



The new standard for milling

AE-VMS

Volume 5



KEY FEATURES: AE-VMS

1 Dularise coating

2 Positive rake angle

3 New flute form

4 High rigidity

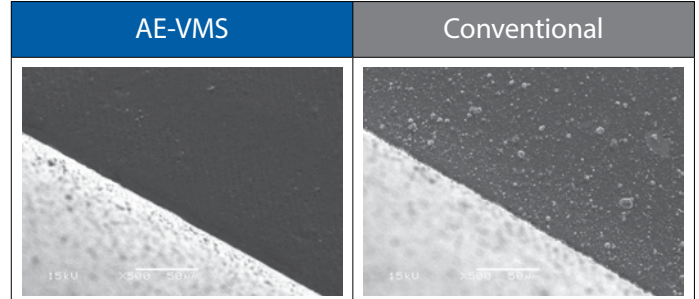
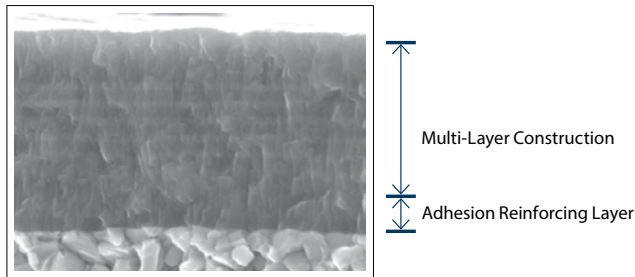
5 Solid carbide



AE-VMS: THE A-BRAND END MILL

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

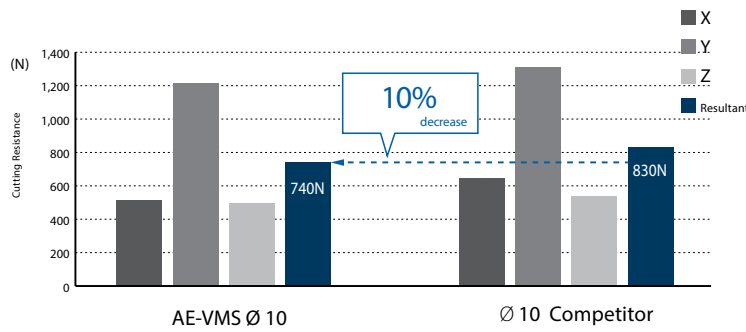
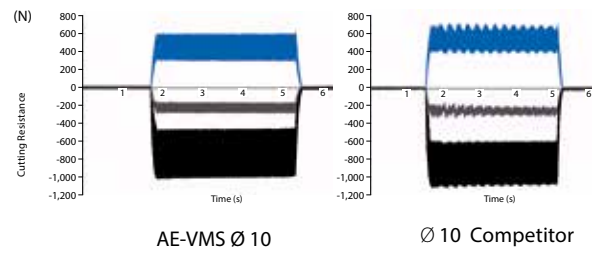
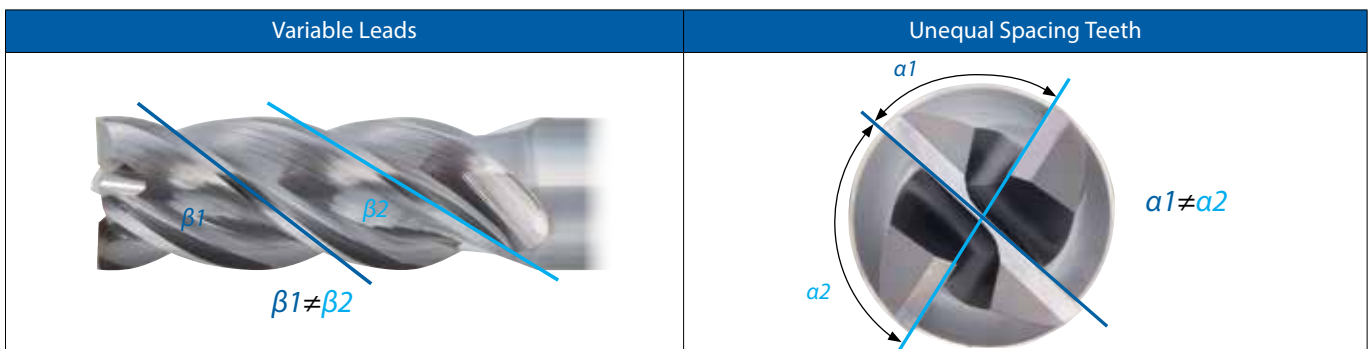


