EURO-BEARINGS LTD

COMBINED ROLLER BEARINGS
&
MATING STEEL PROFILES
CATALOGUE

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Tel: +44 (0)1908 511733
www.euro-bearings.com
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The data printed in this catalogue is correct at the time of print, to the best of our knowledge. No liability is taken for any omissions or errors. Euro-Bearings Ltd cannot be held responsible if the products listed in this catalogue are used incorrectly.
## Combined Roller Bearings

**STANDARD CR BEARINGS**

Our standard Combined Roller bearing consists of a hub, a radial bearing and an axial roller.

### BEARING Dimensions (mm)

<table>
<thead>
<tr>
<th>BEARING REFERENCE</th>
<th>D</th>
<th>T</th>
<th>d</th>
<th>H</th>
<th>h</th>
<th>B</th>
<th>A</th>
<th>S</th>
<th>r</th>
<th>C</th>
<th>C₀</th>
<th>Cₐ</th>
<th>C₀ₐ</th>
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- C = Dynamic Load Capacity for radial roller
- C₀ = Static Load Capacity for radial roller
- Cₐ = Dynamic Load Capacity for axial (side) roller
- C₀ₐ = Static Load Capacity for axial roller

### Notes
- 4.053 and 4.054 bearings do not have grease holes.
- All of our bearings are pre-greased.

See page 35 for information on how to select the correct size of bearing and mating steel channel.

Visit [www.euro-bearing.com](http://www.euro-bearing.com)
Our adjustable Combined Roller bearings have the side (axial) roller mounted on an eccentric shaft which allows for adjustment of their height (dimension ‘h’ on the chart below).

For guidance on how to adjust the height of the face roller of our eccentric CR bearings please see page 34.

**Combined Roller Bearings**

**ECCENTRIC ADJUSTABLE CR BEARINGS**

<table>
<thead>
<tr>
<th>BEARING REFERENCE</th>
<th>Dimensions (mm)</th>
<th>C (kN)</th>
<th>C₀ (kN)</th>
<th>Cₐ (kN)</th>
<th>Cₒa (kN)</th>
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C = Dynamic Load Capacity for radial roller
C₀ = Static Load Capacity for radial roller
Cₐ = Dynamic Load Capacity for axial (side) roller
Cₒa = Static Load Capacity for axial roller
SHIM ADJUSTABLE CR BEARINGS

These combined bearings are adjustable by introducing shims between the hub and the axial roller carrier. This enables the overall height of the bearing to be altered.

<table>
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<th>Dimensions (mm)</th>
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<th>C₀</th>
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C = Dynamic Load Capacity for radial roller
C₀ = Static Load Capacity for radial roller
Cₐ = Dynamic Load Capacity for axial (side) roller
Cₒₐ = Static Load Capacity for axial roller
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SEE THE FOLLOWING PAGES FOR DETAILED DRAWINGS OF ALL OUR PROFILES

CAD files (dwg format) available for download from our website.

www.euro-bearing.com
PROFILE REFERENCE: **EC053**

Weight: 5.2kg per metre

Moment of Area (Wx): 11.6cm³

Material: S355J0 (cold rolled)

Use with our:

4.053 Standard Combined Roller Bearing

Other suitable bearings:

**MRS 900** Channel Ball Bearing
PROFILE REFERENCE: **2890**

Weight: 10.5kg per metre

Moment of Area (Wx): 31.7cm$^3$

Material: S450J2

Use with our:

- **4.054** Standard Combined Roller Bearing
- **4.454** Eccentric Adjustable CR Bearing

Other suitable bearings:

- **4.072** Shim Adjustable CR Bearing
- **2.2062** Radial Roller Bearing
- **MRS 948** Channel Ball Bearing

www.euro-bearings.com
PROFILE REFERENCE: **2867**

Weight: 14.8kg per metre

Moment of Area (Wx): 53.0cm³

Material: S450J2

Use with our:

- **4.055** Standard Combined Roller Bearing
- **4.455** Eccentric Adjustable CR Bearing

Other suitable bearings:

- **4.073** Shim Adjustable CR Bearing
- **2.2070** Radial Roller Bearing
- **MRS 901** Channel Ball Bearing

www.euro-bearings.com
PROFILE REFERENCE: 3018

Weight: 19.4kg per metre

Moment of Area (Wx): 70.2cm³

Material: S450J2

Use with our:

4.055 Standard Combined Roller Bearing
4.455 Eccentric Adjustable CR Bearing
**STANDARD CHANNEL**

**PROFILE REFERENCE: 2810**

Weight: 20.9kg per metre

Moment of Area (Wx): 81.3cm³

Material: S450J2

Use with our:

- **4.056** Standard Combined Roller Bearing
- **4.456** Eccentric Adjustable CR Bearing

Other suitable bearings:

- **4.074** Shim Adjustable CR Bearing
- **2.2077** Radial Roller Bearing
- **MRS 907** Channel Ball Bearing

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![Diagram of the STANDARD CHANNEL 2810 profile](image-url)

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<th>Profile Reference</th>
<th>Web Height mm</th>
<th>Flange Width mm</th>
<th>Channel Height mm</th>
<th>Weight kg / metre</th>
<th>Bearing Reference</th>
<th>Plate Reference</th>
<th>Section Shape</th>
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<td>C Section</td>
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PROFILE REFERENCE: 3019

Weight: 25.3kg per metre

Moment of Area (Wx): 101.7cm³

Material: S450J2

Use with our:

4.057  Standard Combined Roller Bearing
4.457  Eccentric Adjustable CR Bearing

Other suitable bearings:

4.075  Shim Adjustable CR Bearing

www.euro-bearings.com
PROFILE REFERENCE: **2811**

Weight: 28.6kg per metre

Moment of Area (Wx): 127.8cm³

Material: S450J2

Use with our:

- **4.058** Standard Combined Roller Bearing
- **4.458** Eccentric Adjustable CR Bearing

Other suitable bearings:

- **4.076** Shim Adjustable CR Bearing
- **2.2088** Radial Roller Bearing
PROFILE REFERENCE: **3020**

Weight: 34.1kg per metre

Moment of Area (Wx): 160cm³

Material: S450J2

Use with our:

- **4.058** Standard Combined Roller Bearing
- **4.458** Eccentric Adjustable CR Bearing
PROFILE REFERENCE: 2912

Weight: 31.2kg per metre

Moment of Area (Wx): 156cm³

Material: S450J2

Use with our:

4.059 Standard Combined Roller Bearing
4.459 Eccentric Adjustable CR Bearing

Other suitable bearings:

4.077 Shim Adjustable CR Bearing

www.euro-bearings.com
**PROFILE REFERENCE: 3100**

Weight: 40.6kg per metre

Moment of Area (Wx): 219.1cm³

Material: S450J2

Use with our:

- **4.060** Standard Combined Roller Bearing
- **4.460** Eccentric Adjustable CR Bearing

Other suitable bearings:

- **4.078** Shim Adjustable CR Bearing

[www.euro-bearings.com](http://www.euro-bearings.com)
PROFILE REFERENCE: 2862

Weight: 36.0kg per metre

Moment of Area (Wx): 190.1cm³

Material: S450J2

Use with our:

4.061 Standard Combined Roller Bearing
4.461 Eccentric Adjustable CR Bearing

Other suitable bearings:

2.2107 Radial Roller Bearing
PROFILE REFERENCE: 2891

Weight: 42.8kg per metre

Moment of Area (Wx): 249.7cm³

Material: S450J2

Use with our:

4.062 Standard Combined Roller Bearing
4.462 Eccentric Adjustable CR Bearing

Other suitable bearings:

2.2123 Radial Roller Bearing
4.079 Shim Adjustable CR Bearing
### STANDARD CHANNEL

**PROFILE REFERENCE:** **3353**

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<th>Reference</th>
<th>Web Height mm</th>
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<th>Channel Height mm</th>
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<th>Plate Reference</th>
<th>Section Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>3353</td>
<td>175</td>
<td>90</td>
<td>123.8</td>
<td>51.4</td>
<td>4.062</td>
<td>PLATE 4</td>
<td>I Section</td>
</tr>
</tbody>
</table>

- **Profile:** Reference Height Width Height Weight Bearing Plate Section Shape
- **Web:** 175
- **Flange:** 90
- **Channel:** 123.8
- **Weight:** 51.4 kg/metre
- **Bearing:** Reference: 4.062 PLATE 4 I Section

