

Laboratory Mill 3310

Operation Manual



LABORATORY MILL 3310

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PACKING LIST LABORATORY MILL 3310

THIS DELIVERY CONTAINS:

Part No.	Fig	Description
1 x 03.30.1X		Laboratory Mill 3310, including:
1 x 31.02.60	A	Plastic funnel
1 x 33.14.10	B	Sample container with lid
1 x 31.14.40	C	Brush for cleaning
1 x 10.01.18	D	Mains power cable, (For 230 V ~ operation), or
or		
1 x 10.01.19	D	Mains power cable, (For 115 V ~ operation)
1 x		Operation manual Laboratory Mill 3310



Figure 1. Laboratory Mill 3310 with accessories.

SPARE PARTS SUPPLIED

1 x 33.14.10 Sample container with lid

Retain all packing materials for future possible service transport.

CHECK YOUR DELIVERY FOR ANY OPTIONAL ACCESSORIES ORDERED.

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SAFETY INSTRUCTIONS



WARNING: To prevent operator injury or damage to the apparatus, verify that the line voltage is correct **before** connecting to the line power. Check details on the apparatus name plate. Also ensure the line power cable is connected to a line power outlet that is provided with a protective earth ground contact.
In case the power cable connector must be replaced, the replacement must only be made by qualified personnel.

1. The mill must be placed on a stable and horizontal surface.
2. **WARNING.** The mill is only intended for use with agricultural products such as grain. In case you wish to grind other material contact Perten Instruments or your local representative.
3. **WARNING.** The mill **must** be disconnected from the power supply before changing the grinding discs.
4. **CAUTION.** The milling chamber door is equipped with a safety switch. The mill cannot be started with the door open. The mill will stop automatically when the door is opened. Periodically check that the automatic stop functions, once a week, by starting the mill without sample and then carefully opening the door. In case the automatic stop should not function, the mill must not be operated. In such case, contact Perten Instruments or your local supplier.



Figure 2. Milling chamber door safety switch (A).

INSTALLATION INSTRUCTIONS

WARNING: To prevent injury or damage to the apparatus, verify that the line voltage is correct **before** connecting to the line power. Check details on the apparatus name plate. Also ensure the line power cable is connected to line power outlet this is provided with a protective earth ground cable.

Inspection of the milling chamber

1. The mill must be placed on a stable and horizontal surface.
2. The mill should be disconnected. Open the door to the milling chamber. Check that the milling chamber is empty and clean. Check that the stationary grinding disc on the door and the rotating grinding disc in the chamber are properly seated. The grinding disc is fastened by rotating the centre nut anti-clockwise. The mill is, unless otherwise ordered, delivered with a set of medium discs no 1. A "1" is punched close to the centre hole of the rotating disc. Close the door to the milling chamber.
3. After verifying line voltage, connect the mill to the line power.

NOTE: The mill should not be started at temperatures below +5°C. Allow the mill to reach room temperature.

Fitting the funnel and sample container

1. Put the funnel in the inlet of the feed control. Make sure the funnel fits tight against the shoulder and the bottom in the inlet. Compare with figure 3.
2. Push the sample container in position on the adapter on the mill outlet. Compare with figure 3.

NOTE: The milling chamber door is equipped with a safety switch. The mill will not start with the milling chamber door open.



Figure 3.

From top to bottom:

- A. Plastic funnel mounted on feed control,
- B. Feed control on milling chamber door,
- C. Sample container positioned on the milling chamber outlet,
- D. Start and stop pushbuttons.
- E. Disc distance setting knob.

GENERAL DESCRIPTION

The Laboratory Mill 3310 is a disc type mill with one stationary and one rotating disc. The rotating disc rotates at high speed, approx. 2700 RPM for 50 Hz and 3240 for 60 Hz. The sample is rapidly crushed between the two discs and collected in a sample container. The rapid operation and the design of the discs minimize the heat development. Change of moisture content is thus virtually eliminated. A typical sample size is 15-25 g.

The Laboratory Mill 3310 is ideal for sample preparation for the oven moisture test.

It is also adopted for the AACC method no 55-30 Particle Size Index (PSI) for Wheat Hardness.

The grinding coarseness of the mill can be varied by changing distance between the discs. It can also be varied with different types of discs. As standard the mill is delivered with disc type no 1, medium, but one finer and one coarser can be supplied as option.

The mill is especially suitable for low fat grain such as wheat, rye and barley but also oilseeds can be ground. The setting of the disc distance will vary depending on material to be ground.

