



SEPARATION

# HIGH-THROUGHPUT DEWATERING AND CAKE WASHING

HORIZONTAL VACUUM BELT FILTER (HVBF)

**ANDRITZ**

ENGINEERED SUCCESS

In the most challenging applications, for example chemicals or mining and minerals, reliable dewatering and product recovery is critical to maintaining continuous production. This is why ANDRITZ has put decades of expertise into the Horizontal Vacuum Belt Filter (HVBF) technology, to provide a solution with the highest throughput and low residual cake moisture content, while keeping operating costs low.



# A cost effective solution for dewatering and product recovery

The ANDRITZ horizontal vacuum belt filter uses state-of-the-art vacuum filtration technology to offer an efficient and reliable solid/liquid separation unit that is fully CE certified for dewatering and washing of slurries. With an installed base of more than 680 horizontal vacuum belt filters throughout the ANDRITZ GROUP, we have encountered some of the toughest dewatering and cake washing challenges in the industry. In fact, ANDRITZ has been working closely with its customers to continuously improve the value and efficiency of every machine, without compromising on reliability or availability.

## VARIETY AND VARIABILITY

The innovative modular design of the ANDRITZ horizontal vacuum belt filters enables us to offer a wide range of filters with effective filtration areas ranging from 6m<sup>2</sup> to 138m<sup>2</sup>. This coupled with a wide range of materials of construction enables ANDRITZ to customize solutions to suit any application. The ANDRITZ horizontal vacuum belt filter is able to attain the highest cake washing efficiencies when compared to any other filtration technologies, due to plug flow displacement of the wash liquor, resulting in maximized product recovery.

ANDRITZ has a wide range of experience in the installation of horizontal vacuum belt filters in a number of industries including, but not limited to:

### Dewatering applications

- General tailings
- Gypsum
- Phosphate rock
- Coal fines
- Magnetite
- Iron ore
- Lithium

### Washing applications

- Leached materials
- Zinc
- Copper/cobalt
- Soda ash
- Gypsum
- Flue gas desulfurization (FGD)
- Pulp washers
- Potash



