

NIDE
JUST FOR EASY

NINGBO
NIDE
Mechanical Equipment Co.,Ltd.
THE PROFESSIONAL BEARING MANUFACTURER



ISO9001: 2000



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About Us

Located in beautiful coastal city Ningbo, Nide International is a company specializing in the field of electric motors machines and motor components. We have 6 companies covering the research, development, production, sales and marketing of machinery, commutator, ball bearing and carbon brush. Nide bearing factory mainly produce miniature, small size ball bearing, covering an area of 20,000 square meters, annual capacity is around 50 million pcs, ranging from O.D 6mm to 72mm.

The bearings are widely used in household appliances, automotive industry, textile machinery, power tools, office equipment, industrial and agriculture application, etc. By introducing the high precision machines and testing equipment, and strictly implement quality ensurance system ISO9001:2000, we put all of our efforts to produce the good quality products to cater for our customer's different requirements.

To go forward and keep innovation is always the direction we strike for!



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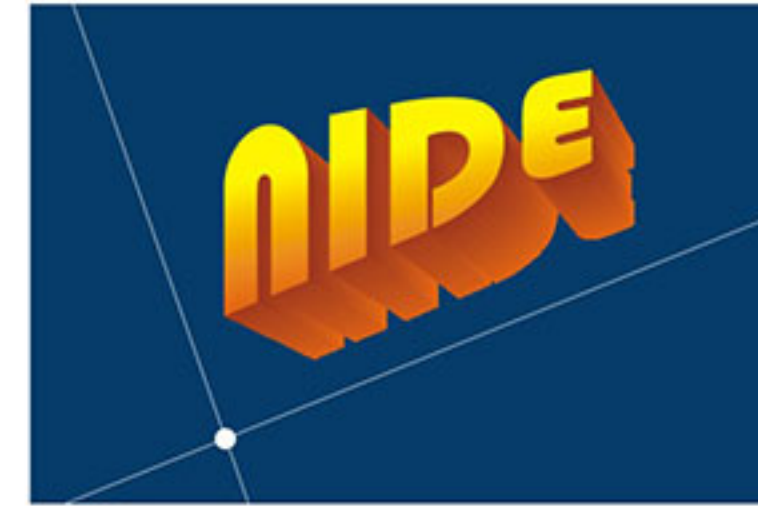
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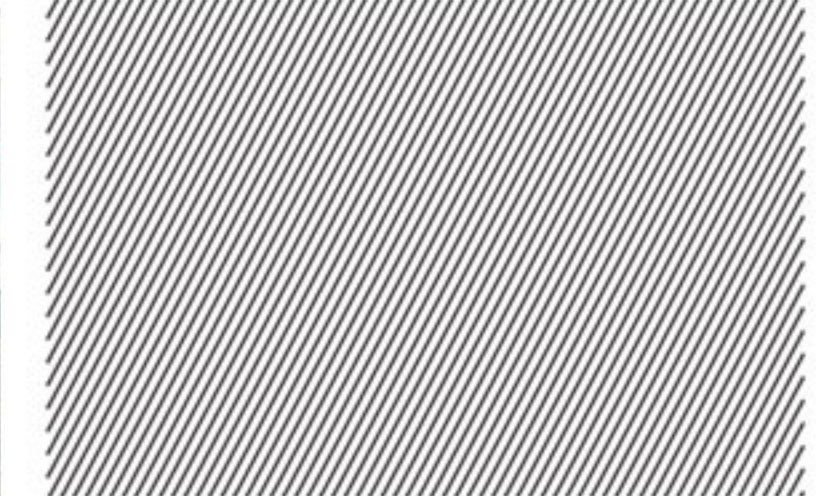
PRODUCTION OVERVIEW

The actual strength comes from the excellent quality



Confidence comes from strength, quality is derived from strict control and management.

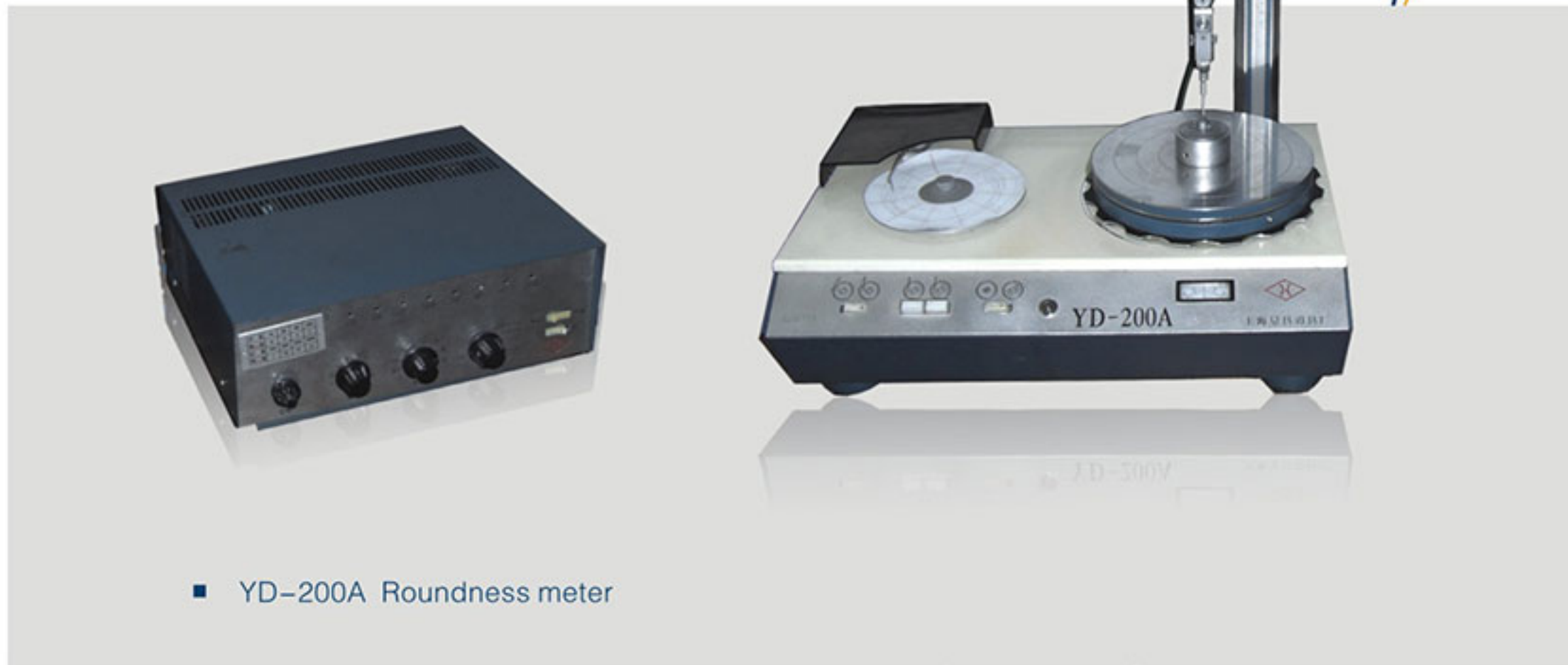

 ISO9001:2000



- | | | | | | | | |
|---|---|---|---|---|--------------------|---|-------------------------------|
| 1 | 2 | 4 | 7 | 1 | Auto Ring Grinding | 4 | Auto Greasing And Shield Assy |
| | 3 | 5 | 8 | 2 | Ultrasonic Washing | 5 | Auto precision grinding |
| | | | | 3 | Coreless Grinding | 6 | Cold Upsetting |
| | | | | | | 7 | Assembly |

INSPECTION INSTRUMENT

Confidence comes from strength, quality is derived from strict control and management. Nide all along works for constant high quality products



■ YD-200A Roundness meter



ISO9001:2000



- | | | | |
|---|---|---|---------------------------------|
| 1 | 2 | 3 | 1 Auto Hardness Meter |
| 4 | 5 | 6 | 2 Metallography analysis meter |
| | | 7 | 3 Optical Hardness Meter |
| | | | 4 Noise(Vibration) Inspection |
| | | | 5 Grinding Finishing Inspection |
| | | | 6 Roundness Testing |
| | | | 7 Clearance Inspection |

