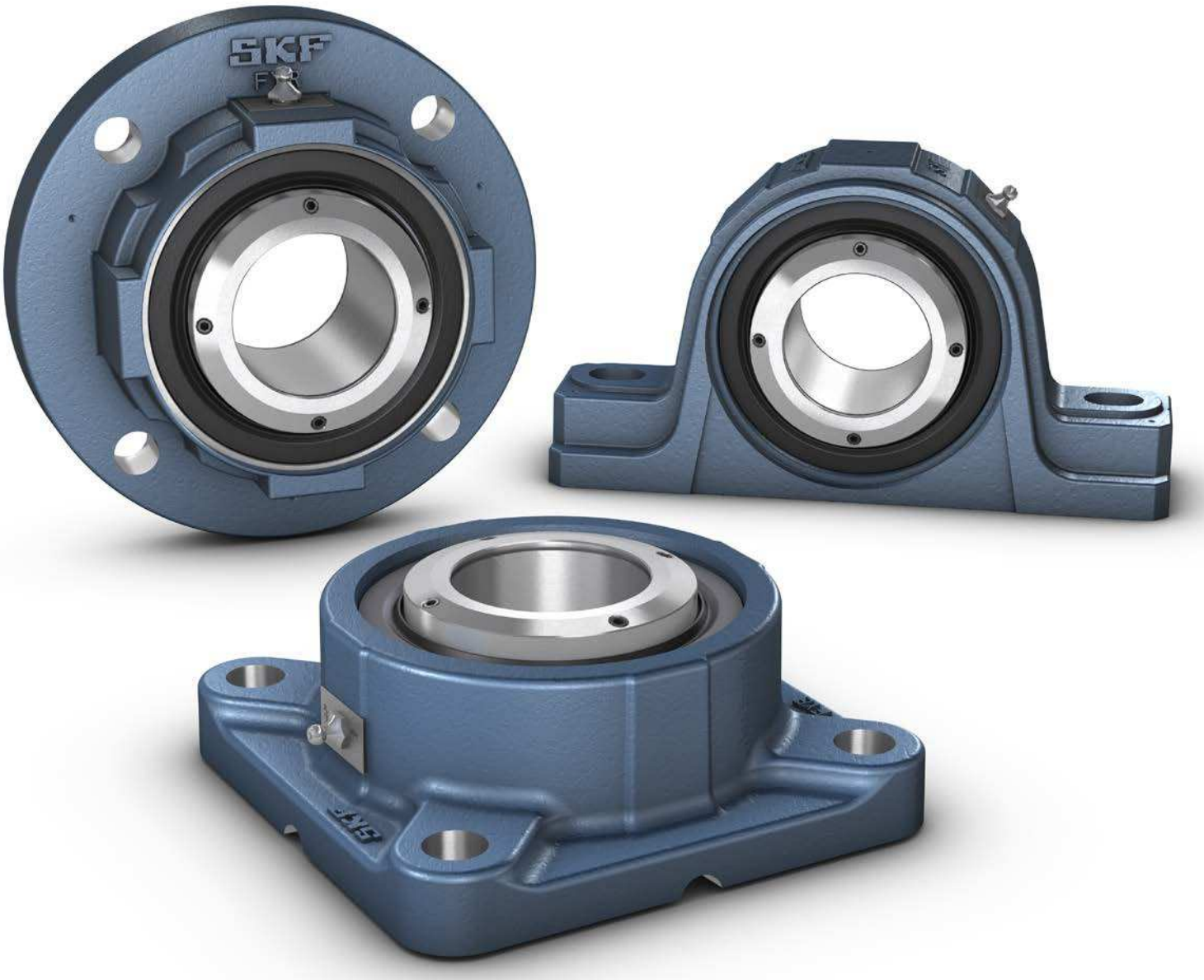
SKF ConCentra roller bearing units

Fast and reliable mounting with an expanded range of inch dimensions



SKF ConCentra roller bearing units, inch dimensions

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MAINTAINS A
360°
CONCENTRIC GRIP AROUND THE SHAFT

Ready to mount, lock, operate and save time

SKF ConCentra roller bearing units offer a highly reliable, time-saving alternative to sleeve-mounted bearings in split housings that require assembly. SKF ConCentra roller bearing units are factory-assembled, sealed and greased for maximum service life. These single units are "shaft-ready" and require far less time and skill to install than a split pillow block housing assembly.

Installers simply slide an SKF ConCentra roller bearing unit onto the shaft and tighten the screws to lock it in place. It's fast and helps provide proper alignment while reducing the risk of assembly-related contamination and mounting errors. Because SKF ConCentra roller bearing units can be mounted more quickly, they help maintenance teams save valuable time.

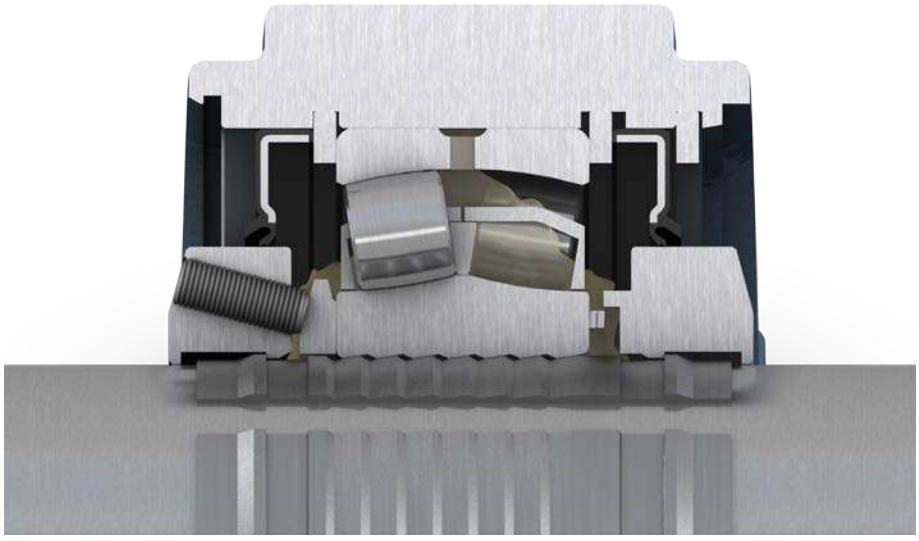
Compared to sleeve-mounted bearing units in split housings, SKF ConCentra roller bearing units deliver:

- Quicker and simpler mounting
- Longer service life
- Higher operational reliability
- Simplified replacement

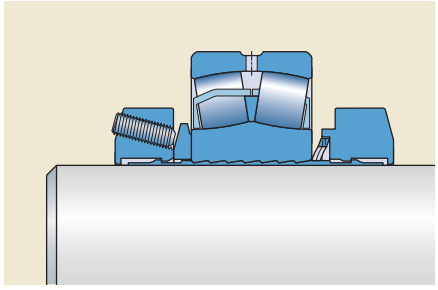
SKF ConCentra roller bearing units, inch dimensions (N suffix)

True concentric locking technology

SKF ConCentra roller bearing units allow the bearings within them to operate reliably and maximize service life. The key is SKF's patented locking concept, which enables a near perfect 360° grip of the bearing on the shaft, reducing radial run-out and virtually eliminating the possibility of fretting corrosion.

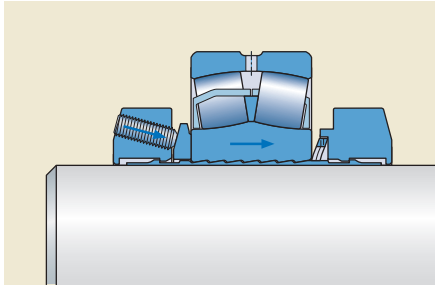


How it works: the locking concept in action



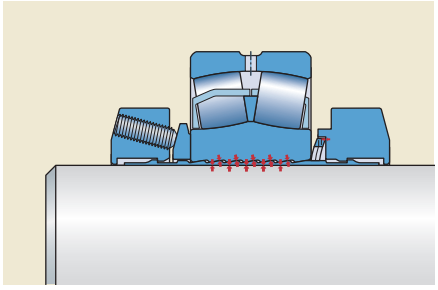
Before installation

The locking concept behind SKF ConCentra roller bearing units begins with the expansion and contraction of two mating surfaces: the bearing bore and the external surface of the stepped sleeve. Both feature precision-engineered inclined serrations. Before mounting, there is a clearance between the set screws in the mounting collar and the washer, as well as between the bearing bore and stepped sleeve.



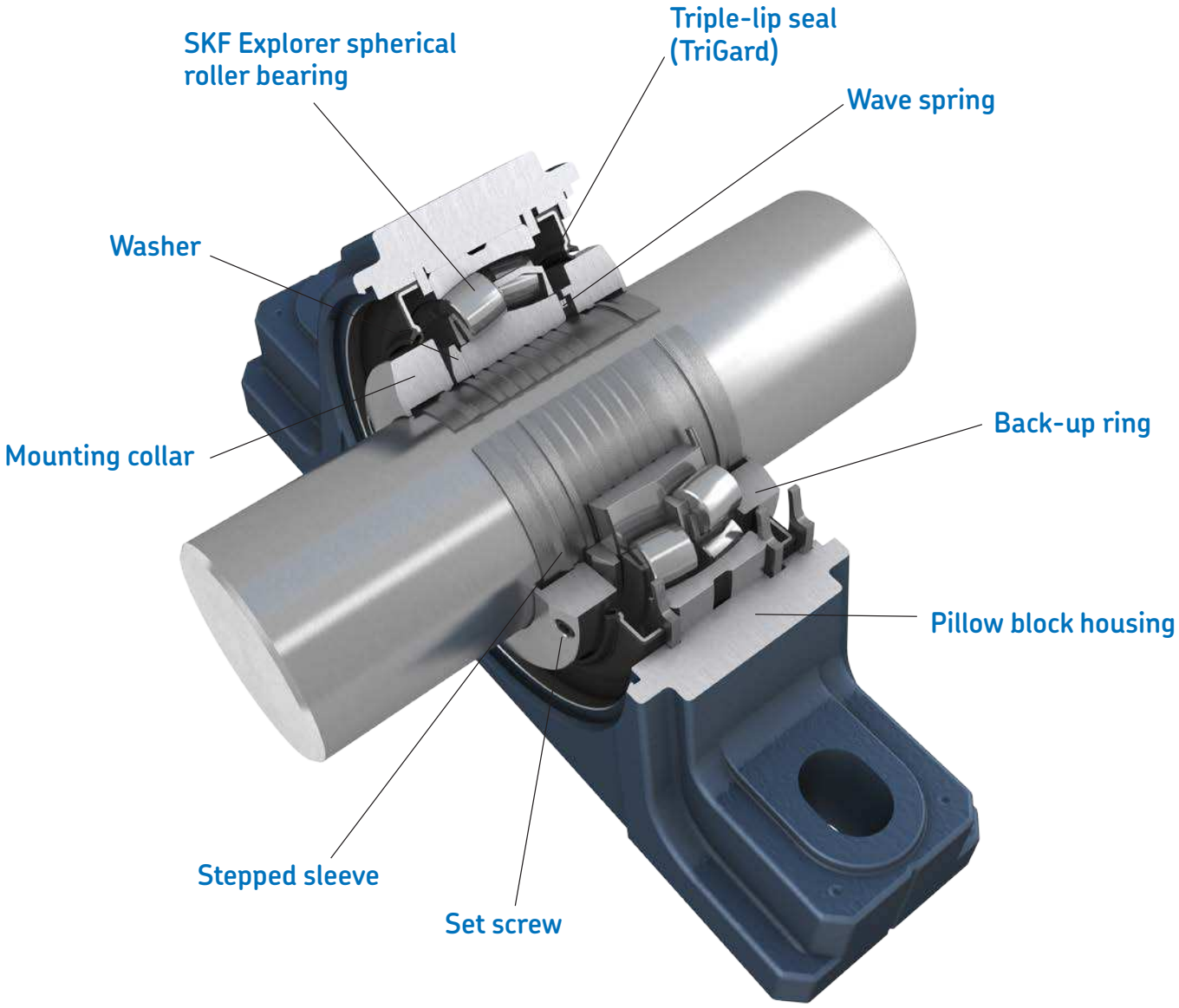
During installation

When the set screws on the mounting collar are tightened, the mating surfaces are displaced axially. This forces the inner ring to move axially on the stepped sleeve, which results in the correct internal clearance in the bearing and presses the wave spring against the back-up ring on the opposite side of the unit. It also exerts pressure on the stepped sleeve, forcing it to contract around the circumference of the shaft for a true concentric, tight fit.



