

ASPX

VIBRATION CONTROL PROVIDES HIGH EFFICIENCY
MACHINING OF TITANIUM ALLOYS

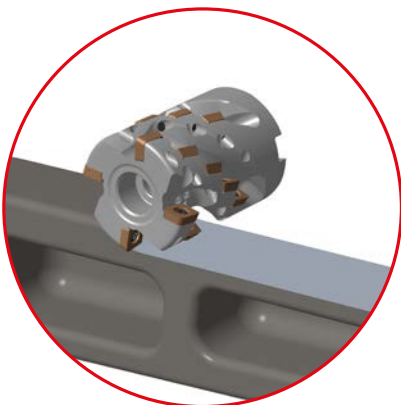
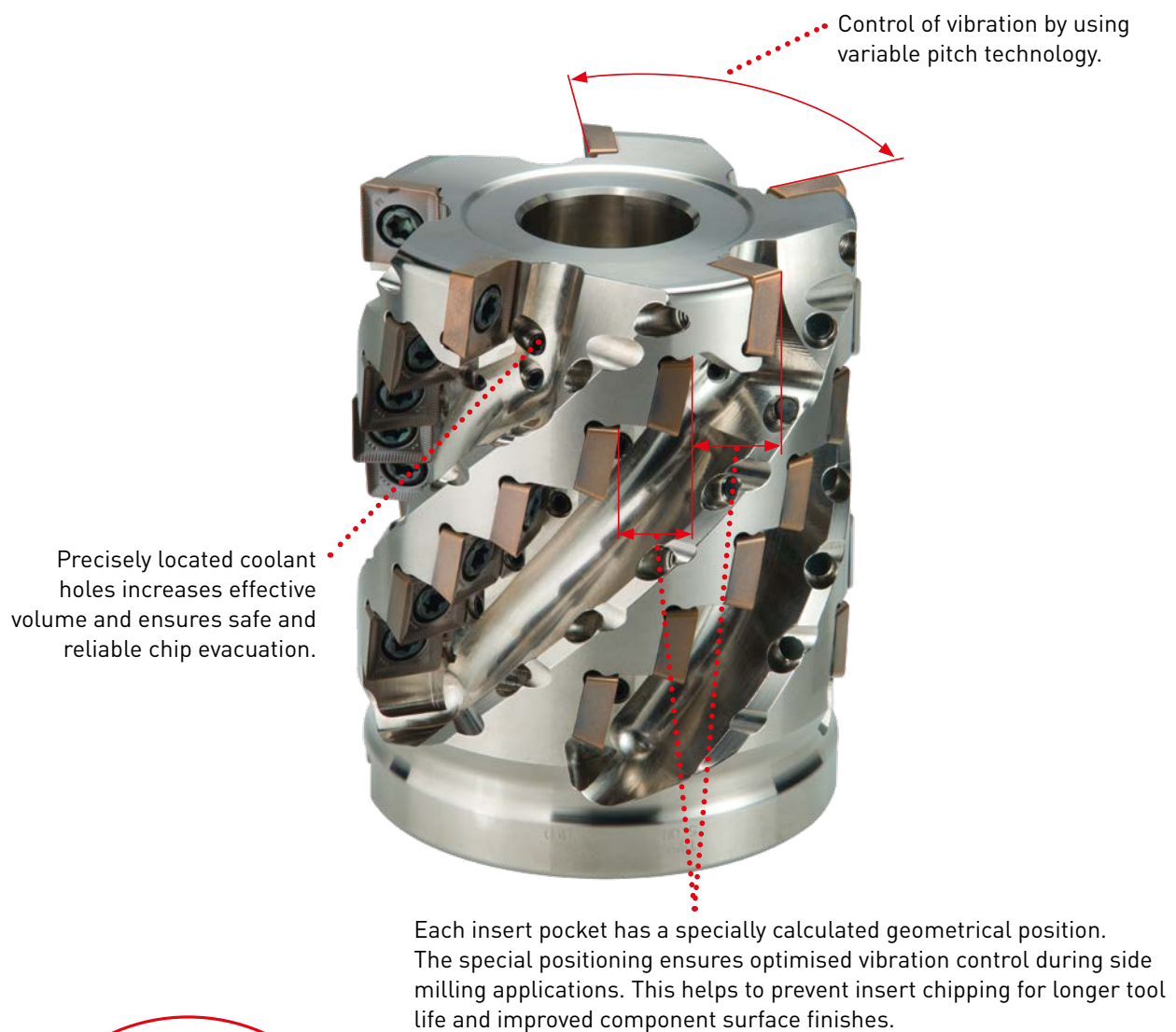


