**Structure and Features**

With the THK Link Ball, a highly accurate bearing steel ball used in the spherical area is first encased in the holder by die cast molding, and then is specially welded with the shank. This unique process enables the mirror surface of the steel ball to be transferred or duplicated on the spherical surface inside the holder to ensure full contact between the ball and the holder. As a result, smooth motion is achieved with a minimum clearance.

**Compact Design**

Model AL has an adequately firm and yet extremely compact shape because of highly balanced design. Together with use of an A-1 alloy, the compact design has achieved weight saving. Thus, this model is optimal for use in the stabilizer connecting rod and the transmission control of automobiles.

**Achieves Sphericity of 0.001 mm**

The spherical surface of the shank ball is transferred on the inner surface of the holder while maintaining the sphericity of the bearing steel ball. This allows smooth motion to be achieved with a minimum clearance and provides favorable operability and feel to the link motion.
● Two Types of Holder Material
Model AL uses the newly developed high-strength aluminum alloy "A-1 Alloy" (see page t-7), which is light and highly resistant to wear. Models BL, RBL and RBI use the proven, high-strength zinc alloy (see page t-8).

● High Lubricity
Since models AL and BL and those models attached with boots contain grease, they have high lubricity and increased wear resistance.

● Large Hexagonal Bolt Seat
The hexagonal bolt seat of the shank has the same dimensions as the seating surface for small hexagon head bolts in accordance with automotive specifications. This prevents the seating surface from sinking and ensures a stable link motion mechanism.

● Lightweight, High Strength
Use of the A-1 Alloy enables the Link Ball to achieve mechanical strength approximately twice that of the commonly used aluminum die cast material ADC 12, or almost equal to the high-strength zinc alloy, while maintaining aluminum alloys' advantages: lightweight and corrosion resistance.

● Equipped with a Boot for Protection against Muddy Water
Use of a boot with high trackability in the ball shank prevents muddy water from entering the spherical area even in a muddy atmosphere. Accordingly, those types equipped with boots are used also in outdoor applications and automobile parts under the chassis.
**Types and Features**

**High-strength Aluminum Alloy**

"A-1 Alloy," a high-strength aluminum alloy newly developed for the Link Ball, has yield strength approximately twice that of the commonly used aluminum die cast material ADC 12, and its strength and wear resistance are equivalent to the high-strength zinc alloy.

With its specific gravity less than that of the high-strength zinc alloy, model AL is optimal as an automotive part that requires lightweight, high strength, high corrosion resistance and high wear resistance.

<table>
<thead>
<tr>
<th></th>
<th>Tensile strength</th>
<th>0.2% yield strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1 alloy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADC12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tensile Strength and Yield Strength of THK A-1 Alloy and ADC 12

**Model AL**

The holder is connected in perpendicular to the shank, which comprises a male thread specially welded with a highly accurate steel ball.

With a grease pocket formed on the top and bottom of the spherical area, this model achieves high lubricity and high wear-resistance.

Use of the A-1 alloy in the holder significantly reduces the weight.
High-strength Zinc Alloy Series

Model RBL

The holder made of the high-strength zinc alloy is connected in perpendicular to the shank, which is incorporated with a ball. Since grease is contained in the boot, this model achieves high lubricity and high wear-resistance.

Model BL

A compact type of model RBL, this model’s holder made of the high-strength zinc alloy is connected in perpendicular to the shank, which is incorporated with a ball. With a grease pocket formed on the top and bottom of the spherical area, this model achieves high lubricity and high wear-resistance.

Model RBI

With this Link Ball model, the high-strength zinc alloy is used in its holder and the mounting bolt and the holder are arranged on the same axis, allowing this model to receive both a compressive load and a pulling load. Since grease in contained in the boot, this model achieves high lubricity and high wear-resistance.

Model TBS

The rolled thread on the circumference of the outer ring allows this model to easily be mounted on the housing. Simply by tightening the screw, the user can achieve play-free, firm installation. Since the covering area of sphere is large, the model is capable of receiving a large axial load.
High-strength Aluminum Alloy "A-1 Alloy"

"A-1 Alloy," a newly developed high-strength aluminum alloy, is an alloy with Al-Zn-Si3 being the main components, is used in the holder of model AL.

