

Ball Bearing Flanged Units

Detail Introduction :

Ball bearing flanged units consist of an insert bearing mounted in a housing that can be bolted to the machine wall or frame. The biggest feature of flanged ball bearing is that the flange is combined with the bearing. When there is no connection at one end of the shaft and it needs to be fixed on a flat surface such as a plate or a wall, the flanged bearing shows its advantages. In the ultra-small bore miniature bearings, they can be divided into ZZ steel plate bearing dust cover series, RS rubber bearing seal series, Teflon bearing seal series, flange series, stainless steel series, ceramic ball series, etc. Miniature ball bearings have a wide range of applications. Suitable for high speed rotation, low friction torque, low vibration, low noise requirements of the product.

Ball bearing flanged units are based on the bearing, with additional part of the baffle or baffle plate, become part of the bearing, more convenient to install, but also can effectively save part of the parts, its specific characteristics are as follows.

What are the advantages of SKF Ball bearing flanged units?

The series of products with flanges on the outer wheel make the axial positioning easy; the bearing seat is no longer needed and becomes more economical. In order to obtain low friction torque, high rigidity and good rotary accuracy of the bearing, small outer diameter steel balls are used. The use of hollow shaft ensures light weight and space for wiring

For the overall flange outer ring can be directly mounted on the fixed end, solving the problem of high technical requirements for the installation of ordinary standard 7 class bearings, the product has a compact structure and small volume, can be bi-directional force, with low vibration, low noise, high rotational accuracy, low friction torque, excellent sealing performance, high-speed performance, wide adaptability, easy to install, as well as low price and long life characteristics.

It is because skf's Ball bearing flanged unit has many significant advantages, so this kind of bearing has a very wide range of applications, in actual use can show a strong superiority.

Specific applications of Ball bearing flanged units.

Flanged ball bearing units are very practical and can be used in all kinds of industrial equipment, small rotary motors, office equipment, micro-motor soft drives, pressure rotors, dental dental drills, hard disk motors, stepper motors, VCR magnetic drums, toy models, fans, pulleys, rollers, transmission equipment, entertainment equipment, robots, medical equipment, office equipment, testing equipment, speed reduction, variable speed devices, motor optics, imaging Instruments, card readers, electromechanical, precision machinery, power tools and toys, etc.

In the process of use, take effective measures to extend the service life of Ball bearing flanged units will help users to further reduce costs.

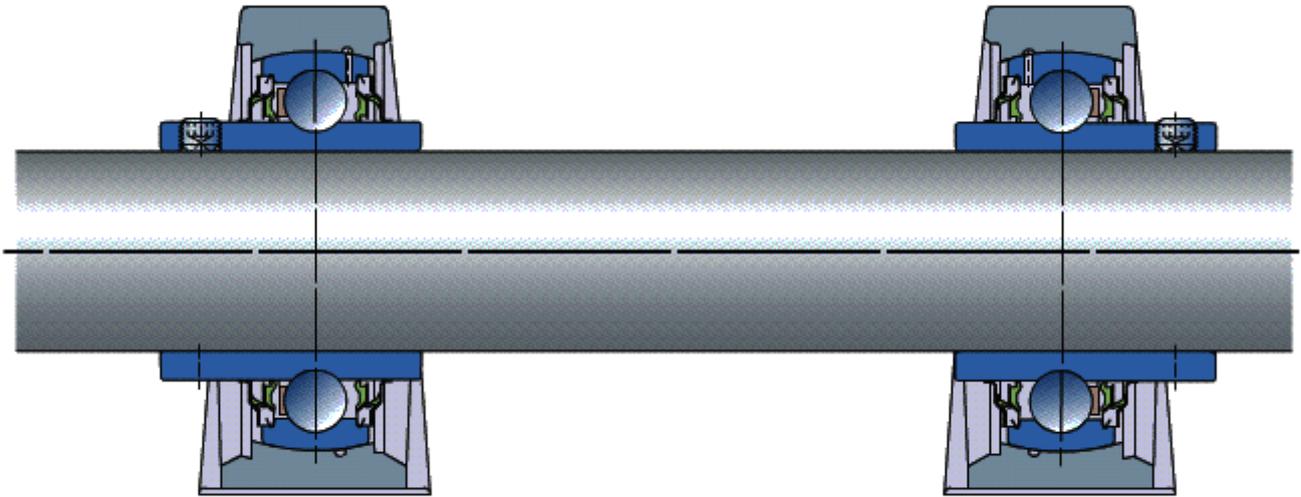
How to extend the service life of Ball bearing flanged units?

