



Ball Bearings for the Food Industry

Deep groove ball bearings · Radial insert ball bearings ·
Plastic housing units

Foreword

Food portfolio – FD

Schaeffler products have proved themselves over many years even under critical and problematic application conditions.

In addition to the specific environmental influences, legal or religious requirements in the food and beverage industry also call for the use of special high-quality solutions. We now offer an extended range of corrosion-resistant products for the food industry, to satisfy these high demands on corrosion resistance, reliability and service life as well as the specific lubricant requirements:

- deep groove ball bearings
- radial insert ball bearings and housing units

Specific lubricants are used in the products that meet the special requirements and approval regulations such as NSF H1. These lubricants are non-toxic and neutral in taste and odour, and are therefore suitable for applications where contact between food and lubricant cannot always be ruled out.



Figure 1
Certifications: Kosher, Halal, NSF H1

The grease also contains only allergen-free ingredients in accordance with Directive (EU) 1169/2011 and is, therefore, free of cereals containing gluten, nuts and milk, for example. In addition, the grease does not contain any components comprising animal or genetically modified organisms.

All other bearing components are, of course, also designed to meet the standards of the food industry. The designations of bearings for the food industry are distinguished from the standard range by the suffix FD.



Image top right, source: Krones AG

Figure 2
Areas of application

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Deep groove ball bearings for the food industry

**Single row deep groove ball
bearings**

FD design
Contact seals on both sides

S60...-FD, S62...-FD, S63...-FD



0016CA33

Deep groove ball bearings for the food industry

Features

Deep groove ball bearings in FD design are optimised for use in the food industry. They correspond in their structure to single row standard deep groove ball bearings but are specially adapted in relation to:

- suitable materials for the food industry
- significantly higher corrosion and media resistance

Bearing design

Single row deep groove ball bearings are the most frequently used type of rolling bearing. They are produced in numerous sizes and designs and are particularly economical. Due to their low frictional torque, they are also suitable for high speeds.

Due to the raceway geometry, the use of balls as rolling elements and the design without a filling slot, deep groove ball bearings can support axial loads in both directions as well as radial loads, see page 11.

The angular adjustment facility of single row deep groove ball bearings is limited, so the bearing positions must be well aligned.

Operation even under difficult conditions is ensured by seals that are matched to the application and the use of food-grade grease.

Special characteristics

- bearing rings, cages and balls made from high-grade steel
- highly effective contact seal
- lubrication with food-grade grease

Design variant

Deep groove ball bearings in FD design for the food industry are available in the following variant:

- single row, contact seals on both sides

If a longer operating life is also necessary, the steel rolling elements in deep groove ball bearings can be replaced with ceramic rolling elements.

Corrosion-resistant materials

The bearing rings, cages and rolling elements are made from high-grade steel.

The materials used in series FD are resistant to moisture, contaminated water, salt spray mist and weak alkaline or weak acidic cleaning agents.

By agreement, deep groove ball bearings for the food industry are also available as hybrid bearings with ceramic rolling elements made from Si_3N_4 .

The following materials are used subject to bearing type and size:

Steels used

Bearing components	Designation			
	Short name			Material number
	ISO 683-17:2000	GB/T 1220-2007	AISI	
Bearing rings	X65Cr13	–	420D	1.4037
	–	95Cr18	–	–
Rolling elements	X105CrMo17	–	440C	1.4125
	–	95Cr18	–	–
Cage	X5CrNi18-10	–	304	1.4301

We reserve the right to make technical changes, including material changes, as part of the ongoing development.

Deep groove ball bearings for the food industry

Media resistance In the food industry in particular, the resistance of the material in relation to various cleaning agents is of increasing importance.

Medium	Concentration %	X65Cr13		X5CrNi18-10		X105CrMo17		95Cr18	
		+20 °C	+80 °C	+20 °C	+80 °C	+20 °C	+80 °C	+20 °C	+80 °C
Hydrochloric acid HCl	0,1	–	–	+	+	–	–	–1)	–1)
	1	–	–	(+)	–	–	–	–1)	–1)
	18	–	–	–	–	–	–	–1)	–1)
Hydrofluoric acid HF	1	–	–	–	–	–	–	–1)	–1)
	5	–1)	–	–1)	–	–1)	–	–1)	–1)
Sulphuric acid H ₂ SO ₄	1	–	–	+	–	–	–	–1)	–1)
	10	–	–	(+)	–	–	–	–1)	–1)
	96	(+)	–	+	(+)	–	–	–1)	–1)
Sulphurous acid H ₂ SO ₃	1	–	–	+	+	–	–	–	–
Nitric acid HNO ₃	5	–	–	+	+	–	–	(–)	(+)
	25	+	(+)	+	+	+	(+)	+	+
	65	+	(+)	+	+	+	(+)	+	+
Phosphoric acid H ₃ PO ₄	1	+	+	+	+	+	+	+	+
	10	–	–	+	+	(+)	+	(+)	(+)
	85	+	–	+	+	+	–	+	+
Formic acid HCOOH	5	–	–	+	+	–	–	–	–
	25	–	–	+	+	–	–	–	–
Acetic acid CH ₃ COOH	5	(+)	–	+	+	+	–	(+)	–
	25	(+)	–	+	+	+	–	(+)	–
Citric acid	5	(+)	–	+	+	+	+	(+)	(+)
	25	(+)	–	+	+	–	–	(+)	(–)
Chloroacetic acid	5	(+)	–	+	+	(+)	–	(+)	–
Sodium chloride NaCl	10	(–)	(–)	+	+	(–)	(–)	2)	2)
Sea water	4	(–)	(–)	+	+	(–)	(–)	+1)	2)
Distilled water	–	+	+	+	+	+	+	+1)	+1)
Ammonium hydroxide NH ₄ OH	1	+	+	+	+	+	+	+1)	+1)
	10	+	+	+	+	+	+	+1)	+1)
Potassium hydroxide KOH solution	0,1	+	+	+	+	+	+	+1)	+1)
	1	+	+	+	+	+	+	+1)	+1)
	10	+	+	+	+	+	+	+1)	+1)
Sodium hypochlorite solution	1	2)	(–)	+1)	+	2)	(–)	(+)	(–)
Hydrogen peroxide H ₂ O ₂	5	+	+	+	+	+	+	2)	2)

+ Resistant
(+) Moderately resistant
(–) Barely resistant
– Not resistant

1) Not tested. Estimate generated from remaining test series.

2) Not tested. No estimate possible.

Lubrication

Food-grade grease application

The high-quality grease used for lubrication is approved for food applications to category NSF H1. The grease is particularly suitable for use in the food industry and meets the quality requirements of FDA 21 CFR 178.3570 in full. Furthermore, the grease is Halal and Kosher-certified.

A lubricant of class NSF H1 is suitable for applications in which incidental contact between food and lubricant may occur and is unavoidable by technical measures. Such lubricants must be non-toxic and neutral in taste and odour.

The grease also contains only allergen-free ingredients in accordance with Directive (EU) 1169/2011 and is, therefore, free of cereals containing gluten, nuts and milk, for example. In addition, the grease does not contain any components comprising animal or genetically modified organisms.

The Halal and Kosher certification of the lubricant used confirms that the strict Halal and Kosher criteria are also met in relation to the processing and ingredients of the bearings. These dietary laws of the Muslim and Jewish population not only apply to the actual food and beverages, but also to the machines and environment during manufacture.



Lubrication of bearings

The bearings are greased using an aluminium complex soap grease with food applications approval to NSF H1, which is characterised by very good water and chemical resistance. The grease filling is measured so that it is sufficient for the entire life of the bearing. As a result, these bearings are generally maintenance-free.

Do not wash greased bearings out prior to mounting. If mounting is carried out using thermal tools, the bearings should not be heated to a temperature in excess of +80 °C, taking account of the grease filling and seal material. If higher heating temperatures are required, it must be ensured that the permissible upper temperature limits for grease and seals are not exceeded.


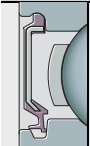
Schaeffler recommends the use of induction heating devices for heating purposes, see MH 1, Mounting Handbook.

Sealing

The bearings are sealed on both sides with contact seals made from NBR. These seals are elastomer lip seals with a sheet steel reinforcement (suffix 2RSR or 2RS).

Deep groove ball bearings for the food industry

Seal type

Seal RSR	
	Single piece, sheet steel washer with vulcanised and radially preloaded seal lip made from NBR
Seal RS	
	Single piece, sheet steel washer with vulcanised and axially preloaded seal lip made from NBR

As standard, bearings for the food industry are delivered with seals made from NBR.



In the case of direct exposure to spray water, prior consultation with Application Engineering is required. For any queries regarding resistance to specific media, please consult Application Engineering.

Operating temperature

Deep groove ball bearings with seals can be used at operating temperatures of –30 °C to +100 °C, restricted by the grease.

Prefixes and suffixes

Prefixes and suffixes for the available designs, see table.

Available designs

Prefix	Suffix	Description	Design
S	–	High-grade steel	Standard
HC	–	Hybrid bearing with ceramic balls made from Si ₃ N ₄	By agreement
–	2RS	Axial contact seal on both sides (lip seal), seal material NBR	
–	2RSR	Radial contact seal on both sides (lip seal), seal material NBR	Standard
–	FD	Suitable for applications in the food industry	
–	C2	Radial internal clearance C2 (smaller than normal)	By agreement
–	C3	Radial internal clearance C3 (larger than normal)	
–	C4	Radial internal clearance C4 (larger than C3)	

Further information

- General information from Rolling Bearings, HR 1, must be observed
➤ <https://www.schaeffler.de/std/1D65>
- Additional information on corrosion resistance. Here you will find other corrosion-resistant bearings made from the high-performance steels Cronidur and Cronitect, which are available by agreement: Corrosion-resistant products, TPI 64,
➤ <https://www.schaeffler.de/std/1F38>
- For information on the correct storage, mounting, dismounting and maintenance of rolling bearings: Mounting Handbook, MH 1,
➤ <https://www.schaeffler.de/std/1F86>

Design and safety guidelines

The information on the design of the bearing arrangement, lubrication, mounting and dismantling and on the operation of the bearings provided in the Technical Principles of Catalogue HR 1, must be observed as further information.

Further information

- Technical principles: Rolling Bearings, HR 1,
➤ <https://www.schaeffler.de/std/1D65>

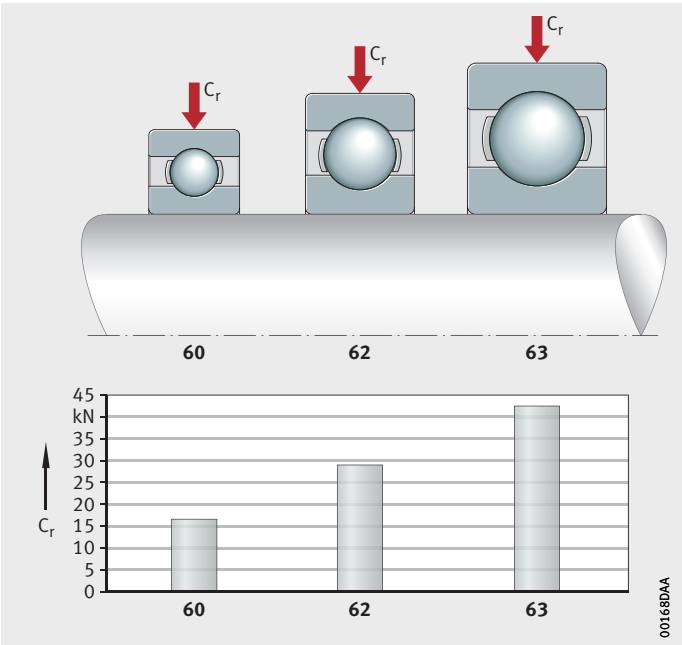
Load carrying capacity
Radial load carrying capacity

The balls are in contact with the raceways at one point only. Under purely radial load, the contact points between the rolling elements and raceways lie at the centre of the raceway. As a result, the connection between the contact points passes through the radial plane, i.e. the optimum load direction is a purely radial load.

