



**ANDRITZ Gouda drum flaker**  
Solidification at its best

# The process

## Flakes with free-flowing character

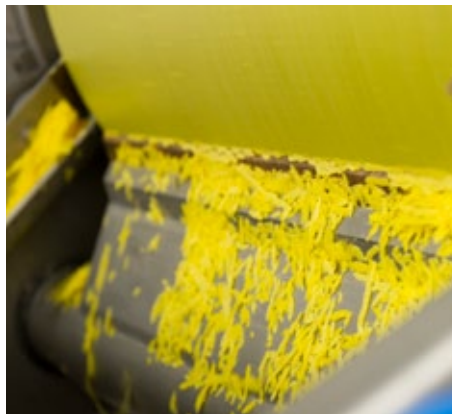
Increased efficiency through a unique operating principle

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The drum flaker is used primarily to process chemical and pharmaceutical products. However, more and more applications for these machines are also being found in the food industry. The closed design is ideally suited for processing of toxic or offensively smelling products. With the drum flaker, a molten product is converted into a solid form. A thin layer of the liquid product adheres to the outside of the rotating, internally cooled drum in a continuous process. Heat is extracted from the product by contact with the cooled drum surface, and the product solidifies and cools to the required final temperature. A stationary knife removes and breaks up the solidified layer.

The required flake size is achieved by controlling circumferential speed, layer thickness, and knife angle. Careful design ensures optimum use of the drum surface area to maximize capacity at the chosen operating conditions. The drum flaker is primarily used to produce flakes, but there are also ways of converting your product into easily manageable pastilles or prills.



▲ Flakes on a drum flaker





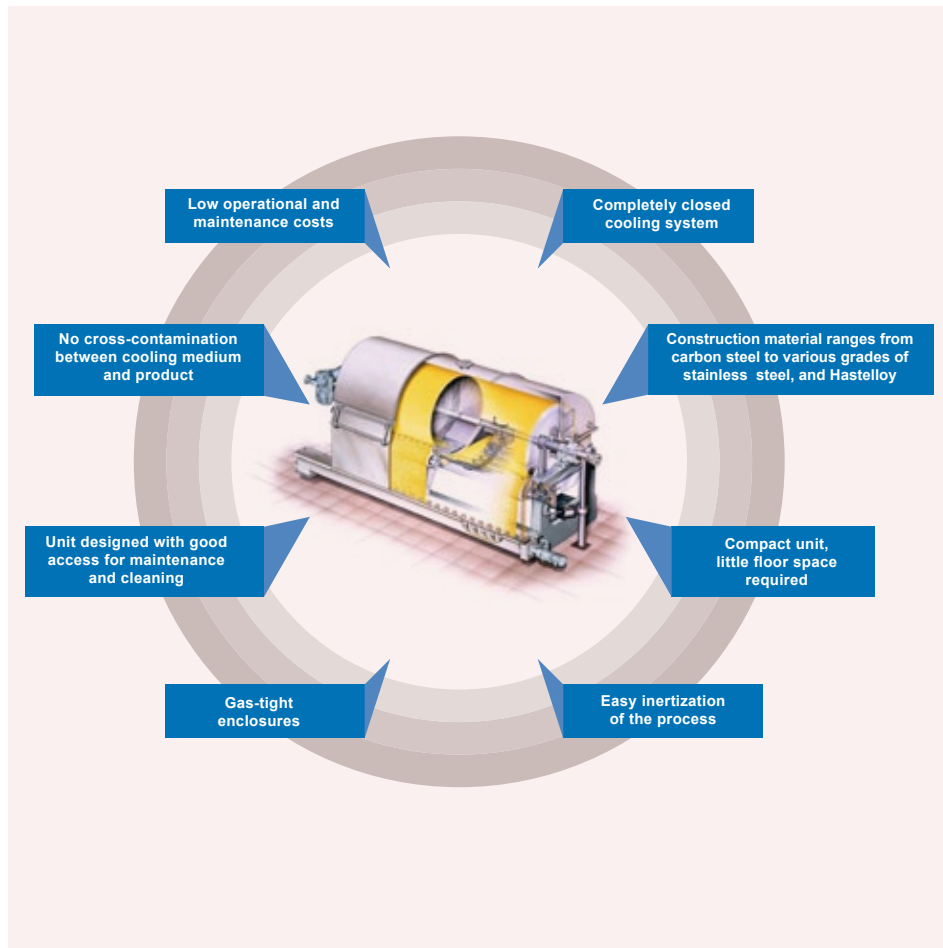
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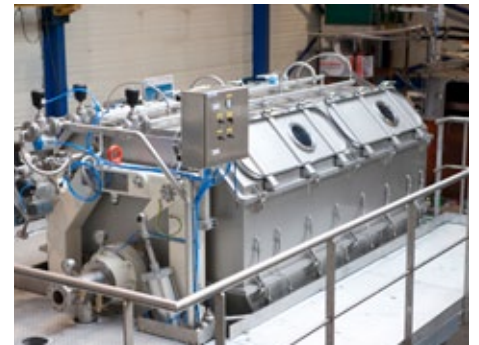
# Features and equipment

