

# Operating Instructions

## Cutting Mill „ pulverisette 15 “



Fritsch GmbH  
Laborgerätebau  
Industriestrasse 8  
D - 55743 Idar-Oberstein

Phone: +49 (0)6784/ 70-0  
Fax: +49 (0)6784/ 70-11  
E-Mail: [info@fritsch.de](mailto:info@fritsch.de)  
Internet: <http://www.fritsch.de>

Fritsch GmbH, Laborgerätebau has been certificated by the TÜV-Zertifizierungsgemeinschaft e.V. on June 24, 1994.



An audit certificated the accordance of the Fritsch GmbH to the DIN EN ISO 9001.

The enclosed declaration of conformity calls the directives which the „pulverisette 15“ corresponds to. This permits us to mark the instrument with the CE-Sign.



Instrument number 15.40XX.00  
Applies as of serial number 2000

## Table of contents

	page
<b>1</b>	<b>General Information / Introduction ..... 1</b>
1.1	Notes about Operating Instructions ..... 1
1.2	Explanations of the signs at the instrument and in the operating instructions ..... 2
1.3	Brief Description of the Instrument ..... 3
1.3.1	Applications ..... 3
1.3.2	Method of Operation ..... 3
1.3.3	Drive Motor ..... 3
1.4	Technical Data ..... 5
<b>2</b>	<b>Operating Safety ..... 6</b>
2.1	General Safety Instructions ..... 6
2.2	Operators ..... 7
2.3	Protective Equipment ..... 7
2.4	Danger Points ..... 8
2.5	Electrical Safety ..... 8
<b>3</b>	<b>Installation ..... 9</b>
3.1	Unpacking ..... 9
3.2	Transport ..... 9
3.3	Erection ..... 9
3.4	Ambience conditions ..... 10
3.5	Electrical Connection ..... 10
3.5.1	Adapting the cutting mill to the available supply ..... 10
3.6	Before Switching On for the First Time ..... 10
3.7	Switching On for the First Time / Test for Correct Functioning ..... 10
<b>4</b>	<b>Working with the Cutting Mill ..... 11</b>
4.1	Preparation for milling ..... 11
4.1.1	Insert sieve ..... 11
4.1.2	Checking the blade gap ..... 11
4.1.3	Closing the cutting mill ..... 11
4.2	Milling process ..... 12
4.2.1	Attaching the collector ..... 12
4.2.2	Insert the material to be cut ..... 12
<b>5</b>	<b>Cleaning ..... 13</b>
5.1	Cleaning the mill chamber ..... 13
<b>6</b>	<b>Maintenance ..... 14</b>
6.1	Removal and fitting of cutting blades ..... 15
6.1.1	Removal and fitting of rotating blades ..... 15
6.1.2	Removal and fitting of fixed blades ..... 15
<b>7</b>	<b>Warranty ..... 16</b>
<b>8</b>	<b>Troubleshooting Checklist ..... 16</b>

# 1 General Information / Introduction

## 1.1 Notes about Operating Instructions

- The copyright to these technical documents is the property of Fritsch GmbH, Manufacturers of Laboratory Instruments.
- These operating instructions are not to be reprinted or copied without the express approval of Fritsch GmbH.
- Please study these instructions carefully before attempting to operate the machine.
- All operators must be familiar with the contents of the operating instructions.
- Please observe all notes concerning your safety.
- The cutting mill was designed with the user's safety in mind, however inherent risks cannot be excluded. Follow the advice in these instructions to avoid risks to users.
- The symbols in the right hand margin highlight the risks described in the text. Symbols are also to be found on the instrument warning users of possible risks. Warning symbols are surrounded by a triangle.
- These operating instructions do not constitute a complete technical description. They describe only the details required for safe operation and maintenance for usage under normal conditions.

## 1.2 Explanations of the signs at the instrument and in the operating instructions

<p>Attention! Warning against danger spot! Observe operating instructions!</p>	
<p>Attention! Mains voltage!</p>	
<p>Attention! Risk of explosion!</p>	
<p>Attention! Hot surface!</p>	
<p>Attention! Inflammable substances!</p>	
<p>Wear protective gloves!</p>	
<p>Wear ear protectors!</p>	
<p>Wear eye shield!</p>	
<p>Do not walk under suspended load!</p>	

## 1.3 Brief Description of the Instrument

### 1.3.1 Applications

The cutting mill can be used for rapid comminution of soft to medium-hard and fibrous materials.

plants:	sheets	spices	wood	corn	malt
	straw	peat	roots	tobacco	
drugs:	dragée	tablets			
foods:	maize	confection- ery	pasta	dried meat	
cellulose:	fibre	fabric	card- board		paper
miscella- neous:	iron-free refuse	animal feed pellets	horn	bone	plastics
	sheet rubber	coal	leather	....	