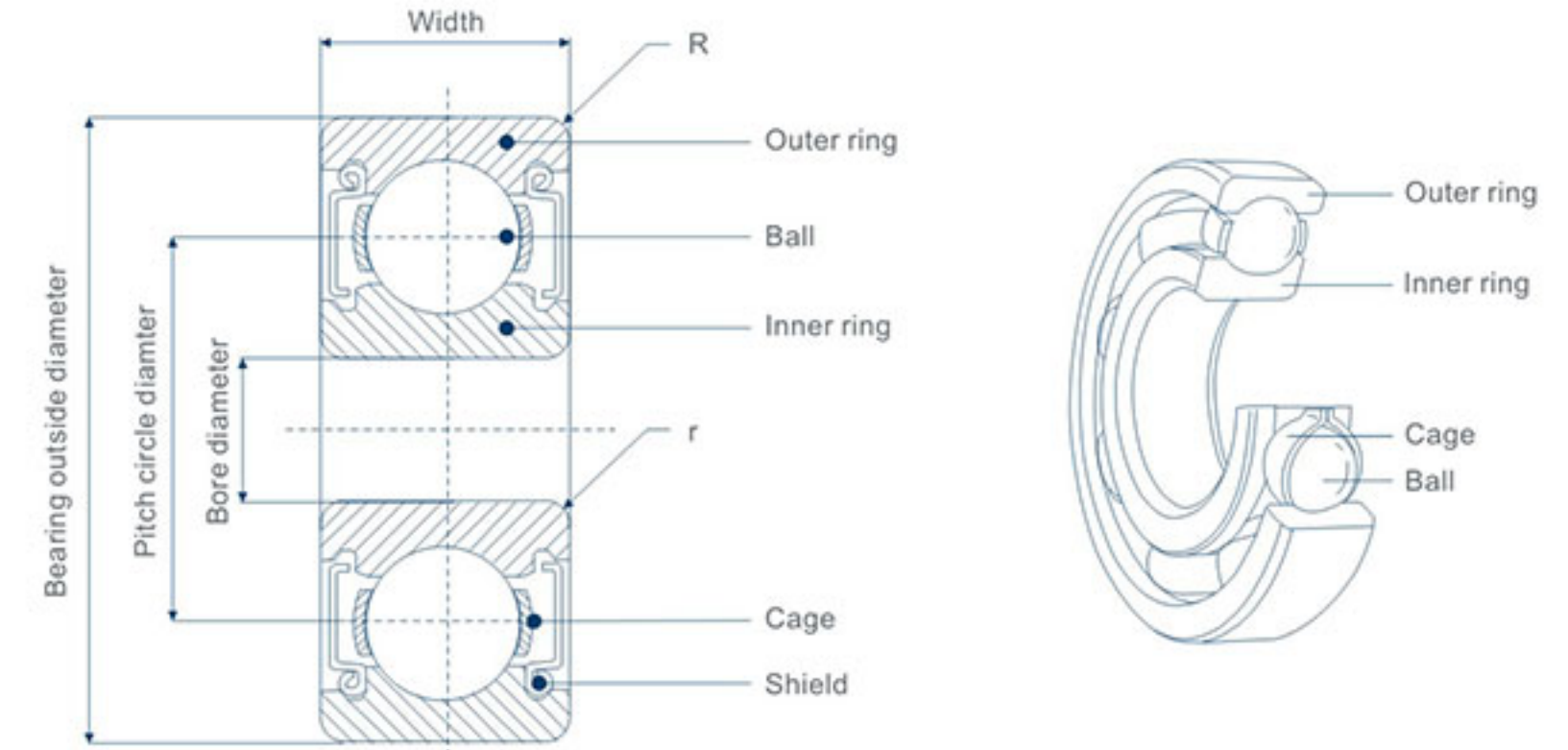


BEARING NUMBER FORMULATION

Bearings are identified by numbers and letters which designate bearing type, boundary dimensions, tolerance class, internal clearance and other specifications,

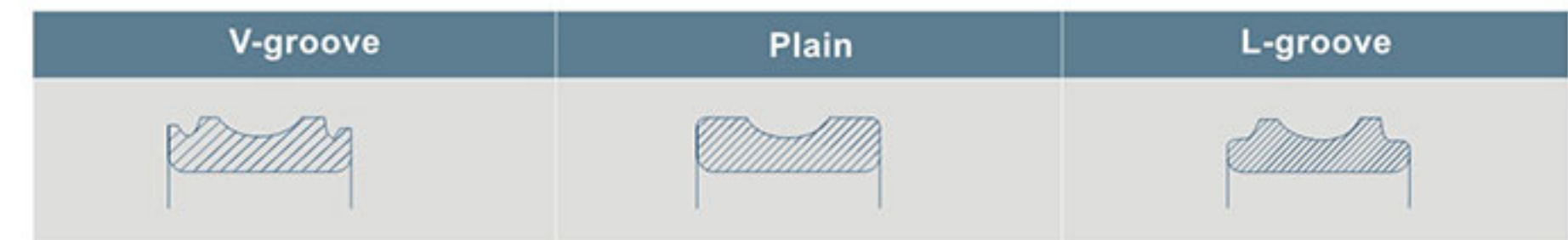
S	1	Material Codes Blank -Gcr 15 Chrome Steel S -440 C Stainless Steel
F	2	Ring/OD Modification Codes F -Flanged Outer Ring W -Extended Inner Ring FW -Flanged Outer/Extended inner Rings
608	3	Basic Bearing Number Codes
2RS	4	Shield/Closure Codes Blank -Open Bearing Z -Single Shield ZZ -Double Shields RS -Single Seal 2RS -Double Seals
NR	5	Snap Ring Codes N -Groove without Ring NR -Groove with Ring
.3122	6	ABEC Tolerance Codes Blank -ABEC1 A3 -ABEC3 A5 -ABEC5 A7 -ABEC7
V3	7	Vibration Level Codes Blank -Standard V4 -Ultralow Noise V3 -Low Noise V2 -Electric Motor Quality V1 -Above Standard, Less than V2
C3	8	Internal Clearance Codes Blank -Standard C2 -Tight C3 -Loose C4 -Looser than C3 C5 -Looser than C4
A3	9	ID Modification Codes .3122 -.3122 inch Bore 13 -13mm Bore 5/8 -5/8 inch Bore 16 -16mm Bore 3/4 -3/4 inch Bore 7/8 -7/8 inch Bore

CONSTRUCTION & COMPONENTS



NOTES:

The above bearing construction drawing only lists one type of inner ring construction(V-groove), which is applied usually in EMQ quality bearings. But there are other two types of inner ring constructions, shielded and sealed deep groove ball bearings as below chart.



CAGE

Following three types of cage are widely.



Rivet-Type cage

Small size deep Groove ball bearings widely use Steel Rivet-type cages.



Tongue-Type cage

Miniature ball Bearings normally use steel Tongue-type cages.



Polymide cage

Polymide cage usually is used in ultra-low noise Bearings.

STANDARD BEARING MATERIAL

NIDE rolling bearings basically consist of two rings, rolling elements and a cage which keeps the rolling elements at equal intervals. Seals are applied to prevent the bearing from outside affect such as dust or oil invasion. The main purpose of lubricants in rolling bearings is to reduce friction and wear of each elements. Choosing the right material for the bearings is especially important for bearings' application function.

