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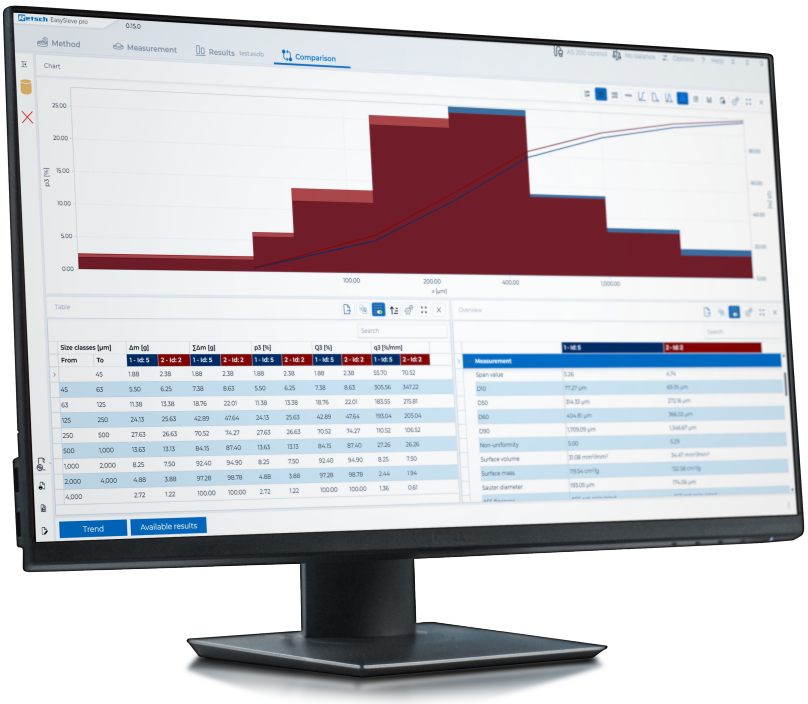


Manual

Software for particle characterization EasySieve pro

Version 0000 | 26.01.2026

Translation

Table of contents

1 Notes on the operating instructions

These operating instructions are technical instructions for the safe operation of the program. Read these operating instructions carefully before installing the software and operating the program. Reading and understanding these operating instructions is a prerequisite for safe and proper use of the program.

These operating instructions do not include repair instructions. If you have any queries or questions about these instructions or the program, or in the event of any faults or necessary repairs, please contact your supplier or Retsch GmbH directly.

Technical application information relating to samples to be processed is not included, or only to a limited extent.

Further information on the program can be found at https://www.retsch.com on the program-specific pages.

Revision status

The document revision Version 0000 of the operating instructions Software for particle characterization EasySieve pro describes the software version 1.0.0.

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 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

Sign/symbol	Meaning
ⓘ	Reference to a recommendation or information
Font style	Software element
`Font style`	Software button which can be selected

1.4 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

	In this user manual, the product Software for particle characterization EasySieve pro is usually referred to as a program.

Target group: All persons who use the program in any way.

The program is suitable for use in particle characterization. This instruction manual is therefore intended for people who are familiar with comparable processes and already have experience with typical procedures.

Safety officer:

The operator must ensure that persons working with and commissioned by this program…

- 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 for this program at all times and without any problems,
- are familiarized with the safe and proper use of the program before starting work, either through a verbal introduction by a competent person and/or through the available technical documentation.

⚠ CAUTION: Improper operation can result in personal injury, property damage and injury. The operator is responsible for their own safety and that of their employees. The operator is responsible for ensuring that no unauthorized persons have access to the program and the device controlled by it.

The program is modern and powerful software from Retsch GmbH and is state of the art. When this program is used as intended and the technical documentation provided here is understood, safe operation is guaranteed.

2.1 General safety instructions

⚠ CAUTION

Risk of injury

No visual contact with the device

→ When controlling the device via the program without visual contact, there is a risk of the device starting up unintentionally.

→ **Only operate the device via the program when you have visual contact with the device.**

→ **Observe the safety and warning instructions in the operating manual for the controlled device.**

⚠ 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.**

2.2 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 Software for particle characterization EasySieve pro

EasySieve pro is a program for particle size analysis. It is capable of automatically performing the necessary measuring and weighing processes – from recording the weights of the analysis sieves to evaluating the data.

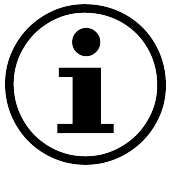
The program can communicate directly with sieving machines from Retsch GmbH and control them. It guides the user through the respective work steps. Existing parameters and the parameters to be calculated can be entered via various input fields. Consistent parameters can be edited, saved and retrieved at any time.

If a balance is connected, the corresponding data (empty weights of the analysis sieves, reweighing of the loaded analysis sieves) can be transmitted directly to the program. If no balance is connected, the data can also be entered manually.

The program calculates all common particle distributions and characteristic values of particle size and enables the results to be displayed in tabular and graphical form in a standard-compliant measurement report. Furthermore, the data can be exported to other software products (e.g., Microsoft Excel).

The program is available in two versions: EasySieve pro and EasySieve pharma. The EasySieve pharma version is an extension of EasySieve pro and features integrated user management. The user management system complies with the requirements of the relevant pharmaceutical guidelines:

- ISPE GAMP 5
- EC GMP Annex 11
- FDA 21 CFR 11

	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.

3.1 Functionality

A sieve analysis with the program is performed in three steps:

1. Definition of a method
2. Performing a measurement
3. Evaluation of the results

A method contains all the information which is required to perform an analysis, identify the sample and calculate a particle size distribution from the raw data. Methods can be saved and stored in a database. During the measurement, the program guides you through the necessary steps in order to ensure that all data is recorded correctly. Each result is stored in a database where each result corresponding to a data record in the database. It is possible to use different databases.

The evaluation can be performed separately from the measurement by retrieving the results from a database. The following information is stored in each data record:

- Method parameters
- Sample-specific information
- Sieves (mesh sizes)
- Weight values per sieve
- Calculated parameters
- Graphical representation of the parameters

3.1.1 Compatible sieving machines

The program can externally control selected sieving machines from Retsch GmbH. In order to do this, the sieving machine must be connected via an interface (USB or RS232) to the computer on which the program is being used. A standard cable can be used for the connection. The following sieving machines are compatible, provided they have the appropriate interface:

Sieve machine	Interface
AS 200 control	USB-A
AS 200 jet	USB-B
AS 200 tap	RS232
AS 300 control	USB-A
AS 400 control	RS232
AS 450 control	RS232

3.1.2 Compatible balance models

The program is able to communicate with selected balances from various manufacturers. Thereby, the functions of taring and transferring the current weight value are available. The balance must be connected to the computer on which the program is used via a free interface. The communication between the balance and the program is based on individual communication protocols. The following product families from the manufacturers are compatible.

Scale manufacturers	Product family
Mettler Toledo	MX series (MT SICS protocol)
Sartorius	Practum, Quintix
Kern	IoT Line (KCP protocol)

NOTICE: If necessary, the balance model must be set up in advance for communication. Please refer to the manufacturer's instructions for this.

3.2 System requirements

Operating system:

- Windows 11

Personal Computer:

- CPU: 1.6 GHz or higher, multi-core (Intel i5 or equivalent processor)
- RAM: 8 GB
- Memory space: 256 GB
- Screen resolution 1920 x 1080
- 2 x USB 2.0 Port or higher

3.3 Used file types

File type	Description
.db	Database for methods, sieves, reference curves and safety function
.esdb	Database for results
.esbk	Backup of program contents It contains information from .db and .json files.
.log	Log of program activity
.xml	Report template for PDF outpu
.json	Global program settings

3.4 Installation

ⓘ NOTE

Local administrator rights

The program requires local administrator rights for installation and operation.

→ Without unrestricted read and write permissions, smooth installation and trouble-free operation cannot be guaranteed.
→ Insufficient read and write permissions during operation may result in data loss.
→ **Make sure that every Windows user has the necessary read and write permissions for the program's installation directory.**

This chapter describes the procedure for installing the program.

ⓘ NOTICE: Proper functioning of the program is only guaranteed if the PC meets the system requirements. Local administrator rights are required on the PC for installation.
ⓘ NOTICE: If a step in the installation wizard is not accepted, the installation process will be canceled and the program cannot be installed.

→ Download the installation package from the Retsch GmbH website. The link can be found on your personal contract documents.
→ Save and unzip the .zip file.
→ Run the .exe file and follow the instructions of the installation wizard.

→ The wizard will guide you step by step through the installation process. Click `Next` in order to proceed to the next step, `Back`in order to return to the previous step or `Cancel` in order to cancel the entire installation process.
→ Confirm that the wizard is allowed to make changes to your device.
→ Confirm the license agreement.
→ The wizard will suggest a storage location for the program. If you want to choose a different destination folder, click `Change` and confirm.
→ Start the installation by clicking `Install`.
→ Confirm the successful installation by clicking `Finish`. A shortcut to start the program will be created on the desktop.
→ Start the program by double-clicking the desktop shortcut. Especially when starting for the first time, it may take up to 20 seconds for the program to open.

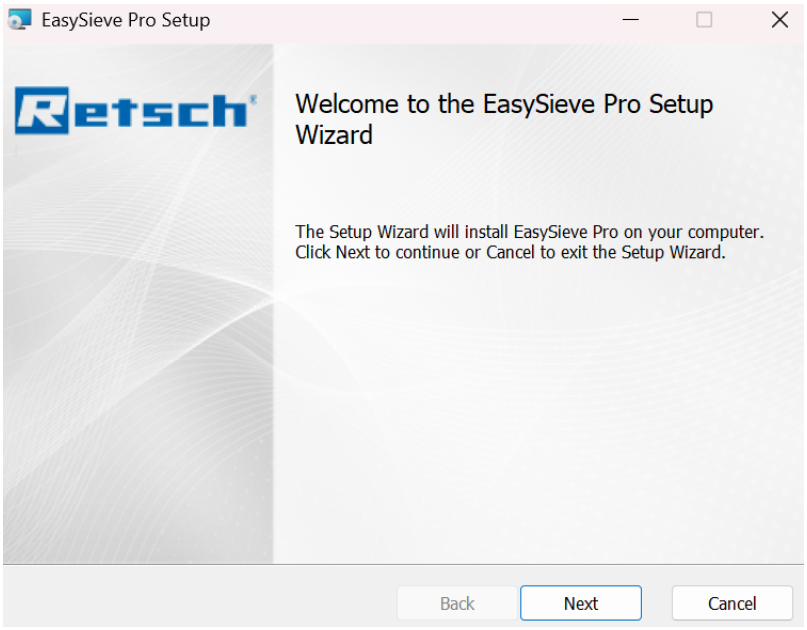


Fig. 1: EasySieve Installation Wizard

3.5 License activation

This chapter describes the procedure for activating the required license. The program can only be used with a valid license. A separate license is required for each computer on which the program is used. License activation is required for the first time after program installation. If a valid license is available, this step is no longer necessary each time the program is started.
NOTICE: A fixed number of licenses are purchased when you buy the program. Please contact the Retsch GmbH representative in your country or Retsch GmbH service directly in order to purchase additional licenses.
NOTICE: An internet connection is required in order to activate the license. If the program is used on a computer without an internet connection, a second computer with an active internet connection must be available for the license activation process.

Perform the license activation as described below when starting the program for the first time:

→ Open the program. The license activation will begin.
→ Follow the instructions and enter the data. You can find the serial number in the item description on your contract documents (order confirmation and invoice). The entered data will be transmitted to Retsch GmbH and may be requested for verification purposes.

Fig. 2: Registration Window License Activation

If the computer on which the program will be used has an active internet connection, activate the license as follows:

→ Confirm the data entry by clicking the `Online activation`button.
→ If the data is correct, the license activation will be confirmed.
→ If the license activation fails, check whether the serial number from the contract documents has been entered correctly. If the error persists, please contact the Retsch GmbHcustomer service
→ After clicking the `Ok` button, the program will start.