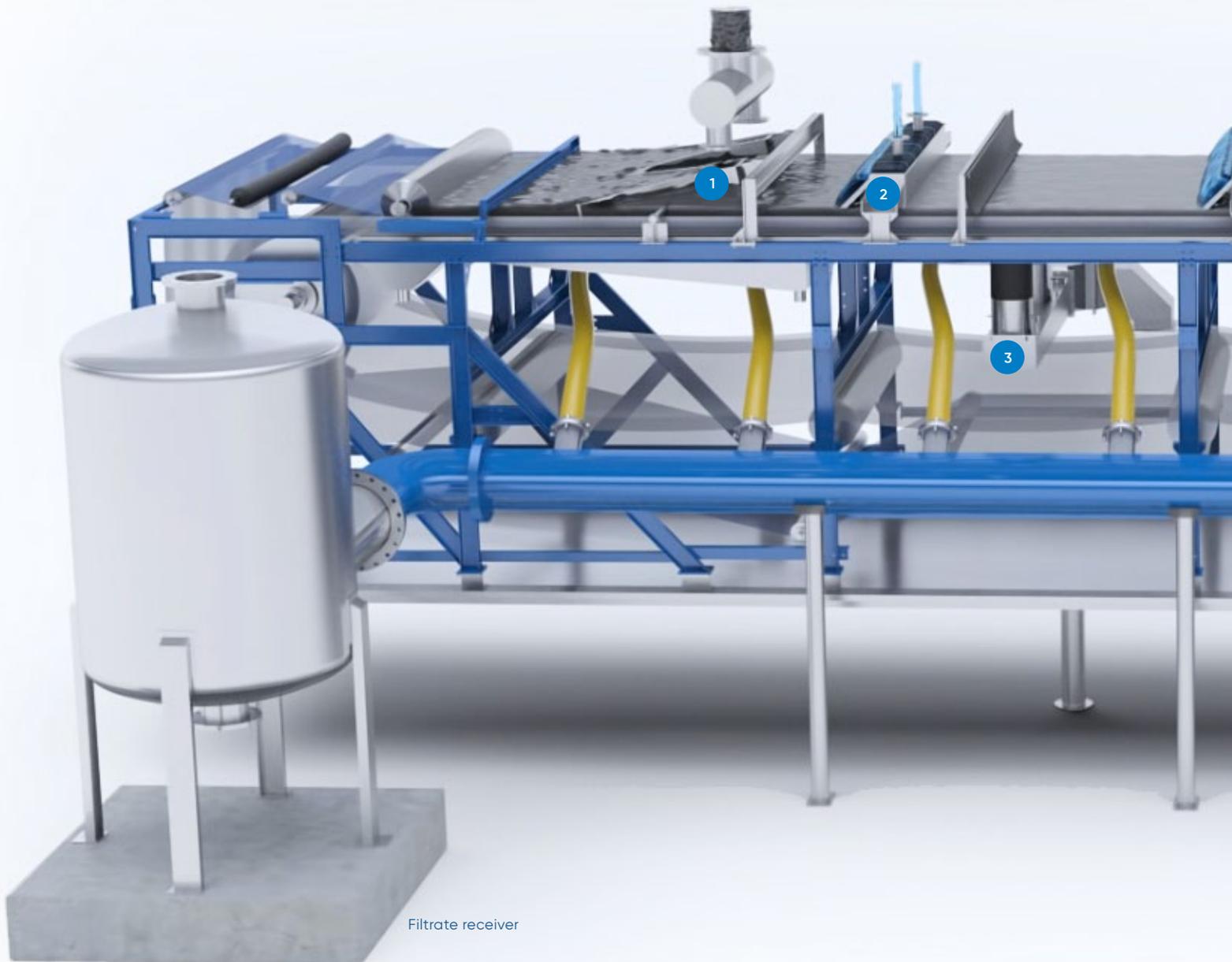
ANDRITZ horizontal vacuum belt filter

# Features and benefits

ANDRITZ makes use of the latest vacuum filtration technology to offer unique design features that can be tailored to suit your specific needs for optimum dewatering or product recovery.

