



Series 460 / 480

Advanced Undercut Drills



Designed for Superior Hole Wall Quality

Undercut Diameter to Reduce Cutting Friction and Temperature

High Helix for Better Debris Flow

Thicker Web for Higher Strength

Variable Web Taper for Rigidity

Optimized Flute Volume to Combat Chip Packing

Can Be Used on a Broad Range of Materials



Series 460 / 480

Designed for Superior Hole Wall Quality

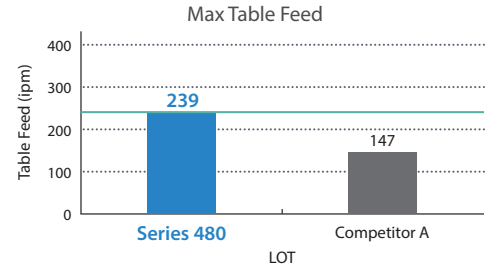
1 Increased Precision, Strength, and Tool Life

Precise Hole Location, High Strength, and Desirable Hole Wall Quality Characteristics

Robustness Tool Performance Comparison (Internal Evaluation)

Constant Variables	
Speed :	120,000 rpm
Retract :	800 ipm
Laminate :	0.062", 10 Layers
Stack Height :	2 High
Entry :	No Entry
Backup :	0.093"
No. of Hits :	100 Hits/ Tool/ Increment

	Max infeed (ipm)
Series 480	239
Competitor A	147

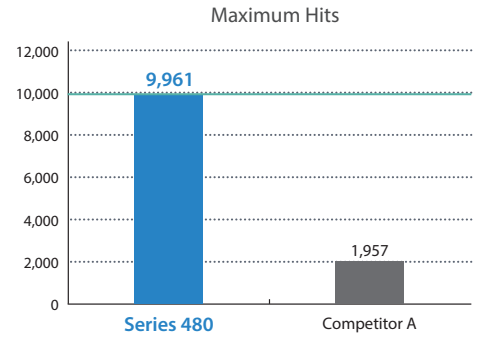


Feed: Start with 100 ipm, increment 20 ipm, stop at 400 ipm

Tool Life Performance Comparison (Internal Evaluation)

Constant Variables	
Speed :	120,000 rpm
Infeed :	80 ipm
Retract :	800 ipm
Laminate :	0.062", 10 Layers
Stack Height :	2 High
Entry :	No Entry
Backup :	0.093"
Max. Hits :	10,000

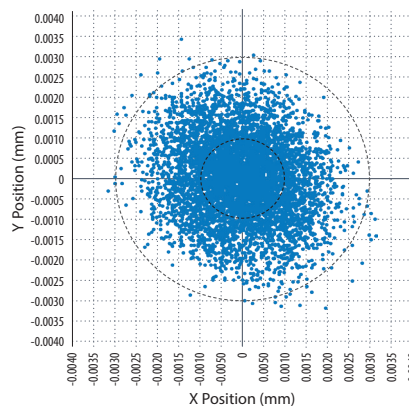
	Avg Hit/Breakage
Series 480	9,961
Competitor A	1,957



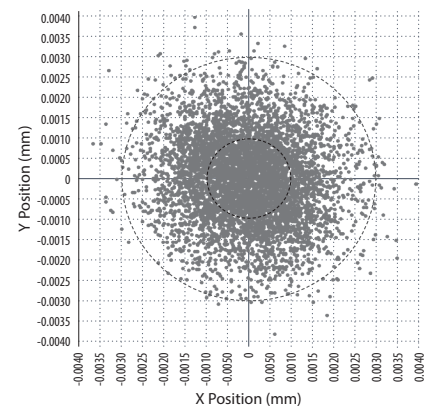
Drill Hole Positional Accuracy / True Position Deviation (Internal Evaluation)

Centered Data	
Max. Hits :	10,000
Layers :	10 Layers
Thickness :	0.062"
Stack Height :	2 High
Infeed Rate :	80 ipm
Speed :	120,000 rpm
Entry :	7 mil Solid Aluminum

Series 480 - 0.25mm (0.0098")



Competitor A - 0.25mm (0.0098")



	Series 480	Competitor A
Cp :	1.72	1.37
CpK :	1.10	0.77
DTP :	0.0075	0.0201
Spec (+/-) :	0.003	0.003

