Hole Finishing

Hole Finishing with Kennametal

Owning the entire process chain from raw materials to reconditioning makes Kennametal one of the few sources in the metalworking industry where you can get complete hole finishing tooling, from reaming and fine boring to motion tooling. Kennametal provides customised solutions that are the best fit for any application or machining challenge, without limitations from product portfolio or capacity.

PCD Tooling

- Extremely productive and tailored for satisfying your high-volume production needs.
- Several standard PCD grades, like KD1415™ and KD1425™, are available to provide the highest tool life and cutting data as well as unmatched surface and diameter tolerance quality.
- Platforms are available depending on your application and preference from steel to carbide based, adjustable pocket seats, fine-boring components like Romicron™ or FB cartridges, spindle couplings, or SIF™ steerable adaptors.

Multi-flute Reaming

- RMR™, RMB™, and RMB-E™ tipped reaming.
- RHR™, RHM™, and RHM-E™ modular reaming.
- Highly productive and easy to apply.
- Large, standard, off-the-shelf portfolio of solid carbide, cermet, carbide-tipped, and modular reaming tools, all ground to achieve H7 without any customisation.
- Complex specials with multiple steps, coupling, and length variations are available.
- Intermediate sizes, grades, and lead chamfers available with short delivery.

Motion Tooling

- Sophisticated tooling achieves most challenging tasks.
- Large, customised complex solution portfolio of:
  - — Linear feed-out heads.
  - — Eccentric actuating heads.
  - — Pivot heads.
  - — Cylinder boring tools.
  - — Line boring bars.
  - — Bottle boring tools.
  - — Valve seat and guide tools.
  - — Machining centre tools.
- Depending on your application and preference, tools are based on the positive-stop principle; use drawbars, like with engineered solution machines; or don't require machining centre modification.

Padded Reaming

- RIQ™ Quattro Cut™ and RIR™ reaming systems.
- Highest precision and surface quality achievable but still easy to apply.
- RIQ is the market-leading reaming technology that eliminates back taper adjustment, dramatically reduces setup time while still offering highest accuracy and surface quality, and offers four cutting edges with PCD, CBN, carbide, or cermet.
- RIR provides the most stable pocket seat and fail-safe clamping, from smallest to largest diameters.
- Combine the large, standard RIQ and RIR insert offering with your customised tool body.

Fine Boring

- Romicron™ and ModBORE™ systems.
- Extremely flexible, with an extensive diameter and length range.
- Offers the latest grade technology using standard turning inserts.
- Romicron enables diameter modifications by hand directly at the machine without setup equipment or affecting lock screw accuracy.
- The ModBORE system offers a very large diameter range with each tool along, with roughing to finishing tooling, and can be easily and safely adapted to every KM™ spindle.

● first choice
○ alternate choice

			P	M	K	N	S	H	standard diameter range	standard diameter accuracy	custom solution diameter range	custom solution diameter accuracy	⊕	⌭
reaming tools		**RMS™** Solid *Carbide*	●	●	●	●	○		5–14mm	IT7	1,4–25,4mm	IT6 >10mm	10 µm	7 µm
		**RMR™** Disc Style *Carbide*	●	●	●	●	○		14–20mm	IT7	14–42mm	IT6	10 µm	7 µm
		**RMB™** Cermet Tipped *Cermet*	●		○	○			14–20mm	IT7	14–65mm	IT6	10 µm	7 µm
		**RMB-E™** Expandable Reamer *Carbide/Cermet*	●	●	●	●	○		14–42mm	IT6	14–42mm	IT5–IT6	10 µm	7 µm
		**RHR™** Modular Disc Style *Carbide*	●	●	●	●	○		14–42mm	IT7	14–42mm	IT6	10 µm	7 µm
		**RHM™** Modular Cermet Tipped *Cermet*	●		○	○			14–42mm	IT7	14–50mm	IT6	10 µm	7 µm
		**RHM-E™ (Expandable)** Modular Expandable Reamer *Carbide/Cermet*	●	●	●	●	○		14–42mm	IT6	14–42mm	IT5–IT6	10 µm	7 µm
		**RIR™** Reamer Insert Rectangular *Carbide*	●	●	●	●	●	○	–	–	6–300mm	IT5	10 µm	4 µm
		**Quattro Cut™ RIQ™** Reamer Insert Quattro Cut *Carbide/Cermet/PCD/CBN*	●	●	●	●	●	○	–	–	16–300mm	IT5	10 µm	4 µm
boring/fine-boring tools		**Romicron™ SVU BB** Fine Boring *Carbide/Cermet/PCD/CBN*	●	●	●	●	●	○	4–100mm	IT6	1,6–100mm	IT6	5 µm	5–10 µm
		**Romicron AVS00B–3B/SVS4B–6B** Fine Boring *Carbide/Cermet/PCD/CBN*	●	●	●	●	●	●	25–139mm	IT6	25–183mm	IT6	5 µm	5–10 µm
		**Romicron SVU65/92** Fine Boring *Carbide/Cermet/PCD/CBN*	●	●	●	●	●	○	71–213mm	IT6	10–326mm	IT6	5 µm	5–10 µm
		**Romicron SVS M** Fine Boring *Carbide/Cermet/PCD/CBN*	●	●	●	○	●	○	>40mm	IT6	40–1600mm	IT6	5 µm	5–10 µm
		**ModBORE™ RBHT** Roughing *Carbide/Cermet/PCD/CBN*	●	●	●	●	●		23,5–153mm	IT9	23,5–153mm	IT9	10 µm	>20 µm
		**ModBORE FBHO** Fine Boring *Carbide/Cermet/PCD/CBN*	●	●	●	●	●	○	9,75–88,1mm	IT7	3,0–88,1mm	IT7	5 µm	5–10 µm
		**ModBORE FBHM** Fine Boring *Carbide/Cermet/PCD/CBN*	●	●	●	●	●	○	9,75–320mm	IT7	3,0–320mm	IT7	5 µm	5–10 µm
		**ModBORE FBHS** Fine Boring *Carbide/Cermet/PCD/CBN*	●	●	●	●	●	○	23,5–153mm	IT7	23,5–153mm	IT7	5 µm	5–10 µm
		**ModBORE Bridge Tools** Roughing *Carbide/Cermet/PCD/CBN*	●	●	●	●	●		150–2205mm	IT9	150–2205mm	IT9	10 µm	>20 µm
		**ModBORE Bridge Tools** Fine Boring *Carbide/Cermet/PCD/CBN*	●	●	●	●	●		150–2205mm	IT7	150–2205mm	IT7	5 µm	>10 µm
		**Fine Boring Cartridges** Fine Boring *Carbide/Cermet/PCD/CBN*	●	○	●	●	○		>28mm	IT7	>28mm	IT7	5 µm	5–10 µm
PCD		**PCD** Round Tools *Steel Base*				●			–	–	10–100mm	IT6	10 µm	10 µm
		**PCD** Round Tools *Carbide Base*				●			–	–	5–25mm	IT6	5 µm	7 µm

⌭ Cylindricity
NOTE: Process- and application-dependent.
Highly dependent on the pre-machine hole accuracy.
Use of high-performance drilling/pre-machining tools mandatory to reach values.

⊕ Position
NOTE: Process- and application-dependent.
Highly dependent on the pre-machine hole accuracy.
Use of high-performance drilling/pre-machining tools mandatory to reach values.

achievable surface quality Ra						capability				cost/part	cycle time	required operator experience	page(s)
P	M	K	N	S	H								
0,5–1,0 µm	0,5–1,0 µm	0,5–1,5 µm	–	0,5–1,0 µm	–	●	●	●	●	moderate	low	low	K6–K10
0,2–0,6 µm	0,5–1,0 µm	0,5–1,0 µm	–	0,5–1,0 µm	–	●	●	●	●	low	low	low	K12, K15–K16, K22
0,2–0,6 µm	–	0,5–1,5 µm	0,1–0,6 µm	–	–	●	●	●	●	moderate	low	low	K13, K17–K18, K22
0,5–1,0 µm	0,5–1,0 µm	0,5–1,5 µm	–	0,5–1,0 µm	–	●	●	●	●	moderate	low	moderate	K14, K19–K22
0,2–0,6 µm	0,5–1,0 µm	0,5–1,0 µm	–	0,5–1,0 µm	–	●	●	●	●	moderate	low	low	K24, K27–K28, K36
0,2–0,6 µm	–	0,5–1,5 µm	0,1–0,6 µm	–	–	●	●	●	●	moderate	low	low	K25, K29–K32, K36
0,5–1,0 µm	0,5–1,0 µm	0,5–1,5 µm	–	0,5–1,0 µm	–	●	●	●	●	moderate	low	moderate	K26, K33–K36
0,2–0,6 µm	0,5–1,6 µm	0,5–1,8 µm	0,1–0,6 µm	<08 µm	<08 µm	●	●	●	●	low	moderate	high	K50–K54, K57–K61
0,2–0,6 µm	0,5–1,6 µm	0,5–1,8 µm	0,1–0,6 µm	<08 µm	<08 µm	●	●	●	●	low	moderate	moderate	K50–K52, K54–K61
0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	<1,2 µm	●	●	○	○	low	moderate	low	K72–K76
0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	<1,2 µm	●	●	●	●	low	moderate	low	K78–K82
0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	<1,2 µm	●	●	○	○	low	moderate	low	K84–K85
0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	<1,2 µm	●	●	●	●	low	moderate	low	please contact us
1,0–5,0 µm	1,0–5,0 µm	1,0–5,0 µm	1,0–2,0 µm	1,0–5,0 µm	–	●	●	●	●	low	low	low–moderate	K118–K122
0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	<1,2 µm	●	●	●	●	low	moderate	low–moderate	K124–K125
0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	<1,2 µm	●	●	●	●	low	moderate	low–moderate	K128–K132
0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	<1,2 µm	●	●	●	●	low	moderate	low–moderate	K133–K137
1,0–5,0 µm	1,0–5,0 µm	1,0–5,0 µm	1,0–2,0 µm	1,0–5,0 µm	–	●	●	●	●	low	low	low–moderate	K137–K141
0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	–	●	●	●	●	low	moderate	low–moderate	K137–K141
0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	0,8–2,0 µm	–	●	●	○	○	low	moderate	low–moderate	K111–K113
–	–	–	0,1–0,8 µm	–	–	●	●	●	●	low	very low	moderate	K146–K150
–	–	–	0,1–0,8 µm	–	–	●	●	●	●	low	very low	moderate	K146–K150

Ra Surface roughness

NOTE: Surface roughness values are guidelines and depend on the application, coolant situation, machine, and cutting data applied.

RMS™ Multi-Flute Reaming Tools

RMS™ multi-flute reaming tools achieve the highest metal removal rates in 5–14mm (.197–.551") diameters. All standard reamers are ground to an ISO H7 tolerance class hole to address common applications. Specific coatings and lead configurations enable high-speed machining of steel, stainless steel, cast iron, and non-ferrous materials at accelerated speeds.

Primary Application

Use standard SIF™ steerable hydraulic chucks or SIF adaptors for easy compensation of radial runout and angular inaccuracies of the spindle to achieve the highest possible hole straightness and surface quality.

Features and Benefits

Higher Productivity and Profitability

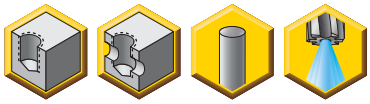
- Longer tool life with increased hole and surface quality due to lapped ground leads.
- Highest metal removal rates at higher speeds and feeds due to reaming-specific grades and substrates.
- Improved straightness and cylindrical form compared to competitive tools, and reduced vibration due to unequal flutes.
- All RMS reamers have internal coolant capability.

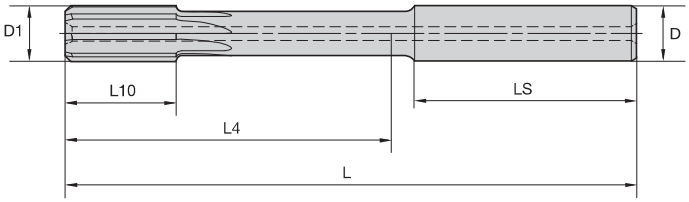
RMS™ multi-flute reaming tools achieve highest metal removal rates from 5–14mm (.197–.551").

Customisation

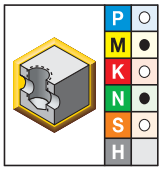
- Diameters 1,40–14,15mm (.055–.557") available with and without internal coolant in 0,001mm (.00004") steps.
- Intermediate diameters of standard programme available as simple specials with short delivery time.
- Solid cermet reaming tools and tooling for heat-resistant materials are available on request.

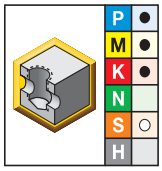
- For hole tolerance H7.
- Intermediate sizes ground to achieve IT7 hole tolerance class available.
- Starting with Ø 10mm in IT6 hole tolerance available.





RMS • Blind Hole Solid Carbide Reamer with Internal Coolant





● first choice
○ alternate choice

K605	KC6305	D1	D	L	L4	L10	LS	Z
RMS05000H7SF	RMS05000H7SF	5,00	6,00	74,0	32,0	12,0	36,0	4
RMS05500H7SF *	RMS05500H7SF	5,50	6,00	74,0	32,0	12,0	36,0	4
RMS06000H7SF	RMS06000H7SF	6,00	6,00	74,0	32,0	12,0	36,0	4
RMS06500H7SF	RMS06500H7SF	6,50	8,00	91,0	49,0	16,0	36,0	4
RMS07000H7SF	RMS07000H7SF	7,00	8,00	91,0	49,0	16,0	36,0	4
RMS08000H7SF	RMS08000H7SF	8,00	8,00	91,0	49,0	16,0	36,0	6
RMS09000H7SF	RMS09000H7SF	9,00	10,00	103,0	57,0	20,0	40,0	6
RMS10000H7SF	RMS10000H7SF	10,00	10,00	103,0	57,0	20,0	40,0	6
RMS11000H7SF	RMS11000H7SF	11,00	12,00	118,0	67,0	24,0	45,0	6
RMS12000H7SF	RMS12000H7SF	12,00	12,00	118,0	67,0	24,0	45,0	6
RMS13000H7SF	RMS13000H7SF	13,00	14,00	132,0	81,0	28,0	45,0	6
RMS14000H7SF	RMS14000H7SF	14,00	14,00	132,0	81,0	28,0	45,0	6

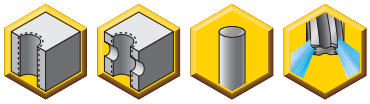
NOTE: *Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.

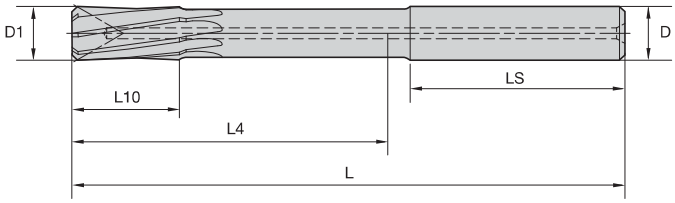
Dimensions for Engineered-Solution Reamers

D1 min	D1 max	D	L	L4	L10	LS	
mm	mm	mm	mm	mm	mm	mm	Z
14,000	15,999	16	147,4	92,4	7,5	49	6
16,000	17,999	20	159,4	102,4	7,5	51	6
18,000	20,000	20	173,4	116,4	7,5	51	6
20,001	22,499	20	202,4	145,4	7,5	51	6
22,500	24,999	20	212,4	155,4	7,5	51	6
25,000	27,499	25	232,4	169,4	7,5	57	8
27,500	29,999	25	242,4	179,4	7,5	57	8
30,000	32,499	25	272,4	209,4	7,5	57	8
32,500	34,999	32	272,4	205,4	7,5	61	8
35,000	37,499	32	272,4	205,4	7,5	61	8
37,500	39,999	32	272,4	205,4	7,5	61	8
40,000	42,500	32	272,4	205,4	7,5	61	8

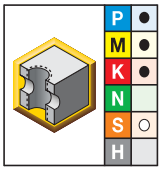
NOTE: The above dimensions are used when ordering engineered-solution reamers on this page unless otherwise specified.

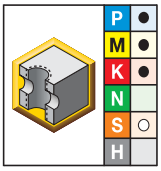
- For hole tolerance H7.
- Intermediate sizes ground to achieve IT7 hole tolerance class available.
- Starting with Ø 10mm in IT6 hole tolerance available.





RMS • Through Hole Solid Carbide Reamer with Internal Coolant





● first choice
○ alternate choice

K605	KC6305	D1	D	L	L4	L10	LS	Z
RMS05000H7HF	RMS05000H7HF	5,00	6,00	74,0	32,0	12,0	36,0	4
RMS05500H7HF	RMS05500H7HF	5,50	6,00	74,0	32,0	12,0	36,0	4
RMS06000H7HF	RMS06000H7HF	6,00	6,00	74,0	32,0	12,0	36,0	4
RMS06500H7HF	RMS06500H7HF	6,50	8,00	91,0	49,0	16,0	36,0	4
RMS07000H7HF	RMS07000H7HF	7,00	8,00	91,0	49,0	16,0	36,0	4
RMS08000H7HF	RMS08000H7HF	8,00	8,00	91,0	49,0	16,0	36,0	6
RMS09000H7HF *	RMS09000H7HF	9,00	10,00	103,0	57,0	20,0	40,0	6
RMS10000H7HF	RMS10000H7HF	10,00	10,00	103,0	57,0	20,0	40,0	6
RMS11000H7HF	RMS11000H7HF	11,00	12,00	118,0	67,0	24,0	45,0	6
RMS12000H7HF	RMS12000H7HF	12,00	12,00	118,0	67,0	24,0	45,0	6
RMS13000H7HF	RMS13000H7HF	13,00	14,00	132,0	81,0	28,0	45,0	6
RMS14000H7HF	RMS14000H7HF	14,00	14,00	132,0	81,0	28,0	45,0	6

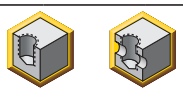
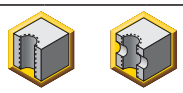
NOTE: *Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.

Dimensions for Engineered-Solution Reamers

D1 min	D1 max	D	L	L4	L10	LS	
mm	mm	mm	mm	mm	mm	mm	Z
14,000	15,999	16	147,4	92,4	7,5	49	6
16,000	17,999	20	159,4	102,4	7,5	51	6
18,000	20,000	20	173,4	116,4	7,5	51	6
20,001	22,499	20	202,4	145,4	7,5	51	6
22,500	24,999	20	212,4	155,4	7,5	51	6
25,000	27,499	25	232,4	169,4	7,5	57	8
27,500	29,999	25	242,4	179,4	7,5	57	8
30,000	32,499	25	272,4	209,4	7,5	57	8
32,500	34,999	32	272,4	205,4	7,5	61	8
35,000	37,499	32	272,4	205,4	7,5	61	8
37,500	39,999	32	272,4	205,4	7,5	61	8
40,000	42,500	32	272,4	205,4	7,5	61	8

NOTE: The above dimensions are used when ordering engineered-solution reamers on this page unless otherwise specified.

RMS™ • Metric

Material Group		 straight flute			 helical flute									
		K605			KC6305			Metric						
		Cutting Speed – vc						Recommended Feed Rate per Tooth						
		Range – m/min						Tool Diameter (mm)	4,16–7,15mm		7,16–9,59mm		9,60–14,00mm	
		min	Starting Value	max	min	Starting Value	max	Feed/ Tooth	min	max	min	max	min	max
P	1	40	**60**	70	90	**120**	155	mm/z	0,05	0,10	0,05	0,12	0,05	0,15
	2	40	**60**	70	90	**120**	155	mm/z	0,05	0,10	0,05	0,12	0,05	0,15
	3	35	**50**	60	75	**100**	130	mm/z	0,05	0,10	0,05	0,12	0,05	0,15
	4	25	**40**	45	60	**80**	105	mm/z	0,05	0,10	0,05	0,12	0,05	0,15
	5	15	**20**	25	30	**40**	55	mm/z	0,04	0,08	0,04	0,10	0,04	0,12
	6	15	**20**	25	30	**40**	55	mm/z	0,04	0,08	0,04	0,10	0,04	0,12
M	1	8	**10**	15	15	**20**	28	mm/z	0,04	0,08	0,04	0,09	0,04	0,10
	2	8	**10**	15	15	**20**	28	mm/z	0,04	0,08	0,04	0,09	0,04	0,10
	3	8	**10**	15	15	**20**	28	mm/z	0,04	0,08	0,04	0,09	0,04	0,10
K	1	35	**50**	60	75	**100**	130	mm/z	0,05	0,16	0,05	0,18	0,05	0,20
	2	25	**40**	50	60	**90**	110	mm/z	0,05	0,14	0,05	0,16	0,05	0,18
	3	20	**30**	45	60	**80**	105	mm/z	0,05	0,12	0,05	0,14	0,05	0,16
N	1	110	**150**	195	–	**–**	–	mm/z	0,06	0,16	0,06	0,18	0,06	0,20
	2	110	**150**	195	–	**–**	–	mm/z	0,06	0,16	0,06	0,18	0,06	0,20
	3	110	**150**	195	–	**–**	–	mm/z	0,06	0,16	0,06	0,18	0,06	0,20
	4	110	**150**	195	–	**–**	–	mm/z	0,06	0,16	0,06	0,18	0,06	0,20
	5	105	**140**	180	–	**–**	–	mm/z	0,06	0,16	0,06	0,18	0,06	0,20
S	1	8	**10**	15	15	**20**	28	mm/z	0,04	0,08	0,04	0,10	0,04	0,12
	2	8	**10**	15	15	**20**	28	mm/z	0,04	0,08	0,04	0,10	0,04	0,12
	3	15	**20**	30	20	**30**	40	mm/z	0,05	0,10	0,05	0,12	0,05	0,15
	4	15	**20**	30	20	**30**	40	mm/z	0,05	0,10	0,05	0,12	0,05	0,15

Revolution in **Crank Boring**

Our asymmetrical line boring bar (LBB) is an ideal solution for crank bore machining. It has the same advantages of a regular LBB, but can be used on machining centres. Setup is done outside of the machine on standard optical presetters. Asymmetrical LBBs feature RI8 inserts made from PCD or carbide, with eight cutting edges per insert for highly economical machining.

