The new standard for milling

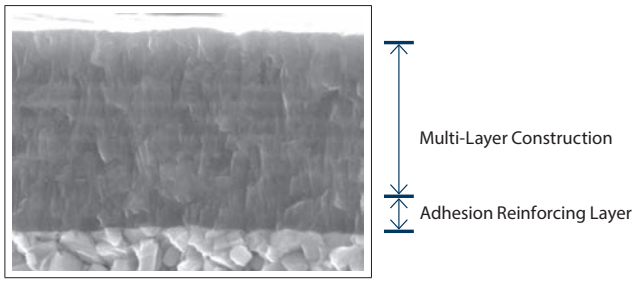
AE-VMS

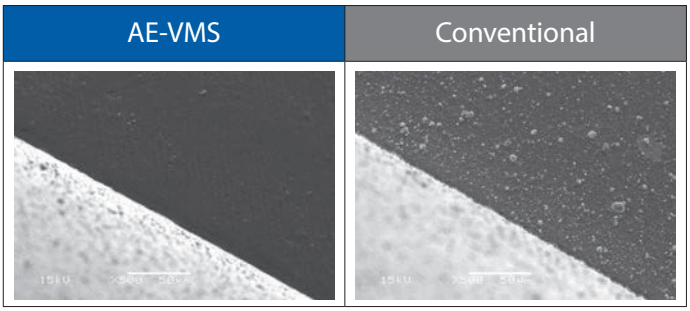
Volume 3

KEY FEATURES: AE-VMS

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.

Positive rake angle

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

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

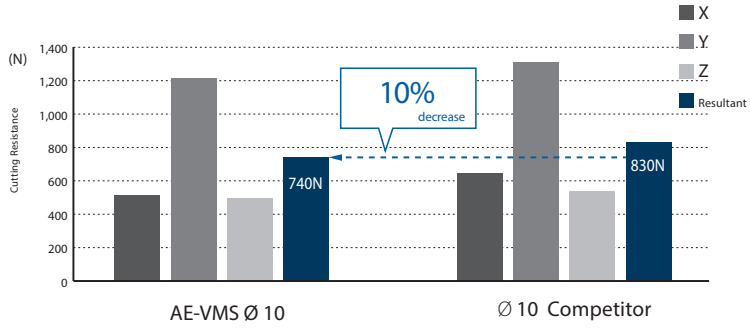
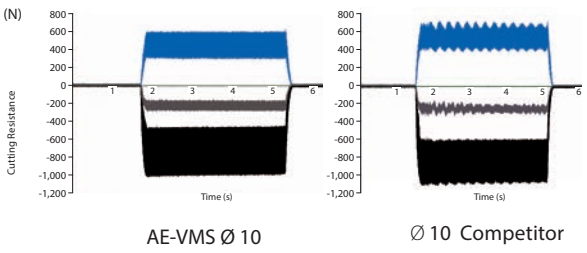
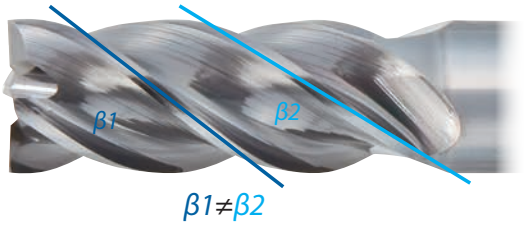
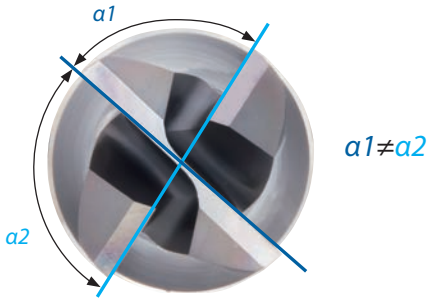


Figure 2. Stable performance even when the overhang length is L/D=4



High rigidity

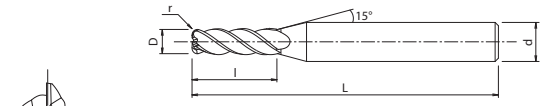
The unequal spacing of teeth and variable-lead geometry enables stable and high efficiency milling and the suppression of vibration.

