MITSUBISHI MATERIALS

# SRM2 Series

## BALL-NOSE END MILL FOR ROUGH TO SEMI-FINISH CUTTING





TOOL NEWS B020A

# Ball-Nose End Mill for Rough to Semi-Finish Cutting

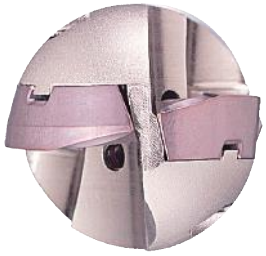
# SRM2

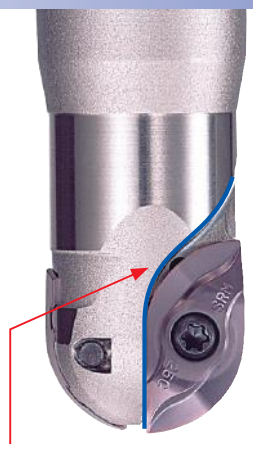
## Features

| | |
|---|---|
| **Cutting Edge Diameter** | **Ø.625", Ø.750", Ø1.000", Ø1.250"** |
| **Application** | **SRM2 applications offer you the strength of a large radius insert, and the ability to penetrate hard to reach cavities.** |

## High Rigidity

Large insert thickness guards against fracture. Thick body core resists body web fracture.

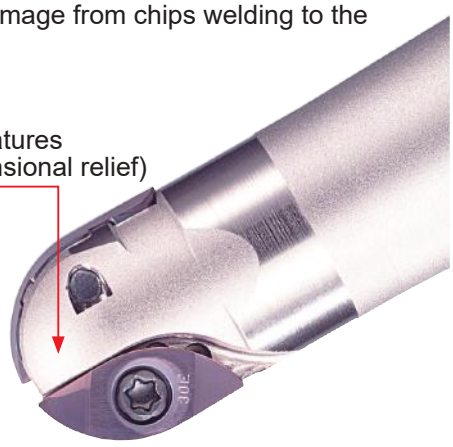




"Streamlined pocket" optimizes a balance of chip flow and body rigidity.

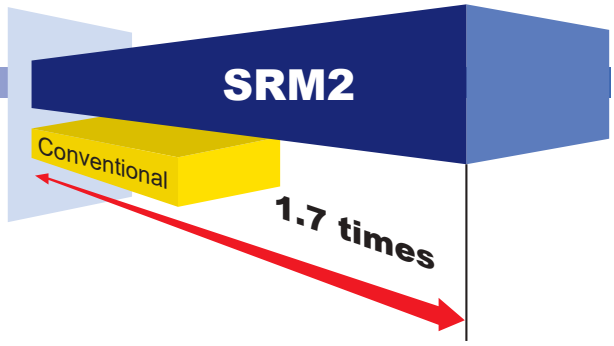
High body rigidity and good chip control, avoid damage from chips welding to the body.

Body features
(3-dimensional relief)



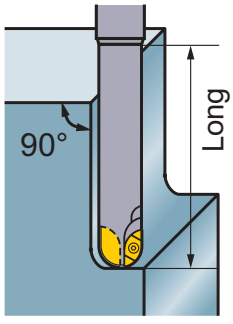
## Highly Heat-resistant Body

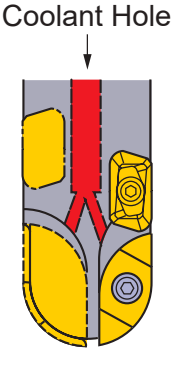
The body of the SRM2 is made of a special alloy steel with excellent high-tempurature strength, enhanced by a corrosion-resistant surface treatment.




## Series Expansion

In addition to the standard and long cutting edge types, this series has been expanded with a long type which can machine vertical faces. The series is now equipped with a coolant hole as standard, enabling it to tackle a wider range of die mold cutting applications.



# High Precision, Low Resistance Inserts

## Strong Cutting Edge Type Inserts

Inserts with strong geometry and tough edge condition for reliable rough machining. Peripheral grinding improves the precision of the insert for longer tool life.



## Sharp, Low-resistance Type Inserts

Top rake chip breaker type inserts for reduced cutting forces.
Lower resistance results in higher quality surface finishes.
Insert tolerance similar to G-class type at economical M-class prices.



## Low Resistance Type Inserts for Ø40 and Ø50

Unique design, 3-dimensional cutting edge:- Variable Radial Undulation (V.R.U. Pat. pending) for efficient chip breaking to significantly lower cutting resistance and vibration.
Screw, slot and key type insert location and clamping for extra security.

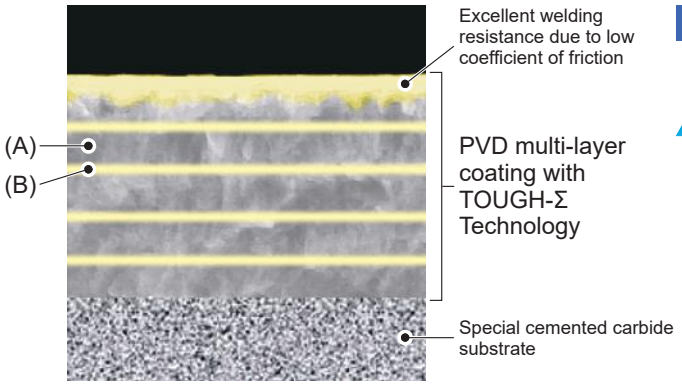


NEW

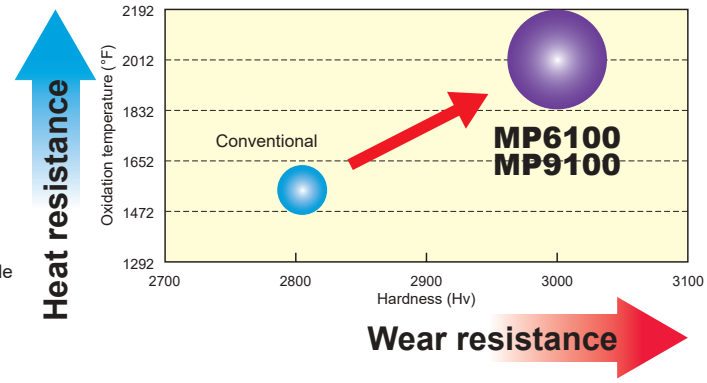
## MP6100, MP9100 - With accumulated Al-Ti-Cr-N based PVD coating

# TOUGH-Σ Technology

A fusion of the separate coating technologies; PVD and multi-layering provides extra toughness.




**Dramatically improving the heat and wear resistance!**




| | Work material | Grade | Coating | | Coefficient of friction | | |
|---|---|---|---|---|---|---|---|
| | | | Base layer (A) | Optimized layer for work material (B) | Measured at 1112° F | | |
| | | | | | 1055 | 304 | Ti-6Al-4V |
| P | Carbon Steel, Alloy Steel | **MP6100** | **High Al-(Al, Ti)N** The new technology Al-(Al, Ti)N provides stability of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance. | (Al, Cr) N based | 0.4 | | |
| | | | | Tough! Resists Chipping | | | |
| S | Titanium Alloy, Heat Resistant Alloy | **MP9100** | | CrN based | | | 0.3 |
| | | | | Tough! Resists Thermal Cracking | | | |
| | | | | Conventional | 0.7 | 0.7 | 0.7 |

# Ball-Nose End Mill for Rough Cutting

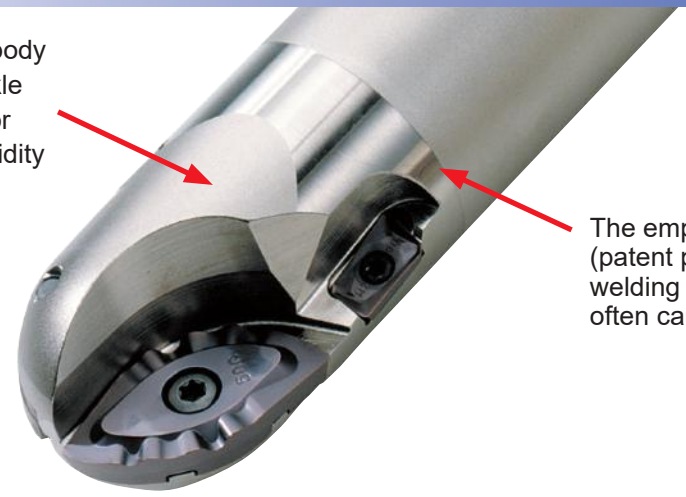
# SRM2 Ø40 Ø50

## Features

| Cutting Edge Diameter | 1.575" (ø40mm), 1.969" (ø50mm) |
|---|---|

## High Rigidity

The specially designed silver body employs special alloy with nickle based coating on its surface for significantly improved body rigidity and durability.



The employment of heel cut (patent pending) prevents welding and damage to the body often caused by generated chips.