Feed in/out

Machining

Ask your Kennametal specialist about asymmetrical line boring.

Experience the advantages at your Authorised Kennametal Distributor or at **kennametal.com**.

KENNAMETAL®

kennametal.com

RMR™ Disc Reaming

Primary Application

In comparison to solid carbide reamers or single-tipped reamers, RMR disc reamers are the economic alternative without disadvantages to productivity or hole quality. Combine RMR disc reamers with the Kennametal SIF™ steerable holder for best results.

Features and Benefits

- Solid carbide disc at front instead of single-tipped carbide blanks.
- Unique coating specifically for reaming applications.
- High-speed and high-performance ready.
- Superior surface finish due to lapped ground leads.
- Improved hole straightness and roundness due to unequal flute spacing (less vibrations) and runout <3 microns.
- Helical and straight flutes for chip control in through and blind holes.
- Adjustment screw with straight-fluted RMR reamers to change internal coolant supply from axial to radial.

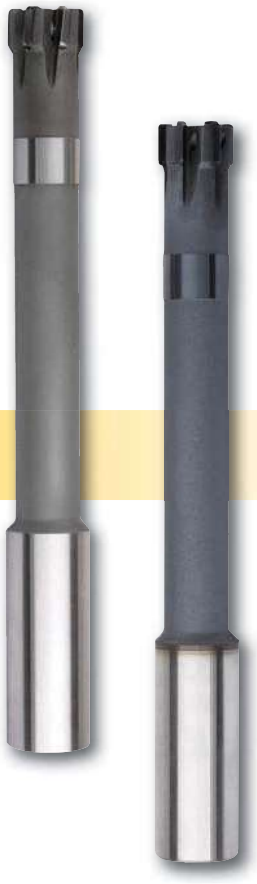
Customisation

- All diameters between 14–42,5mm (.5512–1.6732").
- Variation of leads and cylindrical margin for application-specific optimisation.

RMB™ Cermet Tipped Reamers

Primary Application

RMB™ multi-flute reamers are tipped with cermet blanks and are available in 14–20mm (.5512–.7874") diameters off-the-shelf and up to 50mm (1.968") as custom solutions. Cermet reamers provide excellent tool life and surface finishes in steel applications. Combine RMB reamers with the Kennametal SIF™ steerable holder for best results.



Features and Benefits

Higher productivity and profitability

- Longer tool life with increased hole and surface quality due to lapped ground leads.
- Cermet enables highest metal removal rates at higher speeds and feeds in steel.
- Improved straightness and cylindrical form compared to competitive tools and reduced vibration due to unequal flutes.
- Adjustment screw with straight-fluted RMB reamers to change internal coolant supply from axial to radial.

Customisation

- Diameters up to 50mm (1.968") available with and without internal coolant in 0,001mm (.00004") steps.
- Intermediate diameters from standard offering available as simple specials with short delivery time.
- RMB tooling for machining heat-resistant materials available on request.

RMB-E™ Expandable Reamers

Primary Application

The original idea behind an expansion reamer is to achieve more regrinds. The expansion mechanism is designed for this purpose only.

The Kennametal expandable reaming system is different. It offers a completely linear expansion rate of 2 microns per 30° turn, over an expansion rate of 48 microns. The micron adjustability of this system eliminates manufacturing tolerances and enables machining to the tightest tolerances, typically achieved only by using an uncoated tool or guide pad reaming. No presetting equipment is required.

Features and Benefits

Precision and Productivity

- Use with SIF™ steerable chucks for KST toolholders for easy compensation of radial runout and angular inaccuracies.
- Tools are preadjusted to hit IT6 tolerance.
- Expansion range of 48 microns.
- Completely linear expansion.
- 2 microns per 30° turn.

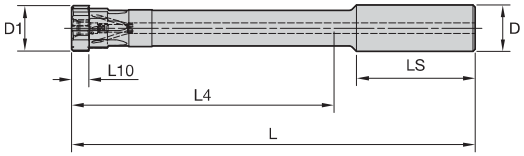
Increased Tool Life

- Longer tool life at smaller tolerances.

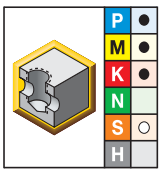
Customisation

- Diameters up to 42mm (1.65") available with helical and straight flutes in 0,001mm (.00004") increments.

- For hole tolerance H7.
- Intermediate sizes ground to achieve IT6 or IT7 hole tolerance class available.
- Adjustment screw to change internal coolant supply from axial to radial.



RMR • Disc Style Reamer • Straight Fluted for Blind Holes with Internal Coolant



● first choice
○ alternate choice

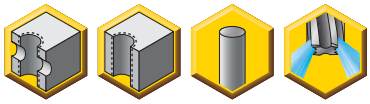
KCU05	D1	D	L	L4	L10	LS	Z
RMR14000H7SF	14,00	16,000	147,4	92,4	7,50	49,00	6
RMR15000H7SF	15,00	16,000	147,4	92,4	7,50	49,00	6
RMR16000H7SF	16,00	20,000	159,4	102,4	7,50	51,00	6
RMR17000H7SF	17,00	20,000	159,4	102,4	7,50	51,00	6
RMR18000H7SF	18,00	20,000	173,4	116,4	7,50	51,00	6
RMR19000H7SF	19,00	20,000	173,4	116,4	7,50	51,00	6
RMR20000H7SF	20,00	20,000	173,4	116,4	7,50	51,00	6

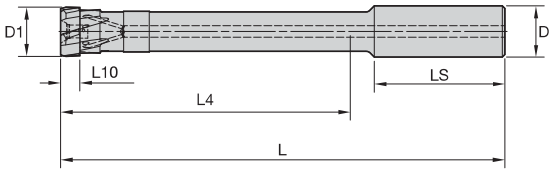
Dimensions for Engineered-Solution Reamers

D1 min	D1 max	D	L	L4	L10	LS	
mm	mm	mm	mm	mm	mm	mm	Z
14,000	15,999	16	147,4	92,4	7,5	49	6
16,000	17,999	20	159,4	102,4	7,5	51	6
18,000	20,000	20	173,4	116,4	7,5	51	6
20,001	22,499	20	202,4	145,4	7,5	51	6
22,500	24,999	20	212,4	155,4	7,5	51	6
25,000	27,499	25	232,4	169,4	7,5	57	8
27,500	29,999	25	242,4	179,4	7,5	57	8
30,000	32,499	25	272,4	209,4	7,5	57	8
32,500	34,999	32	272,4	205,4	7,5	61	8
35,000	37,499	32	272,4	205,4	7,5	61	8
37,500	39,999	32	272,4	205,4	7,5	61	8
40,000	42,500	32	272,4	205,4	7,5	61	8

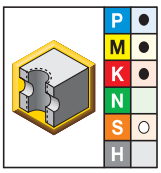
NOTE: The above dimensions are used when ordering engineered-solution reamers on this page unless otherwise specified.

- For hole tolerance H7.
- Intermediate sizes ground to achieve IT6 or IT7 hole tolerance class available.





RMR • Disc Style Reamer • Helical Fluted for Through Holes with Internal Coolant



● first choice
○ alternate choice

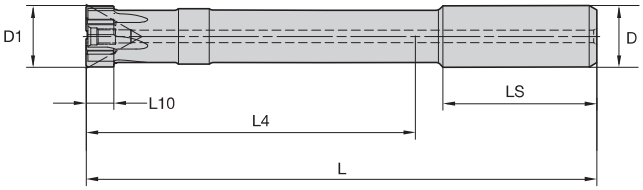
KCU05	D1	D	L	L4	L10	LS	Z
RMR14000H7HF	14,00	16,00	147,4	92,4	7,5	49,00	6
RMR15000H7HF	15,00	16,00	147,4	92,4	7,5	49,00	6
RMR16000H7HF	16,00	20,00	159,4	102,4	7,5	51,00	6
RMR17000H7HF	17,00	20,00	159,4	102,4	7,5	51,00	6
RMR18000H7HF	18,00	20,00	173,4	116,4	7,5	51,00	6
RMR19000H7HF	19,00	20,00	173,4	116,4	7,5	51,00	6
RMR20000H7HF	20,00	20,00	173,4	116,4	7,5	51,00	6

Dimensions for Engineered-Solution Reamers

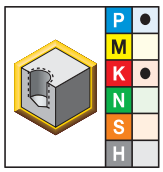
D1 min	D1 max	D	L	L4	L10	LS	
mm	mm	mm	mm	mm	mm	mm	Z
14,000	15,999	16	147,4	92,4	7,5	49	6
16,000	17,999	20	159,4	102,4	7,5	51	6
18,000	20,000	20	173,4	116,4	7,5	51	6
20,001	22,499	20	202,4	145,4	7,5	51	6
22,500	24,999	20	212,4	155,4	7,5	51	6
25,000	27,499	25	232,4	169,4	7,5	57	8
27,500	29,999	25	242,4	179,4	7,5	57	8
30,000	32,499	25	272,4	209,4	7,5	57	8
32,500	34,999	32	272,4	205,4	7,5	61	8
35,000	37,499	32	272,4	205,4	7,5	61	8
37,500	39,999	32	272,4	205,4	7,5	61	8
40,000	42,500	32	272,4	205,4	7,5	61	8

NOTE: The above dimensions are used when ordering engineered-solution reamers on this page unless otherwise specified.

- For hole tolerance H7.
- Intermediate sizes ground to achieve IT6 or IT7 hole tolerance class available.
- Adjustment screw to change internal coolant supply from axial to radial.



RMB • Blind Hole Cermet-Tipped Reamer



● first choice
○ alternate choice

KT6215	D1	D	L	L4	L10	LS	Z
RMB14000H7SF *	14,00	16,00	145,0	76,0	8,0	49,0	6
RMB15000H7SF	15,00	16,00	145,0	76,0	8,0	49,0	6
RMB16000H7SF	16,00	20,00	157,0	86,0	8,0	51,0	6
RMB17000H7SF *	17,00	20,00	157,0	86,0	8,0	51,0	6
RMB18000H7SF *	18,00	20,00	171,0	100,0	8,0	51,0	6
RMB19000H7SF *	19,00	20,00	171,0	100,0	8,0	51,0	6
RMB20000H7SF *	20,00	20,00	200,0	129,0	8,0	51,0	6

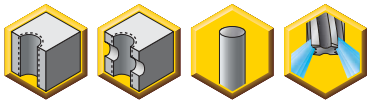
NOTE: Uncoated carbide grade K605™ and uncoated cermet grade KT325™ are available on request.
*Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.

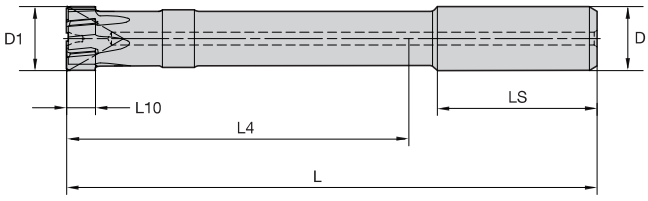
Dimensions for Engineered-Solution Reamers

D1 min	D1 max	D	L	L4	L10	LS	
mm	mm	mm	mm	mm	mm	mm	Z
14,000	15,999	16	145	76	8	49	6
16,000	17,999	20	157	86	8	51	6
18,000	19,999	20	171	100	8	51	6
20,000	21,999	20	200	129	8	51	6
22,000	25,999	20	210	139	10	51	6
26,000	29,999	25	240	163	10	57	8
30,000	32,000	25	270	193	12	57	8

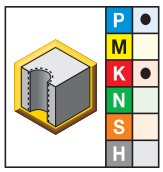
NOTE: The above dimensions are used when ordering engineered-solution reamers on this page unless otherwise specified.

- For hole tolerance H7.
- Intermediate sizes ground to achieve IT6 or IT7 hole tolerance class available.
- Adjustment screw to change internal coolant supply from axial to radial.





RMB • Through Hole Cermet-Tipped Reamer



● first choice
○ alternate choice

KT6215	D1	D	L	L4	L10	LS	Z
RMB14000H7HF *	14,00	16,00	145,0	76,0	7,6	49,0	6
RMB15000H7HF *	15,00	16,00	145,0	76,0	7,6	49,0	6
RMB16000H7HF	16,00	20,00	157,0	86,0	7,6	51,0	6
RMB18000H7HF *	18,00	20,00	171,0	100,0	7,6	51,0	6
RMB19000H7HF *	19,00	20,00	171,0	100,0	7,6	51,0	6
RMB20000H7HF *	20,00	20,00	200,0	129,0	7,6	51,0	6

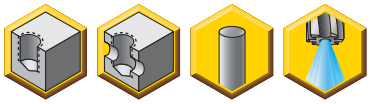
NOTE: Uncoated carbide grade K605™ is available on request.
*Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.

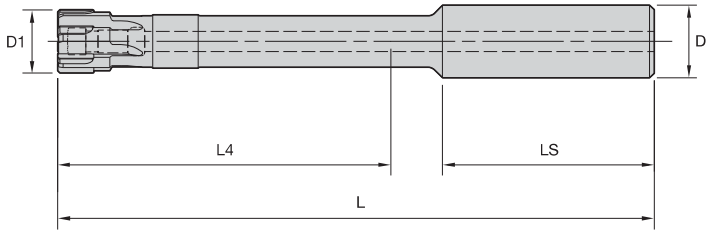
Dimensions for Engineered-Solution Reamers

D1 min	D1 max	D	L	L4	L10	LS	
mm	mm	mm	mm	mm	mm	mm	Z
14,000	15,999	16	145	76	8	49	6
16,000	17,999	20	157	86	8	51	6
18,000	19,999	20	171	100	8	51	6
20,000	21,999	20	200	129	8	51	6
22,000	25,999	20	210	139	10	51	6
26,000	29,999	25	240	163	10	57	8
30,000	32,000	25	270	193	12	57	8

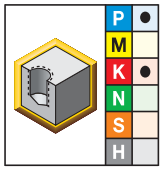
NOTE: The above dimensions are used when ordering engineered-solution reamers on this page unless otherwise specified.

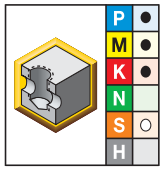
- For hole tolerance H6.
- Intermediate sizes available.
- Allen expansion screw.





RMB-E • Blind Hole Expansion Reamer





● first choice
○ alternate choice

KC6005	KC6305	D1	D	L	L4	LS	Z
RMBE14000H6SF *	RMBE14000H6SF	14,00	16,00	131,5	72,5	49,0	6
RMBE15000H6SF *	RMBE15000H6SF *	15,00	16,00	136,5	77,5	49,0	6
RMBE16000H6SF *	RMBE16000H6SF *	16,00	20,00	143,5	82,5	54,4	6
RMBE17000H6SF *	RMBE17000H6SF *	17,00	20,00	148,5	87,5	51,0	6
RMBE18000H6SF *	RMBE18000H6SF *	18,00	20,00	153,5	92,5	51,0	6
RMBE19000H6SF *	RMBE19000H6SF	19,00	20,00	158,5	97,5	51,0	6
RMBE20000H6SF *	RMBE20000H6SF *	20,00	25,00	169,8	102,5	57,0	6

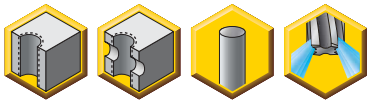
NOTE: Uncoated carbide grade K605™ and uncoated cermet grade KT325™ are available on request.
*Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.

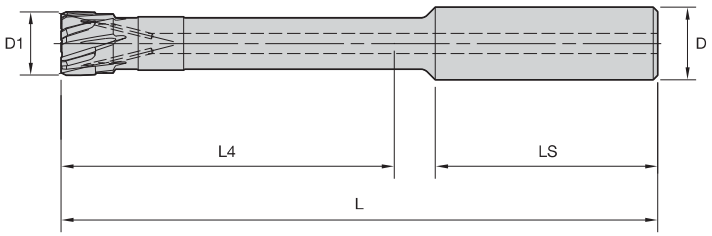
Dimensions for Engineered-Solution Reamers

D1 min	D1 max	D	L	L4	LS	
mm	mm	mm	mm	mm	mm	Z
14,000	14,499	16	131,5	72,5	49	6
14,500	14,999	16	134,0	75,0	49	6
15,000	15,499	16	136,5	77,5	49	6
15,500	15,999	16	139,0	80,0	49	6
16,000	16,499	20	143,5	82,5	51	6
16,500	16,999	20	146,0	85,0	51	6
17,000	17,499	20	148,5	87,5	51	6
17,500	17,999	20	151,0	90,0	51	6
18,000	18,499	20	153,5	92,5	51	6
18,500	18,999	20	156,0	95,0	51	6
19,000	19,499	20	158,5	97,5	51	6
19,500	19,999	20	161,0	100,0	51	6
20,000	20,499	25	169,8	102,5	57	6

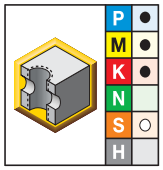
NOTE: The above dimensions are used when ordering engineered-solution reamers on this page unless otherwise specified.
Custom expandable reamers available starting from a diameter of 8mm.

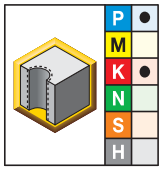
- For hole tolerance H6.
- Intermediate sizes available.
- Allen expansion screw.





RMB-E • Through Hole Expansion Reamer





● first choice
○ alternate choice

KC6005	KC6305	D1	D	L	L4	LS	Z
RMBE14000H6HF	RMBE14000H6HF *	14,00	16,00	131,5	72,5	49,0	6
RMBE15000H6HF *	RMBE15000H6HF	15,00	16,00	136,5	77,5	49,0	6
RMBE16000H6HF *	RMBE16000H6HF	16,00	20,00	143,5	82,5	51,0	6
RMBE17000H6HF *	RMBE17000H6HF *	17,00	20,00	148,5	87,5	51,0	6
RMBE18000H6HF *	RMBE18000H6HF	18,00	20,00	153,5	92,5	51,0	6
RMBE19000H6HF *	RMBE19000H6HF *	19,00	20,00	158,5	97,5	51,0	6
RMBE20000H6HF *	RMBE20000H6HF	20,00	25,00	169,8	102,5	57,0	6

NOTE: Uncoated carbide grade K605™ is available on request.
*Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.