**Use with our:**

- **4.062** Standard Combined Roller Bearing
- **4.462** Eccentric Adjustable CR Bearing

**Other suitable bearings:**

- **4.079** Shim Adjustable CR Bearing
- **2.2123** Radial Roller Bearing

**www.euro-bearings.com**
PROFILE REFERENCE: 2757

Weight: 52.3kg per metre

Moment of Area (Wx): 340cm$^3$

Material: S450J2

Use with our:

- **4.063** Standard Combined Roller Bearing
- **4.463** Eccentric Adjustable CR Bearing

Other suitable bearings:

- **4.080** Shim Adjustable CR Bearing
- **2.2149** Radial Roller Bearing

www.euro-bearings.com
The side rollers on Jumbo bearings are eccentrically adjustable.

<table>
<thead>
<tr>
<th>BEARING REFERENCE</th>
<th>Dimensions (mm)</th>
<th>Radial C (kN)</th>
<th>Radial C₀ (kN)</th>
<th>Axial C (kN)</th>
<th>Axial C₀ (kN)</th>
<th>PROFILE REF C / I SECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.089</td>
<td>165 113 80 69</td>
<td>53 - 56</td>
<td>40 5</td>
<td>50 40</td>
<td>213 388</td>
<td>85 46 133 79</td>
</tr>
<tr>
<td>4.090</td>
<td>190 124 100 84.5</td>
<td>64.5 - 67.5</td>
<td>48 6.5</td>
<td>60 40</td>
<td>266 500</td>
<td>100 46 180 79</td>
</tr>
<tr>
<td>4.091</td>
<td>220 146 110 94.5</td>
<td>74.5 - 77.5</td>
<td>58 6.5</td>
<td>75 60</td>
<td>326 681</td>
<td>138 101 257 173</td>
</tr>
<tr>
<td>4.092</td>
<td>250 168 120 102</td>
<td>77 - 80</td>
<td>60 7</td>
<td>75 60</td>
<td>369 748</td>
<td>138 101 257 173</td>
</tr>
<tr>
<td>4.093</td>
<td>280 188 150 119.5</td>
<td>89.5 - 93.5</td>
<td>72 7.5</td>
<td>90 60</td>
<td>489 1066</td>
<td>182 101 488 173</td>
</tr>
<tr>
<td>4.094</td>
<td>320 218 140 135</td>
<td>110 - 114</td>
<td>85 10</td>
<td>90 8</td>
<td>642 1370</td>
<td>210 422</td>
</tr>
<tr>
<td>4.095</td>
<td>340 240 140 150</td>
<td>120 - 124</td>
<td>89 10</td>
<td>100 8</td>
<td>735 1600</td>
<td>232 463</td>
</tr>
<tr>
<td>4.096</td>
<td>390 242 170 200</td>
<td>150 - 154</td>
<td>118 10</td>
<td>100 8</td>
<td>1050 2243</td>
<td>232 463</td>
</tr>
</tbody>
</table>

* C = Dynamic Load Capacity
* C₀ = Static Load Capacity

**Profile made to order**

*FC = C Section*

*FM = I Section*
Mating Steel Profiles

**JUMBO CHANNEL**

**Overview**

<table>
<thead>
<tr>
<th>Profile</th>
<th>Dimensions (mm)</th>
<th>Weight</th>
<th>Ex</th>
<th>Ey</th>
<th>Lx</th>
<th>Ly</th>
<th>Wx</th>
<th>Wy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference</td>
<td>C</td>
<td>H</td>
<td>B</td>
<td>S</td>
<td>D</td>
<td>A</td>
<td>(kg / m)</td>
<td>(mm)</td>
</tr>
<tr>
<td>FC165</td>
<td>165.4</td>
<td>230</td>
<td>57.5</td>
<td>18</td>
<td>80</td>
<td>38.5</td>
<td>53.3</td>
<td>19.9</td>
</tr>
<tr>
<td>FC190</td>
<td>190.4</td>
<td>255</td>
<td>77</td>
<td>22</td>
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<td>53</td>
<td>73.7</td>
<td>25.9</td>
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<tr>
<td>FC220</td>
<td>220.4</td>
<td>295</td>
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<td>20</td>
<td>125</td>
<td>62.5</td>
<td>86.1</td>
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<tr>
<td>FC250</td>
<td>250.4</td>
<td>344</td>
<td>94</td>
<td>26.5</td>
<td>125</td>
<td>65.5</td>
<td>122.8</td>
<td>32.4</td>
</tr>
<tr>
<td>FC280</td>
<td>280.4</td>
<td>394</td>
<td>114</td>
<td>26.5</td>
<td>125</td>
<td>85.5</td>
<td>161.85</td>
<td>40.8</td>
</tr>
</tbody>
</table>

For profiles FC320, FC340 and FC390 please refer to our website.

