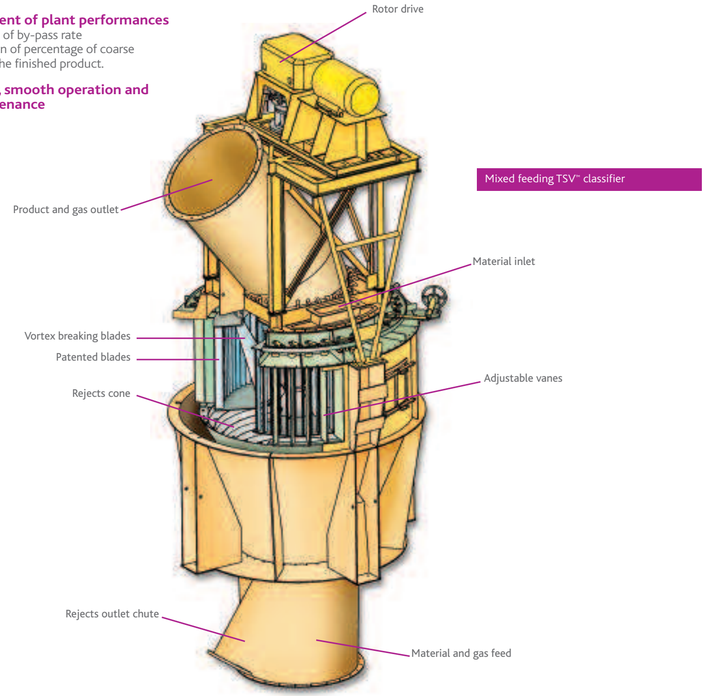
Patented blades
and vortex breaker

→ Choose the **TSV™**
Turbo **S**éparateur **V**entilé
To **S**ave **V**alue:

Improvement of plant performances
by reduction of by-pass rate
and reduction of percentage of coarse
particles in the finished product.

Reliability, smooth operation and low maintenance



Mixed feeding TSV™ classifier

→ More than 200 industrial references

Advanced technologies

Horomill®
Rhodax®
Shoe-mounted mill
"E" ball-race vertical mill
TSV™ classifier
Flash dryer
Low-NO_x precalciner
Kilns on 2 or 3 piers
Low pressure drop preheater

Complete plants

Design and engineering
Supply of equipment
Turnkey construction
Erection
Commissioning

Efficient services

Revamping
Training
Technical assistance
After-sales

Fives FCB
50, rue de Ticléni – B.P. 376
59666 VILLENEUVE D'ASCQ Cedex – FRANCE
Tel. : +33 (0)3 20 43 75 01 – Fax : +33 (0)3 20 43 75 13
E-mail : fivesfcb@fivesgroup.com – www.fivesgroup.com

fives fcb

TSV™ separator

TSV™ the 3rd generation classifier

→ High Efficiency and Low Pressure Drop

Full control
of product fineness

→ Like the leaders in the grinding industries **Choose the TSV™ for:**

Capacity

The TSV™ efficiency results in:

- A minimal bypass allowing the maximal grinding efficiency of the mill,
- An extremely steep slope of the Tromp curve with a strong reduction of coarse particles in the product enabling the optimisation of the target values of fineness and the consequent increase of capacity

The combination of these two features maximises the system capacity

Quality of products

The higher efficiency of separation reduces the amount of coarse particles in the products.

This results in:

- A maximal cement strength with the minimal Blaine set point,
- A highest burnability of the solid fuels in cement kilns and precalciners and the consequent reduction of fuel consumption,
- A high efficiency of separation due to the patented blade design,
- A better burnability of raw meal in the cement kilns.

The stability and the precision of the operation of the TSV™ ensure this permanent quality.

PRODUCT				TSV™		
Type	Blaine	d80	tph	Size-type	Absorbed Power	kWh/t
Cement raw meal		60 µm	123	5000-BF	0 kW	0.00
CEM I	3 200	32 µm	120	3600-HF	29 kW	0.24
CEM I	4 000	24 µm	88	3600-HF	49 kW	0.55
Limestone		20 µm	70	3600-THF	63 kW	0.90

Examples in cement industry with tube mills

Energy saving

Energy savings allowed by the patented vortex breaking system:

- Low pressure drop of the separator
- Extremely low power consumption.

