
HUNGER **Maschinen**

EIN UNTERNEHMEN DER HUNGER-GRUPPE

Bearings for Offshore / Civil Engineering



Your Partner for Complete Solutions

Self-lubricating radial spherical plain bearing GE...HS

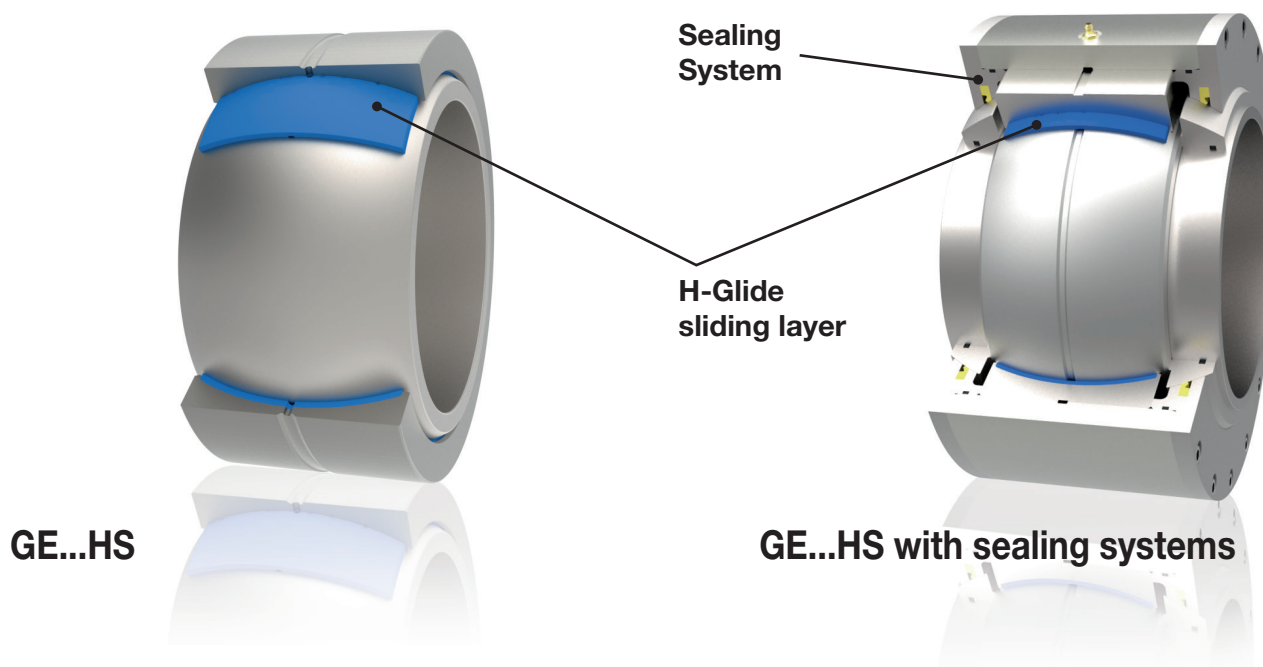
The self-lubricating, maintenance-free HUNGER radial spherical plain bearings of the series GE...HS were specially developed for use in hydraulic steel construction and offshore applications. They are characterized by a particularly wide, compact construction for achieving

- **Increased axial and radial loading capacity** and
- **Dimensions that are optimized for the installation area**

The **H-Glide sliding layer**, which consists of a special GRP-PTFE mixture and is manufactured through injection molding, is the heart of the **HUNGER plain bearings** for hydraulic steel construction and offshore applications. H-Glide was developed for **low friction coefficients**, **stick-slip-free operation**, **the least possible water absorption**, and **high abrasion resistance**. Due to the self-lubricating characteristics of the sliding layer, this tribosystem is **maintenance free**. The initial lubrication applied during installation leads

to an additional increase in the useful life with periodic re-lubrication, as is particularly necessary with large bearings.

For use in particularly harsh environments, GE...HS-bearings can be equipped with an additional seal, **encapsulating the entire bearing**. Kinematics adapted to the respective bearing, in conjunction with high-performance seal materials, ensure an extremely tough seal design.



