

Indexable Ball-nose End Mill for
Finishing

Indexable Corner Radius End Mill
for Finishing

SRF/SRB
SUF

Series
Expansion

High accuracy indexable end mill

Optimum tool for finish machining

- High accuracy insert positioning and high rigidity clamping.
- Significant reduction in tool costs for finishing.
- New SUF indexable corner radius end mill for finish cutting.
- A new PVD coated carbide grade MP8010 added to the SRF range of indexable ball end mills for finish cutting. Excellent performance when machining hardened steel and cast iron.
- SRF screw-in type now available.
- SUF series expansion $\varnothing 10, 12, 16$ and 32mm .
- SUF series, new inserts and new PVD coated carbide grade MP8010 & MP6120.

Applications Finishing of moulds, Copying curved surfaces

Cutting edge radii R5 , R6 , R8 , R10 , R12.5 , R15 , R16

Features

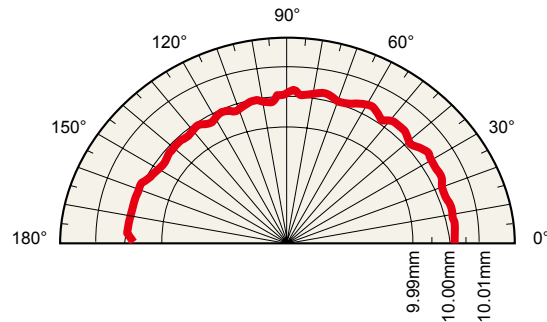
S-shaped end profile

The new S-shaped end profile allows for an edge sharpness similar to solid ball nose end mills.



Accurate radial tolerance

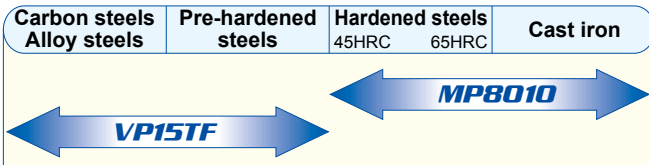
Radius tolerance of $\pm 6\mu\text{m}$ for high accuracy finish machining comparable to solid ball nose end mills.



Insert grades

MIRACLE coated **VP15TF** has a good balance of wear and chipping resistance.

MP8010 demonstrates outstanding cutting performance when machining hardened steel and cast iron.



Wide selection

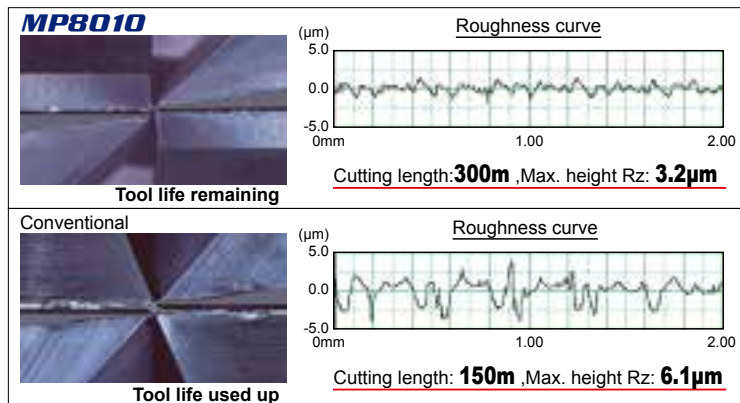
Holders available in 3-styles to suit your application; steel, carbide and screw-in type.

The screw-in type will also allow for interchanging of different tool heads.



Cutting Performance

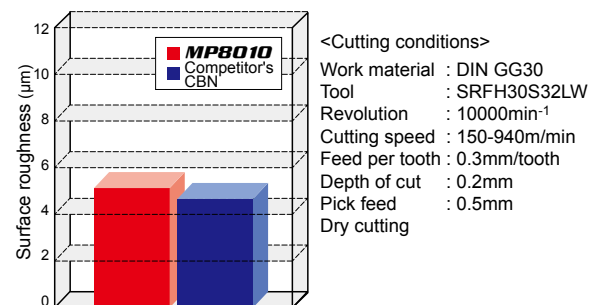
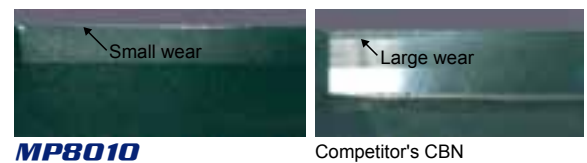
MP8010 gave double tool life and improved surface finishes when compared to a conventional tool.



<Cutting conditions>

Work material : Mould steel (60HRC)	Feed per tooth : 0.2mm/tooth
Tool : SRFH20S25M	Depth of cut : 0.2mm
Revolution : 5220min ⁻¹	Pick feed : 0.2mm
Cutting speed : 80m/min	Dry cutting

MP8010 equaled the performance of CBN during high speed of cutting cast iron.



Indexable Corner Radius End Mill for Finishing

SUF

Applications

Finishing of moulds

Corner R

R0.5 , R1 , R2 , R3

Features

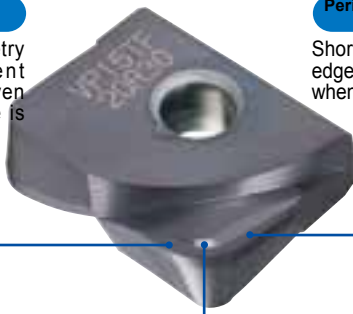
Insert

Wiper edge

Wiper edge geometry provides excellent surface finishes even when the feed rate is increased.

Peripheral cutting edge

Short peripheral cutting edge to reduce vibration when wall machining.

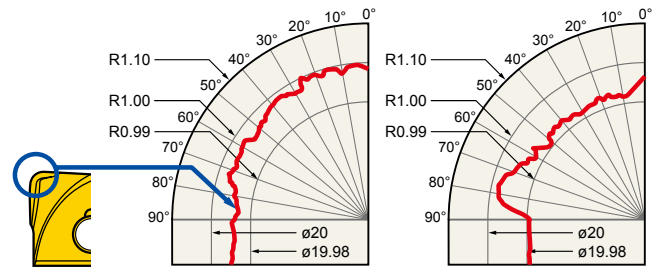


Seamless Gash

The smooth twist in the edge geometry achieves an excellent balance of sharpness and cutting edge strength. Highly accurate seamless grinding of the peripheral cutting edge, corner radii and bottom finishing edge is achieved.