The load carrying capacity is dependent on the bearing series and the size of the ball set in the deep groove ball bearings. As a result, the deep groove ball bearing series 60 with a smaller bearing cross-section cannot support loads as high as those of the standard series 62 with the same dimensions (relative to the bore diameter d) with a larger ball set. The heavy bearing series 63 with the largest ball set is suitable for even higher loads when used for the same bore diameter, *Figure 2*.

C_r = basic dynamic load rating

Figure 2
Single row
deep groove ball bearings,
comparison of cross-section and
load carrying capacity
for bearings with $d = 40\text{ mm}$



Deep groove ball bearings for the food industry

Axial load carrying capacity

Due to the deep raceway grooves in the bearing rings and the narrow osculation between the raceway grooves and the balls, the bearings can support axial loads in both directions. The axial load carrying capacity is dependent, for example, on the bearing size, the internal construction and the operating clearance. If the axial load is too high, however, this can increase the running noise and considerably reduce the operating life of the bearings.

If there is any uncertainty regarding the axial load carrying capacity of the bearings, please consult Schaeffler.

Compensation of angular misalignments

Single row deep groove ball bearings are only suitable for compensating static angular misalignments to a very limited extent. As a result, the bearing positions must be well aligned. Misalignments shorten the operating life, as they place an additional strain on the bearing. In order to keep these loads at a low level, only small adjustment angles are permissible for deep groove ball bearings as a function of the load, see table.

Permissible adjustment angles

Series	Adjustment angle for			
	low loads		high loads	
	from	to	from	to
62, 63	5'	10'	8'	16'
60	2'	6'	5'	10'

Speeds



The dimension tables give the limiting speed n_G . This is the kinematically permissible speed of the bearing. Even under favourable mounting and operating conditions, this value should not be exceeded without prior consultation with Schaeffler.

If the specified speed limits must be exceeded due to the application, please contact Schaeffler Application Engineering.

Dimensioning
Equivalent dynamic bearing load

The basic rating life equation $L = (C_r/P)^P$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r . If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$).

If this condition is not met, a constant radial force must first be determined for the rating life calculation that (in relation to the rating life) represents an equivalent load. This force is known as the equivalent dynamic bearing load P .

The calculation of P is dependent on the load ratio F_a/F_r and the calculation factor e :

$$\frac{F_a}{F_r} \leq e \Rightarrow P = F_r$$

$$\frac{F_a}{F_r} > e \Rightarrow P = X \cdot F_r + Y \cdot F_a$$

F_a	N
Axial load	
F_r	N
Radial load	
e, X, Y	–
Factors, see table	Factors e, X and Y
P	N
Equivalent dynamic bearing load.	

The specified values are valid for normal operating clearance, see table Factors e, X and Y . If the operating clearance differs significantly, the use of BEARINX is recommended for calculation of the rating life. If the calculation values lie between the stated values (such as 0,4), then read off the table values for 0,3 and 0,5 and determine the intermediate values using linear interpolation.

For normal operating clearance, please observe the fit recommendations in Catalogue HR 1, Rolling Bearings.

Factors e, X and Y

$f_0 \cdot F_a$ C_{0r}	Factor (for normal operating clearance)		
	e	X	Y
0,3	0,22	0,56	2
0,5	0,24	0,56	1,8
0,9	0,28	0,56	1,58
1,6	0,32	0,56	1,4
3	0,36	0,56	1,2
6	0,43	0,56	1

f_0	–
Factor, see dimension table	
F_a	N
Axial load	
C_{0r}	N
Basic static load rating, see dimension table.	

Deep groove ball bearings for the food industry

Equivalent static bearing load

The calculation of P_0 for deep groove ball bearings under static load is dependent on the load ratio F_{0a}/F_{0r} and the factor 0,8:

$$\frac{F_{0a}}{F_{0r}} \leq 0,8 \Rightarrow P_0 = F_{0r}$$

$$\frac{F_{0a}}{F_{0r}} > 0,8 \Rightarrow P_0 = 0,6 \cdot F_{0r} + 0,5 \cdot F_{0a}$$

F_{0a}, F_{0r} N
Largest axial or radial load present (maximum load)
 P_0 N
Equivalent static bearing load.

Static load safety factor

In addition to the basic rating life $L (L_{10h})$, it is also always necessary to check the static load safety factor S_0 :

$$S_0 = \frac{C_0}{P_0}$$

S_0 –
Static load safety factor
 C_0 N
Basic static load rating, see dimension table
 P_0 N
Equivalent static bearing load.

Minimum radial load

In order that no slippage occurs between the contact partners, the bearings must be constantly subjected to a sufficiently high load. Based on experience, a minimum radial load of the order of $P > C_{0r}/100$ is thus necessary. In most cases, however, the radial load is higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than stated, please consult Schaeffler.

Design of bearing arrangements

In order to allow full utilisation of the load carrying capacity of the bearings and thus also achieve the requisite rating life, the bearing rings must be rigidly and uniformly supported by means of contact surfaces over their entire circumference and over the entire width of the raceway. The seating and contact surfaces should not be interrupted by grooves, holes or other recesses. The accuracy of mating parts must meet specific requirements, see tables, page 16.

Radial location of bearings – fit recommendations

In addition to supporting the rings adequately, the bearings must also be securely located in a radial direction, to prevent creep of the bearing rings on the mating parts under load. This is generally achieved by means of tight fits between the bearing rings and the mating parts. If the rings are not secured adequately or correctly, this can cause severe damage to the bearings and adjacent machine parts. Influencing factors, such as the conditions of rotation, magnitude of the load, internal clearance, temperature conditions, design of the mating parts and the mounting and dismounting options must be taken into consideration in the selection of fits.



If shock type loads occur, tight fits (transition fit or interference fit) are required to prevent the rings from coming loose at any point.

Further information

The following information provided in Technical principles, Catalogue HR 1, Rolling Bearings, must be taken into consideration in the design of bearing arrangements:

- conditions of rotation
- tolerance classes for cylindrical shaft seats (radial bearings)
- shaft fits
- tolerance classes for bearing seats in housings (radial bearings)
- housing fits

Axial location of bearings – location methods

As a tight fit alone is not normally sufficient to also locate the bearing rings securely on the shaft and in the housing bore in an axial direction, this must usually be achieved by means of an additional axial location or retention method. The axial location of the bearing rings must be matched to the type of bearing arrangement. Shaft and housing shoulders, housing covers, nuts, spacer rings and retaining rings etc., are fundamentally suitable.

Deep groove ball bearings for the food industry

Dimensional, geometrical and running accuracy of the bearing seats

The accuracy of the cylindrical bearing seat on the shaft and in the housing should correspond to the accuracy of the bearing used. For deep groove ball bearings with the tolerance class Normal, the shaft seat should correspond to a minimum of standard tolerance grade IT6 and the housing seat to a minimum of IT7. Guide values for the geometrical and positional tolerances of bearing seating surfaces and corresponding numerical values for IT grades, see tables.

Further information

■ Values for tolerances t_1 to t_3 , see Technical principles, Catalogue HR 1, Rolling Bearings

Guide values for the geometrical and positional tolerances of bearing seating surfaces

Bearing tolerance class		Bearing seating surface	Standard tolerance grades to ISO 286-1 (IT grades)			
To ISO 492	To DIN 620		Diameter tolerance	Roundness tolerance t_1	Parallelism tolerance t_2	Total axial run-out tolerance of abutment shoulder t_3
Normal	PN (P0)	Shaft	IT6 (IT5)	Circumferential load IT4/2	Circumferential load IT4/2	IT4
				Point load IT5/2	Point load IT5/2	
		Housing	IT7 (IT6)	Circumferential load IT5/2	Circumferential load IT5/2	IT5
				Point load IT6/2	Point load IT6/2	

Numerical values for ISO standard tolerances (IT grades) to ISO 286-1:2010

IT grade	Nominal dimension in mm					
	over 6	10	18	30	50	80
	incl. 10	18	30	50	80	120
Values in μm						
IT3	2,5	3	4	4	5	6
IT4	4	5	6	7	8	10
IT5	6	8	9	11	13	15
IT6	9	11	13	16	19	22
IT7	15	18	21	25	30	35

Roughness of cylindrical bearing seating surfaces

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value R_a must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces, see table.

Roughness values for cylindrical bearing seating surfaces – guide values

Nominal diameter of bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats R_{amax} μm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4

Mounting dimensions for the contact surfaces of bearing rings

The mounting dimensions of the shaft and housing shoulders, and spacer rings etc., must ensure that the contact surfaces for the bearing rings are of sufficient height. However, they must also reliably prevent rotating parts of the bearing from grazing stationary parts. Proven mounting dimensions for the radii and diameters of the abutment shoulders are given in the product tables. These dimensions are limiting dimensions (maximum or minimum dimensions); the actual values should not be higher or lower than specified.

Mounting and dismounting

Deep groove ball bearings are not separable. In the mounting of non-separable bearings, the mounting forces must always be applied to the bearing ring with a tight fit.



The mounting and dismounting options for deep groove ball bearings by thermal, hydraulic or mechanical methods, must also be taken into consideration in the design of the bearing position.

Mounting Handbook

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

Further information

The Schaeffler Mounting Handbook, MH 1, gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position.

This book is available from Schaeffler on request:

- Mounting Handbook, MH 1,
- <https://www.schaeffler.de/std/1F86>

Deep groove ball bearings for the food industry

Accuracy

Dimensions, tolerances

The main dimensions of single row deep groove ball bearings correspond to DIN 625-1:2011. Nominal dimensions of single row deep groove ball bearings, see dimension table.

Chamfer dimensions

The limiting dimensions for chamfer dimensions correspond to DIN 620-6:2004. For overview and limiting values, see Catalogue HR 1, Rolling Bearings. Nominal dimension of chamfer dimension, see dimension table.

Tolerances

The tolerances for the dimensional and running accuracy of deep groove ball bearings correspond to tolerance class Normal in accordance with ISO 492:2014.

Internal clearance

Deep groove ball bearings of basic design are manufactured as standard with the radial internal clearance CN (normal), see table. CN is not stated in the designation.

The bearings are also available by agreement with the smaller internal clearance C2 and with the larger internal clearance C3 and C4.

The values for radial internal clearance correspond to DIN 620-4:2004 (ISO 5753-1:2009). These are valid for bearings which are free from load and measurement forces (without elastic deformation).

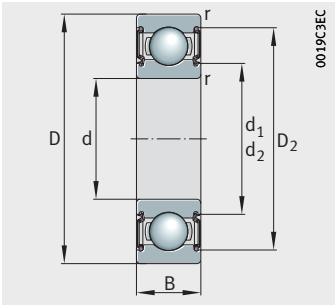
Radial internal clearance of deep groove ball bearings

Nominal bore diameter d mm		Radial internal clearance							
		C2 (Group 2)		CN (Group N)		C3 (Group 3)		C4 (Group 4)	
		μm		μm		μm		μm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
6	10	0	7	2	13	8	23	14	29
10	18	0	9	3	18	11	25	18	33
18	24	0	10	5	20	13	28	20	36
24	30	1	11	5	20	13	28	23	41
30	40	1	11	6	20	15	33	28	46
40	50	1	11	6	23	18	36	30	51

Single row deep groove ball bearings

FD design

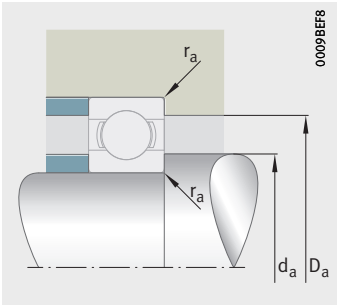
Contact seals on both sides



With seals 2RS, 2RSR
(schematic representation)

