FRITSCH

Planetary Mills · premium line

IDEAL FOR

GEOLOGY AND MINERALOGY
METALLURGY
CERAMICS
MATERIAL RESEARCH/
MECHANICAL ALLOYING
NANOTECHNOLOGY
PHARMACEUTICALS
CHEMISTRY
BIOLOGY
SAMPLE PREPARATION FOR ANALYSIS

premium line

PLANETARY MILLS

QUALITY
MADE IN GERMANY

FRITSCH is more than just a brand: It is backed by a strong, medium-sized, family business in its fourth generation, which has been firmly embedded in the region since 1920 and globally active for decades. All FRITSCH-products are produced according to strict quality criteria, and our entire production is in-house. The innovative ideas of our development department are inspired by the close relationship with our customers and their practical work in the lab. Satisfied customers worldwide count on our quality, our experience and our service. This makes us proud and motivates us.

FRITSCH. ONE STEP AHEAD.

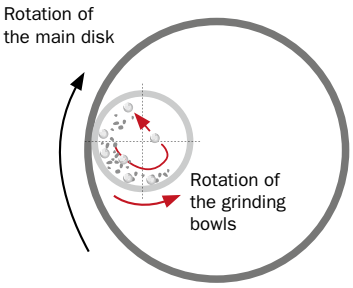
FRITSCH Planetary Mills *premium line* – faster, simpler, safer

FRITSCH Planetary Mills *premium line* are extremely strong all-purpose mills that offer *premium* performance, usability and safety. Due to revolutionary rotational speeds of up to 1100 rpm, ultra-fine results are achieved by powerful wet and dry comminution of hard, medium-hard, soft, brittle and moist samples by the high-energy impact of grinding balls in rotating grinding bowls. Your advantage: extremely short grinding times and reliably reproducible results down into the nano range. FRITSCH Planetary Mills *premium line* are also a perfect choice for highly efficient mixing and homogenising or for mechanical activation and alloying in materials research. Convince yourself!

The FRITSCH *premium line* principle

Making the best even better: According to this principle we develop and produce the high-tech laboratory mills of the FRITSCH *premium line*. Additional power gives them an edge over comparable instruments. And even more practice-oriented equipment elements make working with them even easier, more comfortable, faster and safer. Inspired by ideas, which make your work easier – for *premium* results with absolute reliability.

FRITSCH *premium line* – the high-tech standard for the modern laboratory.



Planetary Mills: The comminution of the sample material takes place primarily through the high-energy impact of grinding balls. To achieve this, the grinding bowls, containing the material to be ground and grinding balls, rotate around their own axis on a main disk rotating in the opposite direction. The overlapping of the centrifugal forces cause the sample material and grinding balls to bounce off the inner wall of the grinding bowl. The grinding balls cross the bowl diagonally at an extremely high speed and grind the sample material on the opposite wall of the bowl. The grinding bowls reach twice the speed of the main disk during this process.

	Planetary Mill **PULVERISETTE 5** *premium line*	Planetary Micro Mill **PULVERISETTE 7** *premium line*
	Ideal for large quantities	**Ideal for small quantities**
Max. feed size (depending on the material)	10 mm	5 mm
Sample quantity	40–450 ml	2–70 ml
Final fineness (depending on the material)	< 0.1 µm	< 0.1 µm
Typical grinding time down to analytical fineness	3 min	3 min
Grinding process	Dry/wet	Dry/wet
Rotational speed of main disk	100–800 rpm	100–1100 rpm
Centrifugal acceleration	64 g	95 g

Our suggestion: At www.fritsch-international.com/solution specific application examples can be found. Or take a look in our practical grinding report database, which contains detailed information, at www.fritsch-international.com/grinding-reports.

PULVERISETTE 5
premium line

High-performance grinding down into the nano range

- **Extra strong 2.2 kW drive power and extremely high centrifugal acceleration up to 64 g and up to 800 rpm* (rotational speed of the bowl 1600 rpm)**
- **Motor-driven ServoLOCK clamping of the grinding bowls**
- **Safe and user-independent reproducible clamping**
- **2 grinding stations for grinding bowls 125 – 500 ml volume**
- **Intuitive touchscreen operation with colour display**

