Power-Carb™

HIGH PERFORMANCE CARBIDE END MILLS

Maximize your Milling Performance of Mold Grade Steels up to 65 HRc

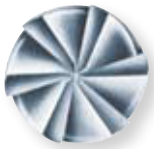
FEATURES/BENEFITS

- Exceptionally strong geometry for:
  - slot and finish milling applications
  - improved surface finishes
  - high feed rates
- Ti-NAMITE-A® (AlTiN) coated for maximum heat and wear resistance
- Engineered carbide provides maximum hardness and fracture resistance
- Long reach capabilities
- Wet or dry machining
- High speed or conventional machining

ADDITIONAL BENEFITS OF DRY MILLING ARE:

- Eliminates procurement costs for cutting fluids*
- Eliminates coolant disposal costs
- Reduces chip disposal costs
- Reduces cutting fluid related health issues (stricter standards have been proposed)

** Research shows coolants to be 17% of manufacturing costs*



Superior Performance in High Temperature Applications

The chemical composition of aluminum titanium nitride (AlTiN) maximizes heat and wear resistance, making it most suitable for wet or dry milling in hardened steels, and many other applications.

Power-Carb® Design Features

Eccentric Relief / Extreme Negative Radial Rake: These features significantly increase edge strength, and are especially critical when finish milling hard materials. Without exceptional strength, edges are prone to chip.

Engineered Carbide: This material is specifically designed for difficult machining operations.

High Helix / Multi-Edge Design: Multiple cutting edges increase rigidity and feed rate capabilities, while the 45 degree helix angle increases shearing ability without sacrificing edge strength. The combination of these features improves surface finishes by reducing cutter deflection and maintaining a more consistent cutter-to-workpiece contact.

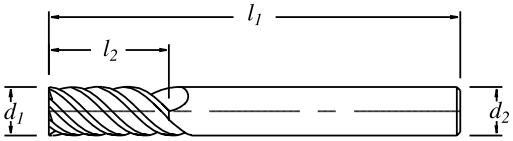
Long Reach: Power-Carbs® are manufactured with extra long shanks for extended reach capabilities.

Advantages of Dry Milling

Extensive testing has shown that elimination of flood coolant often prolongs tool life. Milling applications in hardened steels generate extremely high temperatures and the rapid quenching of conventional flood coolant can produce thermal shock, which reduces tool life. Semi-cooling and chip removal with air and oil blast stabilizes tool temperatures. Dry milling does require an effective heat resistant coating. Ti-NAMITE-A® provides this required protection and is a standard feature of the Power-Carb® end mill.

	Ti-NAMITE-A® (AlTiN)	(TiN)
Vickers Hardness (HV)	3000-3500	2300-3000
Oxidation Temperature	800° C 1472° F	600° C 1112° F

Fractional

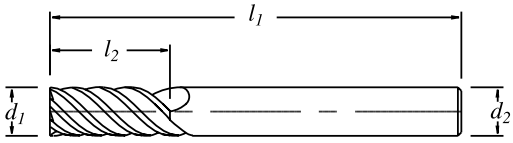


Power-Carb™ - Series 57 - 6 Flute - End Mill

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Ti-NAMITE-A (AlTiN) EDP No.
1/4	17/32	3.5	1/4	36140
5/16	11/16	4.0	5/16	36141
3/8	13/16	4.0	3/8	36142
1/2	1 3/32	4.5	1/2	36143

Tolerances (inch)		
Diameter	d1	d2
1/4	+.0000 / -.0012	-.0001 / -.0003
5/16	+.0000 / -.0016	-.0001 / -.0003
3/8	+.0000 / -.0016	-.0001 / -.0003
1/2	+.0000 / -.0020	-.0001 / -.0004

Metric



Power-Carb™ - Series 57M - 6 Flute - End Mill

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Ti-NAMITE-A (AlTiN) EDP No.
6	13	89	6	46140
8	18	102	8	46141
10	22	102	10	46142
12	26	114	12	46143

Tolerances (mm)		
Diameter	d1	d2
6	+0,000 / -0,030	-0,0025 /-0,0075
8	+0,000 / -0,040	-0,0025 / -0,0075
10	+0,000 / -0,040	-0,0025 /-0,0075
12	+0,000 / -0,050	-0,0025 /-0,0100

POWER-CARB® HIGH PERFORMANCE CARBIDE END MILLS

PERFORMANCE DATA:

Milling D2 / (DIN 1.2379 / X 155 CrMoV 12 1) @ 58 HRc

TOOL USED:

.394" (10 mm)

CUTTING CONDITIONS:

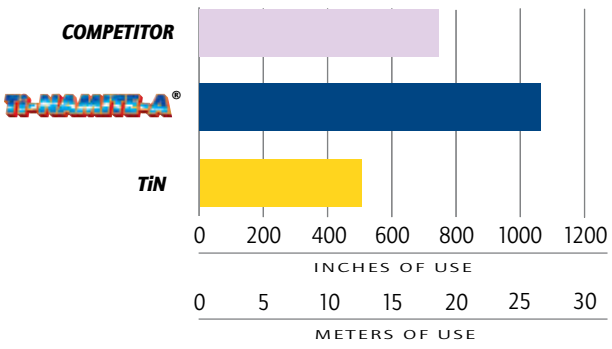
.472" (12mm) axial depth x .020" (0.5mm) radial width

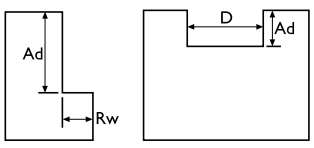
COOLING METHOD:

Air / Oil

TOOL SPEED / FEED RATE:

2384 rpm / 45 ipm (1143 mm/min)





Radial Width of Cut (Rw)
Axial Depth of Cut (Ad)

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Power-Carb Speed and Feed Recommendations

Slotting		Steels 30-45 Rc		Steels 45-55 Rc		Steels 55-60 Rc		Steels 60-65 Rc	
		Rw 1 x D Ad ≤.3 x D		Rw 1 x D Ad ≤.2 x D		Rw 1 x D Ad ≤.1 x D		Rw 1 x D Ad ≤.1 x D	
		Speed		Speed		Speed		Speed	
		215 sfm	65 m / min	145 sfm	45 m / min	100 sfm	30 m / min	65 sfm	20 m / min
Diameter (D)		Feed per Tooth		Feed per Tooth		Feed per Tooth		Feed per Tooth	
in	mm	in	mm	in	mm	in	mm	in	mm
1/4	6	.0014	.035	.0013	.033	.0012	.030	.0011	.028
5/16	8	.0016	.040	.0015	.040	.0014	.035	.0012	.030
3/8	10	.0020	.050	.0018	.045	.0016	.040	.0014	.035
1/2	12	.0024	.060	.0022	.055	.0020	.050	.0018	.045

Profiling		Steels 30-45 Rc		Steels 45-55 Rc		Steels 55-60 Rc		Steels 60-65 Rc	
		Rw ≤.1 x D Ad ≤1.5 x D		Rw ≤.05 x D Ad ≤1.5 x D		Rw ≤.05 x D Ad ≤1.5 x D		Rw ≤.05 x D Ad ≤1.5 x D	
		Speed		Speed		Speed		Speed	
		330 sfm	100 m / min	300 sfm	90 m / min	260 sfm	80 m / min	200 sfm	60 m / min
Diameter (D)		Feed per Tooth		Feed per Tooth		Feed per Tooth		Feed per Tooth	
in	mm	in	mm	in	mm	in	mm	in	mm
1/4	6	.0018	.045	.0015	.040	.0014	.035	.0012	.030
5/16	8	.0022	.055	.0020	.050	.0018	.045	.0015	.040
3/8	10	.0024	.065	.0024	.060	.0022	.055	.0020	.050
1/2	12	.0030	.075	.0027	.070	.0026	.065	.0024	.060

High Speed Profiling		Steels 30-45 Rc		Steels 45-55 Rc		Steels 55-60 Rc		Steels 60-65 Rc	
		Rw ≤.04 x D Ad ≤1.5 x D		Rw ≤.04 x D Ad ≤1.5 x D		Rw ≤.01 x D Ad ≤1.5 x D		Rw ≤.01 x D Ad ≤1.5 x D	
		Speed		Speed		Speed		Speed	
		825 sfm	250 m / min	825 sfm	250 m / min	425 sfm	130 m / min	425 sfm	130 m / min
Diameter (D)		Feed per Tooth		Feed per Tooth		Feed per Tooth		Feed per Tooth	
in	mm	in	mm	in	mm	in	mm	in	mm
1/4	6	.0040	.100	.0035	.090	.0030	.070	.0025	.060
5/16	8	.0045	.110	.0040	.100	.0035	.090	.0030	.070
3/8	10	.0050	.130	.0047	.120	.0040	.100	.0035	.090
1/2	12	.0055	.140	.0050	.130	.0047	.120	.0045	.110