GUHRING

'10

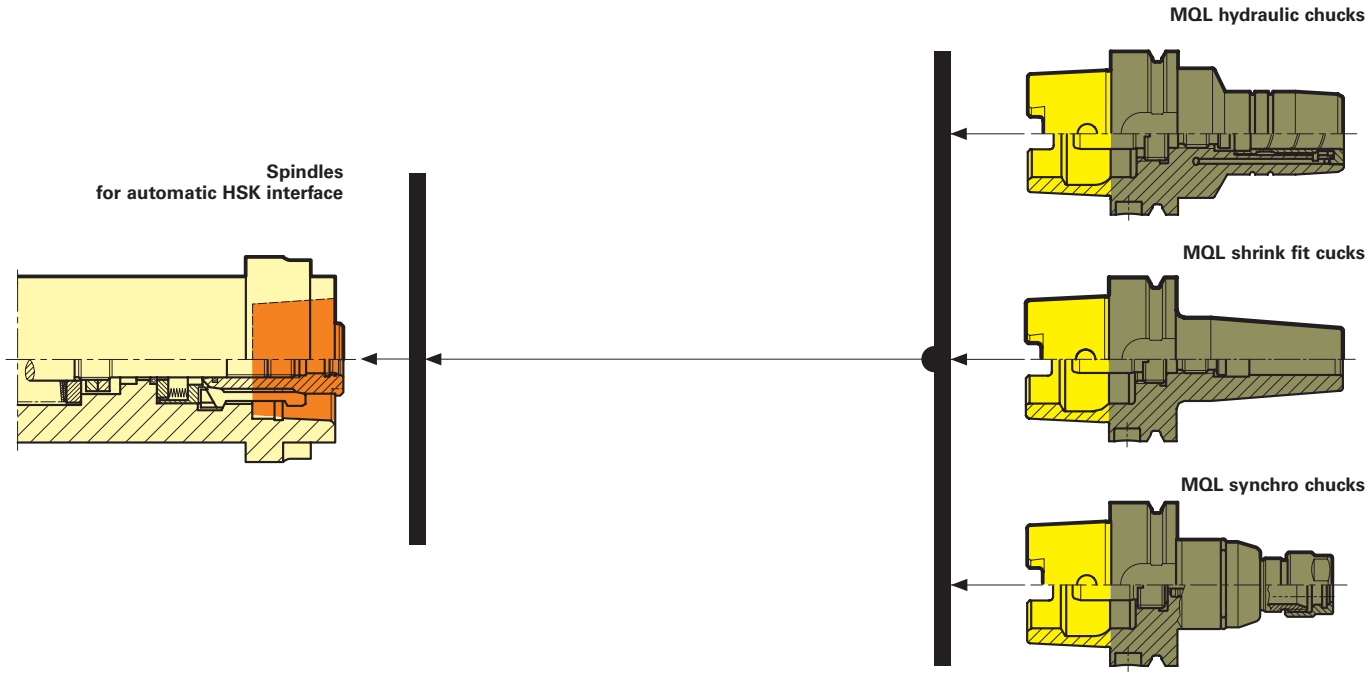
MINIMAL QUANTITY LUBRICATION MQL

Innovative solutions from the spindle to the cutting edge from Guhring's GM 300 program to optimize production

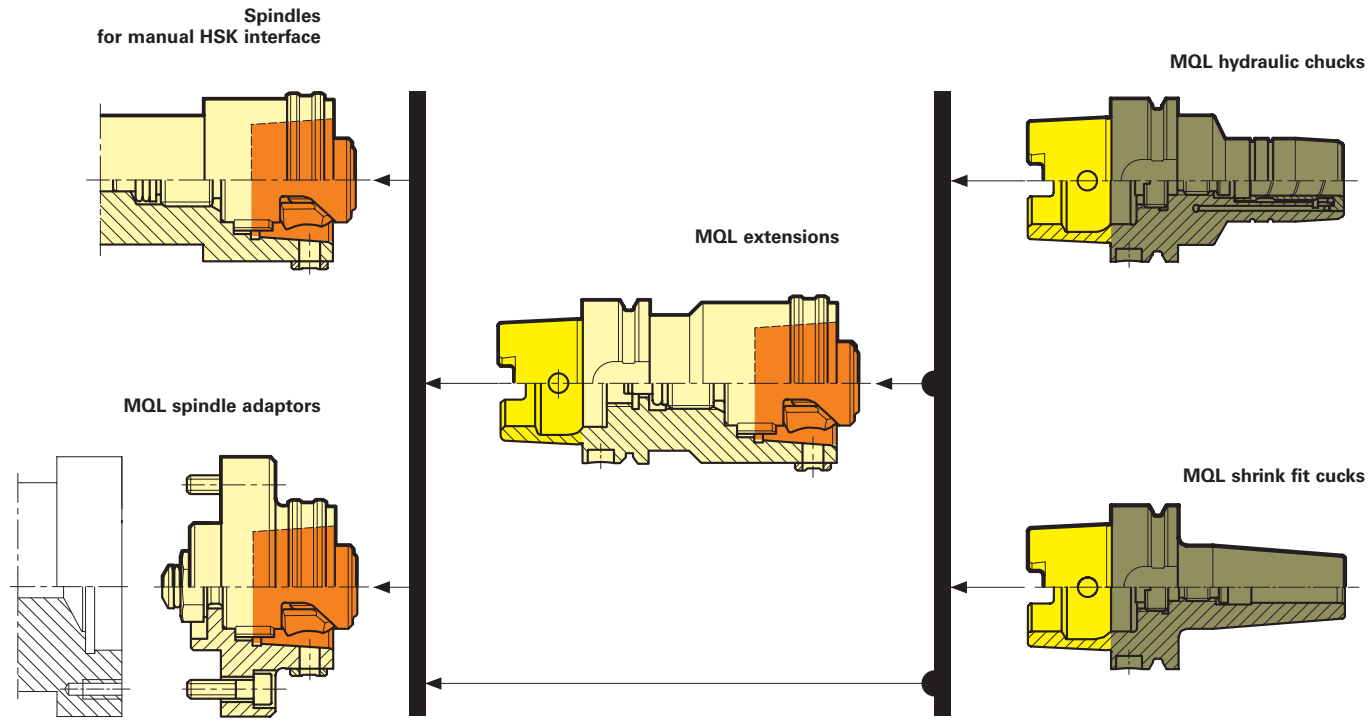
Spindle clamping systems

Tool holders
ISO 12164-1/DIN 69893-1 HSK-A

Automatic tool clamping



Manual tool clamping



Minimal Quantity Lubrication offers numerous advantages - benfit from them with MQL solutions from Guhring!

MQL saves time and money:

- increased cutting rates reduce the machining times and, therefore, your manufacturing cost.
- longer tool life through more consistent cooling without sudden thermal shock reduce the number of tool changes and your tooling requirement.
- the workpieces remain dry, so that you can save on the de-greasing.
- dryer chips can be disposed of easier and more cost-efficient.
- no cost of soluble oil maintenance.
- new machines require less investment in the cooling system.

MQL increases quality:

- the surface quality of the workpieces to be machined is improved by the pure lubricant.

MQL is environmentally friendly and safe:

- there is no spreading of neat oil around the machine.
- there are less environmentally harmful residuals.

MQL with Guhring is simple and cost-efficient:

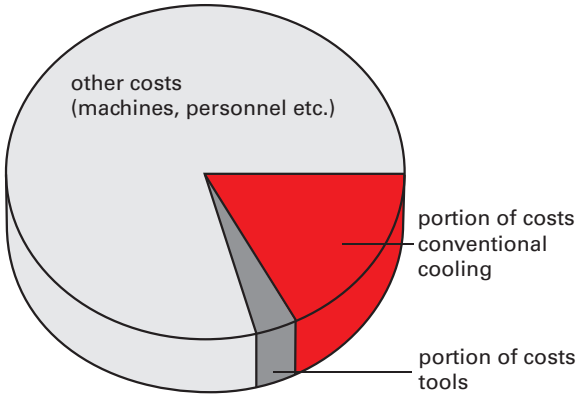
- benefit from a complete system from MQL clamping set and MQL tool holders to MQL tools from one source.
- utilise the excellent price-performance-ratio of Guhring's MQL solutions, to a large extent available as a standard program.
- remain flexible with Guhring's MQL solutions. Guhring's MQL system is completely compatible with the conventional system for wet machining. In addition, Guhring provides solutions for 1-channel as well as 2-channel MQL systems.

From special solution to standard range

Reducing the machining costs is the main aim of every production facility. A detailed examination of the machining process displays a cost structure where alongside the machine and tooling costs especially the costs of cooling/ lubrication are a major contributing factor. Therefore, reducing the cooling lubricant requirement offers a multi-faceted savings potential that needs to be utilised.

Minimising the cooling lubricant does not only bring cost advantages. A lower cooling lubricant consumption is also beneficial to the protection of the environment and health. Therefore, the research and development in minimal quantity lubrication MQL already began in the mid 1990's and Guhring was and to this day remains one of its pioneers.

When at first MQL systems where exclusively established as special solutions or - from a present day perspective one may even say: at worst - applying conventional clamping sets, tool holders and tools, the increased acceptance of the machining technology has presently led to a cumulative standardisation and is currently culminating in the drafts of corresponding DIN-standards.

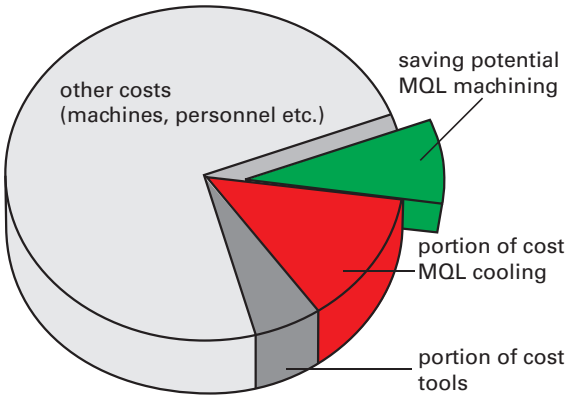


The aim of MQL machining

As well as the reduction of the cooling lubricant requirement whilst maintaining a maximum cooling and lubricating effect when also machining especially deep holes, MQL technology also offers further saving potentials. The acquisition of a new MQL lubricating system is considerably more cost-efficient than conventional cooling lubrication.

Therefore, the minimal proportion of cooling lubricant in the medium not only reduces the cost of the cooling lubricant itself. Especially the consequential costs of cooling decrease considerably. A reduced cooling lubricant application results in significantly lower cleaning costs for the components. In addition, the disposal costs for used cooling lubricant or swarf are reduced. Summing up, these advantages outweigh the relatively large investment in modifying the machines and systems for MQL machining. Added to that are the indirect financial advantages for the protection of the environment and health.

When designing the clamping sets, tool holders and tools for MQL machining the aim was to keep the thermal load at the tool point and therefore wear to a minimum and simultaneously maintain effective chip evacuation especially from deep holes so that the economic efficiency and productivity of MQL machining is equal to the high level of conventional wet machining.

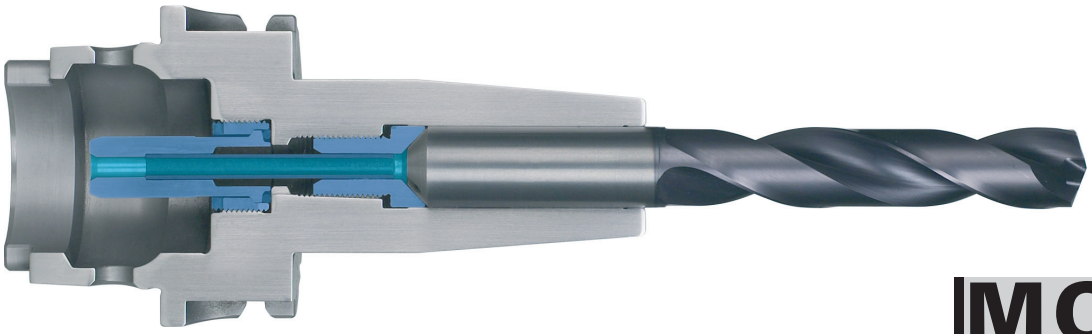


Guhring's MQL delivery system

The development of present-day MQL systems

The quest to reduce the costs in matters concerning cooling lubricants initially resulted in a multitude of provider and customer specific solutions for MQL machining. However, with its basic research for MQL machining, Guhring created the pre-requisites for practical MQL technology that included all components in the development, from clamping set to the cutting edge which led to the first MQL delivery system.

An essential characteristic of Guhring's first MQL delivery system was the delivery of the cooling lubricant without pockets via a special MQL coolant delivery unit, a MQL-suitable tool shank end and the tapered length setting screw in order to ensure optimal cooling lubricant supply at the tool point even applying a medium with a low cooling lubricant content. Detailed studies attested a cooling lubricant delivery to the cutting edge without loss, a delay-free reaction of minimal quantity lubrication and a marginal cutting edge temperature increase. In addition, optimised flutes ensure a problem-free chip evacuation even from deep holes. The only advancement required for Guhring's first MQL delivery system was the addition of automatic length adjustment when clamping the tools.



