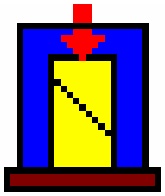
Evaluation and visualisation of triaxial compression tests to DIN 18137 (Part 2)

GGU-TRIAXIAL

VERSION 4



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1 Preface

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

The program is designed to allow simple data input. The system is permanently displayed on the screen. Every alteration to the data is shown on the screen, so that optimum control of input data is guaranteed. Graphic output supports the true-type fonts supplied with WINDOWS, so that excellent layout is guaranteed. Colour output and any graphics (e.g. files in formats BMP, JPG, PSP, TIF, etc.) are supported. DXF files can also be imported by means of the integrated Mini-CAD module (see the "**Mini-CAD**" manual).

The program has been thoroughly tested on numerous examples from the literature and in engineering practice. No faults 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 Licence protection and installation

In order to guarantee a high degree of quality, a hardware-based copy protection system is used for the **GGU-TRIAXIAL** program.

The GGU software protected by the ***CodeMeter*** copy protection system is only available in conjunction with the ***CodeMeter stick*** copy protection component (hardware for connection to the PC, "***CM stick***"). Because of the way the system is configured, the protected software can only be operated with the corresponding CM stick. This creates a fixed link between the software licence and the CM stick copy protection hardware; the licence as such is thus represented by the CM stick. The correct Runtime Kit for the CodeMeter stick must be installed on your PC.

Upon start-up and during running, the **GGU-TRIAXIAL** program checks that a CM stick is connected. If it has been removed, the program can no longer be executed.

For installation of GGU software and the CodeMeter software please refer to the information in the ***Installation notes for GGU Software International***, which are supplied with the program.

3 Language selection

GGU-TRIAXIAL is a bilingual program. The program always starts with the language setting applicable when it was last ended. 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.

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 Starting the program

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

- File
- Info

After clicking the "**File**" menu, either an existing file can be loaded by means of the "**Load**" menu item, or new tests can be entered using "**New**". After clicking "**File/New**" the type of test must be selected from a dialog box. If the "**All diagrams on one sheet**" check box is activated an empty A3 format page is displayed on the screen when the dialog box is closed, otherwise an A4 format output sheet is displayed with an empty form to DIN 18137 (Part 2). The menu bar will then show five menus:

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

After clicking one of these menus, the 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 **GGU-TRIAXIAL** screen is not refreshed after every alteration.

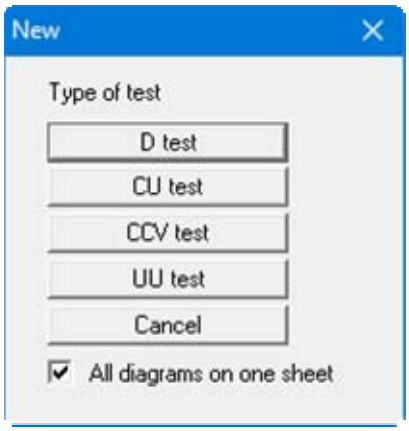
If you would like to refresh the screen contents, press either [**F2**] or [**Esc**]. The [**Esc**] key additionally sets the screen presentation back to your current zoom, which has the default value 1.0.

5 Description of menu items

5.1 File menu

5.1.1 "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.

5.1.2 "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.

5.1.3 "Save" menu item

You can save data entered or edited during program use to a file, in order 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.

5.1.4 "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.

5.1.5 "Export to ASCII file" menu item

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

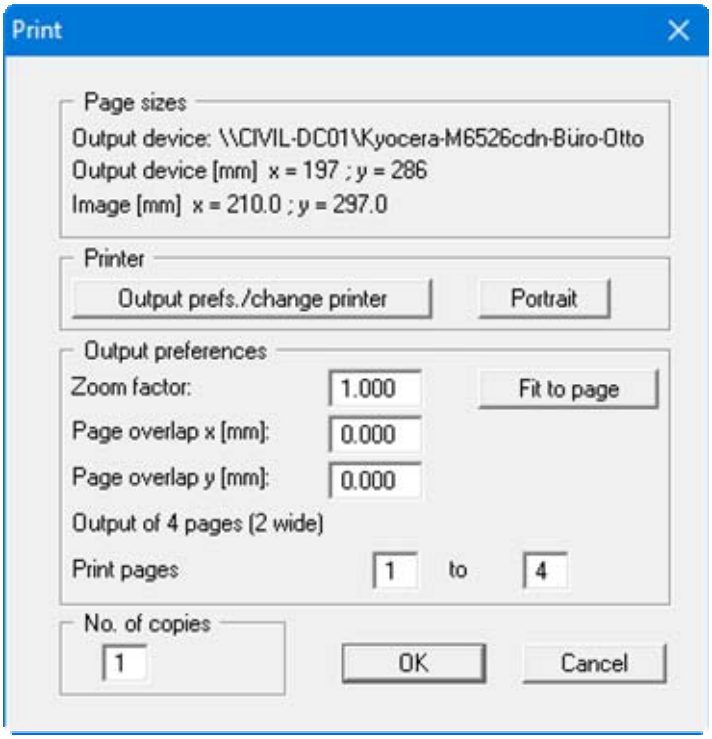
5.1.6 "Output preferences" menu item

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

5.1.7 "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 to the WINDOWS default 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). In order 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. 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.

