

*Knife Mill*



**IDEAL FOR**

- FOODSTUFFS
- ANIMAL FEED
- AGRICULTURE AND FORESTRY
- BIOLOGY
- PHARMACEUTICALS
- CHEMISTRY

**KNIFE 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 11

## LABORATORY MIXER – INDUSTRIAL-GRADE MILL

- Extremely fast comminution, homogenisation and mixing
- Extra strong motor power up to 1250 watt
- Knife blades with 4 cutting edges – up to 56,000 cutting processes per minute
- Up to 1,400 ml useful capacity of the grinding vessel plus Vario-Lid system for variable volume
- Variable speed settings 2,000 – 10,000 rpm, turbo function with 14,000 rpm
- Continuous, reverse and interval mode
- 20 SOPs can be saved, USB interface for SOP management and generation of grinding reports

Standard grinding vessel made of transparent, scratch-resistant, autoclavable plastic PC for optimal observation of the comminution process.

The quietly operating Knife Mill PULVERISETTE 11 is the ideal laboratory mixer for very fast and gentle comminution and homogenisation of moist, oily and fatty as well as of dry, soft, medium-hard and fibrous samples. Ideal for sample preparation in the fields of foodstuffs or animal feed testing, agriculture and forestry, biology, pharmaceuticals and chemistry.

### Reproducible comminution for a wide range of samples

The up to 1250 watt strong motor of the PULVERISETTE 11 and its special knife, fitted with four blades, grinds fast and gentle problematic samples with high fat or water content such as meat, gummi bears, chocolate or also hard samples such as dishwasher tabs or toys. This makes it a perfect all-rounder with many advantages for sample preparation in the fields of foodstuffs or animal feed testing, pharmaceuticals and chemistry and many other applications.

### Intuitive and easy operation with practical functions

Due to its modern touchscreen with colour display, the PULVERISETTE 11 enables fast access to all functions and the SOPs. The grinding time of the integrated stopwatch can be set in 0.5 second steps using a practical multifunctional dial. By the push of a button you simply change from continuous operation to interval operation for pre-crushing of harder samples resp. for better homogenisation or to the reverse mode for better mixing of the sample without having to open the mill. The parameters for interval mode can be set freely in the sub-menu.

### Your decision for professional quality

The PULVERISETTE 11 was developed specifically for utilisation under laboratory conditions and exceeds by far the performance of conventional instruments for household requirements. A safe investment in efficient working, reproducible results for reliable analyses and highest safety at the workplace.



## OUR SUGGESTION

All knives and almost all grinding vessels and lids are autoclavable for sterile comminution – a reliable protection against cross-contamination.



### Safe operation

The PULVERISSETTE 11 does not start until the grinding vessel and knife are inserted and the safety lock in the protective hood has been closed properly. The protective hood cannot be opened whilst the knife is rotating. The control system detects the vessel and prevents the setting of a too high rotational speed. The knife is securely mounted by a bayonet lock and cannot come loose even if the sample material is very hard or the start-up speed is too high.

### Variable speed settings and turbo function

The motor speed can be set digitally – in increments of a hundred between 2,000 and 10,000 rpm – making it possible to adapt the mill to the specific comminution behaviour of each sample. The additional turbo function with 14,000 rpm for up to 6 seconds facilitates the grinding of sticky and fibrous samples.

### Easy cleaning

Grinding vessel, lid and knife of the PULVERISSETTE 11 can be cleaned without a problem in a dishwasher. The knife, which is securely mounted by a bayonet lock, can be removed for cleaning with just a simple motion.



The standard knife with four blades of the PULVERISSETTE 11 can be used for comminution of nearly all materials. As further accessories we offer a sickle knife with different cutting edges and in various materials.



## Reliable representative samples

The PULVERISETTE 11 Knife Mill provides you a homogeneous sample in a very short time due to its special design. Each subsample which you take from any location in the grinding vessel is representative for the original sample and thus ensures an exact, significant analysis. And that for a wide range of different materials.

### Well-conceived down to the smallest detail

Interfering contours on the inner wall of the grinding vessel force the sample material towards the middle of the vessel and thus ensuring an efficient thorough mixing during grinding. The result: a homogeneous sample within a narrow particle size range.