Figure 2. Stable performance even when the overhang length is L/D=4



High rigidity

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



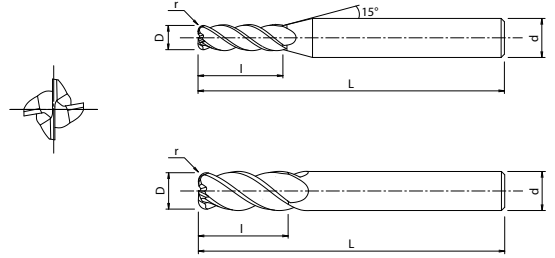
AE-VMS

Milling | Solid carbide

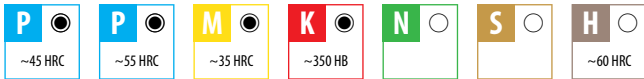


Type 1

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 | 16 | - | 100 | 32 | 16 | 2 | |
| 8556000 | 20 | - | 110 | 40 | 20 | 2 | |
| 8556010 | 25 | - | 120 | 50 | 25 | 2 | |

Milling | Solid carbide

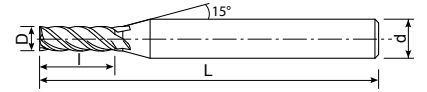


AE-VMSS NEW

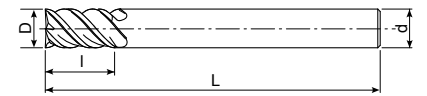
Milling | Solid carbide



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 |
|---------|------|----|------|----|------|-------|
| 8556410 | 1 | 40 | 1,5 | 4 | 1 | |
| 8556415 | 1,5 | 40 | 2,3 | 4 | 1 | |
| 8556420 | 2 | 40 | 3 | 4 | 1 | |
| 8556425 | 2,5 | 40 | 3,8 | 4 | 1 | |
| 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 | |

Milling | Solid carbide



CUTTING CONDITIONS

Milling | Endmills | Cutting conditions

AE-VMS / AE-VMSS

Square Type

Side milling

| Cutting Speed | Mild Steel • Carbon Steel • Cast Iron SS400 • S55C • FC250 ~750N/mm ² | | Alloy Steel • Tool Steel SCM • SKS • SKD ~30HRC | | Prehardened Steel • Hardened Steel PX5 • NAK80 30~45HRC | | Stainless Steel ≤200HB | |
|---------------|--|---------------|---|---------------|---|---------------|---------------------------|---------------|
| | 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) |
| 1 | 38.200 | 840 | 28.700 | 690 | 25.500 | 510 | 22.300 | 450 |
| 1,5 | 25.500 | 920 | 21.200 | 760 | 17.000 | 540 | 14.900 | 460 |
| 2 | 19.900 | 1.430 | 17.500 | 840 | 14.300 | 630 | 11.100 | 470 |
| 2,5 | 15.900 | 1.590 | 14.000 | 900 | 11.500 | 690 | 8.900 | 480 |
| 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 | ae |
| | 1,5D | 0,2D |

