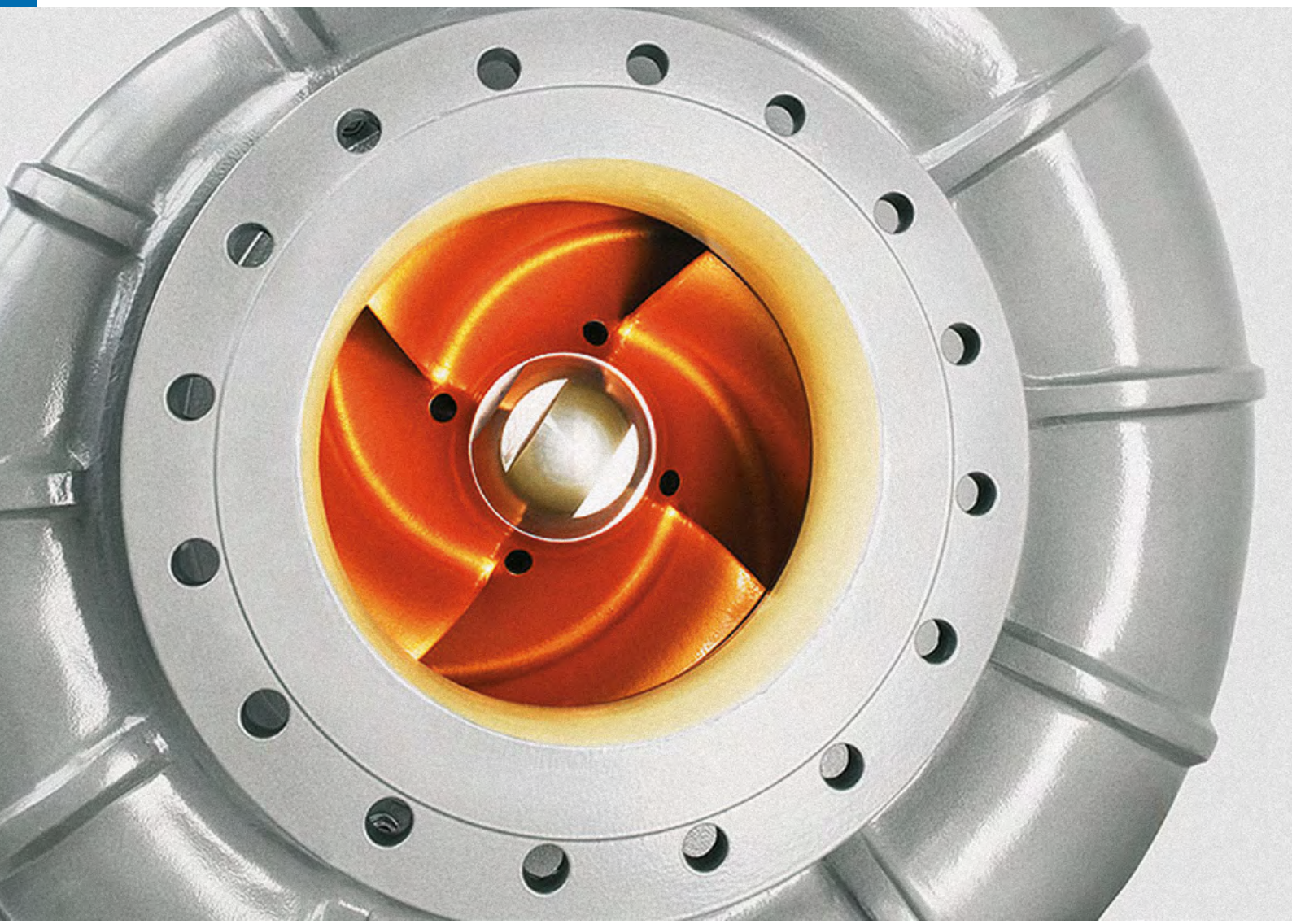
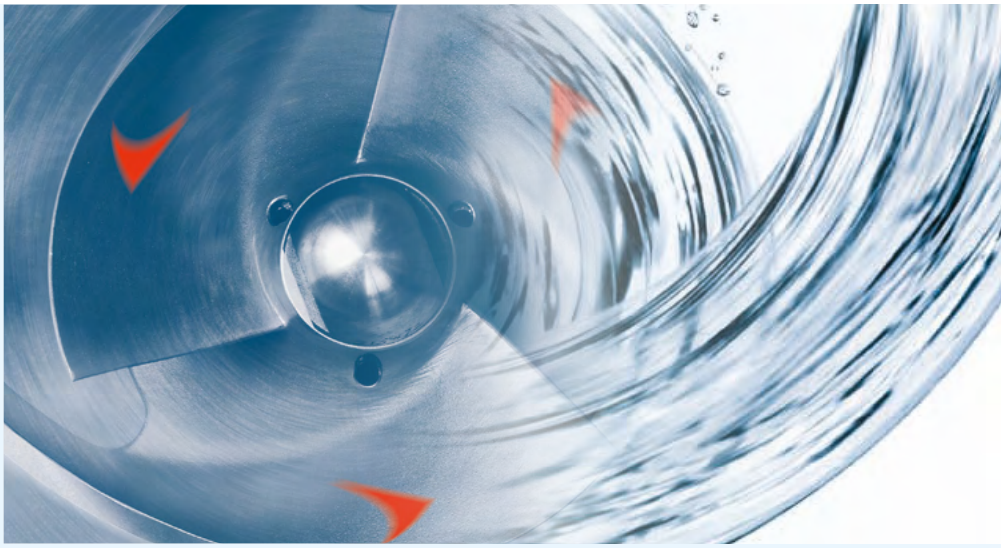
ANDRITZ pumps and motors

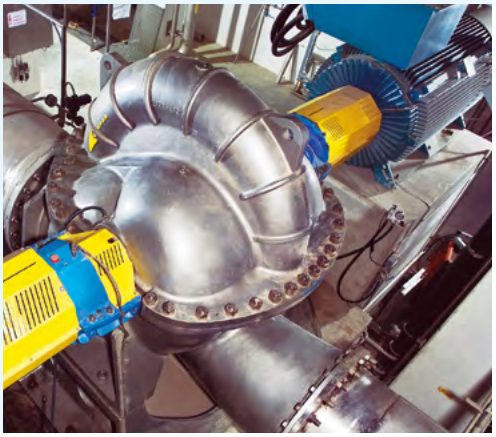
Products, systems, applications



www.andritz.com

Experience and expertise





Decades of experience in hydraulic machine manufacturing and complete process know-how form the basis for our pumps' high performance.

Professional expertise and our understanding of customer requirements make us a valuable partner. We offer innovative and targeted solutions with pumps and complete pumping stations.

From development to model tests, design, manufacturing, project management and installation, to service and training – all from a single source.

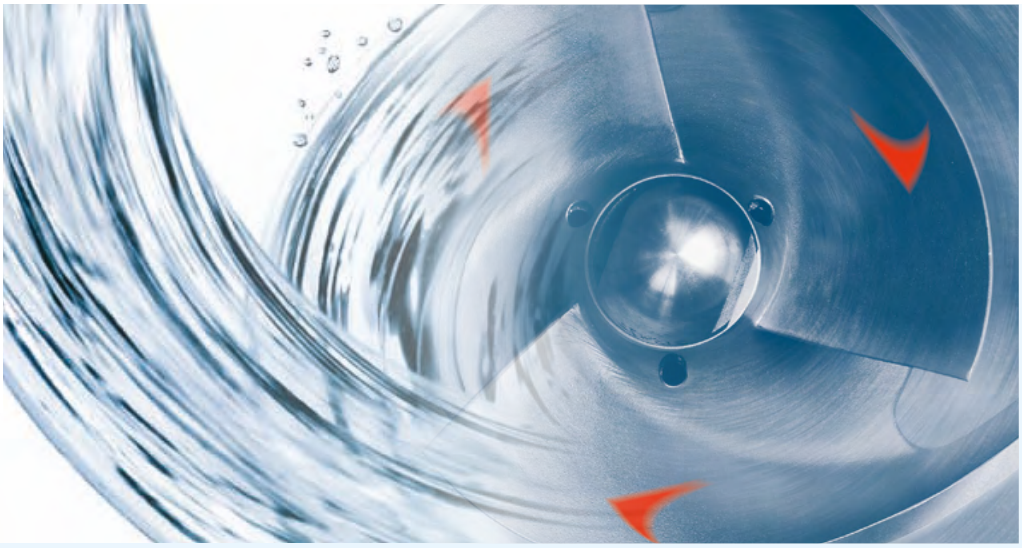
Customers around the world trust us. They value our many years of experience throughout the value chain.

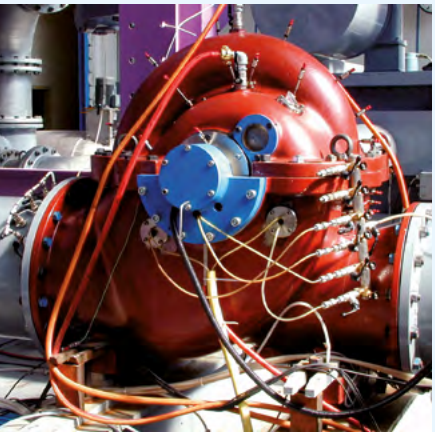
Vertical line shaft pumps
e.g. for irrigation pumping stations

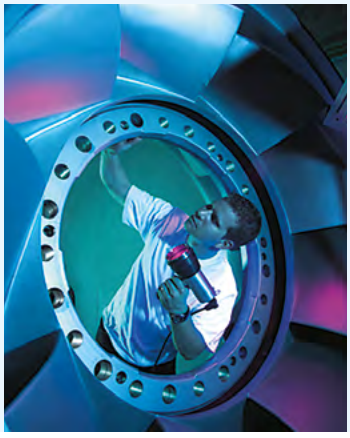
Process pumps
to convey water and suspensions for various industries, such as sugar, pulp and paper, or for water supply

Double-flow axial split case pumps
for pumping water and suspensions

R&D, quality, and service







Intensive research and development

Our commitment to research and development forms the basis for our advances in hydraulic machine manufacturing. We are currently developing and testing our pumps and turbines at five locations in Austria, Germany, Switzerland, and China. 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.

Global quality management

We ensure the high technical standard of our pumps with top manufacturing standards, systematic organization, clearly defined processes, and well-trained employees.

Quality assurance and process requirements, as well as the quality of the pumps, are defined uniformly and implemented worldwide.

Close to our customers

Service and maintenance is key to our corporate philosophy, and is a traditional strength at ANDRITZ. Our goals are to provide first-class service and to secure sustained customer satisfaction and the reliability of our products.

We are supported by the experience and know-how of our service employees as well as our service and production sites around the world.

Products (Part 1)

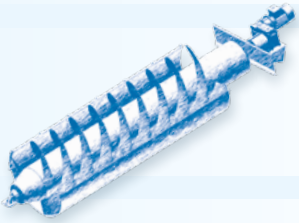
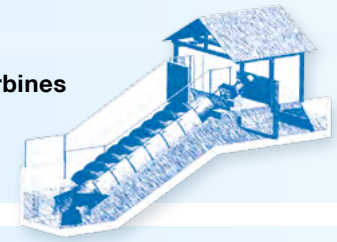
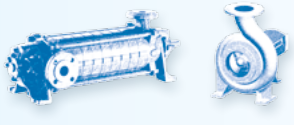
Page
(First mention)

Products (Part 2)

Page
(First mention)






Product portfolio and applications

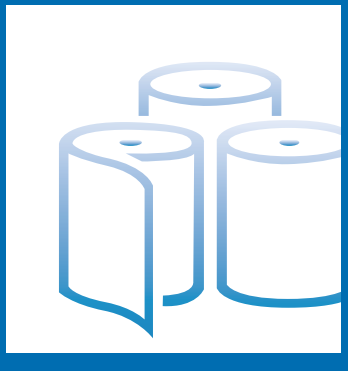
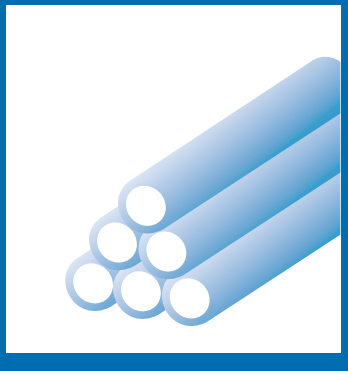
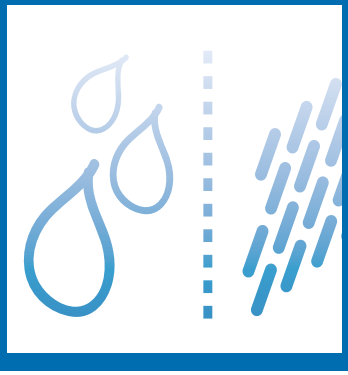
Products	Water	Waste water	Pulp & paper	Mining	Sugar	Thermal power	Other industries*	Small hydropower
Single-stage centrifugal pumps EN733, ISO 2858/5193	■		■		■	■	■	■
Single-stage centrifugal pumps Closed, semi-open, open impeller	■		■	■	■	■	■	■
Double-flow axial split case pumps	■		■			■	■	■
High-pressure pumps	■		■			■	■	■
Self-priming centrifugal pumps	■	■	■		■		■	
Vertical submersible pumps	■	■	■				■	
Medium-consistency pumps			■		■			
Sewage pumps, dry		■						
Sewage pumps, wet		■						
Single-flow submersible motor pumps	■			■			■	
Double-flow submersible motor pumps	■			■			■	
Submersible motors	■			■			■	
Vertical line shaft pumps	■					■	■	
Vertical volute pumps	■					■	■	
Screw pumps	■	■						
Hydrodynamic screw turbines								■
Pumps as turbines								■

* e.g. desalination, offshore, bioethanol (second generation), starch, food, chemical, and steel industries

The ANDRITZ GROUP at a glance

International technology Group ANDRITZ is based in Graz, Austria. It operates more than 200 production, service, and sales sites around the world, and is one of the leading suppliers of systems, equipment and services for:

Hydropower plants	Pulp and paper industry	Metalworking and steel industries	Municipal and industrial solid/liquid separation
ANDRITZ HYDRO	**ANDRITZ PULP & PAPER**	**ANDRITZ METALS**	**ANDRITZ SEPARATION**

Water & waste water

Do you manage water supply or waste water facilities, or are you the project manager for a large infrastructure project for irrigation, drinking water and industrial water supply, or for flood control? Here you will find an overview of our product portfolio in the water and waste water sectors.

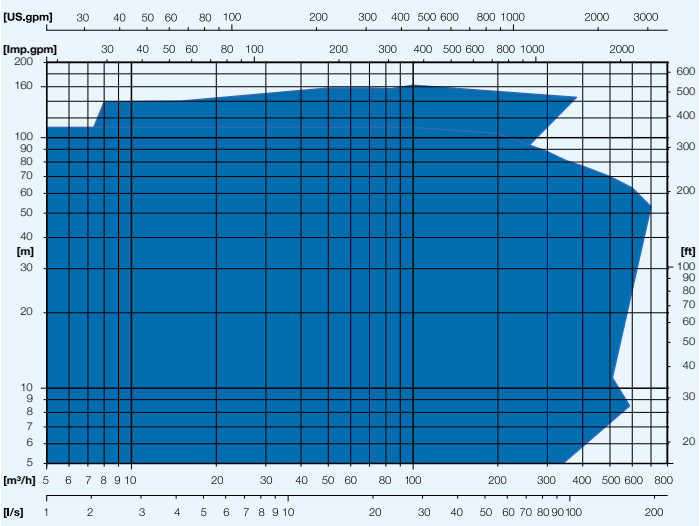
- **Drinking water and industrial water supply**
  The water circuit is completed with ANDRITZ. Our proven pump range is used for pumping water from wells and springs, as well as for water treatment, water transport, and water distribution.
- **Irrigation and drainage**
  Whether irrigating open and industrial areas, or forming part of huge irrigation projects for agricultural areas, ANDRITZ pumps offer efficient and cost-effective solutions.
- **Wastewater disposal**
  ANDRITZ pumps cover the requirements for municipal and for industrial wastewater disposal. We are one of the few pump manufacturers offering sewage pumps for both dry and wet installation.
- **Flood protection (including polder drainage)**
  Quick action is important in times of rising water levels and persistent rain causing rivers to burst their banks. ANDRITZ pumps help to dry out areas which are threatened by high water levels, or those that are already flooded.
- **Pumps for desalination plants**
  Readily available sea water can be used in order to cover the need for clean drinking water in dry regions and in metropolitan areas. ANDRITZ provides the system components to respond to the challenges in successful desalination systems.

