

RETSCH Product Navigator

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Size reduction with mortar grinders and disc mills



Grinding, mixing, and trituration

RETSCH mortar grinders comminute by pressure and friction. The combination of these two stress mechanisms allows for the processing of soft as well as hard-brittle and pasty materials with excellent results.

Quick, reproducible ultra-fine grinding

The RETSCH vibratory disc mill comminutes medium-hard, hard, brittle and fibrous materials particularly quickly.

Comminution of even the hardest substances

The RETSCH disc mill is used for batchwise or continuous primary reduction and fine comminution of medium-hard to hard-brittle substances.

Retsch[®]

Solutions in Milling & Sieving

Superiority in detail – Technology from RETSCH

RETSCH mortar grinders and disc mills are used primarily for fine and very fine comminution of soft, hard and brittle materials. A final fineness of approx. 100 µm can be achieved with disc mills and <10 µm with mortar grinders. A maximum feed size of up to 20 mm is possible depending on the instrument used. If the grain size of the sample is greater than this, it must first be pulverized.

For coarse and primary size reduction RETSCH jaw crushers have proven themselves to be highly efficient:

Jaw crushers



RETSCH jaw crushers are available in 4 different sizes. Depending on the model, they can comminute hard, brittle or tough material to a final size of 0.5 - 5 mm.

In order to ensure reproducible, accurate results before the subsequent fine comminution with RETSCH mortar or disc mills a representative partial sample should be taken first.

Sample dividers



No matter whether sample divider, rotary tube sample divider or sample splitter, with RETSCH sample dividers you can obtain representative partial samples from pourable powders and bulk goods.

Mortar grinders from RETSCH

More than 80 years ago F. Kurt Retsch took out his first patent for a grinding instrument: a mortar grinder that became well-known throughout the world as the "Retsch Mill".



Until 1923 heavy hand-operated mortars had to be used everywhere in laboratories, in science and research, by pharmacists, in chemical testing laboratories and wherever material had to be reduced in size. It frequently took hours of tiresome grinding until the material had achieved the necessary degree of fineness. However, when he invented the first mechanical mortar grinder, F. Kurt Retsch put an end to all this, which brought both him and his company worldwide respect in the fields of science and research.

Since then the "Retsch Mill" has been substantially enhanced and perfected. For instance, the latest RETSCH mortar grinder, the RM 200, sets new standards regarding performance, operator convenience and safety. It does not matter whether grinding, mixing or trituration is carried out wet or dry, whether the sample is hard, soft, brittle or pasty – the RM 200 meets the latest requirements for modern laboratory mills within the framework of GLP and CE.

Suitable for difficult materials

RETSCH mortar grinders can be found in a wide range of industries and institutes. Their working principle is successfully applied in R&D, materials testing and especially in pharmaceuticals and homeopathy.

Samples that are difficult to comminute can be successfully processed in mortar grinders by heating or cooling them, or by using grinding aids. Sticky materials containing oils and fats, that often tend to cake in ball mills, for example, can frequently be processed in mortar grinders without any problems.

Mortar grinders for a wide range of applications

New and interesting applications are continually turning up for RETSCH mortar grinders. As an example, they are used successfully for **the disruption of yeast cells** using a pestle and mortar made of chrome or stainless steel and liquid nitrogen as a grinding aid.

Mortar and pestle made of chrome steel or stainless steel are deep frozen with liquid nitrogen.



Vibratory Disc Mill RS 200



Ideal for XRF sample preparation

The RETSCH Vibratory Disc Mill RS 200 is perfectly suitable for sample preparation for X-ray fluorescence analysis. The chief requirement of this analytical method is that the sample powder has the highest possible degree of homogeneity and fineness – requirements which are completely fulfilled by materials which were processed in the RS 200.

View into the grinding chamber of the RS 200 (the grinding set is secured by a quick-action clamping device)

Size reduction to analytical fineness with the new RS 200 is a matter of seconds.

The new Stabilized-Plane-Drive ensures a high degree of reproducibility, a point whose importance is often underrated in XRF. As XRF is a comparative analytical method, all the unknown samples to be measured against a calibration curve should have the same particle size distribution as the standards used for the calibration.

