	0.2360		3		1		4
27224020	01813			6.10	0.2402	0.2360	5.99		76		25.5	4
27224050	03360				0.2405	0.2360		3		1		4
27224100	03361				0.2410	0.2360		3		1		4
27224150	03362				0.2415	0.2360		3		1		4
27224200	01817		C		0.2420	0.2360		3		1		4
27224210	01818			6.15	0.2421	0.2360	5.99		76		25.5	4
27224250	03363				0.2425	0.2360		3		1		4
27224300	03364				0.2430	0.2360		3		1		4
27224350	03365				0.2435	0.2360		3		1		4
27224400	03366				0.2440	0.2360		3		1		4
27224410	01821			6.20	0.2441	0.2360	5.99		76		25.5	4
27224450	03367				0.2445	0.2360		3		1		4
27224500	03368				0.2450	0.2360		3		1		4
27224550	03369				0.2455	0.2440		3		1		4
27224600	01825		D		0.2460	0.2440		3		1		4
27224610	01829			6.25	0.2461	0.2440	6.20		76		25.5	4



Series 272 Continued



Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes	
		D1				D2		L1		L2			
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm		
27224650	03370				0.2465	0.2440			3		1		4
27224700	03371				0.2470	0.2440			3		1		4
27224750	03372				0.2475	0.2440			3		1		4
27224800	01833			6.30	0.2480	0.2440	6.20			76		25.5	4
27224801	03637				0.2480	0.2440			3		1		4
27224850	03373				0.2485	0.2440			3		1		4
27224900	03374				0.2490	0.2440			3		1		4
27224950	03375	1/4 DP2			0.2495	0.2440			3		1		4
27224980	03376	1/4 DP1			0.2498	0.2440			3		1		4
27224990	03377	1/4 US			0.2499	0.2440			3		1		4
27225000	01837	1/4	E		0.2500	0.2440			3		1		4
27225001	03378			6.35	0.2500	0.2440	6.20			76		25.5	4
27225050	03379				0.2505	0.2440			3		1		4
27225100	03380	1/4 OS			0.2510	0.2440			3		1		4
27225150	03381				0.2515	0.2440			3		1		4
27225190	01841			6.40	0.2519	0.2440	6.20			76		25.5	4
27225200	03382				0.2520	0.2440			3		1		4
27225250	03383				0.2525	0.2440			3		1		4
27225300	03384				0.2530	0.2440			3		1		4
27225390	01844			6.45	0.2539	0.2520	6.40			83		28.5	6
27225400	03385				0.2540	0.2520			3-1/4		1-1/8		6
27225500	03386				0.2550	0.2520			3-1/4		1-1/8		6
27225590	01845			6.50	0.2559	0.2520	6.40			83		28.5	6
27225600	03387				0.2560	0.2520			3-1/4		1-1/8		6
27225700	01849		F		0.2570	0.2520			3-1/4		1-1/8		6
27225800	03388				0.2580	0.2520			3-1/4		1-1/8		6
27225900	03389				0.2590	0.2520			3-1/4		1-1/8		6
27226000	03390				0.2600	0.2520			3-1/4		1-1/8		6
27226100	01853		G		0.2610	0.2520			3-1/4		1-1/8		6
27226200	03391				0.2620	0.2520			3-1/4		1-1/8		6
27226300	03392				0.2630	0.2520			3-1/4		1-1/8		6
27226400	03393				0.2640	0.2520			3-1/4		1-1/8		6
27226500	03394				0.2650	0.2520			3-1/4		1-1/8		6
27226560	01857	17/64			0.2656	0.2520			3-1/4		1-1/8		6
27226600	01861		H		0.2660	0.2520			3-1/4		1-1/8		6
27226700	03395				0.2670	0.2520			3-1/4		1-1/8		6
27226800	03396				0.2680	0.2520			3-1/4		1-1/8		6
27226900	03397				0.2690	0.2520			3-1/4		1-1/8		6
27227000	03398				0.2700	0.2520			3-1/4		1-1/8		6
27227100	03399				0.2710	0.2520			3-1/4		1-1/8		6
27227200	01865		I		0.2720	0.2700			3-1/4		1-1/8		6
27227300	03400				0.2730	0.2700			3-1/4		1-1/8		6

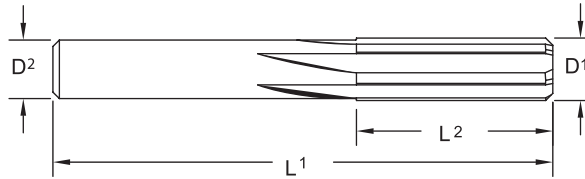
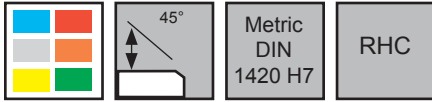