Features of the A-1 Alloy

- Achieves one of the highest strengths among the existing aluminum die cast alloys.
- Has yield strength approximately twice that of the commonly used aluminum die cast alloy (ADC 12)
- Has hardness equal to the high-strength zinc alloy and achieves high wear resistance.
- Achieves specific gravity less than a half of the high-strength zinc alloy to allow significant weight saving.
- Highly resistant to corrosion and can be used as an automotive part related to wheel control.

Mechanical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength:</td>
<td>343 to 392 N/mm²</td>
</tr>
<tr>
<td>Tensile yield strength (0.2%)</td>
<td>245 to 294 N/mm²</td>
</tr>
<tr>
<td>Compressive strength:</td>
<td>490 to 637 N/mm²</td>
</tr>
<tr>
<td>Compressive yield strength (0.2%)</td>
<td>294 to 343 N/mm²</td>
</tr>
<tr>
<td>Charpy impact strength:</td>
<td>0.098 to 0.196 N-m/mm²</td>
</tr>
<tr>
<td>Elongation:</td>
<td>2 to 3 %</td>
</tr>
<tr>
<td>Hardness:</td>
<td>140 to 160 HV</td>
</tr>
</tbody>
</table>

Physical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific gravity</td>
<td>3</td>
</tr>
<tr>
<td>Melting point</td>
<td>570 °C</td>
</tr>
<tr>
<td>Specific heat</td>
<td>793 J/(kg·k)</td>
</tr>
<tr>
<td>Linear expansion ratio</td>
<td>22×10⁻⁶</td>
</tr>
</tbody>
</table>

Wear Resistance

The result of our test has proven that the wear resistance of the A-1 alloy is equivalent to the high-strength zinc alloy.

<table>
<thead>
<tr>
<th>Test conditions</th>
<th>Ambient temperature</th>
<th>Normal temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied load</td>
<td>±1.9kN (perpendicular to axis)</td>
<td>(Note)</td>
</tr>
<tr>
<td>Loading frequency</td>
<td>0.6Hz</td>
<td></td>
</tr>
<tr>
<td>Kinematic angle</td>
<td>Rotation ±20°</td>
<td>Rocking ±20°</td>
</tr>
<tr>
<td>No. of cycles</td>
<td>40 cycles per min.</td>
<td>40 cycles per min.</td>
</tr>
<tr>
<td>Total No. of cycles</td>
<td>1,000,000 cycles</td>
<td></td>
</tr>
</tbody>
</table>

Test result: change in clearance (mm)

<table>
<thead>
<tr>
<th>Change in clearance (mm)</th>
<th>AL10D (A-1 alloy)</th>
<th>BL10D (high-strength zinc alloy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perpendicular to axis</td>
<td>0.036</td>
<td>0.033</td>
</tr>
<tr>
<td>Axial direction</td>
<td>0.052</td>
<td>0.045</td>
</tr>
</tbody>
</table>

Note: For the load direction, see page t-9.
High-strength Zinc Alloy

The high-strength zinc alloy used in the holders of models BL, RBL, RBI and TBS has been developed as a bearing alloy by mixing Al, Cu, Mg, Be and Ti as well as zinc as the base component. It is excellent in mechanical properties, seizure resistance and wear resistance.

