Retsch®
a VERDER company

Manual

Air jet sieving machine
AS 200 jet pro

Version 0000 | 04.12.2025

Translation

Table of contents

1 Notes on the operating instructions

This instruction manual is a technical guide for the safe operation of the device. Please read the instruction manual carefully before installing, commissioning, and operating the device. Reading and understanding the instruction manual is essential for the safe and proper use of the device.

This instruction manual does not include any repair instructions. If you have any questions or concerns regarding these instructions or the device, or in the event of any defects or necessary repairs, please contact your supplier or the Retsch GmbHdirectly.

Further information about your device can be found on the device-specific pages under https://www.retsch.com.

Revision status

This document revision Version 0000 of the instruction manual Air jet sieving machine AS 200 jet pro was prepared in accordance with Machinery Directive 2006/42/EC.

1.1 Disclaimer

This instruction manual has been prepared with the utmost care. Technical specifications are subject to change without notice. No liability is assumed for any personal injury resulting from failure to follow the safety and warning instructions in this instruction manual. No liability is assumed for any property damage resulting from failure to follow the instructions in this instruction manual.

1.2 Copyright

1.3 Download additional languages and documents

This operating manual is available for download in other languages on the Retsch GmbH website in the Downloads section, Operating Manuals (https://www.retsch.com/downloads/operating-instructions/). Alternatively, you can use the QR code below.

Fig. 1: QR code, website Download operating manual

Further documents relating to the device you have purchased are available for download on the Webseite of Retsch GmbH in the Downloads section or on the product-specific page.

1.4 Explanations of signs and symbols

The following signs and symbols are used in this user manual:

Sign/symbol	Meaning
◦ ... ◦ ... • ... • ...	Bullet points for lists
→	Instructions for users
ⓘ	Reference to a recommendation or information
Font style	Software element
`Font style`	Software button which can be selected

1.5 Explanation of the safety instructions

The following warnings in this operating manual alert you to potential hazards and damage:

⚠ DANGER

Risk of fatal injury

Source of danger

→ Possible consequences if the danger is ignored.
→ **Instructions and information on how to avoid the danger.**

Failure to observe the warning marked “Danger” may result in **fatal or serious injury**. There is a **very high risk** of a life-threatening accident or permanent personal injury. The signal word ⚠ DANGER is also used in the running text or in the instructions.

⚠ WARNING

Risk of life-threatening or serious injury

Source of danger

→ Possible consequences if the danger is ignored.
→ **Instructions and information on how to avoid the danger.**

Failure to observe the warning marked “Warning” may result in **life-threatening or serious injury**. There is an **increased risk** of a serious accident or potentially fatal personal injury. The signal word ⚠ **WARNING** is also used in the running text or in the instructions.

⚠ CAUTION

Risk of injury

Source of danger

→ Possible consequences if the danger is ignored.
→ **Instructions and information on how to avoid the danger.**

Failure to observe the warning marked ‘Caution’ may result in **moderate or minor injuries**. There is a moderate or minor risk of an accident or personal injury. The signal word **⚠ CAUTION** is also used in the running text or in the instructions.

ⓘ NOTE

Type of property damage

Source of property damage

→ Possible consequences if the warning is ignored.
→ **Instructions and information on how to avoid the danger.**

Failure to observe the warning may result in **property damage**. The signal word ***ⓘ NOTE*** is also used in the running text or in the instructions.

TIPS & TRICKS

Type of application

Source of application

→ Instructions and notes on how to implement tips and tricks.

“Tips and tricks” provide instructions and recommendations for applications in accordance with the intended use. The signal word **TIPS & TRICKS** is also used in the running text or in the instructions for use.

2 Safety

⚠ CAUTION

Risk of injury

Failure to read the operating instructions

→ The operating instructions contain all safety-related information. Failure to follow the operating instructions may therefore result in injury.

→ **Read the operating instructions carefully before operating the device.**

	In the explanations of this user manual, the product Air jet sieving machine AS 200 jet pro is mostly referred to as the device.

Target group: All persons who are involved in any phase of the device's life cycle.

The device is designed for use in a laboratory environment for sample preparation. This user manual is therefore intended for persons who work with this device in a comparable environment and already have experience with similar devices.

The device is a modern, high-performance product of Retsch GmbH and represents the latest state of the art. Operational safety is ensured when this device is used as intended and with knowledge of the technical documentation provided here.

2.1 Using the device properly

The device is suitable for analysing light materials with small particle sizes. The device is suitable for analysing light materials with small particle sizes. The device is suitable for analysing light materials with small particle sizes. The device is suitable for analysing light materials with small particle sizes.

As a laboratory device, it serves exclusively for sample preparation. This device is not designed as a production machine or for continuous operation, but rather as a laboratory device intended for single-shift, intermittent operation of 8 hours per day.

The device is designed for stationary operation in a dry and clean working environment.

Operators and operating personnel must have read the operating instructions and be familiar with the full range of functions of the device.

2.2 Improper use

The device may only be used for its intended purpose. Any use other than that described under “Intended use” is considered as improper use. Claims for damages in any form are excluded for

property damage and personal injury resulting from improper use and/or failure to follow the safety instructions.

The device is not suitable for processing materials that can form explosive air mixtures.

2.3 Operator obligations

The operator of the machine is responsible for ensuring that every person who works with the machine has been thoroughly instructed on the basis of these instructions. The training of operating personnel must include the following points:

- Intended use of the machine
- Hazardous areas
- Safety regulations
- You must ensure that the personnel have the required qualifications.
- General instructions and measures in an emergency
- Applicable accident prevention regulations
- Necessary personal protective clothing
- Operation of the machine in accordance with these operating instructions
- Recognised, applicable rules for occupational safety

Include the device in your emergency planning:

- Integrate the device into your operating instructions, which regulate behaviour in emergency situations.
- Integrate the device into your risk assessment in accordance with the Industrial Safety Regulation (BetrSichV) to prevent accidents during work processes.
- Take into account fire-fighting measures, combating the effects of escaping substances, possible radiation, rescue of persons, first aid measures.

2.3.1 Regulations

The operator is responsible for ensuring that persons assigned to work on the device

- have read and understood all safety regulations,
- are familiar with all instructions and regulations relevant to their target group before starting work,
- have access to the technical documentation of this device at all times and without any problems,
- are familiar with its safe and proper handling before starting work on the device, either through verbal instruction from a competent person and/or through the available technical documentation.

2.3.2 Personnel

- Ensure that only qualified personnel are deployed who, based on their training and experience, are capable of recognising risks and avoiding any potential hazards.
- Regularly train personnel in the use of the equipment, particularly regarding sudden incidents.

- Personnel undergoing training should only work on the equipment under the supervision of qualified personnel.
- Regularly assess personnel's safety awareness.
- Define personnel responsibilities according to their qualifications and job descriptions.
- Provide personnel with personal protective equipment (PPE)..
- Ensure that the following conditions are met:
  - Personnel have read and understood these operating instructions, especially the safety chapter.
  - Personnel are familiar with and comply with the relevant accident prevention and safety regulations.
  - Personnel wear the prescribed personal protective equipment (PPE) when working with the equipment.

2.3.3 Workspace and device

- Ensure adequate lighting and ventilation of the workplace.
- Ensure that exhaust air is properly vented to the outside.
- Keep all labels on the device in a legible condition.
- Ensure that all checks and maintenance work specified in this operating manual are carried out.

2.3.4 Qualification of the personnel

Phase of life	Qualification
• Transport • Installation • Commissioning • Operation • Maintenance • Dismantling • Disposal	A skilled worker who is trained in the safe handling of the device.
• Troubleshooting/Repair • Repair	Electrical specialist who, based on their professional training, knowledge, and experience, can assess the assigned tasks and recognise potential hazards.

2.3.5 Personal Protective Equipment (PPE)

Phase of life	Personal Protective Equipment (PPE)
• Transport • Installation • Dismantling • Disposal	Safety shoes
• Operation	No personal protective equipment required
• Commissioning • Maintenance	No personal protective equipment required

Phase of life	Personal Protective Equipment (PPE)
• Troubleshooting/Repair • Repair	Safety shoes

2.4 Repair

This user manual does not contain any repair instructions. For safety reasons, repairs may only be carried out by Retsch GmbH or an authorised representative or by qualified service technicians.

In case of a repair, please notify

- the Retsch GmbH representative in your country,
- your supplier, or
- Retsch GmbH directly.

Service address:

2.5 Protection device

The device is equipped with a main switch. In an emergency, the device must be stopped by pressing the main switch or by disconnecting it from the power supply.

2.6 Avoiding any risks

Failure to observe the following safety instructions is contrary to the intended use and poses a danger to personnel and a risk to operational safety.

Transport and setup

- Do not carry the device alone during transport and setup.
- Wear safety shoes during transport and setup.
- Connect the device only to sockets with a protective earth (PE) conductor.
- When connecting the device, the values on the rating plate must match the values of the power supply.

Operation

- Read the operating instructions carefully before putting the device into operation.
- Operate the device only at a sufficiently large workspace with a stable base.
- Check the power cord for any damage before operation.
- Never operate the device if any damage is visible or suspected.
- Operate the device only within its technical operating limits.
- Take measures before operating the device to ensure that communication may be restricted during operation.
- Pay attention to your surroundings during sieving, as the noise level can make it difficult to perceive acoustic signals.
- Do not operate the device in potentially explosive atmospheres.
- Observe the safety data sheets for the samples and follow the instructions by taking appropriate precautions beforehand.
- Do not sieve any explosive and/or flammable substances.
- Do not sieve any substances which could become explosive and/or flammable during sieving.

Maintenance and repair

- Before performing any maintenance work, switch off the device by using the main switch.
- Before performing any maintenance work, secure the device against being switched back on and disconnect it from the power supply.
- Clean the device only with a dry or slightly damp cloth.
- Do not clean the device with compressed air.
- Do not clean the device with running water.
- Repairs should only be carried out by the device manufacturer or an authorised representative.

2.7 Confirmation form for the operator

This operating manual contains basic information and instructions that must be observed for the operation and maintenance of the device. It must be read by the user before starting up the device. This operating manual must be accessible and available at the place of use at all times.

The user of the device hereby confirms to the operator (owner) that they have been sufficiently instructed in the operation and maintenance of the system. The user has received and read the operating instructions and therefore has all the information necessary for safe operation and is sufficiently familiar with the device.

For legal protection, the operator should have the users confirm that they have been instructed in the operation of the device.

I have read all chapters of these operating instructions as well as all safety and warning instructions.

User
Last name, first name (block letters)
Position in the company
Place, date, signature

Operator or service technician
Last name, first name (block letters)
Place, date, signature
Position in the company

3 Air jet sieving machine AS 200 jet pro

The AS 200 jet pro of the Retsch GmbH is a laboratory device which is used for particle characterisation.

The device is suitable for analysing light materials with small particle sizes. The device is suitable for analysing light materials with small particle sizes. The device is suitable for analysing light materials with small particle sizes. The device is suitable for analysing light materials with small particle sizes.

The device is successfully used in almost all areas of industry and research for quality control, especially where high demands are placed on ease of use, speed, precision and reproducibility.

Analytical sieves with an outer diameter of 200 mm and 203 mm (8") are designed for this purpose. For the best possible measurement results, it is recommended to use only analytical sieves from Retsch GmbH.

The device is equipped with an integrated balance, which allows all weighing processes (empty weights of the analysis sieves, sample weighing, reweighing of the loaded analysis sieves) to be carried out directly on the device. An external balance can be connected if required. Operation is convenient via the large touch display. There are three different processes to choose from for performing a sieving. The user can decide whether to use individual sieving without data storage or predefined sieves and methods (SOPs). The software guides the user through all the steps and automatically calculates all typical parameters within the scope of particle characterisation. The evaluation is presented in tabular and graphical form and can be exported in a standard-compliant protocol, among other things.

3.1 Technical data

General Specification	
Application	Air jet sieving, particle analysis, particle size determination, separation, fractionation
Application area	Construction materials, chemicals/plastics, geology/metallurgy, glass/ceramics, food, medicine/pharmaceuticals, environment/recycling
Feed material	Hard, medium-hard, soft, brittle

Sieving specification	
Feed material	Powder
Dry sieving	Yes
Wet sieving	No
Measuring range	10 µm - ~4 mm
Sampling motion	Air jet agitation
Typical sample quantity	0.3 - 100 g

Sieving specification	
Max. sieve tower height	1 sieve (25 mm (1") / 50 mm (2")) per sieving operation
Max. number of fractions	1 recoverable 2 recoverable fractions when using a cyclone
Usable sieve diameters	203 mm 200 mm with adapter
Speed (Nozzle)	Digital, 5 – 80 RPM
Sieve duration setting	Digital, 30 sec – 15 min
Negative pressure display	2,000 – 6,500 Pa / 20 - 65 mbar / 0.3 – 0.95 psi
Negative pressure control	Automatic
Operation	10.1-inch touch display
Sieve mode	Rapid Sieving, Manual Sieving, Methods
Storable SOPs (Standard Operating Procedures)	Method-controlled measurement sequence Sieve-controlled measurement sequence
Advanced software functions	Guided sieving LIMS integration Automatic reporting Trend analysis Weigh-in assistant Grain tolerance Weighing assistant Sieve check Pressure variance calculation Plausibility check
Material (sample contact)	Stainless steel 1.4404 (316L)
With test certificate / Calibratable	Yes
Accessories	Cyclone, vacuum cleaner, additional lid, soft-faced hammer, sieve aids, external balances
Conformity	CE

Electrical specifications	
Mains connection (depending on the variant)	1~, 110-240 V, 50/60 Hz, 1500 VA
Mains voltage fluctuations	+/- 10 %
Overvoltage category	II
Electromagnetic compatibility (EMC)	EMC Class A according to EN 55011
Interfaces	2 x USB 2.0 (maximum 1 A current), Ethernet, PowerCon

Electrical specifications	
Operating system	Windows 11 IoT Enterprise
Memory	64 Gb, SATA
Externally connectable devices	Keyboard, mouse, barcode scanner, USB hub, vacuum cleaner, balance, printer
Balance	Internal, External

Specification Internal balance	
Readability	0.01 g
Maximum capacity	3.000 g
Calibration	Yes, 7-point calibration, freely selectable weights
Calibration accuracy	0,1 g
Technology	Strain gauge

External balance specification	
Interface (on the device)	USB serial
Supported manufacturers, including product family	Mettler Toledo: MX series (MT SICS protocol) Sartorius: Practum, Quintix Core: IoT Line (KCP protocol)

Vacuum cleaner specification	
Interface (on the device)	PowerCon
Supported manufacturers, including product	Nilfisk Attix 33, Retsch GmbH special item (230 V, 110 V) Other vacuum cleaner models may be approved upon request after technical approval.
Power	1400 W
Suction technology	Standard - Bagged vacuum cleaner, beater bar vacuum cleaner
Drive technology	Universal motor
Voltage	Depending on the mains voltage, see type plate 230 V 1~, 50/60 Hz; 110 V 1~, 50/60 Hz
Max. Apparent Power	1500 VA
Maximum starting current	15 A
Control technology	Phase-angle control
Vacuum cleaner with soft start	Not permitted; only vacuum cleaners without soft start may be used
Internal speed control of the vacuum cleaner	Not permitted

Vacuum cleaner specification	
Suction airflow, air volume flow	approx. 4500 l/min
Suction airflow, connection dimensions	32 mm inner diameter, maximum suction port depth 60 mm
Plug-in connection (machine side)	Neutrik Powercon NAC3MPXXA
Plug-in connection (vacuum cleaner side)	Neutrik Powercon NAC3FXXA-W-S

Barcode scanner specification	
Interface (on the device)	USB 2.0
Supported manufacturers, including product	Delock, USB Barcode scanner, No. 90557 QuickScan, 2500 Series Honeywell, XP 1950g
Configuration	HID Mode
Barcode type	1D, 2D
Language setting	Adhere to the language settings provided by the manufacturer.

Computer mouse and keyboard specification	
Interface (on the device)	USB 2.0
Supported manufacturers, including product	Recommendation: Logitech Unifying compatible devices (manage multiple devices via one USB port)
Language setting	Keyboard layout QWERTZ, QWERTY Note: Adhere to the instructions for language settings provided by the manufacturer!

Mechanical specification	
Dimensions W x H x D (without sieve and lid)	516 x 180 x 404 mm
Weight	17 kg
Required footprint (W x D)	600 x 500 mm
Protection class	IP41

Installation site conditions	
Installation altitude	Max. 2000 m above sea level Sea level
Ambient temperature	5 °C to 40 °C
Humidity	Maximum relative humidity 80% up to 31 °C, decreasing linearly to 50% relative humidity at 40 °C
Pollution level	2

3.2 Emissions

Noise characteristics:

The noise characteristics are influenced by the material being sieved, the set speed and the negative pressure.

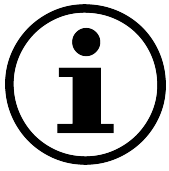
Example 1	
Sieve	25 µm
Rotational speed	30 revolutions/minute
Negative pressure	2.000 Pa
Sieving material	Sand
Feed quantity	100 g

Under these operating conditions, the equivalent continuous noise level at the workplace is Leq = 50.5 dB(A).

Beispiel 2	
Sieve	180 µm
Rotational speed	30 revolutions/minute
Negative pressure	3.000 Pa
Sieving material	Lime
Feed quantity	80 g

Unter diesen Betriebsbedingungen beträgt der arbeitsplatzbezogene äquivalente Dauerschallpegel Leq = 51 dB(A).

3.3 Device views

	The numbering of the components in the following device views is fixed and is maintained in the further illustrations of the components in the operating instructions.

