

Krauss-Maffei VZU vertical centrifuge



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Krauss-Maffei VZU vertical centrifuge

The Krauss-Maffei VZU vertical basket centrifuge has been specifically designed for processing intermediate products in the pharmaceutical and fine chemicals industry.

The requirements established for minimum product loss, such as optimal cleaning ability, minimum dead zone design, and inspection capability, are all fulfilled in this development.

Operating benefits include flexibility to adapt to a wide variety of product requirements, effective and even filling, intensive solids washing, and optimized solids discharge. In addition, the vibration damping system developed for this unit using three column supports is superior to the old standard and results in smooth operation and minimal downtime for maintenance.

Processing parameters

Operation

Batch-type filtration or sedimentation

Basket diameter

1,000, 1,250, 1,600 mm

Basket volume

250-1,000 l

Filter area

2.0-5.0 m²

Solids content

from 3 % by wt.

Average particle size

5-500 µm

Solids throughput

up to 7 t/h

Wash efficiency

Excellent

Solids recovery

almost 100%

Main applications

- Amino acids
- Antibiotics
- Crop protection chemicals
- Fine chemicals
- Pharmaceutical intermediates
- Vitamins

Materials of construction:

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



Krauss-Maffei vertical peeler centrifuge, VZU 1250

Krauss-Maffei VZU vertical centrifuge

Process advantages

■ Simple assembly and maintenance

Machines delivered full assembled, quick-action closure rings, hydraulically operated cover hinge, housing cover opens fully.

■ Efficient product discharge

due to optimized discharge geometry and pneumatic residual heel removal.

■ Minimum product loss

Design contains a minimum of installed parts. Nitrogen supply for residual heel removal is integrated into the scraper arm. Open design for solids discharge.

■ Homogeneous product distribution

Product distribution independent of the slurry concentration and flow rate, using the dynamic feed system.

■ Result-oriented machine control

With continuous measurement of:

- Filtration resistance
- Feed level
- Filtration performance
- Submersion point of the liquid

■ Reduced space requirement

due to the improved machine geometry on the one hand, and the vertical filtrate discharge on the other hand. This allows a simpler and more space-saving arrangement of the filtrate discharge pipes.



Solids discharge outlet

Krauss-Maffei VZU vertical centrifuge

Fine chemicals characteristics

The entire process area boasts generous radii. Parts are installed from the inside and sealed with an exposed O-ring. The solids discharge chute beneath the basket extends in a kidney-shaped design over the entire cross-section, thus avoiding dead zones and making it difficult for product deposits to form. For inspection purposes, the hinged cover of the centrifuge opens in an upward direction.

This allows inspection of the entire process area and also exposes the solids discharge chute. As an option, CIP nozzles are arranged in such a way that the cleaning agent can reach all areas effectively. The housing can be completely flooded, providing efficient cleaning. Operation of the machine is automatic and fully enclosed. There is no contact between the product and the operating personnel, nor the environment.

Cleaning-in-place (CIP)

When changing the product, the equipment has to be cleaned to such an extent that there can be no contamination between the product batches. Users require fully automatic cleaning with verifiable cleaning effect. ANDRITZ KMPT develops an effective CIP program in cooperation with the operators and users. This generally comprises:

Pre-cleaning:

In a first step, the solvent is fed in through the cleaning nozzles at reduced speed.

Main cleaning:

All discharge pipes from the centrifuge are closed. The centrifuge is filled with solvent. The speed and the direction of rotation vary according to a defined program. As a result of this „washing machine effect“, the machine is cleaned efficiently.

Final cleaning:

The machine is rinsed again by the cleaning nozzles.



Krauss-Maffei VZU vertical centrifuge

Operation

Advancements in control and instrumentation enable enhanced flexible and result-oriented operation of discontinuous filter centrifuges.

In applications in the chemical and pharmaceutical industries the individual cycle times for feeding, filtering, washing and peeling vary from just 3 minutes to several hours. The individual process steps are adjusted flexibly to the existing processing conditions.

