TOOL CLAMPING SYSTEMS

EDITION 8
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#### TOOL CLAMPING SYSTEMS

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*Errors and corrections are reserved!*
## Operation guide

### HSK Interface

<table>
<thead>
<tr>
<th>TYPE</th>
<th>HSK - Automatic clamping system</th>
<th>HSK - SUPER-LOCK</th>
<th>HSK - Manual clamping set</th>
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### SK Interface

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</table>
Positive taper lock for automatic tool change

Form A / T
Positive taper lock (version A)
Automatically-changeable tool adapter, torque transmission on positive taper lock, small square face with gripping channel.
Applications:
Machine tools (e.g. lathes, drilling and milling machines), high speed range, conventional material machining, torque transmission via milled driver within the spindle adapter.
Design T analog to design A, but limited backlash of the driver.

Form B
Positive taper lock (version B)
Automatically-changeable tool adapter, torque transmission on collar via grooves, large square face with gripping channel.
Applications:
Machine tools (e.g. lathes, drilling and milling machines), medium speed range, heavy-duty material machining, torque transmission via driver keys, suitable for heavy-duty material machining (cutter heads).

Positive taper lock for manual tool change

Form C
Positive taper lock (version C)
Manually-changeable tool adapter, torque transmission on positive taper lock, small square face without gripping channel.
Applications:
Machine tools (e.g. lathes, drilling and milling machines), high speed range, conventional material machining, torque transmission via milled driver within the spindle adapter.

Form D
Positive taper lock (version D)
Manually-changeable tool adapter, torque transmission on collar via grooves, large square face without gripping channel.
Applications:
Machine tools (e.g. lathes, drilling and milling machines), medium speed range, heavy-duty material machining, torque transmission via driver keys, suitable for heavy-duty material machining (cutter heads).

Positive taper lock for automatic tool change and for high speeds (HSC)

Form E
Positive taper lock (version E)
Automatically-changeable tool adapter, torque transmission via collar and spherical surface, small square face with gripping channel.
Applications:
Machine tools (e.g. lathes, drilling and grinding machines), extremely high speed range (depending on diameter size), grinding work, wood machining, suitable for HSC, utilised for minimal material removal.

Form F
Positive taper lock (version F)
Automatically-changeable tool adapter, torque transmission via collar and spherical surface, large square face with gripping channel.
Applications:
Machine tools (e.g. lathes, drilling and grinding machines), extremely high speed range (depending on diameter size), grinding work, wood machining, suitable for HSC, utilised for minimal material removal.
CONVINCING ACROSS THE BOARD

- 27 % shorter installation length of clamping set for lower space requirement
- 27 % shorter distance of plane face to clamping shoulder for compact force flow
- 33 % lower spring force required for clamping
- + 39 % higher clamping force for safe and reliable clamping of the tools

- Standard DLC coating for longer service life
- Simple and fast installation of clamping sets
- Safe release and ejection due to forced guidance of clamping segments without additional spring elements
- Lower wear of the spindle due to the loss of sliding at the clamping shoulder

(Compared to the usual clamping systems of size HSK-A 63)
Reliability, safety and long service life are the main requirements for a tool clamping system. It is also important for clamping systems to be able to be individually adapted to the customer requirements. Many years of experience as well as technical dominance in all areas allow RÖHM to meet these requirements exactly.

**ADVANTAGES AT A GLANCE**

- Proven functional principle for safe clamping and release of the tools
- 39 % higher clamping force than required in the standard
- Individual adaptation to customer-specific requirements
ADVANTAGES:
- Steady clamping force due to the symmetric clamping surfaces of the clamping segments
- Compact power flow resulting in high static and dynamic rigidity of the tool joint
- High power amplification by transmission of the clamping set
- Force controlled release of the collet
- Automatic ejection of the tool by the clamping bolt during release
- Sealed central coolant supply system
- Perfect suitable to be built into the spindles of machine tools and machining centers

TECHNICAL FEATURES
The advantages of the positive taper lock system originates in the combination of defined radial pretensioned taper and tool face stop. A safe transmission of the torque is achieved by the elastic deformation of the taper resulting in a gap-free connection with the tool. High interchanging and repeating accuracy is leading to increased production quality during the machining.

The clamping process is started by the springs and the movement is transmitted to the clamping set by the draw bar, in direction $F_Z$. The clamping segments of the collet are pushed to the outside by the clamping bolt. The clamping forces are multiple amplified by the angled arrangement of the contact areas. The produced axial forces $F_A$ and radial forces $F_R$ result in a pretension of the positive taper on the entire taper area and, the axial contact area. The proportion of the axial contact force is over 80% of the total clamping force. This explains the importance of the size of the axial contact area concerning the critical load and rigidity of the taper and hollow shank joint.

See also DIN 69893 - Hollow taper shanks types B, D and F. Hollow taper shanks types A and C have two additional positive drive grooves at the end of the taper which interlock with the tool mounting and produce a form-locking, orientated radial positioning.

During the release the tool will be positively unlocked and ejected from the tool spindle by the multifunctional clamping bolt and taper sleeve.
**HSK - Automatic clamping systems**

**Clamping set - Standard**

**APPLICATION**
Clamping set for HSK clamping systems.

**TYPE**
Standard version in compact design.

**CUSTOMER BENEFITS**
- DLC coating guarantees a longer service life of the clamping set
- Short length for compact force flow and high rigidity
- High force amplification due to transmission in the clamping set
- Safe clamping and unclamping of the tools

**TECHNICAL FEATURES**
- Connected collet segments simplify installation

---

### C 15
**Automatic HSK clamping set - Standard** in compact design

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1) Please note the speed diagram according to the corresponding clamping set datasheet

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**on request**

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**on request**

8007
Clamping set - High Speed

APPLICATION
Clamping set suited for high speeds.

TYPE
High Speed version for higher speeds due to exact guidance of the clamping segments.

CUSTOMER BENEFITS
- DLC coating guarantees a longer service life of the clamping set
- Short length for compact force flow and high rigidity
- High force amplification due to transmission in the clamping set
- Safe clamping and unclamping of the tools
- High balancing quality maintained due to exact guidance of the collet chuck

TECHNICAL FEATURES
- Connected collet segments simplify installation

C.15
Automatic HSK clamping set High Speed, due to the exact guidance of the collet chuck segments, this clamping set is especially suitable for higher speeds

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1) Please note the speed diagram according to the corresponding clamping set datasheet
Assembly tool for HSK clamping sets

APPLICATION
For an easy, fast and save mounting of HSK clamping sets.
Mounting of the collet into the spindle with only a few movements.

TYPE
Please check the suitability for your clamping set before ordering. You may find the information in the Manual.

CUSTOMER BENEFITS
- Avoidance of damages at the clamping set and the spindle
- Easy and save installation of the clamping set
- User-friendly design

TECHNICAL FEATURES
- Available for all HSK sizes A 25 - 125
- Works with all HSK types A/C/E/T/B/D/F
- Fits for RÖHM clamping sets with short and slim segments
- Special design for RÖHM segment collets in „long“ design in size HSK-E-50/F-63

C 15
Assembly tool for HSK clamping sets

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Clamping unit and draw bar extension

APPLICATION
Actuation unit for HSK clamping systems.

TYPE
Spring-actuated clamping unit with individually adapted draw bar extension.

CUSTOMER BENEFITS
- Energy stored in the spring package
- Slender design
- Reliable function thanks to sturdy design

TECHNICAL FEATURES
- Clamping system is designed individually for the spindle

Stationary release unit

APPLICATION
Stationary release unit for tool clamping systems.

TYPE
Hydraulic or pneumatic design, stationary attachment.

CUSTOMER BENEFITS
- Clamping system and release piston are separated from one another during the spindle rotation
- No oil supply required in the rotating spindle part
- Low-wear operation

TECHNICAL FEATURES
- Release system designed individually for the spindle
Accessories

C.15

**Socket wrench** for pressure piece screw-in assembly

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C.15

**Measuring device** for measuring the installation contour (clamping shoulder) for automatic HSK clamping sets

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<td>Size HSK-B/D/F</td>
<td>32</td>
<td>40</td>
<td>50</td>
<td>63</td>
<td>80</td>
<td>100</td>
<td>125</td>
<td>160</td>
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</tbody>
</table>
50% SHORTER LENGTH THAN CLAMPING SYSTEMS WITH SPRINGS

HSK clamping system with SUPER-LOCK

HSK clamping system with spring package
The trend toward modern milling machines involves two requirements with regard to the automatic clamping systems. In the area of High Speed Cutting (HSC), increasingly higher speeds and therefore higher balancing qualities are required. Due to higher machining forces during High Performance Cutting (HPC), interfaces must additionally be more rigid. SUPER-LOCK meets these requirements, and with an approx. 50 % shorter length as compared with conventional clamping systems with springs.

**ADVANTAGES AT A GLANCE**

- Compact and extremely short design
- Optimally suited for maximum speeds and machining forces
- Lower force introduced into the spindle as compared to spring clamping systems
HSK - SUPER-LOCK

Clamping unit

APPLICATION
For HSK clamping systems. Can be used universally, preferably for high speeds.

TYPE
Locking unit for HSK clamping set. HSK clamping set separately available.

