High Energy Ball Mill Emax

General Information

The Emax is an entirely new type of ball mill for high energy milling. The unique combination of high friction and impact results in extremely fine particles within the shortest amount of time.

The high energy input is a result of an unrivaled speed of 2000 min^{-1} and the optimized jar design. Thanks to the revolutionary cooling system with water, the high energy input is effectively used for the grinding process without overheating the sample. Due to the special grinding jar geometry, the sample is thoroughly mixed which results in a narrow particle size distribution.

Unlike other high energy ball mills, the Emax is capable of continuous grinding operation without interruptions for cooling down. This dramatically reduces the grinding time. The high energy input in combination with the unique cooling system provides perfect conditions for effective mechanical alloying or grinding down to the nanometer range.

A wealth of safety features such as the integrated safety closure of the grinding jar, temperature control with automatic start/stop system, and integrated imbalance controls make operation of the bench-top mill Emax very user-friendly.

Application Examples

alloys, bones, carbon fibres, catalysts, cellulose, cement clinker, ceramics, chemical products, clay minerals, coal, coke, concrete, fibres, glass, gypsum, iron ore, kaolin, limestone, metal oxides, minerals, ores, paper, pigments, plant materials, polymers, quartz, semi-precious stones, sewage sludge, slag, soils, tea, tobacco, waste samples, wood, ...

Product Advantages

- faster and finer grinding than any other ball mills
- speed of 2000 min^{-1} allow for ultra-fast pulverization of the sample
- water cooling permits continuous operation without cool down breaks
- temperature-controlled grinding
- narrow particle size distribution thanks to special jar design which improves mixing of the sample
- patented drive concept
- easy operation via touch screen, 10 SOPs storable
- operation with 2 grinding jars
- easy installation of grinding jars
- jars with integrated safety closure
- range of jar materials allow for contamination free grinding

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Features

Applications	nano grinding, size reduction, homogenizing, mechanical alloying, colloidal milling, high energy comminution
Field of application	agriculture, biology, Chemistry, construction materials, engineering / electronics, environment / recycling, geology / metallurgy, glass / ceramics, medicine / pharmaceuticals
Feed material	medium-hard, hard, brittle, fibrous - dry or wet
Size reduction principle	impact, friction
Material feed size*	< 5 mm
Final fineness*	< 80 nm
Batch size / feed quantity*	max. 2 x 45 ml
Speed at 50 Hz (60 Hz)	300 - 2000 min^{-1}
Cooling	controlled integrated water cooling / option: external chiller
Temperature control	yes (min and max temperature may be defined)
No. of grinding stations	2
Type of grinding jars	with integrated safety closure devices
Material of grinding tools	stainless steel, tungsten carbide, zirconium oxide
Grinding jar sizes	50 ml / 125 ml
Setting of grinding time	00:01:00 to 99:59:59
Interval operation	yes, with optional direction reversal
Interval time	00:01:00 to 99:59:59
Pause time	00:01:00 to 99:59:59
Storable SOPs	10
Interface	USB / LAN (RJ45)
Drive	3-phase asynchronous motor with frequency converter
Drive power	2600 W
Electrical supply data	different voltages
Power connection	1-phase
Protection code	IP 30
Power consumption	~ 3100W (VA)
W x H x D closed	625 x 525 x 645 mm
Net weight	~ 120 kg
Standards	CE

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Patent / Utility patent	Inclined Grinding bowls (US 8,042,754 B2)

Please note:
*depending on feed material and instrument configuration/settings

Videolink

http://www.retsch.com/emax

Function Principle

The novel size reduction mechanism of the Emax unites the advantages of different mill types: high-frequency impact (mixer mill), intensive friction (vibratory disc mill) and controlled circular jar movements (planetary ball mill) allow for unrivaled grinding performance. This unique combination is generated by the oval shape and the movement of the grinding jars. The grinding jar supports are mounted on two discs respectively which turn in the same direction. As a result, the jars move on a circular course without changing their orientation.

The interplay of jar geometry and movement causes strong friction between grinding balls, sample material and jar walls as well as a rapid acceleration which lets the balls impact with great force on the sample at the rounded ends of the jars. This significantly improves the mixing of the particles resulting in smaller grind sizes and a narrower particle size distribution than has been possible to achieve in ball mills so far.

Order data

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(please order grinding jars and balls [up to 15 mm] separately)

20.510.0001	Emax, 200-240 V, 50/60 Hz, High energy ball mill with 2 grinding stations

Grinding jars Emax

Stainless steel

01.462.0305	50 ml
01.462.0313	125 ml

Tungsten carbide

01.462.0317	50 ml

Zirconium oxide

01.462.0312	50 ml
01.462.0307	125 ml
	Accessories for grinding under inert atmosphere
01.107.0568	Aeration lid for Emax grinding jar 50 ml, stainless steel
01.107.0567	Aeration lid for Emax grinding jar 125 ml, stainless

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	steel
01.107.0569	Aeration lid for Emax grinding jar 50 ml, zirconium oxide
01.107.0564	Aeration lid for Emax grinding jar 125 ml, zirconium oxide

Additional items Emax

02.362.0027	Cooling lubricant, 50 ml
05.114.0057	O-ring for grinding jars 50 ml, 1 piece
05.114.0122	O-ring for grinding jars 125 ml, 1 piece
Stainless steel	
22.455.0010	2 mm Ø, 500 g (approx. 110 ml)
22.455.0011	3 mm Ø, 500 g (approx. 120 ml)
22.455.0002	3 mm Ø, 200 pieces (approx. 6 ml)
22.455.0001	4 mm Ø, 200 pieces (approx. 14 ml)
22.455.0003	5 mm Ø, 200 pieces (approx. 25 ml)
05.368.0034	5 mm Ø
05.368.0035	7 mm Ø
05.368.0063	10 mm Ø
05.368.0037	12 mm Ø
05.368.0109	15 mm Ø
Tungsten carbide	
22.455.0006	3 mm Ø, 200 pieces (approx. 6 ml)
22.455.0005	4 mm Ø, 200 pieces (approx. 14 ml)
22.455.0004	5 mm Ø, 200 pieces (approx. 25 ml)
05.368.0038	5 mm Ø
05.368.0039	7 mm Ø
05.368.0071	10 mm Ø
05.368.0041	12 mm Ø
Zirconium oxide	
32.368.0005	0.1 mm Ø, 0.5 kg (approx. 135 ml)
32.368.0003	0.5 mm Ø, 0.5 kg (approx. 135 ml)
32.368.0004	1 mm Ø, 0.5 kg (approx. 135 ml)
05.368.0089	2 mm Ø, 0.5 kg (approx. 135 ml)
05.368.0090	3 mm Ø, 0.5 kg (approx. 140 ml)
05.368.0094	10 mm Ø
05.368.0096	12 mm Ø
05.368.0113	15 mm Ø