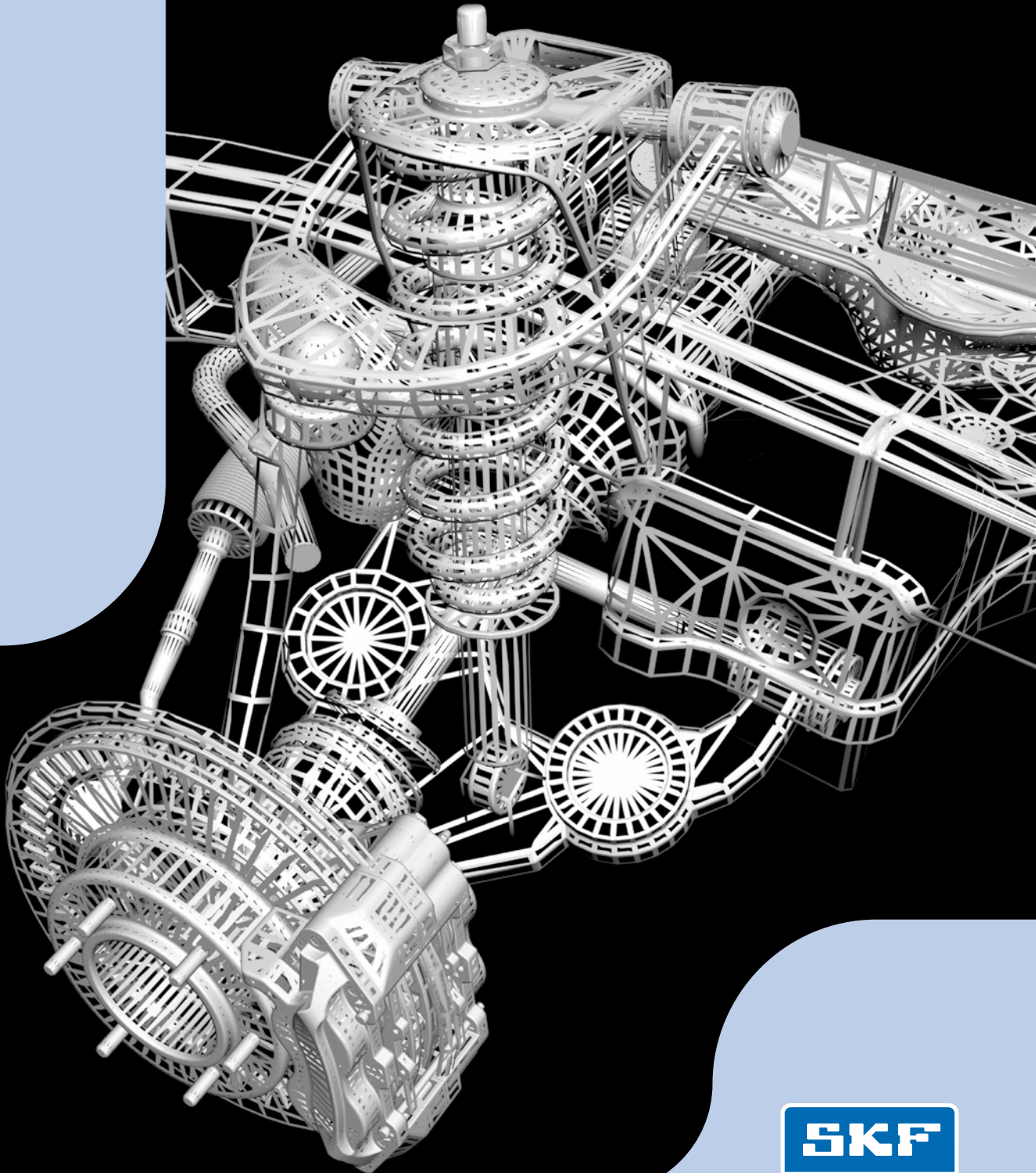


Suspension bearing solutions





The SKF brand now stands for more than ever before, and means more to you as a valued customer.

While SKF maintains its leadership as the hallmark of quality bearings throughout the world, new dimensions in technical advances, product support and services have evolved SKF into a truly solutions-oriented supplier, creating greater value for customers.

These solutions encompass ways to bring greater productivity to customers, not only with breakthrough application-specific products, but also through leading-edge design simulation tools and consultancy services, plant asset efficiency maintenance programmes, and the industry's most advanced supply management techniques.

The SKF brand still stands for the very best in rolling bearings, but it now stands for much more.

SKF – the knowledge engineering company

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Solutions for the suspension system

The SKF suspension products range

Suspension systems serve a dual purpose contributing to the car's handling as well as braking for good active safety and driving pleasure. This system is also keeping vehicle occupants comfortable and reasonably well isolated from road noise, bumps, and vibrations.

These goals are generally at odds, so suspensions tuning involves finding the right compromise. It is important for the suspension to keep the road wheel in contact with the road surface as much as possible, because all the forces acting on the vehicle do so through the contact patches of the tires. The suspension also protects the vehicle itself and any cargo or luggage from damage and wear. The designs of front and rear car suspension are different.

The suspension system is one of the fundamental elements which feature the character of a vehicle, in terms of different behaviours, such as road holding under several road conditions, full of twists and turns.

It also helps the overall driving and travelling comfort, much important especially for long term trips. SKF provides the car industry with a wide selection of solutions for suspension systems and is particularly active in top-mount and spring seat arrangements for MacPherson strut systems. Main car manufacturers around the world adopt the solutions developed by SKF in its Centres of Excellence and spread throughout the five continents.

SKF has been improving its huge application knowledge being able to provide its customers with robust solutions for any suspension application.

SKF's products have passed several reliability tests, such as severe corrosion tests, which demonstrate the highest product durability and reliability.



SKF suspension bearing evolution



Metal sealed unit



Metal or plastic spring seat



Composite bearing



Seals and metallic spring seat



Seals and over-moulded spring seat

Move toward integrated functions for a design capable of being:

Efficient: better use of material.

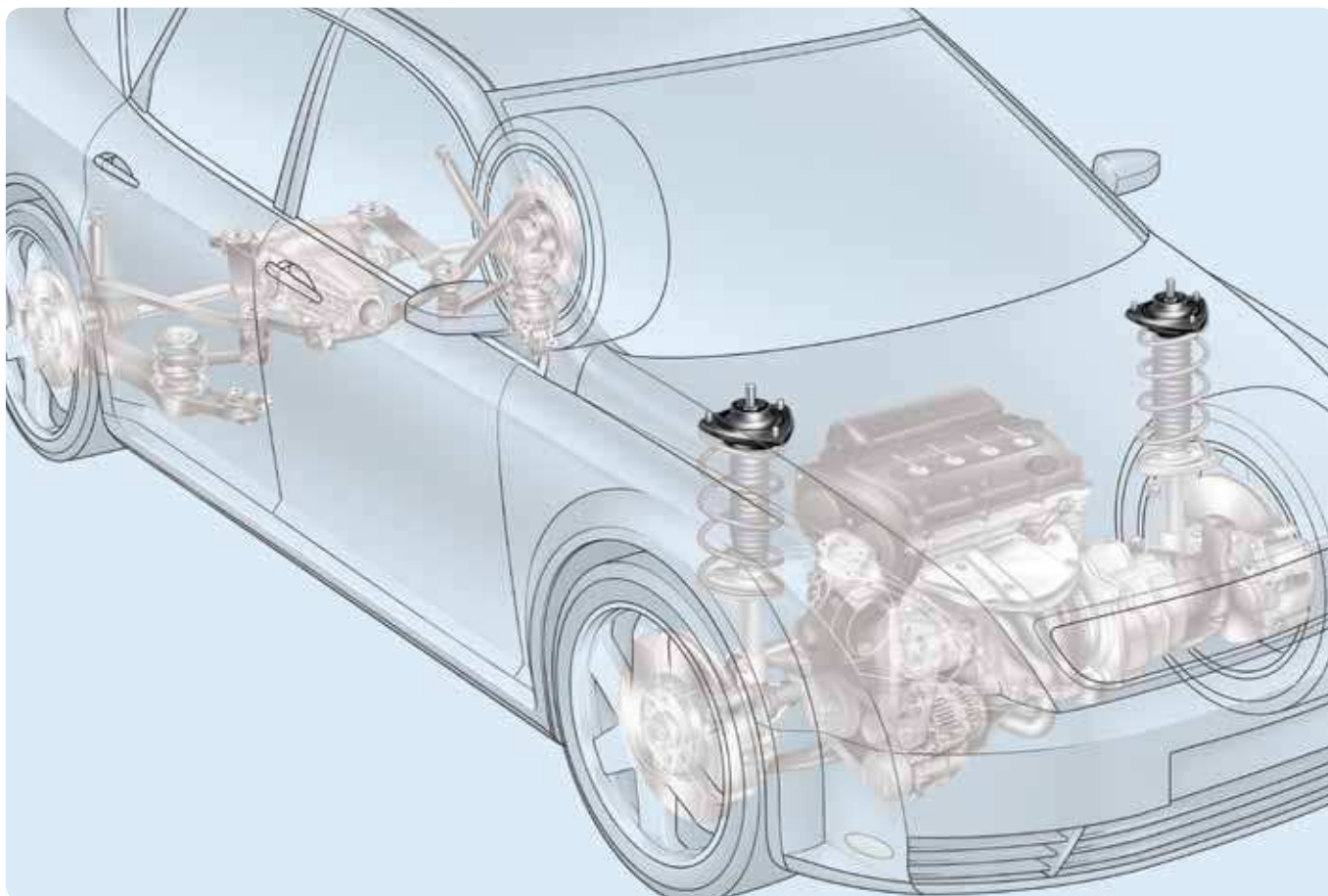
Compact: lower systems weight (no metal spring seat, plastic components, simpler top mount).