Single-stage centrifugal pumps

EN 733, ISO 2858/5193

Nominal diameter (DN)	**32 to 150**
Flow rate	**up to 600 m³/h**
Head	**up to 160 m**
Pressure	**up to 16 bar**
Temperature	**up to 140° C**

Design: Single-stage centrifugal pumps – main dimensions and performance grid also available according to EN 733, ISO 2858 and 5193
Media: Clean, slightly contaminated, and aggressive liquids up to a viscosity of 150 mm²/s without abrasive and solids content
Special benefits: Easy to maintain due to its modular design; impeller unit can be removed from the installed pump casing; low energy consumption
Materials: Cast iron, bronze, stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Closed impeller, radial impeller, vortex impeller, and two-channel impeller available in some cases
Applications: Water, pulp and paper, sugar, thermal power, other industries, small hydropower

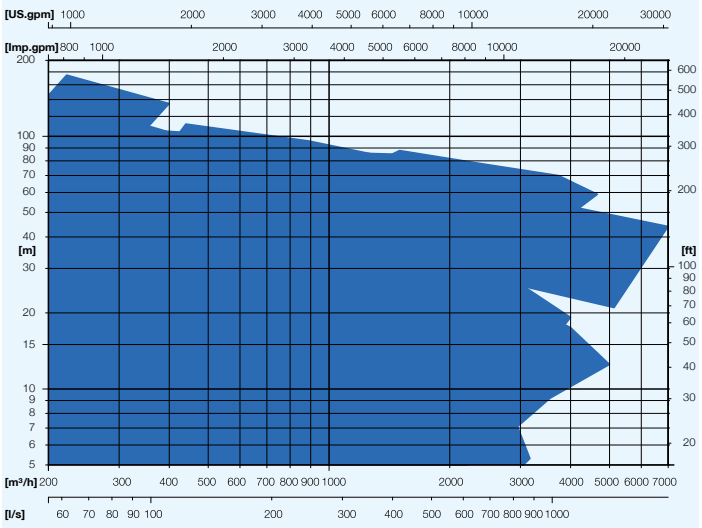


Single-stage centrifugal pumps

From closed to open impellers

Nominal diameter (DN)	**65 to 600**
Flow rate	**up to 6,000 m³/h**
Head	**up to 160 m**
Pressure	**up to 25 bar**
Temperature	**up to 200° C**

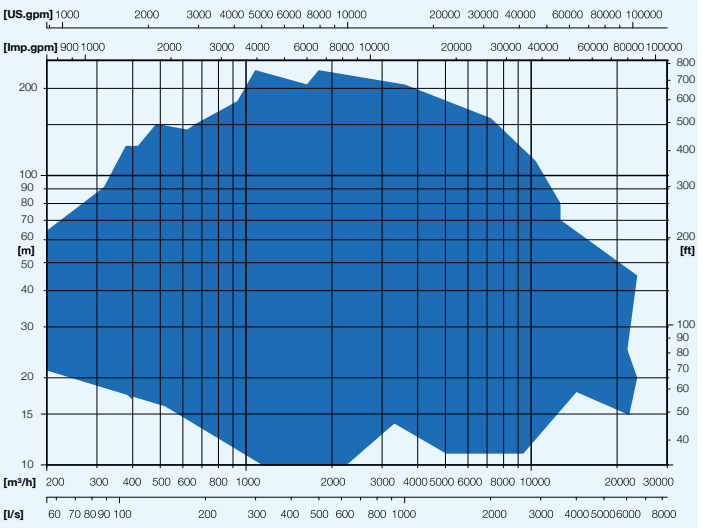
Design: Single-stage centrifugal pumps
Media: Depending on the impeller design: water, slightly contaminated, and contaminated media with some solids content; consistencies up to 8%
Special benefits: Easy to maintain; the modular system is easy to access, uses tested components, and reduces the number of spare parts to be kept on stock; efficiency up to 90%; can be delivered with a degassing unit if the medium has a high gas content (ARE version)
Materials: Cast iron; stainless steel; highly wear-resistant, hardened stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Closed, semi-open, or open impeller, also available in highly wear-resistant design
Applications: Water, pulp and paper, mining, sugar, thermal power, other industries, small hydropower



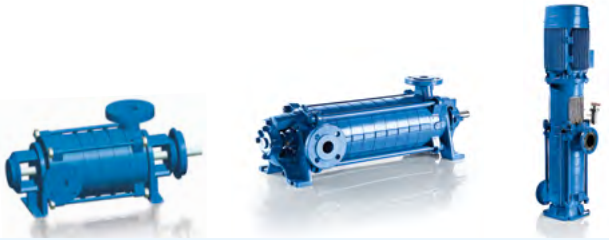
Double-flow axial split case pumps

Nominal diameter (DN)	**150 to 1200**
Flow rate	**up to 20,000 m³/h**
	customized up to 36,000 m³/h
Head	**up to 220 m**
Pressure	**up to 25 bar**
Temperature	**up to 110° C**

Design: Single-stage, double-flow axial split case pumps
Media: Pure, slightly contaminated, and aggressive liquids up to a viscosity of 150 mm²/s without abrasive and solids content; consistency up to 2%
Special benefits: In-line casing design; horizontal or vertical installation; with horizontal installation, the motor can be placed on the left or right; efficiencies over 90%; low pulsation
Materials: Cast iron, stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Double-flow radial impeller with optimum suction behavior and very good NPSH values
Applications: Water, pulp and paper, sugar, thermal power, other industries, small hydropower

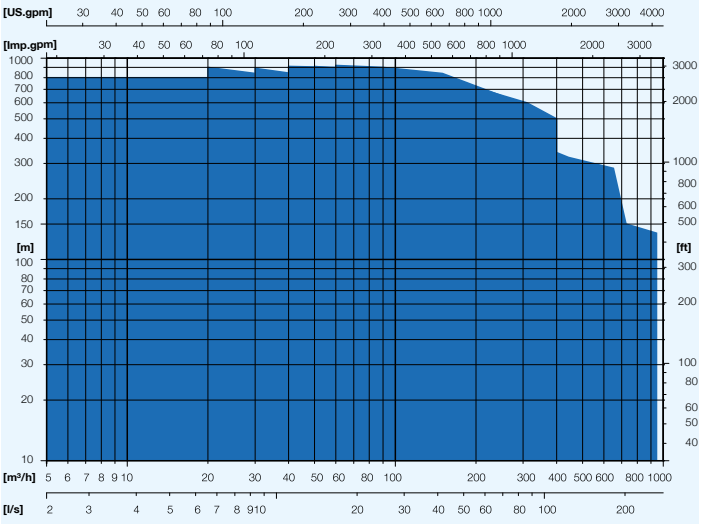


High-pressure pumps
Multi-stage centrifugal pumps



Nominal diameter (DN)	**25 to 250**
Flow rate	**up to 800 m³/h**
Head	**up to 800 m**
Pressure	**up to 100 bar**
Temperature	**up to 160° C**

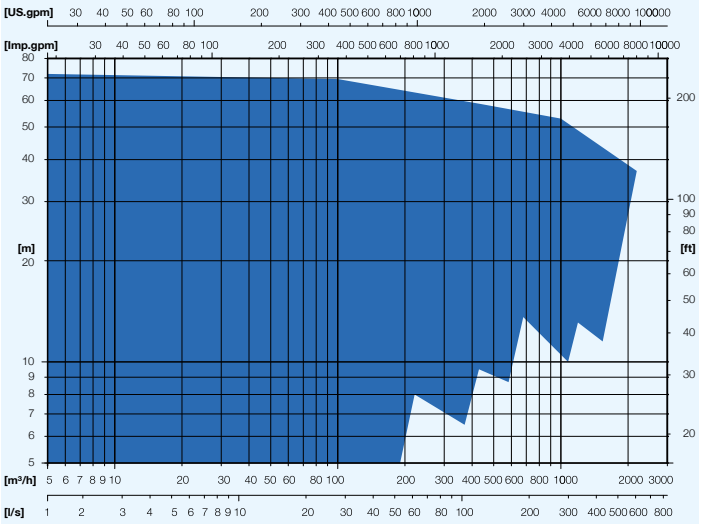
Design: Multi-stage high-pressure pumps, vertical and horizontal design
Media: Clean and slightly contaminated liquids up to a viscosity of 150 mm²/s without abrasive and solid content
Materials: Cast iron, bronze, aluminum-bronze, stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Radial impeller
Applications: Water, pulp and paper, sugar, thermal power, other industries, small hydropower



Self-priming centrifugal pumps

Nominal diameter (DN)	**80 to 250**
Flow rate	**up to 2,000 m³/h**
Head	**up to 75 m**
Pressure	**up to 16 bar**
Temperature	**up to 80° C**

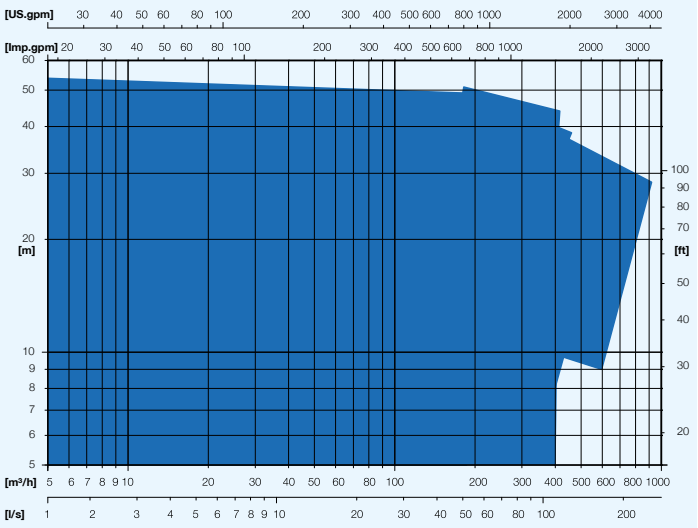
Design: Single-stage, single-flow centrifugal pumps with integrated water ring vacuum pump
Media: Water, viscous media (e.g. sugar concentration of up to 70%), and media containing solids (e.g. for pulp, paper, or waste water applications)
Special benefits: Self-priming; the integrated vacuum pump prevents air from gathering in front of the impeller and the centrifugal pump can therefore operate well even in the presence of high gas content; high-viscosity media can also be pumped
Materials: Cast iron, stainless steel
Shaft seal: Mechanical seal
Impeller design: Semi-open impeller
Applications: Water and waste water, pulp and paper, sugar, other industries



Vertical submerged pumps

Nominal diameter (DN)	**80 to 200**
Flow rate	**up to 800 m³/h**
Head	**up to 50 m**
Pressure	**up to 16 bar**
Temperature	**up to 60° C**

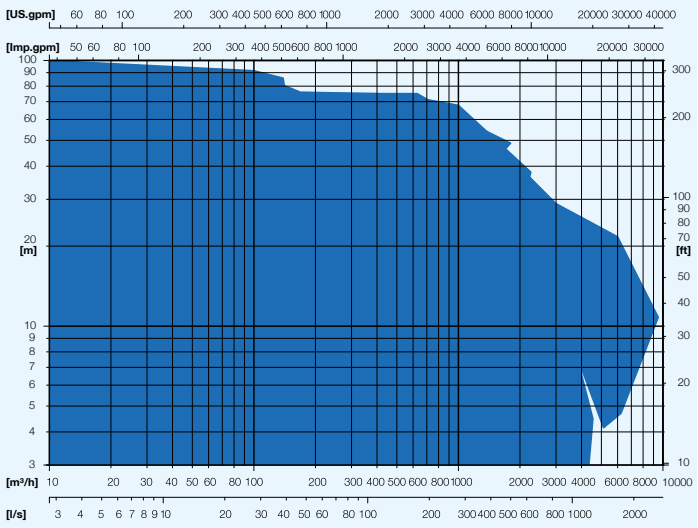
Design: Single-stage, single-flow submerged pumps
Media: Water, waste water, high-viscosity media, and media containing solids, consistencies up to 6%; slurries containing large particles (up to 140 mm); abrasive media
Special benefits: Modular base frame design; generously sized shafts; standard construction length of 1 to 2 m; flexible coupling – also developed for transporting coarse media
Materials: Cast iron, stainless steel
Impeller design: Open or vortex impeller
Applications: Water and waste water, pulp and paper, other industries



Sewage pumps, dry

Nominal diameter (DN)	**65 to 700**
Flow rate	**up to 10,000 m³/h**
Head	**up to 100 m**
Pressure	**up to 16 bar**
Temperature	**up to 140° C**

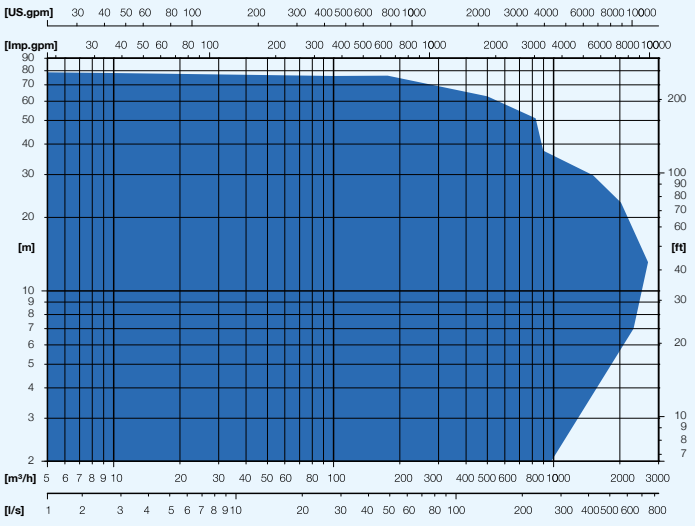
Design: Single-stage waste water pumps
Media: Low-viscosity, high-viscosity, and abrasive media, as well as gaseous and non-gaseous slurries
Special benefits: Easy to maintain due to its modular design; impeller unit can be removed from the installed pump casing
Materials: Cast iron, stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Single-channel, double-channel, vortex, multi-channel, open mixed-flow impeller
Applications: Waste water



Sewage pumps, wet

Nominal diameter (DN)	**65 to 400**
Flow rate	**up to 2,600 m³/h**
Head	**up to 80 m**
Pressure	**up to 10 bar**
Temperature	**up to 40° C**

Design: Single-stage submersible pumps in close-coupled design
Media: Sewage and waste water, as well as sludges with solid content (10% dry substance max.)
Special benefits: Explosion-proof designs can be supplied; available with a float switch
Materials: Cast iron, stainless steel
Shaft seal: Mechanical seal
Impeller design: Single-channel, double-channel, vortex impeller
Applications: Waste water