Composition

Table 1 Composition of the High-strength Zinc Alloy

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A l</td>
<td>3 to 4</td>
</tr>
<tr>
<td>Cu</td>
<td>3 to 4</td>
</tr>
<tr>
<td>Mg</td>
<td>0.03 to 0.06</td>
</tr>
<tr>
<td>Be</td>
<td>0.02 to 0.06</td>
</tr>
<tr>
<td>Ti</td>
<td>0.04 to 0.12</td>
</tr>
<tr>
<td>Zn</td>
<td>Remaining portion</td>
</tr>
</tbody>
</table>

Mechanical Properties

Tensile strength: 275 to 314 N/mm²
Tensile yield strength (0.2%): 216 to 245 N/mm²
Compressive strength: 539 to 686 N/mm²
Compressive yield strength (0.2%): 294 to 343 N/mm²
Fatigue strength: 132 N/mm²×10⁷ (Schenk bending test)
Charpy impact strength: 0.098 to 0.49 N-m/mm²
Elongation: 1 to 5 %
Hardness: 120 to 145 HV

Physical Properties

Specific gravity: 6.8
Melting point: 390 °C
Specific heat: 460 J/(kg·k)
Linear expansion ratio: 24×10⁻⁶

Wear Resistance

The wear resistance of the high-strength zinc alloy is superior to that of class-3 brass and class-3 bronze, almost equal to that of class-2 phosphor bronze.

Amsler wear-tester:
Test piece rotation speed: 185 min⁻¹
Load: 392 N
Lubricant: Dynamo oil

Fig. 2 Wear Resistance of the High-strength Zinc Alloy
Safety Design

Permissible Tilt Angle
The permissible tilt angles of Link Ball models are indicated in the corresponding dimensional tables.

Note: If the permissible tilt angle is exceeded, it may cause serious damage to the holder or the boot. Be sure to use the Link Ball within its permissible tilt angle.

Service Temperature
If the Link Ball is to be used at temperature of 80°C or higher, or receives an impact at low temperature, it is necessary to consider the safety factor of the holder. Contact THK in advance. For details, see the data on durability tests conducted in high and low temperatures (page T-16 of the "THK General Catalog - Technical Descriptions of the Products," provided separately).
In an actual application, the Link Ball has been used as a ball joint for transmission control of a truck at service temperature between -40°C and +140°C.

How Load Directions Are Called
Regardless of the shape, the direction of the load applied to the Link Ball is called "axial direction" if it is parallel to the axis of the ball shank, and "perpendicular-to-axis direction" if it is perpendicular to the axis.
Examples of Installation

Comparison of **THK** Link Ball and the Conventional Rod End

- **THK** model BL
- Conventional Rod End model PHS

- Since it has a shaft, model BL can easily be installed (especially useful for rod assembly).
- Because of the improved shape of the boot lip, the spherical area is protected from muddy water even in a muddy atmosphere.
- Since it contains grease, it can be used without further lubrication (superb in lubricity).
- Unlike the conventional type, which has a clearance between the shaft and the inner circumference of the ring and cannot be fixed completely, model BL has minimum distortion and high rigidity since the shank is integrated with the ball.

Examples of Installing Model RBI

- Joint for cylinder end metal fitting
- Connecting a rod in the axial direction
- Rotation support
- Suspending a light object
### Model AL

#### Tolerance of the Mating Hole of the Ball Shank
H10 is recommended.

#### Spherical Clearance
Perpendicular to axis: 0.02 mm to 0.06 mm
Axial direction: 0.3 mm or less

#### Identification of Left-hand Thread
If the female thread is left-hand, its identification depends on the cap color and marking.

#### Material
- Holder: A-1 alloy (see page t-7)
- Ball Shank: Bearing steel ball
  - Hardness: 650 Hv or higher
  - Shank: S35C (20 to 28 HRC)
- Color: Chromate finish
- Boot: NBR-based special synthetic rubber