MQL by GÜHRING

Guhring's current MQL system

By incorporating the MQL length adjustment screw to Guhring's first MQL delivery system in 2007, the original drawback was eliminated. There is, therefore, currently a MQL delivery system available to the customer that optimally meets the requirements of the present-day production process.

Furthermore, Guhring puts great importance on a complete compatibility of the MQL technology in the chain of clamping set - chuck - tool. Subsequently, Guhring's MQL clamping set can be exchanged problem-free with a corresponding clamping set for conventional cooling thanks to the identical spindle contour. Guhring's MQL tool holders - hydraulic, shrink fit und synchro chucks - are all designed for application in combination with the MQL clamping set, but can also be applied with conventional cooling. The user, therefore, benefits from a standardised system and a clearly reduced stock keeping thanks to compatible components.

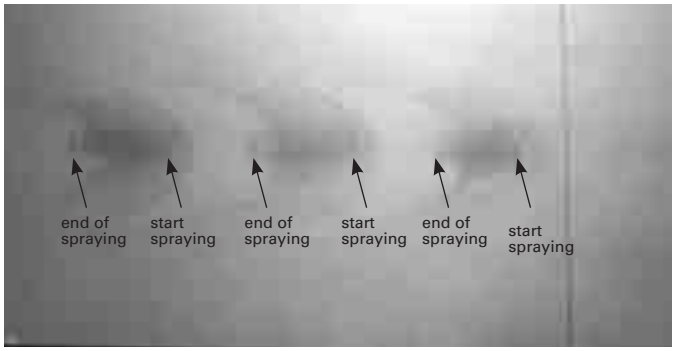
MQL by GÜHRING Lic. HORKOS CORP

MQL suitable shank end

Because an extremely low volume of lubricant is applied with minimal quantity lubrication, the delivery of these low coolant quantities to the effective area is of utmost importance. Hereby, the geometric design of the shank end is of main significance for secure delivery of the lubricant. In a comprehensive series of tests we have thoroughly investigated different geometric designs of the shank end and subsequently determined the optimal design. The Guhring developed conical shank end optimally satisfies the relevant MQL conditions:

- no lubricant pockets
- minimal dead area
- simple operation
- cost-efficient production

Suitable shank ends with corresponding screws



Direct response without loss

Spray tests with conical MQL shank end from Guhring show that the cooling lubricant exits the tool directly at the start and stops exactly at the end of the spraying process. The strength of the spray film indicates that a high cooling lubricant volume is available throughout the entire duration of spraying.

The spray tests were carried out in rotation, i.e under real operating conditions with the following parameters: n=10,000rev./min, f=0.06mm/rev., air volume: 55Nl/min, neat oil volume: 30ml/h.

Evaluation matrix

Shank end	Handling	Cost-efficient production	Minimal dead areas geom. analysis	Leak-proof
Plain w/o slot	++	++	-	-
Plain w. sickle-shaped slot	++	+	-	-
Tapered with slot	++	+	+	++
Recessed end with labyrinth seal	-	-	++	++

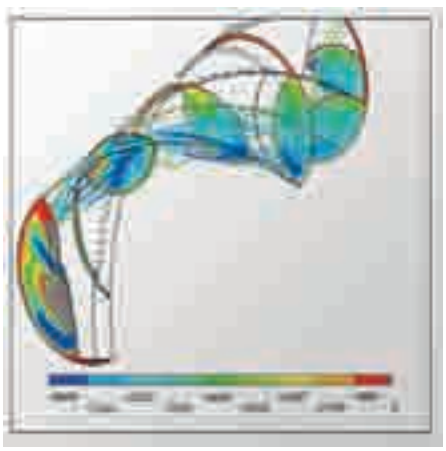
(++ = very good properties, + = good properties, - = poor properties)

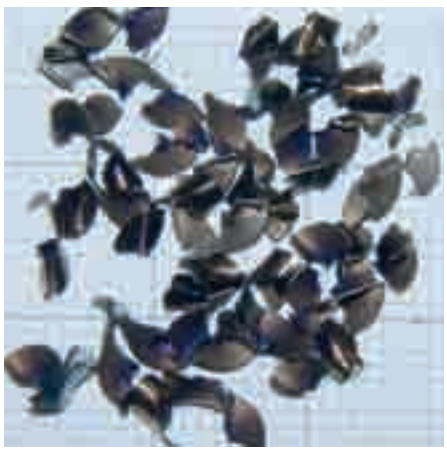
Optimised tool geometries for MQL machining:

Optimised flute cross-section
Guhring MQL tools have a flute geometry specially adapted to the particular requirements for an optimal chip evacuation from deep holes.

Maximum coolant duct cross-section
To optimally provide the cutting edge with lubricant, the tools are manufactured with coolant ducts that have a maximum cross-section. This ensures an effective lubricant supply to the cutting edge as well as an excellent chip evacuation.

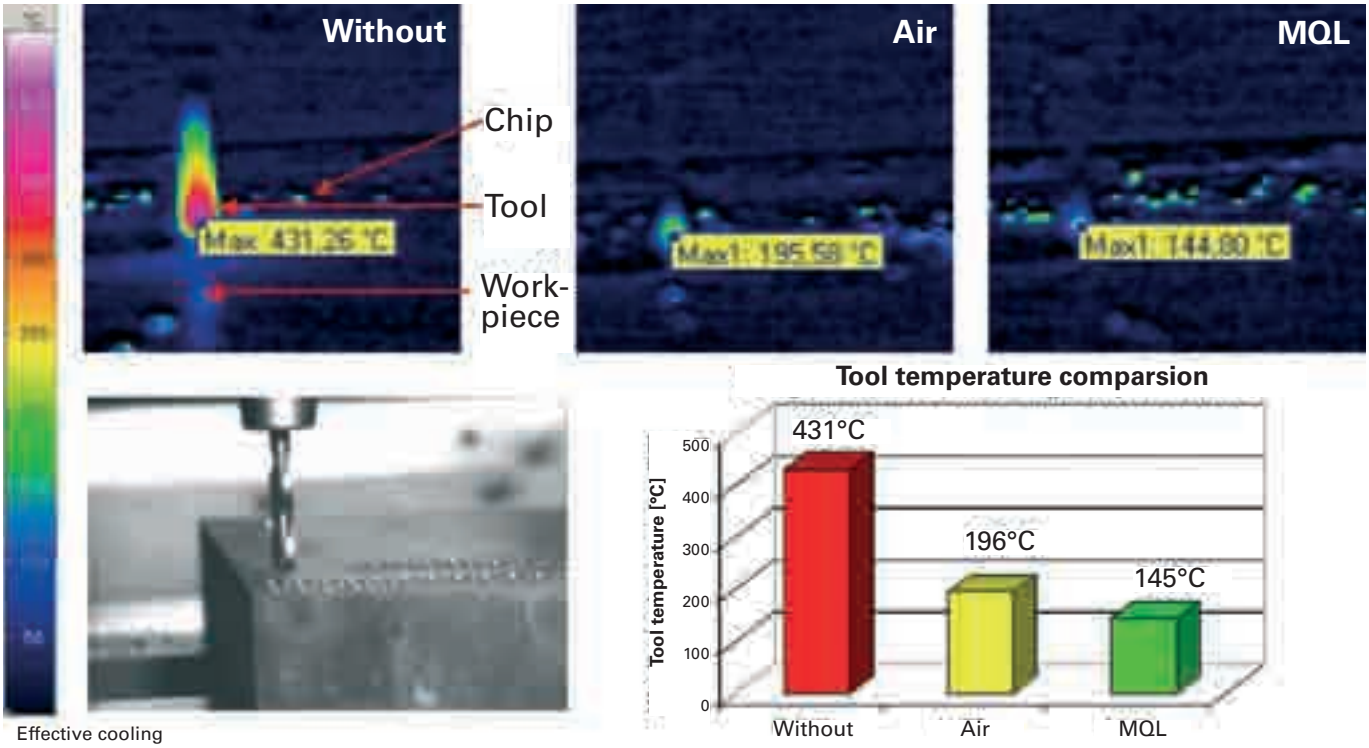
Problem-free chips
Chips, evacuated problem-free also from deep holes effectively prevent chip congestion and the associated jamming of the tool.





MQL considerably reduces the operating temperature

In comparison to entirely dry machining, MQL can considerably reduce machining temperatures. The result is longer tool life and increased process reliability. Thermographic experiments at Guhring showed that cooling with dry air reduces the temperature at the tool point by more than 200 degrees. The addition of a few millimetres of neat oil per hour, hence MQL, resulted in an even lower temperature thanks to the reduced friction.



Effective cooling
Guhring has determined the heat development at the drill point when applied without cooling or with internal cooling with air or MQL respectively with thermographic cameras. With MQL, the temperature of the tool and subsequently the transfer of heat to the workpiece is considerably reduced.

The top MQL clamping set from Guhring – now for many spindle contours!

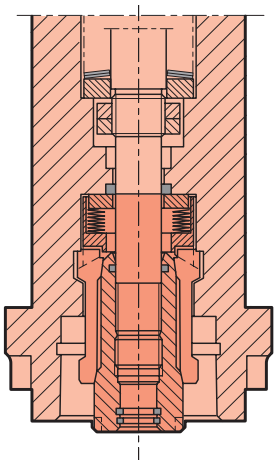
- **The Genuine Article: the clamping set with Guhring contour**
- **New: Guhring M contour**
- **New: PowerClamp/KomLoc®**

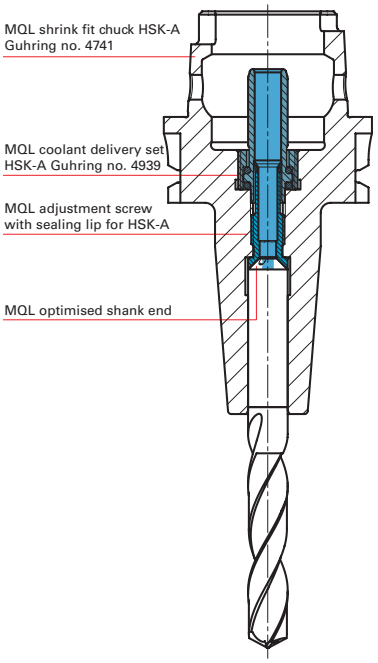
Automatic tool clamping with MQL

Spindle clamping systems with drawbar

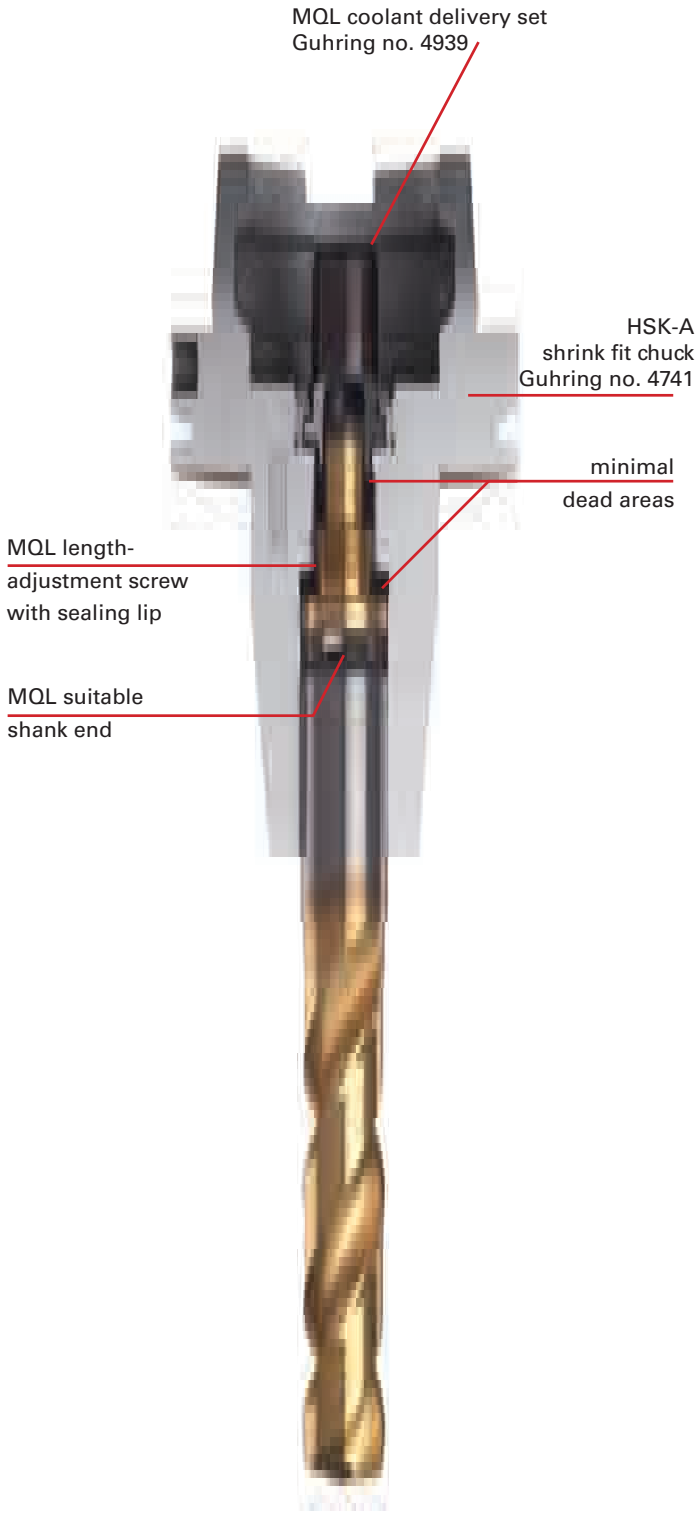
Application in machining centres, milling and turning machines