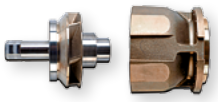
Screw pumps

Screw Ø	**up to 5 m**
Flow rate	**up to 6 m³/s**
Head	**up to 12 m**
Angle of inclination	**30° to 40°**
Efficiency	**up to 86%**

Design: Sheet steel, concrete or cast basalt trough, compact system
Media: Water and waste water, transport of solids in liquids without the danger of blockage
Special benefits: Very long service life and low wear due to low speeds, high-quality materials, and mature technology; automatic adjustment to the inflow volume at constant speed
Materials: Cast iron, stainless steel
Applications: Water and waste water

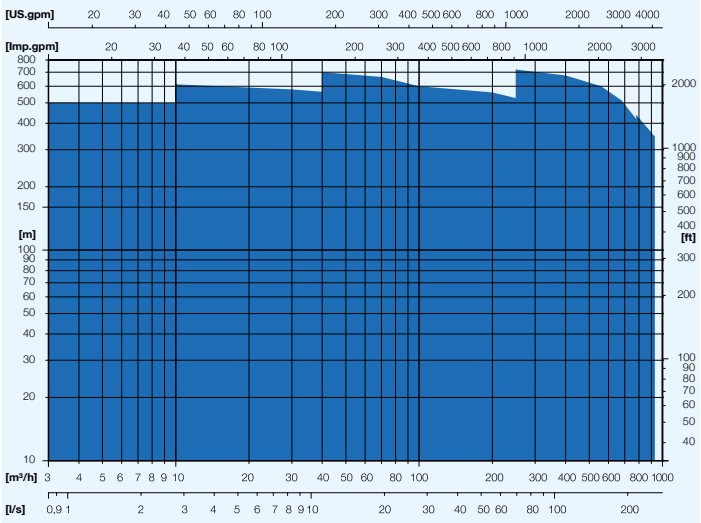
Single-flow submersible motor pumps

MS-T – Modular Shaft Technology



Well Ø	**from 6" upwards**
Flow rate	**up to 900 m³/h**
Head	**up to 800 m**
Pressure	**up to 100 bar**
Temperature	**up to 75° C**

Design: Multi-stage, single-flow submersible motor pumps
Media: Clean, slightly contaminated, and abrasive raw, clean, mineral, sea, industrial, mine, and cooling water
Special benefits: Maintenance-free; long service life, and high operating reliability; can be supplied optionally with modular shaft technology for flexible extension or reduction of the number of stages
Materials: Cast iron, aluminum-bronze, stainless steel
Impeller design: Radial, semi-axial impeller
Applications: Water, mining, other industries (e.g. offshore)



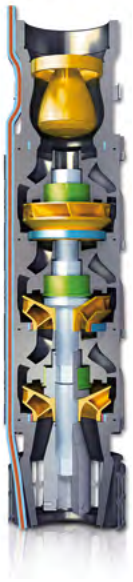
The challenge

The cost of an application is becoming increasingly important in making investment decisions. This raises the question of whether the continuous shaft concept is still up to date. Installing and removing a pump with a continuous shaft requires numerous individual steps. The logistics and storage of many different individual parts is associated with high costs. Adjustments to changing heads are generally only possible through cost-intensive exchanging of pumps.

MS-T – The solution

MS-T is not only a technological evolution, from the cost perspective it is a revolution.

MS-T is designed using a modular concept – with all of its technical and economic advantages:



- Flexible adjustment to changing pumping conditions – easy and fast by extending or reducing the number of stages.
- Simple, time-saving, and targeted installation and removal of individual stages, either horizontal or vertical.
- A small number of highly standardized components ensure high availability and short delivery times, as well as low storage costs for the operator.

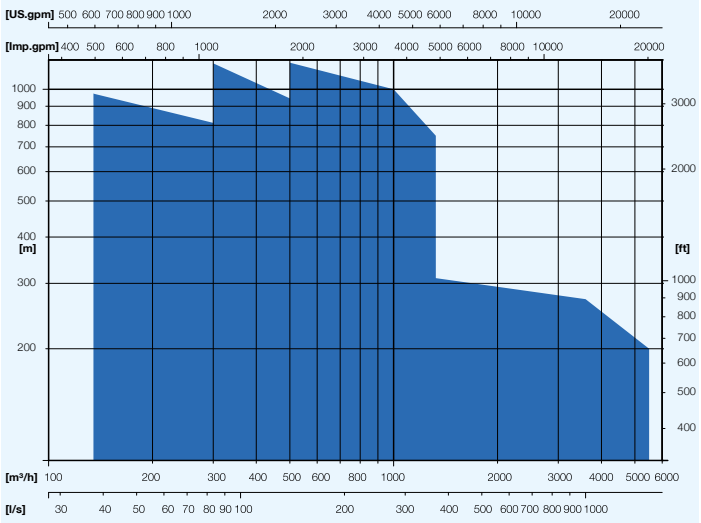
Thus, pumps with MS-T are the best solution wherever there is a need for operating reliability, freedom from maintenance, long service life, high efficiency, and flexible heads.

Double-suction submersible motor pumps

HDM – Heavy Duty Mining

Well Ø	**from 20" upwards**
Flow rate	**up to 6,000 m³/h**
Head	**up to 1,500 m**
Pressure	**up to 150 bar**
Temperature	**up to 75° C**

Design: Multi-stage, double-flow submersible motor pumps
Media: Clean, slightly contaminated, and abrasive raw, clean, mineral, sea, industrial, mine, and cooling water
Special benefits: No axial thrust, double-flow design for long service life and high reliability; maintenance-free
Materials: Cast iron, bronze, aluminum-bronze, stainless steel
Impeller design: Radial impeller
Applications: Water, mining, other industries (e.g. off-shore)



The challenge

The use of submersible motor pumps for large volumes or in great depths is associated with high stresses on the equipment. The higher the pump performance, the greater the axial thrust on the pump, motor, and its thrust bearing. The consequence: overloading and an increased risk of failure.

HDM – The solution

Two pumps are arranged one above the other, running in counter direction and driven by a continuous pump shaft. Splitting the workload between both pumps ensures complete axial thrust balancing and thus contributes towards solving the problems of force effects on the unit and loads on the thrust bearings; at the same time, the flow and suction speed outside the pump is halved. Thus, well walls are protected around the suction areas, and the intake of abrasive particles is minimized.

The result

In addition to technical benefits – HDM offers complete balancing of the axial thrust, flow speeds halved, and smaller impeller cross-sections – there are also economic benefits: maximum operating reliability, minimal wear, and long service life, which can often be more than 20 years. In combination with ANDRITZ high-performance submersible motors, the result is a complete technical solution.

Custom solutions

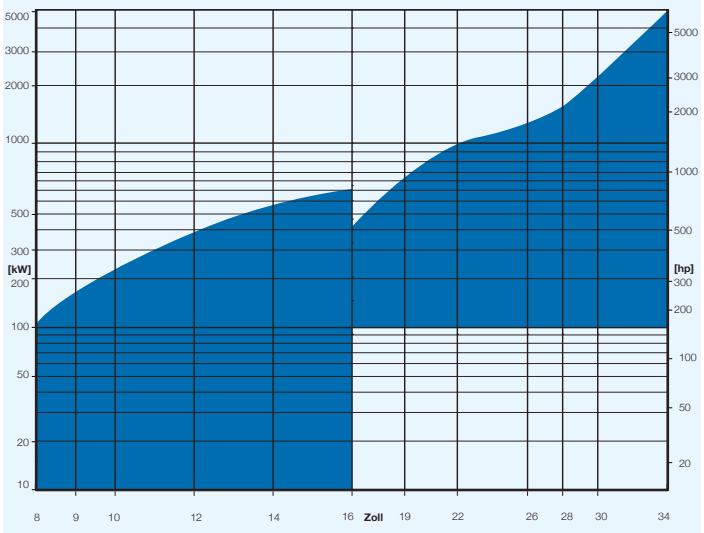
Each ANDRITZ submersible pump with HDM technology is customized. It is individually configured to meet your requirements.

Submersible motors

MC-T – Modular Cooling Technology

Well Ø	**from 8" upwards**
Power	**up to 5,000 kW**
Voltage	**up to 14,000 V**
Temperature	**up to 75° C**

Design: Water-filled and water-cooled three phase asynchronous motors with squirrel-cage rotors
Special benefit: Rewindable winding
Materials: Cast iron, bronze, stainless steel
Shaft seal: Mechanical seal
Installation: Vertical, some horizontal
Applications: Water, mining, other industries (e.g. offshore)



The challenge

Efficient and cost-effective cooling of submersible motors is a constant source of discussion by well and mine operators. Derating is a less-than-ideal solution. In addition to high capital and energy costs, the overlarge, downgraded motors usually require a larger well diameter. Oil cooling needs careful consideration as well – any failure can cause ecological damage.

MC-T – The solution

MC-T, an intelligent and compact cooling system, is the best solution here. A pump impeller brings movement into the cooling circuit and thus provides flow in the right direction. Our own-development cooling channels ensure heat absorption at all thermal sources and heat evacuation, as well as providing optimal heat conduction through the outside of the motor to the flow medium. The additional use of heat exchanger modules allows precise dimensioning of the cooling capacity.

Technical details and economic benefits

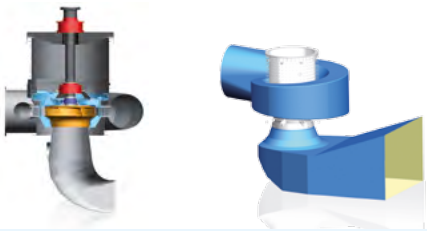
- Media temperature up to 75° C
- High efficiency across the entire performance range
- Uses drinking water as the coolant
- Low investment required
- Reduced energy costs
- Maximum reliability
- Long service life

Vertical line shaft pumps

Flow rate **up to 70,000 m³/h**
Head **up to 80 m**
Power **up to 10,000 kW**

Design: Pull-out or non pull-out
Special benefits: Option with hydraulically adjustable impeller blades: The hydraulic impeller blade adjustment mechanism allows the impeller angle to be varied continuously during operation. Thus, the operator can react promptly to changes in flow rate and head.
Materials: Cast iron, non-alloy and low-alloy steels, duplex and super duplex
Shaft seal: Gland packing, mechanical seal
Impeller design: Radial, axial, and semi-axial impeller, optionally adjustable angle impeller blades or hydraulically adjustable impeller blades
Applications: Water, thermal power, other industries

Vertical volute pumps



Flow rate **up to 180,000 m³/h**
Head **up to 40 m (concrete volute)**
up to 250 m (metal volute)
Power **up to 30,000 kW (concrete volute)**
up to 50,000 kW (metal volute)

Design: Metal or concrete volute with or without guide vane mechanism
Special benefits: The hydraulic dimensioning and design of the volute casing depends on the specific output characteristics. Optimum flow is achieved in the volute thanks to its individual shaping, thus also achieving a high level of efficiency.
Materials: Cast iron, non-alloy and low-alloy steels, duplex and super duplex
Impeller design: Radial, semi-axial
Applications: Water, thermal power, other industries

Pulp & paper

Are you responsible for the operation or maintenance of a pulp or paper production facility, or are you project manager for the construction of a greenfield pulp or paper mill? We can provide you with a series of high-performance, reliable pumps.

- **Centrifugal pumps** are used as process pumps in many different areas in pulp and paper mills. They pump suspensions with consistencies up to 8% b.d., offer high efficiencies up to 90%, and are easy to maintain with a modular design. These pumps are also available with additional degassing units for media with high gas content.
- **Double-flow axial split case pumps** are optimized for use in the pulp and paper industry, above all as headbox or cleaner pumps (fan pumps). They feature efficiencies of over 90% and have been developed specially for the pulp and paper industry with a particularly low-pulsation impeller with staggered blades
- **Medium-consistency pumps** convey the following media: chemical, mechanical, and wastepaper pulp suspensions with consistencies of up to 16% b.d. and efficiencies of up to 74%. They can be operated in most applications without internal or external vacuum pump.
- **Self-priming centrifugal pumps** convey media with high gas content. They are also highly suitable for transporting viscous and solids-containing media due to their open impellers.
- **Sump pumps** convey fresh and white water or waste water, pulp, slurries with large particles, and abrasive media.

Single-stage centrifugal pumps

EN 733, ISO 2858/5193

Nominal diameter (DN)	**32 to 150**
Flow rate	**up to 600 m³/h**
Head	**up to 160 m**
Pressure	**up to 16 bar**
Temperature	**up to 140° C**

Design: Single-stage centrifugal pumps – main dimensions and performance grid also available according to EN 733, ISO 2858 and 5193

Media: Clean, slightly contaminated, and aggressive liquids up to a viscosity of 150 mm²/s without abrasive and solid components

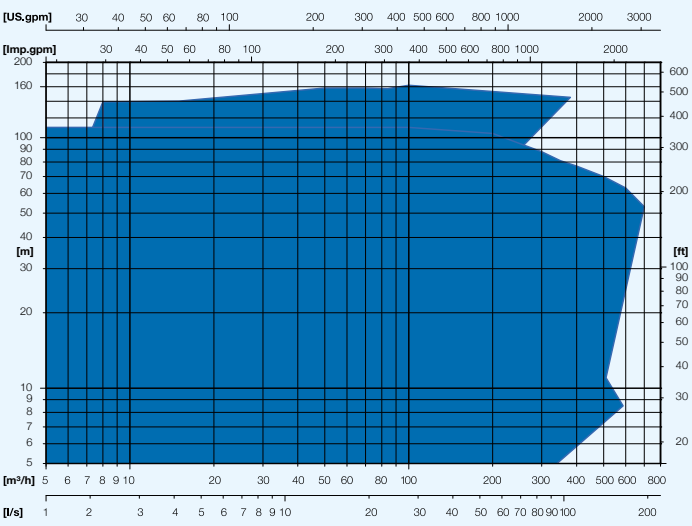
Special benefits: Easy to maintain due to its modular design; impeller unit can be removed from the installed pump casing; low energy consumption

Materials: Cast iron, bronze, stainless steel

Shaft seal: Gland packing, mechanical seal

Impeller design: Closed impeller, radial impeller, vortex impeller, and two-channel impeller available in some cases

Applications: Pulp and paper, sugar, thermal power, water, other industries, small hydropower

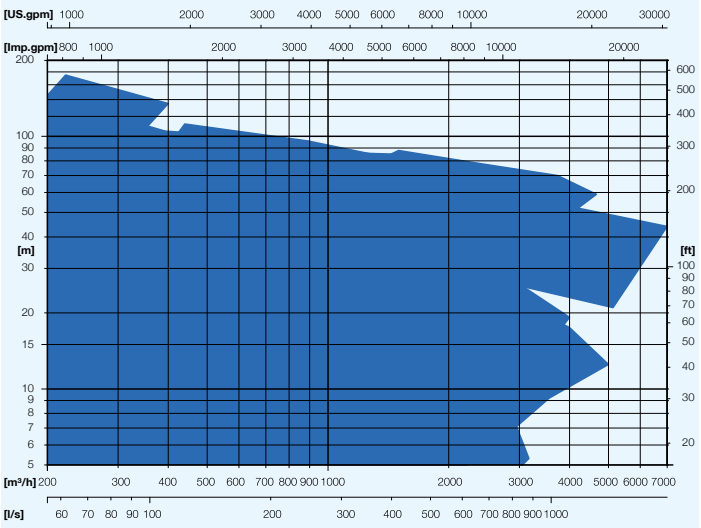


Single-stage centrifugal pumps

From closed to open impellers

Nominal diameter (DN)	**65 to 600**
Flow rate	**up to 6,000 m³/h**
Head	**up to 160 m**
Pressure	**up to 25 bar**
Temperature	**up to 200° C**