3.3.1 Front side

Fig. 2: Front side of the device

No.	Component	Function
1	Nozzle chamber	Directs the fine particles of the sample to the air outlet channel
2	Nozzle	Directs the air jet from below through the sieve
3	Touch display	For controlling the device
4	Housing	Plastic and sheet metal housing for drive and control unit

3.3.2 Rear side

Fig. 3: Rear side of the device

No.	Component	Function
5	Vacuum cleaner connection	Connect the vacuum cleaner by using the PowerCon adapter
6	Main switch	For switching the device on and off
7	Device power outlet	Connection for the power cord
8	Air inlet duct	Opening for air intake and connection for silencer and insert

No.	Component	Function
9	Silencer	Reduction of intake noise at the air inlet duct
10	Air outlet duct	Opening for air outlet and connection for the vacuum cleaner
11	Ethernet interface	Connection for LAN cable
12	USB interface (2 each)	Connection for external components, such as a keyboard, computer mouse, barcode scanner and external balance

3.3.3 Instructions on the device

Fig. 4: Instructions on the device

No.	Component	Function
13	Read the operating instructions	The operating instructions for the device must be read before commissioning and operation.
14	Power warning	Caution: Electric shock! Open the housing only by trained personnel. Unplug the power cord before any maintenance work is performed!
15	Type plate	Information about the device.

3.3.4 Description of the type plate

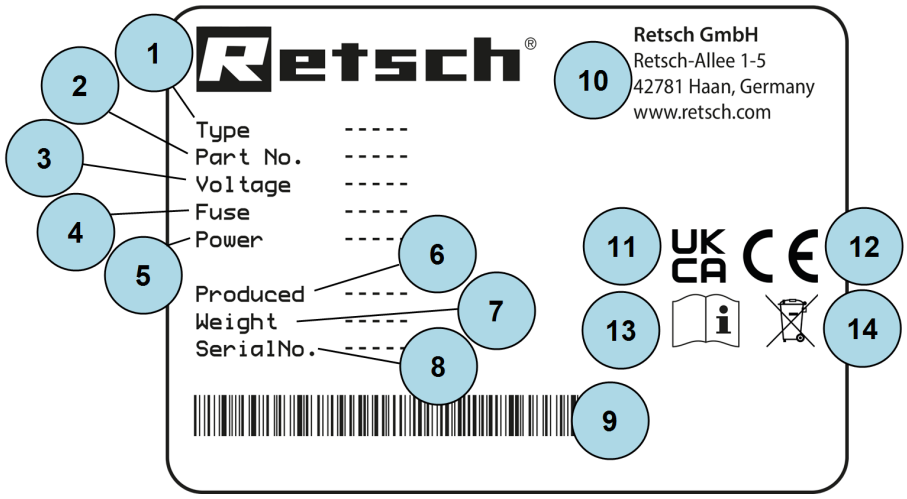


Fig. 5: Type plate

No.	Component
1	Device name
2	Item number
3	Voltage variant, mains frequency
4	Fuse type and fuse rating
5	Performance, current
6	Year of manufacture
7	Weight
8	Serial number
9	Barcode
10	Manufacturer's address
11	UKCA marking
12	CE-Kennzeichnung
13	Safety note: Read the operating instructions
14	Disposal symbol

If you have any questions, always quote the device name (1) or item number (2) and the serial number (8) of the device.

4 Packaging, transport and set up

Follow the instructions in this chapter to properly transport and set up the device in accordance with the manufacturer's recommendations.

4.1 Included accessories in the delivery

The following components are included with the device for the uses described in these instructions:

- Soft-faced hammer
- PowerCon adapter
- Silencer and silencer insert
- Sieve lids (2 each)

4.2 Packaging

The packaging is adapted to the transport route. It complies with generally accepted packaging guidelines.

ⓘ NOTE

Claims

Incomplete delivery or transport damage

→ In the event of any transport damage, the carrier and Retsch GmbH must be notified immediately. Later claims may possibly not be considered.
→ **Upon receipt of the device, please check the delivery for completeness and integrity.**
→ **In the event of any transport damage, notify your carrier and Retsch GmbH within 24 hours.**

4.3 Transport

⚠ CAUTION

Risk of injury from falling device

Improper transport of the device

→ The device can cause injury if it falls due to its weight.
→ **Do not transport the device alone.**
→ **Refer to the descriptions in the relevant chapters of this manual.**

The transport must be carried out according to the device's specifications and may only be performed by qualified personnel with the appropriate expertise.

The safety instructions must be observed during transport.

NOTE

Damages to components

Movements during transport

→ Mechanical or electronic components can be damaged during transport by bumping, shaking or throwing.

→ **Handle the device carefully during transport.**

NOTE

Claims

Incomplete delivery or transport damage

→ In the event of any transport damage, the carrier and Retsch GmbH must be notified immediately. Later claims may possibly not be considered.

→ **Upon receipt of the device, please check the delivery for completeness and integrity.**

→ **In the event of any transport damage, notify your carrier and Retsch GmbH within 24 hours.**

4.4 Temperature fluctuations and condensation

Interim storage

Even during interim storage, the device must be stored dry and within the specified ambient temperature.

NOTE

Damages to components due to condensation

Temperature fluctuations

→ The device may be exposed to significant temperature fluctuations during transport. The resulting condensation can damage electronic components.

→ **Wait until the device has acclimatised before use.**

4.5 Conditions for the installation site

⚠ CAUTION

Risk of injury from falling device

Incorrect device setup

→ The device can cause injury if it falls due to its weight.
→ **Only operate the device on a sufficiently large, firm, and stable work surface.**
→ **Ensure that all device feet are securely positioned.**

- Installation altitude: max. 2000 m above sea level
- Ambient temperature: 5 °C – 40 °C
- Maximum relative humidity < 80 % (at ambient temperatures ≤ 31 °C)

For ambient temperatures U_T between 31 °C and 40 °C, the maximum humidity value L_F decreases linearly according to $L_F = -(U_T - 55) / 0.3$:

Ambient temperature	Maximum relative humidity
≤ 31 °C	80 %
33 °C	73.3 %
35 °C	66,7 %
37 °C	60 %
39 °C	53,3 %
40 °C	50 %

ⓘ NOTE

Setting up the device

Vibrations during operation

→ Depending on the operating condition of the device, slight vibrations may occur.
→ **Only place the device on a vibration-free, level, and stable surface.**

ⓘ NOTE

Setting up the device

Disconnecting the device from the mains power supply

→ The device must be able to be disconnected from the mains power supply at any time.
→ **Position the device in such a way that the power cord connection is always easily accessible.**

NOTE

Ambient temperature

Temperatures outside the permissible range

→ Electronic and mechanical components can be damaged
→ Performance data may change to an unknown extent.
→ **The device's operating temperature range (5 °C – 40 °C ambient temperature) should not be exceeded or fallen below.**

NOTE

Humidity

High relative humidity

→ Electronic and mechanical components can be damaged
→ Performance data may change to an unknown extent.
→ **The relative humidity around the device should be kept as low as possible.**

4.5.1 Installation conditions when using the internal balance

In addition to the general conditions for the installation location of the device, the following additional points should be noted when using the internal balance:

- Install the machine in a quiet environment or on a firm and sufficiently level surface
- Avoid any external influences such as wind, vibration, shocks or vibrations
- Level the device (horizontal alignment) by using a spirit level
- Avoid fluctuating temperatures and sunlight
- Avoid electrostatic influences

4.6 Remove the packaging

Remove the packaging and take out the device as follows:

→ Place the device delivered in the box on a stable surface and open the box.
→ Carefully remove the device from the box.
→ Keep the box and packing material in case you need to return the device.

5 Initial commissioning

Follow the instructions in this chapter to commission the device correctly in accordance with the manufacturer's recommendations.

5.1 Electrical connection

⚠ WARNING

Danger to life due to electric shock

Connecting to a socket without a protective earth conductor

→ Connecting the device to sockets without a protective earth conductor can result in life-threatening injuries from electrical shock.
→ **Only operate the device in sockets with a protective earth conductor (PE).**

⚠ WARNING

Danger to life due to electric shock

Damaged power cable

→ Operating the device with a damaged power cord or plug can result in life-threatening injuries from electric shock.
→ **Before operating the device, check the power cord and plugs for any damage.**
→ **Never operate the device with a damaged power cord or plug!**

⚠ WARNING: An external fuse must be installed when connecting the power cable to the mains in accordance with the regulations of the installation site.

- Refer to the type plate for information on the voltage and frequency required by the device.
- The values listed must correspond to the existing mains supply.
- The device may only be connected to the mains using the connection cable supplied.

Before connecting the power supply, ensure that

- the installation site complies with the installation conditions,
- the device is stable and secure,
- the power ratings of the device (type plate) match the ratings of the power supply at the installation site.

5.2 Connect the device to the mains power supply

→ Check the voltage and frequency on the device's nameplate against the local values.
→ Plug the included power cord into the device's wall socket.

→ Plug the other end of the power cord into a wall socket at the installation location.
→ Implement external circuit protection in accordance with the regulations for the installation location.

5.3 Assembling the silencer

In order to reduce noise in the air intake area, the included silencer must be installed before initial use. Install the silencer as follows:

→ Remove the silencer and foam inserts from the package.
→ Insert the foam inserts into the air outlet duct (8) on the back of the unit.
→ Screw the silencer (9) into the thread of the air outlet duct and tighten it by hand.

NOTE: Never insert the foam inserts if they are deformed. This will block the airflow.

Fig. 6: Install the silencer

5.4 Connecting an industrial vacuum cleaner

⚠ WARNING

Danger to life due to electric shock

Cold device connection for external industrial vacuum cleaner

→ When the device is switched on, there is a risk of electrical shock if the cold appliance connection for the external industrial vacuum cleaner is touched.
→ **Switch off the device before connecting the external industrial vacuum cleaner.**

⚠ CAUTION

Danger of objects being ejected

Connecting compressed air instead of an industrial vacuum cleaner

→ If compressed air is connected to either of the two air inlets, the sieve cover and the analysis sieve may be ejected.
→ **The device must not be operated with compressed air!**

The device can only be operated with a connected industrial vacuum cleaner. The industrial vacuum cleaner is powered by the device and switched on automatically at the start of the sieving process via the software control. Some industrial vacuum cleaners have several modes. For use in air jet sieving, the normal mode without the knock function is recommended. The following suitable models are available as accessories from Retsch GmbH:

- Nilfisk Attix 33, Retsch GmbH special item (230 V, 110 V)

NOTE: Using industrial vacuum cleaner models other than those recommended by Retsch GmbH may result in damage to the device.

Connect the industrial vacuum cleaner and the device as described below:

→ Remove the PowerCon adapter from the scope of delivery of the device.
→ Plug the PowerCon adapter into the vacuum cleaner power supply connection (5) on the rear of the device.
→ Plug the industrial vacuum cleaner plug into the PowerCon adapter socket.
→ Connect the industrial vacuum cleaner suction tube to the device's air outlet channel (10).

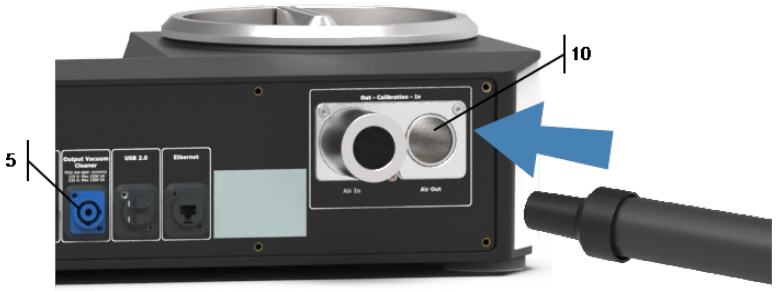


Fig. 7: Connecting an industrial vacuum cleaner

NOTE: The parameters for connecting a vacuum cleaner are listed below. No liability is accepted for damage to property or personal injury resulting from the connection of a vacuum cleaner model not recommended by Retsch GmbH. Other vacuum cleaner models may be approved upon request after technical approval. Apart from the approved models, all modifications to the vacuum cleaner must be clarified with Retsch. Electrical modifications may only be carried out by trained electrical specialists.

⚠ WARNING: Using an industrial vacuum cleaner with a soft start (when the vacuum cleaner is started, the power is reduced to avoid high starting currents) can result in electrical hazards. Read the corresponding operating instructions before starting up the industrial vacuum cleaner.

Vacuum cleaner specification	
Interface (on the device)	PowerCon
Supported manufacturers, including product	Nilfisk Attix 33, Retsch GmbH special item (230 V, 110 V) Other vacuum cleaner models may be approved upon request after technical approval.
Power	1400 W
Suction technology	Standard - Bagged vacuum cleaner, beater bar vacuum cleaner
Drive technology	Universal motor
Voltage	Depending on the mains voltage, see type plate 230 V 1~, 50/60 Hz; 110 V 1~, 50/60 Hz
Max. Apparent Power	1500 VA
Maximum starting current	15 A
Control technology	Phase-angle control
Vacuum cleaner with soft start	Not permitted; only vacuum cleaners without soft start may be used
Internal speed control of the vacuum cleaner	Not permitted
Suction airflow, air volume flow	approx. 4500 l/min
Suction airflow, connection dimensions	32 mm inner diameter, maximum suction port depth 60 mm
Plug-in connection (machine side)	Neutrik Powercon NAC3MPXXA
Plug-in connection (vacuum cleaner side)	Neutrik Powercon NAC3FXXA-W-S

Connection to suction air systems or house connections is only permitted after technical clarification with Retsch. When connected to a suction air system, the automatic vacuum control and vacuum monitoring become inactive. Precise control and regulation of the process pressure cannot be guaranteed for suction systems and house connections. The pressure warning limits are not taken into account. Unexpected errors may occur when using house connections or suction systems.

6 Operation of the device

Follow the instructions in this chapter in order to operate the device correctly in accordance with the manufacturer's recommendations.

⚠ WARNING

Handling of food, pharmaceutical, and cosmetic products

Analysed products

→ Food, pharmaceutical, and cosmetic products analysed by this device must no longer be consumed, used or distributed.

→ **Dispose of these substances in accordance with the applicable regulations.**

⚠ CAUTION

Explosion or fire hazard

Explosive atmosphere

→ Due to its design, this device is not suitable to be used in potentially explosive atmospheres.

→ **The device must not be operated in a potentially explosive atmosphere.**

⚠ CAUTION

Explosion or fire hazard

Variable sample properties

→ The properties, and therefore the hazard potential, of the sample can change during the sieving process.

→ **The device must not be operated in a potentially explosive atmosphere.**

⚠ CAUTION

Risk of personal injury

Hazardous sample material

→ Depending on the hazardous nature of the sample material, the necessary measures must be taken in order to prevent personal injury.

→ **Refer to the safety data sheets for the sample material.**

NOTE

Intended use of the device

Long-term operation

→ This laboratory device is designed for eight-hour single-shift operation at a 30% duty cycle.

→ **The device must not be used as a production machine or for continuous operation.**

NOTE

Damages to the device caused by liquids

Liquids can penetrate the device interior.

→ Mechanical and electronic components will be damaged, and the device's functionality will no longer be guaranteed.

→ **This device must not be used for wet sieving!**

NOTE

Damages to the balance and inflatable seal

No components on the air inlet duct

→ If hot air is drawn into the device, the balance and the inflatable seal can be damaged. This can lead to inaccuracies in the weighing reading.

→ **The air inlet duct must be unobstructed.**

→ **No components, such as units for additionally heating the air, may be mounted in front of the air inlet duct.**

6.1 Functionality

The air jet screening method is used in order to determine the particle size distribution of fine, powdery bulk materials – i.e. very small particles that are difficult to separate using conventional screening methods. There are two methods for performing air jet screening: the standard method and the Swiss method. The two methods differ primarily in terms of sample preparation, screening time and evaluation.
One analysis sieve is used per screening process to divide the sample into two fractions (oversize and undersize). Performing several sieving processes with sieves of different mesh sizes allows a sample to be divided into any number of fractions.

The movement of the sample material on the sieve mesh is achieved by a rotating air jet. The analysis sieve itself does not move during the sieving process. An industrial vacuum cleaner connected to the device creates a vacuum in the sieving chamber by sucking in ambient air. The air flow thus generated exits the rotating slot nozzle at high speed and disperses the sample

material lying on top through the sieve mesh from below. Above the sieve mesh, the air jet is distributed over the entire surface of the analysis sieve and is extracted at low speed through the sieve mesh. The fine fraction of the sample material is transported through the air jet sieve mesh and extracted with an industrial vacuum cleaner. Optionally, the fine fraction can be collected in a cyclone separator.

6.1.1 Sieving in the standard procedure

In the standard procedure, the defined total mass of a sample is used. This mass is applied to the finest sieve. After sieving, the remaining residue on the sieve is removed, weighed and then transferred to the next coarser sieve. This process is repeated several times until all sieve fractions have been passed through. In this way, a single sample is separated step by step, and the sums of the backweights give the complete grain size distribution.

6.1.2 Sieving by using the Swiss method

The Swiss method uses identical partial quantities from a total sample. Each partial sample is sieved separately on a sieve. The reweighing is carried out individually for each sieve; the sample is not transferred from sieve to sieve. A single value is generated for each sieve, e.g. proportion >90 µm, >63 µm, etc.

6.2 Performing a sieving

This chapter explains the standard sieving procedure. The device has various modes that can be used to perform sieving. The user can decide whether to perform sieving with or without predefined parameters. The necessary steps are described below to provide a general understanding of the procedure:

→ Determine the empty weight of the analysis sieve.
→ Place the sample on the analysis sieve and determine its weight. Make sure not to exceed the maximum load.
→ Determine the empty weight of the sieve lid.
→ Set the desired parameters for sieving.
→ Start the sieving process.
→ Weigh the analytical sieve, including the sample remaining on the sieve and the lid.
→ Determine the weight of the sample fraction from the previously determined weighing values (weight after sieving minus the empty weight of the analysis sieve and sieve lid).

6.2.1 Function of the internal balance

The device has an internal balance that records all weighing processes during sieving. The individual weights of the components (sieve, lid) and the sample weight before and after sieving are recorded. To ensure that the correct values are recorded, the balance must be tared before each weighing. The procedure consists of the following steps in detail:

- If the sieve and lid are in place, remove them. Tare the balance manually.
- Insert the sieve and save the weighing value. The balance will then automatically tare itself.
- Add the sample and save the weight value. The balance will then automatically tare itself.