Accurate tolerance

Corner R tolerance : $\pm 0.010\text{mm}$ Cutting edge diameter tolerance : $0 \text{ } -0.020\text{mm}$



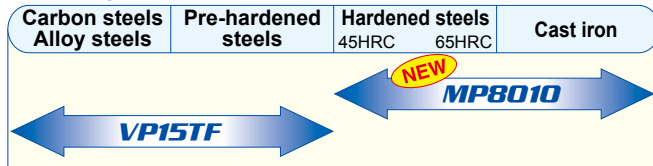
SUF SUFT20R10

Conventional ø20(R1)

Insert grades

MIRACLE coated **VP15TF** has a good balance of wear and chipping resistance.

MP8010 demonstrates outstanding cutting performance when machining hardened steel and cast iron.



Compatibility

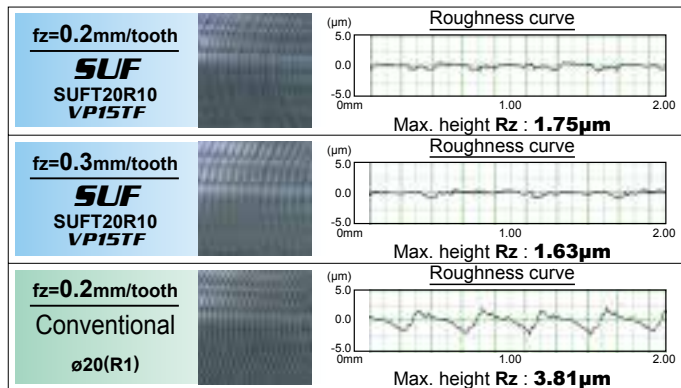
SUF inserts can also be used in the wide range of SRF tool bodies.



Cutting Performance

Accurate and efficient face milling

SUF achieves excellent surface finishes even if the feed per tooth is increased.

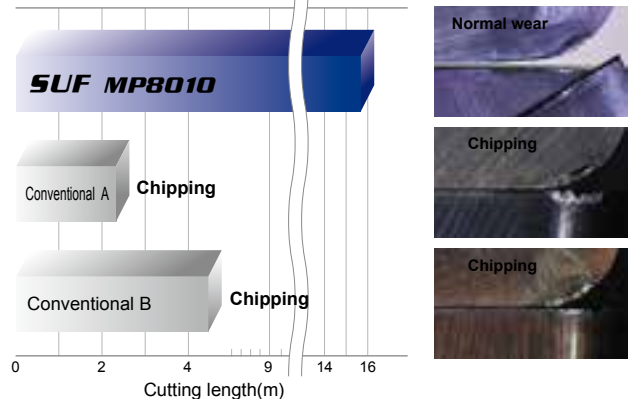


<Cutting conditions>

Work material : DIN Ck55
Tool : SRFH20S25M
Revolution : 3180min⁻¹
Cutting speed : 200m/min
Feed per tooth : 0.2, 0.3mm/tooth
Depth of cut : 0.3mm
Pick feed : 14mm
Dry cutting

Hardened steel milling

MP8010 grade achieved three times tool life compared to a conventional grade.



<Cutting conditions>

Work material : Mould steel (59HRC)
Tool : SRFH20S20L80
Insert : SUFT20R10
Revolution : 1270min⁻¹
Cutting speed : 80m/min
Feed per tooth : 0.2mm/tooth
Depth of cut : 0.2mm
Pick feed : 5mm
Dry cutting

Indexable Ball-nose End Mill for Finishing

SRF/SRB

STEEL SHANK TYPE



Fig.1

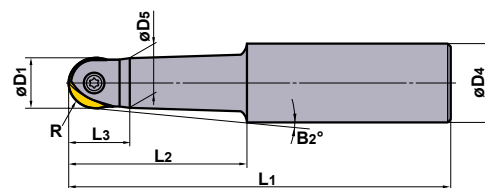


Fig.2

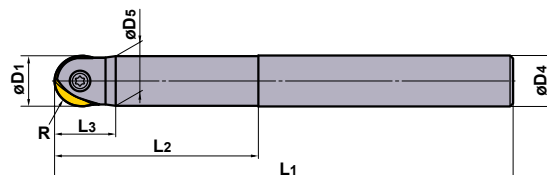
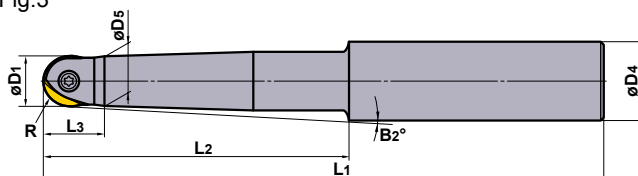


Fig.3



Light Alloy	Cast Iron	Carbon Steel - Alloy Steel	Stainless Steel	Hardened Steel
	➔			➔

Right hand tool holder only.