Suppliers:
Ott
Röhm
Berg
Ortlieb





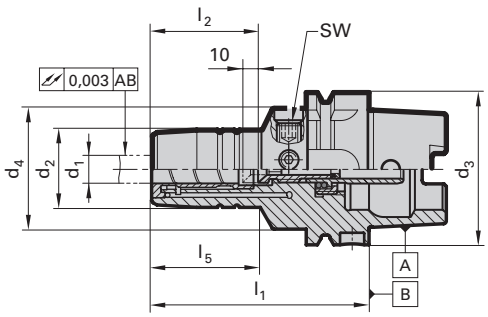
MQL by GÜHRING Lic. HORKOS CORP



MQL HSK-A hydraulic chuck for automatic tool change

Product information
- new MQL standard
- for 1-channel systems
- balancing quality: G6.3 / 15,000 rev./min
- clamping-Ø for shank tolerance h6
- axial length setting

Scope of delivery
- incl. MQL length adjustment screw with sealing lip and coolant delivery set Guhring no. 4939
- incl. clamping key Guhring no. 4912



Guhring no. 4210

HSK-A d_3	for clamping-Ø d_1 h6 mm	d_2 mm	d_4 mm	l_1 mm	l_2 mm	l_5 mm	SW	kg	Code no.	Availability
50	6	26	40	80	36	38	4	0.95	6,050	●
50	8	28	40	80	36	38	4	0.95	8,050	●
50	10	30	40	85	40	44	4	0.95	10,050	●
50	12	32	40	90	45	49	4	0.95	12,050	●
50	14	34	40	90	45	49	4	0.95	14,050	●
50	16	38	53	95	48	36	5	1.25	16,050	●
50	18	40	57	95	48	36	5	1.25	18,050	●
50	20	42	60	100	50	39	5	1.25	20,050	●
63	6	26	50	80	36	34.5	5	1.25	6,063	●
63	8	28	50	80	36	35.5	5	1.25	8,063	●
63	10	30	50	85	40	40	5	1.25	10,063	●
63	12	32	50	90	45	45	5	1.35	12,063	●
63	14	34	50	90	45	46	5	1.35	14,063	●
63	16	38	50	95	48	51	5	1.45	16,063	●
63	18	40	50	95	48	52	5	1.45	18,063	●
63	20	42	50	100	50	58	5	1.45	20,063	●
63	25	57	63	115	56	50	6	2.45	25,063	●
63	32	64	75	120	60	58	6	3.10	32,063	●
100	6	26	50	85	36	36	5	2.60	6,100	●
100	8	28	50	85	36	36	5	2.60	8,100	●
100	10	30	50	90	40	42	5	2.60	10,100	●
100	12	32	50	95	45	47	5	2.65	12,100	●
100	14	34	50	95	45	47	5	2.65	14,100	●
100	16	38	50	100	48	53	5	2.85	16,100	●
100	18	40	50	100	48	53	5	2.85	18,100	●
100	20	42	50	105	50	59	5	3.35	20,100	●
100	25	57	63	115	56	67	6	3.50	25,100	●
100	32	64	75	120	60	72	6	3.95	32,100	●

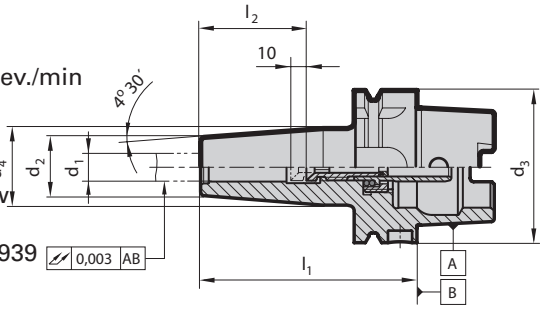
HSK-A shrink fit chuck MQL for automatic tool change

Product information

- new MQL Guhring standard, l2 is plug-in depth of DIN 6535
- balancing quality G 6.3 at 15.000 rev./min
- for shank tolerance h6

Scope of delivery

- incl. MQL length adjustment screw with sealing lip and coolant delivery set Guhring no. 4939
- special dimensions on request



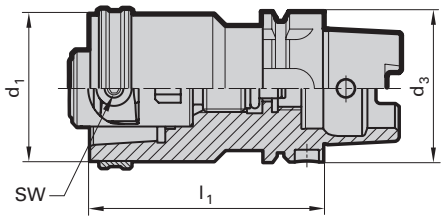
Guhring no. 4741

HSK-A d_3	for clamping-Ø d_1 h6 mm	d_2 mm	d_4 mm	l_1 mm	l_2 mm	kg	Code no.	Availability
40	6	21	27	80	36	0,40	6,040	•
40	8	21	27	80	36	0,40	8,040	•
40	10	24	32	80	40	0,50	10,040	•
40	12	24	32	90	45	0,50	12,040	•
40	14	27	33,5	90	45	0,60	14,040	•
40	16	27	33,5	90	48	0,50	16,040	•
50	6	21	27	80	36	0,60	6,050	•
50	8	21	27	80	36	0,60	8,050	•
50	10	24	32	85	40	0,70	10,050	•
50	12	24	32	90	45	0,70	12,050	•
50	14	27	34	90	45	0,70	14,050	•
50	16	27	34	95	48	0,70	16,050	•
50	18	33	41,5	95	48	0,90	18,050	•
50	20	33	41,5	100	50	0,90	20,050	•
63	6	21	27	80	36	0,70	6,063	•
63	8	21	27	80	36	0,70	8,063	•
63	10	24	32	85	40	0,70	10,063	•
63	12	24	32	90	45	0,80	12,063	•
63	14	27	34	90	45	0,80	14,063	•
63	16	27	34	95	48	0,90	16,063	•
63	18	33	42	95	48	0,90	18,063	•
63	20	33	42	100	50	1,00	20,063	•
63	25	44	52,5	115	56	1,00	25,063	•
63	32	44	52,5	120	60	1,10	32,063	•
63	6	21	27	120	36	0,90	206,063	•
63	8	21	27	120	36	1,00	208,063	•
63	10	24	32	120	40	1,10	210,063	•
63	12	24	32	120	45	1,20	212,063	•
63	6	21	27	160	36	0,80	106,063	•
63	8	21	27	160	36	0,80	108,063	•
63	10	24	32	160	40	0,90	110,063	•
63	12	24	32	160	45	0,90	112,063	•
63	14	27	34	160	45	1,00	114,063	•
63	16	27	34	160	48	1,00	116,063	•
63	18	33	42	160	48	1,20	118,063	•
63	20	33	42	160	50	1,20	120,063	•
63	25	44	52,5	160	56	1,80	125,063	•
63	32	44	52,5	160	60	1,70	132,063	•
80	6	21	27	85	36	1,30	6,080	•
80	8	21	27	85	36	1,30	8,080	•
80	10	24	32	90	40	1,40	10,080	•
80	12	24	32	95	45	1,40	12,080	•
80	14	27	34	95	45	1,50	14,080	•
80	16	27	34	100	48	1,50	16,080	•
80	18	33	42	100	48	1,70	18,080	•
80	20	33	42	105	50	1,70	20,080	•
80	25	44	53	115	56	2,20	25,080	•
80	32	44	53	120	60	2,10	32,080	•
100	6	21	27	85	36	2,10	6,100	•
100	8	21	27	85	36	2,20	8,100	•
100	10	24	32	90	40	2,30	10,100	•
100	12	24	32	95	45	2,30	12,100	•
100	14	27	34	95	45	2,30	14,100	•
100	16	27	34	100	48	2,30	16,100	•
100	18	33	42	100	48	2,50	18,100	•
100	20	33	42	105	50	2,50	20,100	•
100	25	44	53	115	56	3,00	25,100	•
100	32	44	53	120	60	3,00	32,100	•

HSK-A/HSK-C extensions with MQL 4 point clamping set

Product information
- MQL suitable
- for single channel systems

Scope of delivery
- incl. MQL 4 point clamping set Guhring no. 4930 and Adaptor Guhring no. 4934
- incl. brass locking ring Guhring no. 4953
- order coolant delivery set separately



Guhring no. **4350**

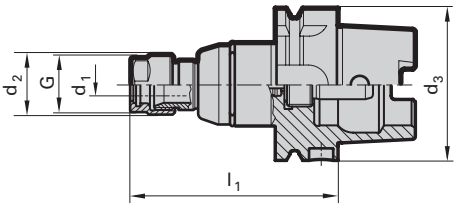
HSK-A/HSK-C d_1 / d_3	l_1 mm	SW	kg	Code no.	Availability
32	60	2.5	0.30	60,032	○
40	80	3.0	0.70	80,040	●
50	80	4.0	0.90	80,050	●
50	100	4.0	1.10	100,050	●
63	100	5.0	1.80	100,063	●
63	140	5.0	2.30	140,063	●
80	120	6.0	4.20	120,080	●
80	160	6.0	5.80	160,080	●
100	140	8.0	8.00	140,100	●

MQL synchro tapping chucks

Produkt-Informationen
- for single channel systems
- compensate synchronisation errors
- guarantees with minimal length compensation
- high thread quality and optimal tool life
- MQL pressure up to max. 10 bar
- max. torque of the clamping nut 30 Nm
- mounted MQL coolant supply pipe

Scope of delivery
- incl. clamping nut
- incl. MQL supply (special solution)
- Guhring no. 4330, 18,063 incl. clamping key BMK 18

- for Guhring no. 4330, 18,063 order tap collet Guhring no. 4310 18,063 separatly
- order tap collet for Guhring no. 4330 20,063 separately
- for Guhring no. 4330 20,063 order sealing washer, Guhring no.4335 and clamping key ER 20, Guhring no. 4913 separately



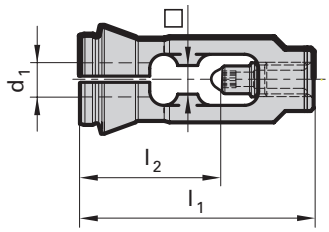
Guhring no. **4330**

HSK-A d_3	retention nut	for thread	G	d_1 mm	d_2 mm	l_1 mm	tensile force/ pressure ± mm	kg	Code no.	Availability
63	BM18	M3.5-M14	M21x1	4.0-11	25	86	0.15	1.10	18,063	○
63	ER20	M3.5-M14	M25x1.5	4.0-11	34	95.5	0.15	1.30	20,063	●
63	ER32	M3.5-M28	M40x2.5	4.0-20	50	111	0.15	1.70	32,063	◐

Collets for MQL

Product information
- MQL or conventional cooling

Scope of delivery
- incl. setting screw with taper
- without sealing disc

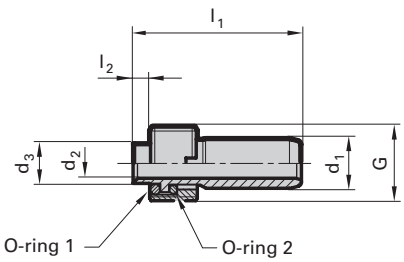


Guhring no. 4310

size	d_1 x □ mm	l_1 mm	plug-in depth l_2 mm	Code no.	Availability
BZ18	4.5 x 3.4	41	23	4,518	◐
BZ18	6.0 x 4.9	41	25	6,018	◐
BZ18	7.0 x 5.5	41	25	7,018	◐
BZ18	8.0 x 6.2/6.3	41	26	8,018	◐
BZ18	9.0 x 7.0/7.1	41	27	9,018	◐
BZ18	10.0 x 8.0	41	28	10,018	◐
BZ18	11.0 x 9.0	41	29	11,018	◐

MQL HSK-A coolant delivery set

Product information
- to DIN draft E-DIN 69090-3
- acc. to Guhring's new MQL standard
- for single channel systems
- for automatic interface



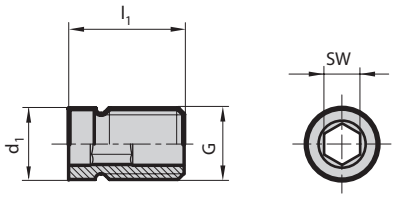
Guhring no. 4939

for HSK-A	d_1 mm	d_2 mm	d_3 mm	l_1 mm	l_2 mm	G	O-ring 1 Viton 75	O-ring 2 Viton 75	Code no.	Availability
40	8	5.4	6.5	35.0	5.5	M12x1.0	7.5x1.5	7.5x1.5	12,040	●
50	10	6.5	7.5	38.5	5.5	M16x1.0	9.0x2.0	9.0x2.0	16,050	●
63	12	8.0	9.5	40.5	4.0	M18x1.0	10.0x2.5	10.0x2.0	18,063	●
80	14	8.0	9.7	44.0	4.0	M20x1.5	13.0x2.0	13.0x2.0	20,080	●
100	16	8.0	11.5	46.0	2.0	M24x1.5	14.0x3.0	14.0x3.0	24,100	●

Length adjustment screw for conventional cooling

For adapting MQL tool holders to meet the requirements of conventional wet machining.
For plain end shanks.
The height of screw head compensates the height of MQL taper.