Disc Mill DM 200

Progressive size reduction

The progressively arranged teeth of the grinding discs in the central area pre-crush the sample before it is finely ground in the outer region. **This special grinding disc shape allows even very hard samples to be comminuted efficiently.**

Constantly good results

This robust mill is primarily used under rough working conditions in laboratories and pilot plants. With its high throughput of up to 150 kg/h, it is also suitable for small-scale production lines. The main fields of application of the DM 200 are:

- construction materials
- mining and metallurgy
- ceramics and glass
- mineralogy and materials



View into the grinding chamber of the DM 200 (grinding discs with progressive arrangement of the toothing)

Mortar grinders RM 200 and KM 100



Grinding, mixing, triturating

RETSCH mortar grinders comminute inorganic and organic substances to analytical fineness. They can mix and homogenize powders, suspensions and pastes. The grinders are also ideal for the uniform trituration of homeopathic and pharmaceutical products.

Soft, hard, brittle and pasty materials with a hardness of up to 9 on Mohs scale can be processed easily in RETSCH mortar grinders.

For example, materials such as

- ashes
- cement clinker
- chemicals
- drugs
- foodstuffs
- frozen yeast cells
- oil seeds
- salts
- pharmaceutical and homeopathic raw materials and finished products
- silicates
- slag
- soil samples
- spices

and many more can be homogenized rapidly and reliably.

RETSCH mortar grinders for universal use.

They are suitable for the proper and reproducible sample preparation for subsequent analysis within the framework of quality assurance and GLP as well as for the preparation of prescriptions and formulations.

Benefits at a glance

- Wet and dry grinding
- Reproducible results by adjustment of the pestle pressure (via a scale) and digital time setting
- 7 different grinding set materials
- Performance display
- Easy exchange of pestle and mortar without tools
- Closed, dust-tight grinding chamber with windows
- High-performance drive with electronic control
- Very easy to clean
- Safe, CE-conforming design
- 2 year warranty

Mortar Grinder RM 200

The RM 200 is a dust-tight closed comminution system that can be used for dry and wet grinding. With a useful volume of 10 to 190 ml it is possible to achieve a final fineness of <math><10 \mu\text{m}</math>. The maximum feed size of the product depends on the properties of the material and is approx. 8 mm. The choice of a grinding set out of 7 different materials allows **neutral-to-analysis sample preparation**.

The sample or grinding additives such as liquids can be added during operation via the right-hand Plexiglas window in the grinding compartment cover. The grinding process can be observed through the large windows.

The grinding time is set digitally between 0 and 99 minutes, continuous operation is also possible. In addition to the grinding time, the contact

pressure of the pestle as well as its position in the mortar also has a considerable influence on the grinding results. The contact pressure can easily be set via a knob on the cover of the RM 200. The positions of the pestle and the scraper are also adjusted with the help of a knob.

The RM 200 features a performance display which indicates the current workload of the mill. This helps to adjust the pestle pressure to the most suitable position.

The grinding chamber cover has a safety switch that cuts off the motor when the cover is raised. An electronic load and speed control protects the motor against overloading.

The new generation of mortar grinders is particularly powerful, safe and easy to operate.



Mortar Grinder KM 100

The Mortar Grinder KM 100 is used for loss-free dry and wet grinding of larger **batches up to 300 ml**.

Depending on the degree of hardness, material with a particle size of up to 10 mm can be processed. A grind size of $<20 \mu\text{m}$ can be achieved. The grinding sets are available in 5 different materials.

The sample is added through one of the two large Plexiglas windows. Just like the RM 200, the KM 100 is also dustproof.

A motor protection switch protects against overloading. When the grinding chamber cover is raised a safety switch automatically switches off the motor.

Benefits at a glance

- Reproducible dry and wet grinding
- High final fineness
- High degree of homogenization
- Closed grinding chamber with windows
- Grinding sets made of 5 different materials
- Timer 0 - 60 min and continuous
- Easy to clean
- Robust, low-maintenance, CE-conforming design
- 2 year warranty

