



SEPARATION

SOLUTION FOR CONTINUOUS DRYING

ANDRITZ PLATE DRYER

ANDRITZ

ENGINEERED SUCCESS

Exact temperature control for optimal thermal treatment

When continuous drying of free-flowing bulk materials is required, the ANDRITZ plate dryer is the right choice.

The ANDRITZ plate dryer is a vertically designed, continuous contact dryer/cooler available in atmospheric, gas-tight or vacuum configuration. Hazardous products can be processed in this closed system under vacuum or with inert gas blanketing. The plate dryer treats products very gently and without any impact on the environment. It can safely handle toxic or solvent-containing products. Stationary, horizontal plates in the dryer are heated while rotating arms with plows transport the product in a spiral pattern across the heated surface of the plates. As such, the product is repeatedly turned over and each particle comes into contact frequently with the drying surface. The thin product layer on the surface of the plates in combination with frequent turning over of the product, results in a short retention time and uniform drying. This mode of operation protects the product against thermal degradation.

The fixed plates have a jacket on the underside and can be heated or cooled with a liquid heating medium or steam. Plates can be grouped together to form multiple heating/temperature zones, allowing exact temperature control for optimal thermal treatment. This is a unique ANDRITZ feature for continuous contact dryers. The number and the size of the plates are determined by the heat transfer surface required by the process and the number of

temperature zones needed. The maximum heating temperature is 325 °C and the typical heating medium is hot water, steam or thermal oil. Different arm and plow arrangements are possible on each plate: between two and eight arms, plow lengths between 90 and 160 mm, and a forward or backward plow orientation. The plate dryer can also be adapted to specific operating conditions by adding optional features or extra equipment.



Plate cross section



MAIN APPLICATIONS FOR THE CHEMICAL INDUSTRY

- Additives for plastics and rubber
- Detergent additives
- Fungicides
- Herbicides
- Insecticides
- Removing residual monomers from plastics
- Salts
- Aluminum hydroxide
- UV blockers



MAIN APPLICATIONS FOR THE PHARMACEUTICAL INDUSTRY

- Antibiotics
- Aspirin
- Acetylsalicylic acid
- Caffeine
- Pharmaceutical intermediate products
- Vitamins

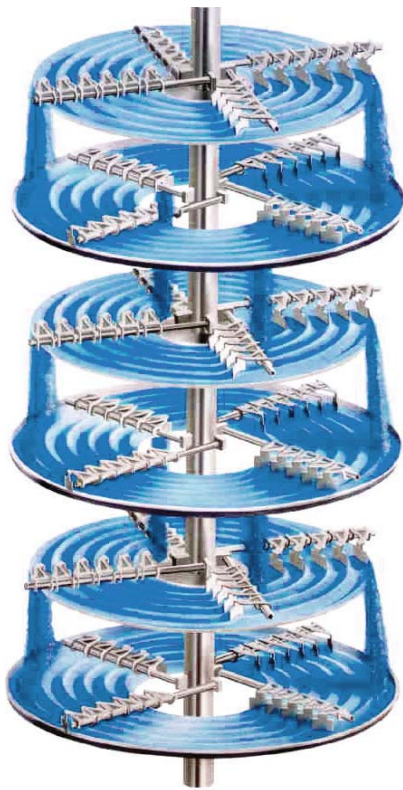


MAIN APPLICATIONS FOR THE FOOD INDUSTRY

- Tea
- Coffee
- Flavors
- Extracts
- Chocolate crumbs

Drying heat sensitive products at lower temperatures

The correct equipment and mode of operation are key considerations at the start of any drying process.



Product flow through dryer

The product flows continuously through the vertical dryer. It is turned over repeatedly, and each particle comes into contact frequently with the drying surface of the heated plates. Moisture evaporates from the product during transport through the dryer. Finally, the dried product falls from the last plate onto the bottom surface of the housing, where it is conveyed by means of plows to the discharge port.

The product is dried by evaporating the solvent. A small amount of carrier purge gas or air (in atmospheric and gas-tight plate dryers) is used to transport the vapors out of the dryer. Processing under vacuum means that the product dries, even at low temperatures, without using any inert gas. Due to the reduced evaporation temperature, heat-sensitive products can be dried at lower temperatures.