ASPX

FEATURING VIBRATION CONTROL PLUS LOW CUTTING RESISTANCE FOR STABLE, HIGH-EFFICIENCY MACHINING

SUPPRESSION OF REGENERATIVE CHATTER

ASPX leads the latest machining theory by adopting irregular flutes and optimally placed inserts to drastically reduce vibration.



ASPX



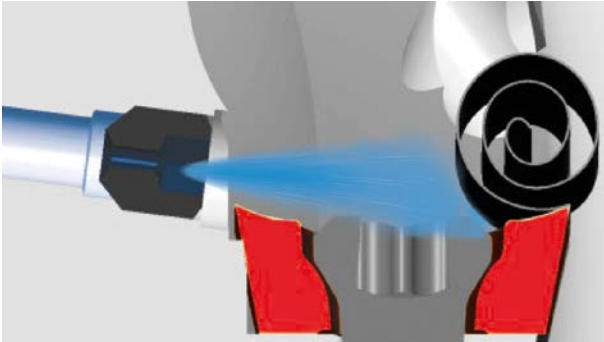
Conventional – Chatter marks

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IMPROVED CHIP DISCHARGE

Coolant applied to the rake face of the cutting edge enables highly efficient chip discharge.

Coolant nozzle



Coolant discharge position



Ideal chip shapes.

REDUCED CUTTING RESISTANCE

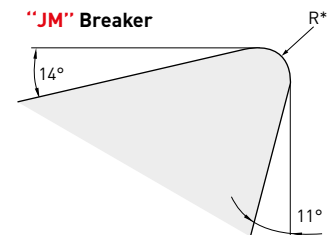
A large rake angle and edge honing that is ideal for titanium machining enhances the low cutting resistance and provides strength to avoid fracturing.



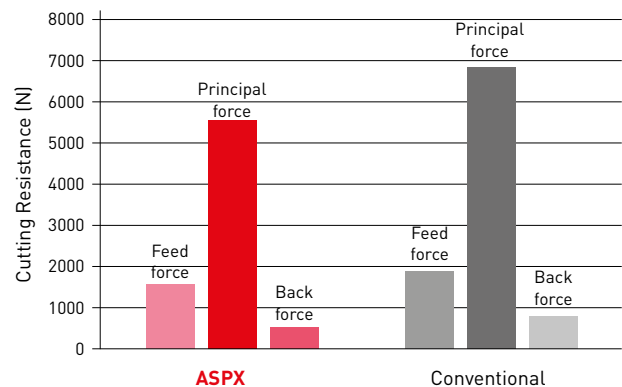
Bottom face insert



Peripheral edge insert



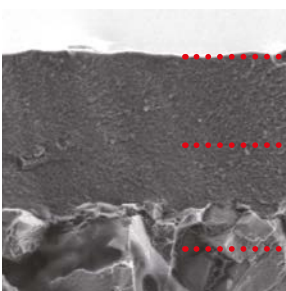
| | |
|------------|-----------|
| Material | Ti-6Al-4V |
| DC (mm) | 80 |
| Vc (m/min) | 60 |
| fz (mm/t.) | 0.15 |
| ap (mm) | 30 |
| ae (mm) | 23.3 |



PVD COATED GRADE FOR DIFFICULT-TO-CUT MATERIALS

MP9140

The combination of a tough cemented carbide material to withstand fracturing, plus a smooth coating with excellent welding resistance, provides stable processing with long tool life.



..... Smooth surface provides excellent welding resistance.

..... The high Al-rich AlTiN coating succeeds in dramatically improving wear and heat resistance.

..... Special tough cemented carbide substrate.