Type	Order Number	Stock	Number of Teeth	Dimensions (mm)								Type (Fig.)	Right hand tool holder only.		
				R	D1	D4	L1	D5	L2	L3	B2°		Clamp Screw	Wrench	Insert
Standard	SRFH10S12M	●	1	5	10	12	110	9.5	40	13	1°30'	1	RS3008T	①TKY08D	SRFT10 SRBT10
	12S16M	●	1	6	12	16	120	11.5	50	15	1°30'	1	RS3510T	①TKY10D	SRFT12 SRBT12
	16S20M	●	1	8	16	20	130	15.5	50	20	1°30'	1	RS4015T	②TKY15T	SRFT16 SRBT16
	20S25M	●	1	10	20	25	150	19.5	70	24	1°30'	1	RS5020T	②TKY20T	SRFT20 SRBT20
	25S32M	●	1	12.5	25	32	180	24.5	80	30	1°30'	1	RS6025T	②TKY25T	SRFT25 SRBT25
	30S32M	●	1	15	30	32	200	29.5	100	35	—	2	RS8030T	②TKY30T	SRFT30 SRBT30
	32S32M	●	1	16	32	32	200	31.5	100	35	—	2	RS8030T	②TKY30T	SRFT32 SRBT32
Semi-long	SRFH10S12L	●	1	5	10	12	150	9.5	60	13	1°30'	1	RS3008T	①TKY08D	SRFT10 SRBT10
	12S16L	●	1	6	12	16	160	11.5	70	15	1°30'	1	RS3510T	①TKY10D	SRFT12 SRBT12
	16S20L	●	1	8	16	20	160	15.5	70	20	1°30'	1	RS4015T	②TKY15T	SRFT16 SRBT16
	20S25L	●	1	10	20	25	180	19.5	80	24	1°30'	1	RS5020T	②TKY20T	SRFT20 SRBT20
	20S20L80	●	1	10	20	20	180	19.5	80	24	—	2	RS5020T	②TKY20T	SRFT20 SRBT20
	25S32L	★	1	12.5	25	32	200	24.5	100	30	1°30'	1	RS6025T	②TKY25T	SRFT25 SRBT25
	25S25L100	●	1	12.5	25	25	200	24.5	100	30	—	2	RS6025T	②TKY25T	SRFT25 SRBT25
30S32L	★	1	15	30	32	230	29.5	130	35	—	2	RS8030T	②TKY30T	SRFT30 SRBT30	
Long	SRFH20S25E	●	1	10	20	25	220	19.5	120	24	1°30'	3	RS5020T	②TKY20T	SRFT20 SRBT20
	20S20E120	●	1	10	20	20	220	19.5	120	24	—	2	RS5020T	②TKY20T	SRFT20 SRBT20
	25S32E	●	1	12.5	25	32	250	24.5	150	30	1°30'	3	RS6025T	②TKY25T	SRFT25 SRBT25
	25S25E150	●	1	12.5	25	25	250	24.5	150	30	—	2	RS6025T	②TKY25T	SRFT25 SRBT25
	30S32E	●	1	15	30	32	300	29.5	200	35	—	2	RS8030T	②TKY30T	SRFT30 SRBT30
Extra Long	SRFH20S25X	★	1	10	20	25	250	19.5	150	24	1°30'	3	RS5020T	②TKY20T	SRFT20 SRBT20
	25S32X	★	1	12.5	25	32	300	24.5	200	30	1°30'	3	RS6025T	②TKY25T	SRFT25 SRBT25
	30S32X	★	1	15	30	32	350	29.5	250	35	—	2	RS8030T	②TKY30T	SRFT30 SRBT30
	32S32X	★	1	16	32	32	350	31.5	250	35	—	2	RS8030T	②TKY30T	SRFT32 SRBT32

(Note) Ensure inserts are fitted in the correct way. (Refer to page 6.)

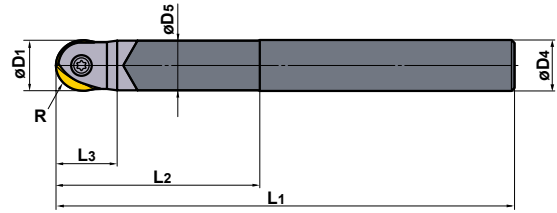
* Clamp Torque (N · m) : RS3008T=1.5, RS3510T=2.5, RS4015T=3.3, RS5020T=5.0, RS6025T=7.5, RS8030T=10.0

● : Inventory maintained. ★ : Inventory maintained in Japan.

CARBIDE SHANK TYPE



Fig.1



Right hand tool holder only.

Type	Order Number	Stock R	Number of Teeth	Dimensions (mm)							Type (Fig.)	*		
				R	D1	D4	L1	D5	L2	L3		Clamp Screw	Wrench	Insert
Standard	SRFH10S10MW	●	1	5	10	10	110	9.5	40	13	1	RS3008T	①TKY08D	SRFT10 SRBT10
	12S12MW	●	1	6	12	12	120	11.5	50	15	1	RS3510T	①TKY10D	SRFT12 SRBT12
	16S16MW	●	1	8	16	16	130	15.5	50	20	1	RS4015T	②TKY15T	SRFT16 SRBT16
	20S20MW	●	1	10	20	20	180	19.5	80	24	1	RS5020T	②TKY20T	SRFT20 SRBT20
	25S25MW	●	1	12.5	25	25	200	24.5	100	30	1	RS6025T	②TKY25T	SRFT25 SRBT25
	30S32MW	★	1	15	30	32	230	29.5	130	35	1	RS8030T	②TKY30T	SRFT30 SRBT30
			16	32	32	231	29.5	131	36	SRFT32 SRBT32				
Long	SRFH10S10LW	●	1	5	10	10	150	9.5	60	13	1	RS3008T	①TKY08D	SRFT10 SRBT10
	12S12LW	●	1	6	12	12	160	11.5	70	15	1	RS3510T	①TKY10D	SRFT12 SRBT12
	16S16LW	●	1	8	16	16	160	15.5	70	20	1	RS4015T	②TKY15T	SRFT16 SRBT16
	16S16EW	●	1	8	16	16	200	15.5	110	20	1	RS4015T	②TKY15T	SRFT16 SRBT16
	20S20LW	●	1	10	20	20	250	19.5	150	24	1	RS5020T	②TKY20T	SRFT20 SRBT20
	25S25LW	★	1	12.5	25	25	300	24.5	200	30	1	RS6025T	②TKY25T	SRFT25 SRBT25
	30S32LW	★	1	15	30	32	350	29.5	250	35	1	RS8030T	②TKY30T	SRFT30 SRBT30
			16	32	32	351	29.5	251	36	SRFT32 SRBT32				

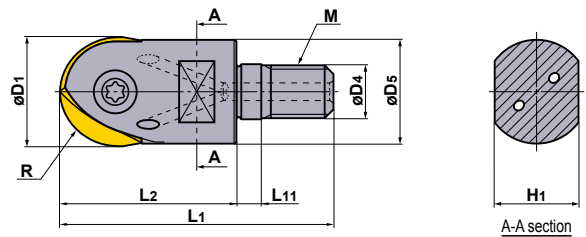
(Note 1) SRFH30S32MW and SRFH30S32LW tool body can use both inserts SRFT30 and SRFT32.

However, the overall length size L1 is different respectively.

(Note 2) Ensure inserts are fitted in the correct way. (Refer to page 6.)

* Clamp Torque (N · m) : RS3008T=1.5, RS3510T=2.5, RS4015T=3.3, RS5020T=5.0, RS6025T=7.5, RS8030T=10.0

SCREW-IN TYPE



Right hand tool holder only.