Value optimized: the right balance between cost and functions.

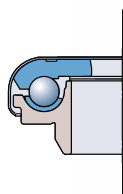
Flexible: to adapt easily to surrounding components.

Performance: seal design included inside SKF bearing.

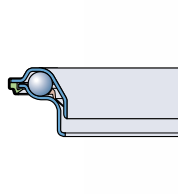
Suspension applications



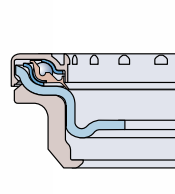
Some typical suspension bearings solutions



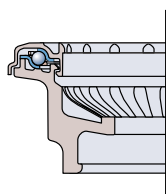
BDA-1020 C



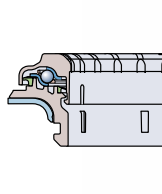
BDA-1029



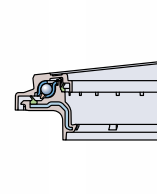
BDA-1032 BB



BDA-1059 AB



BDA-1133



BDA-1136 C

A vehicle suspension must:

- Carry the vehicle mass
- Ensure contact between the tire and the road
- Isolate the chassis from the disturbances created by the interface between tire and road
- Guide the wheel in its displacement

Four major suspension designs are used:

- MacPherson strut
- Double wishbone (also known as Short Long Arm or SLA)
- Multi-link
- Trailing or leading-arm

MacPherson Strut Bearing Unit (MSBU)

MacPherson Strut is, without any doubt, the most widely used front suspension. This solution offers a good compromise between cost and performance, that is why SKF choose to focus its attention on this particular design.

SKF suspension bearings allow:

- Coil spring or complete suspension to rotate during steering movements with low, constant friction torque; with oscillations of 45 degrees about the centre, straight ahead, position.
- Spring rotation during normal suspension movements and transmits suspension loads to chassis:
- Axial load: 3 to 8 kN
- Radial load: 5 to 15% of axial load
- Shock loads: up to 5 times axial load

Each bearing design has been developed for a specific application in terms of:

- Loads
- Geometry of housings
- Protection from environment

Two main types of top mount arrangement are known depending on loads path:

- Single path when spring and damper loads are taken by the same rubber
- Semi double or double when the spring load goes in a different rubber element than damper load.

Adapted to each on suspension type:

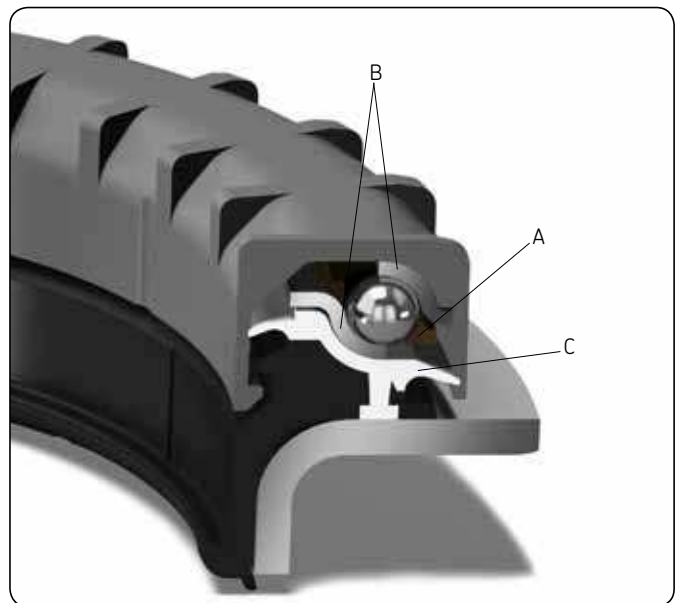
- Small thrust ball bearing
- Sheet metal type
- Composite type
- Integrated MSBU with spring seat, bearing, top mount and bump-stop
- Deep groove ball bearing in addition to standard system



The different components of this bearing show the most relevant functions: the overall ball system hold by the cages (A), the balls roll inside the metal tracks (B) with the main scope of:

- Checking the direction of travel of the vehicle even if under load conditions
- Absorbing the load carried by the wheels and moving it into the vehicle chassis

The seals (C) isolate the bearing from water, mud and any other external contamination. The seat, where the shock absorber spring stands on, is made up of a metallic insert which is integrated into the bearing seat of composite material.

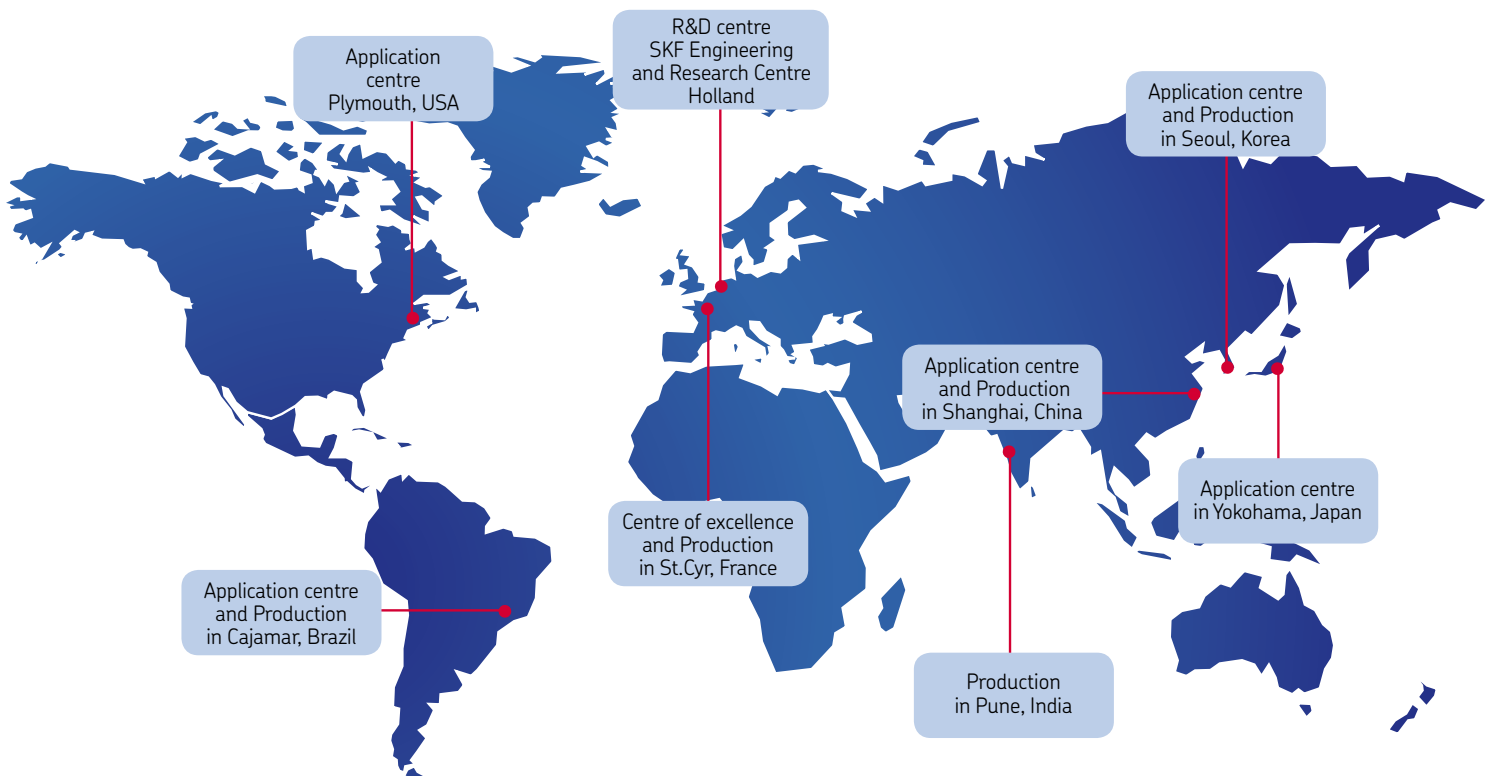


Global presence of SKF suspension bearings

SKF has manufacturing facilities located close to our customers' key markets. This enables you to grow while maintaining control of production costs.

