“AP” Bearings for Industrial Applications
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Introduction

When The Timken Company introduced its revolutionary AP™ (All-Purpose) railroad bearings in 1954, it was a railroad industry milestone. Four decades and more than 10 million “AP” bearings later, The Timken Company, the world’s largest manufacturer of tapered roller bearings, continues to lead in advancing bearing technology through continuous research and development.

In addition to railroad applications, “AP” bearings are successfully being used in more and more types of industrial applications. This can be attributed to many factors including the bearing’s low cost, high load carrying capacity and its adaptability to a wide variety of applications.

Consider These Advantages/Features of Timken “AP” Bearings:

■ Self-contained unit provides substantial cost savings in design and installation. Many mounting parts are available with the bearing assembly.

■ Pregreased unit reduces installation costs.

■ Preassembled bearing reduces the number of separate parts to be applied and helps reduce the chance of incorrect assembly.

■ High quality, tested and improved radial lip seals provide exceptional protection, minimum relubrication and low maintenance.

■ Positive alignment of rollers is maintained in the bearing due to its basic tapered roller construction. This distributes the load over the entire roller length, and prevents rollers from skewing.

■ On-apex design provides true rolling motion with a minimum of friction and maximum resistance to wear.

■ Case-carburized and hardened cones, cups and rollers put hardness where it is needed - at the working surfaces. The core of these parts, being more ductile, resists the propagation of fatigue cracks and spalls.

■ Adaptability to a wide range of applications in new designs and changeovers from other bearing types. “AP” bearings range in bore size from 101.6 to 203.2 mm (4 to 8”). Optional auxiliary parts can be added to suit a wide range of mounting configurations.

Bearing Reconditioning

Rail Bearing Service Corporation, a wholly-owned subsidiary of The Timken Company, reconditions bearings and related parts used in railroad rolling stock and other equipment. Its reconditioning capabilities are integral to the company’s further growth in railroad bearing markets.
Timken “AP” Bearing Assembly
Description of Parts

- The narrow adapter (shown below), available from The Timken Company, can be used in many applications. Another type of mounting, not available from The Timken Company, utilizes a full bore housing (see page 21).

- The bearing assembly is pressed on the axle as a completely sealed unit. The axle end cap, cap screws and locking plate can be applied to the axle as a unit. When the axle end cap, as shown in the photograph (below) is used, the locking plate provided locks the cap screws.

- The recessed end cap, (shown below), reduces the overall bearing assembly width. A piece of soft wire is required to lock the drilled cap screw heads. A backing spacer can be used in place of a backing ring.
## Introduction

### Basic Bearing Assembly Dimensions and Ratings

<table>
<thead>
<tr>
<th>CLASS</th>
<th>Inner Race (Cone) Number</th>
<th>Outer Race (Cup) Number</th>
<th>Bore d *</th>
<th>Outside Diameter D **</th>
<th>Kt</th>
<th>Outer Race Width C</th>
<th>Rating @ 500 RPM For 3000 hr L10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Radial N lbf</td>
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<tr>
<td>B (4¼ x 8)</td>
<td>HM120848-</td>
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<td>101.600</td>
<td>165.100</td>
<td>114.300</td>
<td>120000</td>
<td>120000</td>
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<tr>
<td></td>
<td>HM120848-</td>
<td>HM120817XD</td>
<td>4.0000</td>
<td>6.5000</td>
<td>3.59</td>
<td>4.5000</td>
<td>26900</td>
</tr>
<tr>
<td>C (5 x 9)</td>
<td>HM124646-</td>
<td>HM124618XD</td>
<td>119.062</td>
<td>195.262</td>
<td>108.7</td>
<td>142.875</td>
<td>172000</td>
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<td></td>
<td>HM124646-</td>
<td>HM124618XD</td>
<td>4.6875</td>
<td>7.6875</td>
<td>4.28</td>
<td>5.6250</td>
<td>38600</td>
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<td>D (5½ x 10)</td>
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<td>HM127415XD</td>
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<td>207.962</td>
<td>113.5</td>
<td>152.400</td>
<td>186000</td>
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<td>HM129814XD</td>
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<td>163.512</td>
<td>195000</td>
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<td>HM133416XD</td>
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<td>252.412</td>
<td>136.5</td>
<td>184.150</td>
<td>266000</td>
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<td>G (7 x 12)</td>
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<td>134.9</td>
<td>185.725</td>
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<td>HM136916XD</td>
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<td>10.8750</td>
<td>5.31</td>
<td>7.3120</td>
<td>68600</td>
</tr>
<tr>
<td>GG (7)</td>
<td>H337846-</td>
<td>H337816XD</td>
<td>177.787</td>
<td>301.701+</td>
<td>139.7</td>
<td>196.850</td>
<td>388000</td>
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<tr>
<td></td>
<td>H337846-</td>
<td>H337816XD</td>
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<tr>
<td>K (8)</td>
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<td>140.970</td>
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<tr>
<td></td>
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<td>M241513XD</td>
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<td>11.8750</td>
<td>4.25</td>
<td>5.5156</td>
<td>59700</td>
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</table>

* Cone Bore Tolerance (+0.025 – 0.000mm) +0.010” – .0000”
** Cup OD Tolerance (+0.127 – 0.000mm) +0.050” – .0000”
+ Cup H337816XD OD Tolerance is (+0.127 + 0.076mm) +0.050” + .0030”
Special Cup OD Tolerance (+0.102 + 0.076mm) +0.040” + .0030” also available.

METRIC SYSTEM (millimetres & newtons)
ENGLISH SYSTEM (inches & pounds)
Introduction

Overall Dimensions for “AP” Bearings

### Recessed End Cap Assembly
- **Kb** (6x11): 38.1 mm
- **E** (6x11): 38.1 mm

### Axle End Cap Assembly
- **38.1 mm 1.50” R.**

### Basic Bearing Assembly
- **38.1 mm 1.50” R.**

### *Backing Ring Assemblies W/Shroud W/O Shroud*

<table>
<thead>
<tr>
<th>CLASS</th>
<th>d (Max)</th>
<th>D (Max)</th>
<th>Bc (Max)</th>
<th>Kt (Max)</th>
<th>Kb (Max)</th>
<th>Kr (Max)</th>
<th>C (Max)</th>
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<tbody>
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<td>B (4/4 x 8)</td>
<td>101.600</td>
<td>165.100</td>
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<td>163.8***</td>
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<tr>
<td>D (5/4 x 10)</td>
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<td>207.962</td>
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<td>113.5</td>
<td>158.2***</td>
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<td>142.1</td>
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<td>220.662</td>
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<td>120.6</td>
<td>169.7</td>
<td>130.0</td>
<td>149.2</td>
</tr>
<tr>
<td>F (6/4 x 12)</td>
<td>157.150</td>
<td>252.412</td>
<td>163.5</td>
<td>136.5</td>
<td>181.6</td>
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<td>G (7 x 12)</td>
<td>177.787</td>
<td>276.225</td>
<td>150.8</td>
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<td>G (7 x 14)</td>
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<td>K (8)</td>
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<td>4.81</td>
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</table>

*Backing Ring Assemblies and/or Backing Spacer may be used on either side of the bearing.

