MIXER MILL MM 500 VARIO

Variability redefined

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PROCESSING 2 TO 50 SAMPLES IN ONE BATCH

The new Mixer Mill MM 500 vario is a versatile bench-top unit which provides ultimate performance with maximum flexibility for your sample preparation process.

It is used for dry, wet and cryogenic grinding of small sample amounts with high throughput. The MM 500 vario can be equipped with screw-top grinding jars from 1.5 ml to 50 ml. Available materials include hardened steel, stainless steel, tungsten carbide, agate, zirconium oxide, PTFE.

For biological applications such as homogenization of plant materials, tissues or for cell disruption via bead beating, the MM 500 vario can be equipped with different adapters for single-use vials from 0.2 - 5 ml.

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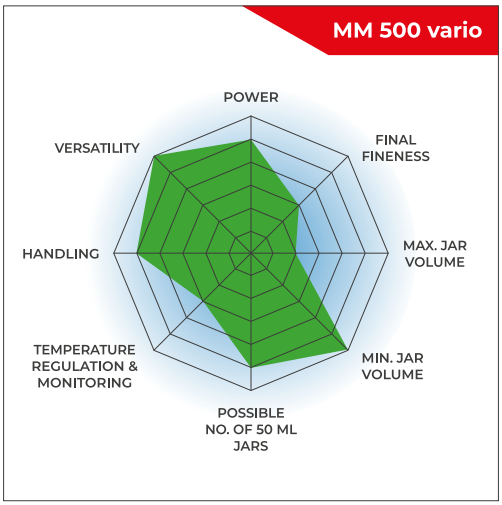
THE STRONG MIXER MILL FOR HIGH THROUGHPUT APPLICATIONS

- Max. speed 35 Hz
- Horizontal oscillation causes strong impact effects for effective sample processing
- Up to 8 mm feed size and 5 µm final fineness
- 6 grinding stations for jars of min. 2 ml and max. 50 ml, adapter holds up to 50 x 2 ml single use vials
- Steel jars can be precooled manually in liquid nitrogen
- Bench-top model, touch screen, storable SOPs and cycle programs, 7 different jar materials



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PERFORMANCE AND DESIGN

- Grind sizes down to 5 µm possible
- Powerful pulverization with up to 35 Hz
- Twice as fast as mills with only 30 Hz
- Ergonomic design with touch display

FLEXIBILITY

- Suitable for dry, wet or cryogenic grinding
- Equally suited for rapid (<2 min) and long-term grinding (up to 99 hours)
- 12 SOPs and 4 program cycles with max. 99 repeats facilitate routine applications
- Grinding jars of various sizes and materials; adapters for single-use vials

SOLUTIONS FOR BIOLOGICAL APPLICATIONS AND CELL DISRUPTION

Mixer mills are widely used for homogenizing biological samples such as tissue, liver, muscle, plants, corn or sputum. For cell disruption via bead beating mixer mills are also the perfect solution. The MM 500 vario accommodates adapters for different single-use vials:

0.2 ml / 1.5 ml / 2 ml / 5 ml

Depending on the tube and the type of adapter, 5-10 tubes can be inserted per adapter, resulting in the following maximum vial capacity per batch:

50 x 1.5 or 2 ml (or 60 x 0.2 ml)
20 x 5 ml

Typical grinding / homogenizing processes of biological materials take less than 2 min. Cell disruption with a good reproducibility and efficiency takes 20 sec to 5 min, depending on the cell type. Cryogenic grinding in single-use vials can also be a suitable way to pulverize tough or temperature-sensitive samples.

