



VSK® Separator

The **VSK®** combines the sturdy design of the **V-Separator** with the high performance of the **SEPMASER**. The cage wheel is arranged as an add-on module to the V. With the V and **VSK® Separator**, the need for auxiliary equipment is greatly reduced: no separate dryer, no deglomerator. New ways of process design are now open to a wide field of applications for new plant and upgrade alike. Wear is minimized, even when grinding

VSK® features:

- **Five jobs in one unit:**
 - Relieving the dynamic classifier of coarse material by pre-classifying.
 - Mixing feed and recycled material before entering the roller press.
 - Degglomeration of RP discharge by impact action of the cascade.
 - Drying / cooling.
 - High efficiency classifying.
- **Cut size between 25 and 150 µm.**
- **Effective wear protection.**

abrasive materials. These new systems are not exclusively bound to the roller press, but can be applied in grinding circuits with

tube mills and impact hammer mills. Tailor-made solutions by KHD Humboldt Wedag are available.



VSK®e Separator ("e" = extended version)

The **VSK®e Separator** will require significantly less mechanical conveying capacity. To accomplish this, the **VSK®** is split into two parts. The static "V"-part underneath the roller press and the dynamic "SK"-part above the roller press are connected by a riser duct (e), over which all fines from the "V"-part are lifted by air flow to the "VSK®"-part.

The benefits of the VSK®e are:

- Minimizing of bucket elevator capacity
- Higher feed rates can be processed
- Reduction in building volume
- Lower capital investment.

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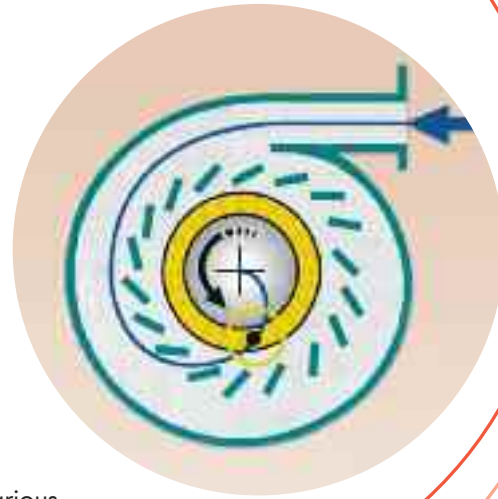
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Focus on efficiency
KHD Separators

The SEPMASTER

High-performance separators have a long tradition at KHD Humboldt Wedag. Our **SEPMASTER** provides excellent selectivity and fits into small space. In addition to installation in new mill circuits, the **SEPMASTER** is particularly well suited for increasing the productivity of mills already in operation. The innovative rotor cage system enables the grinding of premium product qualities. The investment cost incurred by a change of separators is quickly recovered. Through its compact dimensions and low operating and maintenance cost the **SEPMASTER** significantly increases grinding plant efficiency.

Depending on size and application, the **SEPMASTER** separator is available in various versions and with specifically tailored protection against wear and tear.



Rotor stability

The rotor shaft is supported at both ends. This concept avoids vibration and ensures a smooth and safe running machine, even when producing very fine products.

Why is the drive on the bottom?

For maintenance work on the separator, gearbox, motor and electric cables do not need to be moved. The drive is positioned away from the heat and easily accessible.

The bearings are outside.