Dimension table - Dimensions in mm

Designation	Mass m ≈ kg	Dimensions						
		d	D	B	r	d ₁	d ₂	D ₂
					min.	≈	≈	≈
S6000-2RSR-FD	0,02	10	26	8	0,3	–	13,9	22,38
S6200-2RS-FD	0,032	10	30	9	0,6	–	15,3	25,28
S6300-2RSR-FD	0,058	10	35	11	0,6	17,7	–	29,3
S6001-2RSR-FD	0,022	12	28	8	0,3	–	16	25,15
S6201-2RSR-FD	0,036	12	32	10	0,6	18,5	–	27,95
S6301-2RSR-FD	0,065	12	37	12	1	19,3	–	31,92
S6002-2RS-FD	0,03	15	32	9	0,3	–	18,6	29,05
S6202-2RSR-FD	0,045	15	35	11	0,6	21,7	–	31,4
S6302-2RSR-FD	0,081	15	42	13	1	24,5	–	36,8
S6003-2RSR-FD	0,039	17	35	10	0,3	23,5	–	31,85
S6203-2RSR-FD	0,065	17	40	12	0,6	24,9	–	35,8
S6303-2RSR-FD	0,114	17	47	14	1	27,5	–	41,1
S6004-2RSR-FD	0,069	20	42	12	0,6	27,6	–	38,75
S6204-2RSR-FD	0,109	20	47	14	1	29,5	–	40,92
S6304-2RSR-FD	0,144	20	52	15	1,1	30	–	45,4
S6005-2RSR-FD	0,077	25	47	12	0,6	31,7	–	42,73
S6205-2RSR-FD	0,13	25	52	15	1	34	–	45,72
S6305-2RSR-FD	0,245	25	62	17	1,1	38,1	–	53,22
S6006-2RSR-FD	0,1	30	55	13	1	38	–	49,95
S6206-2RSR-FD	0,211	30	62	16	1	40,7	–	55,13
S6306-2RSR-FD	0,32	30	72	19	1,1	44,9	–	62,35
S6007-2RSR-FD	0,155	35	62	14	1	44	–	57,05
S6207-2RSR-FD	0,303	35	72	17	1,1	47,6	–	64,83
S6307-2RSR-FD	0,483	35	80	21	1,5	–	46,8	71,58
S6008-2RSR-FD	0,188	40	68	15	1	49,2	–	62,5
S6208-2RSR-FD	0,384	40	80	18	1,1	–	50,1	70,78
S6009-2RSR-FD	0,244	45	75	16	1	54,5	–	69
S6209-2RSR-FD	0,441	45	85	19	1,1	–	53,5	76,35
S6010-2RSR-FD	0,271	50	80	16	1	60	–	74,55
S6210-2RSR-FD	0,457	50	90	20	1,1	–	60	82,15



Mounting dimensions

Mounting dimensions			Basic load ratings		Fatigue limit load	Limiting speed	Factor
d _a	D _a	r _a	dyn. C _r	stat. C _{0r}	C _{ur}	n _G	f ₀
min.	max.	max.	N	N		min ⁻¹	
12	24	0,3	3 890	1 570	125	11 000	9,9
14,2	25,8	0,6	4 350	1 910	121	9 700	10,5
14,2	30,8	0,6	6 880	2 750	255	8 900	9
14	26	0,3	4 350	1 910	151	9 700	10,5
16,2	27,8	0,6	5 780	2 440	154	9 100	9,8
17,6	31,4	1	8 250	3 350	330	8 300	8,9
17	30	0,3	4 750	2 270	152	8 600	11,1
19,2	30,8	0,6	6 490	2 980	189	8 000	10,5
20,6	36,4	1	9 720	4 350	430	7 000	9,9
19	33	0,3	5 100	2 610	166	7 700	11,5
21,2	35,8	0,6	8 130	3 830	246	7 100	10,5
22,6	41,4	1	11 600	5 290	345	6 300	9,9
23,2	38,8	0,6	7 980	4 050	265	6 600	11,2
25,6	41,4	1	10 900	5 320	345	6 000	10,6
27	45	1,1	13 500	6 270	750	5 900	9,9
28,2	43,8	0,6	8 550	4 680	310	5 800	11,6
30,6	46,4	1	11 900	6 300	405	5 400	11,1
32	55	1,1	17 500	9 000	960	4 700	10,6
34,6	50,4	1	11 200	6 620	435	4 900	11,8
35,6	56,4	1	16 500	9 070	600	4 500	11,1
37	65	1,1	22 700	12 000	1 290	4 100	10,6
39,6	57,4	1	13 600	8 240	720	4 300	11,9
42	65	1,1	21 800	12 300	1 210	3 900	11,1
44	71	1,5	28 300	15 400	1 680	3 600	10,6
44,6	63,4	1	14 300	9 240	770	3 900	12,2
47	73	1,1	24 700	14 300	1 400	3 500	11,2
49,6	70,4	1	17 800	12 100	870	3 500	12,2
52	78	1,1	27 800	16 400	1 490	3 200	11,3
54,6	75,4	1	18 500	13 300	920	3 200	12,5
57	83	1,1	29 800	18 600	1 630	3 000	11,5



Radial insert ball bearings for the food industry

Radial insert ball bearings with grub screws in the inner ring

Radial insert ball bearings with eccentric locking collar

**Features of
radial insert ball bearings,
comparison of series**

Series	Shaft diameter mm		Location
	from	to	
GYE..-KRR-B-FA107-VA-FD	20	40	Grub screws
GE..-KRR-B-FA107-VA-FD	20	40	Eccentric locking collar

- 1)

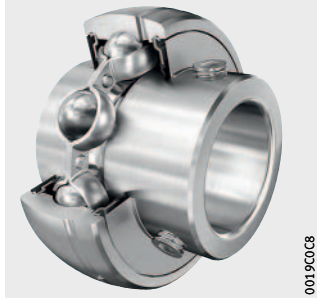
NSF H1 accreditation, see section Food-grade grease application, page 30.
- 2)

Attention!
Recommended operating temperature of bearing series.

Seal	Compensation of misalignment	Internal clearance	Bearing components	Grease approved for food applications ¹⁾	Relubrication facility	Temperature ²⁾ °C		Comments	Dimension table Page
						from	to		
RSR	yes	Group 3	High-grade steel	yes	yes	-30	+100	High-grade steel version, with flinger shield	40
RSR	yes	Group 3	High-grade steel	yes	yes	-30	+100	High-grade steel version	42

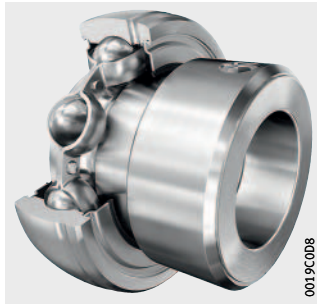
With grub screws in inner ring
FD design

GYE...KRR-B-FA107-VA-FD



With eccentric locking collar
FD design

GE...KRR-B-FA107-VA-FD



Radial insert ball bearings for the food industry

Features Radial insert ball bearings GYE..-KRR-B-FA107-VA-FD and GE..-KRR-B-FA107-VA-FD in FD design are designed for use in the food and beverage industry. They have a significantly higher resistance to corrosion and media than conventional radial insert ball bearings and are therefore extremely suitable for a wide range of applications in the food industry, where they are exposed to various media, moisture, salt spray mist, contaminated water or cleaning agents.

Bearing design The bearings in FD design (high-grade steel version with food-grade grease) correspond in their design to single row deep groove ball bearings 62, are ready to fit, particularly easy to fit and allow robust, economical bearing arrangements with a long operating life. They are located on the shaft by means of grub screws in the extended inner ring or by means of an eccentric locking collar. Operation even under difficult conditions is ensured by seals that are matched to the application and the use of food-grade grease.

Special characteristics

- bearing rings, cages and balls made from high-grade steel
- eccentric locking rings, grub screws and flinger shields made from high-grade steel
- highly effective contact seal of type RSR with high-grade steel reinforcement and additional flinger shield
- lubrication with food-grade grease
- relubrication facility

Design variants Radial insert ball bearings in FD design for the food industry are available with various location methods as:

- radial insert ball bearings with grub screws in the inner ring, GYE..-KRR-B-FA107-VA-FD
- radial insert ball bearings with eccentric locking collar, GE..-KRR-B-FA107-VA-FD

Radial insert ball bearings for the food industry

Location using high-grade steel grub screws

The inner ring (Y type) is located axially on the shaft by means of two high-grade steel grub screws offset by 120°. This location method is suitable for bearing arrangements with a constant direction of rotation or, under low speed and load, for an alternating direction of rotation.

The grub screws are self-retaining and have a fine pitch thread with cup point for secure location of the bearings, in due accordance with the stated tightening torques, see tables, page 37.

Location using high-grade steel eccentric locking collar

The bearings are located on the shaft by means of a high-grade steel locking collar. They are thus particularly suitable for bearing arrangements with a constant direction of rotation or, under low speed and load, for an alternating direction of rotation.

The locking collar is preferably tightened in the direction of rotation and must be secured by means of a grub screw. This location method prevents damage to the shaft and can be easily loosened again.

Corrosion-resistant and FDA-compliant materials

The bearing rings, cages and rolling elements are made from high-grade steel. The seal and flinger shield reinforcement as well as the fasteners such as eccentric locking collars and grub screws are also made from high-grade steel.

The materials used in series FD are resistant to moisture, contaminated water, salt spray mist and weak alkaline or weak acidic cleaning agents.

Steels used

Bearing components	Designation		
	Short name		Material number
	ISO 683-17:2000	AISI	
Bearing rings, rolling elements	X105CrMo17	440C	1.4125
Cages, grub screws, eccentric locking collar, seal reinforcement, flinger shields	X5CrNi18-10	304	1.4301

We reserve the right to make technical changes, including material changes, as part of the ongoing development.

Media resistance

In the food industry in particular, the resistance of the material in relation to various cleaning agents is of increasing importance.

Medium	Concentration %	X5CrNi18-10		X105CrMo17	
		+20 °C	+80 °C	+20 °C	+80 °C
Hydrochloric acid HCl	0,1	+	+	–	–
	1	(+)	–	–	–
	18	–	–	–	–
Hydrofluoric acid HF	1	–	–	–	–
	5	– ¹⁾	–	– ¹⁾	–
Sulphuric acid H ₂ SO ₄	1	+	–	–	–
	10	(+)	–	–	–
	96	+	(+)	–	–
Sulphurous acid H ₂ SO ₃	1	+	+	–	–
Nitric acid HNO ₃	5	+	+	–	–
	25	+	+	+	(+)
	65	+	+	+	(+)
Phosphoric acid H ₃ PO ₄	1	+	+	+	+
	10	+	+	(+)	+
	85	+	+	+	–
Formic acid HCOOH	5	+	+	–	–
	25	+	+	–	–
Acetic acid CH ₃ COOH	5	+	+	+	–
	25	+	+	+	–
Citric acid	5	+	+	+	+
	25	+	+	–	–
Chloroacetic acid	5	+	+	(+)	–
Sodium chloride NaCl	10	+	+	(–)	(–)
Sea water	4	+	+	(–)	(–)
Distilled water	–	+	+	+	+
Ammonium hydroxide NH ₄ OH	1	+	+	+	+
	10	+	+	+	+
Potassium hydroxide solution KOH	0,1	+	+	+	+
	1	+	+	+	+
	10	+	+	+	+
Sodium hypochlorite solution	1	+ ¹⁾	+	²⁾	(–)
Hydrogen peroxide H ₂ O ₂	5	+	+	+	+

- + Resistant
- (+) Moderately resistant
- (–) Barely resistant
- Not resistant

¹⁾ Not tested. Estimate generated from remaining test series.
²⁾ Not tested. No estimate possible.

Radial insert ball bearings for the food industry

FDA-compliant materials

The following FDA-compliant materials are used:

Bearing components	Material, designation	FDA directive
Seals	NBR	FDA 21 CFR 177.2600
Grease	Mobile Grease FM222	FDA 21 CFR 178.3570

Compliance with the FDA directive is based on information provided by material manufacturers.

Lubrication Food-grade grease application

The high-quality grease used for lubrication is approved for food applications to category NSF H1. The grease is particularly suitable for use in the food industry and meets the quality requirements of FDA 21 CFR 178.3570 in full. Furthermore, the grease is Halal and Kosher-certified.

A lubricant of class NSF H1 is suitable for applications in which incidental contact between food and lubricant may occur and is unavoidable by technical measures. Such lubricants must be non-toxic and neutral in taste and odour.

The grease also contains only allergen-free ingredients in accordance with Directive (EU) 1169/2011 and is, therefore, free of cereals containing gluten, nuts and milk, for example. In addition, the grease does not contain any components comprising animal or genetically modified organisms.

