Manual

Evaluation Software EasySieve®

Translation

Retsch®

Table of Contents

1 Notes on the Manual

Dear user,
please read the following manual referring to this programme carefully before starting any software installation and operation of the programme.

This manual is a technical guide on how to operate the programme safely and it contains all the information required for the areas specified in the table of contents. This technical documentation is a reference and instruction manual. The individual chapters are complete in themselves. Familiarity (of the respective target groups defined according to area) with the relevant chapters is a precondition for the safe and appropriate use of the programme.

This manual does not contain any repair instructions. In case of any obscurities or questions with regards to this document or the programme, as well as if errors arise or repairs are necessary, please contact your supplier or get in touch with Retsch GmbH directly.

Application-technical information relating to samples to be processed are not or only to a certain extend included.

Revision status:
This document revision 0007 refers to the manual "Evaluation Software EasySieve®". The following manual describes the software version 5.0 or newer.

1.1 Disclaimer

This document has been prepared with due care. Technical and software based modifications are reserved. No liability is assumed for data loss, personnel injury or damage to the device which results from the failure to observe the instructions and/or warnings in this document.

1.2 Copyright

1.3 Explanations of the Safety Instructions

In this document the following **signs and symbols** are being used:

ⓘ	Reference to a recommendation and/or an important information
→	Reference to a chapter, table or figure
⇨	Action instruction
| Name |	Software menu function
[Name]	Software button
⟨Name⟩	Software checkbox

In this document the following **safety instructions** warn of possible dangers and damages:

⚠ CAUTION C1.0000

Type of danger / personal injury
Source of danger

- Possible consequences if the dangers are not observed.
- **Instructions and information on how the dangers are to be avoided.**

Moderate or mild personal injuries may result from disrespecting the safety instruction for caution. There exists a medium or low risk of an accident or injury to personnel. Additionally, in continuous text or action instructions the signal word **⚠ CAUTION** is used.

NOTICE N1.0000

Type of property damage
Source of property damage

- Possible consequences if the notices are not observed.
- **Instructions and information on how the property damages are to be avoided.**

Property damages may result from disrespecting the notice. However, there exists no risk of an injury to personnel. Additionally, in continuous text or action instructions the signal word ***NOTICE*** is used.

1.4 General Safety Instructions

Target group:
All persons concerned with this programme in any form.

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

Safety manager:
The managing operator himself must ensure that the people entrusted with this programme…

- have noted and understood all the regulations regarding safety,
- are familiar before starting work with all the operating instructions and specifications for the target group relevant to their work,
- have unrestricted and free access to the technical documentation of this programme,

– are familiar before starting work with the safe handling of the device and its use for its intended purpose either by verbal instructions from a competent person and/or by means of this technical documentation.

⚠ CAUTION Improper operation can result in personal injuries and property damage. The managing operator himself is responsible for his own safety and that of his employees. The managing operator himself is responsible that no unauthorised person has access to the programme and the thereby controlled device.

1.5 Repairs

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

In case of repair, please inform…

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

Service address:

2 Confirmation Form for the Managing Operator

This manual contains essential instructions for operating the programme which must be strictly observed. It is essential that they be read by the user and by the qualified staff responsible for the software prior to using the programme. This manual must be available and accessible at the place of use at all times.

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

The managing operator should for legal protection have the user confirm the instruction about the use of the programme.

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

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

Managing operator or service technician
Surname, first name (block letters)
Position in the company
Place, date and signature

3 Technical Data

EasySieve® is a programme for particle size analysis. It is able to automatically perform the required measuring and weighing processes – from determining the weights of the test sieves to evaluating the data.

The EasySieve® programme is able to directly communicate with sieve shakers of Retsch GmbH and to control them. It guides the user through the respective working steps. Available parameters, as well as the characteristics to be calculated can be entered in various edit boxes. Routine parameters can be edited, stored and recalled at any time.

If a scale is connected, the corresponding data (tare weights of test sieves, backweighing of loaded test sieves) can be transferred directly to the EasySieve® programme. If no scale is connected, the input can also be entered manually.

The EasySieve® programme calculates all standard particle distributions, as well as the representative characteristics of the particle size, and allows for the tabular and graphical presentation of results in a measurement report conforming to standards. Furthermore, the data can be exported to other software products (e.g. Microsoft Excel).

Up to 30 test sieves plus collecting pan can be evaluated by the EasySieve® programme. The maximum mesh size supported by the EasySieve® programme is 125 mm.

The EasySieve® programme is also available as AuditTrail enabled version in compliance with 21CFR Part 11.

3.1 System Requirements

NOTICE

N2.0029

System requirements
Non-observance of the minimum system requirements

- Insufficient random access memory (RAM) and/or available hard drive space might cause programme crashes.
- Insufficient system performance can result in data loss.
- **Observe the minimum system requirements to ensure a stable and performant operation of the programme.**

The minimum system requirements in the following table apply exclusively to the EasySieve® programme.

Component	Minimum requirements
Operating system	Windows XP (32bit) Windows 7/8 (32bit / 64bit) Windows 10 (32bit / 64bit)
Processor	Intel Core i5
Random access memory (RAM)	4 GB
Required hard drive space	50 MB
Recommended hard drive space	100 GB
USB interface	2 (2.0 or higher, one each for the software data storage medium and the sieve shaker)

RS232 or USB interface	1 (for the optional connection of a scale)
Network connection	recommended for automatic backups
Internet connection	recommended for remote support

As operating system, the EasySieve® programme requires Windows XP or higher in the 32bit or 64bit version. In addition, the following software is required:

- USB driver for controlling the sieve shaker with USB interface
- Microsoft Visual C++ 2015 Redistributable 32bit
- RS232-to-USB converter driver for controlling the scale or a sieve shaker with RS232 interface

The required installation files are located on the provided software data storage medium. The procedure for the automated installation is described in the following Chapter "Installation". If a manual installation of one or more components is required, refer to Chapter "Manual Installation" for detailed instructions.

4 Installation

NOTICE N3.0030

Local administrator rights
The EasySieve® programme requires local administrator rights for installation and operation

- Without full read and write access a smooth installation and a failure-free operation is not guaranteed.
- Insufficient read and write access during operation could result in data loss.
- **Ensure that each Windows user has the necessary read and write access for the installation directory of the programme.**

NOTICE N4.0034

Missing or wrong driver to control the device
Connecting the device without prior installation of the driver

- If a device is connected to the PC without prior installation of the appropriate driver, an incorrect driver can be installed by Windows.
- No communication between PC and device can be established. The control of the device is not possible.
- **Always install the device driver BEFORE connecting the device to the PC!**

NOTICE The screenshots of the individual programme installations are illustrated for explanatory purposes and may differ from the versions available on the data storage medium.

This chapter describes the automatic installation of the EasySieve® programme, including the additionally required components. The required setup file is located on the supplied data storage medium.

NOTICE If a manual installation of one or more components is required, refer to Chapter "Manual Installation" for detailed instructions.

⇨ Plug the data storage medium into an available USB port and open the Windows Explorer.
⇨ Double-click the EXE file "EasySieveSetup…" and select the desired installation language.
⇨ Accept the license agreement. An installation Wizard will guide through the installation. The installation of all required software components is now automatically carried out. This may take several minutes.
⇨ Accept the license agreement and insert the nine-digit serial number. Keep the default settings.
⇨ Perform a restart after the completion of the installation.

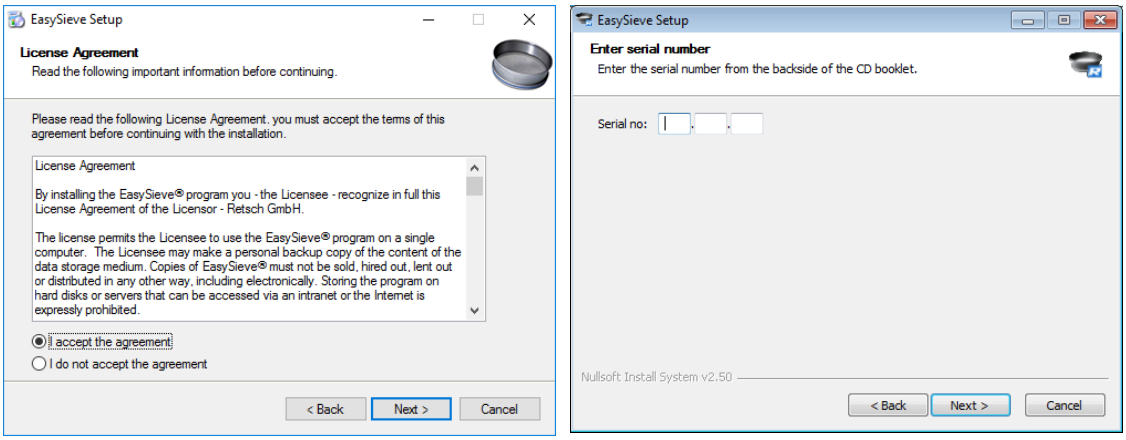


Fig. 1: EasySieve® installation

During installation, the directory C:\EasySieve with the subdirectories SIEVEDAT and SIEVESYS is created. In the individual directories the following files are stored:

Directory	Description
EasySieve	**Root directory:** Contains the system files of the EasySieve® programme, as well as the manuals.
SIEVEDAT	**Directory of measurement results:** The measurement results are stored in subfolders according to the settings in the sieve tasks as RDF, XLD, XLE, and/or CCG files.
SIEVESYS	**Directory of sieve tasks, size class files and reference files:** The sieve tasks are stored as AFG files, the size class files as GKL files and the reference files as REF files.

During installation, the sample measurements "RETSCH001.rdf" and "RETSCH002.rdf" are stored in the RETSCH folder located in the subdirectory SIEVEDAT. In addition, the files "RETSCH.afg", "RETSCH.gkl", "retsch_o.ref" and "retsch_u.ref" are stored in the subdirectory SIEVESYS. These files are used as examples for a sieve task, a size class file and two reference files, respectively. Due to the presence of these files, all functions of the EasySieve® programme can be accessed immediately after installation. However, the sample files are not necessarily required for operation and can be deleted at a later stage, if desired.

In addition, a ZIP file is stored on the desktop during installation, which contains information (LOG files) on the installation process of the individual software components. In the normal case, this ZIP file can be deleted after successful installation. The ZIP file is only required in exceptional cases, if errors occur during installation. In this case, the LOG files can contain information about the cause of the error.

5 First Commissioning

⚠ CAUTION C2.0021

Danger of personal injury
External control

- During the external control via the EasySieve® programme, there exists a risk of an unexpected or unintended start-up of the device to be controlled.
- **The controlled device must always be placed in the field of view of the EasySieve® programme user.**
- **Observe also the manual and the warnings of the corresponding device.**

NOTICE N5.0035

Disturbance of communication between programme and device
Removing the data cable during running programme operation

- If the data cable is removed while the EasySieve® programme is running, data loss can result.
- A flawless communication cannot be ensured without rebooting the PC.
- **Never disconnect the data cable from the device and/or the PC, while the EasySieve® programme is executed and the controlled device is turned on.**

⇨ For sieve shakers with a USB interface, connect one plug of the USB cable to the USB interface on the sieve shaker.
⇨ For sieve shakers with an RS232 interface, connect the RS232 plug of the converter cable to the RS232 interface on the sieve shaker.
⇨ Connect the other side of the USB cable or converter cable to an available USB interface on the PC.
⇨ Turn on the sieve shaker. Windows will automatically install the correct driver.

⇨ Start the EasySieve® programme by double-clicking the desktop icon "EasySieve". The sieve shaker can now be controlled via the EasySieve® programme.

NOTICE N6.0032

Software data storage medium
Damage due to improper handling

- The data storage medium behaves like a normal USB stick and can be irreparably damaged when not handled properly (e.g. when it is removed from the USB port without prior ejecting).
- The data storage medium is not write-protected! All data stored on it will be lost after formatting.
- **Always eject the data storage medium via the USB drive icon on the Windows taskbar.**

NOTICE

N7.0031

Product registration
Loss of the software data storage medium

- In case of loss of the data storage medium, a reinstallation of the software is no longer possible.

- **Keep the data storage medium stored at a safe place.**
- **In order to receive a replacement of the data storage medium in case of loss, it is necessary to register the software under http://www.retsch.com/products/sieving/evaluation-software/information-downloads/. A replacement without prior registration is not possible without further ado!**

5.1 Principle of Operation

A sieve analysis with the EasySieve® programme is performed in three separate steps:

1. Definition of a sieve task
2. Execution of a sieving
3. Evaluation of the results

By means of the EasySieve® programme, a sieve shaker can be externally controlled. To do this, a sieve shaker from Retsch GmbH must be connected to an available interface (USB or RS232) on the PC including the correct driver.

Sieve shaker	Interface	Driver
AS 200 control	USB	USB
AS 200 jet	USB	USB
AS 200 tap	RS232	RS232
AS 300 control	USB	USB
AS 400 control	RS232	RS232
AS 450 control	RS232	RS232

Likewise, it is optionally possible to automatically transfer the weight from a scale connected to an available interface to the PC. If the scale is equipped with an RS232 interface, the supplied RS232-to-USB converter cable can be used. Otherwise, please read the separate manual of the scale in order to obtain information on the correct device driver.

The evaluation can be performed separately in time from the measurement by reading and evaluating the raw data files (RDF files) at any given time. In this process, always the particular sieve task (AFG file) is loaded, which was also used during the sieving process. The evaluation is performed with the parameters (particle size characteristics and view settings), that are currently set in the AFG file. That provides the possibility to subsequently change the sieve task and re-evaluate the raw data with altered parameters. A subsequent change of the size classes used in the sieving process is not possible.

To prevent accidental changes of the parameters of a sieve task, a password protection with two user levels can be activated in the EasySieve® programme.

User level	Description
Measurement mode	The measurement mode is particularly suitable for routine operation. Measuring and evaluating is possible, but no sieve tasks can be created or edited.
Task mode	The task mode is intended for the advanced user having a good knowledge of the EasySieve® programme. In addition to the measurement mode, the creation and modification of sieve tasks is possible.

ⓘ Without activated password protection, the EasySieve® programme is always in task mode.

5.1.1 Used File Types

File type	Description
AFG	**Sieve task:** Contains all required settings for the sieving process and the presentation of the results.
GKL	**Size class file:** Contains the mesh sizes of the test sieves of a sieve series. Optionally, also the tare weights, real mesh sizes and/or serial numbers of the test sieves can be entered. Up to 16 test sieves can be stored in one GKL file. The maximum mesh size supported by the EasySieve® programme is 125 mm.
REF	**Reference file:** Contains reference data (reference curves) in ASCII format. Up to two REF files can be displayed as reference curves simultaneously with the measurement result in the graph.
RDF	**Raw data file (result file):** Contains the measurement data (sieve analysis) of a sieving process.
XLE	**Excel-readable file:** Contains the measurement data (sieve analysis) of a sieving process in Excel-readable ASCII format. A point is used as decimal mark.
XLD	**Excel-readable file:** Contains the measurement data (sieve analysis) of a sieving process in Excel-readable ASCII format. A comma is used as decimal mark.
CCG	**RETSCH file:** Contains part of the measurement data (sieve analysis) of a sieving process in ASCII format. A comma is used as decimal mark. By means of the CCG file, the sieve analysis can be easily imported into the CAMSIZER® programme of the Retsch Technology GmbH.

5.1.2 Used Characteristics

The following characteristics can be determined with the EasySieve® programme. A detailed description of the individual characteristics can be found in Chapter "List of Characteristics".

Characteristic	Description
$p_3(x1,x2)$	**Fraction:** Displays the volume-based ratio of particles in the particle size range between > x1 and ≤ x2.
$Q_3(x)$	**Cumulative distribution:** Displays the volume-based ratio of all particles with a particle size ≤ x.

$1 – Q_3(x)$	**Cumulative distribution of residue:** Displays the volume-based ration of all particles with a particle size > x.
$q_3(x)$	**Frequency distribution:** Displays the volume-based ratio of particles with a particle size = x.
$x(Q_3)$	**Particle size:** Displays the particle size at a certain $Q_3(x)$ value of the cumulative distribution.
Span	**Span value:** Displays the width of the distribution.
U	**Non-uniformity:** Displays the symmetry of the distribution.
S_V	**Volume-based specific surface area:** Displays the ratio between the surface area and the volume of the sample in mm^{-1}.
S_m	**Mass-based specific surface area:** Displays the ration between the surface area and the mass of the sample in cm^2/g.
D_S	**Sauter diameter:** Displays the equivalent diameter of equal spheres having the same specific surface area and the same volume as the sample itself.
AFS no.	**AFS number:** Displays the fineness of the sample. The higher the AFS number, the finer the sample material.
CV	**Coefficient of variation:** Displays the ratio of the standard deviation to the mean value, i.e. the relative dispersion of the sample.
MA	**Mean diameter:** Displays the x_{50} value (median) of the sample (particle size at position $Q_3(x) = 50$ %).
d'	**RRSB particle size:** Displays the $x_{63.2}$ value of the sample (particle size at position $Q_3(x) = 63.2$ %).
n	**Slope of the RRSB curve:** Displays the slope of the RRSB curve.
Correlation	**RRSB correlation:** Displays the correlation of the RRSB curve (cumulative distribution $Q_3(x)$) to an ideal straight line (Gaussian distribution).

5.2 Perform First Sieving

On the first EasySieve® programme start, the installed example sieve task RETSCH.afg is loaded. Via the icon  in the toolbar (**B**), this sieve task enables the immediate execution of a first sieving process with the following settings:

- Control of the sieve shaker: manually
- Control of the scale: manually
- Sieving duration: 5 min
- Amplitude: 1.5 mm
- Size classes: 45 µm, 63 µm, 125 µm, 250 µm, 500 µm, 1 mm, 2 mm, 4 mm (size class file RETSCH.gkl)

If the sieve task RETSCH.afg and/or the size class file RETSCH.gkl do not contain the desired parameters, a new sieve task can be created via the main menu function
│Sieve analysis│New sieve task│ (→ Chapter "New Sieve Task"). Successively, the desired settings of the sieving parameters (setting up of the sieve shaker and scale), the size classes (sieve series), the result files and the report can be made.

5.3 Evaluation of Measurement Results

For the evaluation, the measurement results can be displayed as graph or table. Characteristics which describe the entire sample are displayed in a separate characteristics window. Via the main menu function │Results│, access is given to the submenu functions of the following, individual evaluation windows:

Menu function	Description evaluation window
│Table│	Displays the measurement result in tabular form. The individual size classes are listed with their corresponding values.
│Graph│	Displays the measurement result in graphical form. Up to ten measurements can be displayed simultaneously.
│Characteristics│	Displays product-specific characteristics, which refer to the entire sample in tabular form.
│Mean value│	Allows for the calculation of the mean value of up to 50 measurement results of one sieve task. After the calculation the mean value can be displayed in graphical and tabular form as well.
│Trend analysis│	Allows for the graphical comparison of multiple measurements of a series of measurements. Thus, the time-dependent behaviour of individual characteristics can be examined.

A detailed description of the individual menu functions can be found in the respective chapters of this manual.

Finally, the complete measurement data of all evaluation windows can be summarised in a measurement record (report) and printed. Likewise, all data of the individual evaluation windows can also be both, printed and copied to the clipboard.

6 Operation of the Programme

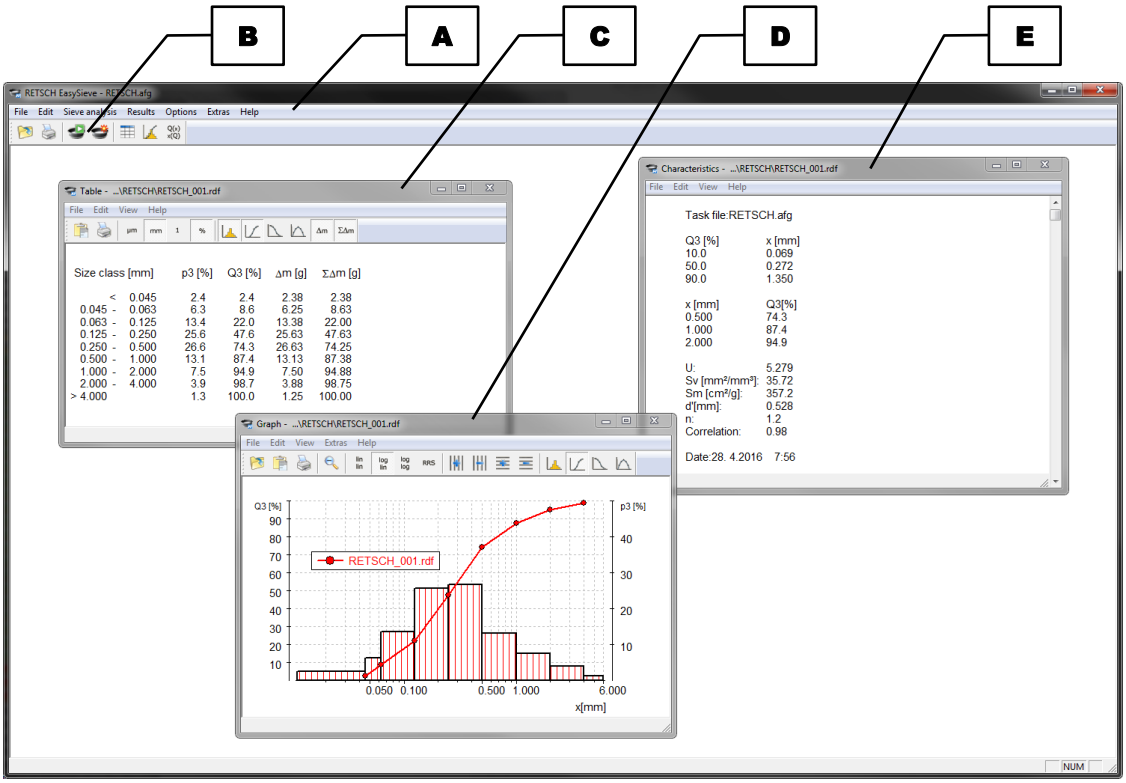


Fig. 2: Main window of the EasySieve® programme

All functions of the EasySieve® programme can be accessed from the main window via the menu bar (**A**). Frequently used functions are also available via the tool bar (**B**) or function keys on the keyboard. In the following table the icons and function keys are summarised.

Icon	Menu function	Function key
	File | Open result file	Ctrl+O
	File | Print report	Ctrl+P
	Sieve analysis | Start sieve analysis	F2
	Sieve analysis | New sieve task	Ctrl+N
	Results | Table	F5
	Results | Graph	F6
	Results | Characteristics	F7
	Help | Help	F1

The measurement results are displayed in individual evaluation windows for the tabular (**C**), graphical (**D**) and sample-specific characteristics (**E**) presentation.

Chapter "Operation of the Programme" is structured analogous to the menu bar (**A**). Each function is described in detail in the following sections and can be referred to individually.

6.1 Functions of the Main Menu Item "File"

The main menu item │File│ contains menu functions for opening, saving and exporting result files. In addition, printer settings can be made and the report can be printed.

