

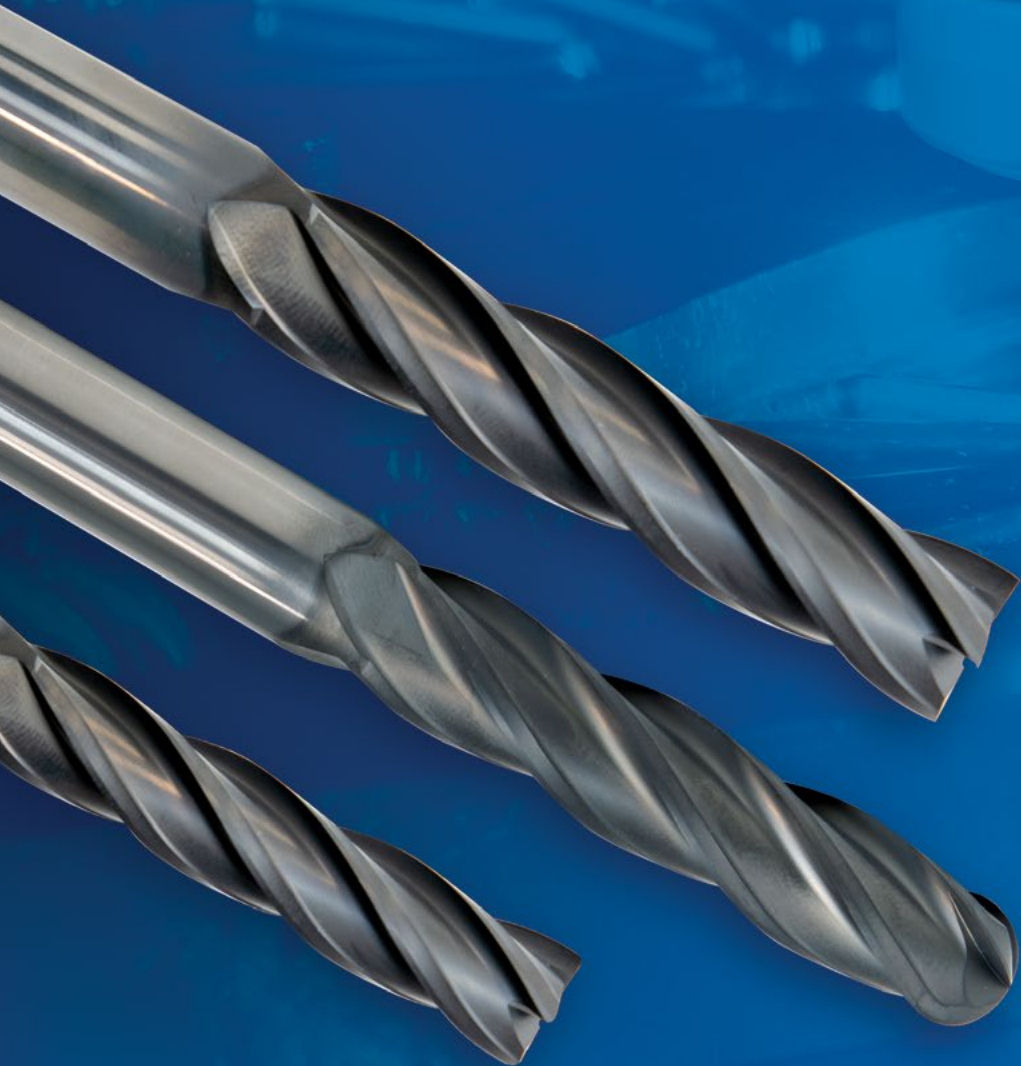


DG Coated End Mills for Graphite

Vol 1

DG End Mills

DG-EML • DG-CR-EML • DG-LN-EML • DG-LN-CR-EML
DG-EBML • DG-LN-EBML

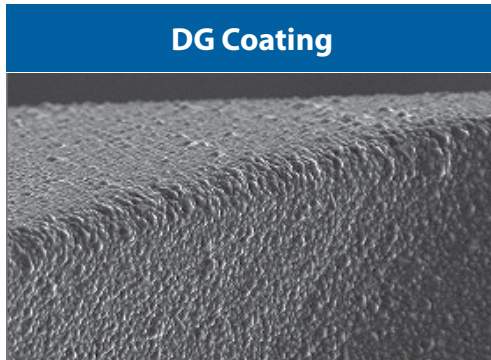


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DG End Mill Lineup!
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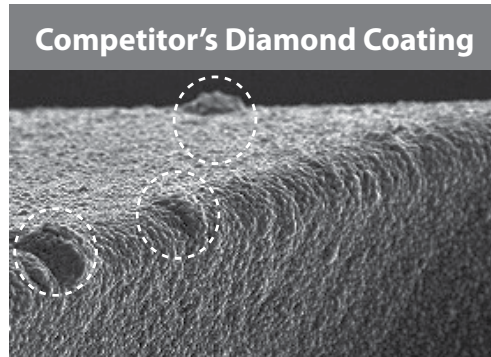
OSG Diamond Coating

Smooth Diamond Coating Achieved Through Advanced Technology



DG Coating

- Sharp cutting edge with minimal roundness means low resistance to minimize the chipping of the workpiece.
- Stable diamond crystals for milling graphite



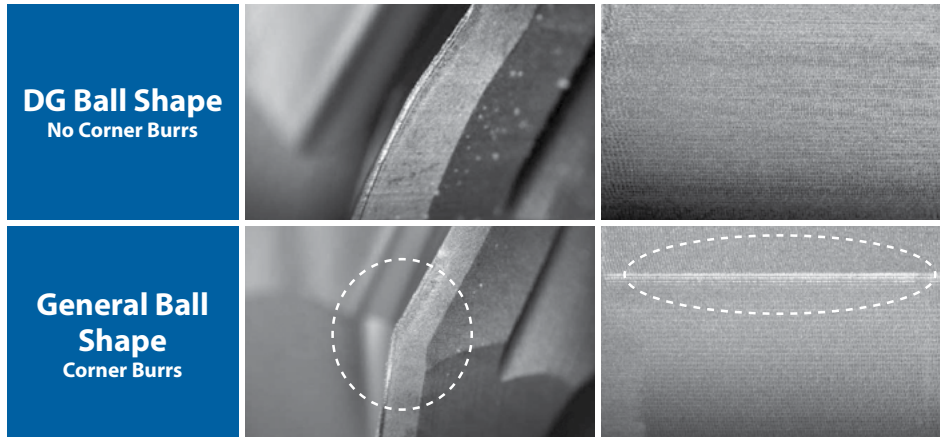
Competitor's Diamond Coating

- Irregular huge diamond grains exist on the cutting edge.

Improved Contour Milling Quality

Seamless Shape Prevents Steps on the Work Surface and Produces a Better Finish