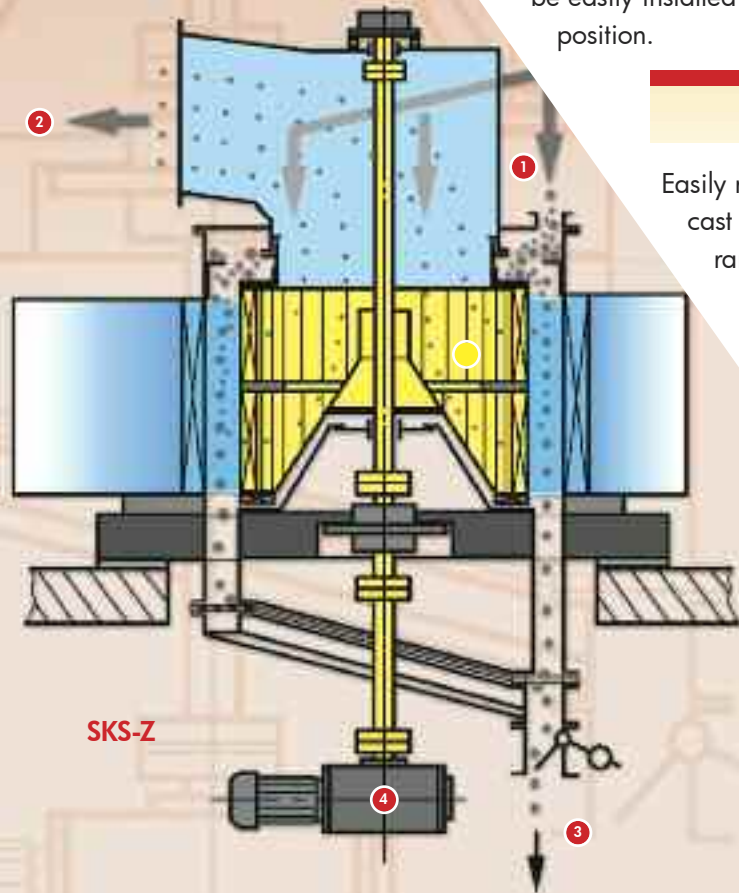
The support bearings are located outside the separator housing and can be easily installed or removed, whilst the cage wheel remains in normal position.

Resistance to wear and tear = lower costs.

Easily replaceable parts made of high quality materials such as cast basalt, ceramics, chromium carbide or chilled iron guarantee long life.

Fits comfortably into small spaces.

The **SEPMASTER** is the perfect replacement for old separators. Compared to older generation separators, the **SEPMASTER** cage wheel separator is not only more efficient but also significantly smaller and lighter.



SKS-Z

- 1 Feed
- 2 Fines
- 3 Coarse
- 4 Drive
- Rotating

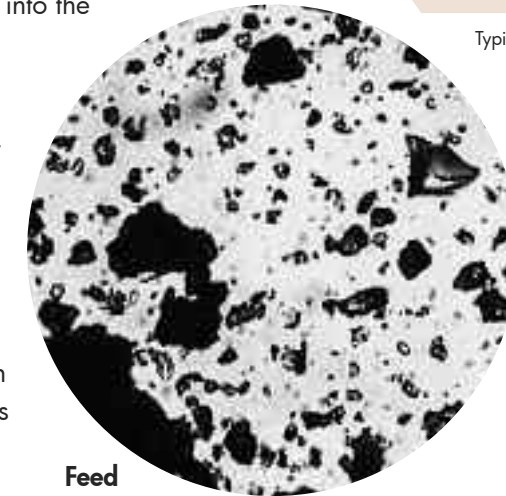
SEPMASTER

Process and options

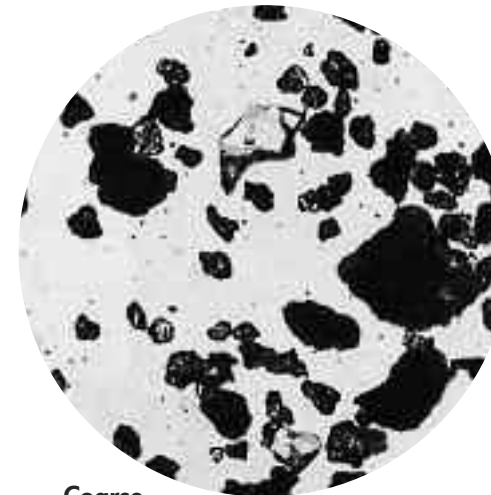
Fine material and coarse material are separated at the periphery of the rotor cage in a vortex predetermined by air deflectors and the rotation of the cage. The airstream, which is fed horizontally, will drag the fine particles against the centrifugal force to the inside of the cage wheel and from there to the fine material discharge. The coarse grains are pushed away from the separator wheel by the centrifugal force and drop into the coarse material discharge.