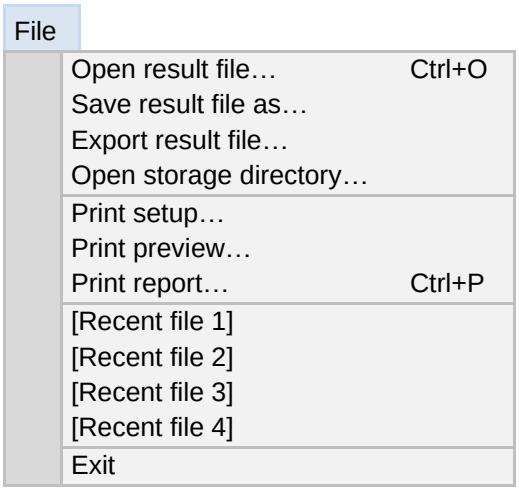


Fig. 3: Menu functions in the main menu item │File│

In the following subchapters, each menu function of the main menu item │File│ is described in detail and can be referred to individually.

6.1.1 Open Result File

Via the menu function │Open result file│, stored raw data files (RDF files) can be opened.

⇨ In the main window, click on the menu bar item │File│ and select │Open result file│ from the context menu. The corresponding dialogue box opens.
⇨ Navigate to the directory containing the RDF files.
⇨ Select the desired file.
⇨ Click the [Open] button. The dialogue box closes and the selected file is loaded.
⇨ To abort the process, click the [Cancel] button.

If no evaluation window is yet open, the graph window opens and the measurement result of the loaded file is graphically displayed. Otherwise, the content of already opened evaluation windows is updated.

In each RDF file, the name of the corresponding sieve task (AFG file) is stored. This sieve task is loaded (if not already active) together with the RDF file. The evaluation and the presentation of the results are performed with the current settings of the AFG file. If changes were made in the AFG file after the measurement, differences in the presentation of the results may occur compared to the presentation displayed directly after the measurement.

6.1.2 Save Result File as

Via the menu function │Save result file as│, the currently loaded raw data file (RDF file) can be stored under a different name.

⇨ In the main window, click on the menu bar item │File│ and select │Save result file as│ from the context menu. The corresponding dialogue box opens.
⇨ Navigate to the directory to which the RDF file is to be saved.
⇨ Enter the desired file name.

⇨ Click the [Save] button to store the file under a different name.
⇨ To abort the process, click the [Cancel] button.

6.1.3 Exporting Result File

Via the menu function │Export result file│, the currently loaded raw data file (RDF file) can be exported to a different format.

⇨ In the main window, click on the menu bar item │File│ and select │Export result file│ from the context menu. The corresponding dialogue box opens.
⇨ Navigate to the directory to which the RDF file is to be saved in a different format.
⇨ Select the desired format from the dropdown list.
⇨ Enter the desired file name.
⇨ Click the [Save] button to store the file in a different format.
⇨ To abort the process, click the [Cancel] button.

RDF files can be exported as XLE, XLD, or CCG file (all in ASCII format).

Format	Description
XLE file	**Excel-readable file with point as decimal mark:** Contains the measurement parameters used during the sieving process, the characteristics selected in the characteristics window at the time of the export, as well as the used size classes (lower and upper limits of fractions) as displayed in the table window at the time of the export.
XLD file	**Excel-readable file with comma as decimal mark:** Contains the measurement parameters used during the sieving process, the characteristics selected in the characteristics window at the time of the export, as well as the used size classes (lower and upper limits of fractions) as displayed in the table window at the time of the export.
CCG file	**RETSCH file with comma as decimal mark:** Contains two columns: – the particle size x in mm – the cumulative distribution $Q_3(x)$ in values between 0 and 1 By means of the CCG file, the measurement result can be easily imported as reference distribution into the CAMSIZER® programme of the Retsch Technology GmbH.

6.1.4 Open Storage Directory

Via the menu function │Open storage directory│, quick access is given to the root directory of the EasySieve® programme.

⇨ In the main window, click on the menu bar item │File│ and select │Open storage directory│ from the context menu. The Windows Explorer is initialised and opens with the directory C:\EasySieve.

6.1.5 Print Setup

Via the menu function │Print setup│, printer-specific settings can be made.

⇨ In the main window, click on the menu bar item │File│ and select │Print setup│ from the context menu. The corresponding dialogue box opens.
⇨ Select the printer and make the desired settings.

⇨ Click [OK] to apply the settings.
⇨ To abort the process, click the [Cancel] button.

6.1.6 Print Preview

Via the menu function │Print preview│, the page view of the report can be opened.

⇨ In the main window, click on the menu bar item │File│ and select │Print preview│ from the context menu. The page view window opens and overlaps the main window.
⇨ Click [Close] to exit the page view again.

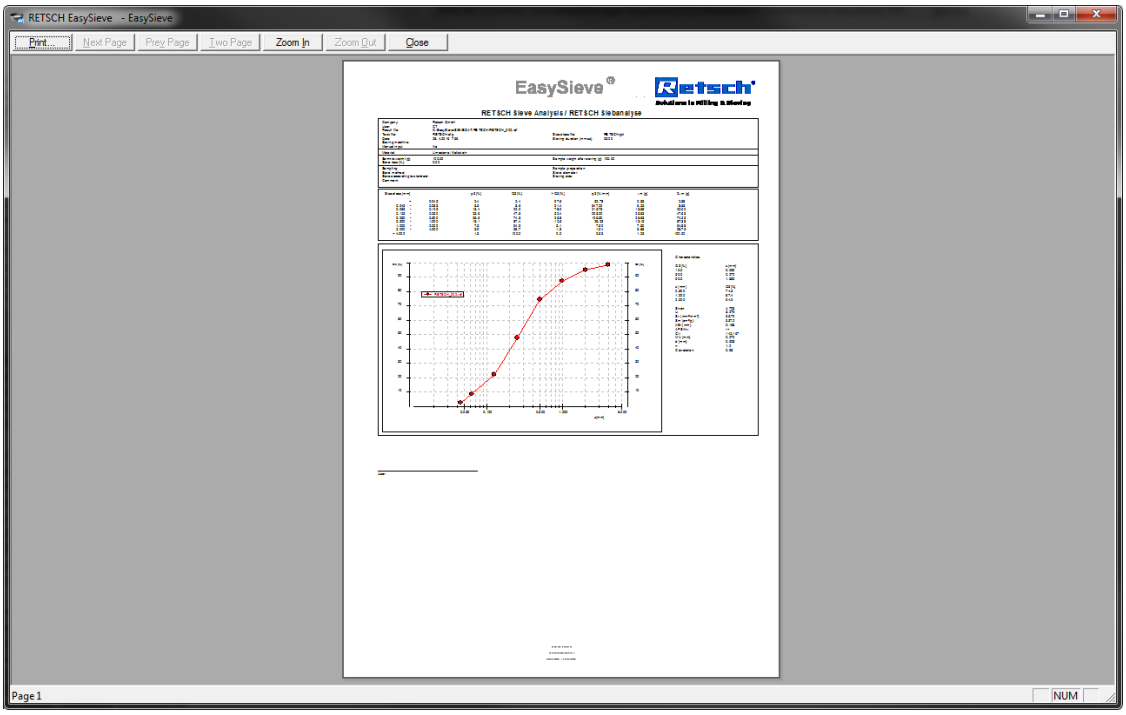


Fig. 4: Page view window

The functions of the page view window can be accesses via buttons in the menu bar.

Button	Description
[Print]	Closes the page view window and opens the printer configuration dialogue box, in which printer settings can be made and a print job can be started.
[Next Page]	Moves to the next page in a multiple-page report.
[Prev Page]	Moves to the previous page in a multiple-page report.
[Two Pages]	Displays two pages of a multiple-page report at once in the page view window. The button changes to [One Page] in double-page view.
[One Page]	Displays one single page of a multiple-page report in the page view window. The button changes to [Two Pages] in single-page view.
[Zoom In]	Zooms in the page view in two stages.
[Zoom Out]	Zooms out the page view in two stages.
[Close]	Closes the page view window. The main window is again on top.

6.1.7 Print Report

Via the menu function │Print report│, the report (measurement record) can be printed.

- ⇨ In the main window, click on the menu bar item │File│ and select │Print report│ from the context menu. The printer configuration dialogue box opens.
- ⇨ Make the desired print settings.
- ⇨ Click [OK] to print the report.
- ⇨ To abort the process, click the [Cancel] button.

The report consists, according to DIN 66165 and DIN ISO 9276-1, of the header information, the table, the graph and the characteristics. The header information is preset in the sieve task and can be updated by the user at the beginning of each sieving process. The settings of the table, the graph and the characteristics are determined by the current settings of the respective evaluation windows in the sieve task.

6.1.8 Recent Files

For quick access to recently created measurement results, the four most recently loaded RDF files are listed in the context menu of the menu bar item │File│.

- ⇨ In the main window, click on the menu bar item │File│.
- ⇨ Click on the desired RDF file in the context menu. The measurement result is loaded.

If no evaluation window is yet open, the graph window opens and the measurement result of the loaded file is displayed as graph. Otherwise, the content of already opened evaluation windows is updated.

6.1.9 Close

Via the menu function │Exit│, the EasySieve® programme can be quit.

- ⇨ In the main window, click on the menu bar item │File│ and select │Exit│ from the context menu. The main window closes together with all open evaluation windows.

6.2 Functions of the Main Menu Item "Edit"

The main menu item │Edit│ contains menu functions for copying measurement results as graphic or text to the clipboard.

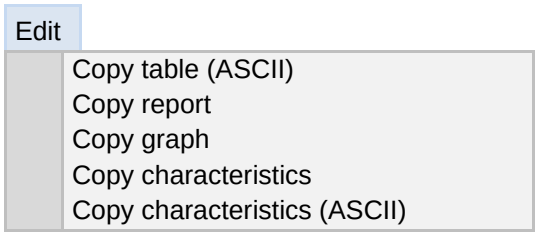


Fig. 5: Menu functions in the main menu item │Edit│

In the following subchapters, each menu function of the main menu item │Edit│ is described in detail and can be referred to individually.

6.2.1 Copy Table (ASCII)

Via the menu function │Copy table (ASCII)│, the particle size x in mm and the cumulative distribution $Q_3(x)$ with values between 0 and 1 are copied to the clipboard as a table with two columns in ASCII format (text format). A comma is used as decimal mark.

⇨ In the main window, click on the menu bar item │Edit│ and select │Copy table (ASCII)│ from the context menu. The corresponding data of the currently loaded RDF file are copied as text to the clipboard.

ⓘ The clipboard content corresponds to the information which is stored in the CCG file.

6.2.2 Copy Report

Via the menu function │Copy report│, the complete measurement record is copied to the clipboard as graphic.

⇨ In the main window, click on the menu bar item │Edit│ and select │Copy report│ from the context menu. The corresponding data of the currently loaded RDF file are copied as graphic to the clipboard.

6.2.3 Copy Graph

Via the menu function │Copy graph│, the content of the graph window is copied to the clipboard as graphic.

⇨ In the main window, click on the menu bar item │Edit│ and select │Copy graph│ from the context menu. The corresponding data of the currently loaded RDF file are copied as graphic to the clipboard.

NOTICE For better identification, the file names of the raw data file (RDF file) and the sieve task (AFG file) are inserted as header.

6.2.4 Copy Characteristics

Via the menu function │Copy characteristics│, the content of the characteristics window is copied to the clipboard as graphic.

⇨ In the main window, click on the menu bar item │Edit│ and select │Copy characteristics│ from the context menu. The corresponding data of the currently loaded RDF file are copied as graphic to the clipboard.

NOTICE For better identification, the file names of the raw data file (RDF file) and the sieve task (AFG file) are inserted as header.

6.2.5 Copy Characteristics (ASCII)

Via the menu function │Copy characteristics (ASCII)│, the content of the characteristics window is copied in ASCII format (text format) to the clipboard. Both, the characteristics, as well as the measurement conditions are copied. Depending on the set programme language, the decimal mark is either a comma (German) or a point (English).

⇨ In the main window, click on the menu bar item │Edit│ and select │Copy characteristics (ASCII)│ from the context menu. The corresponding data of the currently loaded RDF file are copied as text to the clipboard.

6.3 Functions of the Main Menu Item "Sieve analysis"

The main menu item │Sieve analysis│ contains menu functions for starting a sieve analysis, as well as for creating, editing, loading and saving sieve tasks.

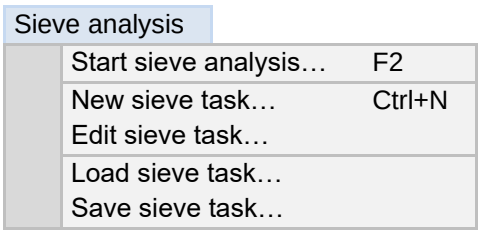


Fig. 6: Menu functions in the main menu item │Sieve analysis│

In the following subchapters, each menu function of the main menu item │Sieve analysis│ is described in detail and can be referred to individually.

6.3.1 Start Sieve Analysis

Via the menu function │Start sieve analysis│, the sieving process is started.

⇨ In the main window, click on the menu bar item │Sieve analysis│ and select │Start sieve analysis│ from the context menu. The start window of the sieve analysis opens.

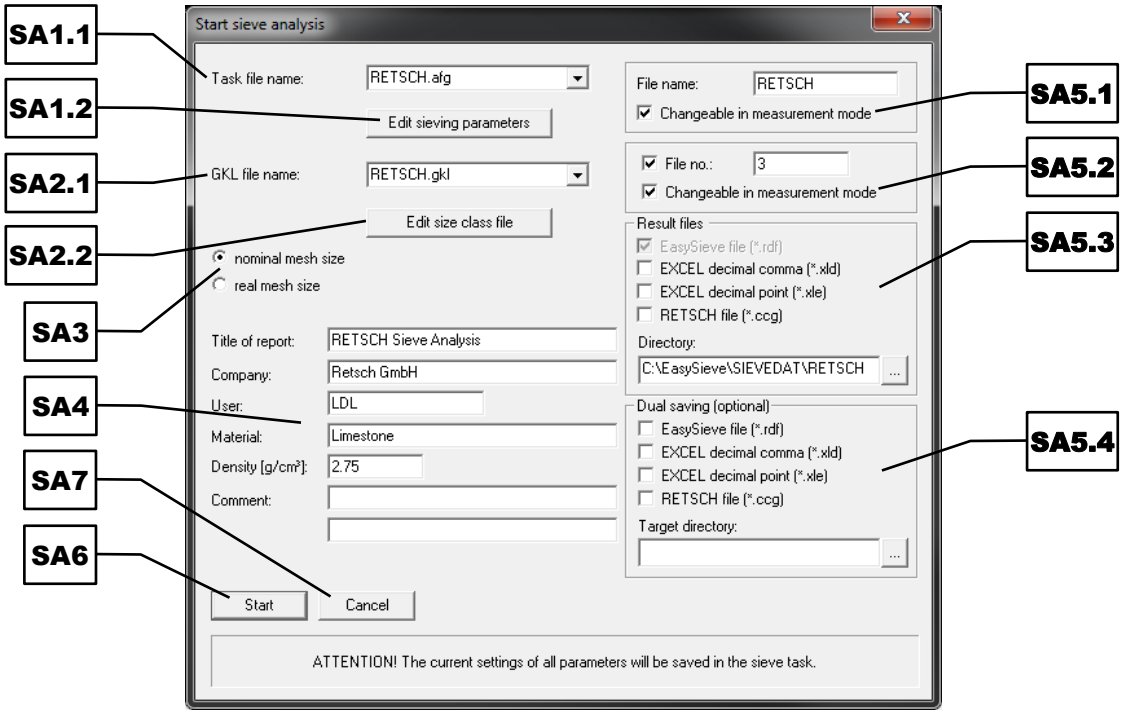


Fig. 7: Start window of the sieve analysis in task mode

In the start window, the settings of the currently loaded sieve task are displayed. Prior to the start of the sieving process, the user can update the settings according to the sample to be analysed.

⇨ Select the desired sieve task from the dropdown list (**SA1.1**).

⇨ If necessary, edit the parameters of the sieve task via the [Edit sieving parameters] button (**SA1.2**) (→ Chapter "Sieving parameters").

⇨ Select the desired size class file from the dropdown list (**SA2.1**).

⇨ If necessary, edit the size classes via the [Edit size class file] button (**SA2.2**) (→ Chapter "Size classes").

⇨ Indicate whether the mesh sizes in the size class file are listed as nominal or real mesh sizes (**SA3**).

- ⇨ Enter the desired information for the report (measurement record) in the respective edit boxes (**SA4**).
- ⇨ Enter the desired file name of the measurement in the edit box (**SA5.1**). The measurement will be stored under this name. If the checkbox ⟨Changeable in measurement mode⟩ is checked, users in the measurement mode can change the file name prior to the start of the sieving process, as well.
- ⇨ Enter the desired file number of the measurement in the edit box (**SA5.2**). Results in a series of measurements can be consecutively numbered by the file number and thus distinguished from each other. If the checkbox ⟨Changeable in measurement mode⟩ is checked, users in the measurement mode can change the file number prior to the start of the sieving process, as well.
- ⇨ Select the desired additional result files (**SA5.3**) which are to be created together with the raw data file. Also, enter the desired storage directory in the corresponding edit box.
- ⇨ Select, if desired, the desired result files (**SA5.4**) which are to be stored to a second storage location (e.g. server drive) as backup copy. Also, enter the desired destination directory of the second storage location in the corresponding edit box.
- ⇨ Click the [Start] button (**SA6**) to start the sieving process with the specified settings.
- ⇨ To abort the process, click the [Cancel] button (**SA7**).

After clicking the [Start] (**SA6**) button, the start window closes and the dialogue box "Sieve analysis" opens. The look of the dialogue box and the procedure of the sieving process depend on the sieve shaker used:

- AS 200 control, AS 200 tap, AS 300 control, AS 400 control, AS 450 control (→ Chapter "Sieve Analysis with Vibratory, Horizontal or Tap Sieve Shaker")
- AS 200 jet (→ Chapter "Sieve Analysis with Air Jet Sieving Machine")

6.3.1.1 Sieve Analysis with Vibratory, Horizontal or Tap Sieve Shaker

The upper section of the "Sieve analysis" dialogue box contains information on the settings for the scale and sieve shaker set in the sieve task. In the following, the tare weights of the test sieves (**S1**), the total weight of the sample (**S2**) and the individual weights of the test sieves after the sieving process (**S4**) are to be transferred or entered in the respective edit boxes.

With activated automatic weight transfer, the transfer of the weights is executed by pressing the transfer button on the scale. The mouse cursor automatically jumps to the next edit box. When using the manual input, the weight has to be entered by the user and confirmed by pressing the Return key on the keyboard.

If a measurement has already been performed with the selected size class file, the edit boxes are filled with the last tare weights. The user now has the possibility to adopt them. In this case, the mouse cursor is to be positioned directly in the edit box of the sample weight.

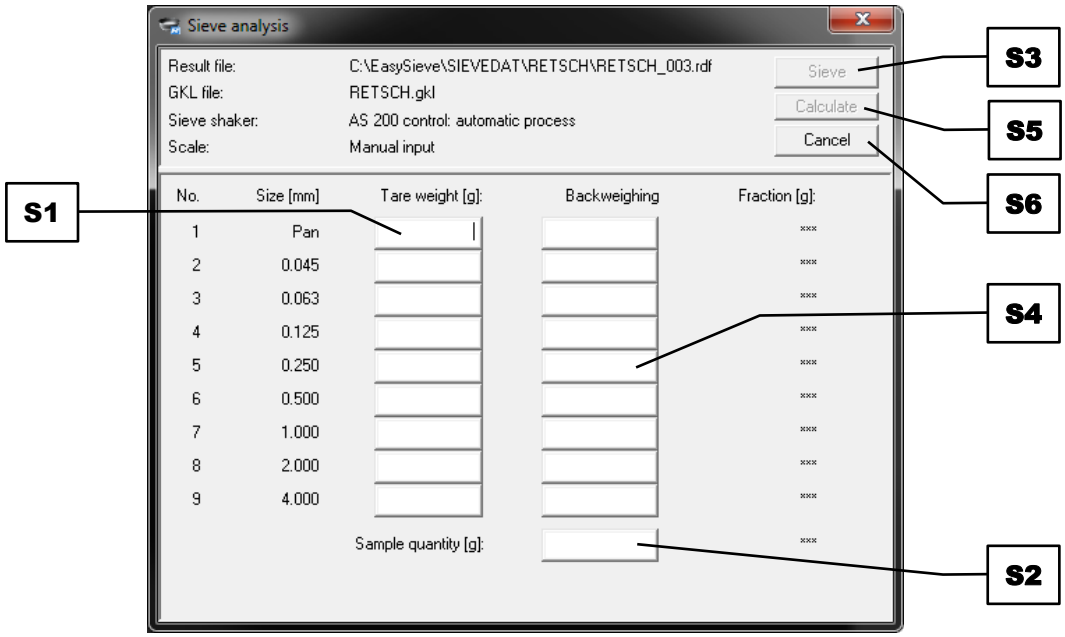


Fig. 8: Sieve analysis for vibratory, horizontal or tap sieve shakers

- ⇨ Transfer or enter the tare weights of the collecting pan and the individual test sieves in the respective edit boxes (**S1**), starting with the finest mesh size.
- ⇨ Transfer or enter the weight of the sample in the edit box (**S2**). After entering the sample weight, the tare weights can no longer be modified.
- ⇨ To abort the process, click the [Cancel] button (**S6**).

⚠ CAUTION Ensure that the test sieves are positioned properly and firmly clamped before starting the sieve shaker!

NOTICE With activated automatic control the sieving process starts automatically after the input of the sample weight. When using the manual control, the sieving process is started by clicking the [Sieve] button (**S3**).

With **manual control** of the sieve shaker, the user is now requested to start the sieve shaker.

- ⇨ Set the same sieving parameters on the sieve shaker as previously defined in the sieve task.
- ⇨ Click [OK] in the appeared dialogue box as soon as the sieving process has been manually started. Another dialogue box opens, in which the end of the sieving process is to be confirmed.
- ⇨ Wait for the sieving process to be finished.
- ⇨ As soon as the sieving process is complete and the sieve shaker is ready again, click [OK] in the dialogue box.

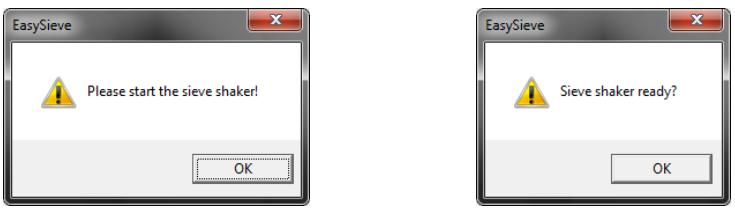


Fig. 9: Notices during manual control: start sieve shaker (left) and sieving process complete (right)

With **automatic control** of the sieve shaker, the user is informed that the EasySieve® programme now transfers the sieving parameters to the sieve shaker and starts the sieving process.

⇨ Before clicking [OK] in the dialogue box, check the tight fit of the test sieves. A dialogue box opens, which displays the progress and amplitude during the sieving process.
⇨ Wait for the sieving process to be finished.
⇨ Acknowledge the corresponding dialogue box with [OK].

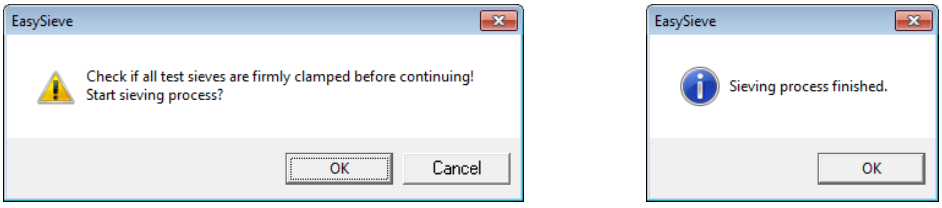


Fig. 10: Notices during automatic control: sieving process starts (left) and sieving process finished (right)

Upon completion of the sieving process the mouse cursor moves to the edit box of the coarsest test sieve for the backweighing.

