

# PLEUGER



PLEUGER Solutions  
for the Oil & Gas Industry



# SUBMERSIBLE PUMP SOLUTIONS FROM THE RELIABILITY EXPERTS

**Performance. Engineering. Design.**

PLEUGER pioneered the first successful application of submersible motor pumps in offshore service and has supplied thousands of specialist submersible pumps and motors to the Oil & Gas industry globally. Recognised as some of the most reliable, efficient and durable units you can buy, PLEUGER submersible units are proven for performance and durability in the harshest of environments.

We also design, manufacture and supply a range of auxiliaries including piping, wellhead and centrizers, sensors and solutions to prevent marine growth.

- 90+ years of experience, quality engineering from Germany
- Reliable, durable, very low maintenance
- Thousands of units installed worldwide
- 3,500 kW subsea motor design
- 6 MW design capability
- 24/7 customer service
- Dedicated after market and global support solutions

**Specialist motors and pumps, built for reliability and used worldwide for:**

- Sea Water Lift Pumps
- Ballast and Deballast Pumps
- Fire Extinguishing Systems
- Emergency Drainage
- Booster Systems
- Process Pumps
- Service Water and Bilge Pumps
- Extraction of Crude Oil
- Cavern Storage of Crude Oil and Refinery

**PLEUGER. Reliable. Always.**

PLEUGER. Reliable. Always.

## OUR ADVANTAGES AT A GLANCE

PLEUGER is a world leader in submersible motor pumps, marine propulsion systems and related services. We have been developing best-in-class pumping solutions for over 90 years, serving the Oil & Gas, Water, Mining, Chemical, Petrochemical, Marine & Offshore industries. Our products are designed and hand built at our Centre of Excellence in Hamburg, Germany.

PLEUGER products are fully backed with reliable through-life service and support, anywhere on the planet. Global sales and support facilities are served from 5 regional offices, backed by a network of accredited service partners. This gives our customers peace of mind that a PLEUGER specialist is always nearby.

### Engineering expertise and specialist advice from the reliability experts

As leading experts for reliability in submersible pump and motor systems, our design and engineering teams are often called upon to solve some of today's toughest challenges.

From retrofitting new solutions to subsea oil storage facilities in the North Sea, system analysis and improvements for various offshore platform applications; to potable water distribution across some of the most barren desert on the planet; PLEUGER's expertise has been paramount in increasing reliability, or upgrading efficiency and performance; while at the same time reducing long-term operating cost for the customer.