- Insert the sieve lid and save the weight value.
- Perform the sieving. The balance will then automatically tare itself.
- Remove the sieve, including the remaining sample and sieve lid.

In order to ensure that the internal balance can determine correct weighing values, the following instructions should be observed during installation and use:

- Install the machine in a quiet environment or on a firm surface
- Avoid any external influences such as wind, vibration, shocks or vibrations
- Levelling (horizontal alignment of the device)
- Avoid fluctuating temperatures and sunlight
- Avoid electrostatic influences
- Adjust the balance regularly
- **TIPS & TRICKS:** For users with very high accuracy requirements (readability better than d = 0.01 g), an external precision laboratory balance from a reputable manufacturer is recommended.

6.2.2 Recommendations for process parameters (sample quantity, sieving time, vacuum, nozzle speed)

Depending on the properties of a sieve and, in particular, its mesh size, the following values provide guidance for achieving plausible and repeatable sieving results.

Mesh size	Maximum load	Negative pressure	Nozzle speed	Sieving time
32 µm	15 ml	3200 Pa	20 rpm	6 min
45 µm	20 ml	3200 Pa	20 rpm	5 min
63 µm	25 ml	3000 Pa	20 rpm	4 min
100 µm	30 ml	2500 Pa	20 rpm	3 min
150 µm	40 ml	2500 Pa	20 rpm	3 min
250 µm	50 ml	2000 Pa	20 rpm	2 min
315 µm	50 ml	2000 Pa	20 rpm	2 min
400 µm	50 ml	2000 Pa	20 rpm	2 min

6.3 Turn the device on and off

⚠ WARNING

Danger to life due to electric shock

Damaged power cable

→ Operating the device with a damaged power cord or plug can result in life-threatening injuries from electric shock.

→ **Before operating the device, check the power cord and plugs for any damage.**

→ **Never operate the device with a damaged power cord or plug!**

Switch on the device as follows:

→ Switch on the device by using the main switch on the rear of the device.

Switch off the device as follows:

→ Switch off the device using the main switch on the rear of the device when no sieving process is running.

6.4 Inserting the analytical sieve

The device is designed for analysis sieves with an outer diameter of 203 mm (8‘) and a height of 50 mm (2’) or 25 mm (1"). Analysis sieves with an outer diameter of 200 mm can also be used in combination with an adapter ring.

→ Place the analysis sieve (1.1) with a diameter of 203 mm (8") directly onto the nozzle chamber (1).
→ For the analysis sieve with a diameter of 200 mm, first place the adapter ring onto the nozzle chamber. Then insert the analysis sieve.

NOTE: When inserting the sieve, make sure that it does not touch the nozzle of the device. Otherwise, the internal balance may give incorrect weighing values.
NOTE: Only with a suitable combination of analysis sieve, adapter ring and sieve cover can the required negative pressure be built up in the nozzle chamber and the sieving process started.
NOTE: Each Retsch analysis sieve is equipped with an O-ring, which serves as a seal to build up the necessary vacuum during sieving.

Fig. 8: Insert analysis sieves 203 and 200 mm

6.5 Inserting the sieve lid

Four different sieve lid options are available for the analytical sieves. These differ in shape and diameter and must be selected to match the analytical sieve being used.

→ Place the lid (1.2) on the analytical sieve (1.1), according to its outer diameter and sieve height.

NOTE: Only with a matching combination of analytical sieve and sieve lid can the necessary negative pressure be created in the nozzle chamber, thus enabling the sieving process to begin.

Fig. 9: Insert the sieve lid

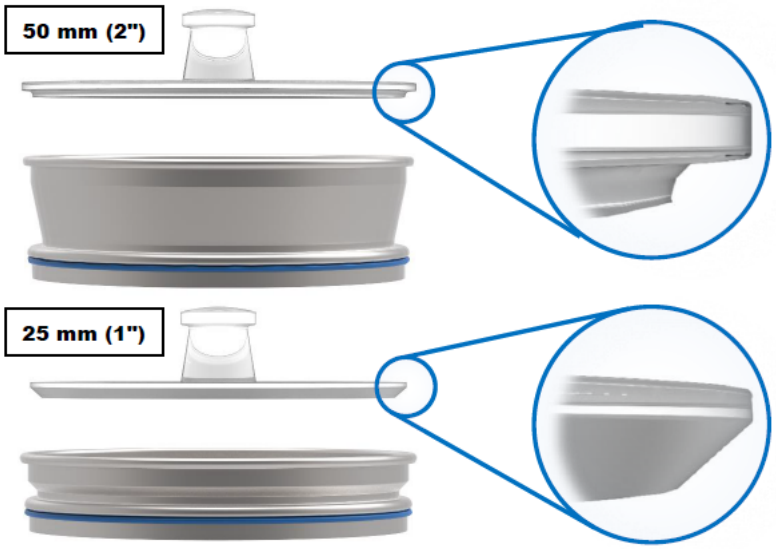


Fig. 10: Sieve lid differences

Note the corresponding markings on the sieve lids:

Marking	Outer diameter	Sieve height	Adapter ring
8 inches x 2 inches (50 mm)	203 mm (8")	50 mm (2") 25 mm (1")	no
8 inch x 1 inch (25 mm)	203 mm (8")	25 mm (1")	no
200 mm x 50 mm	200 mm	50 mm (2") 25 mm (1")	yes
200 mm x 25 mm	200 mm	25 mm (1")	yes

6.6 Using the soft-faced hammer

In order to remove sample material adhering to the underside of the sieve lid during the sieving process, the soft-faced hammer included with the delivery can be used.

→ While the sieving process is running, gently tap the lid with the soft-faced hammer.

NOTE: Excessive force with the soft-faced hammer can lead to premature material fatigue of the lid, for example, in the form of cracks.

Fig. 11: Tapping with the soft-faced hammer

6.7 Connecting external components

In addition to the touch application and use of the internal scales, other options are available for operating the device and entering and transferring data by connecting external components. For example, the screen can also be operated using a computer mouse. Data can be entered by using a keyboard or barcode scanner. Selected scale models are compatible with the device for recording and transferring weighing values. The use of external components may be perceived as more convenient when operating the device, but is not required. The following components can be connected to the device:

- Keyboard
- Computer mouse
- Balance
- Barcode scanner

Various interfaces are available on the rear of the device for connecting external components and enabling data transfer. Communication between external components and the device is based on communication protocols. As a rule, only the country-specific language settings need to be taken into account for standard keyboards, computer mice and barcode scanners. Communication with scales is based on more complex structures and can only be guaranteed for the scales or scale families recommended by Retsch GmbH. Please note the information in the chapters.

6.7.1 Connecting an external keyboard, computer mouse or barcode scanner

An external keyboard, computer mouse or barcode scanner can be connected via the USB interfaces on the rear of the device. We recommend using wireless components that allow a combination of keyboard and computer mouse. If the number of available interfaces is insufficient, additional interfaces can be created by using a USB hub. Please note that when using larger USB hubs, a separate power supply may be necessary.

Connect an external keyboard, computer mouse or barcode scanner as follows:

→ Plug the USB cable of the external component into one of the USB ports (12) on the back of the device.
→ For barcode scanners, follow the instructions for language settings in the manufacturer's manual. The language setting must match the selected system language of the device. The device only supports the languages offered in the system settings.
→ For keyboards, note the layout format. Only the QWERTZ (German) and QWERTY (English) keyboard layouts are supported, depending on the selection in the device's system settings. The language setting must match the selected system language of the device.

Computer mouse and keyboard specification	
Interface (on the device)	USB 2.0
Supported manufacturers, including product	Recommendation: Logitech Unifying compatible devices (manage multiple devices via one USB port)
Language setting	Keyboard layout QWERTZ, QWERTY Note: Adhere to the instructions for language settings provided by the manufacturer!

Barcode scanner specification	
Interface (on the device)	USB 2.0
Supported manufacturers, including product	Delock, USB Barcode scanner, No. 90557 QuickScan, 2500 Series Honeywell, XP 1950g
Configuration	HID Mode
Barcode type	1D, 2D
Language setting	Adhere to the language settings provided by the manufacturer.

6.7.2 Connecting an external balance

An external scale is connected via the serial USB interface on the back of the device. Since communication between the external scale and the device is based on individual communication protocols, please note the information on compatible scale models.

Establish the connection to an external scale as follows:

→ Plug the USB cable of the external scale into one of the USB interfaces (12) on the back of the device.

→ In the device settings, select the use of an external scale in the Device Manager tile. For more information, see chapter Workspace Settings.

External balance specification	
Interface (on the device)	USB serial
Supported manufacturers, including product family	Mettler Toledo: MX series (MT SICS protocol) Sartorius: Practum, Quintix Core: IoT Line (KCP protocol)

NOTE: The external scale model may need to be set up in advance for communication. Please refer to the manufacturer's instructions for this.

7 Device control

The device is controlled via the integrated touchscreen. The display is also suitable for operation while wearing gloves or using a stylus. Alternatively, operation can be performed by connecting an external keyboard and computer mouse. Further information on connecting a keyboard and computer mouse is explained in the chapter Connecting External Components.

All functions for performing sieving, analysing measurement results, and adjusting settings are accessible via the menu surface.

The device's software version depends on the purchased device variant: AS 200 jet pro or AS 200 jet pharma. The AS 200 jet pharma variant is an extension of the AS 200 jet pro. The pharma version includes all the functions of the pro version and additionally offers access to user management, logging functionality, and associated security settings.

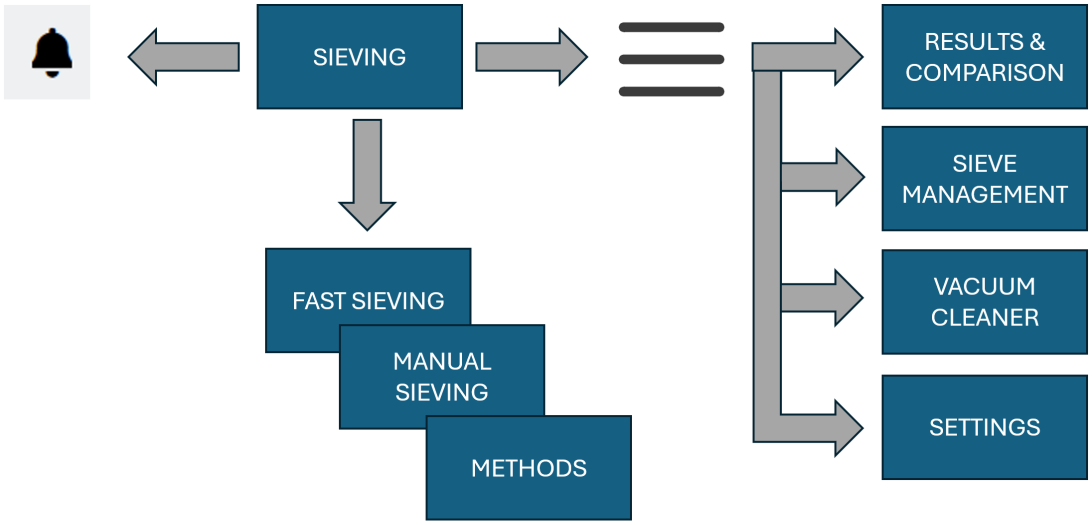


Fig. 12: Schematic menu navigation

	The illustrations in this manual are based on the English audio version. For a better understanding, all versions of this manual use English terms. Therefore, the terminology may differ from the translated audio versions of the software.

7.1 Menu surface of the touch display

The touchscreen's menu interface is divided into the following areas:

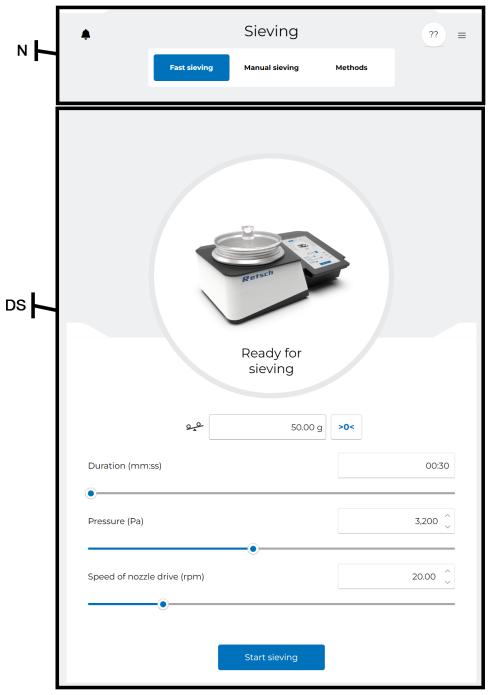


Fig. 13: Menu Interface Layout

	Area	Function
N	Navigation	The navigation area provides access to the notification and Overlay menus. The Overlay menu allows access to workspaces and further settings: ○ Sieving ○ Sieve management ○ Results & Comparison ○ Vacuum cleaner ○ Settings Within a workspace, you can navigate to submenus by selecting tiles. The currently active or selected tile is highlighted in blue. You can switch between tiles by selecting the corresponding button.
DC	Data and Control	The Data and Control section displays the content corresponding to the option selected in the Overlay menu. This includes the parameters and data that can be generated and subsequently analysed during sieving, as well as the settings. Data input is also performed via the keyboard, and the device is controlled during sieving.

7.2 Cross-workspace buttons

Various buttons for different functions are available in the workspaces. The following explains the buttons which are used multiple times and are generally valid. Individual buttons are also

explained in the respective chapters of the workspaces.

Symbol	Designation	Function
☰	Overlay Menu	Provide access to the workspaces and further settings.
Start sieving	Start sieving	Start a sieving operation in the `Fast sieving` tile with the set parameters.
	Start measurement	Start a measurement in the `Manual sieving` or `Methods` tile with the saved parameters of the selected row. The measurement takes place in guided mode according to a predefined sequence.
Stop sieving	Stop sieving	Stop a sieving operation and end the measurement. The temporarily stored values are lost and cannot be recovered.
Pause sieving	Pause sieving	Pause a sieving operation to resume the sieving process later.
Resume sieving	Resume sieving	Resume a paused sieving operation. The measurement will end in guided mode.
Ok	ok	Confirm an entry or action step to continue.
	Retrieve the weight value	Retrieve the current weight value from the internal or externally connected balance and enter it into the adjacent field.
	Weight value stable/unstable	Indicates whether the weight value sent by the balance is subject to fluctuations (unstable) or has settled at a value (stable). Valid when using the internal and connected external balance.
>0<	Tare	Tare the weight value of the internal or externally connected balance.
	Edit	Edit the parameters of a sieve or method.
	More	Open additional buttons.
	Back	Close the edit view to return to the tile list if no changes have been made.
	Save as	Save another method by changing the name of an existing method. Overwrite an existing method by changing the parameters of an existing method. It is greyed out by default and only becomes active when at least one parameter has been changed.
	Save	Save a method or sieve with fully defined parameters. It is greyed out by default and only becomes active once all parameters are defined.

Symbol	Designation	Function
	Undo	Remove all unsaved changes. It is greyed out by default and this option only becomes active after changes have been made.
	Delete	Deletes a method selected via the side menu. Deletes sieves which are assigned to a method. Deletes sieves in `Sieve management`.
	Slider off (grey) or on (blue)	Turns a parameter or function on or off.
	Selection active or inactive	Shows the status of row selections (e.g., sieves or results) in lists.
	Clear selection	Displayed in the header row of tables when at least one row is selected. Clicking on it resets the selection.
	Unsaved change	Changes to parameters which are pending saving are marked with a red dot on the left edge of the row. The marker disappears when the change is undone or saved.
	Non-accepted and missing value	Indicates the entry of non-accepted and missing values for required fields in an input field. As long as the symbol is displayed, the input cannot be saved.
	Close	Closes the currently open menu or view and cancels the current action. If data is not saved at this point, it will be lost.
	Export	Export the current view to one of the available formats.
	Save to clipboard	Copy the current view to the clipboard.
	Table rows are highlighted in colour – On (Grey) / Off (Blue)	Turns a coloured background on or off for every second row in a table.
	Linear X-axis and linear Y-axis	Scale the X- and Y-axes in linear view on the chart.
	Logarithmic X-axis and linear Y-axis	Scale the X-axis in logarithmic and the Y-axis in linear view on the chart.
	Logarithmic X-axis and logarithmic Y-axis	Scale the X- and Y-axes in logarithmic view on the chart.
	RRSB distribution	Representation of the sum distribution Q_3 in the RRSB grid including the limit line at 63.2%.

Symbol	Designation	Function
	Y-axis with sum distribution Q_3	Representation of the result for the sum distribution Q_3 on the first Y-axis (left) in the diagram.
	Y-axis with residual sum distribution $1-Q_3$	Representation of the result for the residual sum distribution $1-Q_3$ on the first Y-axis (left) in the diagram.
	Y-axis with frequency distribution q_3	The result for the frequency distribution q_3 is plotted on the first y-axis (left) in the diagram.
	Y-axis with fraction p_3	The result for the fraction p_3 is plotted on the first y-axis (left) in the diagram.

7.2.1 Keyboard

A keyboard is integrated into the menu interface for data entry. It opens automatically at the bottom of the screen when an input field is selected. Alternatively, the keyboard can be opened at any time by clicking the button. The window closes by clicking the X button. The following functions can be performed by using the keyboard:

- Entering letters, numbers, and special characters
- Tab, Caps Lock, and Shift keys
- Copy , Cut and Paste
- Changing the values of input fields with number formats ,
- Common keyboard shortcuts, for example Ctrl+Z for the undo command

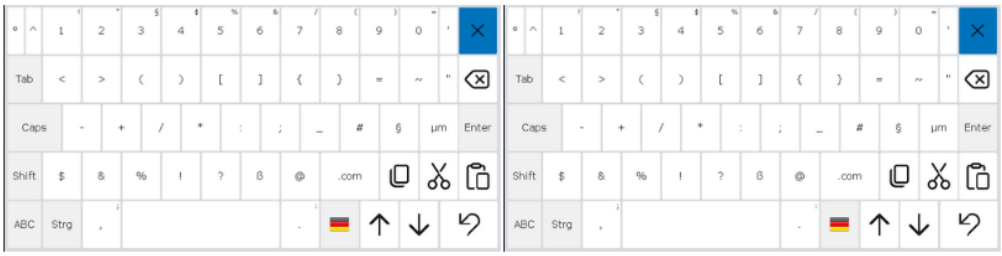


Fig. 14: Keyboard layout

7.3 Workspace Sieving

The `Sieving` workspace can be accessed by opening the overlay menu and selecting the button. The Overlay menu closes automatically and the screen switches to the selected workspace. The workspace contains three different tiles, each representing a sieving mode:

- Fast sieving
- Manual sieving
- Methods

7.3.1 Fast sieving tile

In `Fast sieving` mode, sieving can be performed without first selecting a created sieve. This mode is intended for quick and easy sieving where no data storage of sieve parameters and results or a report is required. The internal balance is available for weighing results. The parameters of the sieving process are set manually using the controls. The following parameters can be set:

- Duration
- Pressure
- Speed of nozzle drive

The parameters are set by dragging the control onto the bar. The currently set value is displayed on the right-hand side of the screen. Sieving is started by using the `Start sieving` button and can be paused or stopped during sieving.