ARM AND PLOW ARRANGEMENTS

The product transport system consists of a central upright shaft with horizontal arms and plows. On every plate level, two to eight arms are fixed to the shaft. These arms have free-moving plows that gently rest on top of the plate surface. Variable plow widths are available, depending on the product requirements. The transport system is driven by a frequency-controlled drive. Transportation of the product is optimized by using different plow lengths and different plow arrangements. The product's residence time in the dryer can be adjusted quickly and easily by varying the speed.

MODE OF OPERATION

The wet material to be processed is fed continuously from a feeder (table feeder, rotary valve, vacuum lock ...) on the top plate of the dryer. Rotating arms with plows spread the product in a spiral pattern across the heated surface of the horizontal plate. The product is conveyed towards the outer rim of the small-diameter top plate, where it falls over the edge onto the second, larger plate directly below. On this plate, the product is moved inwards towards the central opening through which it cascades onto the next, again smaller plate. It is then conveyed once more towards the outer rim ... And so forth.

MAIN BENEFITS

- Optimization of the drying process is achieved by adapting the product layer, speed of the product conveying system, number of conveying arms, and the type and size of the plows.
- Suitable for a wide range of particle sizes.
- No product back-mixing, ensuring consistent and highly reproducible product quality.
- Precise adjustment of retention time.
- Exact temperature control with separately heated/cooled plates.
- Low mechanical stress on the product.
- Unrestricted vertical product flow.



Controlled flow of purge gas through drying zones

100% of the solvents separated in the plate dryer can be recovered by condensation.

OPTIMIZED PURGE GAS FLOW

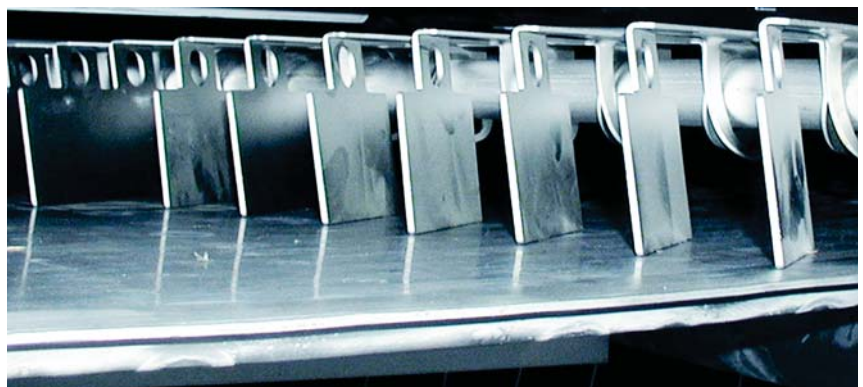
For installations containing nitrogen purge gas loops with solvent recovery systems, it is important to optimize the purge gas flow through the system in order to minimize operational costs and dust formation. The latest ANDRITZ gas-tight plate dryer allows a controlled flow of purge gas through different drying zones. The purge gas enters the process area from the side through diffuser plates and flows across the plates to the exhaust posts on the opposite side. High purge gas velocity in the middle of the dryer provides good heat and mass transfer. Low velocities at the outer diameter keep the amount of dust in the purge gas to a minimum. Dust filters are installed to avoid any product losses.

Ease of use and installation

- Minimal process instrumentation and controls required
- Self-emptying thanks to product conveying system design
- Excellent cleanability and visual inspection
- Workshop assembly results in easy on-site installation
- Only utilities and insulation have to be provided on site.
- Minimal floor space required as a result of the vertical design of the dryer.



