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PFEUFFER

Operating instructions

Electronic moisture meter **HOH-EXPRESS**

HE 50

for cereals, oil seeds and legumes



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Revision 7/17.11.2020

Translation of the original operating instructions



These operating instructions form part of the moisture meter **HE 50** and must be available to the operating personnel at any time. They are intended for the owner of the system, the operating personnel and the specialists who are responsible for transport, setup, installation, commissioning, operation, maintenance, cleaning, disassembly and disposal.

The Pfeuffer GmbH has prepared and reviewed these Operating Instructions with the greatest care. However, no guarantee is made for its completeness or accuracy.

Subject to technical modifications.

Translation

On delivery or subsequent sale to countries of the European Economic Area (EEA), the operating instructions must be translated into the corresponding language of the country of use. In the event of discrepancies in the translated text, the original operating instructions (German) must be referred to for clarification, or else contact the manufacturer.

Operating instructions in electronic format

The original operating instructions (German) and translations of the original operating instructions can be requested in PDF file format via e-mail: doku@pfeuffer.com
Specifying the correct type designation and serial number is important for further processing!

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(DIN ISO 16016)

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1 Introduction

1.1 Designated use

The **HE 50** is a versatile and precise moisture meter for use in agriculture. It is used for measuring the moisture content of cereals, milled products, oil seeds and legumes. Products such as spelt, triticale, soy meal and beans can be replaced by other products such as timothy grass, linseed, etc.

The sample to be investigated is crushed in the measurement cell by screwing it together, then homogeneously mixed and compressed.

The **HE 50** is designed as a portable device to be operated by batteries.

The **HE 50** is not intended for private use.

NOTICE

The **HE 50** is exclusively intended for the aforementioned purpose.

Any other use beyond this definition or conversion of the **HE 50** without written consultation with Pfeuffer GmbH is regarded as contrary to the intended use.

Pfeuffer GmbH will not be liable for any damage resulting from this! The risk is the responsibility of the owner alone.

Measuring fluids is prohibited.

The samples to be used for intended operation of the **HE 50** are obtained by the owner.

Correct treatment of these materials and the associated risks are exclusively the responsibility of the owner.

The owner must also provide notes on danger and notes on disposal.

The designated use also includes complying with the operating instructions as well as the maintenance and servicing conditions as defined in these operating instructions.

1.2 EU Declaration of Conformity

In accordance with the EU Directives:

- Electromagnetic Compatibility (EMC) 2014/30/EU
- Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) 2011/65/EU

Manufacturer: **Pfeuffer GmbH**
 Flugplatzstraße 70
 97318 Kitzingen
 GERMANY

Person authorized to compile the technical documents:

Lothar Pfeuffer,
General Manager

Product: Moisture meter HOH-EXPRESS **HE 50**

Serial no. _____

The aforementioned product complies with the requirements of the following harmonized standards:

Standard	Title
DIN EN 61326-1:2013	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: general requirements
DIN EN IEC 63000:2019	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Any modification to the **HE 50** not agreed with us shall result in this declaration losing its validity.

Kitzingen, _____

Lothar Pfeuffer, General Manager

1.3 Structural features of the danger notes

The operating instructions from Pfeuffer GmbH contain instructions that you must comply with for your personal safety as well as to avoid damage to property. Information intended for your personal safety is highlighted by a warning triangle.

Comply with the following categories of danger notes and explanations of symbols:

Pictogram



SIGNAL WORD

- Type of danger and its source
- Possible consequence of failure to comply
- ⇒ Measure to guard against the danger.



DANGER

This is a warning about a highly dangerous situation that will lead to serious or fatal injuries.



WARNING

This is a warning about a dangerous situation that may result in serious or fatal injuries.








CAUTION

This is a warning of a possibly dangerous situation that will lead to slight or moderate injuries.

NOTICE

This is a warning about harmful situations for the product and/or environment.

1.4 Pictograms in the operating instructions

	Information of particular importance and/or additional information
	Comply with the operating instructions
	Warning
	Warning of electrical voltage
	Warning of corrosive substances

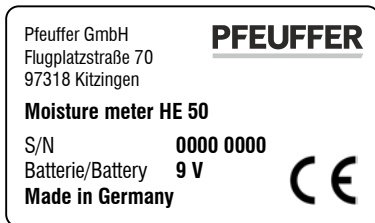
1.5 Identification

The information in these operating instructions only applies to the device with the type designation indicated on the title page.

