PUMPS

MAXIMUM OPERATIONAL RELIABILITY AND EXTREMELY LONG SERVICE LIFE

SUBMERSIBLE MOTORS – SM SERIES

ANDRITZ

ENGINEERED SUCCESS

ANDRITZ pumps for your industry

ANDRITZ specializes in the development and manufacturing of high-quality pumps, offering a comprehensive range from standardized products to tailor-made solutions across various industries. Our pumps have achieved global success in diverse applications, including municipal drinking water supply, wastewater disposal, industrial water distribution, and significant infrastructure projects such as irrigation, seawater desalination, and water transmission.

In flood control, irrigation, and water transport, ANDRITZ not only provides the largest and most powerful pumps, but also complete systems and pumping stations. As a prominent supplier to the pulp and paper industry, we leverage strong process expertise to deliver pump solutions that enhance process stability and energy efficiency. Our product portfolio encompasses a full range of robust process pumps and innovative medium-consistency pumps with an advanced system to avoid fiber losses. Notably, our double-suction headbox pumps boast efficiency levels of up to 93% and low-pulsation impellers, crafted with innovative methods. They thus provide the best performance in the paper manufacturing process.

In line with our commitment to sustainability, ANDRITZ offers reliable small hydroelectric power plants and pumps utilized as turbines for private, municipal, industrial, and commercial applications. Our diverse range ensures economically and ecologically sustainable energy production. Specializing in hydroelectric storage, our pumps cover a wide range from high heads to high flows, showcasing our engineering competence.

Our pump series, distinguished by modern and robust designs, high efficiency levels, and sustainability features, find applications in various demanding industries, including sugar and starch, lysine, bioethanol, hydrogen, fertilizer, mining, offshore, and general process industries.

Additionally, ANDRITZ provides IIOT-enabled premium pump technology for enhanced process monitoring, thus reflecting our commitment to cutting-edge solutions.

Customized premium pump technology

For over 170 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.

ANDRITZ develops and manufactures submersible motors for various fields of application in water supply, mining and offshore. Equipped with a special cooling technology (MCT) and an interior permanent motor technology (IPM), ANDRITZ submersible motors achieve impressive performance values, efficiencies, and cost savings. Their rewindable winding makes ANDRITZ submersible motors the ideal drivers for submersible deep well pumps, bottom intake pumps, seawater lift pumps, and for subsea machinery. Thus, they can be used for water supply and in the offshore as well as the mining industry. They are designed as water-filled and water-cooled three-phase asynchronous motors with squirrel-cage rotors with a mechanical shaft seal. Depending on the field of operation, ANDRITZ submersible motors can be made of cast iron, bronze or stainless steel and can be installed vertically and horizontally.

FIELDS OF APPLICATION

Ideal drivers for submersible deep well pumps, bottom intake pumps, seawater lift pumps, and for subsea machinery in

- Water supply
- Mining industry
- Other industries (e.g. offshore)

FACTS

ANDRITZ SM series - low-voltage motors

- **Design: water-filled and cooled three-phase asynchronous**
- **Power: up to 700 KW**
- **Voltage: up to 1,000 volts**
- **Temperature: up to 75° C**
- **Speed: up to 3,600 rpm**

ANDRITZ SM series - high-voltage motors

- **Design: water-filled and cooled three-phase asynchronous**
- **Power: up to 5,000 KW**
- **Voltage: up to 14,000 volts**
- **Temperature: up to 75° C**
- **Speed: up to 3,600 rpm**

Customized premium pump engineering

PRODUCT FACTS

- Reduced investment and energy costs
- Drinking water as the cooling medium
- Suitability for media temperatures up to 75 °C
- Maximum operational reliability
- Extremely long service life
- Innovative modular cooling technology (MCT)

DESIGNED FOR HIGHEST TEMPERATURES

Efficient and cost-effective cooling of submersible motors is a constant source of discussion by well and mine operators. High efficiency and an effective cooling system are essential to keep the internal temperature rise as low as possible. Derating is a less-than-ideal solution. With this method, a high-output motor is deployed for a much lower power requirement. However, "derating" was, and still is, a makeshift solution causing high investment and energy costs.

