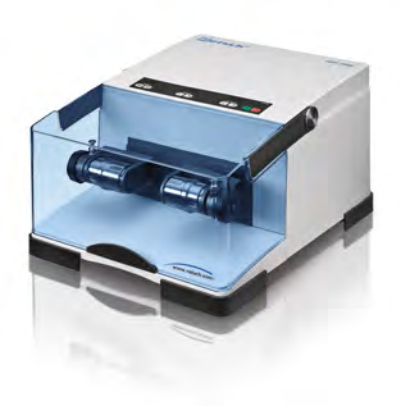
Mixer Mill MM 400

General Information



The mixer mill MM 400 is a compact versatile bench-top unit, which has been developed specially for dry, wet and cryogenic grinding of small amounts of sample.
It can mix and homogenize powders and suspensions in only 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 high performance and great flexibility the mixer mill MM 400 is a unique product in the market.

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, 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, ...

Product Advantages

- reproducible, efficient grinding, mixing and homogenization in seconds
- powerful grinding by impact and friction, up to 30 Hz for up to 20 samples per run
- 3 different grinding modes (dry, wet or cryogenic)
- screw-top grinding jars for leak-proof grinding
- 9 SOPs can be stored
- wide range of accessories including various jar and ball sizes, adapter racks for single use vials and tubes, grinding tool materials, CryoKit
- efficient cell disruption of max. 240 ml cell suspension for DNA/RNA- and protein extraction

Features

Applications	size reduction, mixing, homogenization, cell disruption, 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

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Material feed size*	≤ 8 mm
Final fineness*	~ 5 µm
Batch size / feed quantity*	max. 2 x 20ml
No. of grinding stations	2
Setting of vibrational frequency	digital, 3 - 30 Hz (180 - 1800 min^{-1})
Typical mean grinding time	30 s - 2 min
Dry grinding	yes
Wet grinding	yes
Cryogenic grinding	yes
Cell disruption with reaction vials	yes, up to 20 x 2.0 ml
Self-centering clamping device	yes
Type of grinding jars	screw top design
Material of grinding tools	hardened steel, stainless steel, tungsten carbide, agate, zirconium oxide, PTFE
Grinding jar sizes	1.5 ml / 5 ml / 10 ml / 25 ml / 35 ml / 50ml
Setting of grinding time	digital, 10 s - 99 min
Storable SOPs	9
Electrical supply data	100-240 V, 50/60 Hz
Power connection	1-phase
Protection code	IP 30
Power consumption	150 W
W x H x D closed	371 x 266 x 461 mm
Net weight	~ 26 kg
Documentation	Operation & Application Video
Standards	CE

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

Videolink

http://www.retsch.com/mm400

Function Principle

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The grinding jars of the 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 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. 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.

Order data

Mixer Mill MM 400

with quick release clamp (please order grinding jars and balls separately)

20.745.0001	MM 400, 100-240 V, 50/60 Hz

Grinding jars MM 400, screw top design

Hardened steel	
01.462.0237	25 ml
Stainless steel	
01.462.0230	1.5 ml
01.462.0231	5 ml
01.462.0236	10 ml
02.462.0213	25 ml
01.462.0214	35 ml
01.462.0216	50 ml
Tungsten carbide	
01.462.0235	10 ml
01.462.0217	25 ml
Agate	
01.462.0232	5 ml
01.462.0233	10 ml
Zirconium oxide	
01.462.0234	10 ml
01.462.0201	25 ml
01.462.0215	35 ml
PTFE	
01.462.0238	25 ml
01.462.0244	35 ml
22.041.0003	Mixing beakers of polystyrene, 28 ml, 100 pieces
22.041.0004	Mixing beakers of polystyrene, 56 ml, 100 pieces

Accessories for grinding jars MM 400

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22.486.0005	Jar wrench for grinding jars
22.085.0007	Gasket for grinding jar 1.5 ml, 10 pieces
22.085.0008	Gasket for grinding jar 5 ml, 10 pieces
22.085.0009	Gasket for grinding jar 10 ml, 10 pieces
22.085.0006	Gasket for grinding jar 25 ml hardened steel and stainless steel, 10 pieces
22.085.0003	Gasket for grinding jar 25 ml zirconium oxide and tungsten carbide, 10 pieces
22.085.0005	Gasket for grinding jar 35 ml stainless steel, 10 pieces
22.085.0004	Gasket for grinding jar 35 ml zirconium oxide, 10 pieces
22.085.0002	Gasket for grinding jar 50 ml stainless steel, 10 pieces