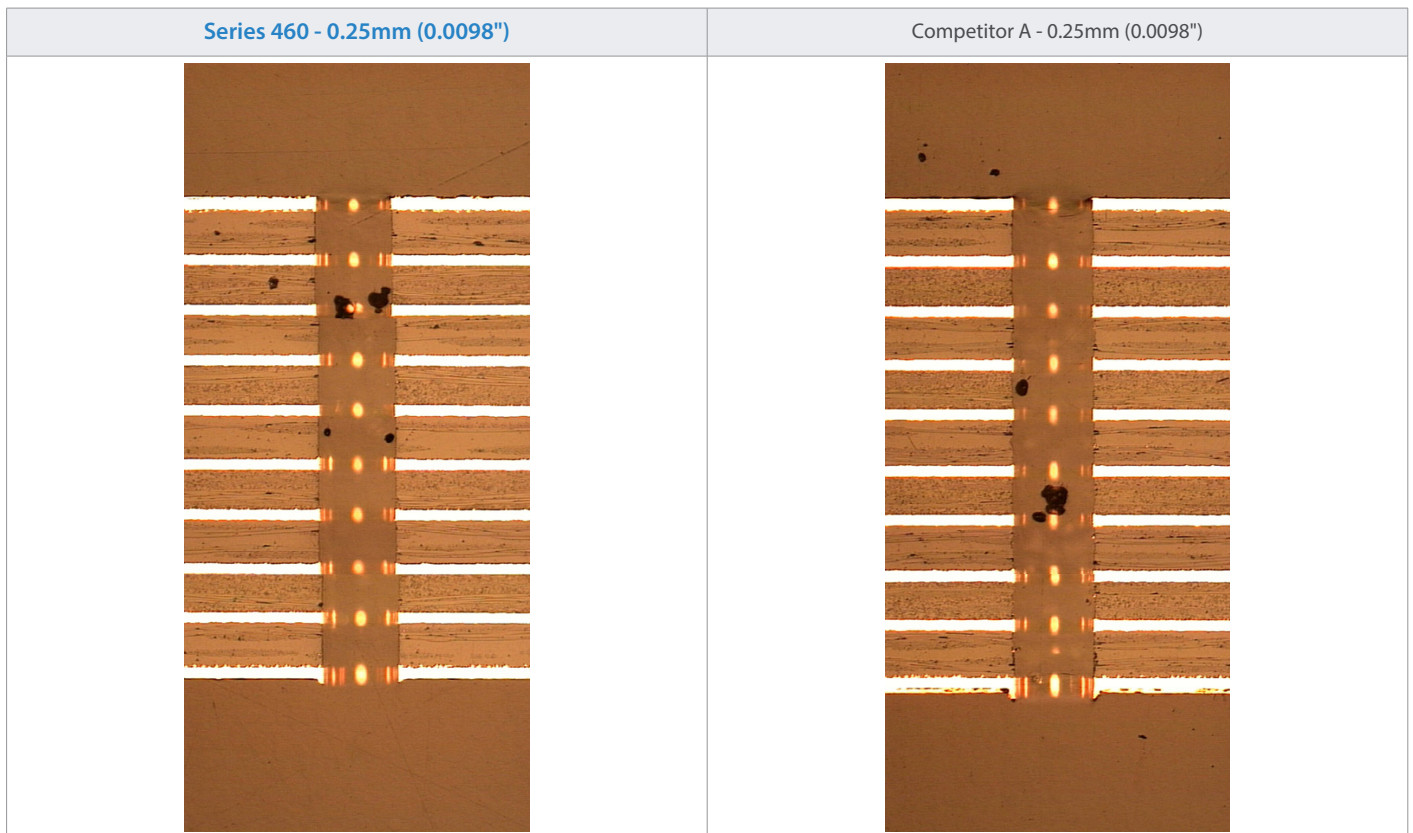
2 Excellent Hole Wall Quality

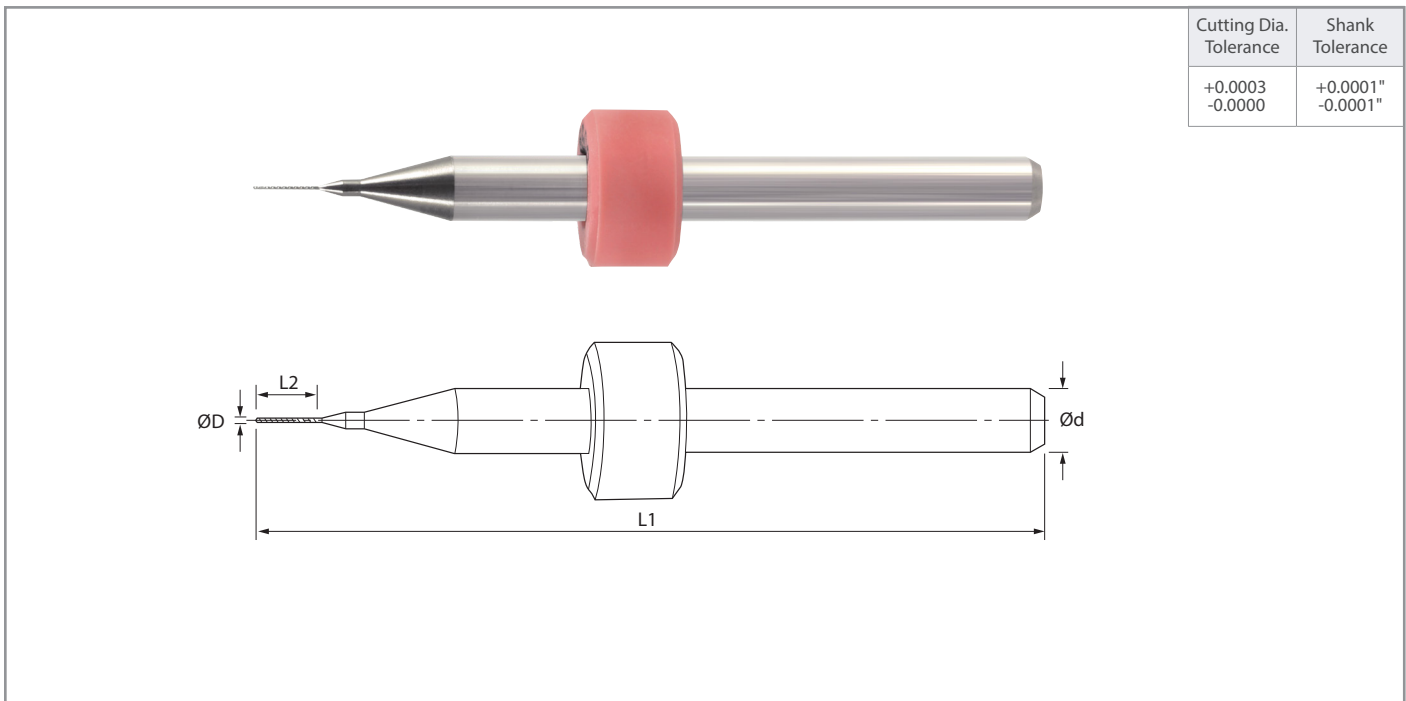
Hole Wall Quality at 1500 Hits (Internal Evaluation)

Constant Variables	
Speed :	120,000 rpm
Infeed :	60 ipm
Retract :	800 ipm
Laminate :	0.062" Polyclad 370 HR, 10 Layers
Stack Height :	1 High
Entry :	7mil Solid Aluminum
Backup :	0.093" Tri Star Gold
Hit Count :	1500 Hits

Series 460 - 0.25mm (0.0098")													
Tool	ROUGHNESS (mil)					Avg Roughness	NAILHEADING						Avg Nailheading
	1	2	3	Avg	Max		1	2	3	Nominal	%Ave	%Max	
1	0.04	0.08	0.04	0.05	0.08	0.06	1.49	1.53	1.49	1.28	117%	120%	124%
2	0.04	0.06	0.04	0.05	0.06		1.63	1.56	1.53	1.28	123%	127%	
3	0.12	0.08	0.06	0.09	0.12		1.70	1.74	1.60	1.28	131%	136%	

Competitor A - 0.25mm (0.0098")													
Tool	ROUGHNESS (mil)					Avg Roughness	NAILHEADING						Avg Nailheading
	1	2	3	Avg	Max		1	2	3	Nominal	%Avg	%Max	
1	0.20	0.18	0.20	0.19	0.20	0.24	1.63	1.74	1.77	1.28	134%	138%	136%
2	0.26	0.32	0.22	0.27	0.32		1.77	1.74	1.70	1.28	136%	138%	
3	0.28	0.20	0.26	0.25	0.28		1.77	1.74	1.81	1.28	139%	141%	