### 1.3.2 Method of Operation



Material to be cut is fed from a hopper into the cutting chamber by means of a pusher. Here, four rotating blades work against three fixed blades to chop up the sample. The bottom of the cutting chamber is closed by a sieve insert. Comminuted material passes through the sieve and is collected in a pot.

### 1.3.3 Drive Motor

Driven by: 1~100/ 120 V Motor or  
1~230 V Motor or  
3~230/400 V Motor.

The machine is driven by a three-phase a.c. motor or an a.c. motor with no mechanical brake.

### **Direction of rotation of the drive motor**

Viewed from the drive side, the 3-phase AC motor should rotate **anti-clockwise**. (Viewed from the front, looking at the cutting mill, anticlockwise; viewed from the rear, looking at the motor cooling grid, clockwise.) The single-phase AC motor is factory-set to rotate anticlockwise.

See:

- DIN VDE 0530 part 8 “Terminal marking and direction of rotation”
- DIN VDE 0530 Teil 7 / EN 60 934-7 “Type codes”.

The direction of rotation of the 3-phase motor can be changed by swapping two of the leads, L1, L2 and L3 (either at the motor terminals or in the plug).

**The direction of rotation may only be changed by a trained electrician.**

## 1.4 Technical Data

### Dimensions and weight

Dimension on the stand: 1450 x 620 x 580 mm

Dimension on the table: 690 x 420 x 480 mm  
(height x width x depth)

Weight: 42 kg (net weight)  
72 kg (gross weight)

### Noise level

The noise level is approx. 99dB (A).

<b>Voltage</b>	1~ 115 / 230V ± 10%	3~ 230 / 400V ± 10%.
<b>Current consumption</b>	100-120 V / 16,5 A 200-240 V / 9,5 A	230 V / 5,7 A 400 V / 3,3 A
<b>Power consumption</b>	1,76 / 2,1 kW with high loading (significantly less in normal use).	1,9 kW with high loading (significantly less in normal use).

Transient overvoltages according to overvoltage category II allowed.  
(See also section [3.5 Electrical Connection](#))

### Electric fuses

- Thermal protection switch (motor protection switch); ready for operation again automatically after cooling down (a few minutes).

### Material

- Feed particle size maximum 60 mm
- Feed amount maximum 800 ml

### Final fineness

Achievable mean final fineness 0.25-6 mm depending on sieve.



## 2 Operating Safety

### 2.1 General Safety Instructions

- Read the operating instructions carefully before use.
- The instrument can only be used for the purpose described in section [1.3.1 Applications](#).
- We recommend that a safety logbook should be kept in which all work (service, repairs etc.) carried out on the machine should be entered.
- Use only original accessories and original spare parts. Failure to do so may call into question the performance of the instrument.
- Do not use damaged accessories.
- The operators must be familiar with the contents of the operating instructions.  
To this end, for example, the operating instructions must be kept with the instrument.
- Do not remove labels.
- Protective devices must not be made unserviceable or removed.
- Unauthorized modification of the instrument or any part thereof will result in the loss of the conformity to European directives which is asserted by Fritsch and the warranty.
- Wear protective gloves while cleaning the cutting chamber.
- Wear ear protectors if the noise level is higher than 99dB(A).
- Wear eye shield!
- Behaviour at all times must be such as to strictly preclude any risk of accidents.
- Furthermore, the MAC values at place of work specified in the pertinent safety regulations must be adhered to. Where applicable, ventilation must be provided or the instrument must be operated under an exhaust hood.
- When oxidizable materials such as metals, organic materials, wood, coal, plastic, etc. are ground or sieved, the risk of spontaneous ignition (dust explosion) exists whenever the fine particles exceed a specific percentage. While such materials are being ground or sieved, it is therefore necessary to take special safety precautions (e.g. wet grinding or wet sieving) and the work must be supervised by a specialist.
- The instrument is not explosion-proof and is unsuitable to grind or sieve materials which are explosive, combustible or promote combustion.
- Do not run the cutting mill unsupervised.