RINGS & ROLLING ELEMENTS

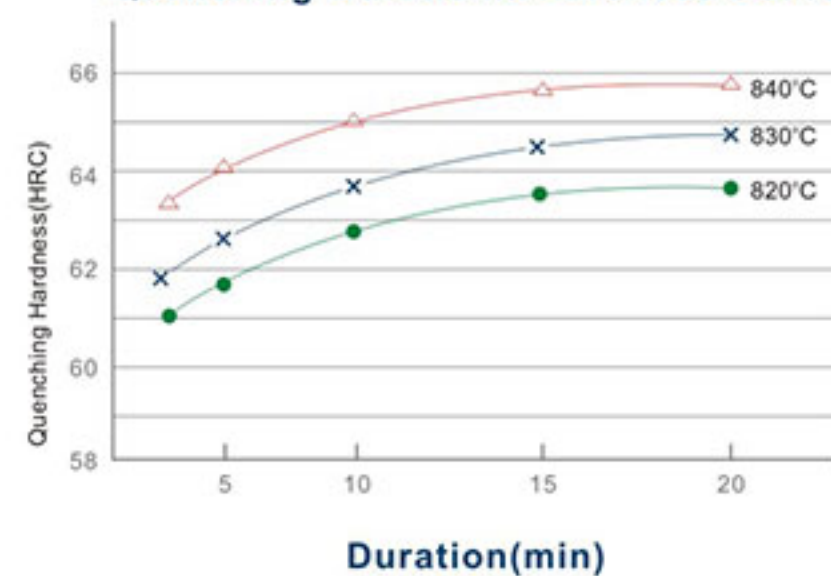
Vacuum degassed, chromium bearing steel Gcr15 is the standard material for precision bearing rings and rolling elements. The material has uniform specification as AISI 52100(America),DIN100 Cr6(German), JISSUJ2(Japan).

Steel NO.	Chemical Composition %								
	C	Si	Mn	P	S	Cr	Mo	Cu	Ni
GCr 15 SAE52100	0.95-1.05	0.15-0.35	0.25-0.45	≤0.025	≤0.025	1.40-1.65	—	≤0.25	≤0.30

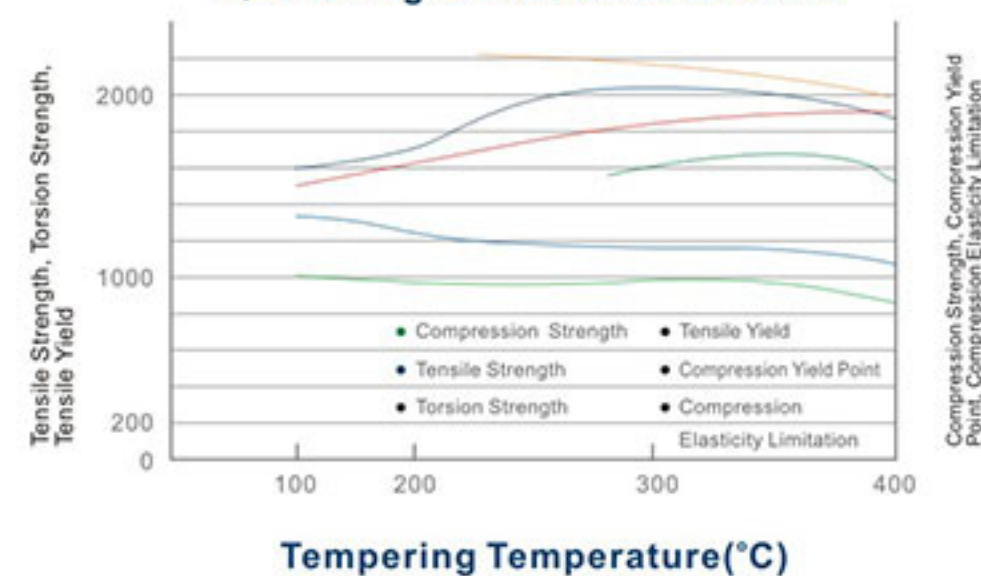


NIDE takes special care with its raw material used in its bearings. The raw material applied in the bearing rings and rolling elements is from the companies that sell same quality material to world top class bearing manufacturers in japan and Europe. Also, NIDE's latest computerized heat treatment system and technology distinguish NIDE brand bearings from others. It helps the bearing material to reach the characteristics of high level of hardness, high rolling contact fatigue resistance, excellent wear resistance, dimensional stability and excellent mechanical strength which is essential to delay the advent of material fatigue.

Quenching Duration & Hardness GCr15



Quenching Characteristics GCr15



CAGE MATERIAL

Material for cages is required to have properties of good wear resistance, dimensional stability and good mechanical strength.

Cold-rolled steel is used for pressed cages.(Specification see the below table)

Sheet Steel NO.	Chemical Composition%						
	C	Si	Mn	P	S	Ni	Cr
JISG 3141 SPCC	<0.12	—	<0.5	<0.04	<0.045	—	—

Polyamide resin is applied depending on the type of bearing and the application, but should not be used at temperatures above 120°C or below -40°C . Polyamide cages may be affected by the use of specific lubricants. Brass cages are not suitable in Ammonia(e.g. In refrigeration) because Ammonia causes season cracking in brass.

So for selection of cage material, it is important to consider the operation conditions.

SHIELDS MATERIAL

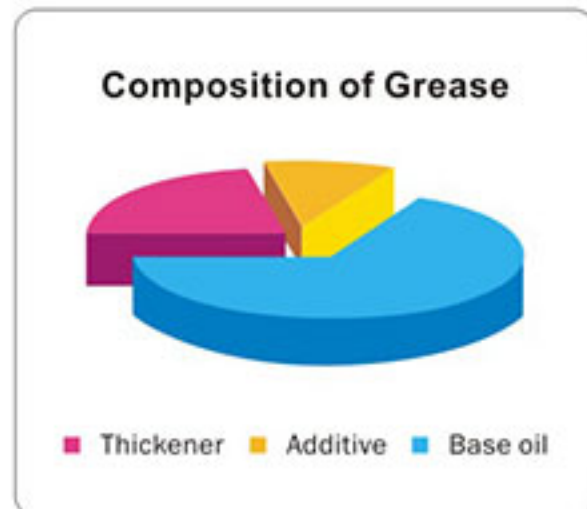
NIDE bearings employ carbon steel as standard, and the option of AISI-300 stainless steel is available when needed.

SEALS MATERIAL

NIDE bearings use a variety of sealing materials to meet the requirements of high temperature operation and compatibility with greases. Buna Nitrile is the standard material used, while fluorocarbon, silicone, and teflon seals are commonly specified for high temperatures.

LUBRICANTS

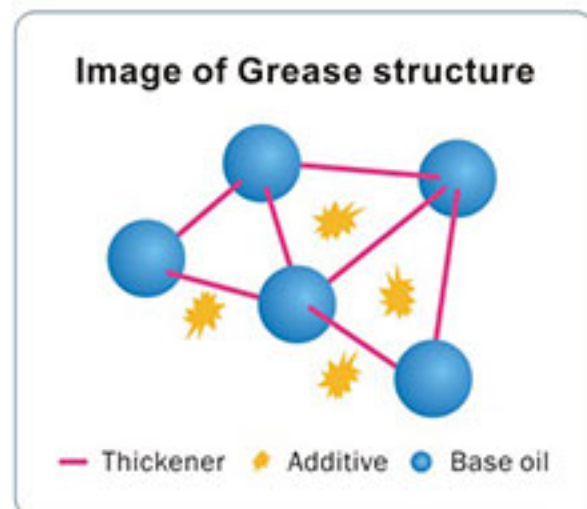
The lubricants in rolling bearings are mainly employed to prevent direct metallic contact between each rolling and sliding elements. bearing performance and service life are largely dependent on the suitability of the lubricating system and lubricant to the application.



LUBRICATING GREASE

Grease is a semi-solid lubricant of a base oil and a thickener. Other ingredients are sometimes added to impart special properties to the base.

Base oil-is the liquid lubricant carried by a thickener. Mineral oil or synthetic oils such as silicon or diester oil, are commonly used as the base oil for grease. The lubricating properties of grease are dependent on the characteristics of its base oil. Normally grease with high viscosity base oils suits for high temperatures and heavy loads.



Thickener-has a structure like a sponge with a combination of fine fibers or particles. Thickeners are roughly divided into three types: metallic soaps, inorganic compounds and heat resisting organic thickeners. Lithium soap grease is recommended where moisture is present because of its resistance to wash off.

Additives-refer to an agent that provides extreme pressure and rust resistance. grease often contains a variety of additives such as anti-oxidants, rust preventatives, and extreme pressure enhancers to give it special properties.