Feeding

During the feed process the slurry is fed into the centrifuge basket through the feed distributor. This usually takes place in several stages so that the slurry does not flow over the basket rim. The feed level is measured by a feed controller. This determines the filling level by a mechanical or contact-free method, using ultrasonic means for example. Usually the basket is filled up to approx. 75-85% of the height of the basket rim. The process is completed when the filter cake has attained the desired height. The special feature of Krauss-Maffei vertical basket centrifuges is the dynamic feed system developed by ANDRITZ KMPT. The advantage of this system is that it compensates for fluctuating flow rates and concentrations. It is also possible to use conventional feed pipes as an option.

Filtration

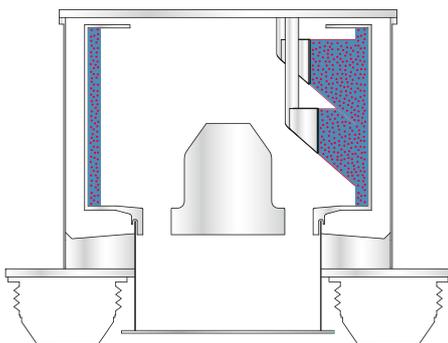
The main filtration process takes place concurrently with feeding. It is completed when the slurry submerges into the filter cake.

Washing

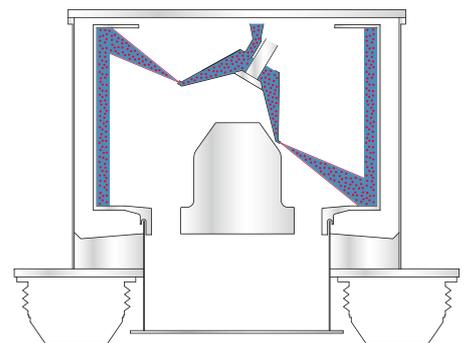
After the main filtration process, the cake is often washed once or several times. For this purpose a wash liquid is fed into the basket trough the feed pipe or, in the event of bad washing conditions, trough a wash pipe. The level of the wash liquid is controlled by the feed controller in the same way as in the feed process. Wash filtration is completed when the wash liquid has submerged into the filter cake.

Dry spinning

After completion of the wash procedure, the centrifuge is accelerated to full speed. The spinning process continues until the desired residual moisture content is obtained in the filter cake.



Feeding with static nozzle

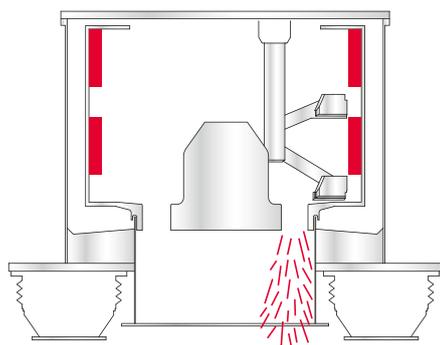


Feeding with rotating distributor



Peeling

At the beginning of the peeling procedure the centrifuge basket is reduced to the required speed. The peeler knife moves radially into the filter cake and peels off the cake. In order to achieve peeling over the entire height of the basket, the peeler knife is moved downwards radially. The peeling device then moves in again to clean the basket bottom. The filter cake removed drops directly into the solids shaft, which extends across almost the entire circumference of the lower basket surface. Plugging and caking are minimized with this design.



Peeling

Residual heel removal

In order to protect the filter media a thin layer of filter cake remains in the filter basket. This layer is called the residual heel and is used as an additional filter medium. The residual heel is removed pneumatically by the peeling device using compressed nitrogen. A further special feature of Krauss-Maffei vertical peeler centrifuges: The nitrogen is fed in through the shaft of the peeling device. This ensures that there are no hoses in the process area.

Maintenance

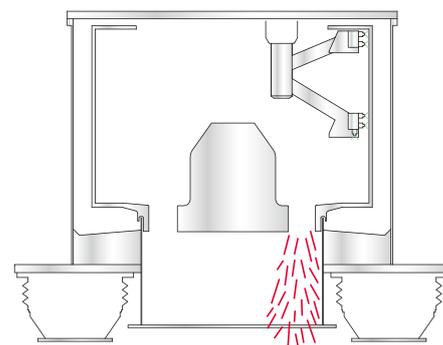
The Krauss-Maffei vertical peeler centrifuge has been designed to make operation and maintenance easy. The primary goal is to keep operating and maintenance costs down.

