



**PUMPS**

# **PREMIUM PUMPING TECHNOLOGY FOR THE STARCH INDUSTRY**

**IIoT ENABLED PUMP SOLUTIONS**

**ANDRITZ**

**ENGINEERED SUCCESS**





# Pump solutions for the starch industry

ANDRITZ offers innovative and targeted pumping solutions throughout the entire starch production process – from raw material preparation to extraction and fiber separation, on to final washing and concentration. Decades of experience in hydraulic machine manufacturing and comprehensive process know-how form the basis of our pumps' top performance. Our high-quality products and in-depth knowledge of starch production processes generate reliable pumping solutions to meet the needs of our customers.

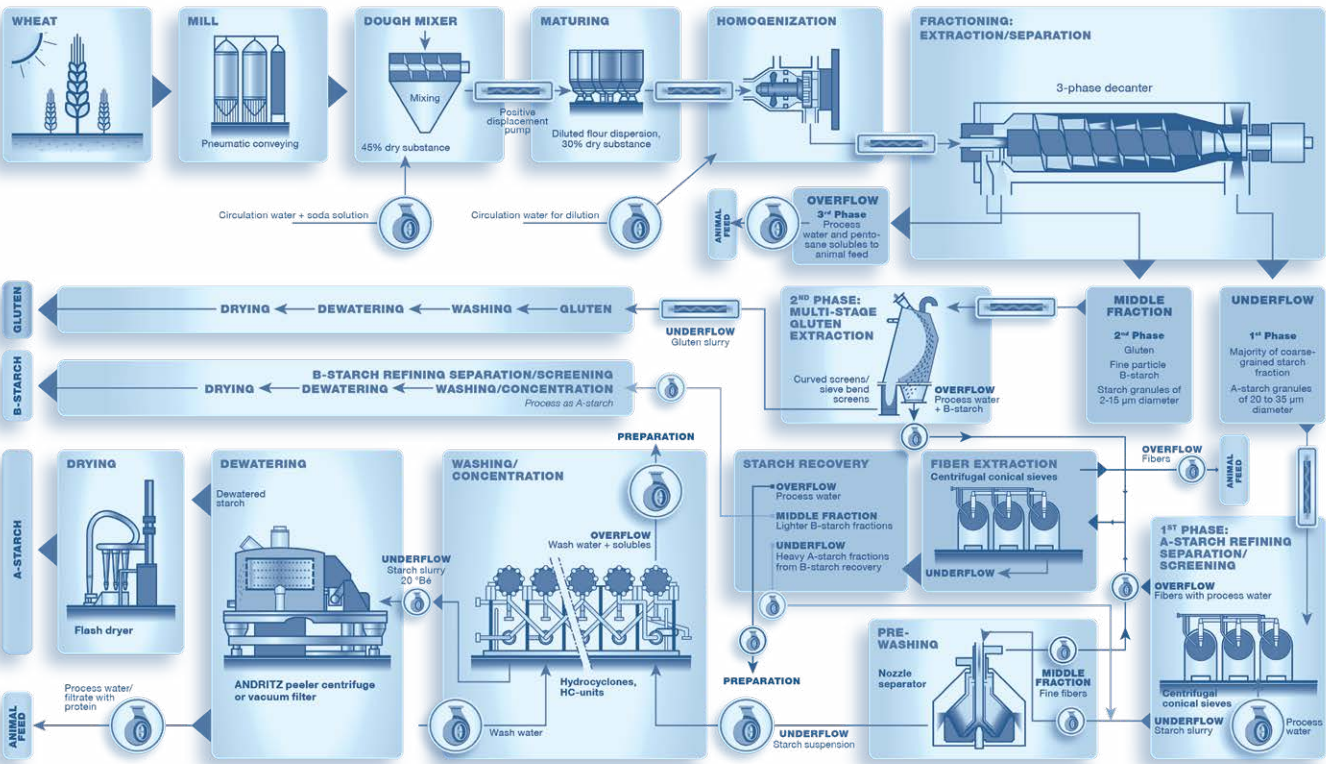
Depending on the facility concerned, we supply centrifugal pumps with a closed, open, or semi-open impeller and an integrated vacuum pump. Foaming liquids, in particular, create one of the most challenging conditions for centrifugal pumps. The combination of a single-stage centrifugal pump with an integrated vacuum pump prevents accumulations of air at the impeller inlet and guarantees highly efficient pumping operations, even with fluids at higher viscosities (e.g. fibrous pulp slurries containing up to 40% air). The vacuum pump removes the gas content in the medium in order to ensure that fluids can be conveyed without any difficulties. As a result of these design features, ANDRITZ self-priming centrifugal pumps are excellently suited for trouble-free handling of crucial processes.