⇨ Transfer or enter the weights of the test sieves after the measurement in the respective edit boxes (**S4**) for the backweighing, starting with the coarsest mesh size. The fraction is automatically determined.
⇨ Click the [Calculate] button (**S5**) to perform the evaluation.

The result files previously defined in the sieve task are created and already opened evaluation windows are updated.

Furthermore, the EasySieve® programme performs a check in accordance with DIN 66165-1. If the mass of the sample quantity deviates from the cumulative mass of the fractions, a corresponding warning is displayed:

– the warning of sieving loss appears, if the difference between sample weight and cumulated mass of the fractions amounts more than 1 %.
– the warning of an increase of the sample weight appears, when the cumulated mass of the fractions is greater than the mass of the sample quantity.

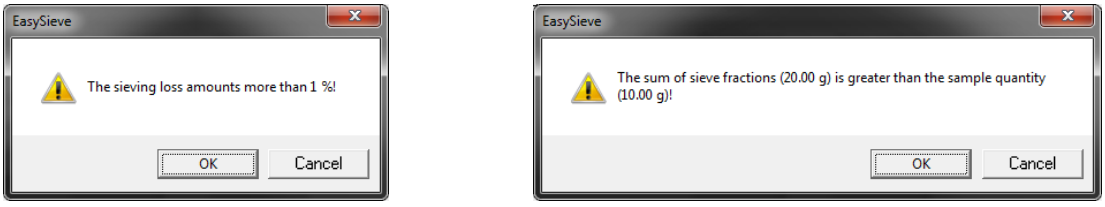


Fig. 11: Warning of deviating masses: "Sieving loss more than 1 %" (left) and "Cumulated mass of fractions bigger than mass of the sample quantity" (right)

6.3.1.2 Sieve Analysis with Air Jet Sieving Machine

A sieving process with the air jet sieving machine can only be performed with one test sieve. If such a sieve cut is not sufficient and if more than one test sieve is to be used, a corresponding number of sieving processes (sieve cuts) must be carried out. In this case, the sieving method to be used is initially queried, if the number of samples corresponds to the number of test sieves used.

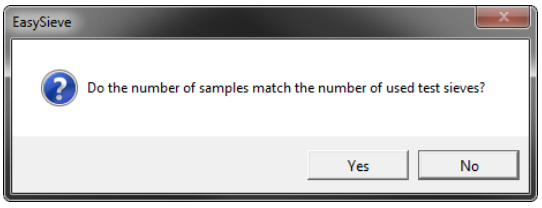


Fig. 12: Query for the sieving method for the air jet sieving machine

⇨ Click **[Yes]**, if the sieve analysis is to be performed according to the so-called **"Swiss method"**.
⇨ Click **[No]**, if the sieve analysis is to be performed according to the **standard method**.

Standard method:
In the standard method, the complete sample quantity is given on the finest test sieve. After the sieving process, the oversize is quantitatively given on the next coarser test sieve and sieved again. This procedure is continued until the sample is completely fractionated. The advantage of this method compared to the Swiss method is the low sample consumption.

Swiss method:
For the Swiss method, a complete, representative subsample of the sample material must be available for each of the test sieves to be used. Important in this context is an exact sample division, which results in an identical particle size distribution (and ideally identical mass) in all of the subsamples. The advantage of this method compared to the standard method is the higher accuracy, since fewer errors can be caused by sieving losses (quantitative transfer of the oversize from fine to coarser test sieve).

After the selection of the method, the "Sieve analysis" dialogue box opens.

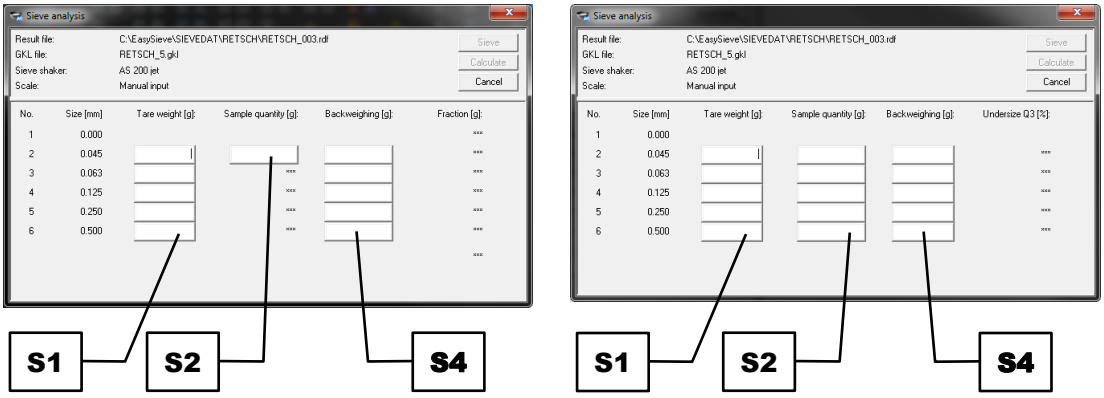


Fig. 13: Sieve analysis for air jet sieving machines according to the standard method (left) and according to Swiss method (right)

The operational sequence of the sieving process will take place analogous to the sieve analysis with vibratory, horizontal or tap sieve shaker.

In the standard method, the initial sample weight (**S2**) is entered and then calculated automatically by the EasySieve® programme for the subsequent sieving processes.

In the case of the sieve analysis according to the Swiss method, the sample weight (**S2**) is transmitted or entered by the user for each sieving process. Here, after clicking the [Calculate]

button, a message appears with the information, that the calculation is based on an average weight of all subsamples.

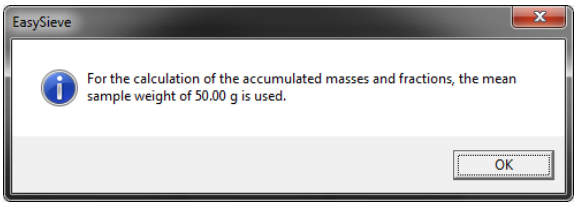


Fig. 14: Information on the used average sample weight

6.3.1.3 Start Sieve Analysis in Measurement Mode

In measurement mode, the user can only make very limited settings in the start window.

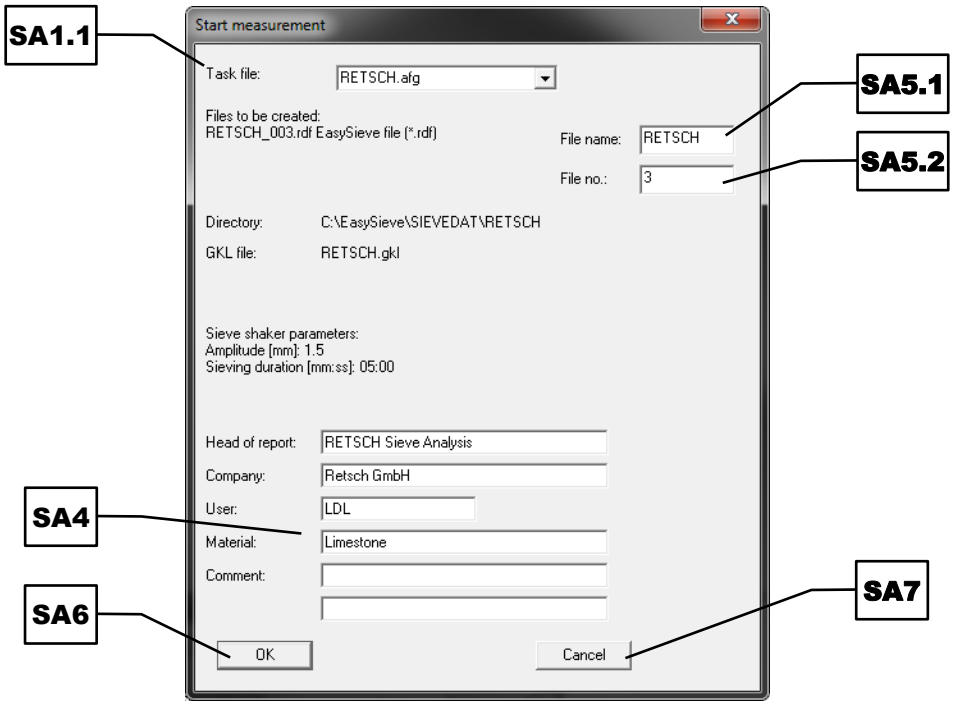


Fig. 15: Start window of the sieve analysis in measurement mode

- ⇨ Select the desired sieve task from the dropdown list (**SA1.1**).
- ⇨ Enter the desired information for the report (measurement record) in the respective edit boxes (**SA4**).
- ⇨ If enabled in the task mode, enter the desired file name of the measurement in the edit box (**SA5.1**). The measurement will be stored under this name.
- ⇨ If enabled in the task mode, enter the desired file number of the measurement in the edit box (**SA5.2**). Results in a series of measurements can be consecutively numbered by the file number and thus distinguished from each other.
- ⇨ Click [OK] (**SA6**) to start the sieving process with the specified settings.
- ⇨ To abort the process, click the [Cancel] button (**SA7**).

After clicking the [OK] button (**SA6**), the start window closes and the "Sieve analysis" dialogue box opens. The further procedure corresponds to that in the task mode.

With activated automatic weight transfer, the transfer of the weights is executed by pressing the transfer button on the scale. The mouse cursor automatically jumps to the next edit box. A manual input is not possible in measurement mode, when the automatic weight transfer is enabled.

6.3.2 New Sieve Task

NOTICE This function is not available in measurement mode.

Via the menu function │New sieve task│, a new sieve task (AFG file) is created. In this process, all necessary dialogue box for the configuration of the sieve task are opened sequentially. The AFG file contains all required information to control the sieve shaker and scale, and to display the results.

⇨ In the main window, click on the menu bar item │Sieve analysis│ and select │New sieve task│ from the context menu. The first dialogue box for creating a new sieve task opens.

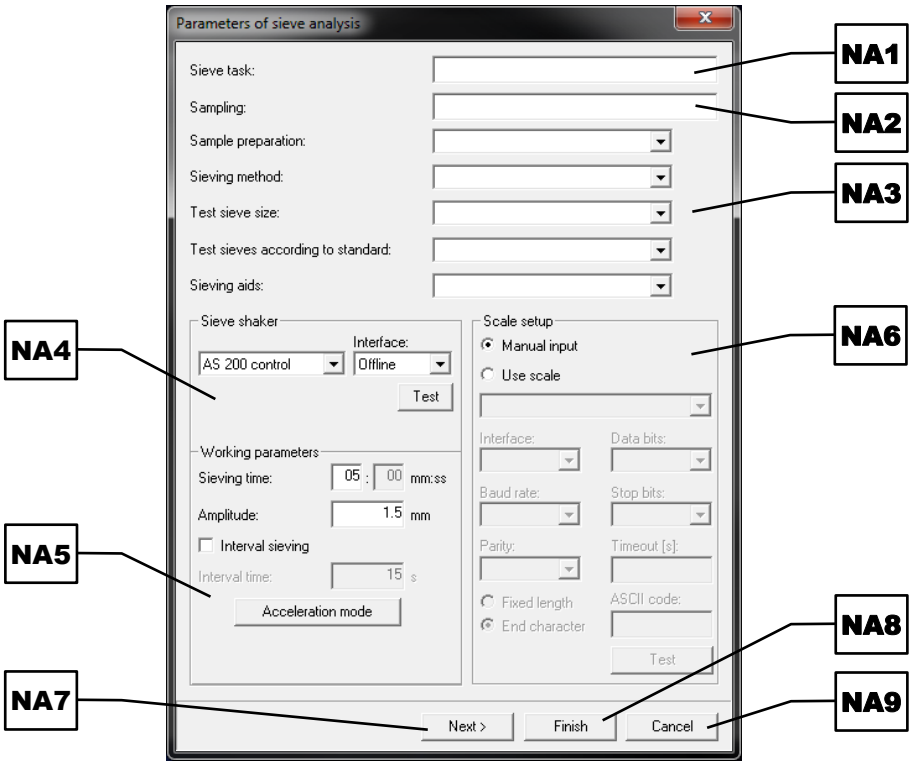


Fig. 16: First dialogue box for creating a new sieve task

⇨ Enter the desired name of the sieve task in the edit box (**NA1**).
⇨ Enter the type of the sampling (e.g. with shovel) in the edit box (**NA2**).
⇨ For documentation purposes in accordance with DIN ISO 9276-1, select the type of the sample preparation, the sieving method, the size of the test sieves, the standard of the test sieves, as well as the used sieving aids in the individual dropdown lists (**NA3**).
⇨ Select the type of the sieve shaker and its COM interface from the respective dropdown lists (**NA4**).
⇨ Press the [Test] button to test the communication.
⇨ Click [OK] in the dialogue box of the connection test. If no connection has been established, make sure, the correct COM interface has been selected from the dropdown list.

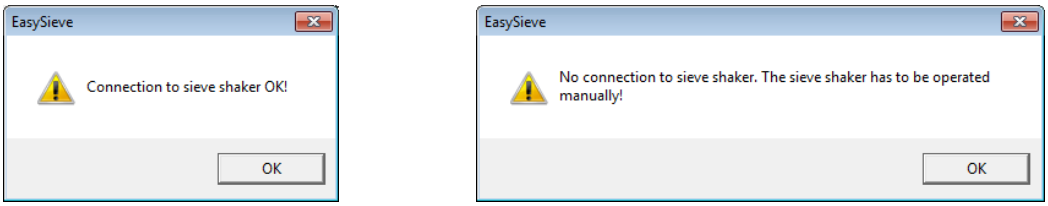


Fig. 17: Connection test to the sieve shaker: connection OK (left) or not OK (right)

⇨ Set the desired working parameters (**NA5**) for the sieve shaker. The available parameters are depending on the type of the sieve shaker.

Working parameter	Function	Sieve shaker
Sieving time	Specifies the duration of the entire sieving process	all types
Amplitude	Specifies the height or strength of the amplitude in mm or g (acceleration of gravity), respectively	– AS 200 control – AS 300 control – AS 450 control
Revolutions	Specifies the number of revolutions per minute	– AS 200 jet – AS 400 control
Interval sieving	Turns the interval function on or off	– AS 200 control – AS 300 control – AS 400 control – AS 450 control
Interval time	Specifies the duration of the interval sieving in seconds. After expiry of the interval time, the sieve shaker stops briefly, and then again runs with the set amplitude	– AS 200 control – AS 300 control – AS 400 control – AS 450 control
Open mesh function	Turns the open mesh function on or off. With the function turned on, the nozzle moves permanently forth and halfway back in order to loosen clamped particles more easily. The revolutions are set fix to 10 min^{-1}	– AS 200 jet
Vacuum	Specifies the vacuum in mbar, when the automatic vacuum regulation is connected (optional)	– AS 200 jet
Acceleration mode	Switches the amplitude to the acceleration mode. The strength of the amplitude is now expressed in g (acceleration of gravity)	– AS 200 control – AS 300 control – AS 400 control – AS 450 control
Amplitude mode	Switches the amplitude in the amplitude mode. The height of the amplitude is now expressed in mm. For the AS 400 control, the horizontal sieving movement is now expressed in revolutions per minute	– AS 200 control – AS 300 control – AS 400 control – AS 450 control

⇨ Choose between the manual or automatic input of weights (**NA6**).

- ⇨ For automatic input, select the type of the scale and its COM interface from the respective dropdown lists.
- ⇨ Press the [Test] button to test the communication.
- ⇨ Click [OK] in the dialogue box of the connection test. If no connection has been established, make sure, the correct COM interface has been selected from the dropdown list.

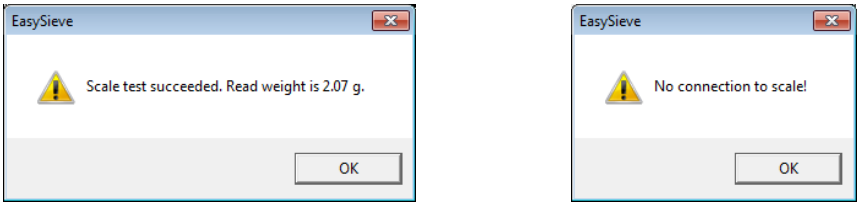


Fig. 18: Connection test to the scale: connection OK (left) or not OK (right)

The dropdown list contains a number of preset communication parameters for scales of the brands Mettler and Sartorius. If the parameters for the scale to be used should not be listed, the settings for the data bits, baud rate, stop bits, parity, timeout and ASCII code can be individually set by selecting the dropdown list item "Custom scale".

NOTICE For the connection of scales whose COM interface is not listed in the drop-down list, the parameters must be maintained manually by the user. Retsch GmbH does not guarantee that other scale models are compatible. Important: The scale must be set up in such a way that it exclusively transmits the weight value. For the correct set-up of the scale, please contact the scale manufacturer, if necessary.

NOTICE When calling up the menu function │Start sieve analysis│, the connection to the scale will be checked. The connected scale must respond within the time set in the edit box "Timeout". Therefore, the time must be selected in such a way, that the scale even responds to the signal sent from the PC within this timeframe when being in idle mode. The signal can be sent either with a fixed length or with a defined end character. Please read the manual of the scale for detailed information on the correct settings.

- ⇨ Click the [Next >] button (**NA7**) to switch to the next dialogue box.
- ⇨ To save the sieve task without making any further settings, click the [Finish] button (**NA8**).
- ⇨ To abort the process, click the [Cancel] button (**NA9**).

Via the [Next >] button (**NA7**), the following additional dialogue boxes are sequentially opened:

1. "Define size classes" dialogue box (→ Chapter "Size Classes")
2. "Select characteristics" dialogue box (→ Chapter "Characteristics")
3. "Save sieve task" dialogue box (→ Chapter "Save Sieve Task")

In each dialogue box, it is possible to change back to the previous dialogue box via the [< Back] button, to save the sieve task via the [Finish] button, or to abort the process via the [Cancel] button.

In the last dialogue box "Save sieve task", the sieve task can either be stored via the [Save] button, or stored and directly executed via the [Save & Start] button.

6.3.3 Edit Sieve Task

NOTICE This function is not available in measurement mode.

Via the menu function │Edit sieve task│, the currently loaded sieve task (AFG file) can be modified. In this process, all dialogue boxes for the configuration of the sieve task are opened sequentially.

⇨ In the main window, click on the menu bar item │Sieve analysis│ and select │Edit sieve task│ from the context menu. The first dialogue box "Parameters of sieve analysis" opens.
⇨ Make the desired modifications.
⇨ Click the [Next >] button (**NA7**) to switch to the next dialogue box.
⇨ To save the sieve task without making any further settings, click the [Finish] button (**NA8**).
⇨ To abort the process, click the [Cancel] button (**NA9**).

Via the [Next >] button (**NA7**), the following additional dialogue boxes are sequentially opened:

1. "Define size classes" dialogue box (→ Chapter "Size Classes")
2. "Select characteristics" dialogue box (→ Chapter "Characteristics")
3. "Configuration of table" dialogue box (→ Chapter "Table")
4. "Configuration of graph" dialogue box (→ Chapter "Graph")
5. "Save sieve task" dialogue box (→ Chapter "Save Sieve Task")

In each dialogue box, it is possible to change back to the previous dialogue box via the [< Back] button, to save the sieve task via the [Finish] button, or to abort the process via the [Cancel] button.

In the last dialogue box "Save sieve task", the sieve task can be stored via the [Save] button.

6.3.4 Load Sieve Task

Via the menu function │Load sieve task│, an existing sieve task (AFG file) can be loaded.

⇨ In the main window, click on the menu bar item │Sieve analysis│ and select │Load sieve task│ from the context menu. The corresponding dialogue box opens.
⇨ Select the desired sieve task from the dropdown list (**SL1**).
⇨ To edit the sieve task, click the [Edit] button (**SL2**).
⇨ To start a measurement with the selected sieve task, click the [Start] button (**SL3**).

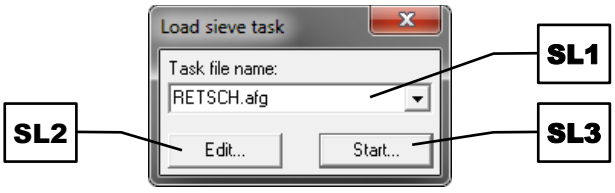


Fig. 19: Load sieve task

Load and edit a sieve task:
Via the [Edit] button (**SL2**), the dialogue boxes are opened sequentially. The function corresponds to the menu function │Edit sieve task│ (→ Chapter "Edit Sieve Task").

Load and start a sieve task:
Via the [Start] button (**SL3**), the start window of the sieve analysis is opened. The function corresponds to the menu function │Start sieve analysis│ (→ Chapter "Start Sieve Analysis").

6.3.5 Save Sieve Task

NOTICE This function is not available in measurement mode.

If changes were made to the current sieve task but not yet saved, this can be done afterwards via the menu function │Save sieve task│.

⇨ In the main window, click on the menu bar item │Sieve analysis│ and select │Save sieve task│ from the context menu. The corresponding dialogue box opens.

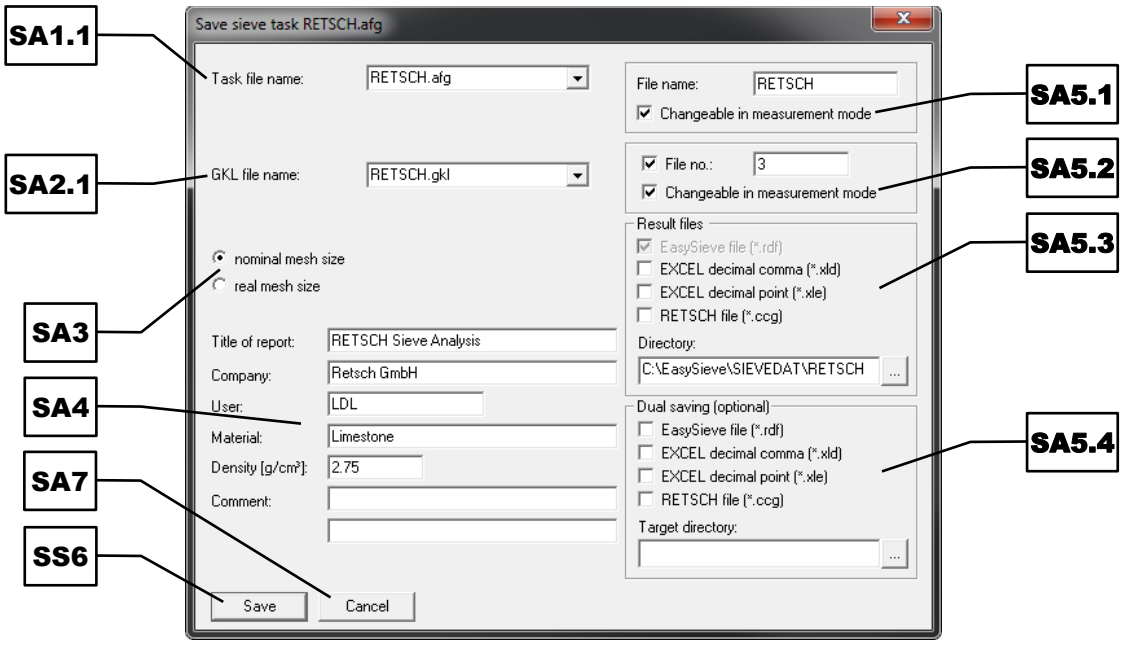


Fig. 20: Save sieve task

The "Save sieve task" dialogue box corresponds almost entirely to the start window of the sieve analysis (→ Chapter "Start Sieve Analysis"). Only the sieving parameters and the size class file cannot be further edited.

