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1 Notes on the Operating Manual

This operating manual is a technical guide on how to operate the device safely and it contains all the information required for the areas specified in the table of contents. This technical documentation is a reference and instruction manual. The individual chapters are complete in themselves.

Familiarity (of the respective target groups defined according to area) with the relevant chapters is a precondition for the safe and appropriate use of the device.

This operating manual does not contain any repair instructions. If faults arise or repairs are necessary, please contact your supplier or get in touch with Retsch GmbH directly.

Application technology information relating to samples to be processed is not included but can be read on the Internet on the respective device’s page at www.retsch.com.

Changes
Subject to technical changes.

Copyright
Disclosure or reproduction of this documentation, use and disclosure of its contents are only permitted with the express permission of Retsch GmbH.
Infringements will result in damage compensation liability.
1.1 Explanations of the safety warnings

In this Operating Manual we give you the following safety warnings

**Serious injury** may result from failing to heed these safety warnings. We give you the following warnings and corresponding content.

---

**WARNING**

**Type of danger / personal injury**

**Source of danger**

– Possible consequences if the dangers are not observed.

• **Instructions on how the dangers are to be avoided.**

---

We also use the following signal word box in the text or in the instructions on action to be taken:

---

**CAUTION**

**Type of danger / personal injury**

**Source of danger**

– Possible consequences if the dangers are not observed.

• **Instructions on how the dangers are to be avoided.**

---

In the event of possible **property damage** we inform you with the word “Instructions” and the corresponding content.

---

**NOTICE**

**Nature of the property damage**

**Source of property damage**

– Possible consequences if the instructions are not observed.

• **Instructions on how the dangers are to be avoided.**

---

We also use the following signal word in the text or in the instructions on action to be taken:

---

**NOTICE**
1.2 General safety instructions

**CAUTION**

Read the Operating Manual
Non-observance of these operating instructions
- The non-observance of these operating instructions can result in personal injuries.
- *Read the operating manual before using the device.*
- *We use the adjacent symbol to draw attention to the necessity of knowing the contents of this operating manual.*

**Target group:** All persons concerned with the machine in any form

This machine is a modern, high performance product from Retsch GmbH and complies with the state of the art. Operational safety is given if the machine is handled for the intended purpose and attention is given to this technical documentation.

You, as the owner/managing operator of the machine, must ensure that the people entrusted with working on the machine:
- have noted and understood all the regulations regarding safety,
- are familiar before starting work with all the operating instructions and specifications for the target group relevant for them,
- have easy access always to the technical documentation for this machine,
- and that new personnel before starting work on the machine are familiarised with the safe handling of the machine and its use for its intended purpose, either by verbal instructions from a competent person and/or by means of this technical documentation.

Improper operation can result in personal injuries and material damage. You are responsible for your own safety and that of your employees.

Make sure that no unauthorised person has access to the machine.

**CAUTION**

Changes to the machine
- Changes to the machine may lead to personal injury.
- *Do not make any change to the machine and use spare parts and accessories that have been approved by Retsch exclusively.*

**NOTICE**

Changes to the machine
- The conformity declared by Retsch with the European Directives will lose its validity.
- You lose all warranty claims.
- *Do not make any change to the machine and use spare parts and accessories that have been approved by Retsch exclusively.*
1.3 Repairs

This operating manual does not contain any repair instructions. For your own safety, repairs may only be carried out by Retsch GmbH or an authorized representative or by Retsch service engineers.

**In that case please inform:**

<table>
<thead>
<tr>
<th>The Retsch representative in your country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your supplier</td>
</tr>
<tr>
<td>Retsch GmbH directly</td>
</tr>
</tbody>
</table>

**Your Service Address:**


2 Confirmation

This operating manual contains essential instructions for operating and maintaining the device which must be strictly observed. It is essential that they be read by the operator and by the qualified staff responsible for the device before the device is commissioned. This operating manual must be available and accessible at the place of use at all times.

The user of the device herewith confirms to the managing operator (owner) that (s)he has received sufficient instructions about the operation and maintenance of the system. The user has received the operating manual, has read and taken note of its contents and consequently has all the information required for safe operation and is sufficiently familiar with the device.

As the owner/managing operator you should for your own protection have your employees confirm that they have received the instructions about the operation of the machine.

I have read and taken note of the contents of all chapters in this operating manual as well as all safety instructions and warnings.

