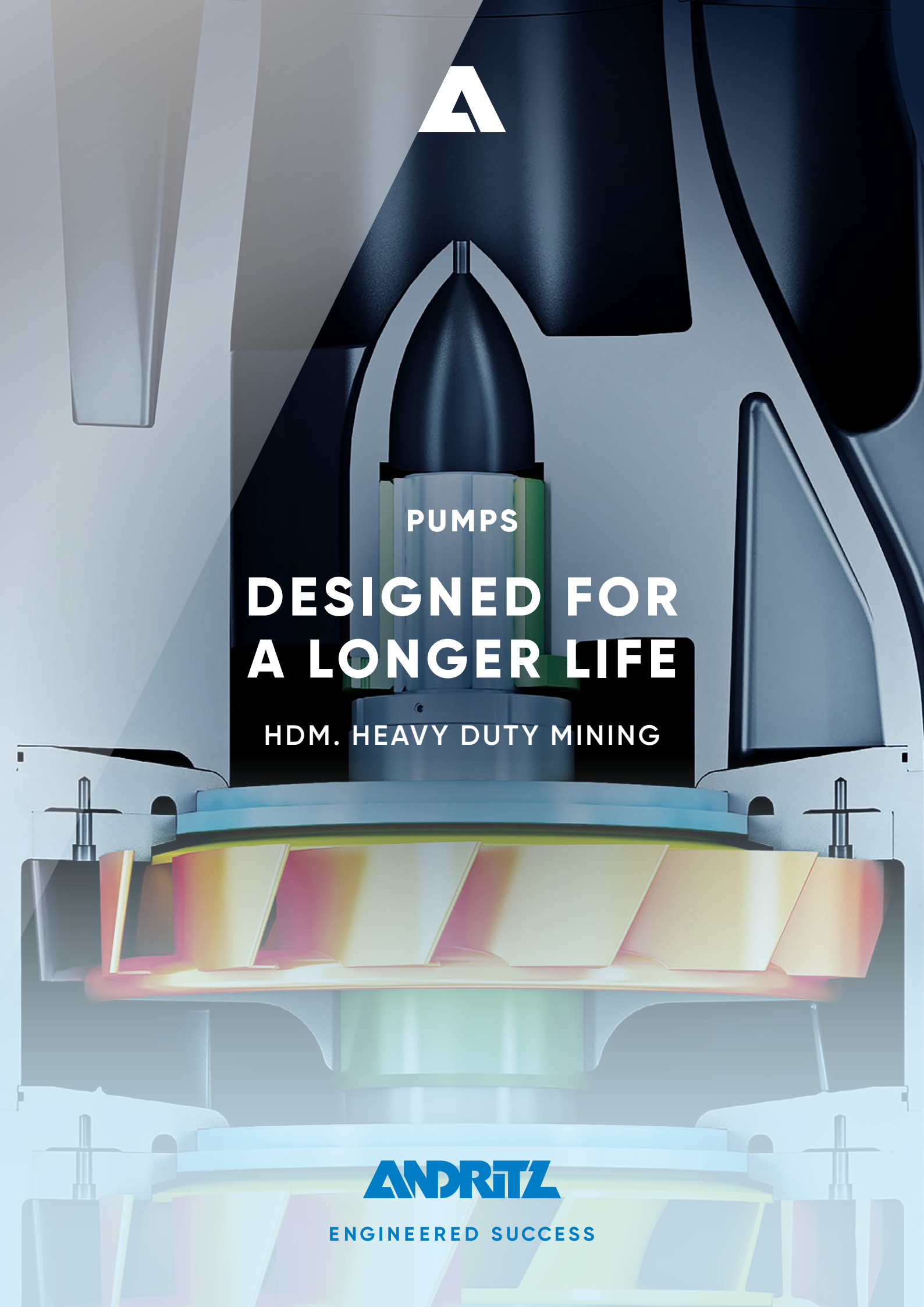


PUMPS

DESIGNED FOR A LONGER LIFE

HDM. HEAVY DUTY MINING

ANDRITZ

ENGINEERED SUCCESS

ANDRITZ pumps for your industry

Water | Pulp and paper | Food | Mining and minerals | Power | Other industries

ANDRITZ develops and manufactures high-quality custom tailored pumps for various industries. We supply pumps for different water and waste water applications. ANDRITZ pumps are operating successfully worldwide, for example in water resources management, waste water disposal, as well as large infrastructure projects for irrigation, desalination, and for drinking water and industrial water supplies.

Thousands of ANDRITZ submersible motors and pumps have been installed in mines around the world, working under severest conditions in water management and emergency drainage, including the largest submersible dewatering pumps in the world.

