

# SUPER PRECISION BEARING

Decades of focus on designing and manufacturing  
high precision ball bearings  
[www.gilbearing.com](http://www.gilbearing.com)

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## COMPANY PROFILE

### Rolling Bearings and Mechatronics Components

**Granville** is a diversified company founded in London, UK in 2008. Its brand GIL has been present with its products on the global market for decades. In order to adapt to the international market situation and enterprise development needs, since 2012, the company has gradually oriented to foreign markets through resource integration, operating in the industry clusters:

Industrial components, Automotive aftermarket accessories, Machine tools & Mechatronics.

Vested with the mission of "provide the comprehensive high quality products and thoughtful customer service", Granville upholds its core values of "Thoughtcast, Innovation, and Progressive".

With its relentless pursuit of the corporate culture of "Discipline, Treats people the enthusiasm, Diversity, Teamwork", the company is committed to becoming a trustworthy integrated service provider worldwide.

#### Vision

Driving connections, Delivering trusts.

Continue to innovate through resource integration and business diversification to maintain uniqueness in the market.

#### Mission

Actively seek opportunities, use our expertise and talent development strategies, provide comprehensive quality products and thoughtful customer service.

#### Our Values

Behavior-based, service oriented, focused on results, and committed to continuous improvement.

We continue to provide reliable quality products, actively innovate, improve the process to pursue efficiency and effect.

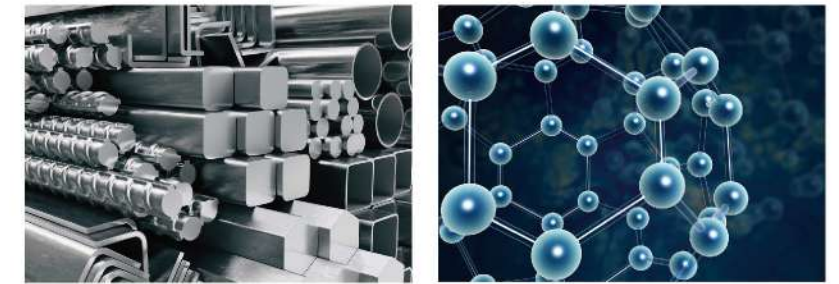
**Granville** is committed to providing its clients with:

- >World class product quality
- >A wide range of products
- >Fast delivery, service, and shipment all over the world
- >Competitive performance-price ratio
- >Customized solutions

## GIL ADVANTAGE

### Excellent Materials

Tested a variety of bearing steel grades from five countries and conducted numerous tests to compare the impact resistance, abrasion resistance, corrosion resistance and temperature resistance of the materials, and has come up with its own set of material application solutions for different industries.



**Granville** pursues perfection in the product itself and meticulously selects materials from Japan, Korea, Sweden and Germany.

Heat treatment process: High-carbon quenching process and oil tempered

Grinding method: Super grinding over times

Service life: 40% increase from the original base

### Quality Management

Detection is the last resort, Prevention is the core of **Granville** quality control

Strict implementation of process inspection, a total of 54 manufacturing processes, 20 inspection processes. We try our best to avoid defective products and delivery qualified products to customers, and strictly follow the following 5 quality management processes:





## Granville ADVANTAGE

### Industry Expertise

Based on the industry as the market development direction, in-depth understanding of the customer's specific needs, coupled with our partner's years of manufacturing experience for precision bearings, to customize the perfect solution for customers.

The industries involved are Photovoltaic wire-electrode cutting, CNC spindles, Escalators and Appliances.

The **GIL** bearing manufacture partner research for the photovoltaic wire cutting industry, found that the spindle box speed for silicon wafers cutting is the core demand. The direct benefits are:

- 1 > cost reduction
- 2 > production efficiency improvement

At present, the domestic counterparts in the photovoltaic wire cutting technology, for the speed of the temperature rise and using life problem has not yet a perfect solution. In this regard, we have made three improvements, so that the spindle box line speed from 23 m/s to 30 m/s.

- 1. Optimized design of bearing structure, higher rotating speed.
- 2. Improved seal and shield system to prevent water and silicon chips from entering the shaft box.
- 3. Cooling system improvement, better control of temperature rise after speed increase.  
Now it has been recognized by the domestic PV wafer processing industry!

### Equipment Upgrade

Super-precision bearings must be machined with ultra-high precision equipment, and our factory have a very precise calculation of whether our equipment meets the requirements of ultra-high precision machining compared to other bearing manufacturers. We specialize in deeply precision modification of the manufacturing equipment (grinding machines) used to produce bearings.



## PRODUCT SUPERIORITY

### High speed, High rigidity, High reliability

#### Ceramic Ball

Ceramics are a new type material with a great many excellent characteristics, such as thermal resistance, durability, light weight, low expansion and insulation, its application scope is very wide. **GIL** super precision ball bearings focuses on the excellent characteristics of Si<sub>3</sub>N<sub>4</sub> in ceramic material, fulfills the ultra-high speed and super precision rotation requirements which steel ball bearing can't achieve, the bearings greatly upgrade the service performance, limiting-speed increased 120% and 2 times service life than steel ball bearing, and receive wide recognition in spindle and precision machinery field.

#### ■ Burn resistance

Compared with steel balls, the burn resistance of ceramic ball bearings is greatly improved. With the gradual increase of temperature, the temperature rise of ceramic ball bearings is 3-5°C less than that of steel ball bearings.

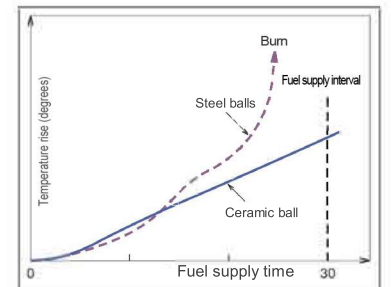
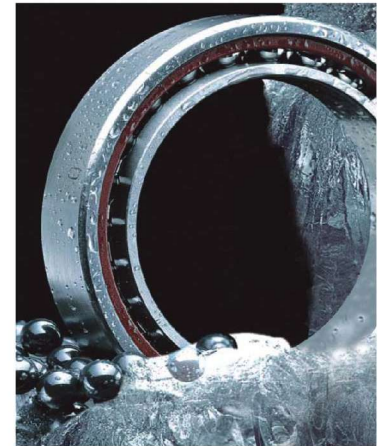
#### ■ High speed and Low heating

40% lighter than steel ball, its centrifugal force acting on rolling element has little impact and beneficial to high speed rotation

Low coefficient of linear expansion and heating value is 3-5 °C lower comparing with steel ball.

#### Low friction

The ceramic balls cause less slippage than steel balls and generates less heat, which facilitates high-speed rotation and can increase the ultimate speed by about 1.2 times.



Oil supply 30s steel ball and ceramic ball heating up



#### Long-life Technology of Steel Materials

In accordance with the customer demand, **GIL** adopts high speed and heat resistant, high load and wear resistant long-life bearing steel as the material of precision bearing for machine tools, high efficiency heat treatment process, special stable treatment technology, increasingly mature grinding process and special assembly technology, adapt to the customer's best choice in different environments with high thermal resistance, high wear resistance and burn resistance, and increase service life at two to three times than common bearing.



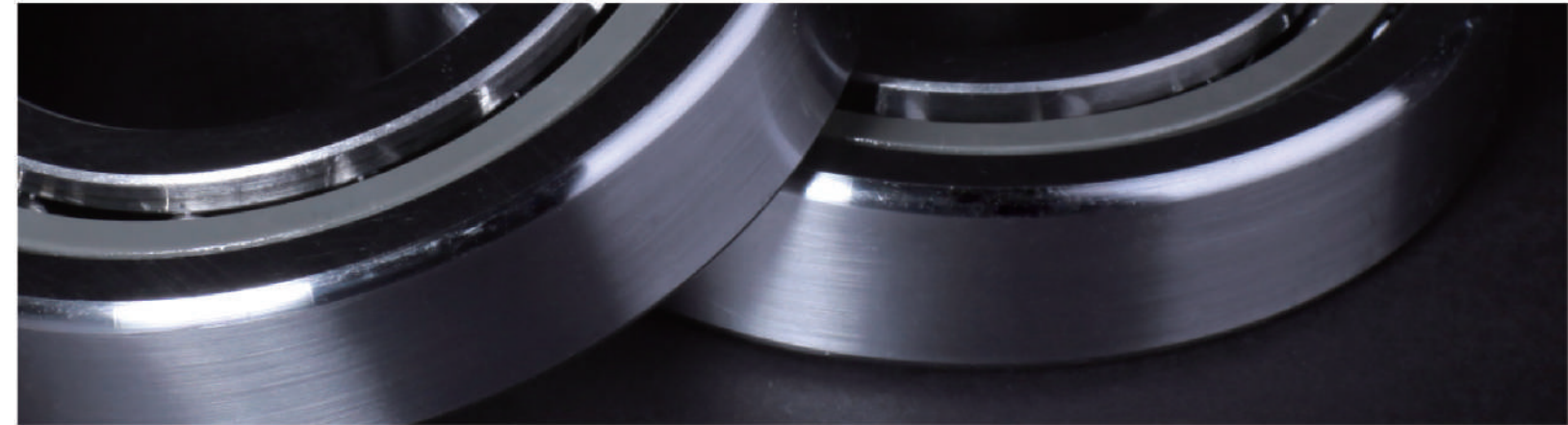
#### Cage

Adopts ball guiding polyamide resin retainer (TN or TYN), commonly called as nylon cage; outer circle guiding phenolic resin cage (TA) commonly called as Bakelite cage; and copper alloy retainer (M), with high speed, high rigidity and high reliability.



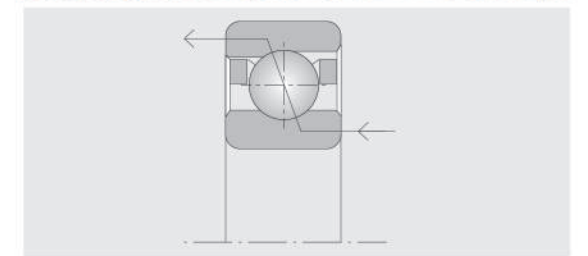
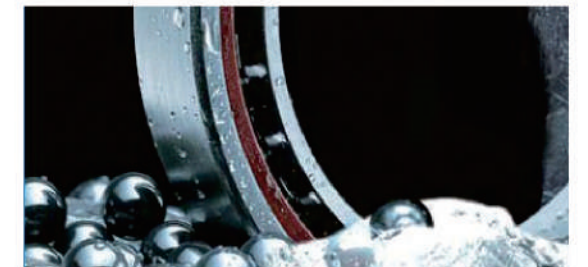
#### High-precision

**GIL** strictly controls the accuracy of bearing rings and accessories, and stabilizes the rings to reduce plastic deformation, making grinding dimensions more stable and fully capable of achieving P4, P4S (P4A), and P2 levels.

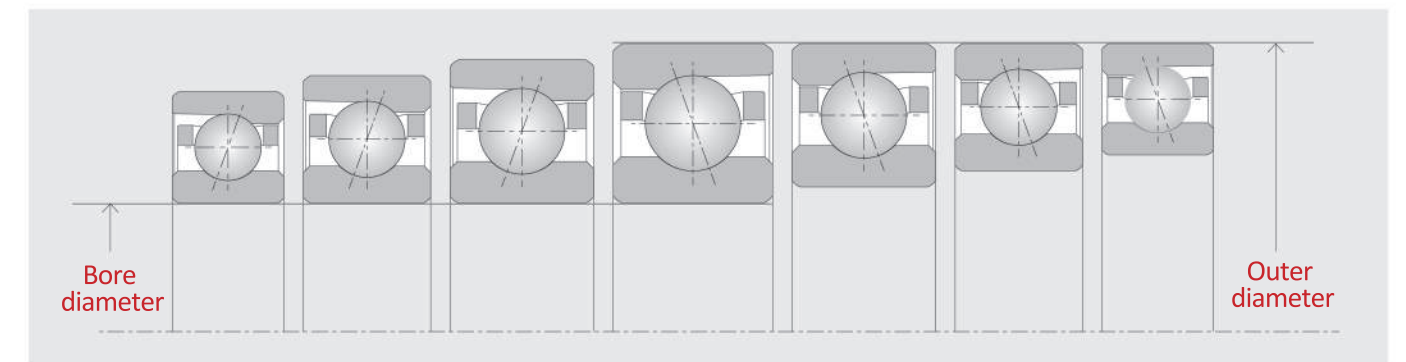


## PRODUCT FEATURES

- Bore diameter 5 - 120mm
- Contact angle 15° - 25°
- Forces transmitted from one raceway to the other under this pressure angle
- Withstand large axial and radial loads
- Large number of balls than with than deep groove ball bearings
- Great rigidity and load capacity
- Full range and sizes are available as hybrid bearings
- All GIL ball bearings are available with greased
- All GIL bearing bore sizes are available with various diameters



### GIL spindle ball bearings: Bore diameter / Outer diameter



<b>Series:</b>	718	719	70	72	70	719	718
ISO series:	18	19	10	02	10	19	18

Boundary dimensions per DIN, ISO and ABMA

**Granville Industrial**

**GIL  
HIGH PRECISION  
ANGULAR CONTACT  
BALL BEARING**

- Product features
- Ring material
- Cage
- Ball material
- Compound ball bearing
- Standard series



## MATERIAL RING

### Assured performance efficiency and service life

Uses high-quality materials and processing techniques to manufacture all components of its high precision spindle ball bearings. The highest standards of quality assure the best possible performance efficiency and optional service life for GIL products.

#### Inner and Outer ring



**Material**

Chrome steel Gcr15 (100 Cr6)  
Material code, SAE 52100, SUJ2  
Special steels on request

**Permissible operating temperature**

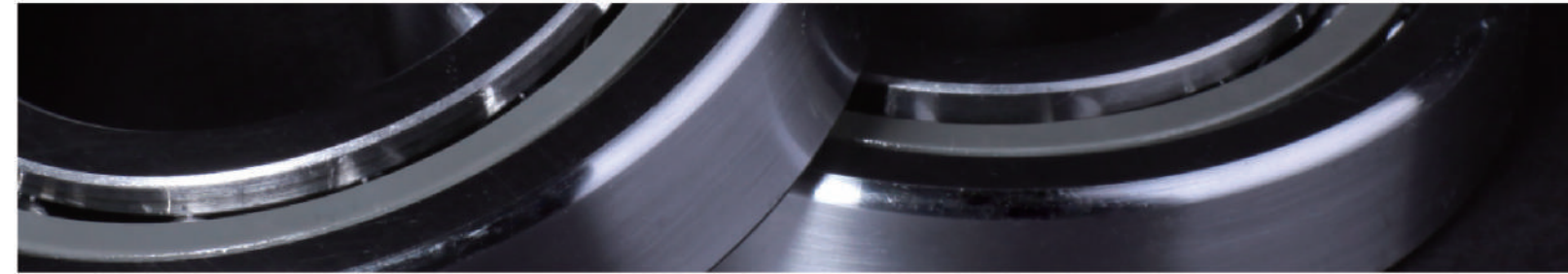
High treated for continuous operating temperatures up to 150 °C

**Hardness**

60 to 64 HRC, fully hardened; corresponds to 700-800 HV30

**Characteristics**

High purity and homogeneity, vacuum degassed



TXP / TXM cage

**Material**

Partially crystalline high performance plastic PEEK (polyetheretherketone), carbon fiber reinforced

**Permissible operating temperature**

250°C

**Cage guidance**

on outer ring, ball retaining

**Manufacture**

injection molded

**Application**

for S, SM series  
optimized for grease lubrication

**Characteristics**

low friction coefficient, for oil and grease lubrication



## CAGE

### Respect to speed, load capacity and service life

#### T / TA type



**Material**

Laminated phenolic resin  
Phenolic resin with fine mesh cotton webbing

**Permissible operating temperature**

120°C

**Cage guidance**

on outer ring

**Fabrication**

machining

**Application**

for high speed S, SM, KH series  
general purpose

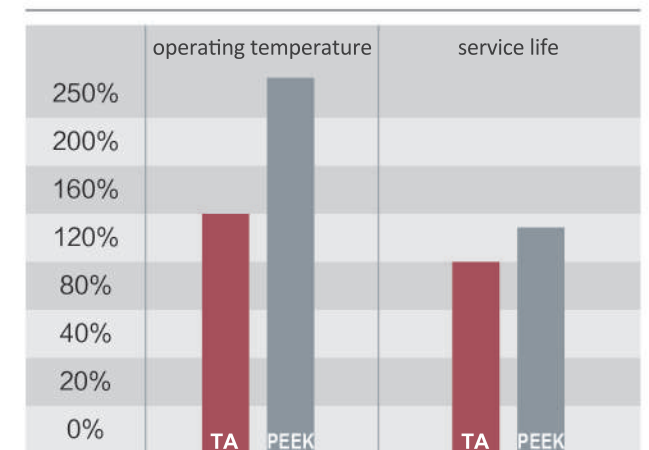
**Characteristics**

low friction coefficient, for oil and grease lubrication

**Advantages:**

- High resistance to wear
- Outstanding emergency operating characteristics due to favorable sliding properties and reduced abrasion
- Reduced operating temperature due to lower friction and more favorable tribology
- Constant grease lubrication due to the formation of grease reservoirs in provided cage pockets
- Long service life
- Increased cost effectiveness

#### TA- and TXP / TXM cages in comparison



Other cage materials, types, special treatments (e.g. TB, brass) are available on request.