Without having an edge between the corner radius and the radial relief, there is no longer a step on the work surface and improves surface finish.



Smooth Cutting Edge Even at Small Diameters

Condition of the Cutting Edge Captured Through Projection Photography

Especially apparent on smaller radius tools, the contour of the cutting edge is extremely smooth as a result of fine coating technology and high-precision grinding.



DG Coating



Competitor's Diamond Coating

List 7440

DG-EML, 4 Flute, Square

NEW SPEED FEED P8 CARBIDE **DG** LONG 30°



Milling Radius Tolerance	
D < 1/4	+/- 0.00028
1/4 <= D	+/- 0.00039

Units: Inch

EDP Number	Mill Diameter	OAL	Length of Cut	Shank Dia.	No. of Flutes	Status
	D	L	Lc	d		
74400125	1/32	2 1/2	5/32	1/8	4	○
74400225	3/64	2 1/2	15/64	1/8	4	○
74400325	1/16	2 1/2	5/16	1/8	4	●
74400425	3/32	2 1/2	15/32	1/8	4	●
74400525	1/8	3	5/8	1/8	4	●
74400625	3/16	3	15/16	3/16	4	●
74400725	1/4	4	1 1/4	1/4	4	●
74400825	3/8	6	1 7/8	3/8	4	●
74400925	1/2	6	2 1/4	1/2	4	●

Packed: 1 pc.

