

RN 1734

Translation of the original operating manual HSK clamping set



Store for reference
Version 1.0

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1 About these operating instructions

These operating instructions describe in detail the use, installation, assembly and maintenance of the HSK clamping set.

The efficiency of the HSK clamping set depends primarily on correct use and careful maintenance.

These operating instructions serve as the leading document and are provided online. The product packaging contains brief instructions with the most important information on safety, assembly and maintenance.

The personnel must have carefully read and understood the Operating Instructions before beginning any work.

Observance of all safety instructions and instructions for use in these Operating Instructions is the basic prerequisite for safe work with the HSK clamping set.

In addition to the regulations listed here, the local and user-related operating instructions and the professional accident prevention regulations are to be observed.

1.1 Manufacturer details

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Fax: +49 7325 16492

Web: www.roehm.biz

1.2 Copyright

These operating instructions are protected by copyright and are intended for internal purposes only.

The forwarding of the operating instructions to third parties, reproduction by any means - even in part - as well as use and/or communication of the content without the permission of the manufacturer are prohibited (except for internal purposes).

Infringements will lead to claims for compensation. We reserve the right to assert further claims.

1.3 Warranty and liability

All information and instructions in these operating instructions are given in good faith on the basis of our experience and knowledge to date.

The products of RÖHM GmbH are subject to constant further development. The manufacturer therefore reserves the right to make any modifications and improvements deemed useful. However, there is no obligation to extend these modifications and extensions to previously delivered clamping sets.

The clamping set is exclusively constructed for the purpose specified under "intended use". Any use beyond this is deemed to be inappropriate. RÖHM GmbH is not liable for damage resulting from such use. The risk is borne solely by the owner.

Product liability for consequential damage of any type is excluded for damage and operational interruptions resulting from operating errors, failure to observe these Operating Instructions or incorrect maintenance by unauthorised personnel.

RÖHM GmbH expressly points out that replacement and wear parts supplied by the manufacturer must be authorised by RÖHM GmbH. The company RÖHM GmbH does not accept liability for unauthorised replacement and wear parts. This applies to both product liability for consequential damage of all types and to liability for damage to property.

All unauthorised conversions, modifications to the HSK clamping set and/or changes in conditions are not permitted for safety reasons and exclude all liability of RÖHM GmbH for any damage which may result. If modifications to the HSK clamping set are necessary or the area of use differs from the intended use, this must be agreed with the express permission of RÖHM GmbH.

The statutory and contractually agreed terms and conditions apply.

The following damage or defects are excluded from the warranty

- caused by the operator due to non-compliance with the written instructions of the seller with regard to
 - commissioning (e. g. incorrect construction and assembly work),
 - operation and
 - maintenance of the equipment (insofar as this maintenance has not been contractually taken over by the manufacturer);
- caused by technical operating conditions unknown to the manufacturer (e. g. chemical or electrolytic influences) and/or machine specifications;
- caused by natural wear;
- caused by force majeure;
- caused by incorrect operation of all types or by incorrect use or operation of the HSK clamping set. This also includes loading beyond the specified load limits (e. g. speed, pressure, force etc.).

This also includes damage caused

- if the customer or third parties carry out modifications or repairs to the services / products of the manufacturer without prior permission of the manufacturer. Excepted from this are damage or defects which have occurred which were demonstrably not due to these modifications or repairs.
- which occur due to use of the HSK clamping set under altered operating conditions (e. g. materials, tools, cutting parameters, programs etc.), in particular without consulting and obtaining written authorisation from the seller or manufacturer;
- which are due to altered environmental conditions.

1.4 Conventions of presentation

1.4.1 Text display

To improve legibility and comprehension of the text, the following conventions were agreed:

Text type	Marking	Function
Operating instruction	1., 2., etc.	Marks a sequence of actions
	•	Marks an individual request for action
	➤ Intermediate result	Marks the intermediate result of an operating instruction
	✓ End result	End result of an operating instruction
List	■	Marks elements of a list
	□	Marks comments within a list

1.4.2 Display of safety and warning instructions

Safety and warning instructions are marked by pictograms. The signal word and the colouring show the level of danger.

Observe the safety instructions to prevent personal injury and damage to property.