## MATERIAL BALL

### Standard balls material



#### Material

Bearing steel (chrome steel) Gcr 15  
100 Cr6, SAE 52100, SUJ2  
Special steels on request

#### Permissible operating temperature

Heat treated for continuous operating temperatures up to 150°C

#### Hardness

61 to 66 HRC, fully hardened; corresponds to 700–800 HV30

#### Characteristics

High purity and homogeneity, vacuum-degassed

## COMPOUND BALL BEARING

### Hybrid ball bearings

Compound ball bearings, same called as Hybrid ball bearings are characterized by a combination of materials; chrome bearing steel (inner and outer rings) and ceramic (balls). The material-based characteristics of ceramic balls (in comparison to bearings with steel balls) offer clear performance improvements, especially under critical conditions in machine operation.

#### Balls (hybrid ball bearings)

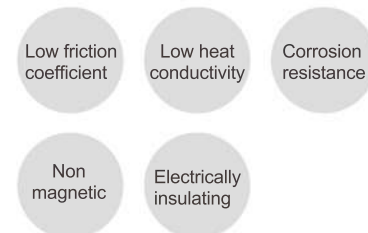


#### Material

Ceramic (silicon nitride Si<sub>3</sub>N<sub>4</sub>)

#### Material characteristics

Low chemical affinity to Gcr 15



#### Longer service life

Because of their material characteristics, hybrid bearings are able to attain more than twice the service life of steel bearings. Machine operation time is significantly increased.

#### Higher speeds

Due to their tribological characteristics and lower mass forces, speeds can be increased as much as 30% in comparison with steel balls.

#### Low-cost lubrication

The maximum speed for grease and oil lubrication is increased. Therefore grease lubrication can frequently be use instead of cost-intensive oil lubrication.

#### Greater rigidity

The characteristics of the materials improve both radial and axial rigidity. The advantages here are increased accuracy and a shift of critical resonance.

#### Improved machining accuracy

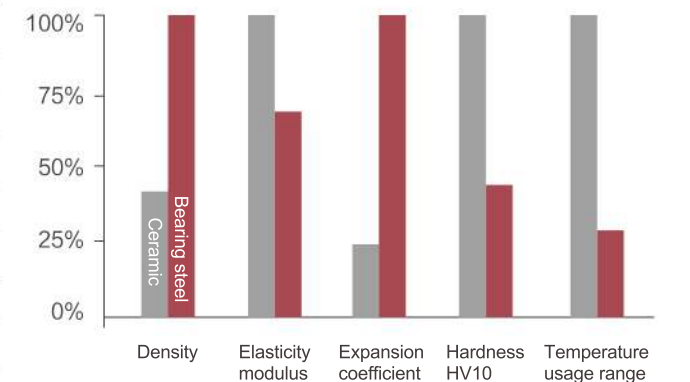
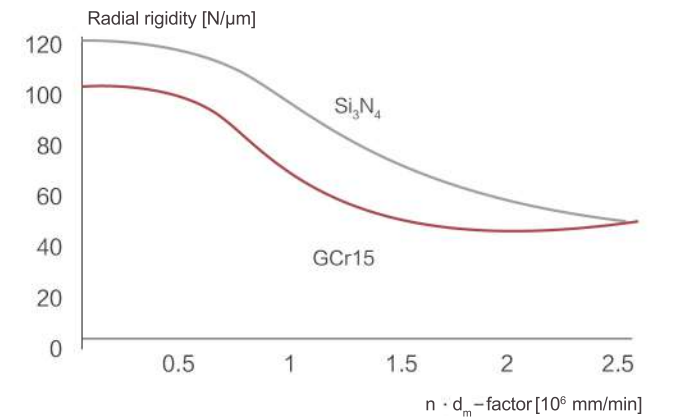
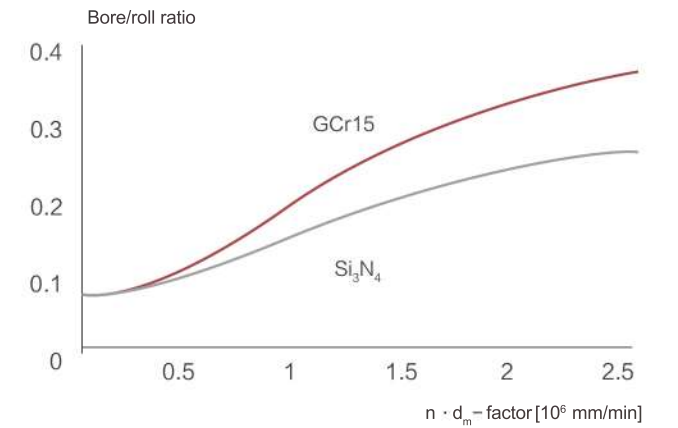
Greater bearing rigidity, reduced thermal expansion and lower vibration excitation make it possible to achieve maximum process-ing accuracy.

#### Application examples

- > Machine tool spindles
- > Fast running machine bearing journals
- > Lifetime optimized precision bearings

#### Characteristics of ceramics (silicon nitride) Si<sub>3</sub>N<sub>4</sub> and bearing steel (chrome steel) Gcr 15

Characteristics at room temperature		Ceramic Si <sub>3</sub> N <sub>4</sub>	Bearing steel Gcr15
Density	【g/cm <sup>3</sup> 】	3.2	7.8
Expansion coefficient	【10 <sup>-6</sup> /k】	3.2	11.5
Elasticity modulus	【GPa】	315	210
Poisson's ratio	-	0.26	0.3
Vickers hardness	-	1600	700
Tensile strength	【MPa】	700	2500
Fracture toughness	【MPa m <sup>0.5</sup> 】	7	20
Thermal conductivity	【W/mK】	30–35	40–45
Specific electrical resistance	【Ωmm <sup>2</sup> /m】	1017–1018	0.1–1





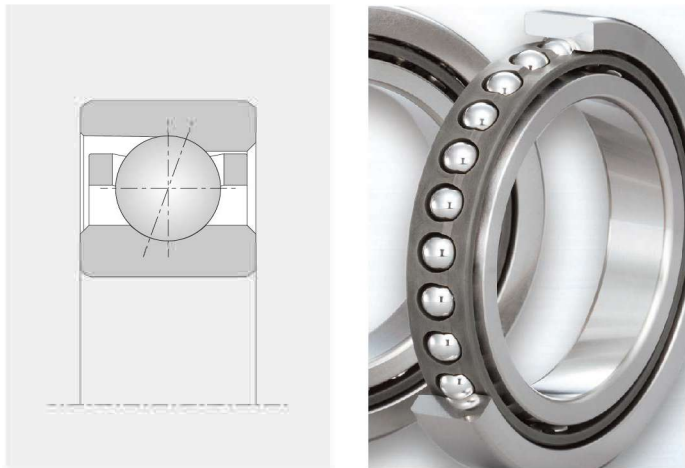
## STANDARD SERIES

### Comprehensive ranges

Spindle bearings from **GIL** cover a comprehensive range of sizes, types and designs. Based on a diverse choice of products, **GIL** offers quality-oriented and economic spindle bearing solutions for a large number of specific requirements.

#### Standard (70. 72. 719 series)

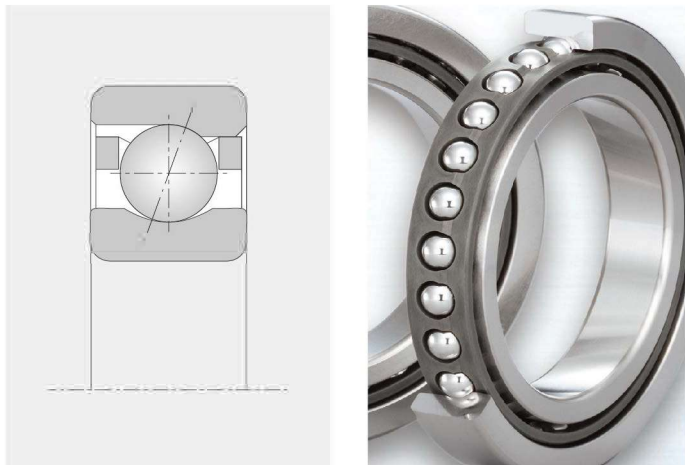
The standard series covers a wide range of sizes, speed adaptability and load capacity



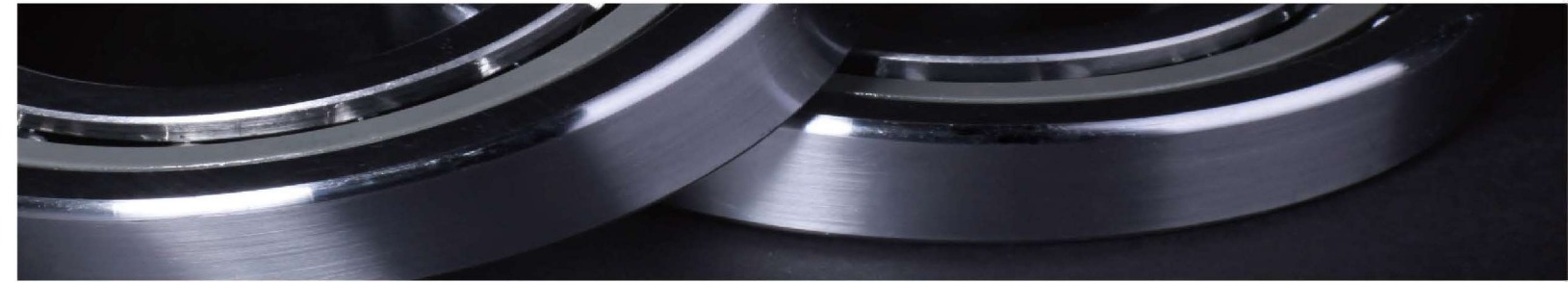
- Standard spindle bearings
- High speed suitability and rigidity
- Highly economical and reliable

#### Special high-speed (BNR series)

Due to optimized inner geometry, the BRN Series permits almost 20% higher speeds – in comparison to Standard series

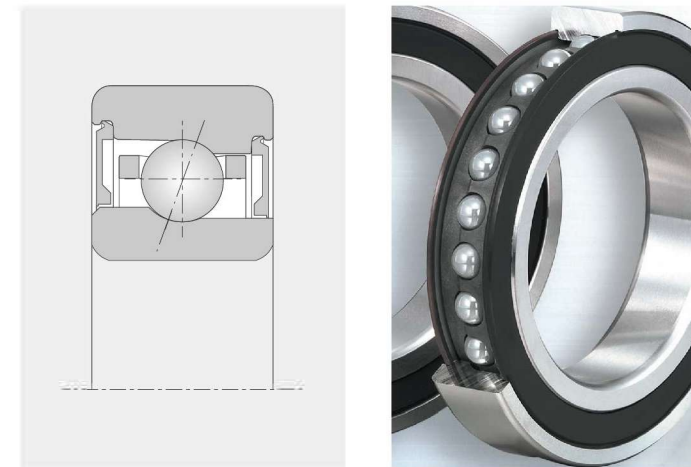


- Optimized inner ring bevel form for high speeds
- Long service life due to reduced friction
- Highly resistant to temperature influences due to large radial bearing clearance
- Low operating temperature due to minimal friction



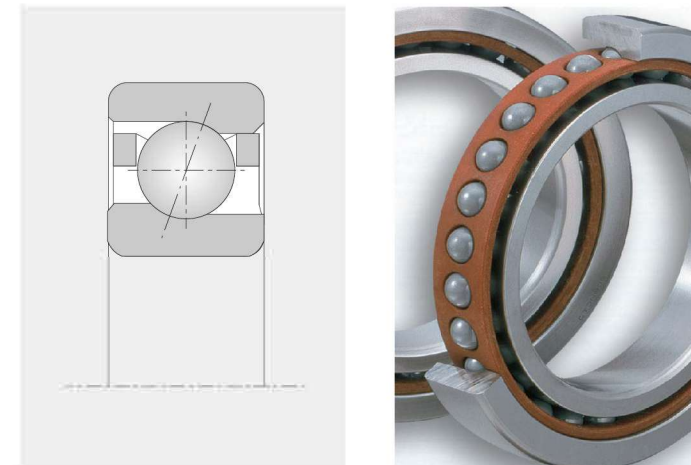
#### High speed sealed type (H70 series)

Optimized bearing geometry, the H70 Series provides outstanding speed properties, service life and economy



- Sealed: with permanent grease lubrication  
Standard grease  
or customer-specific grease

#### High speed open type (B70 oil lubrication)



- Open type: for oil lubrication

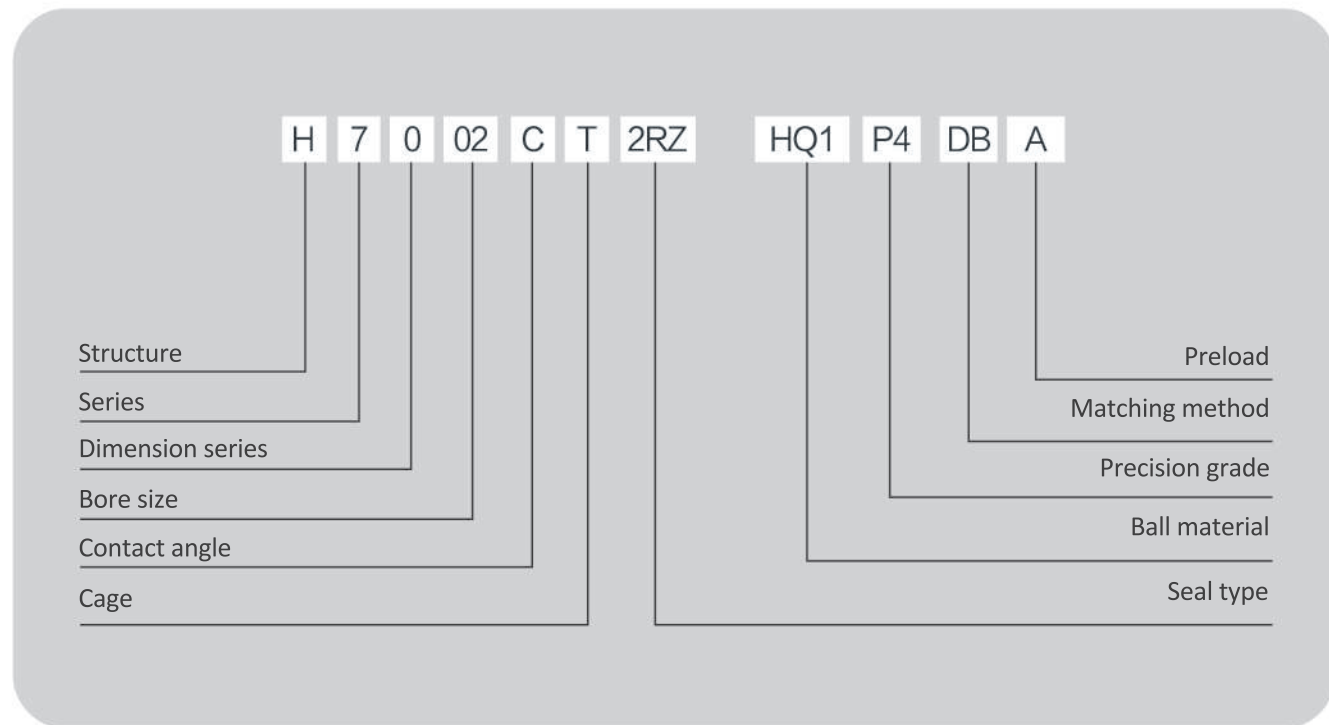
- Optimized for highest speed
- Optimized raceway structure brings low operating temperature
- High resistance to temperature fluctuations caused by large bearing radial clearance
- Optimize the number of balls and the ratio between ball diameter and rated load.
- Optimized internal structures about grease lubrication Spaces and belinda lubrication.

