

# MIXER MILL MM 400

A true multipurpose mill



**The Mixer Mill MM 400 is a compact, versatile bench-top unit developed specially for dry, wet and cryogenic grinding of small sample amounts.**

This laboratory mill mixes and homogenizes up to 2 x 20 ml powders and suspensions within a few seconds. It is also perfectly suitable for the disruption of biological cells as well as for DNA/RNA and protein extraction. With its powerful performance and great flexibility, the Mixer Mill MM 400 is a unique product in the market.

You may also be interested in the mixer mill models MM 500 nano or MM 500 vario which operate with the same functional principle but with a higher frequency of 35 Hz. Each model has a specific application focus.

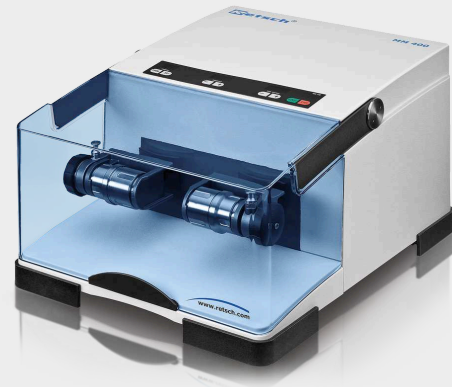


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**Product Video**

## PERFORMANCE AND DESIGN

- | Powerful size reduction and homogenization by impact and friction with up to 30 Hz
- | Equipped with 2 grinding stations for up to 20 samples per run
- | Digital parameter setting ensures reproducible results
- | Memory for 9 Standard Operating Procedures (SOP)



## UNMATCHED VERSATILITY

- | 3 different grinding modes: dry, wet or cryogenic
- | Mixes powdered sample and binder in plastic vessels prior to pelletizing, e. g. for XRF analysis
- | Suitable for research applications such as mechanochemistry or for biological cell disruption by bead beating

### MIXER MILL MM 400

## SOLUTIONS FOR BIOLOGICAL APPLICATIONS AND CELL DISRUPTION

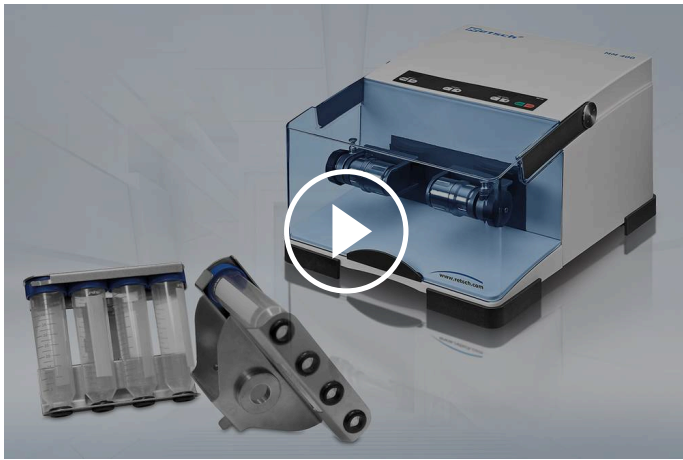
Laboratory Mixer Mills like the MM 400 are widely used for homogenizing biological samples such as tissue, liver, muscle or plant materials like cannabis. For cell disruption via bead beating mixer mills are also the perfect solution. The MM 400 accepts adapters for different single-use vials with the following capacities per batch:

20 x 0.2 ml / 20 x 1.5 or 2 ml / 10 x 5 ml / 8 x 30 ml / 8 x 50 ml

The MM 400 can be used for efficient cell disruption of max. 240 ml cell suspension for DNA/RNA and protein extraction. It is also possible to isolate intact bacteria from tissue in 8 x 30 ml bottles or 10 x 5 ml vials for accurate diagnosis of infections.

Accessories for the pulverization of 25 - 30 g plant material, like cannabis flower buds, include conical centrifugation tubes.