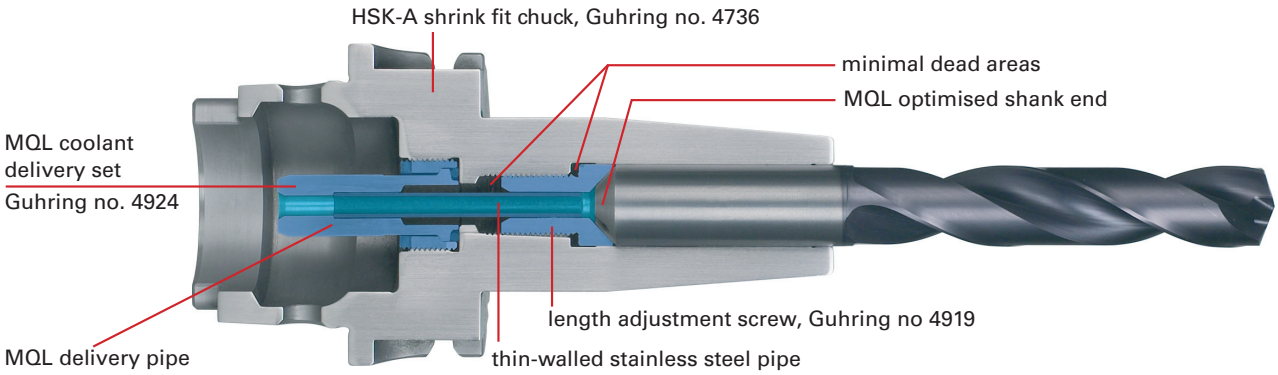
Product information
- for MQL shrink fit chucks HSK-A
- for MQL hydraulic chucks HSK-A
- for use with shank form to DIN 6535 with plain shank end for conventional cooling



Guhring no. **4941**

for HSK-A	clamping-Ø	G	d_1 mm	l_1 mm	SW 1	SW 2	Code no.	Availability
40	6	M7x1	6	15	2.5	2.5	6,040	●
40	8	M7x1	6	18	3.0	3.0	8,040	●
50	6	M8x1	8	14	2.5	2.5	6,050	●
50	8	M8x1	7	18	3.0	3.0	8,050	●
40/50	10	M8x1	10	17.7	4.0	4.0	10,050	●
63/80/100	6	M10x1	9	22	2.5	2.5	6,100	●
63/80/100	8	M10x1	9	22	3.0	3.0	8,100	●
63/80/100	10	M10x1	10	16.2	4.0	4.0	10,100	●
40/ 50/ 63/ 80/ 100	12	M10x1	10	16.2	5.0	5.0	12,100	●
40/ 50/ 63/ 80/ 100	14	M10x1	10	17.2	5.0	5.0	14,100	●
50/ 63/ 80/ 100	16	M12x1	16	18.2	6.0	6.0	16,100	●
50/ 63/ 80/ 100	18	M12x1	16	19.2	6.0	6.0	18,100	●
50/ 63/ 80/ 100	20	M16x1	16	19.2	8.0	6.0	20,100	●
63/ 80/ 100	25	M16x1	16	22.7	8.0	6.0	25,100	●
63/ 80/ 100	32	M16x1	16	26.7	8.0	6.0	32,100	●

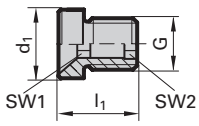
The application of Guhring's MQL technology does not necessarily require the conversion of the complete stock of hydraulic chucks and shrink fit chucks to the new Guhring MQL standard for tool holders. With the assistance of Guhring's MQL length adjustment screw, Guhring no. 4919, and MQL coolant delivery set, Guhring no. 4924, tool holders such as hydraulic chucks, Guhring no. 4299 and 4399, or shrink fit chucks, Guhring no. 4736, from Guhring's GM 300 program can be converted for application under MQL conditions and automatic tool clamping.



Assembly of conventional MQL system

MQL length adjustment screws

Product information
- for hydraulic chucks and shrink fit chucks
- with special geometry optimised for MQL
- with conical end for tapered MQL shank ends

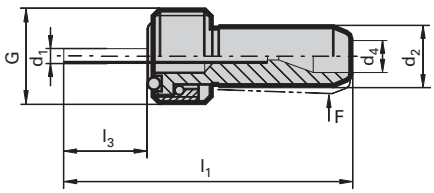


Guhring no.					4919	
						
G	d_1 mm	l_1 mm	SW1	SW2	Code no.	Availability
M5	6	14.8	2.5	2.5	6,000	•
M6	8	15.6	3.0	3.0	8,000	•
M8x1	10	16.1	4.0	4.0	10,000	•
M8x1	10	16.6	3.0	3.0	10,040	•
M6	10	16.6	3.0	3.0	10,032	•
M10x1	12	16.6	5.0	5.0	12,000	•
M6	12	17.6	3.0	3.0	12,032	•
M10x1	14	17.6	5.0	5.0	14,000	•
M6	14	18.6	3.0	3.0	14,040	•
M12x1	16	18.6	5.0	5.0	16,000	•
M6	16	19.6	3.0	3.0	16,040	•
M12x1	18	19.6	5.0	5.0	18,000	•
M16x1	20	20.6	5.0	5.0	20,000	•
M16x1	25	22.6	8.0	6.0	25,000	•
M16x1	32	26.1	8.0	6.0	32,000	•

Product information
- replace conventional coolant delivery sets, Guhring no. 4949, when applying MQL

Scope of delivery
- complete MQL coolant delivery set consisting of :
  coolant pipe, cap nut
  MQL tube and O-rings

DSF = hydraulic chucks
WSF = shrink fit chucks

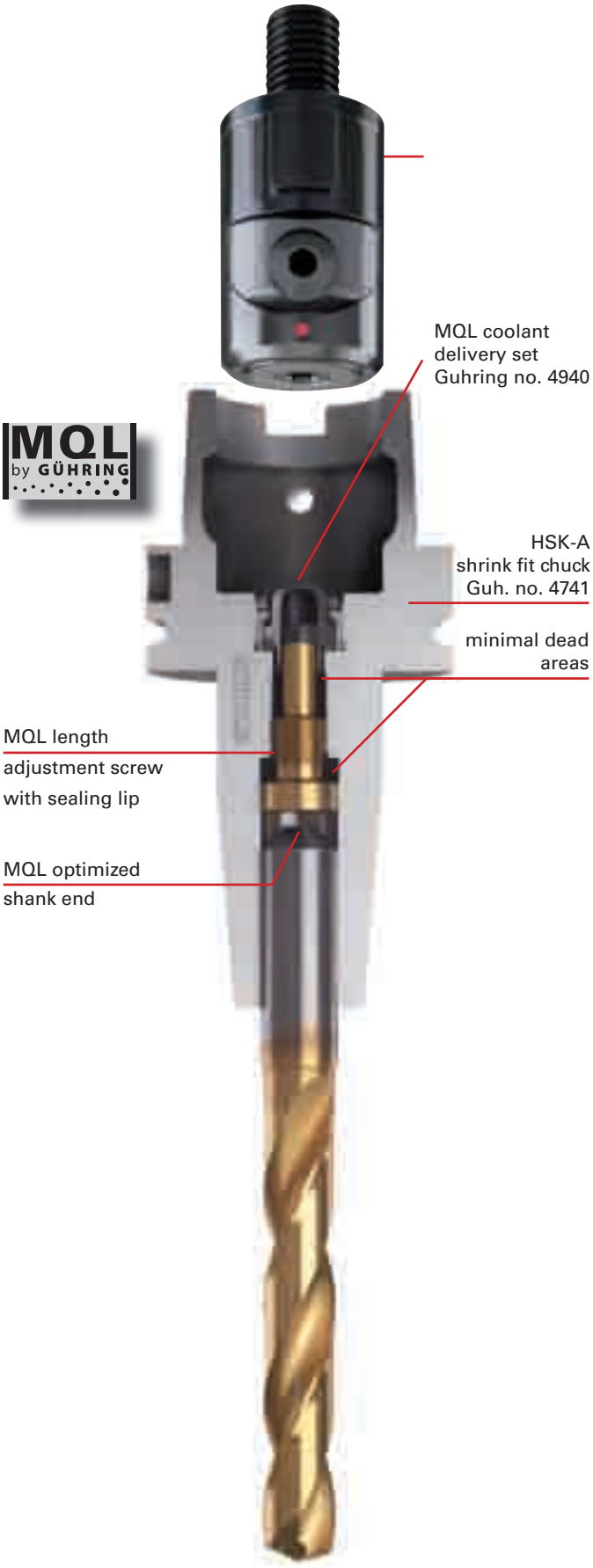


Guhring no. **4924**

for HSK-A	WSF DSF	clamping-Ø mm	d_1 mm	d_2 mm	d_4 mm	l_1 mm	l_3 mm	G	Code no.	Availability
32	DSF	6	2.5	6	3.5	54.2	28.0	M10x1	32,010	•
32	WSF	6	2.5	6	3.5	45.1	18.9	M10x1	32,020	•
32	DSF	8	3.0	6	3.5	54.3	28.1	M10x1	32,030	•
32	DSF	10	3.0	6	3.5	55.8	29.6	M10x1	32,050	•
32	WSF	10	3.0	6	3.5	45.7	19.5	M10x1	32,060	•
32	DSF	12	3.0	6	3.5	56.6	30.4	M10x1	32,070	•
32	WSF	8/12	3.0	6	3.5	45.2	19.0	M10x1	32,080	•
40	DSF	6	2.5	8	4.0	45.1	16.0	M12x1	40,010	•
40	WSF	6	2.5	8	4.0	56.0	26.9	M12x1	40,020	•
40	DSF	8	3.0	8	4.0	56.2	15.8	M12x1	40,030	•
40	WSF	8	3.0	8	4.0	56.2	27.0	M12x1	40,040	•
40	DSF	10	3.0	8	4.0	46.3	17.1	M12x1	40,050	•
40	WSF	10	3.0	8	4.0	51.7	22.5	M12x1	40,060	•
40	DSF	12	3.0	8	4.0	46.7	17.5	M12x1	40,070	•
40	WSF	12/14	3.0	8	4.0	57.2	28.0	M12x1	40,100	•
40	WSF	16	3.0	8	4.0	54.2	25.0	M12x1	40,120	•
50	DSF	6	2.5	10	4.0	44.6	11.9	M16x1	50,010	•
50	WSF	6	2.5	10	4.0	55.4	22.7	M16x1	50,020	•
50	DSF	8	3.0	10	4.0	46.1	13.4	M16x1	50,030	•
50	WSF	8	3.0	10	4.0	46.5	13.8	M16x1	50,040	•
50	DSF	10	4.0	10	4.0	45.7	13.0	M16x1	50,050	•
50	WSF	10	4.0	10	4.0	46.1	13.4	M16x1	50,060	•
50	DSF	12	5.0	10	4.0	46.1	13.4	M16x1	50,070	•
50	WSF	12	5.0	10	4.0	55.7	23.0	M16x1	50,080	•
50	DSF	14	5.0	10	4.0	51.5	18.8	M16x1	50,090	•
50	WSF	14	5.0	10	4.0	55.7	22.9	M16x1	50,100	•
50	DSF	16	5.0	10	4.0	52.8	20.1	M16x1	50,110	•
50	DSF	18	5.0	10	4.0	53.2	20.5	M16x1	50,130	•
50	WSF	16/18	5.0	10	4.0	57.7	25.0	M16x1	50,140	•
50	DSF	20	5.0	10	4.0	51.5	18.8	M16x1	50,150	•
50	WSF	20	5.0	10	4.0	60.7	28.0	M16x1	50,160	•
63	DSF	6	2.5	12	4.0	45.7	9.5	M18x1	63,010	•
63	DSF	6	2.5	12	4.0	126.9	90.6	M18x1	63,011	•
63	DSF	6	2.5	12	4.0	176.9	140.6	M18x1	63,012	•
63	WSF	6	2.5	12	4.0	56.7	20.5	M18x1	63,020	•
63	WSF	6	2.5	12	4.0	137.7	101.4	M18x1	63,021	•
63	DSF	8	3.0	12	4.0	46.0	9.8	M18x1	63,030	•
63	DSF	8	3.0	12	4.0	126.1	89.9	M18x1	63,031	•
63	DSF	8	3.0	12	4.0	176.2	139.9	M18x1	63,032	•
63	WSF	8	3.0	12	4.0	57.0	20.8	M18x1	63,040	•
63	WSF	8	3.0	12	4.0	137.0	100.7	M18x1	63,041	•
63	DSF	10	4.0	12	4.0	51.7	15.5	M18x1	63,050	•
63	DSF	10	4.0	12	4.0	122.2	86.0	M18x1	63,051	•
63	DSF	10	4.0	12	4.0	172.2	135.9	M18x1	63,052	•
63	WSF	10	4.0	12	4.0	55.7	19.5	M18x1	63,060	•
63	WSF	10	4.0	12	4.0	132.2	95.9	M18x1	63,061	•
63	DSF	12/14/20	5.0	12	4.0	52.1	15.9	M18x1	63,070	•

