ANDRITZ Separation

Krauss-Maffei HZ peeler centrifuge

Batch-operated filtration centrifuge

ANDRITZ Separation

Krauss-Maffei HZ peeler centrifuge

Table of contents

Krauss-Maffei HZ peeler centrifuge
Maximum efficiency

Krauss-Maffei horizontal peeler centrifuges are batch-operated filtration centrifuges known for their reliable performance at high capacities. They are used in many processes, primarily in the bulk chemicals, fine chemicals, and food industries.

The horizontal rotor assembly is cantilever-mounted and, depending on the application, can be provided with a conventional filtration basket or a specially designed rotary siphon basket. A fully opening housing door provides access to the basket and all process components for maintenance. Adding variable speed drives and custom-tailored controls and instrumentation enables the peeler centrifuge to be optimally adapted to a multitude of processing requirements for peak performance.

Main applications

- **Bulk chemicals**
  Petrochemical intermediates, fertilizers, chlorides, sulfates, calcium compounds, sodium compounds
- **Fine chemicals**
  Aluminum fluoride, amino acids, bleaching agents, surfactants, herbicides, pesticides, catalysts, dyestuffs
- **Pharmaceuticals/related**
  APIs, vitamins, salicylic acid, citric acid, ascorbic acid, calcium citrate, antibiotics
- **Plastics/related**
  ABS, resins, melamine, PE, PP, antioxidant agents)
- **Foodstuff/related**
  Native and modified starches, artificial sweeteners, vanillin, caffeine

Processing parameters

Average particle size:	2-500 µm
Feed solids concentration:	From 3.0% by wt.
Solids throughput:	Up to 15 t/h

Construction materials for process-wetted parts

- Various grades of stainless steel
- Nickel-based alloys
- Special metals with or without lining

▲ Krauss-Maffei peeler centrifuge, HZ 125/3.2 Si

Krauss-Maffei HZ peeler centrifuge
Process advantages

▲ Krauss-Maffei peeler centrifuge, HZ 180/7.1

Krauss-Maffei peeler centrifuges with rotary siphon

By utilizing the rotary siphon feature, an original ANDRITZ KMPT development, the overall performance of the peeler centrifuge can be improved considerably. Substantial advantages include:

Increased filtration capacity

Creating a vacuum beneath the filter cloth increases the filtration pressure and boosts the filtration rate.

Superior product purity

The filtration rate can be adjusted to prolong the contact time between wash liquid and solids to produce a purer cake.

Extended residual heel service life

Regeneration of the residual heel is achieved by means of backwashing through the filter medium.

Smoother operation

As a result of backwashing and throttling of the filtration rate, the siphon feature enables feeding into a liquid pool to achieve uniform distribution of solids without vibration, even with fast-filtering products.

Your benefits

- Krauss-Maffei peeler centrifuges can be adapted easily to changing process requirements. Different control recipes can be used to select the optimum operating speed and cycle sequence to yield the highest product quality at peak capacity.
- Lower residual cake moisture due to high centrifugal forces
- Adjusted to your product
- Excellent wash results due to even distribution of wash liquid, achieved with a horizontal basket configuration and feed via distributor or spray bars

Krauss-Maffei HZ peeler centrifuge
Basket designs

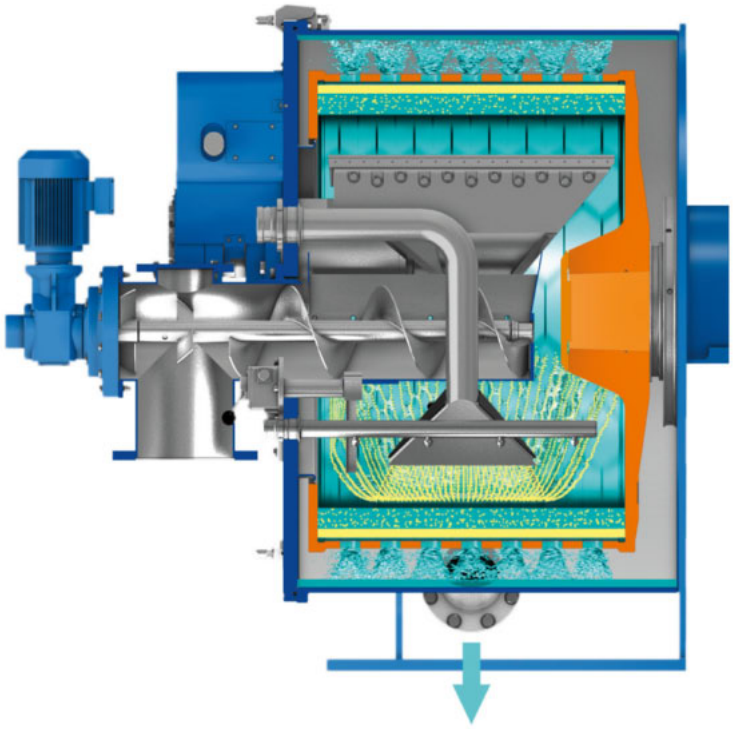
Krauss-Maffei peeler centrifuges are equipped with various basket designs. The versions most frequently applied are the conventional filtration basket and the rotary siphon basket, an original ANDRITZ KMPT development.