Variable Leads	Unequal Spacing Teeth
	

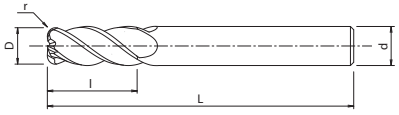
AE-VMS

Milling | Solid carbide

Type 1



Type 2



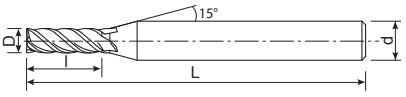
- First choice in quality and performance
- Carbide end mill with Duarise coating
- Wide variety in applications and work materials
- 4 flutes, variable helix and unequal spacing

EDP	D	R	L	l	d	Type	Price
8555830	3	-	60	8	6	1	
8556050	3	0,2	60	8	6	1	
8556060	3	0,5	60	8	6	1	
8555840	4	-	60	11	6	1	
8556070	4	0,2	60	11	6	1	
8556080	4	0,5	60	11	6	1	
8556090	4	1	60	11	6	1	
8555850	5	-	60	13	6	1	
8556100	5	0,2	60	13	6	1	
8556110	5	0,5	60	13	6	1	
8556120	5	1	60	13	6	1	
8555860	6	-	60	13	6	2	
8556130	6	0,3	60	13	6	2	
8556140	6	0,5	60	13	6	2	
8556150	6	1	60	13	6	2	
8555880	8	-	70	19	8	2	
8556160	8	0,3	70	19	8	2	
8556170	8	0,5	70	19	8	2	
8556180	8	1	70	19	8	2	
8556190	8	1,5	70	19	8	2	
8556200	8	2	70	19	8	2	
8555900	10	-	80	22	10	2	
8556210	10	0,3	80	22	10	2	
8556220	10	0,5	80	22	10	2	
8556230	10	1	80	22	10	2	
8556240	10	1,5	80	22	10	2	
8556250	10	2	80	22	10	2	
8556260	10	3	80	22	10	2	
8555920	12	-	90	26	12	2	
8556270	12	0,5	90	26	12	2	
8556280	12	1	90	26	12	2	
8556290	12	1,5	90	26	12	2	
8556300	12	2	90	26	12	2	
8556310	12	3	90	26	12	2	
8555960 NEW	16	-	100	32	16	2	
8556000 NEW	20	-	110	40	20	2	
8556010 NEW	25	-	120	50	25	2	

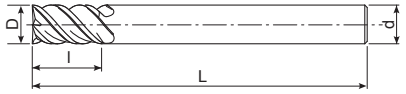
AE-VMSS NEW

Milling | Solid carbide

Type 1



Type 2

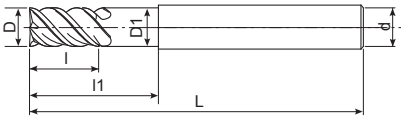


- First choice in quality and performance
- Carbide end mill with Duarise coating
- Wide variety in applications and work materials
- 4 flutes, variable helix and unequal spacing
- Anti-vibration stub carbide end-mill, square type, stub length

EDP	D	L	l	d	Type	Price
8556430	3	45	4,5	6	1	
8556435	3,5	45	5,3	6	1	
8556440	4	45	6	6	1	
8556445	4,5	45	6,8	6	1	
8556450	5	45	7,5	6	1	
8556455	5,5	45	8,3	6	1	
8556460	6	45	9	6	2	
8556465	6,5	60	9,8	8	1	
8556470	7	60	10,5	8	1	
8556475	7,5	60	11,3	8	1	
8556480	8	60	12	8	2	
8556485	8,5	70	12,8	10	1	
8556490	9	70	13,5	10	1	
8556495	9,5	70	14,3	10	1	
8556500	10	70	15	10	2	
8556505	10,5	75	15,8	12	1	
8556510	11	75	16,5	12	1	
8556515	11,5	75	17,3	12	1	
8556520	12	75	18	12	2	

AE-VMSS NEW

Milling | Solid carbide



- First choice in quality and performance
- Carbide end mill with Duarise coating
- Wide variety in applications and work materials
- 4 flutes, variable helix and unequal spacing
- Long neck type