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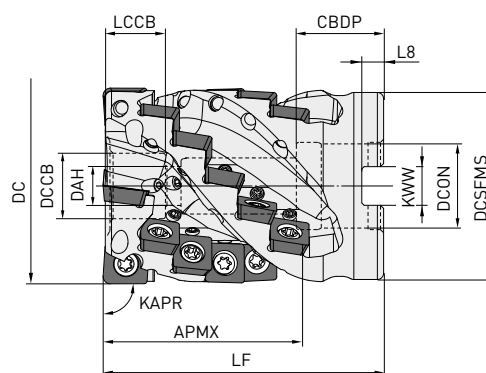


FOR DEEP SHOULDER MILLING OF TITANIUM AND HEAT RESISTANT ALLOYS

S



KAPR: 90°



Right hand tool holder only.

| DCX | Set bolt | Geometry |
|-----|----------|----------|
| Ø50 | HSC10070 | |
| Ø63 | HSC12070 | |
| Ø80 | HSC16080 | |

SHELL TYPE

| Order number | Stock | APMX | DC | DCON | LF | WT | ZNF | ZNP | Bottom face | Peripheral |
|----------------------|-------|------|----|------|-----|-----|-----|-----|-----------------|--------------------|
| ASPX4-050A03A054RA15 | ● | 54 | 50 | 22 | 85 | 0.6 | 3 | 15 | JPGX1404PPER-JM | SPGX1204100PPER-JM |
| ASPX4-063A04A064RA24 | ● | 64 | 63 | 27 | 90 | 1.0 | 4 | 24 | | |
| ASPX4-080A05A075RA35 | ● | 75 | 80 | 32 | 100 | 2.0 | 5 | 35 | | |

With coolant hole: Shell type should be combined with a through coolant arbor.








MOUNTING DIMENSIONS

| Order number | CBDP | DAH | DCCB | DCSFMS | KWW | LCCB | L8 |
|----------------------|------|------|------|--------|------|------|-----|
| ASPX4-050A03A054RA15 | 21 | 10.5 | 17 | 47 | 10.4 | 14 | 6.3 |
| ASPX4-063A04A064RA24 | 28 | 12.5 | 21 | 60 | 12.4 | 19 | 7 |
| ASPX4-080A05A075RA35 | 28 | 16.5 | 27 | 76 | 14.4 | 20 | 8 |

ASPX

SPARE PARTS

| Tool holder type |  |  |  |  |  | |
|------------------|---|---|---|---|---|----------------------|
| | Clamp screw | Seal washer | Wrench | Coolant nozzle | Number | Anti-seize lubricant |
| ASPX4-050A | TS55 | W10-S1 | TKY25D | HSD04004H08 | 18 | MK1KS |
| ASPX4-063A | TS55 | W12-S1 | TKY25D | HSD04004H08 | 28 | MK1KS |
| ASPX4-080A | TS55 | W16-S1 | TKY25D | HSD04004H08 | 40 | MK1KS |

Clamp torque (N • m): TS55 = 5.0

| | ≤ 1 Mpa (≤ 20 l/min) | Standard | ≥ 5 Mpa (≥ 30 l/min) | ≥ 7 Mpa (≥ 50 l/min) | To plug a coolant hole |
|--------------|-------------------------|-------------|-------------------------|-------------------------|------------------------|
| Nozzle Dia | ø 0.6 mm | ø 0.8 mm | ø 1.2 mm | ø 1.6 mm | |
| Order number | HSD04004H06 | HSD04004H08 | HSD04004H12 | HSD04004H16 | HSS04004 |

Coolant nozzles are available with varying diameters for adjusting coolant pressure.

Select the correct nozzle according to the specification.

Use HSS04004 (JIS B 1177 flat point M4x4 screw, clamp torque 1.5 Nm) to plug the coolant hole.

