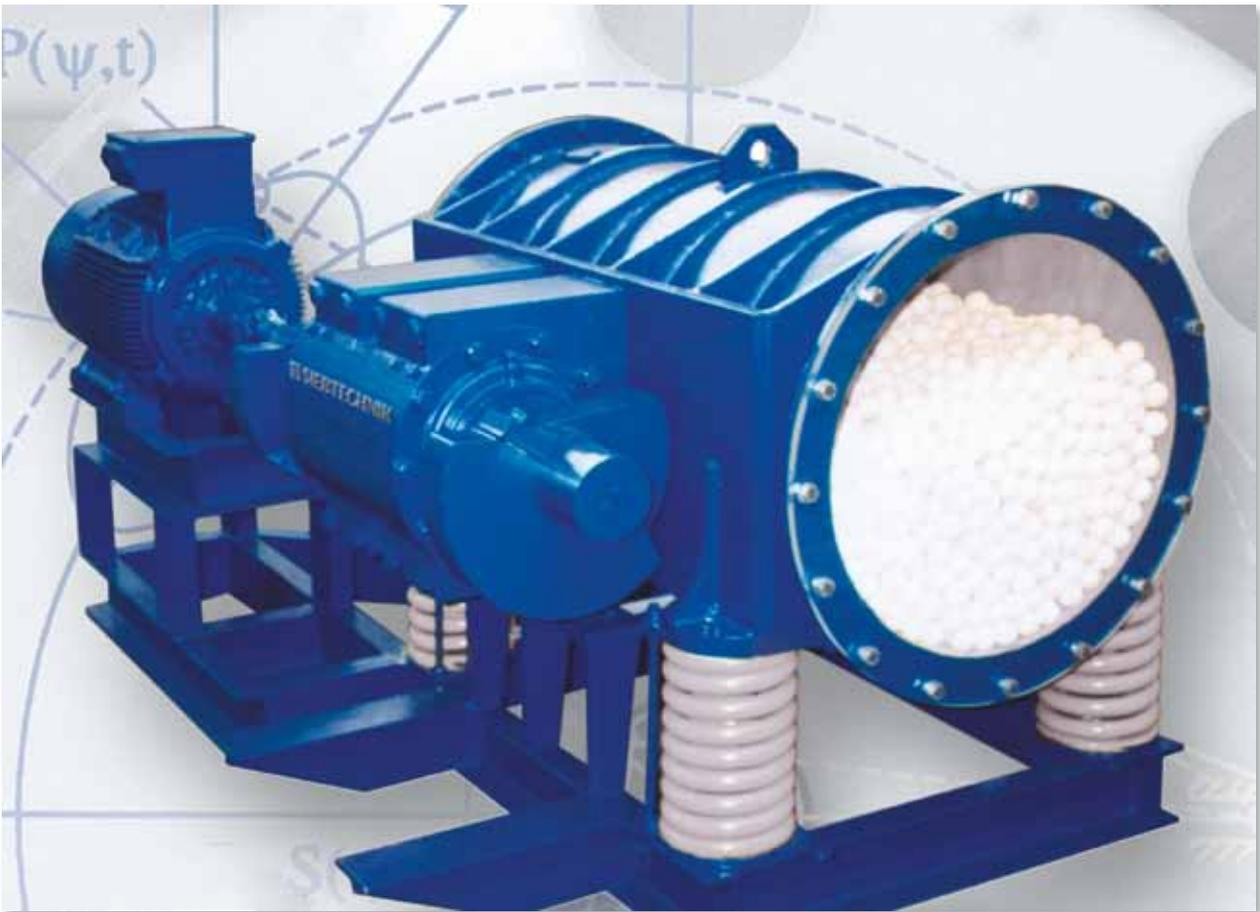


# Eccentric vibrating mill



Mechanical-chemical activation  
and finest reduction  
of all brittle materials

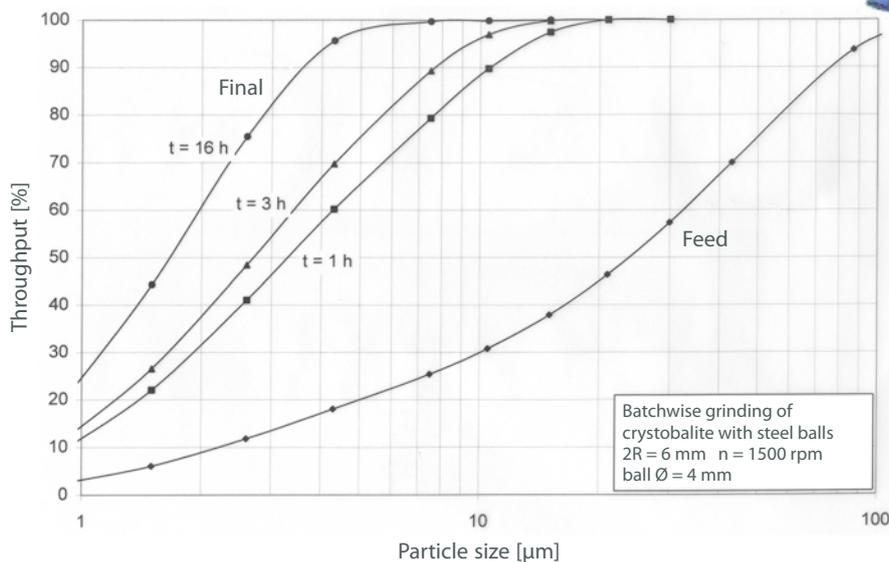
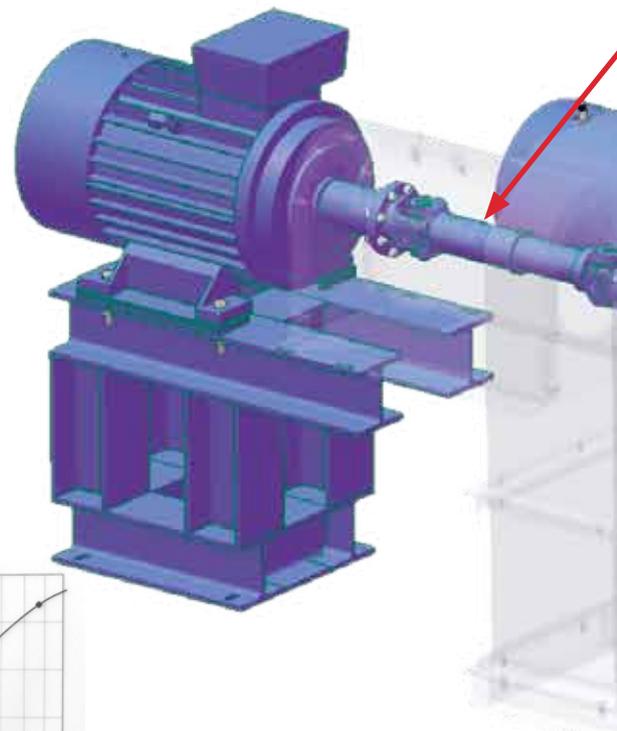
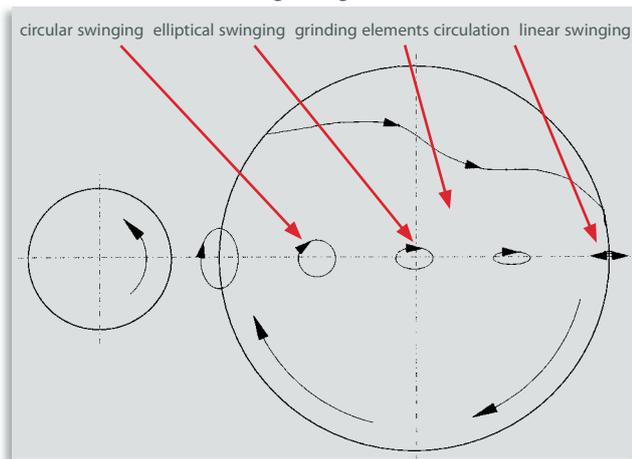
# Application

Vibrating mills are suitable for the reduction of all brittle material. Depending on the grinding time and material, reduction of 20 mm feed material are possible. The attainable ultimate fineness is approximately 0...5  $\mu\text{m}$ . Vibrating mills are specially suited for combined grinding and mixing, as well as for mixing, alone. A feed material consisting of many different components can be efficiently reduced and thoroughly mixed in one operation. Grinding in vacuum, under pressure and in inert gas is also possible.

The mills are very suitable for mechanical-chemical processes.