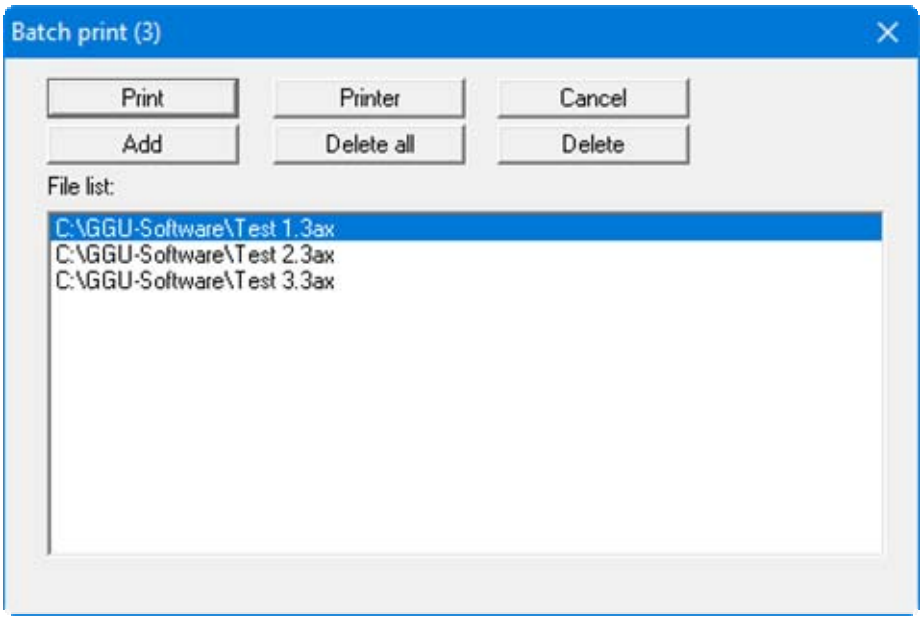
- "**Metafile**"
  allows output of the graphics to a file in order to be further processed with third party software. Output is in the standardised EMF format (Enhanced Metafile format). Use of the Metafile format guarantees the best possible quality when transferring graphics.

> 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**", Section 6.3).
>
> Using the "**Mini-CAD**" program module you can also import EMF files generated using other GGU applications into your graphics.

- "**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.

5.1.8 "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 output 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.

5.1.9 "Exit" menu item

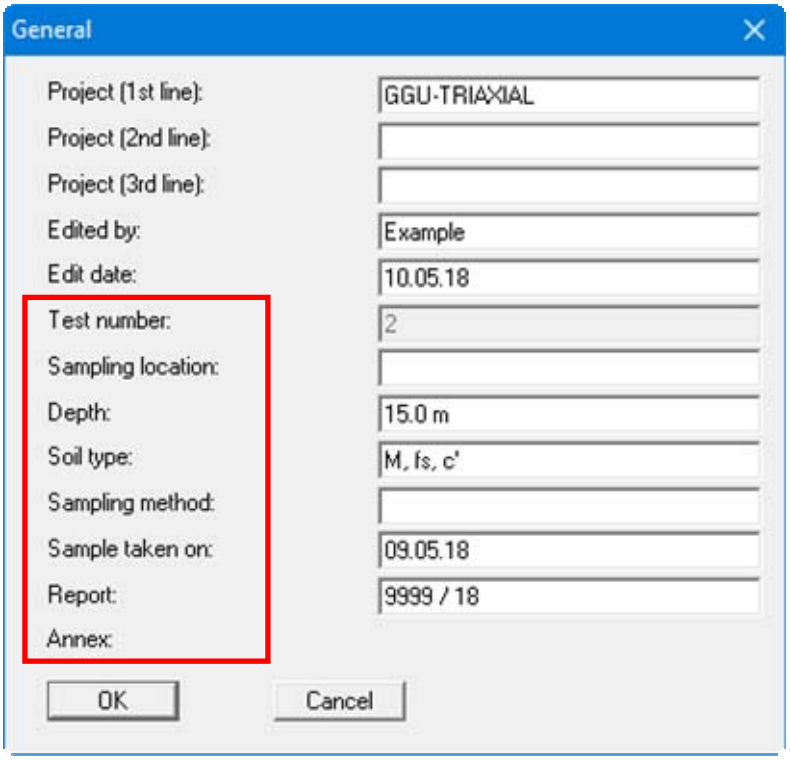
After a confirmation prompt, you can quit the program.

5.1.10 "1, 2, 3, 4" menu items

The "**1, 2, 3, 4**" menu items show the last four files worked on. By selecting one of these menu items the listed file will be loaded. If you have saved files in any other folder than the program folder, you can save yourself the occasionally onerous ***rummaging*** through various sub-folders.

5.2.1 "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.

