SEPARATION

EFFICIENT SLUDGE THICKENING AND DEWATERING FOR THE ENVIRONMENT INDUSTRY

DECANTER CENTRIFUGE D

ANDRITZ
ENGINEERED SUCCESS
Centrifugation, an efficient solution to solve your dewatering and thickening tasks

Centrifugation is a mechanical separation process in which two or more materials are separated using centrifugal forces. The demands of a centrifuge depend strongly on the specific application (e.g. flow rates and solids load), the material characteristics (e.g. particle size and abrasion behavior), and the operating environment (e.g. explosion-proof design).
Each machine in the ANDRITZ decanter centrifuge family benefits from an application-specific design. Whether your goal is to separate solids from liquids, two liquids from each other, or even to accomplish both tasks at the same time, our application specialists have an optimal design for you. Thanks to decades of experience with continuously evolving machine designs, our top-of-the-class decanter centrifuges ensure reliable and efficient performance.

**FILTRATION VERSUS SEDIMENTATION**
Compared to filtration equipment, centrifugal sedimentation equipment can often achieve the same capacity at a lower investment cost. The sedimentation process can also reach higher flow rates in a continuous mode. Wide variations in feeding parameters can also be accepted.

In sedimentation processes, consumables, such as filter media in filtration processes, are not used. Better capture rates can be achieved by centrifugal sedimentation as washing cycles in the filtration process could reduce the final product capture rate. Sedimentation processes are better able to handle complex products, especially compressible ones, which are difficult to separate in filtration processes.

Washing of sedimentation equipment is easier than with filtration equipment because the filtration equipment’s wash water is under pressure, thus larger quantities are used.
Decanter with low energy consumption features
Get more results with less energy

We put all our energy into delivering the best separation equipment so that you never have to waste energy in your decanter centrifuge.

**KEY ENERGY-SAVING FEATURES**

- The High Hydraulic Pressure (HHP) design of the rotating assembly reduces the discharge radius of the clarified liquid (centrate). Besides improved separation characteristics, this design helps to recover the kinetic energy of the fluid to reduce energy consumption by up to 15%
- Working the same way as a jet engine, the TurboJet weir plates recover the remaining kinetic energy of the clarified liquid. By creating liquid jets pointing in the opposite direction to the bowl rotation, the reaction force thus supports bowl rotation. The TurboJet weir plate reduces total power consumption by up to 30% as a stand-alone feature.
- As a standard feature, ANDRITZ offers two drive systems: a regenerative back drive and a direct drive. Whereas common back drive systems dissipate the braking energy of the scroll into heat, the regenerative back drive recovers this energy and feeds it back to the main motor. The direct drive system feeds the scrolling power directly to the scroll and therefore avoids recirculation losses, thus reducing total power consumption by another 5%.
- The unmatched TurboWISE solution is key to performance in the raw material feed chamber. The polyurethane liners of the TurboWISE system can be replaced easily on site and serve to accelerate the incoming slurry efficiently. The computational fluid dynamic optimization ensures lowest flocculant consumption, significantly reduced wear, and decreases the total power consumption again by up to 2%.

**Energy efficiency**

The ANDRITZ decanter centrifuge D has always been at the cutting edge of energy efficiency. We have shaped and improved today’s industry standards through a number of technological innovations.

![Energy-saving features chart]
What’s your separation challenge?

ANDRITZ decanter centrifuges are suitable for different processes.

DEWATERING
The ANDRITZ decanter centrifuge D is the most versatile of all existing solid/liquid separation technologies, and can be tailored to meet your target dry solids content. The decanter makes it possible to produce both thickened sludge and extremely dry cake from highly diluted sludge. Some Thermal Hydrolysis Process (THP) plant projects, for example, use it to achieve pre-dewatering (upstream thermal lysis step) and thickening during the same process stage. Others use this dual functionality to run the ANDRITZ decanter centrifuge D in thickening mode during the period in which liquid sludge can be spread on the fields, and in dewatering mode when it is forbidden to spread liquid sludge on the fields. Pig manure separation also falls into this category. The ANDRITZ decanter centrifuge D is capable of producing clarified liquid with a capture rate of more than 80% TSS, while at the same time producing dewatered solids with a very specific granularity necessary for efficient composting.