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Mixer Mill MM 400 - Yeast Cell Disruption



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Mixer Mill MM 400 - Cryogenic Grinding

FOR SAFE AND EFFECTIVE GRINDING PROCESSES

## ACCESSORIES FOR THE MIXER MILL MM 400



### GRINDING JARS IN 6 DIFFERENT MATERIALS

The nominal volume of the screw-top grinding jars ranges from 1.5 ml to 50 ml; available materials include hardened steel, stainless steel, agate, tungsten carbide, zirconium oxide and PTFE, ensuring contamination-free sample preparation.



### ADAPTERS FOR SINGLE-USE VIALS

Adapters for 0.5 / 1.5 / 2 / 5 ml single-use vials can be used in the MM 400. For larger sample amounts, e. g. for protein extraction, adapters for 50 ml conical centrifugation tubes or 30 ml wide-mouth bottles are available.



### CRYOKIT FOR GRINDING WITH LN<sub>2</sub>

The CryoKit is a cost-efficient solution for occasional cryogenic grinding with the Mixer Mill MM 400. This set of insulated containers, tongs and safety glasses is used for pre-cooling the grinding jar in liquid nitrogen.

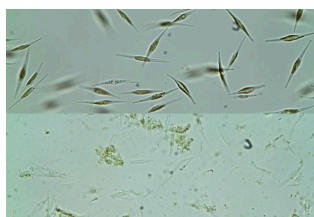
MIXER MILL MM 400

## TYPICAL SAMPLE MATERIALS

RETSCH mixer mills are true allrounders. They homogenize, for example, alloys, animal feed, bones, ceramics, cereals, 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.



*hair*



*cell disruption*



*capsules*



*soil*

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

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## TECHNICAL DATA

<b>Applications</b>	size reduction, mixing, homogenization, cell disruption, cryogenic grinding
<b>Field of application</b>	agriculture, biology, chemistry / plastics, construction materials, engineering / electronics, environment / recycling, food, geology / metallurgy, glass / ceramics, medicine / pharmaceuticals
<b>Feed material</b>	hard, medium-hard, soft, brittle, elastic, fibrous
<b>Size reduction principle</b>	impact, friction
<b>Material feed size*</b>	<= 8 mm
<b>Final fineness*</b>	~ 5 µm
<b>Batch size / feed quantity*</b>	max. 2 x 20 ml
<b>No. of grinding stations</b>	2
<b>Setting of vibrational frequency</b>	digital, 3 - 30 Hz (180 - 1800 min <sup>-1</sup> )
<b>Typical mean grinding time</b>	30 s - 2 min
<b>Dry grinding</b>	yes
<b>Wet grinding</b>	yes
<b>Cryogenic grinding</b>	yes
<b>Cell disruption with reaction vials</b>	yes, up to 20 x 2.0 ml
<b>Self-centering clamping device</b>	yes
<b>Type of grinding jars</b>	screw top design
<b>Material of grinding tools</b>	hardened steel, stainless steel, tungsten carbide, agate, zirconium oxide, PTFE
<b>Grinding jar sizes</b>	1.5 ml / 5 ml / 10 ml / 25 ml / 35 ml / 50ml
<b>Setting of grinding time</b>	digital, 10 s - 99 min
<b>Storable SOPs</b>	9
<b>Electrical supply data</b>	100-240 V, 50/60 Hz
<b>Power connection</b>	1-phase
<b>Protection code</b>	IP 30
<b>Power consumption</b>	150 W
<b>W x H x D closed</b>	371 x 266 x 461 mm
<b>Net weight</b>	~ 26 kg
<b>Standards</b>	CE

\*depending on feed material and instrument configuration/settings

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## FUNCTIONAL PRINCIPLE

The grinding jars of the mixer mill MM 400 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 jars and pulverize it. Also, the movement of the 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. If several small balls are used (e.g. glass beads) then, for example, biological cells can be disrupted. The large frictional impact effects between the beads ensure effective cell disruption.



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[www.retsch.com/mm400](http://www.retsch.com/mm400)