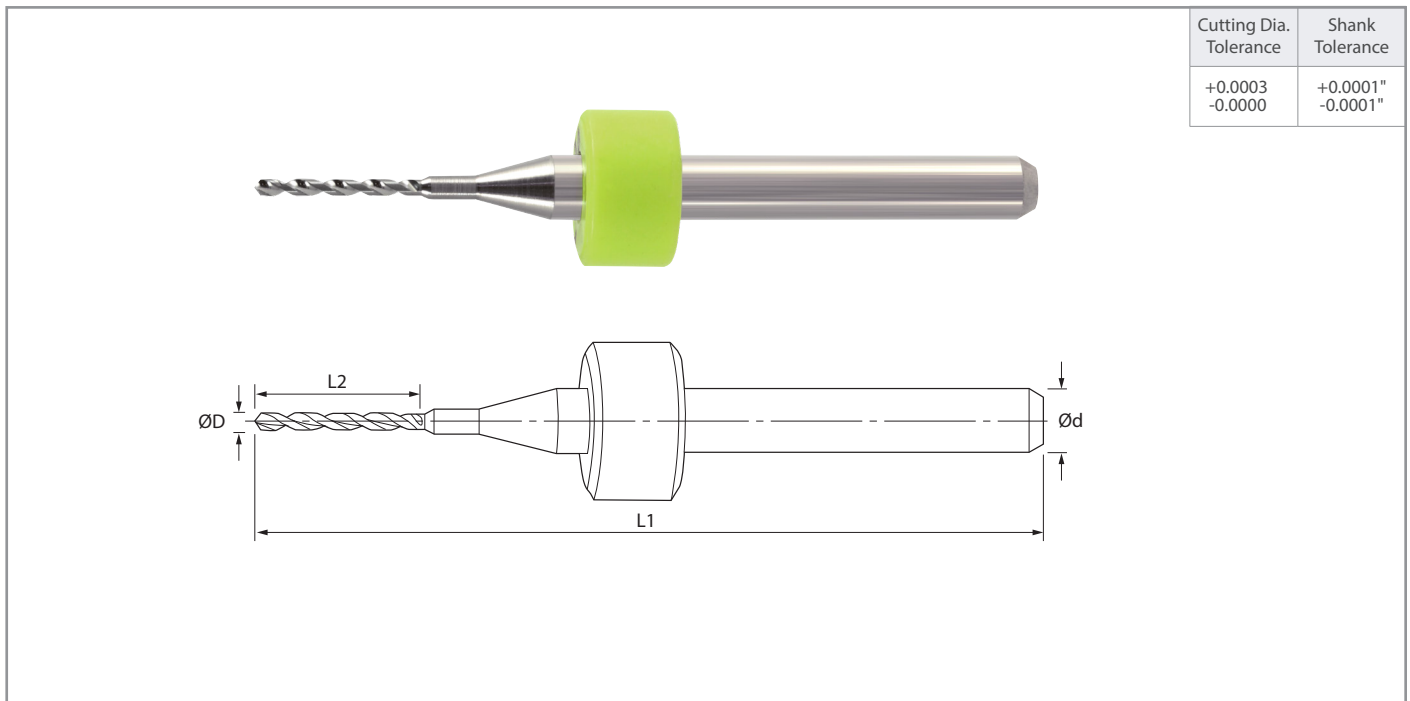


Drill Dimensions

Part Number	Stock	Dimensions (in)					Point Angle
		Size	Cutting Diameter	Shank Diameter	Overall Length	Flute Length	
			ØD	Ød	L1	L2	
460.0059.079	●	0.15mm	0.0059	0.1248	1.500	0.079	130°
460.0079.118	●	0.20mm	0.0079			0.118	
460.0091.158	●	#89	0.0091			0.158	
460.0098.177	●	0.25mm	0.0098			0.177	
460.0110.177	●	#85	0.0110			0.177	
460.0118.217	●	0.30mm	0.0118			0.217	
460.0138.217	●	0.35mm	0.0138			0.217	
460.0145.217	●	#79	0.0145			0.217	
460.0157.217	●	0.40mm	0.0157			0.217	
460.0177.220	●	0.45mm	0.0177			0.220	
460.0197.220	●	0.50mm	0.0197			0.220	
460.0217.250	●	0.55mm	0.0217			0.250	
460.0256.250	●	0.65mm	0.0256			0.250	

Part Numbers include rings set at 0.800"
Additional diameters, special ring colors, and ringless part numbers available upon request.