Solutions for biological applications and cell disruption

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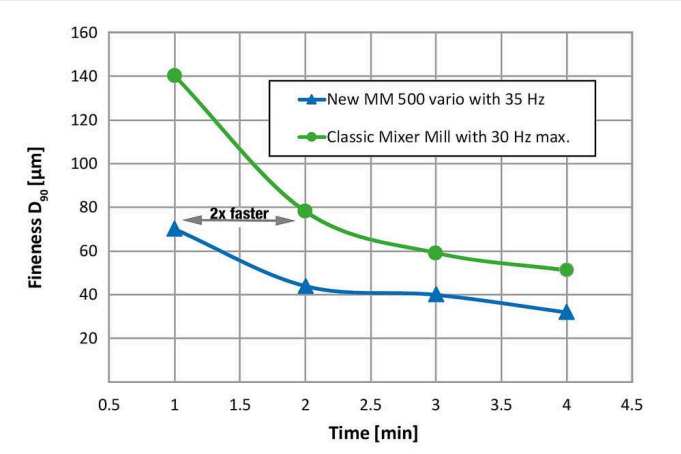
MAXIMIZE YOUR THROUGHPUT

- Maximum frequency of 35 Hz reduces grinding time to 50% compared to mixer mills with only 30 Hz
- Six grinding stations instead of two, as in classic mixer mills, ensure high throughput
- In combination, the throughput of the MM 500 vario is 6 times higher compared to a classic mixer mill



Grinding of basalt in the MM 500 vario results in better fineness compared to classic Mixer Mills thanks to the increased frequency of 35 Hz instead of 30 Hz (50 ml jar + 12 x 12 mm grinding balls).

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FOR SAFE AND EFFECTIVE GRINDING PROCESSES

ACCESSORIES FOR THE MM 500 VARIO

GRINDING JARS IN 6 DIFFERENT MATERIALS

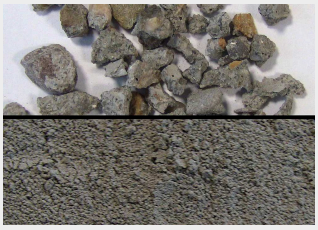
All grinding jars of the smaller MM 400 model are compatible with the MM 500 vario. The nominal volume ranges from 1.5 ml to 50 ml and available materials include hardened steel, stainless steel, agate, tungsten carbide, zirconium oxide and PTFE, ensuring contamination-free sample preparation.

ADAPTERS FOR SINGLE-USE VIALS

The adapters for 0.5 / 1.5 / 2 / 5 ml single-use vials of the smaller MM 400 model can be used in the MM 500 vario.

TYPICAL SAMPLE MATERIALS

RETSCH mixer mills are true allrounders. They homogenize, for example, waste, soil, chemical products, coated tablets, drugs, ores, grain, tissue, glass, hair, ceramics, bones, plastics, alloys, minerals, oil seeds, plants, sewage sludge, pills, textiles, wool etc.



concrete

wood

plastic granulates

hair

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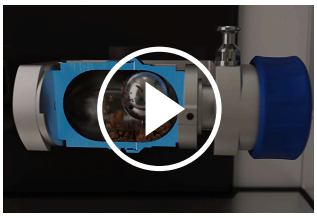
MIXER MILL MM 500 VARIO

FUNCTIONAL PRINCIPLE

The grinding jars of the mixer mill MM 500 vario 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.



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TECHNICAL DATA

Applications	mechanochemistry, homogenization, size reduction, cryogenic grinding, mechanical alloying, mixing,
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*	<= 8 mm
Final fineness*	~ 5 µm
Batch size / feed quantity*	max. 6 x 20 ml
No. of grinding stations	6
Vibrational frequency	3 - 35 Hz (180 - 2100 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
Self-centering clamping device	yes
Type of grinding jars	screw top design
Material of grinding tools	hardened steel, stainless steel, tungsten carbide, zirconium oxide, agate, PTFE
Grinding jar sizes	1.5 ml / 5 ml / 10 ml / 25 ml / 35 ml / 50 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	100-120 V, 50/60 Hz; 200-230 V, 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

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*depending on feed material and instrument configuration/settings

