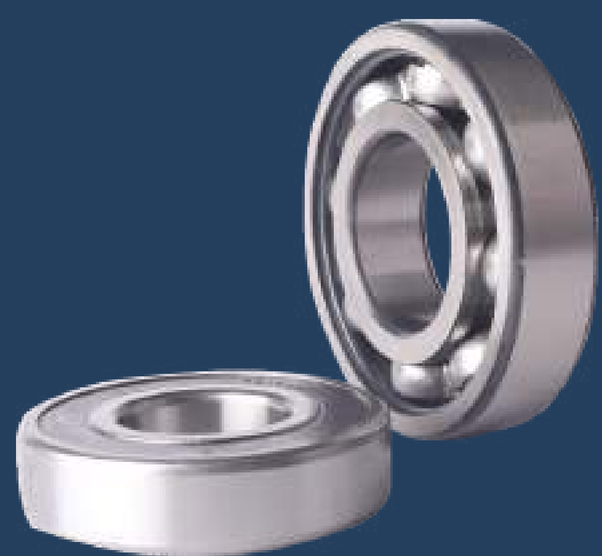
YSK BEARINGS
TS16949 CERTIFIED ENTERPRISE

YSK

NINGBO YSK PRECISION MACHINERY CO.,LTD.
ADDRESS:1# HOUHESHAN RD,LANGXIA DISTRICT,YUYAO NINGBO CITY,ZHEJIAN PROVINCE CHINA.
TEL:+86-(0)574 6222 6675
FAX:+86-(0)574 6222 6674
MAILBOX:INFO@YSKBEARING.COM
WEBSITE:WWW.YSKBEARING.COM



NINGBO YSK PRECISION MACHINERY CO.,LTD.

YSK

YSK BEARINGS
TS16949 CERTIFIED ENTERPRISE

Thought is the only way to attain the dignity of life
Without faith, there is no end to the soul,
and all values are without support

F A I T H

COMPANY PROFILE

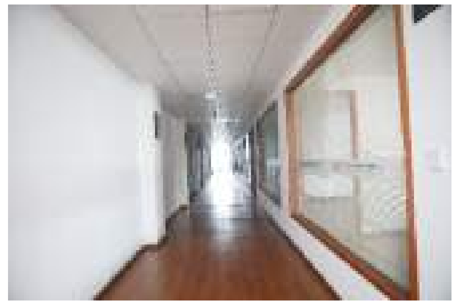
Our company was founded in June 2010,located in the central of Yangtze River Delta area ,Langxia industrial zone ,Yuyao,Zhejiang,is a collection of bearing research and development, manufacture and sales service as one of the modern bearing manufacturing enterprise, specialized in the production of precision tiny, tiny, small bearings.Company leading product for the 6 series small small-sized bearing, on the silent, high speed and long life with industry leading technology advantages, the main application is for domestic and foreign cars, air conditioners, washing machines, vacuum cleaners, electric tools etc.market.

Our company promotes institutionalized, process-based and scientific management in strict accordance with the IATF16949, ISO9001 quality management system and ISO14001 environmental management system.Constantly introduce and absorb domestic and foreign advanced automation processing equipment, high precision measurement test equipment, a comprehensive import lean production management mode, the company with the pursuit of excellence, build capacity scale advantage, quality advantage and management advantage;Improve performance, reduce costs, and create value through management to achieve a win-win strategy between customers, employees, society and the company.

Our company takes "expanding the national industry and replacing the imported bearings" as its own responsibility, and gains the trust of customers with its high quality advantage and grows rapidly. The self-owned brands created are YGA, QIJI and YSK.
Our Company stand people-oriented, management with law,enterprise development with quality, innovation for the idea,provide a good development platform for outstanding person, attract ,develop and respect to talents, continuous innovation, establishing scientific management mechanism, to create excellent management team.In the economic tide in the 21st century, the company is full of good modern manufacture enterprises outstanding style and vitality, the company aim with the people-oriented, harmonious, benefit to society, provide high quality products of bearing for the society, by the faith, win-win, unity, cooperation, as the idea of cooperation.

We sincerely welcome people from all parts of society to visit our company and discuss business!

YSK WORKSHOP

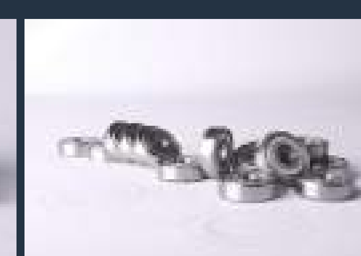








CATALOG






ROLLING BEARING CONSTRUCTION AND CLASSIFICATION

ling bearings are generally composed of bearing rings, rolling elements and cages. Several rolling elements are placed between two bearing rings and cages prevent the rolling elements from contact and with such a structure, a smooth rolling action becomes possible.

Rolling bearings are divided into radial bearings and thrust bearings, mainly depending on the applicable load direction. Radial bearing mainly take radial loads. Most types of radial bearings can also take thrust loads. Thrust bearings generally take thrust loads only and not radial loads.

Rolling bearings are largely divided into ball bearings and roller bearings in accordance with the types of rolling elements, Roller bearings are further divided depending on the shape of the roller into cylindrical roller bearings tapered roller bearings, spherical roller bearings and needle roller bearings. Ball bearings are divided into several types, depending on the shape of bearing rings and the contact position between the balls and the raceway.

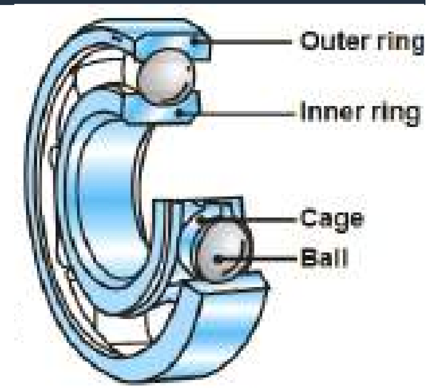
The cages of rolling bearings are divided into pressed and machined ones with the shapes differing according to the bearings type and conditions of use.

Bearing Classification

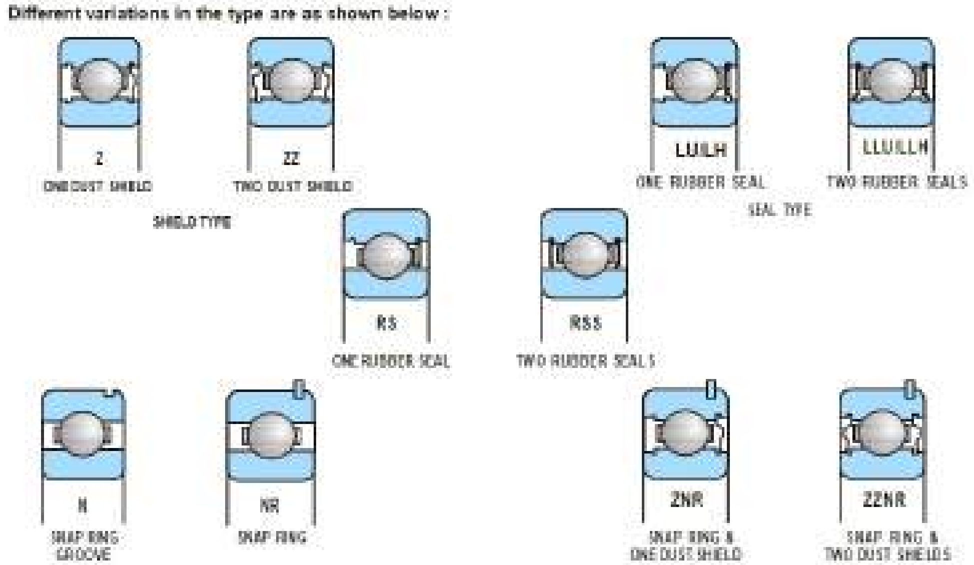
The Single row radial ball bearings accommodate pure radial, pure axial or any combination of radial and axial loads within its capacity.These can operate at very high speeds.
For these reasons and its economical price, it is the most widely used bearing.

Owing to high degree of conformity between balls and raceways, the self aligning capability of deep groove ball bearings is small. This fact calls for well aligned bearing mountings.

These bearings can be located endwise in both the directions



Deep Groove single Row Ball Bearing



ACCURACY AND TOLERANCES

2.1 Radial Runout

Radial runout of assembled bearing inner ring, Kia (radial bearing): Difference between the largest and the smallest of the radial distances between the bore surface of the inner ring, in different angular positions of this ring, and a point in fixed position relative to the outer ring. At the angular position of the point mentioned, or on each side and close to it, rolling elements are to be in contact with both the inner and outer ring raceways and (in a tapered roller bearing) the cone back face rib, the bearing parts being otherwise in normal relative positions.