THICKENING
As with all sludge dewatering and thickening technologies, performance of the ANDRITZ decanter centrifuge D is affected by the conditioning process, such as polymer type and dosage. But unlike other sludge separation technologies, the ANDRITZ decanter centrifuge D can still achieve a high solid/liquid separation rate in many applications without slurry pre-conditioning.
**CLARIFICATION**
The ANDRITZ decanter centrifuge D combines two significant advantages: high g-force capability and a specific HHP rotor design. The HHP rotor design helps to manage internal solids transportation, making it possible to utilize g-force capabilities to their fullest. All applications benefit from this approach, particularly food production processes such as juice clarification, which demand a high degree of separation at all times.

**CLASSIFICATION**
The ANDRITZ decanter centrifuge D can also be used in classification processes in all industries – from mining & minerals to food, chemical, and environmental applications. One such application is the classification of sand contained in sludge before being processed in a wet oxidation unit.

**3-PHASE SEPARATION**
The ANDRITZ decanter centrifuge D can also be used for 3-phase separation, in which the centrifugal force is used to separate liquids and solids with different densities, or to separate light liquid phase and heavy liquid phase from solids. Many ANDRITZ decanter centrifuges D in three phases design are used in applications ranging from slop oil and animal fat separation to olive oil and palm oil. Our machines are designed to support high-temperature processes, up to almost 100°C, to achieve the highest separation rate efficiency.
Getting to know your ANDRITZ decanter centrifuge D

Design optimized to the very smallest detail to provide best results, while ensuring ease of maintenance and providing modularity for optimum fit to your needs.

SCROLL
The scroll of the ANDRITZ decanter centrifuge D is the most flexible scroll available on the market. Its specific open flight design reduces the torque created by the sludge and maximizes the clarification rate. The special cone design leads to high sludge compaction.

• Reduction of sludge conveying torque by 30%, which impacts the gear box lifetime and the scroll drive size positively.
• High cake dryness due to better sludge compaction.
• Excellent centrate quality due to minimized internal turbulences and maximized settling volume.

BOWL
The bowl design is carefully selected to balance the various needs for integrity, stability, smooth operation, minimized windage, high durability, low wear, and easy maintenance, while ensuring the principle process functions. The design is modular to allow an easy fit to different basic process conditions by adjustment of diameter, length, and cone angle. The overall design is optimized to minimize the power consumption and provide the best possible stiffness. ANDRITZ decanter centrifuges are not only factory-tested before delivery to a customer’s site, but also extensively type-tested according to international standards to meet all product safety requirements.

COVER
Covers protect you against spillage and touching rotating parts, meet the noise radiation and thus are vital safety features. The shape is optimized for easy cleaning and handling. Different options are available to fit in with your needs, be it highest corrosion resistance, lowest noise radiation, or similar.
WEAR PROTECTION
The different zones and elements in a decanter that may be subject to higher wear are protected by a carefully composed selection of wear protection means. Depending on the extent of wear, different material compositions, ranging from polyurethane to sintered tungsten carbide elements, are used to protect scroll flights, feed chamber, feed pipe discharge ports, and discharge housing. Your ANDRITZ specialists are glad to offer their expertise in working towards the best combination of protection choice versus cost and selecting the best fit from the wide range of options.

MACHINE CONTROL AND PROTECTION
ANDRITZ decanter centrifuges will be as transparent in operation and for maintenance as you require. From the minimum machine protection to all levels of predictive maintenance information, including bearing conditioning sensors, the recommended minimum configuration depends on your operation and your application environment. It can be scaled to your needs in perfect combination with our addIQ control systems to support optimization of your operation. Our separation specialists seek to make operation and good care of your equipment, ensuring a long service life, blend seamlessly into your work schedule, and will provide fast and precise support should you need it.
High-performance materials: Best protection against wear for extended decanter life cycle

The ANDRITZ decanter centrifuge D is manufactured with advanced wear-resistant materials for a long, continuous life cycle. A variety of materials ensures that your operations are able to withstand high temperatures, heavy-duty products, and corrosive products.

