



For more information

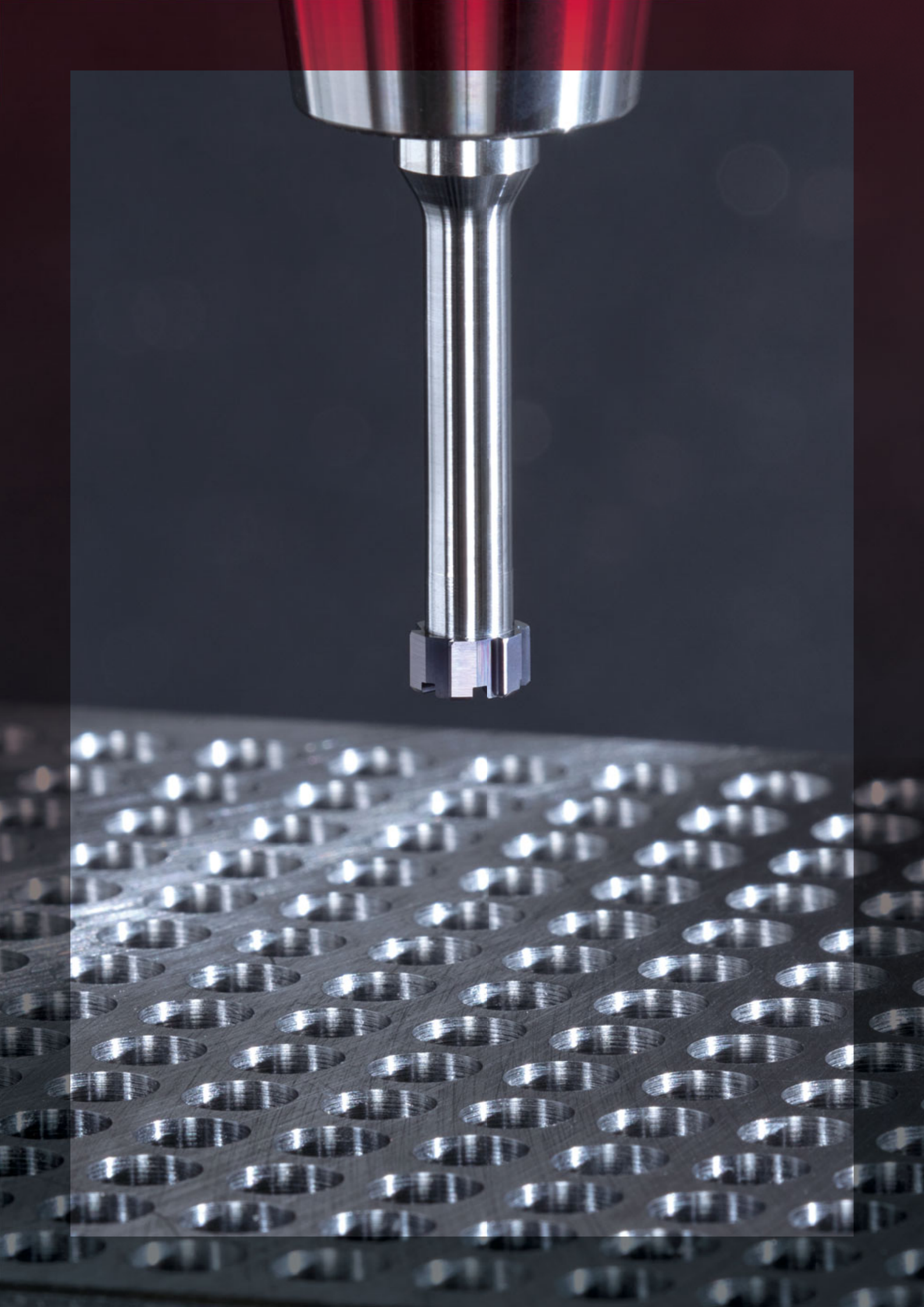
Head changeable reamer

REAMMEISTER

Tungaloy Report No. 530-G

Head changeable reamer for a **high precision**
and productive solution







REAMMEISTER



New generation reamer for finishing hole operation

Innovative head clamping system ensures **high quality and productive reaming operation**

■ Exchangeable head reamer for H7 hole accuracy in $\varnothing 10 - 32$ mm and $1.5xD - 8xD$

- A quick-change twist lock mechanism allows for swift tool changes.
- Increased productivity thanks to high speed machining.
- Minimizes costs by avoiding the needs for regrinding and re-coating.
- Eliminates unstable part quality and tool life due to inconsistent re-coating quality.

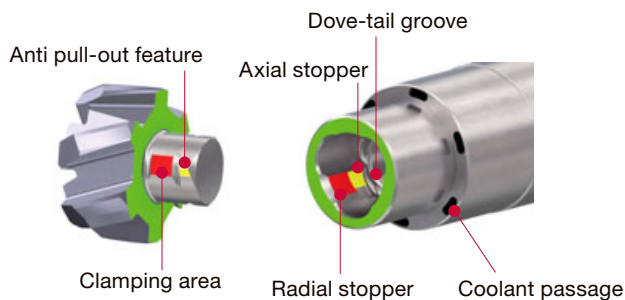
New

Self-clamp system

Tool diameter: $\varnothing 10 - \varnothing 11.499$ mm



Parts



Screw clamp system

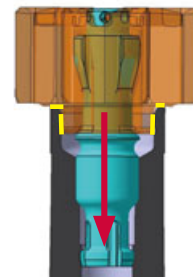
Tool diameter: $\varnothing 11.5 - \varnothing 32$ mm



Parts



Clamping mechanism



Optimal through-coolant supply to direct the coolant to the cutting point and the work surface

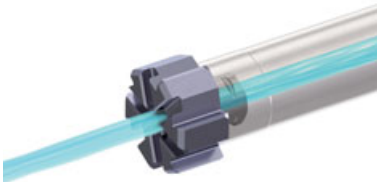
- Effective coolant supply promotes smooth chip evacuation, allowing high speed cutting for **improved efficiency**
- Effectively cools down the cutting edges, inhibiting edge wear progression for **stable accuracy of hole dimensions**
- Effectively directs coolant to the work surface for **improved surface quality**

New

Tool diameter: $\varnothing 10 - \varnothing 11.499 \text{ mm}$

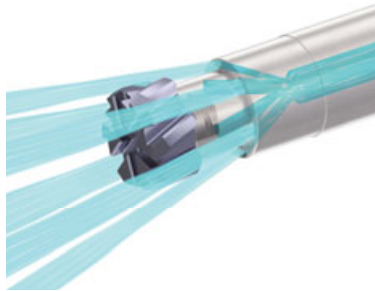
Axial coolant supply

AS head + body for blind holes



Peripheral coolant supply

BL head + body for through holes



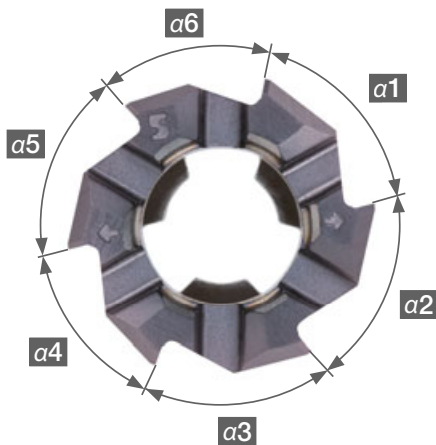
Tool diameter: $\varnothing 11.5 - \varnothing 32 \text{ mm}$

Radial coolant supply

AS / BL head + common use body



Anti-vibration variable pitch design



$$\alpha 1 \neq \alpha 2 \neq \alpha 3 \neq \alpha 4 \neq \alpha 5 \neq \alpha 6$$

Variable pitch design prevents **vibrations during high speed cutting**

Superior reaming performance vs. conventional solid reamers

	REAMMEISTER	Solid carbide reamers	HSS reamer
Wear resistance	◎	○	×
Impact resistance	○	○	◎
Machining efficiency (high speed cutting)	◎	○	×
Surface quality	◎	○	○
Inventory management	◎	×	×

Better cutting performance and streamlined inventory management

REAMER HEADS

AS geometry for blind hole applications

New

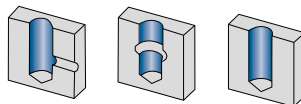


Tool diameter
10 - 11.499 mm



Tool diameter
11.5 - 32 mm

Applications



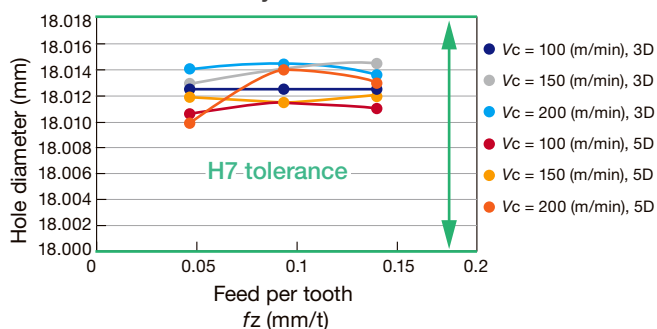
Note: Radial coolant supply.
Can also be used for blind holes in
11.5 mm diameter or greater.

