SEPARATION

VERSATILE THERMAL PROCESSING

ANDRITZ GOUDA PADDLE DRYER



NGINEERED SUCCESS

The process: Keeping heat transfer simple and handle products with utmost care

The ANDRITZ Gouda paddle dryer, a machine with a lot to offer, to most materials.

Dried or cooled? The continuous indirect heat transfer setup within the paddle dryer's state-of-the-art interior produces quality product with incredible efficiency – and a minimum of maintenance. Powdered, granulated or pasty materials? The paddle dryer is built to handle products with the utmost care – even toxic materials. For heator oxygen sensitive products we have developed a vacuum execution of the paddle dryer.

THE ANDRITZ GOUDA PADDLE DRYER IS SUITABLE FOR THE FOLLOWING PROCESSES

- Drying
- Heating
- Cooling
- Reacting
- Roasting
- Cooking, braising
- Calcining
- Sterilizing
- Solvent stripping
- Melting
- Vacuum



GPD type 5W18





Various applications and end products



Modest energy requirements

In drying processes two things are essential: efficient use of energy and the proper treatment of off-gases.

For cooling, just use water. Saturated steam or hot oil are perfect for drying or heating. The hollow design of the paddle shafts means that the entire interior surface acts as one large heat exchanger. Controlled agitation by the rotating shafts with paddles deliver superb product-to-surface interaction, for an optimal heat transfer rate. Energy requirements? Suitably modest, especially if compared to direct drying with its associated large hot air flows. No wonder the triedand-proven paddle dryer has found has found so many different applications.

MAIN ADVANTAGES

- Maximum efficiency
- Coolant circulation provides optimum heat transfer
- Dust-tight or gas-tight







Limited odour treatment and recovery of energy in the condensor.

Today our customers ask for environmental friendly, energy saving and compact process solutions. Moreover, a fully enclosed operation enables the safe treatment of toxic, noxious and/or flammable product.



MAIN FEATURES

- High heated surface area in a small process volume; small footprint
- No sweepgas
- Limited off-gas treatment
- Easy solvent recovery (at high temperatures)

Instrumentation & Control

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Unique efficiency

Easy treatment of toxic and flammable products with the ANDRITZ Gouda paddle dryer.

Whatever its type, every paddle dryer unit is manufactured to a modular design – one which allows for many alternatives and is always adaptable to the extraordinary requirements of individual products and processes. Skillfully engineered moving parts are crucial to the system. The heat transfer in the paddle dryer is very high. The two rotating paddle shafts in the trough ensure optimal heat transfer and mixing. The paddles of the ANDRITZ Gouda paddle dryer play a large role in creating the ideal local environment.



Dried sludge as alternative energy







THE PADDLES

The rotating paddles of the ANDRITZ Gouda paddle dryer play an important role in creating the ideal process environment. The front and rear sides of the paddles contribute equally to heat transfer because they are pitched and have no transport function. The uniquely designed wedge-shaped paddles are self-cleaning, which makes it possible to treat products that are not free-flowing. For highly abrasive products, a special hard facing can be applied to the paddle surface.



THE TROUGH

Two counter-rotating shafts with paddles pass through the jacketed trough. Heat transfer medium (steam, thermal oil, or cooling water) flows through the jacket, hollow shafts and even the paddles. The wedge-shaped paddles ensure perfect local mixing and mechanical fluidization. The shafts are precisely aligned: the paddles interweave as they turn, creating the ideal surface-toproduct contact and plug flow.



THE COVER

The paddle dryer's dust-tight cover can be adapted for full vacuum or overpressure with an adapted feed and product removal system. Because the cover is heat-traced no condensation of vapors takes place inside the dryer. The whole unit is slightly inclined enabling the flow of particles by gravity.

ADVANTAGES OF THE WEDGE-SHAPED PADDLES

- Paddles not pitched for optimum contact
- Good mixing in radial direction
- Plug flow in axial direction



Residence time: Similar for each particle

As the product moves through the machine, the paddles ensure that the product is mixed well and flows easily.

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The paddles provide excellent mixing in radial direction. The product is pushed by the feed in axial direction, gradually meeting it's final specifications. Even flow, plug flow, through the machine gives each product particle a similar residence time.





Best protection against wear thanks to High-Velocity Oxygen Fuel (HVOF) coating

Prolonged life cycle for paddle dryers.