## Adapted to customers' needs

Several concepts to choose from depending on the upstream processes and potential pollutants to be filtered out, including tailored solutions for industrial applications.

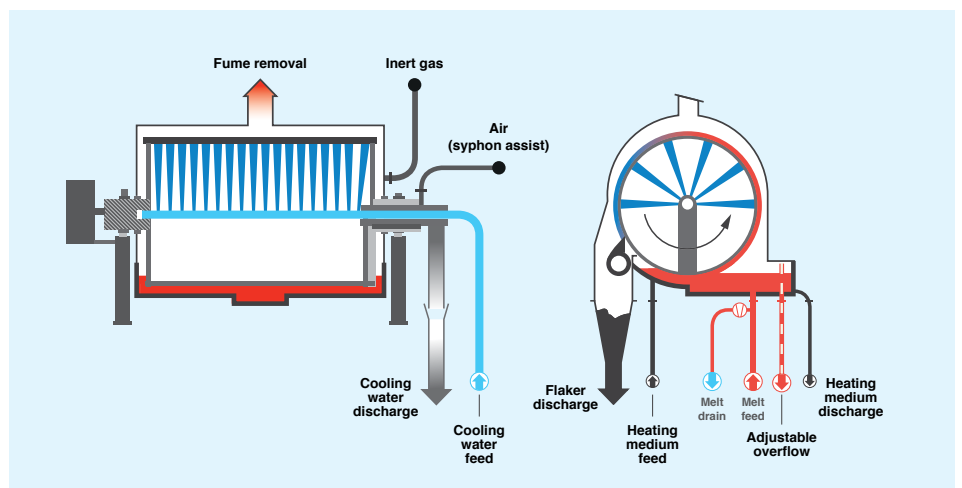


▲ Key features of the drum flaker



### Special casing for toxic and hazardous fumes

In view of the current environmental and health requirements, most drum flakers are equipped with a fully enclosed casing to prevent toxic, offensive smelling vapors and dust, from appearing during flaking. Oxygen-sensitive products may be protected by inert gas blanketing. In cases where products tend to cause heavy sublimation deposits in the enclosure, a heated wall design can be used to minimize internal cleaning. Large hatches are provided with quick release closures for easy cleaning, inspection, and knife replacement. Hatches are flush with the inside of the machine hood.



Flow diagram of the drum flaker ►



### The drum

Cooling drums are available in a choice of materials selected in accordance with the chemical properties and adhesion ability of the product to be processed. The materials range from fine grain cast iron and carbon steel to Hastelloy, etc. The drums are specially designed for maximum geometric stability. Distortion due to differential temperature gradient or mechanical forces is impossible in normal operation. The drum design ensures equal heat transfer over the entire drum surface, ensuring uniform flake size distribution. For products with poor adhesion to metal surfaces, drums with special grooved surfaces are available.



### Coolant circulation

When liquid refrigerants are used, these are sprayed by a central spray tube over the internal drum surface. The turbulent flow ensures maximum heat transfer over the full drum surface, including over shell ends and heads. Consequently, an equal temperature is guaranteed over the total length of the drum, resulting in uniform flakes with low fines content. The liquid is siphoned off from the lowest part in the drum to avoid an accumulation of refrigerant there. The siphoning action is assisted by some slight overpressure inside the drum. The entire system, made of stainless steel, is easily detachable without disassembly of the drum. This design enables feed and discharge of the refrigerant through one and the same shaft, while the other shaft is used for the drive. Moreover it offers excellent accessibility to the inside of the drum for cleaning and inspection. Some options are available, such as refrigeration through direct evaporation of Freon or ammonia.