Chip evacuation

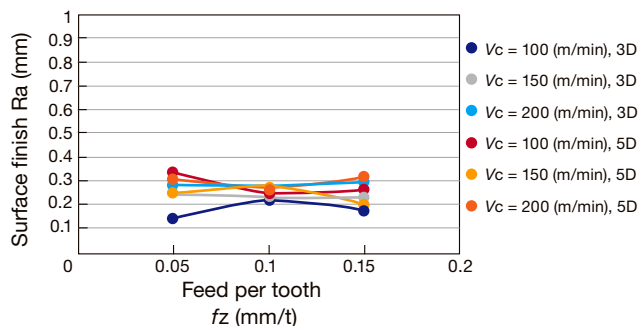


Chips out of
the entrance

Hole diameter accuracy



Surface finish



Tool : TRM-T7-R20-3, TRM-T7-R20-5
Head : HRM-18.000-AS-T7 AH725
(CICT = 6)
Workpiece material : S55C / C55

Pre hole diameter : 17.8 mm
Hole depth : H = 30 mm
Coolant : Internal

BL geometry for through hole applications

New

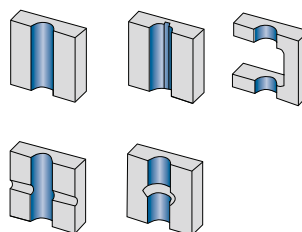


Tool diameter
10 - 11.499 mm



Tool diameter
11.5 - 32 mm

Applications

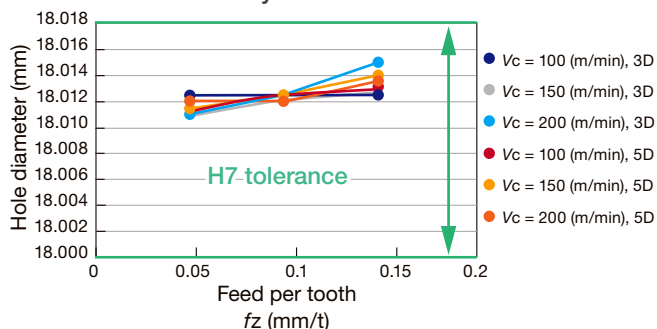


Chip evacuation

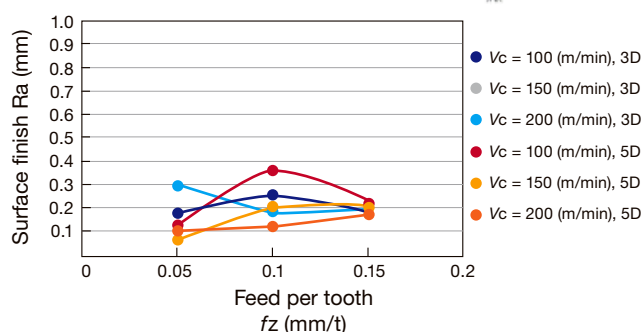


Chips out of
the exit

Hole diameter accuracy



Surface finish

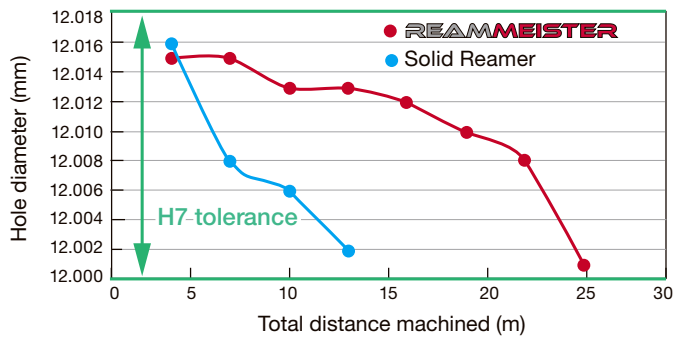


Tool : TRM-T7-R20-3, TRM-T7-R20-5
Head : HRM-18.000-AS-T7 AH725
(CICT = 6)
Workpiece material : S55C / C55

Pre hole diameter : 17.8 mm
Hole depth : H = 30 mm
Coolant : Internal

TOOL LIFE

P S55C / C55



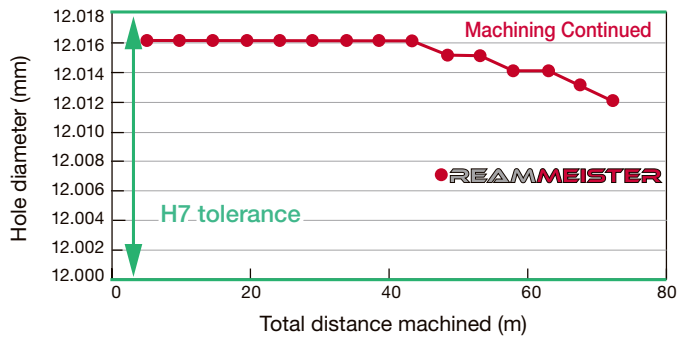
REAMMEISTER

Tool : TRM-T5-R16-3
 Head : HRM-12.000-AS-T5 AH725
 Cutting speed : $V_c = 150$ m/min
 Feed per tooth : $f_z = 0.1$ mm/t
 Coolant : Internal

Solid Reamer

Tool : $\phi 12.000$ Solid Reamer (Uncoated)
 Cutting speed : $V_c = 50$ m/min
 Feed per tooth : $f_z = 0.1$ mm/t
 Coolant : Internal

K FCD600 / 600-3

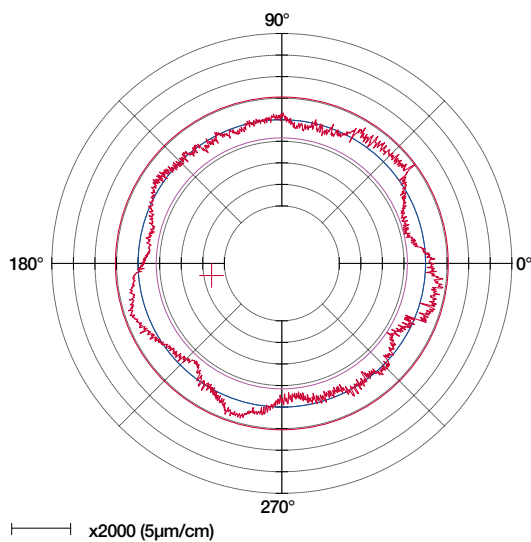


REAMMEISTER

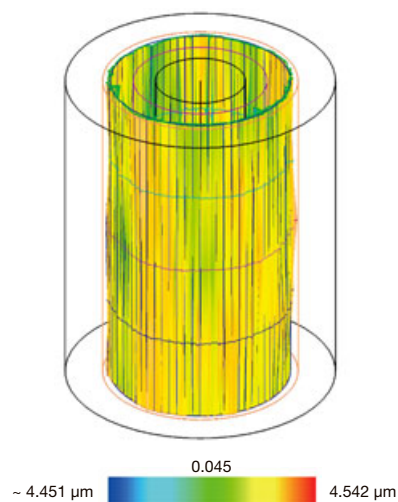
Tool : TRM-T5-R16-3
 Head : HRM-12.000-AS-T5 AH725
 Cutting speed : $V_c = 150$ m/min
 Feed per tooth : $f_z = 0.1$ mm/t

CIRCULARITY AND CYLINDRICITY

Circularity < 3 μm



Cylindricity < 9 μm



Geometric tolerances achievable with ReamMeister

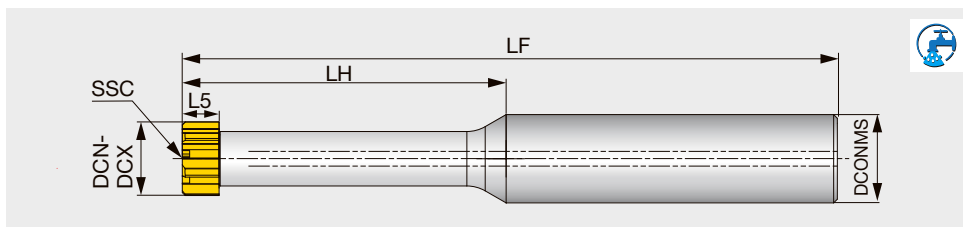
$\circ$	0.005	cyl	0.010
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REAMER

New

TRM-D**B

Reamer tool L/D = 3 and 5, AS reaming head for blind holes



Designation	DCN	DCX	SSC	L/D	DCONMS	L5	LF	LH	Head
TRM-D10B-R12-3	10	10.999	D10	3	12	5	89	44	HRM-10**-AS
TRM-D10B-R12-5	10	10.999	D10	5	12	5	109	64	HRM-10**-AS
TRM-D11B-R12-3	11	11.999	D11	3	12	5.5	92.5	47.5	HRM-11**-AS
TRM-D11B-R12-5	11	11.999	D11	5	12	5.5	114.5	69.5	HRM-11**-AS

OPTIONAL SPARE PARTS

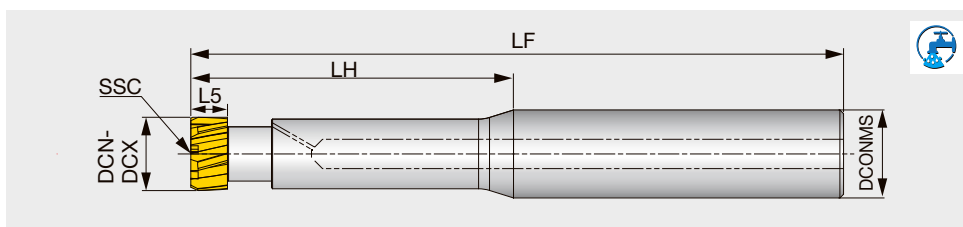
Designation	Torx Bit	Grip
TRM-D10..., TRM-D11...	BLD-RM-D10.000-11.999	H-TB2W