Suspension is a relevant sector and SKF has got a truly global presence related to this strategic business areas. It has got 5 manufacturing Unit covering Europe (France, Germany and Italy), North America (USA) and Asia (China) as well as technical centres and research and development centres spread in different parts of the world.

SKF engineering support for suspension application are located worldwide with a centre of excellence in France as well as application centre and laboratories in USA, Brazil, China, Korea and Japan. Suspension engineering centres are also supported by main SKF Group research and development centres located in the Netherlands as well as technical centres in North America, China, India and Japan which provide support for laboratory investigation and testing facilities.



- Five manufacturing centres
- Five application and technical centres located in the main business area
- Advanced research and development centres in Europe
Centre of Excellence located in France (Engineering and Business Development team)

Suspension bearing range

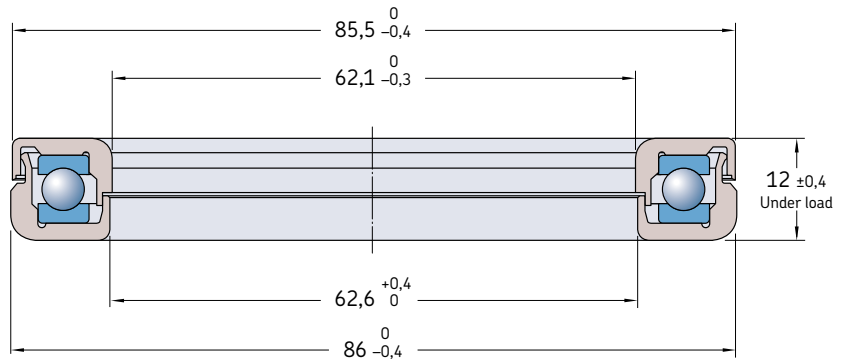
SKF suspension bearings range

Dimensions			Mass	Static capacity	Designation
Bore diameter d	Outside diameter D	Inner ring width B			
mm			g	N	–
12,2	45,3	19,3	73	32 000	BDA-1020 C
31,5	69,8	9,7	52,0	34 500	BDA-1050
35,0	107,0	36,0	381,0	44 000	BDA-1032 BB
35,0	107,0	44,0	200,4	39 000	BDA-1059 AB
35,0	120,0	46,9	460,3	86 500	BDA-1085 AA
35,0	129,0	36,8	487,3	86 500	BDA-1099 BD
35,0	109,0	44,0	201,0	39 000	BDA-1127 B
35,0	122,1	60,4	250,1	39 000	BDA-1129
35,0	109	44	200,2	33 000	BDA-1141 C
57,5	97,35	16,8	99,6	55 000	BDA-1144
58,0	97,3	16,8	95,8	55 000	BDA-1130 AA
61,5	103,6	31,8	127,6	33 500	BDA-1132 D
62,1	86	12	92,6	58 500	BD1B 351873 D
65,5	100,0	19,7	134,3	29 000	BDA-1029
68,0	112,0	25,0	208,5	39 000	BDA-1074
68,9	113,5	36,2	163,4	43 000	BDA-1106 AD
69,3	115,0	33,6	220,9	39 000	BDA-1133
70,0	128,0	41,5	384,7	50 000	BDA-1113 D
74,5	126,8	39	258	50 000	BDA-1136 C
79,5	111,5	14	83,3	39 000	BDAB 447071 CB
88,2	61,6	12,0	66,6	44 000	BDA-1027 A
98,0	140,4	29,6	350,8	58 500	BDA-1116 AC

BD1B 351873 D

Benefits

- Robust, compact, light plastic bearing for heavy vehicles
- Excellent load-carrying capacity
- Optimized and cost-effective sealing performance due to special labyrinth seal



SKF suspension bearings range overall dimensions

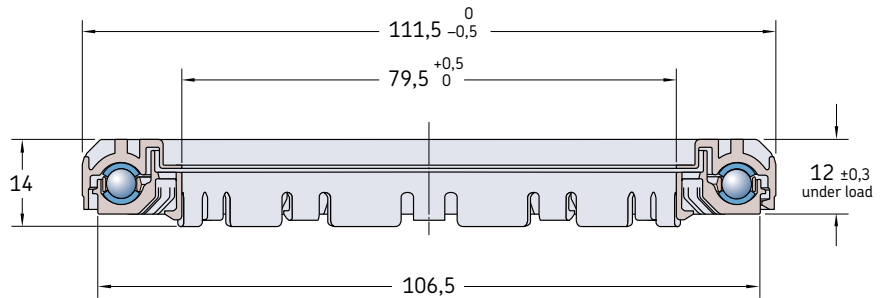
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
–	mm	mm	mm	g	N
BD1B 351873 D	62,1	86	12	92,6	58 500



BDAB 447071 CB

Benefits

- Robust, compact, light plastic bearing for heavy vehicles
- Excellent load-carrying capacity
- Optimized and cost-effective sealing performance due to special labyrinth seal



SKF suspension bearings range overall dimensions

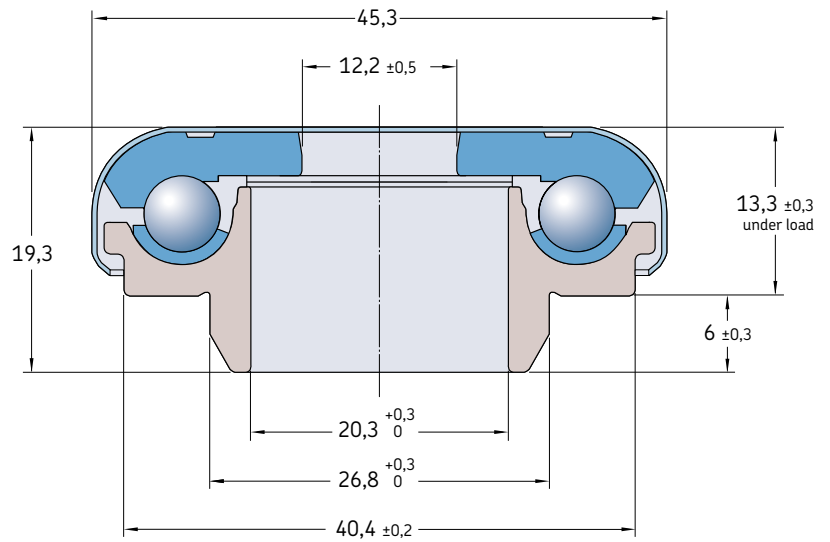
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
–	mm	mm	mm	g	N
BDAB 447071 CB	79,5	111,5	14	83,3	39 000



BDA-1020 C

Benefits

- Compact, light plastic bearing for small to medium-sized vehicles
- Metal raceways combined with plastic lower housing
- Excellent load-carrying capacity
- Optimized and cost-effective sealing performance due to special labyrinth seal



SKF suspension bearings range overall dimensions

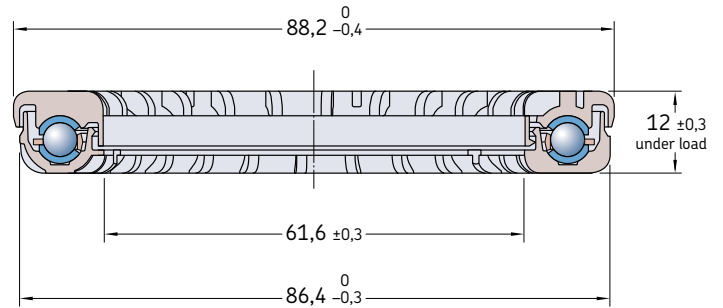
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
–	mm	mm	mm	g	N
BDA-1020 C	12,2	45,3	19,3	73	32 000



BDA-1027 A

Benefits

- Robust, compact, light plastic bearing for heavy vehicles
- Excellent load-carrying capacity
- Optimized and cost-effective sealing performance due to special labyrinth seal



