Manual symbols - conventions

- Paragraphs beginning with the icons and and relate to the following items respectively: Comment, Idea-Trick, Caution and Reminder
- Whenever the use of a specific key is required, its symbol will appear in a framed grey background, e.g. use of the 'Caps' lock key appears as: Caps Lock
- Activation of certain buttons by clicking on them is apparent in the button's image, e.g. symbolizes the 'New project' button and **Cancel** symbolizes the cancel button.
- Anything that needs to be typed appears in bold, e.g. Type
- The functions described in the present manual concern the Professional version. Some of the following features do not exist or are disabled in the Standard version. For more information, you can refer to the comparative table of the program versions on our website www.alconsoft.com.

Product Activation

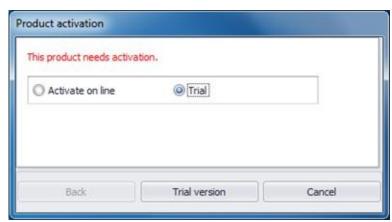
At the first run of ExtrAXION the program asks you for activation.

More:

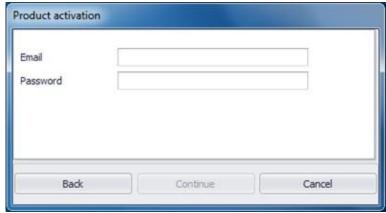
- Activation of trial version
- Activation of full license version
- Off-line activation steps

Activation of trial version

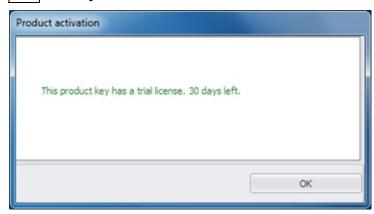
If you have not already purchased ExtrAXION you can choose the trial version.



Insert the email and the password that you have used for the registration to ALCONSOFT's site (www.alconsoft.com) and then click Continue.

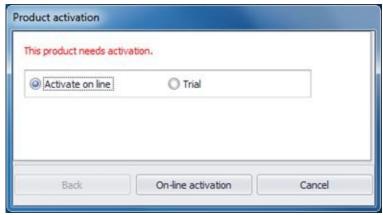


The trial activation is completed and now you are able to use the program for 30 days. Click **OK** and try ExtrAXION.

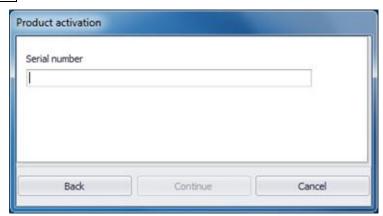


Activation of full license version

If you have purchased ExtrAXION select the option Activate on line and press **On-line activation**.



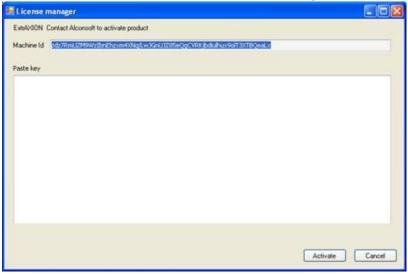
The following window shows up and you have to enter the Serial number (S/N) of the product that ALCONSOFT has provided you with. Afterwards, click **Continue**.



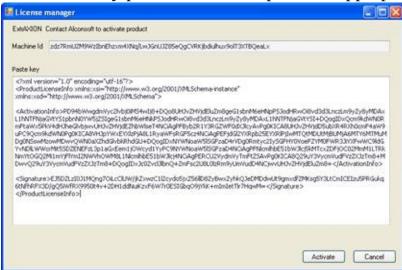
If you do not have a S/N for your product please contact ALCONSOFT or its authorized distributors via email to ask for it.

Off-line activation steps

1. Run LM which is located in ExtrAXION folder. You will see a window like the following:

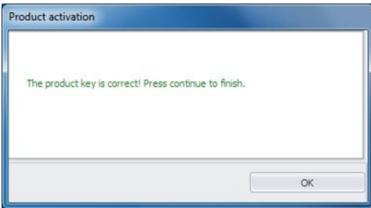


- 2. Copy and paste the machine Id shown and send it via email to ALCONSOFT <u>info@alconsoft.com</u>. ALCONSOFT will reply to you with a unique key.
- 3. Paste the key provided for each pc in the appropriate area



4. Press Activate button

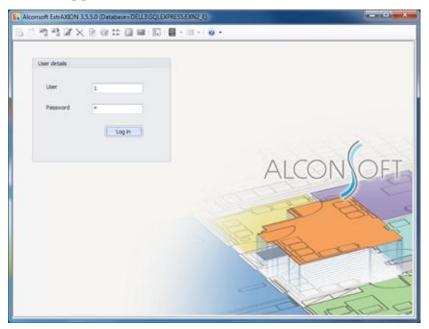
When the activation progress is completed you can see on your screen the following message:



Click **OK** and ExtrAXION opens.

General - Main Toolbar

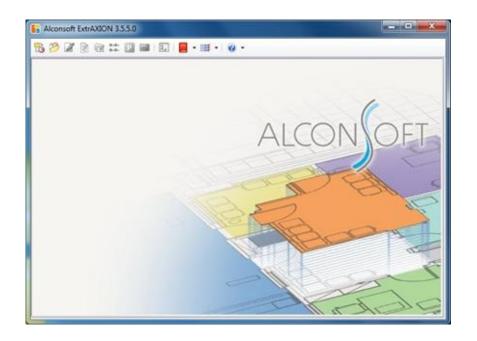
By double-clicking the ExtrAXION icon, the application starts and the following window appears:



Enter the user name and password and click **Login** (see Settings/<u>Users</u>).

1 The number 1 is the default value for both the user name and the password.

In case you are not using SQL Server, the following window appears on your screen:



Click the 'New Project' or 'Open Project' button of the main toolbar to start.

More:

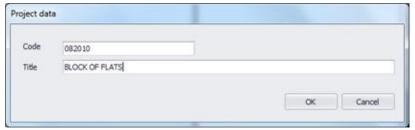
- New project
- □ Open project (Ctrl+O)
- Import/Export project
- Edit project data
- Delete project
- Refresh project
- Drawings management
- Measurement categories
- Project measurements parameters
- Recalculate
- WBS (Ctrl+B)
- Library
- Settings
- Help

[4]	<u></u> •]

New project ®

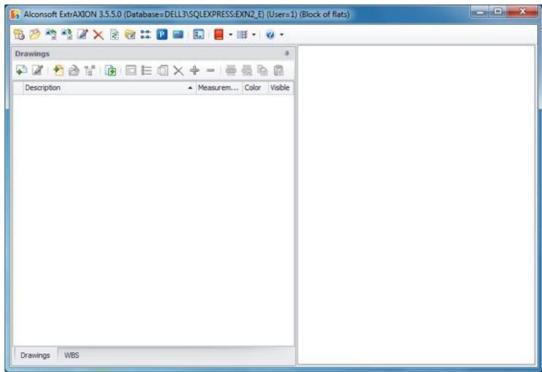
Using this button, you can create a new project.

If you are using SQL Server, the program prompts you to enter a code and title of the project:



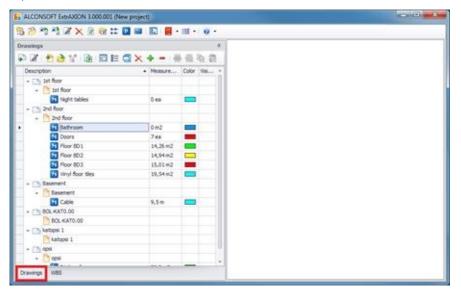
In the case you are not using SQL Server the application prompts you to specify the name of the project file and the location where the file will be stored. Then, in both cases, the display will be divided into two panes.

The project files which are created by ExtrAXION when you are not using SQL Server have the extension SDF.



In the left pane there are two tabs (see bottom of the pane). In the 'Drawings' tab a tree view of all drawings, measurement sheets and measurements of the current project is shown (See <u>Drawings</u>), while in the 'WBS' tab the tree

view consists of the WBS items and their corresponding measurements (<u>See Work items</u>).

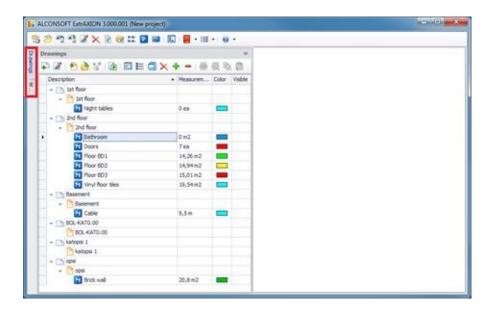


Width

You can set the width of the left pane by placing the cursor on its right margin and dragging it left or right, in order to reduce or increase its width, respectively.

Hide-Show

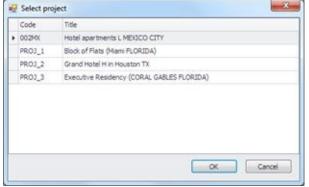
The left pane can be permanently pinned to the foreground or it can be minimized and hidden depending on the orientation of the pin • on its upper right-hand corner. Click on the pin to change its orientation. When the pin is vertical •, the pane is permanently 'pinned' in place. On the contrary, when the pin is horizontal •, if you click on any part to the right of the navigation pane, the pane will hide in order to free more working space. In this case, the titles of all tabs are located in the left part of the pane, instead of the bottom. To bring a tab into the foreground, you need only hover your cursor over it.



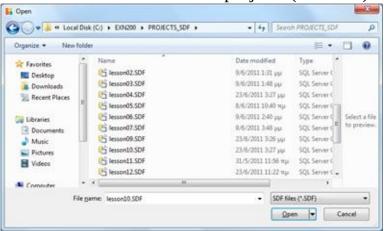
Open project (Ctrl+O) 🍑

Using this button, you may open a project, which has already been saved. Alternatively, you can use the following shortcut: Ctrl+O. The application prompts you to specify the name of the project file you wish to open. The project includes the drawings and the WBS (Work Breakdown Structure) you have entered, the measurement sheets you have created, as well as the measurements. The measurements are listed below each work item in the 'WBS' tab and below each measurement sheet in the 'Drawings' tab. By opening an existing project, you can see the 'WBS' tab open. In case there are no work items, then the 'Drawings' tab is open instead.

If you are using SQL Server, a list appears, which contains the projects contained in the database you have chosen (see Settings/Select database)



Otherwise, select the location of the saved projects (.sdf files).



Only one project may be open at any given time.

Import/Export project

With the 'Import project' button you can import an .sdf file into the Database that you are using and with the 'Export project' button you can export a project to an .sdf file in order for example to save it on your hard disc drive and send it to another ExtrAXION user.



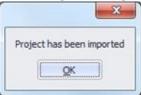
These buttons appear only when you are using SQL Server.

More:

- Import project
- Export project

Import project 🍱

Click on the button, and select the project that you want to import. After the import is completed, the following message appears:



Then you can open the imported project by clicking on the (Open project) button.

The project retains its code and gets as a Title the name of the .sdf file.

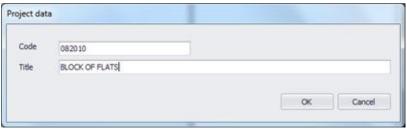
Export project 🥞

Having the project that you want to export opened click on the button. Enter the desired name for the .sdf file and press 'Save'. When the export is completed the following message appears:



Edit project data 🗷

This button enables you to set or edit the project's code and title. The default code and title are 'New project.' On your screen, the following window appears:



Enter the desired code and title.

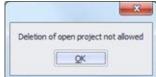
In the 'Code' box you may enter up to 20 characters, and in the 'Title' box up to 100.

Delete project ×

Using this button you can delete a project from your database. It is valid only when you are using SQL server. Select the project that you want to delete from the project list and then press **OK**. The application asks your confirmation twice:



To be able to delete a project, the project must not be opened. Otherwise the following message appears:



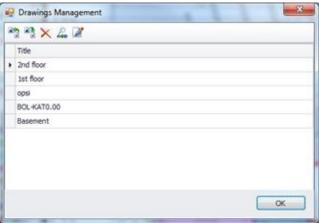
After deletion you lose all the data of your project, as well as all of your drawings with their measurements and they CANNOT be retrieved! Be very careful!

Refresh project 🗟

Using this button the project is reloaded from the current Database to be updated with additions or changes that have been made by other users who have been working simultaneously at the same project.

Drawings management @

This button allows you to manage the drawings of the project on the 'Drawings Management' window.



Use the buttons on the toolbar to:

- Import a new drawing.
- Select a format to export the current drawing.
- Delete the current drawing of the list, provided that it has no measurement sheets.
- Replace the underlying drawing with another one. This feature is very useful when the initial drawing has been modified. .
- Open the 'Drawing Properties' windows where you can see and edit the properties of the current drawing (See Drawings/<u>Drawing</u> <u>properties</u> <u>\omegas</u>).

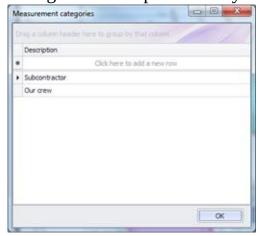
The path of the new drawing will be shown at its properties (See Drawings/Drawing Properties/General).

This change does not affect the way the drawing is stored (into the project database or as an external reference).

Measurement categories

This button allows you to set the categories which constitute a concurrent, independent organization of measurements. Using categories you may classify your measurements in various ways, such as work carried out by subcontractors or your own crew, building level, etc.

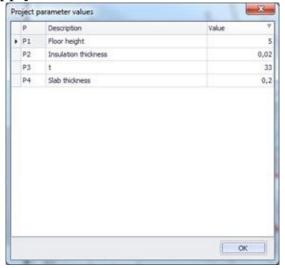
Click on the button to view a list with the various measurement categories. There is a default category 'Category 1' in every new project. To add a new category, click on the field above the list, type its description and press **Enter**. You can change the descriptions at any time.



- The measurement categories are project specific.
- **②** Categories are used to group measurements. (See Appendix/<u>Filters/Sorting</u>)

Project measurements parameters

This button enables you to modify the default values of library parameters, which you wish to apply to all measurements of the current project.



Parameters are used in the formulas that appear in measurement calculations. To enter new parameters, click the button to view the library parameters (See General/Library/Parameters).

Recalculate **=**

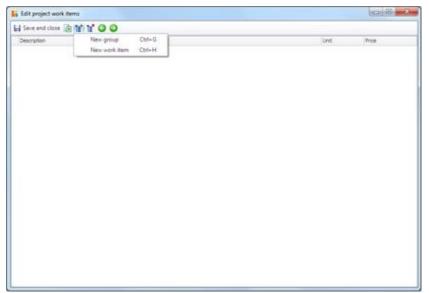
By clicking this button, all of the project's measurements are recalculated, in case there has been a subsequent change to the initial calculation input data, e.g. the values of project parameters.



WBS (Ctrl+B) ₺

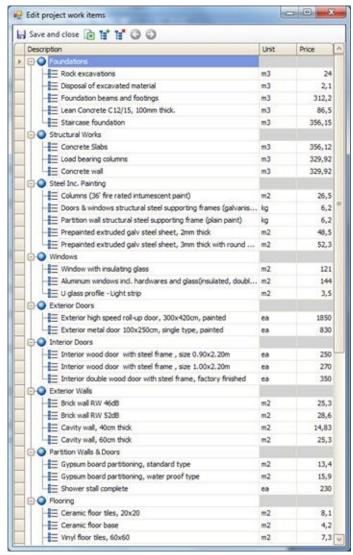
This button allows you to enter the **W**ork **B**reakdown **S**tructure (**WBS**) for your project, so that you can directly link the measurements carried out on the drawings to their corresponding work items. Alternatively, you may use the ($\boxed{\textbf{Ctrl}}$ + $\boxed{\textbf{B}}$) shortcut.

Click on the 🗓 button to display the 'Edit project work items' window.

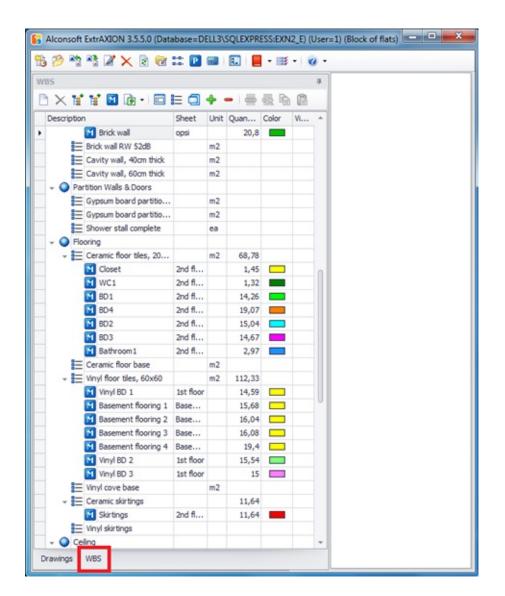


In the WBS, enter the description, the units of measurement, and the unit price for each work item.

You may add a new work item during a measurement (See Measuring in image files/Type and method of measurement/New work item).



Work items, along with quantities that result from the measurements, the corresponding measurement sheets, as well as any other details you select to view (See Appendix/Filters/Sorting), appear in the 'WBS' tab (See Work items).



More:

- Save and close
- Import WBS from Excel
- New group/work item
- □ Delete group/work item
- Move left , right

Save and close 🖥

This button lets you close the 'WBS' window and all changes are saved.

Import WBS from Excel 🖻

This button allows you to import a WBS from Excel. This way, you can save time and avoid re-creating the WBS in the application. The file should have the following 3-column format:

Description	Measurement	Price
	Unit	

You may enter the columns' headers in the first row of the spreadsheet.

- This row will not be taken into account on import. Therefore, the first row of the Excel spreadsheet should either contain the columns' headers or be blank. If the first row contains e.g. the first group and the following rows contain the items, it will not be imported.
- A work item row should be preceded by a group row. If not, the following message is displayed:



- Importing stops when it encounters the first blank row in the excel sheet.
 Make sure there are no blank rows between groups, work items etc.
- If there are more than one sheets (tabs) into the excel file, then only the current one is imported (current is the visible sheet when you open the excel file).
- There is a 500 characters limit of the work items descriptions. If there are longer descriptions into the Excel spreadsheet, they will be truncated. Below, you will find an example of an Excel spreadsheet for a WBS that can be imported directly:

Description	Unit	Unit Price
Main building		
Earthmoving		
General earthy excavations	m3	3,10
Concrete		
C12/15	m3	30,00
C16/20	m3	36,00
Mechanical		

Steelworks		
Black Steel Plate	kg	1,10
Plumbing		
Galvanized Steel Pipe OD	m3	17,50
1/2'		

The rows containing groups are distinguished from work items by the fact that the 'Unit' and 'Unit Price' cells of a group row should be blank.

The groups' hierarchy is set at a later stage, using the button and the button.

When the import process is completed, the following message appears.



Importing WBS from Excel may also be carried out gradually. The data of each Excel spreadsheet are added in the end, following any existing work items.

New group/work item **ば**

Using this button, you can enter either a new group or a new work item **in** the current group. The groups and the work items are indicated by and respectively, so that they can be distinguished. You should enter the description of each group, and in the case of a work item you can also enter the unit of measurement and unit price.

At least one group should exist before entering any work items. Otherwise, the following message will appear:



You can use the shortcut of **Ctrl** + **G** keys to create a new group and **Ctrl** + **H** keys to create a new work item.

You can move groups or work items to a different position later on. Add the desired group/work items (if it doesn't already exist) and then move it by placing your cursor on the symbol that characterizes it (or respectively) and dragging it to the desired position. During this action, the following symbols , , appear. The light blue arrows , indicate the upward or downward direction of movement respectively, and the green indicates the new position. Moreover the symbol is used by the application to indicate the positions where moving is not allowed. Finally, the buttons allow you to change the hierarchy of the groups at a later time.

Delete group/work item **¥**

Using this button, you can delete the selected group or work item. The application will ask your confirmation each time you choose to delete a group/work item.

Move left 🔾, right 🔾

Using these buttons you can promote or demote the groups, respectively, by one level, in order to create the WBS 'tree'.

These buttons are disabled when a work item is selected.

Library

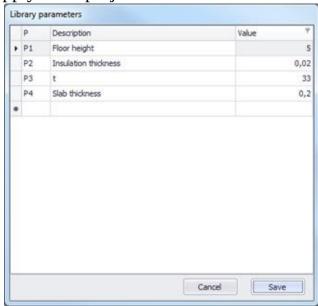
The library contains data that can be used in any project. It constitutes a database that includes parameters and model custom measurements that are provided by ALCONSOFT as examples, and can also contain your own data.

More:

- Parameters
- Custom Measurements
- Unit aliases

Parameters

Using this item of the 'Library' button, you can alter or insert new parameters, which can be used in the formulas that appear in measurement calculations and apply to all projects.



Enter a custom description. Also, you may enter a default value to be applied in all projects.

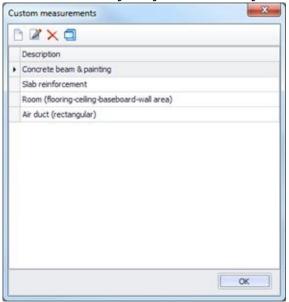
Parameters are automatically indicated with Pi, where i is the increasing number.

Use parameters when there are some constant values which you wish to be modified quickly (e.g. the height of a floor). It applies to values which you know from the start that will appear many times throughout the measurements and might need to be modified.

Parameter details are saved centrally, along with their default values. In each project, their values can be modified using the 'Project Measurement Parameters' button (See General/Project measurements parameters).

Custom Measurements

Using this item of the 'Library' button you can define your own measurement types (See Measurements in image files/Types and method of measurements/Custom measurements . By setting the appropriate parameters and calculation formulas, you have the ability to make use of the primary measurements and link them to one or more WBS work items. A window with ALCONSOFT's example model measurements appear on your screen. You can create as many of your own as you like.



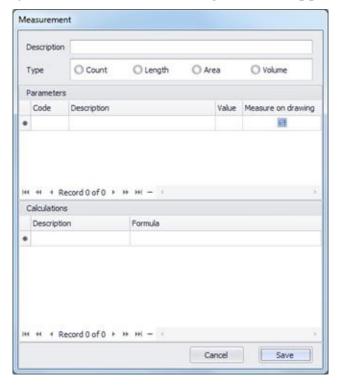
These measurements are saved in the Library and are available for use in every project.

- New measurement
- Editing a measurement
- Deleting a measurement
- Duplicate measurement

New measurement



Using the 'New measurement' button, you can enter a new measurement in the library database. On your screen, the following window appears:



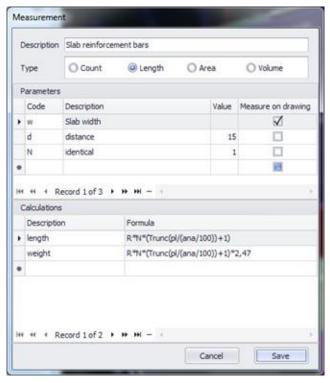
- Description-Type
- Parameters
- Calculations

Description-Type

Enter the description you wish for the new measurement, e.g. 'Slab reinforcement bars, and set the measurement type on which it will be based: objects count, length, area, or volume.

Parameters

You may set parameters for this particular measurement. Measurement parameters can be used during a measurement, for the input of extra values (that is, additionally to the primary measurement result) that influence the final result. Enter the parameter code exactly like it will be used in the calculation formulas of the final result. Also, enter a short description and a default value. Check the 'Measurement on drawing' option in case you wish the value of this particular parameter to be defined by marking a length on the drawing during the measurement.



- You can redefine the marking length of a parameter, at any time, by moving its end points. All relevant measurement values will be adjusted accordingly.
- The parameter values can be different per sub-measurement (See Drawings/Measurement analysis). In the Measurement analysis window, the parameter values used in each sub-measurement appear in a separate column.
- The parameter codes can include numbers, but they must not start with a number. Also, the characters R, L, A, and P1, P2 ...Pn are not valid (they are used by the program to symbolize results and general parameters).
- Use the navigator at the bottom of the window to move from one entry to

another or to delete an entry. Specifically, use the ', ' buttons to move to the previous or next entry, the ', ' to move to the previous or next page, the '', '' buttons to move to the first or last entry, and, finally, the - button to delete an entry.

Calculations

You can optionally enter one or more formulas for each measurement, so they can be ready to use during measurements.

Set the description and formula for the calculation of the result. Enter the left part of the formula you desire without the = symbol, inserting numbers, parameters, and functions.

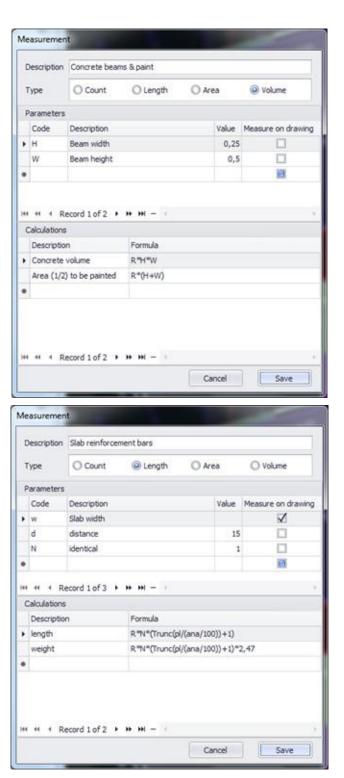
Use:

- Numbers (without the thousands separator), using the (.) as decimal point.
- Library parameters Pi which you have already defined in the library. The values that will be used in the formulas will be the ones you set for the current project in the 'Project measurement parameters' window (See General/Project measurements parameters P).
- The letters R, L, and A to symbolize the result of a measurement (**R**esult), the measured length (**L**ength), or the measured area (**A**rea) respectively. In the case of measuring area, the program automatically computes the perimeter length while in the case of measuring length (using a polyline) it attempts to calculate the area as well.
- The symbols of the mathematical operations: plus (+), minus (-), multiply (*), divide (/) and raise to power (^).
- Parentheses for grouping parts of the expression.
- Functions, which are input in the exact same format used in Excel.

There are many of the most widely used Excel functions. See the Appendix for their correct syntax. You can also refer to Excel Help.

Some of the available functions are:

ABS, ACOS, ASIN, ASINH, ATAN, ATAN2, CEILING, COS, COSH, EXP, FACT, FLOOR, LOB, ROUND, SIGN, SIN, SINH, SQRT, TRUNC



Use the navigator at the bottom of the window to move from one entry to another or to delete an entry. Specifically, use the •, • buttons to move to the previous or next entry, the •, • to move to the previous or next page, the •, • buttons to move to the first or last entry, and finally the - button to delete an

entry.

Editing a measurement 🗷

Using this button, you can open an existing custom measurement and modify it.

Deleting a measurement ×

Using this button, you can delete the selected custom measurement from your measurement list.

By deleting a measurement, you also delete all items associated with it, and they **CANNOT be retrieved!** You should be cautious in proceeding with deletion!

Duplicate measurement 🗐

Using this button, you can duplicate the current custom measurement. The duplicate is added to the list as a new custom measurement and you can open and edit it.

Unit aliases

Measurements and work item quantities can be expressed in many different units, even for the same type of quantity (e.g. length can be expressed in meters, millimeters, feet). Furthermore, the units on the drawing may be different than the ones for the corresponding WBS item. **ExtrAXION** can automatically convert between any units as long as they have been registered in 'Unit aliases'.



- Column 'Unit' contains the default names used by ExtrAXION.
- Column 'Aliases' contains different names of that unit. You can use these if they are more familiar than the default ones or add your own, e.g. to match the units shown in the WBS you may have imported from an xlx file. To add new aliases, separate each name with a comma; dots, dashes and spaces will not be taken into account.
- Given a measurement, it is possible to display one unit alias in the 'Drawings' tab and a different alias for the related work item in the 'WBS' tab. If you want to change the default name of the 1st column,

then enter an alias under the $3^{\rm rd}$ column: 'Drawing unit display alias'. It will then be displayed in the 'Drawings' tab.

Settings ■

- $\hfill \square$ Drawing measurements settings
- Select database
- Users
- Edit user data
- Select language

Drawing – measurements settings

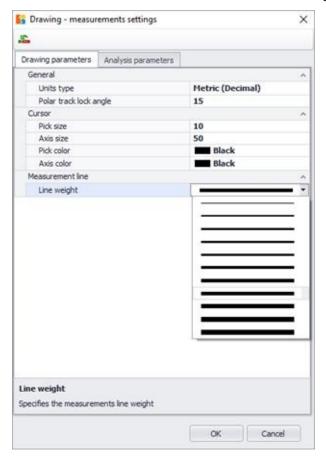
Using this item of the 'Settings' button you can set various parameters which are used during measurements procedure.

If you click the 'Defaults' button all parameter values are set to their defaults irrespective of any changes you have made.

- Drawing parameters
- Measurement analysis parameters

Drawing parameters

In this tab you can set the size and color of the crosshair and the mouse rectangle. You can also set the default measurements line weight.



Select:

- Units type: Choose between Metric (Decimal), US engineering and US architectural
- Polar track lock angle: The track lock of the pointer in degrees
- Pick size: The mouse rectangle size in pixels (Acceptable values: 1 50)
- Axis size: The mouse crosshair size in pixels (Acceptable values:: 1 1000)
- Pick color: The color used to draw the mouse rectangle
- Axis color: The color used to draw the mouse crosshair

Select also:

• The default line weight of all measurements

You can set the line weight of each measurement separately.

Measurement analysis parameters

In this tab you can set various measurement analysis parameters such as colors, columns width, measurement types etc. (See <u>Measurement analysis</u>).

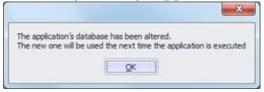
Select database

With this option, you are able to select the way your projects are saved and change the current database. You can either store your projects on SQL Server or save each project on a local database as an .sdf file.

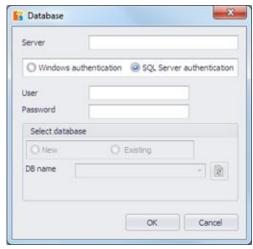
If **ExtrAXION** is set to use an SQL Server the following window shows up:



You may create a new database or select an existing one. You have also the option to change the way your data is saved by pressing the **Switch to local database** button. The following message appears:



If **ExtrAXION** is set to use local database (save projects into .sdf file type) you may change that and store your projects into an SQL Server database. In this case a window like the following one appears:



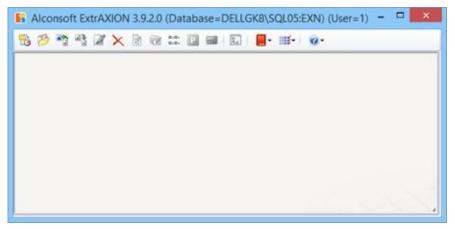
In order to select the desired Database enter the server name of the SQL Server in the field 'Server'.

If the installation of the SQL Server was done according to ALCONSOFT's instructions (See <u>SQL Server Installation</u>) enter *COMPUTER_NAME\SQLEXPRESS*. You can find your computer's name from the Start menu, by right-clicking on 'Computer' and by selecting 'Properties' and the 'Computer name' tab. Copy the 'Full computer name' to the Clipboard. **ATTENTION!** If at the end of the name there is a point, copy the name till the point. If your computer is connected to a domain copy just your computer's name and not the domain name e.g. if the 'Full computer name' is delltg.ALCONSOFT.local, copy only '**delltg**'. Paste it then in the field 'Server' and then type **SQLEXPRESS** to get delltg\SQLEXPRESS.

If you have installed **ExtrAXION** on a server using the concurrent users licensing option the field 'Server' is dimmed and cannot be changed. Afterwards, type the user ID and the password that you use when connecting to the above mentioned instance of SQL Server.

If the installation of the SQL Server was done according to ALCONSOFT's instructions (See <u>SQL Server Installation</u>) enter **sa** in the field 'User' and **7** in the field 'Password'.

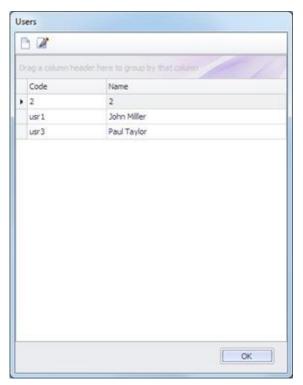
Then, select if you prefer to create a New or use an Existing database. If you choose 'New' then enter in the field 'DB name' the name you want for the new database else if you choose 'Existing' select one of the existing databases (if any). You may also press the Refresh button to update the list. Finally, press OK and on your screen appears:



At the window's title you can see the name of the current Database.

Users

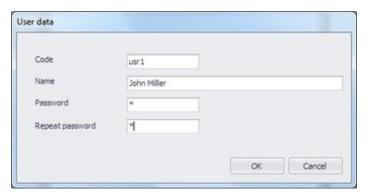
With this option, you can create new users and edit their accounts with the corresponding buttons, if you have logged on as administrator (initially, user 1).



- New user
- Edit user data

New user

On your screen appears a window with the necessary information for creating a new user.



User ID

Insert the identification code of the new user.

User Name

Insert the full name of the new user

User password

Insert the new user's password

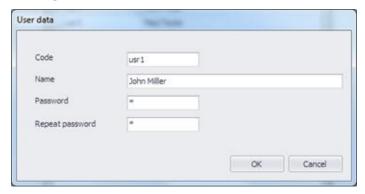
Re-enter user password

Insert the user password again for confirmation

Hit the **OK** button and the user you just created appears in the Users list.

Edit user data 🗹

On your screen appears a window with the current information of the user you have selected for editing.



User ID

Insert the new identification code of the selected user.

User Name

Insert the new full name of the selected new user

User password

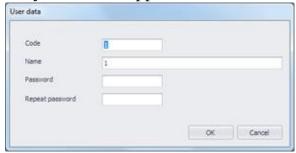
Insert the selected user's new password

Re-enter user password

Insert the selected user's new password again for confirmation Hit the $\boxed{\mathbf{OK}}$ button and the selected user appears in the Users list with his new information.

Edit user data

On your screen appears a window with the information of the **current** user.



User ID

Insert the new identification code of the current user.

User Name

Insert the new full name of the current user

User password

Insert the current user's new password

Re-enter user password

Insert the current user's new password again for confirmation Hit the $\overline{\mathbf{OK}}$ button and the current user appears in the Users list with his new information.

Select language

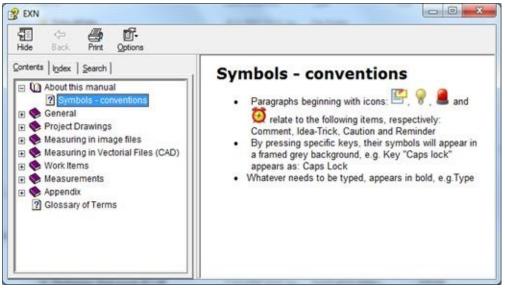
Using this item of the 'Settings' button you can set the preferred language of the program environment, such as English, French, German, Greek, Italian, Spanish (Mexican) and Turkish. For the change of language to take into effect, you must restart the application.

Help 🥝

- Help
- Export events dataAbout ExtrAXION

Help

If you select 'Help,' the help window of the application will open:



You can find information about the application, using either the table of contents or the search function.

Export events data

With this option you can export all the data of the log file into a new file (.dat format). This enables you to send information to ALCONSOFT in order to solve any issues that have occurred during the use of the program.

About ExtrAXION

If you select 'About **ExtrAXION**', a window with information about the currently installed version of the application and its serial number will open.



Finally, you can view information concerning the End-User License Agreement (EULA) by clicking on the respective link.

Drawings

In each project, you can add as many drawings as you wish of various file types. Both vector files and scanned (image) files are supported. Vector drawings are stored either into the project database or separately as external references, but image files can only be stored into the project.

For every drawing that you add to a project, you can create one or more measurement sheets. On each measurement sheet you can make as many measurements as you wish.

This way, a tree view is created, in each project, which consists of any number of drawings, measurement sheets and measurements. The tree view provides a clear and concise way of organizing your work and furthermore, since measurements are carried out on the measurement sheets, the original drawings are not affected.

For each measurement, the tree view of the 'Drawings' tab contains columns for the description, the color, the result (including the unit of measurement) and whether it is visible or not. You can sort the tree view list by any of these columns by clicking on its header. (see Appendix/Filters/Sorting/Data Sorting)

Sorting by the 'Description' field is applied first on the drawings, then on the measurement sheets and finally on the measurements themselves. Every drawing, measurement sheet or measurement that is added, or has its name changed afterwards, follows this setting and its position into the tree view list is set automatically.

You can expand or collapse the 'Drawings' tab tree view, by right clicking in the tab's area.

Expand 🔚

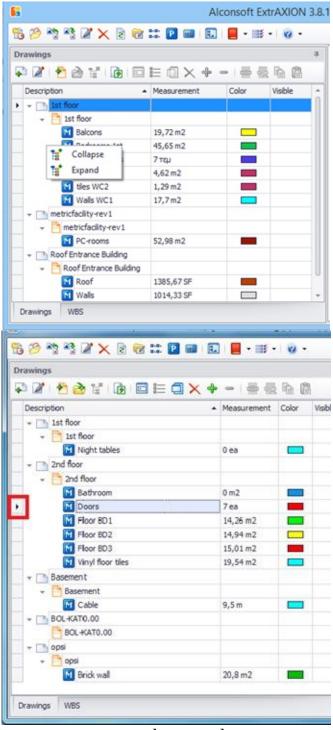
Using this button you can fully expand the tree so that all groups, work items and measurements are shown.

You can expand only a certain part of the entire tree by clicking on the 4 symbol, on the left of groups (or work items) description when collapsed.

Collapse 🐮

Using this button, you, can fully collapse the tree, so that only the groups of the 1st level are shown.

You can collapse only a certain part of the entire tree by clicking on the 6 symbol, on the left of groups (or work items) description when expanded.



To manage drawings, measurement sheets and measurements, use the command buttons of the toolbar of the 'Drawings' tab.

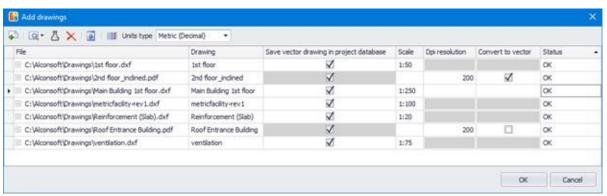
■ Add drawings					
Drawing properties					
New measurement sheet					
Open measurement sheet					
□ Delete sheet					
■ Export Measurements					
■ Edit measurement					
Measurement analysis					
Duplicate measurement					
Delete measurement					
■ Continue measurement					
■ Continue measurement (subtract)					
■ Show all measurements					
☐ Hide all measurements					
■ Copy visible measurements					
■ Paste measurements					

Add drawings 🔊

Using this button, you can add new drawings to the project. You can select the drawings you wish to insert, through the window that appears on your screen. These drawings consist the background of the measurement sheets.



You may select vector files, such as .dwg, .dxf, .dgn, .emf, .wmf, or image files, such as .bmp, .gif, .jpg, .tif, .ico.png and .pdf. Select the desired drawing by double-clicking it or by clicking **OK**. The drawing is added in the 'Project Drawings' list. If you want to add more than one drawing in the project select them while pressing **CTRL** or **SHIFT** and press **OK**. The 'Add drawings' window appears:



- Table columns
- Commands-Buttons of `Add drawings' window
- After adding new drawings

Table columns

More:

- File
- Drawing
- Save vector drawing in project database
- Scale
- Dpi resolution
- Convert to vector
- Status

File

The full name and path of the imported drawing files.

Drawing

The names of the selected files (without their extension, for example .dwg) are automatically entered as the default value in this column. That name also appears in the tree view of the 'Drawings' and 'WBS' tab. You can change these names if you wish.

If some of the selected files are in pdf format and have more than one pages, then each page is inserted as a separate drawing. Each drawing-page will have the same name as the main part of the pdf file name, followed by an underscore and the page number, for example main_floor_1, main_floor_2 etc.

Save vector drawing in project database

Let the 'Save vector drawing in project database' field checked, unless you want to use the original drawing as the background using an XREF like method.

All image files selected for imports are saved in the project database anyway.

Note that, in case of using the method of external reference, when you open a drawing, it is reloaded, resulting in delays.

Changes in external references are reflected on the corresponding project drawing, but they have no effect on its measurement sheets. It is possible that corrections have to be made on the measurement sheets to coincide with the new version of the drawing.

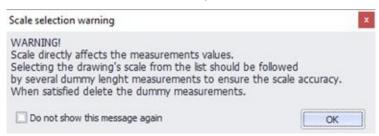
Scale

Set the scale by selecting it from the shortcut menu.

On image and pdf files, it is recommended that you set the scale on the drawing (see <u>Set scale on drawing</u>), so you can have the highest accuracy. If you select the scale from the list, to speed-up the process, you may have deviations. For example, if you export a drawing from your CAD program, as a pdf file with a specific scale and insert it to **ExtrAXION** by converting it to image selecting the scale from the list does not guarantee that your measurements will be absolutely accurate.

For example, if a drawing is printed scaled (not in actual size), then scanned, inserted to ExtrAXION and then if you select its scale from the list (the one you see printed on the drawing), measurement results will be totally wrong!

If you did choose the scale from the drop down list, then after clicking 'OK' and importing the drawing, the following window appears on your screen warning you that measurement values may be affected.



Dpi resolution

When importing pdf files, you can change the default resolution in dpi of the image, which is produced by the conversion of the current pdf file to image.

In case of large files, the value of 200 dpi may be inadequate and some details will not be visible. As a result, you won't be able to measure correctly. Increase the resolution to 300 dpi, for example, and use the button 'Load and preview current' to see how the drawing will appear when imported in the project.

Notice that in case of over-increasing the dpi value, files become larger and you cannot process them easily.

Convert to vector

Check the box to convert a pdf file into a vector drawing. Vector drawings are more convenient to use since they feature layers, object snaps and automatic object/block selection. If the file is a pdf created from a vector drawing, many of these data are preserved and **ExtrAXION** can utilize them.

Status

After setting all other properties, click on 'Analyze drawings' (see <u>Analyze drawings</u>). The result of that analysis is displayed in the 'Status' column. If the status is 'OK' feel free to import the drawings.