Dryer in operation



Typical plow configuration



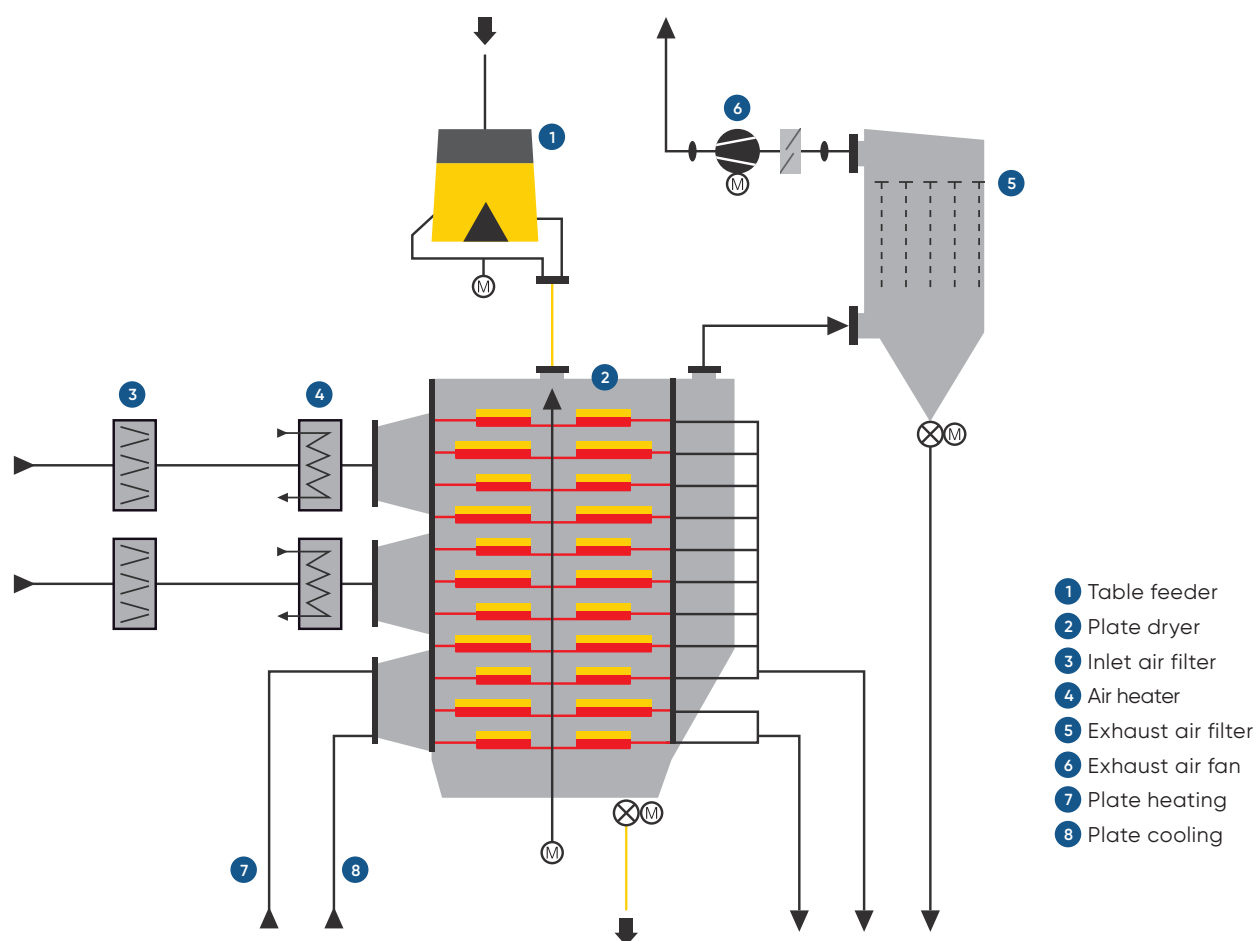
VTT 27/20 dryer system with dust filter,
(2) table feeders, and discharge hoppers

Plate dryers with different housing configurations

The plate dryer has a modular design. The number and size of the plates depend on the individual application. Three basic dryer models are available, each in different housing configurations and suitable for its own specific operating conditions.