After installation

Once the set screws have been tightened to the recommended torque, the bearing maintains the correct bearing internal clearance and a 360° grip on the shaft. When it's time to dismount the bearing, the preloaded wave spring facilitates removal of the unit.

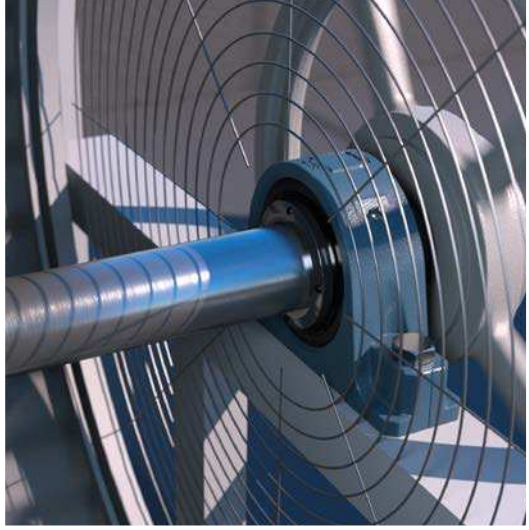


Features

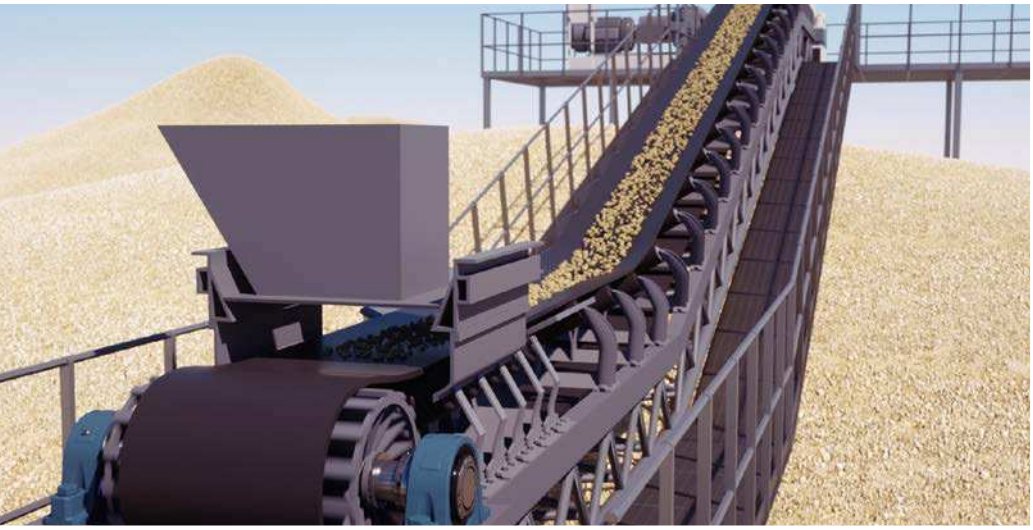
- Factory assembled and lubricated units ready for use
- Patented SKF concentric locking technology
- Available in 3 pillow block designs and 3 flanged designs
- Suitable for located and non-located positions
- Seal types optimized for a range of operating conditions
- SYE, SYR, FSYE, FYR and FYE housings suitable for condition monitoring

Benefits

- Minimal maintenance
- Extended service life
- Reduce radial run-out
- Reduce trouble and contamination during mounting and dismounting – no feeler gauges or hook spanner required
- Higher operational reliability






Designed to perform in harsh conditions

SKF ConCentra roller bearings can handle punishing outdoor conditions as well as heavy loads, shock loads and contaminants. Whenever low noise and minimal maintenance are key requirements, SKF ConCentra roller bearings can provide a cost-effective alternative to conventional bearing and housing arrangements.

Applications

- Belt, bucket and chain conveyors
- Mining and metallurgical equipment
- Industrial air handling units
- Fans, pumps and blowers
- Textile machinery
- Agricultural and forestry machinery
- Food and beverage processing equipment
- Wastewater treatment equipment
- Refining equipment
- Commercial laundry equipment

Application requirements

- Ready-to-mount and ready-to-operate
- Robust design and reliable solution
- Effective sealing
- Filled with premium grease
- Allows 1,5° of misalignment
- Prepared for condition monitoring
- Accommodate thermal elongation of the shaft

SKF ConCentra roller bearing units – inch dimensions

An upgraded, expanded range

Designed to enable mounting and dismounting on the same side, SKF ConCentra roller bearing units now feature an expanded range of inch sizes. The components that comprise each unit include:

- a pillow block or flanged housing
- an SKF Explorer spherical roller bearing
- an SKF ConCentra stepped sleeve
- an integral seal fitted on both sides
- an adequate grease fill

Housings

3 pillow block designs

- Two-bolt pillow block units (SYE and SYR)
- Four-bolt pillow block units (FSYE)

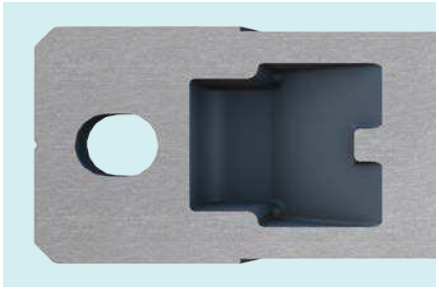
3 flanged designs

- Square flanged units (FYE)
- Round flanged units (FYR)
- Piloted flanged units (FYRP)

Pillow (plummer) block housings have a stiff design that helps the housing to retain its form. These non-split, grey cast iron housings have the same excellent heat conducting properties and strength as comparably sized SKF split SAF pillow block housings.

