



Advanced Performance Anti-Vibration Carbide End Mills

Vol 1

AE-VMS

AE-VMS • AE-CR-VMS • AE-LN-CR-VMS



The A Brand *The Tooling Master Class*

LINE-UP

The A Brand is not only a premium tooling brand, it also represents the quality assurance OSG guarantees to each and every customer.

To better accommodate evolving manufacturing needs, the A Brand offering has been expanded. Whether you are looking for better tools or need assistance in choosing the right tool, give one of the A Brand products a try. You will experience a level of quality, reliability and satisfaction that can only be delivered by the A Brand tooling master class.

A-DRILL



A Brand® ADO-TRS 3D & 5D



A Brand® ADF • ADFO • ADFL



A Brand® ADO 3-30D



A Brand® AD 2D & 4D



A Brand® ADO-SUS 3D & 5D



A Brand® AD-LDS

A-TAP



A Brand® AT-1



A Brand® A-CSF



A Brand® A-CHT



A Brand® A-SFT • A-OIL-SFT • A-LT-SFT



A Brand® A-POT • A-OIL-POT • A-LT-POT

A-END MILL

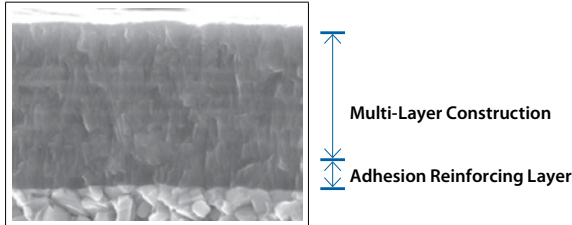


A Brand® AE-VMS

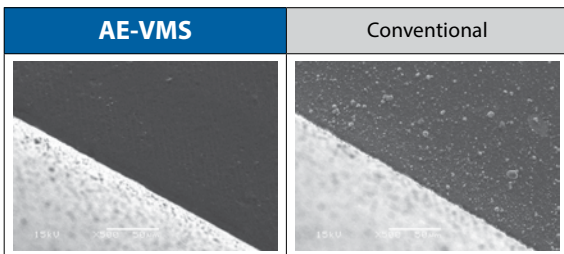
Duarise Coating

Superior Surface Quality

OSG's Duarise coating provides excellent lubricity, superior friction-resistance, and high oxidation temperature. Multi-layer construction minimizes the thermal cracks that often occur when using water-soluble oil.



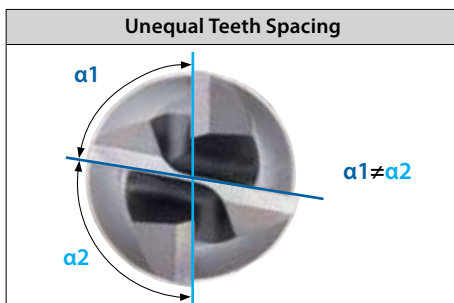
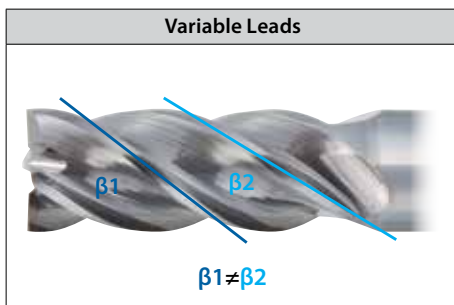
Duarise Coating Provides Excellent Surface Finish



Vibration Suppression

Stable, High Efficiency Milling

Unequal spacing of teeth and variable-lead geometry enables stable and high efficiency milling.