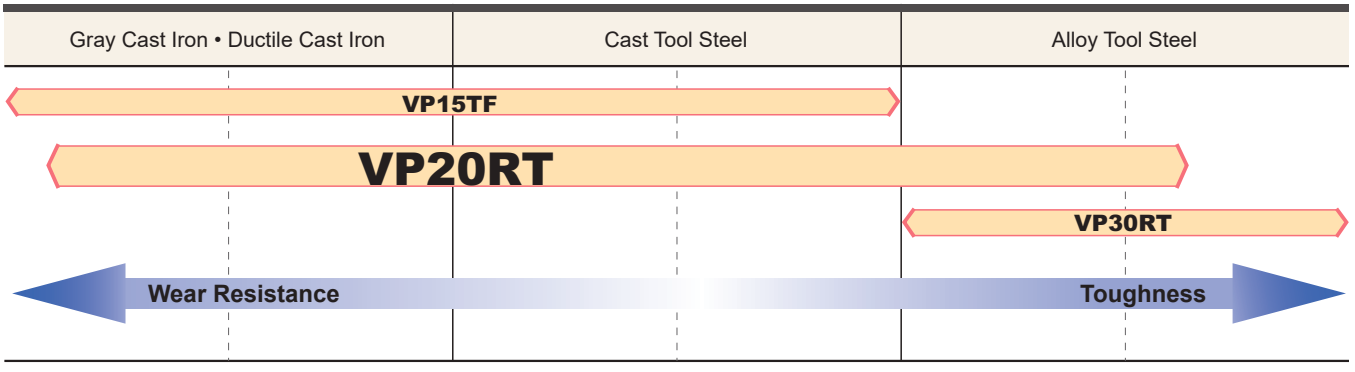
## Low Resistance

### Low-resistance Cutting Edge Type Inserts (With Breakers)

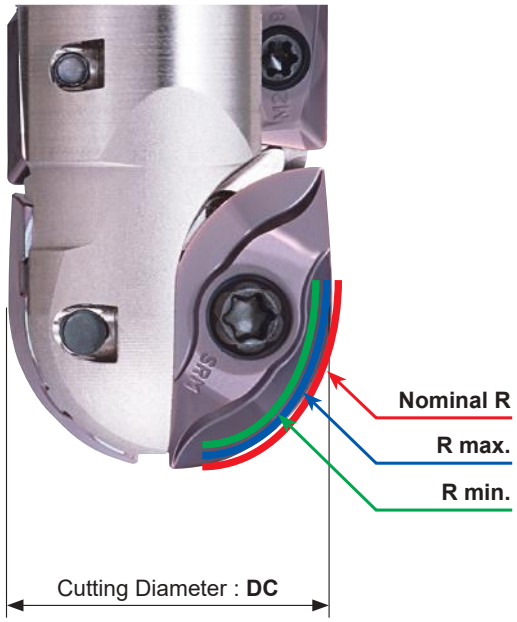


Unique design, 3-dimentional cutting edge:- Variable Radial Undulation (V.R.U. Pat. pending) for efficient chip breaking to significantly lower cutting resistance and vibration. Screw, slot and key type insert location and clamping for extra security.

## Insert Grade Application Guide



# Radius tolerance and other dimensions when an insert is set in a body




<Radius tolerance>

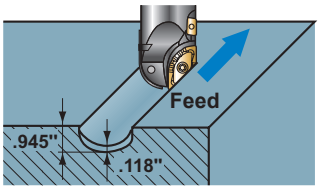
| Cutting Dia. | Nominal R | R min. | R max. |
|---|---|---|---|
| **.625** | .3125 | .309 | .312 |
| **.750** | .375 | .371 | .374 |
| **1.000** | .500 | .496 | .499 |
| **1.250** | .625 | .621 | .624 |

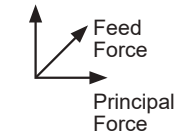
<Dimensions when an insert is set in a body>

| Cutting Dia. | DC min. | DC max. |
|---|---|---|
| .625 | .610 | .6226 |
| .750 | .735 | .7476 |
| 1.000 | .985 | .9976 |
| 1.250 | 1.235 | 1.2476 |

# Cutting Performance

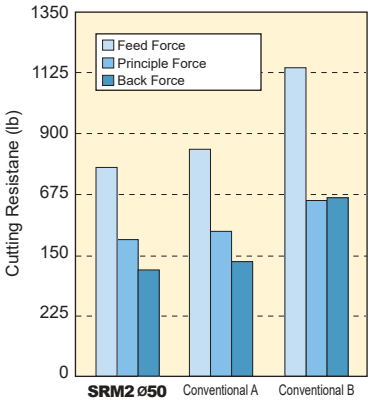
## Comparison of Cutting Resistance




Cutting Conditions

| | |
|---|---|
| Work piece | Ductile cast iron |
| Tool | Ball nose end mill with 50mm cutting edge diameter |
| Cutting Speed | 615 SFM |
| Table Feed | 42.5 IPM |
| Depth of Cut | .118 inch |
| Cutting mode | Dry cutting |




Chip Geometry



**SRM2 Ø50** | Conventional A | Conventional B

# BALL NOSE END MILL

Roughing

Including curved faces

## SRM2

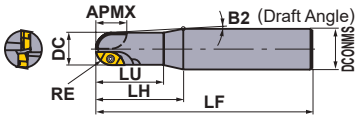
P M K N S H



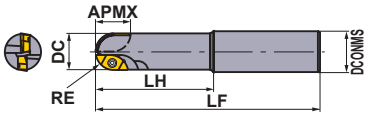
- Air / coolant through.
- Suitable for roughing to semi-finishing of small and medium molds.
- High rigidity body design.
- Low resistance chipbreaker.
- Key type clamp.
- Shrink fit ready.

**Short Type**

SRM210SAS2
SRM212SAS2

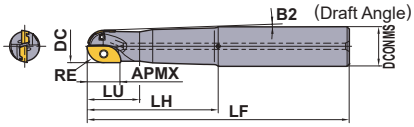



SRM216SAS2
SRM220SAS2

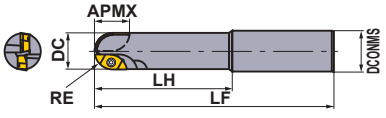



**Medium Type**

SRM210SAM2
SRM212SAM2

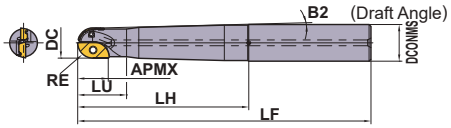



SRM216SAM2
SRM220SAM2

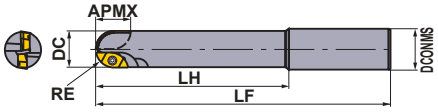



**Long Type**

SRM210SAL2
SRM212SAL2
SRM216SAL2

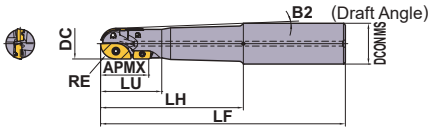



SRM220SAL2

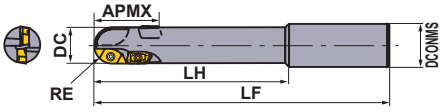



**Long Edge Type**

SRM212SAL4
SRM216SAL4




SRM220SAL4




Right hand tool holder only.

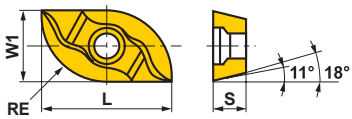
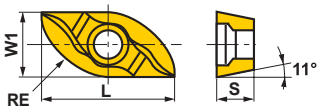
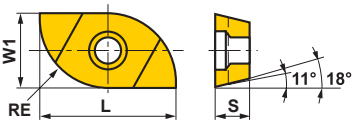
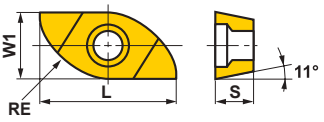
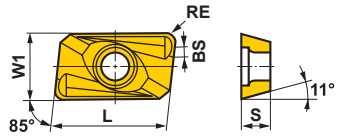
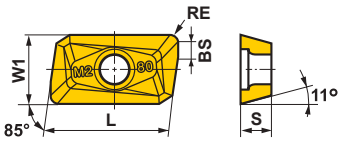
### SHANK TYPE

