



VERTICAL ROLLER MILLS KTM

- Compact design
- Comfortable operation and maintenance
- KTM series of wide capacity range



Vertical roller mills KTM



Application of KTM mills

KTM vertical roller mills are used for grinding of cement, lime, glass, as well as a number of chemical and metallurgical materials. With its data base and test equipment PSP forecasts operating results of many more materials of other industries where coarse, fine or very fine grinding is required. The mills are air swept and suitable for drying, when this air is heated. The type KTMU is designed for coal grinding.

Operating principle

The coarse material is fed to the center of a round table rotated by an electric motor with gearbox. The material spreads down the slope of the central pile and further by centrifugal force. Conical grinding runners are pressed on the rotating material bed by means of hydraulic or pneumatic and occasionally also by spring force. The ground material passes a retainer ring at the periphery of the table, where it is picked up by a swirled air stream drawn from the lower part of the mill and lifted completely to the inlet of an internal separator. The coarse fraction is returned to the center of the table.

From the separator outlet the final product reaches cyclones or filters for separation from the air, which is fully or partially recirculated to the mill. The entire circuit is under negative pressure for dust free operation.

Advantages

No contact between runners and casing

Quick adjustment of grinding pressure by adjustment hydraulic-pneumatic pressures

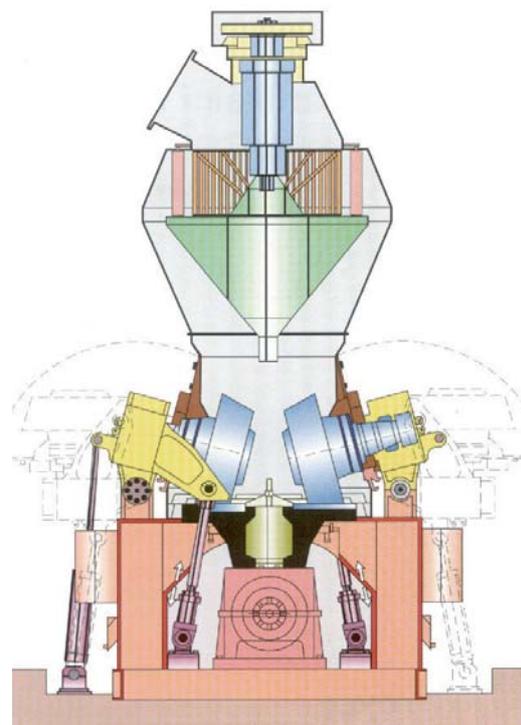
Easy access for replacement of runners, casing and segments of the rotating table without dismantling of the grinding chamber and separator

Reduced foundation requirement due to reduced external forces

Electric power saving by narrowed mill body for lift of ground material without recirculation

Responsive and continuous regulation of product fineness

Suitable for drying of free flowing raw materials at high air temperature



3D model of the KTM mill

Summary

- KTM vertical mills are offered for**
- an inlet size range of 0 – 100 mm
 - an outlet size range of under 20 microns to over 2 mm
 - a capacity range of several kg/h up to 200 t/h
 - a drying temperature of up to 300 °C

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KTM mills during manufacture and installation or reconstruction



Assembly of a KTM 1200 in PSP's work shop



A new mill KTM 1200 installed on existing foundation frame of existing mill KTM in customer's plant - bentonite grinding.



Existing mill KTM 1200 before disassembly and installation of a new mill on the existing foundation

Reconstruction

Typical reconstruction of existing vertical mills comprise

- 3rd generation separator DTIM for at least 10% higher capacity for the same fineness. No other mill parameters need to be modified.
- replacement of a spring system for the bed pressure by a hydraulic-pneumatic system
- replacement of other mill or mill circuit components by more efficient ones



DTIM 1500 separator of a vertical mill installed on a KTM 1400



Lime grinding plant with KTM 1200



Reconstruction of a KTM 1200 in PSP's work shop

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Mill separator DTIM 2500 with upper feeding of grist



