

# **ANDRITZ Gouda drum dryer**

Built on solid principles



# The process

## The ultimate drying drum

Products have been dried industrially for more than a century. Since its early years, ANDRITZ Gouda has specialized in industrial processing lines.

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▲ Drum dried product film

For easy, hygienic drying of everything from baby/infant food to toxic materials, ANDRITZ Gouda is with you every step of the process. Product treatment before and after drying receives our equal attention. From kitchen preparation through to mill sifting and pneumatic transport, we can offer practical solutions as well as access to a wealth of informed research.

Drum drying is a continuous indirect drying method. Products are dried by spreading them in a thin and uniform layer onto the heated surface. Due to the kneading effect of the applicator system and to the scraped heat exchange surface, the dryer is unique for the drying of viscous, pasty, and sticky materials. Due to the short retention time of the product at high temperature, virtually no heat damage will occur. Contrary to

#### Benefits

- Highest hygienic standard
- Low energy consumption
- High thermal efficiency
- A long, continuous life cycle

the direct drying method, which uses hot air for evaporation, the drum dryer does not need any dust separation. The thermal efficiency is favorable, whilst no heat is wasted in the largest volumes of exhaust air. A very thin layer of the product to be dried is applied to the outside of a rotating cylinder (drum). This drum is heated on the inside by means of steam. When in contact with the heated surface, the liquid will evaporate from the thin layer very quickly. After an almost complete rotation of the drum, the remaining dried product is scraped off the



▲ Cereal based baby/infant food

drum surface in the form of a film or as a powder. A special composition of cast iron gives the drum a combination of favorable properties: very accurate shape retention even at high steam pressure and temperature, and excellent “scraping properties” for the scraping knife. Steam heating gives uniform temperature distribution over the drum surface, and this results in a consistent product quality. The steam condenses on the inside of the drying drum. The condensate is removed continuously from the drum to make the largest possible surface area available on the inside of the drum for

condensation of the steam. The steam system is a closed system, which means that the product cannot come into contact with the steam or condensate.

Drum drying is an environmentally friendly drying method. There is hardly any dust emission, as only a relatively small amount of air is removed by suction. The maximum specified dust emission values can be obtained without complicated filter installations. Energy recovery and smell abatement are possible. The compact drum dryer leaves an interestingly small financial footprint.

A relatively low investment in building and installation is required compared to other drying technologies. Drying can be an expensive part of the production process. With the ANDRITZ Gouda drum dryer, however, running costs can be significantly lower. Its high thermal efficiency translates to steam consumption of approx. 1.4 kg for each kilogram of water evaporated. Useful energy can even be recovered as it exits the system.



# Equipment

## The keys to the system

The pure geometry of the drum creates the perfect heat exchange surface. Indeed the concepts of strength and simplicity are incorporated throughout the ANDRITZ Gouda design. And while cleaning industrial equipment might never be a joy, care in construction makes the necessary tasks as painless as possible.



### The ultimate drying drum

Designing a pressure vessel to satisfy stringent production, quality, and safety parameters is not a role for the faint-hearted. In ANDRITZ Gouda's experience, only cast iron of a special composition can ensure high quality drum drying. Its uniform hardness and homogenous structure equip the drum to withstand high temperatures and inner pressure with unflinching accuracy, whatever the prevailing operating conditions.

Also, chromium plating of the cast iron drum can be supplied for hygienic requirements or corrosive protection of the drum for certain applications. ANDRITZ Gouda drum cylinders are not just built for strength. They are machined both inside and out for smoothest action. A highly accurate curve and wall thickness ensure exceptionally consistent heat transfer.



### An adaptable feed

Regular product distribution is the first essential within a controlled drying process. ANDRITZ Gouda can supply a wide range of fixed or transferring feed systems to suit particular product and viscosity types.



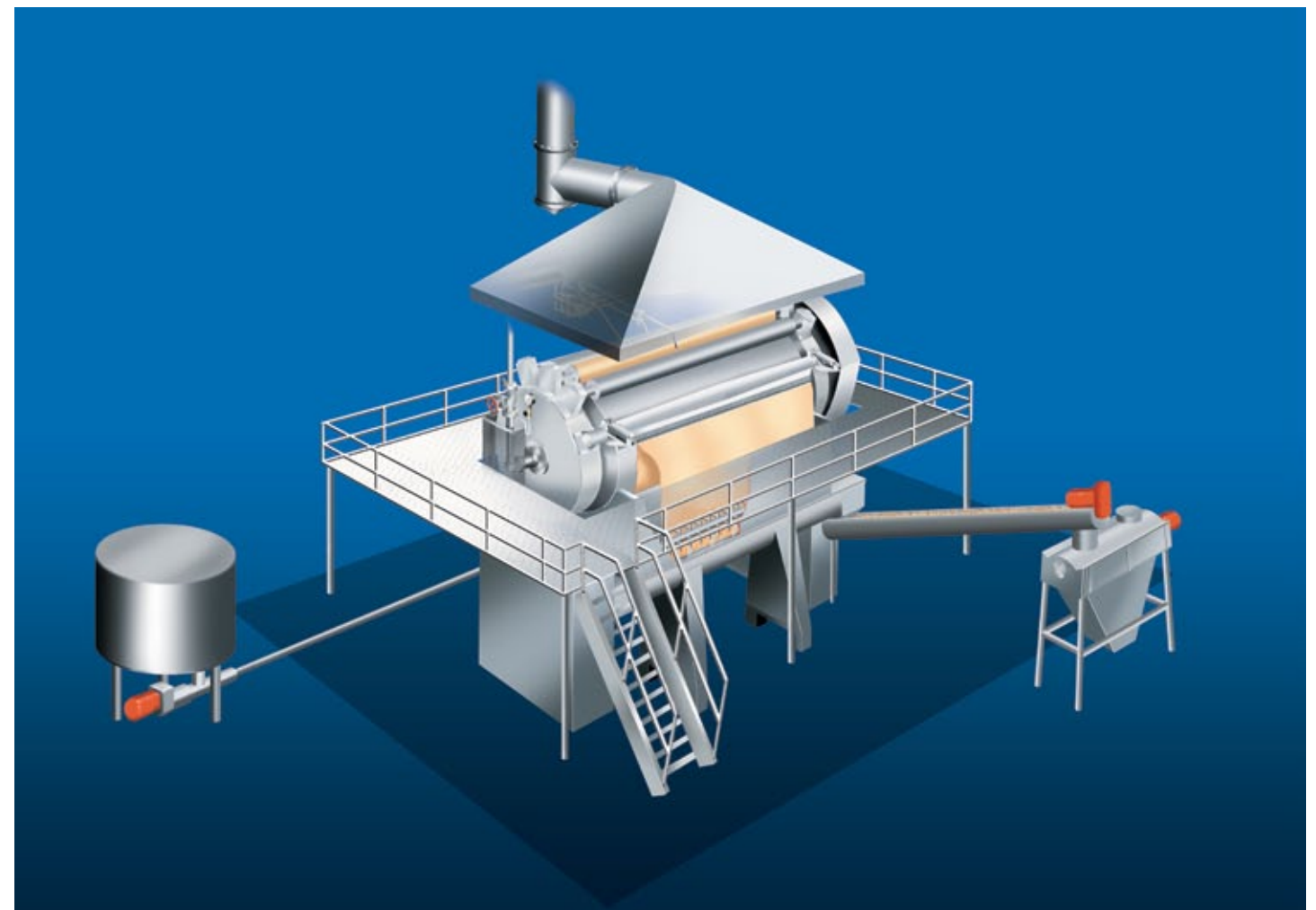
### Drive

ANDRITZ Gouda supplies a variable speed drive as part of the process control system. This drive can be provided with an explosion-proof motor and is built up furthermore using tested standard components from reputable manufacturers. The choice can be made in consultation with the customer.