Plant material can generally be ground after drying (in for example a commercial microwave oven) and pre-cutting.

DIRECTIONS FOR USE

NOTE: The mill has a special motor with a low starting force. It is most important to control that the milling chamber is empty before starting the motor. The funnel should also be empty at start.

Particle size

The particle size, or the coarseness of the ground material can be adjusted by adjusting the distance between the grinding disks. Position 0 provides the finest grind and position 6 the coarsest grind.

The following particle size analysis for a wheat sample provides a guideline (A total of 50 g ground sample was sieved in a laboratory plan sifter for 15 minutes using sieving aids):

Wheat, approx. 12% moisture content. Results with medium grinding discs.						
Sieve	Position 0	Pos. 1	Pos. 2	Pos. 3	Pos. 4	Pos. 6
>1.7 mm	0 %	0 %	0 %	0.1 %	0.5 %	9 %
>1.0 mm	0.1 %	2 %	11 %	26 %	55 %	64 %
>0.5 mm	27 %	55 %	60 %	49 %	31 %	16 %
<0.5 mm	73 %	43 %	29 %	25 %	13 %	11 %

Moisture analyses

The determination of moisture content is specified in e.g. ICC Standard No. 110/1.

The original sample must have a moisture content between 7 and 17%. The ground material must be smaller than or equal to 1.7 mm, with less than 10% by weight larger than 1 mm and more than 50% by weight smaller than 0.5 mm.

In general this means that position 0 should be used.

A quantity of the sample which is a little larger than the amount intended for the test, which must be at least 5 g, is ground rapidly. Generally a duplicate determination is carried out.

To prevent any moisture loss, it is recommended that not more than 15 g should be ground which will be adequate for two moisture determinations.

Operation

1. Set the coarseness according to requirements using the disc distance setting knob on the mill.
2. Switch on the mill by pressing the start button.
3. Close the feed control and pour the sample into the funnel.
4. Feeding rate is adjusted by the feed control. See figure 4. Open the feed control approx. 3 cm, which carefully feeds the sample into the mill. The mill has a capacity of approx. 5 gram per second. For any other grinding than for moisture test it is recommended to use a slower feeding for better milling result.

In general, feeding rate is dependent on moisture content. The higher the moisture content is, the slower the feeding rate should be.



Figure 4. Feed control (A).

5. When all the grain has passed through the mill, close the feed control fully and allow the mill to run another 5 seconds to clean out the milling chamber. Switch off the mill.
6. Remove the sample container and brush any meal adhering on the walls of the milling chamber outlet into the container. Mix the ground sample well and store in an air-tight container.

Cleaning

Open the milling chamber door and clean the discs, the milling chamber and the outlet as shown in figure 5 and 6.



Figure 5. Cleaning of the milling chamber and discs.



Figure 6. Cleaning of the milling chamber outlet.

MAINTENANCE

Change of grinding discs

WARNING: The mill **must** be disconnected from the power supply before changing the grinding discs.

NOTE: To retain the same grinding fineness before changing the grinding discs, the distance between the discs has to be checked and corrected in connection with the change.

1. Disconnect the mill from the power supply and open the door to the milling chamber.
2. Loosen and remove the rotating grinding disc by unscrewing the centre nut. The centre nut is REMOVED by turning it CLOCKWISE. Use a 14 mm spanner for the nut and prevent the disc from rotation by locking the disc with a screw driver. See figure 7. Remove the old disc by pulling the "wing" on the disc with a pipe grip or similar and pushing it outwards with a screwdriver. See figure 8.



Figure 7. Loosening the center nut. Figure 8. Pulling out the disc. Figure 9. Position of stationary disc.

3. Fit the new grinding disc and fasten the nut (anti-clockwise).
4. Unscrew the stationary grinding disc from the mill door (2 screws) and remove it. Make sure to clean the door behind the disc thoroughly from any material.
5. Fit the new stationary disc with the new screws supplied with the new disc.

NOTE: Be careful putting the new disc into correct position. The hole is not symmetric. See figure 9.

At change of the discs, there may be a need to replace the nut and the key in the shaft.

Part No.	Description
33.12.22	Nut for grinding disc
33.12.28	Key in shaft

Adjustment of disc distance

NOTE: The milling chamber must be empty when adjusting the distance setting.