● : Standard Item



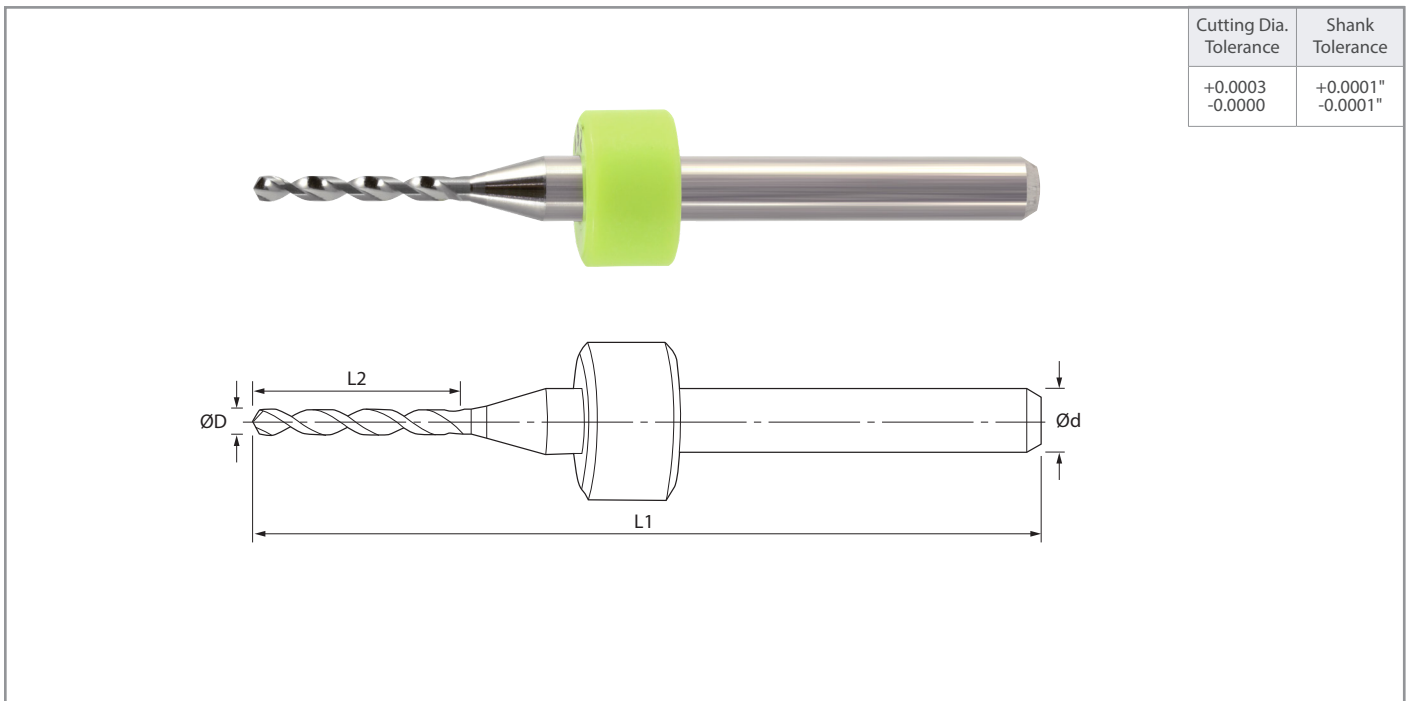
Cutting Dia. Tolerance	Shank Tolerance
+0.0003 -0.0000	+0.0001" -0.0001"

