

CASCADE AIR SEPARATOR KVT

- High efficiency
- Low costs for operation and maintenance
- High operating reliability
- High sharpness of separation
- High capacity

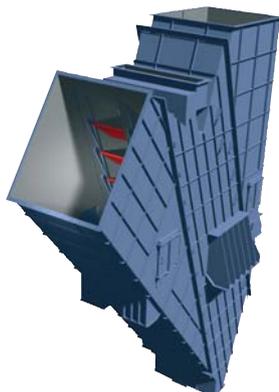




Above: Cascade air separator KVT 1800 as part of the 120 tph cement grinding plant at Qilianhan Cement, China. The photo shows the lower part of the separator with the coarse fraction discharge



Above and below: 3D models of the cascade air separator KVT



Separator application

The cascade air KVT separator supplied by PSP Engineering is a static air separator predominantly used in pre-grinding circuits of grinding plants with roller presses or similar equipment.

Characteristics of the cascade air KVT separator

- No movable parts
- Low cost of installation
- Negligible maintenance
- Pressure drop is approximately 50% of dynamic separators
- Suitable for high capacities utilizing a high material load up to 4 kg/m³
- Sorted material can be effectively dried and cooled
- Suitable for abrasive material
- Wear parts are effectively protected against abrasion and can be easily replaced
- Lumps are disagglomerated

Design of the KVT separator

The separator KVT is made of rectangular cross-sections in a V-shaped longitudinal arrangement with three sections: A sorting gas inlet, a central built-in material inlet, and a gas outlet. The gas inlet and outlet are installed at the top part of the two outer sections. The coarse material fraction is discharged into the discharge hopper while the fine fraction is vented together with the air flow to the outlet. The center section accommodates the material inlet. The material inlet consists of two opposing rows of cascading and inclined partitions. These partitions consist of several plates and are seated in frames, which are connected to the housing of the separator.

These replaceable plates are designed for minimal wear according to the type of the material to be sorted.

The plates are made of wear-resistant steel and are equipped with hard-facing or basalt stiffened with steel bars. The separator housing is lined with basalt or DENSIT. The separator is designed so that the plate width does not exceed 1300 mm. The three sections are assembled and connected to the support structure. Manholes are installed on the side panels of the inlet and outlet sections for routine inspection and maintenance. An inspection port is also installed in the material discharge hopper.

Operating principle of the KVT separator

The material is guided to the center section of the separator and falls downward through the material inlet where it strikes against the cascading partition diaphragms. Lumps and large pieces disagglomerate upon striking. The fines fraction is picked up by gas and is carried through the outlet section while the coarse particles continue downward between the partitions and are further broken down into fines.

The fine material and gas are discharged from the upper outlet section into cyclones that separate the fines from the gas. The coarse fractions are collected in a discharging hopper in the lower part of the separator where they are returned for reprocessing. The sorting cut size is controlled by regulating the discharge fan. During the sorting process the material can be dried or cooled.

Cascade air separator KVT

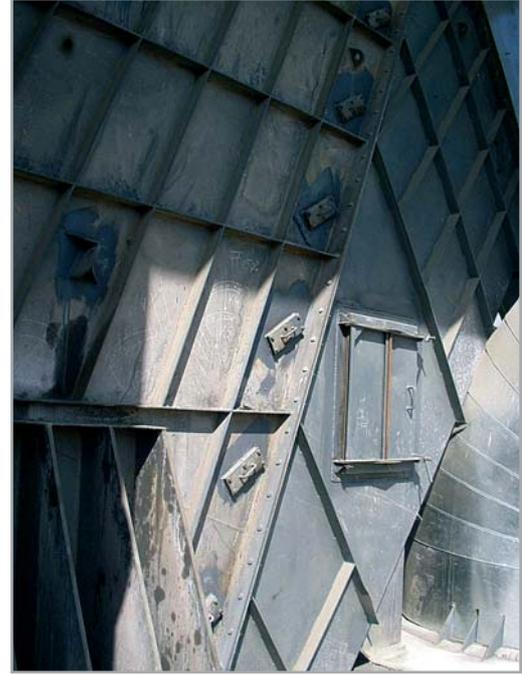
Application of the KVT separator in grinding and sorting plants

The KVT separator is suitable for air sorting of material with a particle size between 0.1 to 2 mm. It is predominately used for the following types of grinding and sorting plants:

- Semi-finish grinding plants with pre-grinding circuits equipped with a roller press or similar machinery
- Initial sorting stage of finish grinding plants equipped with a roller press or similar machinery
- Sorted material can be dried or cooled during the sorting process
- Circulation grinding plants equipped with a ball mill or similar machinery for grinding coarse material to the desired fineness
- Separate sorting circuits for sorting materials with particle sizes between 0.1 to 2 mm

Capacities of KVT separators

Type	Volume of air	Amount of inlet material	Number of material inlets
	m ³ /h	t/h	
KVT 300	12 000	40	1
KVT 400	20 000	70	1
KVT 500	28 000	100	1
KVT 600	40 000	140	1
KVT 700	50 000	170	1
KVT 800	60 000	200	1
KVT 900	70 000	240	1
KVT 1000	85 000	280	1
KVT 1100	100 000	330	1
KVT 1200	110 000	360	1
KVT 1300	120 000	390	1
KVT 1400	130 000	420	2
KVT 1600	160 000	500	2
KVT 1800	180 000	600	2
KVT 2000	200 000	670	2
KVT 2200	220 000	740	2
KVT 2400	240 000	800	2
KVT 2600	260 000	870	2
KVT 2800	280 000	940	3
KVT 3000	300 000	1 000	3
KVT 3300	325 000	1 100	3
KVT 3600	350 000	1 200	3

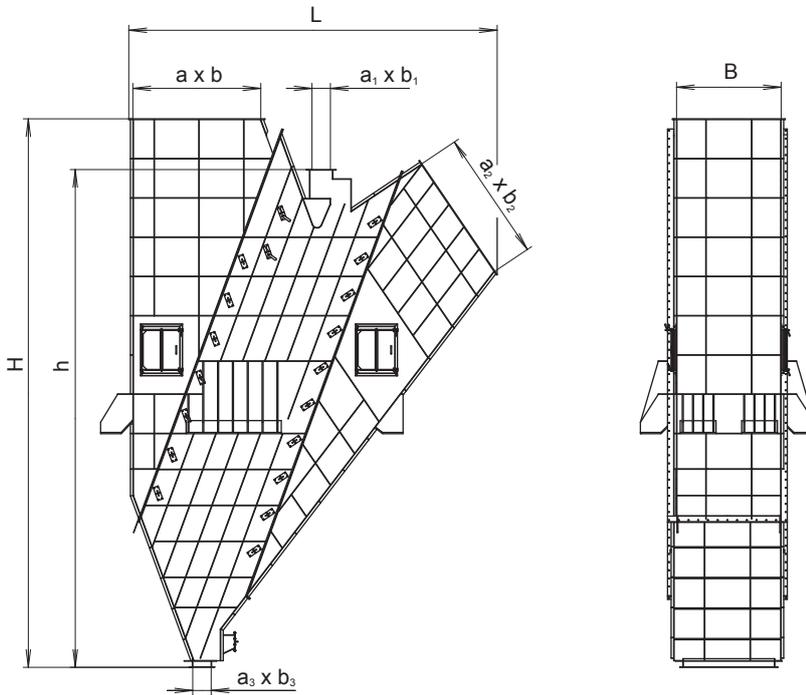


Above: View of the separator central section with manholes for easy access during maintenance



View of the separator upper part with the material inlet and gas exhaust





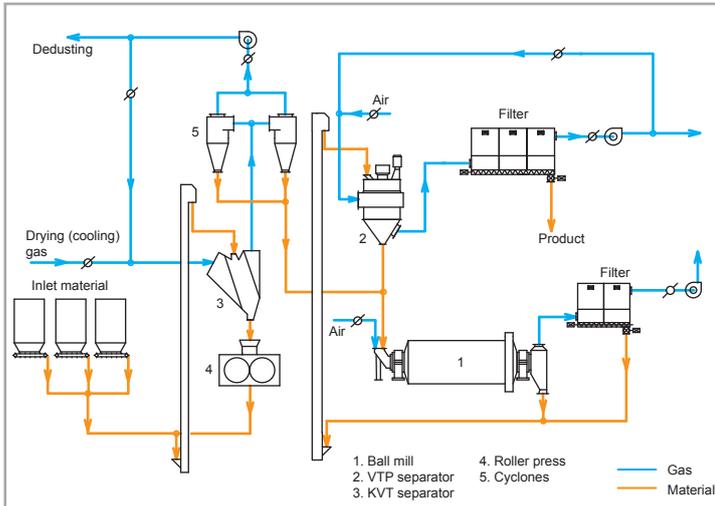
View of the partition diaphragms

Dimensions of the KVT separator (mm)