Mill separator DTIM 2500 with upper feeding of grist



Electric motor with gearbox

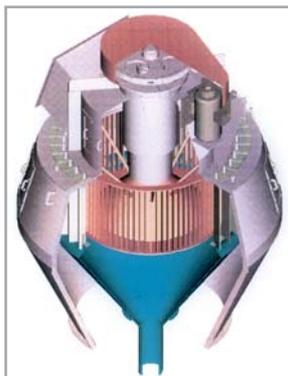
DTIM dynamic 3rd generation separator

The dynamic separator DTIM is an integral part of the KTM mill. It is designed to significantly extend service life and reduce wear. The fineness and sharpness of separation are controlled by:

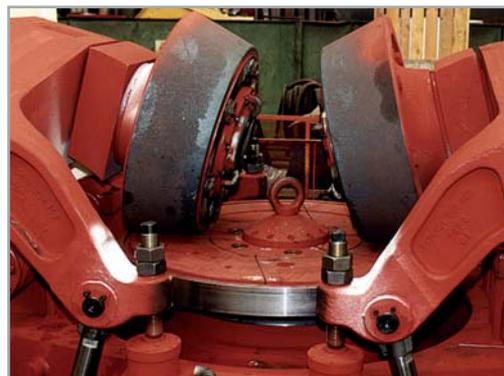
- Tilting of the stator blades
- Adjustment of the speed of the rotor by a frequency converter or by replacement of pulleys
- Adjustment of the air flow through the separator

Characteristics of DTIM separators

- High efficiency and sharpness of separation
- Possibility of separation of materials of different grain size distribution
- Easy adjustment of the fineness of the product
- Low specific power consumption
- High drying efficiency within the separator
- Cooling of the material with ambient air
- Favorable particle size distribution of raw meal for the subsequent burning process
- Possibility to take out all or partial grits portion from separator
- Possibility of feeding fine meal (grist) to the upper part of separator for pre-separation of material before grinding



3D model of the separator



Grinding table with runners

Integral equipment of KTM mills

When abrasive materials are ground, great attention is paid to the internal equipment of the mill

- Casings of grinding runners and grinding segments are cast anti abrasive alloys or hard faced.
- The grinding chamber is lined with special shaped castings and plates.
- Separator rotor, its stator blades and other exposed surfaces are protected by Hardox plates or they are equipped with wear resistant coatings or welded.
- The separator body is lined with Hardox material.



Cast lining of the grinding chamber



Grinding chamber armored with HARDOX and cast segments of grinding table



Hard faced grinding runners and grinding chamber lining

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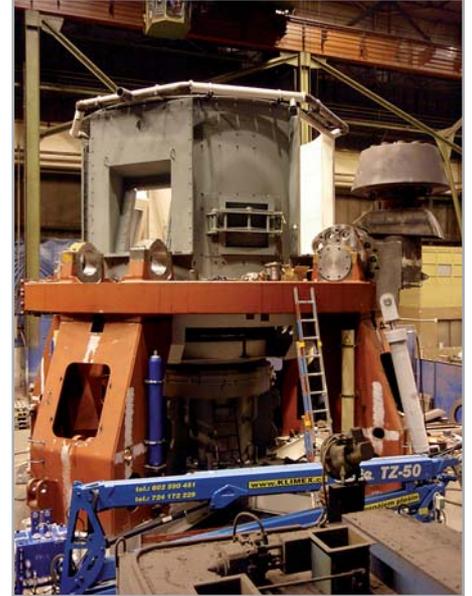


Assembly of a mill for 150t/h of raw meal

With 4 runners in PSP's work shop:



Grinding runner with carrier



Lift out of grinding runner



Placement of grinding carrier in the bearings



Placement of grinding carrier in the bearings



Cover of the grinding chamber



Check assembly of the upper part of the mill separator



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KTMU vertical roller mill

is used for grinding of coal, petroleum coke, anthracite and other explosive fuels. The equipment meets the safety and operation requirements, e.g. instantaneous release of overpressure caused by an explosion of the material. The mill releases exploded material out