Technical data:

- Outer and inner bearing ring made of stainless steels (by request, special steels are also available)
- H-Glide: sliding layer glued to the outer ring
- Optional: special seal with high-performance plastics
- Operating temperature range: -30 to +90°C

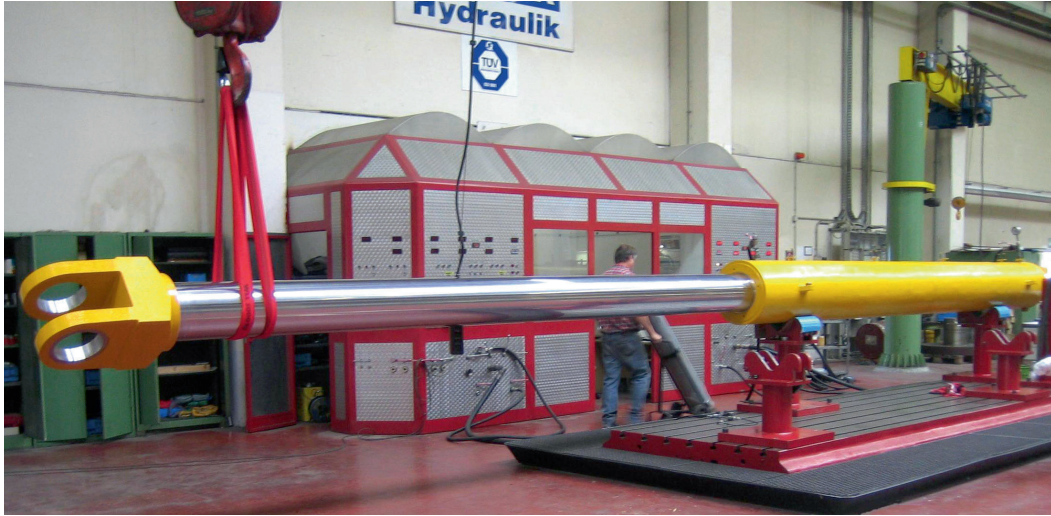
Application areas:

- Hydraulic cylinders in locks, ship cranes, etc.

H-Glide

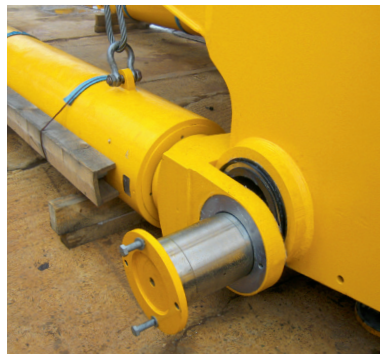
Properties	Test standard	Value	Unit
Tensile strength	ISO 527-2/1 A	180	MPa
Young's modulus	ISO 178	8	GPa
Friction coefficient (static)		0,18	-
Specific gravity	ISO 1183	1.5	g/cm ³
Working conditions		-30 - +80	°C

Fields of application for radial spherical plain bearing GE...HS



A typical application are for type GE...HS radial spherical plain bearings is use in mid-sized and large cylinders for maritime applications. The strict requirements for corrosion resistance make the use of special materials and seal designs necessary.

Power transmission to the connection geometry has always been extremely important in hydraulic cylinders . For this reason, all HUNGER hydraulic cylinders are equipped with bearings manufactured by the company. A 100% final inspection as well as expert installation on-site guarantee many years of problem-free operation.



An example of the use of type GE...HS radial spherical plain bearings that has been successful for many years: HUNGER-hydraulic cylinders for ship and loading cranes.



Ball joints

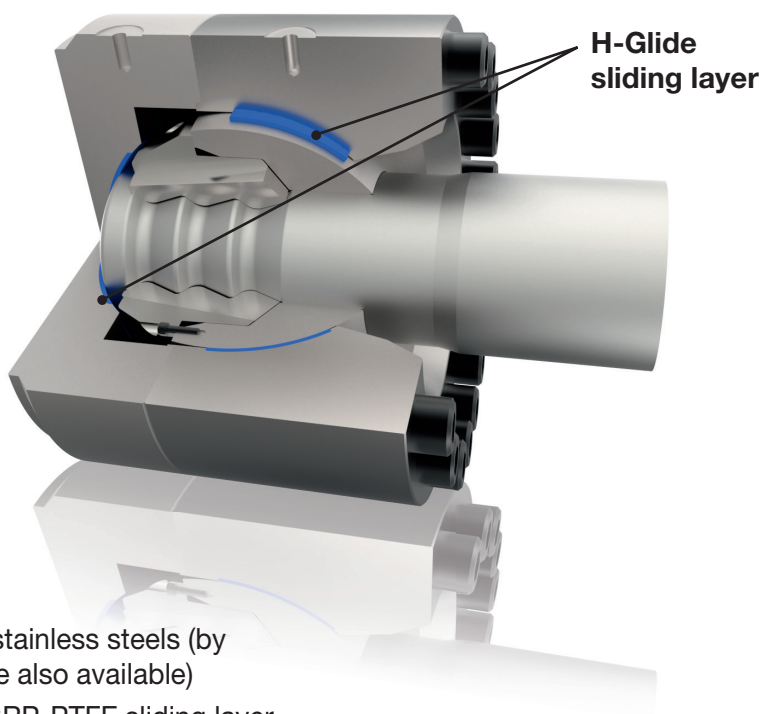
If multiple-axis movements must be compensated for at the force application points in hydraulic cylinders, ball joints are usually utilized in place of rod ends.