Reliability

- Manual or automatic lubrication system for minimal maintenance.
- Bearings calculated for more than 100 000 h lifetime.
- Adapted wear protection based on experience.

Flexibility

The different types of feed system and the corresponding wear liners allow the installation of the TSV™ in a wide range of process design.

In a tube mill plant, the TSV™ can be:

- Integrated into the mill venting system for complete or semi-ventilated mills,
- In a separated air circuit with axial or tangential air inlet duct.

A same separator is able to process efficiently a large scale of products.
For example:
from d50 = 8 µm to d50 = 35 µm.

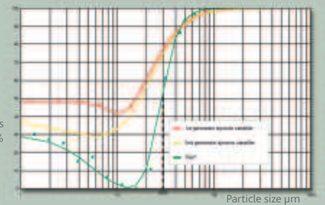
The TSV™ can also be integrated to different types of vertical mills (E-mill, Raymond mill, roller mill)

With tube mill or Horomill® plant, if necessary, the TSV™ can be installed above a flash dryer.

TSV™ type	Typical cut size	PRODUCTS
TBF	150 µm	Ilmenite slag, various ores
BF	70 µm	Cement raw meal
MF	61 µm	Coal, petcoke
HF	31 µm	Cement, slag, anhydrite, limestone
THF	13 µm	Limestone, dolomite

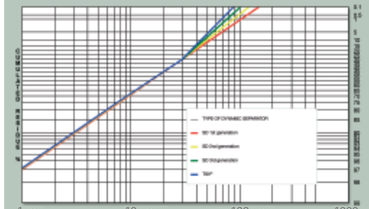
Adaptability

The versatile design of the TSV™ allows for its adaptation to a large range of industrial applications.



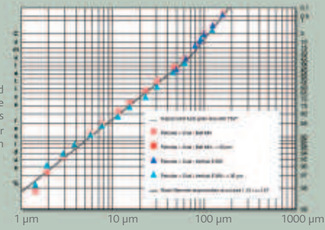
Tromp Curves
Selection efficiency %

Particle size µm



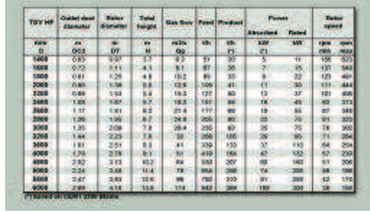
Comparison of typical cements grain size distributions with different separators
Rosin Rammler diagram

1µm 10 µm 100 µm 1000 µm



Examples of solid fuels grain size distributions
Rosin Rammler diagram

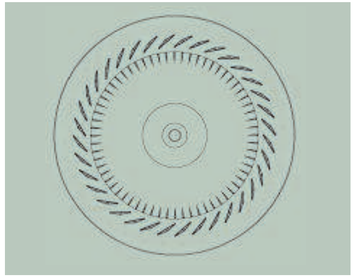
1 µm 10 µm 100 µm 1000 µm

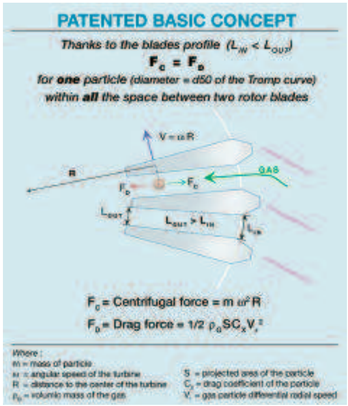


TSV™ Range

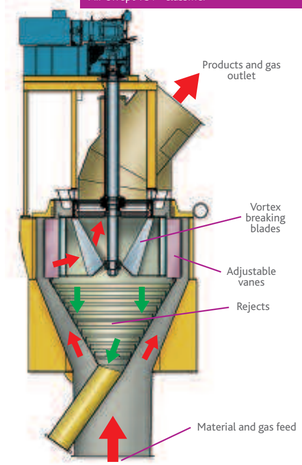
→ TSV™ process key components:

- Circular damper with swivelling counterblades controlled simultaneously.
- Turbine with patented rotor blades and anti-vortex plates.
- Drive system with speed variation.





Air-swept TSV™ classifier



Top feeding and tangential air inlet duct TSV™