If the computer on which the program will be used does NOT have an active internet connection, activate the license as follows:

→ Confirm the data entry by clicking the `Offline activation`button.
→ Follow the instructions. Copy the generated activation code and make it available on a computer with an internet connection.
→ Open the link to the specified website (https://activate.retsch.com) on your computer with an internet connection. Copy the activation code into the designated input field and confirm.
→ If the information is correct, a file will be available for download. If no file is available for download, check whether the serial number from your contract documents and the activation code have been entered correctly. If the error persists, please contact the Retsch GmbHcustomer service
→ Save the file to the specified path on the computer where you intend to use the program.
→ Continue the license activation by clicking the `Open license file`button. The Explorer will open.

→ Navigate to the location of the previously saved file, select it and confirm.
→ Start the program by double-clicking the desktop shortcut.

NOTICE: The program will start after a maximum of 15 seconds. If this process takes longer, check the computer's Task Manager to see if the program is listed among the background processes (EasySieve.AppShell). If the program still does not run after waiting for a long time, its execution is blocked due to the Windows user settings. In this case, please contact your local IT department.

4 General control elements

The program interface consists of a menu bar and the display area for the workspaces. The menu bar can be used in order to set global settings which can affect all program content. Each workspace consists of a side menu, the layout organizer and individual tiles. There are four different workspaces, which provide all the steps necessary to perform particle characterization:

- Method
- Measurement
- Results
- Comparison

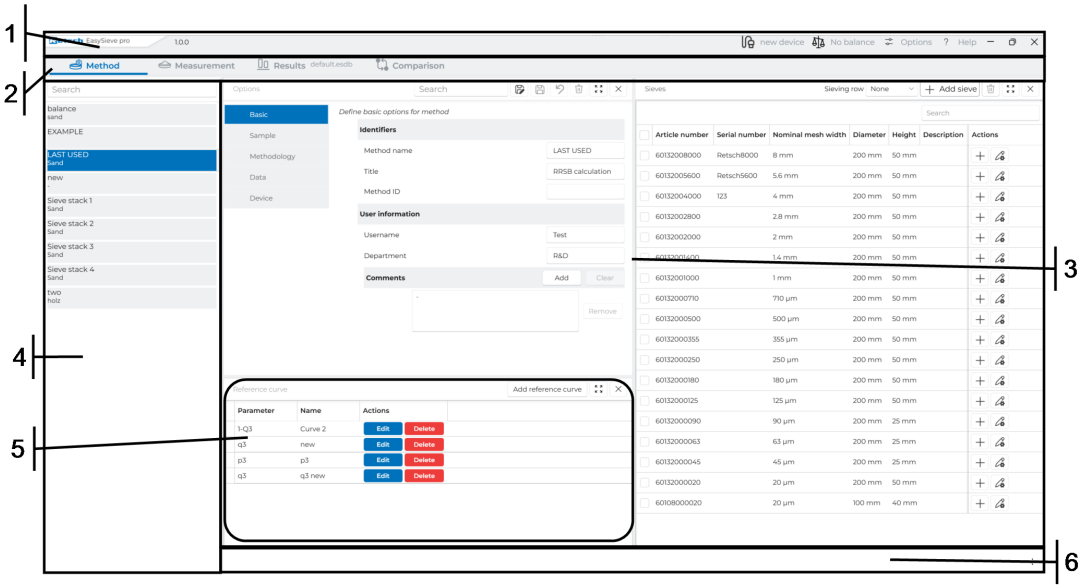


Fig. 3: Program interface

No.	Component	Function
1	Menu bar	Contains the global program settings, the help menu, and the selection of connected devices (sieving machine and balance).
2	Title bar of the workspaces	Display and selection of the workspace
3	Display area	Displays the contents of the selected workspace.
4	Side menu	Contains individual functions within a workspace.
5	Tile	Displays the individual contents of workspaces.
6	Layout organizer	Organization of the tile arrangement Display and opening of closed tiles.

4.1 Menu bar

The program's menu bar contains the global settings which affect the entire program, the help menu and the menus for selecting connected devices and balances. It also contains the controls

for minimizing, maximizing and exiting the program.

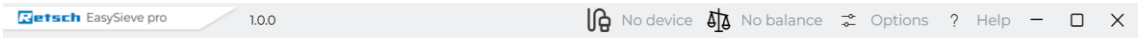


Fig. 4: Menu bar

4.1.1 Devices menu

In order to perform a measurement and fully configure a method, a device must be selected in the Devices menu.
No device is selected when the software is restarted. In order to select a device, click on the menu, and the available devices will be displayed. Click on the desired device. Devices are managed via `Device management` under `Options`. Further information on device management can be found in chapter Device management.

4.1.2 Balances Menu

Optionally, a balance can be selected in the Balances menu for automatic data transfer of weighing values to the program.
No balance is selected when the software is restarted. In order to select a balance, click on the menu, and the available balances will be displayed. Click on the desired balance. Balances are managed via `Balance management` under `Options`. Further information on managing balances can be found in the Balance management chapter.

4.1.3 Options menu

The general program settings are defined in the `Options` menu. Access is via the `Options` button, which opens the selection menu:

- Language
- Device management
- Balance management
- Application settings

4.1.3.1 Language

The language and format settings of the program are managed in the *Language* workspace. The *Format* setting for numbers, date and time may be based on the language selected within the software or the system settings of the computer on which the program is installed.
Confirm the saving of changes by clicking the `Apply` button. Any unsaved changes can be undone by clicking the `Cancel` button. In order to activate the changes to the settings, the program must be restarted.

4.1.3.2 Device management

In the `Device management` workspace, all devices which are used with the program are managed. This includes devices that are controlled by the program as well as those which are operated independently. Devices which are configured here can be selected in the Devices menu.
This workspace contains a list of all previously configured devices and allows their management. The list is empty when you restart. Only a subset of the parameters that define a device is visible in the list view. In order to create a new device, click the `Create New` button and enter the following parameters:

- Identifiers
  - Name
  - Serial number
  - Description
- Hardware
  - Device type
  - Communication ports

In order to save a device, at least the *Name* parameter must be entered.
The *Serial number* value is unique and can only be assigned once. If an already assigned serial number is entered for another device, the entry will not be accepted and the device cannot be saved.
The selection *Device type* Type is crucial for correctly configuring the device with regard to its communication protocol. The program can control the following devices of the Retsch GmbH during a measurement:

- AS 200 control
- AS 200 jet
- AS 200 tap
- AS 300 control
- AS 400 control
- AS 450 control

Select the appropriate *Device type* for your device from Retsch GmbH according to its name. After that, the setting *Communication ports* is required. The currently active communication ports are displayed in the selection menu. Select the port through which the device is connected to the program.
NOTICE: In order to fully configure a device of Retsch GmbH, the device must be connected to the program via an interface (USB/RS232) and switched on. If no connection or the wrong one is displayed in the program, check the computer's Device Manager
Any other device cannot be controlled by the program and must be saved by selecting "Other" for *Device type*.
Save the device by clicking the `Save` button or cancel the process by clicking `Cancel`. A device which has already been saved can be edited later by clicking the button or deleted .

4.1.3.3 Balance management

In the `Balance management` workspace, all balances which are used with the program are managed. This includes both balances controlled by the program and those which are operated independently. Devices created here can be selected in the Balances menu.
This workspace contains a list of all previously created balances and allows you to manage them. The list is empty when you restart. Only some of the parameters that define a balance are visible in the list view. 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
  - Communication ports

In order to save a balance, at least the *Name* parameter must be entered.
The *Serial number* value is unique and can only be assigned once. If an already assigned serial number is entered for another balance, the entry will not be accepted and the balance cannot be saved.
The selection *Device type* is crucial for correctly configuring the balance with regard to its communication protocol. The program can control the following balance models during a measurement:

Scale manufacturers	Product family
Mettler Toledo	MX series (MT SICS protocol)
Sartorius	Practum, Quintix
Kern	IoT Line (KCP protocol)

Select the appropriate *Balance type* in accordance with the manufacturer's name. After that, the setting *Communication ports* is required. The currently active communication ports are displayed in the selection menu. Select the port through which the balance is connected to the program.
NOTICE: For a balance to be fully configured, it must be connected to the program via an interface and switched on. If no connection or the wrong one is displayed in the program, check the computer's Device Manager
Any other scale product family cannot be controlled by the program and must be saved by selecting "Other" for *Balance type*.
Save the balance by clicking on the `Save` button or cancel the process by clicking on `Cancel`. A balance which has already been saved can be edited at a later time by clicking on the button or deleted by clicking on .

4.1.3.4 Application settings

In the `Application Settings` workspace, you can configure the global settings for the program as well as further settings for performing measurements:

- Units and Labels
  - Labels
  - Length Units
  - Mass Units
  - Pressure units
  - Time
- Tolerances

- Backweighing tolerances
- Loss tolerance

◦ Auto Report
- Generate reports after measurements
  - Enabled on application startup
    - Report template
    - Print report
    - Save report as PDF

◦ Data

In the `Units und Labels` tile, the display format for data and various parameter units used in the workspaces is selected.
In the `Tolerances` tile, tolerance settings for measurements are selected. The *Backweighing tolerance* setting allows you to define the expected proportions of oversize and undersize particles in the respective fraction and limit them to a permissible tolerance. The settings for each sieve are configured in the `Sample` tile of a method. *Loss tolerance* enables the monitoring of sieve loss according to the specified standards. When this option is activated, a warning is issued and documented in the results if the selected maximum sieve loss is exceeded.
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 `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. Creating new templates or modifying existing ones is described in the `Results` workspace, chapter Side menu. 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 which have been previously configured via the PC's Windows settings are displayed. 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 the button opens File Explorer, allowing you to change the storage location.
Confirm the saving of changes by clicking the `Apply` button. Any unsaved changes can be undone by clicking the `Cancel` button.
In the *Data* workspace, you can back up the program's contents or restore the program from an existing backup. The backup includes all global settings, filters, methods and results stored at that time. In order to perform a backup, click on the `Create backup` button. The file explorer will open, and you must select the backup location. The program will close after a few seconds and then restart.
In order to perform a restore, click the `Restore data` button, which will open the File Explorer. Navigate to the location where the backup is stored and select the file. Confirm the warning about the loss of unsaved data when restoring from an existing backup by clicking the `Yes` button. The program closes after a few seconds and then restarts.
NOTICE: If the program is restored from an existing backup, all data not included in this or any other backup will be lost!

4.1.4 Help menu

In the `Help` menu, you can generate an error report, manage access via TeamViewer and view program- and license-specific information:

- Create Debug Report
- About
  - Version
  - Build
  - Retsch company information
  - Support
  - License information
- TeamViewer

Clicking the `Create Debug Report` button generates an error report and saves it in .zip format under C:\ProgramData\EasySieve.AppShell\DebugReports. In the event of an ongoing support request, a service representative from Retsch GmbH may ask you to create and provide this file.
NOTICE: Only send the error report or file to official service representatives from Retsch GmbH. Disclosing it to third parties could lead to misuse of potentially personal data or program content!
Any information about the software, contact details and license information can be found in the *About* workspace. In the event of an ongoing support request, a service representative from Retsch GmbH may ask you to provide this information for verification purposes.

With the device operator's consent, Retsch GmbH service may be granted access to the program via TeamViewer. The service is then able to connect to the screen of the computer on which the program is installed. The connection must be established by providing an ID and a password, thus protecting access by third parties.
NOTICE: In order to use the TeamViewer function, the computer on which the program is installed must have an active internet connection.
NOTICE: 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, select the *TeamViewer* button. The TeamViewer application opens automatically and generates an individual ID and password.

4.2 Title bar of the workspaces

The buttons with the workspace titles can be used for the following functions:

- Switch between workspaces by clicking on them. The currently active workspace is highlighted in color in the title bar.
- Disconnect workspace by clicking and dragging, e.g. to a second screen.
- A detached workspace can be docked again by dragging it to the central icon ❐. Take the header of the detached workspace and drag it to the main program window. The icon ❐ appears in the center of the window.

Alternatively, the cross icon can be used to close a detached workspace and dock it back to the main window.

- In addition to the title, the buttons contain further information and controls, which are described in the workspace sections.

TIPS & TRICKS: The sequence of the workspaces in the title bar cannot be changed and is based on a typical workflow from defining a method through the actual measurement to reviewing the results.