The eccentric vibrating mill ESM is to use structural measures to increase the introduction of energy in vibrating mills, so that the size of the energy-depleted zone can be minimised and the upper limit of the grinding container diameter - hitherto determined by the size of the energy-depleted zone - or of the grinding tube diameter of 650 mm can be exceeded.

Illustration of the grinding elements circulation



# Construction

The eccentric vibrating mill has one cylindrical grinding vessel with grinding elements, to which is solidly attached the exciter unit. The exciter unit is excited eccentrically on one side, that is outside the gravity axis and the mass centre of the grinding container.

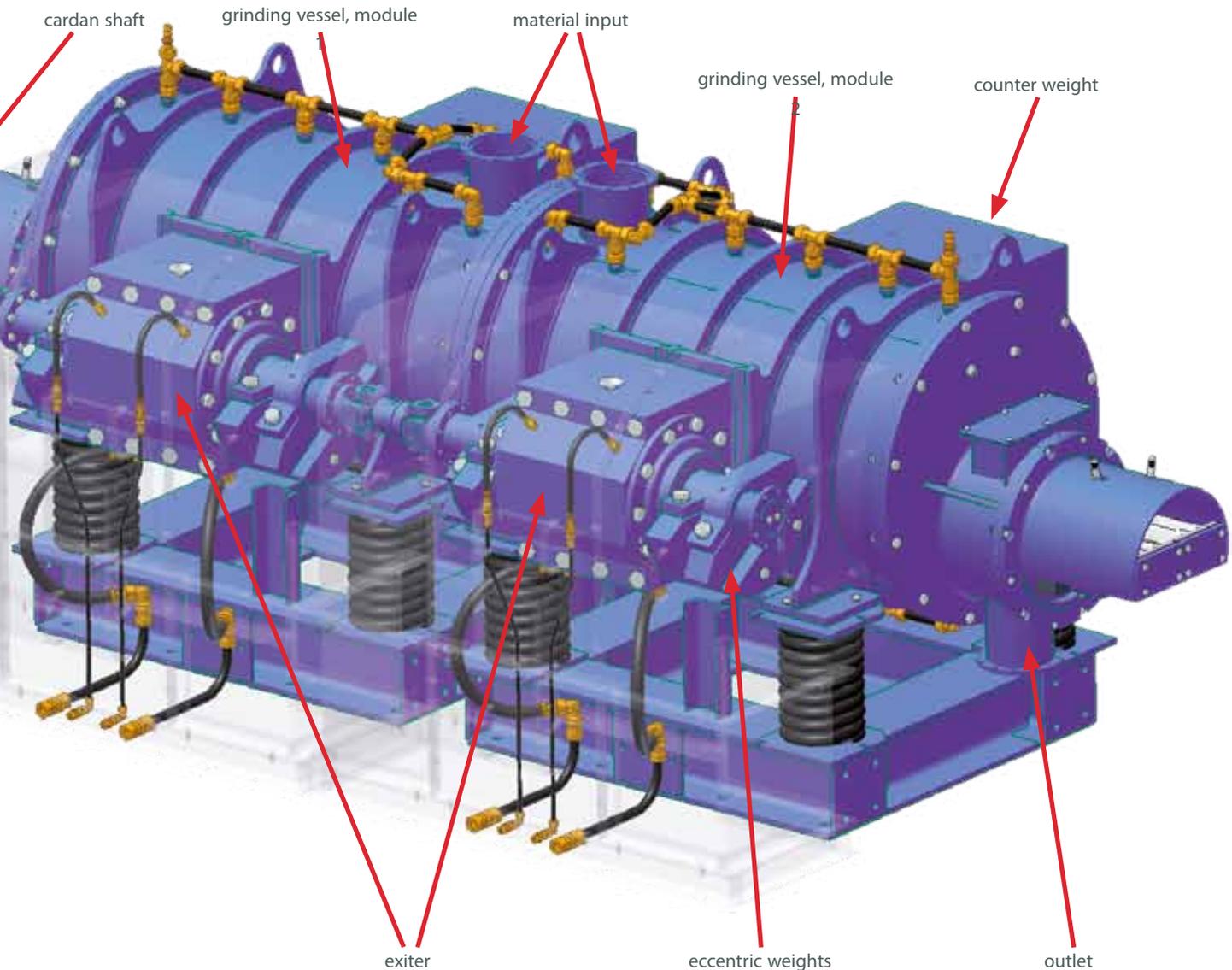
The exciter mass is balanced by a parallel counterweight disposed on the opposite side of the grinding container. The cylindrical grinding vessel in welded construction is mounted on helical springs which are resting on the base frame. Both grinding container ends are closed with bolted on covers, one of which is fitted with an inspection cover.