Series 272 Continued

Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27227400	03401				0.2740	0.2700		3-1/4		1-1/8		6
27227500	03402				0.2750	0.2700		3-1/4		1-1/8		6
27227560	01869			7.00	0.2756	0.2700	6.86		83		28.5	6
27227600	03403				0.2760	0.2700		3-1/4		1-1/8		6
27227700	01873		J		0.2770	0.2700		3-1/4		1-1/8		6
27227800	03404				0.2780	0.2700		3-1/4		1-1/8		6
27227900	03405				0.2790	0.2700		3-1/4		1-1/8		6
27228000	03406				0.2800	0.2700		3-1/4		1-1/8		6
27228100	01877		K		0.2810	0.2700		3-1/4		1-1/8		6
27228120	01881	9/32			0.2812	0.2700		3-1/4		1-1/8		6
27228200	03407				0.2820	0.2700		3-1/4		1-1/8		6
27228300	03408				0.2830	0.2700		3-1/4		1-1/8		6
27228400	03409				0.2840	0.2700		3-1/4		1-1/8		6
27228500	03410				0.2850	0.2700		3-1/4		1-1/8		6
27228600	03411				0.2860	0.2700		3-1/4		1-1/8		6
27228700	03412				0.2870	0.2850		3-1/4		1-1/8		6
27228800	03413				0.2880	0.2850		3-1/4		1-1/8		6
27228900	03414				0.2890	0.2850		3-1/4		1-1/8		6
27229000	01885		L		0.2900	0.2850		3-1/4		1-1/8		6
27229100	03415				0.2910	0.2850		3-1/4		1-1/8		6
27229200	03416				0.2920	0.2850		3-1/4		1-1/8		6
27229300	03417				0.2930	0.2850		3-1/4		1-1/8		6
27229400	03418				0.2940	0.2850		3-1/4		1-1/8		6
27229500	01889		M		0.2950	0.2850		3-1/4		1-1/8		6
27229530	01893			7.50	0.2953	0.2850	7.24		83		28.5	6
27229600	03419				0.2960	0.2850		3-1/4		1-1/8		6
27229680	01897	19/64			0.2968	0.2850		3-1/4		1-1/8		6
27229700	03420				0.2970	0.2850		3-1/4		1-1/8		6
27229800	03421				0.2980	0.2850		3-1/4		1-1/8		6
27229900	03422				0.2990	0.2850		3-1/4		1-1/8		6
27230000	03423				0.3000	0.2850		3-1/4		1-1/8		6
27230100	03424				0.3010	0.2850		3-1/4		1-1/8		6
27230200	01901		N		0.3020	0.2850		3-1/4		1-1/8		6
27230300	03425				0.3030	0.3010		3-1/4		1-1/8		6
27230400	03426				0.3040	0.3010		3-1/4		1-1/8		6
27230500	03427				0.3050	0.3010		3-1/4		1-1/8		6
27230600	03428				0.3060	0.3010		3-1/4		1-1/8		6
27230700	03429				0.3070	0.3010		3-1/4		1-1/8		6
27230800	03430				0.3080	0.3010		3-1/4		1-1/8		6
27230900	03431				0.3090	0.3010		3-1/4		1-1/8		6
27231000	03432				0.3100	0.3010		3-1/4		1-1/8		6
27231050	01903				0.3105	0.3010		3-1/4		1-1/8		6
27231100	03433				0.3110	0.3010		3-1/4		1-1/8		6
27231150	01904				0.3115	0.3010		3-1/4		1-1/8		6
27231200	03434	5/16 DP2			0.3120	0.3010		3-1/4		1-1/8		6



Series 272 Continued



Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes	
		D1				D2		L1		L2			
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm		
27231230	03435	5/16 DP1			0.3123	0.3010			3-1/4		1-1/8		6
27231240	03436	5/16 US			0.3124	0.3010			3-1/4		1-1/8		6
27231250	01905	5/16			0.3125	0.3010			3-1/4		1-1/8		6
27231300	03437				0.3130	0.3010			3-1/4		1-1/8		6
27231350	03438	5/16 OS			0.3135	0.3010			3-1/4		1-1/8		6
27231400	03439				0.3140	0.3010			3-1/4		1-1/8		6
27231500	01909			8.00	0.3150	0.3010	7.65		83		28.5		6
27231501	03638				0.3150	0.3010			3-1/4		1-1/8		6
27231600	01913		O		0.3160	0.3010			3-1/4		1-1/8		6
27231700	03440				0.3170	0.3010			3-1/4		1-1/8		6
27231800	03441				0.3180	0.3010			3-1/4		1-1/8		6
27231900	03442				0.3190	0.3170			3-1/2		1-1/4		6
27232000	03443				0.3200	0.3170			3-1/2		1-1/4		6
27232100	03444				0.3210	0.3170			3-1/2		1-1/4		6
27232200	03445				0.3220	0.3170			3-1/2		1-1/4		6
27232300	01917		P		0.3230	0.3170			3-1/2		1-1/4		6
27232400	03446				0.3240	0.3170			3-1/2		1-1/4		6
27232500	03447				0.3250	0.3170			3-1/2		1-1/4		6
27232600	03448				0.3260	0.3170			3-1/2		1-1/4		6
27232700	03449				0.3270	0.3170			3-1/2		1-1/4		6
27232800	03450				0.3280	0.3170			3-1/2		1-1/4		6
27232810	01921	21/64			0.3281	0.3170			3-1/2		1-1/4		6
27232900	03451				0.3290	0.3170			3-1/2		1-1/4		6
27233000	03452				0.3300	0.3170			3-1/2		1-1/4		6
27233100	03453				0.3310	0.3170			3-1/2		1-1/4		6
27233200	01925		Q		0.3320	0.3170			3-1/2		1-1/4		6
27233300	03454				0.3330	0.3170			3-1/2		1-1/4		6
27233400	03455				0.3340	0.3320			3-1/2		1-1/4		6
27233460	01929			8.50	0.3346	0.3320	8.43		89		32.0		6
27233500	03456				0.3350	0.3320			3-1/2		1-1/4		6
27233600	03457				0.3360	0.3320			3-1/2		1-1/4		6
27233700	03458				0.3370	0.3320			3-1/2		1-1/4		6
27233800	03459				0.3380	0.3320			3-1/2		1-1/4		6
27233900	01933		R		0.3390	0.3320			3-1/2		1-1/4		6
27234000	03460				0.3400	0.3320			3-1/2		1-1/4		6
27234100	03461				0.3410	0.3320			3-1/2		1-1/4		6
27234200	03462				0.3420	0.3320			3-1/2		1-1/4		6
27234300	03463				0.3430	0.3320			3-1/2		1-1/4		6
27234370	01937	11/32			0.3437	0.3320			3-1/2		1-1/4		6
27234400	03464				0.3440	0.3320			3-1/2		1-1/4		6
27234500	03465				0.3450	0.3320			3-1/2		1-1/4		6
27234600	03466				0.3460	0.3320			3-1/2		1-1/4		6
27234700	03467				0.3470	0.3320			3-1/2		1-1/4		6

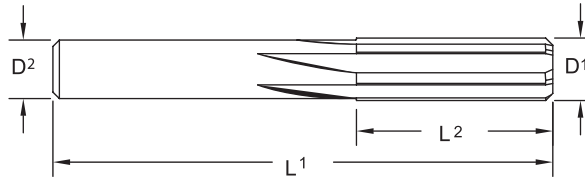
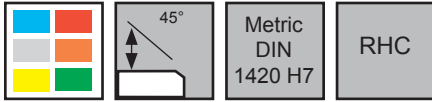