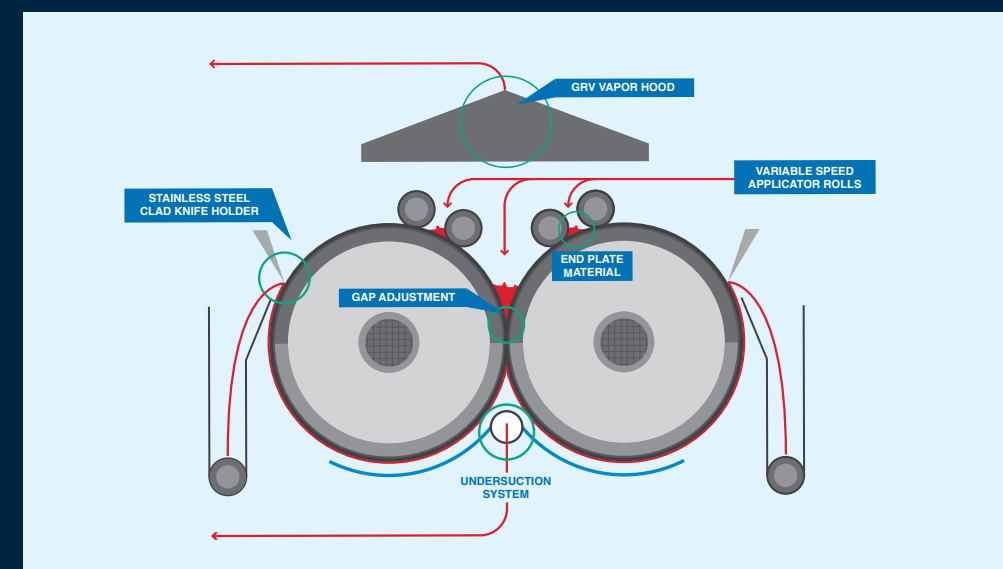


### Recovery that's pure and simple

The cast iron construction of the dryer's scraper assembly guarantees uniform pressure over the full length of the drum, and further serves to eliminate vibration. Knife pressure can be controlled hydraulically. Dried product is recovered as film or powder into a special screw conveyor, complete with pre-flaking capability, enabling the output to be transported easily. A special adaptation of the recovery system is available for handling thermoplastic products.



Drum dryer construction

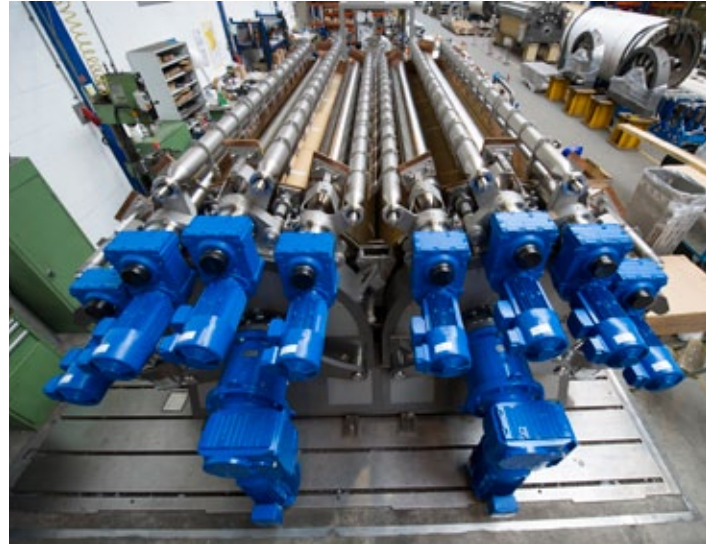


Instrumentation and control



# ANDRITZ Gouda drum dryer

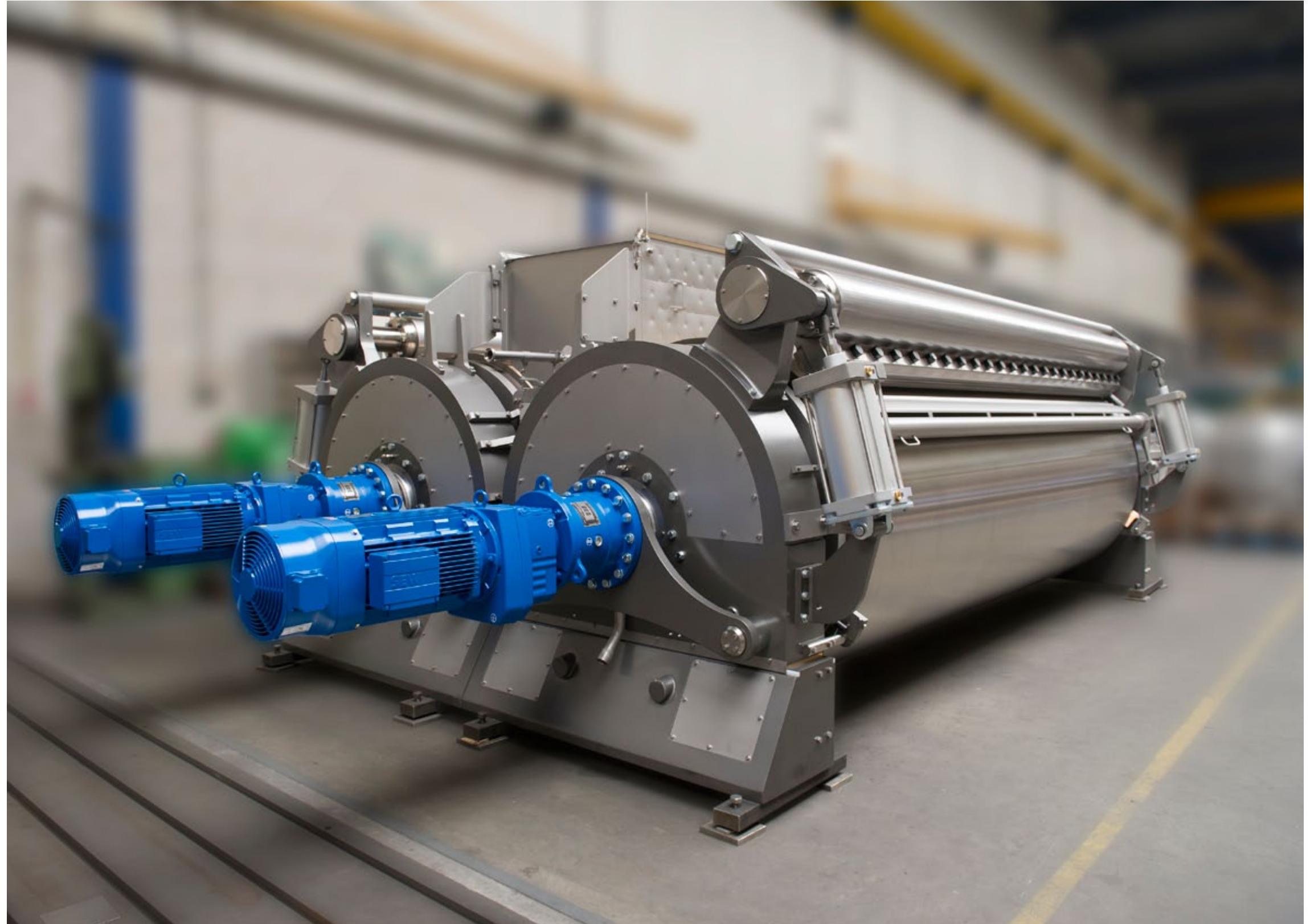
Visual impressions



▲ Special design drum dryer



▲ Drum dryer with vapor hood



▲ Double drum dryer



## Various designs

### Different operating principles

Precision-engineered for ultimate stability, ANDRITZ Gouda dryers are equipped for a long, uninterrupted life-cycle.



▲ Product on a drum dryer

Building a reputation for quality means using highly specified materials and components. Special, completely closed alloy castings for optimal heat transfer, vapor hood tracing, special bearings, are all standard. ANDRITZ Gouda's quality assurance includes certification by ASME, TÜV, European PED, and CE. Depending on the design, the product is applied continuously as a thin film at the bottom or on top of the main drum. As the drum rotates and is heated on the inside, the product dries

on the outside of the drum surface. The brief exposure to a high temperature reduces the risk of damage to the product. The construction of the knife holder guarantees even pressure over the entire length of the drum. The use of specific materials prevents vibrations as a result of scraping and guarantees uniform product removal. The pressure of the knife can be controlled simply and outside of the process area.

