



INNOVATIVE SOLUTION FOR HIGHLY CORROSIVE APPLICATIONS

COREST[™] vacuum drum filter

ANDRITZ

Advanced design for high reliability

Vacuum drum filters are the state-of-the-art technology for highly corrosive applications such as producing titanium dioxide (TiO_2) in sulfuric acid (H_2SO_4) processes or in processes where slurries with a high content of hydrochloric acid (HCl) are used. The CORES™ vacuum drum filter from ANDRITZ provides a very reliable, long-life solution with an innovative design that offers maximum corrosion resistance.

CHALLENGING REQUIREMENTS

Conventional vacuum drum filters are made of carbon steel covered with a rubber lining to protect the structural design of the machine against corrosive attack. The disadvantage of this rubber lining is a partial embrittlement with a tendency to form cracks in a relatively short time and massive corrosion of structural elements, resulting in high maintenance costs with unscheduled breaks in production.

In the past, glass fiber filters have also proven to be unsuitable for long-term operation because of structural weaknesses in this material caused by chemical attacks along the glass fibers due to capillary effects. PP (polypropylene) filters were also built in the past because of their very high chemical resistance in such processes, but failed ultimately due to their poor mechanical properties.

FIRST CHOICE IN CORROSIVE APPLICATIONS

With the CORES™ vacuum drum filter, ANDRITZ has developed an innovative filter design that effectively incorporates the strengths of each material used. The CORES™ vacuum drum filter is a significant innovation to prevent corrosion. The patented sandwich design provides a permanently chemically resistant surface and can be implemented with different materials to ensure resistance to chemicals. Depending on the size required, the structure itself is made of steel or

CONSTRUCTION MATERIALS

Depending on process requirements, the outer surfaces in contact with the product of the CORES™ vacuum drum filter are made of resistant plastic, such as PP, PE, PVDF or ECTFE. These plastics are embedded into the structural GRP and create a lasting connection of these two materials. The GRP parts are formed layer by layer with resin. This is also used to connect them to the specially shaped steel parts of the design.

PROCESSING PARAMETERS

Average particle size	1–300 µm
Solids throughput	Up to 1,500 kg/m ² /h
Filtration capacity	100–2,000 l/m ² /h
Washing ratio	Up to 1:1 water to dry solids
Process temperature	80 °C for PP

completely of GRP (glass fiber-reinforced plastic). In addition, all parts in contact with the product are covered with a layer of corrosion-resistant, non-reinforced plastic, such as PP, which is commonly used in the chemical industry. Furthermore, some internal wetted parts are made entirely of resistant plastic and are welded together with external surfaces made of plastic to provide a closed surface for corrosive applications.

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MAIN APPLICATIONS

- Titanium dioxide
- Sulfuric acid applications
- Hyper chloride applications
- Processes with potentially unknown acids
- Acid leaching slurries
- Rare earths
- Black mass washing and leaching
- Ore digestion
- Suspensions containing hydrochloric acid

YOUR BENEFITS

- Highest corrosion resistance: No corrosion on parts of the machine coming into contact with the product due to the corrosion-resistant design
- High availability and less downtime
- Significantly reduced maintenance costs
- Continuous and automatic processing



Thanks to its advanced construction, the CORES™ vacuum drum filter offers substantially enhanced corrosion resistance compared to conventional rubber-lined carbon steel filters and standard GRP filter designs without a PP protective layer

OPERATION

The suspension to be filtered is fed continuously to the filter trough. Depending on the application, different systems are available to guarantee homogeneous mixing of the slurry. Either a specially designed pendulum agitator from ANDRITZ is used or use of an agitator can be avoided entirely by performing a successful CFD simulation of slurry mixing in the trough with special inlet geometry to prevent sedimentation of the solids.

The shell of the filter drum is divided into cells and covered by a filter cloth. Approximately 37% of the filtration area is submerged in the suspension, and the drum rotates at up to 4 rpm. The CORES™ vacuum drum filter builds up a vacuum with a liquid seal pump, which is connected to the drum cells via separators, control head, and filtrate pipes. This causes the liquid to filter through the filter cloth. The solids contained in the suspension are deposited in a uniform layer on the filter cloth, thus forming a filter cake.

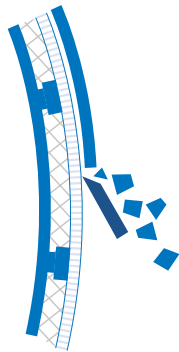
The filtrate is discharged either by pumping or by utilizing the barometric height. The filtered solids layer emerges from the slurry as the drum rotates and is then

washed, dried, and removed from the filter cloth. In the course of one revolution, each point of the drum area passes through these zones in succession.

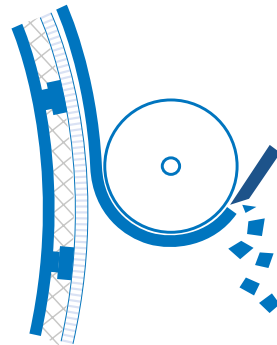
The wash liquid is applied to the cake either directly by washing devices (weirs, spray nozzles) or through a wash belt placed on top of the solids layer. The filtrates from the washing zones can be drained off separately, enabling multi-stage counter-current washing. The filter cake is discharged by means of a discharge device that covers the entire drum width and is specially suited to the cake thickness, consistency, structure, and so on (scraper, roller, pre-coat scraper, string, or belt discharge).

