

GGU-TRIAXIAL manual

Triaxial compression tests (DIN 18137-2)

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1 GGU-TRIAXIAL: Preface

The **GGU-TRIAXIAL** program system allows the evaluation and visualisation of triaxial compression tests to DIN 18137 (Part 2)

The program includes convenient data input. The system is permanently displayed on the screen. Every change to the data is displayed on the screen, so that optimum control of the input data is guaranteed.

There are "?" and "Info" buttons in the dialog boxes for many technical and program-specific questions. Click on the "?" buttons or "Info" buttons to obtain the necessary information.

The graphic output supports the true type fonts provided by WINDOWS, so that an excellent layout is guaranteed. Colour output and numerous graphic formats (BMP, TIF, JPG etc.) are supported. PDF and DXF files can also be imported via the integrated **Mini-CAD** system (see "**Mini-CAD**" manual).

The program has been extensively tested. No errors have been found. Nevertheless, liability for completeness and correctness of the program and the manual, and for any damage resulting from incompleteness or incorrectness, cannot be accepted.

2 GGU-TRIAXIAL: Licence protection

To protect the GGU software from unauthorised access, each GGU program is equipped with the **CodeMeter software protection system** from WIBU-Systems. Each GGU program is bound to a so-called **CmContainer** via a licence with the corresponding product code.

To be able to use the GGU licences in a CmContainer, a runtime environment, the **CodeMeter Runtime Kit**, must be installed on your computer via driver software. You can obtain the current version from [Software for Users - Wibu-Systems](#) (CodeMeter User Runtime for Windows).

You can work with the following CmContainer types on your PC with the CodeMeter Runtime Kit installed (= **CodeMeter licence server**):

- **CmStick**

The licence for your GGU program is stored in a USB dongle.

- **CmActLicense** (soft licence, not for virtual PC/servers)

The licence for your GGU program is stored in a licence file that is linked to the hardware of a computer.

- **CmCloudContainer**

The licence is located on a CmCloud server of WIBU-Systems and is mirrored to your CodeMeter licence server. The advantages of this type of licence binding are described on the following website: [Licence binding | GGU Software](#).

The GGU programs check at start-up and during runtime whether a corresponding license is available in a CmContainer.

3 GGU-TRIAXIAL: Language selection

The GGU programs can be used in German and English. The program always starts with the language in which it was terminated.

The language preferences can be changed at any time in the "**Info**" menu, using the menu item "**Spracheinstellung**" (for German) or "**Language preferences**" (for English).

4 Tips and tricks

4.1 GGU-TRIAXIAL: Keyboard and mouse

By double-clicking the left mouse button on legends or **Mini-CAD** objects, the editor for the selected element immediately opens, allowing it to be edited.

If you double-click in the system graphics with the left mouse button you will see a message box with the results at the selected depth. This gives you a quick overview of the results for any desired depth.

In most dialog boxes, the buttons for leaving the box or buttons for decisive functions are marked thickly and can be reached by clicking the **[Enter]/[Return]** key.

In dialog boxes in which you have to make entries, e.g. change soil properties, the quickest way to jump to the next input box is to use the **[Tab]** key. The previous value is marked and can be overwritten directly with the new entry. You do not have to move to the box with the mouse and delete the old entry in advance.

In input boxes with numerical values, you can use the calculation operations listed in **"Tips and tricks: Mathematical functions in input boxes with numbers"** to change them.

You can scroll the screen with the keyboard using the cursor keys and the **[Page up]** and **[Page down]** keys. After activating the zoom functions, click on an area of the screen to enlarge or reduce the display by a factor of 2. Alternatively, by clicking and dragging the mouse while holding down the **[Ctrl]** key, you define a window section which is then displayed in full screen. By clicking and dragging the mouse while holding down the **[Shift]** and **[Ctrl]** keys, you zoom into your system graphic, i.e. you change the scale of your system representation.

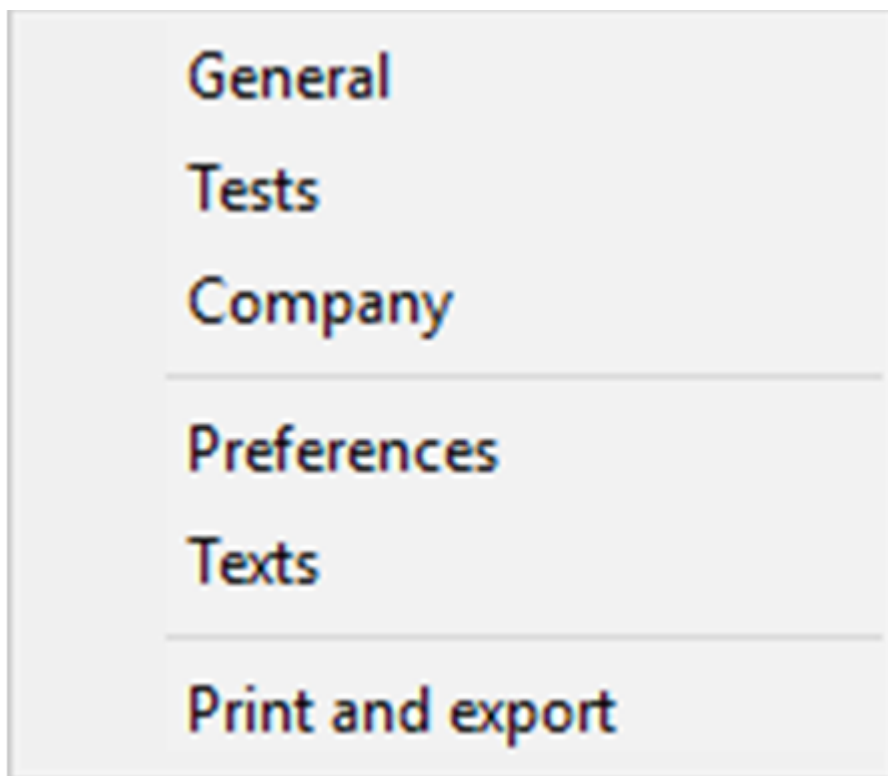
You can also use the mouse wheel to zoom in or out or to move the screen display. When the program is started for the first time, the default setting for mouse wheel operation is activated according to Windows conventions:

- Mouse wheel up = move screen image up
- Mouse wheel down = move screen image down
- **[Shift]** + mouse wheel up = move screen image right
- **[Shift]** + mouse wheel down = move screen image left
- **[Strg]** + mouse wheel up = enlarge screen image (zoom in)

[Strg] + mouse wheel down = reduce screen image (zoom out)

From a zoomed representation you return to the full screen with **[Esc]**.

If you click the right mouse button anywhere on the screen a context menu containing the principal menu items opens.



4.2 GGU-TRIAXIAL: Function keys

Some of the function keys are assigned program functions. The allocations are noted after the corresponding menu items. The individual function key allocations are:

- **[Esc]** refreshes the screen content and resets the screen section to your current image zoom, which is preset to 1.0. This is useful, for example, if you have used the magnifying glass function to display sections of the drawing on the screen and want to quickly return to the overall view.
- **[F1]** opens the manual file.
- **[F2]** refreshes the screen without altering the current magnification.
- **[F11]** activates the menu item "**Move objects**", which appears in the GGU programs under various menu titles, e.g. "**Page size + margins**", "**Graphics preferences**" or "**Output preferences**".