## ADDED VALUE WHEN WORKING WITH ANDRITZ

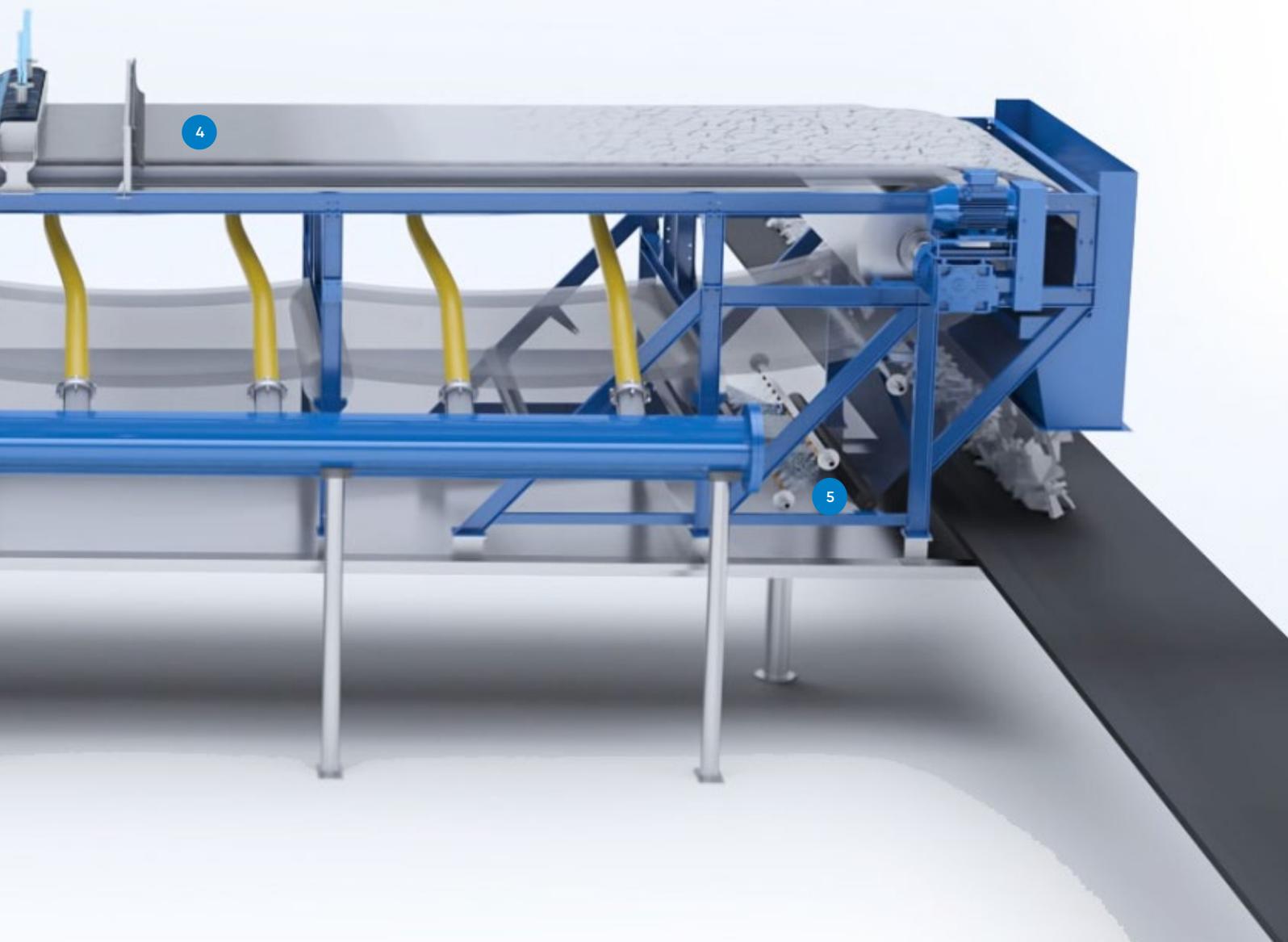
- High-throughput dewatering and cake washing
- Reduced downtime due to innovative design
- Global testing facilities
- Increased flexibility due to modular design



Filtrate receiver



- 1 **Various slurry feeder designs** to ensure even distribution of slurry and full coverage of filtration area for various applications.
- 2 **Co-current and counter-current** for cake washing using plug flow displacement to allow for maximized product recovery.
- 3 **Various possible methods of supporting the rubber carrier belt** to reduce downtime during maintenance work and increase availability.
- 4 **Unique vacuum box lifting and lowering device** for easy inspection and replacement of wearing parts resulting in reduced downtime of the filter.
- 5 **High-pressure cloth washing** to minimize cloth blinding and maximize filtration rates.



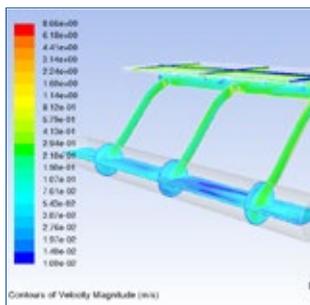


20m<sup>2</sup> horizontal vacuum belt filter installed in a graphite concentrate dewatering application

# Engineering solutions for optimized designs

ANDRITZ has fully integrated engineering capabilities that enable accurate design with state-of-the-art technology to provide optimized equipment sizing and footprint.