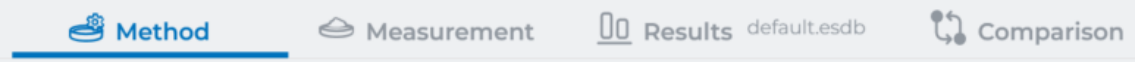


Fig. 5: Workspaces

4.3 Tiles

In the workspace display area, different content is presented as tiles. A tile can contain interactive elements (e.g., for creating a method, starting a measurement, etc.) or displays (e.g., for showing results). The use and functions of each tile are described in the respective sections of this manual. 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
	Maximize	Enlarges the tile in order to fill the entire display area of a workspace. All other tiles are automatically minimized to the Layout Organizer.
	Restore	Reduces the tile to its original size and automatically opens all other tiles in the workspace.
	Close	Closes the tile and places it as a button in the Layout Organizer. The tile can be reopened from there.
	More	Open additional buttons.
	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 grayed 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. This option is grayed out by default and only becomes active once all parameters have been defined.
	Undo	Remove all unsaved changes. Is grayed out by default and only becomes active after changes have been made.

Symbol	Designation	Function
	Delete	Deletes a method selected via the side menu. Delete sieves assigned to a method Delete sieves.
	Back	Close the edit view in order to return to the tile list as long as no changes have been made.
	Add a sieve	Adds the sieve to the currently selected method.
	Edit	Edit the parameters of a sieve or method.
	Start measurement	Start a measurement by using the saved parameters of a method. The measurement takes place in Guided Sieving mode according to a predefined flowchart.
	End measurement	End a measurement after all steps of Guided Sieving mode have been successfully completed.
	Next	Move to the next step of Guided Sieving within a measurement.
	Start sieving	Start a sieving operation or a connected sieve machine within a measurement by using the machine-specific parameters.
	Pause sieving	Pause a sieving operation to resume it later.
	Resume sieving	Resume a paused sieving operation. The measurement continues in guided mode.
	Cancel	Cancel a measurement. All previously entered data will be lost and not saved.
	Retrieve the weight value	Retrieve the current weight value from the connected balance and enter it into the adjacent field.
	Tare	Tare the weight value from the connected balance.
	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.

Symbol	Designation	Function
	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.
	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%.
	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.
	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 colored background on or off for every second row in a table.

Symbol	Designation	Function
	Sort ascending (gray) or descending (blue)	Select an ascending or descending sort order for the size classes of sieves in a tabular view.

4.3.1 Arrangement of tiles

The tiles are arranged in a grid within their workspace. It is not possible to detach a tile from its workspace. By clicking and dragging the tile's title bar, the position of two tiles within the workspace can be swapped. The boundaries between the tiles can be moved by clicking and dragging.

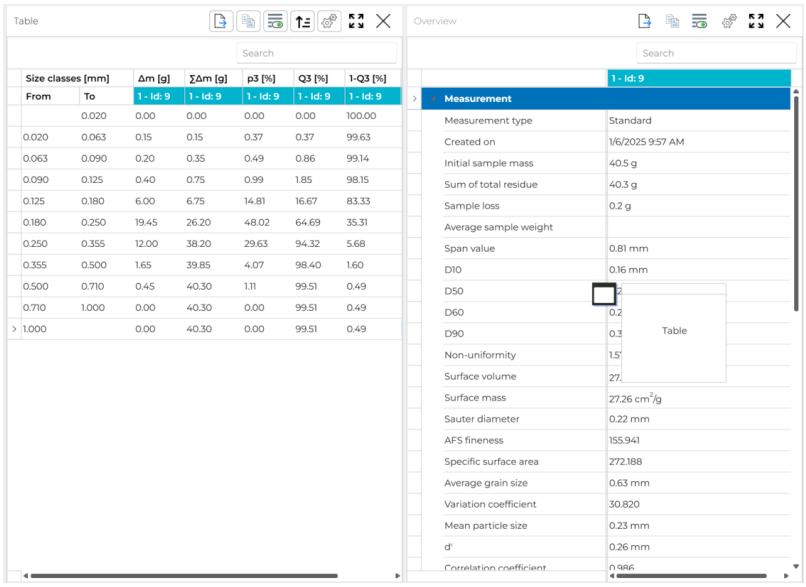


Fig. 6: Swap the position of two tiles

4.3.2 Layout organizer

Minimized tiles are stored in the workspace's layout organizer. A button with the corresponding name appears for each closed tile. Clicking the button restores the tile to its full size in the workspace. Open tiles are not displayed in the layout organizer.

In the right-hand section of the layout organizer is the button ⋮ for managing the tile arrangement within a workspace. Clicking the ⋮ button grants access to the layout management:

- Auto save layout
- Save current layout
- Undo layout changes
- Reset to default

If `Auto save layout` is selected, the last tile arrangement will be saved automatically when the program is closed. The saved arrangement is automatically loaded the next time the program is

started. Activation of the button is indicated by a blue background and a checkmark on the icon. The buttons `Undo layout changes` and `Reset to default` reset the layout to the last saved setting and the default setting, respectively.

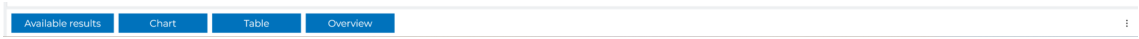


Fig. 7: Layout organizer when tiles are closed

4.4 Side menu

The side menu contains settings that can affect multiple tiles within a workspace and other workspaces. The detailed functions and relationships are explained in the chapters for each workspace.
The side menu is fixed to the left edge of the screen and cannot be closed. In some workspaces, a button is available to fold a nd fold out the side menu. Alternatively, the width can be adjusted by clicking and dragging the right edge. The functions are also accessible when the side menu is folded by clicking the icons.

5 Method workspace

The `Method` workspace contains the following tiles:

- Options
- Sieves
- Reference curve

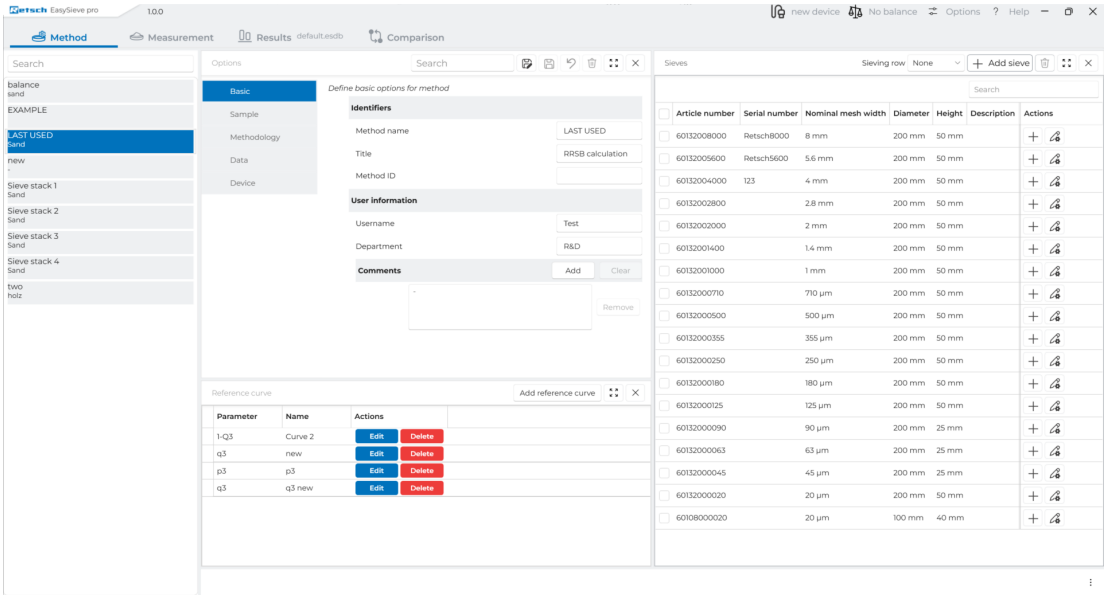


Fig. 8: Overview of the Method workspace

The methods containing the specific parameters for a measurement are defined in the *Options* tile.
The *Sieves* tile manages all sieves and can be assigned to methods.
The *Reference curve* tile defines the comparison curves that can be used in the `Comparison` workspace in order to analyze measurement results.
The side menu contains a list of the methods that have been created.

All data displayed in this workspace is independent of the logged-in Windows user and can be viewed and edited by anyone.

5.1 Side menu

The created methods are listed in the side menu. The currently selected method is highlighted in blue, and its parameters can be edited in the *Options* tile.

The EXAMPLE and LAST USED methods are included in the program by default and cannot be deleted. EXAMPLE contains a predefined set of parameters. LAST USED always contains the parameter definitions of the method which was last used for a measurement.

In order to search for a specific method, use the search field in the menu header. Entering characters there will search the list for any matches. Only the method name and sample designation, which are used to display the methods, are considered in the search. All other parameters are ignored in the search. If no match is found, the list remains empty.

5.2 Options tile

The methods containing the specific parameters for a measurement are defined in the *Options* tile.
A method contains all the information necessary to perform a measurement, calculate and display the result. A method must be fully defined in order to perform a measurement. The EXAMPLE and LAST USED methods are stored in the program by default and already maintained with sample values.
Each method consists of the categories listed below, in which the specific parameters are defined:

- Basic
- Sample
- Methodology
- Data
- Device

TIPS & TRICKS: The *Device* category is only visible if a device is selected in the selection menu of the menu bar.

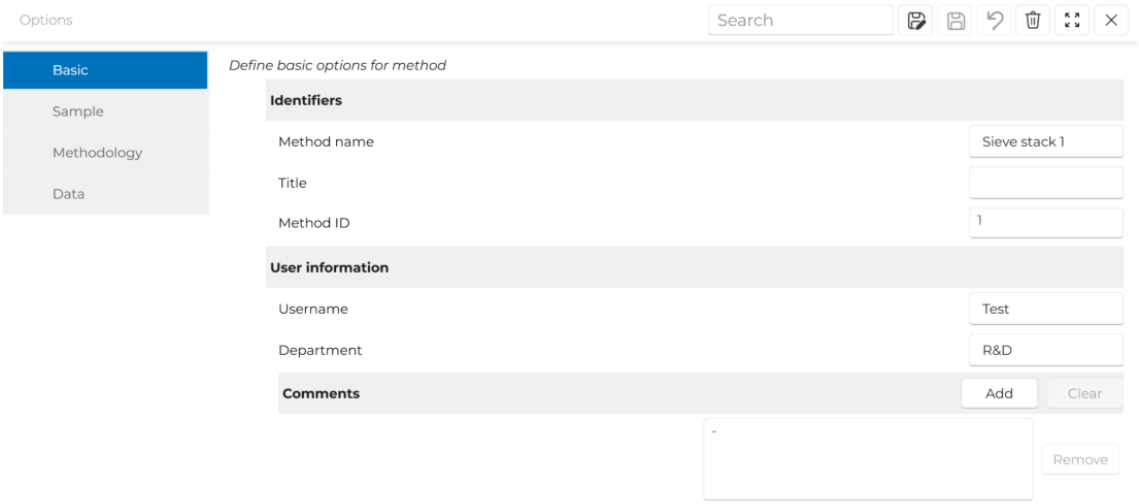


Fig. 9: Options tile of the Method workspace

5.2.1 Create and edit a method

A new method is always created based on an existing method. Select the desired method from the side menu and give the method a new name under *Method name*. In order to save the new method and list it in the side menu, click the button.
In order to edit a method, select the desired method from the side menu and change the parameters as needed. 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 . Changes can be undone by clicking the button. All unsaved data will be lost.

5.2.1.1 Category Basic

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

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

The method is listed in the side menu under *Method name*. 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.

5.2.1.2 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. It must always be greater than zero. The unit of density cannot be changed and is always given in g/cm^3.

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 for sieving machines and air jet sieving machines in the *Method process* standard.
The *Weighing assistant* helps you weigh samples so that sieves are not overloaded or underloaded. Depending on the mesh size of a sieve, maximum loading quantities for sieves are defined in accordance with DIN 66165 and ISO 2591. The minimum load quantity is based on the smallest representative subset. These values serve as the basis for verification by the wizard. The function is activated or deactivated by clicking on the slider. The wizard is only available for sieves that were created under a Retsch article number in the `Sieves` tile and are 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*.

