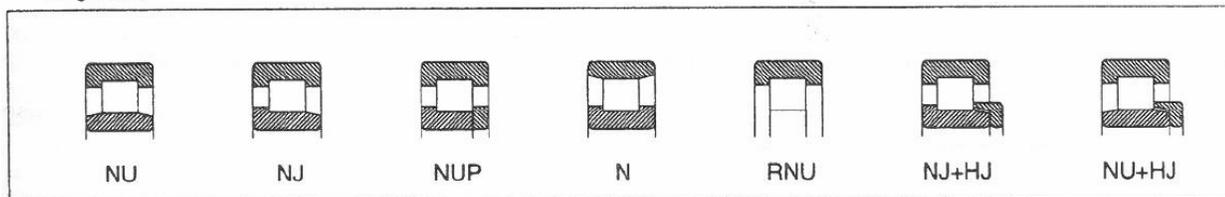


## Radial Roller Bearings – General Information

### General Description

Cylindrical roller bearings are manufactured in a various range of types and sizes, particularly single row cylindrical roller bearings but also two rows or more. Typical single row designs are shown in the designs below. In case of cylindrical roller bearings, the rollers are laterally guided by the fixed ribs of one ring. The four basic designs (NU, NJ, N and NUP) are given in the bearing tables. Bearings of NU design have two fixed ribs on the outer ring and one smooth inner ring. Bearings of N design have two fixed ribs on the inner ring and one smooth outer ring. These designs allow an axial displacement within certain limits, of the shaft in relation to the housing. Therefore, these rolling bearings are used in non-locating bearing units. Bearings of NJ design have two fixed ribs on the outer ring and a rib on the inner ring which can accept thrust in single direction (axially). Bearings of NUP design have also two fixed ribs on the outer ring and, on the inner ring, a fixed rib and a support washer. This way they can be used as locating bearings, guiding the shaft axially in both directions. The bearings have separable components to make it easier for installation. The table below shows the prefix nomenclature.



### Design Modification Suffixes

- |  |  |
|--|--|
| <b>AR</b> - Grinding addition on the inner ring raceway  | <b>P51</b> - Tolerance class P5 and radial clearance C1  |
| <b>B</b> - Cylindrical roller bearing with extended inner ring                                 | <b>P53</b> - Tolerance class P5 and radial clearance C3  |
| <b>C2</b> - Radial clearance smaller than normal, bearings with interchangeable elements       | <b>P4</b> - P4 Tolerance   |
| <b>C2NA</b> - Radial clearance smaller than normal, bearings with non-interchangeable elements | <b>P41</b> - Tolerance class P4 and radial clearance C1  |
| <b>C3</b> - Radial clearance larger than normal, bearings with interchangeable elements        | <b>R</b> - Non-standardized radial clearance (ex. R45)   |
| <b>C3NA</b> - Radial clearance larger than normal, bearings with interchangeable elements      | <b>TN</b> - Polyamide cage   |
| <b>D</b> - Two-piece inner ring  | <b>V</b> - Roller bearing without cage (full-complement)   |
| <b>E</b> - Cylindrical roller bearings, E -design (increased Basic static and dynamic loads)   | <b>VH</b> - Self-retaining roller bearing without cage   |
| <b>F</b> - Machined steel or special cast iron cage  | <b>W3</b> - Lubrication holes in the outer ring  |
| <b>F2</b> - Special modifications  | <b>W4</b> - Lubrication holes in the outer and inner ring  |
| <b>K</b> - Tapered bore bearing  | <b>W5</b> - Lubrication groove and holes in both rings   |
| <b>M</b> - Machined brass cage guided on the rolling elements                                  | <b>W6</b> - Lubrication groove and holes in the outer ring and lubrication holes in the inner ring |
| <b>MA</b> - Machined brass cage guided in the outer ring                                       | <b>W7</b> - Locating holes   |
| <b>MB</b> - Machined brass cage guided on the inner ring                                       | <b>W8</b> - Lubrication groove on the outer ring side surfaces                                     |
| <b>MPA</b> - Machined brass cage (one-piece)   | <b>W9</b> - Lubrication grooves on the inner ring side surfaces                                    |
| <b>N</b> - Circular groove in the outer ring (no snap ring)                                    | <b>W20</b> - Lubrication holes in the outer ring   |
| <b>NA</b> - Radial clearance, non-interchangeable elements                                     | <b>W33</b> - Lubrication groove and holes on the outer ring  |
| <b>NR</b> - Circular groove in the outer ring including snap ring                              | <b>W44</b> - Lubrication groove and holes on the inner ring  |
| <b>P</b> - Two-pieces outer ring   | <b>W339</b> - W9+ W33  |
| <b>P5</b> - P5 Tolerance class more accurate than normal                                       |  |

