

# Ball Bearing Plummer Block Units

## Detail Introduction :

A bearing housing is a product used primarily for securely mounting bearings, where the outer ring is usually stationary and the inner ring can be rotated. The housing is bolted to the base through a hole in the base. Bearing housings are either split or non-split type. Split housings are usually two-piece housings in which the cover and the base can be separated.

The housing material of Ball bearing plummer block units is usually made of cast iron or pressed steel. Some series are one-piece housings that provide various seals to prevent dust and other contaminants from entering the housing. The housing provides a clean environment for the expensive bearings to rotate freely, thereby improving their performance and duty cycle.

SKF vertical ball bearing units consist of a housed bearing mounted in a housing that can be bolted to a support surface. the SKF product line includes units that meet ISO standards, North American standards, or Japanese industry standards, and you can find a unit to meet almost any requirement in the SKF product line.

## Features of Ball bearing plummer block units.

1. Inserts (available separately) can be removed from the housing for future replacement as required.
2. Cost-effective housing assembly, relubricatable, replaceable inserts, fixed with flat head screws.
- 3?Provides a fully sealed bearing insert mounted in the housing and includes a grease nipple for easy relubrication.

- 4?It is very widely used, simple design, no separation, suitable for high speed, reliable operation and low maintenance cost.

- 5?In order to facilitate the installation of the imported bearing and the housing, there are also locating pin holes on the housing, which can be used when necessary.

## Application of Ball bearing plummer block units.

Housing bearings are widely used in various machinery, especially food machinery, but also for pharmaceutical machinery, photographic film processing machinery, spinning machines, printing and dyeing machinery, agricultural applications, construction machinery, food and beverage processing and packaging, conveying systems, material handling systems, packaging systems, textile equipment, air handling, special machinery, such as car wash systems, fitness equipment, go-karts, etc.

Ball bearing plummer block units are a base for providing support for rotating shafts with the help of compatible bearings and various accessories. The assembly consists of a mounting block fitted with a bearing. The block is mounted to the base and inserted into a shaft allowing the internal rotation of the bearing. The inside of the bearing is typically 0.001 inch (0.025 mm) larger than the shaft to ensure a tight fit. Set screws, locking rings or retaining rings are typically used to hold the shaft in place. The housing material of the shaft table is usually made of cast iron or cast steel.

Ball bearing plummer block units provide simple and effective self-centering for mounting errors and can be easily mounted on a variety of industrial shafts, which work particularly well in equipment racks. Types include vertical blocks, various flanged blocks, keyway blocks, round blocks, etc. Materials used include gray cast iron blocks, ductile iron blocks, stamped steel blocks, stainless steel blocks, and plastic blocks.

SKF bearing ball bearing plummer block units consist of outer spherical bearing and bearing seat, in the use of a separate design bearing box, small size, simple structure, can be directly mounted on the host design parts with bolts, easy to use. The sales of these products are very good and highly appreciated by users.

The following is more information about Ball bearing plummer block units.

### 1. Permissible misalignment

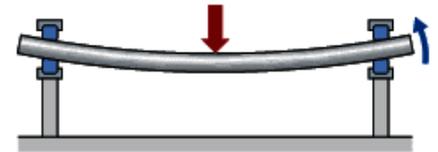
The types of misalignment are explained in table 1.

**Static misalignment**

There is an initial alignment error between the two supports of a shaft.



Shaft deflection creates misalignment between bearing inner and outer rings that is constant in magnitude and direction.



**Dynamic misalignment**

Varying shaft deflection creates misalignment between bearing inner and outer rings that is continuously changing in magnitude or direction.

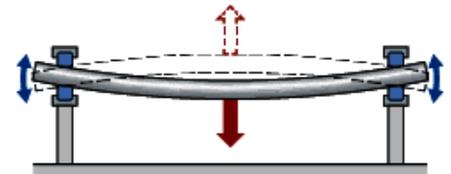


table 1

**Static misalignment**

Ball bearing units can accommodate static initial misalignment by tilting in the housing. The permissible values are:

1. Where relubrication is not required: 5°
2. Where relubrication is required: 2°
3. For units with a back seal (designation suffix DFH): 1°

When using pressed steel housings, misalignment cannot be accommodated once the attachment bolts have been fully tightened, unless a rubber seating ring is used.