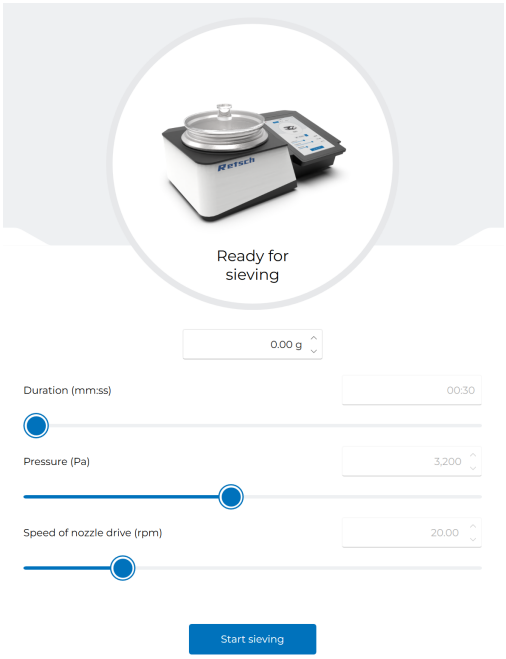


Fig. 15: Fast sieving workspace

7.3.2 Manual sieving tile

The `Manual sieving` sieving mode is suitable for sieving operations in which a specific sieve with assigned parameters is used (sieve cut). The sieving process follows a fixed sequence of steps, through which the user is automatically guided (Guided Sieving). Typical parameters for particle characterisation are automatically calculated based on the determined weighing values.

The tile contains a list of all sieves that were previously created in the `Sieve management` workspace and can therefore be used to perform sieving. The list is empty when the software is newly installed. Only some of the parameters that define a sieve are visible in the list view. In order to view or edit all parameters, click on the button in the row of the corresponding filter. Any changes made to a sieve are visible in the `Manual sieving` and `Sieve management` workspaces.
In order to search for a specific sieve, use the search field above the sieve list. Characters, which

are entered there, search all columns of the list for matches. All other parameters are not taken into account in the search! Each match is highlighted in colour and the list is filtered. If no match is found, the list remains empty.

In order to perform a sieve, proceed as follows:

→ Search the list for the specific sieve to be used for the sieving. If no sieve or the desired sieve is not available, switch to the `Sieve management` workspace and create a sieve there. For more information, see the chapter Sieve management workspace.

→ In order to start the sieving process, click on the ▶ button in the row of the sieve to be used for sieving.

→ The sieving process starts in Guided Sieving. Follow the instructions on the touch display. Once the process has been successfully completed, an extract of the results is displayed.

→ The sieving process can be cancelled at any time by clicking on the ✕ button at the top right of the screen. All data stored in the cache up to that point will be lost and cannot be recovered!

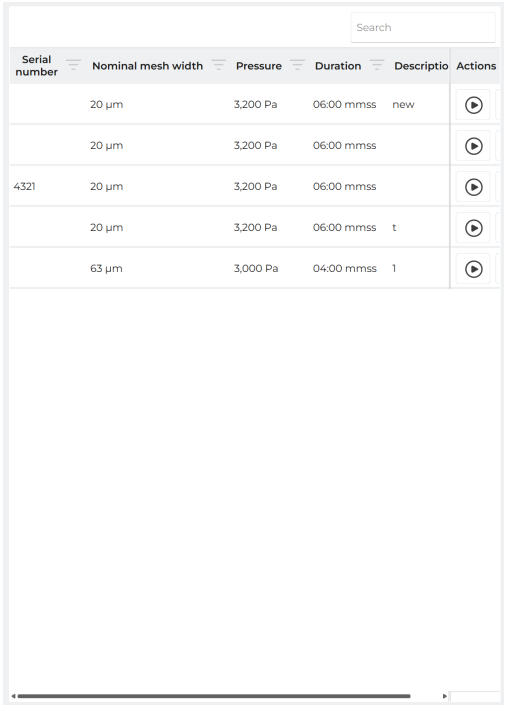


Fig. 16: Manual sieving workspace

7.3.3 Methods tile

The `Methods` sieving mode is suitable for sieving in which several sieves with assigned parameters and sample-specific data are used to calculate the result. The sieving process follows a fixed sequence of steps, through which the user is automatically guided (Guided Sieving). Typical parameters for particle characterisation are automatically calculated based on the determined weighing values. All data is stored and can be retrieved at a later date and compared with other results.

The tile contains a list of all methods that have been previously created and can therefore be used to perform sieving. When newly installed, the list contains a method called LAST USED, which always displays the last method used.

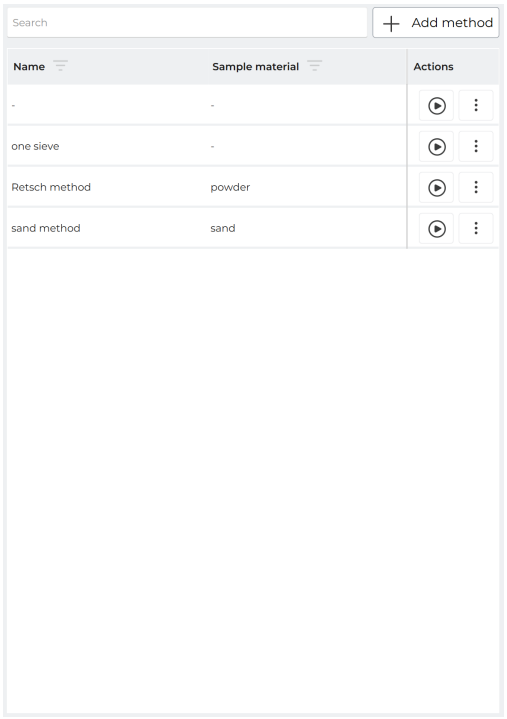


Fig. 17: Methods workspace

7.3.3.1 Start a method

In order to perform a sieve, proceed as follows:

→ Search the list for the method to be used for sieving. If no method or the desired method is not available, create a new method or edit an existing method.

→ In order to start the screening process, click on the button in the row of the method to be used for screening. If no screen has been added to the method, the start button remains greyed out.

→ Guided sieving will start. Follow the instructions on the touch display. Once guided sieving has been successfully completed, an extract of the results will be displayed. Detailed screening results can be viewed in the `Results & Comparison` workspace.

7.3.3.2 Create and edit a method

In order to create a new method, click on the `+ Add method` button. The mandatory fields for the method are filled in with example values.

In order to edit the parameters of an existing method, click on the button in the row of the corresponding method. Then select the button. Any changes made to the method parameters are marked with a red dot next to the method parameter. If an invalid value is entered in a field, the parameter is marked with . If an existing method is being edited, the changes can be undone by clicking on the button. The process can be cancelled by clicking on the `Back` button. All

unsaved data will be lost.
A method contains all the information necessary to perform a measurement, calculate and display the result. Each method consists of the categories listed below, in which the specific parameters are defined:

- Basic
- Sample
- Methodology
- Data
- Device

Category Basic

The general measurement data is defined in the `Basic` category:

- Identifiers
  - Method name
  - Title
  - Method ID
- User information
  - Username
  - Department
- Comments

The saved method is listed under *Method name* in the `Methods` tile. The method name is unique and can only be assigned once. If a method with the same name is saved, the method under the existing method name will be overwritten.
Method ID can only be maintained with a numeric value.
In the *Comments* area, further comments can be added by using the `Add` button. Individual comments can be removed by using the `Remove` button. With the exception of one mandatory field, all comments created can be deleted simultaneously by using the `Clear` button.

Category Sample

The sample-specific data for the measurement is defined in the `Sample` category. In addition, wizards and checks can be activated:

- Characteristics
  - Sample material
  - Sample preparation
  - Density
  - Source
  - Sampling
  - Sample weight
- Sample tolerances and check
  - Weigh-in tolerance
  - Weighing assistant
- Backweighing tolerances

- Mesh size
  - Expected Overgrain/Undergrain
- Comment

The value stored for *Density* influences the calculation of the results. The unit of density cannot be changed and is always specified in g/cm^3 . If the density of a material in this unit is unknown, the density can be calculated manually. Click on the button to open the calculation tool. The tool can be used with both the internal and an externally connected balance.
Enter the volume-related quantity for *Sample quantity*. The value for *Weight* is displayed automatically if the internal balance is selected in the settings and cannot be overwritten. Only if an external balance is selected and connected will its value be displayed and it will be possible to overwrite the value manually. By confirming with the `Ok` button, the calculated value is automatically transferred to the density method parameter. The calculated value can be overwritten at any time. The numbers entered for the calculation are not saved.

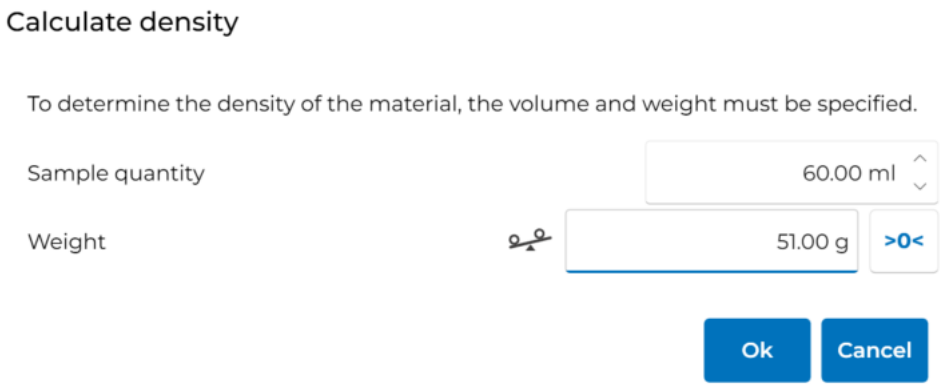


Fig. 18: Calculate the density

If a value is entered for *Sample weight*, this weight is expected as the weigh-in value during the measurement. It also serves as a reference value for the *Weigh-in tolerance*.
The *Weigh-in tolerance* is the verification of the weighed sample weight at the start of a measurement. The value entered in the *Sample weight* parameter is compared with the actual weight weighed during the measurement, taking into account the tolerance specifications entered. The function is activated or deactivated by clicking on the slider. Once the function is activated, the input fields become active. If the weight of the sample weighed during a measurement does not correspond to the previously entered sample weight including the set tolerance, this is displayed in the form of an error message and documented in the result. This function is only available if Standard is selected for `Select sieving process` in the settings in the *Sieve analysis* tile. The function is not available in the Swiss method.
The *Weighing assistant* helps you weigh samples so that sieves are not overloaded or underloaded. Depending on the mesh size of a sieve, minimum and maximum loading quantities for sieves are defined in accordance with DIN ISO 3310. These values serve as the basis for verification by the weighing assistant. The function is activated or deactivated by clicking on the slider. The weighing assistant is only available for sieves that have been created under a Retsch item number in the `Sieve management` workspace and assigned to the method. If the load of a sieve entered during a measurement does not correspond to the weight specifications of

the weighing assistant, this is indicated in the form of an error message and documented in the result.
Backweighing tolerances is an automatic check of the backweighed sample weight after sieving If the sample weight backweighed during a measurement does not correspond to the set tolerance, this is documented in the form of an error message. The tolerance can be switched on or off individually for each sieve assigned to the method by clicking on the slider. Once the function is activated, the input fields become active. Each sieve is identified by its defined mesh size and this value is listed next to *Mesh size*. In the input field *Expected Overgrain/Undergrain*, enter the expected sample quantity that remains on the sieve (overgrain) or passes through the sieve (undergrain) as a weight value. In the input fields *From* and *To* >, the lower and upper deviation in percent (tolerance) from the weight value above can be defined. This function is only available if oversize or undersize is selected for `Backweighing tolerances` in the settings, in the *Sieve analysis* tile. Depending on this setting, the name of the input field changes between *Expected Overgrain* and *Expected Undergrain*.

Category Methodology

The `Methodology` category defines the process-specific data for sieving and the sieves:

- Method process
- Sieve analysis
  - Analytical sieve size
  - Test sieves according to standard
  - Sieving aids
  - Sieve check
- Sieving row
- Sieves

The selection for *Method process* influences the sieving method used in Guided Sieving. If Standard is selected, the sample weight only needs to be weighed at the beginning. For each additional sieve, the weighed sample weight from the previous sieve is automatically transferred. If the Swiss method is used, each subsample must be weighed.
The settings for *Analytical sieve size* and *Sieving row* determine the selection of sieves that can be assigned to a method. Clicking on the `Assign sieve` button opens the list of available sieves and filters them according to the settings. If the settings in the method do not match the values of a sieve, the sieve is not displayed in the list.
Sieve check allows you to check during a sieving process whether the sieve previously assigned to the method is actually being used. The check is performed based on the serial number of the sieve. The function is activated or deactivated by clicking on the slider. If *Sieve check* > is activated, all sieves for which *Sieve check* is deactivated in the sieve parameters are removed from the method. For more information, see the chapter Sieve management workspace.
When *Sieving row* is selected, an automatic suggestion for a suitable sieve sequence is created based on a value range. The value range can be changed manually. This may result in changes to the suggested sieve sequence. If the mesh size value from the suggested sieve sequence does not match the value of the sieve, this sieve cannot be selected for this method.
In order to add one or more sieves under *Sieves*, click the `Assign Sieves` button. Only those sieves previously created in the Sieve management workspace whose parameters match the

settings within the method are displayed for selection. These can be the parameters *Serial number* and *Analytical sieve size*. If there are no sieves to choose from, you must create sieves in `Sieve management` or change the method parameters. Select at least one sieve by clicking on the button on the left-hand side of the row of the desired sieve. The sieve is added to the method as a copy, with all parameters assigned in `Sieve management`. The parameters of the sieve can be adjusted in the *Device* category. Changing the parameters within a method does not result in any changes to the parameters in `Sieve management`.

Category Data

In the `Data` category, in addition to the standard analysis parameters to be calculated for the result, further specific parameters relating to the percentage and actual particle size distribution are defined.

- Percentiles
- Particle sizes

Percentiles enables the calculation of particle size x at a specific point in the cumulative distribution Q. The distribution value for which the corresponding particle size is to be calculated must be entered in the input field. The calculated value is documented in the result. Only distribution values from 0 to 100% can be entered. Additional input fields can be added by using the `Add` button. Individual input fields can be removed by using the `Remove` button. With the exception of one mandatory field, all input fields created can be deleted simultaneously by using the `Clear` button.
Particle sizes enables the distribution value Q to be calculated for a specific particle size x. Enter the particle size for which the corresponding distribution value is to be calculated in the input field. The calculated value is documented in the result. Additional input fields can be added by using the `Add` button. Individual input fields can be removed by using the `Remove` button. With the exception of one mandatory field, all input fields created can be deleted simultaneously by using the `Clear` button.

Category Device

The `Device` category is used to define the sieving and device-specific data for sieving.

- Mesh size configurations
  - Mesh size
    - Sieving time
    - Neg. pressure target value
    - Speed of nozzle drive
- Parameters
  - Pressure warning upper limit
  - Pressure warning lower limit
- Custom parameters

The settings in the *Mesh size configurations* area define the parameters of the sieves for the individual sieving processes in Guided Sieving. The values can only be maintained if at least one sieve is assigned to the method. Each sieve is identified by its defined mesh size and this value is

listed next to *Mesh size*. Für jedes Sieb wird auf Basis der Maschenweite automatisch ein Vorschlag für die Parameter *Sieving time*, *Neg. pressure target value* und *Speed of nozzle drive* gemacht. Each value can be adjusted manually. Changes to the parameters have no effect on the parameter settings in the `Sieve management`.
The settings for *Pressure warning upper limit* and *Pressure warning lower limit* check the fluctuations in the negative pressure generated by the connected vacuum cleaner during a sieving process. If the set negative pressure falls below or exceeds the defined limits, this is indicated in the form of a message. In addition, the negative pressure display is coloured orange.
When creating a new method, the settings for these parameters are taken from the `Settings` workspace, `Device manager` tile. Changing the parameters in the method does not result in any changes in the `Settings` workspace.
For documentation purposes, additional parameters can be defined under *Custom parameters*. These parameters have no effect on the sieving process, but are documented in the results. Additional input fields can be added by using the `Add` button. Individual input fields can be removed by using the `Remove` button, and all input fields created can be deleted simultaneously by using the `Clear` button.

7.3.3.3 Save a method and save method as

A method can only be saved if the mandatory fields have been filled in correctly. Confirm the save by clicking on the button. An existing method can be saved as a copy if *Method name* has been changed. In order to do this, click on the button.

7.3.3.4 Delete a method

In order to delete an existing method, click on the button in the row of the corresponding method. Then select the button. Confirm the deletion by clicking on the `Yes` button. Alternatively, the method can also be deleted while it is being edited.

