

*Variable Speed Rotor Mill - premium line*



**IDEAL FOR**

ANALYTIC  
BIOLOGY  
CHEMISTRY  
AGRICULTURE AND FORESTRY  
FOODSTUFFS  
PLASTICS AND TEXTILES  
PHARMACEUTICALS  
ENVIRONMENT/ROHS

*premium line*

**VARIABLE SPEED ROTOR MILL**



# 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.**





# PULVERISETTE 14

*premium line*

## Fast pre- and fine-grinding in one instrument

- Powerful grinding with 22,000 rpm for particularly fast sample throughput
- Extremely high impact speed of the rotor (111 m/s = 399.6 km/h)
- Max. feed size < 15 mm, sample throughput of up to 15 l/h and more
- Multifunctional with impact or cutting rotor in one instrument
- AutoLOCK grinding chamber for particularly safe operation
- Final fineness  $d_{50} < 40 \mu\text{m}$ , sieve rings 0.08 – 6 mm
- Particularly good cooling of the grinding material
- Pleasantly quiet operation
- Easiest cleaning due to Clean Design

The FRITSCH Variable Speed Rotor Mill PULVERISETTE 14 *premium line* offers impact, shearing and cutting comminution in one instrument with a higher performance, better cooling and is significantly quieter than comparable instruments. Its powerful motor is ideal for the particularly fast comminution of soft to medium-hard, brittle as well as fibrous materials and temperature-sensitive samples with an extremely fast sample throughput of up to 15 litres and more per hour, depending on the material and parameter settings.

### Your instrument for master-batches

Due to its high performance, the PULVERISETTE 14 *premium line* is the ideal Variable Speed Rotor Mill for comminution at pilot plant-scale in the plastics industry.

### FRITSCH *premium advantage*: Pleasantly quiet operation

We have incorporated special design features into the FRITSCH PULVERISETTE 14 *premium line* to ensure that it is considerably quieter than comparable instruments. Use of the provided funnel lid and funnel insert reduces the noise level even further. For a pleasantly quiet operation in accordance with DIN EN.

### FRITSCH *premium advantage*: Significantly better cooling

The strong airflow produced by the motor, an ingenious air routing, as well as special cooling fins on the rotors further intensify cooling. Your advantage: melting or sticking is greatly reduced, even with temperature-sensitive samples. The cooling function can easily be enhanced further by utilizing the integrated option to connect an exhaust system or a FRITSCH Cyclone separator.



Impact rotor  
with cooling fins

### **The FRITSCH *premium line* principle**

The best even made 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 and functions make working with them even easier, more comfortable, faster and safer. Inspired by your daily work.

For *premium* results with absolute reliability.

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



### **FRITSCH *premium advantage*: High-speed motor with ceramic bearings**

The heavy-duty motor and especially durable ceramic bearings ensure a particularly high impact and rotor speed with an extra powerful 22,000 rpm. Your advantage: finer results in shorter times. And a long-term investment, which is definitely worth it.



## *premium* functionality for safe operation

As with all FRITSCH *premium line* instruments, the Variable Speed Rotor Mill PULVERISETTE 14 *premium line* makes your work even easier, faster and safer. This is especially due to the new, intelligent AutoLOCK grinding chamber and the integrated Intelligence-Safety-Control-System, which only allows the machine to start once all the parts are correctly inserted.



Intelligent AutoLOCK grinding chamber enables incredibly simple operation

### **AutoLOCK grinding chamber**

As soon as you have set the grinding parameters and started the grinding, the AutoLOCK grinding chamber of the Variable Speed Rotor Mill PULVERISETTE 14 *premium line* automatically closes itself tightly and safely. A sensitive anti-clamping and crushing protection ensures that the instrument lid blocks as soon as it encounters an obstruction.

### **Intelligent control**

The integrated Intelligence-Safety-Control-System automatically checks the grinding set's components – collecting vessel with lid, rotor and labyrinth disk – for completeness and correct insertion. Even the new FRITSCH Vibratory Feeder LABORETTE 24 is detected by the programme. The grinding starts only when all the parts are fully and correctly inserted and the instrument's lid is properly locked. Your advantage: absolutely safe operation with a complete safety lock.