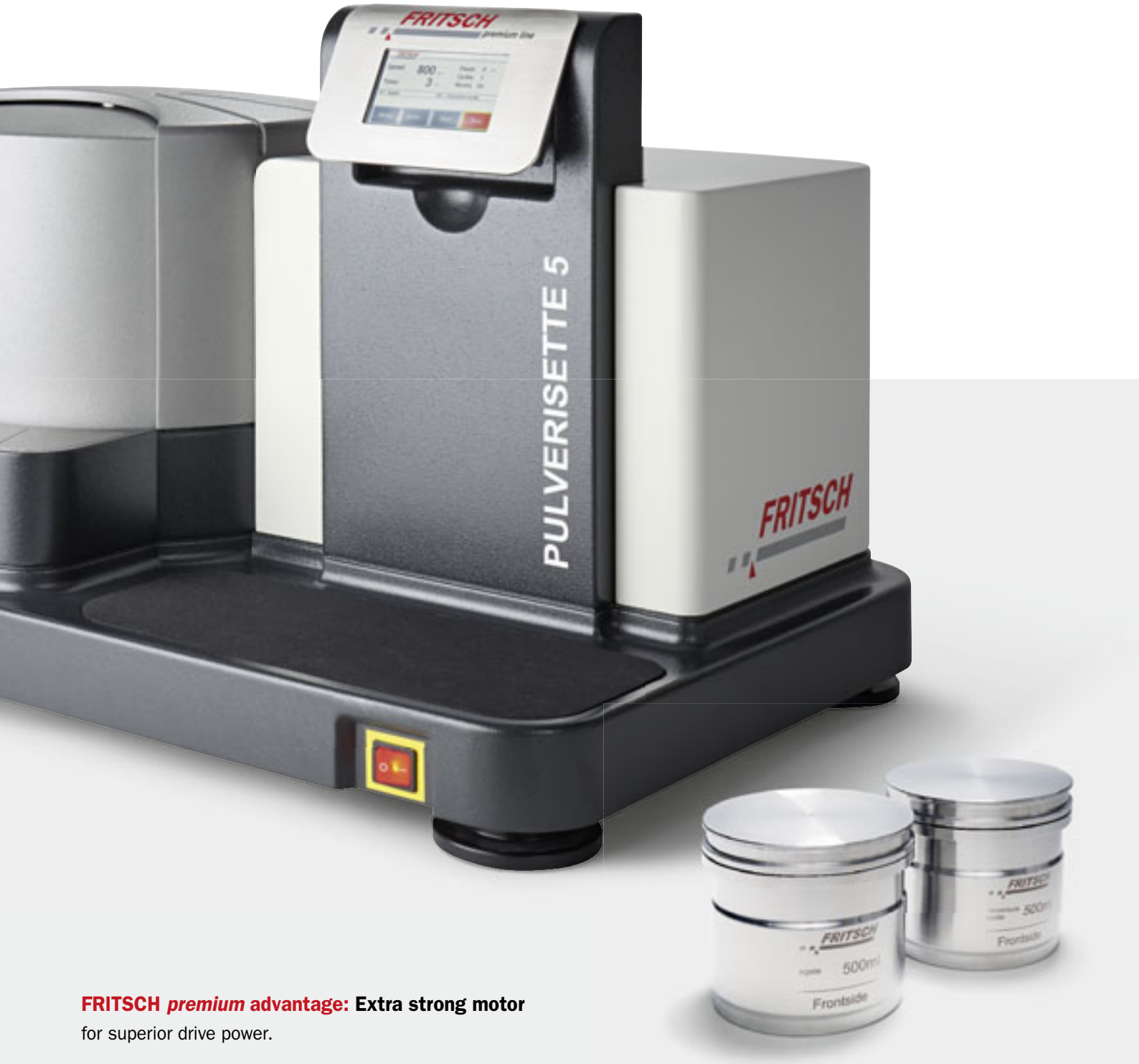
With two grinding stations, we have developed the FRITSCH Planetary Mill PULVERISETTE 5 *premium line* as the 'big sister' to the PULVERISETTE 7 *premium line*: Your ideal mill for fast wet and dry grinding, mechanical alloying, mixing and homogenising of larger sample quantities with reliable results down into the nano range – and an absolutely secure automatic clamping of bowls.

FRITSCH *premium* advantage: Maximum operational safety

In the completely newly developed bearing of the grinding bowl holder, the grinding bowls of the PULVERISETTE 5 *premium line* are housed in a completely enclosed frame. It is automatically locked by the machine via ServoLOCK instead of manually. Your advantage: extremely safe and easy operation with reproducible, user-independent clamping at any time.

* The maximum rotational speed reached depends on the machine load.

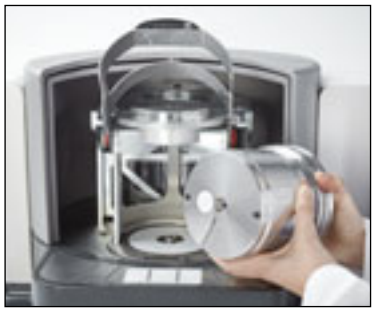
FRITSCH *premium* advantage: Intuitive user navigation
Fast and easy operation due to a high-resolution touchscreen, logical menu structure in multiple languages and practical plain-text user navigation.



FRITSCH *premium* advantage: Extra strong motor
for superior drive power.

More safety due to ServoLOCK

Grinding has never been safer: With the completely brand new ServoLOCK clamping of the grinding bowls and the automatic check of the fastening of the bowls inside the mill, man and machine are optimally protected. In the event of impermissible operating states, the machine blocks the start of a grinding – and if an imbalance occurs it automatically shuts off. It doesn't get any safer than this.



FRITSCH *premium* advantage: Safely guided insertion

The grinding bowl is simply inserted in the PULVERISETTE 5 *premium line* from the front into the holder. Correct positioning is automatically ensured by a practical guide.

FRITSCH *premium* advantage: Motor-driven grinding bowl clamping

The revolutionary ServoLOCK is activated with a single hand motion by pressing down the clamp. The actual clamping is motor-driven by the mill. Your advantage: each grinding with always same conditions without screwing or other manual fastening.

FRITSCH *premium* advantage: Safe opening in the event of overpressure

Any overpressure is released by the specially designed Servo-LOCK in the PULVERISETTE 5 *premium line*. In this way, the grinding bowl can always be easily and safely opened.

