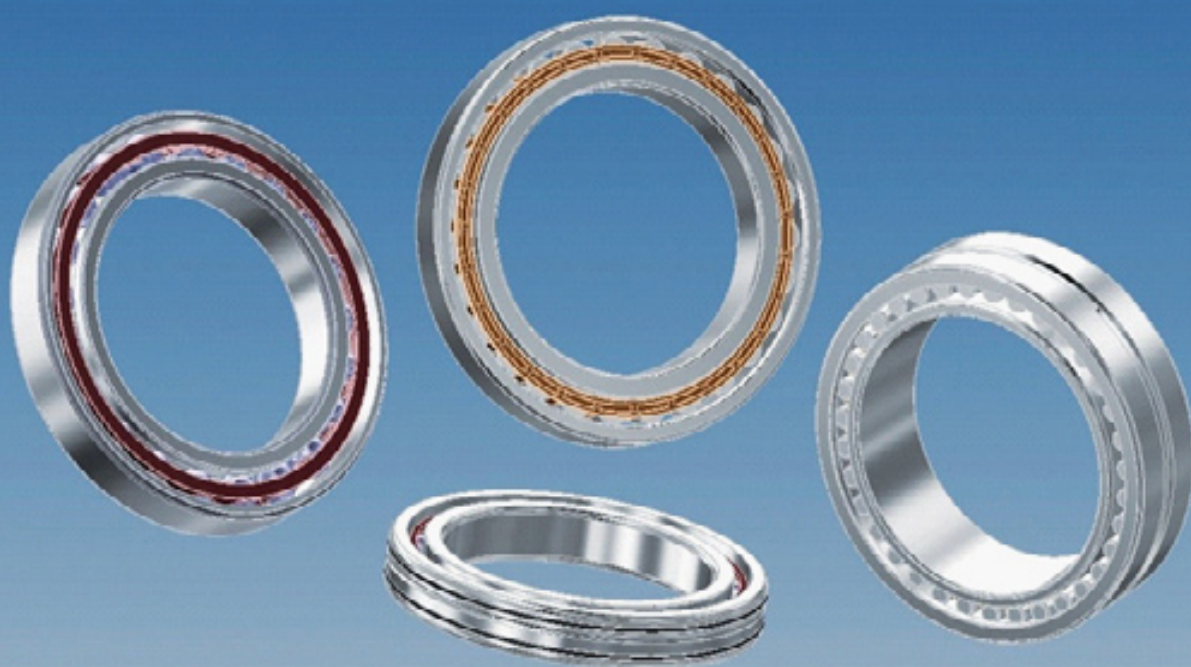


1.	Spindle bearings and high-speed spindle bearings	6
1.1.	General provisions	
1.1.1.	Spindle bearings	
1.1.2.	High-speed spindle bearings	
1.2.	Approvals and standards	
1.3.	Design	
1.4.	Materials	
1.4.1.	The outer and inner rings, balls	
1.4.2.	Cage	
1.5.	Contact angle	
2.	Data for bearings	10
2.1.	Tolerances and tolerances classes	
2.2.	Group sizes for spindle bearings	
2.3.	Rotation speed	
2.4.	Working temperature	
2.5.	Noise level	
3.	Universal bearings, bearing sets	17
3.1.	Universal bearings "U"	
3.2.	The layout of the bearings	
3.2.1.	O-configuration	
3.2.2.	X-configuration	
3.2.3.	The tandem configuration	
3.2.4.	The multi-component configuration	
3.2.4.1.	TO- and TX-configuration	
3.2.4.2.	TOT- and TXT-configuration	
3.3.	Intermediate rings	
4.	Hybrid spindle bearings	20
5.	Sealed spindle bearings	
6.	Spindle bearing with direct injection of the lubricant	
7.	Calculate bearing design	
7.1.	General provisions	
7.2.	Rated Lifetime	
7.3.	Equivalent dynamic bearing load	
7.4.	Calculation of the limit rotation speed	
7.5.	Suspension and stiffness	
7.6.	Load bearing capacity	
7.7.	Preload	
8.	The tolerances for the installation of spindle bearings	
8.1.	Tolerances for machining parts surrounding the bearings	
8.2.	Recommendations for machining shafts	
8.3.	Recommendation for machining holes in housing	
9.	Installation	
9.1.	Preparing the installation	
9.2.	Bearing Lubrication	
9.3.	Bearing installation	
9.3.1.	Installation using a press	
9.3.2.	Installing a bearing heating	
9.4.	Fixing bearing	
9.4.1.	Fixing with precision nuts	
9.4.2.	Fixing by the housing cover	
10.	Marking of bearings	
10.1.	Content and layout of marking	

10.2.	Labeling scheme for spindle bearings	
11.	The introduction of brands from other manufacturers in the product designation VBF	
12.	Size tables	36
12.1.	Spindle bearings	c 36
12.2.	High-speed spindle bearings	c 74
13.	High precision cylindrical roller bearings	100
13.1.	General provisions	
13.2.	Heat treatment	
13.3.	Design	
13.4.	Hybrid cylindrical roller bearings	
13.5.	Materials	
14.	Tolerances and tolerances classes	104
15.	Bearing clearance	106
16.	Calculation of bearing design	107
16.1.	General provisions	
16.2.	Rated Lifetime	
16.3.	Equivalent dynamic bearing load	
17.	Tolerances for the installation of cylindrical roller bearings	108
17.1.	Tolerances for machining parts surrounding the bearings	
17.2.	Recommendation for machining cylindrical shafts	
17.3.	Recommendations for machining taper shafts	
17.4.	Recommendation for machining holes in housing	
18.	Installation	112
18.1.	Preparing the installation	
18.2.	Bearing Lubrication	
18.3.	Bearing installation	
19.	Marking of bearings	114
19.1.	Content and layout of marking	
19.2.	Labeling scheme for precision cylindrical roller bearings	
20.	The introduction of brands from other manufacturers in the product designation VBF	115
21.	Size tables	116
21.1.	High precision cylindrical roller bearings, single row	c 116
21.2.	High precision cylindrical roller bearings, double row	c 122
22.	The terms and symbols used in accordance with DIN ISO 1132-1, DIN 620	126
22.1.	The diameter of the holes	
22.2.	Housing diameter	
22.3.	Width	
22.4.	The radius of curvature	
22.5.	Changing the wall thickness	
22.6.	Distance accuracy	
22.6.1.	Radial runout	
22.6.2.	Runout	
22.6.3.	Lateral runout	
23.	Grease	129
23.1.	General provisions	
23.2.	Grease	
23.2.1.	Grease lifetime	
23.2.2.	Running-in grease	
23.2.3.	Grease	
23.3.	Lubricating oil	
24.	Delivery conditions	134

1. Spindle bearings and high-speed spindle bearings

Precision bearings VBF



Precision bearings VBF are available in one- and two-row version as spindle bearings, high-speed spindle bearings and high precision cylindrical roller bearings.

1. Spindle bearings and high-speed spindle bearings

1.1. General provisions

Spindle bearings are a special design of single-row angular contact ball bearings. They have found particularly wide application in machine-building industry, as well as in other areas where the bearings are subjected to high and extremely strict requirements in terms of accuracy and / or the permissible speeds. They have a raceway on the inner and outer ring which are disposed on the bearing axis staggered relative to each other, and can simultaneously accept large radial and axial loads in one direction.

The force generated by radial loads on the bearing and directed along the axis, should be compensated by an external force to counter. That is why they always have a close with a second bearing. Supplied spindle bearings usually have a universal design. They have such dimensions that allow you to combine them in any configuration. Thanks to the standardized external dimensions can be made to replace them both with each other and with other products, inherent in the industry.

1.1.1. Spindle bearings are available in a series of B719, B70, B72 and A73. Furthermore, various combinations of materials and designs, as described in the following chapters.

This robust design is suitable for many applications where there is a need for a high load-bearing capacity, while at the same time, high-speed rotation.



Fig. 1.1. Spindle bearing

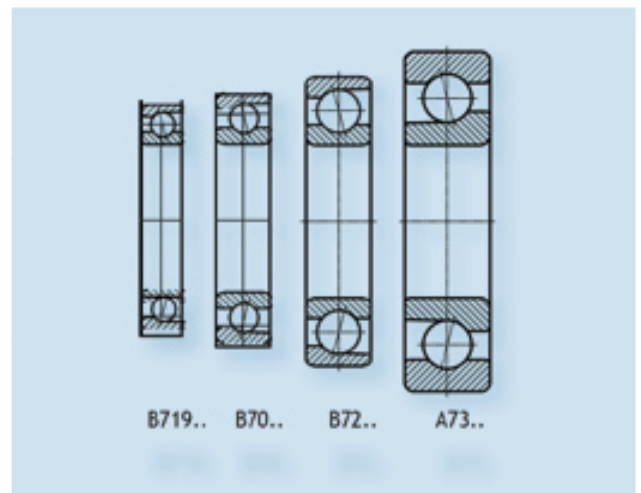


Fig. 1.2. Series of high-speed spindle bearings

1. Spindle bearings and high-speed spindle bearings

1.1.2. High-speed spindle bearings

According to its basic size high-speed spindle bearings Spindle bearings are identical to the line B. They are distinguished, in particular, its suitability for operation in higher speeds, having a low coefficient of friction and low heat generation.

High-speed spindle bearings are available in a series of HS719 and HS70, and also in different designs and material combinations.



Fig. 1.3. High-speed spindle bearing

1.2. Approvals and standards

Main dimensions correspond to common spindle bearings drawings with slits, made in accordance with DIN 616 (ISO 15). They are manufactured in dimension series 19, 10, 02 and 03.

B719 and B70 series bearings are designed in accordance with DIN 628-6.

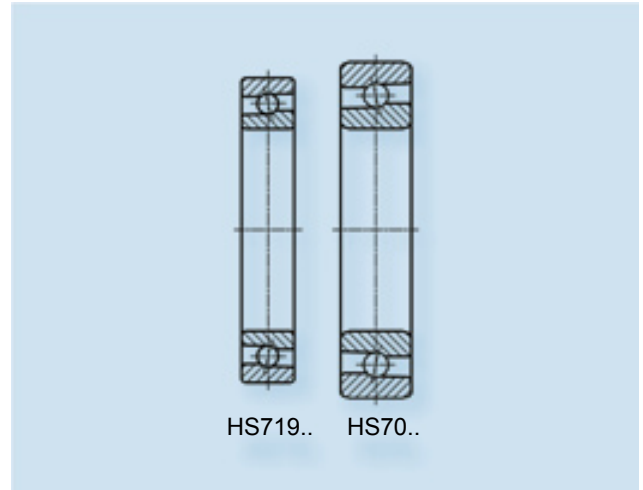


Fig. 1.4. Series of high-speed spindle bearings

1.3. Design

To facilitate installation of the cage and ensure best bearing lubrication during operation, it is necessary to use at least one ring with a reduced diameter fins. Bearings are integral.

Design	VBF series
B	B719, B70, B72
A	A73
HS	HS719, HS70

1. Spindle bearings and high-speed spindle bearings

1.4. Materials

1.4.1. The outer and inner rings, balls

VBF bearings are manufactured using vacuum chromium steel 100Cr6 or comparable material. High purity material ensures maximum reliability. This operation provides a steel product at operating temperatures not exceeding 150 ° C, without compromising the dimensional stability and hardness. Spindle bearings with ceramic balls and / or roller bearing rings made of a material Cronidur 30, are used in special applications (see. Section 4. Hybrid spindle bearings).

1.4.2. Cage

Spindle bearings are generally equipped with a solid cage integrally with windows, which is directed towards the outer edge and is made of PCB (cotton fabric impregnated with phenolic resin). This material enables the production of compact, accurate cages suitable for operation at high speeds. As a cage made of a PCB, is not suitable for use at operating temperatures of > 100 ° C, it is recommended to use brass cages or cages from polyetheretherketone (PEEK) under these conditions.

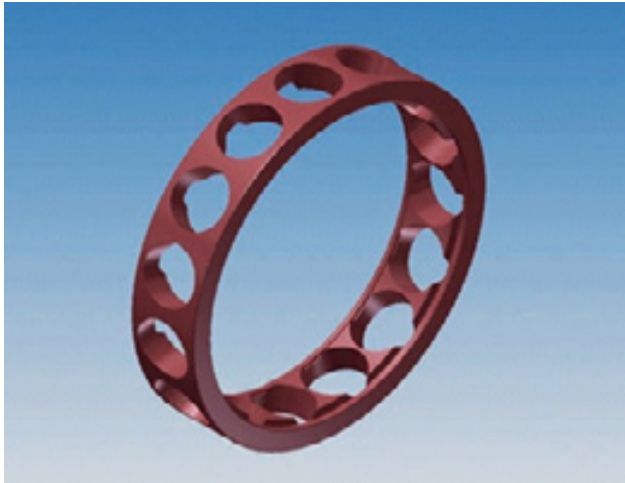


Fig. 1.5. Cage laminated phenoplast



Fig. 1.6. Brass cage

1.5. Contact angle

contact angle α defined by the straight line connecting the point of ball / raceway contact, and the radial plane. External loads are transmitted from one bearing ring to the other in the direction of these lines. To provide different operating conditions spindle bearings are typically made with two different contact angles.

Other contact angles may alternatively on request. It should also be noted that an increase in the contact angle increases the axial stiffness, while the radial rigidity reduced. Moreover, the value of the contact angle affects the limit of the rotation speed, i.e., the larger the contact angle, the lower limit of the rotation speed. The contact angle is determined by design and may vary in certain operating conditions, such as different operating temperatures of the bearing rings and the centrifugal force at the maximum rotational speed, external forces.

Contact angle	Code
15°	C
25°	E

2.1. Tolerances and tolerances classes

The following tolerance classes are usually used to dimensional tolerances and tolerances on beating spindle bearings:

Tolerance class	Standards
P4 и P2	In accordance with DIN 620-2
P4S	In accordance with DIN 628-6 (standard)
P2S	In accordance with an internal standard VBF

To ensure a wide range of applications and, hence, a high quality in terms of use, spindle bearings, generally produced in VBF class P4S tolerance, i.e. parameters bearing compounds have the quality P4, as important parameters for performance, such as radial runout They have P2 tolerances.

2. Data on the bearings

Tolerance class P4

The inner ring (Dimensions in mm)											
The nominal bore diameter	over	10	18	30	50	80	120	180	250	315	400
	before	18	30	50	80	120	180	250	315	400	500
Tolerance class P4 (Tolerances in microns)											
Deviation	$\Delta d_{mp}, \Delta d_s^{1)}$	0	0	0	0	0	0	0	0	0	0
		-4	-5	-6	-7	-8	-10	-12	-15	-19	-23
Circularity $V_{dp} / 2$	Diameter series 7 • 8 • 9 0 • 1 • 2 • 3 • 4	2	2,5	3	3,5	4	5	6	7,5	9,5	11
		1,5	2	2,5	2,5	3	4	4,5	6	7	8,5
Resizing	V_{dmp}	2	2,5	3	3,5	4	5	6	8	10	12
Deviation in width	ΔB_s	0	0	0	0	0	0	0	0	0	0
		-80	-120	-120	-150	-200	-250	-300	-350	-400	-450
Changing the width	V_{Bs}	2,5	2,5	3	4	4	5	6	7	8	0
Radial runout	K_{ia}	2,5	3	4	4	5	6	8	8	10	10
Resizing at inclination to the outer cylindrical surface of the hole	S_d	3	4	4	5	5	6	7	7	8	9
The beating of the assembled inner ring raceway (axial runout)	S_{ia}	3	4	4	5	5	7	8	10	12	13

¹⁾ This data Δd_s and ΔD_s It applies only to diameter series 0 • 1 • 2 • 3 • 4.

The outer ring (dimensions in mm)												
The nominal outer diameter	over	18	30	50	80	120	150	180	250	315	400	500
	before	30	50	80	120	150	180	250	315	400	500	630
Tolerance class P4 (Tolerances in microns)												
Deviation	$\Delta D_{mp}, \Delta D_s^{1)}$	0	0	0	0	0	0	0	0	0	0	0
		-5	-6	-7	-8	-9	-10	-11	-13	-15	-20	-25
Circularity $V_{dp} / 2$	Diameter series 7 • 8 • 9 0 • 1 • 2 • 3 • 4	2,5	3	3,5	4	4,5	5	5,5	6,5	7,5	9	11
		2	2,5	2,5	3	3,5	4	4	5	5,5	7	8,5
Resizing	V_{Dmp}	2,5	3	3,5	4	5	5	6	7	8	9	11
Deviation in width	V_{Cs}	2,5	2,5	3	4	5	5	7	7	8	9	10
Radial runout	K_{ea}	4	5	5	6	7	8	10	11	13	14	17
Resizing inclination at the outer cylindrical surface with respect to the side surface of the outer ring	S_D	4	4	4	5	5	5	7	8	10	10	12
Heartbeat assembled bearing outer ring raceway (axial runout)	S_{ea}	5	5	5	6	7	8	10	10	13	15	18

¹⁾ Tolerance in width ΔC_s is identical ΔB_s for the corresponding inner ring.

2. Data on the bearings

Tolerance class P4S

The inner ring (Dimensions in mm)													
The nominal bore diameter	over	0	10	18	30	50	80	120	150	180	250	315	400
	before	10	18	30	50	80	120	150	180	250	315	400	500
Tolerance class P4S (Tolerances in microns)													
Deviation	$\Delta d_{mp}, \Delta d_s$	0	0	0	0	0	0	0	0	0	0	0	0
		-4	-4	-5	-6	-7	-8	-10	-10	-12	-15	-19	-23
Circularity $V_{dp} / 2$	Row 8 • 9	2	2	2,5	3	3,5	4	5	5	6	7,5	9,5	11
	Row 0 • 2 • 3	1,5	1,5	2	2,5	2,5	3	4	4	4,5	6	7	8,5
Resizing	V_{dmp}	2	2	2,5	3	3,5	4	5	5	6	8	10	12
Deviation in width	ΔB_s	0	0	0	0	0	0	0	0	0	0	0	0
		-40	-80	-120	-120	-150	-200	-250	-250	-300	-350	-400	-450
Changing the width	V_{B_s}	1,5	1,5	1,5	1,5	1,5	2,5	2,5	4	5	6	7	8
Radial runout	K_{ia}	1,5	1,5	2,5	2,5	2,5	2,5	2,5	5	5	6	7	8
Resizing at inclination to the outer cylindrical surface of the hole	S_d	1,5	1,5	1,5	1,5	1,5	2,5	2,5	4	5	6	7	8
The beating of the assembled inner ring raceway (axial runout)	S_{ia}	1,5	1,5	2,5	2,5	2,5	2,5	2,5	5	5	7	9	11

Outer ring (Dimensions in mm)													
The nominal outer diameter	over	10	18	30	50	80	120	150	180	250	315	400	500
	before	18	30	50	80	120	150	180	250	315	400	500	630
Tolerance class P4S (Tolerances in microns)													
Deviation	$\Delta D_{mp}, \Delta D_s$	0	0	0	0	0	0	0	0	0	0	0	0
		-4	-5	-6	-7	-8	-9	-10	-11	-13	-15	-18	-22
Circularity $VD_p / 2$	Row 8 • 9	2	2,5	3	3,5	4	4,5	5	5,5	6,5	7,5	9	11
	Row 0 • 2 • 3	1,5	2	2,5	2,5	3	3,5	5	4	5	5,5	7	8,5
Resizing	V_{Dmp}	2	2,5	3	3,5	4	5	5	6	7	8	9	11
Changing the width	V_{C_s}	1,5	1,5	1,5	1,5	2,5	2,5	2,5	4	5	7	7	8
Radial runout	K_{ea}	1,5	2,5	2,5	4	5	5	5	7	7	8	9	11
Resizing inclination at the outer cylindrical surface with respect to the side surface of the outer ring	S_D	1,5	1,5	1,5	1,5	2,5	2,5	2,5	4	5	7	8	9
Heartbeat assembled bearing outer ring raceway (axial runout)	S_{ea}	1,5	2,5	2,5	4	5	5	5	7	7	8	10	12
Tolerance in width ΔC_s is identical ΔB_s for the corresponding inner ring.													

2. Data on the bearings

tolerance class P2

The inner ring (dimensions in mm)						
The nominal bore diameter	over before	10 18	18 30	30 50	50 80	80 120
P2 tolerance class (Tolerances in microns)						
Deviation	$\Delta d_{mp}, \Delta d_s$	0 -2,5	0 -2,5	0 -2,5	0 -4	0 -5
Roundness	$V_{dp}/2$	1,5	1,5	1,5	2	2,5
Resizing	V_{dmp}	1,5	1,5	1,5	2	2,5
Deviation in width	ΔB_s	0 -80	0 -120	0 -120	0 -150	0 -200
Changing the width	V_{B_s}	1,5	1,5	1,5	1,5	2,5
Radial runout	K_{ia}	1,5	2,5	2,5	2,5	2,5
Resizing at inclination to the outer cylindrical surface of the hole	S_d	1,5	1,5	1,5	1,5	2,5
The beating of the assembled inner ring raceway (axial runout)	S_{ia}	1,5	2,5	2,5	2,5	2,5

outer ring (Dimensions in mm)											
The nominal outer diameter	over before	18 30	30 50	50 80	80 120	120 150	150 180	180 250	250 315	315 400	400 500
P2 tolerance class (Tolerances in microns)											
Deviation	$\Delta D_{mp}, \Delta D_s$	0 -4	0 -4	0 -4	0 -5	0 -5	0 -7	0 -8	0 -8	0 -10	0 -12
Roundness	$V_{Dp}/2$	2	2	2	2,5	2,5	3,5	4	4	5	6
Resizing	V_{Dmp}	2	2	2	2,5	2,5	3,5	4	4	5	6
Changing the width	V_{C_s}	1,5	1,5	1,5	2,5	2,5	2,5	4	5	7	8
Radial runout	K_{ea}	2,5	2,5	4	5	5	5	7	7	8	10
Resizing mood at the outer cylindrical surface with respect to the side surface of the outer ring	S_D	1,5	1,5	1,5	2,5	2,5	2,5	4	5	7	8
Heartbeat assembled bearing outer ring raceway (axial runout)	S_{ea}	2,5	2,5	4	5	5	5	7	7	8	10
Tolerance in width ΔC_s is identical ΔB_s for the corresponding inner ring.											

2. Data on the bearings

Tolerance class P2S

Additionally compressed tolerances accuracy class P2 are defined as classes intrafactory P2S accuracy. These bearings meet the most stringent accuracy requirements and are suitable for use in conditions of maximum speeds.

The inner ring (Dimensions in mm)								
The nominal bore diameter	over	0	10	18	30	50	80	120
	before	10	18	30	50	80	120	150
Tolerance class P2S (Tolerances in microns)								
Deviation	$\Delta ds, \Delta dmp$	0	0	0	0	0	0	0
		-2	-2	-2	-2,5	-4	-5	-6
Circularity $Vdp / 2$	Row 8 • 9	1	1	1	1,5	2	2	2,5
	Row 0 • 2	1	1	1,5	1,5	1,5	2	2,5
Deviation in width	ΔBs	0	0	0	0	0	0	0
		-25	-25	-25	-25	-25	-50	-50
Changing the width	VBs	1	1	1	1,3	1,3	2	2
Radial runout	K_{ia}	1,3	1,3	1,5	1,5	2	2	2,5
Vibrations at inclination to the outer cylindrical surface of the hole	S_d	1,3	1,3	1,3	1,3	1,3	2	2
The beating of the assembled inner ring raceway (axial runout)	S_{ia}	1,3	1,3	2	2	2	2	2,5

Outer ring (Dimensions in mm)								
The nominal outer diameter	свыше	10	18	30	50	80	120	150
	до	18	30	50	80	120	150	180
Tolerance class P2S (Tolerances in microns)								
Deviation	$\Delta Ds, \Delta Dmp$	0	0	0	0	0	0	0
		-2,5	-3,5	-3,5	-3,5	-4	-4	-6
Circularity $VDp / 2$	Row 8 • 9	1	2	2	2	2	2	3
	Row 0 • 2	1	1,5	1,5	1,5	2	2	2,5
Changing the width	VCs	1	1	1	1,3	2	2	2
Radial runout	K_{ea}	1,5	2	2	2,5	3	3	3,5
Vibration in the outer cylindrical surface of inclination with respect to the side surface of the outer ring	S_D	1,3	1,3	1,3	1,3	2,5	2,5	2,5
Heartbeat assembled bearing outer ring raceway (axial runout)	S_{ea}	1,5	2	2	3	4	4	4
Tolerance in width ΔCs is identical ΔBs for the corresponding inner ring.								

2. Data on the bearings

2.2. . Group sizes for spindle bearings

For spindle bearings dimensional tolerances concerning the hole diameter and the outer diameter divided into three ranges. The mean change in the range is recorded as actual value in microns on the outer ring (e.g. <-3>) or on the inner ring (e.g. <-1>).