Available DG coating only.

● Stocked ○ Available Upon Request; Minimum Order Quantity May Apply ▲ Japan Stocked

Stock and availability vary - Please go to osgtool.com or contact customer service to confirm availability.



List 7470

DG-CR-EML, 4 Flute, Corner Radius

NEW SPEED FEED P9 CARBIDE **DG** LONG 30°



Milling Radius Tolerance	
D < 1/4	+/- 0.00028
1/4 <= D	+/- 0.00039

Units: Inch

EDP Number	Mill Diameter	Corner Radius	OAL	Length of Cut	Shank Dia.	No. of Flutes	Status
	D	R	L	Lc	d		
74700125	3/64	0.010	2 1/2	15/64	1/8	4	○
74700225	1/16	0.010	2 1/2	5/16	1/8	4	○
74700325	3/32	0.015	2 1/2	15/32	1/8	4	○
74700425	3/32	0.020	2 1/2	15/32	1/8	4	○
74700525	1/8	0.015	3	5/8	1/8	4	○
74700625	1/8	0.020	3	5/8	1/8	4	○
74700725	1/8	0.030	3	5/8	1/8	4	○
74700825	3/16	0.030	3	15/16	3/16	4	○
74700925	3/16	0.060	3	15/16	3/16	4	○
74701025	1/4	0.015	4	1 1/4	1/4	4	○
74701125	1/4	0.020	4	1 1/4	1/4	4	○
74701225	1/4	0.030	4	1 1/4	1/4	4	○
74701325	1/4	0.060	4	1 1/4	1/4	4	○
74701425	3/8	0.015	6	1 7/8	3/8	4	○
74701525	3/8	0.030	6	1 7/8	3/8	4	○
74701625	3/8	0.060	6	1 7/8	3/8	4	○
74701725	1/2	0.015	6	2 1/4	1/2	4	○
74701825	1/2	0.030	6	2 1/4	1/2	4	○
74701925	1/2	0.060	6	2 1/4	1/2	4	○

Packed: 1 pc.

Available DG coating only.

● Stocked ○ Available Upon Request; Minimum Order Quantity May Apply ▲ Japan Stocked

Stock and availability vary - Please go to osgtool.com or contact customer service to confirm availability.



List No.	Work Material																
	P					M			K	N		S		Other			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels ≤200HB			Cast Iron	Aluminum		Nickel Alloy	Titanium	Mg	Brass, Bronze	Graphite	Cobalt-Chrome
	Low	Med.	High	300		400	17-4 PH	6061 7075		Casting	Inconel	6Al4V (30 HRC)					
7440	1010	1035	1065	4140													○
7470	1018	1045		4340													○

○ good ○ best



EXOCARB® DG-LN-EML

Long Length of Cut Long Neck DG Coated 4-Fluted Square End Mills for Graphite

List 7441

DG-LN-EML, 4 Flute, Square, Long Neck

NEW	SPEED FEED P10	CARBIDE	DG	LONG	30°
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Milling Radius Tolerance	
D < 1/4	+/- 0.00028
1/4 ≤ D	+/- 0.00039



Units: Inch

EDP Number	Mill Diameter	OAL	Length of Cut	Neck Length	Shank Dia.	No. of Flutes	Status
	D	L	Lc	L1	d		
74410125	1/32	2 1/2	5/32	1/4	1/8	4	○
74410225	3/64	2 1/2	15/64	1/2	1/8	4	○
74410325	1/16	2 1/2	5/16	5/8	1/8	4	○
74410425	3/32	2 1/2	15/32	1	1/8	4	○
74410525	1/8	3	5/8	1 1/4	1/8	4	●
74410625	3/16	3	15/16	1 1/2	3/16	4	●
74410725	1/4	4	1 1/4	2	1/4	4	●

Packed: 1 pc.