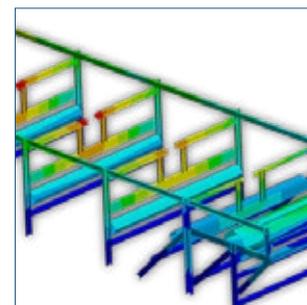
## ENGINEERING CAPABILITIES INCLUDE



CFD analysis



3D modelling



FEA analysis

The wide variety of materials of construction and the bolted frame structure allow for modular designs that are customized to the clients' requirements.

## FILTRATION AREAS (m<sup>2</sup>)

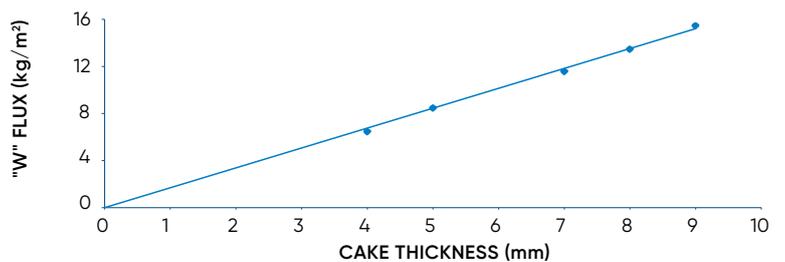
Total vacuum box length (m)	Belt width (m)						
	1.2	1.6	2	2.4	3.2	4.2	4.8
6	6	8	11				
9	9	13	16	20			
12	12	17	22	27	36	48	55
15		21	27	33	45	60	69
18		25	33	40	54	72	83
21			38	46	63	84	97
24			43	53	72	96	111
27			49	60	81	108	124
30				66	90	120	138
33				73	99	132	
36					108		
39					117		



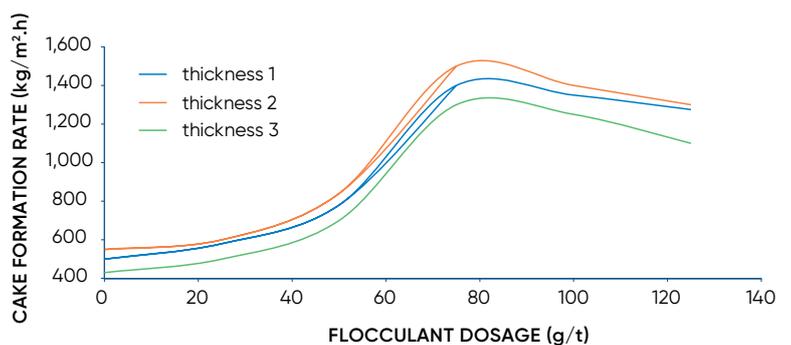
# Laboratory facilities and trials for a fully optimized dewatering process

The state-of-the-art laboratory testing facilities around the globe enable ANDRITZ to offer the most suitable horizontal vacuum belt filter size that can be used for both dewatering and multiple cake washing to provide optimum product recovery.

As the world's leading separation specialist, we understand that no challenge starts or ends with one single machine. By taking a closer look at your entire process, we can apply the knowledge of more than 2,000 separation specialists and the technical capabilities of one of the world's broadest technology portfolios. Whether it's upstream or downstream, add-ons or automation, we have in-depth process know-how and resources around the world to further optimize your entire dewatering process.



Cake formation rate versus flocculant dosage



Cake thickness versus 'W' flux

# Innovative features to boost performance even further

ANDRITZ has developed a new device for lifting vacuum boxes on horizontal vacuum belt filters – the SmartLIFT. Not only does the device make short work of a classically high-risk task, it can also be retrofitted to any brand or size and reduces downtime for vacuum box maintenance by over 30%.

## WHY DOES A VACUUM BOX NEED A LIFTING DEVICE?

Vacuum box maintenance on horizontal vacuum belt filters is an unpleasant, high-risk job. Current methods involve unwieldy hand-operated winches, counterweights, levers, and other manual lifting equipment, all of which are high-labor alternatives that run the risk of personnel injury, while the option of using a pneumatic cylinder can prove prohibitively expensive.