MQL coolant delivery sets

									Guhring no.	4924
for HSK-A	WSF DSF	clamping-Ø mm	d_1 mm	d_2 mm	d_4 mm	l_1 mm	l_3 mm	G	Code no.	Availability
63	WSF	12/14	5.0	12	4.0	44.6	19.5	M18x1	63,080	●
63	WSF	12/14	5.0	12	4.0	127.1	90.8	M18x1	63,081	●
63	DSF	16/18	5.0	12	4.0	53.8	17.6	M18x1	63,090	●
63	DSF	12/14	5.0	12	4.0	117.6	81.4	M18x1	63,091	●
63	DSF	12/14	5.0	12	4.0	167.6	131.3	M18x1	63,092	●
63	WSF	16/18	5.0	12	4.0	57.5	21.3	M18x1	63,100	●
63	WSF	20	5.0	12	4.0	60.7	24.5	M18x1	63,110	●
63	DSF	16	5.0	12	4.0	114.3	78.0	M18x1	63,111	●
63	DSF	25/32	6.0	12	4.0	77.0	40.8	M18x1	63,120	●
63	WSF	25	6.0	12	4.0	69.0	32.8	M18x1	63,130	●
63	DSF	18	5.0	12	4.0	114.6	78.3	M18x1	63,131	●
63	DSF	16/18	5.0	12	4.0	164.6	128.3	M18x1	63,132	●
63	WSF	32	6.0	12	4.0	70.7	34.5	M18x1	63,140	●
63	WSF	16/18	5.0	12	4.0	124.3	88.0	M18x1	63,141	●
63	DSF	20	5.0	12	4.0	112.9	76.6	M18x1	63,151	●
63	DSF	20	5.0	12	4.0	162.9	126.6	M18x1	63,152	●
63	WSF	20	5.0	12	4.0	122.1	85.8	M18x1	63,161	●
63	WSF	25	6.0	12	4.0	116.2	79.9	M18x1	63,181	●
63	WSF	32	6.0	12	4.0	112.2	75.9	M18x1	63,201	●
80	DSF	6	2.5	14	4.0	44.8	5.5	M20x1.5	80,010	●
80	WSF	6	2.5	14	4.0	61.2	21.9	M20x1.5	80,020	●
80	DSF	8	3.0	14	4.0	44.9	5.6	M20x1.5	80,030	●
80	WSF	8	3.0	14	4.0	61.3	22.0	M20x1.5	80,040	●
80	DSF	10	4.0	14	4.0	50.9	11.6	M20x1.5	80,050	●
80	WSF	10	4.0	14	4.0	61.3	22.0	M20x1.5	80,060	●
80	DSF	12	5.0	14	4.0	51.3	12.0	M20x1.5	80,070	●
80	DSF	14	5.0	14	4.0	51.6	12.3	M20x1.5	80,090	●
80	WSF	12/14	5.0	14	4.0	61.3	22.0	M20x1.5	80,100	●
80	DSF	16	5.0	14	4.0	57.9	18.6	M20x1.5	80,110	●
80	DSF	18	5.0	14	4.0	58.3	19.0	M20x1.5	80,130	●
80	WSF	16/18	5.0	14	4.0	63.3	24.0	M20x1.5	80,140	●
80	DSF	20	5.0	14	4.0	56.6	17.3	M20x1.5	80,150	●
80	WSF	20	5.0	14	4.0	66.3	27.0	M20x1.5	80,160	●
80	DSF	25	6.0	14	4.0	53.1	13.8	M20x1.5	80,170	●
80	WSF	25	6.0	14	4.0	70.3	31.0	M20x1.5	80,180	●
80	DSF	32	6.0	14	4.0	77.2	37.9	M20x1.5	80,190	●
80	WSF	32	6.0	14	4.0	71.3	32.0	M20x1.5	80,200	●
100	DSF	6	2.5	16	4.0	53.0	9.2	M24x1,5	100,010	●
100	WSF	6	2.5	16	4.0	63.9	20.1	M24x1,5	100,020	●
100	DSF	8	3.0	16	4.0	53.7	9.9	M24x1,5	100,030	●
100	WSF	8	3.0	16	4.0	64.6	20.8	M24x1,5	100,040	●
100	DSF	10	4.0	16	4.0	63.3	19.5	M24x1,5	100,050	●
100	WSF	10	4.0	16	4.0	63.3	19.5	M24x1,5	100,060	●
100	DSF	12	5.0	16	4.0	63.8	20.0	M24x1,5	100,070	●
100	DSF	14	5.0	16	4.0	64.2	20.4	M24x1,5	100,090	●
100	WSF	12/14	5.0	16	4.0	63.3	19.5	M24x1,5	100,100	●
100	DSF	16	5.0	16	4.0	65.4	21.6	M24x1,5	100,110	●
100	DSF	18	5.0	16	4.0	65.8	22.0	M24x1,5	100,130	●
100	WSF	16/18	5.0	16	4.0	65.3	21.5	M24x1,5	100,140	●
100	DSF	20	5.0	16	4.0	69.2	25.4	M24x1,5	100,150	●
100	WSF	20	5.0	16	4.0	68.3	24.5	M24x1,5	100,160	●
100	DSF	25	6.0	16	4.0	68.6	24.8	M24x1,5	100,170	●
100	WSF	25	6.0	16	4.0	72.3	28.5	M24x1,5	100,180	●
100	DSF	32	6.0	16	4.0	64.6	20.8	M24x1,5	100,190	●
100	WSF	32	6.0	16	4.0	73.3	29.5	M24x1,5	100,200	

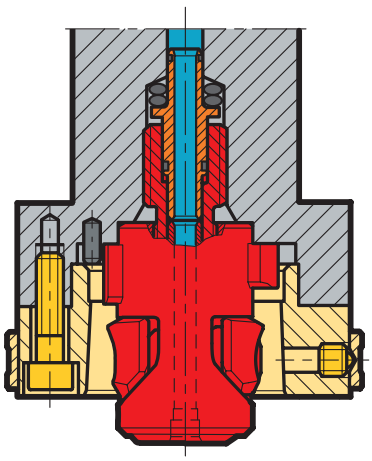


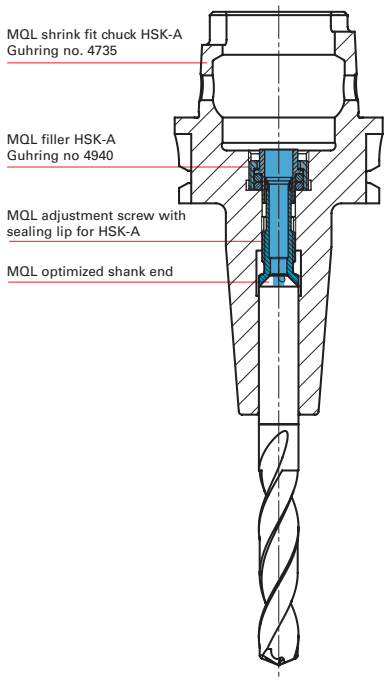
Manual tool clamping with MQL

Installation with adaptors

Application in transfer lines, fixtures, setting equipment (i.e. in drilling spindles), in multi-spindle drilling heads

adaptor (integrated)





4-point clamping technology for MQL and conventional cooling

Technical information and advantages

Our 4-point clamping sets for minimal quantity lubrication or conventional cooling are 100 % compatible. They are suitable for radial manual clamping. Primarily designed for installation in spindles (short drilling spindles, multi-spindle drilling heads). Most prominant features are:

- simple and hence more economic spindle manufacture
- short, small diameter spindles with constricted spindle bearing spacing.

Two clamping segments displaced by 180° with 2 clamping planes each are uniformly moved outwards with a differential threaded spindle, thereby generating the necesssary clamping force. For conventional internal cooling our MQL 4-point clamping sets are suitable for a pressure up to 80 bar.

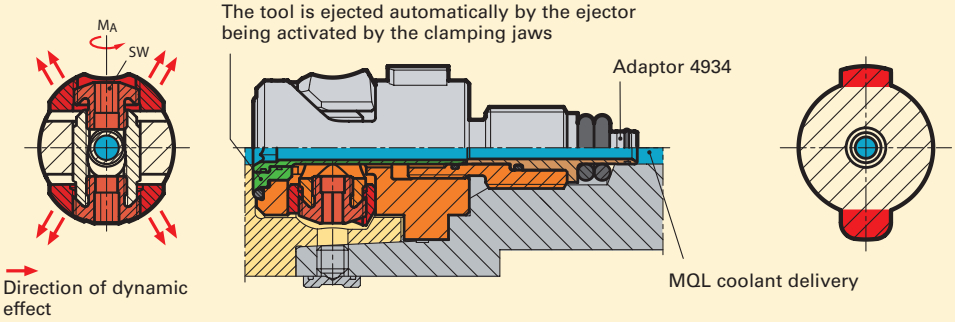
Thanks to their identical internal spindle contour, especially for the application with minimal quantity lubrication (MQL) and with MQL optimised tools we developed MQL 4-point clamping sets offering the following features and advantages:

- a central, coaxial MQL duct with consistent internal diameter ensures MQL coolant delivery to the tool without coolant pockets and offers quick operating times.

① We recommend MA max. for rough machining and milling operations. For drilling and reaming operations a lower deviation of MA max. up to 30% is permissible. Please check the torque with a torque wrench.
② Depending on temperature and lubricating conditions these values can be up to 15% lower.
③ Due to the screwed connection MT max. can be lower with adaptors liegen.

HSK-C	**max.** torque M_A [Nm] ①	SW	**max.** drawing force [kN] ②	**max.** linear bend. moment M_B [Nm] ②	**max.** transferrable torsional moment M_T [Nm] ② ③
32	3	2.5	8.5	72	105
40	6	3	12.5	135	180
50	14	4	24	330	390
63	24	5	32	570	680
80	40	6	45	1000	1570
100	60	8	53	1620	4200

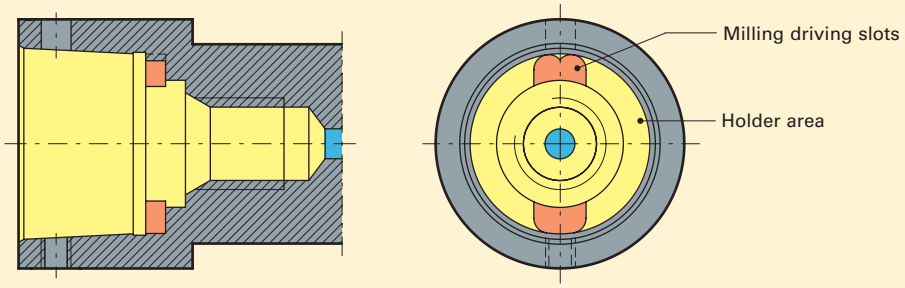
Installation and principle of operation



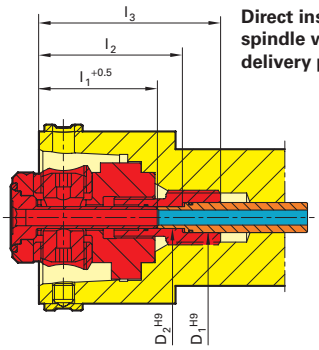
4-point clamping technology for MQL and conventional cooling

General notes: Our manual clamping sets must not be operated with motor-driven tools (impulse screwdriver or similar). The hexagonal key should not exceed the key size over its entire length, this largely prevents excessive torque being transferred. We recommend the T-handle hexagonal key, Guhring no. 4912. For accurate setting of the maximum torque and achieving the maximum interface rigidity, we recommend the application of a torque wrench, Guhring no. 4915, with hexagonal sockets, Guhring no. 4916. Production drawings of the spindle contour to suit direct installation are available on request including .dxf.