Positive Rake Angle

Reduces Cutting Force

High Rigidity

Improves milling accuracy

New Flute Form

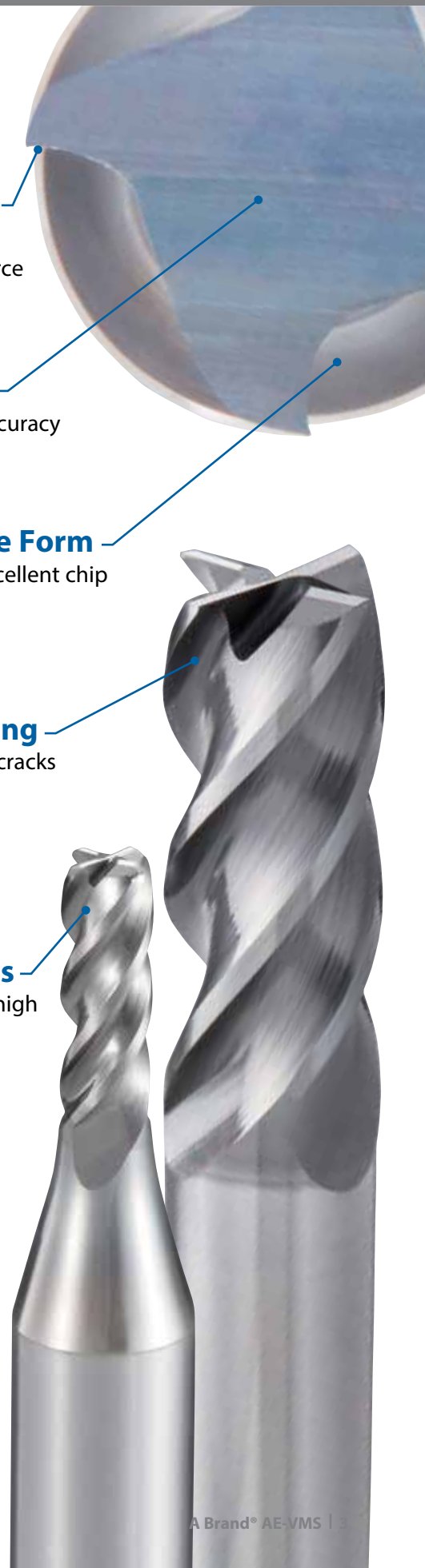
Facilitates excellent chip evacuation

Duarise Coating

Minimizes thermal cracks

Variable Leads

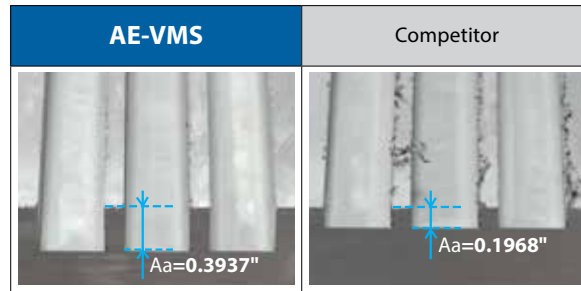
Enables stable and high efficiency milling



Suppression of Burrs

Great Surface Finish with No Vibration and Minimal Burrs

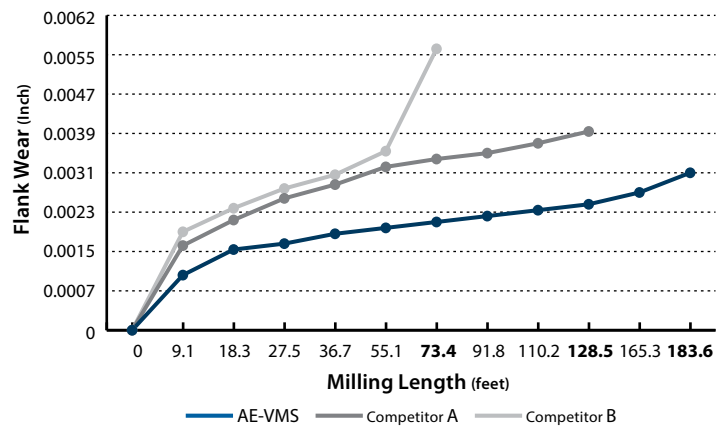
Tool	AE-VMS	Competitor
Tool Size	Ø10	
Work Material	Stainless Steel 316	
Milling Method	Slot Milling	
Cutting Speed	226 SFM (2,200 RPM)	
Feed	13.7 IPM (0.0015 IPT)	
Depth of Cut	Aa = 0.3937"	Aa = 0.1968"
Coolant	Water-Soluble	
Machine	Vertical Machining Center	
M.R.R.	2.13 in ³ /min	1.06 in ³ /min



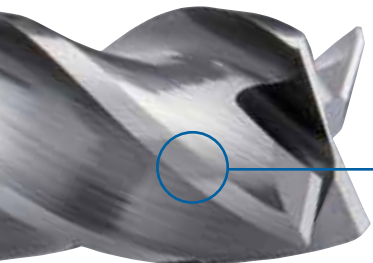
Stable Performance

Normal Wear with No Chipping Even in Slot Milling

Tool	AE-VMS	Competitors
Tool Size	Ø10	
Work Material	Stainless Steel 304	
Milling Method	Slot Milling	
Cutting Speed	230 SFM (2,250 RPM)	
Feed	18.7 IPM (0.002 IPT)	
Depth of Cut	Aa = 0.3937"	
Coolant	Water-Soluble	
Machine	Vertical Machining Center	



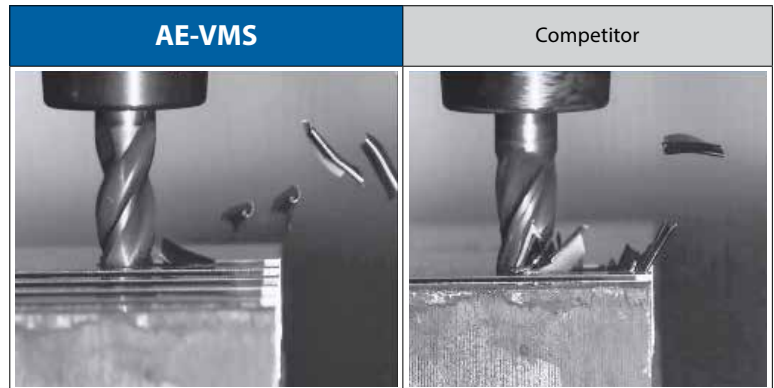
Wear Comparison of the Peripheral Cutting Edge