Slotting

| Cutting Speed | Mild Steel • Carbon Steel • Cast Iron SS400 • S55C • FC250 ~750N/mm ² | | Alloy Steel • Tool Steel SCM • SKS • SKD ~30HRC | | Prehardened Steel • Hardened Steel PX5 • NAK80 30~45HRC | | Stainless Steel ≤200HB | |
|---------------|--|---------------|---|---------------|---|---------------|---------------------------|---------------|
| | 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) |
| 1 | 28.700 | 570 | 25.500 | 460 | 22.300 | 360 | 19.100 | 340 |
| 1,5 | 19.100 | 610 | 17.000 | 480 | 14.900 | 420 | 12.700 | 360 |
| 2 | 14.300 | 630 | 12.700 | 510 | 11.100 | 440 | 9.600 | 380 |
| 2,5 | 11.500 | 780 | 10.200 | 570 | 8.900 | 460 | 7.600 | 430 |
| 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 | ap | |
| | Dc≤6 | 0,5D |
| | Dc>6 | 1D |

- The above milling condition is a guideline for the overhang length is 3xD.
- Use a rigid and precise machine and holder.
- 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.
- Please use a suitable fluid with high smoke retardant properties.
- During dry (no fluid) milling, please use air blow to remove disposable chips from the milling area and to eliminate chip packing.
- Please use water-soluble oil when machining stainless steel.
- Reduce speed and feed as well as depth of cut when high precision is required.
- 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

| Cutting Speed | Mild Steel • Carbon Steel • Cast Iron SS400 • S55C • FC250 ~750N/mm ² | | Alloy Steel • Tool Steel SCM • SKS • SKD ~30HRC | | Prehardened Steel • Hardened Steel PX5 • NAK80 30~45HRC | | Stainless Steel ≤200HB | |
|---------------|--|---------------|---|---------------|---|---------------|---------------------------|---------------|
| | 130 (100-150) (m/min) | | 120 (100-150) (m/min) | | 100 (80-120) (m/min) | | 80 (60-100) (m/min) | |
| ∅ | 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

| Cutting Speed | Mild Steel • Carbon Steel • Cast Iron SS400 • S55C • FC250 ~750N/mm ² | | Alloy Steel • Tool Steel SCM • SKS • SKD ~30HRC | | Prehardened Steel • Hardened Steel PX5 • NAK80 30~45HRC | | Stainless Steel ≤200HB | |
|---------------|--|---------------|---|---------------|---|---------------|----------------------------|---------------|
| | 100 (80-120) (m/min) | | 90 (70-110) (m/min) | | 80 (60-100) (m/min) | | 70 (50-80) (m/min) | |
| ∅ | 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 Dc≤6 0,5D Dc>6 1D | |

- The above milling condition is a guideline for the overhang length is 3xD.
- Use a rigid and precise machine and holder.
- 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.
- Please use a suitable fluid with high smoke retardant properties.
- During dry (no fluid) milling, please use air blow to remove disposable chips from the milling area and to eliminate chip packing.
- Please use water-soluble oil when machining stainless steel.
- Reduce speed and feed as well as depth of cut when high precision is required.
- Adjust the speed and feed accordingly when the overhang length is longer than specified.

Fix rate cutting condition

| Work Material | L/D | Mild Steel - Carbon Steel Cast Iron SS400 • S55C • FC250 ~750N/mm ² | | Alloy Steel Tool Steel SCM • SKS • SKD ~30HRC | | Prehardened Steel Hardened Steel PX5 • NAK80 • 30~45 HRC | | Stainless Steel (≤ 200HB) | |
|---------------|-----|---|---------------|--|---------------|---|---------------|------------------------------|---------------|
| | | 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% | |

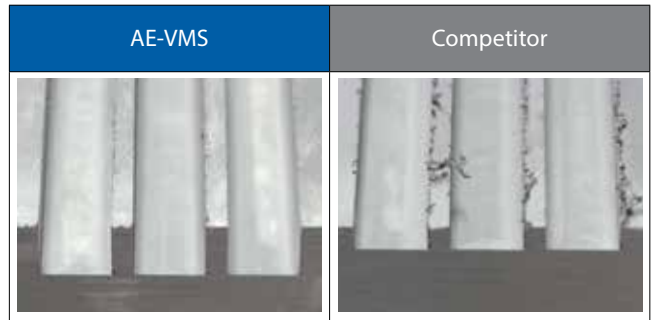
Milling | Solid carbide

CUTTING DATA

Suppression of Burrs

Great surface finish without vibration and minimal burrs.