Spare parts are sold separately

New

TRM-D**T

Reamer tool L/D = 3 and 5, BL reaming head for through holes



Designation	DCN	DCX	SSC	L/D	DCONMS	L5	LF	LH	Head
TRM-D10T-R12-3	10	10.999	D10	3	12	5	89	44	HRM-10**-BL
TRM-D10T-R12-5	10	10.999	D10	5	12	5	109	64	HRM-10**-BL
TRM-D11T-R12-3	11	11.999	D11	3	12	5.5	92.5	47.5	HRM-11**-BL
TRM-D11T-R12-5	11	11.999	D11	5	12	5.5	114.5	69.5	HRM-11**-BL

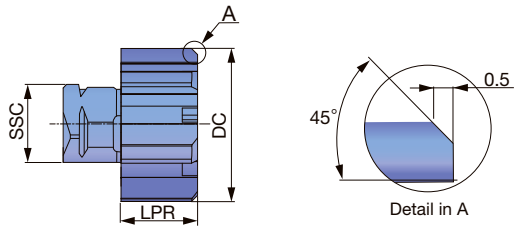
OPTIONAL SPARE PARTS

Designation	Torx Bit	Grip
TRM-D10..., TRM-D11...	BLD-RM-D10.000-11.999	H-TB2W

Spare parts are sold separately

REAMER HEAD

HRM-AS (For blind holes)



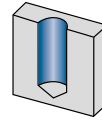
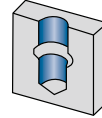
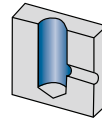
Designation	DC	AH725	SSC	LPR	CICT
HRM-10.000-AS	10	●	D10	5	6
HRM-11.000-AS	11	●	D11	5.5	6

● : New

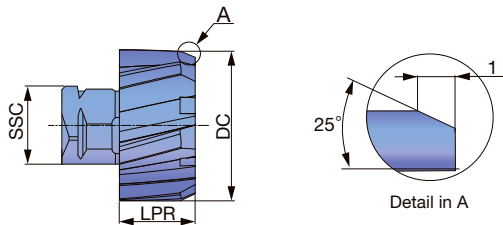
Package quantity = 1 pcs.

Head diameter range	Tolerance range of the head	Hole diameter tolerance (H7)
ø10.000	+0.012 / +0.008	+0.015 / 0
ø11.000	+0.015 / +0.011	+0.018 / 0

- All standard heads are designed to achieve H7 hole tolerance.
- Head diameters are produced so that the hole diameter achieved is close to the max tolerance limit.



HRM-BL (For through holes)



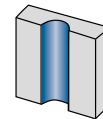
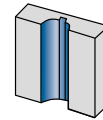
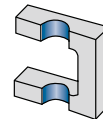
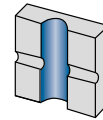
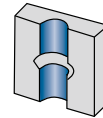
Designation	DC	AH725	SSC	LPR	CICT
HRM-10.000-BL	10	●	D10	5	6
HRM-11.000-BL	11	●	D11	5.5	6

● : New

Package quantity = 1 pcs.

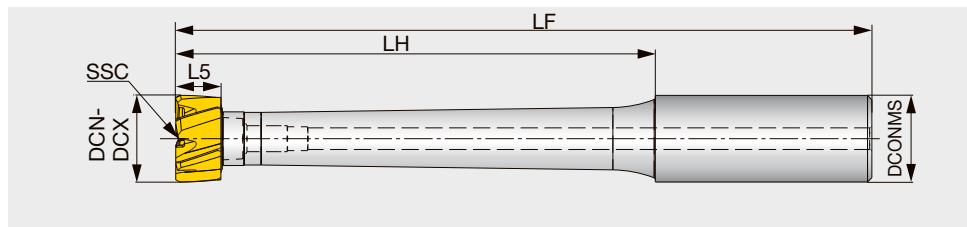
Head diameter range	Tolerance range of the head	Hole diameter tolerance (H7)
ø10.000	+0.012 / +0.008	+0.015 / 0
ø11.000	+0.015 / +0.011	+0.018 / 0

- All standard heads are designed to achieve H7 hole tolerance.
- Head diameters are produced so that the hole diameter achieved is close to the max tolerance limit.



TRM

Reamer tool L/D = 1.5, 3, 8



Designation	DCN	DCX	SSC	L/D	DCONMS	L5	LF	LH
TRM-T5-R16-1.5	11.5	13.5	T5	1.5	16	9.3	77.8	29.8
TRM-T5-R16-3	11.5	13.5	T5	3	16	9.3	97.8	49.8
TRM-T5-R16-5	11.5	13.5	T5	5	16	9.3	125	77
TRM-T5-R16-8	11.5	13.5	T5	8	16	9.3	165.5	117.5
TRM-T6-R16-1.5	13.501	16	T6	1.5	16	9.4	81.5	33.5
TRM-T6-R16-3	13.501	16	T6	3	16	9.4	105.4	57.4
TRM-T6-R16-5	13.501	16	T6	5	16	9.4	137.4	89.4
TRM-T6-R16-8	13.501	16	T6	8	16	9.4	185.4	137.4
TRM-T7-R20-1.5	16.001	20	T7	1.5	20	10.6	90.7	40.7
TRM-T7-R20-3	16.001	20	T7	3	20	10.6	120.6	70.6
TRM-T7-R20-5	16.001	20	T7	5	20	10.6	160.6	110.6
TRM-T7-R20-8	16.001	20	T7	8	20	10.6	220.6	170.6
TRM-T8-R20-1.5	20.001	25.999	T8	1.5	20	12.8	101	51
TRM-T8-R20-3	20.001	25.999	T8	3	20	12.8	137.8	87.8
TRM-T8-R20-5	20.001	25.999	T8	5	20	12.8	187.8	137.8
TRM-T8-R20-8	20.001	25.999	T8	8	20	12.8	262.8	212.8
TRM-T9-R32-1.5	26	32	T9	1.5	32	12.8	120.9	60.9
TRM-T9-R32-3	26	32	T9	3	32	12.8	167.1	107.1
TRM-T9-R32-5	26	32	T9	5	32	12.8	231.1	171.1
TRM-T9-R32-8	26	32	T9	8	32	12.8	327.1	267.1
TRMU-T5-R0.625-1.5	11.5	13.5	T5	1.5	15.875	9.3	77.7	29.7
TRMU-T5-R0.625-3	11.5	13.5	T5	3	15.875	9.3	97.8	49.8
TRMU-T5-R0.625-5	11.5	13.5	T5	5	15.875	9.3	125.0	77.0
TRMU-T5-R0.625-8	11.5	13.5	T5	8	15.875	9.3	165.4	117.3
TRMU-T6-R0.625-1.5	13.501	16	T6	1.5	15.875	9.4	81.5	33.5
TRMU-T6-R0.625-3	13.501	16	T6	3	15.875	9.4	105.4	57.4
TRMU-T6-R0.625-5	13.501	16	T6	5	15.875	9.4	137.4	89.4
TRMU-T6-R0.625-8	13.501	16	T6	8	15.875	9.4	185.4	137.4
TRMU-T7-R0.75-1.5	16.001	20	T7	1.5	19.05	10.6	90.7	40.6
TRMU-T7-R0.75-3	16.001	20	T7	3	19.05	10.6	120.4	70.6
TRMU-T7-R0.75-5	16.001	20	T7	5	19.05	10.6	160.5	110.5
TRMU-T7-R0.75-8	16.001	20	T7	8	19.05	10.6	220.5	170.7
TRMU-T8-R0.75-1.5	20.001	25.999	T8	1.5	19.05	12.8	101.1	51.1
TRMU-T8-R0.75-3	20.001	25.999	T8	3	19.05	12.8	137.7	87.6
TRMU-T8-R0.75-5	20.001	25.999	T8	5	19.05	12.8	187.7	137.7
TRMU-T8-R0.75-8	20.001	25.999	T8	8	19.05	12.8	262.9	212.9
TRMU-T9-R1.25-1.5	26	32	T9	1.5	31.75	12.8	120.9	61.0
TRMU-T9-R1.25-3	26	32	T9	3	31.75	12.8	167.1	106.9
TRMU-T9-R1.25-5	26	32	T9	5	31.75	12.8	231.1	171.2
TRMU-T9-R1.25-8	26	32	T9	8	31.75	12.8	327.2	267.0

•Key and screw are included.

•Maximum effective reaming depth = Head diameter(mm) x L/D ratio.

