

**SKF**

# Reliable bearing solutions for a corrosive environment



## **Stainless steel deep groove ball bearings**

Longer service life in a severe environment

Open or sealed

Available from stock



# Stainless steel bearings for increased reliability



*Stainless steel deep groove ball bearings*

## The bearings

SKF stainless steel deep groove ball bearings, like their standard steel counterparts, have deep raceway grooves without filling slots and a close osculation between raceways and balls. For this reason they can carry axial loads acting in both directions in addition to radial loads, even at high speeds. They have the same running properties as standard steel bearings, but with slightly reduced load carrying capacity. SKF stainless steel deep groove ball bearings are available in several types and sizes, and they are identified as stainless steel by the designation prefix W. (See “Range and types”).

## The benefits

The main advantage of SKF stainless steel bearings is their resistance to corrosion in moisture and other corrosive environments. They are also highly versatile since the sealed versions can be supplied with different grease fillings. This allows the choice of the right grease for each application, for example, the use of food compatible, non-toxic bearing grease for the food industry. SKF bearings are temperature-stabilized at 150 °C but can be used up to 300 °C depending on the lubricant used.

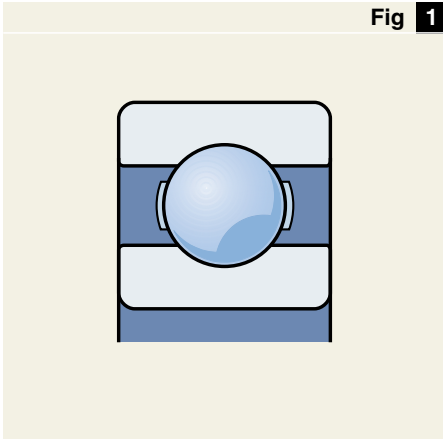
## The applications

SKF stainless steel deep groove ball bearings are recommended for use wherever resistance to corrosion is a factor. Typical applications include:

- Food and beverage industry
- Chemical equipment
- Medical equipment
- Optical instruments
- Printing machines
- Nuclear technology
- Engines and Pumps
- Paper mills
- Off-shore
- Marine industry

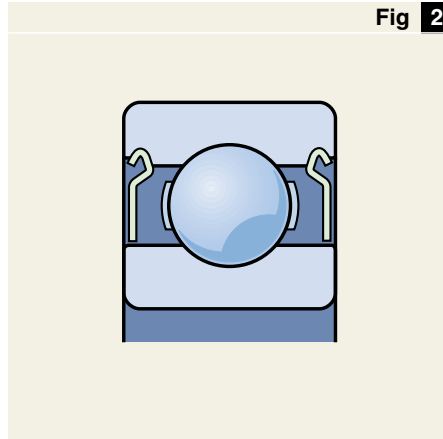


Fig 1



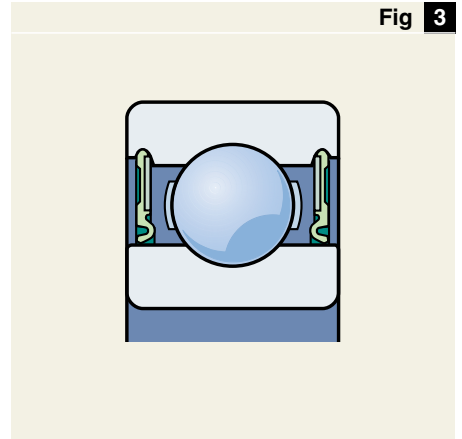
Open bearing

Fig 2



Bearing with Z shields, suffix 2Z

Fig 3



Bearing with RS1 seals, suffix 2RS1

## Range and types

SKF deep groove stainless steel ball bearings were formerly available up to a maximum bore diameter of 10 mm. The line has been expanded with the series W 60, W 62 and W 63, which now offers new possibilities to the design engineer with requirements for diameters up to 50 mm.

SKF stainless steel bearings are available in the following types:

- open (→ fig 1),
- with non-contact Z shields (→ fig 2),
- with rubbing RS1 seals (→ fig 3),

and on request also with

- RS2 seals of fluoroelastomer rubber and/or
- low-friction RZ seals.

In addition, SKF stainless steel deep groove ball bearings can also be supplied

- for shaft-diameters of 0,6 to 9 mm
- for inch shaft-diameters of 0,04 to 0,75 inch
- with flanged outer ring
- as thin section bearing.

Information about these can be obtained from SKF Application Engineering or the “SKF Interactive Engineering Catalogue” under [www.skf.com](http://www.skf.com), or in the CD-ROM 4702.

## General bearing data

### Dimensions

The boundary dimensions of the deep groove ball bearings conform to ISO 15-1998.