- Because of the use of non-contact seals, no need to reduce speed (up to 120°C). In vertical or inclined installation position, no grease drying
- No additional sealing element is required
- Reduced the hazards caused by contamination of the assembly area

## BEARING TYPE IDENTIFICATION

### GIL high precision bearing designation

#### Example



H	Structure	'- : High speed; B: Improved high speed; H: Super-high speed series
7	Series	7: Single row angular contact ball bearing
0	Dimension series	0: 10 series; .18 .19 series; 2: 02 series
02	Bore diameter	0-10mm for bore below 3mm; 01: 12mm; 02: 15mm; 03: 17mm; Bore dia. above 04 = bore dia.number x5mm
C	Contact angle	C: 15° ; AC: 25°
T	Cage	T: Laminated phenolic resin cage with guidance on outer ring; TN: Nylon cage with guidance on ball retaining; M: Brass cage
2RZ	Seal type	No marks: Open type; 2RZ: Non-contact NBR seals; 2RS: Contact NBR seals
HQ1	Ball material	No marks: Steel ball (Gcr15); HQ1: Ceramic (Si3N4); HV: Stainless steel (9Cr18)
P4	Precision grade	P2: Tolerance P2 corresponds to ISO 2 grade; P4: Tolerance P4 corresponds to ISO4; P5: Tolerance P5 corresponds to ISO5; P4S: Tolerance ISO4 grade, rotating precision ISO 2 grade
DB	Matching method	G: Single row universal matching; DU: Double row universal matching; DB: Back to back matching (pair); DF: Face to face pair matching; DT: Parataxis pair matching
A	Preload	A: Light preload; B: Medium preload; C: Heavy preload; CA: Light preload clearance; CB: Medium preload clearance; CC: Heavy preload clearance

### GIL HIGH PRECISION ANGULAR CONTACT BALL BEARING BEARING DATA

Bore dia. 6-150mm  
 Key dimensions  
 Basic Load Rating  
 Limit speed  
 Ceramic ball limit speed  
 Preload



# BEARING TYPE IDENTIFICATION

## 718 Series (Standard)

Contact angle  $\alpha = 15^\circ, 25^\circ$   
 Bore diameter 10-150 mm



ITEM	Key dimensions (mm)					Basic load rating (KN)		Limit speed (r/min)		Ceramic ball limit speed (r/min)		Preload (N)		
	Designation	d	D	B	r	r1	Cr	Cor	Oil	Grease	Oil	Grease	Light(A)	Medium(B)
71800C	10	19	5	0.3	0.1	1.9	0.98	75000	120000	95000	160000	7	23	54
71800AC	10	19	5	0.3	0.1	1.9	0.98	70000	110000	85000	140000	8	31	80
71801C	12	21	5	0.3	0.1	2.08	1.18	67000	100000	85000	140000	7	25	58
71801AC	12	21	5	0.3	0.1	1.96	1.12	60000	90000	75000	120000	8	33	85
71802C	15	24	5	0.3	0.1	2.28	1.5	56000	85000	70000	110000	8	27	63
71802AC	15	24	5	0.3	0.1	2.16	1.4	50000	75000	63000	95000	8	34	91
71803C	17	26	5	0.3	0.1	2.32	1.6	50000	75000	67000	100000	8	26	64
71803AC	17	26	5	0.3	0.1	2.2	1.53	48000	70000	56000	85000	7	33	92
71804C	20	32	7	0.3	0.1	3.8	2.65	43000	63000	53000	80000	15	50	114
71804AC	20	32	7	0.3	0.1	3.65	2.5	38000	56000	45000	67000	18	70	174
71805C	25	37	7	0.3	0.1	4.15	3.2	36000	53000	45000	67000	16	54	123
71805AC	25	37	7	0.3	0.1	3.9	3	32000	48000	38000	56000	18	72	181
71806C	30	42	7	0.3	0.1	4.4	3.65	30000	45000	38000	56000	16	56	129
71806AC	30	42	7	0.3	0.1	4.15	3.4	28000	43000	34000	50000	18	73	189
71807C	35	47	7	0.3	0.1	4.65	4.15	26000	40000	34000	50000	17	58	135
71807AC	35	47	7	0.3	0.1	4.4	3.8	24000	38000	30000	45000	19	76	197
71808C	40	52	7	0.3	0.1	4.8	4.55	24000	38000	30000	45000	17	59	138
71808AC	40	52	7	0.3	0.1	4.55	4.25	22000	36000	26000	40000	17	75	199
71809C	45	58	7	0.3	0.1	7.2	6.95	22000	36000	28000	43000	22	98	221
71809AC	45	58	7	0.3	0.1	6.8	6.4	19000	32000	24000	38000	35	133	328
71810C	50	65	7	0.3	0.1	7.35	7.35	19000	32000	24000	38000	21	99	224
71810AC	50	65	7	0.3	0.1	6.95	6.8	17000	28000	20000	34000	34	133	332
71811C	55	72	9	0.3	0.1	10.2	10.2	17000	28000	22000	36000	35	147	326
71811AC	55	72	9	0.3	0.1	9.65	9.5	16000	26000	19000	32000	57	206	491
71812C	60	78	10	0.3	0.1	13.2	13.2	16000	26000	20000	34000	51	200	435
71812AC	60	78	10	0.3	0.1	12.2	12.2	14000	22000	17000	28000	80	280	649
71813C	65	85	10	0.6	0.3	13.4	14	15000	24000	19000	32000	51	201	440

ITEM	Key dimensions (mm)					Basic load rating (KN)		Limit speed (r/min)		Ceramic ball limit speed (r/min)		Preload (N)		
	Designation	d	D	B	r	r1	Cr	Cor	Oil	Grease	Oil	Grease	Light(A)	Medium(B)
71813AC	65	85	10	0.6	0.3	12.7	12.9	13000	20000	16000	26000	82	289	673
71814C	70	90	10	0.6	0.3	14	15	14000	22000	18000	30000	53	210	459
71814AC	70	90	10	0.6	0.3	12.9	13.7	13000	20000	15000	24000	81	289	678
71815C	75	95	10	0.6	0.3	14.3	15.6	13000	20000	16000	26000	53	213	467
71815AC	75	95	10	0.6	0.3	13.4	14.6	12000	19000	14000	22000	84	298	702
71816C	80	100	10	0.6	0.3	14.6	16.6	12000	19000	16000	26000	53	216	474
71816AC	80	100	10	0.6	0.3	13.7	15.6	11000	18000	13000	20000	84	302	712
71817C	85	110	13	1	0.3	21.6	24	11000	18000	14000	22000	93	344	739
71817AC	85	110	13	1	0.3	20.4	22.4	10000	17000	12000	19000	113	507	1142
71818C	90	115	13	1	0.3	21.2	23.6	11000	18000	14000	22000	91	337	724
71818AC	90	115	13	1	0.3	20	22	9500	16000	12000	19000	110	495	1116
71819C	95	120	13	1	0.3	21.6	24.5	10000	17000	13000	20000	92	343	737
71819AC	95	120	13	1	0.3	20.4	22.8	9000	15000	11000	18000	111	504	1137
71820C	100	125	13	1	0.3	21.6	25	9500	16000	12000	19000	91	341	735
71820AC	100	125	13	1	0.3	20.4	23.6	8500	14000	10000	17000	109	500	1132
71821C	105	130	13	1	0.3	22.8	27.5	9000	15000	12000	19000	95	358	774
71821AC	105	130	13	1	0.3	21.6	25.5	8000	13000	10000	17000	112	525	1193
71822C	110	140	16	1	0.3	31.5	36.5	8500	14000	11000	18000	146	521	1105
71822AC	110	140	16	1	0.3	29	34	7500	12000	9000	15000	181	757	1673
71824C	120	150	16	1	0.3	32	39	7500	12000	10000	17000	146	527	1119
71824AC	120	150	16	1	0.3	30	36	7000	11000	8500	14000	184	779	1725
71826C	130	165	18	1.1	0.6	42.5	51	7000	11000	9000	15000	208	723	1523
71826AC	130	165	18	1.1	0.6	40	48	6300	9500	7500	12000	277	1092	2378
71828C	140	175	18	1.1	0.6	43	54	6300	9500	8000	13000	208	728	1536
71828AC	140	175	18	1.1	0.6	40.5	51	6000	9000	7000	11000	275	1097	2397
71830C	150	190	20	1.1	0.6	56	69.5	6000	9000	7500	12000	281	955	1995
71830AC	150	190	20	1.1	0.6	52	64	5300	8000	6300	9500	386	1465	3145



# BEARING TYPE IDENTIFICATION

## 719 Series (Standard)

Contact angle  $\alpha = 15^\circ, 25^\circ$   
 Bore diameter 10-150 mm



ITEM	Key dimensions (mm)					Basic load rating (KN)		Limit speed (r/min)		Ceramic ball limit speed (r/min)		Preload (N)		
	Designation	d	D	B	r	r1	Cr	Cor	Oil	Grease	Oil	Grease	Light(A)	Medium(B)
71900C	10	22	6	0.3	0.1	3	1.53	70000	110000	90000	150000	14	51	114
71900AC	10	22	6	0.3	0.1	2.9	1.46	63000	95000	75000	120000	17	63	149
71901C	12	24	6	0.3	0.3	3.35	1.86	60000	90000	80000	130000	15	56	126
71901AC	12	24	6	0.3	0.3	3.2	1.76	56000	85000	67000	100000	19	67	162
71902C	15	28	7	0.3	0.3	5	2.9	50000	75000	67000	100000	20	77	167
71902AC	15	28	7	0.3	0.3	4.8	2.75	48000	70000	56000	85000	22	112	259
71903C	17	30	7	0.3	0.3	5.3	3.15	48000	70000	60000	90000	21	81	176
71903AC	17	30	7	0.3	0.3	5	3	43000	63000	50000	75000	23	116	268
71904C	20	37	9	0.3	0.3	7.35	4.55	38000	56000	50000	75000	41	137	297
71904AC	20	37	9	0.3	0.3	6.95	4.4	36000	53000	43000	63000	38	172	390
71905C	25	42	9	0.3	0.3	8.15	5.7	32000	48000	43000	63000	40	141	326
71905AC	25	42	9	0.3	0.3	7.8	5.5	30000	45000	36000	53000	40	189	430
71906C	30	47	9	0.3	0.3	8.65	6.55	28000	43000	36000	53000	42	158	345
71906AC	30	47	9	0.3	0.3	8.15	6.3	26000	40000	32000	48000	40	194	445
71907C	35	55	10	0.6	0.6	11.8	9.5	24000	38000	32000	48000	61	209	481
71907AC	35	55	10	0.6	0.6	11	9	22000	36000	26000	40000	61	276	619
71908C	40	62	12	0.6	0.6	17.6	13.7	22000	36000	28000	43000	85	300	633
71908AC	40	62	12	0.6	0.6	16.6	13.2	20000	34000	24000	38000	112	450	984
71909C	45	68	12	0.6	0.6	18.6	15.6	19000	32000	24000	38000	89	315	667
71909AC	45	68	12	0.6	0.6	17.6	15	18000	30000	22000	36000	116	473	1038
71910C	50	72	12	0.6	0.6	19	16.6	18000	30000	22000	36000	90	321	679
71910AC	50	72	12	0.6	0.6	18	15.6	16000	26000	20000	34000	118	482	1059
71911C	55	80	13	1	1	22.8	20.4	16000	26000	20000	34000	112	391	825
71911AC	55	80	13	1	1	21.6	19.3	15000	24000	18000	30000	149	592	1287
71912C	60	85	13	1	1	24	22.8	15000	24000	19000	32000	117	410	866
71912AC	60	85	13	1	1	22.8	21.6	14000	22000	17000	28000	156	622	1353
71913C	65	90	13	1	1	24.5	24	14000	22000	18000	30000	118	417	883

ITEM	Key dimensions (mm)					Basic load rating (KN)		Limit speed (r/min)		Ceramic ball limit speed (r/min)		Preload (N)		
	Designation	d	D	B	r	r1	Cr	Cor	Oil	Grease	Oil	Grease	Light(A)	Medium(B)
71913AC	65	90	13	1	1	22.8	22.4	13000	20000	15000	24000	153	617	1348
71914C	70	100	16	1	1	33.5	32.5	13000	20000	16000	26000	172	588	1230
71914AC	70	100	16	1	1	31.5	31	12000	19000	14000	22000	234	890	1917
71915C	75	105	16	1	1	34	34.5	12000	19000	16000	26000	174	596	1246
71915AC	75	105	16	1	1	32	32.5	11000	18000	13000	20000	236	901	1943
71916C	80	110	16	1	1	34.5	36	12000	19000	15000	24000	175	603	1262
71916AC	80	110	16	1	1	32.5	34	11000	18000	13000	20000	238	911	1969
71917C	85	120	18	1.1	1.1	45	46.5	11000	18000	13000	20000	239	804	1672
71917AC	85	120	18	1.1	1.1	42.5	44	9500	16000	12000	19000	336	1232	2631
71918C	90	125	13	1.1	1.1	45.5	49	10000	17000	13000	20000	240	811	1688
71918AC	90	125	13	1.1	1.1	43	46.5	9000	15000	11000	18000	337	1243	2655
71919C	95	130	18	1.1	1.1	46.5	51	9500	16000	12000	19000	245	827	1724
71919AC	95	130	18	1.1	1.1	44	48	8500	14000	10000	17000	343	1269	2713
71920C	100	140	20	1.1	1.1	58.5	64	9000	15000	11000	18000	318	1059	2194
71920AC	100	140	20	1.1	1.1	55	60	8000	13000	9500	16000	453	1626	3437
71921C	105	145	20	1.1	1.1	58.5	64	8500	14000	11000	18000	318	1059	2194
71921AC	105	145	20	1.1	1.1	55	60	7500	12000	9000	15000	453	1626	3437
71922C	110	150	20	1.1	1.1	58.5	67	8000	13000	10000	17000	316	1056	2191
71922AC	110	150	20	1.1	1.1	56	63	7500	12000	9000	15000	458	1651	3495
71924C	120	165	22	1.1	1.1	73.5	85	7000	11000	9000	15000	408	1344	2773
71924AC	120	165	22	1.1	1.1	69.5	80	6700	10000	8000	13000	591	2087	4388
71926C	130	180	24	1.5	1.5	86.5	100	6700	10000	8500	14000	489	1600	3291
71926AC	130	180	24	1.5	1.5	81.5	95	6000	9000	7000	11000	714	2477	5193
71928C	140	190	24	1.5	1.5	90	108	6000	9000	7500	12000	506	1661	3412
71928AC	140	190	24	1.5	1.5	85	102	5600	8500	6700	10000	740	2576	5405
71930C	150	210	28	2	1	122	143	5600	8500	7000	11000	710	2286	4680
71930AC	150	210	28	2	1	114	134	5000	7500	6000	9000	1046	3541	7369