Performance data	RM 200	KM 100
Field of application	grinding, mixing and triturating	
Feed material	soft, hard, brittle, pasty, dry and wet	
Feed size*	$<8 \text{ mm}$	$<10 \text{ mm}$
Final fineness*	$<10 \mu\text{m}$	$<20 \mu\text{m}$
Batch size/Feeding quantity	10 - 190 ml	50 - 300 ml
Setting grinding time	0 - 99 min / continuous	0 - 60 min / continuous
Setting pestle pressure	yes, via scale	yes
Setting scraper pressure	yes, via knob	yes
Technical data		
Nominal motor performance	130 W	370 W
Speed at 50 Hz	100 min^{-1}	115 min^{-1}
Speed at 60 Hz	100 min^{-1}	138 min^{-1}
Protection code	IP 53	IP 00
B x H x D	approx. 400 x 480 x 370 mm	approx. 400 x 700 x 580 mm
Weight, net (without grinding set)	approx. 24 kg	approx. 98 kg
Noise values (Noise measurement according to DIN 45635-31-01-KL3)		
Emission value with regard to workplace	$L_{pAeq} 71 \text{ dB(A)}$	$L_{pAeq} 75 \text{ dB(A)}$
Measuring conditions:		
Feed material	quartz sand	quartz sand
Feed size	$<1 \text{ mm}$	$<1 \text{ mm}$

*depending on feed material and instrument configuration/settings

Mortar Grinder RM 200 and KM 100 technology

Mortar grinders comminute, mix and triturate by pressure and friction. The function of the scraper is to feed the material into the area between the mortar and pestle. This forced feed ensures that the whole of the sample is continuously subjected to the grinding and trituration process and is also intensively mixed. The pestle is

not located in the center of the mortar but is offset; contact with the rotating mortar and the sample causes it to rotate automatically. The necessary grinding pressure is achieved by the weight of the pestle itself combined with the adjustable spring pressure acting on its axis.



Selection of grinding sets



Mortar and pestle made of 7 different materials

The choice of the suitable grinding set material depends primarily on the hardness of the sample and the possible effects of any abrasion on the subsequent analysis or further processing. For example, the DAB (Deutsches Arzneimittel Buch – German Pharmacopoeia) stipulates the use of hard porcelain grinding sets for the preparation of pharmaceutical and homeopathic products.

For soft to medium-hard or pasty substances grinding sets made from hard porcelain or sintered aluminum oxide (Al_2O_3) are usually adequate.

For processing **hard, abrasive substances, for long-term and for heavy-metal-free processing**, we

recommend the use of grinding sets made from agate, zirconium oxide or tungsten carbide.

For less demanding applications, also **under rough conditions**, grinding sets made from chrome steel or stainless steel should be used.

The standard scraper is made from abrasion-resistant Vulkollan. A special version made from beech wood is available as an option for use in the pharmaceutical sector. A PTFE scraper is particularly suitable for cryogenic grinding.

The mortar of the RM 200 has a maximum useful volume of 190 ml; that of the KM 100 is 300 ml.

Tips for optimum results

- Samples that are difficult to grind can be cooled or processed by using grinding aids.
- Moist soils and marine samples containing fats should be dried by treatment with Na_2SO_4 before grinding.
- For the preparation of pastes the mortar containing the sample (e.g. cocoa nips) should first be heated to approx. 40 °C in a temperature cabinet.
- The addition of Aerosil® helps to avoid caking when grinding pharmaceutical products.
- Pure quartz sand can be added as a grinding aid when processing oil seeds (rape seed, soybean, mustard, etc.).

Material composition guidelines

Grinding set	Material no. or name	RM 200	KM 100	approx. hardness	Material analysis (in %)
Chrome steel	1.2080	■	■	62-63 HRC	Fe (85.34), Cr (12), C (2.2), Mn (0.45), Si (0.4), P (0.03), S (0.03)
Stainless steel	1.4034	■	-	48-52 HRC	Fe (84.5), Cr (13), C (0.42), Mn (1), Si (1), P (0.05), S (0.03)
Tungsten carbide	WC	■	-	1180-1280 HV 30	WC (94), Co (6)
Agate	SiO_2	■	■	6.5-7.0 Mohs	SiO_2 (99.91), Al_2O_3 (0.02), Na_2O (0.02), Fe_2O_3 (0.01), K_2O (0.01), MnO (0.01), MgO (0.01), CaO (0.01)
Sintered alum. oxide	Al_2O_3	■	■	1750 HV	Al_2O_3 (99.7), SiO_2 (0.075), MgO (0.075), CaO (0.07), Na_2O (0.01), Fe_2O_3 (0.01)
Zirconium oxide*	YTZ	■	■	1200 HV	ZrO_2 (94.5), Y_2O_3 (5.2), SiO_2 / MgO / CaO / Fe_2O_3 / Na_2O / K_2O (<0.3)
Hard porcelain		■	■	1200 HV 0.5	SiO_2 (61), Al_2O_3 (34), K_2O (3), MgO (1), CaO (1)

The above percentages are mean values. We reserve the right to make alterations.

