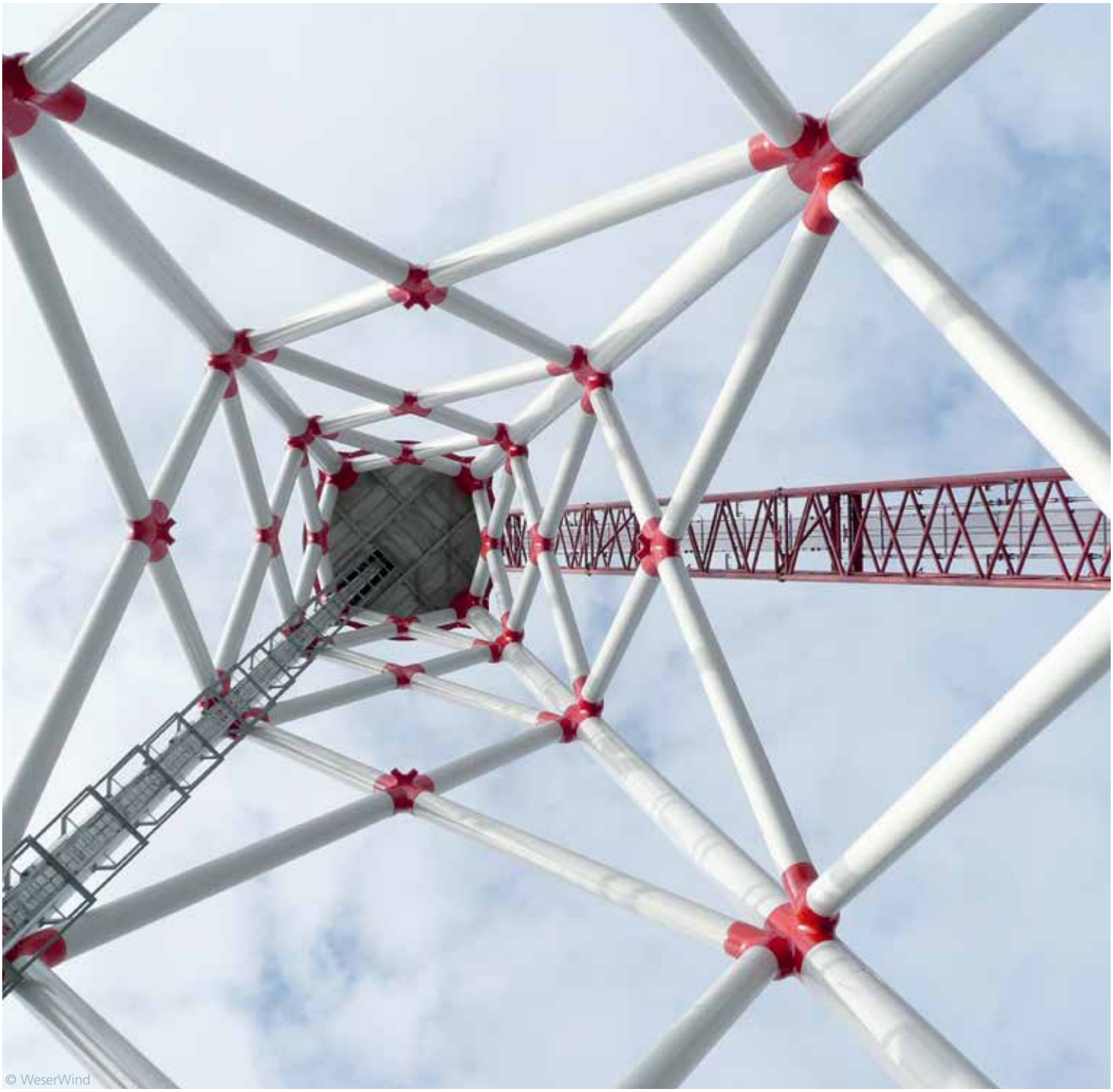
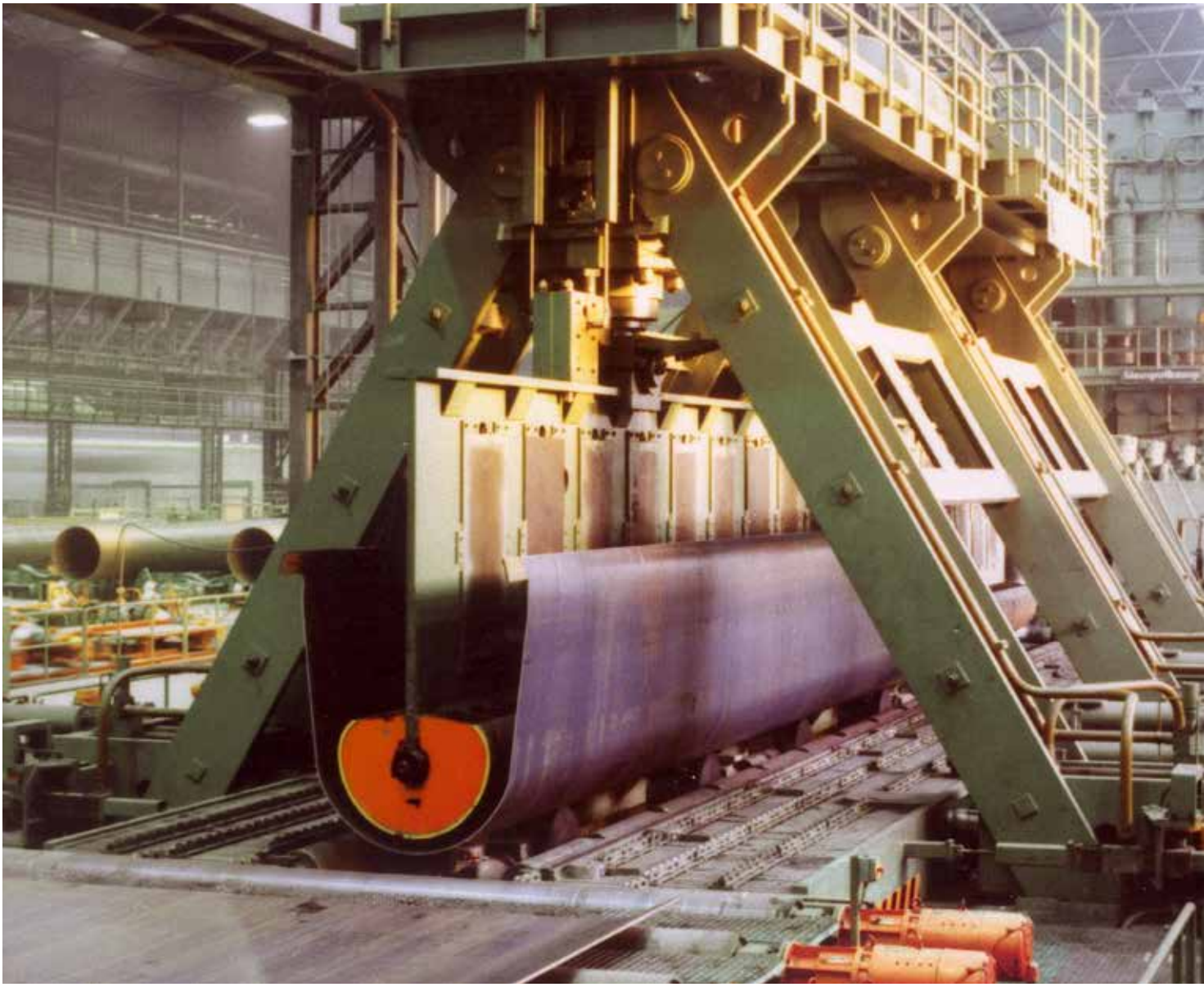