7.3.3.5 Search and filter a method

The search field above the method list can be used to search for a specific method. Characters which are entered there are searched for matches in all columns of the list. All other parameters are not taken into account in the search! Each match is highlighted in colour and filters the list display. If no match is found, the list remains empty.
In order to filter within a single column, click on the button next to the column heading of the desired column. The menu with the buttons for `Filter Rules` and `Filter Values` opens. Switch between filtering by rules and values by selecting the buttons. In order to search by rules, select one of the rules and enter a value in the field below. When searching for values, all known values in the column are listed and can be selected as single or multiple selections. The filter becomes active when the first value is selected and the button changes to . The settings can be reset by clicking on the `Clear Filter` button.
Filtering is also possible across multiple columns. In order to do this, activate the filter for all desired columns.
All active filters are displayed at the bottom of the screen. There, filters can be activated, deactivated and deleted either individually or completely.

7.4 Workspace Sieve management

The `Sieve management` workspace can be accessed by opening the overlay menu ☰ and selecting the button. The overlay menu closes and the screen switches to the selected workspace. The workspace contains a list of all sieves that have been created previously and allows you to manage them. The list is empty when you restart. This list is identical to the list in the `Sieving`workspace, `Manual sieving` tile. Any changes made to a sieve are visible in both workspaces. Only some of the parameters that define a sieve are visible in the list view.

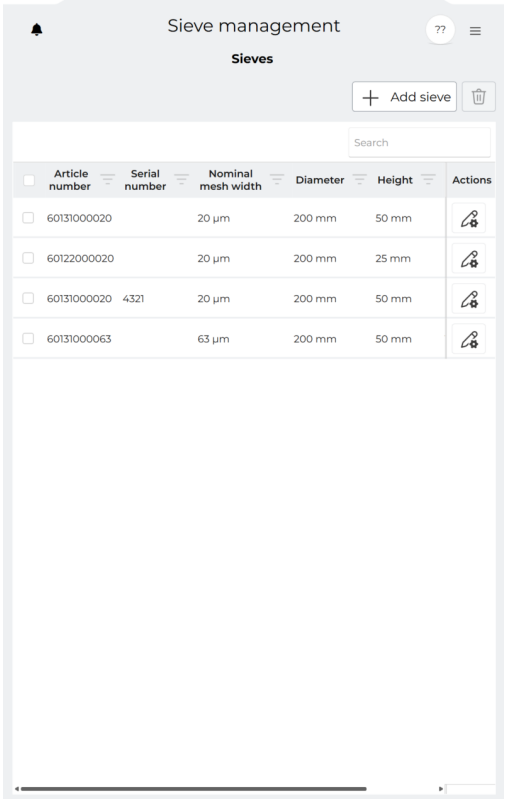


Fig. 19: Overview of the Sieve management workspace

7.4.1 Create and edit a sieve

In order to create a new sieve, click on the `+ Add sieve`button. In order to fully define a sieve, at least the mandatory fields must be filled in. Mandatory fields that are not defined are marked with the symbol ❗. In order to edit the parameters of an existing sieve, click on the button in the row of the corresponding sieve . If an existing sieve is being edited, the changes can be undone by clicking on the button. Cancel the process by clicking on the `Back` button. All unsaved data will be lost.
A sieve contains information that is necessary for performing a sieving, calculating and displaying the result. Each sieve contains the tiles listed below with the specific parameters:

- Basic
  - Article number
  - Serial number
  - Nominal mesh width

- Real mesh width
- Analytical sieve size
- Standard compliance
- Weight
- Certificate type
- Sieve check
- Description

- Device
  - Sieving time
  - Neg. pressure target value
  - Speed of nozzle drive

If the Retsch article number of a sieve is entered, the parameters *Nominal mesh width*, *Analytical mesh width*, *Standard compliance* and *Certificate type* are automatically maintained. These values cannot be changed as long as a valid *Article number* is entered.
Only numeric values can be entered for *Serial number*. This number is unique and can only be assigned once. If a serial number that has already been assigned is entered for another sieve, the entry will not be accepted and the sieve cannot be saved.
The settings for the parameters *Serial number* and *Analytical sieve size* influence the subsequent assignment of the sieve to methods. For more information, see the chapter Sieving workspace.
The parameter *Weight* can be maintained manually or with the weight value from the internal or an externally connected scale. The scale can be tared with the button >0< before placing the sieve on it. In order to accept the weighing value, confirm with the button.
The *Sieve check* parameter is disabled by default and can only be used if the *Serial number* parameter contains a value. The function can be enabled to uniquely identify a sieve during the sieving process. During guided sieving, when the sieve is inserted, confirmation is requested that the stored *Serial number* matches the serial number of the sieve used.

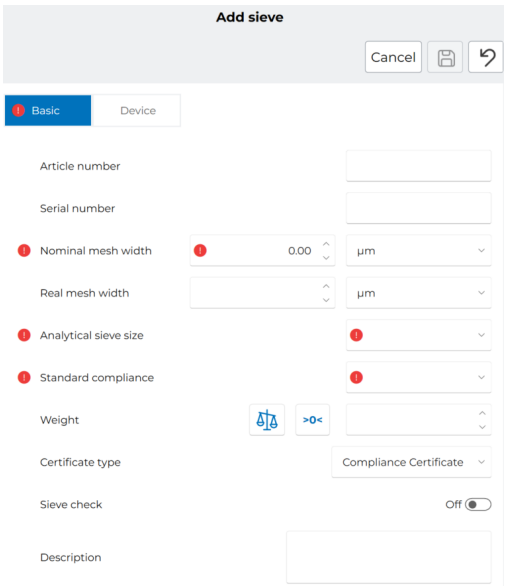


Fig. 20: Create new sieve

7.4.2 Save a sieve and save a sieve as

A sieve can only be saved if the mandatory fields have been filled in correctly. Confirm the save by clicking on the button. An existing sieve can be saved as a copy. All parameters except *Serial number* are transferred. In order to do this, click on the button.

7.4.3 Delete a sieve

In order to delete an existing sieve, click on the button in the row of the selected sieve. Confirm the deletion of the sieve by clicking on the button. By selecting multiple rows, more than one sieve can be deleted at the same time. If a sieve that is assigned to a method is deleted, this has no effect on the method and the sieve remains there.

7.4.4 Search and filter a sieve

In order to search for a specific sieve, use the search field above the sieve list. Characters which are entered there are searched for matches in all columns of the list. All other parameters are not taken into account in the search! Each match filters the display of the list. If no match is found, the list remains empty.

In order to filter within a single column, click on the button next to the column heading of the desired column. The menu with the buttons for `Filter Rules` and `Filter Values` opens. Switch between filtering by rules and values by selecting the buttons. In order to search by rules, select one of the rules and enter a value in the field below. When searching for values, all known values in the column are listed and can be selected as single or multiple selections. The filter becomes active when the first value is selected and the button changes to . The settings can be reset by clicking on the `Clear Filter` button.

Filtering is also possible across multiple columns. In order to do this, activate the filter for all desired columns.

All active filters are displayed at the bottom of the screen. There, filters can be activated, deactivated and deleted either individually or completely.

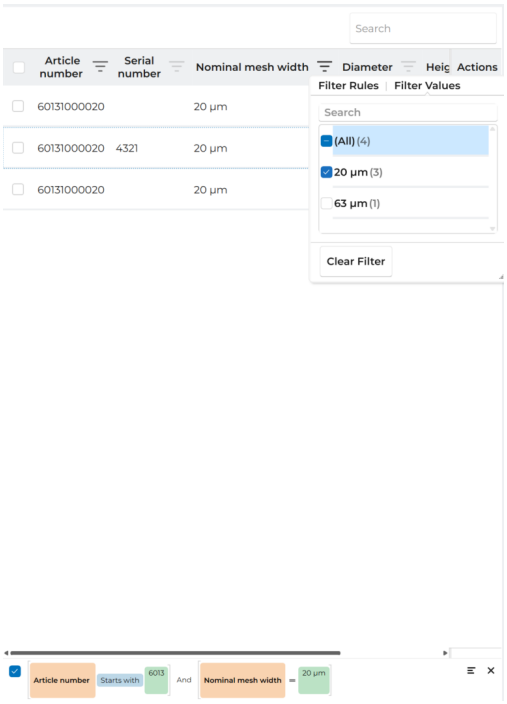


Fig. 21: Display with active filters

7.5 Workspace Results & Comparison

The `Results & Comparison` workspace can be accessed by opening the Overlay menu ☰ and by selecting the button. The Overlay menu closes automatically and the screen switches to the selected workspace. This workspace displays the results of sievings performed from the Sieving workspace, Methods tile. The workspace contains five tiles that can be used to view and analyse the results:

- Selected results
- Chart
- Table
- Overview
- Trend

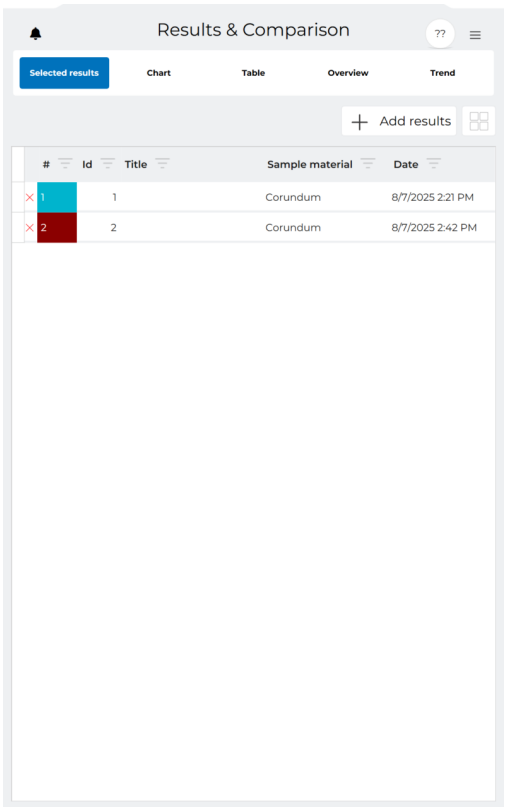


Fig. 22: Overview of the Results & Comparison workspace

7.5.1 Selected Results tile

The `Selected Results` tile displays a list of the results selected for display from the sievings that have been performed. As long as no results are selected, the list remains empty. In order to display results in the list, click on the `+ Add results` button. All sievings performed are then displayed under *Available results*. In order to select a result, click on the button in the row of the selected result. Clicking the button again will deselect the result. Confirm your selection by clicking the `Apply` button or cancel the process by clicking the `Cancel` button. By selecting multiple rows, more than one result can be added at a time. This allows two or more results to be compared.

To remove results from the tile, click the button in the row of the selected result. In order to delete all results in the list, click the button.

The details of the selected results are displayed in the other tiles. When displayed in the list, each result is assigned a colour code by the column heading #, which is valid for all other tiles.

In order to filter within a single column, click on the button next to the column heading of the desired column. The menu with the `Filter Rules` and `Filter Values` buttons open. Switch between filtering by rules and values by selecting the buttons. In order to search by rules, select one of the rules and enter a value in the field below. When searching for values, all known values in the column are listed and can be selected as single or multiple selections. The filter becomes active when the first value is selected and the button changes to . The settings can be reset by clicking on the `Clear Filter` button.

Filtering is also possible across multiple columns. In order to do this, activate the filter for all

desired columns.
All active filters are displayed at the bottom of the screen. There, filters can be activated, deactivated and deleted either individually or completely.

7.5.2 Chart tile

The `Chart` tile displays distribution-specific parameters in graphical form. The display is only active if at least one result is listed in the `Selected Results` tile. The colour of the entries in the diagram corresponds to the colour assigned in the `Selected Results` tile. When two or more results are displayed, overlaps may occur in the diagram.
The X-axis shows the particle size, while the Y-axis shows the selected parameter. Four settings are available for the axis scaling and data display of the left Y-axis for the diagram:

- X-axis linear and Y-axis linear (LIN/LIN)
- X-axis logarithmic and Y-axis linear (LOG/LIN)
- X-axis logarithmic and Y-axis logarithmic (LOG/LOG)
- RRSB distribution (RRSB)
- Y-axis with sum distribution Q_3
- Y-axis with residual sum distribution $1\text{-}Q_3$
- Y-axis with frequency distribution q_3
- Y-axis with fraction p_3

If the `RRSB` button is selected, the data display is limited to the cumulative distribution Q_3.

Clicking on the button opens the menu for general diagram settings. There you can customise the design and applications of the diagram as well as its size according to your personal preferences:

- Decoration
  - Major gridlines
  - Minor gridlines
  - Stripes
- Interactions
  - Crosshair
  - Zoom
  - Legend
- Size
  - Font size
  - Line thickness

You can zoom within the diagram. In the touch application, this is done by touching the screen with two fingers and moving them apart (to zoom in) or towards each other (to zoom out). When using a computer mouse, this is done by turning the mouse wheel. The set zoom can be reset by clicking on the button.

The current view can be saved as an image by clicking on the button in the clipboard.

Further settings can be made by clicking on , which opens the *Chart Settings* menu. Within the menu, the Y-axis on the right-hand side of the chart can be configured independently of the

settings on the left-hand side. In order to do this, activate the slider for *Secondary axis* and select the data display under *Distribution Type*. If no limitations are set under Characteristics range, the axis scaling is always 100 per cent.
Under Characteristics range, the axis scaling can be individually adjusted for the four parameters q_3, Q_3, $1\text{-}Q_3$, p_3. In order to activate this, switch on the slider. This unlocks the values in the *From* and *To* fields for editing. The values can be changed by selecting the field and entering them manually, by dragging the slider on the bar or by clicking on the + and - buttons. The display in the chart always depends on the selection *Distribution Type*, the axis scaling is a downstream setting! Confirm the changes in *Chart Settings* by clicking on the `Apply` button or cancel with `Cancel`.

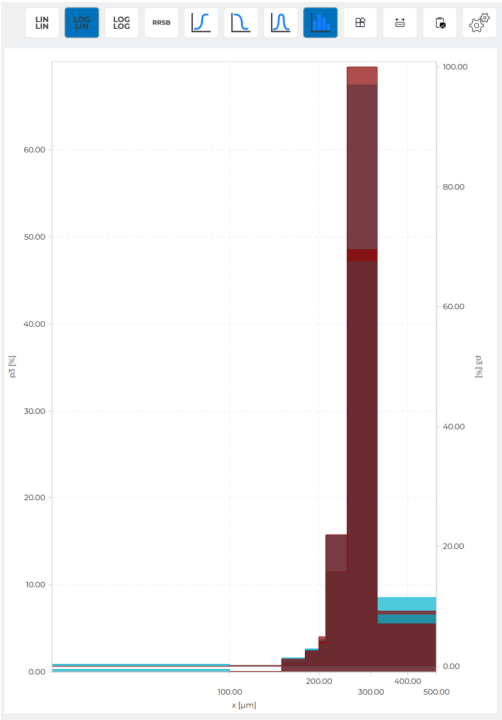


Fig. 23: Example result in the Chart tile

7.5.3 Table tile

The `Table` tile displays the distribution-specific parameters and screening parameters in tabular form. The display is only active if at least one result is listed in the `Selected Results` tile. The ID and colour code of each result correspond to the information in the `Selected Results` tile. When two or more results are displayed, the entries are expanded to the right for each column. Each row of the table represents a size class. Each column of the table represents a parameter under which the result(s) are entered:

- Fraction mass
- Cumulative mass
- Fraction p_3
- Total distribution Q_3
- Residual distribution $1\text{-}Q_3$
- Density q_3
- Average pressure p

- Pressure variance S_2
- Pressure standard deviance σ
- Serial number SN
- Set duration t
- Actual duration t_act
- Speed of nozzle drive n

If several results with different size classes are displayed, some fields in the table may remain empty. This is because the parameters and results are only specified according to the size class; values in between are not possible.
The list of size classes in the metric system is set in the first column of the table. In addition, the size classes can be displayed in the Anglo-American system or according to Tyler. For more information, see *Table Settings* in this paragraph.

The current view can be exported by clicking on the button. There are various formats (.xls, .xlsx, .xps, .csv, .pdf, .png, .jpg, .txt, .rtf, html, .mht) available for saving the generated file.

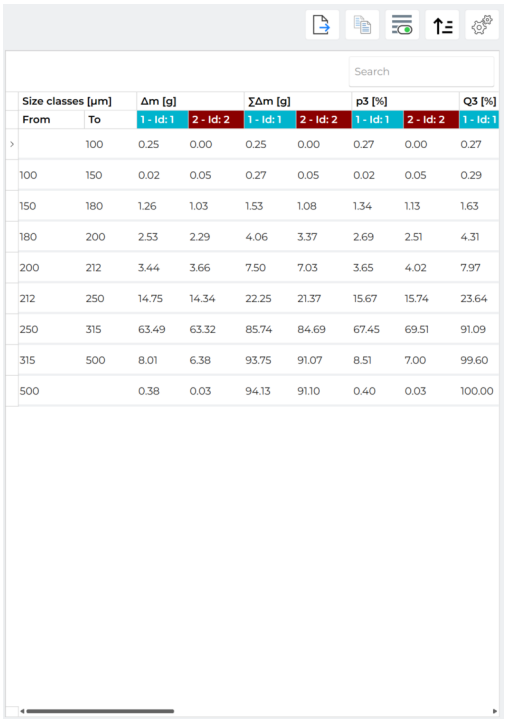
The current view can be saved as an image by clicking on the button in the clipboard.

For better readability, the background of every second row of the table can be coloured by clicking on the button. The button changes to . In order to deselect, click the button again.

When the system starts up, the size classes are sorted in ascending order from top to bottom. Durch klicken auf die Schaltfläche wird die Reihenfolge der Größenklassen umgekehrt und die Schaltfläche wechselt zu . In order to deselect, click the button again.

Further settings can be made by clicking , which opens the *Table Settings* menu. In this menu, the individual table columns can be switched on (visible) or off (not visible) by clicking on the slider.

The search field can be used to search for data within the table. Characters, which are entered there, search all columns of the table for matches. Hidden columns are not included in the search! Each match filters the display of the rows. If no match is found, the table remains empty.