Order Number	Stock R	Coolant Hole	Number of Teeth	Dimensions (mm)										Tool Weight (kg)	*		
				R	D1	D4	D5	L1	L2	L11	H1	M	Clamp Screw		Wrench	Insert	
SRFH16AM0830	●	○	1	8	16	8.5	14.9	48	30	6	10	8	0.1	RS4015T	TKY15T	SRFT16 SRBT16	
20AM1035	●	○	1	10	20	10.5	18.4	54	35	6	14	10	0.1	RS5020T	TKY20T	SRFT20 SRBT20	
25AM1240	●	○	1	12.5	25	12.5	23.5	62	40	6	19	12	0.1	RS6025T	TKY25T	SRFT25 SRBT25	
30AM1645	●	○	1	15	30	17	28.1	68	45	6	24	16	0.2	RS8030T	TKY30T	SRFT30 SRBT30	
				16	32	17	28.1	69	46	6	24	16	0.2			SRFT32 SRBT32	


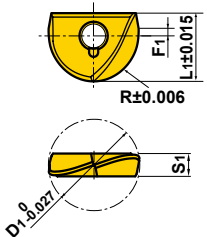

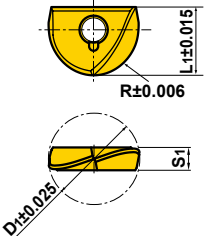
(Note 1) SRFH30AM1645 tool body can use both inserts SRFT30 and SRFT32.

However, the overall length size L1 is different respectively.

(Note 2) For screw-in type arbors, refer to page 11.

* Clamp Torque (N · m) : RS4015T=3.3, RS5020T=5.0, RS6025T=7.5, RS8030T=10.0

INSERTS

Shape	Order Number	Coated			Dimensions (mm)					Geometry
		MP6120	VP15TF	MP8010	D1	R	L1	F1	S1	
	SRFT10	●	●	●	10	5	8.5	0.5	2.6	
	12	●	●	●	12	6	10	0.5	3	
	16	●	●	●	16	8	12	1	4	
	20	●	●	●	20	10	15	1	5	
	25	●	●	●	25	12.5	18.5	1	6	
	30	●	●	●	30	15	22.5	1	7	
	32	●	●	●	32	16	23.5	1	7	
	SRBT10	●			10	5	8.5	0.5	2.6	
	12	●			12	6	10	0.5	3	
	16	●			16	8	12	1	4	
	20	●			20	10	15	1	5	
	25	●			25	12.5	18.5	1	6	
	30	●			30	15	22.5	1	7	
	32	●			32	16	23.5	1	7	

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed vc (m/min)	Feed per Tooth fz (mm/tooth)	Depth of Cut ap (mm)
P	Carbon Steel Alloy Steel	180–280HB	EP6120 VP15TF	200 (80–300)	0.2 (0.1–0.3)	≤0.05D1
	Pre-Hardened Steel	≤45HRC	EP6120 VP15TF	150 (80–200)	0.2 (0.1–0.3)	≤0.05D1
	Alloy Tool Steel	180–380HB	EP6120 VP15TF	150 (80–200)	0.2 (0.1–0.3)	≤0.05D1
K	Gray Cast Iron	Tensile Strength ≤350MPa	MP8010	250 (180–450)	0.2 (0.1–0.3)	≤0.05D1
	Ductile Cast Iron	Tensile Strength ≤800MPa	MP8010	200 (80–300)	0.2 (0.1–0.3)	≤0.05D1
H	Hardened Steel	45–55HRC	MP8010	100 (60–120)	0.2 (0.1–0.3)	≤0.05D1
	Hardened Steel	55–65HRC	MP8010	80 (60–120)	0.2 (0.1–0.3)	≤0.01D1

(Note 1) The above values are average condition values at actual cutting speeds. The values change slightly according to the state of a machine to be used and method of workholding. Adjust the values depending on an actual machine condition, referring to the above values.

(Note 2) For end mills with a carbide shank, you will be able to set about 20 percent higher cutting conditions.

(Note 3) Please note the following when machining hardened steel with MP8010.

- Shorten tool overhang as much as possible.
- Use a carbide shank type.
- Depth of cut setting is important to prevent fracture.

CUTTING SPEED FORMULAE

1. Employing θ° ➔ Calculate cutting speed at point P.
(Cutting speed at the cutting depth border for oblique machining)

$$\text{Formula : Cutting Speed} = \frac{\pi \cdot D_1 \cdot \sin \theta \cdot n}{1000} \text{ (m/min)}$$

$$\theta^\circ = \cos^{-1} \left(\frac{D_1 - 2ap}{D_1} \right) + 90 - \alpha$$

n : Spindle Speed (min^{-1})

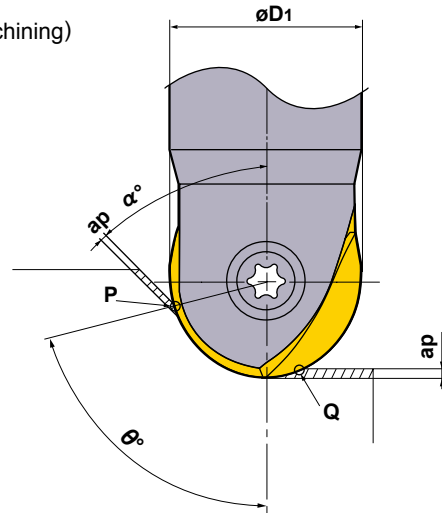
2. Employing ap ➔ Calculate cutting speed at point Q.
(Cutting speed at the cutting depth border)

$$\text{Formula : Cutting Speed} = \frac{2\pi n \sqrt{ap(D_1 - ap)}}{1000} \text{ (m/min)}$$

n : Spindle Speed (min^{-1})

D1 : Cutting Edge Diameter (mm)

ap : Depth of Cut (mm)



FITTING INSERTS ON HOLDERS

1. Clean the insert seat

Thoroughly clean the insert and seat in the holder body.

2. Fitting the insert

Place the concave mark on the insert uppermost as shown with the clamp screw inserted from above (only SRF type inserts). Fasten the clamp screw while firmly pressing the insert against the insert seat wall. Use of a special anti seize lubricant MK1KS is recommended. Tighten within the recommended torque range.