CUSTOMER BENEFITS
- Without springs - clamping force is maintained with self-locking
- Short and compact design
- Low force transmission during releasing

TECHNICAL FEATURES
- For actuation, a clamping and unclamping unit are required

C 15
Clamping unit SUPER-LOCK, self-locking mechanism without springs for automatic tool clamping

<table>
<thead>
<tr>
<th>Item No.</th>
<th>1122572</th>
<th>1122574</th>
<th>1122718</th>
<th>1122725</th>
<th>1122569</th>
<th>1122731</th>
<th>1122581</th>
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</thead>
<tbody>
<tr>
<td>Size HSK-A/C/E/F</td>
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<td>50</td>
<td>50</td>
<td>63</td>
<td>90</td>
<td>100</td>
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<tr>
<td>D1</td>
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<td>15,1</td>
<td>18,6</td>
<td>23,6</td>
<td>31</td>
<td>39</td>
<td>49</td>
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<tr>
<td>D2</td>
<td>11</td>
<td>12,5</td>
<td>16,4</td>
<td>20,4</td>
<td>25</td>
<td>31,2</td>
<td>40</td>
</tr>
<tr>
<td>D3</td>
<td>8</td>
<td>10</td>
<td>16</td>
<td>19</td>
<td>24</td>
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<td>31</td>
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<td>12,5</td>
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<tr>
<td>D6</td>
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<td>38</td>
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<td>75</td>
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<tr>
<td>G1 mm</td>
<td>M14x0,5</td>
<td>M16x0,75</td>
<td>M20x1</td>
<td>M25x1</td>
<td>M33x1</td>
<td>M42x1,5</td>
<td>M52x2</td>
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<tr>
<td>G3</td>
<td>M8x,75</td>
<td>M8x0,75</td>
<td>M10x1</td>
<td>M12x1,25</td>
<td>M14x1,5</td>
<td>M18x1,5</td>
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</tr>
<tr>
<td>H1 mm</td>
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<td>19,9</td>
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<tr>
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<td>18,9</td>
<td>22,8</td>
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<td>45,9</td>
<td>57</td>
<td>70</td>
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<td>4</td>
<td>5</td>
<td>6,3</td>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>

Clamping force kN: 3,5 | 5 | 10 | 15 | 25 | 37,5 | 50 |

Max. application speed 1) min⁻¹: 120000 | 80000 | 60000 | 50000 | 40000 | 30000 | 24000 |

1) Please note the speed diagram according to the corresponding clamping set datasheet

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8014

▲ on request
MANUAL CLAMPING SET FOR COMPACT FORCE FLOW WITHOUT INFLUENCING THE HSK TAPER

RÖHM HSK system for manual force clamping with compact force flow.
A critical factor for the HSK interface with manual tool change in lathes or turrets as well as milling machines is the rigidity and change precision. Manual clamping systems from RÖHM achieve this via the compact force flow within a minimum amount of space.

ADVANTAGES AT A GLANCE

- Convincingly simple construction for high reliability and simple installation
- Safe ejection of tools during release by means of the guide bolt
- No negative influence of the HSK taper, since the actuation screw lies in the driver area

Mounted flange in HSK-C or HSK-D for simple attachment

Adjusting screw for actuating the installed clamping set

Sealed, central cooling feed-through

Installed clamping set HSK-C or HSK-D
HSK-C clamping set

APPLICATION
Manual clamping of HSK tools.

TYPE
HSK-C for tool shafts A/C/T.

CUSTOMER BENEFITS
- Convincingly simple construction for high reliability and simple installation
- Safe ejection of tools during unclamping by means of the guide bolt
- No negative influence of the HSK taper, since the actuation screw lies in the driver area

TECHNICAL FEATURES
- Central coolant supply (except size 25)

C 15
Clamping set HSK-C with coolant supply through the centre (except size 25) for tool holders with internal drivers HSK-A/C/T

<table>
<thead>
<tr>
<th>Item no.</th>
<th>760530</th>
<th>784603</th>
<th>812617</th>
<th>831435</th>
<th>586214</th>
<th>475170</th>
<th>475172</th>
<th>483213</th>
<th>831306</th>
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</thead>
<tbody>
<tr>
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<td>50</td>
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<td>80</td>
<td>100</td>
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<td>160</td>
</tr>
<tr>
<td>D1</td>
<td>25</td>
<td>32</td>
<td>40</td>
<td>50</td>
<td>63</td>
<td>80</td>
<td>100</td>
<td>125</td>
<td>160</td>
</tr>
<tr>
<td>Taper Ø d₂</td>
<td>19</td>
<td>24</td>
<td>30</td>
<td>38</td>
<td>48</td>
<td>60</td>
<td>75</td>
<td>96</td>
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</tr>
<tr>
<td>d²w</td>
<td>10</td>
<td>12</td>
<td>15</td>
<td>18</td>
<td>24</td>
<td>32</td>
<td>40</td>
<td>48</td>
<td>60</td>
</tr>
<tr>
<td>I₁</td>
<td>28</td>
<td>34</td>
<td>45</td>
<td>55</td>
<td>65</td>
<td>80</td>
<td>97,5</td>
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<td>I₂</td>
<td>11,4</td>
<td>14</td>
<td>17,5</td>
<td>21,5</td>
<td>27</td>
<td>34</td>
<td>42</td>
<td>53</td>
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<tr>
<td>I₃</td>
<td>15</td>
<td>18,5</td>
<td>22</td>
<td>27</td>
<td>34</td>
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<td>67</td>
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<tr>
<td>I₅</td>
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<td>8</td>
<td>10</td>
<td>10</td>
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<td>4</td>
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<td>12</td>
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<tr>
<td>Tightening torque Nm</td>
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<td>6,5</td>
<td>14</td>
<td>25</td>
<td>42</td>
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<td>100</td>
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<tr>
<td>Clamping force kN</td>
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<td>6,8</td>
<td>11</td>
<td>18</td>
<td>30</td>
<td>45</td>
<td>70</td>
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<td>Flow cross section mm²</td>
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<td>27,7</td>
<td>56,5</td>
<td>100,5</td>
<td>100,5</td>
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<td>760464</td>
<td>760465</td>
<td>760466</td>
<td>760467</td>
<td>812815</td>
<td>831311</td>
</tr>
</tbody>
</table>

Built-in clamping set HSK-D on request

www.eshop.roehm.biz
HSK-C clamping set with adaptor

APPLICATION
For attachment to spindles, turrets, etc.

TYPE
HSK-C for tool shafts A/C/T.

CUSTOMER BENEFITS
- Convincingly simple construction for high reliability and simple installation
- Safe ejection of tools during unclamping by means of the guide bolt
- No negative influence of the HSK taper, since the actuation screw lies in the driver area

TECHNICAL FEATURES
- Balancing quality G 2.5
- Central coolant supply (except size 25)

C 15
Adaptors with clamping set HSK-C, balanced and with coolant supply through the centre (except size 25)

<table>
<thead>
<tr>
<th>Item no.</th>
<th>850322</th>
<th>820802</th>
<th>820803</th>
<th>820804</th>
<th>820805</th>
<th>820806</th>
<th>820807</th>
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<tbody>
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<td>63</td>
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<td>125</td>
</tr>
<tr>
<td>Taper Ø d2</td>
<td>19</td>
<td>24</td>
<td>30</td>
<td>38</td>
<td>48</td>
<td>60</td>
<td>75</td>
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<tr>
<td>d3</td>
<td>10</td>
<td>12</td>
<td>15</td>
<td>18</td>
<td>24</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>d4</td>
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<td>3,4</td>
<td>4,5</td>
<td>5,5</td>
<td>6,5</td>
<td>9</td>
<td>11</td>
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<tr>
<td>d5</td>
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<td>33,5</td>
<td>42</td>
<td>56</td>
<td>68</td>
<td>84</td>
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<td>Ø-TK</td>
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<td>40,5</td>
<td>52</td>
<td>66</td>
<td>82</td>
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<tr>
<td>t1</td>
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<td>45</td>
<td>55</td>
<td>65</td>
<td>80</td>
<td>97,5</td>
</tr>
<tr>
<td>t2</td>
<td>22</td>
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<td>17,5</td>
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</tr>
<tr>
<td>t4</td>
<td>15,5</td>
<td>19</td>
<td>23</td>
<td>29</td>
<td>35</td>
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<td>8</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>12,5</td>
<td>12,5</td>
</tr>
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</table>

Adjusting screw complete Item no. 870022 870023 870024 870025 870026 870027 870028
Dyn. balanced: G 2.5 DIN ISO 21940

Accessories

C 15
Measuring device for measuring the installation contour (clamping shoulder) for manual clamping sets

<table>
<thead>
<tr>
<th>Item no.</th>
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<th>1195813</th>
<th>1233618</th>
<th>1195814</th>
<th>1233619</th>
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<th>1233616</th>
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</thead>
<tbody>
<tr>
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<td>50</td>
<td>63</td>
<td>80</td>
<td>100</td>
<td>125</td>
<td>160</td>
</tr>
<tr>
<td>Size HSK-B/D/F</td>
<td>32</td>
<td>40</td>
<td>50</td>
<td>63</td>
<td>80</td>
<td>100</td>
<td>125</td>
<td>160</td>
<td>-</td>
</tr>
</tbody>
</table>
After about 75 operating hours or 20,000 changes of tool, tool clamping systems should be maintained in order to ensure process reliability and rule out mechanical breakdowns. In most cases this involves manual lubrication. This means time has to be taken to maintain manually, and there is a margin for error: the time chosen may not be ideal, or the quantity of lubricant may be incorrectly judged. Quite apart from the fact that in some cases lubrication fails to be carried out at all. In hope of making these problems a thing of the past, RÖHM has developed its innovative Lubritool® lubrication device. Having been informed by the machine controls of the right moment in time, the product novelty Lubritool® is automatically deployed directly from the tool magazine, and supplies the tool clamping system with the ideal quantity of lubricant within seconds. This eliminates timewasting and costly maintaining operations, as well as ruling out mechanical breakdown.
In order to guarantee the impeccable functioning of milling machines and machining centres, the tool clamping system should be maintained regularly. Unfortunately this requirement is often neglected in practice. With its innovative Lubritool® lubrication device, which has been submitted for a patent, RÖHM is launching a completely new product on the market – one that brings about automated lubrication within seconds.

ADVANTAGES AT A GLANCE

- Optimal lubrication – always the ideal lubricant, just at the right time, in the right quantity and place
- No manual intervention needed – no failure to carry out maintenance
- Reduced maintenance times – 5 seconds rather than 5 minutes
Lubritool® lubrication device

APPLICATION
For automated and manual maintenance of RÖHM clamping sets.