Bearing cartridge

The bearings and main shaft assembly can be removed easily as a single unit, thus the bearings can be replaced in a remote maintenance shop instead of on the production platform.

Shaft seal

The shaft seal has a cartridge design for easy assembly and disassembly. If only the shaft seals need replacement, the old seal can be removed and replaced without having to dismount the shaft and bearing.



Residual heel removal

Krauss-Maffei VZU vertical centrifuge

Centrifuge controls



UFKR

Result-oriented control

In order to deal with frequent product changes, Krauss-Maffei vertical peeler centrifuges are equipped with appropriate measurement and control systems. The following parameters are measured continuously:

- Filling level in the basket
- Filtration speed
- Submersion point of the liquid into the filter cake

The values measured are analyzed by the control electronics, and the process parameters, such as feed time, dry spinning time, wash time, and so on, are adapted to optimum benefit. The unit is controlled on a result-oriented basis. For optimized feed level detection, ANDRITZ KMPT recommends the following feed controller:

Ultrasonic feed controller (UFKR)

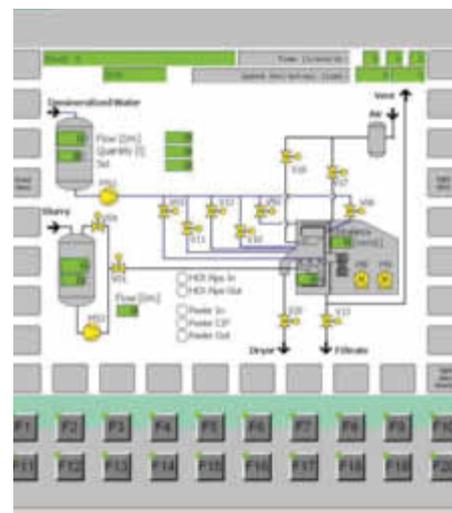
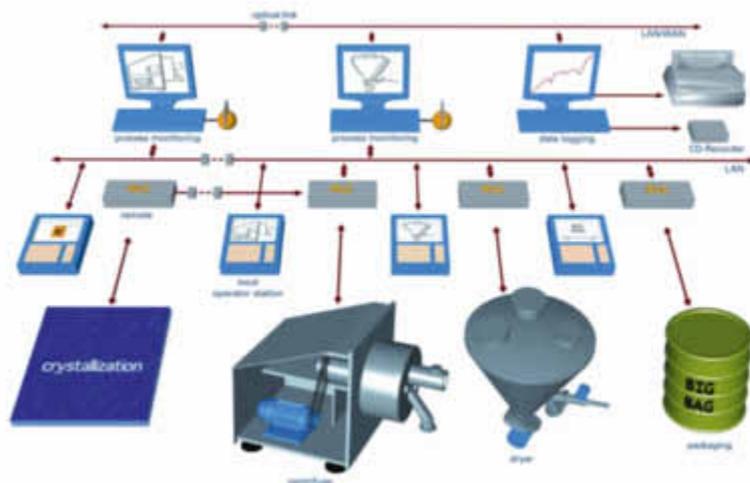
Only Krauss-Maffei centrifuges are fitted with the ANDRITZ KMPT patented contact-free ultrasonic feed controller. An ultrasonic sensor emits a measuring signal in the direction of the charge in the basket. The ultrasonic signal reflected by the charge is picked up by a sensor and evaluated by the control electronics. When using different solvents, a reference measurement guarantees compensation of different sound velocities.

Advantages:

- Contact-free measurement avoids splashing and caking.
- Analog and continuous level detection measurement of the liquid and the cake height.
- Analog value can be stored in electronic form.
- No mechanical adjustments at machine, feed height is determined in process parameter recipe.
- No wear on the sensor and consequently, no contamination of the product with metal abrasion.

ANDRITZ KMPT

Process automation



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

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.