Filtration basket

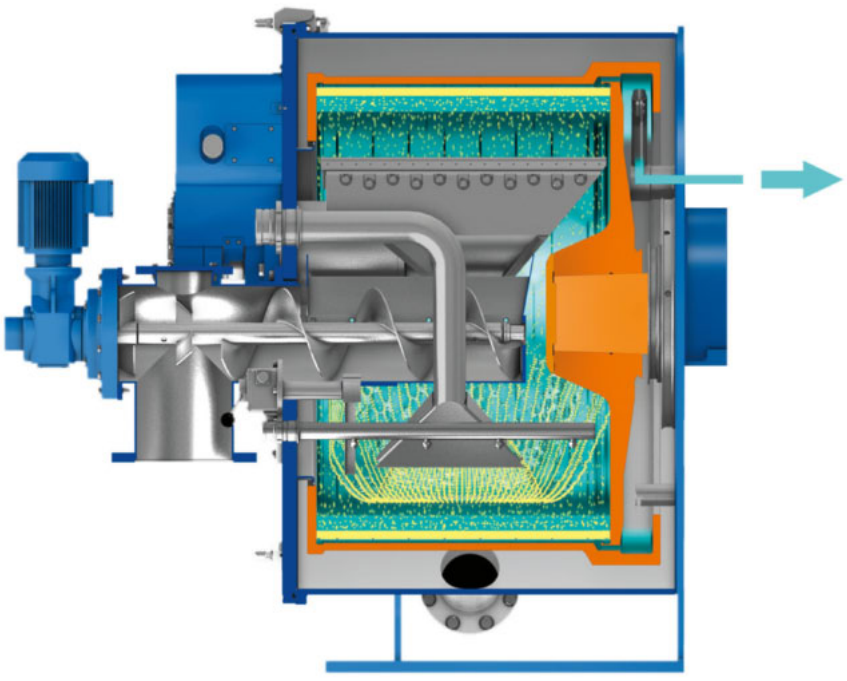
The filtration basket has a fabricated/welded or cast design and a filtration basket with a cylindrical shell and filtrate bores through which the filtrate is spun out into the filtrate housing after passing through the filter medium.

Rotary siphon basket

Contrary to the conventional perforated basket, the rotary siphon basket has a solid cylindrical shell with filtrate bores arranged radially at the rear end of the basket, where they are connected to a siphon-shaped chamber. Once it has penetrated the filter cake and the filter medium, the filtrate is redirected through axial channels beneath filter medium support segments into the siphon chamber, where a pivoting skimmer pipe extracts it from the centrifuge under positive pressure. The radial distance between the filter medium and the liquid level in the siphon chamber increases the driving force and thus, also the filtration rate.



▲ Filtration basket



▲ Rotary siphon basket

Krauss-Maffei HZ peeler centrifuge
Operation

Feeding
The suspension is introduced into the rotating centrifuge basket via the feed distributor. Typically, this would include several intermittent feed pulses to prevent the suspension from spilling over the basket rim. The fill level is monitored and regulated by a feed controller. Normally, the basket is filled with solids up to 75-80% of the basket rim height. The feed step is complete when the filter cake has reached the desired level.

Filtration
Primary filtration of the mother liquor through the filter medium installed in the basket begins with the feed step and ends when the mother liquor submerges into the filter cake. The solids retained on the filter medium after completion of a cycle and discharge of the product serve as a filter medium for subsequent cycles.