Ex. For a reamer with $\phi 12$ mm: $12 \text{ mm} \times 3D = 36 \text{ mm}$

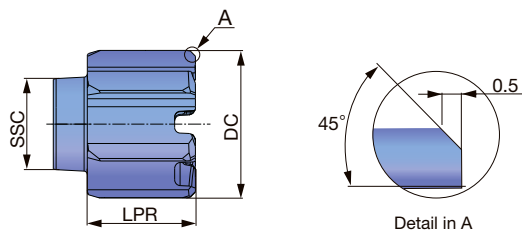
SPARE PARTS



Designation	Screw	Key
TRM-T5-R16-1.5	SCR-TRM-T5	K-TRM-T5
TRM-T5-R16-3	SCR-TRM-T5	K-TRM-T5
TRM-T5-R16-5	SCR-TRM-T5	K-TRM-T5
TRM-T5-R16-8	SCR-TRM-T5	K-TRM-T5
TRM-T6-R16-1.5	SCR-TRM-T6	K-TRM-T6
TRM-T6-R16-3	SCR-TRM-T6	K-TRM-T6
TRM-T6-R16-5	SCR-TRM-T6	K-TRM-T6
TRM-T6-R16-8	SCR-TRM-T6	K-TRM-T6
TRM-T7-R20-1.5	SCR-TRM-T7	K-TRM-T7
TRM-T7-R20-3	SCR-TRM-T7	K-TRM-T7
TRM-T7-R20-5	SCR-TRM-T7	K-TRM-T7
TRM-T7-R20-8	SCR-TRM-T7	K-TRM-T7
TRM-T8-R20-1.5	SCR-TRM-T8	K-TRM-T8
TRM-T8-R20-3	SCR-TRM-T8	K-TRM-T8
TRM-T8-R20-5	SCR-TRM-T8	K-TRM-T8
TRM-T8-R20-8	SCR-TRM-T8	K-TRM-T8
TRM-T9-R32-1.5	SCR-TRM-T9	K-TRM-T9
TRM-T9-R32-3	SCR-TRM-T9	K-TRM-T9
TRM-T9-R32-5	SCR-TRM-T9	K-TRM-T9
TRM-T9-R32-8	SCR-TRM-T9	K-TRM-T9
TRMU-T5-R0.625-1.5	SCR-TRM-T5	K-TRM-T5
TRMU-T5-R0.625-3	SCR-TRM-T5	K-TRM-T5
TRMU-T5-R0.625-5	SCR-TRM-T5	K-TRM-T5
TRMU-T5-R0.625-8	SCR-TRM-T5	K-TRM-T5
TRMU-T6-R0.625-1.5	SCR-TRM-T6	K-TRM-T6
TRMU-T6-R0.625-3	SCR-TRM-T6	K-TRM-T6
TRMU-T6-R0.625-5	SCR-TRM-T6	K-TRM-T6
TRMU-T6-R0.625-8	SCR-TRM-T6	K-TRM-T6
TRMU-T7-R0.75-1.5	SCR-TRM-T7	K-TRM-T7
TRMU-T7-R0.75-3	SCR-TRM-T7	K-TRM-T7
TRMU-T7-R0.75-5	SCR-TRM-T7	K-TRM-T7
TRMU-T7-R0.75-8	SCR-TRM-T7	K-TRM-T7
TRMU-T8-R0.75-1.5	SCR-TRM-T8	K-TRM-T8
TRMU-T8-R0.75-3	SCR-TRM-T8	K-TRM-T8
TRMU-T8-R0.75-5	SCR-TRM-T8	K-TRM-T8
TRMU-T8-R0.75-8	SCR-TRM-T8	K-TRM-T8
TRMU-T9-R1.25-1.5	SCR-TRM-T9	K-TRM-T9
TRMU-T9-R1.25-3	SCR-TRM-T9	K-TRM-T9
TRMU-T9-R1.25-5	SCR-TRM-T9	K-TRM-T9
TRMU-T9-R1.25-8	SCR-TRM-T9	K-TRM-T9

REAMER HEAD

HRM-AS (For blind holes)



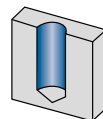
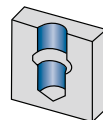
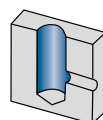
Designation	DC	AH725	SSC	LPR	CICT
HRM-11.501-AS-T5	11.501	●	T5	9.3	6
HRM-12.000-AS-T5	12	●	T5	9.3	6
HRM-12.700-AS-T5	12.7	●	T5	9.3	6
HRM-13.000-AS-T5	13	●	T5	9.3	6
HRM-13.500-AS-T5	13.5	●	T5	9.3	6
HRM-14.000-AS-T6	14	●	T6	9.4	6
HRM-15.000-AS-T6	15	●	T6	9.4	6
HRM-15.875-AS-T6	15.875	●	T6	9.4	6
HRM-16.000-AS-T6	16	●	T6	9.4	6
HRM-16.001-AS-T7	16.001	●	T7	10.6	6
HRM-17.000-AS-T7	17	●	T7	10.6	6
HRM-18.000-AS-T7	18	●	T7	10.6	6
HRM-19.000-AS-T7	19	●	T7	10.6	6
HRM-19.050-AS-T7	19.05	●	T7	10.6	6
HRM-20.000-AS-T7	20	●	T7	10.6	6
HRM-20.001-AS-T8	20.001	●	T8	12.8	8
HRM-21.000-AS-T8	21	●	T8	12.8	8
HRM-22.000-AS-T8	22	●	T8	12.8	8
HRM-23.000-AS-T8	23	●	T8	12.8	8
HRM-24.000-AS-T8	24	●	T8	12.8	8
HRM-25.000-AS-T8	25	●	T8	12.8	8
HRM-25.400-AS-T8	25.4	●	T8	12.8	8
HRM-26.000-AS-T9	26	●	T9	12.8	8
HRM-27.000-AS-T9	27	●	T9	12.8	8
HRM-28.000-AS-T9	28	●	T9	12.8	8
HRM-29.000-AS-T9	29	●	T9	12.8	8
HRM-30.000-AS-T9	30	●	T9	12.8	8
HRM-31.000-AS-T9	31	●	T9	12.8	8
HRM-31.750-AS-T9	31.75	●	T9	12.8	8
HRM-32.000-AS-T9	32	●	T9	12.8	8

Package quantity = 1 pcs.

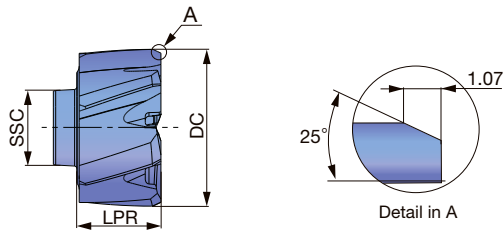
●: Line up

Head diameter range	Tolerance range of the head	Hole diameter tolerance (H7)
ø11.500 - ø18.000	+0.015 / +0.011	+0.018 / 0
ø18.001 - ø30.000	+0.017 / +0.013	+0.021 / 0
ø30.001 - ø32.000	+0.021 / +0.016	+0.025 / 0

- All standard heads are designed to achieve H7 hole tolerance.
- Head diameters are produced so that the hole diameter achieved is close to the max tolerance limit.



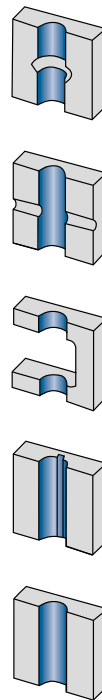
HRM-BL (For through holes)



Designation	DC	AH725	SSC	LPR	CICT
HRM-11.501-BL-T5	11.501	●	T5	9.3	6
HRM-12.000-BL-T5	12	●	T5	9.3	6
HRM-12.700-BL-T5	12.7	●	T5	9.3	6
HRM-13.000-BL-T5	13	●	T5	9.3	6
HRM-13.500-BL-T5	13.5	●	T5	9.3	6
HRM-13.501-BL-T6	13.501	●	T6	9.4	6
HRM-14.000-BL-T6	14	●	T6	9.4	6
HRM-15.000-BL-T6	15	●	T6	9.4	6
HRM-15.875-BL-T6	15.875	●	T6	9.4	6
HRM-16.000-BL-T6	16	●	T6	9.4	6
HRM-16.001-BL-T7	16.001	●	T7	10.6	6
HRM-17.000-BL-T7	17	●	T7	10.6	6
HRM-18.000-BL-T7	18	●	T7	10.6	6
HRM-19.000-BL-T7	19	●	T7	10.6	6
HRM-19.050-BL-T7	19.05	●	T7	10.6	6
HRM-20.000-BL-T7	20	●	T7	10.6	6
HRM-20.001-BL-T8	20.001	●	T8	12.8	8
HRM-21.000-BL-T8	21	●	T8	12.8	8
HRM-22.000-BL-T8	22	●	T8	12.8	8
HRM-23.000-BL-T8	23	●	T8	12.8	8
HRM-24.000-BL-T8	24	●	T8	12.8	8
HRM-25.000-BL-T8	25	●	T8	12.8	8
HRM-25.400-BL-T8	25.4	●	T8	12.8	8
HRM-26.000-BL-T9	26	●	T9	12.8	8
HRM-27.000-BL-T9	27	●	T9	12.8	8
HRM-28.000-BL-T9	28	●	T9	12.8	8
HRM-29.000-BL-T9	29	●	T9	12.8	8
HRM-30.000-BL-T9	30	●	T9	12.8	8
HRM-31.000-BL-T9	31	●	T9	12.8	8
HRM-32.000-BL-T9	32	●	T9	12.8	8

Package quantity = 1 pcs.

●: Line up



Head diameter range	Tolerance range of the head	Hole diameter tolerance (H7)
ø11.500 - ø18.000	+0.015 / +0.011	+0.018 / 0
ø18.001 - ø30.000	+0.017 / +0.013	+0.021 / 0
ø30.001 - ø32.000	+0.021 / +0.016	+0.025 / 0

- All standard heads are designed to achieve H7 hole tolerance.
- Head diameters are produced so that the hole diameter achieved is close to the max tolerance limit.