### **FRITSCH *premium* advantage:**

The fixation against twisting of the sieve rings and collecting vessels ensure less wear and even quieter, vibration-free operation.



Even particularly hard and fatty materials such as feed pellets can be easily comminuted with the PULVERISETTE 14 *premium line*.

### Funnel for different grinding tasks

Each PULVERISETTE 14 *premium line* is equipped with a polyamide funnel with stainless steel insert e.g. for foodstuffs, a smaller feeding funnel for flexible adjustment to the sample type and particle size, as well as a noise-insulating funnel lid to guard against splashes.

### Well-designed touchscreen

The Variable Speed Rotor Mill PULVERISETTE 14 *premium line* is operated via the well-designed and ergonomically arranged touchscreen with a particularly logical menu structure in different languages. Via the touchscreen you enter the variable rotational speed and define the grinding time using the minutes and seconds timer. The integrated stopwatch function for time recording, e.g. for new samples, is particularly practical. In addition as a system monitoring safety feature, the instrument's power consumption and the system temperature are displayed, and a warning is shown in case of overload.



**Practical:** the spacious work surface for labyrinth disk, rotor and sieve ring.

### Flexible remote control

If your PULVERISETTE 14 *premium line* is isolated for special grinding tasks – e. g. in a glove box – it can be easily remotely controlled using a separate computer. All system values can be read directly as well.



## Clean Design for fast cleaning

The well-conceived Clean Design of the Variable Speed Rotor Mill PULVERISETTE 14 *premium line* covers all the areas, which make the cleaning of your mill as easy as possible: All the surfaces are designed to be extremely dirt-resistant and easy to clean, and every surface which comes into contact with the samples can be sterilised. And all the parts that need regular cleaning, like funnel, collecting vessel with lid, rotor, sieve ring and labyrinth disk – each can be removed with a single motion without tools. Even the lid of the instrument can be easily removed for cleaning.



**FRITSCH premium advantage:** In the PULVERISETTE 14 *premium line*, the grinding and electrical chambers are completely separated from each other. Your advantage: The air in the grinding chamber does not come into contact with the electronics and stays cooler – and the electronics are protected from dust. A clever idea, which results in a longer service life for your mill and increased safety with no faulty switching.



## FRITSCH-COMPETENCE

A total of 2 patents have been granted for the FRITSCH Variable Speed Rotor PULVERISETTE 14 *premium line* by the German Patent Office.

### TECHNICAL DATA

#### Electrical details

200-240 V/1~, 50-60 Hz, 2500 watt  
Other voltages on request.

#### Weight

Net 40 kg  
Gross 55 kg

#### Dimensions w x d x h

Bench top instrument 55 x 52 x 63 cm

#### Packaging w x d x h

Case 70 x 70 x 65 cm

#### Emission sound pressure level at the workplace according to DIN EN ISO 3746

$L_{pA}$  = 70 dB

(depending on the material to be ground, adjusted rotor-speed and instrument configuration)

Order No. **200-240 V/1~**  
14.4020.00



After a quick cleaning, the PULVERISETTE 14 *premium line* is ready to be used again with just a few motions.



IQ/OQ documentation available to support equipment qualification.

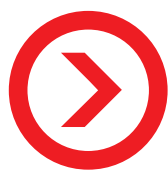
**FRITSCH Advantage:** The innovative laser welding of the sieve rings enables due to less dead spaces a significantly easier cleaning, as well as greater stability and longer service life.

### APPLICATION EXAMPLES

<b>Analytic</b>	Creation of samples for the chemical analysis of soil samples, slurries or plant samples, spectroscopy
<b>Biology</b>	Plants, roots, leaves, needles, grains, drugs, peat, seeds, ash
<b>Chemistry</b>	Chemicals, fillers, waxes, paraffins, chalk, kaolin
<b>Agriculture and forestry</b>	Plants, wood, roots, leaves, needles, grains, soil (without stones), fertilisers, pellets, feed
<b>Foodstuffs</b>	Rice, spices, foodstuffs for protein and nitrogen analysis, dried fruits
<b>Plastics and textiles</b>	Textiles, leather, cellulose, compound materials, rubber, powder coatings, styrenes, polyester, synthetic resins, foils, PVC, PP and PE
<b>Pharmaceuticals</b>	Pharmaceuticals, dragées, tablets
<b>Environment/RoHS</b>	Electronic parts, plastics, glass