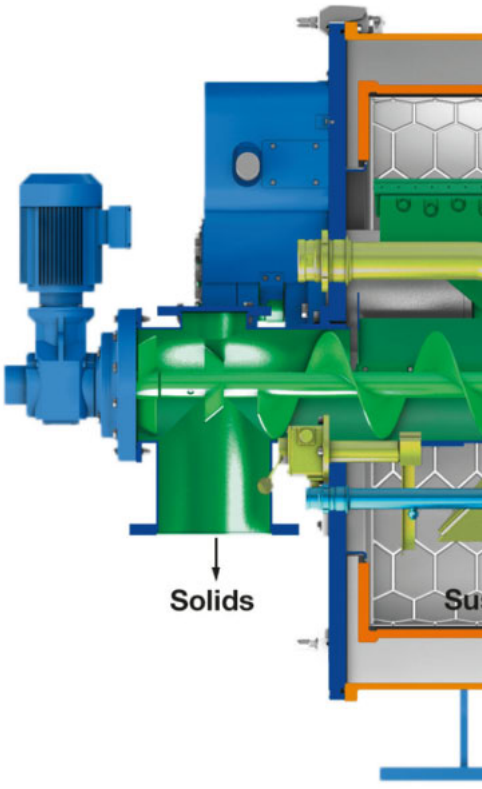
Washing
A cake washing step will often follow the primary filtration step. Wash liquid is introduced through the feed distributor or, for lower wash rates, through a separate spray bar. The wash liquid level is again monitored by the feed controller, and the wash step is concluded once the predetermined amount of wash liquid has been used and the liquid submerges into the filter cake.

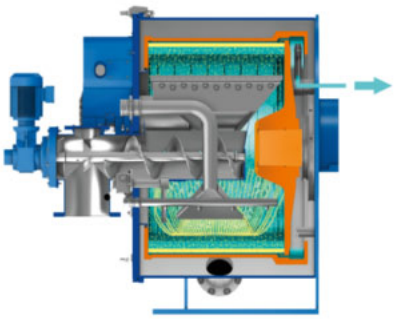
Dry spinning
Immediately after the feed and wash step, which may be carried out at a lower speed, the basket is accelerated to maximum allowable speed for the cake dry spinning step, which ends when the desired residual cake moisture is reached or after a predetermined spin time.

Peeling/cake discharge
At the end of each centrifuge cycle, the filter cake is removed from the basket by a pivoting peeling device equipped with a broad peeler knife. Depending on the product characteristics, the peeling motion is conducted at full or reduced basket speed with adjustable swivel advance velocity. The layers of product scraped off are diverted into a trough and discharged from the centrifuge through an inclined chute or a horizontal screw conveyor. To protect the filter medium, a thin layer of filter cake is retained in the basket. This layer, called the residual heel, becomes the filter aid for subsequent cycles.

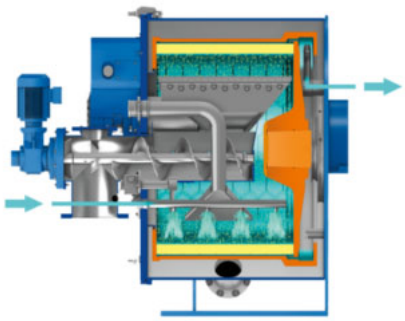
Screw conveyor
The peeled product is diverted to a horizontal, door-mounted screw conveyor that conveys the solids to the outside of the centrifuge.

Advantages
Higher centrifuge throughput due to the potential of utilizing longer baskets. Suitable for applications with solids showing a tendency to adhere and with increased internal friction factors, both of which affect the gravity flow inherent to chute discharge configurations.

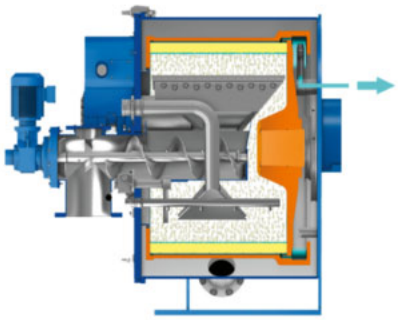




▲ Siphon basket feeding



▲ Siphon basket washing



▲ Siphon basket dry spinning

Backwashing

With the rotary siphon basket, it is possible to feed backwash liquid from an overhead-mounted prime tank through the siphon chamber to permeate the residual heel from underneath. This process re-suspends the residual heel and restores its permeability. It also primes the rotary siphon for the next filtration cycle.

The liquid pool on top of the heel created by backwashing will help to distribute the subsequent cycle's incoming suspension evenly, which will virtually eliminate the potential for imbalances during the feed step.

Residual heel removal

After frequent cycles, the residual heel may have compacted with enough fine solids to make it impermeable, resulting in poor filtration performance. When this occurs, the heel can be regenerated (by backwashing in siphon peeler centrifuges) or removed pneumatically or hydraulically (in peeler centrifuges with filtration baskets).