If the 'Convert to vector' was selected and the status is "No elements in drawing", then uncheck 'Convert to vector' to import the drawing as an image.

Commands-Buttons of 'Add drawings' window

More:

- Add drawings
- Preview
- Analyze drawings
- Delete drawing
- Fill down
- Import drawings parameters
- Units type

Add drawings 🔊

Insert more than one drawings, even from different folders, to the list, in order to import all of them in the project.

Preview 🔍

The following options are available from the drop down menu:

- 'Preview current' > shows the original drawing as it will appear when imported in the project.
- 'Load and preview current' is similar to 'Preview current', but also applies any changes in the properties made by the user while importing the file (e.g. resolution).
- 'Preview using PDF reader ' application of your PC.

Analyze drawings

Applies any changes the user made in the drawing properties from the table or in 'Import drawing parameters' and checks the imported file. The result of the analysis is displayed in the 'Status' column of the table (see <u>Status</u>).

Delete drawing ×

Delete the selected drawing from the list, if you don't want to import it into the project.

Use the 'Delete drawing' button \times so you won't insert to the project some of the pages of lengthy pdf files.

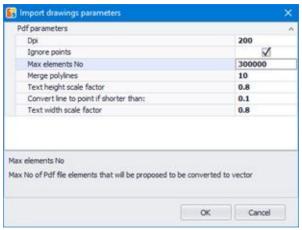
Fill down 退

Select a table cell and then click in 'Fill down' to copy its content to all the cells of the column below the current one.

Use the 'Fill down' button to accelerate the procedure of adding drawings, in case they all have the same scale or mark all pdf files to convert them into vector drawings.

Import drawings parameters ■

Customize the conversion of pdf files to images or vector drawings.



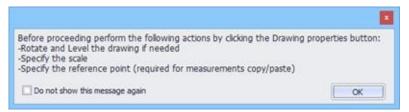
- Dpi: See <u>Dpi resolution</u>.
- Ignore points: If checked, the points of the pdf file will be omitted, resulting in smaller file sizes.
- Max elements No: If the pdf file has more elements than this upper limit, then a warning will be shown in the 'Status' column. However ExtrAXION will still try to convert the pdf file to a vector drawing, if the user insists.
- Merge polylines: The number of passes that ExtrAXION will do, while
 it tries to merge lines into a polyline. Increase this to reduce the file size, at
 the expense of slower import process.
- Text height/width scale factor: Adjust this factor appropriately to match the text size of original drawing.
- Convert line to point if shorter than: Short lines will be converted to points in order to minimize elements and file size.

Units type

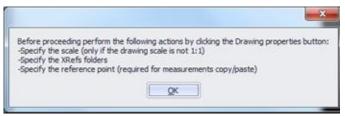
Select a unit type system from the drop down menu. You can select between Metric (decimal), US Engineering and US Architectural. These units will apply to all measurements of the drawing but may be different from the units of the corresponding WBS items. The conversion between them is automatic though.

After adding new drawings

After importing new drawings to the project, they are added to the 'Drawings' tab tree view and, at the same time, a new measurement sheet is created automatically as the first node below each drawing. The corresponding drawing window opens and the drawing is displayed. Finally, a reminder of certain basic adjustments that may be necessary is displayed. For image files, you should rotate and level the drawing, if needed, and then set its scale and origin, for easy and correct copying of measurements from drawing to drawing.



You should follow these instructions in the order described above. Once you set the scale, you can no longer rotate the drawing, for example. If you have added a vector file, you should set the scale (only if the drawing has not been created using the usual 1:1 scale), and also specify the location of the folders of the corresponding drawings (XREF), if there are any. You should also set the scale in case the drawing unit specified in **ExtrAXION** differs from the unit of the drawing. Additionally, you can define the origin for easy and correct copying of measurements from drawing to drawing and rotate the drawing, if needed.



You can adjust all of the above settings at the Properties window (See Drawings/<u>Drawing properties</u>) where you can also change the description and the unit of measurement of the drawing, set digit number for the measurements calculation precision, background color etc.

When adding more than one drawings simultaneously, they do not open automatically. In this case the above windows appear when you open the drawing for the first time.

Large drawings (several MBs) may slow down the taking measurements process considerably. Therefore, it is recommended that very large drawings be converted to smaller ones, e.g. in case of .dwg drawings remove layers that are not necessary.

Drawing properties

Using this button, you can set or change the properties of the current drawing. A window appears where the properties are organized in groups:

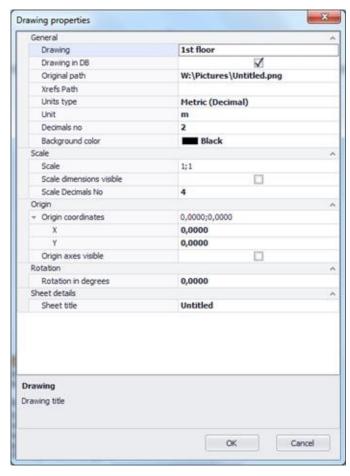
More:

- General
- Scale
- Origin
- Rotation
- Sheet details

General

At this group you can set or change the following properties:

- The description/name of the drawing (the default name is the file name of the drawing without its extension).
- The full path and name of the original file from which the drawing was imported to the project, and whether the drawing is stored into the project or is an external reference. These two properties are read-only.
- The full paths of any external references, separated by semicolon (;).
- The unit system to be used. You can select between Metric (decimal), US Engineering and US Architectural. As a default is used the unit system which was set on the settings (See Settings/<u>Drawing-Measurement settings</u>)
- The unit of length on which measurements will be based (the default is meter for the Metric unit system and feet for the US systems).
- The accuracy of measurement calculations, by setting the number of the significant digits (the default is 2).
- The background color.



In some vector drawings the unit of length is other than the meter, for example electrical drawings with mm as unit of length. In this case you should select the same unit of length with the original drawing or define a scale different than 1:1.

Scale

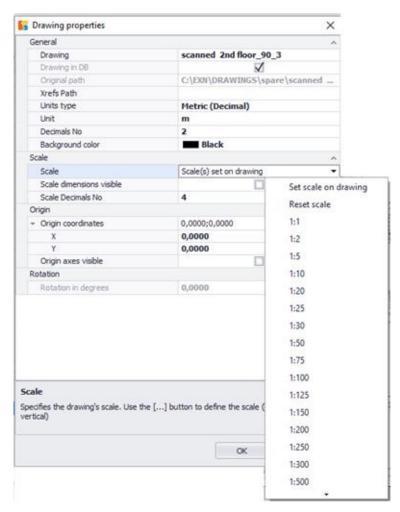
By setting the scale, you also eliminate any distortions caused by reduction or magnification during scanning or photo-copying, and thus measurements will correspond to the real dimensions:

More:

- In image files:
- Set scale on drawing
- In vector drawings

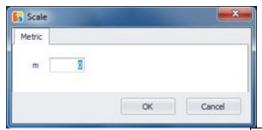
In image files:

Click on the 'Scale' field and choose 'Set scale on drawing' from drop down menu.



Set scale on drawing

By selecting 'set the scale on the drawing' you pick two points, which define a specific length, on the drawing and the window below appears on the screen.

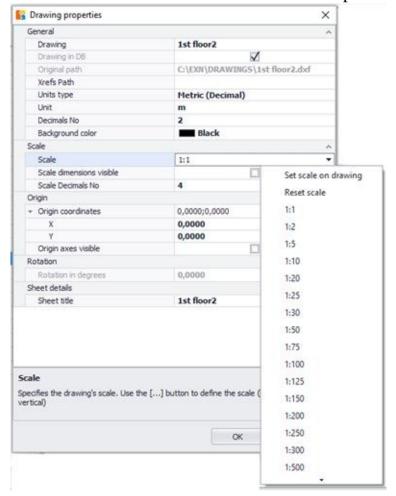


Enter the length you have marked on the drawing, click **OK**, and the scale appears on the drawing. Click the **Update and close** button to save the new scale. If you select 'Reset scale' from the drop-down menu, then the scale is set to its default value (1:1).

Scanned image files can be deformed in a way that the original x/y axis scale ratio is altered. Thus, you need to set the vertical axis scale as well. Generally, you can only move in 'ortho' mode when setting the scale.

In vector drawings

Click on the 'Scale' field and select 'Set scale' from the drop down menu.



In vector drawings you have more options:

- Select the scale from the menu (1:1 to 1:5000)
- Choose a standard one from the drop down list (1:1000, 1:100, 1:10)
- Define the scale on the drawing, as shown in image files.

Define the accuracy of scale calculations by setting the number of the significant digits (the default is 4).

If you don't want the scale dimensions to be visible on the drawing uncheck the 'Scale dimensions visible' box.

In order to achieve the maximum possible accuracy in the calculations, the selection of the longest possible dimension on the drawing as well is

recommended (See Auxiliary measuring tools).

Scale setting makes sense in case of image files as well as in vector drawings that have been created on a scale other than 1:1.

In vector files you cannot set both the horizontal and the vertical axis scale. Only the last calibration is saved.

If you chose to convert a pdf file into a vector drawing when importing it, you must set the scale the same way you would for an image file (see <u>Set scale on drawing</u>).

Origin

By setting the origin, you can set the (0,0) coordinate point on the drawing. Click the ... button on the 'Origin coordinates' field. On the drawing that appears mark the (0,0) origin using the cross hair cursor and click **Update and close**. Alternative you can enter the X and Y coordinates at the corresponding fields. Check the 'Origin axes visible' box if you want the origin to be visible on the drawing.

Set the corresponding origin on the rest of the drawings, where you wish to copy the measurements, in order for them to be copied in the exact same location as in their original drawing. In case, for example, that the creator of the drawing changes the origin, then, if it is not reset, it is possible for copied measurements to be pasted to an entirely wrong place!

Rotation

By rotating a drawing you can change its orientation so that it is leveled during measurements. Click the ... button on the 'Rotation in degrees' field. On the drawing that appears, select two points along a horizontal line, e.g. two points on any line which should be horizontal in your drawing, but, probably due to misaligned placement in the scanner, appears tilted. Click **Update and close** to save the new rotation.

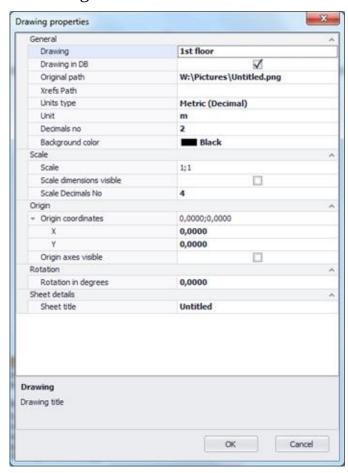


The rotation of a drawing must be done before the scale setting and before any measurement.

To rotate and level a drawing by 90 degrees you can select a vertical line on the drawing. Note that the order in which you select the start and end point will determine if the rotation is clockwise or anticlockwise.

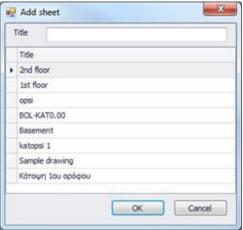
Sheet details

You can see and change the title of the current measurements sheet. However, this field is visible only if you have clicked on 'Drawing properties 'Z' while having a sheet selected.



New measurement sheet 2

Using this button you can add new measurement sheets to the drawings. A window appears with the list of all drawings that you have imported into the project. Select the drawing on which you wish to create the new measurement sheet and type the title of the new measurement sheet at the field above the list.

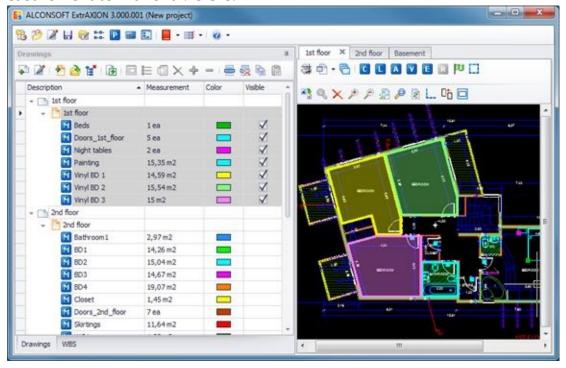


Click **OK** and the new measurement sheet is created and added as a child node of the selected drawing at the tree view of the 'Drawings' tab. Finally, on the right side of the application window, the corresponding drawing opens.

Open measurement sheet 📂

Using this button, you can open the selected measurement sheet from the 'Drawings' tree view on a new window on the right side of the application window. You may open any number of measurements sheets of as many drawings you wish. Each open measurement sheet appears in the drawing pane with its title at the top.

- You can also open a measurement sheet window by double-clicking its title or any of its measurements. If the window is already open then it becomes current. To close a measurement sheet window click the x symbol on the right part of the window's tab.
- En The measurement sheet and its measurements of the current window are marked with gray color on the 'Drawings' and 'WBS' tree views.
- The measurements of the current window are only visible when the check box at the 'Visible' column of the 'Drawings' tree view is checked. Click on the check box to change its status or double click on a measurement to make it visible.



Delete sheet 🕌

Using this button, you can delete the selected measurement sheet from the drawings tree view. If the underlying drawing has no more measurement sheets then the drawing itself is also removed from the drawings tree view.

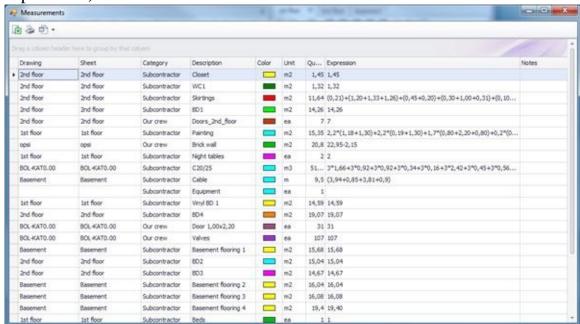
A drawing that has been removed from the tree view is not actually deleted from the project. When you create a new measurement sheet (See Drawings/New measurement sheet) and also, at the measurements management window (General/Drawings management), you can see and use all the drawings that have been imported to the project, even if they are not shown at the drawings tree view.

You should close a drawing in order to be able to delete it.

By deleting a measurement sheet, you also delete all items associated with it **along WITH its measurements** which **CANNOT be retrieved!**

Export Measurements

This button allows you to export the primary measurements to a table. Then, you can change the table's appearance before its final export to Excel. This table shows all measurement details in the following columns: 'Drawing', 'Sheet', 'Category', 'Description', 'Color', 'Unit', 'Quantity', 'Expression', 'Notes'.



Using the advanced filtering, grouping, column selection, and sorting tools, you have many options of setting the number, the form, and the type of the data you wish to view (See Appendix/Filters/Sorting).

Using the 'Measurements analysis' button you can preview and print the analysis of the measurements in the above list. The analysis includes dimensions marking and details of surface area calculations (See Measurement analysis).

In the column 'Expression', in case of an area, appear the calculations of the analysis of surfaces into basic shapes like in the 'Measurement analysis'. If the analysis exceeds 4000 characters the quantity field content is shown instead.

In order to have a better view of the results of the analysis, it is recommended that the measurements are not very complicated but split in more measurements or sub-measurements.

The 'Measurements analysis' button is also present at the drawings window toolbar and gives similar results (see Drawing windows/Measurement analysis). The difference is that, the analysis obtained from this window takes into account the sub-measurements and individual shapes, if any, of each measurement. If for example the continuation of a measurement is interrupted twice (by addition or subtraction), then three sub-measurements appear in different rows and for each one of them a separate page is created.

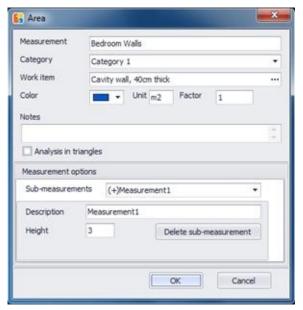
Using the filters you can set criteria to limit the number measurements that appear in the list and subsequently the measurements that will be included in the analysis.

Exporting measurements and work items can be done from the 'WBS' tab where these features are described in detail (See Work items/Exporting WBS/Export WBS measurements).

Edit measurement =

Using this button, you can view or modify the details of the selected measurement at a later stage. Correct the description or the category of the measurement, the work items of the WBS to which it is linked, change its color, insert a factor, and modify the measurement unit accordingly, or add explanatory notes. When finished, click $\overline{\mathbf{OK}}$.

Editing the names and parameters is performed per sub-measurement (See Drawings/Continue measurement). You can view and select them from the drop down list. Each one will be preceded by a (+) or (-) sign, depending on if it was created with 'Continue measurement +' or 'Continue measurement (subtract) -' respectively.

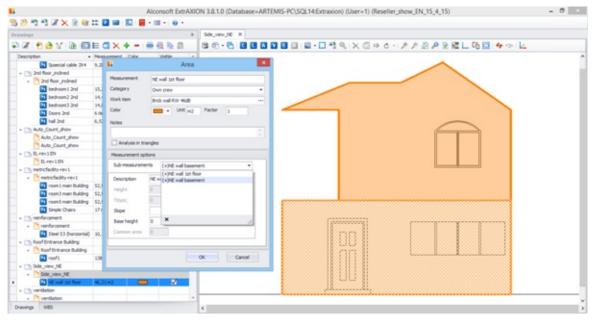


Parameters may vary depending on the sub-measurement's type, which you can change when continuing a measurement. For example, if an area measurement is performed on the drawing's level and then continued to a sub-measurement perpendicular to the drawing, only the latter will be associated with the 'Common height' parameter.

When you select a sub-measurement from the dropdown list all figures that belong to that sub-measurement are marked on the drawing.

 $ilde{\sqsubseteq}$ If you have selected on the drawing figures that belong to different

measurements, when you right click and select the 'edit measurement' option, the measurement that will be edited is the one where the last selected figure belongs.

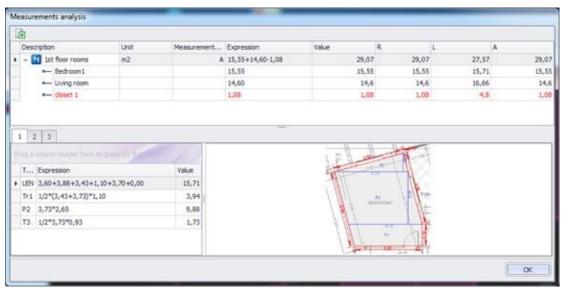


In case the values of a parameter are defined per node, e.g. when you enter them every time you create a new point by clicking on the drawing, this parameter doesn't have a common value and cannot be edited in this window. Editing such values is performed directly on the drawing by right clicking on the nodes instead (See Measurement/Measuring procedure/Figure data).

 $ilde{\sqsubseteq}$ The notes you add will be printed in the measurement table.

Measurement analysis ≡

Using this button, the selected measurement's analysis is viewed. Each submeasurement appears in a different row, while the main measurement's values are shown in the first row. The columns display the description (name) of the sub measurement, its unit, measurement type, calculation expression and value. Furthermore the columns L, A and R contain the length, area and primary result of the measurement respectively. On the lower part of the window there is the detailed calculation of these results, as well as a thumbnail of the region where the sub measurement was performed, divided in basic geometric shapes (See Measurement analysis). Each sub-measurement is displayed in a different tab.



Each time the continuation of a measurement (by addition or subtraction) is made, a new sub-measurement is created (See Drawings/Continue measurement). If a sub measurement was created via the Continue measurement (subtract) —, then it will be colored red.

By temporarily stopping a measurement by pressing the **Esc** key once, distinct parts are created in the measurement analysis, which are distinguished with the use of parentheses in the expression column, e.g. the measurement of the baseboard with gaps in the place of doors.

More:

■ Export to Excel

Export to Excel

Click the button of the above table to save it as an .xlsx file. Select between:

- 1. Export figures, where the sketches of the selected sections of the drawing are shown, along with the basic shape type and the expression (bottom section of the above window)
- 2. Export tree (top section of the above window)

Then, input the location and the filename you wish to use.

Duplicate measurement

Using this button, you create one or more copies of the selected measurement, which you can then move around on the drawing by defining the start and end point of a point of reference. After placing a copy at its final position, it is then linked to the same work item as the original measurement, while its name is also derived from the original via appending an index number (e.g. _1, _2, etc.). This feature is useful in cases where the same measurement can be used in different cases, e.g. a ceiling measurement can also be used to measure the floor.

In the above example, it is recommended to link the measurement with many different work items instead of duplicating it (ExtrAXION Proversion).

It is also possible to duplicate only parts of a measurement by selecting them on the drawing and using the 'Duplicate selection 'button in the drawing windows area. In this case, any copied items are added to the measurement they belong to (See <u>Auxiliary measuring tools/ Duplicate selection</u>).

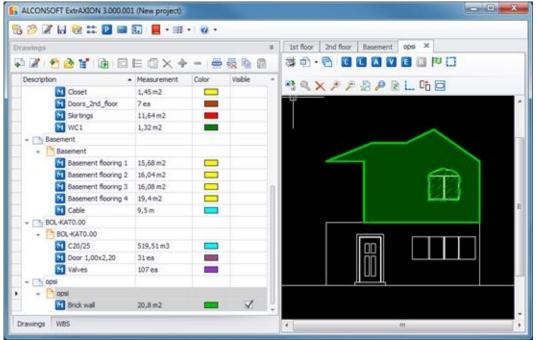
Delete measurement ×

Using the 'Delete measurement' button, you can delete the selected measurement. The measurement is removed from the 'Drawings' and 'WBS' tree views as well as from the drawing window.

By deleting a measurement, you lose all of its data and you cannot retrieve them!

Continue measurement +

Using this button, you can continue the selected measurement, creating sub measurements.



A measurement consists of one or more sub measurements of the same type (e.g. count measurement). The value of the main measurement is equal to the sum of all its sub measurements' values.

Each sub measurement has its own name. When neither 'Continue measurement + 'nor 'Continue measurement (subtract) - 'is used, there is only one sub measurement with the same name as the main measurement. Each time one of those buttons is pressed, a new one is created with a new name. New names are created by appending index numbers to the original name.

Sub measurements of the same measurement have in common:

- Category
- Work item
- Color, unit and factor
- Notes
- Marking figure (See <u>Measuring in image files/Types and method of measurement/Object count</u>)

These items are properties of the main measurement. If you change one

of them when you create a new sub measurement, it will be changed for all. However the following properties are not necessarily the same in all sub measurements:

- Name (See <u>Drawings/Edit measurement</u>)
- Measurement method (e.g. <u>perpendicular to the drawing</u>, <u>marking figures</u>, etc)
- Parameters
- It is possible for all sub measurements to have the same name, but it is not recommended.
- When you create a new sub measurement with parameters, their values are equal to the previous ones by default. You can then change them.
- All these properties can also be seen during the process '<u>Edit</u> measurement', where it is apparent which properties are common or not.
- Apart from sub measurements there are also figures, which are parts of a measurement created when you pause by using ESC. (See Measuring in image files/Types and method of measurement/Length measurement/ Measuring discontinuous segments)

Continue measurement (subtract) -

Using this button, you can continue the selected measurement in cases where you wish to subtract the area of already drawn surfaces (e.g. in the facade, by removing the surface area of the wall openings). By doing so a new sub measurement is created (See Drawings/Continue measurement). The surfaces that you remove from the measurement are marked on the drawing with cross-hatching, while the outline of the areas removed is marked with a dashed line. In length measurements you can also remove parts of lines which are then marked with a dashed line.

Continue measurement (subtract) cannot be performed on count measurements . The button is deactivated too.

Show all measurements

By selecting 'Show all measurements', all the measurements appear on the measurement sheet and the check box of the column 'Visible' appears checked.

Hide all measurements 🗟

By selecting 'Hide all measurements', all the measurements disappear from the measurement sheet and the check box of the column 'Visible' appears unchecked.

Copy visible measurements 🗎

Using this button, all measurements which are currently visible are copied to the clipboard. They can then be pasted in another measurement sheet of the same or different drawing of the current project.

You can use this button when, for example, all measurements are similar on different floors, or if a drawing is changed. Copy all the measurements and modify the ones that need to be adapted to the new drawing.

Paste measurements

This button pastes the copied measurements to the current measurement sheet. If you have set the same origin in both measurement sheets (See Drawings/Drawing Properties/Origin), the measurements are automatically pasted in the exact same position as in the initial measurement sheet.

Note that you should be very careful in setting the origin (reference point) in the case where the measurement sheets belong to different drawings. If the origin has changed in the new version of the drawing, its position should be reset before pasting the measurements.

If there are already other measurements on the measurement sheet where you paste, then only those with different names from the existing ones will be pasted.

Drawing windows

Drawing windows is the area where you make your measurements. They are located at the right side of the application window and each one corresponds to a measurement sheet of the drawings tree view. A new drawing window opens when you:

- Add a new drawing to the drawings tree view in which case its first measurement sheet is also created automatically (See Drawings/<u>Add</u> <u>drawings</u>).
- Create a new measurement sheet of an existing drawing (See Drawings/<u>New measurement sheet</u>).
- Open the current measurement sheet by using the button, by double clicking on it or on one of its measurements (See Drawings/Open measurement sheet).

You can open as many drawing windows as you wish. Each one has a tab with the title of the corresponding measurement sheet and the x mark which is used to close it.

At any time, one of the open drawing windows is current, which means that appears in front of all others. The corresponding measurement sheet of the current drawing window, along with its measurements, are marked with gray color on the tree views of both 'Drawings' and 'WBS' tabs.

At the top of the drawing window there are buttons for managing drawings and measurement sheets and buttons to be used as tools for the measurements. The following chapters contain detailed description of the measurement procedures in case of image files (See Measuring in image files) and of vector files (See Measuring in vector files (CAD)) as well as description of many auxiliary functions and tools (See Auxiliary measuring tools).

More:

- Print
- Measurement analysis
- Drawing Layers
- Export Drawing

Print 🌦

More:

- Printing of the current sheet (Ctrl+P)
- Print all
- Plot of the current sheet

Printing of the current sheet (Ctrl+P)

Using the 'Print' button, you can print the current measurement sheet as you see it on your screen, that is only with the visible drawing's and measurements' layers along with the legend.

In case you have set regions then only the part which is placed into those regions is printed instead of the whole sheet. Each region is printed on a different page. (See also <u>Draw Measurement Region</u>).

Print all

Using the 'Print' button you can print all open measurement sheets you see on the screen, each time, that is only with the visible drawing's and measurements' layers along with the legend.

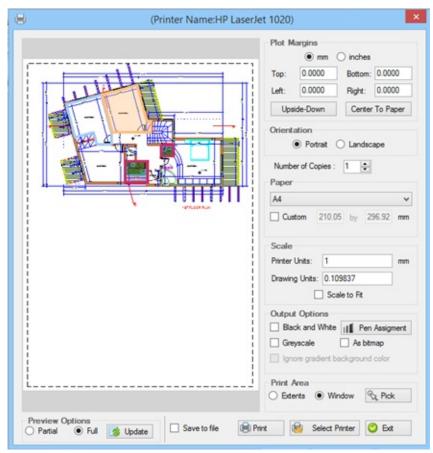
In that case too you have set regions then only the part which is placed into those regions is printed instead of the whole sheet. Each region is printed on a different page.

Take advantage of the 'print all' command which allows you to print massively many drawings for the presentation of measurement results on the drawings. Open the sheets you wish, set the regions you want to print, hide and show the layers of the drawings and the measurements you want and print!



Plot of the current sheet

Click the 'Plot' button, to print the current measurement sheet, you see on the screen, including the layers of the measurements you have created. The print-parameters configuration window will open:



In the 'Plot margins' field, you may set the margins of the page and the alignment of the drawing on the paper by selecting 'Upside – Down' and 'Center to paper'.

In the 'Orientation' field, set the orientation of the drawing. Click on the 'Portrait' option to vertically orientate the drawing and on the 'Landscape' option to horizontally orientate the drawing.

In the 'Paper' field, you may set the dimensions of the printing paper either by selecting any of the predefined formats (letter, legal, A3, A4, A5 etc.), or by setting the paper dimensions in the 'Custom' field.

In the 'Scale' field, you can set the printing scale of the drawing by filling in the respective 'Printer Units' and 'Drawing Units' fields. Alternatively, you can customize the drawing to the paper dimensions regardless of the scale by selecting 'Scale to Fit'.

In the 'Display options' field, you can select the B&W printing option by clicking on the 'Black and white' option or the 'Grayscale' one. You can print the drawing as an image file, by selecting the 'As bitmap' option. You can also change the line width per color by pressing the 'Pen assignment' button. In the 'Print area' field, you have the possibility of selecting the area you want to print. If you want to print a part of the drawing, select the 'Window' option and then click on the 'Pick' option to mark this part on the drawing. If you wish to print the entire drawing, just click on the 'Extends' option. In the 'Preview options' field, you can select either the partial or the full preview of your drawing.

Click on the 'Update preview' option each time you change any of the printing settings in order to refresh the preview, unless of course the preview is automatically refreshed. Choose the 'Select Printer field. In the respective fields of the window that appears on the screen you may select the printer as well as the printing properties 'Properties'.

Check the 'Save to file' option, click the 'Save to file' button that appears and save the file in order to print it later on.

Click 'Print' to print the drawing or click 'Exit' to close the printing window.

Color printing of a drawing (or part of a drawing) with active measurements (or some of the measurements) can be of great aid when checking measurements.

Measurement analysis 🗈

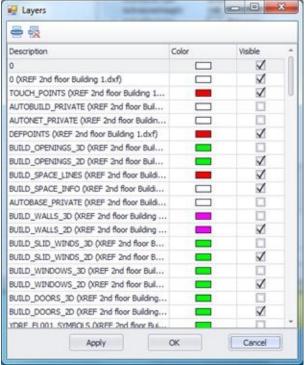
Using this button you can preview and print the analysis of the measurements. The analysis is based on the template which you select from the drop-down menu and includes dimensions marking and details of surfaces calculations. Measurement analysis is explained in detail in a separate chapter (Se).

Drawing Layers

By clicking on the 'Layers' button, you can see all the drawing's layers. The layers window includes their description, their color, and allows for their selective (by clicking on the respective 'visible' check box) or collective activation and deactivation. Moreover, users can sort or apply filters to the content of the columns (See Appendix/Filters/Sorting).



In the case of XREF files, in the end of the description of each layer, the word XREF and the name of the drawing from which it originates appear in parenthesis.



Select the layers you wish to activate or deactivate and click **Apply** to immediately view the changes on the drawing, without closing the window. This way, you have the ability to immediately view which layers hide or appear.

If more than one users work on the same project, the visible layers can be different for each one. Therefore, each user can concentrate on the relevant layers without hindering the rest.

More:

- Show all layers
- Hide all layers

Show all layers €

By selecting 'Show all layers', all layers of the drawing are shown.

Hide all layers ፟፟፟፟፟

By selecting 'Hide all layers', all layers of the drawing are hidden.

Export Drawing

Using the 'Export drawing' button, you can export the current measurement sheet to a separate file, including the measurements you have created. The drawing can be exported only if it is saved in the database and not as an external reference.

You can export the drawing to various file types, such as: dxf, dwg, dgn, wmf, bmp, gif, jpg, tif, png, ico, svg, dwf, pdf.

Using the export option in the above file types, you can edit the drawings along with the measurements in specialized design applications or even transfer them along with their measurements to another computer in the form of a .pdf file for checking purposes.

When exporting the drawing only the visible measurements are exported, as separate layers. That enables you to export the drawing with only the measurements you want each time and then edit it easily using a CAD software.

The export file does not contain any data from external references of the drawing, if there are any. In addition, if the drawing is not stored into the project but is an external reference itself, then only the layers of the measurement sheets are exported and not the original drawing.

Initial settings

Every time you import a new image file into the project (Drawings/Add drawing), a message box appears which guides you through the initial settings you have to establish:

- Rotate and level the drawing, if needed
- Set the drawing scale
- Set the origin, if you wish to copy measurements

You can find all these initial settings at the drawing's properties window (See Drawings/ <u>Drawing properties</u> **(See Drawing properties)**

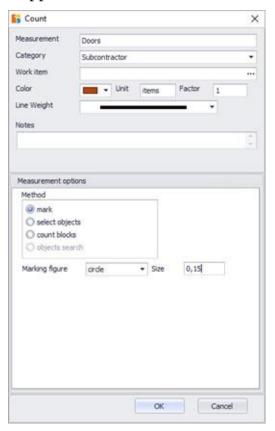
Types and method of measurement

More:

- Object count
- Length measurement
- Measuring area
- Measuring volume
- Custom measurements

Object count

Using this button, you can count objects on the drawing, e.g. how many sinks, doors, windows there are in a drawing. Click the button and the following window will appear:



More:

- Description
- Category
- Work item
- New work item
- Color
- Factor
- \blacksquare Unit
- Notes
- Measurement type
- Marking figure
- Object search

Description

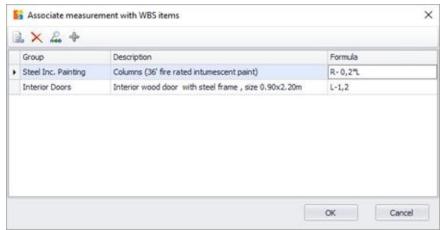
Enter the description of your new measurement in the Description field, e.g. internal doors.

Category

Select the category to which you wish to add your new measurement, thus grouping the measurements (See General/Measurement categories). For example, you may enter all door measurements in a specific category in order to filter the measurement table's data and export to Excel only this particular category (See Appendix/Filters/Sorting).

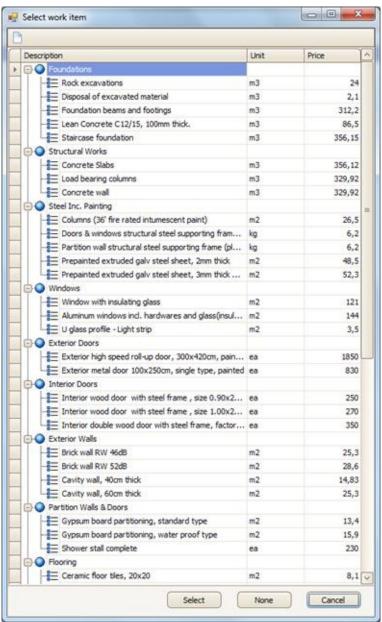
Work item

Click the button and the 'Associate measurement with WBS items' option window will appear.

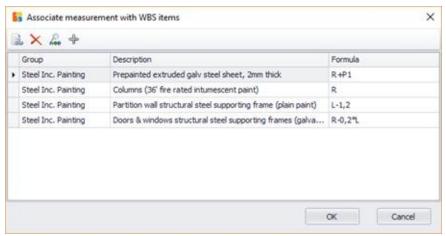


Click the 'Associate with WBS item' button to link the measurement with the work items you have entered into the WBS (See General/WBS (Ctrl+B)). In case you do not desire to enter the measurement under any of the work items, you can leave the corresponding field blank.

In the Standard version, where it is not possible to link a measurement with more than one work items, the WBS window appears on your screen immediately.

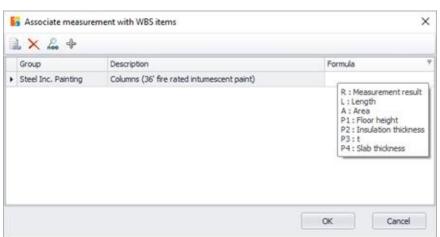


Select the work item under which your measurement will be entered by double-clicking it or by clicking on it and then clicking the $\boxed{\textbf{Select}}$ option. Repeat the procedure to link the measurement with more than one work items. If you leave the 'Formula' field blank or type the letter \mathbf{R} (\mathbf{R} esult), then the primary measurement result is entered into the WBS.



If you wish for a modified result to be entered in the work item, you should fill in the corresponding field using the available parameters and functions (See General/Library/New measurement/<u>Parameters</u>).

If you hover the mouse pointer over the 'Formula' column header, a tooltip pops up. There you can see all available parameters, as well as their descriptions.



In the WBS window you can select more than one work item, by using **CTRL** or **SHIFT** and simultaneously link them to the measurement.

If you select more than one work items to link to the measurement, then they all appear at the 'Work Item' field, separated by commas.

If there is a mistake in the expression, then the result appearing in the work item is -1.

Attention! When a measurement contains a factor that is different from 1, be careful when linking it to a WBS item. If you type anything in the 'Formula'

field even only the letter **R** (**R**esult), the factor <u>is not taken into account</u>. You can use the extra results of the different types of measurements, based on the following table (See General/Library/New measurement/<u>Calculations</u>)

TABLE FOR EXTRA MEASUREMENT					
RESULTS					
Item count	n/a				
Length measurement	A C				
Area measurement					
-on drawing's level	L C				
-perpendicular to drawing	L A C				
-by item count	С				
Volume measurement					
-area on drawing's level	L A C				
-linear object	L A C				
-by item count	С				

When you select a work item, the measurement unit of the primary measurement is not automatically updated according to the unit of the work item with which it is linked. If, for example, you want to count the number of the windows, and the respective work item unit in the WBS is m2, as soon as you select the work item, the measurement unit remains items. By using an appropriate formula or factor, you can convert the result of the basic measurement to comply with the work item's units.

New work item

Using this button, you can enter -during a measurement- a new group of work items or a new work item that does not exist in the WBS, and link it to the result of the measurement. If you click the 'Add work item' button, the 'WBS' window will appear on your screen. Add the desired group/work item (See General/WBS (Ctrl+B)) and click 'Close'. The changes will appear in the 'Select Work Item' window as well as in the 'WBS' tab (See Work items).

Apart from adding a group/work item, you can also edit the description or any other detail of the existing groups/work items in the WBS or even delete some of them.

More:

- Delete connection
- Replace work item
- Add stored items

Delete connection ×

Using this button, you can delete the current connection.

Replace work item 🚣

Using this button, the current work item, can be replaced with another. Choose the work item you wish, and close the window by clicking «Select»

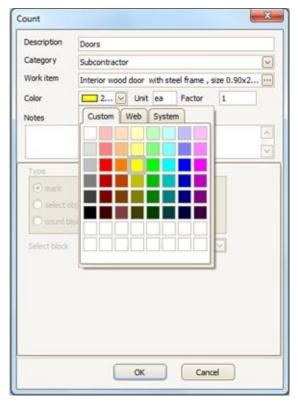
Replacing the work item does not affect the «Formula» field, which remains the same. This command is really useful if you have chosen by mistake, one work item instead of another, or if you want to replace a work item without necessarily delete the link and then add a new one, filling again the formula field.

Add stored items 🕈

Every time you link a measurement with one or more work items (you may also have set some formulae) they are temporarily kept in memory. By clicking this button you link the current measurement with all the saved work items along with their formulae.

Color

You can change the default color which will be used to mark the items you want to measure.



The last selected color and measurement unit are retained in future measurements, when you assign the same work item. Of course, you have the option of changing them again.

Factor

The 'Factor' field allows you to increase or reduce a result (the primary result, as shown in the 'Drawings' tab; in the 'WBS' tab there can be modified results too) as well as to convert it to a different measurement unit. For example, suppose you want to calculate the total weight of 5 similar drainage grids in kg and each grid weighs 100kg. Enter 100 and kg in the factor and Unit fields respectively and the total weight of the grids will be immediately calculated.

In the Pro version, you are advised to use appropriate calculation formulas instead of a factor when linking a measurement to a work item.

In the case where, for example, besides the area measurement of a floor, you wish to calculate the number of tiles needed, you can add an extra work item to the WBS, named 'Tile number,' with items as its unit of measurement. You can then link the measurement with this new work item using an appropriate factor to convert area to items. Be careful to set the unit price of this work item to zero, so that it does not alter the total cost.

In case of linking a measurement that includes a factor that is different from 1 to a work item be very careful. If you type anything in the 'Formula' field even the letter **R** (**R**esult), the factor is not taken into account.

Attention! The expression in the 'Formula' refers to each submeasurement separately as well as to the letters **R** (**R**esult), **L** (**L**ength), **A** (**A**rea). e.g if you type the expression R+1 in the 'Formula' field and then continue the measurement twice thus creating three submeasurements (See Drawings/Continue measurement), the final result will be (R1+1)+(R2+1)+ (R3+1) = R+3 instead of R+1 where R1,R2,R3 symbolize the results of the submeasurements and the letter R their sum. This is needed since the values of custom measurements parameters that are used in formulas may be different per sub-measurement (eg. height).

Unit

For object count measurements the default unit is 'items'. For more information about units in general see Measuring in image files/Types and method of measurement/Length measurement

Notes

In the 'Notes' field you can enter comments that relate to this specific measurement.

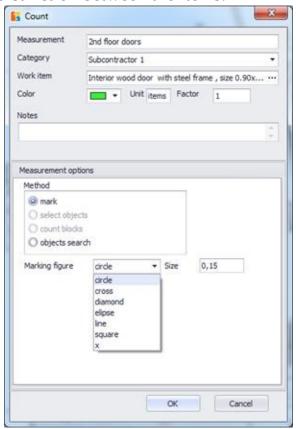
These notes will be exported along with the other details to both the measurements table and the WBS table.

Measurement type

There are two different ways to count items in image file: by marking items manually on the drawing or by automatic object detection.

Marking figure

Select the shape with which the marking on the drawing will be done. The choices are circle, diamond, ellipse, etc. By using different marking figures, you can achieve an extra distinction between the items.



The marking figures shown on the list are located in the folder images/count inside the program's folder.

You can create your own marking figures using a CAD software. Save the marker shape in a .dwg file and put it in the above mentioned folder in order to see it on the list.

You can change the marking figure used for a measurement later on using the Edit measurement button.

More:

- Marker size
- Measuring procedure

Marker size

You can change the size by typing in this field. Keep in mind that the default size depends also on the unit in use.

If the marking figures are out of proportion compared to the rest of the drawing you can adjust their size later on using the Edit measurement button.

Measuring procedure

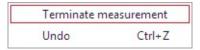
Once you fill in all the desired fields, click **OK**. Note that on the left side of the screen, under the work item, a new entry is created for the new measurement.

E During the measuring procedure, the 'Recording' button is constantly active.