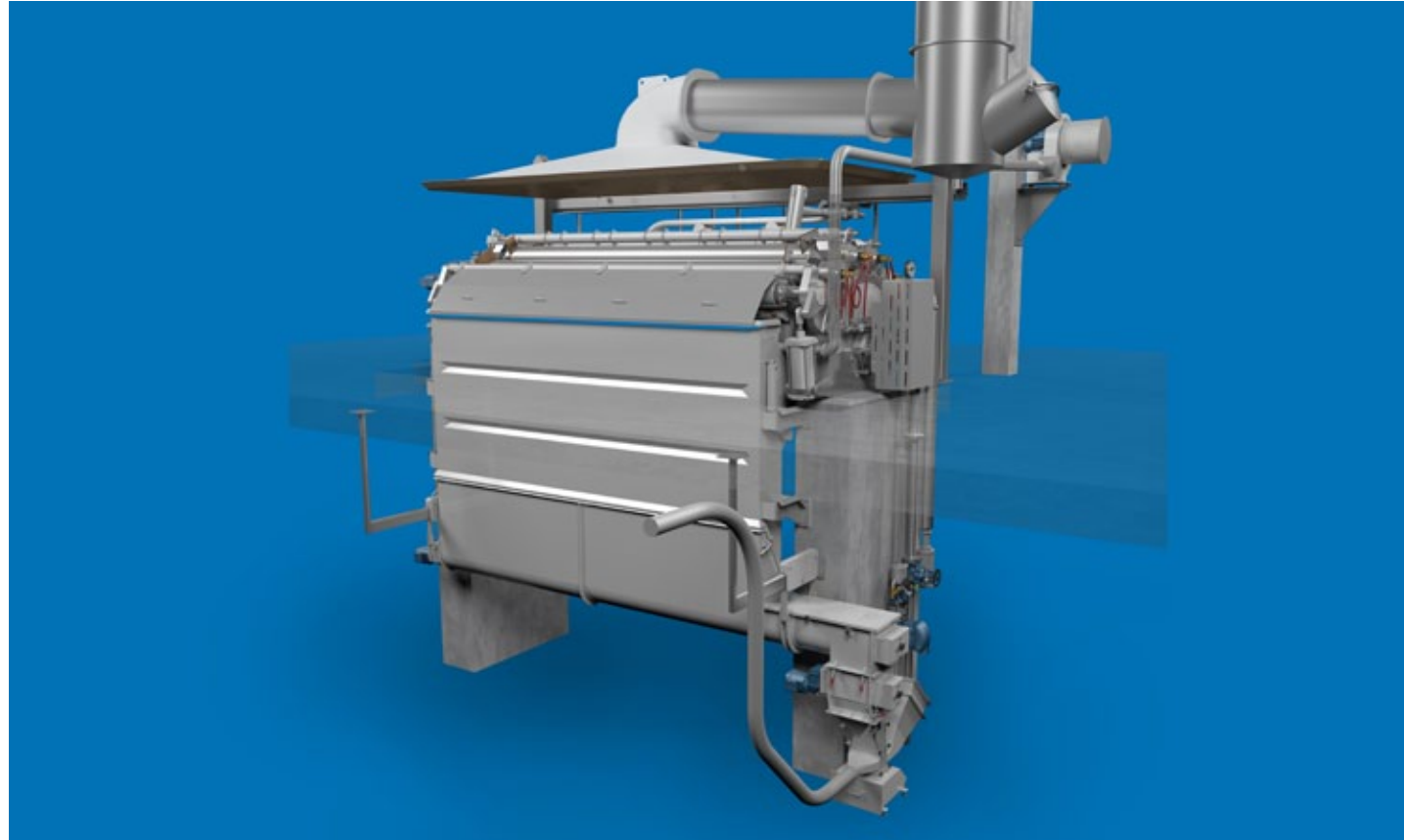


◀ Soya flakes



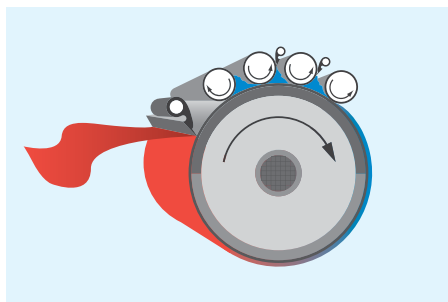
## Various designs

### The single drum dryer



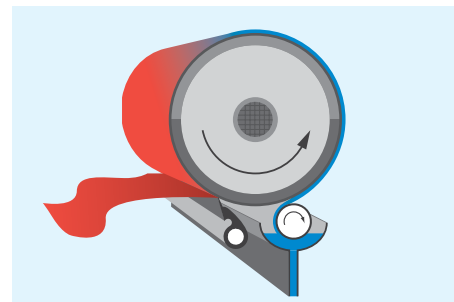
On the single drum dryer, the wet product is fed to the dryer by means of applicator rolls

Depending on the number of applicator rolls used, the layer formed on the drying drum can be thicker or thinner. The special construction of this dryer makes it particularly suitable for processing pasty or pulpy products. This is due to the applicator system, which ensures perfect distribution of the product along the full length of the drum. In addition, the kneading effect of the rolls, prevent sticky products from forming lumps.



#### Drum dryer with applicator rolls

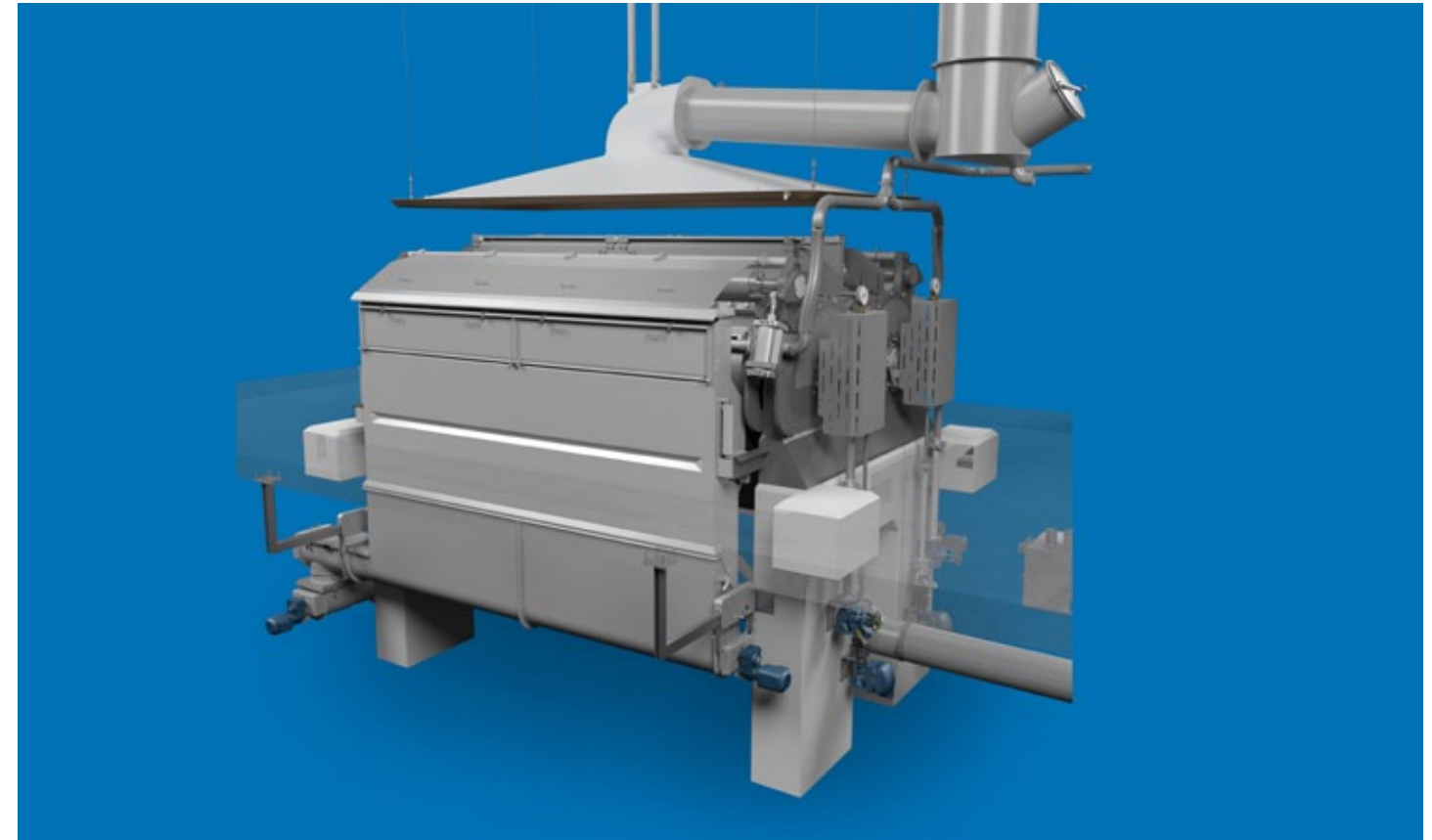
The applicator rolls make it easy to regulate product feed. In addition, they have a kneading effect, preventing lump formation in stickier materials. With perfect distribution along the length of the drum, the system is ideal for processing pasty or pulpy products.



