DLC Coated End Mills for Non-Ferrous Materials

Vol 5

AE-N

AE-LNBD-N • AE-TL-N • AE-VTS-N • AE-CR-VTS-N

Expanded Offering for AE-VTS-N!

Scan to check out our new A Brand AE-N End Mills
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The A Brand

AE-LNBD-N

Suitable for a milling beautiful copper electrodes without burrs!

Excellent Machined Surface Accuracy

Beautiful Edge Without Burrs

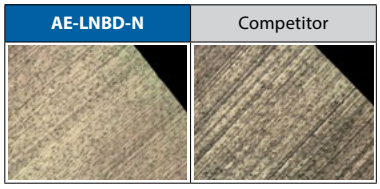
High Quality Milling

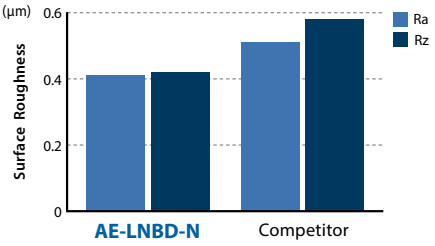
Precise Ball Specifications that Enable High Quality Milling

- Optimal cutting edge shape for milling copper alloy
- Superior Ball R Precision

R ± 0.002	R ± 0.003	R ± 0.004
RE≤0.2	0.2<RE≤1.5	1.5<RE

- High Quality Primary Relief Surface

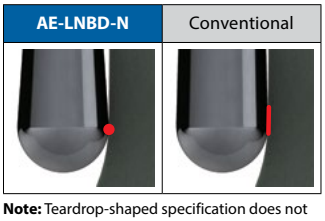




Superior Surface Accuracy

Teardrop-Shaped Outer Periphery Prevents Chattering & Chipping

Strong back taper geometry enables milling by point, which prevents chattering and chipping, resulting in improvement of surface accuracy.



Note: Teardrop-shaped specification does not apply to items above R2.

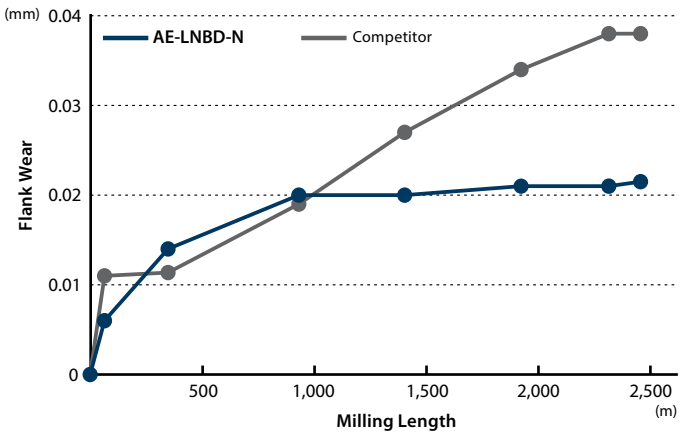
Superior Shank Accuracy

Supports H4 Tolerance (0/-0.004)

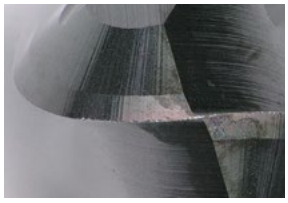
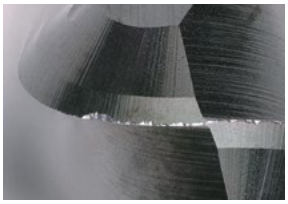
Long Tool Life

DLC-IGUSS Coating Enables Consistent Tool Wear

Tool	AE-LNBD-N	Competitor
Size	R1 x 10 x 4	
Work Material	C1100	
Machining Method	Pick Milling	
Cutting Speed	413 SFM (20,000 RPM)	
Feed	79 IPM (0.002 IPT)	
Depth of Cut	Aa = 0.2mm (0.1D) Ar = 0.4mm (0.2D)	
Coolant	Water Soluble	
Machine	Vertical Machining Center (BT40)	



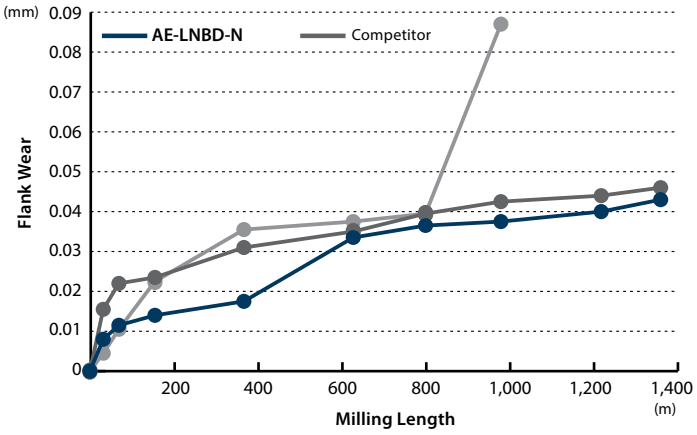
Wearing condition of ball flank after milling 2,480m.

AE-LNBD-N	Competitor
	

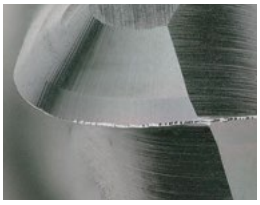
Long Tool Life

Exhibits Superior Endurance in Copper Tungsten

Tool	AE-LNBD-N	Competitor
Size	R1 x 10 x 4	
Work Material	C1100	
Machining Method	Pick Milling	
Cutting Speed	413 SFM (20,000 RPM)	
Feed	79 IPM (0.002 IPT)	
Depth of Cut	Aa = 0.2mm (0.1D) Ar = 0.4mm (0.2D)	
Coolant	Water Soluble	
Machine	Vertical Machining Center (BT40)	



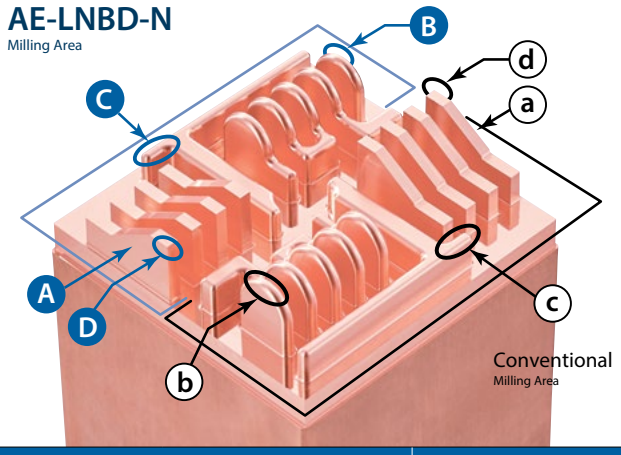
Wear condition of ball flank.

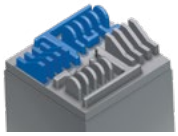
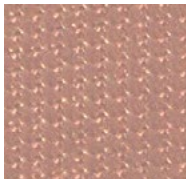
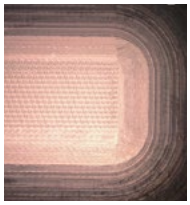
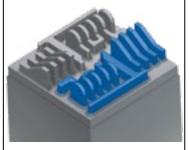
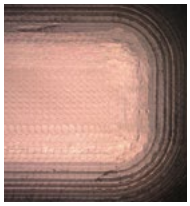
AE-LNBD-N (1,378m)	Competitor A 1,378m	Competitor B 970m
		

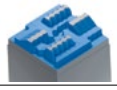
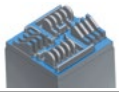
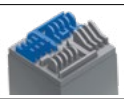
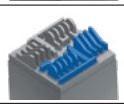
Excellent Surface Finish

Achieves Good Machined Surface Without Burrs Compared to Conventional Products

Tool	AE-LNBD-N	Conventional
Size	R1 x 10 x 4	
Work Material	C1100	
Work Size	60mm x 60mm (10mm Milling Depth)	
Coolant	MQL	
Machine	Vertical Machining Center (HSK-E32)	



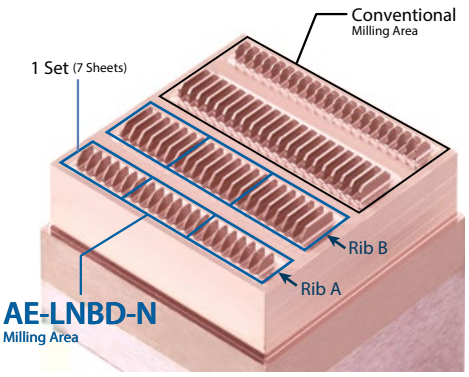
Tool	Process	Condition of Machined Surface			Condition of Burrs
AE-LNBD-N R1×10×4	⑤ 	A  Ra: 0.1125μm	B 	C 	D 
Conventional (Cr Coating) R1×10×4	⑥ 	a  Ra: 0.19125μm	b  Tear	c  Collapse of Shape	d  Burrs