Available DG coating only.

● Stocked ○ Available Upon Request; Minimum Order Quantity May Apply ▲ Japan Stocked

Stock and availability vary - Please go to osgtool.com or contact customer service to confirm availability.



Work Material																	
List No.	P				Die Steels	M			K Cast Iron	N		S		Other			
	Carbon Steels			Alloy Steels		Stainless Steels ≤200HB				Aluminum		Nickel Alloy Inconel	Titanium 6Al4V (30 HRC)	Mg	Brass, Bronze	Graphite	Cobalt-Chrome
	Low	Med.	High			300	400	17-4 PH		6061 7075	Casting						
7441	1010 1018	1035 1045	1065	4140 4340													○

○ good ○ best



EXOCARB® DG-LN-CR-EML

Long Length of Cut Long Neck DG Coated 4-Fluted Corner Radius End Mills for Graphite

List 7471

DG-LN-CR-EML, 4 Flute, Corner Radius, Long Neck

NEW	SPEED FEED P10	CARBIDE	DG	LONG	30°
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Milling Radius Tolerance	
D < 1/4	+/- 0.00028
1/4 ≤ D	+/- 0.00039



Units: Inch

EDP Number	Mill Diameter	Corner Radius	OAL	Length of Cut	Neck Length	Shank Dia.	No. of Flutes	Status
	D	R	L	Lc	L1	d		
74710125	1/32	0.005	2 1/2	5/32	1/4	1/8	4	○
74710225	3/64	0.010	2 1/2	15/64	1/2	1/8	4	○
74710325	1/16	0.010	2 1/2	5/16	5/8	1/8	4	○
74710425	3/32	0.015	2 1/2	15/32	1	1/8	4	○
74710525	3/32	0.020	2 1/2	15/32	1	1/8	4	○
74710625	1/8	0.015	3	5/8	1 1/4	1/8	4	○
74710725	1/8	0.020	3	5/8	1 1/4	1/8	4	○
74710825	1/8	0.030	3	5/8	1 1/4	1/8	4	○
74710925	3/16	0.030	3	15/16	1 1/2	3/16	4	○
74711025	3/16	0.060	3	15/16	1 1/2	3/16	4	○
74711125	1/4	0.015	4	1 1/4	2	1/4	4	○
74711225	1/4	0.020	4	1 1/4	2	1/4	4	○
74711325	1/4	0.030	4	1 1/4	2	1/4	4	○
74711425	1/4	0.060	4	1 1/4	2	1/4	4	○

Packed: 1 pc.

Available DG coating only.

● Stocked ○ Available Upon Request; Minimum Order Quantity May Apply ▲ Japan Stocked

Stock and availability vary - Please go to osgtool.com or contact customer service to confirm availability.



Work Material																			
List No.	P				Die Steels	M			K	N		S		Other					
	Carbon Steels			Alloy Steels		Stainless Steels ≤200HB				Cast Iron	Aluminum		Nickel Alloy	Titanium	Mg	Brass, Bronze	Graphite	Cobalt-Chrome	
	Low	Med.	High			300	400	17-4 PH			6061 7075	Casting							Inconel
7471	1010 1018	1035 1045	1065	4140 4340															

○ good ⊗ best



EXOCARB® DG-EBML

Long Length of Cut DG Coated 4-Fluted Ball Nose End Mills for Graphite

List 7430

DG-EBML, 4 Flute, Ball

NEW	SPEED FEED P11	CARBIDE	DG	LONG	30°
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Milling Radius Tolerance	
D < 1/4	+/- 0.00028
1/4 ≤ D	+/- 0.00039