### FACTS AND ADVANTAGES

- Simple, tool-free changing of rotor, collecting vessel, sieve ring, labyrinth disk and -seal
- Simple cleaning
- Efficient cooling of the grinding chamber due to extremely high airflow
- Highly durable low-wear rotors with cooling fins made of stainless steel
- Grinding chamber made of stainless steel or PTFE-coated
- Grinding parts made of stainless steel and pure titanium
- Maintenance-free three-phase motor with regulated rotor speed 6,000–22,000 rpm (max. impact speed 399.6 km/h)
- High speed stability even under full load
- Wear-free labyrinth seal between the grinding chamber and drive motor
- Removable dust filter for convenient cleaning
- Ergonomic operation with touchscreen
- USB interface as well as integrated regulation function for the new Vibratory Feeder LABORETTE 24
- 2-year guarantee



## The right accessory for each application

As a standard, the Variable Speed Rotor Mill PULVERISETTE 14 *premium line* is equipped with collecting vessel and lid. In order to operate the mill, you must also order a rotor as well as a sieve ring – allowing you to select your grinding tools according to your specific application.



### IMPACT ROTORS AND SIEVE RINGS

Inside the Variable Speed Rotor Mill, the sample is comminuted by impacting against the ribs of the impact rotor, rotating at high speed and also sheared between the rotor teeth and the inserted sieve ring. The extremely durable, low-wear, impact rotors with cooling fins and sieve rings with reinforced edges made of the stainless steel of the PULVERISETTE 14 *premium line* are suitable for all standard applications, for comminution of medium-hard, soft, brittle, fibrous substances from lime to plants. To meet various grinding tasks, impact rotors with 6, 12 and 24 ribs and cooling fins as well as sieve rings with trapezoidal or round perforation from 0.08 mm to 6 mm with reinforced edges are available.

#### IMPACT ROTORS WITH COOLING FINNS

**Fast comminution of fibrous substances < 15 mm feed size**

- ④ 6-ribs impact rotor

**Feed size < 10 mm**

- ④ 12-ribs impact rotor

**Fine materials with a feed size < 5 mm**

- ④ 24-ribs impact rotor

#### SIEVE RINGS WITH REINFORCED EDGES

**Fast comminution of medium-hard to soft materials**

- ④ Sieve ring with trapezoidal perforation for additional shearing effects

**Brittle material and medium fineness with narrow particle size range**

- ④ Sieve ring with round perforation

**Our suggestion:** The corresponding element analyses for the accessories of the PULVERISETTE 14 *premium line* with detailed information about the material, is found at [www.fritsch.de](http://www.fritsch.de).

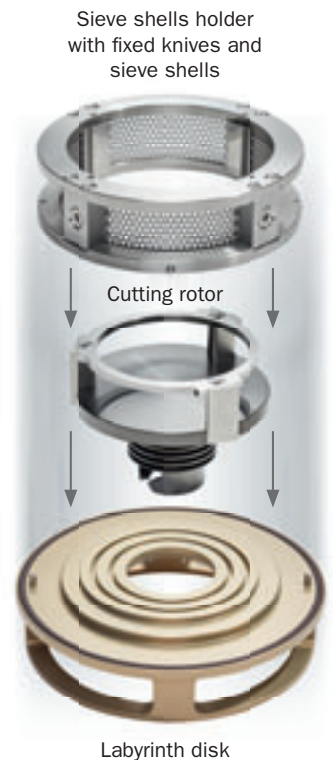
④ Our experts will be happy to advise you: +49 67 84 70 150 · [service@fritsch.de](mailto:service@fritsch.de)

## CUTTING WITH THE PULVERISETTE 14 *premium line*

Available only from FRITSCH: With the cutting rotor made of **stainless steel** the PULVERISETTE 14 *premium line* is ideal for fast, efficient comminution of fibrous materials and plastics. The cutting rotor made of **hardmetal tungsten carbide** is especially suitable for comminution of hard-tough materials due to the combination of impact and cutting forces. Just order the cutting insert of the desired materials consisting of a cutting rotor with straight cutting edges and cooling fins, collecting vessel, labyrinth disk and sieve shells holder with fixed knives and sieve shells. Select additionally a set sieve shells with trapezoidal or round perforation to determine the desired final fineness. The materials are then comminuted by cutting and shearing. The PULVERISETTE 14 *premium line* detects the labyrinth disk and automatically operates in an optimized mode with up to 15,000 rpm. And the use of a FRITSCH Cyclone separator will further improve throughput and cooling and is indispensable for finer mesh sizes.