## THE ADVANTAGES AT A GLANCE

- Efficiencies of up to 90%
- Assembly system
- Highly cost-effective thanks to high efficiency and long service life
- Cost reduction if self-priming centrifugal pumps are used instead of positive displacement pumps
- Decades of experience and comprehensive process know-how guarantee a high standard



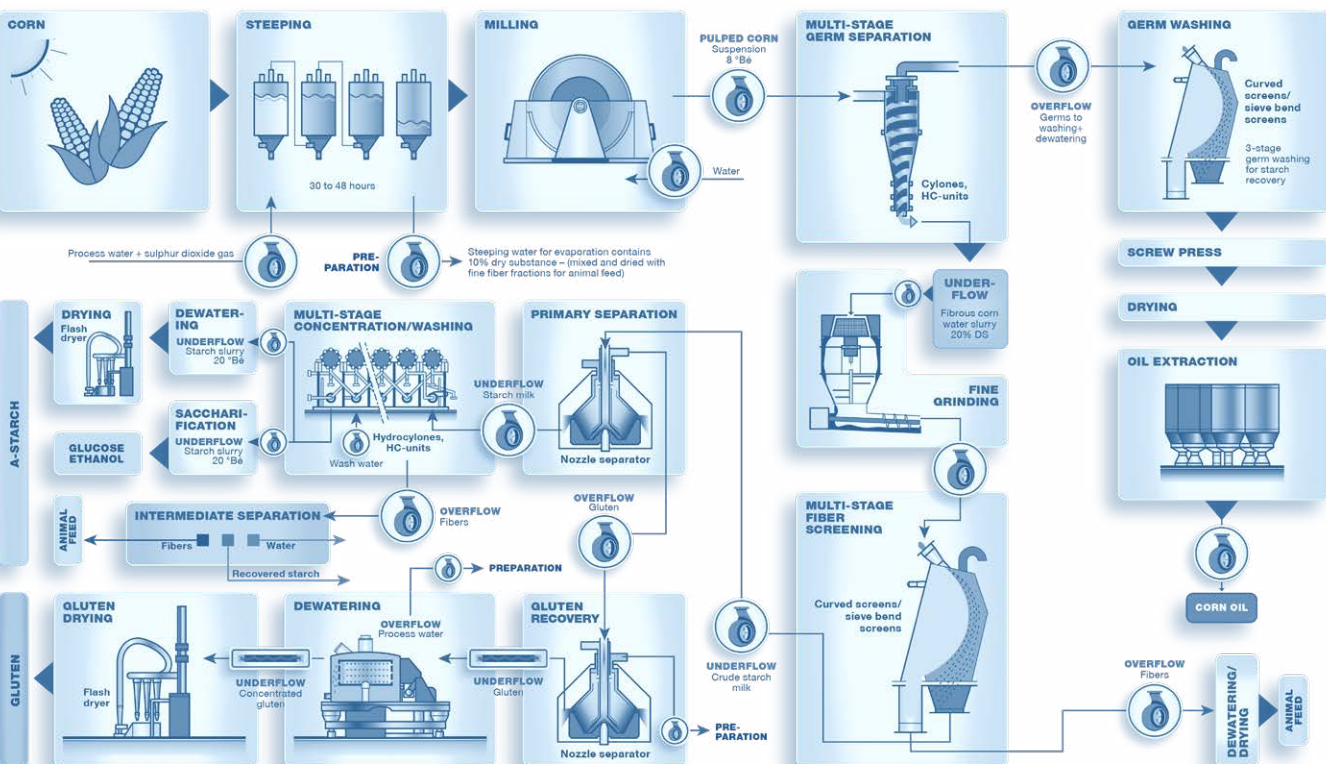
# Wheat starch processing



## CENTRIFUGAL PUMPS SUITABLE FOR THE ENTIRE PROCESS

Process stage	Wheat fractioning	Starch refining	Fiber/gluten extraction	Starch washing/concentration/recovery	Process water auxiliaries
Applications	Overflow (3-phase process)	Starch milk	Starch milk	Starch milk	Dilution water
	Overflow (2-phase process)	Fiber fractions	Fiber fractions	Fiber fractions	Wash water
ISO pumps		■	■	■	■
AD pumps	■	■	■	■	
ACP pumps	■	■	■	■	■
S pumps	■	■	■	■	