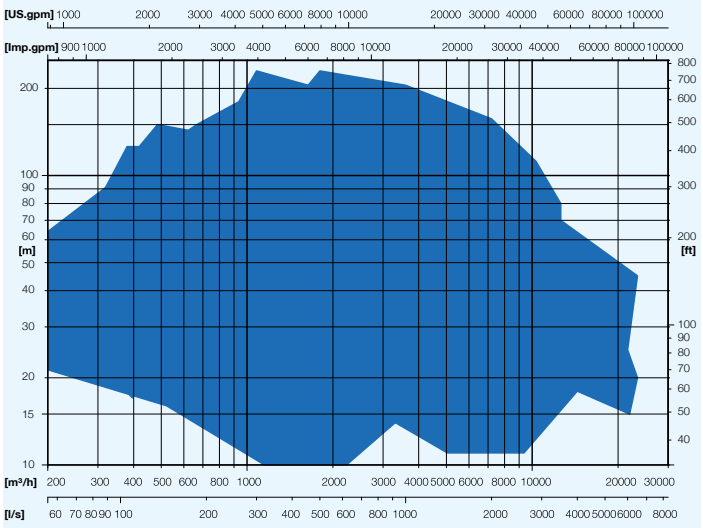
Design: Single-stage centrifugal pumps
Media: Depending on the impeller design: water, slightly contaminated, and contaminated media with solids content; consistencies up to 8%
Special benefits: Easy to maintain; the modular system is easy to access, uses tested components, and reduces the number of spare parts to be kept in stock; efficiency up to 90%; can be delivered with a degassing unit if the medium has a high gas content (ARE version)
Materials: Cast iron; stainless steel; highly wear-resistant, hardened stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Closed, semi-open, or open impeller, also available in highly wear-resistant design
Applications: Pulp and paper, water, mining, sugar, thermal power, other industries, small hydropower



Double-flow axial split case pumps

Nominal diameter (DN)	**150 to 1200**
Flow rate	**up to 20,000 m³/h**
	customized up to 36,000 m³/h
Head	**up to 220 m**
Pressure	**up to 25 bar**
Temperature	**up to 110° C**

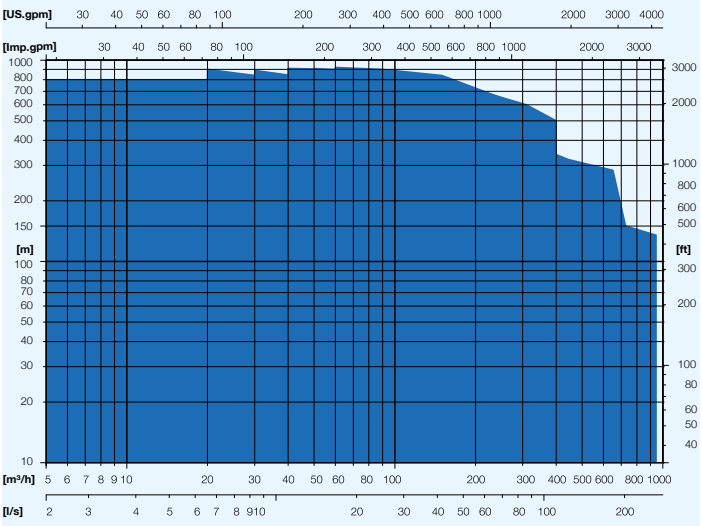
Design: Single-stage, double-flow axial split case pumps
Media: Clean, slightly contaminated, and aggressive liquids up to a viscosity of 150 mm²/s without abrasive and solids content; consistency up to 2%
Special benefits: In-line casing design; horizontal or vertical installation; with horizontal installation, the motor can be placed on the left or right; efficiencies over 90%; low pulsation
Materials: Cast iron, stainless steel
Shaft seals: Gland packing, mechanical seal
Impeller design: Double-flow radial impeller with optimum suction behavior and very good NPSH values
Applications: Pulp and paper, water, thermal power, other industries, small hydropower



High-pressure pumps
Multi-stage centrifugal pumps

Nominal diameter (DN)	**25 to 250**
Flow rate	**up to 800 m³/h**
Head	**up to 800 m**
Pressure	**up to 100 bar**
Temperature	**up to 160° C**

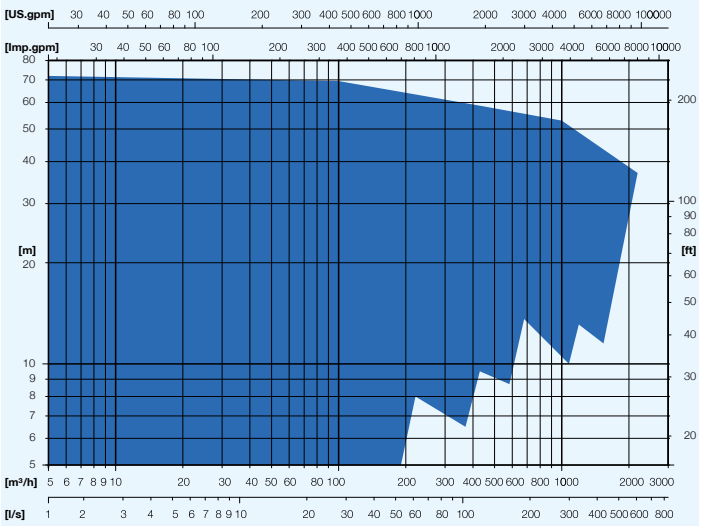
Design: Multi-stage high-pressure pumps, vertical and horizontal design
Media: Clean and slightly contaminated liquids up to a viscosity of 150 mm²/s without abrasive and solids content
Materials: Cast iron, bronze, aluminum bronze, stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Radial impeller
Applications: Pulp and paper, water, thermal power, other industries, small hydropower



Self-priming centrifugal pumps

Nominal diameter (DN)	**80 to 250**
Flow rate	**up to 2,000 m³/h**
Head	**up to 75 m**
Pressure	**up to 16 bar**
Temperature	**up to 80° C**

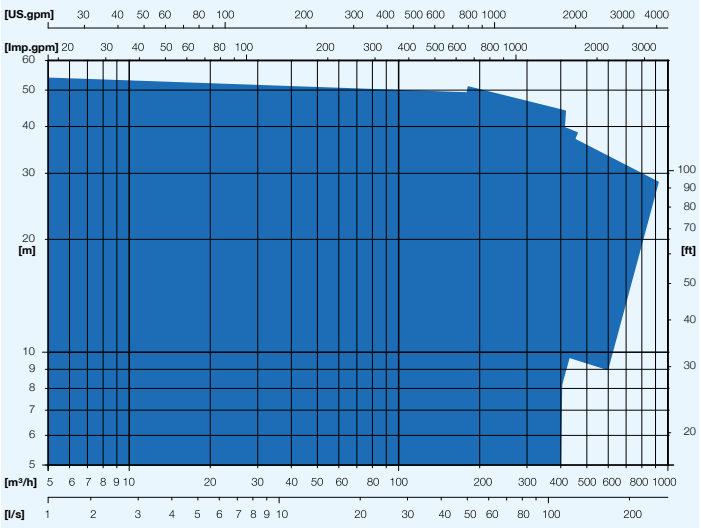
Design: Single-stage, single-flow centrifugal pumps with integrated water ring vacuum pump
Media: Water, viscous media (e.g. sugar concentration of up to 70%), and media containing solids (e.g. for pulp, paper, or waste water applications)
Special benefits: Self-priming; the integrated vacuum pump prevents air from gathering in front of the impeller so that the centrifugal pump can thus operate well, even in the presence of high gas content; high-viscosity media can also be pumped
Materials: Cast iron, stainless steel
Shaft seal: Mechanical seal
Impeller design: Semi-open impeller
Applications: Pulp and paper, water and waste water, sugar, other industries



Vertical submerged pumps

Nominal diameter (DN)	**80 to 200**
Flow rate	**up to 800 m³/h**
Head	**up to 50 m**
Pressure	**up to 16 bar**
Temperature	**up to 60° C**

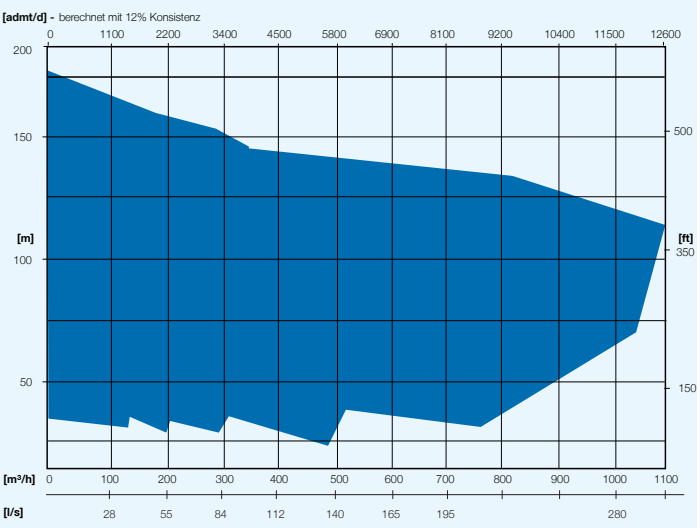
Design: Single-stage, single-flow submerged pumps
Media: Water, waste water, high-viscosity media, and media containing solids, consistencies up to 6%; slurries containing large particles (up to 140 mm); abrasive media
Special benefits: Modular base frame design; generously sized shaft; standard construction lengths of 1 to 2 m; flexible coupling – also developed for transporting coarse media
Materials: Cast iron, stainless steel
Impeller design: Open or vortex impeller
Applications: Pulp and paper, water and waste water, other industries



Medium-consistency pumps

Nominal diameter (DN)	**80 to 400**
Flow rate	**up to 13,000 admt/d**
Head	**up to 190 m**
Pressure	**up to 25 bar**
Temperature	**up to 140° C**
Consistencies	**up to 16% b.d.**

Design: Single-flow, single-stage, medium-consistency pump with fluidizer
Media: Pulp suspensions up to a consistency of 16% b.d. and all types of viscous media
Special benefits: No need to monitor the pressure in the degasser line and no loss of fibers thanks to the newly developed SMARTSEP degassing system
Materials: Cast iron, stainless steel, acid-resistant individual components if needed
Shaft seal: Mechanical seal
Impeller design: Semi-open impeller
Applications: Pulp and paper, sugar



Mining

Are you looking for safe and effective solutions in mining water management? ANDRITZ is one of the leading manufacturers of pumps for water management and emergency drainage in surface and underground mining.

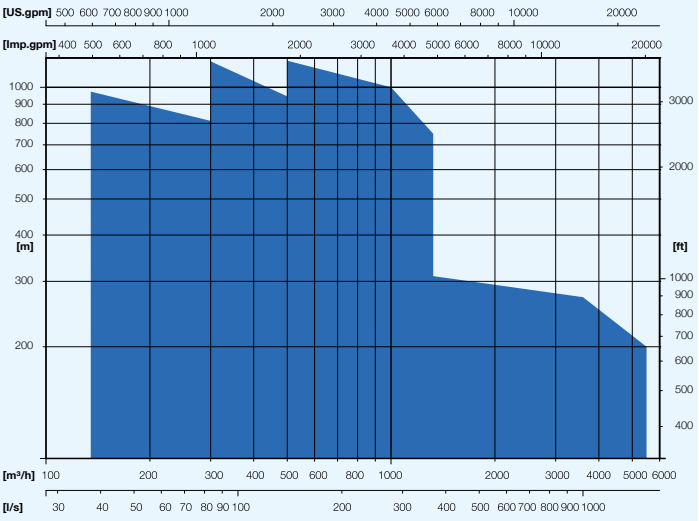
- **Deployment under extreme conditions**
- **Highest operating reliability**
- **Long service life**
- **Maintenance-free operation**
- **High-grade materials**

Safety and reliability are the greatest necessities in surface and underground mining in order to ensure that there are no disruptions in extraction. Mine operators around the world trust the single-flow and double-suction submersible motor pumps from ANDRITZ in order to remove mine water reliably from operating areas. If rescue pumps are needed to drain water from mines reliably and quickly in emergencies, the patented HDM technology is the best possible solution to keep people and the environment safe.

Double-suction submersible motor pumps

Well Ø	**from 20" upwards**
Flow rate	**up to 6,000 m³/h**
Head	**up to 1,500 m**
Pressure	**up to 150 bar**
Temperature	**up to 75° C**

Design: Multi-stage, double-flow submersible motor pumps
Media: Clean, slightly contaminated, and abrasive raw, clean, mineral, sea, industrial, mine, and cooling water
Special benefits: No axial thrust, double-flow design for long service life and high operating reliability; maintenance-free
Materials: Cast iron, bronze, aluminum-bronze, stainless steel
Impeller design: Radial impeller
Applications: Mining, water, other industries (e.g. offshore)



HDM – Heavy Duty Mining

The challenge

The use of submersible motor pumps for large volumes or in great depths is associated with high stresses on the equipment. The higher the pump performance, the greater the axial thrust on the pump, motor, and its thrust bearing. The consequence: overloading and an increased risk of failure.

HDM – The solution

Two pumps are arranged one above the other, running in counter direction and driven by a continuous pump shaft. Splitting the workload between both pumps ensures complete axial thrust balancing and thus contributes towards solving the problems of force effects on the unit and loads on the thrust bearings; at the same time, the flow and suction speed outside the pump is halved. Thus, well walls are protected around the suction areas, and the intake of abrasive particles is minimized.

The result

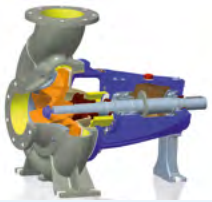
In addition to technical benefits – HDM offers complete balancing of the axial thrust, flow speeds halved, and smaller impeller cross-sections – there are also economic benefits: maximum operating reliability, minimal wear, and long service life, which can often be more than 20 years. In combination with ANDRITZ high-performance submersible motors, the result is a complete technical solution.

Custom solutions

Each ANDRITZ submersible pump with HDM technology is customized. It is individually configured to meet your requirements.