5.2.1.3 Category Methodology

The `Methodology` category defines the procedure-specific data for the measurement and the sieves:

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

The selection for *Method process* is only visible if a device with *Device type* AS 200 jet A is selected in the Device menu of the menu bar. This setting 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. If the settings in the method do not match the values of a sieve from the *Sieves* tile, the sieve cannot be selected for this method. For more information, please see the chapter Sieves tile.
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 + button in the row of the desired sieve in the *Sieves* tile. Only sieves whose *Diameter* parameter matches the specifications for *Analytical sieve size* within the method can be added.

5.2.1.4 Category Data

In the `Data` category, in addition to the standard analysis parameters for the result, other 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.

5.2.1.5 Category Device

In the `Device` category, the device-specific data for the measurement are defined. The entries depend on the *Device type* of the device selected in the Device menu of the menu bar..
The `Device` category is only visible if a device is selected in the Device menu of the menu bar. The following table explains the function and dependencies of the parameters.

Parameters	Function	Device type
Operation mode	Select whether the connected device is controlled by the program during a measurement (online) or not controlled (offline).	AS 200 control AS 200 jet A AS 200 tap AS 300 control AS 400 control AS 450 control
Device mode (Amplitude, Acceleration)	Select between acceleration and amplitude mode of the sieving machine. Setting the height or strength of the amplitude in mm or g (gravitational acceleration).	AS 200 control AS 300 control AS 450 control Other
Interval	Switch the interval function on or off. Duration of the interval time in seconds. During sieving, the sieving machine pauses briefly after the interval time has elapsed and then continues with the set amplitude.	AS 200 control AS 300 control AS 400 control AS 450 control Other
Duration	Time of the entire sieving process	All device types
Revolutions	Number of revolutions per minute	AS 200 jet A AS 400 control Other
Pressure	Negative pressure setting for air jet sieving machines with connected automatic suction power adjustment (optional accessory)	AS 200 jet A Other
Open mesh function	Switch the open mesh function on or off. When the function is switched on, the nozzle moves forward continuously and then back halfway in order to loosen any particles that are stuck. The revolutions are set to 10 revolutions/minute.	AS 200 jet A
Custom parameters	Definition of individual parameters or information	All device types

5.2.2 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. If an existing method is edited, you must confirm that this method will be overwritten. An existing method can be saved as a copy if *Method name* has been changed. In order to do this, click on the button.

The EXAMPLE and LAST USED methods cannot be renamed and are always saved as new methods when *Method name* is changed.

5.2.3 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.
The EXAMPLE and LAST USED methods cannot be deleted because they are stored in the program by default.

5.2.4 Search and filter method parameters

The search field in the header of the tile can be used in order to search for parameters within a method. Any characters entered there search the parameter names of all categories for matches. The entered value for a parameter is not included in the search! Each match filters the display of categories and parameters. If no match is found, the tile remains empty.

5.3 Sieves tile

The sieves that can be used in the methods are created and managed in the *Sieves* tile. All created sieves are listed in tabular form. Only some of the parameters that define a sieve are visible in the list view. When the program is started for the first time, the list is empty.

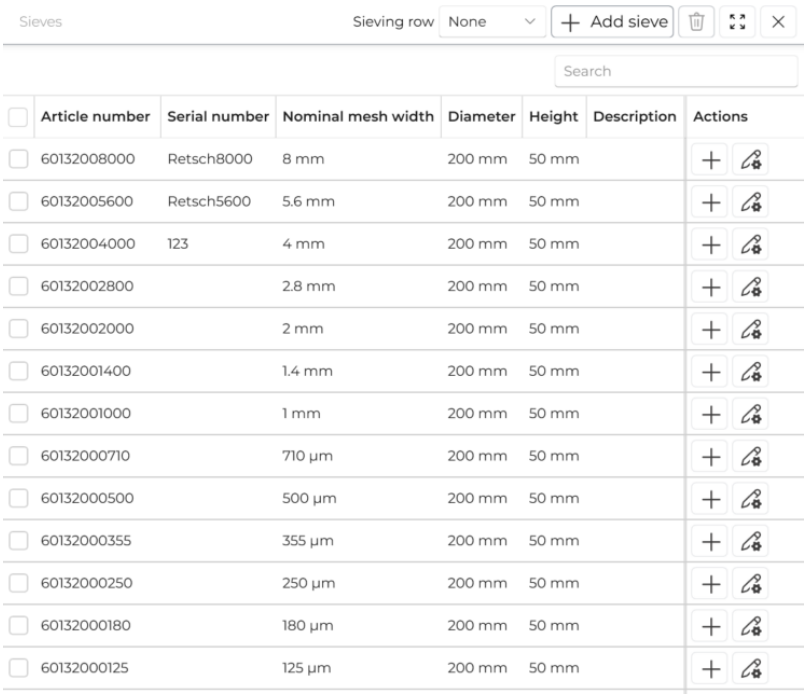


Fig. 10: Sieves tile in the Method workspace

5.3.1 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 are marked with a . In order to edit the parameters of an existing sieve, click the button in the row of the corresponding sieve. A sieve contains information that is necessary for performing a measurement, calculating and displaying the result. Each sieve contains the parameters listed below:

- Article number
- Serial number
- Nominal mesh width

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

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 *Diameter* or *Analytical sieve size* influence the subsequent assignment of the sieve to Methods. For more information, please see the chapter Tile Options.
The parameter *Weight* can be maintained manually or with the weight value from a connected balance. The scale can be tared with the button before placing the sieve on it. In order to accept the weighing value, confirm with the button.

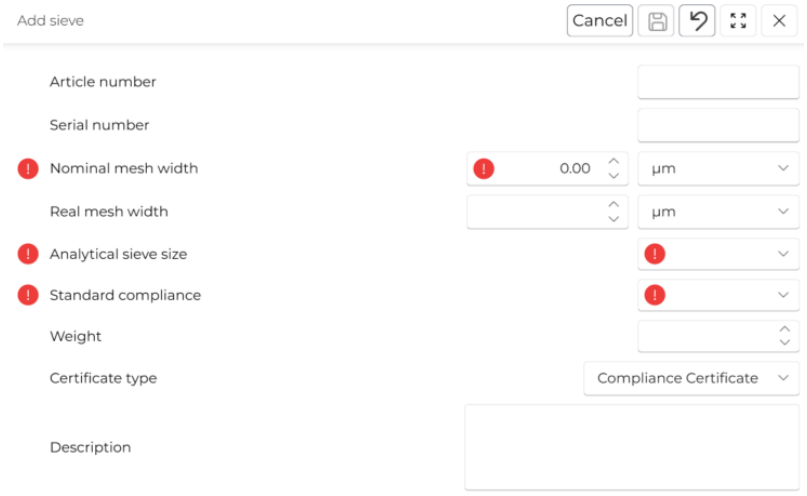


Fig. 11: Create a sieve

5.3.2 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.

5.3.3 Sieving row menu

All created sieves are displayed by default in the *Sieves* tile. The *Sieving row* menu can be used as a filter function for the display within the tile and contains the common sieve rows. If a sieve row is selected, only the sieves belonging to this sieve row are displayed. The filter can be deactivated by selecting the entry *None*.

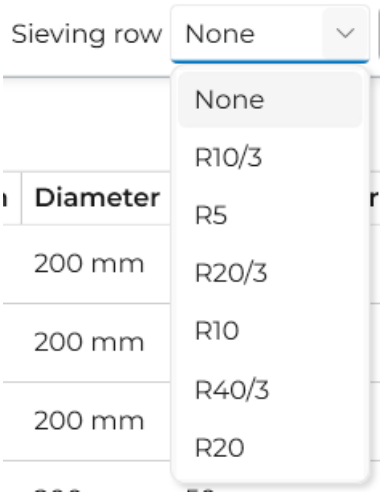


Fig. 12: Sieving row menu

5.3.4 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. Deleting a sieve that is assigned to a method has no effect on the method, and the sieve remains there
.Alternatively, a sieve can also be deleted while it is open for editing.

5.3.5 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 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, move the mouse pointer over the column header and click the button that appears. 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 remains permanently displayed. 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 tile. There, filters can be activated, deactivated and deleted either individually or completely.

5.4 Reference curve tile

The *Reference curve* tile is used to create and manage reference curves, also known as comparison curves. Reference curves can be displayed in the Chart tile of the Comparison workspace for analysis purposes. It is possible to display one or more reference curves, for example, for use as minimum and maximum limit curves. For more information on displaying

reference curves, please see the chapter Chart tile.
All created reference curves are listed in tabular form. Only some of the parameters that define a reference curve are visible in the list view. When the program is started for the first time, the list is empty.

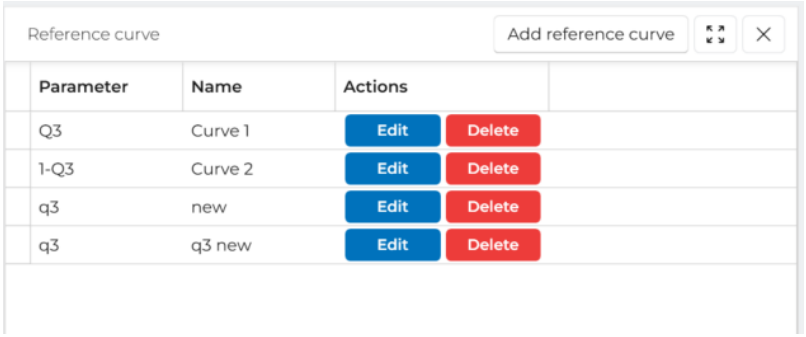


Fig. 13: Tile Reference curve of the Method workspace

5.4.1 Creating and editing reference curves

In order to create a new reference curve, click on the `+ Add reference curve`button. To fully define a reference curve, at least the mandatory fields must be filled in. Mandatory fields are marked with a . In order to edit the parameters of an existing reference curve, click on the `Edit` button in the row of the corresponding reference curve. Each reference curve contains the parameters listed below:

- Name
- Unit
- Secondary axis
- Data points

The *Name* is unique and can only be assigned once. If a name that has already been assigned is entered for another reference curve, the entry will not be accepted and the reference curve cannot be saved.
The setting for *Secondary axis* determines the type of parameter for which a reference curve is defined. The reference curve is only visible in the diagram if the setting of the parameter for the reference curve matches the display setting of the diagram for the selection of the left Y-axis.
The individual data sets that define the reference curve in the diagram are entered under *Data points*. Each data set corresponds to a row, with the left input field defining the particle size (x-axis) and the right input field defining the value of the selected parameter (y-axis). 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.

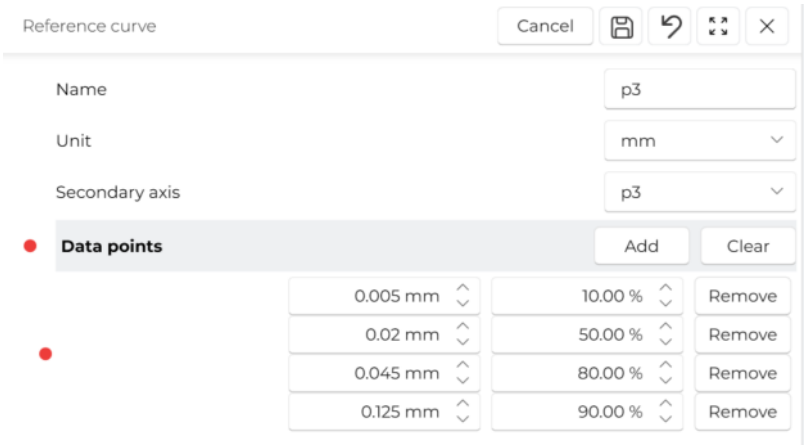


Fig. 14: Create reference curve

5.4.2 Save reference curve

A reference curve can only be saved if the mandatory fields have been filled in correctly. Confirm the save by clicking on the button.

5.4.3 Delete reference curve

In order to delete an existing reference curve, click the `Delete` button in the row of the selected reference curve. When a reference curve is deleted, it is no longer available in the *Chart* tile of the `Comparison` workspace.
Alternatively, a reference curve can also be deleted while it is open for editing.