Drill Dimensions

Part Number	Stock	Dimensions (in)					Point Angle
		Size	Cutting Diameter	Shank Diameter	Overall Length	Flute Length	
			ØD	Ød	L1	L2	
480.0059.118	●	0.15mm	0.0059	0.1248	1.500	0.118	130°
480.0079.158	●	0.20mm	0.0079			0.158	
480.0098.217	●	0.25mm	0.0098			0.217	
480.0118.256	●	0.30mm	0.0118			0.256	
480.0138.277	●	0.35mm	0.0138			0.277	
480.0145.280	●	#79	0.0145			0.280	
480.0157.295B1	●	0.40mm	0.0157			0.295	
480.0177.295	●	0.45mm	0.0177			0.295	
480.0197.310	●	0.50mm	0.0197			0.310	
480.0210.310	●	#75	0.0210			0.310	
480.0217.340	●	0.55mm	0.0217			0.340	
480.0225.360	●	#74	0.0225			0.360	
480.0236.340	●	0.60mm	0.0236			0.340	
480.0250.340	●	#72	0.0250			0.340	
480.0256.340	●	0.65mm	0.0256			0.340	
480.0260.400	●	#71	0.0260			0.400	
480.0276.360	●	0.70mm	0.0276			0.360	
480.0280.400	●	#70	0.0280			0.400	
480.0295.360	●	0.75mm	0.0295			0.360	
480.0310.394	●	#68	0.0310			0.394	
480.0315.400	●	0.80mm	0.0315			0.400	
480.0320.394	●	#67	0.0320			0.394	
480.0335.400	●	0.85mm	0.0335			0.400	
480.0354.400	●	0.90mm	0.0354			0.400	
480.0360.400	●	#64	0.0360			0.400	
480.0370.394	●	#63	0.0370			0.394	

Part Numbers include rings set at 0.800"
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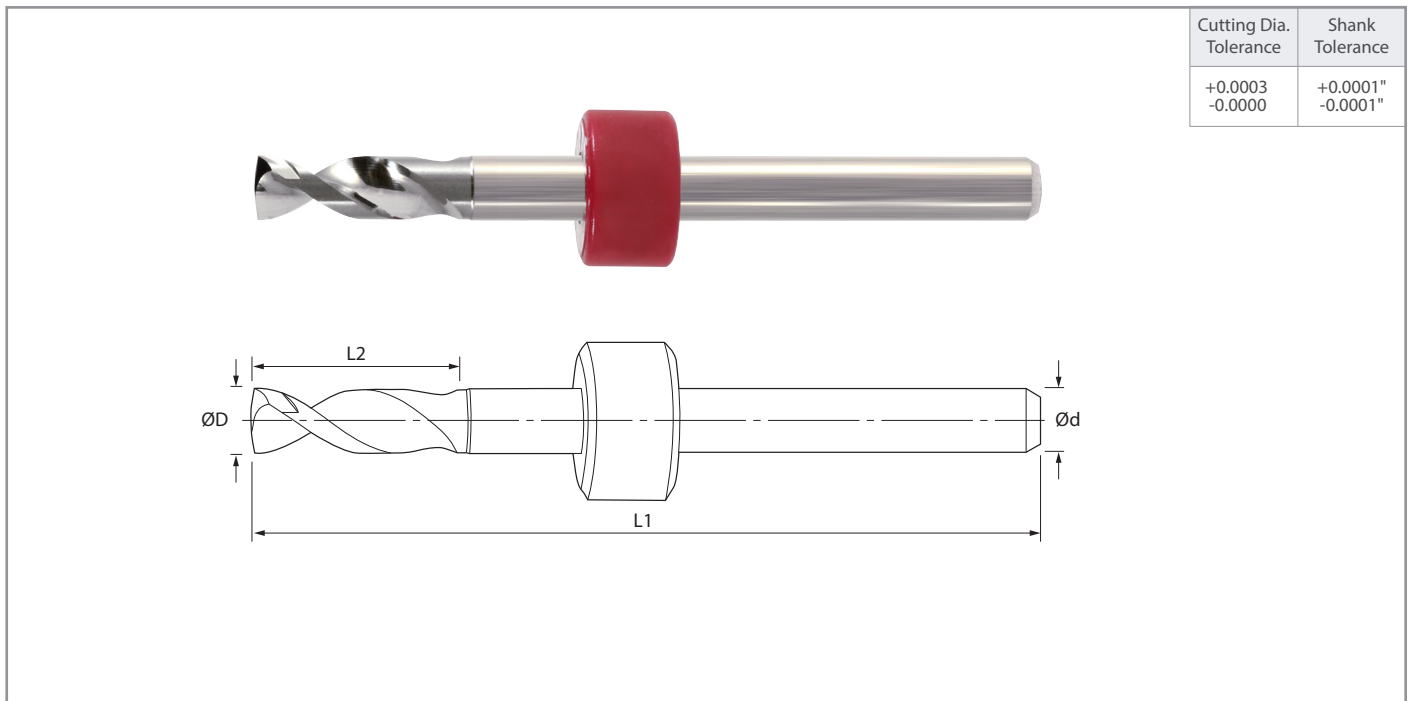
Cutting Dia. Tolerance	Shank Tolerance
+0.0003 -0.0000	+0.0001" -0.0001"

