GGU-FIELDCAPACITY manual

Available field capacity and air capacity of soils (KA5)

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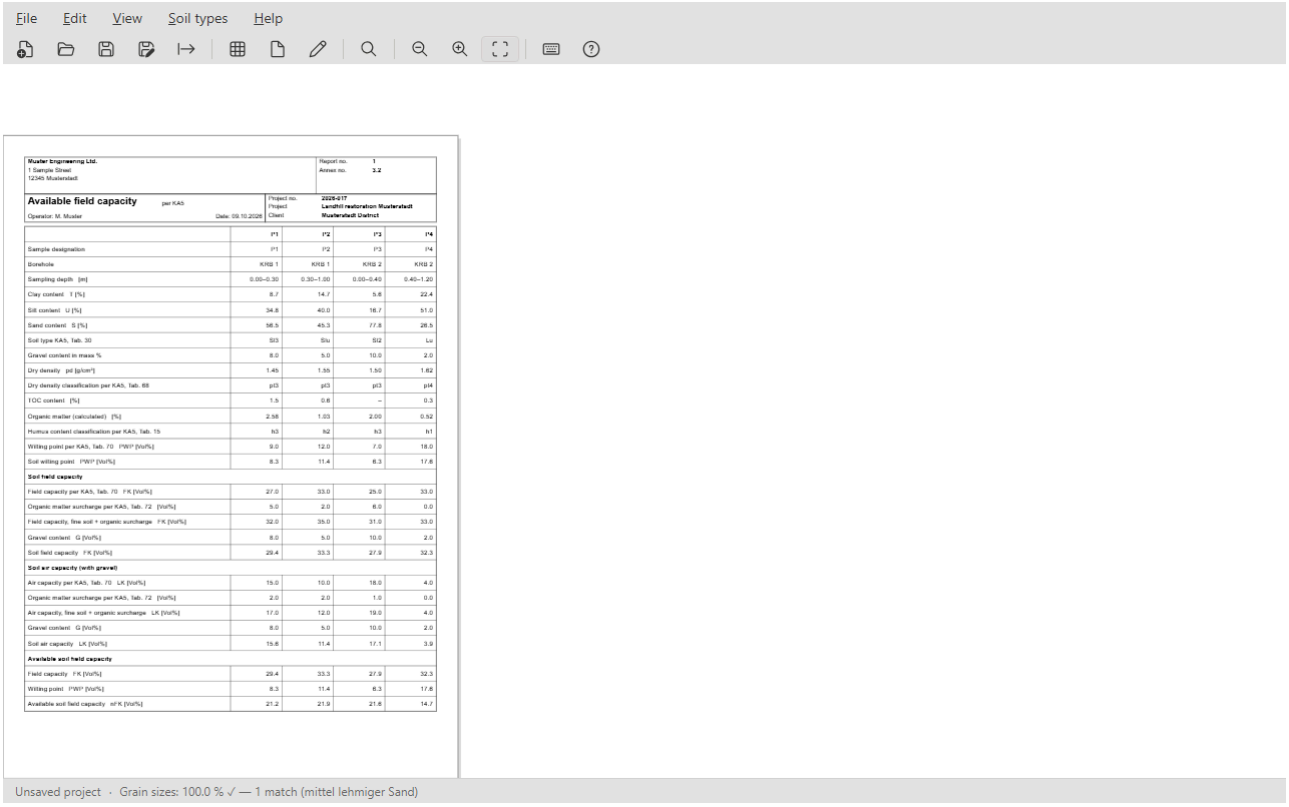
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1 GGU-FIELDCAPACITY: Preface

GGU-FIELDCAPACITY determines the **available field capacity (nFK)** and the **air capacity (LK)** of soils according to the German soil mapping guideline, Bodenkundliche Kartieranleitung, 5th edition (KA5). It works from the grain-size distribution, the dry bulk density and the humus content of a sample. Typical uses are assessing topsoils in agriculture and verifying restoration and cultivation layers, for example in landfill construction.

The result is an A4 evaluation sheet with up to six samples side by side, which you export as a PDF and attach to your report.



1.1 Workflow at a glance

1. If the samples are in GGU-CONNECT, take them over from there first: Exchanging data with GGU-CONNECT. Taking them over replaces the open project, including the company header.
2. Enter the project data and the company header: Project and company.
3. Enter or complete the samples with grain sizes, dry bulk density and TOC or humus content: Entering samples.
4. Check the evaluation sheet and adjust the rows shown if needed: Evaluation sheet.
5. Save the project and export the sheet as a PDF or print it: Files and PDF export. For samples from GGU-CONNECT, hand the results back with **GGU-CONNECT / Export data to GGU-CONNECT**.

How the program derives the parameters from your input is described in Calculation according to KA5.

1.2 Program version

This manual describes GGU-FIELDCAPACITY from version 0.10. Evaluation according to the 6th edition of the guideline (KA6) is in preparation and cannot be selected in the program yet.

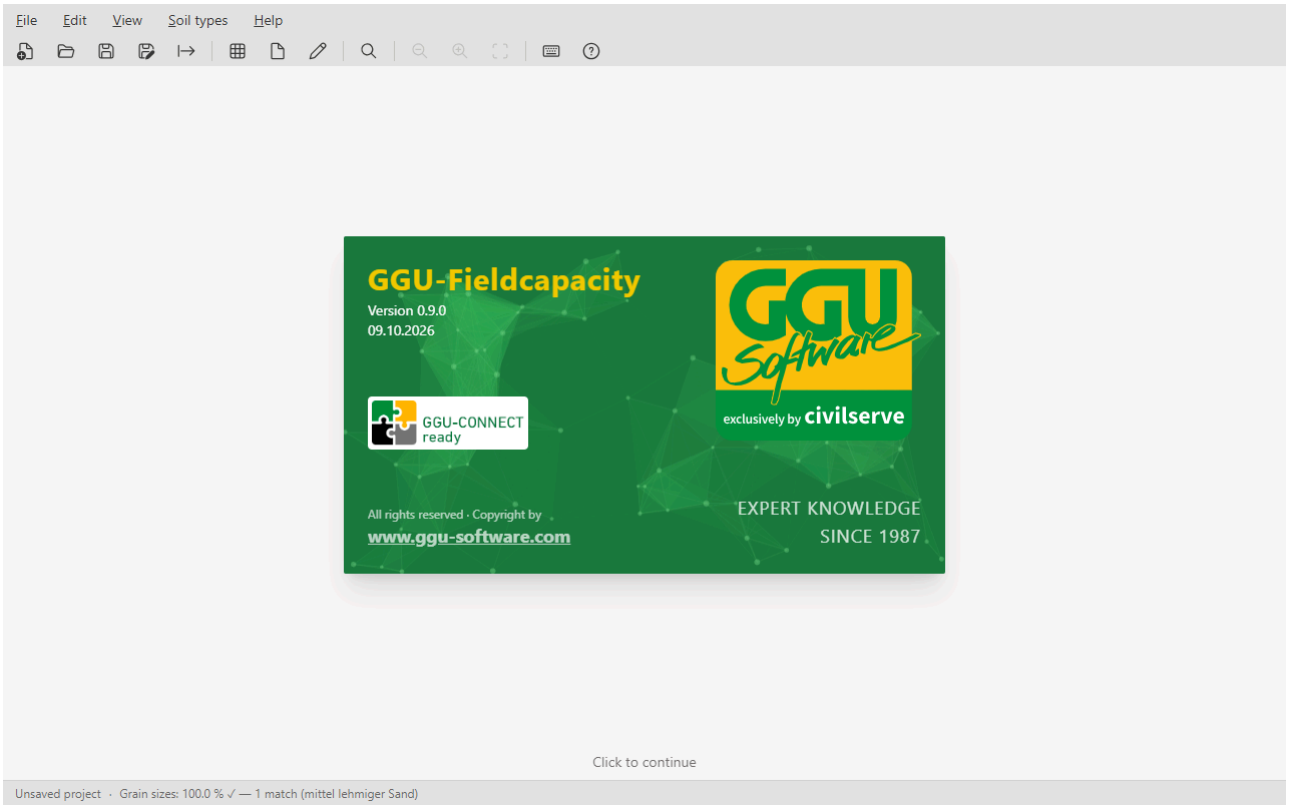
1.3 Project files

A project is saved as a file with the extension **.ggufk**. It contains all samples, the project and company data including the logo, and the selection of rows on the evaluation sheet. Program settings such as language or appearance are not part of the project; they apply to your installation. See Files and PDF export and Program settings.