The type plate with type designation is on the right-hand side of the housing of the measurement instrument.

It is important to state the type designation and serial number with all queries. Only in this way will rapid processing be possible.

Sample Pfeuffer GmbH type plate:



2 Safety

NOTICE Opening the housing and inappropriate operation will invalidate the warranty.

2.1 Obligations on the owner

In the European Economic Area (EEA), it is mandatory to comply with and follow the national implementation of the general directive 89/391/EEC as well as the corresponding individual directives and, of these, in particular Directive 2009/104/EC "concerning the minimum safety and health requirements for the use of work equipment by workers at work", in each case in the valid version.

In addition, he/she must comply with the local legal requirements on:

- Safety of personnel (accident prevention regulations)
- The accident prevention regulations DGUV regulation 3 (previously BGV A 3) "Electrical systems and equipment" (DGUV = German Social Accident Insurance Association)
- Safety of work equipment (protective equipment and maintenance)
- Product disposal (waste legislation)
- Material disposal (waste legislation)
- Cleaning (cleaning agents and disposal)
- Hazardous substances
(in Germany, the Technical Rules for Hazardous Substances – TRGS 555 apply)
- Environmental protection regulations

2.2 General safety notes

The safety devices and safety information given in these operating instructions must be complied with.

- ⇒ Do not allow the **HE 50** to become damp during transport, storage, cleaning and operation.
- ⇒ Only use the **HE 50** when it is in correct condition.
- ⇒ Never touch the battery or the rechargeable battery with moist hands.
- ⇒ Only use genuine spare parts and accessories (see **chapter 8**).

3 Technical data

HOH EXPRESS HE 50	Moisture meter
Products	Cereal, maize, leguminous crops, oil seeds
Parameters	Moisture
Measuring time	approx. 7 seconds

3.1 Dimensions

Measurement instrument:

Height	50 mm
Height with measurement cell in place	130 mm
Width	120 mm
Length	220 mm

Case:

Height	90 mm
Width	290 mm
Length	390 mm

3.2 Weight

Measurement device	approx. 730 g
Measurement device incl. measurement cell	approx. 1.7 kg
Case, empty	approx. 1.1 kg
Overall weight with accessories	approx. 3.2 kg

3.3 Power supply

Battery or rechargeable battery	9 V block battery
---------------------------------	-------------------

3.4 General data

Ambient temperature for storage and transport	-10 °C to +60 °C
Ambient temperature for measurement	+5 °C to +40 °C
Atmospheric humidity	20 % to 80 % non-condensing

4 Delivery, transport and storage

4.1 Scope of delivery



Figure 1: Scope of supply HE 50

The standard scope of delivery to the owner comprises:

Item	Designation
1	Electronic measurement device
2	Measurement cell with integrated temperature sensor
3	Ratchet (for screwing in the measurement cell)
4	2 measurement cups (11 ml)
5	Cleaning screw
6	Cleaning brushes (2x hard and 1x soft)
7	Hand brush
8	Plastic case
not illustr.	Operating instructions

For the particular article numbers, refer to **chapter 8**.

4.2 Transport and packaging

Systems, machines and instruments from Pfeuffer GmbH are carefully checked and packaged before shipping; nevertheless it is impossible to rule out the possibility of transport damage entirely.

Incoming check

- ⇒ Check for completeness with reference to the delivery note.

In case of damage

- ⇒ Check the delivery for damage (visual inspection).

In case of complaints

If the delivery suffered damage in transit:

- ⇒ Keep the packaging (to allow it to be checked subsequently by the forwarding company, or for sending back).
- ⇒ Immediately inform the supplier or Pfeuffer GmbH.

4.3 Intermediate storage

The shipping packaging of the **HE 50** and its accessories and replacement parts is designed for a storage period of six months from delivery.

- ⇒ Do not place any heavy objects on the packaging.

Storage conditions

Enclosed, dry room with a room temperature between min. -10 °C and max. +60 °C

- ⇒ Keep the original packaging in case you need to send the equipment back.

4.4 Return transport

- ⇒ If possible, use the original packaging and the original packaging material. If neither is available any longer, request new packaging from Pfeuffer GmbH.