INSERTS

S Heat-resistant alloy, Titanium alloy

Cutting conditions:

●: Stable cutting ●: General cutting ✖: Unstable cutting

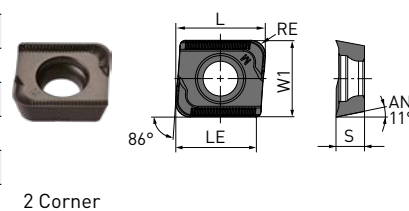
Honing :

E: Round

Order number Class Edge MP9140 L RE LE S IC W1 Shape Geometry

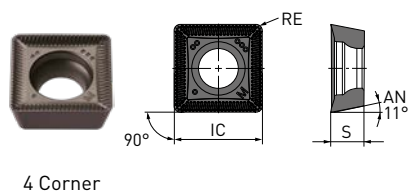
Bottom face

| | | | | | | | | | |
|--------------------|---|---|---|-------|------|------|-----|---|------|
| JPGX1404080PPER-JM | G | E | ● | 15.12 | 0.8 | 13.4 | 4.8 | - | 12.7 |
| JPGX1404120PPER-JM | G | E | ● | 15.06 | 1.2 | 13.3 | 4.8 | - | 12.7 |
| JPGX1404160PPER-JM | G | E | ● | 15.00 | 1.6 | 13.3 | 4.8 | - | 12.7 |
| JPGX1404240PPER-JM | G | E | ● | 14.88 | 2.4 | 13.2 | 4.8 | - | 12.7 |
| JPGX1404320PPER-JM | G | E | ● | 14.72 | 3.2 | 13.1 | 4.8 | - | 12.7 |
| JPGX1404400PPER-JM | G | E | ● | 14.64 | 4.0 | 13.0 | 4.8 | - | 12.7 |
| JPGX1404500PPER-JM | G | E | ● | 14.49 | 5.0 | 13.0 | 4.8 | - | 12.7 |
| JPGX1404635PPER-JM | G | E | ● | 14.29 | 6.35 | 12.9 | 4.8 | - | 12.7 |



Peripheral

| | | | | | | | | | |
|--------------------|---|---|---|---|-----|---|-----|------|---|
| SPGX1204100PPER-JM | G | E | ● | - | 1.0 | - | 4.8 | 12.7 | - |
|--------------------|---|---|---|---|-----|---|-----|------|---|



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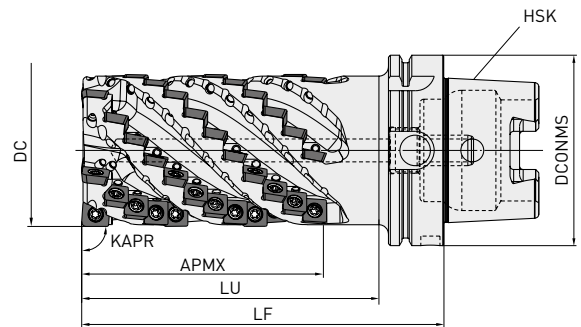


FOR DEEP SHOULDER MILLING OF TITANIUM AND HEAT RESISTANT ALLOYS

S





KAPR: 90°







The standard type is right-handed (R) only.
The HSK shank type has a built-in central coolant pipe.

HSK SHANK TYPE

| Order number | Stock | APMX | DC | ZNF | ZNP | DCONMS | LF | LU | HSK |  |  |
|----------------------|-------|------|----|-----|-----|--------|-----|-----|----------|--|--|
| | R | | | | | | | | | Bottom face | Peripheral |
| ASPX4R0805H100A127SA | ● | 127 | 80 | 5 | 60 | 100 | 190 | 156 | HSK-A100 | JPGX1404 | PPPER-JM |
| ASPX4R0805H125A127SA | ● | 127 | 80 | 5 | 60 | 125 | 190 | 156 | HSK-A125 | SPGX1204 | 100PPER-JM |

SPARE PARTS

| Tool holder type |  |  |  | Number |  | Number of insert | |
|------------------|---|---|---|--------|---|------------------|------|
| | Clamp screw | Wrench | Coolant nozzle | | Anti-seize lubricant | JPGX | SPGX |
| ASPX4R0805H100A | TS55 | TKY25D | HSD04004H08 | 65 | MK1KS | 5 | 55 |
| ASPX4R0805H125A | TS55 | TKY25D | HSD04004H08 | 65 | MK1KS | 5 | 55 |

Clamp torque (N • m): TS55 = 5.0

CUTTING EXAMPLE

TITANIUM ALLOY TI-6AL-4V: ULTRA-HIGH EFFICIENCY MACHINING EXAMPLE

Compared to a conventional tool, productivity has been improved by 30 % and tool life has been doubled.