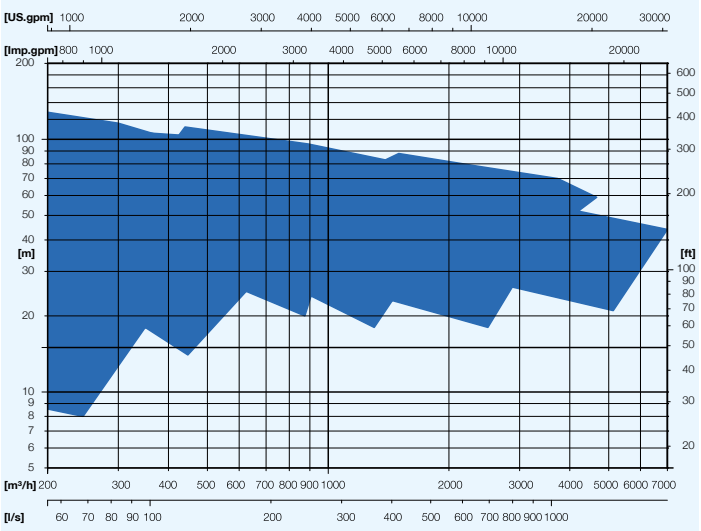
Single-stage pumps

Highly abrasion-resistant



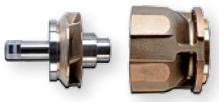
Nominal diameter (DN)	**65 to 600**
Flow rate	**up to 6,000 m³/h**
Head	**up to 160 m**
Pressure	**up to 25 bar**
Temperature	**up to 200° C**

Design: Single-stage, abrasion-resistant volute casing pumps
Media: Slightly contaminated and contaminated media with solids content
Special benefits: Easy to maintain, the modular system is easy to access, uses tested components, and reduces the number of spare parts to be kept on stock, efficiency up to 90%
Materials: Cast iron; stainless steel; highly wear-resistant, hardened stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Semi-open, or open impeller, also available in highly wear-resistant design
Applications: Mining, sugar



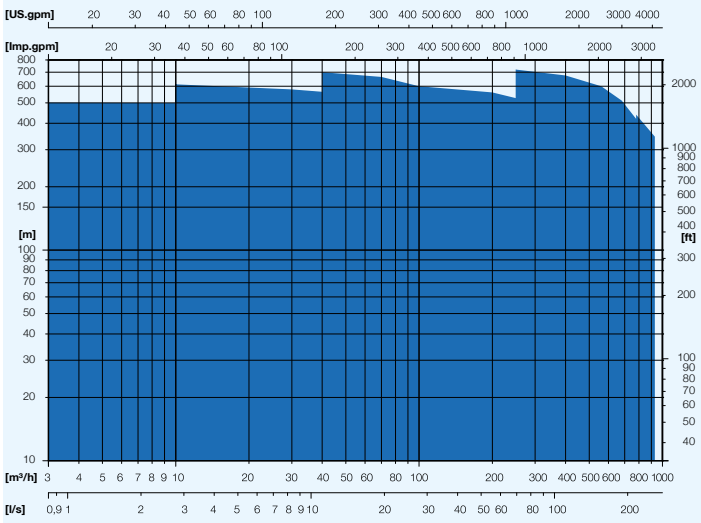
Single-flow submersible motor pumps

MS-T – Modular Shaft Technology



Well Ø	**from 6" upwards**
Flow rate	**up to 900 m³/h**
Head	**up to 800 m**
Pressure	**up to 100 bar**
Temperature	**up to 75° C**

Design: Multi-stage, single-flow submersible motor pumps
Media: Clean, slightly contaminated, and abrasive raw, pure, mineral, sea, industrial, mine, and cooling water
Special benefits: Maintenance-free; long service life and high operating reliability; can be supplied optionally with modular shaft technology for flexible extension and to reduce the number of stages
Materials: Cast iron, aluminum-bronze, stainless steel
Impeller design: Radial, semi-axial impeller
Applications: Water, mining, other industries (e.g. offshore)



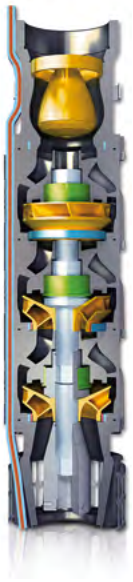
The challenge

The cost of an application is becoming increasingly important in making investment decisions. This raises the question of whether the continuous shaft concept is still up to date. Installing and removing a pump with a continuous shaft requires numerous individual steps. The logistics and storage of many different individual parts is associated with high costs. Adjustments to changing heads are generally only possible through cost-intensive exchanging of pumps.

MS-T – The solution

MS-T is not only a technological evolution, from the cost perspective it is a revolution.

MS-T is designed using a modular concept – with all of its technical and economic advantages:



- Flexible adjustment to changing pumping conditions – easy and fast by extending or reducing the number of stages.
- Simple, time-saving, and targeted installation and removal of individual stages, either horizontal or vertical.
- A small number of highly standardized components ensure high availability and short delivery times, as well as low storage costs for the operator.

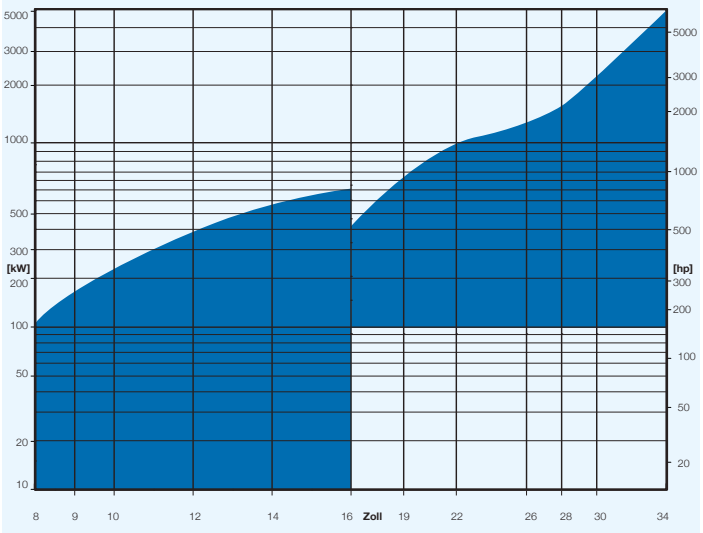
Thus, pumps with MS-T are the best solution wherever there is a need for operating reliability, freedom from maintenance, long service life, high efficiency, and flexible heads.

Submersible motors

MC-T – Modular Cooling Technology

Well Ø	**from 8" upwards**
Power	**up to 5,000 kW**
Voltage	**up to 14,000 V**
Temperature	**up to 75° C**

Design: Water-filled and water-cooled three phase asynchronous motors with squirrel-cage rotors
Special benefit: Rewindable winding
Materials: Cast iron, bronze, stainless steel
Shaft seal: Mechanical seal
Installation: Vertical, some horizontal
Applications: Water, mining, other industries (e.g. offshore)



The challenge

Efficient and cost-effective cooling of submersible motors is a constant source of discussion by well and mine operators. Derating is a less-than-ideal solution. In addition to high capital and energy costs, the overlarge, downgraded motors usually require a larger well diameter. Oil cooling needs careful consideration as well – any failure can cause ecological damage.

MC-T – The solution

MC-T, an intelligent and compact cooling system, is the best solution here. A pump impeller brings movement into the cooling circuit and thus provides flow in the right direction. Our own-development cooling channels ensure heat absorption at all thermal sources and heat evacuation, as well as providing optimal heat conduction through the outside of the motor to the flow medium. The additional use of heat exchanger modules allows precise dimensioning of the cooling capacity.

Technical details and economic benefits

- Media temperature up to 75° C
- High efficiency across the entire performance range
- Uses drinking water as the coolant
- Low investment required
- Reduced energy costs
- Maximum reliability
- Long service life

Sugar

Are you responsible for the operation or maintenance of a sugar processing facility? ANDRITZ develops and manufactures centrifugal pumps that can be used in the entire sugar production process.

Depending upon where they are installed, our pumps have either closed or open impellers. In self-priming centrifugal pumps, an open impeller with an integrated water ring vacuum pump is used. When choosing pumps, the pump type selected depends on the characteristics of the media in each stage of the production process – such as viscosity, solids content, size of the solids, and abrasion characteristics.

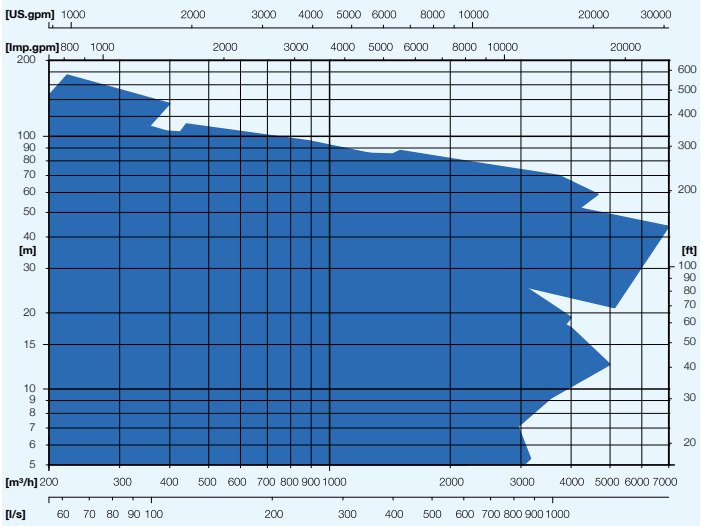
- **For example, self-priming centrifugal pumps:** The combination of a single-stage centrifugal pump with an integrated vacuum pump prevents gas from gathering at the inflow opening. This guarantees smooth operation, even with suboptimal suction pipe configurations. The pump unit can also be used without any difficulties up to a sugar content of 70% thanks to its semi-open impeller
- **For example, medium-consistency pumps:** ANDRITZ offers a practically tested pump to transport molasses, green juice, white juice, lime water, or sludge.

Single-stage centrifugal pumps

From closed to open impellers

Nominal diameter (DN)	**65 to 600**
Flow rate	**up to 6,000 m³/h**
Head	**up to 160 m**
Pressure	**up to 25 bar**
Temperature	**up to 200° C**

Design: Single-stage centrifugal pumps
Media: Depending on the impeller design: water, slightly contaminated, and contaminated media with some solids content; consistencies up to 8%
Special benefits: Easy to maintain; the modular system is easy to access, uses tested components and reduces the number of spare parts to be kept on stock; efficiency up to 90%; can be delivered with a degassing unit if the medium has a high gas content (ARE version)
Materials: Cast iron; stainless steel; highly wear-resistant, hardened stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Closed, semi-open, or open impeller, also available in highly wear-resistant design
Applications: Sugar, water, pulp and paper, mining, thermal power, other industries, small hydropower

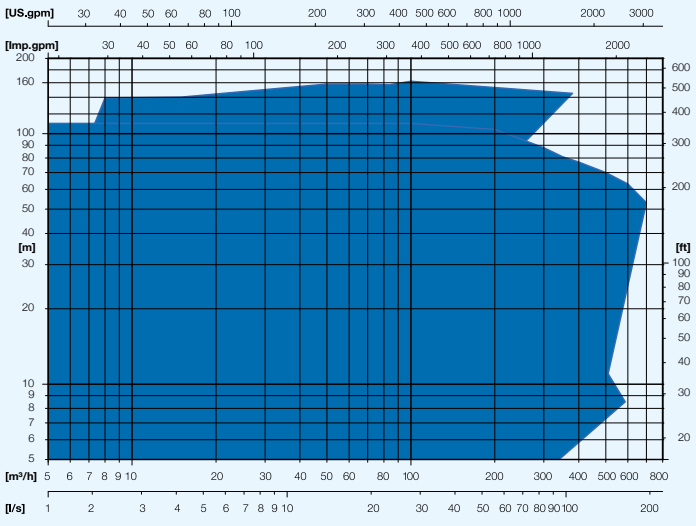


Single-stage centrifugal pumps

EN 733, ISO 2858/5193

Nominal diameter (DN)	**32 to 150**
Flow rate	**up to 600 m³/h**
Head	**up to 160 m**
Pressure	**up up to 16 bar**
Temperature	**up to 140° C**

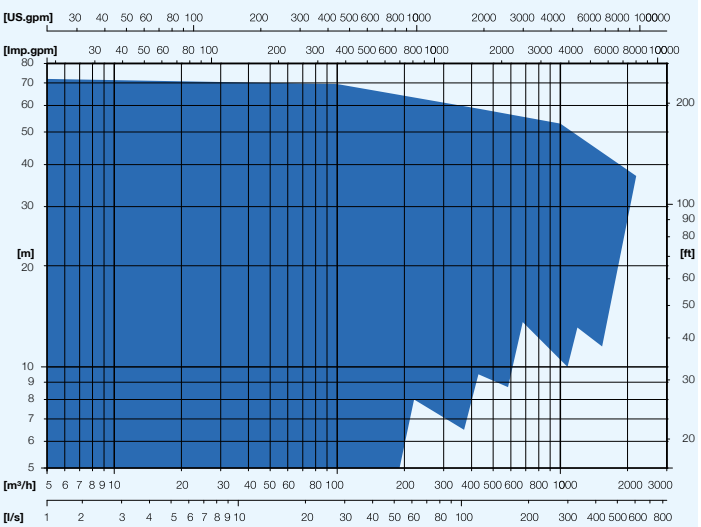
Design: Single-stage centrifugal pumps – main dimensions and performance grid also available according to EN 733, ISO 2858 and 5193
Media: Clean, slightly contaminated, and aggressive liquids up to a viscosity of 150 mm²/s without abrasive and solids content
Special benefits: Easy to maintain due to its modular design; impeller unit can be removed from the installed pump casing; low energy consumption
Materials: Cast iron, bronze, stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Closed impeller, radial impeller, vortex impeller, and two-channel impeller available in some cases
Applications: Sugar, water, pulp and paper, thermal power, other industries, small hydropower



Self-priming centrifugal pumps

Nominal diameter (DN)	**80 to 250**
Flow rate	**up to 2,000 m³/h**
Head	**up to 75 m**
Pressure	**up to 16 bar**
Temperature	**up to 80° C**

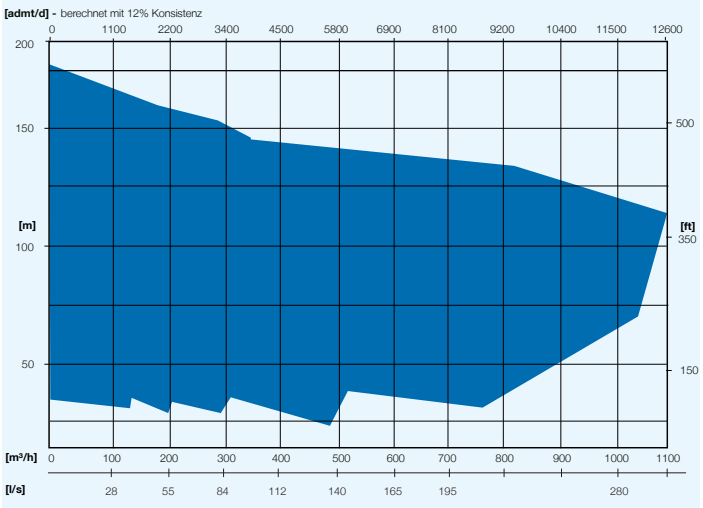
Design: Single-stage, single-flow centrifugal pumps with integrated water ring vacuum pump
Media: Water, viscous media (e.g. sugar concentration of up to 70%), and media containing solids (e.g. for pulp, paper, or waste water applications)
Special benefits: Self-priming; the integrated vacuum pump prevents air gathering in front of the impeller and the centrifugal pump can therefore operate well even in the presence of high gas content; high-viscosity media can also be pumped
Materials: Cast iron, stainless steel
Shaft seal: Mechanical seal
Impeller design: Semi-open impeller
Applications: Sugar, water and waste water, pulp and paper, other industries



Medium-consistency pumps

Nominal diameter (DN)	**80 to 400**
Flow rate	**up to 13,000 admt/d**
Head	**up to 190 m**
Pressure	**up to 25 bar**
Temperature	**up to 140° C**
Consistencies	**up to 16% b.d.**

Design: Single-flow, single-stage, medium-consistency pump with fluidizer
Media: All types of viscous media and fibrous suspensions up to a consistency of 16% b.d.
Special benefits: No need to monitor the pressure in the degassing line thanks to the newly developed SMARTSEP degassing system
Materials: Cast iron, stainless steel, acid-resistant individual components if needed
Shaft seal: Mechanical seal
Impeller design: Semi-open impeller
Applications: Sugar, pulp and paper



Thermal power

Are you planning or do you operate a thermal power plant? ANDRITZ offers energy utility pumps worldwide. We develop and produce:

- **Cooling water pumps** such as vertical line shaft and vertical volute pumps for thermal power plants.
- **Standard centrifugal pumps** such as double-flow split case pumps for district heating facilities.