<table>
<thead>
<tr>
<th>User</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surname, first name (block letters)</td>
</tr>
<tr>
<td>Position in the company</td>
</tr>
<tr>
<td>Signature</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service technician or operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surname, first name (block letters)</td>
</tr>
<tr>
<td>Position in the company</td>
</tr>
<tr>
<td>Place, date and signature</td>
</tr>
</tbody>
</table>

3 Transport, scope of delivery, installation

3.1 Packaging

The packaging has been adapted to the mode of transport. It complies with the generally applicable packaging guidelines.
NOTICE

Storage of packaging

– In the event of a complaint or return, your warranty claims may be endangered if the packaging is inadequate or the machine has not been secured correctly.

• Please keep the packaging for the duration of the warranty period.

3.2 Transport

NOTICE

Transport

– Mechanical or electronic components may be damaged.

• The machine may not be knocked, shaken or thrown during transport.

NOTICE

Claim

– In case of any transport damage, you must inform the forwarder and also Retsch GmbH immediately. Claims that are made later, may not be considered.

• Inform the forwarder and Retsch GmbH within 24h.

3.3 Temperature fluctuations and condensed water

NOTICE

Temperature fluctuations

The machine may be subject to strong temperature fluctuations during transport (e.g. aircraft transport)

– The resultant condensed water may damage electronic components.

• Protect the machine from condensed water.

3.4 Conditions for the place of installation

Ambient temperature: 5 °C to 40 °C

NOTICE

Ambient temperature

– Electronic and mechanical components may be damaged and the performance data alter to an unknown extent.

• Do not exceed or fall below the permitted temperature range of the machine (5 °C to 40 °C / ambient temperature).

3.5 Installation of the machine

Installation height: maximum 2000 m above sea level
3.6 Type plate description

Fig. 1: Type plate lettering

1 Device designation
2 Year of production
3 Part number
4 Serial number
5 Manufacturer’s address
6 CE marking
7 Disposal label
8 Bar code
9 Power version
10 Mains frequency
11 Capacity
12 Amperage
13 Number of fuses
14 Fuse type and fuse strength

In the case of questions please provide the device designation (1) or the part number (3) and the serial number (4) of the device.
3.7 Electrical connection

**WARNING**
When connecting the power cable to the mains supply, use an external fuse that complies with the regulations applicable to the place of installation.

- Please check the type plate for details on the necessary voltage and frequency for the device.
- Make sure the levels agree with the existing mains power supply.
- Use the supplied connection cable to connect the device to the mains power supply.
- Make sure that the voltage and frequency of your mains connection corresponds to that on the type plate of the AT 100 XL.
  - The mains connection must be fused to at least 15A
  - An electrical connection without protective earth PE is not permitted.

3.8 Transport

**WARNING**
**Serious personal injury**
Falling loads
- The appliance is very heavy and can therefore cause serious personal injuries if it falls down.
- **Lifting above head height is not permissible!**

**NOTICE**
**Transport safeguard**
- Components may be damaged.
- **Operate the machine only without the transport safeguard or transport the machine only with transport safeguard.**
Transport, scope of delivery, installation

Fig. 2: Dismounting the transport screws
The device should only be lifted and transported using the 4 supplied transport screws (TS).

NOTICE

Transport
– Mechanical or electronic components may be damaged.
• The machine may not be knocked, shaken or thrown during transport.

3.9 Installation of the machine

• Place the device on a firm surface.
Please refer to the “Technical Data” chapter for further parameters.
The device must be locked before it is put into operation.
4 Technical data

4.1 Use of the machine for the intended purpose

**CAUTION**

**Risk of explosion or fire**
Changing sample properties

- Consider that the properties and therefore also the hazardousness of your sample can change during the grinding process.
- **Do not use any substances in this device which carry the risk of explosion or fire.**

**CAUTION**

**Risk of explosion or fire**

- On account of its design, the device is not suitable for use in hazardous (potentially explosive) atmospheres.
- **Do not operate the device in a hazardous atmosphere.**

**CAUTION**

**Danger of personal injury**
Dangerous nature of the sample

- Depending on the dangerous nature of your sample, take the necessary measures to rule out any danger to persons.
- **Observe the safety guidelines and datasheets of your sample material.**

**Target group:** Operator, All persons concerned with the machine in any form.

**Machine type designation:** AT 100 XL

A detailed overview and knowledge of the characteristics of a raw material is of utmost importance, especially when planning the layout of a crushing plant. In order to minimize all possible risks extensive trials are necessary to obtain information on the properties of the raw materials. A clear definition of the required crushing capacities and the desired product quality can be precisely determined by using the Bond Index test methods. Using the Bond Index test procedures it is possible to calculate crushing / abrasion behavior of mineral samples. This knowledge is essential to define the required ball mill layout and production capacity.
Advantages

– suitable for the determination of Work Index according to Bond
– fixed parameters according to Bond Index standards
– removable ringsieve
– solid steel frame
– removable sample collector
– chamber with gasket for loss-free operation
– solid noise-protection hood with safety switch
– emergency switch

NOTICE

Area of use of the machine

– This machine is a laboratory machine designed for 8-hour single-shift operation.
• This machine may not be used as a production machine nor is it intended for continuous operation.