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ORDER DATA

MIXER MILL MM 500 VARIO

Mixer Mill MM 500 vario with quick release clamp
(please order grinding jars and balls separately)

20.766.0001		MM 500 vario	200–230 V, 50/60 Hz
20.766.0002		MM 500 vario	100–120 V, 50/60 Hz

GRINDING JARS MM 500 VARIO, SCREW TOP DESIGN

HARDENED STEEL

01.462.0237		25 ml

STAINLESS STEEL

01.462.0230		1.5 ml
01.462.0231		5 ml
01.462.0290		5 ml (for use with adapter 02.706.0351)
01.462.0236		10 ml
01.462.0213		25 ml
01.462.0214		35 ml
01.462.0216		50 ml

TUNGSTEN CARBIDE

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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
05.068.0004		Mixing beakers of polystyrene, 28 ml, 1 piece (please order amount multiple of 100 pcs.)
05.068.0006		Mixing beakers of polystyrene, 56 ml, 1 piece (please order amount multiple of 100 pcs.)

ACCESSORIES FOR GRINDING JARS MM 500 VARIO

03.018.0155		Safety element for empty grinding station
02.486.0005		Jar wrench for grinding jars

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02.706.0351		Adapter for use of 2/4 grinding jars 5 ml (01.462.0290) (Only for MM 400 with item no. 20.715.0001)
03.111.0229		Gasket for grinding jar 1.5 ml, 1 piece (please order amount multiple of 10 pcs.)
03.111.0231		Gasket for grinding jar 5 ml, 1 piece (for grinding jar 01.462.0231) (please order amount multiple of 10 pcs.)
03.111.0262		Gasket for grinding jar 5 ml, 1 piece (for grinding jar 01.462.0290) (please order amount multiple of 10 pcs.)
03.111.0232		Gasket for grinding jar 10 ml, 1 piece (please order amount multiple of 10 pcs.)
03.111.0228		Gasket for grinding jar 25 ml hardened steel and stainless steel, 1 piece (please order amount multiple of 10 pcs.)
03.111.0212		Gasket for grinding jar 25 ml zirconium oxide and tungsten carbide, 1 piece (please order amount multiple of 10 pcs.)
03.111.0224		Gasket for grinding jar 35 ml stainless steel, 1 piece (please order amount multiple of 10 pcs.)
03.111.0222		Gasket for grinding jar 35 ml zirconium oxide, 1 piece (please order amount multiple of 10 pcs.)
03.111.0209		Gasket for grinding jar 50 ml stainless steel, 1 piece (please order amount multiple of 10 pcs.)

ACCESSORIES FOR COLD GRINDING MM 500 VARIO

22.354.0001		Cryo kit for cooling the grinding jars with liquid nitrogen (incl. 2 insulated containers (1 and 4 liter), 2 pairs of grinding jar tongs, 1 pair of safety glasses)

ACCESSORIES FOR CELL AND TISSUE DISRUPTION

22.008.0010		Adapter for 5 reaction vials 5.0 ml, made of PTFE
22.008.0014		Adapter for 10 reaction vials 1.5 and 2.0 ml, made of PTFE or stainless steel
22.008.0005		Adapter for 5 reaction vials 1.5 and 2.0 ml, made of PTFE or stainless steel
22.008.0006		Adapter for 10 reaction vials 0.2 ml, made of PTFE
22.749.0006		Safe-lock reaction vials 5.0 ml, 200 pcs.

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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.
22.749.0008		Reaction vials made of stainless steel 316L, 2.0 ml, 10 pcs.

ACCESSORIES MM 500 VARIO

99.200.0038	IQ/OQ Documentation for MM 500 vario

GRINDING BALLS

HARDENED STEEL

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

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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

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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)
05.368.0146		7 mm Ø
05.368.0094		10 mm Ø
05.368.0096		12 mm Ø
05.368.0113		15 mm Ø

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05.368.0093		20 mm Ø
05.368.0106		25 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

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)

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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)

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