PUMPS

PREMIUM PUMPING TECHNOLOGY FOR WATER AND WASTE WATER

IIoT ENABLED PUMP SOLUTIONS

ANDRITZ

ENGINEERED SUCCESS

Water

Pulp & Paper

Food & Beverages

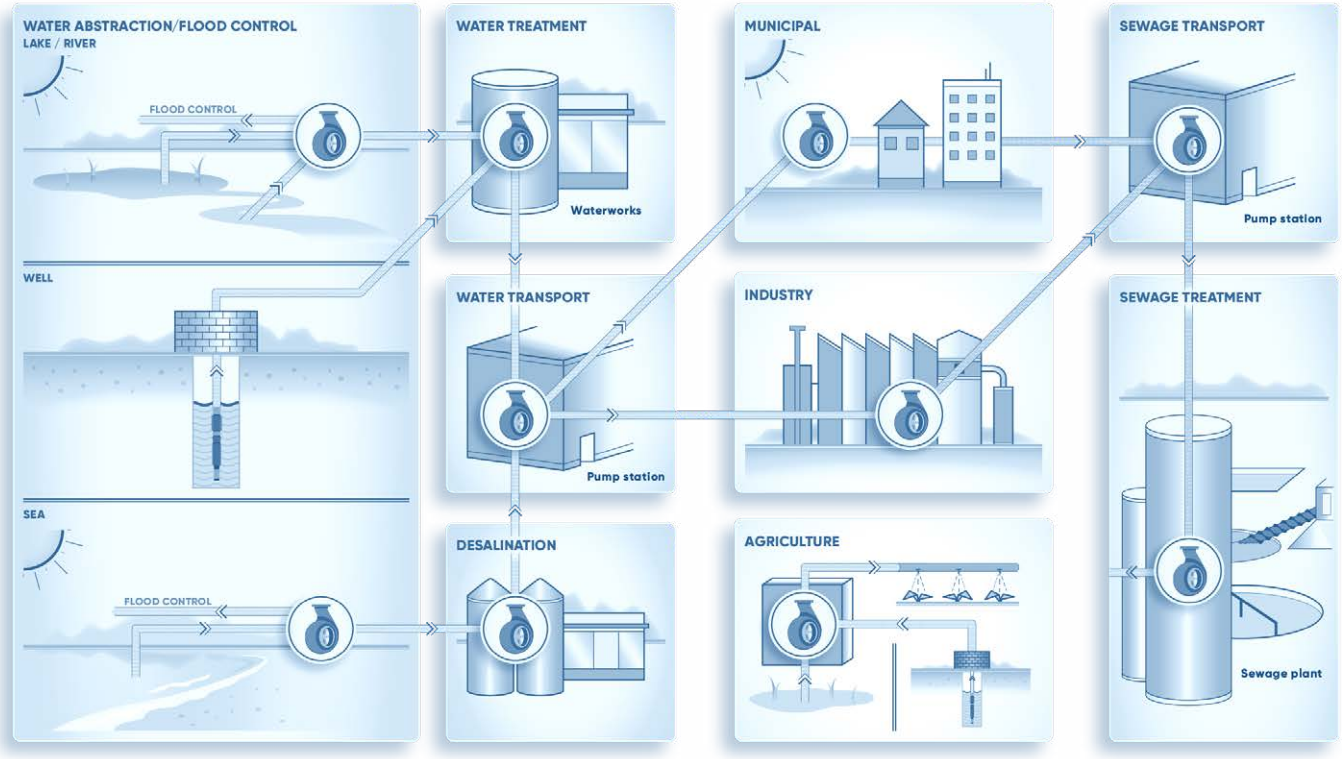
Mining & Minerals

Power

Other Industries

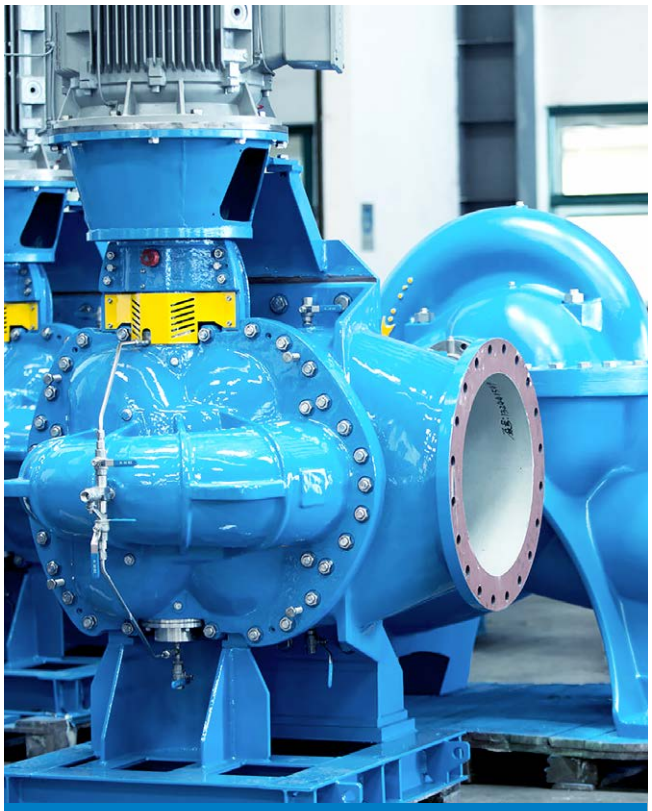
ANDRITZ in the water resources management

For decades, the reliability of ANDRITZ centrifugal pumps has made them the first choice for applications in water resources management. The standard components of ANDRITZ pumps guarantee high availability, allow the use of time-tested components, and minimize the number of spare parts to be kept in stock.



Custom-tailored pump solutions

Are you responsible for water resources management or waste water disposal, or are you project manager of a large infrastructure project for irrigation, drinking water and industrial water supplies or for flood protection? You can find an overview of our offers for water resources management here.