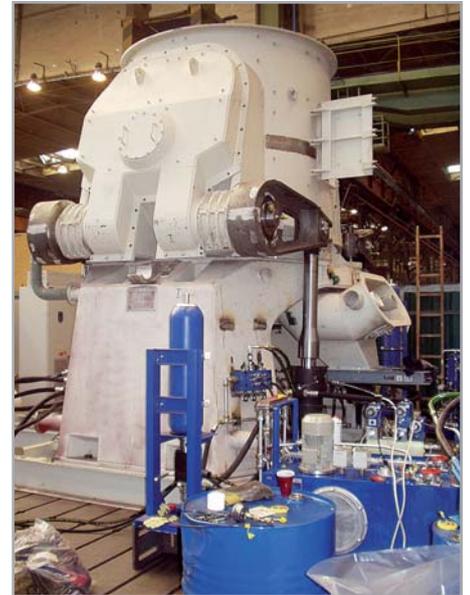
of the area of the grinding plant. Fire is extinguished by water inside the mill and/or by sealing of all flexible parts against access of ambient air with oxygen. Part of the mill is the DTMU dynamic air separator, which respects the same standards as the mill itself.



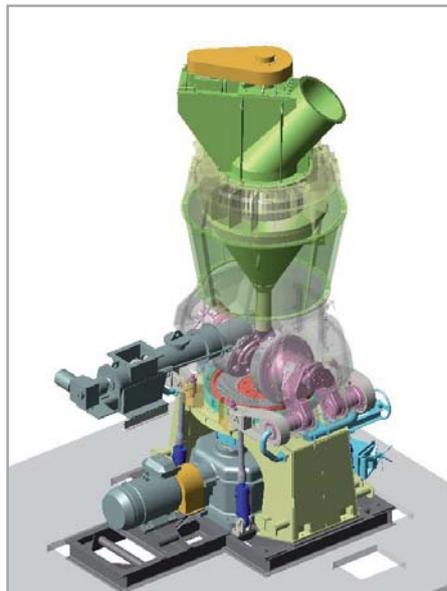
3 D model of the mill KTMU 1800



Assembly of a KTMU 1800 for grinding of coal in PSP's work shop



KTMU 1200 for grinding of petroleum coke and anthracite



3D model of the mill KTMU 1200



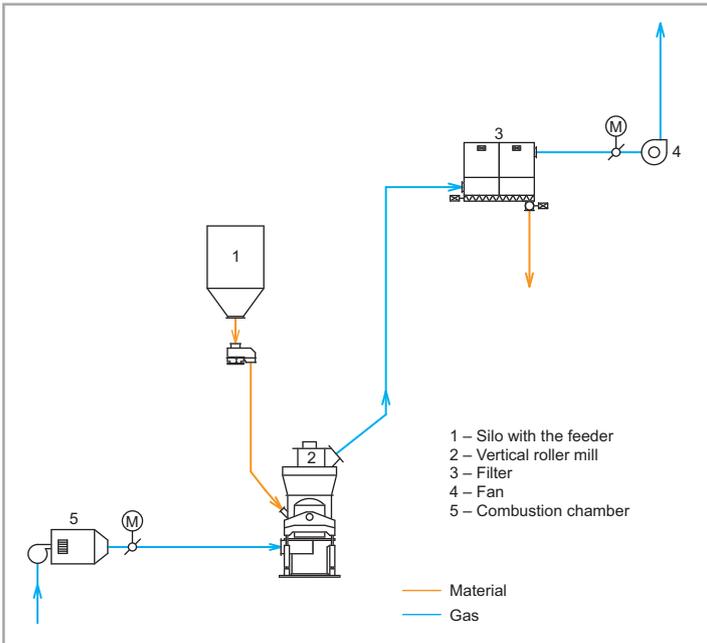
Separator DTMU 1000 in coal grinding plant

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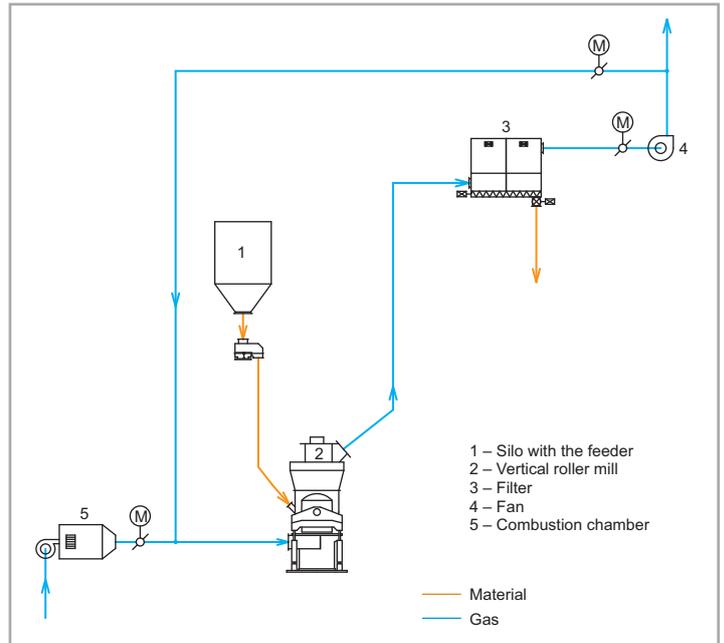


