

The background features a large, stylized circular graphic resembling a gear or a turbine, composed of concentric rings and radial segments in shades of blue and grey. In the center of this graphic is the company logo. Below the logo, there are faint, technical line drawings of hydraulic components, including what appears to be a pump or valve assembly on the left and a cylindrical component on the right.

HUNGER

Hydraulic Group

WE CREATE HYDRAULIC SOLUTIONS

75

1945 - 2020

HUNGER HYDRAULIC GROUP



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ADVANTAGE THROUGH EXPERIENCE

As an international medium-sized company, the Hunger Group is one of the leading providers of hydraulic engineering components and customer specific hydraulic system solutions

The company, which was founded in 1945, has diversified its services in recent years to meet the needs of a wide-ranging customer base. Business activities today focus on bespoke client problem solutions in the hydraulics and automotive engineering sectors . The hydraulic business is divided into cylinders, seals, abrasives, machines and power units, along with commissioning, servicing and repairs. As a manufacturer of vehicle components, the automotive sector is partnered with various companies within the automotive industry and supply chain.

Hydraulic engineering is the predominant business area of the Hunger Group. The components and systems manufactured by Hunger Hydraulics are universally recognized as leading their class, meeting the highest standards and requirements and employed in applications around the globe. Many years of experience in all fields of hydraulic engineering helped the company to develop extensive know-how, targeted to meet the demands of varying customer specific problems. The experience and acquired production know-how provides the cornerstone for component and system manufacture, ensuring the highest quality standards in the industry. The combination of experience, utilization of latest technologies and the ability to address client specific needs when integrating components and systems into customer applications makes Hunger Hydraulics unrivalled in this business sector.

Main production areas for the automotive sector are trailer couplings and sheet metal processing. Innovative fully hydraulic maintenance free trailer couplings are unique in their field whilst distinguishing factors in the area of sheet metal processing are production know-how and extensive experience in the manufacture of complex forming & stamping components. When combined with high level engineering capabilities and a customer focused approach, high standards which exceed client expectations are assured.

Walter Hunger laid the foundation for the business endeavors of the Hunger Group by manufacturing hydraulic tipping vehicles in Saxony in 1945. Today the company operates internationally with subsidiaries in Europe, North America, China and India, with agencies in many other countries.

“Everything that we encounter leaves traces“

Johann Wolfgang von Goethe



THE ORIGINS OF A SUCCESS STORY

The history of the Hunger Group begins in 1945 in Frankenberg, Saxony



Tipper truck with telescopic cylinder

Returning from the war, Walter Hunger acquires an old forge. Three years later, the 23-year-old orphan constructs his first hydraulic truck tipping system. The most important component was a strut he dismantled from an aircraft wreck.

From that moment on things develop rapidly: In Frankenberg, Saxony, the first employees produce hydraulic pumps, valves and telescopic cylinders, installing them in trucks and trailers for sale.

Groundbreaking new designs are created, such as the first 8-ton trailer with an air-brake tipping mechanism. A 3-ton truck is equipped with a hydraulic cylinder driven tilting device.

ALWAYS AHEAD OF THE TIMES



Trailer with rubber tires - arised from the scrap of the 2nd world war



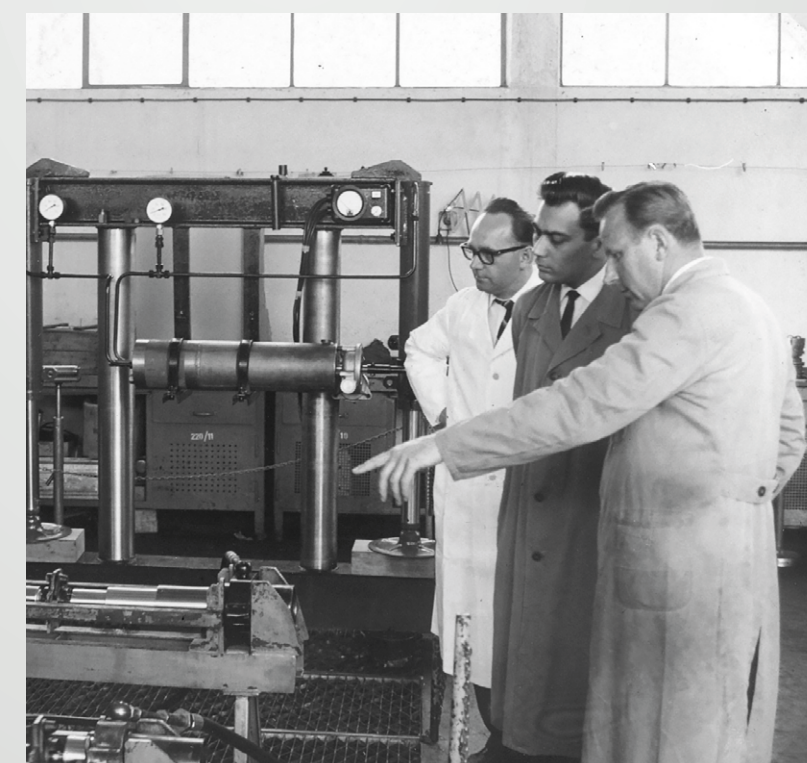
60 ton flat bed trailer with levelling hydraulic



IDEAS AND QUALITY THE FOUNDATIONS FOR GROWTH

From craftsman to industrial enterprise with talent and ingenuity

Driven by enthusiasm and curiosity for new technology, together with early business success, Walter Hunger quickly developed a number of new products and customer-specific solutions, resulting in numerous registered inventions and patents. He also understood how best to take these ideas to the market and very soon his Frankenberg manufactured high quality vehicle products were in high demand.





ESCAPE FROM EXPROPRIATION

10 years later and the rapid ascent of the still developing company is stopped in its tracks

In 1957 Walter Hunger expands the main factory in Frankenberg, where overhead loaders and bulldozers are now being produced. In the same year he transfers the mechanical department, electroplating and production of the TL40 & TL80 low loaders to a new factory in Chemnitz. In 1958 he leases a motor vehicle company with 5000 square meters of floor space.

But the political climate in the former GDR makes operation increasingly difficult for the private Hunger Company, with stricter tax laws and state-regulated sales being imposed. The impending nationalization of private companies drives Walter Hunger together with his family and employees to flee to the West. His production plants in Frankenberg, Chemnitz and Leipzig remain in the East with over 1000 of his employees.



“Beginning is easy, perseverance is an art”



Hunger- Fahrzeugwerke factory in Frankenberg



Headline in the Bild newspaper about the escape



NEW BEGINNINGS IN LOHR AM MAIN

Walter Hunger is left with nothing. Together with several employees who fled with him from the former GDR he makes a fresh start in Lohr am Main, Franken



Meeting about factory expansion

Advance plans for a partnership with a local hydraulic company do not work out as intended resulting in most of the employees who fled the GDR with Walter Hunger leaving the company.

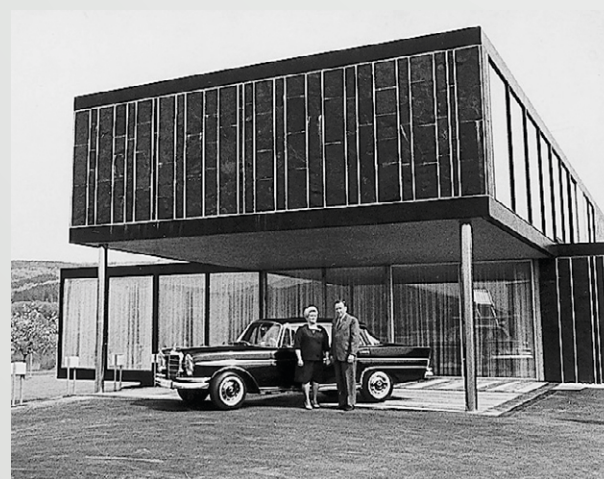
The Lohr mayor, Dr. Nebel, introduces Walter Hunger to the Rexroth company who kindly offer to provide finance and temporary premises for 6 months. In November 1958 the Walter Hunger Comp. OHG is founded. Walter Hunger's contributions are his patents and all of his extensive knowledge and experience.

In early 1959 the first production and administration building is built on newly acquired land on Rodenbacher Strasse with production beginning by mid 1959. Success comes quickly and very soon thereafter the company establishes itself amongst the top tier of German hydraulic cylinder manufacturers.

AFTER TWO YEARS BACK TO THE TOP OF THE GERMAN HYDRAULIC COMPANIES



New construction of factory building



The new residential building



The new administrative building



1987 - Philip-Morrison-Prize



1995 - Environment-Protection-Award for the industry



1991 - Honorary doctorate from the Technical University Chemnitz

DR.-ING. E. H. WALTER HUNGER, PATENTS AND HONOURS

*“Only those who research
and develop will be
successful in the end.”*

An honorary doctorate, the Federal Cross of Merit, the Phillip Morris Prize and over 200 patents and intellectual property rights, are just a few examples of the innovative strength of Dr.-Ing. E. h. Walter Hunger

Improvisation, continuous research and development and an entrepreneurial spirit are driving factors in his life. His inventions lead to over 200 patents, often implemented in highly specialized products. He collaborates with universities and institutes, supports dissertations and theses, awards diplomas and PhD's.

In 1991 the Technical University of Chemnitz awards him an honorary doctorate for his outstanding services in the field of manufacturing technology in the hydraulic sector. Further innovations and inventions pave the way to environmental protections and sustainability. In 1995 for his work on the patented, maintenance-free trailer coupling, Walter Hunger receives the BDI Industrial Environmental Protection Award in the category of environmentally friendly products.

In 1996 the Bavarian State Government awards him the Federal Cross of Merit for his work and entrepreneurship towards the reconstruction work in the new German Federal States. In 2004 the Indian Hydro-power Association (INHA) honours Dr.-Ing E. h. Hunger for his expertise and contribution to the field of hydraulic steel structures.



1996 - Federal Cross of Merit





*“Performance convinces,
quality establishes trust”*



FAMILY & TRADITION

The constant pursuit of Dr.-Ing. E. h. Walter Hunger for technically advanced products of the highest quality results in the formation of a group of medium-sized companies

In the background of his pursuit was always the wish that his five children would one day join the company. They were trained in the sectors of business management and technology. Son Armin and daughter Gisela join the company in 1974. Armin now lives in the USA and runs the subsidiary there. Gisela leaves the company in 1979. Two years later, daughter Ingrid joins the company and to this day continues to steer the business into a bright future in line with her family tradition. As managing director and authorized signatory, Ingrid is fully committed to the company. She is the guarantor to ensure the continuation of Walter Hunger's life's work.

Just in time for the eightieth birthday of Dr.-Ing. E. h. Walter Hunger, youngest son Jan becomes part of the management. Jan studied mechanical and industrial engineering, gaining experience for several years in a management consultancy before joining the company.

A fresh breeze is now blowing through the Hunger family business. Dr.-Ing. E. h. Walter Hunger has achieved another goal in handing over the reins of his company to the next generation of his family. And for the future there are one granddaughter and seven grandsons following in his footsteps, three of them have studied mechanical engineering and business administration, undoubtedly with the same entrepreneurial blood of their grandfather pumping through their veins.

AT HOME ANYWHERE IN THE WORLD



COMPANY FORMATION



1945 | GUNNERSDORF – Taking over of a forge



1950 | FRANKENBERG – Company foundation at new place



1958 | LOHR AM MAIN – Restart and foundation of Walter Hunger KG



1973 | Foundation of Hunger Hydraulic UK



1977 | WÜRZBURG – Foundation of Hunger DFE



1981 | Foundation of Hunger Hydraulics USA



1986 | Foundation of Hunger Hydraulics CHINA



1991 | FRANKENBERG
Retransfer of the company



1999 | Foundation of Hunger Worldwide Service



2009 | Foundation of Hunger Hydraulics INDIA



2015 | Foundation of Hunger KOREA



>> 1945

1950

1960

1970

1980

1990

2000

2010

>>

1945 Manufacturing and repair of agricultural vehicles

1948 Construction of hydraulic tipping system for trailers



1950 Manufacturing of hydraulic pumps, valves and telescopic cylinders for tipping systems

1954 40 t low loader trailer with hydraulic cylinder lowering system

1956 Hunger carousel "Kosmo Plane" with hydraulic cylinder lowering system

1958 The Hunger family and several of their employees flee to West Germany



1961 Manufacturing of all telescopic tilt cylinders for the Daimler Benz Unimog

1963 Hull lifting system for enlarging ship's hull



1970 The first telescopic fire extinguisher cylinder was developed for the Parat fire extinguisher boat

1972 Delivery of large cylinders for the Iron Gate barrage on the Danube river

1972 Hydraulic Cylinder for tunnel excavating machine

1977 Hydraulic telescopic antenna with a total height of 52 meters for the German armed forces.

1979 21 turbine inlet cylinders for the Guri dam in Venezuela



1980 First vertical casting cylinder with integrated anti-rotation device for the aluminum industry

1984 Hydraulic bridge construction feed frame for the construction of the ICE terrace

1985 Hydraulic cylinder for the world's largest mobile crane with 1000 t lifting capacity

1986 NASA research contract to develop new seals in response to the Challenger disaster



1991 onorary doctorate from the Technical University of Chemnitz for Walter Hunger

1991 Recovery of Frankenberg plant property

1993 Complete hydraulic system for the Wuqianxi dam in China

1995 Hydro-pneumatic bicycle suspension

1996 Federal Cross of Merit for Dr.-Ing. E. h. Walter Hunger

1999 Large hydraulic cylinder for oil rig heave compensation

1999 Hydraulic Cylinder for the Puttgarden ferry terminal



2001 Hydraulic jack for nuclear research centre for transporting detectors ?? weighing up to 5000 t

2003 Complete hydraulic system for the new flood-gate in Bremerhaven

2004 Telescopic hydraulic cylinder for Canary Wharf bridge in London

2007 Large cylinder for St. Petersburg flood protection barriers

2007 Hydraulic stretching cylinders with a capacity of up to 11,000 t

2008 Hydraulic cylinder for bascule lifting bridge in the port of Porto



2011 Hydraulic cylinders for the wave power generation plants Oyster I and Oyster II

2013 Hydraulic drive system for modernization of the St Petersburg Palace bridge

2015 Equipping the NASA space shuttle transporter with modern hydraulic cylinders with a 50 % increase in lifting capacity

2015 Delivery of the 200 t dredger hydraulic cylinder to Japan for the world's largest floating dredger GOSHO

2016 Telescopic cylinders for submarine antennas and periscopes

2019 Hydraulic cylinders for Boston-Barrier floodgate in the UK



MILESTONES





CHALLENGE ACCEPTED!

COMPLETE HYDRAULIC SOLUTIONS FROM A SINGLE SOURCE – WALTER HUNGER GMBH & CO. KG

Hunger Hydraulics – the synonym for extraordinary hydraulic cylinders and system solutions

From the first customer consultation through to the engineering, certification requirements & procedures, manufacturing, testing and additional services such as installation, commissioning and maintenance – our customers have one contact person to guide them through the whole process.

cations, makes Hunger a competent partner on the global stage of mechanical and plant engineering. Quality, reliability and special consideration given to customer requirements are the core values of our corporate philosophy, developed over decades, and the essential trademark of Hunger hydraulic products.