STANDARD CUTTING CONDITIONS

Conversion table for feed per tooth

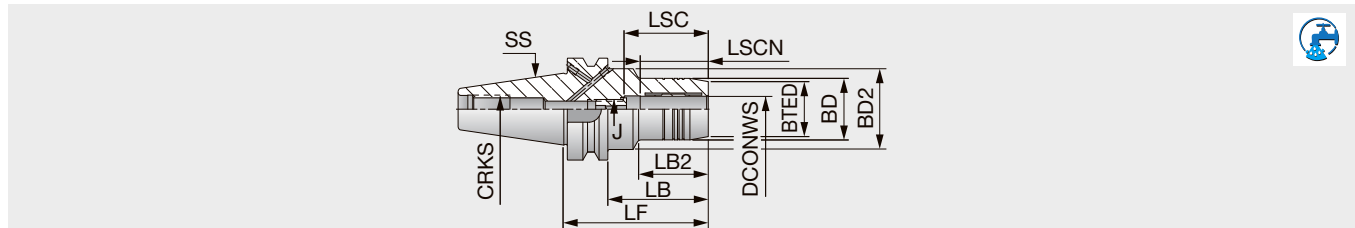
ISO	Workpiece materials	Cutting speed V _c (m/min)	Feed: fz(mm/t)			
			AS: Straight flute (for blind holes)		BL: Left hand flute (for through holes)	
			Ø10 - Ø16	Ø16 - Ø32	Ø10 - Ø16	Ø16 - Ø32
P	Low carbon steel (C<0.3) SS400, SM490, S25C, E275A, etc.	80 - 200	0.05 - 0.18	0.05 - 0.20	0.05 - 0.2	0.05 - 0.27
	Carbon steel (C>0.3) S45C, S55C, C45, C55, etc.	80 - 150	0.05 - 0.15	0.05 - 0.18	0.05 - 0.18	0.05 - 0.25
	Low alloy steel (C<0.3) SCM415, etc.	80 - 200	0.05 - 0.18	0.05 - 0.20	0.05 - 0.2	0.05 - 0.27
	Alloy steel (C>0.3) SCM440, SCr420, 42CrMo4, 20Cr4 etc.	50 - 150	0.03 - 0.10	0.05 - 0.13	0.05 - 0.13	0.05 - 0.17
M	Stainless steel (Austenitic) SUS304, SUS316, X5CrNi18-9, X5CrNiMo17-12-3, etc.	20 - 40	0.03 - 0.10	0.03 - 0.13	0.05 - 0.13	0.05 - 0.17
	Stainless steel (Martensitic and ferritic) SUS430, SUS416, X6Cr17, etc.	20 - 40	0.03 - 0.10	0.03 - 0.13	0.05 - 0.13	0.05 - 0.17
	Stainless steel (Precipitation hardening) SUS630, X5CrNiCuNb16-4 etc.	20 - 40	0.03 - 0.10	0.03 - 0.13	0.05 - 0.13	0.05 - 0.17
K	Gray cast iron FC250, GG25, 250 etc.	100 - 250	0.05 - 0.18	0.05 - 0.20	0.05 - 0.2	0.05 - 0.27
	Ductile cast iron FCD700, etc.	80 - 200	0.05 - 0.15	0.05 - 0.18	0.05 - 0.18	0.05 - 0.25
N	Aluminum alloy	100 - 300	0.05 - 0.18	0.05 - 0.20	0.05 - 0.2	0.05 - 0.27
S	High temp. alloy Inconel718 etc.	15 - 50	0.03 - 0.06	0.03 - 0.08	0.05 - 0.1	0.05 - 0.13
	Titanium alloy Ti-6Al-4V etc.	30 - 60	0.03 - 0.10	0.03 - 0.13	0.05 - 0.13	0.05 - 0.17
H	Hardened steel Over 40HRC etc.	50 - 100	0.03-0.08	0.03 - 0.1	0.05-0.12	0.05 - 0.15

Conversion table for feed per revolution

ISO	Workpiece materials	Cutting speed V _c (m/min)	Feed: <i>f</i> (mm/rev)					
			AS: Straight flute (for blind holes)			BL: Left hand flute (for through holes)		
			ø10 - ø16 6 flutes	ø16.001 - ø20 6 flutes	ø20.001 - ø32 8 flutes	ø10 - ø16 6 flutes	ø16.001 - ø20 6 flutes	ø20.001 - ø32 8 flutes
P	Low carbon steel (C<0.3) SS400, SM490, S25C, E275A, etc.	80 - 200	0.3 - 1.08	0.3 - 1.2	0.4 - 1.6	0.3 - 1.2	0.3 - 1.62	0.4 - 2.16
	Carbon steel (C>0.3) S45C, S55C, C45, C55, etc.	80 - 150	0.3 - 0.9	0.3 - 1.08	0.4 - 1.44	0.3 - 1.08	0.3 - 1.5	0.4 - 2
	Low alloy steel (C<0.3) SCM415, etc.	80 - 200	0.3 - 1.08	0.3 - 1.2	0.4 - 1.6	0.3 - 1.2	0.3 - 1.2	0.4 - 2.16
	Alloy steel (C>0.3) SCM440, SCr420, 42CrMo4, 20Cr4 etc.	50 - 150	0.18 - 0.6	0.3 - 0.78	0.4 - 1.04	0.3 - 0.78	0.3 - 1.02	0.4 - 1.36
M	Stainless steel (Austenitic) SUS304, SUS316, X5CrNi18-9, X5CrNiMo17-12-3, etc.	20 - 40	0.18 - 0.6	0.18 - 0.78	0.24 - 1.04	0.3 - 0.78	0.3 - 1.02	0.4 - 1.36
	Stainless steel (Martensitic and ferritic) SUS430, SUS416, X6Cr17, etc.	20 - 40	0.18 - 0.6	0.18 - 0.78	0.24 - 1.04	0.3 - 0.78	0.3 - 1.02	0.4 - 1.36
	Stainless steel (Precipitation hardening) SUS630, X5CrNiCuNb16-4 etc.	20 - 40	0.18 - 0.6	0.18 - 0.78	0.24 - 1.04	0.3 - 0.78	0.3 - 1.02	0.4 - 1.36
K	Gray cast iron FC250, GG25, 250 etc.	100 - 250	0.3 - 1.08	0.3 - 1.2	0.4 - 1.6	0.3 - 1.2	0.3 - 1.62	0.4 - 2.16
	Ductile cast iron FCD700, etc.	80 - 200	0.3 - 0.9	0.3 - 1.08	0.4 - 1.44	0.3 - 1.8	0.3 - 1.62	0.4 - 2
N	Aluminum alloy	100 - 300	0.3 - 1.08	0.3 - 1.2	0.4 - 1.6	0.3 - 1.2	0.3 - 1.62	0.4 - 2.16
S	High temp. alloy Inconel718 etc.	15 - 50	0.18 - 0.36	0.18 - 0.48	0.24 - 0.64	0.3 - 0.6	0.3 - 0.78	0.4 - 1.04
	Titanium alloy Ti-6Al-4V etc.	30 - 60	0.18 - 0.6	0.18 - 0.78	0.24 - 1.04	0.3 - 0.78	0.3 - 1.02	0.4 - 1.36
H	Hardened steel Over 40HRC etc.	50 - 100	0.18 - 0.48	0.18 - 0.6	0.24 - 0.8	0.3 - 0.72	0.3 - 0.9	0.4 - 1.2

BT-HYDRO

Hydraulic endmill chuck holder (BT)



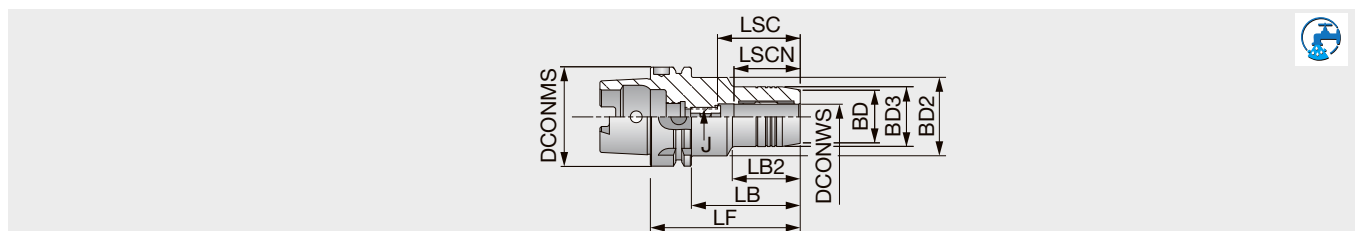
Designation	SS	DCONWS	BTED	BD	BD2	LF	LB	LB2	LSCN	LSC	J	CRKS
BT30HYDRO12X72	30	12	29	32	50	72	50	44.5	37	47	M10x1	M12
BT30HYDRO16X90	30	16	34	38	50	90	68	47.5	42	52	M12x1	M12
BT30HYDRO20X90	30	20	38	42	50	90	68	47.5	42	52	M12x1	M12
BT40HYDRO12X90	40	12	29	32	50	90	63	44.5	37	47	M10x1	M16
BT40HYDRO16X90	40	16	34	38	50	90	63	47.5	42	52	M12x1	M16
BT40HYDRO20X90	40	20	38	42	50	90	63	47.5	42	52	M12x1	M16
BT40HYDRO32X110	40	32	56	60	60	110	81.5	81.5	52	62	M16x1	M16
BT50HYDRO12X110	50	12	29	32	80	110	72	42	37	47	M10x1	M24
BT50HYDRO16X110	50	16	34	38	80	110	72	45	42	52	M12x1	M24
BT50HYDRO20X110	50	20	38	42	80	110	72	47.5	42	52	M12x1	M24
BT50HYDRO32X110	50	32	56	60	80	110	72	47.5	54	64	M12x1	M24

- Applicable for 10 MPa coolant
- Reduction sleeves are available for d = 12, 20 and 32 mm.
- Chucking force will reduce when using a reduction sleeve.