Ball bearing flanged units are mainly subjected to radial load, but also can be subjected to radial load and axial load at the same time, the following three measures can effectively extend the service life of the flanged ball bearing units.

- 1.To make the clearance between the bearing retainer and bearing ring in the radial direction set larger than the eccentric amount, the internal structure is improved.
2. To improve the strength of the retainer by optimizing the shape, plate thickness, etc. using FEM analysis.
3. To prevent surface damage caused by reduced lubricating oil, a guide groove was designed in the bearing ring.

Skf is a leading company in the bearing industry, always represents the most advanced production in the bearing industry, leading the development of the bearing industry, with wear resistance, corrosion resistance, simple structure, well-designed and many other significant advantages, among all skf bearings, Ball bearing flanged unit is unanimously recognized by the manufacturers, has a very high market demand.

You can learn more about the flanged ball bearing unit through the following information.
Ball bearing flanged units 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.	

Static misalignment

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

where relubrication is not required: 5°

where relubrication is required: 2°

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?Ball bearing flanged units 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 (fig. 1).

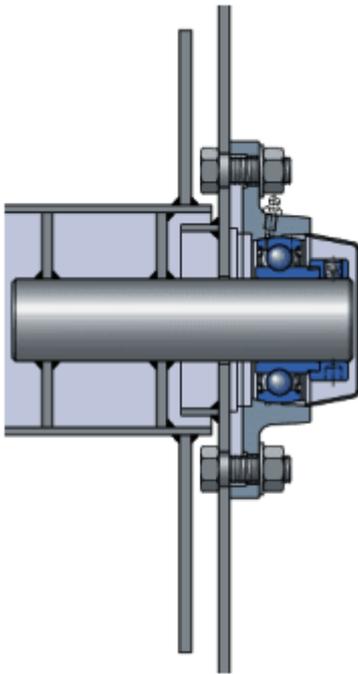


fig. 1

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. 2). If using one groove, the second set screw should be removed.

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.

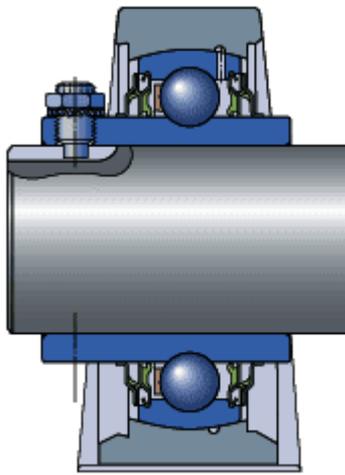


fig. 2

3?Ball bearing flanged units Lubrication

Grease fills

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

Grease	Temperature range ¹⁾						Thickener	Base oil type	NLGI grade	Base oil viscosity [mm ² /s]		Grease performance factor (GPF)
	-50	0	50	100	150	200				250 °C	at 40 °C (105 °F)	
VT307	[Color-coded bar: red from -50 to 0, green from 0 to 100, yellow from 100 to 200, red from 200 to 250]						Lithium-calcium soap	Mineral	2	190	15	1
GFM	[Color-coded bar: red from -60 to 30, green from 30 to 120, yellow from 120 to 300, red from 300 to 480]						Calcium sulphionate complex	Mineral	2	113	5.8	1.5

table 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.

all other bearings

? standard grease VT307

Grease life

Grease life for insert bearings:

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

depends on the load, operating temperature and the ndm value (diagram 1)