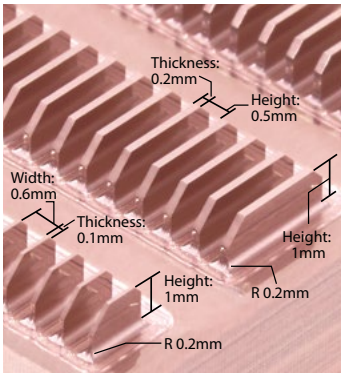
Process	Milling Part	Milling Process	Tool	Cutting Speed (SFM)	Feed (IPM)	ap (mm)	Pf (mm)
①	Overall 	Contouring Line *Long Flute High Efficiency Roughing*	AE-TL-N 3×15	164 SFM (5,300 RPM)	23 IPM (0.0015 IPT)	11	0.3
②	Overall 	Contouring Line *Roughing*	**AE-LNBD-N** R1×10×4	345 SFM (16,800 RPM)	59 IPM (0.0018 IPT)	0.25	0.25
③	Surface Plane 	Frontal Milling *Semi-roughing*	AE-TL-N 3×15	164 SFM (5,300 RPM)	16 IPM (0.001 IPT)	0.1	1
④	Overall 	Contouring Line *Semi-finishing*	**AE-LNBD-N** R1×10×4	344 SFM (16,800 RPM)	59 IPM (0.0017 IPT)	0.25	0.25
⑤	Left Shape 	Contouring Line *High-precision Finishing*	**AE-LNBD-N** R1×10×4	417 SFM (20,160 RPM)	30 IPM (0.0007 IPT)	0.03	0.03
⑥	Right Shape 	Contouring Line *High-precision Finishing*	Conventional (Cr Coating) R1×10×4	417 SFM (20,160RPM)	30 IPM (0.0007 IPT)	0.03	0.03

Superior Tool Wear and Accuracy

Achieves Consistent Tool Wear Over Time and Machining Accuracy Compared to Conventional Products

Tool	AE-LNBD-N	Conventional (Cr Coating)
Size	R0.2 x 1 x 4	
Work Material	① Copper Tungsten ② Tough-Pitch Copper (C1100)	
Work Size	19mm x 19mm (1mm Milling Depth)	
Milling Method	Contour and HighPrecision Finishing	
Cutting Speed	246 SFM (60,000 RPM)	
Feed	24.62 IPM (0.0002 IPT)	
Depth of Cut	Aa = 0.005mm Ar = 0.005mm	
Coolant	Non-Water-Soluble	
Machine	Android II (HSK-E25)	

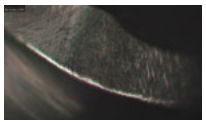
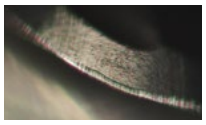


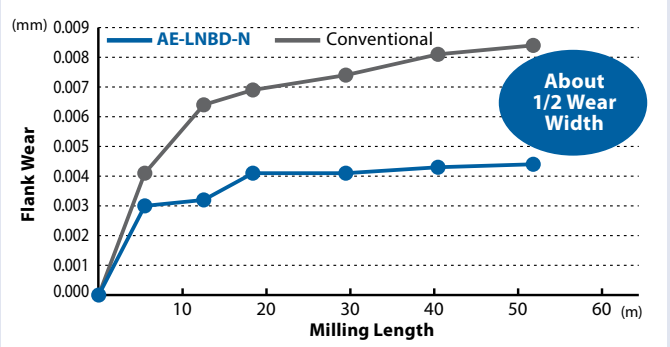


① Machining Copper Tungsten

- Stable wear transition

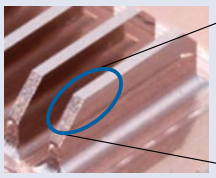
Wear comparison after milling 52.1 m

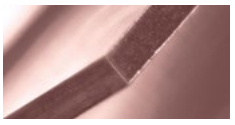
AE-LNBD-N	Conventional
	



② Machining Tough-Pitch Copper

- Good edge without burrs
- Stable machining accuracy with little dimensional change

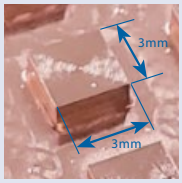


AE-LNBD-N	Conventional
	

Evaluation Method of Cutting Test

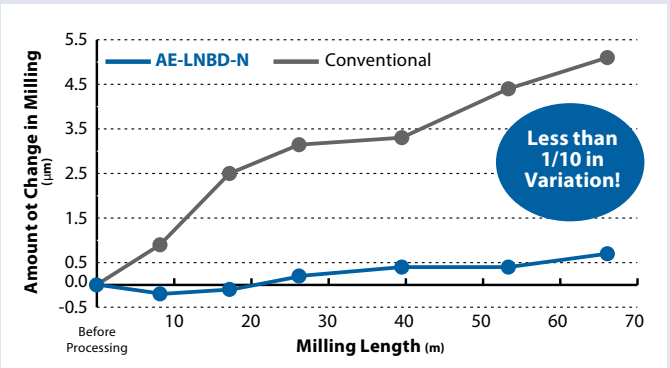
① Milling 1 set of tough-pitch copper ribs (7 sheets)

② Dimensional measurement by processing a copper alloy block for dimensional measurement of each set of ribs



Block of copper alloy for dimensional measurement

Cutting Length of 1 Set of Ribs	
Rib A	Rib B
	
6.2 m/1 set	11.1m/1 set

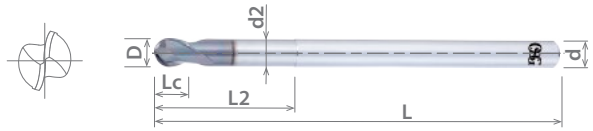


List 8990

AE-LNBD-N, 2 Flute, Stub Length, Long Neck, Ball End, Rib Processing

SPEED FEED	CARBIDE	DLC-IGUSS	R ± 0.002	R ± 0.003	R ± 0.004	30°	SHANK h4	SHRINK FIT
P8-9			RE≤0.2	0.2<RE≤1.5	1.5<RE			

Milling Radius Tolerance (mm)	
D ≤ 0.4	+/- 0.002
0.4 < D ≤ 3	+/- 0.003
3 < D	+/- 0.004



Units: mm

EDP Number	Mill Dia.	Overall Length	Length of Cut	Neck Length	Non-Tapered Neck Length	Neck Dia.	Interference Angle	Effective Neck Length (Le) (Based on Inclined Angle)					Shank Dia.	Type	Number of Flutes	Status
								α								
	D	L	Lc	L1	L2	d2	Θk	0.5°	1°	1.5°	2°	3°	d			
3056370	0.1	45	0.08	7.6	0.3	0.09	14.52°	0.3	0.31	0.32	0.33	0.36	4	1	2	●
3056371	0.1	45	0.08	7.8	0.5	0.09	14.07°	0.53	0.56	0.59	0.62	0.67	4	1	2	●
3056372	0.15	45	0.12	7.5	0.3	0.135	14.55°	0.3	0.31	0.32	0.33	0.35	4	1	2	●
3056373	0.15	45	0.12	7.7	0.5	0.135	14.12°	0.52	0.55	0.58	0.6	0.65	4	1	2	●
3056374	0.15	45	0.12	8.2	1	0.135	13.29°	1.05	1.1	1.14	1.18	1.27	4	1	2	●
3056375	0.2	45	0.16	7.4	0.3	0.19	14.59°	0.3	0.31	0.32	0.33	0.34	4	1	2	●
3056376	0.2	45	0.16	7.6	0.5	0.19	14.12°	0.53	0.56	0.58	0.61	0.66	4	1	2	●
3056377	0.2	45	0.16	8.1	1	0.19	13.28°	1.06	1.11	1.15	1.19	1.28	4	1	2	●
3056378	0.2	45	0.16	8.6	1.5	0.19	12.53°	1.58	1.65	1.7	1.76	1.9	4	1	2	●
3056379	0.3	45	0.24	7.5	0.6	0.285	14.02°	0.63	0.65	0.68	0.7	0.75	4	1	2	●
3056380	0.3	45	0.24	7.9	1	0.285	13.33°	1.05	1.09	1.13	1.17	1.25	4	1	2	●
3056381	0.3	45	0.24	8.4	1.5	0.285	12.56°	1.57	1.63	1.68	1.74	1.87	4	1	2	●
3056382	0.3	45	0.24	8.9	2	0.285	11.87°	2.09	2.16	2.24	2.32	2.49	4	1	2	●
3056383	0.4	45	0.3	7.7	1	0.38	13.38°	1.04	1.08	1.11	1.15	1.23	4	1	2	●
3056384	0.4	45	0.3	8.7	2	0.38	11.87°	2.08	2.15	2.22	2.3	2.47	4	1	2	●
3056385	0.4	45	0.3	9.7	3	0.38	10.66°	3.12	3.22	3.33	3.45	3.47	4	1	2	●
3056386	0.4	45	0.3	10.7	4	0.38	9.68°	4.15	4.29	4.44	4.6	4.95	4	1	2	●
3056387	0.5	45	0.4	7.6	1	0.475	13.43°	1.03	1.07	1.1	1.13	1.2	4	1	2	●
3056388	0.5	45	0.4	8.6	2	0.475	11.87°	2.07	2.14	2.21	2.28	2.45	4	1	2	●
3056389	0.5	45	0.4	9.6	3	0.475	10.63°	3.11	3.21	3.32	3.43	3.69	4	1	2	●
3056390	0.5	45	0.4	10.6	4	0.475	9.63°	4.14	4.28	4.42	4.58	4.93	4	1	2	●
3056391	0.5	45	0.4	11.6	5	0.475	8.79°	5.18	5.35	5.53	5.73	6.18	4	1	2	●
3056392	0.6	45	0.5	7.3	1	0.55	13.5°	1.02	1.05	1.07	1.1	1.17	4	1	2	●
3056393	0.6	45	0.5	8.3	2	0.55	11.89°	2.06	2.12	2.18	2.25	2.41	4	1	2	●
3056394	0.6	45	0.5	9.3	3	0.55	10.62°	3.09	3.19	3.29	3.4	3.66	4	1	2	●
3056395	0.6	45	0.5	10.3	4	0.55	9.59°	4.12	4.26	4.4	4.55	4.9	4	1	2	●
3056396	0.6	45	0.5	11.3	5	0.55	8.74°	5.16	5.33	5.51	5.7	6.14	4	1	2	●
3056397	0.6	45	0.5	12.3	6	0.55	8.02°	6.19	6.4	6.62	6.85	7.39	4	1	2	●
3056398	0.8	45	0.6	8	2	0.75	11.87°	2.05	2.11	2.17	2.24	2.39	4	1	2	●
3056399	0.8	45	0.6	9.1	3	0.75	10.53°	3.09	3.18	3.28	3.39	3.63	4	1	2	●
3056400	0.8	45	0.6	10	4	0.75	9.46°	4.12	4.25	4.39	4.54	4.88	4	1	2	●
3056401	0.8	45	0.6	12	6	0.75	7.86°	6.19	6.39	6.61	6.84	7.36	4	1	2	●
3056402	0.8	45	0.6	14	8	0.75	6.72°	8.25	8.53	8.82	9.14	9.85	4	1	2	●
3056403	1	45	0.8	7.6	2	0.95	11.85°	2.05	2.1	2.16	2.22	2.37	4	1	2	●
3056404	1	45	0.8	8.6	3	0.95	10.44°	3.08	3.17	3.27	3.37	3.61	4	1	2	●
3056405	1	45	0.8	9.6	4	0.95	9.32°	4.12	4.24	4.38	4.52	4.85	4	1	2	●
3056406	1	45	0.8	10.6	5	0.95	8.42°	5.15	5.31	5.49	5.67	6.1	4	1	2	●
3056407	1	45	0.8	11.6	6	0.95	7.68°	6.18	6.38	6.59	6.82	7.34	4	1	2	●
3056408	1	45	0.8	13.6	8	0.95	6.52°	8.25	8.52	8.81	9.12	9.83	4	1	2	●
3056409	1	45	0.8	15.6	10	0.95	5.67°	10.32	10.66	11.03	11.42	12.31	4	1	2	●
3056410	1	45	0.8	17.6	12	0.95	5.01°	12.39	12.8	13.24	13.72	14.8	4	1	2	●
3056411	1.5	45	1.2	8.8	4	1.45	8.8°	4.18	4.33	4.46	4.6	4.92	4	1	2	●
3056412	1.5	45	1.2	10.8	6	1.45	7.09°	6.27	6.47	6.68	6.9	7.4	4	1	2	●
3056413	1.5	55	1.2	16.8	12	1.45	4.46°	12.48	12.89	13.33	13.8	14.86	4	1	2	●
3056414	1.5	55	1.2	22.8	18	1.45	3.25°	18.68	19.31	19.98	20.7	22.32	4	1	2	●
3056415	2	50	1.6	8.2	4	1.95	7.88°	4.22	4.44	4.65	4.86	5.26	4	1	2	●
3056416	2	50	1.6	10.2	6	1.95	6.2°	6.35	6.67	6.96	7.23	7.75	4	1	2	●
3056417	2	50	1.6	12.2	8	1.95	5.1°	8.47	8.87	9.22	9.54	10.24	4	1	2	●
3056418	2	50	1.6	14.2	10	1.95	4.34°	10.58	11.05	11.45	11.84	12.73	4	1	2	●
3056419	2	50	1.6	16.2	12	1.95	3.77°	12.68	13.21	13.67	14.14	15.21	4	1	2	●
3056420	2	50	1.6	18.2	14	1.95	3.33°	14.78	15.36	15.88	16.44	17.7	4	1	2	●
3056421	2	50	1.6	20.2	16	1.95	2.99°	16.87	17.5	18.1	18.74	-	4	1	2	●