# Corn starch processing

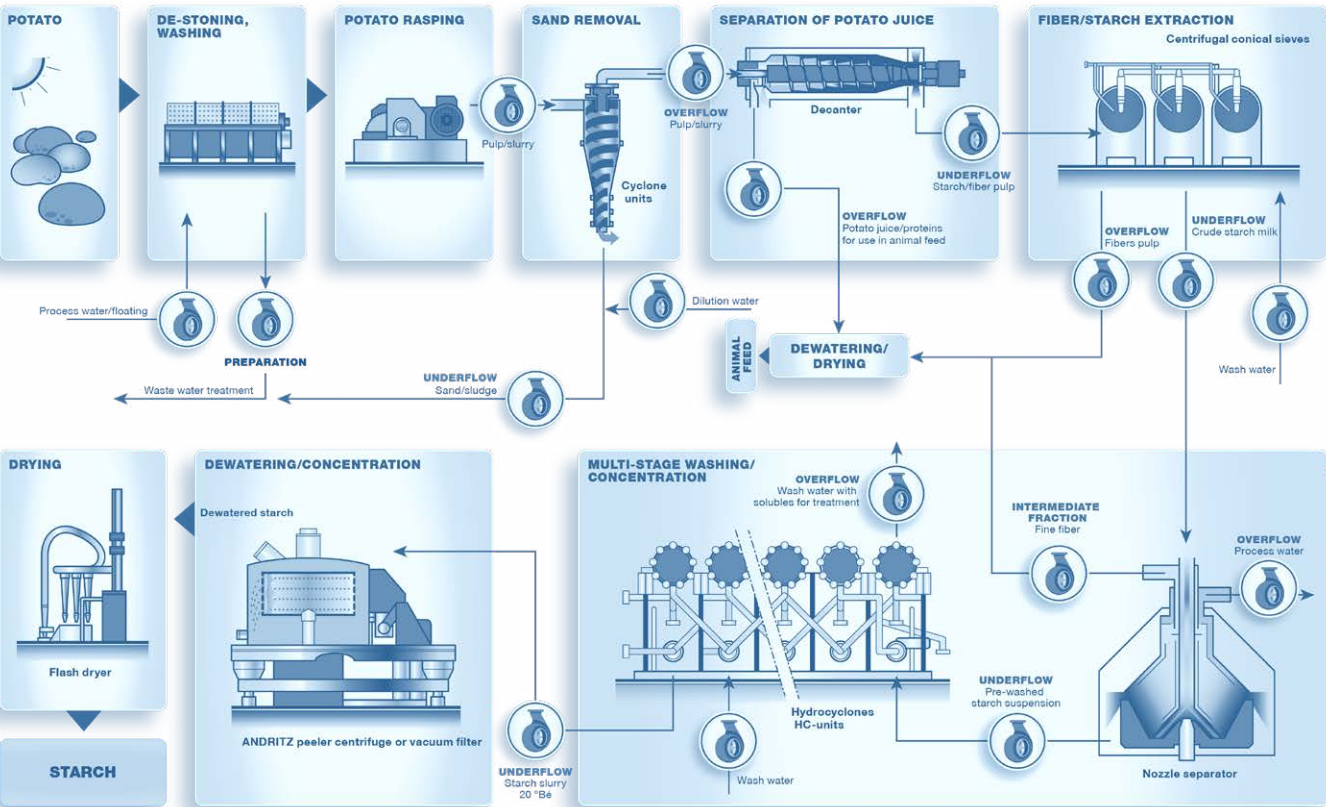


## CENTRIFUGAL PUMPS SUITABLE FOR THE ENTIRE PROCESS

Process stage	Steeping	Wet milling	Germ separation	Fiber screening/primary separation	Starch washing/concentration	Gluten recovery/corn oil processing
Applications	Process water	Process water	Germ slurry	Fiber fractions/starch milk	Starch milk	Gluten water
				Crude starch milk (mill starch)	Starch slurry	Corn oil
	Steeping water	Pulped corn suspension	Corn slurry	Gluten water	Wash water	
ISO pumps	■	■		■	■	■
AD pumps		■	■	■	■	
ACP pumps	■	■	■	■	■	■
S pumps	■	■	■	■	■	
ACP HW pumps	■					



# Potato starch processing



## CENTRIFUGAL PUMPS SUITABLE FOR THE ENTIRE PROCESS

Process stage	Preparation	Rasping/ extraction	Sand removal	Potato juice separation	Washing/ concentration	Process water auxiliaries
Applications	Wash water	Fibrous slurries	Sand water	Potato juice	Starch milk	Dilution milk
	Waste water	Crude starch milk		Fibrous slurries/pulp	Starch slurry	Wash water
ISO pumps				■	■	■
AD pumps		■		■	■	
ACP pumps	■	■			■	■
S pumps	■	■				■
ACP HW Pumps	■		■			