| Type | Order Number | Stock R | Number of Teeth | Dimensions (inch) RE | DC | LF | DCONMS | LH | LU | APMX | B2 | Inner, Outer Insert Screw * | Peripheral Insert Screw * | Inner, Outer Wrench | Peripheral Wrench | Inner Insert | Outer Insert | Peripheral Insert |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Short | SRM210SAS2 | ● | 2 | .313 | .625 | 4.0 | .75 | 1.5 | 1.00 | .625 | 3° | TS25H | — | ① TKY08D | — | SRM210C-M | SRM210E-M | — |
| | SRM212SAS2 | ● | 2 | .375 | .750 | 4.0 | 1.00 | 1.5 | 1.25 | .750 | 6° 30' | TS32 | — | ① TKY08D | — | SRM212C SRM212C-M | SRM212E SRM212E-M | — |
| | SRM216SAS2 | ● | 2 | .500 | 1.000 | 4.5 | 1.00 | 2.0 | — | .945 | — | TS43 | — | ② TKY15T | — | SRM216C SRM216C-M | SRM216E SRM216E-M | — |
| | SRM220SAS2 | ● | 2 | .625 | 1.250 | 5.0 | 1.25 | 2.0 | — | 1.102 | — | TS55 | — | ② TKY25T | — | SRM220C SRM220C-M | SRM220E SRM220E-M | — |
| Medium | SRM210SAM2 | ● | 2 | .313 | .625 | 5.0 | .75 | 2.5 | 1.00 | .625 | 1° 30' | TS25H | — | ① TKY08D | — | SRM210C-M | SRM210E-M | — |
| | SRM212SAM2 | ● | 2 | .375 | .750 | 5.0 | 1.00 | 2.5 | 1.25 | .750 | 1° 30' | TS32 | — | ① TKY08D | — | SRM212C SRM212C-M | SRM212E SRM212E-M | — |
| | SRM216SAM2 | ● | 2 | .500 | 1.000 | 5.5 | 1.00 | 3.0 | — | .945 | — | TS43 | — | ② TKY15T | — | SRM216C SRM216C-M | SRM216E SRM216E-M | — |
| | SRM220SAM2 | ● | 2 | .625 | 1.250 | 6.5 | 1.25 | 3.5 | — | 1.102 | — | TS55 | — | ② TKY25T | — | SRM220C SRM220C-M | SRM220E SRM220E-M | — |
| Long | SRM210SAL2 | ● | 2 | .313 | .625 | 6.0 | .75 | 3.5 | 1.00 | .625 | 1° 30' | TS25H | — | ① TKY08D | — | SRM210C-M | SRM210E-M | — |
| | SRM212SAL2 | ● | 2 | .375 | .750 | 6.0 | 1.00 | 3.5 | 1.50 | .750 | 1° 30' | TS32 | — | ① TKY08D | — | SRM212C SRM212C-M | SRM212E SRM212E-M | — |
| | SRM216SAL2 | ● | 2 | .500 | 1.000 | 6.5 | 1.25 | 4.0 | 1.75 | .945 | 1° 30' | TS43 | — | ② TKY15T | — | SRM216C SRM216C-M | SRM216E SRM216E-M | — |
| | SRM220SAL2 | ● | 2 | .625 | 1.250 | 8.0 | 1.25 | 5.0 | — | 1.102 | — | TS55 | — | ② TKY25T | — | SRM220C SRM220C-M | SRM220E SRM220E-M | — |
| Long Edge | SRM212SAL4 | ● | 4 | .375 | .750 | 6.0 | 1.00 | 3.5 | 1.50 | 1.180 | 1° 30' | TS32 | TS25 | ① TKY08D | ① TKY08D | SRM212C SRM212C-M | SRM212E SRM212E-M | APMT1135 PDER-□2 |
| | SRM216SAL4 | ● | 4 | .500 | 1.000 | 6.5 | 1.25 | 4.0 | 1.75 | 1.457 | 1° 30' | TS43 | TS25 | ② TKY15T | ③ TKY08F | SRM216C SRM216C-M | SRM216E SRM216E-M | APMT1135 PDER-□2 |
| | SRM220SAL4 | ● | 4 | .625 | 1.250 | 8.0 | 1.25 | 5.0 | — | 1.732 | — | TS55 | TS43 | ② TKY25T | ③ TKY15F | SRM220C SRM220C-M | SRM220E SRM220E-M | APMT1604 PDER-□2 |

* Clamp Torque (lbf-in) : TS25H=8.9, TS25=8.9, TS32=8.9, TS43=31, TS55=66

● : Inventory maintained.
<10 inserts in one case>

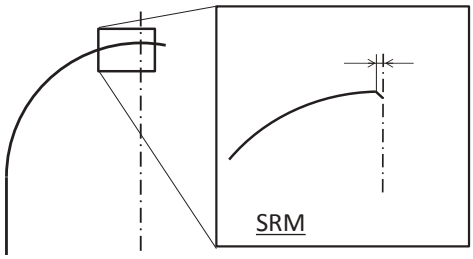
## INSERTS

| Type | | Shape | Order Number | Class | Coated | | | Dimensions (inch) | | | | | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | MP6120 (NEW) | MP9120 (NEW) | VP15TF | RE | L | W1 | S | BS | |
| Inner | With Breaker |  | **SRM210C-M** | M | ● | ● | ● | .313 | .630 | .323 | .138 | — |  |
| | | | **SRM212C-M** | M | ● | ● | ● | .375 | .748 | .385 | .169 | — | |
| | | | **SRM216C-M** | M | ● | ● | ● | .500 | .945 | .512 | .216 | — | |
| | | | **SRM220C-M** | M | ● | ● | ● | .625 | 1.102 | .638 | .275 | — | |
| Outer | With Breaker |  | **SRM210E-M** | M | ● | ● | ● | .313 | .531 | .258 | .138 | — |  |
| | | | **SRM212E-M** | M | ● | ● | ● | .375 | .610 | .315 | .169 | — | |
| | | | **SRM216E-M** | M | ● | ● | ● | .500 | .807 | .409 | .216 | — | |
| | | | **SRM220E-M** | M | ● | ● | ● | .625 | .964 | .520 | .275 | — | |
| Inner | No Breaker | Strong Cutting Edge Type  | **SRM212C** | M | ● | ● | ● | .375 | .748 | .385 | .169 | — |  |
| | | | **SRM216C** | M | ● | ● | ● | .500 | .945 | .512 | .216 | — | |
| | | | **SRM220C** | M | ● | ● | ● | .625 | 1.102 | .638 | .275 | — | |
| Outer | No Breaker | Strong Cutting Edge Type  | **SRM212E** | M | ● | ● | ● | .375 | .610 | .315 | .169 | — |  |
| | | | **SRM216E** | M | ● | ● | ● | .500 | .807 | .409 | .216 | — | |
| | | | **SRM220E** | M | ● | ● | ● | .625 | .964 | .520 | .275 | — | |
| Peripheral | With Breaker | Strong Cutting Edge Type  | **APMT1135PDER-H2** | M | | | ● | .031 | .433 | .250 | .138 | .047 |  |
| | | | **APMT1604PDER-H2** | M | | | ● | .031 | .650 | .375 | .187 | .055 | |
| | With Breaker | Low Resistance Type  | **APMT1135PDER-M2** | M | | | ● | .031 | .433 | .250 | .138 | .047 |  |
| | | | **APMT1604PDER-M2** | M | | | ● | .031 | .650 | .375 | .187 | .055 | |

(Note) The **M** type breaker (APMT....PDER-M2) is the first recommendation for its excellent cutting performance.
Please use **H** type breakers (APMT....PDER-H2) due to cutting edge strength.

■ = MIRACLE SIGMA

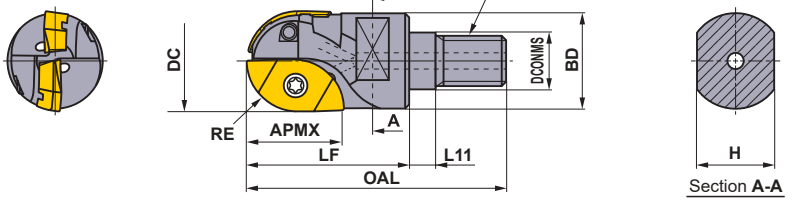
(Note) SRM tooling is designed for rough machining applications. *Programming Note: If you choose to use SRM tooling for semi-finishing applications, care must be taken when setting the tool height. The SRM insert includes a chamfer flat at the tip as illustrated. To assist with SRM programming needs, please download our CAD data from our web site; http://www.mitsubishicarbide.com/



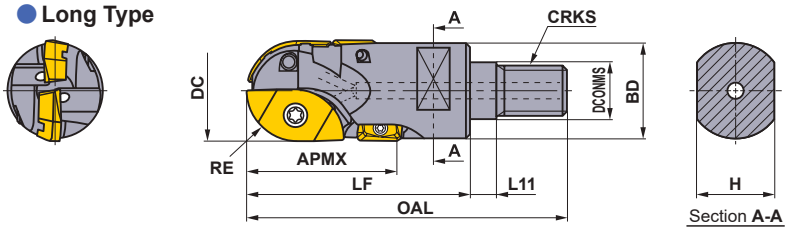
# BALL-NOSE END MILL FOR ROUGH TO SEMI-FINISH CUTTING



● Standard Type




● Long Type




## METRIC Standard

### SCREW-IN TYPE

Right hand tool holder only.