5 Operation

5.1 Overview

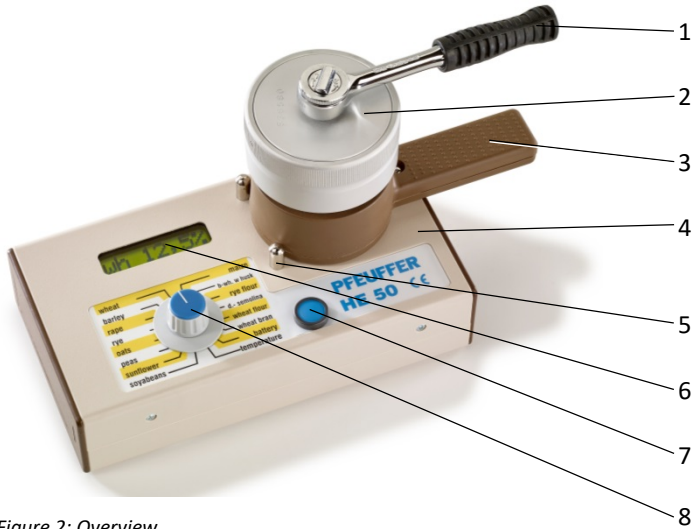


Figure 2: Overview

Item	Designation
1	Ratchet
2	Measurement cell top part
3	Measurement cell bottom part
4	Measurement device
5	Guide pin
6	LC display
7	Measurement key
8	Product selection dial switch

NOTICE

Protect the **HE 50** against direct sunlight and extreme temperatures in excess of +50 °C!

Under extreme temperature conditions, the LC display on the measurement device may appear darker, making it more difficult to read off the values. This does not mean the display is broken! It will regenerate itself under normal temperatures (+5 °C to +40 °C).

5.2 Preparation of a sample

NOTICE

Optimum measurement results can be achieved with **cleaned samples**.

Extraneous constituents (e.g. stones, straw, husks, weed seeds, green grains or pieces of stalk from maize) must be removed prior to the measurement!

The temperature correction is performed automatically.

Ambient temperature for measurement	Moisture
+5 °C to +40 °C	20 % to 80 %, non-condensing

Measurements below or above the specified temperature are possible, but do represent a risk of yielding inaccurate measurement values!

Allow the product samples to adjust to the ambient temperature!

This applies in particular to:

- Frozen samples, because the condition of aggregation of water is significant for the measurement.
- Hot samples, e.g. taken during the drying process.

Products with extreme **surface moisture** must be dried before homogenization.

Measurement results from samples that already give off a fermentation smell may be subject to greater errors than freshly harvested samples.

To achieve an exact measurement result, it is necessary to have a **sample quantity** of approx. **11 ml** (corresponding to the size of the supplied measurement cup).

5.3 Filling the measurement cell and crushing



Figure 3: Filling the measurement cell

Item	Designation	Item	Designation
1	Ratchet	4	Stop pin
2	Measurement cell top part	5	Spindle
3	Milling disk	6	Measurement cell bottom part

- ⇒ Fill the measurement cup with the product so it is level with the rim.
- ⇒ Insert the supplied ratchet into the top part of the measurement cell until it engages.
- ⇒ Screw the measurement cell top part on anticlockwise and put it down.
- ⇒ Remove the plastic disk (protection against contact for the milling disks).
- ⇒ Empty the content of the measurement cup evenly into the bottom part of the measurement cell.
- ⇒ Put the top part on.
- ⇒ Change over the ratchet and turn the measurement cell clockwise as far as the stop.

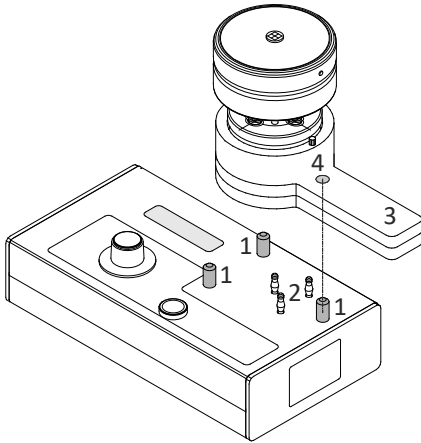


Tip: Tip the measurement cell to the side if the milling disk touches the product. Screw in the measurement cell with short movements of the ratchet.

NOTICE

Only close the measurement cell once as far as the stop.
Turning to and fro several times is not required, and can impair the measurement result.

Exception: Tough products, see **chapter 5.4.3**.



⇒ Insert the measurement cell into the holding device on the measurement device so the handle is pointing to the right.

The pins on the measurement device like the hole in the handle of the measurement cell are used for guidance.