SKF suspension bearings range overall dimensions

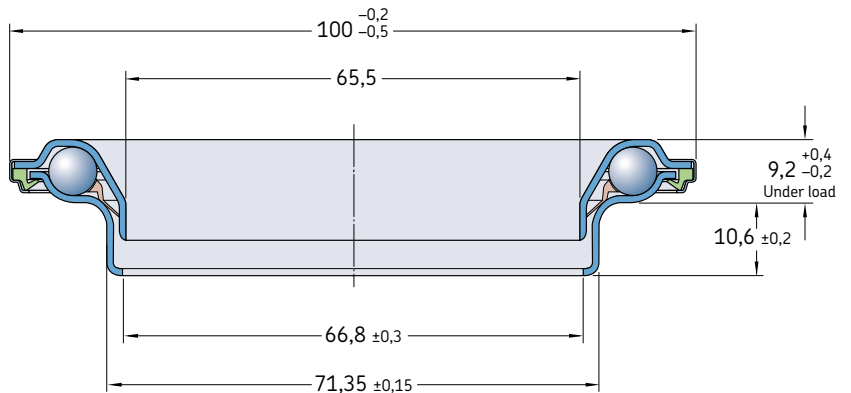
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
–	mm	mm	mm	g	N
BDA-1027 A	88,2	61,6	12,0	66,6	44 000



BDA-1029

Benefits

- Fully metal angular contact bearing for medium-sized vehicles.
- Excellent sealing performance thanks to contacting seal integrated in the ball set cage



SKF suspension bearings range overall dimensions

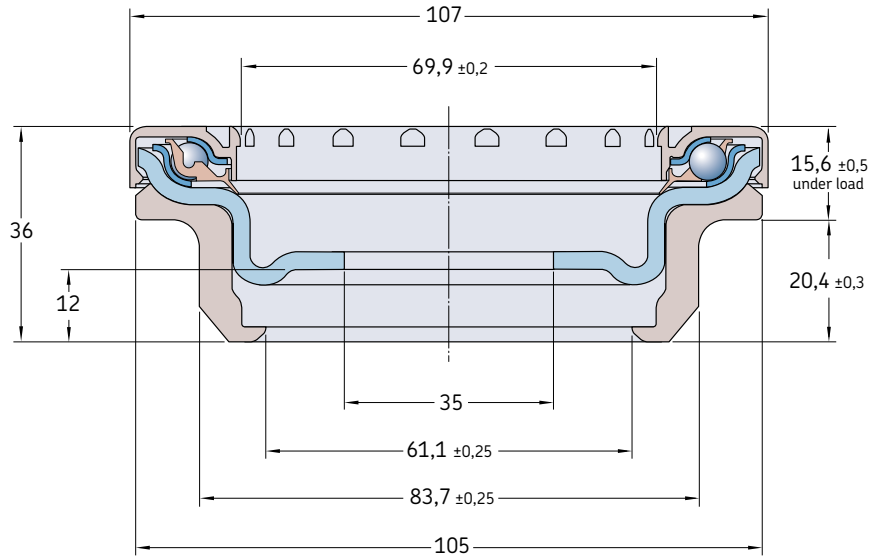
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
-	mm	mm	mm	g	N
BDA-1029	65,5	100,0	19,7	134,3	29 000



BDA-1032 BB

Benefits

- Composite bearing with integrated spring seat and top-mount interface
- Metal spring seat resistant to bump-stop loads
- Optimized and cost-effective sealing performance thanks to a combination of external labyrinth and internal contacting seals



SKF suspension bearings range overall dimensions

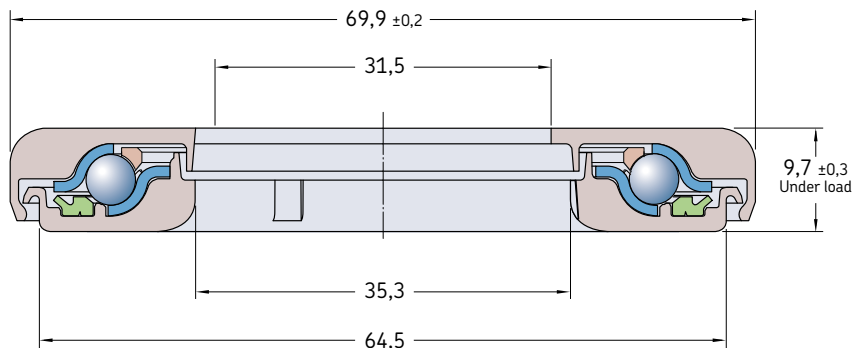
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
-	mm	mm	mm	g	N
BDA-1032 BB	35,0	107,0	36,0	381,0	44 000



BDA-1050

Benefits

- Very compact and light angular contact bearing for light, medium and heavy vehicles
- Optimized and cost-effective sealing performance thanks to a combination of external labyrinth and internal contacting seals



SKF suspension bearings range overall dimensions

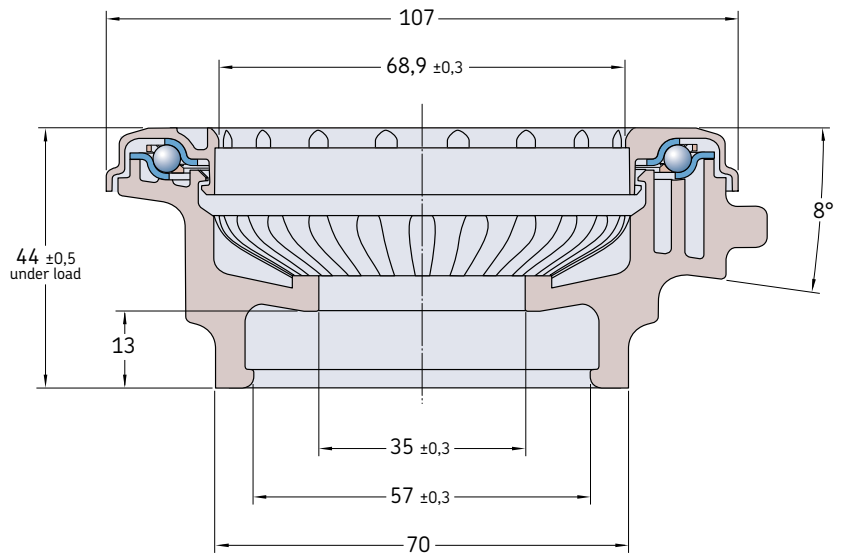
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
–	mm	mm	mm	g	N
BDA-1050	31,5	69,8	9,7	52,0	34 500



BDA-1059 AB

Benefits

- Composite bearing with integrated spring seat and top-mount interface
- Many functions incorporated (i.e. bump-stop loads, dust boot clipping, inclined spring seat, low weight, etc.)
- Optimized and cost-effective sealing performance due to special labyrinth seal



SKF suspension bearings range overall dimensions

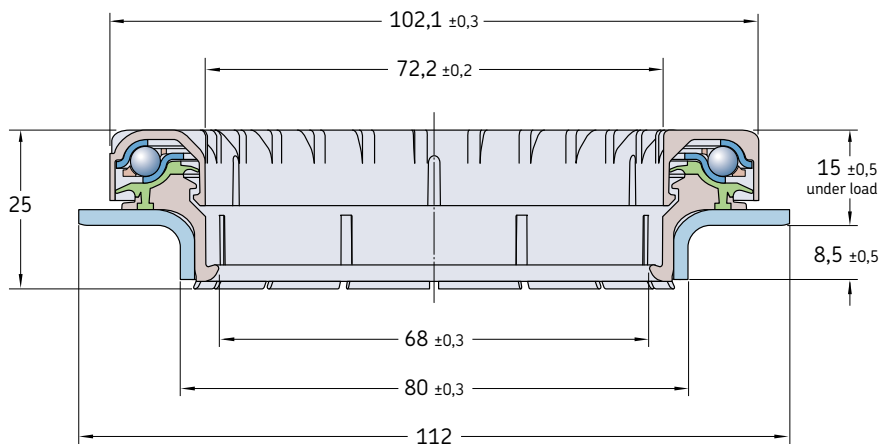
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
-	mm	mm	mm	g	N
BDA-1059 AB	35,0	107,0	44,0	200,4	39 000



BDA-1074

Benefits

- Composite bearing with integrated spring seat and top-mount interface for medium size vehicle.
- Metal spring seat to increase rigidity
- Optimized sealing performance thanks to a combination of two contacting seals



SKF suspension bearings range overall dimensions

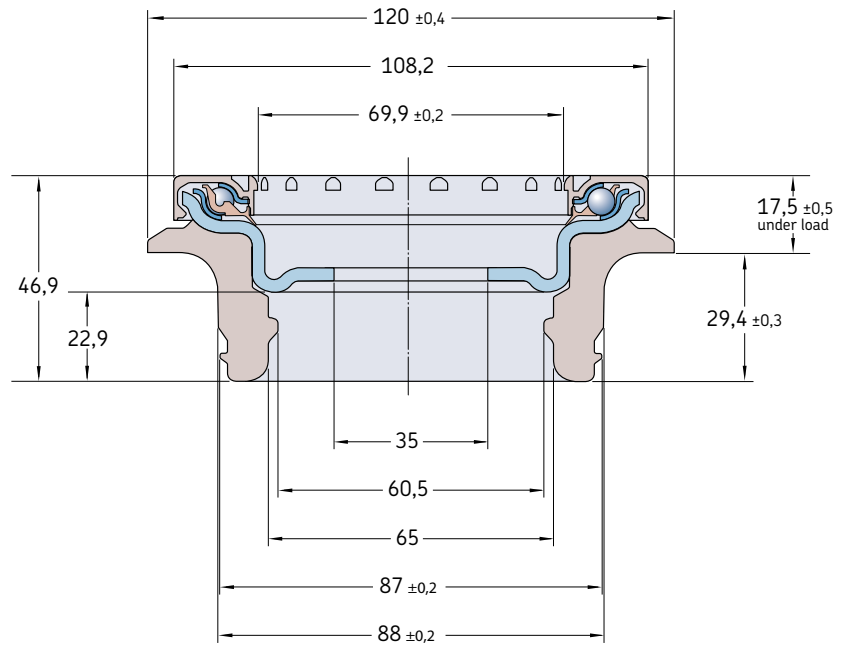
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
–	mm	mm	mm	g	N
BDA-1074	68,0	112,0	25,0	208,5	39 000