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**METRIC SYSTEM (millimetres & newtons)**

**ENGLISH SYSTEM (inches & pounds)**
How To Identify Part Numbers and Assembly Numbers

Bearing Assembly Numbers

In order to facilitate the identity of groups of parts, as listed to the right, a “bearing assembly number” system is used. “AP” bearings are each assigned a five digit numeric code that follows the cone part number to describe the individual component parts, prelubrication, performance codes, and internal clearance of the pre-set assembly. In some cases the code may be alphanumeric, although the first digit is always “9”.

For new applications an assembly number is assigned on receipt of the first order. It is very important for the correct fitting and functioning of the bearing that the same assembly number is quoted for all subsequent replacement orders for that specific bearing position. Standard and supplemental assembly numbers are listed in this booklet starting on page 39. The Timken Company should be consulted if additional information is needed on any combination of parts or if questions arise about the correct assembly number for a specific application.

See page 39 to 41 for basic “AP” bearing assembly numbers.
See page 43 to 69 for supplemental and special assembly numbers.

The “assembly number,” shown below, identifies an assembly consisting of:

- 2 - HM120848 cones
- 1 - HM120817XD cup
- 1 - HM120848XA cone spacer
  (fitted for normal internal clearance)
- 2 - K86890 seal wear rings
- 2 - K86895 seal assemblies
- 1 - K86874-90010 backing ring assembly
  consisting of:
  - 1 - K86874 backing ring
  - 1 - K89716 vent fitting
# How To Identify Part Numbers and Assembly Numbers

## Standard Parts for Timken “AP” Bearings

<table>
<thead>
<tr>
<th>Bearing Class</th>
<th>Inner Race (Cone)</th>
<th>Outer Race (Cup)</th>
<th>Cone Spacer</th>
<th>Seal Wear Ring</th>
<th>Seal Assembly</th>
<th>Backing Ring</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>With Shroud</td>
<td>Without Shroud</td>
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<td>B (4/8)</td>
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<td>HM120848XA</td>
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<td>HM124646XA</td>
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<td>HM127446XA</td>
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<td>K88680</td>
<td>K85525</td>
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<td>E (6x11)</td>
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<td>HM129814XD</td>
<td>HM129848XA</td>
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<td>K88681</td>
<td>K85095</td>
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<td>HM133416XD</td>
<td>HM133444XA</td>
<td>K85509</td>
<td>K85520</td>
<td>K85516</td>
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<td>HM136916XD</td>
<td>HM136948XA</td>
<td>K147767</td>
<td>K96501</td>
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<td>HM136916XD</td>
<td>HM136948XA</td>
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<td>K96501</td>
<td>K95200</td>
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<tr>
<td>GG (7&quot; bore)</td>
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<td>H337846XA</td>
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<td>K (8&quot; bore)</td>
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<td>K504073</td>
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## Diagrams

![Diagram of Bearing Assembly](image_url)

## Tables

<table>
<thead>
<tr>
<th>Bearing Class</th>
<th>Backing Spacer</th>
<th>Axle End Cap</th>
<th>Recessed End Cap</th>
<th>Adapter**</th>
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<td></td>
<td></td>
<td></td>
<td>Narrow</td>
</tr>
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<td>K83093</td>
<td>K46462</td>
<td>K78880</td>
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<td>K83093</td>
<td>K46462</td>
<td>K78880</td>
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<tr>
<td>K</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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</table>

* Not Available - Consult The Timken Company
** Not Shown
Mounting Designs

Typical Applications

Listed below are some of the various applications on which “AP” bearings are presently being used. Photographs and/or line drawings of some of these designs are shown on the following pages.

Apron Feeder  Auto Shredder  Band Saw  Barking Drum – Thrust Rollers  Billet Ejector  Bucket Unloader  Calender Rolls  Cam Roller

Cars
- Billet Grinder Cars
- Cable Cars
- Cane Cars
- Charging Box Cars
- Coke Guide Cars
- Coke Quench Cars
- Coke Screening Cars
- Furnace Cars
- Furnace Heat Shield Cars
- Hot Metal Cars
- Ingot Cars
- Ingot Transfer Cars
- Ladle Transfer Cars
- Larry Cars
- Loop Cars
- Manipulator Cars
- Ore Transfer Cars
- Orienter Cars
- Scale Cars
- Scrap Charging Cars
- Sheer Piler Cars
- Shot Blast Cars
- Sintering Pallet Cars
- Skip Cars
- Slab Return Cars
- Slag Pot Cars
- Transfer Cars
- Transformer Cars
- Tundish Cars
- Weight Cars
- Workroll Changer Cars
- X-Ray Cars
- Chippers
- Chopper – Land Clearing
- Clay Gun Carriage
- Coal Crushing Machine
- Breaker Shaft
- Conveyor Drum
- Eccentric Shaft
- Coal Pulverizer
- Compactor Press
- Backhaast
- Flywheel
- Continuous Casters
- Apron Guide Rollers
- Runout Table Rolls
- Cut Off Conveyor
- Continuous Miner Drive
- Cutter Head
- Trackwheel Sprocket
- Conveyors
- Head and Tail Drums
- Crane
- Bridge Wheels
- Trolley Wheels
- Drum Supports
- Davey – Anchor
- Digest
- Dock – Loader and Unloader
- Dragline
- Drum Hoists
- Dynamometer
- Feeders
- Film Evaporators
- Flanging Machine
- Furnace
- Roof Swing Guide
- Walking Beam Wheels
- Rotary
- Gearless Elevator
- Gate Bar Rapper
- House Moving Dolly
- Jaw Crushers
- Laminators
- Levellers
- Line Shaft
- Line Tension Drum
- Locomotives
- Locomotive Cranes
- Log Rolls
- Missile Transporter
- Mobile Charger
- Moveable Stadium Stands
- Muckers
- Paper Mill Rolls
- Paper Reelers
- Pig Casting Machine
- Pillow Blocks
- Pinch Rolls
- Plate Benders
- Press
- Back Shaft
- Fly Wheel
- Press Rolls
- Pulp Beaters
- Pumping Unit
- Saddle
- Equalizer
- Radiation Chamber Door
- Ram Rollers
- Reeler Bar
- Rod Mill Roll Necks
- Rotary Wheels
- Saw Mill Carriage
- Shear
- Sheaves
- Elevator
- Fairlead
- Hoisting
- Idler
- Mine Head
- Ski Lift
- Slab Extractor
- Soaking Pit Cover
- Stackers
- Axles
- Conveyor Drums
- Hopper Car
- Triple Cable
- Table Rolls
- Bar Mills
- Billet Mills
- Blooming Mills
- Furnace Feed
- Merchant Mills
- Pipe Conveyor
- Rod Mills
- Slab Mills
- Strip Mills
- Structural Mills
- Table Roll Line Shaft
- Target Transporter
- Temnor Mill 2 Stand
- Trunnion Rollers
- Barking Drum
- Copper Converter
- Dryer
- Kiln
- Scrubber
- Turntables
- Water Purification Drum
- Welding Positioners
- Wire Spool Support Heads

Crane Bridge and Trolley Axle

This illustrates a typical “AP” bearing mounting for crane bridge and trolley axle using recessed end cap. This clamped wheel design is shown on a drive axle. The idler axle design is similar except both bearings are clamped in the same manner as the left-hand assembly shown in the drawing on the left. The drawings on the right show typical full bore housing designs for crane wheel applications.
Mounting Designs

Crane Bridge and Trolley Axle

These bridge and trolley wheel applications illustrate both recessed and standard end caps.