FRITSCH *premium* advantage: Reliable bowl detection via RFID chip

The PULVERISETTE 5 *premium line* does not start until both bowls are correctly inserted and prevents the setting of too high speeds depending on the bowl material used*. Your advantage: guaranteed constant, reliable results – incorrect operation impossible.

* At www.fritsch.de, you find the maximum speed limits for different grinding ball diameters and grinding bowls made of agate.

ONLY AVAILABLE FROM FRITSCH

Turn your Planetary Mill into an analytical measuring system with the EASY GTM system.

Adjustable touchscreen

The PULVERISETTE 5 *premium line* is operated via the ergonomically arranged touchscreen that can be easily adjusted with just a single hand motion. Here you enter the variable rotational speed and define the grinding time. You can programme interval and pause times using the minutes and seconds timer and can save up to 10 programmes.

Easy recording

due to perfect integration into the IT structure of your laboratory and the MillControl software. All data can be easily exported via USB.

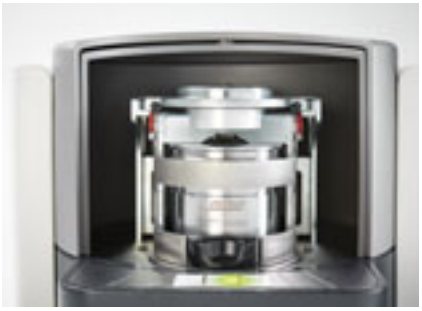
Insert – start – done!

FRITSCH *premium* advantage: Easy insertion

The grinding bowl is inserted in the PULVERISETTE 5 *premium line* from the front into the holder. To insert the second bowl, the second grinding station moves forward at the press of a button.

FRITSCH *premium* advantage: ServoLOCK

Once the grinding bowl is inserted, the clamp is closed with a single hand motion. Motor-driven by the mill, the grinding bowls are clamped in. In this way, clamping is always identical, regardless of who operates the device. A clear advantage that ensures reproducibility.



FRITSCH *premium* advantage: Clamping release

The LED light shows that the bowl is correctly inserted and clamped. Now the second bowl can be inserted and clamped.

FRITSCH *premium* advantage: Automatic closing

Once both grinding bowls are correctly inserted and clamped, you choose the “Close” command on the touchscreen and the grinding chamber will close automatically. Simply enter the grinding parameters and start the grinding process.

FRITSCH-COMPETENCE

A total of 5 patents have been granted for the FRITSCH Planetary Mill PULVERISETTE 5 *premium line* by the German Patent Office.

TECHNICAL DATA

Electrical details
200-240 V/1~, 50-60 Hz, 2800 watt
200-240 V/1-2~, 50-60 Hz, 2800 watt

Weight
Net 110 kg
Gross 140 kg

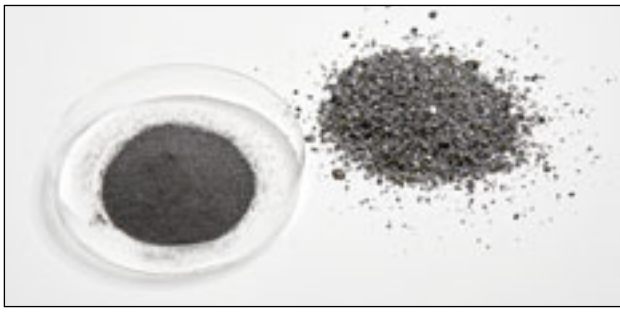
Dimensions w x d x h
Bench top instrument 82 x 52 x 48 cm

Packaging w x d x h
Case 100 x 72 x 83 cm

Emission sound pressure level at the workplace according to DIN EN ISO 3746
L_{pAd} = 84 dB
(depending on the material to be ground, grinding bowls/balls used, selected rotational speed)

Order no.	200-240 V/1~	200-240 V/1-2~
	05.7020.00	05.7030.00

Optimal preparation of a soil sample using the Planetary Mill PULVERISETTE 5 *premium line*



Ferrovanadium before and after grinding with the Planetary Mill PULVERISETTE 5 *premium line*

APPLICATION EXAMPLES

Geology/Mineralogy	Rocks, gravel, sand, minerals
Metallurgy	Ores, slags
Ceramics	Porcelain, sintered ceramics, clay, fireclay
Material research/ Mechanical alloying	Pigments, precious materials, new materials, alloys, mechanical alloying and activation
Nanotechnology	Graphite, titanium dioxide, silicon dioxide, aluminium oxide, diazepines
Pharmaceuticals	Ophthalmological agents, gels, creams, extracts, drugs, pastes, dragées, tablets
Chemistry	Pesticides, fertilisers, salts, inorganic and organic materials
Biology	Plants, leaves, freeze-dried samples
Sample preparation for analysis	Spectroscopy, x-ray fluorescence, x-ray structure analysis, chromatography

IQ/OQ documentation available to support equipment qualification.