EDP	D	l1	L	l	D1	d	Price
8556618	6	18	60	9	5,8	6	
8556630	6	30	70	9	5,8	6	
8556724	8	24	70	12	7,7	8	
8556740	8	40	80	12	7,7	8	
8556830	10	30	80	15	9,7	10	
8556850	10	50	100	15	9,7	10	
8556936	12	36	90	18	11,7	12	
8556960	12	60	110	18	11,7	12	

CUTTING CONDITIONS

AE-VMS / AE-VMSS

Square Type

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 30~45HRC		Stainless Steel ≤200HB	
Cutting Speed	130 (100-150) (m/min)		120 (100-150) (m/min)		100 (80-120) (m/min)		80 (60-100) (m/min)	
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
16	2.600	1.250	2.400	1.060	2.000	640	1.400	450
20	2.100	1.010	1.900	840	1.600	510	1.100	370
25	1.700	820	1.500	660	1.300	420	900	310
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 30~45HRC		Stainless Steel ≤200HB	
Cutting Speed	100 (80-120) (m/min)		90 (70-110) (m/min)		80 (60-100) (m/min)		70 (50-80) (m/min)	
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
16	2.000	600	1.800	500	1.600	420	1.200	310
20	1.600	480	1.400	390	1.300	340	900	250
25	1.300	390	1.100	310	1.000	260	600	170
Depth of cut	ap: 1D						Dc: Dc≤6 → ap: 0,5D; Dc>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.

CUTTING CONDITIONS

Milling | Endmills | Cutting conditions

AE-VMS / AE-VMSS

Radius Type

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 30~45HRC		Stainless Steel ≤200HB	
Cutting Speed	130 (100-150) (m/min)		120 (100-150) (m/min)		100 (80-120) (m/min)		80 (60-100) (m/min)	
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	1.410	12.700	910	10.600	610	8.000	380
4	10.400	1.560	9.600	980	8.000	640	6.000	480
5	8.300	1.690	7.600	1.030	6.400	720	4.800	450
6	6.900	1.970	6.400	1.460	5.300	950	4.200	570
8	5.200	1.680	4.800	1.460	4.000	940	3.200	550
10	4.100	1.560	3.800	1.300	3.200	810	2.500	520
12	3.500	1.330	3.200	1.220	2.700	680	2.100	480
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 30~45HRC		Stainless Steel ≤200HB	
Cutting Speed	100 (80-120) (m/min)		90 (70-110) (m/min)		80 (60-100) (m/min)		70 (50-80) (m/min)	
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	790	9.600	590	8.500	410	7.400	380
4	8.000	820	7.200	610	6.400	410	5.600	390
5	6.400	870	5.700	680	5.100	490	4.500	450
6	5.300	1.010	4.800	860	4.200	600	3.700	330
8	4.000	870	3.600	680	3.200	580	2.800	330
10	3.200	800	2.900	660	2.500	500	2.200	320
12	2.700	770	2.400	640	2.100	490	1.900	300
Depth of cut	ap: 1D						Dc≤6: ap 0,5D; Dc>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.
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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.
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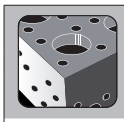
8. Adjust the speed and feed accordingly when the overhang length is longer than specified.

Fix rate cutting condition

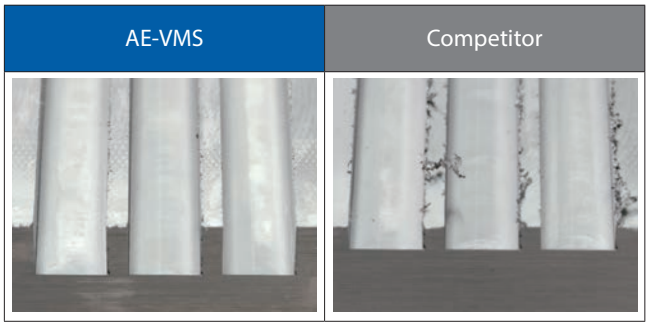


	Work Material	Mild Steel - Carbon Steel Cast Iron SS400 • S55C • FC250 ~750N/mm²		Alloy Steel Tool Steel SCM • SKS • SKD ~30HRC		Prehardened Steel Hardened Steel PX5 • NAK80 • 30~45 HRC		Stainless Steel (≤ 200HB)	
Ø	L/D	S (min⁻¹)	F (mm/min)	S (min⁻¹)	F (mm/min)	S (min⁻¹)	F (mm/min)	S (min⁻¹)	F (mm/min)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

Suppression of Burrs

Great surface finish without vibration and minimal burrs.