As plant and equipment supplier to the pulp and paper industry, ANDRITZ provides a complete pump program. Our product portfolio comprises medium-consistency pumps with an innovative fiber separation system, for example, as well as headbox pumps with efficiencies of over 90% and particularly low pulsation.

We also supply high-performance and reliable pumps for food applications such as proteins, dairy products, or beverages as well as a complete pump program for the entire sugar and starch industry. To round off the portfolio, ANDRITZ small hydropower plants and pumps used as turbines suitable for the private as well as the municipal sectors, and for industrial and commercial facilities ensure an economic and ecological independent power generation.

Customized premium pump technology

For over 165 years, ANDRITZ has been a byword for designing and manufacturing customized pump solutions at the highest level. Our engineered pumps are operating in various industrial applications successfully all over the world. They offer robustness and wear resistance, and fulfill highest customer expectations in terms of efficiency, life cycle, maintenance friendliness, and economic efficiency. The high standard of ANDRITZ centrifugal pumps is based on decades of experience in designing hydraulic machines and extensive know-how. In the interests of our customers, we set no limits on size and flow rate in the development and manufacture of customer-specific pumps. Experienced experts assist our customers with planning, development, installation, start-up and after-sales service. Engineering, design, material selection and manufacturing all run according to defined standards. The processes are transparent and can be adapted to individual needs. Our goals at ANDRITZ are to provide first-class products and service to secure sustained customer satisfaction.

Extracting increasing quantities of water reliably and economically from ever-greater depths for the water supply, and for water drainage, represents one of the biggest challenges facing operators. The use of single-suction submersible motor pumps for pumping huge quantities or from great depths is associated with extreme loads on the unit. The higher the pump performance, the stronger the axial thrust exerted on the pump, the motor and its thrust bearing. The consequences are overloading and untimely shutdown. Doubling up, however, means greater durability as a double-suction pump design provides full compensation of axial thrust.

THOUSANDS OF ANDRITZ HDM. HEAVY DUTY MINING PUMPS
have been produced and are in trouble-free operation working under even the toughest conditions around the globe; including the biggest submersible motor pump in the world. This applies to all areas of water extraction and drainage, for example, in mining and surface mining to extract coal, gold, copper, tin or diamonds, in offshore, as well as in deep wells to extract water.

FIELDS OF APPLICATION
Water extraction and drainage in:
- Mining and surface mining to extract coal, gold, copper, tin or diamonds
- Offshore
- Deep wells to extract water

FACTS:

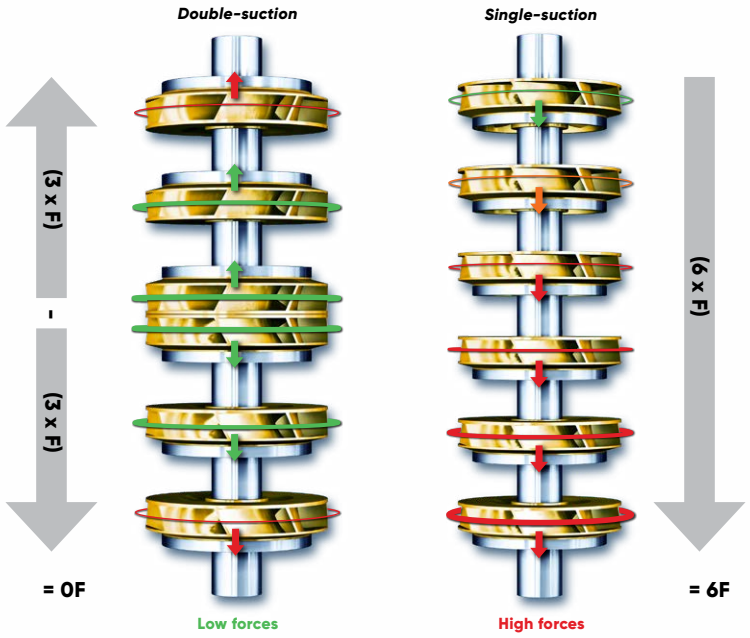
Performance data of the pump:
- **Well diameter: beyond 20" (inch)**
- **Flow rate: up to 6,000 m^3/h**
- **Head: up to 1,500 m**
- **Pressure : up to 150 bar**
- **Speed: up to 3600 rpm**

Performance data of the motor:
- **Frequency: 50 Hz / 60 Hz**
- **Voltage: up to 14,000 volts**
- **Motor power: up to 6,000 kW**
- **Speed: up to 3600 rpm**
- **Temperature: up to 75 °C**
- **Materials: The materials are selected individually depending on project and customer requirements; including grey cast iron, ductile iron, bronze, aluminium bronze, duplex stainless steel.**

HDM.
Heavy Duty Mining

PRODUCT FACTS

- Maintenance-free
- Long service life
- Maximum operating reliability
- High cost-effectiveness
- Optional supply with modular shaft technology for flexible extension or reduction of the number of stages