The main types of grease and general properties of grease are listed in the following table.
Grease Varieties and Characteristics

Grease Name	Lithium Grease			Sodium Grease (Fiber Grease)	Ca Compound Base Grease	Non-soap Base Grease	
	Li soap	Diester oil	Silicone oil	Na soap	Ca+Na soap Ca+Li soap	Bentone, silica gel, urea, fluorine compounds, etc.	
Thickener							
Base Oil	Mineral oil	Diester oil	Silicone oil	Mineral oil	Mineral oil	Mineral oil	Synthetic oil
Dropping Point °C	170-190	170-190	200-250	150-180	150-180	250 or above	250 or above
Working temperature Range °C	-30~130	-50~130	-50~160	-20~130	-20~120	-10~130	-50~200
Mechanical Stability	Excellent	Good	Good	Excellent~Good	Excellent~Good	Good	Good
Pressure Resistance	Good	Good	Poor	Good	Excellent~Good	Good	Good
Water Resistance	Good	Good	Good	Good~poor	Good~poor	Good	Good
Applications	General Purpose Lubricant. Widest range of applications.	Good low temperature and wear characteristics. Often used for small motor.	Suitable for high and low temperatures. Unsuitable for high speed and heavy load.	Not suitable for high speed or when water is introduced. Excellent at relatively high temperatures.	Excellent pressure resistance and mechanical stability. Often used for large bearings receiving shock loads.	Can be used in a wide range of low to high temperature. Shows excellent heat resistance, cold resistance, chemical resistance, and other characteristics when matched with a suitable base oil and thickener.	

It should be noted that even for the same type of grease composition, different brands of grease may have different properties. There are so many brands of grease made by different grease companies and the characteristics and properties are different as well.

Therefore, it is critical to select the most suitable grease type for a specific application regarding the requirement of rotating speed, water prevention ability, heat removal ability, torque, friction and wear reduction, dust-proofing, stress concentration, as well as the noise.

Frequently Used Grease Brand and Properties:

Manufacturer	Product	Base Oil/Thickener	Working temperature range °C	0.1mm Worked Penetration °C	Dropping point °C	Remark
Kyodo Yushi	Multemp SRL	Polyol ester+Diester/ Lithium hydroxy Stearate	-50~150	250	190	Low noise, Long life, High temperature
	Multemp PS	Diester+Refined mineral oil / Lithium Stearate	-60~130	No.2	190	Low torque, Outstanding noise suppressant property
	Multemp SB-M	Synthetic hydrocarbon/ Diurea	-40~200	220	> 260	High temperature, High speed operatino, Low noise property
	Multemp ET-K	Synthetic ether+Polyol ester/Aromatic diurea	-40~200	300	230	High temperature, Long life, Anti-radiation
Shell	Alvania RLQ 2	Mineral oil / Lithium	-25~120	266	195	Wide applications available
	Alvania RL 2	Mineral oil / Lithium	-30~120	310	185	Wide applications available
	Alvania RL 3	Mineral oil / Lithium	-30~120	220	185	Not good for transmission
	Alvania EP 2	Mineral oil / Lithium	-20~110	265	185	Long service life under heavy load, Water resistance, Corrosion resistance
Klüber	Asonic GL Y 32	PAO, Ester oil / Lithium	-50~140	265~295	> 190	Low noise, Long life, High temperature
	Asonic Q 74-73	PAO, Ester oil / Lithium	-40~160	220~250	> 250	Low noise, Long life, High temperature
	Klüberquiet BQH 72-102	Ester oil / Polyurea	-40~180	250~280	> 250	Low noise, Long life, High temperature
	Klüberquiet BEP 72-82	Ester oil / Polyurea	-40~180	250~280	> 250	High temperature, Available for auto generator bearings
	Petamo GHY 133 N	Mineral oil, PAO / Polyurea	-30~160	265~295	> 250	High temperature, Available for auto generator bearings
	Lsoflex LDS 18 Special A	Ester oil, Mineral oil / Li	-50~120	265~295	> 190	Available for pump bearings, Motor and its accessory
Exxon Mobil	Beacon 325	Diester / Lithium	-54~120	280	193	High speed, Low noise, Corrosion resistance
	Polyrex EM	Mineral / Diurea	-29~177	318	288	Low temperature
	Mobilgrease 28	Diester / Microgel	-62~177	310	> 260	Water resistance, High temperature
Chevron	SRI-2	ISOSYN / Polyurea	-30~150	280		Water resistance, Corrosion resistance, High temperature
Dupont	Krytox 240	Fluinated / PTFE	-34~288	285	243	High temperature
Jinzhi	Hangu 2	Mineral oil / Lithium	-20~120	265~295	198	Wide applications available

NOISE AND VIBRATION

Bearing vibration is closely related to bearing noise. In general a rolling bearing does not generate noise by itself. What is perceived as "bearing noise" is in fact the audible effect of the vibrations generated directly or indirectly by the bearing on the surrounding structure.. Therefore, vibration is the root cause of noise, while noise is the reflection of the vibration.

During the bearing manufacturing & inspection, bearing noise can be controlled through strict control on the vibration. In NIDE bearing manufacturing, a frequency spectrum analyzer is used to measure the magnitude of vibration and the distribution of the frequencies. When the rotating speed of bearing reaches 1800 rpm, the frequency between 50Hz~10000Hz could be divided into three bands as following form:

Frequency Bands	Low Band	Medium Band	High Band
Frequency Range	50~300Hz	300~1800Hz	1800~10000Hz

Furthermore, the machine electronically translates these signals by a heterodyning process, making them audible, so that inspectors can hear these sounds from the machine speaker and see them as intensity increments on a meter. By this way, testing results also enable the determination of the likely

cause of the bearing irregularity. NIDE is making 100% such noise and vibration testing before every single bearing leaves the factory. Also, NIDE has recently significantly improved design of deep groove ball bearings, to further reduce noise and vibration levels.

Customers need to pay attention, when coming across the following conditions.

Vibration Rising and Countermeasures

Type	Description	Causes	Countermeasures
Self-Generated Vibration	Vibration generated from the bearing itself when it is in the rotating condition	Variations of circular form in the bearing balls and raceway.	Can not be avoided, but could reduce the vibration level by selecting the proper clearance due to the application
Vibration Arising from Exposure to External	Disturbed noises occur with the performance degrades of bearings in modes known as wear oxidation or corrosion fretting	The contaminated surrounding environment affects bearing. Loaded bearings operate without sufficient lubrication	These conditions can be relieved by properly designed isolation supports and adequate lubrication
Vibration from Mis-alignment	Not well-aligned bearings make noise when they are rotating	Bearings are not well aligned on the shafts or houses during installation. The shafts and houses are not accurate.	Good alignment methods and special alignment tools to reduce vibration. Applying high accuracy shafts and houses
Local Damage Vibration	The small damaged sections on the raceways and rolling elements generate a specific vibration frequency	Mishandling or incorrect mounting	Applying correct mounting methods and mechanical tools such as fitting tools. Applying induction heaters with time control and pre-set temperature mode.

The vibration and noise of bearings are classified as four classes as Z1,Z2,Z3and Z4.It is measured by the instrument of S0910-1,For special requirement, it is measured by BVT-1 and classified as V1,V2V3 and V4. The data are shown as below. Please mark the requirement of vibration and noise class on the order.