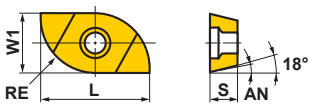
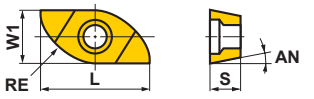
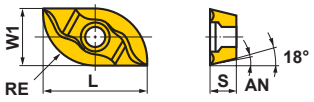
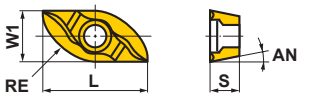
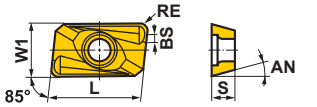
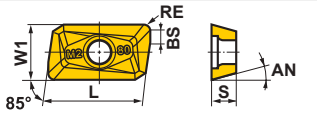
| Type | Order Number | Stock R | *3 Coolant Thru | Dimensions (mm) RE | DC | DCONMS | BD | OAL | LF | L11 | H | CRKS *2 | APMX | *4 WT | *1 Inner, Outer Insert Screw | *1 Peripheral Insert Screw | Wrench | Inner Insert | Outer Insert | Peripheral Insert |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Standard | **SRM2160AM08S30** | ★ | Y | 8 | 16 | 8.5 | 14.6 | 48 | 30 | 6 | 10 | M8 | 12 | 0.1 | TS25H | — | ①TKY08D | SRG16C SRM16C-M | SRG16E SRM16E-M | — |
| | SRM**2200AM10S35** | ★ | Y | 10 | 20 | 10.5 | 18.6 | 54 | 35 | 6 | 14 | M10 | 14 | 0.1 | TS32 | — | ①TKY08D | SRG20C SRM20C-M | SRG20E SRM20E-M | — |
| | SRM**2250AM12S40** | ★ | Y | 12.5 | 25 | 12.5 | 23.5 | 62 | 40 | 6 | 19 | M12 | 19 | 0.2 | TS43 | TS25 | ②TKY15T | SRG25C SRM25C-M | SRG25E SRM25E-M | — |
| | SRM**2300AM16S45** | ★ | Y | 15 | 30 | 17 | 28.3 | 68 | 45 | 6 | 24 | M16 | 24 | 0.2 | TS55 | — | ②TKY15T ③TKY08F | SRG30C SRM30C-M | SRG30E SRM30E-M | — |
| | SRM**2320AM16S45** | ★ | Y | 16 | 32 | 17 | 30.0 | 68 | 45 | 6 | 24 | M16 | 28 | 0.2 | TS55 | TS43 | ②TKY25T ③TKY15F | SRG32C SRM32C-M | SRG32E SRM32E-M | — |
| Long | **SRM2200AM10L45** | ★ | Y | 10 | 20 | 10.5 | 18.6 | 64 | 45 | 6 | 14 | M10 | 30 | 0.2 | TS32 | TS25 | ①TKY08D | SRG20C SRM20C-M | SRG20E SRM20E-M | APMT1135 PDER-□2 |
| | SRM**2250AM12L55** | ★ | Y | 12.5 | 25 | 12.5 | 23.5 | 77 | 55 | 6 | 19 | M12 | 37 | 0.3 | TS43 | TS25 | ②TKY15T ③TKY08F | SRG25C SRM25C-M | SRG25E SRM25E-M | APMT1135 PDER-□2 |
| | SRM**2300AM16L60** | ★ | Y | 15 | 30 | 17 | 28.3 | 83 | 60 | 6 | 24 | M16 | 44 | 0.3 | TS55 | TS43 | ②TKY25T ③TKY15F | SRG30C SRM30C-M | SRG30E SRM30E-M | APMT1604 PDER-□2 |
| | SRM**2320AM16L60** | ★ | Y | 16 | 32 | 17 | 29.0 | 83 | 60 | 6 | 24 | M16 | 44 | 0.3 | TS55 | TS43 | ②TKY25T ③TKY15F | SRG32C SRM32C-M | SRG32E SRM32E-M | APMT1604 PDER-□2 |

*1 Clamp Torque (lbf-in) : TS25H=8.9, TS25=8.9, TS32=8.9, TS43=31, TS55=66
*2 Clamp Torque of the Head (lbf-ft) : M8=17.1, M10=33.8, M12=59.2, M16=66.7
*3 Y=Yes
*4 WT : Mass

● : Inventory maintained. ★ : Inventory maintained in Japan.
<10 inserts in one case>

# INSERTS

**For Metric Standard**

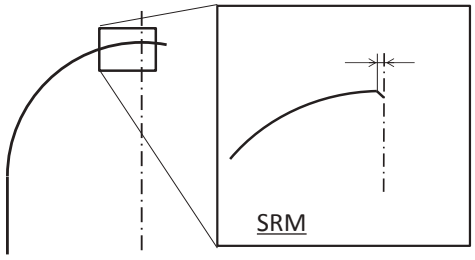
| Type | Shape | Order Number | Class | Coated | | | | Dimensions (mm) | | | | | | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | F7030 | MP6120 NEW | MP9120 NEW | VP15TF | RE | L | W1 | S | BS | AN | |
| Inner | Strong Cutting Edge Type | **SRG16C** | G | | ★ | ★ | ★ | 8 | 16 | 8.2 | 3.5 | – | 11° |  |
| | | **SRG20C** | G | | ★ | ★ | ★ | 10 | 19 | 10.2 | 4.6 | – | 10° | |
| | | **SRG25C** | G | | ★ | ★ | ★ | 12.5 | 24 | 12.8 | 5.5 | – | 10° | |
| | | **SRG30C** | G | | ★ | ★ | ★ | 15 | 28 | 15.3 | 7 | – | 10° | |
| | | **SRG32C** | G | | ★ | ★ | ★ | 16 | 28 | 16.3 | 7 | – | 10° | |
| Outer | Strong Cutting Edge Type | **SRG16E** | G | | ★ | ★ | ★ | 8 | 13.5 | 6.7 | 3.5 | – | 11° |  |
| | | **SRG20E** | G | | ★ | ★ | ★ | 10 | 15.5 | 8.5 | 4.6 | – | 9° | |
| | | **SRG25E** | G | | ★ | ★ | ★ | 12.5 | 20.5 | 10.2 | 5.5 | – | 9° | |
| | | **SRG30E** | G | | ★ | ★ | ★ | 15 | 25.2 | 12.2 | 7 | – | 9° | |
| | | **SRG32E** | G | | ★ | ★ | ★ | 16 | 26.1 | 13.1 | 7 | – | 9° | |
| Inner | Low Resistance Type | **SRM16C-M** | M | | ★ | ★ | ★ | 8 | 16 | 8.2 | 3.5 | – | 11° |  |
| | | **SRM20C-M** | M | | ★ | ★ | ★ | 10 | 19 | 10.2 | 4.6 | – | 10° | |
| | | **SRM25C-M** | M | | ★ | ★ | ★ | 12.5 | 24 | 12.8 | 5.5 | – | 10° | |
| | | **SRM30C-M** | M | | ★ | ★ | ★ | 15 | 28 | 15.3 | 7 | – | 10° | |
| | | **SRM32C-M** | M | | ★ | ★ | ★ | 16 | 28 | 16.3 | 7 | – | 10° | |
| Outer | Low Resistance Type | **SRM16E-M** | M | | ★ | ★ | ★ | 8 | 13.5 | 6.7 | 3.5 | – | 11° |  |
| | | **SRM20E-M** | M | | ★ | ★ | ★ | 10 | 15.5 | 8.5 | 4.6 | – | 9° | |
| | | **SRM25E-M** | M | | ★ | ★ | ★ | 12.5 | 20.5 | 10.2 | 5.5 | – | 9° | |
| | | **SRM30E-M** | M | | ★ | ★ | ★ | 15 | 25.2 | 12.2 | 7 | – | 9° | |
| | | **SRM32E-M** | M | | ★ | ★ | ★ | 16 | 26.1 | 13.1 | 7 | – | 9° | |
| * Peripheral | Strong Cutting Edge Type | **APMT1135PDER-H2** | M | ● | | | ● | 0.8 | 11 | 6.35 | 3.5 | 1.2 | 11° |  |
| | | **APMT1604PDER-H2** | M | ● | | | ● | 0.8 | 16.5 | 9.525 | 4.76 | 1.4 | 11° | |
| | Low Resistance Type | **APMT1135PDER-M2** | M | ● | | | ● | 0.8 | 11 | 6.35 | 3.5 | 1.2 | 11° |  |
| | | **APMT1604PDER-M2** | M | ● | | | ● | 0.8 | 16.5 | 9.525 | 4.76 | 1.4 | 11° | |

(Low-resistance inner or outer inserts are precision M class type.)

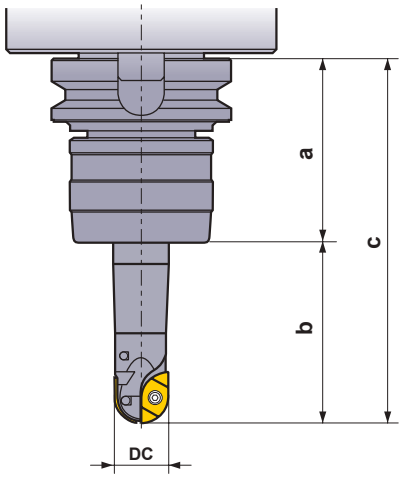
■ = MIRACLE SIGMA

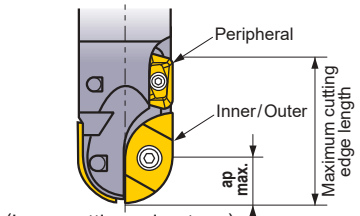
* Selection guide for peripheral cutting edges : The first recommendation is the super sharp M breaker (APMT....PDER-M2).
When cutting edge strength is particularly important, use the H breaker (APMT....PDER-H2).

(Note) SRM tooling is designed for rough machining applications. *Programming Note: If you choose to use SRM tooling for semi-finishing applications, care must be taken when setting the tool height. The SRM insert includes a chamfer flat at the tip as illustrated. To assist with SRM programming needs, please download our CAD data from our web site; http://www.mitsubishicarbide.com/



## RECOMMENDED CUTTING CONDITIONS




(Long cutting edge type)

### Tool Overhang

Recommended cutting conditions on this literature are chosen based on deflection, vibration and machined surface when using a CAT50 arbor. Conditions-**"a"** is the length from a gage line to the arbor end face, and **"b"** is the neck length (tool overhang from the arbor).

(Inch)

| Cutting Diameter : DC | Type | a | b | c |
|---|---|---|---|---|
| .625" | Short | 4 | 1.5 | 5.5 |
| | Medium | | 2.5 | 6.5 |
| | Long | | 3.5 | 7.5 |
| .750" | Short | | 1.5 | 5.5 |
| | Medium | | 2.5 | 6.5 |
| | Long | | 3.5 | 7.5 |
| 1.000" | Short | | 2.0 | 6.0 |
| | Medium | | 3.0 | 7.0 |
| | Long | | 4.0 | 8.0 |
| 1.250" | Short | | 2.0 | 6.0 |
| | Medium | | 3.5 | 7.5 |
| | Long | | 5.0 | 9.0 |

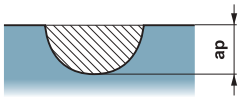
### Recommended Depth of Cut for Long Cutting Edge Type

The maximum cutting edge length of the long cutting edge type with a peripheral insert is 1.4-1.5DC. The peripheral insert is for light machining only.