#### Model number coding

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Outer dimensions</th>
<th>Thread</th>
<th>Holder dimensions</th>
<th>Ball shank dimensions</th>
<th>Ball diameter</th>
<th>Permissible tilt angle</th>
<th>Applied static load</th>
<th>Yield point strength</th>
<th>Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL 4D</td>
<td>24.5 13 20</td>
<td>M4x0.7</td>
<td>18 8 4 7.5 9.5 8</td>
<td>d₅ h9 M1 M₁ ±0.3 ℓ₁ B₀-0.3 d₆</td>
<td>4 15 7</td>
<td>6 7 8.1</td>
<td>7.938 40</td>
<td>4510 1370 7</td>
<td></td>
</tr>
<tr>
<td>AL 5D</td>
<td>34.5 15 26.7</td>
<td>M5x0.8</td>
<td>27 15 4 9 12 10</td>
<td>5 21 10 8 9.2</td>
<td>9.525</td>
<td>40</td>
<td>6470 2250 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL 6D</td>
<td>38.5 17 32.6</td>
<td>M6x1</td>
<td>30 16 5 10 13 11</td>
<td>6 26 11 10 11.6</td>
<td>11.112</td>
<td>40</td>
<td>9900 3920 18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL 8D</td>
<td>46 20 38.6</td>
<td>M8x1.25</td>
<td>36 19 6 13 16 14</td>
<td>8 31 14 12 13.8</td>
<td>12.7</td>
<td>40</td>
<td>12500 6570 32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL 10D</td>
<td>56 26 46.3</td>
<td>M10x1.25</td>
<td>43 23 7 15.5 19 17</td>
<td>10 37 17 15 14 16.2</td>
<td>15.875</td>
<td>40</td>
<td>18300 11300 65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL 10BD</td>
<td>56 26 52.3</td>
<td>M10x1.5</td>
<td>43 23 7 15.5 19 17</td>
<td>10 43 17 21 14 16.2</td>
<td>15.875</td>
<td>40</td>
<td>18300 11300 68</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Yield Point Strength
It indicates the strength in the direction shown in the figure below.

#### Lubrication
Lithium soap group grease No. 2 is contained in the boot and the cap.

---

**Selecting a Model Number**
Refer to the "THK General Catalog - Technical Descriptions of the Products," provided separately.
### Model RBL