⚠ Danger	
	<p>Indicates an imminently dangerous situation which may lead to death or permanent personal injury if not avoided.</p> <ul style="list-style-type: none"> ➤ List of all measures which must be taken to prevent consequences.
⚠ Warning	
	<p>Indicates a possible danger which may lead to death or serious injuries if not prevented.</p> <ul style="list-style-type: none"> ➤ List of all measures which must be taken to prevent consequences.
⚠ Caution	
	<p>Indicates a possible danger which may lead to minor or serious injuries if not prevented.</p> <ul style="list-style-type: none"> ➤ List of all measures which must be taken to prevent consequences.
Notice	
	<p>Indicates a possible danger which may lead to damage to property if not avoided.</p> <ul style="list-style-type: none"> ➤ List of all measures which must be taken to prevent consequences.

1.5 Other applicable documents

Other applicable documents refers to documents containing information on the HSK clamping set which goes beyond the scope of these Operating Instructions..

The following documents represent other applicable documents:

- brief operating instructions of the HSK clamping set included with the product packaging;
- product catalogue;
- relevant drawings.

2 Safety

Safety instructions and safety equipment serve to prevent accidents and damage when working with the HSK clamping set. The chapter on safety contains warnings and basic safety instructions. In addition to the safety instructions in this chapter, the following chapters contain action-related warnings. Maximum protection of personnel and the environment is only possible when all safety instructions and warnings are observed.

2.1 Intended use

The HSK clamping set is exclusively intended for installation in an automatic tool clamping system. The HSK clamping set may only be used to clamp hollow shaft cone tools pursuant to DIN 69893 or DIN ISO 12164 insofar as the bore of the tool spindle complies with DIN 69063 or DIN ISO 12164 and further specifications of the clamping system manufacturer.

The HSK clamping set is intended exclusively for commercial use.

2.2 Improper use

If the HSK clamping set is operated for a purpose other than the intended use as specified in these Operating Instructions, this is deemed to be improper use.

Any utilisation beyond the scope of the intended use poses risks and is not approved by RÖHM GmbH.

Improper use refers to:

- use of the HSK clamping set for suspending loads (e.g. as a gripper);
- operation of the HSK clamping set without an inserted tool at more than 500 rpm;
- releasing or removing the tool from the HSK clamping set while the spindle is rotating;
- operation of the HSK clamping set with a defective clip or vulcanised rubber ring;
- operation of the HSK clamping set with missing or damaged segments;
- use of the HSK clamping set outside of the specified limit values.
 - The individual limit values are given in chapter "3.2 Technical specifications". However, values listed on drawings have priority.

2.3 Obligations of the owner

Before work on and with the HSK clamping set is commenced, the owner must ensure

- that the Operating Instructions are available to the responsible personnel;
- that the responsible personnel are sufficiently qualified for their work;
 - This applies in particular to assembly, maintenance and repair.
- that the responsible personnel have read and understood the operating instructions;
 - RÖHM GmbH recommends that this be documented in a suitable form.
- that all safety equipment is correctly mounted and operational;
 - Safety equipment must never be by-passed, manipulated or shut down.
- the clamping set is in perfect technical condition;
- that all damaged and defective parts are replaced immediately;

2.4 Qualification of operating and specialist personnel

Personnel without experience of operating clamping fixtures are exposed to increased risks of injury in the event of incorrect conduct, especially during assembly and maintenance work, due to the clamping movements and forces which occur on the clamping fixtures.

Therefore, the HSK clamping set may only be used, set up or repaired by persons who have received special training or instruction for this purpose or who have extensive experience.

2.5 Personal protective equipment

When working on and with the HSK clamping set, personal protective equipment must be worn. The owner is responsible for providing personal protective equipment.

- Personal protective equipment must be in perfect condition when carrying out work. Defective safety equipment is to be replaced immediately.
- Observe information on personal protective equipment posted in the working area.



Wear eye protection



Wear foot protection

2.6 General dangers

When using the HSK clamping set there is a special potential of residual risks

- during assembly and set-up work.
- during operation.
- during maintenance and service work.

This potential risk cannot be completely eliminated considering the functional availability of the HSK clamping set. Therefore, all individual regulations of these Operating Instructions are to be observed.

Danger of crushing

In the case of assembly and set-up work, there is an increased danger of crushing of hands, as during this work hands are used without protection at the point of danger. The point of danger is situated directly in the machine spindle.

Accidental operation of the automatic clamping system triggers the automatic clamping process. If fingers are in the danger zone at this time, this may result in serious crushing injuries.

Injuries due to flying parts

Operation of the HSK clamping set at unauthorised speeds may increase the clamping force of the HSK clamping set and lead to overloading of the HSK clamping set. Overloading of the HSK clamping set may lead to damage to the segments or other parts. Safe clamping can no longer be ensured if the HSK clamping set is damaged.