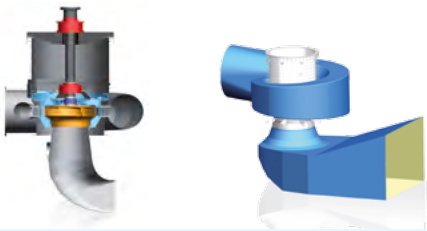
Experience and know-how in hydraulic machinery and pump engineering guarantee the high standard of ANDRITZ pumps, providing consistent high quality and the effective use of energy. Our in-house laboratory for fluid dynamics, ASTRÖ, develops pumps according to customer requirements with very high efficiency, thus significantly lower energy costs, and excellent cavitation properties. In addition, many years of experience in turbine design and manufacturing enable ANDRITZ to make optimum use of the advantages of hydraulic impeller blade adjustment for cooling water pumps.

Vertical line shaft pumps

Flow rate	**up to 70,000 m³/h**
Head	**up to 80 m**
Power	**up to 10,000 kW**

Design: Pull-out or non pull-out
Special benefits: Option with hydraulically adjustable impeller blades: The hydraulic impeller blade adjustment mechanism allows the impeller angle to be varied continuously during operation. Thus, the operator can react promptly to changes in flow rate and head.
Materials: Cast iron, non-alloy and low-alloy steels, duplex and super duplex
Shaft seal: Gland packing, mechanical seal
Impeller design: Radial, axial, and semi-axial impeller, optionally angle adjustable impeller blades or hydraulically adjustable impeller blades
Applications: Thermal power, water, other industries

Vertical volute pumps



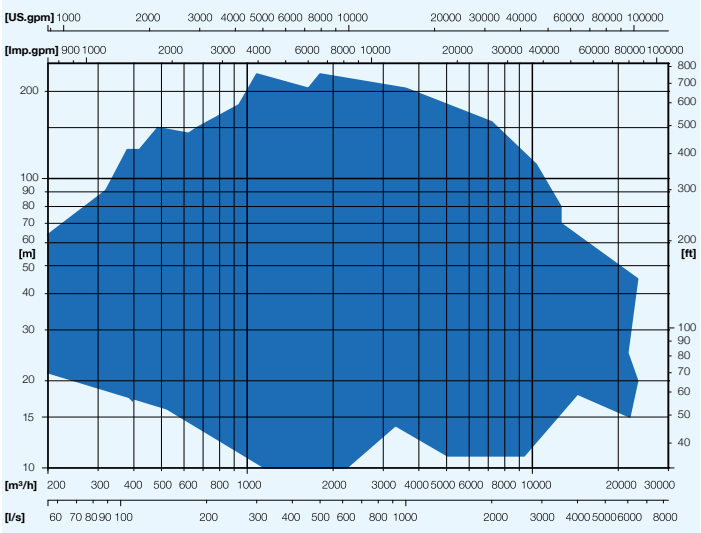
Flow rate	**up to 180,000 m³/h**
Head	**up to 40 m (concrete volute)**
	up to 250 m (metal volute)
Power	**up to 30,000 kW (concrete volute)**
	up to 50,000 kW (metal volute)

Design: Metal or concrete volute with or without guide vane mechanism
Special benefits: The hydraulic dimensioning and design of the volute casing depends on the specific output characteristics. Optimum flow is achieved in the volute thanks to its individual shaping, thus also achieving a high level of efficiency.
Materials: Cast iron, non-alloy and low-alloy steels, duplex and super duplex
Impeller design: Radial, semi-axial
Applications: Thermal power, water, other industries

Double-flow axial split case pumps

Nominal diameter (DN)	**150 to 1200**
Flow rate	**up to 20,000 m³/h**
	customized up to 36,000 m³/h
Head	**up to 220 m**
Pressure	**up to 25 bar**
Temperature	**up to 110° C**

Design: Single-stage, double-flow axial split case pumps
Media: Pure, slightly contaminated, and aggressive liquids up to a viscosity of 150 mm²/s without abrasive and solids content; consistency up to 2%
Special benefits: In-line casing design; horizontal or vertical installation; with horizontal installation, the motor can be placed on the left or right; efficiency over 90%; low pulsation
Materials: Cast iron, stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Double-flow radial impeller with optimum suction behavior and very good NPSH values
Applications: Thermal power, water, pulp and paper, other industries, small hydropower

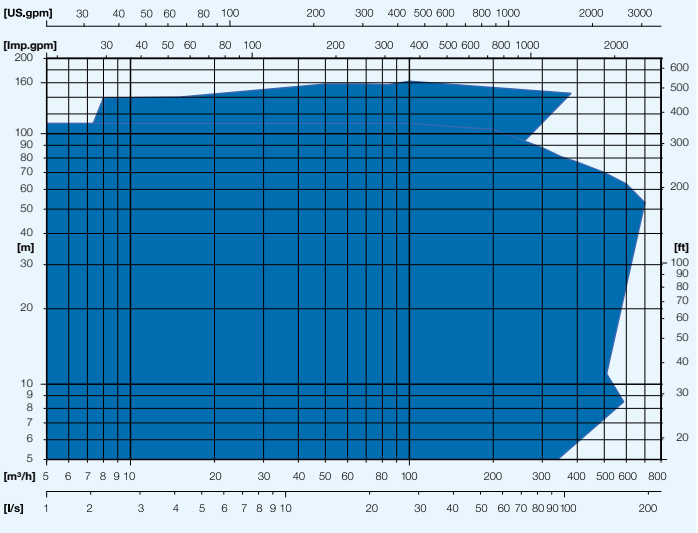


Single-stage centrifugal pumps

EN 733, ISO 2858/5193

Nominal diameter (DN)	**32 to 150**
Flow rate	**up to 600 m³/h**
Head	**up to 160 m**
Pressure	**up to 16 bar**
Temperature	**up to 140° C**

Design: Single-stage centrifugal pumps – main dimensions and performance grid also available according to EN 733, as well as ISO 2858 and 5193
Media: Clean, slightly contaminated, and aggressive liquids up to a viscosity of 150 mm²/s without abrasive and solids content
Special benefits: Easy to maintain due to its modular design; impeller unit can be removed from the installed pump casing; low energy consumption
Materials: Cast iron, bronze, stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Closed impeller, radial impeller, vortex impeller, and two-channel impeller available in some cases
Applications: Thermal power, water, pulp and paper, sugar, other industries, small hydropower

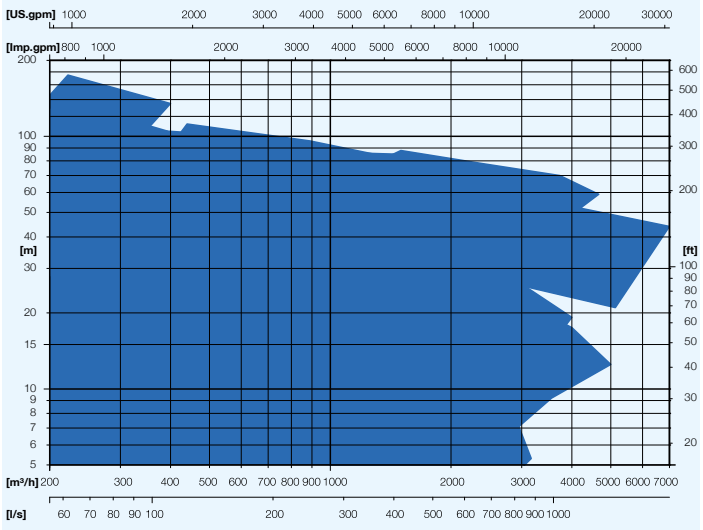


Single-stage centrifugal pumps

From closed to open impellers

Nominal diameter (DN)	**65 to 600**
Flow rate	**up to 6,000 m³/h**
Head	**up to 160 m**
Pressure	**up to 25 bar**
Temperature	**up to 200° C**

Design: Single-stage centrifugal pumps
Media: Depending on the impeller design: water, slightly contaminated, and contaminated media with solids content; consistencies up to 8%
Special benefits: Easy to maintain; the modular system is easy to access, uses tested components and reduces the number of spare parts to be kept on stock; efficiency up to 90%; can be delivered with a degassing unit if the medium has a high gas content (ARE version)
Materials: Cast iron; stainless steel; highly wear-resistant, hardened stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Closed, semi-open, or open impeller, also available in highly wear-resistant design
Applications: Thermal power, water, pulp and paper, mining, sugar, other industries, small hydropower

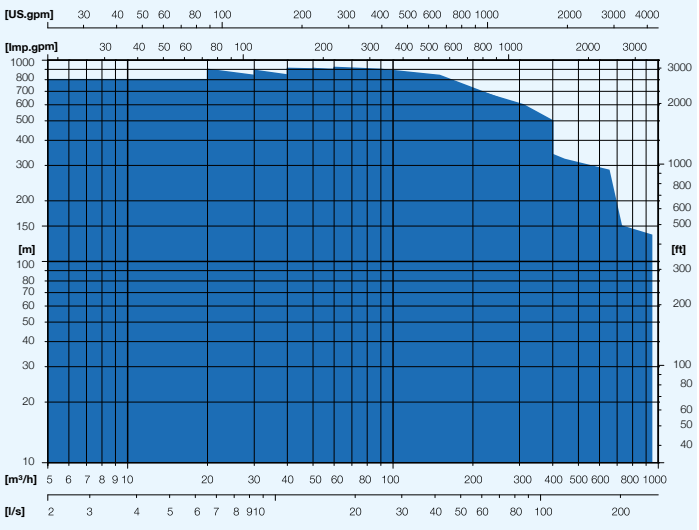


High-pressure pumps

Multi-stage centrifugal pumps

Nominal diameter (DN)	**25 to 250**
Flow rate	**up to 800 m³/h**
Head	**up to 800 m**
Pressure	**up to 100 bar**
Temperature	**up to 160° C**

Design: Multi-stage high-pressure pumps, vertical and horizontal design
Media: Clean and slightly contaminated liquids up to a viscosity of 150 mm²/s without abrasive and solids content
Materials: Cast iron, bronze, aluminum-bronze, stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Radial impeller
Applications: Thermal power, water, pulp and paper, other industries, small hydropower



Other industries

None of the previous sectors apply to you? Here you can find further examples of where ANDRITZ pumps are used in many different industries and applications.

- **Offshore**
  We have been working in the offshore industry for many years, primarily in seawater pumping applications. ANDRITZ pumps and motors can be found on platforms and on board ships. In the sub-sea sector, we offer customer-specific solutions for special submersible motors.
- **Seawater desalination**
  Readily available seawater can be used in order to cover the need for clean drinking water in dry regions and in metropolitan areas. ANDRITZ provides system components that respond to the challenges in successful desalination systems.
- **Bioethanol**
  ANDRITZ offers pumps for second-generation bioethanol plants.
- **Starches and the food industry**
  Our product portfolio extends beyond sugar and starches to cover proteins, dairy products, and drinks.
- **Various industrial applications**
  In addition, ANDRITZ industrial pumps are used nearly everywhere where secondary circuits are used for pumping coolants or auxiliary and operating liquids, or in demanding washing and cleaning processes in the raw materials sector. ANDRITZ pumps work in extreme temperatures and under high pressure, in aggressive, corrosive or solids-containing media (e.g. in the steel or chemical industries), and they transport coolants and lubricants as well as acids, liquors, and oils.

Single-stage centrifugal pumps

EN 733, ISO 2858/5193

Nominal diameter (DN)	**32 to 150**
Flow rate	**up to 600 m³/h**
Head	**up to 160 m**
Pressure	**up to 16 bar**
Temperature	**up to 140° C**

Design: Single-stage centrifugal pumps – main dimensions and performance grid also available according to EN 733, ISO 2858 and 5193

Media: Clean, slightly contaminated, and aggressive liquids up to a viscosity of 150 mm²/s without abrasive and solids content

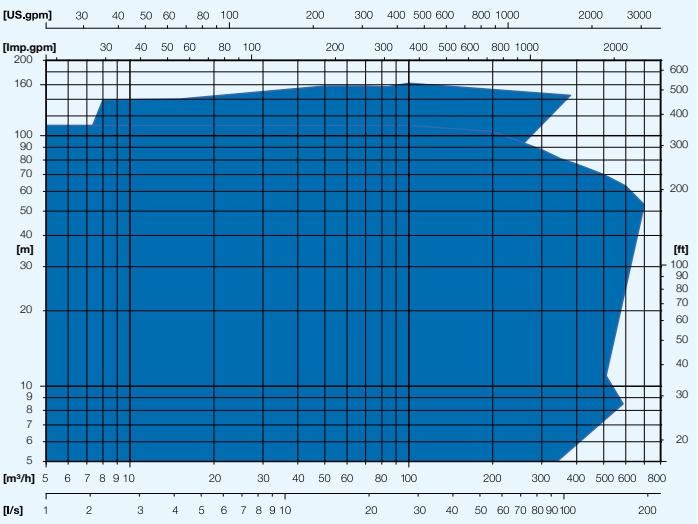
Special benefits: Easy to maintain due to its modular design; the impeller unit can be removed from the installed pump casing; low energy consumption

Materials: Cast iron, bronze, stainless steel

Shaft seal: Gland packing, mechanical seal

Impeller design: Closed impeller, radial impeller, vortex impeller, and two-channel impeller available in some cases

Applications: Other industries, water, pulp and paper, sugar, thermal power, small hydropower

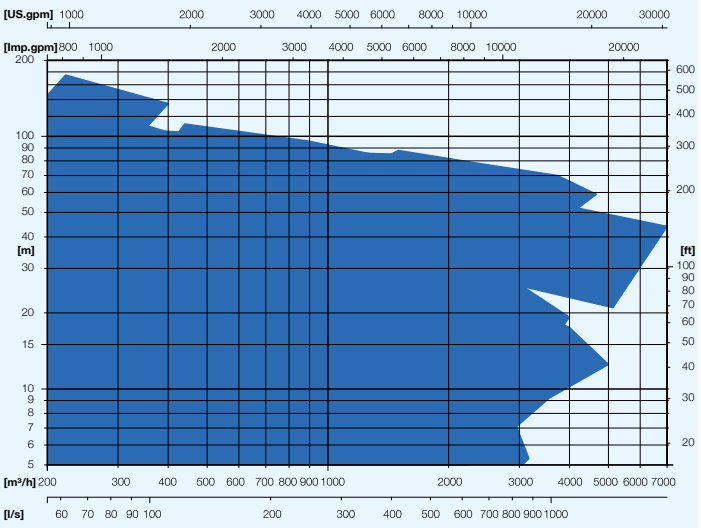


Single-stage centrifugal pumps

From closed to open impellers

Nominal diameter (DN)	**65 to 600**
Flow rate	**up to 6,000 m³/h**
Head	**up to 160 m**
Pressure	**up up to 25 bar**
Temperature	**up to 200° C**

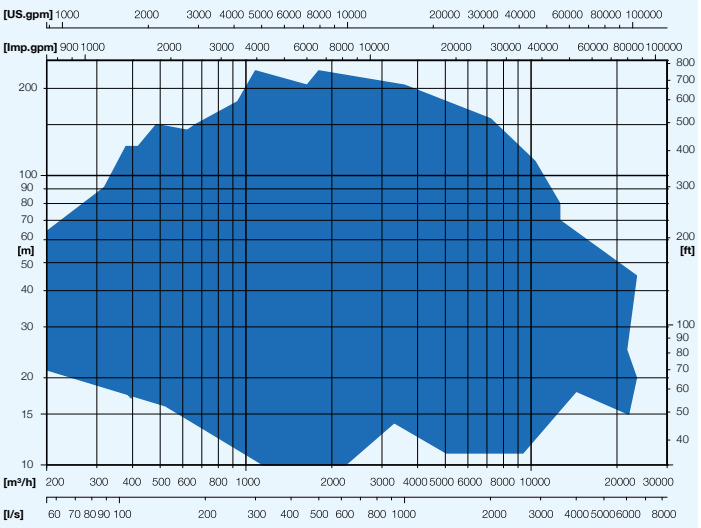
Design: Single-stage centrifugal pumps
Media: Depending on the impeller design: water, slightly contaminated, and contaminated media with solids content; consistencies up to 8%
Special benefits: Easy to maintain; the modular system is easy to access, uses tested components and reduces the number of spare parts to be kept on stock; efficiency up to 90%; can be delivered with a degassing unit if the medium has a high gas content (ARE version)
Materials: Cast iron; stainless steel; highly wear-resistant, hardened stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Closed, semi-open, or open impeller, also available in highly wear-resistant design
Applications: Other industries, water, pulp and paper, mining, sugar, thermal power, small hydropower