Radial runout of assembled bearing outer ring, Kea (radial bearing) : Difference between the largest and the smallest of the radial distance between the outside surface of the outer ring, in different angular positions of this ring, and a point in a fixed position relative to the inner ring. At the angular position of the point mentioned, or on each side and close to it, rolling elements are to be in contact with both the Inner and outer ring raceways and (in a tapered roller bearing) the cone back face rib, the bearing parts being otherwise in normal positions.

2.2 Face runout with raceway

Assembled bearing inner ring face runout with raceway, Sia (groove type radial ball bearing) : Differences between the largest and the smallest of the axial distances between the reference face of the inner ring, in different relative angular positions of this ring, at a radial distance from the inner ring axis equal to half the inner ring raceway contact diameter, and a point in a fixed position relative to the outer ring. The inner and the outer ring raceways are to be in contact with all the balls.

Assembled bearing cone back face runout with raceway, Sia (tapered roller bearing) : Difference between the largest and the smallest of the axial distances between the cone back face, in different angular positions of the cone, at a radial distance from the cone axis equal to half the cone raceway contact diameter and a point in a fixed position relative to the cup. The cone and cup raceways and the cone back face rib are to be in contact with all the rollers, the bearing parts being otherwise in normal relative positions.

Assembled bearing outer ring face runout with raceway Sea (groove type radial ball bearing) : Difference between the largest and the smallest of the axial distances between the reference face of the outer ring, in different relative

angular positions of this ring, at a radial distance from the outer ring axis equal to half the outer ring raceway contact diameter, and a point in a fixed position relative to the inner ring. The inner and outer ring raceways are to be in contact with all the balls.

Assembled bearing cup back face runout with raceway Sea (tapered roller bearing) : Difference between the largest and the smallest of the axial distances between the cup back face, in different angular positions of the cup, at a radial distance from the cup axis equal to half the cup raceway contact diameter, and a point in a fixed position relative to the cone. The cone and cup raceways and the cone back face rib are to be in contact with all the rollers, the bearing parts being otherwise in normal relative positions.

2.3 Face runout with bore

Face runout with bore, Sd (inner ring reference face):
Difference between the largest and the smallest of the axial distances between a plane perpendicular to the ring axis and the reference face of the ring, at a radial distance from the axial of half the inner ring raceway contact diameter.

2.4 Raceway parallelism with face

Raceway parallelism with face, Si or Se (inner or outer ring of groove type radial ball bearing reference face) : Difference between the largest and the smallest of the axial distances between the plane tangential to the reference face and the middle of the raceway.

2.5 Outside surface inclination

Variation of outside surface generatrix inclination with face, Sd (outer ring basically cylindrical surface reference face) : Total variation of the relative position in a radial direction parallel with the plane tangential to the reference face of the outer ring, of points on the same generatrix of the outside surface at a distance from the side faces of the ring equal to the maximum limits of the axial chamfer dimension.

2.6 Thickness–variation

Inner ring raceway to bore thickness variation, Ki (radial bearing) : Difference between the largest and the smallest of the radial distances between the bore surface and the middle of a raceway on the outside of the ring.

Outer ring raceway to outside surface thickness variation, Ke (radial bearing) : Difference between the largest and the smallest of the radial distances between the outside surface and the middle of a raceway on the inside of the ring.

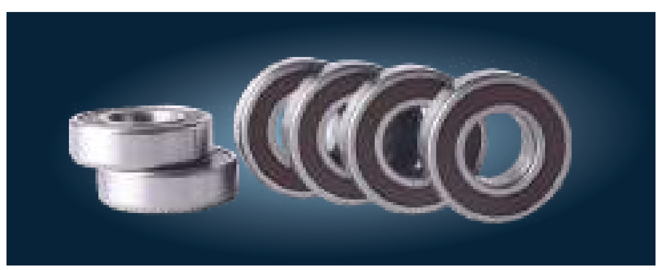
3.Tolerances For Radial Bearings INNER RING:

OUTER RING:

Values in microns												
d (mm)		Δ dmp		Vdp Diameter Series			V_{dmp}	K_{ia}	ΔBS			VBS
				9	0,1	2,3,4			All	Normal	Modified	
Over	Including	High	Low	Max			Max	Max	High	Low		Max
2.5	10	0	-8	10	8	6	6	10	0	-120	-250	15
10	18	0	-8	10	8	6	6	10	0	-120	-250	20
18	30	0	-10	13	10	8	8	13	0	-120	-250	20
30	50	0	-12	15	12	9	9	15	0	-120	-250	20
50	80	0	-15	19	19	11	11	20	0	-150	-380	25
80	120	0	-20	25	25	15	15	25	0	-200	-380	25
120	180	0	-25	31	31	19	19	30	0	-250	-500	30
180	250	0	-30	38	38	23	23	40	0	-300	-500	30
250	315	0	-35	44	44	26	26	50	0	-350	-500	35
315	400	0	-40	50	50	30	30	60	0	-400	-630	40
400	500	0	-45	56	56	34	34	65	0	-450	-	50
500	630	0	-50	63	63	38	38	70	0	-500	-	60
630	800	0	-75	94	94	55	55	80	0	-750	-	70
800	1000	0	-100	125	125	75	75	90	0	-1000	-	80

INNER RING:

Values in microns												
D (mm)		Δ Dmp		V_{DP} Open Bearings Diameter Series			Capped Bearing	V_{Dmp}	K_{ea}	ΔCs ΔC1s		Vcs VC1s
				9	0,1	2,3,4	2,3,4					
Over	Including	High	Low	Max			Max	Max	Max	High	Low	Max
6	18	0	-8	10	8	6	10	6	15	Identical to ΔBS and VBS of Inner ring of same bearing		
18	30	0	-9	12	9	7	12	7	15			
30	50	0	-11	14	11	8	16	8	20			
50	80	0	-13	16	13	10	20	10	25			
80	120	0	-15	19	19	11	26	11	35			
120	150	0	-18	23	23	14	30	14	40			
150	180	0	-25	31	31	19	38	19	45			
180	250	0	-30	38	38	23	-	23	50			
250	315	0	-35	44	44	26	-	26	60			
315	400	0	-40	50	50	30	-	30	70			
400	500	0	-45	56	56	34	-	34	80			
500	630	0	-50	63	63	38	-	38	100			
630	800	0	-75	94	94	55	-	55	120			
800	1000	0	-100	125	125	75	-	75	140			
1000	1250	0	-125	155	155	94	-	94	160			
1250	1600	0	-160	200	200	120	-	120	190			
1600	2000	0	-200	250	250	150	-	150	220			
2000	2250	0	-250	310	310	190	-	190	250			

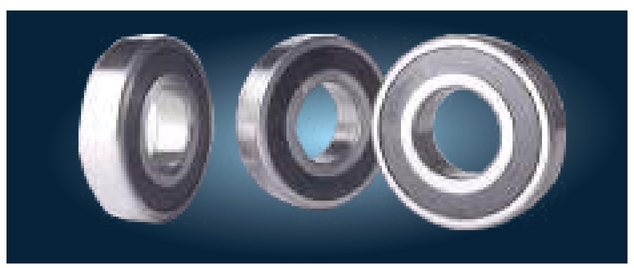


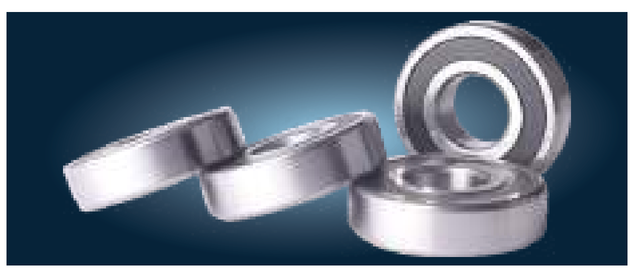
BEARING INTERNAL CLEARANCE

Bearing Internal clearance (Initial clearance) is the amount of
internal clearances, a bearing has before being installed on a shaft or on a housing as shown in figure when either the inner/outer ring is fix and the other ring is free to move. Displacement can take place either in axial/radial direction. This amount of displacement (Radially or Axially) is termed by internal clearance, and depending on the direction, is called the radial clearance or the axial internal clearance. When the internal clearance of a bearing is measured, a slight measurement load is applied to the race ways so the internal clearance may be measured accurately. However, at this time, a slight amount of elastic deformation of the bearing occurs under the measurement load, and the clearance measurement value is slightly larger than the two clearances. This discrepancy between the two bearing clearances and the increased amount due to elastic deformation must be compensated. These compensated values are given in Table below

ADJUSTMENT OF RADIAL INTERNAL CLEARANCE OF DEEP GROOVE BALL BEARINGS BASED ON MEASURED LOAD

Unit μm							
Nominal Bore Diameter d (mm)		Measuring Load		Radial Clearance Increase			
over	incl.	N	(Kgf)	C2	CN	C3	C4
10	18	24.5	(2.5)	3-4	4	4	4
18	50	49	(5)	4-5	5	6	6
50	200	147	(15)	6-8	8	9	9





4. LUBRICATION

Why Bearing Should be lubricated ?

