

Offshore technology



Your Partner for Complete Solutions

About Hunger seals

Continuously increasing technical demands within the cylinder industry has lead to higher quality standards in the sector of seal application.

Continuous and creative research to meet these new demands has resulted in new methods being applied to the sector of seals and bearing elements.

The high technical know-how of our specialists and effective co-operation with end users in practice has lead to the development of new wear-resistant materials for use in functional profiling. Nowadays all cylinder manufacturers can be offered a solution for any sealing application using seals from the world-wide patented HUNGER DFE system. Today the production range of the HUNGER DFE system covers seals and bearing elements for hydraulics and pneumatics for both dynamic and static applications.



Offshore technology

Hunger DFE is an experienced hydraulic seal system provider and partner of customers in the oil and gas industry for several years.

Hunger DFE offers a large range of PTFE-Compounds, elastomers, rubbers and molded thermoplastics – each grade adapted to the demands of the industrial application.

Hydraulic equipment and seals in oil and gas industry have to bear hardest climatic and geologic conditions and must operate successfully at any time. To secure these properties and guarantee a safe, efficient and economic production we offer different solutions, each one specially adapted to the application. No industrial production line will work without seals – we offer systems for static sealings, dynamic piston and rod seals as well rotating applications, bearing elements and wipers for different kinds of operating conditions concerning pressures, temperatures, fluids and velocities.

Our products are successfully used all over the world in several applications and processes On- and Offshore.

Seal products are made from current high grade elastomers, some especially developed for highest pressures, extreme temperatures or chemical aggressive and demanding fluids.



Application field – Offshore crane cylinders

Offshore crane cylinders provide a safe lifting and loading process on ships or drilling platforms and different facilities of oil and gas production. A precise, rocking free positioning of loadings and a controlled beam movement must be possible even under roughest weather conditions.





Tailor-made sealing systems for highest demands – safe lifting and handling of goods

The sealing systems have been adapted to the respective demands placed on the cylinder. Our customers – leading oil and gas companies, require highest quality levels of products from their suppliers with outstanding performance concerning lifetime and service.

Offshore crane cylinders with tube diameters up to 600mm operate under hardest and environmental conditions all over the world and have to cope with heavy loadings of several hundreds of tons. Wearing parts like the sealing and bearing elements are of particular significance. To protect these components Hunger DFE developed a special wiping system A-Eis-SL.

Radial clearance of massive brass wiping lip follows movements and rod deflections and removes rough and crusty dirt layers from the surface. Secondary elastomer wiping lip avoids ingress of dirty fluid films and moisture.





Ice whiper testing

Fitting proposal for crane cylinders

Rod seal system



FI / FA

- consisting of extremely wear resistant and low friction POM-PTFE/Bz-Compound, other high com pressive strength materials available on request (e.g. H-Glide)
- compatible with almost every hydraulic fluid extraordinary dry running properties, can also be used with pneumatic applications
- preventing metal to metal contact due to maximum distance between rod and housing very simple snap in installation, groove arrangement securing against axial movement

GD1000K

- · double effect piston compact seal for highest stress
- high sealing effect for good efficiency, Stick slip free operation due to PTFE slide ring
- no metallic contact due to integrated bearing elements
- compact elastomer and thermoplastic parts developed for high pressures and wide temperature and fluid range
- simple snap in installation
- · no additional bearing elements necessary

A-EIS-SL

- equipped with a swimming primary wiping lip following rod deflections due to bending forces
- secondary lip, mostly manufactured from high grade elastomers or PTFE-compounds
- prevent ingress of dust, fine films of remaining dirt or humidity
- protects the sealing and bearing element from damage by foreign particles
- material combinations for temperature ranges from -60°C to +200°C available

TDI / TDA

- single acting tandem seal combining a PTFE seal and the sealing effect of a PUR-lip seal in one part
- PTFE-compound slide ring reducing friction levels to a minimum, leading to higher service life
- no stiction, no stick slip effects or unacceptable heat generation
- different types of elastomers and PTFE-compounds available for different kinds of application fluids and temperatures

Piston seal system



Application field – drilling ships and platforms

Stabilizing systems for drilling ships and platforms are equipped with modern, directly connected compensation cylinders to equalize high dynamic movements and loadings due to lifting, rolling and tilting. These systems guarantee a predefined loaded and positioned drill rig at any kind of sea condition.



Accumulator loaded, high dynamic long stroke cylinders need a special taylor made sealing and bearing system to cope with extraordinary system loadings and operational speeds.

Only highest quality engineering plastics, elastomers and PTFE-based compounds can guarantee low friction grades and stick slip free movements. Special developed Hunger DFE components like friction reduced lip seal TRO-I can improve the reliability of the whole cylinder system remarkably.

For these demanding applications piston rods often come with coatings consisting of carbides, oxides or stainless steel in order to improve service life under operation – Hunger seals can be adapted to these hard wearing surfaces.