Special Products

EUROPIPE



EUROPIPE: THINKING AHEAD

1804. The Dillinger Hütte steel mill rolls its first steel plate. In 1845, a company which later becomes part of Mannesmannröhren-Werke produces continental Europe's first welded steel pipe. In 1991, these two steel industry pioneers – AG der Dillinger Hüttenwerke and Mannesmannröhren-Werke AG – decide to pool their experience and know-how and create EUROPIPE. Our rich heritage in terms of steel technology and manufacturing expertise plus the dedication and hard work of our people enabled us to achieve some very demanding objectives.

Today the EUROPIPE Group is the world-market leader in large-diameter pipe production for the oil and gas sector and has the most extensive manufacturing footprint in the industry. With four pipe mills in Europe and the USA, the Group produces more than 3,000 kilometres of large-diameter pipes per year for pipeline projects throughout the world: onshore and offshore, in the Arctic ice, the depths of the world's oceans and in the desert heat.

EUROPIPE's core business is the production of large-diameter longitudinally and helically welded pipes, fully integrated into the steel manufacturing and R&D resources of its shareholders, AG der Dillinger Hüttenwerke and Salzgitter Mannesmann GmbH.

The "Special Products" sales unit serves smaller volume projects and is your partner for entering new markets with non-pipeline applications involving steel pipes.

EUROPIPE Special Products has already delivered over 170,000 tonnes of pipes for offshore and onshore projects: Civil engineering applications, e.g. the roof support frame of the football stadium in Hanover, Germany and of the "Neue Messe" exhibition hall in Stuttgart, Germany. Offshore platform constructions, e.g. tension leg pipes at world record water depths of 1,600 meter in the Gulf of Mexico. Marine engineering, e.g. pilings for the gate construction of the Venice flooding protection project "MOSE".

EUROPIPE is a partner in the development and introduction of new products such as the Knutsen OAS "PNG®" technology for marine gas transportation and the WeserWind "Vario Base®" Jacket Foundation for multi-megawatt (MW) offshore wind turbines. These are just six of many exciting projects in which EUROPIPE plays a major role in non-pipeline applications.

WE OFFER MORE THAN PIPES

The strengths of EUROPIPE Special Products lie in the ability to adapt our core expertise to specialist projects.

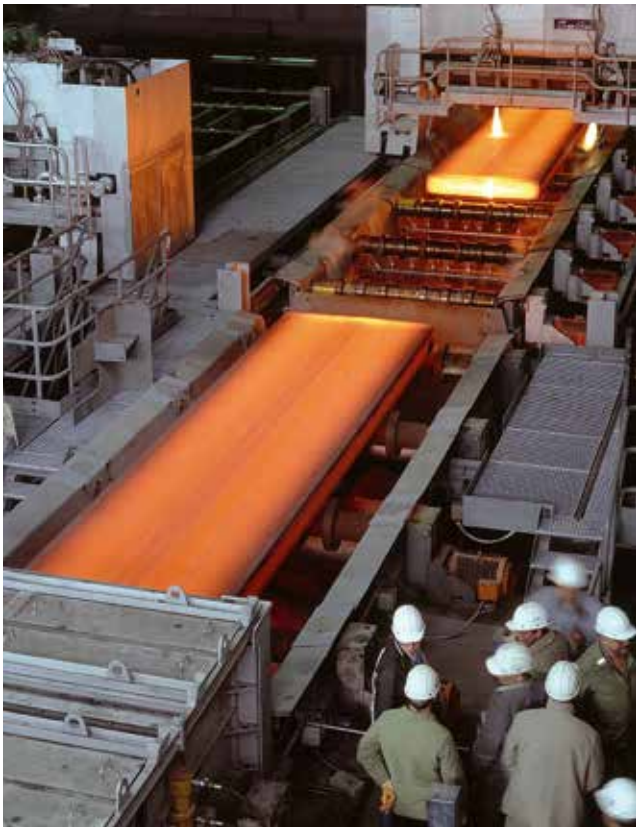
SECURE SUPPLY OF HIGH-QUALITY PRE-MATERIAL