BDA-1085 AA

Benefits

- Composite bearing with integrated spring seat and top-mount interface
- Metal spring seat resistant to bump-stop loads
- Optimized and cost-effective sealing performance thanks to a combination of external labyrinth and internal contacting seals



SKF suspension bearings range overall dimensions

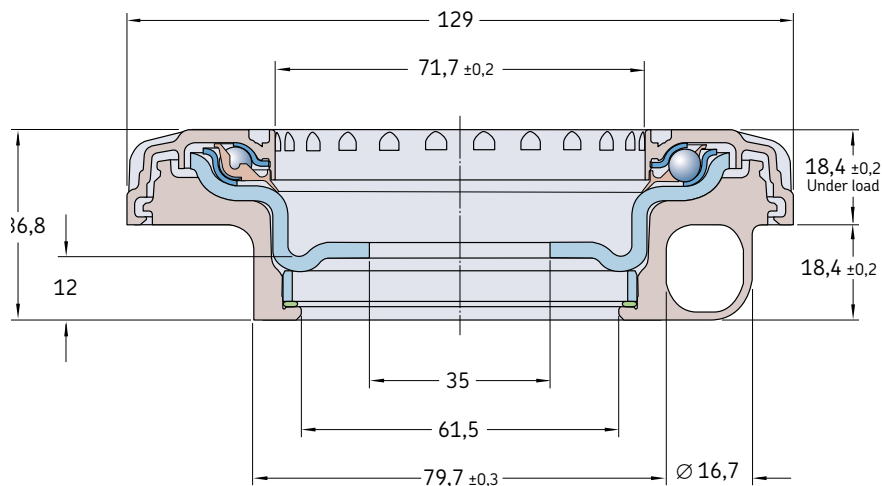
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
-	mm	mm	mm	g	N
BDA-1085 AA	35,0	120,0	46,9	460,3	86 500



BDA-1099 BD

Benefits

- Composite bearing with integrated spring seat and top-mount interface
- Metal spring seat resistant to bump-stop loads
- Optimized and cost-effective sealing performance thanks to a combination of external labyrinth and internal contacting seals
- Spring support function incorporated in the lower housing to protect against spring breakage



SKF suspension bearings range overall dimensions

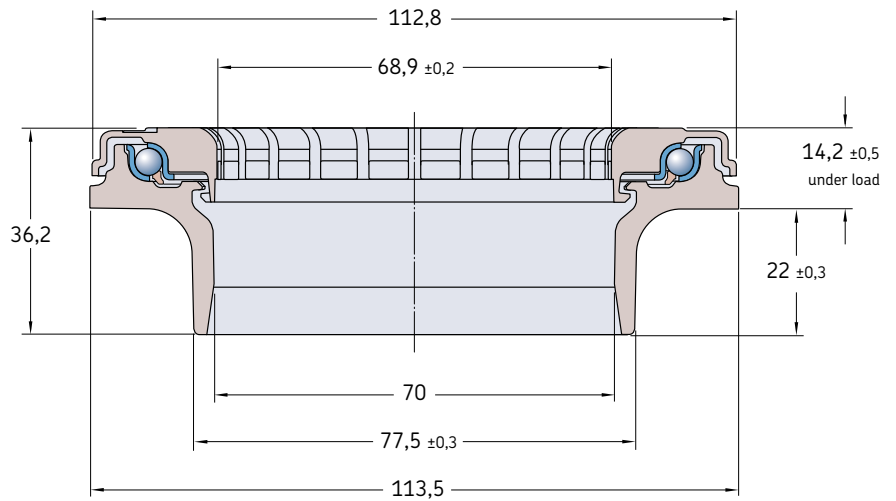
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
–	mm	mm	mm	g	N
BDA-1099 BD	35,0	129,0	36,8	487,3	86 500



BDA-1106 AD

Benefits

- Composite bearing with integrated spring seat and top-mount interface for heavy vehicle.
- Optimized and cost-effective sealing performance thanks to a labyrinth seal
- Latest SKF Six Sigma design of ball set, optimized for radial capacity, displacements and over-turning moments



SKF suspension bearings range overall dimensions

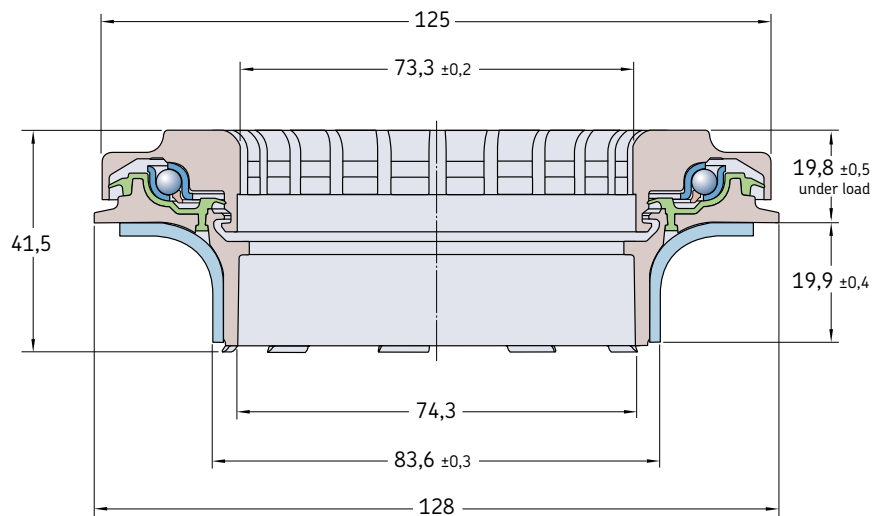
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
-	mm	mm	mm	g	N
BDA-1106 AD	68,9	113,5	36,2	163,4	43 000



BDA-1113 D

Benefits

- Composite bearing with integrated spring seat and top-mount interface for heavy vehicle.
- Metal spring seat to increase rigidity
- Optimized sealing performance thanks to two contacting seals
- Latest SKF Six Sigma design of ball set optimized for radial capacity, displacements and over-turning moments



SKF suspension bearings range overall dimensions

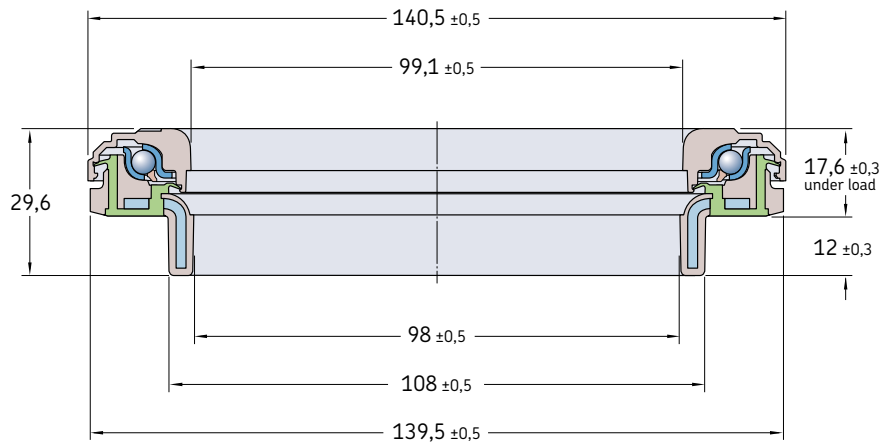
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
–	mm	mm	mm	g	N
BDA-1113 D	70,0	128,0	41,5	384,7	50 000



BDA-1116 AC

Benefits

- Composite bearing with integrated spring seat and top-mount interface for heavy vehicle.
- Over-moulded metal spring seat to increase rigidity
- Optimized sealing performance thanks to two contacting seals
- Latest SKF Six Sigma design of ball set optimized for radial capacity, displacements and over-turning moments