### C SECTION

**Material:** S355

### I SECTION

For profiles FM230, FM240 and FM290 please refer to our website.
### RADIAL BEARINGS

**Axle / Hub**

**Blanking Plate**

**Radial Bearing**

<table>
<thead>
<tr>
<th>BEARING REFERENCE</th>
<th>Dimensions (mm)</th>
<th>C (kN)</th>
<th>C₀ (kN)</th>
<th>PROFILE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2062</td>
<td>62 42 30 36.5 20 3 39 65</td>
<td>2890</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2070</td>
<td>70.1 48 35 42 23 4 56 93</td>
<td>2867</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2077</td>
<td>77.7 53 40 45.5 23 4 57 101</td>
<td>2810</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2088</td>
<td>88.4 59 45 54 41 30 4 82 134</td>
<td>2811</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2107</td>
<td>107.7 71 60 65.5 31 5 96 174</td>
<td>2862</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2123</td>
<td>123 80 60 67.8 37 5 131 243</td>
<td>2891</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2149</td>
<td>149 103 60 74 54 45 3 183 353</td>
<td>2757</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*C = Dynamic Load Capacity  
C₀ = Static Load Capacity*

---

See page 35 for information on how to select the correct size of bearing and mating steel channel.

www.euro-bearing.com
**CHANNEL BALL BEARINGS**

The complete assembly includes the sealed ball bearing, a metal hub (ST52) and a polyamide rubbing block.

<table>
<thead>
<tr>
<th>Assembly Part No.</th>
<th>Bearing Part No.</th>
<th>Dimensions (mm)</th>
<th>Load (kN)</th>
<th>Load Centre</th>
<th>PROFILE</th>
<th>REF</th>
</tr>
</thead>
<tbody>
<tr>
<td>10000</td>
<td>MRS 900</td>
<td>d 25, D 52.4, B 17, S (Max - Min) 28-27</td>
<td>R 32, A 6, 2 to 4</td>
<td>500mm</td>
<td>EC053</td>
<td></td>
</tr>
<tr>
<td>10001</td>
<td>MRS 948</td>
<td>d 25, D 62.4, B 20, S (Max - Min) 33 - 31</td>
<td>R 32, A 5, 5 to 8</td>
<td>500mm</td>
<td>2890</td>
<td></td>
</tr>
<tr>
<td>10002</td>
<td>MRS 901</td>
<td>d 30, D 70, B 22, S (Max - Min) 38 - 36</td>
<td>R 40, A 5, 10 to 15</td>
<td>500mm</td>
<td>2867 / 3018</td>
<td></td>
</tr>
<tr>
<td>10003</td>
<td>MRS 907</td>
<td>d 30, D 78, B 22, S (Max - Min) 38 - 36</td>
<td>R 40, A 5, 15 to 20</td>
<td>500mm</td>
<td>2810 / 3019</td>
<td></td>
</tr>
</tbody>
</table>

The bearings can be purchased separately - please use this part number.

**Note:**
- Assembly includes sealed ball bearing, metal hub (ST52), and polyamide rubbing block.
- Dimensions for each part are specified in millimeters.
- Load capacities are given in kilonewtons (kN) with minimum and maximum load limits.
- Centre distances and PROFILER information are also provided.
### Standard Mounting Plates

**Overview**

<table>
<thead>
<tr>
<th>Plate Reference</th>
<th>For Bearing</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>Y</td>
</tr>
<tr>
<td>PL00</td>
<td>90</td>
<td>50</td>
</tr>
<tr>
<td>PL0</td>
<td>100</td>
<td>60</td>
</tr>
<tr>
<td>PL1</td>
<td>120</td>
<td>80</td>
</tr>
<tr>
<td>PL2</td>
<td>120</td>
<td>80</td>
</tr>
<tr>
<td>PL3</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>PL4</td>
<td>180</td>
<td>120</td>
</tr>
<tr>
<td>PL6</td>
<td>200</td>
<td>150</td>
</tr>
</tbody>
</table>