Ball joints allow for much greater swivel and tilt angles than conventional spherical bearings. Depending upon the design and the load, angles of up to 20° can be achieved, in special cases even beyond this.

Ball joints can also transmit tensile and compressive forces. The transmission of force between the multi-part ball attached to the end of the cylinder rod and the two-part socket is provided as with GE...HS-spherical bearings, by means of **sliding layers made of H-Glide**.

Due to the great forces to be transmitted, low friction force transmission is particularly important, as transverse forces have a negative effect on the useful life of the hydraulic cylinders.

HUNGER-ball joints are maintenance-free after initial lubrication. In order to maintain the lowest possible friction coefficients over the long term, the bearings can be re-lubricated from the outside by means of lubricant holes. For offshore use with occasional or constant contact with seawater, all of the individual parts are manufactured out of stainless steels. By using additional seal systems, **extraordinary useful lives can be achieved under even the most difficult environmental and operational conditions**.



Technical data:

- All individual parts made of stainless steels (by request, special materials are also available)
- H-Glide: special multi-part GRP-PTFE sliding layer glued to the outer parts
- Re-lubrication possible without disassembly
- Special seal with high-performance plastics
- Operating temperature range : -30 bis +90°C

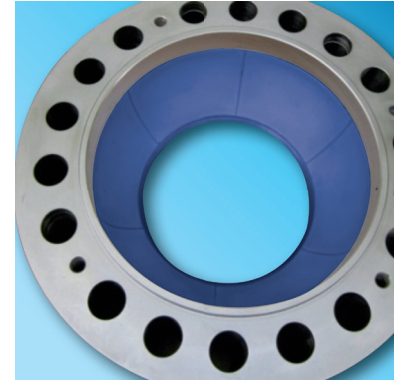
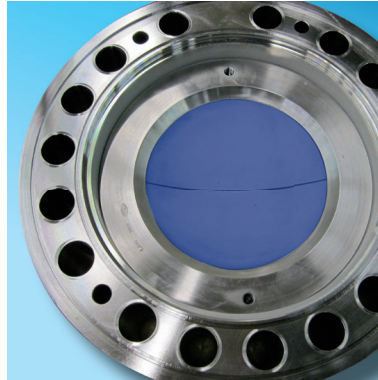
Application areas:

- Hydraulic cylinders for riser-tensioner applications in offshore drilling platforms with regular / constant contact with seawater

H-Glide

Properties	Test standard	Value	Unit
Tensile strength	ISO 527-2/1 A	180	MPa
Young's modulus	ISO 178	8	GPa
Friction coefficient (static)		0,18	-
Specific gravity	ISO 1183	1.5	g/cm ³
Working conditions		-30 - +80	°C

Production and Fields of application for ball joints



Ball, pressure plate, and tension ring together form the ball joint. All forces are transmitted by the multi-part sliding layers made of H-Glide.

HUNGER ball joints are used in riser-tensioner cylinders on offshore drilling platforms and ships for oil and gas production, among other things. The constant contact with seawater, extreme loads, and dynamics as well as the required, absolutely fault-free operation provide particular challenges for materials and design.