### FRITSCH Advantage

#### Well-conceived knife geometry

The specially curved knife blades of the PULVERISETTE 11 achieve with up to 56,000 cutting processes per minute, significantly faster a homogeneous sample than comparable instruments at the same grinding time and rotational speed. And in the reverse mode, the PULVERISETTE 11 enables a better thorough mixing if necessary.



### FRITSCH Advantage

#### Fast cryogenic comminution in a single step

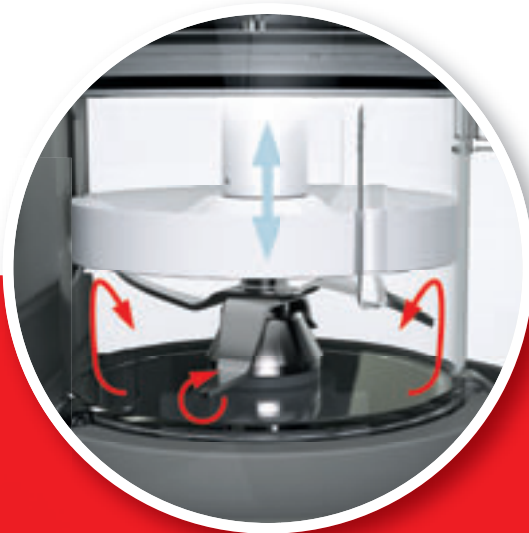
Samples which are difficult to grind such as gummi bears, chocolate or plastic toys can be embrittled with liquid nitrogen for comminution directly in the grinding vessel made of stainless steel 316L. The sample material remains 100% cold. Just select the special lid with the easily exchangeable single-use sieve insert – the reliable protection against contamination.





### **Autoclavable Vario-Lid system**

The freely adjustable Vario-Lid system made of plastic PP fulfils two important requirements at the same time: It can be used to reduce the grinding chamber volume down to 0.54 litre and to manually compress and loosen up the sample material at the beginning and at any time during comminution. Thus you always achieve a homogeneous sample in a narrow particle size range even for smaller sample quantities and for difficult-to-grind materials. The Vario-Lid system is delivered as a standard with a reduction sample pusher for moist, liquid and viscous sample materials such as tomatoes, cucumbers or yoghurt. It automatically returns rising liquids during the comminution and can be used for most sample materials. A reduction sample pusher can be ordered as an option for dry, solid samples.



### **FRITSCH Advantage**

**Single-use grinding vessels** ideal for example for use in food quality control, pharmacy, chemistry, forensics and pathology.

**Your advantage:** safe protection against cross contamination, no need for cleaning and the sample can be stored in the single-use grinding vessel.



## Clear operation advantage: Save up to 20 SOPs

### YOUR ADVANTAGES

- **20 Standard Operating Procedures can be saved and edited**
- **Up to 15 grinding sequences can be programmed**
- **Practical clear text labelling**
- **Simple operation even for changing users**
- **Integrated USB interface for SOP management**
- **Generation of revision-proof grinding reports**

A clear advantage of the PULVERISETTE 11 over comparable instruments is the possibility to program and save up to 20 Standard Operating Procedures (SOPs) and to label them with a clear text. Instead of SOP 1, 2 or 3, every user directly finds the saved program on the touchscreen for example for hazelnuts, bananas or meat. Up to 15 grinding sequences can be programmed in each individual SOP. The setting up of the SOPs is done very easily via the touchscreen and the multifunctional dial of the control panel. Via the integrated USB interface, all saved SOPs can be uploaded, exchanged and saved with the free SOP editor by laptop. Simply download the SOP Editor at [www.fritsch.de/p-11/sop](http://www.fritsch.de/p-11/sop). And upon consultation, we deliver the SOPs, which were determined for certain sample materials during an individual sample grinding (see page 11).

### Software P-11Control

With the software P-11Control, the mill can be controlled via the integrated USB port. SOPs can be edited, saved and managed directly on the connected laptop via drag & drop. Revision-proof grinding reports can be created, archived quickly and easily with the integrated report generator. The software P-11Control offers a data interface for the connection to your laboratory database.





