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Sealed SKF single row angular contact ball bearings

Robust, cost-effective and interchangeable

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Sealed SKF single row angular contact

Sealed SKF single row angular contact ball bearings have an attractive combination of design features such as low friction seals and the same load carrying capacity as open variants – features that enable new design solutions for many demanding applications.

Reduced need for maintenance

Sealed SKF single row angular contact ball bearings are ready-to-use units that are filled at the factory with the proper amount of high quality grease, under clean conditions.

The cleanliness in a bearing is essential for long service life. Protection is particularly important during installation. By using sealed single row angular contact ball bearings instead of open bearings, solid contaminants are less likely to enter the bearing.

Less frictional heat extends grease life

Non-contact SKF seals, which are standard on all sealed SKF single row angular contact ball bearings, generate less friction and frictional heat than contact seals or external lip seals. Lower operating temperatures influence grease life positive.

Reduced cost of ownership

Sealed SKF single row angular contact ball bearings are well suited for bearing arrangements where, due to limited space or for cost reasons, external seals are not practical. Their favourable design characteristics save space axially, enabling more compact machine designs.

Environmentally friendly

When compared to open bearings, sealed SKF single row angular contact ball bearings can significantly reduce grease consumption. These bearings do not have a relubrication feature, so all costs associated with relubrication including the costs to purchase and dispose of used grease are eliminated. More importantly, these bearings can reduce the environmental impact that a machine will have over course of its life cycle.

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ball bearings provide distinct benefits

Features of sealed SKF single row angular contact ball bearings

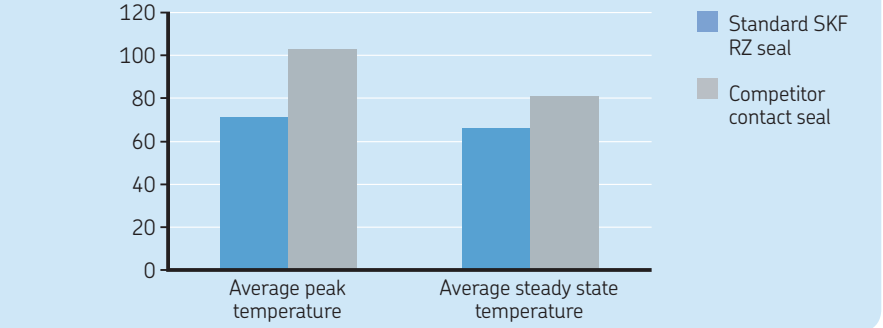
Sealed SKF single row angular contact ball bearings are manufactured the same way as open bearings, to provide the same quality and service life you have come to expect from SKF. What makes Sealed SKF single row angular contact ball bearings stand above the competition is SKF's unique seal design.

Sealed SKF single row angular contact ball bearings are fitted with two non-contact seals as standard. These seals (→ **fig. 1**, **page 4**) are made of NBR and reinforced with a sheet steel insert for higher mechanical stability.

There is an extremely narrow gap between the seal lip and its counterface on the inner ring, but due to the special seal lip design, grease ejection is minimized.

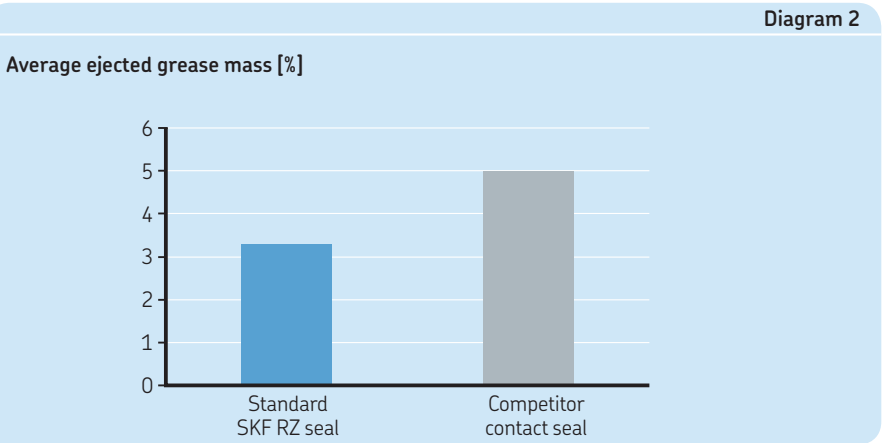
Another advantage of this seal design is that there is no friction between the seal and its counterface on the inner ring. This reduces frictional heat (→ **diagram 1**), which extends the service life of the lubricant and does not affect the speed at which these bearings can operate.