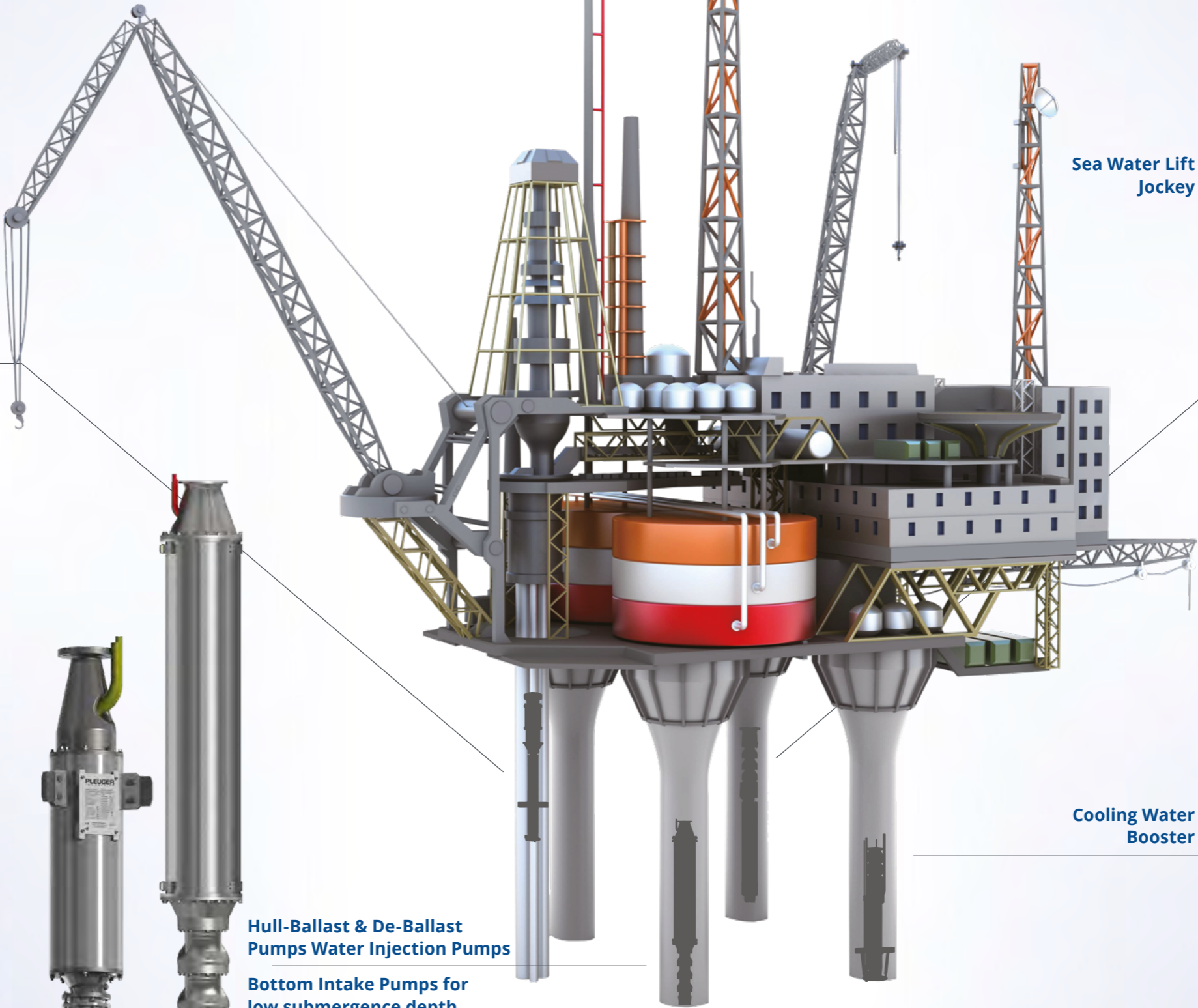
Our Engineering department is on hand to help you with your engineering challenges, including feasibility studies, design proposals for new installations, or plans to remodel, expand or upgrade existing submersible pumping systems.

# UPSTREAM / MIDSTREAM AND FPSO APPLICATIONS

Designed to perform for decades, PLEUGER pumps offer economic, reliable and safe pump solutions for seawater lift and fire water applications. Installed in external or integrated hull caissons, our pumps give assurance of safety and reliability throughout operation.



Fire Fighting & Drain  
Caisson Pumps



Sea Water Lift Pumps  
Jockey Pumps



Cooling Water Pumps  
Booster Pumps



High performance pumps and motors, used in a range of offshore applications. Reliability makes PLEUGER a leading name in offshore submersible pump solutions.

Hull-Ballast & De-Ballast  
Pumps Water Injection Pumps  
Bottom Intake Pumps for  
low submergence depth

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# PUMP SYSTEMS AND COMPONENTS

PLEUGER offers a wide range of pump system components including installation, piping, control and monitoring equipment. Designed and built using high-grade materials such as Super Duplex stainless steel, PLEUGER solutions are engineered to maximise both performance and reliability throughout the pump system.