Indexable Corner Radius End Mill for Finishing

SUF

STEEL SHANK TYPE

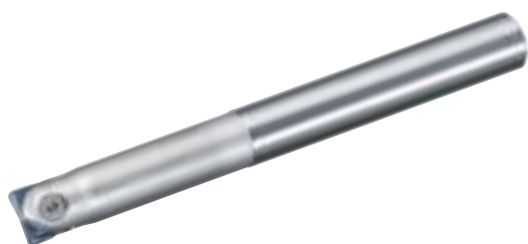


Fig.1

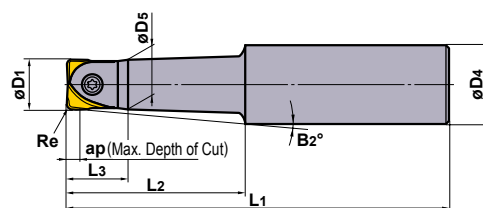


Fig.2

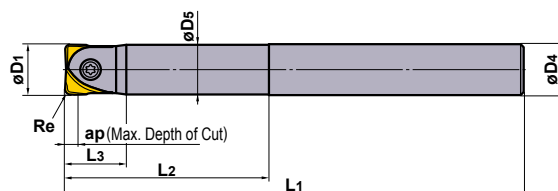
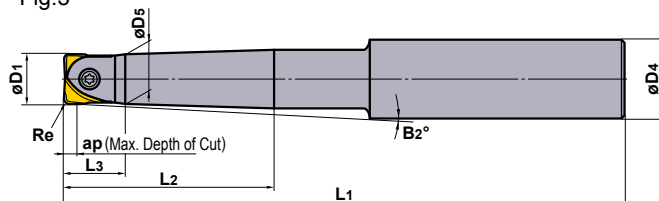


Fig.3



Right hand tool holder only.

Light Alloy	Cast Iron	Carbon Steel - Alloy Steel	Stainless Steel	Hardened Steel
	➔			

Type	Order Number	Stock	Number of Teeth	Dimensions (mm)							Type (Fig.)	* ① ②		
				D1	D4	L1	D5	L2	L3	B2°		Clamp Screw	Wrench	Insert
Standard	NEW SRFH10S12M	●	1	10	12	110	9.5	40	13	1°30'	1	RS3008T	①TKY08D	SUFT10R○○
	NEW 12S16M	●	1	12	16	120	11.5	50	15	1°30'	1	RS3510T	①TKY10D	SUFT12R○○
	NEW 16S20M	●	1	16	20	130	15.5	50	20	1°30'	1	RS4015T	②TKY15T	SUFT16R○○
	20S25M	●	1	20	25	150	19.5	70	24	1°30'	1	RS5020T	②TKY20T	SUFT20R○○
	25S32M	●	1	25	32	180	24.5	80	30	1°30'	1	RS6025T	②TKY25T	SUFT25R○○
	30S32M	●	1	30	32	200	29.5	100	35	—	2	RS8030T	②TKY30T	SUFT30R○○
	NEW 32S32M	●	1	32	32	200	31.5	100	35	—	2	RS8030T	②TKY30T	SUFT32R○○
Semi-long	NEW SRFH10S12L	●	1	10	12	150	9.5	60	13	1°30'	1	RS3008T	①TKY08D	SUFT10R○○
	NEW 12S16L	●	1	12	16	160	11.5	70	15	1°30'	1	RS3510T	①TKY10D	SUFT12R○○
	NEW 16S20L	●	1	16	20	160	15.5	70	20	1°30'	1	RS4015T	②TKY15T	SUFT16R○○
	20S25L	●	1	20	25	180	19.5	80	24	1°30'	1	RS5020T	②TKY20T	SUFT20R○○
	20S20L80	●	1	20	20	180	19.5	80	24	—	2	RS5020T	②TKY20T	SUFT20R○○
	25S32L	★	1	25	32	200	24.5	100	30	1°30'	1	RS6025T	②TKY25T	SUFT25R○○
	25S25L100	●	1	25	25	200	24.5	100	30	—	2	RS6025T	②TKY25T	SUFT25R○○
30S32L	★	1	30	32	230	29.5	130	35	—	2	RS8030T	②TKY30T	SUFT30R○○	
Long	SRFH20S25E	●	1	20	25	220	19.5	120	24	1°30'	3	RS5020T	②TKY20T	SUFT20R○○
	20S20E120	●	1	20	20	220	19.5	120	24	—	2	RS5020T	②TKY20T	SUFT20R○○
	25S32E	●	1	25	32	250	24.5	150	30	1°30'	3	RS6025T	②TKY25T	SUFT25R○○
	25S25E150	●	1	25	25	250	24.5	150	30	—	2	RS6025T	②TKY25T	SUFT25R○○
	30S32E	●	1	30	32	300	29.5	200	35	—	2	RS8030T	②TKY30T	SUFT30R○○
Extra Long	SRFH20S25X	★	1	20	25	250	19.5	150	24	1°30'	3	RS5020T	②TKY20T	SUFT20R○○
	25S32X	★	1	25	32	300	24.5	200	30	1°30'	3	RS6025T	②TKY25T	SUFT25R○○
	30S32X	★	1	30	32	350	29.5	250	35	—	2	RS8030T	②TKY30T	SUFT30R○○
	NEW 32S32X	★	1	32	32	350	31.5	250	35	—	2	RS8030T	②TKY30T	SUFT32R○○

(Note) Ensure inserts are fitted in the correct way. (Refer to page 9.)

* Clamp Torque (N · m) : RS3008T=1.5, RS3510T=2.5, RS4015T=3.3, RS5020T=5.0, RS6025T=7.5, RS8030T=10.0

● : Inventory maintained. ★ : Inventory maintained in Japan.

CARBIDE SHANK TYPE

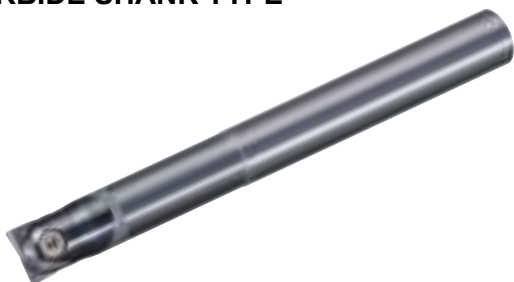
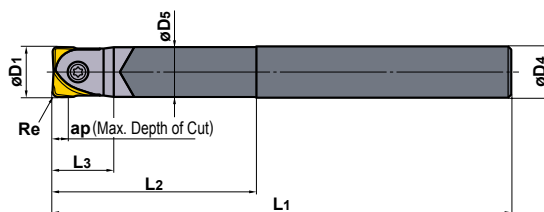


Fig.1



Right hand tool holder only.