The Halal and Kosher certification of the lubricant used confirms that the strict Halal and Kosher criteria are also met in relation to the processing and ingredients of the bearings. These dietary laws of the Muslim and Jewish population not only apply to the actual food and beverages, but also to the machines and environment during manufacture.

- ①

Kosher
- ②

Halal
- ③

National Sanitation Foundation (NSF)

Figure 1
Certifications



Lubrication of bearings Initial greasing is carried out with Mobile Grease FM222, an aluminium complex soap grease with food applications approval to NSF H1, which is sufficient in many cases for the operating life of the bearings. The bearings are relubricated via lubrication holes on the outside surface of the outer rings. The use of rolling bearing grease Arcanol FOOD2 is recommended for relubrication.

Arcanol Food2 Arcanol FOOD2 is a rolling bearing grease for rolling bearing arrangements in the food industry. It is registered to NSF-H1 (reg. no. 150727), is Halal and Kosher-certified, has very good water resistance and corrosion protection, and has very good resistance to cleaning chemicals.

Typical areas of application are:

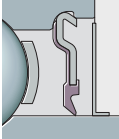
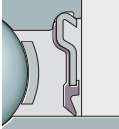
- applications with food contact
- H1 to USDA
- bearing positions with NSF-H1 requirement (food contact)

The criteria for application are:

- universal application
- good relubrication

Further information ■ Arcanol Rolling Bearing Greases, TPI 168,
➤ <https://www.schaeffler.de/std/1F66>

Sealing Radial insert ball bearings for the food industry are sealed in a radial direction on both sides with contact seals made from NBR. These seals are of the type RSR and are elastomer lip seals with a high-grade steel reinforcement. This variant has the suffix KRR. In the case of variant GYE, the seals are additionally fitted with flinger shields made from high-grade steel, which protect the seals against mechanical damage. As standard, bearings for the food industry are delivered with seals made from NBR.

Seal type	
RSR type seal with flinger shield in high-grade steel design	
	Single piece, sheet steel washer made from high-grade steel with vulcanised and radially preloaded seal lip made from NBR and additional flinger shield made from high-grade steel. Used in radial insert ball bearings with grub screws in the inner ring (series GYE).
Seal RSR in high-grade steel design	
	Single piece, sheet steel washer made from high-grade steel with vulcanised and radially preloaded seal lip made from NBR. Used in radial insert ball bearings with eccentric locking collar (series GE).



In the case of direct exposure to spray water, prior consultation with Application Engineering is required. For any queries regarding resistance to specific media, please consult Application Engineering.

Radial insert ball bearings for the food industry

Operating temperature	Radial insert ball bearings for the food industry are suitable for operating temperatures from –30 °C to +100 °C.																	
Suffixes	Suffixes for available designs, see table.																	
Available designs	<table> <tr> <th>Suffix</th><th>Description</th><th>Design</th></tr> <tr> <td>B</td><td>Bearing with spherical outside surface of outer ring</td><td rowspan="5">Standard</td></tr> <tr> <td>FA107</td><td>Bearing with lubrication holes on the locating side</td></tr> <tr> <td>FD</td><td>Suitable for applications in the food industry</td></tr> <tr> <td rowspan="2">KRR</td><td>Series GE: lip seal on both sides (seal type RSR) made from NBR</td></tr> <tr> <td>Series GYE: lip seal on both sides (seal type RSR) made from NBR with additional flinger shield</td></tr> <tr> <td>VA</td><td>High-grade steel version</td><td></td></tr> </table>	Suffix	Description	Design	B	Bearing with spherical outside surface of outer ring	Standard	FA107	Bearing with lubrication holes on the locating side	FD	Suitable for applications in the food industry	KRR	Series GE: lip seal on both sides (seal type RSR) made from NBR	Series GYE: lip seal on both sides (seal type RSR) made from NBR with additional flinger shield	VA	High-grade steel version		
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VA	High-grade steel version																	
Further information	<div> <div>■</div> <div>General information from Rolling Bearings, HR 1, must be observed ➤ https://www.schaeffler.de/std/1D65</div> </div> <div> <div>■</div> <div>Entire range of radial insert ball bearings and housing units: Radial Insert Ball Bearings and Housing Units, SG 1, ➤ https://www.schaeffler.de/std/1F80</div> </div> <div> <div>■</div> <div>Additional information on corrosion resistance. Here you will find other corrosion-resistant bearings made from the high-performance steels Cronidur and Cronitect, which are available by agreement: Corrosion-resistant products, TPI 64, ➤ https://www.schaeffler.de/std/1F38</div> </div> <div> <div>■</div> <div>For information on the correct storage, mounting, dismounting and maintenance of rolling bearings: Mounting Handbook, MH 1, ➤ https://www.schaeffler.de/std/1F86</div> </div>																	

Design and safety guidelines

The information on the design of the bearing arrangement, lubrication, mounting and dismantling and on the operation of the bearings provided in the Technical Principles of Catalogue HR 1, must be observed as further information.

Further information

- Technical principles: Rolling Bearings, HR 1,
► <https://www.schaeffler.de/std/1D65>

Load carrying capacity

Radial load carrying capacity

The balls are in contact with the raceways at one point only. Under purely radial load, the contact points between the rolling elements and raceways lie at the centre of the raceway. As a result, the connection between the contact points passes through the radial plane, i.e. the optimum load direction is a purely radial load.

Axial load carrying capacity

Due to the deep raceway grooves in the bearing rings and the narrow osculation between the raceway grooves and the balls, the bearings can support axial loads in both directions. The axial load carrying capacity is dependent, for example, on the bearing size, the internal construction and the operating clearance. If the axial load is too high, however, this can increase the running noise and considerably reduce the operating life of the bearings.

If there is any uncertainty regarding the axial load carrying capacity of the bearings, please consult Schaeffler.

Compensation of static misalignments

Bearings with a spherical outside surface of the outer ring, fitted in housings with a concave bore, can compensate for static misalignment of the shaft, *Figure 2*.

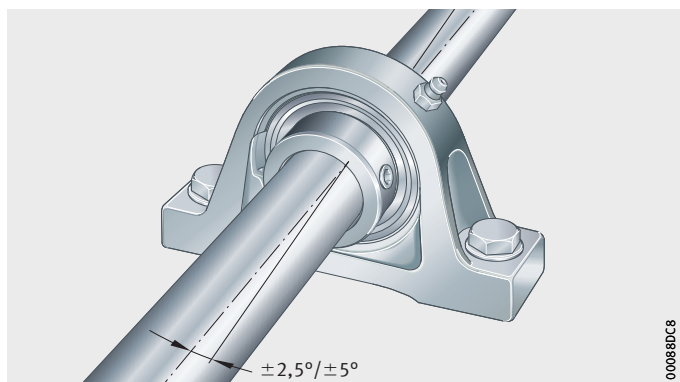
For units with a lubrication groove in the housing and lubrication hole in the radial insert ball bearing, the following applies:

- Up to $\pm 2,5^\circ$, the units can be relubricated.
- Between $\pm 2,5^\circ$ and $\pm 5^\circ$, the facility for relubrication is dependent on the specific unit. Please contact us in this case.
- Over $\pm 5^\circ$, relubrication is no longer possible.



The units must not be used to support swivelling or tumbling motion.

Figure 2
Compensation of static shaft misalignment



Radial insert ball bearings for the food industry

Speed limits for radial insert ball bearings

The speed limits are dependent on the load, the clearance between the bearing bore and shaft and the friction of the seals in the case of bearings with contact seals.

Guide values for the permissible speeds can be derived from the diagram, *Figure 3*, page 34.

In the case of load ratios $C_r/P > 13$, the speeds can be increased. For $C_r/P < 5$, location by means of a fit with a shaft roughness of $Ra\ 0,3$ is recommended, see Catalogue HR 1, Technical principles. For both types of applications, please contact us. In order to ensure slippage-free operation, the minimum radial load must be observed, see page 36.

Example of
permissible speed calculation

- Given:

■ Shaft tolerance

■ Radial insert ball bearing

■ Ball set

■ Basic dynamic load rating C_r

■ Load P

■ Sealing

h6 Ⓢ

GE25-KRR-B-FA107-VA-FD

205

13 400 N

1 000 N

Seals RSR

- Required:

■ Load ratio

■ Permissible speed

$C_r/P = 13\ 400\ \text{N}/1\ 000\ \text{N}$

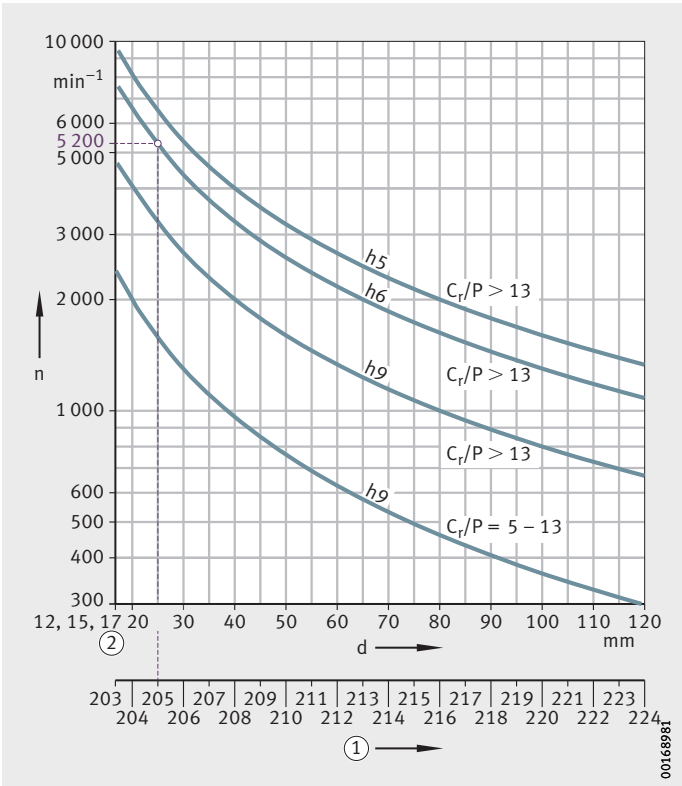
$n \approx 5\ 200\ \text{min}^{-1}$, *Figure 3*

n = permissible speed
d = shaft diameter
h5, h6, h9 = shaft tolerance
(subject to envelope requirement Ⓢ)
 C_r/P = load ratio

- ① Ball set

② For d = 12 mm, 15 mm and 17 mm, identical ball set 203

Figure 3
Permissible speeds for radial insert ball bearings with seal RSR (design KRR)



Dimensioning
Equivalent dynamic bearing load

The basic rating life equation $L = (C_r/P)^P$ used in the dimensioning of bearings under dynamic load assumes a load of constant magnitude and direction. In radial bearings, this is a purely radial load F_r . If this condition is met, the bearing load F_r is used in the rating life equation for P ($P = F_r$).

If this condition is not met, a constant radial force must first be determined for the rating life calculation that (in relation to the rating life) represents an equivalent load. This force is known as the equivalent dynamic bearing load P .

The calculation of P is dependent on the load ratio F_a/F_r and the calculation factor e :

$$\frac{F_a}{F_r} \leq e \Rightarrow P = F_r$$

$$\frac{F_a}{F_r} > e \Rightarrow P = X \cdot F_r + Y \cdot F_a$$

- F_a N
- Axial load
- F_r N
- Radial load
- e, X, Y –
- Factors, see table
- P N
- Equivalent dynamic bearing load.

The specified values are valid for normal operating clearance, see table. If the operating clearance differs significantly, the use of BEARINX is recommended for the calculation of the rating life. If the calculation values lie between the stated values (such as 0,4), then read off the table values for 0,3 and 0,5 and determine the intermediate values using linear interpolation.

For normal operating clearance, please observe the fit recommendations in Catalogue HR 1, Rolling Bearings.

Factors e, X and Y

$f_0 \cdot F_a$ C_{0r}	Factor (for normal operating clearance)		
	e	X	Y
0,3	0,22	0,56	2
0,5	0,24	0,56	1,8
0,9	0,28	0,56	1,58
1,6	0,32	0,56	1,4
3	0,36	0,56	1,2
6	0,43	0,56	1

- f_0 –
- Factor, see dimension tables
- F_a N
- Axial load
- C_{0r} N
- Basic static load rating, see dimension tables.

