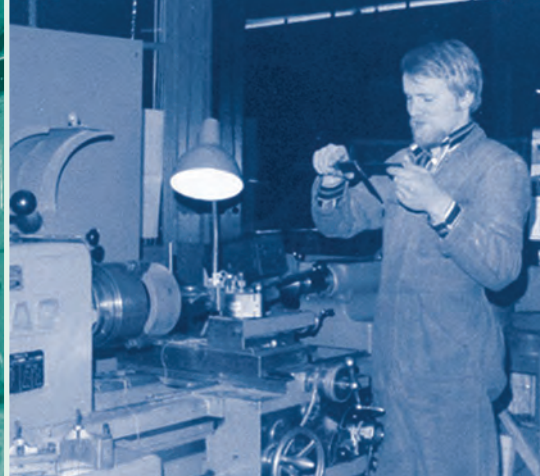
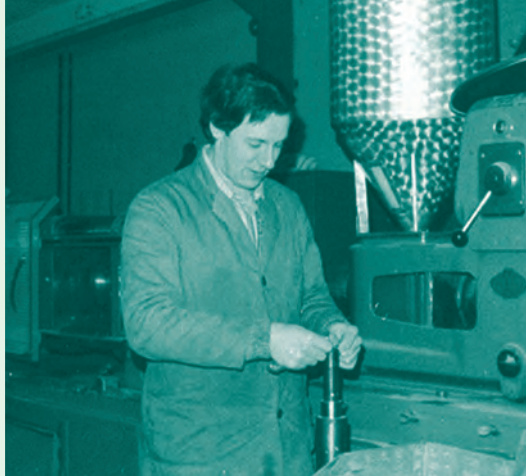


HUNGER

Dichtungen

EIN UNTERNEHMEN DER HUNGER-GRUPPE





Foreword

It is a great honour for me to write a few words on the success story of HUNGER DFE (Seals and Bearing Elements).

It all began with problems with the sealing of Hunger hydraulic cylinders.

For decades seals had always been one of the most important built-in elements of hydraulic systems, particularly of hydraulic cylinders.

However, most of the seals on offer were no longer adequate for modern cylinder construction, for example with respect to the choice of materials.

Even before the foundation of HUNGER DFE the ideas of my father - the inventor and entrepreneur Walter Hunger - had already been the basis for numerous patents for various types of seals produced under licence by major seal manufacturers.

When the delivery times of external suppliers for seals with special dimensions became unacceptable, the idea of setting up our own seal production was born.

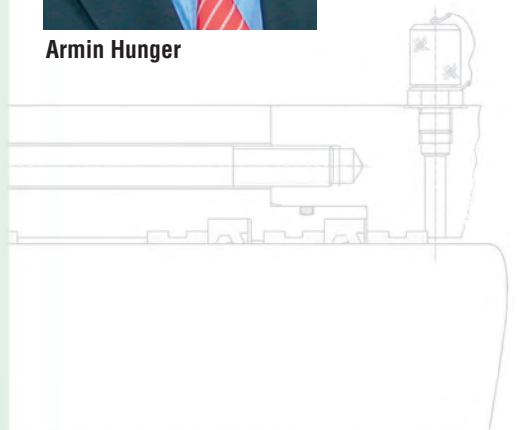
The foundation of HUNGER DFE in 1977 was preceded by a development phase lasting several years. Finally, owing to the constant expansion of new manufacturing processes, automation and continuous research and development, HUNGER DFE has developed in the last three decades into one of the world leaders in the field of sealing technology.

The basis for this is an ambitious and forward-looking company policy, as pursued by my sister Ingrid after I retired from the company management in 1980.

Through the inventor and founder of the company, as well as the two managing directors, the company has always been in family hands. The way has already been paved for this situation to continue in future so that my father's work can be carried on as before.



Armin Hunger





1977

The Establishment of Hunger DFE

The establishment of HUNGER DFE 1977 in Lohr am Main is closely associated with the growth of the „Walter Hunger KG“ cylinder factory, especially with its manufacturing spectrum for special and large cylinders.

With increasing frequency a situation arose whereby the requirements for sealing and bearing elements could either not be covered at all by the suppliers, or only after a long delivery period.

In order to maintain our own flexibility and be in a position to supply highly specialised hydraulic cylinders ourselves within a short period, the decision was taken in 1977 to set up our own production location on the existing factory premises in Lohr am Main.