THE ADVANTAGES AT A GLANCE

- Modular system
- Robust
- High efficiencies
- Pumps for all applications from one supplier
- Numerous horizontal and vertical designs

DRINKING AND INDUSTRIAL WATER SUPPLIES

The water loop closes with ANDRITZ: Our time-tested range of pumps is used to remove water from pits or wells, for water transport, and for water distribution.

IRRIGATION

Whether it is a matter of irrigating-free and special-purpose zones or huge irrigation projects for agricultural areas, ANDRITZ pumps offer efficient and cost-effective solutions.

WASTE WATER TRANSPORT

ANDRITZ pumps cover the requirements of both municipal and industrial waste water transport. As one of a small number of pump manufacturers, we offer both dry- and wet-mounted sewage pumps.

FLOOD CONTROL AND DRAINAGE

In times of rising flood levels, as a result of, for example, sustained rainfall and rivers bursting their banks, prompt action is important. ANDRITZ pumps can be used to drain areas prone to flooding as well as areas already flooded.

PUMPS FOR SEAWATER DESALINATION

In order to cover the demand for freshwater as drinking and process water, also in very dry regions and in areas with a high population density, the plentiful supply of seawater should be harnessed. ANDRITZ meets the challenges that desalination applications set for plant components.

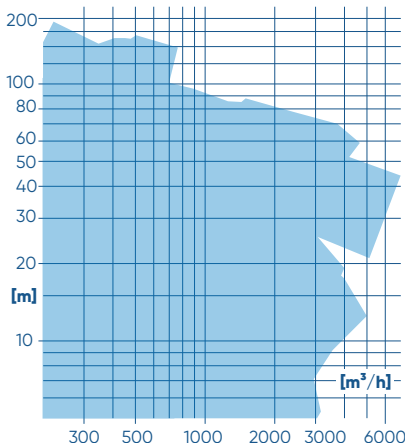
Single-stage centrifugal pumps

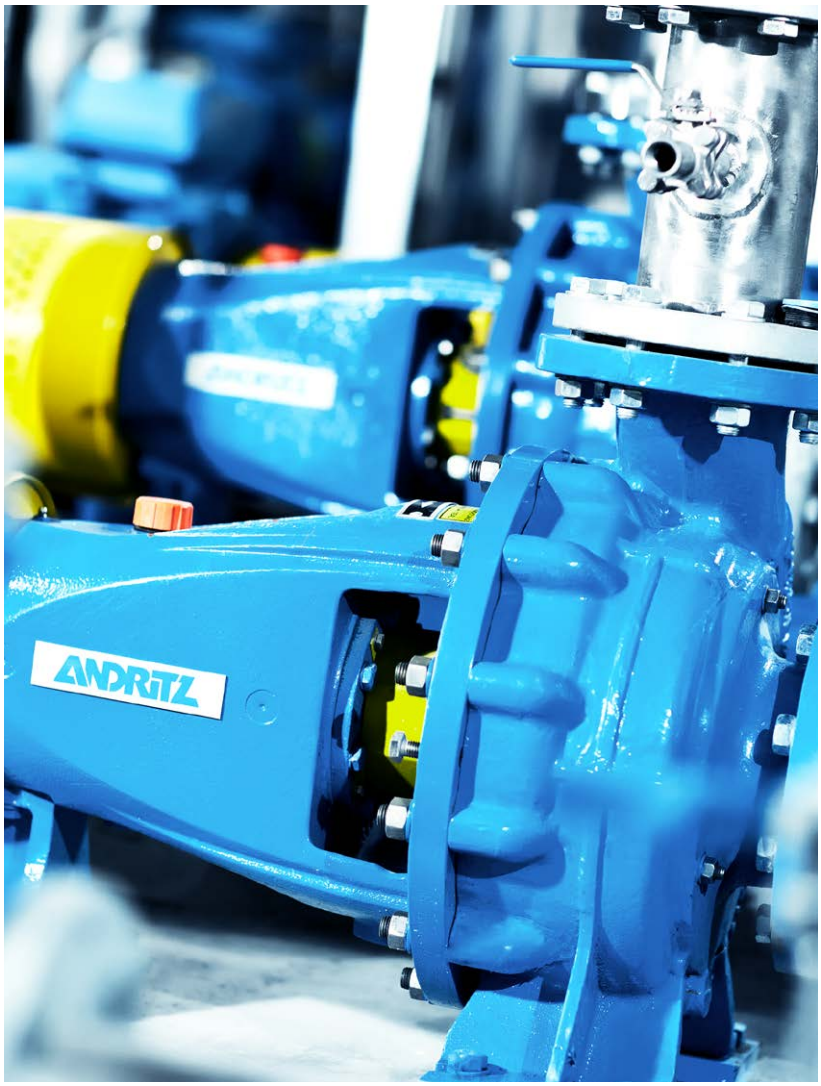
ANDRITZ single-stage centrifugal pumps are characterized by robustness, maintenance-friendliness, and economic efficiency. The pumps are available according to EN 733, ISO2858 and 5199. Various material combinations guarantee long product life cycles and excellent efficiencies. The end-suction pumps are available with closed, semi-open or open impellers in a highly wear-resistant design. These centrifugal pumps operate in water supply, waste water treatment, desalination plants, and irrigation as well as drainage. A modular system ensures high availability, enables the use of proven components and reduces the number of spare parts to be held in stock.