Inexpert assembly of the collet or of the thrust piece may lead to flying parts. In the case of an incorrectly inserted HSK clamping set, there is a risk that the complete clamping set becomes detached from the spindle and is ejected together with the tool. The ejected parts may lead to serious injuries and damage to the machine.

In order for the HSK clamping set to hold and clamp the tool against externally applied machining forces, the operator must determine the machining forces occurring for a certain machining task and using the calculation method must apply a safety margin adapted to the machining process.

The HSK clamping set may only be used for the machining task as long as the clamping fixture can produce these calculated forces.

2.7 Procedure in the event of danger and accidents

In the event of danger and accidents, it must be ensured that first aid measures can be taken immediately.

1. Shut the machine down immediately via the Emergency-Stop button.
2. Remove the person involved from the danger zone and sit or lay the person down.
3. Call a doctor.
 - Do not make any changes to the accident site.
4. Administer first aid.
 - Stop any bleeding.
 - Cool burns.
5. Report all accidents to a superior.

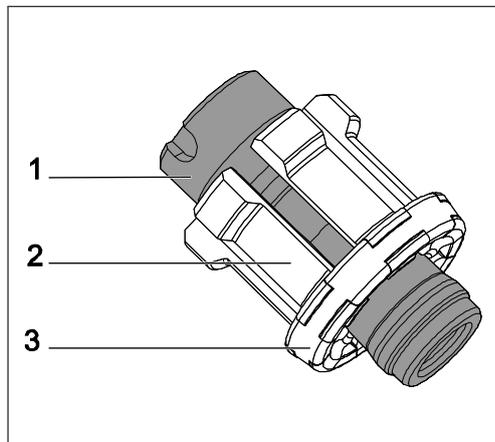
3 About this HSK clamping set

The HSK clamping set is designed and manufactured in accordance with the latest technical standards. All relevant safety regulations were observed. Nevertheless, residual risks exist during correct use of the HSK clamping set.

3.1 Product description

The HSK clamping set consists of the following assemblies:

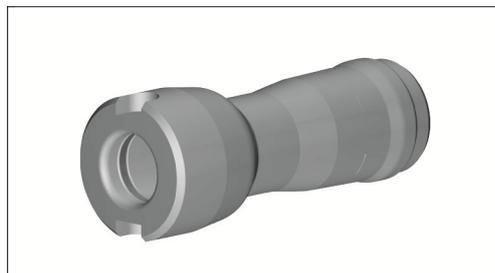
- (1) thrust piece;
- (2) segment of the segment collet;
- (3) clip ring / vulcanised rubber ring



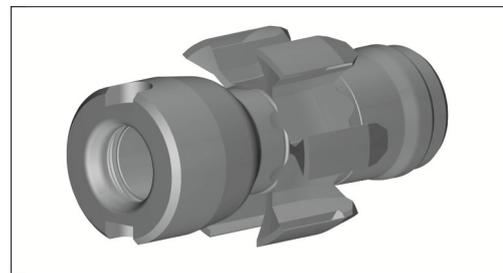
The thrust piece may vary in accordance with the place of use of the HSK clamping set. A distinction is made between the following two designs:

- standard clamping set
- high-speed clamping set

In contrast to the standard thrust piece, the high-speed thrust piece has central guide ridges. These produce additional positive locking between the thrust piece and the collet. The clamping set can thus be operated at a higher speed.



Thrust piece (standard clamping set)



Thrust piece (high-speed clamping set)

3.2 Technical specifications

3.2.1 Permissible operating data

The operating data of each clamping set size are listed in the following table.

Size	A25	A32	A40	A50	A63	A80	A100	A125
Actuating force [kN]	0.7	1	2	3	4	7.5	10	15
Clamping force [kN]	3.5	5	10	15	25	37.5	50	70
Total stroke [mm]	7	9	13	15	14	17	18	20
Clamping stroke [mm]	4	5.5	7	8	8	11	12	14
Discharge stroke [mm]	0.2	0.3	0.5	0.5	0.5	0.5	0.8	0.8
Total length [mm]	28.8	35.1	42.5	50	62	80	98.5	121
Setting dimension [mm] ± 0.1	6.2	8.3	8.5	10.5	10.5	13	13.3	16.8
Standard speed [rpm]	70000	48000	36000	30000	24000	18000	14000	10000

Tolerances and further information in accordance with the clamping set drawing!