The specialization in bespoke and large cylinders, high level integration of manufacturing with our in-house surface coating and other processing methods together with a broad range of customers and appli-

Hydraulic cylinder with 20 m stroke and 200 ton own weight for a dredger



Demonstrator for internal coatings



Hydraulic cylinders for open cast mining application

*“All good principles exist in this world,
you just have to apply them”*

Blaise Pascal

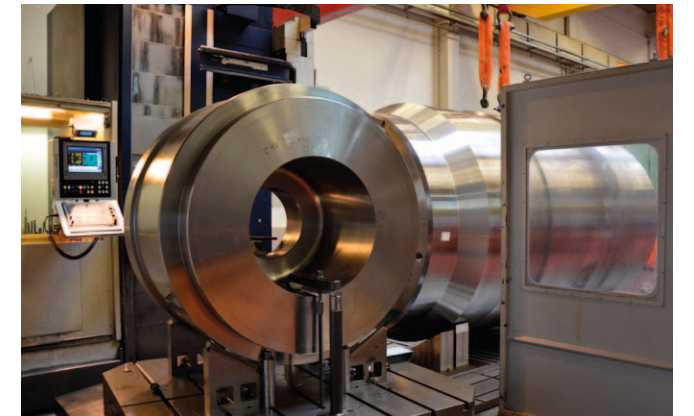


MANUFACTURING FACILITIES FOR SPECIAL CYLINDERS

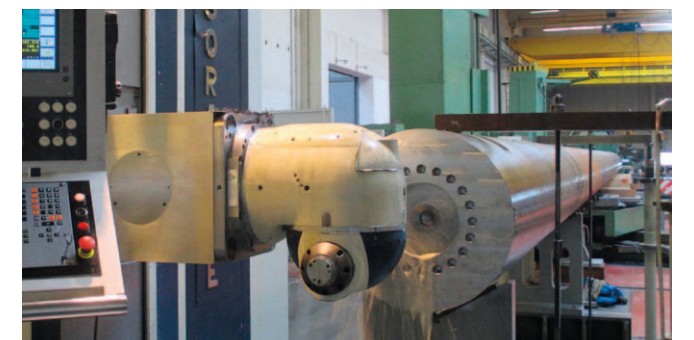
Turning, drilling and honing for component dimensions up to 4 m in diameter, 25 m in length with component weights of up to 100 t – we are well equipped to tackle extreme demands

Large lathes, deep hole drilling and honing machines and machining centres specifically designed for the machining of large cylinder components are at the heart of our mechanical production technologies.

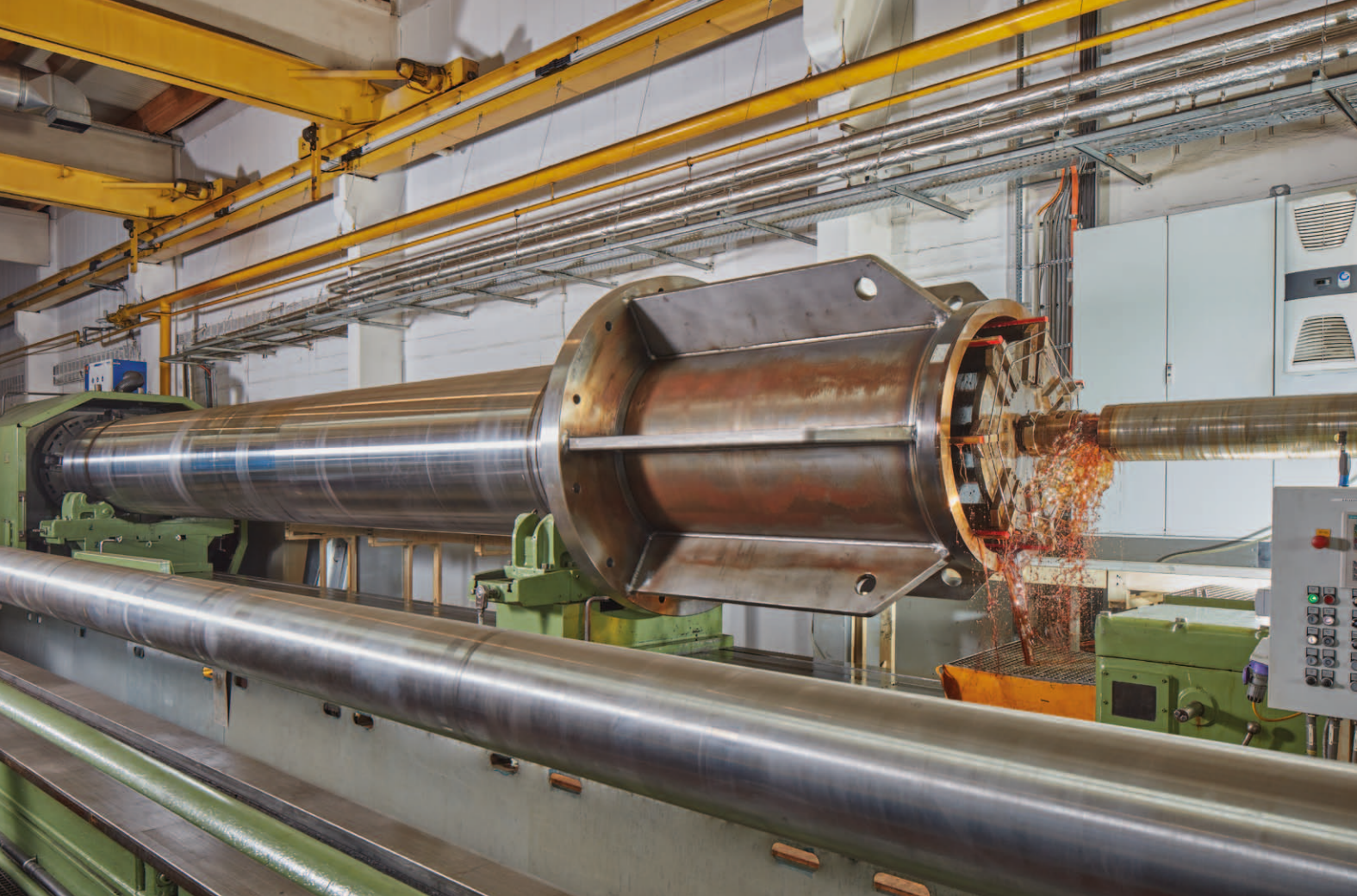
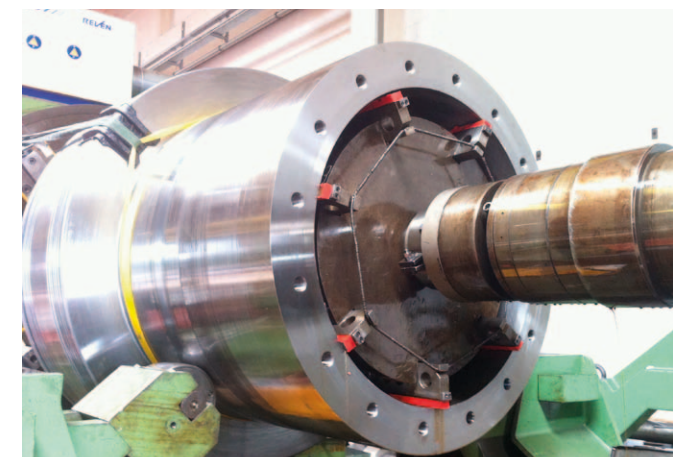
No less important are the skills and experience of our highly qualified employees when it comes to the processing and assembly of such large items. For this reason we teach our young skilled operatives in our own training workshops.



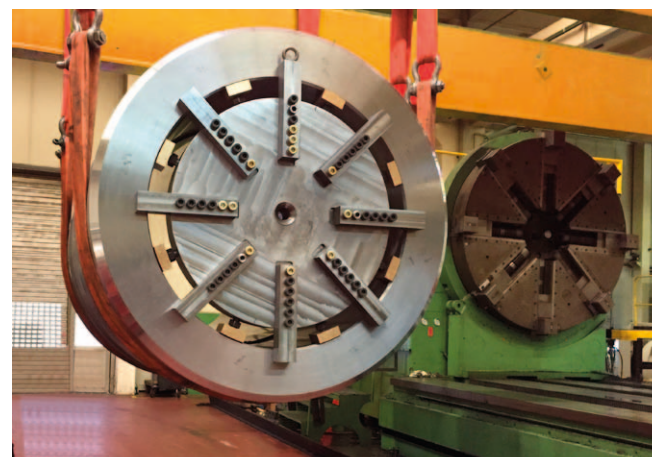
Mill centres for large work pieces but also for compact work piece dimensions



Horizontal and vertical outside and inside honing machines for surface machining of piston rods and cylinder bore holes as well as for coated surfaces



Honing process on an inside honing machine as well as several lathes with cylinder pieces of up to 100 ton weight



In addition to appropriate manufacturing machines for very large and heavy components, necessary heavy lifting equipment is also required during the production process, such as cranes, lifting frames and transport trolleys

In order to provide the highest possible flexibility and economy, a purpose built hydraulic lifting frame is available with a total lifting capacity of 320 t, which can be positioned directly above the respective machines or assembly areas.





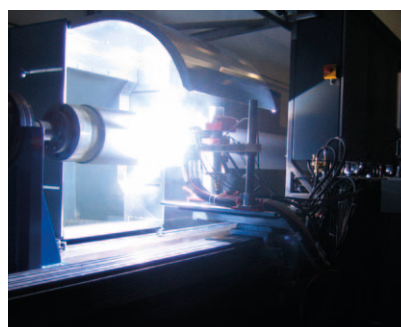
SURFACE COATINGS FOR PISTON RODS

Thanks to our high-performance surface coatings for piston rods, hydraulic cylinders can nowadays be used successfully under environmental conditions which just a few years ago represented an insurmountable limitation of usage, or which reduced the durability and service life considerably

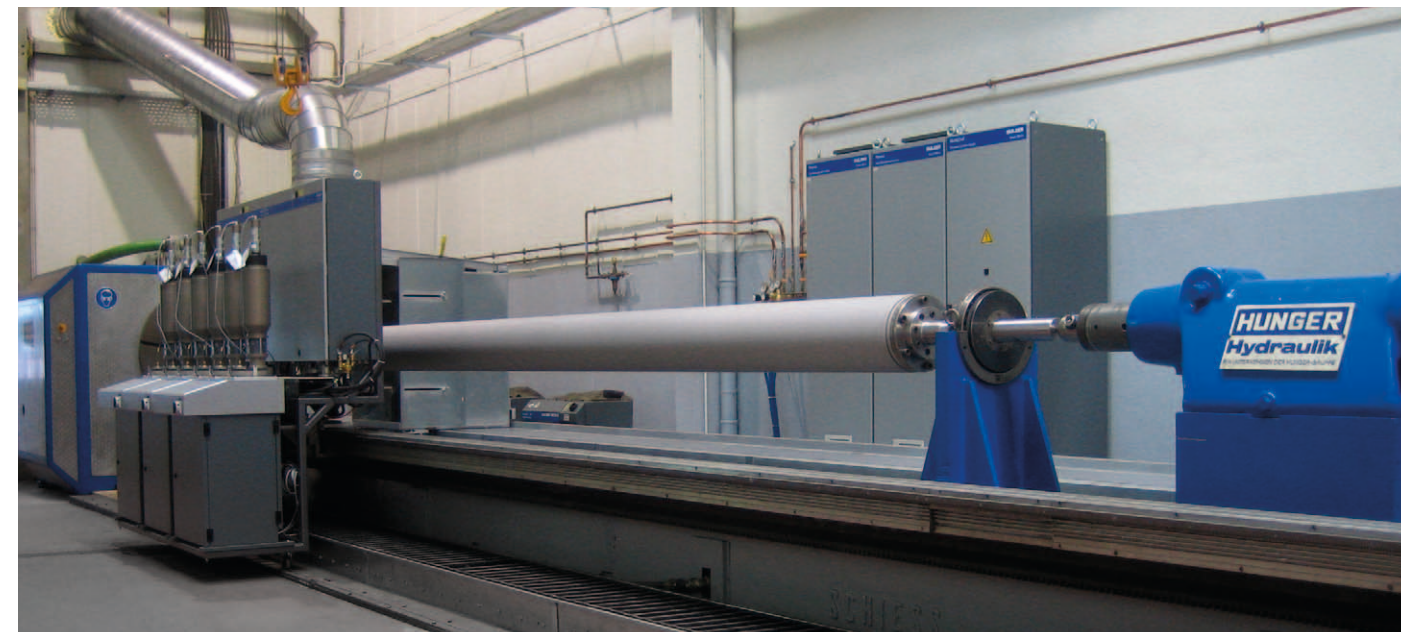
PLASMA SPRAYING AND LASER DEPOSITION WELDING

Practically all types of material and coatings can be applied with our plasma spray and laser welding systems. Both systems are designed for components up to 1 m in length and up to 50 t weight

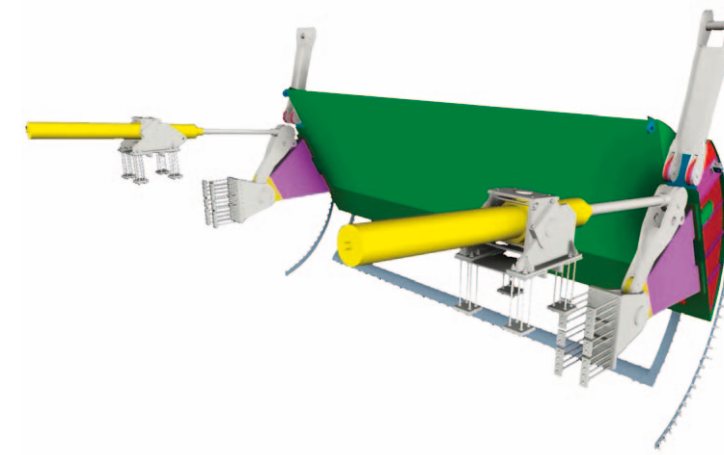
High speed laser cladding machine for the application of the piston rod coatings ChromePlus, UltraplatePlus as well as of the basic layer for the Ceraplate-Plus coating



With high speed laser cladding corrosion and wear resistant coatings can be applied with high efficiency and in excellent quality. The plasma spraying technology enables the application of extremely wear resistant ceramic coatings



Plasma spraying machine for the application of the piston rod coating Ceraplate as well as of the the top layer for the CeraplatePlus coating

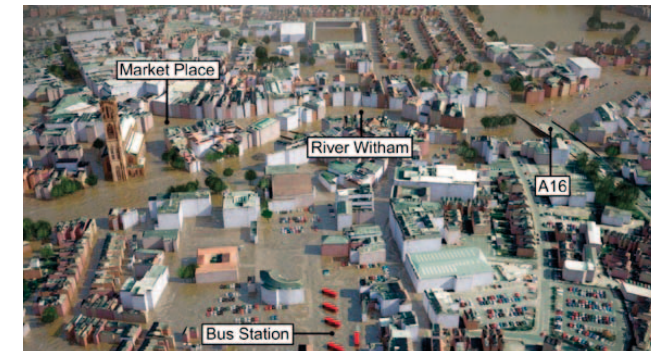


HYDRAULICS IN CIVIL ENGINEERING

Water is a force of nature and an increasingly important resource for the world population, industry, agriculture and energy. We help to control this force of nature

COMPLETE HYDRAULIC SYSTEMS FOR FLOOD BARRIERS, DAMS AND SHIP LOCKS.

Flood protection system in St. Petersburg, Russia, with a 115 m wide vertical slide gate, which is lowered at normal water levels but can then be raised with 4 hydraulic Cylinders at high tide levels. Each of the hydraulic cylinders has a lifting capacity of 12,500 kN with a lifting stroke of 11,800 mm. In operation the extended Ceraplate coated piston rods of the cylinders, are submerged in the brackish water of the Baltic Sea and the river Neva for up to 11 months of the year. Nevertheless, reliable operation is guaranteed even after a long period of inactivity.

