Maggio 2017

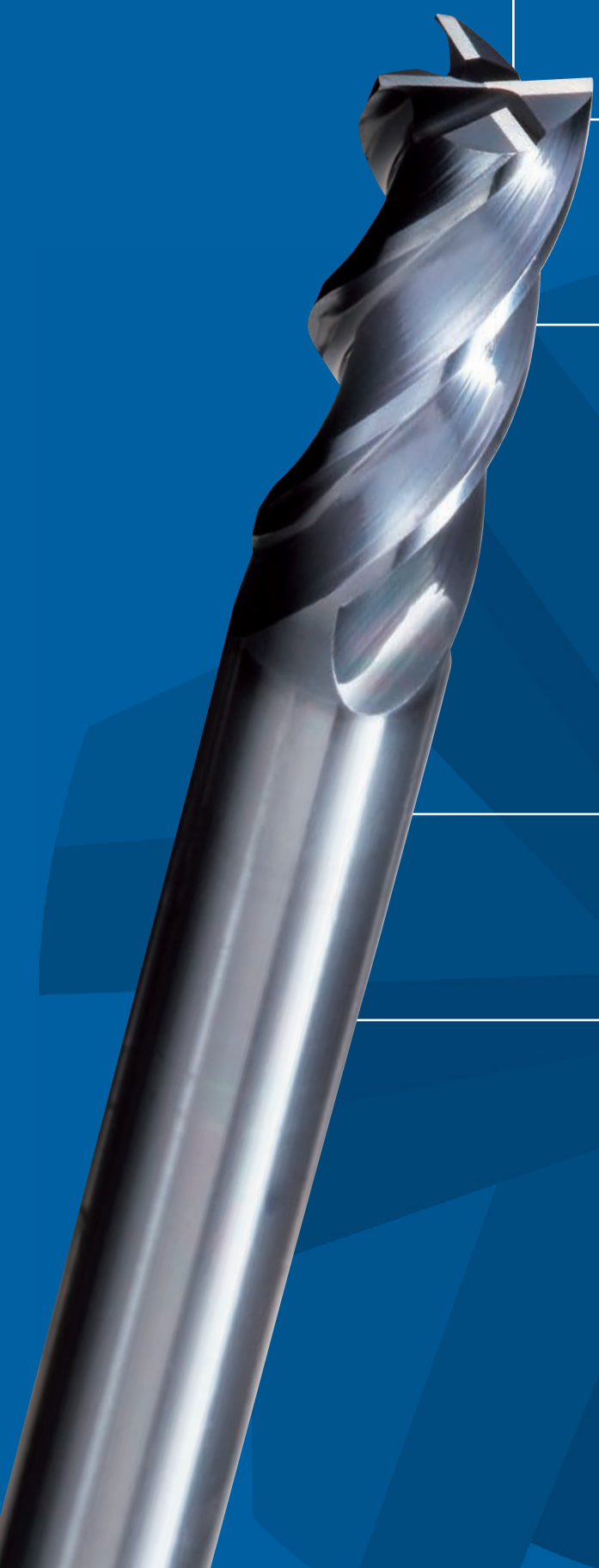
The new standard for milling

AE-VMS

Volume 2

ECONOMICAL, HIGH QUALITY AND MULTI-PURPOSE TOOLS • ECONOMICAL, HIGH QUALITY AND MULTI-PURPOSE TOOLS •

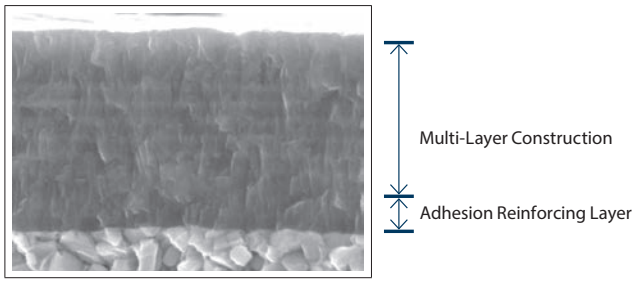
Key features: AE-VMS

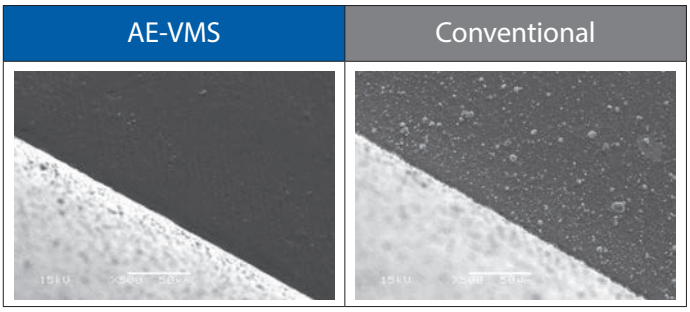


AE-VMS: the A-brand end mill

1 Duarise coating

The new duarise coating provides excellent lubricity, superior friction-resistance and high oxidation temperature. Multi-layer construction minimizes the thermal cracks that often occurred while using water-soluble oil.