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Outer dimensions</th>
<th>Thread</th>
<th>Holder dimensions</th>
<th>Ball shank dimensions</th>
<th>Boot</th>
<th>Eccentricity</th>
<th>Ball diameter</th>
<th>Permissible tilt angle</th>
<th>Applied static load</th>
<th>Yield point strength</th>
<th>Mass g</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBL 5D</td>
<td>35 16 29</td>
<td>M5×0.8</td>
<td>L1 4 L2 9 D1 11 D2 11 W 0.3</td>
<td>d1 5 m2 10 m3 8 δ 7</td>
<td>6</td>
<td>11</td>
<td>1.112</td>
<td>45</td>
<td>9220</td>
<td>2250</td>
<td>24</td>
</tr>
<tr>
<td>RBL 6D</td>
<td>40 19 35.5</td>
<td>M6×1</td>
<td>L1 5 L2 10 D1 13 D2 11 W 0.3</td>
<td>d1 6 m2 11 m3 8 δ 7</td>
<td>6</td>
<td>12</td>
<td>1.27</td>
<td>45</td>
<td>12100</td>
<td>3530</td>
<td>37</td>
</tr>
<tr>
<td>RBL 8D</td>
<td>48 23 42.5</td>
<td>M8×1.25</td>
<td>L1 5 L2 17 D1 16 D2 14 W 0.3</td>
<td>d1 8 m2 14 m3 10 δ 12</td>
<td>24</td>
<td>15.875</td>
<td>45</td>
<td>19100</td>
<td>6570</td>
<td>67</td>
<td></td>
</tr>
<tr>
<td>RBL 10D</td>
<td>57 27 50.5</td>
<td>M10×1.25</td>
<td>L1 4 L2 21 D1 19 D2 17 W 0.3</td>
<td>d1 10 m2 17 m3 15 δ 14</td>
<td>30</td>
<td>19.05</td>
<td>45</td>
<td>27500</td>
<td>10700</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>RBL 12D</td>
<td>66 31 57.5</td>
<td>M12×1.25</td>
<td>L1 5 L2 25 D1 19 D2 17 W 0.3</td>
<td>d1 12 m2 19 m3 17 δ 19</td>
<td>32</td>
<td>22.225</td>
<td>45</td>
<td>27500</td>
<td>16400</td>
<td>185</td>
<td></td>
</tr>
<tr>
<td>RBL 14D</td>
<td>75 35 73.5</td>
<td>M14×1.5</td>
<td>L1 5 L2 25 D1 19 D2 17 W 0.3</td>
<td>d1 14 m2 19 m3 22 δ 19</td>
<td>32</td>
<td>22.225</td>
<td>45</td>
<td>37500</td>
<td>16400</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>RBL 16D</td>
<td>84 39 79.5</td>
<td>M16×1.5</td>
<td>L1 5 L2 25 D1 19 D2 17 W 0.3</td>
<td>d1 16 m2 19 m3 25 δ 19</td>
<td>38</td>
<td>25.4</td>
<td>45</td>
<td>49800</td>
<td>16400</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>RBL 16B</td>
<td>84 39 85.5</td>
<td>M16x2</td>
<td>L1 5 L2 25 D1 19 D2 17 W 0.3</td>
<td>d1 16 m2 19 m3 25 δ 19</td>
<td>38</td>
<td>25.4</td>
<td>45</td>
<td>49800</td>
<td>16400</td>
<td>260</td>
<td></td>
</tr>
<tr>
<td>RBL 18D</td>
<td>94 44 90</td>
<td>M18×1.5</td>
<td>L1 5 L2 35 D1 23 D2 21 W 0.3</td>
<td>d1 18 m2 23 m3 31 δ 27</td>
<td>50</td>
<td>28.575</td>
<td>35</td>
<td>61900</td>
<td>33300</td>
<td>465</td>
<td></td>
</tr>
<tr>
<td>RBL 20D</td>
<td>99 44 90</td>
<td>M20X1.5</td>
<td>L1 5 L2 35 D1 23 D2 21 W 0.3</td>
<td>d1 20 m2 23 m3 34 δ 30</td>
<td>50</td>
<td>28.575</td>
<td>35</td>
<td>61900</td>
<td>45900</td>
<td>540</td>
<td></td>
</tr>
<tr>
<td>RBL 22D</td>
<td>109 50 95</td>
<td>M22X1.5</td>
<td>L1 5 L2 35 D1 23 D2 21 W 0.3</td>
<td>d1 22 m2 23 m3 37 δ 32</td>
<td>54</td>
<td>31.75</td>
<td>27</td>
<td>75400</td>
<td>48000</td>
<td>715</td>
<td></td>
</tr>
</tbody>
</table>

### Note
- The fine letters in the model numbers represent semi-standard types. We recommend using model BL on page t-16.
- Material: High-strength zinc alloy (see page t-6)
- Holder: Bearing steel ball
- Hardness: 650 Hv or higher
- Shank: S35C (color chromate finish)
- Boot: NBR-based special synthetic rubber

### Spherical Clearance
- Perpendicular to axis: 0.02 mm to 0.06 mm
- Axial direction: 0.3 mm or less

### Model number coding
- **RBL10 DL**
  - 1: Model number
  - 2: With boot attached
  - 3: Left-hand thread

### Tolerance of the Mating Hole of the Ball Shank
- H10 is recommended.

### Yield Point Strength
- It indicates the strength in the direction shown in the figure below.

### Lubrication
- Lithium soap group grease No. 2 is contained in the boot.

### Identification of Left-hand Thread
- If the female thread is left-hand, symbol "L" is added.
- The actual product is marked with symbol "L" on the wrench jaw area of the holder.
Selecting a Model Number
Refer to the "THK General Catalog - Technical Descriptions of the Products," provided separately.