Our pre-material suppliers are also our shareholders. This has significant advantages in terms of supply security, supply chain management, quality assurance, and research and development. Many of our breakthrough innovations over the last decades have resulted from the close collaboration between EUROPIPE and our pre-material suppliers.

A LEADER IN RESEARCH, DEVELOPMENT AND TESTING

Experts from the EUROPIPE Group and our plate mill partners, e. g. Salzgitter Mannesmann Forschung (SZMF), are organised in permanent working groups that examine methods for enhancing our already advanced processing technology and that develop tailored new-material solutions. Because after all, we have our reputation to defend: the best in the business. Just ask our customers.

All our pre-material partner facilities are equipped with the latest in technology and software to capture, transmit, archive and evaluate all relevant quality data. Our pre-material

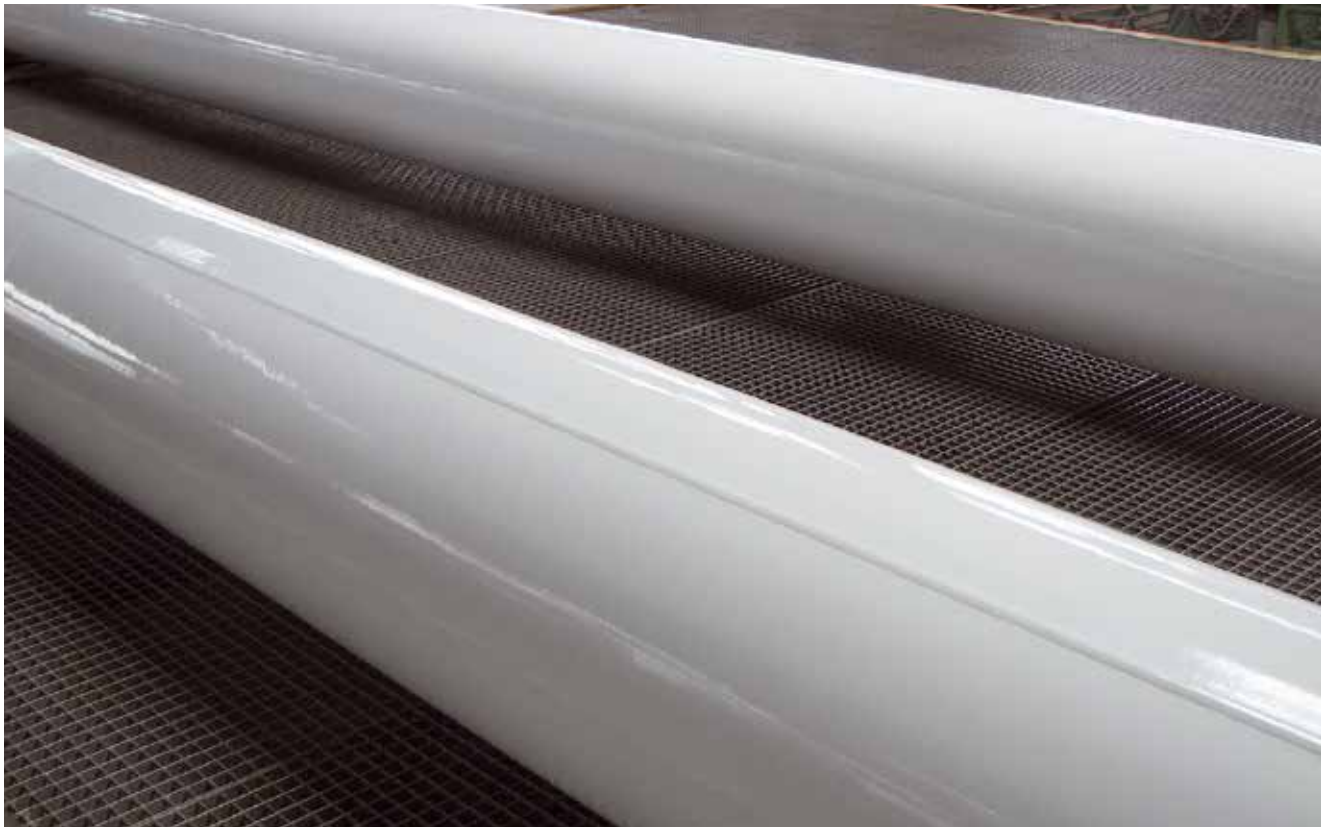


suppliers guarantee and demonstrate full traceability, from casting to the released plate. All our pre-material suppliers are ISO 9001 certified, and certified for health and safety (OHSAS 18001) and environmental standards (ISO 14001). In addition, EUROPIPE conducts yearly audits based on customised requirements that go beyond the ISO standards.