*Yttrium-part-stabilized

Mortar grinder order data

Mortar Grinder RM 200		Item No.	Item No.
Mortar Grinder RM 200 (please order mortar and pestle separately)			
RM 200	for 230 V, 50 Hz		20.455.0001
RM 200	for 110 V, 60 Hz		20.455.0003
RM 200	for 120 V, 60 Hz		20.455.0004
Mortars and pestles for RM 200		Mortar	Pestle
Material	chrome steel	02.460.0018	02.461.0112
	stainless steel	02.460.0057	02.461.0113
	tungsten carbide	02.460.0021	02.461.0114
	agate	02.460.0098	02.461.0115
	sintered aluminum oxide	02.460.0017	02.461.0116
	zirconium oxide	02.460.0086	02.461.0117
	hard porcelain	02.460.0016	02.461.0118
Accessories for RM 200			
Scraper, beech wood			03.008.0023
Scraper, PTFE (e.g. for cryogenic grinding)			03.008.0022
Spare scraper, Vulkollan			03.862.0011

Mortar Grinder KM 100		Item No.	Item No.
Mortar Grinder KM 100 (please order mortar and pestle separately)			
KM 100	for 3/N~ 400 V, 50 Hz		20.453.0001
KM 100	for 230 V, 50 Hz		20.453.0003
KM 100	for 220 V, 60 Hz		20.453.0004
Mortars and pestles for KM 100		Mortar	Pestle
Material	chrome steel	02.460.0005	02.461.0005
	agate	01.460.0059	02.461.0006
	sintered aluminum oxide	02.460.0004	02.461.0004
	zirconium oxide	02.460.0087	02.461.0098
	hard porcelain	02.460.0003	02.461.0003
Accessories for KM 100			
Scraper, beech wood			05.008.0018
Spare scraper, Vulkollan			05.862.0008

Agate hand mortars

Hand mortars made from agate are particularly suitable for grinding, mixing and triturating medium-hard to hard substances. Agate is extremely abrasion-resistant and very pure (99.9% SiO₂). This guarantees its neutrality for the subsequent analysis.

The quality of RETSCH hand mortars is particularly high. The abrasion surfaces are smooth and flawless, the outer surfaces are uniformly ground.



Hand mortar order data

Hand mortar with pestle, agate			Item No.	Hand mortar with pestle, agate			Item No.
Volume (ml)	O.D. (mm)	I.D. (mm)		Volume (ml)	O.D. (mm)	I.D. (mm)	
8	40	30	20.262.0001	50	100	85	20.262.0006
10	50	40	20.262.0002	80	110	95	20.262.0007
16	60	50	20.262.0003	130	130	110	20.262.0008
25	70	55	20.262.0004	180	150	130	20.262.0009
30	80	65	20.262.0005	300	175	145	20.262.0010

Vibratory Disc Mill RS 200



Analytical fineness in seconds

The RETSCH vibratory disc mill is particularly suitable for rapid, loss-free grinding of hard, brittle and fibrous materials to analytical fineness. **The RS 200 is primarily used for sample preparation for spectral analysis.**

The RS 200 provides grinding results with excellent reproducibility. The new Stabilized-Plane-Drive ensures that the main directional movement of the drive train is secured in a plane. This prevents the jar from gyrating or tumbling.

The powerful drive allows for the extremely rapid formation of the movement pattern of the grinding discs inside the jar which leads to analytical fineness after a very short grinding time. This efficient instrument is characterized by its great stability even with large grinding sets at high speeds.

Operation of the mill is easy and convenient. The grinding parameters are entered using a single button.

In addition to the current settings a graphics display shows service and operating information. Up to 10 parameter combinations can be stored and the user can choose between 13 languages for menu guidance.