Efficiency of separation

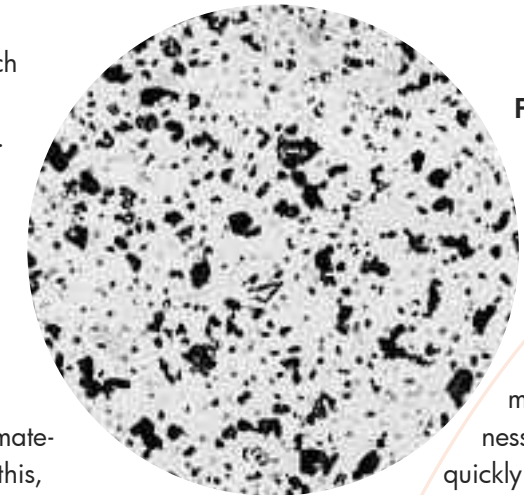
Precise separation was previously only possible on a laboratory scale, but can now be achieved in large plants because of the **SEPMASTER's** high performance. Upgraded plants show savings in grinding energy of 10 to 20% on average and production increases



Feed



Coarse



Fines

fine products such as high quality cement or filler. As a result of the excellent selectivity, grits returned to the mill in the grinding circuit are well cleaned of fine material. Because of this, more fresh material can be fed to the mill. The "Tromp" selectivity curve is used to assess the selectivity performance of separators. The KHD **SEPMASTER** achieves top marks, as can be seen in the graph.

Setting the cutpoint:

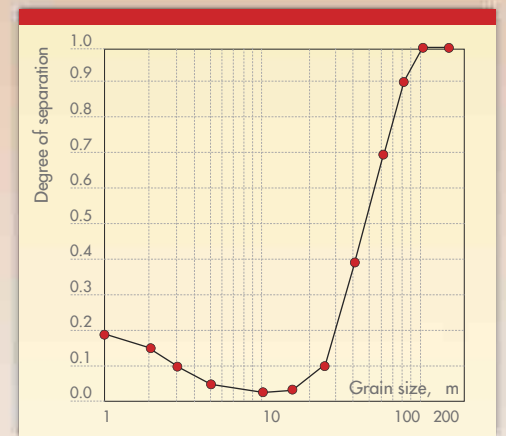
Fineness of the finished product is quickly and accurately set by the cage speed.

Consistent quality

Variation in fineness and mass flow of the feed material have little effect on the fineness of the finished product. The quality of the product remains constant.

Readily reproducible separator results

The desired material fineness can be quickly reproduced, a great advantage when switching to a different product.



Typical **SEPMASTER** selectivity curve according to Tromp.

Replaceable cage bars make easy maintenance.



Fine material – without "OSP's" (oversized particles)

The rotor seal, which is purged with fresh air, ensures fine products without oversized particles and higher protection against wear. Quick-Lime producers in particular enjoy the "OSP" free operation performance of the SEPMMASTER.



Important effect on downstream performance

Excellent product quality is achieved by accurate control of oversize material. For raw meal, low levels of super fine material allows for good burn and flow characteristics.

SEPMMASTER SKS - V:
The feed material is fines from the V - SEPARATOR.

