

pulverisette 23



Mini-Mill

- Very small sample quantities < 5 ml
- Very easy to operate
- Compact and low-priced

milling sample
ball mill preparation
for your lab

FRITSCH

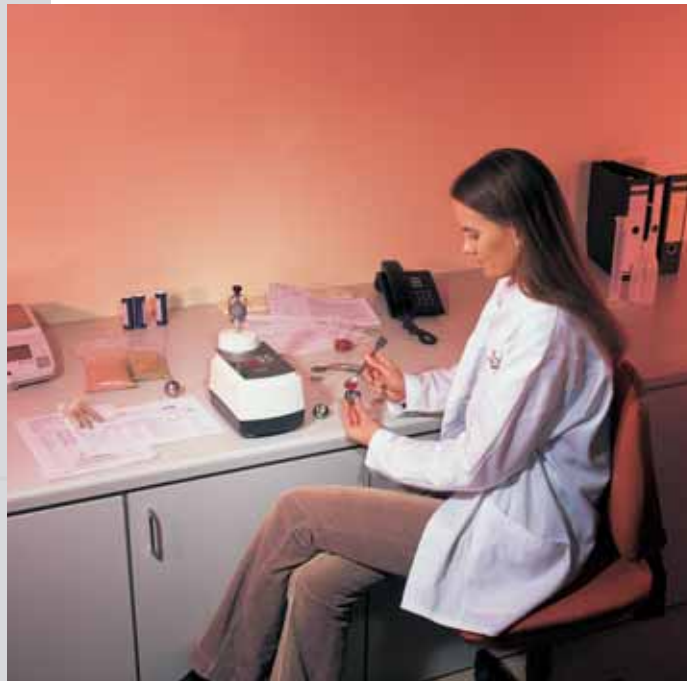
Mini-Mill

Field of application

For fine comminution of very small-quantities, dry laboratory samples or solids in suspension. For mixing and homogenisation of emulsions.
Sample quantity up to 5 ml.

Ideal for sample preparation, for example, for chemical analysis, chromatography, mass spectrometry or X-ray structural analysis. Can be used for preparing samples for genetic research, for homogenising of active ingredients, preparation of extracts in the forensic analysis and milling of pigments or other precious materials.

The pulverisette 23 is also specially suited for the assessment of biological samples and for cryo-comminution of deep freeze or refrigerated soft samples.



fine grinding **quality control**
Mini-Mill



pulverisette 23 with PCR tube container



clamping system and integrated glass keyboard

Method of operation

A large sized d.c. motor converts the rotation to a vertical oscillation using a robust crankshaft drive. The oscillation of the grinding bowl at high amplitude and high frequency generates a particle-size reduction in the grinding bowl through the impact of the grinding balls on the grinding bowl wall as well as through the friction between the grinding balls and the grinding bowl wall.

A significant increase in effectiveness is achieved in contrast to comparable grinders through adaptation of the interior spherical design of the grinding bowl to optimize the size reduction principle.

Mini-Mill

Advantages

- Very small sample quantities < 5 ml
- Very easy to operate
- Easy cleaning of the grinding elements
- Rapid, reproducible grinding
- Ease of maintenance
- Certified safety (CE mark)
- 2 year guarantee

Design Characteristics

- Small grinding bowl volume (2 sizes)
- Low contact surface area with grinding elements
- Quick fastening of the grinding bowl
- Slot-and-key clamping system
- Oscillation amplitude 9 mm
- Adjustable and reproducible grinding time
- Adjustable stress frequency
- Regulated oscillation frequency (15-50 Hz)
- Robust crankshaft drive
- Integrated glass keyboard

sample
preparation
grinding
very small quantities



tube container, grinding bowls and balls

Accessories

Grinding bowls and balls

Grinding bowls and balls are available in 5 different materials to avoid contamination of samples caused by unwanted abrasion of grinding elements.

Material	Density g/cm ³	Abrasion resistance	Material to be ground
Agate 99.9 % SiO ₂	2.65	good	soft to medium-hard samples, iron-free grinding
Zirconium oxide 94.8 % ZrO ₂	5.7	very good	fibrous, abrasive samples
Stainless steel bowls: 17-19 % Cr + 8-10 % Ni balls: 12.5-14.5 % Cr + 1 % Ni	7.8	fairly good	medium-hard, brittle samples
Tempered steel bowls: 11-12 % Cr balls: 1-1.65 % Cr	7.9	good	hard, brittle samples
PTFE	2.2	adequate	cell disruption of frozen tissue samples

Recommended number of balls per grinding bowl

Grinding bowl/ useful capacity	15 ml 0.5-5ml	10 ml 0.2-1 ml	5 ml 0.1-1 ml
Balls			
5 mm	60	30	20
10 mm	8	3	1
15 mm	2	1	

Normally grinding bowls and balls of the same material are used.

Tube Container / Grinding bowl made of PTFE

For extremely small sample quantities, primarily in the biological field, a tube container is available for up to six 0.5 ml, 1.5 ml or 2 ml PCR tubes. The samples to be tested are usually available in liquid form, can be assessed very quickly and gently in the individual tubes with 1 mm glass or steel balls.

A special 5 ml grinding bowl made of PTFE is available for other, also primarily biological applications. A 10 mm steel grinding ball is used to grind deep freeze tissue, cells, etc.. The entire bowl can be pre-cooled in liquid nitrogen. The sample is subsequently comminuted in sub-zero temperature.

pulverisette 23

Technical data

working principle	impact force
max. feed size (depending on the material)	6 mm
min. sample quantity	0.2 ml
max. sample quantity	5 ml
final fineness	10 µm
typical grinding time (e. g. for quartz sand up to < 40 µm)	2 min
grinding process	dry / wet
oscillations of the grinding bowl	900 – 3,000 oscillations/min at 9 mm amplitude
electrical details	for 100-240 V/1~, 50-60 Hz, 90 Watt
weight	net: 15 kg, gross: 17 kg
dimensions w x d x h	bench top instrument: 20 x 30 x 30 cm
packing details	carton: 37 x 25 x 34 cm

Ordering data

Order no.	Description
	Mini-Mill pulverisette 23 without grinding bowls and balls
23.1000.00	for 100-240 V/1~, 50-60 Hz
	Grinding bowls/Tube container
	Grinding bowls 15 ml volume
23.1427.00	zirconium oxide
23.1410.00	stainless steel
23.1409.00	tempered steel
	Grinding bowls 10 ml volume
23.1305.00	agate
23.1327.00	zirconium oxide
23.1310.00	stainless steel
23.1309.00	tempered steel
	Grinding bowl 5 ml volume
23.1600.00	PTFE
	Tube container
23.1700.00	for 6 PCR tubes à. 0.5 ml, 1.5 ml or 2 ml volume
	Grinding balls
	Grinding balls 15 mm dia. for grinding bowl 15 ml, 10 ml
55.0150.05	agate, polished
55.0150.27	zirconium oxide
55.0150.10	stainless steel
55.0150.09	tempered steel
	Grinding balls 10 mm dia. for grinding bowl 15 ml, 10 ml, 5 ml
55.0100.05	agate, polished
55.0100.27	zirconium oxide
55.0100.10	stainless steel
55.0100.09	tempered steel
	Grinding balls 5 mm dia. for grinding bowl 15 ml, 10 ml, 5 ml
55.0050.05	agate, polished
55.0050.27	zirconium oxide
55.0050.10	stainless steel
55.0050.09	tempered steel