FACTS AND ADVANTAGES

- Absolutely safe operation – motor-driven, user-independent reproducible clamping
- 2 grinding stations for grinding bowls 125, 150, 250, 420 and 500 ml volume
- Min. sample quantity 40 ml, max. sample quantity 450 ml
- Simultaneous processing of up to 4 samples
- Grinding ball diameters 0.1–40 mm
- Easy-to-clean grinding elements
- Rotational speed of main disk 100–800 rpm, relative rotational speed of grinding bowls up to 1600 rpm
- Transmission ratio planetary disk / grinding bowl $i_{relative}$ = 1 : -2
- Effective diameter of main disk 180 mm
- Centrifugal acceleration (g = 9.81 m/s²) 64 g
- Up to 10 programmes can be saved, software MillControl (optional), USB interface for transmission of process parameters
- 2-year guarantee

PULVERISETTE 7
premium line

Nano grinding for small quantities

- **Extra strong centrifugal acceleration with up to 95 g and up to 1100 rpm**
- **Extremely fast bowl changing due to SelfLOCK clamping**
- **2 grinding stations for grinding bowls 20 ml, 45 ml and 80 ml volume**
- **For the first time grinding bowls and lid form a single unit**
- **Intuitive touchscreen operation**

Due to sunken grinding bowls, the high-performance Planetary Micro Mill PULVERISETTE 7 *premium line* reaches unprecedented relative rotational speeds of the grinding bowls of up to 2200 rpm and centrifugal accelerations of 95 times the force of gravity. Thereby is the application of energy approximately 150 % above that of conventional Planetary Mills. For ultra-fine grinding results down into the nano range in shorter times.

FRITSCH *premium* advantage: Fast, easy and safe operation due to extremely fast bowl changing without complex bowl clamping. In the case of impermissible operating states, the mill blocks the start and automatically shuts off if imbalance occurs. Maximum safety for man and machine.

FRITSCH *premium* advantage: Adjustable touchscreen
with logical menu structure in 10 languages for easy, intuitive user navigation. Adjustable with a single hand motion for easy adaption to any set-up situation. Here you enter the variable rotational speed and define the grinding time. You can programme interval and pause times using the minutes and seconds timer and can save up to 10 programmes.

Easy recording
due to perfect integration into the IT structure of your laboratory and the MillControl software. All data can be easily exported via USB.

The patent: SelfLOCK

For maximum safety at maximum rotational speeds: For the first time, the bowl and lid form a single unit – and snap securely into place in the machine due to the revolutionary SelfLOCK clamping. Without additional clamping and without the risk of incorrect operation.

FRITSCH *premium* advantage: Bowl and lid as a secure unit

By using two side snaps, we combine the lid and bowl into a secure unit which is just as easy re-opened. Simple, fast and absolutely safe.

FRITSCH *premium* advantage: Intelligent bowl detection

An RFID chip in the button of the bowl lid saves the exact parameters of the grinding bowl. Your advantage: when a bowl is inserted into the mill, the control system detects the specific bowl, automatically sets the grinding parameters to the maximum permitted default values to prevent impermissible grinding settings.* Your advantage: always optimal and guaranteed constant results.

FRITSCH *premium* advantage: Securely sunken bowls

Discover a completely new dimension in high-tech grinding with the FRITSCH PULVERISETTE 7 *premium line*: for the first time, we have sunken the grinding bowls of our high-performance mill in the grinding chamber. This enables us to reach unprecedented rotational speeds and ultra-fine grinding results down into the nano range. Brilliantly simple – brilliantly effective!

* At www.fritsch.de, you find the maximum speed limits for different grinding ball diameters and grinding bowls made of agate.

ONLY AVAILABLE FROM FRITSCH

Turn your Planetary Mill into an analytical measuring system with the EASY GTM system.

Safe grinding under overpressure

The standard lids of the grinding bowls for the PULVERISETTE 7 *premium line* are equipped with a manual device that allows a controlled reduction of overpressure. As a result, the grinding bowls can always be easily and safely opened.

As simple as a centrifuge

FRITSCH *premium* advantage: Snapping bowl lids
To close the grinding bowls, the lid is simply placed on the bowl and securely fastened with a single hand motion due to two practical snaps.

FRITSCH *premium* advantage: Easy bowl positioning
The grinding chamber of the PULVERISETTE 7 *premium line* opens automatically. The bowl holder automatically rotates into a convenient position.

FRITSCH *premium* advantage: SelfLOCK
The bowl is simply inserted with light pressure and automatically snaps into place.

FRITSCH *premium* advantage: Automatic closing
The grinding chamber also closes automatically. Grinding starts once it is closed. After grinding, the bowls are removed and opened with just two simple hand motions. For this reason, the PULVERISETTE 7 *premium line* is just as simple to operate as a centrifuge.

FRITSCH-COMPETENCE

A total of 11 patents have been granted for the FRITSCH Planetary Micro Mill PULVERISETTE 7 *premium line* by the German and European Patent Office. Also registered are 7 utility models.