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

horizontal shaft

very light to moderate loads ($P \leq 0.05 C$)

stationary machine

low vibration levels

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

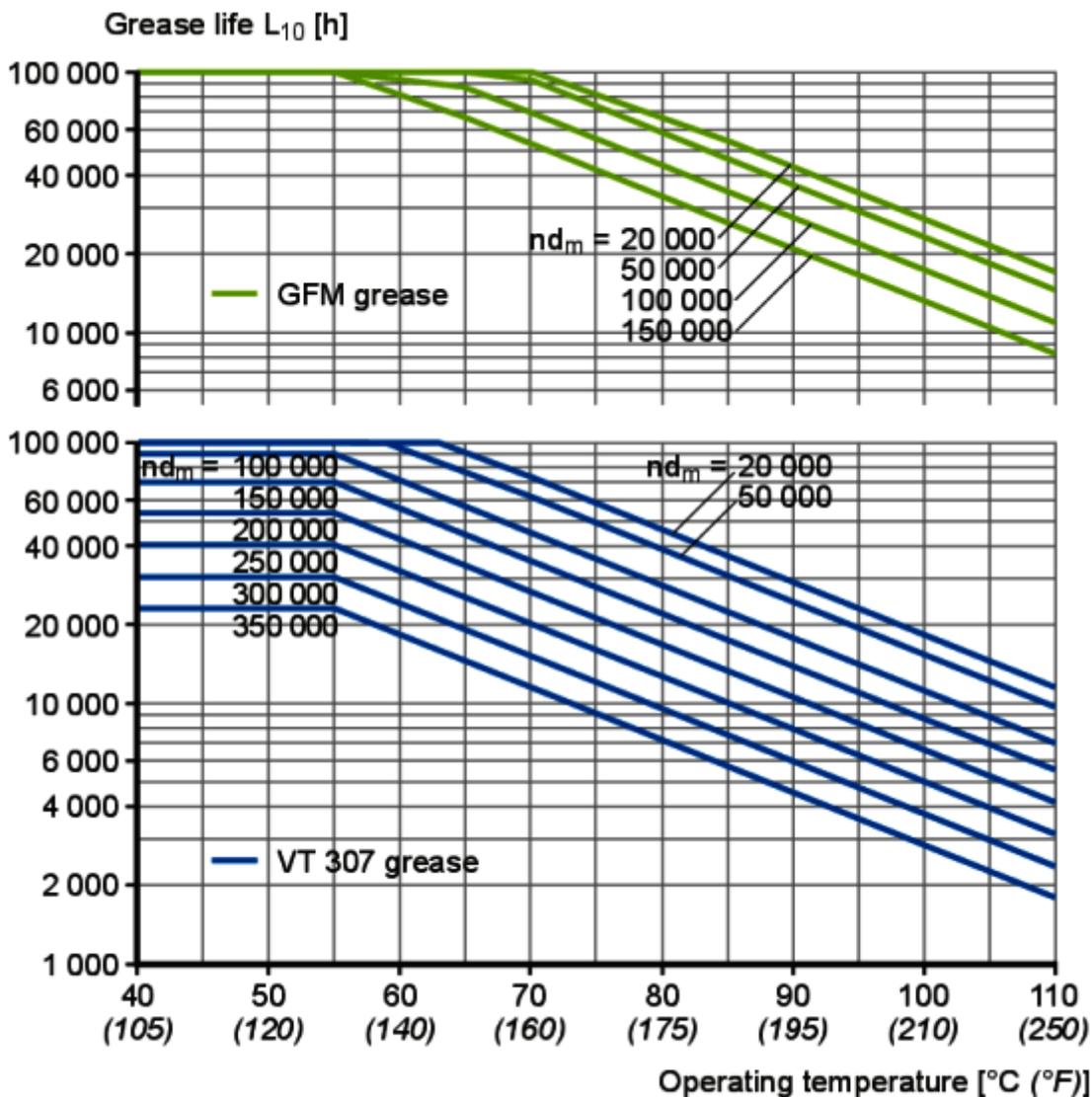


diagram 1

vertical shafts ? 50% of the obtained value

heavier loads ($P > 0.05 C$) ? apply reduction factor (table 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.

Load P	Reduction factor
? 0.05 C	1
0.1 C	0.7
0.125 C	0.5
0.25 C	0.2

table 2

Relubrication

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

The bearings are exposed to high humidity or severe contamination.

The bearings accommodate normal or heavy loads.

The bearings operate for extended periods at high speeds or at temperatures above 55 °C (130 °F).