#### Drum dryer with bottom dip roll

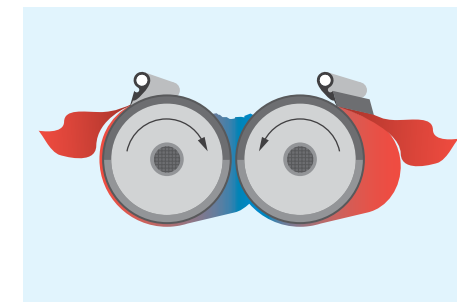
A version designed for specific applications and chemicals. In this machine, the roll sits underneath and dips into the product, picking up a liquid layer for transfer to the drum – similar to a printing press.

### The double drum dryer



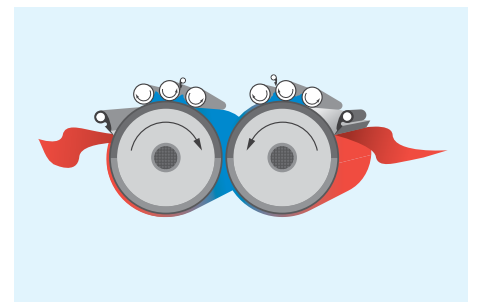
A double drum dryer provides additional capability

A double drum dryer is often used for products with lower viscosities. The product is fed into the sump between the two drums. The distance between the drums can be adjusted accurately to control the layer thickness on the drums. In addition, applicator rolls can be used. This machine can also be used as two single drum dryers with overhead applicator rolls.



#### Double drum dryer

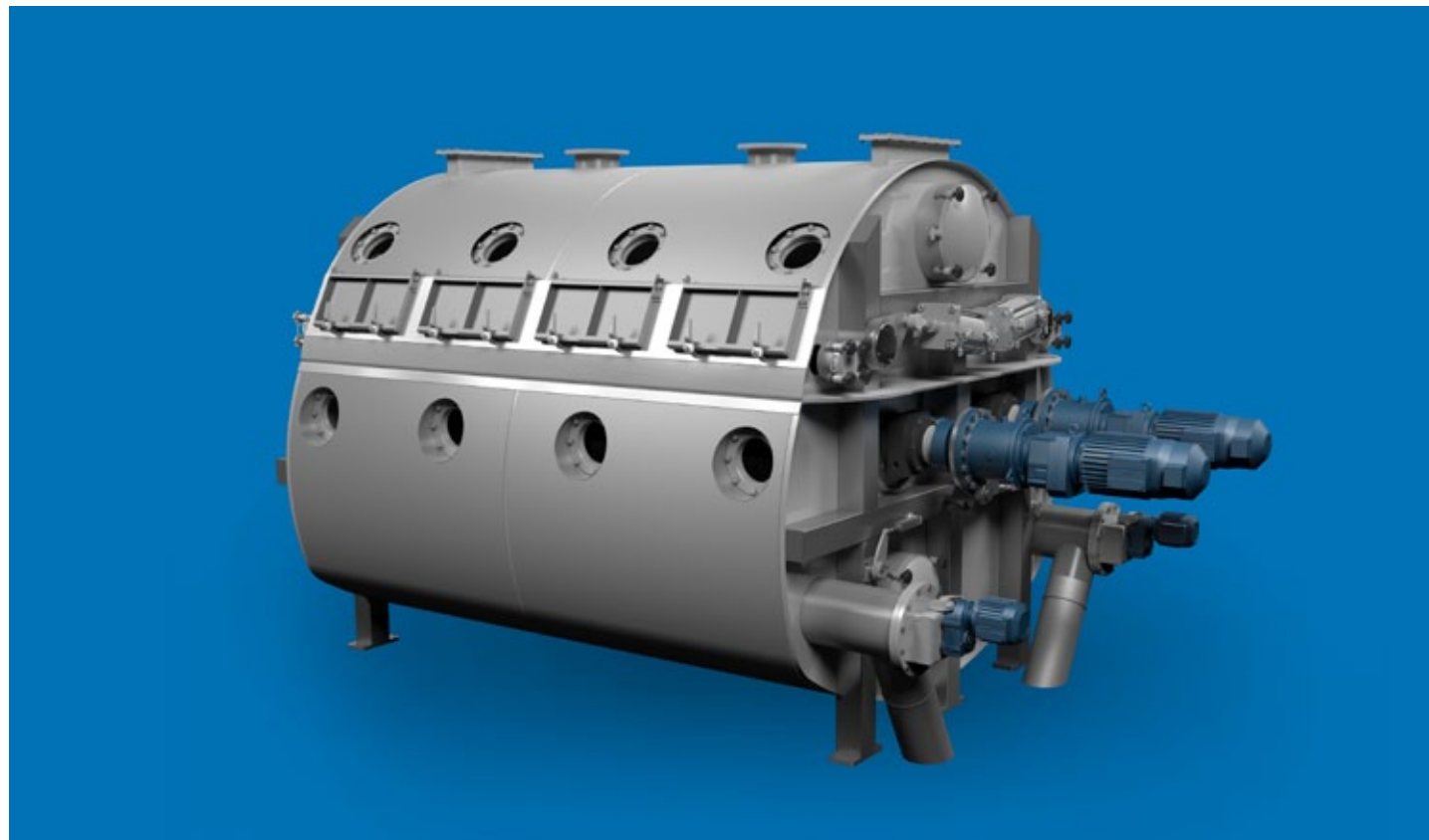
With this system, product is fed into the nip between a pair of drums (which always rotate in opposite directions). This small gap between the drums is finely adjustable to optimize the film thickness.



#### Double drum dryer with applicator rolls

The double drum dryer with applicator rolls is suitable for customers with more variables in their product range. This multifunctional setup offers the greatest versatility – combining the advantages of both the single and double drum dryer systems