The ANDRITZ Gouda paddle dryer is designed for long, continuous operation and is manufactured with sophisticated welding techniques. It can handle high temperatures, heavy duty and corrosive products. To protect the crucial, heat exchanging paddles against heavily abrasive products, a wear-resistant, hard-face coating can be applied. HVOF is a high-velocity spraying technique to apply protective, anti-abrasion layers. ANDRITZ is the only manufacturer of paddle dryers to use this proven, best-in-class, coating technique. Even after many years, HVOF coated paddles show no decrease in layer thickness, nor any form of wear. Low wear results in no unplanned downtime, and leads to planned maintenance which leads to reduced costs of ownership. We promote HVOF coating as a strategic long-term investment with a guaranteed return.







Applications: The chemical industry

Fully enclosed operation allows safe treatment of chemical products.





For crystallizing and drying PET (polyethylene terephthalate), a special version is available for ensuring degradation-free processing and a very narrow residence time distribution.

Special attention is paid to deliver a gas-tight machine to prevent solvent from escaping. Solvent recovery is enhanced by keeping the solvent concentration in the exhaust vapor as high as possible. Any non-condensables can be recycled and heated before being returned to the unit as sweep gas. Pressure is controlled by a small gas bleed.

The following chemical applications can be handled by the paddle dryer:

- Polymers (PET, SAP, PA)
- Gypsum
- Minerals
- Metal powders



Treatment of polyethylene terephtalate

ADVANTAGES

- Good plug flow
- Fully continuous
- High capacities
- High heat transfer



ADVANTAGES

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Drying through the plastic phase = no back-mixing

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- Uniform product treatment = perfect hygienization
- Energy efficient
- Highest flexibiliy on sludge types
- Minimal off-gasses to treat
- Low mechanical speeds/low wear
- Compact design and plant lay-out
- Class A biomass

Applications: The environmental industry

In order to make their waste water treatment plants more environmentally friendly, the industry is looking for solutions to reduce their waste streams.

Sludge coming from a waste water treatment plant is normally mechanically dewatered up to a typical dry solids content of 20-25%. The disposal cost of this voluminous waste product is increasingly high and handling is labor intensive. Further reduction of this waste stream can be obtained only through drying. Drying minimizes the stream by a factor 4-5 and increases the calorific value of the sludge, transforming it into a valuable product (fuel) for e.g. the cement industry.

FLEXIBLE FOR DIFFERENT SLUDGES

Any type of sludge is accepted by the ANDRITZ Gouda paddle dryer, making it extremely suitable for centralized drying plants accepting different sludges from different regions. As back-mixing is not required, any residual moisture level can be chosen for the end product. This makes the machine very suitable for partial drying to 35-40% dry solids, which is required prior to incineration of sludge.

TURNKEY SOLUTIONS FOR VARIOUS APPLICATIONS

Although each line can be customized to client requirements, our drying lines normally include:

- a wet sludge handling system
- a paddle dryer
- WET SLUDGE ESILO WET SLUDGE ESILO WET SLUDGE ESILO THERMAL OIL BOILER PADDLE DRYER COOLER ORY SLUDGE SILO

Sludge drying line

- a dry sludge handling system
- the vapor treatment system

ANDRITZ supplies complete solutions for sludge dewatering and drying.

TÜV NORD CERTIFIED

The ANDRITZ Gouda paddle dryer has a complete safety concept which is approved and certified by TÜV Nord. The ANDRITZ solutions are fully compliant with ATEX and NFPA legislation.

SAFETY - BASIC CONCEPT:

- Closed system
- No oxygen during process
- O₂ and CO monitoring
- Water spraying
- Explosion prevention, no deflagration membranes

THE FOLLOWING ENVIRONMENTAL APPLICATIONS CAN BE HANDLED BY THE PADDLE DRYER:

- Sewage sludges
- Biogas residues
- Industrial sludge
- Drilling mud
- Biomass
- Digested manure
- Pulp mill sludge



Sludge drying in a cement factory





Applications: The food industry

Special care is taken to prevent cross-contamination.



For food applications, the ANDRITZ Gouda paddle dryer is manufactured following hygienic design specifications. The product contact parts receive a surface treatment, like polishing or coating. Special attention is given to the accessibility for cleaning purposes.