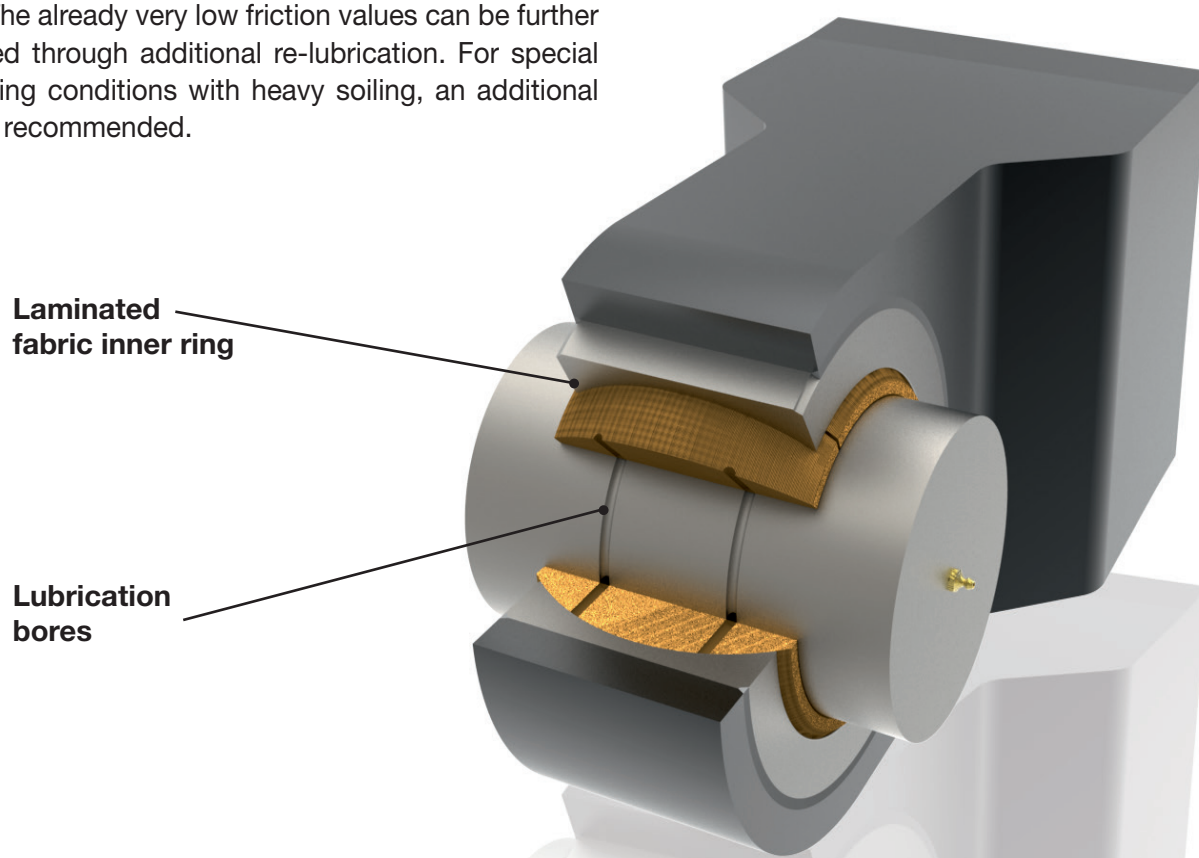


Radial spherical plain bearings with laminated fabric inner rings

HUNGER-spherical bearings with inner rings of H-TEX 200 were developed for the strictest corrosion resistance requirements in maritime applications. H-TEX 200 is a phenol-resin impregnated laminated fabric, which is especially suitable for use as a bearing material due to the following characteristics:

- Maintenance-free operation
- High wear resistance
- High thermal resistance
- Very good vibration and sound dampening ability

HUNGER-spherical bearings with inner rings of H-TEX 200 are maintenance-free after initial lubrication. The already very low friction values can be further reduced through additional re-lubrication. For special operating conditions with heavy soiling, an additional seal is recommended.



Technical data:

- Outer ring of the bearing made of corrosion-resistant steel
- Inner ring of the bearing made of laminated fabric based on phenolic resin (H-TEX 200)
- Optionally with additional seal
- Operating temperature range: -40 to +130°C

Application areas:

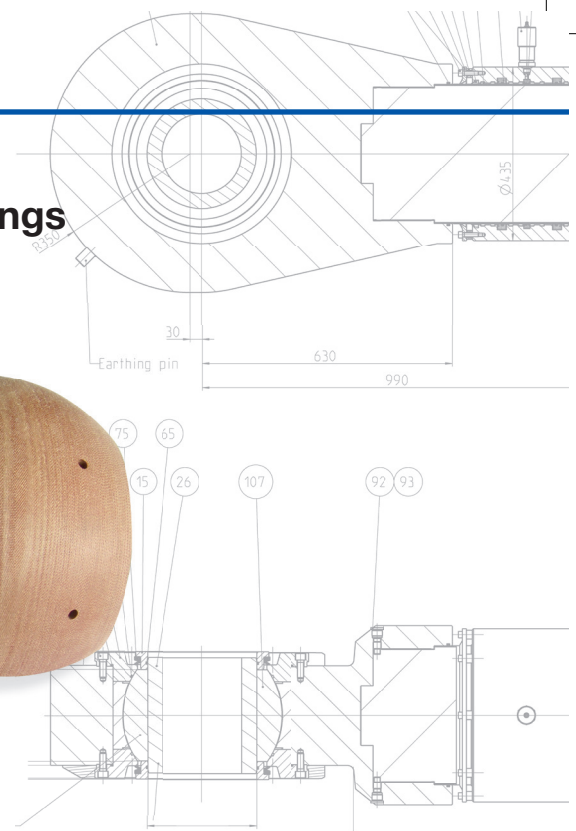
- Hydraulic cylinder for maritime applications with continuous contact with seawater and high variable, sudden loads

H-TEX 200

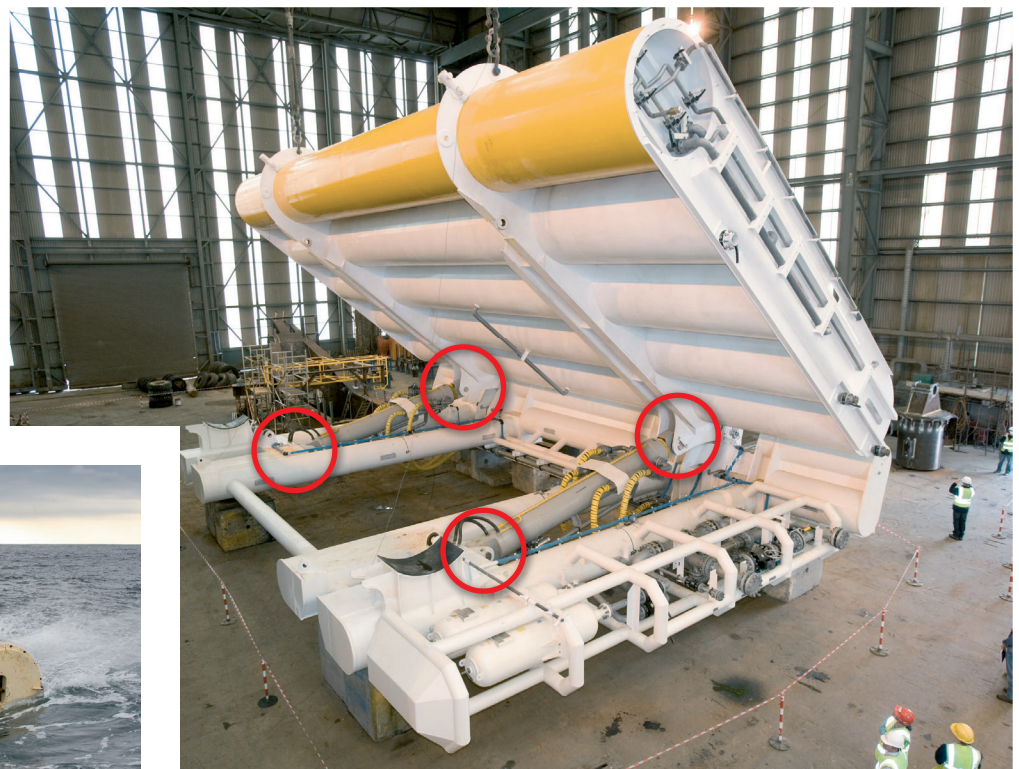
Properties	Test standard	Value	Unit
Tensile strength	DIN 53455	45	N/mm ²
Compression strength	DIN 53454	345	N/mm ²
Bending strength	DIN 53452	80	N/mm ²
Young's modulus	DIN 53457	4000	N/mm ²
Friction coefficient (static)	ASTM D1498	0,05	-
Specific gravity	DIN 53479	1.2	g/cm ³
Working conditions		-30 - +140	°C

Fields of application for radial spherical plain bearings with laminated fabric inner rings