6 Measurement workspace

Measurements are performed in the `Measurement` workspace. It contains the following tiles:

- Measure
- Table
- Chart

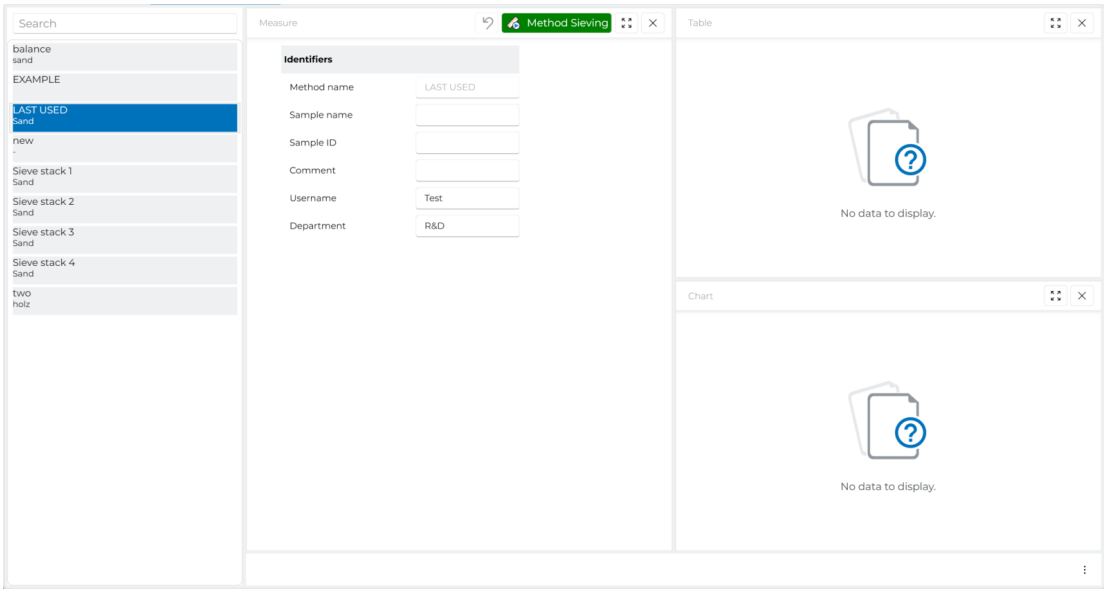


Fig. 15: Overview of the Measurement workspace

The measurement is started with the currently selected method in the *Measure* tile.
The *Table* tile displays a preview of the results of the last measurement in tabular form.
The *Chart* tile displays a preview of the results of the last measurement in graphical form.
The side menu contains a list of the methods that have been created.

6.1 Side menu

The created methods are listed in the side menu. The currently selected method is highlighted in blue, and its parameters can be edited in the *Options* tile.

The EXAMPLE and LAST USED methods are included in the program by default and cannot be deleted. EXAMPLE contains a predefined set of parameters. LAST USED always contains the parameter definitions of the method which was last used for a measurement.

In order to search for a specific method, use the search field in the menu header. Entering characters there will search the list for any matches. Only the method name and sample designation, which are used to display the methods, are considered in the search. All other parameters are ignored in the search. If no match is found, the list remains empty.

6.2 Measure tile

Measurements are started and performed in the `Measure` tile. In order to start a measurement, a fully defined method must be selected. The sieving process follows a fixed sequence of steps, through which the user is automatically guided (Guided Sieving). Typical parameters for particle characterization 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.

In order to perform a measurement, proceed as follows:

→ Select the method to be used for the measurement from the list in the side menu. The selected method is highlighted in blue.
TIPS & TRICKS: If no method or the desired method is not available, create a new method or edit an existing method. For more information, see the chapter Tile Options.

→ In order to start the measurement, click the `Method Sieving` button in the header of the tile. The tile name changes from *Measure* to *Method Sieving*, indicating that a measurement is in progress.
TIPS & TRICKS: If the selected method is not fully defined, for example because no sieve has been assigned, the button for starting the measurement is not visible.

→ The guided measuring (Guided Sieving) starts. Follow the instructions within the tile. Click the `Next` button in order to navigate through the Guided Sieving process. The measurement can be canceled at any time by clicking the `Cancel` button.

→ The measurement is completed by clicking the `Close` button. The tile name changes back to *Measure* and the next measurement can be started. Upon successful completion of Guided Sieving, an excerpt of the results is displayed in the *Table* and *Chart* tiles of the workspace. Detailed results can be viewed in the `Results` and/or `Comparison` workspaces.

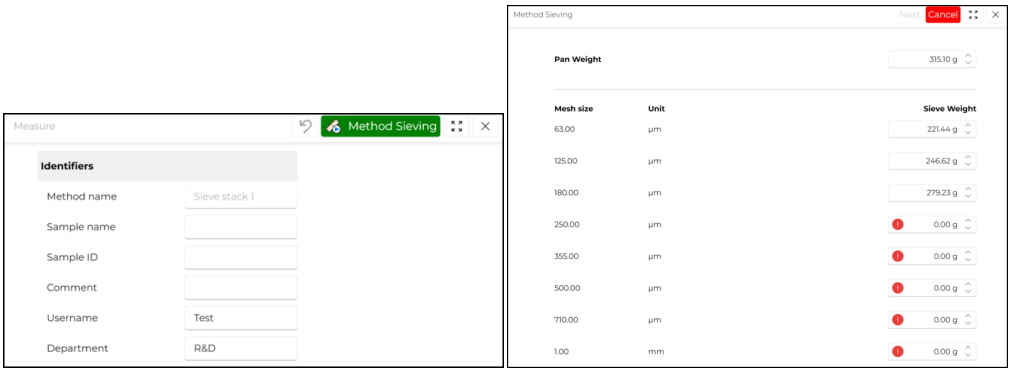


Fig. 16: Entering measurement-specific data (left), weighing the sieves (right)

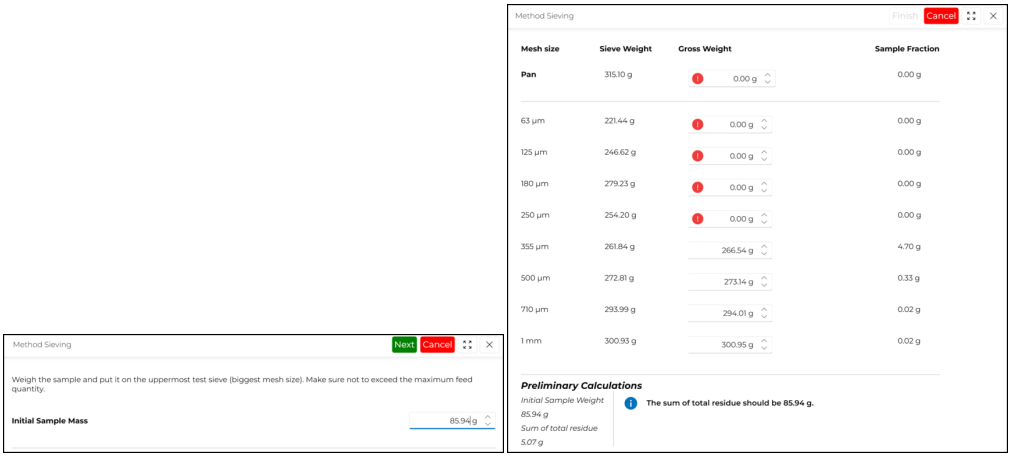


Fig. 17: Weighing the sample (left), reweighing the sample (right)

6.3 Chart tile

The `Chart` tile displays selected distribution-specific parameters from the last measurement in graphical form. The display of the chart cannot be customized and serves only as initial information after a measurement has been performed. The contents of the tile are reset each time the program is restarted. If no measurement has been performed after restarting, no data is displayed in the tile.

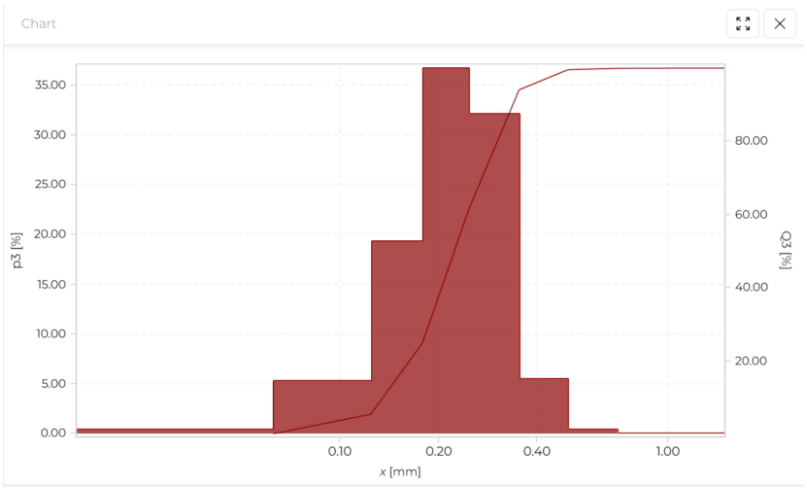


Fig. 18: Chart tile Workspace Measurement

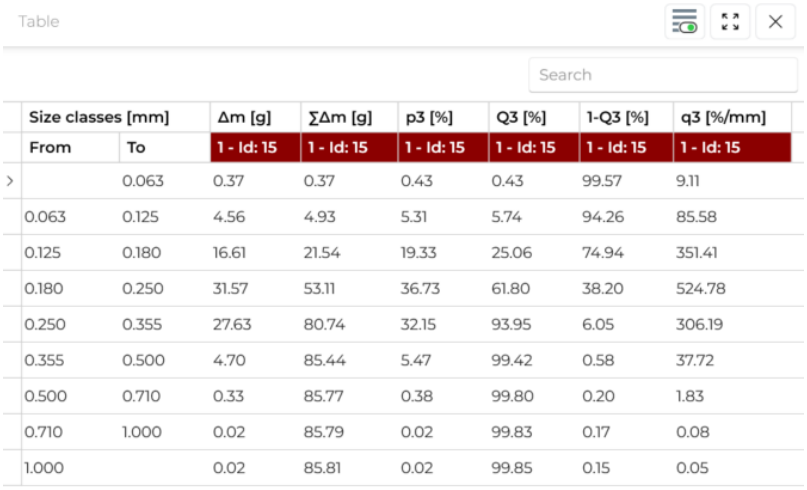
The X-axis shows the particle size. The Y-axis shows the fraction p_3 on the left and the total distribution Q_3on the right.

6.4 Table tile

The `Table` tile displays an excerpt of the distribution-specific parameters of the result of the last measurement performed in tabular form. The table display cannot be customized and serves only as initial information after a measurement has been performed. The contents of the tile are reset

each time the program is restarted. If no measurement has been performed after restarting, no data is displayed in the tile.