Packed: 1 pc.

Available DLC-IGUSS 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.

AEM

List 8990 (Continued)

AE-LNBD-N, 2 Flute, Stub Length, Long Neck, Ball End, Rib Processing

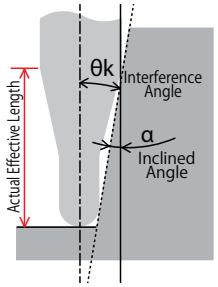
SPEED FEED P8-9 | CARBIDE | DLC-IGUSS | R ± 0.002 (RE≤0.2) | R ± 0.003 (0.2<RE≤1.5) | R ± 0.004 (1.5<RE) | 30° | SHANK h4 | SHRINK FIT

Units: mm

EDP Number	Mill Dia.	Overall Length	Length of Cut	Neck Length	Non-Tapered Neck Length	Neck Dia.	Interference Angle	Effective Neck Length (Le) (Based on Inclined Angle)					Shank Dia.	Type	Number of Flutes	Status
	D	L	Lc	L1	L2	d2	Θk	α 0.5°	α 1°	α 1.5°	α 2°	α 3°	d			
3056422	2	60	1.6	24.2	20	1.95	2.47°	21.04	21.78	22.53	23.34	-	4	1	2	●
3056423	2	60	1.6	29.2	25	1.95	2.04°	26.24	27.13	28.07	29.09	-	4	1	2	●
3056424	3	55	2.4	15.8	10	2.85	5.95°	10.44	10.83	11.18	11.55	12.37	6	1	2	●
3056425	3	55	2.4	17.8	12	2.85	5.23°	12.53	12.98	13.4	13.85	14.85	6	1	2	●
3056426	3	55	2.4	19.8	14	2.85	4.67°	14.62	15.12	15.62	16.15	17.34	6	1	2	●
3056427	3	55	2.4	21.8	16	2.85	4.21°	16.7	17.26	17.83	18.45	19.83	6	1	2	●
3056428	3	55	2.4	25.8	20	2.85	3.53°	20.85	21.54	22.27	23.05	24.8	6	1	2	●
3056429	3	65	2.4	30.8	25	2.85	2.93°	26.03	26.89	27.81	28.8	-	6	1	2	●
3056430	3	65	2.4	35.8	30	2.85	2.5°	31.2	32.24	33.35	34.54	-	6	1	2	●
3056431	4	60	3.2	14	10	3.85	4.75°	10.42	10.79	11.13	11.47	12.25	6	1	2	●
3056432	4	60	3.2	19	15	3.85	3.37°	15.64	16.16	16.67	17.22	18.47	6	1	2	●
3056433	4	65	3.2	24	20	3.85	2.61°	20.84	21.51	22.21	22.97	-	6	1	2	●
3056434	4	65	3.2	29	25	3.85	2.13°	26.02	26.85	27.75	28.72	-	6	1	2	●
3056435	4	80	3.2	34	30	3.85	1.79°	31.18	32.2	33.3	-	-	6	1	2	●
3056436	4	80	3.2	44	40	3.85	1.37°	41.52	42.9	-	-	-	6	1	2	●
3056437	6	70	4.8	-	10	5.85	-	-	-	-	-	-	6	2	2	●
3056438	6	70	4.8	-	15	5.85	-	-	-	-	-	-	6	2	2	●
3056439	6	70	4.8	-	20	5.85	-	-	-	-	-	-	6	2	2	●
3056440	6	90	4.8	-	30	5.85	-	-	-	-	-	-	6	2	2	●
3056441	6	90	4.8	-	50	5.85	-	-	-	-	-	-	6	2	2	●

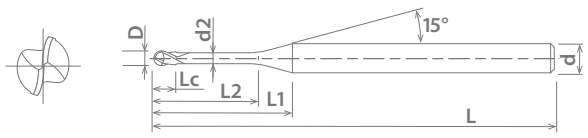
Packed: 1 pc.
Available DLC-IGUSS coating only.
● Stocked ○ Available Upon Request; Minimum Order Quantity May Apply ▲ Japan Stocked
Stock and availability vary - Please go to osgtool.com or contact customer service to confirm availability.

AEM

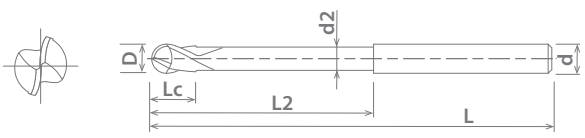


Note: If there is no value in the actual effective length (Le column) for the work gradient angle **α**, it indicates no interference.

Type1



Type2



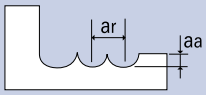
Work Material

List No.	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels ≤200HB			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels			
	Low	Med.	High														
	1010 1018	1035 1045	1065	4140 4340		300	400	17-4 PH		6061 7075	Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC
8990										◎	◎						

○ good ◎ best

List 8990: 2 Flute, Stub Length, Long Neck, Ball End

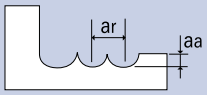
Contouring

Hardness	-				-			
Work Material	Copper, Aluminum				Copper Alloy, Aluminum Alloy			
Depth of Cut								