Type	Order Number	Stock	Number of Teeth	Dimensions (mm)						Type (Fig.)	Tools		
				D1	D4	L1	D5	L2	L3		Clamp Screw	Wrench	Insert
Standard	NEW SRFH10S10MW	●	1	10	10	110	9.5	40	13	1	RS3008T	①TKY08D	SUFT10R
	NEW 12S12MW	●	1	12	12	120	11.5	50	15	1	RS3510T	①TKY10D	SUFT12R
	NEW 16S16MW	●	1	16	16	130	15.5	50	20	1	RS4015T	②TKY15T	SUFT16R
	20S20MW	●	1	20	20	180	19.5	80	24	1	RS5020T	②TKY20T	SUFT20R
	25S25MW	●	1	25	25	200	24.5	100	30	1	RS6025T	②TKY25T	SUFT25R
	30S32MW	★	1	30	32	230	29.5	130	35	1	RS8030T	②TKY30T	SUFT30R
			32	32	231	29.5	131	36	SUFT32R				
Long	NEW SRFH10S10LW	●	1	10	10	150	9.5	60	13	1	RS3008T	①TKY08D	SUFT10R
	NEW 12S12LW	●	1	12	12	160	11.5	70	15	1	RS3510T	①TKY10D	SUFT12R
	NEW 16S16LW	●	1	16	16	160	15.5	70	20	1	RS4015T	②TKY15T	SUFT16R
	NEW 16S16EW	●	1	16	16	200	15.5	70	20	1	RS4015T	②TKY15T	SUFT16R
	20S20LW	●	1	20	20	250	19.5	150	24	1	RS5020T	②TKY20T	SUFT20R
	25S25LW	★	1	25	25	300	24.5	200	30	1	RS6025T	②TKY25T	SUFT25R
	30S32LW	★	1	30	32	350	29.5	250	35	1	RS8030T	②TKY30T	SUFT30R
			32	32	351	29.5	251	36	SUFT32R				

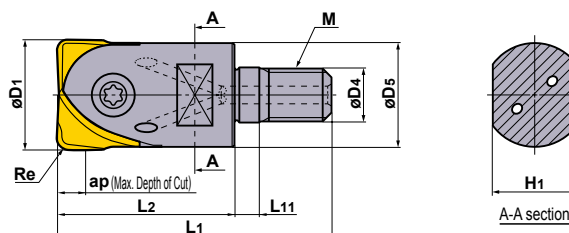
(Note 1) SRFH30S32MW and SRFH30S32LW tool body can use both inserts SUFT30R and SUFT32R.

However, the overall length size L1 is different respectively.

(Note 2) Ensure inserts are fitted in the correct way. (Refer to page 9.)

* Clamp Torque (N · m) : RS3008T=1.5, RS3510T=2.5, RS4015T=3.3, RS5020T=5.0, RS6025T=7.5, RS8030T=10.0

SCREW-IN TYPE



Right hand tool holder only.

Order Number	Stock	Coolant Hole	Number of Teeth	Dimensions (mm)								Type (Fig.)	Tools		
				D1	D4	D5	L1	L2	L11	H1	M		Clamp Screw	Wrench	Insert
NEW SRFH16AM0830	●	○	1	16	8.5	14.9	48	30	6	10	8	0.1	RS4015T	TKY15T	SUFT16R
20AM1035	●	○	1	20	10.5	18.4	54	35	6	14	10	0.1	RS5020T	TKY20T	SUFT20R
25AM1240	●	○	1	25	12.5	23.5	62	40	6	19	12	0.1	RS6025T	TKY25T	SUFT25R
30AM1645	●	○	1	30	17	28.1	68	45	6	24	16	0.2	RS8030T	TKY30T	SUFT30R
				32	17	28.1	69	46	6	24	16				SUFT32R

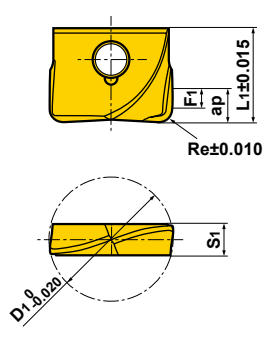
(Note 1) SRFH30AM1645 tool body can use both inserts SUFT30R and SUFT32R.

However, the overall length size L1 is different respectively.

(Note 2) For screw-in type arbors, refer to page 11.

* Clamp Torque (N · m) : RS4015T=3.3, RS5020T=5.0, RS6025T=7.5, RS8030T=10.0

INSERTS

Shape	Order Number	Coated			Dimensions (mm)						Geometry
		MP8010	VP15TF		D1	Re	F1	ap	L1	S1	
	NEW SUFT10R05	●	●		10	0.5	1	1.5	8.5	2.6	
	NEW 10R10	●	●		10	1	1	2	8.5	2.6	
	NEW 10R20	●	●		10	2	1	3	8.5	2.6	
	NEW 12R05	●	●		12	0.5	1.2	1.7	10	3	
	NEW 12R10	●	●		12	1	1.2	2.2	10	3	
	NEW 12R20	●	●		12	2	1.2	3.2	10	3	
	NEW 12R30	●	●		12	3	1.2	4.2	10	3	
	NEW 16R05	●	●		16	0.5	1.6	2.1	12	4	
	NEW 16R10	●	●		16	1	1.6	2.6	12	4	
	NEW 16R15	●	●		16	1.5	1.6	3.1	12	4	
	NEW 16R20	●	●		16	2	1.6	3.6	12	4	
	NEW 16R30	●	●		16	3	1.6	4.6	12	4	
	20R05	●	●		20	0.5	2	2.5	15	5	
	20R10	●	●		20	1	2	3	15	5	
	NEW 20R15	●	●		20	1.5	2	3.5	15	5	
	20R20	●	●		20	2	2	4	15	5	
	20R30	●	●		20	3	2	5	15	5	
	25R05	●	●		25	0.5	2.5	3	18.5	6	
	25R10	●	●		25	1	2.5	3.5	18.5	6	
	25R20	●	●		25	2	2.5	4.5	18.5	6	
	25R30	●	●		25	3	2.5	5.5	18.5	6	
	30R05	●	●		30	0.5	3	3.5	22.5	7	
	30R10	●	●		30	1	3	4	22.5	7	
	30R20	●	●		30	2	3	5	22.5	7	
	30R30	●	●		30	3	3	6	22.5	7	
	NEW 32R05	●	●		32	0.5	3.2	3.7	23.5	7	
	NEW 32R10	●	●		32	1	3.2	4.2	23.5	7	
	NEW 32R20	●	●		32	2	3.2	5.2	23.5	7	



FITTING INSERTS ON HOLDERS

1. Clean the insert seat

Thoroughly clean the insert and seat in the holder body.