**NOTES:**

- **X** = Length
- **Y** = Length
- **Z** = Thickness
- **Lx1** = Length
- **Lx2** = Length
- **d1** = Diameter
- **d2** = Diameter
- **D** = Diameter
- **s** = Thickness

**PLATES CAN BE SUPPLIED INDIVIDUALLY OR WELDED TO A BEARING**

**www.euro-bearings.com**
THICKNESS: 10mm

PLATE REFERENCE: PL00
WELD TO BEARING: 4.053
USE WITH
STEEL CHANNEL: EC053
THICKNESS: 10mm

PLATE REFERENCE: PL0

WELD TO BEARING: 4.054 or 4.454 or 4.072 or 2.2062

USE WITH

STEEL CHANNEL: 2890
THICKNESS: 15mm

PLATE REFERENCE: PL1

WELD TO BEARING: 4.055 or 4.455 or 4.073 or 2.2070

USE WITH

STEEL CHANNEL: 2867

www.euro-bearings.com
THICKNESS: 15mm

PLATE REFERENCE: PL2

WELD TO BEARING: 4.056 or 4.456 or 4.074 or 2.2077

USE WITH

STEEL CHANNEL: 2810
THICKNESS: 20mm

PLATE REFERENCE: PL3

WELD TO BEARING: 4.058 or 4.458 or 4.076 or 2.2088

USE WITH

STEEL CHANNEL: 2811
THICKNESS: 20mm

PLATE REFERENCE: PL4

WELD TO BEARING:
4.061 or 4.461 or 2.2107
4.062 or 4.462 or 2.2123

USE WITH
STEEL CHANNEL: 2862 or 2891
PLATE REFERENCE: PL6

WELD TO BEARING: 4.063 or 4.463 or 4.080 or 2.2149

USE WITH

STEEL CHANNEL: 2757
# SQUARE MOUNTING PLATES

## Overview

<table>
<thead>
<tr>
<th>Plate Reference</th>
<th>For Bearing</th>
<th>Dimensions (mm)</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
<th>Lx</th>
<th>Ly</th>
<th>d1</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL00 SQ</td>
<td>4.053</td>
<td></td>
<td>50</td>
<td>50</td>
<td>10</td>
<td>30</td>
<td>30</td>
<td>M8</td>
<td>30</td>
</tr>
<tr>
<td>PL0 SQ</td>
<td>4.054</td>
<td></td>
<td>60</td>
<td>60</td>
<td>10</td>
<td>40</td>
<td>40</td>
<td>M10</td>
<td>30</td>
</tr>
<tr>
<td>PL1 SQ</td>
<td>4.055</td>
<td></td>
<td>80</td>
<td>80</td>
<td>15</td>
<td>50</td>
<td>50</td>
<td>M12</td>
<td>35</td>
</tr>
<tr>
<td>PL2 SQ</td>
<td>4.056</td>
<td></td>
<td>80</td>
<td>80</td>
<td>15</td>
<td>50</td>
<td>50</td>
<td>M12</td>
<td>40</td>
</tr>
<tr>
<td>PL4 SQ</td>
<td>4.061 &amp; 4.062</td>
<td></td>
<td>120</td>
<td>120</td>
<td>20</td>
<td>80</td>
<td>80</td>
<td>M16</td>
<td>60</td>
</tr>
<tr>
<td>PL6 SQ</td>
<td>4.063</td>
<td></td>
<td>150</td>
<td>150</td>
<td>20</td>
<td>100</td>
<td>100</td>
<td>M16</td>
<td>60</td>
</tr>
</tbody>
</table>