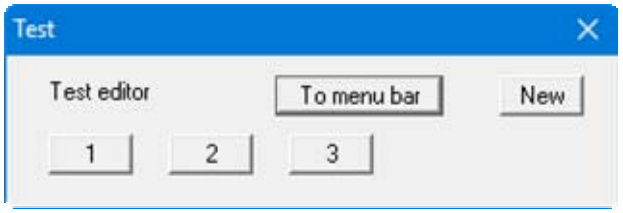


The marked texts in the dialog box also appear in the output sheet. Input boxes can be altered or switched off such as "**Test number:**" as shown in the above dialog box by going to the menu item "**Output preferences/Texts**" button "**Main form**" (see Section 5.4.3).

5.2.2 "Single tests" menu item

5.2.2.1 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:



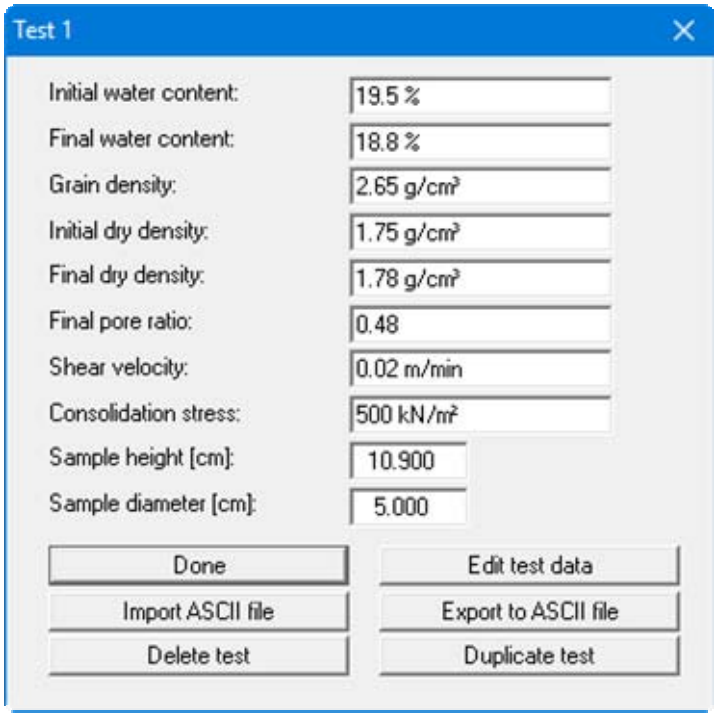
Three tests are already present in this example. The tests are automatically numbered and the test numbers ("1, 2, 3, ...") shown on the respective buttons.

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.

5.2.2.2 Dialog box for editing base data

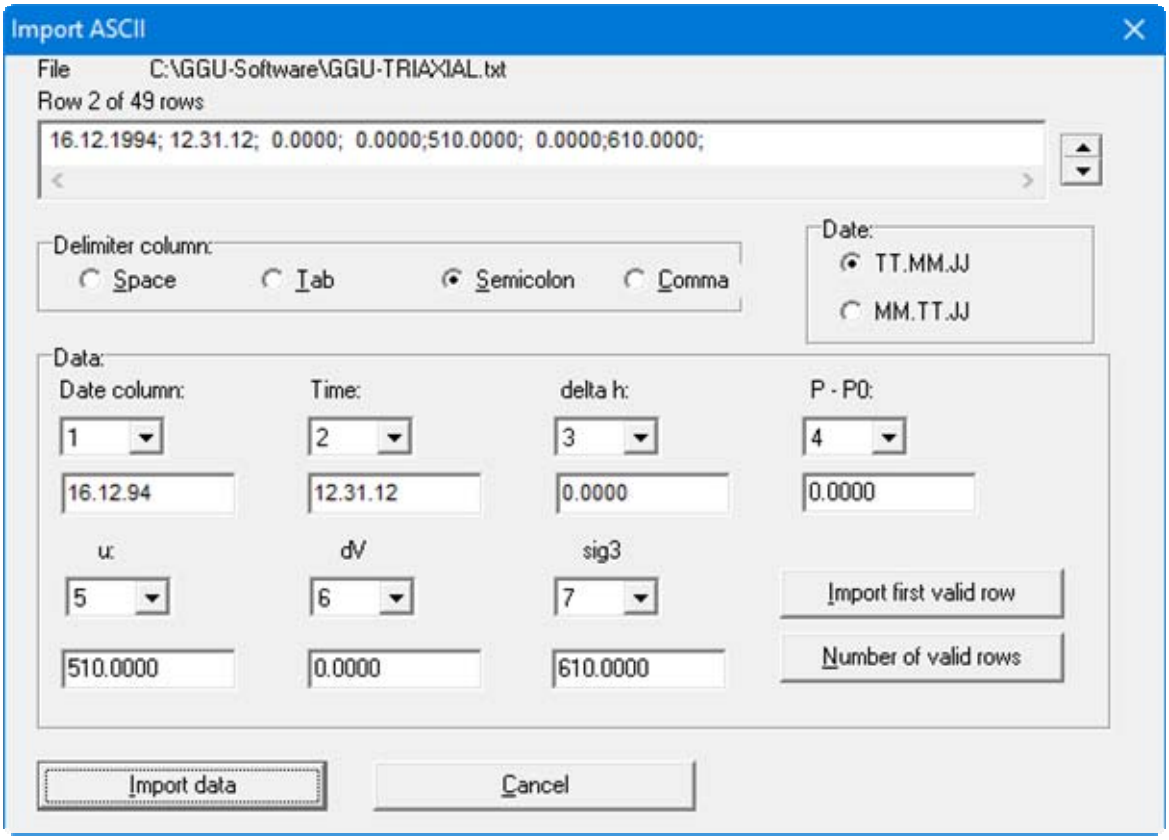
After clicking on "**New**" or on the button of an existing test a dialog box opens for entering the base test data. The following dialog box opens:



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 (see Section 5.4.3). 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 5.2.2.3.
- "**Import ASCII file**"
  The measured data can 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:

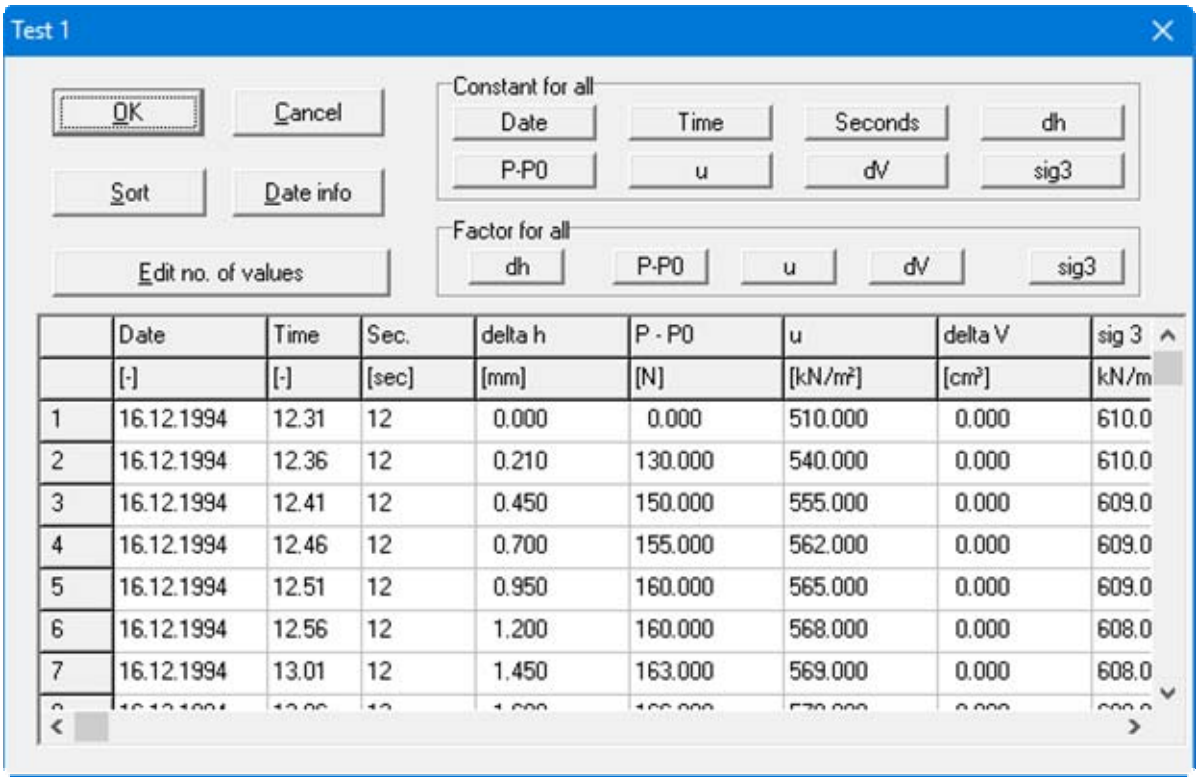


The current row of the ASCII file is shown at the top. You can navigate through the file using the arrow buttons on the right. In the columns "**Date column**", etc., define the column in which the measured value is located. If a given measured value does not exist, enter a "0" as column number. If all 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 testis 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.

5.2.2.3 *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.).



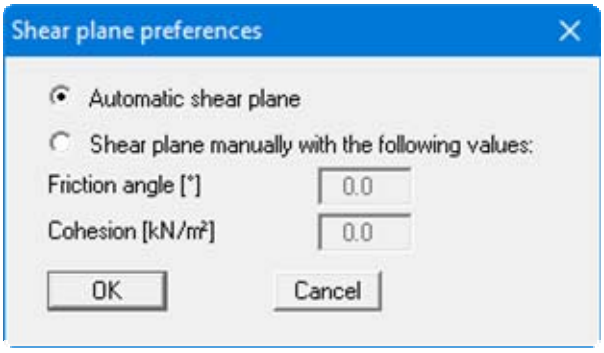
	Date	Time	Sec.	delta h	P - P0	u	delta V	sig 3
	[-]	[-]	[sec]	[mm]	[N]	[kN/m²]	[cm³]	kN/m
1	16.12.1994	12.31	12	0.000	0.000	510.000	0.000	610.0
2	16.12.1994	12.36	12	0.210	130.000	540.000	0.000	610.0
3	16.12.1994	12.41	12	0.450	150.000	555.000	0.000	609.0
4	16.12.1994	12.46	12	0.700	155.000	562.000	0.000	609.0
5	16.12.1994	12.51	12	0.950	160.000	565.000	0.000	609.0
6	16.12.1994	12.56	12	1.200	160.000	568.000	0.000	608.0
7	16.12.1994	13.01	12	1.450	163.000	569.000	0.000	608.0

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**".
- "**Edit no. of values**"
  Any number of new data rows can be generated using this button. The data from the last row are transferred to the new one. 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**"/"**Factor for all**" 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.