2. Fitting the insert

Place the concave mark on the insert uppermost as shown with the clamp screw inserted from above (only SUF type inserts). Fasten the clamp screw while firmly pressing the insert against the insert seat wall. Use of a special anti seize lubricant MK1KS is recommended. Tighten within the recommended torque range.



RECOMMENDED CUTTING CONDITIONS

SHOULDER MILLING (Small width of cut. *)

	Work Material	Hardness	Grade	Cutting Speed vc (m/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	Feed per Tooth fz (mm/tooth)
P	Carbon Steel Alloy Steel	180–280HB	VP15TF	200 (80–300)	≤0.05D ₁	≤0.05D ₁	0.2 (≤0.4)
	Pre-Hardened Steel	≤45HRC	VP15TF	150 (80–200)	≤0.05D ₁	≤0.05D ₁	0.15 (≤0.3)
	Alloy Tool Steel	180–380HB	VP15TF	150 (80–200)	≤0.05D ₁	≤0.05D ₁	0.15 (≤0.3)
M	Stainless Steel	≤270HB	VP15TF	150 (100–200)	≤0.05D ₁	≤0.05D ₁	0.2 (≤0.4)
K	Gray Cast Iron	Tensile Strength ≤350MPa	MP8010	250 (180–450)	≤0.05D ₁	≤0.05D ₁	0.3 (≤0.4)
	Ductile Cast Iron	Tensile Strength ≤350MPa	MP8010	200 (80–300)	≤0.05D ₁	≤0.1D ₁	0.3 (≤0.4)
H	Hardened Steel	45–55HRC	MP8010	100 (80–120)	≤0.05D ₁	≤0.02D ₁	0.1 (≤0.2)
	Hardened Steel	55–65HRC	MP8010	80 (60–100)	≤0.05D ₁	≤0.02D ₁	0.1 (≤0.2)

* When the pick feed direction is along the axis of the tool such as finish machining at the wall part.

SLOTting•SHOULDER MILLING (Large width of cut. *)

	Work Material	Hardness	Grade	Cutting Speed vc (m/min)	Depth of Cut ap (mm)	Cutting Width ae (mm)	Feed per Tooth fz (mm/tooth)
P	Carbon Steel Alloy Steel	180–280HB	VP15TF	200 (80–300)	≤0.02D ₁	≤D ₁	0.2 (≤0.4)
	Pre-Hardened Steel	≤45HRC	VP15TF	150 (80–200)	≤0.02D ₁	≤D ₁	0.15 (≤0.3)
	Alloy Tool Steel	180–380HB	VP15TF	150 (80–200)	≤0.02D ₁	≤D ₁	0.15 (≤0.3)
M	Stainless Steel	≤270HB	VP15TF	150 (100–200)	≤0.02D ₁	≤D ₁	0.2 (≤0.4)
K	Gray Cast Iron	Tensile Strength ≤350MPa	MP8010	250 (180–450)	≤0.03D ₁	≤D ₁	0.3 (≤0.4)
	Ductile Cast Iron	Tensile Strength ≤350MPa	MP8010	200 (80–300)	≤0.03D ₁	≤D ₁	0.3 (≤0.4)
H	Hardened Steel	45–55HRC	MP8010	100 (80–120)	≤0.01D ₁	≤D ₁	0.1 (≤0.2)
	Hardened Steel	55–65HRC	MP8010	70 (60–80)	≤0.01D ₁	≤D ₁	0.1 (≤0.2)

* When the feed is in the radial axis of the tool. E.g. machining a side wall.

(Note 1) Cutting conditions are for a standard steel shank type. If vibration or chipping of the insert occurs, reduce the cutting conditions appropriately.

(Note 2) Cutting speed is calculated at the peripheral edge of the tool. Calculate spindle speed in the following way.

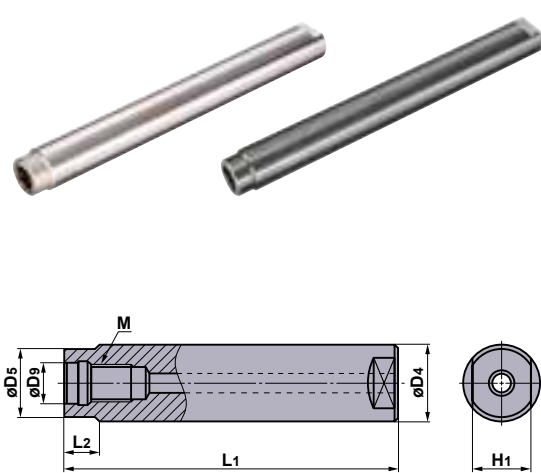
$$\text{Spindle speed } n(\text{min}^{-1}) = 1000 \times \text{Cutting speed } vc \div \text{Diameter of cutting tool } D_1 \div 3.14$$

(Note 3) Please note the following when machining hardened steel with MP8010.

- Shorten tool overhang as much as possible.
- Use a carbide shank type.
- Depth of cut setting is important to prevent fracture.