With its robust design, the mill has proven to be very suitable for use in the building materials sector (cement), in geology, mineralogy, metallurgy and in power plants. It is particularly suitable for processing materials such as

- cement
- cement clinker
- ceramics
- coal
- coke
- concrete
- corundum
- glass
- metal oxides
- minerals
- ores
- plant material
- silicates
- slag
- soils

and many others.

Benefits at a glance

- Extremely short grinding time
- Reproducible results
- 1-button operation with graphic display
- 10 parameter combinations can be stored
- Programmable starting time
- Grinding sets in different sizes and materials
- Agate recognition for automatic speed reduction
- Quick-action grinding set clamping device
- Sealed, noise-insulated grinding chamber
- Maintenance-free, CE-conforming design
- 2 year warranty

Performance data	RS 200
Field of application	size reduction, mixing, trituration
Feed material	medium-hard, hard, brittle, fibrous
Feed size*	<15 mm
Final fineness*	<40 µm
Batch size/Feeding quantity	35 - 150 ml
Speed settings	700 min ⁻¹ to 1500 min ⁻¹ , continuously adjustable
Digital grinding time setting (hours:minutes:seconds)	00:00:01 bis 99:59:59
Technical data	
Drive	frequency controlled 3-phase motor
Nominal motor performance	1.5 kW
Protection code	IP 40
B x H x D	836 x 1220 x 780 mm
B x H x D (with open cover)	836 x 1900 x 780 mm
Weight (without grinding set)	approx. 210 kg
Noise values (Noise measurement according to DIN 45635-31-01-KL3)	
Emission value with regard to workplace	L _{peq} 79 dB(A)
Measuring conditions:	
Grinding set	100 ml tungsten carbide
Feed material	broken glass, grain size <10 mm
Speed	1400 min ⁻¹
*depending on feed material and instrument configuration/settings	



Exceptionally simple and safe handling

A grinding set for the vibratory disc mill consists of a grinding dish with cover and a grinding disc. The 100 ml and 250 ml grinding sets contain an additional grinding ring.

These grinding sets feature the following advantages:

- safe, non-slip attachment with integral safety devices on cover and base
- user-friendly gripping on cover and base
- gap between dish and cover edge for easy opening

- optimal sealing with O-ring
- protective jacket made from stainless steel (for agate, zirconium oxide and tungsten carbide dishes)
- grinding set identification (article number, material and volume)
- marking field (e.g. for information about sample)

The grinding sets have been developed especially for extreme test conditions such as high sample throughput and high mechanical stress. Ordering information is given on page 12.

Sample preparation for XRF analysis

RETSCH offers the **Pellet Press PP 40** as a useful completion to sample preparation in the RS 200. The press features individual pressure force regulation from 10 to 400 kN. It not only controls the pressure force but also the pressure built-up and release during the pressing process. This reduces the internal stress on the sample and ensures that even difficult materials are pressed perfectly. The PP 40 is available with 4 different pressing tools.

Please refer to the brochure „Assisting“ for more details.



Material composition guidelines

Grinding set	Material no. or name	RS 200	approx. hardness	Material analysis (in %)
Chrome steel	1.2080	■	62-63 HRC	Fe (85.34), Cr (12), C (2.2), Mn (0.45), Si (0.4), P (0.03), S (0.03)
Tungsten carbide	WC	■	1180-1280 HV 30	WC (94), Co (6)
Agate	SiO ₂	■	6.5-7.0 Mohs	SiO ₂ (99.91), Al ₂ O ₃ (0.02), CaO (0.01), Fe ₂ O ₃ (0.01), K ₂ O (0.01), Na ₂ O (0.02), MgO (0.01), MnO (0.01)
Zirconium oxide*	YTZ	■	1250 HV 0.5	ZrO ₂ (94.5), Y ₂ O ₃ (5.2), SiO ₂ / MgO / CaO / Fe ₂ O ₃ / Na ₂ O / K ₂ O (<0.3)
For heavy-metal-free grinding				
Steel	1.1740	■	60-63 HRC	Fe (98.008), C (0.65), Mn (0.8), Si (0.4), P (0.035), S (0.035)

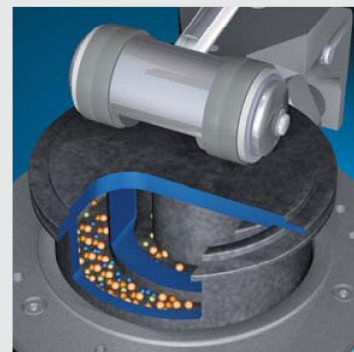
The above percentages are mean values. We reserve the right to make alterations.