Series 272 Continued

Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27234800	01941		S		0.3480	0.3320		3-1/2		1-1/4		6
27234900	03468				0.3490	0.3320		3-1/2		1-1/4		6
27235000	03469				0.3500	0.3480		3-1/2		1-1/4		6
27235100	03470				0.3510	0.3480		3-1/2		1-1/4		6
27235200	03471				0.3520	0.3480		3-1/2		1-1/4		6
27235300	03472				0.3530	0.3480		3-1/2		1-1/4		6
27235400	03473				0.3540	0.3480		3-1/2		1-1/4		6
27235430	01945			9.00	0.3543	0.3480	8.84		89		32.0	6
27235500	03474				0.3550	0.3480		3-1/2		1-1/4		6
27235600	03475				0.3560	0.3480		3-1/2		1-1/4		6
27235700	03476				0.3570	0.3480		3-1/2		1-1/4		6
27235800	01949		T		0.3580	0.3480		3-1/2		1-1/4		6
27235900	03477				0.3590	0.3480		3-1/2		1-1/4		6
27235940	01953	23/64			0.3594	0.3480		3-1/2		1-1/4		6
27236000	03478				0.3600	0.3480		3-1/2		1-1/4		6
27236100	03479				0.3610	0.3480		3-1/2		1-1/4		6
27236200	03480				0.3620	0.3480		3-1/2		1-1/4		6
27236300	03481				0.3630	0.3480		3-1/2		1-1/4		6
27236400	03482				0.3640	0.3480		3-1/2		1-1/4		6
27236500	03483				0.3650	0.3630		3-1/2		1-1/4		6
27236600	03484				0.3660	0.3630		3-1/2		1-1/4		6
27236700	03485				0.3670	0.3630		3-1/2		1-1/4		6
27236800	01957		U		0.3680	0.3630		3-1/2		1-1/4		6
27236900	03486				0.3690	0.3630		3-1/2		1-1/4		6
27237000	03487				0.3700	0.3630		3-1/2		1-1/4		6
27237100	03488				0.3710	0.3630		3-1/2		1-1/4		6
27237200	03489				0.3720	0.3630		3-1/2		1-1/4		6
27237300	03490				0.3730	0.3630		3-1/2		1-1/4		6
27237400	01961			9.50	0.3740	0.3630	9.22		89		32.0	6
27237401	03639				0.3740	0.3630		3-1/2		1-1/4		6
27237450	03491	3/8 DP2			0.3745	0.3630		3-1/2		1-1/4		6
27237480	03492	3/8 DP1			0.3748	0.3630		3-1/2		1-1/4		6
27237490	03493	3/8 US			0.3749	0.3630		3-1/2		1-1/4		6
27237500	01965	3/8			0.3750	0.3630		3-1/2		1-1/4		6
27237600	03494	3/8 OS			0.3760	0.3630		3-1/2		1-1/4		6
27237700	01969		V		0.3770	0.3630		3-1/2		1-1/4		6
27237800	03495				0.3780	0.3630		3-1/2		1-1/4		6
27237900	03496				0.3790	0.3630		3-1/2		1-1/4		6
27238000	03497				0.3800	0.3630		3-1/2		1-1/4		6
27238100	03498				0.3810	0.3630		3-1/2		1-1/4		6
27238200	03499				0.3820	0.3630		3-1/2		1-1/4		6
27238300	03500				0.3830	0.3630		3-1/2		1-1/4		6
27238400	03501				0.3840	0.3630		3-1/2		1-1/4		6
27238500	03502				0.3850	0.3630		3-1/2		1-1/4		6
27238600	01973		W		0.3860	0.3630		3-1/2		1-1/4		6
27238700	03503				0.3870	0.3800		3-1/2		1-1/4		6



Series 272 Continued



Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes	
		D1				D2		L1		L2			
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm		
27238800	03504				0.3880	0.3800			3-1/2		1-1/4		6
27238900	03505				0.3890	0.3800			3-1/2		1-1/4		6
27239000	03506				0.3900	0.3800			3-1/2		1-1/4		6
27239060	01977	25/64			0.3906	0.3800			3-1/2		1-1/4		6
27239100	03507				0.3910	0.3800			3-1/2		1-1/4		6
27239200	03508				0.3920	0.3800			3-1/2		1-1/4		6
27239300	03509				0.3930	0.3800			3-1/2		1-1/4		6
27239370	01979			10.00	0.3937	0.3800	9.65		89		32.0		6
27239400	03510				0.3940	0.3800			3-1/2		1-1/4		6
27239500	03511				0.3950	0.3800			3-1/2		1-1/4		6
27239600	03512				0.3960	0.3800			3-1/2		1-1/4		6
27239700	01981		X		0.3970	0.3800			3-1/2		1-1/4		6
27239800	03513				0.3980	0.3800			3-1/2		1-1/4		6
27239900	03514				0.3990	0.3800			3-1/2		1-1/4		6
27240000	03515				0.4000	0.3800			3-1/2		1-1/4		6
27240100	03516				0.4010	0.3800			3-1/2		1-1/4		6
27240200	03517				0.4020	0.3800			3-1/2		1-1/4		6
27240300	03518				0.4030	0.3800			3-1/2		1-1/4		6
27240400	01983		Y		0.4040	0.3800			3-1/2		1-1/4		6
27240500	03519				0.4050	0.3800			3-1/2		1-1/4		6
27240600	03520				0.4060	0.3800			3-1/2		1-1/4		6
27240620	01985	13/32			0.4062	0.3800			3-1/2		1-1/4		6
27240700	03521				0.4070	0.3800			3-1/2		1-1/4		6
27240800	03522				0.4080	0.3800			3-1/2		1-1/4		6
27240900	03523				0.4090	0.3800			3-1/2		1-1/4		6
27241000	03524				0.4100	0.3800			3-1/2		1-1/4		6
27241100	03525				0.4110	0.3800			3-1/2		1-1/4		6
27241200	03526				0.4120	0.3800			3-1/2		1-1/4		6
27241300	01987		Z		0.4130	0.3800			3-1/2		1-1/4		6
27241340	01989			10.50	0.4134	0.3800	9.65		89		32.0		6
27241400	03527				0.4140	0.3800			3-1/2		1-1/4		6
27241500	03528				0.4150	0.3800			3-1/2		1-1/4		6
27241600	03529				0.4160	0.4100			3-3/4		1-3/8		6
27241700	03530				0.4170	0.4100			3-3/4		1-3/8		6
27241800	03531				0.4180	0.4100			3-3/4		1-3/8		6
27241900	03532				0.4190	0.4100			3-3/4		1-3/8		6
27242000	03533				0.4200	0.4100			3-3/4		1-3/8		6
27242100	03534				0.4210	0.4100			3-3/4		1-3/8		6
27242190	01991	27/64			0.4219	0.4100			3-3/4		1-3/8		6
27242200	03535				0.4220	0.4100			3-3/4		1-3/8		6
27242300	03536				0.4230	0.4100			3-3/4		1-3/8		6
27242400	03537				0.4240	0.4100			3-3/4		1-3/8		6