⇨ If necessary, make additional changes.

⇨ Click the [Save] button (**SS6**) to store the sieve task. The selected sieve task will be overwritten with the current settings without any further notice.

⇨ To discard the changes, click the [Cancel] button (**SA7**).

6.4 Functions of the Main Menu Item "Results"

The main menu item │Results│ contains menu functions for analysing the measurement results. Measurement results can be displayed as a table or graph. In addition, the mean value can be calculated and trend analyses can be made.

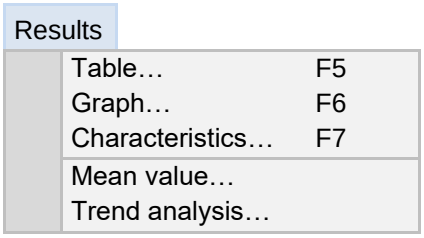


Fig. 21: Menu functions in the main menu item │Results│

In the following subchapters, each menu function of the main menu item │Results│ is described in detail and can be referred to individually.

6.4.1 Table

Via the menu function │Table│, distribution-specific characteristics are displayed in tabular form.

⇨ In the main window, click on the menu bar item │Results│ and select │Table│ from the context menu. The table window opens. Alternatively, the evaluation window can also be opened via the function key F5 on the keyboard or the icon in the tool bar (**B**) of the main window.

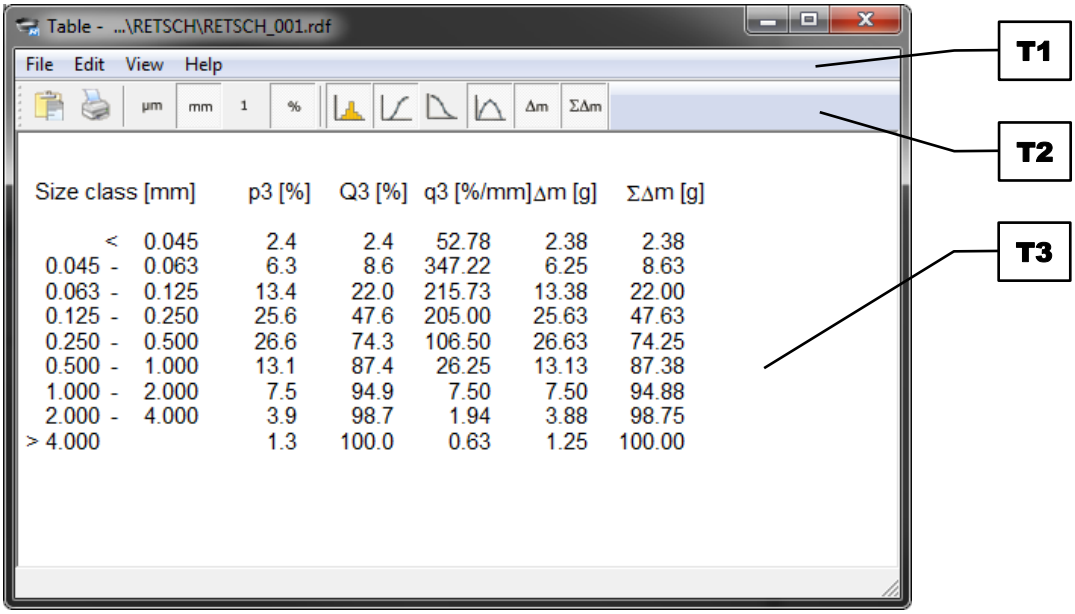


Fig. 22: Table window

In the client area (**T3**) of the table window, the individual size classes are displayed together with the respective fraction (p_3), cumulative distribution (Q_3), cumulative distribution of residue ($1 – Q_3$), frequency distribution (q_3), mass of the oversize (Δm) and/or accumulated mass of the oversize (ΣΔm).

All functions of the table window can be accessed via the menu bar (**T1**). Frequently used functions are also available via the tool bar (**T2**) or function keys on the keyboard. In the following table the icons and function keys are summarised.

Icon	Menu function / Description	Function key
	│Edit│Copy│	
	│File│Print table│	Ctrl+P
µm	Display of the size classes in µm	
mm	Display of the size classes in mm	
1	Normalised display of the results in the range of 0 – 1	
%	Display of the results in %	
	Display of the fraction p_3	

	Display of the cumulative distribution Q_3	
	Display of the cumulative distribution of residue 1 – Q_3	
	Display of the frequency distribution q_3	
Δm	Display of the mass of the oversize Δm	
ΣΔm	Display of the accumulated mass of the oversize ΣΔm	

NOTICE If any changes of the settings made here shall remain effective also in subsequent measurements, the sieve task must be saved anew after the modification (→ Chapter "Save Sieve Task").

6.4.1.1 Functions of the Menu Bar Item "File"

The menu bar item │File│ contains menu functions for printing the window content and for closing the evaluation window.

Fig. 23: Table window: menu functions of the menu bar item │File│

Menu function │Print table│:
Via the menu function │Print table│ the content of the table window can be printed.
⇨ In the table window, click on the menu bar item │File│ and select │Print table│ from the context menu. The printer configuration dialogue box opens.
⇨ Make the desired print settings.
⇨ Click [OK] to print the table.
⇨ To abort the process, click the [Cancel] button.

NOTICE For better identification, the file names of the raw data file (RDF file) and the sieve task (AFG file) are inserted as header.

NOTICE The font size and font type are defined by the setting in the menu function │Printer font│ of the main window (→ Chapter "Printer Font").

Menu function │Exit│:
Via the menu function │Exit│, the evaluation window can be closed.
⇨ In the evaluation window, click on the menu bar item │File│ and select │Exit│ from the context menu. The evaluation window closes.

6.4.1.2 Functions of the Menu Bar Item "Edit"

The menu bar item │Edit│ contains menu functions for copying results to the clipboard.

Fig. 24: Table window: menu functions of the menu bar item │Edit│

Menu function │Copy│:
Via the menu function │Copy│, the content of the evaluation window is copied to the clipboard as graphic.

⇨ In the evaluation window, click on the menu bar item │Edit│ and select │Copy│ from the context menu. The corresponding data of the currently loaded RDF file are copied as graphic to the clipboard.

NOTICE For better identification, the file names of the raw data file (RDF file) and the sieve task (AFG file) are inserted as header.

Menu function │Copy (ASCII)│:
Via the menu function │Copy (ASCII)│, the content of the table window is copied to the clipboard in ASCII format (text format). A comma is used as decimal mark.

⇨ In the table window, click on the menu bar item │Edit│ and select │Copy (ASCII)│ from the context menu. The corresponding data of the currently loaded RDF file are copied as text to the clipboard.

6.4.1.3 Functions of the Menu Bar Item "View"

The menu bar item │View│ contains menu functions for selecting the characteristics and units to be displayed.

Fig. 25: Table window: menu functions of the menu bar item │View│

Menu function │Settings│:
Via the menu function │Settings│ up to seven distribution-specific characteristics can be selected.

⇨ In the table window, click on the menu bar item │View│ and select │Settings│ from the context menu. The dialogue box for selecting the columns opens.
⇨ Make the desired modifications.
⇨ Click [OK] to apply the settings.
⇨ To discard the changes, click the [Cancel] button.

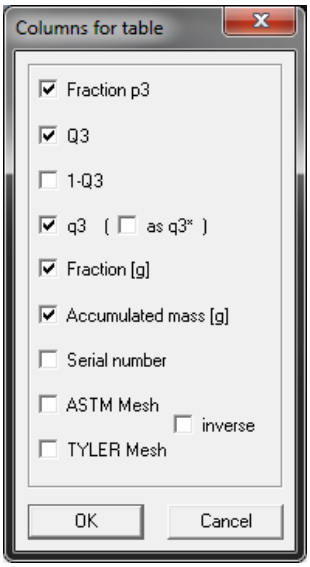


Fig. 26: Setting options of the table window

The following characteristics are available:

Characteristic	Description
p_3	Displays the column of the fraction p_3 in the table. The checkbox corresponds to the icon in the tool bar (**T2**) of the table window.
Q_3	Displays the column of the cumulative distribution Q_3 in the table. The checkbox corresponds to the icon in the tool bar (**T2**) of the table window.
$1 – Q_3$	Displays the column of the cumulative distribution of residue $1 – Q_3$ in the table. The checkbox corresponds to the icon in the tool bar (**T2**) of the table window.
q_3	Displays the column of the frequency distribution q_3 in the table. The checkbox corresponds to the icon in the tool bar (**T2**) of the table window.
as q_3*	Displays the column of the logarithmic frequency distribution q_3* in the table.
Mass [g]	Displays the column of the mass of the oversize Δm in the table. The checkbox corresponds to the icon in the tool bar (**T2**) of the table window.
Accumulated mass [g]	Displays the column of the accumulated mass of the oversize ΣΔm in the table. The checkbox corresponds to the icon in the tool bar (**T2**) of the table window.
Serial number	Displays the column of the serial numbers of the test sieves in the table. The serial numbers can be entered in the sieve stock.
ASTM mesh	Displays the column of the mesh sizes as ASTM mesh values in the table. With activated characteristic, the Tyler mesh values cannot be displayed.
Tyler mesh	Displays the column of the mesh sizes as Tyler mesh values in the table. With activated characteristic, the ASTM mesh values cannot be displayed.
inverse	Reverses the table so that the results are displayed in descending order of mesh size.

Menu function │Units│:
Via the menu function │Units│, the measurement units to be displayed can be selected.

⇨ In the table window, click on the menu bar item │View│ and select │Units│ from the context menu. The dialogue box for selecting the measurement units opens.

⇨ Select whether the size classes are to be displayed in mm or µm. The radio buttons correspond to the mm or µm icons in the tool bar (**T2**) of the table window, respectively.

⇨ Select whether the distributions are to be displayed normalised in the rage of 0 – 1 or in percent. The radio buttons correspond to the 1 or % icons in the tool bar (**T2**) of the table window, respectively.

⇨ Click [OK] to apply the settings.

⇨ To discard the changes, click the [Cancel] button.

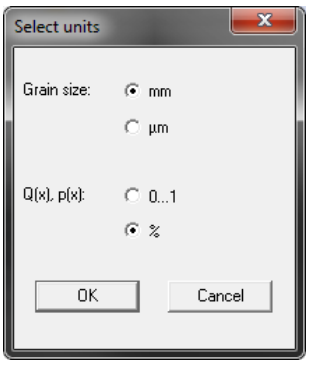


Fig. 27: Dialogue box of measurement units

NOTICE The dialogue box of the measurement units is the same in the table window, the graph window and the characteristics window. A modification in one evaluation window therefore also affects the display in the other two evaluation windows.

6.4.1.4 Functions of the Menu Bar Item "Help"

The menu bar item │Help│ opens the manual as PDF file.

6.4.2 Graph

Via the menu function │Graph│, the measurement results are displayed graphically. The X axis indicates the particle size, while the Y axis represents the currently selected characteristic.

⇨ In the main window, click on the menu bar item │Results│ and select │Graph│ from the context menu. The graph window opens. Alternatively, the evaluation window can also be opened via the function key F6 on the keyboard or the icon in the tool bar (**B**) of the main window.

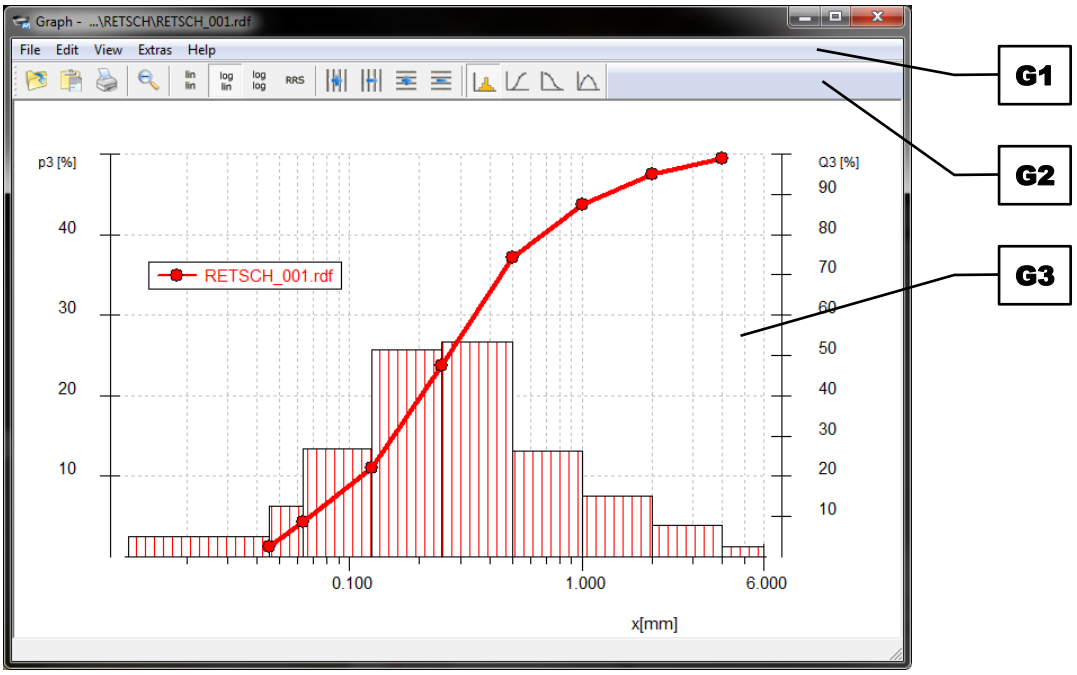


Fig. 28: Graph window

In the client area (**G3**) of the graph window up to two characteristics can be displayed simultaneously. Furthermore, up to nine comparison files can be loaded additionally.

All functions of the graph window can be accessed via the menu bar (**G1**). Frequently used functions are also available via the tool bar (**G2**). In the following table the icons are summarised.

Icon	Menu function / Description
	File | Read comparison file
	Edit | Copy
	File | Print graph
	Zooming out the display in the direction of the X axis
lin lin	Linear display of the X axis, linear display of the Y axis
log lin	Logarithmic display of the X axis, linear display of the Y axis
log log	Logarithmic display of the X axis, logarithmic display of the Y axis
RRS	Display of the cumulative distribution Q_3 in the RRSB grid including the threshold line at 63.2 %
	Adds vertical grid lines
	Removes vertical grid lines
	Adds horizontal grid lines
	Removes horizontal grid lines
	Display of the fraction p_3 on the first Y axis (left)
	Display of the cumulative distribution Q_3 on the first Y axis (left)
	Display of the cumulative distribution of residue 1 – Q_3 on the first Y axis (left)
	Display of the frequency distribution q_3 on the first Y axis (left)

Zooming in the display in the direction of the X axis is possible by dragging over the area of interest using the right mouse button. The selected area is enlarged in such a way, that the size classes contained in it are displayed in full. By clicking the  icon, the original view is restored.

NOTICE If any changes of the settings made here shall remain effective also in subsequent measurements, the sieve task must be saved anew after the modification (→ Chapter "Save Sieve Task").

6.4.2.1 Functions of the Menu Bar Item "File"

The menu bar item │File│ contains menu functions for reading comparison files, for printing the window content and for closing the evaluation window.

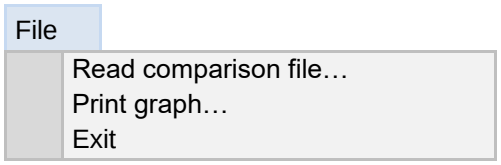


Fig. 29: Graph window: menu functions of the menu bar item │File│

Menu function │Read comparison file│:
Via the menu function │Read comparison file│, up to nine additional measurement results can be displayed in the graph.

⇨ In the graph window, click on the menu bar item │File│ and select │Read comparison file│ from the context menu. The "Open File" dialogue box opens.
⇨ Select the desired comparison files.
⇨ Click the [Open] button. The dialogue box closes and the selected comparison files are read.
⇨ To abort the process, click the [Cancel] button.

The individual comparison files can be removed again by right-clicking on the respective file name in the legend. When closing the graph window, all comparison files are removed again.

Menu function │Print graph│:
Via the menu function │Print graph│ the content of the graph window can be printed.

⇨ In the graph window, click on the menu bar item │File│ and select │Print graph│ from the context menu. The printer configuration dialogue box opens.
⇨ Make the desired print settings.
⇨ Click [OK] to print the graph.
⇨ To abort the process, click the [Cancel] button.

NOTICE For better identification, the file names of the raw data file (RDF file) and the sieve task (AFG file) are inserted as header.

NOTICE The font size and font type are defined by the setting in the menu function │Printer font│ of the main window (→ Chapter "Printer Font").

Menu function │Exit│:
Via the menu function │Exit│, the evaluation window can be closed.

⇨ In the evaluation window, click on the menu bar item │File│ and select │Exit│ from the context menu. The evaluation window closes.

6.4.2.2 Functions of the Menu Bar Item "Edit"

The menu bar item │Edit│ contains menu functions for copying results to the clipboard.

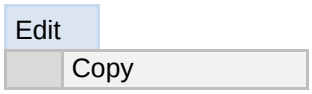


Fig. 30: Graph window: menu functions of the menu bar item │Edit│

Menu function │Copy│:
Via the menu function │Copy│, the content of the evaluation window is copied to the clipboard as graphic.

⇨ In the evaluation window, click on the menu bar item │Edit│ and select │Copy│ from the context menu. The corresponding data of the currently loaded RDF file are copied as graphic to the clipboard.

NOTICE For better identification, the file names of the raw data file (RDF file) and the sieve task (AFG file) are inserted as header.

6.4.2.3 Functions of the Menu Bar Item "View"

The menu bar item │View│ contains menu functions for selecting the characteristics and units to be displayed.

Fig. 31: Graph window: menu functions of the menu bar item │View│

Menu function │Settings│:
Via the menu function │Settings│, the characteristics for both Y axes, the scaling of the X axis, as well as up to two reference files can be selected.

⇨ In the graph window, click on the menu bar item │View│ and select │Settings│ from the context menu. The dialogue box of the graph settings opens.

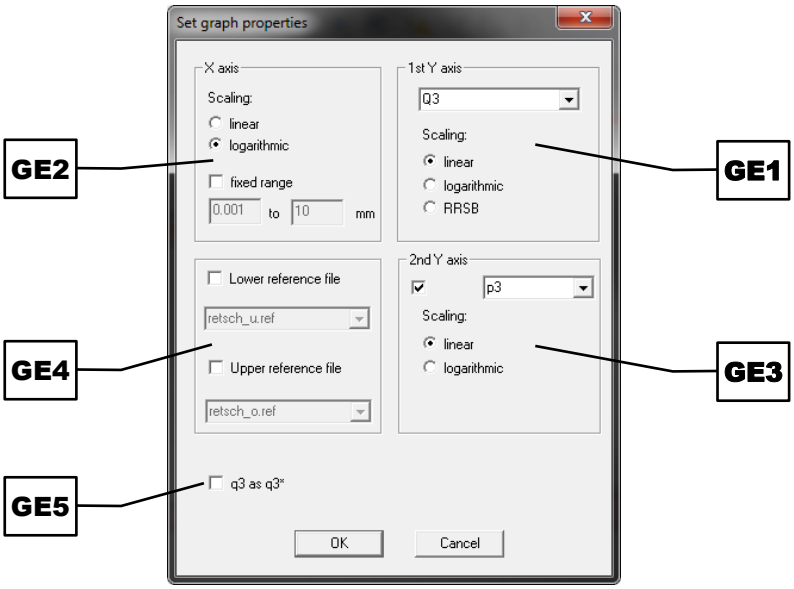


Fig. 32: Setting of the graph window

- ⇨ Select the characteristic to be displayed from the dropdown list in the section of the first Y axis (**GE1**). The selection of the list corresponds to the icons for $p_3(x1,x2)$, for $Q_3(x)$, for $1 - Q_3(x)$ and for $q_3(x)$ in the tool bar (**G2**) of the graph window.
- ⇨ Select the scaling in the section of the first Y axis (**GE1**). The selection of the RRSB grid will lock the scaling of the second Y axis. Furthermore, the combination of linear X axis with logarithmic Y axis is not applicable.
- ⇨ Select the scaling in the section of the X axis (**GE2**).
- ⇨ Enter, if desired, a fixed range for the X axis.
- ⇨ Select, if desired, the characteristic to be displayed from the dropdown list in the section of the second Y axis (**GE3**).
- ⇨ Select the scaling in the section of the second Y axis (**GE3**).
- ⇨ Select, if desired, the lower and/or upper reference file (REF file) from the respective dropdown list in the section of the reference files (**GE4**). Reference files are only displayed, if the characteristic $Q_3(x)$ or $1 - Q_3(x)$ is selected for the Y axis.
- ⇨ Check the checkbox (**GE5**), if the frequency distribution $q_3(x)$ is to be displayed as logarithmic frequency distribution $q_3^*(x)$.
- ⇨ Click [OK] to apply the settings.
- ⇨ To discard the changes, click the [Cancel] button.

Menu function │Units│:

Via the menu function │Units│, the measurement units to be displayed can be selected.

- ⇨ In the evaluation window, click on the menu bar item │View│ and select │Units│ from the context menu. The dialogue box for selecting the measurement units opens.
- ⇨ Select whether the size classes are to be displayed in mm or µm.
- ⇨ Select whether the distributions are to be displayed normalised in the rage of 0 – 1 or in percent.
- ⇨ Click [OK] to apply the settings.
- ⇨ To discard the changes, click the [Cancel] button.

NOTICE The dialogue box of the measurement units is the same in the table window, the graph window and the characteristics window. A modification in one evaluation window therefore also affects the display in the other two evaluation windows.

6.4.2.4 Functions of the Menu Bar Item "Extras"

The menu bar item │Extras│ contains menu functions for selecting the colour of curves, the type of curves, the type of bars, the type of grid, and the legend.

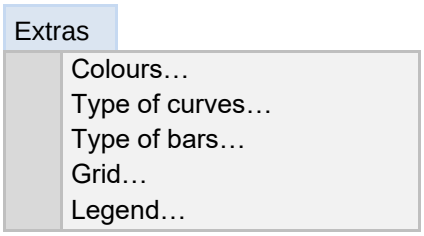


Fig. 33: Graph window: menu functions of the menu bar item │Extras│

Menu function │Colours│:
The menu function │Colours│ allows for the free colour mapping of each curve (and each bar).

⇨ In the graph window, click on the menu bar item │Extras│ and select │Colours│ from the context menu. The corresponding dialogue box opens.
⇨ Click on the colour field of an arbitrary curve number of the first or second Y axis, or of a reference file. The dialogue box for selecting the colours opens.
⇨ Select one of the basic colours, or define a new colour via the [Define Custom Colors >>] button.
⇨ Confirm the colour selection with [OK].
⇨ To abort the colour selection, click the [Cancel] button.

