

Planetary Ball Mills / High Energy Ball Mills, RETSCH

① Planetary Ball Mills Type PM 100 / PM 200 / PM 400

Application:

Planetary Ball Mills are suitable for mixing and grinding soft, medium-hard, extremely hard, brittle and fibrous materials. They are used whenever high degrees of fineness down to the submicron range are to be achieved in a very short time. In addition to dry and wet grinding, they are also suitable for colloidal grinding and mechanical alloying. Typical materials are minerals, ores, chemicals, ceramics, soils, household and industrial waste etc.

Capability characteristics:

- Extremely high fineness down to submicron range
- 1 / 2 / 4 grinding stations
- Grinding jar volumes from 12 ml to 500 ml
- Suitable for long-term trials and continuous use
- Programmable starting time
- Power failure backup ensures storage of remaining grinding time
- Reproducible results due to digital parameter settings
- 10 parameter combinations can be stored
- 1-button operation with graphic display
- Automatic grinding chamber ventilation for cooling the grinding jars
- Grinding jars in 6 sizes and 8 different materials available

Technical data:

	PM 100	PM 100 CM	PM 200	PM 400
No. of grinding stations:	1	1	2	4
Speed ratio				
Sun wheel/Grinding jar:	1:-2	1:-1	1:-2	1:-2
Grinding jar:	12 – 500 ml	12 – 500 ml	12 – 125 ml	12 – 500 ml
Fees size:	up to 10 mm	up to 10 mm	up to 4 mm	up to 10 mm
Finalgrain size:	<1 µm	<1 µm	<1 µm	<1 µm
(depending on product properties and process parameters)				
Throughput/batch:	220 ml or 2x20 ml	220 ml or 2x20 ml	2x50 ml	max. 4x220 ml or 8x20 ml
Dimensions (WxHxD) mm:	630x415x468	630x415x468	630x415x468	836x1220x780
Weight:	approx. 86 kg	approx. 86 kg	approx. 72 kg	approx. 290 kg
Power supply:	230 V/50-60 Hz	230 V/50-60 Hz	230 V/50-60 Hz	220-230 V/50- 60 Hz

Article	Order No.
PM 100	53 29 54001
PM 100 CM	10 29 21100
PM 200	53 29 64001
PM 400	10 29 21400

Scope of supply: Planetary Ball Mill. Grinding jars and grinding balls have to be ordered separately.



② Grinding jars „comfort“ for PM 100, PM 200, PM 400 and PM 100 CM

Material	Volume ml	125	250	500
	Order No.	Order No.	Order No.	Order No.
Hardened steel	53 29 20145	53 29 20144	53 29 20224	53 29 20229
Stainless steel	53 29 20149	53 29 20148	53 29 20223	53 29 20228
Tungsten carbide	53 29 20156	53 29 20155	53 29 20222	
Agate	53 29 20139	53 29 20136	53 29 20220	53 29 20225
Sintered corundum	53 29 20153	53 29 20152	53 29 20221	53 29 20226
Zirconium oxide	53 29 20188	53 29 20187	53 29 20219	53 29 20227

Grinding jars 250 and 500 ml not for PM 200. Grinding jars 12 and 25 ml are available on request.

Other accessories for grinding jars „comfort“ (e.g. adapter for stacking, grinding jar for aeration, safety closing device) are available on request.

The Measuring system PM GrindControl for record of pressure and temperature in the grinding jar during grinding is available on request.

Grinding balls

Material	Ball Ø mm			
	10	20	30	40
	Order No.	Order No.	Order No.	Order No.
Hardened steel	53 29 36859	53 29 43028	53 29 36857	53 29 36856
Stainless steel	53 29 36863	53 29 43032	53 29 36861	53 29 36860
Tungsten carbide	53 29 36871	53 29 46093	53 29 36869	53 29 36868
Agate	53 29 36867	53 29 36828	53 29 36865	53 29 36864
Sintered corundum	53 29 46082	53 29 36854	53 29 36853	53 29 36852
Zirconium oxide	53 29 36894	53 29 43044	53 29 36892	53 29 36891

Other sizes available on request.



Recommended ball fillings

Grinding bowl nominal vol. ml	Samples volume ml	Max. input grain mm	Ball filling pcs.	Ø 10 mm	Ø 20 mm	Ø 30 mm	Ø 40 mm
50	5,0 – 20	3	10	3			
80	10 – 35	4	25	5			
125	15 – 50	4	30	7			
250	25 – 120	6	50	15	6		
500	75 – 220	10	100	25	8	4	

③ High energy ball mill E_{max}

Application:

The E_{max} is an entirely new type of ball mill for high energy milling for medium-hard, hard, brittle and fibrous materials. The combination of high friction and impact results in extremely fine particles within the shortest amount of time. Thanks to the cooling system with water, the high energy input is effectively used for the grinding process without overheating the sample. The E_{max} is capable of continuous grinding operation without interruptions for cooling down. 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.

Features:

- speed of 2000 min⁻¹ allow for ultra-fast and fine pulverization of the sample
- controlled water cooling allow for continuous operation without timely cool down breaks
- temperature-controlled grinding
- narrow particle size distribution thanks to special jar design which improves mixing of the sample
- 10 SOPs, 3 sequences and additional information storable
- operation with 2 grinding jars with integrated safety closure
- range of jar materials allow for contamination free grinding

Technical data:

Material feed size ¹⁾ :	< 5 mm
Final fineness ¹⁾ :	< 1 µm, for colloidal grinding < 80 nm
Batch size / feed quantity ¹⁾ :	max. 2 × 45 ml
Power connection:	1-phase
Dimensions (W×H×D):	625 × 525 × 645 mm

¹⁾**Please note:** depending on feed material and instrument configuration/settings

Article	Order No.
High energy ball mill E _{max}	10 29 22053
Grinding jar, 50 ml, stainless steel	10 29 20305
Grinding jar, 125 ml, stainless steel	10 29 20313
Grinding jar, 50 ml, zirconium oxide	10 29 20312
Grinding jar, 125 ml, zirconium oxide	10 29 20307
Grinding jar, 50 ml, tungsten carbide	10 29 20317
Aeration lid for Emax grinding jar 50 ml, stainless steel	10 29 20568
Aeration lid for Emax grinding jar 125 ml, stainless steel	10 29 20567
Aeration lid for Emax grinding jar 50 ml, zirconium oxide	10 29 20569
Aeration lid for Emax grinding jar 125 ml, zirconium oxide	10 29 20564

Please order grinding balls separately. Please refer to accessories for planetary ball mills. Other grinding ball types for colloid grinding on request.