In this GGU program, the following function keys are also assigned to program functions:

4.3 GGU-TRIAXIAL: "Copy/print area" icon

A dialog box opens when the **"Copy/print area"** icon

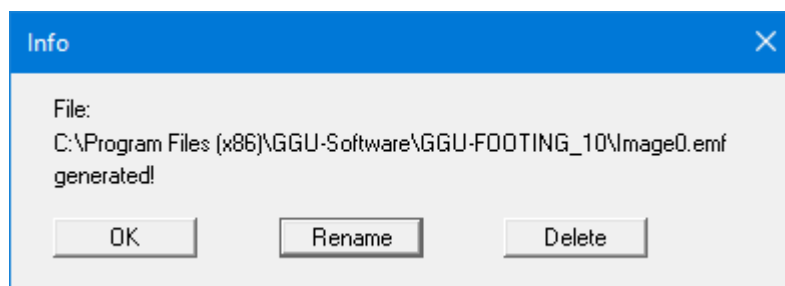


in the menu toolbar is clicked, describing the options available for this function. For example, using this icon it is possible to either copy areas of the screen graphics and paste them into the report, or send them directly to a printer.

In the dialog box, first select where the copied area should be transferred to: **"Clipboard"**, **"File"** or **"Printer"**. The cursor is displayed as a cross after leaving the dialog box and, keeping the left mouse button pressed, the required area may be enclosed. If the marked area does not suit your requirements, abort the subsequent boxes and restart the function by clicking the icon again.

If **"Clipboard"** was selected, move to the MS Word document (for example) after marking the area and paste the copied graphics using **"Edit/Paste"**.

If **"File"** was selected, the following dialog box appears after defining the area, shown here as an example for the **GGU-FOOTING** program:



The default location of the file is the folder from which the program is started (here: GGU-FOOTING_10) and, if several files are created, the file is given the file name **"Image0.emf"** with sequential numbering. If the

"Rename" button in the dialog box is clicked, a file selector box opens, and the copied area can be saved under a different name in a user-defined folder. Saving can be aborted by pressing the **"Delete"** button.

If the **"Printer"** button was pressed in the first dialog box, a dialog box for defining the printer settings opens after marking the area. Following this, a dialog box for defining the image output settings opens. After confirming the settings, the defined area is output to the selected printer.

5 GGU-TRIAXIAL: Starting the program

After starting the program, you will see two menus at the top of the window:

File

Info

After clicking on the "**File**" menu, a previously entered test can be loaded by means of the "**Load**" menu item, or a new one created using "**New**".

After clicking on "File/New" an empty form is shown on the screen. Five menus now appear at the top of the window:

- File
- Edit
- Graphics preferences
- Output preferences
- Info

After clicking one of these menus, the so-called menu items roll down, allowing you access to all program functions.

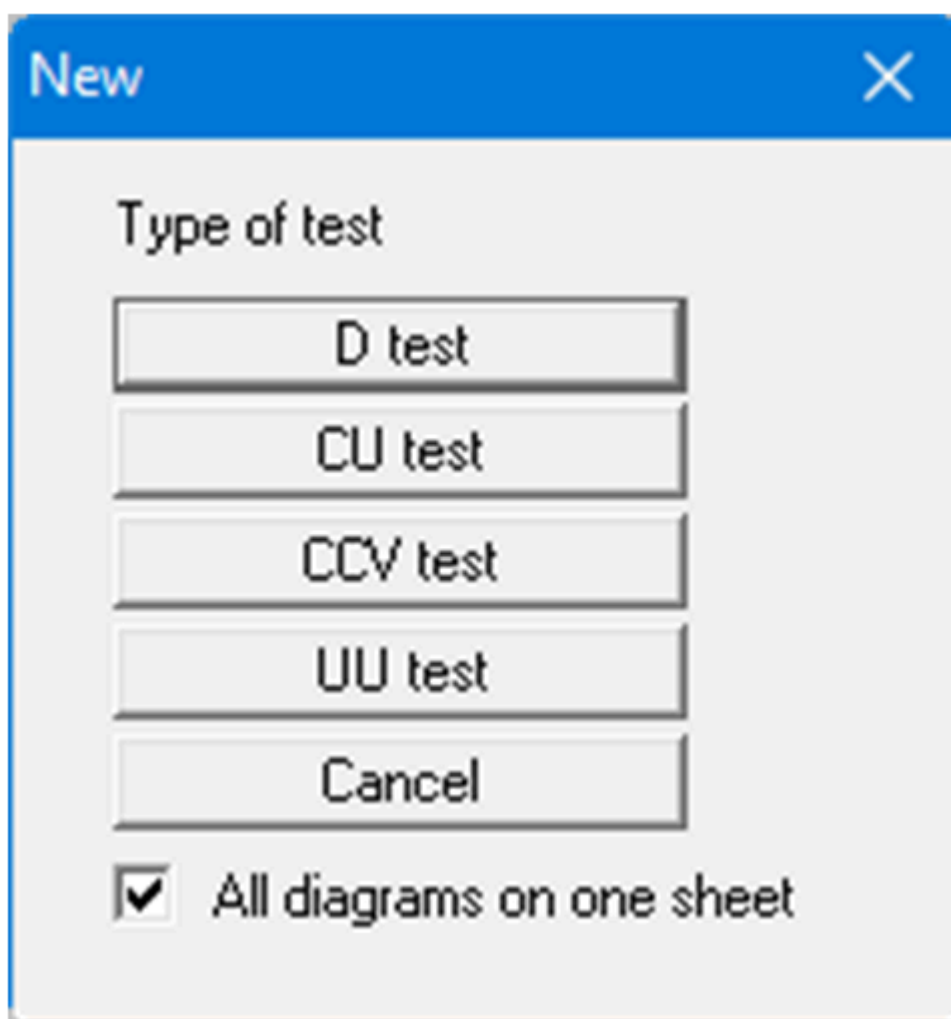
The program works on the principle of ***What you see is what you get***. This means that the screen presentation represents, overall, what you will see on your printer. In the last consequence, this would mean that the screen presentation would have to be refreshed after every alteration you make. For reasons of efficiency and as this can take several seconds for complex screen contents, the screen is not refreshed after every alteration.

If you would like to refresh the screen contents, press either [F2] or [Esc]. The [Esc] key also resets the screen display to your current image zoom, which is usually preset to 1.0, which corresponds to an A3 or A4 sheet in most GGU programs (see menu item "**Graphics preferences/Refresh and zoom**").

6 File menu

6.1 GGU-TRIAXIAL: "New" menu item

All data entered is deleted and the following dialog box is displayed, which also appears when the program is started.



If the **"All diagrams on one sheet"** check box is activated an empty A3 format page with all available diagrams is displayed on the screen when the dialog box is closed. Otherwise an A4 format output sheet is displayed. If the check box is deactivated the various diagrams are visualised consecutively on several A4 sheets.

You can choose from four types of test:

- **Consolidated, drained test (D test)**

After saturation and consolidation are complete, and keeping the drains open and the saturation pressure constant, the sample is sheared slowly enough to allow volume change in the sample without the development of pore water pressure, which can influence the test results.

- **Consolidated, undrained test (CU test)**

Once consolidation and saturation are complete, uptake and ejection of pore water during shearing is prevented by closing the pore water system. The resulting pore water pressure is measured. Changes in load and deformations are performed so slowly that the pore water pressure can be uniformly distributed within the sample.

- **Consolidated, drained test with constant volume (CCV test)**

The CCV test is a shear test on consolidated and drained samples, in which volume changes are prevented by controlling at least one total principal stress at constant pore water pressure (saturation pressure).