## HOW DOES IT WORK?

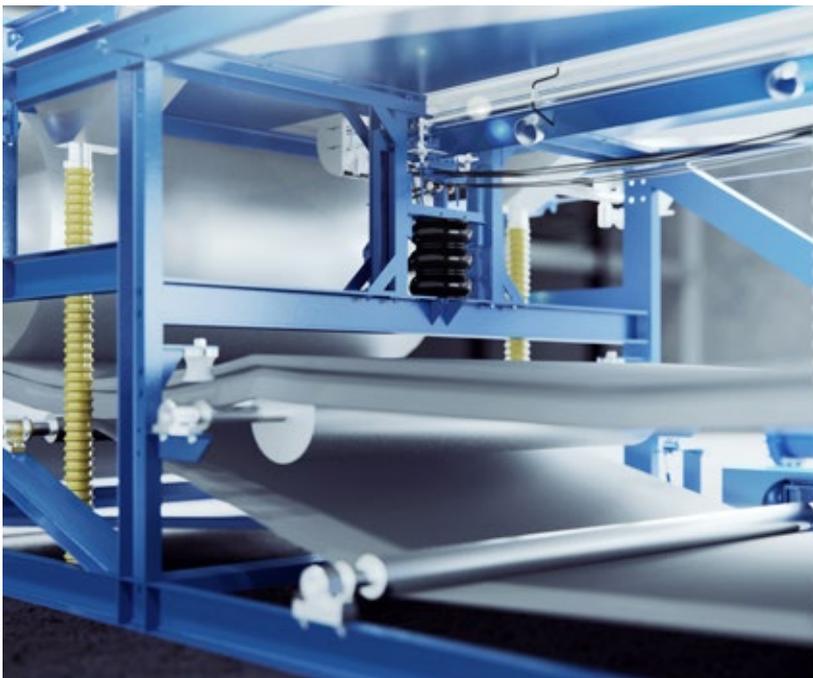
The horizontal vacuum belt filter vacuum box is fitted with a SmartLIFT vacuum box lifting device that is situated directly under the vacuum box. A bellow-supported frame runs between guide slides on either side of the main frame vacuum box opening. The support can be adjusted in order to centralize the vacuum box in the horizontal vacuum belt filter.

For maintenance purposes, the bellow-supported frame is lifted pneumatically to take the weight of

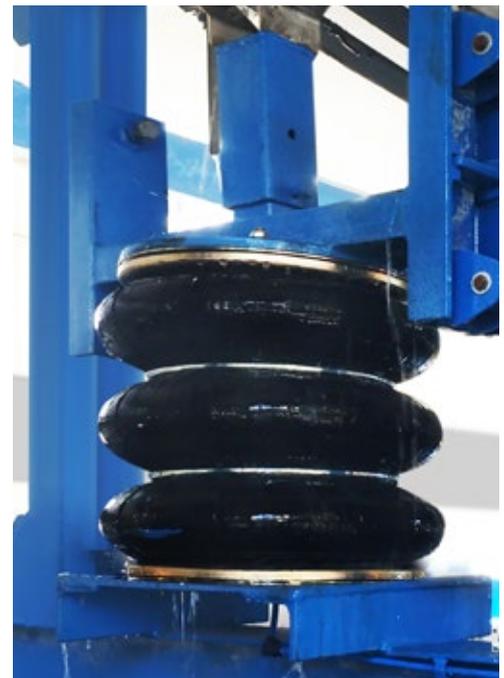
the vacuum box. The retaining system keeping the vacuum box in position can now be removed. Then the bellow(s) is/are simply deflated to lower the vacuum box so maintenance can now be carried out in a safe and stable position. The vacuum box is lifted back into position by inflating the bellow(s).