ALL-ROUND PROTECTION: PIPE COATING

Each of the EUROPIPE Group mills either has an integrated pipe coating facility or long-standing coating partners nearby. All the coating plants are sized corresponding to the capacity of their respective Group pipe works.

While the operational management of the coating plants is always local, all process, engineering and material improvements are coordinated by MÜLHEIM PIPECOATINGS in Mülheim an der Ruhr, Germany, as the technical centre of excellence. With far in excess of 8 million square metres of inside and outside coating capacity per year, this facility is the largest of its kind in our industry.



WIND ENERGY

Wind turbines whose power supply exceeds 5 MW can weigh as much as 400 tonnes, are between 100 and 150 metres tall and have rotors with blades spanning 60 to 70 metres.

The innovation in these Vario Base® jackets lies in their structural design. Cast steel joints are attached to the four legs of the structure as connecting elements for the lateral pipes. This first of all achieves an exceptionally favourable distribution of weight at the joints, where stress peaks usually form.

Secondly, the joints make it easier to connect lateral and longitudinal pipes with a circumferential weld seam. Because of the high degree of automation in welding and inspection, the process, which can be transferred directly from pipeline installation, is both cost-effective and of high quality. EUROPIPE supports this by manufacturing standardised pipes with very tight tolerances.

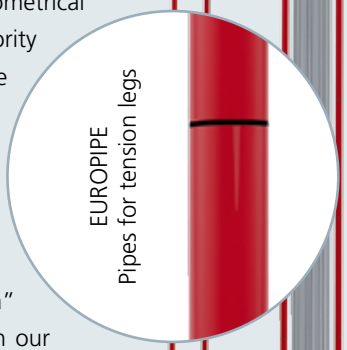
This is important as the entire system is extremely prone to strain through wind, waves and the movement of the rotors. Measurements of all dynamic actions are taken and recorded using the prototype in Bremerhaven, with tests at sea to follow. This prototype of an offshore-suitable jacket structure with a 5 MW turbine was installed in 2008. It has been producing electricity since the start of 2009, and this electricity is fed into the power supply system in Bremerhaven. Measurements of all dynamic actions have been successfully recorded.

The project was sponsored by the state of Bremen and by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). This and other projects are designed to make German offshore technology more competitive.


© WeserWind

TENDON PIPES

Tendon pipes – pipes for the tension legs of offshore platforms – connect the floating structure of a TLP with the sea floor. The buoyancy of the platform puts tension stresses on the pipes and exposes them to fatigue. Pipes for tension legs are therefore one of the most safety-critical components of this type of platform. The combination of heavy wall thickness, high toughness levels and extremely tight geometrical tolerances can be fulfilled worldwide by a few authority approved pipe mills only. EUROPIPE is one of these mills and carries the longest track record with the most challenging projects.



EUROPIPE
Pipes for tension legs

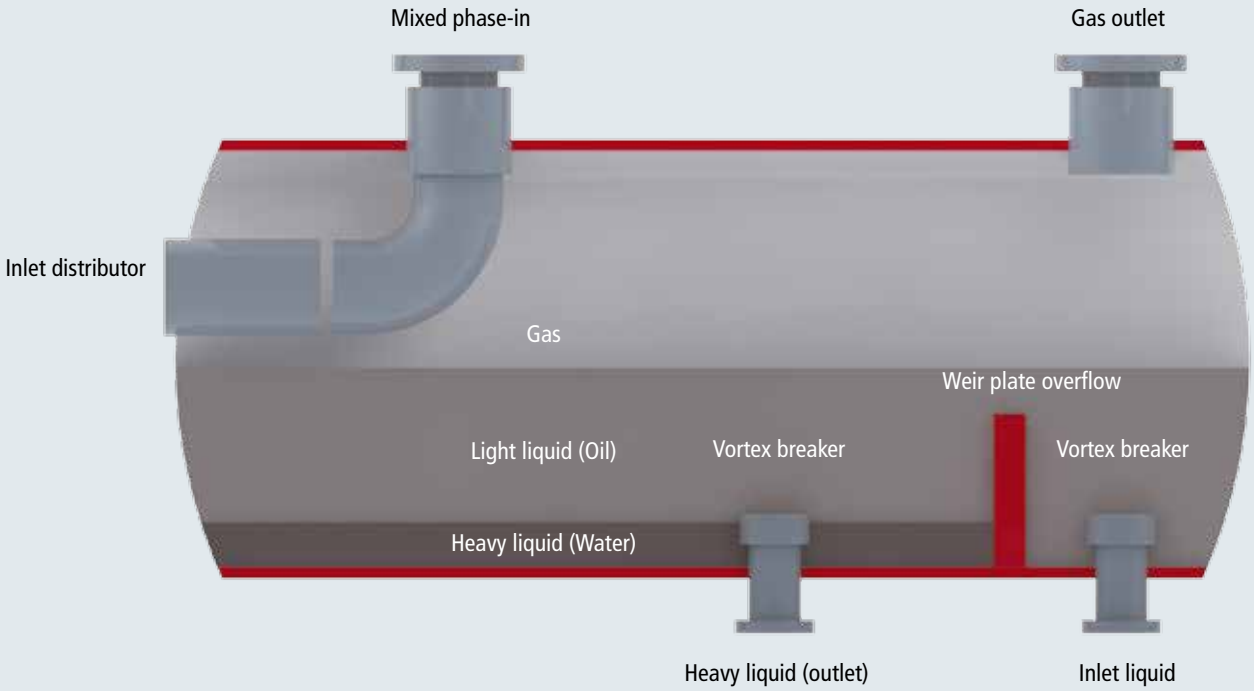
The Brazilian company Petrobras relies on the quality of EUROPIPE's products to extract oil in its "Papa Terra" project. At a depth of 1,200 m, the tensile force on our 18-metre pipes is immense. It is not just the wall thickness of around 36 mm (1.40") that makes the project special – the speed at which the pipes were manufactured also set new standards. Approximately 6,500 tonnes of the 18-metre pipes with a 812.8 mm (32") diameter and made of steel grade X70M were produced in just one week.

