

Amorphous Diamond – AD

Diamond thin-film offers a low coefficient of friction, excellent abrasion resistance, good thermal and chemical stability, and high hardness at drastically reduced costs.

Graphite milling tests have shown that SGS Amorphous Diamond film can last up to 6 times longer than AlTiN coated carbide tools, but actual tool life will depend on operating conditions.

Characteristics of Diamond Coatings

Property	Amorphous	CVD Diamond
Diamond Structure	Amorphous	Crystalline
Hardness(Gpa) Surface	60 - 95	85 - 100
Roughness Thickness	Smooth ≤ 1 micron	Rough 6 - 20 microns
Deposition Temperature C	150° C	850° - 900°
Special Grade Substrate	No *	Yes

* Any SGS solid carbide tool in stock can be coated with Amorphous Diamond

Extends Tool Life up to 6 Times Longer than AlTiN Coated Tools

Amorphous Diamond

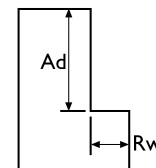
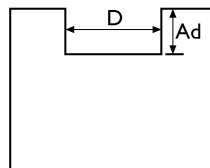
SGS Tool Company is pleased to offer Amorphous Diamond coated, solid carbide end mills to machine nonferrous materials such as graphite, where a cutter's resistance to abrasiveness is paramount. Graphite electrodes can be accurately milled with Amorphous Diamond coated end mills to produce electrodes with exacting detail at an affordable cost. In addition, finishing in graphite, high silicon aluminum, Fiberglass reinforced plastics, and green (pre-sintered) ceramics are other applications well-suited for SGS Amorphous Diamond coated end mills.

Diamond Thin Film Characteristics

SGS Amorphous Diamond tools are coated with thin film diamond. The thin film diamond conforms to the precise contour of the tool producing a shiny, slippery coating. An outstanding feature of Diamond thin-film is its high resistance to abrasive wear. With its low friction coefficient, the tool runs much cooler and prevents workpiece material from adhering to the cutting edges. This becomes a distinct advantage when no coolant is used in machining graphite.

Speed and Feed Recommendations

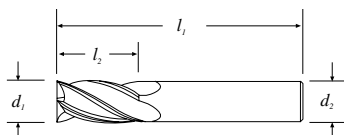
Cutting Diameter Inch mm	Feed Rate per Tooth					
	Slotting		Peripheral		Contouring	
Finishing	Rw 1 x D	Ad .03 x D	Rw .06 x D	Ad .45 x D	Rw .02 x D	Ad .03 x D
	Speed 3280 - 5900 sfm (1000 - 1800 m/min)					
Roughing	Rw 1 x D	Ad .25 x D	Rw .1 x D	Ad .65 x D	Rw .1 x D	Ad .25 x D
	Speed 1310 - 1970 sfm (400 - 600 m/min)					
1/16	1,6	0.0003 in (0.008mm)	0.0004 in (0.010 mm)	0.0005 in (0.011mm)		
1/8	3	0.0006 in (0.016mm)	0.0008 in (0.020 mm)	0.0009 in (0.022mm)		
3/16	5	0.0013 in (0.032mm)	0.0016 in (0.041 mm)	0.0017 in (0.044mm)		
1/4	6	0.0013 in (0.032mm)	0.0016 in (0.041 mm)	0.0017 in (0.044mm)		
5/16	8	0.0027 in (0.068mm)	0.0034 in (0.086 mm)	0.0037 in (0.094mm)		
3/8	10	0.0027 in (0.068mm)	0.0034 in (0.086 mm)	0.0037 in (0.094mm)		
1/2	12	0.0041 in (0.103mm)	0.0046 in (0.117 mm)	0.0050 in (0.127mm)		



4 Flute - Square End

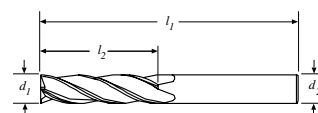
Fractional

Series 1



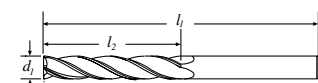
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	EDP No.
1/64	1/32	1-1/2	1/8	93300
1/32	5/64	1-1/2	1/8	93301
3/64	7/64	1-1/2	1/8	93302
1/16	3/16	1-1/2	1/8	93303
5/64	3/16	1-1/2	1/8	93304
3/32	9/32	1-1/2	1/8	93305
7/64	3/8	1-1/2	1/8	93306
1/8	1/2	1-1/2	1/8	93307
3/16	5/8	2	3/16	93308
1/4	3/4	2-1/2	1/4	93309
5/16	13/16	2-1/2	5/16	93310
3/8	1	2-1/2	3/8	93311
7/16	1	2-3/4	7/16	93344
1/2	1	3	1/2	93345

Series 1L Long



Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	EDP No.
1/8	3/4	2-1/4	1/8	93324
3/16	3/4	2-1/2	3/16	93325
1/4	1-1/8	3	1/4	93326
5/16	1-1/8	3	5/16	93327
3/8	1-1/8	3	3/8	93328

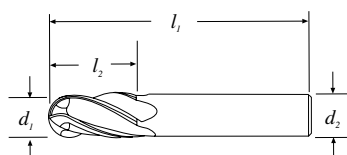
Series 1EL Extra Long



Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	EDP No.
1/8	1	3	1/8	93334
3/16	1-1/8	3	3/16	93335
1/4	1-1/2	4	1/4	93336
5/16	1-5/8	4	5/16	93337
3/8	1-3/4	4	3/8	93338

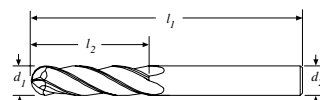
4 Flute - Ball End

Series 1B



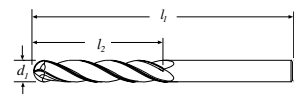
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	EDP No.
1/64	1/32	1-1/2	1/8	93312
1/32	5/64	1-1/2	1/8	93313
3/64	7/64	1-1/2	1/8	93314
1/16	3/16	1-1/2	1/8	93315
5/64	3/16	1-1/2	1/8	93316
3/32	9/32	1-1/2	1/8	93317
7/64	3/8	1-1/2	1/8	93318
1/8	1/2	1-1/2	1/8	93319
3/16	5/8	2	3/16	93320
1/4	3/4	2-1/2	1/4	93321
5/16	13/16	2-1/2	5/16	93322
3/8	1	2-1/2	3/8	93323
7/16	1	2-3/4	7/16	93346
1/2	1	3	1/2	93347

Series 1LB Long



Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	EDP No.
1/8	3/4	2-1/4	1/8	93329
3/16	3/4	2-1/2	3/16	93330
1/4	1-1/8	3	1/4	93331
5/16	1-1/8	3	5/16	93332
3/8	1-1/8	3	3/8	93333

Series 1ELB Extra Long



Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	EDP No.
1/8	1	3	1/8	93339
3/16	1-1/8	3	3/16	93340
1/4	1-1/2	4	1/4	93341
5/16	1-5/8	4	5/16	93342
3/8	1-3/4	4	3/8	93343