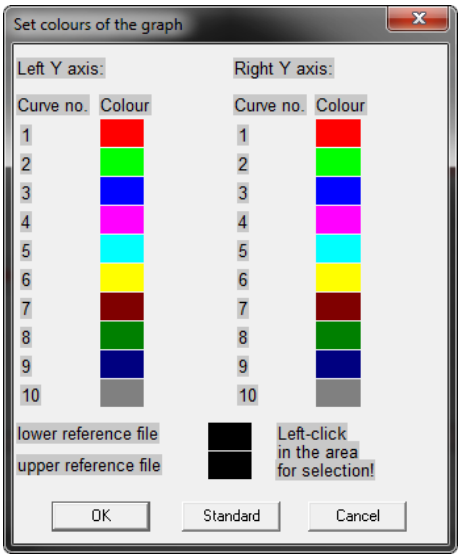


Fig. 34: Settings for the colour of the curves in the graph window

⇨ Click [OK], to apply the changed colour selection to the individual curves (bars).
⇨ To restore the colour selection, click the [Standard] button.
⇨ To discard the changes, click the [Cancel] button.

Menu function │Type of curves│:
Via the menu function │Type of curves│, the display of the curves can be defined.

⇨ In the graph window, click on the menu bar item │Extras│ and select │Type of curves│ from the context menu. The corresponding dialogue box opens.

⇨ Check the ⟨with marking⟩ checkbox, if the measurement curves are to be displayed with a marking of the individual measurement points.
⇨ Check the ⟨with line⟩ checkbox, if the lines of the measurement curves are to be displayed.
⇨ Click [OK] to apply the changes.
⇨ To discard the changes, click the [Cancel] button.

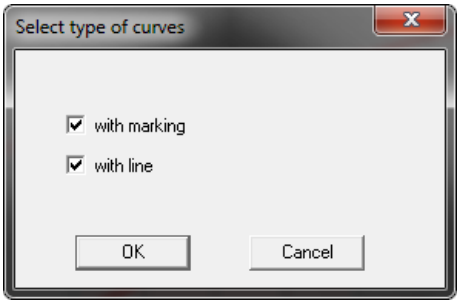


Fig. 35: Type of curves settings

ⓘ At least one of the two checkboxes must be checked.

Menu function │Type of bars│:
Via the menu function │Type of bars│, the display of the bars for the characteristic p_3 can be defined.
⇨ In the graph window, click on the menu bar item │Extras│ and select │Type of bars│ from the context menu. The dialogue box for selecting the type of bars opens.
⇨ Select the desired type of bar from the dropdown list.
⇨ Click [OK] to apply the changes.
⇨ To discard the changes, click the [Cancel] button.

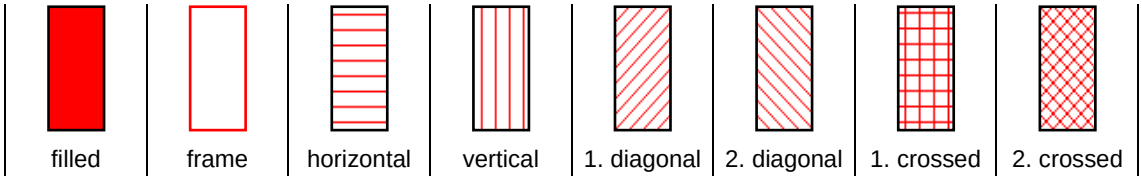


Fig. 36: Available types of bars

ⓘ As soon as more than one measurement curve is displayed in the graph window, the bar type "frame" is used.

Menu function │Grid│:
Via the menu function │Grid│, the display of the grid can be defined.
⇨ In the graph window, click on the menu bar item │Extras│ and select │Grid│ from the context menu. The dialogue box for selecting the type of grid opens.
⇨ Select one of the two radio buttons, to display the grid lines either solid or dashed.
⇨ Click the [Select colour] button to set the colour of the grid lines. The corresponding dialogue box opens.
⇨ Select one of the basic colours, or define a new colour via the [Define Custom Colors >>] button.
⇨ Confirm the colour selection with [OK].
⇨ To abort the colour selection, click the [Cancel] button.

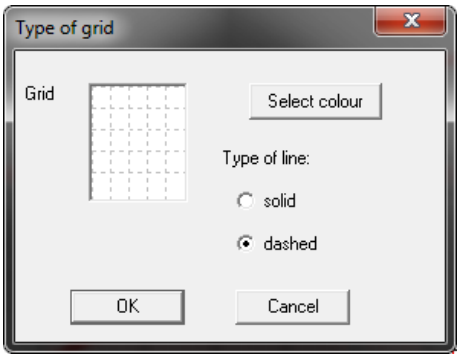


Fig. 37: Settings for the type of grid

⇨ Click [OK] to apply the changes.
⇨ To discard the changes, click the [Cancel] button.

Menu function │Legend│:
Via the menu function │Legend│, the display of the legend (labelling of the measurement curves) can be defined.

⇨ In the graph window, click on the menu bar item │Extras│ and select │Legend│ from the context menu. The dialogue box for setting the legend opens.
⇨ Check the ⟨Legend of curves⟩ checkbox, if the legend is to be displayed in the graph window.
⇨ Check the ⟨with one line⟩ checkbox, if the marking of the first measurement curve of the Y axis is to be displayed on the left in the legend.
⇨ Check the ⟨with two lines⟩ checkbox, if the markings of the first and second measurement curve of the Y axis is to be displayed on the left and right in the legend.
⇨ Select one of the three radio buttons, to display the legend either ⟨without frame⟩, ⟨with frame⟩ or ⟨with shaded frame⟩.
⇨ Click [OK] to apply the changes.
⇨ To discard the changes, click the [Cancel] button.

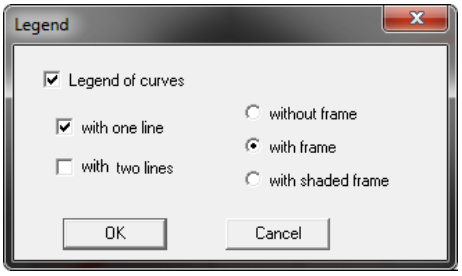


Fig. 38: Legend settings

6.4.2.5 Functions of the Menu Bar Item "Help"

The menu bar item │Help│ opens the manual as PDF file.

6.4.3 Characteristics

Via the menu function │Characteristics│, the sample-specific characteristics are displayed in tabular form.

⇨ In the main window, click on the menu bar item │Results│ and select │Characteristics│ from the context menu. The characteristics window opens. Alternatively, the evaluation window

can also be opened via the function key F7 on the keyboard or the icon in the tool bar (**B**) of the main window.

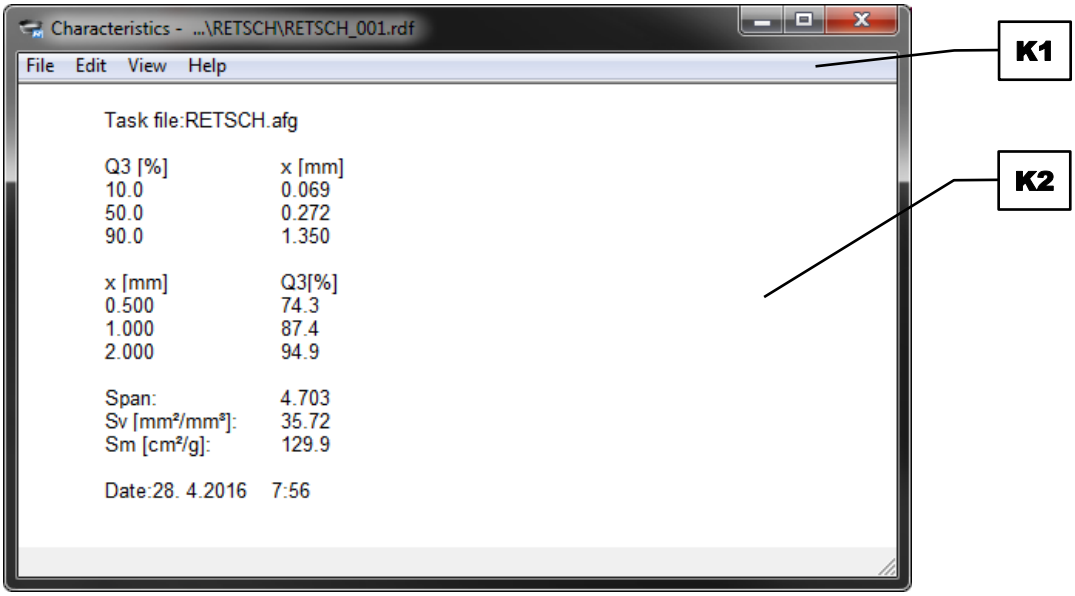


Fig. 39: Characteristics window

In the client area (**K2**) of the characteristics window, the sample-specific characteristics of the current raw data file are displayed.

All functions of the characteristics window can be accessed via the menu bar (**K1**).

NOTICE If any changes of the settings made here shall remain effective also in subsequent measurements, the sieve task must be saved anew after the modification (→ Chapter "Save Sieve Task").

6.4.3.1 Functions of the Menu Bar Item "File"

The menu bar item │File│ contains menu functions for printing the window content and for closing the evaluation window.

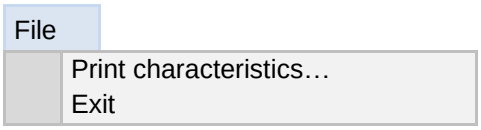


Fig. 40: Characteristics window: menu functions of the menu bar item │File│

Menu function │Print characteristics│:
Via the menu function │Print characteristics│ the content of the characteristics window can be printed.

⇨ In the characteristics window, click on the menu bar item │File│ and select │Print characteristics│ from the context menu. The printer configuration dialogue box opens.
⇨ Make the desired print settings.
⇨ Click [OK] to print the characteristics.
⇨ To abort the process, click the [Cancel] button.

NOTICE For better identification, the file names of the raw data file (RDF file) and the sieve task (AFG file) are inserted as header.

NOTICE The font size and font type are defined by the setting in the menu function │Printer font│ of the main window (→ Chapter "Printer Font").

Menu function │Exit│:
Via the menu function │Exit│, the evaluation window can be closed.
⇨ In the evaluation window, click on the menu bar item │File│ and select │Exit│ from the context menu. The evaluation window closes.

6.4.3.2 Functions of the Menu Bar Item "Edit"

The menu bar item │Edit│ contains menu functions for copying results to the clipboard and for switching the displayed information.

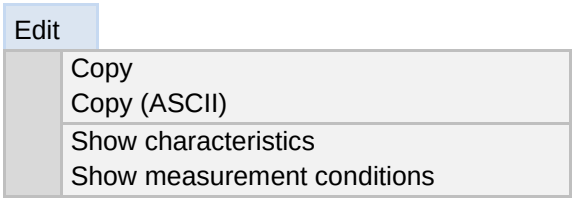


Fig. 41: Characteristics window: menu functions of the menu bar item │Edit│

Menu function │Copy│:
Via the menu function │Copy│, the content of the evaluation window is copied to the clipboard as graphic.
⇨ In the evaluation window, click on the menu bar item │Edit│ and select │Copy│ from the context menu. The corresponding data of the currently loaded RDF file are copied as graphic to the clipboard.

NOTICE For better identification, the file names of the raw data file (RDF file) and the sieve task (AFG file) are inserted as header.

Menu function │Copy (ASCII)│:
Via the menu function │Copy (ASCII)│, the measurement conditions, as well as the currently selected characteristics are copied to the clipboard in ASCII format (text format).
⇨ In the characteristics window, click on the menu bar item │Edit│ and select │Copy (ASCII)│ from the context menu. The corresponding data of the currently loaded RDF file are copied as text to the clipboard.

Menu function │Show characteristics│:
Via the menu function │Show characteristics│, information on the selected characteristics are displayed in the client area (**K2**). In addition, the date and time of the sieving process is listed.
⇨ In the characteristics window, click on the menu bar item │Edit│ and select │Show characteristics│ from the context menu. The corresponding data of the currently loaded RDF file are displayed in the client area (**K2**).

Menu function │Show measurement conditions│:
Via the menu function │Show measurement conditions│, the measurement conditions under which the sieving process was performed are displayed in the client area (**K2**). This also

includes the information entered for the report in section (**SA4**) of the start window of the sieve analysis.

⇨ In the characteristics window, click on the menu bar item │Edit│ and select │Show measurement conditions│ from the context menu. The corresponding data of the currently loaded RDF file are displayed in the client area (**K2**).

6.4.3.3 Functions of the Menu Bar Item "View"

The menu bar item │View│ contains menu functions for selecting the characteristics and units to be displayed.

Fig. 42: Characteristics window: menu functions of the menu bar item │View│

Menu function │Settings│:
Via the menu function │Settings│, the sample-specific characteristics to be displayed can be selected.

⇨ In the characteristics window, click on the menu bar item │View│ and select │Settings│ from the context menu. The dialogue box for characteristics selection opens.

⇨ To select from all available characteristics, click the [Advanced >>] button. The dialogue box expands downwards and the [Standard <<] button appears instead of the [Advanced >>] button.

⇨ Click [OK] to apply the settings.

⇨ To discard the changes, click the [Cancel] button.

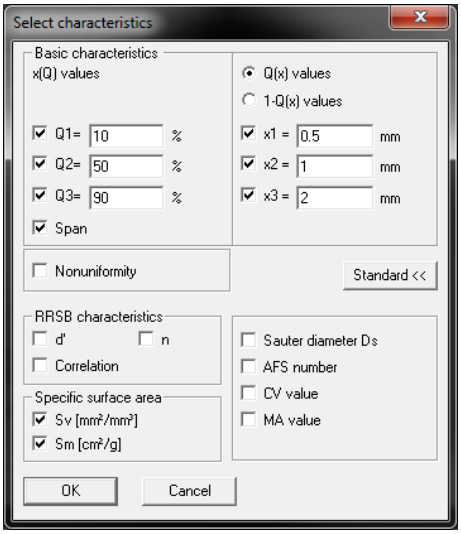


Fig. 43: Setting options of the characteristics window

The following characteristics are available:

Characteristic	Description
Q1	Displays the particle size x(Q1), which is located in the cumulative distribution at the position of the value entered in the edit box Q1. By default, Q1 = 10 %.

Q2	Displays the particle size x(Q2), which is located in the cumulative distribution at the position of the value entered in the edit box Q2. By default, Q2 = 50 %.
Q3	Displays the particle size x(Q3), which is located in the cumulative distribution at the position of the value entered in the edit box Q3. By default, Q3 = 90 %.
Span	Displays the width of the distribution. The Span value depends on the values entered in the edit boxes Q1, Q2 and Q3, and is calculated by $Span = \frac{Q3 - Q1}{Q2}$
Q(x) values	Displays the values of the cumulative distribution $Q_3(x)$ at the particle size positions x1, x2 and x3.
1 – Q(x) values	Displays the values of the cumulative distribution of residue $1 – Q_3(x)$ at the particle size positions x1, x2 and x3.
x1	Displays the value of the distribution, which is located at the particle size value entered in the edit box x1.
x2	Displays the value of the distribution, which is located at the particle size value entered in the edit box x2.
x3	Displays the value of the distribution, which is located at the particle size value entered in the edit box x3.
Non-uniformity	Displays the symmetry of the distribution. The U value is calculated by $U = \frac{x(Q_{60\,\%})}{x(Q_{10\,\%})}$
d'	Displays the particle size x at position $Q_3(x)$ = 63.2 %.
n	Displays the slope of the RRSB curve.
Correlation	Displays the correlation of the RRSB curve (cumulative distribution $Q_3(x)$) to an ideal straight line (Gaussian distribution).
S_V	Displays the volume-based specific surface area in mm^{-1}. Basis for the calculation is always a sphere model.
S_m	Displays the mass-based specific surface area in cm^2/g. Basis for the calculation is always a sphere model.
Sauter diameter D_S	Displays the equivalent diameter of equal spheres having the same specific surface area and the same volume as the sample itself.
AFS number	Displays the fineness of the sample. The higher the AFS number, the finer the sample material.
CV value	Displays the coefficient of variation (relative dispersion of the sample). The CV value is calculated by $CV = 50\frac{x(Q_{84\,\%}) - x(Q_{16\,\%})}{x(Q_{50\,\%})}$
MA value	Displays the median of the sample, i.e. the particle size x at position $Q_3(x)$ = 50 % (mean diameter).

NOTICE For some characteristics there are conditions which must be fulfilled in order to have them displayed:

- The RRSB characteristics can only be calculated, if $Q_3(x)$ values of at least two sieve cuts located within 5 % and 95 % of the cumulative distribution curve are available.
- The mass-based specific surface area S_m can only be calculated, if prior to the sieving process, the material density has been defined in the start window of the sieve analysis (**SA4**).

– The AFS number can only be calculated, if corresponding test sieves have been used, i.e. the selected test sieves must be a contiguous subset of the ASTM mesh 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 / 1.000 mm / 1.400 mm / 2.000 mm / 2.800 mm / 4.000 mm / 5.600 mm.

A detailed description of the individual characteristics can be found in Chapter "List of Characteristics".

Menu function │Units│:
Via the menu function │Units│, the measurement units to be displayed can be selected.
⇨ In the evaluation window, click on the menu bar item │View│ and select │Units│ from the context menu. The dialogue box for selecting the measurement units opens.
⇨ Select whether the size classes are to be displayed in mm or µm.
⇨ Select whether the distributions are to be displayed normalised in the rage of 0 – 1 or in percent.
⇨ Click [OK] to apply the settings.
⇨ To discard the changes, click the [Cancel] button.

NOTICE The dialogue box of the measurement units is the same in the table window, the graph window and the characteristics window. A modification in one evaluation window therefore also affects the display in the other two evaluation windows.

6.4.3.4 Functions of the Menu Bar Item "Help"

The menu bar item │Help│ opens the manual as PDF file.

6.4.4 Mean Value

Via the menu function │Mean value│, an average of several measurement results can be calculated and displayed in the evaluation windows.
⇨ In the main window, click on the menu bar item │Results│ and select │Mean value│ from the context menu. The "Open File" dialogue box opens.
⇨ Navigate to the directory containing the RDF files.
⇨ Select up to 50 file of the same sieve task, from which the mean value is to be calculated.
⇨ Click the [Open] button. The dialogue box closes and the mean value is calculated from the selected files.
⇨ To abort the process, click the [Cancel] button.

If no evaluation window is yet open, the graph window opens and the mean value is graphically displayed. Otherwise, the content of already opened evaluation windows is updated. In each evaluation window "Mean value" appears in the window header. In the graph window, "Mean value" is also written in the legend.

Prerequisite for mean value formation is the use of the same size class file for all of the RDF files to be averaged. If this is not the case, a corresponding warning is issued.

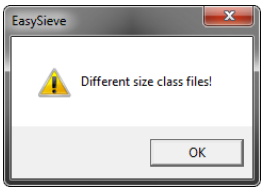


Fig. 44: Warning, that the selected RDF files do have different size classes

The result of the mean value can be subsequently stored as RDF file via the main menu function │File│Save result file as│, or exported as XLD, XLE, or CCG file via the main menu function │File│Export result file│ (→ Chapters "Save result file as" and "Export result file").

6.4.5 Trend Analysis

Via the menu function │Trend analysis│, a series of measurements can be evaluated, in order to monitor the chronological course of the selected characteristics and their changes. By default, the characteristic x_{50} is displayed (particle size x at position $Q_3(x) = 50$ %). The X axis either displays the file number or the time (date of the sieve analysis), whereas the Y axis displays the selected characteristic.

⇨ In the main window, click on the menu bar item │Results│ and select │Trend analysis│ from the context menu. The "Open File" dialogue box opens.
⇨ Navigate to the directory containing the RDF files.
⇨ Select an arbitrary file of the desired series of measurements, from which the trend analysis is to be created.
⇨ Click the [Open] button. The dialogue box closes and the "Trend analysis" dialogue box is opened.
⇨ To abort the process, click the [Cancel] button.

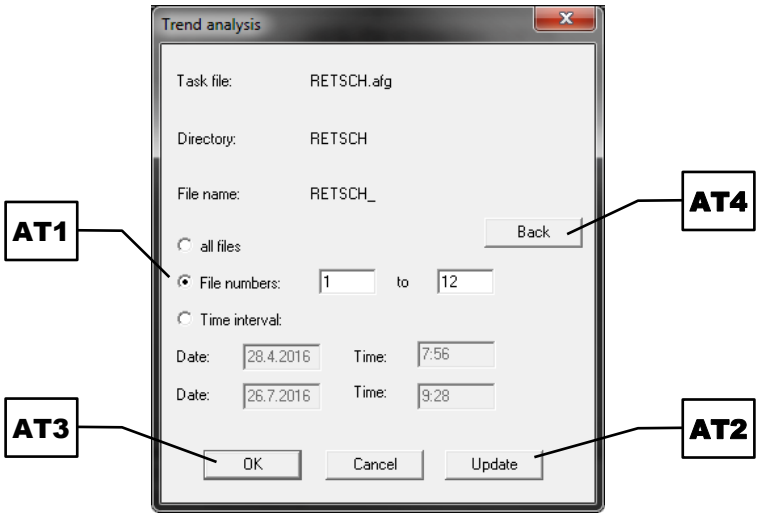


Fig. 45: Dialogue box for file selection for the trend analysis

A trend analysis should be carried out only with measurement results from the same series of measurements (i.e. measured with the same sieve task). The files must all be located in the same directory, but not necessarily have the same file name. With the selection of the first, arbitrary RDF file, the sieve task, the storage directory, as well as the file name are specified and displayed in the upper section of the "Trend analysis" dialogue box.

⇨ Select one of the three radio buttons (**AT1**) for the selection of the RDF files to be analysed:

- ⟨all files⟩: all RDF files in the specified directory will be added to the trend analysis, regardless of the file name. By default, the X axis shows the time.
- ⟨File numbers⟩: all RDF files with the specified file name are added to the trend analysis, whereas the range of the file numbers can be selected. By default, the X axis shows the file number.
- ⟨Time interval⟩: all RDF files with the specific file name are added to the trend analysis, whereas the time interval can be selected. By default, the X axis shows the time.

⇨ If a modification in the setting is made, click the [Update] button (**AT2**) to update the edit boxes of the time interval and the file number accordingly.

⇨ Click [OK] (**AT3**), to confirm the selection.

⇨ To select another series of measurements, click the [Back] button (**AT4**). The "Open File" dialogue box opens again.

⇨ To abort the process, click the [Cancel] button.