Tool: Integrated Type HSK-A100

| | |
|------------------|------|
| Vc (m/min) | 75 |
| fz (mm/t.) | 0.12 |
| ap (mm) | 80 |
| ae (mm) | 25 |
| M.R.R. (cm³/min) | 360 |

Cutting time 35 min/workpiece

Conventional

| | |
|------------------|------|
| Vc (m/min) | 55 |
| fz (mm/t.) | 0.12 |
| ap (mm) | 80 |
| ae (mm) | 25 |
| M.R.R. (cm³/min) | 264 |

Cutting time 50 min/workpiece



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RECOMMENDED CUTTING CONDITIONS

| Material | ae | Vc | fz |
|---|----------------------|--------------|--------------------|
| S Ti Alloys (Ti-6Al-4V, Ti-6Al-4V-ELI, Ti-10V-2Fe-3Al, Ti-5Al-5V-5Mo-3Cr etc.) | ae < 0.5 DC | 60 (50 – 80) | 0.12 (0.10 – 0.14) |
| | 0.5 DC < ae < 0.8 DC | 50 (40 – 60) | 0.10 (0.08 – 0.12) |
| | ae > 0.8 DC | 40 (50 – 60) | 0.08 (0.06 – 0.10) |

The cutting performance depends on machine and clamping rigidity, as well as the supply and pressure of the coolant.

Adjust as necessary.

Use a machine and spindle size suitable for heavy machining of titanium alloys. (7/24 taper #50 or #60, or high-rigidity

HSK-A100 or A125, with an output of 15kW or higher and torque of 500 Nm or higher for a rotation speed of 500 rpm or less).

Caution, at high load cutting conditions the output power of the machine spindle may be exceeded.

If chatter and vibration or machine overloading occur, it is recommended to reduce the depth of cut (ap).

The coolant system combines internal and external lubrication, it is recommended to supply coolant in ample quantities.

A gradual roll feed into the workpiece and use of down cutting (climb milling) is recommended. Please refer to page 9.

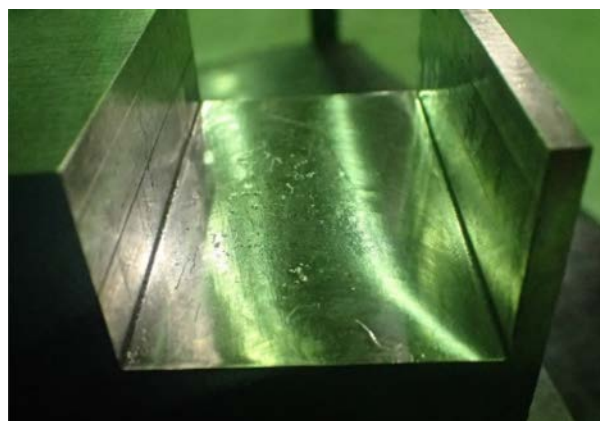
CUTTING PERFORMANCE

HIGH-EFFICIENCY MACHINING OF Ti-6Al-4V

Machined surfaces free of chatter marks can be realised to ensure no effects on the finish machining process.



| Material | Ti-6Al-4V |
|------------------|-----------|
| DC (mm) | 50 |
| Vc (m/min) | 40 |
| fz (mm/t.) | 0.13 |
| ap (mm) | 60 |
| ae (mm) | 15 |
| M.R.R. (cm³/min) | 90 |



| Material | Ti-6Al-4V |
|------------------|-----------|
| DC (mm) | 50 |
| Vc (m/min) | 40 |
| fz (mm/t.) | 0.08 |
| ap (mm) | 30 |
| ae (mm) | 50 |
| M.R.R. (cm³/min) | 92 |

ASPX

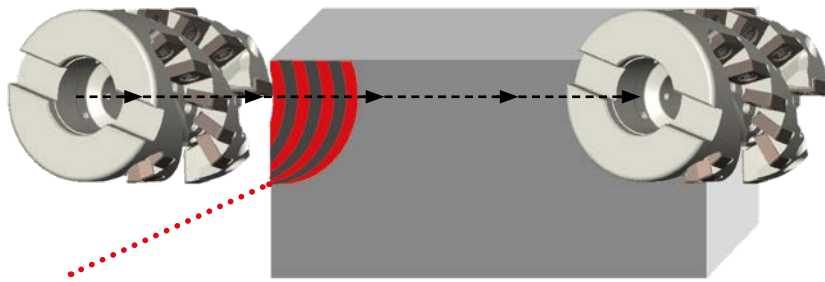
HOW TO USE

POSITIVE EFFECTS OF A ROLL INTO CUTTING APPROACH

The roll into cutting approach can control sharp increases in cutting loads and prevent sudden chipping of inserts that tends to occur at the start of machining.