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



Size classes [mm]		Δm [g]	∑Δm [g]	p3 [%]	Q3 [%]	1-Q3 [%]	q3 [%/mm]
From	To	1 - Id: 15	1 - Id: 15	1 - Id: 15	1 - Id: 15	1 - Id: 15	1 - Id: 15
	0.063	0.37	0.37	0.43	0.43	99.57	9.11
0.063	0.125	4.56	4.93	5.31	5.74	94.26	85.58
0.125	0.180	16.61	21.54	19.33	25.06	74.94	351.41
0.180	0.250	31.57	53.11	36.73	61.80	38.20	524.78
0.250	0.355	27.63	80.74	32.15	93.95	6.05	306.19
0.355	0.500	4.70	85.44	5.47	99.42	0.58	37.72
0.500	0.710	0.33	85.77	0.38	99.80	0.20	1.83
0.710	1.000	0.02	85.79	0.02	99.83	0.17	0.08
1.000		0.02	85.81	0.02	99.85	0.15	0.05

Fig. 19: Table tile of the Measurement workspace

7 Results workspace

This workspace displays the results of measurements which were last performed in workspace `Measurement`. The title of the workspace displays the name of the database in which the results of the measurements are stored. The `Results` workspace contains the following tiles:

- Table
- Chart
- Overview

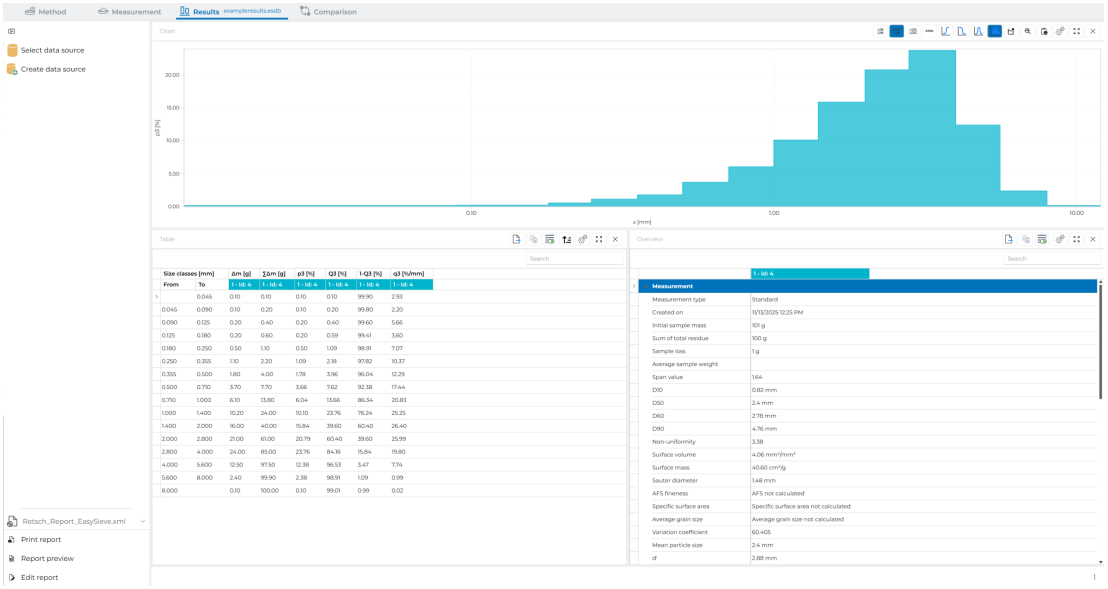


Fig. 20: Overview of the Results workspace

The *Table* tile displays the result of the last measurement performed in tabular form.
The *Chart* tile displays the result of the last measurement performed in graphical form.
The *Overview* tile displays the defined parameters and the calculated parameters of the last measurement performed.
The databases and report templates are managed in the side menu.

7.1 Side menu

The databases and report templates are managed in the side menu. Each completed measurement is saved in the database and can be viewed later. The report template allows the export of a measurement in PDF format.

The currently used database is displayed in the workspace title. A default database (default.esdb) is installed when the program is started for the first time. This database can be accessed by any logged-in Windows user. Additional databases can be created and used.
In order to create a new database, click the `Create data source` button. Windows Explorer will open. Select the location and name for the new database, then confirm. The created database will automatically be set as the new storage location for newly generated results. This is indicated by the database name in the workspace title.
In order to switch between databases, click the `Select data source` button. Windows

Explorer will open. Select the desired database and confirm. The name of the selected database will be displayed in the workspace title. Please note that this function can only be executed if a database has been created or made available beforehand.
NOTICE: If additional databases are created besides default.esdb for use by multiple Windows users, a location must be chosen for which all Windows users have the necessary permissions.

All functions related to the report template for a measurement are available at the bottom of the menu:

- Selected report template
- Print report
- Report preview
- Edit report

7.1.1 Select report template

A default report template (Retsch_Report_EasySieve.xml) is used when the program is started for the first time. All PDF outputs of results are configured based on the template selected in this area. In order to select a different template, click the down arrow. The report template selection menu opens and lists all available templates. This list is based on all templates stored under C:\Program Files (x86)\Retsch\EasySieve Pro\ReportTemplates.
If the desired report template is not available, a new report template must be created or an existing one edited. For more information, please see the chapter Creating and Editing of Report Templates.

7.1.2 Print report

Results can be exported from the program in PDF format by using the report function.
In order to print a report, click the `Print report` button. The print dialog opens and allows you to configure further settings for the report output. From this menu, you can export the report as a PDF file by using Microsoft Print to PDF or send it to a printer.
NOTICE: The printers displayed in this menu depend on the configuration of the computer on which the program is installed. If the desired printer is not available, it must be configured by your local IT department.
In order to preview a report for a measurement, click the `Report preview` button. The preview dialog will open and display the report. Print options are also available in this dialog.
TIPS & TRICKS: If no result is selected in the *Available Results* tile, the `Print report`, `Report preview` and `Edit report` buttons will be grayed out and cannot be selected.

7.1.3 Create and edit report templates

In order to edit an existing report template or create a new one, click the `Edit report` button. The report template editing dialog will open. The currently selected report template in the drop-down menu will be edited automatically.

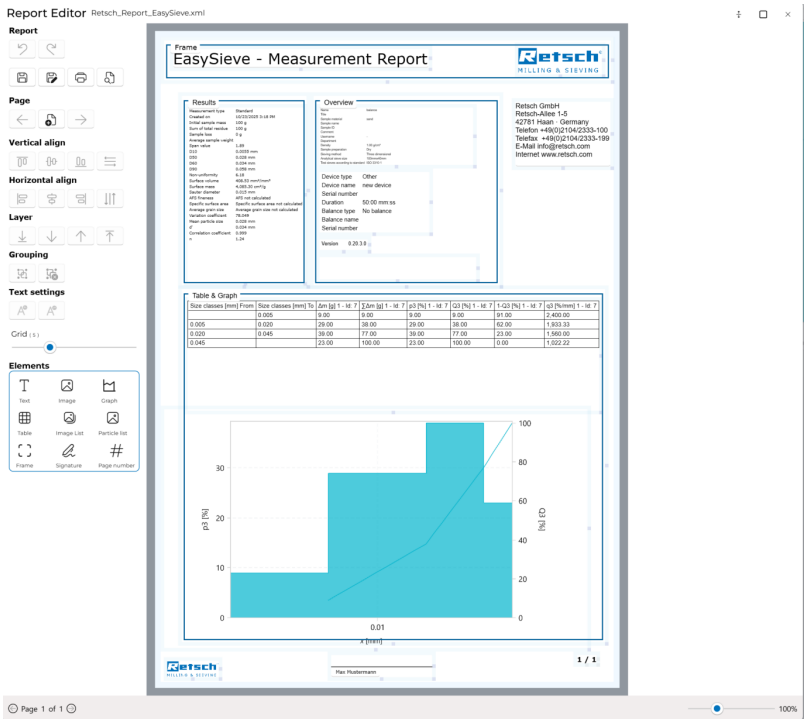


Fig. 21: Report Editing Dialog

The editing dialog provides various functions on the left side for editing the open report template:

- Report
- Page
- Vertical align
- Horizontal align
- Layer
- Grouping
- Text settings
- Grid
- Elements
  - Text
  - Image
  - Graph
  - Table
  - Image list
  - Particle list
  - Frame
  - Signature
  - Page number

In order to use the functions which relate to the report template's content, at least one element must be inserted and selected. Depending on the selected function, additional information and settings will be displayed on the right.

The name of the report template currently being edited is listed in the dialog's header.
In the report *Report* workspace, changes can be undone and reapplied using the arrow keys.

Changes can be saved to the open template or as a new template. Please note that the report template must be saved under C:\Program Files (x86)\Retsch\EasySieve Pro\ReportTemplates to be available in the selection menu (chapter Select report template). The print dialog or print preview can also be opened.
In the *Page* workspace, another page can be added to the report template. Use the arrow keys to switch between pages and select a page for editing.
In the *Vertical align* workspace, selected elements of a report page can be aligned vertically. These functions are only available when at least two or three elements are selected. Click the first element, hold down the Ctrl key, and click additional elements.
In the *Horizontal align* workspace, selected elements of a report page can be aligned horizontally. These functions are only available when at least two or three elements are selected. Click the first element, hold down the Ctrl key, and click additional elements.
In the *Layer* workspace, the assignment of selected elements to different layers can be configured.
In the *Grouping* workspace, selected elements can be grouped or removed from a group. These functions are only available when at least two elements are selected. Click the first element, hold down the Ctrl key, and click additional elements.
In the *Text settings* workspace, the formatting of a text element can be copied and applied to another element.
In the *Grid* workspace, the grid spacing is set, which is applied when moving and resizing elements.
In the *Elements* workspace, all elements that can be part of the report template are available. In order to insert an element into the report template, click the element type and then click anywhere within the template. In order to edit the element, click it and define it using the settings on the right side of the dialog box.

7.2 Chart tile

The `Chart` tile displays the distribution-specific parameters of the result of the last measurement performed in graphical form. The content of the tile is updated with each subsequent measurement and reset when the program is restarted. If no measurement has been performed after restarting, no data is displayed in the tile.

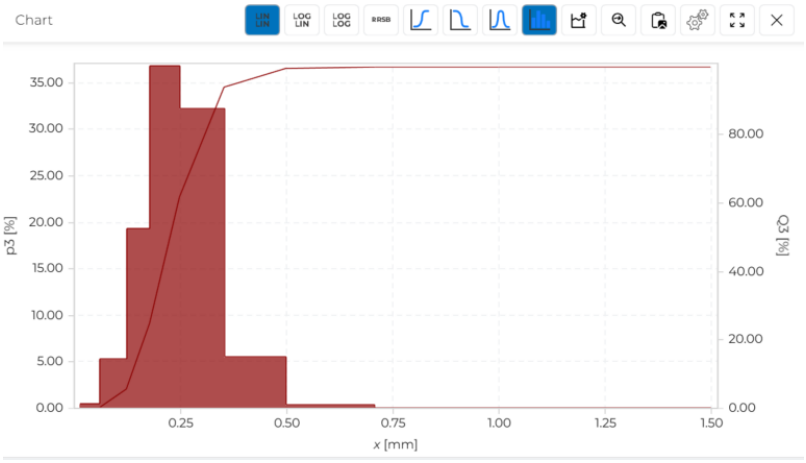


Fig. 22: Chart tile of the Results workspace

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 customize 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 in and out within the chart by turning the wheel on your computer mouse en. 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.

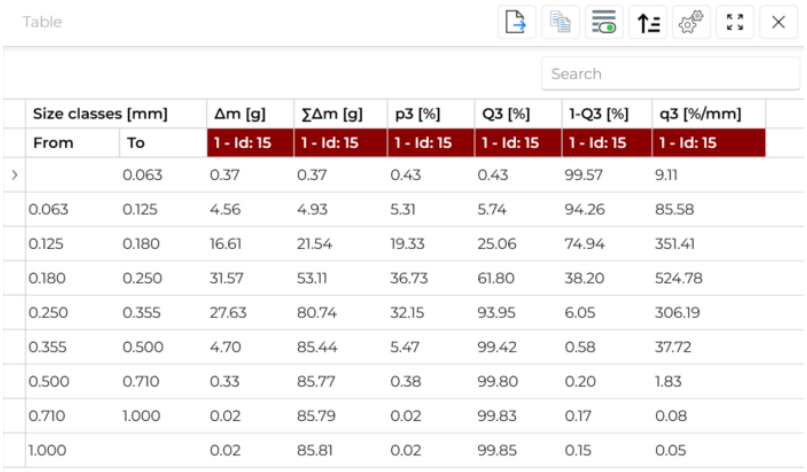
Further settings can be made by clicking on the button, which opens the *Chart Settings* menu. Under *Input reference fields* comparison curves previously created in the `Method` workspace, tile *Reference curve* can be displayed. Each comparison curve created is listed as a row with its name. In order to activate the display of a comparison curve, click on the slider. If there are no comparison curves to choose from, they must be created. For more information, see the chapter Reference curve tile.
Under *Secondary axis*, the Y-axis on the right side of the diagram can be configured independently of the settings on the left side. In order to do this, activate the slider and select the data display under *Distribution Type*. If no limitations are set under *Characteristics range*, the axis scaling is always 100 percent..
Under *Characteristics range* the axis scaling can be adjusted individually 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`.