Moveable Stadium Stands

Timken “AP” bearings enable a section of stands of this stadium to be moved to provide better viewing angles for baseball and football games.
A single standard narrow adapter is used on each end of this table roll to support the “AP” bearing. The adapter is mounted in a fabricated housing that provides both radial and axial positioning.
**Ram Roller - Adapter Mounting**

A standard narrow adapter is used at both positions to insure positive radial location of the “AP” bearing cups.

A close clearance is provided between thrust lugs and the sides of the adapters to keep axial movement of the shaft to a minimum.
Mounting Designs

Continuous Casting Machine Guide Rollers

Used successfully on both original and conversion guide roller applications, “AP” bearings provide a maintenance free, economical mounting arrangement.

Close tolerance adapters are used in the lower design.
Continuous Casting Machine Runout Tables

Continuous cast shapes roll on “AP” bearing equipped runout tables.

Pillow Block

Greasing systems are not required with the prelubricated “AP” bearing used in this pillow block application. This assures a substantial savings in initial cost as well as subsequent maintenance.
This mine head sheave is Timken Class C & E “AP” bearing equipped.
**Elevator Sheave**

The cup of this “AP” bearing is mounted directly into the sheave hub with a tight fit. Snap rings are required because of elevator safety regulations.

No provision for relubrication is made in this application. Some builders prefer to completely fill the bearing with grease at assembly while others depend on the initial charge of grease as supplied in a new bearing. Either practice is completely satisfactory for this application.

**Trunnion Rollers**
Mounting Designs

Ingot Cars

Thousands of “AP” bearing-equipped ingot cars in various capacity ratings are in service in steel plants around the world. Maintenance costs for these cars are negligible. Minimum relubrication attention is required when compared to cars equipped with other types of bearings.

The “AP” bearing with standard narrow adapter has been incorporated into cast journal box with a splash cover.
The cones in this inboard design are clamped on the shaft by the press fit of the wheel hub.

The adapter is mounted in a cast side frame and is restricted from axial movement as shown in Section C-C.
Mounting Designs

Sintering Car Wheel

This application illustrates the effectiveness of the “AP” bearing seals in excluding the abrasive material from the bearing elements.

Coal Crusher

“AP” bearings are used on the breaker shaft (insert) as well as in the conveyor drive head and tail drums of this coal crusher.
**Mounting Designs**

**Wood Pulp Beater Spindle**

This beater spindle uses all standard parts of the “AP” bearing unit with exception of the special housing. A clearance can be provided between the faces of the cup and housing shoulders to provide axial float as required. Note that this design uses a split housing.

**Furnace Wheel**

This design still takes advantage of the “package” portion of the “AP” bearing – seal wear ring to seal wear ring. The use of both the adapter and backing ring is eliminated. The end cap is applied after insertion of a special spacer backing against the seal wear ring to completely clamp up the bearing assembly.
### Technical Support

#### Axle Details

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<th>CLASS</th>
<th>( d_a^{**} )</th>
<th>Bkg. Spacer</th>
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** For normal rotating shaft applications. For other conditions, see fitting practice tables on page 27

#### Axle End Cap

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<th>( G_c )</th>
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<th>( d_c )</th>
<th>( G_a )</th>
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** Metric System (millimetres & newtons)

** English System (inches & pounds)
### Technical Support

#### Full Bore Housing Dimensions

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<th>C&lt;sub&gt;j&lt;/sub&gt;</th>
<th>D&lt;sub&gt;a&lt;/sub&gt;*</th>
<th>D&lt;sub&gt;b&lt;/sub&gt;</th>
<th>K&lt;sub&gt;l&lt;/sub&gt;**</th>
<th>K&lt;sub&gt;n&lt;/sub&gt;**</th>
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<td>(-0)</td>
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⚠️ Outer undercut can be eliminated if housing is shortened to end of the “Cg” dimension.

* See page 27 for complete fitting practice information.
** Bearing width dimensions.
*** Relief machined on cup OD; housing undercut not required.

NOTE: Full bore housings are not furnished by The Timken Company.

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**METRIC SYSTEM (millimetres & newtons)**

**ENGLISH SYSTEM (inches & pounds)**

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21
Technical Support

ADAPTERS AND MOUNTING DESIGNS
Mounting Dimensions for Narrow Adapter

NOTE: All drawings are shown in inch dimensions.

1. Thrust lugs could be welded or machined into opening.
2. Class G and K adapter do not require thrust lugs.
3. Provide shim to give 0.25 mm to 0.38 mm (.010” to .015”) clearance between tie plate and cup OD.

If cup turning in the adapter should occur a resilient pad may be used between the tie plate and the cup OD to lightly hold the cup from turning.

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<th>Kf</th>
<th>Kg</th>
<th>Kh*</th>
<th>Kj</th>
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* See opposite page
** Adapter with thrust lugs at top - see opposite page

NOTE: If existing frame design will not accommodate a narrow adapter, consult The Timken Company for possible use of a wide adapter – see page 9 for application photos.
Class B, C, D, E, and F Narrow Adapter

Section B-B

Class G and K Narrow Adapter

Section B-B

Half Front View - Half Section A-A
### Auxiliary Parts Detail Dimensions

#### Seal Wear Ring

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#### Backing Spacer

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**METRIC SYSTEM** (millimetres & newtons)

**ENGLISH SYSTEM** (inches & pounds)
### Auxiliary Parts Detail Dimensions

#### Axle End Cap

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<th>(d_u)</th>
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<th>(B_t)</th>
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#### Recessed End Cap

METRIC SYSTEM (millimetres & newtons)

ENGLISH SYSTEM (inches & pounds)
### Auxiliary Parts Detail Dimensions

#### Backing Rings With Shroud

![Diagram of Backing Rings With Shroud](image)

#### Backing Rings Without Shroud

![Diagram of Backing Rings Without Shroud](image)

### Class B thru F and G (7 & 14) Class G (7 x 12) and GG (7)

All drawings are shown in inch dimensions.

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<tr>
<th>CLASS</th>
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<th>$d_j$</th>
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<th>$B_k$</th>
<th>$B_l$</th>
<th>$B_o$</th>
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<th>$B_k$</th>
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### METRIC SYSTEM (millimetres & newtons)

### ENGLISH SYSTEM (inches & pounds)

* Consult The Timken Company for availability
## Technical Support

### Industrial Equipment – Fitting Practice For “AP” Bearings (Micrometres, \(\mu m\))

<table>
<thead>
<tr>
<th>CLASS</th>
<th>Cone</th>
<th>Cup</th>
<th>Rotating Cone</th>
<th>Stationary Cone</th>
<th><strong>Rotating Cup</strong></th>
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<td>HM120817XD</td>
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* Cup OD Tolerance +0.127 to -0.000 (cup no. H337816XD OD tolerances is +0.127 to +0.076: (T) - Tight (L) - Loose

** Rotating cup applications require 0.025 cup OD tolerance +0.050 +0.025 (Consult The Timken Company for availability).

## Industrial Equipment – Fitting Practice For “AP” Bearings (Inches)

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<tr>
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<th>Cup</th>
<th>Rotating Cone</th>
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</tbody>
</table>

* Cup OD Tolerance +0.050 to -0.000 (cup no. H337816XD OD tolerances is +0.050 to +0.030: suitable for rotating cup applications.)