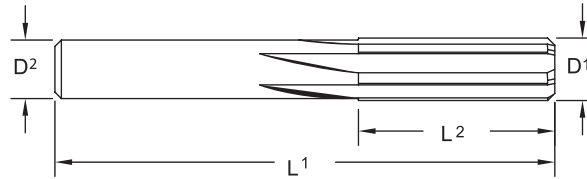
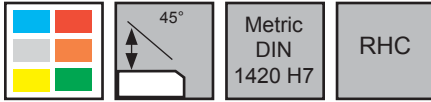


Series 272 Continued

Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27242500	03538				0.4250	0.4100		3-3/4		1-3/8		6
27242600	03539				0.4260	0.4100		3-3/4		1-3/8		6
27242700	03540				0.4270	0.4100		3-3/4		1-3/8		6
27242800	03541				0.4280	0.4100		3-3/4		1-3/8		6
27242900	03542				0.4290	0.4100		3-3/4		1-3/8		6
27243000	03543				0.4300	0.4100		3-3/4		1-3/8		6
27243100	03544				0.4310	0.4100		3-3/4		1-3/8		6
27243200	03545				0.4320	0.4100		3-3/4		1-3/8		6
27243300	03546				0.4330	0.4100		3-3/4		1-3/8		6
27243310	01993			11.00	0.4331	0.4100	10.41		95		35.0	6
27243400	03547				0.4340	0.4100		3-3/4		1-3/8		6
27243500	03548				0.4350	0.4100		3-3/4		1-3/8		6
27243600	03549				0.4360	0.4100		3-3/4		1-3/8		6
27243700	03550	7/16 DP2			0.4370	0.4100		3-3/4		1-3/8		6
27243730	03551	7/16 DP1			0.4373	0.4100		3-3/4		1-3/8		6
27243740	03552	7/16 US			0.4374	0.4100		3-3/4		1-3/8		6
27243750	01995	7/16			0.4375	0.4100		3-3/4		1-3/8		6
27243800	03553				0.4380	0.4100		3-3/4		1-3/8		6
27243850	03619	7/16 OS			0.4385	0.4100		3-3/4		1-3/8		6
27243900	03554				0.4390	0.4100		3-3/4		1-3/8		6
27244000	03555				0.4400	0.4100		3-3/4		1-3/8		6
27244100	03556				0.4410	0.4100		3-3/4		1-3/8		6
27244200	03557				0.4420	0.4100		3-3/4		1-3/8		6
27244300	03558				0.4430	0.4100		3-3/4		1-3/8		6
27244400	03559				0.4440	0.4100		3-3/4		1-3/8		6
27244500	03560				0.4450	0.4100		3-3/4		1-3/8		6
27244600	03561				0.4460	0.4400		3-3/4		1-3/8		6
27244700	03562				0.4470	0.4400		3-3/4		1-3/8		6
27244800	03563				0.4480	0.4400		3-3/4		1-3/8		6
27244900	03564				0.4490	0.4400		3-3/4		1-3/8		6
27245000	03565				0.4500	0.4400		3-3/4		1-3/8		6
27245100	03566				0.4510	0.4400		3-3/4		1-3/8		6
27245200	03567				0.4520	0.4400		3-3/4		1-3/8		6
27245270	01997			11.50	0.4527	0.4400	11.18		95		35.0	6
27245300	03568				0.4530	0.4400		3-3/4		1-3/8		6
27245310	01999	29/64			0.4531	0.4400		3-3/4		1-3/8		6
27245400	03569				0.4540	0.4400		3-3/4		1-3/8		6
27245500	03570				0.4550	0.4400		3-3/4		1-3/8		6
27245600	03571				0.4560	0.4400		3-3/4		1-3/8		6
27245700	03572				0.4570	0.4400		3-3/4		1-3/8		6
27245800	03573				0.4580	0.4400		3-3/4		1-3/8		6
27245900	03574				0.4590	0.4400		3-3/4		1-3/8		6
27246000	03575				0.4600	0.4400		3-3/4		1-3/8		6
27246100	03576				0.4610	0.4400		3-3/4		1-3/8		6
27246200	03577				0.4620	0.4400		3-3/4		1-3/8		6
27246300	03578				0.4630	0.4400		3-3/4		1-3/8		6