- To protect the bowl, the inner surface has strips or grooves, depending on machine size and application. Bowl outlets are protected with easily replaceable bushings.
- To protect the screw conveyor, the inside of the feed chamber is coated with tungsten carbide spray or protected with TurboWISE polyurethane inserts. Feed chamber outlets are equipped with replaceable bushings, and the screw conveyor blade has replaceable tiles made of tungsten carbide.

- Good wear protection is a strategic, long-term investment with a guaranteed return.
- To protect the solids casing, the receiving surface is a thick stainless steel plate with polyurethane or tungsten carbide spray coating, depending on the application.
- Exchangeable wear parts mean fewer repairs and less downtime, both of which lead directly to reduced maintenance costs.
The addIQ centrifuge control system combines all of our extensive operational, troubleshooting, and start-up experience in one tailored automation solution. The heart of addIQ system is a modular, PLC-based control system that supports you in making the best use of your ANDRITZ equipment.

The addIQ product range is scalable from Eco, Pure up to Prime level and can be run in different operating modes to enhance the performance of your process:
- Optional remote access gives immediate support to your operation and maintenance team.
- Relative speed control allows the operator to enter the speed set points directly. If the feed product concentration is stable, this is the preferred and most efficient control mode.
- Torque control mode ensures constant dryness under varying process conditions. This automatic operation is achieved by a torque feedback algorithm.
- Maintenance and manual operation.
- CIP (Cleaning-In-Place) sequences and an optimized thickening control facilitate the operation of the machine and assure economical best return of the process.
- Alarms and support in troubleshooting.
- Built-in support for trending, documenting, and reporting efficiency is included. Multilanguage functionality is integrated in the operation interface to support communication.

Metris addIQ control system, decades of experience in one box
APPLICATIONS

- Thickening biological sludge with and without polymers
- Thickening primary and tertiary sludge
- Dewatering membrane sludge
- Dewatering fresh, blended sludge
- Dewatering digested sludge
- Pre-thickening and dewatering of hydrolyzed sludge
- Classification of sludge
- Sand removal
- Potable water
Municipal wastewater: Reliability and performance guaranteed by experience

In cities all over the world, there is a rising need for efficient processing of wastewater and sludge, combined with increasingly tight regulatory standards and municipal budgets. To tackle these complex and conflicting challenges, you need a partner with the full perspective of your wastewater treatment needs, and an array of reliable solutions to fulfill them. Across all thickening, pre-thickening, and dewatering applications, ANDRITZ has the most experience worldwide with the largest installed base of equipment in operation.

FLEXIBLE HANDLING OF ALL TYPES OF SLUDGE

The ANDRITZ decanter centrifuge D is a high-performance solid bowl decanter centrifuge engineered for sludge treatment. It accepts any type of sludge, making the technology extremely suitable for centralized dewatering plants receiving different sludges from different regions. The centrifuge’s unique design is the result of decades of engineering experience together with continuous feedback from our customers and service partners. ANDRITZ decanter centrifuges D provide a unique combination of robust design requirements, high-quality manufacturing, and enhanced maintenance-friendly features.

For municipal wastewater treatment plants of all sizes, the final step of sludge treatment is a critical one, accounting for a significant share of the plant’s total operating costs. Since this is the last step before the sludge leaves the facility, the equipment must reliably produce stable dewatered sludge while minimizing downtime and maintenance requirements. Medium to large plants will also include a digestion treatment step using either standard aerobic, anaerobic, or more advanced methods such as pre-hydrolysis sludge treatment.