Tolerance Data for Vibration of Single Bearing

Tolerance in $\mu\text{m/s}$

d mm	V			V ₁			V ₂			V ₃			V ₄		
	Low Brand	Medium Brand	High Brand	Low Brand	Medium Brand	High Brand	Low Brand	Medium Brand	High Brand	Low Brand	Medium Brand	High Brand	Low Brand	Medium Brand	High Brand
3,4	80	44	44	60	35	32	48	26	22	31	16	15	28	10	10
5,6	110	72	60	74	48	40	58	36	30	35	21	18	32	11	11
7,8,9	130	96	80	92	66	54	72	48	40	44	28	24	38	12	12
10,12	160	120	100	120	80	70	90	60	50	55	35	30	45	14	15
15	210	150	120	150	100	85	110	78	60	65	46	35	52	18	18
17	210	150	120	150	100	85	110	78	60	65	46	35	52	25	25
20	260	190	150	180	125	100	130	100	75	80	60	45	60	25	25
22,25	260	190	150	180	125	100	130	100	75	80	60	45	60	30	32
28	260	190	150	180	125	100	130	100	75	80	60	45	60	35	40
30,32	300	240	190	200	150	130	150	120	100	90	75	60	70	35	40
35	300	240	190	200	150	130	150	120	100	90	75	60	70	42	45
40	360	300	260	240	180	160	180	150	130	110	90	80	82	50	50
45	360	300	260	240	180	160	180	150	130	110	90	80	82	60	60
50	420	320	320	280	200	200	210	160	160	125	100	100	95	70	70

Maximum Vibration Acceleration of Single Bearing


Tolerance in dB

d mm	Diameter Series(0)					Diameter Series(2)					Diameter Series(3)				
	Z	Z ₁	Z ₂	Z ₃	Z ₄	Z	Z ₁	Z ₂	Z ₃	Z ₄	Z	Z ₁	Z ₂	Z ₃	Z ₄
3	35	34	32	28	36	35	32	30	-	37	36	33	31	-	-
4	35	34	32	28	36	35	32	30	-	37	36	33	31	-	-
5	37	36	34	30	38	37	34	32	-	39	37	35	33	-	-
6	37	36	34	30	38	37	34	32	-	39	37	35	33	-	-
7	39	38	35	31	40	38	36	34	-	-	-	-	-	-	-
8	39	38	35	31	40	38	36	34	-	-	-	-	-	-	-
9	41	40	36	32	42	40	37	35	-	-	-	-	-	-	-
10	43	42	38	33	44	42	39	35	30	46	44	40	37	32	32
12	44	43	39	34	45	43	39	35	30	47	45	40	37	32	32
15	45	44	40	35	46	44	41	36	31	48	46	42	38	33	33
17	46	44	40	35	47	45	41	36	31	49	47	42	38	33	33
20	47	45	41	36	48	46	42	38	33	50	48	43	39	34	34
22	47	45	41	36	48	46	42	38	33	50	48	43	39	34	34
25	48	46	42	38	49	47	43	40	36	51	49	44	41	37	37
28	49	47	43	39	50	48	44	41	37	52	50	45	42	38	38
30	49	47	43	39	50	48	44	41	37	52	50	45	42	38	38
32	50	48	44	40	51	49	45	42	38	53	51	46	43	39	39
35	51	49	45	41	52	50	46	43	39	54	52	47	44	40	40
40	53	51	46	42	54	52	47	44	40	56	54	49	45	41	41
45	55	53	48	45	56	54	49	46	43	58	56	51	47	44	44
50	57	54	50	47	58	55	51	48	45	60	57	53	49	46	46
55	59	56	52	49	60	57	53	50	47	62	59	54	51	48	48
60	61	58	54	51	62	59	54	51	48	64	61	56	53	50	50

BEARINGS TOLERANCE

According to dimension tolerances and runout accuracy, NIDE deep groove ball bearings are ranged from ABEC-1 to ABEC-7, ABEC-1 is standard grade, while ABEC-3 is higher, ABEC-5 is much higher and ABEC-7 is the highest. These tolerance grades are according to the International Standard(ISO-492). The grades correspond as follows:

NIDE(ABMA)	ISO/DIN	JIS
ABEC-1	P0	Class0
ABEC-3	P6	Class6
ABEC-5	P5	Class5
ABEC-7	P4	Class4



Symbols.

The following symbols are used to identify boundary dimensions, size and size variations, and runout errors.

Symbols for Bearing Dimensions and Accuracy

Basic Dimensions

- d = Basic bore diameter
- D = Basic outside diameter
- B = Basic inner ring width
- C = Basic outer ring width
- r = Charnfer of inner ring and outer ring

Dimentional Variaties

- Vd_{mp} = Single plane mean bore diameter deviation from basic
- VD_{mp} = Mean outside diameter variation
- VB_s = inner ring width variation
- VC_s = Single outer ring width deviation from basic

Dimentional Accuracy

- Δd_{mp} = Mean bore diameter variation
- ΔD_{mp} = Single plane mean outside diameter deviation from basic
- ΔB_s = Single inner ring width deviation from basic
- ΔC_s = Single outer ring width deviation from basic

Running Accuracy

- K_{ia} = Radial runout of assembled bearing inner ring
- S_{ia} = Axial runout of assembled bearing inner ring
- S_d = Inner ring reference face runout with bore
- K_{ea} = Radial runout of assembled bearing outer ring
- S_{ea} = Axial runout of assembled bearing outer ring
- SD = Outside cylindrical surface runout with outer ring reference face

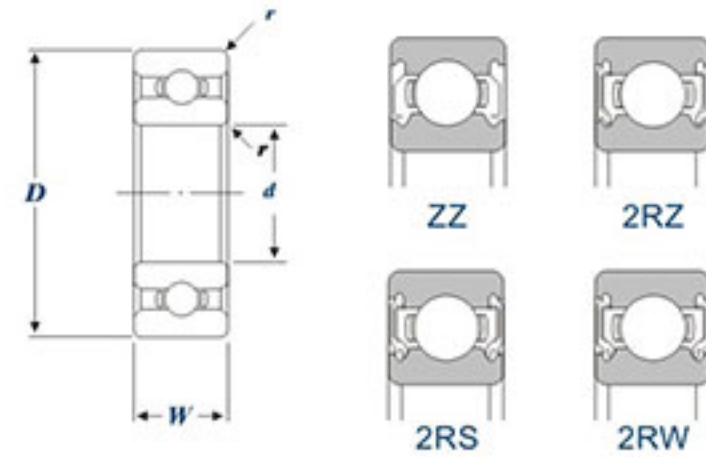
TROUBLE-SHOOTING BEARING PROBLEMS

While it is apparently impossible to directly observe bearings in operation, one can get a good idea of how they are operating by monitoring noise, vibration, temperature and lubricant condition. Types of damages typically encountered are presented in the table below.

Typical Bearing Damages and Corrective Measures

	Description	Causes	Correction
Seizure	The bearing heats up and becomes discolored. Eventually the bearing will seize up.	<ul style="list-style-type: none"> • Insufficient clearance(including clearances made smaller by local deformation). • Insufficient lubrication or improper lubricant. • Excessive loads(excessive pressure). 	<ul style="list-style-type: none"> • Check for proper clearance. (Increase clearances.) • Review lubricant type and quantity. • Review application conditions. • Take steps to prevent misalignment. • Reevaluate the design of the area around the bearing(including fitting of the bearing). • Improve assembly procedures.
Retainer Damage	Rivets break or become loose resulting in retainer damage.	<ul style="list-style-type: none"> • Excessive moment loading. • High speed or excessive speed fluctuations. • Inadequate lubrication. • Impact with foreign objects. • Excessive vibration. • Improper mounting.(Mounted misaligned) • Abnormal temperature rise. (Plastic retainers) 	<ul style="list-style-type: none"> • Review of application conditions. • Reevaluation of lubrication conditions. • Review of retainer type selection. • Take more care in handling. • Investigate shaft and housing rigidity.
Meandering Wear Patterns	Abrasion or an irregular, meandering wear pattern left by rolling elements along receway surfaces.	<ul style="list-style-type: none"> • Shaft or housing of insufficient accuracy. • Improper installation- • Insufficient shaft or housing rigidity. • Shaft whirling caused by excessive internal bearing clearances. 	<ul style="list-style-type: none"> • Reinspect bearing's internal clearances. • Review accuracy of shaft and housing finish. • Review rigidity of shaft and housing.
Rust and Corrosion	The surface becomes either partially or fully rusted, and occasionally rust even occurs along the rolling element pitch lines.	<ul style="list-style-type: none"> • Poor storage conditions. • Poor packaging. • Insufficient rust inhibitor. • Penetration by water, acid, etc. • Handling with bare hands. 	<ul style="list-style-type: none"> • Take measures to prevent rusting while in storage. • Improve sealing performance. • Periodically inspect the lubricating oil. • Take care when handling the bearing.
Surface Matting	Luster of raceway surfaces is gone; surface is matted, rough, and/or evenly dimpled. Surface covered with minute dents.	<ul style="list-style-type: none"> • Infiltration of bearing by foreign matter. • Insufficient lubrication. 	<ul style="list-style-type: none"> • Reevaluation of lubricant type and lubrication method. • Review sealing mechanisms. • Examine lubrication oil purity. (Filter may be excessively dirty, etc.)