Units: Inch

EDP Number	Mill Diameter	OAL	Length of Cut	Shank Dia.	No. of Flutes	Status
	D	L	Lc	d		
74300125	1/32	2 1/2	5/32	1/8	4	●
74300225	3/64	2 1/2	15/64	1/8	4	●
74300325	1/16	2 1/2	5/16	1/8	4	●
74300425	3/32	2 1/2	15/32	1/8	4	●
74300525	1/8	3	5/8	1/8	4	●
74300625	3/16	3	15/16	3/16	4	●
74300725	1/4	4	1 1/4	1/4	4	●
74300825	3/8	6	1 7/8	3/8	4	○
74300925	1/2	6	2 1/4	1/2	4	●

Packed: 1 pc.

Available DG coating only.

● Stocked ○ Available Upon Request; Minimum Order Quantity May Apply ▲ Japan Stocked

Stock and availability vary - Please go to osgtool.com or contact customer service to confirm availability.



Work Material

List No.	P			Alloy Steels 4140 4340	Die Steels	M			K Cast Iron	N		S Titanium 6Al4V (30 HRC)	Other					
	Carbon Steels					Stainless Steels ≤200HB				Aluminum			Nickel Alloy Inconel	Mg	Brass, Bronze	Graphite	Cobalt-Chrome	
	Low 1010 1018	Med. 1035 1045	High 1065			300	400	17-4 PH		6061 7075	Casting							
7441																		

○ good ⊗ best



EXOCARB® DG-LN-EBML

Long Length of Cut Long Neck DG Coated 4-Fluted Ball Nose End Mills for Graphite

List 7431

DG-LN-EBML, 4 Flute, Ball, Long Neck

NEW	SPEED FEED P11	CARBIDE	DG	LONG	30°
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Milling Radius Tolerance	
D < 1/4	+/- 0.00028
1/4 <= D	+/- 0.00039



Units: Inch

EDP Number	Mill Diameter	OAL	Length of Cut	Neck Length	Shank Dia.	No. of Flutes	Status
	D	L	Lc	L1	d		
74310125	1/32	2 1/2	5/32	1/4	1/8	4	○
74310225	3/64	2 1/2	15/64	1/2	1/8	4	○
74310325	1/16	2 1/2	5/16	5/8	1/8	4	●
74310425	3/32	2 1/2	15/32	1	1/8	4	○
74310525	1/8	3	5/8	1 1/4	1/8	4	●
74310625	3/16	3	15/16	1 1/2	3/16	4	○
74310725	1/4	4	1 1/4	2	1/4	4	●

Packed: 1 pc.

Available DG coating only.

● Stocked ○ Available Upon Request; Minimum Order Quantity May Apply ▲ Japan Stocked

Stock and availability vary - Please go to osgtool.com or contact customer service to confirm availability.



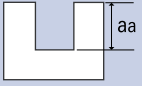

Work Material																		
List No.	P					M			K	N		S		Other				
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels ≤200HB				Cast Iron	Aluminum		Nickel Alloy	Titanium	Mg	Brass, Bronze	Graphite	Cobalt-Chrome
	Low	Med.	High			300	400	17-4 PH			6061 7075	Casting						
7431																	○	

○ good ⊗ best



List 7440: DG-EML

Contouring

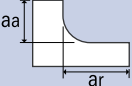
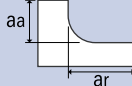
Work Material	Graphite			
	Slotting		Side Milling	
Cutting Speed	246 SFM		246 SFM	
Depth of Cut	 $Aa = 0.1D$		 $Aa = 1D$ $Ar = 0.1D$	
Mill Dia. Inch	Speed RPM	Feed in/min	Speed RPM	Feed in/min
1/32	25,000	100	25,000	142
3/64	20,000	66	20,000	95
1/16	15,000	50	15,000	71
3/32	10,000	33	10,000	47
1/8	7,520	25	7,520	35
3/16	5,010	16	5,010	24
1/4	3,860	12	3,860	18
3/8	2,500	8	2,500	12
1/2	1,880	6	1,880	9

Set the ramping angle to be approximately 3°.