Click consecutively on the drawing, where the items you wish to count are placed, in order to mark them. Note that with each click, a mark with the selected figure and color appears in the position of the cursor.

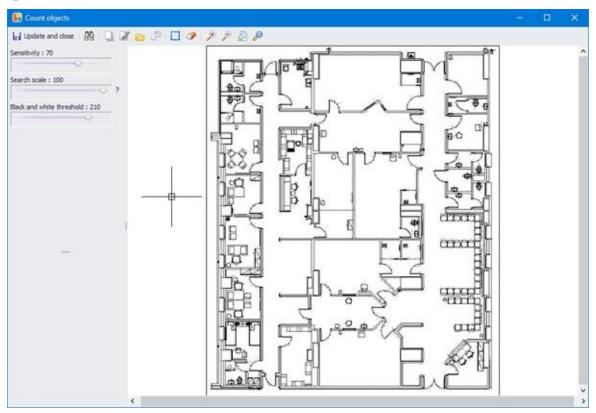
Terminating a measurement

To complete the measuring process, right-click and a shortcut menu appears. Select 'Terminate Measurement'. Alternatively, you can stop the measuring process by pressing the **Esc** key twice.



Object search

If you select 'Object search' as a measurement type, then the following window is opened

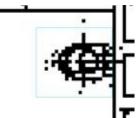


More:

- Specify template on image
- Edit template
- Load template
- Save template
- Sensitivity
- Search scale
- Black and white threshold
- Search objects
- Define search region
- Clear search region
- Update and close

Specify template on image

Press this button to define the object you want to count on the drawing. To mark the object, zoom on it and then enclose it in a rectangle by drag and drop.

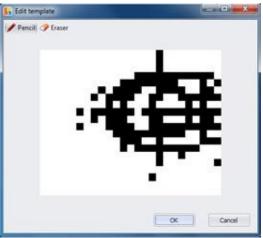


The selected template will then be displayed on the left side of the screen alongside variations produced by rotating it in steps of 90 degrees and mirroring it about the horizontal and vertical axes.

Choose the variations you want to search by filling their check boxes. However the more you choose, the longer the detection process will take. Thus you should omit mirrors when searching for symmetrical objects.

Edit template 📝

This option lets you edit the template you have defined. Use the pencil tool to darken pixels or the eraser tool to clear them.



Save template Export the template you have defined for later use.

Sensitivity

Drag this slider to the left in order to increase the tolerance in differences with the selected template and thus make it more probable to find all its occurrences. By doing so though, more unrelated objects will also be found.

Instead of decreasing the sensitivity too much, you can adjust it to find most of the template's occurrences and then add the remaining ones manually. This can be done after completing the measurement. Just click on the 'Continue measurement' button, which is located in the taskbar of the 'Drawings' or 'WBS' tab and by changing the counting method to "Mark".

Search scale

Choose a percentage lower than 100 to scale down both the drawing and the template. This is recommended in large scanned or pdf drawings to increase search speed. However, doing so may reduce the accuracy of the search. For more details, access the respective help page by clicking on the ? button next to the 'Search scale' slider.

Black and white threshold

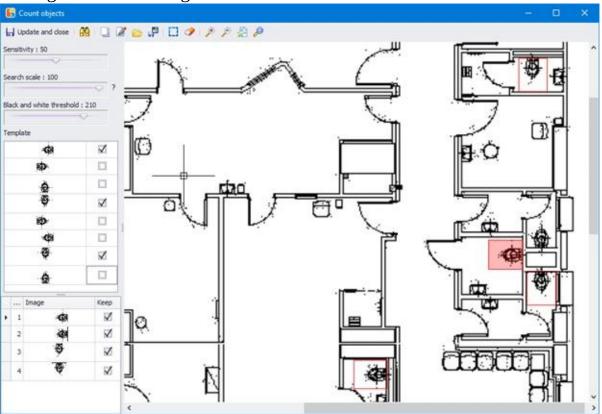
Set the threshold before a pixel is regarded black or white by the program in order to get better results.



All images are converted to black and white when opened.

Search objects 🙈

Press this button to trigger the search for the selected template. The results will be displayed in the lower left corner of the screen and marked with a red rectangle on the drawing.



There may be unwanted items in the results list. To remove them uncheck the 'Keep' checkbox. Notice that when you click on a result item, the drawing will zoom in on it, allowing you to decide if you want to include it in the measurement or not. Excluded objects will be marked with a blue rectangle on the drawing, in contrast to the red rectangle of the included ones.

Try out different levels of sensitivity and black & white threshold, in order to achieve the best possible result.

Define search region 🛄

This button lets you define a rectangular search region, where object search will be limited to. By doing so, when you use 'Search object' , the object detection will only be performed in the specified area.

By limiting the detection process to the necessary area you can save up a lot of time depending on the file size. In large images the desired object will probably be located in a smaller area only, thus it pays off to use this option.

Clear search region 🧈

By pressing this button you delete the search region you defined with and any object searches will be performed on the entire drawing.

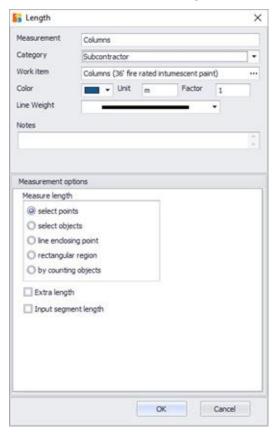
If you want to define a new search region, there is no need to clear the previous one. It will be done automatically.

Update and close

This option adds the search results to the count measurement and then closes the current window. All counted objects will be marked on the drawing with the marker color and shape you chose.

Length measurement •

Using this button, you can measure the length of a single straight line, a curve, a polyline, multiple single straight lines, curves or polylines on the drawing. Click the button and the following window will appear:



More:

- Description/Category/Work Item/Color/Notes
- Factor
- Unit
- Line weight
- Measurement options
- Measuring procedure
- Extra length
- Input Segment length

Description/Category/Work Item/Color/Notes

(See Measuring in image files/Types & method of measurement/<u>Object count</u> .

Factor

The 'Factor' field allows you to directly increase or reduce a result (the primary result of a measurement which is shown in the 'Drawings' tab) as well as to convert it to a different measurement unit. For example, if you wish to increase the measured distance by 10%, enter the **1.1** value in the 'Factor' field.

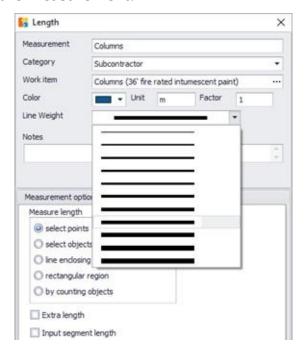
Unit

In general, all measurements (also see <u>Measuring area</u> and <u>Measuring volume</u>) use the same units as the drawing, which can be set when importing it (see <u>Units type</u>) or by modifying its 'Drawing properties' (see <u>Drawing properties</u>). The default primary measurement unit is meters for the metric system and feet for the US systems.

If this measurement is linked to a WBS work item, then it is possible that the unit of the work item and the unit of the measurement are different. Nevertheless, converting between the two units is done automatically. The unit of the measurement, which is the unit of the drawing, is displayed in the 'Drawings' tab, while the unit of the WBS item is displayed in the 'WBS' tab. For a list of all available units see General-Main Toolbar/Library/Unit aliases

Line weight

The 'Line weight' drop down menu allows you to choose the width of the line that will be used for the measurement.



Measurement options

Measuring procedure

To measure the length of a segment, click the first point that defines the distance you want to measure, move your mouse to the endpoint and click on it.

In image drawings, the button 'Polar track lock' is activated by default, in order to foster the line drawing during the measurement procedure.

Notice that during the track of the pick, a dashed line appears in the continuation of the straight part of the line which highlights the «locked» angle-position.



Notice also that the current length of the respective drawing part is displayed in a rectangle near the pick, in order to be aware of the length at any time and facilitate the measurement procedure.

If you wish to measure curved lines, click first then right-click on the point where the curve starts; from the shortcut menu that appears, select the 'Drawing arc' option, which can be enabled or disabled during a measurement.

Alternatively, you can use the **F10** key.

Terminate m	easurement
Undo	Ctrl+Z
Drawing arc	F10

More:

- Measuring Discontinuous Segments
- Undoing a measurement (Ctrl+Z)
- Terminating a measurement
- Editing a measurement

Measuring Discontinuous Segments

If you wish to measure discontinuous segments, press the $\boxed{\textbf{Esc}}$ key once and then click on the starting point of the next segment and so on. As a result the measurement is temporarily paused and separate figures are created. These figures belong to the same sub-measurement (See $\boxed{\textbf{Drawings/Continue}}$ $\boxed{\textbf{measurement}}$). Thus the hierarchy is: measurement \rightarrow sub-measurements \rightarrow figures.

In the Measurement analysis window (See Drawing windows/Measurement Analysis •), each distinct segment is separated from the rest with the use of parentheses in the calculation expressions.

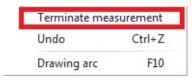
Undoing a measurement (|Ctrl|+|Z|)

In the duration of a measurement procedure, in order to quickly correct a wrong action, e.g. in the creation of a polyline, there is the ability of multiple undoing of the last actions by right clicking and selecting 'Undo,' or, alternatively, by using the **Ctrl**+**Z** key combination.

Terminate me	asurement
Undo	Ctrl+Z
Drawing arc	F10

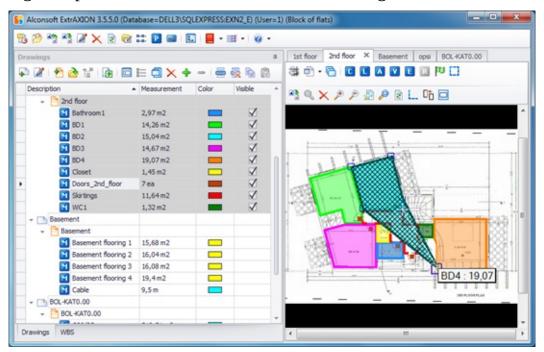
Terminating a measurement

To complete the measuring procedure, right-click. A shortcut menu appears. Select 'Terminate Measurement'. Alternatively, you can stop the measuring process by pressing the **Esc** key twice. You can also click the **R** 'Recording' button in order to disable it.



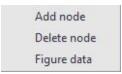
Editing a measurement

You can also modify a measurement at a later stage. You can edit the measurement by changing the polyline shape or its dimensions. Select the polyline and move its nodes or right-click on it to show the shortcut menu, including the options 'Add node', 'Delete node' and 'Figure data'.



Adding a node

By selecting this option, you will 'Add a node' in the selected closed polygon or polygonal line (polyline).



By clicking on any point in the perimeter of a polygon or a polyline, you can insert a node there. You can then move that node and view the change in the polygon or the polyline.

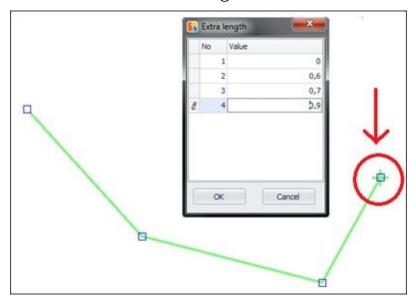
Deleting a node

By selecting this option, you will 'Delete a node' from the selected closed polygon or polygonal line (polyline). By clicking on any node of the polygon or polyline, you can remove it and view the resulting change in the polygon or polyline.

The measurement result is automatically updated with the above changes.

Figure data

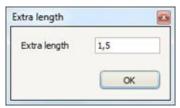
In many measurement types, there are parameters the values of which are different in each node of the measurement. For example, if you perform an area measurement perpendicular to the drawing without specifying a common height, then whenever you create a new node in the measurement polyline, you will be prompted for the value of height at that node. Other examples of this behavior include length measurements with an extra length or manual length input and volume measurements using linear items. You can modify the values of such parameters by selecting 'Figure data'. Then you can edit the table that is opened, where the nodes are listed in one column and the parameter values in the other. In the previous example, even if you have chosen a common height, you could still edit each node's height via the same method.



- $\stackrel{\text{left}}{=}$ When editing a node, it will be marked on the drawing with a cross (+).
- Figure data' is deactivated in length measurements, unless you tick the 'Extra length' or 'Input Segment length' checkbox, when creating the measurement.
- Parameters that are common for a measurement, or a sub-measurement to be exact, can be edited using 'Edit measurement'. However, once you modify a node's value by using 'Figure data', the parameter stops being common and is no longer visible in the 'Edit measurement' window.

Extra length

Select the 'Extra Length' option to add length to the distance you measure (e.g. to the floor plan views of Electromechanical works for vertically-oriented piping, cabling). During a measurement in which you have enabled the extra length option, every time you click on the nodes of the distance you measure, the following window appears on the screen:



Enter the value you wish to add at this particular point and press OK.

This value will be the default value for each subsequent node in the measurement in such a way as not to require from the user to re-enter it —in case the additional length is equal to that of the previous node- while users have the possibility of changing it.

You may want to add an extra length to a point between the nodes of a line and at a later time. To do so, you can <u>add an intermediate node to the polyline</u>, then right click on it and select 'Figure data' to edit the value of the extra length. By default, the value will be copied from the previous node. Apparently, this is possible only if you have ticked the 'Extra length' checkbox, when creating the measurement.

Input Segment length

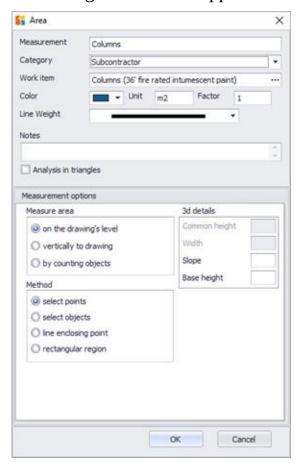
Select the 'Input Segment length' option when you prefer to manually define the length of each segment instead of letting ExtrAXION to calculate it. During a measurement in which you have enabled the input segment length option, every time you click on a node to end a segment, the following window appears on the screen:



Enter the value you wish for the current segment and press OK. You can use this feature in several cases e.g. when a drawing has different scale in some regions, in isometric type drawings or if you just want to override ExtrAXION's calculations and set the length you prefer.

Measuring area 🔼

Using this button, you can measure the area of a surface that is either perpendicular to or co-planar with the drawing, or by counting objects. Click the button and the following window will appear:



More:

- Description/Category/Work Item/Color/Notes/Factor
- Unit
- Analysis in triangles
- Measurement options
- Type of Measurement

Description/Category/Work Item/Color/Notes/Factor

(See Measuring in Image Files/Types & Method of Measurement/<u>Object count</u> •).

Unit

Analysis in triangles

Check the 'Analysis in triangles' box if you wish the calculation and analysis of the surface area to be carried out using triangles only. If you leave it unchecked, then rectangular, trapezoid, triangular and curved shapes will be used for the analysis (See Measurement analysis).

If the area to be calculated includes curved parts then the analysis is always carried out by the second method, even if you check the 'Analysis in triangles' box.

Analysis using only triangles is useful for on-site measurements. Calculations are performed using the Heron's formula:

$$T = \sqrt{\frac{(a+b+c)(-a+b+c)(a-b+c)(a+b-c)}{16}}$$

Measurement options

More:

- Measuring surface area
- On the drawing's level
- Sub-measurement
- Perpendicular to the drawing

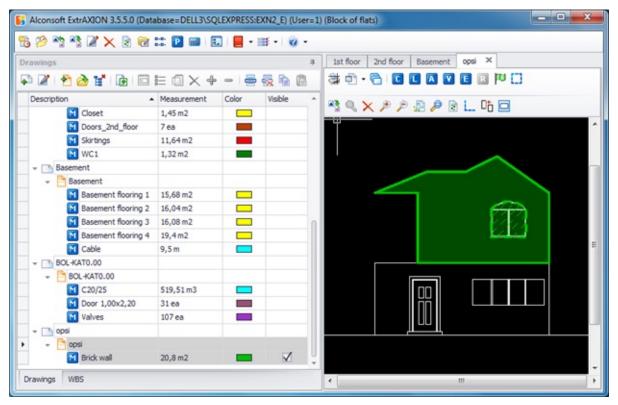
Measuring surface area

On the drawing's level

Select the option 'On the drawing's level' when you want to measure a surface area which is located on the same level with the one depicted in the drawing. In order to measure the desired surface, you have to draw it again by consecutively clicking on its perimeter's nodes.

During the measurement procedure, you can measure surface areas that are enclosed by curved lines by right-clicking and selecting 'Drawing arc' (See Measuring in image Files/Types & Methods of Measurement/Length Measurement/Measuring procedure).

Alternatively, you can use F10 to toggle a 'draw a curve' mode. If you want to calculate the total area of more than one surfaces in one measurement, press **Esc** once and then measure the next area, and so on (e.g. counting tiles in a WC and two bathrooms simultaneously). The measuring procedure can be completed by right-clicking and selecting 'Terminate Measurement,' or by pressing the **Esc** key twice. To continue the measurement, click the ***** 'Continue Measurement' button to add surface areas to the measurement, or ***** 'Continue Measurement (subtract)' if you wish subtract the area of already drawn surfaces (e.g. in the façade, by removing the surface area of the wall openings). The surfaces that you remove from the measurement are marked on the drawing with cross-hatching, while the outline of the areas removed is marked with a dashed line.



- In the case of counting items, after measurement completion, the **Continue Measurement (subtract)** option is disabled.
- If you wish to subtract items, you can select them either one by one by clicking on them or all together, and then use the 'Delete selected' option.
 X.
- The different types of measurements (on the drawing, perpendicular to the drawing, item counting) can be interchanged and combined (e.g. on the drawing and perpendicular to the drawing as in counting bathroom tiles), by using submeasurements (See Drawings/Continue measurement).
- The CAD vector files (.dwg, .dxf, .dgn) provide additional abilities for measuring, in comparison to the image files (See Measuring in vector files (CAD)).

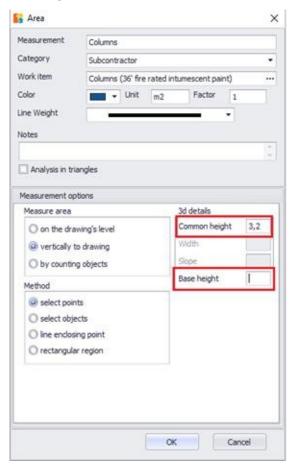
Sub-measurement

Whenever you chose to continue a measurement, either by addition or subtraction, a new sub-measurement is created. Each sub-measurement appears in the Measurement analysis window as an additional line (See Drawings/Measurement analysis).

Perpendicular to the drawing

Select the option 'Vertically to drawing' when you want to measure a surface which is perpendicular to the level depicted in the drawing.

To measure surfaces that are perpendicular to the drawing, you are prompt to specify their height and their base height. If the surface height is uniform, enter its value in the 'common height' field, as illustrated, in the following window:



The base height does not affect the measurement result and it's not necessary to be defined. However it can help you to have a complete supervision of the drawing's measurements in 3D view. (See <u>3D View</u>)

Click **OK** and mark the surface you wish to measure by drawing the outline of its base.

If the height is variable, leave the common height field blank and click \boxed{OK} . Every time you click on the nodes of the surface you measure, the following window appears:



Specify the height of this particular point in the surface you measure.

- This value will be the default value for each subsequent node in the measurement, so as not to require from the user to re-enter it —in case the additional height is equal to that of the previous node- while users have the ability to change it.
- You can later change the height of a node, even if you have opted for a common height; you will alter only the value of a specific node. To do so, right click on any node of the measurement, choose 'Figure data' and edit the desired values in the table that is opened (See Measuring procedure/Figure data).
- It is also possible to input a height at an intermediate node of the line. To do so, right click on the polyline and choose 'Add node', so that a new node is added (See Measuring in image files/Length measurement/Measuring procedure/Add node). After moving the node to the desired location, right click again and choose figure data, as described above.

Type of Measurement

More:

- By selecting pointsRectangular Region
- By counting objects

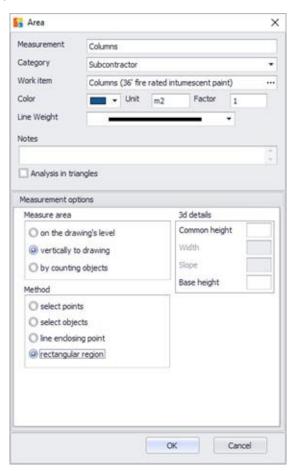
By selecting points

Using the type of measurement 'select points', you can measure area on the drawing's level, by clicking on its nodes and dragging the pointer.

Rectangular Region

Using the type of measurement 'Rectangular Region' you can measure the area of rectangular surfaces by clicking on the node you want to start with, and dragging the pointer to its diametrically opposed node.

With this option you can complete your measurement faster using just two clicks instead of four.

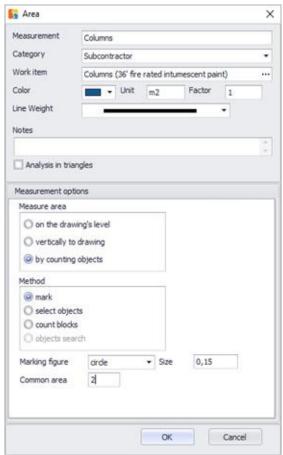


By counting objects

Select 'By counting objects' if you wish to measure a surface based on counting items.

Mark

With this option you manually mark the desired objects on the drawing. If all items to be counted have the same area, fill in the value in the 'common area' field, as shown in the following window:



Click **OK** and select the objects by consecutively clicking on the drawing, where the objects you wish to measure are placed.

If the surface area of the objects is variable, leave the respective field blank and click $\overline{\mathbf{OK}}$.

Every time you click on an object whose surface area you wish to measure, the following window appears:



Specify the surface area of this particular object.

This value will be the default value for each subsequent object so the user does not have to re-enter it -in case the surface area is equal to that of the previous object- while users have the ability to change it.

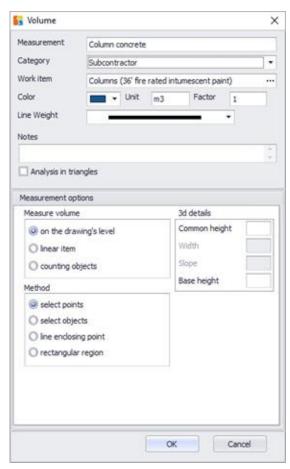
Objects search

(See Measuring in image files/Types and method of measurement/Object count/Object search)

Measuring volume ■

Using this button, you can measure the volume from a surface, a linear item, or objects on the drawing's level. Click the

■ button and the following window will appear:



More:

- $\begin{tabular}{l} \blacksquare \begin{tabular}{l} Description/Category/Work item/Color/Notes/Factor \end{tabular}$
- Unit
- Analysis in triangles
- Measurement type
- Measuring volume from

Description/Category/Work item/Color/Notes/Factor

(See Measuring in image Files/Types & Method of Measurement/<u>Object count XE "Item Counting"</u> C).

Unit

The default volume unit is m3 for metric system and cu ft for US systems. (See Measuring in image Files/Types & Methods of Measurement/Length measurement XE "Length Measurement" .

Analysis in triangles

(Measuring in image files/Types and method of measurement/Measuring area/<u>Analysis in triangles</u>)

Measurement type

Measuring volume from

More:

- $\ lue{}$ A surface on the drawing's level
- Linear item
- By counting objects

A surface on the drawing's level

Select the option 'on the drawing's level' when you want to measure the volume from a surface which is located on the same level as the one depicted in the drawing.

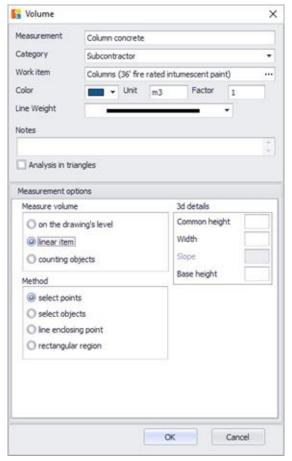
To measure the volume from a surface on the drawing's level, you have to fill in the 'common height' field. Once you specify the height, click **OK** and then draw the area you wish to measure by clicking consecutively on its nodes.(See Measuring in image Files/Types & Method of Measurement/Measuring area/Measuring surface area/On the drawing's level).

Puring a measurement, the different measuring methods (measuring volume from a surface on drawing's level, from a linear item, from counting objects) can interchange and combine.

Linear item

By selecting the option 'linear item', you can measure the volume from a linear item, as, for example, in the case you want to measure the volume of a trench in the perimeter of a plot, from a floor-plan view, in order to place rainwater drainage pipes.

To measure volume from a linear item, you will be prompted to fill in its width as well as its height in the corresponding fields; that is, if those characteristics are uniform throughout, as shown in the following window:



The 'width' may only be uniform and does not function the same way as the 'common height' field, which will be considered variable if you do not fill in a value. If you do not specify a width value, a warning message will appear.

Click **OK** and then click on the points of the linear item whose volume you wish to measure.

If the height of the linear items is variable, leave the corresponding field blank and click $\overline{\mathbf{OK}}$.

Every time you click on the points of the linear items whose volume you wish to

measure, the following window appears:



Specify the height of this particular point of the linear item you are measuring.

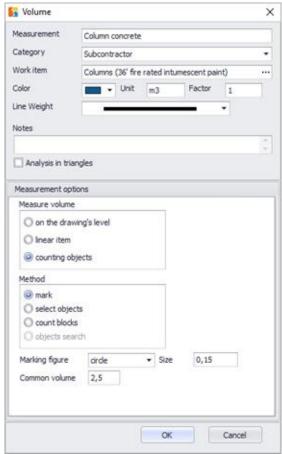
- This value will be the default value for each subsequent object so the user does not have to re-enter it -in case the surface area is equal to that of the previous object- while users have the ability to change it.
- You can later change the height of a point, even if you have opted for a common height; you will alter only the value of a specific node. To do so, right click on any node of the measurement, choose 'Figure data' and edit the desired values in the table that is opened (See Measuring procedure/Figure data).
- It is also possible to input a height at an intermediate node of the line. To do so, right click on the polyline and choose 'Add node', so that a new node is added (See Measuring in image files/Length measurement/Measuring procedure/Add node). After moving the node to the desired location, right click again and choose figure data, as described above.

By counting objects

Choose 'counting objects' if you wish to measure the volume based on objects. For example, you can measure the total volume of 5 decorative concrete globes if you know the volume of one of them.

Mark

With this option you manually mark the desired objects on the drawing. You can measure volume from items; if the volume of the items is common, you will be prompted to fill in the value in the corresponding field, as shown in the following window:



Click **OK** and select the objects by consecutively clicking on the drawing, where the items you wish to measure are placed.

If the volume of the items is not common, leave the corresponding field blank and click $\overline{\mathbf{OK}}$.

Every time you click on an item whose volume you wish to measure, the following window appears:



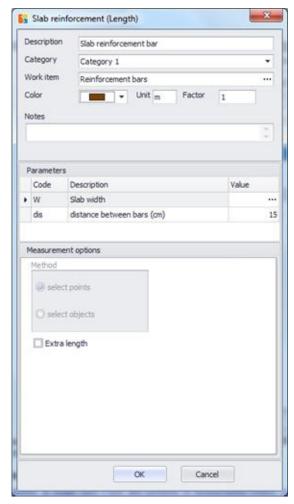
Specify the volume of the particular object you are measuring.

This value will be the default value for each subsequent object so the user does not have to re-enter it -in case the surface area is equal to that of the previous object- while users have the ability to change it.

Objects search

(See Measuring in image files/Types and method of measurement/Object count/Object search)

Using this button, you can make custom measurements you have set in the library (See General/Library/<u>Custom Measurements</u>). Click the button and a list of the available custom measurements of the library appears. By selecting one of them, the following window appears:



The 'Measurement details' region's exact form depends on whether the custom measurement is of object, length, area or volume type.

More:

- Description/Category /Color/Notes/Factor
- Work item
- Unit
- Parameters

Description/Category /Color/Notes/Factor

(See Measurements in image files/Types and methods of measurement/<u>Object</u> <u>count</u> <u>C</u>)

Work item

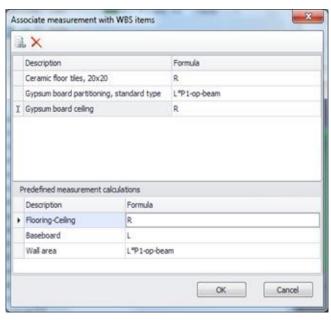
(See Measurements in image files/Types and methods of measurement/<u>Object</u> <u>count</u> <u>C</u>)

When linking the measurement with WBS work items, the formulas which were set in the region 'Predefined measurement calculations' of the 'Custom Measurement window' in the Library are also shown.

Enter for each of the WBS work items -to which the measurement will be linked- the formula you want.

Alternatively, when the cursor is at the formula field of the WBS item, you can automatically copy one of the predefined formulas by double-clicking on it.

If there is only one formula defined for the custom measurement, then it is automatically copied to the formula field.



Unit

The default unit of the primary measurement is automatically set, depending on the type of measurement you have set in the Library. It is possible to change the unit of measurement. (See Measurements in image files/Types and methods of measurement/Length measurement XE "Length Measurement"

Parameters

Here appear the parameters of the current custom measurement as they have been set them in the Library.

Enter for each parameter the values you want or leave the predefined ones.

The ... mark at the end of the value field signifies that the values of the parameters can be entered either by marking them on the drawing or by typing them in (See General/Library/Custom Measurements). During defining it on the drawing, you can form one or more line segments. When finished press **ESC** to add all these lengths and store the result in the parameter. The values of the rest of the parameters can be left with their default, or can be assigned a new value.

If you have created more than one sub-measurements, the value of its parameters can be different for each one (See <u>Drawings/Continue</u> <u>measurement</u>). You can edit these values separately for each sub-measurement (See <u>Drawings/Edit measurement</u>). In case the parameter can be defined on the drawing, instead of typing its new value, you can edit it by clicking on the ... sign and repeating the aforementioned procedure. Note that when doing so, you have to define all line segments from the beginning, as the previous value is not retained.

Parameters that are defined on the drawing are marked in a similar way to the dimension objects in a CAD program. You can modify them by dragging and dropping the nodes of the corresponding line segments. The value of the parameter and ultimately the measurement will be automatically renewed.

Initial settings

Every time you import a new vector file (CAD) into the project (Drawings/Add drawing), a message box appears which guides you through the initial settings you have to establish:

- Rotate the drawing, if needed
- Set the drawing scale, if other than 1:1
- Define the folders where the external references, if any, are located
- Set the origin, if you wish to copy measurements

You can find all these initial settings at the drawing's properties window (See Drawings/<u>Drawing properties XE "Drawing:Details"</u>)

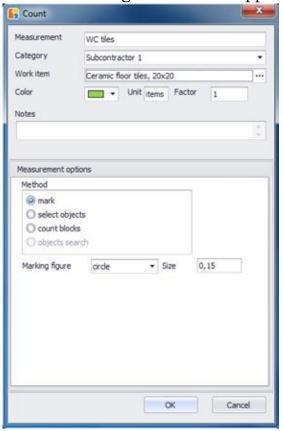
Types and method of measurement

- Object count
- Length measurement
- Measuring surface area
- Measuring volume
- Custom measurements

Object count

Using this button, you can count the objects included in the drawing. Counting objects in vector files (CAD) as opposed to image files may be done also by selecting objects or similar blocks.

Click the button and the following window will appear:



- $\begin{tabular}{l} \blacksquare \ Description/Category/Work \ Item/Color/Unit/Notes/Factor \end{tabular}$
- Measuring procedure

Description/Category/Work Item/Color/Unit/Notes/Factor

(See Measurements in image files/Types and methods of measurement/<u>Object</u> <u>count</u> <u>C</u>).

Measuring procedure

- Measurement by markingObject selection
- Counting blocks

Measurement by marking

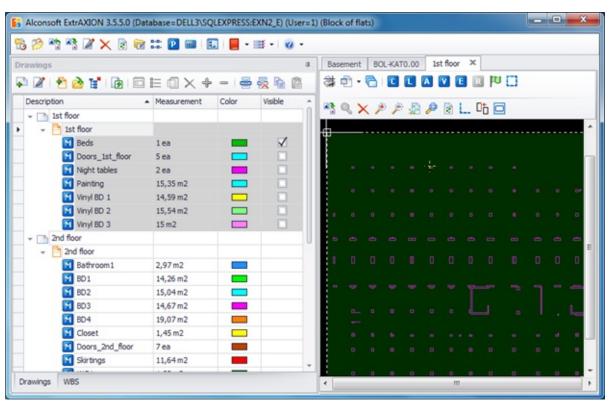
(See Measurements in image files/Types and methods of measurement/<u>Object</u> <u>count</u> <u>C</u>).

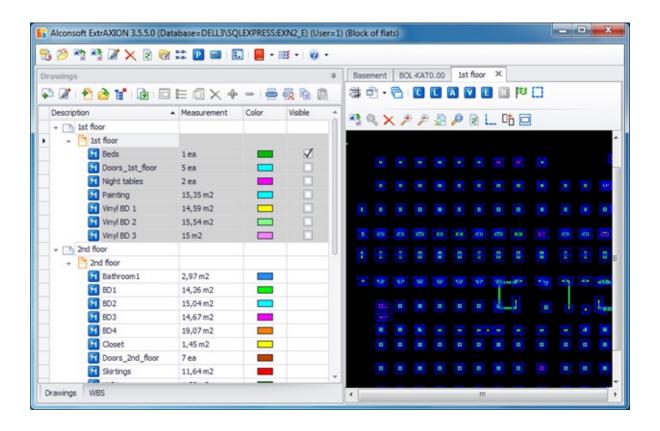
Object selection

By selecting objects on a drawing, you can measure objects which are CAD 'entities'.

On the drawing, mark the CAD objects you want to measure by clicking on any part of them. You can also select many objects simultaneously by following the same process that applies to CAD applications, e.g. by clicking on any part of the screen and dragging your cursor in such a way as to include in the marked surface the objects you wish to include in your measurement.

If you drag the cursor to the right, then the selection rectangular is blue and only objects that are fully included into it are selected. If dragging is to the left then the rectangular is green and even objects that partially intercept are selected.



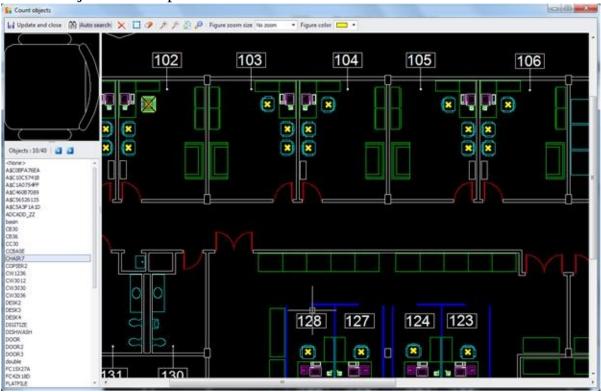


An object cannot be selected more than once on the same measurement. This way you can avoid selecting the same object twice, and consequently including it twice in your measurement.

By using the 'selecting objects' option, you can only measure standalone CAD entities, while you cannot select/mark objects that are within a block.

Counting blocks

With this option, you can count the number of similar blocks in the drawing. Select 'count blocks' as a measurement method, press **OK** and a new window 'Count objects' will open.



Block preview window

Selected blocks will be previewed in the upper left panel. Initially this window is empty.

Drawing window

On the right part of the screen you can move around the drawing and select blocks by clicking on them. When you select the instance of a block:

- The block will be displayed in the preview window.
- All instances of this block will be marked on the drawing, while the currently selected one will also be enclosed in a rectangle, marked with an X and zoomed in on.
- The name of the block will be highlighted in the list and the 'Objects' counter will show the number of all its instances.
- Blocks belonging to invisible layers can't be measured, even if they are

included in the list. If you wish to count all the blocks you must, before measurement, make sure that all the layers of the drawing are checked as visible (See Drawing windows/<u>Drawing Layers XE "Layers"</u> (a).

You can change the markers' color in the window's taskbar if the one you selected when you started the measurement isn't discernible enough.

List of blocks

On the left side there is a list with the names of all the blocks in the drawing. Here you can choose a block if you know its name. You can also use the two arrows on the top to select the next or previous instance of the current block.

Taskbar

Update and close

With this button you store the counted blocks as the result of the measurement and then the window is closed.

Auto search

Enabled by default, this option triggers an automatic search for all the instances of a block, every time you choose one. You can turn it off by clicking on the button **Auto search.**

Search objects 🔒

This button is enabled when you turn off 'Auto search'. In this mode you have to manually press the button fater you select an object in order to count its instances.

Delete selected ×

If you select one or more markers that correspond to instances of the block you want to measure and press \times , they will be removed from the measurement. The change will also be reflected in the 'Objects' counter, which will be reduced accordingly.

• Use this option to remove any unwanted instances, e.g. to delete the block instance located in the drawing's legend.

Define search region

This button lets you define a region where the search of blocks will be limited to. This region is marked with a red dashed line on the drawing. When you count blocks, any instances outside the search region will be excluded from the measurement.

■ The search region will be automatically deleted if you click on a block outside its boundaries.

Blocks on the search region's edges are included in the measurement.

Clear search region 🧈

Press this button to delete the defined search region and count all the instances of a block in the drawing.

Zoom in 🎤

(See Auxiliary measuring tools/Zoom in)

Zoom Out 🥕

(See Auxiliary measuring tools/Zoom out)

Zoom Extents 🔊

(See Auxiliary measuring tools/Zoom Extents)

Zoom Window

(See Auxiliary measuring tools/Zoom Window)

Figure zoom size

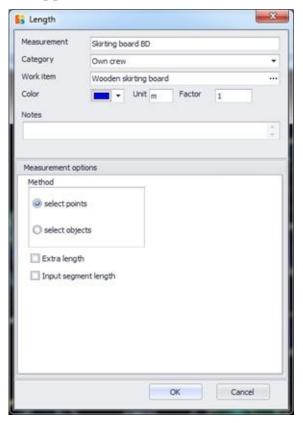
In large and complex drawings it is often difficult to discern the marked blocks. For this reason ExtrAXION automatically zooms in when you select a block instance. The 'Figure zoom size' option allows you to specify the appropriate zoom level. If you leave it at 'No zoom' the drawing will just be centered on the selected block.

Figure color

Choose the color of the markers used. (See <u>Measuring in image files/ Types and method of measurement/Object count/Color</u>).

Length measurement

Using this button, you can measure the length of a single straight line, a curve, a polyline, multiple single straight lines, curves or polylines on the drawing. Length measurement in vector files (CAD) as opposed to image files may also be done by selecting objects. Click the button and the following window will appear:



- $\ \ \, \square \ \, Description/Category/Work \ \, Item/Color/Notes/Factor$
- Unit
- Measuring procedure
- Extra length
- Input Segment length

Description/Category/Work Item/Color/Notes/Factor

(See Measurements in image files/Types and methods of measurement/<u>Object</u> <u>count</u> <u>C</u>).

Unit

(See Measurements in image files/Types and methods of measurement/Length Measurement).

Measuring procedure

- Selecting pointsObject selection

Selecting points

(See Measurements in image files/Types and methods of measurement/<u>Length</u> <u>Measurement</u>)

Object selection

By selecting objects on a drawing, you can measure the length of objects which are CAD 'entities'. To do that, use 'select objects' as type of measurement and click $\overline{\mathbf{OK}}$.

On the drawing, mark the CAD objects whose length you want to measure by clicking on any part of them.

Puring a measurement, every object can be selected only once. This way you can avoid selecting the same object twice, and consequently including it twice in your measurement.

By using the 'selecting objects' option, you can only measure standalone CAD entities, while you cannot select/mark objects that are within a block.

During length measurement through object selection, you cannot select and measure the length of entities that belong to a block.

Extra length

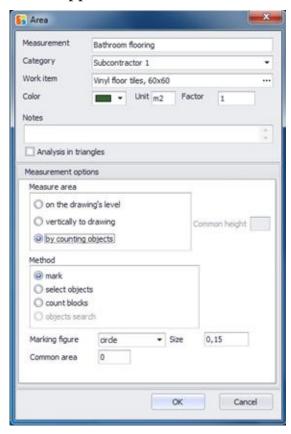
(See Measurements in image files/Types and methods of measurement/Length Measurement).

Input Segment length

(See Measurements in image files/Types and methods of measurement/Length Measurement).

Measuring surface area 🔼

Using this button, you can measure the area of a surface that is either perpendicular to or coplanar with the drawing, or by counting objects. Measuring a surface in vector files (CAD), as opposed to image files, can also be done by selecting objects or similar blocks. Click the button and the following window will appear:



- Description/Category/Work Item/Color/Notes/Factor
- Unit
- Analysis in triangles
- Measuring surface area

Description/Category/Work Item/Color/Notes/Factor

(See Measurements in image files/Types and methods of measurement/<u>Object</u> <u>count</u> <u>C</u>).

Unit

(See Measuring in Image Files/Types & Method of Measurement/Measuring area).

Analysis in triangles

(See Measuring in image files/Types and Measuring procedure/Measuring area/<u>Analysis in triangles</u>).

Measuring surface area

- On the drawing's levelPerpendicular to the drawing
- By counting objects

On the drawing's level

Selecting points

(See Measuring in Image Files/Types & Method of Measurement/Measuring a Surface Area/On the drawing's level).

Object selection

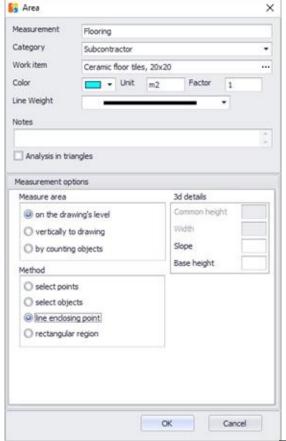
By selecting objects, you can measure the surface area of standalone CAD entities. To measure the surface area of CAD entities, select the 'By counting objects' method and click $\overline{\mathbf{OK}}$.

Then, select the CAD entities whose surface area you wish to measure, by clicking on them or by selecting all of them at once in such a way as to include the desired entities. This way, you can measure with just one click, for example, the volume of concrete in a plan view, allowing only the corresponding layer to be visible, by specifying the height and selecting all concrete walls and props at once.