2 GGU-FIELDCAPACITY: User interface

2.1 Start screen

When the program starts, a start screen shows the program version and build date. A mouse click or any key closes it, and the evaluation sheet appears.



2.2 Menus

As in the other GGU programs, every menu opens with the **Alt** key and the underlined letter, for example **Alt+E** for **Edit**.

Menu	Item	Purpose	Key
File	**New**	Start an empty project	Ctrl+N
	Open…	Load a project file (.ggufk)	Ctrl+O
	Save	Write the project to the current file	Ctrl+S
	Save as…	Save the project under a new name	Ctrl+Shift+S

Menu	Item	Purpose	Key
	Import data from GGU-CONNECT…	Import samples from GGU-CONNECT	
	Export data to GGU-CONNECT	Hand results back to GGU-CONNECT	
	Export GGU-CONNECT data as GGUML…	Save the results as a file	
	Export as PDF	Output the evaluation sheet as a PDF	Ctrl+P
	Print…	Print the evaluation sheet	
	Exit	Close the program	
Edit	**Samples…**	Entering samples	F6 or Ctrl+Shift+E
	Project…	Project data	Ctrl+Shift+P
	Company…	Company header and logo	Ctrl+Shift+F
	Evaluation sheet rows…	Choose and order rows	Ctrl+Shift+R
	Settings…	Program settings	
View	**Zoom in**	Enlarge the sheet	+
	Zoom out	Reduce the sheet	–
	Actual size (100 %)	Show the sheet at actual size	0
	Fit sheet	Fit the whole sheet into the window	Home or F9
Soil types	**KA5 soil types…**	Look up soil types according to KA5	Ctrl+F
GGU-CONNECT		the same three commands as in the **File** menu, see Exchanging data with GGU-CONNECT	

Menu	Item	Purpose	Key
Help	**Keyboard shortcuts…**	List of all keyboard shortcuts	
	Check for updates…	Look for a new program version	
	About GGU-Fieldcapacity	Program version and build date	F1

2.3 Toolbar

The toolbar below the menus holds the most frequent commands, from left to right:

- **New**, **Open**, **Save**, **Save as**, **Export as PDF**, **Print**
- **Samples**, **Project**, **Evaluation sheet rows**
- **KA5 soil types**
- **Zoom out**, **Zoom in**, **Fit sheet**
- **Keyboard shortcuts**, **About GGU-Fieldcapacity**

Hovering over a button shows the command and its keyboard shortcut. **Company** and **Settings** are only available from the **Edit** menu.

2.4 Status bar

At the bottom left you see the name of the open project file, or "Unsaved project". Next to it the program reports on the sample selected under **Edit / Samples**:

Message	Meaning
Enter grain sizes	No sample of the project has any input yet.
Grain sizes: 60.0 %	Clay, silt or sand is still missing for the selected sample.
Grain sizes: 85.0 % (Σ ≠ 100)	Clay, silt, sand and gravel of the selected sample do not add up to 100 %.
Grain sizes: 100.0 % ✓ — 1 match (mittel lehmiger Sand)	The total is correct and the soil type according to KA5 has been determined.

Message	Meaning
Generating PDF...	The PDF export is running.

The soil type is given by its German name from KA5, also in the English interface.

2.5 Moving and zooming the evaluation sheet

You can move and zoom the sheet with mouse and keyboard. How the mouse wheel behaves is set under Program settings. With the default "As in the GGU programs":

- **Mouse wheel**: move the sheet up or down
- **Shift + mouse wheel**: move the sheet left or right
- **Ctrl + mouse wheel**: zoom in or out

The view keys work while the mouse pointer is over the drawing area:

- **+** and **−**: zoom in and out
- **0**: actual size, **Home** or **F9**: fit sheet
- **Arrow keys**: move the sheet
- **Page Up / Page Down**: move by one page (only with the mouse wheel setting "As in the GGU programs")
- **Esc**: back to the full view (only with the mouse wheel setting "As in the GGU programs")

A double click next to the sheet also fits it back into the window.

The complete list is under Keyboard shortcuts.

2.6 Editing content directly on the sheet

You can also reach the dialogs for a part of the evaluation sheet directly in the drawing area: a double click on an area opens the matching dialog, the right mouse button opens a context menu with the commands for that area. Both run the same commands as the **Edit** menu.

Area on the sheet	Double click opens	Context menu offers
Company field at the top left of the header	**Edit / Company**	Company
Headings and project field	**Edit / Project**	Project

Area on the sheet	Double click opens	Context menu offers
Row labels on the left of the table	**Edit / Evaluation sheet rows**	Evaluation sheet rows, Samples
Column of a sample	**Edit / Samples**, on this sample	Samples, Evaluation sheet rows
Empty space on the sheet or next to it	Fit sheet (only next to the sheet)	Fit sheet, Actual size (100 %), Settings

A double click or right click on a sample column selects that sample; the status bar then shows its state.

2.7 New program version

After startup the program checks in the background whether a newer version exists. If so, the **Update Available** dialog appears with the changes in the newer versions and the button **Download Now**. **Later** closes it until the next start; with **Don't ask again until the next available version** it does not appear again for this version. In both cases a hint stays on the right of the menu bar.

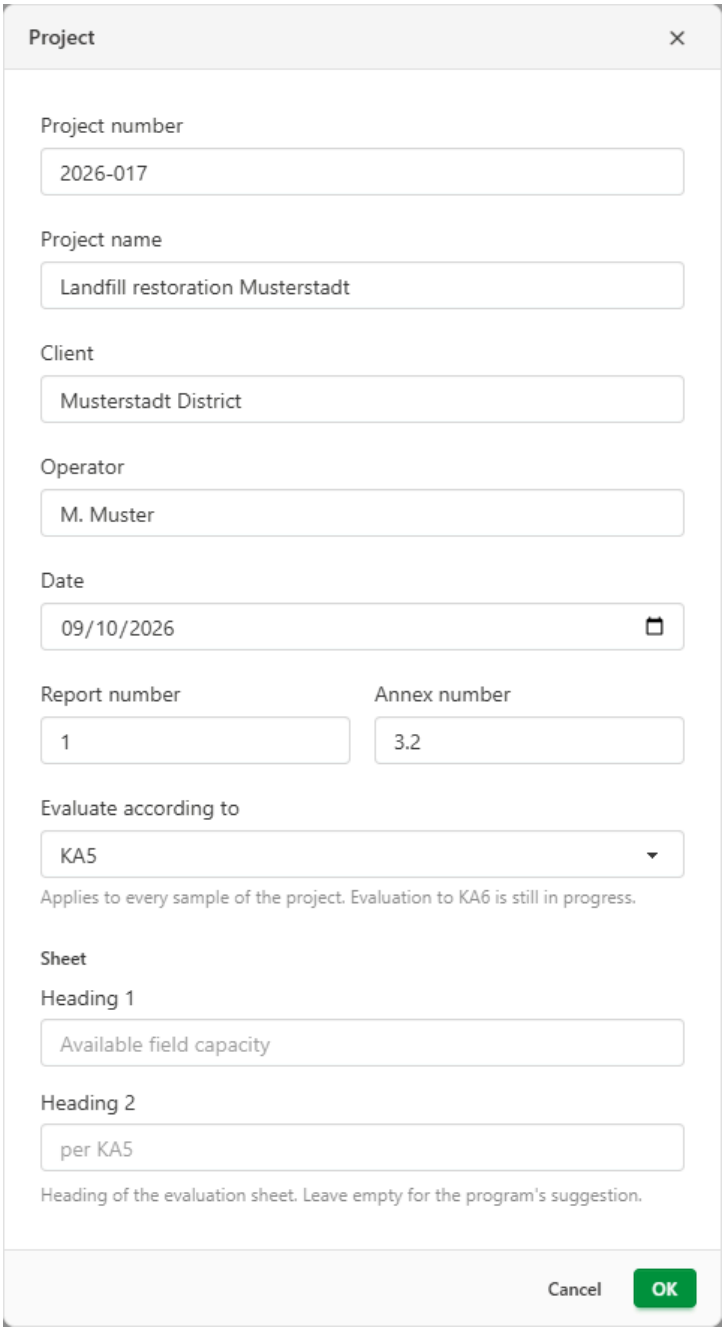
To check by hand, use **Help / Check for updates…**.