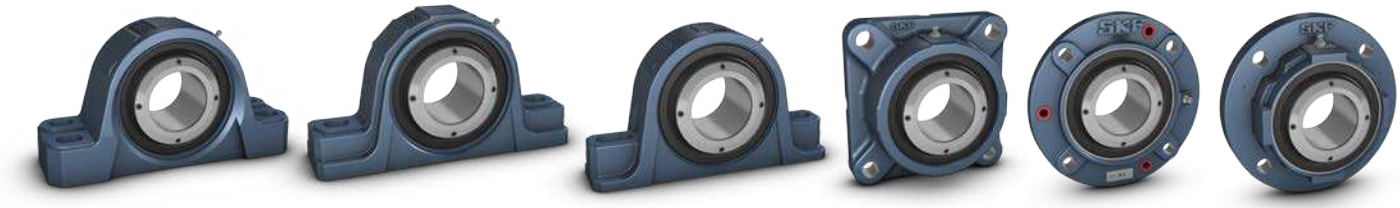
Flanged housings are also made of grey cast iron and are produced in three flange designs depending on the size.

Housings in the SYE and SYR series have two holes cast into the base for attachment bolts. The FYR flange units have either 3 or 4 drilled holes depending on size. The FYRP has 4 or 6 drilled holes depending on size. Square FYE flanged housings have 4 drilled holes. The area around the holes in both housing series is strengthened to minimize the risk of fracture caused by possible overtightening of the attachment bolts. Centre lines and dimples are cast into the housing base.



Stiff design
The design of the base of the pillow block housing helps strengthen it and also enables good heat dissipation, while providing a solid flat surface for shims.

Markings in the base
To reduce alignment errors, centre lines cast into the housing base or flange indicate the position of the centre of the bearing. Appropriate positions for dowel pin holes are indicated by dimples.



FSYE series *SYE series* *SYR series* *FYE series* *FYRP series* *FYR series*

Bearings

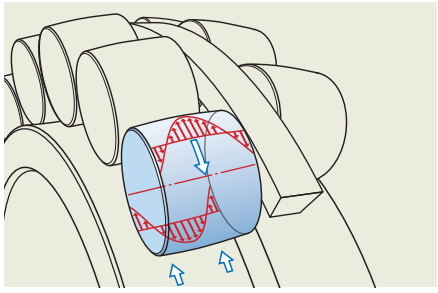
The bearings used in SKF ConCentra roller bearing units are based on SKF Explorer E-design spherical roller bearings in the 222 series. Optimized for superior performance and endurance, the bearings in SKF ConCentra roller bearing units support long bearing service life and high operational reliability. Bearing features include:

- a multi-stepped bore to accommodate the SKF ConCentra stepped sleeve
- self-guiding symmetrical rollers with an optimized roller profile
- a floating guide ring between the roller rows
- two lightweight, high-strength and wear-resistant steel cages
- self-aligning to accommodate up to 1.5° misalignment of the shaft relative to the housing

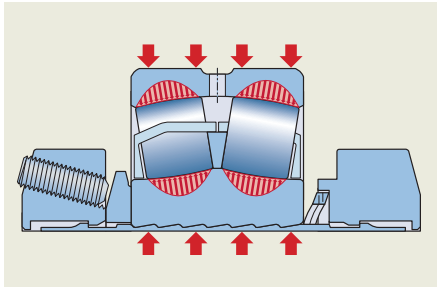
SKF ConCentra stepped sleeve

The patented SKF ConCentra stepped sleeve is the key locking technology innovation behind the SKF ConCentra bearing unit. This low cross section sleeve features an external surface with serrations that match the profile of the bearing bore.

The stepped sleeve is supplied with a mounting collar, washer, back-up ring and wave spring. The mounting collar is equipped with set screws that are positioned at an angle, rather than horizontally, to facilitate mounting and dismounting.

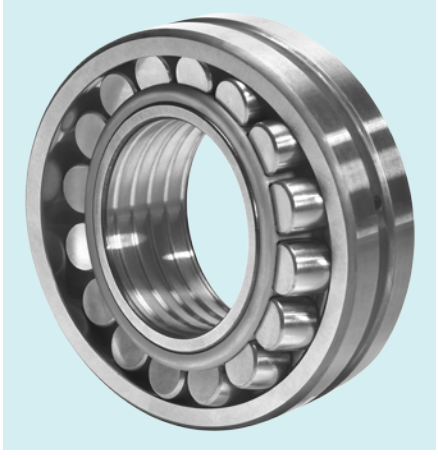


Low friction
Both the rollers and the floating guide ring minimize friction and heat generation.

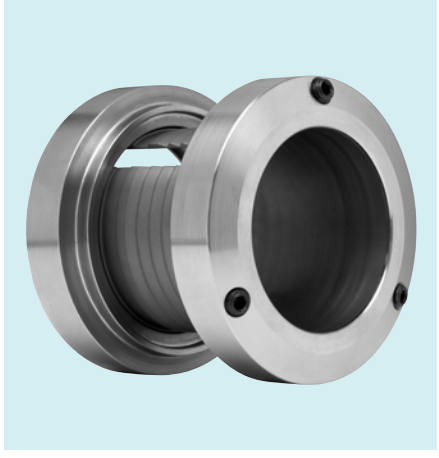


No edge stresses
The special roller profile prevents edge stresses.

SKF Explorer E-design spherical roller bearing with inclined serrations on the bore



SKF ConCentra stepped sleeve



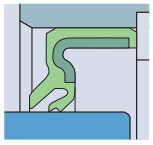
Seals

SKF ConCentra roller bearing unit seals keep contaminants out of the bearing and retain the grease. The integrated seals also help keep the unit design compact. Seals are available in a various types to meet a range of operating parameters such as the environment, circumferential speed and operating temperature.

SKF roller bearing units are available with two different sealing solutions:

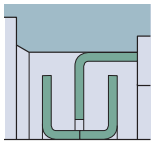
- triple-lip seals (TriGard)
- labyrinth seals

Triple-lip seals (TriGard)



TriGard seals are standard with inch roller bearing units. These acrylonitrile-butadiene rubber (NBR) seals feature outside surface and seal lips vulcanized to a sheet steel insert. To protect the seal lips from coarse contaminants, the seal consists of two lips that make contact with the mounting collar or bearing inner ring, and a third, non-contact lip. The rubber coated outside circumference secures the seal in the housing and enhances the sealing effect.

Labyrinth seals



As labyrinth seals do not generate friction, bearing units fitted with them are capable of relatively high speed operation. In SKF ConCentra units, three sheet steel rings create the labyrinth – two rings are fixed to the mounting collar or back-up collar and rotate with the shaft to act as flingers. The third ring is secured in the housing bore.