By selecting objects, you can measure of CAD entities, while you cannot mark areas that are not objects.

Line enclosing point

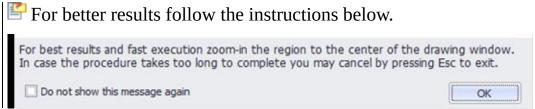
By selecting line enclosing point, you can measure the surface area on the drawing's level based on the lines that surround the point you click.



To use this method select «line enclosing point» and click **OK**.

Zoom in and pan, in order to move and bring in the middle of the screen the closed area to be measured. Then click inside this area.

The perimeter is marked automatically even if it is not designated as a closed polyline.



In case you haven't zoomed in enough and haven't centered the region you may wait for a long time and the measurement may not finish. Press Esc to stop the procedure. You can then repeat the measurement following the instructions.

You can continue by clicking in other points, in order to include in the same sub-measurement other closed regions, always by panning and zooming appropriately.

eal By right clicking hide or show the layers you wish, in order to «clear» the

drawing and to make the selection efficient and easy. Choose either «Hide figure layer» or «Figure layer only visible».

If there is a region which is overlaid at the measurement around a point, this is measured only once.

Rectangular Region

(See Measuring in Image Files/Types & Method of Measurement/Measuring a Surface Area/Rectangular region).

Perpendicular to the drawing

Selecting points

(See Measuring in Image Files/Types & Method of Measurement/Measuring a Surface Area/Perpendicular to the drawing).

Object selection

(See Measuring in vector files/Types & Method of Measurement/Measuring a Surface Area/On the drawing's level/<u>Object selection</u>)

By counting objects

Measurement by marking

(See Measuring in Image Files/Types & Method of Measurement/Object count ...).

Object selection

(See Measuring in Vector Files/Measuring a Surface Area/On the drawing's level/<u>Object selection</u>)

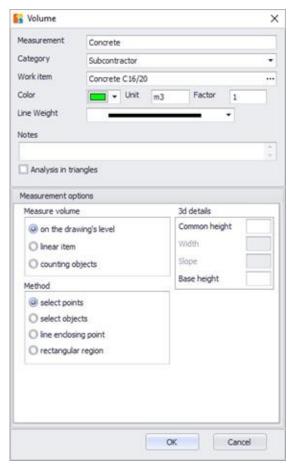
Count blocks

With this option, you can measure the surface area of similar blocks on the drawing.

Fill in the common area of each of the blocks you will count and then press **OK**. A new window, where you can count the blocks will be opened (See <u>Measuring in vector files/Object count/Counting blocks</u>).

Measuring volume ■

Using this button, you can measure volume from a surface on the drawing's level, from a linear item, or from a selection of items. Measuring in vector files (CAD), as opposed to measuring in image files, may be done by selecting objects or similar blocks. Click the button and the following window will appear:



- Description/Category/Work Item/Color/Notes/Factor
- Unit
- Analysis in triangles
- Measuring volume from

Description/Category/Work Item/Color/Notes/Factor

(See Measuring in Image Files/Types & Method of Measurement/<u>Object count</u> •).

Unit

(See Measuring in Image Files/Types & Method of Measurement/<u>Measuring</u> volume ✓).

Analysis in triangles

(See Measuring in image files/Types and Measuring procedure/Measuring area/<u>Analysis in triangles</u>).

Measuring volume from

More:

- $\hfill \square$ Surface area on the drawing's level
- Linear item
- Object selection

Surface area on the drawing's level

Selecting points

(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/ A surface on the drawing's level).

Object selection

(See Measuring in Vector Files/Types & measuring procedure/Measuring a Surface Area/ On the drawing's level /<u>Object selection</u>)
(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/ <u>A surface on the drawing's level</u>).

Linear item

Selecting points

(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/<u>Linear item</u>)

Object selection

(See Measuring in Vector Files/ Types & measuring procedure /Measuring a Surface Area/ On the drawing's level /<u>Object selection</u>)

(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/<u>Linear item</u>)

Object selection

Measurement by marking

(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume/By counting objects).

Object selection

By selecting objects, you can measure the volume of standalone CAD entities. You will be prompted to fill in the common volume of the objects you want to measure. If the objects' volume is not common, leave the field blank so that every time you select a CAD entity by clicking on it, you will be asked to enter its volume.

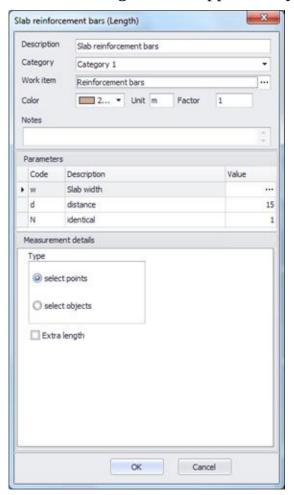
(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume/By counting objects).

Identical blocks

(See Measuring in Vector Files/ Types & measuring procedure /Measuring Surface Area/By counting objects /<u>Count blocks</u>).

Custom measurements

Using this button, you can make custom measurements you have set in the library (See General/Library/<u>Custom Measurements</u>). Click the button and a list of the available custom measurements of the library appears. By selecting one of them, the following window appears on your screen:



More:

Description/Category/Color/Notes/Factor/Work item/Unit/Parameters

Description/Category/Color/Notes/Factor/Work item/Unit/Parameters

(See Measuring in Image Files/Types & Method of Measurement/<u>Custom</u> measurements [E]).

Recording <a>B

The **Recording** button is activated during a measurement, and it is deactivated once the measurement is completed. By clicking the button while it is activated, you stop the measurement.

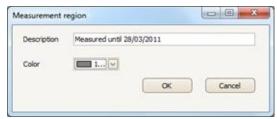
Annotations ...

More:

- Draw measurement region
- Add note
- Build legend
- Label figures
- Clear labels

Draw measurement region |**

Using this button, you can mark the areas of the drawing where the measurements have been completed. This option offers you the ability to better monitor the areas that have already been quantity surveyed. If you click the button, the following window will appear:



In the 'Description' field, enter the description of the measured area, e.g. 'OK up to 6/3/2011'. In the 'Color' field, you can change the default which is used to mark each measured area. Then, click **OK** and draw the area where all measurements are complete by consecutively clicking on its perimeter's nodes. To complete the marking procedure for the measured area, right-click or press the **Esc** key.

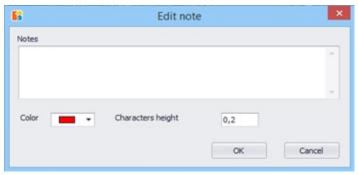
Once you have finished marking the measured area, you can modify it. By double clicking any part of the area, the 'Measurement Area' window appears and you can change both the description of the measured area and the color of the marking.

Furthermore, you may edit the marked area by changing the polyline shape (See Measurements in image files/Types and methods of measurement/Length Measurement).

By disabling and enabling the auxiliary layer, the marking of the measured area and the setting of the scale in image files hide and show, respectively.

Add note **S**

Using this button you can add notes on your drawing. If you click this button the following window will appear:



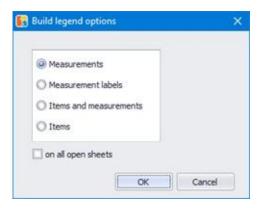
In the 'Notes' field, enter the note you want to add on the drawing, e.g. 'To be checked again'. In the 'Color' field, you can change the default which is used to write the note and in the 'Characters height' field you can change the default number in order to make the note apparent. Then, click **OK** and place the note on the drawing by clicking at the point you want it inserted. You can edit notes whenever you want. By right clicking on a note and selecting 'Edit note', the window 'Edit note' appears and you can change the description and characters' color and size.

You can move a note by clicking on its left edge and dragging to the desirable position. In case you want to move more than one notes at the same time you can select them all and use the button 'Move selection'.

You can also delete one or more notes by selecting them while pressing **SHIFT** and clicking the 'Delete selected' button.

Build legend

Using this button, you can create automatically a legend on the current or on all the open sheets. By clicking this button the following window appears on the screen:



Choose the type of legend you want:

- Measurements: Includes all visible measurements in the drawing
- Measurement labels: Same as 'Measurements', but breaks down each measurement into the figures it consists of. Labels must be created beforehand (See <u>Label figures</u>).
- Items and measurements: Combination of 'Measurements' and 'Items'.
- Items: Displays the work items corresponding to measurements that are visible and linked with a WBS item.

Check the 'on all open sheets' box to create a legend in every open sheet instead of repeating the process manually. Then click **OK**.

The legend belongs to a special layer of the drawing and it can be shown or hidden. (See Drawing layers).

In the first column of the table of the 'Measurements', 'Measurement labels' or 'Items and Measurements' type legend, you see the color of the measurement. In case of item counting, instead of a rectangle of the same color as the measurement, the shape chosen for marking the objects appears. In the rest columns the measurement description, unit and quantity are shown.

The legend includes only visible measurements.

You can move the legend by clicking on its upper left corner and then

dragging it.

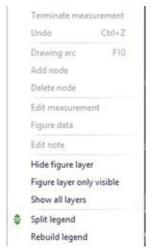
- There can be multiple legends in the same drawing.
- Pouble click on a row to highlight the corresponding figure on the drawing.
- The quantity shown in every work row is the total of all measurements, on all drawings and includes also even measurements which are not in drawings.

More:

- Split legend
- Rebuild legend
- View legend on 3d

Split legend •

By right clicking anywhere on the legend, the following shortcut menu appears:



Choose 'Split legend' and the legend gets divided into its rows.

You can move each row individually by dragging its upper left corner, in order to place them near the corresponding measurements.

In case you want to move simultaneously more than one rows of a legend that has been split, you must select them all and then press the 'move selection' button.

Rebuild legend

Select 'Rebuild legend' and the legend gets built again including the currently visible measurements. In case the table has been moved, its position on the drawing remains the same.

E The selection 'Rebuild legend' is not available if the table has been separated into its rows. In this case you must select again the 'Build legend' button from the menu. The table is relocated on its default position, on the left top corner.

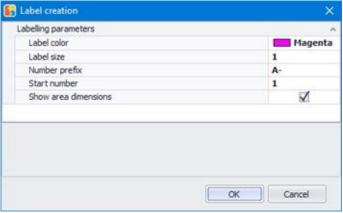
View legend on 3d

The legend is also displayed on the 3d view of the drawing with its measurements.

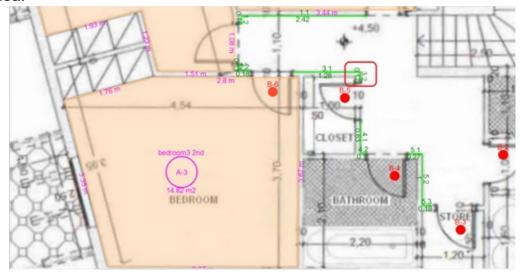
The table of the legend can be also moved on the 3d drawing using the same method as in 2d.but in that case the new position is not stored on memory.

Label figures ⁰

Using this button, you can create labels for all measurements on the drawing. To do so, make sure that the desired measurements are visible, select them, click on 'Annotations' and then choose 'Label figures' from the drop down menu. The selected measurements will be automatically numbered and labeled on the drawing. The following window appears on the screen:



In this window you can customize the color, font size, numbering and prefix of the labels that will appear. With the 'Show area dimensions' check box toggled on, the lengths of the segments around a measured area will also be labeled.



Figures of a measurement will be labeled explicitly, along with their value. In the screenshot above, label 3.2 indicates that the 2nd figure of the 3rd sub-measurement of a length measurement is 0.17.

 \P If you have not selected any measurements in particular, then all visible

measurements of the current drawing will be labeled.

Clear labels 🍼

Click this button to delete the labels of all visible measurements. Alternatively, you can hide the label by toggling off the 'Visible' checkbox of the corresponding measurement in the Drawings or WBS tab

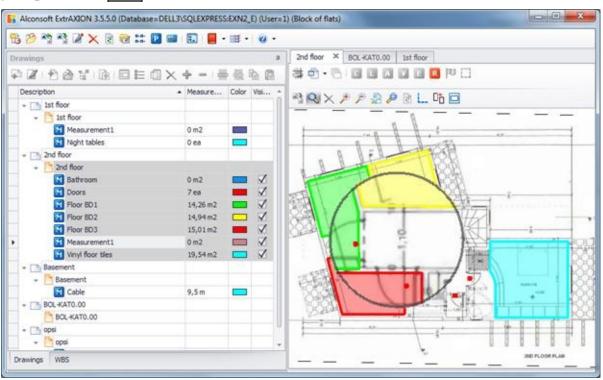
Define analysis region

Using this button you can draw a rectangular area on the drawing in order to define the measurements that will be included in the analysis of the current measurement sheet. Click and drag the cursor to define the region and click again to complete it. Analysis regions on the drawing are distinguished by a red dashed line.

- You can define as many analysis regions as you wish. Each region will appear in a separate tab of the analysis window. If there is no analysis regions defined then the whole drawing is considered as one region.
- Note that, for a measurement to be included in the analysis of a region, it must fully surrounded by the region's rectangle.
- If a measurement is included in more than one analysis regions, it will be analyzed and appear in all of them.
- You can resize an analysis region after its creation. Click on it to select and then drag the upper-left or the lower-right handle to change its size. Click again to complete the resizing.
- You can delete a region at any time. Click on it to select and then click the 'Delete selected' × button.

Magnifier (Ctrl+M) /

Using this button, you can magnify a particular area of the drawing. Click the button with the magnifier icon or use the **Ctrl**+**M** shortcut each time you want to focus on a specific part of the drawing. The magnifier is disabled when you click on the next point of your measurement, or when you press the **Esc** button.



The magnifier button is enabled only during a measurement.

Delete selected ×

This button allows you to delete the selected lines, curves, or points that were created on the drawing during the measurements, without deleting the entire measurement (See Drawings/<u>Delete measurement</u> ×). Click on the drawing at any point of the measurement layer you wish to delete, and then click the 'Delete selected' button.

- Deleting selected areas is accompanied by the update of the relevant measurements results in both 'Drawings' and 'WBS' tab tree views.
- Besides measurements, you can also select and delete measurement regions and analysis regions.

Duplicate selection

You can copy one or more parts of the same or multiple measurements by selecting them on the drawing, pressing this button and moving them around. Moving is performed by defining the start and end point of a point of reference. These copies will then be automatically added to their respective measurements, the values of which will be increased.

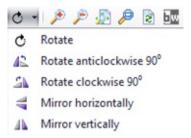
♥ To select multiple items, press and hold Shift or use the selection rectangles, as in CAD software.

Move selection ⇒

Same as before (See <u>Auxiliary measuring tools/Duplicate selection</u>), but without creating copies or modifying measurements.

Rotation C -

Having selected one or more parts of one or more measurements, you can rotate them using the options shown to the following drop down list.



More:

- Rotate
- Rotate anticlockwise 90°
- Rotate clockwise 90°
- Mirror horizontally
- Mirror vertically

Rotate o

You can rotate the selected measurement around a center of rotation you are asked to define on the drawing.

Rotate anticlockwise 90° 🕰

You can rotate the selected measurement 90° anticlockwise.

Rotate clockwise 90° a

You can rotate the selected measurement 90° clockwise.

Mirror horizontally **4**

You can rotate the selected measurement around the horizontal axis.

Mirror vertically A

You can rotate the selected measurement around the vertical axis.

Zoom-in 🎤

Click this button to enlarge the drawing.

 You can also zoom-in by clicking on the part you want to enlarge and then rolling the mouse wheel forwards.

Zoom-out 🎤

Click this button to zoom out of the drawing.

vert You can also zoom out by clicking on the part you want to reduce and then rolling the mouse wheel backwards.

Zoom extents 🔊

Click this button to fit the drawing to the dimensions of your screen. The drawing is moved and resized (using the appropriate zoom) so that the entire drawing appears on your screen as large as possible.

Zoom window 🔑

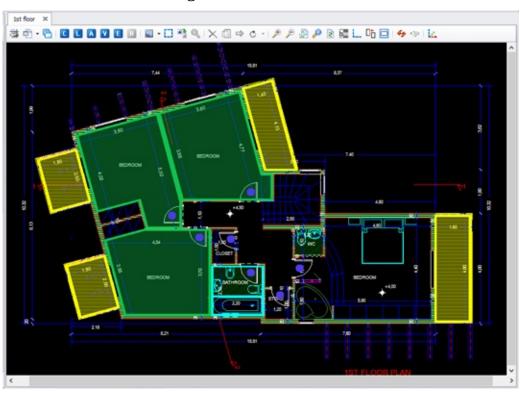
Press this button to zoom in a specific part of the drawing. Click on the drawing and define, by dragging, the desired part where you want to enlarge.

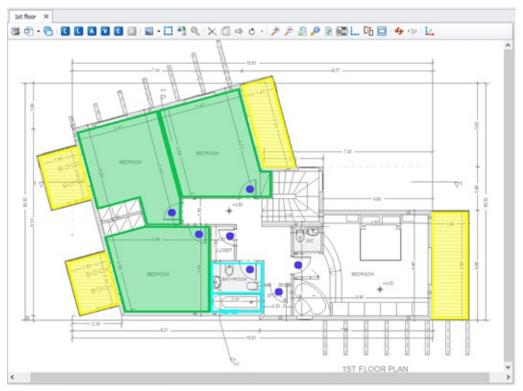
Refresh 🗟

Using this button, you can refresh the current drawing (redraw).

Black & White M

CAD Drawings usually have plenty of colors and the measurements may not be easily identified. Using this button you can convert the drawing into black & white with only the measurements' layers remaining colored. You can see the difference at the following windows:





The black & white view is possible only for vector drawings and not in image files.

Polar track lock (F8)

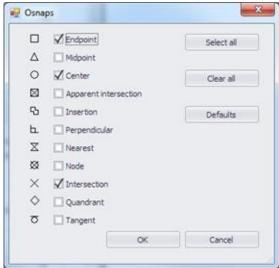
If this button is activated during the measurement procedure, you can exclusively move on specific axes (the step of the track lock angle is set by default to 15°). Alternatively, press the button **F8**. It replaced the «Ortho» option

- For changing the polar track lock (See Drawing-Measurements settings/Polar track lock)
- On image files, this button is 'on' by default, in order to make the line drawing easier during the measuring procedure.
- Object snap prevails over Polar track lock.

Object snaps (Osnaps) ¹⁵

Using this button, you, can choose to activate object snapping. Set the points where you wish snapping to be possible.

The options are shown in the following window:



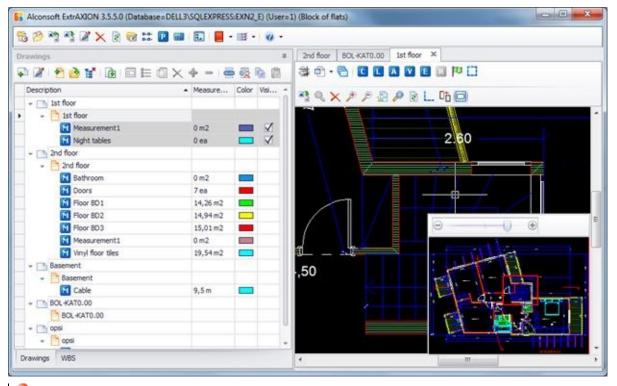
Click **Select all** in order to activate all snaps with one click, **Clear all** in order to disable all of them and **Defaults** in order to reinstate the factory presets.

You can enable, disable or change the osnap options as many times as you wish during a measurement.

If you modify any of the default osnap options, they are saved for the current drawing sheet only. These options are saved per pc user.

Show zoom-and-pan window

Using this button you can activate or deactivate the zoom-and-pan window, so that is does or does not show in the lower right part of the screen.



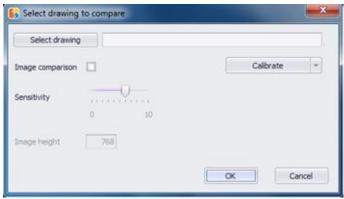
■ In the case of very large files, it is recommended to use alternative ways of zooming and panning, and not the zoom-and-pan window.

Having the zoom-and-pan window activated, you can pan the drawing by moving the red frame, which marks the part of the drawing that is visible in the right part of the screen. To zoom in or out, move the zoom indicator towards the + and - respectively.

Compare **

You can compare different versions of a drawing and easily find what has been added, removed or modified.

By clicking on this button the drawing comparison starts and a new window is opened. After you have finished, press it again to exit the comparison mode.



More:

- Select drawing
- Image comparison
- Sensitivity
- Image height
- Calibrate
- Overlay

Select drawing

Choose a drawing from your computer to compare with the current one. You can perform comparisons between image files (.jpg, .png, .pdf) or between vector drawings (.dwg, .dxf) but you cannot mix them up.

Image comparison

This checkbox is activated only in vector drawings. When checked, the drawings will be converted to images and then the comparison will take place.

Sensitivity

This slider is activated when comparing image files or when you have checked 'Image comparison'. Adjust it to define how great a difference must be in order for it to be marked and displayed.

Try to decrease the sensitivity in order to ignore false positive differences, due to the slightly different scale or the image quality of the two drawings.

Image height

This field is activated when comparing image files or when you have checked 'Image comparison'. It is the height in pixels of the images when they get compared.

Calibrate

Click on the downwards arrow to view a drop down menu with the following actions:

More:

- Set rotation
- Set scale
- Set origin

Set rotation

Rotate the new drawing. (See <u>Drawings/Drawing properties/Rotation</u>)

Set scale

Type the scale, choose from a list of standard ones, or define it on the new drawing.

(See <u>Drawings/Drawing properties/Scale</u>)

■ In image files, defining the scale on the drawing isn't perfect in terms of accuracy. Thus the two drawings will most likely have a slightly different scale. If the comparison marks everything as being different, try to decrease the sensitivity or increase your accuracy with a higher zoom level when defining the scale.

Set origin

Define the (0,0) point of the new drawing. (See <u>Drawings/Drawing properties/Origin</u>)

In vector drawings you can use the Objects snaps to have perfect accuracy.

While setting the origin isn't generally required in vector drawings, unless it was changed by their author, in image files it will be most likely necessary.

Overlay

After you have selected and calibrated the second drawing, press **OK** and wait while ExtrAXION performs the comparison. Once the execution is completed, the two drawings are displayed overlaid.

- Grey items are identical in both drawings.
- Blue items are found only in the second drawing.
- Red items are found only in the first drawing.
- When an item is changed, then it is colored green.
- Changed items can be detected only in vector drawings.



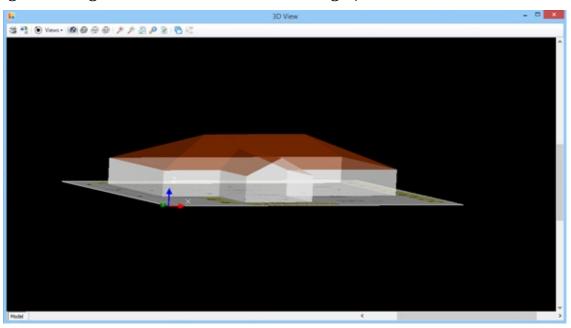
To end the comparison and return to the original drawing press again. To view a more detailed comparison follow the next instructions.

Show drawing's versions comparison 🤏

This button is activated only when you compare two drawings. Press the button to open a new window, where you can move between the first drawing, the second and their overlay by clicking on the respective tabs.

3D View 🛂

Using this button you can see the measurements of the drawing on 3D view. You can see perpendicular to the drawing area measurements and inclined area measurements and point out mistakes that are not visible on 2D view (e.g. wall height less than the roof's base height).



More:

- Plot (Ctrl+P)
- Export drawing
- Rotate 3D
- Views
- Render
- Shade on
- Hide
- Wire
- Zoom out
- Zoom in
- Zoom extents
- Zoom window
- Refresh
- Drawing Layers
- Black & White

Plot (Ctrl+P)

Using this button you can plot the drawing's 3D view (See Print

Printing of the current sheet (Ctrl+P) XE "Print: Drawings"

Export drawing 🥞

Using this button you can export the drawing's 3D view to several file types (See Export Drawing

Rotate 3D •

Using this button you can rotate the model/object. When you activate this button a circle appears on your screen and you can rotate the model/object pressing the left button of the mouse and moving it towards the direction you want.

Depending on where you place the cursor according to the circle, the rotation type changes as well as the cursor's shape. There are the two following cases:

Placement of the cursor in the circle.

If you press the left button of the mouse while the cursor is in the area inside the circle and move the mouse keeping its left button pressed, you can rotate the model in three dimensions.

© Placement of the cursor out of the circle.

If you press the left button of the mouse while the cursor is out of the circle and move the mouse keeping its left button pressed, you can rotate the model around the level that is defined by x, y axes.

Views

Clicking this button appear many preset viewpoint options, which you can see at the following window:



Top [□]: You can see the 3D model from the top.

Bottom⁴: You can see the 3D model from the bottom.

Left! You can see the 3D model from the left.

Right : You can see the 3D model from the right.

Front : You can see the 3D model from the front.

Back !: You can see the 3D model from the back.

NE ♥ : You can see the model from the Northeast direction.

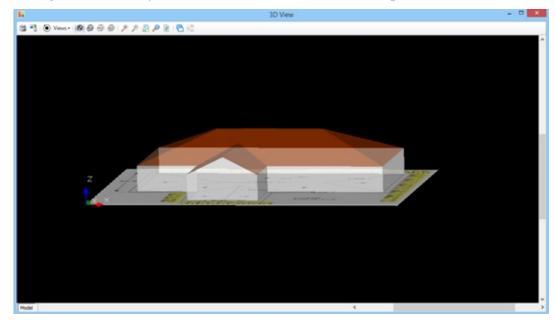
NW ♥ : You can see the model from the Northwest direction.

SE **V**: You can see the model from the Southeast direction.

SW ♥ : You can see the model from the Southwest direction.

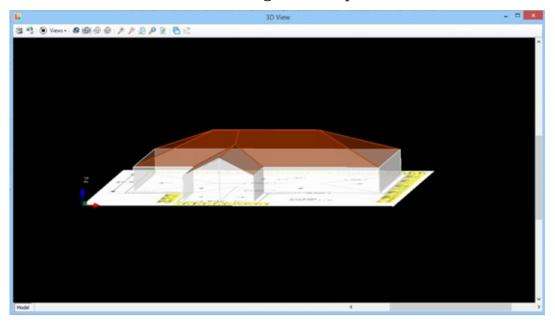
Render 🚳

Using this button you can see the model as a compact, colored solid.



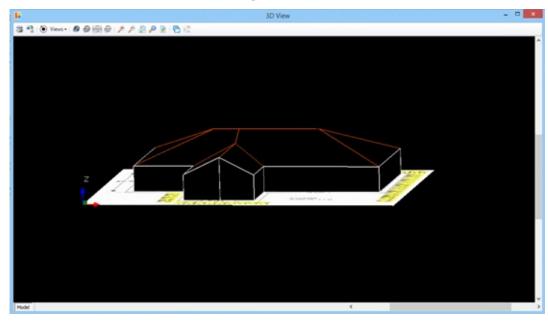
Shade on 🕮

This button has the same features with the previous one 'Render', with the difference that the model's edges are emphasized.



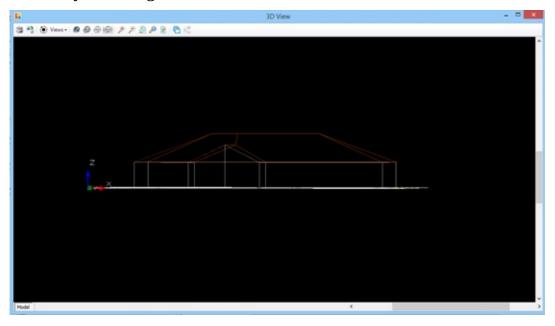
Hide @

Using this button you can view only the objects and the edges that are in the front and hide the ones being on the back of the model.



Wire 🐠

Using this button you can depict 3D objects into transparent form and view only their edges.



Zoom out 🥕

See **Zoom-out**.

Zoom in 🥕

See **Zoom-in**.

Zoom extents 🔊

See **Zoom** extents.

Zoom window 🔑

See **Zoom window**.

Refresh 🗟

See Refresh.

Drawing Layers

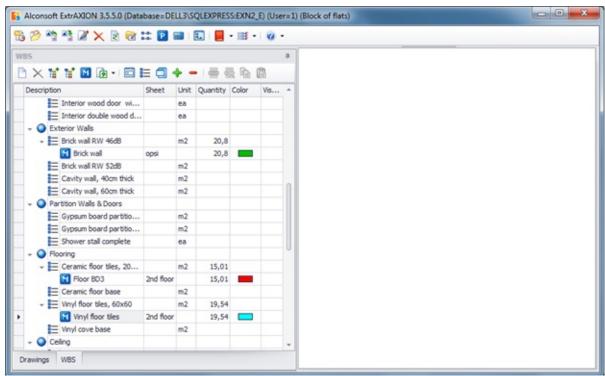
The layers which are visible by default in 3D view are defined by the 2D view. You can edit them on 3D view as well without however the changes being saved when you return to the 2D view. See Drawing Layers.

Black & White **W**

See Black & White.

General

After opening an existing project, the 'Work Items' table appears, where you can view all of your project's work items as you entered them in the WBS (See General/WBS (Ctrl+B)), as well as the measurements you have linked with each work item.

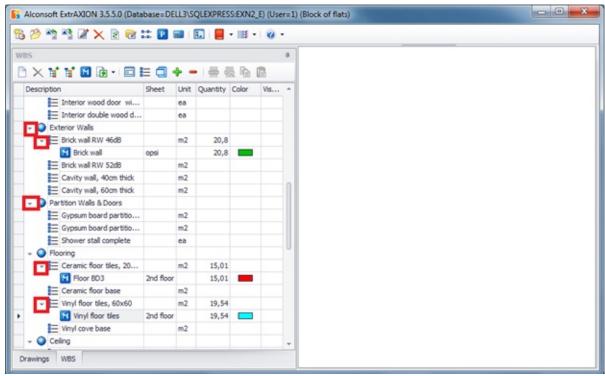


The 'Work Items' tree view table, by default, shows in columns the description of WBS work-items and measurements, the measurement sheets from which the measurements were derived, the measurement unit, the quantity, the color and the 'Visible' check box. Using the filtering, grouping, column selection, and sorting tools, you have many options of setting the number, the form, and the type of the data you wish to view (See Appendix/Filters/Sorting).

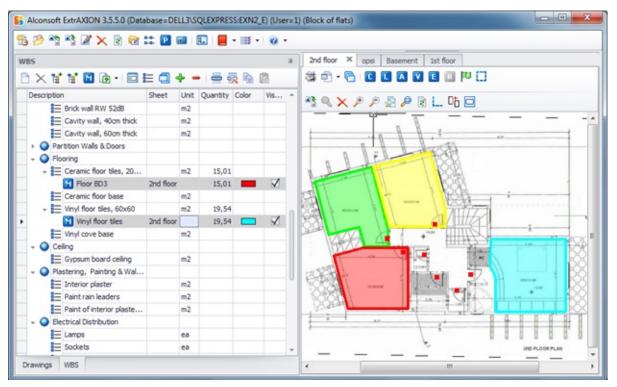
The quantity (result value) of a measurement in the 'WBS' tree view might be different of the quantity of the same measurement in the 'Drawings' tree view. This is due to the reason that in the 'Drawings' tab appear the quantities of the primary measurements, while in the 'WBS' tab appear the quantities that have been associated (linked) to each work item and might have been modified by an expression formula (See Measurement in image files/Types and method of measurement/Work item).

Only measurements that are checked as 'Visible' appear in the current drawing window. Click the 'Visible' check box of a measurement to change its status or double click on the measurement row to make it visible. Click on the header of the 'Drawing', 'Unit' and 'Quantity' fields etc. in order to sort the table's contents based on the above fields (See Appendix/Filters/Sorting).

By double-clicking on a work item that contains measurements, you can collapse or expand them. Alternatively, you can click on the 6 downward arrow symbol to collapse and on the 4 right-ward arrow to expand.

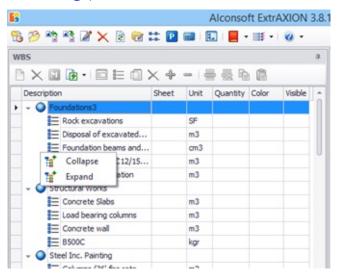


If a work item includes more than one measurement on the same drawing, e.g. ceramic floors, by double-clicking on one of its measurements, the corresponding drawing is opened, and all measurement layers that relate to this work item in this drawing are enabled.



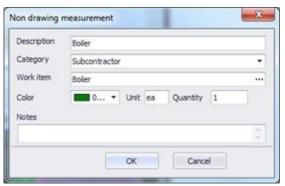
When you double click for the first time on a measurement of a measurement sheet that is either closed or open but not current, then only the measurements that are associated with the same work item appear in the drawing window. All other measurements remain invisible. This way, tracking of the areas that have not been measured yet, is greatly facilitated.

You can expand or collapse the 'WBS' tab tree view, by right clicking in the tab area. (See <u>Drawings</u>)



New non-drawing measurement

This button allows you to enter a measurement which either you do not want to measure on the drawing or cannot be measured on the drawing, but you wish to include it in the WBS quantities anyway. The following window will appear on your screen:



Set the 'Quantity', the 'Description', the 'Category', the 'Work Item', the 'Color', the 'Unit' and any notes you wish (See Measuring in Image Files/Types & Method of Measurement/Object count) and click **OK**.

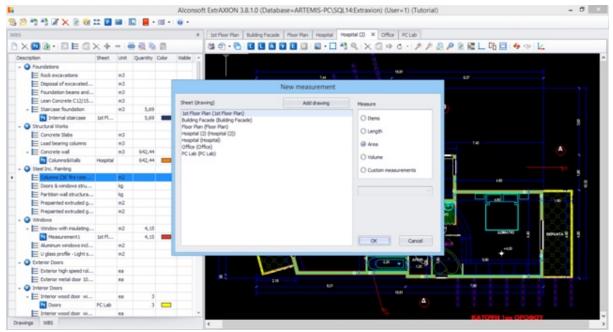
Since this measurement is not related to any drawing, it will not appear in the drawings tree view. Nevertheless it will be included in the list of measurement to export (See Work items/Exporting WBS/Export WBS measurements).

Delete non-drawing measurement ×

This button is enabled only when you have selected an existing non-drawing measurement, so that you can delete it. Select the measurement and click \times . The application will prompt you to confirm your selection.

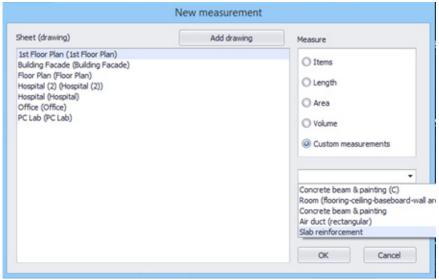
New measurement M

You can start a new measurement while viewing the WBS tab without even opening a drawing, using the \Box , \Box , \triangle and \bigvee buttons. With the WBS workitem you wish to measure selected, click the 'New measurement' button $\widecheck{\blacksquare}$.



As you can see on the right, the measurement type is selected according to the measurement unit of the WBS work-item. On the left, select the measurement sheet you want from the list of sheets and click \overline{OK} .

You can add new drawings to the project directly from this window by clicking the 'Add drawing button'.



On the left side of the window that appears, select the measurement sheet you wish from the list of measurement sheets you have created and, on the right, the desired type of measurement, and click **OK**. For custom measurements, select a specific one from the drop down menu. The measurement sheet you have selected opens (if not already open) and the corresponding measurement window appears. When you start a measurement from a WBS work-item, the 'Work item' field in the measurement parameters window is pre-selected (See Measuring in Image Files/Types & Methods of Measurement/<u>Object count</u> **C**).

Each measurement sheet name in the list is followed by the name of the underlying drawing to facilitate its identification.

The button is disabled when you are at group level.

Exporting WBS

This button allows you to export work items and measurements to a table where you can make adjustments on their appearance e.g. hiding or moving columns etc. before you make the final export to an Excel table.

More:

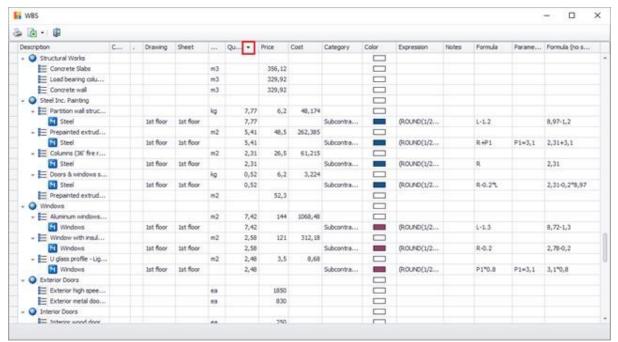
- Export WBS
- Export WBS measurements

Export WBS

The table shows all WBS and measurement details in the following columns: 'Description', 'Drawing', 'Sheet', 'Unit', 'Quantity', 'Unit Price', 'Cost', 'Category', 'Description', 'Color', 'Expression', 'Notes', 'Formula', 'Parameters' and 'Formula (no symbols)'. Using the advanced column selection and sorting tools, you have numerous options of setting the number, the form and the type of data you wish to view or to export (See Appendix/Filters/Sorting).



Click on the header of any column to sort the table contents based on the above-mentioned fields (See Appendix/Filters/Sorting).



You can also apply ascending or descending sorting by right-clicking on any of the columns and using the corresponding option from the popup menus. Finally, use the 'Column chooser' to add or remove columns from the default table (See Appendix/Filters/Sorting).



More:

Exporting to Excel

Exporting to Excel

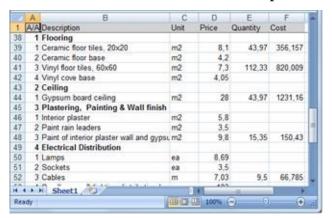
Click the button of the above table to save it as an .xls file. Specify the location and filename you wish to use. The application offers you many exporting options.

More:

- Exporting a WBS
- Export details
- Export summary
- Export work items

Exporting a WBS

By selecting 'Export WBS', a table which includes the groups and work items as you entered them in their respective locations (See General/WBS (Ctrl+B), the total quantity of each work item, and the cost is exported to Excel.

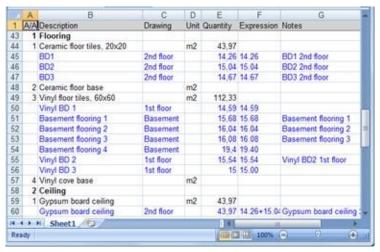


The data you export to Excel are predefined, regardless of which columns have been added or removed using the 'Column Chooser'. The Excel sheet is ready for easy sorting or filtering.

If you wish to sort data according to a column's content, the exporting procedure will be performed based on the applied sorting.

Export details

By selecting 'Export details', you can export a table to Excel, with the measurements that are linked to each work item appearing below it, and the following measurement details: description, measurement sheet of origin, measurement unit, quantity (partial or total), numeric analysis of the result, and notes. The measurements and their details appear in the Excel table in blue font, in order to be easily visible.

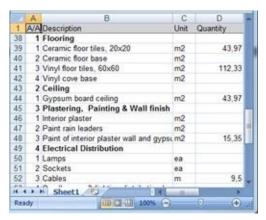


E The data you export to Excel are predefined, regardless of which columns have been added or removed using the 'Column Chooser.

If you wish to sort data according to a column's content, the exporting procedure will be performed based on the applied sorting.

Export summary

Exporting the quantity survey summary includes the description of groups and work items, the measurement unit and the total quantity that derives from the measurements.



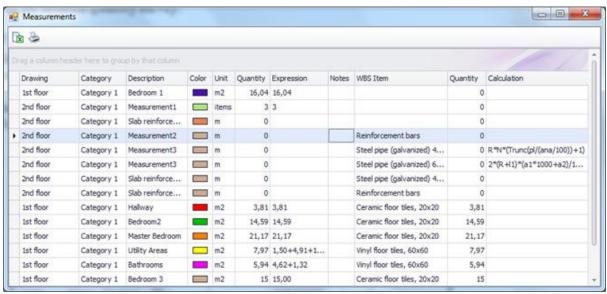
- E The data you export to Excel are predefined, regardless of which columns have been added or removed using the 'Column Selector'.
- If you wish to sort data according to a column's content, the exporting procedure will be performed based on the applied sorting.

Export work items

By selecting the 'Export work items' option, you can export the work items table by applying any column choice or data sorting you wish. Basically, you export the table to Excel as viewed in the application (WYSIWYG). The measurements, along with their details, appear in blue font, as in the case of the detailed quantity survey.

Export WBS measurements

This table includes all the WBS work item details, along with their linked measurements and their details. This data appears in the following columns: 'Drawing', 'Sheet', 'Category', 'Description', 'Color', 'Unit, 'Quantity', 'Expression', 'Notes', 'Work item', 'Calculation'. Each measurement can be viewed more than once, depending on the number of the work items with which it is linked. For this reason, along with each work item appears the function that produces its quantity value.



Using the advanced column selection and sorting tools, you have numerous options of setting the number, the form and the type of data you wish to view or to export. (See Appendix/<u>Filters/Sorting</u>). Click on the header of any column to sort the table contents based on the above-mentioned fields (See Appendix/<u>Filters/Sorting</u>).

You can also apply ascending or descending sorting by right-clicking on any of the columns and using the respective option from the popup menus. Finally, use the 'Column Chooser' to add or remove columns from the default table (See Appendix/Filters/Sorting).