3 GGU-FIELDCAPACITY: Project and company

The data from these two dialogs forms the header of the evaluation sheet. Both dialogs work on a copy: changes only apply after **OK**, **Cancel** discards them.

3.1 Project

Menu **Edit / Project** (Ctrl+Shift+P).



Field	On the sheet
Project number	Project no.
Project name	Project
Client	Client
Operator	Operator
Date	Date; today's date for a new project
Report number	Report no.
Annex number	Annex no.

The program also suggests the project number and project name as the file name when you save the project for the first time or export it as a PDF.

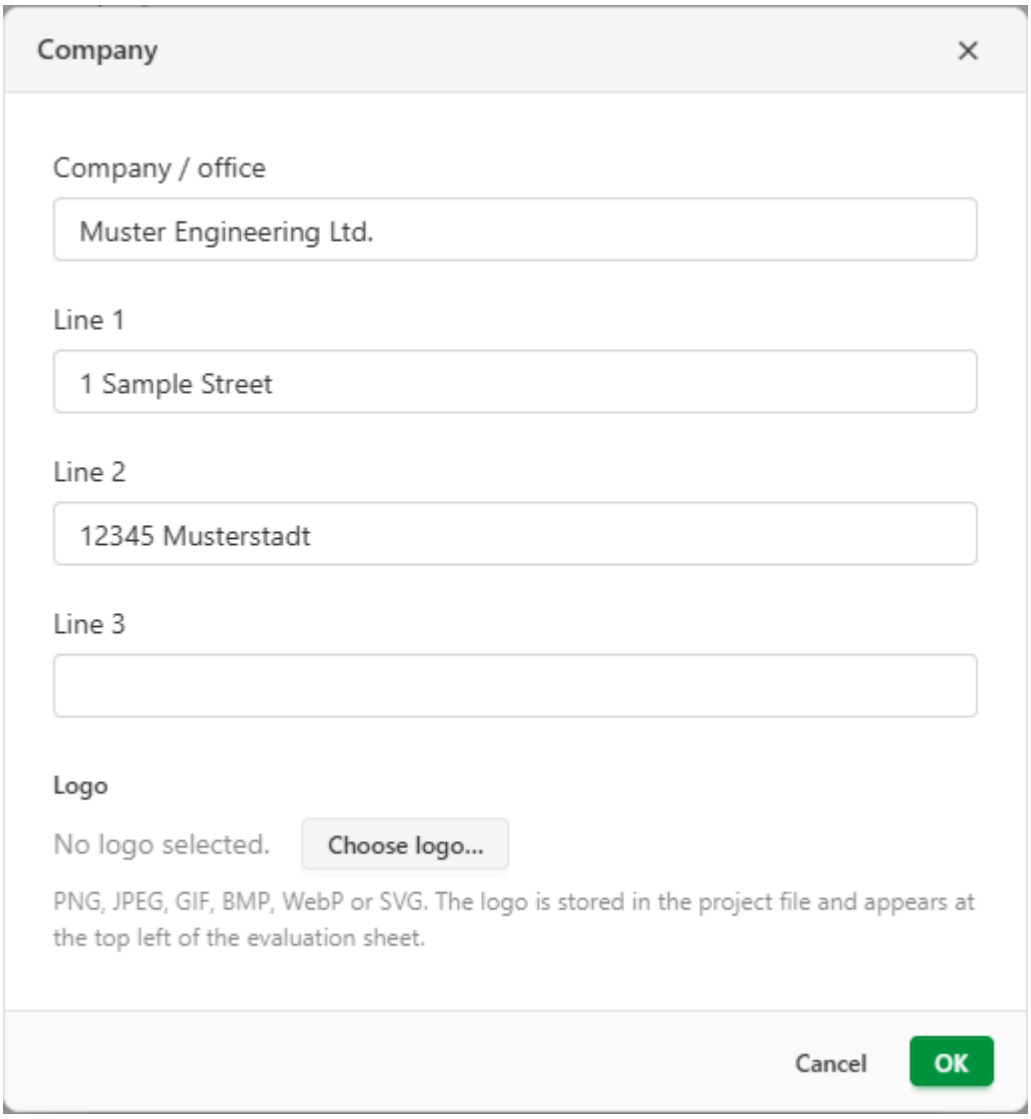
If the project comes from GGU-CONNECT, the data taken over from there is protected by a lock (see Exchanging data with GGU-CONNECT).

Evaluate according to sets the method for all samples of the project. **KA5** is currently available. Evaluation according to KA6 is in preparation.

In the **Sheet** section you can change the two headings of the sheet. If **Heading 1** and **Heading 2** are left empty, the program uses "Available field capacity" and "per KA5".

3.2 Company

Menu **Edit / Company** (Ctrl+Shift+F).