Even after two years HUNGER DFE had grown so rapidly that the premises in Lohr were no longer large enough. However, as the local town council was not able to make any land available for the construction of new buildings, production was relocated in 1979 to Würzburg in a building constructed in accor-

dance with our own requirements. Here, in the research and development of new materials it was possible for HUNGER DFE to take advantage of the proximity of the South German Plastics Centre and the Würzburg Technical College.

In the years 1976 and 1977 the company supplied products not only to the Hunger Group, but began delivering items to external customers such as Hasenclever, Müllerpressen, Menck, Bucher and Luther, among others, in Germany.

In addition to these German firms, initial successes were also achieved in foreign countries, the most important of which were South Africa (the firm Hytec), France, India and the USA (the firm Miller Fluid Power). Currently the company holds approximately 22 patents relating to seals, all of which are being exploited. For over 25 years an entire product range has been in existence, consisting of seals and bearing elements for all types of applications.



Ingrid Hunger





1978-1983 New Bearing Elements for Müller-Press

The very first main customers outside the HUNGER Group were the press manufacturers, who quickly saw the advantages of the HUNGER bearing elements.

In press construction, large cylinders are required for the creation of the enormous forces – sizes which many seal suppliers are not able to provide.

In contrast to the bronze bushes which they had used previously, they were now able to save material and manufacturing costs without having to renounce stability or reliability.

In this way the press manufacturer Müller in the town of Weingarten was able to incorporate leading-edge technology into its designs through the use of our specially developed type FI bearing elements.

These customers were the impulse for the marketing strategy and the acquisition of further customers.



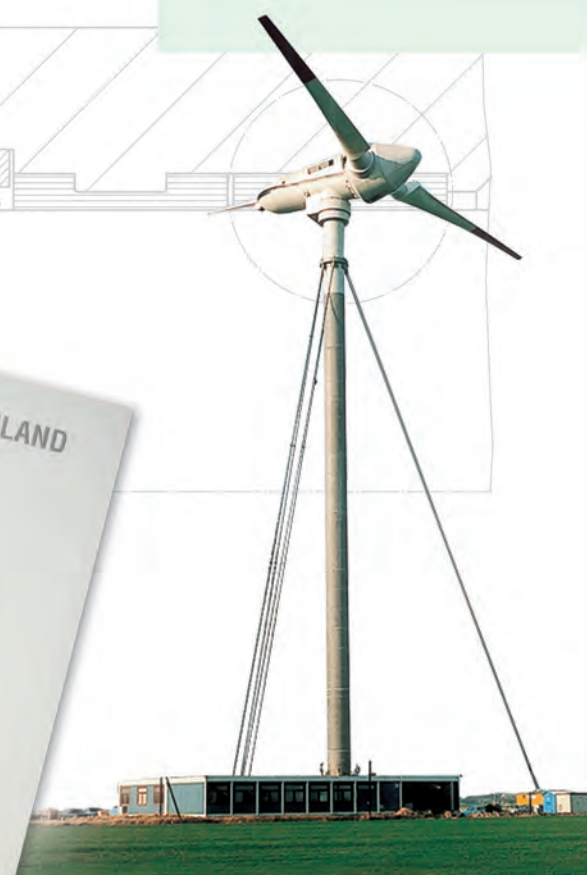
Large-scale Wind Farm „GROWIAN“

Between Brunsbüttel and Marne on the North Sea coast of Germany the large-scale wind farm „GROWIAN“ was set up in 1983.

The 50-metre long rotor blades can be rotated and their angle of inclination corrected irrespective of the force or direction of the wind in order to achieve an approximately constant speed. The friction of the bearings had to be reduced to a minimum due to the shaft diameter of 2 metres and tracking times of just seconds. This was achieved by the use of an oil bath in which the two rotor shafts are located as well as two particularly low-friction seals per shaft. These seals were developed by HUNGER DFE in close cooperation with the lead contractor MAN.

The extreme conditions required the highest performance from the sealing system: a high sealing efficiency with a low pressure (0.2 bar), minimum friction and compensation for the shaft movement of +/- 2 mm caused by the vibration.

By the use of special PTFE compound elements, abrasion-proof special thermoplast elastomers, round section elastomer rings and thermoplastic support rings, the seal profile made by HUNGER DFE is able to fulfil this difficult task.