## Installation

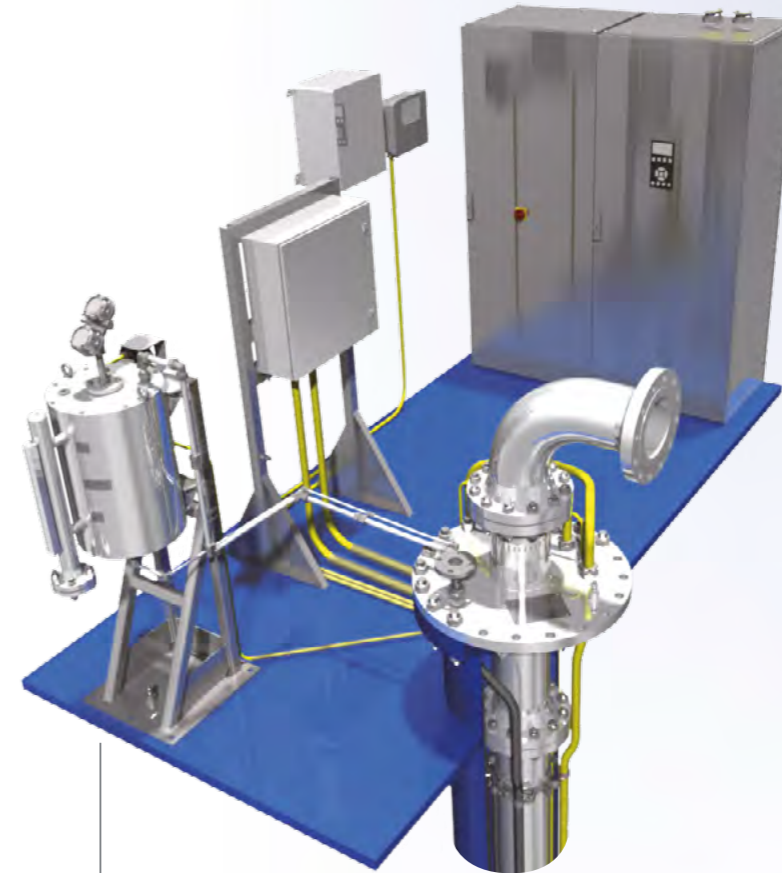
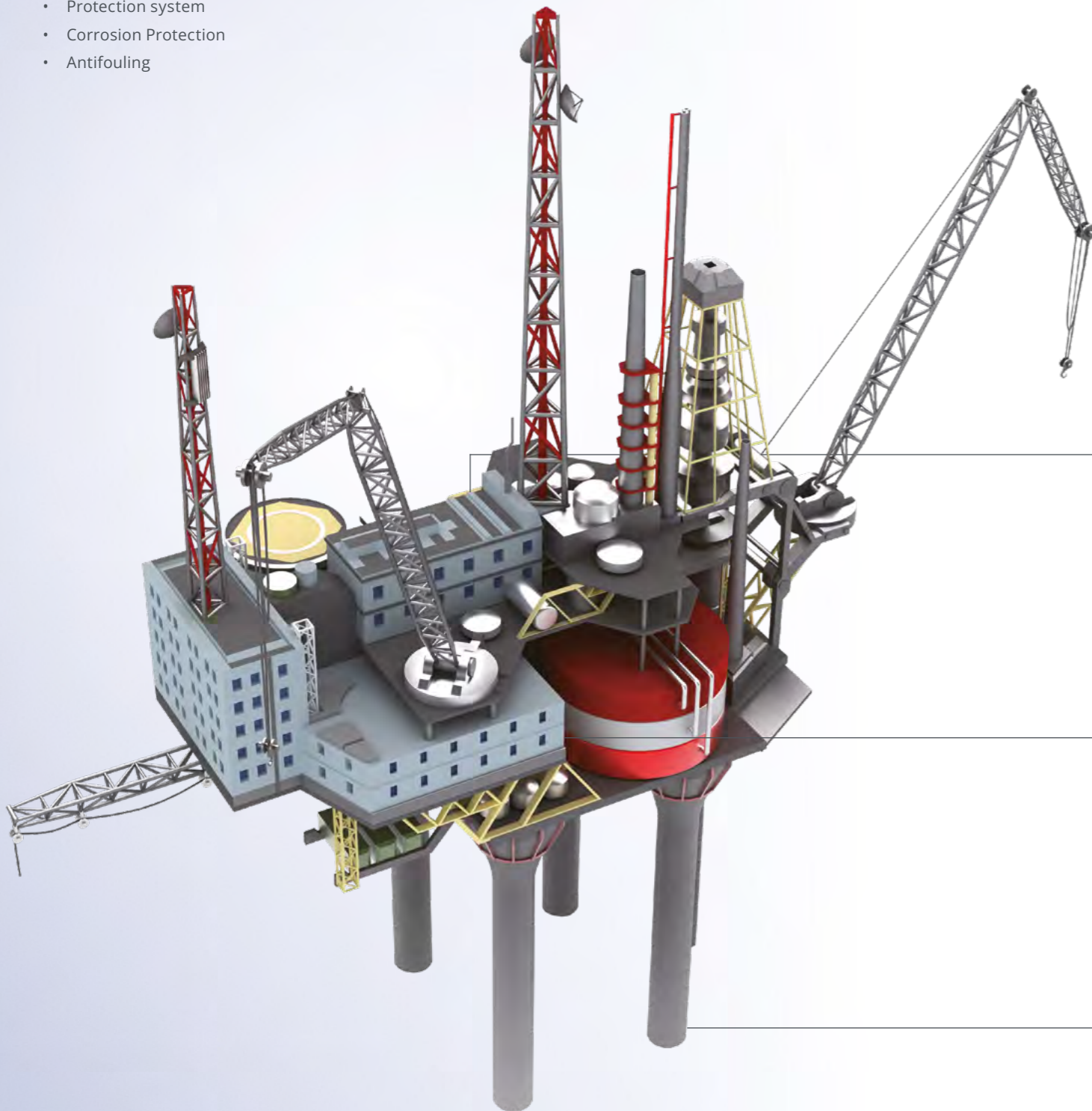
- Tools
- Piping
- Valves
- Service
- Protection system
- Corrosion Protection
- Antifouling