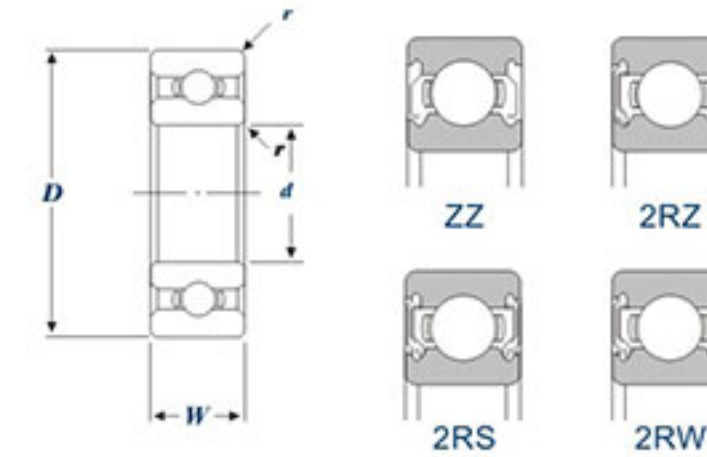
BEARING SPECIFICATIONS
62 Series



Any combination of closures is available

Basic Bearing No.	Nominal Bearing Dimensions				Ball Complement		Basic Load Rating KN		Max Runout Speed		Weight kg				
	BORE <i>d</i>		Outer Diameter <i>D</i>		Width <i>B, C</i>		Radius <i>r min</i>		No.	Size		Dynamic <i>Cr</i>	Static <i>Cor</i>	Grease	Oil
	mm	inch	mm	inch	mm	inch	mm	inch		mm		KN	KN	rpm	rpm
624	4	0.1575	13	0.5118	5	0.1968	0.2	0.007	6	2.381	1.31	0.490	42000	50000	0.0048
625	5	0.1968	16	0.6299	5	0.1968	0.3	0.012	6	3.1753	1.76	0.680	37000	44000	0.0050
626	6	0.2362	19	0.2362	6	0.2362	0.3	0.012	7	500	2.34	0.885	33000	41000	0.0080
627	7	0.2756	22	0.8661	7	0.2756	0.3	0.012	7	3.969	3.35	1.400	30000	36000	0.0120
628	8	0.3149	24	0.9448	8	0.3149	0.3	0.012	7	3.969	4.00	1.590	28000	33000	0.0170
629	9	0.3543	26	1.0236	8	0.3149	0.3	0.012	7	4.763	4.55	1.960	27000	32000	0.0190
6200	10	0.3937	30	1.1811	9	0.3543	0.6	0.024	8	4.763	5.10	2.390	25000	30000	0.0300
6201	12	0.4724	32	1.2598	10	0.3937	0.6	0.024	7	5.953	6.10	2.750	23000	28000	0.0360
6201-1/2	12.7	0.5000	32	1.2598	10	0.3937	0.6	0.024	7	5.953	6.10	5.750	23000	28000	0.0360
6202	15	0.5906	35	1.3780	11	0.4331	0.6	0.024	8	5.953	7.75	3.600	20000	25000	0.0460
6202-5/8	15.875	0.6250	35	1.3780	11	0.4331	0.6	0.024	8	5.953	7.75	3.600	20000	25000	0.0460
6202-16	16	0.6299	35	1.3780	11	0.4331	0.6	0.024	8	5.953	7.75	3.600	20000	25000	0.0460
6203	17	0.6693	40	1.5748	12	0.4724	0.6	0.024	8	6.747	9.60	4.600	18000	22000	0.0650
6203-5/8	15.875	0.6250	40	1.5748	12	0.4724	0.6	0.024	8	6.747	9.60	4.600	18000	22000	0.0650
6204	20	0.7874	47	1.8504	14	0.5512	1.0	0.039	8	7.938	12.80	6.650	15000	18000	0.1070
6205	25	0.9843	52	2.0470	15	0.5906	1.0	0.039	9	7.938	14.00	7.850	13000	16000	0.1250
6206	30	1.1811	62	2.4409	16	0.6299	1.0	0.039	9	9.525	19.50	11.300	12000	14000	0.2010
6207	35	1.3780	72	2.8346	17	0.6693	1.1	0.043	9	11.112	25.70	15.300	10000	12000	0.2870
6208	40	1.5748	80	3.1496	18	0.7087	1.1	0.043		11.509	29.10	17.800	8800	10000	0.3650
6209	45	1.7717	85	3.3465	19	0.7480	1.1	0.043	9	12.000	32.50	20.400	7200	9000	0.4200
6210	50	1.9685	90	3.5433	20	0.7874	1.1	0.043	10	12.700	35.00	23.200	6500	8000	0.4660
6211	55	2.1654	100	3.9370	21	0.8268	1.5	0.059	10	13.494	43.50	29.200	6100	7500	0.6060
6212	60	2.3622	110	4.3307	22	0.8661	1.5	0.059	10	15.081	52.50	36.000	5800	7300	0.7930
6213	65	2.5591	120	4.7244	23	0.9055	1.5	0.059	10	16.669	58.50	40.500	5500	7000	0.9900
6214	70	2.7559	125	4.9213	24	0.9449	1.5	0.059	11	16.669	63.70	45.000	5000	6100	1.1000
6215	75	2.9528	130	5.1181	25	0.9843	1.5	0.59	11	17.462	68.90	49.000	4800	5600	1.2000