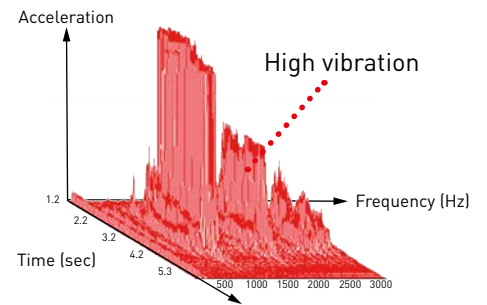
Direct approach method*

Cutting load increases suddenly. High risk of chipping.



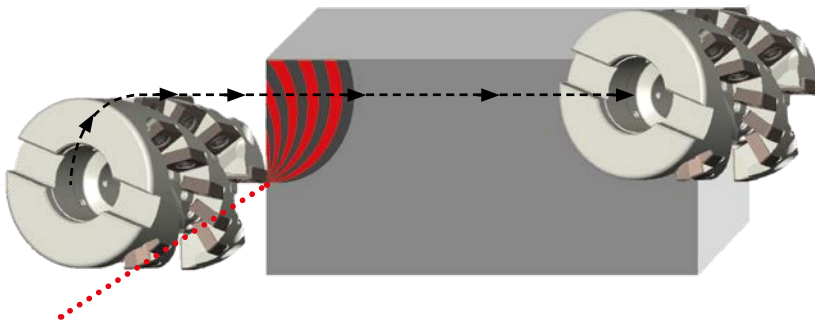
Exit chips are thick.

Image of cutting vibration frequency



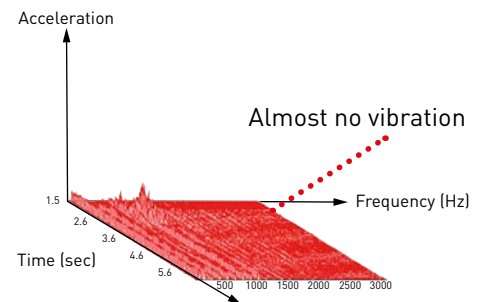
Roll into cutting approach method*

Cutting load increases smoothly.



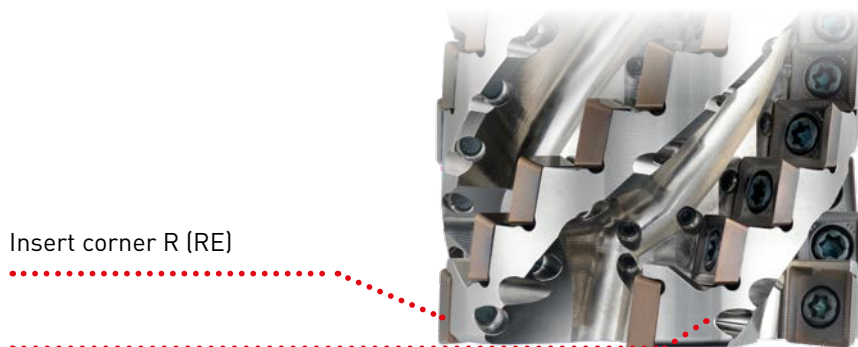
Exit chips have zero thickness.

Down cutting (climb milling) is recommended.



USE OF INSERTS WITH LARGE CORNER RADII

When using inserts with corner radius $R_E \geq R$ 3.2 mm, please machine the cutter body with a radius form as shown on the table below.



Insert corner R (R_E)

Cutter body R

| Insert corner R R_E | Cutter body radius R |
|--------------------------|-------------------------|
| 3.2 | 3.0 |
| 4.0 | 4.0 |
| 5.0 | 5.0 |
| 6.35 | 6.2 |

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