More:

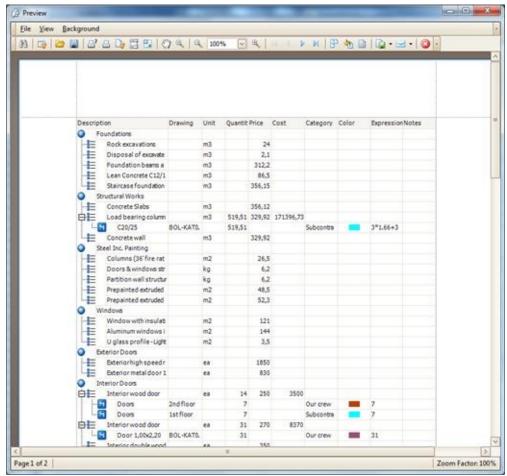
- Export to Excel
- Print

Export to Excel 🗟

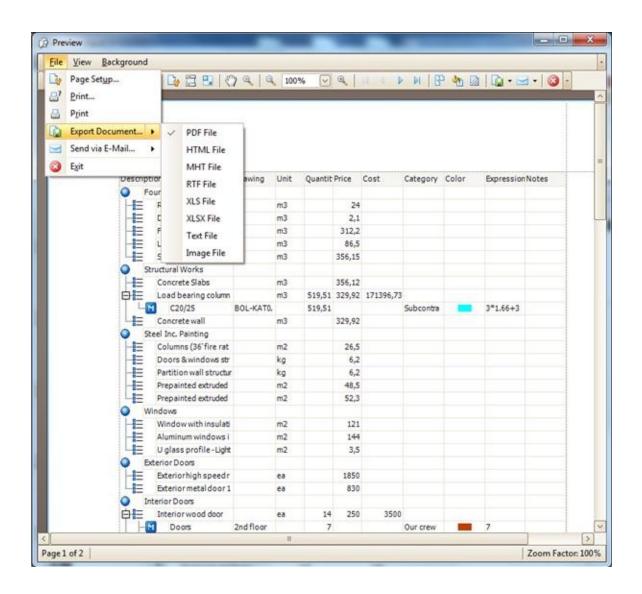
Click the button of the above table to save it as an .xls file. Input the location and the filename you wish to use.

Print 🍣

Click this button to print the work item table. Printing includes the table's details, as you have selected them to appear on the screen, e.g. any sorting or addition/removal of columns is preserved. Print preview appears on your screen.



You may print the table as it is or configure the page, the background, the margins and other printing preferences. You may also export the file in various formats (.pdf, .xls, .html, .rtf etc.) or even send a copy of the table directly by email.



Edit measurement =

(See Drawings/<u>Edit measurement</u>).

Measurement analysis ≡

From the 'WBS' tab select a **work item** (not a measurement), press 'Measurement analysis 'and wait as a new window is opened. This window is similar to the one opened if you use 'Measurement analysis' from the 'Drawings' tab (See Drawings/Measurement analysis).

×											
Description	Unit	Measuremen	Expression	Value	Formula	Parameters	R	L	A	Formula (no symbols)	 → Work item value
▶ - E Ceramic fl	m2			0			0	0	0		44,4
+ M 1st flo	m2	A	14,65+16,	32,2			32,2	38,19	32,2		32,
Clo			1,50	1,5			1,5	5	1,5		1,
* Be			14,65	14,65			14,65				14,6
=- Livi			16,05	16,05			16,05	16,62			16,0
M Stairs	m2		4,90	4.0	R*2,5		4,9	9,4	4.0	4,9*2,5	12,2
1 2 3 4 Drog a column header			1/2)	4,5	K 4,5		1				
1 2 3 4	23+1,4 35)*1,10	5+1,10+3,96+3,6	Value	1,5	16. 243						

- However, there are a few new columns displayed, such as: The calculation **formula** column, which is empty unless one was created when you linked a measurement to the work item. There actually two columns; one where the variables are written as names and one where they are substituted by their values.
- The **parameter** column, where the parameters of a **custom measurement** are shown, if you created a formula containing them during linking the measurement to the work item.
- The **work item value** column, which displays the number shown in the 'WBS' tab under this work item. This is the result of the aforementioned formula, while the primary result of the measurement is the count, length, area or volume measured directly on the drawing. The latter, which is shown in the 'Drawings' tab, might be used in a formula in order to produce the value corresponding to a work item (See <u>Drawings</u>).

🖺 If you press 'Measurement analysis 🧮 while having selected a

measurement, you won't see this kind of window but a window like the one that appears if you press \subseteq from the 'Drawings' tab.

Duplicate measurement

(See Drawings/<u>Duplicate measurement</u> <u>)</u>).

Continue measurement +

(See Drawings/<u>Continue measurement</u> ♣).

Continue measurement (subtract) -

(See Drawings/Continue measurement (subtract) -).

Show all measurements **≡**

(See Drawings/Show all measurements =).

Hide all measurements 🗟

Copy visible measurements

(See Drawings/Copy visible measurements •).

Paste measurements

(See Drawings/Paste measurements).

General

that is:

Measurements analysis is the procedure through which you can preview and print the analysis of selected measurements including dimensions marking and details of surfaces.

The selected measurements are printed on template sheets of various sizes (A3, A4 etc), in separate pages or all in one. Calculation expressions and results of the analysis are printed at designated parts of the template sheets. Analysis of surface area can be carried out using triangles only or using rectangular, trapezoid, triangular and curved shapes (See Measurement in image files/Measuring area/<u>Analysis in triangles</u>). Triangle calculations are performed using the Heron's formula:

$$T = \sqrt{\frac{(a+b+c)(-a+b+c)(a-b+c)(a+b-c)}{16}}$$
$$T = SQRT((a+b+c)*(-a+b+c)*(a+b-c)/16)$$

where a b c are the lengths of the triangle sides.

You can select and set various parameters which affect the template sheet appearance as, for example, colors, column widths and formulas (See General/Settings/Measurement analysis parameters).

Note, also, that measurement analysis can be done either overall in which case it includes all measurements, or selectively by defining analysis regions (See Auxiliary tools/Analysis regions).

Overall measurement analysis

Click the 'Export measurements' button of the 'Drawings' tab. At the 'Measurements' window that appears click the 'Measurement analysis' button and, from the list of the templates provided by ALCONSOFT, select the one you wish to use for the analysis.

Using the filters you can limit the number of measurements to be included in the analysis (See Appendix/<u>Filters/Sorting</u>). Another way to "isolate" the measurements you want to be included in the analysis is to define one or more analysis regions (See Auxiliary measuring tools/

<u>Define analysis region</u>, in which case each region will be analyzed and printed in a separate page of the template sheet.

If there are no filters, all measurements will be analyzed.

When the analysis includes a high number of measurements with too many shapes, then it might be time consuming. Click the **Cancel** button if you wish to stop the procedure after the analysis of the current measurement is completed. You can preview and print the analysis of the pages that have been created before interrupting the analysis.



Zoom in using the mouse wheel for a clear view of each page.

Using Print and Plot buttons you can print the current page of the analysis. Plot prints the whole drawing while Print prints each page separately.

The appearance of the page depends on the selected template.

Work items associated with the measurements and their quantities are printed in the work breakdown structure (WBS) region. In the CALCULATIONS region the detailed numbers and expressions of every measurement part are presented.

The part of the drawing related to the measurement is printed in the IMAGE region while in the PLAN region there is a thumbnail of the whole drawing

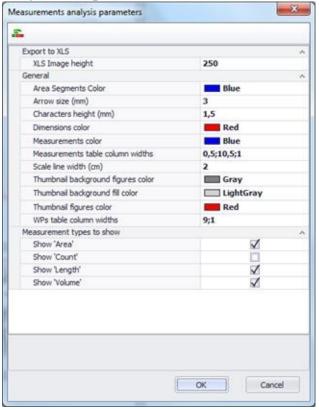
where the measurement position is marked with a sharp color. ALCONSOFT provides ready to use templates with various ways of organizing and positioning of the above regions. These templates have various sizes (A3, A4 etc) and orientations and new ones are frequently added. Templates are files located into the template subfolder of the application folder.

More:

- Analysis parameters
- Export to Excel
- Edit drawing

Analysis parameters 🗉

Using this button a window appears where you can set various parameters of the measurement analysis templates.



Select:

- the image height for the export to .xls file Select also the color you wish to be used for:
 - drawing area segments
 - drawing dimension lines and numbers
 - drawing measurements
 - thumbnail figures background
 - thumbnail background filling
 - drawing thumbnail figures

Select also or type:

- the arrow size in mm
- the characters height in mm
- the measurements table column widths in cm, separated by semicolons (;)

- the scale line width in cm
- the WBS table columns widths

Finally you can select which measurement types you want to show on the analysis sheets. The default setting is to show all except object counting.

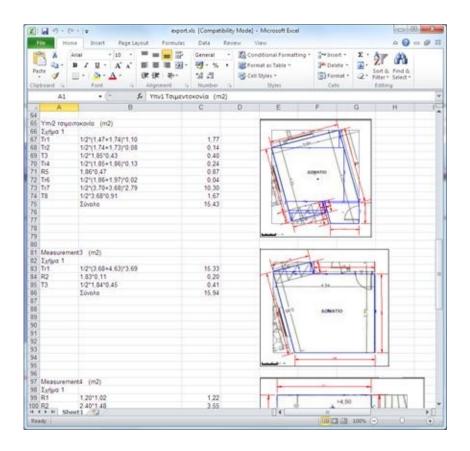
Notice that only the layers of the drawing which are visible before pressing the analysis button, are shown on the measurement analysis window. If you wish to exclude certain measurements irrespective of their type, you can simply make them invisible before you start the analysis procedure.

Setting the right values of the parameters results in better appearance of the analysis sheets. For example you can avoid character overlapping you can decrease their height.

If you click the 'Defaults' button all analysis parameter values are set to their defaults irrespective of any changes you have made.

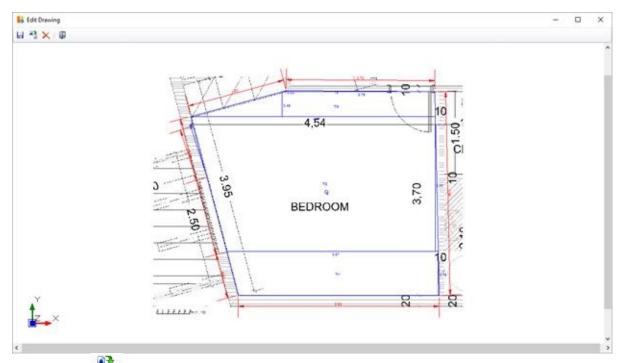
Export to Excel

Using this button you can export the data to .xls format file. Type the name of the new file and click 'Yes' to immediately open the file containing your data.



Edit drawing

Using this button a window appears where you can edit the drawing. In this window you can move the various parts of the drawing in order to achieve the best result



Using the button you can export the drawing that is shown on the above window and save it in any form you want.

Except from moving drawing's sections, you can even delete them by using the \times button.

When the editing is complete click the Save and Close button to see your changes on the main drawing and print it.

■ Note that the changes you make are not preserved if you repeat the analysis procedure.

Use the 'exit' button to quit the editing window and the overall measurement analysis without saving any changes.

Measurement analysis by region

If you do not wish the overall analysis of all measurements of the current measurement sheet, then you can define one or more analysis regions on the drawing (See Auxiliary measuring tools/

Define analysis region).

If you define more than one analysis region then each region is analyzed and printed in a separate page of the analysis sheet. You can preview these pages at the 'Measurement analysis' window which appears when you click the Measurement analysis button and select a template. You can navigate through the pages by clicking on their tabs. All other features of the overall measurement analysis such as exporting, printing, editing and parameter setting, apply to the measurement analysis by region as well.

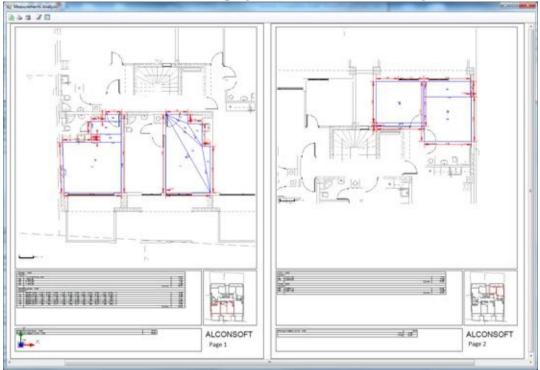
Note that, for a measurement to be included in the analysis of a region, it must fully surrounded by the region's rectangle. Furthermore, if a measurement is included in more than one analysis regions, it will be analyzed and appear in all of them.

More:

All pages

All pages®

Click this button to show all pages on a common background.



Click again to show each page separately.

Finally, using the button you can export and save the drawing as it is shown on your screen. You can save it in any form you want, even as a dwg file.

In case you want to edit the drawing using your CAD program, you'll have to use the 'explode' command, to have access to all objects.

Filters/Sorting

All list display customization options are available by right-clicking on the header row and selecting the respective option from the pop-up menu.



More:

- Data Sorting
- Grouping
- Show/Hide/Best fit
- Show find panel
- Show Auto Filter Row
- Record filters

Data Sorting

Using the 'Ascending/Descending sorting' options you can sort the list whenever you wish, based on any column. Sorting is also done by clicking on the respective header. By selecting 'Clear sorting', the entries are sorted by their creation date.

Grouping

By selecting 'Group by this column', or by dragging the header to the Grouping Area (the row above headers), you group the list based on the corresponding column. By repeating this procedure with other columns, you can achieve multiple grouping with any desired combination sequence.

Show/Hide/Best fit

You can show or hide each one of the list's columns at your discretion. By selecting 'Remove This column' or by dragging the header downwards (a large X symbol appears) you can hide the selected column.

By selecting 'Column Chooser', a box that includes all hidden columns is shown in the lower right part of the list.

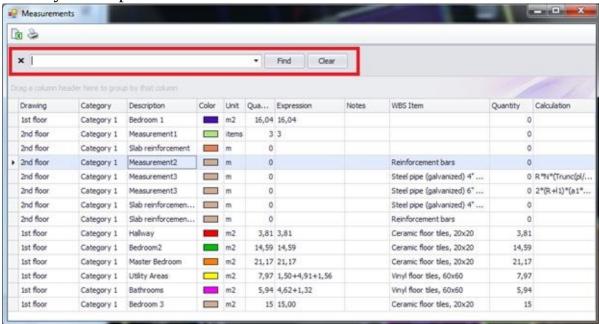


By dragging them from the list to the headers row, you can display them again.

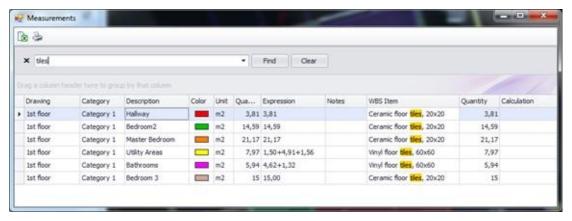
By selecting 'Best fit (all columns)' or 'Best fit', the width of all the columns or each column respectively, will be automatically and optimally set, based on the properties of the corresponding field.

Show find panel

Using the 'Show find panel', a frame appears on the top part of the table, where you can perform a search of the table's content.

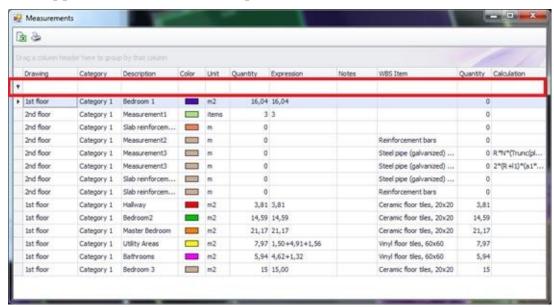


Enter the desired search description, and the table content is automatically narrowed to the search criteria, which appear marked in a bold yellow color.

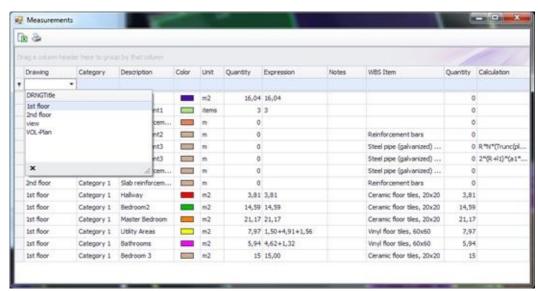


Show Auto Filter Row

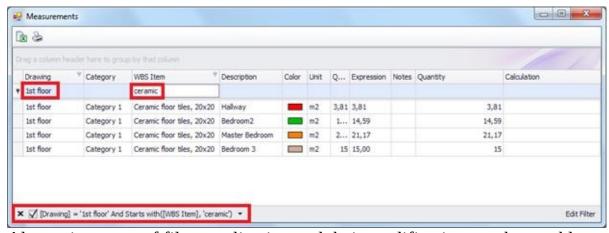
Using the 'Show Auto Filter Row' option, a special line with the ♥ (filter) symbol appears over the table's top row, on the left.



In each of the columns, select or type in the desired filter criteria, in order to filter the table content.



The criteria you set appear in the automatic filter line, as well as at the bottom of the table.



Alternative ways of filter application and their modification are thoroughly described in the following pages.

Record filters

More:

- Quick data filter
- \square Filter editor
- Changing column width and position

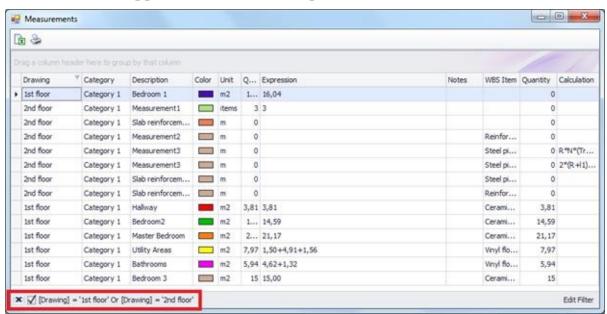
Quick data filter

You can display a subset of the entries in a list by clicking on the (filter) symbol that appears when you hover your cursor over a column header. This action displays a list, in which you can either quickly select an item depending on the field type, or select 'Custom' to set a more complex filter.

Click on the 'Custom' option in each column to apply a more complex filter to the table contents. Filters work either integrally or disjunctively. The criteria may be either both true ('and') or one of them true ('or').

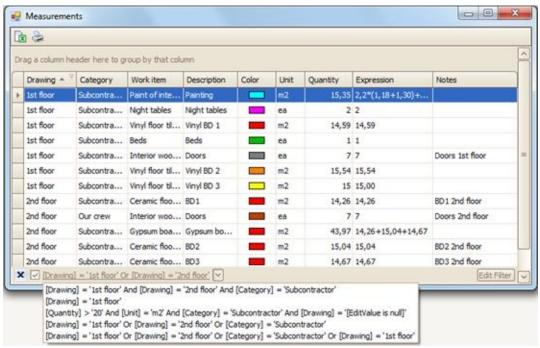


The criteria used appear in the lower left part of the screen.

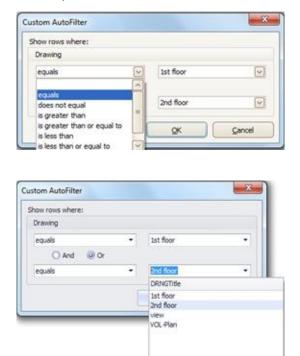


You can remove a filter by clicking \square at the lower left part of the window. You can also temporarily disable the filter by clicking \square on the right. By clicking \square again, you can re-enable it.

The filters you apply are stored until you exit the application. You may recall any of them by clicking the right arrow key and selecting from the list (drop down menu).

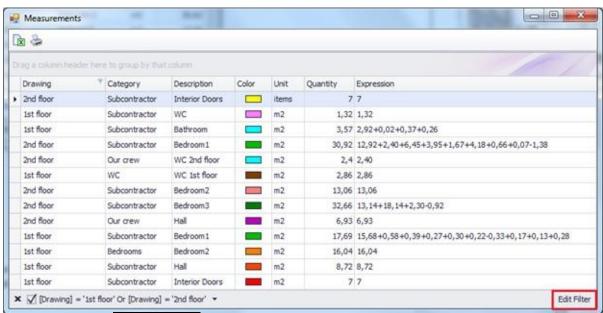


You can create criteria using predefined types such as 'is greater than', 'is greater than or equal to', 'is less than', 'blanks' etc.



Filter editor

Using the Filter editor at the lower right part of the window or in the shortcut menu, you can create a filter that only displays the entries that comply with predefined criteria.



By clicking the **Edit Filter** button, a new window, called 'Filter editor,' appears on the screen.



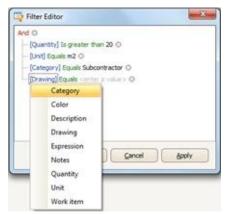
By selecting + you can 'add a new condition to this group' and you have the ability to create multiple combinations between the data in the table's columns.

Each criterion consists of **one field**, **one factor** (e.g. contains, is equal to, etc.) and **one value**, which should be entered or selected from a list. You can add as many criteria as you wish, which are combined together with (and) or (or / either). Once you create the filter, click **OK** or **Apply** and the list will display only the entries that comply with the filter's criteria.

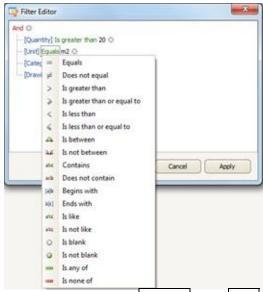
The initial filter you apply may include or exclude the subsequent options.



Then, select the field on which the filter you wish to create will be based.



The factors of comparison change depending on the field you select (details, quantity survey, category, Unit, description, items, etc.).



Apply the filters you wish and then click **Apply** and **OK**.



Changing column width and position

You can change the width of each column by clicking and dragging with your cursor the separation lines between two field headers, to the left or to the right. You may also change the fields' order by selecting the header of any column you wish to move and dragging it to a new place.

Special Software Requirements

In order to run ExtrAXION, Microsoft.net Framework 4 needs to be installed.

Functions

More:

- ACOS
- ASIN
- ATAN
- ATAN2
- **CEILING**
- **COSH**
- \square EXP
- FACT
- FLOOR
- PI
- **ROUND**
- SIGN
- SIN
- SINH
- SQRT
- **TRUNC**

ABS

Returns the absolute value of a number, a number without its sign.

Syntax

ABS(number)

Number is the true number whose absolute value you need.

ACOS

Returns the arccosine of a number, the angle whose cosine is this number. The angle is in radians, in the range from 0 to pi.

Syntax

ACOS(number)

Number is the cosine of the desired angle, and must be a number between -1 and 1.

ASIN

Returns the arcsine of a number, the angle whose sine is this number. The angle is in radians, in the range -pi/2 to pi/2.

Syntax

ASIN(number)

Number is the sine of the desired angle, and must be a number between -1 and 1.

Comments

In order to express the arcsine in degrees, you have to multiply the result by 180/pi(), or use the DEGREES function.

ATAN

Returns the arctangent of a number, the angle whose sine is this number. The angle is in radians, in the range –pi/2 to pi/2.

Syntax

ATAN(number)

Number is the tangent of the desired angle

Comment

In order to express the arctangent in degrees, you have to multiply the result by 180/pi(), or use the DEGREES function.

ATAN2

Returns the arctangent of the specified x and y coordinates (the angle of a line that crosses the origin (0,0) and a point with x_num , y_num coordinates). The angle is in radians, in the range -pi to pi, excluding the value -pi.

Syntax

ATAN2(x_num;y_num)

X_num is the point's x coordinate.

Y_num is the point's y coordinate.

Comment

A positive result signifies a counterclockwise angle with the x axis, while a negative result signifies a clockwise angle.

ATAN2(a;b) equals ATAN(b/a), but in the ATAN2 function, a can be equal to 0.

If the x_num and y_num values are 0, the ATAN2 function returns the error value #DIV /0!.

In order to express the arctangent in degrees, you have to multiply the result by 180/pi(), or use the DEGREES function.

CEILING

Rounds the number up, to the nearest integer or to the nearest multiple of significance. For example, if you wish to use cents in your transactions, and the price of an item is 9\$ 36 cents, use the =CEILING(936; 10) to round the prices to the next dime.

Syntax

CEILING(number, significance)

Number is the value you wish to round.

Significance is the multiple based on which you wish the rounding to be performed. **Comment**

If one of the entries is not numeral, the CEILING function returns the error value #VALUE!.

Regardless of the number's sign, a value is rounded up when it is adjusted away from zero. If the number is an exact multiple of the Significance entry, then the value is not rounded.

If the entries Number and Significance have different signs, the CEILING function returns the error value #NUM!.

COS

Returns the cosine of the given angle.

Syntax

COS(number)

Number is the angle (in radians) whose cosine you desire.

Comment

If the angle is in degrees, you have to multiply the result by pi()/180, or use the RADIANS function, in order to convert it to radians.

Example

The example will be easier, if you copy it to an empty worksheet.

COSH

Returns the hyperbolic cosine of the given angle.

Syntax

COSH(number)

Number is any real number, whose hyperbolic cosine you need.

Comment

The hyperbolic cosine definition is:

$$COSH(z) = \frac{e^z + e^{-z}}{2}$$

EXP

Returns e raised to the power of a given number. The constant 'e' is equal to 2,71828182845904 and constitutes the basis of the natural logarithm.

Syntax

EXP(number)

Number is the exponent that is applied to the base e.

Comment

In order to calculate the powers of other bases, use the factor of raising to a power ($^{\land}$).

The EXP function is the reverse of the LN function, a number's natural logarithm.

FACT

Returns the factorial of a number, equal to 1*2*3*...*number.

Syntax

FACT(number)

Number is the non-negative number whose factorial you wish to calculate. If the entry Number is not an integer, the decimal digits are cut off

FLOOR

Rounds a number down, to the nearest specified multiple of significance.

Syntax

FLOOR(number;significance)

Number is the numeral value you wish to round.

Significance the multiple based on which you wish the rounding to be performed.

Comment

If either of the entries is non-numeral, the FLOOR function returns the error value #VALUE!.

If the entries Number and Significance have different signs, the FLOOR function returns the error value #NUM!.

Regardless of the number's sign, a value is rounded down when it is adjusted away from zero. If the entry Number is an exact multiple of the entry Significance, then the value is not rounded.

LOG

Returns the logarithm of a number to the base you specify.

Syntax

LOG(number;base)

Number is the positive real number whose logarithm you desire. Base is the logarithm's base. If the entry Base is skipped, it is considered to be equal to 10.

PΙ

Returns the number 3,14159265358979, the mathematical constant pi, with 15 decimal digits precision.

Syntax PI()

ROUND

Rounds a number to the specified number of digits.

Syntax

$ROUND (number; num_digits)$

Number is the number you wish to round.

Num_digits specifies the number of digits to which you want to round the number. **Comment**

If the entry num_digits is greater than zero, then the number is rounded to the specified number of decimal digits.

If the entry num_digits is 0, then the number is rounded to the nearest integer.

If the entry num_digits is lower than zero, the the number is rounded to the specified number of decimal digits, to the left of the decimal point.

SIGN

Returns the sign of a number. It returns the value 1 if the number is positive, 0 if it is 0, and -1 if it is negative.

Syntax

SIGN(number)

Number is any real number.

SIN

Returns the sine of a desired angle.

Syntax

SIN(number)

Number is the angle whose sine you desire, expressed in radians.

Comment

If the angle is in degrees, you have to multiply the result by pi()/180, or use the RADIANS function, in order to convert it to radians.

SINH

Returns the hyperbolic sine of the given angle.

Syntax

SINH(number)

Number is any real number.

Comment

The hyperbolic sine definition is: $SINH(z) = \frac{e^{z^{2}} - e^{-z^{2}}}{2}$

$$SINH(z) = \frac{e^{z} - e^{-z}}{2}$$

SQRT

Returns the square root of a number.

Syntax

SQRT(number)

Number is the number whose square root you desire

Comment

If the entry Number is a negative number, the SQRT function returns the error value #NUM!.

TRUNC

Truncates a number to an integer by removing the decimal (or fractional) part of the number.

Syntax

TRUNC(number;num_digits)

Number is the number whose decimal digits you wish to truncate. Num_digits is the number of decimal digits that remain after the truncation. The default value of the entry num_digits is 0 (zero).

Comment

The TRUNC and INT functions are similar, as both return an integer. The TRUNC function removes the decimal part of a number, while the INT function rounds the number down, to the closest integer, based on the number's decimal part. The INT function is different from the TRUNC function only in the handling of negative numbers: The formula TRUNC(-4,3) returns the value -4, while the formula INT(-4,3) returns the value -5, because -5 is the nearest downward integer.

SQL Server Installation

If you want to store your projects on an SQL Server database you should have access to an SQL Server instance with mixed mode authentication. If not, you must install it first. For example the **SLQ Server 2008 R2 Express** version can be downloaded for free from Microsoft's website: www.microsoft.com/en-us/download/details.aspx?id=30438

• For 64 bit systems select the 1st file:

SQLEXPR_x64_ENU.exe

122.4 MB

• For 32 bit systems select the 3rd file:

SQLEXPR32_x86_ENU.exe

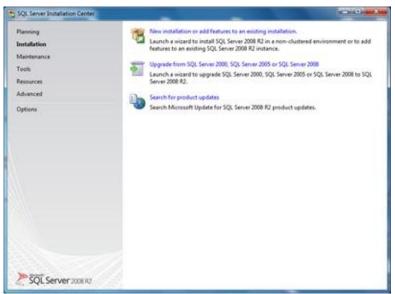
97.4 MB

- 1. If you do have a server within your organization it is recommended that you do the SQL Server installation on the server, so that the database of the measurements is centralized.
- 2. If you do not have a server or if you want to work at your laptop without connecting to the server then install the SQL server at your PC.

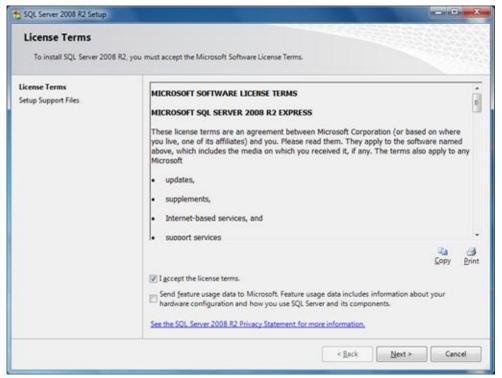
Save on your hard disc the SQL Server's setup file and run it to start the installation.



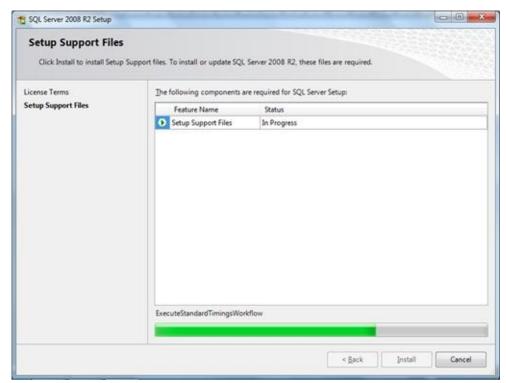
After the folder extraction is completed, the window of 'SQL Server Installation Center' shows up. Select 'New installation or add features to an existing installation' in order to launch the installation wizard.



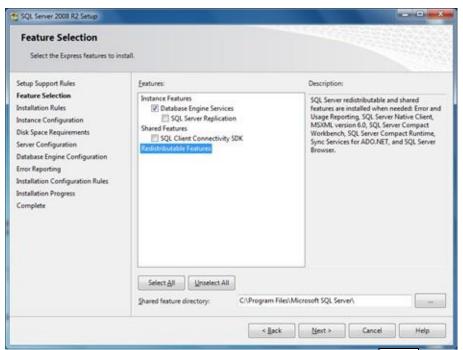
Read the License Terms for MICROSOFT SQL SERVER 2008 R2 EXPRESS and check the box 'I accept the license terms'. Then click **Next**.



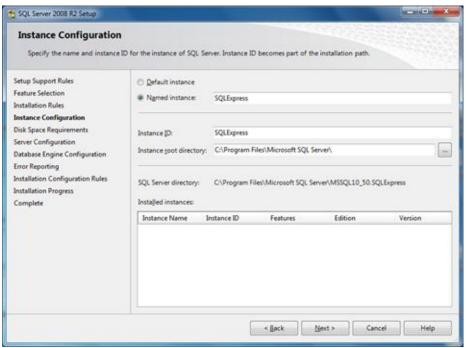
The Setup begins automatically and the SQL Server's Setup Support Files are being installed.



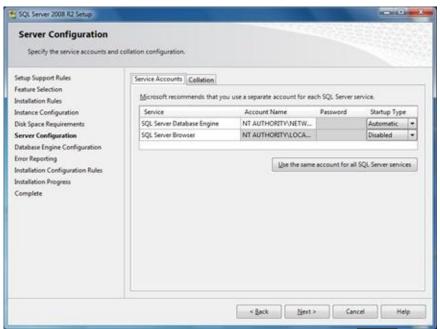
After the installation of these files is completed the following window shows up:



Check only the 'Database Engine Services' box and click **Next**.

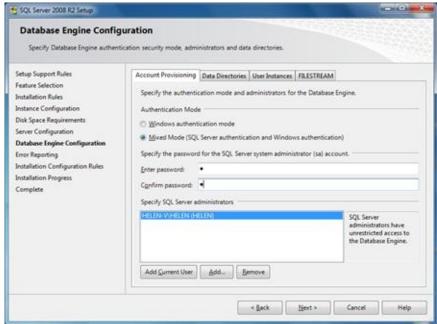


In the above window you can choose the name and the ID for the instance of SQL Server. Select 'Named instance' and notice that the default name is SQLExpress. In case you choose a different name it is essential to remember it because it becomes a part of the Server name that will be used in **ExtrAXION**. Click **Next**.



In the 'Server Configuration' window that appears click **Next**. Then in the 'Database Engine Configuration' window, select 'Mixed mode (SQL Server authentication and Windows authentication)' and as a password

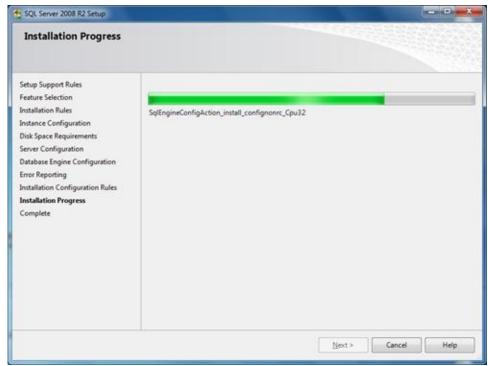
for user **sa** enter the number **7**.



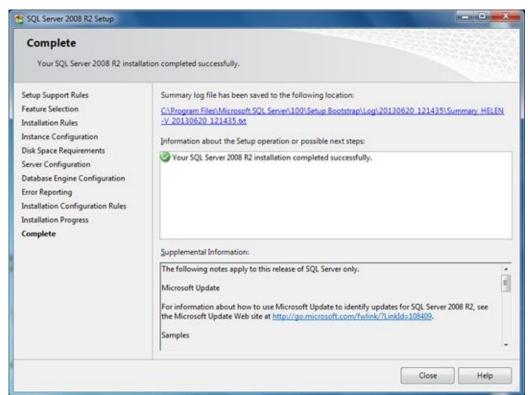
Confirm the password and click **Next**.



Click **Next** to continue to the 'Installation Progress'.



After the installation is completed successfully, the following window appears:



Click **Close** to exit the wizard and now you are ready to run **ExtrAXION** with access to SQL Server.

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Γιώργος Κιόρτσης, ALCONSOFT (George Kiortsis)
ExtrAXION_manual_EN_4_3_0_17_19-2-18-11-template.dot
Dell3XPSec 2 1 2016-06-06T15:36:00Z 2018-03-08T09:24:00Z
2018-03-08T09:24:00Z 2 33940 183281 1527 433 216788 11.9999
1024x768 false false false C:\EXN_Help\4.3\ExtrAXION.d2h

ExtrAXION

User manual

Description: sima

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Rev 4.3.0.17

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User manual

1 About this manual

1.1 Manual symbols XE "Symbols" - conventions

•	Paragraphs beginning with the icons	,	
	,	and	
	relate to	the following items respectively:	
	Comment, Idea-Trick, Caution and Ren	ninder	
•	Whenever the use of a specific key is required, its symbol will appear i		
	a framed grey background, e.g. use of the 'Caps' lock key appears as:		
	Caps Lock		
•	Activation of certain buttons by click	ing on them is apparent in the	
	button's image, e.g.	symbolizes the 'New	
	project' button and Cancel symbolizes	s the cancel button.	
•	Anything that needs to be typed appearance	ars in hold, e.g. Tyne	

- Anything that needs to be typed appears in bold, e.g. **Type**
- The functions described in the present manual concern the Professional version. Some of the following features do not exist or are disabled in the Standard version. For more information, you can refer to the comparative table of the program versions on our website www.alconsoft.com.

2 Product Activation XE "Activation"

At the first run of ExtrAXION the program asks you for activation.

2.1 Activation of trial version XE "Activation:Trial"

If you have not already purch	ased ExtrAXION you	can choose the	e trial version.
Insert the email and the passw	_		
ALCONSOFT's site (www.al	<u>consoft.com</u>) and then	click Contin	<u>ue</u> .
The trial activation is complete	tad and narr var are al	blo to was the r	yogram for 70
The trial activation is completed days. Click OK and try ExtrA		oie to use the p	orogram for 30

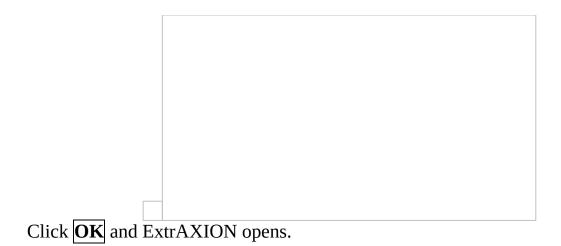
2.2 Activation of full license version XE "Activation: full license"

If you have purchased ExtrAXION select the option Activate on line and press **On-line activation**.

On-line activation	<u>011</u> .	
	indow shows up and you have to enter the Serial nunt ALCONSOFT has provided you with. Afterward	
	If you do not have a C/N for your pro	duat plana
contact ALCON	If you do not have a S/N for your pro SOFT or its authorized distributors via email to ask	-

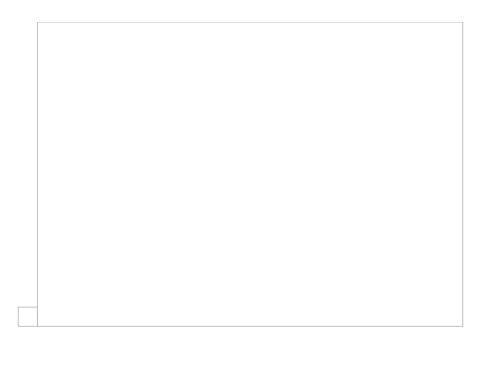
2.3 Off-line activation steps XE "Activation: Off-line"

1. Run LM which is located in ExtrAXION folder.	
You will see a window like the following:	
2. Copy and paste the machine Id shown and send it via email to ALCO	NSOFT
info@alconsoft.com. ALCONSOFT will reply to you with a unique key	
3. Paste the key provided for each pc in the appropriate area	•
5. Faste the key provided for each pc in the appropriate area	
4. Press Activate button	
When the activation progress is completed you can see on your screen the	ne
following message:	



3 General - Main Toolbar

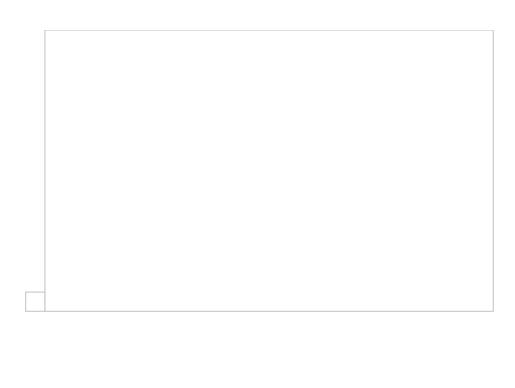
By double-clicking following window	ng the ExtrAXION wappears:	icon, the application	n starts and the
	me and password and ci BACE118C8200AA004	` `	•
).			
The number password.	er 1 is the default value	for both the user name	e and the
1 =	ot using SQL Server, th	e following window a	ppears on your



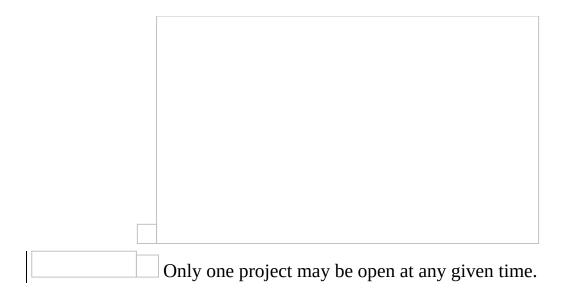
Click the 'New Project' or 'Open Project' button of the main toolbar to start.

	XE "New:Project" XE "XE "Options - commands project:
New project '	
Using this button, you ca	
the name of the project from both cases, the display	sing SQL Server the application prompts you to specify ile and the location where the file will be stored. Then, will be divided into two panes. oject files which are created by ExtrAXION when you er have the extension SDF.

In the left pane there are two tabs (see bottom of the pane). In the 'Drawings' tal
a tree view of all drawings, measurement sheets and measurements of the current
project is shown (See <u>Drawings</u>
08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000
), while in the 'WBS' tab the tree view consists of the WBS items and their
corresponding measurements (<u>See Work items</u>
08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000
).
Width XE "Navigation Pane:Width"
You can set the width of the left pane by placing the cursor on its right margin
and dragging it left or right, in order to reduce or increase its width, respectively
Hide-Show XE "Hide-Show Navigation Pane" XE "Navigation Pane: Hide-
Show"
The left pane can be permanently pinned to the foreground or it can be
minimized and hidden depending on the orientation of the pin on its upper
right-hand corner. Click on the pin to change its orientation. When the pin is
vertical , the pane is permanently 'pinned' in place. On the contrary, when the
pin is horizontal , if you click on any part to the right of the navigation pane, the pane will hide in order to free more working space. In this case, the titles of
the pane will hide in order to free more working space. In this case, the titles of
all tabs are located in the left part of the pane, instead of the bottom. To bring a
tab into the foreground, you need only hover your cursor over it.