## Various designs

### The vacuum drum dryer

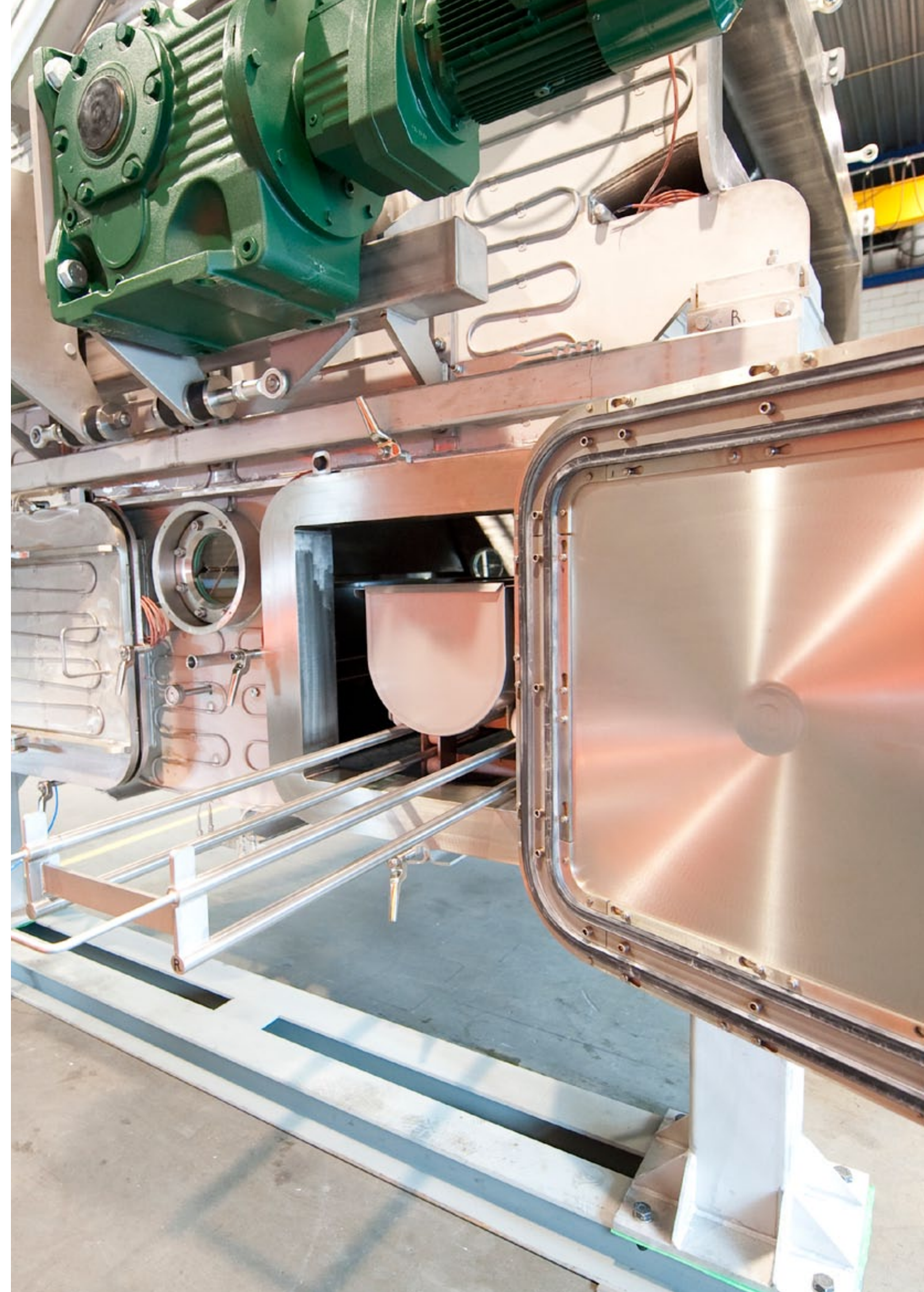
Heat sensitive? Cool-running vacuum drum dryers and double drum dryers.

Enables drying at low temperatures, thus avoiding damage to heat-sensitive product components. freedom from atmospheric contamination and independence from climatic conditions, operating results are always uniform. Moreover, these dryers can be used for recovery of solvents by collecting the vapors forming during the drying process. Double vacuum dryers offer larger capacity and, lower production costs. Two steam-heated drums revolve in a hermetically sealed casing under strong vacuum. Liquid is fed in between the rolls, dried, and scraped off before the drums have completed a single rotation.

#### Food products may benefit especially

- Swift evaporation without risk of oxidation
- Enzymes and vitamins are preserved
- Coagulation of proteins is prevented
- Highly soluble end product

The vacuum dryers are very hygienic. There is no recirculation of material, no waste is produced, and the drum is accessible for thorough cleaning. Since operation is totally independent of climatic conditions, results are always the same.



Vacuum drum dryer – batch type ▶



# Research and development

## Realizing the future vision

Research and development has been the cornerstone of ANDRITZ Gouda's success. The R&D activities are carried out in close co-operation with clients and focus on the feasibility of a desired process or product.

ANDRITZ Gouda is implementing future standards, today. Making better, cleaner, more complete dryers, with stainless steel parts made of the best grade. Designing systems with minimal energy exhaust and dust emission (no complicated filter installations required). And, of course, ensuring optimal hygiene throughout the process – machines that operate to HACCP/EHEDGE standards.

### Energy-efficient, environmentally friendly

With the ANDRITZ Gouda drum dryer, running costs can be significantly lower than with other dryers. Its high thermal efficiency translates to steam consumption of approximately 1.4 kg for each kilogram of water evaporated. Useful energy can even be recovered as it exits the system. Drum drying is environmental friendly as well; there is hardly any dust emission, thus avoiding complicated filter installations and additional waste.

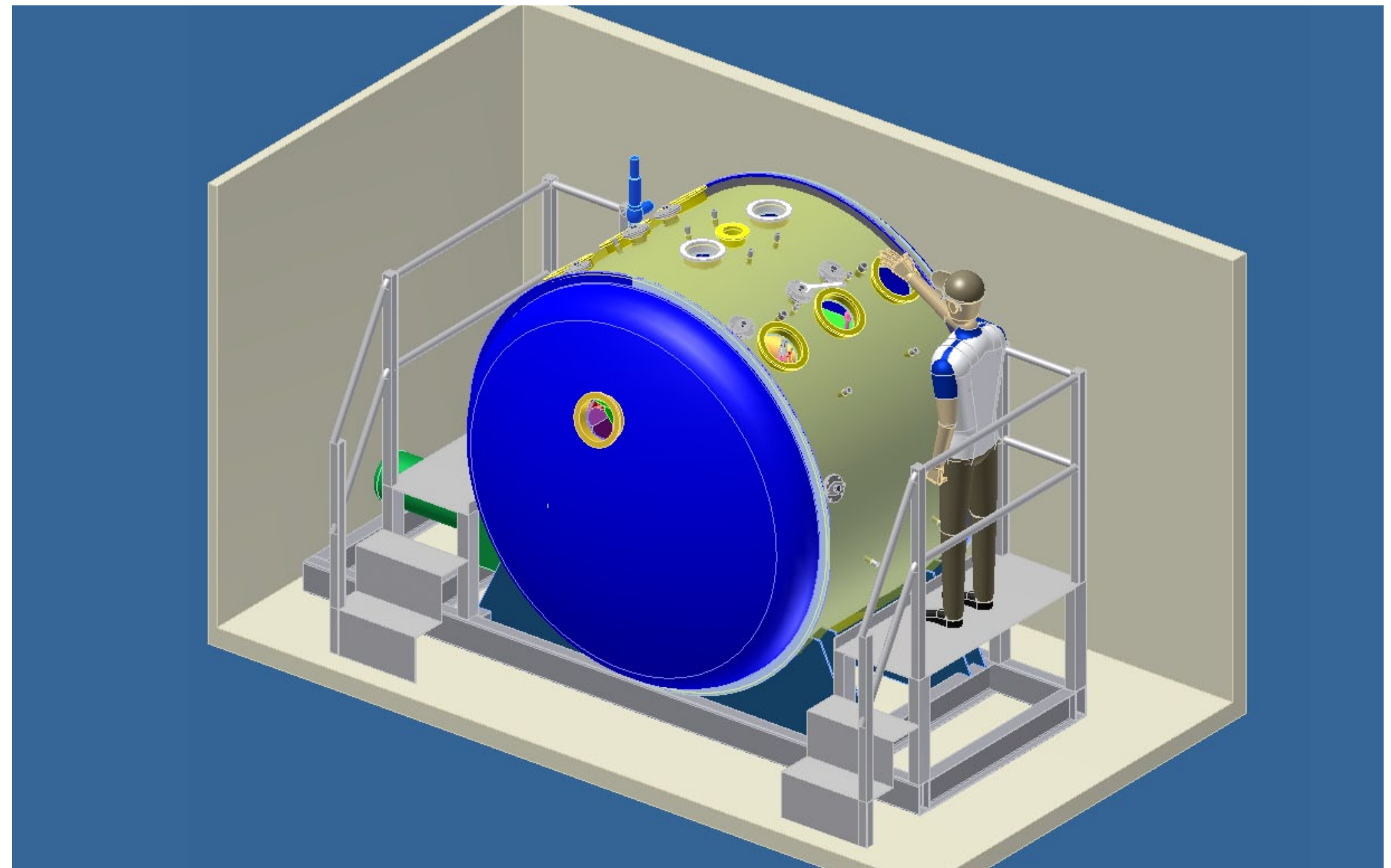
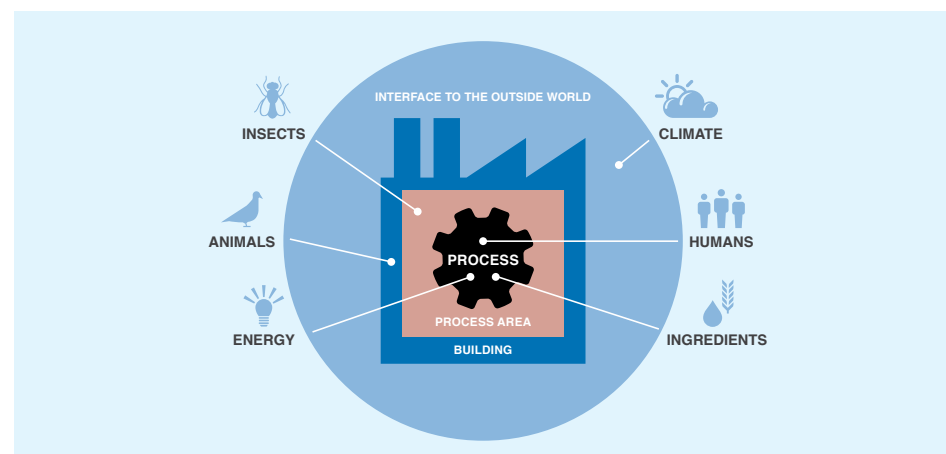
### Hygiene