SKF suspension bearings range overall dimensions

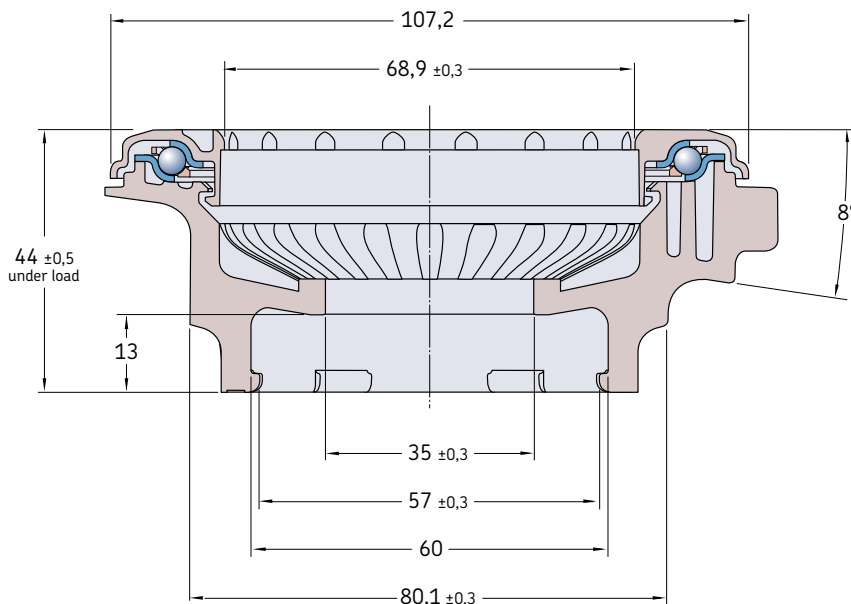
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
–	mm	mm	mm	g	N
BDA-1116 AC	98,0	140,4	29,6	350,8	58 500



BDA-1127 B

Benefits

- Composite bearing with integrated spring seat and top-mount interface
- Many functions incorporated (i.e. bump-stop loads, dust boot clipping, inclined spring seat, low weight, etc.)
- Optimized and cost-effective sealing performance due to special labyrinth seal



SKF suspension bearings range overall dimensions

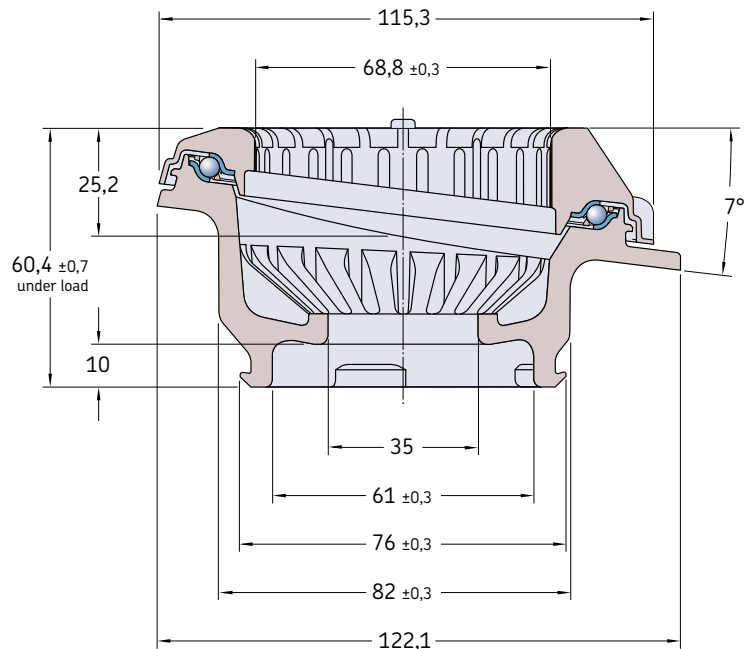
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
-	mm	mm	mm	g	N
BDA-1127 B	35,0	109,0	44,0	201,0	39 000



BDA-1129

Benefits

- Composite bearing with integrated spring seat and top-mount interface
- Inclined ball set to reduce bearing radial loads
- Many functions incorporated (i.e. bump-stop loads, dust boot clipping, inclined spring seat, low weight, etc.)
- Optimized and cost-effective sealing performance due to special labyrinth seal



SKF suspension bearings range overall dimensions

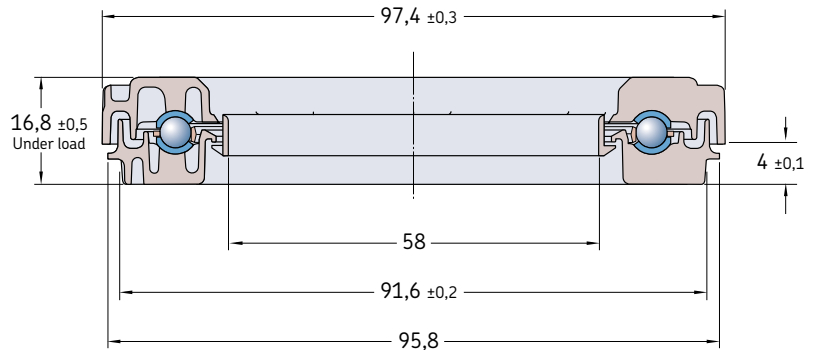
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
-	mm	mm	mm	g	N
BDA-1129	35,0	122,1	60,4	250,1	39 000



BDA-1130 AA

Benefits

- Robust, compact, light plastic bearing for medium size vehicles
- Optimized and cost-effective sealing performance due to a double labyrinth seal design
- Excellent load-carrying stability thanks to the axial ball set



SKF suspension bearings range overall dimensions

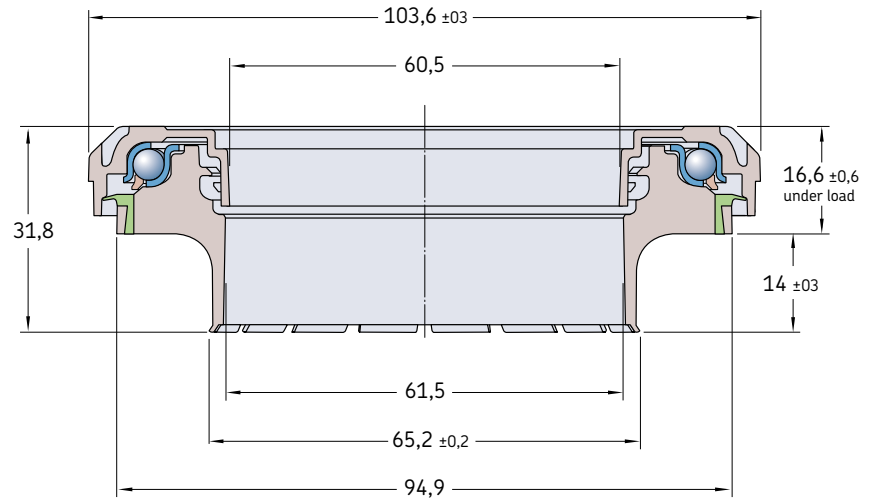
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
–	mm	mm	mm	g	N
BDA-1130 AA	58,0	97,3	16,8	95,8	55 000



BDA-1132 D

Benefits

- Composite bearing with integrated spring seat and top-mount interface
- Optimized sealing performance thanks to the external contacting seal
- Latest SKF Six Sigma design of ball set, optimized for radial capacity, displacements and over-turning moments



SKF suspension bearings range overall dimensions

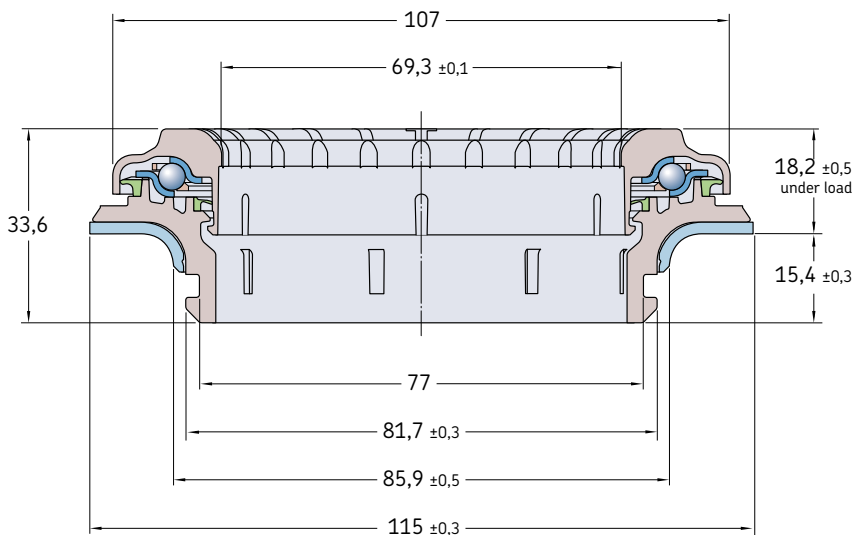
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
–	mm	mm	mm	g	N
BDA-1132 D	61,5	103,6	31,8	127,6	33 500