** Rotating cup applications require 0.010 cup OD tolerance +0.040 +0.030 (Consult The Timken Company for availability).

METRIC SYSTEM (millimetres & newtons)
ENGLISH SYSTEM (inches & pounds)
**Technical Support**

**Press Fit Force Required to Apply Collars. Gears, or Couplings Used to Retain an “AP” Bearing**

The clamping force resulting from a press fit is equal to:

\[ F = \frac{1}{2} \pi f L \delta E \left[1 - \left(\frac{b}{c}\right)^2\right] \]

Where:
- \( F \) = Clamping Force - newton (lb)
- \( f \) = Coefficient of Friction - .17
- \( L \) = Length of Clamping Part - metre (in)
- \( \delta \) = Fit on Dia - metre (in)
- \( E \) = 2.068x10^11 pascal (30x10^6 lb/in^2)
- \( b \) = ID of Clamping Part - metre (in)
- \( c \) = OD of Clamping Part - metre (in)

**Axle Stress Calculation for Cars and Rolling Stock**

\[ S = 10.2 \times P \times \ell \]

\[ (da)^3 \]

Where:
- \( S \) = Axle Stress - MPa (lb/in^2)
- \( P \) = Bearing Load - newton (lb)
- \( d_a \) = Cone Seat - mm (in)
- \( \ell_i, \ell_o \) = Moment Arm - mm (in)

Inboard Journal - \( \ell_i \) = Distance from bearing centerline to wheel load centerline

Outboard Journal - \( \ell_o \) = Distance from bearing centerline to point on \( d_a \) tangent to shaft radius

**METRIC SYSTEM (millimetres & newtons)**

<table>
<thead>
<tr>
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<th>( (da)^3 )</th>
<th>( \ell_o )</th>
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**ENGLISH SYSTEM (inches & pounds)**

---

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**Basic “AP” Bearing Dimensions and Ratings**

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<th>Cone Length</th>
<th>Spacer Length</th>
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<td>59700</td>
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</table>

**Bearing Loading Analysis Formulae**

\[
L_{10} = \left( \frac{C_{90}}{P} \right)^{10/3} \left( \frac{1.5 \times 10^6}{n} \right)
\]

Where:
- \( L_{10} = \) Rated Life in Hours (life expectancy associated with 90% reliability)
- \( C_{90} = \) Rating at 500 RPM for 3000 hr L10
- \( P = \) Dynamic equivalent radial load from a combination of radial and thrust loads.

**METRIC SYSTEM** (millimetres & newtons)

**ENGLISH SYSTEM** (inches & pounds)
**Technical Support**

**ASSEMBLY AND DISASSEMBLY**

*Bearing Installation*

Bearing assemblies should be stored in a clean, dry place and should be protected from moisture and kept dry until they are installed on the axle.

Bearing assemblies should not be removed from the shipping package nor should the protective wrapping be removed until time of application.

Do not remove the cardboard insert from the bore of the bearing assembly. This insert will hold the cone spacer in alignment with the bearing cones when installing the bearing assembly on the pilot sleeve.

*Pressing Bearing Assemblies on Axles*

The amount of press fit of the bearing on the axle is predetermined by the dimensional tolerances of the axle and bearing cones. Neither bearings nor axle need be selected for fit.

Tools designed for roller bearing installation and removal should be used.

Timken “AP” bearings may be installed or removed with a bearing press, wheel press, or with portable fixtures depending on production requirements.

Coat the bearing seats of the axle with castor oil, heavy mineral oil, or a molydenumdisulphide and oil mixture. *Do not use white lead.* Lead compounds may be detrimental to lubricating greases by acting as an oxidation catalyst.

A thin coating of rust preventive can be applied to the axle fillet if the standard backing ring as shown below is used. The rust preventive used must not contain lead or other compounds which may be detrimental to lubricating greases.

The bearing assemblies are shipped with a protective coating of grease over the vent fitting. Care should be taken to see that the grease is not wiped off when the bearings are applied to the axles.
A pilot sleeve should be used to keep the cone spacer in alignment with the bores of the cones and to guide the bearing assembly on the axle. (page 30)

An assembly sleeve which contacts the seal wear ring outer face and telescopes over the pilot sleeve is used to press the bearing on the axle.

When the bearing assembly is slipped on the pilot sleeve and the cardboard insert is ejected, the seal wear ring should be held in place to prevent it from sliding out of the enclosure seal.

If the seal wear rings does slip out of the assembly it must be inserted into the enclosure seal correctly and carefully, chamfered end first, so that the outer lip of the seal does not turn under when the seal lips are expanded over the seal wear ring.

*Do not insert any tool or other instrument between the seal element lips and seal wear ring.* This may damage the seal element lips or scratch the seal wear ring resulting in bearing lubricant leakage.

To make sure that the bearings are firmly seated against the axle fillet, the forces shown in the following table should be applied to the bearings after the surge of the pressure gage indicates that the bearings have contacted the axle fillet.

**Bearing Installation Force**

<table>
<thead>
<tr>
<th>Bearings Class</th>
<th>Clamping Force</th>
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<tr>
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<tr>
<td>B &amp; C</td>
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</tr>
<tr>
<td>D, E, &amp; F</td>
<td>50-60</td>
</tr>
<tr>
<td>G &amp; GG</td>
<td>60-70</td>
</tr>
<tr>
<td>K</td>
<td>50</td>
</tr>
</tbody>
</table>

Due to the rubbing type seals, the bearing assembly will not rotate freely at initial application. New bearing assemblies are pre-set at the factory. No adjustment is necessary at installation.

**Applying The Axle End Cap**

Remove the axle end cap assembly from the carton and remove the cardboard cap screw retainer.

Apply the axle end cap, locking plate, and cap screws to the end of the axle as a unit.

A ratchet wrench or an impact wrench may be used to run up the cap screws.

Tighten the cap screws with a torque wrench to the torque specified in the table below. Recheck each cap screw several times until the specified torque is obtained for each cap screw.

**Cap Screw Tightening Torque**

<table>
<thead>
<tr>
<th>Cap Screw Size</th>
<th>Torque</th>
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<tbody>
<tr>
<td></td>
<td>lb-ft</td>
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<tr>
<td>1/8&quot;</td>
<td>110-120</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>110-120</td>
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<tr>
<td>7/8&quot;</td>
<td>140-150</td>
</tr>
<tr>
<td>1&quot;</td>
<td>250-270</td>
</tr>
<tr>
<td>1 1/8&quot;</td>
<td>360-390</td>
</tr>
<tr>
<td>1 1/4&quot;</td>
<td>430-460</td>
</tr>
</tbody>
</table>

Lock the cap screws by bending all tabs of the locking plate flat against the sides of the cap screw heads. For the recessed end cap, simply wire the heads together.

If water or humid conditions exist, a bead of sealant can be applied around the joint of the backing ring and shaft, after the bearing assembly is pressed in place (not required for backing rings press fitted on shaft step).
Equipment For Bearing Installation and Removal

Details of the pilot sleeve and the assembly sleeve used for applying Timken “AP” bearing assemblies to an axle with a wheel press or bearing press.

### Technical Support

**Equipment For Bearing Installation and Removal**

Details of the pilot sleeve and the assembly sleeve used for applying Timken “AP” bearing assemblies to an axle with a wheel press or bearing press.