TECHNICAL DATA

Electrical details
100-120/200-240 V/1~, 50-60 Hz, 1200 watt

Weight
Net 44 kg
Gross 61 kg

Dimensions w x d x h
Bench top instrument 40 x 58 x 36 cm

Packaging w x d x h
Case 68 x 54 x 72 cm

Emission sound pressure level at the workplace according to DIN EN ISO 3746
L_{pAd} = 80 dB
(depending on the material to be ground, grinding bowls/balls used, selected rotational speed)

Order no.
07.5000.00

Optimal preparation of a granite sample using the Planetary Micro Mill PULVERISETTE 7 *premium line*

Glass before and after grinding with the Planetary Micro Mill PULVERISETTE 7 *premium line*

APPLICATION EXAMPLES

Geology/Mineralogy	Rocks, gravel, sand, minerals
Metallurgy	Ores, slags
Ceramics	Porcelain, sintered ceramics, clay, fireclay
Material research/ Mechanical alloying	Pigments, precious materials, new materials, alloys, mechanical alloying and activation
Nanotechnology	Graphite, titanium dioxide, silicon dioxide, aluminium oxide, diazepines
Pharmaceuticals	Ophthalmological agents, gels, creams, extracts, drugs, pastes, dragées, tablets
Chemistry	Pesticides, fertilisers, salts, inorganic and organic materials
Biology	Plants, leaves, freeze-dried samples
Sample preparation for analysis	Spectroscopy, x-ray fluorescence, x-ray structure analysis, chromatography

IQ/OQ documentation available to support equipment qualification.

FACTS AND ADVANTAGES

- Absolutely safe operation – due to the revolutionary SelfLOCK, grinding bowls snap into place in the machine – without any additional clamping
- Min. sample quantity 2 ml, max. sample quantity 70 ml
- Simultaneous processing of to 2 samples
- Grinding ball diameters 0.1–20 mm
- Easy-to-clean grinding elements
- Rotational speed of main disk 100–1100 rpm, relative rotational speed of grinding bowls up to 2200 rpm
- Transmission ratio planetary disk / grinding bowl $i_{relative}$ = 1 : -2
- Effective diameter of main disk 140 mm
- Centrifugal acceleration (g = 9.81 m/s²) 95 g
- Up to 10 programmes can be saved, software MillControl (optional), USB interface for transmission of process parameters
- 2-year guarantee

Well-conceived grinding bowls

All *premium line* grinding bowls and the corresponding balls are available in different materials to directly prevent contamination of the sample as a result of undesired abrasion. In normal cases, grinding bowls and balls of the same material are used. You can select different grinding ball sizes in order to adapt the grinding to your specific application. Our tip: To shorten the grinding time, grinding bowls and balls with a higher density and correspondingly higher impact energy can be used.

All grinding bowls of the FRITSCH *premium line* are cased in stainless steel, have a label and the same inner diameter regardless of their volume.

Please note: The material of the grinding elements must always be harder than the material to be ground.

Material data for grinding bowls/grinding balls

Material	Main component of the material*	Density g/cm³	Abrasion resistance	Use for sample material
Agate	SiO_2	2.65	Good	Soft to medium-hard samples
Sintered corundum	Al_2O_3	3.8	Fairly good	Medium-hard, fibrous samples
Silicon nitride	Si_3N_4	3.25	Excellent	Abrasive samples, metal-free grinding
Zirconium oxide	ZrO_2	5.7	Very good	Fibrous, abrasive samples
Hardened, stainless steel	Fe – Cr	7.7	Good	Hard, medium-hard, brittle samples
Hardmetal tungsten carbide	WC	14.3	Very good	Hard, abrasive samples

* At www.fritsch.de, you can find the corresponding element analyses with detailed information about the materials.

Screw-on grinding bowl lid

With the screw-on grinding bowl lids, you can seal the grinding bowls of the PULVERISETTE 5 *premium line* gas-tight for transport between filling in the glove box and the mill.

Grinding bowl PULVERISETTE 7 *premium line* with 6 sample glasses 1.5 ml volume for single-use technology, for example in pharmacy, forensics and pathology, RNA/DNA extraction, bacteriology, chemistry.

IN SITU measurement

Turn your Planetary Mill PULVERISETTE 5 *premium line* and Planetary Micro Mill PULVERISETTE 7 *premium line* into an analytical measuring system by using the **EASY GTM system** (Gas Pressure and Temperature Measurement System) with special lid and transmitter as well as a receiver board and the included Mill-Control software. Your advantage: easy and safe monitoring and analysis of thermal effects, physical and chemical reactions or increases/decreases in pressure through continuous measurement of gas pressure and temperature directly in the grinding bowl. The mill is automatically controlled to ensure that the set parameters are not exceeded. EASY GTM bowls are available in different materials.

FRITSCH advantage: The special lid of the EASY GTM system of the PULVERISETTE 5 *premium line* is additionally equipped with gassing valves.
Your advantage: Simultaneous gassing and measurement of gas pressure and temperature.

EASY GTM grinding bowls for the PULVERISETTE 7 *premium line* are available in different bowl volumes.

FRITSCH software MillControl

The FRITSCH Planetary Mills *premium line* can also be controlled in addition to the touchscreen via the FRITSCH software MillControl.

Your advantages:

- Automatic control of the mill and validation of grinding process
- Monitoring and graphical display of the set and actual rotational speed and power consumption
- Creation and saving of individual SOPs for various grinding processes with different parameters to ensure identical conditions for recurring grinding tasks
- Generation of standardised reports with the most relevant parameters
- Archive function for documenting of all grinding processes performed

FRITSCH *premium* advantage: Grinding in inert gas and mechanical alloying/activation are possible with the *premium line* gassing lids.