### Model BL

**Model number coding**

<table>
<thead>
<tr>
<th>BL6 D L</th>
</tr>
</thead>
</table>

- **Model number**
- **With boot attached**
- **Left-hand thread**

**Material**

- High-strength zinc alloy (see page t-8)
- Ball shank: Bearing steel ball
  - Hardness: 650 Hv or higher
  - Shank: S35C (20 to 28 HRC)
  - Color chromate finish
- Boot: NBR-based special synthetic rubber

**Spherical Clearance**

- Perpendicular to axis: 0.02 mm to 0.06 mm
- Axial direction: 0.3 mm or less

**Thread**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Outer dimensions</th>
<th>Thread</th>
<th>Holder dimensions</th>
<th>Ball shank dimensions</th>
<th>Ball Diameter</th>
<th>Permissible tilt angle</th>
<th>Applied static load</th>
<th>Yield point strength</th>
<th>Mass g</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL 6D</td>
<td>38</td>
<td>16</td>
<td>32.6</td>
<td>M6x1</td>
<td>6</td>
<td>26</td>
<td>11</td>
<td>11</td>
<td>11.12</td>
</tr>
<tr>
<td>BL 6D</td>
<td>45.5</td>
<td>19</td>
<td>38.8</td>
<td>M8x1.25</td>
<td>8</td>
<td>31</td>
<td>14</td>
<td>12</td>
<td>12.7</td>
</tr>
<tr>
<td>BL 1OD</td>
<td>55.5</td>
<td>25</td>
<td>46.3</td>
<td>M10x1.25</td>
<td>10</td>
<td>37</td>
<td>17</td>
<td>15</td>
<td>15.875</td>
</tr>
<tr>
<td>BL 1OD</td>
<td>55.5</td>
<td>25</td>
<td>52.3</td>
<td>M10x1.25</td>
<td>10</td>
<td>43</td>
<td>17</td>
<td>21</td>
<td>15.875</td>
</tr>
<tr>
<td>BL 1OD</td>
<td>64.5</td>
<td>29</td>
<td>39.7</td>
<td>M12x1.25</td>
<td>12</td>
<td>42</td>
<td>19</td>
<td>17</td>
<td>19.05</td>
</tr>
<tr>
<td>BL 1OD</td>
<td>64.5</td>
<td>29</td>
<td>39.7</td>
<td>M12x1.25</td>
<td>12</td>
<td>49</td>
<td>19</td>
<td>21</td>
<td>19.05</td>
</tr>
<tr>
<td>BL 14D</td>
<td>74</td>
<td>34</td>
<td>68.4</td>
<td>M14x1.5</td>
<td>14</td>
<td>56</td>
<td>21.5</td>
<td>22</td>
<td>22.225</td>
</tr>
<tr>
<td>BL 14D</td>
<td>74</td>
<td>34</td>
<td>74.4</td>
<td>M14x1.5</td>
<td>14</td>
<td>62</td>
<td>21.5</td>
<td>28</td>
<td>22.225</td>
</tr>
<tr>
<td>BL 14D</td>
<td>83</td>
<td>38</td>
<td>80</td>
<td>M16x1.5</td>
<td>16</td>
<td>60</td>
<td>23.5</td>
<td>23</td>
<td>22.225</td>
</tr>
<tr>
<td>BL 14D</td>
<td>83</td>
<td>38</td>
<td>80</td>
<td>M16x1.5</td>
<td>16</td>
<td>66</td>
<td>23.5</td>
<td>29</td>
<td>22.225</td>
</tr>
</tbody>
</table>

**Tolerance of the Mating Hole of the Ball Shank**

H10 is recommended.

**Yield Point Strength**

- It indicates the strength in the direction shown in the figure below.

**Identification of Left-hand Thread**

- If the female thread is left-hand, its identification depends on the cap color and marking.

<table>
<thead>
<tr>
<th>Thread</th>
<th>Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cap color</td>
</tr>
<tr>
<td>Right-hand</td>
<td>White</td>
</tr>
<tr>
<td>Left-hand</td>
<td>Yellow</td>
</tr>
</tbody>
</table>

**Lubrication**

- Lithium soap ball grease No. 2 is contained in the boot and the cap.
## Model RBI