Series 272 Continued



Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes	
		D1				D2		L1		L2			
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm		
27246400	03579				0.4640	0.4400			3-3/4		1-3/8		6
27246500	03580				0.4650	0.4400			3-3/4		1-3/8		6
27246600	03581				0.4660	0.4400			3-3/4		1-3/8		6
27246700	03582				0.4670	0.4400			3-3/4		1-3/8		6
27246800	03583				0.4680	0.4400			3-3/4		1-3/8		6
27246880	02001	15/32			0.4688	0.4400			3-3/4		1-3/8		6
27246900	03584				0.4690	0.4400			3-3/4		1-3/8		6
27247000	03585				0.4700	0.4400			3-3/4		1-3/8		6
27247100	03586				0.4710	0.4400			3-3/4		1-3/8		6
27247200	03587				0.4720	0.4400			3-3/4		1-3/8		6
27247240	02003			12.00	0.4724	0.4400	11.18		95		35.0		6
27247300	03588				0.4730	0.4400			3-3/4		1-3/8		6
27247400	03589				0.4740	0.4400			3-3/4		1-3/8		6
27247500	03590				0.4750	0.4400			3-3/4		1-3/8		6
27247600	03591				0.4760	0.4700			4		1-1/2		6
27247700	03592				0.4770	0.4700			4		1-1/2		6
27247800	03593				0.4780	0.4700			4		1-1/2		6
27247900	03594				0.4790	0.4700			4		1-1/2		6
27248000	03595				0.4800	0.4700			4		1-1/2		6
27248100	03596				0.4810	0.4700			4		1-1/2		6
27248200	03597				0.4820	0.4700			4		1-1/2		6
27248300	03598				0.4830	0.4700			4		1-1/2		6
27248400	03599				0.4840	0.4700			4		1-1/2		6
27248440	02005	31/64			0.4844	0.4700			4		1-1/2		6
27248500	03600				0.4850	0.4700			4		1-1/2		6
27248600	03601				0.4860	0.4700			4		1-1/2		6
27248700	03602				0.4870	0.4700			4		1-1/2		6
27248800	03603				0.4880	0.4700			4		1-1/2		6
27248900	03604				0.4890	0.4700			4		1-1/2		6
27249000	03605				0.4900	0.4700			4		1-1/2		6
27249100	03606				0.4910	0.4700			4		1-1/2		6
27249200	03607				0.4920	0.4700			4		1-1/2		6
27249300	03608				0.4930	0.4700			4		1-1/2		6
27249400	03609				0.4940	0.4700			4		1-1/2		6
27249500	03610				0.4950	0.4700			4		1-1/2		6
27249600	03611				0.4960	0.4700			4		1-1/2		6
27249700	03612				0.4970	0.4700			4		1-1/2		6
27249800	03613				0.4980	0.4700			4		1-1/2		6
27249900	03614				0.4990	0.4700			4		1-1/2		6
27249950	03615	1/2 DP2			0.4995	0.4700			4		1-1/2		6
27249980	03616	1/2 DP1			0.4998	0.4700			4		1-1/2		6
27249990	03617	1/2 US			0.4999	0.4700			4		1-1/2		6



Series 272 Continued

Tool No.	EDP	Diameter				Shank		OAL		Flute Length		Flutes
		D1				D2		L1		L2		
		Inch	Wire	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	
27250000	02007	1/2			0.5000	0.4700		4		1-1/2		6
27250100	03618	1/2 OS			0.5010	0.4700		4		1-1/2		6
27251180	02009			13.00	0.5118	0.5050	12.83		102		38.0	6
27251560	02011	33/64			0.5156	0.5050		4		1-1/2		6
27253120	02013	17/32			0.5312	0.5050		4		1-1/2		6
27254690	02015	35/64			0.5469	0.5350		4		1-1/2		6
27255120	02017			14.00	0.5512	0.5350	13.59		102		38.0	6
27256250	02019	9/16			0.5625	0.5350		4		1-1/2		6
27257810	02021	37/64			0.5781	0.5650		4		1-3/4		6
27259050	02023			15.00	0.5905	0.5650	14.35		102		44.5	6
27259380	02025	19/32			0.5938	0.5650		4		1-3/4		6
27260940	02027	39/64			0.6094	0.5950		4		1-3/4		6
27262500	02029	5/8			0.6250	0.5950		4		1-3/4		6
27262990	02031			16.00	0.6299	0.5950	15.11		102		44.5	6



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Troubleshooting Chart

Problem	Possible Solution																		
	Speed & Feed						Tool Geometry						Coolant & Stock Removal						
	Reduce Feed	Increase Feed	Reduce Speed	Increase Speed	Use Larger Reamer	Use Smaller Reamer	Bad Speed & Feed	Worn Tool Margin	Worn Cutting Edge	Uneven Lip Height	Chip Capacity of Reamer	Too Much Clearance	Grind Larger Back Taper	Bent Reamer	Insufficient Stock	Too Much Stock	Use Coolant	Run Dry	Poor Hole Prep
Burnishing		X								X				X					
Reamer Wear	X		X				X									X	X		X
Hole Quality	X		X				X	X	X	X					X	X	X		X
Hole Undersize	X		X		X			X	X						X	X	X		
Hole Oversize		X		X		X		X	X					X		X	X	X	X
Accuracy	X					X				X							X		
Chatter		X	X							X	X	X			X		X		
Out of Round Hole					X			X	X	X	X				X	X	X		
Hole Taper						X		X	X	X			X			X	X		
Bell Mouth		X					X	X	X		X		X	X			X		
Reamer Life		X	X				X			X		X					X		
Scoring in Bore							X	X	X	X					X	X	X		X
Deflection																			

Problem	Possible Solution													
	Set Up						Cutting Errors							
	Alignment	Holder Accuracy	Concentricity	Use Adjustable Holder	Use Floating Holder	Lack of Rigidity in Set-Up	Work Holding Error	Spindle Bearings	Tool Extended Too Far	Poor Regrind	Poor Machinability	Built Up Edge	Wrong Tool	Poor Chip Removal
Burnishing	X						X			X				
Reamer Wear	X	X					X			X	X		X	
Hole Quality	X		X				X			X	X	X	X	
Hole Undersize	X										X			
Hole Oversize	X		X				X			X	X	X	X	
Accuracy							X			X				
Chatter	X	X				X	X	X	X	X				
Out of Round Hole	X						X			X				
Hole Taper	X	X	X	X	X		X			X	X	X		
Bell Mouth	X	X	X	X	X		X			X	X			
Reamer Life	X	X	X			X	X	X	X	X				
Scoring in Bore			X								X	X		X
Deflection	X													

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Total Stock Allowance - Inch