The material to be ground is fed into the mill via a flanged connection at the highest point of the container. Ground material is discharged via an outlet in one of the covers. This outlet is fitted with a perforated plate, to retain the grinding elements inside the container.

Drive of the mill is a 3-phase motor via a cardan shaft. The inhomogeneous vibrations are generated by the exciter unit in form of the bearing pedestal with adjustable eccentric weights. The exciter unit is laterally flange mounted, with the counterweight on the opposing side also flange mounted.

The exciter unit is operated such that uneven swingings such as circular, elliptical and linear swingings are produced. Through this arrangement the direction movements of the mill filling are decisively altered.

The extent of the linear swingings causes an increase in the speed of circulation of the mill filling (by approximately a factor of 4) compared to circular motion vibrating mills, so that apart from the increase in normal impact force, an increase in the frictional impact force is especially obvious.



# Construction

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Characteristic for the essentially one-sided excitement outside the gravity axis and the mass centre of the vibrating mill is that in comparison to the normal circular vibrating mills the circular movement of the mill filling is only carried out when the exciter is arranged on the right side and is driven in a clockwise rotation.

The advantage of the one-sided excitement of the vibrating mill outside the gravity axis and of the mass centre is that the additional incidence of elliptical and linear vibrations contributes essentially to the improvement of the transport procedures by an

increase in the speed of rotation, which is critical for the continuance of grinding.

Also worth mentioning is the possibility to link modules of identical diameters. In such a case the grinding containers are flanged with screws while the eccentric masses are synchronized by means of cardan shafts. Up to 3 modules may be coupled this way thereby extending the grinding period and adjusting it to the grinding task.

A possibly expansion of production at a later date is, due to this modular design no problem either.



ESM 654-1ks



ESM 856-1ks for grinding of gypsum

To meet customer demands, we naturally are prepared to deliver special executions of eccentric vibrating mills. This generally concerns:

- Lining the mill with elastomers, ceramic and highly abrasion-resistant materials
- Grinding bodies made of steel, hard metals and ceramic of varying quality
- Additional cooling or heating of the grinding container
- Possibility of soundproofing
- Special solutions for filling and emptying
- Addition of additives during the milling process
- Grinding in a vacuum or an inert gas atmosphere
- Entire plants including the necessary accessories



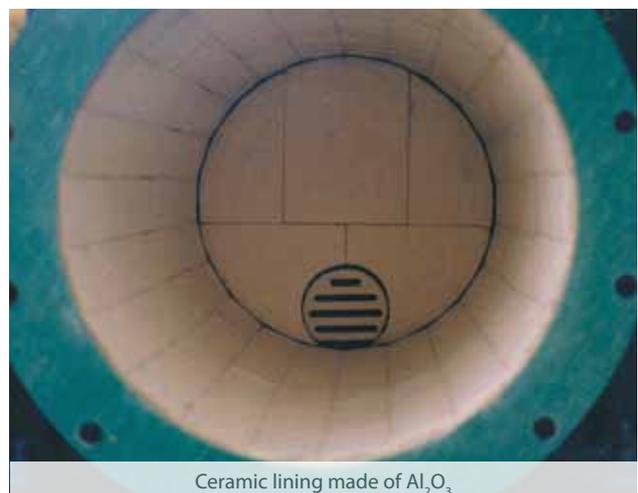
sound isolation cover with feeding and discharge equipment