Lubrication is an essential requirement for the proper operation of bearings.
The purpose of bearing lubrication is to prevent direct metallic contact between the various rolling and sliding elements. This is accomplished through the formation o fathinfilm of oil/grease
on the contact surfaces.

The Advantages of lubrication

* Protects the bearing from rust & corrosion.
* Protects the bearing from the foreign particles.
* Minimizes the friction between the races & rolling elements.
* Reduces the friction arising out of elastic deformation of rolling elements when under load.
* Facilitates the smooth running of bearing by minimizing noise.
* Saves power losses by minimizing internal friction.
* Helps the bearing to attain the required speed.
* Helps to attain the anticipated life of the bearing.Selection of lubricant:
* Small size bearings operating at high speed, low viscosity oil is used
* The lubricant must have sufficient lubricating capacity at the prevailing temperature
* It must form a load sustaining lubricating film for prevailing load conditions.

4.1 Types of Lubrication

4.1.1 Grease Lubrication

Grease type lubricants are relatively easy to handle & require only the simplest sealing devices and it also involves a minimum of design and maintenance requirements and thus offers an optimum economy. For these reasons, grease is most widely used lubricant for rolling bearings.
Grease is a semi-solid lubricant consisting of base oil,thickener and additives

A. Base Oil :

Mineral oils or synthetic oils such as silicon diester oils and fluorocarbon oils are mainly used as the base oil for grease.The lubricating properties of grease depend mainly on characteristics of its base oil. Therefore greases with low viscosity base oil are best suited for low temperature and high
speeds. High viscosity base oils are best suited for heavy loads.

B. Thickening Agents :

Thickening agents are compounded with the base oils to maintain the semi-solid state of the grease. There are several types of metallic soaps such as lithium, sodium & calcium and
inorganic thickeners such as silica gel & bentonite and heat resisting organic thickeners such as polyurea and fluoric compounds. The various special characteristics of a grease, such as limiting temperature range, mechanical stability, waterresistance, etc. depend largely on the type of thickening agent used. For example, a sodium based grease is generally poor in water resistance and lithium base greases are water repellent within the certain limits and may also be used in the case of moisture if corrosion inhibitors are added. Greases with betone, poly-urea and other non-metallic soaps as the thickening agent are generally superior in high temperature properties.

C. Additives :

Various additives are added to grease such as antioxidants,corrosion inhibitors and extreme pressure additives (EP Additives) to improve various properties.EP additives are used in heavy load applications. For long use without replenishment, an antioxidant should be added.

D. Consistency:

Consistency indicate the stiffness and liquidity and expressed by a numerical index. Greases are divided into various consistency classes according to the NLGI (National Lubricating grease Institute Scale). The NLGI values for this index indicate the relative softness of the grease, the larger the number the stiffer the grease. It is mainly determined by the amount of thickening

agent used and the viscosity of the base oil. For rolling bearing lubrication grease with the NLGI numbers of 1 ,2, & 3 are used.

Grease name	Lithium grease			Calcium grease (cup grease)	Sodium grease (fiber grease)
Thickener	Lithium Soap			Calcium Soap	Sodium Soap
Base Oil	Mineral oil	Synthetic oil (diester oil)	Synthetic oil (Silicon oil)	Mineral oil	Mineral oil
Dropping point (°c)	170 to 190	170 to 230	220 to 260	80 to 100	160 to 180
Operating temp. Range (°c)	-30 to +120	-50 to +130	-50 to +180	-10 to +70	0 to +110
Rotational range	Medium to high	High	Low to medium	Low to medium	Low to high
Mechanical stability	Excellent	Good to excellent	Good	Fair to good	Good to excellent
Water resistance	Good	Good	Good	Good	Bad
Pressure resistance	Good	Fair	Bad to fair	Fair	Good to excellent
Remarks	Most widely usable for various rolling bearings	Superior Low Temperature & friction characteristics. Suitable for bearings for measuring instruments & extra small ball bearings for small electric motors.	Superior, High & low temperature characteristics.	Suitable for application at Low rotation speed & under light load. Not applicable at high temperature	Liable to emulsify in the presence of water. Used at relatively high temperature.

Grease name	Complex Base Grease		Non-Soap Base Grease		
Thickener	Lithium Complex Soap	Calcium Complex Soap	Bentone	Urea Compounds	Fluorine Compunds
Base Oil Dropping point (C)	Mineral Oil 250 or Higher	Mineral Oil 200 to 280	Mineral Oil -	Mineral Oil/Synthetic Oil 240 or higher	Synthetic Oil 250 or Higher
Operating Temp. Range (C)	-30 to +150	-10 to +130	-10 to +150	-30 to +150	-40 to +250
Rotational Range	Low to High	Low to Medium	Medium to High	Low to High	Low to Medium
Mechanical Stability	Good to Excellent	Good	Good	Good to Excellent	Good
Water Resistance	Good to Excellent	Good	Good	Good to Excellent	Good
Pressure Resistance	Good	Good	Good	Good to Excellent	Good
Remarks	Superior mechanical stability and heat resistance. Used at relatively high temperature.	Superior pressure resistance when extreme pressure agents is added. Used in bearings for rolling mills.	Suitable for application at high temperature & under relatively heavy load	Superior water resistance, oxidation stability, and heat stability. Suitable for application at high temperature & high rotation speed.	Superior chemical resistance and solvent resistance. Usable upto 250 °C.

5.SEATING

Seating for bearing rings must be parallel, circular and machined to their correct limits. Badly made seatings can distort thin section bearing rings, and thus reduce the efficiency and life of the bearings.

Shafts must be designed so that where rigid bearings are used, the slope at the bearings due to deflection is as small as possible.The permissible slope must vary with individual applications as it depends upon the operating conditions consequently limiting values are not listed.When experience is lacking on this point, our Technical Department will be pleased to give advice.

Housing must give adequate support to the outer ring of a bearing under load. If a housing distorts excessively, the outer ring will invariably distort as well, causing premature failure of the bearing. Where individual housing is used accurate alignment must be provided for rigid bearings.

Split housing should not be used unless absolutely necessary, since the joint between the cap and its base could distort the outer ring. If such housings are used, the two halves should be accurately doweled or registered before the bearing seating is machined. It is advisable to ensure that the cap can only be fitted one way round by suitably arranging the dowels or register.
Light alloy housings should be provided with substantial steel liners when :

· A bearing has to work under wide variation of temperature, as differential expansion between the seating and bearing materials affects the initial fit between these members.! Heavy and/or shock loads are involved, for alloy seatings can quickly loose shape under such loading and give rise to serious trouble.! The steel liners must be an interference fit in their housings at the temperature extremes anticipated, and beating seatings should be machined after the liners are fitted.
· When light alloy or other non ferrous seating are to be used, we advise consultation with our Technical Department about the seating limits to be adopted.