BDA-1133

Benefits

- Composite bearing with integrated spring seat and top-mount interface for medium size vehicle.
- Metal spring seat to increase rigidity
- Optimized sealing performance thanks to a combination of two contacting seals



SKF suspension bearings range overall dimensions

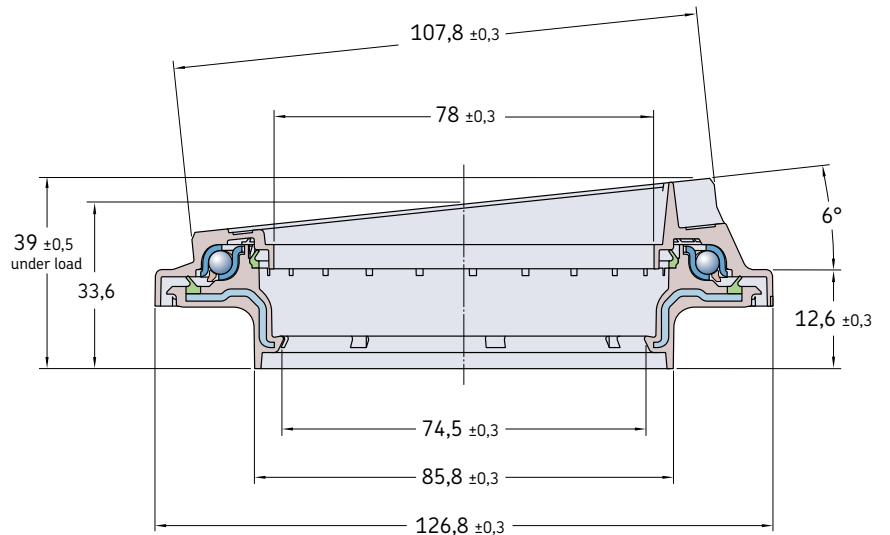
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
–	mm	mm	mm	g	N
BDA-1133	69,3	115,0	33,6	220,9	39 000



BDA-1136 C

Benefits

- Composite bearing with integrated spring seat and top-mount interface for heavy vehicle.
- Over-moulded metal spring seat to increase rigidity
- Optimized sealing performance thanks to two contacting seals
- Latest SKF Six Sigma design of ball set optimized for radial capacity, displacements and over-turning moments
- Inclined ball set to reduce bearing radial loads



SKF suspension bearings range overall dimensions

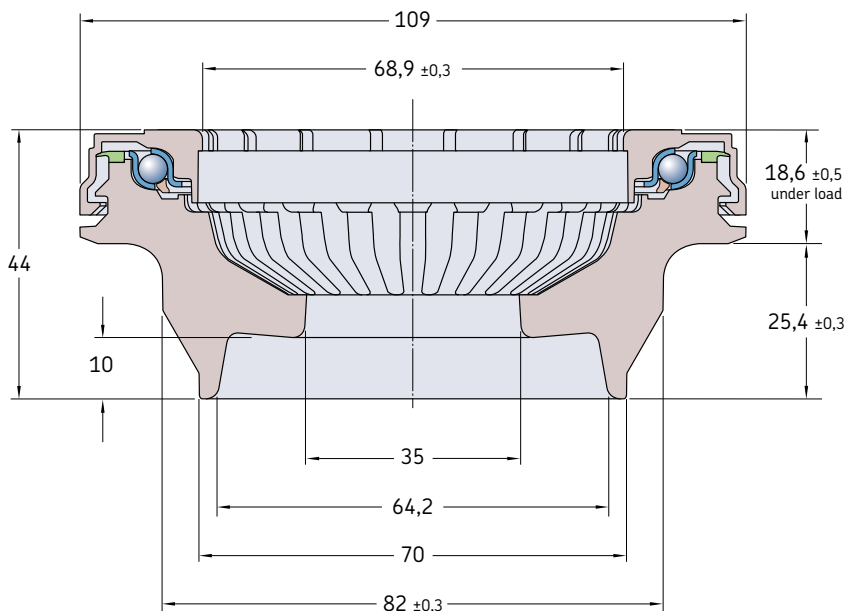
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
-	mm	mm	mm	g	N
BDA 1136 C	74,5	126,8	39	258	50 000



BDA-1141 C

Benefits

- Composite bearing with integrated spring seat and top-mount interface
- Many functions incorporated (i.e. bump-stop loads, dust boot clipping, inclined spring seat, low weight, etc.)
- Optimized sealing performance thanks to two contacting seals



SKF suspension bearings range overall dimensions

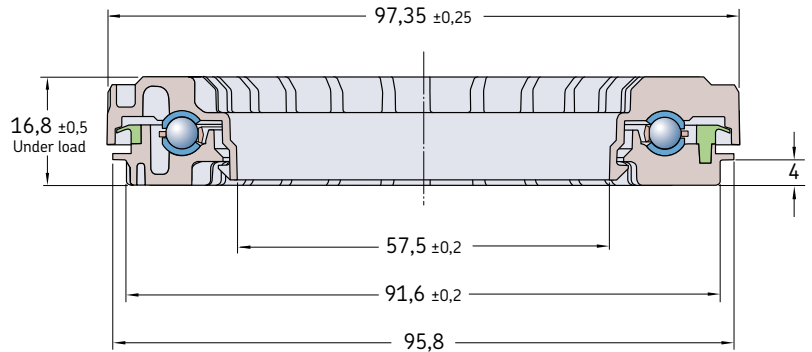
Designation	Bore diameter	External diameter	Height	Weight	Static capacity
–	mm	mm	mm	g	N
BDA-1141 C	35,0	109	44	200,2	33 000



BDA-1144

Benefits

- Robust, compact, light plastic bearing for medium size vehicles
- Optimized sealing performance thanks to the external contacting seal
- Excellent load-carrying stability thanks to the axial ball set



SKF suspension bearings range overall dimensions

Designation	Bore diameter	External diameter	Height	Weight	Static capacity
–	mm	mm	mm	g	N
BDA-1144	57,5	97,35	16,8	99,6	55 000



Application data list

Project information

- Platform, vehicle model, etc.
- Estimated volumes:
- Target dates and target price:

Application information

- Sketch of available space envelope (including interfacing dimensions of surrounding components)
- Bump-stop loads transmitted through bearing in Z axis? If so, what is the bump stop force (N)?
- Sealing requirements (severe environment?)

Dimensional data

	Radial loads	Radial loads	Axial loads	Distance between bearing axis and pierce point		Distance from spring seat plane to bearing plane
	F _x axis	F _y axis	F _z	d _x	d _y	d _z
	N	N	N	mm	mm	mm