TYPE
HSK-A for tool shafts A.

CUSTOMER BENEFITS
- Optimal lubrication – always the ideal lubricant, just at the right time, in the right quantity and place
- No manual intervention needed – no failure to carry out maintenance
- Reduced maintenance times – 5 seconds rather than 5 minutes
- Compact design for more work space within the machine

TECHNICAL FEATURES
- Manifold ring for optimal distribution of the lubricant at the clamping set

NEW: 20% reduced length

<table>
<thead>
<tr>
<th>Item No.</th>
<th>1330233</th>
<th>1323415</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface design (ISO12164-1)</td>
<td>HSK-A63</td>
<td>HSK-A100</td>
</tr>
<tr>
<td>a mm</td>
<td>48</td>
<td>51</td>
</tr>
<tr>
<td>b mm</td>
<td>191,5</td>
<td>194</td>
</tr>
<tr>
<td>Ø c mm</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Weight kg (without cartridge)</td>
<td>1,6</td>
<td>2,7</td>
</tr>
<tr>
<td>Weight kg (with cartridge)</td>
<td>1,8</td>
<td>2,9</td>
</tr>
<tr>
<td>Lubrication applications</td>
<td>100 cycles</td>
<td>100 cycles</td>
</tr>
<tr>
<td>Item No. Lubriflux grease cartridge (set of 2 pcs)</td>
<td>1334234</td>
<td>1334234</td>
</tr>
</tbody>
</table>
Lubritool® is located in the tool magazine. Whenever the machine control notifies that a lubrication process is necessary, Lubritool® will be set up into the spindle.

Within the spindle the lubrication impulse is automatically activated. An optimal quantity of Lubriflux lubricant is sprayed to the right place of the tool clamping system.

After the lubrication process, Lubritool® is set back to the tool magazine and remains there until the next lubrication cycle.
THE RIGHT FUNCTIONAL PRINCIPLE FOR EVERY APPLICATION

Clamping system with stationary release unit
Stationary release unit is disconnected from the rotating system during spindle rotation and is therefore especially suited for higher speeds.

Clamping system with integrated release hydraulic
Hydraulic release mechanics are attached/installed on the spindle shaft. No force acts on the spindle bearing during the tool change.

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SK - AUTOMATIC TOOL CLAMPING SYSTEM

For the automatic clamping of steep-taper tools, reliability, safety and long service life are essential basic requirements. Particularly for machine tools with a rotating working spindle, high rotational frequencies and high clamping forces. Due to many years of experience in this area, RÖHM can specifically see to customized requirements, thereby meeting this requirement.

ADVANTAGES AT A GLANCE

- Safe clamping and release of the steep-taper tools by using proven components
- High variant variety for a wide range of installation situations
- Individual adaptation to customer-specific requirements

Rotary feed-through for media supply of coolant and cleaning air

Stationary release unit particularly suitable for high speeds

Tool clamp with spring package and wedge gear

Draw bar extension for individual spindle solutions

Clamping set suitable for different tool holders
SK clamping sets

APPLICATION
For the automatic clamping of steep-taper tools.

TYPE
Available in different versions to match the respective tool.

CUSTOMER BENEFITS
- Proven construction and high-quality processing
- Safe clamping and unclamping of the tools

TECHNICAL FEATURES
- With internal coolant supply

C 15
Clamping sets type DIN 69871/72

<table>
<thead>
<tr>
<th>Item no.</th>
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<th>d 2</th>
<th>Pull-in force max. N</th>
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<td>M10x1,5</td>
<td>7500</td>
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<tr>
<td>756340</td>
<td>SK 40</td>
<td>27</td>
<td>M14x1,5</td>
<td>15000</td>
</tr>
<tr>
<td>760391</td>
<td>SK 50</td>
<td>40</td>
<td>M16x1,5</td>
<td>26000</td>
</tr>
<tr>
<td>760390</td>
<td>SK 60</td>
<td>52</td>
<td>M20x1,5</td>
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</tbody>
</table>

Further designs available on request

C 15
Clamping sets type MAS BT 45°

<table>
<thead>
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<th>Item no.</th>
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<th>Pull-in force max. N</th>
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<td>861930</td>
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<td>SK 50</td>
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</table>

Further designs available on request

C 15
Clamping sets type ANSI 5.50-78 „CAT“

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Design</th>
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<th>d 2</th>
<th>Pull-in force max. N</th>
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<td>M10x1,5</td>
<td>6000</td>
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<td>756334</td>
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<td>27</td>
<td>M14x1,5</td>
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<td>SK 50</td>
<td>40</td>
<td>M16x1,5</td>
<td>20000</td>
</tr>
</tbody>
</table>

Further designs available on request
Clamping system with stationary release unit

APPLICATION
Suitable for SK spindles in higher speed range.

TYPE
Spring package with or without transmission gears and stationary release unit.

CUSTOMER BENEFITS
○ Slender design
○ No oil supply required in the rotating spindle part
○ Stationary release unit decoupled from spindle rotation, therefore low-wear

TECHNICAL FEATURES
- Release system designed individually for the spindle

Rotary feed-through for media supply of coolant and cleaning air
Stationary release unit particularly suitable for high speeds
Tool clamp with sturdy spring package
Individual draw bar extension for spindle length
Clamping set suitable for different tool holders

SK - Automatic tool clamping system

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SK - Automatic tool clamping system

Clamping system with integrated release hydraulic

APPLICATION
For SK spindles with compact design.

TYPE
Spring package with transmission gear and installed release hydraulics.

CUSTOMER BENEFITS
- No force acts on spindle bearing during the tool change
- Compact design and high pull-in forces due to integrated wedge gear

TECHNICAL FEATURES
- Release system designed individually for the spindle

Rotary feed-through for media supply of coolant and cleaning air

Tool clamp with spring package, wedge gear and hydraulic release mechanics

Clamping set suitable for different tool holders

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### Accessories SK - Automatic clamping systems

#### Accessories

![Image of a socket wrench with through-hole](image)

### C 15

**Socket wrench with through-hole**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Socket wrench</th>
<th>Size</th>
<th>Item No.</th>
<th>Hexagon wrench</th>
<th>Length l1 mm</th>
<th>Key width SW</th>
</tr>
</thead>
<tbody>
<tr>
<td>772214</td>
<td>SK 30</td>
<td>SK 30</td>
<td>367665</td>
<td></td>
<td>183</td>
<td>4</td>
</tr>
<tr>
<td>756393</td>
<td>SK 40</td>
<td>SK 40</td>
<td>802094</td>
<td></td>
<td>350</td>
<td>6</td>
</tr>
<tr>
<td>756396</td>
<td>SK 40 (without through-hole)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>760328</td>
<td>SK 50</td>
<td>SK 50</td>
<td>769078</td>
<td></td>
<td>400</td>
<td>8</td>
</tr>
<tr>
<td>747337</td>
<td>SK 60</td>
<td>SK 60</td>
<td>769078</td>
<td></td>
<td>400</td>
<td>8</td>
</tr>
</tbody>
</table>

![Diagram of socket wrench with through-hole](image)

*Optional image or diagram*
EXCHANGEABLE MEASURING ADAPTER FOR HSK, SK AND SPK

- HSK measuring adapter
- SK measuring adapter and draw bolts
- Basic unit
- Measurement of HSK interfaces
- Measurement of SK interfaces

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Ensuring consistently high machining quality has top priority. Due to the regular check of the tool clamping system with the pull-in force measuring device, F-senso spindle, changes in the clamping force are detected even before it has an effect on the machining quality.

ADVANTAGES AT A GLANCE

- Maximum flexibility due to exchangeable measuring adapter for all HSK and SK sizes
- Best user-friendliness due to intuitive operation and delivery in a practical case
- Simulation of the tool and spindle tolerances possible by a scaled ring

Interface can be screwed for different measuring adapters

Compact design with ergonomic handle shape

Rotatable ring with scale, for simulating the tolerances of the tool and spindle

Display with automatic storage of the maximum value and automatic switch-off
F-senso spindle 0-15 kN

APPLICATION
Measuring device for SK and HSK spindles of size SK 30; HSK (A) 25, 32, 40.

TYPE
Measuring range 0-15 kN.

CUSTOMER BENEFITS
- Maximum flexibility due to exchangeable adapters for all HSK and steep-taper sizes
- High user-friendliness due to intuitive operation and delivery in a practical case
- Simulation of the tool and spindle tolerances possible by a scaled ring

Delivery includes:
- F-senso spindle force measurement device
- Case with space for adapter
- Mounting bar
- Battery

C 15
Pull-in force measurement device F-senso spindle 0-15 kN

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Measuring range / Clamping force kN</th>
<th>Accuracy</th>
<th>Dimensions (base unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1266341</td>
<td>0-15 kN</td>
<td>0,25% (t.s.)</td>
<td>ca. Ø66 mm; L = 172 mm</td>
</tr>
</tbody>
</table>

C 15
Adaptor for HSK taper

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Size HSK-A/C/E/T</th>
<th>Size HSK-B/D/F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1255735</td>
<td>25</td>
<td>32</td>
</tr>
<tr>
<td>1255737</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>1255736</td>
<td>32</td>
<td>40</td>
</tr>
</tbody>
</table>

C 15
Adaptor for steep taper shank

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Matching adapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1255743</td>
<td>SK 30</td>
</tr>
</tbody>
</table>

A 34
Draw-in bolts

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Size</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>698582</td>
<td>SK 30</td>
<td>Draw-in bolts DIN 69872 A</td>
</tr>
<tr>
<td>698583</td>
<td>SK 30</td>
<td>Draw-in bolts DIN 69872 B</td>
</tr>
<tr>
<td>1297449</td>
<td>SK 30</td>
<td>Draw-in bolts ISO 7388/II-B</td>
</tr>
<tr>
<td>1297435</td>
<td>SK 30</td>
<td>Draw-in bolts MAS BT 1 (45°)</td>
</tr>
<tr>
<td>1297436</td>
<td>SK 30</td>
<td>Draw-in bolts MAS BT 2 (30°)</td>
</tr>
<tr>
<td>1297450</td>
<td>SK 30</td>
<td>Draw-in bolts ANSI B5.50</td>
</tr>
</tbody>
</table>

C 15
Calibration services F-senso spindle (including test certificate)

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>1295776</td>
<td>Calibration including test certificate (recommendation: annually)</td>
</tr>
</tbody>
</table>

www.eshop.roehm.biz
F-senso spindle 10-100 kN

APPLICATION
Measuring device for SK and HSK clamping systems of sizes SK 40, 50, 60; HSK (A) 50, 63, 80, 100, 125 and clamping head SPK.

