SKF

SKF spherical plain bearings. The machines' joints.

You may admire the muscles,
but without joints to take the load
they aren't much use.

SKF Plain Bearings. Discover the power. And enjoy the choice.

SKF – the first choice for spherical plain bearings

Systemised solutions from the experts

Synergy brought about by a wide product range
Worldwide, SKF is known to be the expert for everything relating to bearings. SKF's own manufacturing range comprises rolling bearings, plain bearings, seals, linear engineering products and many more. We have equally well become the leaders in Machine Asset Optimisation. Our wealth of experience and know-how makes us an excellent partner for all solutions incorporating bearings of any kind.

Technical lead thanks to research and development
In our "think tank", the Engineering and Research Centre in the Netherlands, 150 scientists and engineers are working on technologies yielding improved materials, improved design, improved lubricants and improved seals – that is on everything helping to make your spherical plain bearings even stronger and more durable. Many SKF pioneering solutions, also for spherical plain bearings, were born here.

Systems from one source
SKF is also a leading expert on seals and lubrication technology:

- Our companies Chicago Rawhide (CR) and RFT S.p.A. are among the largest seal manufacturers worldwide.
- Our experience with oils and greases is highly esteemed by many users and manufacturers. They have oils and greases tested by our laboratories and released for extraordinarily sensitive bearing arrangements.

Therefore co-operation with SKF means nothing less than obtaining everything required for shaft management from one source.

Our service makes your life easier

Application-specific consultancy and calculation services
Contrary to the dimensions, the basic load ratings of spherical plain bearings are neither standardised nor defined in a uniform and systemised way. Therefore the data given by the different manufacturers cannot be directly compared or spherical plain bearings of identical size exchanged. Rely on the quality and performance of SKF products. SKF was the first manufacturer to make available its own calculation methods for determination of the required bearing size or rated bearing life.

For you, calculation is no longer a problem: Simply use the calculation programs on our "SKF Interactive Engineering Catalogue" CD-ROM. It takes only a few clicks on the mouse to perform all necessary calculations.

Close to our customers
A worldwide logistics and distributor network ensures deliveries at short notice and on time. Any of our distributors can supply products from the largest spherical plain bearing and rod end range worldwide – often available from stock, always on time. For you this means the right solutions at the right moment in the right place.

Free of charge for you: catalogues and publications
Do you need more detailed information? Your SKF distributor has available for you any information you may want or he can obtain it for you.
For example:

- "SKF Interactive Engineering Catalogue" on CD-ROM. Available also on the internet under www.skf.com.
- "SKF spherical plain bearings and rod ends", catalogue 4407 E.
- "CR seals", catalogue 4006 E.

Multi-groove lubricating system

Make your design maintenance-free

Maintenance-free SKF spherical plain bearings – an unparalleled range
To an increasing extent your customers want to install maintenance-free machines and equipment. Our reaction to these demands is a large range of maintenance-free spherical plain bearings. In order to ensure maintenance-free operation in as many applications as possible, SKF manufactures spherical plain bearings of the following types:

- Radial spherical plain bearings to ISO 12240-1:1998, for shaft diameters from 4 to 1 250 mm.
- Angular contact spherical plain bearings to ISO 12240-2:1998 for shaft diameters from 25 to 120 mm.
- Spherical plain thrust bearings to ISO 12240-3:1998 for shaft diameters from 17 to 120 mm.

Sliding contact surface combinations for different conditions
Different sliding contact surface combinations – in part depending on the size of the bearing – help expand the fields of application even further:

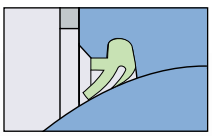
- hard chromium/composite, suffix C,
- hard chromium or steel/PTFE fabric, suffix T, and
- hard chromium or steel/glass-fibre reinforced plastics + PTFE, suffix F.

Hard chromium/composite, suffix C

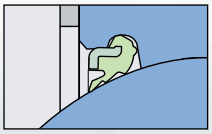
Hard chromium or steel/PTFE fabric, suffix T

Hard chromium or steel/glass-fibre reinforced plastics + PTFE, suffix F

Seal required?
The maintenance-free SKF spherical plain bearings run without lubrication and therefore do not require seals against grease leakage. Yet a seal protecting against the ingress of contamination or moisture can significantly prolong the service life. Two different seals are available.