Cases of KTM grinding circuits

The fine material is separated by in a filter. Care is taken for reduced space for build-ups. Drying of the material takes place at all stages. The case is preferred for very fine products.

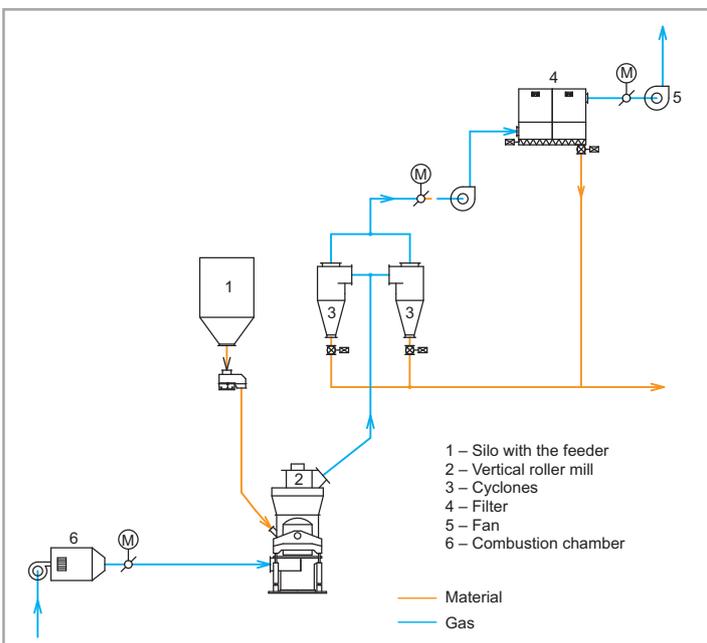


Open circuit

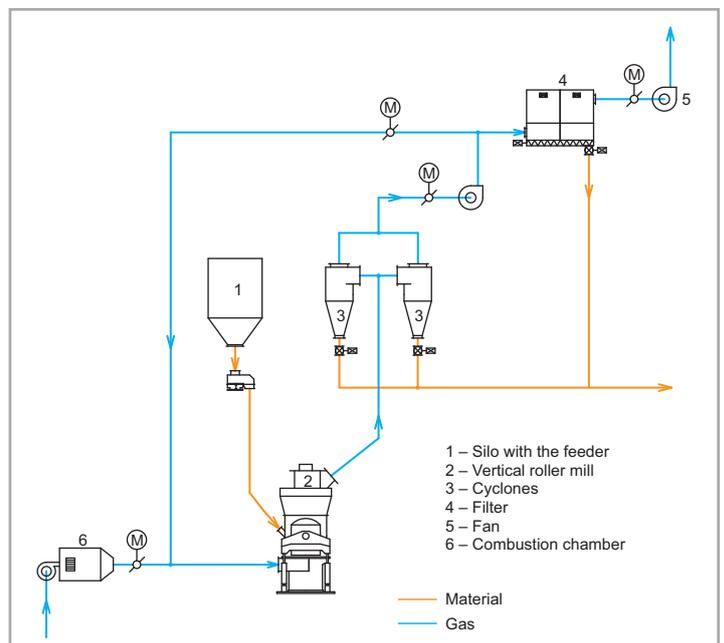


Closed circuit

The fine and dried material is separated in cyclones. The case is preferred for medium fineness. By the cyclones the size of the filter is reduced.



Open circuit



Closed circuit



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PSP Engineering is a leading supplier of specialized equipment and complete production plants for the building material and mineral processing industries. For more than 50 years PSP has been involved in the design and construction of cement plants, lime works, quarry and crushing plants, as well as gravel and sand pits.

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