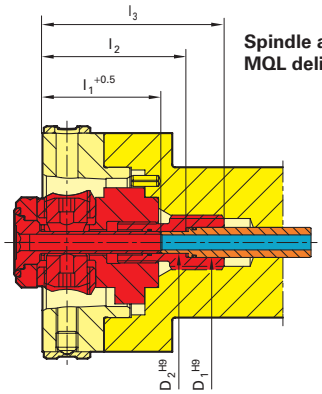
Internal spindle contour



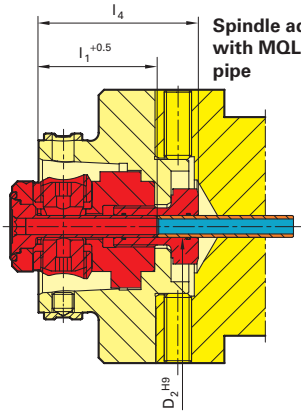
MQL 4-point clamping set connection dimensions for new designs



Direct installation in spindle with MQL delivery pipe



Spindle adaptor with MQL delivery pipe



Spindle adaptor with MQL delivery pipe

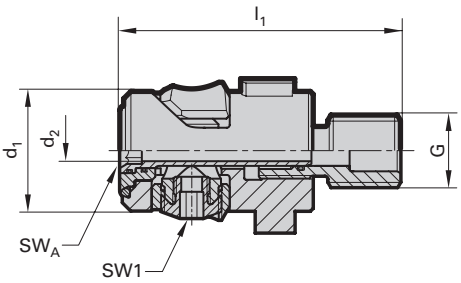
for HSK code	holder-Ø in retention spindle D1/H9	fitting-Ø in retention spindle D2/H9	ejector position $l1^{+0.5}$	stop coolant delivery pipe l2	threading depth retention spindle l3	internal Ø of retention spindle l4
32 24,000	4	4	31.8	-	39.8	36.0
40 30,000	7	5	30.5	34.8	41.8	39.0
50 38,000	9	6	35.8	41.8	49.5	46.5
63 48,000	11	8	43.3	52.5	66.5	58.5
80 60,000	13	10	53.9	69.9	85.9	71.1
100 75,000	15	12	67.9	85.5	105.5	89.0

Dimensions without tolerance specification to DIN ISO 2768 m

MQL 4-point clamping sets

Product information
- The central and coaxial MQL supply with constant internal diameter prevents coolant from consolidating
- for a coolant pressure up to 80 bar

Scope of delivery
- complete as shown in illustration
- Installation and operating instructions

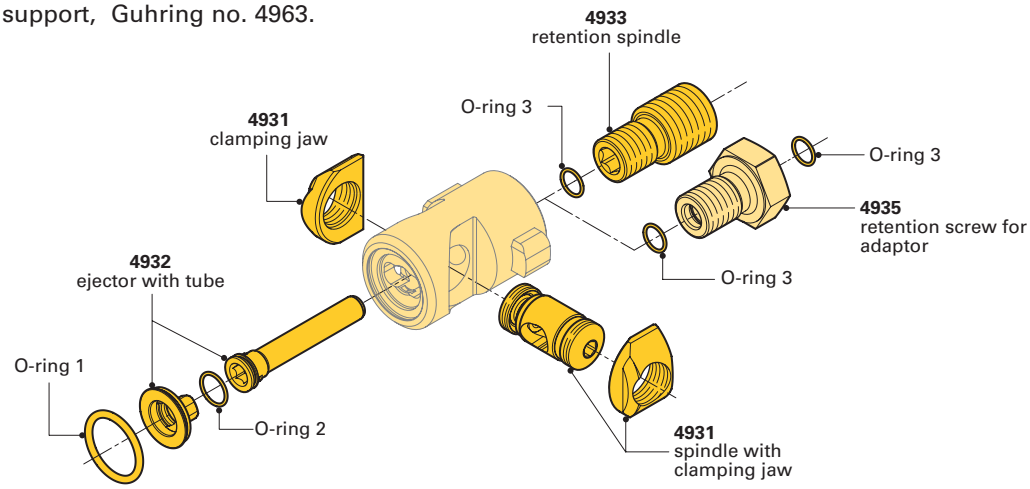


Guhring no. 4930

for HSK-C	d_1 mm	d_2 mm	l_1 mm	G	SW1	SW_A	kg	Code no.	Availability
32	16.7	3	39.5	M10	2.5	3	0.05	24,000	●
40	20.6	4	49.5	M12	3	4	0.09	30,000	●
50	25.5	5	59.0	M16	4	5	0.18	38,000	●
63	33.0	6	76.0	M20	5	6	0.37	48,000	●
80	41.0	8	98.0	M24	6	8	0.70	60,000	●
100	52.0	10	117.5	M24	8	10	1.30	75,000	●

Component parts for MQL 4-point clamping sets, Guhring no. 4930

- retention spindle only for adaptor.
- if the spindle cannot be locked, use torque support, Guhring no. 4963.

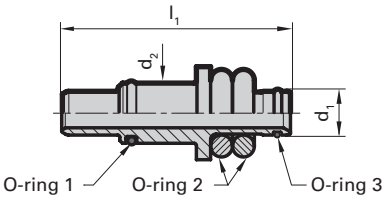


for HSK-C	O-rings 1 NBR 70	O-rings 2 NBR 70	O-rings 3 NBR 70	4931 Spindle with clamping jaw	4932 Ejector with tube	4933 Retention spindle	4935 Retention screw	Availability
32	10.82x1.78	4.0x1.0	-	24,000	24,000	24,000	24,000	◐
40	13.0x2.0	6.0x1.0	5.0x1.0	30,000	30,000	30,000	30,000	◐
50	16.0x2.0	8.0x1.0	6.0x1.0	38,000	38,000	38,000	38,000	◐
63	20.3x2.4	10.0x1.0	8.0x1.0	48,000	48,000	48,000	48,000	◐
80	24.0x3.0	12.0x1.5	10.0x1.5	60,000	60,000	60,000	60,000	◐
100	31.34x3.53	15.0x1.5	12.0x1.7	75,000	75,000	75,000	75,000	◐

Adaptor for MQL 4-point clamping sets

Product information
- Adaptor for direct installation in spindle and spindle adaptors in existing spindles

Scope of delivery
- complete as shown in illustration
- O-ring



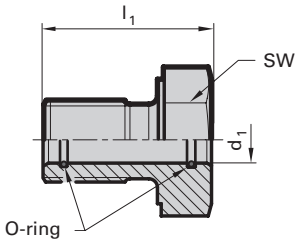
Guhring no. 4934

for HSK-C	d_1 mm	d_2 mm	l_1 mm	O-ring 1 NBR70	O-ring 2 2xNBR70	O-ring 3 NBR70	Code no.	Availability
32	4.0	-	19	4.0x1.0	-	2x1	24,000	●
40	5.0	7	28	4.5x1.0	4x2.5	3x1	30,000	●
50	6.0	9	32	5.5x1.5	5x4.0	4x1	38,000	●
63	8.0	11	42	7.5x1.5	8x4.0	6x1	48,000	●
80	10.2	13	56	9.0x1.5	10x5.0	8x1	60,000	●
100	12.0	15	58.5	12.0x1.5	12.0x4.0	10x1	75,000	●

Clamping screw for MQL 4-point clamping sets

Product information
- necessary for installation of MQL 4-point clamping set in spindle adaptors Guhring no. 4386 and 4387
- change against standard retention bolt

Scope of delivery
- complete as shown in illustration



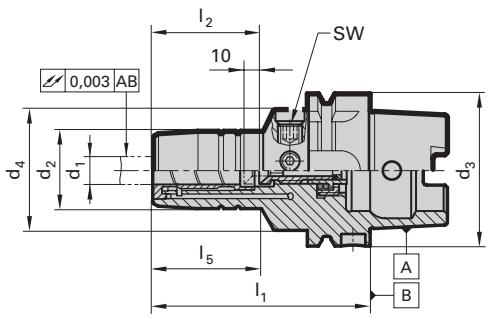
Guhring no. 4935

for HSK-C	d_1 mm	l_1 mm	SW	O-ring 2 x NBR 70	Code no.	Availability
32	-	21.5	13	-	24,000	●
40	5.0	21	16	5x1.0	30,000	●
50	6.0	25	18	6x1.0	38,000	●
63	8.0	31	24	8x1.0	48,000	●
80	10.0	36	24	10x1.5	60,000	●
100	12.0	40	32	12x1.7	75,000	●

MQL HSK-A hydraulic chuck for manual tool change

Product information
- new MQL standard
- for 1-channel systems
- balancing quality: G6.3/15,000 rev./min
- clamping-Ø for shaft tolerance h6
- axial length setting

Scope of delivery
- incl. MQL length adjustment screw with sealing lip and coolant delivery set Guhring no. 4940
- incl. clamping key Guhring no. 4912



Guhring no. 4209

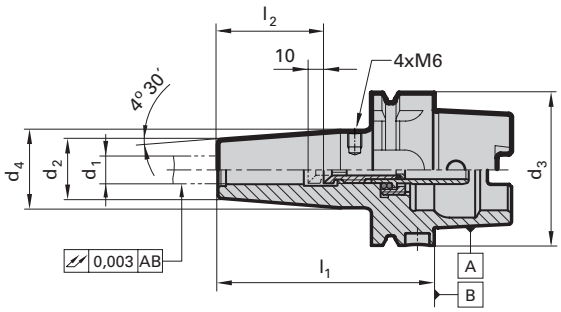
MQL by GÜHRING Lic. HORKOS CORP.

HSK-A d_3	for clamping-Ø d_1 h6 mm	d_2 mm	d_4 mm	l_1 mm	l_2 mm	l_5 mm	SW	kg	Code no.	Availability
50	6	26	40	80	36	38	4	0.95	6,050	●
50	8	28	40	80	36	38	4	0.95	8,050	●
50	10	30	40	85	40	44	4	0.95	10,050	●
50	12	32	40	90	45	49	4	0.95	12,050	●
50	14	34	40	90	45	49	4	0.95	14,050	●
50	16	38	53	95	48	36	5	1.25	16,050	●
50	18	40	57	95	48	36	5	1.25	18,050	●
50	20	42	60	100	50	39	5	1.25	20,050	●
63	6	26	50	80	36	34.5	5	1.25	6,063	●
63	8	28	50	80	36	35.5	5	1.25	8,063	●
63	10	30	50	85	40	40	5	1.25	10,063	●
63	12	32	50	90	45	45	5	1.35	12,063	●
63	14	34	50	90	45	46	5	1.35	14,063	●
63	16	38	50	95	48	51	5	1.45	16,063	●
63	18	40	50	95	48	52	5	1.45	18,063	●
63	20	42	50	100	50	58	5	1.45	20,063	●
63	25	57	63	115	56	50	6	2.45	25,063	●
63	32	64	75	120	60	58	6	3.10	32,063	●
100	6	26	50	85	36	36	5	2.6	6,100	●
100	8	28	50	85	36	36	5	2.6	8,100	●
100	10	30	50	90	40	42	5	2.6	10,100	●
100	12	32	50	95	45	47	5	2.65	12,100	●
100	14	34	50	95	45	47	5	2.65	14,100	●
100	16	38	50	100	48	53	5	2.85	16,100	●
100	18	40	50	100	48	53	5	2.85	18,100	●
100	20	42	50	105	50	59	5	3.35	20,100	●
100	25	57	63	115	56	67	6	3.5	25,100	●
100	32	64	75	120	60	72	6	3.95	32,100	●

MQL HSK-A shrink fit chuck for manual tool change

Product information
- new MQL standard,
  l2 is plug-in depth at DIN 6535
- for 1-channel systems
- balancing quality: G 6.3 / 15,000 rev./min
- for shank tolerance h6

Scope of delivery
- incl. MQL length adjustment screw with sealing lip and coolant delivery set
  Guhring no. 4940
- incl. clamping key Guhring no. 4912



Guhring no. 4735

- special dimensions on request

HSK-A d_3	for clamping-Ø d_1 h6 mm	d_2 mm	d_4 mm	l_1 mm	l_2 mm	kg	Code no.	Availability
40	6	21	27	80	36	0.40	6,040	●
40	8	21	27	80	36	0.40	8,040	●
40	10	24	32	80	40	0.50	10,040	●
40	12	24	32	90	45	0.50	12,040	●
40	14	27	33.5	90	45	0.60	14,040	●
40	16	27	33.5	90	48	0.50	16,040	●
50	6	21	27	80	36	0.60	6,050	●
50	8	21	27	80	36	0.60	8,050	●
50	10	24	32	85	40	0.70	10,050	●
50	12	24	32	90	45	0.70	12,050	●
50	14	27	34	90	45	0.70	14,050	●
50	16	27	34	95	48	0.70	16,050	●
50	18	33	41.5	95	48	0.90	18,050	●
50	20	33	41.5	100	50	0.90	20,050	●
63	6	21	27	80	36	0.70	6,063	●
63	8	21	27	80	36	0.70	8,063	●
63	10	24	32	85	40	0.70	10,063	●
63	12	24	32	90	45	0.80	12,063	●
63	14	27	34	90	45	0.80	14,063	●
63	16	27	34	95	48	0.90	16,063	●
63	18	33	42	95	48	0.90	18,063	●
63	20	33	42	100	50	1.00	20,063	●
63	25	44	52.5	115	56	1.00	25,063	●
63	32	44	52.5	120	60	1.10	32,063	●
63	6	21	27	120	36	0.90	206,063	●
63	8	21	27	120	36	1.00	208,063	●
63	10	24	32	120	40	1.10	210,063	●
63	12	24	32	120	45	1.20	212,063	●
63	6	21	27	160	36	0.80	106,063	●
63	8	21	27	160	36	0.80	108,063	●
63	10	24	32	160	40	0.90	110,063	●
63	12	24	32	160	45	0.90	112,063	●
63	14	27	34	160	45	1.00	114,063	●
63	16	27	34	160	48	1.00	116,063	●
63	18	33	42	160	48	1.20	118,063	●
63	20	33	42	160	50	1.20	120,063	●
63	25	44	52.5	160	56	1.80	125,063	●
63	32	44	52.5	160	60	1.70	132,063	●
80	6	21	27	85	36	1.30	6,080	●
80	8	21	27	85	36	1.30	8,080	●
80	10	24	32	90	40	1.40	10,080	●
80	12	24	32	95	45	1.40	12,080	●
80	14	27	34	95	45	1.50	14,080	●