Type	B	H	L	h	h ₁	a x b	a ₁ x b ₁	a ₂ x b ₂	a ₃ x b ₃
KVT 300	300	4 380	2 930	3 450	1 350	1010 x 348	300 x 200	910 x 348	300 x 200
KVT 400	400	5 500	3 100	4 500	1 800	1110 x 448	400 x 200	1020 x 448	400 x 200
KVT 500	500	6 500	3 200	5 500	2 000	1210 x 548	500 x 200	1120 x 548	500 x 200
KVT 600	600	7 500	5 000	6 500	2 500	1700 x 648	600 x 200	1550 x 648	600 x 200
KVT 700	700	7 500	5 000	6 500	2 500	1700 x 748	700 x 200	1550 x 748	700 x 200
KVT 800	800	8 600	5 800	7 500	3 500	2200 x 848	800 x 200	2100 x 848	800 x 200
KVT 900	900	8 600	5 800	7 500	3 500	2200 x 948	900 x 200	2100 x 948	900 x 200
KVT 1000	1 000	10 500	7 200	8 900	4 500	2700 x 1056	1000 x 360	2500 x 1056	1000 x 360
KVT 1100	1 100	10 500	7 200	8 900	4 500	2700 x 1156	1100 x 360	2500 x 1156	1100 x 360
KVT 1200	1 200	10 500	7 200	8 900	4 500	2700 x 1256	1200 x 360	2500 x 1256	1200 x 360
KVT 1300	1 300	10 500	7 200	8 900	4 500	2700 x 1356	1300 x 360	2500 x 1356	1300 x 360
KVT 1400	1 400	10 500	7 200	8 900	4 500	2700 x 1456	1400 x 360	2500 x 1456	1400 x 360
KVT 1600	1 600	10 800	7 200	9 800	4 600	2700 x 1644	1558 x 360	2500 x 1644	1580 x 360
KVT 1800	1 800	10 800	7 200	9 800	4 600	2700 x 1844	1758 x 360	2500 x 1844	1580 x 360
KVT 2000	2 000	10 800	7 200	9 800	4 600	2700 x 2044	1958 x 360	2500 x 2044	1780 x 360
KVT 2200	2 200	10 800	7 200	9 800	4 600	2700 x 2244	2158 x 360	2500 x 2244	1980 x 360
KVT 2400	2 400	10 800	7 200	9 800	4 600	2700 x 2444	2358 x 360	2500 x 2444	2180 x 360
KVT 2600	2 600	10 800	7 200	9 800	4 600	2700 x 2644	2558 x 360	2500 x 2644	2380 x 360
KVT 2800	2 800	10 800	7 200	9 800	4 600	2700 x 2862	2758 x 360	2500 x 2862	2580 x 360
KVT 3000	3 000	10 800	7 200	9 800	4 600	2700 x 3062	2958 x 360	2500 x 3062	2780 x 360
KVT 3300	3 300	10 800	7 200	9 800	4 600	2700 x 3362	3258 x 360	2500 x 3362	3080 x 360
KVT 3600	3 600	10 800	7 200	9 800	4 600	2700 x 3662	3558 x 360	2500 x 3662	3380 x 360