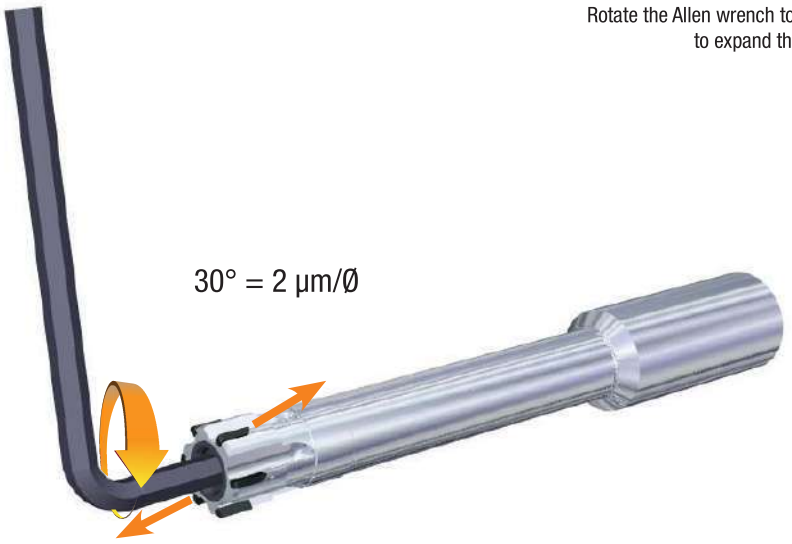
Dimensions for Engineered-Solution Reamers

D1 min	D1 max	D	L	L4	LS	
mm	mm	mm	mm	mm	mm	Z
14,000	14,499	16	131,5	72,5	49	6
14,500	14,999	16	134,0	75,0	49	6
15,000	15,499	16	136,5	77,5	49	6
15,500	15,999	16	139,0	80,0	49	6
16,000	16,499	20	143,5	82,5	51	6
16,500	16,999	20	146,0	85,0	51	6
17,000	17,499	20	148,5	87,5	51	6
17,500	17,999	20	151,0	90,0	51	6
18,000	18,499	20	153,5	92,5	51	6
18,500	18,999	20	156,0	95,0	51	6
19,000	19,499	20	158,5	97,5	51	6
19,500	19,999	20	161,0	100,0	51	6
20,000	20,499	25	169,8	102,5	57	6

NOTE: The above dimensions are used when ordering engineered-solution reamers on this page unless otherwise specified.
Custom expandable reamers available starting with a diameter of 8mm.

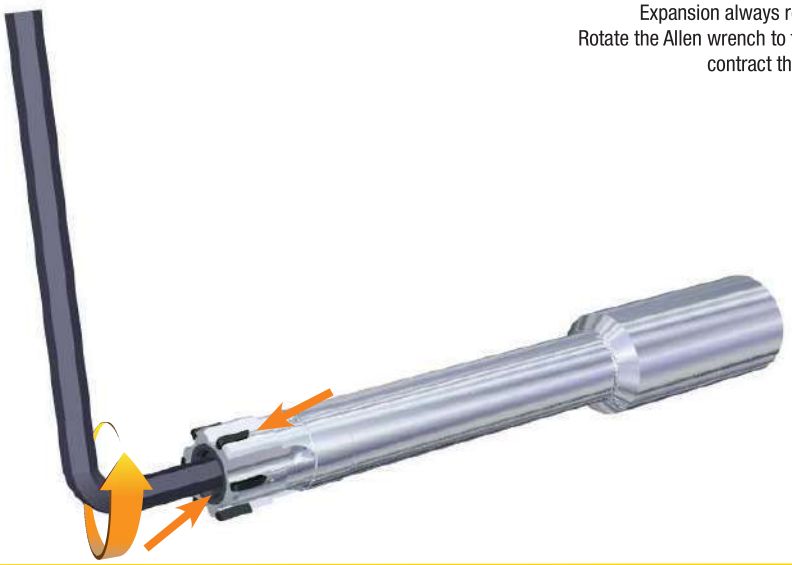
To Expand

Rotate the Allen wrench to the right to expand the reamer.



To Contract

Expansion always reversible: Rotate the Allen wrench to the left to contract the reamer.



- 30° = 2 µm linear expansion.
- 720° = 2 revolutions; = 48µm maximum expansion.
- Hard stop after 720° expansion. You cannot over expand!
- The expansion occurs in the elastic material behaviour.
- You cannot reduce the diameter below D1.

RMR • Metric

Material Group		KCU05 Cutting Speed — vc Range — m/min min	Starting Value	max	Metric Recommended Feed Rate per Tooth Tool Diameter (mm)	14,00–19,99mm min	max	20,00–32,00mm min	max
					Feed/Tooth				
P	1	90	**120**	155	mm/z	0,10	0,22	0,10	0,25
	2	90	**120**	155	mm/z	0,10	0,22	0,10	0,25
	3	75	**100**	130	mm/z	0,10	0,22	0,10	0,25
	4	50	**80**	105	mm/z	0,10	0,22	0,10	0,25
	5	30	**40**	60	mm/z	0,10	0,22	0,10	0,25
	6	30	**40**	60	mm/z	0,08	0,20	0,08	0,22
M	1	15	**20**	40	mm/z	0,08	0,18	0,08	0,20
	2	15	**20**	30	mm/z	0,08	0,18	0,08	0,20
	3	15	**20**	30	mm/z	0,08	0,18	0,08	0,20
K	1	80	**110**	130	mm/z	0,10	0,22	0,10	0,25
	2	65	**90**	110	mm/z	0,10	0,22	0,10	0,25
	3	50	**70**	90	mm/z	0,10	0,20	0,10	0,25
S	1	15	**20**	30	mm/z	0,10	0,18	0,10	0,20
	2	15	**20**	30	mm/z	0,10	0,18	0,10	0,20
	3	20	**30**	40	mm/z	0,10	0,20	0,10	0,20
	4	20	**30**	40	mm/z	0,10	0,20	0,10	0,20

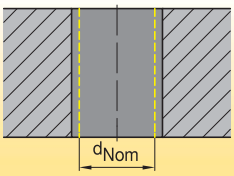
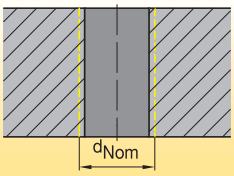
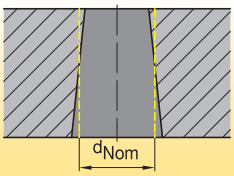
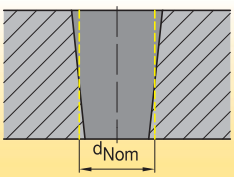
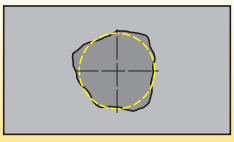
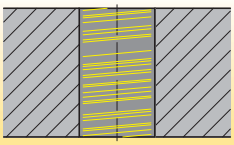
RMB™ and RMB-E™ • Metric

Material Group		RMB — Cermet Tipped straight flute KT6215 Cutting Speed — vc Range — m/min min	Starting Value	max	RMB — Cermet Tipped helical flute KT6215 min	Starting Value	max	RMB-E straight flute K605 min	Starting Value	max	RMB-E helical flute KC6305 min	Starting Value	max	Metric Recommended Feed Rate per Tooth Tool Diameter (mm) Feed/ Tooth	14,00–19,99mm min	max	20,00–32,00mm min	max
P	1	150	**180**	210	180	**210**	240	40	**60**	70	90	**120**	155	mm/z	0,10	0,22	0,10	0,25
	2	150	**180**	210	180	**210**	240	40	**60**	70	90	**120**	155	mm/z	0,10	0,22	0,10	0,25
	3	130	**160**	180	150	**180**	210	30	**40**	50	75	**100**	130	mm/z	0,10	0,22	0,10	0,25
	4	100	**130**	150	120	**150**	170	25	**40**	45	50	**80**	105	mm/z	0,10	0,22	0,10	0,25
	5	80	**100**	120	100	**130**	150	10	**20**	30	30	**40**	55	mm/z	0,08	0,20	0,08	0,22
	6	80	**100**	120	100	**130**	150	10	**20**	30	30	**40**	55	mm/z	0,08	0,20	0,08	0,22
M	1	–	**–**	–	–	**–**	–	8	**10**	15	15	**20**	28	mm/z	0,08	0,18	0,08	0,20
	2	–	**–**	–	–	**–**	–	8	**10**	15	15	**20**	28	mm/z	0,08	0,18	0,08	0,20
	3	–	**–**	–	–	**–**	–	8	**10**	15	15	**20**	28	mm/z	0,08	0,18	0,08	0,20
K	1	150	**180**	200	180	**210**	240	30	**50**	60	80	**110**	130	mm/z	0,10	0,22	0,10	0,25
	2	130	**160**	180	150	**180**	210	25	**40**	45	65	**90**	110	mm/z	0,10	0,22	0,10	0,25
	3	100	**130**	160	120	**150**	170	20	**30**	40	50	**70**	90	mm/z	0,10	0,20	0,10	0,22
N	1	–	**–**	–	–	**–**	–	110	**150**	195	–	**–**	–	mm/z	0,10	0,30	0,10	0,30
	2	–	**–**	–	–	**–**	–	110	**150**	195	–	**–**	–	mm/z	0,10	0,30	0,10	0,30
	3	–	**–**	–	–	**–**	–	110	**150**	195	–	**–**	–	mm/z	0,10	0,30	0,10	0,30
	4	–	**–**	–	–	**–**	–	110	**150**	195	–	**–**	–	mm/z	0,10	0,30	0,10	0,30
	5	–	**–**	–	–	**–**	–	105	**140**	180	–	**–**	–	mm/z	0,10	0,30	0,10	0,30
S	1	–	**–**	–	–	**–**	–	8	**10**	15	15	**20**	28	mm/z	0,10	0,18	0,10	0,20
	2	–	**–**	–	–	**–**	–	8	**10**	15	15	**20**	28	mm/z	0,10	0,18	0,10	0,20
	3	–	**–**	–	–	**–**	–	15	**20**	30	20	**30**	40	mm/z	0,10	0,20	0,10	0,20
	4	–	**–**	–	–	**–**	–	15	**20**	30	20	**30**	40	mm/z	0,10	0,20	0,10	0,20

Reaming Allowances for Multi-Blade Reaming

	reaming allowances in diameter mm		
mm	min	middle	max
1,40–4,80	0,08	0,12	0,20
4,81–9,59	0,10	0,15	0,25
9,60–15,00	0,15	0,20	0,30
15,00–20,00	0,15	0,25	0,35
20,00–50,00	0,20	0,30	0,40

Troubleshooting

Problem		Cause	Possible Remedy
Hole diameter too large.		• Reaming tool running out-of-centre. • Concentricity of pilot hole and ream machining unsatisfactory. • Built-up edge. • Unsuitable cooling lubricant. • Reaming tool diameter too large.	• Use equalising adaptor. • Re-align, use floating head. • Change cooling lubricant. • Change cutting speed. • Measure reamers and send for repairs.
Hole diameter too small.		• Reamer worn. • Unsuitable cooling lubricant. • Reaming allowance too small.	• Replace and refit tool. • Change cooling lubricant. • Increase reaming allowance.
Conical hole profile wider towards drill runout.		• Concentricity of pilot hole and reaming unsatisfactory. • Positioning accuracy of pilot hole to reaming.	• Re-align, use equalising adaptor. • Correct positioning accuracy.
Conical hole profile wider at drill entry point.		• Concentricity of pilot hole and reaming unsatisfactory. • Reaming tool skim cutting with ledger.	• Re-align, use floating head. • Securely clamp reaming tool axially.
Hole out-of-centre and/or showing chatter marks.		• Reaming tool running out-of-centre. • Slanted cutting surface/asymmetrical cutting. • Workpiece twisted.	• Use equalising adaptor. • Spot face as drilling preparation. • Take the direction of impact into account when clamping the workpiece.
Surface quality does not meet specification.		• Tool cutters worn. • Reaming tool running out-of-centre. • Incorrect technology data (cutting parameters). • Inadequate chip evacuation.	• Use equalising adaptor. • Re-align, use floating head. • Change cooling lubricant. • Change cutting speed. • Measure reamers and send for repairs.
Feed grooves.		• Built-up edge.	• Change cooling lubricant. • Change cutting speed.

RHR™ Disc Reaming

Primary Application

The RHR modular disc reaming system combines the productivity of disc reamers with the idea of interchangeable reaming heads. Only five coupling sizes cover the whole diameter range, a comfortable interchange mechanism, and no need for setting fixtures or repeat measurements makes this system very attractive. Combine RHR disc reamers with the Kennametal SIF™ steerable holder for the best results.

Features and Benefits

- Solid carbide disc at front instead of single-tipped carbide blanks.
- Unique coating specifically for reaming applications.
- Unique patented coupling system enables same runout accuracy as monoblock systems (<3 microns), eliminating repeat runout checking.
- Quick radial clamping change-outs, even in narrow situations.
- No fixture for clamping or dismounting necessary.
- Helical and straight flutes for chip control in through and blind holes.
- Bodies available with straight shank, HSK back end, and SIF connection.

Customisation

- All diameters between 14–42,5mm (.5512–1.6732").
- Variation of leads and cylindrical margin for application-specific optimisation.

RHM™ Modular Cermet-Tipped System

Primary Application

RHM modular reamers are tipped with cermet blanks and available in diameters from 14–42,5mm (.5512–1.6732") as standards, and up to 50mm (1.968") as custom solutions. Cermet reamers provide excellent tool life and surface finishes in steel applications. Combine RHM modular reamers with the Kennametal SIF™ steerable holder for best results.

Use SIF steerable hydraulic chucks or SIF adapters for easy compensation of radial runout and angular inaccuracies of the spindle to achieve the highest possible hole straightness and surface quality. Radial or axial tool bodies are available at diameter 20mm.

Features and Benefits

Taper-Face Contact with KST Coupling

- Symmetrical torque transmission near head.
- Higher feed rate than conventional reaming tools.
- Better surface quality and tool life due to less tendency to vibrate.
- No need for head to body orientation.

Customisation

- Diameters up to 50mm (1.968") available with and without internal coolant in 0,001mm (.00004") steps.
- Intermediate diameters from standard offering available with short delivery time.
- RHM tooling for machining heat-resistant materials, as well as different lengths and couplings or shanks, available on request.

Higher productivity and profitability

- Longer tool life with increased hole and surface quality due to lapped ground leads.
- Cermet enables highest metal removal rates at higher speeds and feeds in steel.
- Improved straightness and cylindrical form compared to competitive tools and reduced vibration tendency due to unequal flutes.

RHM-E™ Expandable Reamers

Primary Application

The original idea behind an expansion reamer is to achieve more regrinds. The expansion mechanism is designed for this purpose only.

The Kennametal expandable reaming system is different. Over an expansion range of 48 microns, it comes with a completely linear expansion rate of 2 microns per 30° turn. The micron-adjustability of this system eliminates manufacturing tolerances and thus allows for machining tightest tolerances, usually only achievable by using an uncoated tool or guide pad reaming. No pre-setting equipment is required.

Features and Benefits

Precision and Productivity

- Use with SIF™ steerable chucks for KST toolholders for easy compensation of radial runout and angular inaccuracies.
- Tools are preadjusted to hit IT6 tolerance.
- Expansion range of 48 microns.
- Completely linear expansion.
- 2 microns per 30° turn.

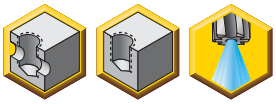
Increased Tool Life

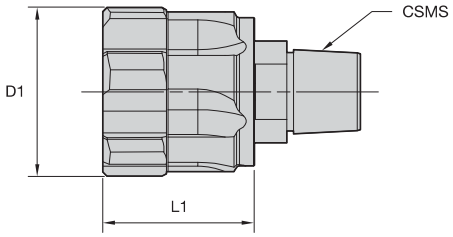
- Longer tool life at smaller tolerances.

Customisation

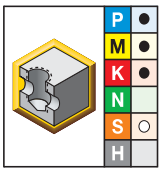
- Diameters up to 42mm (1.65") available with helical and straight flutes in 0,001mm (.00004") increments.

- For hole tolerance H7.
- Intermediate sizes ground to achieve IT6 or IT7 hole tolerance class available.
- Please order lock screw and retention knob separately.





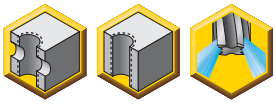
RHR • Disc Style Reamer Head • Straight Fluted for Blind Holes with Internal Coolant

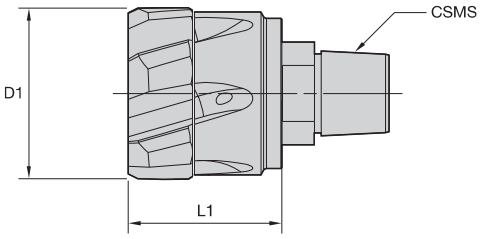


● first choice
○ alternate choice

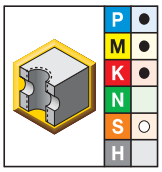
KCU05	CSMS system size	D1	L1	Z
RHR14000KST115H7SF	KST115	14,00	17,90	6
RHR15000KST115H7SF	KST115	15,00	17,90	6
RHR16000KST135H7SF	KST135	16,00	17,90	6
RHR17000KST135H7SF	KST135	17,00	17,90	6
RHR18000KST155H7SF	KST155	18,00	17,90	6
RHR19000KST155H7SF	KST155	19,00	17,90	6
RHR20000KST175H7SF	KST175	20,00	17,90	6
RHR21000KST175H7SF	KST175	21,00	17,90	6
RHR22000KST175H7SF	KST175	22,00	17,90	6
RHR23000KST200H7SF	KST200	23,00	18,90	6
RHR24000KST200H7SF	KST200	24,00	18,90	6
RHR25000KST200H7SF	KST200	25,00	18,90	8
RHR26000KST200H7SF	KST200	26,00	18,90	8
RHR27000KST200H7SF	KST200	27,00	18,90	8
RHR28000KST250H7SF	KST250	28,00	18,90	8
RHR29000KST250H7SF	KST250	29,00	18,90	8
RHR30000KST250H7SF	KST250	30,00	18,90	8
RHR31000KST250H7SF	KST250	31,00	18,90	8
RHR32000KST250H7SF	KST250	32,00	18,90	8
RHR33000KST300H7SF	KST300	33,00	20,40	8
RHR34000KST300H7SF	KST300	34,00	20,40	8
RHR35000KST300H7SF	KST300	35,00	20,40	8
RHR36000KST300H7SF	KST300	36,00	20,40	8
RHR37000KST300H7SF	KST300	37,00	20,40	8
RHR38000KST350H7SF	KST350	38,00	20,40	8
RHR39000KST350H7SF	KST350	39,00	20,40	8
RHR40000KST350H7SF	KST350	40,00	20,40	8
RHR41000KST350H7SF	KST350	41,00	20,40	8
RHR42000KST350H7SF	KST350	42,00	20,40	8

- For hole tolerance H7.
- Intermediate sizes ground to achieve IT6 or IT7 hole tolerance class available.
- Please order lock screw and retention knob separately.





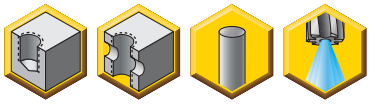
RHR • Disc Style Reamer Head • Helical Fluted for Through Holes with Internal Coolant

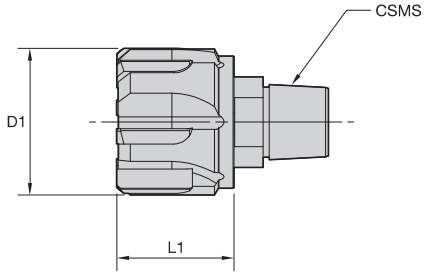


● first choice
○ alternate choice

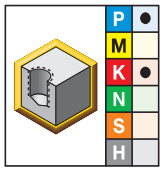
KCU05	CSMS system size	D1	L1	Z
RHR14000KST115H7HF	KST115	14,00	17,90	6
RHR15000KST115H7HF	KST115	15,00	17,90	6
RHR16000KST135H7HF	KST135	16,00	17,90	6
RHR17000KST135H7HF	KST135	17,00	17,90	6
RHR18000KST155H7HF	KST155	18,00	17,90	6
RHR19000KST155H7HF	KST155	19,00	17,90	6
RHR20000KST175H7HF	KST175	20,00	17,90	6
RHR21000KST175H7HF	KST175	21,00	17,90	6
RHR22000KST175H7HF	KST175	22,00	17,90	6
RHR23000KST200H7HF	KST200	23,00	18,90	6
RHR24000KST200H7HF	KST200	24,00	18,90	6
RHR25000KST200H7HF	KST200	25,00	18,90	8
RHR26000KST200H7HF	KST200	26,00	18,90	8
RHR27000KST200H7HF	KST200	27,00	18,90	8
RHR28000KST250H7HF	KST250	28,00	18,90	8
RHR29000KST250H7HF	KST250	29,00	18,90	8
RHR30000KST250H7HF	KST250	30,00	18,90	8
RHR31000KST250H7HF	KST250	31,00	18,90	8
RHR32000KST250H7HF	KST250	32,00	18,90	8
RHR33000KST300H7HF	KST300	33,00	20,40	8
RHR34000KST300H7HF	KST300	34,00	20,40	8
RHR35000KST300H7HF	KST300	35,00	20,40	8
RHR36000KST300H7HF	KST300	36,00	20,40	8
RHR37000KST300H7HF	KST300	37,00	20,40	8
RHR38000KST350H7HF	KST350	38,00	20,40	8
RHR39000KST350H7HF	KST350	39,00	20,40	8
RHR40000KST350H7HF	KST350	40,00	20,40	8
RHR41000KST350H7HF	KST350	41,00	20,40	8
RHR42000KST350H7HF	KST350	42,00	20,40	8

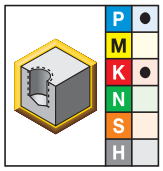
- For hole tolerance H7.
- Intermediate sizes ground to achieve IT6 or IT7 hole tolerance class available.
- Please order lock screw for axial use or retention knob separately.