Search

Size classes [µm]		Δm [g]		Σ Δm [g]		p3 [%]		Q3 [%]
From	To	1 - Id: 1	2 - Id: 2	1 - Id: 1	2 - Id: 2	1 - Id: 1	2 - Id: 2	1 - Id: 1
	100	0.25	0.00	0.25	0.00	0.27	0.00	0.27
100	150	0.02	0.05	0.27	0.05	0.02	0.05	0.29
150	180	1.26	1.03	1.53	1.08	1.34	1.13	1.63
180	200	2.53	2.29	4.06	3.37	2.69	2.51	4.31
200	212	3.44	3.66	7.50	7.03	3.65	4.02	7.97
212	250	14.75	14.34	22.25	21.37	15.67	15.74	23.64
250	315	63.49	63.32	85.74	84.69	67.45	69.51	91.09
315	500	8.01	6.38	93.75	91.07	8.51	7.00	99.60
500		0.38	0.03	94.13	91.10	0.40	0.03	100.00

Fig. 24: Example result in the Table tile

7.5.4 Tile Overview

The `Overview` tile lists all parameters defined in the `Sieving` workspace and the calculated parameters. The display is only active if at least one result is listed in the `Selected Results` tile. The ID and colour code of each result correspond to the information in the `Selected Results` tile. When two or more results are displayed, the column width is reduced and the display is extended to the right. Each column in the table represents one result. Each row in the table represents one parameter that documents the result:

- Measurement
  - Measurement type
  - Created on
  - Initial sample mass
  - Average sample weight
  - Span value
  - D10
  - D50
  - D60
  - D90
  - Non-uniformity
  - Surface volume
  - Surface mass
  - Sauter diameter
  - AFS fineness
  - Specific surface area
  - Average grain size
  - Variation coefficient

- Mean particle size
- d'
- Correlation coefficient
- n

- Percentiles
- Particle sizes
- Device
  - Device type
  - Serial number
  - Pressure warning upper limit
  - Pressure warning lower limit
  - Balance type
  - Balance name
  - Serial number
- Method
  - Name
  - Title
  - Sample material
  - Sample name
  - Sample ID
  - Comment
  - Username
  - Department
  - Density
  - Sample preparation
  - Analytical sieve size
  - Test sieves according to standard
- Software
  - Version
  - Firmware version info
- Measurement warnings

The current view can be exported by clicking on the button. There are various formats (.xls, .xlsx, .xps, .csv, .pdf, .png, .jpg, .txt, .rtf, html, .mht) available for saving the generated file.

The current view can be saved as an image by clicking on the button in the clipboard.

For better readability, the background of every second row of the table can be coloured by clicking on the button. The button changes to . To deselect, click on the button again.

Further settings can be made by clicking on , which opens the *Overview Settings* menu. In this menu, the individual rows can be switched on (visible) or off (not visible) by clicking on the slider.

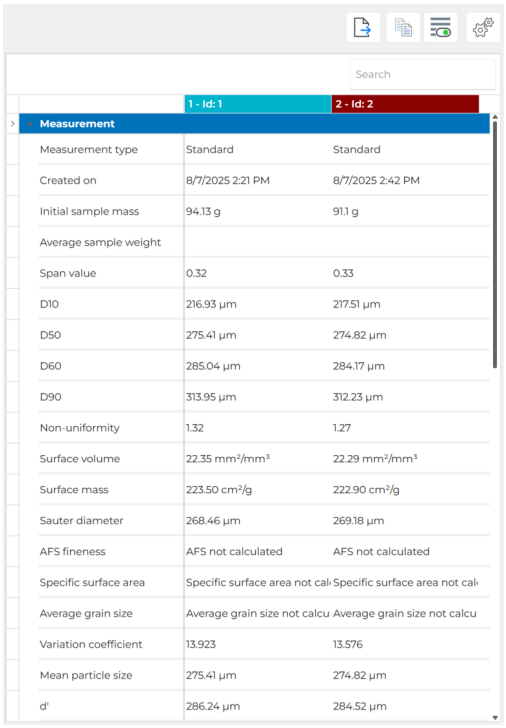


Fig. 25: Example result in the Overview tile

7.5.5 Trend tile

In der Kachel `Trend` können ausgewählte verteilungsspezifische Kenngrößen von Ergebnissen nachberechnet und analysiert werden. The particle size, the sum distribution and the fraction are available for selection. The display is only active if at least one result is listed in the Selected Results tile. The colour of the entries in the diagram corresponds to the colour assigned in the `Selected Results` tile. When two or more results are displayed, overlaps may occur in the diagram.

Clicking on the button opens the menu for general diagram settings. There you can adjust the design and applications of the diagram as well as its size:

- Decoration
  - Major gridlines
  - Minor gridlines
  - Stripes
- Interactions
  - Crosshair
  - Zoom
  - Legend
- Size
  - Font size
  - Line thickness

You can zoom within the diagram. In the touch application, this is done by touching the screen with two fingers and moving them apart (to zoom in) or towards each other (to zoom out). When using a computer mouse, this is done by turning the mouse wheel. The set zoom can be reset by

clicking on the button.

The current view can be saved as an image by clicking on the button in the clipboard.

The settings for the parameters can be adjusted by clicking on , which opens the *Trend Settings* menu. Within the menu, there are three tiles to choose from, each representing a parameter:

- Measurement $Q_3(x)$
- Total distribution Q_3
- Fraction p_3

In the `Measurement` tile, the $Q_3(x)$ value for the particle size is defined for a specific value of the total distribution. The values D10, D50, D60 and D90 (positions x=10, 50, 60 and 90) are available by default. In the `Total distribution` tile, the Q_3 value for the percentage of a specific particle size is defined. The p_3 value, for the percentage of particles in a particle size range, is defined in the Fraction tile.

By clicking on the `Add` button, further values can be defined. Only when a value has been activated by selecting the slider in the corresponding row are the further settings available.

To define the parameter, maintain the *Percentiles* (tile `Measurement`) or *Mesh Size* (tiles `Total Distribution` and `Fraction`). If required, the display range can be limited by clicking on the slider in front of the *Visible range* parameter. Once the parameter has been activated, the *From* and *To* fields are enabled so that a lower and upper limit for the particle size or percentage can be defined there.. In addition, by clicking on the slider in front of the parameter *Highlighted range*, a defined range in the diagram can be displayed in colour. Once the parameter has been activated, the *From* and *To* fields are enabled so that a lower and upper limit can be defined there.

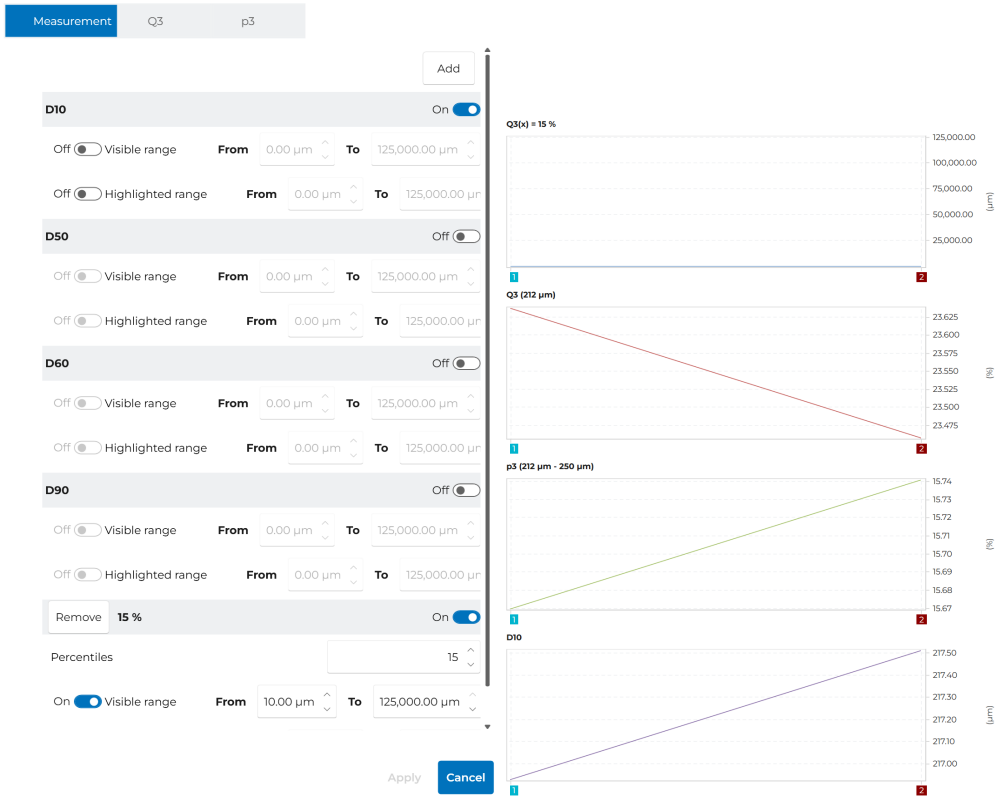


Fig. 26: Definition of parameters and example trend analysis

7.6 Workspace: Start and stop vacuum cleaner

The workspace can be accessed by opening the Overlay menu ☰ and selecting the button. Selecting the button `Start vacuum cleaner` or `Stop vacuum cleaner` controls the vacuum cleaner connected to the device. The function of the button depends on whether the vacuum cleaner is switched on or off.

The vacuum cleaner can be switched on and off manually as required. This is useful, for example, for cleaning sieves or the nozzle chamber. Dust deposits can accumulate in the nozzle chamber, especially after the device has not been used for a long time, which can lead to inaccurate weighing values.

7.7 Workspace Settings

The `Settings` workspace can be accessed by opening the Overlay menu ☰ and selecting the button. The Overlay menu closes automatically and the screen switches to the selected workspace. The workspace contains four tiles where further settings for sieving and the device can be made:

- System
- Language and units
- Sieve analysis
- Device manager

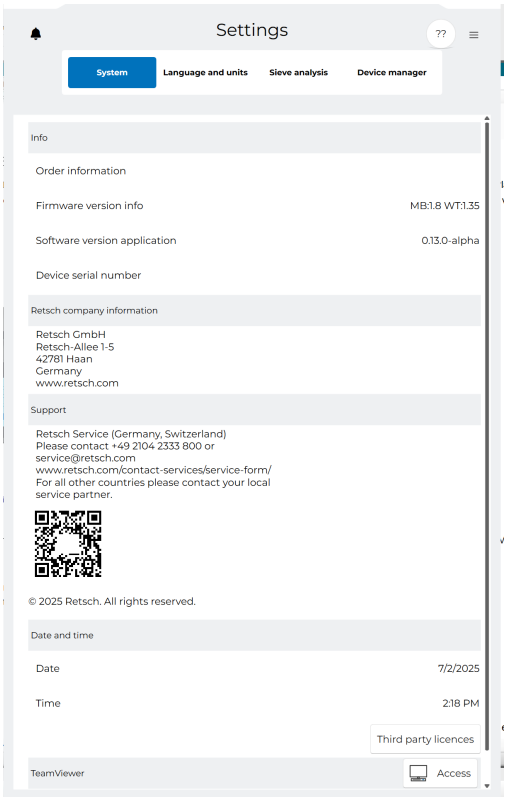


Fig. 27: Overview of the Settings workspace

7.7.1 System tile

The `System` tile contains general information about the device and software. It also manages access via TeamViewer and access to the Service menu.

- Info
  - Order information
  - Firmware version information
  - Software version application
  - Device serial number
- Retsch company information
- Support
- Date and time
  - Date
  - Time
- TeamViewer
- Data
- Software update
- Service menu

7.7.1.1 TeamViewer

With the consent of the device operator, the Retsch GmbH service can be granted access to the device via TeamViewer. The service is then able to connect to the device's screen. The connection must be established by providing an ID and password, which protects access by third parties.

NOTE: In order to use the TeamViewer function, the device must have an active internet connection.

NOTE: Only share the ID and password with an official employee of the Retsch GmbH service. Disclosing this information to third parties may result in unforeseeable remote access and, in some cases, unwanted data transfer and loss.

In order to manage access via *TeamViewer*, select the `Access` button. The TeamViewer application opens automatically and generates an individual ID and password.

7.7.1.2 Service menu

The *Service menu* area allows the Service Retsch GmbH more detailed access to device information and functions in the event of a service call to the device. The access is password protected.

7.7.1.3 Data

In the *Data* area, the contents of the software can be backed up or the software can be restored based on an existing backup. The backup includes all global settings, filters, methods and results stored at that time. To execute the functions, select the location where the backup is to be stored or from which it is to be restored under *Available drives*. The folder structure of the available network can be accessed under *Data folder*. In order to do this, click on the button and navigate to the desired subfolder.

In order to perform a backup, click on the `Create backup` button. Select the storage location for the backup and confirm by clicking on the `Apply` button. A loading bar and status information will appear on the screen.

In order to perform a restore, click on the `Restore data` button. Navigate to the location where the backup is stored and select the file. The name of the selected file is displayed in the field next to the *File name* parameter. If the file is compatible, the `Apply` button is activated. Confirm the creation from a backup by clicking on the `Apply` button. A loading bar and status information will appear on the screen. Do not make any changes to the device and wait until the software displays the `Sieving` workspace.

NOTE: The device's internal memory is not intended for this type of data backup! We recommend saving the data to an external data carrier (USB stick) or network drive.

NOTE: If the software is created from an existing backup, all data that is not part of this or another backup will be lost!

7.7.1.4 Software update

The update process for the software is started in the *Software update* area. The files required for the update must be stored on an external data carrier or network drive connected to the device. Under *Available drives*, select the location where the files are stored. The folder structure of the available network can be accessed under *Path of update files*. In order to do this, click on the button and select the subfolder containing the files for the update. Confirm your selection by clicking on the `Apply` button.

If the files for the update are recognised, the entry *No update available* changes to a button. Start the software update by clicking on the `Update software` button. A loading bar and status

information will appear on the screen. Do not make any changes to the device and wait until the software displays the `Sieving` workspace.

NOTE: Before performing a software update, back up all data on the device by creating a backup. For more information, see the Datachapter.

7.7.2 Language and units tile

In the `Language and units` tile, you can choose between the available languages for the software, the display format for data and various parameter units used in the workspaces:

- Language Selection
  - Language
  - Format
- Units and Labels
  - Labels
  - Length Units
  - Mass Units
  - Pressure units
  - Volume Units
  - Time

In order to activate the changes to the settings for *Language Selection*, the device must be restarted.
The *Format* setting for numbers, date and time can be based on the selected language within the software or the system settings of the device. The device's system settings are set to English by default.

Confirm changes by clicking the button. Unsaved changes can be undone by clicking the button.

7.7.3 Sieve analysis tile

In the `Sieve analysis` tile, the sieving process, permissible tolerances and settings for the auto report are selected:

- Sieving
  - Select sieving process
- Tolerances
  - Backweighing tolerances
  - Loss tolerance
- Auto Report
  - Generate reports after measurement
    - Enabled on application startup
    - Report template
    - Print report
      - Printer
    - Save report as PDF
      - Directory

Mit *Select sieving process* adjusts Guided Sieving during sieving according to the differences between the standard and Swiss methods.
The *Backweighing tolerance* setting for oversize or undersize grain allows the definition of each sieve within a method in the `Sample` tile of a method.
The *Auto Report* function enables a report to be generated automatically at the end of a measurement. The report contains all data documented in the `Chart`, `Table` and `Overview` tiles in the `Results & Comparison` workspace. The additional settings only become active once the function has been enabled using the slider. Restarting the device disables the function, unless the *Enabled on application startup* slider is enabled. A report can only be created if a *Report template* has been selected. It is not possible to change the template or create additional templates. If you have any questions about creating templates, please contact the Retsch GmbH service. The generated report can be sent to a printer for printing or saved digitally, provided these functions are activated via the slider. In order to print a report, a printer must be selected. Only printers that have been configured previously are displayed. The configuration of a printer must be carried out by a system administrator. Please contact the service department of Retsch GmbH for this. In order to save a report digitally in PDF format, a storage location must be set A USB stick connected to the device or the file directory of a network drive can be used as the storage location. The currently set storage location is displayed in the field next to *Directory*. Clicking on the button opens the device's file explorer and allows you to change the storage location. In order to display network drives, the device must be connected via the LAN interface. Confirm changes by clicking the button. Unsaved changes can be undone by clicking the button.

NOTE: The internal memory of the device is not suitable for saving results in PDF format! The backup must be made on an external data carrier (USB stick) or network drive.

7.7.4 Device manager tile

The settings for using the internal or external scales and the connected vacuum cleaner are made in the `Device manager` tile. In addition, data on operating hours is listed and various device functions can be viewed and tested.

- Balances
  - Internal balance
    - Use internal balance
    - Internal balance adjustment
  - External balance
    - External balance
    - Balance management
- Vacuum cleaner
  - Pressure warning upper limit
  - Pressure warning lower limit
  - No vacuum pressure limit
  - Differentiative factor
  - Integrative factor
  - Proportional factor

- Limit blanking time
- Vacuum startup time

◦ Operating hours
- Device powered
- Device running
- Duty cycles

◦ Health check
- Vacuum cleaner
  - Neg. pressure target value
  - Start vacuum
  - Stop vacuum
  - Pressure difference
  - Load current
  - No vacuum pressure limit
  - Pressure warning upper limit
  - Pressure warning lower limit
  - Pressure In
  - Pressure Out
  - Grid frequency
  - Firing angle
- Internal balance ODER No internal balance configured
  - Current weight
  - Decouple nozzle
- External balance OR No external balance configured
  - Weight
  - Balance type
- Self-check nozzle and decoupling
  - Speed of nozzle drive
  - Decouple nozzle
  - Start rotate nozzle
  - Stop rotate nozzle
- Self check seal
  - Current weight
  - Start seal check
  - Status seal
- Barcode scanner
  - Barcode text
- Network/Archive/Printer

Confirm changes by clicking the button. Unsaved changes can be undone by clicking the button.

7.7.4.1 Internal balance

The device's internal balance is only activated if *Use internal balance* is switched on by clicking the slider. If the function is deactivated, communication with an externally connected balance is possible. For more information, see the chapter External balance.