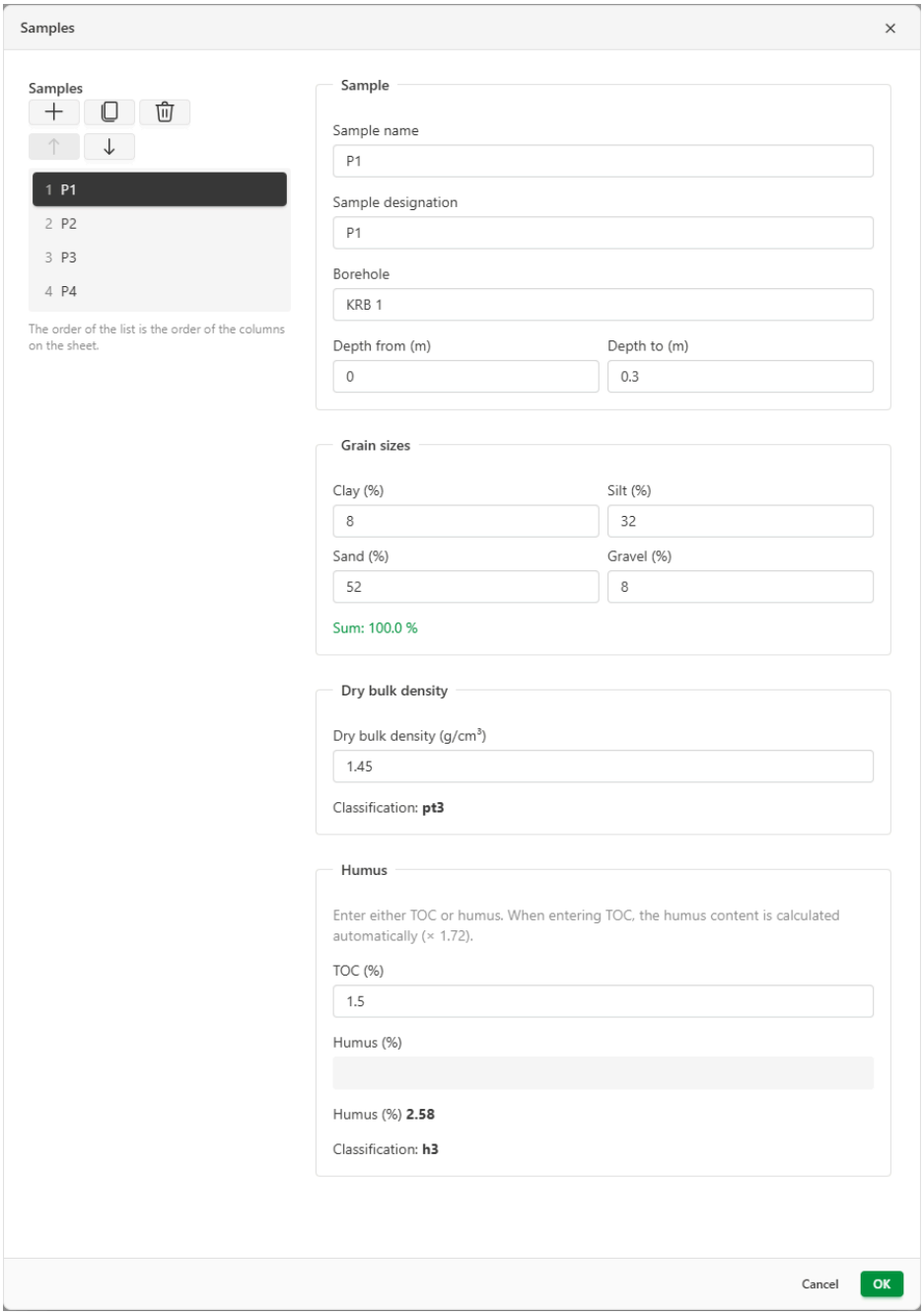
Under **Company / office** and the fields **Line 1** to **Line 3** you enter the sender of the sheet, for example your office with its address, or the laboratory that carried out the tests. This data appears at the top left of the evaluation sheet header.

Choose logo… adds a company logo. PNG, JPEG, GIF, BMP, WebP and SVG are accepted, up to 512 KB. The logo appears at the top left of the sheet and is stored in the project file, which is why its size is limited. **Replace logo…** and **Remove logo** change it later.

Company data and logo belong to the project. For a new project, enter them again, or open an existing project and save it under a new name with **File / Save as**.

4 GGU-FIELDCAPACITY: Entering samples

You edit the samples of a project via the menu **Edit / Samples** (key **F6**). Each sample becomes one column on the evaluation sheet.



The dialog works on a copy: your changes are only applied with **OK**. **Cancel** discards them.

4.1 Sample list

The list of samples is on the left. The order of the list is the order of the columns on the sheet. The buttons above the list let you:

- add a sample (**+**),
- duplicate the selected sample, for example to create a second sample from the same borehole with similar values,
- remove the selected sample (one sample always remains),
- move the selected sample up or down.

At most six samples fit on one evaluation sheet. Once that number is reached, no further samples can be added or duplicated.

4.2 Sample section

Field	Meaning
Sample name	Short name of the sample; it heads the sample's column on the sheet. If left empty, the column shows "Sample 1", "Sample 2" and so on.
Borehole	Exploration point the sample comes from.
Depth from (m), **Depth to (m)**	Sampling depth in metres.

Above the sample data the type **Sample** or **Mixed sample** is shown. Mixed samples come only from GGU-CONNECT; for them **Borehole** and the depths are omitted, because they come from several sampling points.

4.3 Samples from GGU-CONNECT

Samples that you imported from GGU-CONNECT (see Exchanging data with GGU-CONNECT) also show:

- a **lock** on every value that comes from GGU-CONNECT. These values are protected against accidental changes. Click the lock to unlock the value; if you then change it, it counts as your own input. If you do not change it, it is locked again the next time you open the dialog.
- an orange dot in the sample list and the note **Done in GGU-CONNECT** if the sample's KA5 experiment is already marked as done there. Handing it over again overwrites the results in GGU-CONNECT.

4.4 Grain sizes section

Enter the mass percentages of **Clay**, **Silt**, **Sand** and **Gravel**, for example from a sieve and sedimentation analysis. Below the fields the program shows the running total. It should be 100 %; if it is higher, even by only 0.1 %, it is shown in red and the program does not calculate any parameters for this sample. A total below 100 % does not stop the calculation.

For gravel-free soils, enter **0** for **Gravel**. If the field is left empty, the program still determines the soil type, but it does not calculate the field capacity, air capacity and available field capacity of the soil, because these need the gravel content.

The soil type according to KA5 follows from clay, silt and sand. How the program takes the gravel content out of the calculation is described in Calculation according to KA5.

4.5 Dry bulk density section

Enter the **dry bulk density** in g/cm³. Below it the program shows the classification according to KA5:

Classification	Dry bulk density
pt1	below 1.2 g/cm³
pt2	1.2 to below 1.4 g/cm³
pt3	1.4 to below 1.6 g/cm³
pt4	1.6 to below 1.8 g/cm³
pt5	1.8 g/cm³ and above

4.6 Humus section

Enter **either** the **TOC** content **or** the **humus** content in mass %. As soon as one of the two fields has a value, the other is locked. From the TOC content the program calculates the humus content with the factor 1.72. Below it the classification according to KA5 is shown:

Classification	Humus content
h0	0 %
h1	above 0 to below 1 %

Classification	Humus content
h2	1 to below 2 %
h3	2 to below 4 %
h4	4 to below 8 %
h5	8 to below 15 %
h6	15 to below 30 %
h7	30 % and above

A surcharge for organic matter applies only to the classes h2 to h5 (see Calculation according to KA5). Without any humus data the program calculates without a surcharge.

4.7 Your own entries section

If you have created your own rows under **Edit / Evaluation sheet rows**, this section appears with one input field per row. The text you enter appears on the sheet in the sample's column. How to create your own rows is described under Evaluation sheet.

5 GGU-FIELDCAPACITY: Evaluation sheet

The A4 portrait evaluation sheet is the result of the program. It is rebuilt immediately with every input and is exactly what you get from the PDF export.

5.1 Layout

- **Header**: company with logo, report and annex number, the two headings, operator, date, project number, project name and client. Where this data comes from is described under Project and company.
- **Table**: one column per sample, at most six. The column is headed by the sample name.