### Tolerances

The metric deep groove ball bearings of stainless steel are manufactured with Normal tolerances corresponding to ISO 492-1994.

### Internal clearance

SKF stainless steel single row deep groove ball bearings are manufactured with Normal radial internal clearance to ISO 5753-1991 as standard, but

bearings with greater or smaller clearance can be supplied on request.

The values for the internal clearance are given in table 1 and are valid for bearings before they are mounted and under zero measuring load.

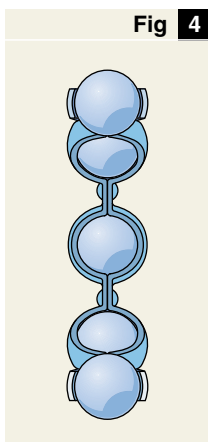
### Material

The bearing rings and balls are produced from stainless steel X 65 Cr 13 (material number 1.4037).

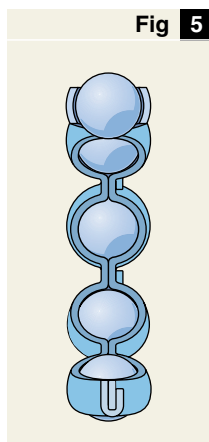
### Radial internal clearance

Table 1

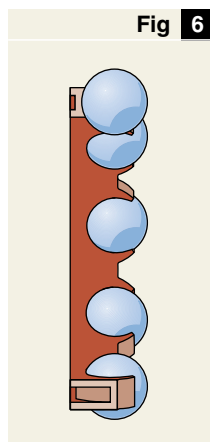
Bore d	incl.	Radial internal clearance									
		C2		Normal		C3		C4		C5	
mm		min	max	min	max	min	max	min	max	min	max
–	10	0	7	2	13	8	23	14	29	20	37
10	18	0	9	3	18	11	25	18	33	25	45
18	24	0	10	5	20	13	28	20	36	28	48
24	30	1	11	5	20	13	28	23	41	30	53
30	40	1	11	6	20	15	33	28	46	40	64
40	50	1	11	6	23	18	36	30	51	45	73



Riveted cage



Ribbon-type cage



Polyamide cage

### Cages

The bearings are equipped with a riveted cage of pressed stainless steel as standard (→ fig 4). In addition on request they can also be supplied with the following types of cage:

- Riveted brass sheet cage (→ fig 4)
- Ribbon-type cage of steel sheet (→ fig 5)
- Ribbon-type cage of brass sheet (→ fig 5)
- Injection moulded polyamide 6.6 cage (→ fig 6).

### Greases for sealed bearings

### Seals

The bearings of 2Z execution are equipped with pressed shields of stainless steel (X5 CrNi 18 10 / SUS 304, material number 1.4301). They form a sealing gap with the land of the inner ring shoulder (→ fig 2), and allow high temperatures and speeds. Bearings fitted with shields are primarily intended for applications where the inner ring rotates. If the outer ring rotates, there is a risk of the grease leaking from the bearing at elevated speeds.

The bearings of 2RS1 type are equipped with rubbing seals, which are run with their seal lip on the land of the inner ring shoulder (→ fig 3). The seals are fitted with their external

edge in the recesses at the outer ring and seal tightly, but without deforming it. The RS1 seals are made of an oil and wear resistant nitrile-butadiene-rubber (NBR), have a sheet metal reinforcement and can be used at operating temperatures between -35 and +120 °C. They protect the bearing reliably against moisture and dirt and prevent the leaking of grease.

### Speed ratings

The permissible rotational speeds depend on the type of the built-in sealing and the lubrication. The values are given in the product table.

### Grease filling

Bearings with shields or seals as standard are filled for life with a lithium grease which shows good rust-inhibiting properties and is suitable for temperatures between -25 and +120 °C. These bearings are maintenance free. The grease quantity fills about 25 to 35 % of the free space in the bearing. Details of this grease will be found in table 2.

Other lubricating greases can be supplied on request, for example, for other temperature ranges or, for use in the food industry (→ table 2).

### Lubrication of open bearings

For the open bearings, SKF recommends lubrication with one of the approved and application-proven dependable SKF bearing greases:

- Grease LGMT 2: all-purpose bearing grease for a wide range of industrial and automotive applications.
- Grease LGLT 2: low temperature bearing grease for high speed and low noise applications.
- Grease LGLC 2: low temperature bearing grease for high speed and medium load applications.
- Grease LGHQ 3: high temperature and low noise bearing grease.
- Grease LGFP 2: food processing bearing grease USDA H1.