Rebound position

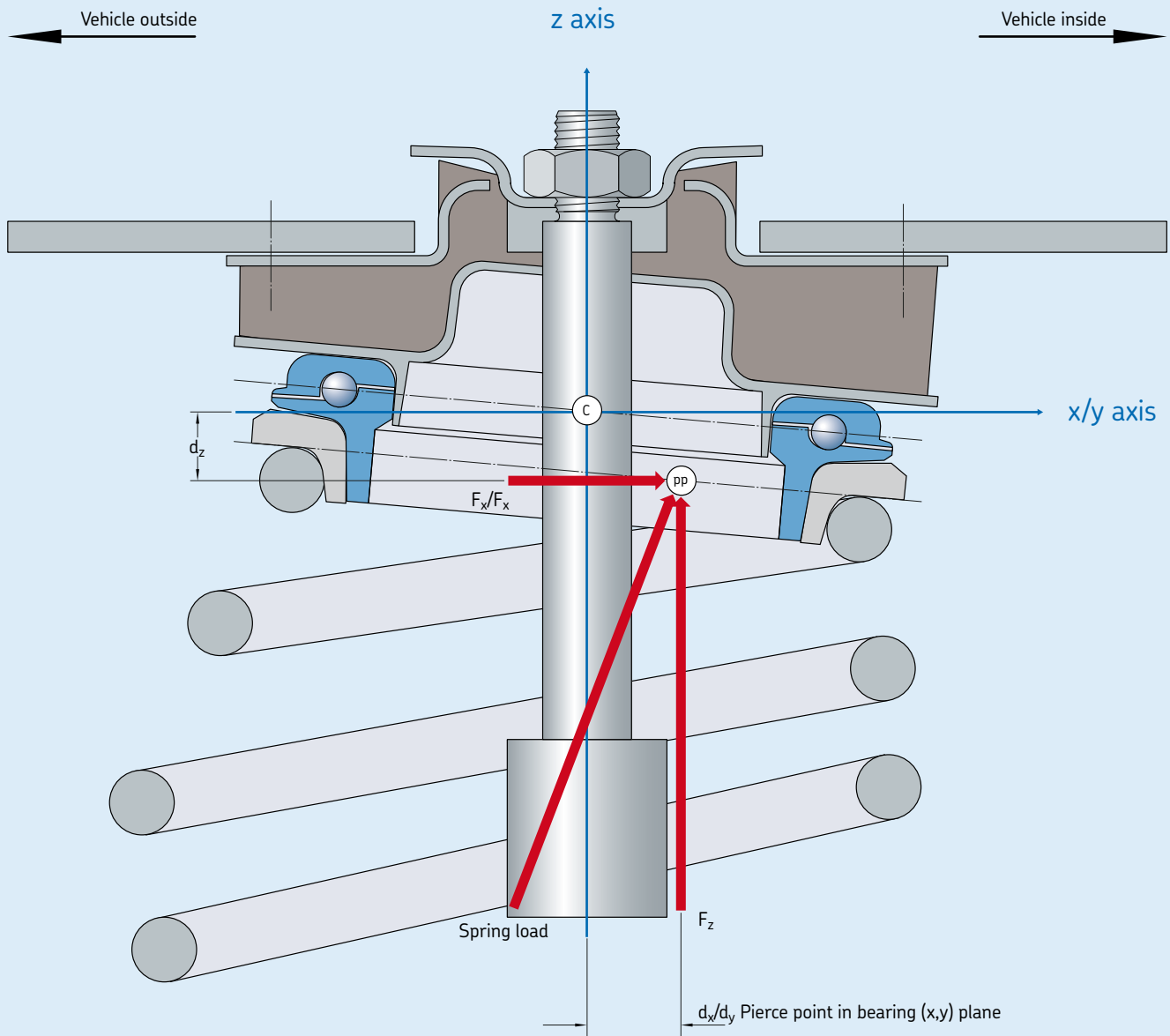
Design position

Jounce position

Spring load distribution on to bearing lower housing

angle (°)	Spring load at rebound condition			Spring load at design condition			Spring load at jounce condition		
	F _x	F _y	F _z	F _x	F _y	F _z	F _x	F _y	F _z
	N	N	N	N	N	N	N	N	N

0									
20									
40									
60									
80									
100									
120									
140									
160									
180									
200									
220									
240									
260									
280									
300									
320									
340									
360									



- C = Center of the bearing
- PP = Pierce point
- d_z = Distance between bearing plane and pierce point in z axis
- d_x/d_y = Distance between bearing axis and pierce point
- F_x = Radial load on spring seat in x axis
- F_y = Radial load on spring seat in y axis
- F_z = Axial load on spring seat in z axis

Notes

SKF – the knowledge engineering company

From the company that invented the self-aligning ball bearing more than 100 years ago, SKF has evolved into a knowledge engineering company that is able to draw on five technology platforms to create unique solutions for its customers. These platforms include bearings, bearing units and seals, of course, but extend to other areas including: lubricants and lubrication systems, critical for long bearing life in many applications; mechatronics that combine mechanical and electronics knowledge into systems for more effective linear motion and sensorized solutions; and a full range of services, from design and logistics support to condition monitoring and reliability systems.

Though the scope has broadened, SKF continues to maintain the world's leadership in the design, manufacture and marketing of rolling bearings, as well as complementary products such as radial seals. SKF also holds an increasingly important position in the market for linear motion products, high-precision aerospace bearings, machine tool spindles and plant maintenance services.

The SKF Group is globally certified to ISO 14001, the international standard for environmental management, as well as OHSAS 18001, the health and safety management standard. Individual divisions have been approved for quality certification in accordance with ISO 9001 and other customer specific requirements.

With over 120 manufacturing sites worldwide and sales companies in 70 countries, SKF is a truly international corporation. In addition, our distributors and dealers in some 15 000 locations around the world, an e-business marketplace and a global distribution system put SKF close to customers for the supply of both products and services. In essence, SKF solutions are available wherever and whenever customers need them. Overall, the SKF brand and the corporation are stronger than ever. As the knowledge engineering company, we stand ready to serve you with world-class product competencies, intellectual resources, and the vision to help you succeed.

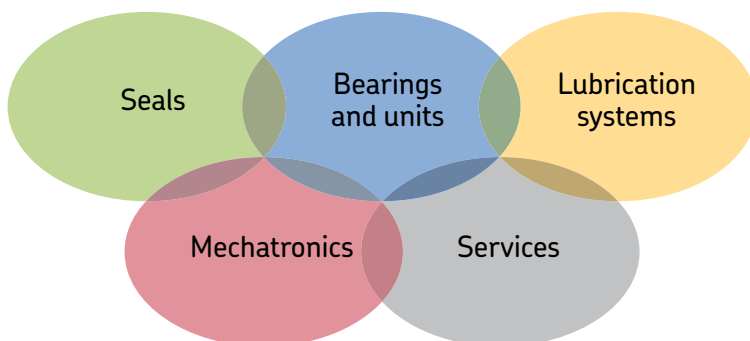


© Airbus – photo: e*rn company, H. Goussé

Evolving by-wire technology

SKF has a unique expertise in the fast-growing by-wire technology, from fly-by-wire, to drive-by-wire, to work-by-wire. SKF pioneered practical fly-by-wire technology and is a close working partner with all aerospace industry leaders. As an example, virtually all aircraft of the Airbus design use SKF by-wire systems for cockpit flight control.

SKF is also a leader in automotive by-wire technology, and has partnered with automotive engineers to develop two concept cars, which employ SKF mechatronics for steering and braking. Further by-wire development has led SKF to produce an all-electric forklift truck, which uses mechatronics rather than hydraulics for all controls.





Harnessing wind power

The growing industry of wind-generated electric power provides a source of clean, green electricity. SKF is working closely with global industry leaders to develop efficient and trouble-free turbines, providing a wide range of large, highly specialized bearings and condition monitoring systems to extend equipment life of wind farms located in even the most remote and inhospitable environments.



Working in extreme environments

In frigid winters, especially in northern countries, extreme sub-zero temperatures can cause bearings in railway axleboxes to seize due to lubrication starvation. SKF created a new family of synthetic lubricants formulated to retain their lubrication viscosity even at these extreme temperatures. SKF knowledge enables manufacturers and end user customers to overcome the performance issues resulting from extreme temperatures, whether hot or cold. For example, SKF products are at work in diverse environments such as baking ovens and instant freezing in food processing plants.



Developing a cleaner cleaner

The electric motor and its bearings are the heart of many household appliances. SKF works closely with appliance manufacturers to improve their products' performance, cut costs, reduce weight, and reduce energy consumption. A recent example of this cooperation is a new generation of vacuum cleaners with substantially more suction. SKF knowledge in the area of small bearing technology is also applied to manufacturers of power tools and office equipment.



Maintaining a 350 km/h R&D lab

In addition to SKF's renowned research and development facilities in Europe and the United States, Formula One car racing provides a unique environment for SKF to push the limits of bearing technology. For over 60 years, SKF products, engineering and knowledge have helped make Scuderia Ferrari a formidable force in F1 racing. (The average racing Ferrari utilizes around 150 SKF components.) Lessons learned here are applied to the products we provide to automakers and the aftermarket worldwide.



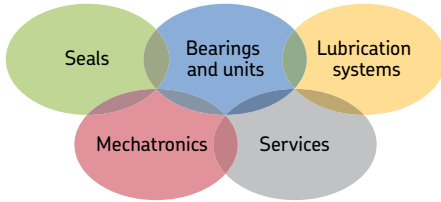
Delivering Asset Efficiency Optimization

Through SKF Reliability Systems, SKF provides a comprehensive range of asset efficiency products and services, from condition monitoring hardware and software to maintenance strategies, engineering assistance and machine reliability programmes. To optimize efficiency and boost productivity, some industrial facilities opt for an Integrated Maintenance Solution, in which SKF delivers all services under one fixed-fee, performance-based contract.



Planning for sustainable growth

By their very nature, bearings make a positive contribution to the natural environment, enabling machinery to operate more efficiently, consume less power, and require less lubrication. By raising the performance bar for our own products, SKF is enabling a new generation of high-efficiency products and equipment. With an eye to the future and the world we will leave to our children, the SKF Group policy on environment, health and safety, as well as the manufacturing techniques, are planned and implemented to help protect and preserve the earth's limited natural resources. We remain committed to sustainable, environmentally responsible growth.



The Power of Knowledge Engineering

Drawing on five areas of competence and application-specific expertise amassed over more than 100 years, SKF brings innovative solutions to OEMs and production facilities in every major industry worldwide. These five competence areas include bearings and units, seals, lubrication systems, mechatronics (combining mechanics and electronics into intelligent systems), and a wide range of services, from 3-D computer modelling to advanced condition monitoring and reliability and asset management systems. A global presence provides SKF customers uniform quality standards and worldwide product availability.

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