# Air degassing pumps AD series

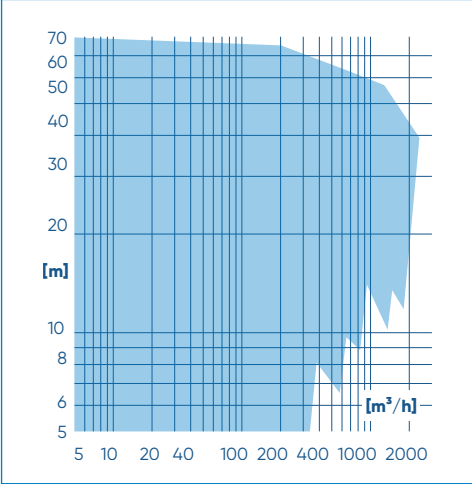
ANDRITZ self-priming centrifugal pumps fulfill high customer expectations regarding efficiency, life cycle, maintenance friendliness and economic efficiency. They achieve high priming and degassing performance thanks to the integrated vacuum pump. The integrated vacuum pump prevents air from collecting at the impeller inlet and guarantee that the pump primes well,

even with high gas content or unfavorable suction pipe arrangements. Thanks to these design features, the self-priming centrifugal pumps are perfectly suited for applications and processes in the starch industry. With its semi-open impeller, the pump is designed for transporting liquids at high viscosity and/or high air content, e.g. fibrous slurries, starch milk, and potato juice.

### PRODUCT FACTS\*

- Self-priming
- Integrated water ring vacuum pump
- Flow rate up to 9,000 m³/h
- Head up to 190 m
- Delivery pressure up to 40 bar

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

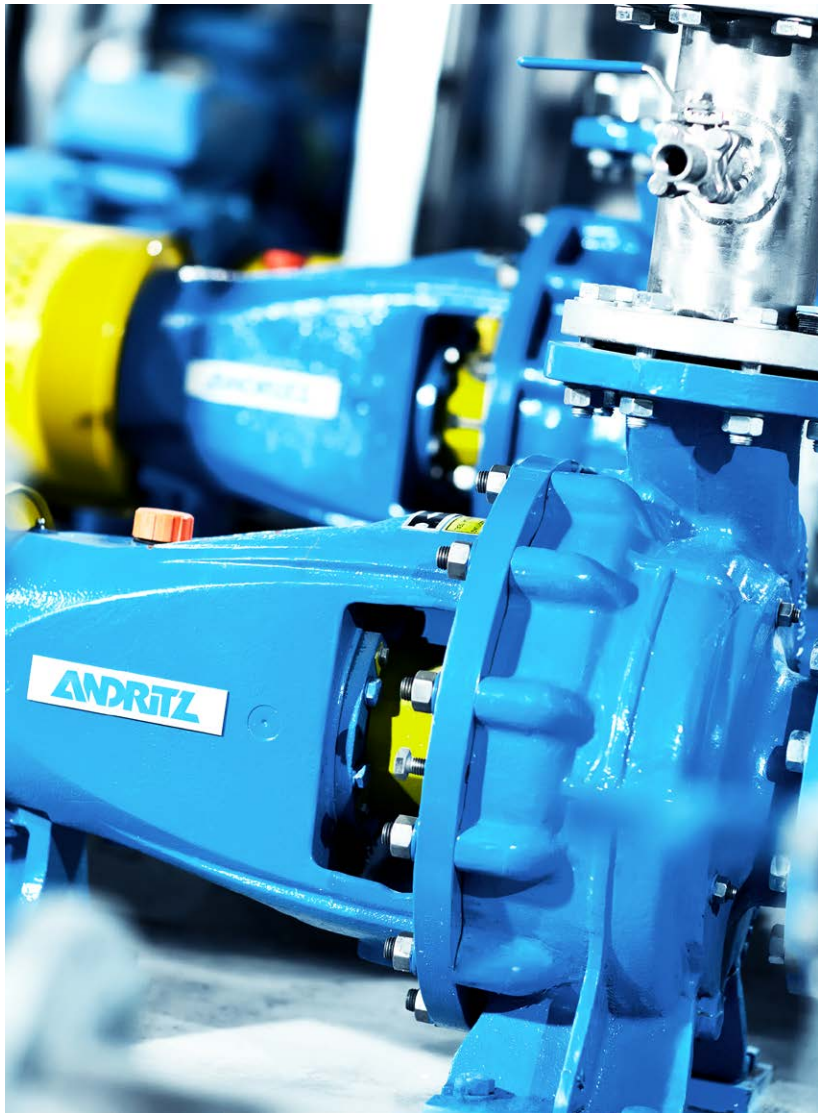
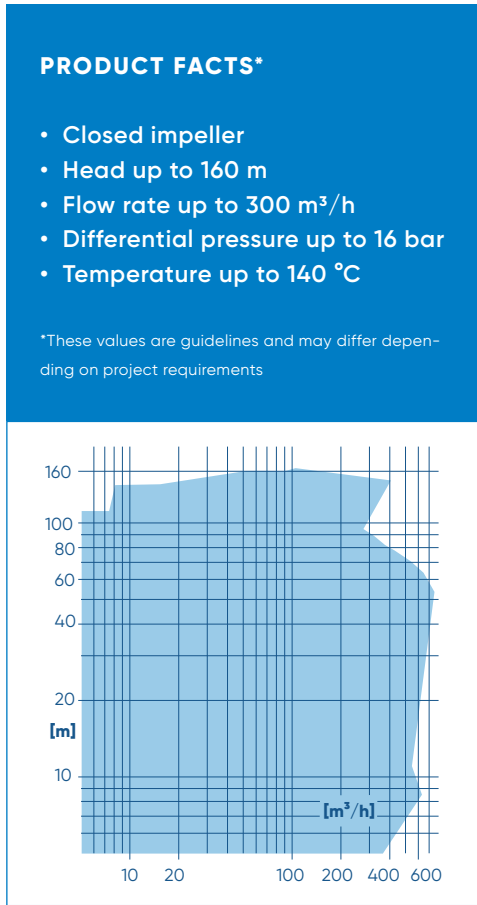