**Dynamic misalignment**

Ball bearing units cannot accommodate dynamic misalignment.

**2. Locating/non-locating support**

**Locating support**

SKF ball bearing units are designed to serve as locating supports.

**Non-locating support**

SKF ball bearing units are not intended to accommodate axial displacement of the shaft relative to the housing. The internal clearance of the bearing units is sufficient to compensate for minimal displacements. The distance between bearing positions should be kept short to avoid inducing excessive axial loads as a result of thermal expansion of the shaft.

**Design for small axial displacement**

To accommodate small axial displacements, the bearing units should be supported by resilient surrounding structures.

**Design for larger axial displacement**

In applications where there are low speeds and light loads, bearing units with set screw locking can be used to accommodate axial displacement. The shaft at the non-locating bearing position should be provided with one or two grooves, 120° or 62° apart, to engage a modified set screw:

Hexagon socket set screws with a dog point, in accordance to ISO 4028, but with a fine thread as listed in the technical specifications for each product (product tables). The set screw should be

secured by a nut and a spring or star lock washer (fig. 1). If using one groove, the second set screw should be removed.

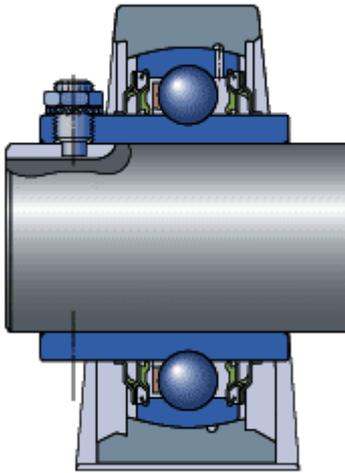


fig. 1

The screw(s) and groove(s) accommodate changes in shaft length and prevent the shaft from turning independently of the bearing. The sliding surfaces between the shaft and inner ring and those in the shaft grooves should be coated with a lubricant paste.

### 3. Permissible speed

SKF ball bearing units should not operate at speeds above the limiting speed listed in the product tables. This speed limit is set by the seal design.

For insert bearings with set screws or an eccentric locking collar, the permissible speed is also influenced by the shaft tolerance. When using these bearings on shafts with tolerances other than h6, compare the speed values listed in the product tables with those in table 1. The lower value is the permissible speed.

Bearing size	Permissible speed of the axis machined to the tolerance class			
3	6000	4300	1500	950
4	5300	3800	1300	850
5	4500	3200	1000	700
6	4000	2800	900	630
7	3400	2200	750	530
8	3000	1900	670	480
9	2600	1700	600	430
10	2400	1600	560	400
11	2000	1400	500	360
12	1900	1300	480	340
13	1700	1100	430	300
14	1600	1000	400	280
15	1500	950	380	260

16	1400	900	360	240
17	1300	850	340	220
18	1200	800	320	200
20	1100	750	300	190

The permissible speed of insert bearings with 5-lip seals is valid under the following conditions:

1. outer ring temperature ? 60 °C (140 °F)
2. ambient temperature ? 25 °C (80 °F)
3. very light to moderate loads (P ? 0.05 C)
4. cast iron housing

For other conditions, contact SKF.

For applications operating at higher speeds that are approaching but still below the limiting speed, and where eccentric locking methods are not suitable, or where low vibration or quiet running is required, SKF recommends using one of three concentric locking methods – either SKF ConCentra insert bearings, insert bearings on an adapter sleeve, or insert bearings with a standard inner ring.

#### 4. Lubrication

##### Grease fills

Insert bearings are filled with one of the following greases (table 1):

Grease	Temperature range <sup>1)</sup>		Thickener	Base oil type	NLGI grade	Base oil viscosity [mm <sup>2</sup> /s]		Grease performance factor (GPF)
	°C	°F				at 40 °C (105 °F)	at 100 °C (210 °F)	
VT307	-50	250	Lithium-calcium soap	Mineral	2	190	15	1
GFM	-60	480	Calcium sulphonate complex	Mineral	2	113	5.8	1.5

table 1

1. Bearings with zinc-coated rings and stainless steel bearings

? food-grade grease GFM, registered by NSF as category H1

The NSF registration confirms the grease fulfils the requirements listed in the US Food and Drug Administration's guidelines under 21 CFR section 178.3570 (lubricant acceptable with incidental food contact, for use in and around food processing areas).