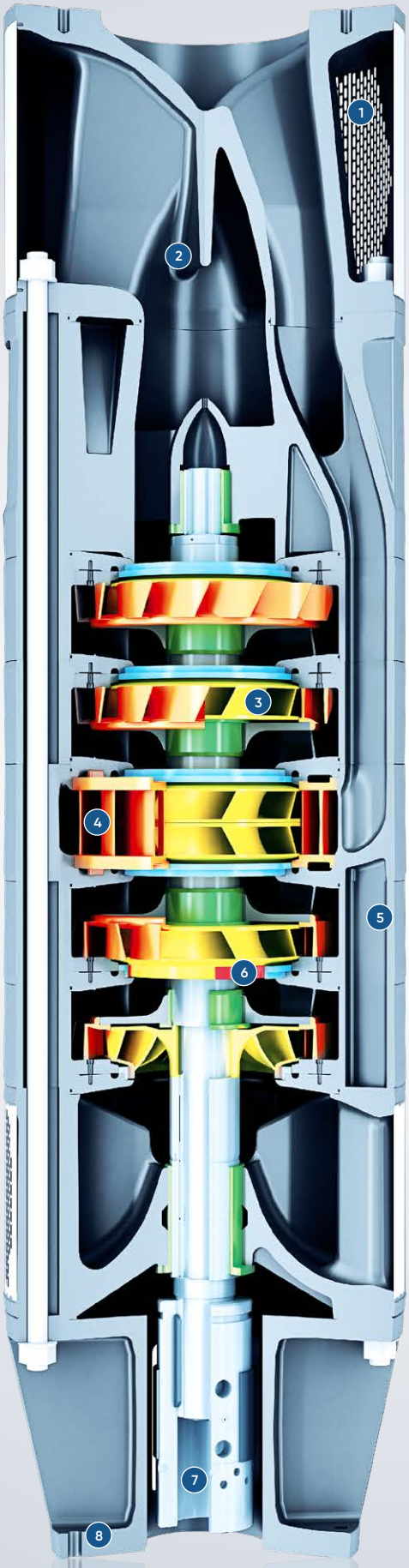


With HDM, two contra-rotating submersible motor pumps are arranged on top of each other and driven by a continuous pump shaft. The suction branches of the two pumps are located at the ends of the HDM module. Each of the two pumps transports half the capacity to the middle of the pump at full pressure. There, a deviating stage directs the flow to the pressure line via the external casing channels. The double-suction design completely compensates the axial thrust. Loads on the unit are kept to a minimum and the thrust bearing is no longer subjected to tons of thrust. This significantly reduces wear and tear, increasing service life up to 20 years or more.

The division of work between the two pumps not only achieves complete compensation of axial thrust, it also halves the suction velocity outside the pump. This protects the well walls around the intake openings and minimizes the intake of abrasive solids and silt. There is an even more compelling benefit: With half the delivery flow going to each pump, smaller impeller intake cross-sections are possible and therefore, lower circumferential velocity in the seal gaps.

EVERY PUMP FEATURING HDM IS TAILOR-MADE FROM STANDARD MODULES BASED ON PROJECT AND CUSTOMER REQUIREMENTS.

- **Hydraulics module:** The optimum combination of impeller, diffuser and casing leads to the best adaptation to the desired operating point at extremely high efficiency.
- **Material module:** A choice of materials enables flexible adaptation to suit your operating conditions.
- **Motor module:** Each HDM features a heavy duty motor specially adapted to power usage of up to 14,000 volts. This minimizes both the cross-sections for energy transmission and transmission losses.
- **Cooling module:** Here the MCT – Modular Cooling Technology – is deployed. It can be configured to suit any requirement.



1 SUCTION AREAS
The two suction areas half the suction velocity and minimise the intake of abrasive solids and silt.

2 INLET/OUTLET CASING
The upper inlet/outlet casing delivers optimum rates of flow in the suction and pressure area.

3 HYDRAULICS
Various hydraulics enable flexible adaptation to suit the operating conditions at maximum efficiency.

4 DEVIATING STAGE
The deviating stage combines the delivery flows from the two pumps and directs it via the external casing channels.

5 HIGH-QUALITY MATERIAL SELECTION
A choice of materials offers maximum flexibility to suit specific operating conditions.

6 WEAR PARTS
Wear parts made of corrosion- and abrasion resistant materials protect all important components under even the toughest conditions.

7 HEAVY DUTY MOTOR
The use of custom heavy duty motors reduces the cross-section for energy transmission, as well as transmission losses. Adapted to the relevant environment, the MCT – Modular Cooling Technology delivers maximum operational reliability.