- **Unconsolidated, undrained test (UU test)**

The UU test is a shear test on undrained cohesive samples, the water content of which is the same as the water content of the soil. The samples are subjected to various cell pressures with the drainage closed and are then sheared, also with the drainage closed.

Once the test type has been decided the dialog box is closed by clicking the appropriate test button.

6.2 GGU-TRIAXIAL: "Load" menu item

You can load a file with test data, which was created and saved at a previous sitting, and then edit the test data.

6.3 GGU-TRIAXIAL: "Add file" menu item

Using this menu item it is possible to load the results of a number of tests, stored on disk as separate files, in order to visualise them together on one sheet. The tests contained in the added file will be appended to the current record.

6.4 GGU-TRIAXIAL: "Save" menu item

You can save data entered or edited during program use to a file, to have them available at a later date, or to archive them. The data is saved without prompting with the name of the current file.

6.5 GGU-TRIAXIAL: "Save as" menu item

You can save data entered during program use to an existing file or to a new file, i.e. using a new file name. For reasons of clarity, it makes sense to use ".3ax" as file suffix, as this is the suffix used in the file requester box for the menu item "**File/Load**". If you choose not to enter an extension when saving, ".3ax" will be used automatically.

6.6 GGU-TRIAXIAL: "Export to ASCII file" menu item

The test data can be exported to an ASCII file, allowing processing in other applications.

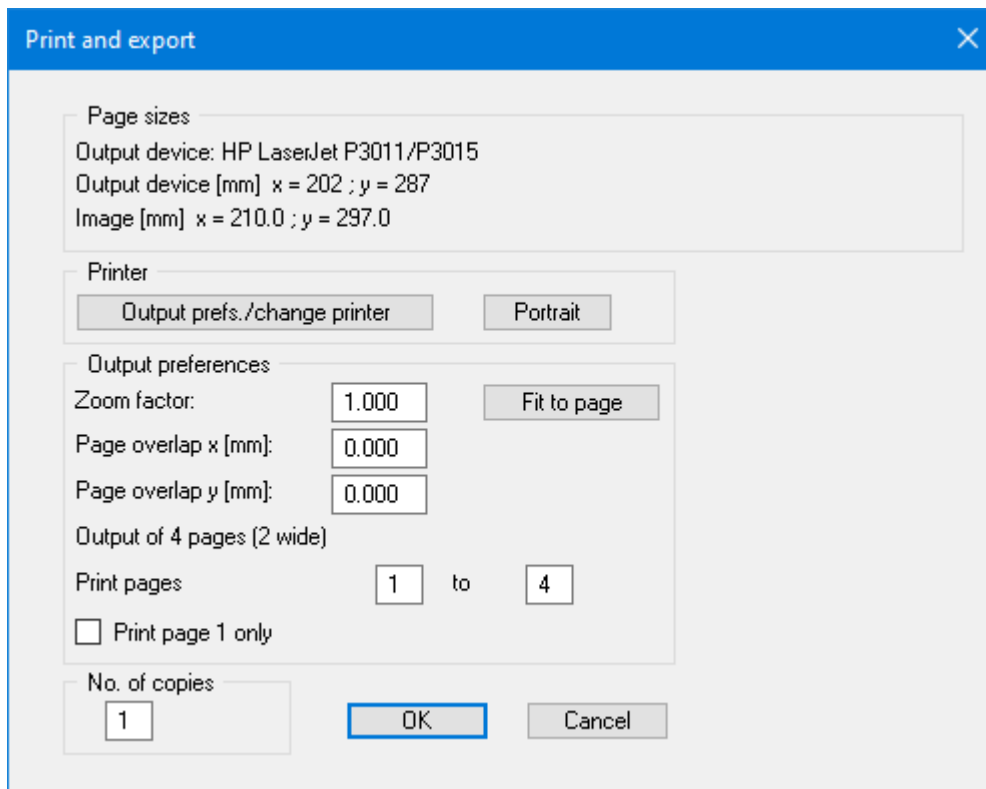
6.7 GGU-TRIAXIAL: "Output preferences" menu item

You can edit output preferences (e.g. swap between portrait and landscape) or change the printer in accordance with WINDOWS conventions.

6.8 GGU-TRIAXIAL: "Print and export" menu item

You can select your output format in a dialog box. You have the following possibilities:

- "**Printer**"
allows graphic output of the current screen contents (*graphical representation*) to the WINDOWS standard printer or to any other printer selected using the menu item "**File/Output preferences**". But you may also select a different printer in the following dialog box by pressing the "**Output prefs./change printer**" button.



In the upper group box, the maximum dimensions which the printer can accept are given. Below this, the dimensions of the image to be printed are given. If the image is larger than the output format of the printer, the image will be printed to several pages (in the above example, 4). To facilitate better re-connection of the images, the possibility of entering an overlap for each page, in x and y direction, is given.

Alternatively, you also have the possibility of selecting a smaller zoom factor, ensuring output to one page ("**Fit to page**" button). Following this, you can enlarge to the original format on a copying machine, to ensure true scaling. You can also print only the 1st page with zoom factor = 1.0, in which case the bottom left-hand area is printed. Furthermore, you may enter the number of copies to be printed.

- **"DXF file"**
allows output of the graphics to a DXF file. DXF is a common file format for transferring graphics between a variety of applications.
- **"GGU-CAD file"**
allows output of the graphics to a file, in order to enable further processing with the **GGU-CAD** program. Compared to output as a DXF file this has the advantage that no loss of colour quality occurs during export.
- **"Clipboard"**
The graphics are copied to the WINDOWS clipboard. From there, they can be imported into other WINDOWS programs for further processing, e.g. into a word processor. In order to import into any other WINDOWS program, you must generally use the "*Edit/Paste*" function of the respective application.
- **"Metafile"**
allows output of the graphics to a file in order to be further processed with third party software. Output is in the standardised EMF format (Enhanced Metafile format). Use of the Metafile format guarantees the best possible quality when transferring graphics.

If you select the **"Copy/print area"** tool



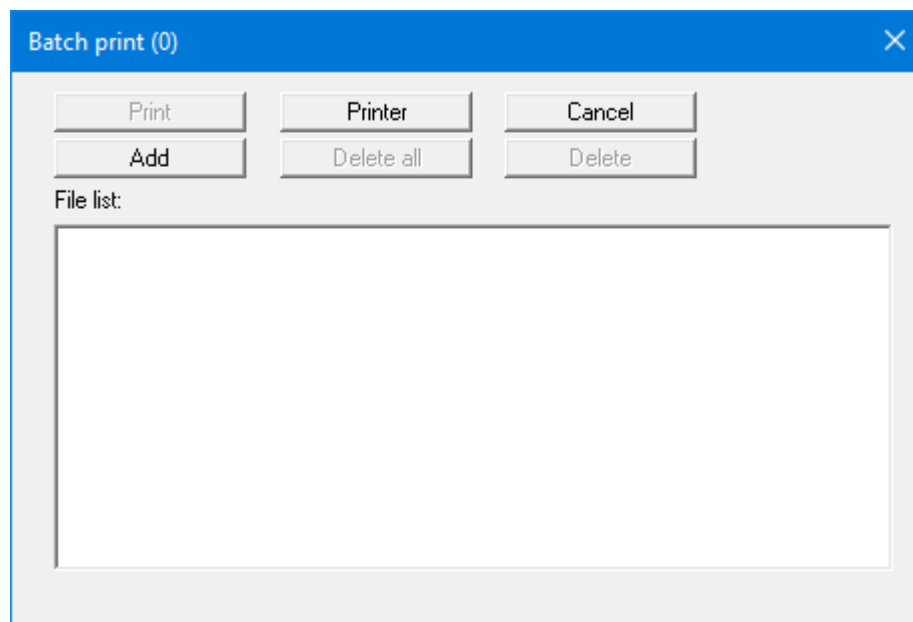
from the toolbar, you can copy parts of the graphics to the clipboard or save them to an EMF file. Alternatively you can send the marked area directly to your printer (see **"Tips and tricks"**).