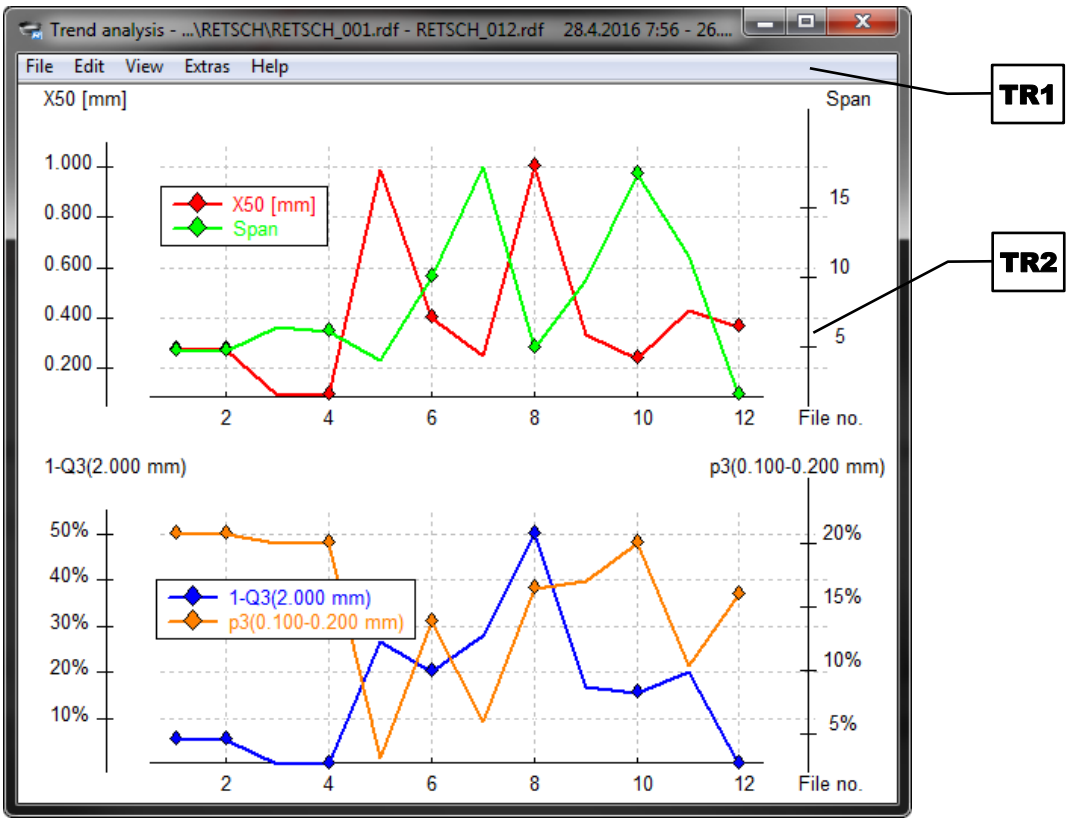


Fig. 46: Trend analysis window

In the client area (**TR2**) of the trend analysis window, up to two coordinate systems, each with up to two characteristics can be displayed simultaneously.

All functions of the trend analysis window can be accessed via the menu bar (**TR1**).

NOTICE If any changes of the settings made here shall remain effective also in subsequent measurements, the sieve task must be saved anew after the modification (→ Chapter "Save Sieve Task").

6.4.5.1 Functions of the Menu Bar Item "File"

The menu bar item │File│ contains menu functions for printing the window content and for closing the evaluation window.

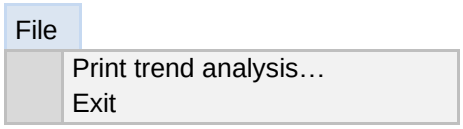


Fig. 47: Trend analysis window: menu functions of the menu bar item │File│

Menu function │Print trend analysis│:
Via the menu function │Print trend analysis│ the content of the trend analysis window can be printed.

⇨ In the trend analysis window, click on the menu bar item │File│ and select │Print trend analysis│ from the context menu. The printer configuration dialogue box opens.
⇨ Make the desired print settings.
⇨ Click [OK] to print the trend analysis.
⇨ To abort the process, click the [Cancel] button.

NOTICE For better identification, the file names of the raw data file (RDF file) and the sieve task (AFG file) are inserted as header.

NOTICE The font size and font type are defined by the setting in the menu function │Printer font│ of the main window (→ Chapter "Printer Font").

Menu function │Exit│:
Via the menu function │Exit│, the evaluation window can be closed.

⇨ In the evaluation window, click on the menu bar item │File│ and select │Exit│ from the context menu. The evaluation window closes.

6.4.5.2 Functions of the Menu Bar Item "Edit"

The menu bar item │Edit│ contains menu functions for copying results to the clipboard.

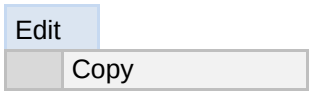


Fig. 48: Trend analysis window: menu functions of the menu bar item │Edit│

Menu function │Copy│:
Via the menu function │Copy│, the content of the evaluation window is copied to the clipboard as graphic.

⇨ In the evaluation window, click on the menu bar item │Edit│ and select │Copy│ from the context menu. The corresponding data of the currently loaded RDF file are copied as graphic to the clipboard.

NOTICE For better identification, the file names of the raw data file (RDF file) and the sieve task (AFG file) are inserted as header.

6.4.5.3 Functions of the Menu Bar Item "View"

The menu bar item │View│ contains menu functions for selecting the characteristics and units to be displayed.

Fig. 49: Trend analysis window: menu functions of the menu bar item │View│

Menu function │Settings│:
Via the menu function │Settings│, sample-specific characteristics to be displayed can be selected. ***NOTICE*** This menu function is not available in measurement mode.

⇨ In the trend analysis window, click on the menu bar item │View│ and select │Settings│ from the context menu. The dialogue box for selecting the characteristics opens.

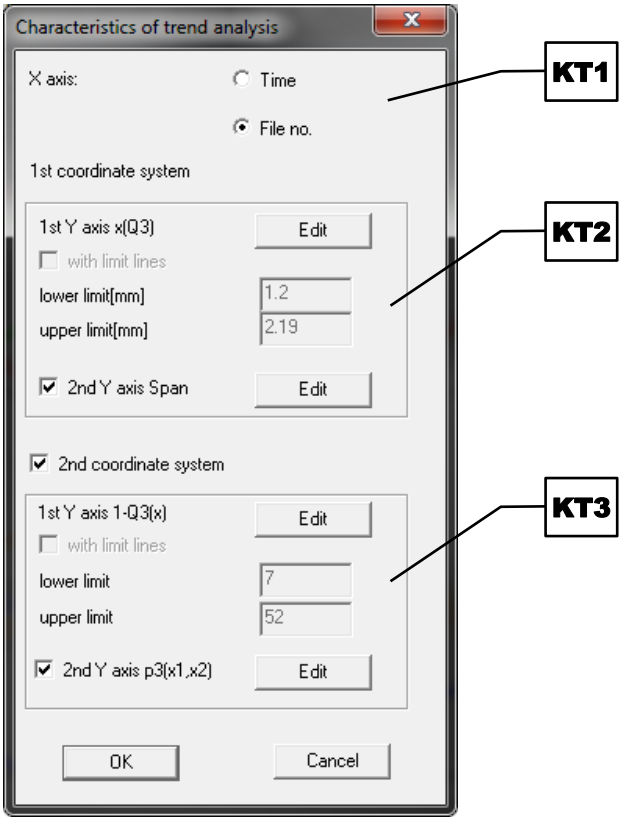


Fig. 50: Setting options of the trend analysis window

⇨ Select one of the two radio buttons in the section of the X axis (**KT1**), to either display the time or file numbers on the X axis.

⇨ Click on the [Edit] button(s) in the section of the first coordinate system (**KT2**) in order to select the characteristic for the first and/or second Y axis. The dialogue box for selecting the characteristic of the Y axis opens.

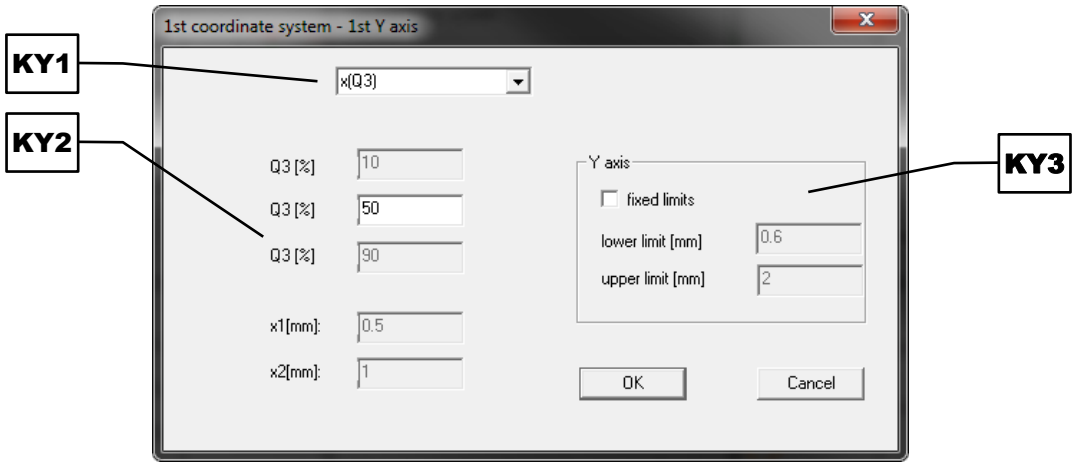


Fig. 51: Selection of the characteristic for the Y axis

⇨ Select the characteristic of the Y axis from the dropdown list (**KY1**). Depending on the selection, different edit boxes (**KY2**) will be activated.
⇨ Enter the desired value in the relevant edit boxes (**KY2**).
⇨ Enter, if desired, fixed limits (**KY3**) for the Y axis. Otherwise, the limits are set automatically.

The following characteristics are available (a detailed description of the individual characteristics can be found in Chapter "List of Characteristics"):

Characteristic	Description
$x(Q_3)$	Displays the particle size, which is located in the cumulative distribution at the position of the value entered in the edit box Q_3.
$Q_3(x)$	Displays the value of the cumulative distribution located at the particle size value entered in the edit box x1.
$1 – Q_3(x)$	Displays the value of the cumulative distribution of residue located at the particle size value entered in the edit box x1.
$p_3(x1,x2)$	Displays the value of the fraction, which results from the values entered as particle size range in the two edit boxes x1 and x2.
Span	Displays the width of the distribution, which results from the values entered in the three edit boxes Q_3.
U	Displays the symmetry (non-uniformity) of the distribution. This characteristic cannot be edited.

⇨ Click [OK] to apply the settings.
⇨ To discard the changes, click the [Cancel] button.

In the trend analysis, limit lines for the first Y axis can be defined if required, illustrating the exceeding or falling below of certain thresholds. The checkbox ⟨with limit lines⟩ in the section of the first coordinate system (**KT2**) can only be checked, if the second Y axis is inactive.

If desired, a second coordinate system (**KT3**) can be displayed in the trend analysis window by checking the respective checkbox. The selection of the characteristics is carried out in the same way as described for the first coordinate system. The second coordinate system is always displayed below the first coordinate system in the trend analysis window.

Menu function │Units│:
Via the menu function │Units│, the measurement units to be displayed can be selected.

- ⇨ In the trend analysis window, click on the menu bar item │View│ and select │Units│ from the context menu. The dialogue box for selecting the measurement units opens.
- ⇨ Select whether the size classes are to be displayed in mm or µm.
- ⇨ Select whether the distributions are to be displayed normalised in the rage of 0 – 1 or in percent.
- ⇨ Select whether the time for the accordingly configured X axis is to be displayed in days, hours or minutes.
- ⇨ Click [OK] to apply the settings.
- ⇨ To discard the changes, click the [Cancel] button.

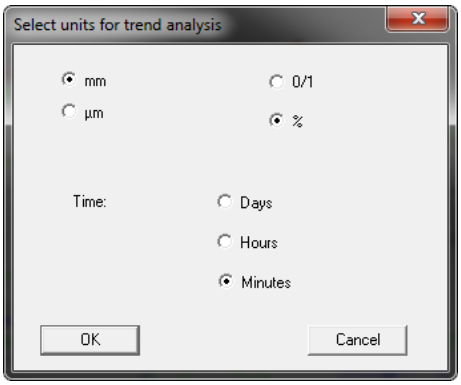


Fig. 52: Dialogue box of measurement units in the trend analysis window

6.4.5.4 Functions of the Menu Bar Item "Extras"

The menu bar item │Extras│ contains menu functions for selecting the colour of curves.

Fig. 53: Trend analysis window: menu functions of the menu bar item │Extras│

Menu function │Colours│:
The menu function │Colours│ allows for the free colour mapping of each curve.

- ⇨ In the trend analysis window, click on the menu bar item │Extras│ and select │Colours│ from the context menu. The corresponding dialogue box opens.
- ⇨ Click on the colour field of an arbitrary Y axis of the first or second coordinate system. The dialogue box for selecting the colours opens.
- ⇨ Select one of the basic colours, or define a new colour via the [Define Custom Colors >>] button.
- ⇨ Confirm the colour selection with [OK].
- ⇨ To abort the colour selection, click the [Cancel] button.

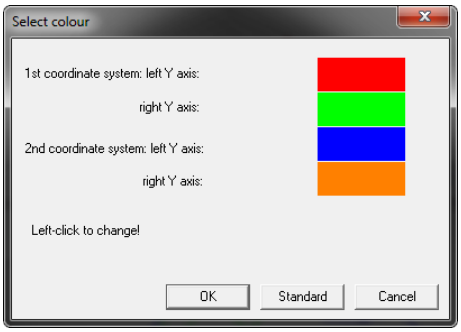


Fig. 54: Settings for the colour of the curves in the trend analysis window

⇨ Click [OK], to apply the changed colour selection to the individual Y axes.
⇨ To restore the colour selection, click the [Standard] button.
⇨ To discard the changes, click the [Cancel] button.

6.4.5.5 Functions of the Menu Bar Item "Help"

The menu bar item │Help│ opens the manual as PDF file.

6.5 Functions of the Main Menu Item "Options"

NOTICE This function is not available in measurement mode.

The main menu item │Options│ contains menu functions for adjusting the size classes, sieving parameters and sieve stock. In addition, reference distributions can be entered.

Options

Change particle size limits…
Sieving parameters… Size classes…
Sieve stock…
Input reference distribution…

Fig. 55: Menu functions in the main menu item │Options│

In the following subchapters, each menu function of the main menu item │Options│ is described in detail and can be referred to individually.

6.5.1 Change Particle Size Limits

Via the menu function │Change particle size limits│, the size range of already conducted sieving processes can be expanded downwards (minimum particles) and/or upwards (maximum particles).

⇨ In the main window, click on the menu bar item │Options│ and select │Change particle size limits│ from the context menu. The corresponding dialogue box opens.
⇨ To define the lower limit, check the respective checkbox. The edit box (**KG1**) is activated.
⇨ Enter the desired lower limit in the edit box (**KG1**). Here, the value of the edit box must be smaller than the smallest mesh size used during the sieving process.
⇨ To define the upper limit, check the respective checkbox. The edit box (**KG2**) is activated.

⇨ Enter the desired upper limit in the edit box (**KG2**). Here, the value of the edit box must be bigger than the biggest mesh size used during the sieving process.
⇨ Click [OK] to apply the settings.
⇨ To abort the process, click the [Cancel] button.

NOTICE If invalid values are entered in the edit boxes, the text cursor jumps in the edit box concerned when clicking [OK].

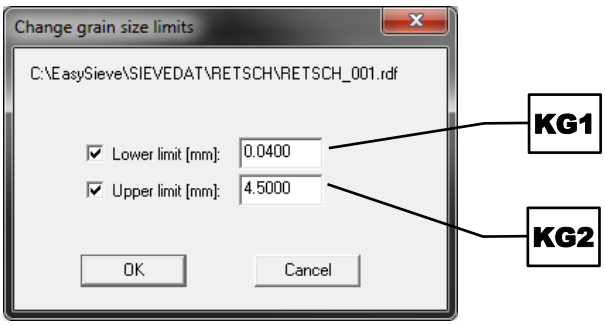


Fig. 56: Setting the particle size limits

NOTICE In order to change the particle size limits permanently in the current RDF file, the RDF file must be subsequently saved anew via the menu function │File│Save result file as│. The corresponding sieve task (AFG file) and size class file (GKL file) are not modified in this process.

6.5.2 Sieving Parameters

Via the menu function │Sieving parameters│, the sieving parameters of the currently loaded sieve task (AFG file) can be modified.

⇨ In the main window, click on the menu bar item │Options│ and select │Sieving parameters│ from the context menu. The corresponding dialogue box opens.

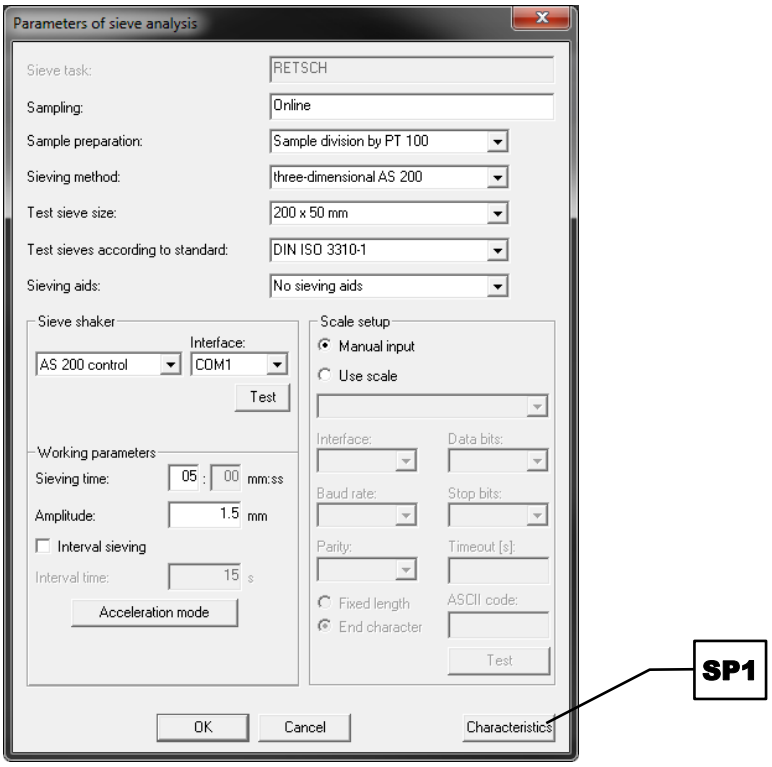


Fig. 57: Sieving parameters

⇨ Make the desired settings as described in Chapter "New Sieve Task".
⇨ Click the [Characteristics] button (**SP1**) to open the dialogue box "Select characteristics" and make the desired settings.
⇨ Click [OK] to apply the settings.
⇨ To abort the process, click the [Cancel] button.

NOTICE If any changes of the settings made here shall remain effective also in subsequent measurements, the sieve task must be saved anew after the modification (→ Chapter "Save Sieve Task").

6.5.3 Size Classes

Via the menu function │Size classes│, new sieve series can be created, existing size class files (GKL file) can be modified, or the properties of individual test sieves can be viewed.

⇨ In the main window, click on the menu bar item │Options│ and select │Size classes│ from the context menu. The corresponding dialogue box opens.
⇨ Select one of the two radio buttons (**GK1**) in order to select whether the mesh sizes are to be displayed in ⟨mm⟩ or ⟨µm⟩.

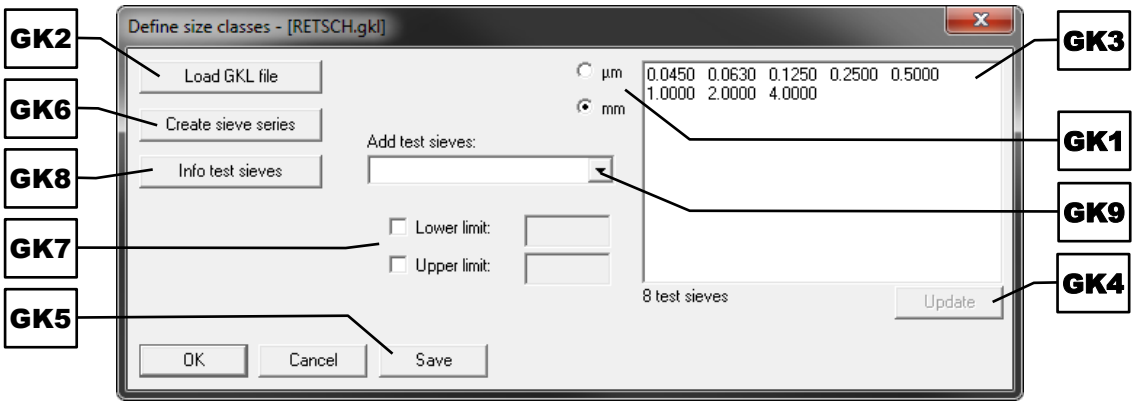


Fig. 58: Define size classes

Load size class file:

⇨ Click the [Load GKL file] button (**GK2**). The dialogue box for selecting the GKL file opens.
⇨ Select the desired GKL file from the dropdown list.
⇨ Click the [Load] button to read the selected GKL file. The test sieves contained in the selected GKL file are listed in the edit box (**GK3**).
⇨ To abort the process, click the [Cancel] button.

Edit size class file:

In the edit box (**GK3**), test sieves can be removed by deleting the respective mesh size. To add test sieves, the individual mesh sizes can be typed in separated by a space. The order of entry can be made arbitrarily.

⇨ Make the desired modifications in the edit box (**GK3**).
⇨ Click the [Update] button (**GK4**). The mesh sizes are sorted by size.

NOTICE A maximum of 30 mesh sizes can be entered. If the sieve series is derived from ASTM mesh or Tyler mesh, only a deletion of individual classes or a reinsertion of previously deleted ASTM mesh or Tyler mesh classes is possible.

Save size class file:

⇨ To save modifications made, click the [Save] button (**GK5**). The dialogue box "Set file name" opens.
⇨ To overwrite an existing GKL file with the test sieves currently entered in the edit box (**GK3**), select the desired file from the combo box.
⇨ To create a new GKL file with the test sieves currently entered in the edit box (**GK3**), enter a new name in the combo box.
⇨ Click [OK]. If an existing GKL file is now to be overwritten, confirm this in the following dialogue box.
⇨ To abort the process, click the [Cancel] button.

Create sieve series:

⇨ Click the [Create sieve series] button (**GK6**). The dialogue box "Sieve series" opens.
⇨ Select the desired sieve series from the dropdown list (**SR1**). The following sieve series are available: Renard series R5, R20/3, R10, R40/3, R20, R40, R10/3, as well as ASTM mesh, and Tyler mesh.
⇨ Enter the size range for the sieve series from x_{min} to x_{max} in mm in the corresponding edit boxes (**SR2**).
⇨ Click [OK] to read the selected sieve series.
⇨ To abort the process, click the [Cancel] button.

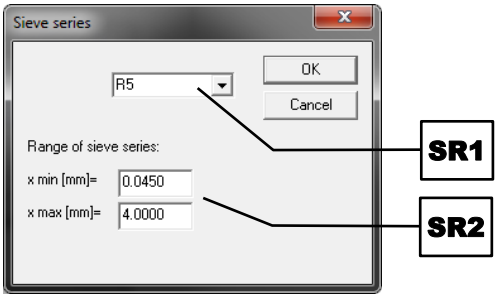


Fig. 59: Define a sieve series

NOTICE If, for the selected settings, a sieve series with more than 30 test sieves should result, a corresponding notice appears and only the first 30 mesh sizes of the sieve series are listed in the edit box (**GK3**).

Determine the particle size limits:
Optionally, a lower particle size limit (minimum particles) and/or an upper particle size limit (maximum particles) can be determined.

⇨ Check the checkbox of the lower and/or upper limit and enter the desired limits in the corresponding edit boxes (**GK7**).

A subsequent change of the particle size limits is possible via the main menu function │Options│Change particle size limits│ (→ Chapter "Change Particle Size Limits").

Information on test sieves:

⇨ Click the [Info test sieves] button (**GK8**) to view the properties of the test sieves currently contained in the edit box (**GK3**). The corresponding dialogue box opens.

Add test sieves:
If test sieves were deposited in the sieve stock via the main menu function │Options│Sieve stock│, they can be added to the sieve series in the edit box (**GK3**).