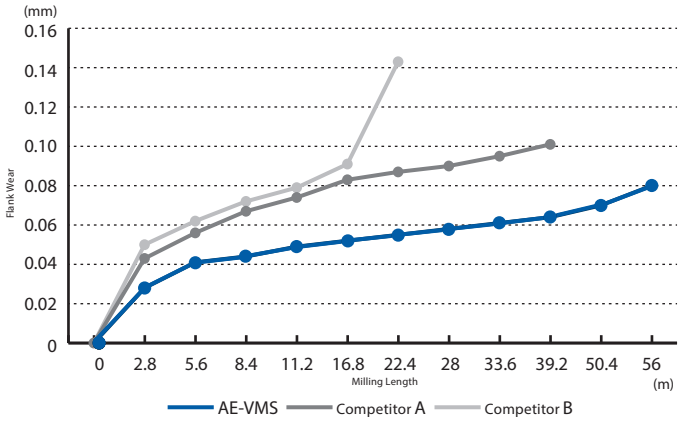
Tool	AE-VMS Ø 10	Competitor Ø 10
Work Material	SUS316	
Cutting Speed	69m/min (2.200 min^{-1})	
Feed Rate	350mm/min (0,04mm/t)	
Depth of Cut	ap = 10mm	ap=5mm
Coolant	Water Soluble	
Machine	Vertical Machining Center	
M.R.R.	35 cm^3/min	17,5 cm^3/min