ATMOSPHERIC PLATE DRYER, TYPE TTB

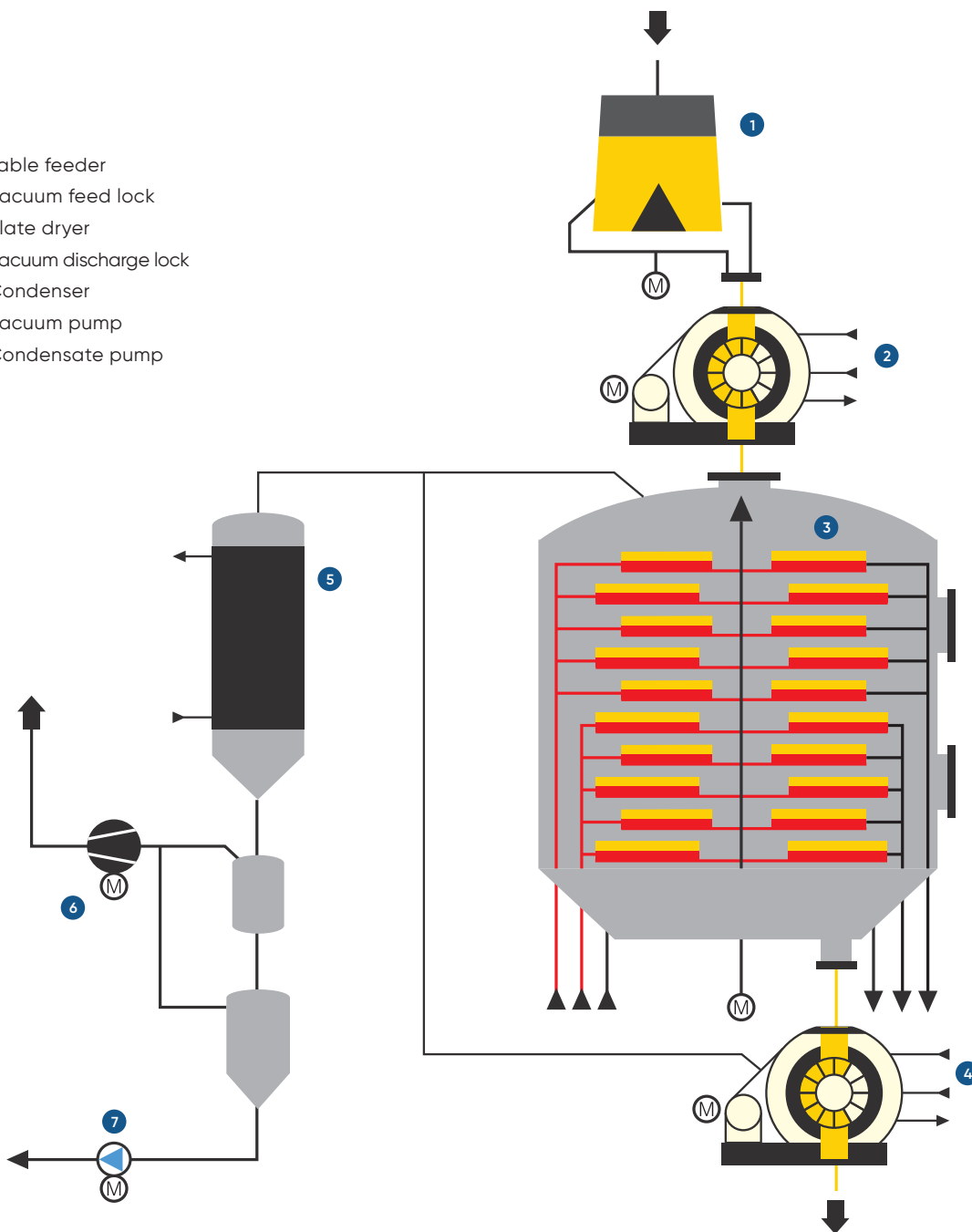
The atmospheric plate dryer TTB is designed for handling wet, non-hazardous, non-poisonous bulk materials with atmospheric air as carrier gas. It is a dust-tight system with an exhaust air fan that draws the air through the housing. The air temperature is almost equal to the plate temperature. The vapor-laden exhaust air is emitted where necessary after passing through a dust filter system.