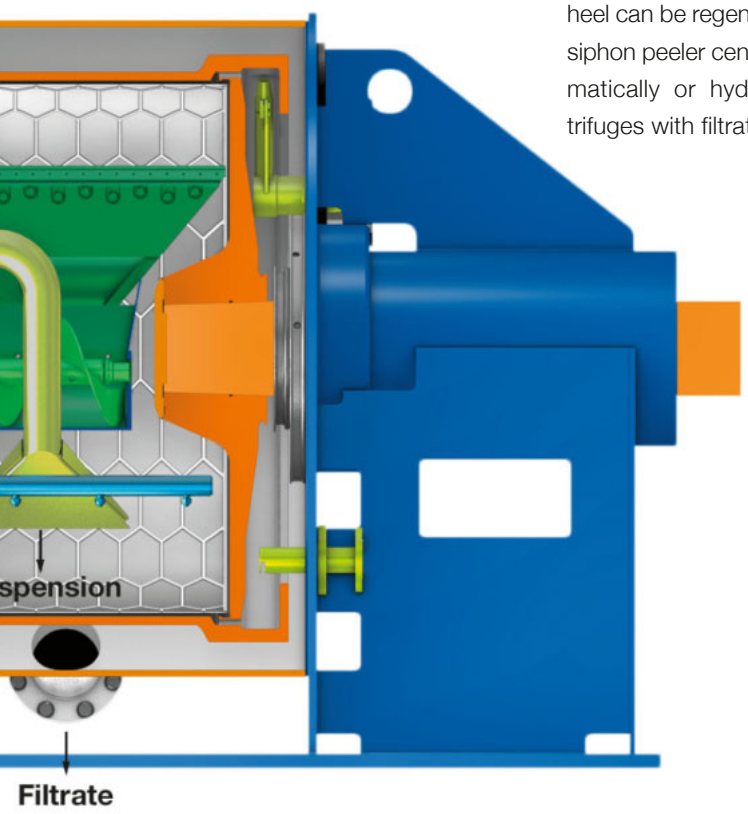
Pneumatic heel removal

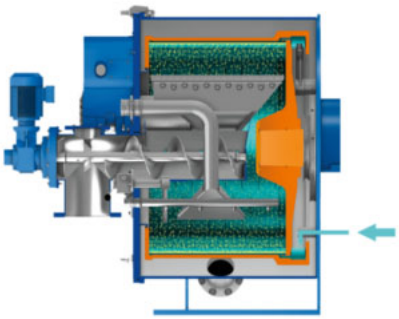
By blowing either compressed air or nitrogen against the heel through special flat-jet nozzles mounted on a pivoting and oscillating manifold inside the basket, the heel cake is broken up into pieces and discharged by the peeling device.

Hydraulic heel removal

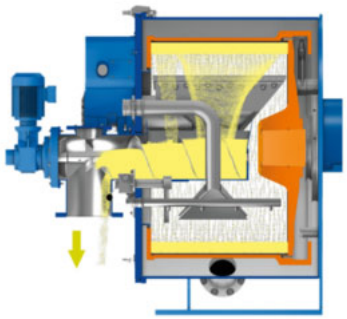
Using the feed distributor, a large quantity of rinse liquid is introduced into the basket for a short period of time. The resulting shear forces create sufficient turbulence to lift the heel off the filter medium. The rinse liquid with the dispersed heel solids is discharged from the basket by the peeling device. This step requires diverting the liquid to outside the centrifuge away from the normal dry product discharge. The rinse liquid can be recycled to the main process or divided into heel solids and liquid in a separate process step.

In both procedures, the heel is removed at low basket speeds to avoid tearing the filter medium. Hydraulic heel removal has the added advantage of simultaneously cleaning the interior of the centrifuge. The most suitable removal procedure will depend upon the specific application.





▲ Siphon basket backwashing



▲ Screw conveyor

Krauss-Maffei HZ peeler centrifuge
Centrifuge controls

▲ Standard paddle feed control, FC

Automatic and optimum operation of the centrifuge to yield a product with uniform quality at maximum capacity requires a sophisticated system for continuously monitoring and controlling a number of process and operating parameters, such as:

- Basket speed
- Feed time and basket filling level
- Filtration rate and spin time
- Wash ratio and wash time
- Safety-related inputs, interlocks, position indicators, and other process-related instrument signals

Typically, Krauss-Maffei peeler centrifuges are provided with variable frequency drives for operating the centrifuge within a speed range best suited for each application and/or step in the process cycle. Programmable control electronics housed in local operator panels and/or in remote control cabinets evaluate the process signals and adapt process parameters on a result-dependent basis.The core controlling devices in peeler centrifuges are feed controllers that provide the feedback signals for controlling the supply of product suspension, wash liquid, etc., to the centrifuge.