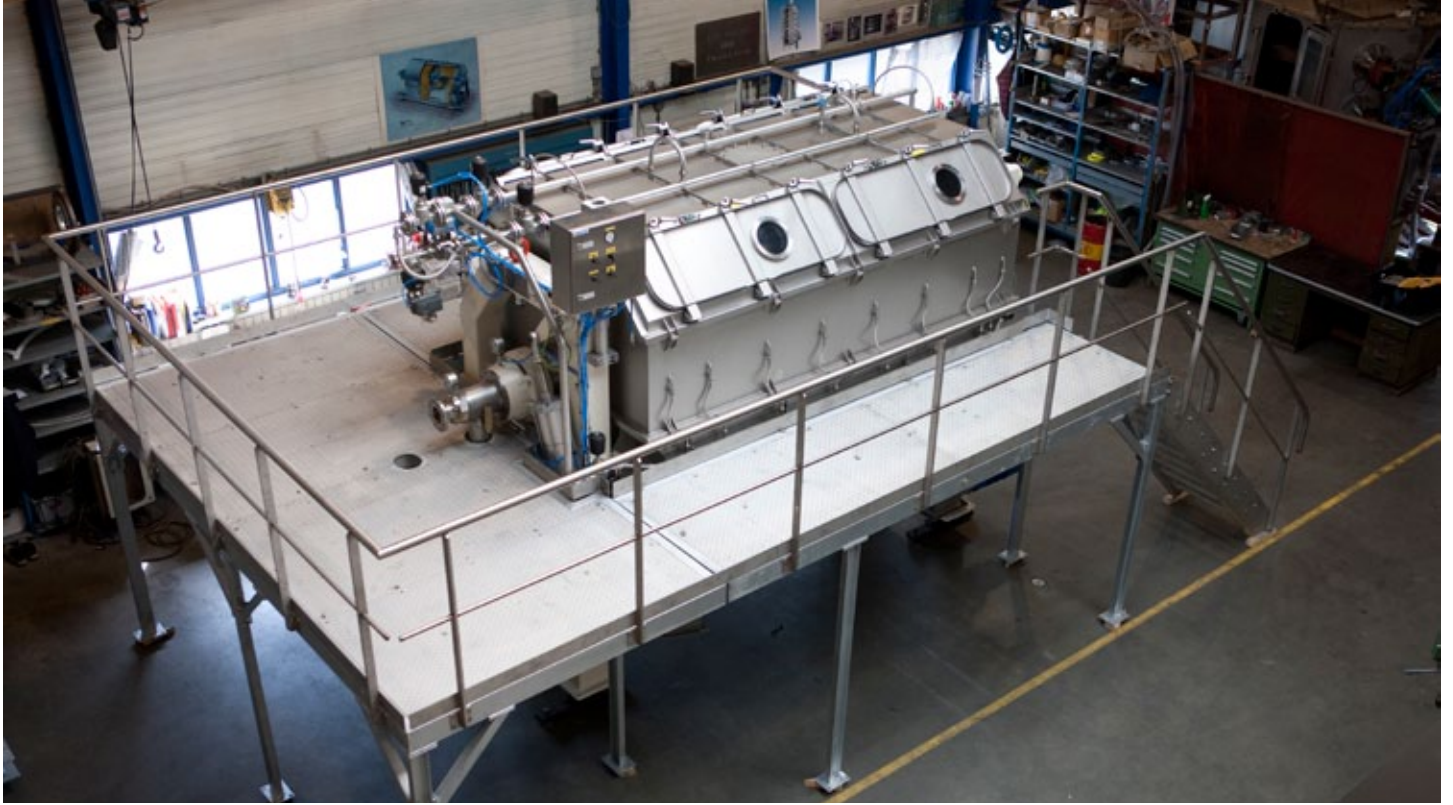
### Scraper assembly

Rigid construction designed to ensure a uniform pressure against the drum over the full length and to eliminate vibrations. The knife pressure is effected and controlled by means of a pneumatic pressing system. For entirely enclosed machinery, the knife's pressing system is located outside the process environment. Scraper knives are available in a range of materials, from steel to technical plastics. The flake size can be determined in advance by the choice of scraper system.