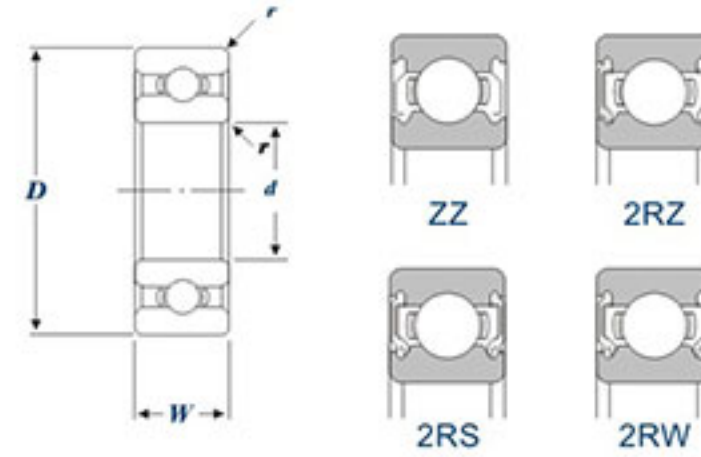
BEARING SPECIFICATIONS
63 Series



Any combination of closures is available

Basic Bearing No.	Nominal Bearing Dimensions				Ball Complement		Basic Load Rating KN		Max Runout Speed		Weight kg				
	BORE <i>d</i>		Outer Diameter <i>D</i>		Width <i>B, C</i>		Radius <i>r min</i>		No.	Size		Dynamic <i>Cr</i>	Static <i>Cor</i>	Grease	Oil
	mm	inch	mm	inch	mm	inch	mm	inch		mm		KN	KN	rpm	rpm
635	5	0.1969	19	0.7480	6	0.2362	0.3	0.012	9	2.381	2.34	0.885	34000	42000	0.0110
636	6	0.2362	22	0.8661	7	0.8661	0.3	0.012	7	3.696	2.55	1.370	32000	38000	0.0140
637	7	0.2756	26	1.0236	9	0.3543	0.3	0.012	7	4.763	3.5	2.78	30000	36000	0.0250
638	8	0.3149	28	1.1024	9	0.3543	0.3	0.012	7	4.763	3.54	1.99	28000	32000	0.0290
639	9	0.3543	30	1.1811	10	0.3937	0.6	0.024	8	4.763	3.93	2.23	25000	30000	0.0360
6300	10	0.3937	35	1.3780	11	0.4331	0.6	0.024	7	6.350	8.20	3.500	23000	27000	0.0540
6301	12	0.4724	37	1.4567	12	0.4724	1.0	0.039	7	6.350	9.70	4.200	21000	25000	0.0590
6302	15	0.5906	42	1.6535	13	0.5118	1.0	0.039	7	7.938	11.40	5.450	19000	22000	0.0820
6303	17	0.6693	47	1.8504	14	0.5512	1.0	0.039	7	8.731	13.50	6.550	16000	19000	0.1130
6304	20	0.7874	52	2.0472	15	0.5906	1.1	0.043	7	9.525	15.90	7.900	14000	17500	0.1420
6305	25	0.9843	62	2.4409	17	0.6693	1.1	0.043	7	11.500	21.20	10.900	12000	14000	0.2260
6306	30	1.1811	72	2.8346	19	0.7480	1.1	0.043	8	12.000	26.70	15.000	10000	12000	0.3490
6307	35	1.3780	80	3.1496	21	0.8268	1.5	0.059	8	13.494	33.50	19.100	8500	10000	0.4600
6308	40	1.5748	90	3.5433	23	0.9055	1.5	0.059	8	15.081	40.50	24.000	7800	9000	0.6450
6309	45	1.7717	100	3.9370	25	0.9843	1.5	0.059	8	16.669	53.00	32.000	6800	8100	0.8420
6310	50	1.9685	110	4.3307	27	1.0630	2.0	0.079	8	18.256	62.00	38.500	6200	7500	1.0860
6311	55	2.1654	120	4.7244	29	1.1417	2.0	0.079	8	20.638	74.10	45.000	5700	6700	1.3500
6312	60	2.3622	130	5.1181	31	1.2205	2.1	0.083	8	22.225	85.20	52.000	5300	6300	1.7000
6313	65	2.5591	140	5.5118	33	1.2992	2.1	0.083	8	23.812	97.50	60.000	5000	6000	2.1000
6314	70	2.7559	150	5.9055	35	1.3740	2.1	0.083	8	25.400	111.00	68.000	4500	5300	2.5000
6315	75	2.9528	160	6.2992	37	1.4567	2.1	0.083	8	26.983	119.00	76.500	4300	5000	3.0000

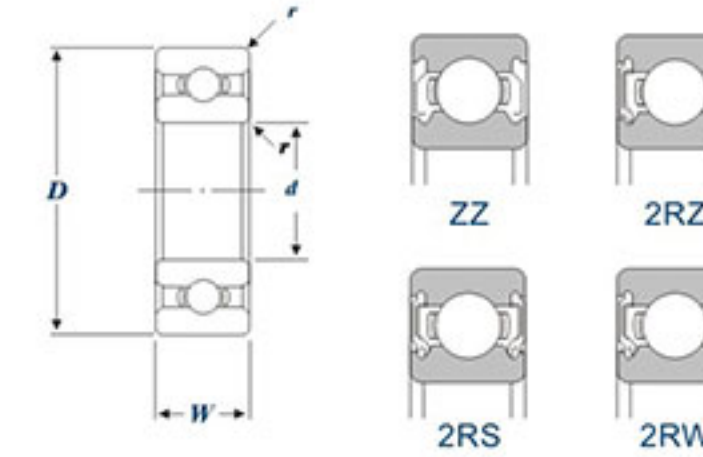
BEARING SPECIFICATIONS
68 Series



Any combination of closures is available

Basic Bearing No.	Nominal Bearing Dimensions						Ball Complement		Basic Load Rating KN		Max Runout Speed		Weight kg				
	BORE <i>d</i>		Outer Diameter <i>D</i>		Width <i>B, C</i>		No.	Size mm	Dynamic <i>C_r</i> KN	Static <i>C_{or}</i> KN	Grease rpm	Oil rpm					
	mm	inch	mm	inch	Open mm	Shielded Sealed mm								mm	inch		
685	5	0.1969	11	0.4331	3	0.1181	5	0.1969	0.15	0.006	8	1.588	0.715	0.282	46000	54000	0.0024
686	6	0.2362	13	0.5118	3.5	0.1378	5	0.1969	0.15	0.006	8	2.000	1.080	0.440	40000	50000	0.0027
687	7	0.2756	14	0.5512	3.5	0.1378	5	0.1969	0.15	0.006	9	2.000	1.170	0.510	39000	49000	0.0030
688	8	0.3150	16	0.6299	4	0.1575	5	0.1969	0.20	0.008	9	2.381	1.260	0.585	37000	45000	0.0040
689	9	0.3543	17	0.6693	4	0.1575	5	0.1969	0.20	0.008	11	2.000	1.720	0.820	35000	42000	0.0040
6800	10	0.3937	19	0.7480	5	0.1969	5	0.1969	0.30	0.012	9	2.381	1.830	0.925	33000	40000	0.0050
6800W7	10	0.3937	19	0.7480	7	0.2756	7	0.2756	0.30	0.012	9	2.381	1.830	0.925	33000	40000	0.0060
6801	12	0.4724	21	0.8268	5	0.1969	5	0.1969	0.30	0.012	12	2.381	1.920	1.040	32000	38000	0.0060
6802	15	0.5906	24	0.9449	5	0.1969	5	0.1969	0.30	0.012	14	2.381	2.080	1.260	28000	32000	0.0070
6803	17	0.6693	26	1.0236	5	0.1969	5	0.1969	0.30	0.012	15	2.381	2.810	1.720	25000	30000	0.0080
6804	20	0.7874	32	1.2598	7	0.2756	7	0.2756	0.30	0.012	13	3.500	4.000	2.470	23000	28000	0.0150
6805	25	0.9843	37	1.4567	7	0.2756	7	0.2756	0.30	0.012	15	3.500	4.300	2.950	18000	23000	0.0200
6806	30	1.1811	42	1.6535	7	0.2756	7	0.2756	0.30	0.012	19	3.175	4.700	3.650	16000	19000	0.0250
6807	35	1.3780	47	1.8504	7	0.2756	7	0.2756	0.30	0.012			4.900	4.050	13000	17000	0.0290
6808	40	1.5748	52	2.0472	7	0.2756	7	0.2756	0.30	0.012			5.100	4.400	12000	15000	0.0330
6809	45	1.7717	58	2.2835	7	0.2756	7	0.2756	0.30	0.012			6.400	5.650	10000	13000	0.0400
6810	50	1.9685	65	2.5591	7	0.2756	7	0.2756	0.30	0.012			6.600	6.100	9000	11000	0.0520

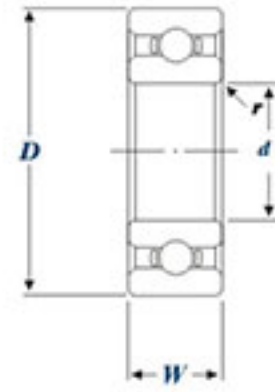
BEARING SPECIFICATIONS
69 Series



Any combination of closures is available

Basic Bearing No.	Nominal Bearing Dimensions						Ball Complement		Basic Load Rating KN		Max Runout Speed		Weight kg		
	BORE <i>d</i>		Outer Diameter <i>D</i>		Width <i>B, C</i>		No.	Size mm	Dynamic <i>C_r</i> KN	Static <i>C_{or}</i> KN	Grease rpm	Oil rpm			
	mm	inch	mm	inch	mm	inch								mm	inch
693	3	0.1181	8	0.315	3	0.1181	0.15	0.006	6	1.588	0.560	0.180	61000	68000	0.0006
W693	3	0.1181	8	0.315	4	0.1181	0.15	0.006	6	1.588	0.560	0.180	61000	68000	0.0007
694	4	0.1575	11	0.4331	4	0.1575	0.2	0.008	7	2.000	0.715	0.276	50000	56000	0.0018
695	5	0.1969	13	0.5118	4	0.1575	0.2	0.008	8	2.000	1.080	0.430	44000	51000	0.0030
696	6	0.2362	15	0.5906	5	0.1969	0.3	0.012	8	2.381	1.350	0.530	40000	46000	0.0040
697	7	0.2756	17	0.6693	5	0.1969	0.3	0.012	9	2.381	1.610	0.715	37000	43000	0.0060
698	8	0.315	19	0.7480	6	0.2362	0.3	0.012	7	3.500	1.990	0.865	37000	42000	0.0070
699	9	0.3543	20	0.7874	6	0.2362	0.3	0.012	9	2.381	2.480	1.090	34000	40000	0.0080
6900	10	0.3937	22	0.8661	6	0.2362	0.3	0.012	12	2.381	2.700	1.270	32000	38000	0.0100
6901	12	0.4724	24	0.9449	6	0.2362	0.3	0.012	9	3.500	2.890	1.460	31000	36000	0.0110
6902	15	0.5906	28	1.1024	7	0.2756	0.3	0.012	10	3.969	4.100	2.060	27000	31000	0.0150
6903	17	0.6693	30	1.1881	7	0.2756	0.3	0.012	11	3.969	4.650	2.580	25000	29000	0.0170
6904	20	0.7874	37	1.4567	9	0.3543	0.3	0.012	11	4.763	6.400	3.700	20000	24000	0.0350
6905	25	0.9843	42	1.6535	9	0.3543	0.3	0.012	13	4.763	7.050	4.550	17000	21000	0.0420
6906	30	1.1881	47	1.8504	9	0.3543	0.3	0.012	14	4.763	7.250	5.000	16000	19000	0.0490
6907	35	1.3780	55	2.1654	10	0.3937	0.3	0.012			11.200	7.450	13000	17000	0.0740
6908	40	1.5748	62	2.4409	12	0.4724	0.3	0.012			14.600	10.200	11000	13000	0.1100
6909	45	1.7717	68	2.6772	12	0.4724	0.3	0.012			15.100	11.200	9800	11000	0.1280
6910	50	1.9685	72	2.8346	12	0.4724	0.3	0.012			15.600	12.200	9000	10000	0.1320