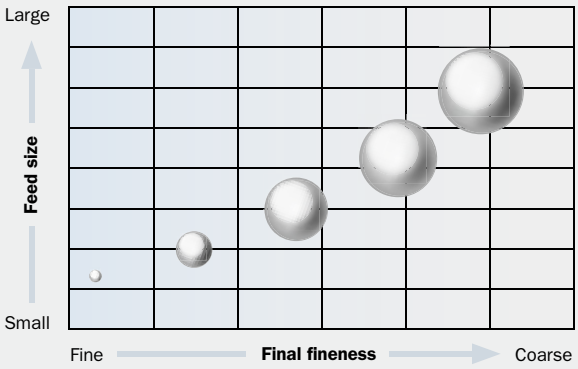
Grinding bowls PULVERISETTE 5 *premium line*

Grinding bowls for the PULVERISETTE 5 *premium line* are available in the sizes 125 ml, 150 ml, 250 ml, 420 ml and 500 ml. This gives you total flexibility for optimal adjustment to your specific sample volume. If you would like to grind four samples simultaneously, simply order four grinding bowls, each with 150 ml resp. 125 ml bowl volume and 2 stacking rings. For grinding with only one grinding bowl 150 ml resp. 125 ml per grinding bowl holder, we offer an adapter for weight compensation.

In general, smaller grinding balls achieve finer grinding results. We will be happy to assist you to select the right grinding bowls and ball size.

Just ask us. +49 67 84 70 150 · service@fritsch.de

Correlation ball size, feed size, final fineness



Recommended grinding bowl filling
PULVERISETTE 5 *premium line*

I. Grinding balls ≥ 5 mm: Recommended number of balls per grinding bowl

Grinding bowl in ml/ Useful capacity in ml (sample volume)	**125 15–50**	**150 20–70**	**250 30–125**	**420 60–200**	**500 80–225**
Ball diameter					
20 mm	9	12	15	20	25
15 mm	25	35	45	60	70
10 mm	35	40	50	80	100
5 mm	600	900	1200	1800	2000

II. Grinding balls ≤ 3 mm*: Recommended ball mass per grinding bowl

Grinding bowl in ml/ Useful capacity in ml (sample volume)	**150 20–70**	**250 30–125**	**500 80–225**
Material			
Zirconium oxide	170 g	400 g	800 g
Hardened, stainless steel	350 g	500 g	1100 g
Hardmetal tungsten carbide	800 g	1000 g	2100 g

* Grinding balls with a diameter of 3 mm and less must be weighed out. The respective tables for the PULVERISETTE 5 and PULVERISETTE 7 *premium line* provide you with the required mass per grinding bowl.

Grinding bowls PULVERISETTE 7 *premium line*

Recommended grinding bowl filling
PULVERISETTE 7 *premium line*

I. Grinding balls ≥ 5 mm: Recommended number of balls per grinding bowl			
Grinding bowl in ml/ Useful capacity in ml (sample volume)	**20 1–9**	**45 3–20**	**80 10–30**
Ball diameter			
20 mm			5
15 mm		7	10
10 mm	10	18	25
5 mm	80	180	250

II. Grinding balls ≤ 3 mm*: Recommended ball mass per grinding bowl			
Grinding bowl in ml/ Useful capacity in ml (sample volume)	**20 1–9**	**45 3–20**	**80 10–30**
Material			
Zirconium oxide	30 g	70 g	100 g
Hardened, stainless steel	40 g	90 g	150 g
Hardmetal tungsten carbide	80 g	200 g	300 g

The specified ball filling per bowl is the minimum quantity and should possibly be increased depending on the material properties. In exceptional cases, the number of grinding balls can be reduced by up to 15 %. However, increased abrasion should be expected.

Grinding bowls for the PULVERISETTE 7 *premium line* are available in the sizes 20 ml, 45 ml and 80 ml for optimal adaption to your sample volume. For uniform grinding without imbalance, always choose two grinding bowls of the same weight.

Special emptying device

After grinding in suspension, the FRITSCH special emptying device with 2 sieves enables a quick and easy separation of grinding balls and suspension. For this purpose, the device is firmly attached onto the grinding bowl and the suspension is drawn out with a syringe. The grinding balls remain in the bowl.

ORDERING DATA

Order no.	Article

PLANETARY MILL *premium line*

PULVERISETTE 5
Instrument without grinding bowls and balls, incl. ServoLOCK clamping

05.7020.00	For 200-240 V/1~, 50-60 Hz, 2800 watt
05.7030.00	For 200-240 V/1-2~, 50-60 Hz, 2800 watt The PULVERISETTE 5 with voltage of "1-2~" requires at least 200 V AC voltage and real power of 2800 watt. For this purpose, it may be necessary to use a two-phase resp. a three-phase supply network.

GRINDING BOWLS WITH LID AND SEAL RING *premium line*
Grinding bowls 420-500 ml volume
for PULVERISETTE 5 premium line

50.6400.00	Agate 420 ml volume, with steel casing
50.6490.00	Zirconium oxide 500 ml volume, with steel casing
50.6550.00	Hardened, stainless steel 500 ml volume, with steel casing
50.6580.00	Hardmetal tungsten carbide 500 ml volume, with steel casing

Grinding bowls 250 ml volume
for PULVERISETTE 5 premium line

50.6610.00	Agate 250 ml volume, with steel casing
50.6700.00	Zirconium oxide 250 ml volume, with steel casing
50.6760.00	Hardened, stainless steel 250 ml volume, with steel casing
50.6790.00	Hardmetal tungsten carbide 250 ml volume, with steel casing