## YOUR BENEFITS

- Transforms a high-risk task into a low-risk task
- Reduces the downtime required for vacuum box maintenance by 30%
- Reduces labor input since less manpower is required to lift and lower the vacuum box
- Reduces the risk of injury during vacuum box maintenance by 50% as the lifting device stabilizes the vacuum box when lifting and lowering
- Is low-maintenance thanks to the device having no pivoting points



Intermediate frame with vacuum box lifting device installed



Bellows for vacuum box lifting device

# Customized solutions to suit your applications and needs

Numerous design options are available for the horizontal vacuum belt filter in order to offer the optimum dewatering or cake washing solution that fits your needs. One of the options includes the selection of the rubber carrier belt support method in order to minimize friction and increase the lifetime of the rubber carrier belt.

ANDRITZ is able to offer various options for supporting the rubber carrier belt:

- Roller deck support system
- Belt slides

Each system has unique advantages that are applied to the filter based on the application requirements and your specific needs. The roller deck support system contains a number of low-friction rollers to support the belt, resulting in minimum drive power

requirements. The rollers have internal bearings, which result in minimal maintenance and eliminate the need for a high-pressure blower. This reduces consumption of energy or lubrication water, resulting in lower OPEX costs. The belt slides system is made up of disposable wear belts running on strips that utilize water to minimize friction. While this system eliminates the need for a high-pressure blower, more lubrication water is required. However, there are fewer moving parts so less maintenance effort is required.

## 1 Belt slide system

## 2 Roller deck support system utilizing low-friction rollers with internal bearings



Roller deck belt support





# Your full-service provider

With ANDRITZ, you gain access to one of the world's largest OEM manufacturers for solid/liquid separation systems, including such well-known brands as 3Sys Technologies, Bird, Delkor Capital Equipment (Pty) Ltd., Escher Wyss dryers, Frautech, Guinard Centrifugation, KHD Humboldt Wedag, Krauss-Maffei centrifuges, dryers, and filters, Lenser, Netzsch Filtration, Rittershaus & Blecher, Royal GMF Gouda, Sprout Bauer, and Vandebroek.

Whether you need spare parts, rentals, local service, repairs, upgrades, or modernization of your equipment, ANDRITZ is your true full-service provider. From initial consulting through to service agreements, process optimization, and training programs, we are always looking for ways to minimize downtime and increase predictability in operations while raising your overall production efficiency. Wherever you operate, our network of 550 service specialists and global service centers ensures we'll always be there to support you for many life cycles to come. Let's sit down and see how we could take your operations to the next level.



#### LOCAL SUPPORT

Responsive local service centers and field service technicians



#### REPAIRS & UPGRADES

Optimization of machine and process performance, repair work, retrofitting, and modernization



#### SECOND-HAND & RENTALS

Certified second-hand and rental machines



#### TRAINING

Operator training and tailored seminars for operating and maintenance personnel



#### OEM SPARE PARTS

Filter cloths, spare and wear parts from OEMs or with OEM level quality, all readily available



#### SERVICE AGREEMENTS

Preventive maintenance, contracts for spare parts, maintenance, inspections, repairs, upgrades, operation, and equipment monitoring



#### PROCESS OPTIMIZATION

Automation tools and process expertise to boost your profit



#### LAB AND ON-SITE TESTS

Lab and testing capabilities for process optimization and machine upgrades





## WHAT'S YOUR SEPARATION CHALLENGE?

ANDRITZ Separation is the world's leading separation specialist with the broadest technology portfolio and more than 2,000 specialists in 40 countries. For more than 150 years, we have been a driving force in the evolution of separation solutions and services for industries ranging from environment to food, chemicals, and mining & minerals. As the OEM for many of the world's leading brands, we have the solutions and services to transform your business to meet tomorrow's changing demands – wherever you are and whatever your separation challenge. **Ask your separation specialist!**

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