3.2.2 Permissible operating materials

The following grease pastes and lubricating sprays are permitted for assembly and maintenance of the HSK clamping set:

Different lubricants must not be mixed!

Grease pastes (preferred for initial commissioning)	
Lubricating metal paste (Metaflux) 70-85 Grease paste Metaflux 70-8508	TECHNO-SERVICE GmbH Detmolder Str. 515 33605 Bielefeld
Molykote TP42	DOW CORNING GmbH Pelkovenstr. 152 80992 Munich
Lubricating sprays (preferred for re-lubrication)	
Lubricating metal spray Metaflux 70-81 Anti-seize spray 70-82	TECHNO-SERVICE GmbH Detmolder Str. 515 33605 Bielefeld
HT 1200	INTERFLON DEUTSCHLAND GmbH Herrenpfad-Süd 6 41334 Nettetal

3.2.3 Environmental and operational conditions

The HSK clamping set is designed for the following environmental and operating conditions:

relative humidity (at 40 °C)	< 50 %
ambient temperature at place of operation	+10 °C to +80 °C
ambient temperature for transport and storage	-15 °C to +55 °C

Pollution of the environment caused by the machine itself is permitted. However, perfect operation of the HSK clamping set must be ensured and checked regularly. In addition, the HSK clamping set must be maintained in accordance with the maintenance interval.

4 Assembly

⚠ Warning	
	<p>Danger to life due to flying parts</p> <p>An incorrectly installed collet can be ejected when the tool spindle starts up and cause serious injuries to the whole body.</p> <ul style="list-style-type: none"> ➤ Switch the machine off and protect against being switched on before carrying out assembly or maintenance work. ➤ Ensure intended position and tight fit of the collet.
⚠ Warning	
	<p>Crushing injuries to hands</p> <p>Hands are situated unprotected in the machine spindle during assembly or maintenance work. Serious cutting injuries to hands may occur due to unintentional clamping of the clamping fixture.</p> <ul style="list-style-type: none"> ➤ Switch the machine off and protect against being switched on again before carrying out assembly and maintenance work.

4.1 Auxiliary materials

The following auxiliary materials are required for assembly of the HSK clamping set:

- Lubricating grease (see Chapter "3.2.2 Permissible operating materials")
- Socket spanner (for thrust piece screw-in assembly)
- Depth calipers
- Clamping force meter

4.2 Mount segment collet (if available)

The segment collet with clip ring is an innovation of RÖHM GmbH and consists of 5 or 6 segments and 1 clip ring. The number of openings in the clip ring corresponds to the number of segments also supplied. In contrast to the conventional vulcanised collets, the segments are not permanently connected to the rubber ring but are replaceable. This offers the advantage that the clip ring can be replaced if worn or defective. Like the conventional clamping sets, the segment collet also offers a high clamping force accuracy and fast replaceability of the complete HSK clamping set.

Note

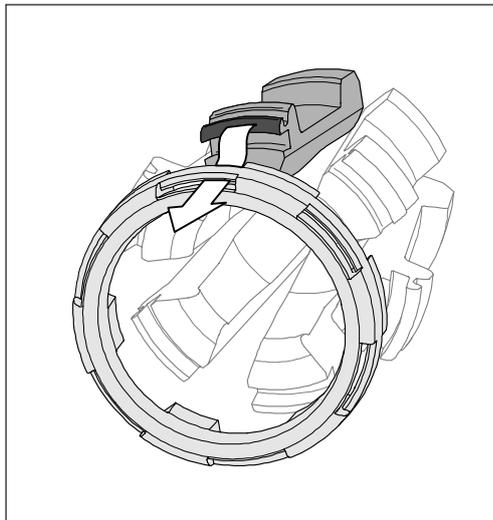


Loss of operational and processing accuracy.

In order to maintain the operability and processing accuracy of the HSK clamping set, if one segment is worn or defective, all segments must always be replaced. Replacement of an individual segment is prohibited.

Clip segments into the clip ring

- In order to clip the segments into the clip ring, guide the hook of the segment into the opening of the clip ring provided and press tight.



Assembly of the individual segments

4.3 Set TARGET setting dimension

Before the collet can be inserted into the machine spindle, the ACTUAL setting dimension must be determined and compared with the TARGET setting dimension. The ACTUAL setting dimension must be measured with depth calipers.

If the measured ACTUAL setting dimension differs from the TARGET setting dimension, the difference must be corrected.