Material		Drill Decimal Equivalent/Size										
		.0135	.029/.028	.055/.052	.113	.238	.3594	.4844	.6094	.7344	.8594	.9844/1.480
		#80	#69/#70	#54/#55	#33	LET "B"	23/64	31/64	39/64	47/64	55/64	63/64
		Reamer Diameter										
		.0150	.0320	.0625	.1250	.2500	.3750	.5000	.6250	.7500	.8750	1.000-1.500
		Total Stock Allowance										
Magnesium		.0014	.0030	.0060	.0110	.0120	.0150	.0160	.0180	.0200	.0210	.0220
Aluminum	<5%SI	.0014	.0030	.0060	.0110	.0120	.0150	.0160	.0180	.0200	.0210	.0220
	>5%SI	.0014	.0030	.0060	.0110	.0120	.0130	.0150	.0160	.0180	.0190	.0200
Brass & Soft Bronze	Brass	.0014	.0030	.0060	.0110	.0120	.0130	.0150	.0160	.0180	.0190	.0200
	Bronze	.0014	.0030	.0060	.0110	.0120	.0140	.0150	.0170	.0190	.0200	.0210
Copper & Hard Bronze		.0014	.0030	.0060	.0110	.0120	.0140	.0150	.0170	.0190	.0200	.0210
Cast Iron	Cast	.0013	.0028	.0055	.0099	.0110	.0130	.0140	.0160	.0180	.0190	.0200
	Ductile	.0013	.0028	.0055	.0099	.0110	.0130	.0140	.0150	.0170	.0180	.0190
Steel	<35% C	.0013	.0028	.0055	.0099	.0110	.0130	.0140	.0160	.0170	.0180	.0190
	>35% C	.0012	.0025	.0049	.0089	.0100	.0120	.0130	.0150	.0170	.0180	.0190
	Tool	.0012	.0025	.0049	.0089	.0100	.0120	.0130	.0150	.0170	.0180	.0190
	Hard	.0009	.0020	.0040	.0072	.0080	.0100	.0110	.0130	.0140	.0150	.0160
Stainless		.0012	.0025	.0049	.0089	.0100	.0120	.0130	.0150	.0160	.0170	.0180
High Temp Alloys	Soft	.0012	.0025	.0049	.0089	.0100	.0110	.0130	.0140	.0160	.0170	.0180
	Hard	.0010	.0023	.0044	.0081	.0090	.0100	.0120	.0130	.0140	.0150	.0160
Titanium		.0013	.0028	.0055	.0099	.0110	.0130	.0140	.0160	.0170	.0180	.0190

Dowel Pin Chart - Inch

Dowel Pin	Nominal Dowel Decimal	Tight Press Fit Reamer		Tight Press Fit Reamer 0.0005		Loose Press Fit Reamer		Tight Slip Fit		Loose Slip Fit Reamer	
Size	Decimal	0.0005	Tool No.	DP(2)	Tool No.	DP(1)	Tool No.	Reamer	Tool No.	OS	Tool No.
1/8	.1250	.1230	27212300	.1245	27212450	.1248	27212480	.1255	27212550	.1260	27212601
3/16	.1875	.1855	27218550	.1870	27218701	.1873	27218730	.1880	27218800	.1885	27218850
1/4	.2500	.2480	27224801	.2495	27224950	.2498	27224980	.2505	27225050	.2510	27225100
5/16	.3125	.3110	27231100	.3120	27231200	.3123	27231230	.3130	27231300	.3135	27231350
3/8	.3750	.3740	27237401	.3745	27237450	.3748	27237480	.3750	27237500	.3760	27237600
7/16	.4735	.4360	27243600	.4370	27243700	.4373	27243730	.4380	27243800	.4385	27243850
1/2	.5000	.4990	27249900	.4995	27249950	.4998	27249980	.5000	27250000	.5010	27250100

+ 0.0001/ +0.0003 Tolerance (Reamer) Normal Dowels are nominal Size +.0001/ -.0001

Safety Note

Always wear the appropriate personal protective equipment such as safety glasses and protective clothing when using solid carbide or HSS cutting tools. Machines should be fully guarded. Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Total Stock Allowance - Metric

Material		Drill Size (mm)										
		0.30	0.90	1.80	2.70	3.70	4.70	5.70	7.60	9.60	11.60	15.50
		Reamer Diameter										
		0.35	1.00	2.00	3.00	4.00	5.00	6.00	8.00	10.00	12.00	16.00
		Total Stock Allowance										
Magnesium		.04	.09	.19	.27	.29	.29	.30	.34	.38	.40	.46
Aluminum	<5%Si	.04	.09	.19	.27	.29	.29	.30	.34	.38	.40	.46
	>5%Si	.04	.09	.19	.27	.29	.29	.30	.32	.34	.37	.41
Brass & Soft Bronze	Brass	.04	.09	.19	.27	.29	.29	.30	.32	.34	.37	.41
	Bronze	.04	.09	.19	.27	.29	.29	.30	.33	.36	.38	.43
Copper & Hard Bronze		.04	.09	.19	.27	.29	.29	.30	.33	.36	.38	.43
Cast Iron	Cast	.03	.09	.17	.24	.26	.27	.28	.31	.33	.35	.41
	Ductile	.03	.09	.17	.24	.26	.27	.28	.31	.33	.35	.38
Steel	<35% C	.03	.09	.17	.24	.26	.27	.28	.31	.33	.35	.41
	>35% C	.03	.08	.15	.21	.23	.24	.25	.28	.31	.32	.38
	Tool	.03	.08	.15	.21	.23	.24	.25	.28	.31	.32	.38
	Hard	.02	.06	.12	.17	.19	.19	.20	.23	.26	.27	.33
Stainless		.03	.08	.15	.21	.23	.24	.25	.28	.31	.32	.38
High Temp Alloys	Soft	.03	.08	.15	.21	.23	.24	.25	.27	.29	.32	.36
	Hard	.03	.07	.14	.20	.21	.22	.23	.24	.26	.29	.33
Titanium		.03	.09	.17	.24	.26	.27	.28	.31	.33	.35	.41