Seating Fits

It is very important that bearing seating be machined to their correct limits, incorrect fits can cause tightness within the bearing or allow one or both of the bearing rings to creep, and affect the running accuracy and the assembly and dis-assembly of a machine.Creep is slow rotation of one ring relative to its seating. It is undesirable since the shaft and the bore of the bearing or the housing and the outside diameter of the bearing become worn. Creep is not due to friction within a bearing but is generally caused by radial loads rotating or oscillating with respect to a fixed point on the ring under consideration.The only satisfactory way of preventing creep under such conditions is to make the affected ring an interference fit on its seating.Set-screws or key ways should not be used in an effort to prevent creep, for they quickly wear due to constant chafing, or can distort bearing- rings, causing local overload and rapid bearing failure. Also, clamping a ring endways does not normally prevent creep.Ball Journal, Roller Journal, Angular Contact and Duplex Bearings Rotating Rings (usually inner ring) should be made interference fit on their seating to ensure that they will not creep.Stationary Rings (usually outer ring) need not be interference fit provided there are no out-of-balance or oscillating loads.Some bearing rings must slide endways on their seatings and in such cases a sliding fit is essential, although excessive slackness should be avoided.For example, where two or more Ball Journal bearings, or Roller Journal bearings with non detachable rings are mounted on the same unit, the unlocated ring or rings should be free to move endways, otherwise the bearings that are adjusted endwise should also be made sliding fits. Where the stationary ring of Ball Journal, Angular Contact or Duplex Bearing is held endways, it is common practice to make the ring a sliding fit.In the case of Roller Journal bearings a transition fit is normally used. For Journal bearings light interference fits, however, are not detrimental provided the correct diametral clearance is used, and the seating fit adopted may well be governed by considerations of mounting, dismounting, and of rigidity.If a stationary ring does creep, out-of-balance loading or outof square mounting of one of the bearing rings must be suspected. Mounting errors should be corrected, and where out-of-balance loading exists the assembly should be dynamically balanced, static balancing not being enough.Where out-of balance loading can't be reduced to a low level, or where it is a function of the machine, an interference fit must be used on the stationary ring as well as on the rotating ring. In a bearing arrangement where interference fits are used on all rings, a bearing layout must be used in which there is no danger of the bearings being axially nipped one against the other

5.2 Fits

The necessity of a proper fit In some cases improper fit may lead to damage and shorten bearing life. Therefore, it is necessary to make a careful analysis while selecting a proper fit.Some of the negative conditions caused by improper fit are
listed below :
·Raceway cracking, early pitting and displacement of raceways
·Raceway & shaft or housing abrasion caused by creeping in fretting corrosion
·Seizing caused by loss of internal clearance
· Increased noise & lowered rotational accuracy due to raceway groove deformation.

Selection of fits

Selection of proper fit depended upon thorough analysis of bearing operating conditions, including consideration of following factors :

(1) Condition of Rotation
Condition of rotation refer to the moving of bearing ring being considered in relation to the direction of load. There are 3 different conditions :
·Rotating load
·Stationery load
·Direction of load indeterminate

(2) Magnitude of the load
The interference fit of a bearing's Inner ring on its seating will be loosened with the increasing load, as the ring will expand under the influence of rotating load, & ring may begin to creep. So, if it is of shock character, greater interference is required.
The loss of interference due to increasing load can be
estimated using the following equation :

When Fr is $\leq 0.3C_{or}$ Where Δdp = Interference decrease of inner ring(μm)

$$\Delta dp = 0.08\sqrt{\frac{d}{B}Fr}$$

d = Bearing Bore (mm)

When Fr is $\leq 0.3\,C_{or}$

$$\Delta dp = 0.02\left(\frac{Fr}{B}\right)$$

B = Inner Ring Width(mm)
Fr = Radial Load (N)
C_{or} = Basic Static Load (N)

(3) Bearing Internal Clearance
·An interference fit of a bearing on the shaft or in housing means that ring is elastically deformed (expanded or compressed), and bearing's internal clearance reduced.
·The internal clearance and permissible reduction depend on the type and size of the bearing.
·The reduction in clearance due to interference fit can be so large that bearings with an internal clearance which is greater than normal have to be used.
·The expansion of the inner ring and contraction of outer ring can be assumed to be approximately 60 - 80 % of the interference, depending on the material of shaft and housing.

— YSK —
BEARINGS

(4) Temperature Condition
Interference between inner ring & steel shaft is reduced as a result of temperature increase (difference between bearing temperature and ambient temperature).This can result in an easing of fit of the inner ring on its seating. while outer ring expansion may result in increase in clearance.
The decrease of the interference of the inner ring due to this temperature difference may be calculated using following
equation :

$$\Delta dt = 0.0015\ d\ \Delta T$$

Where Δdt = Required effective interference for temperature difference μm
ΔT = Temperature difference between bearing temperature and ambient temperature °c.
d = Bearing bore diameter mm.

(5) Running Accuracy Requirement
To reduce resilience and vibration, clearance fit should generally not be used for bearings, where high demands are placed on running accuracy.

(6) Design & Material of Shaft & Housing
The fit of a bearing ring on its seating must not lead to uneven distortion of the ring (out of roundness).This can be caused by discontinuity in the housing surface. Split housings are therefore not suitable where outer rings are to have an interference fit.

(7) Ease of Mounting & Dismounting
Bearings with clearance fit are usually easier to mount or dismount than those having interference fit.Where operating condition necessitate interference fit and it is essential that mounting & dismounting can be done easily, separable bearings or bearings with taper bore and adaptor or withdrawal sleeve may be used.

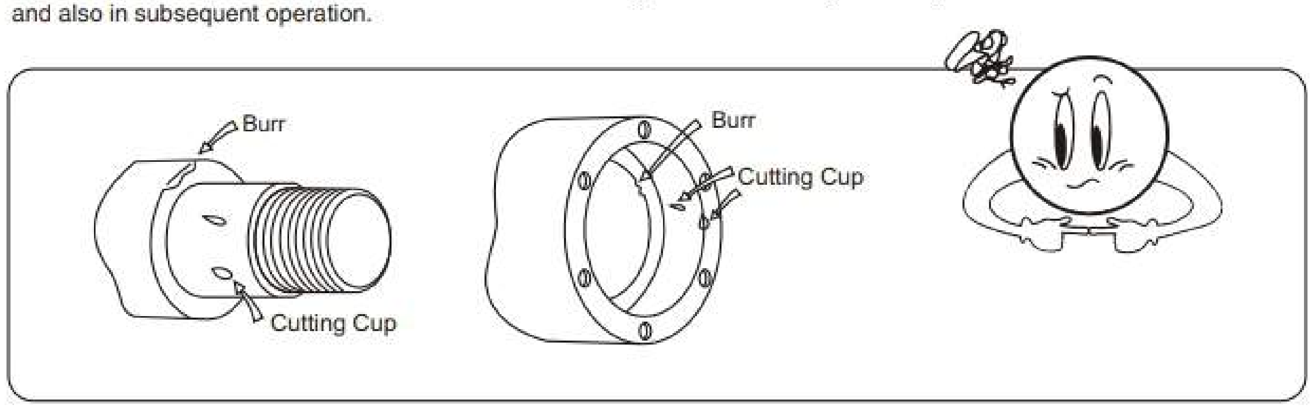
(8) Displacement of Non-Locating Bearings
If non-separable bearings are used as floating bearings, it is imperative that one of the bearing rings has to move axially during operation.This is ensured by adopting a clearance fit for that ring, which carries a stationary load, when the outer ring is under stationary load, so that axial displacement has to take place in the housing bore, a hardened intermediate bushing is often fitted to the outer ring.

(9) Effective Interference and finish of shaft & housing
Since the roughness of the fitted surface is reduced during fitting, the effective interference becomes less than the apparent interference. the amount of this interference decrease varies depending on roughness of the surfaces.