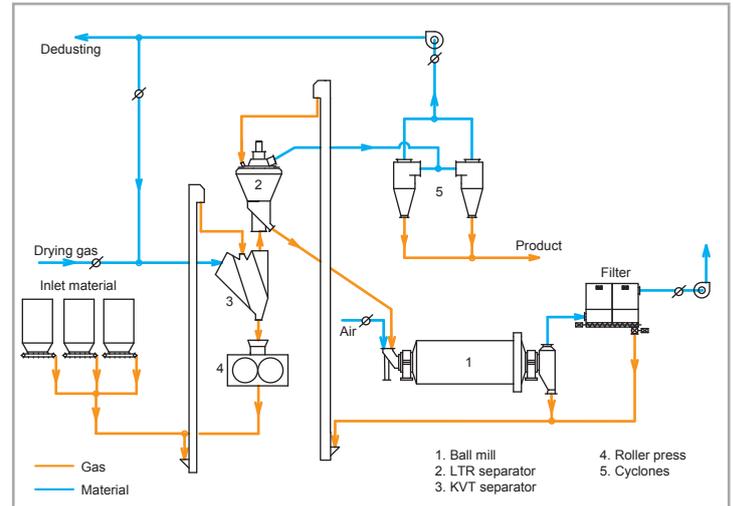


Sample arrangement of the KVT separator in grinding circuits



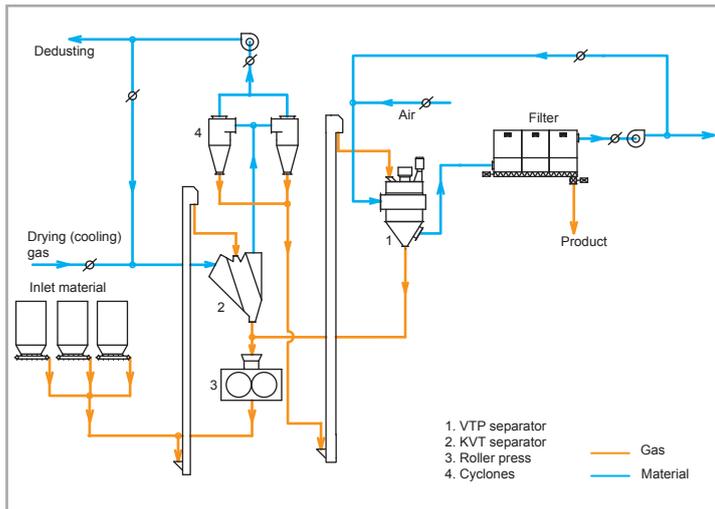
1st example:
Cement grinding plants - semi-finish system

In a pre-grinding circuit, the KVT separator is used for 1st stage sorting in conjunction with a roller press. Sorted material can be dried or cooled concurrently. The final grinding stage is accomplished in a closed circuit in conjunction with a ball mill and a dynamic VTP separator.



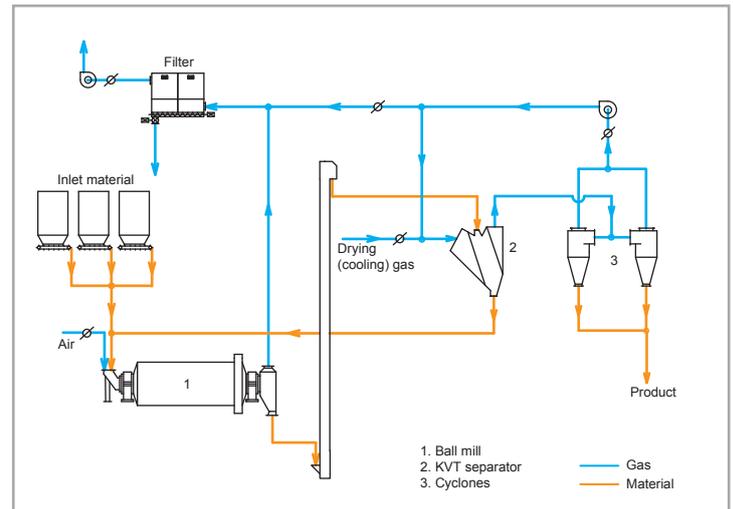
2nd example:
Cement grinding plant - semi-finish system

As a 1st stage sorting device for pre-grinding, the KVT separator is installed in conjunction with a roller press. Final grinding is accomplished in closed circuit with a ball mill and a dynamic LTR separator. The dynamic LTR separator is also used for 2nd stage sorting in a pre-grinding circuit.



3rd example:
Cement grinding plant - finish system

The material is ground to the desired fineness by a roller press. The flow sheet shows a two-stage sorting circuit arrangement with a roller press. In the 1st stage of sorting the roller press is arranged with a KVT separator. In the 2nd stage of sorting the roller press is arranged with a dynamic VTP separator.



4th example:
Grinding plant for coarse grinding

The flow sheet represents an arrangement of a grinding circuit for coarse materials. The KVT separator in this arranged in closed circuit with a ball mill. The final product, ground to the desired fineness ranging from 0.1 to 2 mm, is sorted and collected in cyclones for final separation of material from gas.

The specialists at PSP Engineering design and manufacture separators for application in all types of grinding, pre-grinding, and sorting circuits. Sorting parameters are studied and evaluated in the proprietary testing and simulation facility at PSP Engineering.



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

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