**METRIC SYSTEM (millimetres & newtons)**

<table>
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<tr>
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<th>Recessed</th>
<th>All</th>
<th>Axle End Cap</th>
<th>Recessed</th>
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<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
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<td>3978</td>
<td>3.978</td>
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<td>978</td>
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<td>4.167</td>
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<td>106.25</td>
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<td></td>
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<td>88.9</td>
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**Details of the pilot sleeve and the assembly sleeve used for applying Timken “AP” bearing assemblies to an axle with a wheel press or bearing press.**

**ENGLISH SYSTEM (inches & pounds)**
### Equipment For Bearing Installation and Removal (Limited Production)

#### METRIC SYSTEM (millimetres & newtons)

<table>
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<tr>
<th>CLASS</th>
<th>dₐ*</th>
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<th>Recessed End Cap</th>
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<td>dₜ</td>
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<td>4.000</td>
<td>–</td>
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*Axle size for rotating cone applications

For those applications where a limited quantity of bearings are to be mounted, the assembly tool shown above can be economically fabricated.

**METRIC SYSTEM (millimetres & newtons)**

**ENGLISH SYSTEM (inches & pounds)**
**Technical Support**

**SIMPLIFIED INSTALLATION OF “AP” BEARINGS FOR INDUSTRIAL EQUIPMENT**

What does the operator of a machine do when his machine, located in a remote area away from any sophisticated tools, needs a bearing replaced? The Timken Company suggests using the following procedures for installing “AP” bearings when sophisticated tools are not available. These methods for installing “AP” bearings are valuable ways of saving time and money.

**Installation Methods**

Unlike other tapered roller bearing installations where the individual components are installed separately, the complete “AP” bearing assembly should be installed simultaneously.

**Hydraulic RAM Method**

One method of installation utilizes a hydraulic pump and ram in an arrangement as shown at right.

The 445 kilonewton (50 ton) capacity centerhole hydraulic ram is used for the Class “D” (5½ x 10) bearing.

**Threaded Rod and Nut Method**

One of the least expensive tooling arrangements for installing our “AP” bearing utilizes the tools shown in at right.

The push tube is counterbored to accommodate our T127 thrust bearing to eliminate much of the friction between the nut face and the push tube.
**Tooling**

Both installation methods used a 1-1/4”-7 UNC threaded rod (SAE 4340 steel, hardened 48-53 Rc) threaded into a bearing pilot as shown at right. Both methods use a push tube, nut, and cap screws.

Three cap screws are then used to bolt the bearing pilot to the end of the shaft.

Lubricant is applied to the shaft before pressing on the bearing.

Required installation clamping force for each size of “AP” bearing may be obtained from page 31.

**Comparison of Methods**

If the user does not own a hydraulic pump and ram, the “threaded rod and nut” method would probably be less expensive. However, the threaded rod and nut method requires slightly more time and effort to install the bearing.

In many instances an operator already has a hydraulic pump and ram which he uses for routine maintenance. If this is the case, the hydraulic pump and ram method would be less expensive than the threaded rod and nut method. The hydraulic method is slightly faster and requires less effort than the threaded rod and nut method.

Regardless of the method used for installing the bearing assembly, it should be made certain that all components are properly seated. A distinctive metallic ping occurs at the instant all the components are seated.
Bearing Removal (Axle)

The bearing assemblies may be removed with a press or with portable fixtures. A force of 356-534 kilonewtons (forty to sixty tons) pressure is normally required to break the bearing fit.

When it is desirable to remove the bearing without removing a wheel or other adjacent backing part, a pulling shoe is used, similar to that shown below.

Make sure that the pulling shoe is of the correct size for the bearing to be removed. Proper contact with the backing ring and puller alignment are necessary for efficient bearing removal.

Position the pulling shoe behind the backing ring. The pulling shoe contact surface of the backing ring is very narrow. Therefore, it is necessary to hold the pulling shoe down in position behind the backing ring as shown below until the initial pressure has been applied to insure proper contact with the backing ring. Extend the ram to remove the bearing from the axle.

If bearings are to be removed along with wheels, make sure that the wheel hub will contact the backing ring or seal wear ring if a backing ring is not used. If the axle has large wheel seats, a suitable shoe or blocks must be used to make contact between the wheel hub and backing ring.

When bearings are removed from the axle, a pilot sleeve or guide tube should be fastened to the end of the axle or to the press ram to keep the bearing parts together and protect them from damage. Do not drop the bearing when removing it from the pilot sleeve.

After the bearing assembly is removed from the pilot sleeve, a tube similar to the cardboard insert or a similar device should be inserted in the bore of the bearing assembly to hold the internal bearing parts in place. Particular attention should be given to keeping the seal wear ring in place in the enclosure seals.

Whenever bearing assemblies are removed from the axles, the bearings should be disassembled, cleaned and inspected.
Technical Support

Lubrication of “AP” Bearings

Timken “AP” bearings are furnished prelubricated approximately half full with greases approved by the Association of American Railroads (AAR) Specification M942-78.

To help prevent the ingress of contamination, it is often advantageous for the customer to fill the “AP” bearing completely full of grease, particularly in low and moderate speed applications. The grease used to fill the bearing should be compatible with the factory fill grease. That is, any grease added to the factory grease should not result in grease softening and consequent leakage around the seals. A lithium 12 hydroxy stearate soap grease with added rust and oxidation inhibitors is suggested. The viscosity of the base oil should be in a range from 150-220 cSt at 40°C (60-100 SUS at 210°F). An NLGI No. 2 grease is preferred; however, if there is a problem of pumping an NLGI No. 2 grease in cold weather, an NLGI No. 1 grease can be considered.

In industrial applications, factory fill greases are generally satisfactory up to 93°C (200°F) on a continuous basis and up to 121 °C (250°F) on an intermittent operation basis. For higher temperature operating environments and grease temperatures up to 177°C (350°F), a high temperature grease should be used to fill the “AP” bearing, as well as for further relubrication. In these instances, products utilizing a urea, or complex, thickener should be considered. The grease selected should also have rust and oxidation inhibitors and a minimum base oil viscosity of 150 cSt at 40°C (60 SUS at 210°F). Frequent relubrication may be required even with higher temperature capability greases.

WARNING
Proper bearing maintenance and handling practices are critical. Failure to follow correct installation instructions can result in equipment failure, creating a risk of serious bodily harm.

Grease Capacities of “AP” Bearings

<table>
<thead>
<tr>
<th>Class</th>
<th>Normal Initial Charge*</th>
<th>Additional Grease Required to Fill*</th>
<th>Total Additional Grease Required to Completely Fill Assembly*</th>
</tr>
</thead>
<tbody>
<tr>
<td>B (4 1/4 x 8)</td>
<td>8</td>
<td>7.8</td>
<td>3.2</td>
</tr>
<tr>
<td>C (5 x 9)</td>
<td>12</td>
<td>14.2</td>
<td>3.4</td>
</tr>
<tr>
<td>D (5 1/2 x 10)</td>
<td>16</td>
<td>15.7</td>
<td>4.7</td>
</tr>
<tr>
<td>E (6 x 11)</td>
<td>16</td>
<td>20.9</td>
<td>6.3</td>
</tr>
<tr>
<td>F (6 1/2 x 12)</td>
<td>24</td>
<td>33.8</td>
<td>6.4</td>
</tr>
<tr>
<td>G (7 x 12)</td>
<td>32</td>
<td>36.5</td>
<td>7.3</td>
</tr>
<tr>
<td>G (7 x 14)</td>
<td>32</td>
<td>51.8</td>
<td>14.6</td>
</tr>
<tr>
<td>GG (7)</td>
<td>27</td>
<td>27</td>
<td>8</td>
</tr>
</tbody>
</table>

* Ounces of grease
1 Pint of grease = .95 pounds (.55 oz./in.)
How To Order

“AP” BEARING ORDERING PROCEDURE

Bearing assemblies may be ordered by two different methods.