Selection considerations

When selecting the type of seal, the most important points to consider are:

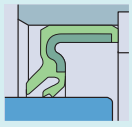
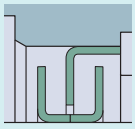
- operating temperature
- permissible circumferential speed at the seal lip (except for labyrinth seals)
- suitability for the environmental conditions

Details about the bearing unit variants are provided in **table 1**.

Triple-lip seal (TriGard) *Labyrinth seals*

Table 1

SKF ConCentra roller bearing unit – seal variants

Variant	General	High-speed
Seal	Triple-lip seal (TriGard) 	Labyrinth 
Permissible operating temperatures	–5 to 230 °F[1)]	–5 to 230 °F[1)]
Max. circumferential speed[2)] (m/s)	13	not limited
Max. misalignment (°)	1,5	1,5
Low friction	+	++
Axial shaft displacement	+	+
Vertical shaft arrangement	+	+
Sealing suitability – dust	++	–
Sealing suitability – fine particles	++	–
Sealing suitability – coarse particles	++	+
Sealing suitability – chips	+	++
Sealing suitability – liquids when sprayed	+	– –
Sealing suitability – direct sunlight	+	++
Lubricant	Mineral oil-based grease with a lithium thickener and consistency grade NLGI 2	
Application examples	Textile machines 	Industrial fans and blowers 
Designation suffix for variant	–	-118

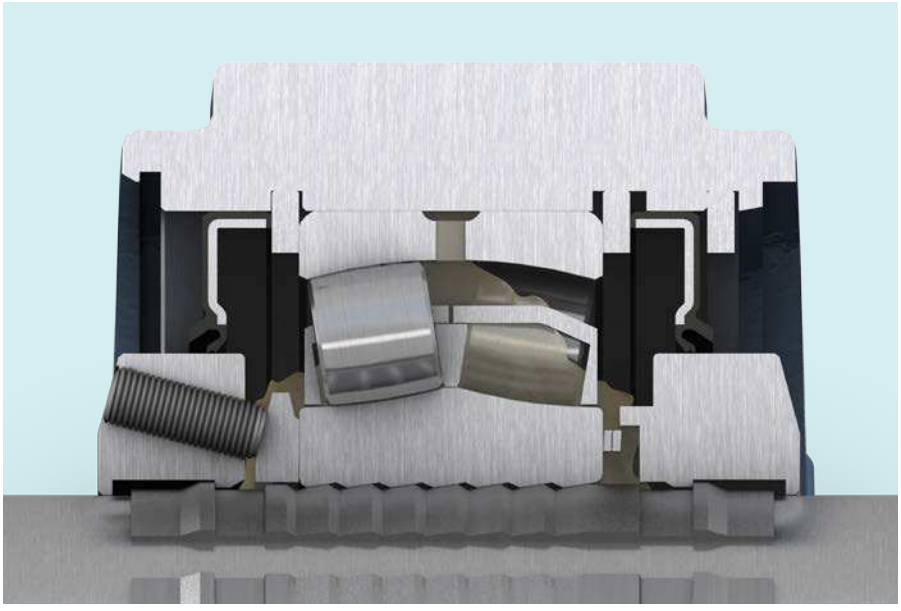
Symbol: n/a not applicable
++ very suitable
+ suitable
– limited suitability
– – unsuitable

1) Imposed by the grease.
2) For limiting speeds of the bearing units, refer to the product tables available at skf.com.

Lubricant

SKF ConCentra roller bearing units are designed for grease lubrication and are greased at the factory. All bearing units are filled with premium mineral oil-based grease with a lithium thickener. The initial grease fill at the factory fills the bearing completely and 40 to 50% of the free space in the housing. The grease provides reliable performance when operating between 95 and 230 °F. During start-up, temperatures down to –5 °F are permissible. For short periods, temperatures above 230 °F can be tolerated.

- Good lubricating properties, even under heavy loads and at low speeds
- Excellent ageing resistance
- Very good rust inhibiting properties



End covers

End covers are available for SKF ConCentra roller bearing units fitted at shaft ends. Along with protecting the shaft ends of bearing arrangements, end covers also help prevent accidents.

For bearing units with shaft diameters up to 3 in, end covers are made from polypropylene (PP), which resists most chemicals and can handle operating temperatures up to 212 °F. For bearing units with shaft diameters above 3 in, the end covers are metal. Each end cover type can be snapped easily into the recess of the housing bore, on the mounting collar side.