Hygiene is especially important in food applications. In the design of the drum dryer, a clear distinction is made between the process section of the dryer and the mechanical parts. This, for instance, prevents the risk of contamination by lubricants (or contamination of the lubricants due to leakage of the product). It also improves the accessibility of parts for adjustment, inspection and maintenance.



### Innovation areas of the drum dryer are:

- Increasingly hygienic design
- Machine safety
- Maintenance aspects
- Product quality
- Energy savings/recovery
- Operator independence



▲ Developing a vacuum dryer

◀ The dryer's process area is separated from its mechanical components, thus eliminating the risk of contamination.



# Applications

## Food industry

ANDRITZ Gouda is implementing future standards today, ensuring optimal hygiene throughout the process.



▲ Specialized drum dryers for products based on milk, starch or cereals

The use of ANDRITZ Gouda dryers is not limited to the mere evaporation of water or solvents from a given product. In the case of certain nutritious substances for instance, there is also a ready-cooking effect in addition to drying and at which remarkable instant properties are obtained. Various world-famous instant foods are therefore made on ANDRITZ Gouda dryers. Food products may benefit especially from the vacuum drum dryer, which enables drying at low temperatures, avoiding damage to heat-sensitive product components. Evaporation occurs within seconds, without risk of oxidization.

Enzymes and vitamins are preserved, and the coagulation of proteins is prevented. And the final product – either in flake or powder form – is highly soluble, allowing rapid reconstitution to a liquid.

### Applications

- Cereal-based baby food
- Milk
- Cereal-based drinks
- Yeast
- Pre-gelatinized starch
- Gelatin
- Potatoes
- Fruit

### Advantages

- Short residence time
- Vacuum options
- Continuous process

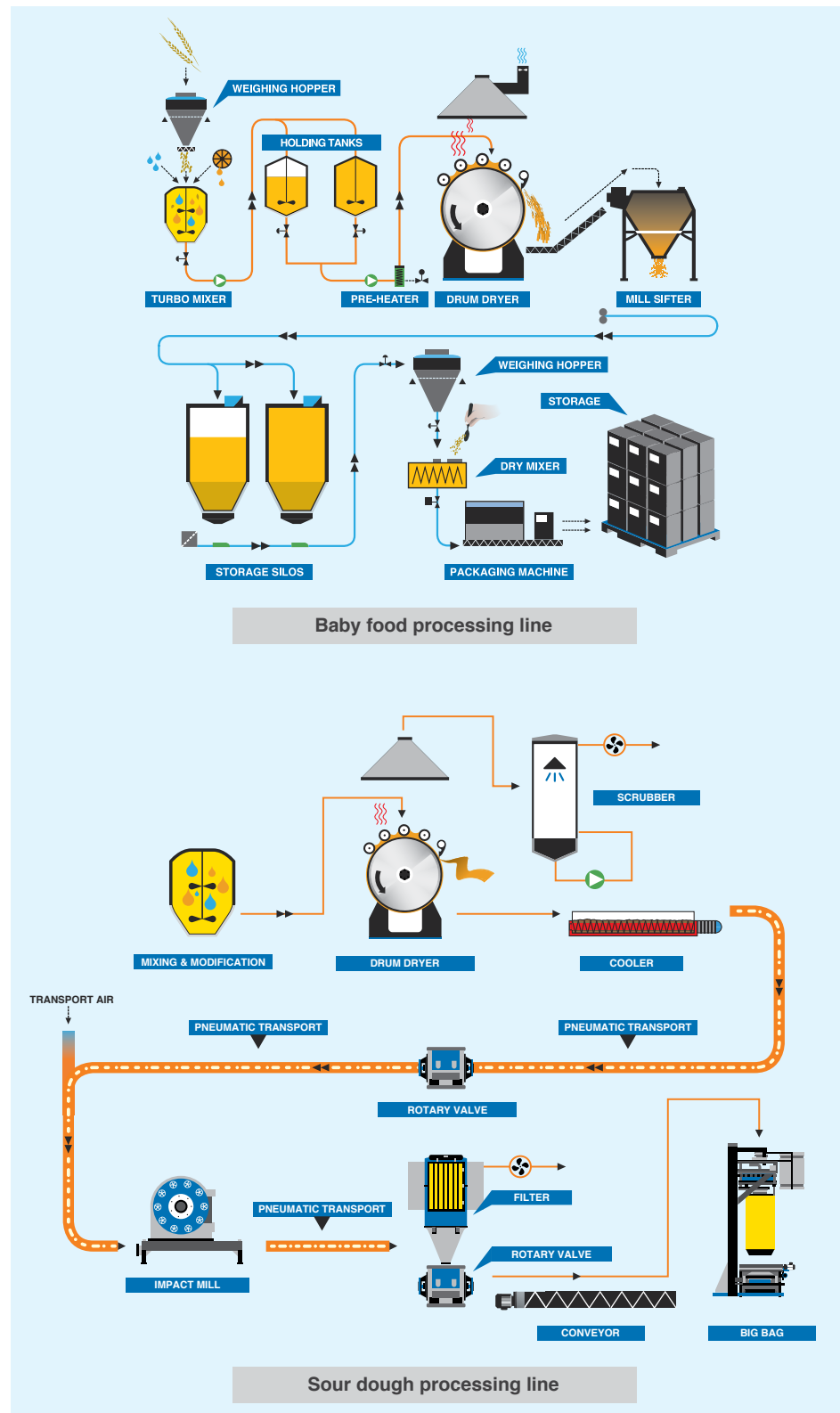


# Applications

## Food industry

Turnkey solutions for various applications

Although each production line must be specially designed, a modern processing line will include intake, weighing and mixing of raw materials, a drum drying section, a milling section, storage silos, and a section for composing and mixing the final formulae. Over the years, extensive knowledge has been gained on all kinds of production process possibilities and machines to obtain the final product characteristics.



# Applications

## Chemical, pharmaceutical industry

ANDRITZ Gouda not only produces a range of standardized machines, but also has wide experience in building special machines according to customers requirements.