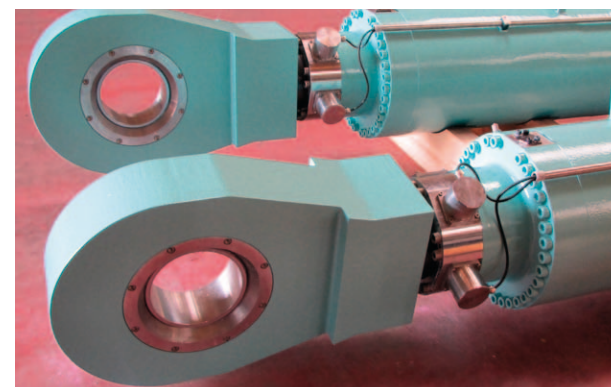


Flooding of the city of Boston, UK, by the river Witham before the installation of the flood barrier

Hunger is a highly qualified partner in civil engineering and construction. Large dimension hydraulic cylinders with Hunger manufactured drive and control units are now in use in over 140 dams, floodgates and weir systems worldwide. They control the functions of radial segment gates, sluice gates, roller gates, slide and flap gates along with turbine control gates ensuring reliable control of massive turbines. Our customer service, project planning, state-of-the-art engineering, manufacturing and testing (according to DIN, ASME and many other national standards) of complete hydraulic solutions combined with almost maintenance-free operation means Hunger hydraulic products are in high demand worldwide.



Sungcheoun flood barrier in South-Korea



Cylinder heads with integrated position sensors CIPS



Cylinders for Boston-Barrier project / GB with immersible sectional gate

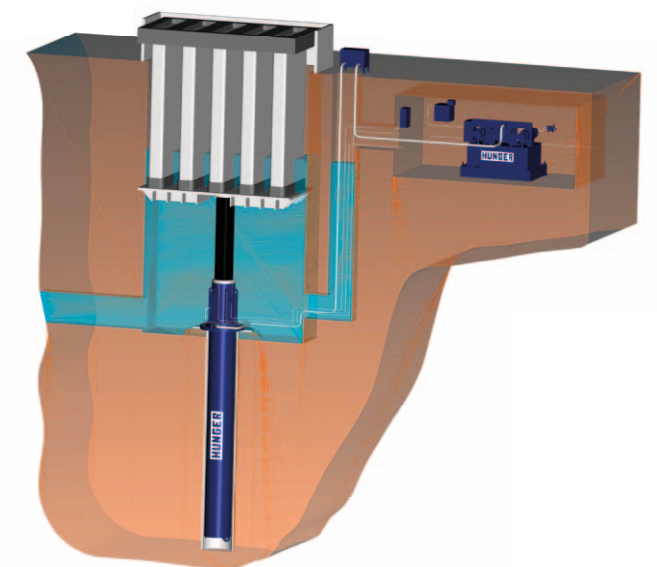


Pleikrong-Dam, Vietnam, with 12 radial gate cylinders

KEY COMPONENTS FOR THE ALUMINUM INDUSTRY

Hunger vertical casting cylinders operate with extreme sensitivity in aluminum casting plants, moving up to 200 t of liquid aluminum with maximum precision and in perfect harmony with the casting furnace hydraulic system, producing high-alloy aluminum materials for aircraft, cars, electronics, buildings and packaging

Vertical casting cylinders lower a casting platform during the casting process, taking control of all cast management functions. For this reason the cylinder has a very stiff piston rod with a highly accurate internal anti-rotation device fitted. The casting cylinder is constantly subjected externally to hot cooling water and casting waste in contaminated pits which requires the piston rod to have excellent protection against corrosion and wear. Both challenges are met by protecting the rod with Hunger Ceraplate or CeraplatePlus coating. Casting cylinders are available in dimensions up to 1,000 mm rod diameter and 15 m stroke.



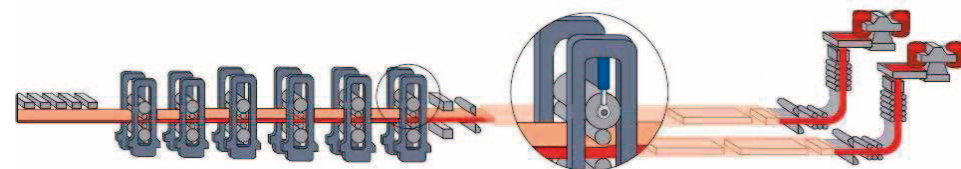
Vertical casting machine layout

In addition to the casting cylinders, associated hydraulic power units can also be supplied from which all functions of the system are operated, including furnace tilting and door lifting cylinders, details of which can be found in our product portfolio.



GETTING STEEL INTO SHAPE – HYDRAULIC CYLINDERS IN HARSH ENVIRONMENTS

Hydraulic cylinders operating in steelworks withstand high temperatures and extreme conditions but still provide the highest levels of reliability and precision



Hydraulic cylinders for ladle turrets, furnaces, rolling mills and steel sheet coil winding lines



Ladle turret lifting cylinder



Ladle turret with hydraulic lifting cylinder



Vertical casting cylinder under works test



Aluminum billet after casting

PRESS CYLINDERS – PERFORMANCE IS IN HIGH DEMAND

Press forces up to 10,000 t per cylinder, high dynamic loads combined with high accuracy - Hunger hydraulic cylinders are the first choice in forging, forming and bending presses

Press cylinders are exposed to frequent and very high static and dynamic loads. Precise design calculations are required, often based on fatigue strength with seals and their mating surfaces selected for their durability and wear properties.

In order to generate the very high press forces required large piston diameters up to 2,000 mm are used with operating pressures up to 500 bar.



3000 ton bending press with two cylinders with Ceraplate rod coating



3500 ton press cylinder with mounted pre-fill valve

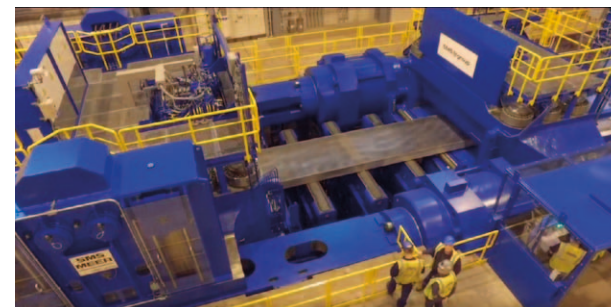
To achieve high speeds with these large dimensions integrated rapid traverse pistons are incorporated into the cylinder design which are used to quickly position the large rams prior to and after pressing, thereby reducing press cycle times. A Hunger pre-fill valve is fitted to the main piston which allows large volumes of oil to enter and exit while in rapid traverse. Once in position the prefill valve closes and high pressure is applied to the main piston to generate the pressing force.



“Nothing great in the world happens without passion“
Georg Wilhelm Friedrich Hegel

Baler for waste management, suitable for processing paper, plastics and non-ferrous metals. Waste materials are automatically portioned, compressed and ejected as pressed bales.

Assembly of stretching cylinder units with a unit weight of 258 t requires special lifting and handling systems in order to work safely with the required accuracy. Due to the high weight the assembly is transported in individual modules.



The world's largest stretching line for the cold forming of large aluminum ingot. The formed bars are the raw material used in the manufacture of aircraft structural components.





WAVE ENERGY GENERATION POWER PLANTS

Using the force of the waves in a controlled manner is an enormous engineering challenge, both for components and materials employed in plant design. Robust and overload-safe hydraulic solutions are the first choice when Hunger special cylinders take on the task of transmitting wave energy

HYDRAULIC CYLINDER PERMANENTLY SUBMERGED IN WITH WATER AS AN OPERATING MEDIUM, A MAJOR CHALLENGE FOR SURFACES AND SEALS

The operating conditions for hydraulic cylinders used in the Oyster wave power generation plant demanded an extremely high level of corrosion protection, both outside and inside. For environmental reasons water was the preferred solution for the hydraulic fluid. Specially developed sealing and guide elements proved their suitability on an endurance test bench, withstanding several million stroke cycles. The piston rods have Hunger Ultraplate offshore coating, which in addition to excellent wear and corrosion protection also provides antifouling properties. The piston running surface of the cylinder tubes is effectively protected against corrosion by a stainless steel liner drawn in to the outer tube.



Maritime vegetal cover on a cylinder head

The Corpower buoy system generates energy via the vertical movement of the buoyant float. Linearly arranged cylinders inside the float provide necessary pre-tension to the seabed and simultaneously produce power generation via a power take off train also located inside the float.

To evaluate the OPT PowerBouy several versions of the buoys were built and installed at different locations. Power is produced by a hydraulic cylinder driving a motor and generator inside the float. The cylinder is in turn driven by a Hunger supplied transmission rod inserted into the dry inner part of the float via a seal box fitted with Hunger seals and guides, all designed for permanent seawater submersion. Seals and guides are friction-optimized for maximum efficiency energy transmission.



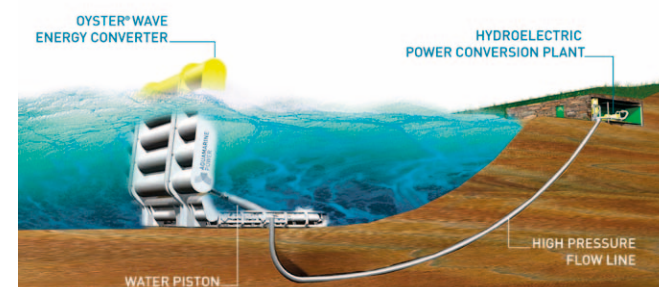
CORPOWER power buoy



Vertical travel cylinder of a power buoy



Oyster II hydraulic cylinders



Principle: Oyster wave energy plant



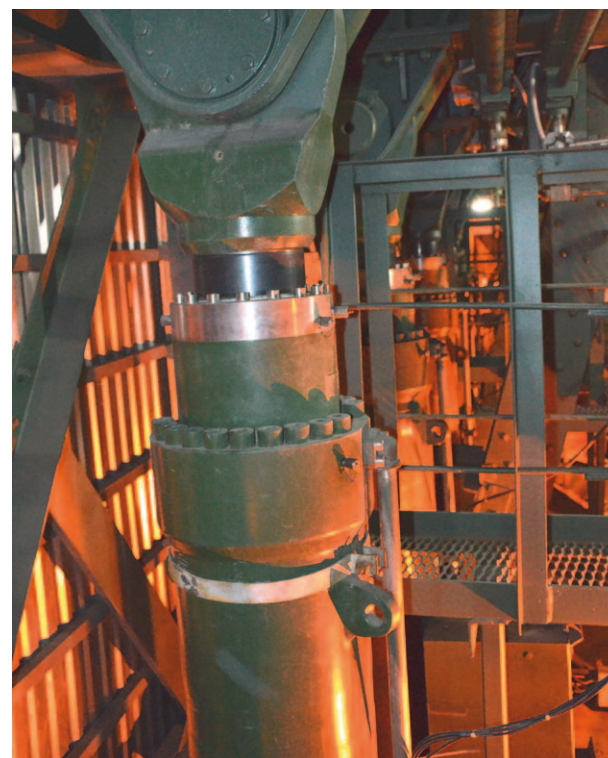
OPT- Power- Buoy



MODERN HYDRAULIC SOLUTION FOR A CENTURION

Modernization of the 100 year old Palace Bridge in St. Petersburg, Russia via replacement of electromechanical drives with modern electrohydraulic drive systems

Updating of the operating system for the Palace Bridge in St Petersburg placed exceptional demands on the new electro-hydraulic system. Load attachment points at the bridge structure had to be very carefully considered resulting in each bridge leaf requiring six hydraulic cylinders for even load distribution. In addition each hydraulic power unit had to be provided with 100% redundancy to ensure the bridge remains fully operational at all times.



6 synchronized hydraulic cylinders for each bridge section

FLEXIBLY DESIGNED TRAFFIC ROUTES

Modern hydraulic systems for lifting and swing bridges provide reliable and continuous use of intersecting traffic routes

Hydraulic power density allows even very large bridge sections to be raised with relative ease, with two or more bridge leaves often used for longer and wider spans. In these cases synchronization of the leaves may be necessary which thanks to modern position measuring technology and control system engineering is readily accomplished.

Depending on the application and scope of the project, Hunger can also deliver complete hydraulic operating systems including hydraulic cylinders, hydraulic power units and electronic control systems. At the project planning stage we focus on safety, quality and reliability. Extensive testing is carried out to prove the integrity of all system components. Hydraulic cylinders must not only be designed to move the weight of the bridge but must also be capable of supporting significant additional wind and snow loads.



Bascule bridge in Poole, UK, with diagonal divided bridge sections



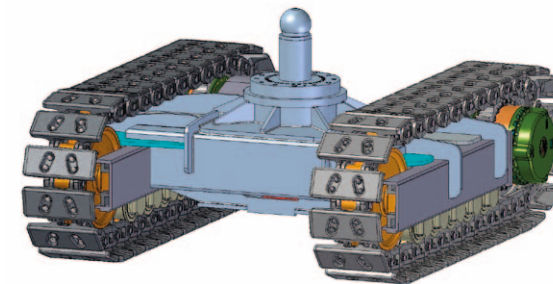
Hydraulic power unit and spherical bearings



HYDRAULIC SOLUTIONS FOR HEAVY DUTY TRANSPORT SYSTEMS

Safe and efficient transport of heavy loads thanks to the high energy density of hydraulic systems

The lifting cylinders for the NBR offshore transport caterpillars have a lifting capacity of 320 t and are equipped with an integrated spherical anti-rotation device, load sensors, position sensors, pressure sensors and swivel angle measurement.



NBR-Offshore crawler with central jacking cylinder



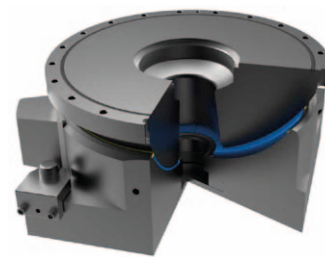
Jacking cylinder for NBR-Offshore crawler

LIFTING, BALANCING AND LEVELING

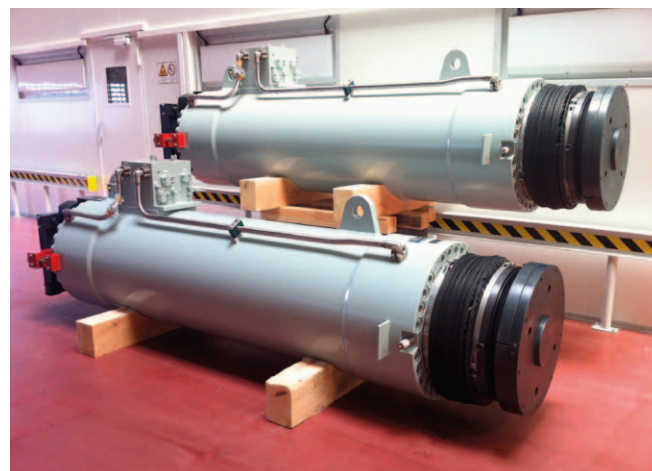
Stability, reliability and maximum precision –
Minimum requirements for the transportation of Rockets

For the transport of their spaceships from the Vertical Assembly Building (VAB) to the launch pads at Kennedy Space Center in Florida, NASA used two special transporters. To accommodate the new SLS Rocket and Orion spacecrafts the payload demand for the transporter increased by 50 % requiring the structure and the cylinders to be upgraded. A total of 16 hydraulic cylinders in the crawler are used to lift, balance and level the launch platform and rocket while driving to the launch pad, including keeping it level whilst traversing a 5-degree ramp.

To meet the new specified loads completely new cylinders were developed and built. On the basis of a risk analysis, a multi-level load holding safety concept was developed, which guarantees safe load holding even in the event of a total failure of a main cylinder. This together with other outstanding technical solutions and the quality of the product, are key contributors to the success of the project.