2.3. Rotation speed

Spindle bearings are particularly well suited for operation at high speeds. Factors affecting the speed of rotation:

- Operating temperatures: special attention to dissipate heat
- Lubrication: when using grease operating speed is only about 65% of the rotation speed reached by using an oil lubricant
- Range of sizes: The smaller the cross-section of the bearing, the better it is suitable for high rotational speeds.
- Preload: Working speed decreases with increasing preload.
- Fitting Scheme Maximum rotation speed is reached when installing a single bearing. Installation bearing sets consisting of two or more bearings, the rotational speed decreases accordingly. (Section 7.4).
- contact angle: Reserve rotation speed decreases with increasing contact angle.
- Accuracy: Maximum speed increases with increasing accuracy.
- Precise machining of the bearings.
- Cage Type: Low cage reduces w8 imbalance; In addition, the guide diameter of the outer ring rib ensures self centering of the cage.

For spindle bearings set the correction factors to be multiplied to the prescribed rotational speed:

Bearing properties	Correction factor
Accuracy	
P4	0,9
P4S	1
P2	1,1
P2S	1,15
Contact angle	
15°	1
25°	0,9
Lubricant	
butter	1
grease	0,65

These values are approximate, applicable to a fixed preload in optimal working conditions such as the installation tolerances, operating temperature, lubrication, etc. Level dynamic balancing is essential to ensure good motion.

2.4. Working temperature

Spindle bearings VBF subjected to heat treatment, so they are dimensionally stable up to operating temperature 150 ° C. Blue cages temperature, bearing seals and lubricants can further limit the upper bearing operating temperature.

Detail	Upper Temperature Range
Ring roller bearings	150°C
The cage of laminated phenolic (standard)	100°C
Brass cage	150°C
Cage polyetheretherketone (PEEK)	about. 260°C (to 150°C without any limitations in performance)
Sealing wheels of NBR (nitrile rubber) (2RSD)	110°C
Grease L75 (standard)	120°C

If possible, the bearing outer ring temperature should not exceed 80 ° C. Also possible, the bearings must be cooled, e.g., via the cooling body or circulating oil lubrication.

2.5. Noise level

Noise level is a sign of spindle bearings of their quality and performance of the bearings. Since the bearing noise is caused by any existing irregularities, waviness and roughness, attention is paid to ensure the production of the highest quality, especially with regard to the above characteristics. appropriate measurement technology is used to support this process. All bearings are fully tested for quality control in relation to the noise level using a special test equipment to ensure the supply of only those bearings that meet the highest standards. In addition, this test provides feedback in relation to clean bearings.

3. Universal bearings, bearing sets

3.1. Universal bearings «U»

VBF range of products also includes bearings with universal coordinated designs (UL, UM, US). Universal «U» bearings defined so that both the inner and outer rings are aligned properly under the action of a predetermined axial force (preload force). In real terms, this means that if the inner ring of two identical spindle bearings are loaded in the axial direction (O-configuration), the result is exactly the preload force, said bearing manufacturer:

- Light preload (UL)
- average preload (UM)
- Heavy preload (US).

X-configuration behaves in the same way, despite the fact that the outer ring of both bearings are loaded axially. Spindle bearings in universal design (same size and same structure) can be set in any arrangement. An even load distribution is best achieved using kits VBF bearings that are harmonized with each other in the production process. In addition, VBF offers the following options for simple storage and high flexibility:

- Two-component kits, e.g., with the suffix DUL.

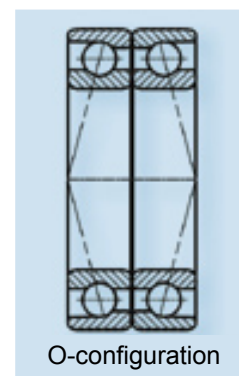
They are a duplex pair of bearings, wherein the hole diameter sizes and shell match with each other; they can be installed in a configuration O (DB), X (DF), and in the configuration T (DT). Secured thus flatness is particularly important for operation at high speeds and high accuracy and is recommended by VBF.

- Three-component kits For example, with an index of TUL, similar to a two-component kits
- quaternary kits For example

3.2. The layout of the bearings

3.2.1. O-configuration (DB suffix)

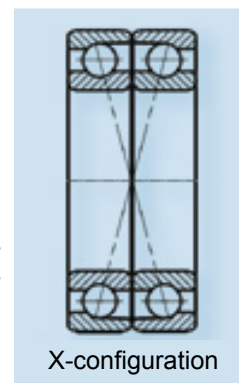
Pressure lines deviate from the axis of the bearing. This leads to a large step on the bearing axis. Thanks to this arrangement gives a very rigid bearing with respect to the tilting moments, which also absorbs the axial forces in both directions.



O-configuration

3.2.2. X-configuration (DF Suffix)

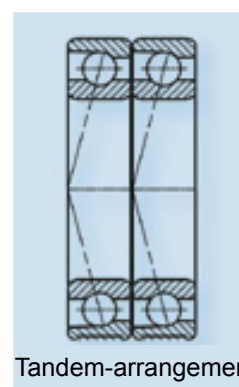
Pressure lines merge towards the bearing axis. This leads to a small step on the bearing axis. When bending rigidity smaller than the n. 3.2.1. The configuration is less sensitive to alignment disturbance. Reaction support and elasticity of the bearing act along the lines of the configuration of O.



X-configuration

3.2.3. Sequential (tandem) location (DT suffix)

Оба спаренных подшипника расположены параллельно в направлении действия нагрузки, при этом в направлении действия нагрузки возможна большая осевая нагрузка, чем с отдельными подшипниками. Каждый из двух подшипников воспринимает почти равную долю осевой нагрузки. Необходимо учитывать, что тандемная пара в любом случае должна быть подвержена предварительному натягу относительно третьего подшипника.



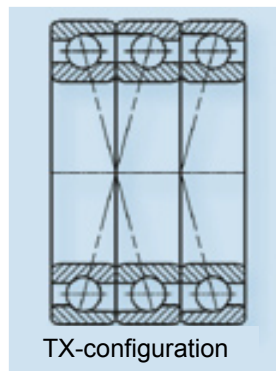
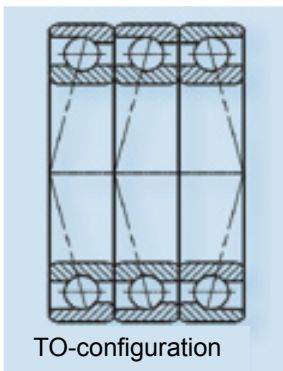
Tandem-arrangement

3.2.4. The multi-component configuration

If necessary, larger loads or in circumstances requirements to ensure high stiffness in exceptional cases, collected and set sets of 3 or 4 or even 5 bearings. Bearings, selected in such a way manufactured, labeled and packaged in the company VBF either pairs or sets. These bearings have identical dimensions of the openings and the outer diameter.

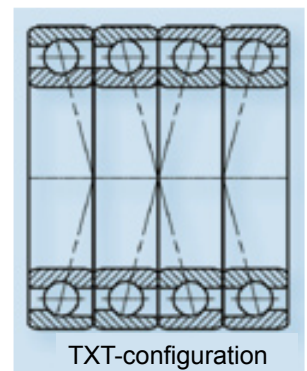
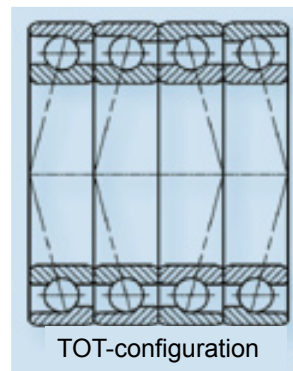
3.2.4.1. TO-configuration (TBT suffix) and TX-configuration (TFT suffix)

Both of these configurations are used as a sequential (tandem) for sensing the location of increased axial loads in one direction. Optional third bearing is used to combat and makes a fixed bearing multicomponent configuration.



3.2.4.2. TOT-configuration (QBC suffix) and TXT-configuration (QFC suffix)

Both configurations are used as fixed bearings (rigid supports) for sensing high radial loads and high axial loadings. This configuration results in a very high rigidity. It is not practical to install more than three bearings directly next to each other, since heat dissipation is worse, and the supply of lubricant to the bearings all complicated. That's why there is necessary to use spacers.



3. Universal bearings, bearing sets

3.3. . Cages

Installation intermediate rings (inner and outer respectively) agreed between the bearings should lead to the following results:

- Step bearing configuration X and O increases.
- Improved lubrication, ie the possibility of oil supply to each bearing, as in the case of grease lubrication, there is a stock of grease.
- Facilitated dispersion of the heat of friction.
- Using intermediate rings can change the preload configuration with X and / or O. In real terms, this means: Inner spacer has a thinner design than the outer, so preload decreases with increasing X configuration, or a configuration O.
- Necessary changes sizes are available on request.

In the manufacture of intermediate rings, special attention should be paid to ensure parallelism and equality planes. Both intermediate rings must be subjected to one-stage grinding surface if possible.

Tolerance class	P0, P6, P5, P4	P2
The difference in the width of the inner and outer intermediate rings	3,0	2,0
Changing the width	2,5	1,3
Runout	2,5	1,3

Hybrid spindle bearings are bearings with the raceways, made of bearing steel, and balls of ceramic material (silicon nitride Si_3N_4) of maximum uniformity and hardness. Furthermore, the ceramic balls are lighter than steel balls. This reduces the centrifugal force and hence to a smaller friction. They are insulated against the action of the electric current and are nonmagnetic. In addition, they have high corrosion resistance. These bearings are specially designed as a heavy-duty bearings for machine tool spindles, provide the necessary conditions for a high production capacity. Based on the positive characteristics of ceramics, hybrid bearings are characterized by considerably less friction during operation, and thus, have the following advantages as compared to bearings with steel balls:

- increasing the rotational velocity is about 20%
- better functioning after the failure of the lubrication system
- higher stiffness
- less vibration
- below the noise level
- more favorable characteristics of acceleration and deceleration

Hybrid bearings originally used specifically for high speeds. Given that their lifespan is almost the same as that of bearings with steel balls, they are also used in all other series of bearings.



Fig. 4.1. Hybrid spindle bearings

5. Sealed spindle bearings

Spindle bearings hermetically sealed (2RSD) are also included in the product range of the company VBF, as specified in the product tables. Lubrication of the bearings is unattended, so that the bearings have lower temperature when operating at high speeds for extended periods of time. Due to their relatively simple installation, lubrication and maintenance, they are the ideal solution for customers requiring bearings with long service life. The bearings of the same size and the series in hermetic performance may be replaced by similar bearing in sealed design.



Fig. 5.1. Spindle bearing structure 2RSD

6. The spindle bearing with direct injection of the lubricant

With these constructions, in the case of a minimum amount of lubricant oil-based lubricant can be supplied directly to the contact point (ball / raceway).

The DLR structure has an annular oil groove and opening at the outer ring diameter of about 0.5 mm. Two radial grooves defined sealing rings from nitrile rubber (NBR) (standard) provide optimum sealing with the spindle housing.

The user is responsible for the implementation of holes for supplying lubricant in the appropriate place on the body.

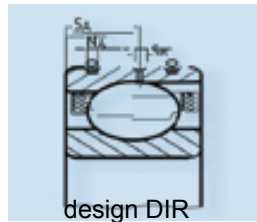


Fig. 6.1. Spindle bearing structure DLR

7. Calculation of the bearing design

7.1. General provisions

Calculation of the design for the basic rated load and the bearing life is based on DIN ISO 76 standard (static rated load), and DIN ISO 281 (dynamic rated load and rated lifespan). These standards describe the complex calculations of structures. As a result, below we will focus only on the core design calculations. These construction payments are used to provide a rough estimation of the bearing.

More in-depth evaluation of bearings are possible by calculating the Hertz contact pressure between the rolling elements and the tracks taking into account the actual conditions of lubrication by means of special calculation programs. In this regard, please contact our engineering department.

7.2. Rated Lifetime

The service life of the bearing indicated by the number of revolutions or hours to as long as the bearing does not show signs of damage. The most common causes are wear, overheating and jamming due to overload (mechanical and thermal), as well as material fatigue. The most common reason for failure in high-speed conditions of use - overheating, followed by bearing seizure.

In accordance with DIN ISO 281 rated life group spindle bearings of the same model with the same contact angle is calculated as follows:

$L_{10} = \left(\frac{K \cdot C_r}{P_r} \right)^3$	in millions of revolutions
$L_{10h} = \frac{L_{10} \cdot 10^6}{60 \cdot n}$	hours

L_{10}	The nominal service life in millions of revolutions to failure probability of 10%
L_{10h}	Rated life in hours with a probability of failure of 10%
C_r	Dynamic radial load in H
K	The correction factor depends on the number of spindle «i» bearings: $K = i^{0,7}$
P_r	The dynamic equivalent radial load in H
F_a	Axial load bearing group in the H
F_r	The radial group bearing load in N
n	The number of revolutions per min-1

7. Calculation of the bearing design

7.3. Equivalent dynamic bearing load

If the bearing is subjected to simultaneous radial and axial load, these loads are reduced in the equivalent load for calculating the nominal lifetime. Equivalent dynamic load is calculated as follows:

$$P_r = X \cdot F_r + Y \cdot F_a \text{ (B H)}$$

Both coefficients X and Y depend on the ratio of the axial and radial F_a / F_r loads comparable to a specific coefficient e bearings.

The bearings installed in the X or O configuration			$F_a / F_r \leq e$		$F_a / F_r > e$	
α	$F_a / (i \cdot C_0)$	e	X	Y	X	Y
15°	0,015	0,38	1	1,65	0,72	2,39
15°	0,029	0,4	1	1,57	0,72	2,28
15°	0,058	0,43	1	1,46	0,72	2,11
15°	0,087	0,46	1	1,38	0,72	2,0
15°	0,12	0,47	1	1,34	0,72	1,93
15°	0,17	0,5	1	1,26	0,72	1,82
15°	0,29	0,55	1	1,14	0,72	1,66
15°	0,44	0,56	1	1,12	0,72	1,63
15°	0,58	0,56	1	1,12	0,72	1,63
25°	-	0,68	1	0,92	0,67	1,41

Individual bearings or tandem configuration			$F_a / F_r \leq e$		$F_a / F_r > e$	
α	$F_a / (i \cdot C_0)$	e	X	Y	X	Y
15°	0,015	0,38	1	0	0,44	1,47
15°	0,029	0,4	1	0	0,44	1,4
15°	0,058	0,43	1	0	0,44	1,3
15°	0,087	0,46	1	0	0,44	1,23
15°	0,12	0,47	1	0	0,44	1,19
15°	0,17	0,5	1	0	0,44	1,12
15°	0,29	0,55	1	0	0,44	1,02
15°	0,44	0,56	1	0	0,44	1,0
15°	0,58	0,56	1	0	0,44	1,0
25°	-	0,68	1	0	0,41	0,87

7.4. Calculation of the limit rotation speed

The number of bearings, their arrangement, the load (air temperature or preload), the external load and lubrication on the one hand, and the heat dissipation on the other hand, are decisive factors for speed. rotation speed specified in Tables bearings as recommendations can vary in both directions depending on the conditions mentioned above. Given the speed of rotation can not be achieved in the case of installation with rigid bearing preload and steam and bearing sets. The following table contains the appropriate factor for calculating the required rotational speed. In any case, this leads to a decrease in rotation speed.

Reducing the rotation speed of spindle bearings kit ($n \cdot f_r$)				
		Factor f_r		
		Bearing preload		
		light	average	heavy / high
The large distance between the bearings		L	M	S
		0,85	0,75	0,50
		0,80	0,70	0,50
		0,75	0,65	0,45
Fixed bearing		movable bearing		
		L	M	S
		0,75	0,60	0,35
		0,65	0,50	0,30
		0,65	0,50	0,30
		0,72	0,57	0,37
		0,54	0,40	0,37

n corresponds to the rotational speed according to the catalog

7. Calculation of the bearing design

7.5. Suspension and stiffness

Due to the bearing without play is achieved very high precision movement, even if they are subjected to various stresses. The necessary stiffness and load type determines the location and bearing preload. Placing bearing kits greatly increases rigidity. The values indicated in the tables for bearing axial stiffness refer to pairs of bearing configurations O or X. Kits bearing with three or more bearings allow higher axial stiffness values.

Radial stiffness can be calculated by using the axial stiffness factor as follows:

$$S_r \approx 6 \cdot S_a \text{ при } \alpha = 15^\circ$$

$$S_r \approx 2 \cdot S_a \text{ при } \alpha = 25^\circ$$

If more than two bearings are combined into sets, axial stiffness increases. The following table illustrates the calculation of the stiffness of concentrically acting axial force.

Combination	S_a	KaE (lifting force) $\alpha = 15^\circ$ and $\alpha = 25^\circ$
	H/МММ	H
DB	S_a	$3 \cdot F_v$
TBT	$1,64 \cdot S_a$	$6 \cdot F_v$
QBC	$2 \cdot S_a$	$6 \cdot F_v$
QBT	$2,24 \cdot S_a$	$9 \cdot F_v$

7.6. Load bearing capacity

The dynamic load rating for the bearing sets, selected in any configuration, is obtained by multiplying the rated load C for a separate bearing at the ratio:

1.62 for sets with two bearings

2.16 kit with bearings 3

2,64 for sets with 4 bearings

3,09 for sets with 5 bearings

A static rated load is obtained by multiplying a specified value C0 in Table 2, 3, 4 or 5.

7.7. Preload

The predefined axial force (preload force) the following: a light (L), medium (M) and heavy (S). Efforts preload shown in Tables bearings include an axial bearing preload pairs (configuration in O or X). In the case of a combination of more than two bearing preload value to be multiplied by the following factor:

Combination	Coefficient
DB, DF	1
TBT, TFT	1,35
QBC, QFT	1,6
QBC, QFC	2

Preload called constant axial load applied to the bearing. He has a significant impact on the

- achievable rotation speed
- rigidity
- allowable load

Preload has to be as large as necessary. Standard construction is light preload (UL), which can be made rigidly (bearings are 10sioned against each other) or elastically (springs).

Fixed preload (in the axial direction):

- thermal effects may increase substantially - a significant effect on the maximum achievable speed.

The elastic preload (springs):

- thermal effect is eliminated predominantly by springs
- the maximum attainable speed is almost not affected. In the case of high rotational speeds, a minimum preload. This depends on the external axial load. lifting force is the outer limit of axial load above which influence preload increases in the case of discharging the ball valves.

Related the following effects:

- Violated constant contact balls and raceways
- Increases sliding friction
- increases wear
- Reduced lifespan

8. The tolerances for the installation of spindle bearings

8.1. Tolerances for machining parts surrounding the bearings

High performance spindle bearings can only be ensured if the accuracy of the respective adjacent parts is provided in accordance with the precision bearings. This condition is necessary because the ring spindle bearings, especially the dimensional series of small cross-section adapted to the shape of the shaft or in the housing opening. This can lead to the formation of defects in shape and misalignment, which leads to higher operating temperatures. The higher the required speed and accuracy levels for the bearing, the more these deficiencies become apparent. Observe average roughness R_a bearing sockets to provide a proper fit, which changes only very slightly during the installation (surface smoothing).

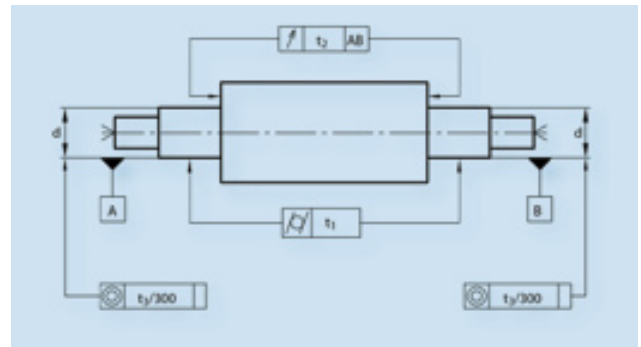


Fig. 8.1. Mechanical shaft treatment

8.2. Recommendations for machining shafts

Nominal size of the shaft, d (in mm)														
Size d	Bearing tolerance class	General recommendation on ISO 286	from to	6 10	10 18	18 30	30 50	50 80	80 120	120 180	180 250	250 315	315 400	400 500
Dimensions and tolerances - empirical values (In microns)														
No-load socket	P5/P4/P4S	h4		0 -4	0 -4	0 -4	0 -6	0 -6	0 -8	0 -9	0 -11	0 -12	0 -14	0 -15
	P2/P2S	h3		0 -3	0 -3	0 -3	0 -4	0 -4	0 -5	0 -6	0 -8	0 -10	0 -10	0 -12
Stationary seat	P5/P4/P4S	js4		2 -2	2,5 -2,5	3 -3	3,5 -3,5	4 -4	5 -5	6 -6	7 -7	8 -8	9 -9	10 -10
	P2/P2S	js3		1,25 -1,25	1,5 -1,5	2 -2	2 -2	2,5 -2,5	3 -3	4 -4	5 -5	6 -6	6,5 -6,5	7,5 -7,5
Cylindrical shape, t1	P5/P4/P4S P2/P2S	IT0		1 0,5	1 0,5	1 0,8	1,5 1	1,5 1	1,5 1,2	2 2	3 2,5	4 3	5 4	6 4
Runout, t2	P5/P4/P4S P2/P2S	IT1		1 0,5	1 0,5	1 0,8	1,5 1	1,5 1	2,5 2	3,5 3	4,5 4	6 5	7 6	8 6
Concentricity, t3	P5/P4/P4S P2/P2S	IT3		2 1	2 1	2 1	3 2	3 2	4 2,5	5 3,5	7 4,5	8 6	9 7	10 8
Average roughness, Ra				0,2	0,2	0,2	0,2	0,4	0,4	0,4	0,4	0,8	0,8	0,8

8. The tolerances for the installation of spindle bearings

8.3. Recommendation for machining holes in housing

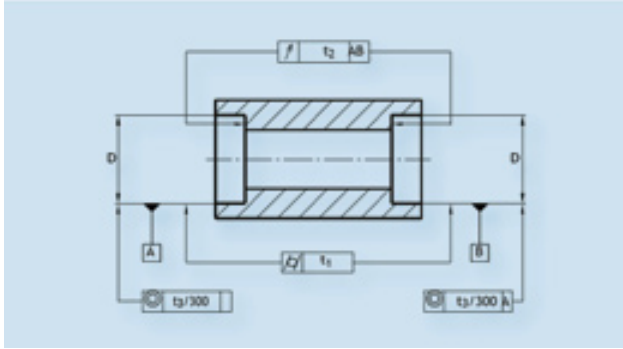


Fig. 8.2. Machining holes in the housing

Nominal size of the shaft, d (in mm) mm														
Size d	Bearing tolerance class	General recommendation on ISO 286	from to	6 10	10 18	18 30	30 50	50 80	80 120	120 180	180 250	250 315	315 400	400 500
			(In microns)											
			Dimensions and tolerances - empirical values											
No-load socket	P5/P4/P4S	h4		0 -4	0 -4	0 -4	0 -6	0 -6	0 -8	0 -9	0 -11	0 -12	0 -14	0 -15
	P2/P2S	h3		0 -3	0 -3	0 -3	0 -4	0 -4	0 -5	0 -6	0 -8	0 -10	0 -10	0 -12
Stationary seat	P5/P4/P4S	js4		2 -2	2,5 -2,5	3 -3	3,5 -3,5	4 -4	5 -5	6 -6	7 -7	8 -8	9 -9	10 -10
	P2/P2S	js3		1,25 -1,25	1,5 -1,5	2 -2	2 -2	2,5 -2,5	3 -3	4 -4	5 -5	6 -6	6,5 -6,5	7,5 -7,5
Cylindrical shape, t1	P5/P4/P4S	IT0		1 0,5	1 0,5	1 0,8	1,5 1	1,5 1	1,5 1	2 1,2	3 2	4 2,5	5 3	6 4
	P2/P2S	IT0		1 0,5	1 0,5	1 0,8	1,5 1	1,5 1	1,5 1	2 1,2	3 2	4 2,5	5 3	6 4
Runout, t2	P5/P4/P4S	IT1		1 0,5	1 0,5	1 0,8	1,5 1	1,5 1	2,5 1,5	3,5 2	4,5 3	6 4	7 5	8 6
	P2/P2S	IT1		1 0,5	1 0,5	1 0,8	1,5 1	1,5 1	2,5 1,5	3,5 2	4,5 3	6 4	7 5	8 6
Concentricity, t3	P5/P4/P4S	IT3		2 1	2 1	2 1	3 2	3 2	4 2,5	5 3,5	7 4,5	8 6	9 7	10 8
	P2/P2S	IT3		2 1	2 1	2 1	3 2	3 2	4 2,5	5 3,5	7 4,5	8 6	9 7	10 8
Average roughness, Ra				0,2	0,2	0,2	0,2	0,4	0,4	0,4	0,4	0,8	0,8	0,8

9. Installation

9.1. Preparing the installation

Bearings high precision meet the most stringent requirements for cleanliness and accuracy. Bearings should be installed with the utmost care. Make sure they are installed in a room that is as pure as possible and free of dust, temperature controlled. Before installing the bearings need to verify the accuracy of connecting parts sizes. Provide and use only those tools that are suitable for installation. In the case of using sets of bearings, it is desirable to combine bearings with identical diameters (as actual values). Open the packaging bearing only immediately prior to installation. Remove excess anticorrosive oil by using a clean, lint-free cloth.