Integral RS design



Integral heavy-duty LS design

Multi-purpose performance
SKF maintenance-free spherical plain bearings are designed above all for applications where

- loads of constant direction occur, even heavy loads,
- low friction or a steady friction level is required,
- relubrication is either not possible or not desired,

such as

- conveyors
- textile and printing machinery
- food and beverage treatment machines.

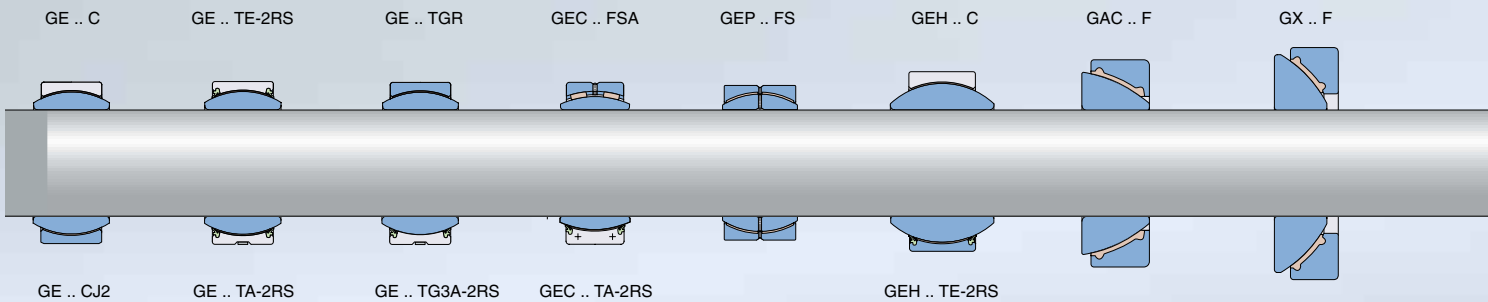
In the event of alternating or impact loads the robust steel-on-steel sliding contact surface combination should be selected.

Everything at a glance
The selection guide on **page 5** gives an overview of the product range and the main characteristics of the different bearings.

Maintenance-free radial spherical plain bearings

Maintenance-free angular contact spherical plain bearing

Maintenance-free spherical plain thrust bearing



Harsh conditions? Take it easy!

Arduous operating conditions
For arduous environmental conditions, e.g. temperatures ranging from –50 to +300 °C, dirt and dust as well as impact or alternating loads, spherical plain bearings requiring maintenance are the right choice. Among other applications, they are used in

- the steel construction industry
- cranes
- rolling mill applications
- construction and earth-moving machines.

Spherical plain bearings requiring maintenance for the hard times in life
For applications which give all components a hard time we recommend SKF spherical plain bearings in the robust steel-on-steel version with relubrication facility. SKF manufactures radial spherical plain bearings to ISO 12240-1:1998 for shaft diameters from 4 to 300 mm. Angular contact spherical plain bearings and spherical plain thrust bearings of the steel-on-steel version are available on request.

Seals suitable for the bearings' alignment capabilities
Contrary to most other bearing types performing movements in only one plane, the alignment capabilities of spherical plain bearings place more stringent demands on the sealing. We offer the most frequently used standard bearings with two different sealing systems protecting them from grease escape or ingress of humidity and contamination. We thus offer you the possibility of solving a large number of sealing problems in a space-saving and above all cost-effective manner, using standard bearings.