High Efficiency

Trouble-Free Chip Evacuation Even in High-Speed Slotting

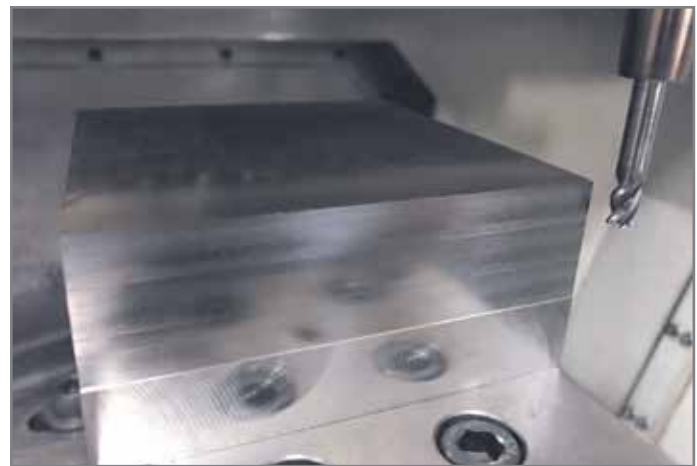
Tool	AE-VMS	Competitor
Tool Size	Ø10 x R1	
Work Material	Alloy Steel 4140	
Milling Method	Slot Milling	
Cutting Speed	295 SFM (2,900 RPM)	
Feed	25.9 IPM (0.0022 IPT)	
Depth of Cut	Aa = 0.393"	
Coolant	None	
Machine	Vertical Machining Center	



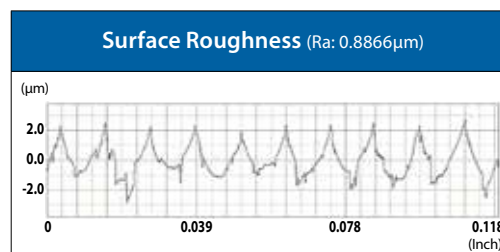
Deep Side Milling

Great Surface Finish with No Chattering

Tool	AE-VMSS
Tool Size	Ø6 x 30
Work Material	Carbon Steel
Milling Method	Side Milling
Cutting Speed	344 SFM (5,570 RPM)
Feed	65.3 IPM (0.0029 IPT)
Depth of Cut	Aa = 0.354" (1.5D) / Ar = 0.0047" (0.02D)
Coolant	Water-Soluble
Machine	Vertical Machining Center
Step Feed	3 Passes (1.06")



Wall Straightness	11µm
After Zero-cut (Spring Pass)	
Wall Straightness	under 5µm
Scallop Height	under 3µm
Surface Roughness	Ra: 0.8866µm



A Brand® AE-VMS

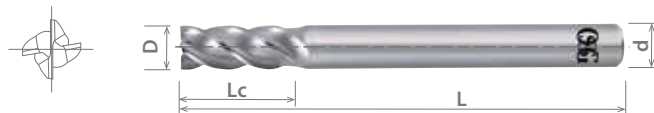
Advanced Performance Anti-Vibration Carbide End Mills

List 8200

AE-VMS, 4 Flute, Multiple Lengths

NEW	SPEED FEED P11-12	CARBIDE	DUR		Var.	SHRINK FIT
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Milling Diameter Tolerance	
D ≤ 7/16	0/-0.0008"
D > 7/16	0/-0.0012"



EDP Number	Mill Diameter	OAL	Length of Cut	Shank Diameter
	D	L	Lc	d
82000021	3/16	2	7/16	3/16
82000221	1/4	2-1/2	7/16	1/4
82000421	5/16	2-1/2	13/16	5/16
82000621	3/8	2-1/2	1/2	3/8
82000821	3/8	2-1/2	7/8	3/8
82001021	7/16	2-3/4	1	7/16
82001221	1/2	2-1/2	5/8	1/2
82001421	1/2	3	1	1/2
82001621	1/2	3-1/2	1-1/4	1/2

EDP Number	Mill Diameter	OAL	Length of Cut	Shank Diameter
	D	L	Lc	d
82001821	5/8	3	3/4	5/8
82002021	5/8	3-1/2	1-1/4	5/8
82002221	5/8	5	1-5/8	5/8
82002421	3/4	3-1/2	7/8	3/4
82002621	3/4	4	1-1/2	3/4
82002821	3/4	4	1-5/8	3/4
82003021	1	4	1-1/2	1
82003221	1	5	2	1
82003421	1	5	2-1/2	1

Packed: 1 pc. Available Duarise coating only.



List No.	Work Material																
	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels 4140 4340	Die Steels	Stainless Steels ≤200HB			Cast Iron	Aluminum		Nickel Alloy Inconel	Titanium 6Al4V (30 HRC)	Hardened Steels			
	Low 1010 1018	Med. 1035 1045	High 1065			300	400	17-4 PH		6061 7075	Casting			~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC
8200	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

good best

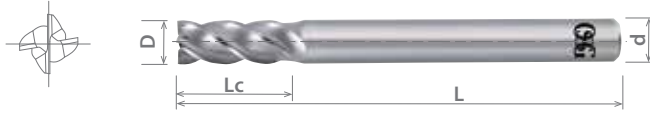


List 8205

AE-VMS, 4 Flute, Regular Length

NEW	SPEED FEED P11-12	CARBIDE	DUR		Var.°	SHRINK FIT
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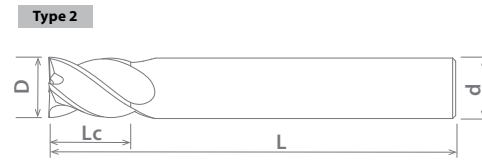
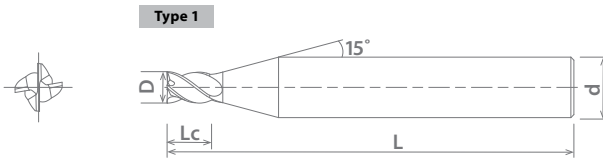
Milling Diameter Tolerance	
D≤12mm	0/-0.020mm
D>12mm	0/-0.030mm