To answer up to the requirements of our clients in the food industry, the paddle dryer comes in a variety of executions:

- vacuum
- two different heat zones
- customized product feed / extraction
- variable inclination

The following food applications can be handled by the paddle dryer:

- Milk
- Starch
- Cocoa
- Flour
- Sugar
- All powders/granules



Sugar

ADVANTAGES

- No sweep gas
- Plug flow
- Low temperature possible due to vacuum
- Dry process
- Hygienic design



Our pilot plant, a valuable test center

Determining the viability of new process technology and common success.



Customer attendance during testing

A unique feature and part of the ANDRITZ R&D program is the pilot plant. The pilot plant is a valuable test center for simulating production processes with a view to testing or optimization of a process before implementation.

The pilot plant is also used to investigate the feasibility of a desired process. Combined with state-of-theart manufacturing technologies, ANDRITZ offers an integrated approach for the setup of processing lines, contributing to significant cost savings (for the customer) in the production process. ANDRITZ has three testing possibilities:

FEASIBILITY TEST

Requires a small amount of product to determine its drying/cooling ability.

BENCH-SCALE TEST

Requires approximately 1 kg of product on a benchscale paddle dryer to determine behavior and produce a small sample.

PILOT PLANT TEST

Requires approximately 100 kg of product to determine a guaranteed capacity and process parameters on a pilot plant paddle dryer.

ANDRITZ can offer rental pilot units for on-site test work at your location. Especially for sludge drying tests, ANDRITZ can offer a fully equipped mobile sludge drying pilot plant.

The proven calculation model for scaling up to industrial size ensures successful application to reallife processing.



Dimensions and models

The ANDRITZ Gouda paddle dryer comes in a variety of sizes, from a heat transfer area of 3 m^2 to 287 m^2 .



Type of paddle drver	TL	L	IL.	тw	IW	н	D paddle	Heated area	Effective product	Speed paddle sbafts	
aryer	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[m²]	[m ²]	[rpm]	
GPD 1.6W3	3,550	2,230	2,035	630	300	1,680*	160	3.2	0.07	40	
GPD 3W6	4,000	1,910	1,635	1,100	600	1,300	300	6.0	0.21	22	
GPD 3W9	4,700	2,625	2,350	1,100	600	1,300	300	8.7	0.30	22	
GPD 5W12	5,400	2,300	2,010	1,500	930	1,800	500	12.2	0.72	14	
GPD 5W18	6,560	3,250	2,950	1,500	930	1,800	500	18.1	1.06	14	
GPD 6W25	7,200	3,660	3,255	1,600	1,105	2,000	600	25.4	1.64	11	
GPD 6W32	8,100	4,500	4,100	1,600	1,105	2,000	600	32	2,05	11	
GPD 8W40	8,140	4,350	4,050	2,100	1,475	2,600	800	41.2	3.24	9	
GPD 8W50	9,100	5,300	4,900	2,100	1,475	2,600	800	51.4	4.02	9	
GPD 10W65	9,800	5,150	4,700	2,600	1,855	3,200	1,000	65.0	5.83	7	
GPD 10W80	11,000	6,320	5,900	2,600	1,855	3,200	1,000	81.9	7.29	7	
GPD 12W100	11,370	6,575	6,130	2,900	2,200	3,400	1,200	103.4	10.09	6	
GPD 12W120	12,370	7,575	7,100	2,900	2,200	3,400	1,200	120.5	11.67	6	
GPD 14W155	13,500	7,900	7,400	3,600	2,570	3,800	1,400	152.9	16.42	5	
GPD 14W190	15,250	9,700	9,150	3,600	2,570	3,800	1,400	190.2	20.26	5	
GPD 17W240	15,325	9,090	8,440	4,200	3,130	4,400	1,700	2,41.1	29.06	4	
GPD 17W300	17,250	10,995	10,000	4,200	3,130	4,400	1,700	2,87.4	34.41	4	





Standard installed power [kW]	Standard lifting weights [kg]
2.2	1,000
3	2,300
5.5	2,600
7.5	4,600
15	5,000
15	8,000
18.5	9,800
22	17,000
30	18,000
37	29,000
45	32,000
55	43,000
75	50,000
90	78,000
 110	87,000
160	105,000
175	115,400







full-service provider

ANDRITZ

With ANDRITZ Separation, 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 Vandenbroek.

Whether you need spare parts, rentals, local service, repairs, upgrades, or modernization of your equipment, ANDRITZ Separation 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



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 45

SECOND-HAND & RENTALS Certified second-hand and rental machines



PROCESS OPTIMIZATION Automation tools and process expertise to boost your profit



Operator training and tailored seminars for operating and maintenance personnel



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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