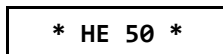
Figure 4: Put on the measurement cell

Item	Designation
1	Guide pin for putting on the measurement cell
2	The contact pins for the measurement cell
3	Correct position of the measurement cell → handle pointing to the right
4	Hole in the handle

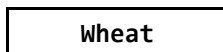
5.4 Measuring procedure

- ⇒ Use the dial switch to select the required product, e.g. wheat.
- ⇒ Press the measurement key to switch the **HE 50** on and start the measurement procedure.

Display shows:



Shortly after that, the selected product is displayed:



After approx. 7 seconds, the result is shown with the first two letters of the product:

Wh 14.5%



Turning the dial switch causes another measurement to be performed immediately thereafter.

Pressing the measurement key several times can produce a slightly different result, because the calibration is configured for an individual measurement.

- ⇒ Change the ratchet position to open the measurement cell.
- ⇒ Hold the measurement cell at the side and unscrew the top part by making short movements with the ratchet.

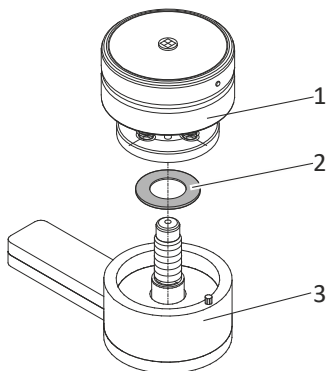
NOTICE

Remove moist milled material from the measurement cell immediately after performing the measurement!

Clean the measurement cell and the spindle after each measurement, see **chapter 6.1**.

The measurement cell is equipped with special fluting to allow all grain-type products to be crushed.

To avoid damage, the measurement cell is not allowed to be screwed together bringing the milling disks into contact without any material fill. Place the plastic disk supplied with the product around the spindle as protection.



Item	Designation
1	Measurement cell top part
2	Plastic disk
3	Measurement cell bottom part

Figure 5: Protection against touching the milling disks

5.4.1 Moist products

- ⇒ Fill a **heaped measurement cup** with the moist product (e.g. freshly harvested maize, approx. 9 g) and distribute the content in the bottom part of the measurement cell.
- ⇒ Screw the measurement cell together, open it, empty and clean it.
- ⇒ Fill the measurement cell again and carry out a measurement.



This procedure increases the measurement accuracy for moist products.

When changing from a moist product to a very dry product, it is also recommended that this »dummy test« should be performed.

5.4.2 Oily products

When measuring moist rape seed and moist sunflower seeds, it is possible that the milling disks might touch one another when being screwed together.

Display shows:

range

- ⇒ Repeat the measurement.
With rape seed, fill a heaped measurement cup, and with sunflower seeds, fill two measurement cups up to the level of the brim.



The measurement result is not falsified in this case!

5.4.3 Tough products

- ⇒ To fill the measurement cell, use **one well filled measurement cup**.
- ⇒ Particularly with **peas** and **beans** in the tough condition (17 % - 20 % moisture content), it is recommended that you should only screw the measurement cell partially together and then open it again.
- ⇒ Repeat this procedure two or three times until the measurement cell can be screwed together as far as the stop.

5.4.4 Finely grained products

When measuring finely grained products (e.g. meal, semolina, flour and grass seeds) it is possible for the milling disks to touch one another when being screwed together.

Display shows:

range

- ⇒ Repeat the measurement.
With **meal and semolina**, use a **heaped measurement cup**, and with **flour and grass seeds**, use **two heaped measurement cups**.
- ⇒ Tamp the product in the measurement cup (up to 10 times) and refill it before you distribute the content in the measurement cell.



The measurement result is not falsified in this case!

For measuring flour, a special flour measurement cell with smooth milling disks is available as an accessory.



To fill the flour measurement cell, use **one well filled measurement cup**.

If you frequently measure finely grained products, we recommend using a funnel.

The particular article numbers can be found in **chapter 8**.

5.4.5 Hops

Hops can only be measured using the flour measurement cell available as an accessory.

- ⇒ Fill the **measurement cup** (0.02 l) **well with compressed** hop cones so the hops still spring back under finger pressure.
- ⇒ Place the funnel on the measurement cell bottom part and fill in the hops.
- ⇒ Turn the funnel and distribute the hops evenly in the bottom part of the measurement cell.
- ⇒ Remove the funnel and turn the measurement cell top part by hand.
- ⇒ Set the dial switch to the required hop program, e.g. "hops 1" and perform the measurement.

NOTICE

A sticky resin (lupulin) is created when hops are milled.