3.2 Open project XE "Opening: Project" XE
"Options - commands project: Opening a project "
(Ctrl+O)
Using this button, you may open a project, which has already been saved. Alternatively, you can use the following shortcut: Ctrl+O. The application prompts you to specify the name of the project file you wish to open. The project includes the drawings and the WBS (Work Breakdown Structure) you have entered, the measurement sheets you have created, as well as the measurements. The measurements are listed below each work item in the 'WBS' tab and below each measurement sheet in the 'Drawings' tab. By opening an existing project, you can see the 'WBS' tab open. In case there are no work items, then the 'Drawings' tab is open instead.
projects contained in the database you have chosen (see Settings/Select database 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000
Otherwise, select the location of the saved projects (.sdf files).



3.3 Import/Export project XE "Importing: Project" **XE** "Exporting: Project"

With the 'Import project' button you can import an .sdf file into the Database that you are using and with the 'Export project' button you can export a project

to an .sdf file in order for example to save it on your hard disc drive and send i
to another ExtrAXION user.
These buttons appear only when you are using SQL Server.
3.3.1 Import project XE "Importing: Project" XE
"Options - commands project: Importing a
project " 🔲
Click on the button, and select the project that you want to import. After the import is completed, the following message appears:
Then you can open the imported project by clicking on the
(Open project) button.
The project retains its code and gets as a Title the name of the
.sdf file.
3.3.2 Export project XE "Exporting: Project" XE
"Options - commands project: Exporting project
Having the project that you want to export opened click on the button. Enter the desired name for the .sdf file and press 'Save'. When the export is completed the following message appears:

		ct data X command		~	roject data "
	-		1 0		title. The default ing window appear
Enter the	desired code	and title.			
		In the	e 'Code' bo	ox you may e	nter up to 20
character	s, and in the	'Title' box up	to 100.		•

3.5 Delete project XE " Delete: Project" XE "Options - commands project: Delete a project " □

"Options - c	ommands project: Delete a project " $lacksquare$
when you are using SC	an delete a project from your database. It is valid only L server. Select the project that you want to delete from press OK . The application asks your confirmation twice
r gas	
	To be able to delete a project, the project must not
be opened. Otherwise	the following message appears:
	After deletion you lose all the data of your project, as
well as all of your dra	vings with their measurements and they
CANNOT be retri	eved! Be very careful!

3.6 Refresh project XE "Options - commands project: Refresh a project "

Using this button the project is reloaded from the current Database to be updated with additions or changes that have been made by other users who have been working simultaneously at the same project.

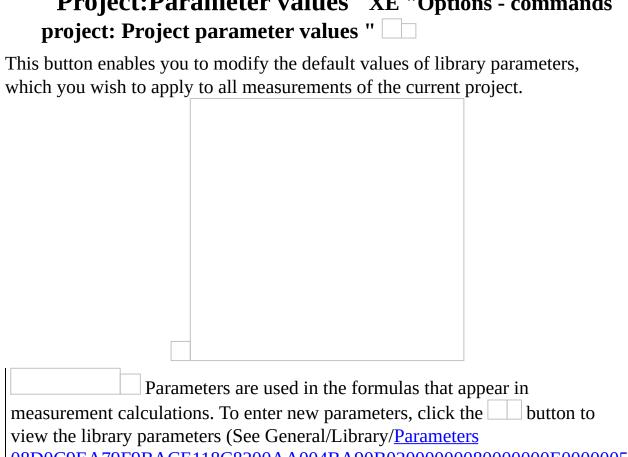
3.7 Drawings management XE " Drawings management " XE "Options - commands project: Drawings management "

management 112 options communas projecti
Drawings management "
This button allows you to manage the drawings of the project on the 'Drawings Management' window.
Use the buttons on the toolbar to:
 Import a new drawing. XE "Importing:a drawing" XE "Options - commands Drawings management:Import a drawing "
 Select a format to export the current drawing. XE "Exporting: drawing" XE "Options - commands Drawings management: Export a drawing " Delete the current drawing of the list, provided that it has no measurement sheets. XE " Delete: drawing " XE "Options - commands Drawings management: Delete a drawing " Replace the underlying drawing with another one. This feature is very useful when the initial drawing has been modified XE " Replace: drawing " XE "Options - commands Drawings management: Replace a drawing "
• Open the 'Drawing Properties' windows where you can see and edit the properties of the current drawing (See Drawings/ <u>Drawing properties</u> XE
"Drawing:Details" XE "Drawing: Properties " 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000E000000000000000000000
The path of the new drawing will be shown at its properties (See Drawings/Drawing Properties/General

08D0C9EA/9I	F9BACE118C8200AA004BA90B02000000080000000E000
).	
	This change does not affect the way the draw
is stored (into t	the project database or as an external reference).

3.8 Measurement categories XE " Measurement:
Categories" XE "Categories"
This button allows you to set the categories which constitute a concurrent, independent organization of measurements. Using categories you may classify your measurements in various ways, such as work carried out by subcontractors or your own crew, building level, etc.
Click on the button to view a list with the various measurement
categories. There is a default category 'Category 1' in every new project. To add
a new category, click on the field above the list, type its description and press
Enter . You can change the descriptions at any time.
The measurement categories are project specific.
Categories are used to group measurements. (See
Appendix/Filters/Sorting
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000000005

3.9 Project measurements parameters XE "Project:Parameter values" XE "Options - commands project: Project parameter values "

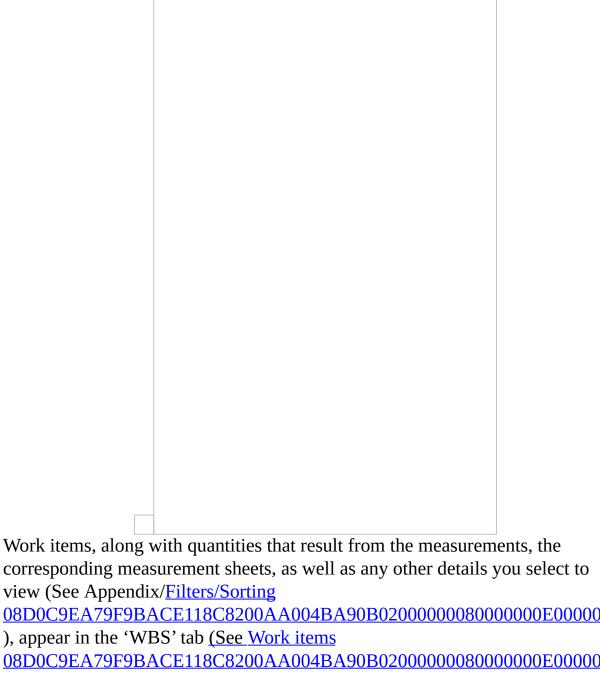


08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005

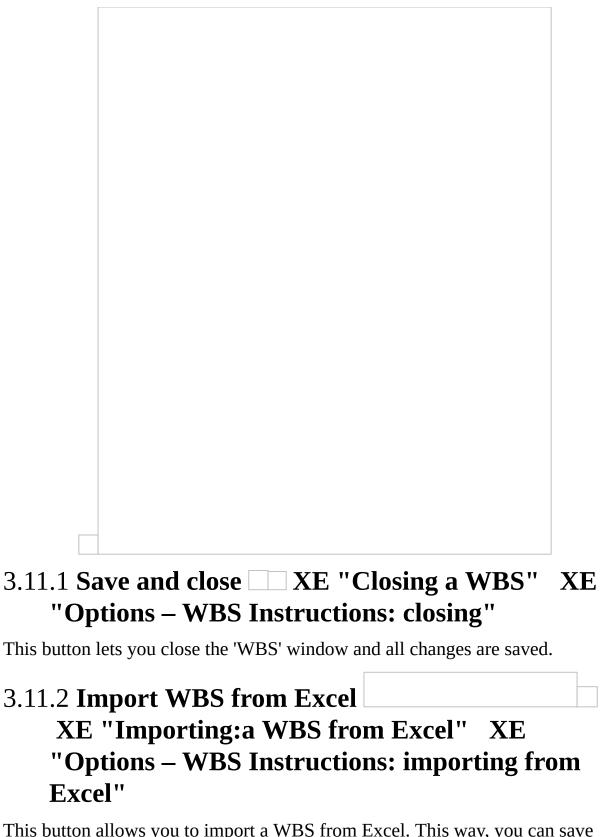
3.10 Recalculate	XE "Rec	alculatio	n" XE '	'Options -
commands pr	oject: Red	calculatio	on "	
By clicking this button, all case there has been a substhe values of project paragraphs.	sequent change			
1 3 1				

3.11 WBS (Ctrl+B) XE "WBS" XE "Budget" XE "BOQ" XE "Options - commands project: Work Breakdown Structure "

BOQ XE "Options - commands project: work
Breakdown Structure "
This button allows you to enter the W ork B reakdown S tructure (WBS) for your project, so that you can directly link the measurements carried out on the drawings to their corresponding work items. Alternatively, you may use the (Ctrl + B) shortcut. Click on the button to display the 'Edit project work items' window.
In the WBS, enter the description, the units of measurement, and the unit price
for each work item.
You may add a new work item during a measurement (See Measuring in image files/Type and method of measurement/New work item XE " Measurement: New Work Item" 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000



corresponding measurement sheets, as well as any other details you select to view (See Appendix/Filters/Sorting 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005E), appear in the 'WBS' tab (See Work items 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005E).

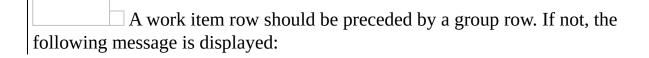


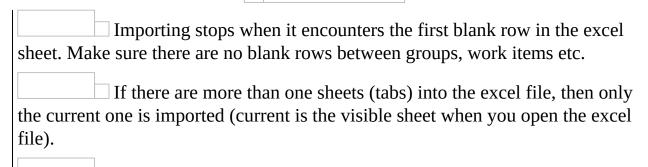
This button allows you to import a WBS from Excel. This way, you can save time and avoid re-creating the WBS in the application. The file should have the

following 3-column format:

contain the items, it will not be imported.

	Description	Measurement	Price		
		Unit			
You may enter the	You may enter the columns' headers in the first row of the spreadsheet.				
This	row will not be	taken into account (on impor	t. Therefore, the	
first row of the Ex	ccel spreadsheet	should either conta	in the co	lumns' headers or	
be blank. If the fir	est row contains	e.g. the first group	and the f	ollowing rows	





There is a 500 characters limit of the work items descriptions. If there are longer descriptions into the Excel spreadsheet, they will be truncated. Below, you will find an example of an Excel spreadsheet for a WBS that can be imported directly:

<u>ee_j </u>		
Description	Unit	Unit Price
Main building		
Earthmoving		
General earthy excavations	m3	3,10
Concrete		
C12/15	m3	30,00
C16/20	m3	36,00
Mechanical		
Steelworks		
Black Steel Plate	kg	1,10
Plumbing		

	Galvanized Steel Pipe OD 1/2'	m3	17,50	
	taining groups are distinguing the strain of			•
The groups' h	nierarchy is set at a later stag	ge, using	g the	
button and th	ne b	utton.		
When the imp	oort process is completed, th	e follov	ving message a	ippears.
	Inon outing IA/DC from E			ad aut au dualle.
The data of e	Importing WBS from E each Excel spreadsheet are a			0
3.11.3 Ne	w group/work item	1	XE "Opti	ons – WBS
	uctions: new group		_	
	v:Group/Work Iter			
Using this bu current group respectively, of each group	tton, you can enter either a real. The groups and the work it so that they can be distingular, and in the case of a work it and unit price.	new gro tems are ished. Y	e indicated by our should ente	and and r the description
	At least one g	roup she	ould exist before	re entering any
work items.	Otherwise, the following me	-		0 9
	You can use the shortcu	t of Ct	rl + G keys to	create a new

group and Ct	rl + H keys to create a	new work	item.	
it by placing y respectively) following syn indicate the u green in the applicatio	lesired group/work item your cursor on the symb and dragging it to the o nbols , , , , , , , ipward or downward di idicates the new position in to indicate the position	s (if it doesnool that chardesired posite appear. The rection of man, Moreover and where man, where where man, where w	ion. During this action, the	nove the y y,
,	of the groups at a later		VE UOntions	
			XE "Options – Group/Item" XE "	
	e: Group/Item"		•	
· ·	ton, you can delete the s ll ask your confirmation em.	•	-	
3.11.5 Mo	ve XE "Option	s – WBS	S Instructions:	
Movi	ng a Group/Iten	n" XE		
"Mov	ing:Group/Item	ı''left		
right				
_	ittons you can promote to create the WBS 'tree		he groups, respectively, by	one
	These buttons are di	sabled whe	n a work item is selected.	

3.12 Library XE "Library"

The library contains data that can be used in any project. It constitutes a database that includes parameters and model custom measurements that are provided by ALCONSOFT as examples, and can also contain your own data.

3.12.1 Parameters XE " Parameters"

Using this item of the 'Library' button, you can alter or insert new parameters, which can be used in the formulas that appear in measurement calculations and apply to all projects.

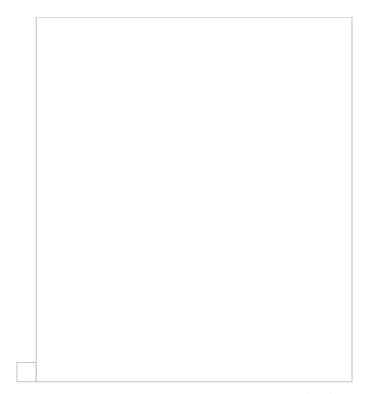
Enter a custom description. Also, you may enter a default value to be applied in all projects.

Parameters are automatically indicated with P*i*, where *i* is the increasing number. Use parameters when there are some constant values which you wish to be modified quickly (e.g. the height of a floor). It applies to values which you know from the start that will appear many times throughout the measurements and might need to be modified.

Parameter details are saved centrally, along with their default values. In each project, their values can be modified using the 'Project Measurement Parameters' button (See General/<u>Project measurements parameters</u>). <u>XE</u> "<u>Project:Parameter values</u>" <u>XE</u> "<u>Options - commands project: Project:Parameter values</u>"

3.12.2 Custom Measurements XE "Custom measurements"

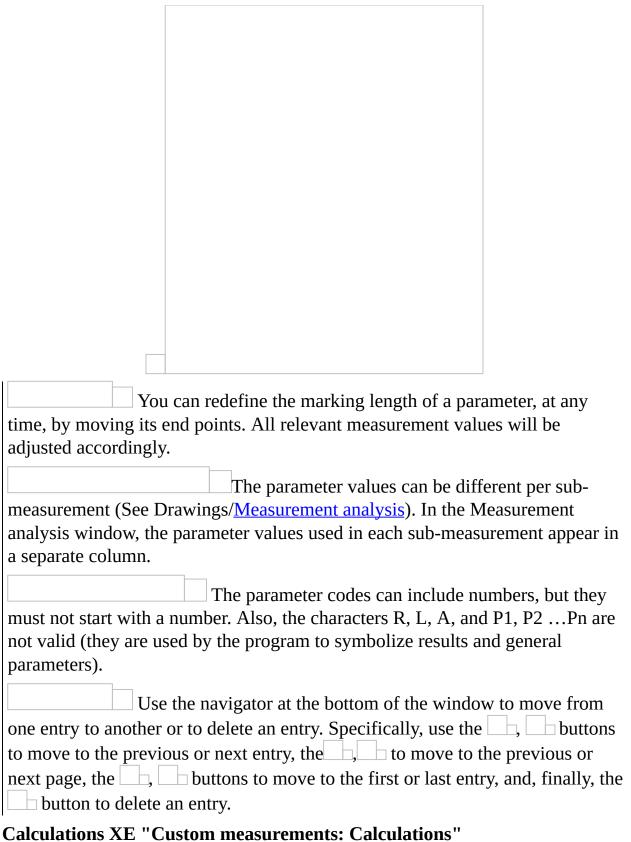
measureme	nts"	
types (See Measurement measurements/Custom 08D0C9EA79F9BACE). By setting the appropability to make use of the WBS work items. A window with ALCON	Library' button you can define your outs in image files/Types and method of measurements 118C8200AA004BA90B02000000000000000000000000000000000	f 80000000E0000005E Tulas, you have the tem to one or more
These measurements ar	e saved in the Library and are availab	ole for use in every
project.	•	
	XE "New: measurement" XE	"Custom
measurements: new		
•	ement' button, you can enter a new nur screen, the following window appe	



Description-Type XE "Custom measurements: Description type" Enter the description you wish for the new measurement, e.g. 'Slab reinforcement bars, and set the measurement type on which it will be based: objects count, length, area, or volume.

Parameters XE "Custom measurements: Parameters"

You may set parameters for this particular measurement. Measurement parameters can be used during a measurement, for the input of extra values (that is, additionally to the primary measurement result) that influence the final result. Enter the parameter code exactly like it will be used in the calculation formulas of the final result. Also, enter a short description and a default value. Check the 'Measurement on drawing' option in case you wish the value of this particular parameter to be defined by marking a length on the drawing during the measurement.



You can optionally enter one or more formulas for each measurement, so they

can be ready to use during measurements.

Set the description and formula for the calculation of the result. Enter the left part of the formula you desire without the = symbol, inserting numbers, parameters, and functions.

Use:

- Numbers (without the thousands separator), using the (.) as decimal point.
- The letters R, L, and A to symbolize the result of a measurement (**R**esult), the measured length (**L**ength), or the measured area (**A**rea) respectively. In the case of measuring area, the program automatically computes the perimeter length while in the case of measuring length (using a polyline) it attempts to calculate the area as well.
- The symbols of the mathematical operations: plus (+), minus (-), multiply (*), divide (/) and raise to power (^).
- Parentheses for grouping parts of the expression.
- Functions, which are input in the exact same format used in Excel.

	There are many of the most widely used Excel functions. See
the Appendix	for their correct syntax. You can also refer to Excel Help.
Some of the av	vailable functions are:

ABS, ACOS, ASIN, ASINH, ATAN, ATAN2, CEILING, COS, COSH, EXP, FACT, FLOOR, LOB, ROUND, SIGN, SIN, SINH, SQRT, TRUNC

	the navigator at the bottom of the windo	
	or to delete an entry. Specifically, use the ous or next entry, the h, h to move to	
To move to the previe		ry, and fina

button to delete an entry.
Editing a measurement XE "Custom measurements: editing a
measurement"
Using this button, you can open an existing custom measurement and modify it.
Deleting a measurement XE "Custom measurements: deleting a
measurement"
Using this button, you can delete the selected custom measurement from your measurement list.
By deleting a measurement, you also delete all items
associated with it, and they CANNOT be retrieved! You should be cautious in proceeding with deletion!
Duplicate measurement XE "Duplicate:Custom measurement "
Using this button, you can duplicate the current custom measurement. The
duplicate is added to the list as a new custom measurement and you can open and edit it.

3.12.3 Unit aliases

Measurements and work item quantities can be expressed in many different units, even for the same type of quantity (e.g. length can be expressed in meters, millimeters, feet). Furthermore, the units on the drawing may be different than the ones for the corresponding WBS item. **ExtrAXION** can automatically convert between any units as long as they have been registered in 'Unit aliases'.

- Column 'Unit' contains the default names used by **ExtrAXION**.
- Column 'Aliases' contains different names of that unit. You can use these if they are more familiar than the default ones or add your own, e.g. to match the units shown in the WBS you may have imported from an xlx file. To add new aliases, separate each name with a comma; dots, dashes and spaces will not be taken into account.
- Given a measurement, it is possible to display one unit alias in the 'Drawings' tab and a different alias for the related work item in the 'WBS' tab. If you want to change the default name of the 1st column, then enter an alias under the 3rd column: 'Drawing unit display alias'. It will then be displayed in the 'Drawings' tab.

3.13 Settings XE "Tools" XE " Settings " 3.13.1 **Drawing – measurements settings** Using this item of the 'Settings' button you can set various parameters which are used during measurements procedure. If you click the 'Defaults' button all parameter values are set to their defaults irrespective of any changes you have made. **Drawing parameters XE** "Settings " XE " Drawing parameters In this tab you can set the size and color of the crosshair and the mouse rectangle. You can also set the default measurements line weight.

Select:

• Units type: Choose between Metric (Decimal), US engineering and US architectural

- Polar track lock angle: The track lock of the pointer in degrees
- Pick size: The mouse rectangle size in pixels (Acceptable values: 1 50)
- Axis size: The mouse crosshair size in pixels (Acceptable values:: 1 -1000)
- Pick color: The color used to draw the mouse rectangle
- Axis color: The color used to draw the mouse crosshair

Select also:

• The default line weight of all measurements

You can set the line weight of each measurement separately.

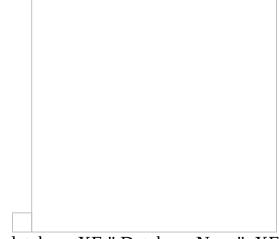
Measurement analysis parameters XE "Measurement analysis:parameters"

In this tab you can set various measurement analysis parameters such as colors, columns width, measurement types etc. (See <u>Measurement analysis</u> <u>08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F</u>).

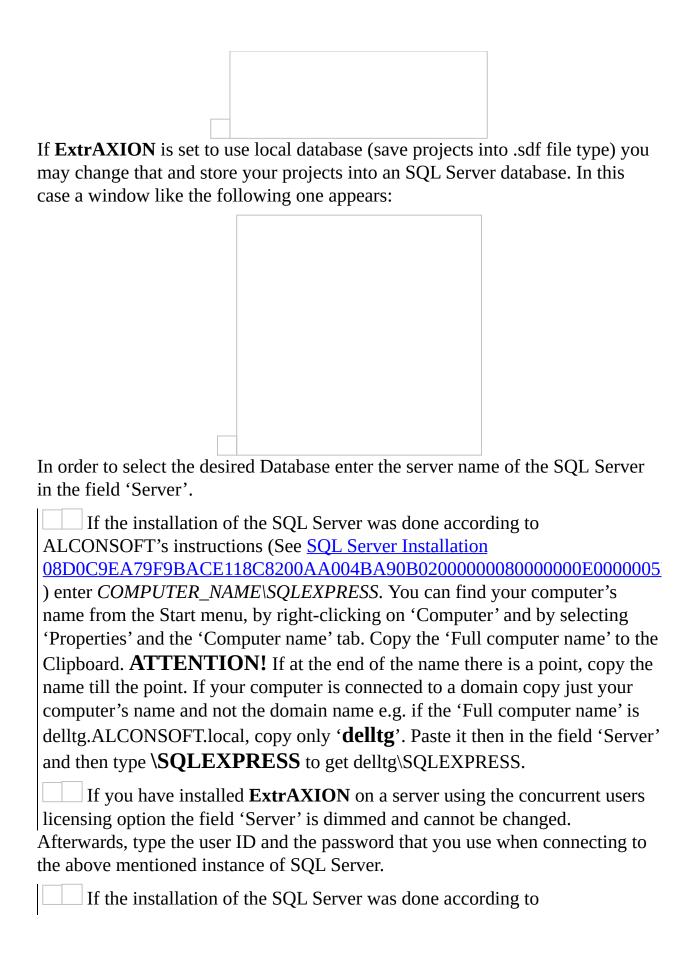
3.13.2 Select database XE " Database: Select "

With this option, you are able to select the way your projects are saved and change the current database. You can either store your projects on SQL Server or save each project on a local database as an .sdf file.

If **ExtrAXION** is set to use an SQL Server the following window shows up:



You may create a new database XE " Database:New " XE "New:Database" or select an existing one. You have also the option to change the way your data is saved by pressing the **Switch to local database** XE " Database: Switch to local " button. The following message appears:



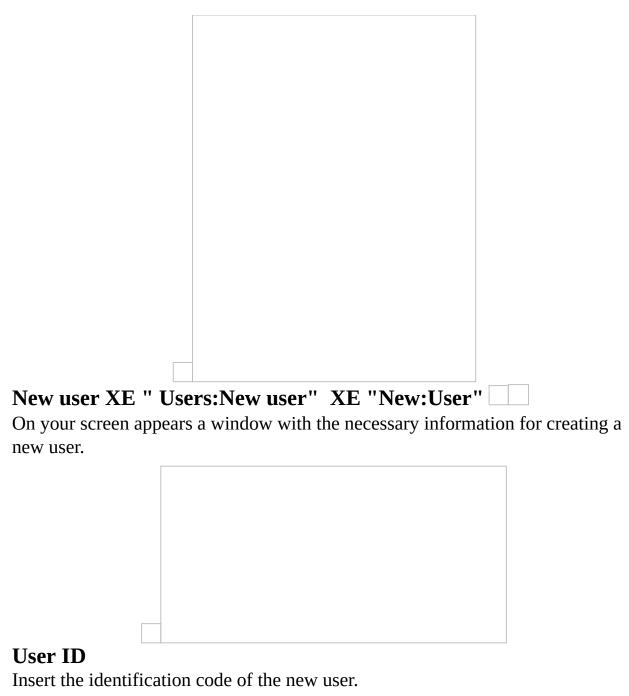
Then, select if you prefer to create a New or use an Existing database. If you choose 'New' then enter in the field 'DB name' the name you want for the new database else if you choose 'Existing' select one of the existing databases (if any). You may also press the Refresh button to update the list.

Finally, press	OK and on your screen appears:

At the window's title you can see the name of the current Database.

3.13.3 Users XE " Users "

With this option, you can create new users and edit their accounts with the corresponding buttons, if you have logged on as administrator (initially, user 1).



User Name

Insert the full name of the new user

User password

Insert the new user's password

Re-enter user password

Insert the user password again for confirmation

Hit the **OK** button and the user you just created appears in the Users list.

Edit user data XE " Users: Edit user information" On your screen appears a window with the current information of the user you have selected for editing.		
User ID		
Insert the new identification code of the	selected user.	
User Name		
Insert the new full name of the selected in	new user	
User password		
Insert the selected user's new password		
Re-enter user password		
Insert the selected user's new password a	•	1 .
Hit the OK button and the selected user information.	appears in the Users list w	ith his new
information.		
3.13.4 Edit user data XE "	Users: Edit user d	lata"
On your screen appears a window with t	the information of the cur	rent user.

User ID

Insert the new identification code of the current user.

User Name

Insert the new full name of the current user

User password

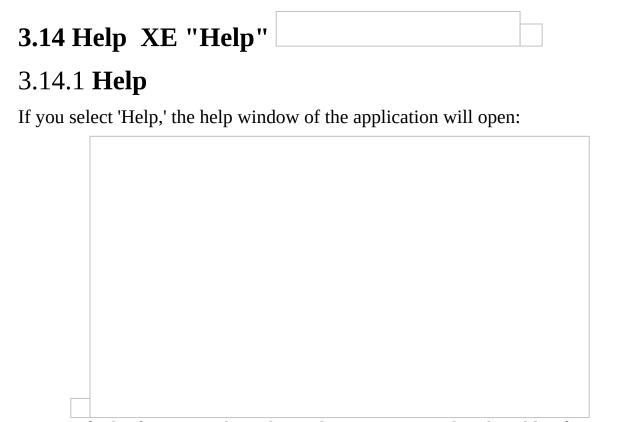
Insert the current user's new password

Re-enter user password

Insert the current user's new password again for confirmation Hit the $\overline{\mathbf{OK}}$ button and the current user appears in the Users list with his new information.

3.13.5 Select language XE " Select language " XE " Language"

Using this item of the 'Settings' button you can set the preferred language of the program environment, such as English, French, German, Greek, Italian, Spanish (Mexican) and Turkish. For the change of language to take into effect, you must restart the application.



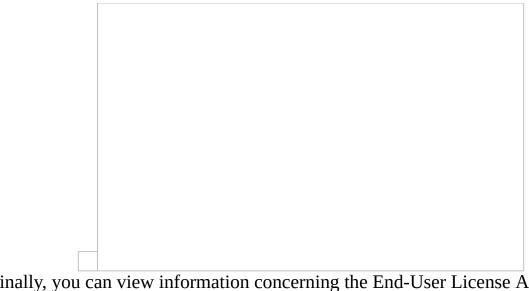
You can find information about the application, using either the table of contents or the search function.

3.14.2 Export events data XE "Exporting:events data" XE "Log file" XE "Errors log file"

With this option you can export all the data of the log file into a new file (.dat format). This enables you to send information to ALCONSOFT in order to solve any issues that have occurred during the use of the program.

3.14.3 About ExtrAXION XE "Help:About ExtrAXION" XE "ExtrAXION Version" XE "Version of ExtrAXION"

If you select 'About **ExtrAXION**', a window with information about the currently installed version of the application and its serial number will open.



Finally, you can view information concerning the End-User License Agreement (EULA) by clicking on the respective link.

4 Drawings XE "Project:Drawings"

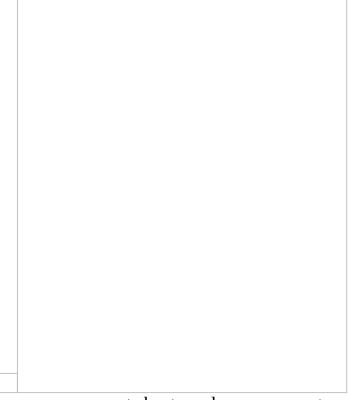
In each project, you can add as many drawings as you wish of various file types. Both vector files and scanned (image) files XE "Scanned drawings" are supported. Vector drawings are stored either into the project database or separately as external references, but image files can only be stored into the project.

For every drawing that you add to a project, you can create one or more measurement sheets. On each measurement sheet you can make as many measurements as you wish.

This way, a tree view is created, in each project, which consists of any number of drawings, measurement sheets and measurements. The tree view provides a clear and concise way of organizing your work and furthermore, since measurements are carried out on the measurement sheets, the original drawings are not affected. For each measurement, the tree view of the 'Drawings' tab contains columns for the description, the color, the result (including the unit of measurement) and whether it is visible or not. You can sort the tree view list by any of these columns by clicking on its header. (see Appendix/Filters/Sorting/Data Sorting <a href="https://doi.org/10.1001/10.

Sorting by the 'Description' field is applied first on the
drawings, then on the measurement sheets and finally on the measurements
themselves. Every drawing, measurement sheet or measurement that is added,
or has its name changed afterwards, follows this setting and its position into the
tree view list is set automatically.
You can expand or collapse the 'Drawings' tab
tree view, by right clicking in the tab's area.
Expand
Using this button you can fully expand the tree so that all groups, work items
and measurements are shown.
You can expand only a certain part of the entire tree by clicking
on the 4 symbol, on the left of groups (or work items) description when
collapsed.
Collapse

Using this button, yo 1 st level are shown.	ou, can fully collapse the tree, so that only the	he groups of the
	u can collapse only a certain part of the enti mbol, on the left of groups (or work items)	•



To manage drawings, measurement sheets and measurements, use the command buttons of the toolbar of the 'Drawings' tab.

4.1 Add drawings XE "Add: Drawing" XE "New:Drawing" XE "Drawing: Add" Using this button, you can add new drawings to the project. You can select the drawings you wish to insert, through the window that appears on your screen. These drawings consist the background of the measurement sheets. You may select vector files, such as .dwg, .dxf, .dgn, .emf, .wmf, XE "Vector Files .dwg, .dxf, .dgn, .emf, .wmf" or image files, such as .bmp, .gif, .jpg, .tif, .ico.png and .pdf XE "Image Files .bmp, .gif, .jpg, .tif, .ico, .png" . Select the desired drawing by double-clicking it or by clicking **OK**. The drawing is added in the 'Project Drawings' list. If you want to add more than one drawing in the project select them while pressing **CTRL** or **SHIFT** and press **OK**. The 'Add drawings' window appears:

4.1.1 Table columns

File

The full name and path of the imported drawing files.

Drawing

For example, if a drawing is printed scaled (not in actual size), then scanned, inserted to ExtrAXION and then if you select its scale from the list (the one you see printed on the drawing), measurement results will be totally wrong!
If you did choose the scale from the drop down list, then after clicking 'OK' and importing the drawing, the following window
appears on your screen warning you that measurement values may be affected.
Dpi resolution When importing pdf files, you can change the default resolution in dpi of the image, which is produced by the conversion of the current pdf file to image.
In case of large files, the value of 200 dpi may be inadequate and some details will not be visible. As a result, you won't be able to measure correctly. Increase the resolution to 300 dpi, for example, and use the button 'Load and preview current' to see how the drawing will appear when imported in the project.
Notice that in case of over-increasing the dpi value, files become larger and you cannot process them easily.
Convert to vector
Check the box to convert a pdf file into a vector drawing. Vector drawings are more convenient to use since they feature layers, object snaps and automatic object/block selection. If the file is a pdf created from a vector drawing, many o these data are preserved and ExtrAXION can utilize them.
Status
After setting all other properties, click on 'Analyze drawings' (see <u>Analyze drawings</u>). The result of that analysis is displayed in the 'Status' column. If the status is 'OK' feel free to import the drawings.
If the 'Convert to vector' was selected and the status

is "No elements in drawing", then uncheck 'Convert to vector' to import the drawing as an image.

4.1.2 Commands-Buttons of 'Add drawings' window

Add drawings
Insert more than one drawings, even from different folders, to the list, in order to import all of them in the project.
Preview
The following options are available from the drop down menu: • 'Preview current' shows the original drawing as it will appear when imported in the project.
• 'Load and preview current' is similar to 'Preview current', but also applies any changes in the properties made by the user while importing the file (e.g. resolution).
• 'Preview using PDF reader 'XE "Preview pdf file opens a pdf file in the default Pdf Reader application of your PC.
Analyze drawings
Applies any changes the user made in the drawing properties from the table or in 'Import drawing parameters' and checks the imported file. The result of the analysis is displayed in the 'Status' column of the table (see <u>Status</u>).
Delete drawing
Delete the selected drawing from the list, if you don't want to import it into the
project.
Use the 'Delete drawing' button so you won't insert to the project some of the pages of lengthy pdf files.
Fill down
Select a table cell and then click in 'Fill down' to copy its content to all the cells of the column below the current one.
Use the 'Fill down' button to accelerate the procedure of adding drawings, in case they all have the same scale or mark all pdf files to convert them into vector drawings.
Import drawings parameters
Customize the conversion of pdf files to images or vector drawings.



- Dpi: See <u>Dpi resolution</u>.
- Ignore points: If checked, the points of the pdf file will be omitted, resulting in smaller file sizes.
- Max elements No: If the pdf file has more elements than this upper limit, then a warning will be shown in the 'Status' column. However ExtrAXION will still try to convert the pdf file to a vector drawing, if the user insists.
- Merge polylines: The number of passes that **ExtrAXION** will do, while it tries to merge lines into a polyline. Increase this to reduce the file size, at the expense of slower import process.
- Text height/width scale factor: Adjust this factor appropriately to match the text size of original drawing.
- Convert line to point if shorter than: Short lines will be converted to points in order to minimize elements and file size.

Units type

Select a unit type system from the drop down menu. You can select between Metric (decimal), US Engineering and US Architectural. These units will apply to all measurements of the drawing but may be different from the units of the corresponding WBS items. The conversion between them is automatic though.

4.1.3 After adding new drawings

After importing new drawings to the project, they are added to the 'Drawings' tab tree view and, at the same time, a new measurement sheet is created automatically as the first node below each drawing. The corresponding drawing window opens and the drawing is displayed.

Finally, a reminder of certain basic adjustments that may be necessary is

and then set its scale and origin, for easy and correct copying of measurements
from drawing to drawing.
You should follow these instructions in the order
described above. Once you set the scale, you can no longer rotate the drawing,
for example.
If you have added a vector file, you should set the scale (only if the drawing has
not been created using the usual 1:1 scale), and also specify the location of the
folders of the corresponding drawings (XREF), if there are any. You should also
set the scale in case the drawing unit specified in ExtrAXION differs from the
unit of the drawing. Additionally, you can define the origin for easy and correct
copying of measurements from drawing to drawing and rotate the drawing, if
needed.
You can adjust all of the above settings at the Properties window (See
<u>Drawings/Drawing properties</u> XE "Drawing:Details" XE "Drawing: Properties
08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000
) where you can also change the description and the unit of measurement of the
drawing, set digit number for the measurements calculation precision,
background color etc.
When adding more than one drawings
simultaneously, they do not open automatically. In this case the above windows
appear when you open the drawing for the first time.
Large drawings (several MPs) may slove deven
Large drawings (several MBs) may slow down the taking measurements process considerably. Therefore, it is recommended
the taking measurements process considerably. Therefore, it is recommended

displayed. For image files, you should rotate and level the drawing, if needed,

that very large drawings be converted to smaller ones, e.g. in case of .dwg drawings remove layers that are not necessary.

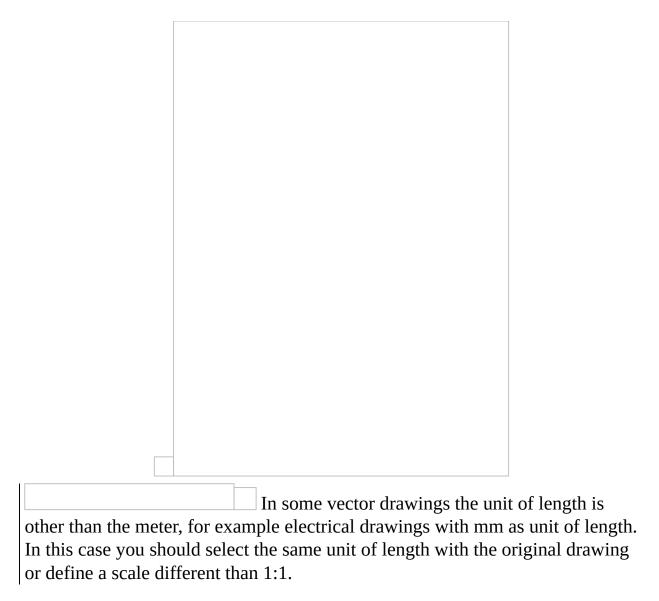
4.2 Drawing properties XE "Drawing: Details" XE "Drawing: Properties "

Using this button, you can set or change the properties of the current drawing. A window appears where the properties are organized in groups:

4.2.1 General XE "Drawing: Properties: General "

At this group you can set or change the following properties:

- The description/name of the drawing (the default name is the file name of the drawing without its extension).
- The full path and name of the original file from which the drawing was imported to the project, and whether the drawing is stored into the project or is an external reference. These two properties are read-only.
- The full paths of any external references, separated by semicolon (;).
- The unit system to be used. You can select between Metric (decimal), US Engineering and US Architectural. As a default is used the unit system which was set on the settings (See Settings/<u>Drawing-Measurement settings</u>)
- The unit of length on which measurements will be based (the default is meter for the Metric unit system and feet for the US systems).
- The accuracy of measurement calculations, by setting the number of the significant digits (the default is 2).
- The background color.



4.2.2 Scale XE "Drawing: Scale Specifying"

By setting the scale, XE "Setting the Scale in a Drawing" you also eliminate any distortions caused by reduction or magnification during scanning XE "Scanned drawings" or photo-copying, and thus measurements will correspond to the real dimensions:

In image files: XE "Specifying the Scale:In image files"

Click on the 'Scale' field and choose 'Set scale on drawing' from drop down menu.

Set scale on drawing By selecting 'set the scale on the drawing' you pick two points, which define a specific length, on the drawing and the window below appears on the screen.			
By selecting 'set the scale on the drawing' you pick two points, which define a			
By selecting 'set the scale on the drawing' you pick two points, which define a			
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By selecting 'set the scale on the drawing' you pick two points, which define a			
By selecting 'set the scale on the drawing' you pick two points, which define a		• .	
	By selecting 'set	the scale on the drawing' you pick two points, whi	
	1 0 7		
Enter the length you have marked on the drawing, click OK , and the scale appears on the drawing. Click the Update and close button to save the new			
scale. If you select 'Reset scale' from the drop-down menu, then the scale is set to its default value (1:1).	•	-	e scale is set
Scanned image files XE "Scanned drawings" can be deformed in a way that the original x/y axis scale ratio is altered. Thus, you	deformed in a w	3	•

need to set the vertical axis scale as well. Generally, you can only move in
'ortho' mode when setting the scale.
In vector drawings XE "Specifying the Scale:In vector files"
Click on the 'Scale' field and select 'Set scale' from the drop down menu.

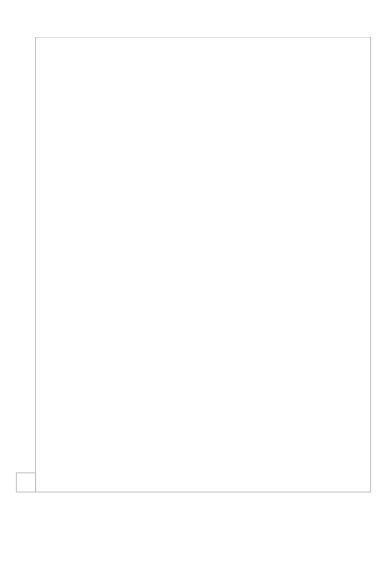
In vector drawings you have more options:

- Select the scale from the menu (1:1 to 1:5000)
- Choose a standard one from the drop down list (1:1000, 1:100, 1:10)
- Define the scale on the drawing, as shown in image files.

Define the accuracy of scale calculations by setting the numbe
of the significant digits (the default is 4).
If you don't want the scale dimensions to be visible on the drawing uncheck the 'Scale dimensions visible' box.