Diagram 1

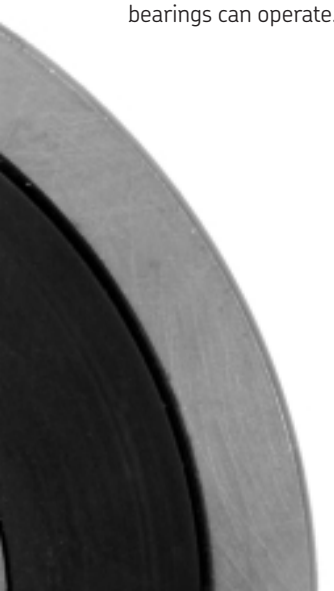


The temperature difference between standard SKF bearings with non-contact seals and standard competitor bearings with contact seals

Diagram 2



Standard SKF bearings with non-contact seals were tested against standard competitor bearings with contact seals on vertical shafts



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Temperature measurements taken on the outer rings showed that peak temperatures for standard sealed SKF single row angular contact ball bearings were more than 30% lower than competitor single row angular contact ball bearings with contact seals and that steady state temperatures were nearly 20% lower.

The design of the seal lip makes these bearings suitable for vertical shaft applications (→ **diagram 2**, **page 3**).

The mass of ejected grease is lower at sealed SKF single row angular contact ball bearings with a non-contact seal.

Sealed SKF single row angular contact ball bearings with a non-contact seal on both sides are identified by the designation suffix 2RZ.

In case of severe contamination or sealing against liquids is required, a low friction contacting seal solution can be proposed. Please contact SKF.

Temperature range for RZ seals

The permissible operating temperature range for RZ seals is –40 to +100 °C (*–40 to +212 °F*). Temperatures up to 120 °C (*248 °F*) can be tolerated for brief periods.

Grease service life

Reducing the heat generated by a bearing has a significant impact on grease service life. As a rule of thumb, reducing the operating temperature by 15 °C doubles the service life of the grease. However, other factors that increase or decrease service life must be taken into consideration and include load, speed and misalignment. Please contact SKF application engineering to confirm the expected grease service life.

Fig. 1

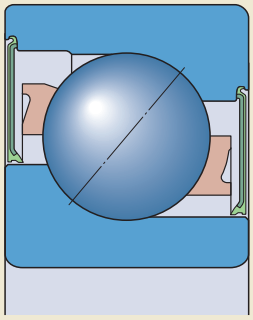

Table 1

Technical specifications of SKF GXN grease for sealed single row angular contact ball bearings

Grease	Temperature range [°C]	Thickener	Base oil type	NLGI consistency class	Base oil viscosity [mm²/s] at 40 °C *(105 °F)*	at 100 °C *(210 °F)*
GXN[1)]	–50 0 50 100 150 200 250 °C 0 100 200 300 400 500 °F –50 50 150 250 350 450	Polyurea soap (di-urea)	Mineral oil	2–3	96	10,5

[1)] Standard grease – suffix GXN is not written in the bearing designation

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Product data

Seals

Bearings are fitted on both sides with a seal made of an oil and wear-resistant NBR that is reinforced with a sheet steel insert.

Cages

Bearings are fitted with an injection moulded, ball centred cage made of a glass fibre reinforced polyamide.

Dimensions and tolerances

Sealed SKF single row angular contact ball bearings are dimensionally interchangeable with same size SKF open bearings and are manufactured with the same tolerances.

Load carrying capacity

Sealed SKF single row angular contact ball bearings have the same load carrying capacity and speed ratings as open SKF single row angular contact ball bearings, see **table 2**.

Clearance and preload

Standard sealed SKF single row angular contact ball bearings are supplied as non-matchable bearings for single use. Universally matchable bearings with three different clearance and preload classes are available on request.

Lubricant

Sealed SKF single row angular contact ball bearings are standard filled with a high performance polyurea grease (GXN). Non-standard greases and grease-fills are available on request.

For grease specifications see **table 1**.

Assortment

The range of standard sealed SKF single row angular contact ball bearings covers shaft diameters 15 to 55 mm for the 72 series and 12 to 50 mm for the 73 series.