Using the **"Mini-CAD"** program module you can also import EMF files generated using other GGU applications into your graphics (see menu item **"Graphics preferences/Mini-CAD"**).

- **"Mini-CAD"**
allows export of the graphics to a file in order to enable importing to different GGU applications with the **Mini-CAD** module.
- **"GGUMiniCAD"**
allows export of the graphics to a file in order to enable processing in the **GGUMiniCAD** program.
- **"Cancel"**
Printing is cancelled.

6.9 GGU-TRIAXIAL: "Batch print" menu item

If you would like to print several appendices at once, select this menu item. You will see the following dialog box:



Create a list of files for printing using **"Add"** and selecting the desired files. The number of files is displayed in the dialog box header. Using **"Delete"** you can mark and delete selected individual files from the list. After selecting the **"Delete all"** button, you can compile a new list. Selection of the desired printer and printer preferences is achieved by pressing the **"Printer"** button.

You then start printing by using the "**Print**" button. In the dialog box which then appears you can select further preferences for printer output such as, e.g., the number of copies. These preferences will be applied to all files in the list.

6.10 GGU-TRIAXIAL: "Exit" menu item

After a confirmation prompt, you can quit the program.

6.11 GGU-TRIAXIAL: "1, 2, 3, 4" menu items

If you have not stored a working directory for the program icon, the program jumps to the program directory after starting to load or save a file.

Under the menu items of the File menu, the most recently edited files are listed with the respective storage path ("**1, 2, 3, ...**"). Selecting one of these files loads the selected file. The next time the "**File/Load**" or "**File/Save**" menu items are called up in the same program session, the program automatically jumps to the directory of the last file loaded.

7 Edit menu

7.1 GGU-TRIAXIAL: "General" menu item

Go to this menu item to enter general data such as the project identification, report number, annex number, etc. This data is displayed in the correct elements of the output sheet.

Project (1st line):	GGU-TRIAXIAL
Project (2nd line):	
Project (3rd line):	
Edited by:	Example
Edit date:	10.05.18
Test number:	2
Sampling location:	
Depth:	15.0 m
Soil type:	M, fs, c'
Sampling method:	
Sample taken on:	09.05.18
Report:	9999 / 18
Annex:	

OK Cancel

The marked texts in the dialog box also appear in the output sheet. Input boxes can be altered or switched off such as "Test number:" as shown in the above dialog box by going to the menu item "Output preferences/Texts" button "Main form".

7.2 "Single tests" menu item

7.2.1 GGU-TRIAXIAL: Central input box

This represents the program's central menu item. Here, you enter almost all of the data for the triaxial test. As an example, after clicking the menu item the following dialog box opens:



Three tests are already present in this example. The tests are automatically numbered and the test numbers ("1, 2, 3, ...") shown on the respective buttons.

The following actions are possible:

- **"To menu bar"**
You return to the original menu bar.
- **"New"**
You can now enter data for a new test.
- **"1", "2", ...**
By clicking the buttons labelled with the test numbers you can open and edit the data for the corresponding test.
- **"Failure values"**
If tests have already been entered, you can use this button to display the failure values for the individual tests in an info box and save them to the Windows clipboard using the **"To clipboard"** button.

7.2.2 GGU-TRIAXIAL: Dialog box for editing base data

After clicking on "New" or on the button of an existing test a dialog box opens for entering the base test data. The following dialog box opens:



Enter the elementary triaxial test data in the upper input boxes. The input box texts can be adapted using the menu item **"Output preferences/Texts"**, **"Single test"** button or the input boxes even completely hidden. The following additional actions can be performed

- **"Done"**
You will arrive back at the previous dialog box. All data entered will be accepted.
- **"Edit test data"**
The dialog box that opens for entering or editing the test data is described in more detail in the following section.

- **"Import ASCII file"**

The measured data can be imported from a file in standard ASCII format. In addition, ASCII data in the file formats of the apparatus manufacturers Wüest and Wille can be imported.

The following dialog box opens when importing a standard ASCII file using the **"Normal"** button:

The current row of the ASCII file is shown at the top. You can navigate through the file using the arrow buttons on the right. In the columns **"Date column"**, etc., define the column in which the measured value is located. If a given measured value does not exist, enter a "0" as column number. If all the information is correct, the result for the row is shown in the box below the column. Otherwise, **"Error"** appears. You may need to change the column delimiter or the time format. If the file contains invalid as well as valid rows, these will simply be skipped during the subsequent import. Finally, select the **"Import data"** button. You can then further process the test and evaluate it. The column numbers are stored separately in the document for each test. They are also saved in the **GGU-TRIAXIAL.alg** preferences file. The column numbers need not be specified again for a new test if you either load an existing test and rework it, or if you load the preferences from the preferences file.

- **"Export to ASCII file"**

The test data can be exported to an ASCII file, allowing processing in other applications. The required delimiter for column separation is entered in a dialog box.

- **"Delete test"**

After a confirmation prompt the single test is deleted.

- **"Duplicate test"**

The currently displayed test is duplicated. You are automatically led to the next test. All input made for the test to be duplicated will be transferred to the new one.

7.2.3 GGU-TRIAXIAL: Dialog box for editing test data

After clicking the **"Edit test data"** button a dialog box opens allowing sequential input of the results of the triaxial test (date, time, etc.).



The following actions can be carried out:

- **"OK"/"Cancel"**

You return to the previous dialog box. All entered data will be accepted with **"OK"** and rejected by clicking **"Cancel"**.

- **"Sort"**

If you have forgotten an intermediate value during data input you can enter this value at the end of the table. Then select the **"Sort"** button. The measured values are then sorted according to date and time.

- **"Date info"**

To simplify date input it is possible to enter a '=' if the previous date is to be used again. The date is increased by one day respectively by entering '+'. The dates are displayed after clicking **"Sort"**.

- **"Delete measured values"**

You can delete a specific measured value or contiguous group of measured values. To do this, enter the corresponding test numbers in a dialog box.

- **"Edit no. of values"**

Any number of new data rows can be generated using this button. The time is entered in hours (before the point) and minutes (after the point). A comma is also accepted in the place of a point for date input, allowing faster input using the numeric keypad.

- **"Constant for all"/"Addition or multiplication"** group boxes

Using the buttons of these group boxes constants and factors can be awarded for all measurement series'. This can be useful if the data was imported from an ASCII file, for example, and certain imported values do not possess the correct units. You can then alter the appropriate values using a correction factor.

7.3 GGU-TRIAXIAL: "Shear plane preferences" menu item

In the default setting the shear plane is automatically computed by the program (regression curve according to Gauß' least squares method). If the values are to be specified individually, activate the **"Shear plane manually with the following values"** check box in the dialog box and enter the required data for the shear parameters.