## Monitoring

- Temperature
- Vibration
- Leakage Detection

## Power control

- Starting and Control systems



Fully equipped  
Discharge Head



Corrosion  
Protection system

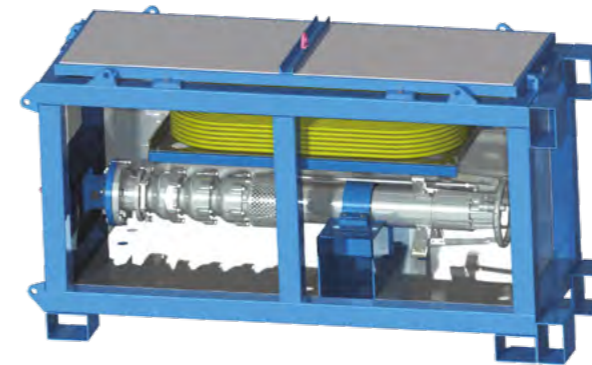




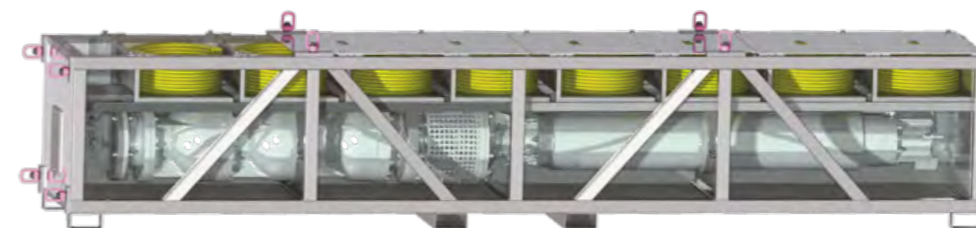
## TRANSPORTATION EQUIPMENT

PLEUGER can manufacture special equipment for transport, storage, difficult installation or extreme operating conditions.

**Skids for transportation, storage or installation** built by PLEUGER to ensure maximum safety. These can be built in stainless or powder coated steel to suit the application.



**Protective shrouds** can be custom designed and built for heavy duty applications. Suction/cooling shrouds improve cooling, water level management or special fluid handling.



# DOWNSTREAM APPLICATIONS

## CAVERN STORAGE

PLEUGER has extensive experience in customized, high-quality pump systems for underground storage of hydrocarbon liquids



PLEUGER ATEX certified submersible pumps are a perfect solution for the safe storage or handling of liquids such as crude oil, LPG, LNG, Butane, Propane, Diesel, and Gasoline.

Our cavern pump units are also ideal for handling penetrating leak water usually due to rock porosity. They pump away any leak-water with our ultra-reliable, low maintenance bottom intake submersible pumps, to ensure safe, uncontaminated storage.

PLEUGER engineers can design and build solutions to give you peace of mind and lower total cost of ownership through savings in maintenance and running costs.



### Technical Specifications

- Discharge Flow: 5 m<sup>3</sup>/h - 6000 m<sup>3</sup>/h (22 - 26,417 USGPM)
- Discharge Head: 7 m - 800 m (23 ft - 2,625 ft)
- Water-Filled motors as standard
- Oil-Filled motors on request
- Power Output: 0.37 kW - 5 MW (0.5 HP - 6,705 HP)
- 2-pole (standard) to 12-pole motor designs for 50 Hz and 60 Hz

# PLEUGER TECHNOLOGY ADVANTAGE

Our high performing, ultra-low maintenance pumps are recognised worldwide as some of the most reliable and durable available today, with a design lifetime exceeding 25 years.

Built on a heritage of 90+ years expertise, our engineers are always investigating how new technologies, materials and approaches can enhance what we do, to maximise performance and reliability, and minimize energy consumption.