RHM • Blind Hole Cermet Tipped Reamer



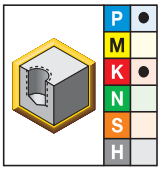


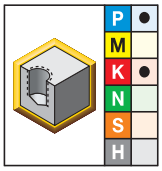
● first choice
○ alternate choice

KT325	KT6215	CSMS system size	D1	L1	Z
RHM14000KST115H7SF *	RHM14000KST115H7SF	KST115	14,00	13,50	6
RHM14288KST115H7SF *	RHM14288KST115H7SF	KST115	14,29	13,50	6
RHM15000KST115H7SF *	–	KST115	15,00	13,50	6
RHM15875KST115H7SF *	RHM15875KST115H7SF	KST115	15,88	13,50	6
RHM16000KST135H7SF *	RHM16000KST135H7SF	KST135	16,00	13,50	6
RHM17000KST135H7SF *	RHM17000KST135H7SF *	KST135	17,00	15,50	6
RHM17463KST135H7SF *	–	KST135	17,46	15,50	6
RHM18000KST155H7SF	RHM18000KST155H7SF	KST155	18,00	15,50	6
RHM19000KST155H7SF *	–	KST155	19,00	15,50	6
–	RHM19050KST155H7SF *	KST155	19,05	15,50	6
RHM20000KST175H7SF	RHM20000KST175H7SF	KST175	20,00	15,50	6
RHM20640KST175H7SF *	RHM20640KST175H7SF *	KST175	20,64	15,50	6
RHM21000KST175H7SF *	RHM21000KST175H7SF	KST175	21,00	15,50	6
–	RHM22000KST175H7SF *	KST175	22,00	15,50	6
RHM22230KST175H7SF *	RHM22230KST175H7SF *	KST175	22,23	15,50	6
RHM22500KST200H7SF *	RHM22500KST200H7SF *	KST200	22,50	16,50	6
RHM23000KST200H7SF *	RHM23000KST200H7SF *	KST200	23,00	16,50	6
RHM23810KST200H7SF *	RHM23810KST200H7SF *	KST200	23,81	16,50	6
RHM24000KST200H7SF *	RHM24000KST200H7SF *	KST200	24,00	16,50	6
RHM25000KST200H7SF *	RHM25000KST200H7SF	KST200	25,00	16,50	6
RHM25400KST200H7SF *	RHM25400KST200H7SF *	KST200	25,40	16,50	6
RHM26000KST200H7SF *	–	KST200	26,00	16,50	8
RHM26990KST200H7SF *	RHM26990KST200H7SF *	KST200	26,99	16,50	8
RHM27000KST200H7SF	RHM27000KST200H7SF *	KST200	27,00	16,50	8

(continued)

(RHM • Blind Hole Cermet Tipped Reamer — continued)



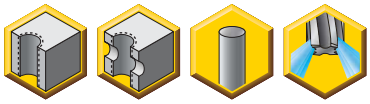


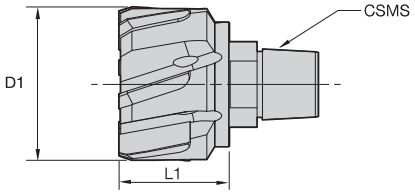
● first choice
○ alternate choice

KT325	KT6215	CSMS system size	D1	L1	Z
RHM27500KST250H7SF *	RHM27500KST250H7SF *	KST250	27,50	16,50	8
RHM28000KST250H7SF *	RHM28000KST250H7SF	KST250	28,00	16,50	8
RHM28580KST250H7SF *	RHM28580KST250H7SF *	KST250	28,58	16,50	8
RHM29000KST250H7SF	RHM29000KST250H7SF *	KST250	29,00	16,50	8
RHM30000KST250H7SF	RHM30000KST250H7SF *	KST250	30,00	16,50	8
RHM30160KST250H7SF *	–	KST250	30,16	16,50	8
RHM31000KST250H7SF *	RHM31000KST250H7SF *	KST250	31,00	16,50	8
RHM31750KST250H7SF *	RHM31750KST250H7SF *	KST250	31,75	16,50	8
RHM32000KST250H7SF *	–	KST250	32,00	16,50	8
RHM32500KST300H7SF *	RHM32500KST300H7SF *	KST300	32,50	18,00	8
RHM33000KST300H7SF *	RHM33000KST300H7SF *	KST300	33,00	18,00	8
RHM33340KST300H7SF *	RHM33340KST300H7SF *	KST300	33,34	18,00	8
RHM34000KST300H7SF *	–	KST300	34,00	18,00	8
RHM34930KST300H7SF *	RHM34930KST300H7SF *	KST300	34,93	18,00	8
RHM35000KST300H7SF *	RHM35000KST300H7SF *	KST300	35,00	18,00	8
RHM36000KST300H7SF *	RHM36000KST300H7SF *	KST300	36,00	18,00	8
RHM36510KST300H7SF *	RHM36510KST300H7SF *	KST300	36,51	18,00	8
RHM37000KST300H7SF *	–	KST300	37,00	18,00	8
RHM37500KST350H7SF *	RHM37500KST350H7SF *	KST350	37,50	18,00	8
RHM38000KST350H7SF *	RHM38000KST350H7SF *	KST350	38,00	18,00	8
RHM38100KST350H7SF *	RHM38100KST350H7SF *	KST350	38,10	18,00	8
RHM39000KST350H7SF *	RHM39000KST350H7SF *	KST350	39,00	18,00	8
RHM39690KST350H7SF *	RHM39690KST350H7SF *	KST350	39,69	18,00	8
–	RHM40000KST350H7SF *	KST350	40,00	18,00	8
RHM41000KST350H7SF *	RHM41000KST350H7SF *	KST350	41,00	18,00	8
RHM41280KST350H7SF *	RHM41280KST350H7SF *	KST350	41,28	18,00	8
RHM42000KST350H7SF	RHM42000KST350H7SF *	KST350	42,00	18,00	8

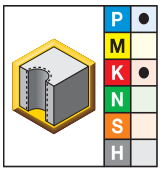
NOTE: *Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.

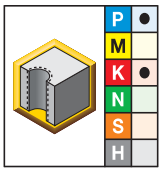
- For hole tolerance H7.
- Intermediate sizes ground to achieve IT6 or IT7 hole tolerance class available.
- Please order lock screw for axial use or retention knob separately.





RHM • Through Hole Cermet Tipped Reamer



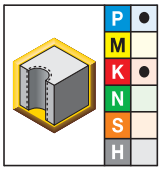


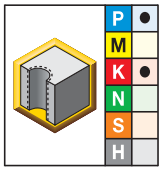
● first choice
○ alternate choice

KT325	KT6215	CSMS system size	D1	L1	Z
RHM14000KST115H7HF *	RHM14000KST115H7HF	KST115	14,00	13,50	6
RHM14288KST115H7HF *	RHM14288KST115H7HF *	KST115	14,29	13,50	6
RHM15875KST115H7HF *	–	KST115	15,88	13,50	6
RHM16000KST135H7HF	RHM16000KST135H7HF	KST135	16,00	13,50	6
RHM17000KST135H7HF *	RHM17000KST135H7HF	KST135	17,00	15,50	6
RHM17463KST135H7HF *	RHM17463KST135H7HF *	KST135	17,46	15,50	6
RHM18000KST155H7HF *	RHM18000KST155H7HF	KST155	18,00	15,50	6
RHM19000KST155H7HF *	RHM19000KST155H7HF	KST155	19,00	15,50	6
RHM19050KST155H7HF *	RHM19050KST155H7HF	KST155	19,05	15,50	6
RHM20000KST175H7HF	RHM20000KST175H7HF	KST175	20,00	15,50	6
RHM20640KST175H7HF *	RHM20640KST175H7HF	KST175	20,64	15,50	6
RHM21000KST175H7HF	RHM21000KST175H7HF	KST175	21,00	15,50	6
RHM22000KST175H7HF	RHM22000KST175H7HF *	KST175	22,00	15,50	6
RHM22230KST175H7HF *	RHM22230KST175H7HF *	KST175	22,23	15,50	6
RHM22500KST200H7HF *	RHM22500KST200H7HF *	KST200	22,50	16,50	6
RHM23000KST200H7HF *	RHM23000KST200H7HF *	KST200	23,00	16,50	6
RHM23810KST200H7HF *	RHM23810KST200H7HF *	KST200	23,81	16,50	6
RHM24000KST200H7HF	RHM24000KST200H7HF *	KST200	24,00	16,50	6
RHM25000KST200H7HF	RHM25000KST200H7HF	KST200	25,00	16,50	6
RHM25400KST200H7HF *	RHM25400KST200H7HF	KST200	25,40	16,50	6
RHM26000KST200H7HF *	–	KST200	26,00	16,50	8
RHM26990KST200H7HF *	RHM26990KST200H7HF *	KST200	26,99	16,50	8
RHM27000KST200H7HF *	RHM27000KST200H7HF *	KST200	27,00	16,50	8
RHM27500KST250H7HF *	RHM27500KST250H7HF *	KST250	27,50	16,50	8

(continued)

(RHM • Through Hole Cermet Tipped Reamer — continued)

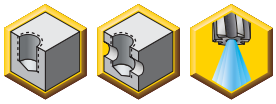


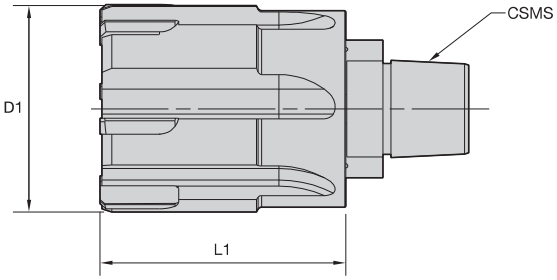


KT325	KT6215	CSMS system size	D1	L1	Z
RHM28000KST250H7HF	**RHM28000KST250H7HF**	KST250	28,00	16,50	8
RHM28580KST250H7HF *	–	KST250	28,58	16,50	8
RHM29000KST250H7HF *	**RHM29000KST250H7HF** *	KST250	29,00	16,50	8
RHM30000KST250H7HF	**RHM30000KST250H7HF**	KST250	30,00	16,50	8
RHM30160KST250H7HF *	**RHM30160KST250H7HF** *	KST250	30,16	16,50	8
RHM31000KST250H7HF *	**RHM31000KST250H7HF** *	KST250	31,00	16,50	8
RHM31750KST250H7HF *	**RHM31750KST250H7HF** *	KST250	31,75	16,50	8
RHM32000KST250H7HF *	**RHM32000KST250H7HF** *	KST250	32,00	16,50	8
RHM32500KST300H7HF *	**RHM32500KST300H7HF** *	KST300	32,50	18,00	8
RHM33000KST300H7HF *	**RHM33000KST300H7HF** *	KST300	33,00	18,00	8
RHM33340KST300H7HF *	**RHM33340KST300H7HF** *	KST300	33,34	18,00	8
–	**RHM34000KST300H7HF**	KST300	34,00	18,00	8
RHM34930KST300H7HF *	**RHM34930KST300H7HF** *	KST300	34,93	18,00	8
RHM35000KST300H7HF	**RHM35000KST300H7HF**	KST300	35,00	18,00	8
RHM36000KST300H7HF	–	KST300	36,00	18,00	8
RHM36510KST300H7HF *	**RHM36510KST300H7HF** *	KST300	36,51	18,00	8
RHM37000KST300H7HF *	**RHM37000KST300H7HF**	KST300	37,00	18,00	8
RHM37500KST350H7HF *	**RHM37500KST350H7HF** *	KST350	37,50	18,00	8
RHM38100KST350H7HF *	–	KST350	38,10	18,00	8
RHM39000KST350H7HF *	**RHM39000KST350H7HF** *	KST350	39,00	18,00	8
RHM39690KST350H7HF *	**RHM39690KST350H7HF** *	KST350	39,69	18,00	8
RHM40000KST350H7HF	**RHM40000KST350H7HF**	KST350	40,00	18,00	8
RHM41000KST350H7HF *	**RHM41000KST350H7HF** *	KST350	41,00	18,00	8
RHM41280KST350H7HF *	**RHM41280KST350H7HF** *	KST350	41,28	18,00	8
RHM42000KST350H7HF	**RHM42000KST350H7HF** *	KST350	42,00	18,00	8

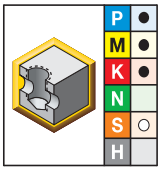
NOTE: Uncoated carbide grade K605™ is available on request.
*Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.

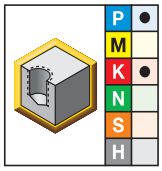
- For hole tolerance H6.
- Intermediate sizes available.
- Lock screw for axial use or retention knob comes with holder.
- Allen expansion screw.





RHM-E • Blind Hole Expansion Reamer



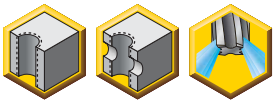


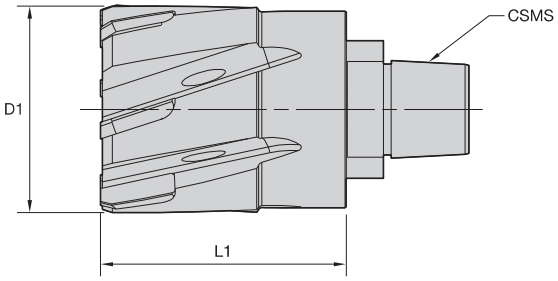
● first choice
○ alternate choice

KC6005	KC6305	CSMS system size	D1	L1	Z
RHME14000KST115H6SF *	RHME14000KST115H6SF	KST115	14,00	25,00	6
RHME14288KST115H6SF *	RHME14288KST115H6SF *	KST115	14,29	25,00	6
RHME15000KST115H6SF *	RHME15000KST115H6SF	KST115	15,00	25,00	6
RHME16000KST135H6SF	RHME16000KST135H6SF	KST135	16,00	25,00	6
RHME17000KST135H6SF *	RHME17000KST135H6SF	KST135	17,00	25,00	6
RHME17463KST135H6SF *	RHME17463KST135H6SF *	KST135	17,46	25,00	6
RHME18000KST155H6SF *	RHME18000KST155H6SF *	KST155	18,00	25,00	6
RHME19000KST155H6SF *	RHME19000KST155H6SF *	KST155	19,00	25,00	6
RHME19050KST155H6SF *	RHME19050KST155H6SF *	KST155	19,05	25,00	6
RHME20000KST175H6SF *	RHME20000KST175H6SF	KST175	20,00	25,00	6
RHME21000KST175H6SF	RHME21000KST175H6SF *	KST175	21,00	25,00	6
RHME22000KST175H6SF *	RHME22000KST175H6SF *	KST175	22,00	25,00	6
RHME22225KST175H6SF *	RHME22225KST175H6SF	KST175	22,23	25,00	6
RHME23000KST200H6SF *	RHME23000KST200H6SF *	KST200	23,00	25,00	6
RHME23813KST200H6SF *	RHME23813KST200H6SF *	KST200	23,81	25,00	6
RHME24000KST200H6SF	RHME24000KST200H6SF *	KST200	24,00	25,00	6
RHME25000KST200H6SF	RHME25000KST200H6SF	KST200	25,00	30,00	6
RHME25400KST200H6SF *	RHME25400KST200H6SF *	KST200	25,40	30,00	6
RHME26000KST200H6SF *	RHME26000KST200H6SF *	KST200	26,00	30,00	8
RHME27000KST200H6SF *	RHME27000KST200H6SF	KST200	27,00	30,00	8
RHME28000KST250H6SF	RHME28000KST250H6SF	KST250	28,00	36,00	8
RHME30000KST250H6SF	RHME30000KST250H6SF	KST250	30,00	36,00	8
RHME31750KST250H6SF *	RHME31750KST250H6SF *	KST250	31,75	36,00	8
RHME32000KST250H6SF *	RHME32000KST250H6SF *	KST250	32,00	36,00	8
RHME34000KST300H6SF *	RHME34000KST300H6SF *	KST300	34,00	36,00	8
RHME36000KST300H6SF *	RHME36000KST300H6SF *	KST300	36,00	36,00	8
RHME38000KST350H6SF *	RHME38000KST350H6SF *	KST350	38,00	36,00	8
RHME40000KST350H6SF *	RHME40000KST350H6SF *	KST350	40,00	36,00	8
RHME42000KST350H6SF	RHME42000KST350H6SF *	KST350	42,00	36,00	8

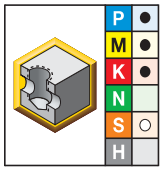
NOTE: Uncoated carbide grade K605™ is available on request.
*Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.

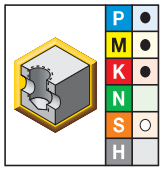
- For hole tolerance H6.
- Intermediate sizes available.
- Lock screw for axial use or retention knob comes with holder.
- Allen expansion screw.





RHM-E • Through Hole Expansion Reamer





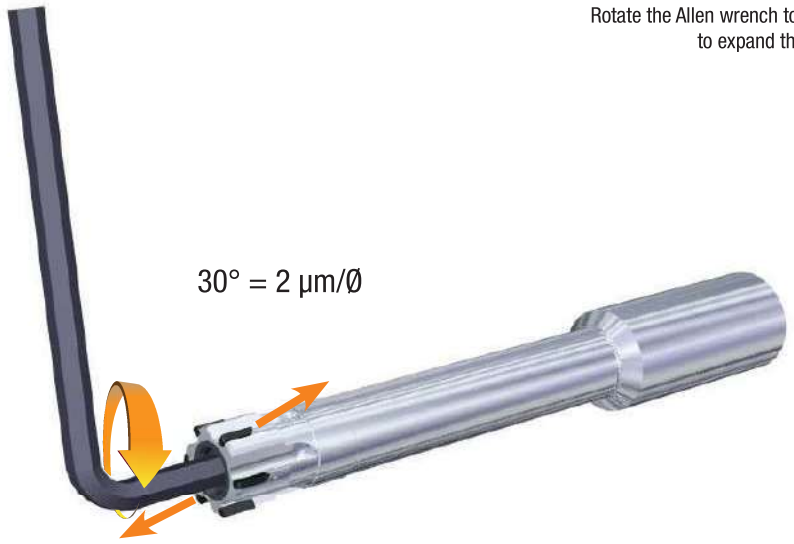
● first choice
○ alternate choice

KC6005	KC6305	CSMS system size	D1	L1	Z
RHME14000KST115H6HF *	RHME14000KST115H6HF *	KST115	14,00	25,00	6
RHME14288KST115H6HF *	RHME14288KST115H6HF *	KST115	14,29	25,00	6
RHME15000KST115H6HF *	RHME15000KST115H6HF *	KST115	15,00	25,00	6
RHME16000KST135H6HF	RHME16000KST135H6HF	KST135	16,00	25,00	6
RHME17000KST135H6HF	RHME17000KST135H6HF *	KST135	17,00	25,00	6
RHME17463KST135H6HF	RHME17463KST135H6HF *	KST135	17,46	25,00	6
RHME18000KST155H6HF *	RHME18000KST155H6HF	KST155	18,00	25,00	6
RHME19000KST155H6HF *	RHME19000KST155H6HF *	KST155	19,00	25,00	6
RHME19050KST155H6HF *	RHME19050KST155H6HF	KST155	19,05	25,00	6
RHME20000KST175H6HF	RHME20000KST175H6HF	KST175	20,00	25,00	6
RHME21000KST175H6HF *	RHME21000KST175H6HF *	KST175	21,00	25,00	6
RHME22000KST175H6HF	RHME22000KST175H6HF	KST175	22,00	25,00	6
RHME22225KST175H6HF *	RHME22225KST175H6HF	KST175	22,23	25,00	6
RHME23000KST200H6HF *	RHME23000KST200H6HF *	KST200	23,00	25,00	6
RHME23813KST200H6HF *	RHME23813KST200H6HF *	KST200	23,81	25,00	6
RHME24000KST200H6HF *	RHME24000KST200H6HF *	KST200	24,00	25,00	6
RHME25000KST200H6HF *	RHME25000KST200H6HF	KST200	25,00	30,00	6
RHME25400KST200H6HF	RHME25400KST200H6HF	KST200	25,40	30,00	6
RHME26000KST200H6HF *	RHME26000KST200H6HF	KST200	26,00	30,00	8
RHME27000KST200H6HF *	RHME27000KST200H6HF *	KST200	27,00	30,00	8
RHME28000KST250H6HF	RHME28000KST250H6HF	KST250	28,00	36,00	8
RHME30000KST250H6HF	RHME30000KST250H6HF	KST250	30,00	36,00	8
RHME31750KST250H6HF *	RHME31750KST250H6HF	KST250	31,75	36,00	8
RHME32000KST250H6HF *	RHME32000KST250H6HF *	KST250	32,00	36,00	8
RHME34000KST300H6HF *	RHME34000KST300H6HF *	KST300	34,00	36,00	8
RHME36000KST300H6HF *	RHME36000KST300H6HF *	KST300	36,00	36,00	8
RHME38000KST350H6HF *	RHME38000KST350H6HF *	KST350	38,00	36,00	8
RHME40000KST350H6HF *	–	KST350	39,99	36,00	8
–	RHME40000KST350H6HF *	KST350	40,00	36,00	8
RHME42000KST350H6HF *	RHME42000KST350H6HF *	KST350	42,00	36,00	8

NOTE: Uncoated carbide grade K605™ is available on request.
*Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.