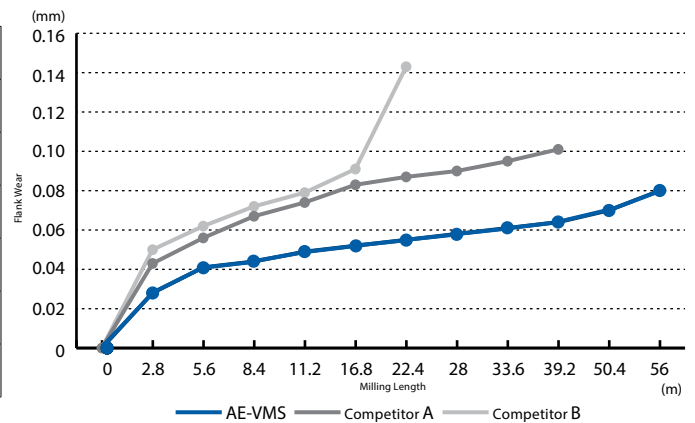
| | | |
|---------------|------------------------------------|---------------------------|
| Tool | AE-VMS Ø 10 | Competitor Ø 10 |
| Work Material | SUS316 | |
| Cutting Speed | 69m/min (2.200 min ⁻¹) | |
| Feed Rate | 350mm/min (0,04mm/t) | |
| Depth of Cut | ap = 10mm | ap=5mm |
| Coolant | Water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



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 |



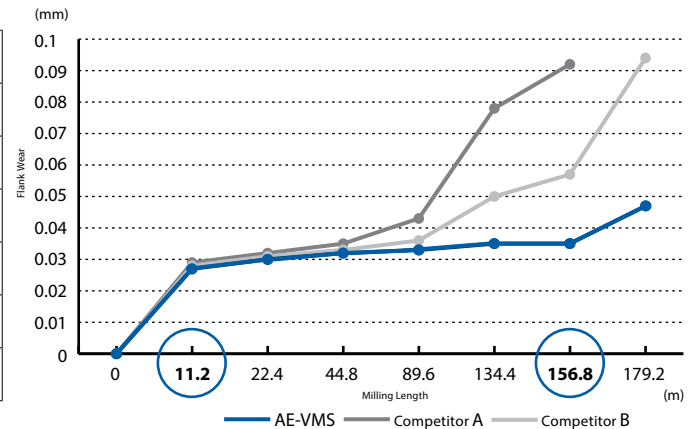
Cutting edge wear comparison



Suppression of Burrs

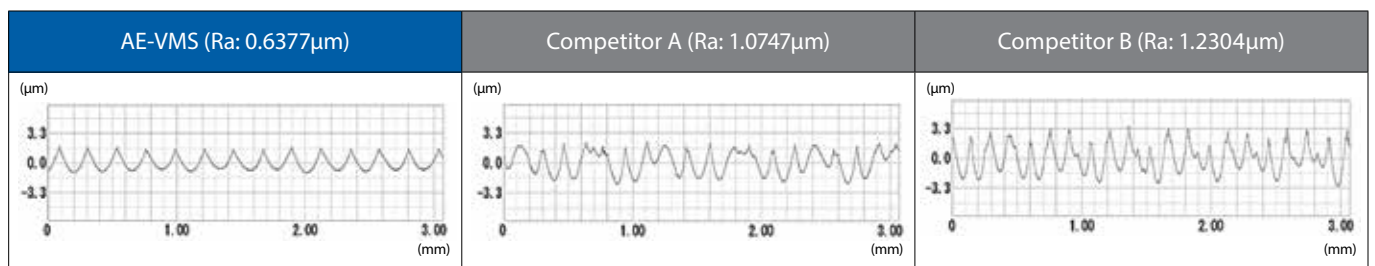
Suppression of cutting heat generation minimizes tool wear

| | |
|----------------------|-------------------------------------|
| 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



Tool condition comparison

Tool condition after milling 156,8m

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

OUT NOW!





shaping your dreams

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