Z = Thickness

*PLEASE SEE PAGE 24 FOR OUR STANDARD MOUNTING PLATES*

www.euro-bearings.com
**FLANGED CLAMPS FOR STANDARD CHANNEL**

<table>
<thead>
<tr>
<th>CLAMP REFERENCE</th>
<th>Dimensions (mm)</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CF0</td>
<td>2890 121.3 60 130 10 88.5 44.5 41.0 10.8 100 40 6 11 18 20.5 M10x30</td>
<td>1.62</td>
</tr>
<tr>
<td>CF1</td>
<td>2867 135.4 60 130 10 105.0 38.5 53.0 12.7 100 40 6 11 18 26.5 M10x30</td>
<td>1.95</td>
</tr>
<tr>
<td>CF2</td>
<td>2810 157.2 80 160 15 123.0 49.5 61.2 14.0 130 60 6 13 18 30.6 M12x35</td>
<td>3.70</td>
</tr>
<tr>
<td>CF3</td>
<td>2811 175 80 160 15 137.5 46.9 66.2 16.2 130 60 6 13 18 33.1 M12x35</td>
<td>4.20</td>
</tr>
<tr>
<td>CF4</td>
<td>2862 201.5 80 160 15 159.0 44.4 71.2 19.4 130 60 6 13 18 35.6 M12x35</td>
<td>5.05</td>
</tr>
</tbody>
</table>
FREQUENTLY ASKED QUESTIONS

1. HOW DO WE MOUNT THE BEARINGS?

The stub axle of the bearing is made from ST52 which is a weldable steel. The best method is to drill a hole to locate the stub diameter marked ‘d’ in the drawings and to then weld from behind. The 45° chamfer (weld gusset) allows the weld to be kept flat, in case you need to use that area for rolling another bearing over. You do NOT have to disassemble the bearing to weld it into position- just keep the torch or arc away from the hardened steel radial roller and axial roller.

2. HOW DO YOU LUBRICATE THE BEARING?

All but the smallest sizes (4.053 and 4.054) of our standard range of Combined Roller Bearings have a threaded lube hole and hex-headed plug to allow the insertion of a grease nipple. Remove the plug to allow for the insertion of the grease nipple. If the nipple cannot be left in place for operational reasons, re-insert the plug. Use a good quality bearing grease (EP3 Lithium grease). Nipples are not supplied but the holes are standard metric threads.

The standard bearings are pre-lubricated and can be run without any further lubrication.

The adjustable types are also pre-lubricated but they are not re-lubricable.

3. ARE THE BEARINGS SEALED?

All ranges of the bearings are sealed with either metal or rubber shields. All our standard range of Combined Roller Bearings have composite rubber / metal shields. The adjustable (eccentric) types all have rubber seals. Both types of seals are very effective and these bearings are used in a variety of industrial environments.

Further information can be found on our website: www.euro-bearings.com
Adjusting the axial roller position:

**STEP 1**: Unscrew the four screws holding the front plate in position.

**STEP 2**: Rotate the axial bearing to the desired position.

**STEP 3**: Measure dimension ‘A’ (dimension ‘A’ on page 3)

**STEP 4**: Insert and tighten the four screws holding the front plate in position. Use a drop of adhesive (eg. Loctite threadlocker) on the screw thread to secure them permanently.

NB.
The series 4.454 through to 4.461 have splined eccentric shaft ends. 4.462 and 4.463 have hexagonal eccentric shaft ends. Both function in the same way.
SELECTING THE CORRECT SIZE OF BEARING & STEEL PROFILE

There are two important considerations when deciding which bearings to use:

a) Moments AND b) Hertzian Pressure

a) MOMENTS- the force on the bearing depends upon the distance between the load and the point of suspension and also the distance between the bearings and the point of suspension.

The location of the bearing with respect to the suspension point is critical in determining the force acting upon the bearing. The Hertzian static load capacity of the chosen bearing must not be exceeded and this therefore limits the maximum allowable load.

Using the moment-balance formula, the bearing distance can be calculated from:

\[ I = \frac{(P \cdot L)}{2 \cdot C} \]

where:

\( P \) = Weight of the load being moved in Newtons (N)
\( L \) = Distance between the load and \( P \), the suspension point (mm)
\( I \) = Distance of bearings from the suspension point (mm)
\( C \) = Maximum allowable static force per bearing, determined by Hertzian Pressure (see page 38)

This formula can be rearranged to calculate the static force generated:

\[ C = \frac{(P \cdot L)}{2 \cdot I} \]

And this value of \( C \) can then be compared with those given in the Hertzian Pressure data (provided by the table on page 38) to determine which bearing is best suited to the loading conditions. Please see the worked example on page 37.