# BEARING TYPE IDENTIFICATION

## 70Series (Standard)

Contact angle  $\alpha = 15^\circ, 25^\circ$   
 Bore diameter 6-150mm



ITEM	Key dimensions (mm)					Basic load rating (KN)		Limit speed (r/min)		Ceramic ball limit speed (r/min)		Preload (N)		
	Designation	d	D	B	r	r1	Cr	Cor	Oil	Grease	Oil	Grease	Light(A)	Medium(B)
706C	6	17	6	0.3	0.3	2.36	0.97	95000	160000	120000	190000			
706AC	6	17	6	0.3	0.3	2.28	0.93	85000	140000	100000	170000			
708C	8	22	7	0.3	0.3	3.8	1.73	75000	120000	95000	160000			
708AC	8	22	7	0.3	0.3	3.75	1.66	67000	100000	80000	130000			
7000C	10	26	8	0.3	0.3	4.25	2.08	60000	90000	80000	130000	17	67	145
7000AC	10	26	8	0.3	0.3	4.05	2	56000	85000	67000	100000	22	100	224
7001C	12	28	8	0.3	0.3	4.75	2.6	56000	85000	70000	110000	19	74	161
7001AC	12	28	8	0.3	0.3	4.55	2.5	50000	75000	60000	90000	23	110	250
7002C	15	32	9	0.3	0.3	6.2	3.4	48000	70000	60000	90000	28	102	216
7002AC	15	32	9	0.3	0.3	6	3.25	43000	63000	50000	75000	36	154	344
7003C	17	35	10	0.3	0.3	8.65	4.9	43000	63000	53000	80000	41	146	308
7003AC	17	35	10	0.3	0.3	8.3	4.75	38000	56000	45000	67000	54	221	487
7004C	20	42	12	0.6	0.6	10.4	6	36000	53000	45000	67000	52	179	377
7004AC	20	42	12	0.6	0.6	10	5.7	32000	48000	38000	56000	71	277	598
7005C	25	47	12	0.6	0.6	14.6	9.15	30000	45000	38000	56000	74	254	533
7005AC	25	47	12	0.6	0.6	13.7	8.65	28000	43000	34000	50000	101	384	828
7006C	30	55	13	1	1	15	10.2	26000	40000	32000	48000	75	260	545
7006AC	30	55	13	1	1	14.3	9.8	24000	38000	28000	43000	102	397	861
7007C	35	62	14	1	1	19	13.7	22000	36000	28000	43000	97	333	697
7007AC	35	62	14	1	1	18.3	12.9	20000	34000	24000	38000	136	518	1116
7008C	40	68	15	1	1	20.4	16	20000	34000	26000	40000	102	353	743
7008AC	40	68	15	1	1	19.6	15	19000	32000	22000	36000	142	547	1180
7009C	45	75	16	1	1	27.5	21.2	18000	30000	24000	38000	145	490	1019
7009AC	45	75	16	1	1	26.5	20	17000	28000	20000	34000	209	768	1638
7010C	50	80	16	1	1	28.5	22.8	17000	28000	22000	36000	150	507	1054
7010AC	50	80	16	1	1	27	21.6	15000	24000	18000	30000	211	779	1663
7011C	55	90	18	1.1	1.1	38	31	15000	24000	19000	32000	207	687	1424
7011AC	55	90	18	1.1	1.1	36	29	14000	22000	17000	28000	298	1066	2257
7012C	60	95	18	1.1	1.1	39	33.5	14000	22000	18000	30000	211	704	1459

ITEM	Key dimensions (mm)					Basic load rating (KN)		Limit speed (r/min)		Ceramic ball limit speed (r/min)		Preload (N)		
	Designation	d	D	B	r	r1	Cr	Cor	Oil	Grease	Oil	Grease	Light(A)	Medium(B)
7012AC	60	95	18	1.1	1.1	36.5	31.5	13000	20000	15000	24000	299	1075	2281
7013C	65	100	18	1.1	1.1	40	35.5	13000	20000	17000	28000	216	720	1495
7013AC	65	100	18	1.1	1.1	38	33.5	12000	19000	15000	24000	310	1118	2372
7014C	70	110	20	1.1	1.1	50	43	12000	19000	16000	26000	278	915	1888
7014AC	70	110	20	1.1	1.1	46.5	41.5	11000	18000	13000	20000	398	1397	2945
7015C	75	115	20	1.1	1.1	51	46.5	12000	19000	15000	24000	283	931	1923
7015AC	75	115	20	1.1	1.1	48	44	11000	18000	13000	20000	408	1439	3027
7016C	80	125	22	1.1	1.1	63	58.5	11000	18000	14000	22000	357	1163	2391
7016A	80	125	22	1.1	1.1	60	55	9500	16000	12000	19000	529	1830	3825
7017C	85	130	22	1.1	1.1	65.5	62	10000	17000	13000	20000	370	1209	2484
7017AC	85	130	22	1.1	1.1	62	58.5	9000	15000	11000	18000	545	1888	3949
7018C	90	140	24	1.5	1.5	76.5	72	9500	16000	12000	19000	440	1427	2925
7018AC	90	140	24	1.5	1.5	72	68	8500	14000	10000	17000	649	2217	4623
7019C	95	145	24	1.5	1.5	78	76.5	9000	15000	11000	18000	447	1452	2980
7019AC	95	145	24	1.5	1.5	75	72	8000	13000	9500	16000	675	2308	4813
7020C	100	150	24	1.5	1.5	81.5	81.5	8500	14000	11000	18000	467	1516	3112
7020AC	100	150	24	1.5	1.5	76.5	76.5	7500	12000	9000	15000	685	2347	4902
7021C	105	160	26	2	2	106	102	8000	13000	10000	17000	625	1999	4083
7021AC	105	160	26	2	2	102	98	7000	11000	8500	14000	960	3206	6639
7022C	110	170	28	2	2	110	110	7500	12000	9500	16000	648	2072	4235
7022AC	110	170	28	2	2	104	104	6700	10000	8000	13000	975	3262	6760
7024C	120	180	28	2	2	112	116	6700	10000	8500	14000	657	2107	4308
7024AC	120	180	28	2	2	106	110	6300	9500	7500	12000	989	3317	6881
7026C	130	200	33	2	2	143	150	6000	9000	7500	12000	857	2720	5545
7026AC	130	200	33	2	2	137	143	5600	8500	6700	10000	1322	4358	8972
7028C	140	210	33	2	2	146	160	5600	8500	7000	11000	873	2775	5657
7028AC	140	210	33	2	2	140	150	5000	7500	6300	9500	1345	4446	9159
7030C	150	225	35	2.1	2.1	183	193	5300	8000	6700	10000	1111	3503	7142
7030AC	150	225	35	2.1	2.1	173	186	4800	7000	5600	8500	1705	5555	11417



# BEARING TYPE IDENTIFICATION

## 72 Series (Standard)

Contact angle  $\alpha = 15^\circ, 25^\circ$   
**Bore diameter 10-130 mm**



ITEM	Key dimensions (mm)					Basic load rating (KN)		Limit speed (r/min)		Ceramic ball limit speed (r/min)		Preload (N)		
	Designation	d	D	B	r	r1	Cr	Cor	Oil	Grease	Oil	Grease	Light(A)	Medium(B)
7200C	10	30	9	0.6	0.6	5.85	2.9	56000	85000	70000	110000	25	92	198
7200AC	10	30	9	0.6	0.6	5.6	2.8	50000	75000	60000	90000	31	139	312
7201C	12	32	10	0.6	0.6	7.65	3.9	50000	75000	63000	95000	35	124	264
7201AC	12	32	10	0.6	0.6	7.35	3.75	45000	67000	56000	85000	47	191	420
7202C	15	35	11	0.6	0.6	9.65	5	45000	67000	56000	85000	47	165	347
7202AC	15	35	11	0.6	0.6	9.3	4.8	40000	60000	48000	70000	65	256	555
7203C	17	40	12	0.6	0.6	10.8	5.85	38000	56000	50000	75000	53	186	391
7203AC	17	40	12	0.6	0.6	10.4	5.6	36000	53000	43000	63000	75	289	626
7204C	20	47	14	1	1	14.6	8.15	32000	48000	43000	63000	74	252	527
7204AC	20	47	14	1	1	14	7.8	30000	45000	36000	53000	105	393	843
7205C	25	52	15	1	1	15.6	9.3	28000	43000	36000	53000	79	269	562
7205AC	25	52	15	1	1	15	9	26000	40000	32000	48000	113	420	901
7206C	30	62	16	1	1	23.2	14.6	24000	38000	30000	45000	122	412	856
7206AC	30	62	16	1	1	22	14	22000	36000	26000	40000	175	637	1357
7207C	35	72	17	1.1	1.1	25.5	18	20000	34000	26000	40000	136	454	942
7207AC	35	72	17	1.1	1.1	24.5	17	19000	32000	22000	36000	197	714	1521
7208C	40	80	18	1.1	1.1	32	22.4	18000	30000	24000	38000	176	584	1204
7208AC	40	80	18	1.1	1.1	30.5	21.6	17000	28000	20000	34000	259	912	1925
7209C	45	85	19	1.1	1.1	33.5	24.5	17000	28000	22000	36000	184	607	1252
7209AC	45	85	19	1.1	1.1	32	23.6	15000	24000	18000	30000	270	955	2016
7210C	50	90	20	1.1	1.1	43	31.5	16000	26000	20000	34000	242	792	1631
7210AC	50	90	20	1.1	1.1	40.5	30.5	14000	22000	17000	28000	355	1230	2583
7211C	55	100	21	1.5	1.5	46.5	37.5	14000	22000	18000	30000	261	849	1750
7211AC	55	100	21	1.5	1.5	44	35.5	13000	20000	15000	24000	381	1331	2797
7212C	60	110	22	1.5	1.5	55	44	13000	20000	16000	26000	315	1022	2100

ITEM	Key dimensions (mm)					Basic load rating (KN)		Limit speed (r/min)		Ceramic ball limit speed (r/min)		Preload (N)		
	Designation	d	D	B	r	r1	Cr	Cor	Oil	Grease	Oil	Grease	Light(A)	Medium(B)
7212AC	60	110	22	1.5	1.5	52	42.5	12000	19000	14000	22000	467	1599	3333
7213C	65	120	23	1.5	1.5	57	48	12000	19000	15000	24000	325	1051	2163
7213AC	65	120	23	1.5	1.5	54	45.5	11000	18000	13000	20000	482	1656	3455
7214C	70	125	24	1.5	1.5	69.5	58.5	11000	18000	14000	22000	404	1301	2664
7214AC	70	125	24	1.5	1.5	65.5	56	10000	17000	12000	19000	600	2030	4233
7215C	75	130	25	1.5	1.5	72	63	11000	18000	14000	22000	416	1346	2757
7215AC	75	130	25	1.5	1.5	68	60	9500	16000	12000	19000	619	2103	4389
7216C	80	140	26	2	2	73.5	68	10000	17000	12000	19000	424	1354	2701
7216AC	80	140	26	2	2	71	64	9000	15000	11000	18000	662	2249	4899
7217C	85	150	28	2	2	96.5	85	9000	15000	11000	18000	573	1825	3734
7217AC	85	150	28	2	2	91.5	80	8000	13000	10000	17000	869	2889	5972
7218C	90	160	30	2	2	122	104	8500	14000	11000	18000	738	2332	4746
7218AC	90	160	30	2	2	116	100	7500	12000	9000	15000	1136	3717	7651
7219C	95	170	32	2.1	2.1	127	114	8000	13000	10000	17000	768	2426	4937
7219AC	95	170	32	2.1	2.1	122	108	7000	11000	8500	14000	1193	3906	8042
7220C	100	180	34	2.1	2.1	132	122	7500	12000	9500	16000	796	2519	5128
7220AC	100	180	34	2.1	2.1	125	116	6700	10000	8000	13000	1217	3994	8229
7221C	105	190	36	2.1	2.1	163	146	7000	11000	9000	15000	997	3140	6377
7221AC	105	190	36	2.1	2.1	156	140	6300	9500	7500	12000	1558	5040	10337
7222C	110	200	38	2.1	2.1	163	150	6700	10000	8500	14000	997	3139	6376
7222AC	110	200	38	2.1	2.1	153	143	6000	9000	7000	11000	1525	4939	10131
7224C	120	215	40	2.1	2.1	204	196	6000	9000	7500	12000	1269	3957	8038
7224AC	120	215	40	2.1	2.1	196	186	5300	8000	6300	9500	2003	6418	13107
7226C	130	230	40	3	3	212	216	5600	8500	7000	11000	1316	4108	8347
7226AC	130	230	40	3	3	204	204	5000	7500	6000	9000	2079	6671	13628



## BEARING TYPE IDENTIFICATION

### H70 Series (Standard)

### BNR Series



ITEM	Key dimensions (mm)			Limit speed (r/min)	Preload	Application
Designation	d	D	B	Single	N	
H7000 2RZ	10	26	8	90000	17	Motor spindle
H7001 2RZ	12	28	8	90000	19	Motor spindle
H7002 2RZ	15	32	9	68000	28	Motor spindle
H7003 2RZ	17	35	10	63000	41	Motor spindle
H7004 2RZ	20	42	12	54000	52	Motor spindle
H7005 2RZ	25	47	12	46000	74	Motor spindle
H7006 2RZ	30	55	13	39000	75	Motor spindle
H7007 2RZ	35	62	14	34000	97	Motor spindle
H7008 2RZ	40	68	15	30000	102	Motor spindle
H7009 2RZ	45	75	16	27000	145	Motor spindle
H7010 2RZ	50	80	16	25000	150	Motor spindle
H7011 2RZ	55	90	18	24000	207	Motor spindle
H7012 2RZ	60	95	18	20000	211	Motor spindle
H7014 2RZ	70	110	20	18000	278	Motor spindle
H7016 2RZ	80	125	22	16000	357	Motor spindle
H71900 2RZ	10	22	6	100000	14	Motor spindle
H71901 2RZ	12	24	6	90000	15	Motor spindle
H71902 2RZ	15	28	7	75000	20	Motor spindle
H71903 2RZ	17	30	7	70000	21	Motor spindle
H71904 2RZ	20	37	9	56000	41	Motor spindle
H71905 2RZ	25	42	9	49000	40	Motor spindle
H71906 2RZ	30	47	9	41000	42	Motor spindle
H71907 2RZ	35	55	10	36000	61	Motor spindle
H71908 2RZ	40	62	12	32000	85	Motor spindle
H71909 2RZ	45	68	12	29000	89	Motor spindle
H71910 2RZ	50	72	12	26000	90	Motor spindle
H71911 2RZ	55	80	13	24000	112	Motor spindle
H71912 2RZ	60	85	13	22000	117	Motor spindle

ITEM	Key dimensions (mm)					Load rating (KN)		Speed (r/m)	
Designation	d	D	B	r1	r2	Cr	Cor	Grease	Oil
30BNR10S	30	55	13	1	0.6	8.65	5.75	33000	47100
35BNR10S	35	62	14	1	0.6	10.1	7.1	28900	41300
40BNR10S	40	68	15	1	0.6	10.6	7.95	26000	37100
45BNR10S	45	75	16	1	0.6	11.7	9	23400	33400
50BNR10S	50	80	16	1	0.6	12.2	9.9	21600	30800
55BNR10S	55	90	18	1.1	0.6	15.1	12.5	19400	27600
60BNR10S	60	95	18	1.1	0.6	15.6	13.7	18100	25900
65BNR10S	65	100	18	1.1	0.6	16.2	14.8	17000	24300
70BNR10S	70	110	20	1.1	0.6	22.3	19.8	15600	22300
75BNR10S	75	115	20	1.1	0.6	22.6	20.7	14800	21100
80BNR10S	80	125	22	1.1	0.6	26.5	24.5	13700	19600
85BNR10S	85	130	22	1.1	0.6	26.8	25.7	13100	18700
90BNR10S	90	140	24	1.5	1	35	33	12200	17400
95BNR10S	95	145	24	1.5	1	35.5	34.5	11700	16700
100BNR10S	100	150	24	1.5	1	36	36	11200	16000
105BNR10S	105	160	26	2	1	41	41	10600	15100
110BNR10S	110	170	28	2	1	46	47	10000	14300
120BNR10S	120	180	28	2	1	47.5	50.5	9400	13400
130BNR10S	130	200	33	2	1	60	61.5	8500	12200
140BNR10S	140	210	33	2	1	62.5	66.5	8000	11500
150BNR10S	150	225	35	2.1	1	73.5	78	7500	10700