The SEPMMASTER family

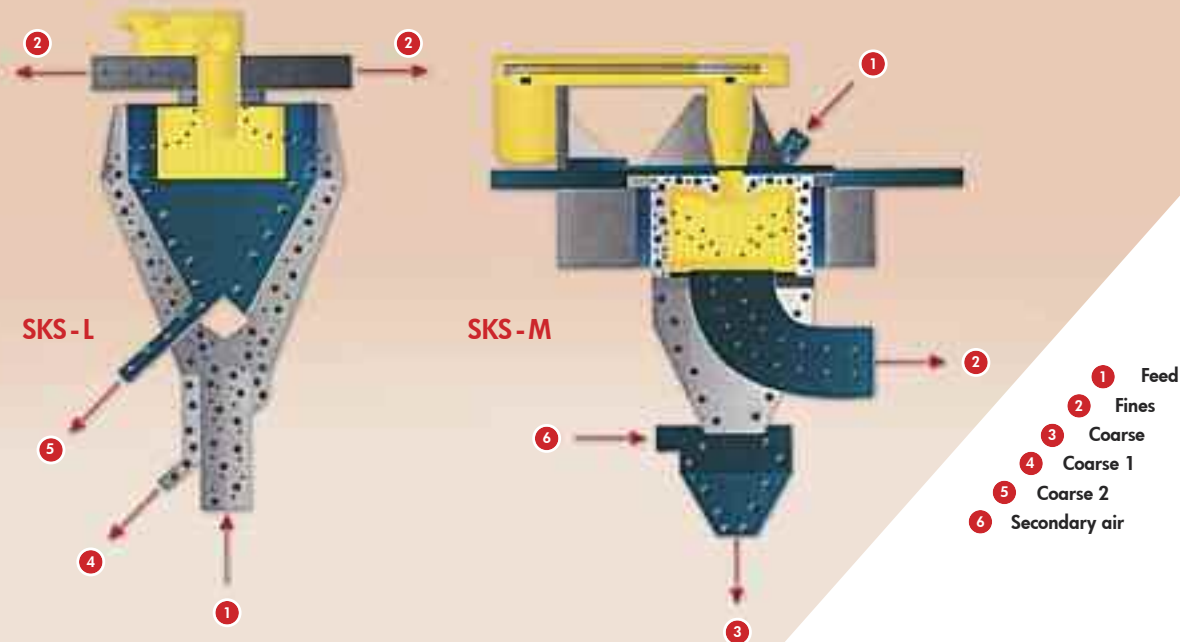
SKS - M Separator Size	Feed material		SKS - Z and SKS - L Rotor cage diameter (mm)	Feed material	
	fine separation t/h	coarse separation t/h		coarse separation t/h	fine separation t/h
400	4	7	1,750	150	230
550	9	15	2,000	190	300
700	15	25	2,250	240	370
850	24	39	2,500	280	440
1,000	34	57	2,750	350	550
1,150	43	72	3,000	410	640
1,350	63	104	3,250	480	750
1,550	84	141	3,500	560	880
			3,750	640	1,000
			4,000	770	1,200
			4,300	880	1,370
			4,600	980	1,530

SEPMMASTER SKS - V:
For combination with the KHD V - SEPARATOR.

SEPMMASTER SKS - Z:
The hundredfold proven separator for separating in the range from 20 to 250 μm cut point.

SEPMMASTER SKS - L:
For use on air-swept systems. Highly suitable for "In-Process-Drying".

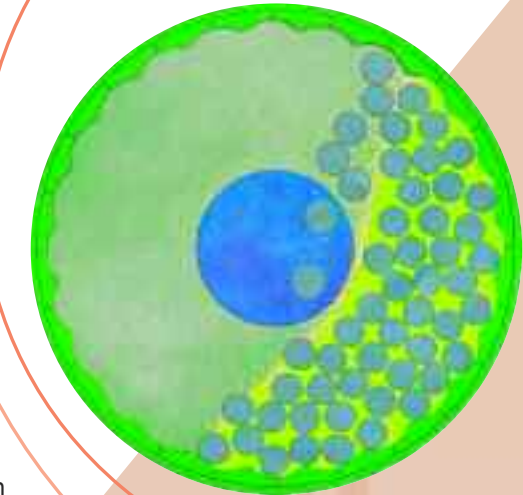
SEPMMASTER SKS - M:
For extremely fine products.