TYPE
Measuring range 10-100 kN.

CUSTOMER BENEFITS
- Maximum flexibility due to exchangeable adapters for all HSK and steep-taper sizes
- High user-friendliness due to intuitive operation and delivery in a practical case
- Simulation of the tool and spindle tolerances possible by a scaled ring

Delivery includes:
- F-senso spindle force measurement device
- Case with space for adapter
- Mounting bar
- Battery

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Measuring range / Clamping force kN</th>
<th>Accuracy</th>
<th>Dimensions (base unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1255729</td>
<td>10-100 kN</td>
<td>0,25% (f.s.)</td>
<td>ca. Ø66 mm; L = 189 mm</td>
</tr>
</tbody>
</table>

C 15
Pull-in force measurement device F-senso spindle 10-100 kN

C 15
Adaptor for HSK taper

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Size HSK-A/C/E/T</th>
<th>Size HSK-B/D/F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1255738</td>
<td>50</td>
<td>63</td>
</tr>
<tr>
<td>1255739</td>
<td>63</td>
<td>80</td>
</tr>
<tr>
<td>1255740</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>1255741</td>
<td>100</td>
<td>125</td>
</tr>
<tr>
<td>1255742</td>
<td>125</td>
<td>160</td>
</tr>
</tbody>
</table>

C 15
Adaptor for steep taper shank

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Matching adapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1255744</td>
<td>SK 40</td>
</tr>
<tr>
<td>1255745</td>
<td>SK 50</td>
</tr>
<tr>
<td>1255746</td>
<td>SK 60</td>
</tr>
</tbody>
</table>

A 34
Draw-in bolts

<table>
<thead>
<tr>
<th>Design</th>
<th>SK-40</th>
<th>SK-50</th>
<th>SK-60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draw-in bolts DIN 69872 A</td>
<td>347325</td>
<td>367316</td>
<td>1297443</td>
</tr>
<tr>
<td>Draw-in bolts DIN 69872 B</td>
<td>698584</td>
<td>698586</td>
<td>1234343</td>
</tr>
<tr>
<td>Draw-in bolts ISO 7388-8-B</td>
<td>367569</td>
<td>698588</td>
<td>1297444</td>
</tr>
<tr>
<td>Draw-in bolts MAS BT 1 (45°)</td>
<td>1297437</td>
<td>698591</td>
<td>1297445</td>
</tr>
<tr>
<td>Draw-in bolts MAS BT 2 (30°)</td>
<td>1297438</td>
<td>698594</td>
<td>1297446</td>
</tr>
<tr>
<td>Draw-in bolts ANSI B5.50</td>
<td>620770</td>
<td>620771</td>
<td>1297447</td>
</tr>
</tbody>
</table>

C 15
Calibration services F-senso spindle (including test certificate)

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>1295776</td>
<td>Calibration including test certificate (recommendation: annually)</td>
</tr>
</tbody>
</table>

Measuring adapters for clamping heads SPK on request

www.eshop.roehm.biz
The built-in clamping head RESK is a universally usable interface for the easy and quick connection of machine components in a minimum amount of space, such as milling heads, machine tables and forming tools. It will convince you with its high pull-in forces and extremely compact design, as well as its process reliability.

ADVANTAGES AT A GLANCE

- Superior process reliability due to innovative design
- High pull-in forces with extremely compact design due to power transmission in the clamping set
- Integrated locking system maintains the clamping force without applied hydraulic pressure

Compact hydraulic piston for clamping and releasing

Draw bar with DLC coating

Collet chuck mechanically self-locking

Adapter ring for installation in the attachment part to be clamped
### APPLICATION
Change interface for machine components.

### TYPE
Clamping and unclamping are hydraulic. Mechanically locking. After clamping, the system remains securely locked, even without hydraulic pressure.

### CUSTOMER BENEFITS
- Maximum process reliability thanks to innovative design without wedge gear
- High pull-in forces with extremely compact design due to power transmission in the clamping set
- Integrated locking system maintains the clamping force, even without hydraulic pressure applied

### TECHNICAL FEATURES
- Centering must be ensured with additional elements, if required

---

**C 15**

**Built-in clamping head RESK**, change interface for machine components

<table>
<thead>
<tr>
<th>Item No.</th>
<th>1191061</th>
<th>1191063</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>D1 mm</td>
<td>Ø 36</td>
<td>Ø 55,5</td>
</tr>
<tr>
<td>D2 mm</td>
<td>Ø 38</td>
<td>Ø 58</td>
</tr>
<tr>
<td>G1 mm</td>
<td>M42x1,5</td>
<td>M62x1,5</td>
</tr>
<tr>
<td>G2</td>
<td>M42x1,5</td>
<td>M62x1,5</td>
</tr>
<tr>
<td>L1 mm</td>
<td>69,6</td>
<td>101</td>
</tr>
<tr>
<td>L2 mm</td>
<td>29</td>
<td>40</td>
</tr>
<tr>
<td>L4 mm</td>
<td>21</td>
<td>35,5</td>
</tr>
<tr>
<td>L5 mm</td>
<td>16</td>
<td>27</td>
</tr>
<tr>
<td>Clamping force kN</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>Operating pressure bar</td>
<td>100</td>
<td>80</td>
</tr>
</tbody>
</table>

---

**C 15**

**Adaptor ring**

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Size</th>
<th>D2</th>
<th>G2</th>
<th>L2</th>
<th>L4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1196524</td>
<td>30</td>
<td>Ø 38</td>
<td>M42x1,5</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>1195380</td>
<td>50</td>
<td>Ø 58</td>
<td>M62x1,5</td>
<td>27</td>
<td>35,5</td>
</tr>
</tbody>
</table>

---

**C 15**

**Adaptor ring**

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Size A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1296114</td>
<td>30</td>
</tr>
<tr>
<td>1296115</td>
<td>50</td>
</tr>
</tbody>
</table>
RÖHM clamping heads are especially suited for applications with pallet clamping, which require very high change precisions, such as machining centers and transfer lines.
RÖHM clamping heads can be used for all existing pallet clamps. They are particularly suitable for applications which require very high change precisions, such as machining centers or transfer lines. Integrated in the machine table, the clamping heads clamp workpiece pallets in a minimum amount of space with high precision in the axial run-out and positioning for maximum efficiency.

**ADVANTAGES AT A GLANCE**

- High change precision due to exact positioning of the pallet on the clamping tapers
- Force amplification of the collet chucks results in high clamping forces and high system rigidity
- Clamping force applied over long time period due to integrated spring package

Segment collet chuck with amplified force effect for high clamping forces and rigidity

Massive centering cone ensures high load capacity and precision

Safe clamping function due to multi-part spring package

Hydraulic piston for realising the clamping head
Spring operated clamping head

APPLICATION
On machine tables, when secure clamping of the pallet must be guaranteed, even without hydraulic pressure applied.

TYPE
Spring-actuated clamping - hydraulic release.

CUSTOMER BENEFITS
- High system rigidity due to stable design due to the connecting ribs between the individual spring packages
- Hydraulic pressure is only required for release
- Pull-out safety device without additional elements
- Spring-actuated locking cover

TECHNICAL FEATURES
- Compact design
- More powerful effect of the collet chuck
- Air sensing possible

C 15
Spring operated clamping head for clamping pallets, hydraulic release

<table>
<thead>
<tr>
<th>Size A</th>
<th>100</th>
<th>110</th>
<th>125</th>
<th>140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contents of delivery</td>
<td>set</td>
<td>set</td>
<td>set</td>
<td>set</td>
</tr>
<tr>
<td>B</td>
<td>86</td>
<td>92</td>
<td>105</td>
<td>118</td>
</tr>
<tr>
<td>C</td>
<td>70</td>
<td>76</td>
<td>85</td>
<td>96</td>
</tr>
<tr>
<td>D</td>
<td>19</td>
<td>19</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>E</td>
<td>70</td>
<td>75</td>
<td>85</td>
<td>95</td>
</tr>
<tr>
<td>H</td>
<td>90</td>
<td>96</td>
<td>93</td>
<td>104</td>
</tr>
<tr>
<td>I</td>
<td>43</td>
<td>49</td>
<td>43</td>
<td>42</td>
</tr>
<tr>
<td>K</td>
<td>-</td>
<td>9,5</td>
<td>9,5</td>
<td>9,5</td>
</tr>
<tr>
<td>L</td>
<td>11</td>
<td>15</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>M</td>
<td>22</td>
<td>23</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>O</td>
<td>6,6</td>
<td>9</td>
<td>9</td>
<td>14</td>
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<tr>
<td>P</td>
<td>14</td>
<td>15</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>D mm</td>
<td>7</td>
<td>8,5</td>
<td>8,5</td>
<td>13</td>
</tr>
<tr>
<td>Piston area: releasing cm²</td>
<td>28,3</td>
<td>33,18</td>
<td>44,1</td>
<td>56,7</td>
</tr>
<tr>
<td>Min. release pressure bar</td>
<td>-</td>
<td>50</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Pull-in force N</td>
<td>15000</td>
<td>20000</td>
<td>20000</td>
<td>40000</td>
</tr>
<tr>
<td>Blast-air pressure bar</td>
<td>10</td>
<td>10</td>
<td>10</td>
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</tr>
<tr>
<td>Weight kg</td>
<td>2,5</td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