Spherical ball bearing in maintenance free execution



Hydraulic cylinders for the chassis of the NASA crawler transporter



Transport of the basement structure of an offshore windmill

OFFSHORE HYDRAULIC CYLINDERS

Hydraulic cylinders are used in a wide range of applications including ship cranes, heave compensation systems, dredgers, pile drivers, fire boats and submarines

Modern floating oil rigs are used for deep sea drilling where it is not possible for a fixed drilling setup at the seabed. To compensate for rig movement at the surface special heave compensation cylinders are provided catering for wave movements up to 10 m whilst supporting drill strings up to 5 km long. Piston rods are overlaid with Hunger Ultraplate for enhanced corrosion protection. In combination with specially developed Hunger seals and guides, long service life with little wear is guaranteed.

Hunger special hydraulic fire-fighting masts elevate fire-fighting monitors to great heights and simultaneously supply the monitor with water or other extinguishing mediums, electrical energy and control signals, combining complex functions and supply elements into a single hydraulic cylinder. The delivery program includes sizes up to 20,000 l/min water throughput and elevating heights up to 18 m.



In addition to optical periscopes, modern submarines need to deploy various communication instruments to the surface via telescopic masts. Special Hunger hydraulic cylinders are the first choice for the mast drive systems.



Hydraulic riser tensioner cylinders



Telescopic masts for submarines

POWER HYDRAULICS ON THE WORLD'S LARGEST FLOATING DREDGER

Hydraulic dredgers have a significant advantage over those with a winch drive due to higher energy efficiency. For this reason the world's largest dredger, GOSHO, is equipped with a central lifting hydraulic cylinder and two hydraulic cylinders for bucket actuation

GOSHO is certified by the Guinness Book of Records to be the largest dredger in the world and is operated with one of the largest and heaviest lift cylinders in the world, with a stroke of 20 meters and a weight of 200 tons.

The main lift cylinder engages with the shovel counterweight moving it via a cable system in up to 40 m water depth. The 20 m stroke hydraulic cylinder generates pushing and pulling forces of up to 1600 tons. The combination of finely polished Ceraplate Coating on the piston rod with Hunger sealing and bearing elements guarantees hundreds of thousands of cycles without any problems.

The 200 m³ capacity excavator bucket is driven by two internal hydraulic cylinders which must operate in contact with sea water, mud, sand, gravel and stones. For enhanced protection against this environment the piston rods are coated with Hunger CeraplatePlus. In addition the Hunger CIPS position measuring system is included allowing continuous monitoring and control of the bucket movements.



Transport of the 200 ton heavy hydraulic cylinder to train loading at our facility in Lohr am Main



Bucket hydraulic cylinders with CeraplatePlus and CIPS

SIZEABLE HYDRAULICS – OPENCAST AND UNDERGROUND MINING

Sand, stones, coal and various ores are excavated in opencast and underground mining. With the help of the heaviest equipment and machinery the mined product is conveyed, crushed and transported away. It is here that hydraulic cylinders with their high-power density and robustness exhibit their full potential.

Bucket wheel excavators, conveyor systems, belt stackers, loaders and drills use a variety of different hydraulic cylinders. These are often directly exposed to the harshest environmental conditions. The use of hard and wear-resistant piston rod coatings such as Ceraplate and CeraplatePlus used in combination with special wipers and seals guarantee high levels of reliability and durability. Selection of suitable steel grades allows use in all climate zones, even in temperatures below -40°C .



Bucket-wheel excavator with cylinders for boom and conveyor belt operation

In gyratory crushers, coarse rock and ore are broken into smaller pieces. The hydraulic cylinder sets the gap in the crusher to achieve the required crushed rock size and compensates for oversize rocks to protect the crusher from damage. The cylinder design includes internal oil feed channels to provide continuous lubrication to the main bearing.



Rotary crusher cylinder on the test rig



Rotary crusher in opencast mining



Rotary crusher with flanged on hydraulic cylinder



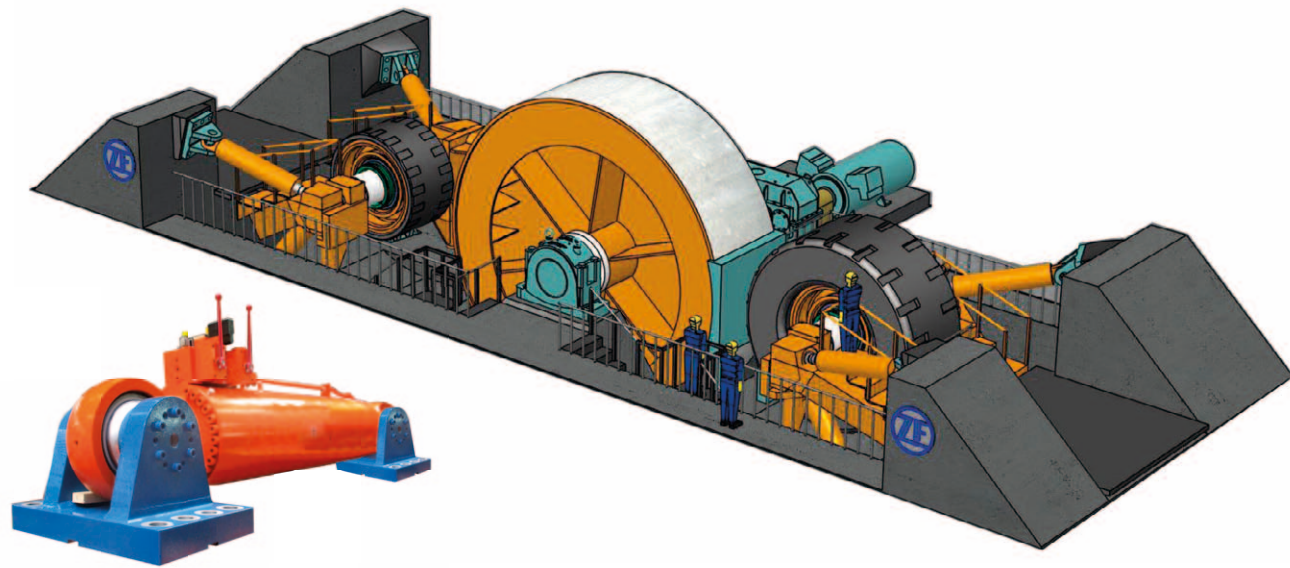
BULK MATERIAL SHIP UNLOADER

Ship unloaders operate at cargo ports or in coastal industrial plants. Boom elevation, adjustment and tensioning of the bucket chain and lateral movement of the bulk material conveyance pipe are all controlled by hydraulic cylinders.

Hydraulic cylinders in ship unloaders work in a corrosive marine atmosphere, especially in coal ports with significant amounts of sulphur-containing dust. As a result, robust offshore piston rod coatings are required, which also protect the rods from falling bulk material and high abrasive contamination. Boom cylinders are fitted with special hydraulic safety blocks which allow the boom to be safely released from the ship's hull, even in the event of a complete power failure.



Boom cylinder for ship unloader with Ceraplate rod coating and maintenance free spherical bearings in stainless steel



TEST RIGS – QUALITY TAKEN TO THE HIGHEST LEVELS

Huge forces, highest precision and the most modern control and measuring technology

DYNAMIC LOAD TESTING RIGS FOR LARGE DUMPER TRUCK TYRES AND NASA CRAWLER CYLINDERS

Hydraulically powered test rigs are utilized wherever very high test forces are required. Test loads can be adjusted with a high degree of accuracy under both static and dynamic test conditions. In combination with the latest measurement and control technology, fully automatic testing sequences can be realized.



Test rig for the calibration of gas flow meters for technical gases. Two synchronized cylinders with precisely defined displacement volumes are driven by a ball screw with a speed-controlled traversing servomotor in a pre-determined manner. This arrangement makes it possible to control different gas flow rates extremely precisely during calibration.



Dynamic load test rig for cyclic testing of large offshore oil drill string pipe connectors. The rig is designed for a maximum test load of 8,000 t at 700 bar hydraulic operating pressure. The high pressure oil is generated using opposing pressure intensifiers controlled by a hydraulic pump and proportional control valve system.



Hydraulic test rig with two independently controlled hydraulic axes for fully dynamic simulated load testing of the NASA crawler JEL lifting cylinders. The test sequence is completely automatic according to a pre-programmed test profile, with simultaneous recording of all relevant test parameters. Maximum test load is 7000 kN over the full 2 m cylinder stroke.

Huge dumper truck tyres with diameters up to 3 m are tested on a purpose built test bench under simulated road operating conditions and loads. Tyres under test run on both sides of the large test wheel with hydraulic cylinders in a hexapod configuration providing pre-programmed positioning, steering angles and loads at varying speeds.



INDIVIDUALITY
IS OUR STANDARD

SEALING AND BEARINGS SYSTEMS

Sealing and bearing elements play an important role in hydraulic and pneumatic cylinders, critical for the correct function of individual cylinder components

Founded in 1977, Hunger DFE set high standards for modern hydraulic sealing technology and continues to constantly drive further product development in this field.

The proven advantages and superiority of the Hunger sealing system have been recognised worldwide by many well-known cylinder manufactures for more than 40 years. Striking features of the patented Hunger DFE system include extraordinary sealing efficiency combined with low friction and the absence of any metal-to-metal contact of any moving parts inside hydraulic cylinders.

Unique seal and bearing profiles prevent scoring of piston rods and cylinder bores, significantly increasing the service life of cylinders and complete systems. Base materials used are high performance thermoplastics, elastomers and PTFE compounds, with properties enhanced by the use of additives and additional processing. This results in products with higher abrasion resistance, lower friction rates and better endurance limits thereby leading to low maintenance and longer service intervals for hydraulic cylinders.

Today, Hunger DFE has a broad range of knowledge, experience and know-how in the fields of plastics processing and sealing technology, and in the production of standard and special seals to meet market demands for a multitude of applications.

EXTRAORDINARY REQUIREMENTS DEMAND EXTRAORDINARY PERFORMANCE

Continuous technical innovation in the fields of sealing and materials technology has established Hunger DFE in the market for many decades. At the forefront of company policy are customer satisfaction and reliability through both technical excellence of developed and distributed products and individual customer contact and consultation on a global basis.

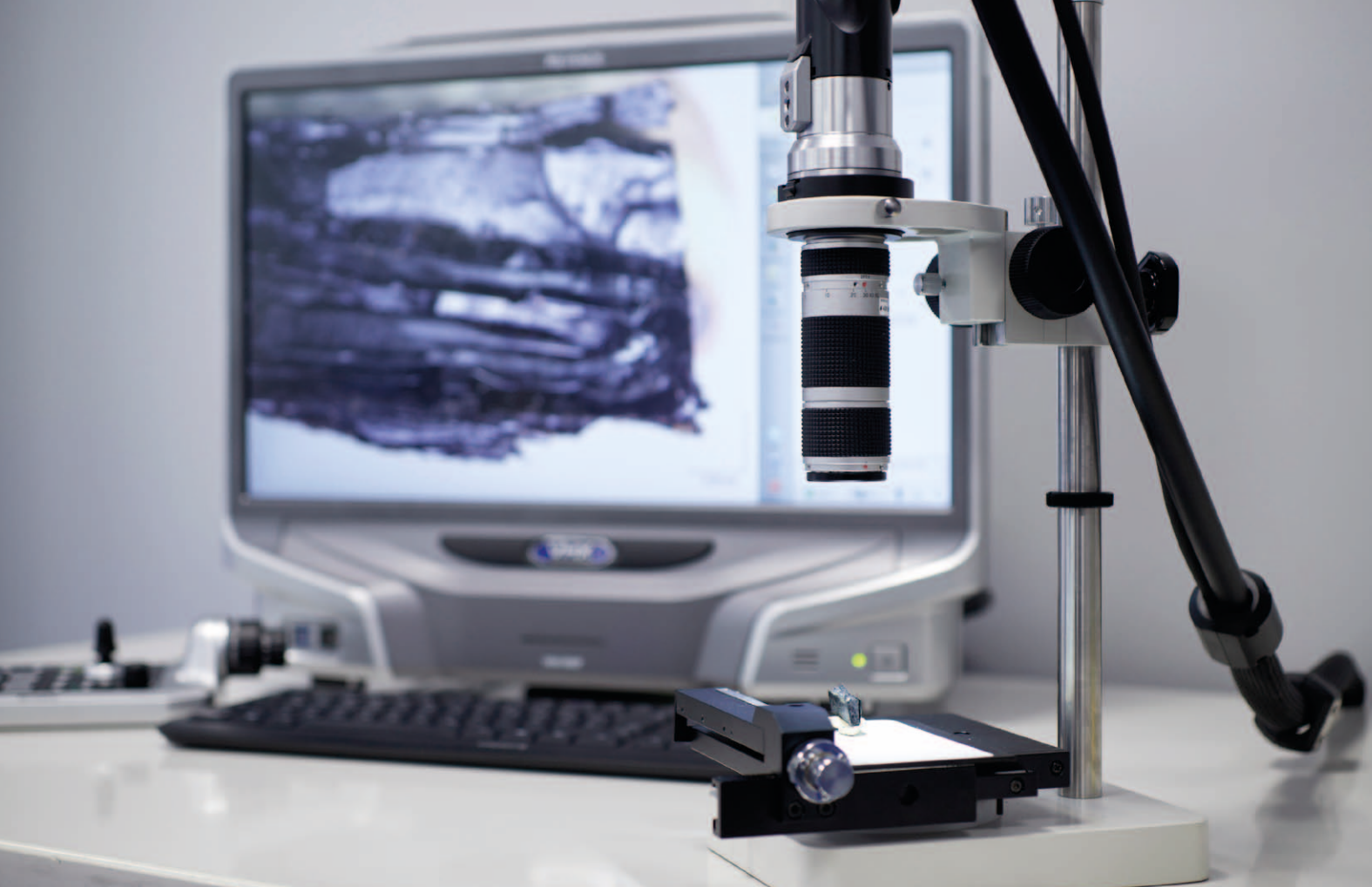


split mould for demounting more complex shaped parts, e. g. wear bands

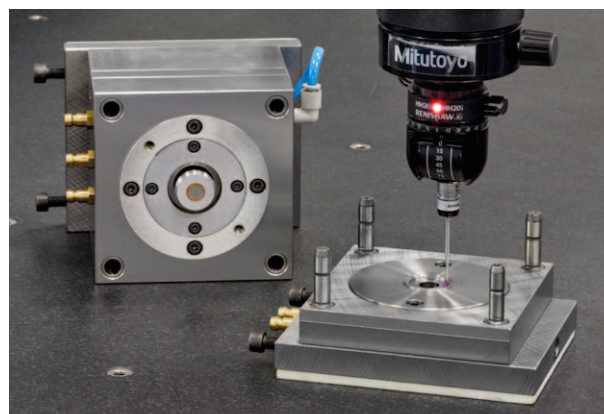


materials capability for a diverse range of applications





“From practice into practice”



Sealing systems are performance and endurance tested under realistic conditions on our own in-house developed test rigs. Hunger DFE sets very high test and quality acceptance criteria for any newly developed seal, bearing or material. Any new seal is not released to the market until all pre-determined test parameters are met, including friction levels, leakage and wear rates. In addition to new developments, Hunger DFE constantly monitors and tests standard products to ensure the expected high product quality levels are always maintained.

modern measurement and testing technology



INNOVATIVE TECHNOLOGY FROM TRADITION

Special seals and bearings from Hunger DFE – a result of more than 40 years of constant research and development

Hunger deliberately did not concentrate on the manufacture of seals for only a few specific applications. The guiding principle “from practice into practice” offers customers a wide range of solutions from existing project developed special seals and sealing systems. The project engineering team takes customer requests and market demands and converts them into feasible solutions in the shortest possible time. The aim then is always to pass the competitive advantage of this newly acquired knowledge onto our customers.