Vacuum plate dryer, type VTT

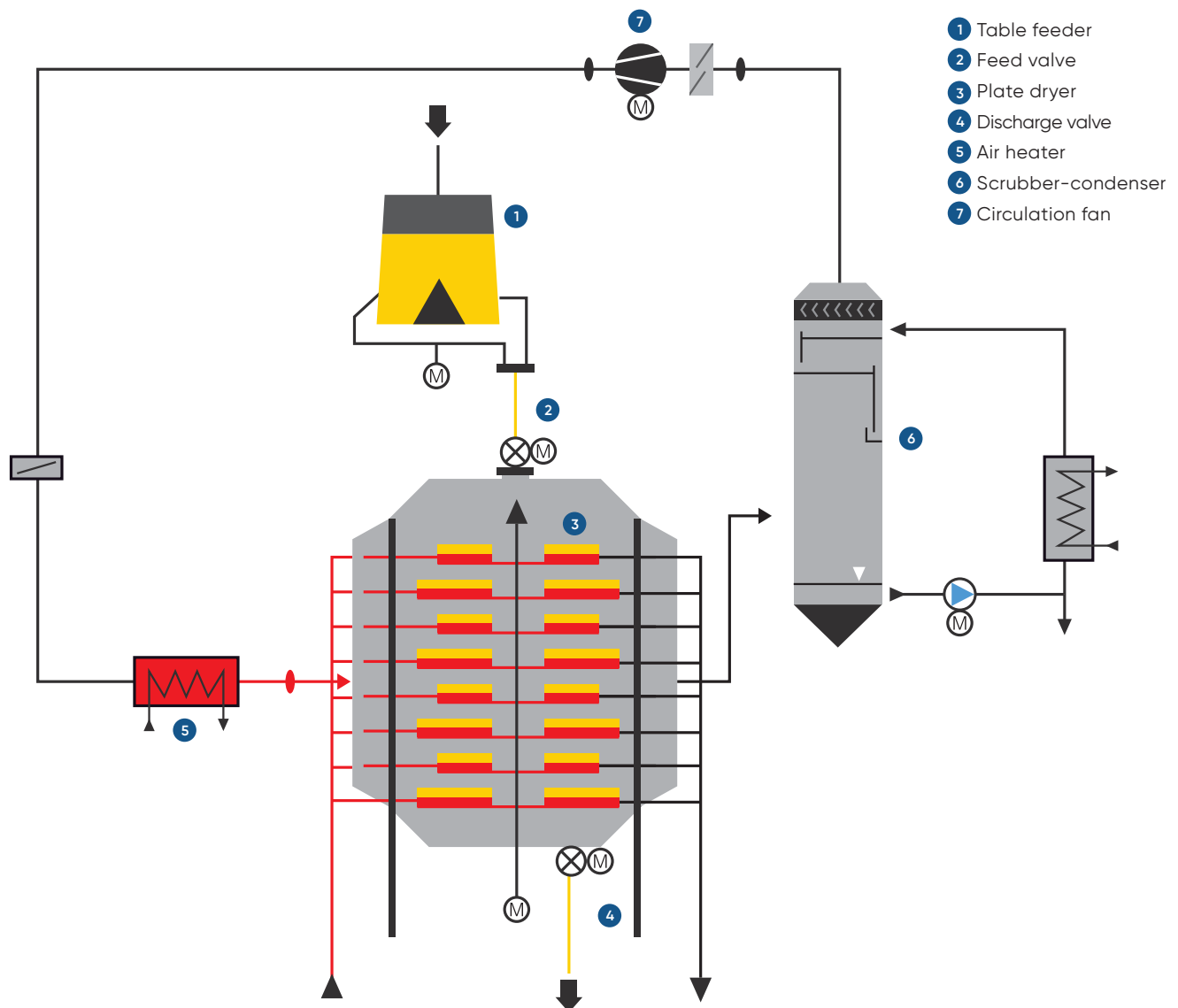
The vacuum plate dryer VTT is typically provided as part of a closed system, designed for processing temperature-sensitive products as well as solvent, wet, toxic, flammable or explosive bulk materials. The exhaust vapor is evacuated by a vacuum pump and passed through a condensation system for solvent recovery.

- 1 Table feeder
- 2 Vacuum feed lock
- 3 Plate dryer
- 4 Vacuum discharge lock
- 5 Condenser
- 6 Vacuum pump
- 7 Condensate pump



Gas-tight plate dryer, type GTT

The gas-tight plate dryer GTT is best suited for processing toxic, flammable or explosive bulk materials with inert gas as carrier gas. Together with the components of the gas recirculation loop, the GTT forms a closed system. The flow rate of the recirculating purge gas must be sufficient to absorb the vapors generated from the drying process. The gas temperature must be adjusted according to specific product characteristics and the type of solvent. After removal of the vapors by condensation, the purge gas is recirculated back into the dryer via a fan and heat exchanger.