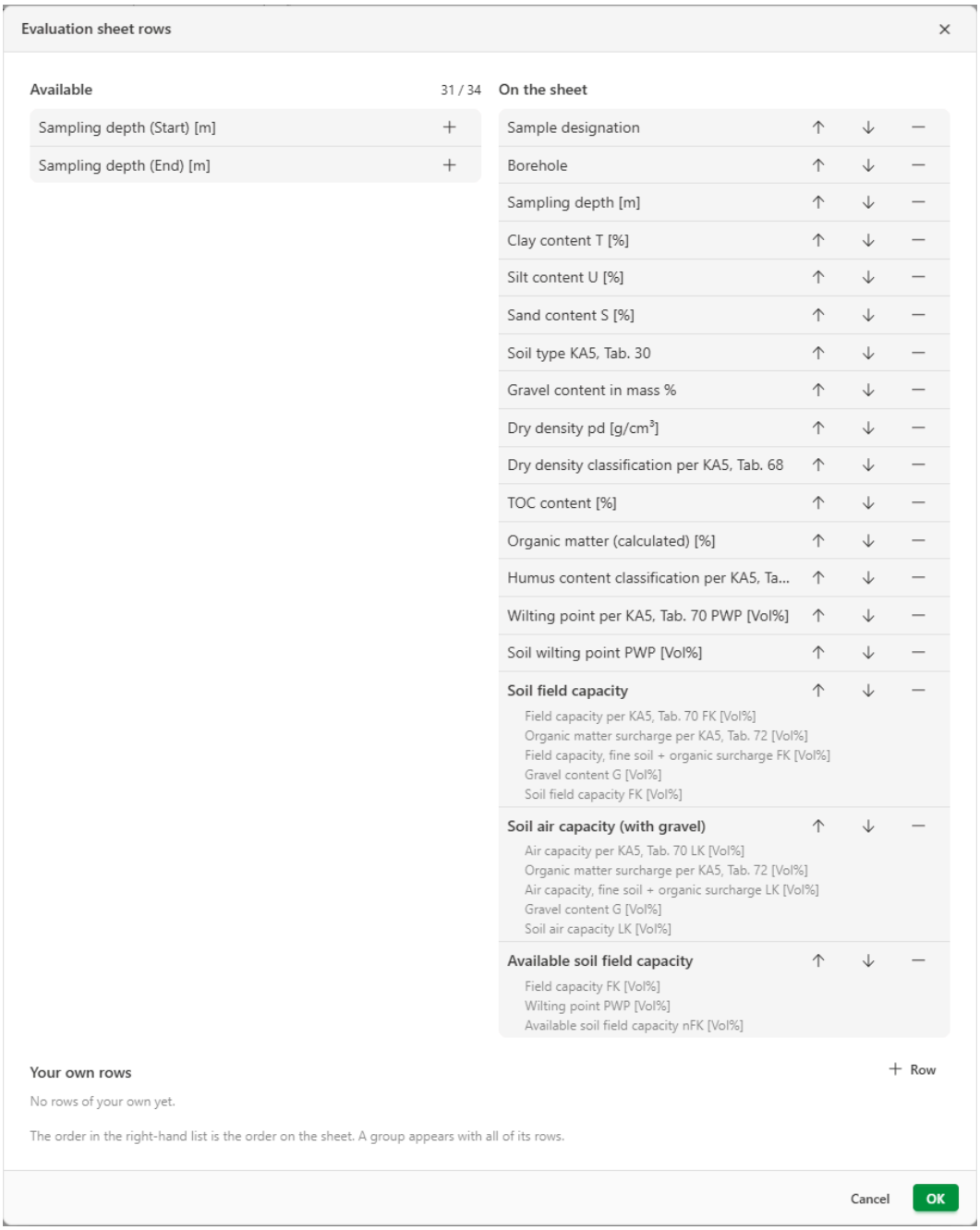
By default the table contains these rows:

- Borehole, sampling depth [m]
- Clay content T, silt content U, sand content S [%], each related to the fine soil
- Soil type KA5, Tab. 30
- Gravel content in mass %
- Dry density pd [g/cm³] and its classification per KA5, Tab. 68
- TOC content [%], organic matter (calculated) [%] and the humus content classification per KA5, Tab. 15
- Wilting point per KA5, Tab. 70 and soil wilting point PWP [vol. %]
- Group **Soil field capacity**: field capacity per KA5, Tab. 70, organic matter surcharge per KA5, Tab. 72, field capacity of fine soil plus surcharge, gravel content and soil field capacity FK [vol. %]
- Group **Soil air capacity (with gravel)**: the same sequence for the air capacity LK [vol. %]
- Group **Available soil field capacity**: field capacity, wilting point and available field capacity nFK [vol. %]

How the values are obtained is described in Calculation according to KA5. A dash "–" means that an input value is missing for this sample or that no value could be determined.

5.2 Evaluation sheet rows

Menu **Edit / Evaluation sheet rows** (Ctrl+Shift+R). Here you decide which rows appear on the sheet and in which order.



- **Available** (left) holds the rows that are currently not on the sheet. **+** adds a row to the sheet. By default this list contains "Sampling depth (Start)" and "Sampling depth (End)", in case you prefer to show the depths separately, and "Sample type", which shows "Sample" or "Mixed sample" for samples from GGU-CONNECT.
- **On the sheet** (right) shows the rows in the order in which they are printed. The arrows move a row, **–** removes it from the sheet.
- The groups field capacity, air capacity and available field capacity are always moved or removed with all their rows, so that the calculation stays complete on the sheet.

A counter next to the heading **Available** shows how many rows are used and how many fit on one sheet. Once the limit is reached, no further rows can be added.

The selection is saved with the project. Changes only apply after **OK**.

5.3 Your own rows

In the lower section **Your own rows**, the **Row** button (plus symbol) adds extra rows, for example for the sampling location or the sample mass. Give the row a name; it is placed on the sheet straight away. You then enter the values per sample under **Edit / Samples** in the section **Your own entries** (see Entering samples).

If you delete one of your own rows that already holds values, the program asks for confirmation. Deleting the row also removes its values from all samples.

6 GGU-FIELDCAPACITY: Calculation according to KA5

GGU-FIELDCAPACITY follows the Bodenkundliche Kartieranleitung, 5th edition (Ad-hoc-AG Boden, 2005). The parameters are determined per sample in the following steps. Each step appears as a row of its own on the evaluation sheet, so the calculation stays traceable.

6.1 1. Fine soil fractions

The KA5 tables refer to the fine soil. The program therefore rescales clay, silt and sand so that they add up to 100 % without gravel:

$T_{\text{fine soil}} = T / (T + U + S) \cdot 100$, likewise for U and S.

These values appear on the sheet in the rows clay content T, silt content U and sand content S. If clay, silt, sand and gravel add up to more than 100 %, the program does not continue for this sample.

6.2 2. Soil type (KA5, Tab. 30)

From the fine soil fractions the program determines the soil type according to the KA5 texture triangle, for example "Sl3" (mittel lehmiger Sand, medium loamy sand). You can look up the limits of each soil type under KA5 soil types.

6.3 3. Dry bulk density class (KA5, Tab. 68)

The dry bulk density is assigned to one of the classes pt1 to pt5; the limits are listed under Entering samples.

6.4 4. Humus content and humus class (KA5, Tab. 15)

If the TOC content is given, humus = TOC · 1.72. The humus content is assigned to one of the classes h0 to h7; the limits are listed under Entering samples.

6.5 5. Fine soil parameters (KA5, Tab. 70)

For the soil type and the density class the program reads from Tab. 70:

- the field capacity FK,
- the air capacity LK,
- the wilting point PWP (dead water),

each in vol. %.

6.6 6. Surcharge for organic matter (KA5, Tab. 72)

For the soil type and the humus class the program reads the surcharges for field capacity and air capacity from Tab. 72 and adds them to the values from step 5. Tab. 72 gives surcharges for the humus classes h2 to h5. For h0, h1, h6 and h7, and without humus data, the surcharge is zero.

6.7 7. Reduction for the gravel content

Gravel does not contribute to water storage. Field capacity, air capacity and wilting point are therefore converted to the whole soil:

$value_{soil} = value_{fine\ soil} \cdot (100 - gravel) / 100$

This gives the rows soil field capacity, soil air capacity and soil wilting point. This step needs the gravel content, so for gravel-free soils enter 0.

6.8 8. Available field capacity

$nFK = FK_{soil} - PWP_{soil}$

The available field capacity in vol. % is the share of water that the soil can store in a form available to plants.