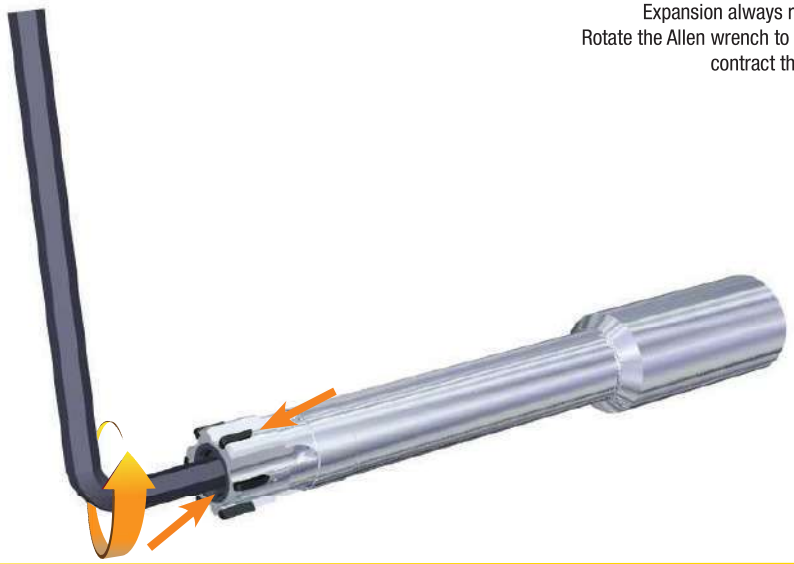
To Expand

Rotate the Allen wrench to the right to expand the reamer.



To Contract

Expansion always reversible:
Rotate the Allen wrench to the left to contract the reamer.

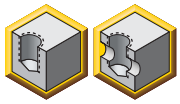
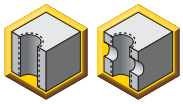


- 30° = 2 µm linear expansion.
- 720° = 2 revolutions; = 48µm maximum expansion.
- Hard stop after 720° expansion. You cannot over expand!
- The expansion occurs in the elastic material behaviour.
- You cannot reduce the diameter below D1.

RHR • Metric

Material Group		KCU05 Cutting Speed – vc Range – m/min			Metric Recommended Feed Rate per Tooth						
					Tool Diameter (mm)	14,00–19,99mm		20,00–32,00mm		32,50–42,00mm	
		min	Starting Value	max	Feed/Tooth	min	max	min	max	min	max
P	1	90	**120**	155	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	2	90	**120**	155	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	3	75	**100**	130	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	4	50	**80**	105	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	5	30	**40**	60	mm/z	0,08	0,18	0,08	0,20	0,08	0,22
	6	30	**40**	60	mm/z	0,08	0,18	0,08	0,20	0,08	0,22
M	1	15	**20**	40	mm/z	0,08	0,15	0,08	0,18	0,08	0,20
	2	15	**20**	30	mm/z	0,08	0,15	0,08	0,18	0,08	0,20
	3	15	**20**	30	mm/z	0,08	0,15	0,08	0,18	0,08	0,20
K	1	80	**110**	130	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	2	65	**90**	110	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	3	50	**70**	90	mm/z	0,10	0,18	0,10	0,20	0,10	0,22
S	1	15	**20**	30	mm/z	0,06	0,15	0,10	0,18	0,10	0,20
	2	15	**20**	30	mm/z	0,06	0,15	0,10	0,18	0,10	0,20
	3	20	**30**	40	mm/z	0,08	0,18	0,10	0,20	0,10	0,20
	4	20	**30**	40	mm/z	0,08	0,18	0,10	0,20	0,10	0,20

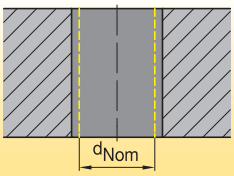
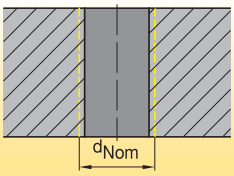
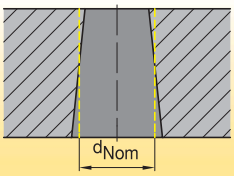
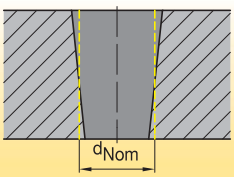
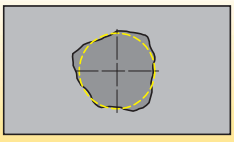
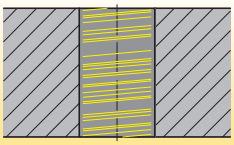
RHM™ and RHM-E™ • Metric

Material Group		Cermet Tipped						Carbide Tipped						Metric						
																				
		straight flute			helical flute			straight flute			helical flute									
		KT325			KT6215			K605			KC6305			Metric						
		Cutting Speed – vc												Recommended Feed Rate per Tooth						
		Range – m/min												Tool Diameter (mm)	14,00–19,99mm		20,00–32,00mm		32,50–42,00mm	
		min	Starting Value	max	min	Starting Value	max	min	Starting Value	max	min	Starting Value	max	Feed/ Tooth	min	max	min	max	min	max
P	1	150	**180**	210	180	**210**	240	40	**60**	70	90	**120**	155	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	2	150	**180**	210	180	**210**	240	40	**60**	70	90	**120**	155	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	3	130	**160**	180	150	**180**	210	30	**40**	50	75	**100**	130	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	4	100	**130**	150	120	**150**	170	25	**40**	45	50	**80**	105	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	5	80	**100**	120	100	**130**	150	10	**20**	30	30	**40**	55	mm/z	0,08	0,18	0,08	0,20	0,08	0,22
	6	80	**100**	120	100	**130**	150	10	**20**	30	30	**40**	55	mm/z	0,08	0,18	0,08	0,20	0,08	0,22
M	1	–	**–**	–	–	**–**	–	8	**10**	15	15	**20**	28	mm/z	0,08	0,15	0,08	0,18	0,08	0,20
	2	–	**–**	–	–	**–**	–	8	**10**	15	15	**20**	28	mm/z	0,08	0,15	0,08	0,18	0,08	0,20
	3	–	**–**	–	–	**–**	–	8	**10**	15	15	**20**	28	mm/z	0,08	0,15	0,08	0,18	0,08	0,20
K	1	150	**180**	200	180	**210**	240	30	**50**	60	80	**110**	130	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	2	130	**160**	180	150	**180**	210	25	**40**	45	65	**90**	110	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	3	100	**130**	160	120	**150**	170	20	**30**	40	50	**70**	90	mm/z	0,10	0,18	0,10	0,20	0,10	0,22
N	1	–	**–**	–	–	**–**	–	110	**150**	195	–	**–**	–	mm/z	0,10	0,30	0,10	0,30	0,10	0,30
	2	–	**–**	–	–	**–**	–	110	**150**	195	–	**–**	–	mm/z	0,10	0,30	0,10	0,30	0,10	0,30
	3	–	**–**	–	–	**–**	–	110	**150**	195	–	**–**	–	mm/z	0,10	0,30	0,10	0,30	0,10	0,30
	4	–	**–**	–	–	**–**	–	110	**150**	195	–	**–**	–	mm/z	0,10	0,30	0,10	0,30	0,10	0,30
	5	–	**–**	–	–	**–**	–	105	**140**	180	–	**–**	–	mm/z	0,10	0,30	0,10	0,30	0,10	0,30
S	1	–	**–**	–	–	**–**	–	8	**10**	15	15	**20**	28	mm/z	0,06	0,15	0,10	0,18	0,10	0,20
	2	–	**–**	–	–	**–**	–	8	**10**	15	15	**20**	28	mm/z	0,06	0,15	0,10	0,18	0,10	0,20
	3	–	**–**	–	–	**–**	–	15	**20**	30	20	**30**	40	mm/z	0,08	0,18	0,10	0,20	0,10	0,20
	4	–	**–**	–	–	**–**	–	15	**20**	30	20	**30**	40	mm/z	0,08	0,18	0,10	0,20	0,10	0,20

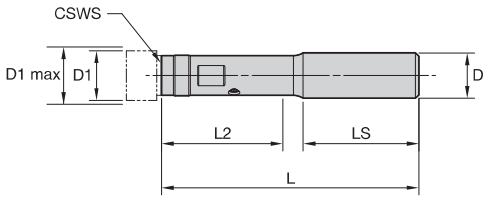
Reaming Allowances for Multi-Blade Reaming

	reaming allowances in diameter mm		
mm	min	middle	max
1,40–4,80	0,08	0,12	0,20
4,81–9,59	0,10	0,15	0,25
9,60–15,00	0,15	0,20	0,30
15,00–20,00	0,15	0,25	0,35
20,00–50,00	0,20	0,30	0,40

Troubleshooting

Problem		Cause	Possible Remedy
Hole diameter too large.		• Reaming tool running out-of-centre. • Concentricity of pilot hole and ream machining unsatisfactory. • Built-up edge. • Unsuitable cooling lubricant. • Reaming tool diameter too large.	• Use equalising adaptor. • Re-align, use floating head. • Change cooling lubricant. • Change cutting speed. • Measure reamers and send for repairs.
Hole diameter too small.		• Reamer worn. • Unsuitable cooling lubricant. • Reaming allowance too small.	• Replace and refit tool. • Change cooling lubricant. • Increase reaming allowance.
Conical hole profile wider towards drill runout.		• Concentricity of pilot hole and reaming unsatisfactory. • Positioning accuracy of pilot hole to reaming.	• Re-align, use equalising adaptor. • Correct positioning accuracy.
Conical hole profile wider at drill entry point.		• Concentricity of pilot hole and reaming unsatisfactory. • Reaming tool skim cutting with ledger.	• Re-align, use floating head. • Securely clamp reaming tool axially.
Hole out-of-centre and/or showing chatter marks.		• Reaming tool running out-of-centre. • Slanted cutting surface/asymmetrical cutting. • Workpiece twisted.	• Use equalising adaptor. • Spot face as drilling preparation. • Take the direction of impact into account when clamping the workpiece.
Surface quality does not meet specification.		• Tool cutters worn. • Reaming tool running out-of-centre. • Incorrect technology data (cutting parameters). • Inadequate chip evacuation.	• Use equalising adaptor. • Re-align, use floating head. • Change cooling lubricant. • Change cutting speed. • Measure reamers and send for repairs.
Feed grooves.		• Built-up edge.	• Change cooling lubricant. • Change cutting speed.

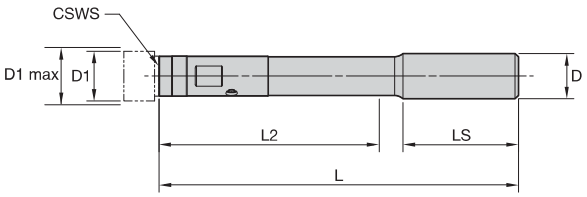
- Tool body shipped with lock screw and wrench.
- Order reamer head separately.



Straight Shank • Axial Clamping • 3 x D


order number	catalogue number	CSWS system size	D1	D1 max	D	L	L2	LS	central lock screw	Torx wrench	Nm	ft. lbs.
4056174	**SS16KST115AR3M**	KST115	14,00	15,999	16,00	91,00	36,00	48,00	**KST115115AS**	**FT8**	3,0	2.2
4056175	**SS20KST135AR3M**	KST135	16,00	17,999	20,00	99,00	39,00	51,00	**KST135155AS**	**FT10**	4,0	3.0
4056176	**SS20KST155AR3M**	KST155	18,00	19,999	20,00	106,00	45,00	51,00	**KST135155AS**	**FT10**	4,0	3.0
3861185	**SS20KST175AR3M**	KST175	20,00	22,499	20,00	113,50	51,50	51,00	**KST175200AS**	**TT15**	5,0	3.7
3861186	**SS20KST200AR3M**	KST200	22,50	27,499	20,00	130,50	65,50	51,00	**KST175200AS**	**TT15**	5,0	3.7
3861187	**SS25KST250AR3M**	KST250	27,50	32,499	25,00	152,50	80,50	56,00	**KST250250AS**	**TT25**	9,0	6.7
3861188	**SS32KST300AR3M**	KST300	32,50	37,499	32,00	174,00	94,00	61,00	**KST300350AS**	**TT30**	13,0	9.7
3861189	**SS32KST350AR3M**	KST350	37,50	42,000	32,00	190,00	108,00	61,00	**KST300350AS**	**TT30**	13,0	9.7

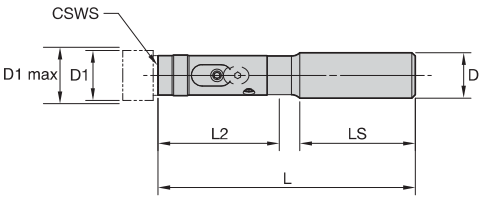
- Tool body shipped with lock screw and wrench.
- Order reamer head separately.



Straight Shank • Axial Clamping • 5 x D


order number	catalogue number	CSWS system size	D1	D1 max	D	L	L2	LS	central lock screw	Torx wrench	Nm	ft. lbs.
4056177	**SS16KST115AR5M**	KST115	14,00	15,999	16,00	123,00	68,00	48,00	**KST115115AS**	**FT8**	3,0	2.2
4056178	**SS20KST135AR5M**	KST135	16,00	17,999	20,00	135,00	75,00	51,00	**KST135155AS**	**FT10**	4,0	3.0
4056179	**SS20KST155AR5M**	KST155	18,00	19,999	20,00	146,00	85,00	51,00	**KST135155AS**	**FT10**	4,0	3.0
3861190	**SS20KST175AR5M**	KST175	20,00	22,499	20,00	158,50	96,50	51,00	**KST175200AS**	**TT15**	5,0	3.7
3861191	**SS20KST200AR5M**	KST200	22,50	27,499	20,00	185,50	120,50	51,00	**KST175200AS**	**TT15**	5,0	3.7
3861192	**SS25KST250AR5M**	KST250	27,50	32,499	25,00	217,50	145,50	56,00	**KST250250AS**	**TT25**	9,0	6.7
3861193	**SS32KST300AR5M**	KST300	32,50	37,499	32,00	249,00	169,00	61,00	**KST300350AS**	**TT30**	13,0	9.7
3861194	**SS32KST350AR5M**	KST350	37,50	42,000	32,00	274,00	192,00	61,00	**KST300350AS**	**TT30**	13,0	9.7

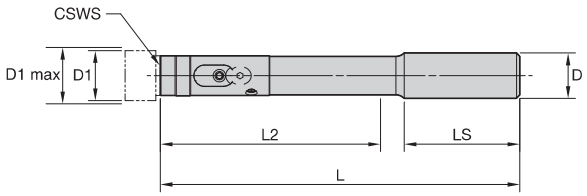
- Tool body shipped with retention knob, clamp set, and wrench.
- Order reamer head separately.



Straight Shank • Radial Clamping • 3 x D

order number	catalogue number	CSWS system size	D1	D1 max	D	L	L2	LS	retention knob	clamp set	Torx wrench	Nm	ft. lbs.
3861195	SS20KST175RR3M	KST175	20,00	22,499	20,00	113,50	51,50	51,00	KST175200RK	KST175CS	TT15	5,0	3.7
3861196	SS20KST200RR3M	KST200	22,50	27,499	20,00	130,50	65,50	51,00	KST175200RK	KST200CS	TT15	5,0	3.7
3861197	SS25KST250RR3M	KST250	27,50	32,499	25,00	152,50	80,50	56,00	KST250250RK	KST250CS	TT25	9,0	6.7
3861198	SS32KST300RR3M	KST300	32,50	37,499	32,00	174,00	94,00	61,00	KST300350RK	KST300CS	TT30	13,0	9.7
3861199	SS32KST350RR3M	KST350	37,50	42,000	32,00	190,00	108,00	61,00	KST300350RK	KST350CS	TT30	13,0	9.7

- Tool body shipped with retention knob, clamp set, and wrench.
- Order reamer head separately.

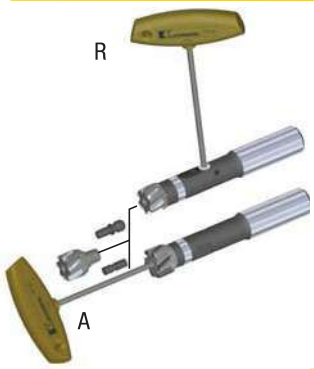


Straight Shank • Radial Clamping • 5 x D

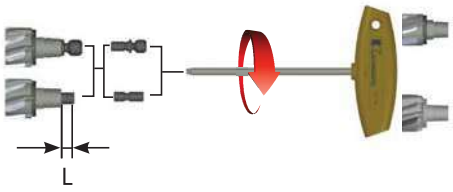
order number	catalogue number	CSWS system size	D1	D1 max	D	L	L2	LS	retention knob	clamp set	Torx wrench	Nm	ft. lbs.
3861200	SS20KST175RR5M	KST175	20,00	22,499	20,00	158,50	96,50	51,00	KST175200RK	KST175CS	TT15	5,0	3.7
3861201	SS20KST200RR5M	KST200	22,50	27,499	20,00	185,50	120,50	51,00	KST175200RK	KST200CS	TT15	5,0	3.7
3861202	SS25KST250RR5M	KST250	27,50	32,499	25,00	217,50	145,50	56,00	KST250250RK	KST250CS	TT25	9,0	6.7
3861203	SS32KST300RR5M	KST300	32,50	37,499	32,00	249,00	169,00	61,00	KST300350RK	KST300CS	TT30	13,0	9.7
3861204	SS32KST350RR5M	KST350	37,50	42,000	32,00	274,00	192,00	61,00	KST300350RK	KST350CS	TT30	13,0	9.7

Assemble

1



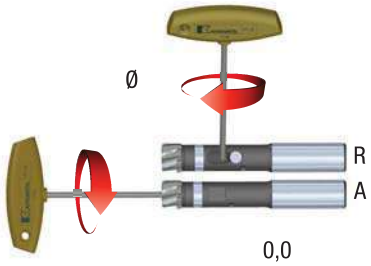
2



Ø (mm)		L (mm)
14,000	27,499	5–5,5
27,500	42,000	5,5–6

3

4

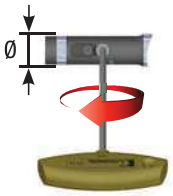


Ø (mm)			(Nm)
14,000	15,999	DT - 8	2
16,000	19,999	DT - 10	3
20,000	27,499	TT - 15	4
27,500	32,499	TT - 25	5
32,500	42,000	TT- 30	13

Disassemble 4 → 3 → 2 → 1

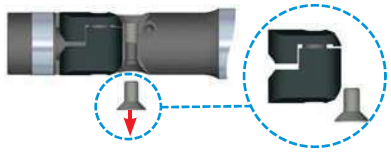
Disassemble

1

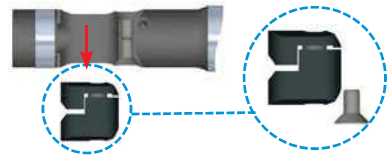


Ø (mm)	Ø (in)			(Nm)	(ft. lbs.)
17,5	0.686	KST175CS	2,5	2,5	1.9
20	0.784	KST200CS	2,5	2,5	1.9
25	0.980	KST250CS	3	5	3.7
30	1.176	KST300CS	4	9	6.7
35	1.373	KST350CS	4	9	9.7

2

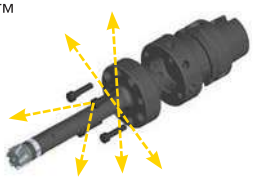


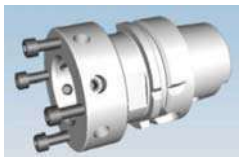
3



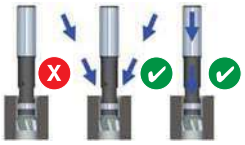
Assemble 3 → 2 → 1

SIF™

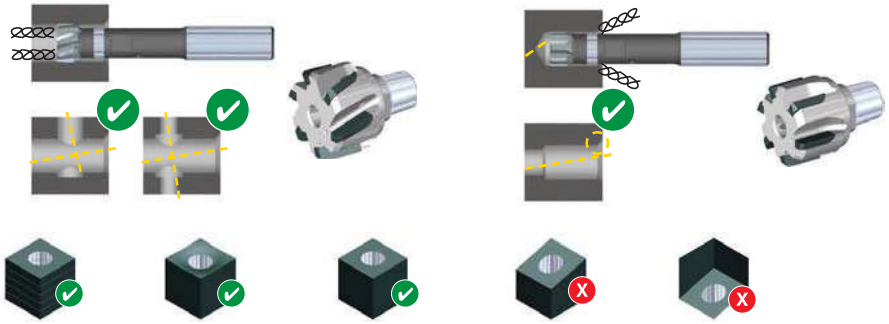




Coolant flow



Application



SIF™ Steerable Toolholder

Primary Application

SIF steerable toolholders should be used for easy compensation of radial runout and angular inaccuracies caused by the machine spindle or gravity. SIF tooling improves hole roundness for highest possible hole straightness and surface quality. Runout-optimised reaming tools provide higher process stability and longer tool life.