PRODUCT FACTS*

- Flow rate up to 9,000 m³/h
- Head up to 190 m
- Delivery pressure up to 40 bar
- Efficiency up to 90%
- Temperature up to 200 °C

*These values are guidelines and may differ depending on project requirements





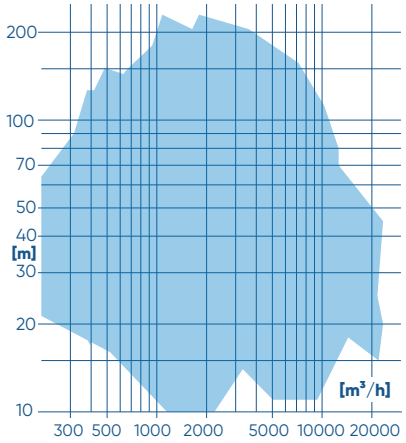
Split case pumps

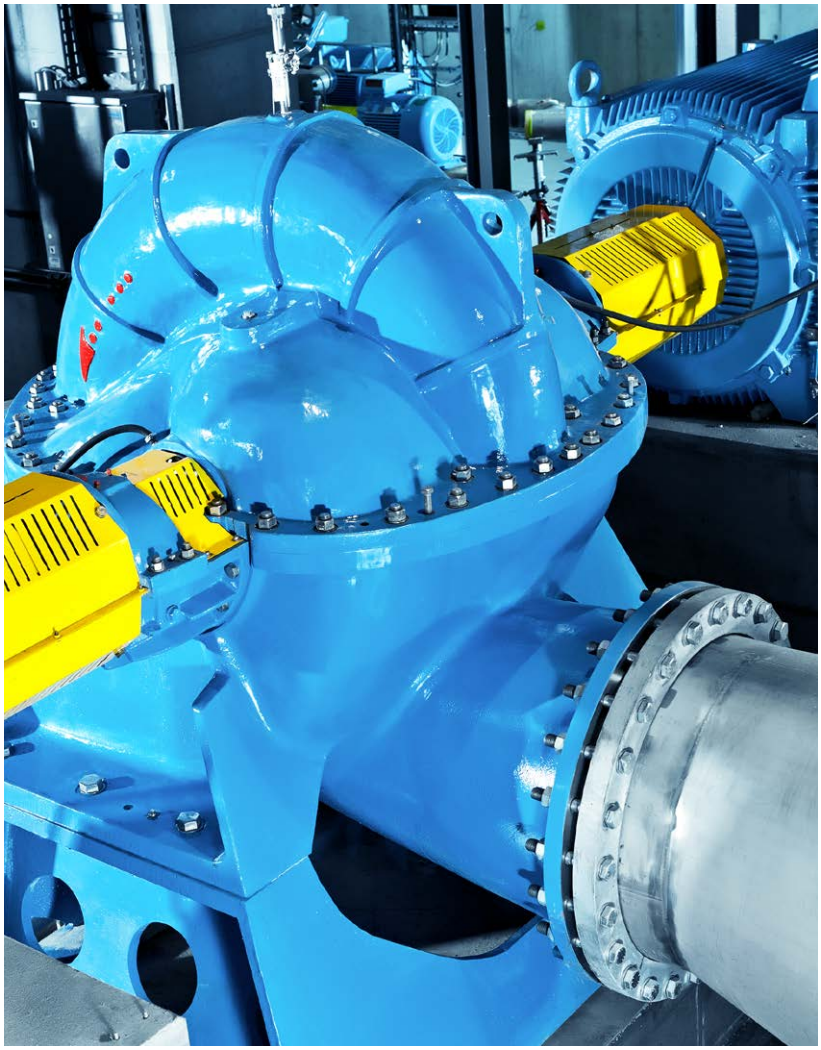
ANDRITZ split case pumps meet the highest customer demands in terms of efficiency, long service life, maintenance-friendliness, and economy. With efficiencies of over 90%, these split case pumps help to save valuable energy. All pumps are fitted with a double-flow radial impeller which achieves very favorable NPSH values. Due to the axial split case design, maintenance is fast and easy. Designed with a double-flow radial impeller and in-line casing, the pump can be horizontally or vertically installed (with horizontal installation, the motor can be placed on the left or right). ANDRITZ split case pumps convey pure and slightly contaminated media or aggressive liquids and operate in water treatment and water supply systems as well as in irrigation, flood control, and desalination.

PRODUCT FACTS*

- Flow rate up to 40,000 m³/h
- Head up to 250 m
- Delivery pressure up to 25 bar
- Efficiency up to 91%
- Temperature up to 80 °C

*These values are guidelines and may differ depending on project requirements





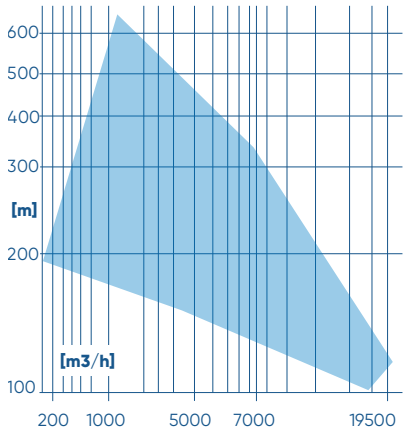
Multi-stage axial split case pumps

ANDRITZ multi-stage axial split case pumps have a multi-stage impeller arrangement in single or double-flow design that can be combined in different ways to fulfill various application needs. This is a highly engineered pump designed to customers' specific requirements. The machine is optimized for transporting pure, slightly contaminated, or aggressive liquids in water supply projects, power station projects and desalination plants. Peak efficiencies, optimum suction performance and user-friendliness make this technology particularly effective, and in the axial split design maintenance-friendly at high heads.

PRODUCT FACTS*

- Flow rate up to 10 m³/s
- Head up to 1000 m
- Power up to 40 MW
- Highest efficiency

*These values are guidelines and may differ depending on project requirements



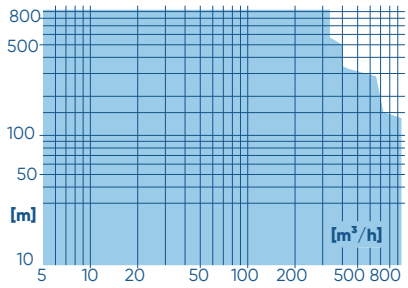
Multi-stage radial split case pumps

ANDRITZ multi-stage, radial split-case, high-pressure pumps in horizontal or vertical design are designed for highest flexibility. Numerous horizontal and vertical models allow for efficient building designs. A variety of material such as cast iron, bronze, aluminum-bronze, or stainless steel variants and sealing versions guarantee optimal adaptability to the medium. Different hydraulic systems for each pump size enable a selection at the best efficiency point.