Double-flow axial split case pumps

Nominal diameter (DN)	**150 to 1200**
Flow rate	**up to 20,000 m³/h**
	customized up to 36,000 m³/h
Head	**up to 220 m**
Pressure	**up to 25 bar**
Temperature	**up to 110° C**

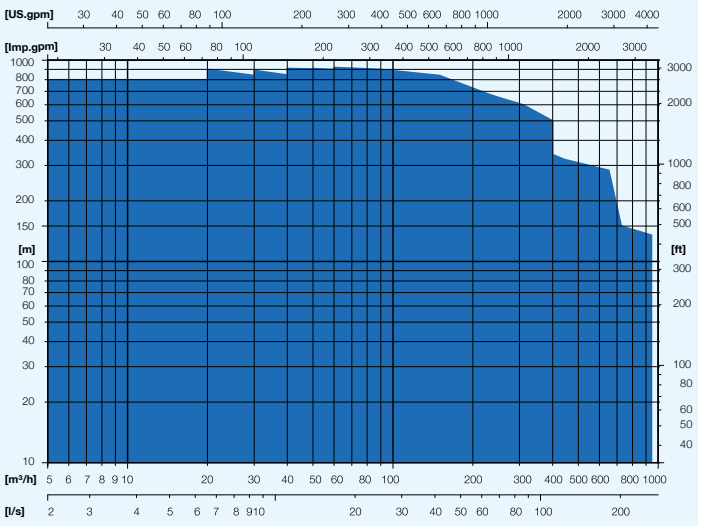
Design: Single-stage, double-flow axial split case pumps
Media: Pure, slightly contaminated, and aggressive liquids up to a viscosity of 150 mm²/s without abrasive and solids content; consistency up to 2%
Special benefits: Inline casing design; horizontal or vertical installation; with horizontal installation, the motor can be placed on the left or right; efficiency over 90%; low pulsation
Materials: Cast iron, stainless steel
Shaft seals: Gland packing, mechanical seal
Impeller design: Double-flow radial impeller with optimum suction behavior and very good NPSH values
Applications: Other industries, water, pulp and paper, thermal power, small hydropower



High-pressure pumps
Multi-stage centrifugal pumps

Nominal diameter (DN)	**25 to 250**
Flow rate	**up to 800 m³/h**
Head	**up to 800 m**
Pressure	**up to 100 bar**
Temperature	**up to 160° C**

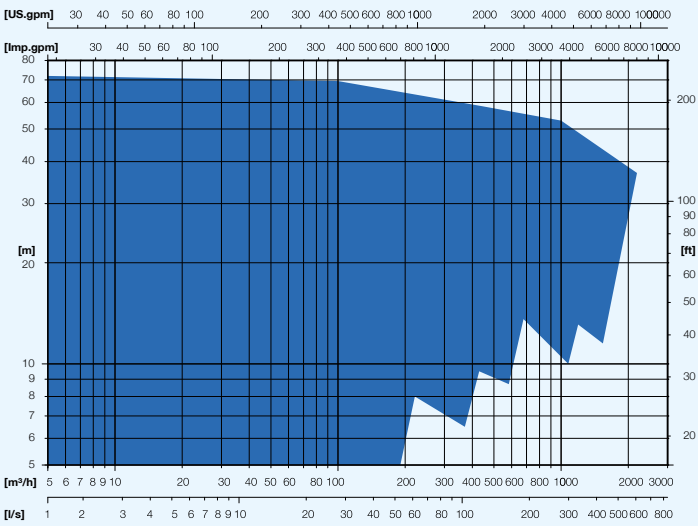
Design: Multi-stage high-pressure pumps, horizontal and vertical design
Media: Clean and slightly contaminated liquids up to a viscosity of 150 mm²/s without abrasive and solids content
Materials: Cast iron, bronze, aluminum-bronze, stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Radial impeller
Applications: Other industries, water, pulp and paper, thermal power, small hydropower



Self-priming centrifugal pumps

Nominal diameter (DN)	**80 to 250**
Flow rate	**up to 2,000 m³/h**
Head	**up to 75 m**
Pressure	**up to 16 bar**
Temperature	**up to 80° C**

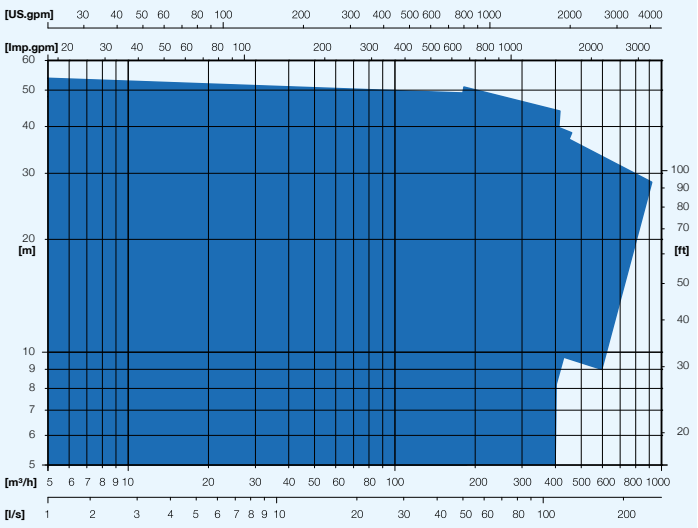
Design: Single-stage, single-flow centrifugal pumps with integrated water ring vacuum pump
Media: Water, viscous media (e.g. sugar concentration of up to 70%), and media containing solids (e.g. for pulp, paper or waste water applications)
Special benefits: Self-priming; the integrated vacuum pump prevents air from gathering in front of the impeller and the centrifugal pump can therefore operate well even in the presence of high gas content; high-viscosity media can also be pumped
Materials: Cast iron, stainless steel
Shaft seal: Mechanical seal
Impeller design: Semi-open impeller
Applications: Other industries, water and waste water, pulp and paper, sugar



Vertical submerged pumps

Nominal diameter (DN)	**80 to 200**
Flow rate	**up to 800 m³/h**
Head	**up to 50 m**
Pressure	**up to 16 bar**
Temperature	**up to 60° C**

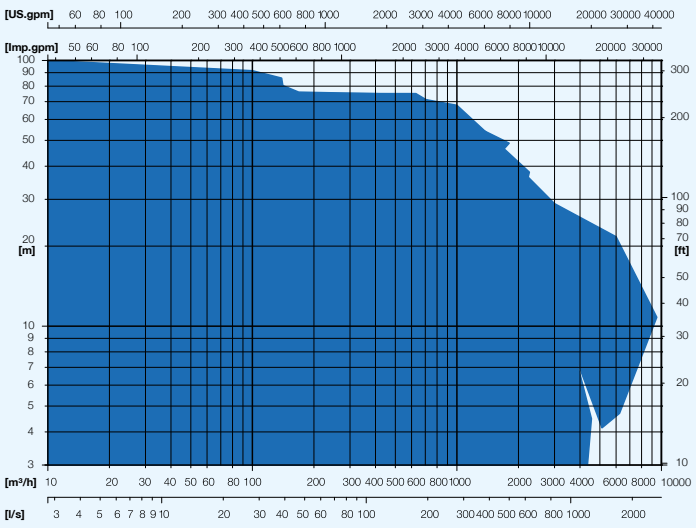
Design: Single-stage, single-flow submerged pumps
Media: Water, waste water, high-viscosity media, and media containing solids; consistencies up to 6%; slurries containing large particles (up to 140 mm); abrasive media
Special benefits: Modular base frame design; generously sized shaft; standard construction length of 1 to 2 m; flexible coupling – also developed for the transport of coarse media
Materials: Cast iron, stainless steel
Impeller design: Open or vortex impeller
Applications: Other industries, water and waste water, pulp and paper



Sewage pumps, dry

Nominal diameter (DN)	**65 to 700**
Flow rate	**up to 10,000 m³/h**
Head	**up to 100 m**
Pressure	**up to 16 bar**
Temperature	**up to 140° C**

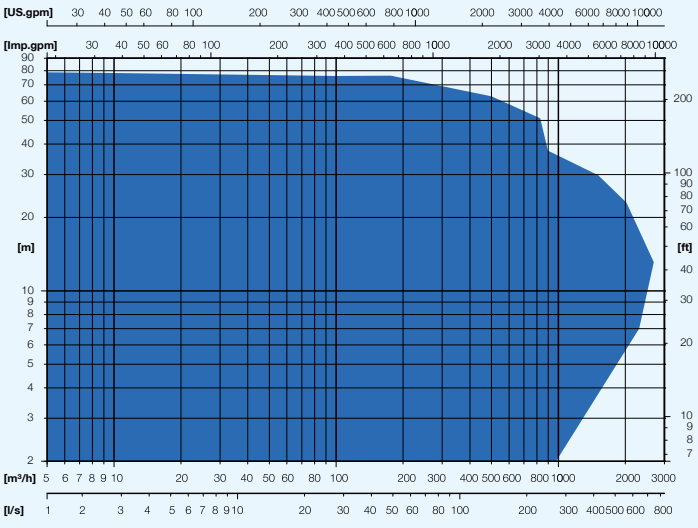
Design: Single-stage waste water pumps
Media: Low-viscosity, high-viscosity, and abrasive media, as well as gaseous and non-gaseous slurries
Special benefits: Easy to maintain due to its modular design; impeller unit can be removed from the installed pump casing
Materials: Cast iron, stainless steel
Shaft seal: Gland packing, mechanical seal
Impeller design: Single-channel, double-channel, vortex, multi-channel, open mixed-flow impeller
Applications: Other industries, waste water



Sewage pumps, wet

Nominal diameter (DN)	**65 to 400**
Flow rate	**up to 2,600 m³/h**
Head	**up to 80 m**
Pressure	**up up to 10 bar**
Temperature	**up to 40° C**

Design: Single-stage submersible pumps in close-coupled design
Media: Sewage and waste water as well as sludges with solids content (10% dry substance max.)
Special benefits: Explosion-proof designs can be supplied; available with a float switch
Materials: Cast iron, stainless steel
Shaft seal: Mechanical seal
Impeller design: Single-channel, double-channel, vortex impeller
Applications: Other industries, waste water



Screw pumps

Screw Ø	**up to 5 m**
Flow rate	**up to 6 m³/s**
Head	**up to 12 m**
Angle of inclination	**30° to 40°**
Efficiency	**up to 86%**

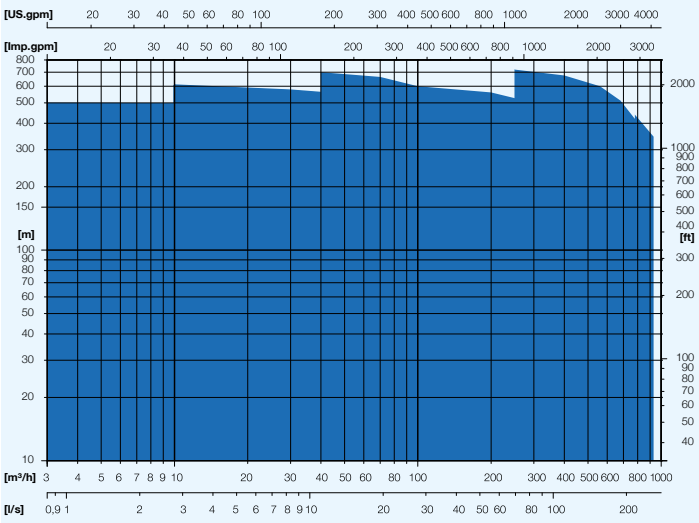
Design: Sheet steel, concrete or cast basalt trough, compact system
Media: Water and waste water, transport of solids in liquids without the danger of blockage
Special benefits: Very long service life and low wear due to low speeds, high-quality materials, and mature technology; automatic adjustment to the inflow volume at constant speed
Materials: Cast iron, stainless steel
Applications: Other industries, water and waste water

Single-flow submersible motor pumps

MS-T – Modular Shaft Technology

Well Ø	**from 6" upwards**
Flow rate	**up to 900 m³/h**
Head	**up to 800 m**
Pressure	**up to 100 bar**
Temperature	**up to 75° C**

Design: Multi-stage, single-flow submersible motor pumps
Media: Clean, slightly contaminated, and abrasive raw, clean, mineral, sea, industrial, mine, and cooling water
Special benefits: Maintenance-free; long service life and high operating reliability; can be supplied optionally with modular shaft technology for flexible extension and reduction of the number of stages
Materials: Cast iron, aluminum-bronze, stainless steel
Impeller design: Radial, semi-axial impeller
Applications: Other industries, water, mining



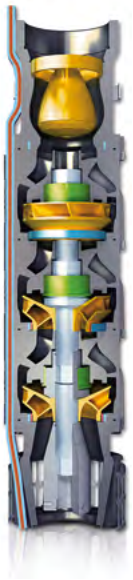
The challenge

The cost of an application is becoming increasingly important in making investment decisions. This raises the question of whether the continuous shaft concept is still up to date. Installing and removing a pump with a continuous shaft requires numerous individual steps. The logistics and storage of many different individual parts is associated with high costs. Adjustments to changing heads are generally only possible through cost-intensive exchanging of pumps.

MS-T – The solution

MS-T is not only a technological evolution, from the cost perspective it is a revolution.

MS-T is designed using a modular concept – with all of its technical and economic advantages:



- Flexible adjustment to changing pumping conditions – easy and fast by extending or reducing the number of stages.
- Simple, time-saving, and targeted installation and removal of individual stages, either horizontal or vertical.
- A small number of highly standardized components ensure high availability and short delivery times, as well as low storage costs for the operator.

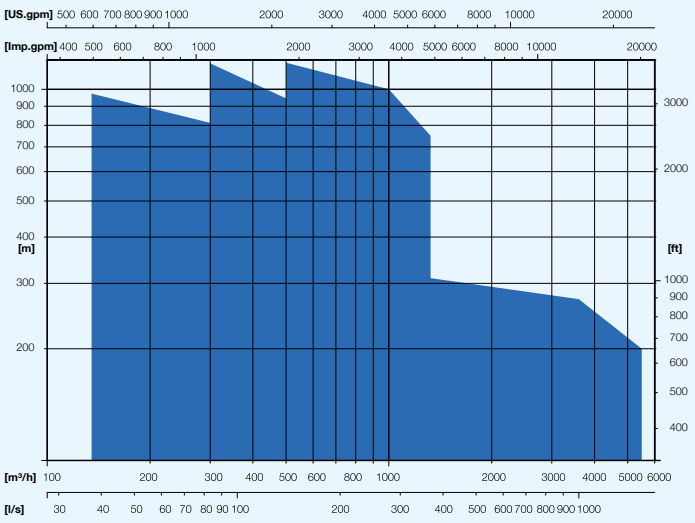
Thus, pumps with MS-T are the best solution wherever there is a need for operating reliability, freedom from maintenance, long service life, high efficiency, and flexible heads.