Option: Wrench for collet

HSK A-HYDRO

Hydraulic endmill chuck holder (HSK-A)



Designation	DCONMS	DCONWS	BD3	BD	BD2	LF	LB	LB2	LSCN	LSC	J
HSKA50HYDRO16X95	50	16	38	34	42	95	69	52	42	52	M12x1
HSKA50HYDRO20X100	50	20	42	38	42	100	74	74	42	52	M16x1
HSKA63HYDRO12X90	63	12	32	29	50	90	64	44	37	47	M10x1
HSKA63HYDRO16X95	63	16	38	34	50	95	69	52	42	52	M12x1
HSKA63HYDRO20X100	63	20	42	38	50	100	74	58	42	52	M16x1
HSKA63HYDRO32X125	63	32	60	56	53	125	99	83	52	62	M16x1
HSKA80HYDRO16X100	80	16	38	34	50	100	74	52	42	52	M12x1
HSKA80HYDRO20X105	80	20	42	38	50	105	79	52	42	52	M16x1
HSKA100HYDRO12X95	100	12	32	29	63	95	66	40	37	47	M10x1
HSKA100HYDRO16X100	100	16	38	34	63	100	71	47	42	52	M12x1
HSKA100HYDRO20X105	100	20	42	38	63	105	76	54	42	52	M16x1
HSKA100HYDRO32X120	100	32	60	56	63	120	91	59	52	62	M16x1

- Applicable for 10 MPa coolant
- Reduction sleeves are available for d = 12, 20 and 32 mm.
- Chucking force will reduce when using a reduction sleeve.

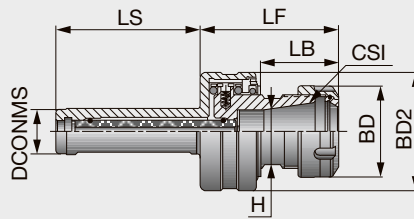
Option: Clamping wrench

FLOATING HOLDERS

During a reaming process, the alignment of the pilot bore with the tool axis is a prerequisite for the correct function of the reamer. When using a reamer on CNC lathes, it is often necessary to compensate for axial errors between the tool adapter and the bore to be machined. This error can be corrected by using a floating holder.

GFI-ST-ER

Floating reamer collet chuck



Designation	DCONMS	CSI	Range	LS	LF	LB	BD	BD2	Radial float	H
GFIST20ER20	20	ER20	1-13	65	55.5	34.5	34	50	1	22
GFIST25ER32	25	ER32	2-20	80	76.9	45.9	50	65	1.6	36

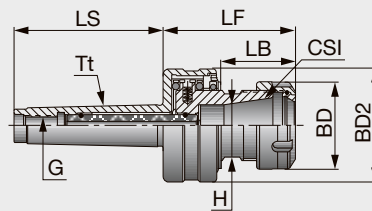
• Applicable for 3 MPa coolant
Maximum 2000 min⁻¹

Option: Wrench for ER collet

GFI-MT-ER

Floating reamer collet chuck

TUNG GFI



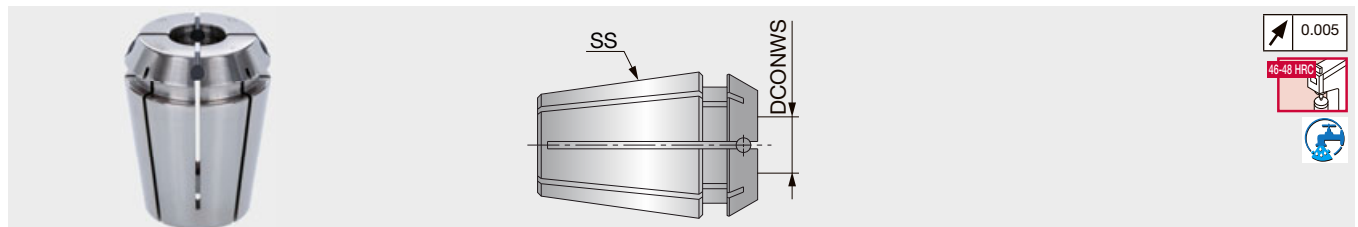
Designation	Tt	CSI	Range	LS	LF	LB	BD	BD2	Radial float	H	G
GFIMT2ER20	MT 2	ER20	1-13	64	60.5	34.5	34	50	1	22	M10
GFIMT3ER32	MT 3	ER32	2-20	81	81.9	45.9	50	65	1.6	36	M12

• Applicable for 3 MPa coolant
Maximum 2000 min⁻¹

Option: Wrench for ER collet

ER-SEAL-AA

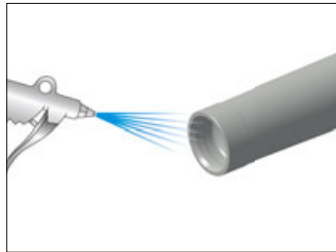
ER sealed spring collets (metric)



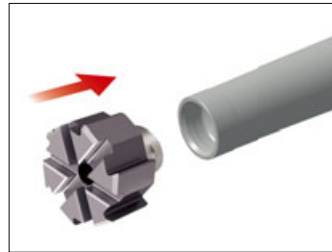
Designation	SS	DCONWS	Designation	SS	DCONWS
ER20SEAL12AA	ER20	12	ER32SEAL16AA	ER32	16
ER32SEAL12AA	ER32	12	ER32SEAL20AA	ER32	20

■ Cautions when using reamers with self-clamping system

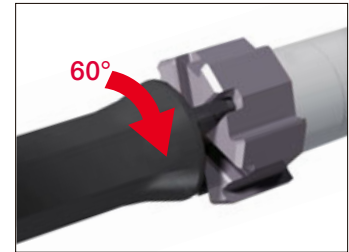
Assembling the ReamMeister



① Thoroughly clean the connection of the body free of dusts with air gun.



② Insert the head into the body with the correct position. (see Fig.1)



③ Use the dedicated key (not included) to rotate the head clockwise 60°.

For successful head clamping

For highest cutting edge repeatability and optimum internal coolant delivery, the reamer head must always be assembled in the correct position.

Assemble the reamer head on the reamer body so that the dot “●” etched on the reamer body aligns with the matching dot “●” on the reamer head when the reamer head is rotated 60° clockwise.

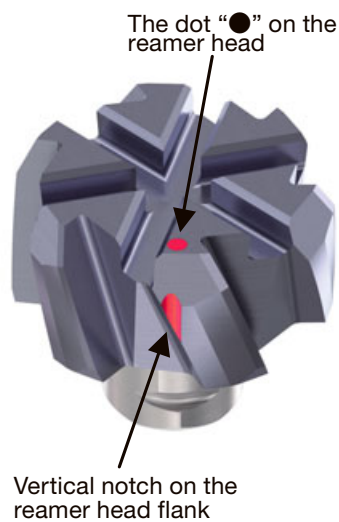
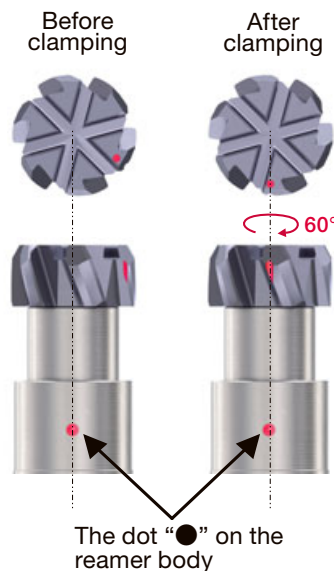


Fig.1 Correct clamping position



Cutting tools may fracture during use. To avoid injury always use safety precautions such as gloves, shields, and eye protection.

■ Cautions when using screw clamping system

First assembly

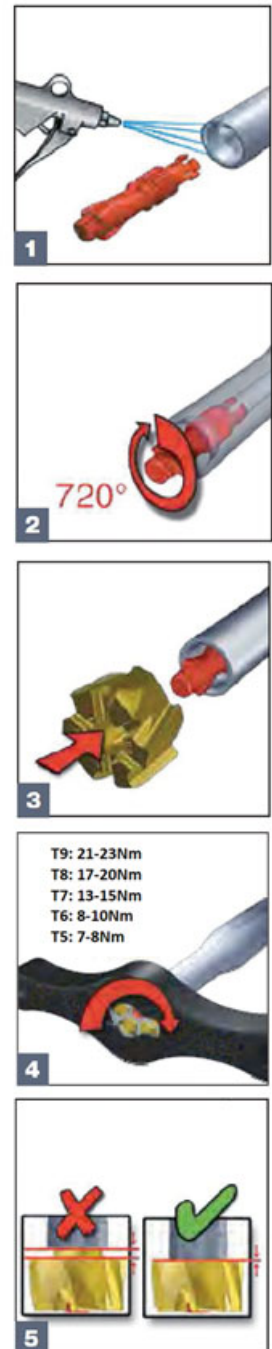
- Clean the tool holder pocket. (Fig. 1)
- Clean the reamer head clamping cone.
- Insert the clamping screw into the holder and rotate it 2-3 turns in the clockwise direction. (Fig. 2)
- Clamp the reaming head on the screw. Please note that T8 and T9 connections can be assembled only in a specific position relative to the screw. (rotate the head until locating the correct position) (Fig. 3)
- Manually rotate the head until feeling a slight torque.
- Tighten with the special key. (Fig. 4)
- Make sure there is no face gap between the tool holder and the reaming head. (Fig. 5)

* For recommended torque for T5 through T9 connections, see the chart on the right

Indexing

- Release the reaming head with the key, turning in the counterclockwise direction until it rotates freely.
- Rotate it one more turn by hand.
- Remove the reamer head from the tool. The clamping screw should remain inside!!!
- Clean the pocket of the tool holder (Fig. 1)
- Clean the cone on the new reamer head.
- Clamp the reaming head on the screw. Please note that T8 and T9 connections can be assembled only in a specific position relative to the screw. (rotate the head until locating the correct position) (Fig. 3)
- Manually rotate the reaming head. In the beginning it should rotate without the screw and then (after 1/6 of a turn) it should engage with the screw. Rotate until it sits firmly in the pocket. If the screw rotates together with the reaming head from the beginning, remove the reaming head and turn the screw one more rotation.
- Manually rotate the head until feeling a slight torque.
- Tighten with the special key. (Fig. 4)
- Make sure that there is no face gap between the tool holder and the reaming head. (Fig. 5)

* For recommended torque for T5 through T9 connections, see the chart on the right



Cutting tools may fracture during use. To avoid injury always use safety precautions such as gloves, shields, and eye protection.