- ⇒ Thoroughly clean the milling disks of the measurement cell after each investigation, using cleaning fluid or spirit.
-



There are various programs for hops, because hop varieties differ in their acid content.

The program selection should be defined with Pfeuffer GmbH before you order the **HE 50**.

Program selection

Program	Variety, e.g.
Hops 1	Tettnanger, Tettnanger Hallertauer, Brewers Gold, Perle
Hops 2	Northern Brewer, Hallertauer Magnum, Taurus
Hops 3	Hallertauer Tradition, Hallertauer mittelfrueh, Saphir
Hops 4	Herbrucker spaet, Spalter Select
Hops 5	Hercules

Hop pellets

Hop pellets will have to be granulated with an electric granulator before the measurement, for example.

- ⇒ Granulate the hop pellets at the highest setting for approx. 20 seconds.
- ⇒ Allow the mass to cool down.
- ⇒ Fill **a measurement cup** with the granulated hop pellets.
- ⇒ Tamp the product in the measurement cup (up to 10 times) and fill it up again until the cup is **filled to the brim**.
- ⇒ Place the funnel on the measurement cell bottom part and fill in the hop pellets.
- ⇒ Turn the funnel and distribute the hop pellets evenly in the measurement cell bottom part.
- ⇒ Take the funnel off and turn the measurement cell top part as far as the stop using the ratchet.
- ⇒ Set the dial switch to "hop pellets" and carry out the measurement.

5.4.6 Coarsely grained special products

- ⇒ With coarsely grained products (e.g. hazel nut kernels) it is recommended that you should crush the product in advance using a hammer, chopping knife or the like.
- ⇒ Fill the measurement cell with **two measurement cups full up to the brim**. Proceed with the rest of the measurement as for cereals.

6 Cleaning and maintenance

NOTICE Opening the housing and inappropriate operation will invalidate the warranty.

To ensure trouble-free operation, it is essential for the **HE 50** to be cleaned and maintained at regular intervals.

6.1 Cleaning

NOTICE Do not use any sharp objects or tools for cleaning. Only use objects that are expressly intended for this purpose.

During cleaning, make sure that no water, steam or dust can penetrate the electronics area.



Cleaning and maintenance intervals:

AEM = After each measurement

AR = As required

6.1.1 Measurement cell

Measure	Interval
Clean the top part of the measurement cell with the hand brush. When brushing, make sure that the milling disk is pointing downwards, to prevent any dirt getting into the threads.	AEM
Clean the bottom part of the measurement cell with the hard or soft brush, depending on the moisture and degree of gumming.	AEM



With very moist, oily and sticky products, it is recommended that you mill a dry sample of cereal (approx. 14 % moisture content) in the measurement cell as a cleaning measure.

Residues will be bound up with the meal and can be removed easily.

NOTICE Do not empty the measurement cell top part or bottom part by knocking it out!
This can lead to damage to the measurement cell.

6.1.2 Threads and contact surfaces of the measurement cell

The threads and contact surfaces of the measurement cell can become blocked with oily products after frequent measurements. This means the measurement cell can only be screwed closed by exerting increased force.

Measure	Interval
Clean the threads of the spindle on the measurement cell bottom part using the hand brush or hard brush.	AR
Clean the top contact surface on the spindle of the measurement cell bottom part using a clean, lint-free cloth.	AR
Carefully screw the cleaning screw supplied with the product into the measurement cell top part. The milling disk should be pointing downwards when you do this so that no dirt will get into the threads. Turn the cleaning screw to and for several times to release adhering dirt particles. Then clean the cleaning screw with the hand brush.	AR
In case of severe contamination, clean the contact spring inside the measurement cell top part carefully using a commercially available cosmetic cotton wool bud.	AR

NOTICE

To avoid damage to the threads, take care not to mis-thread the cleaning screw.

6.1.3 Measurement device

Measure	Interval
Clean the surface, the guide pin and the contact pins with a clean, lint-free cloth.	AR

6.2 Maintenance

Maintenance is a part of servicing and refers to the scheduled cleaning, checking and replacement of wearing parts. The aim of maintenance is to maintain the full functionality of the device over its lifetime.

The **HE 50** should therefore be checked for wear and tear at regular intervals. The inspection intervals depend on the significance of the measured value, the frequency of use and the ambient conditions to which the **HE 50** is exposed. Only through regular checks (visual inspection) can damage to the device caused during use be detected early and reliably. We therefore recommend that this check will be carried out at least once a year, preferably after the harvest period.