1985-1987 Hunger Seals for the NASA Space-Shuttle Project

The 28th September 1986 is a black day in the history of manned space travel. The American spaceship „Challenger“ explodes a few seconds after launch. All crewmembers are killed. The cause is diagnosed as a sealing problem in the solid fuel rockets.

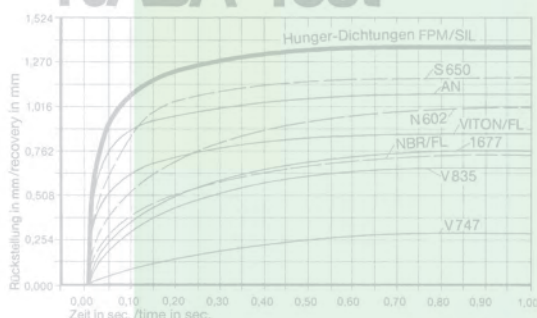
Dr. Eng. h.c. Walter Hunger convinces the American space agency NASA with his ideas and practical expertise and is awarded a development contract.

The HUNGER Development Team works on various solutions.

Not long after Walter Hunger is able to present these personally to the NASA engineers. The Hunger multi-component precision O-ring MCOR displays the best values in the compression test. HUNGER DFE had developed a product which gave the best results not only in terms of its excellent resistance to chemicals, but also with respect to extreme temperatures (-50°C to +220°C).



NASA-Test



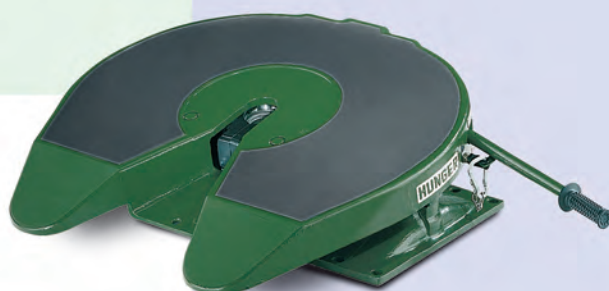
Grease-Free Slideway Lining for Fifth Wheel Couplings

In 1989, after the enormous changes in Germany, Dr. Eng. h.c. Walter Hunger was occupied with the re-privatisation of his former factory in Frankenberg/Saxony, which had been the birthplace of the HUNGER Hydraulics Group in East Germany. In the past hydraulic tipper trucks had been manufactured here.

He decided to continue with the product range in the field of vehicle construction, although this was an area in which no significant innovations had been made.

He therefore developed patented innovations such as a fully hydraulic, maintenance-free fifth wheel coupling. This is extremely environmentally friendly, as the fact that lubrication is no longer required means that there is no road damage or environmental pollution caused by grease residues.

For this application HUNGER DFE developed a special sintered slideway lining which, due to the improved friction characteristics compared to a steel/steel combination, also had a positive effect on driving behaviour.



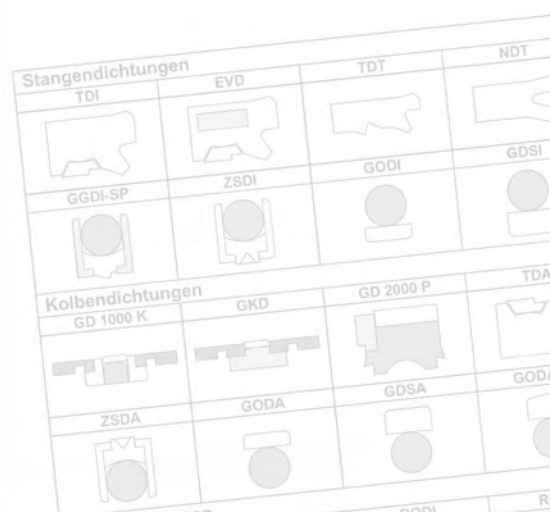


1988-1994 Tunnel Mole

Superlatives have always been used in association with the HUNGER Hydraulics Group. HUNGER DFE special seals of all sizes from mini to maxi are always the first choice even for the most extreme of conditions.

For the expansion of the high-speed railway network in Paris a tunnel mole of the firm ALPINE Westfalia is used with a drilling diameter of 7400 mm - the second largest in the world at the time.

The standard elements of HUNGER DFE are used to develop the special seal TDAI-S with a diameter of 3360 mm, used here as a combination of dirt wiper and grease seal for the cutting head shaft.