# Centrifugal pumps ISO series

ANDRITZ single-stage centrifugal pumps from the ISO series are characterized by their low energy consumption and easy maintenance thanks to their modular design. They are available with closed, radial and vor-

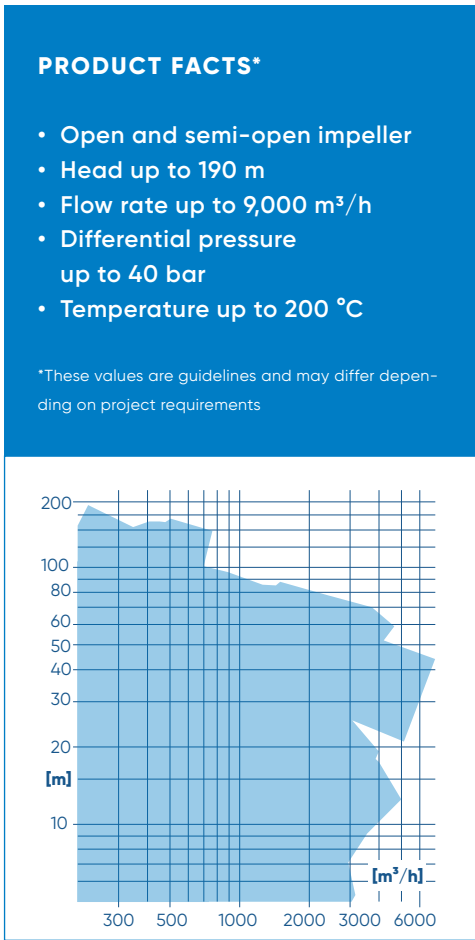
tex impeller. These pumps have been designed to convey starch milk between 3 and 24 °Bé, wash water, filtrate, and auxiliaries.



# Centrifugal pumps S and ACP series

ANDRITZ single-stage centrifugal pumps from the ACP and S series are available with closed, semi-open or open impellers in a highly wear-resistant design. These pumps are suitable for conveying liquids containing solids and/or fibers, e.g. fibrous slurries, steeping wa-

ter, and corn suspensions. They can also be used for wheat fractioning and pumping of auxiliaries. A modular system ensures high availability, enables the use of proven components and reduces the number of spare parts to be held in stock.





# Highly wear-resistant centrifugal pumps – HW series

ANDRITZ wear-resistant centrifugal pumps convince with their particularly robust design. Thus, they are the ideal solution for pumping abrasive liquids such as wash water and waste water in the starch production

process. A modular system ensures high availability, enables the use of proven components and reduces the number of spare parts to be held in stock.