Use a separate SIF tooling package for each machine to ensure best configuration between reaming tool and spindle and HSK bushes. This enables faster tool change to avoid repeating adjustments.

Features and Benefits

Higher Productivity and Profitability

- Easy compensation of radial runout and angular inaccuracies increases process control and tool life.
- Less time-consuming adjustment due to eight radial screws.
- Increased rigidity by using a SIF back-end as a monoblock solution with the reamer.

Versatility

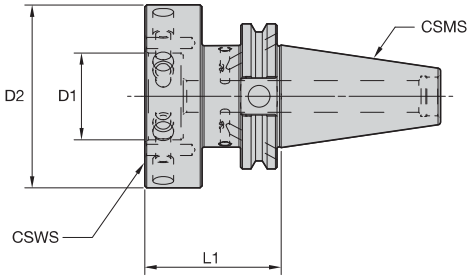
- Use standard DV, BT, CV, and HSK adaptors in combination with SIF hydraulic chucks for precise concentric clamping, highest accuracy, and flexible clamping using hydraulic chuck sleeves.
- HSK bushes with SIF coupling enable fast tool exchange and eliminate repeated runout adjustment, reducing adjustment and downtime.

SIF™ adaptation practically eliminates all spindle errors in terms of runout and angular misalignment.

Customisation

- Different length versions and coupling size combinations are available.

- Through-the-toolholder coolant capability — form AD or form B.
- Suitable for SIF adaptors.



SIF-CV50 Form B/AD

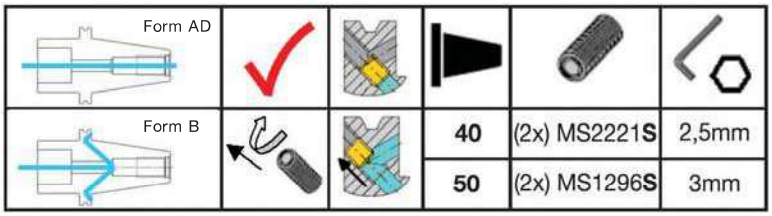
order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg	lbs
3738506	**CV50BSIF70236**	CV50	SIF70	70	38	60	**121.808**	**170.004**	**170.005**	**125.625**	3,49	7.700
3738507	**CV50BSIF100236**	CV50	SIF100	100	58	60	**121.812**	**170.004**	**170.006**	**–**	4,14	9.140

SIF-CV40 Form B/AD

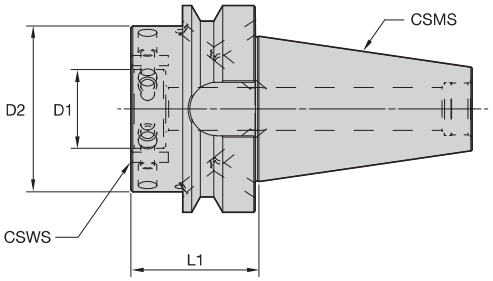
order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg	lbs
3738505	**CV40BSIF80248**	CV40	SIF80	80	38	63	**121.812**	**170.004**	**170.005**	**125.625**	1,77	3.900

SIF-BT40 Form B/AD

order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg	lbs
3738492	**BT40BSIF80063M**	BT40	SIF80	80	38	63	**121.812**	**170.004**	**170.005**	**125.625**	1,86	4.110



- Through-the-toolholder coolant capability — form AD or form B.
- Suitable for SIF adaptors.



SIF-BT50 Form B/AD

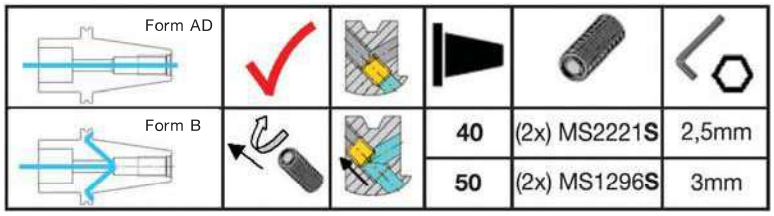
order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg	lbs
3738503	BT50BSIF70063M	BT50	SIF70	70	38	63	121.808	170.004	170.005	125.625	4,08	9.000
3738504	BT50BSIF100068M	BT50	SIF100	100	58	68	121.812	170.004	170.006	–	4,94	10.890

SIF-DV40 Form B/AD

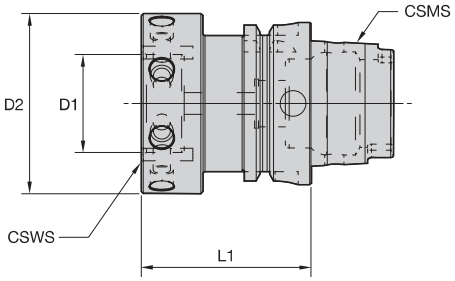
order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg	lbs
3738488	DV40BSIF80061M	DV40	SIF80	80	38	61	121.812	170.004	170.005	125.625	1,83	4.020

SIF-DV50 Form B/AD

order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg	lbs
3738490	DV50BSIF70060M	DV50	SIF70	70	38	60	121.808	170.004	170.005	125.625	3,60	7.930
3738491	DV50BSIF100060M	DV50	SIF100	100	58	60	121.812	170.004	170.006	–	4,30	9.480



- Through-the-toolholder coolant capability.
- Suitable for SIF adaptors.



SIF-HSK63 Form A

order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg	lbs
3738508	**HSK63ASIF70066M**	HSK63A	SIF70	70	38	66	**121.808**	**170.004**	**170.005**	**125.625**	1,44	3.180
3878347	**HSK63ASIF80063M**	HSK63A	SIF80	80	38	63	**121.812**	**170.004**	**170.005**	**125.625**	1,48	3.250

SIF-HSK80 Form A

order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg	lbs
3738510	**HSK80ASIF70066M**	HSK80A	SIF70	70	38	66	**121.808**	**170.004**	**170.005**	**125.625**	2,05	4.520

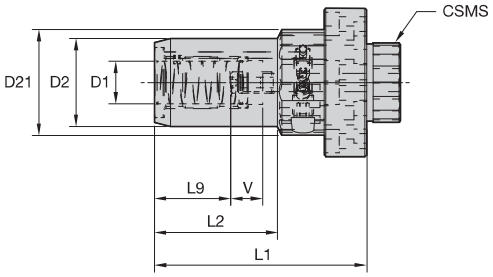
NOTE: HSK coolant unit and wrench are available and must be ordered separately.

SIF-HSK100 Form A

order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg	lbs
3738511	**HSK100ASIF70050M**	HSK100A	SIF70	70	38	50	**121.808**	**170.004**	**170.005**	**125.625**	2,43	5.360
3738512	**HSK100ASIF100070M**	HSK100A	SIF100	100	58	70	**121.812**	**170.004**	**170.006**	–	3,84	8.460

NOTE: HSK coolant unit and wrench are available and must be ordered separately.

- Runout < 0,003mm.
- External side actuation adjustment stop, giving 10mm axial adjustment.



HC HP Line • SIF70

order number	catalogue number	CSMS system size	D1	D2	D21	L1	L2	L9	V	hex wrench	T-handle hex wrench	kg	lbs
3667056	**SIF70HC12090M**	SIF70	12	32	44	90	45	36	10	**170.002**	**170.135**	1,13	2.49
3667057	**SIF70HC20100M**	SIF70	20	42	44	100	58	41	10	**170.003**	**170.135**	2,00	4.41

NOTE: HSK coolant unit and wrench are available and must be ordered separately.
IMPORTANT: Do not overtorque clamp screw. Use supplied wrench and tighten by hand until stop is felt.

HC HP Line • SIF80

order number	catalogue number	CSMS system size	D1	D2	D21	L1	L2	L9	V	hex wrench	T-handle hex wrench	kg	lbs
3667058	**SIF80HC12090M**	SIF80	12	32	50	90	45	36	10	**170.002**	**170.135**	9,00	19.84
3667059	**SIF80HC20100M**	SIF80	20	42	50	100	58	41	10	**170.003**	**170.135**	1,60	3.53
3667060	**SIF80HC25100M**	SIF80	25	50	54	100	51	47	10	**170.003**	**170.136**	1,83	4.03

NOTE: HSK coolant unit and wrench are available and must be ordered separately.
IMPORTANT: Do not overtorque clamp screw. Use supplied wrench and tighten by hand until stop is felt.

HC HP Line • SIF100

order number	catalogue number	CSMS system size	D1	D2	D21	L1	L2	L9	V	hex wrench	T-handle hex wrench	kg	lbs
3667061	**SIF100HC12090M**	SIF100	12	32	50	90	45	36	10	**170.002**	**170.135**	1,98	4.37
3667062	**SIF100HC20100M**	SIF100	20	42	50	100	58	41	10	**170.003**	**170.135**	2,19	4.84
3668023	**SIF100HC25100M**	SIF100	25	50	63	100	51	47	10	**170.004**	**170.136**	2,56	5.64

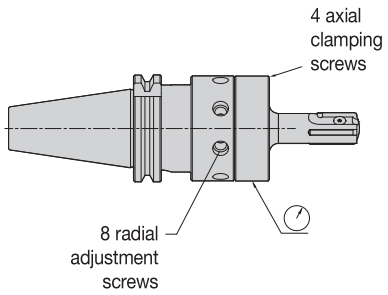
NOTE: HSK coolant unit and wrench are available and must be ordered separately.
IMPORTANT: Do not overtorque clamp screw. Use supplied wrench and tighten by hand until stop is felt.

SIF Tooling Setup

Step 1: Rough setup of runout at flange

1

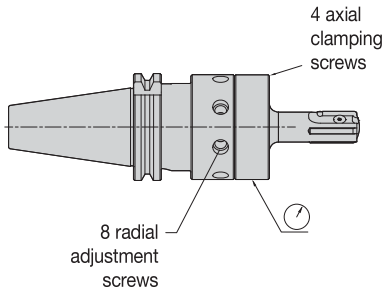
- Set gage (TIR) at SIF flange.
- Tight axial clamping screws 6–8 Nm.
- Use radial adjustment screws to achieve 5 µm runout.



Step 2: Fine setup of runout at the flange

2

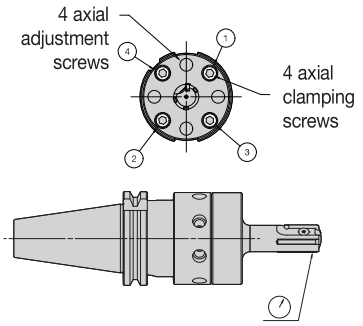
- Tight axial clamping screws crosswise:
  SIF70/80 18 Nm.
  SIF100 32 Nm.
- Use radial adjustment screws to achieve 2 µm runout.
- All radial adjustment screws to be clamped tight at 4 Nm.



Step 3: Adjustment of runout at front

3

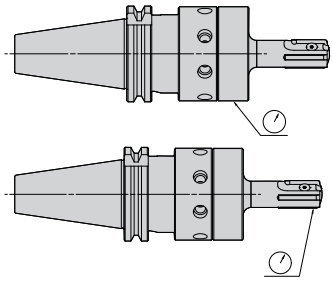
- Set gage (TIR) at control grind, cylindrical land, or guide pads.
- Use axial adjustment screws to achieve a maximum runout error of 2 µm.
- All axial adjustment screws to be clamped tight at 4 Nm.



Step 4: Final runout check

4

- Check using gage (TIR) at flange; no deviation by theory.
- If needed, use radial adjustment screws to set runout below 2 µm.
- Any modification of radial setup demands an axial runout check and adjustment, if necessary.



Engineered Solutions

You Won't Find These Solutions in a Catalogue

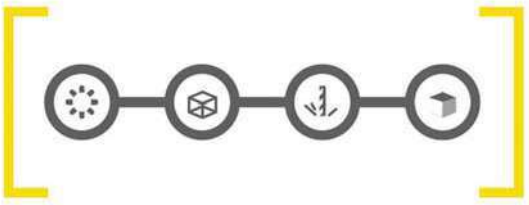
Kennametal engineered solutions pinpoint and address specific needs of customers, workpiece materials, or workpiece configurations. Solutions include standard products, custom designs, and old-fashioned process know-how that can only come from many decades of tooling expertise.

They are the result of coordinated global resources and are available anywhere in the world, no matter how small or large the project.

MANUFACTURING PROCESS

We Look at the Entire Production Process, Not Just Portions of It

From the machine tool to the last stop in production, we can optimise the manufacturing process throughout every step. The result is low implementation time and costs, and rapid return on investment.



RIQ™ (Quattro Cut™) and RIR™

Padded Reamers

Primary Application

Master the highest precision reaming with standard inserts in almost all materials with two unique systems:
RIR padded reamers for small-diameter applications and RIQ padded reamers for easy setup in large-diameters applications.

RIQ reamers are available starting at diameter 16mm (.630") with four cutting edges for lowest cost per hole. The proprietary pocket seat only requires setup of the diameter, which is a huge benefit in simplicity compared to systems that require the diameter and back taper to be adjusted simultaneously. RIR padded reamers are also proprietary and available starting at diameter 6mm (.236") with one cutting edge, and diameter 8mm (.315") with two edges.

Features and Benefits

Higher Productivity and Profitability

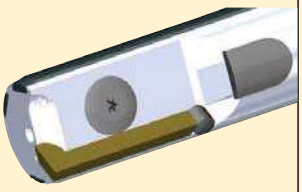
- Longer tool life with Kennametal grades.
- User friendly — RIQ padded reamers reduce setup time.
- Use four full edges even in PCD or PcBN styles of RIQ inserts.

Complete Insert Portfolio

- Large standard offering of lead geometries — E13, EDS, EDR, EGU, EGR, radius, and taper inserts.
- Large offering of grades — coated and uncoated carbide, cermet, PcBN, and PCD.

Customisation

- All RIQ tooling engineered to specific needs in diameters 16–245mm (.630–9.645") with internal coolant.
- All RIR tooling engineered to specific needs in diameters 6–245mm (.236–9.645") with internal coolant.
- RIR taper reamers available upon request.
- Multiflute and step reaming applications and special blade shapes available upon request.
- Measuring and adjustment equipment available as standard.

Application recommendation	RIR	RIQ
	Bore tolerances less than 10 µm (can be greater). Geometric tolerances down to 2 µm. Skilled workforce experience required. 	Bore tolerances less than 10 µm. Geometric tolerances down to 2 µm. Lower skilled workforce, easier adjustment. Multidiameter bores. 
Pocket seat	Flat with clamping groove in blade.	Serrated. Greater insert stability.
Cutting edges	2 (1 with PCD or CBN and 1 within diameter range 6–8mm [.236–.315"])	4 (SC, cermet, PCD, CBN)
Special blade forms	yes	yes
Multiple inserts on diameter	no	yes
Blade adjustment	Diameter and back taper.	Diameter only (back taper defined by serration).
Blade adjusting screws	2	1
Chamfer or valve seat machining	Yes, but adjustment required on position and angle.	Yes, only adjustment of position. Angle adjustment not required due to precision of serrated pocket seat.
General comments	For small diameters with high setup effort.	For larger diameters with low setup effort.

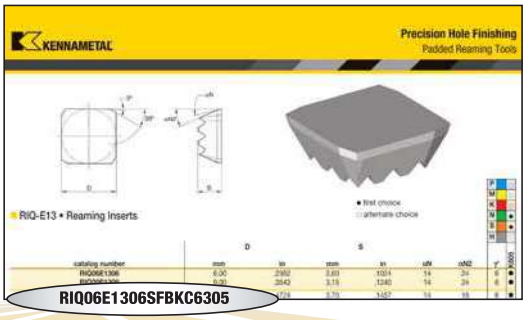

RIR™ Reamer


RIQ™ Reamer


RIQ™ Valve Seat Tool

How Do Catalogue Numbers Work?

Each character in our catalogue number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.



RIQ	06	E13	06	S	FB	KC6305
Type	Size	Lead	Rake	Edge	Chipbreaker	Grade

RIR = Reamer Insert Rectangular

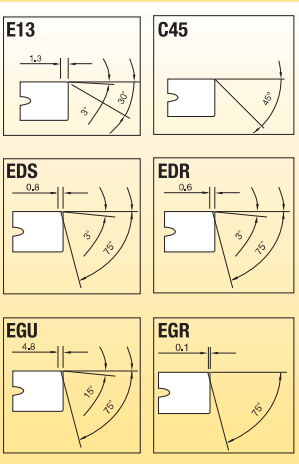
RIQ = Reamer Insert Quattro Cut™

Blade Size

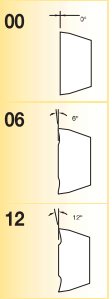
Ø [mm]	RIQ	
16,0–24,99	**06**	6,0 x 6,0mm
Valve Seat	**B6**	6,0 x 6,0mm
Valve Seat	**B7**	6,5 x 6,5mm
Valve Seat	**07**	7,0 x 7,0mm
Valve Seat	**08**	8,0 x 8,0mm
>25	**09**	9,0 x 9,0mm
>25	**12**	12,0 x 12,0mm

Ø [mm]	RIR	
6,0–7,99	**A0**	10,5 x 2,50mm
8,0–10,99	**01**	15,0 x 2,80mm
11,0–13,99	**02**	18,0 x 4,00mm
14,0–17,99	**03**	20,0 x 4,76mm
18,0–45,99	**04**	27,0 x 5,56mm
>46	**05**	27,0 x 6,75mm
Taper Reamer	**T4**	45,0 x 5,56mm

Cutting Lead



Rake Angle



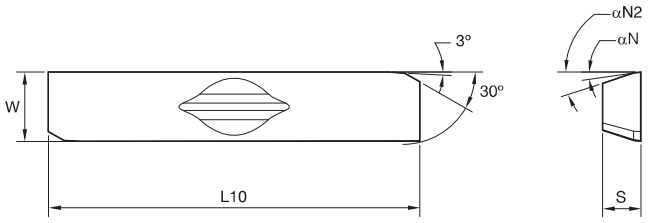
S  Chamfered and Rounded

FB = Finishing Blind Hole

FT = Finishing Through Hole

Grade	
Carbide	KC6005
Carbide	KC6105
Carbide	KC6305
Cermet	KT6225
Cermet	KT6315
PCD	KD1415
CBN	KB1610

R = Radius Blade
R02
R04
R05



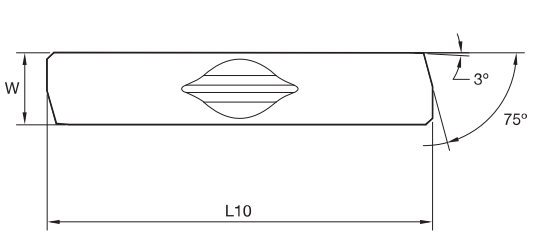
● first choice
○ alternate choice

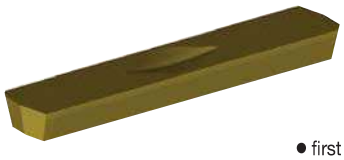
P	●	●	○
M	○	○	●
K	●	●	●
N	○	○	○
S			
H			

RIR-E13 • Reaming Inserts

ISO catalogue number	L10	S	W	αN°	αN2°	γ°	KC6005	KC6105	KC6305
RIR01E1306 *	15,00	1,53	2,80	8	18	6	–	●	–
RIR01E1312 *	15,00	1,53	2,80	8	18	12	–	●	–
RIR02E1312 *	18,00	1,93	4,00	8	18	12	–	●	●
RIR03E1312 *	20,00	2,33	4,76	8	18	12	–	–	●
RIR04E1312	27,00	3,13	5,56	8	18	12	●	–	–
RIR04E1312 *	27,00	3,13	5,56	8	18	12	–	●	–

NOTE: *Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.