7.3 Table tile

The `Table` tile displays the distribution-specific parameters of the last measurement in tabular form. The content of the tile is updated with each subsequent measurement and reset when the program is restarted. If no measurement has been performed after restarting, no data is displayed in the tile. Each row of the table represents a size class. Each column of the table represents a parameter under which the result is entered:

- Fraction mass
- Cumulative mass
- Fraction p_3
- Total distribution Q_3
- Residual distribution 1-Q_3
- Density q_3



Size classes [mm]		Δm [g]	∑Δm [g]	p3 [%]	Q3 [%]	1-Q3 [%]	q3 [%/mm]
From	To	1 - Id: 15	1 - Id: 15	1 - Id: 15	1 - Id: 15	1 - Id: 15	1 - Id: 15
	0.063	0.37	0.37	0.43	0.43	99.57	9.11
0.063	0.125	4.56	4.93	5.31	5.74	94.26	85.58
0.125	0.180	16.61	21.54	19.33	25.06	74.94	351.41
0.180	0.250	31.57	53.11	36.73	61.80	38.20	524.78
0.250	0.355	27.63	80.74	32.15	93.95	6.05	306.19
0.355	0.500	4.70	85.44	5.47	99.42	0.58	37.72
0.500	0.710	0.33	85.77	0.38	99.80	0.20	1.83
0.710	1.000	0.02	85.79	0.02	99.83	0.17	0.08
1.000		0.02	85.81	0.02	99.85	0.15	0.05

Fig. 23: Table tile of the Results workspace

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 colored 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. Clicking the button reverses the order of the size classes and the button changes to. In order to deselect, click the button again.

Further settings can be made by clicking on the

, button, 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.

7.4 Overview tile

The `Overview` tile lists all parameters defined in the `Method` workspace and the calculated parameters from the last measurement performed. Each row in the table represents one parameter that documents the result:

- Measurement
  - Measurement type
  - Created on
  - Initial sample mass
  - Sum of total residue
  - Sample loss
  - 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
  - Device name
  - Serial number
  - Balance type
  - Balance name
  - Serial number
- Method

- Name
- Title
- Sample material
- Sample name
- Sample ID
- Comment
- Username
- Department
- Density
- Sample preparation
- Sieving method
- Analytical sieve size
- Test sieves according to standard

◦ Software
- Version

◦ Measurement warnings

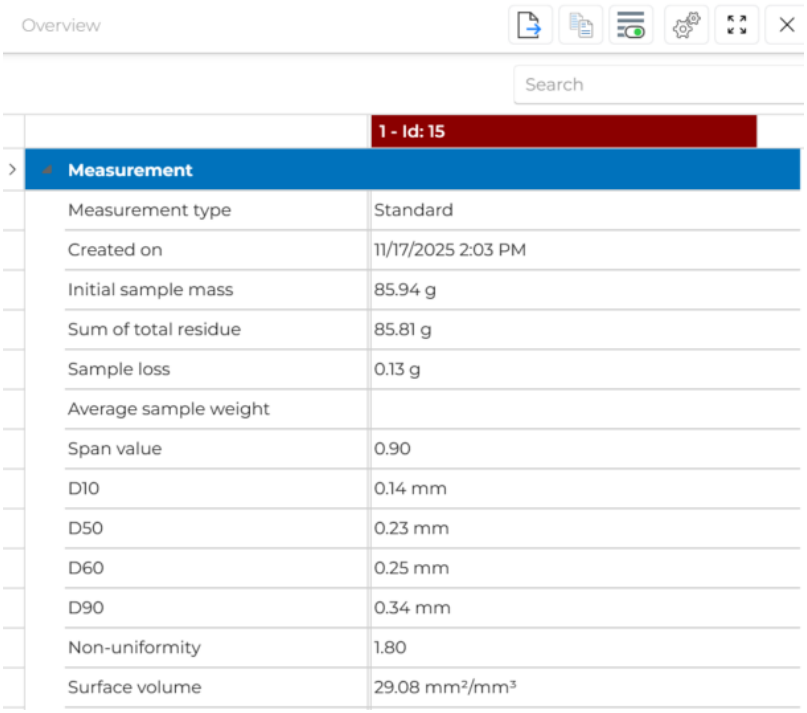


Fig. 24: Tile Overview of the Results workspace

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 colored by clicking on the button. The button changes to. To deselect, click on the button again.
Further settings can be configured by clicking on the button, which opens the *Overview Settings* menu. Here, individual rows can be switched on (visible) or off (not visible) by clicking on

the slider.

TIPS & TRICKS: The display of the table rows may vary depending on the settings you have selected and the measurement you have performed. For example, the *Measurement warnings* area is only displayed if there have been warnings relating to the measurement.

8 Comparison workspace

This workspace displays the results of measurements performed in the `Measurement` workspace. The workspace contains five tiles that can be used to view and analyze the results:

- Selected results
- Chart
- Table
- Overview
- Trend

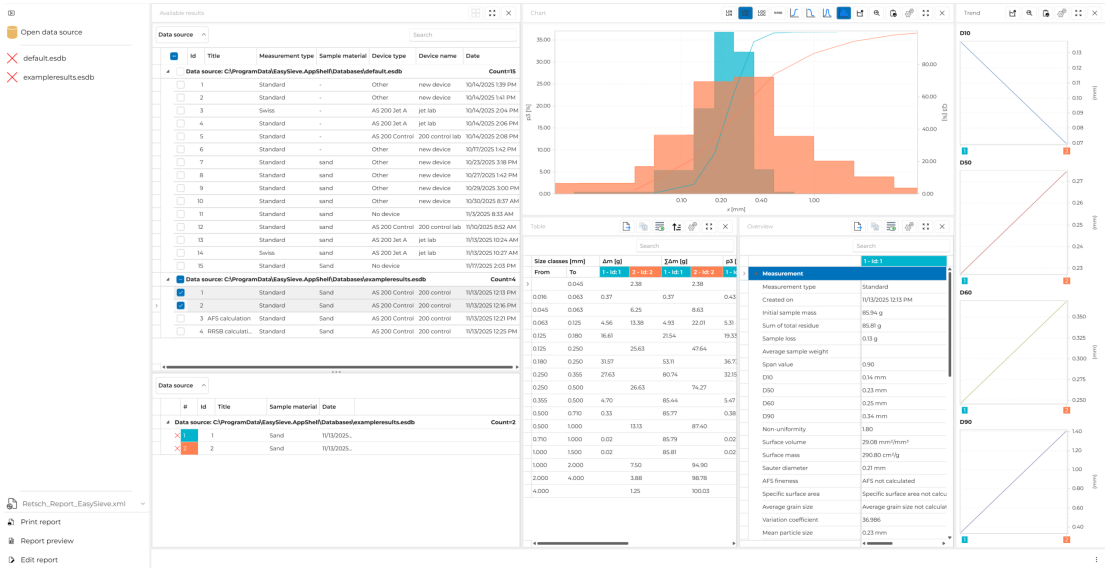


Fig. 25: Workspace overview Comparison

The *Available Results* tile lists the results of the measurements performed and can be selected individually for a more detailed view.
The *Chart* tile displays the result of the last measurement performed in graphical form.
The *Table* tile displays the result of the last measurement performed in tabular form.
The *Overview* tile displays the defined parameters and the calculated parameters of the last measurement performed.
In the *Trend* tile, selected distribution-specific parameters of results can be recalculated and analyzed.
The databases and report templates are managed in the side menu.

8.1 Side menu

The selection of the databases and the report templates is managed in the side menu. Selecting a database allows you to view all measurement results stored within it. The report template allows the export of one or more measurements in PDF format.

The currently used database is listed by its name in the side menu. The database content is displayed in the *Available Results* tile along with its location.
In order to select another database, click the `Open data source` button. Windows Explorer will

open. Select the desired database and confirm. The selected database is displayed in the side menu and in the *Available Results* tile.

In order to undo the selection of a database, click the button ✕ in the side menu next to the name of the desired database.

NOTICE: If additional databases are created besides default.esdb for use by multiple Windows users, a location must be chosen for which all Windows users have the necessary permissions.

All functions related to the report template for a measurement are available in the lower section of the menu. Their use is identical to the functions described in the `Results`workspace, chapter Side menu .

The export is applied to all results selected in the *Available Results* tile when the functions are executed. This makes it possible to export one or more results simultaneously. For more information, please see the chapter Available Results.

8.2 Available results tile

The `Available results` tile lists the selected databases with their contents, as well as the results selected for display in tabular form.

In the upper area of the tile, each database is displayed with its own subheading, indicating its storage location and the number of results. This display can be reduced to the header line only. In order to do this, click on the small arrow at the beginning of the line. Each result within a database is represented by a row in the table.

The results selected for display in the upper area are displayed in a list in the lower area of the tile. As long as no results are selected, the list remains empty.

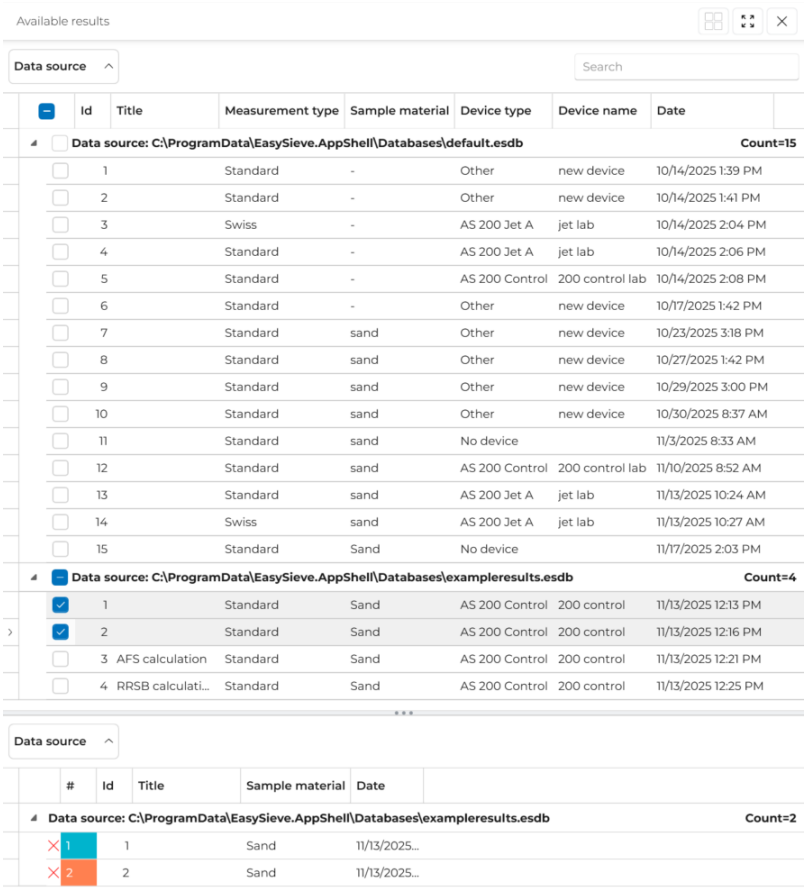


Fig. 26: Available results tile in the Comparison workspace

In order to select a result for display, click the button in the row of the desired result. Clicking the button again will deselect the result. By selecting multiple rows, more than one result can be displayed at the same time. This allows you to compare two or more results (up to 32).
In order to remove results from the list of selected results, click the button in the row of the desired 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, move the mouse pointer over the column header and click the button that appears. 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 remains permanently displayed. 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.

8.3 Chart tile

The `Chart` tile displays the distribution-specific parameters of the results of measurements performed in graphical form. The display is only active if at least one result is selected for display in the `Available Results` tile. The color of the entries in the diagram corresponds to the assigned color in the list in the lower area of the `Available Results` tile. When two or more results are displayed, overlaps may occur in the diagram.