As the drum rotates, it is re-immersed in the suspension. The filter cloth can be cleaned before the next filtration cycle, either with water jets, bubbling, or both. For transport of solids, the drum filters can be fitted with screw or belt conveyors as well as specially designed chutes if the next process step is located close to the filter.

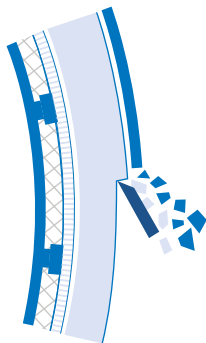
YOUR DISCHARGE OPTIONS



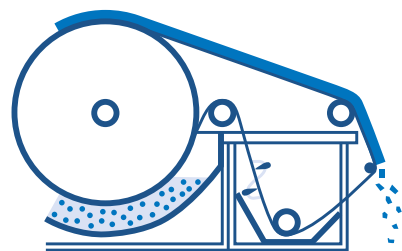
Scraper discharge



Roller discharge



Pre-coat scraper discharge



String/belt discharge

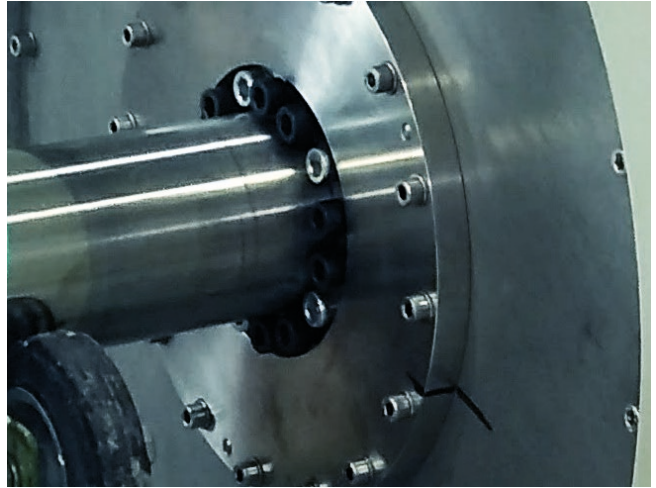
SPECIAL DESIGN

In addition to corrosion, all forces and moments have to be handled. Thus, the structural design, including the shaft, the head walls of the drum, and the framework of the trough, are made of steel, completely of GRP, or of a combination of both in critical areas, depending on the size.

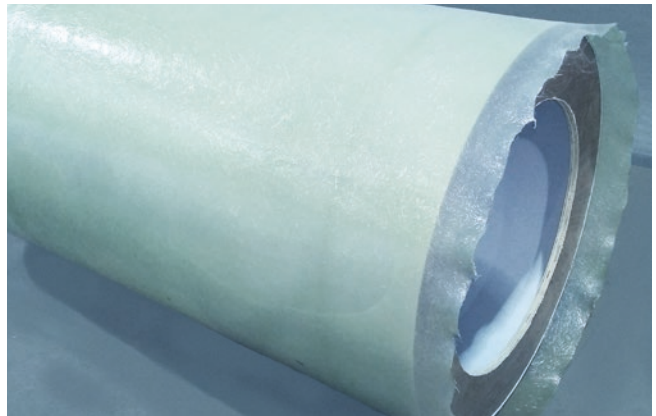
A special design for these parts ensures smooth distribution of moments, torques, and forces, and the shaft design allows body support, which is important for large sizes. Furthermore, the drum body is secured to the shaft with a clamping set, which allows the use of different materials according to the properties required.

All parts are designed according to an FEM calculation carried out for this new development. The support structure of the drum body can be made of GRP only because it is exposed to much fewer forces. The GRP is embedded into resin and laminated onto the steel structure.

Finally, all parts in contact with the product are covered with a layer of non-reinforced plastic, such as PP, for long-term use to ensure chemical resistance. The entire plastic covering is tightly welded, so no single gap or screw remains inside the process area. Used plastics have been applied in the chemical industry for a long time and are well established.