Accessories for mixing and cell disruption MM 400

22.001.0015	Adapter for 4 conical centrifuge tubes (e.g. Falcon Tubes), 2 pieces, incl. 20 tubes
05.026.0001	Conical centrifuge tubes, 50 ml, 20 pieces

Accessories for cold grinding MM 400

22.354.0001	Cryo kit for cooling the grinding jars with liquid nitrogen

Accessories MM 400

99.200.0004	IQ/OQ Documentation for MM 400

Accessories for cell and tissue disruption

22.008.0005	Adapter for 5 reaction vials 1.5 and 2.0 ml, made of PTFE
22.008.0006	Adapter for 10 reaction vials 0.2 ml, made of PTFE
22.008.0008	Adapter rack for 10 reaction vials 1.5 and 2.0 ml, made of PTFE (only for MM 400)
22.749.0001	Safe-lock reaction vials 2.0 ml, 1000 pcs.
22.749.0002	Safe-lock reaction vials 1.5 ml, 1000 pcs.
22.749.0004	Safe-lock reaction vials 0.2 ml, 1000 pcs.

Grinding balls

Hardened steel

05.368.0029	5 mm Ø
05.368.0030	7 mm Ø
05.368.0059	10 mm Ø

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05.368.0032	12 mm Ø
05.368.0108	15 mm Ø
Stainless steel	
22.455.0010	2 mm Ø, 500 g (approx. 110 ml)
22.455.0011	3 mm Ø, 500 g (approx. 120 ml)
22.455.0002	3 mm Ø, 200 pieces (approx. 6 ml)
22.455.0001	4 mm Ø, 200 pieces (approx. 14 ml)
22.455.0003	5 mm Ø, 200 pieces (approx. 25 ml)
05.368.0034	5 mm Ø
05.368.0035	7 mm Ø
05.368.0063	10 mm Ø
05.368.0037	12 mm Ø
05.368.0109	15 mm Ø
05.368.0062	20 mm Ø
05.368.0105	25 mm Ø
Tungsten carbide	
22.455.0006	3 mm Ø, 200 pieces (approx. 6 ml)
22.455.0005	4 mm Ø, 200 pieces (approx. 14 ml)
22.455.0004	5 mm Ø, 200 pieces (approx. 25 ml)
05.368.0038	5 mm Ø
05.368.0039	7 mm Ø
05.368.0071	10 mm Ø
05.368.0041	12 mm Ø
05.368.0110	15 mm Ø
Agate	
05.368.0024	5 mm Ø
05.368.0025	7 mm Ø
05.368.0067	10 mm Ø
05.368.0027	12 mm Ø
Zirconium oxide	
05.368.0089	2 mm Ø, 0.5 kg (approx. 135 ml)
05.368.0090	3 mm Ø, 0.5 kg (approx. 140 ml)
22.455.0007	3 mm Ø, 200 pieces (approx. 6 ml)
22.455.0009	5 mm Ø, 200 pieces (approx. 25 ml)
05.368.0094	10 mm Ø
05.368.0096	12 mm Ø
05.368.0113	15 mm Ø
05.368.0093	20 mm Ø
PTFE with steel core	
05.368.0045	10 mm Ø
05.368.0046	12 mm Ø
05.368.0114	15 mm Ø
05.368.0047	20 mm Ø

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	Polyamide for mixing beakers
05.368.0042	5 mm Ø
05.368.0043	7 mm Ø
05.368.0044	9 mm Ø
05.368.0003	12 mm Ø
	Glass beads
22.222.0001	0.10 - 0.25 mm Ø, 500 g (approx. 320 ml)
22.222.0002	0.25 - 0.50 mm Ø, 500 g (approx. 320 ml)
22.222.0003	0.50 - 0.75 mm Ø, 500 g (approx. 320 ml)
22.222.0004	0.75 - 1.00 mm Ø, 500 g (approx. 320 ml)
22.222.0005	1.00 - 1.50 mm Ø, 500 g (approx. 320 ml)