The demands of the "Big Foot" project in the Gulf of Mexico are even greater. The water depth of 1,600 m is a world record.

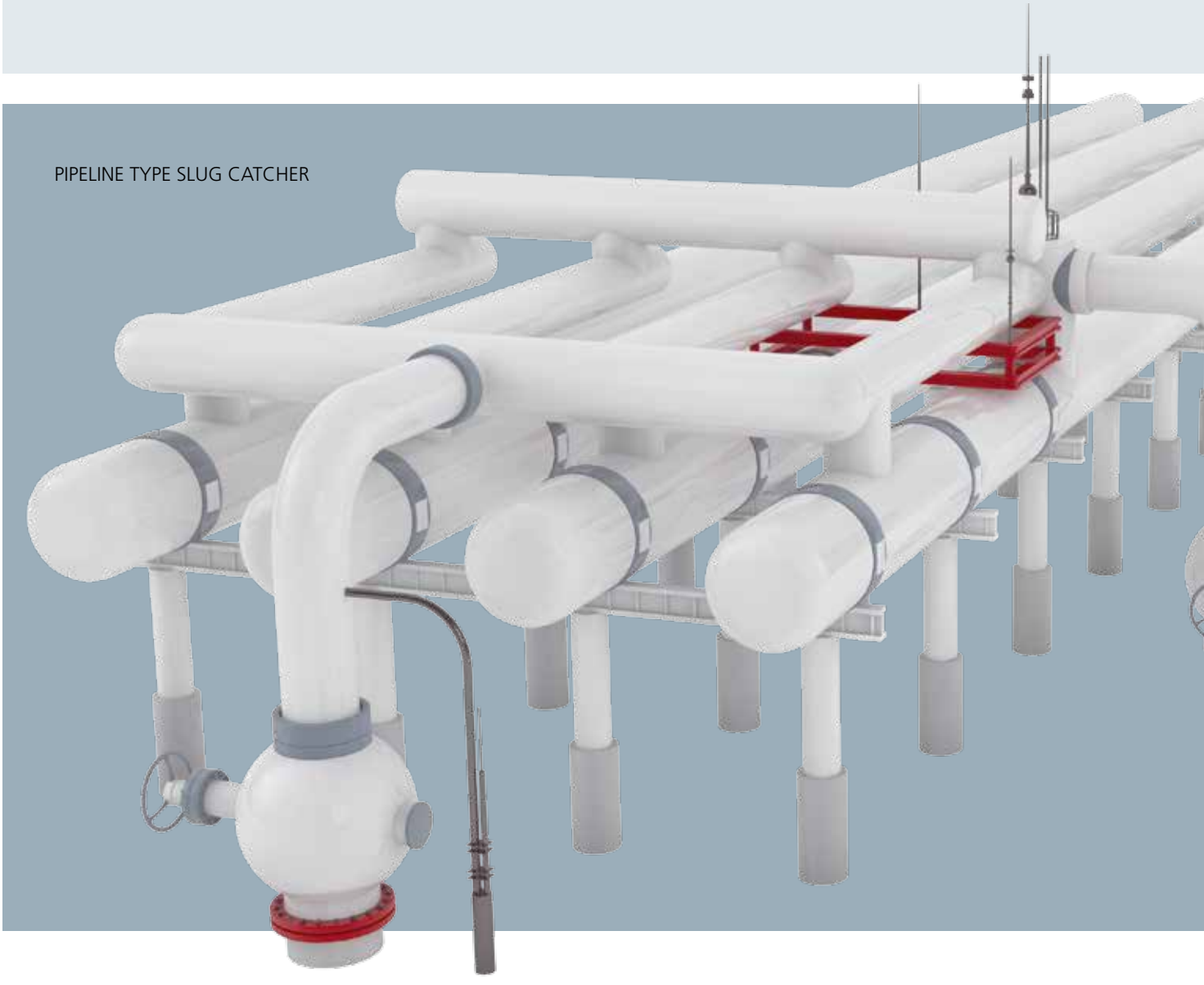
Around 22,000 tonnes of pipes are needed here. EUROPIPE manufactures the pipes with a 914.4 mm (36") outside diameter (OD), lengths of up to 17.3 m and a wall thickness (WT) of 43.18 mm (1.70"). A three-layer PE coating is also added to the pipes made out of steel grade X75M by EUROPIPE's subsidiary MÜLHEIM PIPECOATINGS.

With the most stringent requirements in terms of pre-material, production technology and delivery capacities, we are setting new standards. And it all comes from a single provider.

VESSEL TYPE SLUG CATCHER



PIPELINE TYPE SLUG CATCHER



SLUG CATCHERS

A slug catcher is a piece of equipment that is used in upstream production facilities to remove the slug from the gas. Slug forms because of the multiphase flow of different substances like natural gas, water and salts in a pipeline, which sometimes leads to the formation of slug flow fluids. These multiphase substances flow through a specialised vessel in the processing and storage facilities, where natural gas, water and gases are separated to remove the slug. This phase separator is called Slug Catcher.