⇨ Select the desired test sieve of the sieve stock from the dropdown list (**GK9**).

⇨ Acknowledge the notice, that the test sieve was added to the current sieve series with [OK]. The mesh size of the selected test sieve is now listed in the edit box (**GK3**).

NOTICE If changes of the size classes made here shall remain effective, the GKL file must be subsequently saved anew after the modification via the [Save] button (**GK5**).

6.5.4 Sieve Stock

Via the menu function │Sieve stock│, a fixed stock of test sieves can be created and managed.

⇨ In the main window, click on the menu bar item │Options│ and select │Sieve stock│ from the context menu.

Next to the mesh size of the test sieve, the sieve stock also includes its tare weight and an unequivocal assignment (ideally the serial number). This facilitates a subsequent sieving process, as the test sieves need not to be weighed empty beforehand. However, this requires a careful cleaning of the test sieves, to always maintain the exact tare weight.

If sieving processes have already been performed, the test sieves of the used size class files will also be listed in the dropdown list (**SB1**) of the sieve stock. These automatically created test sieves are marked with "*". A corresponding notice is displayed in this case.

⇨ Click [OK], to acknowledge the notice. The dialogue box "Sieve stock" opens.

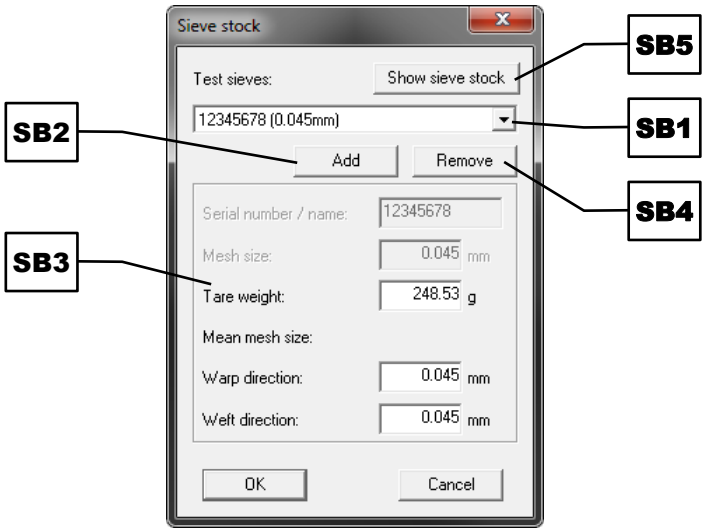


Fig. 60: Sieve stock

Add a test sieve to the sieve stock:

⇨ Click the [Add] button (**SB2**). A dialogue box for adding a test sieve opens.
⇨ Enter the serial number or name of the test sieve, as well as its nominal mesh size in the corresponding edit boxes.
⇨ Click [OK] to add the test sieve to the sieve stock.
⇨ To abort the process, click the [Cancel] button.
⇨ Enter the tare weight and, if known, the warp and weft direction of the test sieve in the corresponding edit boxes (**SB3**).
⇨ Click [OK] to save the changes.
⇨ To discard the changes, click the [Cancel] button.

ⓘ Newly entered test sieves are marked with "*" in the dropdown list (**SB1**). If the dialogue box "Sieve stock" is closed by clicking [OK] and later on opened again, the previously entered test sieves are now listed without marking in the dropdown list (**SB1**).

Remove a test sieve from the sieve stock:

⇨ Click the [Remove] button (**SB4**).
⇨ In the following dialogue box, click [Yes] to confirm the removal of the test sieve from the sieve stock.
⇨ To abort the process, click [No].

NOTICE If the test sieve is listed in one or more stored GKL files, this test sieve should also be removed from the affected size class files. A corresponding dialogue box informs on that in this case.

Sieve stock list:

⇨ Click the [Show sieve stock] button (**SB5**). The dialogue box of the test sieves stored in the sieve stock opens.
⇨ Select one of the two radio buttons, to either sort the list by serial number or by mesh size.

⇨ Click the [Copy (ASCII)] button, to copy the corresponding data of the sieve stock list as text to the clipboard.

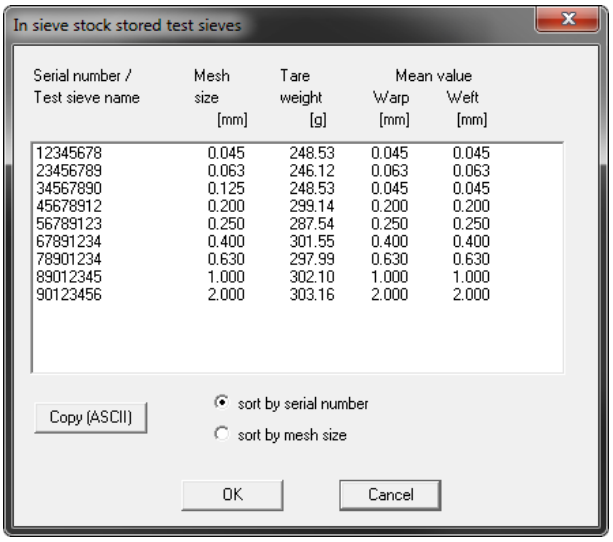


Fig. 61: Sieve stock list

6.5.5 Input Reference Distribution

Via the menu function │Input reference distribution│, reference files (REF file) can be created, edited and stored.

⇨ In the main window, click on the menu bar item │Options│ and select │Input reference distribution│ from the context menu. The corresponding dialogue box opens.

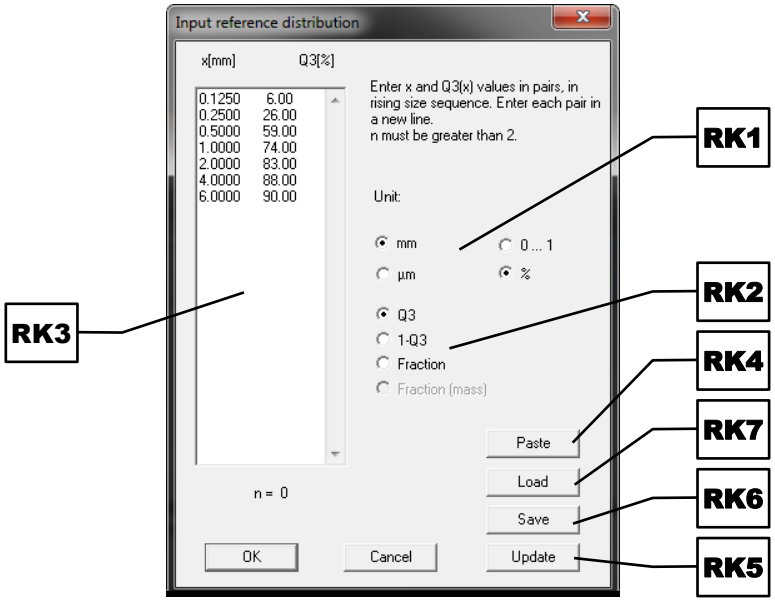


Fig. 62: Input reference distribution

Create reference file:

⇨ Select the units (**RK1**) with which the data of the reference distribution is to be entered. The particle size can either be entered in ⟨mm⟩ or ⟨µm⟩, the distribution either in ⟨%⟩ or

normalised from ⟨0…1⟩. Values already listed in the edit box (**RK3**) will be converted and updated.

⇨ Select the type of the distribution (**RK2**), which is to be entered. The values can be entered as cumulative distribution ⟨Q_3⟩, cumulative distribution of residue ⟨1 – Q_3⟩, volume-based ⟨Fraction⟩, or mass-based ⟨Fraction (mass)⟩.

⇨ Enter the values in pairs and separated by a space in the edit box (**RK3**) as described in the information box. When entering fractions, the sum must amount 100 % or 1. Alternatively, the data can be inserted from the clipboard in text format via the [Paste] button (**RK4**).

⇨ Click the [Update] button (**RK5**) to check the input and update the formatting.

Save reference file:

⇨ Click the [Save] button (**RK6**). The dialogue box "Set file name" opens.

⇨ To overwrite an existing REF file with the values currently entered in the edit box (**RK3**), select the desired file from the combo box.

⇨ To create a new REF file with the values currently entered in the edit box (**RK3**), enter a new name in the combo box.

⇨ Click [OK]. If an existing REF file is now to be overwritten, confirm this in the following dialogue box.

⇨ To abort the process, click the [Cancel] button.

Load reference file:

⇨ Click the [Load] button (**RK7**). The "Open File" dialogue box opens.

⇨ Select the desired REF or CCG file. It is also possible to read a text file created by a text editor. This file must consist of the two columns particle size x and cumulative distribution $Q_3(x)$, whereas x must be listed in ascending order.

⇨ Click the [Open] button. The dialogue box closes and the selected file is loaded. Values, that might have been already contained in the edit box (**RK3**) are overwritten.

⇨ To abort the process, click the [Cancel] button.

NOTICE For both, the pasting from the clipboard, and the loading of text files, tabulators or spaces are interpreted as a delimiter. Commas or dots are interpreted as decimal mark.

Edit reference file:

Values can be added to or removed from the edit box (**RK3**).

⇨ Make the desired modifications in the edit box (**RK3**).

⇨ Click the [Update] button (**RK5**).

⇨ To save any changes made, click the [Save] button (**RK6**).

Afterwards, up to two reference distributions can be displayed in the graph window and for example construed as comparison curves or min. / max. threshold curves (→ Chapter "Graph").

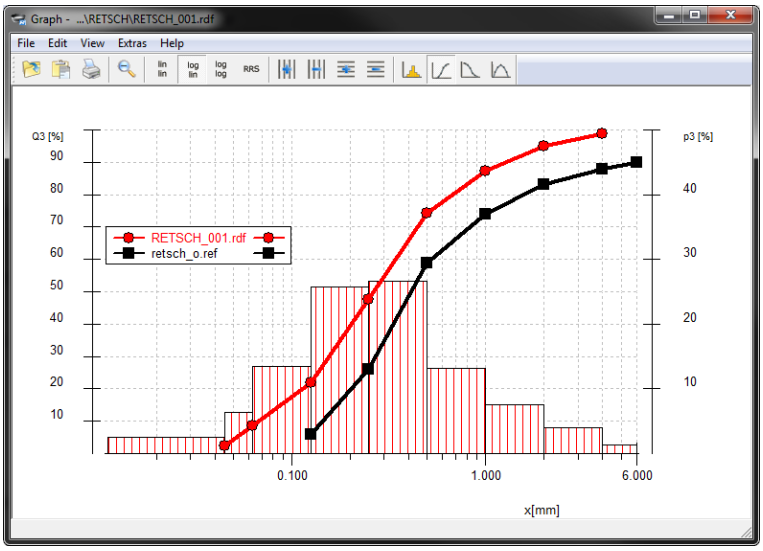


Fig. 63: Graph with reference distribution

6.6 Functions of the Main Menu Item "Extras"

The main menu item │Extras│ contains menu functions for adjusting programme-specific settings. Here, the password protection can also be enabled or disabled, as well. In addition, the communication between PC and sieve shaker and/or scale can be logged.

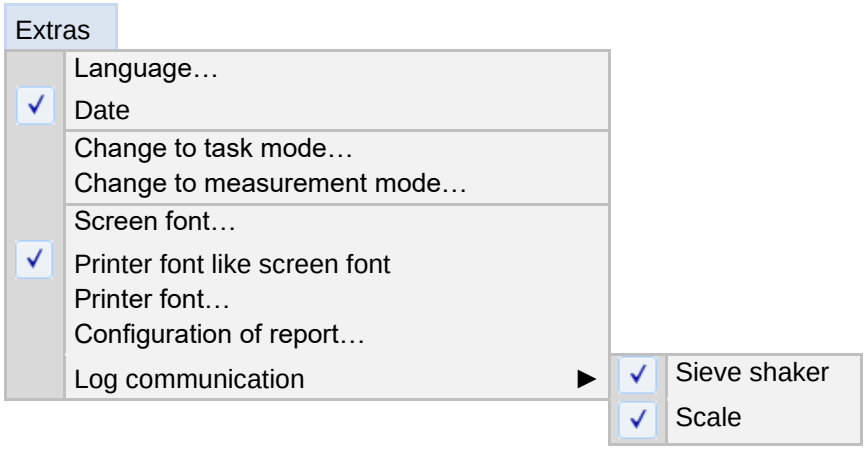


Fig. 64: Menu functions in the main menu item │Extras│

In the following subchapters, each menu function of the main menu item │Extras│ is described in detail and can be referred to individually.

6.6.1 Language

Via the menu function │Language│, the menu language of the EasySieve® programme can be selected.

⇨ In the main window, click on the menu bar item │Extras│ and select │Language│ from the context menu. The dialogue box for selecting the language opens.

⇨ Select the desired language from the dropdown list. Currently, only the German or English menu navigation is available.

⇨ Click [OK]. A notice is displayed, that the change of the menu language will only become effective after a restart of the programme.

⇨ Click [OK] to acknowledge the notice and close the EasySieve® programme.
⇨ Open the EasySieve® programme again by double-clicking the corresponding desktop icon. The menu navigation is now displayed in the previously selected language.

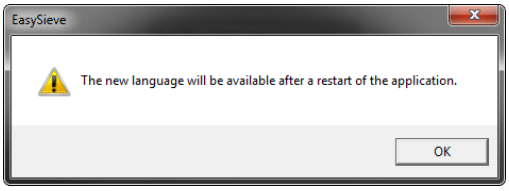


Fig. 65: Notice to restart after language selection

6.6.2 Date

NOTICE This function is not available in measurement mode.

With activated menu function │Date│, the date and time of the sieving process are automatically adopted and displayed in the measurement report, as well as the characteristics window. With deactivated menu function, the respective boxes in the report and characteristics remain empty.

⇨ In the main window, click on the menu bar item │Extras│ and select │Date│ from the context menu. The activated date function is marked with the ✓ icon in front of the context menu item.
⇨ To deactivate the date function, click again on the menu bar item │Extras│ in the main window and select │Date│ from the context menu. The context menu item is unmarked again.

6.6.3 Change to Task Mode

The menu function │Change to task mode│ is only active when the EasySieve® programme is in measurement mode. After the installation of the EasySieve® programme, the task mode is activated by default and all menu functions are enabled.

With activated measurement mode, the menu function │Change to task mode│ allows to change back to the task mode after entering the correct password.

⇨ In the main window, click on the menu bar item │Extras│ and select │Change to task mode│ from the context menu. The dialogue box for entering the password opens.
⇨ Enter the password in the edit box.
⇨ Click [OK]. The EasySieve® programme returns to the task mode and a corresponding dialogue box is displayed.
⇨ To abort the process, click the [Cancel] button.

6.6.4 Change to Measurement Mode

NOTICE This function is not available in measurement mode.

To avoid unintended changes to parameters, the EasySieve® programme can be switched to measurement mode via the menu function │Change to measurement mode│. In this mode, it is only possible for the user to carry out measurements and perform evaluations.

⇨ In the main window, click on the menu bar item │Extras│ and select │Change to measurement mode│ from the context menu. The dialogue box for entering the password opens.

- ⇨ Enter the password in the first edit box.
- ⇨ Repeat the password in the second edit box.
- ⇨ Click [OK]. The password is stored and with immediate effect, the EasySieve® programme is in measurement mode.
- ⇨ To abort the process, click the [Cancel] button.

NOTICE It is to maintain a careful handling of passwords in order to prevent abuse and unwanted programme lock! If a password has been set, the EasySieve® programme remains in measurement mode also for the next programme start. A return to the task mode is only possible with the correct password!

6.6.5 Screen Font

NOTICE This function is not available in measurement mode.

Via the menu function │Screen font│, the font type and font size of the report and evaluation windows displayed on screen can be selected. The settings are retained also on next programme start.

- ⇨ In the main window, click on the menu bar item │Extras│ and select │Screen font│ from the context menu. The "Font" dialogue box opens.
- ⇨ Select the desired font, the font style, as well as the size from the corresponding combo boxes.
- ⇨ Click [OK] to apply the settings.
- ⇨ To discard the changes, click the [Cancel] button.

6.6.6 Printer Font Like Screen Font

With activated menu function │Printer font like screen font│, the font for the printouts is automatically adjusted according to the screen font.

- ⇨ In the main window, click on the menu bar item │Extras│ and select │Printer font like screen font│ from the context menu. The activated function is marked with the ✓ icon in front of the context menu item and the menu function │Printer font│ is disabled.
- ⇨ To deactivate the function, click again on the menu bar item │Extras│ in the main window and select │Printer font like screen font│ from the context menu. The context menu item is unmarked and the menu function │Printer font│ is enabled again.

6.6.7 Printer Font

NOTICE This function is not available in measurement mode.

Via the menu function │Printer font│, the font type and font size for the printout of the report and evaluation windows can be selected. The settings are retained also on next programme start.

- ⇨ In the main window, click on the menu bar item │Extras│ and select │Printer font│ from the context menu. The "Font" dialogue box opens.
- ⇨ Select the desired font, the font style, as well as the size from the corresponding combo boxes.
- ⇨ Click [OK] to apply the settings.
- ⇨ To discard the changes, click the [Cancel] button.

6.6.8 Configuration of Report

NOTICE This function is not available in measurement mode.

Via the menu function │Configuration of report│, an additional, custom company logo can be included in the report (measurement record). The company logo to be included must be available as 256-color bitmap (BMP file) and be stored in the programme directory C:\EasySieve. It is inserted in the top left of the report, whereas the exact position and size can be set.

⇨ In the main window, click on the menu bar item │Extras│ and select │Configuration of report│ from the context menu. The corresponding dialogue box opens.
⇨ Check the ⟨Additional logo⟩ checkbox and select the desired BMP file from the dropdown list (**KP1**).
⇨ Enter the horizontal distance in mm from the left margin of the printing area in the edit box "Start x" (**KP2**).
⇨ Enter the vertical distance in mm from the upper margin of the printing area in the edit box "Start y" (**KP3**).
⇨ Enter the vertical size of the logo in mm in the edit box "Size y" (**KP4**). The resizing in x direction is proportional.
⇨ Click [OK] to apply the settings.
⇨ To discard the changes, click the [Cancel] button.

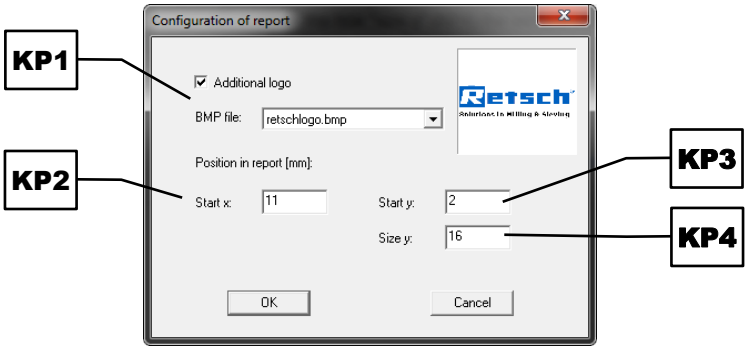


Fig. 66: Configuration of report

6.6.9 Log Communication

Via the menu function │Log communication│, the communication between the EasySieve® programme and the sieve shaker and/or scale can be recorded in a LOG file in text format. The communication report facilitates the setting up of the communication and supports the search for possible communication errors.

To create the respective communication report, the menu function │Sieve shaker│ and/or │Scale│ must be activated precede the sieving process. The respective communication reports are then stored in the programme directory C:\EasySieve under the name "EasySieve_SievingMachine.log" or "EasySieve_Balance.log".

⇨ In the main window, click on the menu bar item │Extras│ and select │Log communication│ from the context menu. Another context menu opens.
⇨ Select one of the two subcontext menu items │Sieve shaker│ or │Scale│. The activated communication report is marked with the ✓ icon in front of the subcontext menu item.
⇨ To deactivate the communication report, click again on the menu bar item │Extras│ in the main window and select the respective subcontext menu item in the context menu item │Log communication│. The respective subcontext menu item is unmarked again.

NOTICE The communication report is only active as long as the EasySieve® programme is executed. If the EasySieve® programme is closed and restarted later, all previously activated communication reports are deactivated again.

6.7 Functions of the Main Menu Item "Help"

The main menu item │Help│ contains menu functions for opening the help and for displaying the EasySieve® programme information.

Fig. 67: Menu functions in the main menu item │Help│

In the following subchapters, each menu function of the main menu item │Help│ is described in detail and can be referred to individually.

6.7.1 Help

The menu function │Help│ opens the manual as PDF file.

⇨ In the main window, click on the menu bar item │Help│ and select │Help│ from the context menu. The manual opens.

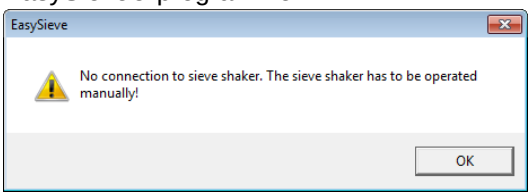
6.7.2 Info EasySieve®

Via the menu function │Info EasySieve│, a dialogue box opens, displaying the version number of the EasySieve® programme.

⇨ In the main window, click on the menu bar item │Help│ and select │Info EasySieve│ from the context menu. The corresponding dialogue box opens.

⇨ Click [OK] to close the dialogue box.

7 Error Messages and Information Notes

Description	Measures
The report is not printed correctly: The report is not printed completely or with a very small font.	⇨ Disable the menu function │Printer font like screen font│ in the EasySieve® programme. ⇨ Set the font size to at least 24 via the menu function │Printer font│.
No connection to the sieve shaker: Although the sieve shaker is connected via a USB cable or RS232-to-USB converter cable and switched on, it is not recognized in the EasySieve® programme.  **Fig. 68:** Notice "No connection to the sieve shaker."	⇨ Check the firm and correct connection of the communication cable and that the sieve shaker is turned on. ⇨ Determine the correct COM port number via the Device Manager and check, if the correct COM port is selected in the EasySieve® programme. ⇨ If the COM port is a double-digit number, assign a single-digit number to the COM port (→ Chapter "Manual COM Port Number Assignment"). ⇨ Turn off the sieve shaker, restart the PC and turn on the sieve shaker again after restart. ⇨ Assure via the Power Options, that the power saving mode of the USB interfaces of the PC is disabled (→ Chapter "Disable the Power Saving Mode of the USB Interface"). ⇨ Reinstall the appropriate device driver (→ Chapter "Installation").
No connection to the scale: A scale is connected via a USB cable, but cannot be selected in the EasySieve® programme.	⇨ Install a virtual driver appropriate for the scale, which converts the USB interface to a COM interface.
Mettler-Toledo scale: Data of an XS (6002 S) scale by the manufacturer Mettler-Toledo are sent to the EasySieve® programme only after pressing the [Print] button twice.	⇨ In the scale settings, set the peripheral device from "Printer" to "Host" (or possibly vice versa).
Mettler-Toledo scale: Data of an XS/XP scale by the manufacturer Mettler-Toledo are not transferred to the EasySieve® programme.	⇨ Select the item "Mettler (PR mode)" in the dropdown list (**NA6**) (→ Chapter "New Sieve Task").
Sartorius scale: Decimal places that are displayed in square brackets (uncalibrated digits) on scales of the manufacturer Sartorius, are interpreted as "0" by the EasySieve® programme.	⇨ In the scale settings, switch the type of communication from "552" to "551".

