Clamping Elements Type RCK 70

These shaft clamping elements are designed to give optimum concentricity, both radially and axially. Similar in design to the RCK 13, but with increased length to provide improved support, and reduced pressures on both shaft and hub. These units must always be installed inside the hub to ensure optimum concentricity. Axial movement of hub will occur during clamping operation.

Recommended tolerances for full torque transmission are:-

<table>
<thead>
<tr>
<th>Shaft</th>
<th>Hub</th>
</tr>
</thead>
<tbody>
<tr>
<td>h8</td>
<td>H8</td>
</tr>
</tbody>
</table>

Clamping surfaces to be finished to Rz ≤ 15 µm.

*Minimum outside diameter of hubs manufactured in medium carbon steel with yield strength ≥ 320 N/mm².

For hub types, and other materials, refer to page 3.
For assembly and disassembly instructions refer to page 24.
Clamping Elements Type RCK 71

The RCK 71 is a type RCK 70 with addition of a distance ring to prevent axial movement of the hub during clamping. Due to the additional friction between the element and hub during clamping maximum torques are reduced, but with reduction in surface pressures also. This design can be mounted within the confines of a hub providing a stepped bore is provided to accommodate the flange.

Recommended tolerances for full torque transmission are:-

Shaft $h_8$
Hub $H_8$

Clamping surfaces to be finished to $R_z \leq 15 \mu m$.

$X = \text{Distance required to remove screws, additional clearance for alan key may be required.}$

---

### Dimensions

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Dimensions mm</th>
<th>Torque Cap. M Nm</th>
<th>Axial Force F kN</th>
<th>Surface Pressure</th>
<th>Clamping Screws</th>
<th>Approx. Weight kg</th>
<th>Min. Hub Dia. $\phi mm$</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCK71-18x47</td>
<td>19 47 45 26 31 39 25</td>
<td>294 31 228 96</td>
<td>17 0.39</td>
<td>64 60 56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-20x47</td>
<td>20 47 45 26 31 39 25</td>
<td>313 31 226 96</td>
<td>17 0.38</td>
<td>64 60 56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-22x47</td>
<td>22 47 45 26 31 39 25</td>
<td>362 33 206 97</td>
<td>17 0.37</td>
<td>64 60 56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-24x50</td>
<td>24 50 45 26 31 39 25</td>
<td>421 35 206 100</td>
<td>17 0.41</td>
<td>69 65 60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-25x50</td>
<td>25 50 45 26 31 39 25</td>
<td>470 38 221 110</td>
<td>17 0.40</td>
<td>72 66 62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-28x55</td>
<td>28 55 45 26 31 39 25</td>
<td>578 41 202 105</td>
<td>17 0.48</td>
<td>77 72 67</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-30x55</td>
<td>30 55 45 26 31 39 25</td>
<td>637 42 221 118</td>
<td>17 0.45</td>
<td>81 75 69</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-32x60</td>
<td>32 60 45 26 31 39 25</td>
<td>784 49 197 114</td>
<td>17 0.56</td>
<td>87 80 75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-35x60</td>
<td>35 60 45 26 31 39 25</td>
<td>843 48 202 118</td>
<td>17 0.52</td>
<td>88 81 75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-38x65</td>
<td>38 65 45 26 31 39 25</td>
<td>1010 53 197 121</td>
<td>17 0.62</td>
<td>97 89 82</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-40x65</td>
<td>40 65 45 26 31 39 25</td>
<td>1188 55 234 143</td>
<td>17 0.99</td>
<td>105 94 86</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-42x75</td>
<td>42 75 55 30 36 47 30</td>
<td>1892 90 216 135</td>
<td>61 0.97</td>
<td>118 107 97</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-45x75</td>
<td>45 75 55 30 36 47 30</td>
<td>1912 85 216 135</td>
<td>61 0.95</td>
<td>118 107 97</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-48x80</td>
<td>48 80 55 30 36 47 30</td>
<td>2137 89 221 142</td>
<td>61 1.07</td>
<td>129 116 105</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-50x80</td>
<td>50 80 55 30 36 47 30</td>
<td>2167 87 221 143</td>
<td>61 1.02</td>
<td>129 116 105</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-55x85</td>
<td>55 85 55 30 36 47 30</td>
<td>2677 97 221 143</td>
<td>61 1.09</td>
<td>137 124 112</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-60x90</td>
<td>60 90 55 30 36 47 30</td>
<td>2853 95 197 131</td>
<td>61 1.19</td>
<td>139 126 116</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-65x95</td>
<td>65 95 55 30 36 47 30</td>
<td>3590 108 206 142</td>
<td>61 1.37</td>
<td>153 138 125</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-70x10</td>
<td>70 10 67 40 46 57 35</td>
<td>5717 163 221 142</td>
<td>61 2.03</td>
<td>177 159 145</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-75x115</td>
<td>75 115 72 40 46 62 35</td>
<td>6207 166 216 148</td>
<td>61 2.65</td>
<td>190 170 153</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-80x120</td>
<td>80 120 72 40 46 62 35</td>
<td>6707 168 216 157</td>
<td>61 2.92</td>
<td>214 189 169</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-85x125</td>
<td>85 125 72 40 46 62 35</td>
<td>6802 188 216 157</td>
<td>61 3.07</td>
<td>210 189 171</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-90x130</td>
<td>90 130 72 40 46 62 35</td>
<td>6802 189 217 143</td>
<td>61 3.07</td>
<td>210 189 171</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-95x135</td>
<td>95 135 72 40 46 62 35</td>
<td>10002 211 187 138</td>
<td>61 3.21</td>
<td>214 193 176</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-100x145</td>
<td>100 145 89 46 52 77 45</td>
<td>13336 267 197 148</td>
<td>124 4.80</td>
<td>239 214 193</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-110x155</td>
<td>110 155 89 46 52 77 45</td>
<td>14582 265 197 178</td>
<td>124 5.20</td>
<td>290 250 219</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-120x165</td>
<td>120 165 89 46 52 77 45</td>
<td>19883 318 216 158</td>
<td>124 5.58</td>
<td>283 251 224</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-130x180</td>
<td>130 180 89 46 52 77 45</td>
<td>20417 314 198 143</td>
<td>124 5.86</td>
<td>291 262 237</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-140x190</td>
<td>140 190 98 51 59 84 45</td>
<td>24920 356 188 138</td>
<td>124 7.62</td>
<td>301 272 248</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-150x200</td>
<td>150 200 98 51 59 84 45</td>
<td>30130 420 198 149</td>
<td>124 8.04</td>
<td>331 296 266</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-160x210</td>
<td>160 210 98 51 59 84 45</td>
<td>32520 407 198 149</td>
<td>124 8.56</td>
<td>348 311 280</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-170x225</td>
<td>170 225 98 51 59 84 45</td>
<td>33450 392 158 119</td>
<td>124 9.19</td>
<td>333 306 282</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-180x235</td>
<td>180 235 98 51 59 84 45</td>
<td>37337 414 154 119</td>
<td>124 9.83</td>
<td>347 319 295</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-190x250</td>
<td>190 250 98 51 59 84 45</td>
<td>46400 488 150 114</td>
<td>124 11.35</td>
<td>363 335 311</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCK71-200x260</td>
<td>200 260 98 51 59 84 45</td>
<td>48200 482 144 110</td>
<td>124 11.90</td>
<td>372 345 321</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Minimum outside diameter of hubs manufactured in medium carbon steels with yield strength $\geq 320 \text{ N/mm}^2$.