Table 1

Property	LGHB 2	LGEP 2	LGGB 2[1)]
Thickener	Calcium sulphonate complex soap	Lithium soap	Lithium/calcium soap
Base oil	Mineral oil	Mineral oil	Ester oil
Operating temperature, °C	–20 to +150	–20 to +110	–40 to +120
Kinematic viscosity of base oil, mm^2/s			
at +40 °C	400 to 450	200	110
at +100 °C	26,5	16	13

[1)] Biodegradable grease

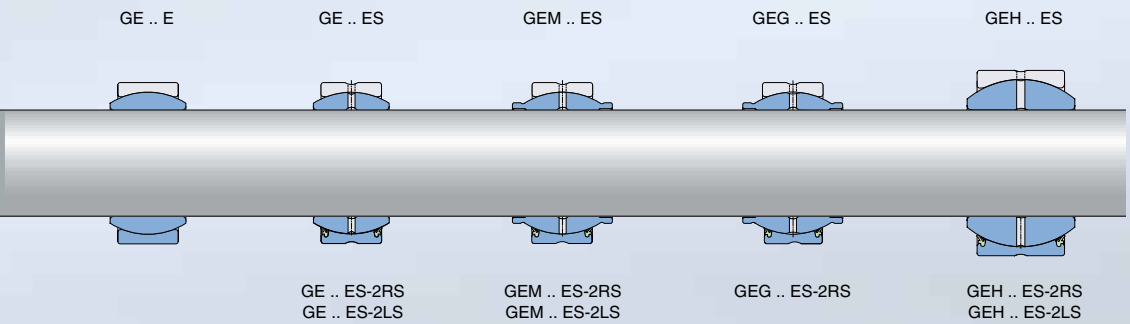
Lubrication for all eventualities
Thanks to our experience in widely differing industries with different material combinations we can offer a large range of standard and special greases. Greases suitable for extreme temperatures, high pressures, even biodegradable grease fulfilling most stringent ecological requirements. A selection of greases recommended for spherical plain bearings can be seen from **table 1**.

The multi-groove lubricating system
The unique multi-groove lubrication system (➔ **page 2**) is the SKF solution against lubrication starvation in steel-on-steel bearings. The multi-groove lubricating system

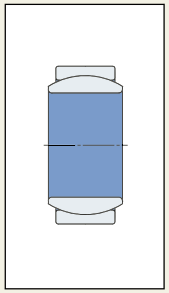
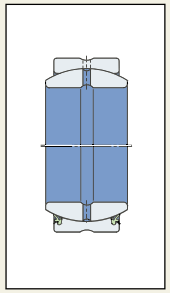
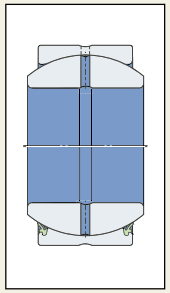
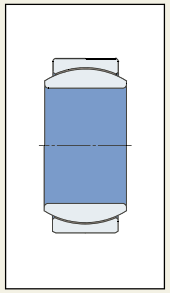
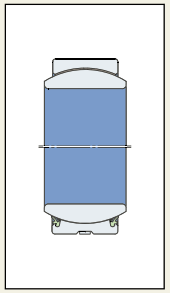
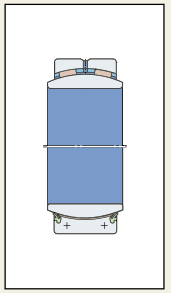
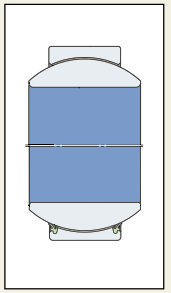
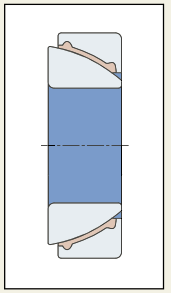
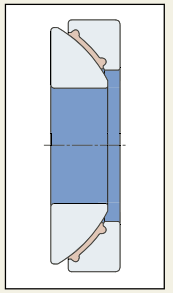
- improves lubricant feed into the load zone
- increases the lubricant reservoir in the bearing
- enables relubrication under load
- extends the lubrication intervals
- provides spaces for depositing wear particles and dirt.

All in all, it improves the lubricant distribution in the bearing, thus extending the lubrication intervals as well as the service life.

Radial spherical plain bearings requiring maintenance



SKF spherical plain bearings. Product selection guide.