Radial insert ball bearings for the food industry

Equivalent static bearing load

As radial insert ball bearings have the same internal construction as single row deep groove ball bearings, their equivalent static bearing load is calculated in the same manner as for deep groove ball bearings.

The calculation of P_0 for deep groove ball bearings under static load is dependent on the load ratio F_{0a}/F_{0r} and the factor 0,8:

$$\frac{F_{0a}}{F_{0r}} \leq 0,8 \Rightarrow P_0 = F_{0r}$$

$$\frac{F_{0a}}{F_{0r}} > 0,8 \Rightarrow P_0 = 0,6 \cdot F_{0r} + 0,5 \cdot F_{0a}$$

F_{0a}, F_{0r} N
Largest radial or axial load present (maximum load)
 P_0 N
Equivalent static bearing load.

Static load safety factor

In addition to the basic rating life L_{10h} , it is also always necessary to check the static load safety factor S_0 :

$$S_0 = \frac{C_0}{P_0}$$

S_0 –
Static load safety factor
 C_0 N
Basic static load rating, see dimension tables
 P_0 N
Equivalent static bearing load.

Minimum radial load

In order that no slippage occurs between the contact partners, the bearings must be constantly subjected to a sufficiently high load. Based on experience, a minimum radial load of the order of $P > C_{0r}/100$ is thus necessary. In most cases, however, the radial load is higher than the requisite minimum load due to the weight of the supported parts and the external forces.

If the minimum radial load is lower than stated, please consult Schaeffler.

Design of bearing arrangements Shaft tolerances for radial insert ball bearings

The permissible shaft tolerance is dependent on the speed and load. Shafts of the tolerance classes h6 @ to h9 @ can be used. Conventional drawn shafts will suffice for most applications.

Roughness of cylindrical bearing seating surfaces

The roughness of the bearing seats must be matched to the tolerance class of the bearings. The mean roughness value R_a must not be too high, in order to maintain the interference loss within limits. The shafts must be ground, while the bores must be precision turned. Guide values as a function of the IT grade of bearing seating surfaces, see table, page 37.

**Roughness values
for cylindrical bearing seating
surfaces – guide values**

Nominal diameter of bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats			
		R _{max} µm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4

**Housing units
for radial insert ball bearings**

For radial insert ball bearings, Schaeffler offers the appropriate plummer block and flanged housings made from plastic. The plastic housings, like the radial insert ball bearings themselves, are corrosion-resistant and suitable for food applications. For an overview of possible combinations, see page 46.

The housing units comprise radial insert ball bearings with a curved outer ring and a housing with a curved bore to form ready-to-fit units. The user is thus spared the need for costly production of the mounting environment required for these bearings. The areas of application correspond to those of the radial insert ball bearings.

Mounting and dismounting

The detailed guidelines on the mounting and dismounting of radial insert ball bearings must be observed.

- Radial Insert Ball Bearings and Housing Units, SG 1,
➤ <https://www.schaeffler.de/std/1F80>
- Mounting of Radial Insert Ball Bearings with Spherical Outer Ring in Bearing Housings, MON 108,
➤ <https://www.schaeffler.de/std/1FA1>

**Tightening torques
for grub screws**

The tightening torques for grub screws from Schaeffler are dependent on the material of the screws. The tightening torques for the high-grade steel grub screws are valid only for original grub screws from Schaeffler (INA or FAG brand), see table.

**Tightening torques
for metric high-grade steel
grub screws**

Width across flats W mm	Thread	Tightening torque M _A Nm
2,5	M5	2,4
3	M6×0,75	3,9
4	M8×1	8,3

Mounting Handbook

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

Further information

The Schaeffler Mounting Handbook, MH 1, gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position.

This book is available from Schaeffler on request:

- Mounting Handbook, MH 1,
➤ <https://www.schaeffler.de/std/1F86>

Radial insert ball bearings for the food industry

Accuracy Dimensions, tolerances

The main dimensions of radial insert ball bearings correspond to ISO 9628 and DIN 626-1:1999. For the nominal dimensions of radial insert ball bearings, see dimension tables.

The tolerances for the dimensional and running accuracy of radial insert ball bearings correspond to tolerance class Normal in accordance with ISO 492:2014.

The diameter tolerances of radial insert ball bearings deviate from the values in the above-mentioned standard, see table. The inner ring bore has a plus tolerance to facilitate mounting of the bearing.

Tolerances of radial insert ball bearings, FD design

Inner ring				Outer ring			
Nominal size Bore d mm		Deviation ¹⁾ t _{Δdmp} μm		Nominal size Outside diameter D mm		Deviation ¹⁾ t _{ΔDmp} μm	
incl.	up to	U	L	incl.	up to	U	L
18	24	+25	0	50	80	0	−13
24	30	+25	0	80	120	0	−13
30	40	+25	0	120	150	0	−13

t_{Δdmp}, t_{ΔDmp} = tolerance symbols in accordance with ISO 492
 U = upper limit deviation
 L = lower limit deviation

¹⁾ In the case of sealed bearings, the largest and smallest values of the outside diameter can deviate from the mean value by approx. 0,03 mm.

Internal clearance

Radial insert ball bearings for the food industry are manufactured as standard with radial internal clearance C3 (Group 3), see table, page 39, and table, page 24. C3 is not stated in the designation.

The internal clearance is larger than in the case of normal deep groove ball bearings. As a result, support of misalignments and shaft deflections is improved.

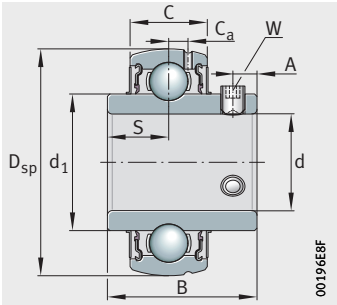
The values for radial internal clearance correspond to DIN 620-4:2004 (ISO 5753-1:2009). These are valid for bearings which are free from load and measurement forces (without elastic deformation).

**Radial internal clearance of
radial insert ball bearings**

Bore d mm		Radial internal clearance							
		Group N μm		Group 3 μm		Group 4 μm		Group 5 μm	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.
2,5	6	2	13	8	23	—	—	—	—
6	10	2	13	8	23	14	29	20	37
10	18	3	18	11	25	18	33	25	45
18	24	5	20	13	28	20	36	28	48
24	30	5	20	13	28	23	41	30	53
30	40	6	20	15	33	28	46	40	64
40	50	6	23	18	36	30	51	45	73
50	65	8	28	23	43	38	61	55	90
65	80	10	30	25	51	46	71	65	105
80	100	12	36	30	58	53	84	75	120
100	120	15	41	36	66	61	97	90	140
120	140	18	48	41	81	71	114	105	160
140	160	18	53	46	91	81	130	120	180

Radial insert ball bearings

FD design
With grub screws in inner ring
Spherical outer ring
With extended inner ring



GYE...KRR-B-FA107-VA-FD

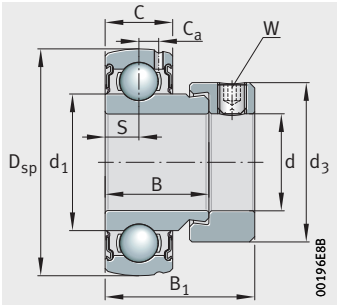
Dimension table · Dimensions in mm						
Designation ^{1) 2)}	Mass m ≈ kg	Dimensions				
		d	D _{sp}	C	B	S
GYE20-KRR-B-FA107-VA-FD	0,16	20	47	16	31	12,7
GYE25-KRR-B-FA107-VA-FD	0,21	25	52	17	34,1	14,3
GYE30-KRR-B-FA107-VA-FD	0,3	30	62	19	38,1	15,9
GYE35-KRR-B-FA107-VA-FD	0,46	35	72	20	42,9	17,5
GYE40-KRR-B-FA107-VA-FD	0,61	40	80	21	49,2	19

1) Speed limits for radial insert ball bearings, see page 34.
2) Lubrication groove and two lubrication holes in the outer ring.

			Width across flats W	Basic load ratings		Fatigue limit load C _{ur} N	Factor f ₀
d ₁	C _a	A		dyn. C _r N	stat. C _{0r} N		
28,3	4	5	2,5	10 900	5 300	280	13,1
34	4,15	5	2,5	11 900	6 300	335	13,8
40,3	5	6	3	16 700	9 000	475	13,8
46,9	5,7	6,5	3	22 000	12 300	655	13,8
52,4	5,9	8	4	24 900	14 300	800	14

Radial insert ball bearings

FD design
With eccentric locking collar
Spherical outer ring



GE...KRR-B-FA107-VA-FD

Dimension table · Dimensions in mm							
Designation ^{1) 2)}	Mass m ≈ kg	Dimensions					
		d	D _{sp}	C	B	S	d ₁
GE20-KRR-B-FA107-VA-FD	0,17	20	47	14	21,5	7	28,3
GE25-KRR-B-FA107-VA-FD	0,2	25	52	15	21,5	7,5	34
GE30-KRR-B-FA107-VA-FD	0,3	30	62	16	23,8	8	40,3
GE35-KRR-B-FA107-VA-FD	0,5	35	72	17	25,4	8,5	46,9
GE40-KRR-B-FA107-VA-FD	0,63	40	80	18	30,2	9	52,4

1) Speed limits for radial insert ball bearings, see page 34.
2) Lubrication groove and two lubrication holes in the outer ring.

			Width across flats W	Basic load ratings		Fatigue limit load C _{ur} N	Factor f ₀
C _a	B ₁	d ₃ max.		dyn. C _r N	stat. C _{0r} N		
4,1	31	33,3	3	12 840	6 650	280	13,1
4,15	31	38,1	3	14 020	7 880	335	13,8
5	35,7	44,5	3	19 460	11 310	475	13,8
5,35	38,9	55,6	3	25 670	15 300	655	13,8
5,5	43,7	60,3	4	29 520	18 140	800	14



White plastic housing units for the food industry

Plummer block housing units with radial insert ball bearings
in FD design

Flanged housing units with radial insert ball bearings
in FD design

Accessories

Possible combinations

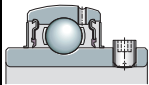
Radial insert ball bearings and plastic housings

Radial insert ball bearing

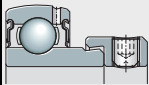
Designation

Shaft diameter
d

GYE...KRR-B-FA107-VA-FD
with grub screws
20 mm – 40 mm

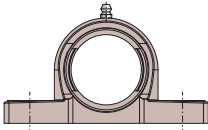
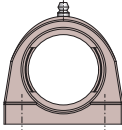
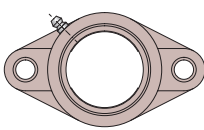

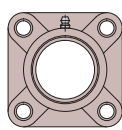


GE...KRR-B-FA107-VA-FD
with eccentric locking collar
20 mm – 40 mm



Dimension table, see pages indicated. Other dimensions and combinations available by agreement.

Combinations not possible or not advisable.

White plastic housings				
Plummer block bearing		Two-bolt flanged housing		Four-bolt flanged housing
				
ASE...-TV-WHT	SHE...-TV-WHT	CJT...-TV-WHT	GLCTE...-TV-WHT	CJ...-TV-WHT
RASEY...-TV-VA-FD page 58	RSHEY...-TV-VA-FD page 60	RCJTY...-TV-VA-FD page 62		RCJY...-TV-VA-FD page 66
RASE...-TV-VA-FD page 58	RSHE...-TV-VA-FD page 60	RCJT...-TV-VA-FD page 62	GLCTE...-TV-VA-FD page 64	RCJ...-TV-VA-FD page 66

Product overview

White plastic housing units
for the food industry

Plummer block housing units

FD design

RASEY..-TV-VA-FD,
RASE..-TV-VA-FD



RSHEY..-TV-VA-FD,
RSHE..-TV-VA-FD



Flanged housing units

FD design

RCJTY..-TV-VA-FD,
RCJT..-TV-VA-FD



GLCTE...-TV-VA-FD



RCJY..-TV-VA-FD,
RCJ..-TV-VA-FD



Accessories
Back Seal component

RWDR...-R-NBR



End caps
Open or closed design

KASK...-S-R-NBR-WHT



KASK...-S-G-WHT




White plastic housing units for the food industry

Features

Housing units with white, FDA-approved plastic housings made from PBT are available as plumber block and flanged housing units. The glass fibre reinforced plastic PBT is highly resistant to humidity, UV radiation, bacterial and fungal attacks as well as many chemical agents. The white plastic housing units are highly suitable for applications in the food industry, where they are exposed to various media, moisture, salt spray mist, contaminated water or cleaning agents.