Internal balance adjustment allows you to adjust the balance for weighing accuracy. An adjustment ensures that the most accurate weighing values possible are delivered by avoiding systematic deviations Regular and correct repetition of the adjustment is important to ensure that measurements are reliable and accurate, especially in applications that require high precision. The timing of the repetition depends on usage behaviour. As a recommendation, the internal balance should be adjusted after prolonged periods of non-use of the device or at least every 6 months.

A process sequence is defined for performing the adjustment, which the device guides you through. Up to eight weight classes can be taken into account. The first weight class of 0 grams is preset, while the following weight classes can be adjusted in grams. Weight classes must be defined from top to bottom with ascending weights. The process is repeated for each weight class and includes the following steps: taring, placing the test weight, performing the adjustment, confirmation. The test weight must be placed as centrally as possible and always in the same position on the sieve chamber. It is recommended to place the test weight on the nozzle.

Perform the adjustment of the internal balance as described below:

→ Before starting the adjustment, make sure that there are no accessories (sieve, lid) or sample residues on and in the nozzle chamber of the device.
→ Open the menu for performing the adjustment by clicking on the `Start adjustment` button.
→ Confirm your selection. The device prepares for the adjustment. The adjustment menu opens after a few seconds.
→ Tare the scale by clicking on the >0< button. The field *Current weight* will then display 0 grams/kilograms and the icon for the stable weight value will change from to .
→ Start the adjustment for the first test weight (0 grams) by clicking on the button in the corresponding row. The remaining time is displayed in the *Status* column and changes to the *Done* button as soon as the step is complete.
→ Confirm the adjustment step by clicking on the `Ok` button. The second adjustment step becomes active.
→ Place the first test weight on the sieve. The second adjustment step starts with a test weight of 100 grams by default, but this value can be changed individually.
→ Start the adjustment for the second test weight (100 grams or individual value) by clicking on the button in the corresponding row. The remaining time is displayed in the *Status* column and changes to the *Done* button as soon as the step is complete.
→ Continue the adjustment for the following test weights as described in the previous steps. The number of test weights should be at least two and is limited to a maximum of eight.
→ Close and save the adjustment of the internal balance by clicking on the `Save` button. Successful adjustment is confirmed.

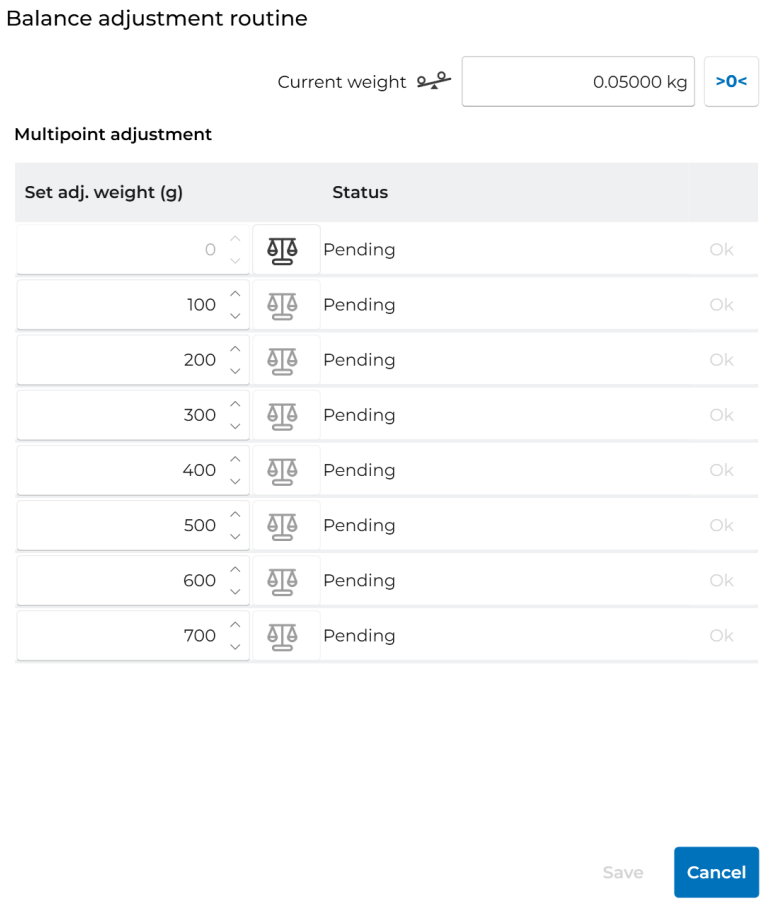


Fig. 28: Menu for adjusting the internal balance

7.7.4.2 External balance

The *External balance* section contains the `Edit balances` button, which provides access to *Balance management*. This is where the external balances are managed. In order to create a new balance, click on the `Create New` button and enter the parameters:

- Identifiers
  - Name
    - Serial number
    - Description
- Hardware
  - Balance type

In order to save a balance, at least the *Name* parameter must be entered.
The selection *Balance type* is crucial for correctly creating the scale in terms of its communication protocol. Please note the information in the chapter Technical data regarding which scale families are supported.
Save the scale by clicking on the `Save` button or cancel the process by clicking on `Cancel`. A scale which has already been saved can be edited at a later time by clicking on the button or deleted by clicking on .

Each scale stored in *Balance management* is displayed when you click on the field of the parameter *External balance*. Confirm your selection of a balance by clicking on its name and then save the changes. In all areas of the software where buttons for communicating with a scale are available, communication now takes place with the selected external scale.
NOTE: Communication can only take place if the external scale is connected to the device via the USB interface.

7.7.4.3 Vacuum cleaner

The settings and data for the vacuum cleaner connected to the device are available in the *Vacuum cleaner* section. The parameters *Pressure warning upper limit* and *Pressure warning lower limit* monitor the percentage deviations of the set negative pressure from the values actually achieved. The device controls the power and thus the negative pressure generated by the connected vacuum cleaner. During screening, it is normal for the negative pressure achieved not always to correspond to the set value. Slight deviations for short periods of time have no effect on the screening result. If the set limit is exceeded for a period of more than 10 seconds, a message is documented in the Notification Panel and in the results.

7.7.4.4 Health check

The *Healthcheck* section offers the option of testing certain device functions outside of the regular sieving process. These tests can be carried out routinely or sporadically and serve to validate the set parameters. Depending on the type, parameters can be defined and device functions checked.

In the *Health check Vacuum cleaner* area, the functionality of the connected vacuum cleaner is checked and its control parameters are displayed. Zur Überprüfung ob der eingestellte Unterdruck erreicht wird, muss ein Wert für *Neg. pressure target value* definiert und mit der Schaltfläche `Set` bestätigt werden. Das im Arbeitsbereich Settings eingestellte *pressure warning upper limit/lower limit* wird auf den eingestellten *Neg. pressure target value* angewendet. Switch on the vacuum cleaner by clicking on the `Start vacuum` button and switch it off by clicking on `Stop vacuum`. In order to perform this, the sieve and sieve cover must be inserted into the grinding chamber.

The functionality of the internal balance is tested in the *Health check Internal balance* area. This includes displaying the current weighing value and manually decoupling the nozzle. The field next to the *Current weight* parameter displays the current weight measured by the internal scale. As soon as this value remains the same for a certain period of time, it is recognised as stable. These states are indicated by for fluctuating values and for stable values in front of the field. The weighing value can be tared by clicking on the >0< button. The internal scale can only display correct values if the nozzle is decoupled. In order to do this, click on the `Decouple nozzle` button.
This section is only available if the parameter *Use internal balance* is enabled in the *Balances* section.

The functionality of the external scale is tested in the *Health check External balance* section. The current weighing value can be retrieved by clicking on the button. The scale can be tared by clicking on the >0< button.

This section is only available if the parameter *Use internal balance* is enabled in the *Balances* section and an external balance is selected.

The functionality of the nozzle is tested in the *Health check Self check nozzle and decoupling* section. In order to check the set speed of the nozzle, a value must be defined for *Speed of nozzle drive* and confirmed with the `Set` button. In order to manually decouple the nozzle, click on the `Decouple nozzle` button. The `Start rotate nozzle` and `stop rotate nozzle` buttons are used to manually start and stop the nozzle at the set speed value.

The functionality of the seal is tested in the *Health check Self check seal* section. For information purposes, the current weight measured by the internal scales is displayed in the field next to the *Current weight* parameter. In order to check the seal, start a predefined sequence by clicking on the `Start seal check` button. The check takes approximately 30 seconds, during which time the device cannot be operated. The seal status during the check is displayed under Status seal with *Open seal* or *Close seal*. Do not move the device or touch the nozzle chamber while the check is in progress. It is recommended to clean the nozzle chamber of the device before the check.

In the *Health check Barcode scanner* section, communication with a connected barcode scanner is tested. In order to check, select the field next to the Barcode text parameter and scan the desired data with the barcode scanner. Confirm the entry on the barcode scanner. Please note the specifications for barcode scanners in this manual. Please observe the instructions for the barcode scanner.

In the *Health check Network/Archive/Printer* section, the connection to available networks and printers is tested. In order to check, click on the `Test printer` button. The print menu will open, additional settings will be available, and the Microsoft Print to PDF option and available printers will be displayed.

7.8 Notification Menu

The Notifications section can be accessed from all workspaces by selecting the icon in the upper left corner of the screen. The menu overlays the last opened view and can be closed by selecting the button . The Notifications menu displays current information and status messages from the device, belonging to one of the following three categories:

- Error
- Note
- Success Message

Each notification includes the category icon on the left. The heading shows the date and time the notification was first displayed. The content follows below in text form. Only the last six notifications are displayed. As soon as a more recent notification appears, the oldest one is deleted. Notifications are only detected over the device's uptime. The Notifications menu is cleared when the device is restarted.
Clicking the `All` and `Resolved` buttons filters the notifications displayed in the list.

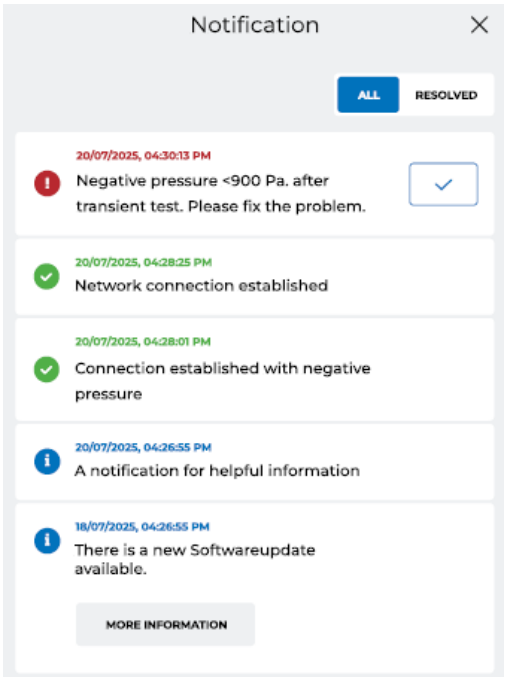


Fig. 29: View Notification Menu

The following notifications require action on the device:

- Seal check
- Allow Cool down

The error *Seal check* indicates a problem with the seal inside the device. While this error persists, not all device functions are available. It is recommended to recheck the seal by clicking the `Retry Seal check now` button. After successful verification
The error *Allow Cool down* indicates an unexpected heat buildup inside the device While this error persists, not all device functions are available. The software automatically starts a countdown that runs in the background. After the countdown expires, all device functions will be available again.
For more information on errors of this type, see the Error Messageschapter.

8 Error messages and notes

Follow the explanations and instructions in this chapter in order to operate the device correctly at all times, in accordance with the manufacturer's recommendations. Error messages and warnings may be displayed during the device's lifetime.

8.1 General problems in the process

When using the device, unexpected events may occur which the user may perceive as a problem affecting the correct functioning of the device. These events do not constitute a direct malfunction of the device and can usually be remedied by the user. The reasons for unexpected events are manifold and may arise due to user error or undetected device errors. The following tips for resolving unexpected events are merely suggestions.

Module	Problem	Measures
Internal/external scale	The scale value is not zero.	◦ Tare the scale. The internal scale can only be tared by using the >0< button. ◦ The external scale can be tared by using the >0< button or directly on the display of the connected scale itself.
Internal/external scale	The scale value is not plausible.	◦ Tare the scale before weighing. ◦ If the error persists, calibrate the scale.
Internal/external scale	The scale value displays incorrect values for known weights.	◦ Tare the scale before weighing. ◦ If the error persists, calibrate the scale.
Internal scale	After removing a weight, the scale value is not reset to zero.	◦ The nozzle must be decoupled. In order to do this, go to the `Settings, Device manager` and navigate to *Healthcheck Self check nozzle and decoupling*. Click on the `Decouple nozzle`button. For more information, see the chapter Settings workspace.
External scale	The scale is not recognised.	◦ Check whether the scale is correctly connected to the device. Note the specifications for compatible scale models in the chapter Technical data. Ensure that the correct *Device type* and *Communication port* are selected in *Balance management*. In order to do this, go to the `Settings, Device manager` and navigate to External balance. Open the Balance management menu by clicking on Edit balance. For more information, see the chapter Settings workspace.

Module	Problem	Measures
Negative pressure	The vacuum cleaner does not build up negative pressure.	◦ Check that the vacuum cleaner is switched on and correctly connected to the device.
Negative pressure	The negative pressure control is not working (fluctuating values or sharp drop).	◦ The vacuum cleaner must be taught in. Contact Retsch GmbH customer service.
Negative pressure	Screening does not start due to a negative pressure error (E83) or stops after a short time.	◦ Check whether the vacuum cleaner is plugged into the correct connection (air outlet channel). ◦ Ensure that the vacuum cleaner hose is clean, free of blockages and kinks. ◦ For further information, refer to the chapters Rear side and Connecting an industrial vacuum cleaner.
Negative pressure	The vacuum cleaner makes irregular noises.	◦ Check whether the vacuum cleaner is in tapping mode. Switch off the tapping mode by using the switch on the vacuum cleaner.
Negative pressure	The set negative pressure target value is not reached.	Check the device for any leaks. For example, ◦ the correct positioning of the sieve and cover on the nozzle chamber ◦ the correct connection of the vacuum cleaner to the air outlet channel.
Negative pressure	Self check seal fails	◦ During the check, the device must not be touched and no weights must be placed on or removed from the nozzle chamber. ◦ If the error occurs, the device automatically repeats the check. If the criterion can be met, the error is resolved automatically.
Power supply	The device does not start or is not switched on	◦ Ensure that the power cord is plugged in. Ensure that the main switch is set to “I”.
Network	The device cannot establish a connection to the network.	◦ The network ports must be activated. These are deactivated in the delivery state for reasons of network security in critical infrastructure. Contact Retsch GmbH customer service.
In case of any service	The device settings are not saved after restarting.	◦ As long as UWF is active, the desktop is displayed in red. In this state, changes to the system are not effective and will be forgotten after restarting. Contact Retsch GmbH customer service.

8.2 Error messages

Error messages inform the user of any detected device or programme errors. An error message indicates a malfunction which automatically interrupts the operation of the device or programme. Any malfunctions of this type must be rectified before the next start-up.

Code	Designation	Measures
E10	Error: Drive overloaded	A thermal overload of the drive has been detected. The drive can withstand short-term overloads. In the event of prolonged overload, the self-protection mechanism will be activated. ◦ Check if the device is overloaded (too much sample material). ◦ Check if the nozzle inside the unit can be moved freely by hand. ◦ Check if the process can be carried out with a reduced nozzle speed. ◦ Check if the specified start-up time has been observed. Long sieving times or rapid succession of sieving operations can lead to increased temperature. ◦ Check if the vacuum cleaner complies with the specifications in these instructions. ◦ Check if the vacuum cleaner has been cleaned. A poor filter condition can lead to increased power consumption and overheating of the vacuum control unit inside the device. ◦ Leave the device switched on until the cool-down timer has expired. ◦ If the fault persists, turn off the main switch and wait 30 seconds before switching the device back on. ◦ If the error persists, contact Retsch GmbH Service.
E11	Error: Drive/Motor	One of the device's drives has a fault. ◦ Turn off the main switch and wait 30 seconds before switching the device back on. ◦ If the error persists, contact Retsch GmbH Service.

Code	Designation	Measures
E20	Error: Control	◦ Turn off the main switch and wait 30 seconds before switching the device back on. ◦ If the error persists, contact Retsch GmbH Service.
E25	Error: Display	The connection to the display is interrupted. ◦ Turn off the main switch and wait 30 seconds before switching the device back on. ◦ If the error persists, contact Retsch GmbH Service.
E40	Error: Sensor 1	The balance has detected an error. The cause of the error may be an overload in either the positive or negative direction. ◦ Ensure that no weights greater than 3 kg are placed on the balance. ◦ If the error persists, calibrate the balance. Please see the relevant chapter for further information. ◦ If the fault persists, turn off the main switch and wait 30 seconds before switching the device back on. ◦ If the error persists, contact Retsch GmbH Service.
E45	Fehler Sensor 2	A fault has been detected with the outlet negative pressure sensor. ◦ If the fault persists, turn off the main switch and wait 30 seconds before switching the device back on. ◦ If the error persists, contact Retsch GmbH Service.
E46	Fehler Sensor 3	A fault has been detected with the inlet negative pressure sensor. ◦ If the fault persists, turn off the main switch and wait 30 seconds before switching the device back on. ◦ If the error persists, contact Retsch GmbH Service.

Code	Designation	Measures
E80	Error: Internal interface	The communication with the internal balance is interrupted. ◦ Check whether the communication cables are fully plugged into the externally connected device and the device itself. ◦ Check if the cable has any kinks or other damage. ◦ If the fault persists, turn off the main switch and wait 30 seconds before switching the device back on. ◦ If the error persists, contact Retsch GmbH Service.
E83	Error: Negative pressure too low	Insufficient negative pressure was generated in the sieve chamber, or a critical drop in negative pressure occurred during sieving. Proper sieving is not guaranteed. ◦ Check if the sieve and lid are correctly inserted and properly seal the sieving chamber ◦ Check if the vacuum cleaner is correctly connected to the suction air inlet. ◦ Check if the vacuum cleaner is sufficiently clean and can generate the required negative pressure. ◦ Check if the vacuum cleaner's power supply is correctly connected. ◦ Check whether approved Retsch accessories are being used. Using unauthorised accessories can lead to unforeseen malfunctions. Unapproved accessories can pose electrical hazards. Electrically compatible but unauthorised vacuum cleaners may require calibration by Retsch Service. ◦ If the fault persists, turn off the main switch and wait 30 seconds before switching the device back on. ◦ If the error persists, contact Retsch GmbH Service.