▲ End products based on drum-dried material

When it comes to tolerance, there can be no compromise. The durable construction of the ANDRITZ Gouda drum dryer makes light work of the most demanding operating conditions. The built-in accuracy of the system delivers correctly processed product, year after year. The single drum dryer with a bottom dip roll is a version designed for specific applications and chemicals.

Since the drying characteristics of most products are not entirely predictable, we use pilot plant testing to select the most efficient machine model and size.

For more than 90 years of continuous operation, ANDRITZ Gouda's pilot plant has tested and developed solutions for a huge variety of requirements. These results and the experience gathered are put to work for today's customer requirements.

### Applications

- Animal-based glue
- Pesticides
- Sodium benzoate
- Polymers
- Pigments
- Detergents
- Enzymes
- Proteins

### Advantages

- Short residence time
- Vacuum options
- Continuous process





▲ Drum dryer test in our pilot plant

## ANDRITZ Gouda pilot plant: For reliable upscaling

Determining new process technology viability and success

A unique feature and part of ANDRITZ Gouda's 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-the-art manufacturing technologies, ANDRITZ Gouda offers an integrated approach for the setup of food processing lines, contributing to significant cost saving (for the customer) on the production process.

ANDRITZ Gouda has several pilot plants available to test new materials, generate design data, and provide representative product samples. The proven calculation model for scaling up to industrial size ensures successful application in real-life processing.

◀ Soya sauce dried on a pilot machine



# ANDRITZ Gouda drum dryer

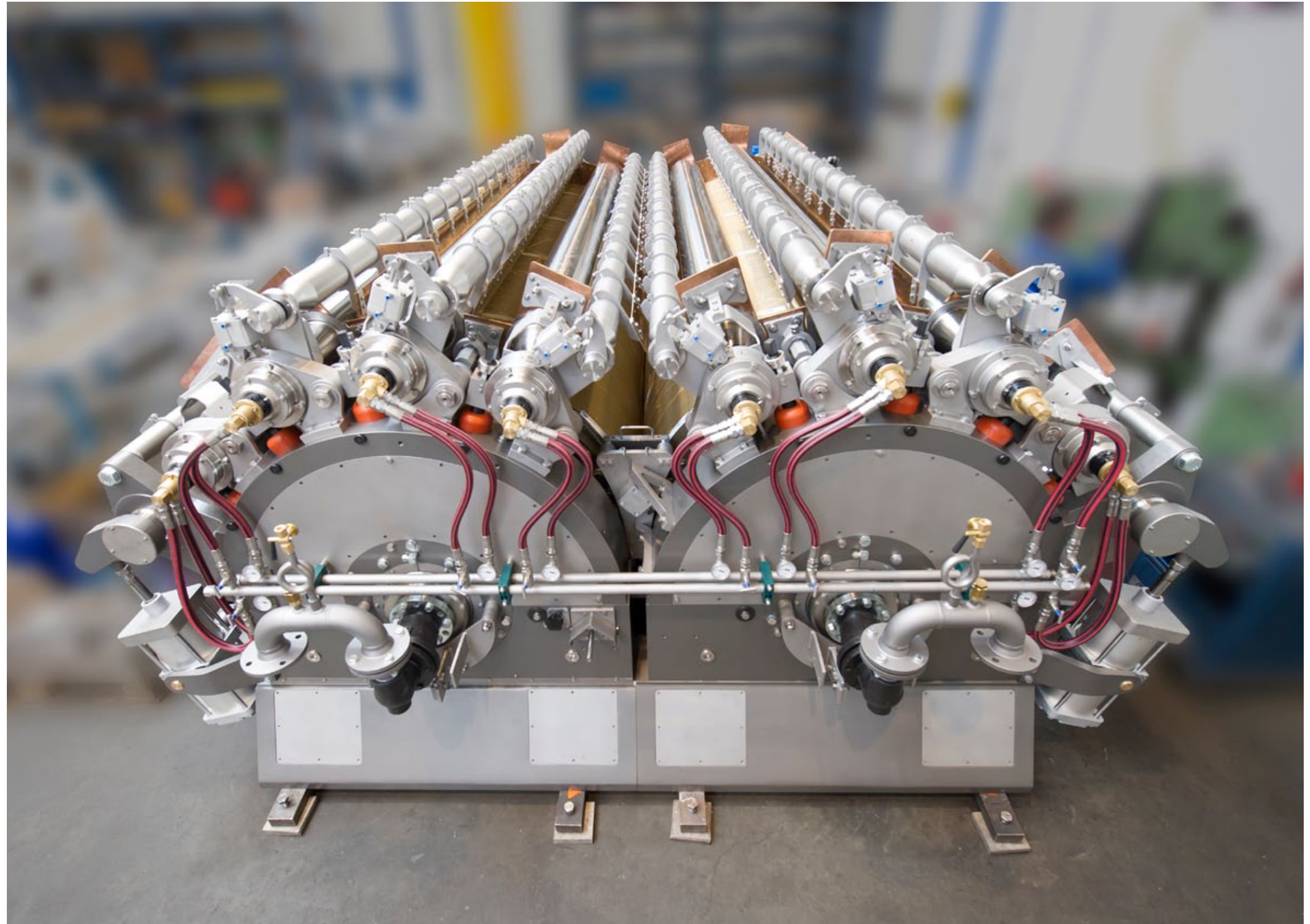
Visual impressions



▲ ANDRITZ Gouda single drum dryer



▲ ANDRITZ Gouda single drum drive system



▲ Double drum dryer



# Worldwide service 24/7

## No added value but an absolute must!

Delivering quality equipment and always being there when the customer needs you are ANDRITZ Gouda's guiding principles.

### Customer-orientated for over 100 years

ANDRITZ Gouda designs, builds, and maintains quality machines for the food, chemical, and waste processing industries. Characteristic of our technically oriented company is that we invest heavily in research and development in order to respond to the evolving needs of our customers. The development of machines is one thing. But if, like us, you sell far beyond the borders of your own country, your customers expect optimum service wherever they are and at all times.

Those that invest in this type of expensive equipment will expect constant use. Downtime means lost production. Delivering quality equipment and always being there when the customer needs you are ANDRITZ Gouda's guiding principles. Thus, good service is not added value for us, it is a matter of course.

### Responsible for our customers

For decades, ANDRITZ Gouda has been known to the world's most important (inter)national companies as a very reliable partner. As with the production of our machinery, we strive to service our customers' equipment to the highest attainable level. We contribute greatly to our customers' production reliability, with a cost-effective maintenance budget for their machines.



▲ Wall thickness measurement

ANDRITZ Gouda provides service and maintains customer contacts from its headquarters in the Netherlands and from offices in Germany, Asia (Singapore and Indonesia), and the USA. The service team of experienced and well-trained specialists is jointly responsible for installation, commissioning and operation of the machines and, of course, is available 24/7 – worldwide. Customers receive assistance with training of operating and maintenance personnel, repair, overhaul, upgrade, parts supply, and relocation of machinery.

### Parts supply

The service department is perfectly equipped to supply spare parts. Many critical machine parts are kept in stock in the warehouses in the Netherlands and in the United States. ANDRITZ Gouda can supply parts, globally, at very short notice. Our goal is to minimize customers' downtime and ensure their continuity of production.