5.2.3 "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.



5.2.4 "Swap tests" menu item

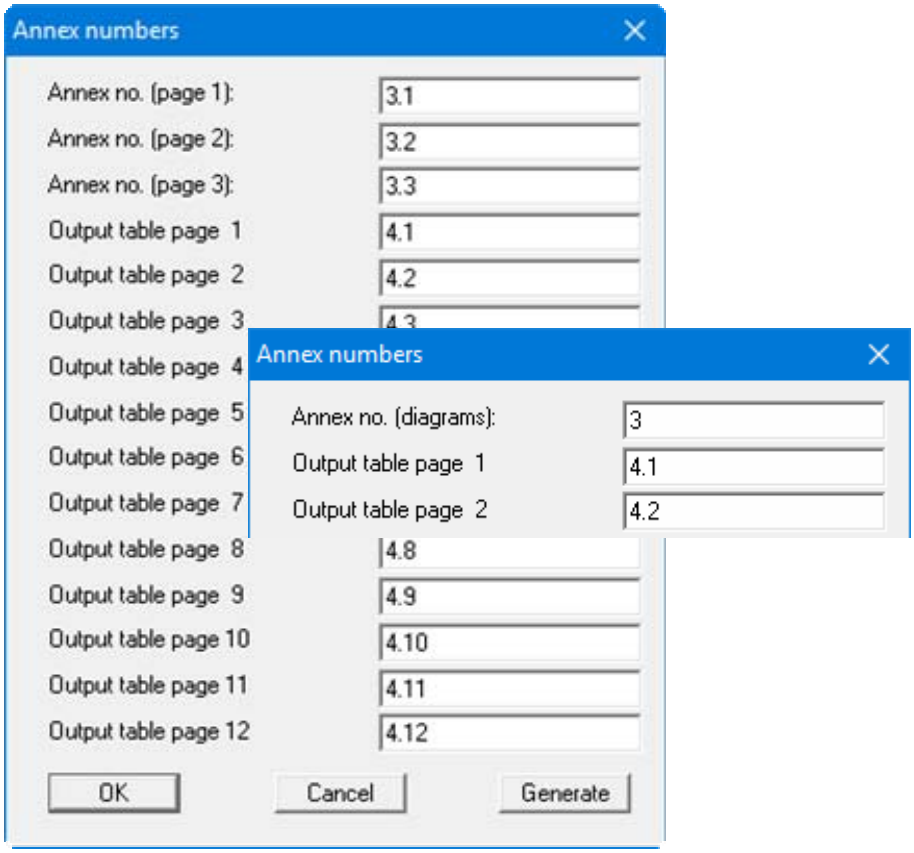
The triaxial test data (e.g. sampling height/diameter, water content, etc.) are displayed in a table on the output sheet. For several triaxial tests, the presentation sequence corresponds to the input sequence, from left to right. If you would like to change this sequence you can do so after selecting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

5.2.5 "Company" menu item

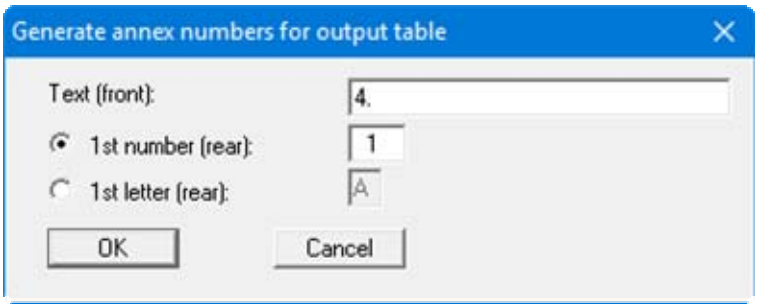
You can enter your company address in four lines. These lines will be entered at the top left of the output sheet.

5.2.6 "Annex numbers" menu item

Here it is possible to define the annex numbers for the output sheets with their various diagrams and for the output tables. If all diagrams are to be visualised on one sheet, only one "**Annex number (diagrams)**" input box appears in the following dialog box, together with the input boxes for the output table sheets.



The annex numbers can be entered, but the numbers for the output sheets can also easily be generated by the program using the "**Generate**" button. Make the following entries to get the numbering shown above:



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).