Optimal preparation of a wood sample with the cutting rotor



### Difficult-to-mill or temperature-sensitive samples and plastics

The FRITSCH impact bar is the ideal solution for very gentle grinding of especially heat-sensitive materials such as powder coatings or plastics as well as for the smooth pre-crushing and fine comminution of hard-brittle to soft, fatty or samples with residual moisture. The impact bar acts as a stator on which the material is additionally beaten. The result: increased grinding performance for a particularly fast and efficient grinding that minimises the thermal load. The corresponding impact rotor and a special sieve ring for the impact bar must be ordered separately.



Impact bar for gentle comminution

### Heavy-metal- and iron-free grinding and sample preparation according to RoHS

For heavy-metal- and iron-free grinding and sample preparation according to RoHS, you can order your Variable Speed Rotor Mill PULVERISETTE 14 *premium line* with a lid made of pure titanium and collecting vessel PTFE-coated.

In addition, select a pure titanium impact rotor with cooling fins:

<b>Feed size &lt; 15 mm</b>	6-ribs impact rotor made of pure titanium
<b>Feed size &lt; 10 mm</b>	12-ribs impact rotor made of pure titanium
<b>Feed size &lt; 5 mm</b>	24-ribs impact rotor made of pure titanium

Then select the appropriate sieve ring with reinforced edges made of pure titanium with a matching perforation for the desired final fineness. The sieve rings are offered with trapezoidal perforation from 0.08–2 mm.



## Optimal sample exhaust system: FRITSCH Cyclone separators

FRITSCH Cyclone separators require an exhaust system which can be ordered along.



**Cool, clean and convenient: FRITSCH Cyclone separators for sample exhaustion open up new possibilities, which would otherwise be impossible. The powerful airflow of the Cyclone separators ensures simple feeding and faster throughput. Due to faster operation and the additional stronger cooling, the thermal load of the sample materials is minimized, so that temperature-sensitive samples can also be ground without any problems.**

The powerful airflow enables the use of finer sieve rings to achieve a higher final fineness – even for materials, which are otherwise difficult to grind finely, such as electrostatically-charged plastics or powder coatings. Especially convenient: the ground sample is drawn directly into the screwed-on sample glass, in which it can be transported, stored and easily removed for analysis.



Compact and powerful: the FRITSCH high-performance Cyclone separator made of stainless steel

## OUR SUGGESTION: CRYOGENIC GRINDING

Samples which are difficult to grind or extremely temperature-sensitive (e.g. plastics) can be embrittled with the addition of liquid nitrogen and subsequently ground in the PULVERISETTE 14 *premium line*.



Simple connection to the PULVERISETTE 14 *premium line*



### FRITSCH high-performance Cyclone separator

The compact FRITSCH high-performance Cyclone separator, which is made completely out of stainless steel 304 is in combination with the exhaust system, particularly indispensable in the analytical sector and the food and pharmaceutical industries. Due to its high surface quality, it offers enhanced resistance to corrosive media such as alkalis and acids – and is especially easy to clean with a wide range of possible cleaning agents, without leaving any residues. The Cyclone separator can also be fully dismantled, meaning that it can be completely emptied, flooded and sterilised. Your advantage: reliable protection against cross-contamination.

### FRITSCH small volume Cyclone separator

The compact FRITSCH small volume Cyclone separator made of plastic can be dismantled completely and cleaned in a dishwasher thus reliably preventing contaminations. The comminuted sample is collected in a screwed-on sample glass of 250 or 500 ml volume. The small volume Cyclone separator can be combined with the exhaust system, which can be ordered along, or can also be used with the supplied fine-dust filter 80-100 µm for passive utilisation.