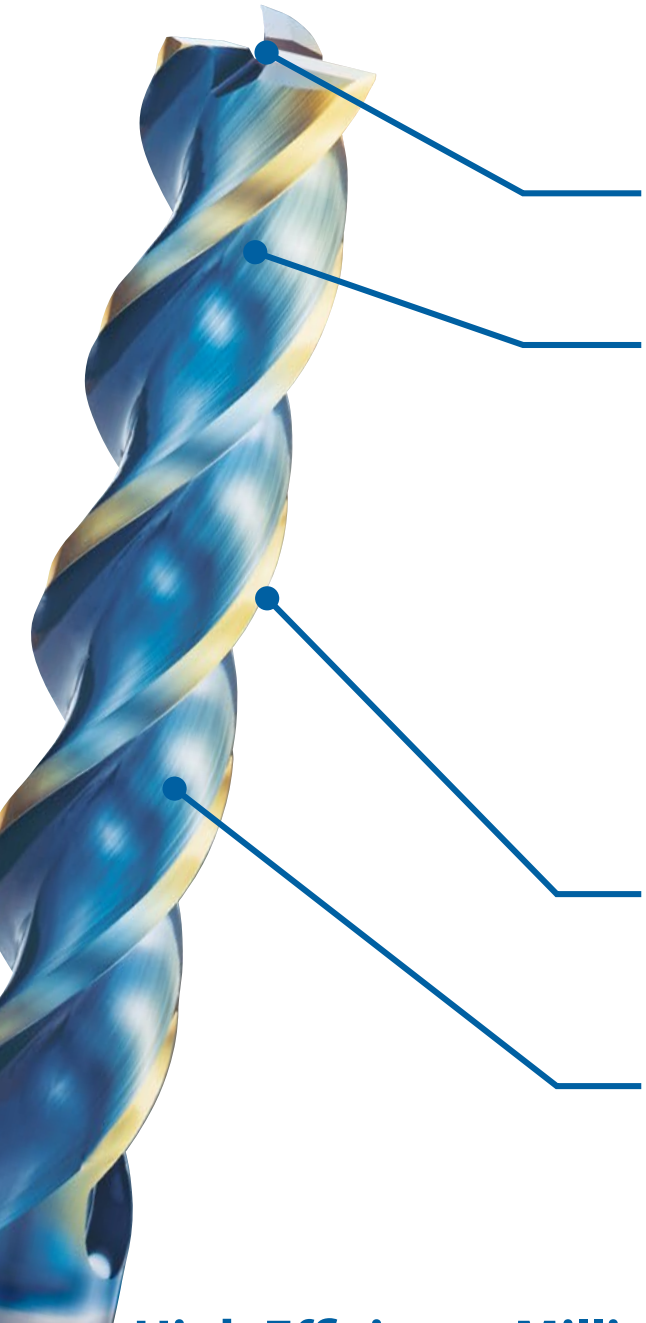
Mill Dia.	Neck Length	Speed RPM	Feed IPM	Aa (Inch)	Ar (Inch)	Speed RPM	Feed IPM	Aa (Inch)	Ar (Inch)
mm	mm								
0.1	0.3	38,400	8.86	0.00020	0.00039	32,000	4.72	0.00020	0.00031
0.1	0.5	38,400	7.09	0.00020	0.00039	32,000	3.78	0.00020	0.00031
0.15	0.3	38,400	10.12	0.00031	0.00079	32,000	5.39	0.00031	0.00059
0.15	0.5	38,400	8.86	0.00031	0.00079	32,000	4.72	0.00031	0.00083
0.15	1	38,400	7.09	0.00020	0.00039	32,000	3.78	0.00020	0.00043
0.2	0.3	38,400	17.72	0.00079	0.00157	32,000	9.45	0.00079	0.00118
0.2	0.5	38,400	17.72	0.00079	0.00157	32,000	9.45	0.00079	0.00118
0.2	1	38,400	8.86	0.00079	0.00157	32,000	4.72	0.00079	0.00118
0.2	1.5	38,400	8.86	0.00079	0.00157	32,000	4.72	0.00079	0.00118
0.3	0.6	38,400	35.43	0.00079	0.00236	32,000	18.90	0.00079	0.00177
0.3	1	38,400	26.57	0.00079	0.00236	32,000	14.17	0.00079	0.00177
0.3	1.5	38,400	26.57	0.00079	0.00236	32,000	14.17	0.00079	0.00177
0.3	2	38,400	26.57	0.00079	0.00236	32,000	14.17	0.00079	0.00177
0.4	1	38,400	35.43	0.00098	0.00394	32,000	18.90	0.00098	0.00295
0.4	2	32,400	26.57	0.00098	0.00394	27,000	14.17	0.00098	0.00295
0.4	3	32,400	26.57	0.00098	0.00394	27,000	14.17	0.00098	0.00295
0.4	4	32,400	26.57	0.00039	0.00236	27,000	14.17	0.00039	0.00177
0.5	1	38,400	44.29	0.00157	0.00394	32,000	23.62	0.00157	0.00295
0.5	2	38,400	35.43	0.00157	0.00394	32,000	18.90	0.00157	0.00295
0.5	3	32,400	26.57	0.00157	0.00394	27,000	14.17	0.00157	0.00295
0.5	4	32,400	26.57	0.00157	0.00394	27,000	14.17	0.00157	0.00295
0.5	5	25,200	17.72	0.00157	0.00394	21,000	9.45	0.00157	0.00295
0.6	1	38,400	88.58	0.00354	0.00472	32,000	56.69	0.00315	0.00472
0.6	2	38,400	66.46	0.00354	0.00472	32,000	42.52	0.00315	0.00472
0.6	3	36,000	36.93	0.00354	0.00472	30,000	23.62	0.00315	0.00472
0.6	4	36,000	36.93	0.00354	0.00472	30,000	23.62	0.00315	0.00472
0.6	5	36,000	36.93	0.00354	0.00472	30,000	23.62	0.00315	0.00472
0.6	6	30,000	22.17	0.00354	0.00472	25,000	14.17	0.00315	0.00472
0.8	2	32,400	66.46	0.00472	0.00630	27,000	42.52	0.00433	0.00630
0.8	3	32,400	66.46	0.00472	0.00630	27,000	42.52	0.00433	0.00630
0.8	4	32,400	66.46	0.00472	0.00630	27,000	42.52	0.00433	0.00630
0.8	6	28,800	36.93	0.00472	0.00472	24,000	23.62	0.00433	0.00472
0.8	8	26,400	22.17	0.00472	0.00472	22,000	14.17	0.00433	0.00472
1	2	33,600	73.82	0.00591	0.00787	28,000	47.24	0.00551	0.00787
1	3	33,600	73.82	0.00591	0.00787	28,000	47.24	0.00551	0.00787
1	4	33,600	73.82	0.00591	0.00787	28,000	47.24	0.00551	0.00787
1	5	25,200	44.29	0.00591	0.00787	21,000	28.35	0.00551	0.00787
1	6	25,200	44.29	0.00591	0.00787	21,000	28.35	0.00551	0.00787
1	8	25,200	44.29	0.00591	0.00591	21,000	28.35	0.00551	0.00591
1	10	21,600	29.53	0.00472	0.00472	18,000	18.90	0.00433	0.00472
1	12	21,600	29.53	0.00472	0.00472	18,000	18.90	0.00433	0.00472
1.5	4	24,000	88.58	0.00945	0.01181	20,000	56.69	0.00866	0.01181
1.5	6	21,600	73.82	0.00945	0.01181	18,000	47.24	0.00866	0.01181
1.5	12	20,400	44.29	0.00945	0.00945	17,000	28.35	0.00866	0.00945
1.5	18	15,600	29.53	0.00709	0.00709	13,000	18.90	0.00630	0.00709
2	4	19,800	103.35	0.01181	0.02205	16,500	66.14	0.01063	0.02205
2	6	19,800	103.35	0.01181	0.02205	16,500	66.14	0.01063	0.02205
2	8	19,800	103.35	0.01181	0.02205	16,500	66.14	0.01063	0.02205
2	10	16,800	73.82	0.01181	0.02205	14,000	47.24	0.01063	0.02205
2	12	16,800	73.82	0.01181	0.02205	14,000	47.24	0.01063	0.02205
2	14	16,800	73.82	0.01181	0.02205	14,000	47.24	0.01063	0.02205
2	16	16,800	73.82	0.01181	0.01654	14,000	47.24	0.01063	0.01654
2	20	13,200	36.93	0.01181	0.01654	11,000	23.62	0.01063	0.01654
2	25	13,200	36.93	0.01181	0.01654	11,000	23.62	0.01063	0.01654
3	10	14,400	88.58	0.01575	0.03307	12,000	56.69	0.01417	0.03307
3	12	12,000	88.58	0.01575	0.03307	10,000	56.69	0.01417	0.03307
3	14	12,000	88.58	0.01575	0.03307	10,000	56.69	0.01417	0.03307
3	16	12,000	44.29	0.01575	0.03307	10,000	28.35	0.01417	0.03307

1. Use a rigid and precise machine and holder.
2. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
3. Use a water soluble fluid.
4. Use a non-water-soluble cutting fluid if the machined surface and accuracy are of critical importance.
5. Always use a cutting fluid recommended by the cutting fluid manufacturer as the workpiece may discolor.

Contouring

Hardness		-				-			
Work Material		Copper, Aluminum				Copper Alloy, Aluminum Alloy			
Depth of Cut									
Mill Dia.	Neck Length	Speed RPM	Feed IPM	Aa (Inch)	Ar (Inch)	Speed RPM	Feed IPM	Aa (Inch)	Ar (Inch)
mm	mm								
3	20	12,000	44.29	0.01575	0.03307	10,000	28.35	0.01417	0.03307
3	25	12,000	44.29	0.01575	0.03307	10,000	28.35	0.01417	0.03307
3	30	10,800	36.93	0.01575	0.03307	9,000	23.62	0.01417	0.03307
4	10	10,800	118.11	0.03937	0.05118	9,000	75.59	0.03543	0.05118
4	15	10,800	9.84	0.03937	0.05118	9,000	56.69	0.03543	0.05118
4	20	4,800	59.06	0.03937	0.05118	7,000	37.80	0.03543	0.05118
4	25	4,800	59.06	0.03937	0.05118	7,000	37.80	0.03543	0.05118
4	30	4,800	59.06	0.03150	0.05118	7,000	37.80	0.02756	0.05118
4	40	6,000	36.93	0.02756	0.05118	5,000	23.62	0.02362	0.05118
6	10	10,800	132.87	0.04724	0.07087	9,000	85.04	0.04331	0.07087
6	15	10,800	132.87	0.04724	0.07087	9,000	85.04	0.04331	0.07087
6	20	8,400	73.82	0.04724	0.07087	7,000	47.24	0.04331	0.07087
6	30	7,200	73.82	0.04724	0.07087	6,000	47.24	0.04331	0.07087
6	50	6,000	44.29	0.03150	0.07087	5,000	28.35	0.02756	0.07087

1. Use a rigid and precise machine and holder.
2. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
3. Use a water soluble fluid.
4. Use a non-water-soluble cutting fluid if the machined surface and accuracy are of critical importance.
5. Always use a cutting fluid recommended by the cutting fluid manufacturer as the workpiece may discolor.