Optimum solutions for each grinding process
Grinding with the tube mill

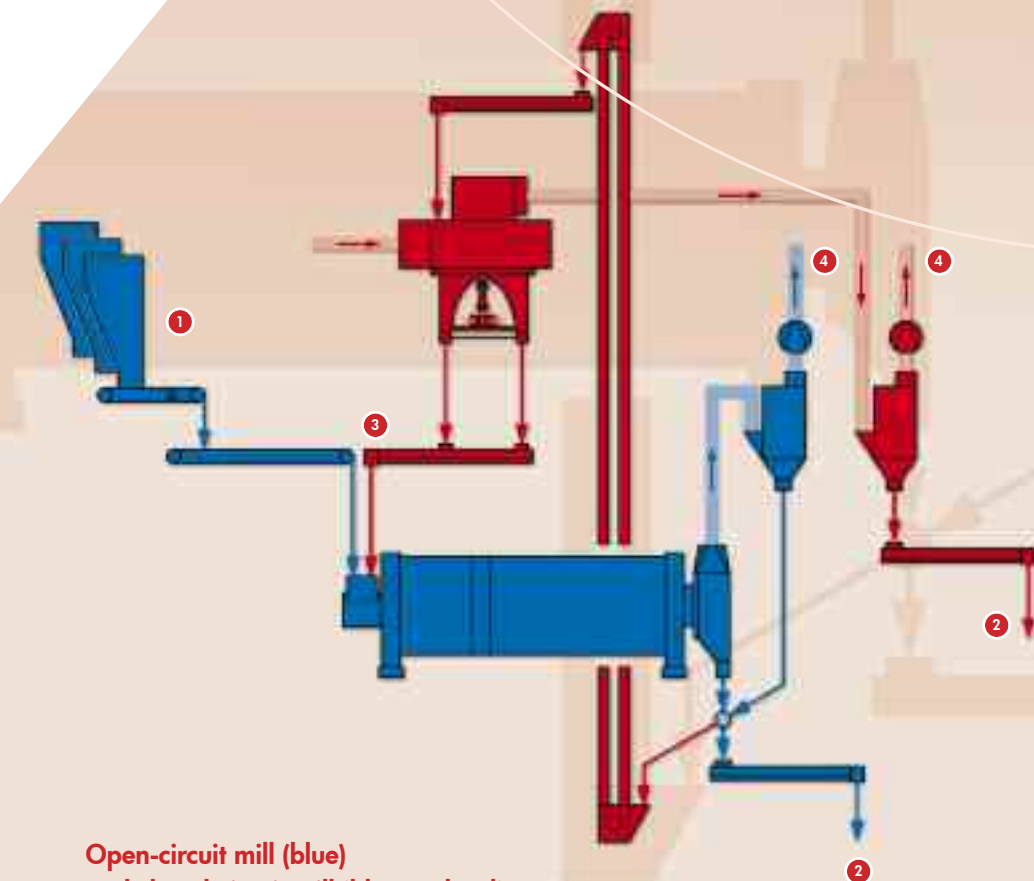
Although tube mills have higher energy consumption than more modern grinding systems, they do offer a number of benefits which justify their use:

- High availability
- Perfect cement characteristics
- Simple adjustment
- Easy maintenance
- Extreme resistance to abrasion

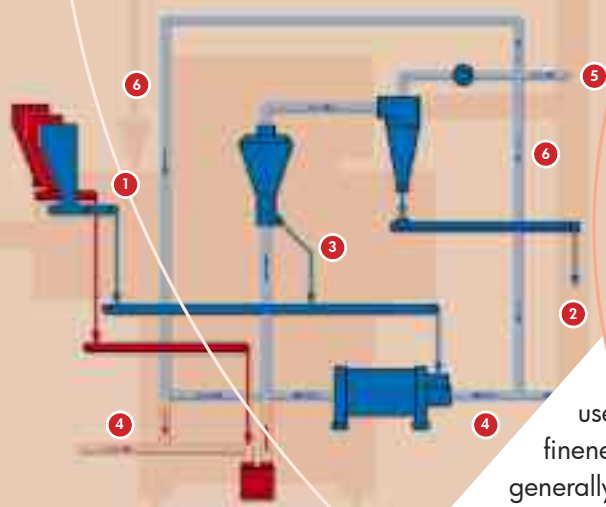


Our classic
For grinding cement or granulated slag, tube mills are in operation either as „open-circuit mill“ or as „closed-circuit mill“ with the SEPMMASTER high performance separator. These mills have a length to diameter ratio of more than 3.0 and are supplied with one or two grinding chambers.