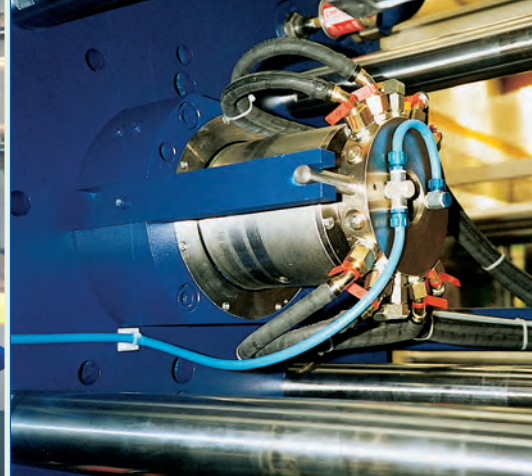


Hydraulically Extendable Telescopic Tubular Masts for Fire Boats

For fighting fires on large ships hydraulically extendable fire extinguishing monitors are used on special fire boats. The telescopic mast system with a central opening for the extinguishing medium is manufactured from

non-rusting material in order to meet the high standards placed on stability as well as seawater and chemical resistance. The use of HUNGER DFE sealing and bearing elements guarantees the production of maintenance-free telescopic masts.



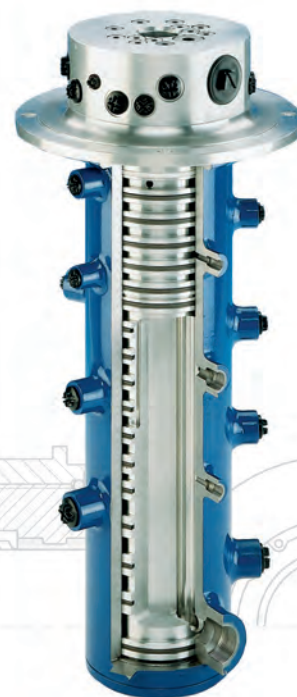


1995-2006 High Speed Seals Type RSI/DSI for Rotary Distributors

One product segment of HUNGER Maschinen GmbH is rotary distributors of special and standard designs.

Rotary distributors for slow rotating and swivelling movements are fitted with Hunger rotary seals and have formed part of the company's range of products for a long time. Sealed separation channels make it possible to simultaneously transmit media such as gases and liquids. Typical fields of application for this version are slewing cranes and excavators.

In machine tool manufacturing considerably higher demands are required with respect to pressure and speed. HUNGER DFE has met these demands with the development of the rotary seals RSI and DSI, which can be used for pressures of up to 360 bar and circumference speeds of up to 8 m/s.



Intelligent Sealing System EVD

With this patented innovation it is possible to compensate for seal wear and tear without the need for the machine to stop.

The externally adjustable EVD sealing system can increase the sealing effect and therefore

the service life of a complete plant many times at the first signs of a leak by manual or automatic prestressing. Further patents are also pending in this direction with respect to intelligent wiper systems.





2007 Hunger DFE Today...

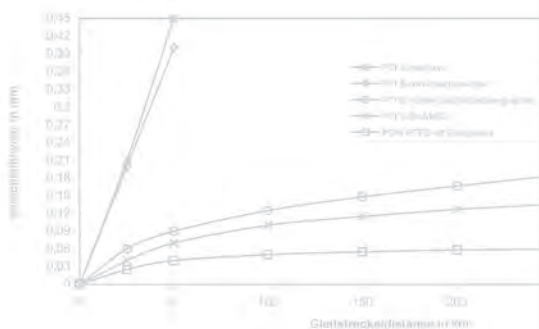
Seal development and production was initially implemented to supply better seals solely for use within Hunger cylinders. However, in the meantime HUNGER DFE has developed into a successful globally active company which will achieve its highest ever turnover in 2007.