Double-suction submersible motor pumps

HDM – Heavy Duty Mining

Well Ø	**from 20" upwards**
Flow rate	**up to 6,000 m³/h**
Head	**up to 1,500 m**
Pressure	**up to 150 bar**
Temperature	**up to 75° C**

Design: Multi-stage, double-flow submersible motor pumps
Media: Clean, slightly contaminated, and abrasive raw, clean, mineral, sea, industrial, mine, and cooling water
Special benefits: No axial thrust, double-flow design for long service life and high reliability; maintenance-free
Materials: Cast iron, bronze, aluminum-bronze, stainless steel
Impeller design: Radial impeller
Applications: Other industries, water, mining



The challenge

The use of submersible motor pumps for large volumes or in great depths is associated with high stresses on the equipment. The higher the pump performance, the greater the axial thrust on the pump, motor, and its thrust bearing. The consequence: overloading and an increased risk of failure.

HDM – The solution

Two pumps are arranged one above the other, running in counter direction and driven by a continuous pump shaft. Splitting the workload between both pumps ensures complete axial thrust balancing and thus contributes towards solving the problems of force effects on the unit and loads on the thrust bearings; at the same time, the flow and suction speed outside the pump is halved. Thus, well walls are protected around the suction areas, and the intake of abrasive particles is minimized.

The result

In addition to technical benefits – HDM offers complete balancing of the axial thrust, flow speeds halved, and smaller impeller cross-sections – there are also economic benefits: maximum operating reliability, minimal wear, and long service life, which can often be more than 20 years. In combination with ANDRITZ high-performance submersible motors, the result is a complete technical solution.

Custom solutions

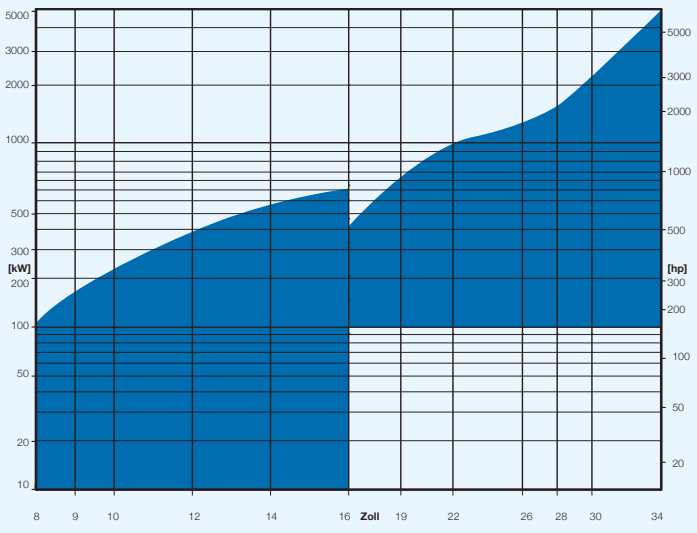
Each ANDRITZ submersible pump with HDM technology is customized. It is individually configured to meet your requirements.

Submersible motors

MC-T – Modular Cooling Technology

Well Ø	**from 8" upwards**
Power	**up to 5,000 kW**
Voltage	**up to 14,000 V**
Temperature	**up to 75° C**

Design: Water-filled and water-cooled three phase asynchronous motors with squirrel-cage rotors
Special benefit: Rewindable winding
Materials: Cast iron, bronze, stainless steel
Shaft seal: Mechanical seal
Installation: Vertical, horizontal in some cases
Applications: Other industries, water, mining



The challenge

Efficient and cost-effective cooling of submersible motors is a constant source of discussion by well and mine operators. De-rating is a less-than-ideal solution. In addition to high capital and energy costs, the overlarge, downgraded motors usually require a larger well diameter. Oil cooling needs careful consideration as well – any failure can cause ecological damage.

MC-T – The solution

MC-T, an intelligent and compact cooling system, is the best solution here. A pump impeller brings movement into the cooling circuit and thus provides flow in the right direction. Our own-development cooling channels ensure heat absorption at all thermal sources and heat evacuation, as well as providing optimal heat conduction through the outside of the motor to the flow medium. The additional use of heat exchanger modules allows precise dimensioning of the cooling capacity.

Technical details and economic benefits

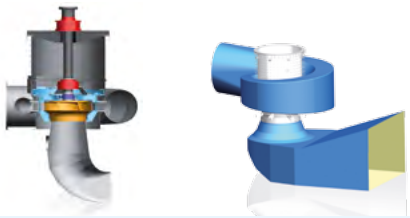
- Media temperature up to 75° C
- High efficiency across the entire performance range
- Uses drinking water as the coolant
- Low investment required
- Reduced energy costs
- Maximum reliability
- Long service life

Vertical line shaft pumps

Flow rate **up to 70,000 m³/h**
Head **up to 80 m**
Power **up to 10,000 kW**

Design: Pull-out or non pull-out
Special benefits: Option with hydraulically adjustable impeller blades: The hydraulic impeller blade adjustment mechanism allows the impeller angle to be varied continuously during operation. Thus, the operator can react promptly to changes in flow rate and head.
Materials: Cast iron, non-alloy and low-alloy steels, duplex and super duplex
Shaft seal: Gland packing, mechanical seal
Impeller design: Radial, axial, and semi-axial impeller, optionally adjustable angle impeller blades or hydraulically adjustable impeller blades
Applications: Thermal power, water, other industries

Vertical volute pumps



Flow rate **up to 180,000 m³/h**
Head **up to 40 m (concrete volute)**
up to 250 m (metal volute)
Power **up to 30,000 kW (concrete volute)**
up to 50,000 kW (metal volute)

Design: Metal or concrete volute with or without guide vane mechanism
Special benefits: The hydraulic dimensioning and design of the volute casing depends on the specific output characteristics. Optimum flow is achieved in the volute thanks to its individual shaping, thus also achieving a high level of efficiency.
Materials: Cast iron, non-alloy and low-alloy steels, duplex and super duplex
Impeller design: Radial, semi-axial
Applications: Water, thermal power stations, other industries

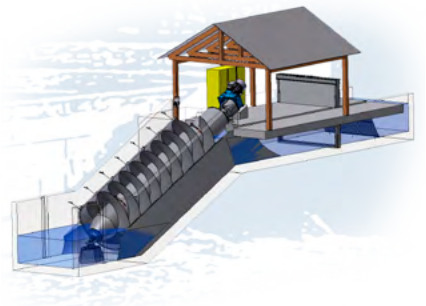
Small hydropower

Are you looking for energy-saving solutions – or for solutions that produce energy? Small hydropower plants, and thus independent power generation, are suitable for the private as well as the municipal sectors, and for industry and commercial facilities.

- Our robust **hydrodynamic screw turbine** is known for its high efficiency and produces up to 500 kW of electricity. Even low heads (up to 10 m) and flow rates (up to 10 m³/s) can be used efficiently with ratings of up to 92%. Every kilowatt-hour regenerated in this way saves the environment about 1 kg of CO_2. Aquatic animals – such as fish –and suspended particles pass through the hydrodynamic screw turbine unharmed.
- **Standard pumps** from ANDRITZ used as turbines are designed for island operation as well as to feed existing networks.
- Save energy with **pumps** from ANDRITZ **used as turbines**: Ecological and economic success was achieved by a paper plant in Germany with a reverse-running standard pump. This pump – an ANDRITZ turbine pump operating in the waste water microflotation plant – takes the existing overpressure after the waste water tank and transfers the additional energy back to the booster pump motor.

Hydroelectric energy has many benefits: It can always be generated, is easily stored, and guarantees a base load. It is also a clean and emission-free means of generating electricity.

Hydrodynamic screw turbines



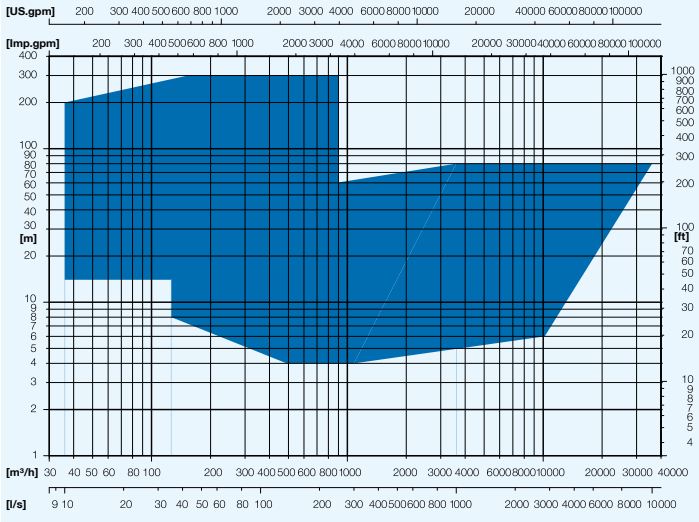
Water flow	**up to 10 m³/s**
Head	**up to 10 m**
Power	**up to 500 kW**
Efficiency	**up to 92%**

Design: Concrete trough, concrete-cast steel trough, self-supporting steel trough, or compact system
Characteristics: High efficiency even with varying water levels and low water volumes; gentle transport of fish and floating particles; improvement of water quality in deeper waters due to oxygen enrichment
Special benefits: Efficient use even with low hydropower potential as from 1 kW, low investment costs and fast amortization, self-controlling system with automatic adjustment to water volume and network frequency; operation with coarse screen only (no fine screen needed)
Applications: As a replacement for water wheels; as a residual water screw turbine in an existing spillway or in a weir system; as replacement for smaller, older turbine equipment; in former irrigation weirs; at the clean water outflow of a sewage plant or the cooling water outflow of thermal power plants

Pumps as turbines

Nominal diameter (DN)	**32 to 1200**
Water flow	**up to 6 m³/s**
Head	**up to 300 m**
Power	**up to 2 MW**

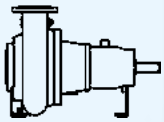
Design: Single-stage or multi-stage; single or double-flow; open and semi-open impeller
Media: Drinking water, residual water and waste water, stock suspensions in the pulp and paper industries
Special benefits: Low investment and fast amortization, short delivery times
Materials: Cast iron, bronze, stainless steel
Shaft seal: Gland packing, mechanical seal
Applications: Energy production and recovery: island facilities (e.g. for mountain refuges), drinking water turbines, waste water turbines, residual water turbines, small power plants connected to the electricity grid, pump turbines for storage in small applications



Installation

Bare shaft pumps

Installation:
dry, horizontal

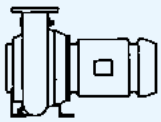


Pumps with flexibly coupled motor

Installation:
dry, horizontal or vertical

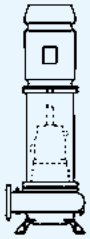
Pumps with directly coupled motor (close-coupled design)

Installation:
dry, horizontal or vertical



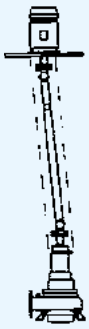
Pumps with flexibly coupled motor

Installation:
dry, vertical



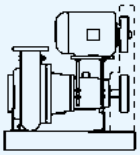
Pumps with cardan shaft drive

Installation:
dry, vertical



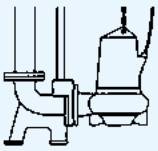
Pumps with V-belt drives

Installation:
dry, horizontal

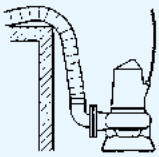


Pumps with a directly coupled submersible motor

Installation:
wet, vertical

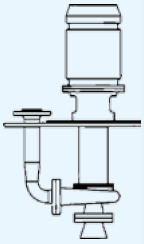


Installation:
wet, vertical, mobile



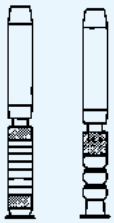
Pumps with drive via extended shaft or supporting tube system, with an optional pressure line

Installation:
wet or dry, vertical



Pumps with directly coupled submersible motor, optionally with cooling or pipe shroud casing

Installation:
wet, vertical, partially horizontal



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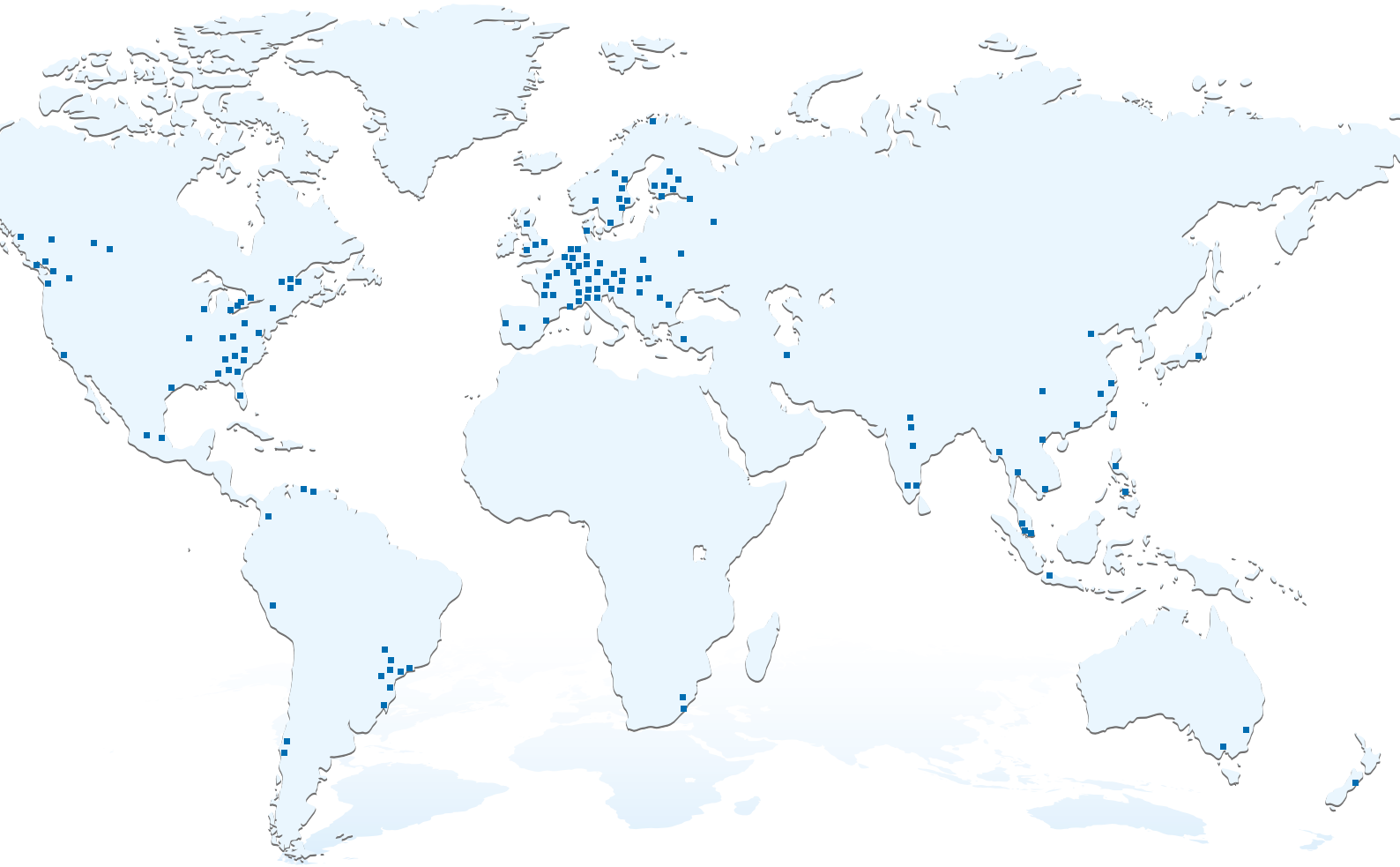
ANDRITZ locations worldwide



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