Smoothing surface coating treatment made an excellent quality of surface finishing.

2 Positive rake angle

A stable performance is gathered by reducing cutting forces as a result of a sharp and positive rake angle.

3 New flute form

The new flute form with its excellent chip evacuation properties enables stable milling and the suppression of burrs.

Figure 1. 10% lower cutting force versus the competitors

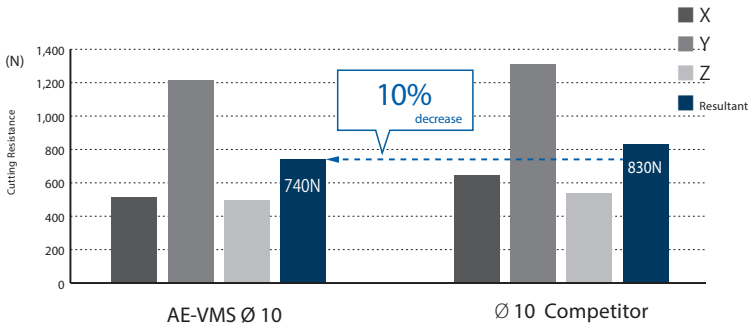
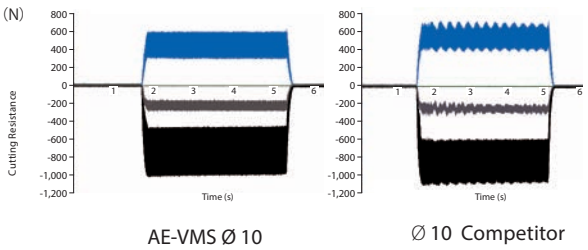
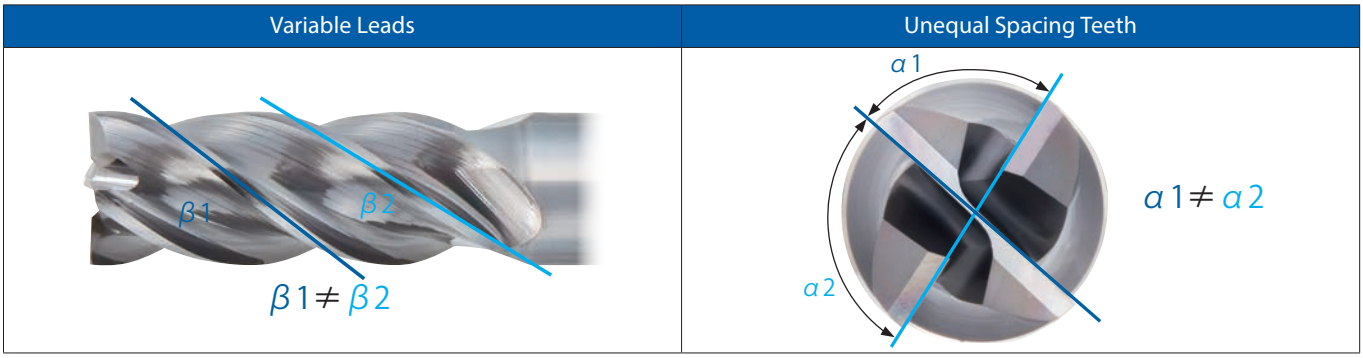