PRODUCT FACTS*

- **Flow rate up to 850 m³/h**
- **Head up to 630 m**
- **Delivery pressure up to 63 bar**

*These values are guidelines and may differ depending on project requirements



Submersible motor pumps

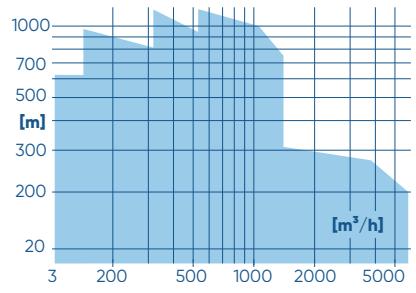
ANDRITZ multi-stage, single-flow or double-flow submersible motor pumps are designed to transport clean, slightly contaminated and abrasive raw water as well as mineral, sea, industrial, mine and cooling water.

They are characterized by zero maintenance, maximum operational reliability, minimum wear, and extremely long service life (quite often exceeding 20 years).

PRODUCT FACTS*

- Flow rate up to 6,000 m³/h
- Head up to 1,500 m
- Delivery pressure up to 150 bar

*These values are guidelines and may differ depending on project requirements



Vertical line shaft pumps

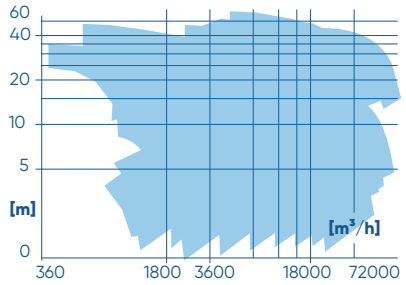
ANDRITZ vertical line shaft pumps are available in a pull-out or non-pull-out design with an optional hydraulic device to adjust the impeller blade angles to react to changing conditions, while the pump is operating. The pumps are used in water transport for irrigation and drainage as well as drinking and industrial water supply. Additionally, these pumps can also function as seawater intake pumps for desalination plants.

Depending on the area of application, ANDRITZ vertical line shaft pumps are designed as radial, axial, or mixed-flow pumps. Similarly, the choice of material is customized ranging from cast iron, cast steel, non-alloyed and low-alloy steel grades, stainless CrNi steel grades, or duplex and super duplex steel grades.

PRODUCT FACTS*

- Flow rate up to 70.000 m³/h
- Head up to 80 m (single-stage), up to 120 m (multi-stage)
- Power up to 10.000 kW

*These values are guidelines and may differ depending on project requirements



Vertical volute pumps

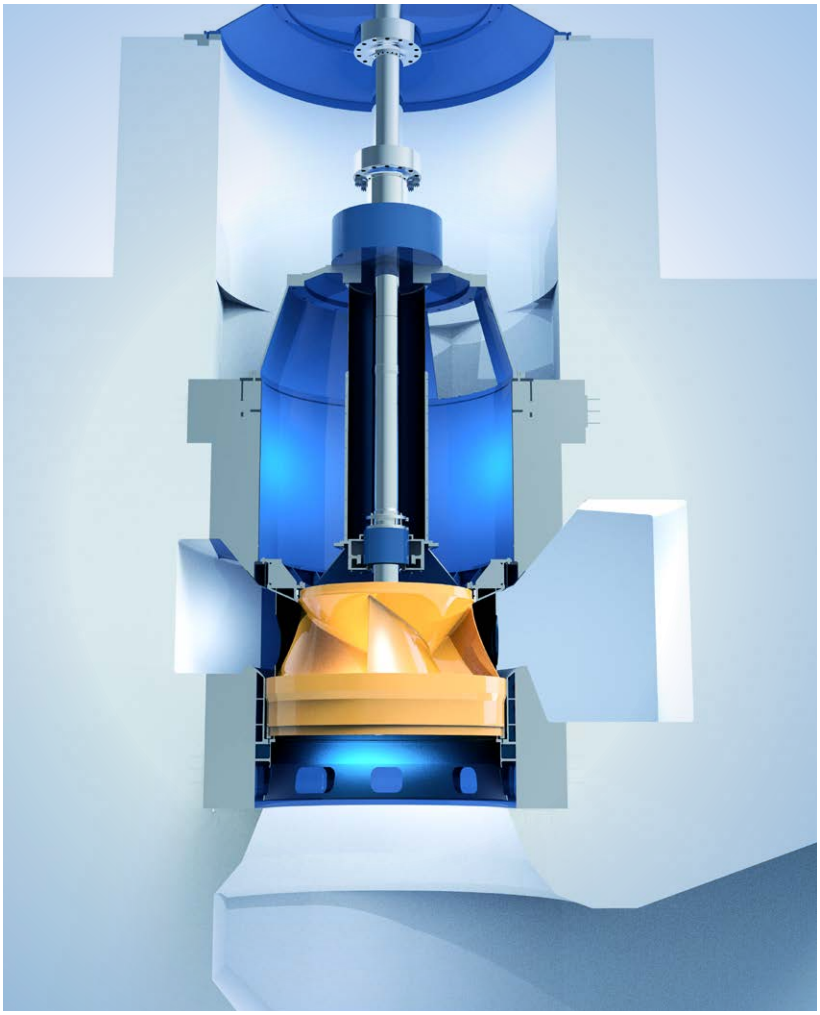
ANDRITZ vertical volute pumps with either a concrete or metal volute are manufactured and designed according to customers' needs and requirements. Optimum flow is achieved in the volute thanks to its individual shaping. Thus also a high level of efficiency is achieved. The volute casing is manufactured as a concrete or metal volute. The metal volute is a welded structure consisting of several segments and can be embedded in concrete as an option. This design is used primarily for larger delivery heads if a solution with a concrete volute is no longer feasible due to strength requirements. From the technological and economic points of view, concrete volute pumps are the best solution when large amounts of water are to be delivered. The concrete casing has a long service life and is resistant to erosion as well as to both seawater and brackish water. Furthermore, the material costs are low. In the water sector, they function as water transport pumps for irrigation, drainage, and flood control, as water supply pumps for drinking and industrial water suppliers as well as seawater intake pumps for desalination plants.