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:

SKF LGWA 2

SKF LGMT 2

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

Housings made of cast iron or spheroidal cast iron

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

units to ISO standards: 1/4-28 UNF

units to North American standards: 1/8-27 NPT for regular cast iron housings, 1/4-28 UNF for spheroidal cast iron housings

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, pressed steel, or stainless steel

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

4. Ball bearing flanged units 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 size1)	Permissible speed			
	h7?	h8?	h9?	h11?
	r/min			
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	200	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:

- outer ring temperature ? 60 °C (140 °F)
- ambient temperature ? 25 °C (80 °F)
- very light to moderate loads (P ? 0.05 C)
- 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.

Complete buying guide for Ball bearing flanged units.

Skf bearings lead the development of the bearing industry, with excellent quality has been recognized by the community, meet a very strong market competitiveness, the use of skf bearings will get a higher quality of products, because skf bearings are very resistant to wear and corrosion, with many advantages.

The following will provide you with detailed answers to some common questions about Ball bearing flanged units: 1.

1.What are the advantages of Ball bearing flanged units?

Ball bearing flanged units are a motion system that does not require the use of a bearing base, and are very popular in applications because of their light weight and low cost. Ball bearing flanged units also use small steel balls, so that not only the precision of the rotation is finer, but also the low friction torque of the bearing can be obtained, and the application is still very convenient.

This is the unique advantage of the flanged ball bearing unit, which expands the range of application of the bearing.

In order to obtain low friction torque, high rigidity, and good rotary accuracy, small outer diameter steel balls are used. The use of hollow shaft ensures light weight and space characteristics of the wiring editor's greatest feature is the integration of flange and bearing. The flanged ball bearing unit is advantageous when there is no articulation at one end of the shaft and it needs to be fixed on a flat surface such as a plate or a wall.

2.What types of flange bearings are there?

There are three basic types of flange bearings: round or square four-bolt flanges, triangular three-bolt flanges, and diamond-shaped two-bolt flanges. Bearings are made using one of four bearing types: ball bearings, plain bearings, needle bearings and roller bearings are plastic, bronze and other materials used to make the actual bearings.

Flange bearings are typically used to provide support for shafts running perpendicular to the bearing mounting surface. When high speeds or heavy loads produce shaft bending, drilling shafts can create problems with vibration and axial load or movement, which can be mitigated by the application of flange bearings.

The flange bearing should be positioned to support the shaft, depending on the length and speed of the shaft, more than one bearing may be required, usually, the problem is deciding which bearing type to use to correct it, other factors when selecting flange type bearings clearance include cost, available space and the amount of radial force the shaft will exert on the bearing.

Normally mounted ball bearing flanges provide smooth, low-friction shaft rotary motion at the outer end of the shaft. The very small contact patch of the ball in this type of bearing does not support the weight of the shaft or resist linear motion. Plain bearings, also known as bushings, provide a smooth, flat surface that helps control the linear motion of the shaft. This type of flange bearing usually contains oil-impregnated, bronze or nylon bushings that do not require frequent lubrication or lubrication to remain in working condition. Flange-mounted needle roller bearings provide support that resists radial loads while also providing a low profile. This type of flange can be greased or maintenance free so that the flange does not require grease to remain in working condition.

Roller bearing flanges provide radial load support and resistance to linear motion of the shaft. Compared to ball bearings, long roller bearings have a larger contact surface, allowing the roller flange bearing to support the greatest amount of load of any flange type. There is a cost to this, and roller bearings typically cost more than other bearing types.

3. What are the precautions when installing Ball bearing flanged units?

For products such as flanged ball bearing units, the installation must be optimized in order for the bearings to be optimally mounted for the application. This requires attention to these three key issues when installing the bearings to ensure that the bearings are installed properly.

1. Separate the parts: Ball bearing flanged units are composed of multiple parts, especially in the time of installation, it is necessary to install multiple parts together in order to form the whole system, and the installation position and way of each part are concerned. In this case, in order to do a good job of installation, it is required to pay attention to distinguish all the components and not to confuse the components.

2. Clear steps: In order to ensure that the flange ball bearing unit to achieve the best installation, requires that before the installation, the specific operation steps are clear, and in the actual installation, in strict accordance with the prescribed steps, to avoid the operation of problems affecting the bearing installation effect.