## FRITSCH-COMPETENCE

A total of 4 patents have been granted for the FRITSCH Knife Mill PULVERISETTE 11 by the German Patent Office.

### TECHNICAL DATA

#### Electrical details

200–240 V/1~, 50/60 Hz, 1250 watt  
100–120 V/1~, 50/60 Hz, 1000 watt

#### Weight

Net 17.6 kg  
Gross 39.6 kg

#### Dimensions w x d x h

Bench top instrument 32 x 43 x 48 cm

#### Packaging w x d x h

Case 80 x 55 x 65 cm

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

$L_{pA}$  = 71 dB

(depending on the material to be ground, selected rotational speed and instrument configuration)

<b>Order No.</b>	<b>200–240 V/1~</b>	<b>100–120 V/1~</b>
	11.3020.00	11.3010.00



Cookies and vitamin tablets before and after comminution in the Knife Mill PULVERISETTE 11



Even hard materials with sticky components can be easily comminuted after embrittlement within seconds.

### APPLICATION EXAMPLES

<b>Foodstuffs</b>	Cereal bars, dried fruit, fish, meat, ham, sausages, frozen foods, vegetables, potatoes, spices, cheese, cacao nibs, nuts, dietary supplements, confectionery, salad, convenience foods, bread
<b>Animal feed</b>	Feed pellets, dog food
<b>Agriculture and forestry</b>	Grain, oilseed, seeds, hops
<b>Biology</b>	Plants, parts of plants, leaves, freeze-dried samples, straw, hay, tissue disruption
<b>Pharmaceuticals</b>	Tablets, dragées, pharmaceutical products, soaps, herbs, teas
<b>Chemistry</b>	Dishwasher tabs, detergent tabs

IQ/OQ documentation available to support equipment qualification.

### FACTS AND ADVANTAGES

- Max. feed size\* 40 mm, final fineness\* < 300 µm
- Sample quantity\* < 1,400 ml, with the Vario-Lid system < 540 ml
- Complete comminution and homogenisation in seconds
- Digital setting of the grinding time as continuous mode or between 0–360 seconds in 0.5 second steps, average grinding time\* 30 seconds
- Max. knife diameter 128 mm, max. knife peripheral speed ~ 67 m/s
- Manual and programmable interval and reverse mode
- Rotational speed regulated by microprocessor
- USB interface for SOP management and generation of grinding reports
- Safety lock of grinding vessel, knife and protective hood with stoppage monitoring
- Gas pressure springs for easy opening of the protective hood
- If the motor temperature is too high, power is reduced automatically
- Intuitive operation via colour 4.3" touchscreen and practical multifunctional dial
- Easy cleaning
- 2-year guarantee

\* depends on material



## Standard configuration and accessories

As a standard, you receive the PULVERISETTE 11 Knife Mill equipped with a 1.4 l grinding vessel made of autoclavable, transparent and scratch-resistant plastic PC, with a standard lid made of silicone and the standard knife made of stainless steel.



Grinding vessels 1.4 litre



Lids for grinding vessels



Different knives with 4 blades

### ➤ Grinding vessels 1.4 litre

In addition to the grinding vessel made of transparent and scratch-resistant plastic PC, we also offer a grinding vessel made of stainless steel 316L for cryogenic comminution and for grinding harder sample materials. Both grinding vessels are autoclavable. For grinding oily samples and for BPA-free sample preparation we recommend the grinding vessel made of Eastman Tritan Copolyester, which is plasticiser-free, resistant to chemicals and dishwasher-proof up to 80° C. The grinding vessel made of glass is autoclavable and ideal for verification of polymers.

### ➤ Lids for grinding vessels

The included standard lid made of silicone is ideal for comminution of soft, medium-hard sample materials, which don't need to be compressed. The Vario-Lid system with plunger made of plastic PP and reduction sample pusher for moist, liquid and viscous sample materials minimises the grinding chamber volume to 0.54 litre and allows for a manual compression of the sample material. A reduction sample pusher can be ordered as an option for dry, solid samples. For cryogenic comminution, we offer a special lid with single-use sieve insert for grinding vessel made of stainless steel 316L.