## BEARING TYPE IDENTIFICATION

### B70 Series (Improved: Oil Lubrication)

Contact angle  $\alpha = 15^\circ$   
Bore diameter 10 - 60 mm

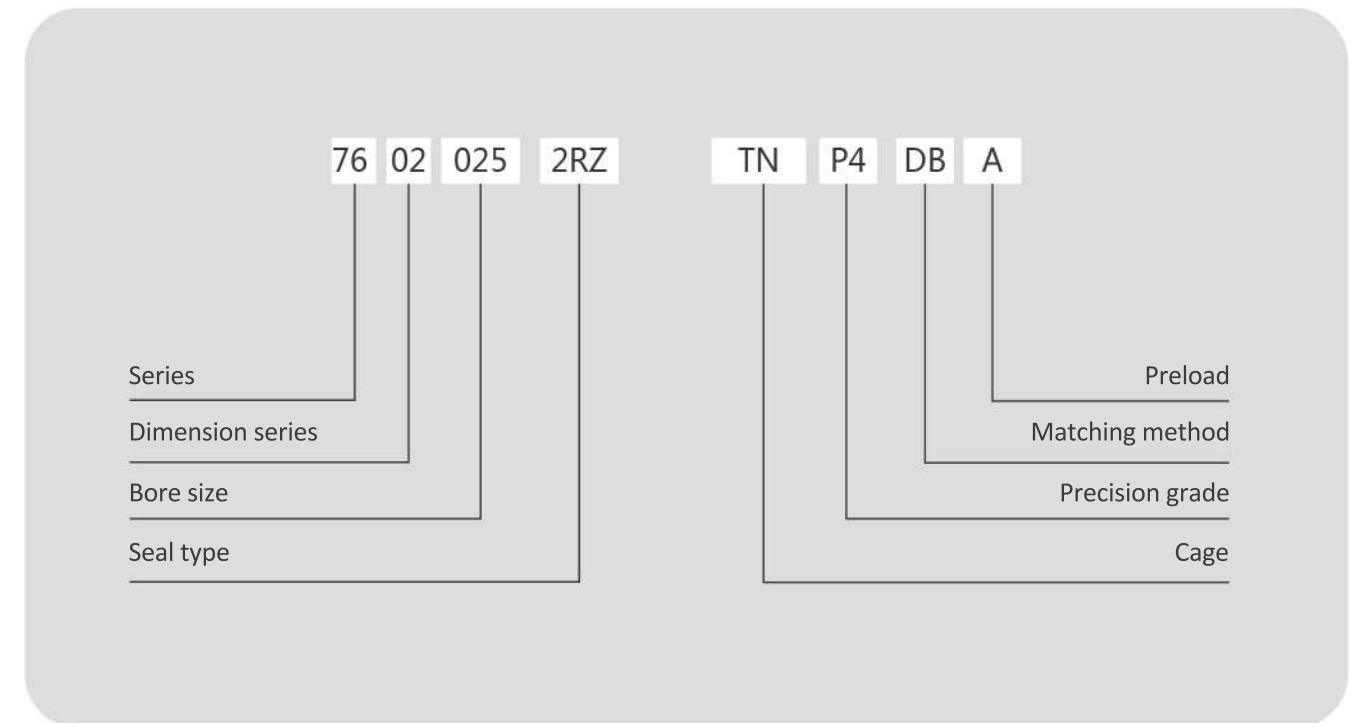


ITEM	Key dimensions (mm)					Basic load rating (KN)		Limit speed (r/min)		Preload (N)		
	Designation	d	D	B	r	r1	Cr	Cor	Grease	Oil	Light(A)	Medium(B)
B7000 C	10	26	8	0.3	0.15	3	1.2	80000	130000	17	67	145
B7000 C HQ1	10	26	8	0.3	0.15	3	1.2	100000	160000	22	100	224
B7001 C	12	28	8	0.3	0.15	3.3	1.3	70000	110000	19	74	161
B7001 C HQ1	12	28	8	0.3	0.15	3.3	1.3	85000	130000	23	110	250
B7002 C	15	32	9	0.3	0.15	3.6	1.6	60000	90000	28	102	216
B7002 C HQ1	15	32	9	0.3	0.15	3.6	1.6	75000	110000	36	154	344
B7003 C	17	35	10	0.3	0.15	3.9	1.7	53000	80000	41	146	308
B7003 C HQ1	17	35	10	0.3	0.15	3.9	1.7	67000	100000	54	221	487
B7004 C	20	42	12	0.6	0.15	5.7	2.7	45000	67000	52	179	377
B7004 C HQ1	20	42	12	0.6	0.15	5.7	2.7	56000	85000	71	277	598
B7005 C	25	47	12	0.6	0.15	7.4	3.8	38000	56000	74	254	533
B7005 C HQ1	25	47	12	0.6	0.15	7.4	3.8	45000	67000	101	384	828
B7006 C	30	55	13	1	0.3	9.1	4.8	32000	48000	75	260	545
B7006 C HQ1	30	55	13	1	0.3	9.1	4.8	38000	56000	102	397	861
B7007 C	35	62	14	1	0.3	10.9	6	28000	43000	97	333	697
B7007 C HQ1	35	62	14	1	0.3	10.9	6	34000	53000	136	518	1116
B7008 C	40	68	15	1	0.3	12.9	7.4	26000	40000	102	353	743
B7008 C HQ1	40	68	15	1	0.3	12.9	7.4	32000	48000	142	547	1180
B7009 C	45	75	16	1	0.3	15	9	24000	38000	145	490	1019
B7009 C HQ1	45	75	16	1	0.3	15	9	30000	45000	209	768	1638
B7010 C	50	80	16	1	0.3	15.9	10	22000	36000	150	507	1054
B7010 C HQ1	50	80	16	1	0.3	15.9	10	26000	43000	211	779	1663
B7011 C	55	90	18	1.1	0.6	19.9	12.9	19000	32000	207	687	1424
B7011 C HQ1	55	90	18	1.1	0.6	19.9	12.9	22000	38000	298	1066	2257
B7012 C	60	95	18	1.1	0.6	20.4	13.6	18000	30000	211	704	1459
B7012 C HQ1	60	95	18	1.1	0.6	20.4	13.6	21000	36000	299	1075	2281

## ANGULAR CONTACT THRUST BALL BEARING

### Ball Screw Support Bearings

#### Designation



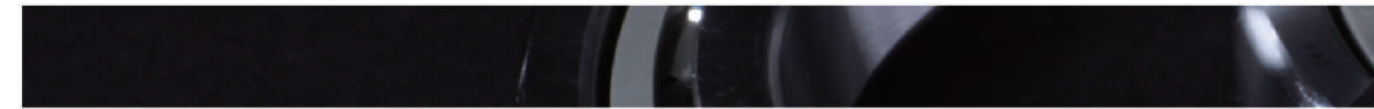
76	Series	76: Angular contact thrust ball bearing with contact angle 60°
02	Dimension series	'02: Width series 0, diameter 2 series; 03: Width series 0, diameter 3 series
025	Bore diameter	'025: Bore diameter 25mm
2RZ	Seal type	No marks: Open type; 2RZ: Non-contact NBR seals; 2RS: Contact NBR seals
TN	Cage	TN: Nylon cage with guidance on ball retaining
P4	Precision grade	P2: Tolerance P2 corresponds to ISO 2 grade; P4: Tolerance P4 corresponds to ISO4; P5: Tolerance P5 corresponds to ISO5;
DB	Matching method	G: Single row universal matching; DU: Double row universal matching; DB: Back to back matching (pair); DF: Face to face pair matching; DT: Parataxis pair matching
A	Preload	A: Light preload; B: Medium preload; C: Heavy preload;
Remarks		



# BEARING TYPE IDENTIFICATION

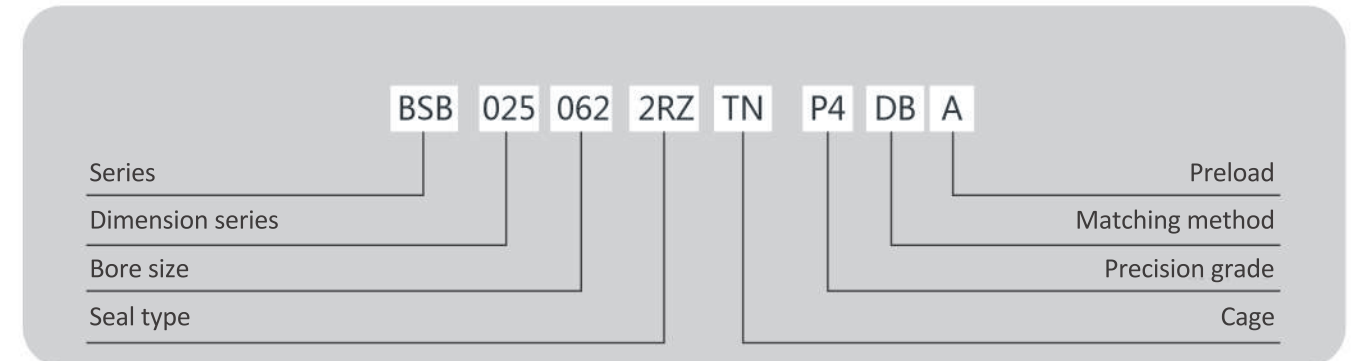
## 760 Series

Contact angle  $\alpha = 60^\circ$   
Bore diameter 12 - 100 mm



ITEM	Exchangeable code	Key dimensions (mm)					Basic load rating (KN)		Greased limit speed (r/min)	Seal type
Designation		d	D	B	r	r1	Ca	Coa		
7602012	760201	12	32	10	0.6	0.6	12.2	20.7	8000	✓
7602015	760202	15	35	11	0.6	0.6	13.1	24.7	6700	✓
7602017	760203	17	40	12	0.6	0.6	17.2	32.5	6000	✓
7602020	760204	20	47	14	1	1	19.1	38	5000	✓
7603020	760304	20	52	15	1.1	1.1	25.5	53	4500	✓
7602025	760205	25	52	15	1	1	23.2	50	4500	✓
7603025	760305	25	62	17	1.1	1.1	29.5	68	3800	✓
7602030	760206	30	62	16	1	1	27.5	66	3800	✓
7603030	760306	30	72	19	1.1	1.1	36.5	89	3200	✓
7602035	760207	35	72	17	1.1	1.1	31.5	81	3200	✓
7603035	760307	35	80	21	1.5	1.5	38	100	3000	✓
7602040	760208	40	80	18	1.1	1.1	39	106	2800	✓
7603040	760308	40	90	23	1.5	1.5	52	138	2600	✓
7602045	760209	45	85	19	1.1	1.1	39.5	111	2600	✓
7603045	760309	45	100	25	1.5	1.5	62	172	2200	✓
7602050	760210	50	90	20	1.1	1.1	41	122	2400	✓
7603050	760310	50	110	27	2	2	72	203	2000	✓
7602055	760211	55	100	21	1.5	1.5	42	132	2200	✓
7603055	760311	55	120	29	2	2	85	255	1900	✓
7602060	760212	60	110	22	1.5	1.5	58	183	2000	✓
7603060	760312	60	130	31	2.1	2.1	92	270	1800	✓
7602065	760213	65	120	23	1.5	1.5	60	197	1800	✓
7603065	760313	65	140	33	2.1	2.1	106	330	1600	✓
7602070	760214	70	125	24	1.5	1.5	68	220	1800	✓
7603070	760314	70	150	35	2.1	2.1	117	360	1600	✓
7602075	760215	75	130	25	1.5	1.5	70	236	1600	✓
7603075	760315	75	160	37	2.1	2.1	132	425	1400	✓
7602080	760216	80	140	26	2	2	81	275	1500	✓
7603080	760316	80	170	39	2.1	2.1	144	465	1400	✓
7602085	760217	85	150	28	2	2	95	340	1400	✓
7603085	760317	85	180	41	3	3	169	550	1300	✓
7602090	760218	90	160	30	2	2	102	365	1300	✓
7603090	760318	90	190	43	3	3	172	580	1200	✓
7602095	760219	95	170	32	2.1	2.1	116	410	1300	✓
7603095	760319	95	200	45	3	3	175	600	1200	✓
7602100	760220	100	180	34	2.1	2.1	128	465	1200	✓
7603100	760320	100	215	47	3	3	201	700	1100	✓

## Designation



BSB	Series	BSB: Angle contact 60° angular contact thrust ball bearing specially used for ball screws
025	Dimension series	025: Inner ring diameter 25 mm
062	Bore diameter	062: Outer ring diameter 62 mm
2RZ	Seal type	No marks: Open type; 2RZ: Non-contact NBR seals; 2RS: Contact NBR seals
TN	Cage	TN: Nylon cage with guidance on ball retaining
P4	Precision grade	P2: Tolerance P2 corresponds to ISO 2 grade; P4: Tolerance P4 corresponds to ISO4; P5: Tolerance P5 corresponds to ISO5;
DB	Matching method	G: Single row universal matching; DU: Double row universal matching; DB: Back to back matching (pair); DF: Face to face pair matching; DT: Parataxis pair matching
A	Preload	A: Light preload; B: Medium preload; C: Heavy preload;
Remarks		

## Ball Screw Support Bearings (BSB Series)

Contact angle  $\alpha = 60^\circ$   
Bore diameter 15-100mm

ITEM	Exchangeable code	Key dimensions (mm)					Basic load rating (KN)		Greased limit speed (r/min)	Seal type
Designation		d	D	B	r	r1	Ca	Coa		
BS1547	15TAC47B	15	47	15	1	0.6	20.5	27	12000	✓
BS1747	17TAC47B	17	47	15	1	0.6	20.8	27	12000	✓
BSB020047	20TAC47B	20	47	15	1	1	20.8	43	5600	✓
BSB025062	25TAC62B	25	62	15	1	1	29.5	68	4300	✓
BSB030062	30TAC62B	30	62	15	1	1	27.5	66	4200	✓
BSB035072	35TAC72B	35	72	15	1	1	31.5	81	3700	✓
BSB040072	40TAC72B	40	72	15	1	1	29.5	82	3500	✓
BSB040090	40TAC90B	40	90	20	1.5	1.5	52	138	3100	✓
BSB045075	45TAC75B	45	75	15	1	1	30	85	3300	✓
BSB045100	45TAC100B	45	100	20	1.5	1.5	62	172	2700	✓
BSB050100	50TAC100B	50	100	20	1.5	1.5	62	172	2700	✓
BSB055090	55TAC90B	55	90	15	1	1	33.5	98	2800	✓
BSB055120	55TAC120B	55	120	20	2	2	63	188	2400	✓
BSB060120	60TAC120B	60	120	20	1.5	1.5	64	196	2300	✓
BSB075110	75TAC110B	75	110	15	1.5	1.5	37	133	2300	✓
BSB100150	100TAC150B	100	150	22.5	2	2	73	265	1800	✓

**GIL**  
**HIGH PRECISION DEEP**  
**GROOVE BALL BEARING**  
**BEARING**

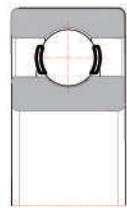
- Deep groove ball bearing
- Ring and ball materials
- Compound ball bearing
- Cage material
- Clearance



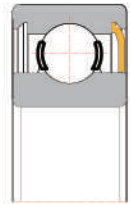
## DEEP GROOVE BALL BEARING

### 60../62..Series

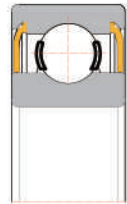
Reference speed coefficient: 0.6 · 106mm/min (steel cage)



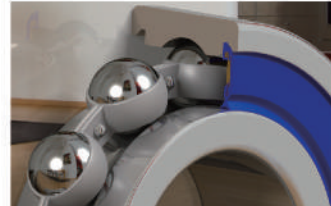
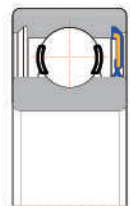
### Z series



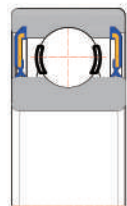
### ZZ series



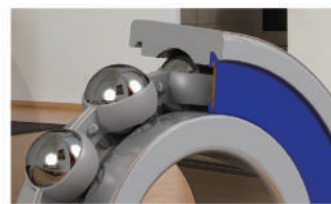
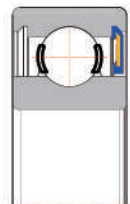
### R Sseries



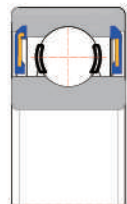
### 2RS series



### RZ series



### 2RZ series



## MATERIAL RINGS AND BALLS

GIL deep groove ball bearing components are manufactured exclusively from high-quality materials and processing techniques. The highest standards of quality assure the best possible performance efficiency and optimal service life.

### Rings and balls (standard material)



#### Material

Bearing steel (chrome steel) Gcr15  
Material no. 100Cr6, SAE 52100, SUJ2  
Special steels on request

#### Permissible operating temperature

BHeat treated for continuous operating temperatures up to 150°C

#### Hardness

60 to 64 HRC, fully hardened; corresponds to 700–800 HV30

#### Characteristics

High purity and homogeneity, vacuum-degassed

## COMPOUND BALL BEARING

Compound (Hybrid) ball bearings are characterized by a combination of materials; bearing steel (inner and outer rings) and ceramic (balls). The material-based characteristics of ceramic balls (in comparison to bearings with steel balls) offer clear performance improvements, especially under intense operational conditions in machine utilization.

### Balls (hybrid ball bearings)

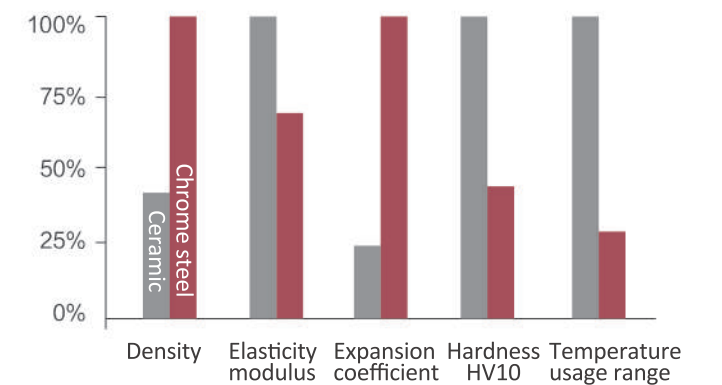
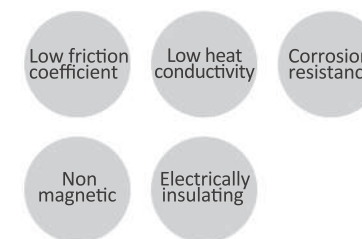
#### Material

Ceramic (silicon nitride Si3N4)



#### Material characteristics

Low chemical affinity to Gcr15



## MATERIAL CAGE

GIL high precision deep groove ball bearings are basically fit with a steel cage (J cage). Depending on specific requirements (e.g. high speeds), cages made of other materials are available.