Sets can be aligned in height on request

Accessories spring operated clamping head

A 34
Draw-in bolts for clamping heads

| Item No. | For clamping head size | Size A | Contents of delivery | B | C | D | E | F | G | H | L | Key-width SW |
|----------|------------------------|-------|----------------------|---|---|---|---|---|---|---|---|---|----------------|
| 1243664  | M18x1,5                | 100   | piece                | 19| 25,4| 15,5| 23,7| 21| 19| 28,2| 49| 22 |
| 1243665  | M18x1,5                | 110   | piece                | 19| 25,4| 19  | 25,1| 23| 20| 30,3| 53| 22 |
| 850094   | M20                    | 125   | piece                | 21| 34  | 19  | 29  | 30| 23| 35  | 65| 30 |
| 1116384  | M24                    | 140   | piece                | 25| 38  | 23  | 34,7| 40| 32| 40  | 80| 30 |

C 15
Mounting flange for clamping heads

<table>
<thead>
<tr>
<th>Item No.</th>
<th>For clamping head size</th>
<th>Size A</th>
<th>Contents of delivery</th>
<th>B</th>
<th>C</th>
<th>C</th>
<th>E</th>
<th>H</th>
<th>I</th>
<th>M</th>
<th>O</th>
<th>P</th>
<th>Q mm</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>1176444</td>
<td>100</td>
<td>105</td>
<td>Satz</td>
<td>90</td>
<td>80</td>
<td>6x60°</td>
<td>64</td>
<td>20</td>
<td>9</td>
<td>27,2</td>
<td>6,6</td>
<td>11</td>
<td>6,8</td>
<td>33</td>
</tr>
<tr>
<td>1176382</td>
<td>110</td>
<td>110</td>
<td>Satz</td>
<td>90</td>
<td>85</td>
<td>6x60°</td>
<td>68</td>
<td>20</td>
<td>7,5</td>
<td>29,06</td>
<td>6,6</td>
<td>11</td>
<td>6,8</td>
<td>35,5</td>
</tr>
<tr>
<td>1296089</td>
<td>125</td>
<td>125</td>
<td>Satz</td>
<td>106</td>
<td>88</td>
<td>4x60°</td>
<td>85</td>
<td>85</td>
<td>32,5</td>
<td>18,5</td>
<td>25</td>
<td>9</td>
<td>15</td>
<td>9</td>
</tr>
<tr>
<td>1296090</td>
<td>140</td>
<td>135</td>
<td>Satz</td>
<td>116</td>
<td>98</td>
<td>-</td>
<td>95</td>
<td>38,5</td>
<td>23,5</td>
<td>30</td>
<td>9</td>
<td>15</td>
<td>9</td>
<td>45</td>
</tr>
</tbody>
</table>

Further details on request
Hydraulic clamping head

APPLICATION
On machine tables with constant hydraulic pressure applied.

TYPE
Clamping and release are hydraulic.

CUSTOMER BENEFITS
- High system rigidity due to stable design due to the connecting ribs between the individual spring packages
- Simple, reliable design
- Spring-actuated locking cover

TECHNICAL FEATURES
- Compact design
- More powerful effect of the collet chuck
- Air sensing possible

C.15
Hydraulic clamping head for clamping pallets

<table>
<thead>
<tr>
<th>Size A</th>
<th>110</th>
<th>125</th>
<th>140</th>
<th>148</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contents of delivery</td>
<td>piece</td>
<td>piece</td>
<td>piece</td>
<td>piece</td>
</tr>
<tr>
<td>B</td>
<td>92</td>
<td>105</td>
<td>118</td>
<td>125</td>
</tr>
<tr>
<td>C</td>
<td>75</td>
<td>85</td>
<td>96</td>
<td>106</td>
</tr>
<tr>
<td>D</td>
<td>20</td>
<td>20</td>
<td>29,5</td>
<td>29,5</td>
</tr>
<tr>
<td>E</td>
<td>75</td>
<td>85</td>
<td>98</td>
<td>100</td>
</tr>
<tr>
<td>H</td>
<td>120</td>
<td>106,5</td>
<td>121,5</td>
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<td>58</td>
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<td>L</td>
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<td>15</td>
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<td>M</td>
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<td>8,5</td>
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<td>Pull-in-force N</td>
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<td>Weight kg</td>
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<td>6</td>
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Sets can be aligned in height on request

Accessories hydraulic clamping head

A.34
Draw-in bolts for clamping heads

<table>
<thead>
<tr>
<th>Item No.</th>
<th>For clamping head size</th>
<th>Size A</th>
<th>Contents of delivery</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>L</th>
<th>Key-width SW</th>
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<tr>
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<td>piece</td>
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<td>piece</td>
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<td>41,5</td>
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<td>33,5</td>
<td>40</td>
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C.15
Mounting flange for clamping heads

<table>
<thead>
<tr>
<th>Item No.</th>
<th>For clamping head size</th>
<th>Size A</th>
<th>Contents of delivery</th>
<th>Parti- tions</th>
<th>C</th>
<th>E</th>
<th>H</th>
<th>I</th>
<th>M</th>
<th>O</th>
<th>P</th>
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<td>125 125</td>
<td>piece</td>
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<td>4x90°</td>
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<td>39</td>
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<td>497214</td>
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<td>piece</td>
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<td>39,9</td>
<td>15</td>
<td>15</td>
<td>9</td>
<td>50,5</td>
</tr>
</tbody>
</table>

Further details on request
The headquarters: our main plant in Sontheim/Brenz

The RÖHM main plant is located in Sontheim/Brenz. In this ultra-modern production facility comprising 41,000 m² optimum conditions have been achieved in order to solve the extensive range of discerning construction and production tasks making the company even better, faster and more efficient in the future.

Sontheim/Brenz

Sontheim  I  All national and international activities are planned and coordinated at the administrative headquarters in Sontheim. Thanks to the excellent infrastructure and transport routes, this location is ideal for a company relying on perfect product quality as well as maximum flexibility. Furthermore, the region around Sontheim offers another key basis for the success of our company: it is rich in quality awareness and motivated employees with the result that we are ideally prepared for the challenges of the future. The main plant uniquely unites mass production, serial production and customised individual production under a single roof.
Such strong growth on the part of the RÖHM Group is also obviously associated with higher requirements on development and production capacities. The demands of today and tomorrow can be complied with the two facilities in Dillingen and St. Georgen.

Plant Dillingen/Danube | This branch plant in Dillingen was put into operation by the RÖHM Group as early as 1953. Thanks to extremely positive development, the plant is subject to constant expansion and modernisation. For this reason, new modern production facilities were built in 1982 and 1991. In 2007 RÖHM built a new production hall for two portal turning and milling machines. This enables machining of workpieces up to 4 metres in length which will secure a leading market position for RÖHM in the future. More than 300 employees are primarily involved in engineering and manufacturing lathechucks, machine vices and special clamping equipment for turning and milling machinery as well as for machining centres.

Engineering and sales department St. Georgen | Apart from standard mandrels, tailor-made solutions for a wide variety of requirements are also manufactured here in this small but accomplished high-tech forge. RÖHM retains mechanical or power-operated mandrels, sliding jaw mandrels and hydraulic mandrels for its customers for tensioning workpieces in drill holes or interior contours.
Always close to our customers.
With locations all around the world.

Customer orientation at RÖHM has less to do with marketing than with attitude. We consider customer proximity as an intensive dialogue with our partners as well as direct presence on key international markets.
Your contacts at RÖHM

Manufacturing and distribution bases

**Germany:**
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Fax 0049 73 25 – 16 510
info@roehm.biz
www.roehm.biz

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BP 90204
F-60744 Saint Maximin Cedex
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Fax 0033 – 34 64 00 68
fr.roehm@roehm.biz
www.rohm.fr

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roehmch@roehm-spanntechnik.ch
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www.roehm-iberica.es

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roehmpolska@roehm.biz

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Tel 0036 – 209 – 324 597
jozsef.alker@roehm.biz

Presence on all continents from A for Austria to V for Vietnam. You can receive the contact information of our worldwide representations easily through www.roehm.biz.
1. Our Terms of Sale shall apply exclusively; we do not recognise contradictory terms and conditions or terms and conditions which deviate from our Terms of Sale unless we have separately confirmed in writing. Only with the signed contract will we carry out the delivery to the buyer without reservation in the knowledge of contradictory terms and conditions of the buyer or terms and conditions which deviate from our Terms of Sale.

2. Our Terms of Sale shall only apply towards an entrepreneur within the meaning of Section 14 BGB [German Civil Code].

3. Services and delivery shall apply with precedence over these Terms of Sale in the respective valid version in cases, which comprise the service offer of ROHM GmbH.

4. Our offers are always to be understood as invitation to offer and are therefore without obligation. If the respective terms and conditions of the customer have not been expressly accepted in writing, the contract shall only be concluded with our written confirmation and in line with its contents and – if a written confirmation is missing – by the service/delivery. If a delivery/service is carried out immediately without a confirmation then the invoice shall at the same time be deemed as an order confirmation.

5. Costs for the production of drawings for special constructions are to be borne by the contract partner as the offer does not lead to an order for reasons, for which we are not responsible.

6. All details concerning weights, dimensions, services and technical data, which are comprised in printed material, catalogues, price lists or in other contractual documents, merely serve for purposes of information and are only binding insofar as they are explicitly described as binding.

7. We reserve the right to make construction and form changes to the object of contract insofar as no changes are made hereto, which are deemed unreasonable for the orderer.

8. The documentation consists of the compilation drawing, the BOM with marking of the part numbers, and the spare parts list (if they have not been expressly requested in writing). The contract shall only be concluded with our written confirmation and in line with its contents and – if a written confirmation is missing – by the service/delivery. If a delivery/service is carried out immediately without a confirmation then the invoice shall at the same time be deemed as an order confirmation.