EDP Number	Mill Diameter	OAL	Length of Cut	Shank Diameter	Type
	D	L	Lc	d	
8555830	3	60	8	6	1
8555840	4	60	11	6	1
8555850	5	60	13	6	1
8555860	6	60	13	6	2

EDP Number	Mill Diameter	OAL	Length of Cut	Shank Diameter	Type
	D	L	Lc	d	
8555880	8	70	19	8	2
8555900	10	80	22	10	2
8555920	12	90	26	12	2

Packed: 1 pc. Available Duarise coating only.



List No.	Work Material																	
	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			300	400	17-4 PH		6061 7075	Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC	
8205	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

good best

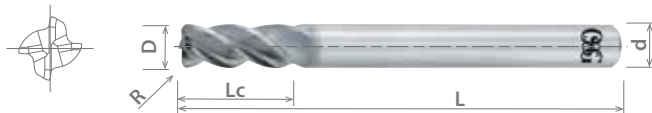


A Brand® AE-CR-VMS

Advanced Performance Anti-Vibration Carbide End Mills

List 8210

AE-CR-VMS, 4 Flute, Multiple Lengths, Corner Radius



NEW	SPEED FEED P13-14	CARBIDE	DUR	Var.°	SHRINK FIT
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Milling Diameter Tolerance	
D ≤ 7/16	0/-0.0008"
D > 7/16	0/-0.0012"

Radius Tolerance	
0.015 ≤ R ≤ 0.125	0/-0.0008"

EDP Number	Mill Diameter	Corner Radius	OAL	Length of Cut	Shank Diameter
	D	R	L	Lc	d
82100021	3/16	0.015	2	7/16	3/16
82100221	3/16	0.030	2	7/16	3/16
82100421	1/4	0.015	2-1/2	7/16	1/4
82100621	1/4	0.030	2-1/2	7/16	1/4
82100821	5/16	0.015	2-1/2	13/16	5/16
82101021	5/16	0.030	2-1/2	13/16	5/16
82101221	3/8	0.015	2-1/2	1/2	3/8
82101421	3/8	0.030	2-1/2	1/2	3/8
82101621	3/8	0.045	2-1/2	1/2	3/8
82101821	3/8	0.060	2-1/2	1/2	3/8
82102021	3/8	0.015	2-1/2	7/8	3/8
82102221	3/8	0.030	2-1/2	7/8	3/8
82102421	3/8	0.045	2-1/2	7/8	3/8
82102621	3/8	0.060	2-1/2	7/8	3/8
82102821	7/16	0.015	2-3/4	1	7/16
82103021	7/16	0.030	2-3/4	1	7/16
82103221	1/2	0.015	2-1/2	5/8	1/2
82103421	1/2	0.030	2-1/2	5/8	1/2
82103621	1/2	0.045	2-1/2	5/8	1/2
82103821	1/2	0.060	2-1/2	5/8	1/2
82104021	1/2	0.090	2-1/2	5/8	1/2
82104221	1/2	0.015	3	1	1/2
82104421	1/2	0.030	3	1	1/2
82104621	1/2	0.045	3	1	1/2
82104821	1/2	0.060	3	1	1/2
82105021	1/2	0.090	3	1	1/2

EDP Number	Mill Diameter	Corner Radius	OAL	Length of Cut	Shank Diameter
	D	R	L	Lc	d
82105221	1/2	0.015	3-1/2	1-1/4	1/2
82105421	1/2	0.030	3-1/2	1-1/4	1/2
82105621	1/2	0.045	3-1/2	1-1/4	1/2
82105821	1/2	0.060	3-1/2	1-1/4	1/2
82106021	1/2	0.090	3-1/2	1-1/4	1/2
82106221	5/8	0.030	3	3/4	5/8
82106421	5/8	0.060	3	3/4	5/8
82106621	5/8	0.090	3	3/4	5/8
82106821	5/8	0.125	3	3/4	5/8
82107021	5/8	0.030	3-1/2	1-1/4	5/8
82107221	5/8	0.060	3-1/2	1-1/4	5/8
82107421	5/8	0.090	3-1/2	1-1/4	5/8
82107621	5/8	0.125	3-1/2	1-1/4	5/8
82107821	3/4	0.030	3-1/2	7/8	3/4
82108021	3/4	0.060	3-1/2	7/8	3/4
82108221	3/4	0.090	3-1/2	7/8	3/4
82108421	3/4	0.125	3-1/2	7/8	3/4
82108621	3/4	0.030	4	1-1/2	3/4
82108821	3/4	0.060	4	1-1/2	3/4
82109021	3/4	0.090	4	1-1/2	3/4
82109221	3/4	0.125	4	1-1/2	3/4
82109421	1	0.030	4	1-1/2	1
82109621	1	0.060	4	1-1/2	1
82109821	1	0.090	4	1-1/2	1
82109921	1	0.125	4	1-1/2	1

Packed: 1 pc. Available Duarise coating only.