Please refer the recommended cutting condition or page 12.

## SLOT MILLING

Cutting Mode



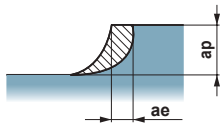

**N :** Spindle Speed (RPM)
**F :** Table Feed (IPM)

| | Work Material | Hardness | Cutting Speed (SFM) | Grade | Type | ϕ.625" | | | ϕ.750" | | | ϕ1.000" | | | ϕ1.250" | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | RPM | IPM | ap | RPM | IPM | ap | RPM | IPM | ap | RPM | IPM | ap |
| P | Carbon Steel Alloy Steel | 180-280HB | 525 | MP6120 VP15TF | Short | 3183 | 15 | .236 | 2546 | 12 | .315 | 2037 | 19 | .492 | 1698 | 16 | .591 |
| | | | 395 | | Medium | 3183 | 15 | .236 | 2546 | 12 | .315 | 2037 | 19 | .492 | 1698 | 16 | .591 |
| | | | 655 | | Long | 3183 | 15 | .157 | 2546 | 12 | .157 | 2037 | 19 | .236 | 1698 | 16 | .295 |
| | | 280-350HB | 460 | MP6120 VP15TF | Short | 2785 | 13 | .236 | 2228 | 11 | .315 | 1783 | 17 | .492 | 1485 | 14 | .591 |
| | | | 395 | | Medium | 2785 | 13 | .236 | 2228 | 11 | .315 | 1783 | 17 | .492 | 1485 | 14 | .591 |
| | | | 525 | | Long | 2785 | 13 | .157 | 2228 | 11 | .157 | 1783 | 17 | .236 | 1485 | 14 | .295 |
| | Pre-Hardened Steel | 35-45HRC | 395 | MP6120 VP15TF | Short | 2387 | 11 | .236 | 1910 | 9 | .315 | 1528 | 14 | .492 | 1273 | 12 | .472 |
| | | | 330 | | Medium | 2387 | 11 | .236 | 1910 | 9 | .315 | 1528 | 14 | .492 | 1273 | 12 | .472 |
| | | | 525 | | Long | 2387 | 11 | .157 | 1910 | 9 | .157 | 1528 | 14 | .236 | 1273 | 12 | .177 |
| | Alloy Tool Steel | ≤350HB | 460 | MP6120 VP15TF | Short | 2785 | 13 | .236 | 2228 | 11 | .315 | 1783 | 21 | .394 | 1485 | 23 | .295 |
| | | | 395 | | Medium | 2785 | 13 | .236 | 2228 | 11 | .315 | 1783 | 21 | .394 | 1485 | 23 | .295 |
| | | | 525 | | Long | 2785 | 13 | .157 | 2228 | 11 | .157 | 1783 | 21 | .197 | 1485 | 23 | .177 |
| M | Stainless Steel | ≤270HB | 655 | VP15TF | Short | 3979 | 19 | .157 | 3183 | 15 | .197 | 2546 | 30 | .236 | 2122 | 33 | .591 |
| | | | 330 | | Medium | 3979 | 19 | .157 | 3183 | 15 | .197 | 2546 | 30 | .236 | 2122 | 33 | .591 |
| | | | 820 | | Long | 3979 | 19 | .118 | 3183 | 15 | .118 | 2546 | 24 | .157 | 2122 | 25 | .177 |
| K | Gray Cast Iron | ≤350MPa | 655 | VP15TF | Short | 3979 | 31 | .236 | 3183 | 25 | .315 | 2546 | 40 | .492 | 2122 | 33 | .591 |
| | | | 490 | | Medium | 3979 | 31 | .236 | 3183 | 25 | .315 | 2546 | 40 | .492 | 2122 | 33 | .591 |
| | | | 985 | | Long | 3979 | 31 | .157 | 3183 | 25 | .157 | 2546 | 40 | .295 | 2122 | 33 | .177 |
| | Ductile Cast Iron | ≤500MPa | 590 | VP15TF | Short | 3581 | 28 | .236 | 2865 | 23 | .315 | 2292 | 36 | .492 | 1910 | 30 | .591 |
| | | | 490 | | Medium | 3581 | 28 | .236 | 2865 | 23 | .315 | 2292 | 36 | .492 | 1910 | 30 | .591 |
| | | | 785 | | Long | 3581 | 28 | .157 | 2865 | 23 | .157 | 2292 | 36 | .295 | 1910 | 30 | .177 |
| | | ≤800MPa | 525 | VP15TF | Short | 3183 | 25 | .236 | 2546 | 20 | .315 | 2037 | 32 | .492 | 1698 | 27 | .591 |
| | | | 490 | | Medium | 3183 | 25 | .236 | 2546 | 20 | .315 | 2037 | 32 | .492 | 1698 | 27 | .591 |
| | | | 820 | | Long | 3183 | 25 | .157 | 2546 | 20 | .157 | 2037 | 32 | .295 | 1698 | 27 | .177 |
| S | Titanium Alloy | ≤350HB | 165 | MP9120 | Short | 995 | 4 | .157 | 796 | 3 | .157 | 637 | 3 | .236 | 531 | 2 | .295 |
| | | | 100 | | Medium | 995 | 4 | .157 | 796 | 3 | .157 | 637 | 3 | .236 | 531 | 2 | .295 |
| | | | 195 | | Long | 995 | 4 | .079 | 796 | 3 | .079 | 637 | 3 | .157 | 531 | 2 | .118 |
| | Heat-resistant Alloy | – | 165 | MP9120 | Short | 995 | 4 | .157 | 796 | 3 | .157 | 637 | 3 | .236 | 531 | 2 | .295 |
| | | | 100 | | Medium | 995 | 4 | .157 | 796 | 3 | .157 | 637 | 3 | .236 | 531 | 2 | .295 |
| | | | 195 | | Long | 995 | 4 | .079 | 796 | 3 | .079 | 637 | 3 | .157 | 531 | 2 | .118 |
| H | Heat Treated Steel | 45-50HRC | 330 | VP15TF | Short | 1989 | 9 | .157 | 1591 | 8 | .157 | 1273 | 10 | .236 | 1061 | 8 | .295 |
| | | | 195 | | Medium | 1989 | 9 | .157 | 1591 | 8 | .157 | 1273 | 10 | .236 | 1061 | 8 | .295 |
| | | | 395 | | Long | 1989 | 9 | .079 | 1591 | 8 | .079 | 1273 | 10 | .157 | 1061 | 8 | .118 |
| | | 50-60HRC | 195 | VP15TF | Short | 1194 | 6 | .157 | 955 | 5 | .157 | 764 | 6 | .236 | 637 | 5 | .295 |
| | | | 130 | | Medium | 1194 | 6 | .157 | 955 | 5 | .157 | 764 | 6 | .236 | 637 | 5 | .295 |
| | | | 330 | | Long | 1194 | 6 | .079 | 955 | 5 | .079 | 764 | 6 | .157 | 637 | 5 | .118 |