Grinding bowls 125-150 ml volume
for PULVERISETTE 5 premium line

50.6840.00	Agate 125 ml volume, with steel casing
50.6900.00	Zirconium oxide 150 ml volume, with steel casing
50.6920.00	Hardened, stainless steel 150 ml volume, with steel casing
50.6940.00	Hardmetal tungsten carbide 150 ml volume, with steel casing

50.6837.00	Adapter for all grinding bowls PULVERISETTE 5 *premium line* 125-150 ml volume (essential, if only one grinding bowl is inserted in the grinding bowl holder)
50.6830.00	Stacking ring for all grinding bowls PULVERISETTE 5 *premium line* 125-150 ml volume (essential, if 2 grinding bowls 125-150 ml volume per grinding bowl holder are used)

Accessories
for all grinding bowls PULVERISETTE 5 premium line

84.0163.15	Replacement seal ring Viton 88.49 x 3.53 mm for all *premium line* grinding bowls 125-500 ml volume
50.6980.24	Replacement grinding bowl seal tape for all *premium line* grinding bowls 125-500 ml volume

Certification
for PULVERISETTE 5 premium line

96.0310.00	IQ/OQ documentation (questionnaire format – implementation by customer)

ACCESSORIES FOR GRINDING IN INERT GAS AND FOR MECHANICAL ALLOYING
Gassing lid with valves and seal ring
for all premium line grinding bowls 500 ml, 420 ml, 250 ml, 150 ml and 125 ml volume for PULVERISETTE 5 premium line

50.6407.00	Agate, with steel casing
50.6497.00	Zirconium oxide, with steel casing
50.6557.00	Hardened, stainless steel, with steel casing
50.6587.00	Hardmetal tungsten carbide, with steel casing

Screw-on grinding bowl lids with seal ring
for all premium line grinding bowls 500 ml, 420 ml, 250 ml, 150 ml and 125 ml volume for PULVERISETTE 5 premium line

50.6405.00	Agate, with steel casing
50.6495.00	Zirconium oxide, with steel casing
50.6555.00	Hardened, stainless steel, with steel casing
50.6585.00	Hardmetal tungsten carbide, with steel casing

EASY GTM – GAS PRESSURE AND TEMPERATURE MEASURING SYSTEM WITH GASSING VALVES
for controlling the grinding process due to continuous measurement of gas pressure and temperature and for grinding in inert gas
for PULVERISETTE 5 premium line

81.0013.00	Receiver unit - board and software MillControl
50.9250.00	250 ml grinding bowl made of zirconium oxide with special lid with gassing valves and transmitter
50.9280.00	250 ml grinding bowl made of hardened stainless steel with special lid with gassing valves and transmitter
50.9310.00	250 ml grinding bowl made of hardmetal tungsten carbide with special lid with gassing valves and transmitter Only one receiver unit with software MillControl has to be ordered.

Gassing lids and special lids for EASY GTM with Swagelok valves are available on request.

Order no.	Article

PLANETARY MICRO MILL *premium line*

PULVERISETTE 7
Instrument without grinding bowls and balls, incl. SelfLOCK clamping

07.5000.00	For 100-120/200-240 V/1~, 50-60 Hz, 1200 watt Voltage, indicated by customer is set.

GRINDING BOWL WITH LID AND SEAL RING *premium line*
Grinding bowls 80 ml volume
for PULVERISETTE 7 premium line

50.9620.00	Agate, with steel casing
50.9630.00	Sintered corundum (99.7% Al_2O_3), with steel casing
50.9670.00	Silicon nitride, with steel casing
50.9660.00	Zirconium oxide, with steel casing
50.9650.00	Hardened, stainless steel, with steel casing
50.9640.00	Hardmetal tungsten carbide, with steel casing

Grinding bowls 45 ml volume
for PULVERISETTE 7 premium line

50.9720.00	Agate, with steel casing
50.9730.00	Sintered corundum (99.7% Al_2O_3), with steel casing
50.9770.00	Silicon nitride, with steel casing
50.9760.00	Zirconium oxide, with steel casing
50.9750.00	Hardened, stainless steel, with steel casing
50.9740.00	Hardmetal tungsten carbide, with steel casing

Grinding bowls 20 ml volume
for PULVERISETTE 7 premium line

50.9820.00	Agate, with steel casing
50.9830.00	Sintered corundum (99.7% Al_2O_3), with steel casing
50.9870.00	Silicon nitride, with steel casing
50.9860.00	Zirconium oxide, with steel casing
50.9850.00	Hardened, stainless steel, with steel casing
50.9840.00	Hardmetal tungsten carbide, with steel casing

Replacement seal rings
for all grinding bowls PULVERISETTE 7 premium line

84.0342.15	Replacement seal ring Silicone 57.5 x 48 x 2 mm for all *premium line* grinding bowls 80 ml, 45 ml, 20 ml volume
84.0341.15	Replacement seal ring Viton 57.5 x 48 x 2 mm for all *premium line* grinding bowls 80 ml, 45 ml, 20 ml volume

Accessories
for all grinding bowls PULVERISETTE 7 premium line

50.9900.00	Special emptying device for all *premium line* grinding bowls 80 ml, 45 ml, 20 ml volume
50.9890.00	Counterweight for all *premium line* grinding bowls 80 ml, 45 ml, 20 ml volume (essential for weight compensation, if only one grinding bowl is used for grinding)