9. The corresponding measurement methods for tests, with which certain temperatures, times and other measured or control values should apply, must be stipulated before start of delivery and recognised by both parties as assented assembly instructions upon request. Respectively in German and/or, upon request, in English. This free documentation shall be supplied in a digital form. The PDF format shall apply to drawings, BOMs and texts other than hereinafter text beyond this, which are separately requested or in a special agreement. The documents may not be reproduced in full or in part, not made accessible to third parties or used for any other purpose apart from that for which they were handed over to us without our prior written authorization.

10. The start of the delivery deadline stated by us presumes the clarification of all technical questions. Delivery dates stated by us are – insofar as not explicitly agreed or determined otherwise by us – in each case subject to availability.

11. The buyer will be obliged to purchase the object of delivery in readiness for delivery, as well as not before the receipt of the agreed down payment.

12. The buyer shall ensure that the object of delivery is suitably packed and will have left the plant by the time it expires or notification has been given that the object is ready for delivery. The right to correct the timely and correct self-delivery. If the orderer changes his order with regard to parts of the delivery then the delivery deadline shall begin to apply anew again with the confirmation of the change.

13. The buyer undertakes to reimburse us the court and out-of-court costs of an action according to Section 771 BGB, the buyer will be liable for the loss incurred to us. The buyer is supposed to purchase the object of delivery in readiness for delivery.
5. In case of breaches of duty by the buyer, in particular with default of payment we are entitled to cancel and to take the goods over. The taking back of goods respectively the assertion of the retention of title and the cancellation of the subscription or an attachment of the reserved goods by us shall not represent a cancellation of the contract unless we had explicitly declared this.

6. If he has performed the object of purchase in the ordinary course of business then he shall hereby now already assign all claims to us in the amount of the final invoice amount (including value added tax) of our claim, to which he is entitled from the resale against the buyer or any other buyer, irrespectively whether the object of purchase has been resold without or after processing. The buyer shall also remain authorized to collect this claim after the assignment. Our authorization to collect the claim ourselves shall remain unaffected until we have declared that we will not collect the claim as long as the buyer satisfies his payment obligations from the collected proceedings, is not in default of payment and in particular no application has been filed for the opening of insolvency proceedings. The payments have been suspended. If this is however the case we can request that the buyer announces the assigned claims and their debtors to us, provides us all details which are necessary for the collection, hands over the associated documents and informs the debtors (third parties) of the assignment.

7. The processing or conversion of the object of purchase by the buyer is always carried out on our behalf. If the object of purchase is processed with other objects, which do not belong to us, then we shall acquire the co-ownership to the new object in the ratio of the value of the object of purchase (end invoice amount, including value added tax) to the other processed objects at the time of the processing. Incidentally, the same shall also apply for objects acquired by us as to the object purchased in case the use of the co-ownership is suspended by reservation.

8. If the object of purchase is inseparably mixed with other objects that do not belong to us but it is possible to separate the object of purchase or the other objects, then we shall acquire the co-ownership to the new object in the ratio of the value of the object of purchase (end invoice amount, including value added tax) to the other mixed objects at the time of mixing. If the mixing is carried out by the buyer according to the mixing instructions the buyer has to be seen as the main object then it shall be deemed as agreed that the buyer assigns us the pro rata co-ownership. The buyer shall store the thus produced sole ownership or co-ownership on our behalf.

§ 8 Quality defects

We shall be liable for quality defects as follows:

1. All those parts or services are to be subsequently improved free of charge at our choice.

2. The subsequent fulfilment the buyer can – irrespectively of possible claims for damages – cancel the contract or reduce the remuneration. The buyer can only request reimbursement for fruitless expenses if we are responsible for the defect owing to willful intent or gross negligence.

3. Defects shall not exist with an only insignificant deviation from the agreed conditions, with an only insignificant impairment to the usability, with natural wear and tear or damages, which are caused after the risk has passed as a result of faulty or negligent treatment, with changes of design, which are agreed, or with the operating equipment or owing to special external influences, which are not presumed according to the contract, as well as with software faults that cannot be reproduced. If improper changes or repair work is carried out by the buyer, we are not liable for the damage. If the defects are unjustifiably reported we are entitled to request reimbursement of the expenses incurred to us by the buyer.

4. We are first of all always to be granted the opportunity for the subsequent fulfilment within a reasonable period of time.

5. If the subsequent fulfilment fails the buyer can – irrespectively of possible claims for damages – cancel the contract or reduce the remuneration. The buyer can only request reimbursement for fruitless expenses if we are responsible for the defect owing to willful intent or gross negligence.

6. Defects shall not exist with an only insignificant deviation from the agreed conditions, with an only insignificant impairment to the usability, with natural wear and tear or damages, which are caused after the risk has passed as a result of faulty or negligent treatment, with changes of design, which are agreed, or with the operating equipment or owing to special external influences, which are not presumed according to the contract, as well as with software faults that cannot be reproduced. If improper changes or repair work is carried out by the buyer, we are not liable for the damage. If the defects are unjustifiably reported we are entitled to request reimbursement of the expenses incurred to us by the buyer.

7. Goods may in each case only be carried out with the explicit consent of the supplier.

8. Claims of the buyer owing to the expenses, which are necessary for the purpose of the infringement of the property right are excluded insofar as he is responsible for the infringement of property right caused by special stipulations of the buyer, due to an application that is not foreseeable for us or by the fact that the delivery is changed by the buyer or is used together with products not delivered by us.

9. In the event of infringements of property rights the provisions of Sub clauses 8.4, 8.5 and 8.9 shall apply accordingly to the claims of the buyer regulated in Sub clause 13.

10. Further or other claims of the buyer against us or our vicarious agents owing to a defect of title than those regulated in this Sub clause 9 are excluded.

§ 10 Joint and several liability

1. Claims of the buyer for damages – irrespective of the legal nature of the asserted claim – are excluded.

2. Excluded from this are:
   a) Damages owing to the breach of essential contractual obligations. Deemed as essen-
   tial are such contractual obligations, the fulfilment of which makes the proper execution
   of the contract possible at all and on the compliance with which the contractual partner
   may as a rule rely and depends.
   b) Damages from the injury to life, the body or the health if we are responsible for
   the breach of obligation.
   c) For other damages, which are due to a willful or grossly negligent breach of duty,
   whereby we are the breaches of duty is deemed equivalent to that of our legal representatives
   or vicarious agents.

3. Liability according to the ProdHaftG (German Product Liability Act)

   a) in case of the buyer the burden of proof for the disadvantage of the buyer is not associated
   with a recognition of an infringement of a property right.

4. Claims of the buyer are further excluded insofar as the infringement of property right is
   caused by special stipulations of the buyer, due to an application that is not foreseeable
   for us or by the fact that the delivery is changed by the buyer or is used together with
   products not delivered by us.

5. In the event of infringements of property rights the provisions of Sub clauses 8.4, 8.5
   and 8.9 shall apply accordingly to the claims of the buyer regulated in Sub clause 13.

6. Further or other claims of the buyer against us or our vicarious agents owing to a defect
   of title than those regulated in this Sub clause 9 are excluded.

§ 11 Obligations of the buyer to provide assistance

1. Assistance services of the buyer, which are explicitly or tacitly agreed within the
   framework of the contract, shall be carried out without a special remuneration unless
   explicitly otherwise agreed.

2. The buyer is obliged to inform us about all facts in time, from which it can be derived
   that goods and products in stock in our company, which we have made available with
   regard to the production capacities reported to us, cannot be used or not used in full.

3. The buyer guarantees that the products supplied by him for processing are suitable for
   the purpose. We are not obliged to examine the products supplied by the buyer for the
   condition and the suitability for the further processing. Within the framework of ongoing
   business relationships as well as if an object for processing has been regularly inspected,
   tested and accepted, the buyer undertakes to inform us of each product change without
   request in writing. In the case of regular processing of objects the buyer is further obliged
   to examine the object that is to be processed by us for deviations and changes for each
   change to the production conditions and in his company, in particular with the exchange
   of tools, machines or with the introduction of new production processes and to notify us
   of such changes and modifications in writing.

4. We do not have to examine the instructions of our buyers, the material selection or
   other regulations, which are made by our buyer, for their accuracy.

5. Therefore, the buyer has to examine all instructions, which he issues as well as the
   quality of the materials stipulated or made available to us for the compliance with the
   statutory and technical regulations.

6. If the buyer is in default with regard to his obligation for provision or to provide
   assistance after a written warning we are entitled to the statutory rights.

7. Goods may in each case only be carried out with the explicit consent of the supplier.
   The return must be carried out carriage paid, by stating the order number and delivery
   details of the original packaging or the condition in the original condition, undamaged
   condition. We will charge 20 % of the goods value, at least however EUR 50.00 plus the
   applicable rate of value added tax for the processing work relating to the return.

8. If the buyer is in default with regard to his obligation for provision or to provide
   assistance after a written warning we are entitled to the statutory rights.

§ 12 Place of performance and place of jurisdiction/miscellaneous

1. The place of performance and place of payment is the registered seat of our
   company in Sontheim/Brenz.

2. The law of the Federal Republic of Germany is to be exclusively applied to the
   contractual relationship. The application of the Convention of the United Nations of
   11 April 1980 concerning Contracts for the International Sale of Goods (CISG „Law
   governing the sale of goods of Vienna“) is excluded.

3. With all disputes ensuing from the contractual relationship, if the orderer is a
   member of a legal entity under public law or a special fund under public law, the
   action is to be filed at the court that has jurisdiction for our headquarters. We are also
   entitled to file action at the headquarters of the orderer.