7.4 GGU-TRIAXIAL: "Swap tests" menu item

The triaxial test data (e.g. sampling height/diameter, water content, etc.) are displayed in a table on the output sheet. For several triaxial tests, the presentation sequence corresponds to the input sequence, from left to right. If you would like to change this sequence you can do so after selecting this menu item.

7.5 GGU-TRIAXIAL: "Company" menu item

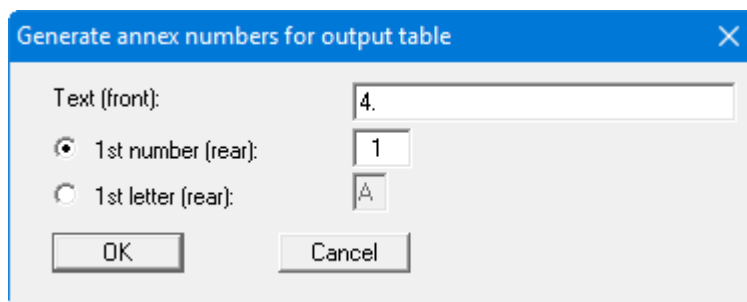
You can enter your company address in four lines. These lines will be entered at the top left of the output sheet header. You can add a company logo in graphic format using the **Mini-CAD** module.

7.6 GGU-TRIAXIAL: "Annex numbers" menu item

Use this menu item to specify the annex numbers for the output sheets (diagrams and output table). When displaying all the diagrams on one sheet, only the "**Annex No. (diagrams)**" input box appears in the subsequent dialog box. When outputting the diagrams to several A4 sheets, a separate input box will open for each diagram sheet.

The screenshot shows two instances of the "Annex numbers" dialog box. The main dialog box in the background has a blue header with the title "Annex numbers" and a close button (X). It contains a list of input fields for annex numbers. The first field is "Annex no. (diagrams):" with the value "3.1". Below it are "Output table page 1" with "4.1", and "Output table page 2" through "Output table page 12" with values from 4.1 to 4.12. At the bottom are "OK", "Cancel", and "Generate" buttons. A smaller, overlapping "Annex numbers" dialog box is also visible, showing "Annex no. (page 1):" with "3.1", "Annex no. (page 2):" with "3.2", "Annex no. (page 3):" with "3.3", and "Output table page 1" with "4.1".

You can manually enter the desired annex numbers for the output tables or have them generated by the program using the "**Generate**" button. Make the following entries to get the numbering shown above:



Generate annex numbers for output table

Text (front): 4.

☒ 1st number (rear): 1

☐ 1st letter (rear): A

OK Cancel

Enter the text to appear in front of the automatic numbering in the first input box; this can be a different number to the annex number for the graphics. It is then possible to select between numbering with numerals or a letter sequence. Activate the required command button and enter the first number or letter (in lower or upper case).

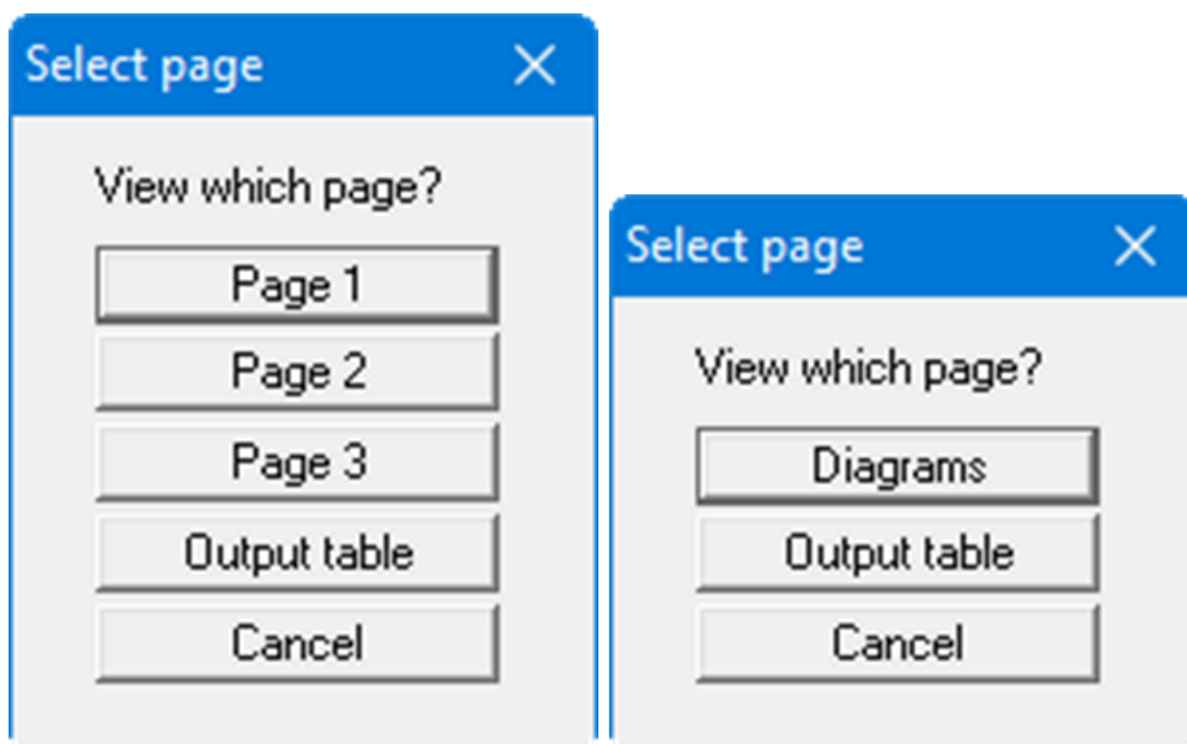
7.7 GGU-TRIAXIAL: "Hottinger" to ASCII" menu item

The evaluation programs provided with the data loggers for triaxial equipment sold by Hottinger and Baldwin generate a rather unusual ASCII data format which writes each value into a separate line. If you have values of this type, this menu item helps to format Hottinger values into lines (all values of a measurement into one ASCII line). This line format can be imported using the "**Import ASCII file**" button in the editor box of the single test.

8 Graphics preferences menu

8.1 GGU-TRIAXIAL: "Select page" menu item

If this menu item is clicked one of the following dialog boxes opens, depending on whether visualisation of all diagrams on one sheet is selected.



The "**Page 1**", "**Page 2**", "**Page 3**" buttons allow the individual test pages to be selected. Depending on the type of test used, different diagrams and tables will be visualised.

After pressing the "**Output table**" button the result table can be viewed with all the measured data belonging to the corresponding test.

Alternatively, move between diagram and output table visualisation using the



and



tools in the Smart icon bar.

The diagram headings are shown in the language selected when the program starts. If the language is changed while processing a test the program must therefore be restarted in order to load the diagram headings in the new language.

8.2 GGU-TRIAXIAL: "Preferences" menu item

If you go to the "**Preferences**" menu item the following dialog box opens:



In this box you can specify the use of markers and their size in millimetres.

You can activate visualisation with stress circles in the stress paths diagram.

Different failure criteria can be adopted to determine the shear parameters. Select the required failure criterion for stress paths and tau-sigma diagram visualisation in the above dialog box .

You can display a summary of the shear parameters for selected failure criteria in the corresponding legend (see menu item "**Output preferences/Shear parameters for failure criteria**").