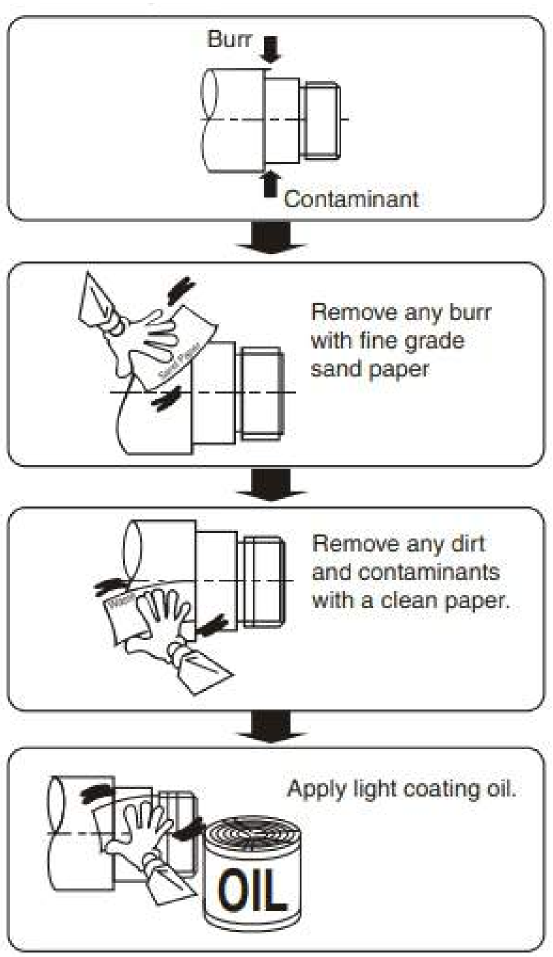
6.BEARING MOUNTING PROCEDURE

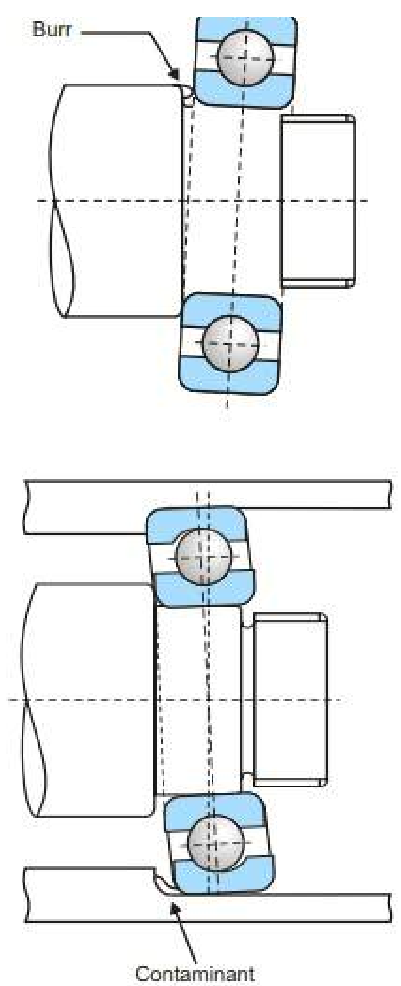
Any burrs, cutting chips, rust or dirt should first be removed from the bearing mounting surfaces. Installation then be simplified if the clean surfaces are lubricated with spindle oil.

Burrs, dirt, and other contaminants that infiltrate the bearing before and during mounting will cause noise and vibration and also in subsequent operation.