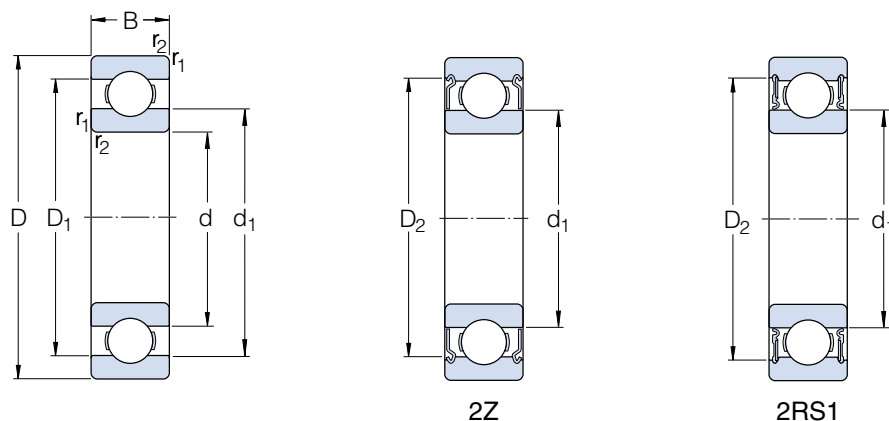
Table 2

Characteristics	Standard lubricating grease	Special grease, food-compatible	Special grease for high temperature
<b>Thickener</b>	Lithium soap	Aluminium complex soap	PTFE
<b>Base oil</b>	Mineral oil	Poly alpha olefin	Fluorinated oil
<b>Operating temperature, °C</b> (continuous operation)	-20 to +120	-25 to +120	-35 to +260
<b>Kinematic viscosity of base oil, mm<sup>2</sup>/s</b> at 40 °C	189	150	400
at 100 °C	15,6	15,5	35
<b>Dropping point, °C</b>	180	290	-
<b>Consistency class</b> (according to NLGI)	2	2	2

0  
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# Stainless steel deep groove ball bearings

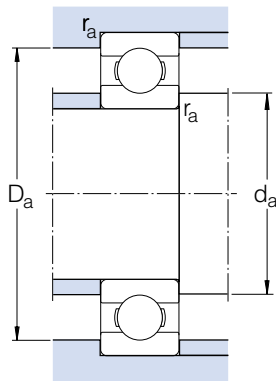
d 10 – 50 mm



Boundary dimensions			Basic load ratings		Calculation factors		Mass	Designations		
d	D	B	C	C <sub>0</sub>	k <sub>r</sub> <sup>1)</sup>	f <sub>0</sub> <sup>2)</sup>				
mm			N		–		kg	–		
10	26	8	3 900	1 900	25	12	0,019	W 6000	W 6000-2Z	W 6000-2RS1
	30	9	4 230	2 280	25	13	0,032	W 6200	W 6200-2Z	W 6200-2RS1
	35	11	6 760	3 250	30	11	0,053	W 6300	W 6300-2Z	W 6300-2RS1
12	28	8	4 230	2 280	25	13	0,022	W 6001	W 6001-2Z	W 6001-2RS1
	32	10	5 720	2 900	25	12	0,037	W 6201	W 6201-2Z	W 6201-2RS1
	37	12	8 190	4 050	30	11	0,060	W 6301	W 6301-2Z	W 6301-2RS1
15	32	9	4 680	2 750	25	14	0,030	W 6002	W 6002-2Z	W 6002-2RS1
	35	11	6 370	3 600	25	13	0,045	W 6202	W 6202-2Z	W 6202-2RS1
	42	13	9 560	5 200	30	12	0,085	W 6302	W 6302-2Z	W 6302-2RS1
17	35	10	5 070	3 150	25	14	0,039	W 6003	W 6003-2Z	W 6003-2RS1
	40	12	8 060	4 650	25	13	0,065	W 6203	W 6203-2Z	W 6203-2RS1
	47	14	11 400	6 300	30	12	0,12	W 6303	W 6303-2Z	W 6303-2RS1
20	42	12	7 930	4 900	25	14	0,069	W 6004	W 6004-2Z	W 6004-2RS1
	47	14	10 800	6 400	25	13	0,11	W 6204	W 6204-2Z	W 6204-2RS1
	52	15	13 500	7 650	30	12	0,14	W 6304	W 6304-2Z	W 6304-2RS1
25	47	12	8 520	5 700	25	15	0,080	W 6005	W 6005-2Z	W 6005-2RS1
	52	15	11 900	7 650	25	14	0,13	W 6205	W 6205-2Z	W 6205-2RS1
	62	17	17 200	10 800	30	13	0,23	W 6305	W 6305-2Z	W 6305-2RS1
30	55	13	11 100	8 000	25	15	0,12	W 6006	W 6006-2Z	W 6006-2RS1
	62	16	16 300	10 800	25	14	0,20	W 6206	W 6206-2Z	W 6206-2RS1
	72	19	22 500	14 600	30	13	0,35	W 6306	W 6306-2Z	W 6306-2RS1
35	62	14	13 500	10 000	25	15	0,16	W 6007	W 6007-2Z	W 6007-2RS1
	72	17	21 600	14 600	25	14	0,29	W 6207	W 6207-2Z	W 6207-2RS1
	80	21	27 600	18 600	30	13	0,46	W 6307	W 6307-2Z	W 6307-2RS1
40	68	15	14 000	10 800	25	15	0,19	W 6008	W 6008-2Z	W 6008-2RS1
	80	18	24 700	17 300	25	14	0,37	W 6208	W 6208-2Z	W 6208-2RS1
45	75	16	17 800	14 600	25	15	0,25	W 6009	W 6009-2Z	W 6009-2RS1
	85	19	27 600	19 600	25	14	0,41	W 6209	W 6209-2Z	W 6209-2RS1
50	80	16	18 200	16 000	25	15	0,26	W 6010	W 6010-2Z	W 6010-2RS1
	90	20	29 600	22 400	25	14	0,46	W 6210	W 6210-2Z	W 6210-2RS1