Our factory includes a wide range of production methods to produce standard and special products in the shortest possible lead times. Machined, moulded and vulcanized parts can be produced within a few hours of a customer request for special products or samples. Goal oriented solutions, even for single production units, are very important for us



continuous quality control and component testing

Products are continuously checked by our modern and extensively equipped Quality Assurance department to consistently confirm the quality of our products to maintain the confidence and trust of our customers. Quality management does not only start before or during the manufacturing process, but is also at the forefront during product development.

SEALS AND BEARINGS FOR MOBILE HYDRAULICS AND PRESSES

Methodical use and arrangement – standard Hunger DFE elements cover all mobile hydraulic requirements



modern lip seal technology available in a huge variety of profiles and dimensions

Seals for cylinders used in scrap balers and crushers must deal with the worst case scenario, operating at extremely high pressures and temperatures in harsh and dirty surroundings.

Robust and wear resistant seal and bearing systems developed by Hunger DFE can withstand those conditions, continuing to operate with worn rods or cylinder tubes until planned overhaul can take place.

Through innovative seal and bearing development Hunger DFE can offer customer sealing solutions that lead to increased efficiency and cost saving.

The mobile hydraulics sector places very high demands on cylinder reliability. Maximum performance is expected from sealing and guiding systems. Hunger seals, wipers and bearings are successfully used in mobile crane support, lift and boom cylinders and in slewing drive rotary actuators, hence why well-known construction machine manufacturers rely on Hunger DFE products.

Modern hydraulic press builders set increasingly greater demands on cylinder technology as higher pressures and velocities are introduced. Modern state-of-the-art sealing systems manufactured in high performance elastomers can replace conventional V-packing systems and lead to higher press efficiency.

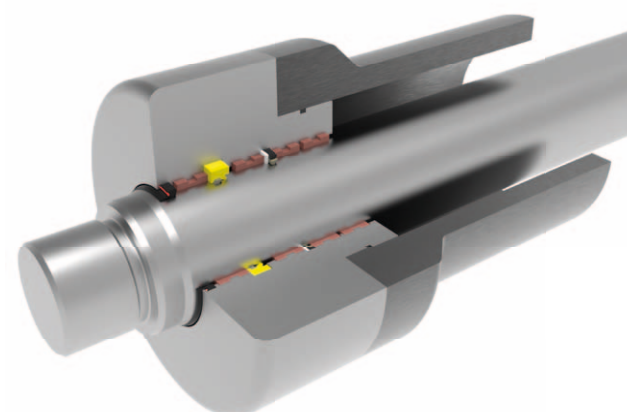


sealing systems for high efficiency scrap baling and recycling presses

HIGH PRESSURE WITH EXTREME LIGHTWEIGHT CONSTRUCTION, PERFECTLY SEALED



high performance concrete pumps equipped with Hunger DFE products



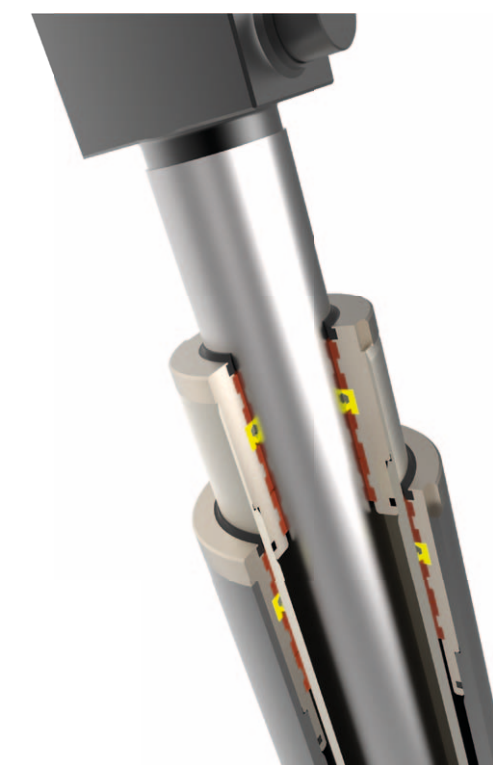
robust and reliable sealing and bearings systems adapted to the application

HYDRAULIC ELEVATOR CONCEPT

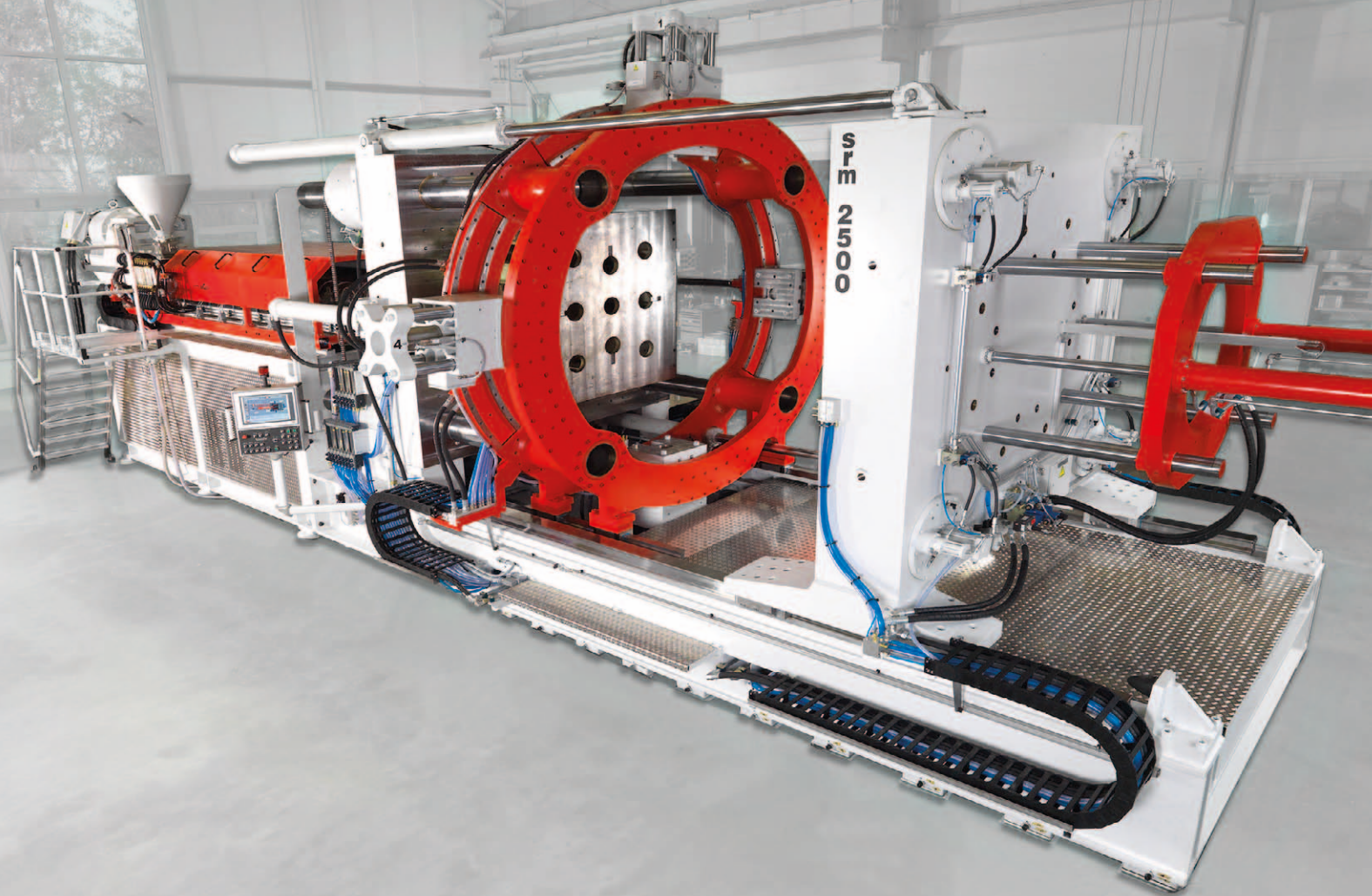
Modern panoramic hydraulic elevators offer a direct insight into elevator technology with the cylinder rod in full view. – “wet” cylinder rods due to unintentional leakage seals are therefore prohibited



‘Wet’ or dirty cylinder rods are unacceptable in modern hydraulic elevator systems. The challenge is to achieve the maximum sealing effect with the minimum possible levels of static and dynamic friction. Hunger DFE has developed special reduced friction seals and bearings for these demanding elevator applications where stick-slip free movement and smooth start-up behavior are essential for the safety and well-being of the elevator car passengers.

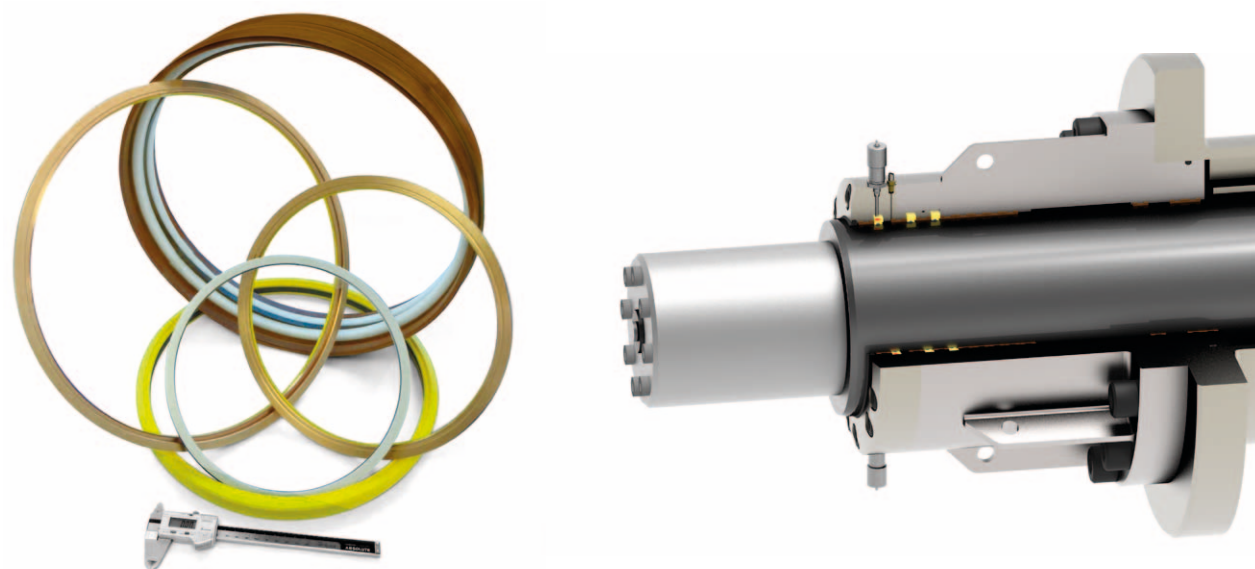


Telescopic elevator cylinder with friction reduced sealing and bearing system



SEALING SYSTEMS FOR INJECTION MOULDING MACHINES

High clamping forces, stick-slip free movement at high and low speeds and high frequency load reversals are some of the demands made on seals and bearings used in injection moulding machine cylinders, demands readily met by Hunger DFE sealing systems. The function and performance of a complete machine can depend on the performance of a single seal, another reason why well known manufacturers around the globe rely on Hunger DFE products.



special cylinder application with externally adjustable EVD seal



COMPLETE SOLUTIONS – CUSTOM MADE

Hydraulic brakes, clutches, winches and shock absorbers are applications that present the utmost challenge for sealing and bearing systems. Customers expect highly sensitive responses when braking or during clutch engagement and disengagement, even under maximum dynamic system loadings. To make matters worse this must often be carried out under extreme temperature fluctuations, at high pressures and operating with aggressive hydraulic fluids

HIGH-PERFORMANCE SEALING SYSTEMS FOR EXTREME CONDITIONS

The loading spectrum for cylinders used in cement and stone mill dampers is huge. Sealing and guide systems must operate at their limits, coping with sudden dynamic impacts at high frequency in adverse and inclined mounting conditions, with high friction generated heat and induced bending stresses. At the other end of the spectrum, aircraft hydraulic landing gear sealing systems must operate in temperatures as low as -54°C. Only specially developed, tested and approved elastomers can be reliably used in such conditions.

Only high precision seals manufactured using the highest quality raw materials, produced strictly in accordance with exactly defined and specified technical parameters meet the exacting requirements of aviation, offshore or deep sea applications.

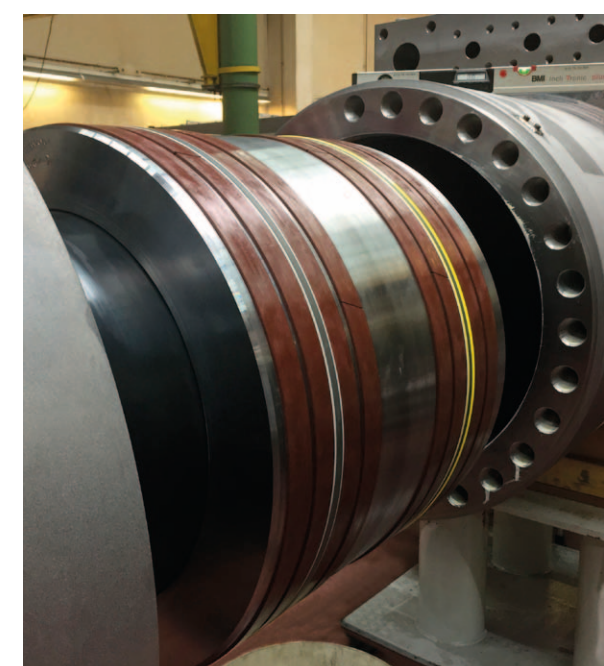
The suitability and reliability of such sealing systems must be proven before they can be released for series production. Materials and sealing components are separately tested and evaluated on purpose built test benches under realistic conditions and operating parameters.



Specially developed sealing and wiper systems for aircraft applications



Landing gear with low temperature seals



Piston seals and bearing system for offshore crane cylinder



Seals in operation on offshore crane cylinders



FROM SINGLE COMPONENTS
TO INTELLIGENT SOLUTIONS

CUSTOMIZED HYDRAULIC SYSTEM SOLUTIONS

Complete system solutions from a single source – only perfectly matched components guarantee reliable functioning of a hydraulic system



Palace Bridge Saint Petersburg, Russia

“Development is not the art, but the market-economy implementation”



In addition to production of special hydraulic components, Hunger Maschinen is primarily dedicated to the manufacture and supply of hydraulic power units, control panels and control manifold blocks. The advantages of such complete supply have been recognised for decades by many customers around the world. Hunger Maschinen can provide hydraulic systems in all sizes and to meet the most diverse application requirements. The range available includes power units with nominal volumes up to 20,000 litres with pressure ranges between 50 and 700 bar and pump flow rates in excess of 10,000 l/min.

For the Azmy bridge project in Egypt Hunger Maschinen not only supplied the hydraulic power unit for operation of two main bridge cylinders and nine secondary bridge function cylinders, but also the complete electrical control system and panel, all installed in an air conditioned cubicle adjacent to the bridge.