# High-pressure pumps HP/MP/MPE series

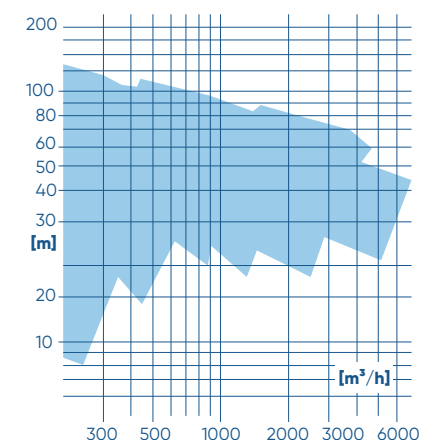
The high standard of the ANDRITZ multi-stage, high-pressure pumps is based on decades of experience in designing hydraulic machines and on extensive process know-how. The multi-stage pumps are designed according to a strict modular system. With this system, different design variants can be supplied according to

the customer's requirements quickly, easily and economically using a minimum number of components. These pumps are used for various high-pressure municipal and industrial applications such as water supply in the starch production process.

## PRODUCT FACTS\*

- Open and semi-open impeller
- Head up to 160 m
- Flow rate up to 6,000 m<sup>3</sup>/h
- Differential pressure up to 25 bar
- Temperature up to 200 °C

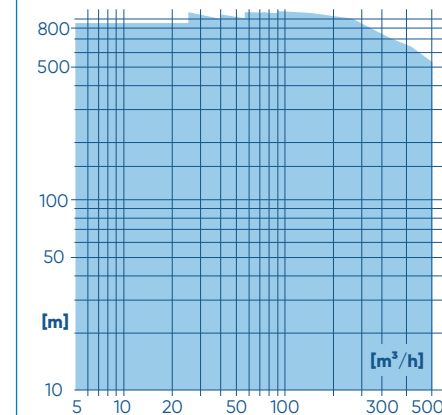
\*These values are guidelines and may differ depending on project requirements



## PRODUCT FACTS\*

- Multi-stage high-pressure pumps
- Head up to 500 m
- Flow rate up to 800 m<sup>3</sup>/h
- Differential pressure up to 100 bar
- Temperature up to 140 °C

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



# End suction pumps ES series

ANDRITZ single-stage centrifugal pumps from ES series are characterized by their low energy consumption and easy maintenance thanks to their modular

design. They are available with closed, radial and vortex impeller. These pumps have been designed to be installed in the process water supply in the starch industry.

# Sewage pumps, wet SW series

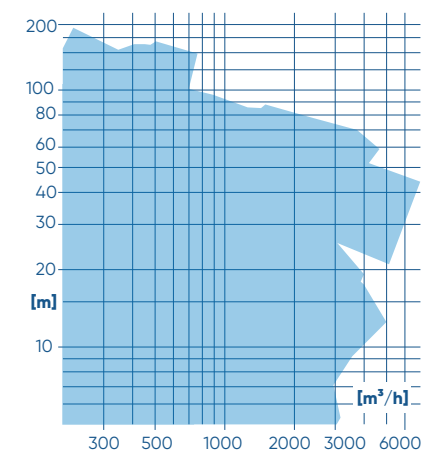
ANDRITZ wet installed sewage pumps are suitable for sewage, waste water, and other types of sludge within the starch production process. They fulfill high expectations regarding efficiency, life cycle, maintenance friendliness and economic efficiency. These

channel impeller pumps are single-stage submersible sewage pumps with a pressure-water-tight motor and a closed-coupled design. They can be supplied for different types of installation and with various impeller types.

## PRODUCT FACTS\*

- Single-stage volute casing pumps according to DIN EN 733
- Head up to 100 m
- Flow rate up to 4,000 m<sup>3</sup>/h
- Differential pressure up to 16 bar
- Temperature up to 140 °C

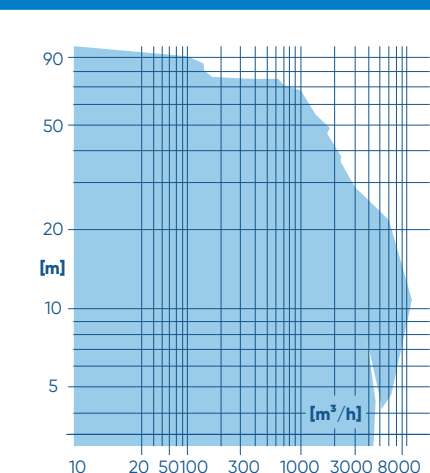
\*These values are guidelines and may differ depending on project requirements