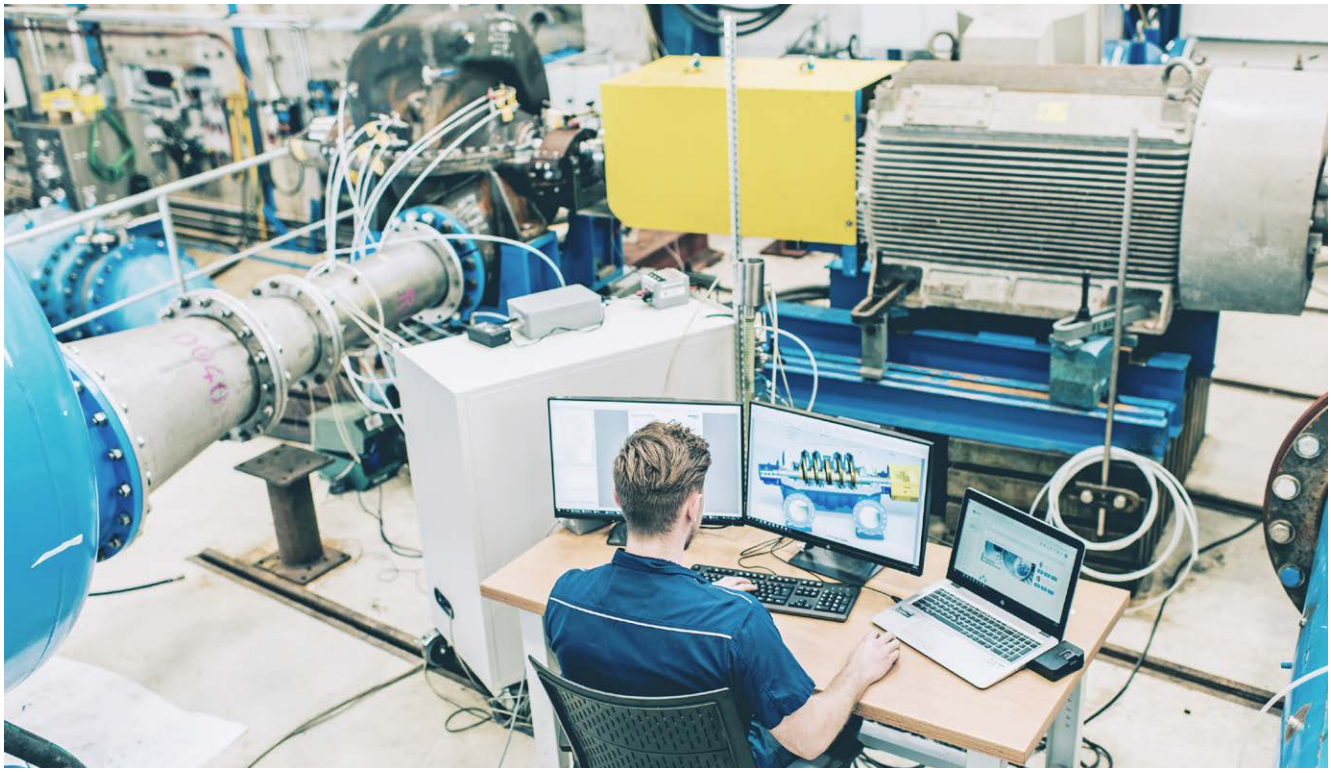
8 ZERO AXIAL THRUST
The double-suction design compensates axial thrust, thereby neutralising the load on the pump, the motor and its thrust bearing.

Always a flow ahead – Research and development

Our affiliate ASTROE enjoys an internationally renowned reputation for its hydraulic developments and investigations. The high efficiency of the ANDRITZ pump series is ensured by Computational Fluid Dynamic (CFD) calculations and extensive testing carried out in our company owned laboratory.

Continuously increasing demands by customers in our operating industries emphasize the significance of R&D in the constant optimization of products and services. Today, efficiency, flexibility, and reliability over an extended lifetime are the major challenges of the market.

Our commitment to research and development forms the basis for our advances in hydraulic machine manufacturing. With ASTROE, center for hydraulic engineering and laboratory, we have an internationally renowned institute for hydraulic development work at our disposal. We are currently developing and testing our pumps and turbines at five locations in Austria, Germany, Switzerland, and China. Our test stands are among the most accurate in the world. By networking these research and development centers, we provide a continuous transfer of know-how within the ANDRITZ GROUP for the benefit of our customers. The main tools for R&D are numerical simulation methods as well as experimental measurements in the laboratory and on site. State-of-the-art equipment, highly precise measuring instruments as well as the latest simulation technologies, and powerful software form the basis of the high technical quality of the pumps and turbines from ANDRITZ.



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