Krauss-Maffei VZU vertical centrifuge

Foundation/installation

Rotation of a centrifuge basket not only generates the centrifugal forces necessary to separate solids from liquids, but also high dynamic forces due to the acceleration of substantial masses, such as the weight of the basket and its filling with product.

Uneven distribution of the product inside the basket creates imbalance forces that are transmitted to the structure supporting the centrifuge.

In order to keep the dynamic forces acting on the structure to a minimum, the centrifuge is best mounted on a damping system supported by spring and damper elements.

Important installation criteria are:

- 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 VZU vertical centrifuge

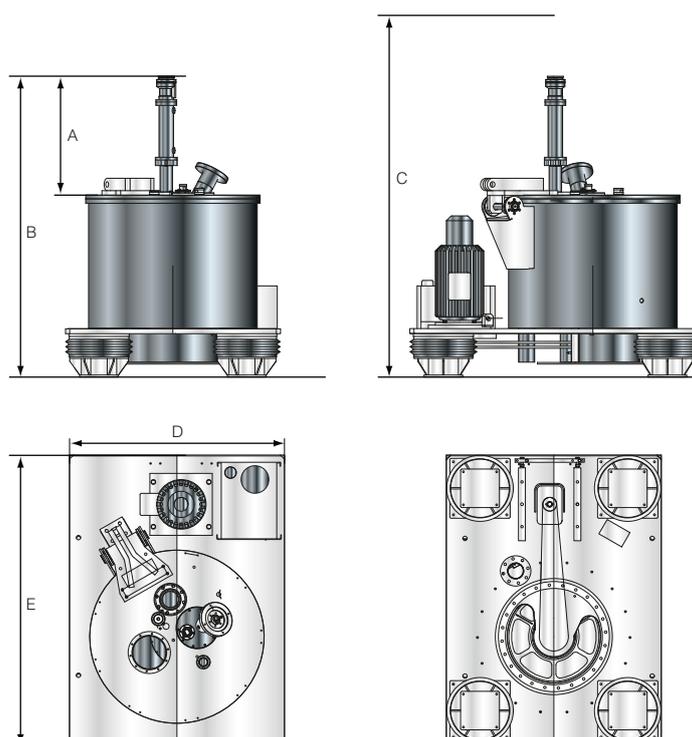
Dimensions and weights

Centrifuge model	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Weight [kg]
VZU 1000/2.0	940	2,250	2,620	1,550	2,100	3,800
VZU 1250/3.2	1,200	2,720	3,100	1,750	2,380	7,500

Technical data

Centrifuge model	Basket inside diameter [mm]	Basket length [mm]	Basket volume [l]	Filter area [m ²]	Max. g-force ¹ [-]	Max. speed [rpm]
VZU 1000/2.0	1,000	630	250	2.0	870	1,250
VZU 1250/3.2	1,250	800	500	3.2	630	950

1) Basis: Density of saturated filter cake 1,250 kg/m³ at T=50°C



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

ANDRITZ KMPT

Test centers



Test center in Vierkirchen, Germany



Production works in Florence, USA



Consulting

ANDRITZ KMPT operates fully equipped test centers in Germany and the USA, offering both bench and pilot scale equipment.

Our experienced engineers will consult with you to determine the equipment most appropriate for your product, then will perform the necessary trials to optimize the operating conditions for your process.

Based on these tests, we will provide a complete report which will recommend the best solution for your solid/liquid separation process, including scale-up information for the production equipment.

We can also assist in running long-term trials at your site with equipment from our rental machine pool.

ANDRITZ KMPT Services



Refurbished equipment

Our goal is to provide our customers with fast and reliable service, from the first process consultation throughout the entire service life of your ANDRITZ KMPT process equipment.

To assist our global customer base, we operate service facilities around the world staffed with experienced, dedicated service teams.

Spare parts

We keep over 6,000 different spare parts and components in stock for you. Our service centers in the USA, the UK, Italy, France, and China, for example, maintain their own spare parts stock to enable faster delivery to your plant site.