Extend your plate dryer process with a centrifuge

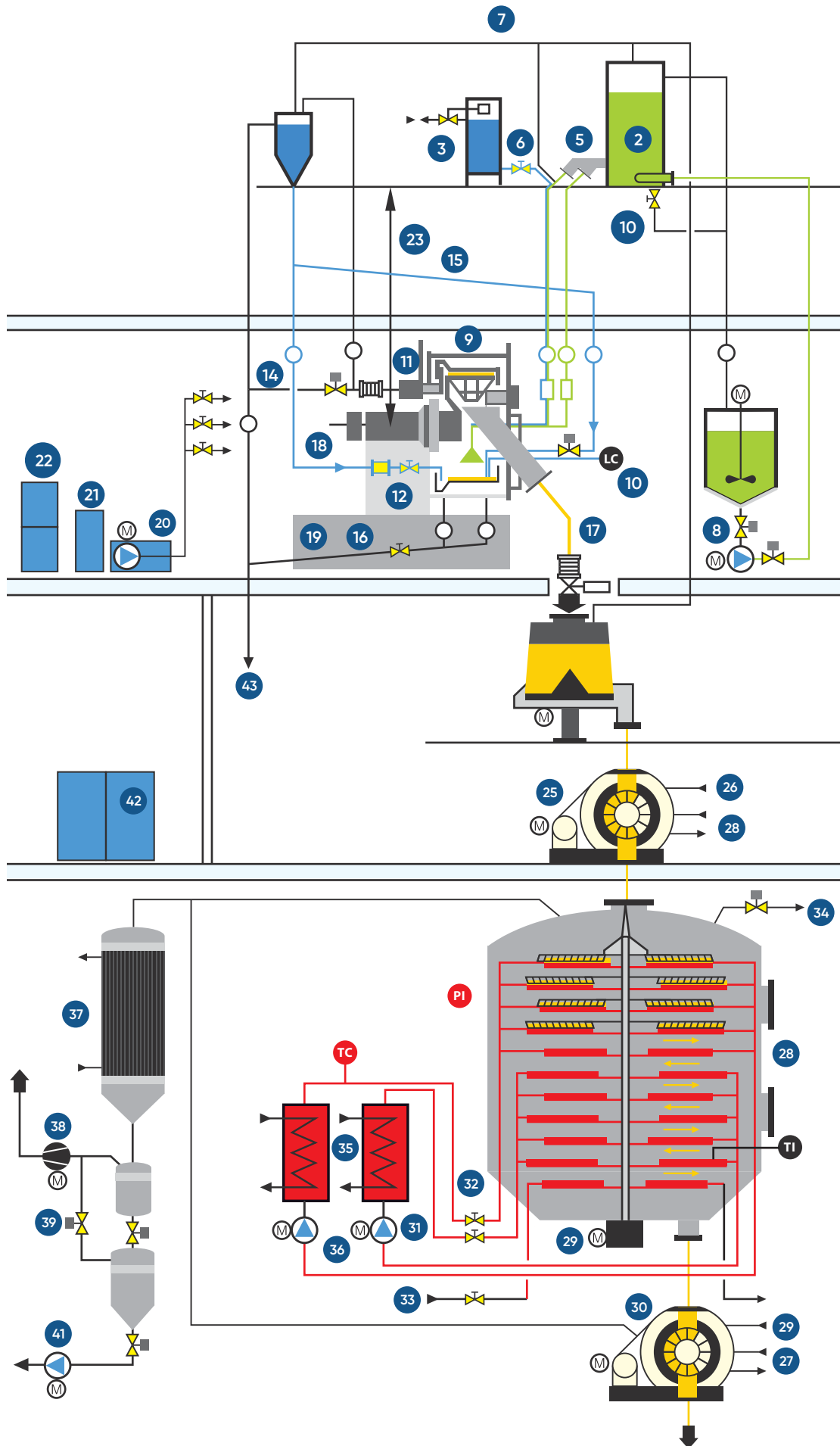
ANDRITZ has the capability to supply all ancillary equipment and components for all types of plate dryers.

All three types of plate dryers have the same basic operating principles when installed with a centrifuge. The product is dewatered mechanically in the centrifuge and fed through a feeding/metering device into the top of the dryer. The batch-type

operation of machines such as a vertical basket or peeler centrifuge is converted to a continuous feed by a table feeder. In addition, suitable product feed and discharge valves such as vacuum locks or rotary valves complete the system.