AE-TL-N

3-Flute, Long Length, for All Non-Ferrous Materials

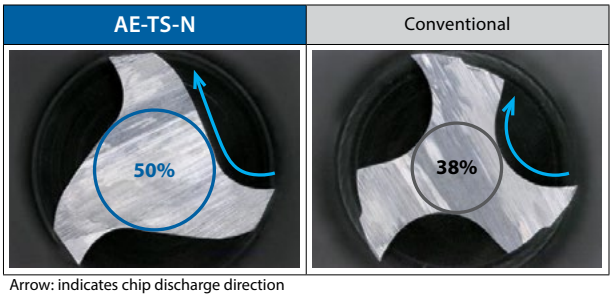
Center Cutting Edge

Ideal for Plunging

Large Core & New Flute Form

High Rigidity and Excellent Chip Evacuation

Rigidity is enhanced by increasing the core thickness, which enables the suppression of chattering. By adopting an optimal flute form, high rigidity can be maintained while ensuring trouble-free chip evacuation.



Arrow: indicates chip discharge direction

Unique Cutting Edge

Achieves Both Rigidity and Sharpness

Unique cutting edge that achieves high durability and good surface finish.

DLC Super Hard Coating

For Superior Surface Accuracy

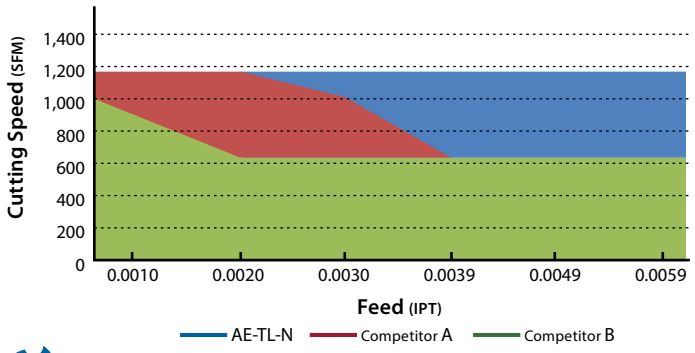
Due to the smoothness of the coating surface, it is extremely effective for non-ferrous materials such as aluminum alloys that require welding resistance and lubricity. Furthermore, its excellent sharpness and ability to suppress burrs enable superior surface finish.

High Efficiency Milling

High Efficiency Even in Slotting with 3D Length of Cut

Tool	AE-TL-N
Size	0.2362" x 0.7087"
Work Material	A7075
Machining Method	Slotting
Depth of Cut	0.2362"
Coolant	Water Soluble

Applicable Cutting Conditions

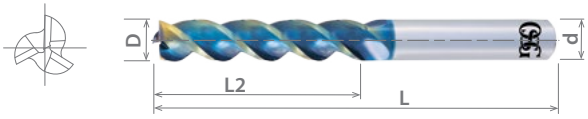


List 8630

AE-TL-N, 3 Flutes, Long Length

SPEED FEED P13-15 | CARBIDE | DLC | ~40° | SHRINK FIT

Milling Diameter Tolerance	
1/8 ≤ D ≤ 1	0 / -0.0008"



Units: Inch

EDP Number	Mill Dia.	OAL	Length of Cut	Shank Dia.	Status
	D	L	Lc	d	
86300009	1/8	1 1/2	3/8	1/8	●
86300109	1/8	2 1/2	1/2	1/8	●
86300209	3/16	2	9/16	3/16	●
86300309	3/16	2 1/4	3/4	3/16	●
86300409	1/4	2 1/2	3/4	1/4	●
86300509	1/4	2 1/2	1	1/4	●
86300609	1/4	3	1 1/4	1/4	●
86300709	5/16	2 1/2	15/16	5/16	○
86300809	3/8	3	1 1/8	3/8	●
86300909	3/8	4	1 1/2	3/8	●
86301009	1/2	4	1 1/2	1/2	●
86301109	1/2	4	2	1/2	●
86301209	1/2	5	2 1/2	1/2	●
86301309	5/8	5	1 7/8	5/8	●
86301409	5/8	5	2 1/2	5/8	●
86301509	5/8	6	3 1/8	5/8	●
86301609	3/4	5	2 1/4	3/4	●
86301709	3/4	6	3	3/4	●
86301809	1	6	3	1	●

Packed: 1 pc.
Available DLC 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.

AEM

YouTube Watch it in Action!

Work Material

List No.	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels ≤200HB			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels			
	Low	Med.	High														
	1010 1018	1035 1045	1065	4140 4340		300	400	17-4 PH		6061 7075	Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC
8630										◎	◎						

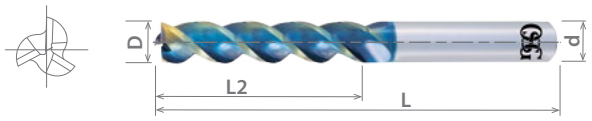
○ good ◎ best

List 8730

SPEED FEED P13-15 | CARBIDE | DLC | ~40° | SHRINK FIT

AE-TL-N, 3 Flutes, Long Length

Milling Diameter Tolerance	
3 ≤ D ≤ 12	0 / -0.020mm



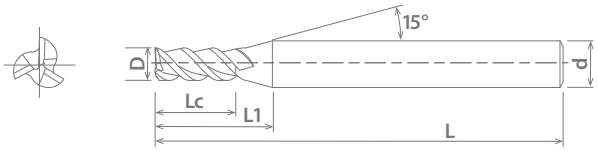
Units: mm

EDP Number	Mill Dia. D	OAL L	Length of Cut Lc	Shank Dia. d	Type	Status
8557340	3	55	9	6	1	▲
8557350	3	55	15	6	1	▲
8557341	4	55	12	6	1	▲
8557351	4	60	20	6	1	▲
8557342	5	55	15	6	1	▲
8557352	5	65	25	6	1	▲
8557343	6	60	18	6	2	▲
8557353	6	75	30	6	2	▲
8557344	8	70	24	8	2	▲
8557354	8	90	40	8	2	▲
8557345	10	75	30	10	2	▲
8557355	10	100	50	10	2	▲
8557346	12	80	36	12	2	▲
8557356	12	110	60	12	2	▲

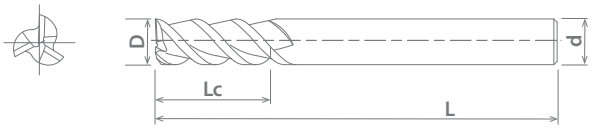
Packed: 1 pc.
Available DLC coating only.
● Stocked ○ Available Upon Request; Minimum Order Quantity May Apply ▲ Japan Stocked
Stock and availability vary - Please go to osgtool.com or contact customer service to confirm availability.

AEM

Type1



Type2



YouTube *Watch it in Action!*

Work Material

List No.	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels ≤200HB			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels			
	Low 1010 1018	Med. 1035 1045	High 1065	4140 4340		300	400	17-4 PH		6061 7075	Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC
8730										◎	◎						

○ good ◎ best

List 8630, 8730: 3xD Length of Cut

Slotting

Work Material		Aluminum Alloys, Magnesium Alloys A5052, A6061, A7075, AZ91, AZ80A		Aluminum Alloy Casting AC4C, ADC		Copper Alloy C1100	
Cutting Speed		600 ~ 1500 SFM		600 ~ 1500 SFM		300 ~ 900 SFM	
Depth of Cut		a_a=1xD				a_a=0.5xD	
Mill Dia.		Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min
Inch	mm						
-	3	25,000	70.9	25,000	70.9	19,400	55.0
1/8	-	25,000	70.9	25,000	70.9	18,300	51.9
-	4	25,000	82.7	25,000	82.7	14,500	48.0
3/16	-	24,400	92.2	24,400	92.2	12,200	46.1
-	5	23,300	96.3	23,300	96.3	11,600	48.0
-	6	19,400	96.2	19,400	96.2	9,700	48.1
1/4	-	18,300	95.1	18,300	95.1	9,200	47.8
5/16	-	14,700	97.2	14,700	97.2	7,300	48.3
-	8	14,500	95.9	14,500	95.9	7,300	48.3
3/8	-	12,200	92.2	12,200	92.2	6,100	46.1
-	10	11,600	95.9	11,600	95.9	5,800	48.0
-	12	9,700	96.2	9,700	96.2	4,800	47.6
1/2	-	9,200	95.6	9,200	95.6	4,600	47.8
5/8	-	7,300	96.6	7,300	96.6	3,700	48.9
3/4	-	6,100	98.0	6,100	98.0	3,100	49.8
1	-	4,600	91.3	4,600	91.3	2,300	45.6

1. Use a rigid and precise machine and holder.
2. The indicated speeds and feeds are for milling with water-soluble coolant.
3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
4. Reduce speed and feed as well as depth of cut when high precision is required.
5. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.

List 8630, 8730: 3xD Length of Cut

Side Milling

Work Material		Aluminum Alloys, Magnesium Alloys A5052, A6061, A7075, AZ91, AZ80A		Aluminum Alloy Casting AC4C, ADC		Copper Alloy C1100	
Cutting Speed		800 ~ 2200 SFM		800 ~ 2200 SFM		600 ~ 1200 SFM	
Depth of Cut		a_a=3xD • a_r=0.1xD					
Mill Dia.		Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min
Inch	mm						
-	3	25,000	79.7	25,000	79.7	25,000	79.7
1/8	-	25,000	88.6	25,000	88.6	25,000	88.6
-	4	25,000	102.8	25,000	102.8	21,800	89.6
3/16	-	25,000	118.1	25,000	118.1	18,300	86.5
-	5	25,000	128.4	25,000	128.4	17,500	89.9
-	6	25,000	154.1	25,000	154.1	14,500	89.4
1/4	-	25,000	162.4	25,000	162.4	13,700	89.0
5/16	-	20,800	172.0	20,800	172.0	11,000	90.9
-	8	20,600	169.3	20,600	169.3	10,900	89.6
3/8	-	17,300	163.5	17,300	163.5	9,200	86.9
-	10	16,500	169.5	16,500	169.5	8,700	89.4
-	12	13,700	168.9	13,700	168.9	7,300	90.0
1/2	-	13,000	168.9	13,000	168.9	6,900	89.7
5/8	-	10,400	172.0	10,400	172.0	5,500	90.9
3/4	-	8,700	174.7	8,700	174.7	4,600	92.4
1	-	6,500	161.2	6,500	161.2	3,400	84.3

1. Use a rigid and precise machine and holder.
2. The indicated speeds and feeds are for milling with water-soluble coolant.
3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
4. Reduce speed and feed as well as depth of cut when high precision is required.
5. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.