8.3 GGU-TRIAXIAL: "Refresh and zoom" menu item

The program works on the principle of ***What you see is what you get***. This means that the screen presentation represents, overall, what you will see on your printer. In the last consequence, this would mean that the screen presentation would have to be refreshed after every alteration you make. For reasons of efficiency and as this can take several seconds for complex screen contents, the screen is not refreshed after every alteration. If, e.g., after using the zoom function (see below), only part of the image is visible, you can achieve a complete view using this menu item. image-20240920-121835.png A zoom factor between 0.4 and 8.0 can be entered in the input box. By then clicking on "**Use**" to exit the box the current factor is accepted. By clicking on the "0.4", "0.6", etc. buttons, the selected factor is used directly, and the dialog box closed. It is much simpler, however, to get a complete overview using **[Esc]**. Pressing **[Esc]** allows a complete screen presentation using the zoom factor specified in this menu item. The **[F2]** key allows screen refreshing without altering the coordinates and zoom factor.

8.4 GGU-TRIAXIAL: "Zoom info" menu item

An info box informs you about the activation and options of the zoom function.

The quickest way to enlarge a specific section of the screen is to open a zoom window by holding down the [Ctrl] key and the mouse button.

8.5 GGU-TRIAXIAL: "Legend font selection" menu item

With this menu item you can switch to a different true-type font. All available true-type fonts are displayed in the dialog box.

8.6 GGU-TRIAXIAL: "Font size selection" menu item

You can edit font sizes of texts [in mm] within the various input areas.

8.7 GGU-TRIAXIAL: "Mini-CAD toolbar" menu item

Using this menu item you can add free text, lines, circles, polygons and images (e.g. files in formats BMP, JPG, PSP, TIF, etc.) to the main program graphics. PDF files can also be imported as images. A pop-up menu opens, the icons and functions used are described in more detail in the Mini-CAD manual saved in the 'C:\Program Files (x86)\GGU-Software\Manuals' folder during installation..

8.8 GGU-TRIAXIAL: "Toolbar preferences" menu item

By clicking on the tools (smart icons) for the menu items you can directly reach most of the program functions. The meaning of the smart icons appears as a text box if you hover with the mouse pointer over the tools. Some of the tool functions cannot be called up via normal menu titles and menu entries.

Not all of the icons described below are available in all GGU programs.



"Next page"/"Previous page"

You can use these icons to scroll forwards and backwards between individual pages. In many GGU programs, you can use this in the **output table representation**.



"Select page" or "Diagram/Output table"

If you are in the **output table representation**, you can use this symbol to jump to a specific page or switch back to the normal display, i.e. your graphic display.



"Zoom out"

If you have previously zoomed in, this tool returns to a full screen display.

**"Zoom (-)"/"Zoom (+)"**

With the zoom functions you can zoom in or out of parts of the image, by clicking the left mouse button.

**"Copy/print area"**

Use this tool to copy only parts of the graphics in order to paste them, e.g. to a report. You will see information on this function and can then mark an area, which is copied to the clipboard or can be saved in a file. Alternatively, you can send the marked area directly to your printer (see **"Tips and tricks"**).

**"Colour on/off" or "Colour/hatching"**

If you want to remove the colour from the system display, e.g. to create a black and white printout, you can do this using this on/off switch.

In several GGU programs, 4 colour and hatching settings are possible via this icon, which you can click through in sequence. A colour filled representation is the default setting, the next click shows the hatching, then coloured and hatched. The fourth click shows a representation with neither colour nor hatching. The next click starts again.

**"Move object"**

Use this icon to position legends and diagrams at the desired position on the output sheet.

**"Undo move object"**

By clicking this icon the last performed movement of graphical elements made using the [F11] function key or the menu item **"Output preferences/Move objects"** can be undone.

**"Restore move object"**

By clicking this symbol, the last object movement undo carried out using "Undo move object" can be restored.

**"Construction phase back"/"Construction phase forward"**

If you are in the display of construction phases, you can use these icons to scroll back and forth between the individual construction phases.

8.9 GGU-TRIAXIAL: "Pen colour and width" menu item

For reasons of clarity, different colours are used as default for graphic presentation of the triaxial diagrams, as well as the type of dashing. With this menu item you can alter the pen width can be edited for the listed elements and, after clicking the appropriate buttons, the pen colours be adapted.

On **monochrome printers** (e.g. laser printers), colours are shown in a corresponding grey scale. Graphic elements employing very light colours may be difficult to see. In such cases it makes sense to edit the colour preferences.

8.10 GGU-TRIAXIAL: "Save graphics preferences" menu item

Some of the preferences you made with the menu items of the **"Graphics preferences"** menu as well as the inputs using the **"Edit/Company"** menu item can be saved to a file. If you select **"GGU-TRIAXIAL_alg"** as file name, and save the file on the same level as the program, the data will be automatically loaded the next time the program is started and need not be entered again.

If you do not go to **"File/New"** upon starting the program, but open a previously saved file instead, the preferences used at the time of saving are shown. If subsequent changes in the general preferences are to be used for existing files, these preferences must be imported using the menu item **"Graphics preferences/Load graphics preferences"**.

8.11 GGU-TRIAXIAL: "Load graphics preferences" menu item

You can reload a graphics preferences file into the program, which was saved using the **"Graphics preferences/Save graphics preferences"** menu item. Only the corresponding data will be refreshed.

9 Output preferences menu

9.1 GGU-TRIAXIAL: "Page size" menu item

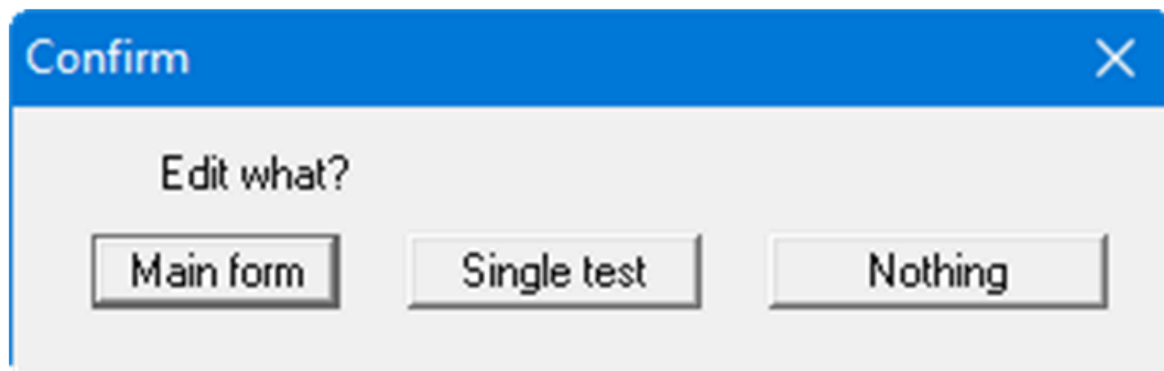
You can edit the page size in the dialog box of this menu item to your personal requirements.

9.2 GGU-TRIAXIAL: "Graph positioning preferences" menu item

Specify whether all diagrams are visualised on one sheet using this menu item. If the check box **"All diagrams on one page"** is deactivated the various diagrams are visualised consecutively on several A4 sheets.

9.3 GGU-TRIAXIAL: "Texts" menu item

The default labelling of some output sheet elements can be edited in this menu item's dialog box. Among other things, the name of the output sheet can be specified here. An option box opens in which the various fields can be selected for editing using the correspondingly labelled buttons.