Reconditioned units

We maintain a select stock of reconditioned units available for fast delivery from our facility. All machines are fully disassembled, inspected and reconditioned by replacing worn or damaged parts. A final test run validates the mechanical guarantee we provide with our refurbished equipment. With our factory reconditioned units you gain production capacity quickly with minimal capital investment.



Commissioning

Repairs and maintenance

Our service centers are ready to provide you with regularly scheduled maintenance or emergency service at your site. Our experts provide assistance including assembly work, installation support, commissioning, upgrades, repair work, and optimization of your process conditions.

Advisory service

Our customer service team is ready to answer any question concerning machine safety, equipment upgrades, and process optimization.

Installation and commissioning

Our experienced service personnel assists you with the installation and start-up of your equipment.

Remote diagnostics

Using modern communications and diagnostic systems, our customer service is able to offer even faster and more efficient support. Via remote access our specialists receive information on the operating condition of your machine and carry out fault diagnoses. Maximum data security is of course guaranteed at all times. We only access the data from your machine when you give your specific approval for us to do so.



Spare parts

24-hour on-call service

You can reach our skilled and experienced service team around the clock.

Maintenance contracts

We offer you tailor-made, long-term contracts for preventive maintenance of your equipment.

Customer training

We train your operating personnel during commissioning of the plant. In addition, we also offer you seminars for maintenance and operation of our entire line of process equipment. This training can be conducted at our site or yours.

ANDRITZ KMPT

Company profile



The ANDRITZ GROUP

The ANDRITZ GROUP is a globally leading supplier of plants and services for the hydropower, pulp and paper, metals, and other specialized industries. The Group is headquartered in Graz, Austria, and has a staff of approximately 16,100 employees worldwide. ANDRITZ operates over 120 production sites, service, and sales companies all around the world.

ANDRITZ SEPARATION

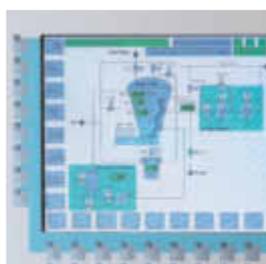
ANDRITZ SEPARATION is one of the leading global suppliers of plants, equipment, and services for mechanical and thermal solid/liquid separation (coal, ore and mineral processing, chemical, petrochemical, and food industries). The business area's field of activity covers design and manufacture of key components (centrifuges, filter presses, rotating filters, drying plants), as well as erection and start-up of turnkey plants, including automation, safety engineering, and services.

ANDRITZ KMPT

ANDRITZ KMPT has been a world leader and innovator in the chemical process industry for over 75 years. The extensive experience of our engineers comes from testing more than 3,000 products and putting over 9,000 applications to work. Over 500 patents demonstrate our capacity for innovation. This extensive knowledge governs our process and equipment recommendations, all tailored to meet our customers' requirements with an optimum in performance and cost.

ANDRITZ KMPT

Product lines



■ Krauss-Maffei centrifuges

With horizontal peeler centrifuges known for reliability, pharma centrifuges designed to meet highest quality standards, innovative vertical basket centrifuges and continuously operating pusher centrifuges, ANDRITZ KMPT has the capability to handle a broad range of separation applications in the chemicals, pharmaceuticals and environmental industries.

■ Krauss-Maffei filters

For vacuum or pressure filtration, our rotary drum and disc filters combine high yield with low production costs in the processing of chemicals, plastics and minerals.

■ Krauss-Maffei dryers

Batch drying in our conical mixer dryer with helical mixing assembly or continuous drying of free-flowing materials in our plate dryer – we offer the right choice of dryers for fine chemical and pharmaceutical producers.

■ ANDRITZ KMPT process systems

We apply our experience and expertise to create fully functional processing modules including peripherals and automation, saving the customer from having to deal with multiple vendors. ANDRITZ KMPT provides all the detailed engineering and reduces installation time with pre-assembled systems.

ANDRITZ stands for ultimate know-how in solid/liquid separation. Our decade-long background in this field and comprehensive technology offering enable us to supply our customers with the best solution for each application, whether in municipal or industrial sewage sludge treatment, the chemical or food industry, or for preparation of minerals and ores.



Food



Chemicals



Minerals



Mining



Environment

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