Dowel Pin Chart - Metric

Dowel Pin	Nominal Dowel Decimal	Tight Press Fit Reamer		Tight Press Fit Reamer 0.013		Loose Press Fit Reamer		Tight Slip Fit		Loose Slip Fit Reamer	
Size (mm)	Decimal	0.013	Tool No.	DP(2)	Tool No.	DP(1)	Tool No.	Reamer	Tool No.	OS	Tool No.
2	0.0787	1.95	27207670	1.98	27207810	1.99	27207850	2.01	27207900	2.02	27207950
3	0.1181	2.95	27211610	2.98	27211750	3.00	27211800	3.01	27211850	3.02	27211900
4	0.1575	3.95	27215550	3.99	27215700	4.00	27215750	4.01	27215800	4.03	27215850
5	0.1969	4.95	27219490	4.99	27219650	5.00	27219690	5.02	27219750	5.03	27219800
6	0.2362	5.95	27223430	5.98	27223550	5.99	27223600	6.01	27223650	6.02	27223700
8	0.3150	7.95	27231300	7.98	27231400	8.00	27231500	8.00	27231500	8.03	27231600
10	0.3937	9.96	27239200	9.98	27239300	10.00	27239370	10.01	27239400	10.03	27239500
12	0.4724	11.96	27247100	11.99	27247200	12.00	27247240	12.01	27247300	12.01	27247300

Tolerance (Reamer) Per **DIN 1420 H7** Normal Dowels are nominal size +.0001" / -.0001" (+.0025/- .0025mm)

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Reamer Cutting Data - Inch

Workpiece Material Group	I S O	Hardness	vc-SFM	Reamer Diameter				
				f-IPR				
				≥ 1/16	>1/16 - 1/8	>1/8 - 1/4	>1/4 - 1/2	>1/2 - 1
Free Machining & Low Carbon Steels 1006, 1008, 1015, 1018, 1020, 1022, 1025, 1117, 1140, 1141, 11L08, 11L14, 1213, 12L13, 12L14, 1215, 1330	P	up to 28 Rc	200-300	.0005-.0030	.0020-.0060	.0040-.0100	.0060-.0150	.0100-.0300
Medium Carbon & High Carbon Steels, Alloy Steels & Easy to Machine Tool Steels 1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 1085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4137, 4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5132, 5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2, W1 to W310	P	28 to 38 Rc	125-200	.0005-.0020	.0020-.0040	.0040-.0060	.0060-.0100	.0100-.0200
Tool Steels & Die Steels O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, A2, A3, A6, A7, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A 128, D2, D3, D4, D5, D7	P	28 to 44 Rc	50-125	.0002-.0010	.0010-.0020	.0020-.0040	.0040-.0060	.0060-.0100
Stainless Steel - Free Machining / Austenitic 304/316	M	up to 28 Rc	120-190	.0005-.0020	.0020-.0040	.0040-.0060	.0060-.0100	.0100-.0200
Stainless Steel - Ferritic / Martensitic	M	up to 28 Rc	80-120	.0002-.0020	.0010-.0040	.0020-.0060	.0040-.0100	.0060-.0200
Stainless Steel - Moderately Difficult 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH	M	up to 28 Rc	60-100	.0002-.0020	.0010-.0040	.0020-.0060	.0040-.0100	.0060-.0200
Inconel 625/718	S	≤ 40 Rc	40-70	.0002-.0010	.0010-.0020	.0020-.0040	.0040-.0060	.0060-.0100
Stellite / Cobalt Chrome	S	≤ 40 Rc	30-45	.0002-.0010	.0010-.0020	.0020-.0040	.0040-.0060	.0060-.0100
Titanium 6Al-4V	S	≤ 40 Rc	35-50	.0002-.0020	.0010-.0040	.0020-.0060	.0040-.0100	.0060-.0200
Cast Iron - Gray CG, ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40	K	up to 240 HB	150-250	.0002-.0020	.0010-.0040	.0020-.0060	.0040-.0100	.0060-.0200
Cast Iron - Ductile & Malleable CGI 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450	K	over 240 HB	125-200	.0005-.0020	.0020-.0040	.0040-.0060	.0060-.0100	.0100-.0200
Cast Iron - (Martensitic) Hard	K		50-75	.0002-.0010	.0010-.0020	.0020-.0040	.0040-.0060	.0060-.0100
Aluminum/Aluminum Alloys	N		500-1000	.0005-.0030	.0020-.0060	.0040-.0100	.0060-.0150	.0100-.0300
Brass/Bronze Free Machining	N		250-400	.0005-.0020	.0020-.0040	.0040-.0060	.0060-.0100	.0100-.0200
Brass/Bronze (Hard)	N		150-250	.0002-.0010	.0010-.0020	.0020-.0040	.0040-.0060	.0060-.0100
Magnesium/Magnesium Alloys/Plastics/Bakelite Plastic - Glass Filled	N		500-1000	.0005-.0030	.0020-.0060	.0040-.0100	.0060-.0150	.0100-.0300
Copper/Hard Bronze	N		100-150	.0002-.0010	.0010-.0020	.0020-.0040	.0040-.0060	.0060-.0100
Hardened Steels	H	23-32 Rc	125-200	.0005-.0020	.0020-.0040	.0040-.0060	.0060-.0100	.0100-.0200
Hardened Steels	H	32-43 Rc	50-125	.0002-.0010	.0010-.0020	.0020-.0040	.0040-.0060	.0060-.0100
Hardened Steels	H	43-52 Rc	35-50	.0002-.0010	.0010-.0020	.0020-.0040	.0040-.0060	.0060-.0100
Hardened Steels	H	50+ Rc	15-35	.0002-.0010	.0010-.0020	.0020-.0040	.0040-.0060	.0060-.0100

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

For product information, call your local distributor.