- 1 Fresh material
- 2 Finished material
- 3 Coarse material
- 4 Waste gas



Open-circuit mill (blue)
and closed-circuit mill (blue and red)



Air-swept grinding plant (blue) and TANDEM grinding plant (blue and red)

Grinding and drying, all in one

A short tube mill with or without drying chamber (depending on feed material moisture) is used for drying and grinding of cement raw material. The air-swept mill is advantageous when the moisture level is high, whereas the closed-circuit mill is mostly used for low moisture and high fineness levels. Air-swept mills are generally used for grinding coal.



TANDEM grinding plant: Pneumatic transfer of ground material from PHM and tube mill to the separator

Team work is top!

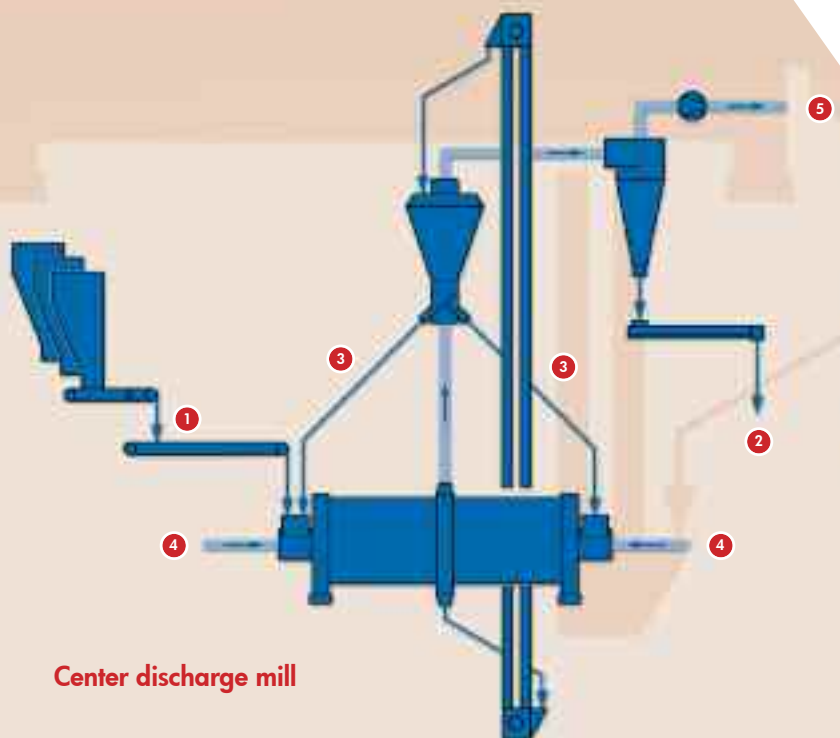
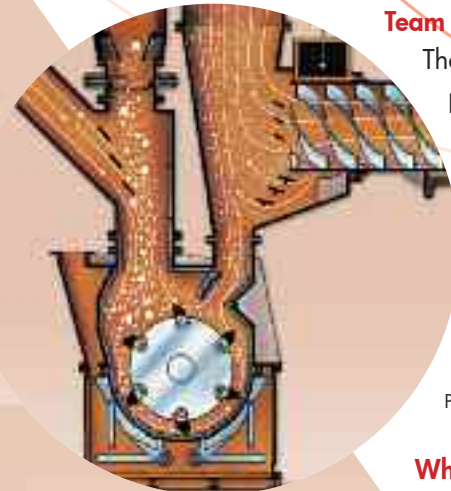
The TANDEM grinding plant is a KHD Humboldt Wedag development. An impact hammer mill (PHM) is connected in series with a tube mill. The solution offers excellent drying performance and handles feed sizes of up to 120 mm. Highly abrasive raw material can be fed directly to the tube mill.