White plastic housings with integral radial insert ball bearing – design

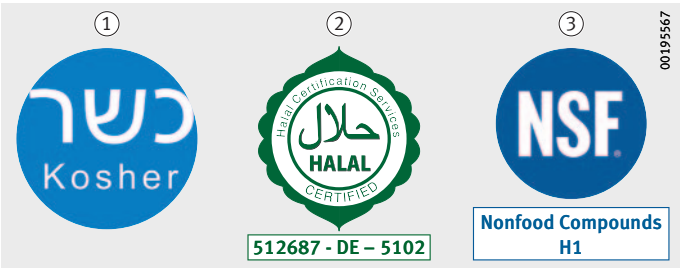
The units are ready-to-fit and comprise white plastic housings in which corrosion-resistant Schaeffler radial insert ball bearings for the food industry are fitted. The possible combinations can be found in the matrix, see page 46. Location on the shaft in the case of housing units with integral radial insert ball bearing GYE...KRR-B-FA107-VA-FD is by means of grub screws and in the case of housing units with integral radial insert ball bearing GE...KRR-B-FA107-VA-FD by means of an eccentric locking collar. The housings are screw mounted on the adjacent construction. Less stringent tolerances are sufficient for the screw mounting surfaces.

 In order to ensure function and reliability under all operating conditions, the bearings and housings are matched to each other with a defined swivel moment after mounting. The swivel moment can be requested from Schaeffler. The lubricant used is approved for food applications to category NSF H1 and meets the quality requirements of FDA 21 CFR 178.3570 in full. Furthermore, the lubricant is Halal- and Kosher-certified. The grease also contains only allergen-free ingredients and no components comprising animal or genetically modified organisms.

- ① Kosher
- ② Halal
- ③ National Sanitation Foundation (NSF)

Figure 1
Certifications

Design variants



- plumber block housing units with white plastic housings, with radial insert ball bearings (high-grade steel, food-grade grease) with grub screw or eccentric locking collar for use in the food industry
- flanged housing units with white plastic housings, with radial insert ball bearings (high-grade steel, food-grade grease) with grub screw or eccentric locking collar for use in the food industry

- Plummer block housing units**

Plummer block housing units are available with a long base or short base. They have a complete housing base and therefore offer no hidden spaces for bacterial growth. The housings are made from glass fibre reinforced, white plastic PBT, are not split and are screw mounted to the adjacent construction by means of slots or threaded holes. Inserts made from corrosion-resistant steel are integrated into the housing base, to prevent damage when tightening the screws.
For relubrication of radial insert ball bearings, the housing bore has a lubrication groove and the housing has a lubrication hole suitable for conventional lubrication nipples. The lubrication nipple is supplied already fitted, a bearing end cap is supplied loose at the time of delivery.
- Flanged housing units**

Flanged housing units are available as two-bolt and four-bolt flanged housing units. For location, the housings have through holes reinforced with high-grade steel inserts.
The housing material, the design of lubrication arrangements and the delivered condition correspond to those of plummer block housing units.
- Corrosion resistance, food grade, lubrication, sealing**

All further information on corrosion resistance, food-grade greasing, lubrication and sealing of the plastic housing units can be found in the section Radial insert ball bearings for the food industry, see page 27.
We reserve the right to make technical changes, including material changes, as part of the ongoing development.
- FDA-compliant materials**

The following FDA-compliant materials are used:

Bearing components	Material, designation	FDA directive
Seals	NBR	FDA 21 CFR 177.2600
Grease	Mobilgrease FM 222	FDA 21 CFR 178.3570
Housing	PBT-GF20	FDA 21 CFR 175 - 178
		FDA 21 CFR 177.1660
End cap	Capilene SR 50	FDA 21 CFR 177.1520(a)(3)(i) and (c)3.1a
		FDA 21 CFR 177.1520(b)

Compliance with the FDA directive is based on information provided by material manufacturers.

White plastic housing units for the food industry

Accessories

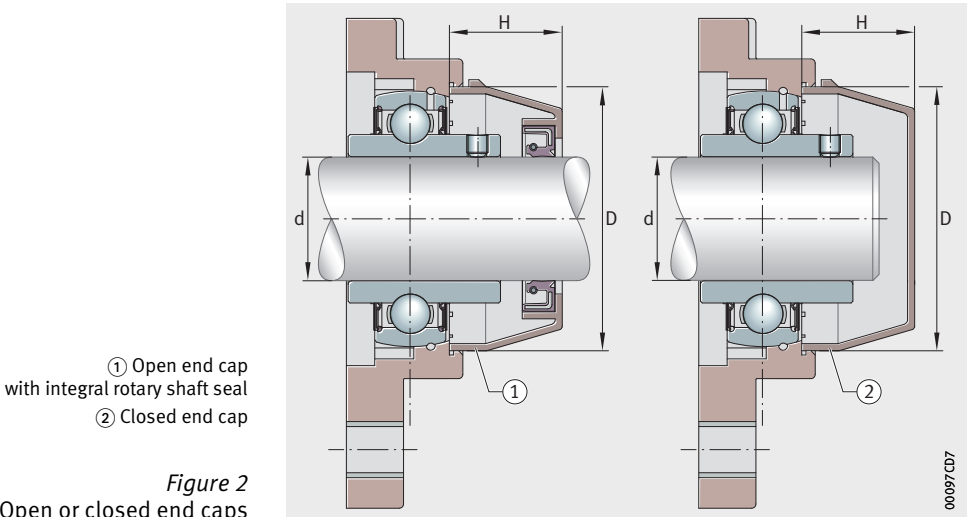
Bearing end caps

Each housing unit is supplied with a closed, white end cap KASK...-S-G-WHT.

For all units, open white end caps KASK...-S-R-NBR-WHT with an integral rotary shaft seal are available by agreement, *Figure 2* and table.

The bearing end caps are made from the plastic Capilene SR 50.

In application testing, the bearing end caps proved resistant to water jets applied at a high water pressure (90 bar). In the test, housings sealed with end caps withstood water jets at a temperature of 80 °C from various angles (0°, 30°, 60°, 90°). They remained in their position on the housings and were not damaged.



① Open end cap
with integral rotary shaft seal
② Closed end cap

Figure 2
Open or closed end caps

Bearing end caps for plastic housing units

Designation		Dimensions mm		
Closed end cap	Open end cap	d	D	H
KASK04-S-G-WHT	KASK04-S-R-NBR-WHT	20	50	23
KASK05-S-G-WHT	KASK05-S-R-NBR-WHT	25	55	25
KASK06-S-G-WHT	KASK06-S-R-NBR-WHT	30	64	30
KASK07-S-G-WHT	KASK07-S-R-NBR-WHT	35	74,6	32
KASK08-S-G-WHT	KASK08-S-R-NBR-WHT	40	84	37

Back Seal component

For flanged housing units RCJ...-TV-VA-FD and RCJT...-TV-VA-FD, a Back Seal component RWDR...-R-NBR is available, which seals the rear of the housing, *Figure 3*, *Figure 4* and table. The Back Seal component is made from NBR and has a spring washer made from corrosion-resistant steel, material number 1.4301. This additional sealing against the environment gives the plastic housing units effective, additional protection against contamination, which extends the operating life of the bearings.

RCJ...-TV-VA-FD
RCJT...-TV-VA-FD

① Back Seal component

Figure 3
Flanged housing units
with Back Seal component

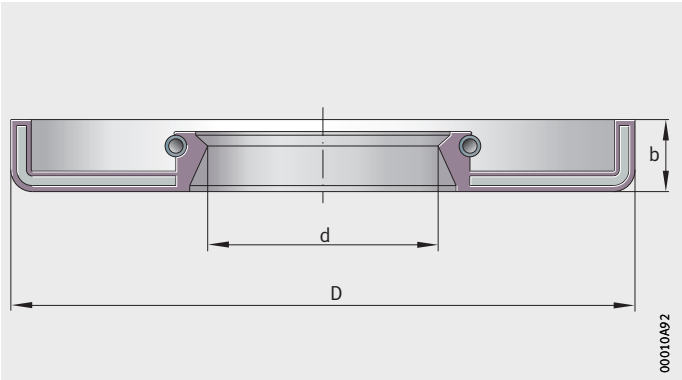
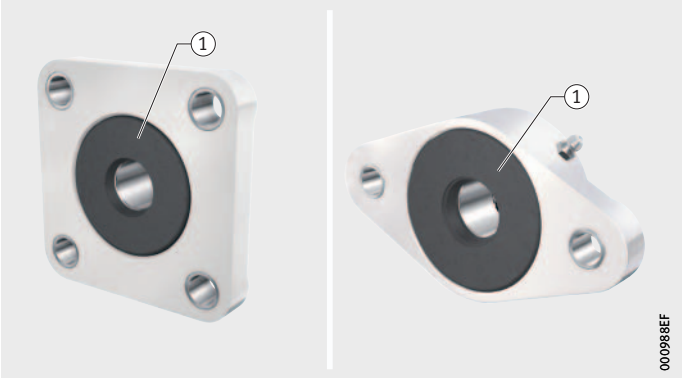


Figure 4
Dimensions
of Back Seal component

Designations and dimensions
of Back Seal components

Designation	Dimensions mm		
	d	b	D
RWDR04-R-NBR	20	6	52
RWDR05-R-NBR	25	6	62
RWDR06-R-NBR	30	6	72
RWDR07-R-NBR	35	6	82
RWDR08-R-NBR	40	6	88

White plastic housing units for the food industry

Operating temperature Housing units with or without a Back Seal component are suitable for operating temperatures from –30 °C to +100 °C. If bearing end caps are used, the maximum temperature is reduced to +80 °C.

Suffixes Suffixes for the available designs, see table.

Available designs

Suffix	Design	Design
TV	Plastic housing	Standard
VA	Components made from high-grade steel	
FD	Suitable for applications in the food industry	

Further information

- General information from Rolling Bearings, HR 1, must be observed
➤ <https://www.schaeffler.de/std/1D65>
- Entire range of radial insert ball bearings and housing units: Radial Insert Ball Bearings and Housing Units, SG 1,
➤ <https://www.schaeffler.de/std/1F80>
- For additional information on corrosion resistance, see Corrosion-resistant products, TPI 64,
➤ <https://www.schaeffler.de/std/1F38>

Design and safety guidelines The information on the design of the bearing arrangement, lubrication, mounting and dismounting and on the operation of the bearings provided in the Technical Principles of Catalogue HR 1, must be observed as further information.

Further information

- Technical principles: Rolling Bearings, HR 1,
➤ <https://www.schaeffler.de/std/1D65>

Due to their versatile characteristics, Schaeffler housing units can be easily used in almost all industrial sectors.



It is always and fundamentally the responsibility of the designer of a machine to ensure that a malfunction of housing units cannot be hazardous to persons. An unplanned stoppage of the machine should not cause major disruptions in operation. In both cases, it is therefore essential that you contact us before design work is carried out.

Load carrying capacity The load carrying capacity of radial insert ball bearings can be found in the section Radial insert ball bearings for the food industry, see section Load carrying capacity, page 33.

Radial load carrying capacity of housings Plastic housings are suitable for moderate loads. The radial static load carrying capacity C_{0rG} of plastic housings and the static load carrying capacity C_{0r} of the radial insert ball bearings is stated in the relevant dimension tables.

Axial load carrying capacity of housings The axial operating load of the unit must not exceed the axial load carrying capacity of the housing.
The axial load carrying capacity of plastic housings is
 $C_{0aG} = 0,25 \cdot C_{0rG}$

Compensation of static misalignments

Due to the spherical outer ring of the bearing and the concave housing bore, housing units can compensate for static misalignments of the shaft, see section Radial insert ball bearings for the food industry, page 33.