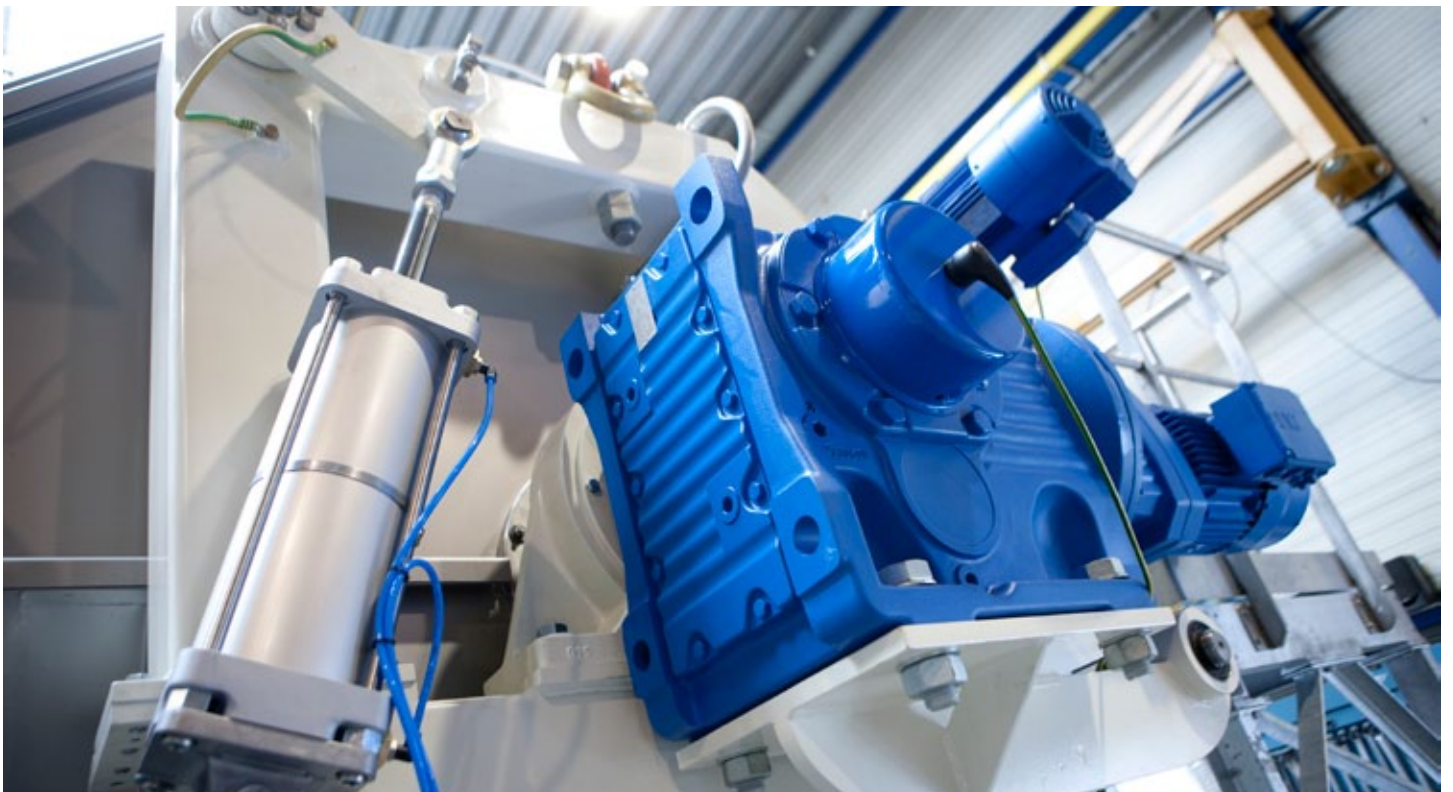


# ANDRITZ Gouda drum flaker

## Visual impressions

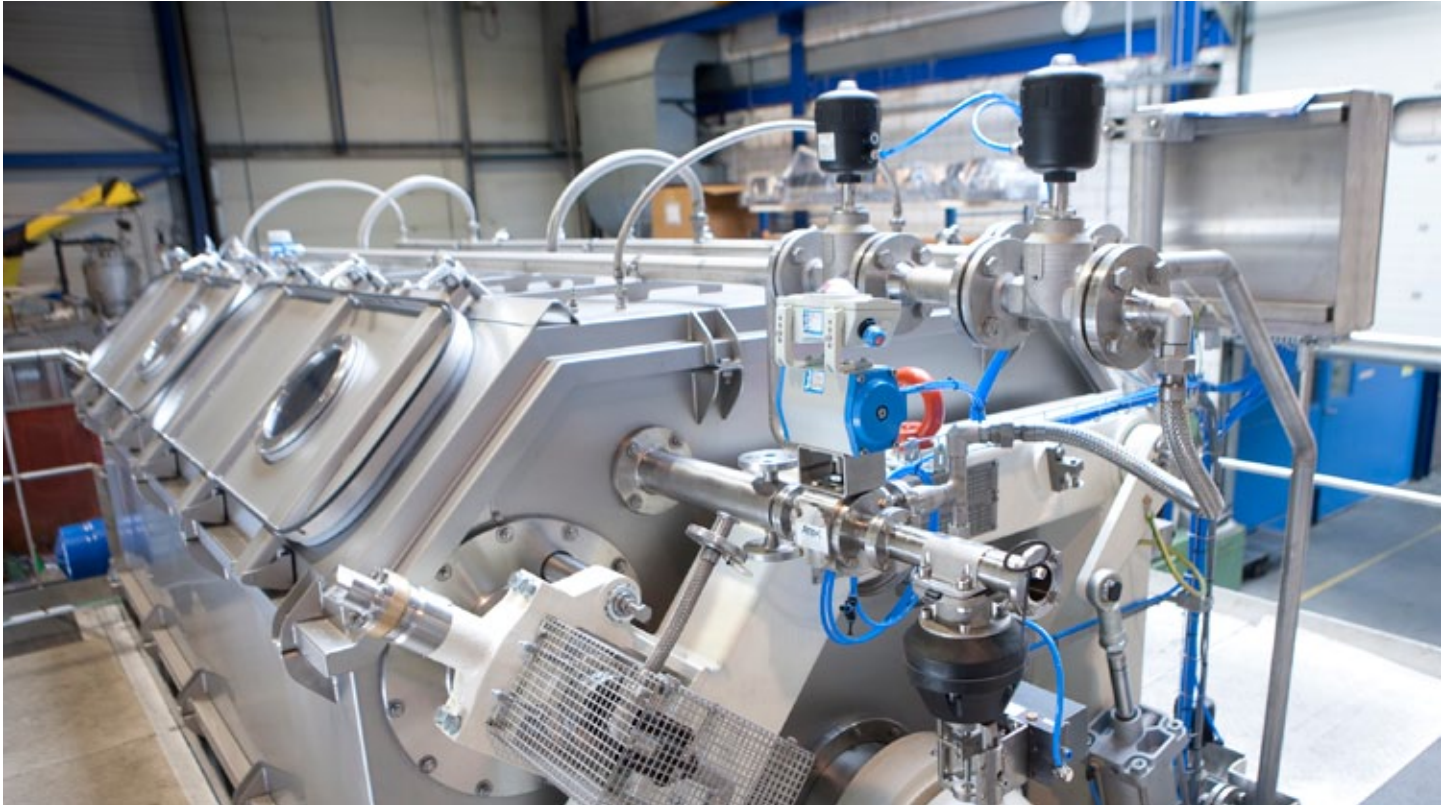


▲ Platform for easy and safe operation



▲ Pneumatic knife pressing system





▲ Enclosed design with coolant circulation



▲ Cooling drum

# Various designs

## Different operating principles

ANDRITZ Gouda supplies a number of specialty machines for special situations.



▲ Fully enclosed model

In view of the large variety of products in the chemical and food industries, it will come as no surprise that ANDRITZ Gouda also supplies an extremely varied range of machines. This variation is not only in design and operating principle, but also in materials used.

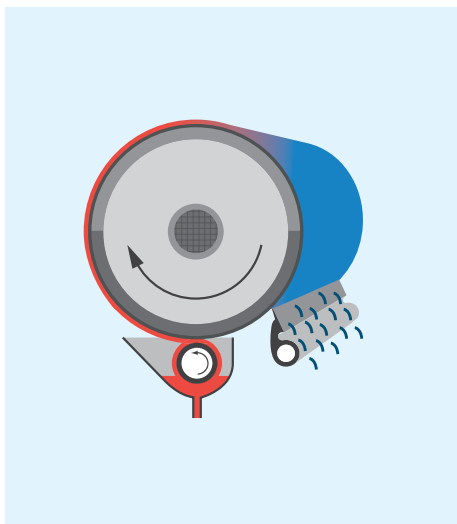
### Products with poor solidifying properties

There are products that do not match the operating principles described on page 9, such as products with neither good nor poor adhesion properties, but with poor solidifying properties instead. For those situations, ANDRITZ Gouda has a range of specialty machines. The surface can also be furnished with special (dovetail-sectioned) grooves for products with poor adhesion properties.