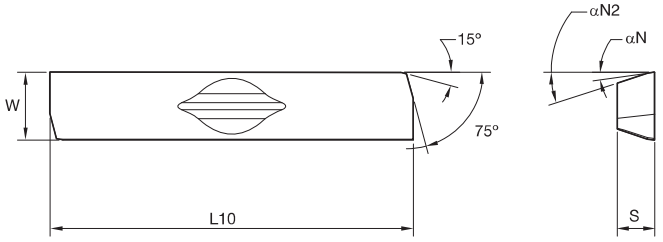
● first choice
○ alternate choice

P			
M			
K			
N			●
S			
H			

RIR-EDS • Reaming Inserts

ISO catalogue number	L10	S	W	αN°	αN2°	γ°	KD1415
RIR04EDS06 *	27,00	3,15	5,56	8	18	6	●

NOTE: All KD1415™ inserts are single tipped except full face at size RIR01.
*Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.



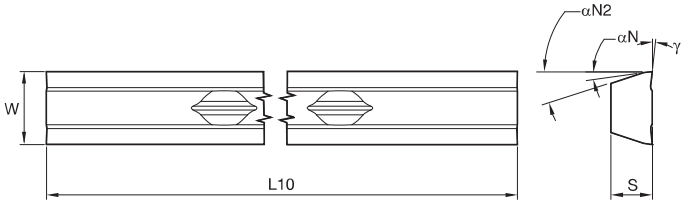
● first choice
○ alternate choice

P			●
M			○
K			●
N			○
S			
H			

RIR-EGU • Reaming Inserts

ISO catalogue number	L10	S	W	αN°	αN2°	KC6105
RIR01EGU00	14,48	1,55	2,80	8	18	●
RIR05EGU00 *	27,00	3,15	6,75	8	18	●

NOTE: *Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.



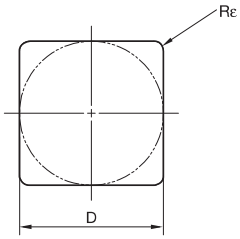
● first choice
○ alternate choice

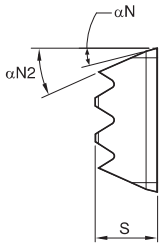
P		●
M		○
K		●
N		○
S		
H		

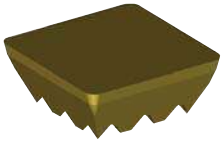
RIR-C45 • Reaming Inserts

ISO catalogue number	L10	S	W	αN°	αN2°	γ°	KC6005
RIRT4C4512	45,00	3,15	5,56	8	18	12	●

NOTE: For use with taper reamer bodies.







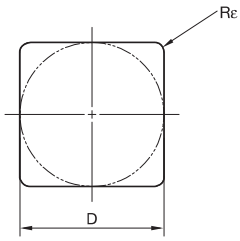
● first choice
○ alternate choice

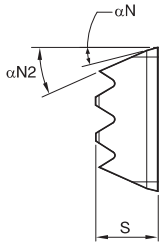
P		
M		
K		
N		●
S		
H		

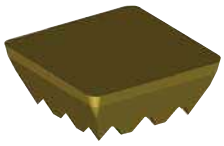
RIQ-R02 • Reaming Inserts

ISO catalogue number	D	S	Rε	αN°	αN2°	γ°	KD1415
RIQ06R0200 *	6,00	2,60	0,20	8	18	0	●

NOTE: *Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.





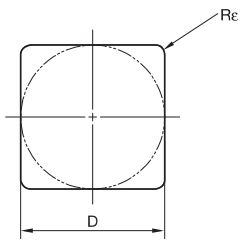


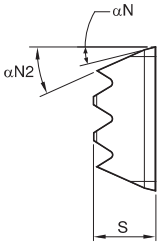
● first choice
○ alternate choice

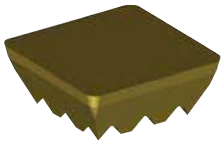
P		●
M		○
K		○
N		
S		
H		●

RIQ-R04 • Reaming Inserts

ISO catalogue number	D	S	Rε	αN°	αN2°	γ°	KB1610	KT6225
RIQ06R0400S	6,00	2,60	0,40	8	18	0	●	–
RIQ09R0400S	9,00	3,15	0,40	8	18	0	●	–





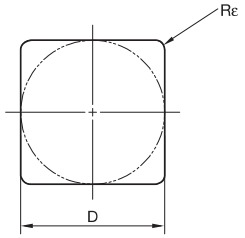


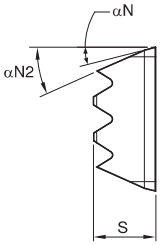
● first choice
○ alternate choice

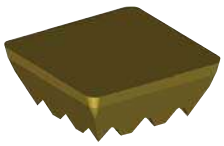
P		●
M		○
K	○	
N		
S		
H	●	

RIQ-R04-FB • Reaming Inserts • With Chipbreaker • For Blind Holes

ISO catalogue number	D	S	Rε	αN°	αN2°	γ°	KB1610	KT6225
RIQ06R0400FB	6,00	2,60	0,40	3	18	12	–	●
RIQ09R0400FB	9,00	3,15	0,40	3	18	12	–	●





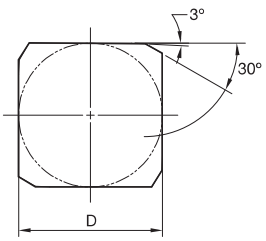


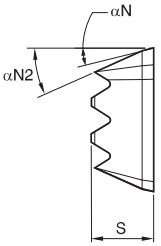
● first choice
○ alternate choice

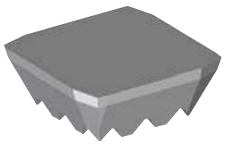
P		●
M		○
K		
N		
S		
H		

RIQ-R05 • Reaming Inserts • With Chipbreaker • For Through Holes

ISO catalogue number	D	S	Rε	αN°	αN2°	γ°	KT6315
RIQ06R0500FT	6,00	2,60	0,50	8	18	0	●
RIQ09R0506FT	9,00	3,15	0,50	14	24	6	●







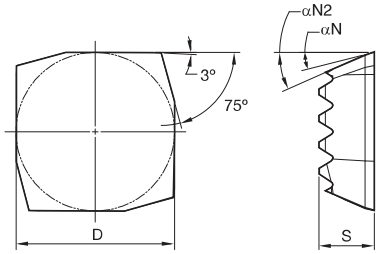
● first choice
○ alternate choice

P	●	●	○
M	○	○	●
K	●	●	●
N	○	○	○
S			
H			

RIQ-E13 • Reaming Inserts

ISO catalogue number	D	S	αN°	αN2°	γ°	KC6005	KC6105	KC6305
RIQ06E1300 *	6,00	2,60	8	18	0	●	●	●
RIQ06E1306 *	6,00	2,60	14	24	6	●	●	●
RIQ06E1312 *	6,00	2,60	20	30	12	●	●	●
RIQ09E1300 *	9,00	3,15	8	18	0	●	●	●
RIQ09E1306 *	9,00	3,15	14	24	6	●	●	●
RIQ09E1312 *	9,00	3,15	20	30	12	●	●	●

NOTE: *Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.



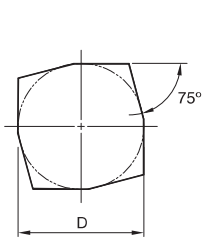
● first choice
○ alternate choice

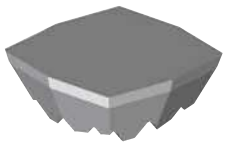
P		●	●	○	
M		○	○	●	
K		●	●	●	
N		○	○	○	●
S					
H					

RIQ-EDR • Reaming Inserts

ISO catalogue number	D	S	αN°	αN2°	γ°	KC6005	KC6105	KC6305	KD1415
RIQ06EDR00	6,00	2,60	8	18	0	●	–	●	–
RIQ06EDR00 *	6,00	2,60	8	18	0	–	●	–	–
RIQ06EDR06 *	6,00	2,60	14	24	6	●	–	–	–
RIQ06EDR06	6,00	2,60	14	24	6	–	●	●	●
RIQ06EDR12 *	6,00	2,60	20	30	12	●	●	●	–
RIQ09EDR00 *	9,00	3,15	8	18	0	●	●	●	–
RIQ09EDR06 *	9,00	3,15	14	24	6	●	●	●	●
RIQ09EDR12 *	9,00	3,15	20	30	12	●	●	●	–

NOTE: *Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.

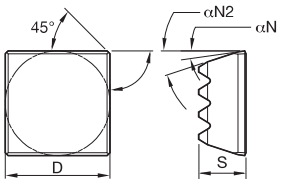




RIQ-EGR • Reaming Inserts

ISO catalogue number	D	S	αN°	αN2°	γ°	KC6005	KC6105	KC6305	KD1415
RIQ06EGR00	6,00	2,60	8	18	0	●	–	–	–
RIQ06EGR00 *	6,00	2,60	8	18	0	–	●	●	–
RIQ06EGR06	6,00	2,60	14	24	6	●	–	–	●
RIQ06EGR06 *	6,00	2,60	14	24	6	–	●	●	–
RIQ06EGR12 *	6,00	2,60	20	30	12	●	●	●	–
RIQ09EGR00	9,00	3,15	8	18	0	●	–	–	–
RIQ09EGR00 *	9,00	3,15	8	18	0	–	●	●	–
RIQ09EGR06 *	9,00	3,15	14	24	6	●	●	–	–
RIQ09EGR06	9,00	3,15	14	24	6	–	–	●	●
RIQ09EGR12 *	9,00	3,15	20	30	12	●	●	●	–

NOTE: *Made-to-order standard item. Standard pricing, manufacturing lead time, and minimum order quantity applies.



● first choice
○ alternate choice

P		
M		
K	●	●
N		
S		
H	●	●

RIQ-C45 • Valve Seat Finishing

ISO catalogue number	D	S	αN°	αN2°	KBHK10	KBHK15
RIQB6C4500S	6,00	2,60	8	18	●	●
RIQB7C4500S	6,50	2,60	8	18	●	●
RIQ07C4500S	7,00	3,15	8	18	●	●
RIQ08C4500S	8,00	3,15	8	18	●	●
RIQ09C4500S	9,00	3,15	8	18	●	●

RIR™/RIQ™ • Metric

Material Group		Grade	Cutting Speed – vc Range – m/min			Hole Types	 1	 2	 3	 4	 5		
						Metric							
						Recommended Feed Rate per Tooth							
			min	Starting Value	max		E13	EDS	EDR	EGR	EGU	R0X	C45*
P	1	KC6005	30	**60**	100	mm/r	0,10–0,20	–	–	–	–	–	0,20–0,30
	2	KC6005	20	**50**	90	mm/r	0,10–0,20	–	–	–	–	–	0,20–0,30
	3	KC6005	20	**40**	80	mm/r	0,05–0,20	–	–	–	–	–	0,20–0,30
		KT6225	120	**180**	240	mm/r	–	–	–	–	–	0,15–0,20	–
		KT6315	120	**180**	240	mm/r	–	–	–	–	–	0,15–0,20	–
	4	KC6005	15	**30**	50	mm/r	0,05–0,20	–	–	–	–	–	0,20–0,30
		KC6105	15	**30**	50	mm/r	0,05–0,20	–	–	–	–	–	–
		KT6225	120	**180**	240	mm/r	–	–	–	–	–	0,15–0,20	–
		KT6315	120	**180**	240	mm/r	–	–	–	–	–	0,15–0,20	–
	5	KC6105	10	**25**	40	mm/r	0,05–0,20	–	–	–	–	–	–
	6	KC6105	10	**25**	40	mm/r	0,05–0,20	–	–	–	–	–	–
M	1	KC6305	10	**25**	40	mm/r	0,05–0,20	–	–	–	–	–	–
	2	KC6305	10	**25**	40	mm/r	0,05–0,20	–	–	–	–	–	–
	3	KC6305	10	**25**	40	mm/r	0,05–0,20	–	–	–	–	–	–
K	1	KC6005	20	**70**	100	mm/r	0,10–0,20	0,15–0,20	0,15–0,20	0,18–0,20	–	–	0,20–0,30
		K6105	20	**70**	100	mm/r	–	–	–	–	0,20	–	–
	2	KC6005	20	**60**	100	mm/r	0,10–0,20	0,15–0,20	0,15–0,20	0,18–0,20	–	–	0,20–0,30
		K6105	20	**60**	100	mm/r	–	–	–	–	0,20	–	–
	3	KC6005	20	**60**	100	mm/r	0,10–0,20	0,13–0,20	0,13–0,20	0,15–0,20	0,17–0,20	–	0,20–0,30
N	1	KD1415	100	**250**	600+	mm/r	–	0,10–0,20	0,10–0,20	0,10–0,20	–	–	–
	2	KD1415	100	**250**	600+	mm/r	–	0,10–0,20	0,10–0,20	0,10–0,20	–	–	–
	3	KD1415	100	**250**	600+	mm/r	–	0,10–0,20	0,10–0,20	0,10–0,20	–	–	–
	4	KD1415	100	**250**	600+	mm/r	–	0,10–0,20	0,10–0,20	0,10–0,20	–	–	–
S	1	–	–	–	–	mm/r	Recommendations available on request						
	2	–	–	–	–	mm/r							
	3	–	–	–	–	mm/r							
	4	–	–	–	–	mm/r							
H	1	KB1610	150	**180**	200	mm/r	–	–	–	–	–	0,05–0,10	–

*For taper reamers vc min 5 m/min, starting vc 10 m/min, max. vc 20 m/min

Overview of RIR and RIQ insert leads

Alternative insert lead that can be used

Tool designed for below listed lead	E06	E13	EDS	EGS	EKS	EGU	EGR	EDR	EKR	ESR	EUR	R02	R04	R06	R08
															
E06	●	–	–	–	–	–	–	–	–	–	–	●	–	–	–
E13	●	●	–	–	–	–	○	○	○	○	○	●	○	–	–
EDS	●	–	●	●	–	–	●	●	○	–	–	●	○	–	–
EGS	○	–	–	●	–	–	●	–	–	–	–	●	○	–	–
EKS	●	–	–	–	●	–	●	●	●	–	–	●	○	–	–
EGU	○	–	○	○	○	●	●	○	○	○	○	●	○	○	–
EGR	●	–	–	–	–	–	●	–	–	–	–	●	○	–	–
EDR	●	–	–	○	–	–	●	●	●	●	○	●	○	–	–
EKR	●	–	–	○	–	–	●	●	●	●	○	●	○	–	–
ESR	●	–	–	○	–	–	●	●	●	●	○	●	○	–	–
EUR	●	–	–	○	–	–	●	●	●	●	●	●	●	–	–
R02	–	–	–	–	–	–	○	–	–	–	–	●	–	–	–
R04	–	–	–	–	–	–	○	–	–	–	–	●	●	–	–
R06	●	–	–	–	–	–	●	●	●	●	●	●	●	●	–
R08	●	–	–	–	–	–	●	●	●	●	●	●	●	●	●

Insert Lead

Surface finish	●●●	●●●	●●	●	●●	●●	●	●●	●●	●●	●●	●●	●●	●●	●●
Postioning accuracy	–	–	●●	●●●	●●	●●	●●●	●●	●●	●●	●●	●	●	●	●

Legend

●	Alternative Inserts	Delivery condition of tool. Insert lead = tool lead.
●		90% compatible. Later support of guide pads at the bore entrance can happen, if leads are not identical.
○		Under certain circumstances compatible. Refer to a Kennametal expert for further support.
–		Do not use in this tool. Can lead to tool damage.

●●●	Surface/ Positioning	Excellent results
●●		Good results
●		Sufficient results
–		Not given

General advice: To mount an insert, where the lead is not identical to the tool lead, the rake angle and insert size have to be identical.

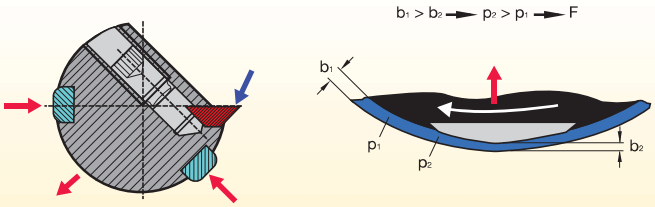
coolant selection		
	recommended	alternative
material type	mineral-oil-based emulsions	semi-synthetic
steel	6%	10%
nickel chrome steel	6%	12%
stainless steel	6%	12%
cast iron	6%	6%
aluminium	6%	12%
zinc alloys	6%	12%
copper	6%	12%
brass	6%	6%

pressure and flow rates					
cut diameter (mm)	cut diameter (in)	flow rate (L/min)	flow rate (gal/min)	pressure (bar)	pressure (psi)
6–12	.25–.468	15–20	55–75	>10	>150
12–16	.468–.625	20–40	75–150	>8	>120
16–20	.625–.781	30–50	115–190	>7	>100
20–32	.781–1.25	40–75	150–285	>5	>75
32–50	1.25–2.0	65–250	245–950	>4	>50
50–100	2.0–4.0	175–350	660–1325	>3	>40

Basic Principle

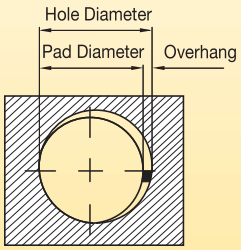
The Kennametal padded reaming tools follow two basic rules. The result, perfectly cylindrical bores with exceptional straightness and superior surface finishes combined with a bore diameter tolerance held to microns:

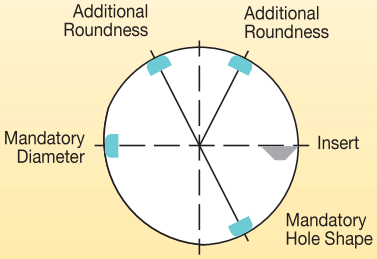
1. A SINGLE-POINT BORING TOOL SUPPORTED BY BEARING PADS, FLOATING ON A COOLANT FILM.
2. A TOOL MUST DEFLECT ONTO THE PADS, ON ENTERING THE HOLE, IN ORDER TO OBTAIN THE CORRECT SIZE.



Each padded reamer hosts a selection of guide pads that are positioned to resist the cutting forces created during machining. A minimum of two guide pads are necessary guiding the reamer in the predrilled hole.

The lubricant, in the form of coolant, gets between the pad and component surface, resulting in frictionless stability during cutting.





Guide pads are ground slightly smaller than the targeted diameter, this allows for blade/insert wear. Most common is a 10 µm overhang but can vary depending on the material to be cut.

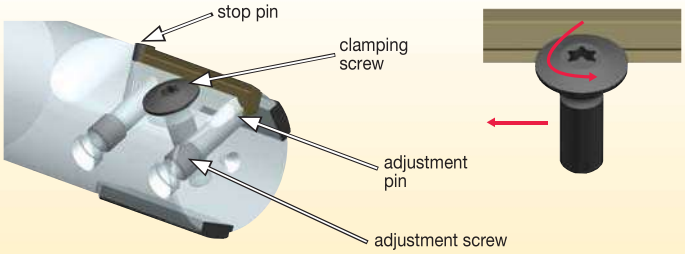
As padded reamers are specifically ground, relative to diameter and tolerance, guide pads are not flexible or adjustable. The pad below the insert ensures hole roundness while the pad opposite the insert defines the bore diameter. Each further pad improves the roundness, straightness, and bridges interruptions within the bore.

These carbide, cermet, PCD, and ceramic guide pads are selected and brazed or bonded to the body depending on coolant availability/type and abrasiveness of the material to be cut. Especially with high L/D ratio tooling (e.g., cam and crank boring bars), bonding of guide pads offers higher precision due to less thermal influence to the steel base body.

● first choice ○ alternate choice

material	P	M	K	N	S	H	MQL
carbide	●	○	●	●		○	○
cermet	●	○	●			○	●
PCD			○		●		●

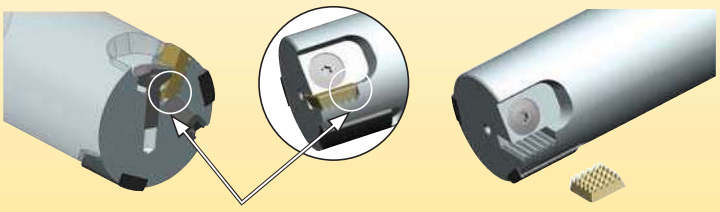
RIR Clamping



RIR reaming inserts are clamped by a single screw to avoid weakening of the pocket seat against common clamping wedges. This clamp screw has a left hand thread to move and securely hold the blade against the stop pin. The stop pin ensures correct advancement of cutting insert to guiding pad.