### Model Number Coding

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Outer dimensions (L)</th>
<th>Diameter (D)</th>
<th>Thread</th>
<th>Holder dimensions</th>
<th>Shaft diameter</th>
<th>Ball shank dimensions</th>
<th>Boot</th>
<th>Ball diameter</th>
<th>Permissible tilt angle</th>
<th>Applied static load</th>
<th>Yield point strength</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBI 5D</td>
<td>46</td>
<td>17</td>
<td>M5X0.8</td>
<td>24</td>
<td>4</td>
<td>12</td>
<td>9</td>
<td>11</td>
<td>20</td>
<td>11.12</td>
<td>25</td>
<td>5690</td>
</tr>
<tr>
<td>RBI 6D</td>
<td>55.2</td>
<td>20</td>
<td>M6X1</td>
<td>28</td>
<td>5</td>
<td>15</td>
<td>10</td>
<td>13</td>
<td>20</td>
<td>12.7</td>
<td>25</td>
<td>7450</td>
</tr>
<tr>
<td>RBI 8D</td>
<td>65</td>
<td>24</td>
<td>M8X1.25</td>
<td>32</td>
<td>5</td>
<td>16</td>
<td>12.5</td>
<td>16</td>
<td>24</td>
<td>15.875</td>
<td>25</td>
<td>11700</td>
</tr>
<tr>
<td>RBI 10D</td>
<td>74.5</td>
<td>28</td>
<td>M10X1.25</td>
<td>35</td>
<td>6.5</td>
<td>18</td>
<td>15</td>
<td>19</td>
<td>30</td>
<td>19.05</td>
<td>25</td>
<td>16800</td>
</tr>
<tr>
<td>RBI 10BD</td>
<td>80.5</td>
<td>28</td>
<td>M10X1.5</td>
<td>35</td>
<td>6.5</td>
<td>18</td>
<td>15</td>
<td>19</td>
<td>30</td>
<td>19.05</td>
<td>25</td>
<td>16800</td>
</tr>
<tr>
<td>RBD 12D</td>
<td>84</td>
<td>32</td>
<td>M12X1.25</td>
<td>40</td>
<td>6.5</td>
<td>20</td>
<td>17.5</td>
<td>22</td>
<td>32</td>
<td>22.225</td>
<td>25</td>
<td>22800</td>
</tr>
<tr>
<td>RBI 12BD</td>
<td>91</td>
<td>32</td>
<td>M12X1.75</td>
<td>40</td>
<td>6.5</td>
<td>20</td>
<td>17.5</td>
<td>22</td>
<td>32</td>
<td>22.225</td>
<td>25</td>
<td>22800</td>
</tr>
<tr>
<td>RBI 14D</td>
<td>103</td>
<td>36</td>
<td>M14X1.5</td>
<td>45</td>
<td>8</td>
<td>25</td>
<td>20</td>
<td>25</td>
<td>38</td>
<td>25.4</td>
<td>17</td>
<td>29800</td>
</tr>
<tr>
<td>RBI 14BD</td>
<td>109</td>
<td>36</td>
<td>M14X2</td>
<td>45</td>
<td>8</td>
<td>25</td>
<td>20</td>
<td>25</td>
<td>38</td>
<td>25.4</td>
<td>17</td>
<td>29800</td>
</tr>
<tr>
<td>RBI 16D</td>
<td>112</td>
<td>40</td>
<td>M16X1.5</td>
<td>50</td>
<td>8</td>
<td>27</td>
<td>22</td>
<td>27</td>
<td>44</td>
<td>25.4</td>
<td>17</td>
<td>29800</td>
</tr>
<tr>
<td>RBI 16BD</td>
<td>118</td>
<td>40</td>
<td>M16X2</td>
<td>50</td>
<td>8</td>
<td>27</td>
<td>22</td>
<td>27</td>
<td>44</td>
<td>25.4</td>
<td>17</td>
<td>29800</td>
</tr>
<tr>
<td>RBI 18D</td>
<td>130.5</td>
<td>45</td>
<td>M18X1.5</td>
<td>58</td>
<td>10</td>
<td>32</td>
<td>25</td>
<td>31</td>
<td>45</td>
<td>28.575</td>
<td>17</td>
<td>37700</td>
</tr>
<tr>
<td>RBI 20D</td>
<td>133</td>
<td>45</td>
<td>M20X1.5</td>
<td>63</td>
<td>10</td>
<td>38</td>
<td>27.5</td>
<td>34</td>
<td>50</td>
<td>28.575</td>
<td>17</td>
<td>37700</td>
</tr>
<tr>
<td>RBI 22D</td>
<td>145</td>
<td>50</td>
<td>M22X1.5</td>
<td>70</td>
<td>12</td>
<td>43</td>
<td>30</td>
<td>37</td>
<td>52</td>
<td>31.75</td>
<td>10</td>
<td>46600</td>
</tr>
</tbody>
</table>