### The drums material

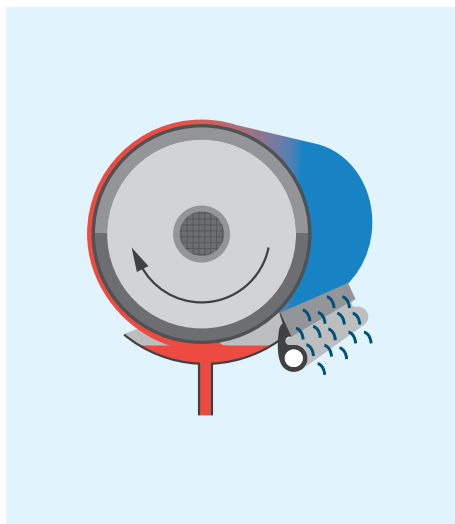
The drums are mostly made of stainless steel. Besides the choice of many types of stainless steel, chromium-plated, Hastelloy, or cast iron drums are also possible. The exact choice will depend on your product, the work site environment, available space, and the process to be performed. The result is a durable drum with high dimensional stability and uniform heat distribution over its entire surface.





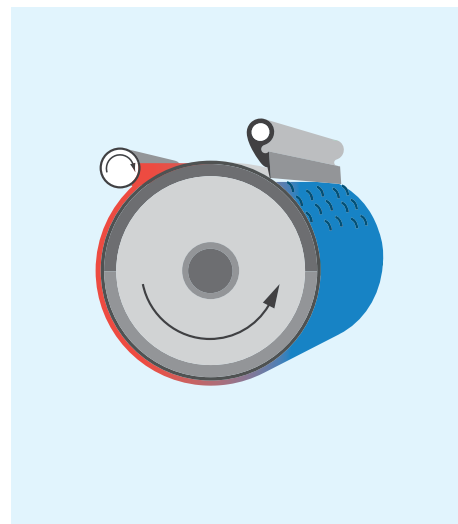
#### **Dip feed (K Flaker)**

For products with low viscosity and good adhesion properties. The rotating drum dips directly into the melt contained in a heated pan under the drum. A film of product solidifies immediately on the drum surface during its contact with the melt. In addition, a thin layer of liquid adheres to the solid layer, passes out of the pan and solidifies during completion of the drum revolution. This system is used for low viscosity products with good adhesion to metal surfaces. Among the products processed on this type of drum flaker are phthalic anhydride, caprolactam, fatty acids, bisphenol, naphthalene and DMT.



#### **Bottom dip roll (KOO Flaker)**

A heated applicator roll is located under the drum and dips into the melt. The film of liquid melt that sticks to the applicator roll is transferred to the cooling drum and solidifies. For products with good adhesion to metal surfaces and low to moderate viscosities, flake thickness may be controlled between certain limits. Applications are flaking of various waxes, resins, and catalysts.



#### **Overhead applicator rolls (KBO Flaker)**

For accurate control of end product thickness and shape. An internally heated applicator roll is located above the cooling drum. The melt is fed into the nip between the applicator roll and the drum. Contact with the heated roll ensures that the product remains liquid in the feeding system. Heated endplates prevent leakage of the melt to the sides both during applicator roll gap setting and thermal expansion. A film of melt passes through the gap between the roll and the drum, sticks to the cold drum, and solidifies. For products showing poor adhesion to metals and moderate to high viscosities, flake thickness may be controlled accurately through the gap setting mechanism of the applicator roll. Applications can be found for example in processing of soaps, stearates, and fatty acids.

# Applications

## Fine chemicals

Fine chemicals are complex, single, pure chemical substances, produced in limited quantities in multipurpose plants in multistep batch chemical or biotechnological processes.

The main demands set by the chemical industry to suppliers of equipment are a high safety standard, maximum plant operating time, the economic use of energy, and competence in problem solving.

The ANDRITZ Gouda drum flaker can be used for solidification and flaking of various fine chemicals. For industrial implementation, some product properties must be investigated under real process conditions. This can be arranged in our pilot plant. Over the years, ANDRITZ Gouda has obtained knowledge on treatment of different chemical applications. Do not hesitate to contact us if your application is not in the list. Feasibility tests can usually be executed at short notice.

### These chemical applications can be processed on the flaker

- Fatty acids
- Oleochemicals
- Phthalic anhydride
- Polyethylene glycols (PEG)
- Maleic anhydride
- Calcium chloride
- Caprolactam
- Resins
- Bisphenol A
- Sulphur



▲ Resins



Calcium chloride ►





# Applications

## Food industry

Your time is important, just like your equipment selection. Finding the right machine, with the reliability and the features you need, has an impact on your profitability.



With more than 100 years' experience in the food industry, ANDRITZ Gouda is one of the world's largest suppliers of equipment for food applications. One of the machines that is used is the drum flaker.

Today's food manufacturers require high product quality, rapid cooling, extended shelf life, while ensuring they remain energy efficient. Our experts can help you define your production process. This includes providing food laboratory services.