List 8630, 8730: 3xD Length of Cut

Plunging

Work Material		Aluminum Alloys, Magnesium Alloys A5052, A6061, A7075, AZ91, AZ80A		Aluminum Alloy Casting AC4C, ADC		Copper Alloy C1100	
Cutting Speed		230 SFM		230 SFM		164 SFM	
Depth of Cut		a_a=1xD				a_a=0.5xD	
Mill Dia. Inch	Mill Dia. mm	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min
-	3	7,500	13.8	7,500	13.8	5,300	3.9
1/8	-	7,023	13.7	7,023	13.7	5,008	4.0
-	4	5,600	13.8	5,600	13.8	3,980	3.9
3/16	-	4,682	14.4	4,682	14.4	3,338	4.2
-	5	4,460	13.8	4,460	13.8	3,180	3.9
-	6	3,680	15.7	3,680	15.7	2,650	4.3
1/4	-	3,511	15.1	3,511	15.1	2,504	4.4
5/16	-	2,809	15.8	2,809	15.8	2,003	4.6
-	8	2,800	17.7	2,800	17.7	1,990	4.7
3/8	-	2,341	16.5	2,341	16.5	1,669	4.8
-	10	2,230	17.7	2,230	17.7	1,590	4.7
-	12	1,840	17.7	1,840	17.7	1,330	4.7
1/2	-	1,756	17.9	1,756	17.9	1,252	5.2
5/8	-	1,405	19.3	1,405	19.3	1,002	5.6
3/4	-	1,170	20.7	1,170	20.7	835	6.0
1	-	878	23.4	878	23.4	626	6.8

1. Use a rigid and precise machine and holder.
2. The indicated speeds and feeds are for milling with water-soluble coolant.
3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
4. Reduce speed and feed as well as depth of cut when high precision is required.
5. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.

List 8630, 8730: 4xD Length of Cut

Side Milling

Work Material		Aluminum Alloys, Magnesium Alloys A5052, A6061, A7075, AZ91, AZ80A		Aluminum Alloy Casting AC4C, ADC		Copper Alloy C1100	
Cutting Speed		800 ~ 1600 SFM		800 ~ 1600 SFM		300 ~ 900 SFM	
Depth of Cut		a_a=4xD • a_r=0.1xD					
Mill Dia. Inch	Mill Dia. mm	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min
-	3	25,000	79.7	25,000	79.7	25,000	79.7
1/8	-	25,000	88.6	25,000	88.6	18,300	64.8
-	4	25,000	102.8	25,000	102.8	14,500	59.6
3/16	-	24,400	115.3	24,400	115.3	12,200	57.6
-	5	23,300	119.7	23,300	119.7	11,600	59.6
-	6	19,400	119.6	19,400	119.6	9,700	59.8
1/4	-	18,300	118.9	18,300	118.9	9,200	59.8
-	8	14,500	119.2	14,500	119.2	7,300	60.0
3/8	-	12,200	115.3	12,200	115.3	6,100	57.6
-	10	11,600	119.2	11,600	119.2	5,800	59.6
-	12	9,700	119.6	9,700	119.6	4,800	59.2
1/2	-	9,200	119.5	9,200	119.5	4,600	59.8
5/8	-	7,300	120.7	7,300	120.7	3,700	61.2
3/4	-	4,600	122.5	4,600	122.5	3,100	62.2

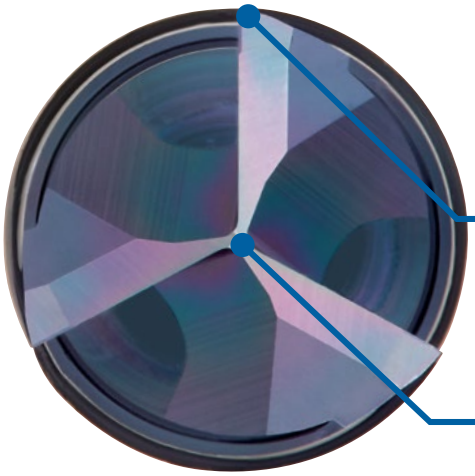
1. Use a rigid and precise machine and holder.
2. The indicated speeds and feeds are for milling with water-soluble coolant.
3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
4. Reduce speed and feed as well as depth of cut when high precision is required.
5. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.

List 8630, 8730: 5xD Length of Cut

Side Milling

Work Material		Aluminum Alloys, Magnesium Alloys A5052, A6061, A7075, AZ91, AZ80A		Aluminum Alloy Casting AC4C, ADC		Copper Alloy C1100	
Cutting Speed		600 ~ 1200 SFM		600 ~ 1200 SFM		200 ~ 600 SFM	
Depth of Cut		a_a=5xD • a_r=0.1xD					
Mill Dia.		Speed	Feed	Speed	Feed	Speed	Feed
Inch	mm	RPM	in/min	RPM	in/min	RPM	in/min
-	3	25,000	79.7	25,000	79.7	12,900	41.1
-	4	21,800	92.7	21,800	92.7	9,700	41.2
-	5	17,500	89.9	17,500	89.9	7,800	40.1
-	6	14,500	89.4	14,500	89.4	6,500	40.1
1/4	-	13,700	89.0	13,700	89.0	6,100	39.6
-	8	10,900	89.6	10,900	89.6	4,800	39.5
-	10	8,700	89.4	8,700	89.4	3,900	40.0
-	12	7,300	90.0	7,300	90.0	3,200	39.5
1/2	-	6,900	89.7	6,900	89.7	3,100	40.3
5/8	-	5,500	90.9	5,500	90.9	2,400	39.7

1. Use a rigid and precise machine and holder.
2. The indicated speeds and feeds are for milling with water-soluble coolant.
3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
4. Reduce speed and feed as well as depth of cut when high precision is required.
5. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.



AE-VTS-N

Suitable for a wide range of cutting applications with high efficiency and high quality processing.

Flat Cutting Edge

Achieves Higher Precision Machined Surface Quality

Large Core Design

High Rigidity Prevents Chattering

Center Cutting Edge

Can Be Used for Plunging

3 Cutting Edges at Center

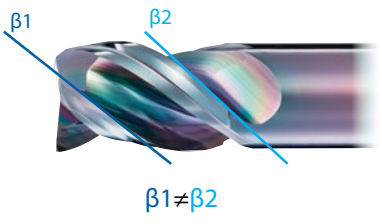
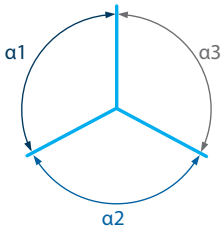
For High Speed Milling

The cutting load is equalized among the cutting edges with greater stability to enable high speed milling. Highly effective for plunging and ramping.

Vibration Suppression

Stable and High Efficiency Milling

Stable and high efficiency milling is made possible by the suppression of chattering.

Variable Leads	Unequal Spacing Teeth
	 α1≠α2≠α3

DLC-IGUSS Coating

Improved Durability and Effectiveness for Non-Ferrous Materials

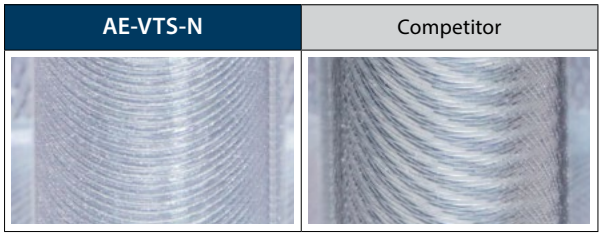
Due to the smoothness of the coating surface, it is extremely effective for non-ferrous materials such as aluminum alloys that require welding resistance and lubricity. Tool durability is also improved.

High Efficiency Milling

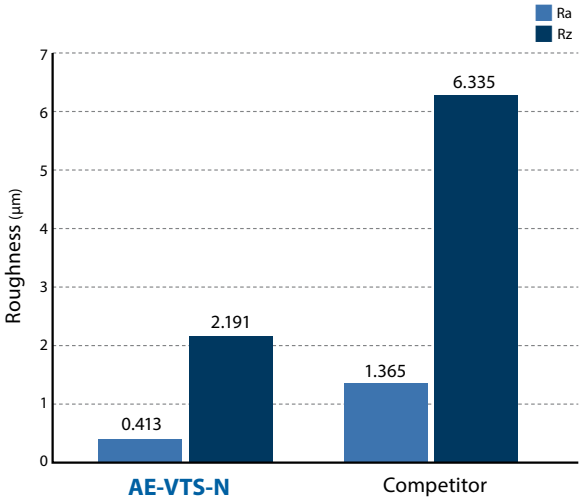
Good Machined Surface Quality Even Under High Speed Cutting Conditions

Due to the anti-welding effect of the DLC coating, the anti-vibration effect of the variable lead and unequal spacing teeth geometry, and the effect of the flat cutting edge specification, good machined surface can be achieved even under aggressive cutting condition.