4.2 Volume and feed size

According to the Bond Index standard 4 times 400 grams of material with a feed size between 12 and 19mm are required.

4.3 Rated power

0.55 KW
Make sure that the voltage and frequency of your mains connection corresponds to that on the type plate of the device. The mains connection must be fused to at least 15A.

NOTE

Reduction of tool service life
Abrasive sample materials
– The presence of abrasive composite materials during grinding can considerably reduce tool service life.
• When grinding electronic scrap, take the properties of the composite materials into account.

4.4 Motor rotation speed

The speed is fixed at 70rpm for the chamber and 632rpm for the paddle. Those parameters are according to the Bond Index standards.
4.5 Emissions

**CAUTION**

Possibility of acoustic signals not being heard
Loud grinding noises
- Acoustic alarms and voice communication might not be heard.
- Consider the volume of the grinding noise in relation to other acoustic signals in the work environment. You may wish to use additional visual signals.

4.5.1 Noise levels AT 100 XL:

Noise measurement in accordance with DIN 45635-31-01-KL3
The noise levels are largely influenced by the machine speed, the grinding material and the grinding set.

Workplace-related emissions value \( L_{pAeq} \) = up to 76dB (A)
Sound power level \( L_{WA} \) = 89dB (A)

Measurement conditions:
Sample material: 400g cement clinker, particle size 12-19mm
Sound level meter: Brüel & Kjaer 2237 Controller

4.6 Degree of protection

IP 55

4.7 Protective equipment

The device is equipped with automatic lid closing which prevents it being started in an unsafe state.
- The device can only be started with closed cover.
- The cover can only be opened when the device has come to a halt.

4.8 Dimensions and weight

Height: 1240mm / Width: 720mm / Depth: 910mm
Weight: AT 100 XL net approx. 260kg

4.9 Required floor space

Height: 1800mm (open cover): / Width: 720mm / Depth: 910mm
5 Operating the machine

5.1 Views of the Instrument

Fig. 3: Front view of the device
5.2 Overview table of the parts of the device

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Hood</td>
<td>Closes the grinding chamber</td>
</tr>
<tr>
<td>B</td>
<td>Emergency Stop-Button</td>
<td>After pressing this button, the machine will immediately stop working</td>
</tr>
<tr>
<td>C</td>
<td>Control panel</td>
<td>Device controller</td>
</tr>
<tr>
<td>D</td>
<td>Main switch</td>
<td>Button for switching machine to On-/Off</td>
</tr>
<tr>
<td>E</td>
<td>Chamber</td>
<td>Chamber for the testing process</td>
</tr>
<tr>
<td>F</td>
<td>Collecting pan (optional)</td>
<td>Collects the material after opening the chamber</td>
</tr>
</tbody>
</table>

5.3 Operating elements and displays

![Fig. 4: View of the control panel](image)
5.4 Overview Table of the Operating Elements and the Display

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Operating button</td>
<td>control to operate the device settings</td>
</tr>
<tr>
<td>M</td>
<td>Button to open the hood</td>
<td>Unlocks the hood</td>
</tr>
<tr>
<td>N</td>
<td>Display</td>
<td>Displays the control functions and parameters</td>
</tr>
</tbody>
</table>

5.5 Opening the device

The following steps are necessary in order to be able to use and clamp the grinding jar.
- Connect the device to the mains.
- Switch on the main switch at the right site of the device.
- Press the button F3 (open lid).

The safety lock opens and the lid can be lifted up.

5.6 Closing the device

It is only possible to lock the grinding chamber if the device has been connected to the power supply and the main switch at the right site of the device has been switched on.
- Shut the housing lid.
  - A sensor detects the closing pin of the housing lid
  - Press the button F3 (close lid).

5.7 Emergency unlocking

**CAUTION**

Emergency Unlocking
Drive continuing to run
- There is a substantial risk of injury if the drive and associated device parts run on a long time without being braked!
- Activate the emergency unlocking only when the machine has come to a complete stop and is disconnected from the power supply.
A key is provided with device delivery. This can be used to open the device manually in the case of a power failure.

- Remove the cap (AK).
- Place the key in the device (NR).