9.3. Bearing installation

9.3.1. Installation using a press

Apply a thin layer of oil on the shaft. During pressing, no effort should not be transmitted through the rolling elements. Zapressuyte bearing uniformly on the inner ring to the shaft of the shoulder using a suitable insertion tool. Avoid skewing rings

9.2. Bearing Lubrication

In the case of lubricants and anti-corrosion oil incompatibility provided with grease bearings should be rinsed with low viscosity oil or kerosene and dried. Thereafter lubricate bearings recommended quantity of lubricant with a syringe or spatula in the same amount between the rolling elements, preferably on the inner ring, and then turn the hand to ensure an even distribution of the lubricant in the bearing. (For information about the recommended amount of grease can be found in Section 23.2.3. The amount of lubricant).

9.3.2. Installing a bearing heating

Heating of the inner ring, for example, by an inductive heating device simplifies the installation of the inner rings. The greater the overlap of the inner ring, the higher the temperature. However, it should not exceed 120 ° C. The recommended temperature difference in degrees Kelvin (K):

Tolerance for the shaft / bore	j5	k5	m5	n6	p6	r5
d < 80	50	60	70	80	100	100
80 < d ≤ 180	40	40	45	55	65	75
180 < d ≤ 315	30	35	40	45	50	60
315 < d ≤ 500	30	30	35	40	45	55

9.4. Fixing bearing

9.4.1. Fixing with precision nuts

Inner rings tightened using locknuts. Tightening torque creates a clamping force which securely overcomes the preload bearing case or O configuration with multiple bearing configurations. To avoid any jamming signs first tighten nuts two to three times the specified torque, then loosen and tighten the nut to recommended torque.

BKZ	number of holes
d	The hole diameter, mm
Ma	Tightening torque Nm
Fz	The resulting clamping force kN

Recommended torques for axial positioning inner bearing rings with a nut

			Series 719		Series 70		Серия 72	
BKZ	d	Thread	Ma	Fz	Ma	Fz	Ma	Fz
02	15	M15x1	1,54	0,85	1,98	1,09	2,13	1,17
03	17	M17x1	1,49	0,73	2,28	1,12	2,66	1,30
04	20	M20x1	2,52	1,06	3,99	1,68	5,17	2,18
05	25	M25x1,5	3,91	1,30	6,31	2,10	7,89	2,63
06	30	M30x1,5	6,97	1,96	9,77	2,75	13,5	3,78
07	35	M35x1,5	9,35	2,28	14,5	3,52	20,6	5,01
08	40	M40x1,5	14,6	3,13	19,1	4,11	27,4	5,88
09	45	M45x1,5	18,2	3,49	24,5	4,70	32,4	6,22
10	50	M50x1,5	20,6	3,57	29,0	5,03	37,6	6,53
11	55	M55x2	28,9	4,52	42,1	6,59	52,6	8,22
12	60	M60x2	31,5	4,53	50,3	7,24	72,5	10,4
13	65	M65x2	39,4	5,25	57,6	7,67	96,1	12,8
14	70	M70x2	52,2	6,48	76,6	9,51	113	14,0
15	75	M75x2	60,9	7,08	87,3	10,1	120	14,0
16	80	M80x2	71,4	7,79	106	11,6	148	16,1
17	85	M85x2	105	10,8	124	12,7	193	19,8
18	90	M90x2	107	10,4	153	14,9	231	22,5
19	95	M95x2	110	10,2	169	15,7	276	25,5
20	100	M100x2	161	14,1	187	16,5	339	29,8
21	105	M105x2	163	13,6	214	18,0	381	31,9
22	110	M110x2	178	14,3	273	21,9	458	35,7
24	120	M120x2	238	17,5	322	23,7	512	37,7
26	130	M130x2	309	21,1	442	30,1	653	44,5

9. Installation

BKZ	d	Резьба	Series 719		Series 70		Series 72	
			Ma	Fz	Ma	Fz	Ma	Fz
28	140	M140x2	357	22,6	509	32,2	886	56,1
30	150	M150x2	494	29,2	598	35,4	1 172	69,4
32	160	M160x3	564	31,1	765	42,1	1 509	83,1
34	170	M170x3	634	32,9	903	46,9	1 738	90,2
36	180	M180x3	831	40,8	1 217	59,8	1 933	94,9
38	190	M190x3	922	42,9	1 349	62,8	2 392	111
40	200	M200x3	1 172	51,9	1 550	68,6	2 916	129
44	220	Tr220x4	1 417	56,8	2 185	87,6	3 863	155
48	240	Tr240x4	1 675	61,7	2 578	94,9		
52	260	Tr260x4	2 474	84,2				
56	280	Tr280x4	2 853	90,3				
60	300	Tr300x4	3 952	117				
64	320	Tr320x5	4 495	124				
68	340	Tr340x5	5 051	132				
72	360	Tr360x5	5 640	139				
84	420	Tr420x5	8 718	185				
92	460	Tr460x5	12 991	252				
500	500	Tr500x5	16 000	285				

9.4.2. Fixing by the housing cover

Especially in the case of the configuration of X and stationary bearing outer ring usually pre 10sioned housing cover. Since the tolerances in width, especially for adjustable spindle bearings, are relatively large, need to carefully adjust the cap. Before tigh10ing cap screws necessary to ensure that the next gap remained between the cap and the housing.

The bearing bore	The gap cover body, a
≤ 100 mm	0,01 to 0,03 mm
> 100 mm	0,02 to 0,04 mm

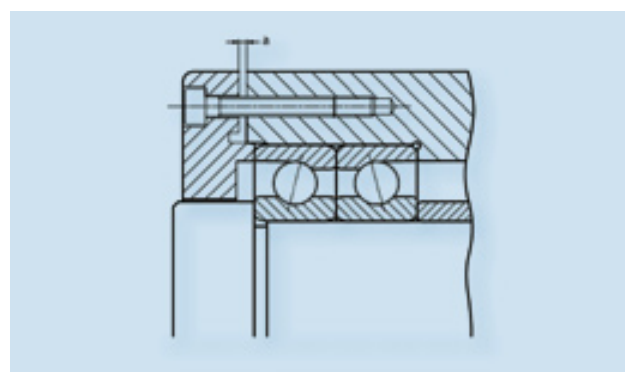


Fig. 9.1. Fixing by the housing cover

10.1. Content and layout marking

Rolling bearings are usually marked as follows:

- Brand Name VBF
- Product designation, e.g., «B71910C.T.P4S.

UL»

- Country of: MADE IN RUSSIA
- Year of release bearing

Bearing marking is usually located on a flat side of the outer ring. In the case of spindle bearings actual dimensions of the outer diameter and bore, and the width indicated as the current value of m in the following manner:

Outer ring	Example
The actual outer diameter and the width between the specified and the product designation "MADE IN RUSSIAN".	$\langle - 3 / - 80 \rangle$
<Outer diameter / width>	
The inner ring	Example
The actual diameter of the hole	$\langle - 1 \rangle$
<Diameter>	

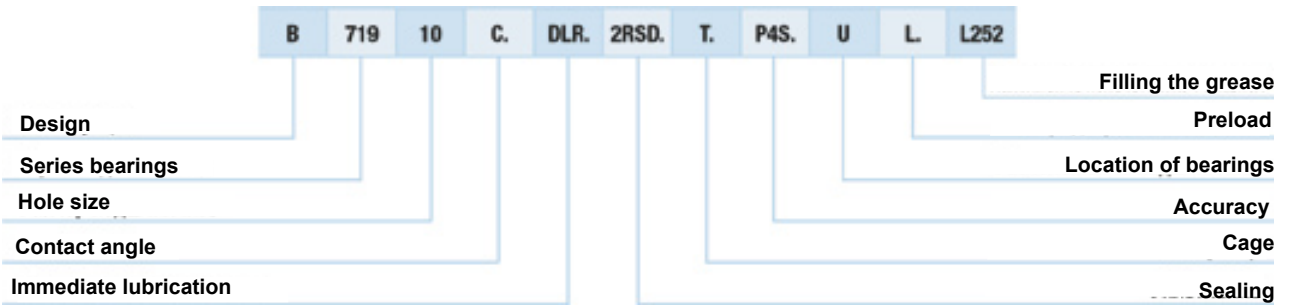
If the marking is provided only on the inner ring:

The inner ring	Example
The actual opening diameter, outer diameter and width are given between the product and the designation "MADE IN RUSSIAN".	$\langle - 1 / - 3 / - 80 \rangle$
<Hole diameter / outer diameter / width>	

The actual width of the bearing is recorded without deflection on the package label (e.g., -1 * / * -3). The inner ring is marked on the line section with the greatest wall thickness (lane toward the opening).

10. Marking of bearings

10.2. Labeling scheme spindle bearings



Design	
B	Standard steel balls
HCB	Standard with ceramic balls
XCB	Standard with ceramic balls, rings for rolling bearings made of Cronidur 30
A	Standard steel balls
HS	High-speed bearings with steel balls
HC	High-speed bearings with steel balls
XC	High speed bearings with ceramic balls, rolling bearing rings made of Cronidur 30
Series bearings	
719	light series
70	average series
72	medium-heavy series
73	heavy series
Hole size	
02	15 mm
03	17 mm
04	4 * 5 = 20 mm
05	5 * 5 = 25 mm
06	6 * 5 = 30 mm (etc.)
Contact angle	
C	15
E	25 °
Immediate lubrication	
DLR	The annular groove and the radial feed opening and two radial grooves with sealing rings OD

Sealing	
2RSD	Sealed and lubricated on both sides
RSDO	Sealed on one side, the disc on the side of the large diameter outer ring / edge, unlubricated
RSDX	Sealed on one side, the disc on the side of the small diameter outer ring / edge, unlubricated
Cage	
T	Window cage made of a multilayer tissue, the guide on the outer ring
MPA	Window cage made of brass to guide an outer ring
ENPA	Window cage made of polyetheretherketone, the guide on the outer ring
Accuracy	
P4S	Standard structure according to the implant standard (Runout tolerances above P2)
K5	With further restricted orifice diameter and an outer diameter corresponding tolerance class
P4	In accordance with DIN 620-2
P2	In accordance with DIN 620-2
P2S	Internal standard tolerance higher than P2
Location of bearings	
U	Separate bearing, suitable for any configuration designation sets of bearings cm. In Section 3.2.
Preload	
L	light
M	Average
S	Heavy
Filling the grease	
-	Without
-	For sealed bearings default L75; L252 or alternatively
L75	L75 Klüberspeed Bf 72-22 from Klüber
L252	L252 Turmogrease Highspeed from Lubcon

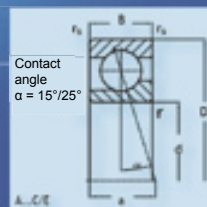
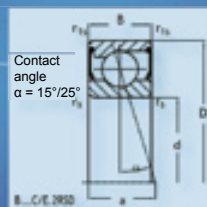
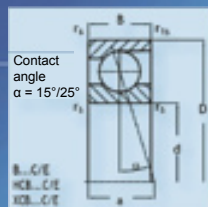
11. The introduction of brands from other manufacturers in the product designation VBF

Make	VBF	FAG	SKF	SNFA	NSK	GMN
Series						
B719	B719 ..	B719 ..	719 ..	SEB ..	79 ..	S619
B70	B70 ..	B70 ..	70 ..	EX ..	70 ..	S60
B72	B72 ..	B72 ..	72 ..	E2 ..	72 ..	S62.
A73	A73 ..		73 ..			
HS719	HS719 ..	HS719 ..	719 .. (A) CE			
HS70	HS70 ..	HS70 ..	70 .. (A) CE			
contact angle						
15	C	C	CD	one	C	C
25 °	E	E	ACD	3	A5	E
Sealing						
B72RSD	-2RSD				
HS72RSD	HSS7 ...				
Cage made of						
laminated fabric	.T (.TPA)	-T (-TPA)	ohne	CE	TR	TA
Brass	.MPA	-MPA		L		
Universal design						
Individual bearing	.U	-U	G	U	SU	U
Bearing pair	.DU	-DU	DG	DU	DU	DU
Bearing sets						
2 bearings in O-arrangement	.DB	-DB	DB	DD	DB	DB
2 bearings in X-arrangement	.DF	-DF	DF	FF	DF	DF
2 bearings in T-arrangement	.DT	-DT	DT	T	DT	DT
3 bearings in TO-arrangement	.TBT	-TBT	TBT	TD	DBD	TBT
3 bearings in TX-arrangement	.TFT	-TFT	TFT	TF	DFD	TFT
3 bearings in T-arrangement	.TT	-TT				TDT
4 bearings in TOT-arrangement	.QBC	-QBC	QBC	TDT	DBB	QBC
4 bearings in TXT-arrangement	.QFC	-QFC	QFC	TFT	DFF	QFC
4 bearings in 3TO-arrangement	.QBT	-QBT	QBT	3TD	DBT	
4 bearings in 3TX-arrangement	.QFT	-QFT	QFT	3TF	DFT	
4 bearings in T-arrangement	.QT	-QT	QT			QTC

11. The introduction of brands from other manufacturers in the product designation VBF

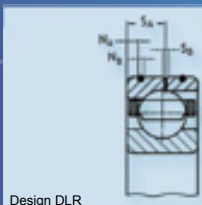
Make	VBF	FAG	SKF	SNFA	NSK	GMN
Presioning						
Light	L	L	A	L	L	L
Medium	M	M	B	M	M	M
Heavy	S	H	C	F	H	S
Individual	U .. (N)					V
Precision						
P4	P4	P4	P4A	7	P4	P4
P4S	P4S	P4S		P4A		
P2	P2	P2	PA9A	9	P2	P2
P2S	P2S					A9

12. Size tables

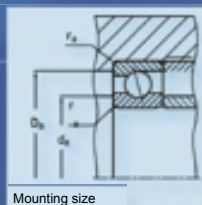


12.1. Spindle bearings

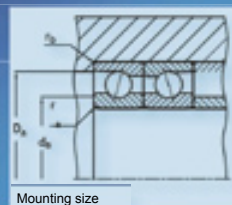
	Size of shaft (mm)						Mounting size (mm)				Size DLR (mm)				
	d	D	B	a	r _a min	r _{1a} min	d _h 12	D _h 12	r _a max	r _b max	N _B	N _A	S _B	S _A	
17	17	35	10	8	0,30	0,15	21,0	32,0	0,3	0,1					
	17	35	10	11	0,30	0,15	21,0	32,0	0,3	0,1					
	17	35	10	8	0,30	0,15	21,0	32,0	0,3	0,1					
	17	35	10	11	0,30	0,15	21,0	32,0	0,3	0,1					
	17	35	10	8	0,30	0,15	21,0	32,0	0,3	0,1					
	17	35	10	11	0,30	0,15	21,0	32,0	0,3	0,1					
	17	35	10	8	0,30	0,15	21,0	32,0	0,3	0,1					
	17	35	10	11	0,30	0,15	21,0	32,0	0,3	0,1					
	17	40	12	10	0,60	0,30	22,5	34,5	0,6	0,3					
	17	40	12	13	0,60	0,30	22,5	34,5	0,6	0,3					
	17	40	12	10	0,60	0,30	22,5	34,5	0,6	0,3					
	17	40	12	13	0,60	0,30	22,5	34,5	0,6	0,3					
	17	40	12	10	0,60	0,30	22,5	34,5	0,6	0,3					
	17	40	12	13	0,60	0,30	22,5	34,5	0,6	0,3					
	17	47	14	11	1,00	0,60	23,0	41,0	1,0	0,6					
	17	47	14	14	1,00	0,60	23,0	41,0	1,0	0,6					
20	20	37	9	8	0,30	0,30	22,0	33,5	0,3	0,1					
	20	37	9	11	0,30	0,30	22,0	33,5	0,3	0,1					
	20	37	9	8	0,30	0,30	22,0	33,5	0,3	0,1					
	20	37	9	11	0,30	0,30	22,0	33,5	0,3	0,1					
	20	37	9	8	0,30	0,30	22,0	33,5	0,3	0,1					
	20	37	9	11	0,30	0,30	22,0	33,5	0,3	0,1					
	20	37	9	8	0,30	0,30	22,0	33,5	0,3	0,1					
	20	37	9	11	0,30	0,30	22,0	33,5	0,3	0,1					
	20	42	12	10	0,60	0,30	25,0	37,0	0,6	0,3					
	20	42	12	13	0,60	0,30	25,0	37,0	0,6	0,3					
	20	42	12	10	0,60	0,30	25,0	37,0	0,6	0,3	1,5	2,2	1,4	6,6	
	20	42	12	13	0,60	0,30	25,0	37,0	0,6	0,3	1,5	2,2	1,4	6,6	
	20	42	12	10	0,60	0,30	25,0	37,0	0,6	0,3	1,5	2,2	1,4	6,6	
	20	42	12	13	0,60	0,30	25,0	37,0	0,6	0,3	1,5	2,2	1,4	6,6	
	20	42	12	10	0,60	0,30	25,0	37,0	0,6	0,3	1,5	2,2	1,4	6,6	
	20	42	12	13	0,60	0,30	25,0	37,0	0,6	0,3	1,5	2,2	1,4	6,6	



Design DLR



Mounting size

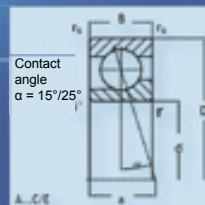
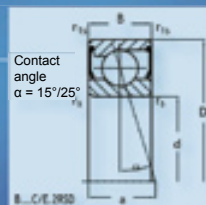
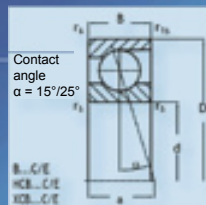


Mounting size

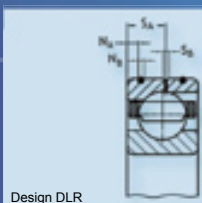
12. Size tables

	Preload (H)			Axial stiffness (H/um)			Payload (κH)		Limit rotational rate (rpm)		Code	Weight
	L	M	S	L	M	S	Dyn. C	Stat. Co	Grease	Oil	Bearing	kg
	41	145	306	21,2	37,7	55,3	8,7	5,2	43 000		B7003C.2RSD.T.P4S.UL	0,040
	54	220	485	48,0	81,2	112,5	8,2	5,0	38 000		B7003E.2RSD.T.P4S.UL	0,040
	41	145	306	21,2	37,7	55,3	8,7	5,2	43 000	63 000	B7003C.T.P4S.UL	0,040
	54	220	485	48,0	81,2	112,5	8,2	5,0	38 000	56 000	B7003E.T.P4S.UL	0,040
	18	73	161	17,1	30,4	44,0	8,7	3,6	53 000	80 000	HCB7003C.T.P4S.UL	0,035
	28	105	250	43,1	69,0	96,2	8,2	3,5	45 000	67 000	HCB7003E.T.P4S.UL	0,035
	18	73	161	17,1	30,4	44,0	13,8	3,6	70 000	110 000	XCB7003C.T.P4S.UL	0,035
	28	105	250	43,1	69,0	96,2	13,2	3,5	60 000	90 000	XCB7003E.T.P4S.UL	0,035
	53	185	390	23,6	42,8	63,8	11,3	6,1	38 000		B7203C.2RSD.T.P4S.UL	0,060
	75	290	625	54,0	90,6	126,0	10,8	5,9	36 000		B7203E.2RSD.T.P4S.UL	0,060
	53	185	390	23,6	42,8	63,8	11,3	6,1	38 000	56 000	B7203C.T.P4S.UL	0,060
	75	290	625	54,0	90,6	126,0	10,8	5,9	36 000	53 000	B7203E.T.P4S.UL	0,060
	25	98	210	19,5	35,0	50,5	11,3	4,3	50 000	75 000	HCB7203C.T.P4S.UL	0,052
	28	141	328	42,5	77,5	107,4	10,8	4,2	43 000	63 000	HCB7203E.T.P4S.UL	0,052
	70	140	290	35,0	45,0	70,0	14,5	7,9	29 000	48 000	A7303C.T.P4S.UL	0,120
	120	250	490	8	100,0	140,0	13,9	7,6	26 000	43 000	A7303E.T.P4S.UL	0,120
	38	135	298	24,3	43,6	66,0	8,6	5,1	38 000		B71904C.2RSD.T.P4S.UL	0,034
	41	172	391	47,0	84,1	118,3	8,2	4,9	36 000		B71904E.2RSD.T.P4S.UL	0,034
	38	135	298	24,3	43,6	66,0	8,6	5,1	38 000	56 000	B71904C.T.P4S.UL	0,034
	41	172	391	47,0	84,1	118,3	8,2	4,9	36 000	53 000	B71904E.T.P4S.UL	0,034
	13	59	130	16,9	32,0	47,3	8,6	3,6	50 000	75 000	HCB71904C.T.P4S.UL	0,030
	27	77	192	47,8	69,5	98,7	8,2	3,4	43 000	63 000	HCB71904E.T.P4S.UL	0,030
	13	59	130	16,9	32,0	47,3	13,8	3,6	63 000	95 000	XCB71904C.T.P4S.UL	0,030
	27	77	192	47,8	69,5	98,7	13,1	3,4	56 000	85 000	XCB71904E.T.P4S.UL	0,030
	52	180	378	22,7	40,0	58,9	11,0	7,0	36 000		B7004C.2RSD.T.P4S.UL	0,069
	71	277	599	51,6	86,6	119,2	10,5	6,7	32 000		B7004E.2RSD.T.P4S.UL	0,069
	52	180	378	22,7	40,0	58,9	11,0	7,0	36 000	53 000	B7004C.T.P4S.UL	0,069
	71	277	599	51,6	86,6	119,2	10,5	6,7	32 000	48 000	B7004E.T.P4S.UL	0,069
	24	92	202	18,8	33,0	47,3	11,0	4,9	45 000	67 000	HCB7004C.T.P4S.UL	0,062
	26	131	304	41,4	73,5	101,5	10,5	4,7	38 000	56 000	HCB7004E.T.P4S.UL	0,062
	24	92	202	18,8	33,0	47,3	17,7	4,9	60 000	90 000	XCB7004C.T.P4S.UL	0,062
	26	131	304	41,4	73,5	101,5	16,8	4,7	50 000	75 000	XCB7004E.T.P4S.UL	0,062

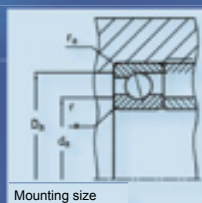
12. Size tables



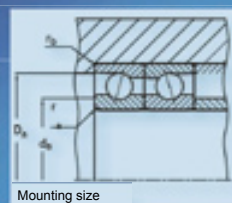
	Size of shaft (mm)						Mounting size (mm)				Size DLR (mm)				
	d	D	B	a	r _s min	r _s max	d _h 12	D _H 12	r _s max	r _b max	N _B	N _A	S _B	S _A	
20	20	47	14	12	1,00	0,60	26,5	40,5	1,0	0,6					
	20	47	14	15	1,00	0,60	26,5	40,5	1,0	0,6					
	20	47	14	12	1,00	0,60	26,5	40,5	1,0	0,6					
	20	47	14	15	1,00	0,60	26,5	40,5	1,0	0,6					
	20	47	14	12	1,00	0,60	26,5	40,5	1,0	0,6					
	20	47	14	15	1,00	0,60	26,5	40,5	1,0	0,6					
	20	52	15	12	1,10	0,60	27,0	45,0	1,1	0,6					
	20	52	15	16	1,10	0,60	27,0	45,0	1,1	0,6					
25	25	42	9	9	0,30	0,30	27,0	38,5	0,3	0,1					
	25	42	9	12	0,30	0,30	27,0	38,5	0,3	0,1					
	25	42	9	9	0,30	0,30	27,0	38,5	0,3	0,1					
	25	42	9	12	0,30	0,30	27,0	38,5	0,3	0,1					
	25	42	9	9	0,30	0,30	27,0	38,5	0,3	0,1					
	25	42	9	12	0,30	0,30	27,0	38,5	0,3	0,1					
	25	42	9	9	0,30	0,30	27,0	38,5	0,3	0,1					
	25	42	9	12	0,30	0,30	27,0	38,5	0,3	0,1					
	25	47	12	11	0,60	0,30	30,0	42,0	0,6	0,3					
	25	47	12	14	0,60	0,30	30,0	42,0	0,6	0,3					
	25	47	12	11	0,60	0,30	30,0	42,0	0,6	0,3	1,5	2,2	1,4	6,6	
	25	47	12	14	0,60	0,30	30,0	42,0	0,6	0,3	1,5	2,2	1,4	6,6	
	25	47	12	11	0,60	0,30	30,0	42,0	0,6	0,3	1,5	2,2	1,4	6,6	
	25	47	12	14	0,60	0,30	30,0	42,0	0,6	0,3	1,5	2,2	1,4	6,6	
	25	47	12	11	0,60	0,30	30,0	42,0	0,6	0,3	1,5	2,2	1,4	6,6	
	25	47	12	14	0,60	0,30	30,0	42,0	0,6	0,3	1,5	2,2	1,4	6,6	
	25	52	15	13	1,00	0,60	31,5	45,5	1,0	0,6					
	25	52	15	17	1,00	0,60	31,5	45,5	1,0	0,6					
	25	52	15	13	1,00	0,60	31,5	45,5	1,0	0,6					
	25	52	15	17	1,00	0,60	31,5	45,5	1,0	0,6					
	25	52	15	13	1,00	0,60	31,5	45,5	1,0	0,6					
	25	52	15	17	1,00	0,60	31,5	45,5	1,0	0,6					
	25	62	17	14	1,10	1,10	32,0	55,0	1,1	1,1					
	25	62	17	19	1,10	1,10	32,0	55,0	1,1	1,1					