GFM grease is American Halal Foundation (AHF) and 1K Kosher certified.

2. All other bearings

? standard grease VT307

##### Grease life

Grease life for insert bearings:

1. Is presented as L10, i.e. the time period at the end of which 90% of the bearings are still reliably lubricated.

2. Depends on the load, operating temperature and the ndm value (diagram 1)

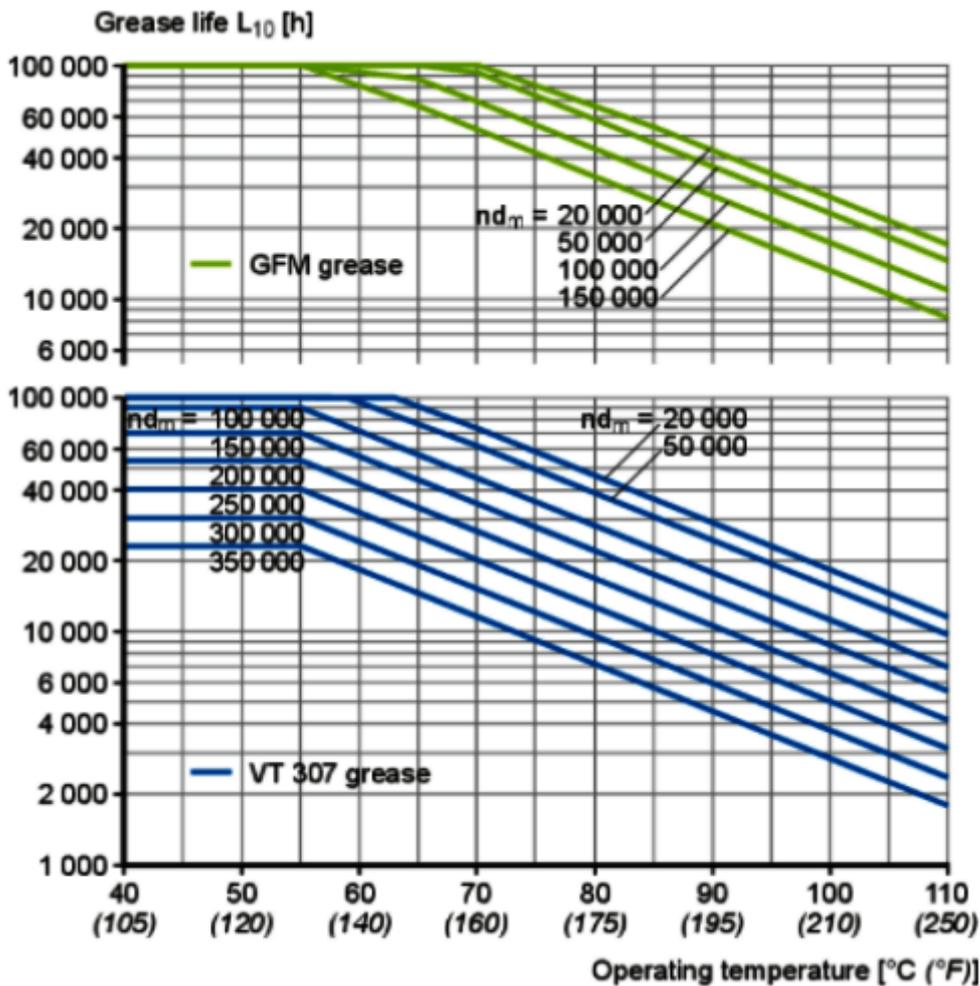


diagram 1

The indicated grease life is valid for the following combination of operating conditions:

1. Horizontal shaft
2. Very light to moderate loads ( $P \leq 0.05 C$ )
3. Stationary machine
4. Low vibration levels

Where the operating conditions vary, the grease life obtained from diagram 1 should be adjusted as follows:

1. Vertical shafts ? 50% of the obtained value
2. Heavier loads ( $P > 0.05 C$ ) ? apply reduction factor (table 2)

Load pressure	Attenuation coefficient
? 0.05?	1
0.1?	0.7
0.125?	0.5
0.25?	0.2

The values for adjusting the grease life are estimates. Vibration can have a negative influence on grease life. The extent cannot be quantified, and the influence increases with increasing operating temperature.