Figure 2. Stable performance even when the overhang length is L/D=4

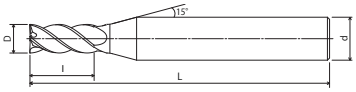


4 High rigidity

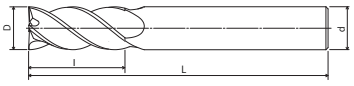
The unequal spacing of teeth and variable-lead geometry enables stable and high efficiency milling and thesuppression of vibration.



AE-VMS

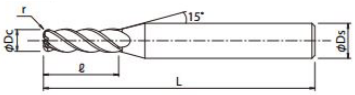


Type 1

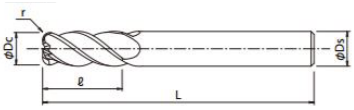


Type 2

NEW



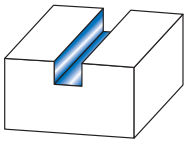
Type 3



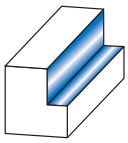
Type 4

NEW EDP	D	r	L	l	d	Type	Price
8555830	3	-	60	8	6	1	31,30
8556050	3	0,2	60	8	6	3	33,20
8556060	3	0,5	60	8	6	3	33,20
8555840	4	-	60	11	6	1	36,20
8556070	4	0,2	60	1	6	3	38,40
8556080	4	0,5	60	11	6	3	38,40
8556090	4	1	60	11	6	3	38,40
8555850	5	-	60	13	6	1	36,20
8556100	5	0,2	60	13	6	3	38,40
8556110	5	0,5	60	13	6	3	38,40
8556120	5	1	60	13	6	3	38,40
8555860	6	-	60	13	6	2	36,20
8556130	6	0,3	60	13	6	4	38,40
8556140	6	0,5	60	13	6	4	38,40
8556150	6	1	60	13	6	4	38,40
8555880	8	-	70	19	8	2	48,90
8556160	8	0,3	70	19	8	4	53,80
8556170	8	0,5	70	19	8	4	53,80
8556180	8	1	70	19	8	4	53,80
8556190	8	1,5	70	19	8	4	53,80
8556200	8	2	70	19	8	4	53,80
8555900	10	-	80	22	10	2	65,80
8556210	10	0,3	80	22	10	4	72,40
8556220	10	0,5	80	22	10	4	72,40
8556230	10	1	80	22	10	4	72,40
8556240	10	1,5	80	22	10	4	72,40
8556250	10	2	80	22	10	4	72,40
8556260	10	3	80	22	10	4	72,40
8555920	12	-	90	26	12	2	95,40
8556270	12	0,5	90	26	12	4	101,20
8556280	12	1	90	26	12	4	101,20
8556290	12	1,5	90	26	12	4	101,20
8556300	12	2	90	26	12	4	101,20
8556310	12	3	90	26	12	4	101,20