Design DLR



Mounting size

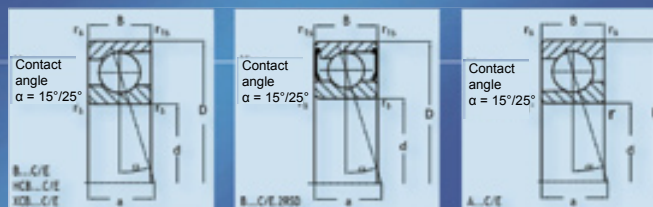


Mounting size

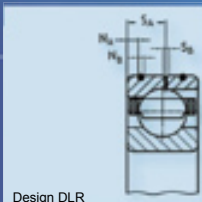
12. Size tables

	Preload (H)			Axial stiffness (H/um)			Payload (kH)		Limit rotational rate (rpm)		Code	Weight
	L	M	S	L	M	S	Dyn. C	Stat. Co	Grease	Oil	Bearing	kg
	74	250	528	27,6	49,5	73,2	13,0	8,0	32 000		B7204C.2RSD.T.P4S.UL	0,108
	105	392	844	63,1	104,9	145,0	12,3	7,7	30 000		B7204E.2RSD.T.P4S.UL	0,108
	74	250	528	27,6	49,5	73,2	13,0	8,0	32 000	48 000	B7204C.T.P4S.UL	0,108
	105	392	844	63,1	104,9	145,0	12,3	7,7	30 000	45 000	B7204E.T.P4S.UL	0,108
	45	161	348	24,3	44,2	64,2	13,0	5,6	43 000	63 000	HCB7204C.T.P4S.UL	0,098
	56	240	540	57,0	98,0	134,5	12,3	5,4	36 000	53 000	HCB7204E.T.P4S.UL	0,098
	90	180	370	34,0	45,0	70,0	18,5	9,9	26 000	42 000	A7304C.T.P4S.UL	0,150
	160	310	630	80,0	110,0	140,0	17,9	9,6	23 000	38 000	A7304E.T.P4S.UL	0,150
	39	140	325	27,1	48,5	75,5	9,0	5,8	32 000		B71905C.2RSD.T.P4S.UL	0,040
	41	188	429	54,4	98,0	137,8	8,5	5,5	30 000		B71905E.2RSD.T.P4S.UL	0,040
	39	140	325	27,1	48,5	75,5	9,0	5,8	32 000	48 000	B71905C.T.P4S.UL	0,040
	41	188	429	54,4	98,0	137,8	8,5	5,5	30 000	45 000	B71905E.T.P4S.UL	0,040
	13	63	148	19,2	37,3	55,0	9,0	4,0	43 000	63 000	HCB71905C.T.P4S.UL	0,035
	30	85	215	55,6	81,0	115,8	8,5	3,8	36 000	53 000	HCB71905E.T.P4S.UL	0,035
	13	63	148	19,2	37,3	55,0	14,4	4,0	53 000	80 000	XCB71905C.T.P4S.UL	0,035
	30	85	215	55,6	81,0	115,8	13,7	3,8	48 000	70 000	XCB71905E.T.P4S.UL	0,035
	74	255	534	29,8	51,9	75,5	12,5	7,7	30 000		B7005C.2RSD.T.P4S.UL	0,084
	100	382	830	67,7	112,0	153,5	11,9	7,4	28 000		B7005E.2RSD.T.P4S.UL	0,084
	74	255	534	29,8	51,9	75,5	12,5	7,7	30 000	45 000	B7005C.T.P4S.UL	0,084
	100	382	830	67,7	112,0	153,5	11,9	7,4	28 000	43 000	B7005E.T.P4S.UL	0,084
	33	131	280	24,5	42,5	60,5	12,5	5,4	38 000	56 000	HCB7005C.T.P4S.UL	0,073
	39	190	430	55,0	96,5	132,0	11,9	5,1	34 000	50 000	HCB7005E.T.P4S.UL	0,073
	33	131	280	24,5	42,5	60,5	20,1	5,4	50 000	75 000	XCB7005C.T.P4S.UL	0,073
	39	190	430	55,0	96,5	132,0	19,1	5,1	43 000	63 000	XCB7005E.T.P4S.UL	0,073
	80	270	560	30,1	53,6	79,2	14,3	9,9	28 000		B7205C.2RSD.T.P4S.UL	0,133
	113	420	900	68,9	144,0	158,0	13,6	9,5	26 000		B7205E.2RSD.T.P4S.UL	0,133
	80	270	560	30,1	53,6	79,2	14,3	9,9	28 000	43 000	B7205C.T.P4S.UL	0,133
	113	420	900	68,9	144,0	158,0	13,6	9,5	26 000	40 000	B7205E.T.P4S.UL	0,133
	46	171	366	27,4	47,7	69,1	14,3	6,9	36 000	53 000	HCB7205C.T.P4S.UL	0,122
	58	250	562	61,5	105,0	145,0	13,6	6,6	32 000	48 000	HCB7205E.T.P4S.UL	0,122
	120	240	470	45,0	60,0	85,0	26,3	15,2	30 000	47 500	A7305C.T.P4S.UL	0,222
	200	400	800	100,0	130,0	180,0	25,5	14,8	26 500	43 000	A7305E.T.P4S.UL	0,222

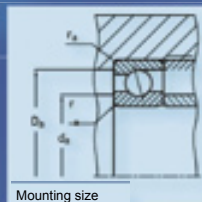
12. Size tables



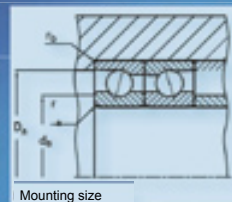
	Size of shaft (mm)						Mounting size (mm)				Size DLR (mm)			
	d	D	B	a	r _s min	r _s min	d _h 12	D _h 12	r _s max	r _s max	N _B	N _A	S _B	S _A
30	30	47	9	10	0,30	0,30	32,0	43,5	0,3	0,1				
	30	47	9	14	0,30	0,30	32,0	43,5	0,3	0,1				
	30	47	9	10	0,30	0,30	32,0	43,5	0,3	0,1				
	30	47	9	14	0,30	0,30	32,0	43,5	0,3	0,1				
	30	47	9	10	0,30	0,30	32,0	43,5	0,3	0,1				
	30	47	9	14	0,30	0,30	32,0	43,5	0,3	0,1				
	30	47	9	10	0,30	0,30	32,0	43,5	0,3	0,1				
	30	47	9	14	0,30	0,30	32,0	43,5	0,3	0,1				
	30	55	13	14	1,00	0,60	36,0	49,0	1,0	0,3				
	30	55	13	16	1,00	0,60	36,0	49,0	1,0	0,3				
	30	55	13	14	1,00	0,60	36,0	49,0	1,0	0,3	1,5	2,8	1,4	7,2
	30	55	13	16	1,00	0,60	36,0	49,0	1,0	0,3	1,5	2,8	1,4	7,2
	30	55	13	14	1,00	0,60	36,0	49,0	1,0	0,3	1,5	2,8	1,4	7,2
	30	55	13	16	1,00	0,60	36,0	49,0	1,0	0,3	1,5	2,8	1,4	7,2
	30	55	13	14	1,00	0,60	36,0	49,0	1,0	0,3	1,5	2,8	1,4	7,2
	30	55	13	16	1,00	0,60	36,0	49,0	1,0	0,3	1,5	2,8	1,4	7,2
	30	62	16	14	1,00	0,60	37,5	54,5	1,0	0,6				
	30	62	16	19	1,00	0,60	37,5	54,5	1,0	0,6				
	30	62	16	14	1,00	0,60	37,5	54,5	1,0	0,6				
	30	62	16	19	1,00	0,60	37,5	54,5	1,0	0,6				
	30	62	16	14	1,00	0,60	37,5	54,5	1,0	0,6				
	30	62	16	19	1,00	0,60	37,5	54,5	1,0	0,6				
	30	72	19	16	1,10	1,10	37,0	65,0	1,1	1,1				
	30	72	19	21	1,10	1,10	37,0	65,0	1,1	1,1				
35	35	55	10	11	0,60	0,30	40,0	50,5	0,6	0,1				
	35	55	10	16	0,60	0,30	40,0	50,5	0,6	0,1				
	35	55	10	11	0,60	0,30	40,0	50,5	0,6	0,1				
	35	55	10	16	0,60	0,30	40,0	50,5	0,6	0,1				
	35	55	10	11	0,60	0,30	40,0	50,5	0,6	0,1				
	35	55	10	16	0,60	0,30	40,0	50,5	0,6	0,1				
	35	55	10	11	0,60	0,30	40,0	50,5	0,6	0,1				
	35	55	10	16	0,60	0,30	40,0	50,5	0,6	0,1				



Design DLR



Mounting size

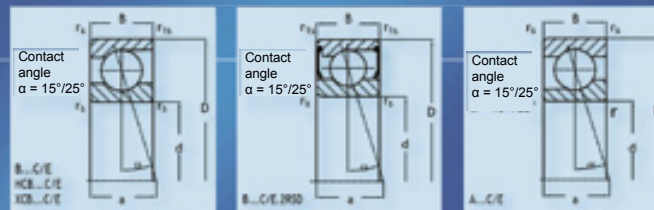


Mounting size

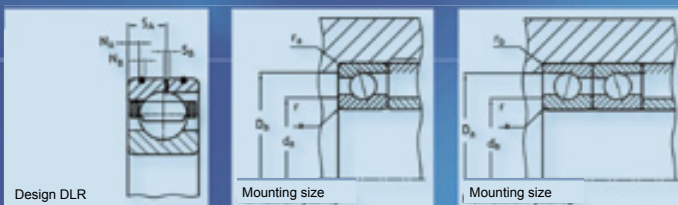
12. Size tables

Preload (H)			Axial stiffness (H/um)			Payload (kH)		Limit rotational rate (rpm)		Code	Weight
L	M	S	L	M	S	Dyn. C	Stat. Co	Grease	Oil	Bearing	kg
40	160	346	30,0	54,5	82,0	8,1	5,8	28000		B71906C.2RSD.T.P4S.UL	0,046
42	195	446	58,7	105,8	149,0	7,6	5,4	26000		B71906E.2RSD.T.P4S.UL	0,046
40	160	346	30,0	54,5	82,0	8,1	5,8	28000	43000	B71906C.T.P4S.UL	0,046
42	195	446	58,7	105,8	149,0	7,6	5,4	26000	40000	B71906E.T.P4S.UL	0,046
15	65	152	21,2	40,1	59,4	8,1	4,1	36000	53000	HCB71906C.T.P4S.UL	0,041
30	85	224	60,0	87,8	126,0	7,6	3,8	32000	48000	HCB71906E.T.P4S.UL	0,041
15	65	152	21,2	40,1	59,4	12,9	4,1	48000	70000	XCB71906C.T.P4S.UL	0,041
30	85	224	60,0	87,8	126,0	12,2	3,8	40000	60000	XCB71906E.T.P4S.UL	0,041
74	258	546	32,6	57,8	85,0	14,1	10,7	26000		B7006C.2RSD.T.P4S.UL	0,117
102	397	860	74,0	124,0	171,0	13,4	9,9	24000		B7006E.2RSD.T.P4S.UL	0,117
74	258	546	32,6	57,8	85,0	14,1	10,7	26000	40000	B7006C.T.P4S.UL	0,117
102	397	860	74,0	124,0	171,0	13,4	9,9	24000	38000	B7006E.T.P4S.UL	0,117
34	138	298	27,1	47,8	68,6	14,1	7,5	32000	48000	HCB7006C.T.P4S.UL	0,106
38	194	445	59,0	106,0	146,5	13,4	6,9	28000	43000	HCB7006E.T.P4S.UL	0,106
34	138	298	27,1	47,8	68,6	14,1	7,5	32000	48000	XCB7006C.T.P4S.UL	0,106
38	194	445	59,0	106,0	146,5	13,4	6,9	28000	43000	XCB7006E.T.P4S.UL	0,106
121	410	857	42,0	75,4	112,0	20,8	14,8	24000		B7206C.2RSD.T.P4S.UL	0,204
175	638	1360	95,0	157,1	218,0	19,8	14,1	22000		B7206E.2RSD.T.P4S.UL	0,204
121	410	857	42,0	75,4	112,0	20,8	14,8	24000	38000	B7206C.T.P4S.UL	0,204
175	638	1360	95,0	157,1	218,0	19,8	14,1	22000	36000	B7206E.T.P4S.UL	0,204
74	270	568	38,5	67,5	98,5	20,8	10,4	30000	45000	HCB7206C.T.P4S.UL	0,183
99	406	894	87,5	148,0	203,5	19,8	9,9	26000	40000	HCB7206E.T.P4S.UL	0,183
160	320	640	50,0	70,0	100,0	32,1	20,0	25500	40500	A7306C.T.P4S.UL	0,329
270	550	1090	120,0	160,0	210,0	31,0	19,4	23000	37000	A7306E.T.P4S.UL	0,329
59	210	480	36,2	64,0	99,5	10,2	7,5	24000		B71907C.2RSD.T.P4S.UL	0,076
61	275	620	73,5	129,5	180,5	9,6	7,0	22000		B71907E.2RSD.T.P4S.UL	0,076
59	210	480	36,2	64,0	99,5	10,2	7,5	24000	38000	B71907C.T.P4S.UL	0,076
61	275	620	73,5	129,5	180,5	9,6	7,0	22000	36000	B71907E.T.P4S.UL	0,076
20	95	218	26,5	50,0	72,5	10,2	5,2	32000	48000	HCB71907C.T.P4S.UL	0,069
44	128	315	74,0	109,0	154,0	9,6	4,9	26000	40000	HCB71907E.T.P4S.UL	0,069
20	95	218	26,5	50,0	72,5	16,4	5,2	40000	60000	XCB71907C.T.P4S.UL	0,069
44	128	315	74,0	109,0	154,0	15,4	4,9	34000	50000	XCB71907E.T.P4S.UL	0,069

12. Size tables



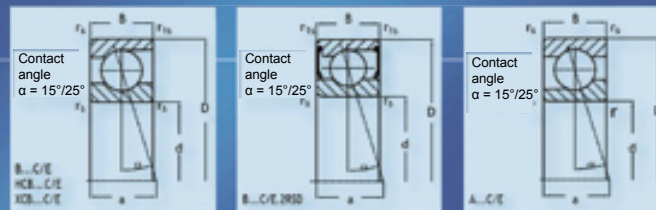
	Size of shaft (mm)						Mounting size (mm)				Size DLR (mm)				
	d	D	B	a	r _a min	r _a max	d _h 12	D _H 12	r _b max	r _b max	N _B	N _A	S _B	S _A	
35	35	62	14	14	1,00	0,60	41,0	56,0	1,0	0,3					
	35	62	14	18	1,00	0,60	41,0	56,0	1,0	0,3					
	35	62	14	14	1,00	0,60	41,0	56,0	1,0	0,3	1,5	2,8	1,4	8,0	
	35	62	14	18	1,00	0,60	41,0	56,0	1,0	0,3	1,5	2,8	1,4	8,0	
	35	62	14	14	1,00	0,60	41,0	56,0	1,0	0,3	1,5	2,8	1,4	8,0	
	35	62	14	18	1,00	0,60	41,0	56,0	1,0	0,3	1,5	2,8	1,4	8,0	
	35	62	14	14	1,00	0,60	41,0	56,0	1,0	0,3	1,5	2,8	1,4	8,0	
	35	62	14	18	1,00	0,60	41,0	56,0	1,0	0,3	1,5	2,8	1,4	8,0	
	35	72	17	16	1,10	0,60	44,0	63,0	1,0	0,6					
	35	72	17	21	1,10	0,60	44,0	63,0	1,0	0,6					
	35	72	17	16	1,10	0,60	44,0	63,0	1,0	0,6					
	35	72	17	21	1,10	0,60	44,0	63,0	1,0	0,6					
	35	72	17	16	1,10	0,60	44,0	63,0	1,0	0,6					
	35	72	17	21	1,10	0,60	44,0	63,0	1,0	0,6					
	35	80	21	18	1,50	1,10	43,0	72,0	1,5	1,1					
	35	80	21	24	1,50	1,10	43,0	72,0	1,5	1,1					
40	40	62	12	13	0,60	0,30	45,0	57,5	0,6	0,1					
	40	62	12	18	0,60	0,30	45,0	57,5	0,6	0,1					
	40	62	12	13	0,60	0,30	45,0	57,5	0,6	0,1	1,5	2,2	1,6	6,6	
	40	62	12	18	0,60	0,30	45,0	57,5	0,6	0,1	1,5	2,2	1,6	6,6	
	40	62	12	13	0,60	0,30	45,0	57,5	0,6	0,1	1,5	2,2	1,6	6,6	
	40	62	12	18	0,60	0,30	45,0	57,5	0,6	0,1	1,5	2,2	1,6	6,6	
	40	62	12	13	0,60	0,30	45,0	57,5	0,6	0,1	1,5	2,2	1,6	6,6	
	40	62	12	18	0,60	0,30	45,0	57,5	0,6	0,1	1,5	2,2	1,6	6,6	
	40	68	15	15	1,00	0,60	46,0	62,0	1,0	0,3					
	40	68	15	20	1,00	0,60	46,0	62,0	1,0	0,3					
	40	68	15	15	1,00	0,60	46,0	62,0	1,0	0,3	1,5	2,8	1,4	8,5	
	40	68	15	20	1,00	0,60	46,0	62,0	1,0	0,3	1,5	2,8	1,4	8,5	
	40	68	15	15	1,00	0,60	46,0	62,0	1,0	0,3	1,5	2,8	1,4	8,5	
	40	68	15	20	1,00	0,60	46,0	62,0	1,0	0,3	1,5	2,8	1,4	8,5	
	40	68	15	15	1,00	0,60	46,0	62,0	1,0	0,3	1,5	2,8	1,4	8,5	
	40	68	15	20	1,00	0,60	46,0	62,0	1,0	0,3	1,5	2,8	1,4	8,5	



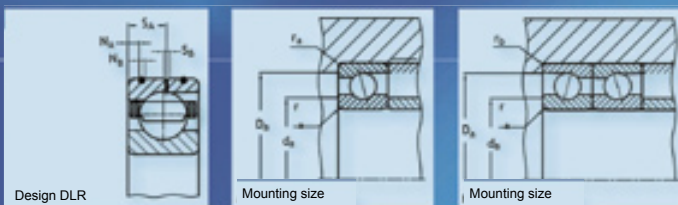
12. Size tables

	Preload (H)			Axial stiffness (H/um)			Payload (κH)		Limit rotational rate (rpm)		Code	Weight
	L	M	S	L	M	S	Dyn. C	Stat. Co	Grease	Oil	Bearing	kg
	96	332	698	38,8	67,5	99,5	16,0	12,7	22 000		B7007C.2RSD.T.P4S.UL	0,157
	135	520	1118	88,2	147,0	202,0	15,1	11,8	20 000		B7007E.2RSD.T.P4S.UL	0,157
	96	332	698	38,8	67,5	99,5	16,0	12,7	22 000	36 000	B7007C.T.P4S.UL	0,157
	135	520	1118	88,2	147,0	202,0	15,1	11,8	20 000	34 000	B7007E.T.P4S.UL	0,157
	45	176	380	32,0	56,0	80,5	16,0	8,9	28 000	43 000	HCB7007C.T.P4S.UL	0,143
	55	254	580	72,5	126,0	173,0	15,1	8,2	24 000	38 000	HCB7007E.T.P4S.UL	0,143
	45	176	380	32,0	56,0	80,5	25,6	8,9	38 000	56 000	XCB7007C.T.P4S.UL	0,143
	55	254	580	72,5	126,0	173,0	24,1	8,2	32 000	48 000	XCB7007E.T.P4S.UL	0,143
	135	455	940	45,0	79,0	116,0	25,4	19,4	20 000		B7207C.2RSD.T.P4S.UL	0,296
	196	715	1520	103,0	170,0	234,0	24,1	18,5	19 000		B7207E.2RSD.T.P4S.UL	0,296
	135	455	940	45,0	79,0	116,0	25,4	19,4	20 000	34 000	B7207C.T.P4S.UL	0,296
	196	715	1520	103,0	170,0	234,0	24,1	18,5	19 000	32 000	B7207E.T.P4S.UL	0,296
	65	240	512	38,0	65,0	93,5	25,4	13,6	26 000	40 000	HCB7207C.T.P4S.UL	0,267
	85	360	805	87,0	148,0	202,0	24,1	13,0	22 000	36 000	HCB7207E.T.P4S.UL	0,267
	200	400	810	60,0	85,0	120,0	40,3	26,6	22 000	36 000	A7307C.T.P4S.UL	0,428
	340	680	1370	140,0	180,0	250,0	38,8	25,0	21 000	32 500	A7307E.T.P4S.UL	0,428
	84	300	632	41,0	73,0	107,5	16,0	13,0	22 000		B71908C.2RSD.T.P4S.UL	0,105
	112	450	985	92,0	155,0	215,0	15,1	12,3	20 000		B71908E.2RSD.T.P4S.UL	0,105
	84	300	632	41,0	73,0	107,5	16,0	13,0	22 000	36 000	B71908C.T.P4S.UL	0,105
	112	450	985	92,0	155,0	215,0	15,1	12,3	20 000	34 000	B71908E.T.P4S.UL	0,105
	39	155	340	34,0	60,0	86,1	16,0	9,1	28 000	43 000	HCB71908C.T.P4S.UL	0,089
	75	222	520	90,8	134,0	185,0	15,1	8,6	24 000	38 000	HCB71908E.T.P4S.UL	0,089
	39	155	340	34,0	60,0	86,1	25,6	9,1	36 000	53 000	XCB71908C.T.P4S.UL	0,089
	75	222	520	90,8	134,0	185,0	24,2	8,6	30 000	45 000	XCB71908E.T.P4S.UL	0,089
	101	354	744	44,0	77,0	113,2	16,9	14,0	20 000		B7008C.2RSD.T.P4S.UL	0,196
	142	546	1180	99,0	166,0	228,5	15,9	13,0	19 000		B7008E.2RSD.T.P4S.UL	0,196
	101	354	744	44,0	77,0	113,2	16,9	14,0	20 000	34 000	B7008C.T.P4S.UL	0,196
	142	546	1180	99,0	166,0	228,5	15,9	13,0	19 000	32 000	B7008E.T.P4S.UL	0,196
	48	188	405	36,0	63,5	91,0	16,9	9,8	26 000	40 000	HCB7008C.T.P4S.UL	0,180
	55	270	618	80,0	142,5	196,0	15,9	9,1	22 000	36 000	HCB7008E.T.P4S.UL	0,180
	48	188	405	36,0	63,5	91,0	27,0	9,8	34 000	50 000	XCB7008C.T.P4S.UL	0,180
	55	270	618	80,0	142,5	196,0	25,5	9,1	28 000	43 000	XCB7008E.T.P4S.UL	0,180