In order to achieve the maximum possible
accuracy in the calculations, the selection of the longest possible dimension on
the drawing as well is recommended (See <u>Auxiliary measuring tools</u>
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
).
Scale setting makes sense in case of image files as well as in vector drawings that have been created on a scale other than 1:1.
In vector files you cannot set both the horizontal and the
vertical axis scale. Only the last calibration is saved.
If you chose to convert a pdf file into a vector drawing when importing it, you must set the scale the same way you would for
an image file (see Set scale on drawing).
4.2.3 Origin XE "Drawing: Properties:Origin "
By setting the origin, you can set the $(0,0)$ coordinate point on the drawing. Click the $\boxed{\dots}$ button on the 'Origin coordinates' field. On the drawing that appears mark the $(0,0)$ origin using the cross hair cursor and click
Update and close. Alternative you can enter the X and Y coordinates at the corresponding fields. Check the 'Origin axes visible' box if you want the origin
to be visible on the drawing.
Set the corresponding origin on the rest of the
drawings, where you wish to copy the measurements, in order for them to be copied in the exact same location as in their original drawing. In case, for
example, that the creator of the drawing changes the origin, then, if it is not reset, it is possible for copied measurements to be pasted to an entirely wrong
place!
4.2.4 Rotation XE "Drawing: Properties:Rotetion "
By rotating a drawing you can change its orientation so that it is leveled during
measurements. Click the button on the 'Rotation in degrees' field. On the
drawing that appears, select two points along a horizontal line, e.g. two points on
any line which should be horizontal in your drawing, but, probably due to

misaligned placement in the scanner, appears tilted. Click Update and close to
save the new rotation.
The rotation of a drawing must be done before the
scale setting and before any measurement.
To rotate and level a drawing by 90 degrees you can select a vertical line on the drawing. Note that the order in which you select the start and end point will determine if the rotation is clockwise or anticlockwise.
4.2.5 Sheet details XE "Drawing: Properties:Sheet details "
You can see and change the title of the current measurements sheet. However,
this field is visible only if you have clicked on 'Drawing properties while having a sheet selected.



4.3 New measurement sheet XE "New:measurement sheet"

Using this button you can add new measurement sheets to the drawings. A window appears with the list of all drawings that you have imported into the project. Select the drawing on which you wish to create the new measurement sheet and type the title of the new measurement sheet at the field above the list.

Click **OK** and the new measurement sheet is created and added as a child node of the selected drawing at the tree view of the 'Drawings' tab. Finally, on the right side of the application window, the corresponding drawing opens.

4.4 Open measurement sheet XE "Opening:measurement sheet "

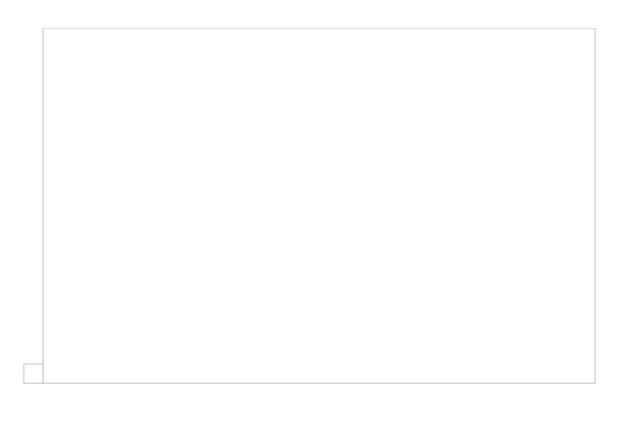
measurement to make it visible.

Using this button, you can open the selected measurement sheet from the 'Drawings' tree view on a new window on the right side of the application window. You may open any number of measurements sheets of as many drawings you wish. Each open measurement sheet appears in the drawing pane with its title at the top.

You can also open a measurement sheet window by double-clicking its title or any of its measurements. If the window is already open then it becomes current. To close a measurement sheet window click the symbol on the right part of the window's tab.

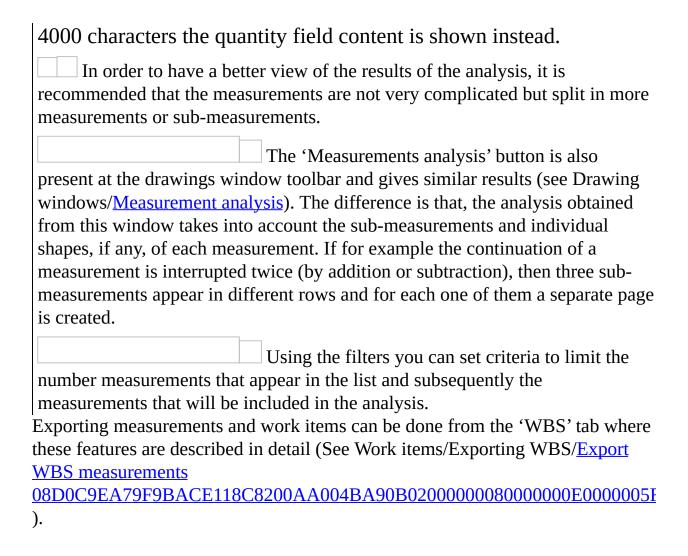
The measurement sheet and its measurements of the current window are marked with gray color on the 'Drawings' and 'WBS' tree views.

The measurements of the current window are only visible when the check box at the 'Visible' column of the 'Drawings' tree view is checked. Click on the check box to change its status or double click on a



4.5 Delete sheet XE " Delete: measurement sheet " [
Using this button, you can delete the selected measurement sheet from the drawings tree view. If the underlying drawing has no more measurement sheets then the drawing itself is also removed from the drawings tree view.	;
A drawing that has been removed from the tree	
view is not actually deleted from the project. When you create a new	
measurement sheet (See Drawings/New measurement sheet) and also, at the	
measurements management window (General/ <u>Drawings management</u> XE "	
Drawings management " XE "Options - commands project: Drawings	
management "	
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E000000	05
), you can see and use all the drawings that have been imported to the project,	
even if they are not shown at the drawings tree view.	
You should close a drawing in order to be able to	Э
delete it.	
By deleting a measurement sheet, you also delete all	l
items associated with it along WITH its measurements which	
CANNOT be retrieved!	
C. II. C. I C. I CHILLY CU.	

4.6 Export Measurements XE
"Exporting:measurements"
This button allows you to export the primary measurements to a table. Then, you can change the table's appearance before its final export to Excel. This table shows all measurement details in the following columns: 'Drawing', 'Sheet', 'Category', 'Description', 'Color', 'Unit', 'Quantity', 'Expression', 'Notes'.
Using the advanced filtering, grouping, column selection, and sorting tools, you
have many options of setting the number, the form, and the type of the data you wish to view (See Appendix/ <u>Filters/Sorting</u> 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000
Using the 'Measurements analysis' button you can preview and print the
analysis of the measurements in the above list. The analysis includes dimensions marking and details of surface area calculations (See <u>REF_Ref361045180 \h</u> Measurement analysis
08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000
In the column 'Expression', in case of an area, appear the calculations of the analysis of surfaces into basic shapes like in the 'Measurement analysis'. If the analysis exceeds



4.7	Edit meas	urement X	E "Edit:	measure	ment"
measur measur insert a	rement at a later rement, the wor	can view or modes stage. Correct the kitems of the Wildington difference of the Wildington of the Control of th	ne description BS to which	n or the catego it is linked, ch	ory of the nange its color,
<u>Drawir</u>	ngs/Continue m	parameters is per easurement). You ill be preceded by	ı can view ar	nd select them	from the drop
created	l with 'Continue	e measurement	, c	or 'Continue n	neasurement
(subtra	ct)	respectively.			
measu	rement's type,	Parametowhich you can ch		depending or continuing a m	
For ex	cample, if an are drawing's leve drawing, only t	ea measurement land then continuted he latter will be a	ued to a sub-	measurement	is performed perpendicular

When you select a sub-measurement from the
dropdown list all figures that belong to that sub-measurement are marked on the drawing.
If you have selected on the drawing figures that belong to different measurements, when you right click and select the 'edit
measurement' option, the measurement that will be edited is the one where the last selected figure belongs.
In case the values of a parameter are defined per node, e.g. when you enter them every time you create a new point by clicking
on the drawing, this parameter doesn't have a common value and cannot be edited in this window. Editing such values is performed directly on the drawing
by right clicking on the nodes instead (See Measuring in image files/Length Measurement/Measuring procedure/Figure data).
The notes you add will be printed in the
measurement table.

4.8 Measurement analysis XE "Measurements:analysis"

Using this button, the selected measurement's analysis is viewed. Each submeasurement appears in a different row, while the main measurement's values are shown in the first row. The columns display the description (name) of the submeasurement, its unit, measurement type, calculation expression and value. Furthermore the columns L, A and R contain the length, area and primary result of the measurement respectively.

On the lower part of the window there is the detailed calculation of these results, as well as a thumbnail of the region where the sub measurement was performed, divided in basic geometric shapes (<u>See Measurement analysis</u>). Each submeasurement is displayed in a different tab.

leasurement is displayed in a different tab.
Each time the continuation of a measurement (by
addition or subtraction) is made, a new sub-measurement is created (See
<u>Drawings/Continue measurement</u>). If a sub measurement was created via the
Continue measurement (subtract), then it will be colored red.
By temporarily stopping a measurement by
pressing the Esc key once, distinct parts are created in the measurement
analysis, which are distinguished with the use of parentheses in the expression
column, e.g. the measurement of the baseboard with gaps in the place of doors.

4.8.1 Export to Excel XE "Exporting:to Excel"

Click the	button of the above table to save it as an .xlsx
file. Select between:	

- 1. Export figures, where the sketches of the selected sections of the drawing are shown, along with the basic shape type and the expression (bottom section of the above window)
- 2. Export tree (top section of the above window)

Then, input the location and the filename you wish to use.

4.9 Duplicate measurement XE "Duplicate: measurement"

Using this button, you create one or more copies of the selected measurement, which you can then move around on the drawing by defining the start and end point of a point of reference. After placing a copy at its final position, it is then linked to the same work item as the original measurement, while its name is also derived from the original via appending an index number (e.g. _1, _2, etc.). This feature is useful in cases where the same measurement can be used in different cases, e.g. a ceiling measurement can also be used to measure the floor.

In the above example, it is recommended to link the			
measurement with many different work items instead of duplicating it			
(ExtrAXION Pro version).			
It is also possible to duplicate only parts of a measurement by selecting them on the drawing and using the 'Duplicate			
selection button in the drawing windows area. In this case, any			
copied items are added to the measurement they belong to (See Auxiliary			
measuring tools/ Duplicate selection).			

4.10 Delete measurement measurement"	XE " Delete:
Using the 'Delete measurement' button measurement. The measurement is rer views as well as from the drawing wir	noved from the 'Drawings' and 'WBS' tre
By deleting and you cannot retrieve them!	g a measurement, you lose all of its data

4.11 Continue measurement XE "Continue measurement" XE " Measurement: Continue" Using this button, you can continue the selected measurement, creating sub measurements. A measurement consists of one or more sub measurements of the same type (e.g. count measurement \(\bigcup_{\quad} \). The value of the main measurement is equal to the sum of all its sub measurements' values. Each sub measurement has its own name. When neither 'Continue measurement 'nor 'Continue measurement (subtract) ' is used, there is only one sub measurement with the same name as the main measurement. Each time one of those buttons is pressed, a new one is created with a new name. New names are created by appending index numbers to the original name.

- Category
- Work item
- Color, unit and factor
- Notes
- Marking figure (See <u>Measuring in image files/Types and method of measurement/Object count</u>)

Sub measurements of the same measurement have in common:

These items are properties of the main measurement.
If you change one of them when you create a new sub measurement, it will be
changed for all.
However the following properties are not necessarily the same in all sub
measurements:
 Name (See <u>Drawings/Edit measurement</u>)
 Measurement method (e.g. <u>perpendicular to the drawing</u>, <u>marking</u>
<u>figures</u> , etc)
• Parameters
It is possible for all sub measurements to have the
It is possible for all sub measurements to have the same name, but it is not recommended.
When you create a new sub measurement with
parameters, their values are equal to the previous ones by default. You can then change them.
All these properties can also be seen during the
process 'Edit measurement', where it is apparent which properties are common
or not.
Apart from sub measurements there are
also figures, which are parts of a measurement created when you
pause by using ESC. (See Measuring in image files/Types and
method of measurement/Length measurement/ Measuring
discontinuous segments)

4.12 Continue measurement (subtract) XE "Continue
measurement (subtract)"
Using this button, you can continue the selected measurement in cases where you wish to subtract the area of already drawn surfaces (e.g. in the facade, by removing the surface area of the wall openings). By doing so a new sub measurement is created (See Drawings/Continue measurement). The surfaces that you remove from the measurement are marked on the drawing with crosshatching, while the outline of the areas removed is marked with a dashed line. In length measurements you can also remove parts of lines which are then marked with a dashed line.
Continue measurement (subtract) cannot be performed on count measurements . The button is deactivated too.

4.13 Show all measurements XE		
"Measurements:Show all"		

By selecting 'Show all measurements', all the measurements appear on the measurement sheet and the check box of the column 'Visible' appears checked.

4.14 Hide all measurements	S XE "Measurements:Hide
all" 🔲	

By selecting 'Hide all measurements', all the measurements disappear from the measurement sheet and the check box of the column 'Visible' appears unchecked.

4.15 Copy visible measurements XE

"Measurements:Copying"

Using this button, all measurements which are currently visible are copied to the clipboard. They can then be pasted in another measurement sheet of the same or different drawing of the current project.

You can use this button when, for example, all measurements are similar on different floors, or if a drawing is changed. Copy all the measurements and modify the ones that need to be adapted to the new drawing.

4.16 Paste measurements XE"Measurements:Pasting"

8
This button pastes the copied measurements to the current measurement sheet. If
you have set the same origin in both measurement sheets (See
Drawings/Drawing Properties/ <u>Origin</u>
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
), the measurements are automatically pasted in the exact same position as in the
initial measurement sheet.
Note that you should be very careful in setting the
origin (reference point) in the case where the measurement sheets belong to
different drawings. If the origin has changed in the new version of the drawing,
its position should be reset before pasting the measurements.
If there are already other measurements on the
measurement sheet where you paste, then only those with different names from
the existing ones will be pasted.

5 Drawing windows XE "Drawing windows"

Drawing windows is the area where you make your measurements. They are located at the right side of the application window and each one corresponds to a measurement sheet of the drawings tree view. A new drawing window opens when you:

- Add a new drawing to the drawings tree view in which case its first measurement sheet is also created automatically (See Drawings/<u>Add</u> <u>drawings</u>).
- Create a new measurement sheet of an existing drawing (See Drawings/New measurement sheet).

•	Open the current measurement sheet by using the
	button, by double clicking on it or on one of its measurements (See
	Drawings/Open measurement sheet).

You can open as many drawing windows as you wish. Each one has a tab with the title of the corresponding measurement sheet and the x mark which is used to close it.

At any time, one of the open drawing windows is current, which means that appears in front of all others. The corresponding measurement sheet of the current drawing window, along with its measurements, are marked with gray color on the tree views of both 'Drawings' and 'WBS' tabs.

At the top of the drawing window there are buttons for
managing drawings and measurement sheets and buttons to be used as tools for
the measurements. The following chapters contain detailed description of the
measurement procedures in case of image files (See Measuring in image files
$\underline{08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E00000005}$
) and of vector files (See <u>Measuring in vector files (CAD)</u>
$\underline{08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E00000005}$
) as well as description of many auxiliary functions and tools (See <u>Auxiliary</u>
measuring tools
$\underline{08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E00000005}$
).

5.1 Print

5.1.1 Printing of the current sheet (Ctrl+P) XE "Print: Drawings" XE "Drawing: Printing"

Using the 'Print' button, you can print the current measurement sheet as you see it on your screen, that is only with the visible drawing's and measurements' layers along with the legend.

In case you have set regions then only the part which is placed into those regions is printed instead of the whole sheet. Each region is printed on a different page. (See also <u>Draw Measurement Region</u>).

5.1.2 Print all XE "Print: all drawings "

Using the 'Print' button you can print all open measurement sheets you see on the screen, each time, that is only with the visible drawing's and measurements' layers along with the legend.

In that case too you have set regions then only the part which is placed into those regions is printed instead of the whole sheet. Each region is printed on a different page.

	Take advantage of the 'print all' command which allows you to		
print massive	ly many drawings for the presentation of measurement results on		
the drawings.	Open the sheets you wish, set the regions you want to print, hide		
and show the layers of the drawings and the measurements you want and print!			
	Only open sheets will be printed.		

5.1.3 Plot of the current sheet XE "Drawing: Printing"

Click the 'Plot' button, to print the current measurement sheet, you see on the screen, including the layers of the measurements you have created. The print-parameters configuration window will open:

In the 'Plot margins' field, you may set the margins of the page and the alignment of the drawing on the paper by selecting 'Upside – Down' and 'Center to paper'. In the 'Orientation' field, set the orientation of the XE "Drawing: Orientation" XE "Orientation" drawing. Click on the 'Portrait' option to vertically orientate the drawing and on the 'Landscape' option to horizontally orientate the drawing. In the 'Paper' field, you may set the dimensions of the printing paper either by selecting any of the predefined formats (letter, legal, A3, A4, A5 etc.), or by setting the paper dimensions in the 'Custom' field.

In the 'Scale' field, you can set the printing scale of the drawing by filling in the respective 'Printer Units' and 'Drawing Units' fields. Alternatively, you can customize the drawing to the paper dimensions regardless of the scale by selecting 'Scale to Fit'.

In the 'Display options' field, you can select the B&W printing option by clicking on the 'Black and white' option or the 'Grayscale' one. You can print the drawing as an image file, by selecting the 'As bitmap' option. You can also change the line width per color by pressing the 'Pen assignment' button.

In the 'Print area' field, you have the possibility of selecting the area you want to print. If you want to print a part of the drawing, select the 'Window' option and

then click on the 'Pick' option to mark this part on the drawing. If you wish to print the entire drawing, just click on the 'Extends' option.

In the 'Preview options' field, you can select either the partial or the full preview of your drawing.

Click on the 'Update preview' option each time you change any of the printing settings in order to refresh the preview, unless of course the preview is automatically refreshed. Choose the 'Select Printer field. In the respective fields of the window that appears on the screen you may select the printer as well as the printing properties 'Properties'.

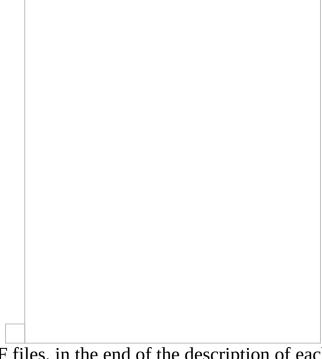
Check the 'Save to file' option, click the 'Save to file' button that appears and save the file in order to print it later on.

Click 'Print' to print the dr	awing or click 'Exit' to close the printing window.
	Color printing of a drawing (or part of a
drawing) with active meas	surements (or some of the measurements) can be of
great aid when checking n	neasurements.

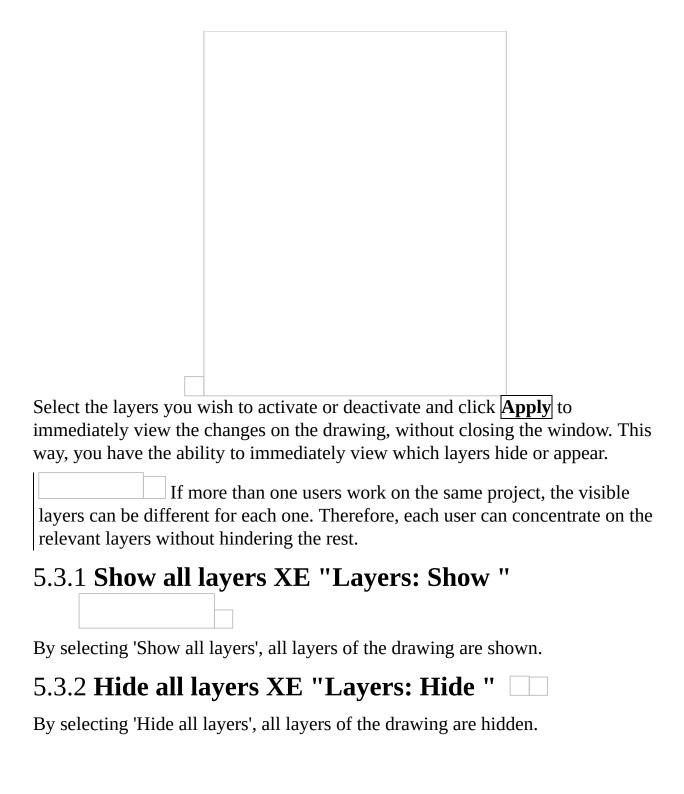
5.2 Measurement analysis XE "Measurement analysis"

Using this button you can preview and print the analysis of the measurements. The analysis is based on the template which you select from the drop-down menu and includes dimensions marking and details of surfaces calculations. Measurement analysis is explained in detail in a separate chapter (Se).

5.3 I	Prawing	g Layers XE	"Layers"	XE	"Drawing:
La	yers"				



In the case of XREF files, in the end of the description of each layer, the word XREF and the name of the drawing from which it originates appear in parenthesis.



5.4 Export Drawing XE "Exporting: drawing" XE "Drawing: Exporting "

Using the 'Export drawing' button, you can export the current measurement sheet to a separate file, including the measurements you have created. The drawing can be exported only if it is saved in the database and not as an external reference.

You can export the drawing to various file types, such as: dxf, dwg, dgn, wmf, bmp, gif, jpg, tif, png, ico, svg, dwf, pdf.

the drawings along with t	ne export option in the above file types, you can edit the measurements in specialized design applications or with their measurements to another computer in the ecking purposes.
exported, as separate laye	xporting the drawing only the visible measurements are ers. That enables you to export the drawing with only ant each time and then edit it easily using a CAD
not stored into the project	The export file does not contain any data from e drawing, if there are any. In addition, if the drawing is t but is an external reference itself, then only the layers are exported and not the original drawing.

6 Measuring in image files XE "Measurements:in Image Files"

6.1 Initial settings XE "Measurements:in Image Files : Initial settings"

Every time you import a new image file into the project (Drawings/Add drawing), a message box appears which guides you through the initial settings you have to establish:

- Rotate and level the drawing, if needed
- Set the drawing scale
- Set the origin, if you wish to copy measurements

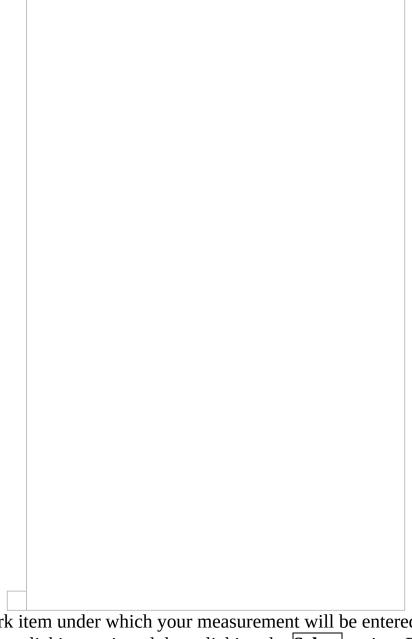
You can find all these initial settings at the drawing's properties window (See
Drawings/ <u>Drawing properties</u> XE "Drawing: Details" XE "Drawing: Properties
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F
)

" 6.2.1 Objec	t count XE "Item Counting" XE"Counting
items"	
Using this button	, you can count objects on the drawing, e.g. how many sinks,
	here are in a drawing. Click the ollowing window will appear:
-	E " Measurement: Description"
-	E " Measurement: Description" tion of your new measurement in the Description field, e.g.
Enter the descriping internal doors.	-
Enter the description internal doors. Category XE	tion of your new measurement in the Description field, e.g.

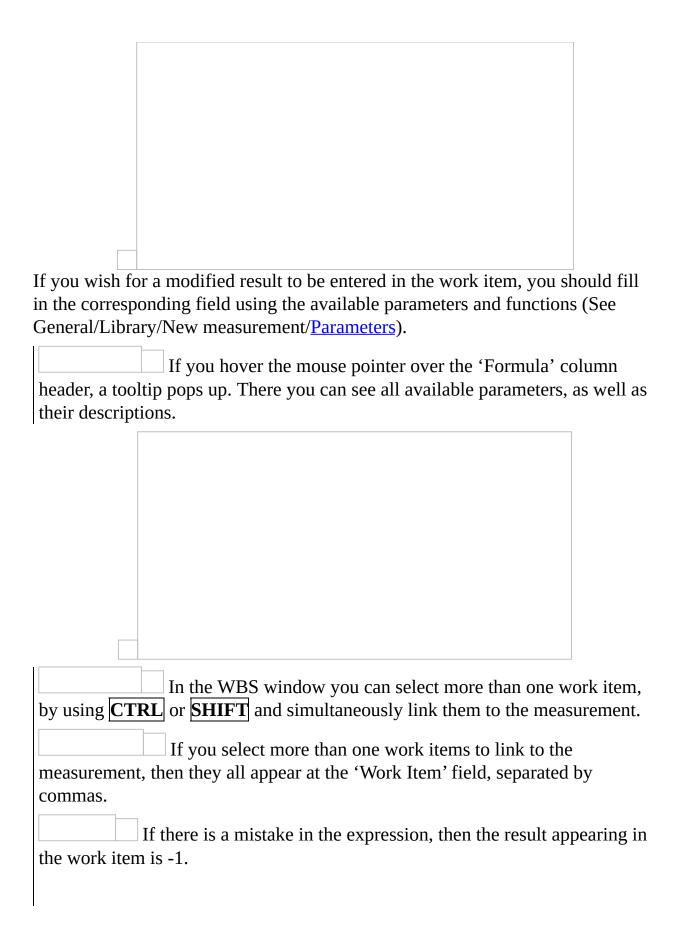
For example, you may enter all door measurements in a specific category in order to filter the measurement table's data and export to Excel only this particular category (See Appendix/<u>Filters/Sorting</u> <u>08D0C9EA79F9BACE118C8200AA004BA90B020000000800000000005F</u>).

ork item XE " Measurement: Work Items"
ick the button and the 'Associate measurement with WBS items' option
ndow will appear.
FF
ick the 'Associate with WBS item' button to link
e measurement with the work items you have entered into the WBS (See
eneral/ <u>WBS (Ctrl+B)</u> XE "WBS" XE "Budget" XE "BOQ" XE "Options
mmands project: Work Breakdown Structure "
D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
In case you do not desire to enter the measurement under any of the work
ms, you can leave the corresponding field blank.
If you click one of the measurement buttons (
while the WBS tab is open in the left part of the screen and some
ork item is selected then this work item is automatically selected as the linked
the current measurement work item.
the Standard version, where it is not possible to link a measurement with more

In the Standard version, where it is not possible to link a measurement with more than one work items, the WBS window appears on your screen immediately.



Select the work item under which your measurement will be entered by double-clicking it or by clicking on it and then clicking the $\boxed{\textbf{Select}}$ option. Repeat the procedure to link the measurement with more than one work items. If you leave the 'Formula' field blank or type the letter \mathbf{R} (\mathbf{R} esult), then the primary measurement result is entered into the WBS.



Attention ! When a measurement contains a factor that is
different from 1, be careful when linking it to a WBS item. If you type anything
in the 'Formula' field even only the letter ${f R}$ (${f R}$ esult), the factor <u>is not taken into</u>
account.
You can use the extra results of the different types of measurements, based on
the following table (See General/Library/New measurement/ <u>REF</u>
<u>Ref361045970 \h</u> Calculations
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005

TABLE FOR EXTRA MEASUREMENT		
RESULTS		
Item count	n/a	
Length measurement	A C	
Area measurement		
-on drawing's level	LC	
-perpendicular to drawing	L A C	
-by item count	С	
Volume measurement		
-area on drawing's level	L A C	
-linear object	L A C	
-by item count	С	

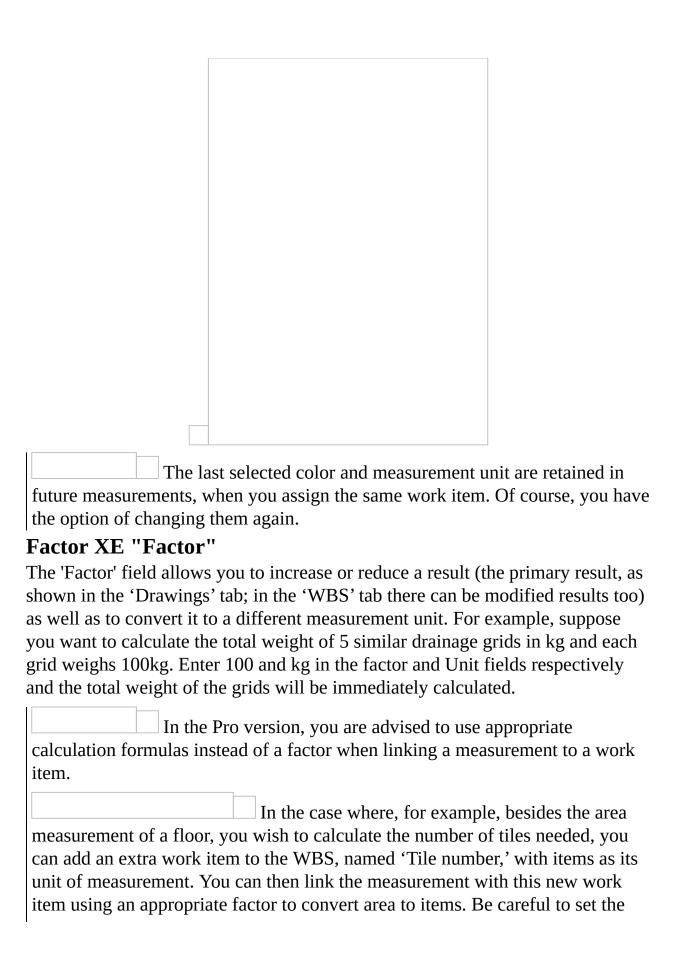
When you select a work item, the measurement unit of the primary measurement is not automatically updated according to the unit of the work item with which it is linked. If, for example, you want to count the number of the windows, and the respective work item unit in the WBS is m2, as soon as you select the work item, the measurement unit remains items. By using an appropriate formula or factor, you can convert the result of the basic measurement to comply with the work item's units.

New work item XE " Measurement: New Work Item" Using this button, you can enter -during a measurement- a new group of work items or a new work item that does not exist in the WBS, and link it to the result of the measurement. If you click the 'Add work item' button, the 'WBS' window will appear on your screen. Add the desired group/work item (See General/WBS (Ctrl+B) XE "WBS" XE "Budget" XE "BOQ" XE "Options - commands project: Work Breakdown Structure "

08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F) and click 'Close'. The changes will appear in the 'Select Work Item' window as
well as in the 'WBS' tab (See <u>Work items</u> 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F
).
Apart from adding a group/work item, you can
also edit the description or any other detail of the existing groups/work items in the WBS or even delete some of them.
Delete connection XE " Delete: non drawing measurement" XE
"Measurements: delete non drawing"
Using this button, you can delete the current connection.
Replace work item XE " Replace: work item "
Using this button, the current work item, can be replaced with another. Choose the work item you wish, and close the window by clicking «Select»
Replacing the work item does not affect the «Formula» field, which remains the same. This command is really useful if you have chosen by mistake, one work item instead of another, or if you want to replace a work item without necessarily delete the link and then add a new one, filling again the formula field.
Add stored items XE "Add: stored items"
Every time you link a measurement with one or more work items (you may also have set some formulae) they are temporarily kept in memory. By clicking this button you link the current measurement with all the saved work items along with their formulae.
'-

Color XE "Color"

You can change the default color which will be used to mark the items you want to measure.



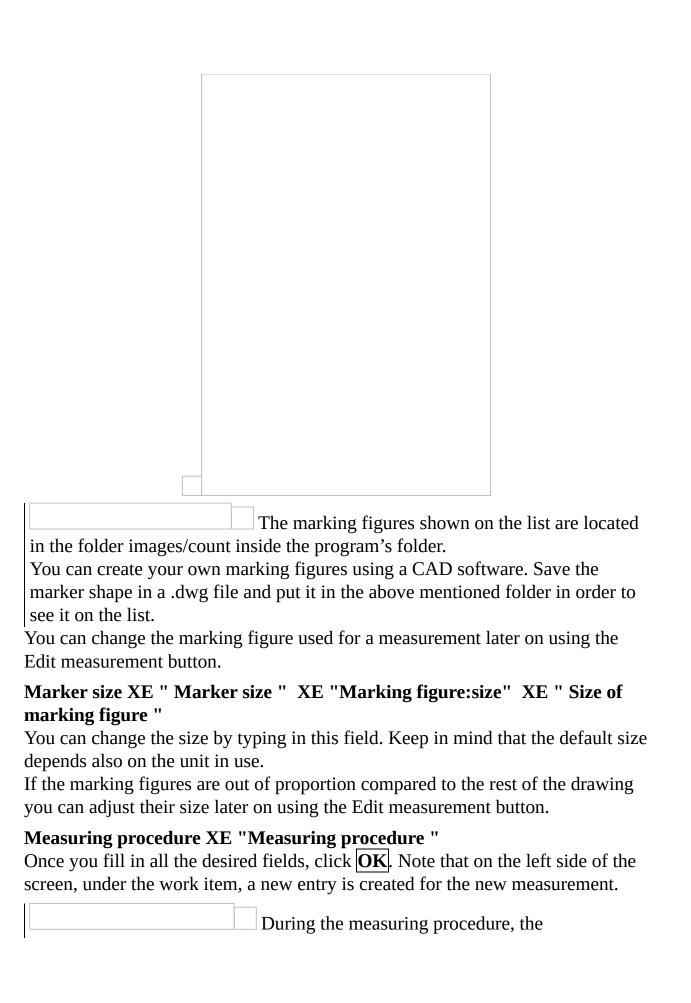
unit price of this work item to zero, so that it does not alter the total cost.
In case of linking a measurement that includes a factor that is different from 1 to a work item be very careful. If you type anything in the 'Formula' field even the letter \mathbf{R} (\mathbf{R} esult), the factor is not taken into account.
Attention! The expression in the 'Formula' refers to each
submeasurement separately as well as to the letters R (R esult), L (L ength), A (A rea). e.g if you type the expression R+1 in the 'Formula' field and then continue the measurement twice thus creating three submeasurements (See Drawings/Continue measurement), the final result will be (R1+1)+(R2+1)+ (R3+1) = R+3 instead of R+1 where R1,R2,R3 symbolize the results of the submeasurements and the letter R their sum. This is needed since the values of
custom measurements parameters that are used in formulas may be different per sub-measurement (eg. height).
Unit XE "Unit"
For object count measurements the default unit is 'items'. For more information about units in general see Measuring in image files/Types and method of measurement/Length measurement XE "Length Measurement"
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F
Notes XE "Notes"
In the 'Notes' field you can enter comments that relate to this specific measurement.
These notes will be exported along with the other
details to both the measurements table and the WBS table.
details to both the measurements table and the WBS table.

Measurement type XE " Measurement: type"

There are two different ways to count items in image file: by marking items manually on the drawing or by automatic object detection.

Marking figure XE "Marking figure"

Select the shape with which the marking on the drawing will be done. The choices are circle, diamond, ellipse, etc. By using different marking figures, you can achieve an extra distinction between the items.



'Recording' button is constantly active. Click consecutively on the drawing, where the items you wish to count are placed, in order to mark them. Note that with each click, a mark with the selected figure and color appears in the position of the cursor.
Terminating a measurement XE "Terminating a Measurement" XE " Measurement: termination"
To complete the measuring process, right-click and a shortcut menu appears. Select 'Terminate Measurement'. Alternatively, you can stop the measuring process by pressing the Esc key twice.
Object search XE "Object search " XE "Automatic counting on image files" If you select 'Object search' as a measurement type, then the following window is opened
Specify template on image XE "Specify template" XE "Template:Specify"

Press this button to define the object you want to count on the drawing. To mark
the object, zoom on it and then enclose it in a rectangle by drag and drop.
The selected template will then be displayed on the left side of the screen
alongside variations produced by rotating it in steps of 90 degrees and mirroring
it about the horizontal and vertical axes.
Choose the variations you want to search by filling
their check boxes. However the more you choose, the longer the detection
process will take. Thus you should omit mirrors when searching for
symmetrical objects.
Edit template XE "Template: Edit "
This option lets you edit the template you have defined. Use the pencil tool to
darken pixels or the eraser tool to clear them.
Load template XE "Template:Load"
Import a template you have saved on your computer beforehand.
Save template XE "Template:Save"
Export the template you have defined for later use.
Sensitivity XE "Sensitivity"
Drag this slider to the left in order to increase the tolerance in differences with

the selected template and thus make it more probable to find all its occurrences.

By doing so though, more unrelated objects will also be found.

Instead of decreasing the sensitivity too much, you can adjust it to find most of the template's occurrences and then add the remaining ones manually. This can be done after completing the measurement. Just click on the 'Continue measurement' button, which is located in the taskbar of the 'Drawings' or 'WBS' tab and by changing the counting method to "Mark".
Search scale
Choose a percentage lower than 100 to scale down both the drawing and the template. This is recommended in large scanned or pdf drawings to increase search speed. However, doing so may reduce the accuracy of the search. For more details, access the respective help page by clicking on the ? button next to the 'Search scale' slider.
Black and white threshold XE "Black and white Threshold "
Set the threshold before a pixel is regarded black or white by the program in order to get better results.
All images are converted to black and white when opened.
Search objects XE "Search objects"
Press this button to trigger the search for the selected template. The results will be displayed in the lower left corner of the screen and marked with a red rectangle on the drawing.

There may be unwanted items in the results list. To remove them uncheck the 'Keep' checkbox. Notice that when you click on a result item, the drawing will zoom in on it, allowing you to decide if you want to include it in the measurement or not. Excluded objects will be marked with a blue rectangle on
the drawing, in contrast to the red rectangle of the included ones.
Try out different levels of sensitivity and black &
white threshold, in order to achieve the best possible result.
Define search region XE "Search region:Define"
This button lets you define a rectangular search region, where object search will be limited to. By doing so, when you use 'Search object', the object
detection will only be performed in the specified area.
By limiting the detection process to the necessary
area you can save up a lot of time depending on the file size. In large images the
desired object will probably be located in a smaller area only, thus it pays off to use this option.
Clear search region XE "Search region:Clear"
By pressing this button you delete the search region you defined with and

any object searches will be	e pe	rformed on the entire drawin	ng.		
no pood to gloor the provide	2116	If you want to define a new	•		
-		one. It will be done automa	ilcany.		
Update and close XE "Up	_				
	ses	the current window. All count he marker color and shape y	•		
6.2.2 Length meas	sur	rement XE "Lengtl	1		
Measurement	**				
_		easure the length of a single s ght lines, curves or polylines	-		
the	button and the following window will appear:				

Description/Category/Work Item/Color/Notes

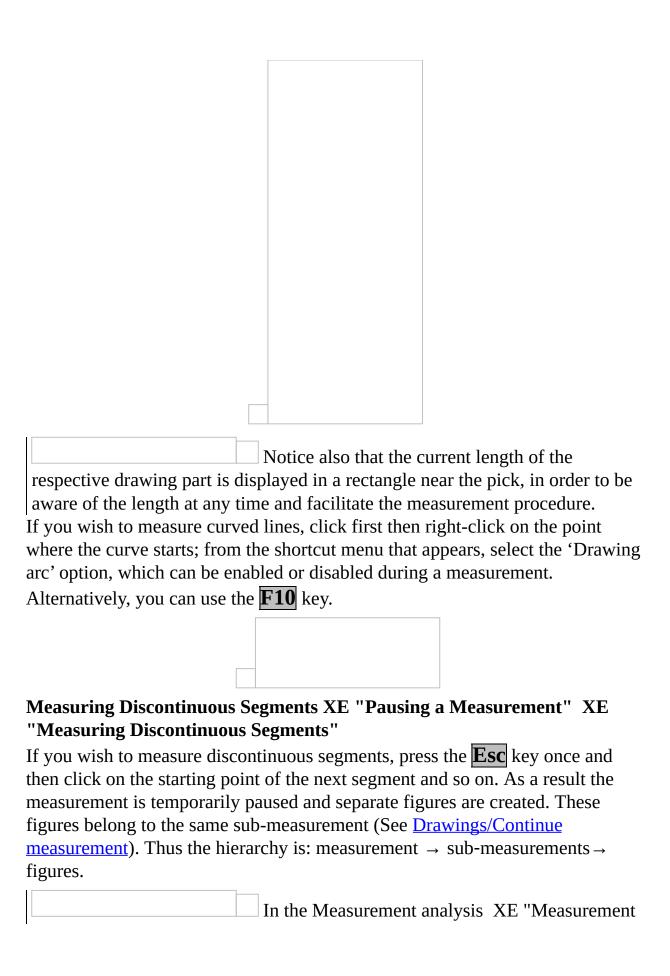
(See Measuring in image files/Types & method of measurement/Object count

XE "Item Counting" XE"Counting items"
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005I
).
Factor XE "Length Measurement: Factor" XE " Factor "
The 'Factor' field allows you to directly increase or reduce a result (the primary
result of a measurement which is shown in the 'Drawings' tab) as well as to
convert it to a different measurement unit. For example, if you wish to increase
the measured distance by 10%, enter the ${f 1.1}$ value in the 'Factor' field.
Unit XE "Length Measurement: Unit" XE "Unit"
In general, all measurements (also see <u>Measuring area</u> and <u>Measuring volume</u>) use the same units as the drawing, which can be set when importing it (see <u>Units type</u>) or by modifying its 'Drawing properties' (see <u>Drawing properties</u>). The default primary measurement unit is meters for the metric system and feet for the US systems.
If this measurement is linked to a WBS work
item, then it is possible that the unit of the work item and the unit of the
measurement are different. Nevertheless, converting between the two units is
done automatically. The unit of the measurement, which is the unit of the
drawing, is displayed in the 'Drawings' tab, while the unit of the WBS item is
displayed in the 'WBS' tab. For a list of all available units see General-Main
Toolbar/Library/ REF _Ref504557943 \h Unit aliases
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005

Line weight XE "Length Measurement: Line weight" XE "Line weight"

The 'Line weight' drop down menu allows you to choose the width of the line that will be used for the measurement.