Reamer Cutting Data - Metric

Workpiece Material Group	I S O	Hardness	vc-m/min	Reamer Diameter (mm)				
				f-mm/rev				
				≥ 1.5	>1.5 - 3.0	>3.0 - 6.0	>6.0 - 12.0	>12.0 - 25.0
Free Machining & Low Carbon Steels 1006, 1008, 1015, 1018, 1020, 1022, 1025, 1117, 1140, 1141, 11L08, 11L14, 1213, 12L13, 12L14, 1215, 1330	P	up to 28 Rc	60-90	.010-.080	.050-.150	.100-.250	.150-.380	.250-.760
Medium Carbon & High Carbon Steels, Alloy Steels & Easy to Machine Tool Steels 1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 1085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4137, 4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5132, 5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2, W1 to W310	P	28 to 38 Rc	40-60	.010-.050	.050-.100	.100-.150	.150-.250	.250-.510
Tool Steels & Die Steels O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, A2, A3, A6, A7, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A 128, D2, D3, D4, D5, D7	P	28 to 44 Rc	15-40	.010-.030	.030-.050	.050-.100	.100-.150	.150-.250
Stainless Steel - Free Machining / Austenitic 304/316	M	up to 28 Rc	35-60	.010-.050	.050-.100	.100-.150	.150-.250	.250-.500
Stainless Steel - Ferritic / Martensitic	M	up to 28 Rc	25-35					
Stainless Steel - Moderately Difficult 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH	M	up to 28 Rc	20-30	.010-.050	.030-.100	.050-.150	.100-.250	.150-.500
Inconel 625/718	S	≤ 40 Rc	15-20	.010-.030	.030-.050	.050-.100	.100-.150	.150-.250
Stellite / Cobalt Chrome	S	≤ 40 Rc	10-15					
Titanium 6Al-4V	S	≤ 40 Rc	10-15	.010-.050	.030-.100	.050-.150	.100-.250	.150-.500
Cast Iron - Gray CG, ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40	K	up to 240 HB	45-75	.010-.050	.030-.100	.050-.150	.100-.250	.150-.500
Cast Iron - Ductile & Malleable CGI 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450	K	over 240 HB	40-60	.010-.050	.050-.100	.100-.150	.150-.250	.250-.500
Cast Iron - (Martensitic) Hard	K		15-25	.010-.030	.030-.050	.050-.100	.100-.150	.150-.250
Aluminum/Aluminum Alloys	N		150-300	.010-.080	.050-.150	.100-.250	.150-.380	.250-.760
Brass/Bronze Free Machining	N		75-120	.010-.050	.050-.100	.100-.150	.150-.250	.250-.500
Brass/Bronze (Hard)	N		45-75					
Magnesium/Magnesium Alloys/Plastics/Bakelite Plastic - Glass Filled	N		150-300	.010-.080	.050-.150	.100-.250	.150-.380	.250-.760
Copper/Hard Bronze	N		30-45	.010-.030	.030-.050	.050-.100	.100-.150	.150-.250
Hardened Steels	H	23-32 Rc	40-60	.010-.050	.050-.100	.100-.150	.150-.250	.250-.500
Hardened Steels	H	32-43 Rc	15-40					
Hardened Steels	H	43-52 Rc	10-15	.010-.030	.030-.050	.050-.100	.100-.150	.150-.250
Hardened Steels	H	50+ Rc	5-10	.010-.030	.030-.050	.050-.100	.100-.150	.150-.250

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Coatings

ALtima®

Aluminum Titanium Nitride (AlTiN). ALtima® is the original high performance coating. This coating allows tools to be run at higher speeds and feeds in a wide array of materials. Also, it allows the option of running tools dry due to the high oxidation temperature of the coating.

ALtima® Plus

This Aluminum Titanium Nitride (AlTiN) multi-layer coating has optimized coating structure, with pre and post treatment of the coating for optimized high performance drilling in any ferrous material.

ALtima® 52

Aluminum Titanium Nitride (AlTiN). ALtima® 52 is specially designed for milling hardened steels 52 Rc and above. It has very high hardness and the oxidation temperature of the coating makes this the absolute best choice for hardened steel milling. ALtima® 52 is designed to allow for dry machining.

ALtima® Blaze

Aluminum Chromium Nitride (AlCrN). ALtima® Blaze is designed to allow higher material removal rates. This coating has a higher oxidation temperature than a typical TiAlN coating. It has shown very good results in nickel alloys, titanium, and other difficult to machine materials. Tools coated with ALtima® Blaze can be used in dry machining.

ALtima® Micro

An ultra thin, nano structured, TiAlN coating developed specifically for micro tool applications.

Fordlube

Titanium DiBoride (TiB₂) is a unique coating with low Aluminum affinity, smooth surface finish and high hardness. It is ideal for Aluminum and Magnesium alloys as it prevents build-up on cutting edge, provides superior chip flow along with extended wear resistance.

Gem+

Recommended for aluminium and aluminium alloys up to 12% Si, non-ferrous metals and composites. Gem+ provides excellent wear resistance and maintains sharp cutting edges.

GemX

A CVD diamond coating for composites and aluminum that offers the maximum hardness and wear resistance of any of our coatings.

TiN

Titanium Nitride (TiN). TiN coating has shown good results in low carbon steels and many iron-based applications. It is a very popular coating used in the industry today.

TiCN

Titanium Carbonitride (TiCN). TiCN is a multi-layer coating. Because of the multi-layer composition, TiCN is tougher than TiN, even though TiCN is harder. The added toughness of the TiCN coating makes it a good choice for mechanically stressed edges like in end mill applications. The higher hardness makes TiCN a good choice for abrasive applications where higher wear resistance is required.

CERAedge®

CERAedge® is a unique coating that provides excellent performance in titanium, aluminium, and composites.

Special Coatings

Upon request, M.A. Ford® can provide any commercially available coating. Any standard M.A. Ford® cutting tool can be provided with coating if requested.

Coating Properties

M.A. Ford® Coating	M.A. Ford® Tool Number Designation	Microhardness (HV)	Maximum Service Temp.	Friction Coefficient
ALtima®	A	3100	1100° C / 2012° F	0.42
ALtima® Plus	AP	3200	1100° C / 2012° F	0.25
ALtima® 52	A	3600	1200° C / 2192° F	0.40
ALtima® Blaze	B	3200	1100° C / 2012° F	0.35
ALtima® Micro	AM	3300	900° C / 1652° F	0.30-0.35
Fordlube	F	4000	700° C / 1292° F	0.30
Gem+	GP	4710	500° C / 932° F	0.30
GemX	GX	10000	600° C / 1100° F	0.10
TiN	T	2300	600° C / 1112° F	0.40
TiCN	C	3000	400° C / 752° F	0.40
CERAedge®	CE	3400	1100° C / 2012° F	0.25