Internal clamping set to secure the drum body to the shaft, non-wetted section



GRP shell during manufacturing



PP covering



Drum made of compound material



PP part

Technical data

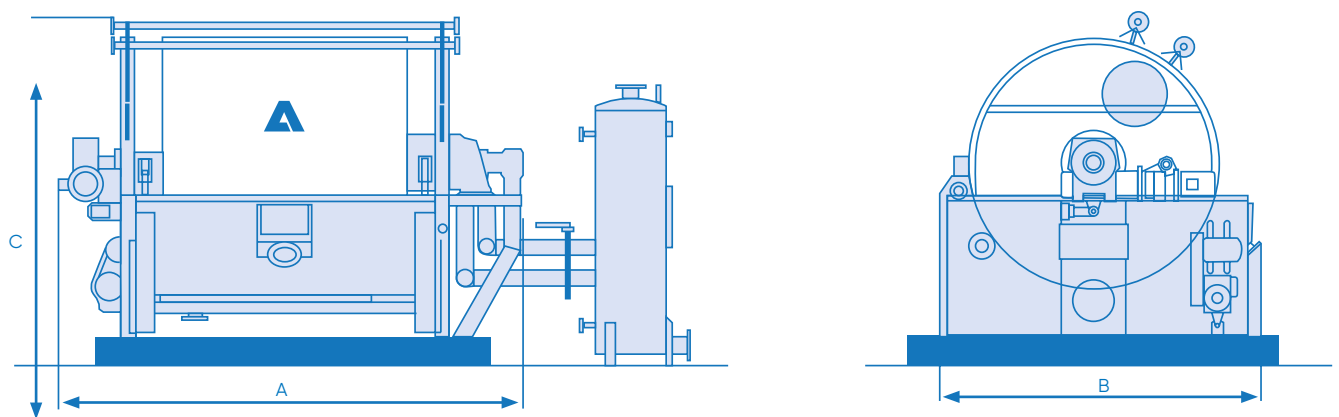
Filter type	Filter area	Drum diameter	Drum width	Number of cells	A	B	C	Weight**	Drive***
	[m ²]	[mm]	[mm]		[mm]	[mm]	[mm]	[t]	[kW]
CORES™* 9.2	0.72-4.30	920	250-1,500	14	2,050-3,300	2,050	1,700	1.4-2.4	1.1
CORES™* 13.1	6.00-12.00	1,310	1,500-3,000	20	3,400-4,700	2,300	2,000	3.4-5.3	1.5
CORES™* 20.9	16.00-30.00	2,090	2,500-4,500	16	4,500-6,500	3,700	2,800	9.5-13.5	2.2

All information is subject to change.

* CORES™ vacuum drum filter

** Operating weight of filter includes filling (approx. data)

*** Power requirements in kW for drum drive and pendulum agitator drive (excl. vacuum and filtrate pump), depending on application



Outline of the CORES™ vacuum drum filter

The right solution for any separation challenge

PEACE OF MIND, COST EFFICIENCY, AND SUSTAINABILITY – ALL FROM ONE TRUSTED PARTNER.

Regardless of your industry – whether environmental, chemicals, mining and minerals, or food and beverage – efficient separation processes are essential for high product quality, reduced waste, and the responsible use of valuable resources. With our advanced technologies, comprehensive services, and smart automation and digitalization solutions, we deliver peace of mind today and lasting success for tomorrow – efficiently, responsibly, and with measurable impact. What's more, with us you also gain access to one of the world's largest OEM manufacturers for solid/liquid separation for well-known brands such as 3Sys Technologies, Bird, Dedert, Delkor Capital Equipment (Pty) Ltd., Escher Wyss dryers, Guinard Centrifugation, KHD Humboldt Wedag, Krauss-Maffei centrifuges, dryers, and filters, LENSER Filtration, Netzsch Filtration, REINEVELD centrifuges, Rittershaus and Blecher, Royal GMF Gouda, Sprout Bauer, and Vandenbroek.

SEPARATION EQUIPMENT AND SYSTEMS

- Decanter and filter centrifuges
- Filter presses
- Dryers
- Presses and screens
- Extractors
- Thickeners
- Evaporators and crystallizers
- Disc and drum filters
- Screening and filtration components
- Specialized thermal systems



FULL-SERVICE OFFERING

- OEM spare and wear parts
 - Maintenance and repairs
- Service agreements
 - Automation and digitalization
 - Machine and process optimization
 - Second-hand and rentals

AUTOMATION AND DIGITALIZATION SOLUTIONS

Site assessment and integration • Advanced process control and artificial intelligence • Simulation and training • Digital twin technology • Data analytics and prediction • Electrification, instrumentation and controls

Enabling the green transition

As a technology leader in a changing world, we strive to make a positive impact on our environment. We believe that what we do today can make a difference tomorrow and in the future. We drive change and enable our customers to achieve their sustainability goals and make the world greener with our sustainable solutions in decarbonization, circular economy, renewable energy, and environmental technologies. It all starts with your specific process requirements and ends with a system that gives you the best results – day in and day out, for decades to come.

ANDRITZ. FOR GROWTH THAT MATTERS.



A WORLD OF SEPARATION SOLUTIONS

ANDRITZ provides mechanical and thermal solid/liquid separation technologies, complemented by comprehensive services, automation, and digitalization solutions for the chemicals, environment, food and beverage, as well as mining and minerals industries. Our customized, innovative solutions focus on minimizing resource consumption and maximizing process efficiency, thus making a substantial contribution towards sustainable environmental protection. With over 150 years of experience and more than 2,700 separation specialists around the globe, we are a driving force in the evolution of separation solutions – enabling industries to meet tomorrow's demands responsibly. **ANDRITZ. FOR GROWTH THAT MATTERS.**

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