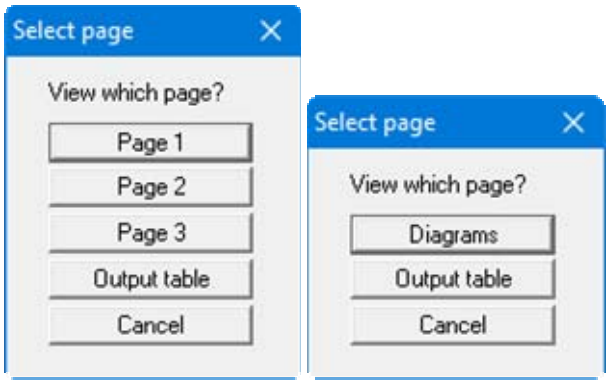
5.2.7 "'Hottinger'" to ASCII" menu item

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 (see Section 5.2.2.2).

5.3 "Graphics preferences" menu

5.3.1 "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 (see Section 5.4.2).



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

- Porewater pressure-strain graphs
- Stress ratio-strain graphs
- Stress paths
- Tau-sigma diagram
- Stress-strain graphs
- sig3'-strain graphs
- Volumetric strain graphs
- Test data table

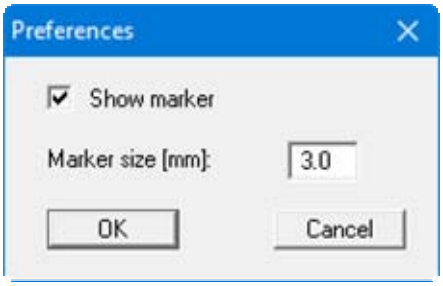
After pressing the "**Output table**" button the result table can be viewed with all the measured data belonging to the corresponding test.

Alternatively, move between diagram and output table visualisation using the tool in the Smart icon bar. If diagram visualisation on several annex sheets is specified, move between the individual sheets via the arrow icons 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.

5.3.2 "Preferences" menu item

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

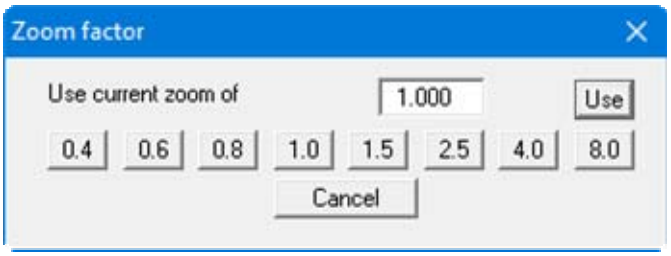


In this box you can specify the use of markers and their size in millimetres.

5.3.3 "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.



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.

5.3.4 "Zoom info" menu item

By clicking two diametrically opposed points you can enlarge a section of the screen in order to view details better. An information box provides information on activating the zoom function and on available options.

5.3.5 "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.

5.3.6 "Font size selection" menu item

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

5.3.7 "Mini-CAD toolbar" menu item

Using this menu item you can add free text to the graphics and add lines, circles, polygons and images (e.g. files in formats BMP, JPG, PSP, TIF, etc.). A pop-up menu opens; the icons and functions used are described in more detail in the "**Mini-CAD**" manual provided.

5.3.8 "Toolbar preferences" menu item

After starting the program a horizontal toolbar appears below the program menu bar. If you would rather work with a popup window with several columns, you can specify your preferences using this menu item. The smart icons can also be switched off.

At the bottom of the program window you find a status bar with further information. You can also activate or switch off the status bar here. The preferences will be saved in the "**GGU-TRIAXIAL.alg**" file (see menu item "**Graphics preferences/Save graphics preferences**") and will be active at the next time the program is started.

By clicking on the tools (smart icons) 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 can be activated from the normal menu items.

"**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.

"**Undo move object**"
If you have previously edited the position or size of an element on the output sheet ([**F11**] or used "**Output preferences/Move objects**"), you can undo the last changement with this tool.

"Restore move object"
If you have previously undone a changement, you can restore with this tool.

"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**", Section 6.3).

5.3.9 "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.

5.3.10 "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**".

5.3.11 "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.

5.4.1 "Page size" menu item

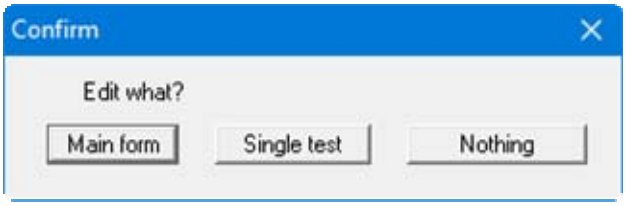
You can edit the page size in the dialog box of this menu item to your personal requirements.