6.9 Example

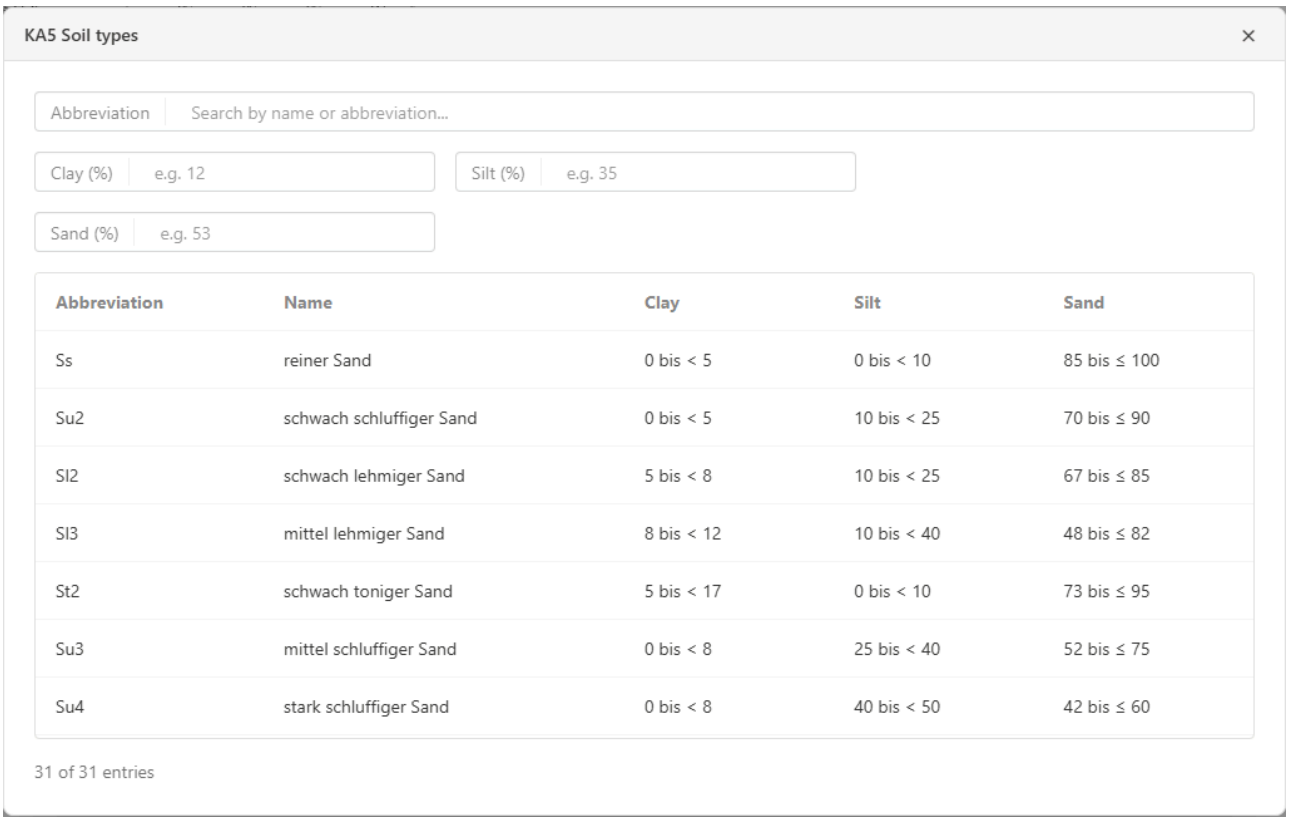
Sample P1 from the picture in the Preface: clay 8 %, silt 32 %, sand 52 %, gravel 8 %, dry bulk density 1.45 g/cm³, TOC 1.5 %.

Step	Result
Fine soil	T 8.7 %, U 34.8 %, S 56.5 %
Soil type	Sl3
Density class	pt3
Humus	1.5 · 1.72 = 2.58 % → h3
Tab. 70	FK 27.0, LK 15.0, PWP 9.0 vol. %
Tab. 72	surcharge FK + 5.0, LK + 2.0 vol. %

Step	Result
Fine soil with surcharge	FK 32.0, LK 17.0 vol. %
Gravel reduction 8 %	FK 29.4, LK 15.6, PWP 8.3 vol. %
Available field capacity	29.4 − 8.3 = 21.2 vol. % (calculated unrounded)

7 GGU-FIELDCAPACITY: KA5 soil types

Menu **Soil types / KA5 soil types** (Ctrl+F). The dialog lists all 31 fine soil types according to KA5, Tab. 30, with their limits for clay, silt and sand.



Abbreviation	Name	Clay	Silt	Sand
Ss	reiner Sand	0 bis < 5	0 bis < 10	85 bis ≤ 100
Su2	schwach schluffiger Sand	0 bis < 5	10 bis < 25	70 bis ≤ 90
Sl2	schwach lehmiger Sand	5 bis < 8	10 bis < 25	67 bis ≤ 85
Sl3	mittel lehmiger Sand	8 bis < 12	10 bis < 40	48 bis ≤ 82
St2	schwach toniger Sand	5 bis < 17	0 bis < 10	73 bis ≤ 95
Su3	mittel schluffiger Sand	0 bis < 8	25 bis < 40	52 bis ≤ 75
Su4	stark schluffiger Sand	0 bis < 8	40 bis < 50	42 bis ≤ 60

You can narrow the list down:

- **Abbreviation**: search by abbreviation or name, for example "Sl" or "lehmig". The names are the German KA5 names.
- **Clay (%)**, **Silt (%)**, **Sand (%)**: only soil types whose range contains the value you enter remain. With all three values you find the soil type for a grain-size distribution.

Below the table you see how many entries remain after filtering.

The dialog is for reference. For the evaluation, the program determines the soil type of each sample itself (see Calculation according to KA5).

8 GGU-FIELDCAPACITY: Files and PDF export

All commands on this page are in the **File** menu and on the toolbar.

8.1 New project

File / New starts an empty project with one empty sample and today's date.

Caution: the program does not ask for confirmation. An unsaved project is lost afterwards, so save it first. The same applies to **File / Open** and **Import data from GGU-CONNECT…**.

8.2 Opening a project

File / Open (Ctrl+O) loads a project file with the extension **.ggufk**. The name of the open file then appears on the left of the status bar.

8.3 Saving a project

- **File / Save** (Ctrl+S) writes the project to the open file. When you save a new project for the first time, the program asks for location and name.
- **File / Save as** (Ctrl+Shift+S) saves the project under a new name, for example as a template for a follow-up project.

The program suggests project number and project name joined by underscores as the file name, for example "2026-017_Landfill_restoration_Musterstadt.ggufk". If both are empty, it suggests "fieldcapacity".

The project file contains:

- all samples with their input,
- the project and company data including the logo,
- the selection and order of the evaluation sheet rows and your own rows.

The program settings are not included, because they apply to your installation, not to a project.

8.4 Export as PDF

File / Export as PDF (Ctrl+P) creates an A4 PDF from the evaluation sheet. During the export the status bar shows "Generating PDF…".

As with saving, the program suggests project number and project name as the file name, with the extension .pdf.

The text in the PDF can be selected and searched. The PDF is always light, black on white, even if you use the program in the dark appearance.

8.5 Printing

File / Print… opens the print dialog with the evaluation sheet in A4 format. There you choose the printer. The command has no keyboard shortcut; in this program Ctrl+P creates the PDF.

8.6 Unsaved work

If you exit the program with unsaved changes, it asks: **Save and exit**, **Exit without saving** or **Cancel**.

9 GGU-FIELDCAPACITY: Exchanging data with GGU-CONNECT

GGU-FIELDCAPACITY takes over samples from GGU-CONNECT and hands the results back there. The exchange works through a GGUML file (.xml extension). The commands are in the **GGU-CONNECT** menu and, with the same names, in the **File** menu. Available from version 0.10.