PRODUCT FACTS*

- Flow rate up to 50 m^3/s (concrete), up to 100 m^3/s (metal)
- Head up to 40 m (concrete), up to 250 m (metal)
- Power up to 20 MW (concrete), up to 140 MW (metal)
- Highest efficiency

*These values are guidelines and may differ depending on project requirements

Find out more about ANDRITZ concrete volute pumps



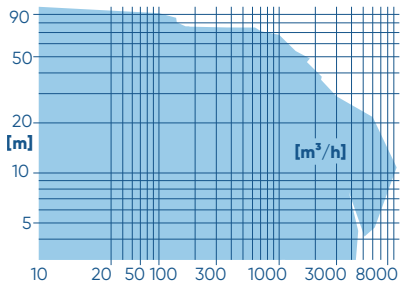
Waste water pumps

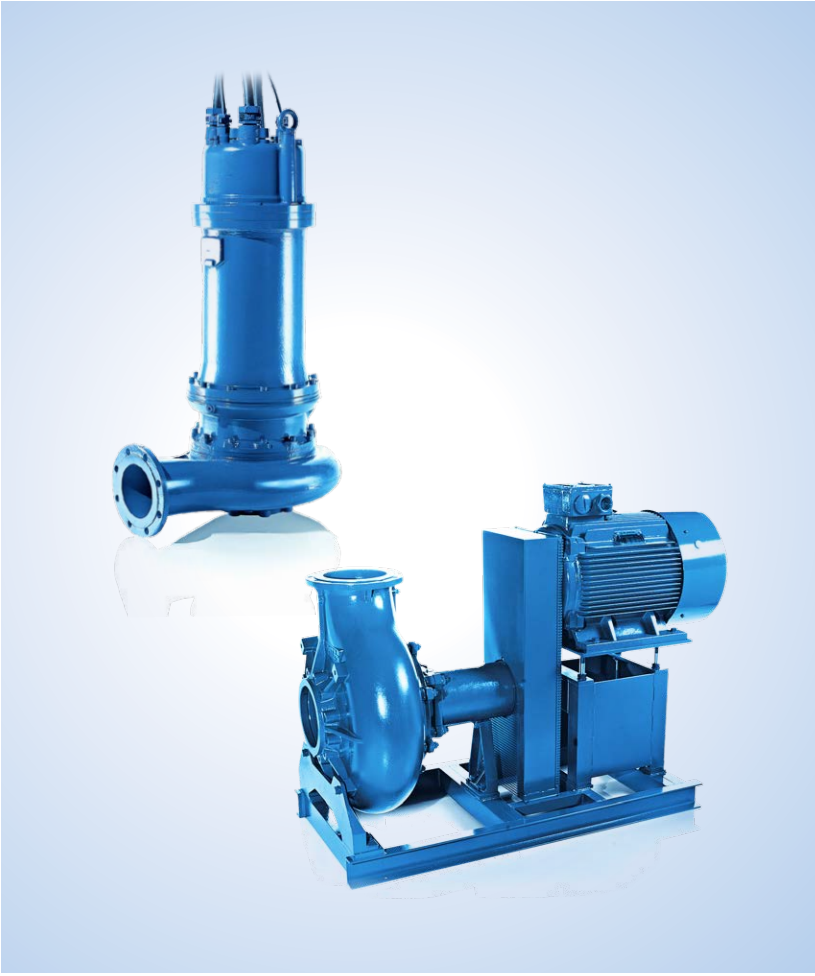
ANDRITZ dry or wet installed sewage pumps are suitable for sewage, waste water, and other types of sludge within the municipal, industrial, and private sector. All pump types fulfill high expectations regarding efficiency, life cycle, maintenance-friendliness and economic efficiency. Sturdy designs and wear-resistant execution guarantee a long service life. A modular system provides for high availability, enables the use of proven components, and reduces the number of spare parts to be held in stock.

PRODUCT FACTS*

- Flow rate up to 10,000 m³/h
- Head up to 100 m
- Delivery pressure up to 16 bar

*These values are guidelines and may differ depending on project requirements





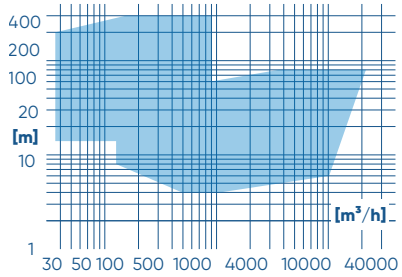
Pumps as turbines

By operating in backward mode, ANDRITZ centrifugal pumps become mini-turbines that can generate a very healthy ROI by recovering and generating electrical power. They are an economical alternative, compared to the cost of buying and operating a conventional turbine. ANDRITZ pump-turbines operate, for example, as recovery turbines in small hydropower plants, and supply energy to mountain refuges and forest lodges. Thereby, the transport various media ranging from drinking water to residual and waste water.