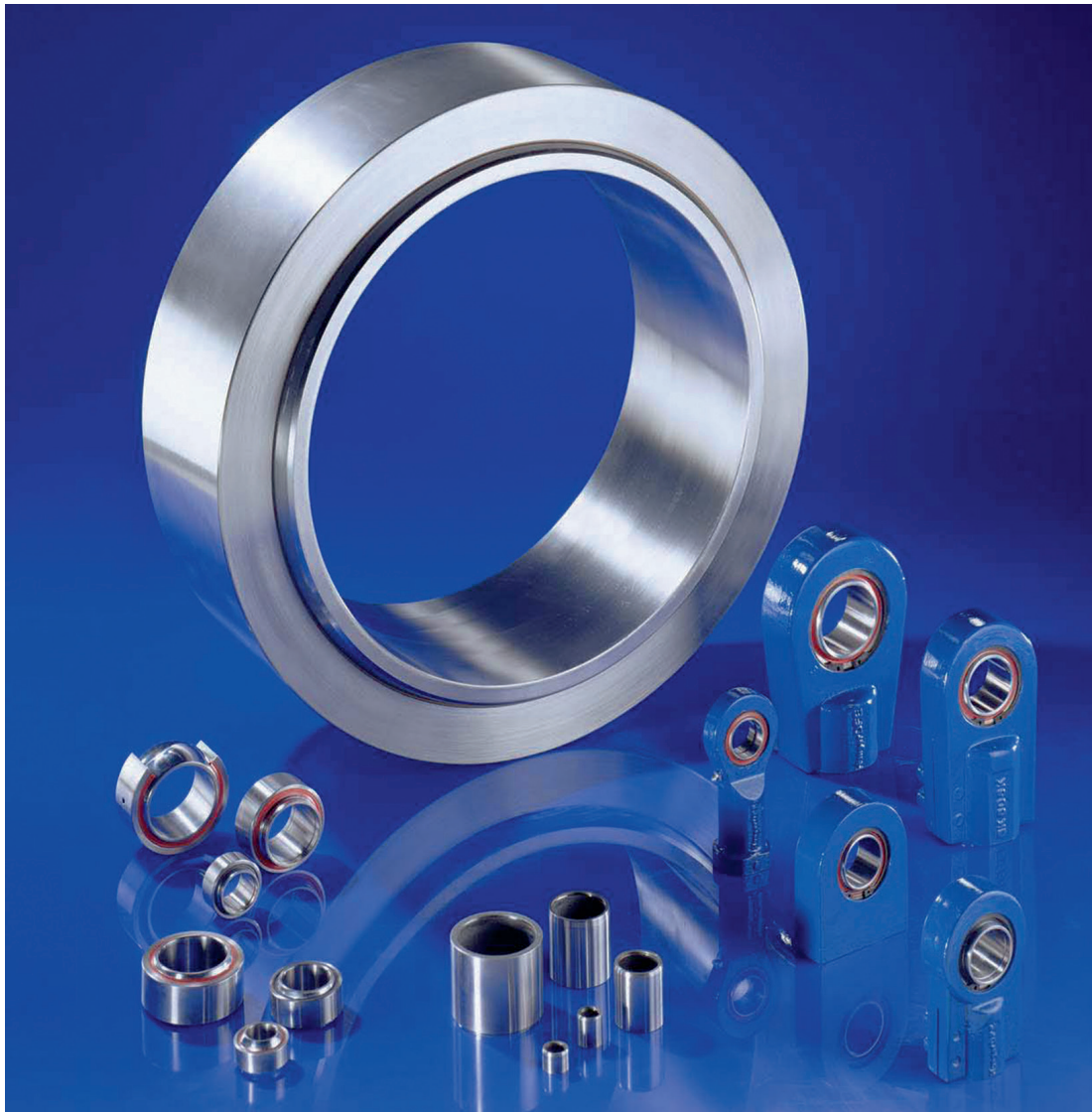
The laminated fabric inner ring is designed in two pieces for easy installation. The fundamentally self-lubricating characteristics are enhanced by the possibility of re-lubrication while installed.



For example, HUNGER-radial spherical plain bearings with inner rings of H-TEX 200 are used on the cylinders of a system for the ocean energy production. These bearings are the only choice for constant use in seawater and with irregular and highly variable loads.



Hunger Standard-Program for plain bearings



- spherical plain bearings
- radial spherical plain bearings
- large-sized and spherical plain bearings
- spherical plain thrust bearings
- rod ends
- plain bushings

The spherical bearings and rod ends can be supplied in different types of materials as required. Stainless steel bearings incorporating special seal-wiper elements are **suitable for use in offshore engineering, hydro-electric dam projects and similar applications.**

In addition to the standard ranges they can be supplied with a nominal **diameter up to 1000 mm on request.** Optional custom designs for outer- and inner ring can be supplied hardened or non-heat treated.

Die HUNGER-Gruppe - The HUNGER Group

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