9.1 Importing samples from GGU-CONNECT

1. In GGU-CONNECT, export the samples as a GGUML file. At most six samples fit on one sheet, so export only the samples for one sheet. If the file contains more, all of them are taken over, but the sheet only appears once you have removed enough of them under **Edit / Samples** to leave six at most.
2. In GGU-FIELDCAPACITY, choose **GGU-CONNECT / Import data from GGU-CONNECT…** and open the file.

The file replaces the open project. The program does not ask for confirmation, so save an open project first. The imported project is not yet linked to a project file; the first time you **Save**, the program asks for a name.

A file may contain only one project. If it contains several, a message appears and the open project stays unchanged.

9.1.1 What is taken over

- from the project: project number, project name, client and operator,
- one column per sample with sample name, borehole and sampling depth,
- clay, silt, sand and gravel, the dry bulk density and the TOC or humus content.

Company and logo, report and annex number and the sheet headings are empty afterwards; enter them under Project and company.

The program looks for the values first in the sample's KA5 experiment, then on the sample itself and in its other tests, for example the sieve and sedimentation analysis. Samples without usable values are still taken over as an empty column.

If a value has different entries, the field stays empty and a message names the sample; enter the value by hand in that case. If both TOC content and humus content were measured, the program takes over the TOC content and calculates the humus content from it. If there is no humus content, it takes over the loss on ignition as the humus content; in clayey soils the loss on ignition is higher than the humus content, so the humus class and the surcharge then come out too high.

9.1.2 Several KA5 experiments on one sample

If a sample in GGU-CONNECT has several KA5 experiments, the program asks before opening, for each such sample, which experiment you want to work with. To help you decide, the dialog shows the status, date of change, operator and values of each experiment. Only the chosen experiment is read and overwritten when the results are handed back. The others stay in GGU-CONNECT. **Cancel** leaves the open project unchanged.

9.1.3 Mixed samples

A mixed sample becomes a column of its own. It has no borehole and no sampling depth. Whether a column is a sample or a mixed sample is shown in the **Samples** dialog; on the sheet you can show the row "Sample type" for this (see Evaluation sheet).

9.1.4 Protected values

Values from GGU-CONNECT carry a lock in the **Samples** and **Project** dialogs and cannot be changed by accident. A click on the lock unlocks the value. If you then change it, it counts as your own input. The protection is kept when you save the project file and open it again (see Entering samples).

9.2 Handing results back to GGU-CONNECT

1. Choose **GGU-CONNECT / Export data to GGU-CONNECT**. The program writes the file **FIELDCAPACITY-CONNECT-EXPORT.XML** to this folder and shows the path: `text %APPDATA%\GGU-Software\GGU-CONNECT`
2. In GGU-CONNECT, read the file in with the "GGUML file" import. The folder is hidden in Windows; paste the path into the address bar of the file dialog. The results go to the existing samples, not into a new project.

GGU-CONNECT / Export GGU-CONNECT data as GGUML… saves the same file to a location of your choice, for example the project folder.

If the KA5 experiment of a sample was already marked as done in GGU-CONNECT when you took the sample over, the program asks before handing the results back. **Hand over anyway** overwrites the results there, **Cancel** writes nothing.

9.2.1 What is handed back

- One KA5 experiment per sample with all input and all calculated values, regardless of which rows are shown on the sheet. As operator, the program enters the operator from **Edit / Project**. The status is "done" (erledigt) if all results have been calculated, otherwise "in progress" (in Bearbeitung).
- In addition, directly on the sample: soil type according to KA5, field capacity, air capacity and available field capacity of the soil.

- The master data project number, project name, client, operator, borehole, sample name and depths: with your change, otherwise as they were read when the samples were taken over. A field you have emptied does not count as a change.

Handing the results back again updates the same KA5 experiment and does not create a second one.

If you have unlocked and changed a value that comes from another test, for example a grain fraction from the sieve and sedimentation analysis, that test stays unchanged. The new value is stored in the KA5 experiment.

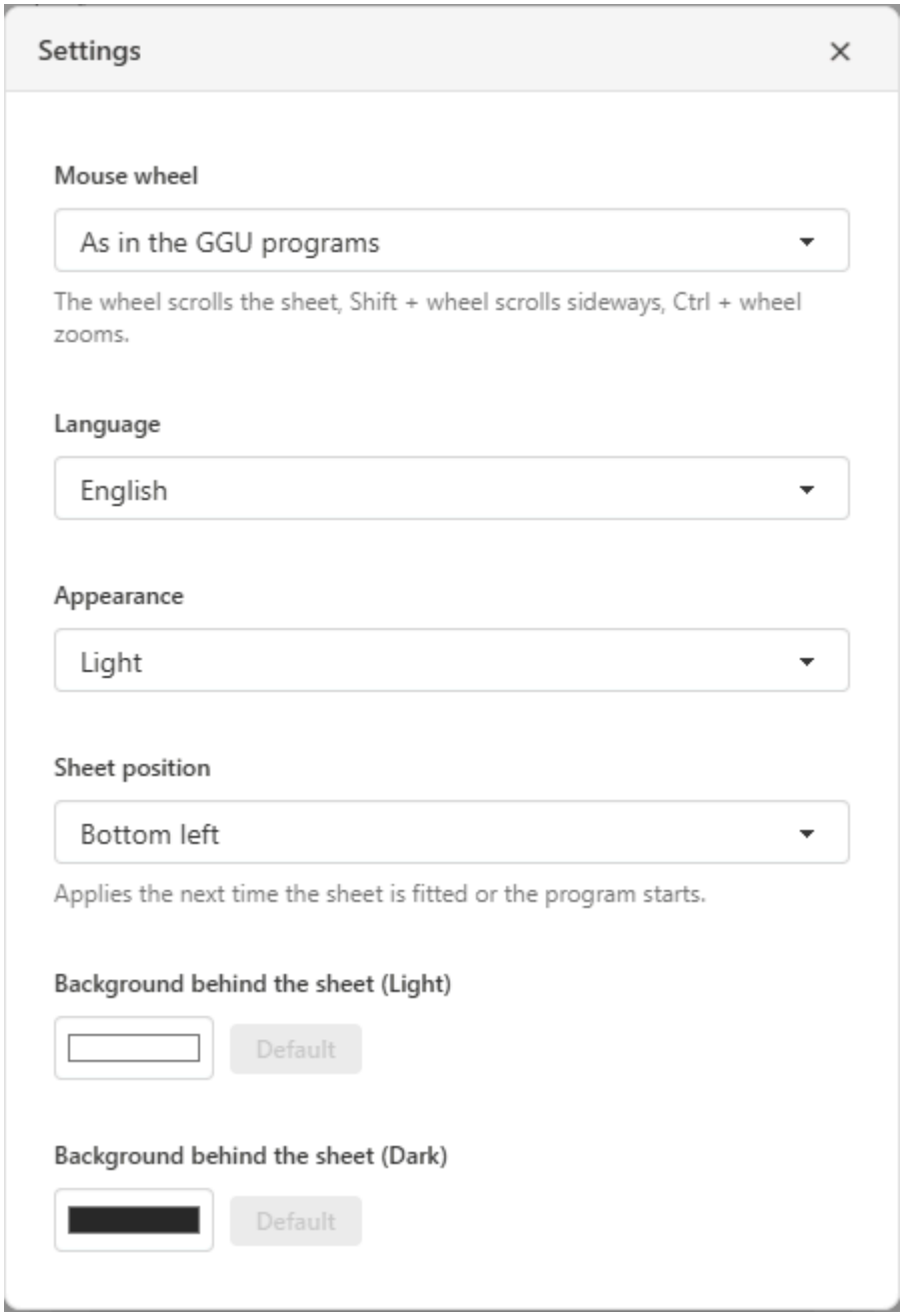
9.2.2 What is not handed back

- Samples that were only created or duplicated in GGU-FIELDCAPACITY.
- Results that could not be calculated. The sample is still handed over, and a message names it. An older result from an earlier hand-over stays in GGU-CONNECT and may then no longer match the input; remove it there.
- Input you have emptied. Its previous value stays in GGU-CONNECT and is read again the next time you take the project over; a message points this out.