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			300	400	17-4 PH		6061 7075	Casting			Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC
8210	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

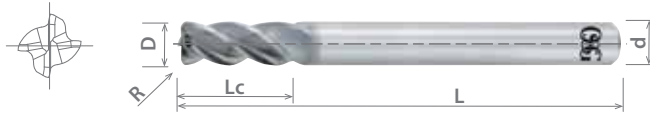
☐ good ☐ best



List 8215

AE-CR-VMS, 4 Flute, Regular Length, Corner Radius

NEW	SPEED FEED	CARBIDE	DUR	Var.°	SHRINK FIT
	P13-14				



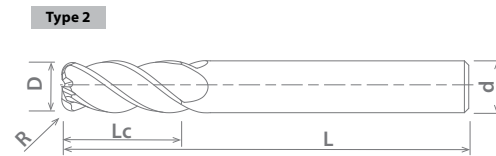
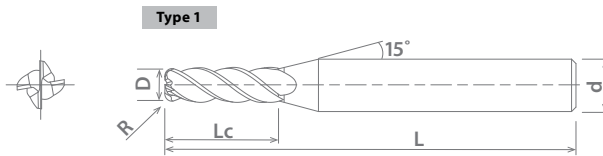
Milling Diameter Tolerance	
D ≤ 12mm	0/-0.020mm
D > 12mm	0/-0.030mm

Radius Tolerance	
0.2 ≤ R ≤ 3	0/-0.02mm

EDP Number	Mill Diameter	Corner Radius	OAL	Length of Cut	Shank Diameter	Type
	D	R	L	Lc	d	
8556050	3	0.2	60	8	6	1
8556060	3	0.5	60	8	6	1
8556070	4	0.2	60	11	6	1
8556080	4	0.5	60	11	6	1
8556090	4	1.0	60	11	6	1
8556100	5	0.2	60	13	6	1
8556110	5	0.5	60	13	6	1
8556120	5	1.0	60	13	6	1
8556130	6	0.3	60	13	6	2
8556140	6	0.5	60	13	6	2
8556150	6	1.0	60	13	6	2
8556160	8	0.3	70	19	8	2
8556170	8	0.5	70	19	8	2
8556180	8	1.0	70	19	8	2

EDP Number	Mill Diameter	Corner Radius	OAL	Length of Cut	Shank Diameter	Type
	D	R	L	Lc	d	
8556190	8	1.5	70	19	8	2
8556200	8	2.0	70	19	8	2
8556210	10	0.3	80	22	10	2
8556220	10	0.5	80	22	10	2
8556230	10	1.0	80	22	10	2
8556240	10	1.5	80	22	10	2
8556250	10	2.0	80	22	10	2
8556260	10	3.0	80	22	10	2
8556270	12	0.5	90	26	12	2
8556280	12	1.0	90	26	12	2
8556290	12	1.5	90	26	12	2
8556300	12	2.0	90	26	12	2
8556310	12	3.0	90	26	12	2

Packed: 1 pc. Available Duarise coating only.



List No.	Work Material																
	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			300	400	17-4 PH		6061 7075	Casting			Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC
8215	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

good best

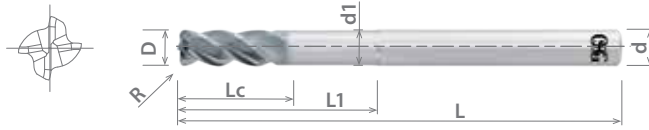


A Brand® AE-LN-CR-VMS

Advanced Performance Anti-Vibration Carbide End Mills

List 8220

AE-LN-CR-VMS, 4 Flute, Long Neck, Long Reach, Corner Radius



NEW	SPEED FEED P15	CARBIDE	DUR		Var.°	SHRINK FIT
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Milling Diameter Tolerance	
D ≤ 7/16	0/-0.008"
D > 7/16	0/-0.0012"

Radius Tolerance	
0.015 ≤ R ≤ 0.125	0/-0.0008"

EDP Number	Mill Diameter	Corner Radius	OAL	Length of Cut	Neck Length	Neck Diameter	Shank Diameter
	D	R	L	Lc	L1	d1	d
82200021	1/4	0.015	4	0.375	1.250	0.235	1/4
82200221	1/4	0.030	4	0.375	1.250	0.235	1/4
82200421	1/4	0.060	4	0.375	1.250	0.235	1/4
82200621	5/16	0.015	4	0.438	1.562	0.295	5/16
82200821	5/16	0.030	4	0.438	1.562	0.295	5/16
82201021	3/8	0.015	4	0.500	1.875	0.353	3/8
82201221	3/8	0.030	4	0.500	1.875	0.353	3/8
82201421	3/8	0.045	4	0.500	1.875	0.353	3/8
82201621	3/8	0.060	4	0.500	1.875	0.353	3/8
82201821	7/16	0.015	4	0.547	1.968	0.400	7/16
82202021	7/16	0.030	4	0.547	1.968	0.400	7/16
82202221	1/2	0.015	4	0.625	2.250	0.470	1/2
82202421	1/2	0.030	4	0.625	2.250	0.470	1/2
82202621	1/2	0.045	4	0.625	2.250	0.470	1/2
82202821	1/2	0.060	4	0.625	2.250	0.470	1/2
82203021	1/2	0.090	4	0.625	2.250	0.470	1/2
82203221	5/8	0.030	4-1/8	0.780	2.250	0.588	5/8
82203421	5/8	0.060	4-1/8	0.780	2.250	0.588	5/8
82203621	5/8	0.090	4-1/8	0.780	2.250	0.588	5/8
82203821	5/8	0.125	4-1/8	0.780	2.250	0.588	5/8
82204021	3/4	0.030	5-1/4	1.000	3.250	0.705	3/4
82204221	3/4	0.060	5-1/4	1.000	3.250	0.705	3/4
82204421	3/4	0.090	5-1/4	1.000	3.250	0.705	3/4
82204621	3/4	0.125	5-1/4	1.000	3.250	0.705	3/4
82204821	1	0.030	5-1/2	1.125	3.250	0.940	1
82205021	1	0.060	5-1/2	1.125	3.250	0.940	1
82205221	1	0.090	5-1/2	1.125	3.250	0.940	1
82205421	1	0.125	5-1/2	1.125	3.250	0.940	1