After clicking **"Main form"** the following dialog box opens:

The 'Texts' dialog box is shown with the following content:

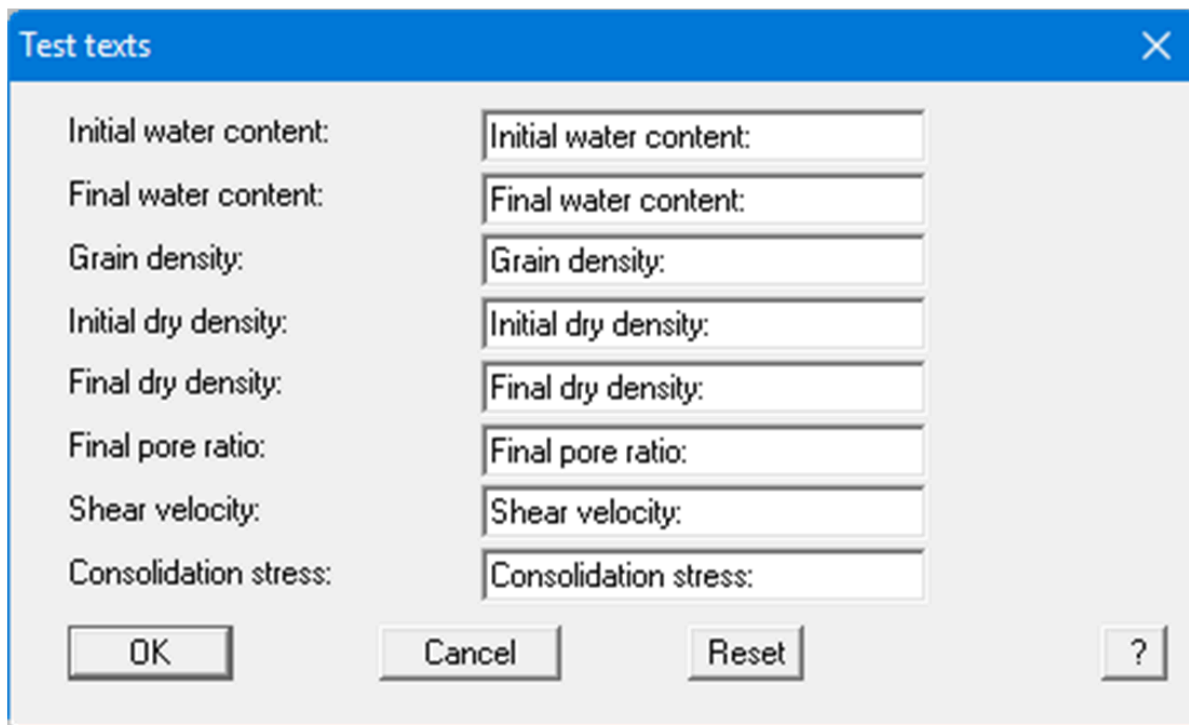
Label	Input Field
Heading 1:	Triaxial test
Heading 2:	
Report:	Report:
Annex:	Annex:
☐ Row 1:	Test number:
☒ Row 2:	Sampling point:
☒ Row 3:	Depth:
☒ Row 4:	Soil type:
☒ Row 5:	Type of sampling:
☒ Row 6:	Sample taken on:

Buttons: OK, Cancel, Reset

Your input in rows 1 to 6 of the above dialog box, as well as the input for "**Report:**" and "**Annex:**" also represent the designations for the input boxes in the "**Edit/General**" menu item dialog box. If lines are deactivated in the above dialog box, the corresponding input boxes in the "**Edit/General**" menu item dialog box are also deactivated.

Use "**Reset**" to restore the default labelling settings. If you have retroactively changed the language, you will see the internal program translations in the input boxes.

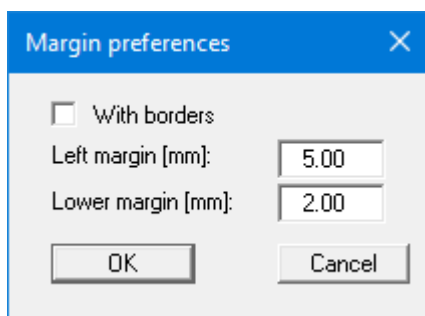
If the "**Singe test**" button is clicked in the above option box the following dialog box opens, allowing editing of the test data input box labelling and the display of the test data table on the output sheet:

A dialog box titled "Test texts" with a blue header bar and a close button (X) in the top right corner. The dialog contains eight text input fields, each preceded by a label: "Initial water content:", "Final water content:", "Grain density:", "Initial dry density:", "Final dry density:", "Final pore ratio:", "Shear velocity:", and "Consolidation stress:". Below the input fields are four buttons: "OK", "Cancel", "Reset", and a help button with a question mark (?).

Test values whose contents you delete in the fields above will not be displayed in the tests base data and in the table of test values on the output sheet.

9.4 GGU-TRIAXIAL: "Margins" menu item

In the default program preferences, the form is shown with cutting borders. For output to an A4 printer, a reduction of the printer output is generally necessary, as proprietary printers cannot fully cover an A4 page. The margin preferences can be defined in the following dialog box.

A dialog box titled "Margin preferences" with a blue header bar and a close button (X) in the top right corner. It contains a checkbox labeled "With borders" which is currently unchecked. Below the checkbox are two text input fields: "Left margin [mm]" with a value of "5.00" and "Lower margin [mm]" with a value of "2.00". At the bottom are two buttons: "OK" and "Cancel".

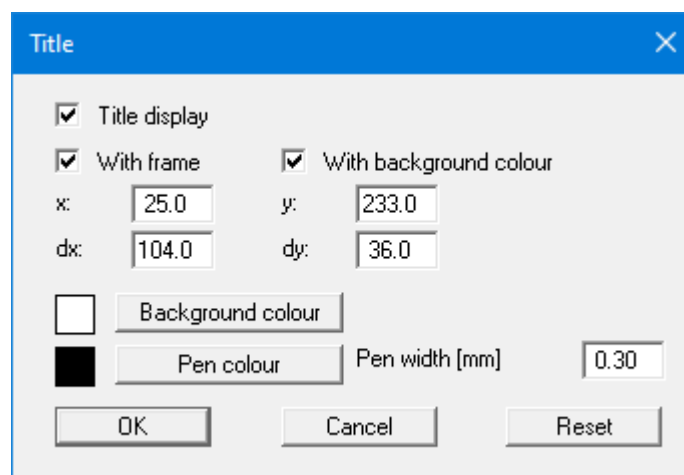
By deactivating the "**With borders**" check box and with an appropriate choice of left and lower margins, it is generally possible to create a non-reduced printer output. It is necessary to also adapt the page height and width.

9.5 GGU-TRIAXIAL: "Position info" menu item

The positions and layout of the individual elements on the output sheet can be altered using the following menu items. This menu item provides information on the options for altering the position and layout more quickly using the mouse.

9.6 GGU-TRIAXIAL: "Title (change position)" menu item

The position and layout of the title element can be altered via the dialog box for this menu item, if the **"Title display"** check box is activated.



The position of the element on the output sheet and its size can be defined or edited by means of the variables **"x"** and **"y"**, **"dx"** and **"dy"**. The element can be provided with a frame and a background colour to suit your personal requirements. If the element needs to be returned to its original condition, this can be done using the **"Reset"** button. Alternatively, you can alter the size and shape of the element using the mouse (see menu item **"Output preferences/Move objects"**).

The heading **"Triaxial test"** shown in the title element can be edited in the menu item **"Output preferences/Texts"** button **"Main form"**. The texts **"Project (1st line)"** to **"Project (3rd line)"** are entered immediately after double-clicking the element or using the menu item **"Edit/General"**.