<sup>1)</sup> Factor for calculating minimum load, for formula see SKF Interactive Engineering Catalogue.

<sup>2)</sup> Calculation factor to determine factor Y when calculating equivalent dynamic bearing load.



Dimensions					Abutment and fillet dimensions			Speed ratings		
d	d <sub>1</sub> ≈	D <sub>1</sub> ≈	D <sub>2</sub> ≈	r <sub>1,2</sub> min	d <sub>a</sub> min	D <sub>a</sub> max	r <sub>a</sub> max	Bearing open Lubrication oil	2Z grease	2RS1
mm					mm			r/min		
10	14,2	21	22,4	0,3	12	24	0,3	36 000	30 000	19 000
	17,6	23,8	25,3	0,6	14,2	25,8	0,6	30 000	24 000	17 000
	17,7	27,4	29,3	0,6	14,2	30,8	0,6	26 000	20 000	15 000
12	17,2	24,1	25,5	0,3	14	26	0,3	32 000	26 000	17 000
	18,5	26,2	28	0,6	16,2	27,8	0,6	28 000	22 000	15 000
	19,3	29,9	31,9	1	17,6	31,4	1	24 000	19 000	14 000
15	20,2	27	28,7	0,3	17	30	0,3	28 000	22 000	14 000
	21,7	29,5	31,4	0,6	19,2	30,8	0,6	24 000	19 000	13 000
	24,5	34,9	36,8	1	20,8	36,2	1	20 000	17 000	12 000
17	23,5	30,1	31,9	0,3	19	33	0,3	24 000	19 000	13 000
	24,9	33,6	35,8	0,6	21,2	35,8	0,6	20 000	17 000	12 000
	27,5	38,9	41,1	1	22,8	41,2	1	19 000	16 000	11 000
20	27,6	35,7	38,7	0,6	23,2	38,8	0,6	22 000	17 000	11 000
	29,5	39,5	40,9	1	25,2	41,8	1	18 000	15 000	10 000
	30	41,7	45,4	1,1	27	45	1,1	16 000	13 000	9 500
25	31,7	40,2	42,7	0,6	28,2	43,8	0,6	18 000	15 000	9 500
	34	44,2	45,7	1	30,6	46,4	1	15 000	12 000	8 500
	38,1	51	53,2	1,1	32	55	1,1	14 000	11 000	7 500
30	38	47,3	49,9	1	34,6	50,4	1	15 000	12 000	8 000
	40,7	52,8	55,1	1	35,6	56,4	1	13 000	10 000	7 500
	44,9	59,3	62,4	1,1	37	65	1,1	11 000	9 000	6 300
35	44	54,3	57,1	1	39,6	57,4	1	13 000	10 000	7 000
	47,6	61,6	64,9	1,1	42	65	1,1	11 000	9 000	6 300
	50,5	66,7	71,6	1,5	44	71	1,5	10 000	8 500	5 600
40	49,2	59,5	62,5	1	44,6	63,4	1	12 000	9 500	6 000
	52,9	67,2	70,8	1,1	47	73	1,1	10 000	8 500	5 600
45	54,5	65,8	69	1	50,8	69,2	1	10 000	8 500	5 600
	56,6	71,8	74,5	1,1	52	78	1,1	9 000	7 500	5 000
50	60	71	74,6	1	54,6	75,4	1	9 000	7 500	5 000
	63,5	78,7	81,4	1,1	57	83	1,1	8 500	7 000	4 800



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