Certification
for PULVERISETTE 7 premium line

96.0260.00	IQ/OQ documentation (questionnaire format – implementation by customer)

ACCESSORIES FOR GRINDING IN INERT GAS AND FOR MECHANICAL ALLOYING
Gassing lid with valves and seal ring
for all premium line grinding bowls 80 ml, 45 ml, 20 ml volume
for PULVERISETTE 7 premium line

50.9627.00	Agate, with steel casing
50.9637.00	Sintered corundum (99.7% Al_2O_3), with steel casing
50.9677.00	Silicon nitride, with steel casing
50.9667.00	Zirconium oxide, with steel casing
50.9657.00	Hardened, stainless steel, with steel casing
50.9647.00	Hardmetal tungsten carbide, with steel casing

Gassing lids with Swagelok valves are available on request.

EASY GTM – GAS PRESSURE AND TEMPERATURE MEASURING SYSTEM
for controlling the grinding process due to continuous measurement of gas pressure and temperature
for PULVERISETTE 7 premium line

81.0013.00	Receiver unit - board and software MillControl
50.9040.00	80 ml grinding bowl made of agate with special lid and transmitter
50.9080.00	80 ml grinding bowl made of sintered corundum (99.7% Al_2O_3) with special lid and transmitter
50.9090.00	80 ml grinding bowl made of silicon nitride with special lid and transmitter
50.9070.00	80 ml grinding bowl made of zirconium oxide with special lid and transmitter
50.9050.00	80 ml grinding bowl made of hardened, stainless steel with special lid and transmitter
50.9060.00	80 ml grinding bowl made of hardmetal tungsten carbide with special lid and transmitter

Only one receiver unit with software MillControl has to be ordered.
EASY GTM is also available for further grinding bowl volumes on request.

Order no.	Article
	ACCESSORIES FOR SINGLE-USE TECHNOLOGY
	for PULVERISETTE 7 premium line
50.9506.00	Grinding bowl made of stainless steel with 6 sample glasses 1.5 ml volume
83.3165.00	Set of sample glasses 1.5 ml volume with lids (set = 12 pieces)

ACCESSORIES FOR AUTOMATIC CONTROL OF THE MILL AND VALIDATION OF THE GRINDING PROCESS

	Software MillControl
	for PULVERISETTE 5 and PULVERISETTE 7 premium line
83.5605.00	Software MillControl for Windows

GRINDING BALLS 20 MM – 5 MM DIAMETER (PIECE)

	Grinding balls 20 mm diameter
	for grinding bowls 500, 420, 250, 150, 125 and 80 ml
55.0200.05	Agate, polished
55.0200.06	Sintered corundum (99.7% Al_2O_3)
55.0200.31	Silicon nitride
55.0200.27	Zirconium oxide
55.0200.09	Hardened, stainless steel
55.0200.08	Hardmetal tungsten carbide
	Grinding balls 15 mm diameter
	for grinding bowls 500, 420, 250, 150, 125, 80 and 45 ml
55.0150.05	Agate, polished
55.0150.06	Sintered corundum (99.7% Al_2O_3)
55.0150.31	Silicon nitride
55.0150.27	Zirconium oxide
55.0150.09	Hardened, stainless steel
55.0150.08	Hardmetal tungsten carbide
	Grinding balls 10 mm diameter
	for grinding bowls 500, 420, 250, 150, 125, 80, 45 and 20 ml
55.0100.05	Agate, polished
55.0100.06	Sintered corundum (99.7% Al_2O_3)
55.0100.31	Silicon nitride
55.0100.27	Zirconium oxide
55.0100.09	Hardened, stainless steel
55.0100.08	Hardmetal tungsten carbide
	Grinding balls 5 mm diameter
	for grinding bowls 500, 420, 250, 150, 125, 80, 45 and 20 ml
55.0050.05	Agate, polished (100 units weigh approx. 17 g) [1)]
55.0050.27	Zirconium oxide (100 units weigh approx. 38 g) [1]
55.0050.09	Hardened, stainless steel (100 units weigh approx. 52 g) [1)]
55.0050.08	Hardmetal tungsten carbide (100 units weigh approx. 97 g) [1)]

[1)] With aid of the indication of the weight, can the high number of balls per grinding bowl be determined by weighing.

GRINDING BALLS ≤ 3 MM DIAMETER (100-G PACKAGE)

	Grinding balls ≤ 3 mm diameter
	for grinding bowls 500, 250, 150, 80, 45 and 20 ml
55.0030.27	Zirconium oxide 3 mm diameter
55.0020.27	Zirconium oxide 2 mm diameter
55.0015.27	Zirconium oxide 1.5 mm diameter
55.0010.27	Zirconium oxide 1 mm diameter
55.0005.27	Zirconium oxide 0.5 mm diameter
55.0001.27	Zirconium oxide 0.1 mm diameter
55.0030.09	Hardened, stainless steel 3 mm diameter
55.0010.09	Hardened, stainless steel 1 mm diameter
55.0030.08	Hardmetal tungsten carbide 3 mm diameter
55.0016.08	Hardmetal tungsten carbide 1.6 mm diameter
55.0006.08	Hardmetal tungsten carbide 0.6 mm diameter

Further grinding balls ≤ 3 mm diameter are available.

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