Designation system overview

F SYE 2 7/16 NH – 118

Prefix

F For pillow block units: four-bolt base
– For pillow block units: two-bolt base

Series

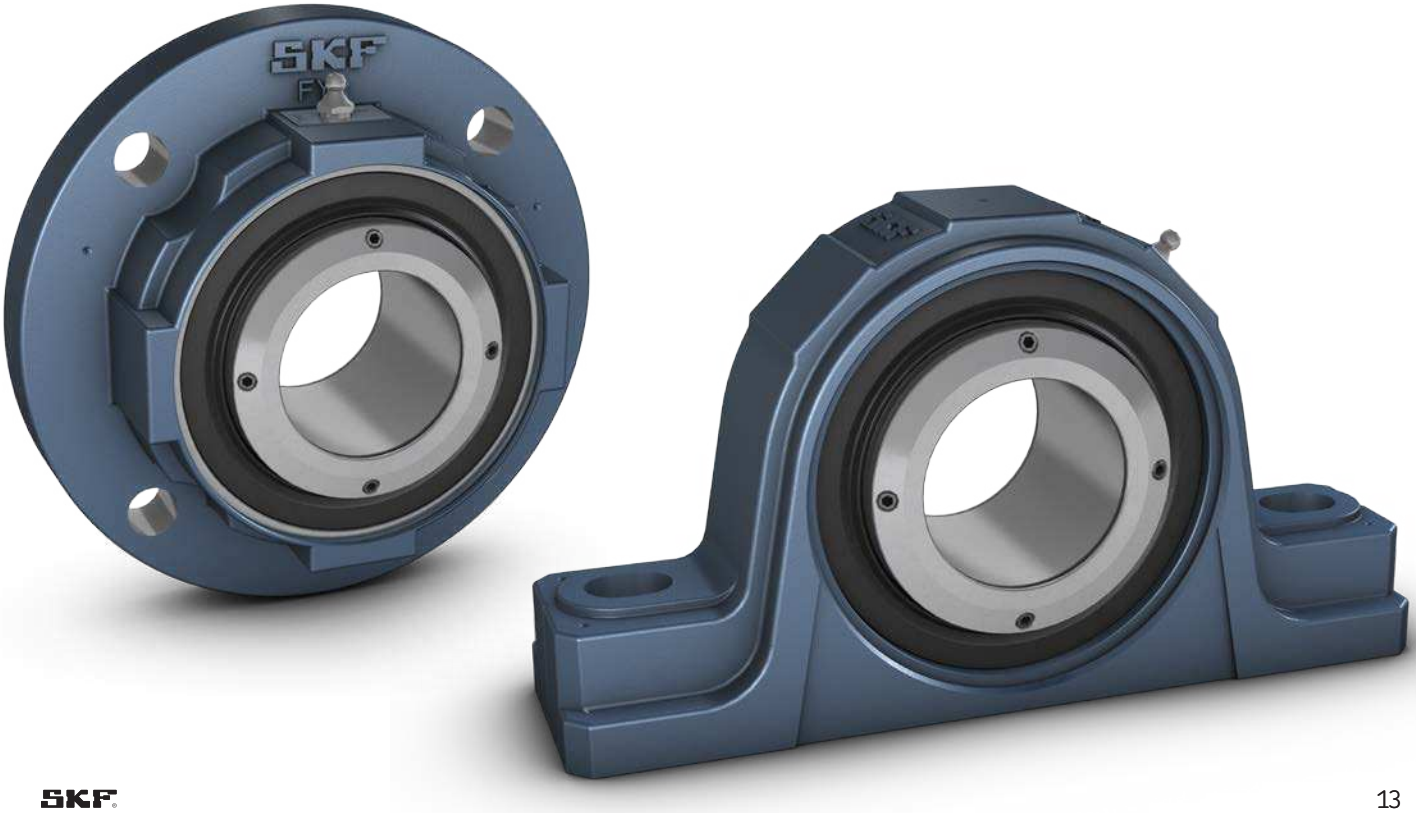
SYE – Pillow block unit
SYR – Pillow block unit
FYE – Square flange unit
FYR – Round flange unit
FYRP – Piloted flange unit

Size identification

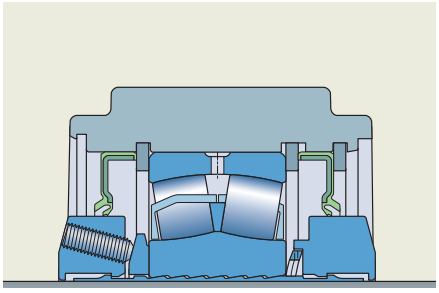
... Shaft diameter (in)

Suffixes

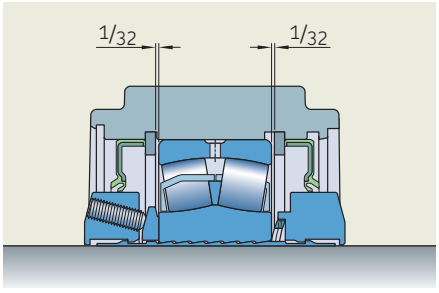
N – SKF ConCentra
H – Locating bearing unit
Y – Closed end (end plug supplied)
-118 Labyrinth seal



Design of bearing unit arrangements



Locating bearing unit
Locating bearing units locate the shaft axially in both directions. Bearing units for the locating bearing position are identified by the designation suffix H.



Non-locating bearing unit
Bearing units for the non-locating bearing position have a wide bearing seat to accommodate 1/32 in of axial displacement, in either direction from the central position (1/16 in maximum).