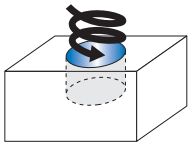
Application



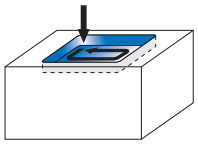
Slotting



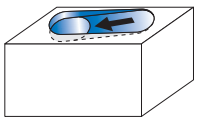
Side Milling



Helical Milling



Contour Milling



Ramping

Applicable work materials

Mild Steel Carbon Steel	Alloy Steel - Tool Steel	Prehardened Steel - Hardened Steel			Stainless Steel	Cast Iron	Copper Alloy	Aluminium Alloy	Titanium Alloy	Heat Resistant Alloy
		~40HRC	~45HRC	~55HRC	~200HB	~350HB				
◎	◎	◎	○		◎	◎	○	○	○	○

Cutting Conditions

Side Milling

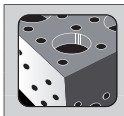
	Mild Steel - Carbon Steel Cast Iron SS400 ■ S55C ■ FC250 ~750N/mm²		Alloy Steel Tool Steel SCM ■ SKS ■ SKD ~30HRC		Prehardened Steel Hardened Steel PX5 ■ NAK80 ■ 30~45 HRC		Stainless Steel (≤ 200HB)	
Cutting Speed	**130 (100~150)**		**120 (100~150)**		**100 (80~120)**		**80 (60~100)**	
Ø	**S (min⁻¹)**	**F (mm/min)**	**S (min⁻¹)**	**F (mm/min)**	**S (min⁻¹)**	**F (mm/min)**	**S (min⁻¹)**	**F (mm/min)**
3	13.800	1.660	12.700	1.070	10.600	760	8.000	480
4	10.400	1.830	9.600	1.150	8.000	800	6.000	530
5	8.300	1.990	7.600	1.220	6.400	900	4.800	560
6	6.900	2.070	6.400	1.540	5.300	1.060	4.200	640
8	5.200	1.770	4.800	1.540	4.000	1.040	3.200	610
10	4.100	1.640	3.800	1.370	3.200	900	2.500	580
12	3,500	1,400	3,200	1,280	2,700	760	2,100	530
Depth of cut	ap: 1,5D / ae: 0,2D							

Slotting

	Mild Steel - Carbon Steel Cast Iron SS400 ■ S55C ■ FC250 ~750N/mm²		Alloy Steel Tool Steel SCM ■ SKS ■ SKD ~30HRC		Prehardened Steel Hardened Steel PX5 ■ NAK80 ■ 30~45 HRC		Stainless Steel (≤ 200HB)	
Cutting Speed	**100 (80~120)**		**90 (70~110)**		**80 (60~100)**		**70 (50~80)**	
Ø	**S (min⁻¹)**	**F (mm/min)**	**S (min⁻¹)**	**F (mm/min)**	**S (min⁻¹)**	**F (mm/min)**	**S (min⁻¹)**	**F (mm/min)**
3	10,600	930	9,600	690	8,500	510	7.400	470
4	8,000	960	7,200	720	6,400	510	5.600	490
5	6,400	1,020	5,700	800	5,100	610	4.500	560
6	5,300	1,060	4,800	900	4,200	670	3.700	370
8	4,000	910	3,600	720	3,200	640	2.800	370
10	3,200	840	2,900	700	2,500	550	2.200	350
12	2,700	810	2,400	670	2,100	550	1.900	330
Depth of cut	ap: 1D						D: D<6 ap: 0,5D; D≥6 ap: 1D	

1. The above milling condition is a guideline for the overhang length is 3×D.
2. Use a rigid and precise machine and holder.
3. The rotational speed is calculated by the median of the recommended cutting speed. Adjustment may be necessary depending on the rigidity of 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 disposable chips from the milling area and to eliminate chip packing.
6. Please use water-soluble oil 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.