Additionally, the motor range is limited and the overlarge, downgraded motors usually require a greater well diameter as well as high starting currents. The second option – particularly where the media temperature is above 50 °C – is oil cooling. This needs careful consideration as well – any failure can cause ecological damage.

MCT – Modular Cooling Technology for submersible motors

Operators around the globe already deploy ANDRITZ motors equipped with the innovative modular cooling technology (MCT). It enhances the motor's durability and also is the most efficient possible mean of cooling submersible motors. The absolutely maintenance-free motors use potable water as cooling fluid and can be installed in media up to 75° C.

On the lower shaft end of the rotor there is a suction and pressure-optimized pump impeller. One of its two main tasks is to cool and lubricate the nearby axial bearing. It also ensures a constant flow of cooling liquid in the right direction. This moves upwards through the inside of the motor. Cooling channels developed in-house define the precise route via all thermal sources to evacuate heat effectively. When it arrives at the top, the heated liquid is transmitted to the outer wall of the motor. There the heat escapes through the surface to the medium being pumped and the whole procedure starts again. The cooling performance can be dimensioned precisely.

MCT – MODULAR COOLING TECHNOLOGY IS BASED ON FOUR BASIC ELEMENTS:

- The integrated pump impeller ensures a constant flow of cooling liquid in the right direction. Thereby, it prevents the formation of heat pockets which arise when cooling liquid does not move. At the same time, the impeller systematically cools and lubricates the axial bearing.

- Optimized cooling circulation featuring specially designed cooling channels ensures that heat is absorbed where it is generated. The system handles evacuation and transports heat effectively to the medium being pumped outside.

- The modular heat exchanger – modern add-on technology – increases the internal volume of coolant and thereby thermal capacity. It also increases the surface area available for transporting heat to the medium being pumped.

- The heat-resistant winding made of various high-quality materials makes it possible to increase technical thermal limits and consequently allows the system to be used at very high temperatures.

DESIGNED FOR SLIM DEEP WELLS

The deeper and greater the well, the greater the required motor power. This formula, however, causes increased investment costs for operators.

MPT – Modular Power Technology from ANDRITZ achieves up to 100% more motor performance for a given well diameter. This means that much slimmer, more cost-effective wells can be implemented. The modular principle allows multiple staging of the motor power, which can be dimensioned to suit individual customer and project requirements.

CONVINCING PERFORMANCE LIMITS

INCHES	8''	10''	12''	14''
Power	200 kW	400 kW	800 kW	1,000 kW

KEY BENEFITS – AN OVERVIEW

- Media temperatures up to 75 °C
- Drinking water as the cooling fluid
- Zero maintenance
- Maximum operational reliability
- Minimum operating costs

1 WINDING
Rewindable, heat-resistant winding. The benefit: increases technical thermal limits, thereby enabling long-term operation in mediums of up to 75 °C.

2 TEMPERATURE MONITORING
High-quality PT-100 sensors in the upper end windings. The benefit: maximum operational reliability by continually monitoring motor temperature.

3 COOLING CIRCULATION
Circulation system featuring specially designed cooling channels. The benefit: ensures heat is absorbed from all thermal sources while at the same time providing optimum heat transmission from the motor to the external medium being pumped.