Azmy Bridge in Egypt



Electro-hydraulic control room

Hunger hydraulic power units are used in a wide range of applications:

- Civil Engineering / bridge construction
- Hydroelectric plants
- Aluminium Industry, casting, furnace and heat treatment plants
- Open cast coal mining and transport
- Offshore and shipbuilding
- Machine Tool Building
- Press construction
- Iron and steel industry
- Lifting platforms and lifting devices
- Test bench technology

OPEN CAST COAL MINING AND COAL TRANSPORT INDUSTRY

Hydraulic systems produced by Hunger are an important complement to other components found in the hydraulic sector



Hydraulic power unit for conveyor drive of a mobile crusher

Hunger Maschinen have been producing hydraulic equipment for open cast mining machines for decades, including the following:

- Bucket wheel excavators
- Bucket chain excavators
- Stacker/reclaimers
- Conveyor systems including tensioning
- Gyratory and cone crushing machines
- Oil lubrication systems

On open cast mining machines, Hunger's hydraulic systems control luffing and traversing functions of main booms together with conveyor belt operation & tensioning and many other auxiliary functions. Hunger's hydraulic lubrication systems provide constant lubrication and cooling of highly stressed inner and outer Crusher bearings. All in all, Hunger provides hydraulic equipment to the highest standards of quality and functionality, suitable for operation in the harshest of conditions such as found in open cast mining.



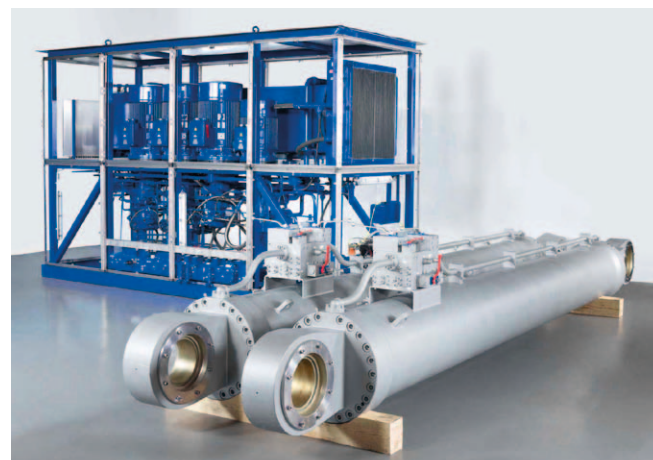
Mobile Crusher YIMIN HE, China



Continuous ship unloader HUILAI III, China

SHIP UNLOADER

For the coal transport industry, hydraulic power units and control blocks are manufactured for equipment including ship loaders and unloaders, stacker/reclaimers and wagon unloading stations. Ship unloaders require up to five independent hydraulic systems to control the main functions of the machine.



Hydraulic system for boom lifting and slewing gear



Hydraulic power unit for ship unloader

ROTARY DISTRIBUTORS IN STANDARD AND BESPOKE DESIGN

Hydraulic rotary distributors, suitable for the use with various liquid and gaseous media, are an important part of the product range

Rotary distributors are used whenever media (hydraulic fluids, gases, coolants, water, etc.) need to be transferred from a stationary to a rotating part of a machine. Individual channels in the distributor are separated from each other by contacting or non-contacting seals.

Roller bearings each end and low internal seal friction ensure low starting and idling torque to guarantee particularly long and maintenance free service life. Slow rotating applications with peripheral speeds at 1.5 m/sec are just as feasible as high-speed applications with movement up to 8 m/sec.

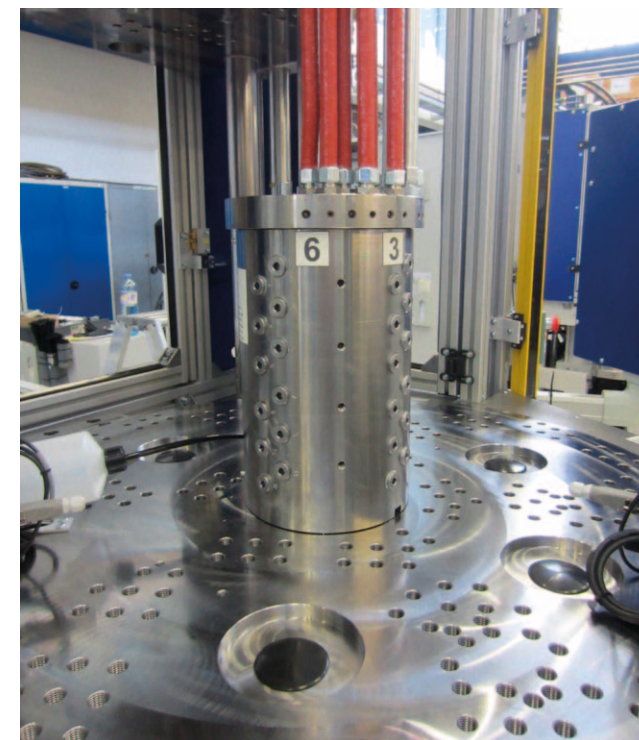
ROTARY DISTRIBUTORS FOR LADLE TURRETS



13-channel rotary distributor with Ceraplate-coated stator for use in ladle turret



Ceraplate coated stator



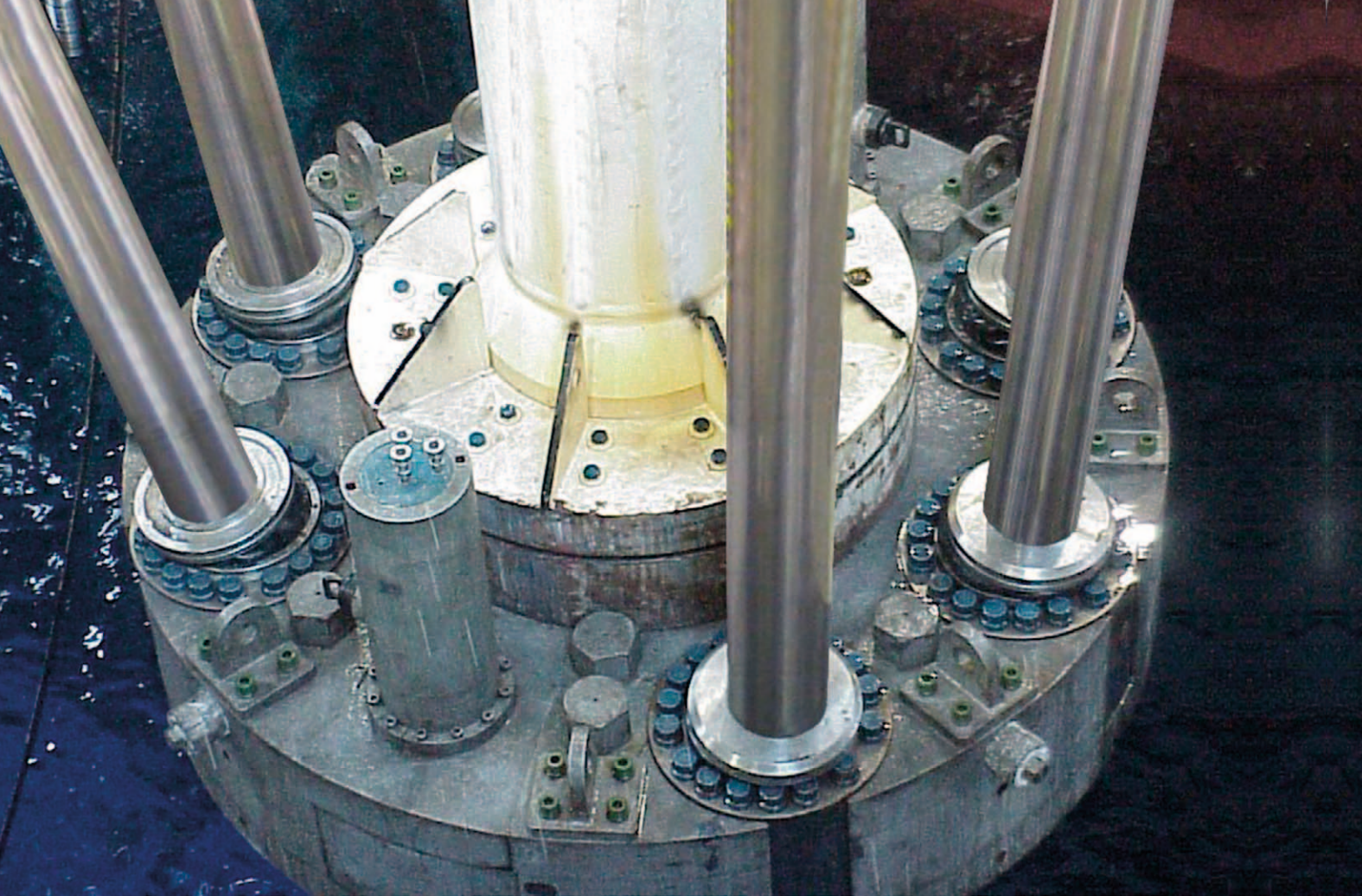
Vertical injection moulding machine



Rotary distributor for vertical injection moulding machine

Special units with up to 44 channels and operating pressures up to 400 bar are designed and manufactured. Rotary distributors are equipped with special rotor seals from Hunger DFE, suitable for use with hydraulic oils, greases, gases, water and other operating media.

Rotary unions are used in the automotive production industry on transfer lines and welding robots as well as on commercial vehicles for slewing rings and rotating feeders. Further examples of use are in heavy construction machinery and injection moulding plants where the rotary unions are used in mould changing systems.

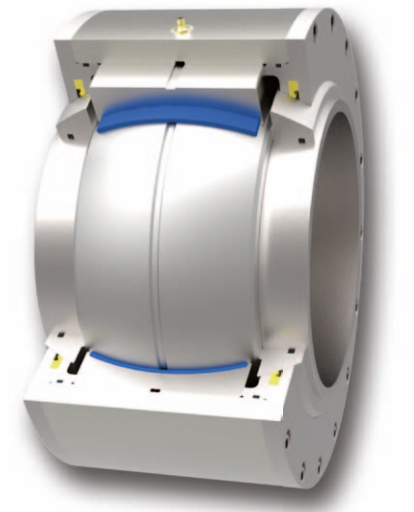


Use of ball joints in riser-tensioner cylinders on offshore drilling platforms

SPHERICAL PLAIN BEARINGS AND ROD ENDS – HARD AT WORK

Hunger Maschinen GmbH supplies standard and customized spherical plain bearings and rod ends to various dimensional standards

Hunger spherical plain bearings and rod ends are manufactured in a diameter range from 20 to 1000 mm, in both standard and customized designs. Spherical plain bearings are available in various material combinations for the inner and outer rings and sliding surfaces, including maintenance free versions. Special seals are also available for operation in extreme environments. The product range includes radial, axial and angular contact bearings, also ball joints and swivel bushes.

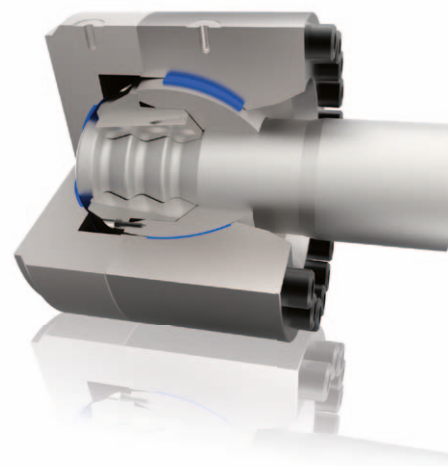


BALL JOINTS FOR OFFSHORE APPLICATION

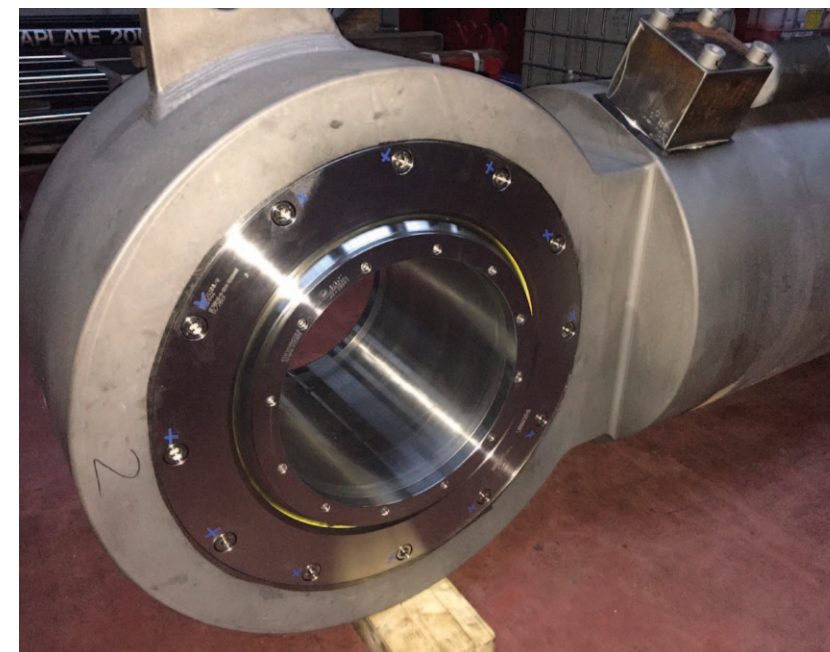
In the offshore sector, maintenance-free ball joints are required for underwater operation. Here, special sliding plastic linings are used in combination with machined stainless steel components and seawater-resistant coatings.



Ball joint for riser-tensioner cylinders (offshore drilling systems)



Internal view of ball joint



Dredger hydraulic cylinder with integrated rod end



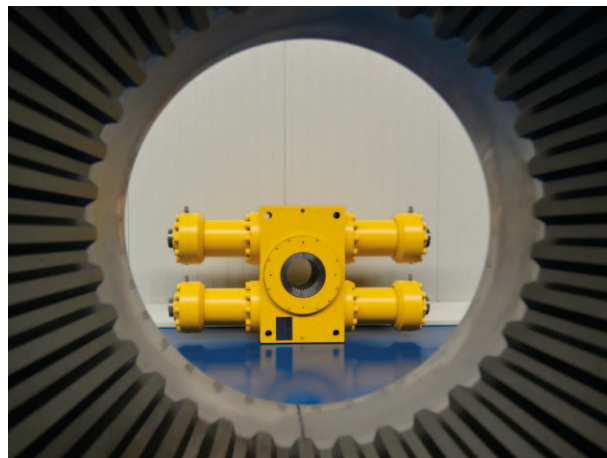


SPECIAL HYDRAULIC VALVES

Special hydraulic cylinder valves for various functions including pre-filling, pressure protection, pressure regulation and load control

HYDRAULIC ROTARY ACTUATORS

Hunger hydraulic rotary actuators are found in applications where constant high torque rotary movements are required. Single and double piston versions have been developed to provide an optimised range covering a wide band of performance parameters. Standard and special designs are available, with output torque ranging from 300 Nm to 1 MNm and swivel angles from 25° to 720°. Rotary actuators are suitable for use in a wide range of industries and are designed to meet the specific requirements of each application. Options include hydraulic safety control blocks and piping, rotary encoders and special sealing systems for a variety of operating environments.



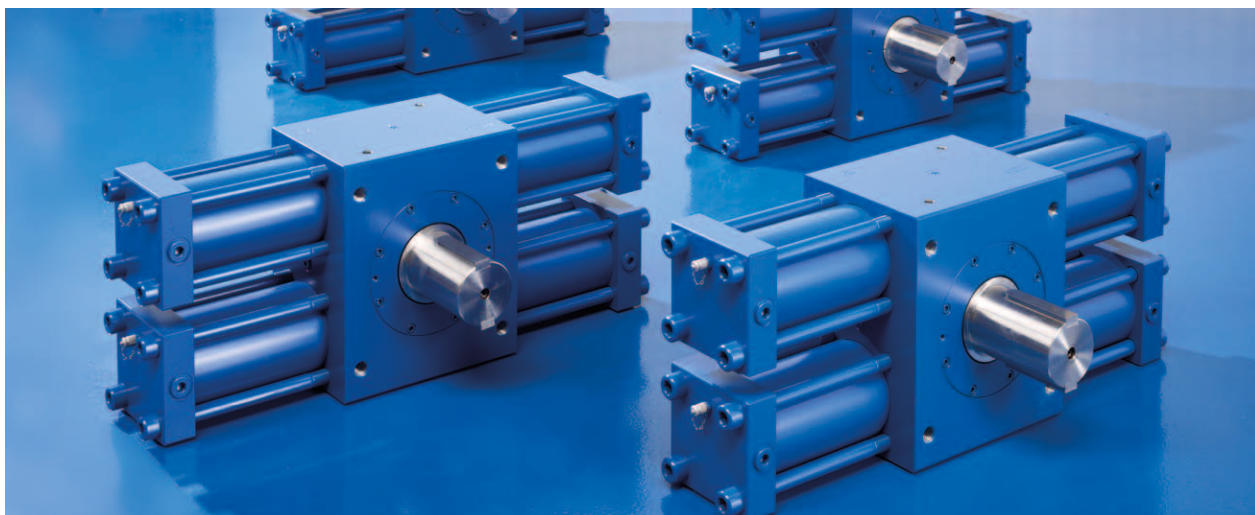
Double piston rotary actuator with hollow drive shaft

Hunger pre-fill valves are used on press cylinders for fast filling & emptying of the main cylinder and as a leak free non-return valve during high pressure press movement.