Code	Designation	Measures
E86	Error: Leakage	A fault has been detected in the seal. ◦ Perform a self-check seal function test (Health check Self check seal). Please see the relevant chapter for further information. ◦ If the fault persists, turn off the main switch and wait 30 seconds before switching the device back on. ◦ If the error persists, contact Retsch GmbH Service.
E88	Error: Mains	A mains frequency fault has been detected. The mains frequency is outside the permissible range. ◦ Check whether the device is correctly connected to the mains power supply using the IEC connector. ◦ Check if the cable has any kinks or other damage. ◦ If the fault persists, turn off the main switch and wait 30 seconds before switching the device back on. ◦ If the error persists, contact Retsch GmbH Service.

8.3 Notes

Notes inform the user about certain device or programme processes. The operation of the device or programme may be briefly interrupted, but there is no malfunction. Some notes must be acknowledged by the user in order to continue the process. Notes provide the user with additional information as a guide, but do not represent a device or programme error.

Code	Designation	Measures
H46	Note: The temperature limit has been reached.	The temperature limit has been reached. ◦ Check if the vacuum cleaner is sufficiently clean and can generate the required negative pressure. ◦ Check if the vacuum cleaner's power supply is correctly connected. ◦ Check whether approved Retsch accessories are being used. Using any unauthorised accessories may result in unforeseen errors. ◦ Leave the device switched on until the cool-down timer has expired. ◦ If the fault persists, turn off the main switch and wait 30 seconds before switching the device back on. ◦ If the error persists, contact Retsch GmbH Service.
H84	Note: Negative pressure drop	During the sieving process, the set vacuum tolerance was exceeded in either the positive or negative direction. ◦ Make sure that the vacuum cleaner is correctly connected to the suction air inlet and is airtight. ◦ Make sure that the air inlet is unobstructed. The air inlet must not be blocked by any objects or foreign matter. ◦ Check if the vacuum cleaner is sufficiently clean and can generate the required negative pressure. ◦ Check if the vacuum cleaner's power supply is correctly connected. ◦ Check whether approved Retsch accessories are being used. Using unauthorised accessories can lead to unforeseen malfunctions. Unapproved accessories can pose electrical hazards. Electrically compatible but unauthorised vacuum cleaners may require calibration by Retsch Service. ◦ Check whether the process can be carried out with larger vacuum fluctuation tolerance settings and adjust the settings accordingly. ◦ If the fault persists, turn off the main switch and wait 30 seconds before switching the device back on. ◦ If the error persists, contact Retsch GmbH Service.

9 Maintenance

Follow the instructions in this chapter to properly maintain the device in accordance with the manufacturer's recommendations

⚠ CAUTION

Risk of injury

Improper modifications to the device

- → Improper modifications to the device can lead to injuries.
- → **Do not make any unauthorised modifications to the device.**
- → **Use only spare parts and accessories approved by Retsch GmbH!**

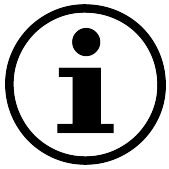
⚠ CAUTION

Risk of injury

Improper repairs

- → Unauthorised and improper repairs can cause injuries.
- → **Any repairs on the device may only be carried out by Retsch GmbH, an authorised representative, or qualified service technicians.**
- → **Do not carry out any unauthorised or improper repairs on the device!**

⚠ CAUTION: The device must always be switched off and disconnected from the power supply before any cleaning or maintenance work is carried out.

	Repair instructions are not included in this user manual. Repairs may only be carried out by Retsch GmbH or an authorised representative, or by Retsch service technicians.

9.1 Cleaning

Follow the instructions in this chapter in order to clean the device according to the manufacturer's recommendations.

⚠ WARNING

Danger to life due to electric shock

Cleaning with water on live parts

→ Cleaning the device with water can lead to life-threatening injuries from electric shock if the device is not disconnected from the power supply.
→ **Only clean the device with water when it is disconnected from the power supply.**
→ **Use a damp cloth for cleaning.**
→ **Do not clean the device under running water!**

⚠ CAUTION

Risk of injury

Cleaning with compressed air

→ When using compressed air for cleaning, dirt and residue of the sample material can be thrown around and injure the eyes.
→ **Always wear safety goggles when cleaning with compressed air.**
→ **Refer to the safety data sheets for the sample material.**

ⓘ *NOTE*

Cross-contamination from sample residues

Mixing of remaining sample residues

→ If sample residues remain in the device, cross-contamination can occur during the next use.
→ **Clean the device and any accessories thoroughly after each use.**

In order to ensure the reliability and operational safety of the device, cleaning must be performed as needed, but at least monthly.

9.1.1 Cleaning the outside of the device

→ Clean the device housing with a damp cloth and, if necessary, a standard household cleaning agent. Ensure that no water or
cleaning agent gets inside the device.

→ Only use neutral cleaning agents. The use of alcohols (EtOH, IPA) is permitted. Do not use any solvent-based cleaners! Acetone is not permitted! Test the cleaning agent on an inconspicuous area.

→ Clean the nozzle chamber and air outlet duct with a brush and vacuum up any loosened material residue with an industrial vacuum cleaner.
→ Alternatively, the nozzle chamber can also be cleaned with compressed air.

→ Replace the vacuum cleaner bag or empty the collection container of the industrial vacuum cleaner as needed.
→ Check the level of contamination in the vacuum cleaner filters at regular intervals and replace them if necessary.

9.1.2 Cleaning of the nozzle

The nozzle inside the device must be cleaned according to the instructions in the chapter Cleaning. In order to access the areas on the underside of the nozzle, it can be removed for cleaning. Follow the instructions below:

→ The nozzle is secured with a threaded pin at the centre of the circular nozzle chamber. Unscrew the threaded pin completely by using a 1.5 mm Allen key.
→ Lift off the nozzle and clean it.
→ Reinstall the nozzle and tighten the threaded pin by hand.

9.2 Maintenance

Follow the instructions in this chapter in order to maintain the device according to the manufacturer's recommendations.

⚠ CAUTION

Risk of injury

Improper maintenance

→ Unauthorised and improper maintenance can cause injury.
→ **Maintenance on the device may only be performed by Retsch GmbH, an authorised representative, or qualified service technicians.**
→ **The service area settings may only be adjusted by Retsch service technicians or an authorised representative.**
→ **Do not perform unauthorised or improper maintenance on the device!**

The device is maintenance-free. No maintenance is required when the device is used as intended.

9.3 Wear

Follow the instructions in this chapter to check the device for any wear according to the manufacturer's recommendations.

⚠ CAUTION

Risk of injury

Improper repairs

→ Unauthorised and improper repairs can cause injuries.
→ **Any repairs on the device may only be carried out by Retsch GmbH, an authorised representative, or qualified service technicians.**
→ **Do not carry out any unauthorised or improper repairs on the device!**

In order to ensure the reliability and operational safety of the device, the following components must be checked for any wear and replaced as needed, but at least every six months.

Even with proper handling of the analytical sieves, wear of the sieve mesh is unavoidable, depending on the frequency of sieve operation and the sample material. The analytical sieves should be regularly inspected for any wear and damage and replaced if necessary.

All existing seals should be also regularly inspected for any wear and replaced if necessary.

9.4 Calibration

In order to ensure optimal sieving performance and reliable results, regular calibration of the device and its components is recommended. The following components can be calibrated:

- Negative pressure (Sensor)
- Nozzle speed
- Internal balance

Please contact the service of Retsch GmbH in order to arrange calibration.

9.5 Return for repair and maintenance

Fig. 30: Return Shipment Slip

The acceptance of devices and accessories from Retsch GmbH for repair, maintenance, or calibration can only take place if the return shipment slip, including the declaration of conformity, is correctly and completely filled out.

→ Download the return shipment slip from the "Miscellaneous" download section on the Retsch GmbH homepage (https://www.retsch.de/de/downloads/sonstiges/).
→ In the case of a device return, attach the return shipment slip to the outside of the packaging.

In order to prevent any health risks to service technicians, Retsch GmbH reserves the right to refuse acceptance and return the shipment at the sender's expense.

10 Parameters in the particle characterisation

The software can calculate the parameters described below for each measurement. The display can be set to either a tabular or graphical view.

Please note that in sieve analysis, volume fractions correspond to mass fractions. This is due to the determination of mass by weighing, assuming the sample has a uniform density.

10.1 Glossary

Parameter	Description
x_i	Sieve mesh size/hole size i
m_{S0}	Sample weight
m_V	Sample fraction (after sieving), sample mass remaining on a sieve
m_S	Sum of the masses of all returned sample fractions

10.2 Characteristics

Parameter	Description
$p_3\,(x_1, x_2)$	Fraction: It indicates the proportion p of particles in the particle size range between > x_1 and ≤ x_2. Index 3 denotes the volume-related fraction. The fraction is calculated by $p_3\,(x_{i-1}, x_i) = \frac{m_F(x_{i-1})}{m_S}$
$Q_3\,(x_i)$	Cumulative distribution: It indicates the proportion Q of all particles with a particle size ≤ x Index 3 denotes the volume-related distribution. The cumulative distribution is calculated by $Q_3 = \sum_{k=1}^{n} p_3\,(k)$
$1 - Q_3\,(x_i)$	Cumulative residue distribution: It indicates the proportion (1 – Q) of all particles with a particle size > x. Index 3 denotes the volume-related distribution. The cumulative residue distribution is calculated by $1 - Q_3 = 100 - \sum_{k=1}^{n} p_3\,(k)$
$q_3\,(x_1, x_2)$	Frequency distribution: It indicates the proportion q of particles with a particle size = x. Index 3 denotes the volume-related distribution. The frequency distribution is defined as the first derivative of the cumulative distribution curve and is calculated by $q_3\,(x_{i-1}, x_i) = \frac{p_3(x_{i-1}, x_i)}{(x_i - x_{i-1})}$

10.3 Key parameters

Parameter	Description
$x_d\ (Q_3)$	Particle size: It indicates the particle size x at a specific value of the cumulative distribution $Q_3(x)$. Where x does not have to correspond exactly to the mesh size, but can take any value. Index 3 denotes the volume-related distribution. The particle size is calculated by $x_d = \frac{Q_3(x_d) - Q_3(x_{i-1})}{q_3(x_{i-1}, x_i)} + x_{i-1}$
$Q_3\ (x_d)$	Cumulative distribution: It indicates the proportion Q of all particles with a particle size ≤ x Where x does not have to correspond exactly to the mesh size, but can take any value. Index 3 denotes the volume-related distribution. The cumulative distribution is calculated by $Q_3\ (x_d) = \sum_{k=1}^{x_{i-1}} p_3\ (k) + q_3\ (x_{i-1}, x_i) \times (x_d - x_{i-1})$
D_{10}, D_{50}, D_{90}	Particle size at a specific value of the cumulative distribution: The D_{10}, D_{50} and D_{90} values serve to characterise a sample in particle size analysis. The following applies: $D_y = x_y = x\ (Q_3)$) with Q_3 = y % The closer the D_{10} - and D_{90} values are, the narrower the particle size distribution. D_{10}: 10% of all particles (by volume) in the sample are smaller than or equal to the D_{10} value. The particle size is often also represented as x_{10}. It is a measure of the smallest particles in the sample. D_{50}: 50 % aller Partikel (volumenbezogen) der Probe sind kleiner oder gleich dem D_{50}-Wert. Particle size is referred to as the median or average diameter and is often also represented as x_{50}. D_{90}: 90 % aller Partikel (volumenbezogen) der Probe sind kleiner oder gleich dem D_{90}-Wert. The particle size is often also represented as x_{90}. It is a measure of the largest particles in the sample.
Span	Span value: It indicates the width of the distribution. The span value is calculated by $SPAN = \frac{(D_{90} - D_{10})}{D_{50}}$
U	Inequality: It indicates the symmetry of the distribution. The inequality is calculated by $U = \frac{D_{60}}{D_{10}}$

10.4 RRSB

Parameter	Description
n	Slope of the regression line
d'	x-value at which the line has the value 0.632. $Q_3(x)=0.632$
Correlation	Correlation coefficient of the regression line

The RRSB parameters can only be calculated if the Q_3- values of at least two sieve sections lie between 5% and 95%.

10.5 Specific surfaces

Parameter	Description
S_V	Volume-related specific surface: It indicates the ratio between surface A of all particles and the volume of all particles in the sample. The volume-related specific surface is calculated by $S_v = 6 \times \left(\sum_{k=1}^{n+1} \frac{p_3(k)}{100 \times \frac{x_k + x_{k-1}}{2}} \right)$ Where n = number of sieves/mesh sizes and n+1 = 1.5* largest mesh size.
S_m	Mass-related specific surface: It indicates the ratio between surface A of all particles and the mass of all particles in the sample. The mass-related specific surface is calculated by $S_m = \frac{10 \times S_v}{\rho}$
D_S	Sauter diameter: It indicates the equivalent diameter D_S of equally sized spheres K_i that have the same specific surface S_V and the same volume V as the sample itself. The Sauter diameter is calculated by: $D_S = \frac{6}{S_v} = \frac{1}{\sum_{k=1}^{n+1} \frac{p_3(k)}{100 \times \frac{x_k + x_{k-1}}{2}}}$ Where n = number of sieves/mesh sizes and n+1 = 1.5* largest mesh size.
CV	Coefficient of variation: It indicates the ratio of the standard deviation to the mean value, i.e., the relative dispersion of the sample. The CV value is calculated by $CV = \frac{D_{84} - D_{16}}{D_{50}}$

Parameter	Description
MA	Medium particle size: It indicates the D_{50} value (median) of the sample, where MA=D_{50} = x_d (50%)
AFS number	AFS particle size number: The AFS number is used to classify moulding and core sand. It can only be calculated if the corresponding sieves are used. The selected sieves must be a partial quantity of the AFS sieve series: 0.020 mm, 0.063 mm, 0.090 mm, 0.125 mm, 0.180 mm, 0.250 mm, 0.355 mm, 0.500 mm, 0.710 mm, 1 mm, 1.4 mm, 2 mm, 2.8 mm, 4 mm, 5.6 mm. In addition, all AFS sieves must be included between the smallest and largest sieves. The determination of the AFS characteristic values is only considered for the fraction > 20 µm. A so-called desludging of the fine fraction < 20 µm or the subtraction of the fraction < 20 µm is a prerequisite for the determination of the AFS parameters.

11 Accessories

Information on available accessories, as well as the corresponding operating instructions, can be viewed directly on the homepage Retsch GmbH (https://www.retsch.com) under the chapter

“Downloads” for the device.

Information on wear parts and small accessories can be found in the complete catalogue Retsch GmbH, which is also available on the homepage.

For any questions regarding spare parts, please contact the Retsch GmbH representative in your country or Retsch GmbHdirectly.

12 Disposal

In the event of disposal, the relevant legal regulations must be observed. The following information applies to the disposal of electrical and electronic equipment in the European Community.

Within the European Community, the disposal of electrically powered equipment is governed by national regulations based on EU Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE).

According to this directive, all equipment delivered after 13 August 2005 in the business-to-business sector, in which this product is classified, may no longer be disposed of with municipal waste or household waste. In order to document this, the devices are marked with a disposal symbol.

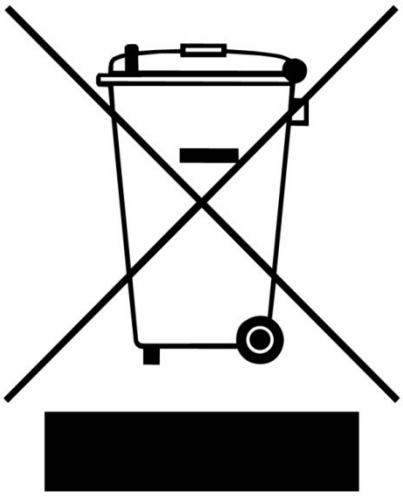


Fig. 31: Disposal symbol

As disposal regulations can vary from country to country worldwide and also within the EU, the supplier of the device should be contacted directly if necessary.

In Germany, this labelling requirement has been in force since 23rd March 2006. From this date onwards, the manufacturer must offer an appropriate take-back option for all devices delivered after 13th August 2005. For all devices delivered before 13th August 2005, the user is responsible for proper disposal.

13 Index

Retsch a VERDER company

EU Declaration of Conformity

Translation

AIR JET SIEVING MACHINE

AS 200 jet pro | 30.034.0001

EU DECLARATION OF CONFORMITY

We, represented by the undersigned, hereby declare that the above device complies with the following directives and harmonised standards:

Machinery Directive 2006/42/EC

Applied standards, in particular:

DIN EN ISO 12100	Machine Safety - General Design Principles
DIN EN 61010-1	Safety Regulations for Electrical Measurement, Control, Regulation and Laboratory Devices

Electromagnetic compatibility 2014/30/EU (tested at 230 V, 50 Hz)

Applied standards, in particular:

EN 55011	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement
DIN EN 61326-1	Electrical equipment for measurement, control and laboratory use - EMC requirements

Restriction of hazardous substances (RoHS) 2011/65/EU

Authorised person for compilation of the technical documentation:
Julia Kürten (Technical Documentation)

Furthermore, we declare that the relevant technical documentation for the above device has been prepared in accordance with Annex VII Part A of the Machinery Directive and we undertake to submit the documentation to the market surveillance authorities on request.

In the event of a modification of the device not agreed on by Retsch GmbH, as well as the use of non-approved spare parts or accessories, this declaration loses its validity.

Retsch GmbH

Haan, 10/2025

Dr. Kevin Schmitz, Head of Development

CE

Retsch GmbH

Retsch-Allee 1-5
42781 Haan
Germany

Contact:

+49 2104 2333-512
info@retsch.com