5.4.2 "Graph positioning preferences" menu item

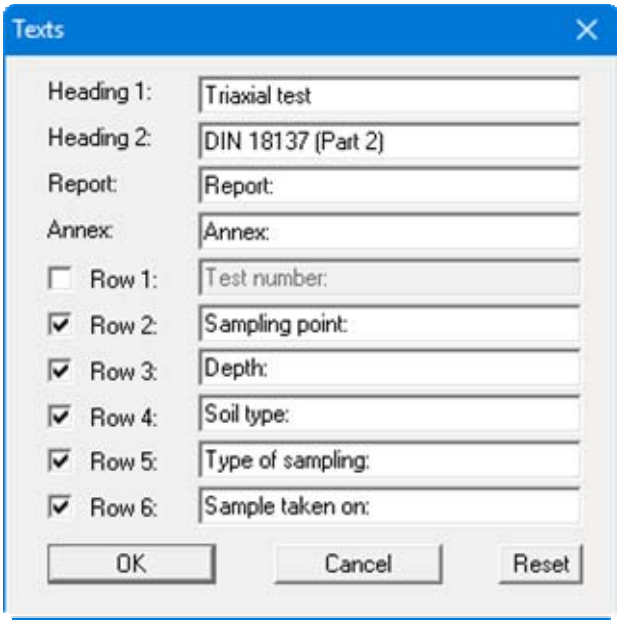
Specify whether all diagrams are visualised on one sheet using this menu item. If the check box "**All diagrams on one page**" is deactivated the various diagrams are visualised consecutively on several A4 sheets.

5.4.3 "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.

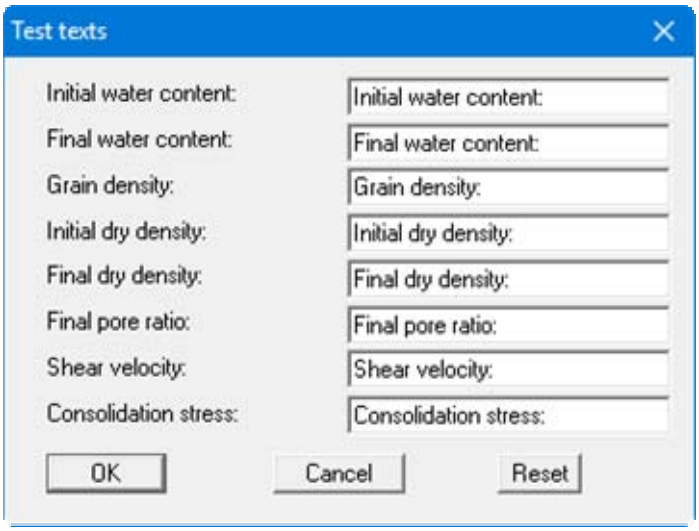


After clicking "**Main form**" the following dialog box opens:



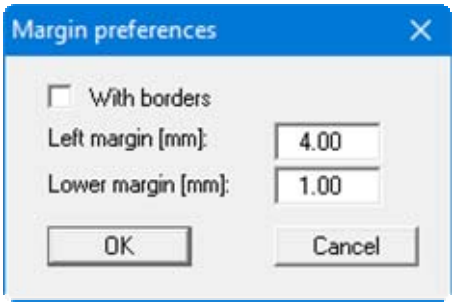
Your input in lines 1 to 6 of the above dialog box, as well as the input for "**Report:**" and "**Annex:**" also represent the designations for the input boxes in the "**Edit/General**" menu item dialog box. If lines are deactivated in the above dialog box, the corresponding input boxes in the "**Edit/General**" menu item dialog box are also deactivated (see Section 5.2.1).

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:



5.4.4 "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.



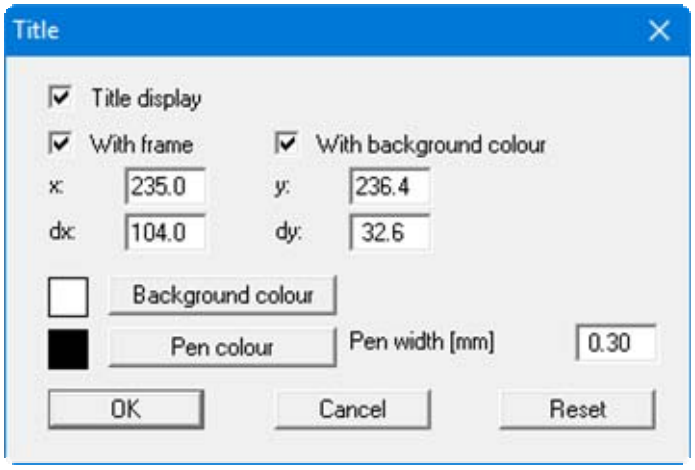
By deactivating the "**With borders**" check box and with an appropriate choice of left and lower margins, it is generally possible to create a non-reduced printer output. It is necessary to also adapt the page height and width (see Section 5.4.1).

5.4.5 "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

5.4.6 "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**", Section 5.4.21).

The heading "**Triaxial test**" shown in the title element can be edited in the menu item "**Output preferences/Texts**" button "**Main form**" (see Section 5.4.3). The texts "**Project (1st line)**" to "**Project (3rd line)**" are entered immediately after double-clicking the element or using the menu item "**Edit/General**" (see Section 5.2.1).

5.4.7 "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 (see Section 5.4.6). Proceed as described there to alter the position or layout of the "**Stress-strain graphs**" element.

5.4.8 "Company" 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 (see Section 5.4.6). Simply proceed as described there to edit the "**Company**" element.

The input for this element can be edited immediately after double-clicking on the element or via the menu item "**Edit/Company**" (see Section 5.2.5).