1. Adjust the speed, the feed rate, and the depth of cut to suit your operating conditions, such as the milling shape, machine reigidity, tool holder rigidity, and work holding force.
2. If you are unable to reach the speed and feed rate indicated in the table above, lower the speed and feed rate using the same ratio.
3. If the workpiece gets chipped or if the operation requires a higher level of milling precision, lower the feed rate as necessary.
4. Depending on the shape, if the workpiece chatters, lower the speed and feed rate using the same ratio.
5. To mill graphite, use a dedicated milling machine. To prevent inhalation of dust, use a dust collector and a dust mask when working around graphite.
6. During milling, keep the runout at the tip of the end mill to be less than 0.0004 inches (0.01 mm).
7. If a cut involves the shaping of a corner during side milling, use the corner radius process of the program, or adjust the speed so that it will not cause chattering, and reduce the speed at the corner at the same time (approximately 40%).

List 7470: DG-CR-EML

Contouring

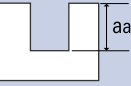

Work Material	Graphite				
	Roughing		Finishing		
Cutting Speed	246 SFM		246 SFM		
Depth of Cut	 $Aa = 1D$ $Ar = 0.1D$		 $Aa = 1D$ $Ar = 0.05D$		
Mill Dia.		Speed RPM	Feed in/min	Speed RPM	Feed in/min
Inch	CR				
3/64	0.010	20,000	95	20,000	79
1/16	0.010	15,000	71	15,000	50
3/32	0.015	10,000	47	10,000	33
3/32	0.020	10,000	47	10,000	33
1/8	0.015	7,520	35	7,520	25
1/8	0.020	7,520	35	7,520	25
1/8	0.030	7,520	35	7,520	25
3/16	0.030	5,010	24	5,010	17
3/16	0.060	5,010	24	5,010	17
1/4	0.015	3,860	18	3,860	12
1/4	0.020	3,860	18	3,860	12
1/4	0.030	3,860	18	3,860	12
1/4	0.060	3,860	18	3,860	12
3/8	0.015	2,500	12	2,500	8
3/8	0.030	2,500	12	2,500	8
3/8	0.060	2,500	12	2,500	8
1/2	0.015	1,880	9	1,880	6
1/2	0.030	1,880	9	1,880	6
1/2	0.060	1,880	9	1,880	6

Set the ramping angle to be approximately between 0.3° and 0.5°.

1. Adjust the speed, the feed rate, and the depth of cut to suit your operating conditions, such as the milling shape, machine rigidity, tool holder rigidity, and work holding force.
2. If you are unable to reach the speed and feed rate indicated in the table above, lower the speed and feed rate using the same ratio.
3. If the workpiece gets chipped or if the operation requires a higher level of milling precision, lower the feed rate as necessary.
4. Depending on the shape, if the workpiece chatters, lower the speed and feed rate using the same ratio.
5. To mill graphite, use a dedicated milling machine. To prevent inhalation of dust, use a dust collector and a dust mask when working around graphite.
6. During milling, keep the runout at the tip of the end mill to be less than 0.0004 inches (0.01 mm).
7. When making a rough cut with a 3/16" or greater end mill, you can feed as high as triple the recommended feed rate provided the stepdown is less than the corner radius.
8. If a cut involves the shaping of a corner during side milling, use the corner radius process of the program, or adjust the speed so that it will not cause chattering, and reduce the speed at the corner at the same time (approximately 60%).