8 Manual Installation

NOTICE N8.0030

Local administrator rights
The EasySieve® programme requires local administrator rights for installation and operation

- Without full read and write access a smooth installation and a failure-free operation is not guaranteed.
- Insufficient read and write access during operation could result in data loss.
- **Ensure that each Windows user has the necessary read and write access for the installation directory of the programme.**

NOTICE The screenshots of the individual programme installations are illustrated for explanatory purposes and may differ from the versions available on the data storage medium.

In the following chapters, the manual installation of the EasySieve® programme and its required additional software will be described. The setup files are all located on the supplied data storage medium.

⇨ Plug the data storage medium into an available USB port and open the folder "Software" on the data storage medium via the Windows Explorer.
⇨ Run the installation analogous to the consecutively numbered folders starting with "1_USB_driver".

NOTICE Observe the installation sequence!

8.1 USB Driver for Controlling the Sieve Shaker with USB Interface

NOTICE N9.0034

Missing or wrong driver to control the device
Connecting the device without prior installation of the driver

- If a device is connected to the PC without prior installation of the appropriate driver, an incorrect driver can be installed by Windows.
- No communication between PC and device can be established. The control of the device is not possible.
- **Always install the device driver BEFORE connecting the device to the PC!**

The USB driver is required for sieve shakers which feature a USB interface. For sieve shakers with an RS232 interface, the driver for the RS232-to-USB converter cable is required instead.

8.1.1 USB Driver for Vibratory Sieve Shaker AS 200 control / AS 300 control

⇨ Double-click the EXE file "USBDriverInstaller". An installation Wizard will guide through the installation.
⇨ Click [Install Drivers].
⇨ Close the dialog box via the red "Close" button in the upper right corner.

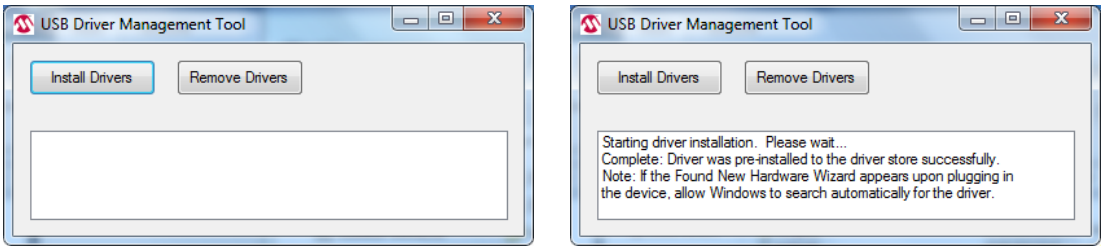


Fig. 69: USB driver installation (AS 200 control / AS 300 control)

After completion of the installation, the Program Compatibility Assistant opens and informs on a potentially incorrect installed programme.

⇨ Click on the link "This program installed correctly."

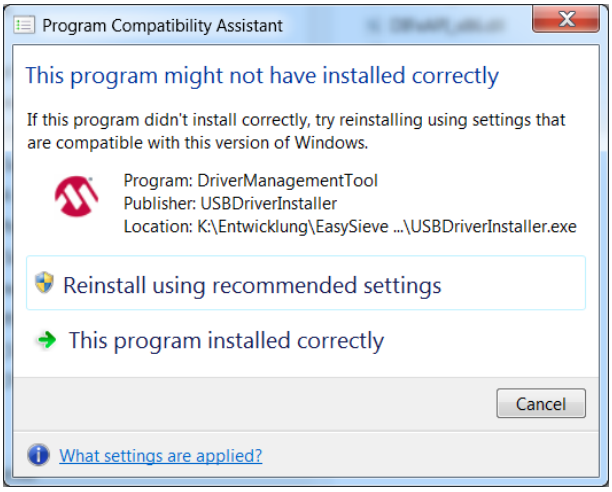


Fig. 70: Program Compatibility Assistant

8.1.2 USB Driver for Air Jet Sieving Machine AS 200 jet

⇨ Double-click the EXE file "CDM21224_Setup".

⇨ Click the [Extract] button. An installation Wizard will guide through the installation.

⇨ Accept the license agreement and click [Next >].

⇨ Click [Finish] to close the dialogue box after completion of the installation.

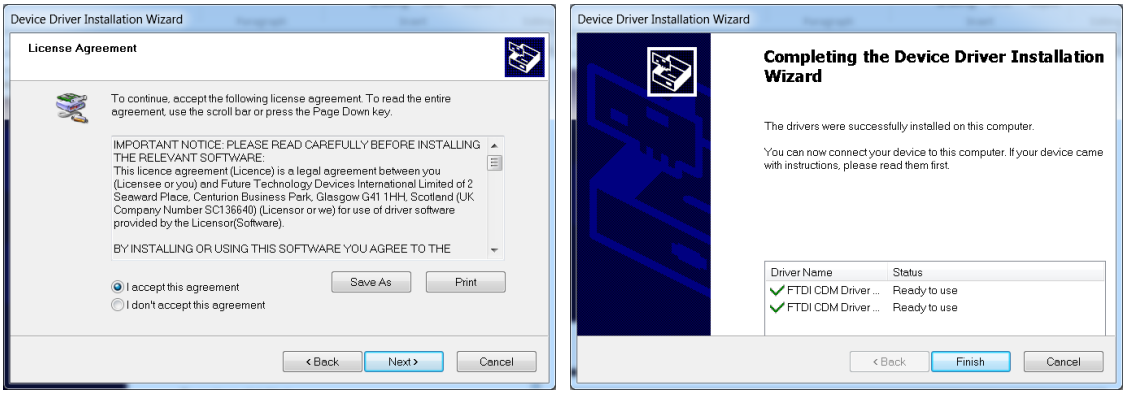


Fig. 71: USB driver installation (AS 200 jet)

8.2 Microsoft Visual C++ 2015 Redistributable 32bit

- ⇨ Double-click the EXE file "en_visual_cpp_2015_redistributable_**x86**". An installation Wizard will guide through the installation of the **32bit version**.
- ⇨ Accept the license agreement and click [Install].
- ⇨ Click [Close] to close the dialogue box after completion of the installation.

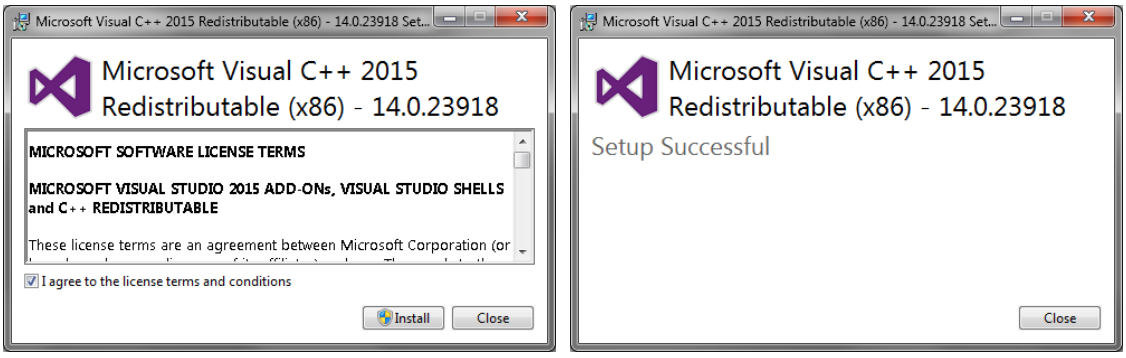


Fig. 72: Microsoft Visual C++ 2015 Redistributable (x86) installation

8.3 EasySieve®

- ⇨ Double-click the EXE file "EasySieve-…" and select the desired installation language. An installation Wizard will then guide through the installation.
- ⇨ Accept the license agreement and insert the nine-digit serial number. Keep the default settings.
- ⇨ Click [Finish] to close the dialogue box after completion of the installation.

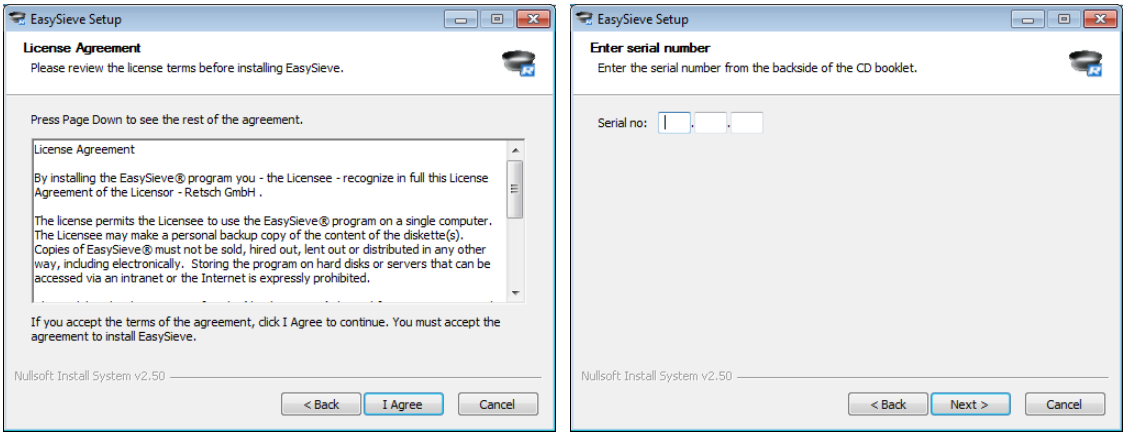


Fig. 73: EasySieve® installation

8.4 RS232-to-USB Converter Driver for Controlling the Scale or a Sieve Shaker with RS232 Interface

NOTICE

N10.0034

Missing or wrong driver to control the device
Connecting the device without prior installation of the driver

- If a device is connected to the PC without prior installation of the appropriate driver, an incorrect driver can be installed by Windows.
- No communication between PC and device can be established. The control of the device is not possible.

• **Always install the device driver BEFORE connecting the device to the PC!**

The RS232-to-USB converter cable supplied with the data storage medium is required to connect a sieve shaker, which features an RS232 interface. For sieve shakers with a USB interface, the USB driver is required instead.

The RS232-to-USB converter cable may also be used for the optional connection of a scale with an RS232 interface. For the correct set-up of the scale for communication with EasySieve, please refer to the operating instructions of the scale.

⇨ Insert the data storage medium in an available USB port and navigate via the Windows Explorer to the subfolder "CP210x_RS232-to-USB_adapter" located on the data storage medium under \Software\Additional_software.
⇨ If **Windows** is installed as a **32bit** system on the PC, double-click the EXE file "CP210xVCPInstaller_**x86**". An installation Wizard will guide through the installation.
⇨ If **Windows** is installed as a **64bit** system on the PC, double-click the EXE file "CP210xVCPInstaller_**x64**". An installation Wizard will guide through the installation.
⇨ Accept the license agreement and keep the default settings.
⇨ Click [Finish] to close the dialogue box after completion of the installation.

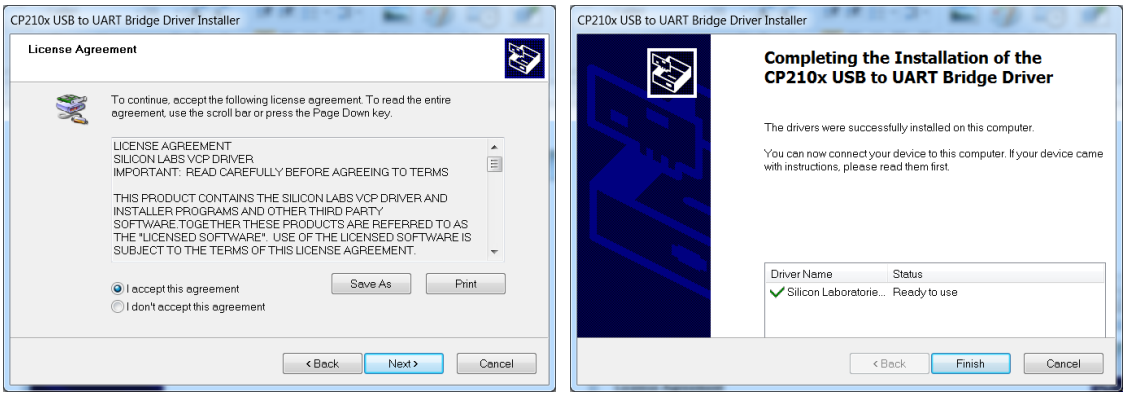


Fig. 74: RS232-to-USB converter driver installation

⇨ Plug the supplied RS232-to-USB converter cable into an available USB port. Windows will automatically install the correct driver.

9 Accessories

Information on available accessories as well as the respective manuals are accessible directly on the Retsch GmbH homepage (http://www.retsch.com) under the heading "Downloads" of the device.

Information on wear parts and small accessories can be found in the Retsch GmbH general catalogue also available on the homepage.

In case of any questions concerning spare parts please contact the Retsch GmbH representative in your country, or Retsch GmbH directly.

10 Disposal

In the case of a disposal, the respective statutory requirements must be observed. In the following, information on the disposal of electrical and electronic devices in the European Community are given.

Within the European Community the disposal of electrically operated devices is regulated by national provisions that are based on the EU Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE).

Accordingly, all devices supplied after August 13th 2005 in the business-to-business area, to which this product is classified, may no longer be disposed of with municipal or household waste. To document this, the devices are provided with the disposal label.

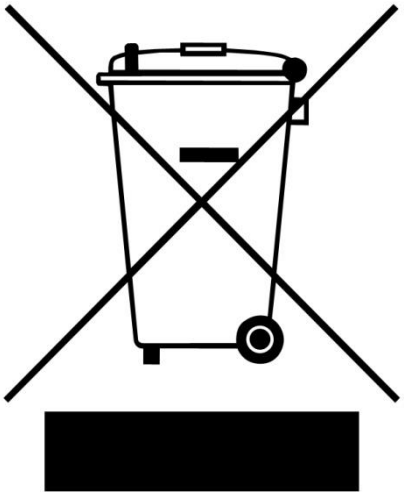


Fig. 75: Disposal label

Since the disposal regulations worldwide and also within the EU may differ from country to country, the supplier of the device should be consulted directly in case of need.

This labelling obligation is applied in Germany since March 23rd 2006. From this date on, the manufacturer must provide an adequate possibility of returning all devices delivered since August 13th 2005. For all devices delivered before August 13th 2005 the end user is responsible for the proper disposal.

11 Appendix

11.1 List of Characteristics

Characteristic	Description
$x(Q_3)$	**Particle size:** Displays the particle size x at a certain value of the cumulative distribution $Q_3(x)$. The index 3 indicates that the distribution is volume-based.
$p_3(x1,x2)$	**Fraction:** Displays the ratio p of particles in the particle size range between > x1 and ≤ x2. The index 3 indicates that the fraction is volume-based. The fraction is calculated by $p_3(x1, x2) = Q_3(x2) - Q_3(x1)$
$Q_3(x)$	**Cumulative distribution:** Displays the ratio Q of all particles with a particle size ≤ x. The index 3 indicates that the distribution is volume-based.
$1 – Q_3(x)$	**Cumulative distribution of residue:** Displays the ratio (1 – Q) of all particles with a particle size > x. The index 3 indicates that the distribution is volume-based.
$q_3(x)$	**Frequency distribution:** Displays the ratio q of particles with a particles size = x. The index 3 indicates that the distribution is volume-based. The frequency distribution is defined as the first derivative of the cumulative distribution curve and calculated by $q_3(x) = \frac{d}{dx} Q_3(x)$
$q_3^*(x)$	**Logarithmic frequency distribution:** Displays the ratio q* of particles with a particle size = x, whereas the frequency distribution is derived from the logarithmic cumulative distribution curve. The index 3 indicates that the distribution is volume-based. The logarithmic frequency distribution is calculated by $q_3^*(x) = \frac{d}{dx} \log[Q_3(x)]$

<table>
<tr><td>D_{10}, D_{50}, D_{90}</td><td>Particle size at a certain value of the cumulative distribution:
The D_{10}, D_{50} and D_{90} values serve to characterise a sample in the particle size analysis. The following applies:
$D_y = x_y = x(Q_3)$ with $Q_3 = y\,\%$

<table><tr><th>Value</th><th>Description</th></tr><tr><td>D_{10}</td><td>10 % of all particles (volume-based) in the sample are smaller or equal to the D_{10} value. The particle size is also often depicted as x_{10}. It is a measure of the smallest particles in the sample.</td></tr><tr><td>D_{50}</td><td>50 % of all particles (volume-based) in the sample are smaller or equal to the D_{50} value. The particle size is referred to as median or mean diameter and often also depicted as x_{50}.</td></tr><tr><td>D_{90}</td><td>90 % of all particles (volume-based) in the sample are smaller or equal to the D_{90} value. The particle size is also often depicted as x_{90}. It is a measure of the biggest particles in the sample.</td></tr></table>
The closer together the D_{10} and D_{90} values are, the narrower the particle size distribution.</td></tr>
<tr><td>Span</td><td>Span value:
Displays the width of the distribution. The Span value is calculated by
$Span = \frac{x(Q3) - x(Q1)}{x(Q2)}$
Whereas by default, the following cumulative distribution values are used:
$Q1 = 10\,\%$
$Q2 = 50\,\%$
$Q3 = 90\,\%$</td></tr>
<tr><td>U</td><td>Non-uniformity:
Displays the symmetry of the distribution. The non-uniformity is calculated by
$U = \frac{x_{60}}{x_{10}}$
Whereby:
$x_{10} = x(Q_3)$ with $Q_3 = 10\,\%$
$x_{60} = x(Q_3)$ with $Q_3 = 60\,\%$</td></tr>
<tr><td>S_V</td><td>Volume-based specific surface area:
Displays the ratio between the surface area A of all particles x_i and the volume V of all particles x_i in the sample in mm^{-1}. The volume-based specific surface area is calculated by
$S_V = \frac{\sum_i A(x_i)}{\sum_i V(x_i)}$</td></tr>
<tr><td>S_m</td><td>Mass-based specific surface area:
Displays the ration between the surface area A of all particles x_i and the mass m of all particles x_i in the sample in cm^2/g. the mass-based specific surface area is calculated by
$S_m = \frac{\sum_i A(x_i)}{\sum_i m(x_i)}$</td></tr>
</table>

D_S	**Sauter diameter:** Displays the equivalent diameter D_S of equal spheres K_i having the same specific surface area S_V and the same volume V as the sample itself. That is, the total volume V of the sample is formed into spheres K_i of the same diameter D_S, wherein the total specific surface area S_V of all particles in the sample corresponds to the total specific surface area S_K of all spheres K_i: $S_V = S_K = \frac{\sum_i A(K_i)}{\sum_i V(K_i)} = \frac{\pi D_S^2}{(\frac{1}{6})\pi D_S^3} = \frac{6}{D_S}$ Consequently, the Sauter diameter is calculated by $D_S = \frac{6}{S_V}$
CV	**Coefficient of variation:** Displays the ratio of the standard deviation to the mean value, i.e. the relative dispersion of the sample. The CV value is calculated by $CV = 50\frac{x_{84} - x_{16}}{x_{50}}$ Whereas: $x_{16} = x(Q_3)$ with $Q_3 = 16\,\%$ $x_{50} = x(Q_3)$ with $Q_3 = 50\,\%$ $x_{84} = x(Q_3)$ with $Q_3 = 84\,\%$
MA	**Mean diameter:** Displays the x_{50} value (median) of the sample, whereas $x_{50} = x(Q_3)$ with $Q_3 = 50\,\%$

AFS no.

AFS number:

Displays the fineness of the sample. The AFS number (American Foundry Society number) is calculated from fixed fractions p_3 in the particle size range from 0.02 mm to 5.6 mm, whereas each size class is multiplied by a fixed weighting factor M_3, which is based on the ASTM mesh format. Each fraction is multiplied by the preceding ASTM mesh number. Hence, the higher the AFS number, the finer the sample material. The AFS number is calculated by

$$AFS = \frac{\sum_i p_3(x_i, x_{i+1}) M_3(x_i, x_{i+1})}{\sum_i p_3(x_i, x_{i+1})}$$

Example:

After the sieving process the following measurement result is determined:

Size class [mm] from	to	ASTM mesh	Fraction p_3 [%]	Weighting factor M_3	p_3M_3
> 1.000		18	–	–	–
0.710	1.000	25	0	18	0
0.500	0.710	35	0.75	25	18.75
0.355	0.500	45	13.70	35	479.5
0.250	0.355	60	28.60	45	1 287
0.180	0.250	80	30.05	60	1 803
0.125	0.180	120	15.90	80	1 272
0.090	0.125	170	6.00	120	720
0.063	0.090	230	2.30	170	391
0.020	0.063	635	0.7	230	161
Collecting pan		–	2	635	1 270
Sum			**100**		**7 402.25**

This results in:

$$AFS = \frac{7402.25}{100} = 74.02$$

RRSB

RRSB curve:

The RRSB curve (named after Rosin, Rammler, Sperling, and Bennet) describes a mathematically manipulated particle size distribution, to reflect an approximately linear relationship between the cumulative distribution $Q_3(x)$ and the particle size x.

In the RRSB grid, the X axis is scaled in $\log(x)$, and the Y axis in $\log\left[\log\left(\frac{1}{1-Q_3(x)}\right)\right]$. Thus, in this grid, a Gaussian distribution is displayed as an ideal straight line.

d'

RRSB particle size:

Displays the $x_{63.2}$ value of the sample, whereas

$x_{63.2} = x(Q_3)$ with $Q_3 = 63.2\,\%$

n

Slope of the RRSB curve:

Displays the slope n of the RRSB curve.

$$n = \frac{\Delta(Y\ axis)}{\Delta(X\ axis)}$$

Correlation	**RRSB correlation:** Displays the correlation of the RRSB curve (cumulative distribution $Q_3(x)$) to an ideal straight line (Gaussian distribution). The more the cumulative distribution differs from a Gaussian distribution, the more the correlation value deviates from 1.

11.2 Manual COM Port Number Assignment

The EasySieve® programme communicates with the device via a COM interface. During the installation of the virtual device driver, Windows automatically assigns a COM port number to the COM interface. In order to ensure a failure-free communication, this COM port number should be single-digit.

If problems occur during the communication due to a double-digit COM port number, another number can be manually assigned to the COM interface.

⇨ Open the Device Manager in the Windows Control Panel.
⇨ Expand the category "Port (COM & LPT)".
⇨ Double-click the corresponding communication port. The dialogue box of the COM interface properties opens.
⇨ Change to the tab "Port Settings".
⇨ Click on the [Advanced] button. The dialogue box of the advanced settings for the selected COM interface opens.
⇨ Select a free, single-digit COM port number from the dropdown list "COM Port Number".
⇨ Click [OK].
⇨ Confirm all following dialogue boxes.
⇨ Restart the PC.

11.3 Disabling the Power Saving Mode of the USB Interface

If the device is connected to the PC via a USB cable or RS232-to-USB converter cable, the USB interface is converted to an RS232 interface (COM interface) by the installed virtual device driver.

During longer periods of inactivity, it may now happen that the USB interface of the PC is switching into the power saving mode. This may subsequently lead to communication problems with the device, which can only be solved by restarting the PC.

In order to avoid this, it is recommended to disable the power saving mode of the USB interfaces on the PC.

⇨ Open the Power Options in the Windows Control Panel.
⇨ Click on the link "Change plan settings" of the power plan enabled.
⇨ In the following dialogue box, click on the link "Change advanced power settings". The dialogue box "Power Options" opens.
⇨ Expand the category "USB settings".
⇨ Expand the subcategory "USB selective suspend setting".
⇨ Select the item "Disabled" from the dropdown list "Setting".
⇨ Click [OK].

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