4. We store your data according to Section23 Federal Data Protection Act.

RÖHM GmbH
89565 Sontheim (Germany)
Status: October 2015
1. Validity

1.1 These ASB form the basis for all business transactions with our customers, which refer to the repair or maintenance of the products manufactured or delivered by us insofar as these transactions concern entrepreneurs within the meaning of Section 14 BGB [German Civil Code].

1.2 Contradictory, supplementary contractual terms and conditions of the customer or the customer’s order confirmations shall not be taken into account and shall be without effect.

1.3 Within the framework of a regular business relationship these ASB will also be valid after the effective inclusion for the first time if we do not explicitly refer hereto in follow-up transactions.

1.4 Insofar as the ASB do not include any regulations, the General Terms of Sale and Delivery of RÖHM GmbH shall apply.

2. Offer and conclusion of the contract

2.1 The offer is only expressly marked as binding – without obligation and merely to be understood as invitation to friendly offer. The right is reserved to an interim sale.

2.2 Contracts with us will only be conclusively decided with our written acceptance declaration.

2.3. If the customer of maintenance or repair was not determined by us then the customer shall point out existing industrial property rights with regard to the object if we are not responsible for any fault the customer shall indemnify us from possible claims of third parties from industrial property rights.

2.4 Insofar as we are responsible for negligence Par. 2.3 shall apply accordingly.

3. Contractual parts

The offer and the product list available to us and the customer are a part of the contract.

4. Technical documents and plans

4.1 All rights to our offer documents as well as documents, which have been handed over to the customer remain reserved.

4.2 The customer shall recognise our rights and will not reproduce the documents in full or in part, not make these accessible to third parties or use these for any other purpose than the order of the contract unless we have granted our written prior authorisation.

5. Scope of services, maintenance, condition of device, repair

5.1 Decisive for the scope of our delivery and service is our binding offer or – if such is not available – an estimate of acceptance. Both individual services can be agreed, which are principally to be remunerated according to Subclause 12.1, as well as the service packages described under Subclause 5.2, which are to be remunerated according to 12.2, respectively 12.3.

5.2 The following activities are a part of our service obligation with the processing of service packages:

5.2.1 Commissioning of service

- skilled execution of the necessary commissioning of the clamping device and control at the place of installation in line with the regulations of the manufacturer.
- assembly work over the course of the commissioning together with the machine manufacturer.
- first instructions and operator training
- we will invoice separate requests for the work with regard to the maintenance and use as separate work.

5.2.2 Inspection service

Skilled execution of the necessary inspection of the clamping device and control at the place of installation in line with the regulations of the manufacturer. Insofar as additional maintenance or repairs become necessary at the customer’s request or owing to special loads, these are to be remunerated separately by the customer.

5.2.3 Maintenance service

Skilled execution of the necessary maintenance of the clamping device and control at the place of installation in line with the regulations of the manufacturer. Insofar as additional maintenance or repairs become necessary at the customer’s request or owing to special loads, these are to be remunerated separately by the customer.

5.2.4 Repair package

The purchase or conclusion of a service package after the expiry of the warranty period the service obligation of RÖHM shall only refer to such products, which are capable of use and free of defects at the time of the conclusion or purchase of the service package. This is to be ensured by an inspection of the products; if defects are determined these are to be remedied before the start of validity of the service package by a necessary repair liable to costs; this repair is not part of the service package.

5.4 Our service obligation shall not include carrying out work on products and accessories, which were (were) not delivered by us.

5.5 Our service obligation shall lapse if the product was not subjected to the function and safety tests according to the details in the operating instructions or third parties have caused damages to the products concerned without our prior written consent. Unless this work has no disadvantageous influence on the provision of our service. The same shall apply if the products have been damaged due to causes for which we are not responsible, for example by water, fire, stroke of lightning or other implications of force majeure as well as with improper treatment by the customer or third parties.

5.6 Depending on the use and type of the product an overhaul may be necessary after long-term use. Costs of an repair exceed the current value of the product. Overhaul within this meaning is also the necessary new acquisition of a product in the absence of available spare parts. Overhauls are not part of the service obligation without their free consent of the opinion that a products that is to be maintained by us under a service package requires an overhaul, we will inform the customer hereof by stating the current value estimated by us and submit an offer for the overhaul to the customer with the calculation according to 12.1.

6. Repair/service that cannot be carried out

6.1 The services provided concerning the details of a cost estimate as well as the further incurred and to be proven work (faulty search time equal to working hours) will be invoiced at our usual rates, which cannot be carried to each lorry or for the product RÖHM GmbH is not responsible, in particular because the fault for which a complaint will be made did not occur during the inspection, spare parts cannot be procured, the customer culpably missed the agreed date or the contract was terminated during the execution.

6.2 The object of repair only needs to be restored to the original condition again at the explicit request of the customer against reimbursement of the costs unless the undertake work was not necessary.

6.3 In case of a repair that cannot be carried out RÖHM GmbH shall not be liable subject to sentence 2 for damages to the object of repair, the breach of contractual secondary obligations and for damages, which were not suffered to the object of repair itself, no matter which legal ground gives rise to such damage. The other hand, will liable in case of wilful intent, with gross negligence of the owner / the executive bodies or executives as well as with the culpable breach of essential contractual duties. Such contractual obligations are determined essential, the fulfilment of which makes the proper execution of the contract possible at all and the compliance with which the contractual partner may as a rule rely and depend upon.

7. Duration of the service

7.1 The details with regard to the duration of repairs and services are based on estimates and merely serve as information and a first estimate by the customer. They are therefore not binding if they have not been explicitly marked as binding.

7.2 In case of subsequent maintenance and additional work necessary with additional repair work the agreed repair deadline shall be extended accordingly.

8. Obligations to provide assistance of the customer

8.1 The customer has to draw our attention to the statutory, official and company safety and other regulations applicable at the place of destination of our delivery and service, which refer to the delivery, the assembly and the operation.

8.2 The customer will inform us with or immediately after his order about possible special features of the place of installation, which may have an implication on the proper function of the products, in particular about the structural condition and the concrete operating environment.

8.3 The customer shall ensure – also during the warranty period according to Subclause 17.5 – a regular and skilled maintenance of the products delivered by us asfar as this was not taken over by us as a part of the contract.

8.4 The customer shall dispose of the goods delivered by us at his own responsibility and at his own costs according to the respective valid regulations. We are not obliged to create feasibility for the delivery. This would have been stipulated by law.

8.5 The customer has to support the repair / maintenance personnel with the execution of the repair at his own costs.

8.6 The customer has to take the special measures, which are necessary for the protection of persons and objects at the workplace. He also has to inform the repair managers about existing special safety regulations insofar as these are of significance for the repair personnel. He shall inform us about the existing special safety regulations of such personnel. In case of serious breaches he can refuse the infringing party access to the repair location by mutual agreement with the repair manager.

9. Obligations of the customer to provide assistance in case of maintenance

9.1 The customer has to draw our attention to the statutory, official and company safety and other regulations applicable at the place of destination of our delivery and service, which refer to the delivery, the assembly and the operation.

9.2 The customer will inform us with or immediately after his order about possible special regulations and other regulations applicable at the place of destination of our delivery and service, which refer to the delivery, the assembly and the operation.

9.3 The customer will provide us with or immediately after his order about possible special features of the place of installation, which may have an implication on the proper function of the products, in particular about the structural condition and the concrete operating environment.

9.4 Our service obligation shall not include carrying out work on products and accessories, which were (were) not delivered by us.

9.5 The customer shall refrain from commission third parties with the services during the warranty period.

9.6 The customer shall provide the goods delivered by us in a timely manner and at his own costs according to the respective valid regulations. We are not obliged to create feasibility for the delivery. This would have been stipulated by law.

9.7 The technical assistance of the orderer must guarantee that the service can be started immediately after the arrival of our personnel and carried out without delay until the acceptance by the orderer. Insofar as special plans or instructions of RÖHM are necessary, RÖHM shall make these available to the orderer in time.

9.8 The customer is obliged to provide the reasonable and necessary technical assistance free of charge, in particular:

a. Provision of the necessary, suitable assistants in the number that is necessary for the repair and for the necessary time, the assistants have to follow the instructions of the repair manager. We do not assume any liability for the assistants, if a defect or damage were caused by the assistants owing to instructions of the repair manager, then the regulations of Sections 17 and 18 shall apply accordingly.

b. Undertaking of all construction, bedding and scaffolding work including the procure of the necessary building materials.

c. Provision of the necessary devices and heavy tools as well as the necessary commodities and required materials.

d. Provision of heating, lighting, operating power, water, including the necessary connection.

e. Provision of necessary, dry rooms, which can be locked for the storage of the tool for the repair personnel.

f. Provision of the repair place and materials against harmful influences of all kinds, cleaning of the repair place.

g. Provision of suitable, theft-proof recreation rooms and work rooms (with heating, lighting, ventilation equipment, sanitary facilities and First Aid kits for repair personnel).

h. Provision of the materials and undertaking of all other acts, which are necessary for the adjustment of the object of repair and for carrying out a testing that is envisaged as per contract.

i. The technical assistance of the orderer must guarantee that the service can be started immediately after the arrival of our personnel and carried out without delay until the acceptance by the orderer. Insofar as special plans or instructions of RÖHM are necessary, RÖHM shall make these available to the orderer in time.

10. Obligations of the customer to provide assistance in case of maintenance

10.1 The products are to be used as intended and according to their protection type and in line with the operating instructions together with their annexes.

10.2 In case of an agreement of one of the service packages described in Subclause 5, the customer will place the products that are to be installed, maintained or repaired into a suitable condition, which is not in such a state that it is impossible to use these products according to their protection type and in line with the operating instructions together with their annexes.

10.3 The customer has to draw our attention to the statutory, official and company safety and other regulations applicable at the place of destination of our delivery and service, which refer to the delivery, the assembly and the operation.