*Yttrium-part-stabilized

RS 200 technology

The vibratory disc mill comminutes by pressure, impact and friction. The grinding set is firmly attached to the vibration plate with a quick-action lever. The plate with the grinding set is subjected to circular horizontal vibrations. The centrifugal force acting on the grinding rings in the dish results in extreme pressure, impact and frictional forces acting on the sample, producing analytical fineness in 1-3 minutes.

The circular vibrations are produced by a frequency controlled 1.5 kW 3-phase motor. A sensor recognizes the presence of agate grinding sets and automatically limits the speed to 700 min⁻¹ to avoid damaging the agate. The cover of the noise-insulated grinding chamber has a safety interlock and can only be opened when the mill is at a standstill.



Disc Mill DM 200



Grinding even the hardest products

The RETSCH Disc Mill DM 200 is used for batchwise or continuous preliminary and fine size reduction of medium-hard to hard-brittle solids (up to 8 Mohs). The disc mill can grind such sample materials to an average final fineness of approx. 100 µm in one go. Thanks to its robust design, it can be used under rough conditions in laboratories and pilot plants, as well as online for the quality control of raw materials.

The DM 200 is particularly suitable for the following materials:

- ores, coal, coke, slag
- dental ceramics, steatite, sintered ceramics, electrotechnical porcelain, chamotte
- bauxite, quartz, clinker, granite, concrete
- frits, glasses
- dried soil samples, drilling cores, construction waste

A particular advantage is the **large sample feed size**, with an edge length of up to 20 mm. The achievable final fineness of up to 100 µm

depends on the set grinding disc gap width and the fracturing properties of the particular sample. In order to achieve such a final fineness the powerful DM 200 usually requires only a few minutes. Thanks to the **exact gap width setting via a scale** (accurate to 0.1 mm) the grinding results are reproducible.

The RETSCH Disc Mill DM 200 is very simple to operate. When the grinding process is finished the hinged grinding chamber housing is simply opened for cleaning.

Benefits at a glance

- Accurate gap setting for reproducible grinding results
- Short grinding times, high final fineness
- Contamination-free grinding with grinding discs made from 4 different materials
- Grinding discs with long working life
- Easy cleaning
- Dust-free grinding thanks to connector for dust extraction
- Maintenance-free 3-phase geared motor
- Approved safety (TÜV, CE)
- 2 year warranty

Performance data	DM 200
Application	preliminary and fine comminution
Feed material	medium-hard, hard, brittle
Feed size*	<20 mm
Final fineness*	up to 100 µm
Hopper volume/Throughput*	2.5 l / up to 150 kg/h
Gap width setting	continuous, 0.1 - 5 mm
Grinding disc speed at 50 Hz	440 min ⁻¹
Grinding disc speed at 60 Hz	528 min ⁻¹
Technical data	
Drive	3-phase geared motor
Nominal motor performance	1500 W
B x H x D	440 x 400 x 870 mm
Weight	approx. 140 kg
Noise values (Noise measurement according to DIN 45635-31-01-KL3)	
Emission value with regard to workplace	L _{pAeq} 69.4 dB(A)
*depending on feed material and instrument configuration/settings	

Grinding discs

A set of grinding discs for the DM 200 consists of a fixed and a rotating grinding disc. The material should be selected so that contamination of the sample and unwanted abrasion are avoided. 4 different materials are available.

For standard size reduction,

e.g. minerals with Mohs hardness 3 - 6

- grinding disc set made from hardened steel or manganese steel

For extreme size reduction,

e.g. minerals with Mohs hardness >6

- grinding disc set made from tungsten carbide (WC)

For heavy-metal-free size reduction,

e.g. dental ceramics

- grinding disc set made from zirconium oxide



After a long period of use the grinding discs will show signs of mechanical wear. However, before they need to be replaced by new ones, the opposite side of the teeth can also be used by changing the direction of rotation of the motor. This considerably extends the working life of the grinding discs.