1. Turn the distance setting knob on the mill clockwise to position 6.
2. Connect the mill to power supply and start the mill.
3. Turn the knob **slowly** anti-clockwise towards position 0 until you hear that the grinding discs **touch** each other.
4. Turn back the knob clockwise **one step** and stop the mill.
5. Loosen the hexagon bolt (A) of the knob (see figure 10) and set the knob to position 0. Lock the bolt. Use a 4 mm hexagon key for the bolt.



Figure 10. Adjustment knob with hexagon bolt (A).

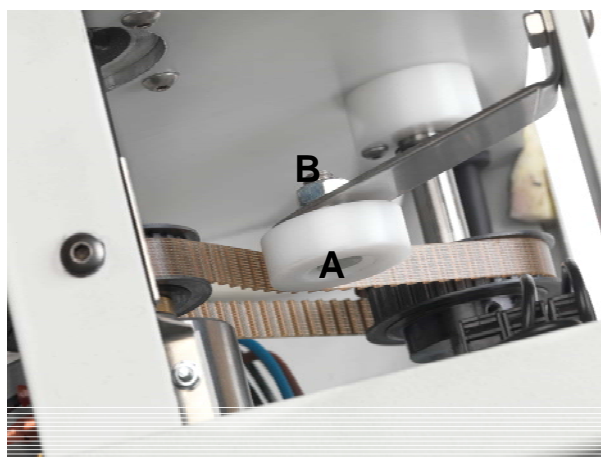


Figure 11. Belt tension wheel.

Tension control of the belt for disc distance

WARNING: The mill **must** be disconnected from the power supply before opening the mill for belt tension control.

1. Remove the mill cover. Use a 2.5 mm hexagon key to remove the 8 screws.
 2. Check that the tension of the belt is fairly tight. If not, loosen the position of the white wheel with an 11 mm socket wrench on the wheel side (A) and a 13 mm spanner on the nut (B) (see figure 11). Push the wheel towards the belt and secure it with the socket wrench and the spanner.
 3. Put back the cover on the mill and connect to power.
- The mill is now adjusted and ready for use.

THERMAL OVERLOAD RELAY

The Laboratory Mill 3310 is equipped with a thermal overload relay for the motor. If the current to the motor is too high the overload relay will cut the current. The relay is situated inside the mill and has an automatic reset. If the relay is released, let the motor rest for a while before restarting the mill.

If, for any reason, the mill cannot be restarted, check the reset of the relay as described below.

WARNING: The mill **must** be disconnected from the power supply before opening the mill for resetting the thermal overload relay.

1. Remove the mill cover. Use a 2,5 mm hexagon key to remove the 8 screws.
2. Reset the relay by pushing the red pushbutton (A) on the relay (see figure 12).
3. Put back the cover on the mill and connect to power.

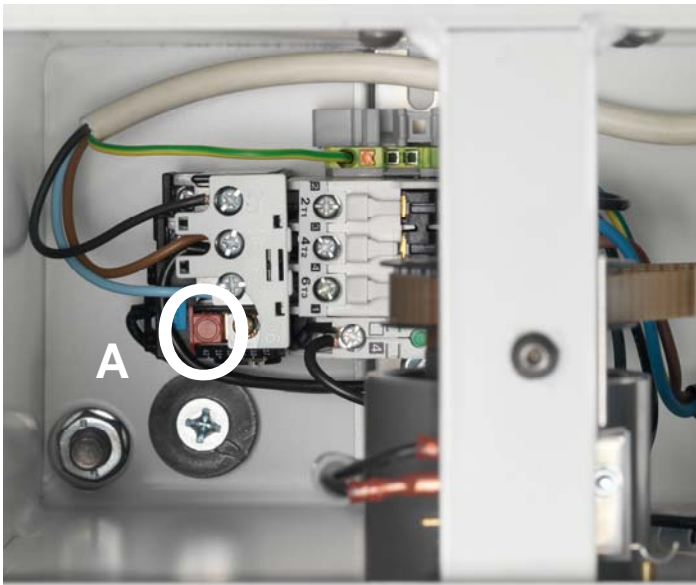


Figure 12. Pushbutton (A) for resetting the relay in the mill.