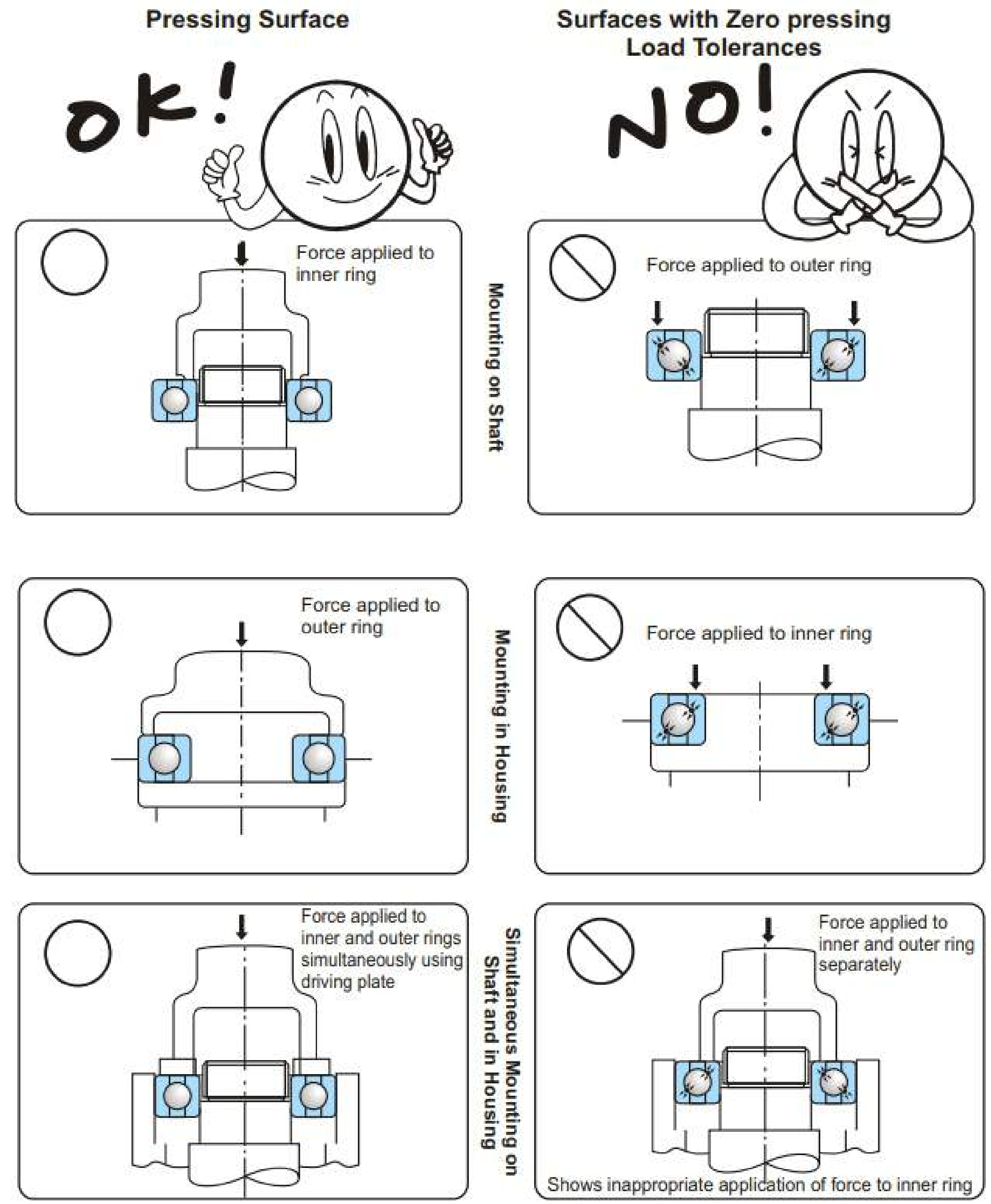


Preparation procedure

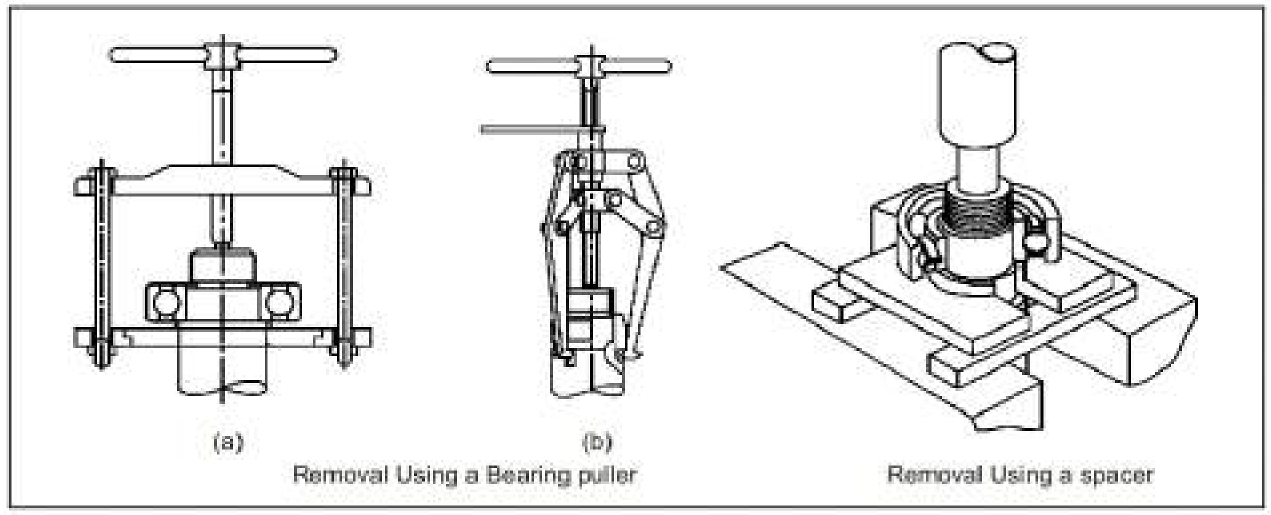


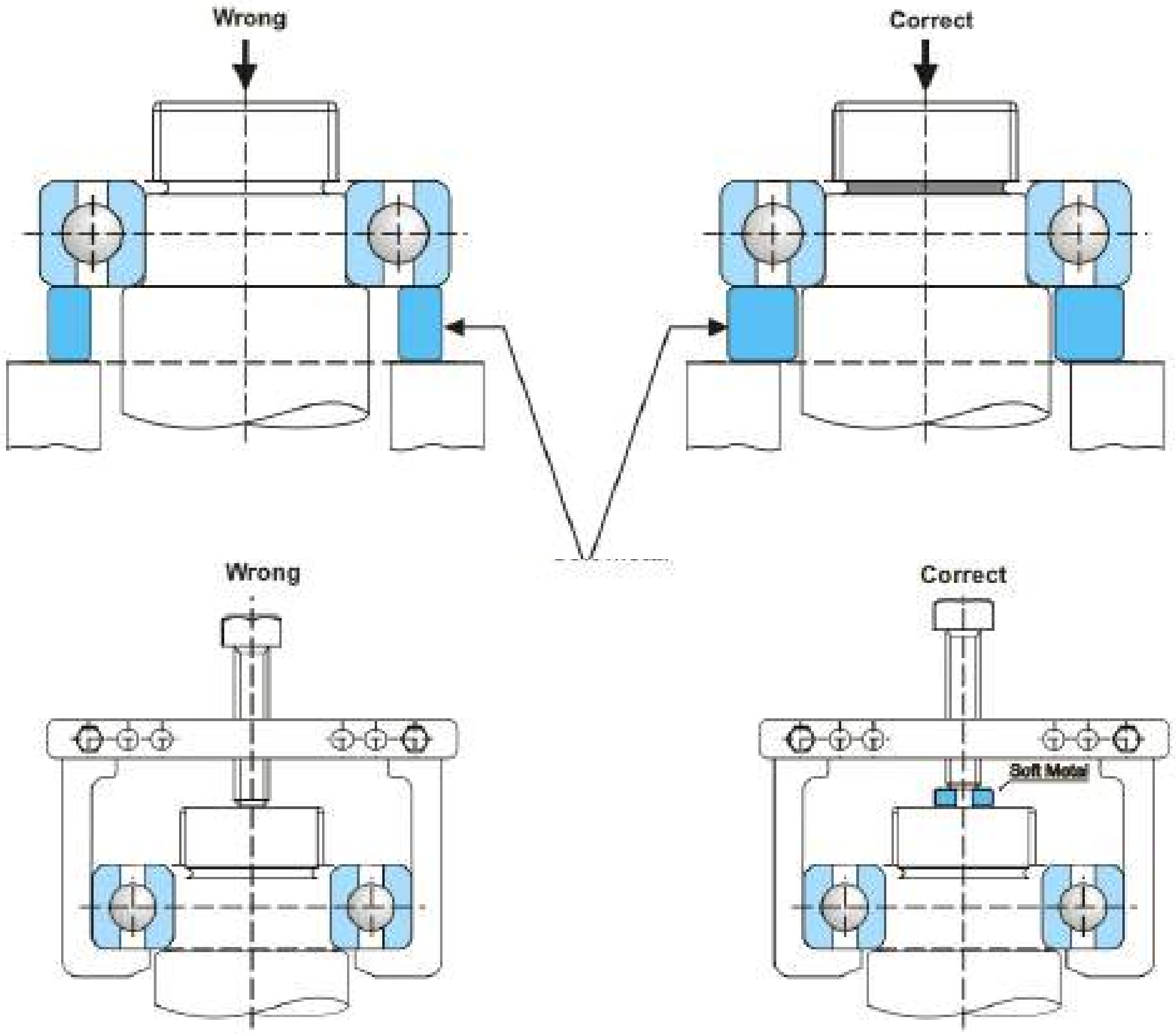


Mounting Procedure



BEARING DISMOUNTING





7.BEARING FAILURE

7.1 WHY BEARING FAILS?

In general, if rolling bearings are used correctly they will survive to their predicted fatigue life. However, they often fail prematurely due to avoidable mistakes. Failure of the rolling bearing can occur for a variety of reasons. Accurate determination of the cause of a bearing failure is must to make suitable recommendations for eliminating the cause.The major factors that singly or in combination may lead to
premature failure during service include incorrect mounting, excessive loading, excessive preloading, inadequate & insufficient lubrication, impact loading, vibrations,contamination, entry of harmful liquids.
It is difficult to determine the root cause of some of the premature failures. If all the conditions at the time of failure, and prior to the time of failure are known, including the application, operating conditions and environment, then by studying the nature of failure and its probable causes, the possibility of similar future failures can be reduced.
Two or more failure pattern can occur simultaneously and can thus be in competition with one another to reduce the bearing life. Also a pattern of failure that is active for one period in the life of a bearing can lead to or can even be followed by another failure mechanism, which then cause premature failure. Thus in some instances, a single failure pattern will be visible and in other indications of several failure pattern will be evident, making exact determination of root cause difficult. So when more than one bearing failure pattern has been occurred, proper analysis depends on careful examination of failed components. In contrast to fatigue life, this premature failure could be caused by :
(1) IMPROPER MOUNTING
(2) IMPROPER HANDLING
(3) POOR LUBRICATION ,
(4) CONTAMINATION
(5) EXCESSIVE HEATING
(6) EXCESSIVE LOAD

7.2 Bearing Damage and Corrective Measures

1. CRACKING

- Excessive impact load
- Excessive load
- Excessive interference fit
- Bearing seat has larger corner radius than bearing
- Slipping of balls due to poor lubrication
- Excessive clearance during operation

- Re-evaluate load conditions
- Check fits & bearing clearance
- Improve the rigidity of shaft & housing
- Correct the method of mounting & handling

2. SMEARING

- Insufficient lubrication
- Ingress of foreign objects
- Jamming of rolling elements in cage pockets
- Improper mounting
- Angular movement of shaft while bearings are stationary under load
- Excessive slippage of the rolling elements

- Select a proper lubricant, quantity & method
- Review the load conditions
- Improve the sealing
- Correct mounting faults
- Clean the shaft & housing
- Setting of a suitable preload

3. EXCESSIVE WEAR

- Coarse/Fine matter in the bearing & acts as lapping agents
- Insufficient lubrication
- Rotational creep due to loose fit
- Skewing of Rollers
- Inner or outer ring out of square

- Improve sealing
- Check lubricant type & amount
- Check shaft & housing
- Correct mounting faults

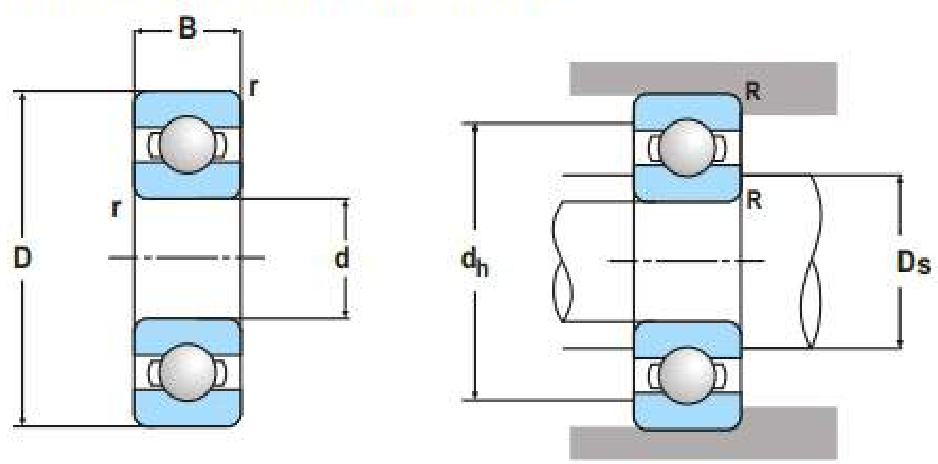
DESCRIPTION **CAUSES** **COUNTER MEASURES**

4. CREEPING

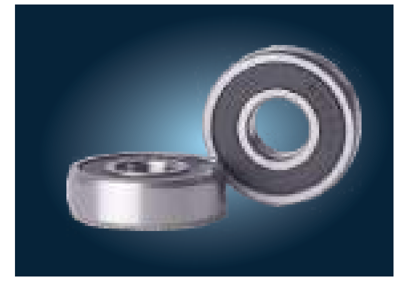
- Insufficient interference in the mating parts
- Insufficient sleeve tightening
- Insufficient surface pressure

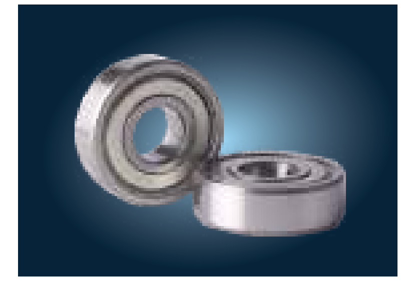
- Review the fits
- Review the usage conditions
- Redesign for greater rigidity