Speed limits for radial insert ball bearings

The speed limits are dependent on the load, the clearance between the bearing bore and shaft and the friction of the seals, see section Radial insert ball bearings for the food industry, page 34.

Dimensioning, minimum load

All information on the dimensioning and minimum radial loading of integral radial insert ball bearings can be found in the section Radial insert ball bearings for the food industry, see page 35 and page 36.

Design of adjacent construction

The permissible shaft tolerance is dependent on the speed, load and the radial insert ball bearing fitted. Shafts of the tolerance classes h6 @ to h9 @ can be used. Conventional drawn shafts will suffice for most applications.

The roughness of the shaft must be matched to the tolerance class of the integral radial insert ball bearing. The mean roughness value R_a must not be too high, in order to maintain the interference loss within limits. The shafts must be ground. Guide values as a function of the IT grade of bearing seating surfaces, see table.

Roughness values for cylindrical bearing seating surfaces – guide values

Nominal diameter of bearing seat d (D) mm		Recommended mean roughness value for ground bearing seats R_{amax} μm			
		Diameter tolerance (IT grade)			
over	incl.	IT7	IT6	IT5	IT4
–	80	1,6	0,8	0,4	0,2
80	500	1,6	1,6	0,8	0,4

Screw mounting surfaces

Recommendations for the screw mounting surfaces are as follows:

- roughness of the screw mounting surface max. R_a 12,5 (R_{zmax} 63)
- geometrical and positional tolerance 0,04/100 concave, spherical not permissible.

Fixing screws

The screw connection should be designed in accordance with VDI 2230; friction coefficient $\mu = 0,12$ (90%).

High-grade steel screws of grade 80 or better can be used for fixing. The maximum tightening torques applicable to this screw grade must not be exceeded even if screws of a higher grade are used.

In principle, we recommend that the screw connection should only be tightened to 70% of the values stated in the standard.

For fixing, hexagonal socket head screws with a coarse pitch full thread in accordance with DIN EN ISO 4017 should be used. The screws should be combined as a minimum with a washer in accordance with DIN EN ISO 7089 or DIN EN ISO 7090.

Screws and accessories for location are not included in the delivery. All screws and other accessories used for location should be in a high-grade steel version.

White plastic housing units for the food industry

Mounting and dismounting

The detailed guidelines on the mounting and dismounting of housing units and radial insert ball bearings must be observed.

- Radial Insert Ball Bearings and Housing Units, SG 1,
➤ <https://www.schaeffler.de/std/1F80>
- Mounting of Radial Insert Ball Bearings with Spherical Outer Ring in Bearing Housings, MON 108,
➤ <https://www.schaeffler.de/std/1FA1>

Mounting Handbook

Rolling bearings are well-proven precision machine elements for the design of economical and reliable bearing arrangements, which offer high operational security. In order that these products can function correctly and achieve the envisaged operating life without detrimental effect, they must be handled with care.

Further information

The Schaeffler Mounting Handbook, MH 1, gives comprehensive information about the correct storage, mounting, dismounting and maintenance of rotary rolling bearings. It also provides information which should be observed by the designer, in relation to the mounting, dismounting and maintenance of bearings, in the original design of the bearing position.

This book is available from Schaeffler on request:

- Mounting Handbook, MH 1,
➤ <https://www.schaeffler.de/std/1F86>

Accuracy

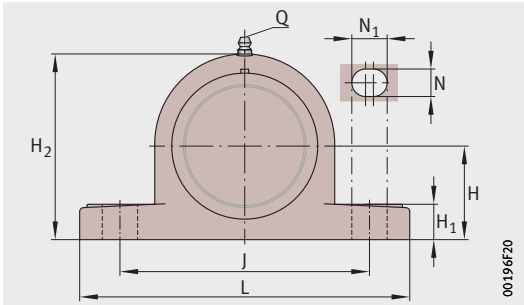
All information on the dimensions, tolerances and internal clearance of integral radial insert ball bearings can be found in the section Radial insert ball bearings for the food industry, see page 38.

Tolerances of plastic housings

The dimensional, geometrical and positional tolerances of plastic housings correspond to DIN 16742.

Plummer block housing units

FD design
White plastic housing
With long base
Radial insert ball bearing with grub screw or
eccentric locking collar

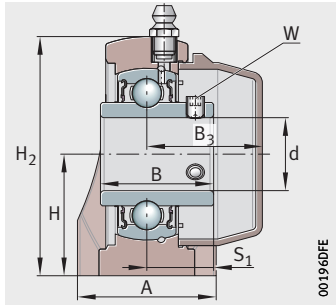


RASEY..TV-VA-FD, RASE..TV-VA-FD

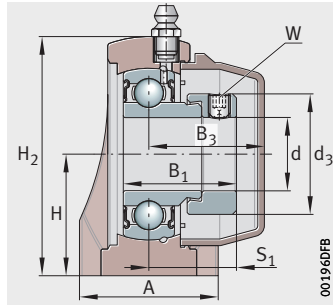
Dimension table · Dimensions in mm										
Designation			Mass	Dimensions						
Unit ¹⁾	Housing	Radial insert ball bearing		d	H	J	L	A	H ₁	H ₂
			m ≈ kg							
RASEY20-TV-VA-FD	ASE04-TV-WHT	GYE20-KRR-B-FA107-VA-FD	0,3	20	33,3	95	127	38	14	65,5
RASEY25-TV-VA-FD	ASE05-TV-WHT	GYE25-KRR-B-FA107-VA-FD	0,37	25	36,5	105	140	38	14	71
RASEY30-TV-VA-FD	ASE06-TV-WHT	GYE30-KRR-B-FA107-VA-FD	0,69	30	42,9	119	162	46	17,8	83
RASEY35-TV-VA-FD	ASE07-TV-WHT	GYE35-KRR-B-FA107-VA-FD	0,76	35	47,6	127	167	48	18	94
RASEY40-TV-VA-FD	ASE08-TV-WHT	GYE40-KRR-B-FA107-VA-FD	0,97	40	49,2	137	184	54	19,5	98

Dimension table · Dimensions in mm										
Designation			Mass	Dimensions						
Unit ¹⁾	Housing	Radial insert ball bearing		d	H	J	L	A	H ₁	H ₂
			m ≈ kg							
RASE20-TV-VA-FD	ASE04-TV-WHT	GE20-KRR-B-FA107-VA-FD	0,3	20	33,3	95	127	38	14,2	65,5
RASE25-TV-VA-FD	ASE05-TV-WHT	GE25-KRR-B-FA107-VA-FD	0,35	25	36,5	105	140	38	14,5	71
RASE30-TV-VA-FD	ASE06-TV-WHT	GE30-KRR-B-FA107-VA-FD	0,55	30	42,9	119	162	46	17,8	83
RASE35-TV-VA-FD	ASE07-TV-WHT	GE35-KRR-B-FA107-VA-FD	0,8	35	47,6	127	167	48	18	94
RASE40-TV-VA-FD	ASE08-TV-WHT	GE40-KRR-B-FA107-VA-FD	0,99	40	49,2	137	184	54	19,5	98

¹⁾ Available end caps, see page 52.



RASE...TV-VA-FD



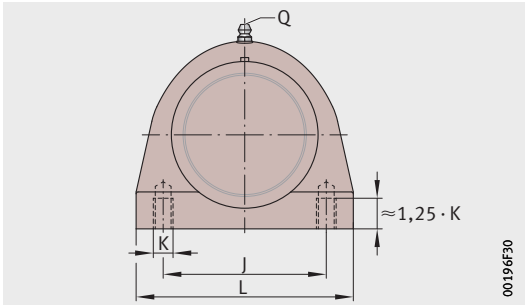
RASE...TV-VA-FD

						Width across flats W	Load carrying capacity				Factor f_0	
							Bearing			Housing		
							Basic load ratings		Fatigue limit load C_{ur} N			
N	N_1	B	B_3	S_1	Q	dyn. C_r N	stat. C_{0r} N			C_{0rG} N		
11	14	31	31,65	18,3	$1/4'' - 28 \text{ UNF}$	2,5	10 900	5 300	280	7 700	13,1	
11	14	34,1	34,05	19,8	$1/4'' - 28 \text{ UNF}$	2,5	11 900	6 300	335	10 000	13,8	
14	18	38,1	39,95	22,2	$1/4'' - 28 \text{ UNF}$	3	18 700	10 700	475	10 600	13,8	
14	18	42,9	44,85	25,4	$1/4'' - 28 \text{ UNF}$	3	22 000	12 300	655	10 800	13,8	
14	18	49,2	51,5	30,2	$1/4'' - 28 \text{ UNF}$	4	24 900	14 300	800	11 100	14	

							Width across flats W	Load carrying capacity				Factor f_0	
								Bearing			Housing C_{0rG} N		
								Basic load ratings		Fatigue limit load C_{ur} N			
								dyn. C_r N	stat. C_{0r} N				
N	N_1	B_1	B_3	S_1	Q	d_3 max.							
11	14	31	31,65	24,1	$1/4'' - 28 \text{ UNF}$	33,3	3	12 840	6 650	280	7 700	13,1	
11	14	31	34,05	23,5	$1/4'' - 28 \text{ UNF}$	38,1	3	14 020	7 880	335	10 000	13,8	
14	18	35,7	39,95	27,7	$1/4'' - 28 \text{ UNF}$	44,5	3	19 460	11 310	475	10 600	13,8	
14	18	38,9	44,85	30,4	$1/4'' - 28 \text{ UNF}$	55,6	3	25 670	15 300	655	10 800	13,8	
14	18	43,7	51,5	34,7	$1/4'' - 28 \text{ UNF}$	60,3	4	29 520	18 140	800	11 100	14	

Plummer block housing units

FD design
White plastic housing
With short base
Radial insert ball bearing with grub screw or
eccentric locking collar



RSHEY..-TV-VA-FD, RSHE..-TV-VA-FD

Dimension table · Dimensions in mm

Designation			Mass	Dimensions					
Unit ¹⁾	Housing	Radial insert ball bearing		d	H	J	L	A	H ₂
			m ≈ kg						
RSHEY20-TV-VA-FD	SHE04-TV-WHT	GYE20-KRR-B-FA107-VA-FD	0,27	20	33,3	50,8	72,8	34,5	66
RSHEY25-TV-VA-FD	SHE05-TV-WHT	GYE25-KRR-B-FA107-VA-FD	0,37	25	36,5	50,8	76,2	39,5	73,5
RSHEY30-TV-VA-FD	SHE06-TV-WHT	GYE30-KRR-B-FA107-VA	0,52	30	42,9	76,2	101	42,5	84
RSHEY35-TV-VA-FD	SHE07-TV-WHT	GYE35-KRR-B-FA107-VA-FD	0,74	35	47,6	82,6	110	47,5	95
RSHEY40-TV-VA-FD	SHE08-TV-WHT	GYE40-KRR-B-FA107-VA-FD	0,91	40	49,2	88,9	120	48	100,5

Dimension table · Dimensions in mm

Designation			Mass	Dimensions					
Unit ¹⁾	Housing	Radial insert ball bearing		d	H	J	L	A	H ₂
			m ≈ kg						
RSHE20-TV-VA-FD	SHE04-TV-WHT	GE20-KRR-B-FA107-VA-FD	0,28	20	33,3	50,8	72,8	34,5	66
RSHE25-TV-VA-FD	SHE05-TV-WHT	GE25-KRR-B-FA107-VA-FD	0,35	25	36,5	50,8	76,2	39,5	73,5
RSHE30-TV-VA-FD	SHE06-TV-WHT	GE30-KRR-B-FA107-VA-FD	0,52	30	42,9	76,2	101	42,5	84
RSHE35-TV-VA-FD	SHE07-TV-WHT	GE35-KRR-B-FA107-VA-FD	0,79	35	47,6	82,6	110	47,5	95
RSHE40-TV-VA-FD	SHE08-TV-WHT	GE40-KRR-B-FA107-VA-FD	0,93	40	49,2	88,9	120	48	100,5

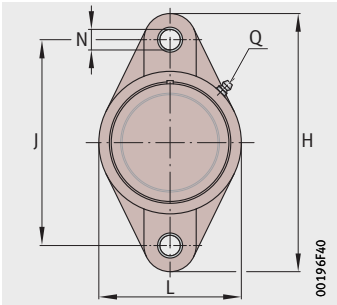
¹⁾ Available end caps, see page 52.