	Steel/steel	Steel/steel	Steel/steel	Steel/ sinter bronze composite	Steel/ PTFE fabric	Steel/ PTFE composite		Steel/ sinter bronze composite	Steel/ PTFE composite	Steel/ PTFE composite
SKF designations	GE .. E GEG .. ESA	GE .. ES GEM .. ES GEG .. ES	GEH .. ES	GE .. C GE .. CJ2	GE .. TE GE .. TA	GEC .. FSA	GEP .. FS	GEH .. C GEH .. TE GEH .. TA	GAC .. F	GX .. F
Seal arrangement		2RS 2LS	2RS 2LS	*)	*) 2RS 2LS			*) 2RS 2LS	*)	*)
Radial load capability	good	good	good	good	good	good	suitable	good	suitable	not suitable
High axial load capability	not suitable	not suitable	not suitable	not suitable	not suitable	suitable		not suitable	suitable	good
Combined load capability	suitable	suitable	suitable	suitable	suitable	good	good	suitable	good	suitable
Constant direction load	suitable	suitable	suitable	good	good	good	good	good	good	good
Alternating direction load	good	good	good	suitable	suitable	suitable	good	suitable	suitable	suitable
High tilting capability	suitable	suitable	good	suitable	suitable	not suitable		good	not suitable	suitable
Maintenance-free operation	not suitable	not suitable	not suitable	good	good	suitable		good	suitable	suitable
High temperature resistant	good	good / suitable	good / suitable	suitable	suitable	not suitable		suitable	not suitable	not suitable
Dirty environment	suitable	suitable / good	suitable / good	not suitable	good / suitable / good	suitable		good / suitable / good	suitable	suitable
Low friction	not suitable	not suitable	not suitable	suitable	good	suitable		good	suitable	suitable
Combined load capability F_a/F_r	≤ 0,25	≤ 0,25	≤ 0,25	≤ 0,25	≤ 0,25	≤ 0,25	≤ 0,4	≤ 0,25	≤ 2	≥ 2
Permissible angle of tilt (degrees)	4–16	6–10	14–17	6–16	6–16	3–4	2	16–18	1,5–3,5	4–6
Permissible operating temperature (°C)	–50 to +300	–50 to +300	–50 to +300	–50 to +180	–50 to +150	–40 to +75		–50 to +180	–40 to +75	–40 to +75
– with seal arrangement 2RS (°C)		–30 to +130	–30 to +130		–30 to + 130			–30 to + 120		
– with seal arrangement 2LS (°C)		–25 to +120	–25 to +120		–25 to + 120			–25 to +120		
Lubricant recommended	LGHB 2/LGGB 2	LGHB 2/LGGB 2	LGHB 2/LGGB 2	Don't lubricate	Don't lubricate	LGEP 2		Don't lubricate	LGEP 2	LGEP 2
Size range d (mm)	4 to 12	15 to 300	20 to 120	4 to 60	12 to 300	100 to 1250		4 to 120	25 to 120	17 to 120
Friction coefficient μ	0,08 to 0,2	0,08 to 0,2	0,08 to 0,2	0,05 to 0,25	0,03 to 0,15	0,05 to 0,2		0,03 to 0,15	0,05 to 0,2	0,05 to 0,2

good suitable not suitable

*) External seals or bellows are required.
The LS seal is designed especially to operate at heavy-duty conditions.
In case of further questions please contact SKF.

Special conditions require special solutions

Standard is not enough?
If the large standard range is not enough we will supply special bearings, provided the quantity is large enough to permit economical manufacture. In this case we can offer a wide choice of variants, tailor-made for the application in question. This means that we will also change basics such as the material, and we will see to special lubrication engineering solutions. We find the optimum sliding material and develop new sealing systems for extreme conditions. We provide special designs for special applications. In other words: We shy from nothing, helping you not to shy at anything.

Real examples

- Angular contact spherical plain bearings with special lubricating groove system ensuring higher reliability under impact loads and high-frequency movements: twin-axle supports in construction-site vehicles.
- Rod ends made of special materials for ambient temperatures of –50 °C with special seal: direction guides in crane lorries.
- Special sealing system protecting against water pressure of 16 bar: control valve in a power plant.
- New design of car gearshift lever support ensuring low noise, zero clearance and freedom from vibrations as well as savings in weight and cost.

Your distributor

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