10.4 Our service obligation shall not include carrying out work on products and accessories, which were (were) not delivered by us. The services provided concerning the details of a cost estimate as well as the further incurred and to be proven work (faulty search time equal to working hours) will be invoiced at our usual rates, which cannot be carried to each lorry or for the product RÖHM GmbH is not responsible, in particular because the fault for which a complaint will be made did not occur during the inspection, spare parts cannot be procured, the customer culpably missed the agreed date or the contract was terminated during the execution.

10.5 The object of repair only needs to be restored to the original condition again at the explicit request of the customer against reimbursement of the costs unless the undertake work was not necessary.
10.2 The customer undertakes to accept our services under this contract immediately after the report that they have been completed. Upon request he has to declare their acceptance in writing towards our employees or vicarious agents insofar as there is no essential defect existing in the object of the service report.

10.3 Our services shall be deemed as accepted free of defects with the re-commencement of the operational use of the maintained or repaired product, in particular for production purposes. This shall not apply if the objects have been previously reported by the customer.

11. Cost details and cost estimate
11.1 The creation of the cost estimates is liable to costs if the execution of the repair is not approved.

11.2 The costs for a cost estimate amount to the flat rates fixed in the current price list.

11.3 If the repair cannot be carried out at these costs or if our employees or vicarious agents consider the execution of additional work to be necessary during the repair the customer's consent is to be obtained if the stated costs are exceeded by more than 15%.

12. Remuneration, maturity and terms of payment
12.1 Insofar as not otherwise agreed and there is no warranty clause our services are to be remunerated according to the actual work requirement pursuant to our respectively valid general price lists. The time required by our employees shall be settled in time sections of 15 min. In addition to the time required for the work that is to be performed in these cases the customer will pay the travelling and waiting times, overtime surcharges, expenses, travelling and accommodation costs as well as the costs of spare parts, materials subject to wear and tear and consumables and replacement part sets according to our prices lists or in line with the offer.

12.2 Insofar as a flat rate remuneration was agreed for a service package, our work and travelling costs and expenses are thus covered, not however the costs for waiting times, overtime at the customer's request, spare parts, materials subject to wear and tear and consumables, replacement part sets as well as other accessories. Our work for applicable necessary repairs is to be remunerated separately by the customer according to Subclause 12.1.

12.3 The prices for our services can be derived from the respective price list valid upon completion of the ones of the contract and are deemed ex works or the delivery point. The calculation basis for the remuneration is the one-shift operation, i.e. a use of the products up to 160 hours in a calendar month. A surcharge to the list price of 50% is charged for the two-shift operation and 100% for the three-shift operation. The above two rates shall only apply to the service packages described under Subclause 5. If the customer requests assignments outside of our normal working hours (Mo - Fr, 6:30 am - 6:30 pm, a max. of 7 h per day) surcharges will be calculated according to the respective valid price list.

12.4 If our personnel and material costs are increased then we are entitled to adjust the contractual prices pursuant to the first year up to a maximum of 5% above the price of the previous year. Price changes will be announced to the customer at least one month before the new contractual prices come into force. The customer is entitled to terminate the contract effective as of the time at which the new price would become valid for him for the first time.

13. Transport and insurance with the repair in the plant of RÖHM GmbH
13.1 The object for repair will be delivered by the customer to us at his costs together with the repair and service form and after execution of the repair collected by the customer again or return to him at the customer's costs.

13.2 The customer shall bear the risk of transport.

13.3 At the customer's request a shipment carried out by us will be insured at the customer's costs. The damage during the transportation occurring up to our plant. The calculation basis for the insurance is the one-shift operation, i.e. a use of the products up to 160 hours in a calendar month. A surcharge to the list price of 50% is charged for the two-shift operation and 100% for the three-shift operation. The above two rates shall only apply to the service packages described under Subclause 5. If the customer requests assignments outside of our normal working hours (Mo - Fr, 6:30 am - 6:30 pm, a max. of 7 h per day) surcharges will be calculated according to the respective valid price list.

13.4 At the customer's request a shipment carried out by us will be insured at the customer's costs. The damage during the transportation occurring up to our plant. The calculation basis for the insurance is the one-shift operation, i.e. a use of the products up to 160 hours in a calendar month. A surcharge to the list price of 50% is charged for the two-shift operation and 100% for the three-shift operation. The above two rates shall only apply to the service packages described under Subclause 5. If the customer requests assignments outside of our normal working hours (Mo - Fr, 6:30 am - 6:30 pm, a max. of 7 h per day) surcharges will be calculated according to the respective valid price list.

13.5 In case of delay of the customer with the take-over we can charge a storage fee for the storage in our plant. The object of repair can also be stored otherwise at our discretion. The costs and risk of the storage during the delay shall be for the expense of the customer.

14. Repair deadline
14.1 The details concerning the repair deadlines are based on estimates and merely serve for the purpose of information and first orientation. They are therefore not binding unless this is explicitly agreed.

14.2 As a rule the binding repair deadline, which must be described as binding, can only be requested by the customer if the scope of the work has been precisely determined.

14.3 The binding repair deadline will have been adhered to if by the time that it expires the object of repair is ready for take-over by the customer, in the event of a contractual negligently envisaged testing ready for its execution.

14.4. In case of a newly placed additional and extension orders or with necessary additional repair work the agreed repair deadline will be extended accordingly.

14.5 If the repair is delayed due to measures within the scope of industrial disputes, in particular strike and lock-out as well as the occurrence of circumstances, which we were not caused by us, a reasonable extension to the repair deadline will occur insofar as such impediments have as proven a substantial influence on the completion of the repair, this shall however not be the case if such circumstances occurred after we are in default.

15. Ban on offsetting and assignment; subcontractors
15.1 The customer is only entitled to offsetting in the event of undisputed claims or claims which have been declared final and binding. This shall not apply if the customer asserts claims which are in conflict with our claims.

15.2 The assignment of rights of the customer from contractual relationships with us is only permissible with our prior written consent. This shall not apply insofar as Section 345a of the HGB (German Commercial Code) applies.

15.3 We are entitled to use third parties in order to fulfil our contractual obligations.

16. Reservation of title
16.1 The goods delivered by us shall remain our property until the payment of all of our claims against the customer, no matter for what legal grounds, also future ones. In case of current account the afore-mentioned property shall be deemed as security for our balance claim.

16.2 The customer may only sell within the framework of his customary business transactions and neither pledge, nor assign the goods as collateral. The customer hereby assigns us for security of our payment claims against him, in the amount of the value of our delivery and service, all claims with all secondary rights, which he acquires against his buyer owing to such a sale.

16.3 As long as the property has not yet been assigned, the customer has to inform us immediately in writing if the delivered object is attached or is exposed to other interventions of third parties. Insofar as the third party is not in the position to reimburse us the court and out-of-court costs of an action according to Section 771 ZPO (German Code of Civil Procedure) the customer shall be liable for the loss incurred to us.

16.4. We undertake to release the securities to which we are entitled at the customer's request insofar as their value exceeds the claims which are to be secured by more than 20 %.*

17. Warranty
17.1 Insofar as the creation of a work has been agreed and thus the law governing contracts for work and services applies the following shall apply: If our services are faulty then we are first of all entitled and obliged to subsequent satisfaction according to Section 634 No. 1 BGB. If the subsequent satisfaction finally fails the customer can according to Section 634 No. 3 cancel the contract or reduce the remuneration and according to Section 634 No. 4 BGB request damages. Claims of the customer for reimbursement of expenses according to Section 634 No. 2 BGB (self-execution) are excluded. Subclause 18 shall apply to claims for damages.

17.2 Insofar as we provide planning services without executing these and thus the law governing service contracts applies (e.g. in the event of a breach of our duties under Subclauses 5.2.1, 5.2.2 and 5.2.3) the following applies: If our services are faulty then we are first of all entitled and obliged to subsequent improvement. If the subsequent improvement finally fails the customer is entitled to damages according to Subclause 18.

17.3 Excluded from the warranty are damages as a result of natural wear and tear, faulty assembly, handling and use, the occurrence of circumstances, which we were not caused by us, a reasonable extension to the repair deadline will occur insofar as such impediments have as proven a substantial influence on the completion of the repair, this shall however not be the case if such circumstances occurred after we are in default.

17.4 The warranty shall lapse if the customer or third party makes changes or repairs to our products without our prior written consent unless the defect is not a result thereof.

17.5 Claims of the customer owing to defects of quality and title shall become statute-barred with the expiry of 12 months after the acceptance of the work or the knowledge of defects with the provision of planning services.

18. Liability
18.1 We shall be liable to an unlimited extent in case of willful intent and gross negligence as well as with the injury to life, the body and the health as well as with the culpable breach of essential contractual obligations. Deemed as essential are such contractual obligations, the fulfilment of which makes the proper execution of the contract possible at all and the compliance with which the contractual partner may as a rule rely and depend on.

18.2 Incidentally our liability is excluded.

18.4 A liability according to the Product Liability Act remains unaffected.

18.5 The personal liability of our legal representatives and vicarious agents is limited as our own liability according to the afore-mentioned provisions.

19. Term of the contract; termination
19.1 Service agreements according to Subclause 5. shall come into force when signed by both parties and shall initially apply until the end of the calendar year, that follows the year in which the contract was concluded. The contractual relationship will subsequently be extended respectively by one year further unless it is terminated by one of the parties with a period of notice of 3 months to the end of the second or following year. Contractual relationships can be terminated on the whole or only with regard to certain services. The costs above shall be incurred by the customer.

19.2 The right to the extraordinary termination for an important reason remains unaffected.

20. Place of jurisdiction; applicable law
20.1 With all disputes ensuing from the contractual relationship if the orderer is a merchant, a legal entity under public law or a special fund under public law, the action is to be filed at the court that has jurisdiction for our headquarters. We are also entitled to file an action at the headquarters of the orderer.

20.2 The legal relationship is subject to the law of the Federal Republic of Germany. German international private law and the Vienna Convention of the United Nations concerning Contracts for the International Sale of Goods (CISG) will not apply.

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