### Steel cage



**Material**  
Sheet steel

**Permissible operating temperature**  
220°C

**Manufacture**  
two piece, tab-clamped or riveted

### TN nylon cage



**Material**  
Polyamide (fiberglass reinforced)

**Permissible operating temperature**  
140°C

**Manufacture**  
single piece, crown cage

### TU cage



**Material**  
TW241F6

**Permissible operating temperature**  
120°C

**Manufacture**  
single piece, crown cage

### TA, TB Bakelite cage



**Material**  
Laminated phenolic resin

**Permissible operating temperature**  
120°C

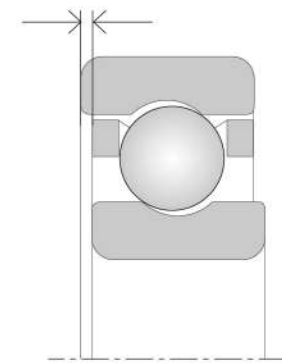
**Manufacture**  
two piece, riveted

## CLEARANCE

GIL deep groove ball bearing components are manufactured exclusively from high-quality materials and processing techniques. The highest standards of quality assure the best possible performance efficiency and optimal service life.

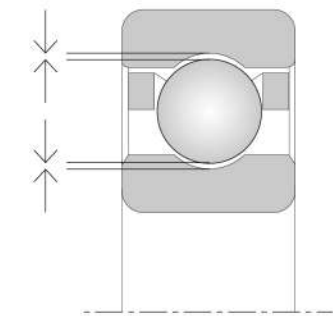
### Axial clearance

left and right displacement of the outer ring relative to the fixed inner ring



### Radial clearance

Displacement of the outer ring up and down relative to the fixed inner ring



### Deep groove ball bearings: Radial clearance (per DIN 620/Part 4)

Bore diameter d [mm]		Radial clearance [μm]							
over	including	C2		CN		C3		C4	
		min	max	min	max	min	max	min	max
1.5	6	0	7	2	13	8	23	-	-
6	10	0	7	2	13	8	23	14	29
10	18	0	9	3	18	11	25	18	33
18	24	0	10	5	20	13	28	20	36
24	30	1	11	5	20	13	28	23	41
30	40	1	11	6	20	15	33	28	46

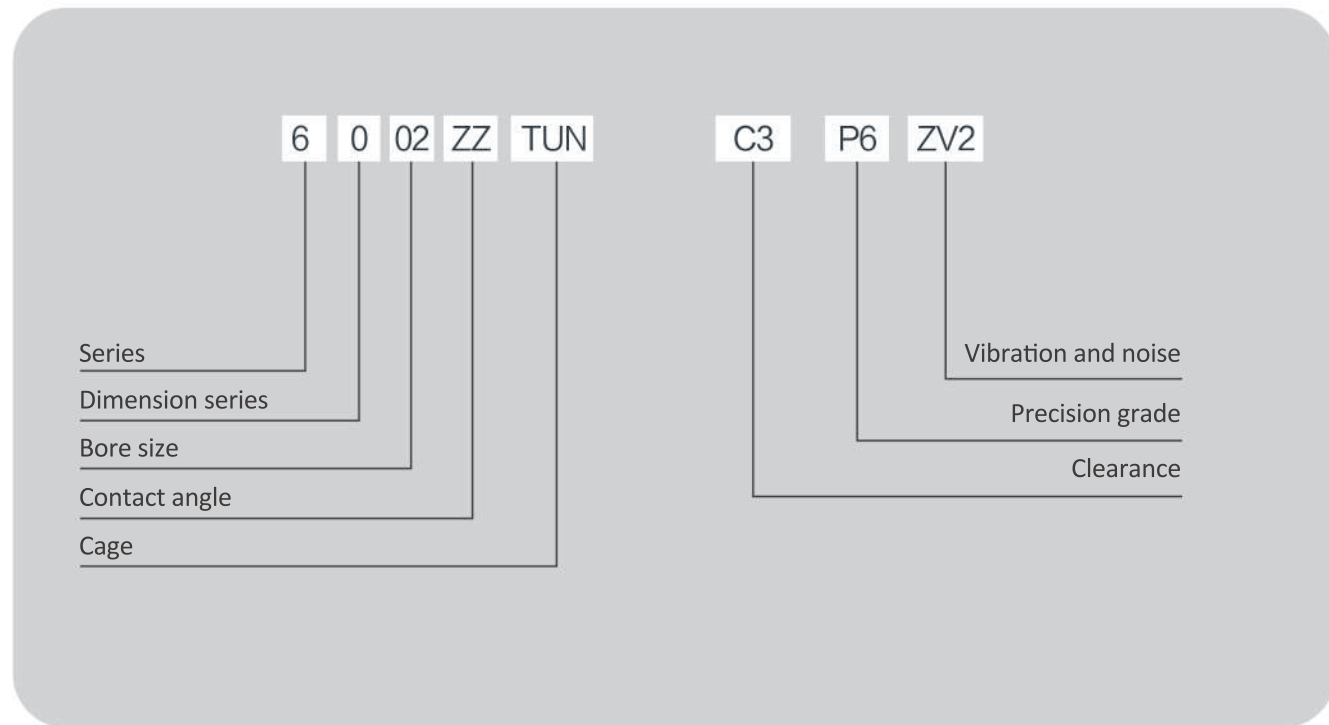
Without a clearance specification are refer to CN specification (standard clearance).



## BEARING TYPE IDENTIFICATION

### High Precision Deep Groove Ball Bearing

#### Designation



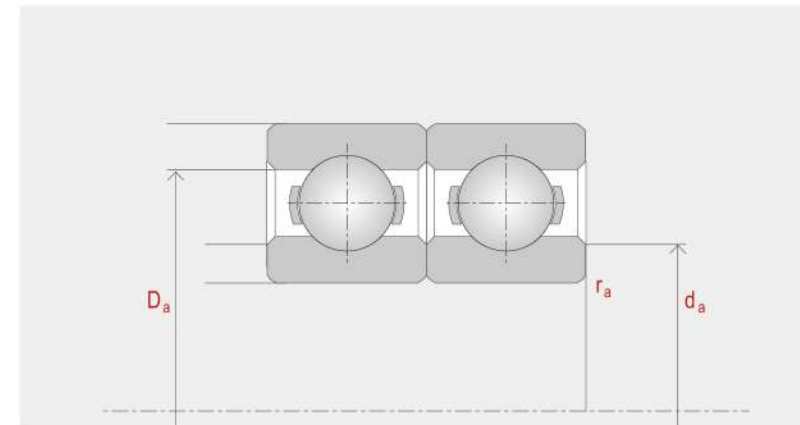
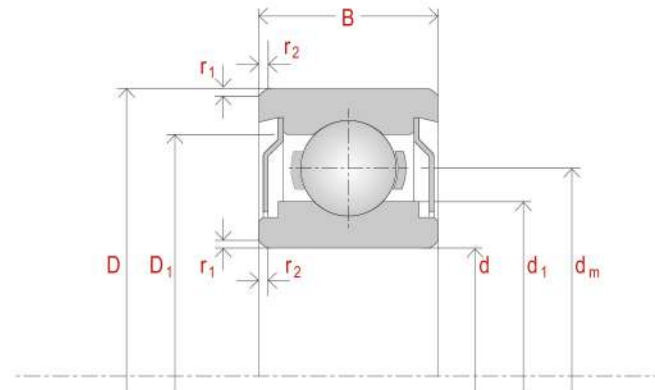
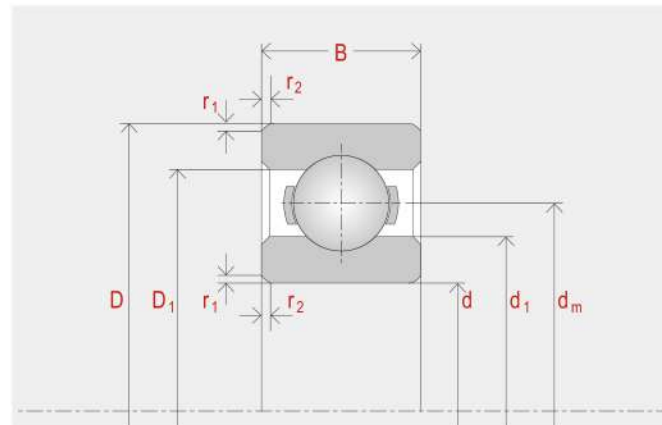
6	Series	Deep groove ball bearing
0	Dimension series	'0: 10 series; 2: 02 series; 18: 18 series; 19: 19 series
02	Bore diameter	'Below 03: 00-10mm; 01: 12mm; 02: 15mm; 03: 17mm; above04: i.d.= bore dia.x5 (mm)
ZZ	Shield/Seal type	No marks: Open type; ZZ: shields on both sides; 2RS: Contact NBR seals on both sides;
TUN	Cage	No marks: Revited cage; TN: Nylon cage; TUN: Silent nylon cageh sides;
C3	Clearance	C0, C2, C3, C4
P6	Precision grade	No marks: tolerance P0 grade; P6: tolerance Class 6, ABEC-3; P5: Class 5, ABEC-5; P4: Class 4 corresponds to ABEC 7 per ABMA standards
ZV2	Vibration and noise	Z2, Z3, Z4, V2, V3, V4

#### GIL HIGH PRECISION DEEP GROOVE BALL BEARING BEARING DATA

- Bore diameter 5 - 120 mm
- Boundary size
- Abutment
- Weight
- Load rating
- Speed value

# BEARING TYPE IDENTIFICATION

## Bearing data Bore diameter 9 - 10 mm



### Boundary dimensions

d	[mm]	Bore diameter
D	[mm]	Outer diameter
B	[mm]	Width of single bearing

### Balls

dm	[mm]	Pitch circle diameter
Dw	[mm]	Ball diameter
Z	pieces	Number of balls

### Dimensions

d1	[mm]	Outer diameter of inner ring
D1	[mm]	Inner diameter of outer ring
r1,2	[mm]	Chamfer (min)

### Abutment dimensions

ra max	[mm]	Undercut of associated component
da min.	[mm]	Abutment diameter inner ring
Da max	[mm]	Abutment diameter outer ring

m [kg] Bearing weight

### Basic load rating

C	[N]	Dynamic load rating
C0	[N]	Static load rating, steel balls
C0 HY	[N]	Static load rating, Si <sub>3</sub> N <sub>4</sub> balls

n<sub>grease</sub> [1/min] Speed with grease lubrication and sheet steel cage

Designation	Boundary dimensions			Balls		Dimensions			Abutment dimensions			Weight	Load rating		Speed value	Designation
	d	D	B	D <sub>w</sub>	Z	d <sub>1</sub>	D <sub>1</sub>	r <sub>1,2</sub>	r <sub>a max</sub>	d <sub>a min</sub>	D <sub>a max</sub>	m	C	C <sub>0</sub>	n <sub>grease</sub>	
<b>9mm</b>																
						mm			mm			kg	kN		r/min	<b>9mm</b>
628/9	9	17	5			11.1	14.9	0.2	0.2	10.6	15.4	0.0042	1.60	0.72	28000	628/9
619/9	9	20	6			12.0	17	0.3	0.3	11.4	18.2	0.0092	2.48	1.08	27000	619/9
609	9	24	7			14.2	19.2	0.3	0.3	11.4	21.6	0.016	3.35	1.40	22000	609
629	9	26	8			14.4	21.1	0.3	0.3	11.4	23.6	0.019	4.45	1.95	22000	629
<b>10mm</b>																
61800	10	19	5	2.381	11	12.6	16.4	0.3	0.3	12.0	17	0.005	1.8	0.93	28000	61800
61900	10	22	6	2.381	9	13.5	18.5	0.3	0.3	12.4	20	0.008	2.70	1.30	25000	61900
6000	10	26	8	2.381	7	14.9	21.3	0.3	0.3	12.4	23.6	0.019	4.58	1.98	22000	6000
6200	10	30	9	2.381	8	17.4	23.8	0.6	0.6	15	26	0.032	5.1	2.38	20000	6200
6300	10	35	11	2.381	7	19.4	27.6	0.6	0.6	15	30	0.053	7.65	3.48	18000	6300



## BEARING TYPE IDENTIFICATION

### Bearing data Bore diameter 12 - 20 mm



Designation	Boundary dimensions			Balls		Dimensions			Abutment dimensions			Weight	Load rating		Speed value	Designation	
	d	D	B	D <sub>w</sub>	Z	d <sub>1</sub>	D <sub>1</sub>	r <sub>1,2</sub>	r <sub>a max</sub>	d <sub>a min</sub>	D <sub>a max</sub>	m	C	C <sub>0</sub>	n <sub>grease</sub>		
	mm									mm			kg	kN		r/min	
<b>12mm</b>																	
61801	12	21	5	2.381	12	14.6	18.4	0.3	0.3	14	19	0.005	1.90	1.00	24000	61801	
61901	12	24	6	3.175	10	15.5	20.6	0.3	0.3	14.4	22	0.008	2.9	1.5	22000	61901	
16001	12	28	7	4.762	8	16.7	23.3	0.3	0.3	14.4	25.6	0.015	5.1	2.4	20000	16001	
6001	12	28	8	4.762	8	17.4	23.8	0.3	0.3	14.4	25.6	0.022	5.1	2.38	20000	6001	
6201	12	32	10	5.953	7	18.3	26.1	0.6	0.6	17	28	0.035	6.82	3.05	19000	6201	
6301	12	37	12	7.938	6	19.3	29.7	1	1	18	32	0.051	9.72	5.08	17000	6301	
<b>15mm</b>																	
61802	15	24	5	2.381	14	17.6	21.4	0.3	0.3	17	22	0.005	2.1	1.3	22000	61802	
61902	15	28	7	3.969	10	18.3	24.7	0.3	0.3	17.4	26	0.012	4.3	2.3	20000	61902	
16002	15	32	8	4.762	9	20.2	26.8	0.3	0.3	17.4	29.6	0.023	5.6	2.8	19000	16002	
6002	15	32	9	4.762	9	20.4	26.6	0.3	0.3	17.4	29.6	0.031	5.58	2.85	19000	6002	
6202	15	35	11	5.953	8	21.6	29.4	0.6	0.6	20	32	0.045	7.65	3.72	18000	6202	
6302	15	42	13	7.938	7	24.3	34.7	1	1	21	37	0.08	11.5	5.42	16000	6302	
<b>17mm</b>																	
61803	17	26	5	2.381	16	19.6	23.4	0.3	0.3	19	24	0.007	2.2	1.5	20000	61803	
61903	17	30	7	3.969	11	20.3	26.7	0.3	0.3	19.4	28	0.014	4.6	2.6	19000	61903	
16003	17	35	8	4.762	10	22.7	29.3	0.3	0.3	19.4	32.6	0.028	6	3.3	18000	16003	
6003	17	35	10	4.762	10	22.9	29.1	0.3	0.3	19.4	32.6	0.04	6	3.25	17000	6003	
6203	17	40	12	6.747	8	24.6	33.4	0.6	0.6	22	36	0.064	9.58	4.78	16000	6203	
6303	17	47	14	8.731	7	26.8	38.2	1	1	23	41	0.109	13.5	6.58	15000	6303	
6403	17	62	17	12.7	6	31.9	47.1	1.1	1	24	55	0.268	22.7	10.8	11000	6403	
<b>20mm</b>																	
61804	20	32	7	3.175	14	23.5	28.6	0.3	0.3	22.4	30	0.015	3.5	2.2	18000	61804	
61904	20	37	9	4.762	11	25.2	31.8	0.3	0.3	22.4	34.6	0.031	6.4	3.7	17000	61904	
16004	20	42	8	5.556	10	27.1	34.9	0.3	0.3	22.4	39.6	0.052	7.9	4.5	16000	16004	
6004	20	42	12	6.35	9	26.9	35.1	0.6	0.6	25	38	0.068	9.38	5.02	16000	6004	
6204	20	47	14	7.938	8	29.3	39.7	1	1	26	42	0.103	12.8	6.65	14000	6204	
6304	20	52	15	9.525	7	29.8	42.2	1.1	1	27	45	0.142	15.8	7.88	13000	6304	
6404	20	72	19	15.081	6	38	56.1	1.1	1	27	65	0.4	31	15.2	9500	6404	