### Automatic feeding

Directly controlled by and precisely matched to the mill, the new FRITSCH Vibratory Feeder LABORETTE 24 always ensures the correct feed rate – ideal for slowly feeding small or smallest material quantities or for grinding larger quantities. An IQ/OQ documentation is available to support equipment qualification.



## ORDERING DATA

Order no.	Article
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**VARIABLE SPEED ROTOR MILL *premium line*****PULVERISETTE 14****Instrument without rotor and sieve ring, incl. funnel, labyrinth disk and collecting vessel with lid**

14.4020.00 For 200-240 V/1~, 50-60 Hz, 2500 Watt

Other voltages on request!

**Impact rotors with cooling fins made of stainless steel**

14.4330.10 With 6 ribs  
 14.4334.10 With 12 ribs  
 14.4337.10 With 24 ribs

**Sieve rings with reinforced edges made of stainless steel**

14.4341.00 0.08 mm trapezoidal perforation  
 14.4342.00 0.12 mm trapezoidal perforation  
 14.4343.00 0.2 mm trapezoidal perforation  
 14.4344.00 0.5 mm trapezoidal perforation  
 14.4345.00 0.75 mm trapezoidal perforation  
 14.4346.00 1 mm trapezoidal perforation  
 14.4347.00 1.5 mm trapezoidal perforation  
 14.4348.00 2 mm trapezoidal perforation

14.4360.00 1 mm round perforation  
 14.4361.00 2 mm round perforation  
 14.4362.00 4 mm round perforation  
 14.4363.00 6 mm round perforation

**Accessories for heavy-metal- and iron-free grinding and sample preparation according to RoHS**

14.4400.00 Lid made of pure titanium and collecting vessel PTFE-coated

14.4430.32 Impact rotor with 6 ribs and cooling fins, pure titanium  
 14.4434.32 Impact rotor with 12 ribs and cooling fins, pure titanium  
 14.4437.32 Impact rotor with 24 ribs and cooling fins, pure titanium

14.4441.32 Sieve ring 0.08 mm trapezoidal perforation with reinforced edges, pure titanium  
 14.4442.32 Sieve ring 0.12 mm trapezoidal perforation with reinforced edges, pure titanium  
 14.4443.32 Sieve ring 0.2 mm trapezoidal perforation with reinforced edges, pure titanium  
 14.4444.32 Sieve ring 0.5 mm trapezoidal perforation with reinforced edges, pure titanium  
 14.4445.32 Sieve ring 0.75 mm trapezoidal perforation with reinforced edges, pure titanium  
 14.4446.32 Sieve ring 1 mm trapezoidal perforation with reinforced edges, pure titanium  
 14.4447.32 Sieve ring 1.5 mm trapezoidal perforation with reinforced edges, pure titanium  
 14.4448.32 Sieve ring 2 mm trapezoidal perforation with reinforced edges, pure titanium

**Accessories for difficult-to-mill and temperature-sensitive samples**14.4470.00 Impact bar  
(Please note: impact rotor and special sieve ring are additionally necessary!)**Sieve rings for impact bar made of stainless steel**

14.4481.10 0.08 mm trapezoidal perforation  
 14.4482.10 0.12 mm trapezoidal perforation  
 14.4483.10 0.2 mm trapezoidal perforation  
 14.4484.10 0.5 mm trapezoidal perforation  
 14.4485.10 0.75 mm trapezoidal perforation  
 14.4486.10 1 mm trapezoidal perforation  
 14.4487.10 1.5 mm trapezoidal perforation  
 14.4488.10 2 mm trapezoidal perforation

14.4490.10 1 mm round perforation  
 14.4491.10 2 mm round perforation  
 14.4492.10 4 mm round perforation  
 14.4493.10 6 mm round perforation

Sieve rings are also available in further perforations.

Order no.	Article
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**Accessories for use of the cutting rotor**14.4590.00 Cutting insert made of stainless steel  
consisting of a cutting rotor with straight cutting edges and cooling fins, sieve shells holder with fixed knives, collecting vessel with lid and labyrinth disk made of aluminium  
(Please note: sieve shells are additionally necessary!)14.4595.00 Cutting insert made of hardmetal tungsten carbide  
consisting of a cutting rotor with straight cutting edges and cooling fins, sieve shells holder with fixed knives, collecting vessel with lid and labyrinth disk made of aluminium  
(Please note: sieve shells are additionally necessary!)