### These food applications can be processed on the flaker

- Cheese
- Chocolate
- Dough
- Vegetables





# Applications

## Pharmaceutical industry

Several concepts to choose from depending on the upstream processes and potential pollutants to be filtered out, including tailored solutions for industrial applications.



ANDRITZ Gouda's experienced sales and engineering specialists recognize a number of very important factors in supplying solidifying solutions - no two pharmaceutical applications are the same; all application requirements are unique; and the last thing you need is a "standard" solution. ANDRITZ Gouda application solutions are successful because of our understanding of the specific demands and requirements of the pharmaceutical industry.

The focus lies on maximizing your operating efficiencies, whether you are commodity-driven or specialty-oriented. ANDRITZ Gouda will work with you on your individual applications, or on upgrading existing

process systems. With today's economy demanding that the quality of your product is excellent, ANDRITZ Gouda continues to help you fulfill your requirements for outstanding performance. Please contact us if you would like to learn more about ANDRITZ Gouda's successful applications in the pharmaceutical industry.

**These pharmaceutical applications can be processed on the flaker**

- Stearate
- Soaps



▲ Soap test in our pilot plant







▲ Flake test in our pilot plant

# ANDRITZ Gouda pilot plant: A valuable test center

To determine 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 centre 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 set-up of processing lines, contributing to significant cost saving (for the customer) in the production process.

ANDRITZ Gouda has three testing possibilities:

**Feasibility test:**

Requires a small amount of product to determine its 'flaking ability'.

**Bench-scale test:**

Requires approximately 1 kg of product on a bench-scale drum flaker to determine flake 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 drum flaker.