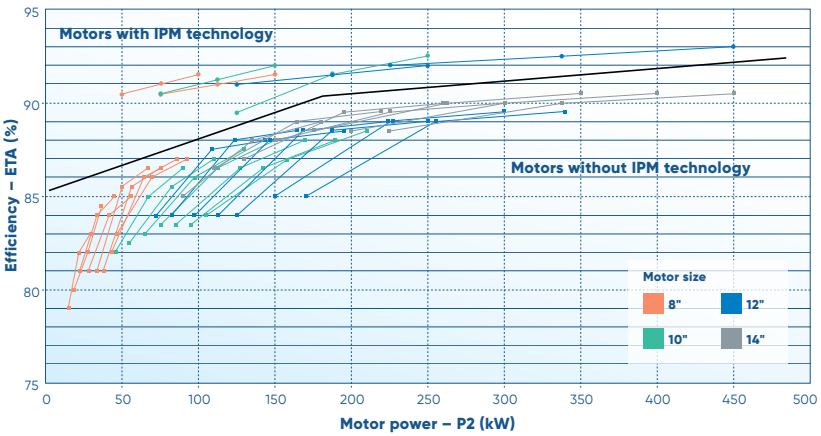
4 IMPELLER
Rotor with suction and pressure-optimised pump impeller. The benefit: guarantees targeted circulation of the cooling liquid inside the motor. Also cools and lubricates the axial bearing effectively.

5 HEAT EXCHANGER
Modern, modular add-on technology. The benefit: enables precision thermal design by increasing the volume of coolant and the surface area available for transporting heat to the medium being pumped.

IPM. Interior Permanent Magnet Motor

ADVANTAGES AT A GLANCE

- Substantially lower costs for warehousing and logistics
- Much higher performance can be achieved from smaller wells
- Investment costs can thus be sustainably minimized



ADJUSTING PUMP PERFORMANCE WITHOUT ANY LOSS

There are three options for adjusting pump performance to meet the requirements of the customer. Firstly, the installation of reduced impeller diameters. The pump performance is indeed reduced, but the hydraulics also deteriorates, thereby reducing the pump efficiency and increasing energy requirements. Secondly, the throttling of the pump performance via a shut-off. By operating at a partial load, not only the pump and energy efficiency is minimized, but energy is also dissipated through throttling. Thirdly, the installation of a high-efficiency frequency converter. The complete IPM motor package also includes a high-efficiency frequency converter with which the rotational speed of the motor and the pump performance can be flexibly adjusted – without losses.

With the new IPM motor technology, a rotor with integrated permanent magnets is used. Existing asynchronous motors thus become permanent-magnet synchronous motors with impressive performance values: average efficiency increases of 4% and in the partial load ranges, as much as 7% at levels above 90%. Compared to asynchronous motors, IPM motors have a substantially higher power density. The performance of an IPM motor of the same size can be over 100% higher. In concrete terms: A motor with IPM technology that is the size of a 45 kW asynchronous motor performs at 100 kW. Due to the extremely high efficiency of the new IPM motor into the partial load range, an overall performance range between 50 and 450 kilowatts can be covered with only five motors.

TECHNICAL DATA SHEET

Motor type	Rated output	Rated voltage U_N	Rated current I_N at U_N	Efficiency *h* [%] at nom. load			Power factor cos *j* at nom. load			Nominal speed	Length	Ø	Weight
	[kW]	[V]	[A]	50	75	100	50	75	100	n_N [rpm]	[mm]	[mm]	[kg]
SM8T/100/4 IPM	100	400	171	90.5	91.0	91.5	0.97	0.95	0.92	3000	1245	189	165
SM8T/150/4 IPM	150	400	256	90.5	91.0	91.5	0.97	0.95	0.93	3000	1523	189	195
SM10T/150/6 IPM	150	400	253	90.5	91.5	92.0	0.97	0.94	0.93	3000	1410	229	300
SM10T/250/6 IPM	250	400	419	89.5	91.5	92.5	0.97	0.94	0.93	3000	1700	229	320
SM12T/250/6 IPM	250	690	244	91.0	91.5	92.0	0.97	0.94	0.93	3000	1807	280	730
SM12T/450/6 IPM	450	690	435	92.0	92.5	93.0	0.97	0.94	0.93	3000	2032	280	760

For other voltages please ask for technical data.