12. Size tables



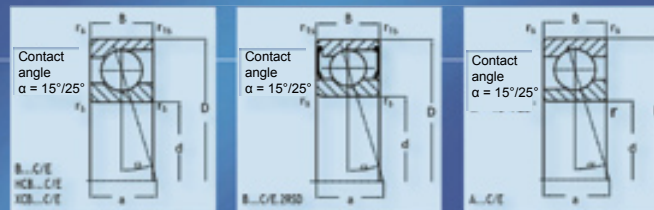
	Size of shaft (mm)						Mounting size (mm)				Size DLR (mm)				
	d	D	B	a	$r_{s \min}$	$r_{s \max}$	$d_h H12$	$D_h H12$	$r_{h \max}$	$r_{b \max}$	N_B	N_A	S_B	S_A	
40	40	80	18	17	1,10	1,10	48,0	72,0	1,0	1,0					
	40	80	18	23	1,10	1,10	48,0	72,0	1,0	1,0					
	40	80	18	17	1,10	1,10	48,0	72,0	1,0	1,0					
	40	80	18	23	1,10	1,10	48,0	72,0	1,0	1,0					
	40	80	18	17	1,10	1,10	48,0	72,0	1,0	1,0					
	40	80	18	23	1,10	1,10	48,0	72,0	1,0	1,0					
	40	90	23	20	1,50	1,50	48,0	82,0	1,5	1,5					
	40	90	23	27	1,50	1,50	48,0	82,0	1,5	1,5					
45	45	68	12	14	0,60	0,30	50,0	63,5	0,6	0,1					
	45	68	12	19	0,60	0,30	50,0	63,5	0,6	0,1					
	45	68	12	14	0,60	0,30	50,0	63,5	0,6	0,1	1,5	2,8	1,6	6,6	
	45	68	12	19	0,60	0,30	50,0	63,5	0,6	0,1	1,5	2,8	1,6	6,6	
	45	68	12	14	0,60	0,30	50,0	63,5	0,6	0,1	1,5	2,8	1,6	6,6	
	45	68	12	19	0,60	0,30	50,0	63,5	0,6	0,1	1,5	2,8	1,6	6,6	
	45	68	12	14	0,60	0,30	50,0	63,5	0,6	0,1	1,5	2,8	1,6	6,6	
	45	68	12	19	0,60	0,30	50,0	63,5	0,6	0,1	1,5	2,8	1,6	6,6	
	45	75	16	16	1,00	0,60	51,0	69,0	1,0	0,3					
	45	75	16	22	1,00	0,60	51,0	69,0	1,0	0,3					
	45	75	16	16	1,00	0,60	51,0	69,0	1,0	0,3	1,5	3,4	1,4	9,3	
	45	75	16	22	1,00	0,60	51,0	69,0	1,0	0,3	1,5	3,4	1,4	9,3	
	45	75	16	16	1,00	0,60	51,0	69,0	1,0	0,3	1,5	3,4	1,4	9,3	
	45	75	16	22	1,00	0,60	51,0	69,0	1,0	0,3	1,5	3,4	1,4	9,3	
	45	75	16	16	1,00	0,60	51,0	69,0	1,0	0,3	1,5	3,4	1,4	9,3	
	45	75	16	22	1,00	0,60	51,0	69,0	1,0	0,3	1,5	3,4	1,4	9,3	
	45	85	19	18	1,10	1,10	52,5	78,0	1,0	1,0					
	45	85	19	25	1,10	1,10	52,5	78,0	1,0	1,0					
	45	85	19	18	1,10	1,10	52,5	78,0	1,0	1,0					
	45	85	19	25	1,10	1,10	52,5	78,0	1,0	1,0					
	45	85	19	18	1,10	1,10	52,5	78,0	1,0	1,0					
	45	85	19	25	1,10	1,10	52,5	78,0	1,0	1,0					
	45	100	25	22	1,50	1,50	54,0	91,0	1,5	1,5					
	45	100	25	29	1,50	1,50	54,0	91,0	1,5	1,5					



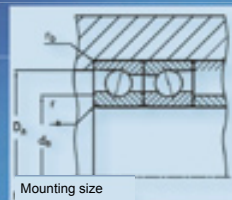
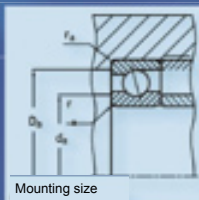
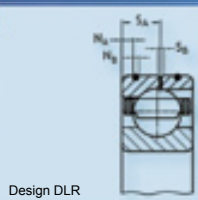
12. Size tables

	Preload (H)			Axial stiffness (H/um)			Payload (kH)		Limit rotational rate (rpm)		Code	Weight
	L	M	S	L	M	S	Dyn. C	Stat. Co	Grease	Oil	Bearing	kg
	175	585	1205	47,0	86,5	126,5	35,0	25,3	18 000		B7208C.2RSD.T.P4S.UL	0,364
	259	910	1925	114,0	186,0	254,0	33,3	24,2	17 000		B7208E.2RSD.T.P4S.UL	0,364
	175	585	1205	47,0	86,5	126,5	35,0	25,3	18 000	30 000	B7208C.T.P4S.UL	0,364
	259	910	1925	114,0	186,0	254,0	33,3	24,2	17 000	28 000	B7208E.T.P4S.UL	0,364
	89	315	660	42,0	71,5	102,0	35,0	17,7	24 000	38 000	HCB7208C.T.P4S.UL	0,315
	117	478	1045	97,5	162,5	220,0	33,3	17,0	20 000	34 000	HCB7208E.T.P4S.UL	0,315
	240	470	950	65,0	90,0	130,0	47,7	32,5	21 000	32 500	A7308C.T.P4S.UL	0,622
	400	810	1610	150,0	200,0	260,0	45,7	31,1	18 500	29 000	A7308E.T.P4S.UL	0,622
	89	316	666	44,2	79,0	116,0	16,8	14,7	19 000		B71909C.2RSD.T.P4S.UL	0,126
	115	472	1040	99,0	169,0	233,5	15,9	13,7	18 000		B71909E.2RSD.T.P4S.UL	0,126
	89	316	666	44,2	79,0	116,0	16,8	14,7	19 000	32 000	B71909C.T.P4S.UL	0,126
	115	472	1040	99,0	169,0	233,5	15,9	13,7	18 000	30 000	B71909E.T.P4S.UL	0,126
	41	164	360	36,5	65,0	93,5	16,8	10,3	24 000	38 000	HCB71909C.T.P4S.UL	0,108
	79	230	540	98,0	145,0	201,0	15,9	9,6	22 000	36 000	HCB71909E.T.P4S.UL	0,108
	41	164	360	36,5	6	93,5	26,9	10,3	32 000	48 000	XCB71909C.T.P4S.UL	0,108
	79	230	540	98,0	145,0	201,0	25,4	9,6	28 000	43 000	XCB71909E.T.P4S.UL	0,108
	144	490	1020	50,0	88,0	128,5	22,8	19,6	18 000		B7009C.2RSD.T.P4S.UL	0,236
	210	768	1640	115,0	190,0	260,0	21,5	18,2	17 000		B7009E.2RSD.T.P4S.UL	0,236
	144	490	1020	50,0	88,0	128,5	22,8	19,6	18 000	30 000	B7009C.T.P4S.UL	0,236
	210	768	1640	115,0	190,0	260,0	21,5	18,2	17 000	28 000	B7009E.T.P4S.UL	0,236
	72	265	560	42,0	73,0	104,0	22,8	13,7	24 000	38 000	HCB7009C.T.P4S.UL	0,211
	90	394	876	97,0	165,0	226,0	21,5	12,7	20 000	34 000	HCB7009E.T.P4S.UL	0,211
	72	265	560	42,0	73,0	104,0	36,5	13,7	30 000	45 000	XCB7009C.T.P4S.UL	0,211
	90	394	876	97,0	165,0	226,0	34,5	12,7	26 000	40 000	XCB7009E.T.P4S.UL	0,211
	185	605	1250	53,0	91,0	134,0	41,0	30,6	17 000		B7209C.2RSD.T.P4S.UL	0,408
	270	955	2016	121,6	197,3	270,0	39,0	29,3	15 000		B7209E.2RSD.T.P4S.UL	0,408
	185	605	1250	53,0	91,0	134,0	41,0	30,6	17 000	28 000	B7209C.T.P4S.UL	0,408
	270	955	2016	121,6	197,3	270,0	39,0	29,3	15 000	24 000	B7209E.T.P4S.UL	0,408
	92	330	695	45,0	76,0	108,0	41,0	21,4	22 000	36 000	HCB7209C.T.P4S.UL	0,344
	120	494	1080	103,0	172,0	234,0	39,0	20,5	18 000	30 000	HCB7209E.T.P4S.UL	0,344
	290	580	1150	75,0	100,0	140,0	57,6	40,2	18 500	29 000	A7309C.T.P4S.UL	0,829
	490	980	1950	170,0	220,0	300,0	55,2	38,4	16 000	23 000	A7309E.T.P4S.UL	0,829

12. Size tables



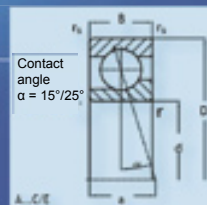
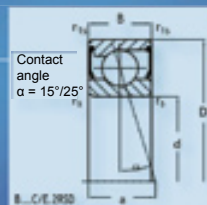
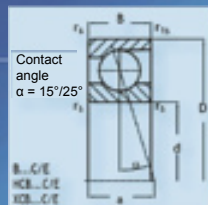
	Size of shaft (mm)						Mounting size (mm)				Size DLR (mm)				
	d	D	B	a	r _s min	r _{ts} min	d _s h12	D _s H12	r _s max	r _s max	N _B	N _A	S _B	S _A	
50	50	72	12	14	0,60	0,30	55,0	67,5	0,6	0,1					
	50	72	12	20	0,60	0,30	55,0	67,5	0,6	0,1					
	50	72	12	14	0,60	0,30	55,0	67,5	0,6	0,1	1,5	2,8	1,6	6,6	
	50	72	12	20	0,60	0,30	55,0	67,5	0,6	0,1	1,5	2,8	1,6	6,6	
	50	72	12	14	0,60	0,30	55,0	67,5	0,6	0,1	1,5	2,8	1,6	6,6	
	50	72	12	20	0,60	0,30	55,0	67,5	0,6	0,1	1,5	2,8	1,6	6,6	
	50	72	12	14	0,60	0,30	55,0	67,5	0,6	0,1	1,5	2,8	1,6	6,6	
	50	72	12	20	0,60	0,30	55,0	67,5	0,6	0,1	1,5	2,8	1,6	6,6	
	50	80	16	17	1,00	0,60	56,0	74,0	1,0	0,3					
	50	80	16	23	1,00	0,60	56,0	74,0	1,0	0,3					
	50	80	16	17	1,00	0,60	56,0	74,0	1,0	0,3	1,5	3,4	1,4	9,3	
	50	80	16	23	1,00	0,60	56,0	74,0	1,0	0,3	1,5	3,4	1,4	9,3	
	50	80	16	17	1,00	0,60	56,0	74,0	1,0	0,3	1,5	3,4	1,4	9,3	
	50	80	16	23	1,00	0,60	56,0	74,0	1,0	0,3	1,5	3,4	1,4	9,3	
	50	80	16	17	1,00	0,60	56,0	74,0	1,0	0,3	1,5	3,4	1,4	9,3	
	50	80	16	23	1,00	0,60	56,0	74,0	1,0	0,3	1,5	3,4	1,4	9,3	
	50	90	20	19	1,10	1,10	57,0	83,0	1,0	1,0					
	50	90	20	26	1,10	1,10	57,0	83,0	1,0	1,0					
	50	90	20	19	1,10	1,10	57,0	83,0	1,0	1,0	1,5	4,0	1,6	11,2	
	50	90	20	26	1,10	1,10	57,0	83,0	1,0	1,0	1,5	4,0	1,6	11,2	
	50	90	20	19	1,10	1,10	57,0	83,0	1,0	1,0	1,5	4,0	1,6	11,2	
	50	90	20	26	1,10	1,10	57,0	83,0	1,0	1,0	1,5	4,0	1,6	11,2	
	50	110	27	24	2,00	2,00	60,0	100,0	2,0	2,0					
	50	110	27	32	2,00	2,00	60,0	100,0	2,0	2,0					
55	55	80	13	16	1,00	0,60	60,0	75,5	0,6	0,3					
	55	80	13	22	1,00	0,60	60,0	75,5	0,6	0,3					
	55	80	13	16	1,00	0,60	60,0	75,5	0,6	0,3	1,5	2,8	1,6	7,2	
	55	80	13	22	1,00	0,60	60,0	75,5	0,6	0,3	1,5	2,8	1,6	7,2	
	55	80	13	16	1,00	0,60	60,0	75,5	0,6	0,3	1,5	2,8	1,6	7,2	
	55	80	13	22	1,00	0,60	60,0	75,5	0,6	0,3	1,5	2,8	1,6	7,2	
	55	80	13	16	1,00	0,60	60,0	75,5	0,6	0,3	1,5	2,8	1,6	7,2	
	55	80	13	22	1,00	0,60	60,0	75,5	0,6	0,3	1,5	2,8	1,6	7,2	



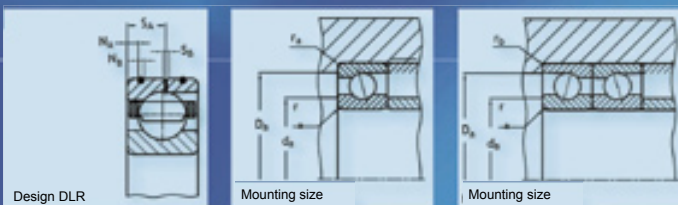
12. Size tables

	Preload (H)			Axial stiffness (H/um)			Payload (kH)		Limit rotational rate (rpm)		Code	Weight
	L	M	S	L	M	S	Dyn. C	Stat. Co	Grease	Oil	Bearing	kg
	90	320	680	46,0	81,5	120,0	17,1	15,3	18000		B71910C.2RSD.T.P4S.UL	0,129
	117	480	1060	103,0	175,0	242,0	16,1	14,2	16000		B71910E.2RSD.T.P4S.UL	0,129
	90	320	680	46,0	81,5	120,0	17,1	15,3	18000	30000	B71910C.T.P4S.UL	0,129
	117	480	1060	103,0	175,0	242,0	16,1	14,2	16000	26000	B71910E.T.P4S.UL	0,129
	40	164	364	38,0	67,0	96,5	17,1	10,7	22000	36000	HCB71910C.T.P4S.UL	0,110
	79	233	550	101,0	150,0	208,0	16,1	10,0	20000	34000	HCB71910E.T.P4S.UL	0,110
	40	164	364	38,0	67,0	96,5	27,3	10,7	30000	43000	XCB71910C.T.P4S.UL	0,110
	79	233	550	101,0	150,0	208,0	25,7	10,0	26000	40000	XCB71910E.T.P4S.UL	0,110
	150	505	1050	52,0	92,0	135,0	28,2	25,5	17000		B7010C.2RSD.T.P4S.UL	0,262
	210	780	1665	120,0	199,0	272,0	26,6	22,8	15000		B7010E.2RSD.T.P4S.UL	0,262
	150	505	1050	52,0	92,0	135,0	28,2	25,5	17000	28000	B7010C.T.P4S.UL	0,262
	210	780	1665	120,0	199,0	272,0	26,6	22,8	15000	24000	B7010E.T.P4S.UL	0,262
	75	275	588	45,0	77,0	110,0	28,2	17,2	22000	36000	HCB7010C.T.P4S.UL	0,226
	88	396	890	100,0	172,0	236,0	26,6	15,9	18000	30000	HCB7010E.T.P4S.UL	0,226
	75	275	588	45,0	77,0	110,0	45,1	17,2	28000	43000	XCB7010C.T.P4S.UL	0,226
	88	396	890	100,0	172,0	236,0	42,6	15,9	24000	38000	XCB7010E.T.P4S.UL	0,226
	242	790	1630	60,0	105,0	153,0	44,6	36,1	16000		B7210C.2RSD.T.P4S.UL	0,459
	350	1220	2580	138,0	222,0	305,0	42,3	34,5	14000		B7210E.2RSD.T.P4S.UL	0,459
	242	790	1630	60,0	105,0	153,0	44,6	36,1	16000	26000	B7210C.T.P4S.UL	0,459
	350	1220	2580	138,0	222,0	305,0	42,3	34,5	14000	22000	B7210E.T.P4S.UL	0,459
	122	423	895	51,0	85,0	123,0	44,6	25,3	20000	34000	HCB7210C.T.P4S.UL	0,385
	168	655	1420	120,0	199,0	267,0	42,3	24,1	17000	28000	HCB7210E.T.P4S.UL	0,385
	350	700	1400	75,0	110,0	150,0	69,7	47,8	16000	26500	A7310C.T.P4S.UL	1,07
	590	1190	2380	180,0	240,0	320,0	66,9	45,7	15000	23000	A7310E.T.P4S.UL	1,07
	110	390	820	51,0	90,0	132,0	20,9	18,8	16000		B71911C.2RSD.T.P4S.UL	0,176
	150	595	1290	114,0	195,0	265,0	19,7	17,5	15000		B71911E.2RSD.T.P4S.UL	0,176
	110	390	820	51,0	90,0	132,0	20,9	18,8	16000	26000	B71911C.T.P4S.UL	0,176
	150	595	1290	114,0	195,0	265,0	19,7	17,5	15000	24000	B71911E.T.P4S.UL	0,176
	50	202	442	42,0	74,2	106,0	20,9	13,1	20000	34000	HCB71911C.T.P4S.UL	0,151
	58	296	692	94,0	169,0	233,0	19,7	12,2	18000	30000	HCB71911E.T.P4S.UL	0,151
	50	202	442	42,0	74,2	106,0	33,5	13,1	26000	40000	XCB71911C.T.P4S.UL	0,151
	58	296	692	94,0	169,0	233,0	31,5	12,2	24000	38000	XCB71911E.T.P4S.UL	0,151

12. Size tables



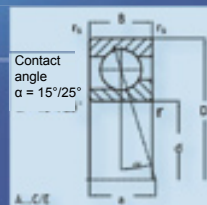
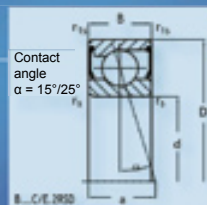
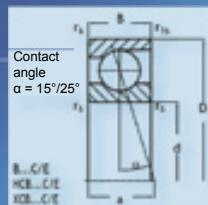
	Size of shaft (mm)						Mounting size (mm) IM				Size DLR (mm)					
	d	D	B	a	r _s min	r ₁₅ min	d ₃ h12	D ₃ H12	r ₃ max	r ₀ max	N _B	N _A	S _B	S _A		
55	55	90	18	19	1,10	1,00	62,0	83,0	1,0	0,6						
	55	90	18	26	1,10	1,00	62,0	83,0	1,0	0,6						
	55	90	18	19	1,10	1,00	62,0	83,0	1,0	0,6	1,5	4,3	1,4	9,7		
	55	90	18	26	1,10	1,00	62,0	83,0	1,0	0,6	1,5	4,3	1,4	9,7		
	55	90	18	19	1,10	1,00	62,0	83,0	1,0	0,6	1,5	4,3	1,4	9,7		
	55	90	18	26	1,10	1,00	62,0	83,0	1,0	0,6	1,5	4,3	1,4	9,7		
	55	90	18	19	1,10	1,00	62,0	83,0	1,0	0,6	1,5	4,3	1,4	9,7		
	55	90	18	26	1,10	1,00	62,0	83,0	1,0	0,6	1,5	4,3	1,4	9,7		
	55	100	21	21	1,50	1,10	63,0	92,0	1,5	1,1						
	55	100	21	29	1,50	1,10	63,0	92,0	1,5	1,1						
	55	100	21	21	1,50	1,10	63,0	92,0	1,5	1,1	1,8	3,8	1,6	12,0		
	55	100	21	29	1,50	1,10	63,0	92,0	1,5	1,1	1,8	3,8	1,6	12,0		
	55	100	21	21	1,50	1,10	63,0	92,0	1,5	1,1	1,8	3,8	1,6	12,0		
	55	100	21	29	1,50	1,10	63,0	92,0	1,5	1,1	1,8	3,8	1,6	12,0		
	55	120	29	26	2,00	2,00	65,0	110,0	2,0	2,0						
	55	120	29	35	2,00	2,00	65,0	110,0	2,0	2,0						
60	60	85	13	16	1,00	0,60	65,0	80,5	0,6	0,3						
	60	85	13	23	1,00	0,60	65,0	80,5	0,6	0,3						
	60	85	13	16	1,00	0,60	65,0	80,5	0,6	0,3	1,5	2,8	1,6	7,2		
	60	85	13	23	1,00	0,60	65,0	80,5	0,6	0,3	1,5	2,8	1,6	7,2		
	60	85	13	16	1,00	0,60	65,0	80,5	0,6	0,3	1,5	2,8	1,6	7,2		
	60	85	13	23	1,00	0,60	65,0	80,5	0,6	0,3	1,5	2,8	1,6	7,2		
	60	85	13	16	1,00	0,60	65,0	80,5	0,6	0,3	1,5	2,8	1,6	7,2		
	60	85	13	23	1,00	0,60	65,0	80,5	0,6	0,3	1,5	2,8	1,6	7,2		
	60	95	18	19	1,10	1,00	67,0	88,0	1,0	0,6						
	60	95	18	27	1,10	1,00	67,0	88,0	1,0	0,6						
	60	95	18	19	1,10	1,00	67,0	88,0	1,0	0,6	1,5	3,8	1,6	10,4		
	60	95	18	27	1,10	1,00	67,0	88,0	1,0	0,6	1,5	3,8	1,6	10,4		
	60	95	18	19	1,10	1,00	67,0	88,0	1,0	0,6	1,5	3,8	1,6	10,4		
	60	95	18	27	1,10	1,00	67,0	88,0	1,0	0,6	1,5	3,8	1,6	10,4		
	60	95	18	19	1,10	1,00	67,0	88,0	1,0	0,6	1,5	3,8	1,6	10,4		
	60	95	18	27	1,10	1,00	67,0	88,0	1,0	0,6	1,5	3,8	1,6	10,4		



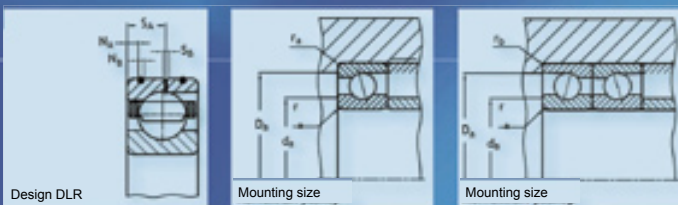
12. Size tables

	Preload (H)			Axial stiffness (H/um)			Payload (kH)		Limit rotational rate (rpm)		Code	Weight
	L	M	S	L	M	S	Dyn. C	Stat. Co	Grease	Oil	Bearing	kg
	205	680	1425	62,0	107,0	155,0	36,8	33,4	15000		B7011C.2RSD.T.P4S.UL	0,383
	298	1065	2260	141,0	230,0	318,0	34,7	31,0	14000		B7011E.2RSD.T.P4S.UL	0,383
	205	680	1425	62,0	107,0	155,0	36,8	33,4	15000	24000	B7011C.T.P4S.UL	0,383
	298	1065	2260	141,0	230,0	318,0	34,7	31,0	14000	22000	B7011E.T.P4S.UL	0,383
	102	370	785	52,0	90,0	128,0	36,8	23,4	19000	32000	HCB7011C.T.P4S.UL	0,335
	135	550	1220	120,0	203,0	277,0	34,7	21,7	17000	28000	HCB7011E.T.P4S.UL	0,335
	102	370	785	52,0	90,0	128,0	58,9	23,4	26000	40000	XCB7011C.T.P4S.UL	0,335
	135	550	1220	120,0	203,0	277,0	55,6	21,7	22000	36000	XCB7011E.T.P4S.UL	0,335
	260	850	1750	66,0	114,0	166,0	53,0	42,7	14000		B7211C.2RSD.T.P4S.UL	0,608
	380	1330	2795	155,0	252,0	342,0	50,3	40,8	13000		B7211E.2RSD.T.P4S.UL	0,608
	260	850	1750	66,0	114,0	166,0	53,0	42,7	14000	22000	B7211C.T.P4S.UL	0,608
	380	1330	2795	155,0	252,0	342,0	50,3	40,8	13000	20000	B7211E.T.P4S.UL	0,608
	135	462	980	58,0	97,0	138,0	53,0	29,9	18000	30000	HCB7211C.T.P4S.UL	0,509
	178	700	1530	135,0	220,0	296,0	80,3	2	15000	24000	HCB7211E.T.P4S.UL	0,509
	370	740	1490	85,0	120,0	170,0	74,3	54,1	15000	24500	A7311C.T.P4S.UL	1,36
	630	1260	2520	200,0	260,0	340,0	71,0	51,5	14000	22000	A7311E.T.P4S.UL	1,36
	116	410	868	55,0	95,0	140,1	22,6	20,4	15000		B71912C.2RSD.T.P4S.JL	0,190
	156	622	1353	124,4	209,2	387,9	21,3	19,0	14000		B71912E.2RSD.T.P4S.JL	0,190
	116	410	868	55,0	95,0	140,1	22,6	20,4	15000	24000	B71912C.T.P4S.UL	0,190
	156	622	1353	124,4	209,2	387,9	21,3	19,0	14000	22000	B71912E.T.P4S.UL	0,190
	54	214	470	44,8	80,1	114,0	22,6	14,3	19000	32000	HCB71912C.T.P4S.UL	0,162
	56	300	705	98,0	180,0	247,9	21,3	13,3	17000	28000	HCB71912E.T.P4S.UL	0,162
	54	214	470	44,8	80,1	114,0	36,2	14,3	26000	40000	XCB71912C.T.P4S.UL	0,162
	56	300	705	98,0	180,0	247,9	34,0	13,3	22000	36000	XCB71912E.T.P4S.UL	0,162
	209	705	1460	64,7	112,0	162,5	37,6	34,9	14000		B7012C.2RSD.T.P4S.UL	0,410
	300	1077	2280	148,0	240,0	330,0	35,4	32,4	13000		B7012E.2RSD.T.P4S.UL	0,410
	209	705	1460	64,7	112,0	162,5	37,6	34,9	14000	22000	B7012C.T.P4S.UL	0,410
	300	1077	2280	148,0	240,0	330,0	35,4	32,4	13000	20000	B7012E.T.P4S.UL	0,410
	105	380	800	55,1	93,0	132,0	37,6	24,4	18000	30000	HCB7012C.T.P4S.UL	0,359
	136	570	1265	127,0	213,4	287,0	35,4	22,7	15000	24000	HCB7012E.T.P4S.UL	0,359
	105	380	800	55,1	93,0	132,0	60,2	24,4	24000	38000	XCB7012C.T.P4S.UL	0,359
	136	570	1265	127,0	213,4	287,0	56,7	22,7	20000	34000	XCB7012E.T.P4S.UL	0,359