# 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.



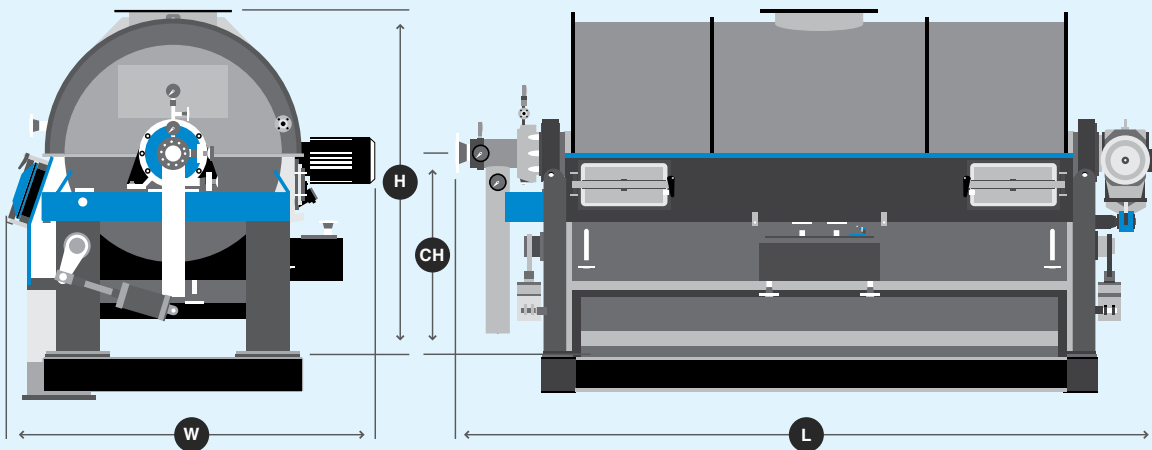




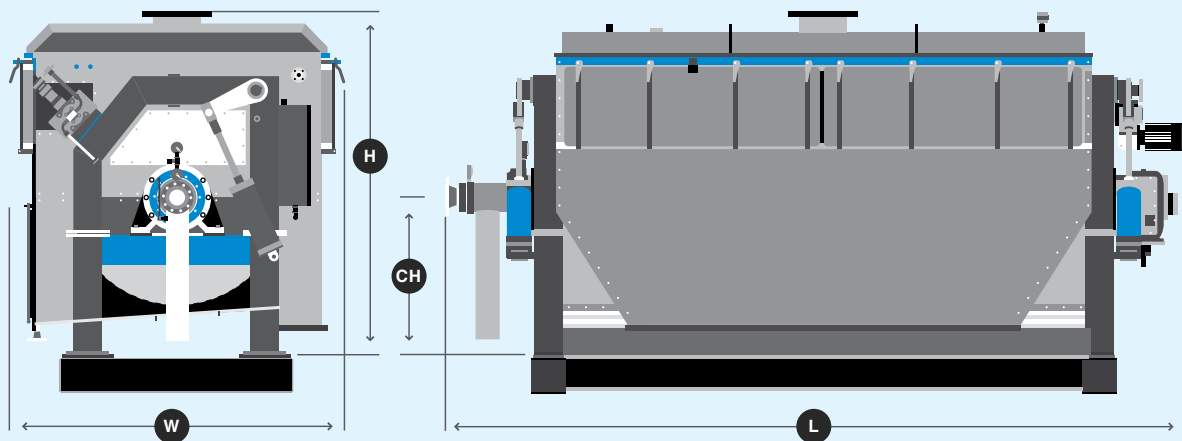
# Dimensions and models

The ANDRITZ Gouda drum flaker comes in a variety of sizes, varying from a cooling surface of 0.75 m<sup>2</sup> to 28 m<sup>2</sup>.

K flaker (flaker with dip feed)



KBO flaker (flaker with overhead applicator rolls)



<b>DRUM FLAKER MODEL K</b>		<b>5/5</b>	<b>5/10</b>	<b>10/10</b>	<b>10/15</b>	<b>10/20</b>	<b>15/20</b>	<b>15/30</b>	<b>15/40</b>	<b>20/40</b>	<b>20/45</b>
Cooling surface	m <sup>2</sup>	0.75	1.5	3.1	4.7	6.3	9.3	14	19	25	28
Drum diameter	mm	500	500	1000	1000	1000	1500	1500	1500	2000	2000
Drum length	mm	500	1000	1000	1500	2000	2000	3000	4000	4000	4500
Length (L)	m	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0	6.0	6.5
Width (W)	m	1.3	1.3	1.8	1.8	1.8	2.5	2.5	2.5	2.8	2.8
Height (H)	m	0.95	0.5	1.8	1.8	1.8	2.4	2.4	2.4	3	3
Center height (CH)	m	0.55	0.55	1.1	1.1	1.1	1.4	1.4	1.4	1.7	1.7
Foundation weight	ton	0.8	1.2	2.7	3.6	4.0	10.0	10.6	11.2	13.0	13.6
Net shipping weight	ton	0.8	1.1	2.5	3.3	3.7	7.3	8.8	10.3	12.6	13.1
Gross shipping weight	ton	0.9	1.3	2.8	3.7	4.1	8.0	9.5	10.8	13.2	13.8
Shipping volume	m <sup>3</sup>	2.5	3.5	11.5	13.5	16	24	30	36	51	55
Motor power	kW	0.55	1.75	1.5	1.5	2.2	5.5	7.5	7.5	15	15
Maximum	kW	0.75	1.1	2.2	3	4	7.5	11	11	30	30

<b>DRUM FLAKER MODEL KBO</b>		<b>5/5</b>	<b>5/10</b>	<b>10/10</b>	<b>10/15</b>	<b>10/20</b>	<b>15/20</b>	<b>15/30</b>	<b>15/40</b>	<b>20/40</b>	<b>20/45</b>
Cooling surface	m <sup>2</sup>	0.75	1.5	3.1	4.7	6.3	9.3	14	19	25	28
Drum diameter	mm	500	500	1000	1000	1000	1500	1500	1500	2000	2000
Drum length	mm	500	1000	1000	1500	2000	2000	3000	4000	4000	4500
Length (L)	m	2.0	2.6	2.6	3.1	3.6	4.2	5.2	6.2	6.0	6.5
Width (W)	m	1.5	1.5	1.8	1.8	1.8	2.6	2.6	2.6	2.8	2.8
Height (H)	m	1.4	1.4	2.0	2.0	2.0	2.6	2.6	2.6	3	3
Center height (CH)	m	0.8	0.8	1.1	1.1	1.1	1.4	1.4	1.4	1.7	1.7
Foundation weight	ton	1.0	1.5	3.1	4.1	4.8	10.7	12.1	13.6	13.0	13.6
Net shipping weight	ton	1.0	1.3	3.2	4.0	4.6	8.8	9.7	10.5	12.6	13.1
Gross shipping weight	ton	1.1	1.5	3.6	4.4	5.1	9.3	11.4	11.0	13.2	13.8
Shipping volume	m <sup>3</sup>	5.5	6.5	12	14.5	17	36	43	50	51	55
Motor power	kW	0.75	1.1	1.5	2.2	3	5.5	7.5	7.5	22	22
Applicator roll	kW	pinion	pinion	0.25	0.37	0.55	0.75	1.5	1,5	3	3

## 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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