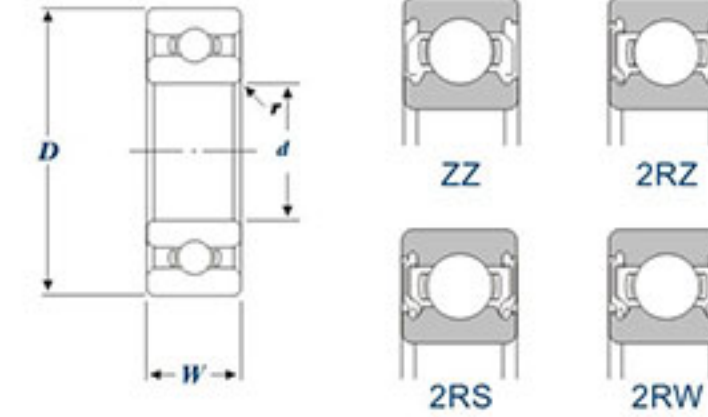
BEARING SPECIFICATIONS
16000 Series



Any combination of closures is available

Basic Bearing No.	Nominal Bearing Dimensions								Ball Complement		Basic Load Rating KN		Max Runout Speed		Weight kg
	BORE <i>d</i>		Outer Diameter <i>D</i>		Width <i>B, C</i>		Radius <i>r min</i>		No.	Size mm	Dynamic <i>Cr</i> KN	Static <i>Cor</i> KN	Grease rpm	Oil rpm	
	mm	inch	mm	inch	mm	inch	mm	inch							
16001	12	0.4724	28	1.1024	7	0.2775	0.3	0.0118		4.763	5.10	2.40	26000	30000	0.019
16002	15	0.5906	32	1.2598	5	0.3150	0.3	0.0118		4.763	5.60	2.80	22000	26000	0.025
16003	17	0.6693	35	1.3780	8	0.3150	0.3	0.0118	10	4.763	6.80	3.35	20000	24000	0.032
16004	20	0.7874	42	1.6535	8	0.3150	0.3	0.0118	10	5.556	7.90	4.50	18000	21000	0.051
16005	25	0.9843	47	1.8504	8	0.3150	0.3	0.0118	12	5.556	8.35	5.10	15000	18000	0.059
16006	30	1.1811	55	2.1650	9	0.3543	0.3	0.0118	12	6.350	11.20	7.40	13000	15000	0.091
16007	35	1.3779	62	2.4409	9	0.3543	0.3	0.0118	14	6.350	11.70	8.20	12000	14000	0.107
16008	40	1.5748	68	2.6772	9	0.3543	0.3	0.0118	15	6.350	12.60	9.65	10000	12000	0.125
16009	45	1.5748	68	2.6672	10	0.3937	0.6	0.0236	16	6.350	12.90	10.50	9200	11000	0.171
16010	50	1.9650	80	3.1496	10	0.3937	0.6	0.0236	16	7.144	13.20	11.30	8400	9800	0.180
16011	55	2.1653	90	3.5433	11	0.4330	0.6	0.0236	16	7.938	18.60	15.30	7700	9000	0.258
16012	60	2.3620	95	3.7400	11	0.4330	0.6	0.0236	18	7.144	20.00	17.50	7000	8300	0.283

BEARING SPECIFICATIONS
INCH R Series



Any combination of closures is available

Basic Bearing No.	Nominal Bearing Dimensions								Ball Complement		Basic Load Rating KN		Weight kg		
	BORE <i>d</i>		Outer Diameter <i>D</i>		Width <i>B, C</i>		Radius <i>r min</i>		No.	Size mm	Dynamic <i>Cr</i> KN	Static <i>Cor</i> KN			
	mm	inch	mm	inch	Open mm inch	Shielded Sealed mm inch	mm	inch							
R3	4.763	0.1875	12.700	0.5000	3.970	0.1562	4.98	0.1960	0.15	0.006	6	2.3810	1.310	0.490	0.003
R3A	4.763	0.1875	12.700	0.5000	4.980	0.1960	4.98	0.1960	1.15	0.006			1.310	0.490	
R4	6.350	0.2500	15.875	0.6250	4.980	0.1960	4.98	0.1960	0.20	0.008	8	2.3810	1.480	0.615	0.005
R4A	6.350	0.2500	19.050	0.7500	5.560	0.2188	7.14	0.2812	0.30	0.012	6	3.9690	2.340	0.885	0.009
R6	9.525	0.3750	22.225	0.8750	5.560	0.2188	7.14	0.2812	0.30	0.012	7	3.9690	3.300	1.400	0.009
R8	12.700	0.5000	28.575	1.1250	6.350	0.2500	7.94	0.3125	0.30	0.012	8	4.7630	3.912	2.245	0.017
R8-7	11.113	0.4375	28.575	1.1250	6.350	0.2500	...	...	0.30	0.012	8	4.7630	3.912	2.245	
R10	15.875	0.6250	34.925	1.3750	7.140	0.2812	8.73	0.3438	0.60	0.024	9	4.7630	4.605	2.774	0.034
R12	19.050	0.7500	41.275	1.6250	7.940	0.3125	11.11	0.4375	0.60	0.024	9	6.3500	7.246	4.445	

NON-STANDARD SERIES

Basic Bearing No.	Nominal Bearing Dimensions								Ball Complement		Basic Load Rating KN		Weight kg		
	BORE <i>d</i>		Outer Diameter <i>D</i>		Width <i>B, C</i>		Radius <i>r min</i>		No.	Size mm	Dynamic <i>Cr</i> KN	Static <i>Cor</i> KN			
	mm	inch	mm	inch	Open mm inch	Shielded Sealed mm inch	mm	inch							
1602	6.350	0.2500	17.463	0.6875	...	...	0.3	0.1200	0.3	0.120	9	2.8310	1.511	0.0724	0.007
99502H	15.875	0.6250	34.925	1.3750	...	...	11.00	0.4331	0.6	0.024	8	5.9530	7.750	3.600	0.043
MS12	31.750	1.2500	79.247	3.1239	22.225	0.8740	...	...	1.1	0.043	7	14.2875	25.500	17.580	
98205	25	0.9843	52	2.0470	9	0.3543	...	...	1.0	0.039	11	6.3500	8.210	6.600	0.082
SC205	25	0.9843	52	2.0470	14	0.5512	...	...	1.0	0.039	9	7.9380	13.800	7.550	0.120
SC0563	25	0.9843	52	2.0470	12	0.4704	...	...	1.1	0.043	9	8.7310	12.810	8.440	0.178
63/28	28	1.1024	68	2.6772	18	0.7087	...	...	1.1	0.043	8	11.5000	26.700	14.000	0.296
28BCS15	28	1.0236	68	2.6772	18	0.7087	...	...	1.1	0.043	7	12.7000	27.800	15.600	0.343
			72	2.8346	18	0.7087	...	...					