SINGLE ROW RADIAL BALL BEARING



YSK
BEARINGS

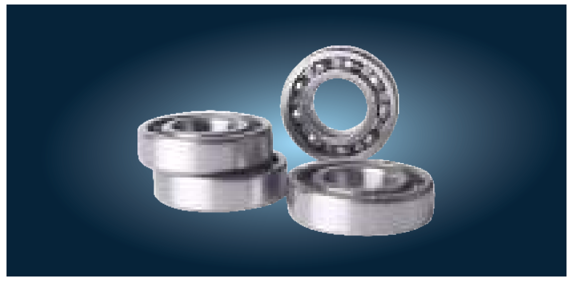




605-6014

Bearing number	Bore d mm	Bore d in	O.D D mm	O.D D in	Width B mm	Width B in	Chamfer rmin mm	Load Rating Dynamic Cr	Load Rating Static Cor	Ballcomplement No.	Ballcomplement Size mm	MaxronoutSpeed Grease r/mm	MaxronoutSpeed Oil r/mm	Weight kg
605	5	.1969	14	.5512	5	.1969	0.2	1.02	0.49	7	2.381	32000	40000	0.0035
606	6	.2362	17	.6693	6	.2362	0.3	1.13	0.56	8	2.381	30000	38000	0.006
607	7	.2756	19	.7480	6	.2362	0.3	2.01	1.05	7	3.50	28000	36000	0.008
608	8	.3150	22	.8661	7	.2756	0.3	2.53	1.36	7	3.969	26000	34000	0.015
609	9	.3543	24	.9449	7	.2756	0.3	2.57	1.36	7	3.969	24000	32000	0.016
6000	10	.3937	26	1.0236	8	.3150	0.3	3.52	1.95	7	4.763	22000	30000	0.019
6001	12	.4724	28	1.1024	8	.3150	0.3	3.93	2.23	8	4.763	19000	26000	0.021
6002	15	.5906	32	1.2598	9	.3543	0.3	4.30	2.51	9	4.763	18000	24000	0.030
6003	17	.6693	35	1.3780	10	.3937	0.3	4.62	2.79	10	4.763	17000	22000	0.040
6004	20	.7874	42	1.6535	12	.4724	0.6	7.22	4.46	9	6.35	15000	19000	0.068
6005	25	.9843	47	1.8504	12	.4724	0.6	7.74	4.96	10	6.35	14000	18000	0.079
6006	30	1.1811	55	2.1645	13	.5118	1.0	10.18	6.91	11	7.143	12000	15000	0.113
6007	35	1.3779	62	2.4409	14	.5511	1.0	12.47	8.66	11	7.938	10000	14000	0.149
6008	40	1.5748	68	2.6772	15	.5925	1.0	13.10	9.45	12	7.938	9800	13000	0.190
6009	45	1.7717	75	2.9528	16	.6300	1.0	21.00	15.20	8	8.731	8800	11000	0.246
6010	50	1.9685	80	3.1496	16	.6300	1.0	21.80	16.60	13	9.525	8300	10000	0.264
6011	55	2.1654	90	3.5433	18	.7087	1.1	28.30	21.30	12	11.112	7500	9000	0.384
6012	60	2.3622	95	3.7402	18	.7087	1.1	29.50	23.20	13	11.112	7000	8300	0.418
6013	65	2.5590	100	3.9370	18	.7087	1.1	30.50	25.20	11	10.319	6500	7800	0.438
6014	70	2.7559	110	4.3307	20	7874	1.1	38.00	31.00	13	11.906	6000	7100	0.607

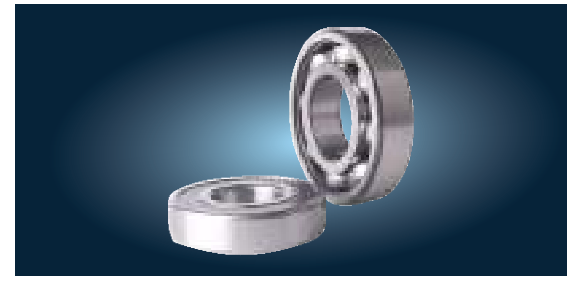
YSK BEARINGS

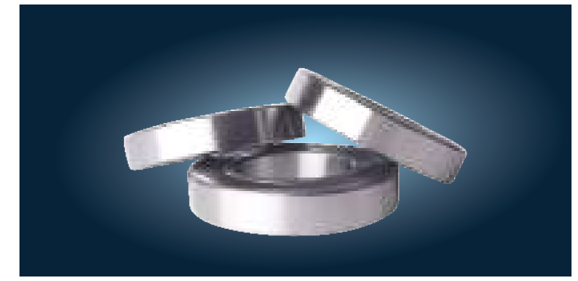


625-6214

Bearing number	Bore d mm	Bore d in	O.D D mm	O.D D in	Width B mm	Width B in	Chamfer rmin mm	Load Rating Dynamic Cr	Load Rating Static Cor	Ballcomplement No.	Ballcomplement Size mm	MaxronoutSpeed Grease r/mm	MaxronoutSpeed Oil r/mm	Weight kg
625	5	.1968	16	.6299	5	.1968	0.30	1.13	0.56	8	2.381	32000	40000	0.005
626	6	.2362	19	.7480	6	.2362	0.30	2.01	1.05	7	3.50	28000	36000	0.008
627	7	.2756	22	.8661	7	.2756	0.30	2.53	1.36	7	3.969	26000	34000	0.014
628	8	.3149	24	.9448	8	.3150	0.30	2.57	1.36	7	3.969	24000	32000	0.016
629	9	.3543	26	1.0236	8	.3150	0.30	3.52	1.95	7	4.763	22000	30000	0.019
6200	10	.3937	30	1.1811	9	.3543	0.60	3.93	2.23	8	4.763	19000	26000	0.032
6201	12	.4724	32	1.2598	10	.3937	0.60	5.25	3.05	7	5.953	18000	24000	0.035
6202	15	.5906	35	1.3780	11	.4331	0.60	5.88	3.49	8	5.953	17000	22000	0.045
6203	17	.6693	40	1.5748	12	.4724	0.60	7.36	4.48	8	6.747	16000	20000	0.064
6204	20	.7874	47	1.8504	14	.5112	1.0	9.88	6.20	8	7.938	14000	18000	0.103
6205	25	.9843	52	2.047	15	.5906	1.0	10.78	6.98	9	7.938	12000	16000	0.127
6206	30	1.1811	62	2.4409	16	.6299	1.0	14.97	10.04	9	9.525	10000	13000	0.202
6207	35	1.3779	72	2.8346	17	.6692	1.1	19.75	13.67	9	11.112	8500	11000	0.287
6208	40	1.5748	80	3.1496	18	.7087	1.1	29.10	17.90	9	11.906	8200	5600	0.366
6209	45	1.7717	85	3.3465	19	.7480	1.1	32.50	20.50	10	12	7600	9300	0.407
6210	50	1.9685	90	3.5433	20	.7874	1.1	35.00	23.20	10	12.7	7000	8600	0.463
6211	55	2.1654	100	3.9370	21	.8268	1.5	43.50	29.30	10	14.288	6300	7700	0.607
6212	60	2.3622	110	4.3307	22	.8661	1.5	52.50	36.00	10	15.081	5800	7100	0.783
6213	65	2.5591	120	4.7244	23	.9055	1.5	57.00	40.00	10	16.669	5300	6500	0.99
6214	70	2.7559	125	7.9231	24	9449	1.5	62.00	44.00	11	16.669	5000	5900	1.07