## 2.2 Operators

- No one other than authorized persons should operate the instrument and it must be serviced and repaired by trained specialists.
- No one suffering from medical problems or under the influence of medications, drugs, alcohol or overtiredness should be permitted to operate the instrument.

## 2.3 Protective Equipment

**Protective equipment must be used as intended and must not be rendered disabled or dismantled.**

**All protective devices should be regularly checked for completeness and to ensure that they are functioning correctly. See also section [6 Maintenance](#).**

The cutting mill has an extensive safety system:

1. Protective switch on mill cover

This monitors whether the cover is closed and prevents the mill from operating if it is open.

⇒ The mill will not start if the mill cover is open

2. Protective switch on collector

During operation this monitors correct seating of the collector (3.5-litre pot or 30-litre container) and prevents the mill from starting in the absence of a collector.

⇒ The mill will not start if the collector is not correctly attached.

**Both switches meet the personal safety requirements**

**The protective switches do not latch the hopper lid and collector.**

**If the lid is opened or the collector is removed, the motor will stop.**

## 2.4 Danger Points

- Danger of injury from sharp blades!
- Danger of pinching when closing hopper lid!
- Danger of pinching when opening the upper half of the housing! (Carefully place the housing half on the support provided)
- Danger of pinching when closing the upper half of the housing!
- Danger of pinching under the hopper lid!
- Danger of pinching when fitting and releasing the collector!

## 2.5 Electrical Safety

### General

On turning the switch to **Stop (0)** the motor is switched off.

⇒ The mill will stop within seconds.

- The collector can be detached.
- The mill cover can be opened.

### Protection against Restarting

If power fails during operation, the motor is switched off.

⇒ The mill will stop within seconds.

- The collector can be detached.

The mill does not restart when the supply returns.

⇒ The mill is secured against restarting.

⇒ On turning the switch to **Start (I)**, the motor is switched on and the mill takes up its function.

### Overload Protection

In the event of overloading, a motor current protection switch will switch off (the rotary switch returns to the STOP (0) position).



## 3 Installation

### 3.1 Unpacking

- Remove the nails with which the hood is fastened on the transport pallet. The hood either a wooden box or a cardboard box placed on the transport pallet.
- Lift the hood off the transport pallet.
- Check that the items supplied correspond to your order before proceeding.

### 3.2 Transport

- Transport the machine on the transport pallet using a fork lift truck or hand fork lift truck.
- To carry the machine, grip it below at the front and the back.

**Carrying the machine will require at least two persons.**

### 3.3 Erection

- The cutting mill is secured to the transport pallet by four screws. Undo the four screws.
- Lift the cutting mill off the transport pallet.

**Lifting the machine down will require at least two persons.**

Position the cutting mill on

1. a strong table or bench and screw the fixing motor base to the top so that the collector flange projects over the edge - or
2. screw the cutting mill onto its stand so that it is above the two feet of the stand.

**Please ensure that the machine is fastened securely, as considerable transverse forces do occur.**

- **Ensure that there is good access to the cutting mill. Ensure that to the right of the mill, there is sufficient space for the housing upper section including the funnel to be opened.**
- **Do not block the ventilation louver at the rear. There is a danger of overheating if the louver is blocked.**



### 3.4 Ambience conditions

- Use the instrument only inside.
- The air must not contain any electrical conductive dust.
- The ambient temperature must be between 5 and 40°C.
- Height up to 2000m M.S.L.
- Maximum relative humidity of air 80% temperature up to 31°C, linear decreasing down to 50% relative humidity of air at 40°C
- Contamination level 2 (IEC 664)

### 3.5 Electrical Connection

Before making the connection, compare the voltage and current values shown on the nameplate with the values of the mains supply to which the machine is to be connected.

(See section [1.4 Technical Data](#))

#### 3.5.1 Adapting the cutting mill to the available supply

Changing the required supply voltage from 230 ~3 to 400 ~3 volts and or changing the connecting cable may only be carried out by a trained electrician.

### 3.6 Before Switching On for the First Time

The rotor must be checked to see that it rotates freely. For this purpose, release the knurled knob on the mill cover and open the cover. If the rotor turns freely by hand, close the cover again.

If the rotor does not turn, see section [4.1.2 Checking the blade gap](#).

