HIGH ENERGY BALL MILL E_{MAX}

the revolution in ultrafine grinding

The E_{max} 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.

- faster and finer grinding than any other ball mill
- 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

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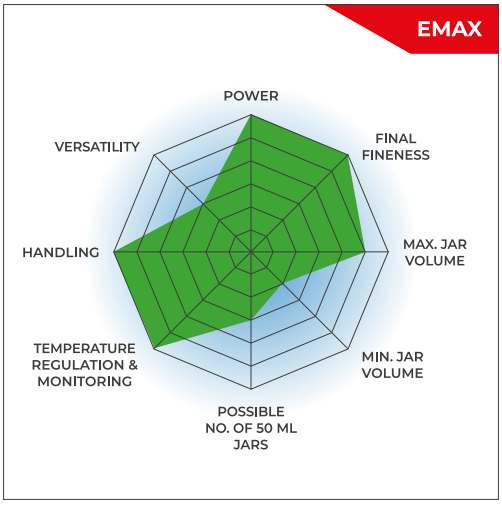
FASTER - FINER - COOLER - THE MOST POWERFUL BALL MILL

- Max. speed 2000 rpm
- Up to 5 mm feed size and 0.08 µm final fineness
- Two grinding stations for jars of min. 50 ml and max. 125 ml
- GrindControl to measure temperature and pressure inside the jar.
- Aeriation lids to control the atmosphere inside the jar
- Temperature monitoring and temperature-controlled grinding, water-cooling of jars
- Storable SOPs and cycle programs, 4 different jar materials for dry and wet grinding



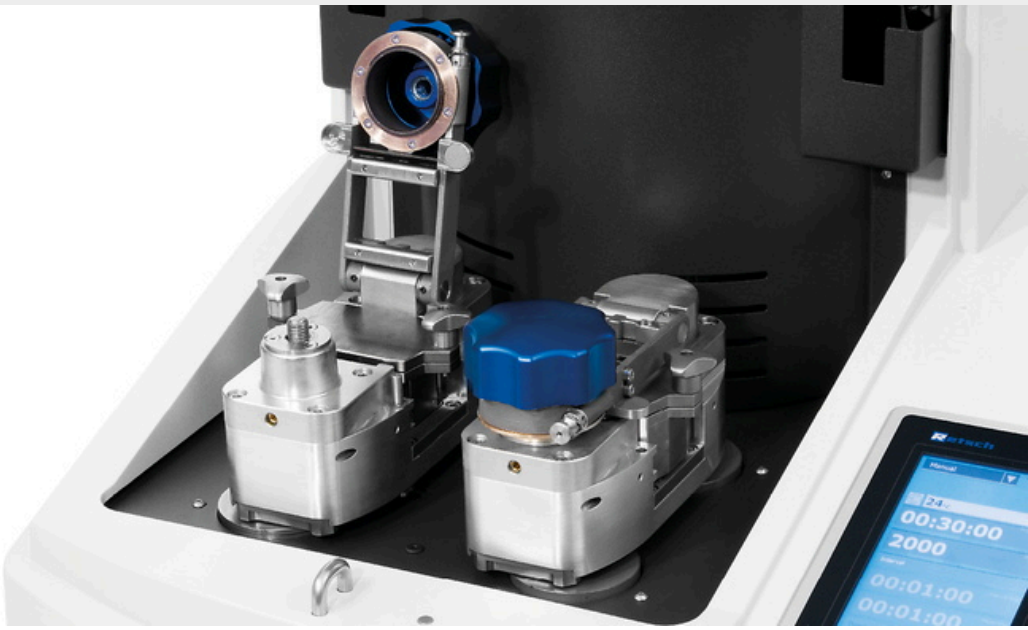
APPLICATION EXAMPLES

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, ...

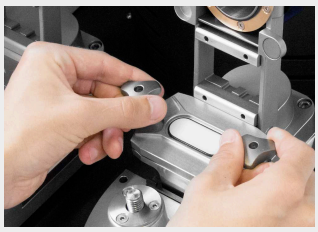
To find the best solution for your sample preparation task, visit our application database.