Tool	AE-VTS-N	Competitor
Size	0.3937"	
Coating	DLC-IGUSS	Non-Coated
Work Material	A7075	
Machining Method	Slotting	
Cutting Speed	1,340 SFM (13,000 rpm)	985 SFM (9,550 rpm)
Feed	187.2 IPM (0.0048 IPT)	57.3 IPM (0.0020 IPT)
Depth of Cut	Aa = .3937" (1 x D)	
Coolant	Water Soluble	
Machine	Vertical MC (BT40)	



Surface Roughness After 433 Inches

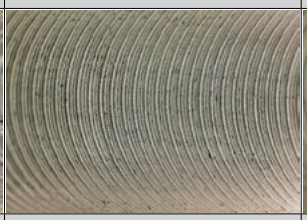


Excellent Surface Finish

With DLC Coating and Flat Cutting Edge

Due to the effect of the DLC coating and the flat cutting edge specification, excellent machined surface quality is achieved.

Tool	AE-VTS-N	Competitor
Size	0.1181"	
Work Material	A7075	
Machining Method	Facing	
Cutting Speed	656 SFM (21,000 rpm)	
Feed	124.0 IPM (0.002 IPT)	
Depth of Cut	Aa = 0.0118 • Ar = 0.0945	
Coolant	Water Soluble	

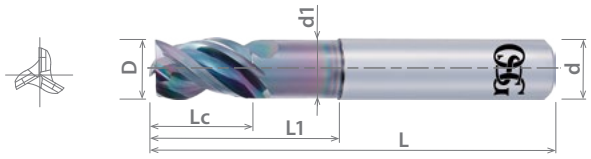
AE-VTS-N (With Wiper)	Competitor A (Without Wiper)	Competitor B (Without Wiper)	Competitor C (Without Wiper)
			
Rz = 1.37 µm Ra = 0.215 µm	Rz = 12.51 µm Ra = 3.206 µm	Rz = 4.98 µm Ra = 0.967 µm	Rz = 5.97 µm Ra = 1.061 µm

List 8830

NEW | SPEED FEED P22-23 | CARBIDE | DLC-IGUSS | Var.° | SHRINK FIT

AE-VTS-N, 3 Flutes, Regular Length, Reduced Neck

Milling Diameter Tolerance	
1/8 ≤ D ≤ 1/2	0 / -0.0008"



Units: Inch

EDP Number	Mill Dia.	OAL	Length of Cut	Neck Length	Neck Diameter	Shank Dia.	Status
	D	L	Lc	L1	d1	d	
88300009	1/8	2 1/4	1/4	3/8	0.120	1/8	●
88300109	3/16	2 1/4	3/8	9/16	0.181	3/16	●
88300209	1/4	2 1/2	1/2	3/4	0.242	1/4	●
88300309	5/16	3	3/4	15/16	0.305	5/16	●
88300409	3/8	3	7/8	1 1/8	0.367	3/8	●
88300509	1/2	3 1/4	1 1/8	1 1/2	0.488	1/2	●

Packed: 1 pc.
Available DLC-IGUSS 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.

AEM

Work Material

List No.	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels ≤200HB			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels			
	Low	Med.	High														
	1010 1018	1035 1045	1065	4140 4340		300	400	17-4 PH		6061 7075	Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC
8830										◎	◎						

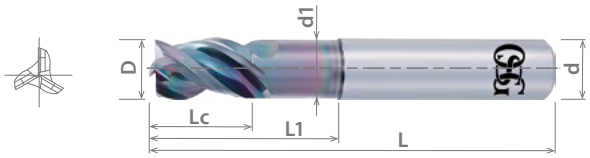
○ good ◎ best

List 8930

NEW | SPEED FEED P22-23 | CARBIDE | DLC-IGUSS | Var.° | SHRINK FIT

AE-VTS-N, 3 Flutes, Regular Length, Reduced Neck

Milling Diameter Tolerance	
1 ≤ D ≤ 12	0 / -0.020mm



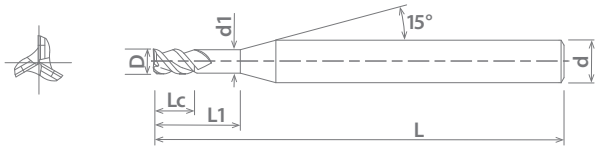
Units: mm

NEW!	EDP Number	Mill Dia. D	OAL L	Length of Cut Lc	Neck Length L1	Neck Diameter d1	Shank Dia. d	Type	Status
	8557243	1.0	45	1.5	3	0.95	4	1	●
	8557244	1.5	45	2.3	4.5	1.45	4	1	●
	8557245	2.0	45	3	6	1.95	4	1	●
	8557246	2.5	45	3.8	7.5	2.4	4	1	●
	8557360	3	55	4.5	9	2.85	6	1	●
	8557361	4	55	6	12	3.8	6	1	●
	8557362	5	55	7.5	15	4.8	6	1	●
	8557363	6	60	9	18	5.8	6	2	●
	8557364	8	70	12	24	7.7	8	2	●
	8557365	10	75	15	30	9.7	10	2	●
	8557366	12	80	18	36	11.7	12	2	●

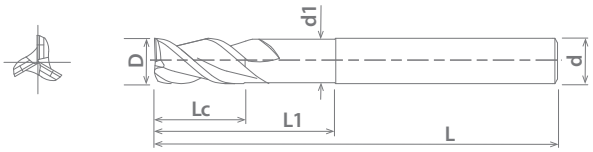
Packed: 1 pc.
Available DLC-IGUSS coating only.
● Stocked ○ Available Upon Request; Minimum Order Quantity May Apply ▲ Japan Stocked
Stock and availability vary - Please go to osgtool.com or contact customer service to confirm availability.

AEM

Type1



Type2



Work Material

List No.	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels ≤200HB			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels			
	Low	Med.	High														
	1010 1018	1035 1045	1065	4140 4340		300	400	17-4 PH		6061 7075	Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC
8930										◎	◎						

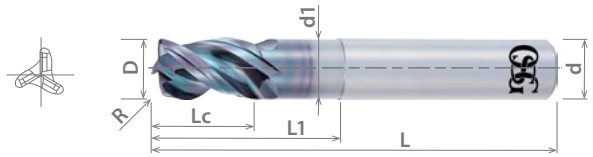
○ good ◎ best

List 8870

NEW | SPEED FEED P22-23 | CARBIDE | DLC-IGUSS | Var.° | SHRINK FIT

AE-CR-VTS-N, 3 Flutes, Regular Length, Reduced Neck, Corner Radius

Milling Diameter Tolerance	
1/8 ≤ D ≤ 1/2	0 / -0.0008"



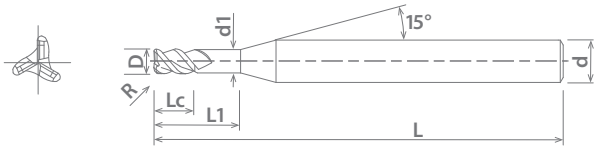
Units: Inch

EDP Number	Mill Dia.	Corner Radius	OAL	Length of Cut	Neck Length	Neck Diameter	Shank Dia.	Status
	D	R	L	Lc	L1	d1	d	
88700009	1/8	0.015	2 1/4	1/4	3/8	0.120	1/8	●
88700109	3/16	0.015	2 1/4	3/8	9/16	0.181	3/16	●
88700209	3/16	0.030	2 1/4	3/8	9/16	0.181	3/16	●
88700309	1/4	0.015	2 1/2	1/2	3/4	0.242	1/4	●
88700409	1/4	0.030	2 1/2	1/2	3/4	0.242	1/4	●
88700509	5/16	0.015	3	3/4	15/16	0.305	5/16	●
88700609	5/16	0.030	3	3/4	15/16	0.305	5/16	●
88700709	3/8	0.015	3	7/8	1 1/8	0.367	3/8	●
88700809	3/8	0.030	3	7/8	1 1/8	0.367	3/8	●
88700909	3/8	0.060	3	7/8	1 1/8	0.367	3/8	●
88701009	1/2	0.030	3 1/4	1 1/8	1 1/2	0.488	1/2	●
88701109	1/2	0.060	3 1/4	1 1/8	1 1/2	0.488	1/2	●
88701209	1/2	0.090	3 1/4	1 1/8	1 1/2	0.488	1/2	●
88701309	1/2	0.120	3 1/4	1 1/8	1 1/2	0.488	1/2	●

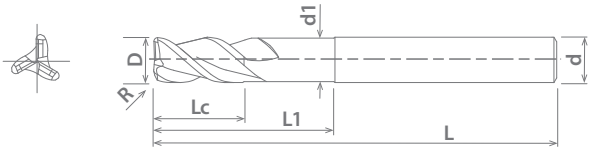
Packed: 1 pc.
Available DLC-IGUSS coating only.
● Stocked ○ Available Upon Request; Minimum Order Quantity May Apply ▲ Japan Stocked
Stock and availability vary - Please go to osgtool.com or contact customer service to confirm availability.