ESM 324-1bs with manual discharge valve



ESM 234-1bs with pneumatic discharge valve actuated

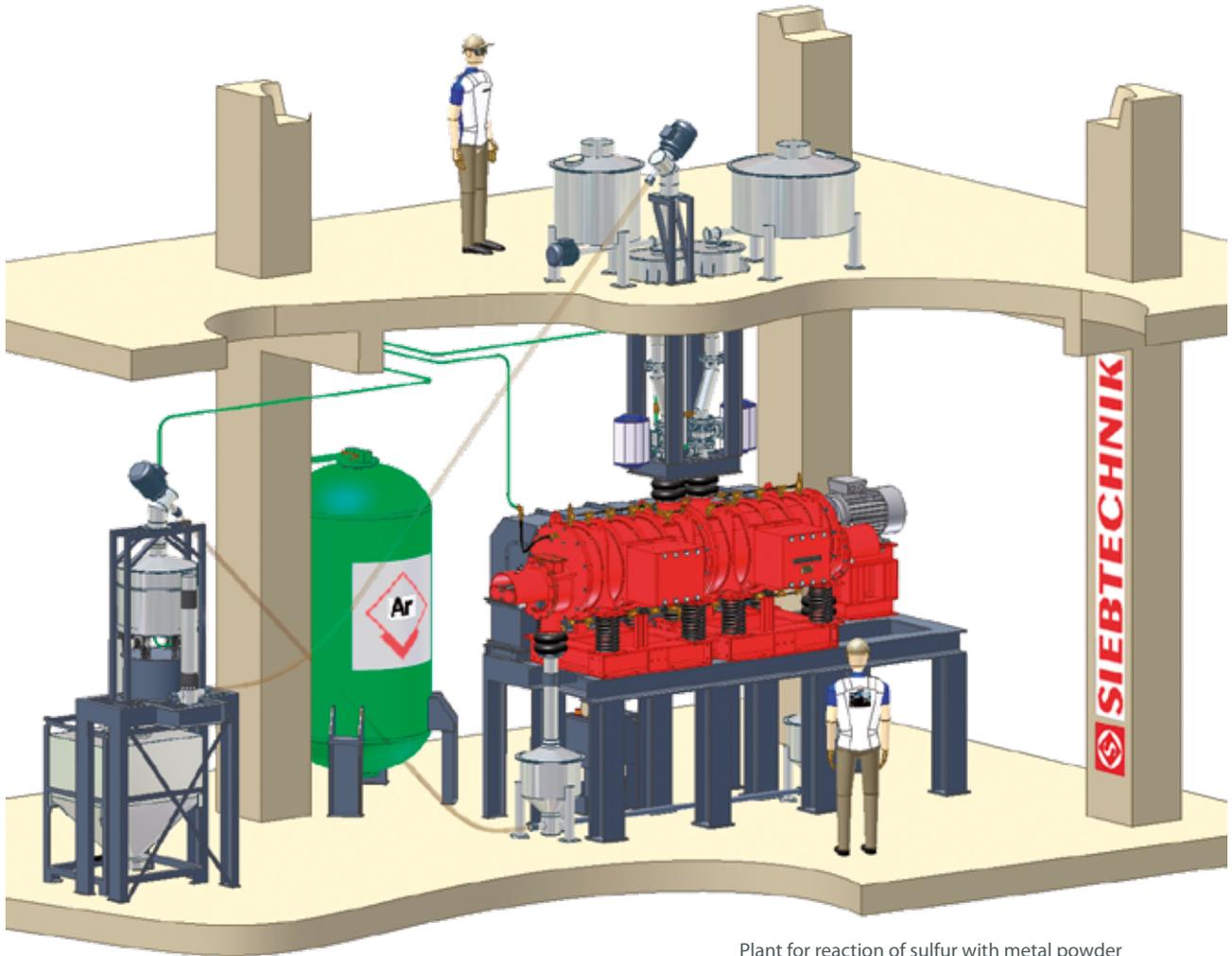


Ceramic lining made of  $Al_2O_3$

# Applications

Fields of applications are in general

- discontinuous dry and wet micro grinding
- mechanical-chemical activation of raw and residual materials
- dry homogenizing of powders and doping agents
- chemical-physical process management (reactor)