Determine ACTUAL setting dimension

1. Place tool clamping system in release position.
2. Mount the thrust piece on the drawbar and tighten hand-tight with a special assembly tool.
3. Measure the distance between the face of the thrust piece and the face of the spindle shaft with depth calipers.
4. Compare the determined ACTUAL setting dimension with the TARGET setting dimension from the following table.

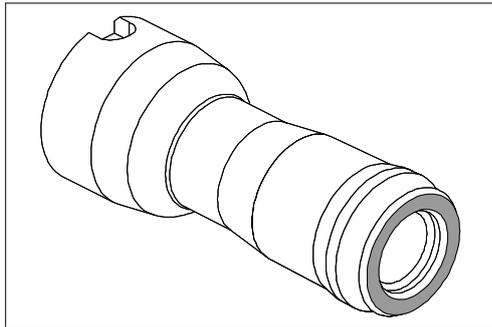
Size	A25	A32	A40	A50	A63	A80	A100	A125
Actuating force [kN]	0.7	1	2	3	4	7.5	10	15
Clamping force [kN]	3.5	5	10	15	25	37.5	50	70
Total stroke [mm]	7	9	13	15	14	17	18	20
Clamping stroke [mm]	4	5.5	7	8	8	11	12	14
Discharge stroke [mm]	0.2	0.3	0.5	0.5	0.5	0.5	0.8	0.8
Total length [mm]	28.8	35.1	42.5	50	62	80	98.5	121
Setting dimension [mm] ± 0.1	6.2	8.3	8.5	10.5	10.5	13	13.3	16.8
Standard speed [rpm]	70000	48000	36000	30000	24000	18000	14000	10000

Tolerances and further information in accordance with the clamping set drawing!

Correct deviation of the ACTUAL setting dimension from the TARGET setting dimension

1. Disassemble the thrust piece.
2. Correct the deviation of the ACTUAL setting dimension as described in the following table:

ACTUAL setting dimension < TARGET setting dimension	Attach corresponding washer(s) to the face of the drawbar.
ACTUAL setting dimension > TARGET setting dimension	Grind the face of the thrust piece facing towards the drawbar and remove burr.



Area of the thrust piece to be ground

4.4 Insert collet into machine spindle

The collet can be inserted into the machine spindle in various ways:

Alternative 1: insert collet into machine spindle by hand

Alternative 2: insert collet into the machine spindle with the HSK assembly aid

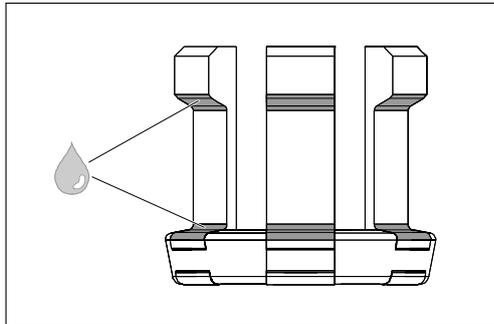
Pre-conditions:

- tool clamping system in clamping position
- thrust piece removed
- contact surfaces of the collet greased

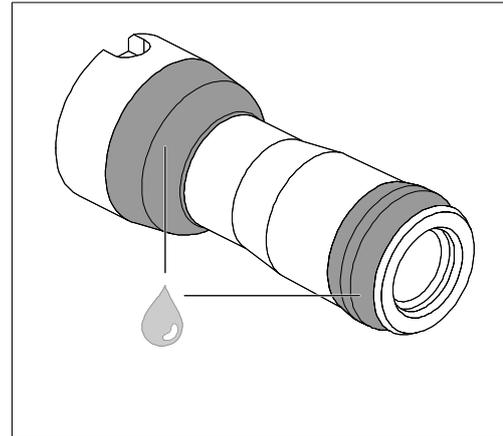
Lubrication points for assembly

Before the individual components of the HSK clamping set are assembled, they must be greased. Greasing the components has the advantages that assembly is facilitated by the lubrication characteristic and wear of the components during operation is reduced.

The individual points to be greased before assembly are listed in the following.