Material composition guidelines

Grinding set	Material no. or name	DM 200	approx. hardness	Material analysis (in %)
Hardened steel	1.2601	■	60-62 HRC	Fe (83.59), Cr (12), C (1.75), Mo (0.7), W (0.6), V (0.5), Si (0.4), Mn (0.4), P (0.03), S (0.03)
Manganese steel	1.3401	■	**	Fe (ca. 83.6 - 85), C (1.1-1.3), Si (0.3-0.5), Mn (12-13), P (0.1), S (0.04), Cr (1.5)
Tungsten carbide	WC	■	1180-1280 HV 30	WC (90.3), Co (9.5), TaC (0.2)
Zirconium oxide		■	1200 HV	ZrO ₂ (94.8), HfO ₂ (1.5), SiO ₂ (<0.1), Al ₂ O ₃ (<0.1), Fe ₂ O ₃ (<0.05), CaO (<0.05), MgO (<3.1-3.3), Na ₂ O (<0.03), others (<0.1)

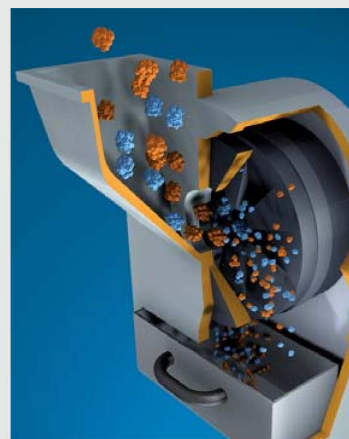
The above percentages are mean values. We reserve the right to make alterations.

** no information about hardness available

DM 200 technology

The feed material enters the dust-proof chamber from the filling hopper and is fed centrally between two vertical grinding discs. A moving grinding disc rotates against a fixed one and draws in the feed material. The necessary size reduction effects are generated by pressure and frictional forces. The progressively arranged teeth of the grinding disc first subject the sample to preliminary crushing; centrifugal force then moves it to the outer regions of the

grinding discs where fine grinding takes place. The processed sample exits through the grinding gap and is collected in a receiver. The gap width between the grinding discs is continuously adjustable during operation in the range between 0.1 and 5 mm; an additional observation window is provided for checking the gap setting.



Vibratory disc mill order data

Vibratory Disc Mill RS 200			Item No.	Item No.
Vibratory Disc Mill RS 200 (please order grinding set separately)				
RS 200 for 220-230 V, 50/60 Hz				20.725.0001
Grinding set for RS 200	Material	Nominal volume	Grinding set	Spare Viton O-rings
50 ml nominal volume (sample amount: max. 50 ml, recommended <35 ml, max feed size: <5 mm)				
	Chrome steel	50 ml	01.462.0170	05.114.0075
	Tungsten carbide	50 ml	01.462.0177	05.114.0068
	Agate (only for 700 min ⁻¹)	50 ml	01.462.0178	05.114.0069
	Zirconium oxide	50 ml	01.462.0193	05.114.0069
100 ml nominal volume (sample amount: max. 100 ml, recommended <75 ml, max feed size: <10 mm)				
	Chrome steel	100 ml	01.462.0171	05.114.0067
	Tungsten carbide	100 ml	01.462.0265	05.114.0070
	Agate (only for 700 min ⁻¹)	100 ml	01.462.0179	05.114.0070
	Zirconium oxide	100 ml	01.462.0192	05.114.0067
250 ml nominal volume (sample amount: max. 250 ml, recommended <150 ml, max feed size: <15 mm)				
	Chrome steel	250 ml	01.462.0263	05.114.0076
	Tungsten carbide	250 ml	01.462.0264	05.114.0067
	For heavy-metal-free grinding	Nominal volume	Grinding set	Spare Viton O-rings
	Steel 1.1740	250 ml	01.462.0266	05.114.0076

Disc mill order data

Disc Mill DM 200		Item No.
Disc Mill DM 200 (please order set of grinding discs separately)		
DM 200 for 3/N~ 400 V, 50/60 Hz		20.740.0001
DM 200 for 3 x 220-230 V, 50 Hz		20.740.0002
Grinding disc set DM 200		
Material	Hardened steel	22.456.0001
	Manganese steel	22.456.0002
	Tungsten carbide	22.456.0003
	Zirconium oxide	22.456.0004
Accessories		
Connector for dust extraction		22.481.0025
Frame for combination Disc Mill DM 200/Jaw Crusher BB 200 upon request		

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