## PRODUCT FACTS\*

- Single-stage pumps in close-coupled design
- Impeller: Single-channel, double-channel, vortex, multi-channel "T"-type
- Head up to 100 m
- Flow rate up to 10,000 m<sup>3</sup>/h
- Differential pressure up to 16 bar
- Temperature up to 140 °C

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





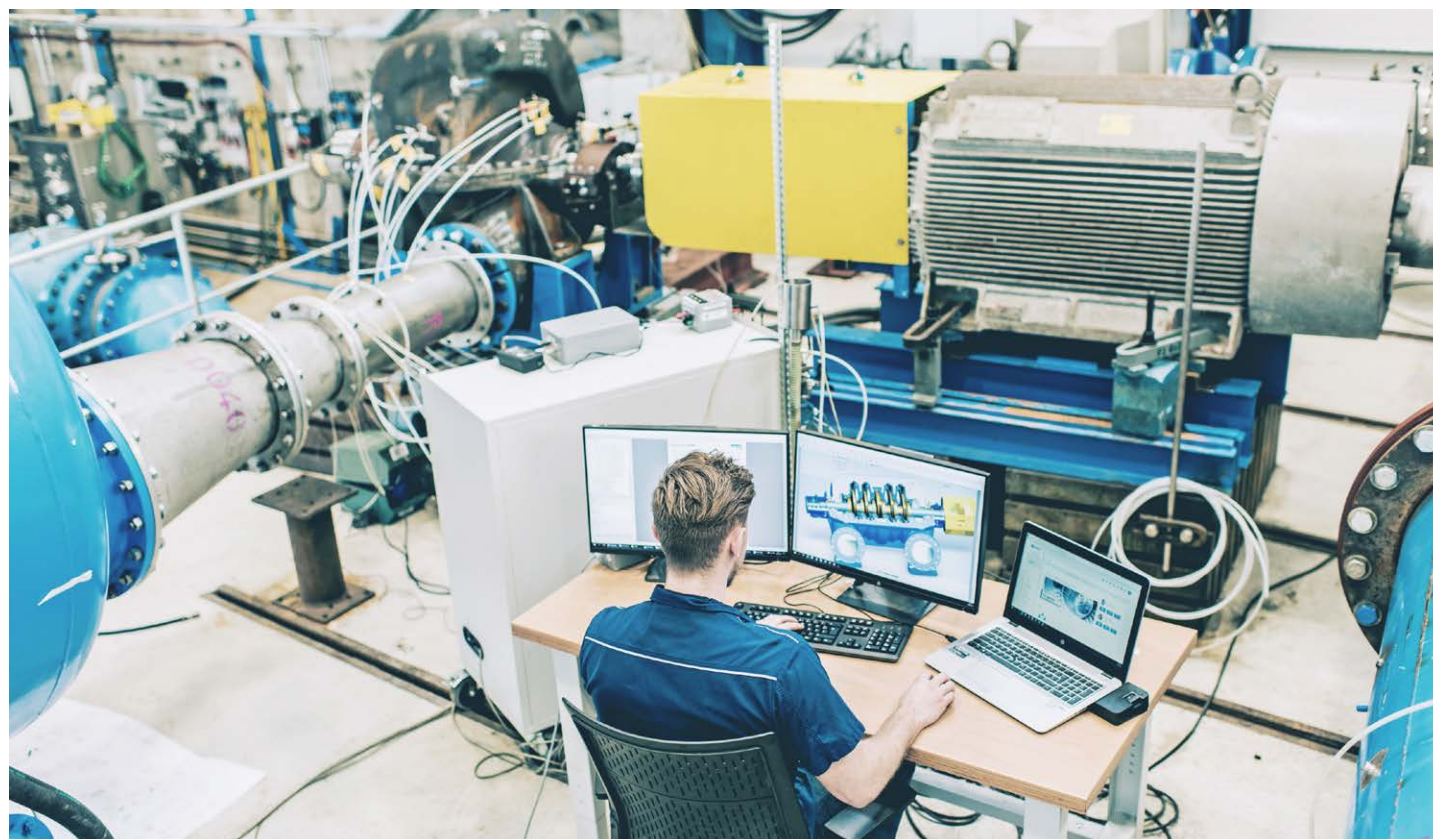
# Always a flow ahead – Research and development

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

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 IIoT 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 pump-

ing 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

Find out more about  
ANDRITZ 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





# ANDRITZ supports the Thai tapioca market with strong process pumps

In the land of smiles, the international technology group ANDRITZ once again demonstrates its innovative strength and engineering skills. Based on decades of experience in hydraulic engineering and comprehensive process know-how as well as an understanding of the most diverse customer requirements, more and more starch producers worldwide rely on ANDRITZ pumps. Now, a Thai tapioca starch producer also installed innovative and targeted pumping solutions for his entire starch production process – from the processing of the raw material through extraction and separation of the fibers to the last washing stage and starch concentration – from ANDRITZ.