How to check the cutting tooth runout

1. Thoroughly clean the arbor and tool body free of dusts and chips.
2. Assemble the tool body to the arbor.
3. Check that the T.I.R. on the body indicates a runout of 0.005 mm or smaller. If not, proceed from Step 1.
4. Thoroughly clean the connection between the reamer head and the tool body.
5. Assemble the head to the body and tighten the head so that there is no gap between the head and body. (See pages 20 - 21.)
6. Check that the runout of the cutting teeth are 0.010 mm or smaller. If not, repeat from Step 4. (A runout of 0.005 mm or smaller is preferred)

Note: We recommend the use of a hydro-chuck arbor for high tool precision. A collet chuck or milling chuck may be used if the runout checked in Step 3 is within the tolerance.



Recommended runout control

Runout control is important to achieve proper reaming process.

Best: less than 0.005

Acceptable: 0.005 - 0.015

Not acceptable: over 0.015

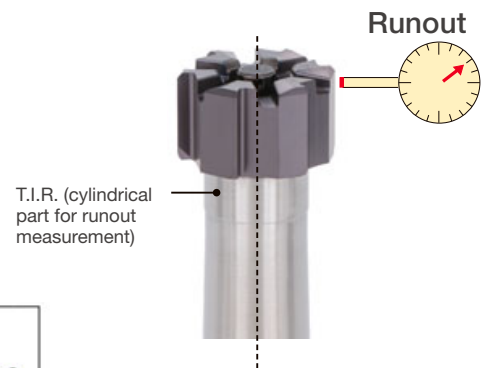
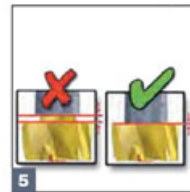
* If an acceptable runout is not achieved, adjust the runout as follows.

1. Make sure that there is no gap between the faces of the reaming head and the tool holder.

If there is a gap, use the key and tighten again until the gap disappears.

2. Measure the runout of the cylindrical part for runout measurement on the upper part of the tool to check the installation accuracy of the tool and the arbor.

If there is excessive runout on the cylindrical surface of the tool, remove the tool from the arbor, clean the tool and the arbor, then remount them and measure the runout.



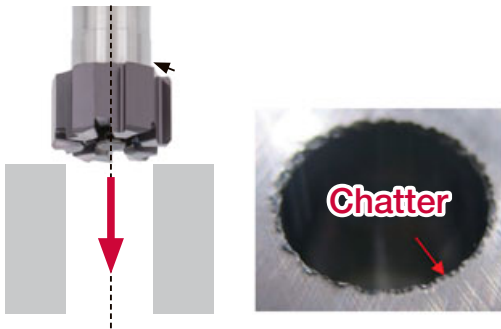
■ Cautions when using 5D and 8D reamers

In long overhang applications with the length-to-diameter ratios of 5D to 8D, a reamer is prone to chatter due to low rigidity when entering the hole.

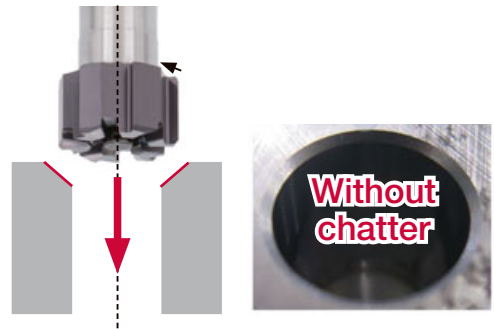
The following methods are recommended for process stability.

1. Provide internal chamfer (e.g. 45° x 0.5) on the hole entrance for smooth reamer engagement.

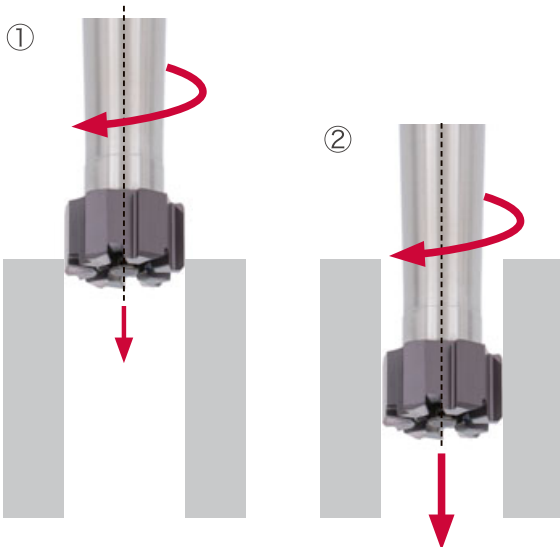
Without chamfer



With chamfer



2. Cutting parameter modifications for tool engaging in the cut



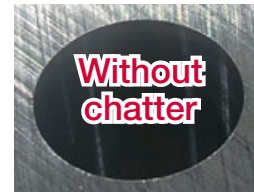
- ① Reduce the cutting speed and feed rate for 2 to 3 mm after the tool engagement to the workpiece.
 - For a reamer with 5xD length, $V_c = 30 - 50$ m/min and $f_z = 0.05$ mm/t.
 - For a reamer with 8xD length, $V_c = 10 - 20$ m/min and $f_z = 0.05$ mm/t.
- ② Increase the parameters to the preset values.

Hole surface machined with 8xD reamer

No parameter modification upon engagement

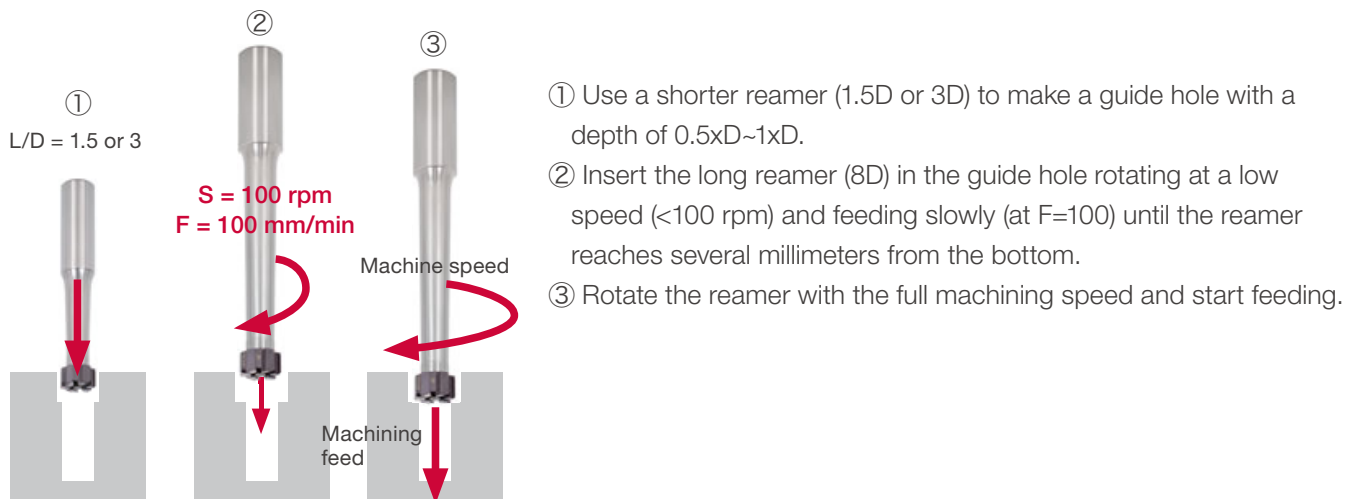


Parameter modified upon engagement



■ Cautions when using 5D and 8D reamers

3. Make a guide hole with a shorter reamer (1.5D or 3D), then use a long overhang tool.



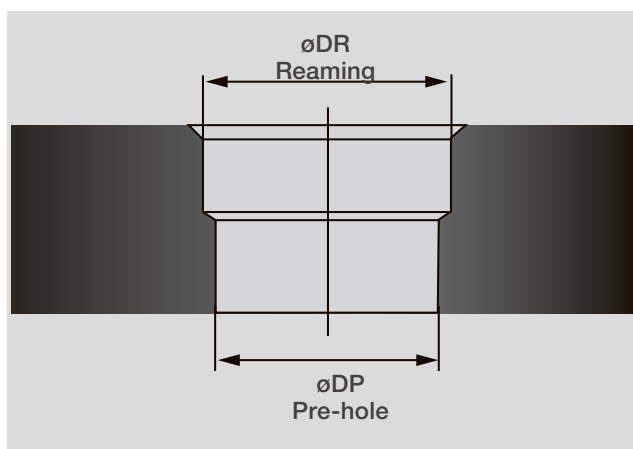
*Use the same diameter heads for both piloting and deep reaming processes

■ Reaming allowance

- Reaming allowance Δ is the stock material to be removed in the reaming process. For a successful reaming operation, reaming allowance must be determined with proper considerations. Refer to the table below for appropriate reaming allowance for various hole diameters and materials. Standard reaming allowance, unless otherwise required, will be the target diameter+0.2 mm for all hole diameter ranges and materials.
- Reaming quality largely depends on the quality of the pre-drilled holes. Holes must have no diameter fluctuation and good straightness.