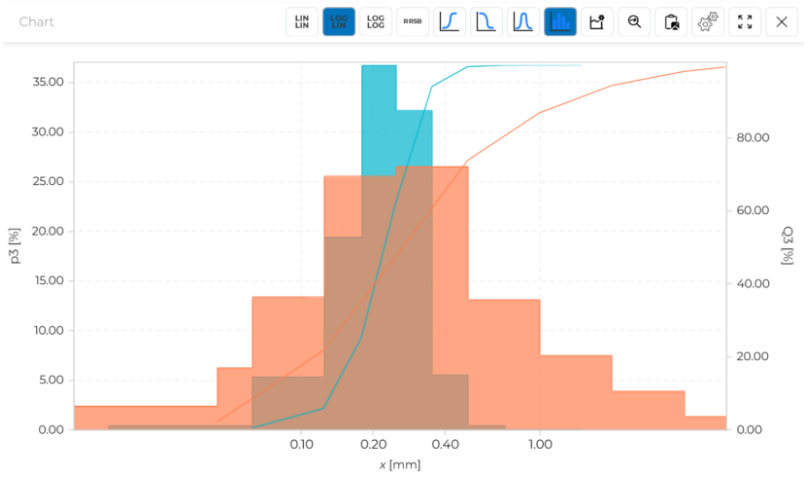


Fig. 27: Chart tile of the Comparison workspace

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 customize 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 in and out within the chart by turning the wheel on your computer mouse en. 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 the button, which opens the *Chart Settings* menu. Under *Input reference fields* comparison curves previously created in the `Method` workspace, tile *Reference curve* can be displayed. Each comparison curve created is listed as a row with its name. In order to activate the display of a comparison curve, click on the slider. The reference curve is only visible in the diagram if the setting of the parameter for the reference curve matches the display setting of the diagram for the selection of the left Y-axis. If there are no suitable comparison curves to choose from, new ones must be created or existing ones edited. If changes are made to a reference curve that is currently displayed in the diagram, the reference curve must be redisplayed. For more information, see the chapter Reference curve tile.
Under *Secondary axis*, the Y-axis on the right side of the diagram can be configured independently of the settings on the left side. In order to do this, activate the slider and select the data display under *Distribution Type*. If no limitations are set under *Characteristics range*, the axis scaling is always 100 percent..
Under *Characteristics range* the axis scaling can be adjusted individually for the four parameters q_3, Q_3, 1-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`.

8.4 Table tile

The `Table` tile displays the distribution-specific parameters of the results from performed measurements in tabular form. The display is only active if at least one result is selected for display in the `Available Results` tile. The ID and color code of each result correspond to the assigned color in the list at the bottom of the `Available 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-Q_3
- Density q_3

Table

Search

Size classes [mm]		Δm [g]		∑Δm [g]		p3 [%]		Q3 [%]		1-Q3 [%]		q3 [%/mm]	
From	To	1 - Id: 1	2 - Id: 2	1 - Id: 1	2 - Id: 2	1 - Id: 1	2 - Id: 2	1 - Id: 1	2 - Id: 2	1 - Id: 1	2 - Id: 2	1 - Id: 1	2 - Id: 2
	0.045		2.38		2.38		2.37		2.37		97.63		70.17
0.016	0.063	0.37		0.37		0.43		0.43		99.57		9.11	
0.045	0.063		6.25		8.63		6.22		8.59		91.41		345.49
0.063	0.125	4.56	13.38	4.93	22.01	5.31	13.31	5.74	21.90	94.26	78.10	85.58	214.73
0.125	0.180	16.61		21.54		19.33		25.06		74.94		351.41	
0.125	0.250		25.63		47.64		25.50		47.40		52.60		204.02
0.180	0.250	31.57		53.11		36.73		61.80		38.20		524.78	
0.250	0.355	27.63		80.74		32.15		93.95		6.05		306.19	
0.250	0.500		26.63		74.27		26.50		73.90		26.10		105.99
0.355	0.500	4.70		85.44		5.47		99.42		0.58		37.72	
0.500	0.710	0.33		85.77		0.38		99.80		0.20		1.83	
0.500	1.000		13.13		87.40		13.06		86.97		13.03		26.13
0.710	1.000	0.02		85.79		0.02		99.83		0.17		0.08	
1.000	1.500	0.02		85.81		0.02		99.85		0.15		0.05	
1.000	2.000		7.50		94.90		7.46		94.43		5.57		7.46
2.000	4.000		3.88		98.78		3.86		98.29		1.71		1.93
4.000			1.25		100.03		1.24		99.53		0.47		0.62

Fig. 28: Table tile of the Comparison workspace

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 colored 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. Clicking the button reverses the order of the size classes and the button changes to. In order to deselect, click the button again.

Further settings can be made by clicking on the , button, 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.

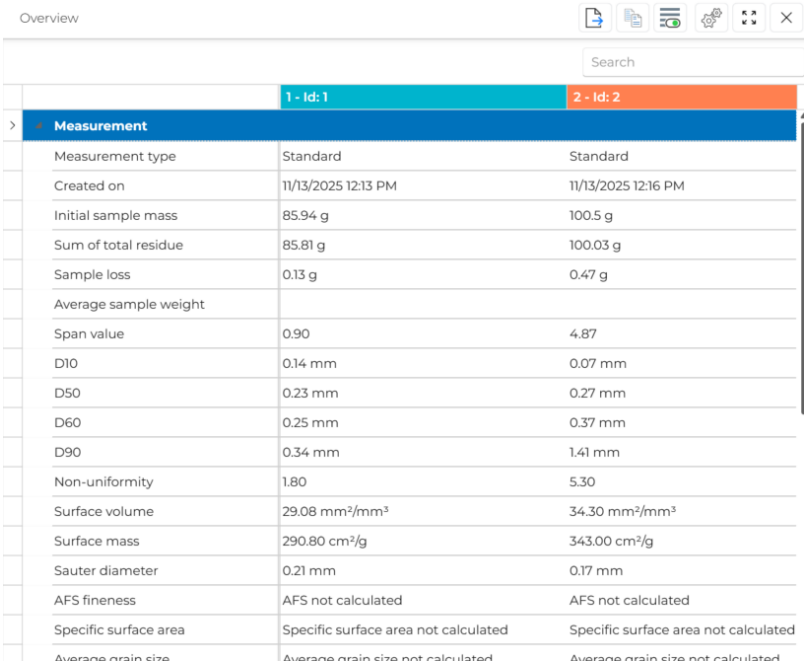
The search field can be used to search for data within the table. Characters, which are entered there, search all columns of the table for matches. Hidden columns are not included in the search! Each match filters the display of the rows. If no match is found, the table remains empty.

8.5 Overview tile

The `Overview` tile lists all parameters defined in the `Method` workspace and the calculated parameters of the results of measurements performed. Each row in the table represents one parameter that documents the result:

- Measurement
  - Measurement type
  - Created on
  - Initial sample mass
  - Sum of total residue
  - Sample loss
  - 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
  - Device name
  - Serial number
  - Balance type
  - Balance name
  - Serial number
- Method
  - Name
  - Title
  - Sample material
  - Sample name
  - Sample ID
  - Comment
  - Username
  - Department
  - Density
  - Sample preparation
  - Sieving method
  - Analytical sieve size
  - Test sieves according to standard

- Software
  - Version
- Measurement warnings



	1 - Id: 1	2 - Id: 2
Measurement		
Measurement type	Standard	Standard
Created on	11/13/2025 12:13 PM	11/13/2025 12:16 PM
Initial sample mass	85.94 g	100.5 g
Sum of total residue	85.81 g	100.03 g
Sample loss	0.13 g	0.47 g
Average sample weight		
Span value	0.90	4.87
D10	0.14 mm	0.07 mm
D50	0.23 mm	0.27 mm
D60	0.25 mm	0.37 mm
D90	0.34 mm	1.41 mm
Non-uniformity	1.80	5.30
Surface volume	29.08 mm^2/mm^3	34.30 mm^2/mm^3
Surface mass	290.80 cm^2/g	343.00 cm^2/g
Sauter diameter	0.21 mm	0.17 mm
AFS fineness	AFS not calculated	AFS not calculated
Specific surface area	Specific surface area not calculated	Specific surface area not calculated
Average grain size	Average grain size not calculated	Average grain size not calculated

Fig. 29: Overview tile of the Comparison workspace

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 colored by clicking on the button. The button changes to . To deselect, click on the button again.
Further settings can be configured by clicking on the button, which opens the *Overview Settings* menu. Here, individual rows can be switched on (visible) or off (not visible) by clicking on the slider.
TIPS & TRICKS: The display of the table rows may vary depending on the settings you have selected and the measurement you have performed. For example, the *Measurement warnings* area is only displayed if there have been warnings relating to the measurement.

8.6 Trend tile

In the `Trend` tile, selected distribution-specific parameters of results can be recalculated and analyzed. The particle size, the sum distribution and the fraction are available for selection. The display is only active if at least one result is selected in the *Available Results* tile and a parameter has been activated in the tile's settings.. The color of the entries in the chart corresponds to the assigned color in the *Available Results* tile. When two or more results are displayed, overlaps may occur in the diagram.

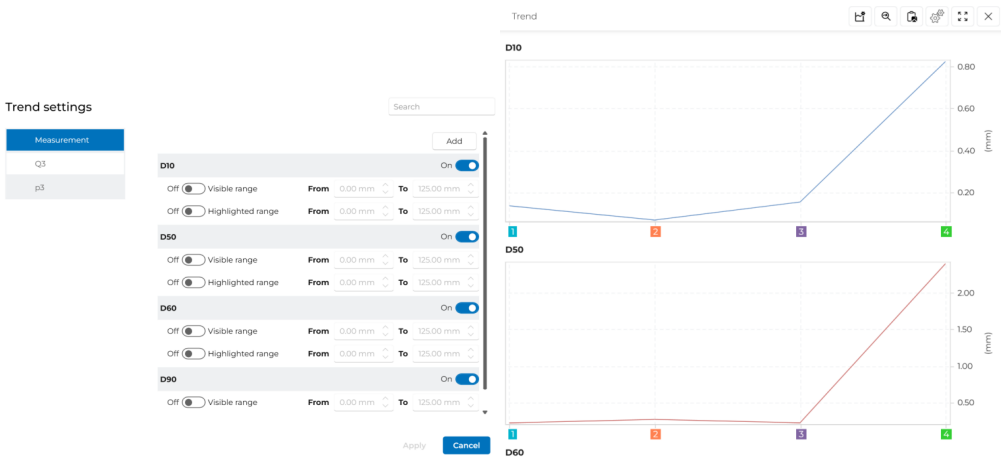


Fig. 30: Definition of parameters and example trend analysis

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 in and out within the chart by turning the wheel on your computer mouse en. 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 x(Q_3)
- Total distribution Q_3
- Fraction p_3

In the `Measurement` tile, the x(Q_3) value, i.e., the particle size relative to a specific value in the cumulative distribution, is defined. The values D10, D50, D60 and D90 (x(10%), x(50%), x(60%) and x(90%), i.e. the maximum particle size of 10%, 50%, 60% and 90% of the sample) 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.

9 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.

9.1 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

9.2 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 $q_3\,(x_{i-1}, x_i) = \frac{p_3(x_{i-1}, x_i)}{(x_i - x_{i-1})}$

9.3 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 $Q_3\,(x_d) = \sum_{k=1}^{x_{i-1}} p_3\,(k) + q_3\,(x_{i-1}, x_i) \times (x_d - x_{i-1})$
Sieve loss	Sample material loss: Sample material can be lost during sieving (sieve transfer, leaks). The absolute sieve loss $m_V = m_{S0} - m_S$ is related to the sample weight to determine the relative sieve loss $p_l = \frac{m_V}{m_{S0}}$
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 % of all particles (by volume) in the sample are smaller than or equal to the D_{50} value. Particle size is referred to as the median or average diameter and is often also represented as x_{50}. D_{90}: 90 % of all particles (by volume) in the sample are smaller than or equal to the D_{90} value. 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 $SPAN = \frac{(D_{90} - D_{10})}{D_{50}}$

Parameter	Description
U	Inequality: It indicates the symmetry of the distribution. The inequality is calculated by $U = \frac{D_{60}}{D_{10}}$

9.4 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%.

9.5 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 $S_m = \frac{10 \times S_v}{\rho}$

Parameter	Description
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 $CV = \frac{D_{84} - D_{16}}{D_{50}}$
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.

10 Index

Retsch GmbH

Retsch-Allee 1-5
42781 Haan
Germany

Contact:

+49 2104 2333-512
info@retsch.com