This diagram shows the various dimensions required for calculating the moments and hertzian pressure.
b) HERTZIAN PRESSURE- the pressure on the profile should not exceed the tensile strength of the profile in order to prevent depressions in the steel channel. By ensuring that the maximum pressure is less than 750N/mm² (for S355 steel) and 900N/mm² (for S450J2 steel) such depressions should be prevented.

The table on the last page shows the approximate maximum static force on each bearing based on 0.31% of the bearing’s surface area being in contact with the channel at any moment in time.

HORIZONTAL TELESCOPIC ARRANGEMENTS

If your application involves a horizontal telescopic slide then you will need to use the following equations:

\[
C_A = \frac{P \times L}{2 \times I} \quad C_B = \frac{C_A + P}{2}
\]

Ususally \( C_B \) will be the largest force.
WORKED EXAMPLE

A 2 tonne load is placed 600mm from the point of suspension (dimension L). The bearings are spaced 500mm apart (dimension I). Which size of bearing should be used?

Using the Moment-Balance formula (from the previous page):

\[ C = \frac{(P \cdot L)}{(2 \cdot I)} \]

Assuming the bottom pair of bearings are level with the point of suspension then the value \( I = 500\text{mm} \). The load is cantilevered out at 600mm and hence this is the value of L. In this example \( P = 20,000\text{N} \) (the 2 tonne load on the forks).

Substituting these values into the equation gives \( C = 12,000\text{N} \)

Looking up this value of \( C \) (for the Radial Roller) on the Hertzian Pressure table (see page 38) shows that \( 4.058 \) is the required bearing size.

Please call if you need help with any of these calculations.

Telephone: 01908 511733

or email:

sales@euro-bearings.com

www.euro-bearings.com
## Hertzian Pressure Table

<table>
<thead>
<tr>
<th>Bearing Reference</th>
<th>Diameter (mm)</th>
<th>Circumference (mm)</th>
<th>Contact Width (mm)</th>
<th>Approx. Contact Area (mm²)</th>
<th>Steel Grade</th>
<th>Maximum Static Force / Hertzian Pressure for Radial Roller (Newtons)</th>
<th>Maximum Static Force / Hertzian Pressure for Axial Roller (Newtons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.053</td>
<td>52.5</td>
<td>164.96</td>
<td>14</td>
<td>7.33</td>
<td>S355J0</td>
<td>5,500</td>
<td>1,680</td>
</tr>
<tr>
<td>4.054</td>
<td>62.5</td>
<td>196.38</td>
<td>15</td>
<td>9.35</td>
<td>S450J2</td>
<td>8,200</td>
<td>3,100</td>
</tr>
<tr>
<td>4.055</td>
<td>70.1</td>
<td>220.25</td>
<td>16</td>
<td>11.19</td>
<td>S450J2</td>
<td>9,800</td>
<td>3,730</td>
</tr>
<tr>
<td>4.056</td>
<td>77.7</td>
<td>244.13</td>
<td>16</td>
<td>12.40</td>
<td>S450J2</td>
<td>10,900</td>
<td>3,870</td>
</tr>
<tr>
<td>4.057</td>
<td>77.7</td>
<td>244.13</td>
<td>16</td>
<td>12.40</td>
<td>S450J2</td>
<td>10,900</td>
<td>2,970</td>
</tr>
<tr>
<td>4.058</td>
<td>88.4</td>
<td>277.75</td>
<td>21</td>
<td>18.52</td>
<td>S450J2</td>
<td>16,300</td>
<td>6,760</td>
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<tr>
<td>4.059</td>
<td>101.2</td>
<td>317.97</td>
<td>18</td>
<td>18.17</td>
<td>S450J2</td>
<td>16,000</td>
<td>5,150</td>
</tr>
<tr>
<td>4.060</td>
<td>107.7</td>
<td>338.39</td>
<td>21</td>
<td>22.56</td>
<td>S450J2</td>
<td>19,800</td>
<td>5,490</td>
</tr>
<tr>
<td>4.061</td>
<td>107.7</td>
<td>338.39</td>
<td>21</td>
<td>22.56</td>
<td>S450J2</td>
<td>19,800</td>
<td>7,160</td>
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<tr>
<td>4.062</td>
<td>123</td>
<td>386.47</td>
<td>26</td>
<td>31.90</td>
<td>S450J2</td>
<td>28,000</td>
<td>10,200</td>
</tr>
<tr>
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