Pressure control valves act to regulate pressure in hydraulic systems or to protect components in the system. Flow control valves regulate actuator speeds by controlling hydraulic fluid flow. Hunger shut-off valves are primarily designed as non-return valves to block fluid flow in one direction with free flow in the opposite direction.



Control valve



Double piston rotary actuator with solid drive shaft end



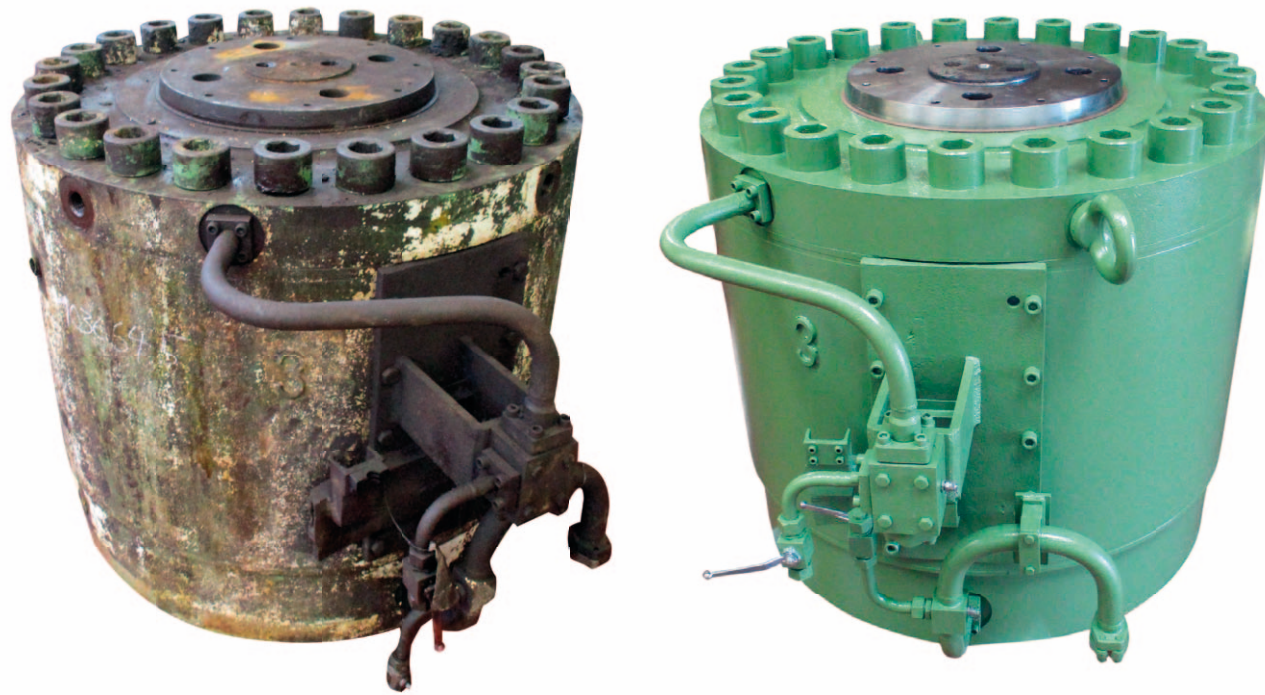
Preload valves



Tank mounted pre-fill valve with displacement sensors

AND THE HYDRAULICS ARE RUNNING AGAIN ...





SUPERVISION, INSPECTION & MAINTENANCE

Supervisors for installation and commissioning or service technicians for seal replacement, troubleshooting and preventative maintenance – and all of this available worldwide

Hydraulic systems require regular maintenance to guarantee expected life and reliability. Our experienced service engineers are able to evaluate the condition of complete hydraulic systems or individual components before proposing appropriate maintenance measures to be carried out on site.



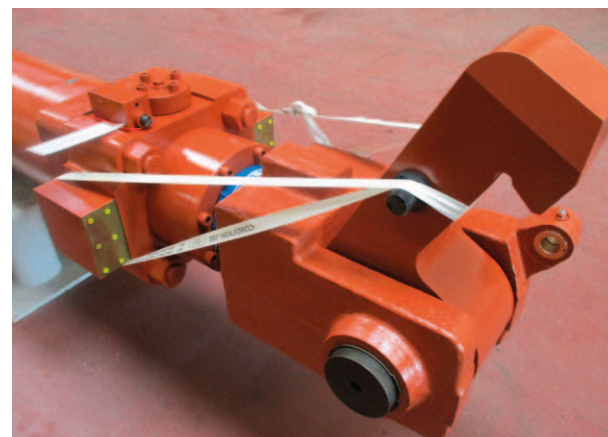
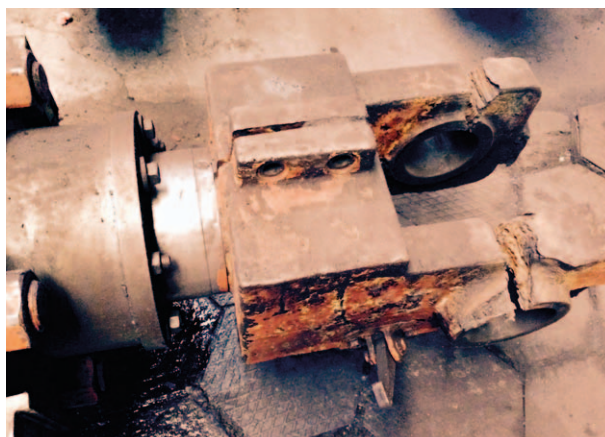
Inspection of a valve port interface

HYDRAULIC CYLINDER REPAIR

Hydraulic cylinders are real powerhouses but are often driven to their design limits and beyond. We guarantee that after a repair and refurbishment full power can again be demanded

A cylinder repair can include reconditioning of existing cylinder components, such as cylinder barrel, piston rod, piston or mounting interfaces, but also new manufacture of individual components or the complete assembly. Wearing parts such as seals & guides, self-aligning bearings or pivot bushes are normally replaced with brand new components. Additional parts, for example hydraulic control blocks, can be inspected and refurbished, fitted with new valves if required or completely replaced.

The final decision on the level of repair is made in consultation with the customer following submission of our inspection report with repair recommendations and estimated costs.



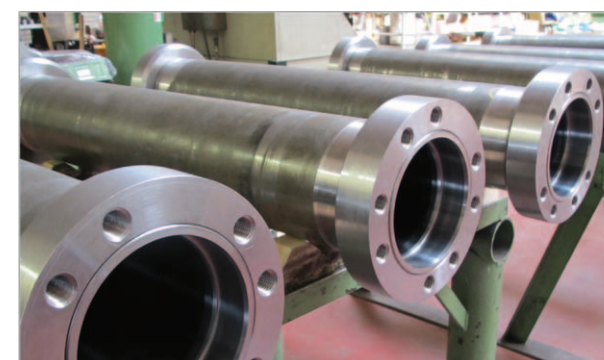
Steel plant cylinder with rod end adaptor hook before and after refurbishment



Commissioning of a bascule bridge cylinder

SERVICE KITS AND CYLINDER COMPONENTS

Customized seal kits, ready to install coated piston rods, honed cylinder tubes and other hydraulic cylinder components – we will help to keep your machines running



Honed cylinder tubes



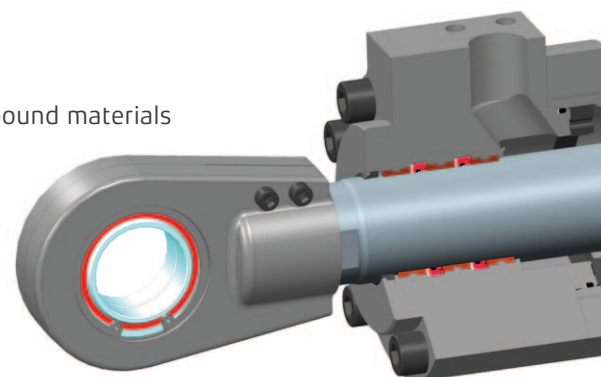
Coated piston rods

MODIFICATION AND UPDATING OF HYDRAULIC CYLINDERS

Hydraulic cylinders can often be in use for several decades and may require modifications or updating to meet current regulations and state-of-the-art technology

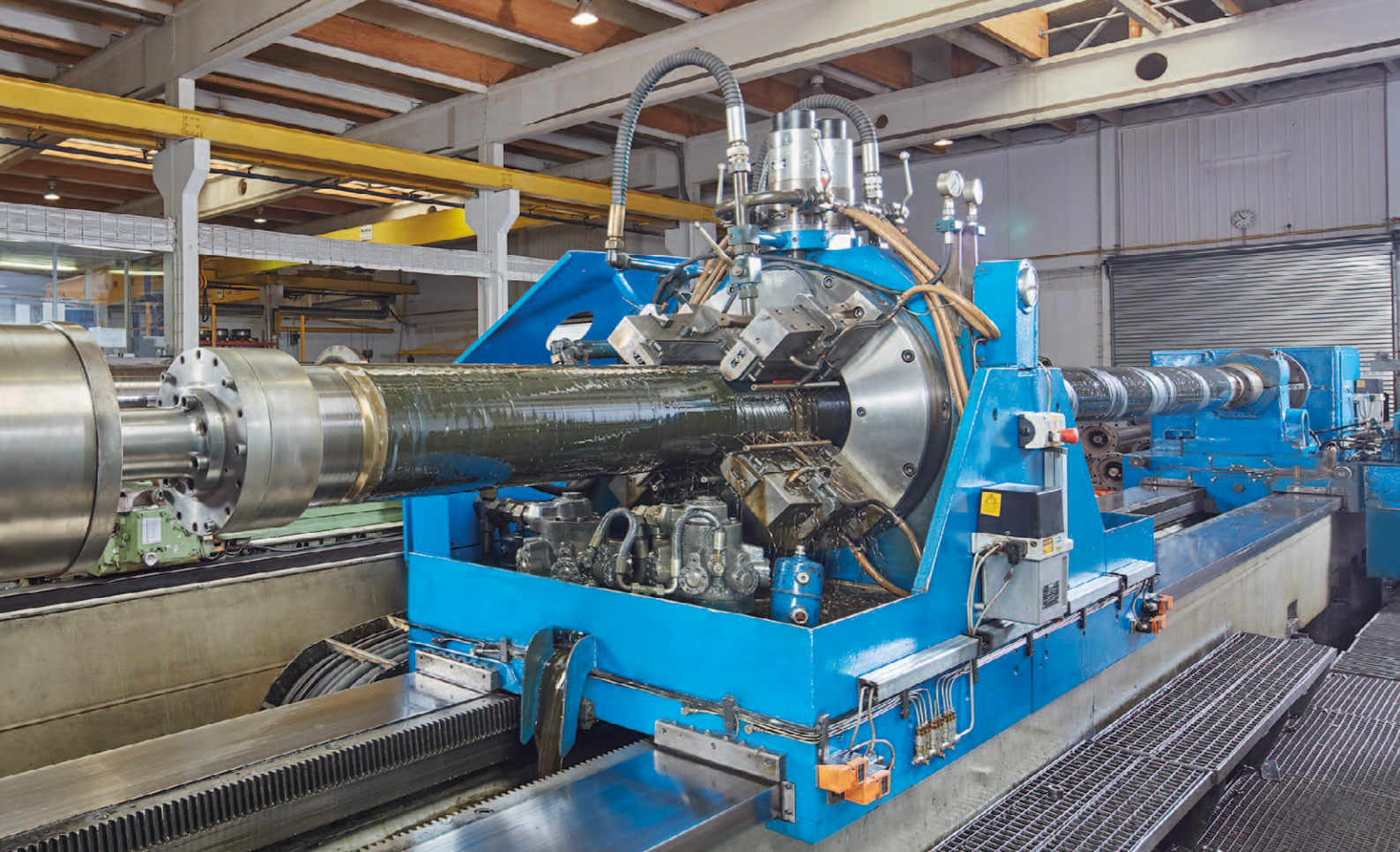
Following inspection and analysis of the existing design, which may include recalculation to current standards, we will provide our proposals for any required modifications and updating, which can include:

- Stroke modification
- New, maintenance free spherical bearings
- New seal and bearing elements in modern plastic compound materials
- New piston rod coatings
- Updated or new manifold blocks
- State-of-the-art sensors for pressure, temperature or stroke position
- New approvals in accordance with current certification standards



Modern seal and bearing system in a cylinder head

ONLY THE FINEST SURFACES
GUARANTEE A LONG SERVICE LIFE



HONING TOOLS AND ABRASIVES ADAPTED TO EACH PROCESS

Standard tools and abrasives along with customized solutions

HUNGER ABRASIVES

Within the Hunger Group, great attention has always been paid to the intensive processing of metallic surfaces

The subsidiary Hunger Schleifmittel GmbH, founded in 1979, not only supplies its products within the Hunger group of companies, but also works with many external customers both domestically and internationally due to its reputation for high performance and quality. High removal rates, profile accuracy and consistent quality are defining characteristics. Besides cylinder manufacturers, main customers are the mechanical engineering and automotive industries.

New developments are tested in our own company under real conditions - a guarantee for the absolute best technology. For the machining of large diameter and extreme length ceramic-coated piston rods Hunger developed special diamond honing stones, which meet the exacting requirements for both material removal and surface roughness. The covering of the ceramic honing stones with a plastic sleeve laterally stabilises the honing stone thereby allowing considerably higher contact pressures and thus improved material removal rates

The plastic coating also enables a one hundred per cent utilisation of the honing stone. Any metallic contact between honing tool and workpiece is prevented and in addition the plastic coating works as a dirt wiper, keeping honing sludge away from the honing stone to increase its efficiency.



Our engineers develop customized tool concepts for our customers to suit the geometries and materials to be machined, focusing on high geometry precision and surface quality together with economical cost.

The honing process is usually only considered for finishing and superfinishing. However, with the further developed honing stones from Hunger Schleifmittel, a true machining process is possible with relatively high material removal rates. The subsequent superfinishing of the surface ensures a long service life.



FINEST STRUCTURES IN THE TRIBOLOGICAL SURFACE

Energy losses can be improved by reducing friction and wear

In systems with surfaces in relative motion, the surface finish is of paramount importance. The absolute surface roughness, and its ability to provide the required lubrication determines the energy consumption and thus the service life of the products.

The surface microstructure created with honing stones and diamond bars during the honing process can lead to a reduction in friction levels, energy losses and wear.



PRECIOUS STONES FOR THE AUTOMOTIVE INDUSTRY

Diamond CBN honing stones and diamond tools from the Hunger abrasives product line are particularly popular in the automotive industry

These high-quality Hunger honing stone and tools are universally used in automatic manufacturing processes for volume machining of components such as engine blocks, brake cylinders, connecting rods and valve shafts.