In each of these cases, the performance of the digester is directly linked to performance of the thickening equipment. ANDRITZ decanter centrifuge D technology is designed to ensure that both thickening and digestion are extremely reliable, flexible, and easily automated.

TURNKEY SOLUTIONS FOR VARIOUS APPLICATIONS

Although each production line must be specially designed, a sludge dewatering line typically includes a sludge feeding system, a polymer preparation and feeding system, dewatered sludge conveying equipment, and a centrifuge. Over the years, we have gained extensive knowledge concerning all types of production facilities and machines to obtain the required final product characteristics. As a result, we offer comprehensive capabilities for the design, support, and supply of your plant’s complete dewatering facility – all with one global partner to respond to your needs.
APPLICATIONS

• Manure and animal waste
• Dairy
• Food and beverage
• Pulp and paper
• Steel and stainless steel
• Power plants
• Slop oils and lagoons
• Drilling muds
• Sand and aggregates
• Mining effluents, etc.
Industrial wastewater: All wastewater deserves the right solution

Industrial manufacturing processes generate specific wastewater and residual material flows. Systematic and efficient processing reduces water consumption, conserves raw materials, provides marketable residues, and improves overall efficiency.

VERSATILE SOLUTIONS FOR DIFFERENT TYPES OF WASTEWATER
有机或非有机的、含油或含油、腐蚀性或磨料高、低含固量 – 所有类型的废水都需要被回收再利用或排放到市政污水处理系统。在工业废水处理方面，ANDRITZ提供针对每个市场特定要求的专家服务，并拥有丰富的参考文献和一系列成熟的解决方案。

WATER TREATMENT AND ZERO LIQUID DISCHARGE
伴随着原材料的回收，减少水消耗已成为大多数行业的一大热点。ANDRITZ提供全面的节水和回收解决方案，基于独特的设计，连续砂滤技术、带式压滤机、离心机和分离器。

SLUDGE MANAGEMENT
有机生产过程中产生的污泥通常适合用作能源密集型行业发电的二级燃料，或者提供给买家。在许多情况下，废热可以用来脱水或干化污水污泥。今天，已经有大型的安装过程，同时产生自己的污泥作为市政污泥和生产过程中的固体肥料。

SOLID/LIQUID SEPARATION
每座工业建筑都必须处理其废水 – 即使没有自己的内部处理厂 – 进行相分离，从而降低污染水平，以便遵守排放限制或减小废水处理厂的规模。在某些应用中，固体相可以被重新利用作为肥料，甚至被回收到生产过程中。这种分离过程适用于矿物和有机流体。ANDRITZ提供完全的技术包，无需进一步的投资，也不会对环境产生影响，因为不使用化学物质。

SELECT THE BEST TECHNOLOGY FOR THE TOUGHEST CHALLENGE
ANDRITZ的脱水离心机D是一种高性能的固体碗式离心机，是市场上最灵活的技术之一。其紧凑且高效的结构使其可以根据特定的工业废水处理来定制解决方案。我们的经验包括选择特定的施工材料、全面的磨料防护，以及双或三相分离系统。标准化的设计确保了ANDRITZ脱水离心机D可以可靠且经济地运行。
Staying ahead in innovation: Test centers and extra focus on R&D

ANDRITZ, with its competence center for decanter centrifuges D in France, operates its own on-site test center to speed up product innovation and reduce the time to release new products and features to customers in a systematic and well-controlled fashion.

With an available area of more than 250 m², this state-of-the-art facility is able to test all kinds of machines (screens, decanters, separators, filter presses, and similar, including mobile units), even at high flow rates exceeding today’s market requirements for single units.

Modern instrumentation equipment is available to analyze mechanical and process elements such as effective power, vibration characteristics, noise rating, and more.
A decanter centrifuge for every need

At ANDRITZ, we have one of the largest decanter centrifuge ranges on the market, from D2 centrifuges for small flow to the largest decanter either for municipal or industrial applications.