Caution: if someone changes the master data or the KA5 experiment in GGU-CONNECT after you have taken the samples over, handing the results back overwrites that change. In that case, take the samples over again.

10 GGU-FIELDCAPACITY: Program settings

Menu **Edit / Settings**.



Unlike the other dialogs, this one has no **OK** button: every change applies immediately. The settings apply to your installation, not to a project; they are not saved in the project file.

10.1 Mouse wheel

Option	Effect
As in the GGU programs (default)	The wheel moves the sheet up and down, Shift + wheel left and right, Ctrl + wheel zooms in and out.
Modern (touchpad-friendly)	The wheel zooms in and out. On a touchpad, two fingers move the sheet, and spreading or pinching zooms.

10.2 Language

System (default) uses the Windows language if it is German or English, otherwise German. **German** or **English** fixes the language. The interface and the evaluation sheet switch immediately.

10.3 Appearance

The **Appearance** setting determines whether the program is shown in light or dark colours:

Option	Effect
System	The program follows the Windows colour mode. If you switch Windows while working, the program follows immediately. This is the default.
Light	Always light, regardless of Windows.
Dark	Always dark, regardless of Windows.

You set the Windows colour mode under **Settings / Personalisation / Colours**, at **Choose your mode**.

In the dark appearance, menus, dialogs and the drawing area are shown dark, including the sheet on screen. This is easier on the eyes in low ambient light. **Exported PDF files are not affected:** they are always produced light, black on white, as they should appear in a report.

The appearance is a setting of your installation. It is not saved in project files; a file you pass on to colleagues opens in their own appearance.

10.4 Sheet position

Sets where the sheet lies in the window after fitting:

- **Bottom left** (default), as in the other GGU programs,
- **Centred**.

A change does not move the sheet immediately. It applies from the next **View / Fit sheet** (Home or F9), from **View / Actual size (100 %)**, from a double click next to the sheet, or from the next program start.

10.5 Background behind the sheet

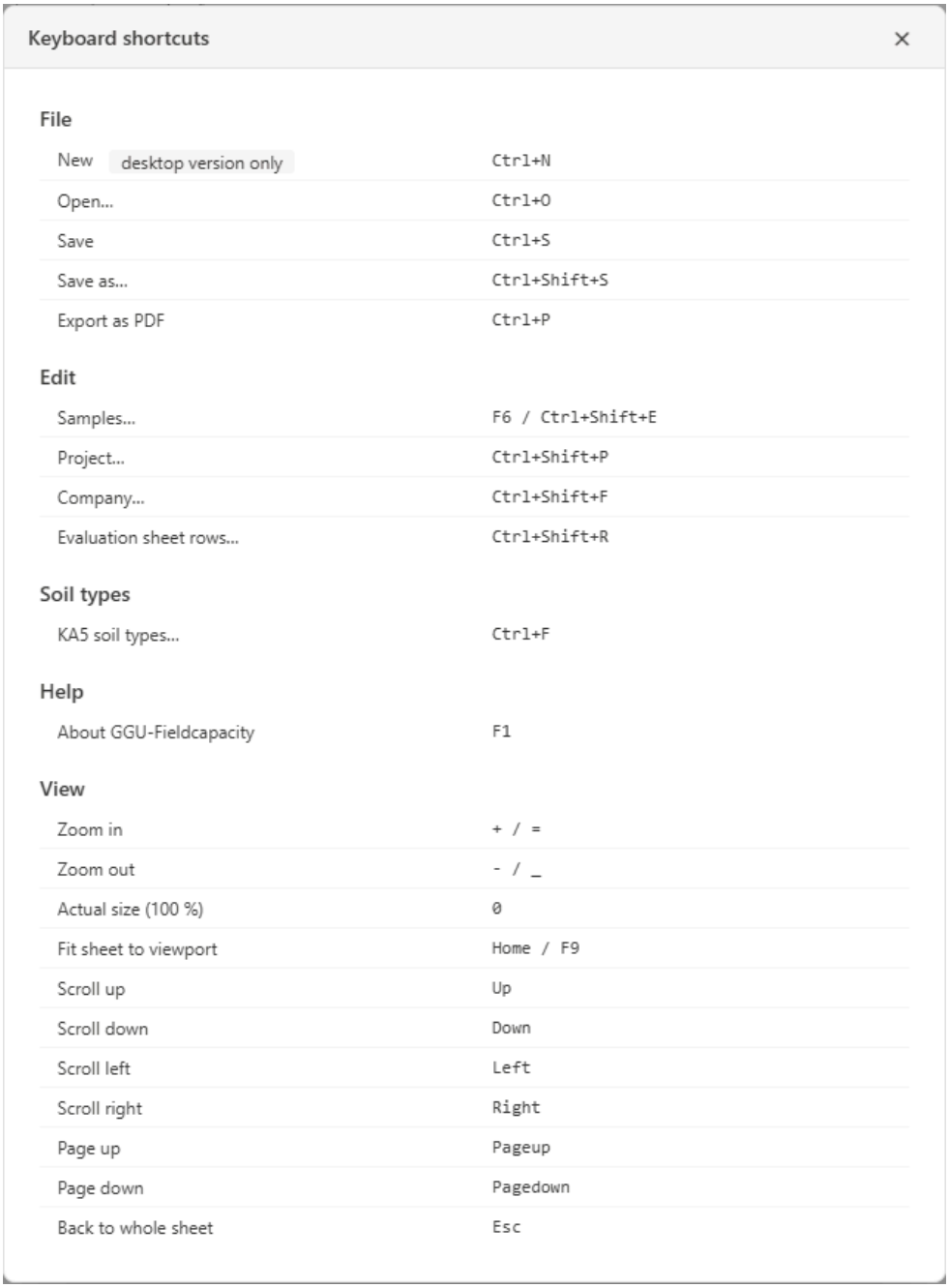
The area around the sheet has its own colour for each appearance:

- **Background behind the sheet (Light)**: default white.
- **Background behind the sheet (Dark)**: the default is the background colour of the dark appearance.

Clicking the colour field opens the colour picker. **Default** restores the default value.

11 GGU-FIELDCAPACITY: Keyboard shortcuts

The program itself shows the current list under **Help / Keyboard shortcuts**.



Command	Key
File / New	Ctrl+N
File / Open	Ctrl+O
File / Save	Ctrl+S

Command	Key
File / Save as	Ctrl+Shift+S
File / Export as PDF	Ctrl+P
Edit / Samples	F6 or Ctrl+Shift+E
Edit / Project	Ctrl+Shift+P
Edit / Company	Ctrl+Shift+F
Edit / Evaluation sheet rows	Ctrl+Shift+R
Soil types / KA5 soil types	Ctrl+F
Help / About GGU-Fieldcapacity	F1
View / Zoom in	+ or =
View / Zoom out	- or _
View / Actual size (100 %)	0
View / Fit sheet	Home or F9
Move the sheet	Arrow keys
One page up or down	Page Up, Page Down
Back to the full view	Esc

The view keys work while the mouse pointer is over the drawing area. Page Up, Page Down and Esc are only available with the mouse wheel setting "As in the GGU programs" (see Program settings). You can also open the menus with **Alt** and the underlined letter, for example **Alt+F** for **File**.