### ➤ Knives with 4 blades

The standard knife made of stainless steel can be used for comminution of nearly all materials due to its four blades and a well-conceived geometry. The sickle knife is ideal for grinding brittle, hard samples. For comminution of especially fibrous, tough or sinewy samples, such as fish, meat, asparagus or bamboo, we recommend the sickle knife with serrated blades made of stainless steel, which is also available TiN-coated for metal-free grinding.

### ➤ Single-use grinding vessels

We have developed an adapter for single-use grinding vessels 40 ml and 100 ml volume for the Knife Mill PULVERISETTE 11 for the comminution of not too hard materials, which are available in small pieces.

**Our suggestion:** At [www.fritsch.de](http://www.fritsch.de), you can find the corresponding element analyses with detailed information about the materials.

## ORDERING DATA

Order no. Article

### KNIFE MILL

#### PULVERISETTE 11



**Instrument incl. 1.4 litre standard grinding vessel made of autoclavable plastic PC, standard lid and standard knife made of stainless steel**

11.3020.00 For 200–240 V/1~, 50/60 Hz, 1250 watt  
11.3010.00 For 100–120 V/1~, 50/60 Hz, 1000 watt

#### Grinding vessels, 1.4 litre

11.3151.16\* Standard grinding vessel made of plastic PC<sup>1)</sup>  
11.3160.00 Grinding vessel made of stainless steel 316L<sup>1)</sup>  
11.3170.00 Grinding vessel made of glass<sup>1)</sup>  
11.3152.16 Grinding vessel made of Eastman Tritan Copolyester

#### Lids for grinding vessels

11.3203.15\* Standard lid made of silicone<sup>1)</sup>  
11.3180.00 Vario-Lid system with plunger made of plastic PP and reduction sample pusher for moist, liquid and viscous sample materials<sup>1)</sup>  
11.3189.16 Reduction sample pusher for dry, solid samples for Vario-Lid system with plunger<sup>1)</sup>  
11.3220.00 Special lid<sup>1)</sup> for cryogenic comminution with single-use sieve insert for grinding vessel made of stainless steel 316L  
11.3224.00 Set of single-use sieve inserts  
(set = 10 inserts)

#### Knives

11.3204.00\* Standard knife made of stainless steel<sup>1)</sup>  
11.3208.00 Sickle knife made of stainless steel<sup>1)</sup>  
11.3210.00 Sickle knife with serrated blades made of stainless steel<sup>1)</sup>  
11.3215.00 Sickle knife with serrated blades, TiN-coated<sup>1)</sup>

#### Single-use grinding vessels

11.3230.00 Adapter for single-use grinding vessel 40 ml and 100 ml volume  
83.3280.00 Set single-use grinding vessels 40 ml volume made of plastic PP  
(set = 10 pieces)  
83.3282.00 Set single-use grinding vessels 40 ml volume made of plastic PP  
(set = 100 pieces)  
83.3285.00 Set single-use grinding vessels 100 ml volume made of plastic PP  
(set = 10 pieces)  
83.3287.00 Set single-use grinding vessels 100 ml volume made of plastic PP  
(set = 100 pieces)

#### Software

11.3990.00 Software P-11Control for Windows  
for automatic control of the mill via USB, for editing, saving and  
managing of the SOPs with grinding report generation

#### Further accessories

83.4075.00 Scraper

#### Certification

96.0350.00 IQ/OQ documentation  
(questionnaire format – implementation not included)

Further knives on request!

<sup>1)</sup> Remark: All parts in contact with the sample are autoclavable.

\* Included in the basic price of the instrument; when ordering a deviating specification of the standard accessories, please specify the exact article number of the part to be replaced.

## FASTER WORKING

Since the grinding times of the PULVERISETTE 11 are so short so that your samples can be processed very fast, it is worthwhile to order several grinding vessels right away for parallel use.



**Worldwide at  
your service  
in 116 countries**

### Always nearby

Wherever you use your FRITSCH instruments: we are nearby. With direct contact persons for application consulting and technical service – and in Europe with the FRITSCH mobile laboratory for practical demonstrations on-site.

### 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!

### Showing you how it's done!

Our applications laboratory will be more than glad to help you find the right Mill for your specific task. If desired, within the scope of a product recommendation, we will conduct 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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