UNIQUE GRINDING JAR GEOMETRY

The High Energy Ball Mill Emax combines high-frequency impact, intensive friction, and controlled circular jar movements to a unique and highly effective size reduction mechanism.



INTUITIVE OPERATION



INSERTING THE GRINDING JAR

CLOSING THE JAR CLAMP

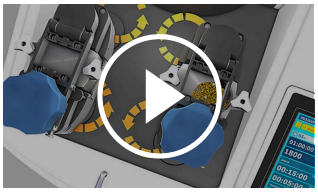
OPERATING THE TOUCHSCREEN

FUNCTION PRINCIPLE

GRIND SIZES IN THE SUBMICRON RANGE

The High Energy Ball Mill Emax combines high-frequency impact, intensive friction, and controlled circular jar movements to a unique and highly effective size reduction mechanism. The grinding jars have an oval shape and are mounted on two discs respectively which move the jars on a circular course without changing their orientation.

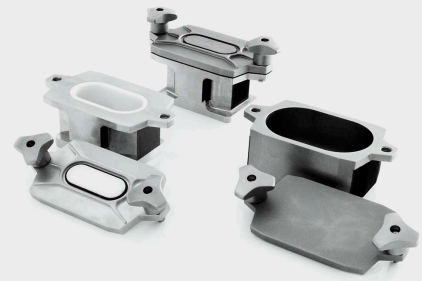
The interplay of jar geometry and movement causes strong friction between the grinding balls, sample material and jar walls as well as a rapid acceleration which lets the balls impact with great force on the sample at the rounded ends of the jars. This significantly improves the mixing of the particles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



Click to view video

FOR SAFE AND EFFECTIVE GRINDING PROCESSES

ACCESSORIES FOR MAXIMUM FLEXIBILITY



GRINDING JARS IN 3 DIFFERENT MATERIALS

Available grinding jar sizes are 50 ml, 80 ml and 125 ml, materials include stainless steel, tungsten carbide and zirconium oxide, ensuring contamination-free sample preparation. Grinding balls are available in sizes from 0.1 mm to 25 mm, depending on the material.

Click to view video

AERATION LID (VIDEO)

RETSCH offers a special aeration lid for the grinding jars designed for applications where a special atmosphere is to be maintained in the ball mill jar.

GRINDCONTROL

The GrindControl measures temperature and pressure inside the jar. The system includes a sensor and transmission unit as well as an analysis software.

TECHNICAL DATA

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	200-240 V, 50/60 Hz
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
Patent / Utility patent	Inclined Grinding bowls (US 8,042,754 B2)

*depending on feed material and instrument configuration/settings

www.retsch.com/emax

ORDER DATA

HIGH ENERGY BALL MILL EMAX

(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

SCREW-LOCK 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

AERATION LIDS FOR EMAX GRINDING JARS	
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 steel
01.107.0636	Aeration lid for Emax grinding jar 50 ml, tungsten carbide
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

ACCESSORIES FOR SCREW-LOCK GRINDING JARS EMAX

02.486.0051	Jar wrench for grinding jars

05.114.0057		O-ring for grinding jars 50 ml, 1 piece
05.114.0122		O-ring for grinding jars 125 ml, 1 piece

ADDITIONAL ITEMS EMAX

03.362.0036	Cooling lubricant, 100 ml
99.200.0029	IQ/OQ Documentation for Emax

PRESSURE AND TEMPERATURE MEASURING SYSTEM GRINDCONTROL

incl. lid with lid insert, sensors and transmitter, receiver, software, case, grinding jar, opening aid and cleaning accessories for Emax

22.782.0010		GrindControl with Emax grinding jar 125 ml, stainless steel
22.782.0009		GrindControl with Emax grinding jar 125 ml, zirconium oxide

GRINDING BALLS

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
05.368.0110		15 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)
05.368.0146		7 mm Ø
05.368.0094		10 mm Ø
05.368.0096		12 mm Ø
05.368.0113		15 mm Ø