Feed controllers are available in various configurations:

Standard paddle feed control, FC

With spring-loaded/hydraulic pivoting motion or fully pneumatic operation.

▲ Thermal feed control, TFC

Thermal feed control, TFC

The sensor arm of the TFC with an embedded thermocouple element is pivoted in and out at adjustable, regular intervals to touch the surface of the basket filling. The frictional heat between the sensor and the product generates a temperature signal, which is conditioned and evaluated by an electronic control module.

The advantages of the TFC are:

- The sensor can distinguish whether it touches a plane of liquid or the surface of a solid due to the different frictional heat created by the contact. It can also determine both the level of basket filling and the filtrate immersion point that signals the end of the filtration or wash step.
- Adjustable immersion frequency and contact time of the TFC sensor provide much more precise feedback on the prevalent processing conditions and allow faster, more efficient centrifuge cycles.

Ultrasonic feed control, UFC

The ultrasonic controller is a contact-free measurement system to detect the filling level in the basket. An ultrasonic probe emits a signal in the direction of the product in the basket. The signal reflected by the rising product is picked up by a sensor and analyzed by control electronics.

▲ Ultrasonic feed control, UFC

The patented UFC system by ANDRITZ KMPT offers the following benefits:

- Continuous level detection
- No mechanical contact with the product, eliminating splashing or dusting
- No mechanical wear on sensors, eliminating potential product contamination from eroded metal particles
- No dynamic seals
- Unobtrusive installation into the process area

Feed control analog, FCA

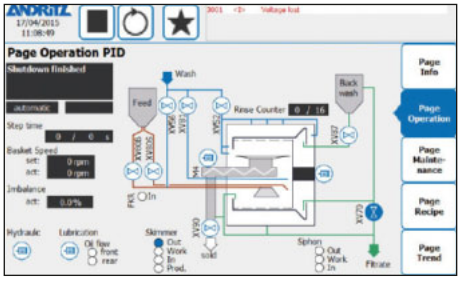
The feed control analog (FCA) is a measuring system that senses the feed level continuously in the centrifuge basket and gives the operator detailed feedback on the feeding and washing process. This enables result-orientated operation of the centrifuge, with optimized throughput, washing, and product quality.

Further advantages are:

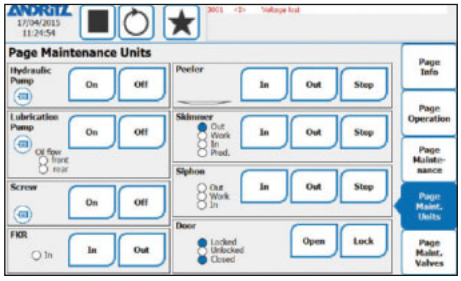
- Prevents overfilling of the basket to minimize product losses
- Limited contact with the product due to adjustable starting points
- Maximum basket feeding at every batch, even with varying feed concentrations
- Reduced splashing and abrasion because of small contact surface

Krauss-Maffei HZ peeler centrifuge

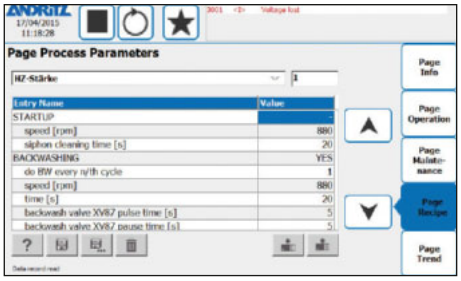
Process automation · Installation



▲ Operation screen



▲ Maintenance screen



▲ Parameter screen

▲ Centrifuge installed on inertia block

Perfection in process engineering requires perfection in process automation.

The superior performance of our process equipment is based on perfecting the interface between equipment hardware, electrical components, electronics, informatics, and process know-how to create an all-encompassing custom-tailored solution for each application. Using intelligent sensors and state-of-the-art communication systems, we control and monitor our machines on a result-oriented basis.

Your benefits

- Enhanced equipment performance
- Consistent high product quality
- Reduced consumption of utilities
- Optional status diagnostics
- Substantial status diagnostic and trend history

Automation of machines

Individual adaptation – we can incorporate the automation concepts for our machine into your existing control system.

Custom concepts

We provide an individually designed service package to fit your specification – from the control of individual units, to incorporation into existing control systems, or automation of complete plants ready for operation.

Services

Based on your quality assurance program, we prepare all the required documents for validation and qualification of the automation software and hardware. Our extensive know-how, profound experience and innovative drive qualify us as your partner for validation of our equipment to meet your production needs.

Machinery directives, ATEX, hazardous location regulations – there are many regulations to be met at the plant site. We are there to serve as your knowledgeable advisor for the safety of your plant.