PRODUCT FACTS*

- Water flow up to 6 m³/s
- Head up to 300 m
- Power up to 2 MW
- Energy production and recovery

*These values are guidelines and may differ depending on project requirements

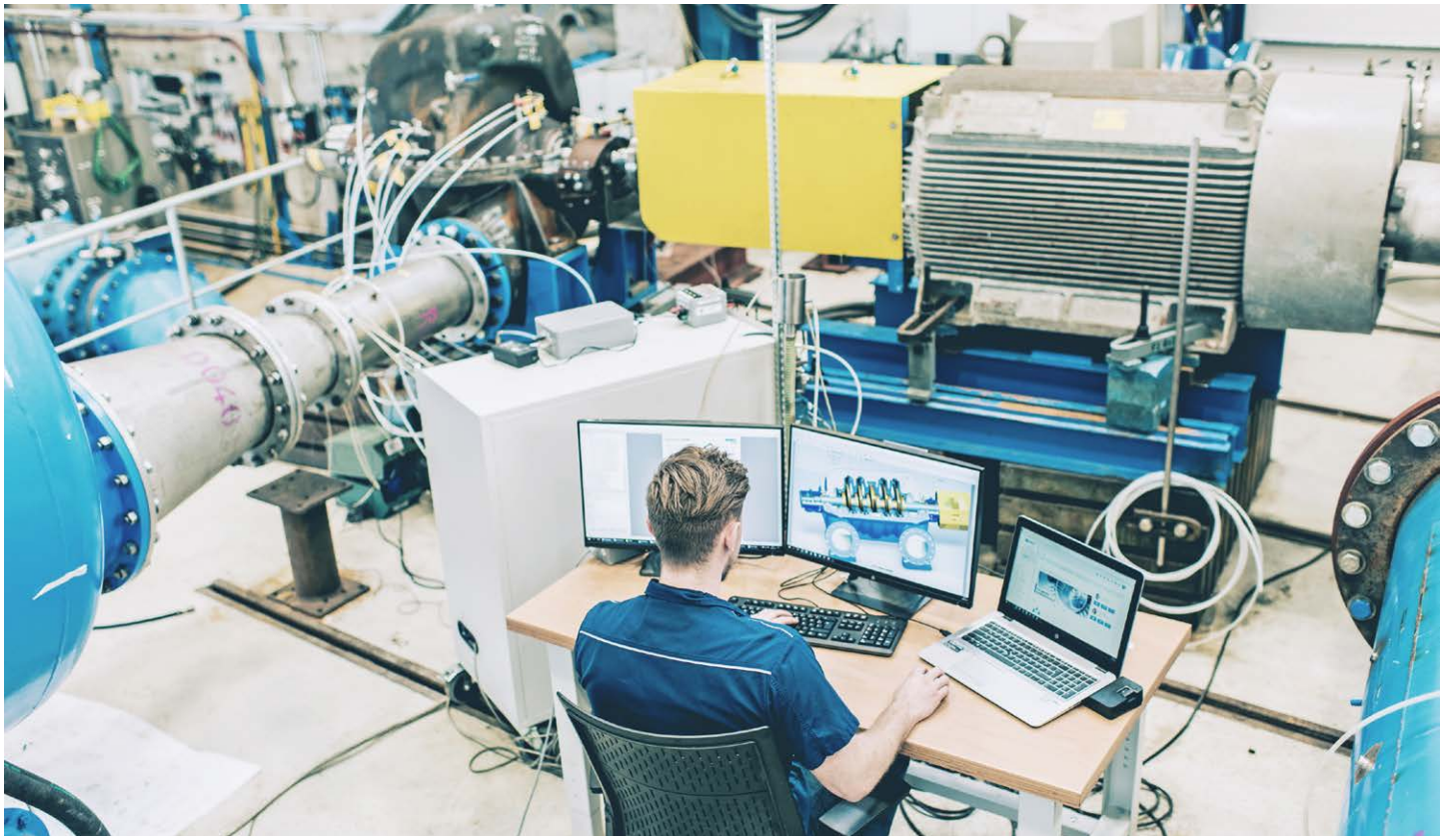


Always a flow ahead – Research and development

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 through and IoP our time 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 from ANDRITZ.



Smart Pumps

ANDRITZ has launched its IIoT activities already back in 2005 and its basic activities in the automation sector began as early as 1984. Now, the company has combined its innovative, industrial IoT solutions, which are field proven in many reference plants, under the technology brand "Metris – Foresee digitally". Metris technologies include latest state-of-the-art Industrial IoT solutions (IIoT) as well as any kind of smart digital services. These can be fully tailored to individual customer requirements and unite our clients' physical and digital worlds.

With regard to IoT solutions for pumps, ANDRITZ has set a key focus on ensuring continuous and sustainable operational reliability and performance of pumps and plants ever since. ANDRITZ delivers highly sophisticated condition monitoring solutions for pumps. These solutions can be standard software packages or tailored to specific customer request. Special sensors are installed at the pump for this purpose and take measurements continuously. All data can be analyzed within the software or exported to various file formats. Limits and alert notifications with a traffic light system approach are also provided. The data is stored in an ANDRITZ Metris database. Metris cloud's data are accessible by both the client and ANDRITZ condition monitoring experts, which enables 24/7 service for the customer. Finally, ANDRITZ also provides optimization modules for pumps in plants or pumping stations as well as remote control options for locally installed platforms.

Thus, ANDRITZ is taking pump and plant operations to the next level. By monitoring an intuitive human-machine interface of the control system that is equipped with groundbreaking digital and visual technology, highly efficient workflows make the future calculable and enable proactive action through the analysis of data. Thereby, ANDRITZ IIoT technologies become the basis for Internet of People (IoP) solutions by connecting our customers' specialists among each other as well with ANDRITZ experts. This value-adding interrelation results not only in a professional preparation of the collected data improving the plant's performance, but moreover enables our customers to practice successfully applied business intelligence.

IoP

ANDRITZ connects people through VR, AR, OPP, IDEAS and many other tools. ANDRITZ IoP reduces costs and risks for our clients, while at the same time sustainably supporting and developing their valuable workforce.

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.

