

# PLANETARY BALL MILL PM 100 CM



Planetary Ball Mills are used wherever the **highest degree of fineness** is required. Apart from the classical **mixing and size reduction** processes, the mills also meet all the technical requirements for **colloidal grinding** and have the energy input necessary for **mechanical alloying** processes. The extremely high centrifugal forces of a planetary ball mill result in very high pulverization energy and therefore **short grinding times**.

The PM 100 CM is a convenient benchtop model with **1 grinding station**. It operates in centrifugal mode mode, which leads to a more **gentle size reduction process with less abrasion**.

You may also be interested in the High Energy Ball Mill Emax, an entirely new type of mill for high energy input. The unique combination of high friction and impact results in extremely fine particles within the shortest amount of time.

## APPLICATION EXAMPLES

alloys, bentonite, bones, carbon fibres, catalysts, cellulose, cement clinker, ceramics, charcoal, chemical products, clay minerals, coal, coke, compost, concrete, electronic scrap, fibres, glass, gypsum, hair, hydroxyapatite, iron ore, kaolin, limestone, metal oxides, minerals, ores, paints and lacquers, paper, pigments, plant materials, polymers, quartz, seeds, semi-precious stones, sewage sludge, slag, soils, tissue, tobacco, waste samples, wood, ...

## PRODUCT ADVANTAGES

- | speed ratio 1:-1 for gentle grinding
- | powerful and quick grinding down to nano range
- | grinding with up to 33.3 x acceleration of gravity
- | reproducible results due to energy and speed control
- | suitable for long-term trials
- | 2 different grinding modes (dry and wet)
- | optional pressure and temperature measuring system PM GrindControl<sup>®</sup>
- | wide range of materials for contamination free grinding
- | Safety Slider for safe operation
- | perfect stability on lab bench thanks to FFCS technology
- | innovative counter weight and imbalance sensor for unsupervised operation
- | gentle grinding in centrifugal mode
- | comfortable parameter setting via display and ergonomic 1-button operation
- | automatic grinding chamber ventilation
- | 10 SOPs can be stored
- | programmable starting time
- | power failure backup ensures storage of remaining grinding time

## FEATURES

<b>Applications</b>	pulverizing, mixing, homogenizing, colloidal milling
<b>Field of application</b>	Chemistry, agriculture, biology, construction materials, engineering / electronics, environment / recycling, geology / metallurgy, glass / ceramics, medicine / pharmaceuticals
<b>Feed material</b>	soft, hard, brittle, fibrous - dry or wet
<b>Size reduction principle</b>	impact, friction
<b>Material feed size*</b>	< 10 mm
<b>Final fineness*</b>	< 1 µm, for colloidal grinding < 0.1 µm
<b>Batch size / feed quantity*</b>	max. 1 x 220 ml, max. 2 x 20 ml with stacked grinding jars
<b>No. of grinding stations</b>	1
<b>Speed ratio</b>	1:-1
<b>Sun wheel speed</b>	100 - 650 min <sup>-1</sup>
<b>Effective sun wheel diameter</b>	141 mm
<b>G-force</b>	33.3 g
<b>Type of grinding jars</b>	"comfort", optional aeration covers, safety closure devices
<b>Material of grinding tools</b>	hardened steel, stainless steel, tungsten carbide, agate, sintered aluminium oxide, silicon nitride, zirconium oxide
<b>Grinding jar sizes</b>	12 ml / 25 ml / 50 ml / 80 ml / 125 ml / 250 ml / 500 ml
<b>Setting of grinding time</b>	00:00:01 to 99:59:59
<b>Interval operation</b>	yes, with direction reversal
<b>Interval time</b>	00:00:01 to 99:59:59
<b>Pause time</b>	00:00:01 to 99:59:59
<b>Storable SOPs</b>	10
<b>Interface</b>	RS 232 / RS 485
<b>Drive</b>	3-phase asynchronous motor with frequency converter
<b>Drive power</b>	750 W
<b>Electrical supply data</b>	different voltages
<b>Power connection</b>	1-phase
<b>Protection code</b>	IP 30
<b>Power consumption</b>	~ 1250W (VA)
<b>W x H x D closed</b>	640 x 480 (780) x 420 mm
<b>Net weight</b>	~ 86 kg
<b>Standards</b>	CE

**Patent / Utility patent**

Counter weight (DE 20307741), FFCS (DE 20310654),  
SafetySlider (DE 202008008473)

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\*depending on feed material and instrument configuration/settings

## FUNCTIONAL PRINCIPLE

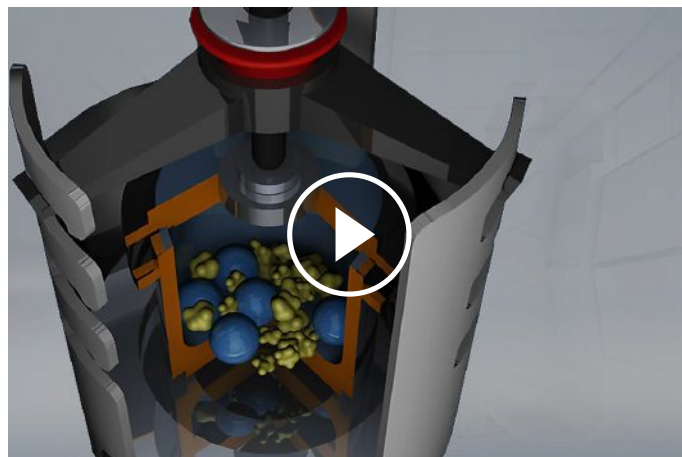
The grinding jar is arranged eccentrically on the sun wheel of the planetary ball mill. The direction of movement of the sun wheel is opposite to that of the grinding jars in the ratio 1:-1.

The grinding balls in the grinding jars are subjected to superimposed rotational movements, the so-called Coriolis forces. The difference in speeds between the balls and grinding jars produces an interaction between frictional and impact forces, which releases high dynamic energies. The interplay between these forces produces the high and very effective degree of size reduction of the planetary ball mill.

Planetary mills with a single grinding station require a counterweight for balancing purposes. In the Ball Mill PM 100 CM this counterweight can be adjusted on an inclined guide rail. In this way the different heights of the centers of gravity of differently-sized grinding jars can be compensated in order to avoid disturbing oscillations of the machine.

Any remaining vibrations are compensated by feet with some free movement (Free-Force Compensation Sockets). This innovative technology is based on the d'Alembert principle and allows very small circular movements of the machine housing that result in an automatic mass compensation. The laboratory bench is only subjected to minimal frictional forces generated in the feet.

In this way the PM 100 CM ensures a quiet and safe operation with maximum compensation of vibrations even with the largest pulverization forces inside the grinding jars and therefore can be left on the bench unsupervised.



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