Δ : Reaming allowance

$$\Delta = \phi DR - \phi DP$$

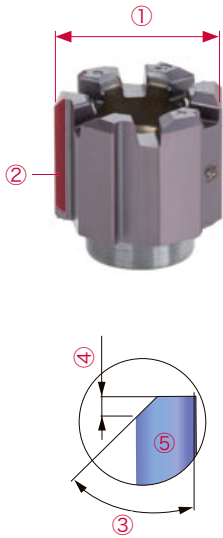


Workpiece material	Hole diameter ϕ (mm)			
	11.500 - 13.500	13.501 - 16.000	16.001 - 26.000	26.001 - 32.000
Steel and cast iron	$\Delta = 0.1 - 0.2$	$\Delta = 0.1 - 0.3$	$\Delta = 0.1 - 0.4$	$\Delta = 0.2 - 0.5$
Aluminum and brass	$\Delta = 0.15 - 0.25$	$\Delta = 0.2 - 0.3$	$\Delta = 0.2 - 0.5$	$\Delta = 0.2 - 0.6$

TAILORED REAMER HEAD

Tungaloy will produce reaming heads with customized diameters and tooth geometries tailored to your specific application needs. Provide the necessary information below or contact your local distributor or Tungaloy sales team.

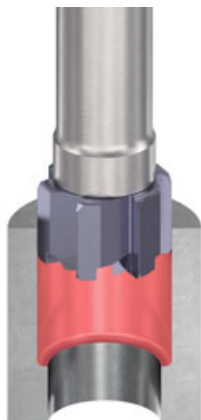
Information sheet for quotation & order



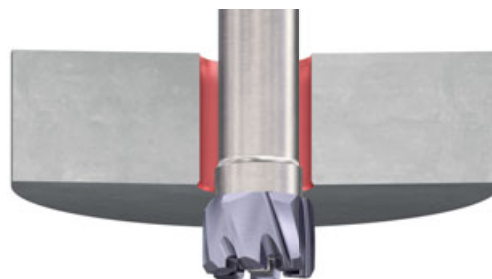
Hole diameter and tolerance	Ø		
Surface finish	☐ Ra	☐ Rz	
Workpiece material			
① Head diameter	Ø (0.001 unit)		
② Flute type	☐ Straight	☐ Helix, Left	☐ Helix, Right
③ Engagement angle	(20° - 90°)		
④ Cutting edge length			
⑤ Corner shape	☐ Up sharp	☐ Round	(R0.2 or higher)
Other specific needs			

Tailored geometry - Samples

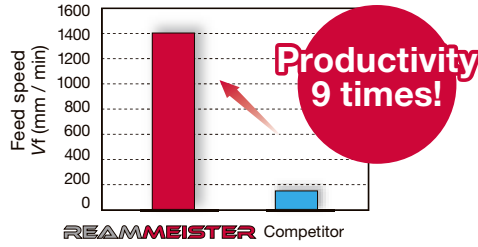
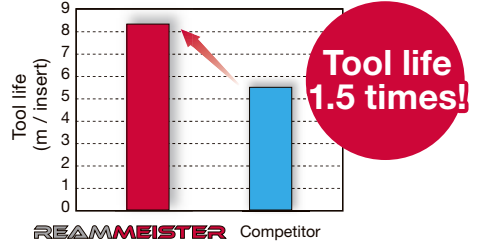
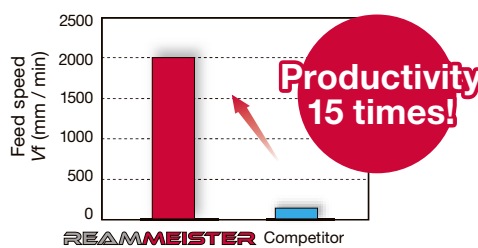
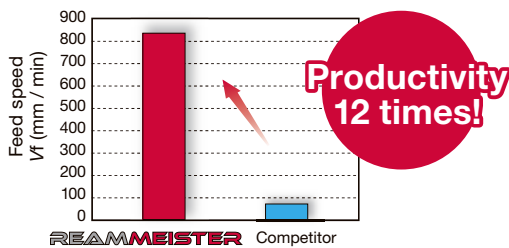
With flat bottom (end milling) edges + round corners

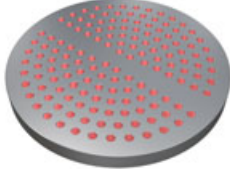
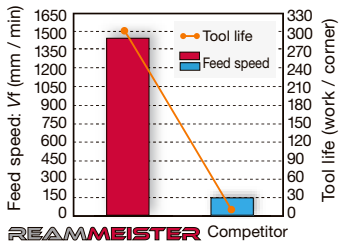
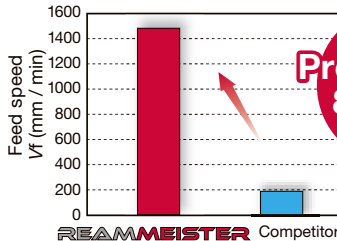
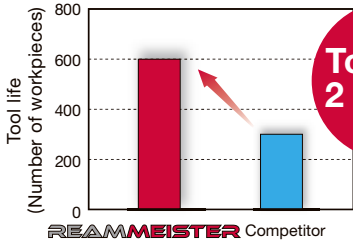
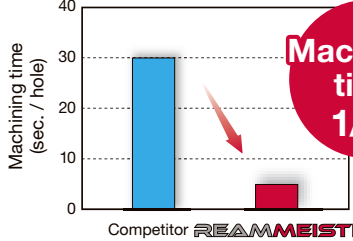


With deburring edges on the back



PRACTICAL EXAMPLES

Workpiece type		Flange yoke	Flange yoke
Tool		TRM-T9-R32-5	TRM-T9-R32-5
Insert		HRM-27.000-BL-T9	HRM-27.000-BL-T9
Grade		AH725	AH725
Workpiece material		FCD500 / GGG50 / 450-10S	S45C / C45
		 K	 P
Cutting conditions	Cutting speed: V_c (m/min)	100	90
	Feed : f (mm/rev)	1.2	0.8
	Feed speed : V_f (mm/min)	1415	850
	Drilling depth : H (mm)	20	15
	Machine	Horizontal M/C	Horizontal M/C
Coolant		Internal	Internal
Results		 Productivity 9 times! Higher cutting speed and feed rates are attainable with ReamMeister over current brazed reamer due to coated insert and optimal edge geometry. 9 times higher productivity is possible with ReamMeister.	 Tool life 1.5 times! Higher cutting speed and feed rates are attainable with ReamMeister over current brazed reamer due to coated insert and optimal edge geometry. 1.5 times longer tool life is possible with ReamMeister.
Workpiece type		Diff case	Hub
Tool		TRM-T9-R32-1.5	TRM-T6-R16-8
Insert		HRM-30.000-BL-T9	TRM-16.000-BL-T6
Grade		AH725	AH725
Workpiece material		FCD500 / GGG50 / 450-10S	S45C / C45
		 K	 P
Cutting conditions	Cutting speed: V_c (m/min)	150	60
	Feed : f (mm/rev)	1.25	0.7
	Feed speed : V_f (mm/min)	1990	836
	Drilling depth : H (mm)	30	18
	Machine	Horizontal M/C	Horizontal M/C
Coolant		Internal	Internal
Results		 Productivity 15 times! ReamMeister, with optimal coolant supply, inhibited edge wear progression, allowing the user to boost machining efficiency by 15x.	 Productivity 12 times! A long overhang tool was needed to avoid tool collision with the workpiece. ReamMeister generated no chatter with increased tool stability. As the result, 12x machining efficiency was achieved.

Workpiece type		Flange yoke	Flange yoke
Tool		TRM-T8-R20-5	TRM-T7-R20-3
Insert		Tailored ø20.050	Tailored ø19.2
Grade		AH725	AH725
Workpiece material		FCD500 / GGG50 / 450-10S	S45C / C45
		 P	 P
Cutting conditions	Cutting speed : V_c (m/min)	170	181
	Feed : f (mm/rev)	0.5	0.5
	Feed speed : V_f (mm/min)	1350	1500
	Drilling depth : H (mm)	100	30
	Machine	NC lathe	Horizontal M/C
Coolant		Internal	Internal
Results		 Productivity 10 times! Tool life 20 times! Higher cutting speed and feed rates are attainable with ReamMeister over current brazed reamer due to coated insert and optimal edge geometry. 10 times higher productivity is possible with ReamMeister.	 Productivity 8 times! Higher cutting speed and feed rates are attainable with ReamMeister over current brazed reamer due to coated insert and optimal edge geometry. 8 times longer tool life is possible with ReamMeister.
Workpiece type		Turbine housing	Turning wheel
Tool		TRM-T7-R20-1.5	TRM-T7-R20-5
Insert		Tailored ø15.5	HRM-20.000-BL-T7
Grade		AH725	AH725
Workpiece material		Steel Casting Stainless	SUS316 / X5CrNiMo17-12-3
		 M	 M
Cutting conditions	Cutting speed : V_c (m/min)	38	100
	Feed : f (mm/rev)	0.9	0.3
	Feed speed : V_f (mm/min)	700	480
	Drilling depth : H (mm)	30	40
	Machine	Horizontal M/C	Horizontal M/C
Coolant		Internal	Internal
Results		 Tool life 2 times! The tool life has doubled due to the special cutting edge geometry that emphasizes fracture resistance.	 Machining time 1/6 ! A solid carbide endmill was used for helical contouring in conventional machining. ReamMeister has shortened the machining time to 1/6.

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