## RECOMMENDED CUTTING CONDITIONS

### SHOULDER MILLING (Cutting Depth : Small)

Cutting Mode

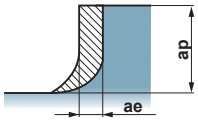



**N :** Spindle Speed (RPM)
**F :** Table Feed (IPM)

| | Work Material | Hardness | Cutting Speed (SFM) | Grade | Type | ϕ.625" | | | | ϕ.750" | | | | ϕ1.000" | | | | ϕ1.250" | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | RPM | IPM | ap | ae | RPM | IPM | ap | ae | RPM | IPM | ap | ae | RPM | IPM | ap | ae |
| P | Carbon Steel Alloy Steel | 180-280HB | 655 | MP6120 VP15TF | Short | 3979 | 31 | .157 | .236 | 3183 | 38 | .197 | .315 | 2546 | 50 | .236 | .394 | 2122 | 50 | .295 | .394 |
| | | | 525 | | Medium | 3979 | 31 | .157 | .236 | 3183 | 38 | .197 | .315 | 2546 | 50 | .236 | .394 | 2122 | 50 | .295 | .394 |
| | | | 820 | | Long | 3979 | 25 | .157 | .157 | 3183 | 25 | .197 | .236 | 2546 | 50 | .236 | .295 | 2122 | 50 | .295 | .295 |
| | | 280-350HB | 525 | MP6120 VP15TF | Short | 3183 | 20 | .157 | .236 | 2546 | 20 | .197 | .315 | 2037 | 32 | .236 | .394 | 1698 | 33 | .295 | .394 |
| | | | 395 | | Medium | 3183 | 20 | .157 | .236 | 2546 | 20 | .197 | .315 | 2037 | 32 | .236 | .394 | 1698 | 33 | .295 | .394 |
| | | | 655 | | Long | 3183 | 15 | .157 | .157 | 2546 | 16 | .197 | .236 | 2037 | 24 | .236 | .295 | 1698 | 20 | .295 | .295 |
| | Pre-Hardened Steel | 35-45HRC | 525 | MP6120 VP15TF | Short | 3183 | 20 | .157 | .236 | 2546 | 20 | .197 | .315 | 2037 | 32 | .236 | .394 | 1698 | 33 | .295 | .394 |
| | | | 395 | | Medium | 3183 | 20 | .157 | .236 | 2546 | 20 | .197 | .315 | 2037 | 32 | .236 | .394 | 1698 | 33 | .295 | .394 |
| | | | 655 | | Long | 3183 | 15 | .157 | .157 | 2546 | 16 | .197 | .236 | 2037 | 24 | .236 | .295 | 1698 | 27 | .295 | .295 |
| | Alloy Tool Steel | ≤350HB | 525 | MP6120 VP15TF | Short | 3183 | 20 | .157 | .236 | 2546 | 20 | .197 | .315 | 2037 | 32 | .236 | .394 | 1698 | 33 | .295 | .394 |
| | | | 395 | | Medium | 3183 | 20 | .157 | .236 | 2546 | 20 | .197 | .315 | 2037 | 32 | .236 | .394 | 1698 | 33 | .295 | .394 |
| | | | 655 | | Long | 3183 | 15 | .157 | .157 | 2546 | 16 | .197 | .236 | 2037 | 24 | .236 | .295 | 1698 | 20 | .295 | .295 |
| M | Stainless Steel | ≤270HB | 655 | VP15TF | Short | 3979 | 19 | .157 | .236 | 3183 | 20 | .197 | .315 | 2546 | 30 | .236 | .394 | 2122 | 33 | .295 | .394 |
| | | | 330 | | Medium | 3979 | 19 | .157 | .236 | 3183 | 20 | .197 | .315 | 2546 | 30 | .236 | .394 | 2122 | 33 | .295 | .394 |
| | | | 820 | | Long | 3979 | 19 | .157 | .157 | 3183 | 15 | .197 | .236 | 2546 | 24 | .236 | .295 | 2122 | 33 | .295 | .295 |
| K | Gray Cast Iron | ≤350MPa | 655 | VP15TF | Short | 3979 | 63 | .157 | .315 | 3183 | 63 | .197 | .394 | 2546 | 60 | .236 | .394 | 2122 | 58 | .295 | .394 |
| | | | 490 | | Medium | 3979 | 63 | .157 | .315 | 3183 | 63 | .197 | .394 | 2546 | 60 | .236 | .394 | 2122 | 58 | .295 | .394 |
| | | | 985 | | Long | 3979 | 47 | .157 | .236 | 3183 | 50 | .197 | .315 | 2546 | 60 | .236 | .394 | 2122 | 58 | .295 | .236 |
| | Ductile Cast Iron | ≤500MPa | 655 | VP15TF | Short | 3979 | 63 | .157 | .315 | 3183 | 63 | .197 | .394 | 2546 | 60 | .236 | .394 | 2122 | 50 | .295 | .394 |
| | | | 490 | | Medium | 3979 | 63 | .157 | .315 | 3183 | 63 | .197 | .394 | 2546 | 60 | .236 | .394 | 2122 | 50 | .295 | .394 |
| | | | 920 | | Long | 3979 | 47 | .157 | .236 | 3183 | 50 | .197 | .315 | 2546 | 60 | .236 | .394 | 2122 | 50 | .295 | .236 |
| | | ≤800MPa | 590 | VP15TF | Short | 3581 | 56 | .157 | .315 | 2865 | 56 | .197 | .394 | 2292 | 54 | .236 | .394 | 1910 | 45 | .295 | .394 |
| | | | 490 | | Medium | 3581 | 56 | .157 | .315 | 2865 | 56 | .197 | .394 | 2292 | 54 | .236 | .394 | 1910 | 45 | .295 | .394 |
| | | | 820 | | Long | 3581 | 42 | .157 | .236 | 2865 | 45 | .197 | .315 | 2292 | 54 | .236 | .394 | 1910 | 45 | .295 | .236 |
| S | Titanium Alloy | ≤350HB | 165 | MP9120 | Short | 995 | 12 | .157 | .157 | 796 | 9 | .157 | .197 | 637 | 8 | .236 | .236 | 531 | 6 | .295 | .118 |
| | | | 100 | | Medium | 995 | 12 | .157 | .157 | 796 | 9 | .157 | .197 | 637 | 8 | .236 | .236 | 531 | 6 | .295 | .118 |
| | | | 195 | | Long | 995 | 12 | .079 | .079 | 796 | 9 | .079 | .118 | 637 | 8 | .157 | .157 | 531 | 6 | .118 | .059 |
| | Heat-resistant Alloy | – | 165 | MP9120 | Short | 995 | 12 | .157 | .157 | 796 | 9 | .157 | .197 | 637 | 8 | .236 | .236 | 531 | 6 | .295 | .118 |
| | | | 100 | | Medium | 995 | 12 | .157 | .157 | 796 | 9 | .157 | .197 | 637 | 8 | .236 | .236 | 531 | 6 | .295 | .118 |
| | | | 195 | | Long | 995 | 12 | .079 | .079 | 796 | 9 | .079 | .118 | 637 | 8 | .157 | .157 | 531 | 6 | .118 | .059 |
| H | Heat Treated Steel | 45-50HRC | 330 | VP15TF | Short | 1989 | 9 | .157 | .157 | 1591 | 8 | .197 | .197 | 1273 | 10 | .236 | .295 | 1061 | 8 | .295 | .118 |
| | | | 195 | | Medium | 1989 | 9 | .157 | .157 | 1591 | 8 | .197 | .197 | 1273 | 10 | .236 | .295 | 1061 | 8 | .295 | .118 |
| | | | 395 | | Long | 1989 | 9 | .157 | .079 | 1591 | 8 | .197 | .118 | 1273 | 10 | .236 | .157 | 1061 | 8 | .295 | .059 |
| | | 50-60HRC | 195 | VP15TF | Short | 1194 | 6 | .157 | .157 | 955 | 5 | .197 | .197 | 764 | 6 | .236 | .295 | 637 | 5 | .295 | .118 |
| | | | 130 | | Medium | 1194 | 6 | .157 | .157 | 955 | 5 | .197 | .197 | 764 | 6 | .236 | .295 | 637 | 5 | .295 | .118 |
| | | | 330 | | Long | 1194 | 6 | .157 | .079 | 955 | 5 | .197 | .118 | 764 | 6 | .236 | .157 | 637 | 5 | .295 | .059 |

## SHOULDER MILLING (Cutting Depth : Large)

Cutting Mode




**N :** Spindle Speed (RPM)
**F :** Table Feed (IPM)

***Machining Stainless Steels**

Down cutting (Climb milling) is preferred.