List 7441: DG-LN-EML

Contouring

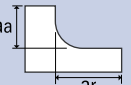

Work Material	Graphite			
	Slotting		Side Milling	
Cutting Speed	123 SFM		123 SFM	
Depth of Cut	 Aa = 0.1D		 Aa = 1D Ar = 0.1D	
Mill Dia.	Speed	Feed	Speed	Feed
Inch	RPM	in/min	RPM	in/min
1/32	15,000	33	15,000	47
3/64	10,000	22	10,000	32
1/16	7,500	16	7,500	23
3/32	5,000	11	5,000	16
1/8	3,760	8	3,760	12
3/16	2,500	5	2,500	8
1/4	1,930	4	1,930	6

Set the ramping angle to be approximately 3°.

1. Adjust the speed, the feed rate, and the depth of cut to suit your operating conditions, such as the milling shape, machine rigidity, tool holder rigidity, and work holding force.
2. If you are unable to reach the speed and feed rate indicated in the table above, lower the speed and feed rate using the same ratio.
3. If the workpiece gets chipped or if the operation requires a higher level of milling precision, lower the feed rate as necessary.
4. Depending on the shape, if the workpiece chatters, lower the speed and feed rate using the same ratio.
5. To mill graphite, use a dedicated milling machine. To prevent inhalation of dust, use a dust collector and a dust mask when working around graphite.
6. During milling, keep the runout at the tip of the end mill to be less than 0.0004 inches (0.01 mm).
7. If a cut involves the shaping of a corner during side milling, use the corner radius process of the program, or adjust the speed so that it will not cause chattering, and reduce the speed at the corner at the same time (approximately 40%).

List 7471: DG-LN-CR-EML

Contouring

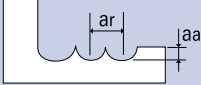
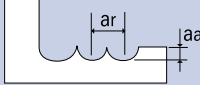
Work Material	Graphite			
	Roughing		Finishing	
Cutting Speed	123 SFM		123 SFM	
Depth of Cut	 Aa = 1D Ar = 0.1D		 Aa = 1D Ar = 0.05D	
Mill Dia.	Speed	Feed	Speed	Feed
Inch	RPM	in/min	RPM	in/min
1/32	15,000	47	15,000	39
3/64	10,000	31	10,000	26
1/16	7,500	23	7,500	17
3/32	5,000	16	5,000	11
3/32	5,000	16	5,000	11
1/8	3,760	12	3,760	8
1/8	3,760	12	3,760	8
1/8	3,760	12	3,760	8
3/16	2,500	8	2,500	6
3/16	2,500	8	2,500	6
1/4	1,930	6	1,930	4
1/4	1,930	6	1,930	4
1/4	1,930	6	1,930	4
1/4	1,930	6	1,930	4

Set the ramping angle to be approximately between 0.3° and 0.5°.

1. Adjust the speed, the feed rate, and the depth of cut to suit your operating conditions, such as the milling shape, machine rigidity, tool holder rigidity, and work holding force.
2. If you are unable to reach the speed and feed rate indicated in the table above, lower the speed and feed rate using the same ratio.
3. If the workpiece gets chipped or if the operation requires a higher level of milling precision, lower the feed rate as necessary.
4. Depending on the shape, if the workpiece chatters, lower the speed and feed rate using the same ratio.
5. To mill graphite, use a dedicated milling machine. To prevent inhalation of dust, use a dust collector and a dust mask when working around graphite.
6. During milling, keep the runout at the tip of the end mill to be less than 0.0004 inches (0.01 mm).
7. When making a rough cut with a 3/16" or greater end mill, you can feed as high as triple the recommended feed rate provided the stepdown is less than the corner radius.
8. If a cut involves the shaping of a corner during side milling, use the corner radius process of the program, or adjust the speed so that it will not cause chattering, and reduce the speed at the corner at the same time (approximately 60%).