In May 2017, ANDRITZ supplied 31 process pumps for the production of tapioca starch to the customer. The company was founded in 2014 and specializes in the design and construction of modern machinery for the tapioca starch industry. The products of the 100% Thai machine supplier are characterized by maximum efficiency, speed and reliability. A project-related symbiosis with the pump division of ANDRITZ was therefore obvious. Not only do ANDRITZ centrifugal pumps impress with their robustness and reliability, they also guarantee a high level of cost-effectiveness that is significantly above the industrial average thanks to their efficiencies of up to 90% and the associated long service life

As part of this joint project, ANDRITZ pumps operate for the first time in a starch production facility that processes the white substance from tapioca. In addition to corn, wheat, potatoes and rice, tapioca, also called manioc, is one of the most important starch plants. It

is an almost tasteless starch made from processed and dried cassava roots. They are then sold as beads that are soaked before use. Tapioca is a popular ingredient in desserts, especially in West African and in East and Southeast Asian cuisine. The most well-known example for this would be the so-called bubble tea, a mixture of mainly tea, milk and tapioca beads. Tapioca plays a significant role in Thai agriculture. In the period from 2015 to 2016, Thailand produced 33 million tons of starch. Although Nigeria continues to be the world's leading producer of tapioca, Thailand is now the world's largest exporter of tapioca products, at 60 percent.

In processing, tapioca behaves the same as any other starch plant. ANDRITZ supplied a total of 31 process pumps for the Thai production site. Depending on their installed position, they transport water, starch milk and starch fibers with consistencies of 30 percent air and 20 percent starch. The pumps handle flow rates between 70 and 499 m<sup>3</sup>/h. Foaming liquids are a particular challenge for the installed pumps in this process. ANDRITZ offers an optimum solution with self-priming centrifugal pumps. The combination of a single-stage centrifugal pump and an integrated vacuum pump prevents air build-up at the impeller inlet and thus, guarantees a highly efficient pump operation even with high viscosity liquids. Due to the vacuum pump, the gas content in the medium is eliminated ensuring that the liquids can be conveyed easily. Thanks to these design criteria, ANDRITZ self-priming centrifugal pumps are perfectly suited for mastering critical processes in the starch production..

THE PRODUCTS ARE CHARACTERIZED BY MAXIMUM EFFICIENCY, SPEED AND RELIABILITY. A PROJECT-RELATED SYMBIOSIS WITH THE PUMP DIVISION OF ANDRITZ WAS THEREFORE OBVIOUS.







## 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!

### EUROPE

ANDRITZ AG  
Stattegger Strasse 18  
8045 Graz, Austria  
p: +43 316 6902-2509  
f: +43 316 6902-413  
pumps@andritz.com

ANDRITZ Pumps Germany GmbH  
Güglingsstraße 50  
73529 Schwäbisch Gmünd,  
Germany  
p: +49 7171 609-0  
f: +49 7171 609 287  
ritz@andritz.com

ANDRITZ Hydro S.L.  
Polígono Industrial La Garza 2  
Carretera de Algete M-106, Km. 2  
28110 Algete  
Spain  
p: +34 91 6636 409  
f: +34 91 425 1001  
bombas.es@andritz.com

### SOUTH AMERICA

ANDRITZ HYDRO S.A.  
Av. Juruá 747, Alphaville Industrial  
06455-010, Barueri, SP - Brasil  
p: +55 11 4133-0000  
f: +55 11 4133-0037  
bombas-brazil@andritz.com

### ASIA

ANDRITZ (CHINA) LTD.  
No.83 B Zone, Leping Central Technology & Industry Park, Sanshui District,  
Foshan 528137, Guangdong, P.R.China  
p: +86 0757 6663-3102  
atc\_pumps@andritz.com

ANDRITZ Separation & Pump  
Technologies India Pvt. Ltd.  
S.No. 389, 400/2A & 400/2C,  
Padur Road, Kuthambakkam  
Village, Poonamallee Taluk,  
Thiruvallur District –  
600124, Chennai, India  
p: +91 44 4399-1111  
pump.in@andritz.com

### ANDRITZ FZCO

Dubai Airport Free Zone (DAFZA)  
Building 6WB – Office No. 642  
Dubai, United Arab Emirates  
p: +971 4 214 6546  
dubai@andritz.com

**ANDRITZ.COM/PUMPS**



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