Fix rate cutting condition

	Work Material	Mild Steel - Carbon Steel Cast Iron SS400 ■ S55C ■ FC250 ~750N/mm²		Alloy Steel Tool Steel SCM ■ SKS ■ SKD ~30HRC		Prehardened Steel Hardened Steel PX5 ■ NAK80 ■ 30~45 HRC		Stainless Steel (≤ 200HB)	
Ø	**L/D**	**S (min⁻¹)**	**F (mm/min)**	**S (min⁻¹)**	**F (mm/min)**	**S (min⁻¹)**	**F (mm/min)**	**S (min⁻¹)**	**F (mm/min)**
Side Milling	**4**	90%		90%		80%		70%	
	5	80%		80%		70%		70%	
Slotting	**4**	80%		70%		70%		60%	
	5	70%		60%		60%		50%	

Cutting Data

Suppression of Burrs

Great surface finish without vibration and minimal burrs.

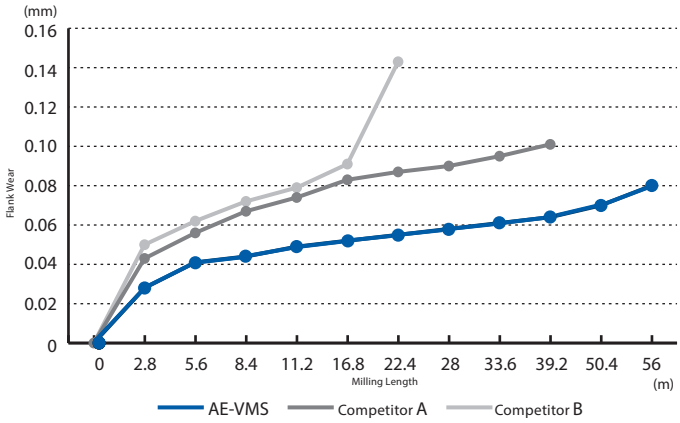
Tool	AE-VMS Ø 10	Competitor Ø 10
Work Material	SUS316	
Cutting Speed	69m/min (2.200 min^{-1})	
Feed Rate	350mm/min (0,04mm/t)	
Depth of Cut	ap = 10mm	ap=5mm
Coolant	Water Soluble	
Machine	Vertical Machining Center	
M.R.R.	35 cm^3/min	17,5 cm^3/min

AE-VMS	Competitor

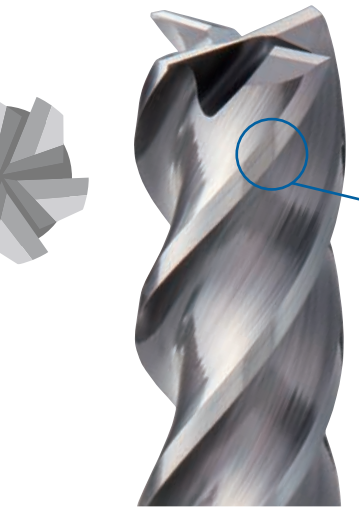
Stable Performance

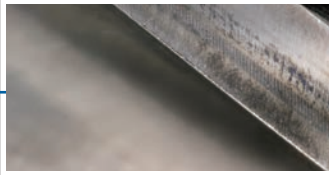
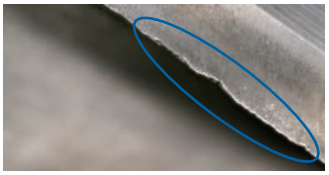
Stable performance on stainless steel

Tool	AE-VMS Ø 10
Work Material	SUS304
Cutting Speed	70m/min (2.250 min^{-1})
Feed Rate	475mm/min (0,053mm/t)
Depth of Cut	ap = 10mm
Coolant	Water Soluble
Machine	Vertical Machining Center