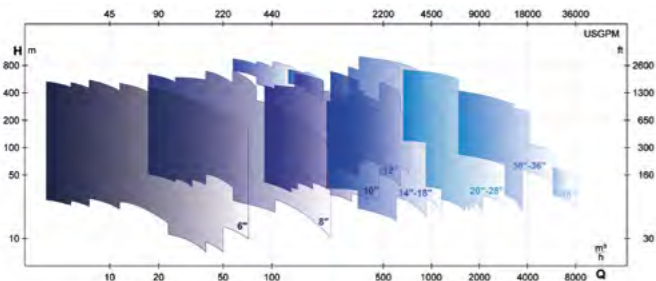
PLEUGER proprietary enhancements include our custom-polymer bearings and wear rings. These are designed for heavy duty operation of up to 300kN axial thrust. Launched in 2013, they have been proven to be highly durable and ultra-low maintenance, ensuring these high wear component last significantly longer than standard materials.

Our high performance motors are rewindable, reducing maintenance costs. Our pumps are fitted with a custom breather diaphragm to compensate internal and external pressures, extending the lifetime of the mechanical seal and O-ring.

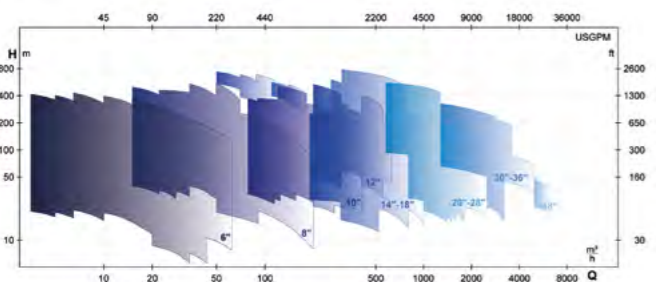
The 4" to 40" diameter standardised pump range is designed for ultra-low maintenance and durability, featuring a best-in-class service life of 25+ years. Packed with technologies and proven innovations that enhance safety, durability and reliability; readily available to rapidly deploy anywhere in the world.

Pumps with Permanent Magnet Motors are available in the 6" - 8" range and are fitted with VFD capabilities. They are designed for even greater efficiencies, capable of reducing energy consumption by 14 percentage points when compared to other options.

PLEUGER engineered-to-order solutions can be up to 50" diameter and engineered to specific performance capabilities with material options based on application.



Radial & semi-axial impeller working ranges (60 Hz)



Radial & semi-axial impeller working ranges (50 Hz)

- ✓ Reliability - built by the reliability experts
- ✓ Ease of maintenance - market leading
- ✓ Life Cycle Cost reduced
- ✓ Space-saving installation in caisson
- ✓ Low noise and vibrations
- ✓ Explosion Proof (ATEX certified)
- ✓ Safe from flooding and freezing
- ✓ Proven technologies
- ✓ Global aftermarket support



## PLEUGER CUSTOM COMPONENTS



**Non-return valve**  
Spring loaded, avoid backflow of water from the pipeline after the pump is switched off



**Non-return flap**  
Used on larger pumps to avoid backflow of water from the pipeline after the pump is switched off



**Radial bearings and rings**  
Custom polymer bearings ensure durability, reliability and ultra-low maintenance cycles



**Heavy-duty thrust bearings**  
Made from proprietary high performance polymer for highest axial thrust loads (up to 300kN), ensures reliability and extraordinary lifetime of motor - developed inhouse by PLEUGER

Further enhancements include our pump bowl flanged design, which changes the traditional screwed housing to a flange bolt arrangement, for far greater durability and wear resistance.



### Features

- Design lifetime 25+ years
- Ultra-low maintenance
- Sizes: 6 inch to 50 inch
- Standardized & Engineered to Order
- Rewindable motor
- Pump bowl flanged design

### Performance

- Flows to: 8,000 m³/h / 26,417 gpm
- -25°C to +100°C
- 230V to 6.6kV (11kV on request)
- 2 pole (standard) to 12 pole available

### Robust casing materials

- Zinc free bronze (up to 15°C)
- NiAlBz (up to 30°C)
- Stainless Steel 316 (up to 30°C Sea Water)
- Duplex (up to 40°C Sea Water)
- Super-Duplex (above 40°C Sea Water)
- Water-filled motors as standard

# SUBMERSIBLE MOTOR TECHNOLOGY EXPERTS

Our ultra-reliable, highly efficient motors are engineered and manufactured in our Centre of Excellence in Hamburg, Germany.

We can design for a broad power range, built to operate with high efficiency and customized corrosion protection.