For hub types, and other materials, refer to page 3.

For assembly and disassembly instructions refer to page 24.
In order to make the best selection of a Cross Shaft Clamping Element for your application a number of factors must be taken into consideration. These include the shaft diameter; the outside diameter of the hub of connecting component; the drive torque to be transmitted, and axial thrust loads, and tilting or bending loads, maximum shaft speeds, operating temperature, and general design parameters and space restrictions.

**Shaft Diameter:-**
The shaft diameter will determine the particular size of clamping element in any series, and by reference to the catalogue details the suitability of that to meet the other parameters can be checked. Also hollow shafts must be checked for any load carrying strength, see below.

**Hub Outside Diameter:-**
The Hub Diameter has to be sufficient to support the stresses imposed by the shaft clamping element. The catalogue gives maximum hub diameters for medium carbon steel, but for other materials and method of determining refer below. Generally if hub diameter is over 2.5 times shaft diameter all series are suitable, but for smaller ratios consider types RCK 80, ACE 81, CCE 54 and CCE 55, and for very thin walled hubs use types RCK 19, RCK 20 and RCK 25.

**Determination of Minimum Hub Diameter and Max. Hollow Shaft Bore:-**
The following calculations are for static conditions only, considering only stresses imposed by the clamping element. The hub diameter is controlled by the pressure applied by the outer cone of the clamping element; the shape of the hub bore and total length of hub; and yield stress for permanent elongation of 0.2%.

$$D_m = D \sqrt{\frac{\sigma + P_C}{\sigma - P_C}}$$

Where
- $D$ = Clamping element outside diameter mm
- $\sigma$ = Yield strength of material N/mm$^2$
- $P_C$ = Surface pressure on hub N/mm$^2$
- $C$ = Constant for Hub shape - see drawings

The tables in the catalogue give minimum hub diameters for hubs manufactured in medium carbon steel (080M40 or C45) or other material where $\sigma = 320$ N/mm$^2$. Values for $\sigma$ on other commonly used hub materials are:-

- 220 Grade Cast Iron $\sigma = 150$ N/mm$^2$
- 260 Grade Cast Iron $\sigma = 180$ N/mm$^2$
- Mild Steels $\sigma = 220$ N/mm$^2$
- 070M55 (En9) $\sigma = 350$ N/mm$^2$
- Stainless Steel $\sigma = 200$ N/mm$^2$
- Aluminium $\sigma = 100$ N/mm$^2$

For hollow bored Shafting:-

$$D_m = d \sqrt{\frac{\sigma - 1.6 P_s}{\sigma}}$$

Where
- $d$ = Clamping element bore mm
- $P_s$ = Surface pressure on Shaft N/mm$^2$

For solid shafting yield strength of material $\sigma$ must be higher than surface pressure $P_s$.