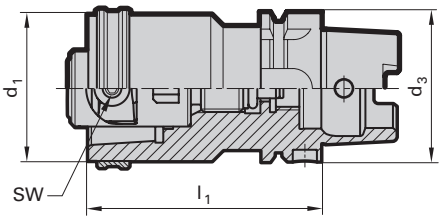
MQL HSK-A shrink fit chuck for manual tool change

							Guhring no.	4735
HSK-A d_3	for clamping-Ø d_1 h6 mm	d_2 mm	d_4 mm	l_1 mm	l_2 mm	kg	Code no.	Availability
80	16	27	34	100	48	1.50	16,080	●
80	18	33	42	100	48	1.70	18,080	●
80	20	33	42	105	50	1.70	20,080	●
80	25	44	53	115	56	2.20	25,080	●
80	32	44	53	120	60	2.10	32,080	●
100	6	21	27	85	36	2.10	6,100	●
100	8	21	27	85	36	2.20	8,100	●
100	10	24	32	90	40	2.30	10,100	●
100	12	24	32	95	45	2.30	12,100	●
100	14	27	34	95	45	2.30	14,100	●
100	16	27	34	100	48	2.30	16,100	●
100	18	33	42	100	48	2.50	18,100	●
100	20	33	42	105	50	2.50	20,100	●
100	25	44	53	115	56	3.00	25,100	●
100	32	44	53	120	60	3.00	32,100	●

HSK-A/HSK-C extensions with MQL 4 point clamping set

Product information
- MQL suitable
- for single channel systems

Scope of delivery
- incl. MQL 4 point clamping set Guhring no. 4930 and Adaptor Guhring no. 4934
- incl. brass locking ring Guhring no. 4953
- order coolant delivery set separately



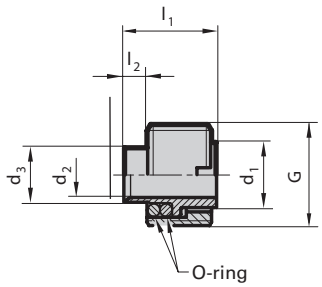
Guhring no. **4350**

HSK-A/HSK-C d_1 / d_3	l_1 mm	SW	kg	Code no.	Availability
32	60	2.5	0.30	60,032	○
40	80	3.0	0.70	80,040	●
50	80	4.0	0.90	80,050	●
50	100	4.0	1.10	100,050	●
63	100	5.0	1.80	100,063	●
63	140	5.0	2.30	140,063	●
80	120	6.0	4.20	120,080	●
80	160	6.0	5.80	160,080	●
100	140	8.0	8.00	140,100	●

MQL HSK-A coolant delivery set (filler)

Product information
- according to new Guhring MQL standard
- for single channel systems
- for manual tool change

Guhring no. 4940



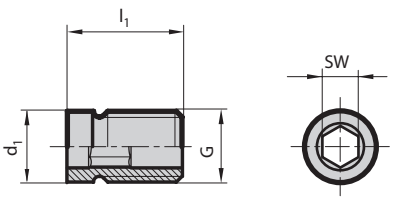
for HSK-A	d_1 mm	d_2 mm	d_3 mm	l_1 mm	l_2 mm	G	O-ring 1 & 2 NBR 70	Code no.	Availability
40	7.6	5.4	6.8	13.8	5.5	M12x1.0	7.5x1.5	12,040	●
50	9.6	6.5	7.8	15.8	5.5	M16x1.0	9.0x2.0	16,050	●
63	11.6	8.0	9.7	16.3	4.0	M18x1.0	10.0x2.5	18,063	●
80	13.6	8.0	9.7	18.4	4.0	M20x1.5	13.0x2.0	20,080	●
100	15.6	8.0	11.7	18.4	2.0	M24x1.5	14.0x3.0	24,100	●

Length adjustment screw for conventional cooling

To adapt MQL tool holders to meet the requirements of conventional wet machining.
For plain end shanks.
The height of screw head compensates the height of MQL taper.

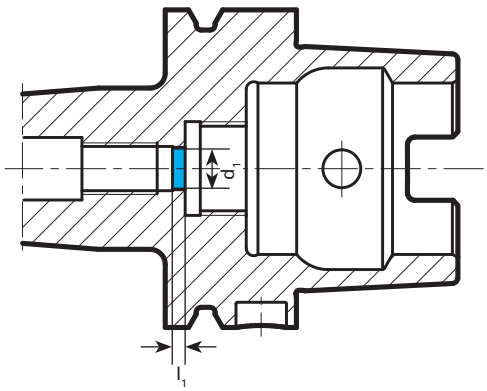
Product information
- for MQL HSK-A shrink fit chucks
- for MQL HSK-A hydraulic chucks
- for use with shank according to DIN 6535 with plain shank end for conventional cooling

Guhring no. 4941



for HSK-A	clamping-Ø	G	d_1 mm	l_1 mm	SW 1	SW 2	Code no.	Availability
40	6	M7x1	6	15	2.5	2.5	6,040	●
40	8	M7x1	6	18	3.0	3.0	8,040	●
50	6	M8x1	8	14	2.5	2.5	6,050	●
50	8	M8x1	7	18	3.0	3.0	8,050	●
40/50	10	M8x1	10	17.7	4.0	4.0	10,050	●
63/80/100	6	M10x1	9	22	2.5	2.5	6,100	●
63/80/100	8	M10x1	9	22	3.0	3.0	8,100	●
63/80/100	10	M10x1	10	16.2	4.0	4.0	10,100	●
40/ 50/ 63/ 80/ 100	12	M10x1	10	16.2	5.0	5.0	12,100	●
40/ 50/ 63/ 80/ 100	14	M10x1	10	17.2	5.0	5.0	14,100	●
50/ 63/ 80/ 100	16	M12x1	16	18.2	6.0	6.0	16,100	●
50/ 63/ 80/ 100	18	M12x1	16	19.2	6.0	6.0	18,100	●
50/ 63/ 80/ 100	20	M16x1	16	19.2	8.0	6.0	20,100	●
63/ 80/ 100	25	M16x1	16	22.7	8.0	6.0	25,100	●
63/ 80/ 100	32	M16x1	16	26.7	8.0	6.0	32,100	●

With HSK-tool holders to the new Guhring MQL standard, the diameter d6 is modified to DIN 69893-1 to a length l1 with the diameter d1.



Nom. size HSK	40	50	63	80	100
d6	7.0 +0.1	8.0 +0.1	10.0 +0.1	10.2	12
l1min	8	8	6	6	4

Table 1: modified dimensions – HSK to DIN 69893-1

Within the HSK sizes MQL tool holders are listed the respective threads for the MQL length adjustment screw and the respective width across flats. Some of these dimensions do not correspond with dimensions of tool holders for conventional cooling.

HSK-A...	Clamping-Ø	d1 mm	G	SW
40	6	-	M 7x1	3
40	8	8	M 7x1	3
40	10	10	M 8x1	3
40	12	12	M 10x1	3
40	14	14	M 10x1	3
40	16	16	M 12x1	3
50	6	-	M 8x1	4
50	8	8	M 8x1	4
50	10	10	M 8x1	4
50	12	12	M 10x1	4
50	14	14	M 10x1	4
50	16	16	M 12x1	4
50	18	18	M 12x1	4
50	20	20	M 16x1	4
63 / 80 / 100	6	-	M 10x1	4
64 / 80 / 100	8	-	M 10x1	4
63 / 80 / 100	10	10	M 10x1	4
63 / 80 / 100	12	12	M 10x1	5
63 / 80 / 100	14	14	M 10x1	5
63 / 80 / 100	16	16	M 12x1	5
63 / 80 / 100	18	18	M 12x1	5
63 / 80 / 100	20	20	M 16x1	5
63 / 80 / 100	25	25	M 16x1	5
63 / 80 / 100	32	32	M 16x1	5

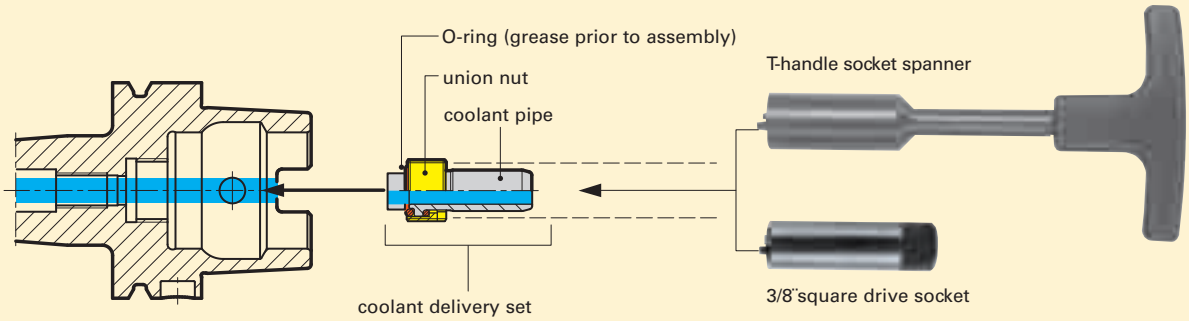
Table 2: Threads and widths across flats of MQL length adjustment screw

1. The HSK holder must be clean, free of swarf and undamaged.
2. Grease the O-rings prior to assembly.
3. Centrally insert the complete coolant delivery set (coolant pipe, union nut and 2 O-rings) in the HSK with the assistance of the socket spanner.
   When inserting the MQL coolant delivery unit, it is paramount to ensure that the MQL pipe is inserted centrally and undamaged into the MQL length setting screw (do not kink).
4. Screw in the coolant delivery set/coolant delivery unit and tighten (see table for torque figures)
5. Check coolant pipe for radial mobility.

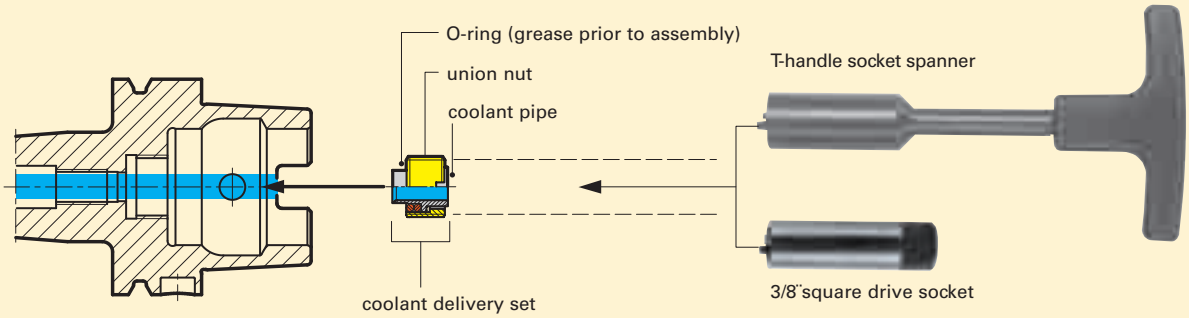
Torque figures

for HSK	MA Nm
32	7
40	11
50	15
63	20
80	25
100	30

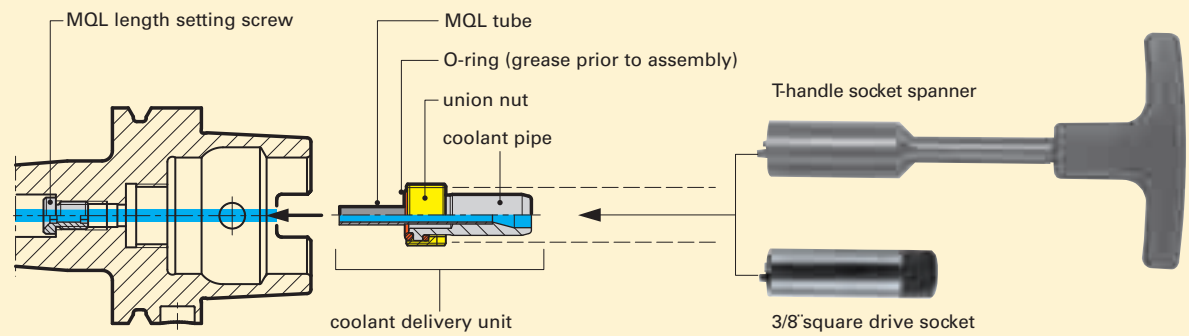
Installation of MQL coolant delivery set 4939



Installation of MQL coolant delivery set filler 4940



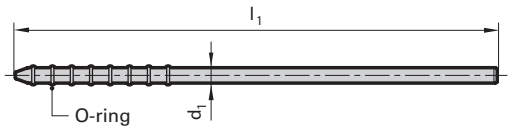
Installation of MQL coolant delivery unit 4924

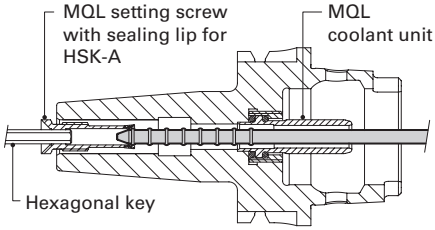


Mounting adaptor for MQL length setting screw

Product information
- for mounting the MQL length setting screw with sealing lip

Scope of delivery
- incl. operating manual





Guhring no. **4972**

size	d_1 mm	l_1 mm	Code no.	Availability
HSK 40	5.4	200	5,040	●
HSK 50	6.5	200	6,050	●
HSK 63/80/100	8	250	8,100	●

Assembly instruction for MQL components

Installation of sealing lip adjustment screw from the side of the holder bore

Automatic application
For automatic application of the holder use the MQL coolant delivery set Guhring no. 4939. Insert the MQL coolant delivery set in the socket spanner Guhring no. 4911, screw in the holder and fasten (torque figures see page 27). Withdraw the socket spanner and check mobility.