# BEARING TYPE IDENTIFICATION

## Bearing data Bore diameter 25- 40mm

Designation	Boundary dimensions			Balls	Dimensions			Abutment dimensions			Weight	Load rating		Speed value	Designation	
	d	D	B	D <sub>w</sub>	Z	d <sub>1</sub>	D <sub>1</sub>	r <sub>1,2</sub>	r <sub>a max</sub>	d <sub>a min</sub>	D <sub>a max</sub>	m	C	C <sub>0</sub>		n <sub>grease</sub>
<b>25mm</b>																
						mm			mm			kg	kN		r/min	
61805	25	37	7	3.5	15	28.2	33.8	0.3	0.3	27.4	35	0.017	4.3	2.9	16000	61805
61905	25	42	9	4.762	13	30.2	36.8	0.3	0.3	27.4	40	0.038	7	4.5	14000	61905
16005	25	47	8	5.556	12	33.1	40.9	0.3	0.3	27.4	44.6	0.059	8.8	5.6	13000	16005
6005	25	47	12	6.35	10	31.9	40.1	0.6	0.6	30	43	0.078	10	5.85	13000	6005
6205	25	52	15	7.938	9	33.8	44.2	1	1	31	47	0.127	14	7.88	12000	6205
6305	25	62	17	11.5	7	36	51	1.1	1	32	55	0.219	22.2	11.5	10000	6305
6405	25	80	21	17	6	42.3	62.7	1.5	1.5	34	71	0.529	38.2	19.2	8500	6405
<b>30mm</b>																
61806	30	42	7	3.5	18	33.2	38.8	0.3	0.3	32.4	40	0.019	4.7	3.6	13000	61806
61906	30	47	9	4.762	14	35.2	41.8	0.3	0.3	32.4	44.6	0.043	7.2	5	12000	61906
16006	30	55	9	6.35	12	38.1	47	0.3	0.3	32.4	52.6	0.084	11.2	7.4	11000	16006
6006	30	55	13	7.144	11	38.4	47.7	1	1	36	50	0.113	13.2	8.3	11000	6006
6206	30	62	16	9.525	9	40.8	52.2	1	1	36	56	0.2	19.5	11.5	9500	6206
6306	30	72	19	12	8	44.8	59.2	1.1	1	37	65	0.349	27	15.2	9000	6306
6406	30	90	23	19.05	6	48.6	71.4	1.5	1.5	39	81	0.71	47.5	24.5	8000	6406
<b>35mm</b>																
61807	35	47	7	3.5	20	38.2	43.8	0.3	0.3	37.4	45	0.023	4.9	4	11000	61807
61907	35	55	10	5.556	14	41.1	48.9	0.6	0.6	40	51	0.078	9.5	6.8	10000	61907
16007	35	62	9	6.35	14	44.6	53.5	0.3	0.3	37.4	59.6	0.107	12.2	8.8	9500	16007
6007	35	62	14	8	11	43.3	53.7	1	1	41	56	0.148	16.2	10.5	9500	6007
6207	35	72	17	11.112	9	46.8	60.2	1.1	1	42	65	0.288	25.5	15.2	8500	6207
6307	35	80	21	13.494	8	50.4	66.6	1.5	1.5	44	71	0.455	33.4	19.2	8000	6307
6407	35	100	25	21	6	54.9	80.1	1.5	1.5	44	91	0.926	56.8	29.5	6700	6407
<b>40mm</b>																
61808	40	52	7	3.5	22	43.2	48.8	0.3	0.3	42.4	50	0.026	5.1	4.4	10000	61808
61908	40	62	12	6.747	14	46.3	55.7	0.6	0.6	45	58	0.103	13.7	9.9	9500	61908
16008	40	68	9	6.35	15	49.6	58.5	0.3	0.3	42.4	65.6	0.125	12.6	9.6	9000	16008
6008	40	68	15	8	12	48.8	59.2	1	1	46	62	0.185	17	11.8	9000	6008
6208	40	80	18	12	9	52.8	67.2	1.1	1	47	73	0.368	29.5	18	8000	6208
6308	40	90	23	15.081	8	56.5	74.6	1.5	1.5	49	81	0.639	40.8	24	7000	6308
6408	40	110	27	21	7	63.9	89.1	2	2	50	100	1.221	65.5	37.5	6300	6408



# BEARING TYPE IDENTIFICATION

## Bearing data Bore diameter 65- 80mm

Designation	Boundary dimensions			Balls		Dimensions			Abutment dimensions			Weight	Load rating		Speed value	Designation
	d	D	B	D <sub>w</sub>	Z	d <sub>1</sub>	D <sub>1</sub>	r <sub>1,2</sub>	r <sub>a max</sub>	d <sub>a min</sub>	D <sub>a max</sub>	m	C	C <sub>0</sub>	n <sub>grease</sub>	
										mm	mm	kg	kN		r/min	
<b>65mm</b>										<b>65mm</b>						
61813	65	85	10	5.556	23	71.1	78.9	0.6	0.6	69	81	0.13	11.9	11.5	6700	61813
61913	65	91	13	7.144	19	72.9	82.2	1	1	71	85	0.196	17.4	16	6300	61913
16013	65	100	11	7.938	18	77.3	87.7	0.6	0.6	70	95	0.241	20.5	18.6	6000	16013
6013	65	100	18	11.112	13	75.3	89.7	1.1	1.1	72	93	0.41	32	24.8	6000	6013
6213	65	120	23	16.669	10	82.5	102.5	1.5	1.5	74	111	0.99	57.2	40	5000	6213
6313	65	140	33	24	8	88.1	116.9	2.1	2.1	77	128	2.1	93.8	60.5	4500	6313
6413	65	160	37	30.162	7	94.5	130.6	2.1	2.1	77	148	3.342	118	78.5	4300	6413
<b>70mm</b>										<b>70mm</b>						
61814	70	90	10	5.556	24	76.1	83.9	0.6	0.6	74	86	0.138	12.1	11.9	6300	61814
61914	70	100	16	8.731	17	79.3	90.7	1	1	76	95	0.336	23.7	21.1	6000	61914
16014	70	110	13	9.525	17	83.8	96.2	0.6	0.6	75	105	0.386	27.9	25	5600	16014
6014	70	110	20	12.303	13	82	98	1.1	1	77	103	0.575	38.5	30.5	5600	6014
6214	70	125	24	16.669	11	89	109	1.5	1.5	79	116	1.084	60.8	45	4800	6214
6314	70	150	35	25.4	8	94.8	125.3	2.1	2.1	82	138	2.55	105	68	4300	6314
6414	70	180	42	34	7	105.6	146.4	3	2.5	84	166	4.896	140	99.5	3800	6414
<b>75mm</b>										<b>75mm</b>						
61815	75	95	10	5.556	26	81.1	88.9	0.6	0.6	79	91	0.147	12.5	12.8	6000	61815
61915	75	105	16	8.731	18	84.3	95.7	1	1	81	100	0.355	24.3	22.5	5600	61915
16015	75	115	13	9.525	18	88.8	101.2	0.6	0.6	80	110	0.411	28.7	26.8	5300	16015
6015	75	115	20	12.303	14	88	104	1.1	1	82	108	0.603	40.2	33.2	5300	6015
6215	75	130	25	17.462	11	94	115	1.5	1.5	84	121	1.171	66	49.5	4500	6215
6315	75	160	37	26.988	8	101.3	133.7	2.1	2.1	87	148	3.05	113	76.8	4000	6315
6415	75	190	45	36.512	7	112.1	155.9	3	2.5	89	176	5.739	154	115	3600	6415
<b>80mm</b>										<b>80mm</b>						
61816	80	100	10	5.556	27	86.1	93.9	0.6	0.6	84	96	0.155	12.7	13.3	5600	61816
61916	80	110	16	8.731	19	89.3	100.7	1	1	86	105	0.375	24.9	23.9	5300	61916
16016	80	125	14	10.319	18	95.8	109.2	0.6	0.6	85	120	0.539	33.1	31.4	5000	16016
6016	80	125	22	13.494	14	95.2	112.8	1.1	1	87	118	0.821	47.5	39.8	5000	6016
6216	80	140	26	18.256	11	100	122	2	2	90	130	1.448	71.5	54.2	4300	6216
6316	80	170	39	28.575	8	107.9	142.2	2.1	2.1	92	158	3.61	123	86.5	3800	6316
6416	80	200	48	38.1	7	117.1	162.9	3	2.5	94	186	6.752	163	125	3400	6416

# BEARING TYPE IDENTIFICATION

## Bearing data Bore diameter 85 - 100 mm

Designation	Boundary dimensions			Balls		Dimensions			Abutment dimensions			Weight	Load rating		Speed value	Designation
	d	D	B	D <sub>w</sub>	Z	d <sub>1</sub>	D <sub>1</sub>	r <sub>1,2</sub>	r <sub>a max</sub>	d <sub>a min</sub>	D <sub>a max</sub>	m	C	C <sub>0</sub>	n <sub>grease</sub>	
<b>85mm</b>																
						mm			mm			kg	kN		r/min	
61817	85	110	13	7.144	24	92.5	102.5	1	1	90	105	0.245	19.2	19.8	5000	61817
61917	85	120	18	10.319	17	95.8	109.2	1.1	1	92	113.5	0.507	31.9	29.7	4800	61917
16017	85	130	14	10.319	19	100.8	114.2	0.6	0.6	90	125	0.568	34	33.3	4500	16017
6017	85	130	22	14	14	99.4	117.6	1.1	1	92	123	0.848	50.8	42.8	4500	6017
6217	85	150	28	19.844	11	107.1	130.9	2	2	95	140	1.803	83.2	63.8	4000	6217
6317	85	180	41	30.162	8	114.4	150.6	3	2.5	99	166	4.284	132	96.5	3600	6317
6417	85	210	52	40	7	123.5	171.5	4	3	103	192	7.933	175	138	3200	6417
<b>90mm</b>																
61818	90	115	13	7.144	25	97.5	107.5	1	1	95	110	0.258	19.5	20.5	4800	61818
61918	90	125	18	10.319	18	100.8	114.2	1.1	1	97	118.5	0.533	32.8	31.5	4500	61918
16018	90	140	16	11.906	17	107.3	122.8	1	1	96	134	0.671	41.5	39.3	4300	16018
6018	90	140	24	15.081	14	107.2	126.8	1.5	1.5	99	131	1.1	58	49	4300	6018
6218	90	160	30	22.225	10	111.7	138.4	2	2	100	150	2.17	95.8	71.5	3800	6218
6318	90	190	43	32	8	120.8	159.2	3	2.5	104	176	4.97	145	108	3400	6318
6418	90	225	54	42.862	7	131.8	183.2	4	3	108	207	9.56	192	158	2800	6418
<b>95mm</b>																
61819	95	120	13	7.144	26	102.5	112.5	1	1	100	115	0.27	19.8	21.3	4500	61819
61919	95	130	18	10.319	19	105.8	119.2	1.1	1	102	124	0.56	33.7	33.3	4300	61919
16019	95	145	16	11.906	18	112.3	127.8	1	1	101	139	0.71	42.7	41.9	4000	16019
6019	95	145	24	15.081	14	110.2	129.8	1.5	1.5	104	136	1.15	57.8	50	4000	6019
6219	95	170	32	24	10	118.1	146.9	2.1	2.1	107	158	2.62	110	82.8	3600	6219
6319	95	200	45	34	8	127.1	167.9	3	2.5	109	186	5.74	157	122	3200	6319
<b>100mm</b>																
61820	100	125	13	7.144	27	107.5	117.5	1	1	105	120	0.28	20.1	22	4300	61820
61920	100	140	20	11.906	18	112.3	127.8	1.1	1	107	133	0.77	42.7	41.9	4000	61920
16020	100	150	16	11.906	19	118.3	133.8	1	1	106	144	0.74	43.8	44.3	3800	16020
6020	100	150	24	16	14	114.6	135.4	1.5	1.5	109	141	1.18	64.5	56.2	3800	6020
6220	100	180	34	25.4	10	124.8	155.3	2.1	2.1	112	168	3.19	122	92.8	3400	6220
6320	100	215	47	36.512	8	135.6	179.4	3	2.5	114	201	7.09	173	140	2800	6320
6420	100	250	58	47.625	7	146.4	203.6	4	3	118	232	12.9	223	195	2400	6420



# BEARING TYPE IDENTIFICATION

## Bearing data Bore diameter 45- 60mm

Designation	Boundary dimensions			Balls	Dimensions			Abutment dimensions			Weight	Load rating		Speed value	Designation	
	d	D	B	D <sub>w</sub>	Z	d <sub>1</sub>	D <sub>1</sub>	r <sub>1,2</sub>	r <sub>a max</sub>	d <sub>a min</sub>	D <sub>a max</sub>	m	C	C <sub>0</sub>		n <sub>grease</sub>
<b>45mm</b>																
						mm			mm			kg	kN		r/min	
61809	45	58	7	3.969	22	48.3	54.7	0.3	0.3	47.4	56	0.03	6.4	5.6	9000	61809
61909	45	68	12	6.747	15	51.8	61.2	0.6	0.6	50	63	0.123	14.1	10.9	8500	61909
16009	45	75	10	7.144	15	55	65	0.6	0.6	50	70	0.155	15.6	12.2	8000	16009
6009	45	75	16	9	12	54.2	65.9	1	1	51	69	0.23	21	14.8	8000	6009
6209	45	85	19	12	10	58.8	73.2	1.1	1	52	78	0.416	31.5	20.5	7000	6209
6309	45	100	25	17.462	8	63	84	1.5	1.5	54	91	0.837	52.8	31.8	6300	6309
6409	45	120	29	23	7	70.7	98.3	2	2	55	110	1.52	77.5	45.5	5600	6409
<b>50mm</b>																
61810	50	65	7	3.969	24	54.3	60.7	0.3	0.3	52.4	62.6	0.043	6.6	6.1	8500	61810
61910	50	72	12	6.747	16	56.3	65.7	0.6	0.6	55	68	0.122	14.5	11.7	8000	61910
16010	50	80	10	7.144	16	60	70	0.6	0.6	55	75	0.166	16.1	13.1	8000	16010
6010	50	80	16	9	13	59.2	70.9	1	1	56	74	0.25	22	16.2	7000	6010
6210	50	90	20	12.7	10	62.4	77.6	1.1	1	57	83	0.463	35	23.2	6700	6210
6310	50	110	27	19.05	8	69.1	91.9	2	2	60	100	1.082	61.8	38	6000	6310
6410	50	130	31	25.4	7	77.3	107.8	2.1	2.1	62	118	1.855	92.2	55.2	5300	6410
<b>55mm</b>																
61811	55	72	9	4.762	23	60.2	66.9	0.3	0.3	57.4	69.6	0.07	9.1	8.4	8000	61811
61911	55	80	13	7.144	16	62.9	72.2	1	1	61	75	0.17	15.9	13.2	7500	61911
16011	55	90	11	7.938	16	67.3	77.7	0.6	0.6	60	85	0.207	19.4	16.2	7000	16011
6011	55	90	18	11	12	65.4	79.7	1.1	1	62	83	0.362	30.2	21.8	7000	6011
6211	55	100	21	14.288	10	68.9	86.1	1.5	1.5	64	91	0.603	43.2	29.2	6000	6211
6311	55	120	29	20.638	8	76.1	100.9	2	2	65	110	1.367	71.5	44.8	5600	6311
6411	55	140	33	26.988	7	82.8	115.2	2.1	2.1	67	128	2.316	100	62.5	4800	6411
<b>60mm</b>																
61812	60	78	10	4.762	24	66.2	72.9	0.3	0.3	62.4	75.6	0.093	9.1	8.7	7000	61812
61912	60	85	13	7.144	17	67.9	77.2	1	1	66	80	0.181	16.4	14.2	6700	61912
16012	60	95	11	7.938	17	72.3	82.7	0.6	0.6	65	90	0.224	19.9	17.5	6300	16012
6012	60	95	18	11	13	71.4	85.7	1.1	1	67	89	0.385	31.5	24.2	6300	6012
6212	60	110	22	15.081	10	76	94.1	1.5	1.5	69	101	0.789	47.8	32.8	5600	6212
6312	60	130	31	22.225	8	81.7	108.4	2.1	2.1	72	118	1.71	81.8	51.8	5000	6312
6412	60	150	35	28.575	7	87.9	122.2	2.1	2.1	72	138	2.811	109	70	4500	6412

# BEARING SELECTION

GIL high precision bearings provide intelligent bearing solutions for the best performance of machine components. With comprehensive product range, suitable precision bearings can also be selected according to specific performance requirements.