5.4.9 "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 (see Section 5.4.6). Simply proceed as described there to edit the "**Designation**" element.

5.4.10 "Test no., etc." 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 (see Section 5.4.6). To edit the "**Test no., etc.**", element, simply proceed as is described there.

The input for this element can be edited immediately after double-clicking on the element or via the menu item "**Edit/General**" (see Section 5.2.1). 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**" (see Section 5.4.3).

5.4.11 "Annex and report" 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 (see Section 5.4.6). To edit the "**Annex and report**" element, simply proceed as described there.

The input for this element can be edited immediately after double-clicking on the element or via the menu items "**Edit/General**" and "**Edit/Annex numbers**" (see Sections 5.2.1 and 5.2.6). 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**" (see Section 5.4.3).

5.4.12 "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 (see Section 5.4.6). Proceed as described there to alter the position or layout of the "**Volume-strain graphs**" element.

5.4.13 "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**" (see Section 5.4.12).

5.4.14 "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**" (see Section 5.4.12).

5.4.15 "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 (see Section 5.4.6). Proceed as described there to alter the position or layout of the "**Stress paths**" element.

5.4.16 "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 (see Section 5.4.6). Proceed as described there to alter the position or layout of the "**Tau-sigma diagram**" element.

5.4.17 "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 (see Section 5.4.6). Proceed as described there to alter the position or layout of the "**Stress ratio-strain graphs**" element.

5.4.18 "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 (see Section 5.4.6). 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**" (see Section 5.2.2.2). 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**" (see Section 5.4.3).

5.4.19 "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 (see Section 5.4.6). Proceed as described there to alter the position or layout of the "**Output table**" element.

5.4.20 "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.

5.4.21 "Move objects" menu item

When you go to this item you can move the various objects with the aid of the mouse. Move the mouse over the object to be moved. When you are located above a moveable object the mouse pointer appears in the shape of a cross. You can now press and hold the left mouse button and drag the object to the required position.

> After going to this menu item only one object at a time can be moved using the mouse or its size be altered.
>
> In order to move or edit several objects, this function can be more quickly activated by pressing [**F11**] or the icon.

The size of an object can also be altered using this menu item or the [**F11**] key. If you move over the frame of a changeable object after activating this function the mouse assumed the shape of a double-headed arrow. Hold the left mouse button and move the frame until the object has reached the required size. To retain the ratio of the sides, pull at one corner only. If on one side only is pulled the object will become higher or wider.

The last change made in the position or size of an object can be undone using [**Back**] or by clicking the icon.

5.5.1 "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 **GGU-TRIAXIAL**.

5.5.2 "Maxima" menu item

Information on the maximum number of tests and measure points possible is displayed in a message box.

5.5.3 "Help" menu item

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

5.5.4 "GGU on the web" menu item

Using this menu item you can access the GGU Software website: www.ggu-software.com.
Keep in touch with new program versions and the regular ***download*** offers.

If you would like to be automatically notified about program innovations, please register for the Newsletter in our Knowledge Base. Go to the following website: http://kbase.civilserve.com.

5.5.5 "GGU support" menu item

This menu item takes to the GGU-Software Support area at www.ggu-software.com.

5.5.6 "What's new?" menu item

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

5.5.7 "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.

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.

6 Tips and tricks

6.1 Keyboard and mouse

You can scroll the screen with the keyboard using the cursor keys and the [**Page up**] and [**Page down**] keys. By clicking and pulling with the mouse, with [**Ctrl**] pressed, you activate the zoom function, i.e. the selected section will fill the screen. Furthermore you can use the mouse wheel to zoom in/out or scrolling the screen presentation. The following mouse wheel functions are available:

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

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

By double-clicking the left mouse button on output sheet elements or **Mini-CAD** objects, the editor for the selected object immediately opens, allowing it to be edited. By double-clicking output sheet elements while holding the [**Shift**] key, the preferences for the position, size and appearance of the element open for editing in the editor.

6.2 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 contents and sets the screen back to the given format (A4 or A3). This is useful if, for example, you have used the zoom function to display parts of the screen and would like to quickly return to a complete overview.
- [**F1**] opens the manual file.
- [**F2**] refreshes the screen without altering the current magnification.
- [**F11**] activates the menu item "**Output preferences/Move objects**".

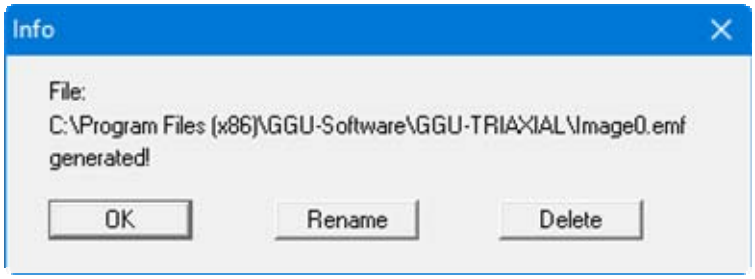
6.3 "Copy/print area" icon

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 opens once the area has been defined:



The default location of the file is the folder from which the program is started 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.

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