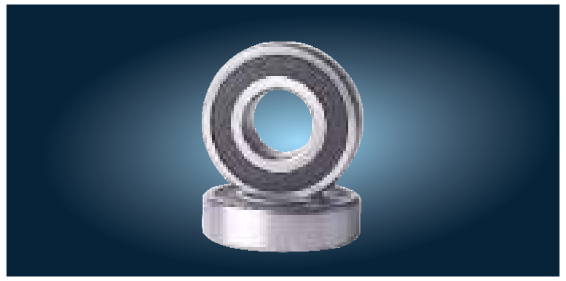
YSK BEARINGS





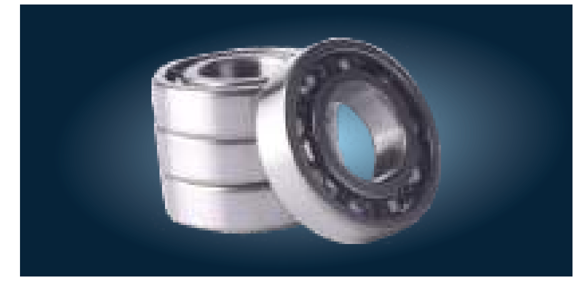
635-6314

Bearing number	Bore d mm	Bore d in	O.D D mm	O.D D in	Width B mm	Width B in	Chamfer rmin mm	Load Rating Dynamic Cr	Load Rating Static Cor	Ballcomplement No.	Ballcomplement Size mm	MaxronoutSpeed Grease r/mm	MaxronoutSpeed Oil r/mm	Weight kg
635	5	.1968	19	.7480	6	.2362	0.3	2.01	1.05	7	3.50	28000	36000	0.0080
636	6	.2362	22	.8661	7	.2756	0.3	1.53	1.36	7	3.969	26000	34000	0.0130
637	7	.2756	26	1.0236	9	.3543	0.6	3.34	1.41	7	3.969	30000	38000	0.0057
638	8	.3149	28	1.1024	9	.3543	0.3	3.52	1.95	7	4.763	22000	30000	0.0290
639	9	.3543	30	1.1811	10	.3937	0.6	5.12	2.39	8	4.762	27000	34000	0.0092
6300	10	.3937	35	1.3780	11	.4331	0.6	5.88	3.47	7	6.35	18000	24000	0.0532
6301	12	.4724	37	1.4566	12	.4724	1.0	7.48	4.65	6	7.938	17000	22000	0.0574
6302	15	.5906	42	1.6535	13	.5118	1.0	8.80	5.43	7	7.938	16000	20000	0.0804
6303	17	.6693	47	1.8504	14	.5511	1.0	10.45	6.56	7	8.731	15000	19000	0.1096
6304	20	.7874	52	2.074	15	.5906	1.1	12.26	7.81	7	9.525	14000	17000	0.1417
6305	25	.9843	62	2.4409	17	.6692	1.1	17.22	11.39	7	11.50	12000	14000	0.2193
6306	30	1.1811	72	2.8346	19	.7480	1.1	20.77	14.17	8	12.0	1000	1200	0.3498
6307	35	1.3780	80	3.1496	21	.8268	1.5	33.50	19.10	8	13.494	8400	6000	0.457
6308	40	1.5748	90	3.5433	23	.9055	1.5	40.50	24.10	8	15.081	7500	9000	0.633
6309	45	1.7717	100	3.9370	25	.9843	1.5	53.00	32.00	8	17.462	6700	4500	0.833
6310	50	1.9685	110	4.3307	27	1.0630	2.0	62.00	38.10	8	19.05	6200	7300	1.07
6311	55	2.1654	120	4.7244	29	1.1417	2.0	71.50	44.50	8	20.638	5600	6600	1.37
6312	60	2.3622	130	5.1181	31	1.2205	2.1	82.00	52.00	8	22.225	5100	6100	1.7
6313	65	2.5590	140	5.5118	33	1.2992	2.1	92.50	59.50	8	23.019	4700	5700	2.08
6314	70	2.7559	150	5.9055	36	1.4173	2.1	104.00	68.00	8	25.4	4400	5300	2.52



685-6814

Bearing number		Bore d mm	Bore d in	O.D D mm	O.D D in	Width B mm	Width B in	Chamfer r_{min} mm	Load Rating Dynamic Cr	Load Rating Static Cor	Ballcomplement No.	Ballcomplement Size mm	MaxronoutSpeed Grease r/mm	MaxronoutSpeed Oil r/mm	Weight kg
685	OPEN SHIELD	5	.1968	11	.4330	3 5	.1181 .1968	0.15	0.60	0.28	9	1.588	35000	45000	0.001 0.0016
686	OPEN SHIELD	6	.2362	13	.5118	3.5 5	.1377 .1969	0.15	0.83	0.39	8	2.0	33000	42000	0.0018 0.0025
687	OPEN SHIELD	7	.2756	14	.5511	3.5 5	.1377 .1969	0.15	0.90	0.44	9	2.0	31000	40000	0.0020 0.0028
688	OPEN SHIELD	8	.3150	16	.6299	4 5	.1574 .1968	0.20	1.23	0.63	9	2.381	29000	38000	0.0032 0.0040
689	OPEN	9	.3543	17	.6693	4 5	.1574 .1968	0.20	1.23	0.63	9	2.381	28000	36000	0.0035 0.0043
6800		10	.3937	19	.7480	7	.2756	0.30	1.32	0.70	10	2.381	26000	34000	0.0050
6801		12	.4724	21	.8267	5	.1968	0.30	1.47	0.84	12	2.381	22000	30000	0.0060
6802		15	.5906	24	.9449	5	.1968	0.30	1.59	0.98	14	2.381	20000	28000	0.0070
6803		17	.6693	26	1.0236	5	.1968	0.30	1.70	1.05	15	2.381	19000	26000	0.0080
6804		20	.7874	32	1.2598	7	.2756	0.30	2.68	1.74	14	3.175	17000	22000	0.0180
6805		25	.9843	37	1.4566	7	.2756	0.30	3.30	2.26	15	3.5	15000	18000	0.0220
6806		30	1.1811	42	1.6535	7	.2576	0.30	4.00	3.15	19	3.175	15000	17000	0.0260
6807		35	1.3780	47	1.8504	7	.2576	0.30	4.27	3.60	22	3.175	13000	15000	0.0290
6808		40	1.5748	52	2.0472	7	.2576	0.30	4.35	4.05	24	3.175	12000	14000	0.0330
6809		45	1.7717	58	2.2835	7	.2576	0.30	4.59	4.33	27	3.179	8800	11000	0.0400
6810		50	1.9685	65	2.5591	7	.2576	0.30	6.61	6.08	24	3.969	10000	12000	0.0520
6811		55	2.1654	72	2.8346	9	.3543	0.30	8.53	8.08	21	4.762	8500	10000	0.0830
6812		60	2.3622	78	3.0709	10	.3937	0.30	11.50	10.60	21	5.556	8000	9500	0.106
6813		65	2.5591	85	3.3465	10	.3937	0.60	12.00	11.50	23	5.556	7500	8500	0.125
6814		70	2.7559	90	3.5433	10	.3937	0.60	12.10	11.90	24	5.556	7000	8000	0.135



695-6914

Bearing number	Bore d mm	Bore d in	O.D D mm	O.D D in	Width B mm	Width B in	Chamfer r_{min} mm	Load Rating Dynamic Cr	Load Rating Static Cor	Ballcomplement No.	Ballcomplement Size mm	MaxronoutSpeed Grease r/mm	MaxronoutSpeed Oil r/mm	Weight kg
695	5	.1968	13	.5118	4	.1574	0.20	0.83	0.39	8	2.0	34000	43000	0.0022
696	6	.2362	15	.5906	5	.1968	0.20	1.13	0.56	8	2.381	32000	40000	0.0039
697	7	.2756	17	.6693	5	.1968	0.30	1.55	0.78	7	3.0	30000	38000	0.0053
698	8	.3150	19	.7480	6	.2362	0.30	2.03	1.05	7	3.5	28000	36000	0.0072
699	9	.3543	20	.7874	6	.2362	0.30	1.91	0.99	8	3.175	27000	34000	0.0075
6900	10	.3937	22	.8661	6	.2362	0.30	2.07	1.12	9	3.175	25000	32000	0.0100
6901	12	.4724	24	.9449	6	.2362	0.30	2.20	1.24	10	3.175	20000	28000	0.0110
6902	15	.5906	28	1.1024	7	.2756	0.30	2.64	1.51	10	3.50	19000	26000	0.0170
6903	17	.6693	30	1.1811	7	.2756	0.30	2.79	1.66	11	3.50	18000	24000	0.0180
6904	20	.7874	37	1.4566	9	.3543	0.30	5.05	3.08	10	5.0	17000	22000	0.0360
6905	25	.9843	42	1.6535	9	.3543	0.30	5.33	3.38	11	5.0	14000	18000	0.0410
6906	30	1.1811	47	1.8504	9	.3543	0.30	5.85	4.0	13	5.0	13000	15000	0.0450
6907	35	1.378	55	2.165	10	.394	0.60	10.39	7.26	13	5.953	10000	13000	0.078
6908	40	1.575	62	2.441	12	.472	0.60	13.02	9.20	13	6.747	9500	12000	0.103
6909	45	1.772	68	2.667	12	.472	0.60	14.10	10.90	14	6.747	8500	11000	0.103
6910	50	1.969	72	2.835	12	.472	0.60	13.90	10.99	15	6.747	8000	9500	0.123
6911	55	2.165	80	3.150	13	.512	1.00	14.82	12.69	17	6.747	7500	9000	0.170
6912	60	2.362	85	3.347	13	.512	1.00	19.40	16.20	18	7.144	7500	9000	0.191
6913	65	2.559	90	3.543	13	.512	1.00	17.40	16.00	19	7.144	7000	8500	0.200
6914	70	2.756	100	3.937	16	.630	1.00	23.50	21.10	17	8.731	6500	7500	0.327