1 **EXTREMELY HIGH EFFICIENCY**
Advantage: significant reduction of energy costs.

2 **FLEXIBLE PUMP PERFORMANCE VIA THE FREQUENCY CONVERTER**
Advantage: avoidance of losses by throttling.

3 **WIDE PERFORMANCE RANGE**
Advantage: loss-free use by extremely high efficiencies up into the partial load range.

4 **ENORMOUS INCREASE IN POWER**
Advantage: at the same size as asynchronous motors, IPM technology enables over 100% more power.

5 **SMALLER CABLE CROSS SECTIONS**
Advantage: higher efficiency, power factor close to 1 and thus lower energy consumption.

6 **MCT COOLING SYSTEM + HIGHER EFFICIENCY**
Advantage: minimal heat generation.

7 **MODULAR ROTOR**
Advantage: targeted replacement of faulty power modules.

8 **SENSORLESS MOTOR TECHNOLOGY**
Advantage: no sensors within the motor are required for rotor position.

9 **NETWORK BOOTABLE MOTORS UP TO 1500 RPM**
Advantage: no frequency transformer in cost-sensitive application.

Always a flow ahead – Research and development

Our Pump Technology Center (PTC) 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 PTC ASTROE, center for hydraulic engineering and laboratory, we have an internationally renowned institute for hydraulic development work at our disposal.

We are developing and testing our pumps at different locations worldwide. 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.

Greater efficiency for a competitive edge – Pumps service

Optimization / Modernization / Operating reliability

The conditions of your plant have changed, but your pumps are still operating as previously and therefore, wasting energy? Would you like to optimize your system to reduce costs? With ANDRITZ, you will have a competent partner for these and numerous other services at your side.

Service and maintenance have a long tradition at ANDRITZ and complement the product portfolio. The century-long expertise is reflected not only in a service portfolio with innovative solutions and advanced products that can be optimally adapted to the respective customer needs, but also in a specially trained staff. ANDRITZ has specialized in the servicing of pumps to achieve improved efficiencies and adaptations to changed operating points of the installed pumps. A large potential for savings can already be achieved by improving the efficiency of 20 percent of the installed pumps. Our service team provides prompt, professional, and reliable assistance – also for other manufacturers' products. Book our service package and you can be sure of the best operating reliability for your systems in the long term. We conduct an expert assessment together with you, thus creating transparency and making an optimum solution possible that is tailored to your needs. After examining your plant, we determine its savings potential and realize it by improving the efficiency of the pumps installed. Additionally, this individual solution lowers your maintenance costs. You do not have to think about personnel, nor about maintenance schedules or utilities. Assembly is conducted according to defined schedules and with assistance from our trained personnel.

AN OVERVIEW OF OUR SERVICES

Supply of original spare parts
Deployment of trained personnel
Installation and start-up
Inspection
Repairs, overhauls, maintenance
Machine assessment by an expert for early fault detection
Consulting and modernization
Performance and vibration measurement
Fault and damage analyses
Feasibility studies
Energy consulting for pumps and systems
Preparation of maintenance schedules
Service and maintenance agreements
Automation and Electrical Power Systems
Electronic equipment
Training

Find out more about
ANDRITZ pumps service

INNOVATION SINCE 1852

The internationally renowned ANDRITZ GROUP has been building pumps for more than 170 years. We offer innovative and targeted solutions with pumps and complete pumping stations. Our longstanding experience in hydraulic machine manufacturing and complete process know-how form the basis of the high standard of ANDRITZ pump engineering. Our quality and high-efficiency products as well as our understanding of customer requirements have made us a preferred partner for pumping solutions worldwide. ANDRITZ offers everything from a single source – from development work, model tests, engineering design, manufacture and project management, to after-sales service and training. We also perform complete start-up on site and guarantee our customers the best support. Our declared goal is your complete satisfaction. See for yourself!

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