Drill Dimensions

Part Number	Stock	Dimensions (in)					Point Angle
		Size	Cutting Diameter	Shank Diameter	Overall Length	Flute Length	
			ØD	Ød	L1	L2	
480.0374.400	●	0.95mm	0.0374	0.1248	1.500	0.400	130°
480.0380.400	●	#62	0.0380			0.400	
480.0394.400	●	1.00mm	0.0400			0.400	
480.0400.400	●	#60	0.0400			0.400	
480.0413.400	●	1.05mm	0.0413			0.400	
480.0420.400	●	#58	0.0420			0.400	
480.0433.400	●	1.10mm	0.0433			0.400	
480.0441.400	●	1.12mm	0.0441			0.400	
480.0453.400	●	1.15mm	0.0453			0.400	
480.0465.400	●	#56	0.0465			0.400	
480.0472.400	●	1.20mm	0.0472			0.400	
480.0492.400	●	1.25mm	0.0492			0.400	
480.0512.394	●	1.30mm	0.0512			0.394	
480.0520.400	●	#55	0.0520			0.400	
480.0531.394	●	1.35mm	0.0531			0.394	
480.0551.394	●	1.40mm	0.0551			0.394	
480.0571.394	●	1.45mm	0.0571			0.394	
480.0591.394	●	1.50mm	0.0591			0.394	
480.0610.394	●	1.55mm	0.0610			0.394	
480.0630.394	●	1.60mm	0.0630			0.394	
480.0650.394	●	1.65mm	0.0650			0.394	
480.0669.394	●	1.70mm	0.0669			0.394	
480.0689.394	●	1.75mm	0.0689			0.394	
480.0709.394	●	1.80mm	0.0709			0.394	
480.0728.394	●	1.85mm	0.0728			0.394	
480.0748.394	●	1.90mm	0.0748			0.394	

Part Numbers include rings set at 0.800"
Additional diameters, special ring colors, and ringless part numbers available upon request.

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Drill Dimensions

Part Number	Stock	Dimensions (in)					Point Angle
		Size	Cutting Diameter	Shank Diameter	Overall Length	Flute Length	
			ØD	Ød	L1	L2	
480.0768.394	●	1.95mm	0.0768	0.1248	1.500	0.394	130°
480.0787.394	●	2.00mm	0.0787			0.394	
480.0807.394	●	2.05mm	0.0807			0.394	
480.0827.394	●	2.10mm	0.0827			0.394	
480.0846.394	●	2.15mm	0.0846			0.394	
480.0866.394	●	2.20mm	0.0866			0.394	
480.0886.394	●	2.25mm	0.0886			0.394	
480.0906.394	●	2.30mm	0.0906			0.394	
480.0925.394	●	2.35mm	0.0925			0.394	
480.0945.394	●	2.40mm	0.0945			0.394	
480.0965.394	●	2.45mm	0.0965			0.394	
480.0984.394	●	2.50mm	0.0984			0.394	
480.1004.394	●	2.55mm	0.1004			0.1248	
480.1024.394	●	2.60mm	0.1024	0.394			
480.1043.394	●	2.65mm	0.1043	0.394			
480.1063.394	●	2.70mm	0.1063	0.394			
480.1083.394	●	2.75mm	0.1083	0.394			
480.1102.394	●	2.80mm	0.1102	0.394			
480.1122.394	●	2.85mm	0.1122	0.394			
480.1142.394	●	2.90mm	0.1142	0.394			
480.1161.394	●	2.95mm	0.1161	0.394			
480.1181.394	●	3.00mm	0.1181	0.394			
480.1201.394	●	3.05mm	0.1201	0.394			
480.1220.394	●	3.10mm	0.1220	0.394			
480.1240.394	●	3.15mm	0.1240	0.394			

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