Installation

Rotation of a centrifuge basket produces not only the centrifugal forces necessary for the separation of solids from liquids, but also high dynamic forces from the acceleration of considerable masses, such as the weight of the basket and its filling with product. Uneven distribution of the product within the basket creates imbalance forces, which will be transmitted to the structure supporting the centrifuge. To keep the dynamic forces exerted on the structure to a minimum, the centrifuge is best mounted on an isolation system, consisting of additional mass (in the form of a steel or inertia block) supported by spring and damper elements.

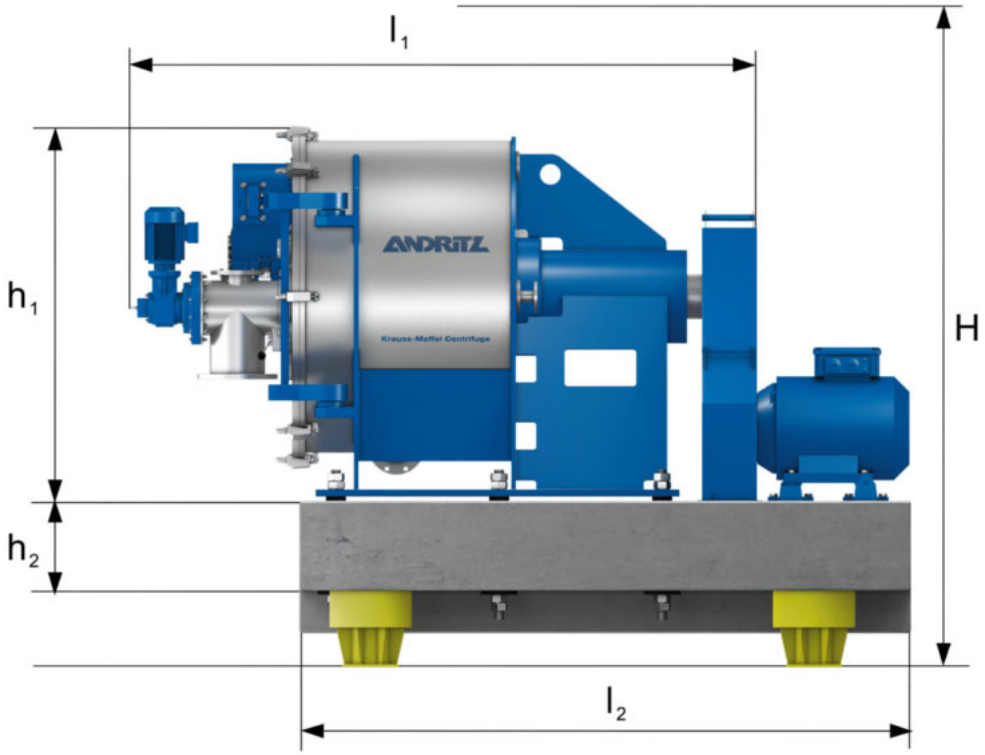
Installation guidelines

- The feed pressure should be around 0.5 bar.
- Keep all supply and discharge lines short and with a maximum possible gradient.
- All attachments to the centrifuge must be flexible.
- Provide for fast draining of all pipes either by venting or pressure compensation in closed loop systems.
- Install sight glasses and sample ports in all supply and discharge lines.
- Provide vertical solids drop without cross-sectional restrictions.

Krauss-Maffei HZ peeler centrifuge
Dimensions and weights

Model	Machine dimensions			Inertia block dimensions			Space requirements			Weight 1	Weight 2
	l1	b1	h1	l2	b2	h2	L	B	H		
	[mm]			[mm]			[mm]			[kg]	[kg]
HZ 25/0.1	670	500	550	-	-	-	1,000	1,100	1,400	75	160
HZ 40/0.2	1,000	720	750	800	1,200	60	1,500	1,300	1,800	500	1,350
HZ 63/0.3	1,500	1,100	1,100	1,650	1,600	260	3,600	3,000	1,800	1,250	2,800
HZ 63/0.6	1,600	1,100	1,100	1,650	1,600	260	3,700	3,000	1,800	1,350	3,500
HZ 80/1.0	2,100	1,400	1,300	2,050	2,100	400	4,300	3,500	2,500	2,600	6,000
HZ 80/1.3	2,400	1,400	1,300	2,050	2,100	400	4,700	3,500	2,500	3,000	7,300
HZ 100/1.6	2,600	1,650	1,600	2,400	2,400	680	5,200	3,800	3,000	3,500	12,000
HZ 100/2.0	2,800	1,650	1,600	2,400	2,400	680	5,400	3,800	3,000	4,100	12,500
HZ 125/2.5	2,900	1,900	1,800	2,600	2,500	650	5,900	4,700	3,500	5,500	15,000
HZ 125/3.2	3,400	1,900	1,850	2,900	2,500	650	6,300	4,700	3,500	7,000	19,000
HZ 160/4.0	3,600	2,300	2,200	3,200	3,200	750	6,700	5,600	4,400	10,000	31,000
HZ 160/5.0	4,000	2,300	2,300	3,500	3,200	750	7,200	5,600	4,500	13,000	36,000
HZ 180/7.1	4,700	3,000	3,000	4,650	3,600	700	8,600	6,600	5,300	23,500	55,700
HZ 200/9.0	5,400	3,200	3,000	4,750	3,600	1,000	8,700	6,800	5,500	28,000	70,000