The design temperature is mostly 0°C (32°F) or lower. Depending on the gas condition the pipes have to be heavy in the wall thickness or made out of sour gas resistant material or the combination out of both requirements.

WHEATSTONE SLUG CATCHER – AUSTRALIA	
Customer	**Taylor Forge Engineered Systems**
Usage	**Offshore**
Medium	**Gas**
Steel grade	**X65M**
EUROPIPE Length	**7.3 km**
EUROPIPE Tonnage	**7,200 t**
Size	**1,219 mm (48") OD** **33.32 mm (1.31") WT**
Year	**2012 – 2013**

DRILLING RISERS

A riser, in principle, is the component connecting a floating oil and gas structure with the sea floor. One special type of riser is the Drilling Riser, which is basically the extension of the borehole to the drill rig. The Drilling Riser is a so-called top-tension riser type which is vertically installed and connected to the Blow Out Preventer (BOP) on the sea bed and to the bottom of the rig, either on a platform or on a drill ship. A tension system, the tensioner, on the vessel continually pulls the top of the riser so that the riser system is always under tension. This situation provides a very stable and always perfect vertical connection to the borehole for the drilling operation.

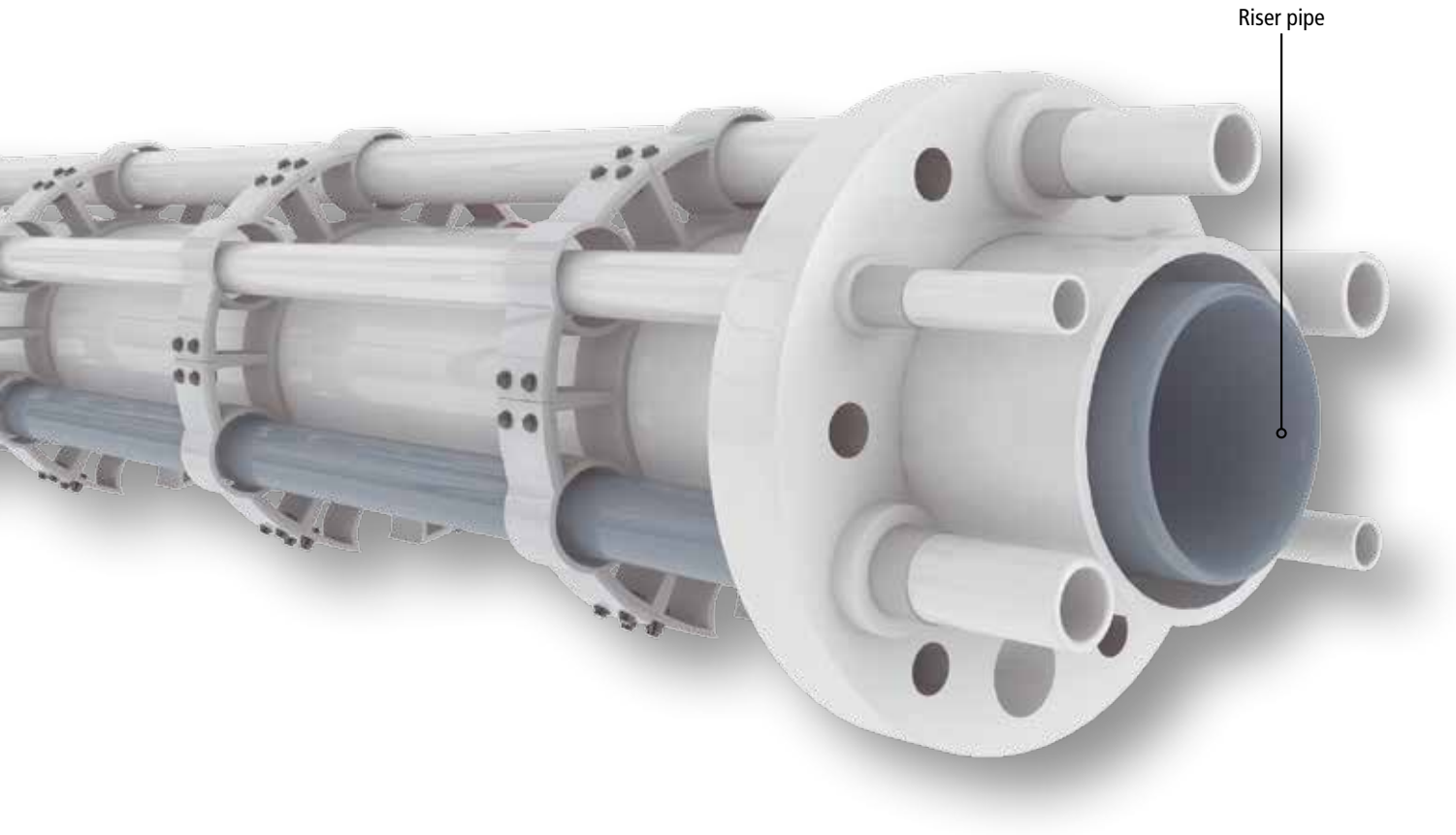
The Drilling Riser is exposed to extreme loads, not only from the inside pressure from the drilling operation and in the final stage from the pressure of the reservoir, but also from tension and high fatigue loads due to the motion of the vessel. This challenging application leads to an extremely demanding specification for the pipes.