- 1 Slurry tank
- 2 Feed vessel
- 3 Wash liquid vessel
- 4 Filtrate vessel
- 5 Feed valve
- 6 Wash valve
- 7 Gas pressure equalizing pipe
- 8 Suspension pump
- 9 Peeler centrifuge
- 10 Automatic feed control
- 11 Siphon for peeler device
- 12 Siphon for backwashing
- 13 Filtrate discharge
- 14 Filtrate switching (pressureless filtrate discharge)
- 15 Filter cloth/screen rinsing
- 16 Splash liquid drain
- 17 Solids discharge
- 18 Centrifuge drive
- 19 Inertia block with springs and vibration absorbers
- 20 Hydraulic power unit and control valve
- 21 Local control panel (hazardous areas)
- 22 Control panel (in control room or local)
- 23 Minimum feed height 3m
- 24 Table feeder TAG
- 25 Vacuum lock VS
- 26 Compressed air supply
- 27 Cooling/heating water supply
- 28 Plate dryer VTT
- 29 Variable dryer drive
- 30 Vacuum lock VS
- 31 Plate heating system 1
- 32 Plate heating system 2
- 33 Cooling water supply
- 34 Ventilation pipe
- 35 Heat exchanger
- 36 Heating medium circulation pump
- 37 Condensator
- 38 Vacuum pump
- 39 Vacuum/venting/condensate valve
- 40 Condensate vessel
- 41 Condensate pump
- 42 Dryer control cabinet





Reliable upscaling

ANDRITZ pilot plant to determine new process technology, viability, and success.

In our test centers, we do research on the right type and size of drying equipment for specific drying requirements. To establish the behavior of material to be dried, scale-up tests are carried out on a simulator, in a laboratory or at customers' plant sites. The simulator operates in conjunction with a data recording and analyzing system in order to evaluate the precise drying times and rates.

Our test center is also equipped with a production-sized atmospheric/gas-tight and vacuum plate dryer for determining product behavior at production scale capacities over an extended period of time. This system can be converted into a small process line by the addition of a mechanical dewatering unit as well as feed (centrifuge) and discharge equipment. With the data gathered during the test work, we are able to size and optimize the dryer and auxiliary equipment.



Product in lab simulator

Environmentally safe

ANDRITZ is constantly aiming for a low environmental footprint. In any of the ANDRITZ plate dryer configurations, environmentally safe operation is key. In atmospheric operation, the dust loading in the exhaust gas is negligible due to low gas velocities in the dryer. Also, operation slightly below atmospheric pressure prevents emissions. The gas-tight configuration is a closed system with recirculated purge gas. Solvent recovery systems are available. The closed system operating under vacuum prevents any release of product or vapors to the surrounding environment. It is known for its simplified solvent recovery with low energy requirement and can be used for heat-sensitive materials. Heat-sensitive products can be dried at lower temperatures.

Reduced energy consumption

- Contact drying yields high thermal efficiency and low energy requirement.
- Low purge gas velocities minimize the energy required to heat the gas in both atmospheric operation and gas recirculation mode.
- Only required vacuum operation, energy is only required for heating of the product to the boiling temperature corresponding the vacuum level and for the heat to vaporize the volatiles.





Your full-service provider

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 Vandebroek.

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



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



Dimensions and models

Three basic dryer models are available, each in different housing configurations and suitable for its own specific operating conditions.

MODEL SIZE 12

NOMINAL DIAMETER OF THE LARGER PLATE 1.200 MM

			Type TTB Atmospheric plate dryer in dust-tight design.		Type GTT Gas-tight design with or without closed loop gas recirculation system.		Type VTT Designed to operate under vacuum with or without closed loop gas recirculation system.	
	Plate surface m²	Drive motor kW inst.	Height mm	Width Depth mm	Height mm	Width Depth mm	Height mm	Width Depth mm
12/5	3.5	0.75	2,500	2,100	2,500	2,100	2,500	2,100