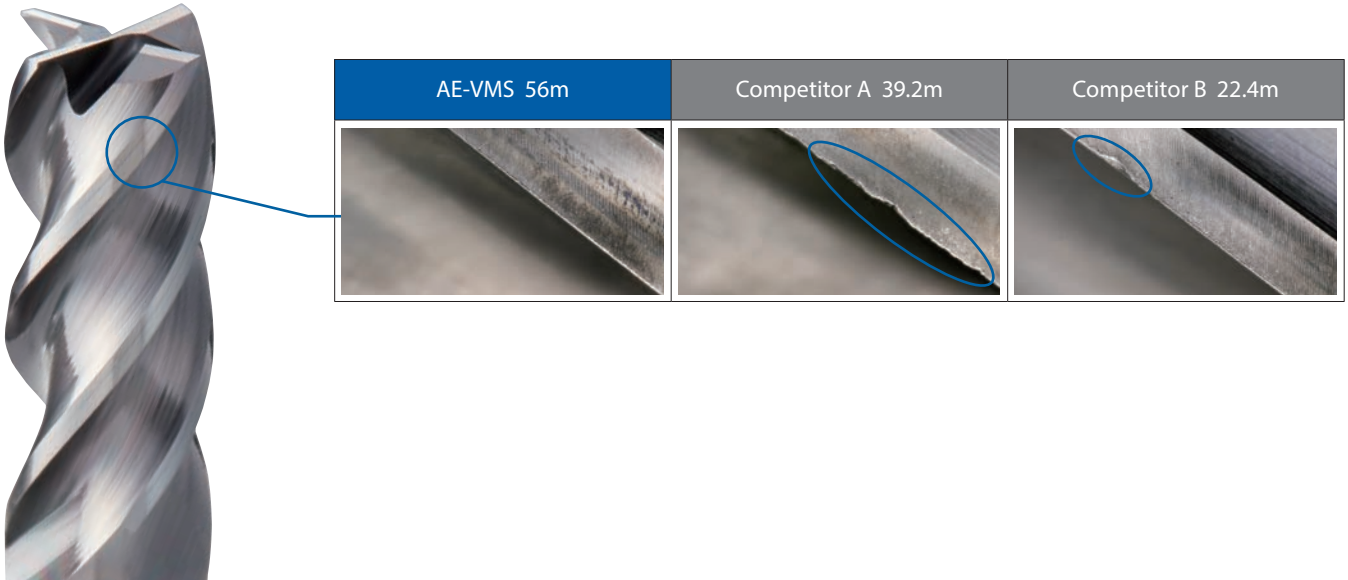
Stable Performance

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



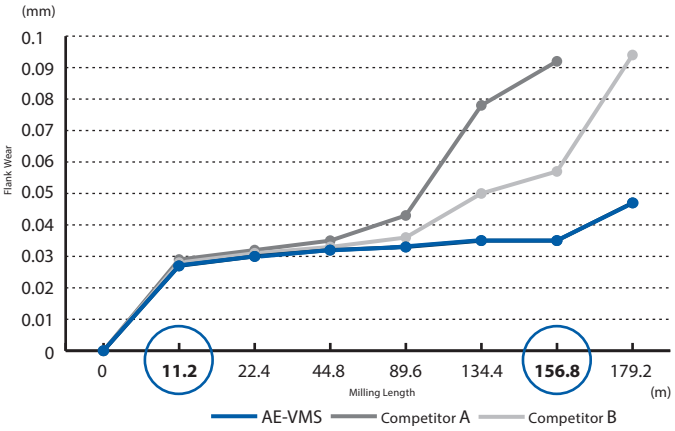
Cutting edge wear comparison



Suppression of Burrs

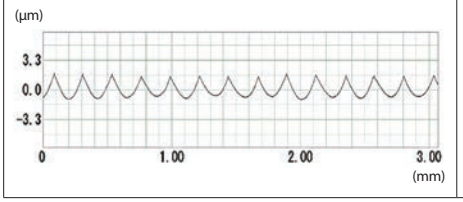
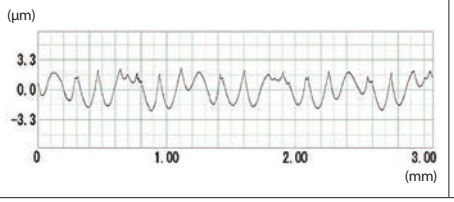
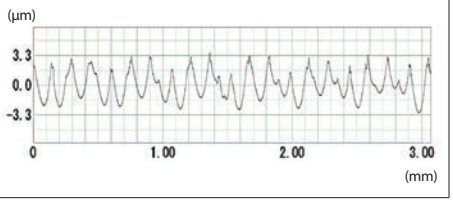
Suppression of cutting heat generation minimizes tool wear

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 = 9mm ae= 1,2mm
Coolant	Air Blow
Machine	Vertical Machining Center



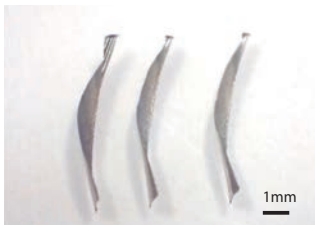
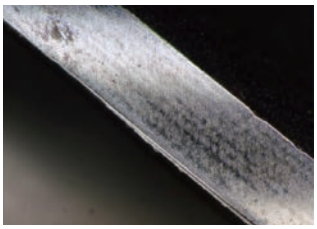
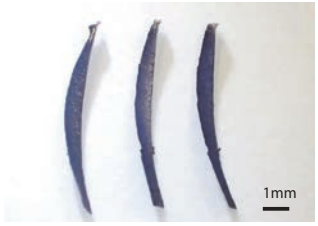
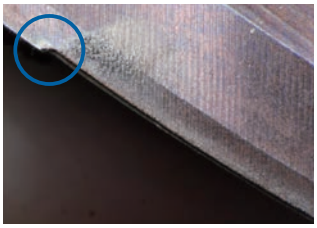
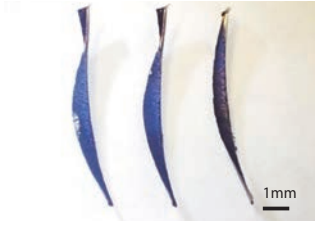
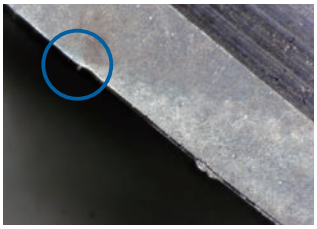
Surface roughness comparison

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

OUT NOW!

shaping your dreams

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