Packed: 1 pc. Available Duarise coating only.



List No.	Work Material																
	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			300	400	17-4 PH		6061 7075	Casting			Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC
8220	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>


good best



List 8200 - A Brand® AE-VMS : 4 Flute, Multiple Lengths

List 8205 - A Brand® AE-VMS : 4 Flute, Regular Length

Side Milling


Hardness	-		-		~30 HRC		30 ~ 45 HRC		
Work Material	Stainless Steel		Mild Steels Carbon Steels Cast Iron		Tool Steel Alloy Steel		Prehardened Steels Hardened Steels		
Cutting Speed	160 ~ 260 SFM		260 ~ 395 SFM		230 ~ 360 SFM		195 ~ 330 SFM		
Depth of Cut	$a_a = 1.5 \times D$ $a_r = 0.2 \times D$ 								
Mill Dia.	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	
-	3	8,079	19.4	13,896	66.7	12,603	40.3	10,664	29.9
-	4	6,059	21.8	10,422	70.9	9,452	45.4	7,998	32.0
3/16	-	5,089	18.3	8,753	59.5	7,939	38.1	6,718	26.9
-	5	4,847	21.3	8,337	80.0	7,562	48.4	6,398	35.8
-	6	4,201	25.2	6,948	83.4	6,302	60.5	5,332	42.7
1/4	-	3,969	23.8	6,565	78.8	5,954	57.2	5,038	40.3
5/16	-	3,176	19.1	5,252	63.0	4,763	45.7	4,031	32.2
-	8	3,151	23.9	5,211	70.9	4,726	60.5	3,999	41.6
3/8	-	2,646	20.1	4,377	59.5	3,969	50.8	3,359	34.9
-	10	2,521	23.2	4,169	65.0	3,781	52.9	3,199	35.8
7/16	-	2,268	20.9	3,751	58.5	3,402	47.6	2,879	32.2
-	12	2,101	21.0	3,474	54.2	3,151	49.2	2,666	29.9
1/2	-	1,985	19.8	3,282	51.2	2,977	46.4	2,519	28.2
5/8	-	1,405	14.0	2,656	41.4	2,382	37.2	2,015	22.6
3/4	-	1,170	15.0	2,214	41.6	1,985	34.1	1,679	20.8
1	-	878	11.9	1,660	31.2	1,469	25.3	1,260	16.1

1. The above milling condition is a guideline for overhang length $3 \times D$.
2. Use a rigid and precise machine and holder.
3. The rotational speed is calculated by the median of the recommended cutting speed. Adjustments may be necessary depending on the rigidity or the workpiece, fixture, and machine.
4. Please use a suitable fluid with high smoke retardant properties.
5. During dry (no fluid) milling, please use air blow to remove chips from the milling area and to eliminate chip packing.
6. Please use water-soluble coolant when machining stainless steel.
7. Reduce speed and feed as well as depth of cut when high precision is required.
8. Adjust the speed and feed accordingly when the overhang length is longer than specified (refer to Parameter Reduction Chart p. 14).