Method 1

Purchase one of the two “Basic” bearing mounting arrangements shown on page 40, plus the required auxiliary parts shown on page 41.

Method 2

Purchase an entire assembly or kit using the overall bearing assembly number as shown in the “Supplemental and Special Assembly Number” lists on pages 43 to 69. This overall assembly number includes all needed auxiliary parts.

Adapters are not part of the bearing assembly and should be ordered separately giving: Quantity - bearing class - part number (page 43).
Basic “AP” Bearing Ordering Procedure:

To facilitate order entry, identify the bearing assembly and required auxiliary parts by specifying the following details from the tables shown on pages 40 and 41. Also specify the quantity of each sub-assembly required to make up the assembly to suit your application. See page 6 for a detailed explanation of assembly numbers.

Quantity - “AP” bearing class (Page 40)
Each consisting of:
- Cone number - assembly number - quantity per bearing (page 40)
- Axle end cap part number - assembly number - quantity per bearing (page 41)
- Backing spacer number - quantity per bearing (page 41)
- Pipe plug - quantity per bearing
  or Lubricant fitting - quantity per bearing
  or Vent fitting - quantity per bearing

EXAMPLES:

1. To order eight of the assemblies shown in class D:

   Eight “AP” bearing assembly class D

   Each consisting of:
   - HM127446 90012 - one per bearing (page 40)
   - K85521 90011 axle end cap assembly - one per bearing (page 41)

2. To order ten of the assemblies shown in class D:

   Ten - “AP” bearing assembly class D

   Each consisting of:
   - HM127446 90048 - one per bearing (page 40)
   - K85521 90011 axle end cap assembly - one per bearing (page 41)
   - K120178 backing spacer - one per bearing (page 41)
   - K83093 vent fitting - one per bearing (page 41)
How To Order

Method 1

Basic Bearing Assembly Numbers

<table>
<thead>
<tr>
<th>Basic “AP” Bearing</th>
<th>Basic “AP” Bearing with Backing Ring Pressed On*</th>
<th>Backing Ring Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Basic “AP” Bearing with Backing Ring Pressed On with shroud</td>
<td>Backing Ring Assembly without shroud</td>
</tr>
</tbody>
</table>

* Specify Backing Ring With or Without Shroud. Backing Rings Without Shroud have reduced OD to facilitate assembly in some housing designs. Backing Rings With Shroud provide added seal protection where required.

Determine Basic “AP” Bearing Assembly required and specify from the following table (include CONE NUMBER as shown with bearing Class):

EXAMPLE: If a Class D bearing with a backing ring with shroud is required, specify:

“AP” bearing class D HM127446-90012.

<table>
<thead>
<tr>
<th>Class Cone Number</th>
<th>Basic “AP” Bearing Assembly Number</th>
<th>Backing Ring With Shroud</th>
<th>Backing Ring Without Shroud</th>
</tr>
</thead>
<tbody>
<tr>
<td>B (4 1/4 x 8) HM120848</td>
<td>90014</td>
<td>90012</td>
<td>90124</td>
</tr>
<tr>
<td>C (5 x 9) HM124646</td>
<td>90056</td>
<td>90014</td>
<td>N.A. **</td>
</tr>
<tr>
<td>D (5 1/4 x 10) HM127446</td>
<td>90048</td>
<td>90012</td>
<td>90318</td>
</tr>
<tr>
<td>E (6 x 11) HM129848</td>
<td>90054</td>
<td>90012</td>
<td>90308</td>
</tr>
<tr>
<td>F (6 1/2 x 12) HM133444</td>
<td>90076</td>
<td>90012</td>
<td>90424</td>
</tr>
<tr>
<td>G (7 x 12) HM136948</td>
<td>N.A.</td>
<td>90320</td>
<td>N.A.</td>
</tr>
<tr>
<td>G (7 x 14) HM136948</td>
<td>90226</td>
<td>90228</td>
<td>N.A.</td>
</tr>
<tr>
<td>GG (7) H337846</td>
<td>90248</td>
<td>90262</td>
<td>N.A.</td>
</tr>
<tr>
<td>K (8) M241547</td>
<td>90028</td>
<td>N.A.</td>
<td>N.A.</td>
</tr>
</tbody>
</table>

N.A. Not Available **Consult The Timken Company for availability.

NOTE: Cup OD tolerances of 0.025 mm (.0010”), reduced width assemblies, assemblies with provision for relubrication through the center of the cup, and assemblies without seal parts are available in some bearing classes. Consult The Timken Company for availability.
How To Order

**Method 1**

### Auxiliary Parts

Add Auxiliary Parts to Basic “AP” Bearings required.

**NOTE:** Provide for relubrication on one side of bearing with vent at opposite side. If an Auxiliary Part is not used, these provisions should be made in parts adjacent the bearing.

---

**Axle End Cap Assembly Includes:**
- (1) End Cap
- (3) Cap Screws
- (1) Lock Plate
- (1) Fitting

**Recessed End Cap Assembly Includes:**
- (1) End Cap
- (3) Cap Screws
- (1) Pipe Plug

**Backing Spacer (w/fitting choices)**
- Lube Fitting
- Pipe Plug
- Vent Fitting

---

**Determine Auxiliary Part(s) required and specify from the following table:**

<table>
<thead>
<tr>
<th>CLASS</th>
<th>Axle End Cap Assembly</th>
<th>Recessed End Cap Assembly</th>
<th>Backing Spacer</th>
<th>Lube Plug Vent Fitting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Part No</td>
<td>Assy No</td>
<td>Incl Pipe Plug</td>
<td>Part No</td>
</tr>
<tr>
<td>B (4(\frac{1}{4}) x 8)</td>
<td>K86877</td>
<td>90010</td>
<td>Incl. Pipe Plug</td>
<td>K399069</td>
</tr>
<tr>
<td></td>
<td>K86877</td>
<td>90012</td>
<td>Incl. Lube Fitting</td>
<td>K78880</td>
</tr>
<tr>
<td>C (5x9)</td>
<td>K86003</td>
<td>90010</td>
<td>Incl. Pipe Plug</td>
<td>K399070</td>
</tr>
<tr>
<td></td>
<td>K86003</td>
<td>90015</td>
<td>Incl. Lube Fitting</td>
<td>K78880</td>
</tr>
<tr>
<td>D (5(\frac{1}{2}) x 10)</td>
<td>K85521</td>
<td>90010</td>
<td>Incl. Pipe Plug</td>
<td>K399071</td>
</tr>
<tr>
<td></td>
<td>K85521</td>
<td>90011</td>
<td>Incl. Lube Fitting</td>
<td>K78880</td>
</tr>
<tr>
<td>E (6x11)</td>
<td>K85510</td>
<td>90010</td>
<td>Incl. Pipe Plug</td>
<td>K399072</td>
</tr>
<tr>
<td></td>
<td>K85510</td>
<td>90011</td>
<td>Incl. Lube Fitting</td>
<td>K78880</td>
</tr>
<tr>
<td>F (6(\frac{1}{2}) x 12)</td>
<td>K85517</td>
<td>90010</td>
<td>Incl. Pipe Plug</td>
<td>K399073</td>
</tr>
<tr>
<td></td>
<td>K85517</td>
<td>90012</td>
<td>Incl. Lube Fitting</td>
<td>K78880</td>
</tr>
<tr>
<td>G (7x12)</td>
<td>K95199</td>
<td>90010</td>
<td>Incl. Pipe Plug</td>
<td>K399074</td>
</tr>
<tr>
<td></td>
<td>K95199</td>
<td>90011</td>
<td>Incl. Lube Fitting</td>
<td>K78880</td>
</tr>
<tr>
<td>G (7x14)</td>
<td>K412057</td>
<td>90010</td>
<td>Incl. Pipe Plug</td>
<td>K399074</td>
</tr>
<tr>
<td></td>
<td>K412057</td>
<td>90011</td>
<td>Incl. Lube Fitting</td>
<td>K78880</td>
</tr>
<tr>
<td>GG (7)</td>
<td>**</td>
<td>**</td>
<td>Incl. Pipe Plug</td>
<td>K399074</td>
</tr>
<tr>
<td></td>
<td>**</td>
<td>**</td>
<td>Incl. Lube Fitting</td>
<td>K78880</td>
</tr>
<tr>
<td>K (8)</td>
<td>N.A.</td>
<td></td>
<td></td>
<td>K504075</td>
</tr>
</tbody>
</table>