### Relubrication

Relubrication can extend bearing unit service life under any of the following conditions:

- 1.The bearings are exposed to high humidity or severe contamination.
- 2.The bearings accommodate normal or heavy loads.
- 3.The bearings operate for extended periods at high speeds or at temperatures above 55 °C (130 °F).
- 4.The bearings are subjected to high vibration levels.

#### Relubrication intervals

If relubrication is needed, the relubrication intervals can be estimated by following the method explained under Estimating the relubrication interval for grease.

When machines and equipment are used for a limited period of time, SKF recommends relubricating each bearing at the end of the operational period, i.e. immediately before being laid up.

#### Relubrication greases

To relubricate ball bearing units that have lubrication features, the following greases can be used:

- 1.SKF LGWA 2
- 2.SKF LGMT 2
- 3.SKF LGMT 3

#### Grease application checks

When relubricating, turn the shaft and pump the grease until fresh grease starts to escape from the seal(s). Excessive pressure from pumping too quickly can damage the seals.

#### Relubrication features

##### Cast iron housings

Ball bearing units with cast iron housings are as standard equipped with a grease fitting (as shown in the relevant product tables) with a thread size as per the following:

- 1.Units to ISO standards: 1/4-28 UNF
- 2.Units to North American standards: 1/8-27 NPT
- 3.Units to Japanese Industrial Standards: 1/4-28 UNF up to size 09, 1/8-27 NPT for larger sizes

For additional information about grease fittings, refer to Manual lubrication tools or contact SKF.

Housings made of composite, composite for the SKF Food Line, or stainless steel

Ball bearing units using these housings are as standard not equipped with a grease fitting and therefore cannot be relubricated.

#### Insert bearings

For details, refer to Insert bearings.

#### A complete guide to Ball bearing plummer block units.

There are many types of bearings, which are widely used in all walks of life, and ball bearing plummer block units as one of them also have a common application, if you want to know more about this, then read on, this guide will bring you great help.

#### 1?What are the product classifications of outer spherical bearings?

(1) with top wire outer spherical bearings: usually the top wire on the outer spherical bearings are two, the angle of 120 °, its characteristic is to cooperate with the shaft is to use the top wire to top on the shaft, and then play a fixed effect, but the cooperation environment needs to be small oscillation scale. This kind of outer spherical ball bearing is relatively widespread, widely used in textile machinery, ceramic machinery and other industries.

(2) with tapered outer spherical ball bearing: such outer spherical ball bearing inner diameter of 1:12 share of the tapered bore, the use of cooperation with the tightening sleeve, the characteristics of such outer spherical ball bearing can accept a greater load than with the top wire outer spherical ball bearing.

(3) with eccentric sleeve outer spherical ball bearing: the main feature of this kind of outer spherical ball bearing is that there is a certain eccentricity at one end of the bearing, and there is the same eccentricity of the eccentric sleeve with its cooperation. Such bearings can also be said to be special bearings, because they are mainly used in agricultural machinery, such external spherical ball bearings are mainly used in the layout of the runout is relatively strong, the cooperation of the eccentric layout can be useful to reduce the strong runout.

#### 2?What is a ball bearing plummer block units?

The bearing block is generally cast and molded. Commonly used seats are vertical seat (P), square seat (F), tab square seat (FS), tab round seat (FC), diamond seat (FL), ring seat (C), slider seat (T), etc..

Seated external spherical bearings are a type of bearing unit that combines a rolling bearing with a housing. Most of the outer spherical bearings are made of spherical outside diameter, and with a spherical bore of the imported bearing seat mounted together, the structure of a variety of forms, versatility and interchangeability, because of the strong interchangeability, bearing heart can be assembled in the same specification of different shapes of bearing seat.

Seated outer spherical bearings are a combination of grease-sealed deep groove ball bearings and various shapes of housings to form a high-precision component product. The bearing assembly can be mounted directly to the main body of the machine by a few bolts, and it is easy to install and use because it has a centering function and can be greased.