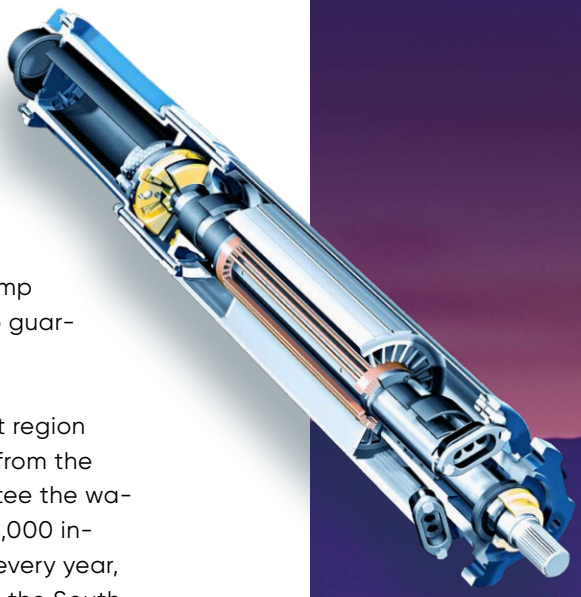
AN OVERVIEW OF OUR SERVICES

- 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

Drinking water supply: Las Vegas, USA

Water management around the world



It is becoming increasingly difficult all over the world to provide the population with clean drinking water in some regions. Growing cities, climate change, and settlements in previously undeveloped areas are three of the main reasons for this. International technology Group ANDRITZ offers pump solutions that are used all over the world to guarantee the water supply.

The US metropolis Las Vegas lies in a desert region and draws 90 percent of its drinking water from the neighboring Lake Mead. In order to guarantee the water supply for the population of around 600,000 inhabitants and just under 40 million visitors every year, and also to make the supply more efficient, the South Nevada Water Authority implemented the know-how and technology of ANDRITZ in 2008. Since then, three large double-suction submersible motor pumps with more than 11,000 HP designed and manufactured by ANDRITZ pump the water (17,200 m^3) from a depth of 80 meters up to this city in the desert. Easy installation, freedom from maintenance, and, above all, the performance of the pumps make the plant particularly efficient. The impellers are made of precision investment casting and are arranged opposite one other so that the axial forces cancel each other out. In addition, the double-flow technology halves the suction speed, causing less solids and suspended substances to be sucked in. In turn, this effect substantially increases the lifetime of the pumps.

11,000 HP

FOR EACH OF THE 3 LARGE DOUBLE-SUCTION SUBMERSIBLE MOTOR PUMPS BY ANDRITZ, TO PUMP THE WATER FROM A DEPTH OF 80 M UP TO THE CITY IN THE DESERT.

ANDRITZ PUMPS

Double-suction submersible motor pumps for Las Vegas

Drinking water supply: Beijing, China

Water management around the world

The Hui Nan Zhuang pumping station in the southwestern part of the Chinese capital Beijing (11.5 million inhabitants) has eight horizontal double-flow split case pumps. They press a total of 60 cubic meters of water per second into two pipes that convey the drinking water to Beijing located 60 kilometers away. The pipes, each with a diameter of four meters, are fed by three pumps, with the fourth unit in each case as standby, which can be activated immediately in an emergency. Hui Nan Zhuang is the only pumping station in the central water supply channel for the South Water to North China scheme, a once-in-a-century undertaking. The channel is approx. 1200 km long.

DRINKING WATER SUPPLY: GUANGZHOU, CHINA

Guangzhou in southeastern China numbers among the fastest growing cities in the country – the current level of around 12 million inhabitants is expected to reach as much as 18 million by the year 2020 according to researchers. This also presents enormous challenges for the drinking water supply. The city's authorities meet this challenge with ANDRITZ technology. In a local pumping station, a total of ten ANDRITZ double-flow axial split case pumps have been in operation since 2010, and two more have been installed as stand-by units. The pumping station conveys around 45 cubic meters of water per second into the city. On its journey there, the water covers a distance of around 40 kilometers and a height difference of 40 meters.

IRRIGATION PUMPS FOR AN AGRICULTURE PROJECT IN ANDHRA PRADESH, INDIA

The Indian state of Andhra Pradesh, where 70 percent of the just under 85 million inhabitants live directly or indirectly from agriculture, is hit again and again by widespread and long-term periods of drought. As a result, the Indian government launched a project to irrigate all of the agricultural land. One of the most important partners is ANDRITZ. The Group is involved in a total of eleven sub-projects and contributes components for numerous pumping stations. The supply, for example, includes ANDRITZ vertical line shaft pumps. It would only take three of these large vertical line shaft pumps, with an impeller diameter of up to four meters, to fill an Olympic swimming pool with 2,500 m^3 of water in under 20 seconds!