Like other types of padded reamers using rectangular reaming inserts, two adjustment screws and wedges are required to adjust diameter and back taper accurately. Therefore, RIR is the preferred solution for diameters below RIQ range.

RIQ Clamping



There is no need to adjust back taper as this is already predefined by the serrations. Only the overhang of the cutting edge, relative to the guide pads, needs to be adjusted.

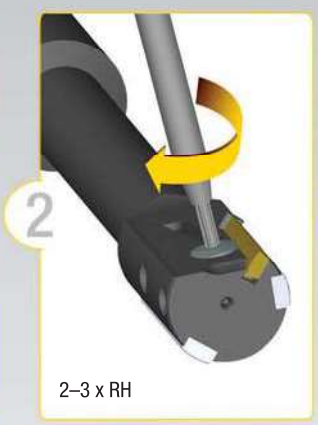
The right-hand clamp screw locks the insert securely onto the high-precision serration. The three cutting edges that are not in use are completely protected by the body while not touching them. All four cutting edges of full-face CBN and PCD inserts can be completely used without the danger of accidently damaging one of them.

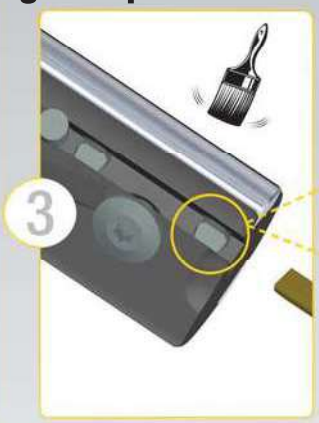
The special form of the clamp screw provides the highest clamping forces enabling less loss of diameter by bedding in effects than known on finger-clamp systems

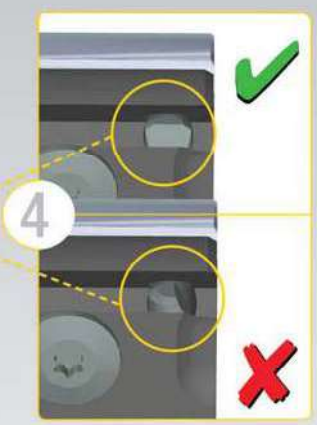
The proprietary adjustment wedge prevents any unpredictable rotation. This avoids errors during setup that cause tool damages.

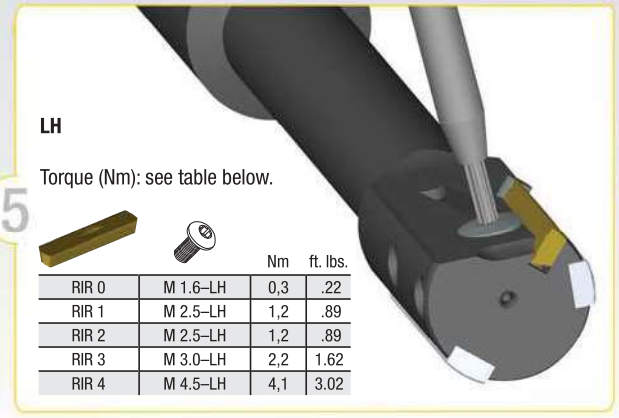
Adjustment Pin and Screw

RIR Tooling Setup

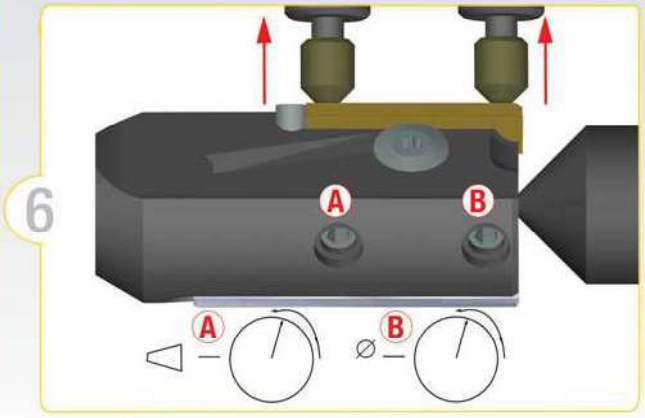




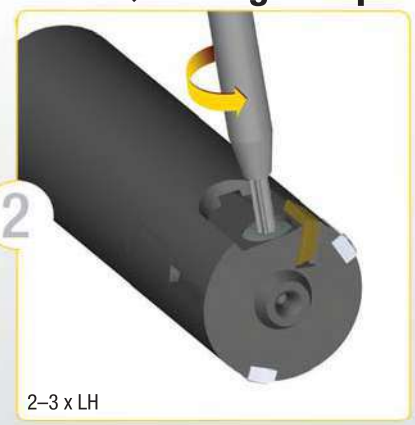


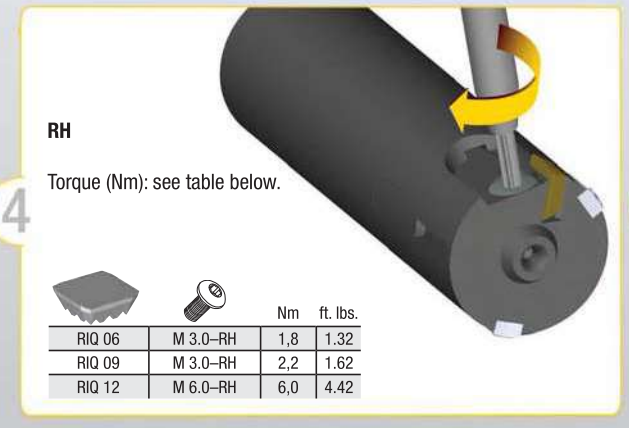


		Nm	ft. lbs.
RIR 0	M 1.6–LH	0,3	.22
RIR 1	M 2.5–LH	1,2	.89
RIR 2	M 2.5–LH	1,2	.89
RIR 3	M 3.0–LH	2,2	1.62
RIR 4	M 4.5–LH	4,1	3.02

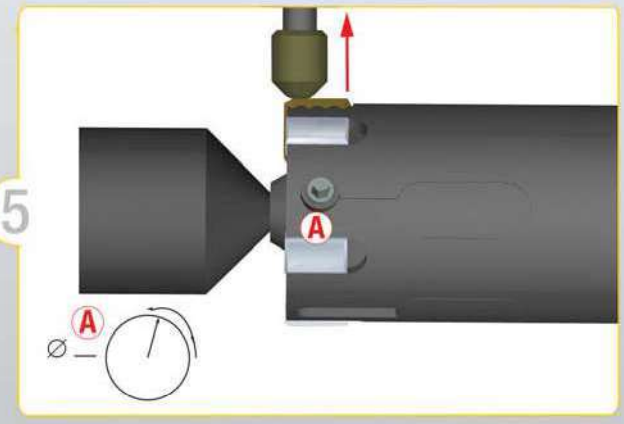


RIQ Tooling Setup



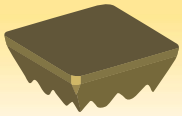


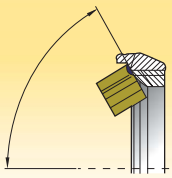
		Nm	ft. lbs.
RIQ 06	M 3.0–RH	1,8	1.32
RIQ 09	M 3.0–RH	2,2	1.62
RIQ 12	M 6.0–RH	6,0	4.42

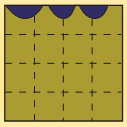


Valve Seat Tools • RIQ™ Quattro Cut™ Based Tooling

RIQ technology enables bypassing any angular adjustment of the insert and provides up to 12 cutting edges.







- Causing in three wear areas per edge.
- Resulting into 12 usable cutting edges per insert.

Valve Seat Tools • Machining Centre Solutions

RIQ valve seat tooling with integrated hydraulic chuck to clamp multiflute RMS™ or RIR™ guide pad reamer.

Machining Centre • Integrated Hydraulic Chuck

RMS Multiflute Reamer
for regular runout accuracy of valve seat to value guide demands

RIR Guide Pad Reamer
for highest requests regarding valve guide roundness and cylindricity

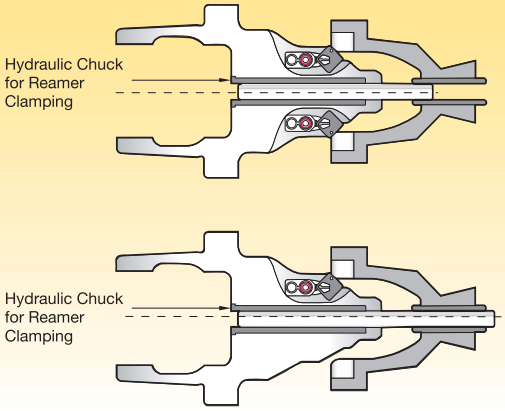
Machining Centre Process • All Angles Formed to Finish Specifications in TWO Passes

Process A (Preferred)
Tool 1 • Semi-Finish:
- Finish of secondary angles.
- Semi-finish of primary angles.
- Create pilot bore (short version of RMS or RIR reamer).

Tool 2 • Finish:
- Finish of primary angles.
- Finish of guide bore (long version of RMS or RIR reamer).

Process B (Alternate)
Tool 1 • Finish Valve Seat:
- Finish of primary and secondary angles.
- Create pilot bore (short version of RMS or RIR reamer).

Tool 2 • Finish Valve Guide:
- Finish of guide bore (long version of RMS or RIR reamer).



Valve Seat Tools • Transfer Line Solutions

RIQ valve seat tooling with carbide bushing guiding RMS or RIR reamer machining the valve guide on transfer lines.

Transfer Line • Integrated Carbide Bushing

Multiflute Reamer RMS
for regular runout accuracy of valve seat to value guide demands

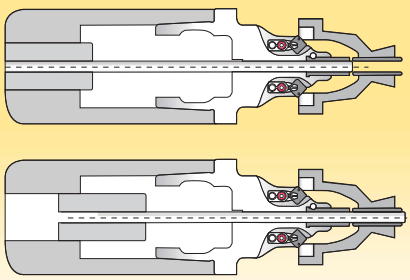
RIR Guide Pad Reamer
for highest requests regarding valve guide roundness and cylindricity

Transfer Line Process • All Angles Formed to Finish Specifications in TWO Passes/ONE Pass

Process A (Preferred)
Tool 1 • Semi-Finish:
- Semi-finish of secondary angles.
- Semi-finish of primary angles.

Tool 2 • Finish:
- Finish of primary angles.
- Finish of secondary angles.
- Finish of guide bore with feed out multiflute or guide pad reamer (squirt-through type).

Process B (Alternate)
Tool 1 • Semi-Finish and Finish Combined:
- Finish of primary and secondary seat angles.
- Finish of guide bore with feed out multiflute or guide pad reamer (squirt-through type).



Fine Boring Application Sheet

Feature tolerances, surface finishes, and geometric tolerances have to be content of the workpiece drawing

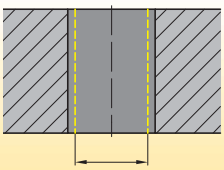
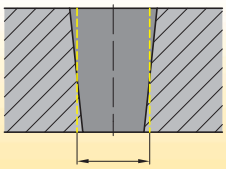
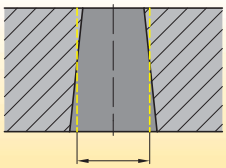
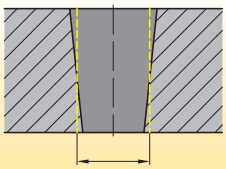
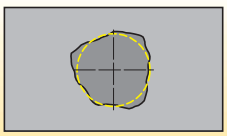
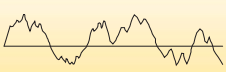
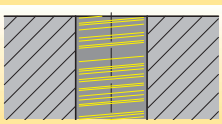
Q-Number:				**Date:**	
Customer:				**Sales eng.:**	
Location:				**Application eng.:**	
Contact person:				**Competitors:**	
General					
Status:	❒ Launch	❒ Running progress	❒ Process change		
Volume:	Holes/Year	**Similar tool:**			
Workpiece					
Operation name:					
Diameters/features to be machined	**1:**	**2:**	**3:**	**4:**	**5:**	**6:**
Tolerance target:	❒ Upper third ❒ Middle third (e.g., if CpK is needed) ❒ Lower third (e.g., if Go/NoGo Gage)		**Interrupted cut:** ❒ Yes ❒ No **Facing included:** ❒ Yes ❒ No **Max lead length:** _____			
CpK-value:	❒ Yes ❒ No		**Hole type:** ❒ Blind ❒ Through			
Workpiece material:			**Hardness/strength:**			(N/mm², HRC,...)
Premachining: (detailed description including stock amounts)						
Machine/Fixture/Hole Gaging						
Machine type:	❒ Machining centre	❒ Transfer line	❒ Lathe	❒ Special purpose machine		
Machine name:						
Tool:	❒ Rotating	❒ Stationary	**Spindle connection:**			(HSK80A, DV50, BT40,...)
Spindle orientation:	❒ Horizontal	❒ Vertical	**Number of spindles:**			(for same operation on same machine)
Workpiece clamping:	❒ Rigid	❒ Weak	**M/C spindle adjustment:**	❒ Radial runout	❒ Axial runout	❒ No
Setting device available: (only for adjustable tools)	❒ Yes:		Description	❒ No		
Gauging method:	❒ Go/NoGo-gage	❒ Air or electronic gage	❒ Other			
Coolant type	❒ Soluble	❒ Semi-synthetic	❒ Synthetic	❒ MQL		
Coolant supply:	❒ Internal	❒ External	❒ None			
Coolant pressure:	bar	**Coolant concentration:**				%
		Coolant flow:				l/min
Additional Information: (e.g. interferences, weight or dimensional restrictions, customer reason for change, known issues,...)						

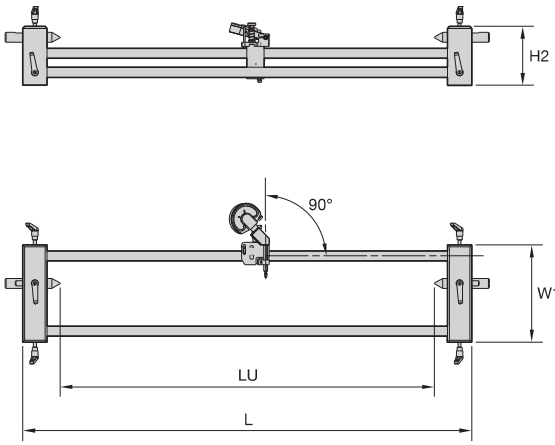
Quotation Processing Only with Workpiece Drawing and Filled Out Form

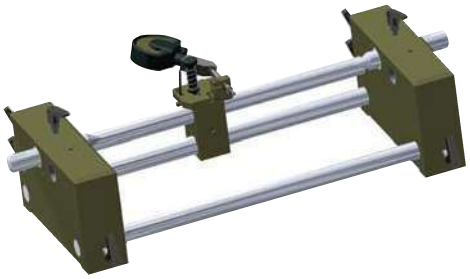
Reaming Allowances for Single Blade Reaming

	reaming allowance in diameter mm		
mm	min	middle	max
6,01–9,59	0,10	0,15	0,25
9,60–15,00	0,15	0,20	0,30
15,00–20,00	0,15	0,25	0,35
20,00–50,00	0,20	0,30	0,40

Causes of and Remedies for Reaming Problems

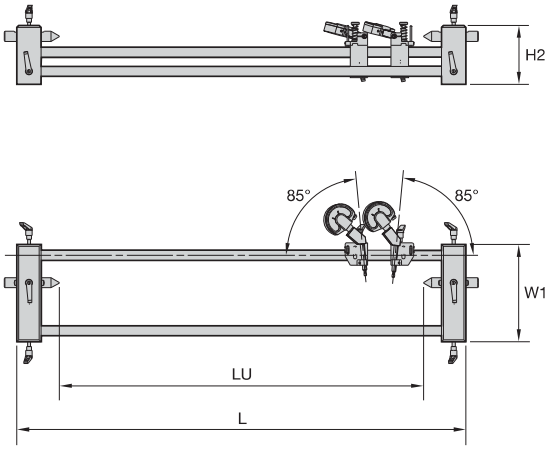
Problem		Cause	Possible Remedy
Drill diameter too large		1. Reaming tool running out-of-centre. 2. Concentricity of pilot hole and ream machining unsatisfactory. 3. Built-up edge. 4. Unsuitable cooling lubricant. 5. Reaming tool Ø too large.	• Use SIF™ equalising adaptor. • Re-align, use floating head. • Change cooling lubricant. • Change cutting speed. • Measure reamers and send for repairs.
Drill diameter too small		1. Reamer worn. 2. Unsuitable cooling lubricant. 3. Reaming allowance too small.	• Replace and refit tool. • Change cooling lubricant. • Increase reaming allowance.
Conical drill profile wider towards drill runout		1. Concentricity of pilot hole and reaming unsatisfactory. 2. Positioning accuracy of pilot hole to reaming.	• Re-align, use SIF equalising adaptor. • Correct positioning accuracy.
Conical drill profile wider at drill entry point		1. Concentricity of pilot hole and reaming unsatisfactory. 2. Reaming tool skim cutting with ledger.	• Re-align, use floating head. • Securely clamp reaming tool axially.
Hole out-of-centre and/or showing chatter marks		1. Reaming tool running out-of-centre. 2. Slanted cutting surface/asymmetrical cutting. 3. Workpiece twisted.	• Use SIF equalising adaptor. • Flatten surface before drilling or reaming. • Take the direction of impact into account when clamping the workpiece.
Surface quality does not meet specification		1. Tool cutters worn. 2. Reaming tool running out-of-centre. 3. Incorrect technology data (cutting parameters). 4. Inadequate chip evacuation.	• Replace and refit tool. • Use SIF equalising adaptor. • Change cutting parameters in machining range. • Optimise coolant supply; increase coolant pressure and volume.
Feed grooves		1. Built-up edge.	• Change cooling lubricant. • Change cutting speed.

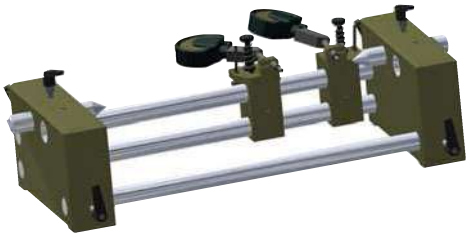




Setting Fixture • One Gage

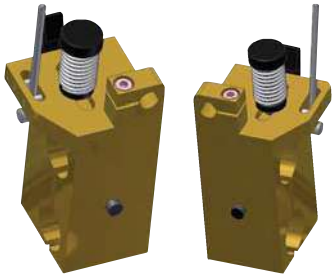
order number	catalogue number	H2	L	LU	W1
5025599	SF300M1RS	118	450	300	195
5025670	SF750M1RS	118	900	750	195





Setting Fixture • Two Gage

order number	catalogue number	H2	L	LU	W1
5025597	SF300M1LA1RA	118	450	300	195
5025598	SF750M1LA1RA	118	900	750	195



Left Hand Right Hand

Axial Slide • 90° with Angle Fine Adjustment

order number	catalogue number
5025672	SFSLLS
5025671	SFSLRS

SM Screw Sets for Slides

Axial Slides

order number	catalogue number
5025683	SFSLSS

Left Hand Right Hand

Axial Slide • 85°

order number	catalogue number
5025674	SFSLLA
5025673	SFSLRA

Base Plate for Vertical Setup

order number	catalogue number
5025680	SFVB

SM Clamp Handle

Clamp Handle for End Blocks and Axial Slides

order number	catalogue number
5025682	SFEBCH

SM End Block

End Block Including Screws

order number	catalogue number
5025681	SFEBS

Contact Pins Set

order number	catalogue number
5025686	SFCPS

Support Bars (450mm and 900mm)

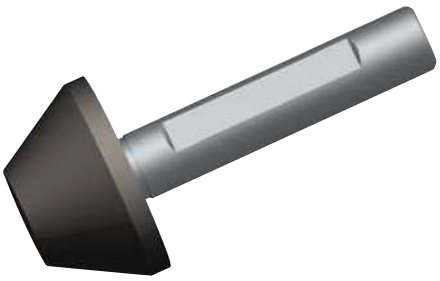
order number	catalogue number
5025684	SFSB450
5025685	SFSB900

Gage Set

order number	catalogue number
5025675	SFMGS

Spring-Loaded Centre Ø 20mm

order number	catalogue number
5025679	SFCR20S



HSK Centre

order number	catalogue number
5025677	SFCRHSK3263
5025678	SFCRHSK63100

Standard Centre Ø 20mm

order number	catalogue number
5025676	SFCR20