### **3?What types of outer spherical bearings are there?**

With vertical housing outer spherical ball bearings, with square housing outer spherical bearings, with diamond housing outer spherical ball bearings, with tabs round housing outer spherical ball bearings, with ring housing outer spherical ball bearings, with sliding block housing outer spherical ball bearings, with suspension housing outer spherical ball bearings, with hanging housing outer spherical ball bearings, with adjustable diamond housing outer spherical ball bearings, with stamping housing outer spherical ball bearings, with other housing outer spherical ball bearings.

### **4?Ways and points of fault diagnosis for ball bearing plunger block units?**

The practical method for condition monitoring and fault diagnosis of outer spherical bearings is vibration analysis. It is necessary to pay attention to the accuracy of the collected signals and the location of the measurement points and the collection method. To truly and accurately reflect the vibration state of imported outer spherical bearings. Therefore, we should arrange the measurement point in the nearest place to the bearing, the free end of the motor generally has a rear fan cover, the measurement point is selected in the fan cover fixed screw has a better monitoring effect. In addition, attention must be paid to the vibration signal for several times to collect and analyze, comprehensive comparison, in order to get accurate conclusions.

External spherical bearings in its use process expressed a strong regularity, temporary production state monitoring found, and repeatability is very good. Normal high-quality bearings in the beginning of use, vibration and noise are relatively small, but the spectrum is somewhat scattered, the amplitude are small, may be due to some defects in the manufacturing process, such as the appearance of burrs.

Vibration and noise to maintain a certain level, after a period of movement, the spectrum is very single, only one or two times the frequency. It rarely appears more than three times the working frequency spectrum. The bearing state is very stable and enters a stable working period. Bearing vibration and noise begin to increase, and enter the late use period after continuing operation. Sometimes there is a strange sound, but the change of vibration increase is slow, the bearing crag value starts to reach a certain value suddenly, at this time the bearing is indicated as the initial failure. It requires close monitoring of the bearing, and this time pay close attention to its changes.

Then, the bearing cliff value and began to decline rapidly, and close to the normal value, while the vibration and noise began to increase significantly, its increase began to accelerate, when the vibration exceeds the vibration specification when the bearing cliff value also began to increase rapidly, when both exceeded the vibration specification, and cliff value also exceeded the normal value, that the bearing has entered the late failure production, need to timely repair equipment, replacement of bearings.

The larger the capacity of the equipment, the bearing indicates late failure characteristics to serious failure, generally for bearing damage such as holding shaft, burns, sand frame scattering, raceway, bead wear, etc., time mostly not more than a week, the faster the speed, the shorter the interval. Therefore, the actual imported outer spherical bearing fault diagnosis, once found late fault characteristics, should be decisive judgment bearing failure, as soon as possible to arrange maintenance.

## **5?What are the characteristics and advantages of the ball bearing plummer block units?**

- (1) The housing and bearing outer ring precision fit: To facilitate the installation of imported bearings and housing, there are positioning pin holes on the housing, which can be used when necessary.
- (2) The interchangeability of the imported bearings: the bearings in the imported bearing units are interchangeable, when the bearings inside are damaged, the bearings inside can be replaced separately.
- (3) Alignability: The outer ring outer diameter surface of the bearing, the inner diameter surface of the housing is spherical design, so the bearing has alignability, the deflection and tilt of the shaft caused by poor installation, etc. can be adjusted by the alignment of the bearing itself.
- (4) safe positioning: the positioning of the inner ring of imported bearings is achieved by the stop screw, this positioning method can ensure that even in vibration and shock occasions can still be well prevented from screw loosening.
- (5) Lightweight and high strength: Imported bearing shells have various types, made of high-quality cast iron overall casting, or high-precision stamping steel manufacturing, in the light weight at the same time with maximum strength, the two different manufacturing methods, stamping steel manufacturing products have lighter characteristics.
- (6) Maintenance-free: The ball bearing unit is sealed with high quality lithium-based grease suitable for sealed bearing use, which can be used for a long time. The bearing is equipped with a sealing device with excellent sealability, which not only prevents the grease from leaking out but also prevents the impurity dust and water from entering the bearing from outside. When the bearing is running, the grease of the inner seal runs with the shaft inside, so that the grease inside can provide sufficient and effective lubrication and can be used for a long time without adding grease.
- (7) special seal design: standard seal by heat-resistant oil-resistant synthetic rubber seal and special design of the oil throw ring seal ring fixed on the outer ring, by the metal skeleton to strengthen the fixed lip and inner ring contact, as far as possible to reduce the friction torque oil throw ring fixed on the side of the inner ring, when the bearing rotates oil throw ring followed by the operation, oil throw ring on the three bumps will form the outward wind flow, to prevent the outside impurities dust The three bumps on the ring will form an outward air flow to prevent the outside impurities and dust from entering the imported bearing. This double-layer sealing structure not only prevents the internal grease from leaking out, but also prevents the external impurities and dust from entering the bearing.