ARBORS

STRAIGHT SHANK ARBOR

Type	Order Number	Stock	Dimensions (mm)						
			D9	D4	D5	L1	L2	H1	M
									
STEEL SHANK TYPE	SC16M08S100S	★	8.5	16	14.5	100	10	10	M8
	08S200L	★	8.5	16	14.5	200	10	10	M8
	SC20M10S120S	★	10.5	20	18.5	120	10	14	M10
	10S220L	★	10.5	20	18.5	220	10	14	M10
	SC25M12S125S	★	12.5	25	23.5	125	10	19	M12
	12S245L	★	12.5	25	23.5	245	10	19	M12
CARBIDE SHANK TYPE	SC32M16S140S	★	17	32	28.5	140	15	24	M16
	16S280L	★	17	32	28.5	280	15	24	M16
	SC16M08S100SW	★	8.5	16	14.5	100	10	10	M8
	08S200LW	★	8.5	16	14.5	200	10	10	M8
	SC20M10S120SW	★	10.5	20	18.5	120	10	14	M10
	10S220LW	★	10.5	20	18.5	220	10	14	M10
	SC25M12S125SW	★	12.5	25	23.5	125	10	19	M12
	12S245LW	★	12.5	25	23.5	245	10	19	M12
	SC32M16S140SW	★	17	32	28.5	140	15	24	M16
	16S280LW	★	17	32	28.5	280	15	24	M16

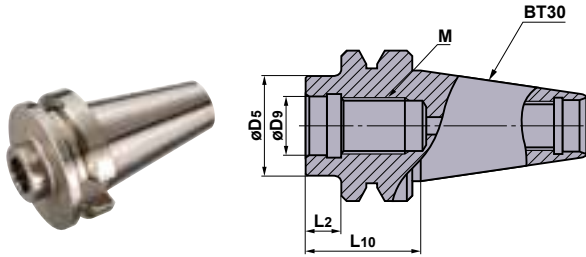
HOW TO INSTALL THE SCREW-IN HEAD

- ① Thoroughly clean the clamp section of the head and the arbor with an air blower or brush before installation.
- ② Tighten the head at the recommended torque and ensure that there is no gap between the head and arbor.

Screw Size	Recommended Torque (N · m)	Wrench Size (mm)
M8	23	10
M10	46	14
M12	80	19
M16	90	24

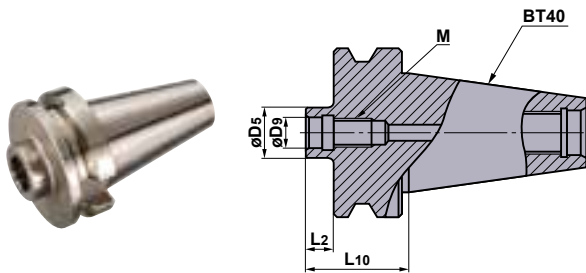
- Cutting tools become extremely hot during cutting. Never touch them with bare hands after operation as this may produce risk of injuries or burns.
- Do not handle the cutting tools with bare hands as this may cause injuries.

BT30 SHANK ARBOR



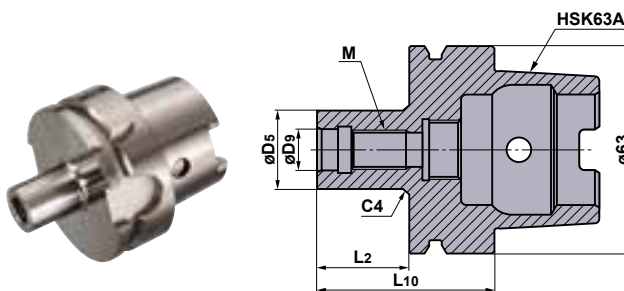
Order Number	Stock	Dimensions (mm)				
		D9	D5	L10	L2	M
SC16M08S10-BT30	★	8.5	14.5	32	10	M8
20M10S10-BT30	★	10.5	18.5	32	10	M10
25M12S10-BT30	★	12.5	23.5	32	10	M12
32M16S10-BT30	★	17.0	28.5	32	10	M16

BT40 SHANK ARBOR



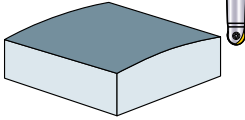
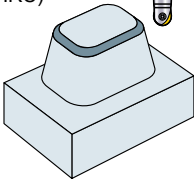

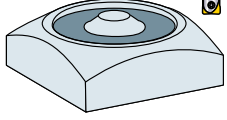
Order Number	Stock	Dimensions (mm)				
		D9	D5	L10	L2	M
SC16M08S10-BT40	★	8.5	14.5	37	10	M8
20M10S10-BT40	★	10.5	18.5	37	10	M10
25M12S10-BT40	★	12.5	23.5	37	10	M12
32M16S10-BT40	★	17.0	28.5	37	10	M16

HSK63A SHANK ARBOR



Order Number	Stock	Dimensions (mm)				
		D9	D5	L10	L2	M
SC16M08S22-HSK63A	★	8.5	14.5	48	22	M8
20M10S24-HSK63A	★	10.5	18.5	50	24	M10
25M12S27-HSK63A	★	12.5	23.5	53	27	M12
32M16S28-HSK63A	★	17.0	28.5	54	28	M16

APPLICATION EXAMPLES

Tool		SRFH20S25M	SRFH20S25M	SRFH30S32LW	SRFH20S20LW
Insert		SRFT20	SRFT20	SRFT30	SUFT20R10
Grade		VP15TF	MP8010	MP8010	VP15TF
Machine		Bridge-column machining centre	Vertical type M/C	Bridge-column machining centre	Vertical type M/C
Work Material		Mould steel (33HRC) 	Mould steel (60HRC) 	Cast iron 	Alloy steel (35HRC) 
Component		Mould for forming resin	Press mould	Press mould	Mould for forming resin
Cutting Conditions	Actual Cutting Speed (m/min)	250	30-100	150-940	188
	Table Feed (mm/min)	1400	636	10000	1800
	Feed per Tooth (mm/tooth)	0.18	0.2	0.3	0.3
	Depth of Cut (mm)	0.2	0.2	0.2	0.1
	Width of Cut (mm)	1.2	0.3	0.5	0.3
Coolant		Water soluble	Air blow	Air blow	Air blow
Results		Low cutting noise and good surface finish.	Higher efficiency machining is achieved and the cutting time can be decreased compared with conventional PVD coated carbide.	Using cutting conditions of conventional CBN, an increased cutting length of 10000m is achievable.	The surface finish on the bottom face is improved compared to a competitors grade. VP15TF also achieved double tool life.

Memo

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**Indexable Corner Radius End Mill
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SRF/SUF



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