Design Spindle parameter	Confirm spindle structure	Confirm spindle dimensions	Bearing performance	Mounting spindle
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Spindle speed	Bearing type	Spindle dimensions	Bearing fatigue life	Shaft precision
Spindle rigidity	Configuration	Bearing spacing	Bearing rigidity	Seating precision
Spindle heating	Preload method	Limit speed	Heating	Fit tolerance
Spindle precision	Driving mode	Spindle rigidity	Lubricant life	End cap compression
Spindle service life	Lubrication	Risky speed	Preload	Lock nut force
Spindle reliability	Cooling	Bearing series	Bearing clearance	Preload verification
			Bearing clearance	Clearance verification
			Limit static load	Lubrication volume
When designing a new spindle, determine the overall performance parameters of the spindle before selecting bearings, and roughly determine the main performance requirements. Such as: the spindle speed is important or to stiffness, in order to determine the choice of bearing.	According to the bearing form (ball bearing, cylindrical roller bearing), configuration column number, driving method (transmission belt, gear, motor direct connection, built-in motor), lubrication (grease lubrication, oil mist lubrication) and other ways.	Limit spindle speed, spindle cutting, dangerous speed, select the appropriate size. The ultimate speed of bearings is changed according to the size, type, number of combination columns and different lubrication modes of bearings.	Fully consider the fatigue life, stiffness, heating and other factors of bearings, select the appropriate bearing clearance (preload), bearing clearance and preload are directly related to the performance of bearings, improper selection may cause early damage or burn of bearings and other problems.	After determining the structure and configuration of the bearing, also necessary to consider the actual installation conditions, the accuracy of the shaft and housing, the tolerance fit, the preload of the nut required when fixing, the bearing preload and the clearance after actual installation.

# BEARING SELECTION

## Bearing Specification Selection Table

If you need help with bearing selection, please fill in the form below and contact us freely.

**GIL high precision bearing selection**

Company name: \_\_\_\_\_

► Usage: Machine type  Machining center  Machine tool  Grinding machine  Electric motor  Others

**Machine series**  
 Site of use  Spindle  Ball screw support  Transmission shaft  
 Direction of spindle  Vertical  Horizontal  Others

**Bearing type**  
 Standard angular contact ball bearing: 70 series, 72 series, 719 series, 718 series  
 Special angular contact ball bearing: BNR series, BAR series  
 Ball screw support bearing: TAC series, BS series, 760 series  
 Cylindrical roller bearing series

**Bearing sets:**  Single  DT  DB  DF  TBT  TFT  QBC  Others

**Item number:**  
 Bore diameter \_\_\_\_\_ mm, Outer dia. \_\_\_\_\_ mm, Width \_\_\_\_\_ mm, Width of the set \_\_\_\_\_ mm, Precision \_\_\_\_\_ grade, Clearance \_\_\_\_\_ mm

► Loading: Speed \_\_\_\_\_ min/1, Radial load rating \_\_\_\_\_ N, Axial load rating \_\_\_\_\_ N, Torque \_\_\_\_\_ N-mm, Loose force \_\_\_\_\_ N

► Shaft/Housing: Shaft fit \_\_\_\_\_, Housing fit \_\_\_\_\_, Outer diameter of the housing \_\_\_\_\_ mm  
 Shaft material \_\_\_\_\_, Housing material \_\_\_\_\_, Shaft hollow diameter \_\_\_\_\_ mm  
 Driving mode \_\_\_\_\_, Cooling \_\_\_\_\_, Preload method \_\_\_\_\_  
 Ring width \_\_\_\_\_, Operating temperature \_\_\_\_\_, Lubrication \_\_\_\_\_

► Expecting: Rigidity \_\_\_\_\_ N/um, Expected preload force \_\_\_\_\_ N, Service life \_\_\_\_\_ hours.

Do you have any other special requirements for bearings?



# BEARING TYPE ANTITHESIS

## Interchangeable Bearing Type

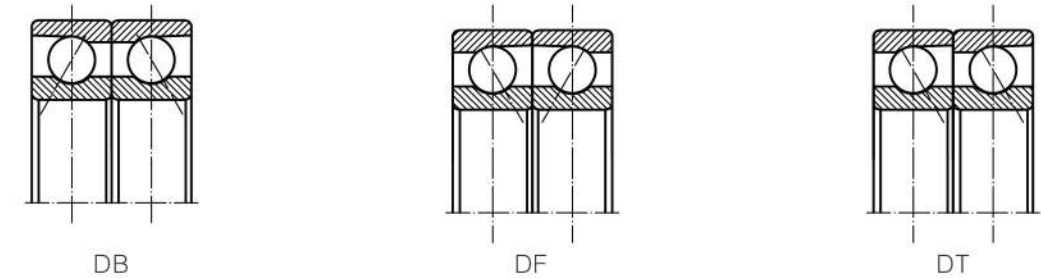
ITEM	SERIES	GIL DESIGNS	SKF	NSK	FAG	SNFA
Series	Extra light series	718	718	78	B718	SEA
	Special light series	719	719	79	B719	SEB
	High speed special light series	H719	719CE	BN19	HS719	VEB
	Light series	70	70	70	B70	EX
	High speed light series	H70	70CE	BN10	HS70	VEX
	Standard series	72	72	72	B72	E200
Precision		P5		P5	P5	5
		P4	P4A	P4	P4S	7
		P2	PA9A	P2	P2	9
Contact angle	15 degree	C	CD	C	C	1
	25 degree	AC	ACD	A5	E	3
Arrangements	< >	DB	DB	DB	DU (O)	DD
	> <	DF	DF	DF	DU (X)	FF
	< <	DT	DT	DT	DU (T)	T
	< < >	TBT	TBT	DBD		TD
	> < <	TFT	TFT	DFD		TF
	< >	QBC	QBC	DBB		TDT
	< >	QBT	QBT	QBT		3DT
	Universal matching	G	G	SU	U	U
Preload	Light	A	A	L	L	L
	Medium	B	B	M	M	M
	Heavy	C	C	H	S	F

# SPECIFICATIONS OF MATCHED ANGULAR CONTACT BALL BEARINGS

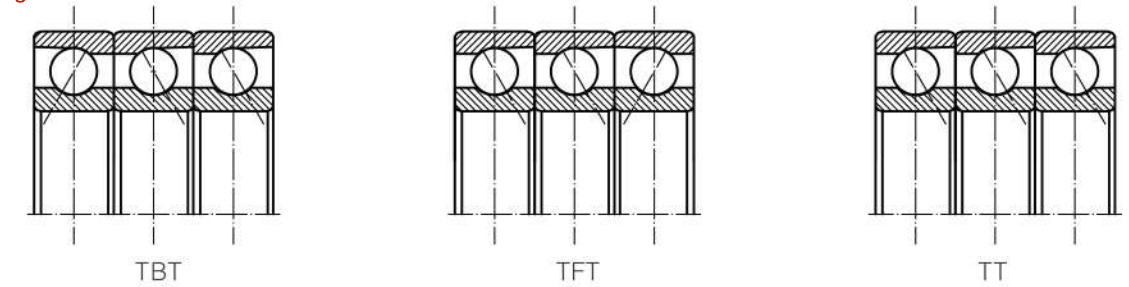
## Bearing Arrangements

Matched bearings are used for undertaking radial-axial union load, and also for pure radial load, matched bearings are consist of single row angular contact ball bearings of same standard which mounted in different form, specific forms as following shown:

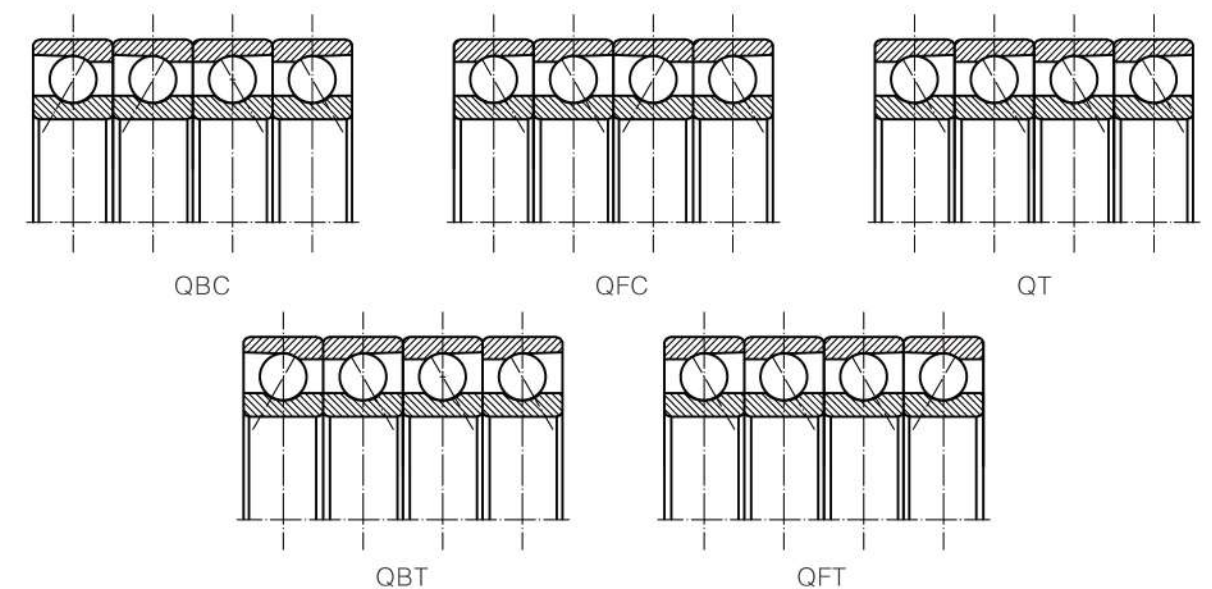
Bearing pairs:



Bearing sets with 3 bearings:



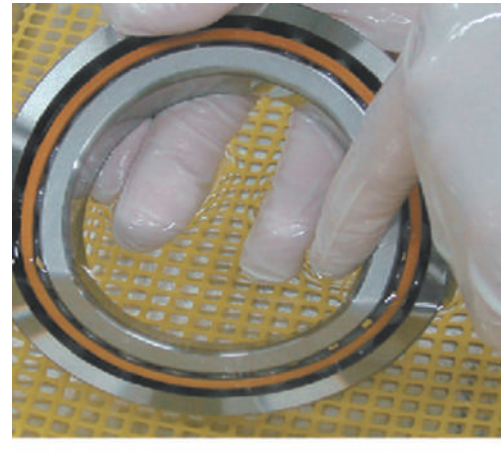
Bearing sets with 4 bearings:



# BEARING MOUNTING AND OPERATION

## Cleaning the bearings and related parts

Appropriate storage of products assures their bearing specific performance features until installation. Careful preparation of the installation environment and relevant components assure unrestricted utilization of bearing performance characteristics. After unpacking the rust-proof oil should be wiped clean and cleaned.



## Checking dimension of associated components

Keep the installation environment clean and free of dust and compressed air. Shaft and bearing housing should be cleaned, bearing and ring surface is not allowed to have scratches, burrs, burrs, etc. Check the size of shaft and bearing housing to ensure that it meets the tolerance of bearing inside and outside diameter.

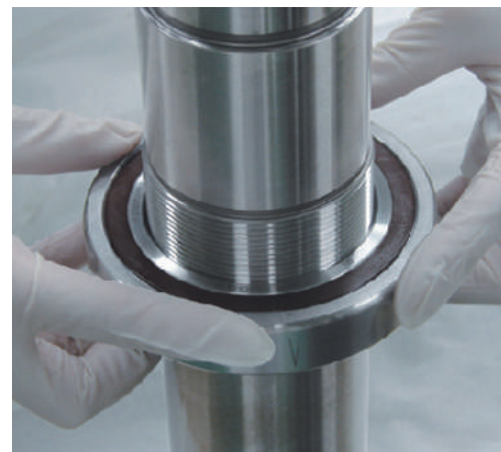
The parallelism of the spacer configured on the spindle should be controlled within 0.003mm (3 $\mu$ m). Poor parallelism of the spacer will cause the inclination of the bearing, resulting in poor accuracy, noise and other problems.



## Checking dimension of associated components

Match the dimensions of the bearings and associated components to one another (fits). Push or pull ball bearings in the axial direction precisely (do not cant). Do not transmit installation force through the balls.

Installation methods vary according to the fit of the inner and outer rings. Small bearings are widely installed by pressing machine. For machine tool bearings with majority inner ring rotation, the inner ring is mostly used for interference fit, and the cylindrical hole is generally used for hot charging, with temperature generally 38°C up to 45°C. The outer ring adopts the clearance match, installation easier.



## Installation precautions

Due to structural of the Angular contact ball bearings, a single bearing can only bear one direction of the load. Therefore, when installed to the shaft or bearing housing, the external load is only applied to the side that capable bear the load. For different bearing arrangements, the order of loading into the shaft is different, be sure to pay attention.

For the high-speed precision spindle, to avoid the imbalance caused by nut tilt or thread clearance when fastening, the shaft sleeve fixing method is often used. The large interference between the shaft and the inner diameter of the shaft sleeve is used for axial fixing. But compared with the nut fastening method, easier loosen under continuous operation, must be checked regularly.

When a wide spacer is placed between angular contact ball bearing sets, if the nut tightening force is too large, the inner ring spacer will be deformed, resulting in a preload greater than the set value during installation. Therefore, the appropriate preload should be fully considered.



## Procedure for filling grease after cleaning bearings

### > The order in which bearings are greased after being cleaned

Improper filling method of bearing grease will lead to unstable temperature rise during initial run-in operation. It is necessary to use the appropriate amount of filling according to the conditions of use.

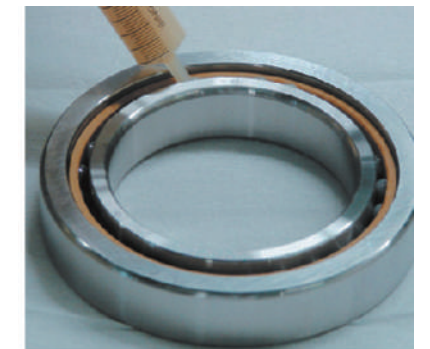
### > Precautions before filling

Make sure no residual foreign matter inside the bearing. It is suggested that bearings for high speed spindle should be cleaned, degreased and then re-lubrication. Other applications are also recommended to clean the anti-rust oil attached to the bearing.

### > Grease filling volume

Angular contact ball bearings for high speed spindles - 15%  $\pm$ 2 of free space  
Cylindrical roller bearings for high speed spindles - 10%  $\pm$ 2 of free space

GIL high precision ball bearings standard fill volume is 30% (tolerance  $\pm$ 5%) of the free space. A fill volume of 20–25% is recommended for smooth running. Long service life is achieved with a 35% grease fill volume. Bearings without grease are delivered with standard conservation.





# BEARING MOUNTING AND OPERATION

## Various Applications



### CNC Machine tool applications

GIL high precision angular contact ball bearings available in P4, P2 grade, widely used for precision CNC machine spindles and ball screw support. Special materials, high speeds, long service life, optimized design.



### Turbocharger applications

According to the turbocharger requirements, specially customized ceramic ball bearings, improve the acceleration time, stable performance.



### Servomotor / Gears

Based on servo motor specifications, GIL provides replacement precision bearings for Fanuc, Mitsubishi and other mainstream models. Low vibration operation, high running accuracy.



### Textile machinery

GIL precision bearings have high stability, widely used in the field of textile machinery, high speed, high temperature resistance, and high fatigue strength.



### Photovoltaic industry

According to the development of single crystal and polysilicon line cutting equipment, the P4 grade photovoltaic special bearing, has been widely recognized by the market.



### Industrial robot

GIL bearings have a very obvious effect on the field of industrial robots, angular contact ball bearings, harmonic reducer bearings, flexible bearings, cross bearings, etc.



### Escalator, Fan industry

Long service life, low noise level, GIL precision deep groove ball bearings with high stability, environmental protection characteristics, widely used in escalator and elevator and fan industry.



### Compressor / Water pump

GIL provide high load and high reliability special bearings for all kinds of compressors and water pumps. Medium speed, long life.