						Width across flats W	Load carrying capacity				Factor f ₀	
							Bearing			Housing		
							Basic load ratings		Fatigue limit load C _{ur} N	C _{0r G} N		
dyn. C _r N	stat. C _{0r} N											
B ₁	B ₃	K	S ₁	Q	d ₃ max.							
31	32,35	M8	24	1/4" – 28 UNF	33,3	3	12 840	6 650	280	6 900	13,1	
31	35,05	M10	23,5	1/4" – 28 UNF	38,1	3	14 020	7 880	335	7 000	13,8	
35,7	41,25	M10	27,7	1/4" – 28 UNF	44,5	3	19 460	11 310	475	6 500	13,8	
38,9	45,05	M10	30,4	1/4" – 28 UNF	55,6	3	25 670	15 300	655	8 000	13,8	
43,7	51,4	M12	34,7	1/4" – 28 UNF	60,3	4	29 520	18 140	800	9 100	14	

Two-bolt flanged housing units

FD design
White plastic housing
Narrow version
Radial insert ball bearing with grub screw or eccentric locking collar

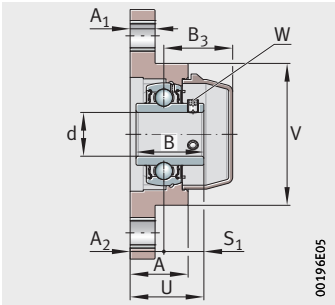


RCJTY...TV-VA-FD, RCJT...TV-VA-FD

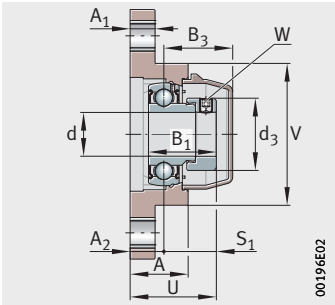
Dimension table · Dimensions in mm											
Designation			Mass	Dimensions							
Unit ¹⁾	Housing	Radial insert ball bearing		d	H	J	L	A	A ₁	A ₂	N
			m ≈ kg								
RCJTY20-TV-VA-FD	CJT04-TV-WHT	GYE20-KRR-B-FA107-VA-FD	0,25	20	114	90	64,8	26,5	11,4	15,4	11
RCJTY25-TV-VA-FD	CJT05-TV-WHT	GYE25-KRR-B-FA107-VA-FD	0,33	25	130	99	70	29,1	13,5	17	11
RCJTY30-TV-VA-FD	CJT06-TV-WHT	GYE30-KRR-B-FA107-VA-FD	0,45	30	148	148	80	30,5	13,3	19	11
RCJTY35-TV-VA-FD	CJT07-TV-WHT	GYE35-KRR-B-FA107-VA-FD	0,65	35	163	130	90	32,8	16,1	18	13
RCJTY40-TV-VA-FD	CJT08-TV-WHT	GYE40-KRR-B-FA107-VA-FD	0,86	40	175	144	100	37,5	20	21,5	14

Dimension table · Dimensions in mm											
Designation			Mass	Dimensions							
Unit ^{1) 2)}	Housing	Radial insert ball bearing		d	H	J	L	A	A ₁	A ₂	N
			m ≈ kg								
RCJT20-TV-VA-FD	CJT04-TV-WHT	GE20-KRR-B-FA107-VA-FD	0,26	20	114	90	64,8	26,5	11,4	15,4	11
RCJT25-TV-VA-FD	CJT05-TV-WHT	GE25-KRR-B-FA107-VA-FD	0,32	25	130	99	70	29,1	13,5	17	11
RCJT30-TV-VA-FD	CJT06-TV-WHT	GE30-KRR-B-FA107-VA-FD	0,45	30	148	117	80	30,5	13,3	19	11
RCJT35-TV-VA-FD	CJT07-TV-WHT	GE35-KRR-B-FA107-VA-FD	0,69	35	163	130	90	32,8	16,1	18	13
RCJT40-TV-VA-FD	CJT08-TV-WHT	GE40-KRR-B-FA107-VA-FD	0,88	40	175	144	100	37,5	20	21,5	14

1) Available end caps, see page 52.
2) Available Back Seal components, see page 53.



RCJTY..-TV-VA-FD



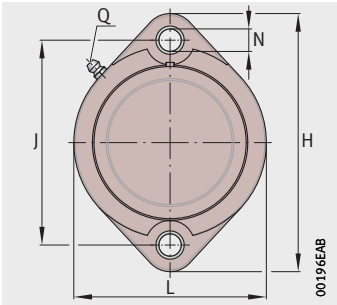
RCJT..-TV-VA-FD

							Width across flats W	Load carrying capacity				Factor <
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							Width across flats W	Load carrying capacity				Factor
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Two-bolt flanged housing units

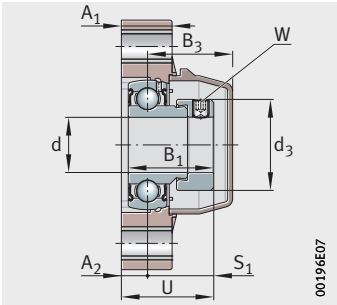
FD design
White plastic housing
Wide version
Radial insert ball bearing with eccentric locking collar



GLCTE...-TV-VA-FD

Dimension table · Dimensions in mm									
Designation			Mass	Dimensions					
Unit ¹⁾	Housing	Radial insert ball bearing	m ≈ kg	d	H	J	L	A ₁	A ₂
GLCTE20-TV-VA-FD	GLCTE04-TV-WHT	GE20-KRR-B-FA107-VA-FD	0,25	20	90,5	71,4	66,5	18,4	9,5
GLCTE25-TV-VA-FD	GLCTE05-TV-WHT	GE25-KRR-B-FA107-VA-FD	0,29	25	97	76,2	91	18,4	9,9
GLCTE30-TV-VA-FD	GLCTE06-TV-WHT	GE30-KRR-B-FA107-VA-FD	0,4	30	112	90,5	84	20,5	11,4
GLCTE35-TV-VA-FD	GLCTE07-TV-WHT	GE35-KRR-B-FA107-VA-FD	0,66	35	126	100	94	22,5	12,4
GLCTE40-TV-VA-FD	GLCTE08-TV-WHT	GE40-KRR-B-FA107-VA-FD	0,82	40	150	119	100	24	13,5

¹⁾ Available end caps, see page 52.

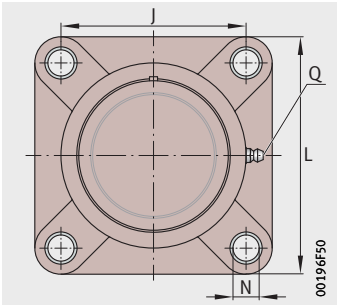


GLCTE...-TV-VA-FD

								Width across flats W	Load carrying capacity				Factor
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Four-bolt flanged housing units

FD design
White plastic housing
Radial insert ball bearing with grub screw or eccentric locking collar

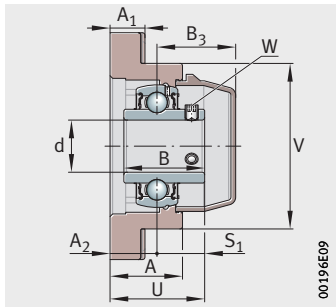


RCJY...TV-VA-FD, RCJ...TV-VA-FD

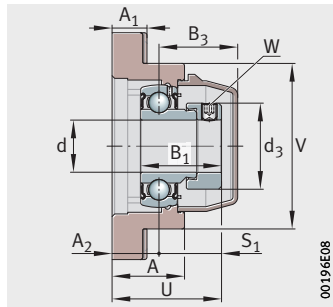
Dimension table · Dimensions in mm										
Designation			Mass	Dimensions						
Unit ¹⁾	Housing	Radial insert ball bearing		d	J	L	A	A ₁	A ₂	N
			m ≈ kg							
RCJY20-TV-VA-FD	CJ04-TV-WHT	GYE20-KRR-B-FA107-VA-FD	0,31	20	63,5	87	27,8	13,4	18	11
RCJY25-TV-VA-FD	CJ05-TV-WHT	GYE25-KRR-B-FA107-VA-FD	0,39	25	70	94,5	27,9	14,3	17	11
RCJY30-TV-VA-FD	CJ06-TV-WHT	GYE30-KRR-B-FA107-VA-FD	0,52	30	83	107	31,5	14,3	19,2	11
RCJY35-TV-VA-FD	CJ07-TV-WHT	GYE35-KRR-B-FA107-VA-FD	0,73	35	92	117	34,8	15,5	21,5	13
RCJY40-TV-VA-FD	CJ08-TV-WHT	GYE40-KRR-B-FA107-VA-FD	0,97	40	102	130	37,5	17	23	14

Dimension table · Dimensions in mm										
Designation			Mass	Dimensions						
Unit ^{1) 2)}	Housing	Radial insert ball bearing		d	J	L	A	A ₁	A ₂	N
			m ≈ kg							
RCJ20-TV-VA-FD	CJ04-TV-WHT	GE20-KRR-B-FA107-VA-FD	0,31	20	63,5	87	27,8	13,4	18	11
RCJ25-TV-VA-FD	CJ05-TV-WHT	GE25-KRR-B-FA107-VA-FD	0,38	25	70	94,5	27,9	14,3	17	11
RCJ30-TV-VA-FD	CJ06-TV-WHT	GE30-KRR-B-FA107-VA-FD	0,52	30	83	107	31,5	14,3	19,2	11
RCJ35-TV-VA-FD	CJ07-TV-WHT	GE35-KRR-B-FA107-VA-FD	0,77	35	92	117	34,8	15,5	21,5	13
RCJ40-TV-VA-FD	CJ08-TV-WHT	GE40-KRR-B-FA107-VA-FD	0,99	40	102	130	37,5	17	23	14

1) Available end caps, see page 52.
2) Available Back Seal components, see page 53.



RCJY..-TV-VA-FD



RCJ..-TV-VA-FD

						Width across flats W	Load carrying capacity				Factor f_0	
							Bearing			Housing C_{0rG} N		
							Basic load ratings		Fatigue limit load C_{ur} N			
							dyn. C_r N	stat. C_{0r} N				
B	B_3	S_1	U	V	Q							
31	30,2	18,3	36,3	63,5	$1/4'' - 28 \text{ UNF}$	2,5	10 900	5 300	280	10 200	13,1	
34,1	33,1	19,8	36,8	70	$1/4'' - 28 \text{ UNF}$	2,5	13 400	7 500	335	12 100	13,8	
38,1	39,5	22,2	41,4	80	$1/4'' - 28 \text{ UNF}$	3	16 700	9 000	475	17 700	13,8	
42,9	42,1	25,4	46,9	90	$1/4'' - 28 \text{ UNF}$	3	22 000	12 300	655	18 500	13,8	
49,2	48	30,2	53,2	99	$1/4'' - 28 \text{ UNF}$	4	24 900	14 300	800	19 200	14	

							Width across flats W	Load carrying capacity				Factor f_0	
								Bearing			Housing C_{0rG} N		
								Basic load ratings		Fatigue limit load C_{ur} N			
								dyn. C_r N	stat. C_{0r} N				
B_1	B_3	S_1	U	V	Q	d_3 max.							
31	30,2	24	42	63,5	$1/4'' - 28 \text{ UNF}$	33,3	3	12 840	6 650	280	10 200	13,1	
31	33,1	23,5	40,5	70	$1/4'' - 28 \text{ UNF}$	38,1	3	14 020	7 880	335	12 100	13,8	
35,7	39,5	27,7	46,9	80	$1/4'' - 28 \text{ UNF}$	44,5	3	19 460	11 310	475	17 700	13,8	
38,9	42,1	30,4	51,9	90	$1/4'' - 28 \text{ UNF}$	55,6	3	25 670	15 300	655	18 500	13,8	
43,7	48	34,7	57,7	99	$1/4'' - 28 \text{ UNF}$	60,3	4	28 500	17 200	800	19 200	14	

Notes

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