PHM impact dryer

When the going gets hard

The center discharge mill is used for material which is very difficult to grind. It has two grinding chambers, both of which can be fed with fresh material and grits. The SEPMASER SKS-L, which is fed by a gas stream from below and via a bucket-elevator from above, is the separator of choice for this mill.

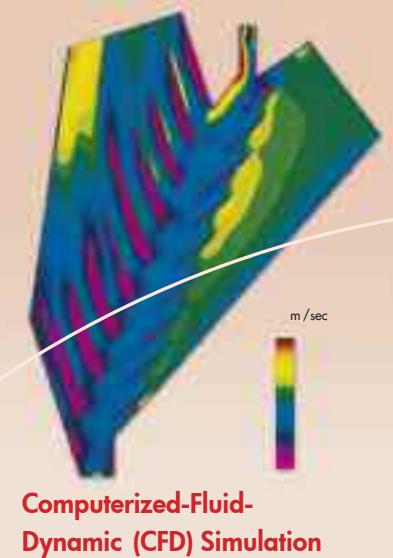
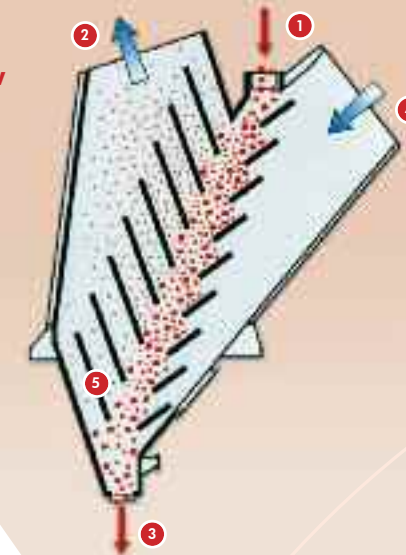
- 1 Fresh material
- 2 Finished material
- 3 Coarse material
- 4 Hot gas
- 5 Waste gas
- 6 Return gas



Center discharge mill

V-SEPARATOR: gas and material flow

- 1 Feed
- 2 Fines
- 3 Coarse
- 4 Air
- 5 Separating channels



Computerized-Fluid-Dynamic (CFD) Simulation

Shape giving name The V - Separator

The V-SEPARATOR in operation

Originally developed to separate fine material from a roller press circuit, the V-SEPARATOR has, however, also proved its value in tough applications with large mass flows and abrasive material of wide size range and high levels of feed moisture.

How does it work?

Material is fed from above to the built-in step grate. From here, the fine material is carried upwards with the air through the separating channels, the coarse material falls down over the step grate and is discharged at the bottom of the housing. The ratio of material load to separating air can be up to three times higher than with an airstream separator.

Virtually unlimited use

The required product fineness is achieved by adjusting the air speed in the separating channels. Cut point range is from approx. 80 μm to 1.5 mm.

Limiting wear and tear

All internal parts are fixed and have straight and level surfaces, as does the housing. This ensures simple but effective protection against wear, eliminating the need for maintenance work for many years.

The benefit to you

The V-SEPARATOR is an uncomplicated static separator without any moving parts. Since it carries out a whole range of process functions, it considerably extends the range of applications for high pressure comminution. In addition to reduced investment for machinery, the V-SEPARATOR also results in energy savings. With the rising cost of energy, this will become increasingly important.



The Allrounder.

Despite its simple design, the V-SEPARATOR carries out a whole range of process-related tasks within the grinding circuit:

- Separating fine material from fresh material
- Drying moisture from fresh material
- Cooling hot fresh material
- Deglomeration
- Mixing fresh material and grits
- Preventing formation of deposits when grinding granulated slag by positioning the V-SEPARATOR underneath the roller press.
- Producing a finished material with custom tailored grain size distribution by combining V-SEPARATOR and cage wheel separator.