LAARMANN®

Innovators in Solids

LM PBM4000 PLANETARY BALL MILL

High efficient fine grinding

FOR RAPID FINE MILLING OF SOFT, HARD, BRITTLE AND FIBROUS MATERIAL TO END FINENESS <1µm

- Up to 8 grinding jars
- Grinding jar volume up to 500cc
- Quick and easy to clean
- Rapid fine milling
- Easy exchange of grinding jars and balls
- Grinding jars and balls made from a wide range of materials available
- Program control
- End fineness < 1µm
- CE-certified

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Description

The LAARMANN® Planetary Ball Mills are used for fine grinding of soft, hard to brittle or fibrous materials.

Dry and wet grindings are possible. They support the daily sample preparation for laboratory and development usage.

Working principle

LAARMANN® Planetary Ball Mills consist of several cylindrical grinding jars (positioned on the sun wheel as shown in the figure) which are filled with loose grinding balls. Two superimposed rotational movements move the grinding jar: like in a planetary system, the grinding jars rotate in an orbit around the centre.

This rotational movement is the self-rotation of the grinding container superimposed. The resulting centrifugal and acting acceleration forces lead to strong grinding effects. Furthermore, there are forces working according to the Coriolis acceleration. The result is an intensive grinding effect between the grinding balls and the sample.

Depending on the speed ratio, different movement patterns of the grinding media can be achieved. It is achieved with the grinding balls that are bouncing off in the inner wall of the grinding jar. When hitting the wall of the grinding jar, the sample will be milled. In a different motion pattern, the grinding balls roll over the sample and mill the ground material.

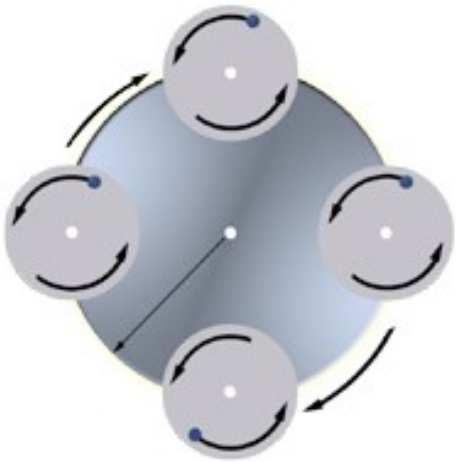
Advantages

With our LAARMANN® Planetary Ball Mills becomes an easy task for the operator because of the user friendly program with options such as speed, rotation reversal and grinding time.

It also ensures safety for the operator because of the clamping of the grinding jars and built in safety system of the machine that ensures the machine will not start if the gap is open and stops when the gap is opened while running.

Planetary ball mill closed

Planetary ball mill 8 grinding jar set up



Movement planetary mill

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Grinding jars available with different materials

- Stainless steel
- Hardened steel
- Tungsten carbide
- Agate
- Sintered corundum
- Zirconium oxide
- Pu-coated
- PTFE-coated
- Others on request

Features of grinding jars

The grinding jars are built from one block of the required material or built with a stainless steel protective jacket with liner from the above materials.

Unique advantages of grinding jars:

- Safe according to stainless steel protective jacket
- Easy opening according to gap between lid and jar
- Self-centring base of grinding jar
- dust-proof sealed by O-ring or other seal

The selection of the right grinding jar and the correct filling level has a big impact on the grinding result. According to the application, you have to select the correct material and amount/ volume for the grinding jar and the grinding balls.

A jar filling should consist of about 1/3 sample and 1/3 ball charge. The remaining third is the free jar volume that is necessary for the movement of the balls. The following table provides recommendations.

500ml zirconium oxide jar

100ml agate jar

Zorconium oxide and stainless steel grinding balls

We recommend to select always grinding jars and balls build from the same material

Nominal volume	Sample amount	Recommended ball charge						
		Max feed size	5mm	10mm	15mm	20mm	30mm	40mm
125 ml	15-20 ml	< 4 mm	500 pcs.	30 pcs.	18 pcs.	7 pcs.		
250 ml	25-120 ml	< 6 mm	1200 pcs.	50 pcs.	45 pcs.	15 pcs.	6pcs.	
500 ml	75-220 ml	< 10 mm	2000 pcs.	100 pcs.	70 pcs.	25 pcs.	8pcs.	4pcs

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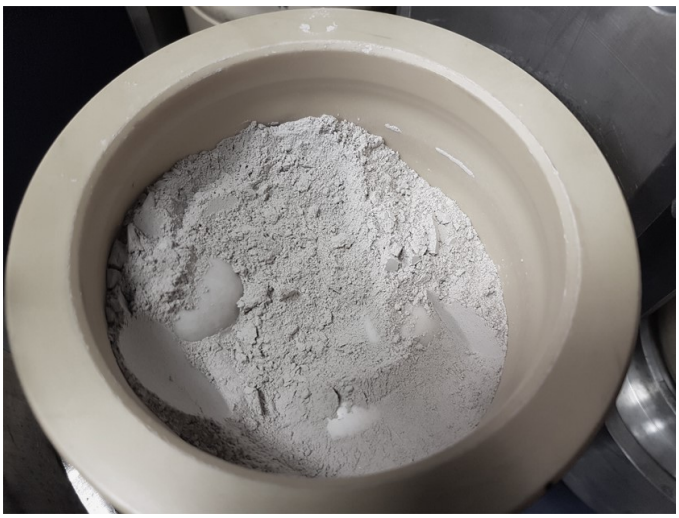
Features and benefits

- Up to 8 grinding jars
- High efficient fine grinding up to end fineness <1µm
- Grinding jars from 50ml to 500 ml in different materials
- Suitable for long-term trials and continuous milling in batches
- Automatic direction reversal to avoid agglomerations
- Reproducible results due to programmable grinding parameters
- Adjust speed, grinding time and reverse direction
- CE - certified



LAARMANN® Planetary Ball Mill suitable applications

- Wood fibres
- Plant materials
- Seeds
- Tobacco
- Betonite
- Concrete
- Gypsum
- Sand
- Stone
- Cement clinker
- Hair
- Bones
- Kaolin
- Tissue
- Carbon fibres
- Paints and lacquers
- Catalysts
- Plastics
- Pigments
- Polymers
- Cellulose
- Glass
- Hydroxylapatite
- Ceramic oxides
- Quarz
- Sludges
- Clay minerals
- Ores
- Semi-precious stones
- Cole
- Coke
- Alloys
- Metal oxides
- Quarz
- Slags
- Electronic scrap
- Organic and unorganic waste

Technical specifications

Adjustment of grinding	duration digit adjustable
Effective sun wheel diameter	360 mm
Speed	50 – 400 min-1
Electrical requirements	200-240 Volt 50/60 Hz
Feed size maximum	10 mm
Max end-fineness	1µm; 0,1µm for colloidal grinding
Number of grinding jars	up to 8 grinding jars
Max volume of each grinding jar	500 ml
Min volume of each grinding jar	10 ml
Motor Power	1,5 kW
Weight	158 Kg gross
Dimensions closed W x D x H	1090 x 660 x 1400 mm

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