Weight 1: without motor
Weight 2: with inertia block and drive
Space requirements for operation and maintenance
l1 may vary with discharge options

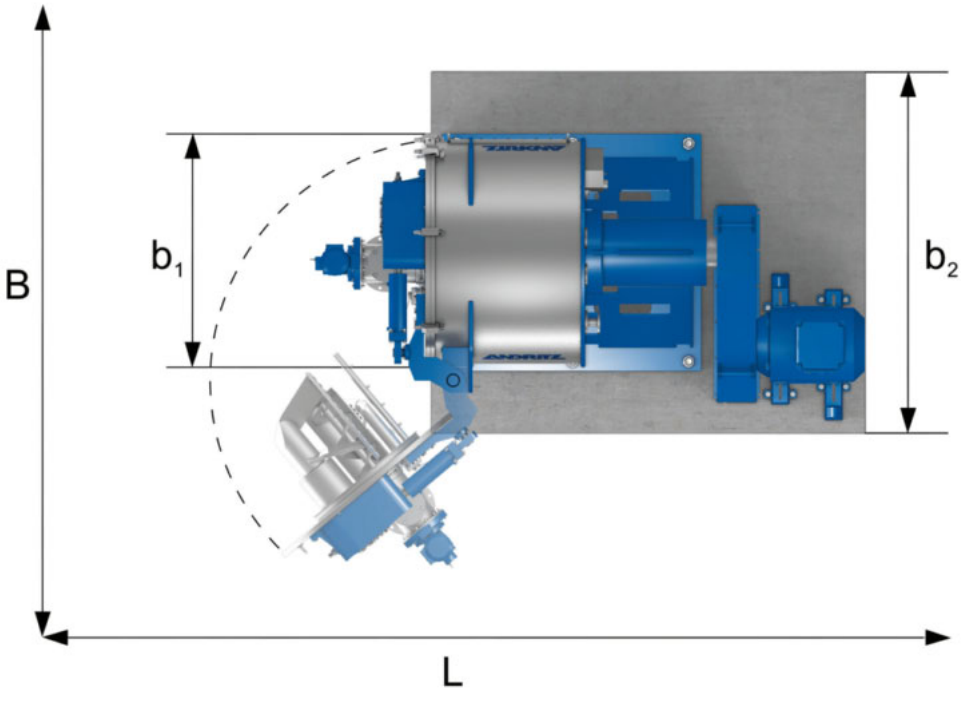


▲ All technical data are approximate and subject to change without notice.

Krauss-Maffei HZ peeler centrifuge
Technical data

Model	Basket inside diameter	Basket length	Basket volume	Filter area	G-force	Maximum* speed
	[mm]	[mm]	[l]	[m²]	[-]	[rpm]
HZ 25/0.1	250	125	2.5	0.10	2,200	4,000
HZ 40/0.2	400	200	9.8	0.25	2,000	3,000
HZ 63/0.3	630	160	20.6	0.32	1,700	2,200
HZ 63/0.6	630	315	40.5	0.62	2,020	2,400
HZ 80/1.0	800	400	83.0	1.01	1,600	1,900
HZ 80/1.3	800	500	103.7	1.26	1,600	1,900
HZ 100/1.6	1,000	500	164.0	1.57	1,290	1,520
HZ 100/2.0	1,000	630	206.6	1.98	1,290	1,520
HZ 125/2.5	1,250	630	323.6	2.46	1,030	1,220
HZ 125/3.2	1,250	800	410.9	3.14	1,030	1,220
HZ 160/4.0	1,600	800	683.6	4.02	805	950
HZ 160/5.0	1,600	1,000	854.6	5.03	805	950
HZ 180/7.1	1,800	1,250	1,350.0	7.07	710	840
HZ 200/9.0	2,000	1,400	1,900.0	9.0	700	790