**Attention: danger of injury from sharp blades**

### 3.7 Switching On for the First Time / Test for Correct Functioning

Switch on the machine only when all the work described in section [3 Installation](#) has been done.

Switching on: turning the switch to “Start” **(1)**

Switching off: turning the switch to “Stop” **(0)**

## 4 Working with the Cutting Mill

### 4.1 Preparation for milling

#### 4.1.1 Insert sieve

To insert the sieve, open the mill cover and insert the sieve from the front or loosen the knurled knob on the left side, open the upper housing halves and insert the sieve.

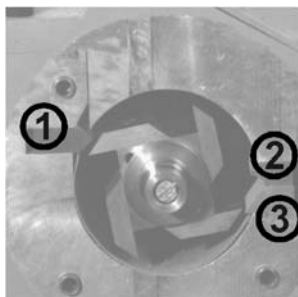
The welded part of the sieves have to fit left justified in the grinding chamber, i. e. the openings of the trapezoidal perforation are directed to the rotating rotor.

Close the housing halves and screw the knurled knob tight. Turn the cutting rotor carefully by hand. The rotor must turn freely. If this is not the case, see sections [4.1.2 Checking the blade gap](#) and [6.1 Removal and fitting of cutting blades](#).

**Attention:** danger of injury from sharp blades

#### 4.1.2 Checking the blade gap

The rotating blades must not touch the fixed blades – the gap between them is set at works:



0.2 - 0.3 mm for fixed blades

The rotating blades must be set parallel to the fixed blades.  
Turn the cutting rotor carefully by hand.



**Attention:** danger of injury from sharp blades

If the rotor cannot be turned, see section [6.1 Removal and fitting of cutting blades](#).

#### 4.1.3 Closing the cutting mill

Before closing the mill cover, please check:

- that the cutter rotor and sieve are firmly seated,
- that the conical guide on the cutting rotor is clean,
- that the conical guide in the mill cover is clean.

Close the mill cover and screw fast with the knurled knob – the safety switch should be actuated.

## 4.2 Milling process

### 4.2.1 Attaching the collector

Engage the flange of the choppings collector (3.5-l pot or 30-l container) in the toggle catches and close both toggles at the same time – the safety switch should be actuated.

### 4.2.2 Insert the material to be cut

**Note:** first turn on the cutting mill, then insert the material.

1. Push in the pusher,
2. Turn on the mill,
3. Open the hopper,
4. Insert the material to be cut,
5. Lift pusher carefully to the end-stop,
6. Slowly lower the pusher and push the material into the cutting chamber.
7. Note that the material may become heated – allow cooling pauses if necessary!
8. When milling is finished: carefully release the collector latches.  
Release both latches together.

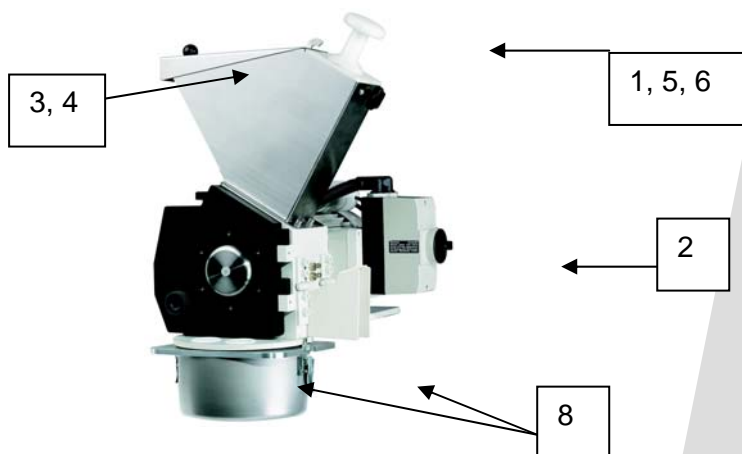


#### ATTENTION:

Only insert as much material as the machine can reasonably handle. Excessive quantities can block the mill.

If the mill is blocked, switch it off and clear it of material.

Before restarting, check the blade gap (see section [4.1.2 Checking the blade gap](#)).



## 5 Cleaning

**Disconnect mains connector before starting any work.  
Disconnect mains connector and secure instrument against being  
turned on again accidentally!**

The mill casing can be wiped off with a damp cloth.