Lubrication points collet



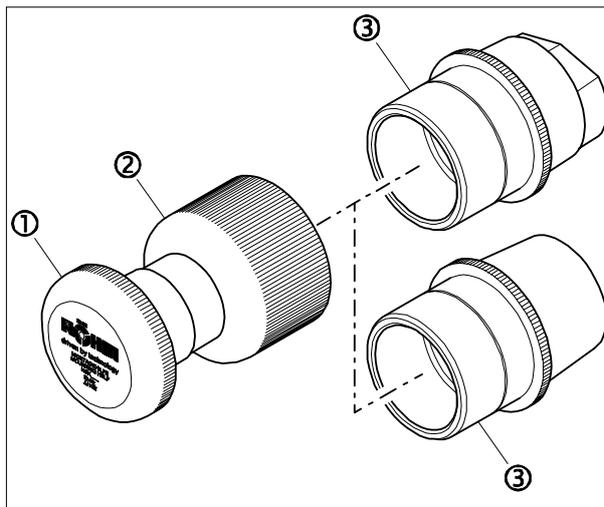
Lubrication points thrust piece

Alternative 1: insert collet into machine spindle by hand

1. Gently press the vulcanised rubber ring/ clip ring and collet together and insert into the annular groove of the machine spindle.
2. Push the collet further into the annular groove with your fingers until it sits tightly in the annular groove.

Alternative 2: Insert collet chuck into the machine spindle with the HSK assembly aid

1. Place assembly sleeve (3) against fixed stop (e.g. table top) and insert segment collet.
2. Position the guide bushing (2) on the assembly sleeve and push on as far as it will go.
3. Push pressure pin (1) in as far as it will go.
4. Place tool clamping system in clamping position: Insert HSK assembly aid into machine spindle.
5. Push pressure pin (1) in as far as it will go.



Overview HSK assembly aid

Size of the HSK assembly aid	Art. no.
25	1329030
32	1329025
40	1329015
50	1329001
63	1324230
80	1329020
100	1329010
125	1329035

4.5 Mount thrust piece

Pre-conditions:

- tool clamping system in release position
- contact surfaces of the thrust piece greased

1. Insert the greased thrust piece into the collet.
2. Screw the thrust piece hand-tight onto the drawbar and tighten with the special socket spanner.
3. Screw the hexagon socket screw into the thrust piece and tighten (counter-lock).
4. Check the ACTUAL setting dimension with the aid of depth calipers.

If the measured ACTUAL setting dimension does not correspond with the specified TARGET setting dimension, the ACTUAL setting dimension must be adjusted (see Chapter "4.3 Set TARGET setting dimension")

5. Measure the clamping force with a clamping force meter and compare with the required clamping force.

5 Maintenance

The state of maintenance of the HSK clamping set has an important effect on operation, clamping force, accuracy and service life.

5.1 Personnel qualification

Decommissioning and disassembly work may only be carried out by qualified, specialist personnel.

5.2 Safety during maintenance

⚠ Warning	
	<p>Danger to life due to flying parts</p> <p>An incorrectly installed collet can be ejected when the tool spindle starts up and cause serious injuries to the whole body.</p> <ul style="list-style-type: none"> ➤ Switch the machine off and protect against being switched on before carrying out assembly or maintenance work. ➤ Ensure intended position and tight fit of the collet.
⚠ Warning	
	<p>Crushing injuries to hands</p> <p>Hands are situated unprotected in the machine spindle during assembly or maintenance work. Serious cutting injuries to hands may occur due to unintentional clamping of the clamping fixture.</p> <ul style="list-style-type: none"> ➤ Switch the machine off and protect against being switched on again before carrying out assembly and maintenance work.

When working on and with the HSK clamping set, personal protective equipment must be worn. The owner is responsible for providing personal protective equipment.

- Personal protective equipment must be in perfect condition when carrying out work. Defective safety equipment is to be replaced immediately.
- Observe information on personal protective equipment posted in the working area.



Wear eye protection



Wear foot protection

5.3 Maintenance intervals

After completion of maintenance work, it must be documented by the maintenance personnel.

Activity	Interval		
	After the first 100 clamping cycles	weekly/ 75 operating hours / 20,000 clamping cycles	monthly / 300 operating hours
Visually inspect for perfect clamping movement		x	
Check clamping set for damage		x	
Check lubrication		x	
Check ACTUAL setting dimension and re-adjust if necessary	x		x
Check clamping force or retraction force with clamping force meter	x		x
Check counter-locking of the hexagon socket screw	x		

6 Disposal

If the HSK clamping set is finally disassembled or dismantled, the materials must be disposed of in an environmentally way in accordance with the valid regulations:

- **Metals**

Metals must be recycled. They must be disposed of in accordance with the valid regulations and the applicable local provisions. Obtain relevant information from the authorities.

- **Rubber (e.g. clip ring)**

Rubber must be disposed of in accordance with the valid regulations and the applicable local provisions. Obtain relevant information from the authorities.