* The speeds stated are standard speeds and can be adjusted to your process requirements

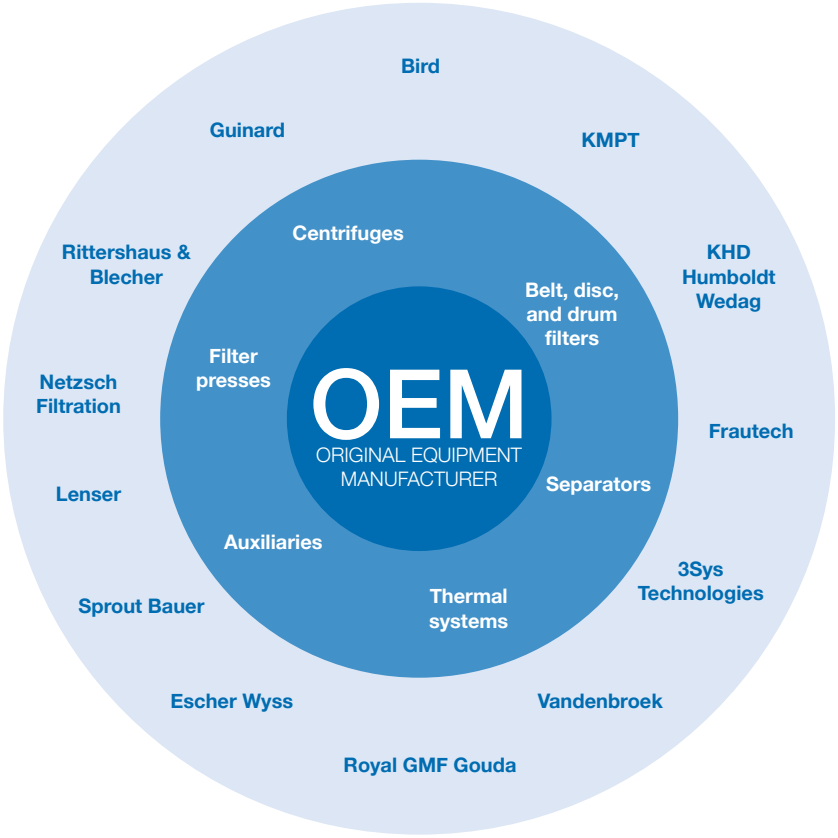


▲ All technical data are approximate and subject to change without notice.

A world
of service

Put our 150 years of OEM experience to work for you

With ANDRITZ SEPARATION, you gain access to one of the world's largest OEM manufacturers for solid/liquid separation, including such well-known names as Bird, KHD, Guinard, and more. From initial consulting through to service agreements, plant optimization, automation, 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

OEM spare parts
Wear and spare parts from OEMs or in OEM quality in local inventories

Repairs & upgrades
Optimization of machine and process performance, repair work, retrofitting, and modernization

Service agreements
Preventive maintenance, from contracts for spare parts, maintenance, inspections and repairs to upgrades and operation

Second-hand & rentals
Certified second-hand and rental machines

Automation
Automation tools to improve processes and plants, both technically and economically

Training
Operator training and tailored seminars for operating and maintenance personnel

AFRICA
ANDRITZ Delkor (Pty) Ltd.
Kyalami, South Africa
Phone: +27 (11) 012 7300
separation.za@andritz.com

AUSTRALIA
ANDRITZ Pty. Ltd.
Carrum Downs, VIC, Australia
Phone: +61 (3) 8773 4888
separation.au@andritz.com

ASIA
ANDRITZ Singapore Pte. Ltd.
Singapore, Singapore
Phone: +65 (6512) 1800
separation.sg@andritz.com

PRODUCT HOME
ANDRITZ KMPT GmbH
Industriestrasse 1-3
85256 Vierkirchen, Germany
Phone: +49 (8139) 80 299 0
Fax: +49 (8139) 80 299 952
kmpt@andritz.com

CHINA
ANDRITZ (China) Ltd.
Foshan, Guangdong, P.R. China
Phone: +86 (757) 8258 6802
separation.cn@andritz.com

NORTH AMERICA
ANDRITZ SEPARATION Inc.
Arlington, TX, USA
Phone: +1 (817) 465 5611
separation.us@andritz.com

SOUTH AMERICA
ANDRITZ SEPARATION Ltda.
Pomerode, Brazil
Phone: +55 (47) 3387 9100
separation.bra@andritz.com

www.andritz.com

VKN HZ peeler centrifuge 1.0 06.2015 EN