**Maximum Shaft Speed:-**
The centrifugal forces generated by high shaft speeds can reduce torque capacity and increase stress loads on hubs. Consult Cross & Morse if speed of shaft results in outer clamping diameter $D$ running above 25M/sec.

**Operating Temperature:-**
Máximo temperatures should not exceed 100°C. At temperatures above 70°C the locking screws should be rechecked after 1 hour operation, whilst assembly is still warm.
Installation Instructions

Installation and Removal of Cross Shaft Clamping Elements

**Types RCK 10, 11, 12, 13, 15, 16, 61, 70, 71, 80 and ACE81**

**Installation:**
1. Slacken all screws in element by approx. two turns.
2. Remove two or three screws completely, and fit into equally spaced empty release thread holes. Tighten these screws lightly so as to ensure inner and outer cones are kept apart.
3. Clean all contact surfaces including screw threads, and lightly oil with clean thin unmodified oil.*
4. Insert clamping element into hub and push onto shaft and locate.
5. Remove screws from release holes and replace in original holes.
6. Tighten all screws finger tight and align hub.
7. Tighten all screws evenly in a diametrically opposite sequence (see typical progression in sketch) using a torque wrench, initially at half screw catalogue torque, then at 3/4 value, and finally at full torque. Check all screws at full torque until no further rotation of screws occurs.

**Disassembly:**
1. Slacken all clamping screws by couple of turns, completely removing as many as release holes in element.
2. Fit screws in release holes and tighten in sequence as clamping to force inner and outer cones apart.
3. Carefully remove hub and clamping element from shaft, and take element from hub.

**Types RCK 40 and 45**

**Installation:**
1. Clean all contact surfaces, and lightly oil with clean thin unmodified mineral oil.*
2. Fit hub to shaft and insert clamping element.
3. Tighten all screws finger tight and align hub.
4. Tighten all screws evenly in a diametrically opposite sequence (see typical progression in sketch) using a torque wrench, initially at half catalogue torque for screw, then at 3/4 value, and finally at full torque. Check all screws are at full torque until no further rotation of screws can be achieved.

**Disassembly:**
1. Release clamping screws in same sequence as for clamping. Element should now self release. If required lightly tap clamping screws to aid release. If still not released remove light coloured screws completely and replace with next larger metric size and tighten these screws to jack the cones apart.

**Type RCK 50**

**Installation procedure depends detailed design, but following is typical:**
1. Clean all contact surfaces, and lightly oil with clean thin unmodified mineral oil.*
2. Push hub onto shaft and insert spacer sleeves and clamping ring sets according to application drawing.
3. Insert distance ring if fitted and attach clamping flange lightly tightening screws. Align hub.
4. Tighten all screws in a diametrically opposite sequence, in several stages up to max. torque for screw size.

**Disassembly:**
The taper of the individual rings is such that the assembly should automatically release when the locking screws are slackened. If not light tapping on the hub circumference should release them.

**Types CCE 54 and 55**

**Installation:**
1. Clean all contact surfaces, and lightly oil with clean unmodified mineral oil.*
2. Turn locking nut anti-clockwise until outer sleeve loose on inner cone.
3. Position hub on shaft and insert clamping element.
4. Align hub and tighten locking nut to catalogue torque value, and bend suitable tab on lock washer to prevent further rotation.

**Disassembly:**
1. Release bent washertab and undo nut until sleeve loose.
2. Remove clamping element, If tight give end of tab gentle tap to release.

**Types RCK 19/20 and 95**

**Installation:**
1. Clean all contact surfaces, and lightly oil with clean thin unmodified mineral oil.*
2. Slacken all clamping bolts by a couple of turns.
3. **(RCK 19/20 only)** Fit clamping element on outer diameter of hub, and slide assembly onto shaft and position.
   **(RCK 95 only)** Fit shaft ends equally into clamping element ensuring small clearance between shafts.
4. Tighten all bolts in a diametrically opposite sequence, in several stages up to max. specified torque.

**Disassembly:**
Slacken all bolts and gently tap on bolts to release clamping element.

*WARNING: Never use, lubricant containing Molydenum or E.P. additives, synthetic lubricant, or grease.