The main features are

- Tensile strength in both longitudinal and transverse direction
- Excellent toughness at low temperatures
- Limited hardness
- Tight tolerances for
  - the out of straightness
  - the out of roundness
  - the inside diameter

The typical dimensions are an outside diameter of 533.0 mm (21") and wall thicknesses of 22.2 mm – 31.8 mm (0.874" – 1.25"). EUROPIPE can deliver pipes of steel grades up to X90 API 5L material (X100 is under development).

Only the best-in-class pipes are able to fulfill this specification with sufficient margin to ensure a perfect performance.



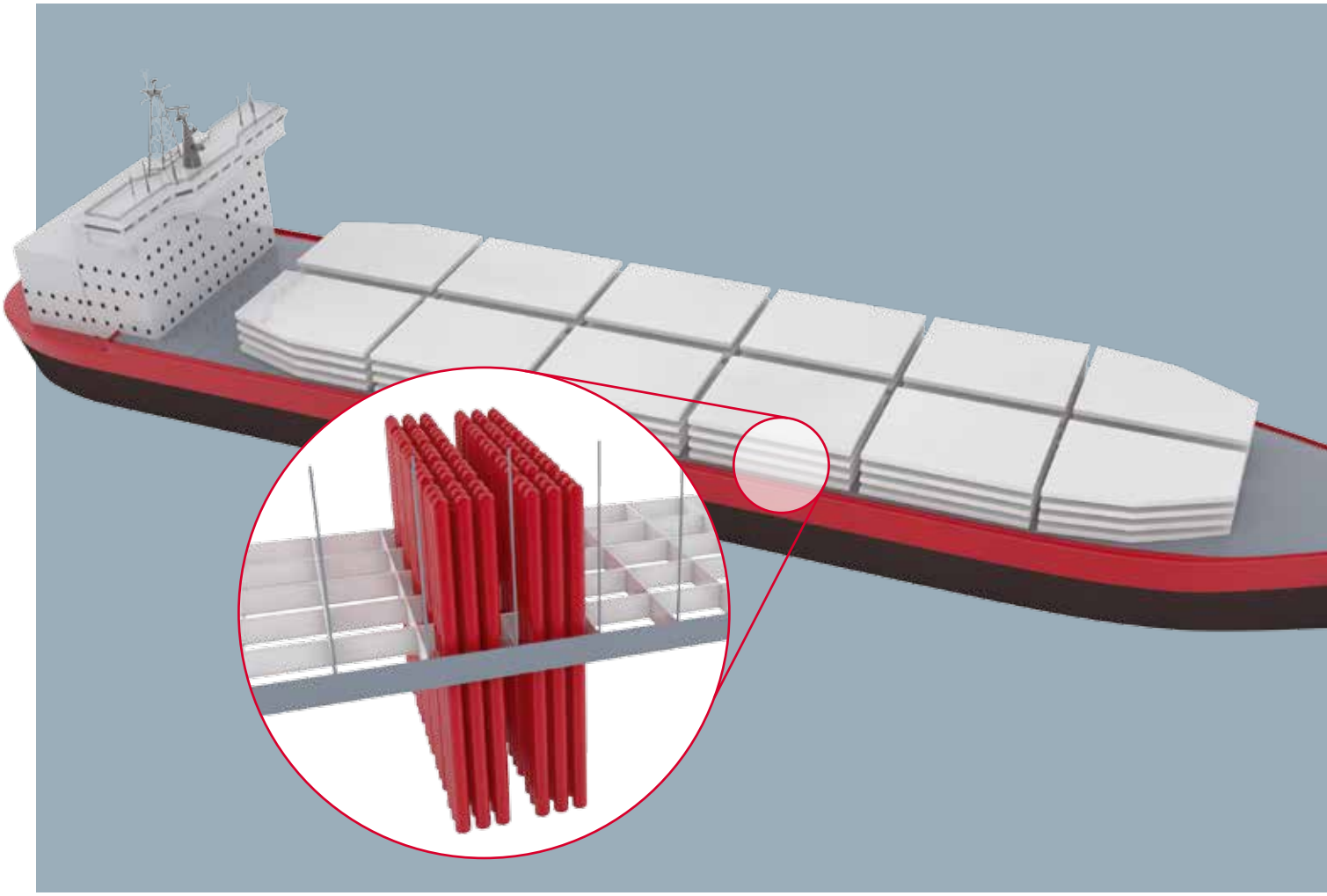
LONGITUDINAL WELDED PIPES WITH ENHANCED FATIGUE STRENGTH (HIFA® PIPE)

The transportation and storage of fluids in pipes can lead to cyclic loading due to fluctuating internal pressure which exceeds the standard pipeline operation range. In this special case, the design of the pipe is based on the fatigue strength rather than on the static strength.

Normally, a welded structure has a reduced fatigue resistance compared to a non-welded component. EUROPIPE and Salzgitter Mannesmann Forschung (SZMF) have developed the HIFA® pipe with enhanced fatigue strength to allow for a design with a higher stress range or a larger number of cycles.

The fatigue strength of pipes is generally governed by the strength, geometry and the surface condition. Whereas the surface quality and the geometry of the pipe body of longitudinally welded pipes are favourable for the fatigue loading, the fatigue strength of these pipes is usually limited by the stress concentration that is induced by the geometry of the weld.