**N.A. - Not Available** **Consult The Timken Company for availability.**
**SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS**

**Typical “AP” Bearing Mounting Arrangements**

The following illustrations on pages 46 to 69 show typical combinations of basic “AP” bearings, and auxiliary parts. See page 6 for a detailed explanation of assembly numbers. When these overall assemblies are used with the adapters shown below, bearing mounting kits are formed.

When making up a mounting arrangement, a provision for relubrication should be made on one side of the bearing, with a vent on the opposite side. If an auxiliary part is not used, these provisions should be made in the parts adjacent the bearing.

Also it is important when designing an “AP” bearing into an application, the bearing must always be securely clamped through the cones. Depending on the mounting arrangement used, this may require additional parts, such as spacers, which are not furnished by The Timken Company.

**Typical Application Parts**

<table>
<thead>
<tr>
<th>Bearing Class</th>
<th>Narrow Adapter</th>
<th>Wide Adapter*</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>K86888</td>
<td>K87124</td>
</tr>
<tr>
<td>C</td>
<td>K85581</td>
<td>K86019</td>
</tr>
<tr>
<td>D</td>
<td>K85530</td>
<td>K85526</td>
</tr>
<tr>
<td>E</td>
<td>K85073</td>
<td>K85513</td>
</tr>
<tr>
<td>F</td>
<td>K85524</td>
<td>K85531</td>
</tr>
<tr>
<td>G(7 x 12)</td>
<td>K83138</td>
<td>–</td>
</tr>
<tr>
<td>G(7 x 14)</td>
<td>K83138</td>
<td>–</td>
</tr>
<tr>
<td>GG(7)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>K</td>
<td>K522803</td>
<td>–</td>
</tr>
</tbody>
</table>

*Not shown*
How To Order

Method 2

Mounting Arrangements are shown in sequential order. See following pages for ordering information.
How To Order

Method 2

4 5 5-A 5-B 5-C 5-D

6 6-A 6-B

5 5-A

5-B 5-C 5-D

6 6-A 6-B
**SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS**

*Bearing Mounting Arrangement 1*

<table>
<thead>
<tr>
<th>Class</th>
<th>Overall Assembly Standard</th>
<th>Overall Assembly Code 350*</th>
<th>Auxiliary Parts*** Sub Assemblies</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>HM120848 - 90023</td>
<td>HM120848 -</td>
<td>Axle end cap K86877-90012</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Backing ring K86874-90010</td>
</tr>
<tr>
<td>C</td>
<td>HM124646 - 90047</td>
<td>HM124646 -</td>
<td>Axle end cap K86003-90015</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Backing ring K85588-90010</td>
</tr>
<tr>
<td>D</td>
<td>HM127446 - 90011</td>
<td>HM127446 - 90211</td>
<td>Axle end cap K85521-90011</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Backing ring K85525-90010</td>
</tr>
<tr>
<td>E</td>
<td>HM129848 - 90011</td>
<td>HM129848 - 90125</td>
<td>Axle end cap K85510-90011</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Backing ring K85095-90010</td>
</tr>
<tr>
<td>F</td>
<td>HM133444 - 90015</td>
<td>HM133444 - 90211</td>
<td>Axle end cap K85517-90012</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Backing ring K85516-90010</td>
</tr>
<tr>
<td>G</td>
<td>HM136948 - 90359</td>
<td>HM136948 - 90355</td>
<td>Axle end cap K95199-90011</td>
</tr>
<tr>
<td>(7 x 12)</td>
<td></td>
<td></td>
<td>Backing ring K147766-90010</td>
</tr>
<tr>
<td>G</td>
<td>HM136948 - 90251</td>
<td>HM136948 -</td>
<td>Axle end cap K412057-90011</td>
</tr>
<tr>
<td>(7 x 14)</td>
<td></td>
<td></td>
<td>Backing ring K147766-90010</td>
</tr>
<tr>
<td>GG(7)</td>
<td>H337846 -</td>
<td>H337846 -</td>
<td>Axle end cap K462064**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Backing ring K147766-90010</td>
</tr>
<tr>
<td>K</td>
<td>M241547 -</td>
<td>M241547 -</td>
<td>Axle end cap Backing ring</td>
</tr>
</tbody>
</table>

* Code 350 provides a cup OD tolerance of +.003 +.004" and is used in applications requiring a press fit for the cup.

** K462064 not currently available, class G(7 x 12) axle end cap K95199 may be substituted.

*** For Reference Only.

Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts.
**SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS**

_Bearing Mounting Arrangement 1A_

---

<table>
<thead>
<tr>
<th>Class</th>
<th>Overall Assembly Standard</th>
<th>Overall Assembly Code 350*</th>
<th>Auxiliary Parts*** Sub Assemblies</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>HM120848 -90011</td>
<td>HM120848 - 90059</td>
<td>Axle end cap K86877-90010</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Backing ring K86874-90010</td>
</tr>
<tr>
<td>C</td>
<td>HM124646 -90013</td>
<td>HM124646 -</td>
<td>Axle end cap K86003-90010</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Backing ring K85588-90010</td>
</tr>
<tr>
<td>D</td>
<td>HM127446 -90013</td>
<td>HM127446 -</td>
<td>Axle end cap K85521-90010</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Backing ring K85525-90010</td>
</tr>
<tr>
<td>E</td>
<td>HM129848 -90013</td>
<td>HM129848 -</td>
<td>Axle end cap K85510-90010</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Backing ring K85095-90010</td>
</tr>
<tr>
<td>F</td>
<td>HM133444 -90011</td>
<td>HM133444 -</td>
<td>Axle end cap K85517-90010</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Backing ring K85516-90010</td>
</tr>
<tr>
<td>G</td>
<td>HM136948 -90327</td>
<td>HM136948 -</td>
<td>Axle end cap K95199-90010</td>
</tr>
<tr>
<td>(7 x 12)</td>
<td></td>
<td></td>
<td>Backing ring K95199-90010</td>
</tr>
<tr>
<td>G</td>
<td>HM136948 -90243</td>
<td>HM136948 -</td>
<td>Axle end cap K412057-90010</td>
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<tr>
<td>(7 x 14)</td>
<td></td>
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<td>Backing ring K95200-90010</td>
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<tr>
<td>GG(7)</td>
<td>H337846 -</td>
<td>H337846 -</td>
<td>Axle end cap K462064**</td>
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<tr>
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<td>Backing ring K147766-90010</td>
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<tr>
<td>K</td>
<td>M241547 -</td>
<td>M241547 -</td>
<td>Axle end cap Backing ring</td>
</tr>
</tbody>
</table>

* Code 350 provides a cup OD tolerance of +.003 +.004” and is used in applications requiring a press fit for the cup.