## Cages

Small and medium-sized single row cylindrical roller bearings are generally fitted with pressed sheet cages. Large-sized bearings are fitted with machined brass cages with one of the following designs; guided on the rolling elements M, on the outside surface MA, or inner ring surface MB. In case of heavy loads and high speeds, cages are made of one piece machined brass. Glass fibre reinforced polyamide 6.6 cages are successfully used for small and medium-sized bearings, if the operating temperature doesn't exceed + 120°C. These cages have low weight, low coefficient of friction and are quiet while running. Cage design and some technical data are given in table 4.

Cage design and technical data

Table 4

Cage	Design bearing	cage	Application	Max. value	
				$D_{\text{in}}$ oil	grease
Pressed sheet cage with tins			<ul style="list-style-type: none"> <li>- General application</li> <li>- Low inertia</li> <li>- Provides proper bearing lubrication</li> <li>- Moderate speeds</li> <li>- Bearings NU, NJ, NUP</li> </ul>	550x 10 <sup>3</sup>	400x10 <sup>3</sup>
Pressed sheet cage with fins			<ul style="list-style-type: none"> <li>- General application</li> <li>- Low inertia</li> <li>- Provides proper bearing lubrication</li> <li>- Moderate speeds</li> <li>- Bearings N</li> </ul>	550x 10 <sup>3</sup>	400x10 <sup>3</sup>
Pressed sheet cage			<ul style="list-style-type: none"> <li>- General application</li> <li>- Low inertia</li> <li>- Provides proper bearing lubrication</li> <li>- Moderate speeds</li> <li>- Bearings construction E type NU, NJ, NUP</li> </ul>	550x 10 <sup>3</sup>	400x 10 <sup>3</sup>
Polyamide cage TN			<ul style="list-style-type: none"> <li>- General application</li> <li>- Low frictional moment</li> <li>- High speeds</li> <li>- Bearings with d &lt; 150 mm</li> </ul>	1400x 10 <sup>3</sup>	1100x10 <sup>3</sup>
Machined brass cage M, MA, MB			<ul style="list-style-type: none"> <li>- General application</li> <li>- Heavy loads</li> <li>- Moderate and high speeds</li> <li>- Bearings with d &gt; 100 mm</li> </ul>	1200x 10 <sup>3</sup>	900x 10 <sup>3</sup>
One piece machined brass cage MPA			<ul style="list-style-type: none"> <li>- General application</li> <li>- Heavy loads</li> <li>- Provides proper lubrication</li> <li>- High speeds</li> </ul>	1400x 10 <sup>3</sup>	1100x10 <sup>3</sup>
Pressed sheet cage ES			<ul style="list-style-type: none"> <li>- General application</li> <li>- Low inertia</li> <li>- Provides proper bearing lubrication</li> <li>- Moderate speeds</li> <li>- Better guiding</li> <li>- Increased bearing life</li> <li>- Bearings NU, NJ, NUP</li> </ul>	550x10 <sup>3</sup>	400x10 <sup>3</sup>