List 8200 - A Brand® AE-VMS (Cont.) : 4 Flute, Multiple Lengths

List 8205 - A Brand® AE-VMS (Cont.) : 4 Flute, Regular Length

Slotting


Hardness	-		-		~30 HRC		30 ~ 45 HRC								
Work Material	Stainless Steel		Mild Steels Carbon Steels Cast Iron		Tool Steel Alloy Steel		Prehardened Steels Hardened Steels								
Cutting Speed	160 ~ 260 SFM		260 ~ 395 SFM		230 ~ 360 SFM		195 ~ 330 SFM								
Depth of Cut	<table border="1"> <tr> <th>Dia</th> <th>a_a</th> </tr> <tr> <td>D ≤ 6</td> <td>0.5D</td> </tr> <tr> <td>D > 6</td> <td>1.0D</td> </tr> </table>		Dia	a _a	D ≤ 6	0.5D	D > 6	1.0D			a _a = 1.0D				
	Dia	a _a													
D ≤ 6	0.5D														
D > 6	1.0D														
Mill Dia.	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min							
-	3	7,594	18.2	10,664	38.4	8,564	24.0	7,433	17.8						
-	4	5,696	20.5	7,998	38.4	7,150	28.6	5,574	17.8						
3/16	-	4,784	17.2	6,718	32.2	6,005	24.0	4,682	15.0						
-	5	4,556	21.9	6,398	41.0	5,720	32.0	4,460	21.4						
-	6	3,797	15.2	5,332	42.7	4,767	34.3	3,716	23.8						
1/4	-	3,588	14.4	5,038	40.3	4,504	32.4	3,511	22.5						
5/16	-	2,870	14.9	4,031	32.2	3,603	25.9	2,809	18.0						
-	8	2,848	14.8	3,999	35.2	3,575	28.6	2,787	22.3						
3/8	-	2,392	13.4	3,359	29.6	3,003	24.0	2,341	18.7						
-	10	2,278	14.6	3,199	33.3	2,860	27.5	2,230	19.6						
7/16	-	2,050	13.9	2,879	29.9	2,574	24.7	2,007	17.7						
-	12	1,899	12.9	2,666	32.0	2,383	25.7	2,101	21.8						
1/2	-	1,794	12.2	2,519	30.2	2,252	24.3	1,985	20.6						
5/8	-	1,221	12.2	2,015	24.2	1,802	19.5	1,588	16.5						
3/4	-	1,018	11.0	1,679	20.2	1,476	15.9	1,349	14.0						
1	-	592	6.6	1,260	15.1	1,088	12.2	992	10.3						

1. The above milling condition is a guideline for overhang length 3xD.
2. Use a rigid and precise machine and holder.
3. The rotational speed is calculated by the median of the recommended cutting speed. Adjustments may be necessary depending on the rigidity or the workpiece, fixture, and machine.
4. Please use a suitable fluid with high smoke retardant properties.
5. During dry (no fluid) milling, please use air blow to remove chips from the milling area and to eliminate chip packing.
6. Please use water-soluble coolant when machining stainless steel.
7. Reduce speed and feed as well as depth of cut when high precision is required.
8. Adjust the speed and feed accordingly when the overhang length is longer than specified (refer to Parameter Reduction Chart p. 14).

List 8210 - A Brand® AE-CR-VMS : 4 Flute, Multiple Lengths, Corner Radius

List 8215 - A Brand® AE-CR-VMS : 4 Flute, Regular Length, Corner Radius

Side Milling

Hardness		-		-		~30 HRC		30 ~ 45 HRC	
Work Material		Stainless Steel		Mild Steels Carbon Steels Cast Iron		Tool Steel Alloy Steel		Prehardened Steels Hardened Steels	
Cutting Speed		200-330 SFM		330-490 SFM		330-490 SFM		260-395 SFM	
Depth of Cut		$a_a=1.5xD$ $a_r=0.2xD$ 							
Mill Dia.		Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min
-	3	8,079	16.2	13,896	55.6	12,765	35.7	10,664	25.6
-	4	6,059	19.4	10,422	62.5	9,573	38.3	7,998	25.6
3/16	-	5,089	16.3	8,753	52.5	8,041	32.2	6,718	21.5
-	5	4,847	17.5	8,337	66.7	7,659	39.8	6,398	28.2
-	6	4,201	21.8	6,948	77.8	6,382	56.2	5,332	38.4
1/4	-	3,969	20.6	6,565	73.5	6,031	53.1	5,038	36.3
5/16	-	3,176	16.5	5,252	58.8	4,824	42.5	4,031	29.0
-	8	3,151	21.4	5,211	66.7	4,787	57.4	3,999	36.8
3/8	-	2,646	18.0	4,377	56.0	4,020	48.2	3,359	30.9
-	10	2,521	20.2	4,169	61.7	3,829	52.1	3,199	32.0
7/16	-	2,268	18.1	3,751	55.5	3,446	46.9	2,879	28.8
-	12	2,101	18.5	3,474	51.4	3,191	48.5	2,666	26.7
1/2	-	1,985	17.5	3,282	48.6	3,015	45.8	2,519	25.2
5/8	-	1,588	14.0	2,626	38.9	2,412	36.7	2,015	20.2
3/4	-	1,323	11.6	2,188	32.4	2,010	30.6	1,679	16.8
1	-	992	8.7	1,641	24.3	1,508	22.9	1,260	12.6


1. The above milling condition is a guideline for overhang length 3xD.
2. Use a rigid and precise machine and holder.
3. The rotational speed is calculated by the median of the recommended cutting speed. Adjustments may be necessary depending on the rigidity or the workpiece, fixture, and machine.
4. Please use a suitable fluid with high smoke retardant properties.
5. During dry (no fluid) milling, please use air blow to remove chips from the milling area and to eliminate chip packing.
6. Please use water-soluble coolant when machining stainless steel.
7. Reduce speed and feed as well as depth of cut when high precision is required.
8. Adjust the speed and feed accordingly when the overhang length is longer than specified (refer to Parameter Reduction Chart p. 14).