12. Size tables



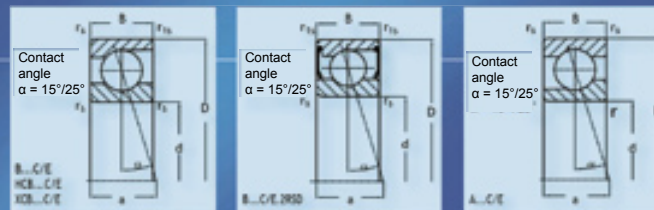
	Size of shaft (mm)						Mounting size (mm) IM)				Size DLR (mm)				
	d	D	B	a	r _s min	r _{s1} min	d _h 12	D _H 12	r _s max	r _{s1} max	N _B	N _A	S _B	S _A	
60	60	110	22	23	1,50	1,50	69,5	101,5	1,5	1,5					
	60	110	22	31	1,50	1,50	69,5	101,5	1,5	1,5					
	60	110	22	23	1,50	1,50	69,5	101,5	1,5	1,5					
	60	110	22	31	1,50	1,50	69,5	101,5	1,5	1,5					
	60	110	22	23	1,50	1,50	69,5	101,5	1,5	1,5					
	60	110	22	31	1,50	1,50	69,5	101,5	1,5	1,5					
	60	130	31	28	2,10	2,10	71,0	119,0	2,1	2,1					
	60	130	31	38	2,10	2,10	71,0	119,0	2,1	2,1					
65	65	90	13	17	1,00	0,60	70,0	85,5	0,6	0,3					
	65	90	13	25	1,00	0,60	70,0	85,5	0,6	0,3					
	65	90	13	17	1,00	0,60	70,0	85,5	0,6	0,3	1,5	2,8	1,6	7,2	
	65	90	13	25	1,00	0,60	70,0	85,5	0,6	0,3	1,5	2,8	1,6	7,2	
	65	90	13	17	1,00	0,60	70,0	85,5	0,6	0,3	1,5	2,8	1,6	7,2	
	65	90	13	25	1,00	0,60	70,0	85,5	0,6	0,3	1,5	2,8	1,6	7,2	
	65	90	13	17	1,00	0,60	70,0	85,5	0,6	0,3	1,5	2,8	1,6	7,2	
	65	90	13	25	1,00	0,60	70,0	85,5	0,6	0,3	1,5	2,8	1,6	7,2	
	65	100	18	20	1,10	1,00	72,0	93,0	1,0	0,6					
	65	100	18	28	1,10	1,00	72,0	93,0	1,0	0,6					
	65	100	18	20	1,10	1,00	72,0	93,0	1,0	0,6	1,8	4,0	1,6	10,4	
	65	100	18	28	1,10	1,00	72,0	93,0	1,0	0,6	1,8	4,0	1,6	10,4	
	65	100	18	20	1,10	1,00	72,0	93,0	1,0	0,6	1,8	4,0	1,6	10,4	
	65	100	18	28	1,10	1,00	72,0	93,0	1,0	0,6	1,8	4,0	1,6	10,4	
	65	100	18	20	1,10	1,00	72,0	93,0	1,0	0,6	1,8	4,0	1,6	10,4	
	65	100	18	28	1,10	1,00	72,0	93,0	1,0	0,6	1,8	4,0	1,6	10,4	
	65	120	23	24	1,50	1,50	75,5	109,5	1,5	1,5					
	65	120	23	33	1,50	1,50	75,5	109,5	1,5	1,5					
	65	120	23	24	1,50	1,50	75,5	109,5	1,5	1,5					
	65	120	23	33	1,50	1,50	75,5	109,5	1,5	1,5					
	65	120	23	24	1,50	1,50	75,5	109,5	1,5	1,5					
	65	120	23	33	1,50	1,50	75,5	109,5	1,5	1,5					
70	70	100	16	19	1,00	0,60	76,0	94,5	0,6	0,3					
	70	100	16	28	1,00	0,60	76,0	94,5	0,6	0,3					
	70	100	16	19	1,00	0,60	76,0	94,5	0,6	0,3	1,8	3,1	1,6	9,3	
	70	100	16	28	1,00	0,60	76,0	94,5	0,6	0,3	1,8	3,1	1,6	9,3	



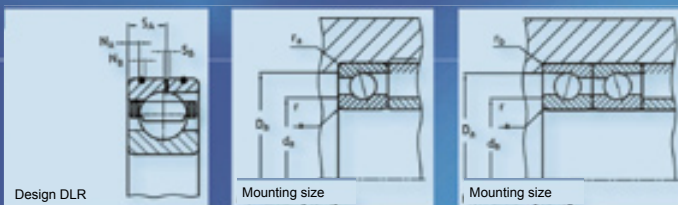
12. Size tables

	Preload (H)			Axial stiffness (H/um)			Payload (kH)		Limit rotational rate (rpm)		Code	Weight
	L	M	S	L	M	S	Dyn. C	Stat. Co	Grease	Oil	Bearing	kg
	313	1020	2100	71,3	123,0	179,1	64,2	52,8	13 000		B7212C.2RSD.T.P4S.UL	0,782
	466	1600	3335	166,0	266,1	360,0	61,0	50,5	12 000		B7212E.2RSD.T.P4S.UL	0,782
	313	1020	2100	71,3	123,0	179,1	64,2	52,8	13 000	20 000	B7212C.T.P4S.UL	0,782
	466	1600	3335	166,0	266,1	360,0	61,0	50,5	12 000	19 000	B7212E.T.P4S.UL	0,782
	160	560	1160	61,1	102,3	145,0	64,2	37,0	16 000	26 000	HCB7212C.T.P4S.UL	0,646
	230	865	1863	144,9	235,7	319,0	61,0	35,4	14 000	22 000	HCB7212E.T.P4S.UL	0,646
	420	850	1690	95,0	130,0	190,0	84,6	64,7	14 000	22 000	A7312C.T.P4S.UL	1,75
	720	1430	2870	220,0	290,0	390,0	80,9	61,6	12 500	19 500	A7312E.T.P4S.UL	1,75
	120	420	880	56,7	99,0	146,1	22,9	21,1	14 000		B71913C.2RSD.T.P4S.UL	0,202
	152	620	1350	127,5	215,0	295,0	21,5	19,6	13 000		B71913E.2RSD.T.P4S.UL	0,202
	120	420	880	56,7	99,0	146,1	22,9	21,1	14 000	22 000	B71913C.T.P4S.UL	0,202
	152	620	1350	127,5	215,0	295,0	21,5	19,6	13 000	20 000	B71913E.T.P4S.UL	0,202
	55	220	480	46,9	82,4	118,0	22,9	14,8	18 000	30 000	HCB71913C.T.P4S.UL	0,173
	57	308	720	101,0	185,0	257,0	21,5	13,7	15 000	24 000	HCB71913E.T.P4S.UL	0,173
	55	220	480	46,9	82,4	118,0	36,6	14,8	24 000	38 000	XCB71913C.T.P4S.UL	0,173
	57	308	720	101,0	185,0	257,0	34,3	13,7	20 000	34 000	XCB71913E.T.P4S.UL	0,173
	215	720	1490	67,2	115,0	169,0	38,3	36,4	13 000		B7013C.2RSD.T.P4S.UL	0,435
	310	1120	2375	155,4	254,0	344,0	36,1	33,8	12 000		B7013E.2RSD.T.P4S.UL	0,435
	215	720	1490	67,2	115,0	169,0	38,3	36,4	13 000	20 000	B7013C.T.P4S.UL	0,435
	310	1120	2375	155,4	254,0	344,0	36,1	33,8	12 000	19 000	B7013E.T.P4S.UL	0,435
	110	390	830	57,2	97,0	138,6	38,3	25,5	17 000	28 000	HCB7013C.T.P4S.UL	0,382
	136	580	1280	131,5	220,0	300,0	36,1	23,7	15 000	24 000	HCB7013E.T.P4S.UL	0,382
	110	390	830	57,2	97,0	138,6	61,3	25,5	22 000	36 000	XCB7013C.T.P4S.UL	0,382
	136	580	1280	131,5	220,0	300,0	57,7	23,7	19 000	32 000	XCB7013E.T.P4S.UL	0,382
	325	1050	2160	75,0	128,8	187,0	66,7	57,9	12 000		B7213C.2RSD.T.P4S.UL	0,997
	482	1660	3460	175,0	280,1	380,0	63,1	55,2	11 000		B7213E.2RSD.T.P4S.UL	0,997
	325	1050	2160	75,0	128,8	187,0	66,7	57,9	12 000	19 000	B7213C.T.P4S.UL	0,997
	482	1660	3460	175,0	280,1	380,0	63,1	55,2	11 000	18 000	B7213E.T.P4S.UL	0,997
	170	582	1215	65,0	108,0	153,0	66,7	40,5	15 000	24 000	HCB7213C.T.P4S.UL	0,852
	232	890	1920	153,6	249,0	335,0	63,1	38,7	13 000	20 000	HCB7213E.T.P4S.UL	0,852
	170	585	1230	66,7	115,0	168,0	31,7	29,6	13 000		B71914C.2RSD.T.P4S.UL	0,331
	232	890	1920	152,0	252,0	340,0	29,8	27,5	12 000		B71914E.2RSD.T.P4S.UL	0,331
	170	585	1230	66,7	115,0	168,0	31,7	29,6	13 000	20 000	B71914C.T.P4S.UL	0,331
	232	890	1920	152,0	252,0	340,0	29,8	27,5	12 000	19 000	B71914E.T.P4S.UL	0,331

12. Size tables



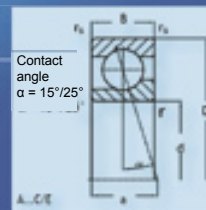
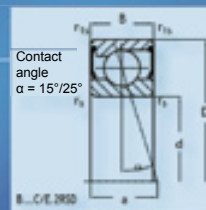
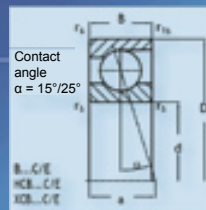
Size of shaft (mm)							Mounting size (mm)				Size DLR (mm)				
	d	D	B	a	$r_{s, \min}$	$r_{s, \max}$	d_{h12}	D_{h12}	$r_{s, \max}$	$r_{b, \max}$	N_b	N_A	S_b	S_A	
70	70	100	16	19	1,00	0,60	76,0	94,5	0,6	0,3	1,8	3,1	1,6	9,3	
	70	100	16	28	1,00	0,60	76,0	94,5	0,6	0,3	1,8	3,1	1,6	9,3	
	70	100	16	19	1,00	0,60	76,0	94,5	0,6	0,3	1,8	3,1	1,6	9,3	
	70	100	16	28	1,00	0,60	76,0	94,5	0,6	0,3	1,8	3,1	1,6	9,3	
	70	110	20	22	1,10	1,00	77,0	102,0	1,0	0,6					
	70	110	20	31	1,10	1,00	77,0	102,0	1,0	0,6					
	70	110	20	22	1,10	1,00	77,0	102,0	1,0	0,6	1,8	4,0	1,6	11,6	
	70	110	20	31	1,10	1,00	77,0	102,0	1,0	0,6	1,8	4,0	1,6	11,6	
	70	110	20	22	1,10	1,00	77,0	102,0	1,0	0,6	1,8	4,0	1,6	11,6	
	70	110	20	31	1,10	1,00	77,0	102,0	1,0	0,6	1,8	4,0	1,6	11,6	
	70	110	20	22	1,10	1,00	77,0	102,0	1,0	0,6	1,8	4,0	1,6	11,6	
	70	110	20	31	1,10	1,00	77,0	102,0	1,0	0,6	1,8	4,0	1,6	11,6	
	70	125	24	25	1,50	1,50	80,0	115,0	1,5	1,5					
	70	125	24	35	1,50	1,50	80,0	115,0	1,5	1,5					
	70	125	24	25	1,50	1,50	80,0	115,0	1,5	1,5					
	70	125	24	35	1,50	1,50	80,0	115,0	1,5	1,5					
75	75	105	16	20	1,00	0,60	81,0	99,5	0,6	0,3					
	75	105	16	29	1,00	0,60	81,0	99,5	0,6	0,3					
	75	105	16	20	1,00	0,60	81,0	99,5	0,6	0,3	1,8	3,1	1,6	9,3	
	75	105	16	29	1,00	0,60	81,0	99,5	0,6	0,3	1,8	3,1	1,6	9,3	
	75	105	16	20	1,00	0,60	81,0	99,5	0,6	0,3	1,8	3,1	1,6	9,3	
	75	105	16	29	1,00	0,60	81,0	99,5	0,6	0,3	1,8	3,1	1,6	9,3	
	75	105	16	20	1,00	0,60	81,0	99,5	0,6	0,3	1,8	3,1	1,6	9,3	
	75	105	16	29	1,00	0,60	81,0	99,5	0,6	0,3	1,8	3,1	1,6	9,3	
	75	115	20	23	1,10	1,00	82,0	107,0	1,0	0,6					
	75	115	20	32	1,10	1,00	82,0	107,0	1,0	0,6					
	75	115	20	23	1,10	1,00	82,0	107,0	1,0	0,6	1,8	4,0	1,6	11,6	
	75	115	20	32	1,10	1,00	82,0	107,0	1,0	0,6	1,8	4,0	1,6	11,6	
	75	115	20	23	1,10	1,00	82,0	107,0	1,0	0,6	1,8	4,0	1,6	11,6	
	75	115	20	32	1,10	1,00	82,0	107,0	1,0	0,6	1,8	4,0	1,6	11,6	
	75	115	20	23	1,10	1,00	82,0	107,0	1,0	0,6	1,8	4,0	1,6	11,6	
	75	115	20	32	1,10	1,00	82,0	107,0	1,0	0,6	1,8	4,0	1,6	11,6	



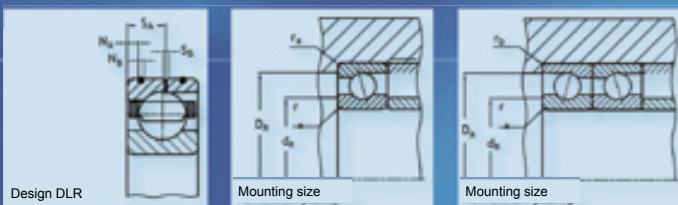
12. Size tables

	Preload (H)			Axial stiffness (H/um)			Payload (kH)		Limit rotational rate (rpm)		Code	Weight
	L	M	S	L	M	S	Dyn. C	Stat. Co	Grease	Oil	Bearing	kg
	82	310	670	55,9	96,0	137,0	31,7	20,7	16000	26000	HCB71914C.T.P4S.UL	0,283
	95	450	1030	126,0	218,0	300,0	29,8	19,3	14000	22000	HCB71914E.T.P4S.UL	0,283
	82	310	670	55,9	96,0	137,0	50,8	20,7	22000	36000	XCB71914C.T.P4S.UL	0,283
	95	450	1030	126,0	218,0	300,0	47,7	19,3	18000	30000	XCB71914E.T.P4S.UL	0,283
	275	910	1890	74,0	127,1	185,0	47,8	47,3	12000		B7014C.2RSD.T.P4S.UL	0,590
	400	1400	2950	172,0	274,0	373,5	45,0	44,0	11000		B7014E.2RSD.T.P4S.UL	0,590
	275	910	1890	74,0	127,1	185,0	47,8	47,3	12000	19000	B7014C.T.P4S.UL	0,590
	400	1400	2950	172,0	274,0	373,5	45,0	44,0	11000	18000	B7014E.T.P4S.UL	0,590
	140	490	1040	63,0	106,0	150,0	47,8	33,1	16000	26000	HCB7014C.T.P4S.UL	0,504
	185	740	1610	147,0	242,0	326,0	45,0	30,8	13000	20000	HCB7014E.T.P4S.UL	0,504
	140	490	1040	63,0	106,0	150,0	76,4	33,1	20000	34000	XCB7014C.T.P4S.UL	0,504
	185	740	1610	147,0	242,0	326,0	72,0	30,8	17000	28000	XCB7014E.T.P4S.UL	0,504
	402	1300	2660	84,0	143,6	208,0	66,3	58,9	11000	18000	B7214C.T.P4S.UL	1,08
	600	2040	4240	195,0	320,0	4	62,7	56,2	10000	17000	B7214E.T.P4S.UL	1,08
	207	709	1480	72,0	120,0	170,0	66,3	41,2	14000	22000	HCB7214C.T.P4S.UL	0,925
	293	1100	2350	171,5	276,5	371,0	62,7	39,3	12000	19000	HCB7214E.T.P4S.UL	0,925
	172	594	1244	68,3	118,4	172,3	31,3	29,4	12000		B71915C.2RSD.T.P4S.UL	0,351
	234	900	1940	156,0	258,1	353,0	29,3	27,4	11000		B71915E.2RSD.T.P4S.UL	0,351
	172	594	1244	68,3	118,4	172,3	31,3	29,4	12000	19000	B71915C.T.P4S.UL	0,351
	234	900	1940	156,0	258,1	353,0	29,3	27,4	11000	18000	B71915E.T.P4S.UL	0,351
	84	320	690	57,9	99,4	141,5	31,3	20,6	16000	26000	HCB71915C.T.P4S.UL	0,303
	96	455	1040	129,2	226,0	307,9	29,3	19,2	13000	20000	HCB71915E.T.P4S.UL	0,303
	84	320	690	57,9	99,4	141,5	50,0	20,6	20000	34000	XCB71915C.T.P4S.UL	0,303
	96	455	1040	129,2	226,0	307,9	47,0	19,2	17000	28000	XCB71915E.T.P4S.UL	0,303
	280	930	1925	76,6	132,0	192,0	48,7	49,2	12000		B7015C.2RSD.T.P4S.UL	0,620
	405	1440	3030	177,5	288,0	390,0	45,8	45,7	11000		B7015E.2RSD.T.P4S.UL	0,620
	280	930	1925	76,6	132,0	192,0	48,7	49,2	12000	19000	B7015C.T.P4S.UL	0,620
	405	1440	3030	177,5	288,0	390,0	45,8	45,7	11000	18000	B7015E.T.P4S.UL	0,620
	142	508	1070	66,1	111,0	157,0	48,7	34,4	15000	24000	HCB7015C.T.P4S.UL	0,530
	192	760	1670	154,0	254,0	343,0	45,8	32,0	13000	20000	HCB7015E.T.P4S.UL	0,530
	142	508	1070	66,1	111,0	157,0	77,8	34,4	19000	32000	XCB7015C.T.P4S.UL	0,530
	192	760	1670	154,0	254,0	343,0	73,3	32,0	16000	26000	XCB7015E.T.P4S.UL	0,530

12. Size tables



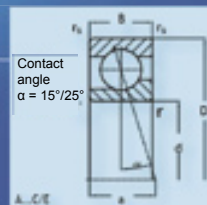
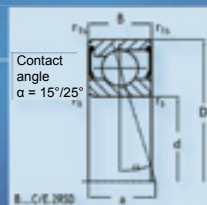
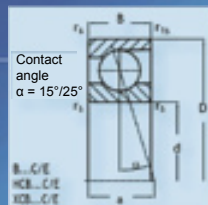
	Size of shaft (mm)						Mounting size (mm)				Size DLR (mm)				
	d	D	B	a	r _s min	r _s max	d _{h12}	D _{H12}	r _s max	r _s max	N _B	N _A	S _B	S _A	
75	75	130	25	26	1,50	1,50	85,0	120,0	1,5	1,5					
	75	130	25	36	1,50	1,50	85,0	120,0	1,5	1,5					
	75	130	25	26	1,50	1,50	85,0	120,0	1,5	1,5					
	75	130	25	36	1,50	1,50	85,0	120,0	1,5	1,5					
80	80	110	16	21	1,00	0,60	86,0	104,0	0,6	0,3					
	80	110	16	30	1,00	0,60	86,0	104,0	0,6	0,3					
	80	110	16	21	1,00	0,60	86,0	104,0	0,6	0,3	1,8	3,1	1,6	9,3	
	80	110	16	30	1,00	0,60	86,0	104,0	0,6	0,3	1,8	3,1	1,6	9,3	
	80	110	16	21	1,00	0,60	86,0	104,0	0,6	0,3	1,8	3,1	1,6	9,3	
	80	110	16	30	1,00	0,60	86,0	104,0	0,6	0,3	1,8	3,1	1,6	9,3	
	80	110	16	21	1,00	0,60	86,0	104,0	0,6	0,3	1,8	3,1	1,6	9,3	
	80	110	16	30	1,00	0,60	86,0	104,0	0,6	0,3	1,8	3,1	1,6	9,3	
	80	125	22	25	1,10	1,00	88,0	117,0	1,0	0,6					
	80	125	22	35	1,10	1,00	88,0	117,0	1,0	0,6					
	80	125	22	25	1,10	1,00	88,0	117,0	1,0	0,6	1,8	4,7	2,6	12,2	
	80	125	22	35	1,10	1,00	88,0	117,0	1,0	0,6	1,8	4,7	2,6	12,2	
	80	125	22	25	1,10	1,00	88,0	117,0	1,0	0,6	1,8	4,7	2,6	12,2	
	80	125	22	35	1,10	1,00	88,0	117,0	1,0	0,6	1,8	4,7	2,6	12,2	
	80	125	22	25	1,10	1,00	88,0	117,0	1,0	0,6	1,8	4,7	2,6	12,2	
	80	125	22	35	1,10	1,00	88,0	117,0	1,0	0,6	1,8	4,7	2,6	12,2	
	80	140	26	28	2,00	2,00	91,0	129,0	2,0	2,0					
	80	140	26	39	2,00	2,00	91,0	129,0	2,0	2,0					
	80	140	26	28	2,00	2,00	91,0	129,0	2,0	2,0					
	80	140	26	39	2,00	2,00	91,0	129,0	2,0	2,0					
85	85	120	18	23	1,10	1,00	92,0	114,0	0,6	0,6					
	85	120	18	33	1,10	1,00	92,0	114,0	0,6	0,6					
	85	120	18	23	1,10	1,00	92,0	114,0	0,6	0,6	1,8	4,0	2,2	10,4	
	85	120	18	33	1,10	1,00	92,0	114,0	0,6	0,6	1,8	4,0	2,2	10,4	
	85	120	18	23	1,10	1,00	92,0	114,0	0,6	0,6	1,8	4,0	2,2	10,4	
	85	120	18	33	1,10	1,00	92,0	114,0	0,6	0,6	1,8	4,0	2,2	10,4	
	85	120	18	23	1,10	1,00	92,0	114,0	0,6	0,6	1,8	4,0	2,2	10,4	
	85	120	18	33	1,10	1,00	92,0	114,0	0,6	0,6	1,8	4,0	2,2	10,4	



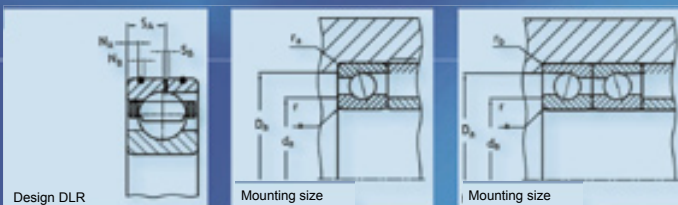
12. Size tables

	Preload (H)			Axial stiffness (H/um)			Payload (kH)		Limit rotational rate (rpm)		Code	Weight
	L	M	S	L	M	S	Dyn. C	Stat. Co	Grease	Oil	Bearing	kg
	415	1345	2760	87,6	150,0	217,0	80,0	71,9	11000	18000	B7215C.T.P4S.UL	1,18
	620	2100	4390	205,0	325,0	441,9	75,8	68,5	9500	16000	B7215E.T.P4S.UL	1,18
	215	735	1530	75,0	126,0	177,5	80,0	50,3	14000	22000	HCB7215C.T.P4S.UL	0,987
	305	1140	2440	180,2	291,0	389,0	75,8	48,0	12000	19000	HCB7215E.T.P4S.UL	0,987
	174	600	1260	70,1	120,0	175,0	32,5	31,7	12000		B71916C.2RSD.T.P4S.UL	0,370
	236	910	1970	160,6	260,0	365,0	30,5	29,6	11000		B71916E.2RSD.T.P4S.UL	0,370
	174	600	1260	70,1	120,0	175,0	32,5	31,7	12000	19000	B71916C.T.P4S.UL	0,370
	236	910	1970	160,6	260,0	365,0	30,5	29,6	11000	18000	B71916E.T.P4S.UL	0,370
	83	320	690	58,5	102,0	144,8	32,5	22,2	15000	24000	HCB71916C.T.P4S.UL	0,318
	95	460	1050	133,0	233,0	318,1	30,5	20,7	13000	20000	HCB71916E.T.P4S.UL	0,318
	83	320	690	58,5	102,0	144,8	52,0	22,2	19000	32000	XCB71916C.T.P4S.UL	0,318
	95	460	1050	133,0	233,0	318,1	48,8	20,7	16000	26000	XCB71916E.T.P4S.UL	0,318
	355	1160	2390	86,1	148,0	214,0	58,1	58,3	11000		B7016C.2RSD.T.P4S.UL	0,857
	530	1830	3830	200,0	322,0	440,0	54,7	54,2	9500		B7016E.2RSD.T.P4S.UL	0,857
	355	1160	2390	86,1	148,0	214,0	58,1	58,3	11000	18000	B7016C.T.P4S.UL	0,857
	530	1830	3830	200,0	322,0	440,0	54,7	54,2	9500	16000	B7016E.T.P4S.UL	0,857
	185	640	1350	73,9	125,0	176,0	58,1	40,8	14000	22000	HCB7016C.T.P4S.UL	0,738
	250	970	2090	175,0	285,1	383,9	54,7	37,9	12000	19000	HCB7016E.T.P4S.UL	0,738
	185	640	1350	73,9	125,0	176,0	92,9	40,8	18000	30000	XCB7016C.T.P4S.UL	0,738
	250	970	2090	175,0	285,1	383,9	87,5	37,9	15000	24000	XCB7016E.T.P4S.UL	0,738
	555	1760	3600	95,2	162,0	234,0	92,1	82,3	10000	17000	B7216C.T.P4S.UL	1,45
	840	2780	5750	221,9	351,0	475,0	87,3	78,5	9000	15000	B7216E.T.P4S.UL	1,45
	290	960	1995	82,0	135,1	190,0	92,1	57,6	12000	19000	HCB7216C.T.P4S.UL	1,20
	420	1515	3200	196,0	312,0	416,0	87,3	55,0	11000	18000	HCB7216E.T.P4S.UL	1,20
	240	806	1675	80,1	138,0	200,0	41,9	43,3	11000		B71917C.2RSD.T.P4S.UL	0,536
	335	1230	2630	184,9	300,0	410,0	39,4	40,3	9500		B71917E.2RSD.T.P4S.UL	0,536
	240	806	1675	80,1	138,0	200,0	41,9	43,3	11000	18000	B71917C.T.P4S.UL	0,536
	335	1230	2630	184,9	300,0	410,0	39,4	40,3	9500	16000	B71917E.T.P4S.UL	0,536
	120	440	935	68,3	116,1	165,0	41,9	30,3	13000	20000	HCB71917C.T.P4S.UL	0,460
	148	640	1440	158,0	266,5	362,0	39,4	28,2	12000	19000	HCB71917E.T.P4S.UL	0,460
	120	440	935	68,3	116,1	165,0	67,0	30,3	18000	30000	XCB71917C.T.P4S.UL	0,460
	148	640	1440	158,0	266,5	362,0	63,0	28,2	15000	24000	XCB71917E.T.P4S.UL	0,460