AEM

Type1



Type2



Work Material

List No.	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels ≤200HB			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels			
	Low	Med.	High														
	1010 1018	1035 1045	1065	4140 4340		300	400	17-4 PH		6061 7075	Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC
8870										◎	◎						

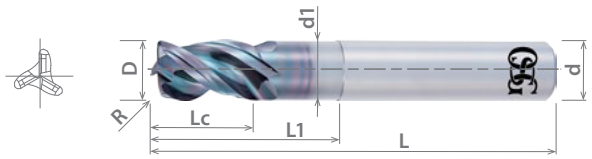
○ good ◎ best

List 8970

NEW | SPEED FEED P22-23 | CARBIDE | DLC-IGUSS | Var.° | SHRINK FIT

AE-CR-VTS-N, 3 Flutes, Regular Length, Reduced Neck, Corner Radius

Milling Diameter Tolerance	
3 ≤ D ≤ 12	0 / -0.020mm



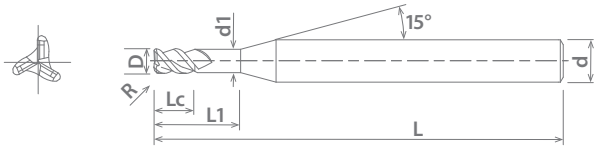
Units: mm

EDP Number	Mill Dia.	Corner Radius	OAL	Length of Cut	Neck Length	Neck Diameter	Shank Dia.	Type	Status
	D	R	L	Lc	L1	d1	d		
8557400	3	0.2	55	6	9	2.85	6	1	▲
8557401	3	0.5	55	6	9	2.85	6	1	▲
8557402	4	0.2	55	8	12	3.80	6	1	▲
8557403	4	0.5	55	8	12	3.80	6	1	▲
8557404	4	1	55	8	12	3.80	6	1	▲
8557405	5	0.2	55	10	15	4.80	6	1	▲
8557406	5	0.5	55	10	15	4.80	6	1	▲
8557407	5	1	55	10	15	4.80	6	1	▲
8557408	6	0.3	60	12	18	5.80	6	2	▲
8557409	6	0.5	60	12	18	5.80	6	2	▲
8557410	6	1	60	12	18	5.80	6	2	▲
8557411	8	0.3	70	16	24	7.70	8	2	▲
8557412	8	0.5	70	16	24	7.70	8	2	▲
8557413	8	1	70	16	24	7.70	8	2	▲
8557414	8	1.5	70	16	24	7.70	8	2	▲
8557415	8	2	70	16	24	7.70	8	2	▲
8557416	10	0.3	75	20	30	9.70	10	2	▲
8557417	10	0.5	75	20	30	9.70	10	2	▲
8557418	10	1	75	20	30	9.70	10	2	▲
8557419	10	1.5	75	20	30	9.70	10	2	▲
8557420	10	2	75	20	30	9.70	10	2	▲
8557421	10	3	75	20	30	9.70	10	2	▲
8557422	12	0.3	80	24	36	11.70	12	2	▲
8557423	12	0.5	80	24	36	11.70	12	2	▲
8557424	12	1	80	24	36	11.70	12	2	▲
8557425	12	1.5	80	24	36	11.70	12	2	▲
8557426	12	2	80	24	36	11.70	12	2	▲
8557427	12	3	80	24	36	11.70	12	2	▲

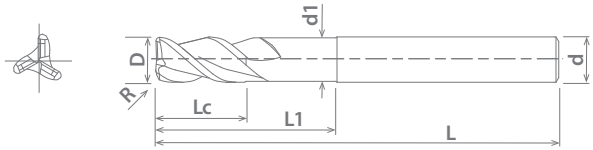
Packed: 1 pc.
Available DLC-IGUSS coating only.
● Stocked ○ Available Upon Request; Minimum Order Quantity May Apply ▲ Japan Stocked
Stock and availability vary - Please go to osgtool.com or contact customer service to confirm availability.

AEM

Type1



Type2



Work Material

List No.	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels ≤200HB			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels			
	Low	Med.	High														
	1010 1018	1035 1045	1065	4140 4340		300	400	17-4 PH		6061 7075	Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC
8970										◎	◎						

◯ good ◎ best

List 8830, 8930, 8870, 8970: 3-Flute, Regular Length, Reduced Neck

Slotting

Work Material		Aluminum Alloys, Magnesium Alloys A5052, A6061, A7075, AZ91, AZ80A		Aluminum Alloy Casting AC4C, ADC		Copper Alloy C1100	
Cutting Speed		600 - 1700 SFM		600 - 1700 SFM		400 - 1000 SFM	
Depth of Cut		Aa=1xD				Aa=0.5xD	
Mill Dia.		Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min
Inch	mm						
-	1	25,000	25.0	25,000	25.0	25,000	25.0
-	1.5	25,000	37.5	25,000	37.5	25,000	37.5
-	2	25,000	50.0	25,000	50.0	25,000	50.0
-	2.5	25,000	62.5	25,000	62.5	25,000	62.5
-	3	25,000	79.7	25,000	79.7	22,600	72.1
1/8	-	25,000	88.6	25,000	88.6	21,400	75.8
-	4	25,000	102.8	25,000	102.8	17,000	69.9
3/16	-	25,000	118.1	25,000	118.1	14,200	67.1
-	5	25,000	128.4	25,000	128.4	13,600	69.9
-	6	21,000	129.5	21,000	129.5	11,300	69.7
1/4	-	19,800	128.6	19,800	128.6	10,700	69.5
5/16	-	15,900	131.5	15,900	131.5	8,500	70.3
-	8	15,800	129.9	15,800	129.9	8,500	69.9
3/8	-	13,200	124.7	13,200	124.7	7,100	67.1
-	10	12,600	129.5	12,600	129.5	6,800	69.9
-	12	10,500	129.5	10,500	129.5	5,700	70.3
1/2	-	9,900	128.6	9,900	128.6	5,300	68.9

1. The above milling condition is a guideline for the overhang length is 4×D.
2. Use a rigid and precise machine and holder.
3. The indicated speeds and feeds are for milling with water-soluble coolant.
4. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
5. Reduce speed and feed as well as depth of cut when high precision is required.
6. Adjust the speed and feed accordingly when the overhang length is longer than specified (refer to p.23).
7. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.

Side Milling

Work Material		Aluminum Alloys, Magnesium Alloys A5052, A6061, A7075, AZ91, AZ80A		Aluminum Alloy Casting AC4C, ADC		Copper Alloy C1100	
Cutting Speed		800 - 2200 SFM		800 - 2200 SFM		600 - 1200 SFM	
Depth of Cut		Aa = 1.5xD Ar = 0.2xD				Aa = 1.5xD Ar = 0.1xD	
Mill Dia.		Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min
Inch	mm						
-	1	25,000	25.0	25,000	25.0	25,000	25.0
-	1.5	25,000	37.5	25,000	37.5	25,000	37.5
-	2	25,000	50.0	25,000	50.0	25,000	50.0
-	2.5	25,000	62.5	25,000	62.5	25,000	62.5
-	3	25,000	79.7	25,000	79.7	25,000	79.7
1/8	-	25,000	88.6	25,000	88.6	25,000	88.6
-	4	25,000	102.8	25,000	102.8	21,800	89.6
3/16	-	25,000	118.1	25,000	118.1	18,300	86.5
-	5	25,000	128.4	25,000	128.4	17,500	89.9
-	6	25,000	154.1	25,000	154.1	14,500	89.4
1/4	-	25,000	162.4	25,000	162.4	13,700	89.0
5/16	-	20,800	172.0	20,800	172.0	11,000	90.9
-	8	20,600	169.3	20,600	169.3	10,900	89.6
3/8	-	17,300	163.5	17,300	163.5	9,200	86.9
-	10	16,500	169.5	16,500	169.5	8,700	89.4
-	12	13,700	168.9	13,700	168.9	7,300	90.0
1/2	-	13,000	168.9	13,000	168.9	6,900	89.7

1. The above milling condition is a guideline for the overhang length is 4×D.
2. Use a rigid and precise machine and holder.
3. The indicated speeds and feeds are for milling with water-soluble coolant.
4. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
5. Reduce speed and feed as well as depth of cut when high precision is required.
6. Adjust the speed and feed accordingly when the overhang length is longer than specified (refer to p.23).
7. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.

List 8830, 8930, 8870, 8970: 3-Flute, Regular Length, Reduced Neck (Cont.)

Plunging

Work Material		Aluminum Alloys, Magnesium Alloys A5052, A6061, A7075, AZ91, AZ80A		Aluminum Alloy Casting AC4C, ADC		Copper Alloy C1100	
Cutting Speed		495 SFM		495 SFM		248 SFM	
Depth of Cut		Aa = 1xD				Aa = 0.5xD	
Mill Dia.		Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min
Inch	mm						
-	1	20000	15.7	20000	15.7	10000	4.7
-	1.5	20000	15.7	20000	15.7	10000	4.7
-	2	20000	15.7	20000	15.7	10000	4.7
-	2.5	20000	15.7	20000	15.7	10000	4.7
-	3	15,900	19.7	15,900	19.7	8,000	5.9
1/8	-	15,110	19.8	15,110	19.8	7,570	6.0
-	4	12,000	19.7	12,000	19.7	6,000	5.9
3/16	-	10,070	19.8	10,070	19.8	5,040	6.0
-	5	9,600	19.7	9,600	19.7	4,800	5.9
-	6	8,000	23.6	8,000	23.6	4,000	7.1
1/4	-	7,550	23.8	7,550	23.8	3,780	7.1
5/16	-	6,040	23.8	6,040	23.8	3,020	7.1
-	8	6,000	27.6	6,000	27.6	3,000	8.3
3/8	-	5,030	27.7	5,030	27.7	2,520	8.2
-	10	4,800	27.6	4,800	27.6	2,400	8.3
-	12	4,000	27.6	4,000	27.6	2,000	8.3
1/2	-	3,770	27.7	3,770	27.7	1,890	8.2

1. The above milling condition is a guideline for the overhang length is 4×D.
2. Use a rigid and precise machine and holder.
3. The indicated speeds and feeds are for milling with water-soluble coolant.
4. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
5. Reduce speed and feed as well as depth of cut when high precision is required.
6. Adjust the speed and feed accordingly when the overhang length is longer than specified (See table below).
7. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys.
   Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.

Cutting Condition Guide for Changes in Overhang Length

	Work Material	Aluminum Alloys, Magnesium Alloys A5052, A6061, A7075, AZ91, AZ80A		Aluminum Alloy Casting AC4C, ADC		Copper Alloy C1100	
	L/D	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min
Slotting	5	70%		70%		70%	
	6	50%		50%		50%	
Side Milling	5	70%		70%		70%	
	6	50%		50%		50%	
Plunging	5	80%		80%		80%	
	6	60%		60%		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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