Friction gradient lip seal TDI



Friction gradient TRO-I



Hunger seals materials

Choosing the right sealing compound for every single application is one of the most important factors to ensure the required sealing functions.

Therefore we offer a wide range of especially developed and customized high-performance plastics and rubbers. With different additives we can adjust our reinforced material properties as requested.

It should be noticed in general with tribological systems that friction and wear of materials are not material properties but system properties which result from the stress conditions and elements employed.

The most important parameters for the sealing technology are: sliding surface, sliding speed, stress duration, temperature, surrounding fluid and nominal force.

Depending on working pressure, required fluids and operation temperature our full technical service will provide you an ideal solution by choosing the right material combination for your operating conditions.



Long term operation temperature range for HUNGER materials

PTFE- fluoropolymere compounds

PTFE is a fluoropolymer with excellent chemical, thermal, electrical and tribological properties. PTFE behaves partly as a thermoplastic. It is highly viscous and is processed by using specific press and sinter technologies. PTFE has the highest resistance to chemicals of all plastics. This is due to the strong carbon-fluorine bond in the molecular chain.

The ability of fluoropolymers to resist extreme temperatures is superior to most other plastics, both at high and low temperatures. Good anti-adhesive characteristics and the low coefficients of friction under both static and dynamic conditions are a particular feature of fluoropolymers.

These characteristics are very important for the materials used in sealing systems. The static and dynamic coefficients of friction are very close to each other and prevent stick-slip behavior. A further advantage is their good behavior with regard to humidity.

Their extremely low absorption of water means that fluoropolymeres can be used without regard for the surrounding fluids.

Reinforced compounds are used mainly in the field of sealing technology in order to increase the load factor of PTFE-pure. They have a considerably better behavior against wear and pressure load with low coefficient of friction.

These brilliant properties can be further improved by using different fillers, that we use for our wide variety of sliderings.

Hunger seals materials

Elastomers

Elastomeres are used for static as for sliding and rotating seals. For every field of application we have the right material.

Hunger applies elastomers with high thermal and chemical resistance. A broad spectrum of resistance

allows the use of seals in conditions where other sealing materials no longer provide an adequate sealing function. The processed elastomers are classical synthetic elastomer which, as a result of suitable additives, can be tailored to the specific requirements of the sealing technology.

The compounds we use, have a very good compression sets. The temperature range for low temperature material is unusually good.

The right material will be found for your application with standard hydraulic fluids based on mineral oil, or oil-water and water-oil emulsions as well as Waterglycol and other fluids.

Thermoplastic Elastomers

The thermoplastic elastomers are materials which possess the characteristic elastic qualities of rubber. Because of the wide-ranging possibilities given in process by injection molding of these materials, various types of thermoplastic elastomers compounds have found application in practise and gained a high reputation for quality.

The special thermoplastic elastomers used by Hunger are distinctive for their good low temperature behaviour as well as by their resistance to hydrolysis and ageing.

These are the basic properties for manufacturing high quality sealing elements.

Engineering plastics

PA and PA-CF

Our PA 6 is a high-molecular polyamide, large elements can be produced economically. PA 6 has also a good wear resistance.

Water absorption and resulting change in volume can be catered for by increasing housing tolerances. PA 6 is used for large bearings and support rings.

POM and POM-PTFE-Bz compound

The thermoplastic material such as our POM compound is used as the base material for all bearing elements of the Hunger DFE product range.

This type of POM is an acetal resin produced by copolymerization. Combined with PTFE-Compound, injectionmolded parts offer excellent sliding characteristics, particularly in the dry-running range of the bearing element.

The material is tough and maintains good stability of shape at different temperatures. Its chemical structure also gives it high resistance to various fluids with low water absorption.

As a result of all these characteristics, POM-PTFE-compound, is particularly suitable for the functions which guide rings and back-up rings are required to fulfill.

PEEK

PEEK is used as special material for high temperature applications. Its temperature range is between -50 to +250 °C. This material is especially suitable for the bearing elements of Hunger due to its excellent resistance against chemicals and hydrolysis. PEEK has good mechanical strength properties and outstanding sliding and wear behaviour.









Tribological behavior

PE-UHMW

This sophisticated polyolefin PE- ultra-high-molecular weight is distinguished by its excellent sliding and wear behavior, and is therefore used as special material for Hunger DFE slide rings.

In particular it is often used in low temperature applications. PE-UHMW is recommended particularly in the field of water hydraulics and for sealing elements in high pressure applications.

In addition to the materials previously mentioned other standard or specifically modified trade plastics, processed and machined as necessary, are also used for special applications.

Feel free to consult our technical service to make advantage of the excellent properties of our materials. Pushing properties of technical polymers can unfortunately also lead to limit some of their qualities. For this reason our specialists will take care that you can use the premium performance for your competitive advantage.

Application field – Working boats

Working boats which are used for direct fire fighting from water-side. Therefor high performance water cannons are necessary which can be positioned and activated via telescopic cylinders with integrated feeding system of water and fire extinguishing media. These unities have to operate reliably under difficult conditions like swell and strong wind.