| | Work Material | Hardness | Cutting Speed (SFM) | Grade | Type | ϕ.625" | | | | ϕ.750" | | | | ϕ1.000" | | | | ϕ1.250" | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | RPM | IPM | ap | ae | RPM | IPM | ap | ae | RPM | IPM | ap | ae | RPM | IPM | ap | ae |
| P | Carbon Steel Alloy Steel | 180-280HB | 655 | MP6120 VP15TF | Short | 3979 | 25 | .315 | .157 | 3183 | 30 | .394 | .157 | 2546 | 50 | .492 | .197 | 2122 | 50 | .591 | .177 |
| | | | 525 | | Medium | 3979 | 25 | .315 | .157 | 3183 | 30 | .394 | .157 | 2546 | 50 | .492 | .197 | 2122 | 50 | .591 | .177 |
| | | | 820 | | Long | 3979 | 19 | .315 | .118 | 3183 | 20 | .394 | .118 | 2546 | 40 | .492 | .157 | 2122 | 33 | .591 | .118 |
| | | 280-350HB | 525 | MP6120 VP15TF | Short | 3183 | 15 | .315 | .157 | 2546 | 20 | .394 | .157 | 2037 | 32 | .492 | .197 | 1698 | 33 | .591 | .177 |
| | | | 395 | | Medium | 3183 | 15 | .315 | .157 | 2546 | 20 | .394 | .157 | 2037 | 32 | .492 | .197 | 1698 | 33 | .591 | .177 |
| | | | 655 | | Long | 3183 | 15 | .315 | .118 | 2546 | 12 | .394 | .118 | 2037 | 24 | .492 | .157 | 1698 | 20 | .591 | .118 |
| | Pre-Hardened Steel | 35-45HRC | 525 | MP6120 VP15TF | Short | 3183 | 15 | .315 | .157 | 2546 | 20 | .394 | .157 | 2037 | 32 | .492 | .197 | 1698 | 33 | .591 | .177 |
| | | | 395 | | Medium | 3183 | 15 | .315 | .157 | 2546 | 20 | .394 | .157 | 2037 | 32 | .492 | .197 | 1698 | 33 | .591 | .177 |
| | | | 655 | | Long | 3183 | 15 | .315 | .118 | 2546 | 12 | .394 | .118 | 2037 | 24 | .492 | .157 | 1698 | 20 | .591 | .118 |
| | Alloy Tool Steel | ≤350HB | 525 | MP6120 VP15TF | Short | 3183 | 15 | .315 | .157 | 2546 | 20 | .394 | .157 | 2037 | 32 | .492 | .197 | 1698 | 33 | .591 | .177 |
| | | | 395 | | Medium | 3183 | 15 | .315 | .157 | 2546 | 20 | .394 | .157 | 2037 | 32 | .492 | .197 | 1698 | 33 | .591 | .177 |
| | | | 655 | | Long | 3183 | 15 | .315 | .118 | 2546 | 12 | .394 | .118 | 2037 | 24 | .492 | .098 | 1698 | 20 | .591 | .118 |
| M | Stainless Steel | ≤270HB | 655 | VP15TF | Short | 3979 | 19 | .315 | .157 | 3183 | 20 | .394 | .157 | 2546 | 30 | .492 | .394 | 2122 | 33 | .591 | .394 |
| | | | 330 | | Medium | 3979 | 19 | .315 | .157 | 3183 | 20 | .394 | .157 | 2546 | 30 | .492 | .394 | 2122 | 33 | .591 | .394 |
| | | | 820 | | Long | 3979 | 19 | .315 | .118 | 3183 | 15 | .394 | .118 | 2546 | 24 | .492 | .157 | 2122 | 20 | .591 | .177 |
| K | Gray Cast Iron | ≤350MPa | 655 | VP15TF | Short | 3979 | 47 | .315 | .315 | 3183 | 50 | .394 | .315 | 2546 | 50 | .492 | .394 | 2122 | 58 | .591 | .394 |
| | | | 490 | | Medium | 3979 | 47 | .315 | .315 | 3183 | 50 | .394 | .315 | 2546 | 50 | .492 | .394 | 2122 | 58 | .591 | .394 |
| | | | 985 | | Long | 3979 | 38 | .315 | .197 | 3183 | 38 | .394 | .157 | 2546 | 50 | .492 | .295 | 2122 | 42 | .591 | .177 |
| | Ductile Cast Iron | ≤500MPa | 655 | VP15TF | Short | 3979 | 47 | .315 | .315 | 3183 | 50 | .394 | .315 | 2546 | 50 | .492 | .394 | 2122 | 50 | .591 | .394 |
| | | | 490 | | Medium | 3979 | 47 | .315 | .315 | 3183 | 50 | .394 | .315 | 2546 | 50 | .492 | .394 | 2122 | 50 | .591 | .394 |
| | | | 920 | | Long | 3979 | 38 | .315 | .197 | 3183 | 38 | .394 | .157 | 2546 | 50 | .492 | .295 | 2122 | 33 | .591 | .177 |
| | | ≤800MPa | 590 | VP15TF | Short | 3581 | 42 | .315 | .315 | 2865 | 45 | .394 | .315 | 2292 | 45 | .492 | .394 | 1910 | 45 | .591 | .394 |
| | | | 490 | | Medium | 3581 | 42 | .315 | .315 | 2865 | 45 | .394 | .315 | 2292 | 45 | .492 | .394 | 1910 | 45 | .591 | .394 |
| | | | 820 | | Long | 3581 | 34 | .315 | .197 | 2865 | 34 | .394 | .157 | 2292 | 45 | .492 | .295 | 1910 | 30 | .591 | .177 |
| S | Titanium Alloy | ≤350HB | 165 | MP9120 | Short | 995 | 8 | .157 | .079 | 796 | 6 | .157 | .118 | 637 | 5 | .236 | .157 | 531 | 4 | .295 | .118 |
| | | | 100 | | Medium | 995 | 8 | .157 | .079 | 796 | 6 | .157 | .118 | 637 | 5 | .236 | .157 | 531 | 4 | .295 | .118 |
| | | | 195 | | Long | 995 | 8 | .079 | .039 | 796 | 6 | .079 | .079 | 637 | 5 | .157 | .059 | 531 | 4 | .118 | .059 |
| | Heat-resistant Alloy | – | 165 | MP9120 | Short | 995 | 8 | .157 | .079 | 796 | 6 | .157 | .118 | 637 | 5 | .236 | .157 | 531 | 4 | .295 | .118 |
| | | | 100 | | Medium | 995 | 8 | .157 | .079 | 796 | 6 | .157 | .118 | 637 | 5 | .236 | .157 | 531 | 4 | .295 | .118 |
| | | | 195 | | Long | 995 | 8 | .079 | .039 | 796 | 6 | .079 | .079 | 637 | 5 | .157 | .059 | 531 | 4 | .118 | .059 |
| H | Heat Treated Steel | 45-50HRC | 330 | VP15TF | Short | 1989 | 9 | .315 | .079 | 1591 | 8 | .394 | .118 | 1273 | 10 | .492 | .157 | 1061 | 8 | .591 | .118 |
| | | | 195 | | Medium | 1989 | 9 | .315 | .079 | 1591 | 8 | .394 | .118 | 1273 | 10 | .492 | .157 | 1061 | 8 | .591 | .118 |
| | | | 395 | | Long | 1989 | 9 | .315 | .039 | 1591 | 8 | .394 | .079 | 1273 | 8 | .492 | .059 | 1061 | 4 | .591 | .059 |
| | | 50-60HRC | 195 | VP15TF | Short | 1194 | 6 | .315 | .079 | 955 | 5 | .394 | .118 | 764 | 6 | .492 | .157 | 637 | 5 | .591 | .118 |
| | | | 130 | | Medium | 1194 | 6 | .315 | .079 | 955 | 5 | .394 | .118 | 764 | 6 | .492 | .157 | 637 | 5 | .591 | .118 |
| | | | 330 | | Long | 1194 | 6 | .315 | .039 | 955 | 5 | .394 | .079 | 764 | 5 | .492 | .059 | 637 | 3 | .591 | .059 |

# BALL NOSE END MILL

Roughing

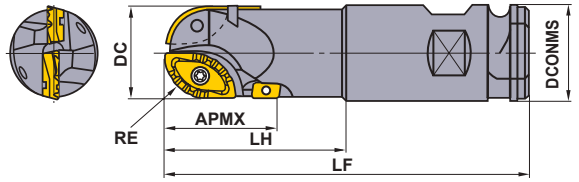
Including curved faces

## SRM2 Ø40 (1.575") Ø50 (1.969")

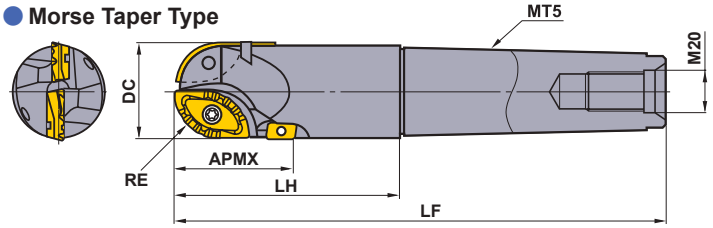
P M K N S H



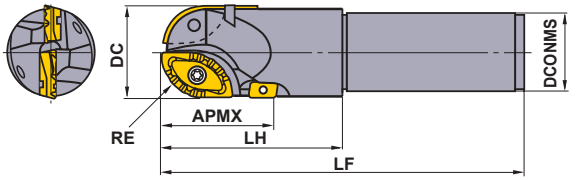
### Combination Type




### Morse Taper Type




### Straight Type



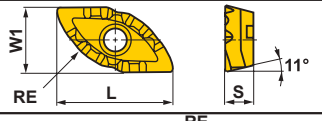
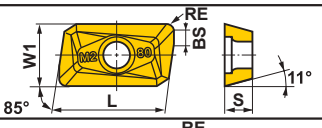
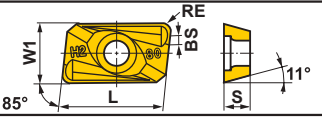

## METRIC Standard

Right hand tool holder only.

| Type | | Order Number | Stock R | Number of Flutes | Dimensions (inch) RE | DC | DCONMS | LF | LH | APMX | * Inner, Outer Insert | * Peripheral Insert | Inner, Outer Wrench | Peripheral Wrench | Inner Insert | Outer Insert | Peripheral Insert |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Combination | Standard | SRM2400WNLS | ★ | 2 | .787 | 1.575 | 2.000 | 7.874 | 4.724 | 2.126 | TS6S | TS43 | TKY30T | TKY15F | SRG40C | SRG40E | APMT1604 PDER-□2 |
| | | SRM2500WNLS | ★ | 2 | .984 | 1.969 | 2.000 | 7.874 | 4.724 | 2.480 | TS6 | TS43 | TKY30T | TKY15F | SRG50C | SRG50E | APMT1604 PDER-□2 |
| | Long | SRM2400WNLM | ★ | 2 | .787 | 1.575 | 2.000 | 9.843 | 6.693 | 2.126 | TS6S | TS43 | TKY30T | TKY15F | SRG40C | SRG40E | APMT1604 PDER-□2 |
| | | SRM2500WNLM | ★ | 2 | .984 | 1.969 | 2.000 | 9.843 | 6.693 | 2.480 | TS6 | TS43 | TKY30T | TKY15F | SRG50C | SRG50E | APMT1604 PDER-□2 |
| | Extra Long | SRM2500WNLL | ★ | 2 | .984 | 1.969 | 2.000 | 11.811 | 8.661 | 2.480 | TS6 | TS43 | TKY30T | TKY15F | SRG50C | SRG50E | APMT1604 PDER-□2 |
| | | SRM2500WNLX | ★ | 2 | .984 | 1.969 | 2.000 | 13.780 | 10.630 | 2.480 | TS6 | TS43 | TKY30T | TKY15F | SRG50C | SRG50E | APMT1604 PDER-□2 |
| Straight | Standard | SRM2400SNLS | ★ | 2 | .787 | 1.575 | 1.654 | 7.874 | 3.937 | 2.126 | TS6S | TS43 | TKY30T | TKY15F | SRG40C | SRG40E | APMT1604 PDER-□2 |
| | | SRM2500SNLS | ★ | 2 | .984 | 1.969 | 1.654 | 7.874 | 3.937 | 2.480 | TS6 | TS43 | TKY30T | TKY15F | SRG50C | SRG50E | APMT1604 PDER-□2 |
| | Long | SRM2400SNLM | ★ | 2 | .787 | 1.575 | 1.654 | 9.843 | 5.906 | 2.126 | TS6S | TS43 | TKY30T | TKY15F | SRG40C | SRG40E | APMT1604 PDER-□2 |
| | | SRM2500SNLM | ★ | 2 | .984 | 1.969 | 1.654 | 9.843 | 3.937 | 2.480 | TS6 | TS43 | TKY30T | TKY15F | SRG50C | SRG50E | APMT1604 PDER-□2 |
| Morse Taper | Standard | SRM2500MNLS | ★ | 2 | .984 | 1.969 | — | 10.079 | 4.724 | 2.480 | TS6 | TS43 | TKY30T | TKY15F | SRG50C | SRG50E | APMT1604 PDER-□2 |
| | Long | SRM2500MNLM | ★ | 2 | .984 | 1.969 | — | 11.260 | 5.906 | 2.480 | TS6 | TS43 | TKY30T | TKY15F | SRG50C | SRG50E | APMT1604 PDER-□2 |