12. Size tables



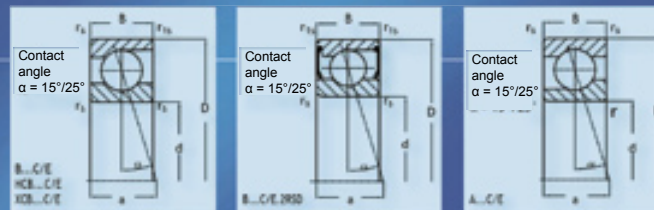
	Size of shaft (mm)						Mounting size (mm)				Size DLR (mm)				
	d	D	B	a	r _s min	r ₁₅ min	d ₉ h12	D ₉ H12	r _s max	r ₁₅ max	N _B	N _A	S _B	S _A	
85	85	130	22	25	1,10	1,00	93,0	122,0	1,0	0,6					
	85	130	22	36	1,10	1,00	93,0	122,0	1,0	0,6					
	85	130	22	25	1,10	1,00	93,0	122,0	1,0	0,6	1,8	4,7	2,6	12,2	
	85	130	22	36	1,10	1,00	93,0	122,0	1,0	0,6	1,8	4,7	2,6	12,2	
	85	130	22	25	1,10	1,00	93,0	122,0	1,0	0,6	1,8	4,7	2,6	12,2	
	85	130	22	36	1,10	1,00	93,0	122,0	1,0	0,6	1,8	4,7	2,6	12,2	
	85	130	22	25	1,10	1,00	93,0	122,0	1,0	0,6	1,8	4,7	2,6	12,2	
	85	130	22	36	1,10	1,00	93,0	122,0	1,0	0,6	1,8	4,7	2,6	12,2	
	85	150	28	30	2,00	2,00	98,0	138,0	2,0	2,0					
	85	150	28	41	2,00	2,00	98,0	138,0	2,0	2,0					
	85	150	28	30	2,00	2,00	98,0	138,0	2,0	2,0					
	85	150	28	41	2,00	2,00	98,0	138,0	2,0	2,0					
90	90	125	18	23	1,10	1,00	97,0	119,0	0,6	0,6					
	90	125	18	34	1,10	1,00	97,0	119,0	0,6	0,6					
	90	125	18	23	1,10	1,00	97,0	119,0	0,6	0,6	1,8	4,0	2,4	10,4	
	90	125	18	34	1,10	1,00	97,0	119,0	0,6	0,6	1,8	4,0	2,4	10,4	
	90	125	18	23	1,10	1,00	97,0	119,0	0,6	0,6	1,8	4,0	2,4	10,4	
	90	125	18	34	1,10	1,00	97,0	119,0	0,6	0,6	1,8	4,0	2,4	10,4	
	90	125	18	23	1,10	1,00	97,0	119,0	0,6	0,6	1,8	4,0	2,4	10,4	
	90	125	18	34	1,10	1,00	97,0	119,0	0,6	0,6	1,8	4,0	2,4	10,4	
	90	140	24	27	1,50	1,10	100,0	131,0	1,5	0,6					
	90	140	24	39	1,50	1,10	100,0	131,0	1,5	0,6					
	90	140	24	27	1,50	1,10	100,0	131,0	1,5	0,6	1,8	4,4	2,6	13,3	
	90	140	24	39	1,50	1,10	100,0	131,0	1,5	0,6	1,8	4,4	2,6	13,3	
	90	140	24	27	1,50	1,10	100,0	131,0	1,5	0,6	1,8	4,4	2,6	13,3	
	90	140	24	39	1,50	1,10	100,0	131,0	1,5	0,6	1,8	4,4	2,6	13,3	
	90	140	24	27	1,50	1,10	100,0	131,0	1,5	0,6	1,8	4,4	2,6	13,3	
	90	140	24	39	1,50	1,10	100,0	131,0	1,5	0,6	1,8	4,4	2,6	13,3	
	90	160	30	32	2,00	2,00	104,0	147,0	2,0	2,0					
	90	160	30	44	2,00	2,00	104,0	147,0	2,0	2,0					
	90	160	30	32	2,00	2,00	104,0	147,0	2,0	2,0					
	90	160	30	44	2,00	2,00	104,0	147,0	2,0	2,0					



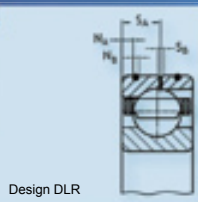
12. Size tables

	Preload (H)			Axial stiffness (H/um)			Payload (kH)		Limit rotational rate (rpm)		Code	Weight
	L	M	S	L	M	S	Dyn. C	Stat. Co	Grease	Oil	Bearing	kg
	372	1205	2480	90,1	154,0	222,9	59,3	60,8	10000		B7017C.2RSD.T.P4S.UL	0,903
	544	1890	3950	211,0	336,9	457,1	55,9	56,5	9000		B7017E.2RSD.T.P4S.UL	0,903
	372	1205	2480	90,1	154,0	222,9	59,3	60,8	10000	17000	B7017C.T.P4S.UL	0,903
	544	1890	3950	211,0	336,9	457,1	55,9	56,5	9000	15000	B7017E.T.P4S.UL	0,903
	190	666	1400	78,0	129,9	185,0	59,3	42,6	13000	20000	HCB7017C.T.P4S.UL	0,778
	262	1010	2180	185,0	300,0	401,0	55,9	39,6	11000	18000	HCB7017E.T.P4S.UL	0,778
	190	666	1400	78,0	129,9	185,0	94,9	42,6	17000	28000	XCB7017C.T.P4S.UL	0,778
	262	1010	2180	185,0	300,0	401,0	89,4	39,6	14000	22000	XCB7017E.T.P4S.UL	0,778
	575	1830	3740	100,0	170,0	244,8	96,0	85,2	9000	15000	B7217C.T.P4S.UL	1,85
	870	2890	5970	233,0	372,0	504,0	90,9	81,2	8000	13000	B7217E.T.P4S.UL	1,85
	300	1000	2070	86,5	143,0	200,0	96,0	59,6	11000	18000	HCB7217C.T.P4S.UL	1,55
	439	1570	3325	205,0	329,0	442,0	90,9	56,9	10000	17000	HCB7217E.T.P4S.UL	1,55
	242	810	1690	82,5	142,0	206,0	37,4	39,5	10000		B71918C.2RSD.T.P4S.UL	0,565
	339	1240	2660	190,0	310,0	424,0	35,1	36,8	9000		B71918E.2RSD.T.P4S.UL	0,565
	242	810	1690	82,5	142,0	206,0	37,4	39,5	10000	17000	B71918C.T.P4S.UL	0,565
	339	1240	2660	190,0	310,0	424,0	35,1	36,8	9000	15000	B71918E.T.P4S.UL	0,565
	121	444	950	70,7	120,0	170,2	37,4	27,6	13000	20000	HCB71918C.T.P4S.UL	0,493
	150	650	1460	162,0	275,0	375,0	35,1	25,8	11000	18000	HCB71918E.T.P4S.UL	0,493
	121	444	950	70,7	120,0	170,2	59,8	27,6	17000	28000	XCB71918C.T.P4S.UL	0,493
	150	650	1460	162,0	275,0	375,0	56,2	25,8	14000	22000	XCB71918E.T.P4S.UL	0,493
	440	1430	2930	96,2	164,0	235,0	75,1	76,0	9500		B7018C.2RSD.T.P4S.UL	1,18
	650	2220	4630	222,8	357,0	482,0	70,8	70,6	8500		B7018E.2RSD.T.P4S.UL	1,18
	440	1430	2930	96,2	164,0	235,0	75,1	76,0	9500	16000	B7018C.T.P4S.UL	1,18
	650	2220	4630	222,8	357,0	482,0	70,8	70,6	8500	14000	B7018E.T.P4S.UL	1,18
	223	777	1620	83,2	136,0	192,0	75,1	53,2	12000	19000	HCB7018C.T.P4S.UL	0,996
	320	1205	2590	198,0	320,0	428,0	70,8	49,4	10000	17000	HCB7018E.T.P4S.UL	0,996
	223	777	1620	83,2	136,0	192,0	120,2	53,2	15000	24000	XCB7018C.T.P4S.UL	0,996
	320	1205	2590	198,0	320,0	428,0	113,3	49,4	13000	20000	XCB7018E.T.P4S.UL	0,996
	740	2330	4750	110,0	186,0	268,0	118,1	110,3	8500	14000	B7218C.T.P4S.UL	2,25
	1140	3720	7650	256,0	405,0	550,0	111,9	105,3	7500	12000	B7218E.T.P4S.UL	2,25
	400	1300	2600	96,5	158,0	221,0	118,1	77,2	11000	18000	HCB7218C.T.P4S.UL	1,87
	580	2020	4250	231,0	363,0	485,0	111,9	73,7	9000	15000	HCB7218E.T.P4S.UL	1,87

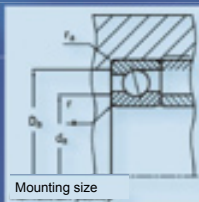
12. Size tables



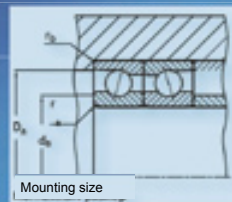
	Size of shaft (mm)						Mounting size (mm)				Size DLR (mm)				
	d	D	B	a	r_s min	r_h min	d_h 12	D_h 12	r_s max	r_h max	N_B	N_A	S_B	S_A	
95	95	130	18	24	1,10	1,00	102,0	124,0	0,6	0,6					
	95	130	18	35	1,10	1,00	102,0	124,0	0,6	0,6					
	95	130	18	24	1,10	1,00	102,0	124,0	0,6	0,6	1,8	4,0	2,4	10,4	
	95	130	18	35	1,10	1,00	102,0	124,0	0,6	0,6	1,8	4,0	2,4	10,4	
	95	130	18	24	1,10	1,00	102,0	124,0	0,6	0,6	1,8	4,0	2,4	10,4	
	95	130	18	35	1,10	1,00	102,0	124,0	0,6	0,6	1,8	4,0	2,4	10,4	
	95	130	18	24	1,10	1,00	102,0	124,0	0,6	0,6	1,8	4,0	2,4	10,4	
	95	130	18	35	1,10	1,00	102,0	124,0	0,6	0,6	1,8	4,0	2,4	10,4	
	95	145	24	28	1,50	1,10	105,0	136,0	1,5	0,6					
	95	145	24	40	1,50	1,10	105,0	136,0	1,5	0,6					
	95	145	24	28	1,50	1,10	105,0	136,0	1,5	0,6	1,8	5,5	2,6	14,5	
	95	145	24	40	1,50	1,10	105,0	136,0	1,5	0,6	1,8	5,5	2,6	14,5	
	95	145	24	28	1,50	1,10	105,0	136,0	1,5	0,6	1,8	5,5	2,6	14,5	
	95	145	24	40	1,50	1,10	105,0	136,0	1,5	0,6	1,8	5,5	2,6	14,5	
	95	145	24	28	1,50	1,10	105,0	136,0	1,5	0,6	1,8	5,5	2,6	14,5	
	95	145	24	40	1,50	1,10	105,0	136,0	1,5	0,6	1,8	5,5	2,6	14,5	
	95	170	32	34	2,10	2,10	110,5	154,0	2,0	2,0					
	95	170	32	47	2,10	2,10	110,5	154,0	2,0	2,0					
	95	170	32	34	2,10	2,10	110,5	154,0	2,0	2,0					
	95	170	32	47	2,10	2,10	110,5	154,0	2,0	2,0					
100	100	140	20	26	1,10	1,00	107,0	133,0	0,6	0,6					
	100	140	20	38	1,10	1,00	107,0	133,0	0,6	0,6					
	100	140	20	26	1,10	1,00	107,0	133,0	0,6	0,6	1,8	4,0	2,6	12,0	
	100	140	20	38	1,10	1,00	107,0	133,0	0,6	0,6	1,8	4,0	2,6	12,0	
	100	140	20	26	1,10	1,00	107,0	133,0	0,6	0,6	1,8	4,0	2,6	12,0	
	100	140	20	38	1,10	1,00	107,0	133,0	0,6	0,6	1,8	4,0	2,6	12,0	
	100	140	20	26	1,10	1,00	107,0	133,0	0,6	0,6	1,8	4,0	2,6	12,0	
	100	140	20	38	1,10	1,00	107,0	133,0	0,6	0,6	1,8	4,0	2,6	12,0	
	100	150	24	29	1,50	1,10	110,0	141,0	1,5	0,6					
	100	150	24	41	1,50	1,10	110,0	141,0	1,5	0,6					
	100	150	24	29	1,50	1,10	110,0	141,0	1,5	0,6	1,8	5,5	2,6	14,5	
	100	150	24	41	1,50	1,10	110,0	141,0	1,5	0,6	1,8	5,5	2,6	14,5	



Design DLR



Mounting size

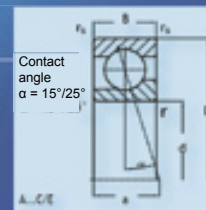
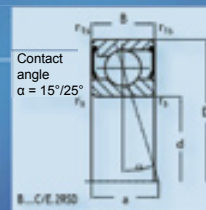
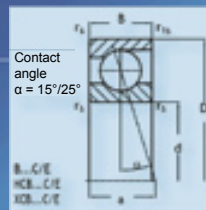


Mounting size

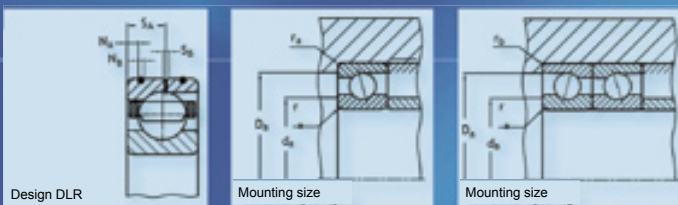
12. Size tables

	Preload (H)			Axial stiffness (H/um)			Payload (kH)		Limit rotational rate (rpm)		Code	Weight
	L	M	S	L	M	S	Dyn. C	Stat. Co	Grease	Oil	Bearing	kg
	244	830	1720	84,6	146,0	211,9	43,3	46,6	9 500		B71919C.2RSD.T.P4S.UL	0,578
	345	1270	2715	195,0	320,5	436,8	40,7	43,4	8 500		B71919E.2RSD.T.P4S.UL	0,578
	244	830	1720	84,6	146,0	211,9	43,3	46,6	9 500	16 000	B71919C.T.P4S.UL	0,578
	345	1270	2715	195,0	320,5	436,8	40,7	43,4	8 500	14 000	B71919E.T.P4S.UL	0,578
	120	440	950	72,8	124,0	175,0	43,3	32,6	12 000	19 000	HCB71919C.T.P4S.UL	0,495
	150	665	1480	166,0	285,0	385,0	40,7	30,4	10 000	17 000	HCB71919E.T.P4S.UL	0,495
	120	440	950	72,8	124,0	175,0	69,3	32,6	16 000	26 000	XCB71919C.T.P4S.UL	0,495
	150	665	1480	166,0	285,0	385,0	65,1	30,4	14 000	22 000	XCB71919E.T.P4S.UL	0,495
	450	1450	2980	99,1	169,0	248,0	72,2	74,4	9 000		B7019C.2RSD.T.P4S.UL	1,19
	670	2315	4815	234,4	374,0	506,0	68,0	62,2	8 000		B7019E.2RSD.T.P4S.UL	1,19
	450	1450	2980	99,1	169,0	248,0	72,2	74,4	9 000	15 000	B7019C.T.P4S.UL	1,19
	670	2315	4815	234,4	374,0	506,0	68,0	62,2	8 000	13 000	B7019E.T.P4S.UL	1,19
	240	815	1690	86,7	144,5	202,5	72,2	52,1	11 000	18 000	HCB7019C.T.P4S.UL	1,02
	325	1230	2650	205,0	331,6	444,5	68,0	4	9 500	16 000	HCB7019E.T.P4S.UL	1,02
	240	815	1690	86,7	144,5	202,5	115,5	52,1	15 000	24 000	XCB7019C.T.P4S.UL	1,02
	325	1230	2650	205,0	331,6	444,5	108,8	48,5	13 000	20 000	XCB7019E.T.P4S.UL	1,02
	770	2430	4930	114,9	196,0	282,0	117,9	107,3	8 000	13 000	B7219C.T.P4S.UL	2,72
	1195	3900	8040	274,2	432,0	582,0	111,7	102,3	7 000	11 000	B7219E.T.P4S.UL	2,72
	410	1350	2780	100,8	166,2	232,1	117,9	75,1	10 000	17 000	HCB7219C.T.P4S.UL	2,30
	600	2090	4400	243,0	382,6	510,0	111,7	71,6	8 500	14 000	HCB7219E.T.P4S.UL	2,30
	320	1060	2195	93,9	162,0	234,1	52,3	57,2	9 000		B71920C.2RSD.T.P4S.UL	0,882
	455	1630	3440	220,5	355,0	482,0	49,3	53,3	8 000		B71920E.2RSD.T.P4S.UL	0,882
	320	1060	2195	93,9	162,0	234,1	52,3	57,2	9 000	15 000	B71920C.T.P4S.UL	0,882
	455	1630	3440	220,5	355,0	482,0	49,3	53,3	8 000	13 000	B71920E.T.P4S.UL	0,882
	160	577	1220	81,2	136,3	192,0	52,3	40,1	11 000	18 000	HCB71920C.T.P4S.UL	0,758
	202	850	1880	187,5	314,0	424,3	49,3	37,3	9 500	16 000	HCB71920E.T.P4S.UL	0,758
	160	577	1220	81,2	136,3	192,0	83,7	40,1	15 000	24 000	XCB71920C.T.P4S.UL	0,758
	202	850	1880	187,5	314,0	424,3	78,8	37,3	12 000	19 000	XCB71920E.T.P4S.UL	0,758
	465	1520	3110	103,7	177,5	256,0	78,8	82,9	8 500		B7020C.2RSD.T.P4S.UL	1,28
	683	2345	4900	243,1	387,0	525,0	74,2	77,1	7 500		B7020E.2RSD.T.P4S.UL	1,28
	465	1520	3110	103,7	177,5	256,0	78,8	82,9	8 500	14 000	B7020C.T.P4S.UL	1,28
	683	2345	4900	243,1	387,0	525,0	74,2	77,1	7 500	12 000	B7020E.T.P4S.UL	1,28

12. Size tables



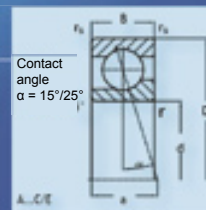
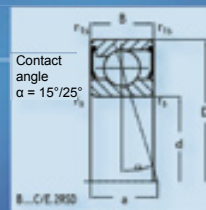
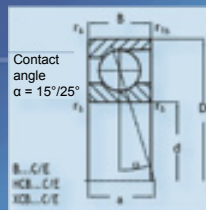
	Size of shaft (mm)						Mounting size (mm)				Size DLR (mm)				
	d	D	B	a	r _s min	r _h min	d _h 12	D _h 12	r _s max	r _h max	N _B	N _A	S _B	S _A	
100	100	150	24	29	1,50	1,10	110,0	141,0	1,5	0,6	1,8	5,5	2,6	14,5	
	100	150	24	41	1,50	1,10	110,0	141,0	1,5	0,6	1,8	5,5	2,6	14,5	
	100	150	24	29	1,50	1,10	110,0	141,0	1,5	0,6	1,8	5,5	2,6	14,5	
	100	150	24	41	1,50	1,10	110,0	141,0	1,5	0,6	1,8	5,5	2,6	14,5	
	100	180	34	36	2,10	2,10	114,5	165,5	2,1	2,1	2,0	6,5	2,6	20,4	
	100	180	34	50	2,10	2,10	114,5	165,5	2,1	2,1	2,0	6,5	2,6	20,4	
	100	180	34	36	2,10	2,10	114,5	165,5	2,1	2,1	2,0	6,5	2,6	20,4	
	100	180	34	50	2,10	2,10	114,5	165,5	2,1	2,1	2,0	6,5	2,6	20,4	
105	105	145	20	27	1,10	1,00	112,0	138,0	0,6	0,6					
	105	145	20	39	1,10	1,00	112,0	138,0	0,6	0,6					
	105	145	20	27	1,10	1,00	112,0	138,0	0,6	0,6	1,8	4,0	2,6	12,0	
	105	145	20	39	1,10	1,00	112,0	138,0	0,6	0,6	1,8	4,0	2,6	12,0	
	105	145	20	27	1,10	1,00	112,0	138,0	0,6	0,6	1,8	4,0	2,6	12,0	
	105	145	20	39	1,10	1,00	112,0	138,0	0,6	0,6	1,8	4,0	2,6	12,0	
	105	145	20	27	1,10	1,00	112,0	138,0	0,6	0,6	1,8	4,0	2,6	12,0	
	105	145	20	39	1,10	1,00	112,0	138,0	0,6	0,6	1,8	4,0	2,6	12,0	
	105	160	26	31	2,00	1,10	116,0	150,0	2,0	1,0					
	105	160	26	44	2,00	1,10	116,0	150,0	2,0	1,0					
	105	160	26	31	2,00	1,10	116,0	150,0	2,0	1,0	2,0	6,0	2,6	15,2	
	105	160	26	44	2,00	1,10	116,0	150,0	2,0	1,0	2,0	6,0	2,6	15,2	
	105	160	26	44	2,00	1,10	116,0	150,0	2,0	1,0	2,0	6,0	2,6	15,2	
	105	160	26	44	2,00	1,10	116,0	150,0	2,0	1,0	2,0	6,0	2,6	15,2	
	105	160	26	44	2,00	1,10	116,0	150,0	2,0	1,0	2,0	6,0	2,6	15,2	
	105	160	26	44	2,00	1,10	116,0	150,0	2,0	1,0	2,0	6,0	2,6	15,2	
	105	190	36	38	2,10	2,10	120,5	174,5	2,1	2,1					
	105	190	36	52	2,10	2,10	120,5	174,5	2,1	2,1					
	105	190	36	38	2,10	2,10	120,5	174,5	2,1	2,1					
	105	190	36	52	2,10	2,10	120,5	174,5	2,1	2,1					
110	110	150	20	27	1,10	1,00	117,0	143,0	0,6	0,6					
	110	150	20	40	1,10	1,00	117,0	143,0	0,6	0,6					
	110	150	20	27	1,10	1,00	117,0	143,0	0,6	0,6	1,8	4,0	2,6	12,0	
	110	150	20	40	1,10	1,00	117,0	143,0	0,6	0,6	1,8	4,0	2,6	12,0	