Flood control for Vietnam

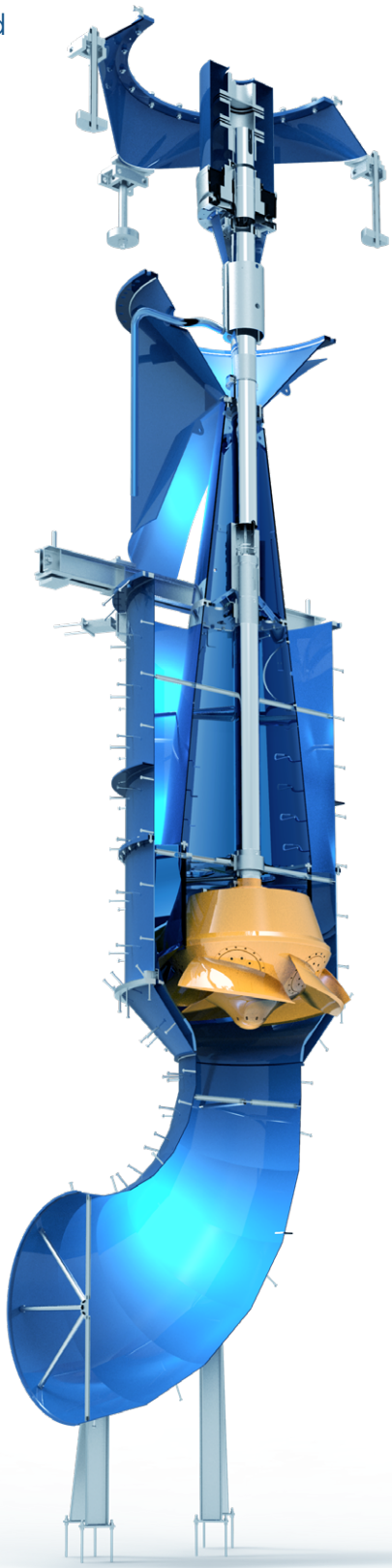
Water management around the world

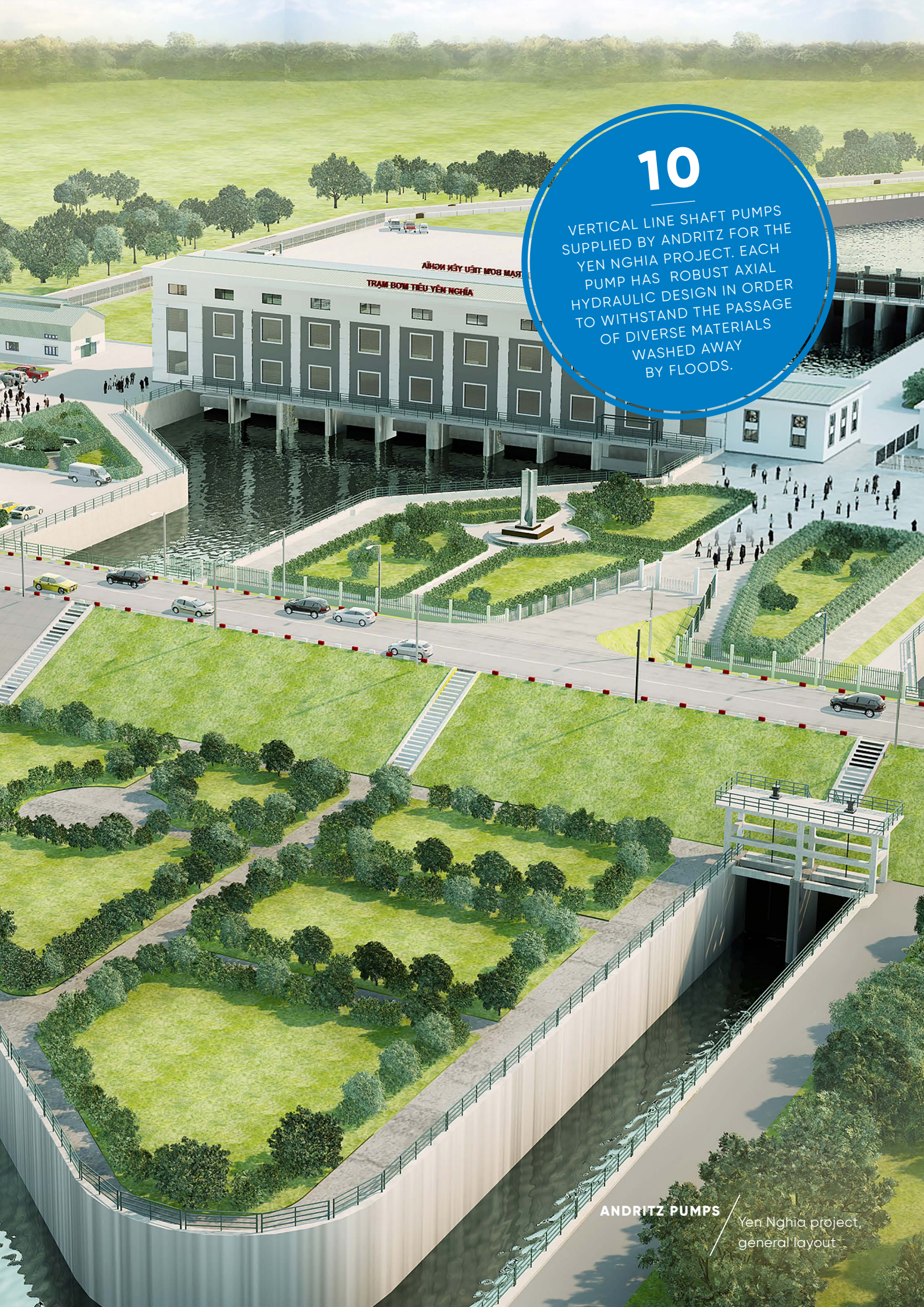
Vietnam has a subtropical climate with a three-month rainy season characterized by the monsoon's heavy storms. These cause rivers and streams to burst their banks and widespread flooding. As a result, over the last decade hundreds of people have lost their lives and countless more have lost their homes.

In order to contain the most severe effects of the monsoon, the Vietnamese Ministry of Agriculture and Rural Development has launched numerous flood control projects. The Yen Nghia project marks the beginning of this initiative. By the end of 2018, the biggest flood discharge pumping station in the country will be built southwest of the capital Hanoi, home to about 6.4 million inhabitants.

The Yen Nghia pumping station has been specifically designed and built for flood control applications. This means that the pumps are only activated in case of need, but then have to work with 100% reliability, pumping large amounts of water at low head in the shortest time possible. ANDRITZ supplies 10 vertical line shaft pumps for the Yen Nghia project.

The scope of supply includes the construction, manufacturing, transport, and installation supervision of the 10 pumps in Vietnam as well as spare parts. Each pump has robust axial hydraulic design in order to withstand the passage of diverse materials washed away by floods. Each pump conveys up to 15 m^3 of water per second. The required performance test of the pumps will be conducted at the bench facilities of Vietnamese company Hai Duong Pump Manufacturing JSC (HPMC), which is responsible for the supply of the entire electro-mechanical equipment for the Yen Nghia station.





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VERTICAL LINE SHAFT PUMPS SUPPLIED BY ANDRITZ FOR THE YEN NGHIA PROJECT. EACH PUMP HAS ROBUST AXIAL HYDRAULIC DESIGN IN ORDER TO WITHSTAND THE PASSAGE OF DIVERSE MATERIALS WASHED AWAY BY FLOODS.

ANDRITZ PUMPS / Yen Nghia project, general layout

INNOVATION SINCE 1852

The internationally renowned ANDRITZ GROUP has been building pumps for more than 165 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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ANDRITZ.COM/PUMPS

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