



Diamond Coating

Characteristics

The characteristics of CVD Diamond Coatings are shown below. The SGS Diamond coating process produces a controlled, uniform coating and performance on all tools.

Thickness	6 - 10	µm
Grain Size	1/2 - 3	µm
Hardness (Knoop)	85 - 100	GPa

CVD - Diamond Coated Solid Carbide End Mills

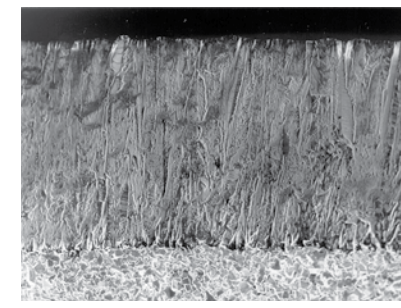
SGS Tool Company is pleased to announce the development of CVD Diamond Coated solid carbide end mills to machine abrasive materials such as graphite compositions used to produce electrodes for Electrical Discharge Machining (EDM) and machining carbon – carbon composites. Graphite electrodes can be accurately milled with diamond coated end mills to produce electrodes with exacting detail because the crystalline diamond CVD coating effectively resists tool wear.

Note: Machining graphite produces abrasive dust. Use ventilation as necessary.

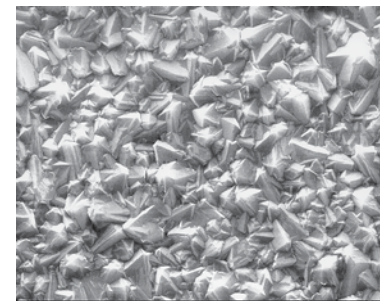
Diamond Coating Characteristics

SGS Diamond Coated tools are coated with hard crystalline (cF8) diamond producing an adherent, continuous diamond coating on solid carbide tools that wears like natural diamonds.

A section of the coating and the coating surface are shown below:



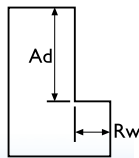
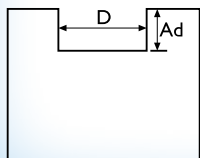
Cross-section of diamond coating on a carbide substrate.
10 µm



Diamond coated surface showing individual diamond crystals.
10 µm

Diamond coating extends the accurate cutting life of carbide tools. Graphite milling tests have shown that **SGS Diamond Coated Tools** can last from **10 to 80 times longer** than uncoated carbide tools, but actual tool life will depend on operating conditions.

Speed and Feed Recommendations

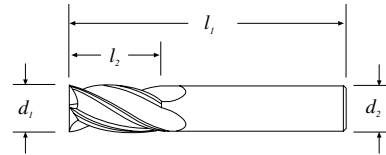


Cutting Diameter Inch mm	Feed Rate per Tooth					
	Slotting		Peripheral		Contouring	
Finishing	Rw 1 x D	Ad .03 x D	Rw .06 x D	Ad .45 x D	Rw .02 x D	Ad .03 x D
	Speed 3280 - 5900 sfm (1000 - 1800 m/min)					
Roughing	Rw 1 x D	Ad .25 x D	Rw .1 x D	Ad .65 x D	Rw .1 x D	Ad .25 x D
	Speed 1310 - 1970 sfm (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)		



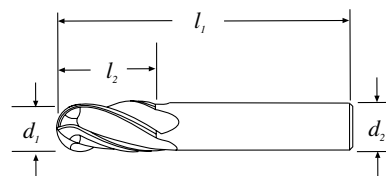
Series 1 - 4 Flute - Square End

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Dia-Carb EDP No.
1/16	3/16	1-1/2	1/8	91268
1/8	1/2	1-1/2	1/8	91272
3/16	5/8	2	3/16	91276
1/4	3/4	2-1/2	1/4	91280
5/16	13/16	2-1/2	5/16	91284
3/8	1	2-1/2	3/8	91288
1/2	1	3	1/2	91292



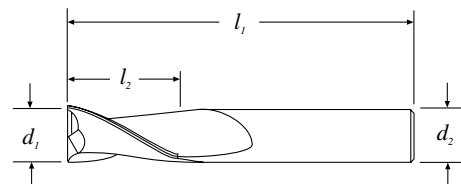
Series 1B - 4 Flute - Ball End

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Dia-Carb EDP No.
1/16	3/16	1-1/2	1/8	91269
1/8	1/2	1-1/2	1/8	91273
3/16	5/8	2	3/16	91277
1/4	3/4	2-1/2	1/4	91281
5/16	13/16	2-1/2	5/16	91285
3/8	1	2-1/2	3/8	91289
1/2	1	3	1/2	91293



Series 3 - 2 Flute - Square End

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Dia-Carb EDP No.
1/16	3/16	1-1/2	1/8	91266
1/8	1/2	1-1/2	1/8	91270
3/16	5/8	2	3/16	91274
1/4	3/4	2-1/2	1/4	91278
5/16	13/16	2-1/2	5/16	91282
3/8	1	2-1/2	3/8	91286
1/2	1	3	1/2	91290



Series 3B - 2 Flute - Ball End

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Dia-Carb EDP No.
1/16	3/16	1-1/2	1/8	91267
1/8	1/2	1-1/2	1/8	91271
3/16	5/8	2	3/16	91275
1/4	3/4	2-1/2	1/4	91279
5/16	13/16	2-1/2	5/16	91283
3/8	1	2-1/2	3/8	91287
1/2	1	3	1/2	91291