12. Size tables

	Preload (H)			Axial stiffness (H/um)			Payload (κH)		Limit rotational rate (rpm)		Code	Weight
	L	M	S	L	M	S	Dyn. C	Stat. Co	Grease	Oil	Bearing	kg
	240	820	1705	89,2	149,5	208,5	78,8	58,1	11000	18000	HCB7020C.T.P4S.UL	1,08
	332	1270	2735	213,5	346,0	465,0	74,2	54,0	9000	15000	HCB7020E.T.P4S.UL	1,08
	240	820	1705	89,2	149,5	208,5	126,1	58,1	14000	22000	XCB7020C.T.P4S.UL	1,08
	332	1270	2735	213,5	346,0	465,0	118,7	54,0	12000	19000	XCB7020E.T.P4S.UL	1,08
	795	2520	5130	122,0	205,5	294,0	121,8	115,6	7500	12000	B7220C.T.P4S.UL	3,21
	1210	4000	8250	287,0	450,0	606,0	115,2	110,1	6700	10000	B7220E.T.P4S.UL	3,21
	430	1410	2900	105,9	174,6	245,0	121,8	80,9	9500	16000	HCB7220C.T.P4S.UL	2,76
	620	2180	5430	256,0	404,0	548,1	115,2	77,1	8000	13000	HCB7220E.T.P4S.UL	2,76
	320	1060	2190	93,8	160,8	234,0	52,3	55,9	8500		B71921C.2RSD.T.P4S.UL	0,810
	455	1630	3440	220,0	355,0	481,6	49,1	52,1	7500		B71921E.2RSD.T.P4S.UL	0,810
	320	1060	2190	93,8	160,8	234,0	52,3	55,9	8500	14000	B71921C.T.P4S.UL	0,810
	455	1630	3440	220,0	355,0	481,6	49,1	52,1	7500	12000	B71921E.T.P4S.UL	0,810
	160	580	1220	81,5	137,8	190,5	52,3	39,1	11000	18000	HCB71921C.T.P4S.UL	0,686
	202	850	1880	186,9	315,0	424,3	49,1	36,4	9000	15000	HCB71921E.T.P4S.UL	0,686
	160	580	1220	81,5	137,8	190,5	83,6	39,1	14000	22000	XCB71921C.T.P4S.UL	0,686
	202	850	1880	186,9	315,0	424,3	78,6	36,4	12000	19000	XCB71921E.T.P4S.UL	0,686
	620	2000	4080	113,8	193,4	280,0	98,8	98,8	8000		B7021C.2RSD.T.P4S.UL	1,52
	960	3200	6645	270,0	428,4	577,0	93,2	91,7	7000		B7021E.2RSD.T.P4S.UL	1,52
	620	2000	4080	113,8	193,4	280,0	98,8	98,8	8000	13000	B7021C.T.P4S.UL	1,52
	960	3200	6645	270,0	428,4	577,0	93,2	91,7	7000	11000	B7021E.T.P4S.UL	1,52
	335	1130	2330	100,3	165,0	230,0	98,8	69,1	10000	17000	HCB7021C.T.P4S.UL	1,21
	470	1700	3620	236,0	380,0	505,0	93,2	64,2	8500	14000	HCB7021E.T.P4S.UL	1,21
	335	1130	2330	100,3	165,0	230,0	158,1	69,1	13000	20000	XCB7021C.T.P4S.UL	1,21
	470	1700	3620	236,0	380,0	505,0	149,2	64,2	11000	18000	XCB7021E.T.P4S.UL	1,21
	1000	3130	6380	132,0	222,2	320,0	151,3	140,3	7000	11000	B7221C.T.P4S.UL	3,88
	1558	5050	10300	312,0	490,0	660,0	143,4	133,8	6300	9500	B7221E.T.P4S.UL	3,88
	530	1730	3560	114,8	188,0	263,0	151,3	98,2	9000	15000	HCB7221C.T.P4S.UL	3,25
	804	2760	5750	280,6	439,0	582,0	143,4	93,7	7500	12000	HCB7221E.T.P4S.UL	3,25
	315	1050	2190	96,5	164,5	235,0	52,7	59,0	8000		B71922C.2RSD.T.P4S.UL	0,850
	460	1650	3495	226,3	365,0	496,0	49,6	55,0	7500		B71922E.2RSD.T.P4S.UL	0,850
	315	1050	2190	96,5	164,5	235,0	52,7	59,0	8000	13000	B71922C.T.P4S.UL	0,850
	460	1650	3495	226,3	365,0	496,0	49,6	55,0	7500	12000	B71922E.T.P4S.UL	0,850

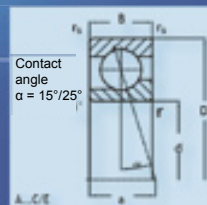
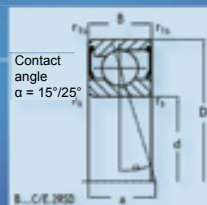
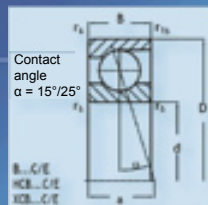
12. Size tables



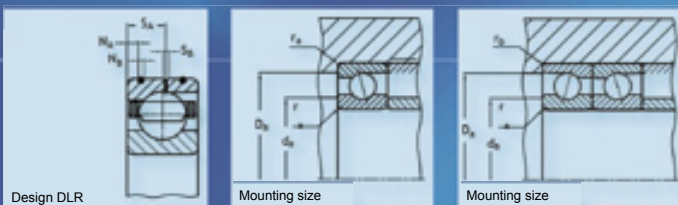
	Size of shaft (mm)						Mounting size (mm)				Size DLR (mm)				
	d	D	B	a	r _s min	r _h min	d _g h12	D _g H12	r _s max	r _h max	N _B	N _A	S _B	S _A	
110	110	150	20	27	1,10	1,00	117,0	143,0	0,6	0,6	1,8	4,0	2,6	12,0	
	110	150	20	40	1,10	1,00	117,0	143,0	0,6	0,6	1,8	4,0	2,6	12,0	
	110	150	20	27	1,10	1,00	117,0	143,0	0,6	0,6	1,8	4,0	2,6	12,0	
	110	150	20	40	1,10	1,00	117,0	143,0	0,6	0,6	1,8	4,0	2,6	12,0	
	110	170	28	33	2,00	1,10	121,0	159,0	2,0	1,0					
	110	170	28	47	2,00	1,10	121,0	159,0	2,0	1,0					
	110	170	28	33	2,00	1,10	121,0	159,0	2,0	1,0	2,0	6,0	2,6	16,2	
	110	170	28	47	2,00	1,10	121,0	159,0	2,0	1,0	2,0	6,0	2,6	16,2	
	110	170	28	33	2,00	1,10	121,0	159,0	2,0	1,0	2,0	6,0	2,6	16,2	
	110	170	28	47	2,00	1,10	121,0	159,0	2,0	1,0	2,0	6,0	2,6	16,2	
	110	170	28	33	2,00	1,10	121,0	159,0	2,0	1,0	2,0	6,0	2,6	16,2	
	110	170	28	47	2,00	1,10	121,0	159,0	2,0	1,0	2,0	6,0	2,6	16,2	
	110	200	38	40	2,10	2,10	126,5	183,5	2,1	2,1	2,0	6,5	2,6	22,6	
	110	200	38	55	2,10	2,10	126,5	183,5	2,1	2,1	2,0	6,5	2,6	22,6	
	110	200	38	40	2,10	2,10	126,5	183,5	2,1	2,1	2,0	6,5	2,6	22,6	
	110	200	38	55	2,10	2,10	126,5	183,5	2,1	2,1	2,0	6,5	2,6	22,6	
120	120	165	22	30	1,10	1,00	128,0	157,0	0,6	0,6					
	120	165	22	44	1,10	1,00	128,0	157,0	0,6	0,6					
	120	165	22	30	1,10	1,00	128,0	157,0	0,6	0,6					
	120	165	22	44	1,10	1,00	128,0	157,0	0,6	0,6					
	120	165	22	30	1,10	1,00	128,0	157,0	0,6	0,6					
	120	165	22	44	1,10	1,00	128,0	157,0	0,6	0,6					
	120	165	22	30	1,10	1,00	128,0	157,0	0,6	0,6					
	120	165	22	44	1,10	1,00	128,0	157,0	0,6	0,6					
	120	180	28	34	2,00	1,10	131,0	169,0	2,0	1,0					
	120	180	28	49	2,00	1,10	131,0	169,0	2,0	1,0					
	120	180	28	34	2,00	1,10	131,0	169,0	2,0	1,0	2,0	6,0	2,6	16,2	
	120	180	28	49	2,00	1,10	131,0	169,0	2,0	1,0	2,0	6,0	2,6	16,2	
	120	180	28	34	2,00	1,10	131,0	169,0	2,0	1,0	2,0	6,0	2,6	16,2	
	120	180	28	49	2,00	1,10	131,0	169,0	2,0	1,0	2,0	6,0	2,6	16,2	
	120	180	28	34	2,00	1,10	131,0	169,0	2,0	1,0	2,0	6,0	2	16,2	
	120	180	28	49	2,00	1,10	131,0	169,0	2,0	1,0	2,0	6,0	2,6	16,2	

61

12. Size tables



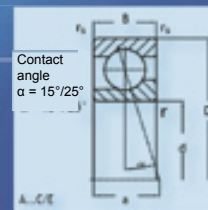
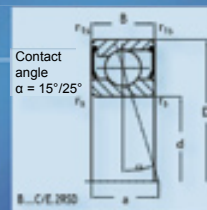
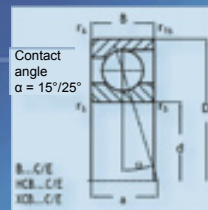
	Size of shaft (mm)						Mounting size (mm)				Size DLR (mm)				
	d	D	B	a	r _s min	r _h min	d _h 12	D _h 12	r _s max	r _h max	N _b	N _A	S _b	S _A	
120	120	215	40	43	2,10	2,10	140,0	195,0	2,1	2,1					
	120	215	40	59	2,10	2,10	140,0	195,0	2,1	2,1					
	120	215	40	43	2,10	2,10	140,0	195,0	2,1	2,1					
	120	215	40	59	2,10	2,10	140,0	195,0	2,1	2,1					
130	130	180	24	33	1,50	1,10	139,0	171,0	0,6	0,6					
	130	180	24	48	1,50	1,10	139,0	171,0	0,6	0,6					
	130	180	24	33	1,50	1,10	139,0	171,0	0,6	0,6					
	130	180	24	48	1,50	1,10	139,0	171,0	0,6	0,6					
	130	180	24	33	1,50	1,10	139,0	171,0	0,6	0,6					
	130	180	24	48	1,50	1,10	139,0	171,0	0,6	0,6					
	130	180	24	33	1,50	1,10	139,0	171,0	0,6	0,6					
	130	180	24	48	1,50	1,10	139,0	171,0	0,6	0,6					
	130	200	33	39	2,00	1,10	142,0	189,0	2,0	1,0					
	130	200	33	55	2,00	1,10	142,0	189,0	2,0	1,0					
	130	200	33	39	2,00	1,10	142,0	189,0	2,0	1,0	2,0	6,0	2,6	19,5	
	130	200	33	55	2,00	1,10	142,0	189,0	2,0	1,0	2,0	6,0	2,6	19,5	
	130	200	33	39	2,00	1,10	142,0	189,0	2,0	1,0	2,0	6,0	2,6	19,5	
	130	200	33	55	2,00	1,10	142,0	189,0	2,0	1,0	2,0	6,0	2,6	19,5	
	130	200	33	39	2,00	1,10	142,0	189,0	2,0	1,0	2,0	6,0	2,6	19,5	
	130	200	33	55	2,00	1,10	142,0	189,0	2,0	1,0	2,0	6,0	2,6	19,5	
	130	230	40	44	3,00	3,00	148,0	211,5	2,5	2,5	2,0	9,0	2,6	24,5	
	130	230	40	62	3,00	3,00	148,0	211,5	2,5	2,5	2,0	9,0	2,6	24,5	
	130	230	40	44	3,00	3,00	148,0	211,5	2,5	2,5	2,0	9,0	2,6	24,5	
	130	230	40	62	3,00	3,00	148,0	211,5	2,5	2,5	2,0	9,0	2,6	24,5	
140	140	190	24	34	1,50	1,10	149,0	181,0	0,6	0,6					
	140	190	24	50	1,50	1,10	149,0	181,0	0,6	0,6					
	140	190	24	34	1,50	1,10	149,0	181,0	0,6	0,6					
	140	190	24	50	1,50	1,10	149,0	181,0	0,6	0,6					
	140	190	24	34	1,50	1,10	149,0	181,0	0,6	0,6					
	140	190	24	50	1,50	1,10	149,0	181,0	0,6	0,6					
	140	190	24	34	1,50	1,10	149,0	181,0	0,6	0,6					
	140	190	24	50	1,50	1,10	149,0	181,0	0,6	0,6					



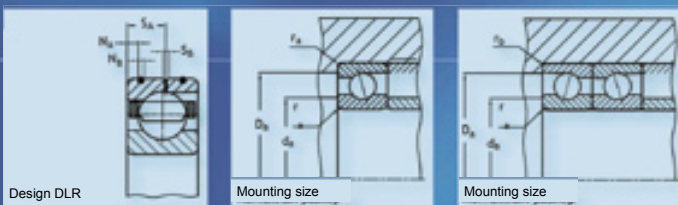
12. Size tables

	Preload (H)			Axial stiffness (H/um)			Payload (kH)		Limit rotational rate (rpm)		Code	Weight
	L	M	S	L	M	S	Dyn. C	Stat. Co	Grease	Oil	Bearing	kg
	1270	3960	8040	139,6	234,0	335,7	189,4	183,7	6000	9000	B7224C.T.P4S.UL	5,29
	2000	6425	13100	334,0	520,0	700,0	180,1	175,6	5300	8000	B7224E.T.P4S.UL	5,29
	685	2190	4485	123,5	200,0	275,8	189,4	129,0	7500	12000	HCB7224C.T.P4S.UL	4,21
	1050	3500	7290	300,5	466,0	620,0	180,1	122,9	6300	9500	HCB7224E.T.P4S.UL	4,21
	490	1600	3290	116,5	200,0	287,0	78,2	87,7	7000		B71926C.2RSD.T.P4S.UL	1,52
	712	2480	5190	274,6	440,0	593,6	73,5	81,7	6700		B71926E.2RSD.T.P4S.UL	1,52
	490	1600	3290	116,5	200,0	287,0	78,2	87,7	7000	10000	B71926C.T.P4S.UL	1,52
	712	2480	5190	274,6	440,0	593,6	73,5	81,7	6700	9000	B71926E.T.P4S.UL	1,52
	256	888	1858	101,9	170,5	235,8	78,2	61,4	8500	14000	HCB71926C.T.P4S.UL	1,28
	350	1355	2925	241,5	395,0	529,0	73,5	57,2	7000	11000	HCB71926E.T.P4S.UL	1,28
	256	888	1858	101,9	170,5	235,8	125,1	61,4	11000	18000	XCB71926C.T.P4S.UL	1,28
	350	1355	2925	241,5	395,0	529,0	117,6	57,2	9500	16000	XCB71926E.T.P4S.UL	1,28
	860	2720	5550	136,5	232,4	333,0	131,8	141,1	6700		B7026C.2RSD.T.P4S.UL	3,15
	1320	4370	8960	329,0	517,2	692,2	124,3	132,8	6000		B7026E.2RSD.T.P4S.UL	3,15
	860	2720	5550	136,5	232,4	333,0	131,8	141,1	6700	9000	B7026C.T.P4S.UL	3,15
	1320	4370	8960	329,0	517,2	692,2	124,3	132,8	6000	8500	B7026E.T.P4S.UL	3,15
	460	1520	3140	122,2	198,8	277,0	131,8	98,8	7500	12000	HCB7026C.T.P4S.UL	2,62
	675	2375	5020	290,5	460,5	615,0	124,3	93,0	6700	10000	HCB7026E.T.P4S.UL	2,62
	460	1520	3140	122,2	198,8	277,0	210,8	98,8	10000	17000	XCB7026C.T.P4S.UL	2,62
	675	2375	5020	290,5	460,5	615,0	198,9	93,0	8500	14000	XCB7026E.T.P4S.UL	2,62
	1310	4100	8350	148,5	245,0	353,2	197,0	201,0	5600	8500	B7226C.T.P4S.UL	6,10
	2080	6675	13600	350,5	555,0	742,0	186,7	191,9	5000	7500	B7226E.T.P4S.UL	6,10
	720	2300	4700	129,5	212,0	292,5	197,0	140,7	7000	11000	HCB7226C.T.P4S.UL	5,00
	1080	3650	7520	316,0	496,0	654,0	186,7	134,3	6000	9000	HCB7226E.T.P4S.UL	5,00
	505	1665	3415	126,0	212,0	302,7	80,9	94,1	6000		B71928C.2RSD.T.P4S.UL	1,63
	740	2580	5400	295,0	470,0	632,0	76,0	87,7	5600		B71928E.2RSD.T.P4S.UL	1,63
	505	1665	3415	126,0	212,0	302,7	80,9	94,1	6000	9000	B71928C.T.P4S.UL	1,63
	740	2580	5400	295,0	470,0	632,0	76,0	87,7	5600	8500	B71928E.T.P4S.UL	1,63
	265	920	1930	109,4	183,0	252,0	80,9	65,8	7500	12000	HCB71928C.T.P4S.UL	1,37
	355	1390	3000	258,0	416,5	562,2	76,0	61,4	6700	10000	HCB71928E.T.P4S.UL	1,37
	265	920	1930	109,4	183,0	252,0	129,5	65,8	10000	17000	XCB71928C.T.P4S.UL	1,37
	355	1390	3000	258,0	416,5	562,2	121,7	61,4	8500	14000	XCB71928E.T.P4S.UL	1,37

12. Size tables



	Size of shaft (mm)						Mounting size (mm)				Size DLR (mm)			
	d	D	B	a	r _s min	r _h min	d _h 12	D _h 12	r _s max	r _h max	N _B	N _A	S _B	S _A
140	140	210	33	40	2,00	1,10	152,0	199,0	2,0	1,0				
	140	210	33	57	2,00	1,10	152,0	199,0	2,0	1,0				
	140	210	33	40	2,00	1,10	152,0	199,0	2,0	1,0				
	140	210	33	57	2,00	1,10	152,0	199,0	2,0	1,0				
	140	210	33	40	2,00	1,10	152,0	199,0	2,0	1,0				
	140	210	33	57	2,00	1,10	152,0	199,0	2,0	1,0				
	140	210	33	40	2,00	1,10	152,0	199,0	2,0	1,0				
	140	210	33	57	2,00	1,10	152,0	199,0	2,0	1,0				
	140	250	42	47	3,00	3,00	163,0	226,5	2,5	2,5				
	140	250	42	66	3,00	3,00	163,0	226,5	2,5	2,5				
	140	250	42	47	3,00	3,00	163,0	226,5	2,5	2,5				
	140	250	42	66	3,00	3,00	163,0	226,5	2,5	2,5				
150	150	210	28	38	2,00	1,10	160,0	199,0	1,0	1,0				
	150	210	28	56	2,00	1,10	160,0	199,0	1,0	1,0				
	150	210	28	38	2,00	1,10	160,0	199,0	1,0	1,0				
	150	210	28	56	2,00	1,10	160,0	199,0	1,0	1,0				
	150	210	28	38	2,00	1,10	160,0	199,0	1,0	1,0				
	150	210	28	56	2,00	1,10	160,0	199,0	1,0	1,0				
	150	210	28	38	2,00	1,10	160,0	199,0	1,0	1,0				
	150	210	28	56	2,00	1,10	160,0	199,0	1,0	1,0				
	150	225	35	43	2,10	1,50	163,0	213,0	2,1	1,0				
	150	225	35	61	2,10	1,50	163,0	213,0	2,1	1,0				
	150	225	35	43	2,10	1,50	163,0	213,0	2,1	1,0				
	150	225	35	61	2,10	1,50	163,0	213,0	2,1	1,0				
	150	225	35	43	2,10	1,50	163,0	213,0	2,1	1,0				
	150	225	35	61	2,10	1,50	163,0	213,0	2,1	1,0				
	150	270	45	51	3,00	3,00	178,0	241,5	2,5	2,5				
	150	270	45	71	3,00	3,00	178,0	241,5	2,5	2,5				
	150	270	45	51	3,00	3,00	178,0	241,5	2,5	2,5				
	150	270	45	71	3,00	3,00	178,0	241,5	2,5	2,5				
160	160	220	28	40	2,00	1,10	170,0	209,0	1,0	1,0				
	160	220	28	58	2,00	1,10	170,0	209,0	1,0	1,0				



12. Size tables

	Preload (H)			Axial stiffness (H/um)			Payload (kH)		Limit rotational rate (rpm)		Code	Weight
	L	M	S	L	M	S	Dyn. C	Stat. Co	Grease	Oil	Bearing	kg
	870	2775	5660	141,5	240,0	340,0	134,4	148,7	6 300		B7028C.2RSD.T.P4S.UL	3,34
	1345	4445	9460	340,3	537,0	720,0	126,7	138,3	5 600		B7028E.2RSD.T.P4S.UL	3,34
	870	2775	5660	141,5	240,0	340,0	134,4	148,7	6 300	8 500	B7028C.T.P4S.UL	3,34
	1345	4445	9460	340,3	537,0	720,0	126,7	138,3	5 600	7 500	B7028E.T.P4S.UL	3,34
	480	1580	3270	125,8	205,5	290,0	134,4	104,1	7 000	11 000	HCB7028C.T.P4S.UL	2,78
	685	2435	5130	303,0	480,5	638,5	126,7	96,8	6 300	9 500	HCB7028E.T.P4S.UL	2,78
	480	1580	3270	125,8	205,5	290,0	215,0	104,1	9 500	16 000	XCB7028C.T.P4S.UL	2,78
	685	2435	5130	303,0	480,5	638,5	202,7	96,8	8 000	13 000	XCB7028E.T.P4S.UL	2,78
	1360	4260	8640	154,8	260,0	370,0	220,5	247,9	5 000	7 500	B7228C.T.P4S.UL	7,87
	2150	6930	14100	377,0	580,0	780,0	208,8	236,3	4 500	6 700	B7228E.T.P4S.UL	7,87
	750	2400	4900	136,6	222,3	306,8	220,5	173,5	6 300	9 500	HCB7228C.T.P4S.UL	6,67
	1130	3800	7910	340,0	522,6	690,0	208,8	165,4	5 300	8 000	HCB7228E.T.P4S.UL	6,67
	710	2290	4680	140,5	238,0	342,0	110,3	124,5	5 600		B71930C.2RSD.T.P4S.UL	2,49
	1050	3540	7370	333,0	527,5	708,0	103,6	115,9	5 000		B71930E.2RSD.T.P4S.UL	2,49
	710	2290	4680	140,5	238,0	342,0	110,3	124,5	5 600	8 500	B71930C.T.P4S.UL	2,49
	1050	3540	7370	333,0	527,5	708,0	103,6	115,9	5 000	7 500	B71930E.T.P4S.UL	2,49
	375	1260	2625	124,6	204,0	282,3	110,3	87,1	7 000	11 000	HCB71930C.T.P4S.UL	2,07
	520	1925	4115	295,0	471,4	630,0	103,6	81,1	6 000	9 000	HCB71930E.T.P4S.UL	2,07
	375	1260	2625	124,6	204,0	282,3	176,5	87,1	9 000	15 000	XCB71930C.T.P4S.UL	2,07
	520	1925	4115	295,0	471,4	630,0	165,8	81,1	8 000	13 000	XCB71930E.T.P4S.UL	2,07
	1100	3500	7150	156,0	265,3	378,4	167,5	183,5	5 300	8 000	B7030C.T.P4S.UL	3,99
	1700	5555	11420	373,2	584,2	785,0	158,0	173,3	4 800	7 000	B7030E.T.P4S.UL	3,99
	600	1960	4020	137,5	223,8	313,0	167,5	128,5	6 700	10 000	HCB7030C.T.P4S.UL	3,20
	900	3100	6500	335,5	527,5	700,0	158,0	121,3	5 600	8 500	HCB7030E.T.P4S.UL	3,20
	600	1960	4020	137,5	223,8	313,0	268,0	128,5	8 500	14 000	XCB7030C.T.P4S.UL	3,20
	900	3100	6500	335,5	527,5	700,0	252,8	121,3	7 500	12 000	XCB7030E.T.P4S.UL	3,20
	1400	4410	8950	165,5	274,0	388,5	226,9	268,2	4 500	6 700	B7230C.T.P4S.UL	10,1
	2190	7025	14400	393,3	605,5	815,0	214,5	255,3	4 000	6 000	B7230E.T.P4S.UL	10,1
	770	2470	5050	143,3	235,5	322,0	226,9	187,7	5 600	8 500	HCB7230C.T.P4S.UL	8,70
	1140	3860	8025	353,0	548,0	722,5	214,5	178,7	5 000	7 500	HCB7230E.T.P4S.UL	8,70
	730	2340	4790	145,5	245,3	353,0	111,5	128,6	5 000	7 500	B71932C.T.P4S.UL	2,62
	1050	3600	7500	344,4	544,3	730,0	104,8	119,8	4 800	7 000	B71932E.T.P4S.UL	2,62