** K462064 not currently available, class G(7 x 12) axle end cap K95199 may be substituted.

*** For Reference Only.

Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts.
### How To Order

**Method 2**

**SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS**

*Bearing Mounting Arrangement 2*

<table>
<thead>
<tr>
<th>Class</th>
<th>Overall Assembly Standard</th>
<th>Overall Assembly Code 350*</th>
<th>Auxiliary Parts*** Sub Assemblies</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>HM120848 -90012</td>
<td>HM120848 - 90060</td>
<td>Backing ring K86874-90010</td>
</tr>
<tr>
<td>C</td>
<td>HM124646 -90014</td>
<td>HM124646 - 90180</td>
<td>Backing ring K85588-90010</td>
</tr>
<tr>
<td>D</td>
<td>HM127446 -90012</td>
<td>HM127446 - 90098</td>
<td>Backing ring K85525-90010</td>
</tr>
<tr>
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* Code 350 provides a cup OD tolerance of +.003 +.004" and is used in applications requiring a press fit for the cup.

*** For Reference Only.

Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts.
## How To Order

### Method 2

#### SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS

**Bearing Mounting Arrangement 2A**

![Diagram of Bearing Mounting Arrangement 2A](image)

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* Code 350 provides a cup OD tolerance of +.003 +.004" and is used in applications requiring a press fit for the cup.

*** For Reference Only.

Auxiliary parts are supplied with the overall assembly number — see pages 64 to 67 for listing of component parts.
## How To Order

**Method 2**

**SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS**

**Bearing Mounting Arrangement 2B**

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* Code 350 provides a cup OD tolerance of +.003 +.004" and is used in applications requiring a press fit for the cup.

*** For Reference Only.

Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts.
### SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS

**Bearing Mounting Arrangement 3**

**Lubricant Fitting**

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* Code 350 provides a cup OD tolerance of +.003 +.004" and is used in applications requiring a press fit for the cup.

** K462064 not currently available, class G(7 x 12) axle end cap K95199 may be substituted.

*** For Reference Only.

Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts.
How To Order

Method 2

SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS
Bearing Mounting Arrangement 3A

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* Code 350 provides a cup OD tolerance of +.003 +.004" and is used in applications requiring a press fit for the cup.
** K462064 not currently available, class G(7 x 12) axle end cap K95199 may be substituted.
*** For Reference Only.
Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts.
# How To Order

## Method 2

### SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS

**Bearing Mounting Arrangement 3B**

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* Code 350 provides a cup OD tolerance of +.003 +.004" and is used in applications requiring a press fit for the cup.

** K462064 not currently available, class G(7 x 12) axle end cap K95199 may be substituted.

*** For Reference Only.

Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts.
**How To Order**

**Method 2**

**SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS**

*Bearing Mounting Arrangement 3C*

---

![Diagram of bearing mounting arrangement 3C with labels for pipe plug and vent fitting.](image)

### Table: SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS

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* Code 350 provides a cup OD tolerance of +.003 +.004" and is used in applications requiring a press fit for the cup.

** K462064 not currently available, class G(7 x 12) axle end cap K95199 may be substituted.

*** For Reference Only.

Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts.
### SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS

**Bearing Mounting Arrangement 4**

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* Code 350 provides a cup OD tolerance of +0.003 +0.004” and is used in applications requiring a press fit for the cup.*
## How To Order

### Method 2

### SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS

#### Bearing Mounting Arrangement 5

![Image of bearing mounting arrangement](image)

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* Code 350 provides a cup OD tolerance of +.003 +.004” and is used in applications requiring a press fit for the cup.

*** For Reference Only.

Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts.
## SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS

**Bearing Mounting Arrangement 5A**

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* Code 350 provides a cup OD tolerance of +.003 +.004” and is used in applications requiring a press fit for the cup.

*** For Reference Only.

Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts.
# How To Order

## Method 2

**SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS**

**Bearing Mounting Arrangement 5B**

![Vent Fitting Diagram](image)

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Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts.
## How To Order

### Method 2

### SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS

**Bearing Mounting Arrangement 5C**

![Diagram of lubricant fitting and vent fitting](image)

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* Code 350 provides a cup OD tolerance of +.003 +.004” and is used in applications requiring a press fit for the cup.

*** For Reference Only.

Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts.
**How To Order**

**Method 2**

**SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS**

*Bearing Mounting Arrangement 5D*

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* Code 350 provides a cup OD tolerance of +.003 +.004” and is used in applications requiring a press fit for the cup.

*** For Reference Only.

*Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts*
SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS

Bearing Mounting Arrangement 6

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* Code 350 provides a cup OD tolerance of +.003 +.004" and is used in applications requiring a press fit for the cup.

*** For Reference Only.

Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts.
# How To Order

## Method 2

**SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS**

*Bearing Mounting Arrangement 6A*

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* Code 350 provides a cup OD tolerance of +.003 +.004” and is used in applications requiring a press fit for the cup.

*** For Reference Only.

Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts.
SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS

Bearing Mounting Arrangement 6B

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<thead>
<tr>
<th>Class</th>
<th>Overall Assembly Standard</th>
<th>Overall Assembly Code 350*</th>
<th>Auxiliary Parts*** Sub Assemblies</th>
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* Code 350 provides a cup OD tolerance of +.003 +.004" and is used in applications requiring a press fit for the cup.
*** For Reference Only.
Auxiliary parts are supplied with the overall assembly number – see pages 64 to 67 for listing of component parts.
### SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS

**Axle End Cap Assemblies**

<table>
<thead>
<tr>
<th>Class</th>
<th>Assembly No</th>
<th>End Cap Part No</th>
<th>Cap Screw(3)</th>
<th>Lock Plate</th>
<th>Pipe Plug</th>
<th>Lube Fitting</th>
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|       | ** K462064 not currently available, class G(7 x 12) axle end cap K95199 may be substituted.**

**K** Not Available
## How To Order

### Method 2

### SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS

**Recessed End Cap Assemblies**

![Diagram of a recessed end cap assembly]

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<thead>
<tr>
<th>Class</th>
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<th>Pipe Plug</th>
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How To Order

Method 2

SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS

Backing Ring with Shroud

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<td>K85525-90010</td>
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**SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS**

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<th>Pipe Plug Part No</th>
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### How To Order

**Method 2**

**SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS**

*Assemblies with Special Cup for Relubrication to Center of the Bearing*

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<th>Cup Number</th>
<th>Remarks</th>
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<td>HM120848-90154</td>
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# How To Order

**Method 2**

## SUPPLEMENTAL AND SPECIAL ASSEMBLY NUMBERS

*Assemblies with Non-Standard - Reduced Width*

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