## Technical Specification:

- Water-Filled Motors as Standard
- Oil-Filled Motors on request
- Sizes: 6 inch to 50 inch
- Power Output: 0.37 kW to 5 MW (0.5 HP to 6,700 HP)
- 230V to 6.6kV
- 3PH - 50Hz & 60Hz
- 2 pole (standard) to 12 pole available
- Suitable for VFD operation
- -25°C to +100°C

## Design Standards:

ANSI / ASTM / DIN / ISO /  
Hydraulic Institute /  
CE / API 610

## Hydraulic Standards:

ANSI/HI / EN ISO / API610 /  
NFPA20

## Electrical Standards:

NEMA / IEC / IEEE

## Certifications:

DNV GL / ABS / CSA / ATEX /  
NSF61

## Approvals:

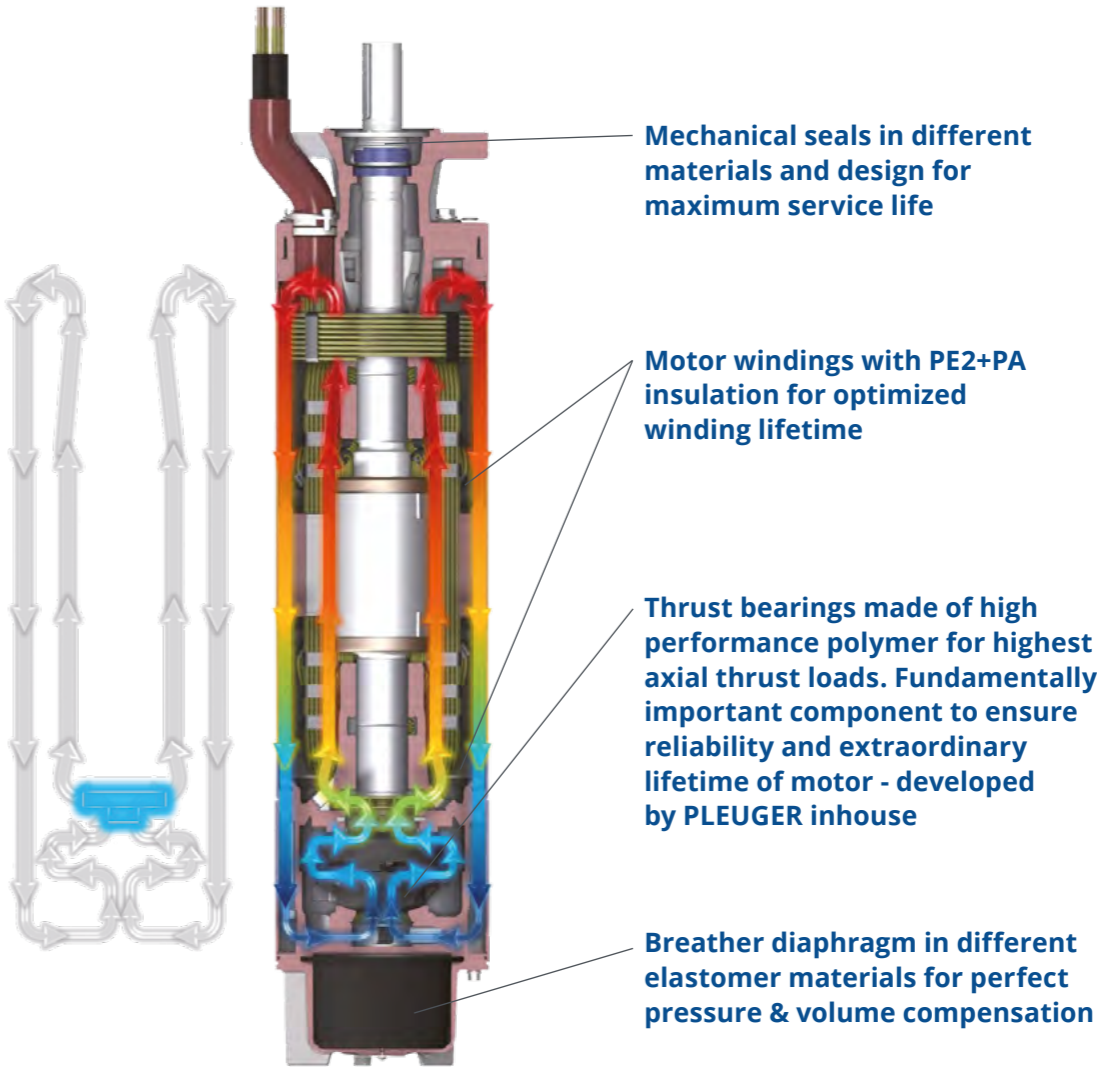
ISO 9001



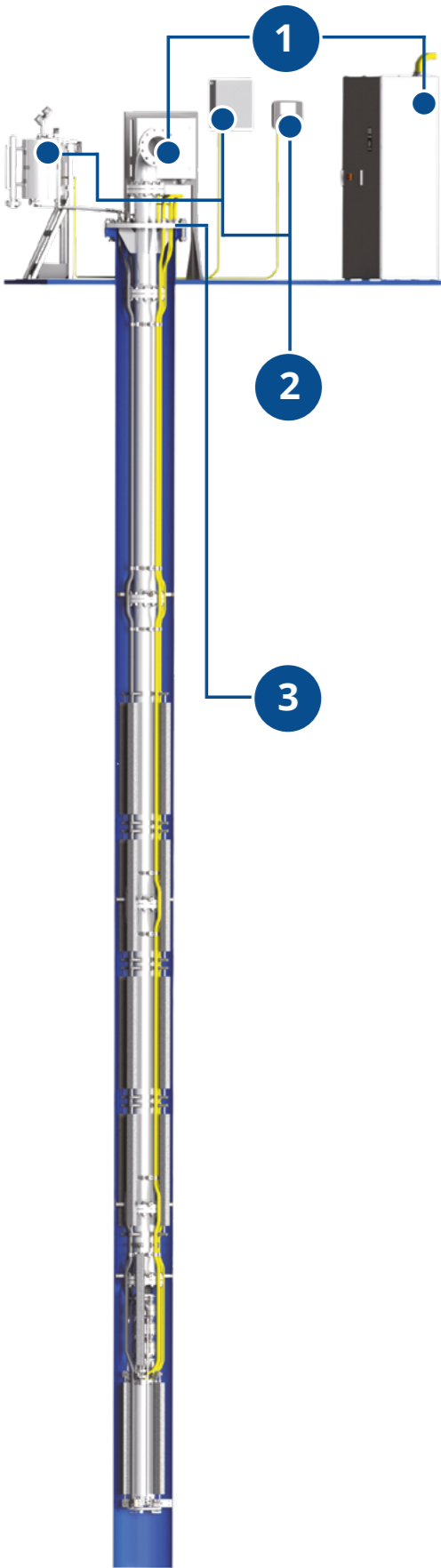
# PLEUGER MOTOR COOLING

## Submersible Motors with Internal Forced Cooling System (I – Design)

The internal cooling system is manufactured with a highly efficient cooling impeller. The impeller is customized for each motor size and provides an efficient cooling circulation. The design ensures sufficient thermal motor reserves and minimizes energy losses, even under tough operating conditions.



PLEUGER EQUIPMENT



1. Power Control	Junction boxes	Junction boxes for signal and power cable connections (on stands or wall mounted), also customized for all zones of explosion prevention and protection
	Starting systems	Different electrical systems for starting and operating, like Frequency converter, soft starter etc
2. Monitoring	Temperature Monitoring	Temperature sensors inside the motor to monitor motor internal temperature
	Vibration monitoring	Submerged sensors to monitor vibration behavior of motor and pump
	Leakage Detection	Liquid reservoir on top deck with level monitoring or leakage detection through conductivity sensor inside the motor
3. Installation	Riser Pipes	Full Riser Pipe Systems including cable clamps, centralizer, installation tools, etc.
	Wellhead	Customized Wellhead designs with cable penetration, back-flow connection, air-release connection, elbow, etc.
	Valves	Air valves, vacuum breaker, multiple check and ball valve types
	Centralizer	Different designs for submersible unit and riser pipe protection during installation
	Corrosion Control and Antifouling	Isolating equipment, active anode systems or passive anode systems for submersible units, riser pipe and caisson protection
	Anti fouling equipment	Anti-fouling system to protect the units against marine growth
	Installation Tools	Supporting clamp, horseshoe, mounting flanges, slings, shackles
	Transportation Skids	Special tailor-made skids for transportation and storing of submersible pump equipment
	Service	Comprehensive service support for installation, commissioning and maintenance as well as high-level technical consulting services from design phase through operation.

AFTERMARKET SERVICES

Dedicated service and solutions from the submersible pump and motor reliability experts.

A comprehensive range of through-life service and support solutions available globally and designed to fit your needs.