## **6?How to install the ball bearing plummer block units?**

Before installing the bearing on the shaft, you must pull off the pin of the bearing jacket, and polish the surface of the journal smoothly, and apply oil to the journal to prevent rust and lubrication. Apply lubricant to the mating surface of the housing and the bearing, and install the bearing into the housing. Then put the assembled bearing and housing together on the shaft and push it to the required position for installation.

Do not tighten the bolts that fix the bearing housing first, to allow the bearing jacket to rotate inside the housing. Similarly install the other end of the bearing and seat on the same shaft, turn the shaft a few turns, let the bearing itself automatically find the right position, and then tighten the bearing seat bolts.

When assembling eccentric sleeve, first set the eccentric sleeve on the eccentric step of the inner sleeve of the bearing and tighten it by hand in the direction of rotation of the shaft, then insert or hold the small iron rod into the sink hole on the eccentric sleeve. Then insert the small iron rod into or against the countersink hole on the eccentric sleeve, hit the small iron rod with a hand hammer in the direction of rotation of the shaft to make the eccentric sleeve firmly installed, and finally lock the hexagonal screw on the eccentric sleeve.

## **7?How to assemble the bearing and the housing of the ball bearing plummer block units?**

There is a rectangular mouth on the bearing housing, pick up the outer spherical bearing, side facing this mouth, this time see the bearing side, bearing side view library cross-shaped, the outer spherical part into this rectangular mouth, and then rotate the bearing in the direction of the cross, this time the bearing is set into the housing inside. If it is very tight you can apply some lubricant, or even heat the bearing seat, so that the bearing seat inner diameter expansion becomes larger, the assembly will be

easy.

### **8?What is the detection of bearing radial clearance?**

In accordance with the functional characteristics of the bearing and the differences in the use of operating conditions, in the selection of suitable bearing type, but also need to be a conventional view of the bearing, the content of these views contain bearings, the specification of the assembly and processing accuracy, lubrication condition, whether the parts of the phenomenon of wear and so on. Of course, after the bearing check, should also carry out the following operations: First, the bearing cleaning, the need to pay attention to the point is that the bearing sealed equipment can be omitted from the cleaning of this link, because the cleaning will constitute an intrusion of foreign matter inside the bearing, affecting the normal use of the bearing; Second, it is necessary to adhere to the monotony of the bearing, the bearing to be cleaned, when cleaning off the bearing on the rust inhibitor, it is necessary to dry the bearing, otherwise it is easy to cause the bearing. It is necessary to dry the bearing, otherwise it is easy to cause the bearing to rust; Third, it is necessary to adhere to the lubricity of lubrication.

In addition to the bearing equipment before the view operation, should also be bearing radial clearance detection. Radial clearance mainly contains bearing in the natural condition of the original clearance, bearing equipment after the original clearance caused by the onset of change in the collaborative clearance, in the temperature and load effect constitutes the practical operation clearance.

Because the size of the radial clearance directly affects the operating temperature of the bearing, oscillation and the use of life expectancy value, so the bearing radial clearance detection is particularly important. The radial clearance measurement need to use special instrument measurement things as far as possible, when there is no special instrument on hand, can use the plug ruler and other things to measure. In the use of the ruler measurement, should pay attention to is, shall not choose the roller from the ruler rolling before the method of measurement.

When using the manual method of measurement method, this method of measurement of the requirements of the higher, and is a prone to error, so generally not recommended to use. On the multi-row bearing, for its each row clearance requirements are very high, it is necessary to pass all, measurement process, should ensure that the bearing roller is into the bottom of the groove.