**Do not allow any liquids to seep into the machine.**

### 5.1 Cleaning the mill chamber

Open the laboratory cutting mill:

- Open the cover
- Set the rotary blade in a vertical position
- Open the upper housing halves
- Remove the sieve

It is recommended that the cutting chamber is cleaned with a brush and vacuum cleaner or with compressed air.

**Attention:** danger of injury from sharp blades



## 6 Maintenance

**Disconnect mains connector before starting any work.  
Disconnect mains connector and secure instrument against being turned on again accidentally!  
When maintenance work is being performed, this should be indicated with a warning sign.**

Functional part	Function / Form	Assay	Maintenance interval
Safety switch 1 (actuated by closing mill cover)	Prevents starting	Open cover: rotary switch will not stay on the on position but jumps back. Attention!! If the switch is faulty, the mill will start, Keep away from rotating blades.	Check switch before each use (replace if defective)
Safety switch 2 (actuated by attaching collector)	Prevents starting	Collector not attached: rotary switch will not stay in the on position but jumps back. Attention!! If the switch is faulty, the mill will start, Keep away from rotating blades.	Check switch before each use (replace if defective)
Conical guides on cutting rotor and cover	Guide rotor	Cleaning	Before each use
Gap between rotating and fixed blades	Cutting action	Check gap	Visual check before each use
Gap between rotating and fixed blades	Cutting action	Check gap	Measure every 500 hours
Rotary bearings	Permanent lubrication	Play	2,000 hours
Drive motor	Permanent lubrication	Play	4,000 hours
Silicone rubber cover seal	Sealing	Distortion and soiling	Before each use

## 6.1 Removal and fitting of cutting blades

Depending on the materials chopped and the operating hours, the rotating blades must be changed or, like the fixed blades, sharpened or replaced.

### 6.1.1 Removal and fitting of rotating blades

To remove the rotating blades, open the upper part of the housing (see section [5.1 Cleaning the mill chamber](#)). The rotating blades are then freely accessible. The fixing screws can be loosened with a 6-mm hexagonal key.

When fitting, first align only one blade parallel to the edge of the rotor and screw it fast.

⇒ This blade is used to adjust the fixed blades.

The remaining three rotating blades are not fitted until the fixed blades have been fitted and/or adjusted, and are set for a spacing of 0.2 – 0.3 mm from the left-hand fixed blade.

### 6.1.2 Removal and fitting of fixed blades

To **remove** one of the fixed blades, loosen the middle fixing screw and withdraw the blade.

Before **fitting** the fixed blades, at least one rotating blade must be installed.

**The fixed blades** are held in position by the middle fixing screw and the two outer pressure screws.

The gap between this blade and the installed rotating blade is adjusted to 0.2 – 0.3 mm (80 g/m<sup>2</sup> printing paper folded in two).

**Attention:**

After setting the fixed blades, be sure to tighten the fixing screws.

After fastening the fixed blades, the remaining 3 rotating blades are fitted and screwed tight (see above).

## 7 Warranty

The warranty card accompanying this instrument must be returned to the manufacturer, duly filled out, in order for the warranty to become effective.

We, Fritsch GmbH, Germany, our application technology laboratory and our agent in your country will gladly provide advice and assistance with this instrument.

Always include the serial number shown on the nameplate with any queries.

## 8 Troubleshooting Checklist

Functional error	Possible cause	Corrective measure
Mill fails to start	No power connected	Insert plug
	Safety switch 1 open	Close cover properly
	Safety switch 2 open	Fit collector properly
Rotor does not turn	Blade gap incorrect	Readjust blade gap, see section <a href="#">4.1.2 Checking the blade gap</a> , <a href="#">6.1 Removal and fitting of cutting blades</a>
Mill stops during operation	Motor overheated	Check fan, allow mill to cool
	Overload, Motor protection switch actuated	Allow mill to cool, clear of material, reduce material feed rate
Poor milling result	Incorrect direction of rotation	Check rotation: Anticlockwise from drive side
Material escapes	Cover leaking	Replace seal
	Tightening screw loose	Tighten screw
	Defective sealing ring	Replace sealing ring
Runs rough with heavy vibration	Uneven setting of rotary blades	Adjust rotating blades
	Cutting rotor dirty	Clean cutting rotor
	Feet standing uneven	Ensure machine stands firm
	Incorrect direction of rotation	Check rotation: Anticlockwise from drive side