### Note

- The permissible tilt angle of types without boot are greater by approximately 5°.

### Tolerance of the Mating Hole of the Ball Shank

H10 is recommended.

### Yield Point Strength

It indicates the strength in the direction shown in the figure below.

### Lubrication

Lithium soap group grease No. 2 is contained in the boot.

### Identification of Left-hand Thread

If the female thread is left-hand, symbol "L" is added. The actual product is marked with symbol "L" on the holder.

---

**Material**

- Holder: High-strength zinc alloy (see page t-6)
- Ball Shank: Bearing steel ball
- Hardness: 650 Hv or higher
- Shank: S35C (color chromate finish)
- Boot: NBR-based special synthetic rubber

**Spherical Clearance**

- Perpendicular to axis: 0.03 mm or less
- Axial direction: 0.1 mm or less
### Model TBS

**Model No.**
- TBS 6: M20x1.5
- TBS 8: M22x1.5
- TBS 10: M25x1.5
- TBS 12: M30x1.5

**Outer dimensions**
- Length (L): ±0.3 mm
- Threads (S): JIS Class 2

**Holder dimensions**
- L1: 1.5 mm
- L2: 1.5 mm
- L3: 1.5 mm

**Shaft diameter**
- d: 6 mm
- h9

**Ball shank dimensions**
- d1: 10 mm
- M1: 12.2 mm
- M2: 15 mm
- M3: 11 mm
- W1: 8 mm
- W: 0.3 mm

**Ball diameter**
- Da: 8.2 mm

**Permissible tilt angle**
- 2θ: 0.3°

**Applied static load**
- C(σ): 13700 N
- C(M): 4900 N
- C(C): 12000 N

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Outer dimensions</th>
<th>Holder dimensions</th>
<th>Shaft diameter</th>
<th>Ball shank dimensions</th>
<th>Ball diameter</th>
<th>Permissible tilt angle</th>
<th>Applied static load</th>
<th>Yield point strength</th>
<th>Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBS 6</td>
<td>M20x1.5</td>
<td>34.2</td>
<td>11.5</td>
<td>8</td>
<td>7</td>
<td>2</td>
<td>17</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>TBS 8</td>
<td>M22x1.5</td>
<td>41.5</td>
<td>14.5</td>
<td>11</td>
<td>8.5</td>
<td>2</td>
<td>19</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>TBS 10</td>
<td>M25x1.5</td>
<td>56.5</td>
<td>17</td>
<td>13.5</td>
<td>10</td>
<td>2</td>
<td>22</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>TBS 12</td>
<td>M30x1.5</td>
<td>63</td>
<td>20</td>
<td>15.5</td>
<td>12</td>
<td>3</td>
<td>27</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

**Material**
- High-strength zinc alloy (see page t-8)
- Ball shank: Bearing steel ball
- Hardness: 650 Hv or higher
- Shank: S35C (color chromate finish)

**Spherical Clearance**
- Perpendicular to axis: 0.03 mm or less
- Axial direction: 0.1 mm or less

**Female Thread for Attaching the Outer Ring**
- JIS Class 2 thread

**Yield Point Strength**
- It indicates the strength in the direction shown in the figure below.

**Example of Installation**
- As shown in the figure below, compared with the conventional installation using a frog-shaped joint, model TBS can be installed more compactly and more easily.

**Lubrication**
- Since the holder has an oil pocket, it allows grease to be replenished as necessary.