Hunger DFE sealing and bearing combinations especially adapted for the application make sure that a stick slip free movement and a sealing without any leakage is possible even for strokes of more than 15m length.

Bearing elements FA for piston and FI for the rod are made of high performance POM-PTFE/Bz-compound which guarantees best operating conditions for the following elastomer seals.

The outstanding quality of used sealing system DMD-Tandem2000 in combination with highest production quality of raw materials warrant long service life and a high reliability also in critical offshore applications.



DMD-Tandem2000

- combination of special lip seal-element with low friction V-packings
- provides low friction, stick slip free movements at high and low operating speed
- high sealing effect without axial pretension
- no system contamination due to fabric and rubber particles
- width can be adjusted to existing installation groove dimensions
- suitable for superfinished and metal-oxide coated piston rods



Stick-slip free V-packing DMD-Tandem2000



Application field – pile driving platforms

Cylinders that are used for the operation of pile driving platforms to anchor concrete or steel piles in the sea bottom with lengths up to 100mtr for bridges, quay or harbour walls.

Hunger DFE provides offshore plastic compound bushings at rod end with automatic locking function as well as a friction and wear optimized sealing and bearing system for best performance and long lasting operational safety. Combination of low friction V-packings backed up by wear resistant rod bearing FI provide smooth running properties even under rough conditions.

Application customized V-packing

DMD-S (PEEK, PTFE-Carbonfiber, Ekonol)

- heavy duty V-packing seals specially adapted to high pressures, high temperatures and aggressive fluids
- packings made of low friction PTFE-compounds like f.ex. PTFE-carbon-fibre or PTFE-Ekonol pressure
- and support rings made f.ex. of high end compression proof polymer PEEK to come in operation where standard V-packings are overextended



mm

Quality system and Certificates

Hunger DFE stands for a customer focused service which is achieved through a strategy of continuous improvement using in-house research and development, engineering and manufacturing services.

ISO 9001 registered quality management is the basis and testament to our commitment of quality and customer satisfaction.

Providing a broad empirical knowledge and experience base for failure analyses, benchmarks, and a consistent flow of new products and innovative solutions Hunger

Special testing methods and documentation for Offshore Products:

- Profile projector
- tactile 3D measuring machine
- Video measuring microscope
- Density balance
- Aluminum measuring device
- Ultrasonic cleaning

DFE guarantees an development of products which includes modern, extensive state-of-the-art testing procedures performed with the outstanding care.



Own - application related - testing center



Production

A brod variety of modern manufacturing machinery offers almost every kind of plastic processing guarantees us a high flexibility with short delivery times.

- Injection molding from 25 tons to 650 tons
- vulcanizing presses and compression molding machinery
- inhouse PTFE pressing and sintering
- all kinds of conventional and CNC machining



Molded seal lip modeling



Vulcanisation of elastomer components





Molding of seals with large dimensions

Many years of expierience of mold designing enables us to respond quickly to our coustomers needs. Molds are made and maintained in our well equiped toolshop.

Hydraulic sealsystem for offshore application

Hunger rod sealing concept

- multi lipsealing also available with wiper function, outside wiping for high stress
- combination of elastic sealing ring and stick-slip-free slide ring with minimal friction
- high seal in static and dynamic application
- simple snap-in installation
- · low-cost production of cylinderhead by equal-dimensioned sealing grooves
- no metallic contact due to bearing elements made of high resistant plastic
- safe static seal against gap extrusion by Composite-O-Ring-Backring seal OBVD
- travel of 10 million cycles achievable without interruption



DIN ISO 7425-2 rod sealing concept

- the double wiper AI-D prevents dust and dirt from entering the system and ensures that a minimum leakage oil films remain in the system.
- the seals GODI-SP offers good sliding properties
- secondary seal of thermoplast for higher sealing







Hunger piston sealing concept

- double effect piston seal for highest stress
- high sealing effect and very good efficiency
- stick-slip-free operation
- no metallic contact due to installation of
- seals and integrated bearing elements
- compact elastomer-material, developed for high pressures with excellent compression-set and wide temperature range
- simple installations even with very broad dimensions of the piston (snap-in installation)
- low cost piston manufacture
- tubing expansion in spaned safely
- no additional bearing elements necessary

DIN ISO 7425-1 piston sealing concept

- smooth Slide Ring-O-Ring seal GDSA
- easy stock keeping for special applications (temperature/media)







GD1000K

GDSA

PFB

Our goal is always to deliver high quality products and solutions to our customers.

Hunger DFE is not only offering million times proven standard elements but also specific systems and individual solutions, which are developed in close cooperation with the customers.

Due to a fully developed production system a flexible customer service is guaranteed and "customers in an emergency" can be supplied within shortest time.

For support please contact the project department where a team of qualified engineers is at disposal for fast execution and support of customer enquiries and to give technical advice in view of applications.



Die HUNGER-Gruppe - The HUNGER Group

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EIN UNTERNEHMEN DER HUNGER-GRUPPE

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