9.7 GGU-TRIAXIAL: "Stress-strain graphs" menu item

Almost exactly the same dialog box opens with the same preference options as that described in the **"Output preferences/Title (change position)"** menu item. Proceed as described there to alter the position or layout of the **"Stress-strain graphs"** element.

9.8 GGU-TRIAXIAL: "Company" menu item

You will see an almost identical dialog box with the same settings options as described in the menu item **"Output preferences/Title (change position)"**. Proceed as described there if you want to make changes to the position or layout of the element in this menu item.

The input for this element can be edited immediately after double-clicking on the element or via the menu item **"Edit/Company"**.

9.9 GGU-TRIAXIAL: "Designation" menu item

If this element is activated the designation of the selected test type is automatically entered in a small message box by the program. Almost exactly the same dialog box opens with the same preference options as that described in the **"Output preferences/Title (change position)"** menu item. Simply proceed as described there to edit the **"Designation"** element.

9.10 GGU-TRIAXIAL: "Test no. etc." menu item

You will see an almost identical dialog box with the same settings options as described in the menu item **"Output preferences/Title (change position)"**. Proceed as described there if you want to make changes to the position or layout of the element in this menu item.

The input for this element can be edited immediately after double-clicking on the element or via the menu item **"Edit/General"**. For this element you also have the option of adapting the texts in front of the input boxes to suit your needs. Go to the menu item **"Output preferences/Texts"** button **"Main form"**.

9.11 GGU-TRIAXIAL: "Annex and report" menu item

You will see an almost identical dialog box with the same settings options as described in the menu item **"Output preferences/Title (change position)"**. Proceed as described there if you want to make changes to the position or layout of the element in this menu item.

The input for this element can be edited immediately after double-clicking on the element or via the menu item **"Edit/General"** and **"Edit/Annex numbers"**. For this element you also have the option of adapting the texts in front of the input boxes to suit your needs. Go to the menu item **"Output preferences/Texts"** button **"Main form"**.

9.12 GGU-TRIAXIAL: "Volume-strain graphs" menu item

Almost exactly the same dialog box opens with the same preference options as that described in the **"Output preferences/Title (change position)"** menu item. Proceed as described there to alter the position or layout of the **"Volume-strain graphs"** element.

9.13 GGU-TRIAXIAL: "Pore water pressure-strain graphs" menu item

There is no separate menu item for this diagram. To alter the position or layout of the element **"Pore water pressure-strain graphs"** go to the menu item **"Output preferences/Volume-strain graphs"**.

9.14 GGU-TRIAXIAL: "sig3'-strain graphs" menu item

There is no separate menu item for this diagram. To alter the position or layout of the element **"sig3'-strain graphs"** go to the menu item **"Output preferences/Volume-strain graphs"**.

9.15 GGU-TRIAXIAL: "Stress paths" menu item

Almost exactly the same dialog box opens with the same preference options as that described in the **"Output preferences/Title (change position)"** menu item. Proceed as described there to alter the position or layout of the **"Stress paths"** element.

9.16 GGU-TRIAXIAL: "Tau-sigma diagram" menu item

Almost exactly the same dialog box opens with the same preference options as that described in the **"Output preferences/Title (change position)"** menu item. Proceed as described there to alter the position or layout of the **"Tau-sigma diagram"** element.

9.17 GGU-TRIAXIAL: "Stress ratio-strain graphs" menu item

Almost exactly the same dialog box opens with the same preference options as that described in the **"Output preferences/Title (change position)"** menu item. Proceed as described there to alter the position or layout of the **"Stress ratio-strain graphs"** element.

9.18 GGU-TRIAXIAL: "Test data" menu item

Almost exactly the same dialog box opens with the same preference options as that described in the **"Output preferences/Title (change position)"** menu item. Proceed as described there to alter the position or layout of the **"Test data"** element.

The input for this element can be edited via the menu item **"Edit/Single tests"**. For this element you also have the option of adapting the texts in front of the input boxes to suit your needs. Go to the menu item **"Output preferences/Texts"** button **"Single test"**.

9.19 GGU-TRIAXIAL: "Output table" menu item

Almost exactly the same dialog box opens with the same preference options as that described in the **"Output preferences/Title (change position)"** menu item. Proceed as described there to alter the position or layout of the **"Output table"** element.

9.20 GGU-TRIAXIAL: "Shear parameters for failure criteria" menu item

Use this menu item to open the following dialog box for visualisation of the shear parameters for the failure criteria in a legend on your output sheet:



In the lower area, you can choose to display all failure criteria or only specific ones. If you have activated legend visualisation, at least one failure criterion must always be selected, otherwise the program activates the first failure criterion.

9.21 GGU-TRIAXIAL: "Reset all" menu item

With this button, all preferences for the aforementioned elements, which may have been edited with the previous menu item, will be reset to the program defaults.

9.22 GGU-TRIAXIAL: "Move objects" menu item

If you select this entry, you can then use the mouse to move the various objects and legends. Move the mouse over the object of your choice. If you are over a movable object, the mouse pointer will take on the shape of a cross. Now press the left mouse button and drag the object to the desired position while holding down the button.

After going to this menu item **only one object** at a time can be moved using the mouse or its size be altered.

If you want to edit several objects, you can also activate the function more quickly by pressing the [F11] key or the symbol



. An info box will then no longer appear.

In many GGU programs you can also alter the size of an object using this menu item or the [F11] function key. If you are positioned over the frame of a resizable object after activating the function, the mouse takes on the shape of a double arrow. Hold down the left mouse button and drag the frame until the object has reached the desired size. Drag a corner to maintain the aspect ratio of the sides. If you drag on one side, the object becomes taller or wider.

Using the [Back] key or by clicking on the icon



you can undo the last change to the position or size of an object.

In programs in which you can position the diagrams yourself (menu item "**System/Graph positioning preferences**"), the result diagrams can also be moved using this function if you have switched to "**Manual graph positioning**".

10 Info menu

10.1 GGU-TRIAXIAL: "Copyright" menu item

You will see a copyright message and information on the program version number.

The "**System**" button shows information on your computer configuration and the folders used by the GGU program.

10.2 GGU-TRIAXIAL: "Maxima" menu item

Here you can check the defaults for maximum values of the program.

10.3 GGU-TRIAXIAL: "Help" menu item

The manual is opened as a PDF document. The help function can also be accessed using the **[F1]** function key.

10.4 GGU-TRIAXIAL: "GGU on the web" menu item

Using this menu item, you can access the [GGU Software website](#).

Check the page of your program module at regular intervals for information about updates and changes. On the "**Changelogs**" subpage, you can also subscribe to an e-mail notification that informs you of all changes on a monthly basis.

10.5 GGU-TRIAXIAL: "GGU support" menu item

This menu takes you directly to the [GGU Software Support Portal](#).

Here you can enter your support request directly and upload your edited GGU program file.

10.6 GGU-TRIAXIAL: "What's new?" menu item

You will see information on program improvements in comparison to older versions.

10.7 GGU-TRIAXIAL: "Language preferences" menu item

This menu item allows you to switch the menus and the graphics from German to English and vice versa. To work in German, deactivate the two check boxes "**Dialoge + Menüs übersetzen (translate dialogues, menus)**" und "**Graphiktexte übersetzen (translate graphics)**".

Alternatively, you can work bilingually, e.g. with German dialog boxes but with graphic output in English. The program always starts with the language setting applicable when it was last ended.