



ОСЦИЛИРАЩА ТОПКОВА МЕЛНИЦА MM 500 VARIO

Variability redefined

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.

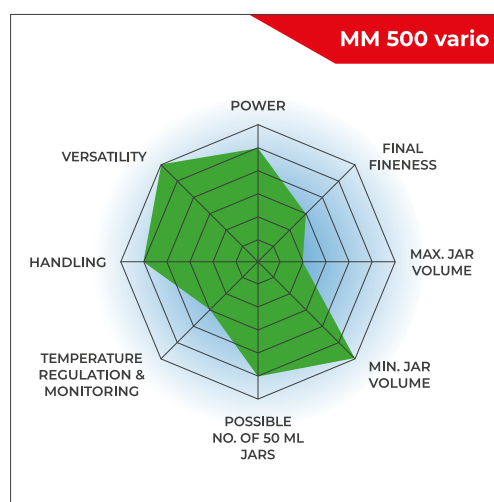
For biological applications such as homogenization of plant materials, tissues or for cell disruption via bead beating, the MM 500 vario can be equipped with different adapters for single-use vials from 0.2 - 5 ml.



[Click to view video](#)

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



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

Смесителните мелници се използват широко за хомогенизиране на биологични проби като тъкан, черен дроб, мускули, растения, царевича или хрaчки. За разрушаване на клетките чрез биене на топчета мелничките също са идеалното решение. MM 500 vario подбира адаптери за различни флакони за еднократна употреба: 0,2 ml / 1,5 ml / 2 ml / 5 ml

В зависимост от тубата и вида на адаптера могат да се поставят 5-10 туби на адаптер, което води до следния максимален капацитет на флакона на партида:

50 x 1,5 или 2 мл (или 60 x 0,2 мл)

20 x 5 мл

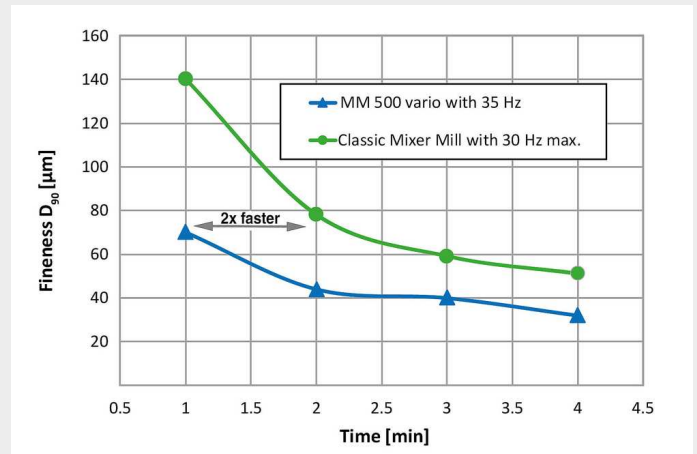
Типичните процеси на смилане / хомогенизиране на биологични материали отнемат по-малко от 2 минути. Разрушаването на клетките с добра възпроизводимост и ефективност отнема от 20 секунди до 5 минути, в зависимост от типа клетка. Криогенното смилане във флакони за еднократна употреба също може да бъде подходящ начин за пулверизиране на жиляви или чувствителни на температура проби.



Solutions for biological applications and cell disruption

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).

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.

ТИПИЧНИ ОБРАЗЦИ НА МАТЕРИАЛИ

Миксерните мелници на Retsch са всестранно развити. Хомогенизират например: отпадъци, почва, химически продукти, таблетки с покритие, лекарства, руди, зърно, тъкан, стъкло, коса, керамика, кости, пластмаси, сплави, минерали, маслодайни семена, растения, утайка от отпадъчни води, хапчета, текстил, вълна и др



бетон



дърво



пластмасови
гранулати



коса

ОСЦИЛИРАЩА ТОПКОВА МЕЛНИЦА MM 500 VARIO

ПРИНЦИП НА РАБОТА

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.



[Click to view video](#)

TECHNICAL DATA

Приложения	mechanochemistry, homogenization, size reduction, cryogenic grinding, mechanical alloying, mixing,
Област на приложение	биология, геология / металургия, инженеринг / електроника, медицина / фармация, околната среда / рециклиране, селското стопанство, строителни материали, стъкло / керамика, химия / пластмаси, храна
Материали	твърд, средно твърди, мек, крехък, еластични, влакнести
Принцип на смилане	удар, триене
Максимален размер на захранващият продукт	<= 8 мм
Големина след смилане*	~ 5 микрона
Размер на партидата / количество на пробата*	max. 6 x 20 ml
Брой на смилачните станции	6
Vibrational frequency	3 - 35 Hz (180 - 2100 min ⁻¹)
Най-често използвано време за смилане	30 с - 2 мин
Сухо смилане	да
Мокро смилане	да
Криогенно смилане	да
Разрушаване на клетки	да
Защита на затягащото устройство	да
Видове смилачни цилиндри	с резба
Материал на смилачните части	закалена стомана, неръждаема стомана, волфрамов карбид, циркониев оксид, ахат, PTFE
Обем на смилачната камера	1.5 ml / 5 ml / 10 ml / 25 ml / 35 ml / 50 ml
Настройване времето за смилане	digital, 10 s - 8 h
Общо време на смилане	99 h
Запаметяване на настройки	12
Брой програми за съхранение на цикъл	4 (с 99 повторения)
Данни за електрозахранването	100-120 V, 50/60 Hz; 200-230 V, 50/60Hz
Захранване	еднофазово
Защита	IP 30

Енергийна консумация	750 Вата
Размери затворена	690 x 375 x 585 mm
Нетно тегло	~ 60 kg
Стандарти	CE

* в зависимост от захранваният материал и настройките на инструмента*

www.retsch.com/mm500-vario

ДАННИ ПОРЪЧКА

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

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



22.041.0004 Mixing beakers of polystyrene, 56 ml, 100 pcs.



ACCESSORIES FOR GRINDING JARS MM 500 VARIO

03.018.0155 Safety element for empty grinding station

22.486.0005 Opening aid for grinding jars, 2 pcs.



02.706.0351 Adapter for use of 2/4 grinding jars 5 ml (01.462.0550)



22.085.0007		Gasket for grinding jar 1.5 ml, 10 pcs.
22.085.0008		Gasket for grinding jar 5 ml, 10 pcs. (for grinding jar 01.462.0231)
22.111.0001		Gasket for grinding jar 5 ml, 10 pcs. (for grinding jar 01.462.0550)
22.085.0009		Gasket for grinding jar 10 ml, 10 pcs.
22.085.0006		Gasket for grinding jar 25 ml hardened steel and stainless steel, 10 pcs.
22.085.0003		Gasket for grinding jar 25 ml zirconium oxide and tungsten carbide, 10 pcs.
22.085.0005		Gasket for grinding jar 35 ml stainless steel, 10 pcs.
22.085.0004		Gasket for grinding jar 35 ml zirconium oxide, 10 pcs.
22.085.0002		Gasket for grinding jar 50 ml stainless steel, 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)
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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.

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
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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)

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)



05.368.0146 7 mm Ø

05.368.0094 10 mm Ø



05.368.0096 12 mm Ø



05.368.0113 15 mm Ø



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)

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)