Cutting edge wear comparison



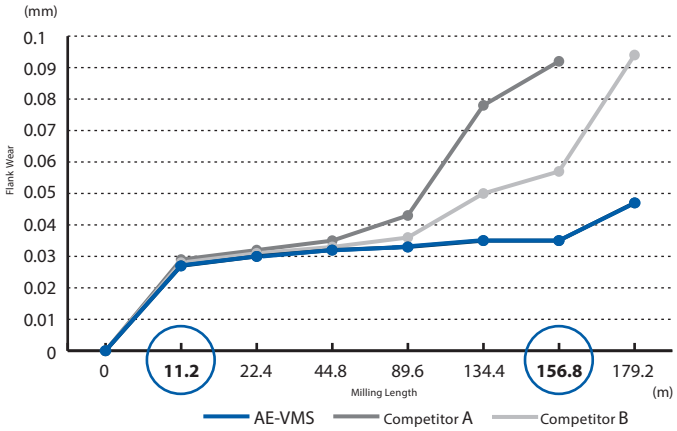
AE-VMS 56m	Competitor A 39.2m	Competitor B 22.4m
		

Cutting Data

Suppression of Burrs

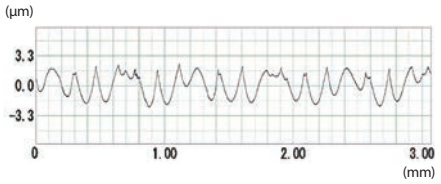
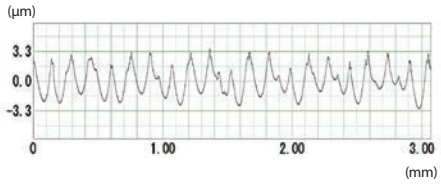
Suppression of cutting heat generation minimizes tool wear

Tool	AE-VMS Ø 6
Work Material	SCM440
Cutting Speed	140m/min (7.500 min^{-1})
Feed Rate	1.800mm/min (0,06mm/t)
Depth of Cut	ap = 90mm ae= 1,2mm
Coolant	Air Blow
Machine	Vertical Machining Center



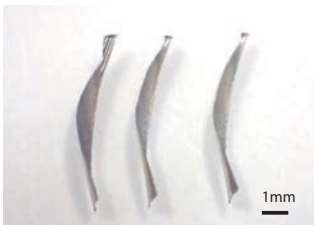
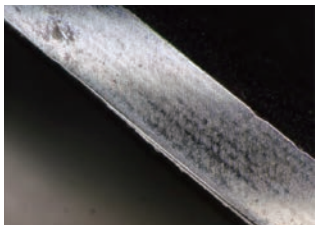
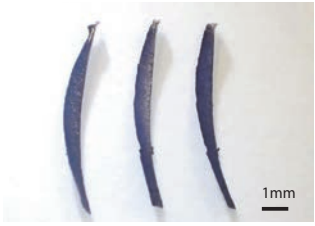
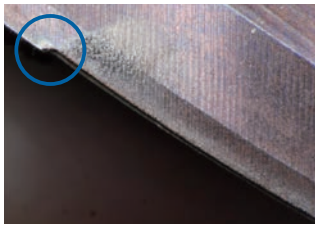
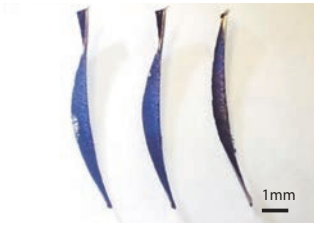
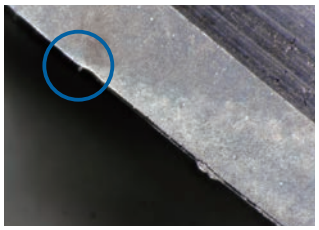
Surface roughness comparison

Surface roughness after milling 11,2m

AE-VMS (Ra: 0.6377µm)	Competitor A (Ra: 1.0747µm)	Competitor B (Ra: 1.2304µm)
		

Tool condition comparison

Tool condition after milling 156,8m

	Cutting Chips	Wear Comparison
AE-VMS	 Brown about 500°C	 No Cutting Edge Recession
Competitor A	 Purple about 600°C	 Excessive Cutting Edge Recession
Competitor B	 Blue about 700°C	 Minimal Cutting Edge Recession

shaping your dreams

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