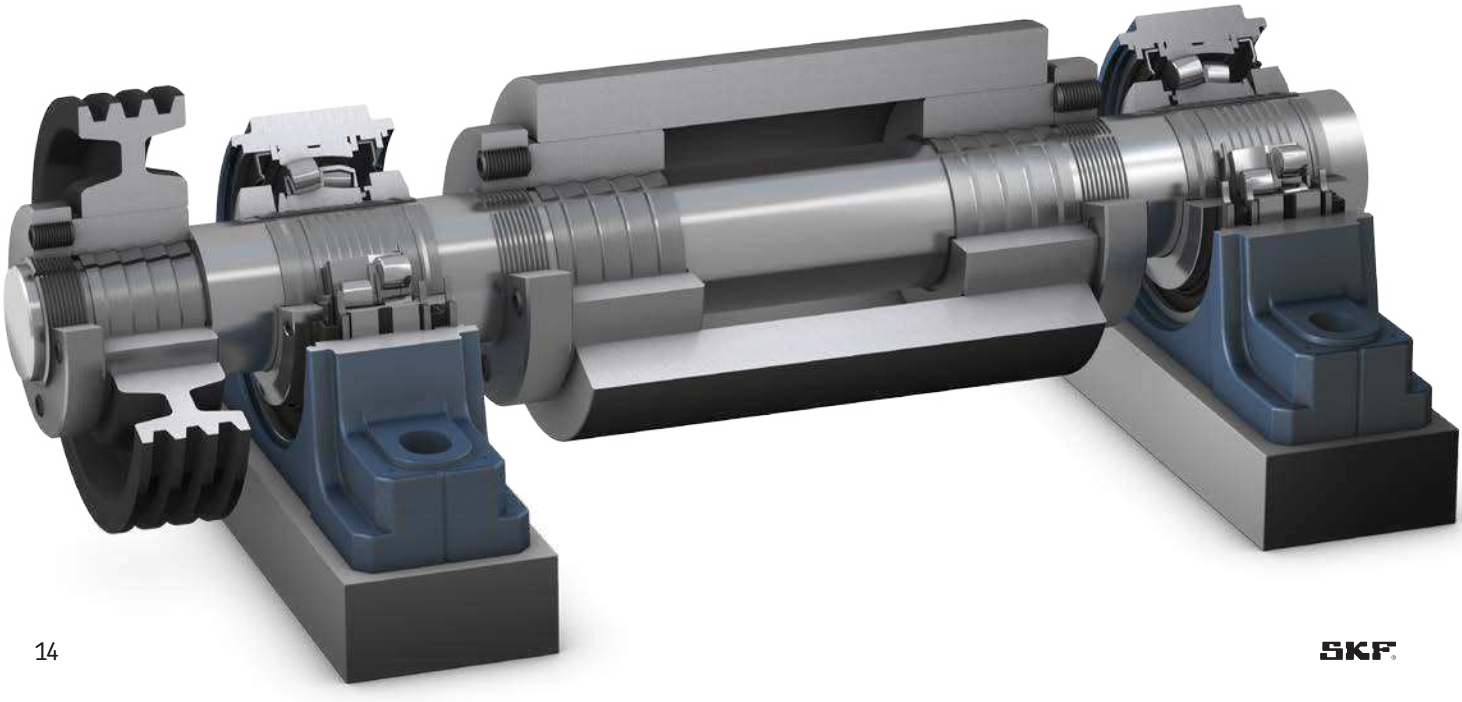
Type of arrangement

Locating and non-locating bearing units

Generally, two bearings are required to support a rotating machine component – most typically with an arrangement that includes one locating and one non-locating bearing unit. SKF ConCentra roller bearing units are available as both locating and non-locating bearing units.

Locating bearing units, which are typically positioned at the drive end, support the shaft radially and locate it axially in both directions.

Non-locating bearing units provide radial support and accommodate axial displacement of the shaft relative to the housing, as a result of thermal elongation. The permissible axial displacement for these bearing units is 1/32 in from the central position of the unit (1/16 in maximum).



Design of associated components

Shaft requirements

SKF ConCentra roller bearing units can be used with commercial grade shafts. SKF recommends using shaft seats to dimensional tolerance class h9Ⓔ and cylindricity tolerance IT5/2, in accordance with ISO 1101:2004.

The surface roughness R_a of the sleeve seat should not exceed 125 µin. A small lead-in chamfer on the end of the shaft will facilitate mounting.

Table 2

Shaft tolerance for SKF Con Centra units

Shaft diameter		Tolerance	
from	to	high	low
in		in	
1 7/16	**1 1/2**	0	–0.003
1 11/17	**2 1/2**	0	–0.004
2 11/16	**4 15/16**	0	–0.005

Support surface requirements

To maximize the service life of an SKF ConCentra roller bearing unit, SKF recommends using a support (mounting) surface with a surface roughness $R_a \leq 500$ µin and a flatness tolerance that meets IT7 specifications.

Attachment bolt recommendations

In typical applications, SAE J429, Grade 5 hexagon head bolts can be used together with washers. If the load does not act perpendicularly toward the base, it may be necessary to use stronger SAE J429, Grade 8 bolts.

SKF inch roller bearing units can withstand loads resulting from tightening the attachment bolts to the torque values recommended by bolt manufacturers. They are valid for oiled, but otherwise untreated, thread surfaces. SKF cannot guarantee that tightening to the recommended value will provide sufficient anchoring. Make sure that attachment bolts, dowels or stops, and a sufficiently strong support can accommodate all occurring loads.

Product data – general

Boundary dimensions

The boundary dimensions of SKF ConCentra roller bearing units conform to industry standards. These bearing units are dimensionally interchangeable with competitors' roller bearing units.

Radial internal clearance

Bearings in SKF ConCentra roller bearing units are manufactured with radial internal clearance identical to C3 radial clearance of spherical roller bearings with a tapered bore. The clearance values, in accordance with ISO 5753:1991, are provided in **table 3** and are valid for un-mounted bearing units under zero measuring load.

Misalignment

SKF ConCentra roller bearing units can accommodate angular misalignments of up to 1,5° between the bearing unit positions.

Speeds

The speeds at which SKF ConCentra roller bearing units can be operated depend on the type of seal used in the bearing unit. For bearing units fitted with triple-lip seals (Tri-Gard), the limiting speeds are based on the permissible circumferential speed at the seal lips. For bearing units fitted with labyrinth seals, the limiting speeds are imposed by the bearing size and the grease.

Corrosion protection

All SKF ConCentra roller bearing housings are made of grey cast iron. The housings are painted blue to RAL 5001. The paint offers protection against rust as specified by category C2 in accordance with ISO 12944-2:1998.

Table 3

Radial internal clearance of bearings in SKF ConCentra roller bearing units

Shaft diameter		Radial internal clearance	
from	to	min	max
in		in	
1 7/16	1 1/2	0.0020	0.0026
1 11/16	2	0.0024	0.0031
2 3/16	2 1/2	0.0030	0.0037
2 11/16	3	0.0037	0.0047
3 7/16	4	0.0043	0.0055
4 7/16	4 7/16	0.0053	0.0067
4 15/16	4 15/16	0.0063	0.0079

Load carrying capacity

Pillow blocks

SKF pillow block roller bearing units are intended for loads acting perpendicularly toward the support surface. If the bearing unit is supported over its entire base and the loads are purely perpendicular, loads are limited only by the bearing.

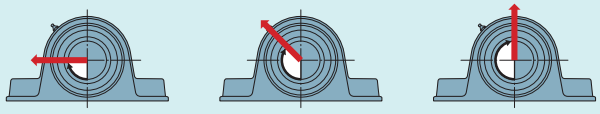
If loads acting in other directions occur, be sure that the magnitude of the load is permissible for the housing and the attachment bolts. Guideline values for the safe loads of the housings are provided in **tables 4** to **6**. The safe loads have been calculated using a safety factor of 5 against fracture.

If the bearing unit is not supported over its entire base, the load carrying capacity for perpendicular loads may be affected. For additional information, contact the SKF application engineering service.

For a purely axial force, static or dynamic, the permissible load on the housing should not exceed 65% of $P_{180°}$.