continued on next page

List 8210 - A Brand® AE-CR-VMS (Cont.): 4 Flute, Multiple Lengths, Corner Radius

List 8215 - A Brand® AE-CR-VMS (Cont.): 4 Flute, Regular Length, Corner Radius

Slotting

Hardness		-		-		~30 HRC		30 ~ 45 HRC							
Work Material		Stainless Steel		Mild Steels Carbon Steels Cast Iron		Tool Steel Alloy Steel		Prehardened Steels Hardened Steels							
Cutting Speed		165-260 SFM		260-395 SFM		230-360 SFM		160-260 SFM							
Depth of Cut		<table border="1"> <tr> <th>Dia</th> <th>a_a</th> </tr> <tr> <td>D ≤ 6</td> <td>0.5D</td> </tr> <tr> <td>D > 6</td> <td>1.0D</td> </tr> </table> 		Dia	a _a	D ≤ 6	0.5D	D > 6	1.0D	a _a =1.0D					
Dia	a _a														
D ≤ 6	0.5D														
D > 6	1.0D														
Mill Dia.		Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min						
-	3	7,433	14.9	10,664	29.9	9,695	23.3	8,402	16.8						
-	4	5,574	15.6	7,998	32.0	7,271	23.3	6,302	15.1						
3/16	-	4,682	13.1	6,718	26.9	6,107	19.5	5,293	12.7						
-	5	4,460	17.8	6,398	33.3	5,817	27.9	5,041	18.1						
-	6	3,716	1.5	5,332	40.5	4,847	27.1	4,201	23.5						
1/4	-	3,511	1.4	5,038	38.3	4,580	25.6	3,969	22.2						
5/16	-	2,809	1.1	4,031	30.6	3,664	20.5	3,176	17.8						
-	8	2,787	13.4	3,999	33.6	3,635	27.6	3,151	22.7						
3/8	-	2,341	11.2	3,359	28.2	3,053	23.2	2,646	19.1						
-	10	2,230	12.5	3,199	32.0	2,908	25.6	2,521	20.2						
7/16	-	2,007	11.2	2,879	28.8	2,617	23.0	2,268	18.1						
-	12	1,858	11.9	2,666	29.9	2,424	25.2	2,101	19.3						
1/2	-	1,756	11.2	2,519	28.2	2,290	23.8	1,985	18.3						
5/8	-	1,405	9.0	2,015	22.6	1,832	19.1	1,588	14.6						
3/4	-	1,170	7.5	1,679	18.8	1,527	15.9	1,323	12.2						
1	-	878	5.6	1,260	14.1	1,145	11.9	992	9.1						

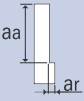
1. The above milling condition is a guideline for overhang length 3xD.
2. Use a rigid and precise machine and holder.
3. The rotational speed is calculated by the median of the recommended cutting speed. Adjustments may be necessary depending on the rigidity or the workpiece, fixture, and machine.
4. Please use a suitable fluid with high smoke retardant properties.
5. During dry (no fluid) milling, please use air blow to remove chips from the milling area and to eliminate chip packing.
6. Please use water-soluble coolant when machining stainless steel.
7. Reduce speed and feed as well as depth of cut when high precision is required.
8. Adjust the speed and feed accordingly when the overhang length is longer than specified (refer to Parameter Reduction Chart below).

Parameter Reduction Chart by Length to Diameter Ratio

Hardness		-		-		~30 HRC		30 ~ 45 HRC	
Work Material		Stainless Steel		Mild Steels Carbon Steels Cast Iron		Tool Steel Alloy Steel		Prehardened Steels Hardened Steels	
L/D		Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min
Slot Milling	4	60%		80%		70%		70%	
	5	50%		70%		60%		60%	
Side Milling	4	70%		90%		90%		80%	
	5	70%		80%		80%		70%	

List 8220 - A Brand® AE-LN-CR-VMS : 4 Flute, Long Neck, Corner Radius

Side Milling

Hardness	-		-		~30 HRC		30 ~ 45 HRC	
Work Material	Stainless Steel		Mild Steels Carbon Steels Cast Iron		Tool Steel Alloy Steel		Prehardened Steels Hardened Steels	
Cutting Speed	130-260 SFM		260-395 SFM		230-360 SFM		130-260 SFM	
Depth of Cut	$a_a = 1.5 \times D$ $a_r = 0.02 \times D$ 							
Mill Dia.	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min
1/4	2,748	16.5	5,191	62.3	4,809	46.2	3,511	28.1
5/16	2,198	13.2	4,153	49.8	3,847	36.9	2,809	22.5
3/8	1,832	13.9	3,461	47.1	3,206	41.0	2,341	24.3
7/16	1,570	14.4	2,966	46.3	2,748	39.6	2,007	22.5
1/2	1,374	13.7	2,595	40.5	2,405	37.5	1,756	19.7
5/8	1,099	11.0	2,076	32.4	1,924	30.0	1,405	15.7
3/4	916	9.2	1,730	27.0	1,603	25.0	1,170	13.1
1	687	6.9	1,298	20.2	1,202	18.8	878	10.5

1. Use a rigid and precise machine and holder.
2. The rotational speed is calculated by the median of the recommended cutting speed.
3. Adjustments may be necessary depending on the rigidity or the workpiece, fixture, and machine.
4. Please use a suitable fluid with high smoke retardant properties.
5. During dry (no fluid) milling, please use air blow to remove chips from the milling area and to eliminate chip packing.
6. Please use water-soluble coolant when machining stainless steel.
7. Reduce speed and feed as well as depth of cut when high precision is required.



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 **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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