3. Ensure the correct position of the components: all components of the flange ball bearing unit must be installed in the required position and required state, the installation effect achieved will be very good, so to do a good job of bearing installation, to ensure that the correct position of the components is very important.

4. Regarding Flange Bearing Load.

Flange load is a mixture of radial load and thrust. If, in addition to radial load, the bearing can also withstand thrust, the range of impact forces must be considered the following points.

If the thrust load is half of the radial load, then the radial load should be selected according to the applied radial load. If the thrust load is equal to or greater than half of the radial load, then the total load should be selected as the equivalent radial load applied.

If Ball bearing flanged units are required to absorb thrust forces other than radial loads, the magnitude of the thrust forces shall be fully considered. If the thrust load is half of the radial load, the selection should be based on the applied radial load.

5. Flange Bearing Applications.

Any application that requires a bearing to be mounted in a high vibration environment, and any application that requires a high axial load, will benefit from a flange ball bearing unit. Automotive applications are a good example, where the construction engineer must be able to select and assemble a bearing that can withstand friction and high temperatures.

As a result, the adhesive or disturbance fit in the bearing assembly is always inadequate in automotive applications. To ensure a long bearing life, flanged ball bearing unit bearings are available. Flanged bearings can maintain their position and withstand the corrosive atmosphere and friction inside the vehicle.

High temperature locations also require the selection of flanged ball bearing units, where temperatures often exceed about 180°C under the hood applications and where the material between the ball bearing and the housing or shaft may result in different thermal expansion rates.

For example, pressing a steel bearing into an aluminum housing; the housing may stretch earlier than the steel bearing and thus lose contact with the bearing. Flanged ball bearing units are mainly used in light duty applications such as food processing equipment, conveyors, material storage, HVAC belt drives, textiles, baggage systems, surgical processing and many other light industrial applications.

6. How to test whether the flange bearings are broken when the machine is running?

Bearing vibration: flange ball bearing unit is very sensitive to vibration, even like indentation, rust, cracks, wear and so on will be in the vibration measurement response, so by taking a special flange ball bearing unit vibration measurement device can measure the size of the vibration, through the frequency can be driven out of the abnormal situation.

Temperature: usually, the ground temperature with the start of the operation slowly back to life, 1-2h after reaching a stable, abnormal temperature because of the machine geothermal capacity, heat dissipation, speed and load and different. If the lubrication and device department is suitable, then the temperature will rise sharply and abnormally high temperature will appear, at which time the operation must be ended. The thermal sensor can detect the working temperature very well and realize the active alarm or stall when the temperature exceeds the specified value.

When the following phenomena occur, you should promptly replace the flange ball bearing unit to avoid continued use.

1. Inner and outer ring, cage in any one of the cracks or emergence of debris.
2. Inner and outer ring, rolling body in any of the peeling.
3. The raceway surface, retaining edge, rotating body has obvious card injury.
4. The cage wears severely or the rivet loosens greatly.
5. The raceway surface and rolling body are rusted and have traces.
6. There are significant indentations and scoring on the raceway surface and rolling body.
7. There is creep on the outer diameter surface of inner ring or outer ring.

7. How to measure Ball bearing flanged units?

Flanged bushing is a sleeve bearing with a "flange" or "shoulder" at one end. The flange has a variety of functions. It can help align and mount the bearing, and it can help simplify the mounting of the bearing.

The flange bushing has 5 different parts. Internal diameter (ID), external diameter (OD), overall bushing length (OAL), flange external diameter (FLOD) and flange thickness (FLTH).

1. Measurements start with ID first
2. Next, measure the outer diameter of the body
3. Measure the total length of the bushing, including the flange, according to the outside diameter.
4. Take note of the OD of both flanges measured
5. Finally, measure the thickness of the flange

8. Is the bearing and the flange integrated?

Ball bearing flanged units are bearing units that are contained within a housing unit. The housing provides a rigid and secure location while allowing the bearing unit to rotate in a clean, enclosed environment. The housing is bolted to the base, allowing the outer ring of the bearing to remain stationary while the inner ring rotates. Bearing housings are most commonly used in light duty applications.