The type of diamond, its bond, concentration and grain size are all critical for long tool life, good shape retention tolerance and finest surface finishes, with Ra below 0.1 µm achievable. Special diamond honing stones and tools for symmetrical and asymmetrical applications, with and without air nozzle control systems, are manufactured in accordance with customer specific requirements.

„Precision as the measure of all things“



Diamond honing stones for honing engine blocks and valve seats

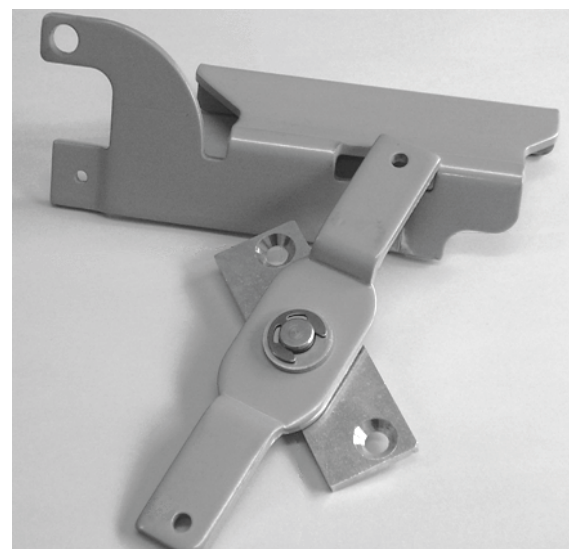




HUNGER VEHICLE CONSTRUCTION AND MOBILE HYDRAULICS WORKS

With the reunification of Germany Dr.-Ing. E. h. Walter Hunger returns to the origin of his life's work

Following transfer of ownership back to Hunger, new production facilities were installed at the original production factory in Frankenberg, Saxony, with initially a return to vehicle construction. In recent years the emphasis has moved away from vehicle construction to mobile hydraulics components, 5th wheel trailer couplings and sheet metal processing.



SHEET METAL PROCESSING AT ITS BEST

From prototype and process development to series production

Close consultation between the customer and our highly experienced and knowledgeable production engineers are necessary before any stamped or deep drawn components are ready for production.

This can include jointing techniques, such as riveting and welding, and building of complete assemblies with subsequent surface finishing and protection.

Intensive discussions take place during this phase, with cost reduction and customer satisfaction high on the agenda. Finished components are mainly produced for the automotive sector with some polished stainless steel parts also produced for the medical sector and the leisure industry. Production takes place on a range of hydraulic and eccentric mechanical presses with capacities from 25 to 250 tonne, fitted with feeding and straightening attachments if required. Further processing of pressed parts is another strength Hunger can offer.



Formed sheet metal parts for car seats

INNOVATIONS FOR THE COMMERCIAL VEHICLE INDUSTRY

Weight reduction contributes to energy saving and environmental protection

The product range also includes aluminium fifth wheel couplings produced for small commercial vehicles. These are considerably lighter than competitor products and are also equipped with the maintenance free low friction lining. In conjunction with a patented lubrication-free kingpin, a complete lubrication-free coupling system is created.

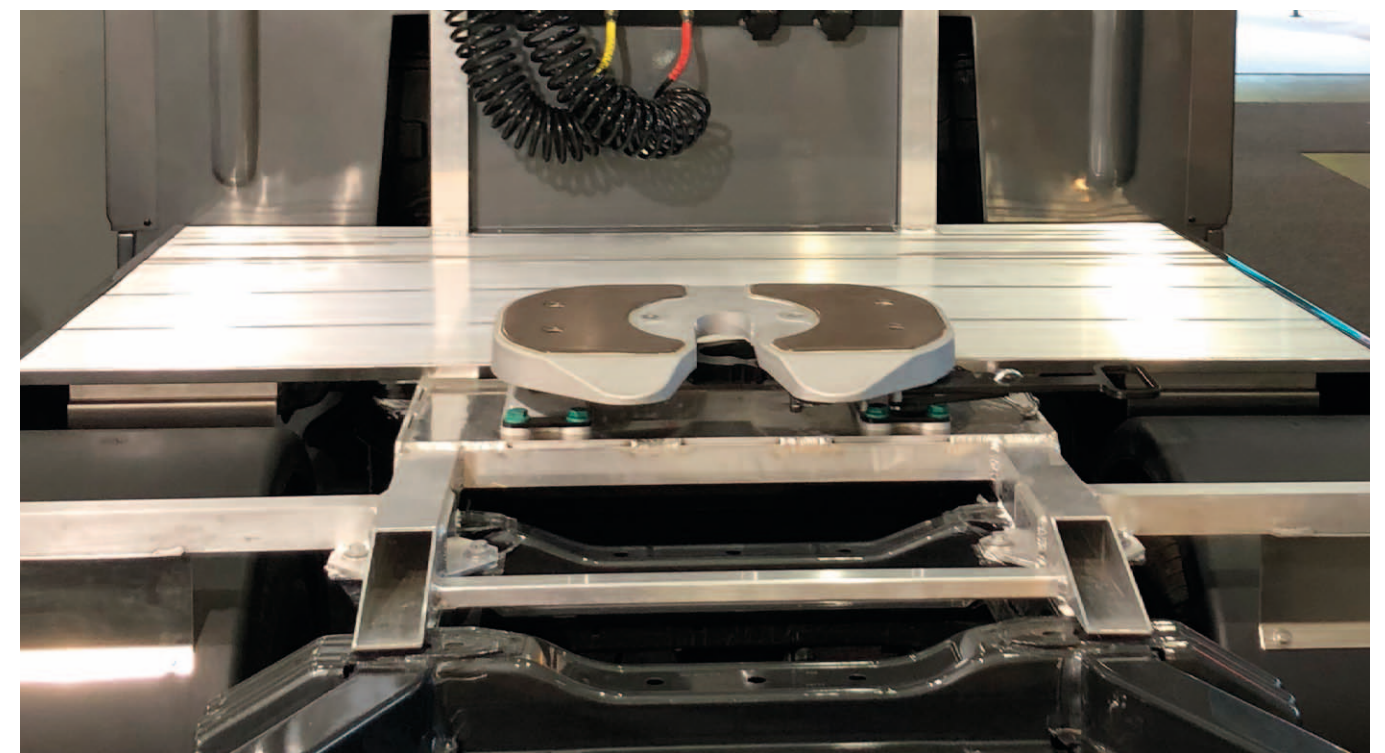


WORLD FIRSTS THAT CONNECT

As early as 1995 Dr.-Ing. E. h. Walter Hunger produced a patented maintenance-free fifth wheel trailer coupling

The mating surfaces of the 5th wheel trailer coupling were produced with a special low friction lining material that removes the need for regular grease lubrication. In addition a split bearing locking mechanism was introduced which eliminates play on the kingpin. These ground-breaking ideas led to the development of a new product range for connecting trucks to trailers.

Today Hunger manufactures trailer couplings characterised by features such as zero backlash and comfort through the use of a hydraulic damping system which prevents transmission of shocks and vibrations from the trailer to the towing vehicle. The opening mechanism is also hydraulically driven for ease of operation. The locking pin can be opened with simple pumping movements, even if slightly under load from the trailer.



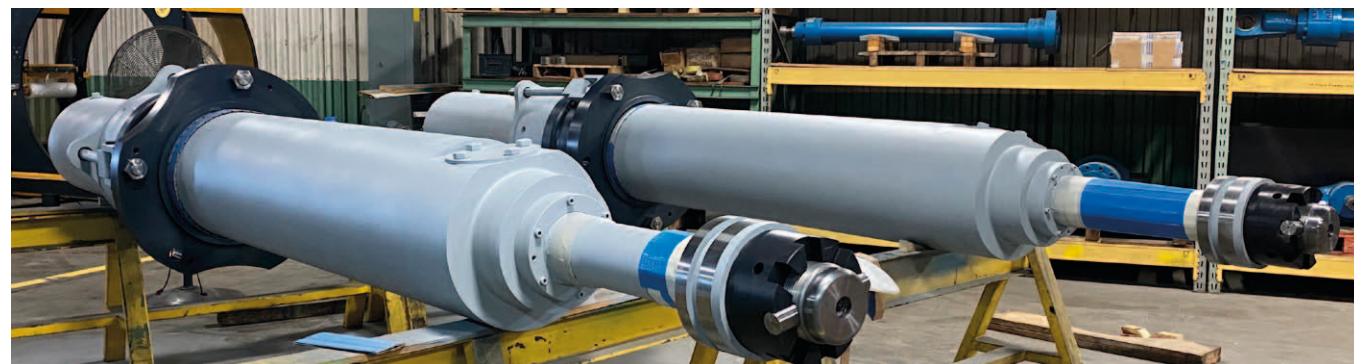
Aluminium fifth wheel coupling fitted to a small commercial vehicle

SERVING NORTH AMERICA SINCE 1981

Hunger Hydraulics USA was founded in 1981 in Toledo, Ohio. As an Ohio Corporation, it serves the United States, Canada and Mexico

With a manufacturing area of 7,000 m² and office and engineering space of 1,000 m² Hunger USA supplies the local cylinder market with new custom-built cylinders alongside cylinder repairs and refurbishment. In addition to using Hunger DFE seals and bearing elements in cylinder manufacturing and repair, Hunger USA also sells all other products of the Hunger group, delivering Hunger quality to the North American market for over 40 years.

HUNGER CYLINDERS MADE IN USA



Pull Back Cylinders for 5,000 ton forging press



Single acting telescopic cylinder with anti-rotation for steel mill



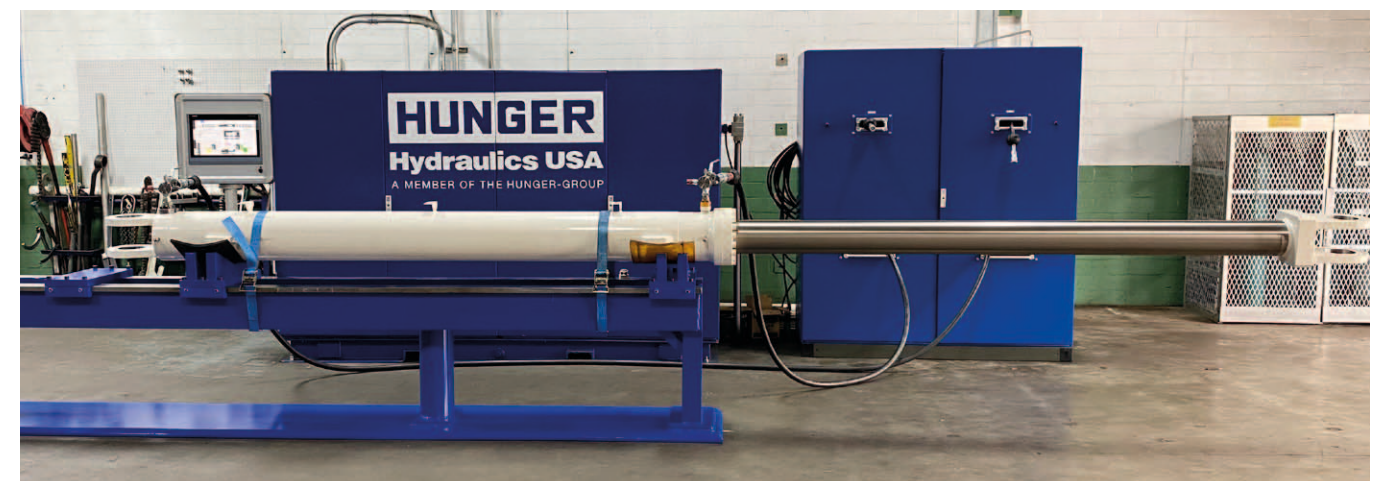
Steel mill cylinders



Submerged Arc welding with NAVSEA certification



Weiler V90x6000 CNC machine



Offshore Crane Cylinder on Final Assembly Test



WORLDWIDE STANDARDS ENSURE CONSISTENT HUNGER QUALITY

Proven quality, excellent customer service and customized solutions are top priorities in India

HUNGER HYDRAULICS INDIA PVT. LTD. SUCCESSFUL EXPANSION IN INDIA

The Hunger Group has been present on the Indian subcontinent since 1987, establishing itself as a competent and reliable solution provider for hydraulic systems of the highest quality. W. Hunger Hydraulics India Pvt. Ltd, a wholly owned subsidiary, was formed in 2006 in Kolkata with its own production plant on the site in West Bengal. The new plant was formally opened in 2009 with initial focus on the production of a standard range of hi-tech seals and guide elements for hydraulic and pneumatic cylinders. In 2013 production facilities were expanded to include repair & overhaul of cylinders and manufacture of complete new cylinders using the most up-to-date manufacturing technology.



Seal production in Kolkata



Fully overhauled ladle turret cylinder



New cylinders for rolling mill

Hunger India currently manufactures about 60 different sealing profiles. To fulfill the growing demand from Indian customers, the product range is constantly being expanded with new types and dimensions. The manufacture and quality of each individual seal is closely monitored by well-trained and highly skilled employees. Many other profiles and sizes are imported from Germany, stocked in a purpose-built humidity and temperature controlled storage warehouse.

When special seals or sealing systems are required, Hunger India staff can always call on the experience and extensive knowledge of the application specialists at Hunger DFE in Germany.

Hunger India refurbishes and manufactures hydraulic cylinders to the usual high quality Hunger standards. Cylinders up to a diameter of 500 mm and a stroke length of 7500 mm can be repaired or newly manufactured on modern machines. Production, quality and testing are all carried out in accordance with German standards.

In addition, highly qualified Indian staff are available to provide extended customer service, including commissioning and maintenance services together with a comprehensive and efficient supply of spare parts. Hunger India also provides advice, support and distribution for all other products in the Hunger Group portfolio.

“It’s always safest to do only what we see immediately in front of us.”

Johann Wolfgang von Goethe

TRADITION & INNOVATION GUIDE US INTO THE FUTURE

Decisive factors in the successful development of the Hunger Group in the preceding decades have been our own innovative powers, combined with the highest quality demands and flexibility. And we shall continue to hold up these success factors as the guiding principles for the Hunger Group

The power of innovation, the highest quality and flexibility are essential if one wishes to offer customer-specific problem solutions associated with an all-round advisory service. With the wide-ranging expertise found throughout the Hunger Group in all areas of hydraulic and automotive engineering and technology we are the perfect partner for the efficient design, development and implementation of customer applications and system solutions. The comprehensive range of services offered by Hunger includes bespoke engineering services, product components, system solutions, and many other complimentary services.

Our application skills and know-how acquired over several decades and our extensive systems experience allow us to provide our customers with sound advice both in the technical selection of components as well as the planning and project management of special application-related solutions. We offer excellent engineering services that are specifically attuned to your requirements.

Our permanent striving to achieve the highest quality necessitates the use of the latest technologies resulting in a portfolio of components and solutions which complement one another so that they can be readily integrated.

This approach enables us to readily develop system solutions in accordance with your individual requirements - independent of proprietary systems. We supply outstanding products and solutions which will exceed your expectations.

The integrative concept of a solution provider naturally includes services. Upon request we can also undertake any commissioning, maintenance, modernization and repair work. We offer an excellent all round service, second to none.

This holistic approach is of great benefit to you the customer as it provides co-ordinated solutions combined with process simplification and investment reduction, which in turn leads to an increase in reliability and cost effectiveness. Why not profit today from the excellent engineering, excellent products and excellent service that we have to offer?

*“A big THANK YOU to all members of staff, associates
and business partners worldwide for supporting us
in the making of this commemorative brochure.”*

Armin Hunger, Ingrid Hunger & Dr. Jan Hunger

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Hydraulic Group

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