- Rotate it in anti-clockwise direction as far as it will go.
  - The lock is open and the lid can be lifted up.
  - To start the machine, the device must be locked again.
5.8 Inserting the testing media

1. Open the lid by releasing the four screws (S)

![Fig 7: Lid](image)

2. Remove / insert the paddle (p) by loosening / tightening the fixing screw (F)

![Fig 8: Paddle](image)

3. Remove / insert the ringsieve (R) by pulling it out / sliding it in

![Fig 9: Ringsieve](image)
5.9 Preparing the testing process

5.9.1 Weighing the paddle

![Image of Paddle for Measuring the Abrasion]

Fig. 10: Paddle for measuring the abrasion

5.9.2 Filling of Material

Filling in the material into the testing chamber

- According to Bond Index the material needs to be separated in 4 samples of 400 grams each and a particle size of 12 – 19 mm

![Image of Testing Chamber]

Fig. 11: Testing chamber
5.9.3 Close testing chamber

Fig. 12: Lid

- Tighten all 4 screws hand tight

5.9.4 Starting the process

Fig. 13: Display

- When the cover is locked (after pressing F3) the display shows “READY” and the process can be started by pressing F1
- The grinding process takes 15 minutes according to Bond Index and is therefore fixed.
5.10 Accessories

The paddle will be delivered with the AT 100 XL. The paddle (hardened to 500 Binell) is necessary to measure the abrasivity of the tested material by weighing the loss of the paddles weight after the full process.

Fig. 14: Paddle

5.11 Display unit – operation of the device

No set up is necessary, because the parameters are fixed according to Bond Index

Choose:
F1: Start
F2: Stop
F3: Lock / Unlock
6 Lubrication, Service and returning for maintenance

**WARNING**

Risk of a fatal electric shock
- An electric shock can cause injuries in the form of burns and cardiac arrhythmia, respiratory arrest or cardiac arrest.
- Do not clean the blender under running water. Use only a cloth dampened with water.
- Disconnect the power supply plug before cleaning the blender.

**WARNING**

The device must always be switched off and disconnected from the mains before any interventions for cleaning or servicing purposes.

### 6.1 Lubrication

Fig. 16: Rear of the AT 100 XL

Fig 17: Lubrication points

The drive of the Abrasion Tester AT 100 XL has 2 lubrication points which have to be lubricated regularly every 150 work hours. The drive is located behind the cover (Fig. 16). Only use lithium-based grease (graphite free) e.g. Shell Gadus S2 V220 2 or BP Energrease LS-EP 2.
6.2 Service

**WARNING**

Risk of loss of life through electric shock
Strong voltage through capacitor discharge
- Due to capacitor discharge on the frequency inverter, the device conducts voltage for up to 3 minutes after the plug has been pulled out.
- You may come into contact with live contacts when the device is open. An electric shock can lead to burns and arrhythmia or to respiratory failure and heart failure.
- After removing the mains lead, wait 3 minutes before opening the device.

6.3 Returning for service and maintenance

Fig. 18: Returned goods dispatch note
RETSCH devices and accessories can only be accepted for repair, maintenance or calibration if the returned goods despatch note has been correctly completed in full.
- When returning a device, attach the returned goods dispatch note to the outside of the packaging.

In order to eliminate any health risk to our employees, we reserve the right to refuse acceptance and to return the respective delivery at the expense of the sender.
7 Disposal

Please observe the respective statutory requirements with respect to disposal. Information on disposal of electrical and electronic machines in the European Community.

Within the European Community the disposal of electrically operated devices is regulated by national provisions that are based on the EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

Accordingly, all machines supplied after 13.08.2005 in the business-to-business area to which this product is classified, may no longer be disposed of with municipal or household waste. To document this they have the following label:

Fig. 19: Disposal label

Since the disposal regulations within the EU may differ from country to country we would request you to consult your supplier.
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Certificate of CE-Conformity according to:

**EC Mechanical Engineering Directive 2006/42/EC**

Applied harmonized standards, in particular:
DIN EN ISO 12100 Security of machines

**EC Directive Electromagnetic Compatibility 2014/30/EU**

Applied standards, in particular:

DIN EN 61010 Safety prescriptions concerning measuring-, operating-, controlling- and laboratory equipment

**Authorized person for the compilation of technical documents:**
H. Neumann (technical documentation)

The following records are held by Retsch GmbH in the form of Technical Documentation:
Detailed records of engineering development, construction plans, study (analysis) of the measures required for conformity assurance, analysis of the residual risks involved and operating instructions in due form according to the approved regulations for preparation of user information data.

The CE-conformity of the Retsch Abrasion Tester Type AT 100 XL is assured herewith.

In case of a modification to the machine not previously agreed with us as well as the use of not licensed spare parts and accessories this certificate will lose its validity.

Retsch GmbH
Haan, December 2015

Holger Neumann