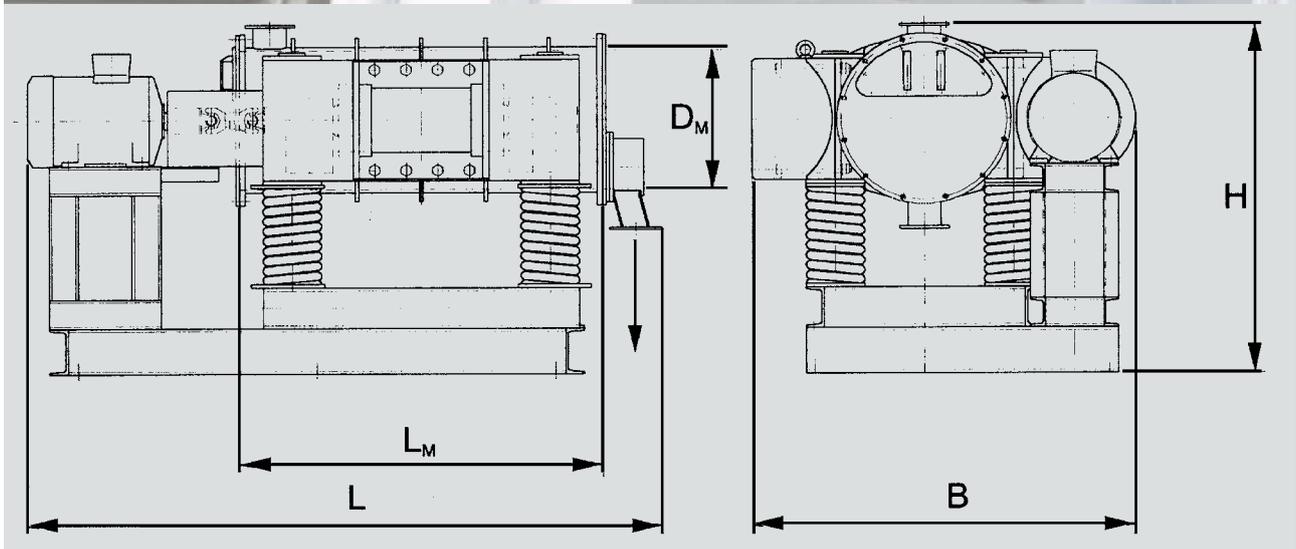
Plant for reaction of sulfur with metal powder



ESM 656.2ks for grinding of asbestos

# Technical Data

<b>ESM</b>	<b>32</b>	<b>4</b>	<b>-</b>	<b>1</b>	<b>k</b>	<b>s</b>
key to the nomenclature of the eccentric vibrating mill						
						wear lining (s: steel, k: ceramic, G: rubber)
					type of process (k: continuous, b: batchwise - discontinuous)	
				number or moduls		
			number of poles of the three phase motor (4: 1500 rpm, 6: 1000 rpm)			
		code number of diameter (32 = 320 mm)				
name of machine: Eccentric vibrating mill						



ESM		234	324	504	654	756	856	
Usuable volume (max.)	l	5	16	70	120	190	300	
total grinding tube volume	l	19	53	220	370	597	937	
Grinding media volume	l	15	42	176	296	478	750	
Weight of steel grinding media	kg	76	190	830	1400	2250	3530	
Weight of ceramic grinding media	kg	30	84	380	650	1050	1600	
Weight of mill (without grinding media)	kg	140	550	1700	2600	5300	8500	
Motor	kW	1,1	5,5	15	22	37	55	
Dimensions	D <sub>M</sub> inside	mm	235	307	476	620	712	814
	L <sub>M</sub>	mm	450	712	1232	1246	1520	1800
	L	mm	648	1526	2450	2520	3100	4040
			1370	1526	2450	2520	3100	4040
	B	mm	800	1005	1350	1650	1850	2150
H	mm	620	743	1215	1340	1410	1675	
Vibrating diameter		6 - 8 mm		with 1500 rpm motor (types with code ..4)				
		12 - 13 mm		with 1000 rpm motor (types with code ..6)				
We reserve the right for technical changes.								

# Delivery Program

## Screening Machines Process Equipment

circular and elliptical motion screens  
double counterweight screens  
multideck horizontal screen  
round screens  
jigs

## Sampling Systems, Airtube Systems, Size Reduction Machines, Laboratory Equipment, Control Screening Machines and Automation

individual units and complete installations  
for sample taking and preparation  
airtube systems  
jaw crushers  
roller mills  
hammer and hammer impact mills  
eccentric-vibrating mills and ball mills  
control screening machines  
analytical screening machines  
splitter  
testing drums  
automation

## Centrifuges

scroll-screen centrifuges  
pusher centrifuges  
sliding discharge centrifuges  
vibratory centrifuges  
decanter centrifuges