List 7430: DG-EBML

Contouring

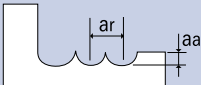
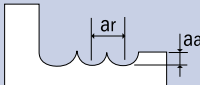
Work Material	Graphite			
	Roughing		Finishing	
Cutting Speed	164 SFM		164 SFM	
Depth of Cut	 $Aa = 0.2D$ $Ar = 0.2D$		 $Aa = 0.03D$ $Ar = 0.03D$	
Mill Dia. Inch	Speed RPM	Feed in/min	Speed RPM	Feed in/min
1/32	20,000	95	20,000	95
3/64	13,365	63	13,365	63
1/16	10,025	47	10,025	47
3/32	6,680	32	6,680	32
1/8	5,010	24	5,010	24
3/16	3,340	16	3,340	16
1/4	2,505	12	2,505	12
3/8	1,670	8	1,670	8
1/2	1,255	6	1,255	6

Set the ramping angle to be approximately 0.5°.

1. Adjust the speed, the feed rate, and the depth of cut to suit your operating conditions, such as the milling shape, machine rigidity, tool holder rigidity, and work holding force.
2. If you are unable to reach the speed and feed rate indicated in the table above, lower the speed and feed rate using the same ratio.
3. If the workpiece gets chipped or if the operation requires a higher level of milling precision, lower the feed rate as necessary.
4. Depending on the shape, if the workpiece chatters, lower the speed and feed rate using the same ratio.
5. To mill graphite, use a dedicated milling machine. To prevent inhalation of dust, use a dust collector and a dust mask when working around graphite.
6. During milling, keep the runout at the tip of the end mill to be less than 0.0004 inches (0.01 mm).
7. If a cut involves the shaping of a corner, use the corner radius process of the program, or adjust the speed so that it will not cause chattering, and reduce the speed at the corner at the same time (approximately 60%).

List 7431: DG-LN-EBML

Contouring

Work Material	Graphite			
	Roughing		Finishing	
Cutting Speed	82 SFM		82 SFM	
Depth of Cut	 $Aa = 0.2D$ $Ar = 0.2D$		 $Aa = 0.03D$ $Ar = 0.03D$	
Mill Dia. Inch	Speed RPM	Feed in/min	Speed RPM	Feed in/min
1/32	10,000	31	10,000	31
3/64	6,685	21	6,685	21
1/16	5,015	16	5,015	16
3/32	3,340	11	3,340	11
1/8	2,505	8	2,505	8
3/16	1,670	5	1,670	5
1/4	1,255	4	1,255	4
3/8	835	3	835	3
1/2	630	2	630	2

Set the ramping angle to be approximately 0.5°.

1. Adjust the speed, the feed rate, and the depth of cut to suit your operating conditions, such as the milling shape, machine rigidity, tool holder rigidity, and work holding force.
2. If you are unable to reach the speed and feed rate indicated in the table above, lower the speed and feed rate using the same ratio.
3. If the workpiece gets chipped or if the operation requires a higher level of milling precision, lower the feed rate as necessary.
4. Depending on the shape, if the workpiece chatters, lower the speed and feed rate using the same ratio.
5. To mill graphite, use a dedicated milling machine. To prevent inhalation of dust, use a dust collector and a dust mask when working around graphite.
6. During milling, keep the runout at the tip of the end mill to be less than 0.0004 inches (0.01 mm).
7. If a cut involves the shaping of a corner, use the corner radius process of the program, or adjust the speed so that it will not cause chattering, and reduce the speed at the corner at the same time (approximately 60%).



shaping your dreams

 **Safe use of cutting tools**

- Use safety cover, safety glasses and safety shoes during operation.
- Do not touch cutting edges with bare hands.
- Do not touch cutting chips with bare hands. Chips will be hot after cutting.
- Stop cutting when the tool becomes dull.
- Stop cutting operation immediately if you hear any abnormal cutting sounds.
- Do not modify tools.
- Please use appropriate tools for the operation. Check dimensions to ensure proper selection.

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OSG USA, Inc. : 800-837-2223

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