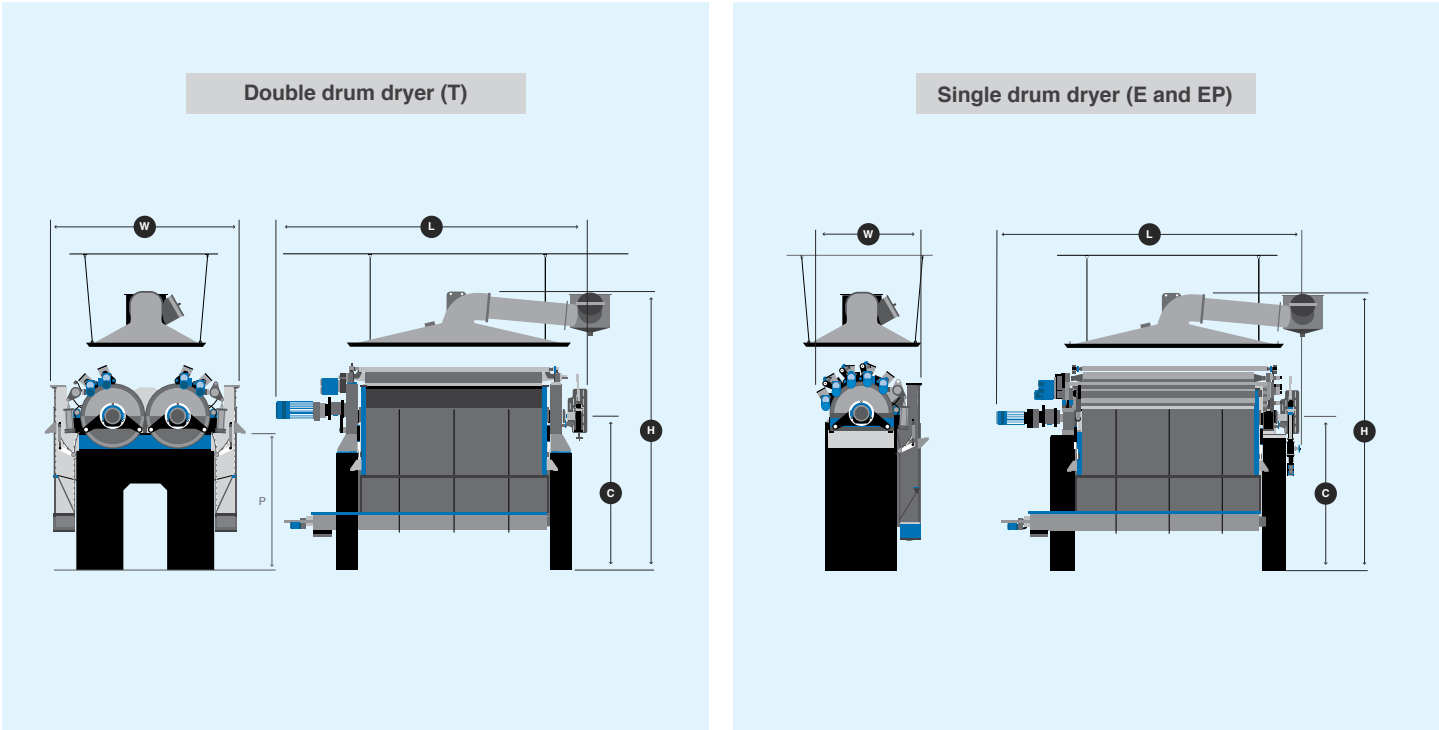
Installing a drum dryer ►





# Dimensions and models

The ANDRITZ Gouda drum dryer comes in a variety of sizes, ranging from dryers with a drying surface area of 0.75 m² up to a dryer with 44 m².



DOUBLE DRUM DRYER MODEL T		5/5	5/10	10/10	10/20	10/30	15/30	15/40
Drying surface area	m²	1.5	3.1	6.2	12.5	18.8	28.2	37.6
Drum diameter	mm	500	500	1000	1000	1000	1500	1500
Drum length	mm	500	1000	1000	2000	3000	3000	4000
Number of applicator rolls	standard optional	0 2 x 2	0 2 x 2	0 2 x 2 or 3	0 2 x 2 or 3	0 2 x 2 or 3	0 2 x 2 or 3	0 2 x 2 or 3
Length** (L)	m	1.8	2.3	4.2	5.2	6.2	5.9	6.9
Width** (W)	m	1.9	1.9	3.3	3.3	3.3	4.3	4.3
Height** (H)	m	1.7	1.7	5.0	5.0	5.0	7.4	7.4
Platform height (P)	m			2.6	2.6	2.6	3.1	3.1
Drum heart line (C)	m	1.8	1.8	3.0	3.0	3.0	3.5	3.5
Speed range	rpm	depending on the application						
Drive power - total installed*	kW - min kW - max	4 7.5	5.5 7.5	8 35	15 35	22 43	37 100	44 100
Weight for foundation**	ton	1.4	2.6	11.9	16.1	20.1	49.8	54
Shipping weight**	net ton	2	2.6	9.8	12.6	15.4	40.8	48
Shipping weight**	gross ton	2.2	2.9	10.4	13.6	16.8	42	50
Shipping volume**	m³	7	9	20	26	32	40	47

SINGLE DRUM DRYER MODEL E		5/5	5/10	10/10	10/20	10/30	15/30	15/40	20/40	20/45
Drying surface area	m²	0.75	1.5	3.1	6.2	9.4	14.1	18.8	25.1	28.2
Drum diameter	mm	500	500	1000	1000	1000	1500	1500	2000	2000
Drum length	mm	500	1000	1000	2000	3000	3000	4000	4000	4500
Number of applicator rolls	standard optional	4 N/A	4 N/A	4 N/A	4 N/A	4 N/A	4 5	4 5	4 5 or 6	4 5 or 6
Applicator roll diameter	mm	120	120	220	220	220	260	260	300	300
Length** (L)	m	1.5	2.0	3.2	4.2	5.2	5.4	6.4	8.3	8.8
Width** (W)	m	1.2	1.2	1.8	1.8	1.8	2.5	2.5	3.0	3.0
Height** (H)	m	3.1	3.1	5.6	5.6	5.6	7.6	7.6	6.5	6.5
Platform height (P)	m			2.6	2.6	2.6	3.1	3.1	3.1	3.1
Drum heart line (C)	m	1.4	1.4	3.0	3.0	3.0	3.5	3.5	3.5	3.5
Speed range	rpm	depending on the application								
Drive power - total installed*	kW - min kW - max	4 7.5	5.5 7.5	13 35	20 35	33 45	34 75	42 100	55 130	65 130
Weight for foundation**	ton	0.8	1.4	7.1	9.8	12.4	21	30	46	50
Shipping weight**	net ton	1.6	1.8	5,8	7.9	10.0	17.5	26.5	34	38
Shipping weight**	gross ton	1.8	2.1	6.0	8.4	10.8	18.5	27.8	35	39
Shipping volume**	m³	6	9	10	13	16	21	25	34	37

SINGLE DRUM DRYER (FOR POTATO FLAKES) MODEL EP		15/30	15/40	15/52	20/52	20/62	20/72
Drying surface area	m²	13.4	18.1	23.8	31.7	38.0	44.3
Drum diameter	mm	1500	1500	1500	2000	2000	2000
Drum length	mm	3000	4000	5200	5200	6200	7200
Number of applicator rolls		5	5	5	5	5	5
Applicator roll diameter	#1 & #5 #2, #3 & #4	260 220	260 220	260 220	260 220	260 220	450*** 325
Length** (L)	m	5.0	6.0	7.2	7.2	8.2	9.2
Width** (W)	m	3.4	3.4	3.4	3.8	3.8	3.8
Height** (H)	m	6.5	6.5	6.5	6.8	6.8	6.8
Platform height (P)	m	2.6	2.6	2.6	2.9	2.9	2.9
Drum heart line (C)	m	3.0	3.0	3.0	3.0	3,0	3.0
Speed range*	rpm	2 - 10	2 - 10	2 - 10	2 - 10	2 - 10	2 - 10
Drive power	kW	11	11	15	18.5	18.5	33.5
Weight for foundation	ton	21	30	39	58	59	60
Shipping weight**	net ton	17.5	26.5	36	48	56	42
Shipping weight**	gross ton	18.5	27.8	37	50	48	45
Shipping volume**	m³	21	25	37	65	74	75

\* typical (depending on application)    \*\* basic machine only incl. drives    \*\*\* only last applicator roll #5



## ANDRITZ Gouda

ANDRITZ Gouda has been implementing complete process solutions for the environmental, chemical, and food industries for over 100 years. As a machine manufacturer as well as process solutions expert, ANDRITZ Gouda is able to handle all of the stages involved in designing and building plants, including engineering, service, installation, and commissioning.

ANDRITZ Gouda, as part of the international ANDRITZ GROUP, has several pilot plants available to test new materials, generate design data, and provide representative product samples. The proven calculation model for scaling up to industrial size ensures successful application in full-scale processing.



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