MIXER MILL MM 500 NANO

Comfortable production of particles in the nanometer range

MORE THAN AN ALTERNATIVE TO A PLANETARY BALL MILL

The mixer mill MM 500 nano is a compact, versatile bench-top unit which has been developed specially for dry, wet and cryogenic grinding of up to 2 x 45 ml sample material within seconds. With a maximum frequency of 35 Hz, it generates enough energy to produce particles in the nanometer range. The robust high-performance drive makes the mill suitable for long-term grinding processes up to 99 hours and thus very interesting for research and mechanochemistry.

Hence, the MM 500 nano is a unique mixer mill in the market to provide a real alternative to grinding in a planetary ball mill – with more comfortable handling and less warming effects.

Click to view video

ADVANTAGES THROUGH DESIGN

- Very easy, comfortable clamping and handling of the grinding jars
- Jars can stay clamped while taking a sub-sample or visual checks of fineness
- Ergonomic design with touch display for easy parameter setting
- 12 SOPs & 4 program cycles with up to 99 repeats to facilitate routine applications

FLEXIBILITY

- Equally suited for rapid pulverization <2 min and long-term grinding up to 99 hours
- Use one large grinding ball in the High Impact mode or several smaller balls in the High Friction mode
- Use the MM 500 nano for routine sample preparation applications, for nano-grinding or for research applications such as mechanochemistry and mechanical alloying

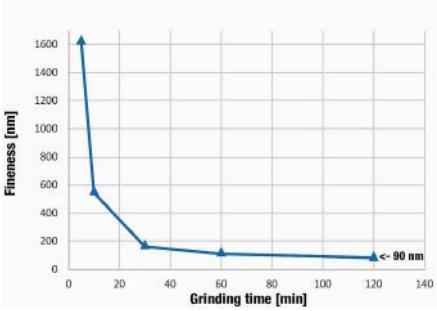
MIXER MILL MM 500 NANO

GRIND SIZES IN THE NANOMETER RANGE

- New jar design allows for optimized usage of jar volume also for wet grinding
- Final fineness < 100 nm possible thanks to maximized energy input at 35 Hz
- Less warming effects, thus grinding can usually be done without grinding breaks for cooling down

Result: You get your nano sample within the shortest time.

NANO-GRINDING OF TITANIUM DIOXIDE WITHOUT COOLING BREAKS



Nano grinding of 25 g titanium dioxide in a 125 ml grinding jar zirconium oxide with 275 g balls 0.1 mm, 30 ml 1% NaPO4 solution. A particle size of 90 nm was achievied after 120 minutes of grinding.

NEW SCREW-LOCK GRINDING JARS: BENEFITS FOR YOU

The new Screw-Lock grinding jars of the MM 500 nano are suitable for dry, wet or cryogenic grinding. The jar sizes (50 / 80 / 125 ml) are larger than those of the classic mixer mills, allowing for grinding 2 x 45 ml per batch. The jars are pressure-tight up to 5 bar, the integrated safety closure allows for convenient handling. The new jar design is very beneficial for wet grinding and pulverizing fibrous samples like hair.

Thanks to the flat lid, the nominal volume can be fully used, for instance when milling fibrous samples, or to ensure the optimum mixture of sample, small grinding balls and liquid for wet grinding.

Available materials include hardened steel, stainless steel, tungsten carbide and zirconium oxide ensuring contamination-free sample preparation. Aeration lids for all jar sizes and materials are available, e.g. for grinding under inert atmosphere.

MIXER MILL MM 500 NANO

TYPICAL SAMPLE MATERIALS

RETSCH mixer mills are true allrounders. They homogenize, for example: alloys, animal feed, bones, ceramics, chemical products, coal, coke, drugs, electronic scrap, glass, grains, hair, minerals, oil seeds, ores, paper, plant materials, plastics, sewage sludge, soils, straw, tablets, textiles, tissue, tobacco, waste samples, wood, wool, etc.

titanium oxide
wet grinding

metal alloy
dry grinding

hair
dry grinding

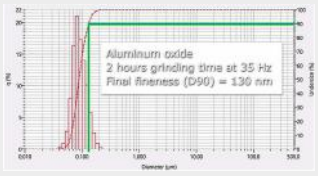
tyre rubber
cryogenic grinding

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

MIXER MILL MM 500 VARIO

NANO GRINDING OF ALUMINUM OXIDE IN THE MM 500 NANO

Narrow particle size distribution of aluminium oxide after grinding (Nano grinding of 30 g aluminum oxide in a 125 ml grinding jar zirconium oxide with 275 g balls 0.1 mm, 33 ml 0.5% NaPO4 solution)



TECHNICAL DATA

Applications	mechanochemistry, mechanical alloying, size reduction, mixing, homogenization, cryogenic grinding
Field of application	agriculture, biology, chemistry / plastics, construction materials, engineering / electronics, environment / recycling, food, geology / metallurgy, glass / ceramics, medicine / pharmaceuticals
Feed material	hard, medium-hard, soft, brittle, elastic, fibrous
Size reduction principle	impact, friction
Material feed size*	<= 10 mm
Final fineness*	~ 0.1 µm
Batch size / feed quantity*	max. 2 x 45 ml
No. of grinding stations	2
Setting of vibrational frequency	digital, 3 - 35 Hz (180 - 2100 min-1)
Typical mean grinding time	30 s - 2 min
Dry grinding/ Wet grinding/ Cryogenic grinding	yes/ yes/ yes
Cell disruption with reaction vials	no
Self-centering clamping device	yes
Type of grinding jars	screw-lock with integrated safety closure devices
Material of grinding tools	hardened steel, stainless steel, tungsten carbide, zirconium oxide
Grinding jar sizes	50 ml / 80 ml / 125 ml
Setting of grinding time	digital, 10 s - 8 h
Total grinding time	99 h
Storable SOPs	12
Number of storable cycle programs	4 (with 99 repeats)
Electrical supply data	100-120V, 50/60 Hz; 200-230V, 50/60Hz
Power connection	1-phase
Protection code	IP 30
Power consumption	750 W
W x H x D closed	690 x 375 x 585 mm
Net weight	~ 60 kg
Standards	CE

*depending on feed material and instrument configuration/settings

MIXER MILL MM 500 NANO

FUNCTIONAL PRINCIPLE

The grinding jars of the mixer mill MM 500 nano perform radial oscillations in a horizontal position. The inertia of the grinding balls causes them to impact with high energy on the sample material at the rounded ends of the grinding jars and pulverize it. Also, the movement of the grinding jars combined with the movement of the balls result in the intensive mixing of the sample. The degree of mixing can be increased even further by using several smaller balls.

Click to view video

THE NEW RETSCH APP

As the leading solution provider for sample preparation equipment, RETSCH has taken operating convenience to the next level and created the new RETSCH App. This tool makes working with your RETSCH mill easy and convenient:

- Operate your devices via your smart phone or tablet
- Control your devices based on your own application routines
- Access information from the RETSCH database
- Get in touch with the RETSCH service team via the app

www.retsch.com/mm500-nano