Table 4

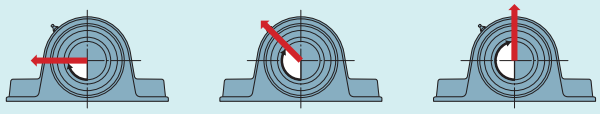
Safe loads for SYE series roller bearing units



Shaft diameter		Safe loads in the direction of		
from	to	$P_{90°}$	$P_{135°}$	$P_{180°}$
in		lbf.		
1 7/16	1 7/16	4 000	1 800	1 800
1 1/2	1 1/2	7 200	4 200	4 800
1 11/16	1 11/16	7 200	4 200	4 800
1 3/4	1 3/4	9 200	5 000	5 600
1 15/16	2	9 200	5 000	5 600
2 3/16	2 3/16	10 200	6 200	6 900
2 7/16	2 1/2	10 400	6 400	7 000
3 11/16	3	16 000	9 600	10 800
3 7/16	3 1/2	18 000	10 400	11 800

Table 5

Safe loads for SYR series roller bearing units



Shaft diameter		Safe loads in the direction of		
from	to	$P_{90°}$	$P_{135°}$	$P_{180°}$
in		lbf.		
1 7/16	1 1/2	6 200	3 200	3 900
1 11/16	1 3/4	7 800	4 400	5 200
1 15/16	2	9 000	5 200	6 400
2 3/16	2 3/16	10 400	6 200	7 400
2 7/16	2 1/2	11 600	7 000	8 300
2 11/16	3	13 000	8 200	10 000
3 7/16	3 1/2	14 600	9 200	11 300
3 11/16	4	16 000	10 000	12 400

Additional housing support

When the housing is subjected to loads acting parallel to the support surface, it may be necessary to pin the housing to the support surface or to provide a stop to counter the load.

When loads act at angles between 55° and 120°, or when the axial loads are greater than 5% of $P_{180°}$ (→ **tables 4** to **6**), the bearing unit should be pinned to the support surface. The dowel pins should be sufficiently strong to accommodate the loads acting parallel to the support surface.

Flanged units

For the safe loads of flanged units, contact the SKF application engineering service.

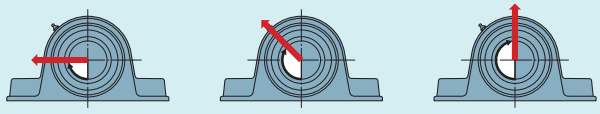
Axial holding force

The axial holding force of SKF ConCentra roller bearing units depends on the friction between the shaft and locking device. It is therefore also dependent on the number of set (grub) screws in the mounting collar (→ **table 7**).

When mounted correctly, the bearing units can withstand typical shock loads equivalent to the axial holding force. However, the axial load carrying capacity of the bearing unit can be limited by the bearing.

Table 6

Safe loads for FSYE series roller bearing units



Shaft diameter		Safe loads in the direction of		
from	to	$P_{90°}$	$P_{135°}$	$P_{180°}$
in		lbf.		
2 7/16	**3 1/2**	17 200	8 800	9 500
2 11/16	**3**	20 800	11 000	12 000
3 7/16	**3 1/2**	23 600	13 600	14 400
3 11/16	**4**	26 800	16 200	16 600
4 7/16	**4 7/16**	29 600	18 600	19 200
4 15/16	**4 15/16**	32 800	20 600	21 200

Table 7

Axial holding force of SKF ConCentra roller bearing units

Shaft diameter		Set screws		Axial holding force [1]
from	to	Number	Tightening torque	
in		–	lbf-in	lbf.
1 7/16	**2 3/16**	3 (M6)	70	3 350
2 7/16	**2 3/4**	4 (M6)	70	4 500
2 11/16	**3**	5 (M6)	70	5 600
3 3/16	**4**	7 (M6)	70	7 850
4 7/16	**4 7/16**	5 (M8)	160	14 600
4 15/16	**4 15/16**	7 (M8)	160	19 100

[1] Not equivalent to the axial load carrying capacity of the bearing unit.

Other SKF bearing units

A range of ready-to-mount units

In addition to the SKF ConCentra roller bearing units, inch dimensions, presented in this brochure, SKF's comprehensive assortment range of ready-to-mount bearing units includes:

- metric dimensions SKF ConCentra roller bearing units
- collar mounted roller bearing units
- SKF ConCentra ball bearing units
- Y-bearing units

Metric dimensions SKF ConCentra roller bearing units

The inch assortment of SKF ConCentra roller bearing units is complemented by various metric size bearing units for shaft diameters ranging from 35 to 100 mm. The bearing units are available as:

- pillow block units in the SYNT series
- flanged units in the FYNT series

These bearing units are interchangeable with similar series collar mounted roller bearing units.

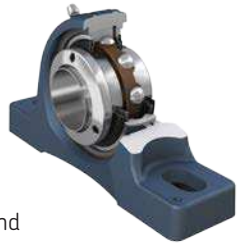
Collar mounted roller bearing units

SKF collar mounted roller bearing units are ready-to-mount, greased and sealed units that can accommodate shaft misalignment relative to the housing. The units are dimensionally interchangeable with similar series inch size SKF ConCentra roller bearing units, differing mainly by the bearing-to-shaft locking method. Instead of a stepped sleeve, the bearings in collar mounted units are secured to the shaft by a locking collar and two grub screws.

Collar mounted roller bearing units are available for 1 7/16 to 4 in diameter shafts as:

- pillow block units in the SYR, SYE and FSYE series
- flanged units in the FYR, FYE and FYRP series

SKF ConCentra ball bearing units



SKF ConCentra ball bearing units are designed for applications where there are relatively high speeds and moderate loads, and where low vibration and noise levels and minimal maintenance are key operational parameters. The units are based on pillow block housings in the SY series, making them dimensionally interchangeable. The bearings are based on deep groove ball bearings in the 62 series.

SKF ConCentra ball bearing units are available as:

- metric units for 25 to 60 mm shaft diameters
- inch size units for 1 to 2 15/16 in shaft diameters

Y -bearing units

Standard SKF ball bearing units are referred to as Y-bearing units. Each unit consists of a single row deep groove ball bearing with an extended inner ring and a convex sphered outside diameter fitted in a housing with a correspondingly concave spherical bore. These ready-to-mount units can accommodate initial misalignment.

SKF Y-bearing units are available as:

- Y-bearing plummer (pillow) block units
- flanged Y-bearing units
- Y-bearing take-up units

The bearings and housings can be ordered separately. A large variety of housings made of composite material, grey cast iron and sheet steel, are available as well as rubber cartridges. Several seal and grease fill variants meet specific application requirements and the assortment includes metric and inch size units.

There are also three bearing-to-shaft locking methods:

- grub screw locking
- eccentric collar locking
- adapter sleeve locking

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