MODEL SIZE 20

NOMINAL DIAMETER OF THE LARGER PLATE 2.000 MM

			Type TTB Atmospheric plate dryer in dust-tight design.		Type GTT Gas-tight design with or without closed loop gas recirculation system.		Type VTT Designed to operate under vacuum with or without closed loop gas recirculation system.	
	Plate surface m²	Drive motor kW inst.	Height mm	Width Depth mm	Height mm	Width Depth mm	Height mm	Width Depth mm
20/5	12.5	1.5	2,800	2,500/2,900	2,800	2,500/2,900	2,700	2,500
20/7	17.6	1.5	3,140	2,500/2,900	3,140	2,500/2,900	3,040	2,500
20/9	22.7	2.2	3,480	2,500/2,900	3,480	2,500/2,900	3,380	2,500
20/11	27.8	2.2	3,820	2,500/2,900	3,820	2,500/2,900	3,720	2,500
20/13	32.9	2.2	4,160	2,500/2,900	4,160	2,500/2,900	4,060	2,500
20/15	38.0	3	4,500	2,500/2,900	4,500	2,500/2,900	4,400	2,500
20/17	43.1	3	4,840	2,500/2,900	4,840	2,500/2,900	4,740	2,500
20/19	48.1	3	5,180	2,500/2,900	5,180	2,500/2,900	5,080	2,500
20/21	53.2	4	5,520	2,500/2,900	5,520	2,500/2,900	5,420	2,500
20/23	58.3	4	5,860	2,500/2,900	5,860	2,500/2,900	5,760	2,500



MODEL SIZE 27

NOMINAL DIAMETER OF THE LARGER PLATE 2.700 MM

Type TTB

Atmospheric plate dryer in dust-tight design.

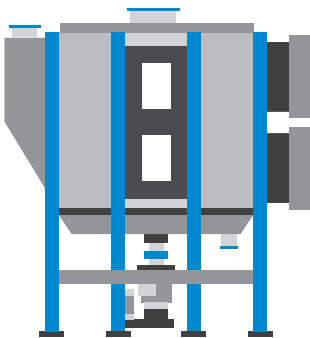
Type GTT

Gas-tight design with or without closed loop gas recirculation system.

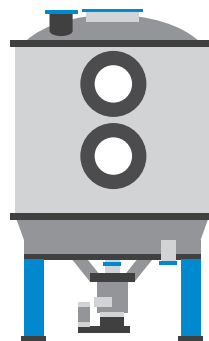
Type VTT

Designed to operate under vacuum with or without closed loop gas recirculation system.

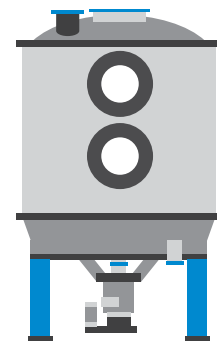
	Plate surface m ²	Drive motor kW inst.	Height mm	Width Depth mm	Height mm	Width Depth mm	Height mm	Width Depth mm
27/11	55	5.5	4,300	3,400 /3,900	4,300	3,400 /3,900	4,700	3,400
27/13	65	5.5	4,700	3,400 /3,900	4,700	3,400 /3,900	5,100	3,400
27/15	75	5.5	5,100	3,400 /3,900	5,100	3,400 /3,900	5,500	3,400
27/17	85	5.5	5,500	3,400 /3,900	5,500	3,400 /3,900	5,900	3,400
27/19	95	7.5	5,900	3,400 /3,900	5,900	3,400 /3,900	6,300	3,400
27/21	105	7.5	6,300	3,400 /3,900	6,300	3,400 /3,900	6,700	3,400
27/23	115	7.5	6,700	3,400 /3,900	6,700	3,400 /3,900	7,100	3,400
27/25	125	7.5	7,100	3,400 /3,900	7,100	3,400 /3,900	7,500	3,400
27/27	135	7.5	7,500	3,400 /3,900	7,500	3,400 /3,900	7,900	3,400
27/29	145	11	7,900	3,400 /3,900	7,900	3,400 /3,900	8,300	3,400
27/31	155	11	8,300	3,400 /3,900	8,300	3,400 /3,900	8,700	3,400
27/33	165	11	8,700	3,400 /3,900	8,700	3,400 /3,900	9,100	3,400
27/35	175	11	9,100	3,400 /3,900	9,100	3,400 /3,900	9,500	3,400
27/37	185	11	9,500	3,400 /3,900	9,500	3,400 /3,900	9,900	3,400
27/39	195	11	9,900	3,400 /3,900	9,900	3,400 /3,900	10,300	3,400



Type TTP



Type GTT



VTT



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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