GRINDING DISCS FOR LABORATORY MILL 3310

There are three versions of the grinding discs available. All three versions are 75 mm in diameter but the teething are different for different coarseness of ground sample. As standard the mill is delivered with disc type no. 1

Type	Article number (complete set)	Teething		Remark
		Stationary	Rotating	
1	33.12.10	3	4	Medium
2	33.12.11	3	3	Fine, PSI test.
3	33.12.12	2	3	Coarse

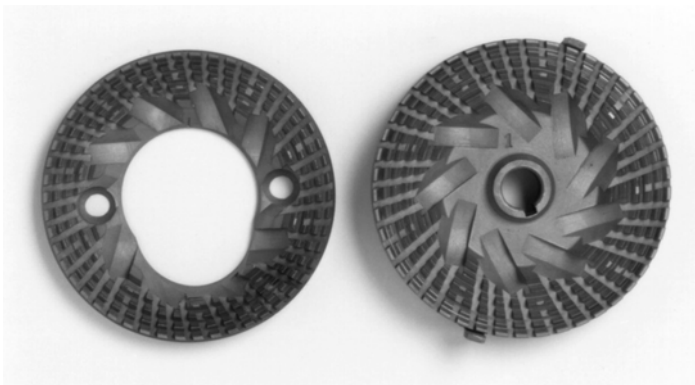


Figure 13. Medium discs. For moisture determination grinding.

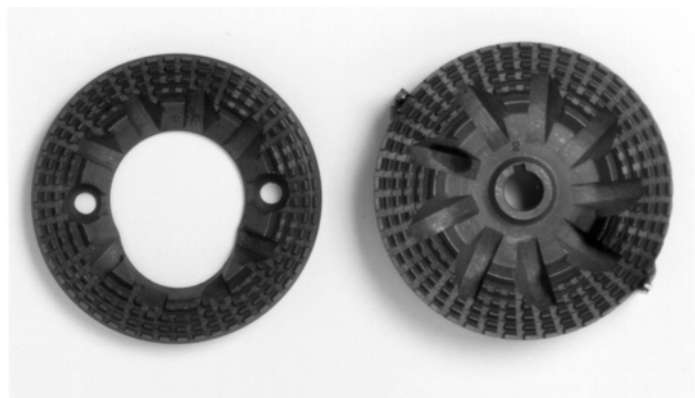


Figure 14. Fine discs. Required for the PSI wheat hardness test.

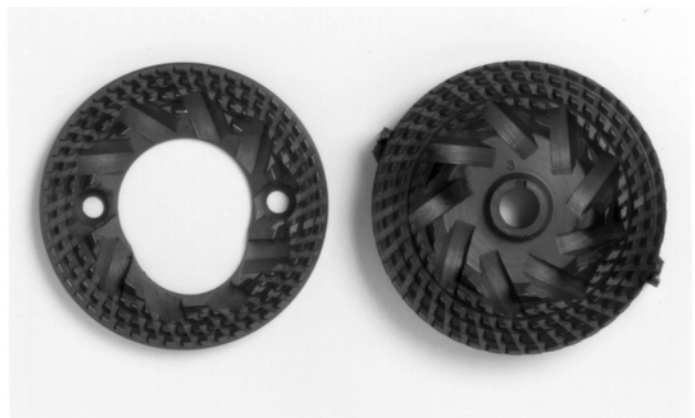


Figure 15. Coarse discs.

TECHNICAL SPECIFICATIONS

Power requirement:	220-240 V~, 1-phase 50 Hz or 1-phase 60 Hz, or 110-120 V~, 1-phase 50 Hz or 1-phase 60 Hz 250 W (refer to apparatus name plate),
Fuses (internal):	Thermal overload relay (automatic reset).
Environmental conditions:	Indoor use. 5-40 °C ambient temperature. (See note below). Maximum relative humidity 80% for temperatures up to 31 °C decreasing linearly to 50% relative humidity at 40 °C ambient temperature.
Acoustic noise emission:	< 70 dB(A), operator position, normal operation.
Dimensions:	(HxDxW) 440 x 550 x 260 mm
Net weight:	33 kg

Note: The environmental conditions ambient temperature range only refers to the temperature range in which the apparatus can be safely used. Temperature variations may affect the analysis result.

DECLARATION OF CONFORMITY

We: Perten Instruments AB
Box 5101, S-141 05 Kungens Kurva, SWEDEN

declare under our sole responsibility that the product:

Laboratory Mill 3310
From serial number 100107

to which this declaration relates is in conformity with the provision of Directive:

89/392/EEG Machinery Directive,
93/44/EEG, 93/68/EEG Amendments
89/336/EEG EMC Directive

Place and date of issue:

Huddinge, SWEDEN, 1 June 2010

A "Declaration of Conformity" in accordance with the above has been made and signed and is on file at Perten Instruments AB, SWEDEN.