14.4541.00 Set sieve shells 0.08 mm trapezoidal perforation, stainless steel  
 14.4542.00 Set sieve shells 0.12 mm trapezoidal perforation, stainless steel  
 14.4543.00 Set sieve shells 0.2 mm trapezoidal perforation, stainless steel  
 14.4544.00 Set sieve shells 0.5 mm trapezoidal perforation, stainless steel  
 14.4545.00 Set sieve shells 0.75 mm trapezoidal perforation, stainless steel  
 14.4546.00 Set sieve shells 1 mm trapezoidal perforation, stainless steel  
 14.4547.00 Set sieve shells 1.5 mm trapezoidal perforation, stainless steel  
 14.4548.00 Set sieve shells 2 mm trapezoidal perforation, stainless steel

14.4560.00 Set sieve shells 1 mm round perforation, stainless steel  
 14.4561.00 Set sieve shells 1.5 mm round perforation, stainless steel  
 14.4562.00 Set sieve shells 2 mm round perforation, stainless steel  
 14.4563.00 Set sieve shells 3 mm round perforation, stainless steel  
 14.4564.00 Set sieve shells 4 mm round perforation, stainless steel

**Sample exhaustion with Cyclone separators and for grinding large quantities**14.4312.00 Collecting vessel with lid made of stainless steel for impact rotor  
14.4520.00 Collecting vessel with lid made of stainless steel for cutting rotor**High-performance Cyclone separator**

14.4800.00 High-performance Cyclone separator made of stainless steel 304, incl. sample glass 1 litre

**Collecting vessels for high-performance Cyclone separator**

83.3250.00 Sample glass 1 litre  
 83.3260.00 Sample glass 2 litres  
 83.3270.00 Sample glass 5 litres

**Small volume Cyclone separator**14.4810.00 Small volume Cyclone separator made of plastic, incl. sample glass 500 ml  
45.8218.16 Replacement fine-dust filter 80-100 µm for small volume Cyclone separator for passive utilisation**Collecting vessels for small volume Cyclone separator**

27.1450.00 Sample glass 250 ml  
 27.1460.00 Sample glass 500 ml

**Exhaust system for high-performance and small volume Cyclone separator and for cooling the PULVERISETTE 14 premium line**

43.9070.00 Exhaust system, dust category "M" according to DIN EN 60335-2-69 for 230 V/1~, 50/60 Hz, 1000 Watt  
 43.9055.00 Fleece filter bag for exhaust system (pack = 5 pieces)<sup>1)</sup>  
 43.9052.00 Plastic bag for exhaust system (pack = 5 pieces)<sup>1)</sup>

**Certification**96.0330.00 IQ/OQ documentation  
(questionnaire format – implementation not included)**Accessories for automatic sample feeding**24.4200.00 Vibratory Feeder LABORETTE 24 with V-shaped channel and stand, incl. connection cable for automatic control via the Variable Speed Rotor Mill PULVERISETTE 14 *premium line***Certification Vibratory Feeder LABORETTE 24**96.0370.00 IQ/OQ documentation  
(questionnaire format – implementation not included)

Sieve rings are also available in further perforations.

<sup>1)</sup>Remark: One pack/one piece is included in the scope of delivery of the exhaust system.



## Grinding reports online

An extensive database of grinding reports for various materials and industries is available online at [www.fritsch-international.com/grinding-reports](http://www.fritsch-international.com/grinding-reports). It's worth taking a look!



## Practical on-site demonstration

If you would like to be convinced of the performance and ease of use of the FRITSCH laboratory instruments, we would be happy to visit you with the FRITSCH mobile laboratory and provide you on-site practical demonstrations.



## Showing you how it's done!

Our applications laboratory will conduct within the scope of a product recommendation a comminution of your material. Simply request at [www.fritsch-international.com/service/sample-analysis](http://www.fritsch-international.com/service/sample-analysis). The result will convince you.

**Or simply give us a call – our experts will be happy to assist you.**

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**[www.fritsch.de](http://www.fritsch.de)**



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