- International field service team
- Installation planning and on-site support at customer sites
- Project management
- Installation supervision to start-up and commissioning
- Specialist Transportation



- Advanced design & modelling
- Customer system analysis
- Pump integration into systems
- Site inspections
- Solutions engineers on-site
- Test capabilities / facilities



- New products & capital projects
- Operations & systems



- Care Agreements
- Spare parts & Kitting
- Repairs & Overhauls
- Upgrades
- Customer training

PLEUGER CARE®

EXTENDED WARRANTY

SPARES INVENTORY & STOCKING

PLANNED MAINTENANCE PROGRAMMES

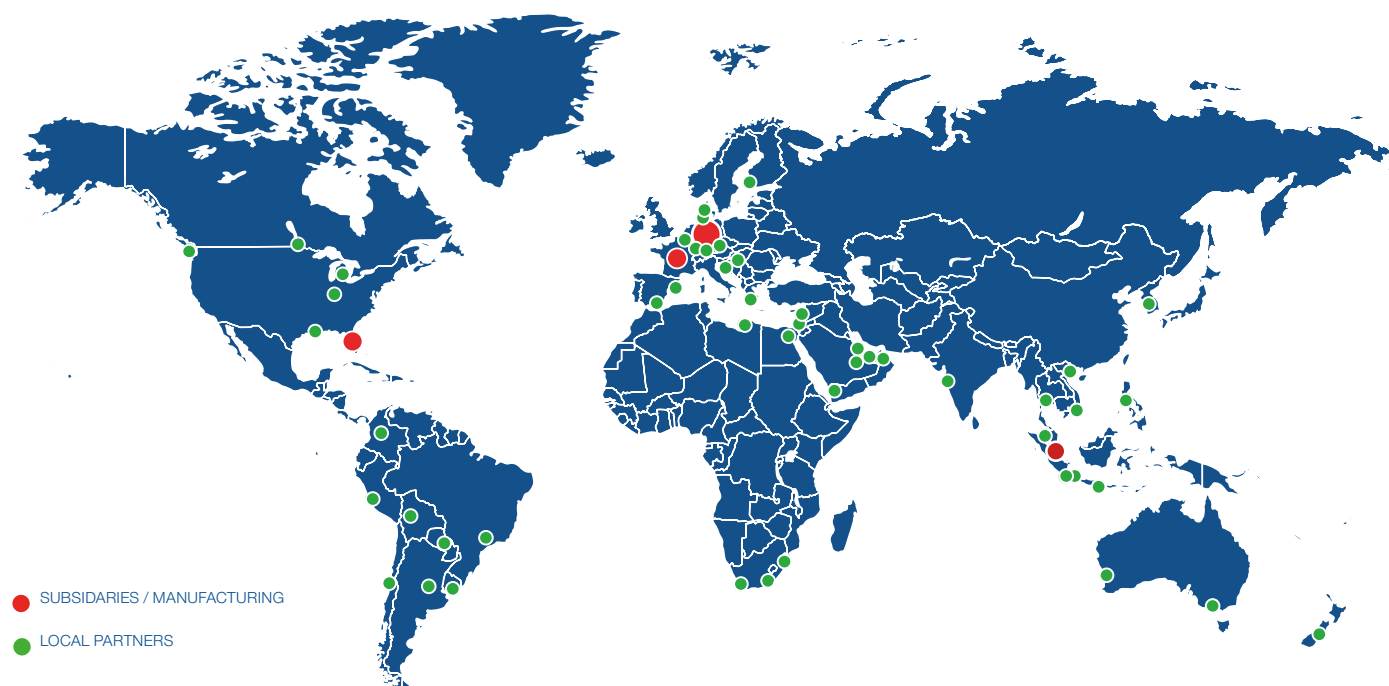
PRIORITY TECHNICAL SUPPORT

RAPID FIELD SERVICE SUPPORT

[pleugerindustries.com/aftermarket](https://pleugerindustries.com/aftermarket)

# WORLDWIDE SALES, SERVICE AND SUPPORT

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## THE RELIABILITY EXPERTS

PLEUGER designs, manufactures and services submersible motors, pumps, thrusters and plunger pumps. Renowned worldwide for absolute reliability and outstanding longevity throughout the energy, mining, water, industrial processing and oil & gas industries.

Our products perform in some of the most challenging and harshest of environments. PLEUGER engineers find solutions to some of the toughest challenges and are trusted across the globe as the reliability experts.

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# PLEUGER

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Made in Germany