If you are unsure whether your device is still completely ready for use, Pfeuffer GmbH's professional service team will be pleased to assist you.

The **HE 50** is often used in goods traffic. According to the QM system according to ISO 9001, the **HE 50** must then be qualified as test equipment and regularly verified. It is useful to define an annual inspection interval.

In this context, it is necessary to check the accuracy of the measured values (e.g. by comparison with a drying oven sample). We recommend having this service performed by a qualified service partner.

Our distributors are at your disposal.

Wear parts and possible wear:

Milling discs: flaking of the chrome plating, abrasion of the fluting

Spindle on the measurement cell bottom part: dirt in the threads

Contact pins: wear, weak contact, contact resistance

Contact spring inside the measurement cell top part: dirt in the top part

6.3 Electrical power supply and battery change

A commercially available 9 V battery or 9 V rechargeable battery is required for powering the **HE 50**.

To check the supply voltage, turn the dial switch to "Battery".

Display shows:

Ba 9.0 V

The supply voltage must be greater than 7.2 V. Otherwise, the **HE 50** will switch itself off automatically.

A weak battery cannot lead to an incorrect measurement. The following message is shown on the display in good time:

load acc

⇒ Open the battery compartment on the measurement device using the slide.

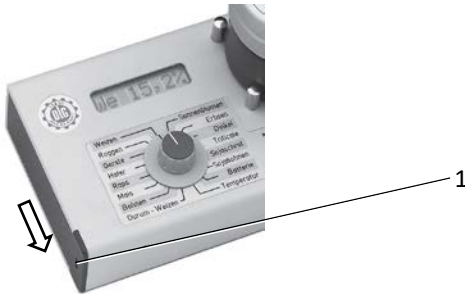


Figure 6: Battery compartment

Item	Designation
1	Slide

There is a black rubber belt around the battery to aid removal.

- ⇒ Change the battery or recharge the rechargeable battery using the external charger.
- ⇒ Before fitting the battery, place the black rubber band around the battery again.
- ⇒ When inserting, pay attention to the positive and negative symbols on the housing.



More than 500 measurements can be carried out with a new battery.



CAUTION



A non-rechargeable battery cannot be recharged!

This can lead to dangerous acid leakage.

Acid contact can cause skin irritation, burns and corrosion.



Return used batteries/rechargeable batteries to a municipal collecting facility or retail outlet.

Disposal as normal domestic waste is prohibited, and represents a violation of battery legislation.

7 Malfunctions – causes and rectification

m-cell

No measurement cell is connected, or is faulty.

range

The product is dryer or moister than the measuring range. It is not possible to display a measurement result.

Or there is not sufficient product in the measurement cell. The milling disks are touching one another.

⇒ Add additional product, for information, see **chapter 5.4.2** and **5.4.4**.

load acc

The battery voltage is too low.

⇒ Charge the rechargeable battery or replace the flat battery with a new one.

8 Supplements and accessories**NOTICE**

It is expressly pointed out that spare and accessory parts not supplied by us will not have been tested and approved by us either. Installing and/or using such products can thus lead to negative changes to the design properties of the **HE 50** under certain circumstances.

Pfeuffer GmbH cannot be held liable for damage attributable to the use of non-genuine parts and non-genuine accessories.

Standard parts can be obtained from the dealer.

Product	Article no.
Measurement cup	3112 0050)*
Hand brush	3190 0050)*
Cleaning bush (soft bristles)	3190 0027)*
Cleaning bush (hard bristles)	3190 0017)*
Replacement battery 9 V block battery	3254 0020
Plastic case with foam inlay	2150 0505
Ratchet	5640 0050
Funnel with spindle guard	3112 0012
Grain cutter	2130 0110
Cleaning screw	3170 5060
Measurement cell, complete	2150 0003
Plastic disk (contact protection for milling disks)	3102 9050
Measurement cell for floury products and hops	2150 0020

)* Minimum order quantity three items per article!

9 Disposal



The **HE 50** must be disposed of according to applicable local environmental regulations.



Return used batteries/rechargeable batteries to a municipal collecting facility or retail outlet.

Disposal as normal domestic waste is prohibited, and represents a violation of battery legislation.



Special waste

Oil, cleaning agents, contaminated cleaning tools (brush, rags, etc.) must be disposed of according to the local regulations and in accordance with the notes in the manufacturers' safety data sheets.