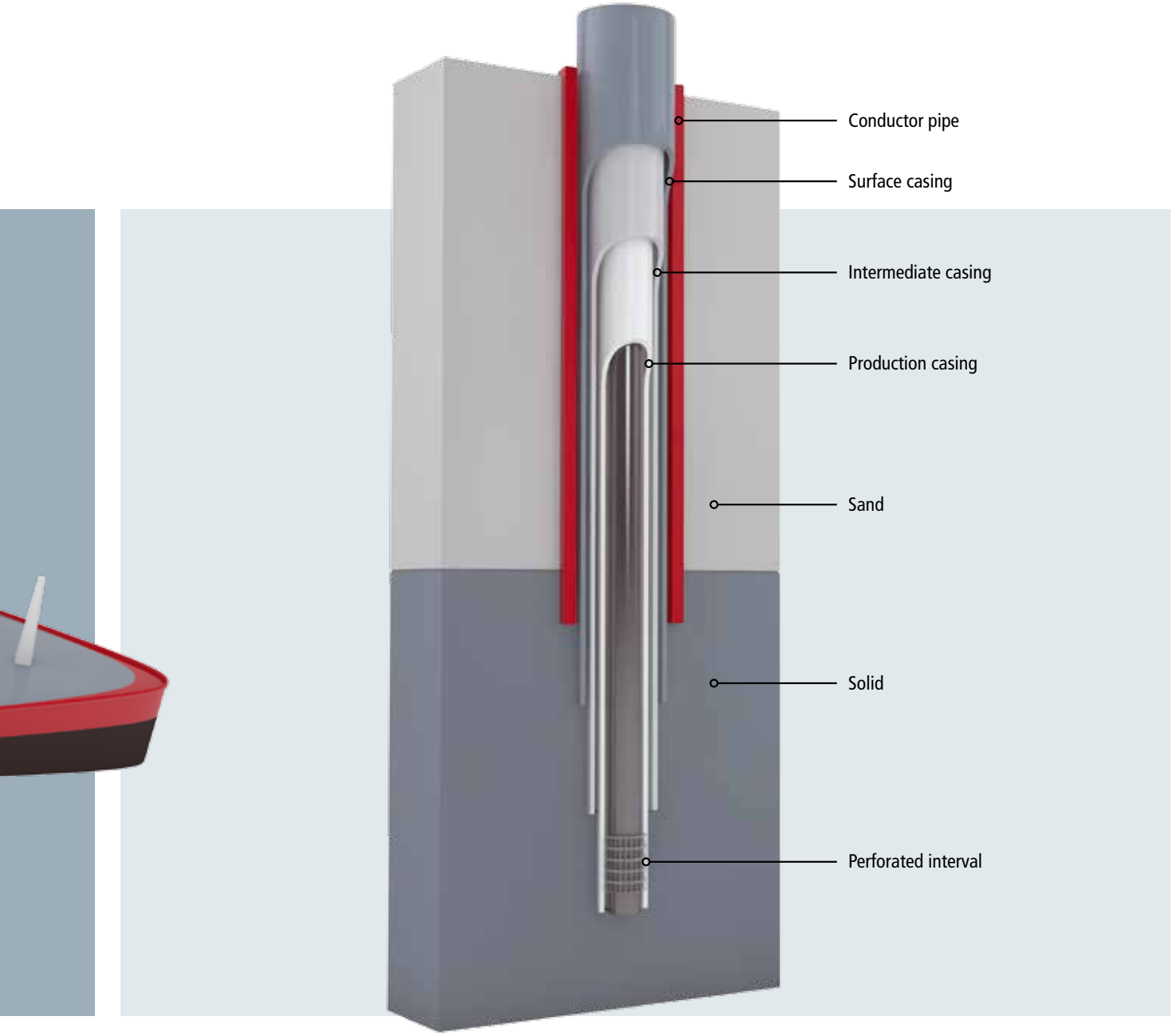
In a trial production of HIFA® pipes, statistical evidence was recorded to achieve DNV approval for EUROPIPE.



CONDUCTOR PIPES

Conductor pipes are pipes for drilling-rig boreholes and oil wells, which stabilise the ground around the top of the well. The steel grades used depend on the environment of application. Conventionally, standard steel grades X56 – X65 are used, however in more demanding applications, heavier wall thicknesses or steel grade X80 are chosen.

The typical dimensions have an outside diameter of 508.0 – 914.4 mm (20" – 36") and a wall thickness of 15.88 – 45.0 mm (0.625" – 1.77"). In special cases up to 50.0 mm (2.0").



MANAGEMENT CHALLENGES

At EUROPIPE, we raise our performance level year after year, meeting the most demanding quality standards and continuously expanding our products and services.
That's a lot, but it's certainly not everything. EUROPIPE thinks further ahead – about the health and safety of its employees, protection of the environment and a consistently resource-saving production.

Maintaining the highest quality standards while producing cost-effectively, and at the same time taking environmental protection, occupational safety and accident prevention very seriously – in the past this was known as "squaring the circle". But we know today that it is indeed possible to bring these demanding aspects together and even make them complement each other. This puts us in a position to uphold our responsibility towards mankind and the environment, and at the same time operate successfully on the international market.
With the setting-up of an integrated system based on the Excellence Model of the European Foundation of Quality Management (EFQM), we have established structures that ensure long-term improvement in all of these spheres. We and our main suppliers fulfil the requirements of ISO 9001, ISO 14001, OHSAS 18001 and ISO 50001.

EUROPIPE GmbH

P.O. Box 100504
45405 Mülheim an der Ruhr
Germany

Pilgerstraße 2
45473 Mülheim an der Ruhr
Germany

Phone +49 208 976-0
Fax +49 208 976-30 00

www.europipe.com

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