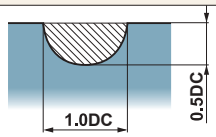
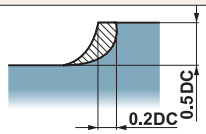
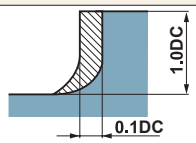
* Clamp Torque (lbf-in) : TS43=31, TS6=89, TS6S=89

## INSERTS

| Application | Shape | Order Number | Class | Coated VP15TF | VP20RT | VP30RT | Dimensions (inch) RE | L | W1 | S | BS | Geometry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Inner |  | * SRG40C | G | ★ | ★ | ★ | .787 | 1.417 | .807 | .315 | — |  |
| | | * SRG50C | G | ★ | ★ | ★ | .984 | 1.575 | 1.024 | .335 | — | |
| Outer |  | * SRG40E | G | ★ | ★ | ★ | .787 | 1.260 | .654 | .315 | — |  |
| | | * SRG50E | G | ★ | ★ | ★ | .984 | 1.409 | .787 | .335 | — | |
| Peripheral |  | APMT1604PDER-M2 | M | ● | | | .031 | .650 | .375 | .187 | .055 |  |
| | Strong Cutting Edge Type  | APMT1604PDER-H2 | M | ● | | | .031 | .650 | .375 | .187 | .055 |  |

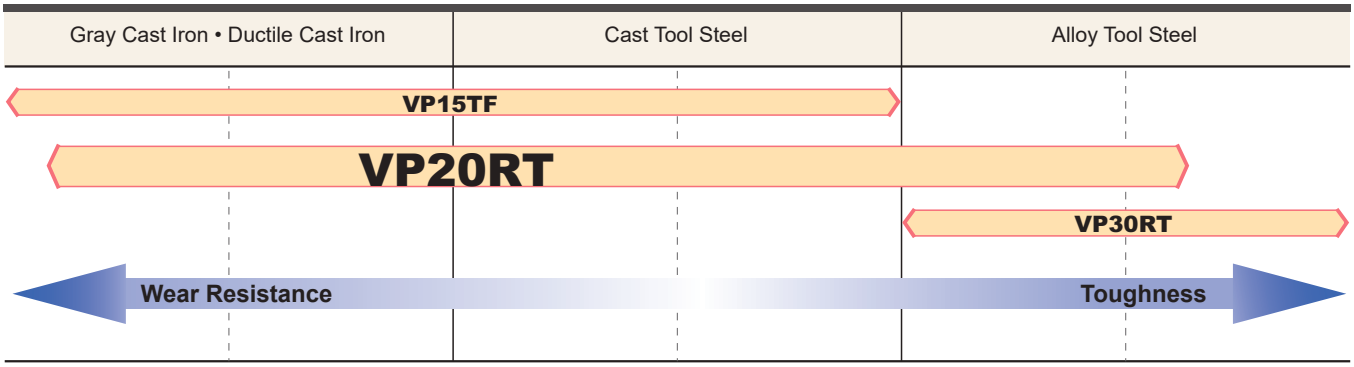
* 2 inserts in one case. ● : Inventory maintained. ★ : Inventory maintained in Japan. <10 inserts in one case>

## RECOMMENDED CUTTING CONDITIONS

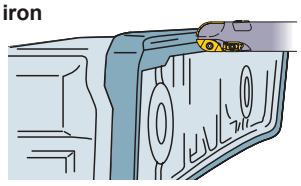
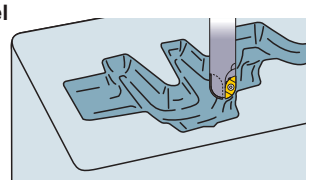
| Cutting Mode | A : Slot Milling | B : Shoulder Milling (Standard Type) | C : Shoulder Milling (Long Cutting Edge Type) |
|---|---|---|---|
| |   |   |   |

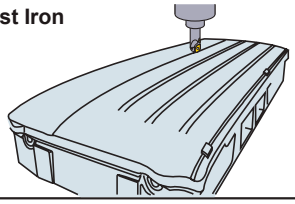
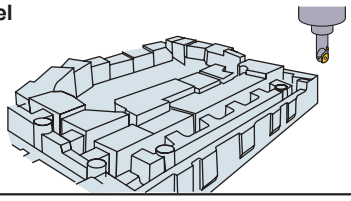
| | Work Material | Hardness | Grade | Cutting Speed (SFM) | Feed per Tooth (IPR) | Cutting Mode |
|---|---|---|---|---|---|---|
| P | Alloy Tool Steel | ≤250HB | **VP20RT VP30RT** | 655 (525—820) | .008 (.004—.012) | A |
| | | | | | .008 (.004—.016) | B |
| | | | | | .012 (.004—.016) | C |
| | Cast Tool Steel | ≤230HB | **VP15TF VP20RT** | 655 (525—985) | .008 (.004—.012) | A |
| | | | | | .012 (.004—.018) | B |
| | | | | | .008 (.004—.016) | C |
| K | Ductile Cast Iron | Tensile Strength ≤540MPa | **VP15TF VP20RT** | 655 (525—985) | .010 (.004—.016) | A |
| | | | | | .010 (.004—.018) | B |
| | | | | | .014 (.004—.018) | C |
| | Gray Cast Iron | Tensile Strength ≤350MPa | **VP15TF VP20RT** | 655 (525—985) | .010 (.004—.016) | A |
| | | | | | .014 (.004—.018) | B |
| | | | | | .010 (.004—.016) | C |

### GRADE APPLICATION GUIDE



## Application Examples

| | Tool | SRM220SAL2 | SRM220SAM2 |
|---|---|---|---|
| | Insert | SRM220C-M, SRM220E-M | SRM220C-M, SRM220E-M |
| | Machine | Horizontal machining center | Double housing planing machining center |
| | Work Piece | **Gray cast iron**  | **Alloy steel**  |
| | Component | Press mold | Forging mold |
| Cutting Conditions | Cutting Speed (SFM) | 540 | 370 |
| | Table Feed (IPM) | 27.5 | 11.8 |
| | Feed per Tooth (IPT) | .009 | .005 |
| | Depth of Cut (inch) | .197-.315 | .197 |
| | Width of Cut (inch) | .197 | .591 |
| | Cutting mode | Air blow | Air blow |
| | Results | Compared to a conventional ball nose end mill, the SRM2 has offered better cutting performance, made smaller cutting noise and lengthen tool life 1.5 fold. | Compared to a conventional ball nose end mill, the SRM2 has offered betting cutting performance, made smaller cutting noise and lengthen tool life 1.3 fold. |

| | Tool | SRM2500WNML | SRM2500WNLS |
|---|---|---|---|
| | Insert | VP15TF | VP20RT |
| | Machine | 2 way machining | Zigzag machining |
| | Work Piece | **Ductile Cast Iron**  | **Die Steel**  |
| | Component | Press mold | Press mold |
| Cutting Conditions | Revolution (min) | 1200 | 1200 |
| | Table Feed (IPM) | 23.6-47.5 | 23.6 |
| | Depth of Cut (inch) | .394-.591 | .197-.787 |
| | Pick Feed (inch) | .276 | .394 |
| | Cutting mode | Dry | Dry |
| | Results | Compared to a conventional product, tool life has become about 1.3 - 2 times longer.<br>Small cutting noise and excellent chip disposal enabled unmanned machining at night. | Compared to a conventional product, tool life has become about 2 time longer.<br>Unmanned machining has been achieved without unexpected insert fracture.<br>Small cutting noise and stable cutting performance. |

# Memo

# MTEC

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- Advanced Face Milling
- Basic Workpiece Materials
- Tool Grades
- Advanced Workpiece Materials

## TRAINING COURSES

Programs are designed for several levels of skill development – from basic understanding to advance manufacturing with digital solutions, complementing to your valued experience in CNC machining environment. Participate in machining demonstrations with Mitsubishi Materials' skilled engineers. Discover methods to reduce setup and cycle time, optimize programs and enhance your knowledge base.

Information on course schedule, course description, and accommodations

## MTECTRAINING.INFO

Follow the QR Code for a virtual facility tour

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## FOR YOUR SAFETY

- Don't handle inserts and chips without gloves.
- Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage.
- Please use safety covers and wear safety glasses.
- When using compounded cutting oils, please take fire precautions.
- When attaching inserts or spare parts, please use only the correct wrench or driver.
- When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

**www.mmc-carbide.com/us**

Tools specifications subject to change without notice.