Table 2

Basic design bearing					Speed ratings		
d	D	B	C	C_0	Reference speed bearing with RZ seal	Limiting speed bearing with RZ seal	
mm	mm	mm	kN	kN	r/min	r/min	–
15	35	11	8,32	4,4	24 000	24 000	7202 BE-2RZP
17	40	12	10,4	5,5	20 000	20 000	7203 BE-2RZP
20	47	14	13,3	7,65	18 000	18 000	7204 BE-2RZP
25	52	15	14,8	9,3	15 000	15 000	7205 BE-2RZP
30	62	16	22,5	14,3	13 000	13 000	7206 BE-2RZP
35	72	17	29,1	19	11 000	11 000	7207 BE-2RZP
40	80	18	37,7	26	11 000	11 000	7208 BE-2RZP
45	85	19	35,8	26	9 000	9 000	7209 BE-2RZP
50	90	20	37,7	28,5	8 500	8 500	7210 BE-2RZP
55	100	21	46,2	36	7 500	7 500	7211 BE-2RZP
12	37	12	10,6	5	24 000	24 000	7301 BE-2RZP
15	42	13	13	6,7	20 000	20 000	7302 BE-2RZP
17	47	14	15,9	8,3	19 000	19 000	7303 BE-2RZP
20	52	15	17,4	9,5	16 000	16 000	7304 BE-2RZP
25	62	17	24,2	14	14 000	14 000	7305 BE-2RZP
30	72	19	32,5	19,3	12 000	12 000	7306 BE-2RZP
35	80	21	39	24,5	10 000	10 000	7307 BE-2RZP
40	90	23	46,2	30,5	9 000	9 000	7308 BE-2RZP
45	100	25	55,9	37,5	8 000	8 000	7309 BE-2RZP
50	110	27	68,9	47,5	7 500	7 500	7310 BE-2RZP

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Application recommendations

Sealed SKF single row angular contact ball bearings can be used in a variety of grease lubricated applications where today single row angular contact ball bearings and external seals are used. In cases where angular contact ball bearings are lubricated with oil, sealed variants can provide a cost-effective additional protection against contamination.

Typical examples

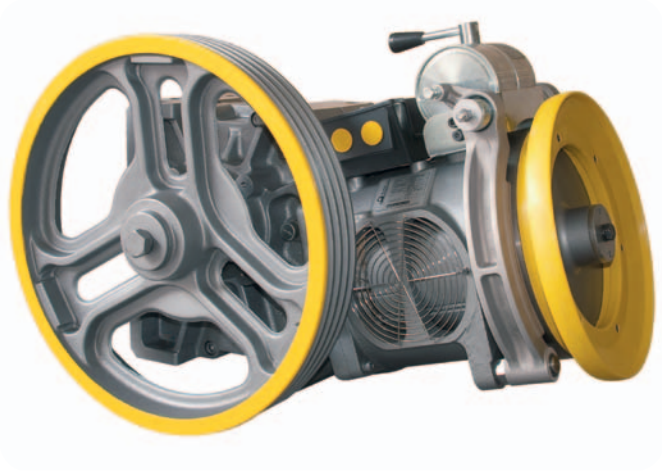
- Fluid machinery:
  - Pumps
  - Scroll compressors
- Material handling:
  - Elevators
- Gearboxes
- Electric motors

Typical requirements

- Minimum maintenance
- Reduced cost of ownership
- High degree of reliability
- Environmentally friendly

Main advantages:

- Replaces external sealing solutions
- Eliminates the need to grind seal counterfaces for external seals
- Space saving compared to external seals
- Greased for life
- Protects against solid contaminants
- Reduced cost of ownership



Sicor elevator gearbox

Electric motor

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Application example: vertical shaft industrial pumps

For industrial pumps, reliability, long service life and energy efficiency are essential. To attain these performance requirements, leading pump manufacturers that used competitor single row angular contact ball bearings with contact seals in the past, turned to SKF and tested non-contact RZ seals with success. The switch to sealed SKF single row angular contact ball bearings made it possible to maintain a class A energy efficiency rating.

Sealed SKF single row angular contact ball bearings have been used successfully in vertical shaft applications. This was made possible by the design of the seals, combined with the grease used.

For additional information and support please contact the SKF application engineering service.

Grundfos industrial pump

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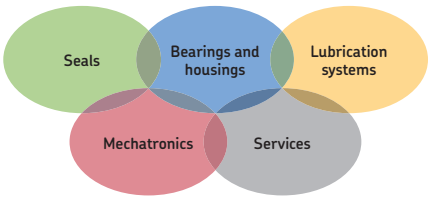

The Power of Knowledge Engineering
Combining products, people, and application-specific knowledge, SKF delivers innovative solutions to equipment manufacturers and production facilities in every major industry worldwide. Having expertise in multiple competence areas supports SKF Life Cycle Management, a proven approach to improving equipment reliability, optimizing operational and energy efficiency and reducing total cost of ownership.

These competence areas include bearings and units, seals, lubrication systems, mechatronics, and a wide range of services, from 3-D computer modelling to cloud-based condition monitoring and asset management services.

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PUB BU/P2 14040 EN · September 2013

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