Manual application
For manual application of the holder use the filler Guhring no. 4940. Push filler on the adapter Guhring no 4948 to the stop and insert together in the socket spanner Guhring no. 4911. Then screw the complete unit in the holder and fasten (torque figures see page 27).
Now push the adapter Guhring no. 4972 through the MQL coolant delivery set or filler in the holder. Position the sealing lip adjustment screw through the holder bore on the adaptor seats, push to stop with the socket spanner Guhring no. 4912. and screw all the way (fig. 1).

With certain clamping diameters, the adjustment screw has to be installed from the HSK side (fig. 2):
- with HSK 40 and HSK 50 => Ø 6 mm
- with HSK 63 => Ø 6 and 8 mm
- with HSK 80 and HSK 100 => Ø 6 / 8 / 10 mm

With these diameters, insert the sealing lip adjustment screw in the MQL coolant delivery set or filler and screw the complete unit in the holder.

General notes

Lightly oil the sealing lip at the external diameter prior to installation and always insert in the filler or the MQL coolant unit with a rotary movement!

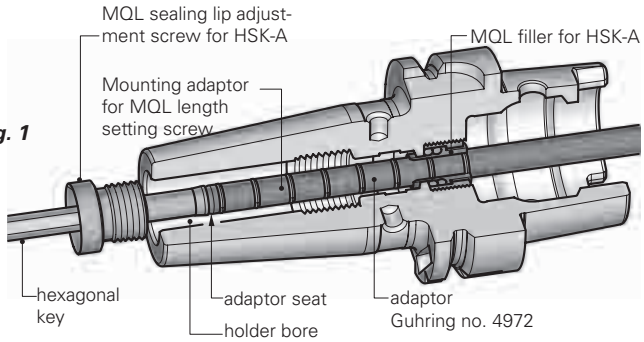


Fig. 1

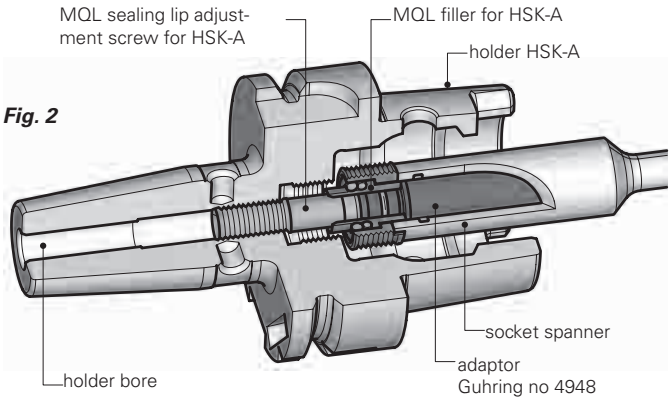
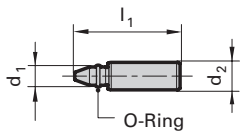


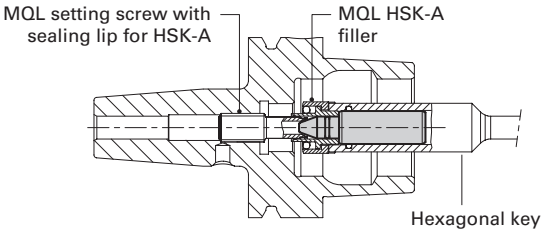
Fig. 2

Mounting adaptor for MQL HSK-A coolant delivery set (filler)

Product information
- adaptor for socket spanner, Guhring no. 4911
- for mounting MQL HSK-A coolant delivery set (filler), Guhring no. 4940, for manual tool change

Scope of delivery
- incl. operating manual





Guhring no. 4948

size	d_1 mm	d_2 mm	l_1 mm	Code no.	Availability
HSK 40	5.4	8	38.5	8,040	●
HSK 50	6.5	10	42	10,050	●
HSK 63	8	12	46	12,063	●
HSK 80	8	14	48.5	14,080	●
HSK 100	8	16	51.5	16,100	●

Assembly instruction for MQL components

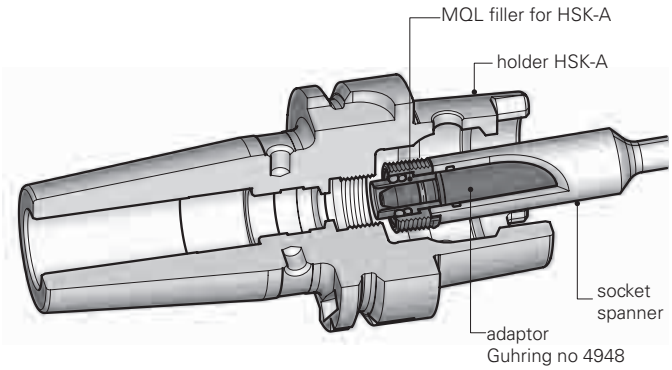
Installation of MQL coolant delivery set (filler)

Manual application

For manual application of the holder use the filler Guhring no. 4940. Push filler on the adaptor Guhring no. 4948 to the stop and insert together in the socket spanner Guhring no. 4911. Now screw the complete unit into the holder and fasten (torque figures see page 27).

Prior to tightening the MQL coolant delivery unit (filler) adjust the adjustment screw towards the holder bore if necessary!

To withdraw the MQL coolant delivery unit (filler) use adaptor Guhring no. 4948. Adjust the adjustment screw to foremost position if necessary. After withdrawal draw off the adaptor.



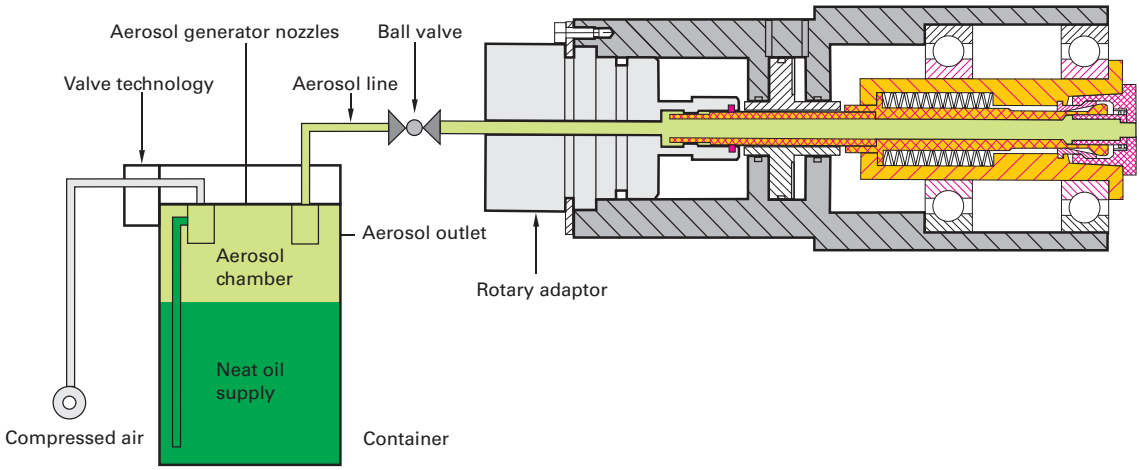
MQL system types

The provision of the MQL medium to the tool can be achieved in two ways: the aerosol mixture can be prepared outside the machine and conveyed to the machining location (1-channel system) or compressed air and MQL medium are conveyed separately to the mixing chamber where they are then mixed together (2-channel system).

The aerosol feed to the machining location is achieved via a suitable minimal quantity lubrication rotary adaptor (preferably with axial flowthrough), the spindle, the clamping system and finally the cutting tool. Unavoidable cross-section modifications should be as streamlined as possible.

1-channel MQL system

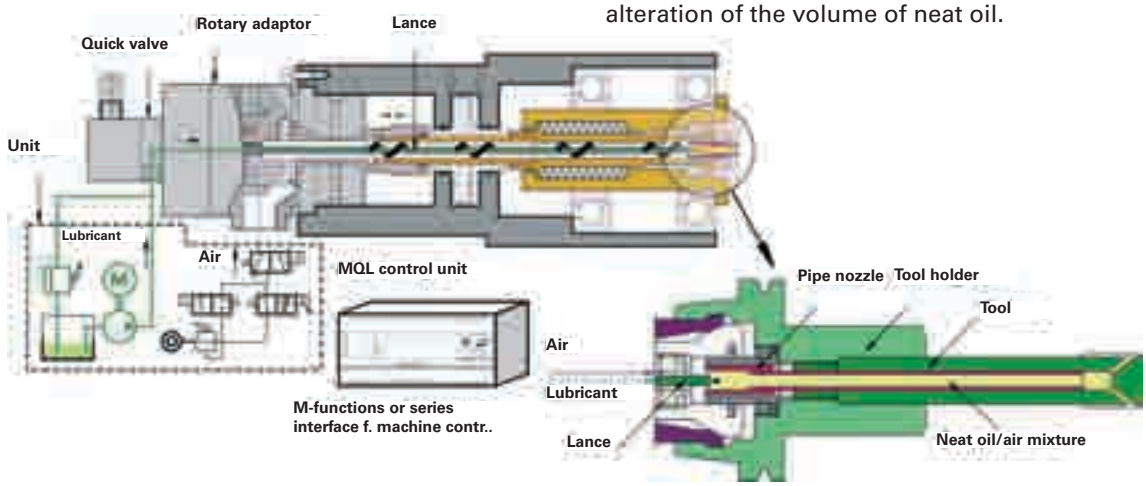
With a 1-channel MQL system, a lubricating aerosol is created in a separate MQL unit attached to the machine tool. Special nozzle systems inside a pressurised container create a lubricating aerosol via a regulated compressed air feed, its neat oil content adjustable and then maintained within the physical limits by the MQL control.



The 2-channel MQL system

With a 2-channel system the neat oil reaches the rotary adaptor from the unit via a ring line and a as short as possible stub line. In it is incorporated a quick valve that regulates minute quantities of neat oil. The neat oil is transported into the tool holder via a lance attached in the spindle.

The second channel of the rotary adaptor is used for the air supply to the tool holder. Only at this point the air is mixed with the neat oil. To achieve this, the tool holder possesses a pressed-in pipe nozzle in which the mixing chamber is located. Neat oil and air can be mixed with this system in more or less any quantities. The route from the mixing chamber to the point of destination is only minimal resulting in a rapid response time and allowing a very quick alteration of the volume of neat oil.



MQL-CHECK 3000

The development of Guhring's new MQL-Check 3000 allows simple and quick measurements of the coolant volume and the reaction time with minimal quantity lubrication (MQL) directly at the tool point. For the user, the result is a considerable increase in process reliability with MQL machining.

Especially with minimal quantity lubrication, optimal delivery of the minimal coolant volume to the cutting edge is paramount. An insufficient delivery or a delayed response time respectively can lead to disasterous results such as premature wear, a deterioration in machining quality or even tool breakage. In contrast, excessive coolant volume results in increased costs through unnecessary coolant consumption and additional cleaning expense for components or machines as well as an unnecessary impact on the environment and personnel.

Until now, measuring the coolant volume exiting at the tool point was practically impossible. With the MQL-Check 3000, Guhring is for the first time offering a simple to operate instrument for quickly measuring the coolant volume directly at the tool point. MQL-Check 3000 is simply installed in the machine, the tool point is passed into the opening of the measuring unit and the coolant delivery switched on. The measuring unit of the MQL-Check 3000 sends the recorded data remotely to the associated display equipment, on which the resulting values are displayed in ml/h. Furthermore, the data interface on the display facility allows the transfer of the data to a PC as an option, making further evaluations and above all the documentation of the measurements possible.

Technical Data

Measuring range:	5 to 60 ml/h
Tool diameter range:	3 to 20 mm
Measuring position:	0 to 90° (vertical and horizontal machining
Power supply:	battery

MQL-Check 3000 consists of:
- measuring unit incl. sender and magnetic base for installation with horizontal machining
- display facility with receiver
- measuring filter for measuring range up to 12 ml/h, up to 30 ml/h and up to 60 ml/h

Data interface and PC software are available as an option.

Subsequently, the user benefits from:
- simple, quick measurements of the coolant volume directly at the tool point
- ascertaining the actual response time, i.e. the time from starting the system to the coolant exiting at the tool point
- reproduceable and at any time comparable measuring data
- a workshop suitable system, wireless operation - in terms of power supply as well as data transfer
- comparitive measuring regarding function of MQL equipment, machine, spindle, tool holder and tool

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