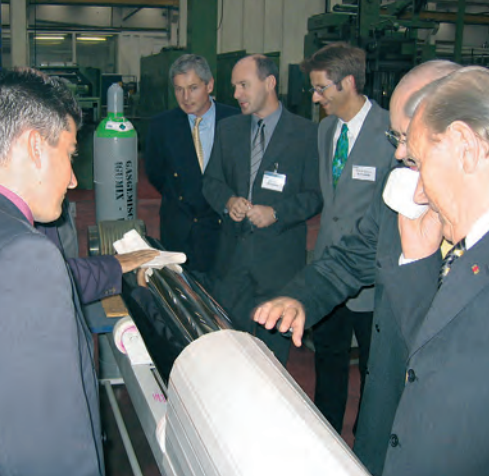
The revised edition of the Seals & Bearings catalogue has been extended to include new products such as the GODI-SPE & GODA-SPE pressure relieved slide-ring seals with enhanced friction properties, the DS-I and DS-A high speed high pressure rotary seals and the A-EIS-SL heavy duty ice wiper/scraper with solid bronze floating primary scraper lip. These

new products were all developed in-house by our own engineering team followed by field testing under real conditions to prove their worth.

We have always placed great importance on the quality of our products, clearly demonstrated by our use of a quality management system in accordance with the requirements of DIN EN 9001:2000, our continuous in-house auditing and long-term studies carried out on behalf of our customers.

The laying of foundation stone for a new manufacturing plant in the developing industrial area of Sankrail, on the outskirts of the Indian metropolis Kolkata in West Bengal, marks a milestone in the history of the company. Since the incorporation of its representation in India 20 years ago HUNGER DFE has ranked among the most respected of German pioneers serving as a partner to the aspiring Indian economy.





2008... Hunger DFE Tomorrow

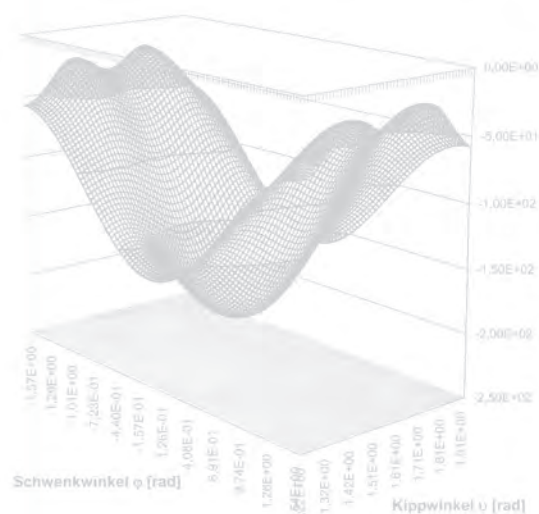
HUNGER DFE continuously focuses on its founding principles: highest product quality, maximum customer satisfaction and the ability to live up to the claim "Hunger solves problems" by constant improvement and development to meet the ever increasing demands of our customers.

We are keen to supply the emerging Asian markets – especially our partner in India – with locally manufactured products. The new manufacturing facility in Kolkata will combine our renowned quality & workmanship with local Indian practice.

We will continue development of new products and will ensure the best technical support to our customers by further recruitment of skilled personnel and ongoing training and updating for our engineers. New technologies, materials and processing will be integrated into our production lines.

HUNGER DFE will continue its contribution to the promotion of Germany as a centre of technology excellence by providing on-the-job training and cooperation with research institutes such as the VDMA (German Engineering Federation) Fluidics Study Group, assisting with diploma theses and contributing to research funds.

Flächenpressung auf S_{11} - PTFE-PTFE-Gewebe



Hunger DFE worldwide



Great Britain

HUNGER

Hydraulic UK

USA

HUNGER
Hydraulics Co. Ltd

Tandemdichtung TDI

Führungsfing FI

France

SKZ
ZERTIFIZIERUNG

Die SKZ-Cert GmbH Zertifizierungen bescheinigt dem Unternehmen

HUNGER
Dichtungen

Ein Unternehmen der Hunger-Gruppe

Hunger DFE GmbH
Dichtungs- und Führungselemente
Alfred-Nobel-Str. 26
97080 Würzburg

Branche:

Entwicklung, Herstellung und Vertrieb von
Dichtungs- und Führungselementen sowie
Formteilen aus Thermoplasten und Elastomeren
die Einführung und Anwendung eines Qualitätsmanagementsystems
gemäß

DIN EN ISO 9001:2000

Der Nachweis wurde durch ein Qualitätsaudit erbracht.

Dieses Zertifikat ist gültig bis:
Zertifikat Nr.:
Erstzertifizierung:

24.05.2008
064/05-R
April 1999

25.05.2005

Zertifizierungsstelle

SKZ-Cert GmbH
Zertifizierungsstelle
Alfred-Nobel-Str. 26
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Z E R T I F I K A T