<table>
<thead>
<tr>
<th>Range</th>
<th>D2 to D 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic capacity (m³/hr)</td>
<td>0.2 to 400</td>
</tr>
<tr>
<td>Installed power (kW)</td>
<td>7.5 to 350</td>
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</tbody>
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ANDRITZ decanter centrifuges: The best fit for the widest range of applications

The ANDRITZ decanter centrifuge D is a centrifuge optimized for lowest consumption and highest output to meet the demands of environmental processes. In addition to the environment market, ANDRITZ decanter centrifuges are versatile in order to fit several applications in various industries. For these specific applications, ANDRITZ specialists would recommend you the following units:

The ANDRITZ decanter centrifuge A, a heavy-duty industry machine, rugged and robust, ideal for mining and minerals as well as the chemical Industry. The decanter centrifuge A also includes special products such as the screen bowl decanter (AS machine) or ACZ Censor for plastics recycling.

APPLICATIONS
Mining and minerals
- Calcium carbonate
- Potash
- Clay
- Salt
- Coal and tailings
- Aluminum
- Iron and tailings
- Copper and tailings
- Phosphate

Chemicals
- Petrochemicals
- Soda ash
- Mineral and slop oil
- Pigments and dyes
- Agrochemicals
- Specialty chemicals
- Natural rubber and bioplastics
- Pharmaceuticals and cosmetics

The ANDRITZ decanter centrifuge F, designed for the food industry, an optimized machine in three different finishes to meet the most stringent hygienic requirements, including CIP (Cleaning-In-Place) and pressure discharge.

APPLICATIONS
Food
- Beverages
- Dairy
- Vegetable oil
- Animal protein processing
- Functional ingredients
- Industrial fermentation
- Starches and proteins
- Sugar
Could you get more from your existing equipment? Or do changing process conditions demand a completely new approach? At ANDRITZ, we have the knowledge and resources to help you find out. Whether you are looking to maximize efficiency, reduce filtration times, or explore new processes and products, our test facilities worldwide are always at your service. Helping you to optimize residual moisture levels, bulk density, particle size distribution, and more. Always with the latest application knowledge and an unmatched database of process performance analysis.

MISSIONS
- Define process warranty, design from experience
- Build sizing charts, specific sizing study
- Build process knowledge, process expertise
- Check technical feasibility of solid/liquid separation through lab tests
- Check performance by pilot tests on-site

GOALS
- Define and validate technical process warranties, separation performance
- Define technologies, sizing, design for projects according to process
- Technical support for various industries, with main focus on environment, mining and minerals, chemicals, and food
Put our 150 years of OEM experience to work for you

Need to optimize your process? Boost availability? Ensure non-stop productivity? When you work with ANDRITZ, you gain access to one of the world’s largest OEM manufacturers for solid/liquid separation. Put our in-depth knowledge of separation equipment and processing to work for you.

VAST EXPERIENCE THROUGH LARGE INSTALLED BASE
With an installed global base of more than 55,000 solid/liquid separation equipment and systems, you can imagine that we take service seriously. Wherever these customers are located, we work very closely with them to maximize uptime and boost efficiency.

WELL-KNOWN OEM BRANDS
Some customers know us as the people with ANDRITZ on our overalls. Others have come to understand that we are the OEM behind former brand names like 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 Vandenbroek, companies who all have been acquired by ANDRITZ. But frankly, we are capable of servicing and supplying spare parts for nearly all brands of solid/liquid separation equipment on the market.

LOCAL SUPPORT BACKED BY GLOBAL EXPERTISE
Our service philosophy is simple: One phone call, one contact person, one dedicated team that speaks your language and knows your equipment and process. This is not an empty promise. It is backed by a network of 550 service specialists for separation equipment and systems as well as service centers all around the world.

A TRUE FULL-SERVICE PROVIDER
Whether you need spare parts, rentals, local service, repairs, upgrades, or modernization of your equipment, ANDRITZ is your service specialist in all aspects of separation. 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. In short, we’ve got you covered.

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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