Iteasurement options XE "Length Measurement: measurement options" Iteasuring procedure XE "Length Measurement: measuring rocedure" In measure the length of a segment, click the first point that defines the distance on want to measure, move your mouse to the endpoint and click on it. In image drawings, the button 'Polar track lock' is activated by default, in order to foster the line drawing during the measurement procedure. Notice that during the track of the pick, a dashed the appears in the continuation of the straight part of the line which highlights the «locked» angle-position.					
leasuring procedure XE "Length Measurement: measuring rocedure" o measure the length of a segment, click the first point that defines the distance ou want to measure, move your mouse to the endpoint and click on it. In image drawings, the button 'Polar track lock' is activated by default, in order to foster the line drawing during the neasurement procedure. Notice that during the track of the pick, a dashed the appears in the continuation of the straight part of the line which highlights					
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In image drawings, the button 'Polar track lock' is activated by default, in order to foster the line drawing during the neasurement procedure. Notice that during the track of the pick, a dashed the appears in the continuation of the straight part of the line which highlights	-	ength of a	segment, click t	he first point th	at defines the distance
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is activated by default, in order to foster the line drawing during the neasurement procedure. Notice that during the track of the pick, a dashed the appears in the continuation of the straight part of the line which highlights			In image dra	nwings, the but	ton 'Polar track lock'
Notice that during the track of the pick, a dashed ane appears in the continuation of the straight part of the line which highlights	is activated	l by defau	J	0	
ine appears in the continuation of the straight part of the line which highlights	measurement pr	ocedure.			
			Notice that of	during the track	of the pick, a dashed
ne «locked» angle-position.				ight part of the	line which highlights
	the «locked» ang	gle-positio	n.		



Editing a measurement XE "Edit: measurement"

You can also modify a measurement at a later stage. You can edit the measurement by changing the polyline shape or its dimensions. Select the polyline and move its nodes or right-click on it to show the shortcut menu, including the options 'Add node', 'Delete node' and 'Figure data'.

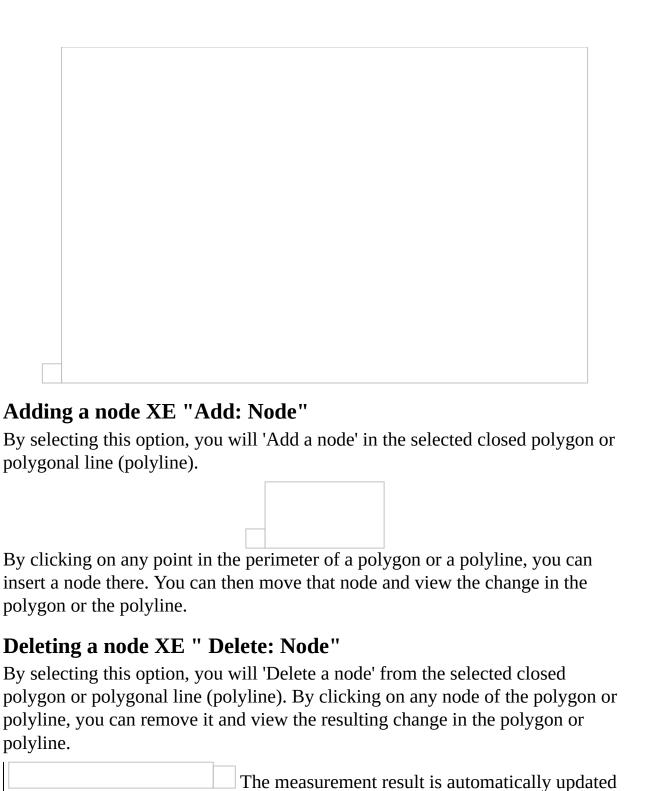


Figure data XE "Figure data"

with the above changes.

In many measurement types, there are parameters the values of which are different in each node of the measurement. For example, if you perform an area

measurement perpendicular to the drawing without specifying a common		
height, then whenever you create a new node in the measurement polyline, you		
will be prompted for the value of height at that node. Other examples of this		
behavior include length measurements with an extra length or manual		
<u>length</u> input and volume <u>measurements using linear items</u> . You can modify		
the values of such parameters by selecting 'Figure data'. Then you can edit the		
table that is opened, where the nodes are listed in one column and the parameter values in the other. In the previous example, even if you have chosen a common		
height, you could still edit each node's height via the same method.		
neight, you could still care cach hode s height via the same method.		
When editing a node, it will be marked on the		
drawing with a cross (+).		
'Figure data' is deactivated in length		
measurements, unless you tick the 'Extra length' or 'Input Segment length'		
checkbox, when creating the measurement.		
Down that are found in the same of the sam		
Parameters that are common for a measurement, or a sub-measurement to be exact, can be edited using 'Edit measurement'.		
However, once you modify a node's value by using 'Figure data', the parameter		
stops being common and is no longer visible in the 'Edit measurement' window.		

Extra length XE "Additional Length"

Select the 'Extra Length' option to add length to the distance you measure (e.g. to the floor plan views of Electromechanical works for vertically-oriented piping, cabling). During a measurement in which you have enabled the extra length

option, every time you click on the nodes of the distance you measure, the
following window appears on the screen:
Enter the value you wish to add at this particular point and press OK.
This value will be the default value for each
subsequent node in the measurement in such a way as not to require from the
user to re-enter it —in case the additional length is equal to that of the previous
node- while users have the possibility of changing it.
Were record and the sald are control longith to a resist.
You may want to add an extra length to a point
between the nodes of a line and at a later time. To do so, you can <u>add an</u> <u>intermediate node to the polyline</u> , then right click on it and select 'Figure data'
to edit the value of the extra length. By default, the value will be copied from
the previous node. Apparently, this is possible only if you have ticked the 'Extra
length' checkbox, when creating the measurement.
Input Segment length XE "Input Segment length" XE "Manual
length input "
Select the 'Input Segment length' option when you prefer to manually define the length of each segment instead of letting ExtrAXION to calculate it. During a
measurement in which you have enabled the input segment length option, every
time you click on a node to end a segment, the following window appears on the
screen:
Screen.
Enter the value you wish for the current segment and press OK.
You can use this feature in several cases e.g. when a drawing has different scale
in some regions, in isometric type drawings or if you just want to override
ExtrAXION's calculations and set the length you prefer.

6.2.3 **Measuring area XE** "**Measuring area**"

Using this button, you can measure the area of a surface that is either	
perpendicular to or co-planar with the drawing, or by counting objects. Click	the
button and the following window will appear:	
Description/Category/Work Item/Color/Notes/Factor	
(See Measuring in Image Files/Types & Method of Measurement/Object cour	ıt
XE "Item Counting" XE"Counting items"	_
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E00000	05I
).	
Unit XE "Measuring area: Unit"	
The default area unit is m2 for metric system and sq ft for US systems. (See	
Measuring in Image Files/Types & Method of Measurement/ REF	
_Ref504558385 \h Length measurement XE "Length Measurement"	
08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000	05I

Measurement options XE "Measuring area: measurement options"

Measuring surface area XE "Measuring area"

On the drawing's level XE "Measuring area: On the drawing's level"

Select the option 'On the drawing's level' when you want to measure a surface area which is located on the same level with the one depicted in the drawing. In order to measure the desired surface, you have to draw it again by consecutively clicking on its perimeter's nodes.

During the measurement procedure, you can measure surface areas that are enclosed by curved lines XE "Curved Line" XE "Arc" by right-clicking and selecting 'Drawing arc' (See Measuring in image Files/Types & Methods of Measurement/Length Measurement/Measuring procedure

08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F

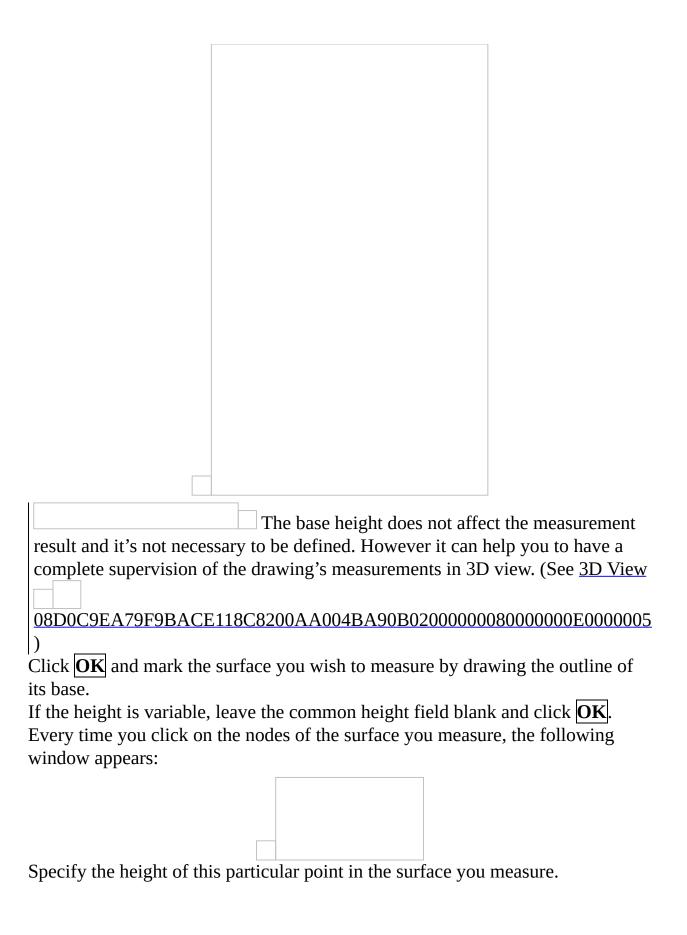
).
Alternatively, you can use F10 to toggle a 'draw a
curve' mode.
If you want to calculate the total area of more than one surfaces in one
measurement, press Esc once and then measure the next area, and so on (e.g.
counting tiles in a WC and two bathrooms simultaneously). The measuring procedure can be completed by right-clicking and selecting
'Terminate Measurement,' or by pressing the Esc key twice.
To continue the measurement, click the Continue Measurement'
button to add surface areas to the measurement, or 'Continue 'Continu
Measurement (subtract)' XE "Resuming a Measurement (subtract)" if you wish subtract the area of already drawn surfaces (e.g. in the façade, by removing the
surface area of the wall openings). The surfaces that you remove from the
measurement are marked on the drawing with cross-hatching, while the outline
of the areas removed is marked with a dashed line.
In the case of counting items, after measurement
completion, the Continue Measurement (subtract) XE "Resuming a Measurement (subtract)" option is disabled.
Micusarement (Subtract) option is disabled.

If you wish to subtract items, you can select them either one by
one by clicking on them or all together, and then use the 'Delete selected'
option.
The different types of measurements (on the drawing, perpendicular to the drawing, item counting) can be interchanged and combined (e.g. on the drawing and perpendicular to the drawing as in counting bathroom tiles), by using sub-measurements (See Drawings/Continue measurement).
The CAD vector files (.dwg, .dxf, .dgn) provide
additional abilities for measuring, in comparison to the image files (See <u>REF</u> <u>Ref361046587 \h</u> Measuring in vector files (CAD)
$\underline{08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005}$
).
Sub-measurement XE "Measuring area: Sub-measurement" XE "Sub-
measurement"
Whenever you chose to continue a measurement, either by addition or
subtraction, a new sub-measurement is created. Each sub-measurement appears
in the Measurement analysis window XE "Measurement analysis" as an
additional line (See Drawings/ <u>Measurement analysis</u> XE
'Measurements:analysis"
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F
).

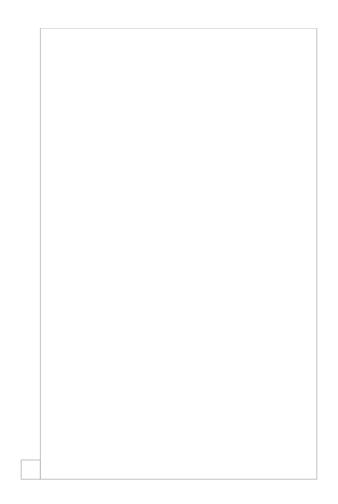
Perpendicular to the drawing XE "Measuring area: Vertically to the drawing"

Select the option 'Vertically to drawing' when you want to measure a surface which is perpendicular to the level depicted in the drawing.

To measure surfaces that are perpendicular to the drawing, you are prompt to specify their height and their base height. If the surface height is uniform, enter its value in the 'common height' field, as illustrated, in the following window:



This value will be the default value for each subsequent node in the measurement, so as not to require from the user to reenter it —in case the additional height is equal to that of the previous node- while users have the ability to change it.
You can later change the height of a node, even if you have opted for a common height; you will alter only the value of a specific node. To do so, right click on any node of the measurement, choose 'Figure data' and edit the desired values in the table that is opened (See Measuring in image files/Length measurement/Measuring procedure/Figure data).
It is also possible to input a height at an intermediate node of the line. To do so, right click on the polyline and choose 'Add node', so that a new node is added (See Measuring in image files/Length measurement/Measuring procedure/Add node). After moving the node to the desired location, right click again and choose figure data, as described above. Type of Measurement XE "Measuring area: Type of measurement"
By selecting points XE "Measuring area: Type of measurement: selecting points"
Using the type of measurement 'select points', you can measure area on the drawing's level, by clicking on its nodes and dragging the pointer.
Rectangular Region XE "Measuring area: Type of measurement: rectangular region" Using the type of measurement 'Rectangular Region' you can measure the area of rectangular surfaces by clicking on the node you want to start with, and dragging the pointer to its diametrically opposed node.
With this option you can complete your measurement faster using just two clicks instead of four.



By counting objects XE "Measuring area: Type of measurement: counting objects"

Select 'By counting objects' if you wish to measure a surface based on counting items.

Mark XE "Measuring area: Type of measurement: mark"

With this option you manually mark the desired objects on the drawing. If all items to be counted have the same area, fill in the value in the 'common area' field, as shown in the following window:

Click OV and calcat the	a abiacte by gangacytivaly clicki	ng on the dust sing tyleous
the objects you wish to	-	
If the surface area of the click OK .	e objects is variable, leave the res	spective field blank and
Every time you click on following window appe	an object whose surface area yo ars:	ou wish to measure, the
Specify the surface area	of this particular object.	
1	This value will be the defance user does not have to re-enter in the previous object- while users leave to the previous object- while users leave the previous th	it -in case the surface
change it.	ı	J

Objects search

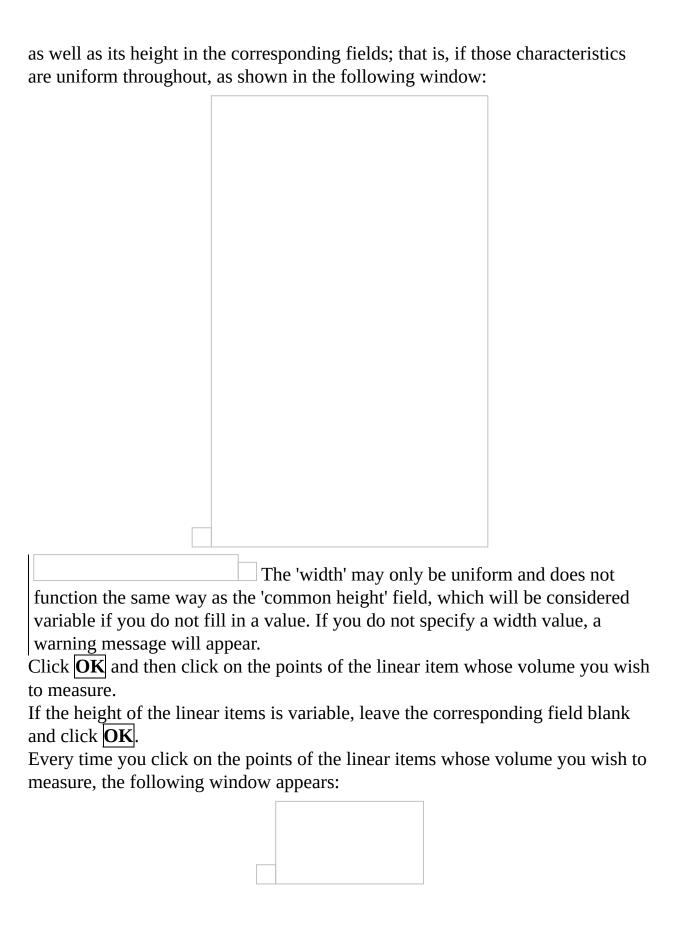
(See Measuring in image files/Types and method of measurement/Object count/Object search)

6.2.4 Measuring volume X	E "Measuring volume"
Using this button, you can measure the	volume from a surface, a linear item, or
objects on the drawing's level. Click the	
the following window will appear:	
Description/Category/Work iten	ı/Color/Notes/Factor
(See Measuring in image Files/Types &	Method of Measurement/ <u>REF</u>
<u>Ref361046662 \h * MERGEFORMA</u>	T Object count XE "Item Counting"
XE"Counting items"	
	04BA90B02000000080000000E0000005F
). Unit VE "Massuring volume U	ni+!!
Unit XE "Measuring volume: Unit XE "Measuring v	IIIL

The default volume unit is m3 for metric system and cu ft for US systems. (See
Measuring in image Files/Types & Methods of Measurement/ REF
_Ref504558421 \h Length measurement XE "Length Measurement"
08D0C9EA79F9BACE118C8200AA004BA90B020000000800000000E0000005F
),
Analysis in triangles XE "Measuring volume: analysis in
triangles"
(Measuring in image files/Types and method of measurement/Measuring
area/ <u>Analysis in triangles</u>
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F
Measurement type XE "Measuring volume: Measurement type"
Measuring volume from
A surface on the drawing's level XE "Measuring volume:from Surface area
at drawing level"
Select the option 'on the drawing's level' when you want to measure the volume
from a surface which is located on the same level as the one depicted in the
drawing.
To measure the volume from a surface on the drawing's level, you have to fill in
the 'common height' field. Once you specify the height, click OK and then draw
the area you wish to measure by clicking consecutively on its nodes.(See
Measuring in image Files/Types & Method of Measurement/Measuring
area/Measuring surface area/On the drawing's level
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F
).
During a measurement, the different measuring methods
(measuring volume from a surface on drawing's level, from a linear item, from
counting objects) can interchange and combine.
Linear item XE "Linear Item" XE "Measuring volume: from Linear item"

By selecting the option 'linear item', you can measure the volume from a linear item, as, for example, in the case you want to measure the volume of a trench in the perimeter of a plot, from a floor-plan view, in order to place rainwater drainage pipes.

To measure volume from a linear item, you will be prompted to fill in its width



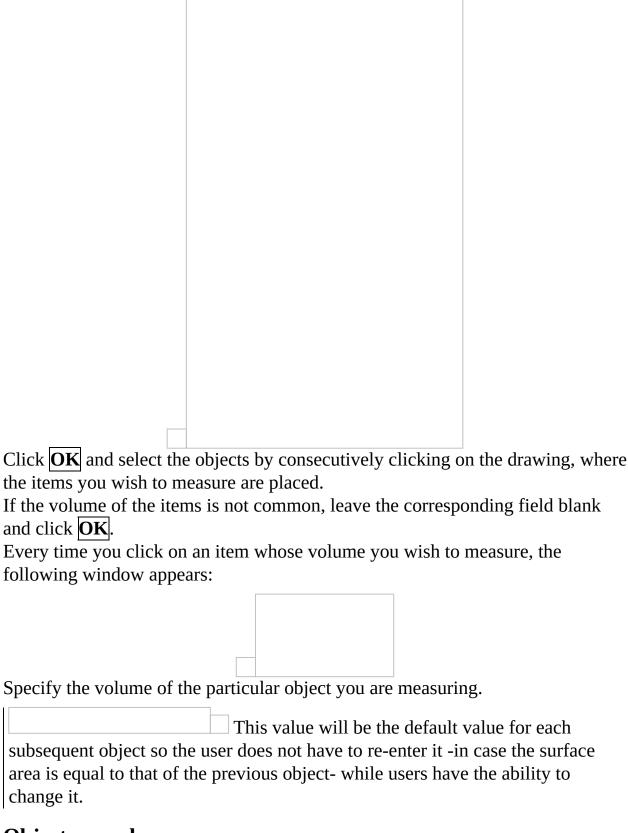
Specify the height of this particular point of the linear item you are measuring.
This value will be the default value for each
subsequent object so the user does not have to re-enter it -in case the surface
area is equal to that of the previous object- while users have the ability to
change it.
You can later change the height of a point, even if
you have opted for a common height; you will alter only the value of a specific
node. To do so, right click on any node of the measurement, choose 'Figure
data' and edit the desired values in the table that is opened (See Measuring in
image files/Length measurement/Measuring procedure/Figure data).
It is also possible to input a height at an
intermediate node of the line. To do so, right click on the polyline and choose
'Add node', so that a new node is added (See Measuring in image files/Length
measurement/Measuring procedure/Add node). After moving the node to the
desired location, right click again and choose figure data, as described above.

By counting objects

Choose 'counting objects' if you wish to measure the volume based on objects. For example, you can measure the total volume of 5 decorative concrete globes if you know the volume of one of them.

Mark

With this option you manually mark the desired objects on the drawing. You can measure volume from items; if the volume of the items is common, you will be prompted to fill in the value in the corresponding field, as shown in the following window:



Objects search

(See Measuring in image files/Types and method of measurement/Object count/Object search)

6.2.5 Custom measurements XE "Custom" measurements" Using this button, you can make custom measurements you have set in the library (See General/Library/Custom Measurements 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F). Click the button and a list of the available custom measurements of the library appears. By selecting one of them, the following window appears: The 'Measurement details' region's exact form depends on whether the custom measurement is of object, length, area or volume type.

Description/Category/Color/Notes/Factor

(See Measurements i	n image files/Types and methods of measurement/Object
	nting" XE"Counting items" CE118C8200AA004BA90B0200000080000000E0000005F
Work item XE "(Custom measurements: work item"
(See Measurements i	n image files/Types and methods of measurement/ <u>Object</u>
	nting" XE"Counting items"
set in the region 'Pred Measurement window	asurement with WBS work items, the formulas which were defined measurement calculations' of the 'Custom w' in the Library are also shown. WBS work items -to which the measurement will be
linked- the formula y	
field of the WBS ite formulas by double-	Alternatively, when the cursor is at the formula m, you can automatically copy one of the predefined clicking on it.
measurement, then i	If there is only one formula defined for the custom t is automatically copied to the formula field.

Unit XE "Custom measurements: unit"

The default unit of the primary measurement is automatically set, depending on

the type of measurement you have set in the Library. It is possible to change the unit of measurement. (See Measurements in image files/Types and methods of measurement/ REF _Ref504558458 \h Length measurement XE "Length"
Measurement" 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000
)
Parameters XE "Custom measurements: parameters"
Here appear the parameters of the current custom measurement as they have been set them in the Library.
Enter for each parameter the values you want or leave the predefined ones.
The mark at the end of the value field signifies that the values of the parameters can be entered either by marking them on the drawing or by typing them in (See General/Library/Custom Measurements 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000
If you have created more than one submeasurements, the value of its parameters can be different for each one (See Drawings/Continue measurement). You can edit these values separately for each sub-measurement (See Drawings/Edit measurement). In case the parameter can be defined on the drawing, instead of typing its new value, you can edit it by clicking on the Sign and repeating the aforementioned procedure . Note that when doing so, you have to define all line segments from the beginning, as the previous value is not retained. Parameters that are defined on the drawing are marked in a similar way to the dimension objects in a CAD program. You can modify them by dragging and dropping the nodes of the corresponding line
segments. The value of the parameter and ultimately the measurement will be automatically renewed.

7 Measuring in vector files (CAD) XE "Measurements:in Vector Files (CAD)"

7.1 Initial settings

Every time you import a new vector file (CAD) into the project (Drawings/Add drawing), a message box appears which guides you through the initial settings you have to establish:

- Rotate the drawing, if needed
- Set the drawing scale, if other than 1:1
- Define the folders where the external references, if any, are located
- Set the origin, if you wish to copy measurements

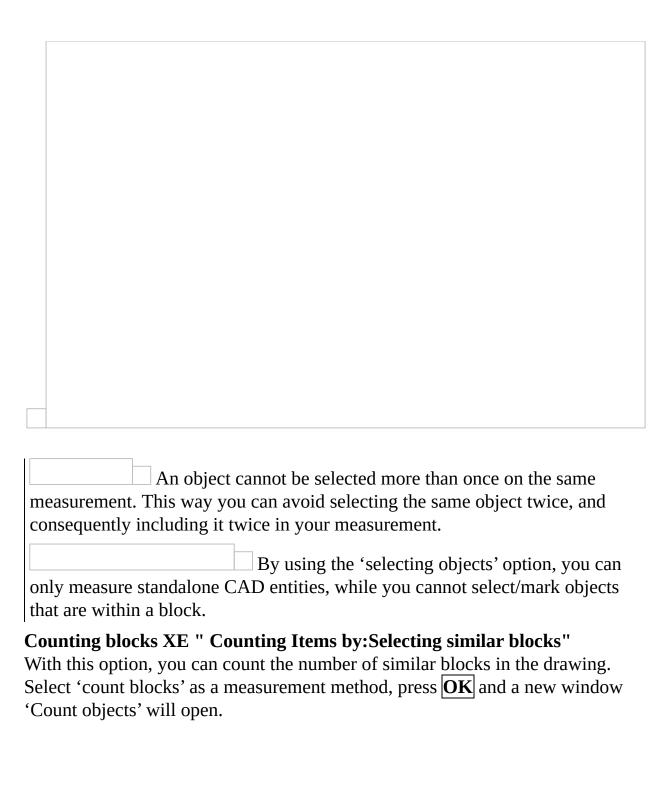
You can find all these initial settings at the drawing's properties window (See
Drawings/ <u>REF_Ref361046970 \h</u> Drawing properties <u>XE "Drawing:Details"</u>
XE "Drawing: Properties "
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005E

7.2 Types and method of measurement

7.2.1 Object count XE '	'Counting items"
	he objects included in the drawing. Counting pposed to image files may be done also by
Click the appear:	button and the following window will
1 0	Types and methods of measurement/Object
count XE "Item Counting" XE"Co	

Measuring procedure

Measurement by marking XE " Counting Items by: Marking" (See Measurements in image files/Types and methods of measurement/Object
count XE "Item Counting" XE"Counting items" 08D0C9EA79F9BACE118C8200AA004BA90B020000000800000000005F).
Object selection XE " Counting Items by: Selecting CAD objects" By selecting objects on a drawing, you can measure objects which are CAD 'entities' XE "CAD Entities". On the drawing, mark the CAD objects you want to measure by clicking on any part of them. You can also select many objects simultaneously by following the same process that applies to CAD applications, e.g. by clicking on any part of the screen and dragging your cursor in such a way as to include in the marked surface the objects you wish to include in your measurement.
If you drag the cursor to the right, then the selection rectangular is blue and only objects that are fully included into it are selected. If dragging is to the left then the rectangular is green and even objects that partially intercept are selected.



Block preview window
Selected blocks will be previewed in the upper left panel. Initially this window is empty.
Drawing window
On the right part of the screen you can move around the drawing and select blocks by clicking on them. When you select the instance of a block:
 The block will be displayed in the preview window. All instances of this block will be marked on the drawing, while the
currently selected one will also be enclosed in a rectangle, marked with an
X and zoomed in on.The name of the block will be highlighted in the list and the 'Objects'
counter will show the number of all its instances.
Blocks belonging to invisible layers can't be
measured, even if they are included in the list. If you wish to count all the
blocks you must, before measurement, make sure that all the layers of the drawing are checked as visible (See Drawing windows/ <u>REF_Ref361047228 \h</u>
,

08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
).
You can change the markers' color in the window's taskbar if
the one you selected when you started the measurement isn't discernible
enough.
List of blocks
On the left side there is a list with the names of all the blocks in the drawing.
Here you can choose a block if you know its name. You can also use the two
arrows on the top to select the next or previous instance of the current block.
Check the preview of a block with an obscure name to see what
it corresponds to.
Taskbar
Update and close
With this button you store the counted blocks as the result of the measurement
and then the window is closed.
A - 4
Auto search
Enabled by default, this option triggers an automatic search for all the instances
of a block, every time you choose one. You can turn it off by clicking on the button Auto search.
Dutton Auto Search.
Search objects
This button is enabled when you turn off 'Auto search'. In this mode you have to
manually press the button after you select an object in order to count its
instances.
Delete selected
If you select one or more markers that correspond to instances of the block you
want to measure and press , they will be removed from the measurement.
The change will also be reflected in the 'Objects' counter, which will be reduced
accordingly.
Use this option to remove any unwanted instances, e.g. to delete the
ose and option to remove any unwanted instances, e.g. to defete the

block instance located in the drawing's legend.
Define search region XE "Search region:Define" This button lets you define a region where the search of blocks will be limited to. This region is marked with a red dashed line on the drawing. When you count blocks, any instances outside the search region will be excluded from the measurement.
The search region will be automatically deleted if you click on a block outside its boundaries.
Blocks on the search region's edges are included in the measurement.
Clear search region XE "Search region:Clear" Press this button to delete the defined search region and count all the instances of a block in the drawing.
Zoom in
(See <u>Auxiliary measuring tools/Zoom in</u>)
Zoom Out (See <u>Auxiliary measuring tools/Zoom out</u>)
Zoom Extents
(See <u>Auxiliary measuring tools/Zoom Extents</u>)
Zoom Window
(See <u>Auxiliary measuring tools/Zoom Window</u>)

Figure zoom size XE "Figure zoom size"

In large and complex drawings it is often difficult to discern the marked blocks. For this reason ExtrAXION automatically zooms in when you select a block instance. The 'Figure zoom size' option allows you to specify the appropriate zoom level. If you leave it at 'No zoom' the drawing will just be centered on the selected block.

Figure color

Choose the color of the markers used. (See <u>Measuring in image files/ Types and method of measurement/Object count/Color</u>).

7.2.2 Length me	easurement XE "Length	
Measureme	ent"	
polyline, multiple singl	can measure the length of a single straig e straight lines, curves or polylines on to a vector files (CAD) as opposed to imag	the drawing.
be done by selecting of following window will		button and the
Description/Catego	ry/Work Item/Color/Notes/Fact	or
•	image files/Types and methods of meas	
	ng" XE"Counting items"	0000000E0000005F
Unit XF "Length N	Aeasurement∙ Unit"	

(See Measurements in image files/Types and methods of measurement/Length

Measurement).

Measuring procedure XE "Length Measurement: measuring procedure"

Selecting points XE "Length Measurement: measuring procedure: selecting

(See Measurements in image files/Types and methods of measurement/Length **Measurement**)

Object selection XE "Length Measurement: measuring procedure: selecting objects" XE " Counting Items by: Selecting CAD objects "

By selecting objects on a drawing, you can measure the length of objects which are CAD 'entities' XE "CAD Entities". To do that, use 'select objects' as type of measurement and click **OK**.

On the drawing, mark the CAD objects whose length you want to measure by

clicking on any part of them.
During a measurement, every object can be selected only once. This way you can avoid selecting the same object twice, and consequently including it twice in your measurement.
By using the 'selecting objects' option, you can
only measure standalone CAD entities, while you cannot select/mark objects
that are within a block.
During length measurement through object selection, you cannot select and measure the length of entities that belong to a block.
Extra length XE "Length Measurement: extra length"
(See Measurements in image files/Types and methods of measurement/Length Measurement).
Input Segment length XE "Input Segment length" XE "Manual length input "

(See Measurements in image files/Types and methods of measurement/Length Measurement).

7.2.3 Measuring surface area	
☐ XE "Measuring surfac	

Jsing this button, you can measure the area of a surface that is either perpendicular to or coplanar with the drawing, or by counting objects. Measuring a surface in vector files (CAD), as opposed to image files, can also be
lone by selecting objects or similar blocks. Click the
button and the following window will appear:
Description/Category/Work Item/Color/Notes/Factor
See Measurements in image files/Types and methods of measurement/Object
count XE "Item Counting" XE"Counting items"
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F
T. '4 NT UNA
Unit XE "Measuring surface area: unit"
See Measuring in Image Files/Types & Method of Measurement/Measuring wea).
Analysis in triangles XE "Measuring surface area: analysis in
riangles"
See Measuring in image files/Types and Measuring procedure/Measuring

area/<u>Analysis in triangles</u>

<u>08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F</u>).

Measuring surface area

On the drawing's level XE "Measuring surface area:On the drawing's level"

Selecting points XE "Measuring surface area:On the drawing's level:by selecting points"

Object selection XE "Measuring surface area:On the drawing's level:by selecting objects"

By selecting objects, you can measure the surface area of standalone CAD entities. To measure the surface area of CAD entities, select the 'By counting objects' method and click $\overline{\mathbf{OK}}$.

Then, select the CAD entities whose surface area you wish to measure, by clicking on them or by selecting all of them at once in such a way as to include the desired entities. This way, you can measure with just one click, for example, the volume of concrete in a plan view, allowing only the corresponding layer to be visible, by specifying the height and selecting all concrete walls and props at once.

By selecting objects, you can measure of CAD
entities, while you cannot mark areas that are not objects.

Line enclosing point XE "Measuring surface area:On the drawing's level:by line enclosing point"

By selecting line enclosing point, you can measure the surface area on the drawing's level based on the lines that surround the point you click.

To use this method Zoom in and pan, it closed area to be more than the perimeter is more than the peri	in order to mov neasured. Then	e and bring in click inside tl	the middle his area.	of the screen th
Zoom in and pan, i	in order to mov neasured. Then	e and bring in click inside tl	the middle his area.	of the screen th
Zoom in and pan, it closed area to be made area to be made area. The perimeter is made area.	in order to mov neasured. Then narked automati	re and bring in click inside the cally even if	the middle his area.	of the screen th
Zoom in and pan, it closed area to be made The perimeter is made.	in order to mov neasured. Then narked automati	re and bring in click inside the cally even if	the middle his area.	of the screen the gnated as a clos
Zoom in and pan, it closed area to be not the perimeter is more polyline. In case you haven't	in order to mov neasured. Then narked automati For	e and bring in click inside the cally even if it better results ough and hav	the middle his area. it is not desi	of the screen the gnated as a closs instructions beled the region you
Zoom in and pan, it closed area to be more than the perimeter is more polyline.	in order to move the neasured. Then narked automating For the second in endeast and the meast the meast the second in endeast the meast the meast the meast the second in endeast the meast the meas	re and bring in click inside the click inside the cally even if it better results ough and havurement may	the middle his area. it is not design the follow the fendered not finish. P	of the screen the gnated as a close instructions below the region you bress Esc to stop

By right clicking hide or show the layers you wish, in order to «clear» the drawing and to make the selection efficient and easy. Choose either «Hide figure layer» or «Figure layer only visible».
If there is a region which is overlaid at the measurement around a point, this is measured only once.
Rectangular Region
(See Measuring in Image Files/Types & Method of Measurement/Measuring a Surface Area/Rectangular region).
Perpendicular to the drawing XE "Measuring surface area: Vertically to the drawing"
Selecting points XE "Measuring surface area: Vertically to the drawing:by selecting Items"
(See Measuring in Image Files/Types & Method of Measurement/Measuring a Surface Area/Perpendicular to the drawing
<u>08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F</u>).
Object selection XE "Measuring surface area:Vertically to the drawing:by selecting objects"
(See Measuring in vector files/Types & Method of Measurement/Measuring a Surface Area/On the drawing's level/ <u>Object selection</u>
<u>08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F</u>)
By counting objects XE "Measuring surface area:by counting items"
Measurement by marking XE "Measuring surface area:by
counting items: Measurement by marking"
(See Measuring in Image Files/Types & Method of Measurement/Object count
XE "Item Counting" XE"Counting items"

Object selection XE "Measuring surface area:by counting items: selecting objects"

(See Measuring in Vector Files/Measuring a Surface Area/On the drawing's level/<u>Object selection</u> <u>08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F</u>)

Count blocks XE "Measuring surface area:by Counting items: finding similar blocks"

With this option, you can measure the surface area of similar blocks on the drawing.

Fill in the common area of each of the blocks you will count and then press **OK**. A new window, where you can count the blocks will be opened (See Measuring in vector files/Object count/Counting blocks).

7.2.4 Measuring volume XE	E "Measuring volume"
Using this button, you can measure volumevel, from a linear item, or from a select (CAD), as opposed to measuring in imag	tion of items. Measuring in vector file
objects or similar blocks. Click the following window will appear:	button and the

•	ry/Work Item/Color/Notes/Fa	
	e Files/Types & Method of Measure	ment/ <u>Object count</u>
XE "Item Counting" XE 08D0C9EA79F9BACE	118C8200AA004BA90B020000000	8000000E0000005F
). 	ar and the same of the same	
Unit XE "Measuring (See Measuring in Imag	e Files/Types & Method of Measure	ement/Measuring
volume XE "Measuring		
9	118C8200AA004BA90B020000000	80000000E0000005F
). Analysis in tuinnals	o VE "Mooguring volumes on	alvaia in
Analysis in trialigie triangles"	s XE "Measuring volume: and	arysis iii
O	e files/Types and Measuring procedu	ure/Measuring
area/ <u>Analysis in triangle</u>	<u>es</u> 118C8200AA004BA90B020000000	BUUUUUUUUUUU
<u>00D0C3EA73F3BACE</u>).	110C0200AA004DA30D020000000	100000000000000000000000000000000000000

Measuring volume from

Surface area on the drawing's level

Selecting points

(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/ <u>A surface on the drawing's level</u> <u>08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F</u>).

Object selection

(See Measuring in Vector Files/Types & measuring procedure/Measuring a Surface Area/ On the drawing's level / REF_Ref362267803 \h_* MERGEFORMAT Object selection 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F) (See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/ A surface on the drawing's level 08D0C9EA79F9BACE118C8200AA004BA90B020000000800000000005F).

Linear item

Selecting points

(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/<u>Linear item</u> <u>08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F</u>)

Object selection

```
(See Measuring in Vector Files/ Types & measuring procedure /Measuring a Surface Area/ On the drawing's level /Object selection 08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F) )
(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/Linear item 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F)
```

Object selection

Measurement by marking

(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume/By counting objects 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F).

Object selection

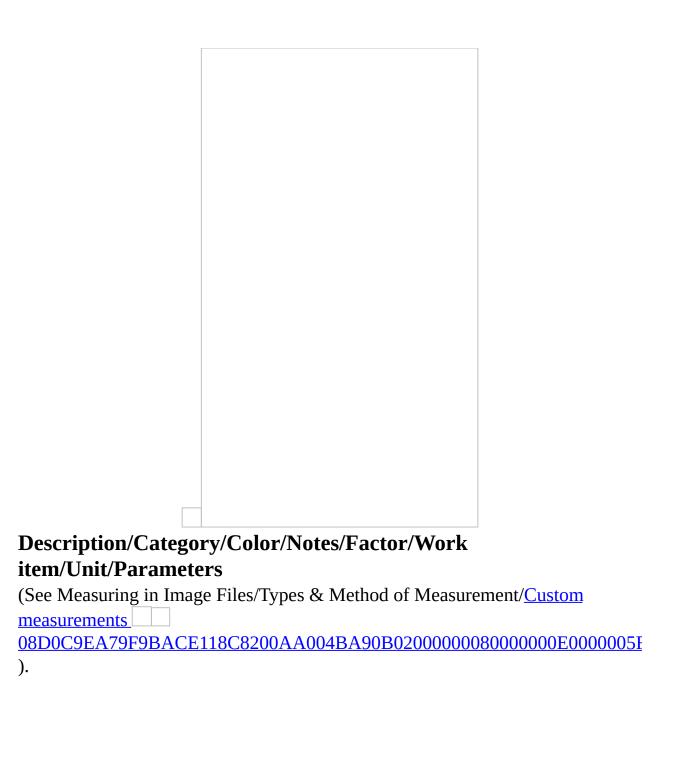
By selecting objects, you can measure the volume of standalone CAD entities. You will be prompted to fill in the common volume of the objects you want to measure. If the objects' volume is not common, leave the field blank so that every time you select a CAD entity by clicking on it, you will be asked to enter its volume.

Identical blocks

(See Measuring in Vector Files/ Types & measuring procedure /Measuring Surface Area/By counting objects /Count blocks 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000005F).

7.2.5 Custom measurements XE "Custom measurements"

Using this button, you can make custom measurements you have set in the
library (See General/Library/ <u>Custom Measurements</u>
<u>08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F</u>
). Click the button and a list of the available custom measurements of the
library appears. By selecting one of them, the following window appears on your
screen:



8 Auxiliary measuring tools

8.1 Recording	
The	Recording button is activated during a
measurement, and it is o	leactivated once the measurement is completed. By
clicking the button whil	e it is activated, you stop the measurement.

8.2	Annotations	
8.2.	Draw measurement region	XE "
	Draw measurement region "	
meas moni	this button, you can mark the areas of the drawing where the rements have been completed. This option offers you the ability or the areas that have already been quantity surveyed. If you click, the following window will appear:	
to 6/3 mark meas To co	'Description' field, enter the description of the measured area, e2011'. In the 'Color' field, you can change the default which is each measured area. Then, click OK and draw the area where a rements are complete by consecutively clicking on its perimeter applete the marking procedure for the measured area, right-click key.	used to ll r's nodes.
Once doub and y	you have finished marking the measured area, you can modify it clicking any part of the area, the 'Measurement Area' window ou can change both the description of the measured area and the rking.	appears
Furth Meas	rmore, you may edit the marked area by changing the polyline strements in image files/Types and methods of measurement/Lengrement).	
	By disabling and enabling the auxiliary ng of the measured area and the setting of the scale in image fil respectively.	•
8.2.	Add note XE "Add: note"	

Using this button you can add notes on your drawing. If you click this button the following window will appear:

	the note you want to add on t	
•	olor' field, you can change the	
	Characters height' field you on the note apparent. Then, click	
	g at the point you want it inse	
	ver you want. By right clicking	
and characters' color and	Edit note' appears and you ca size.	n change the description
	move a note by clicking on it In case you want to move mo	0 00 0
	them all and use the button '	
	Vou can also delete one	or more notes by selecting
them while pressing SH	FT and clicking the 'Delete	, and the second
8.2.3 Build legen	d XE " <u>Add:</u> leg	end " XE " Build
legend " XE	" Legend : build "	
the open sheets. By clicki	n create automatically a legening this button the following v	
screen:		
	_	

Choose the type of legend you want:

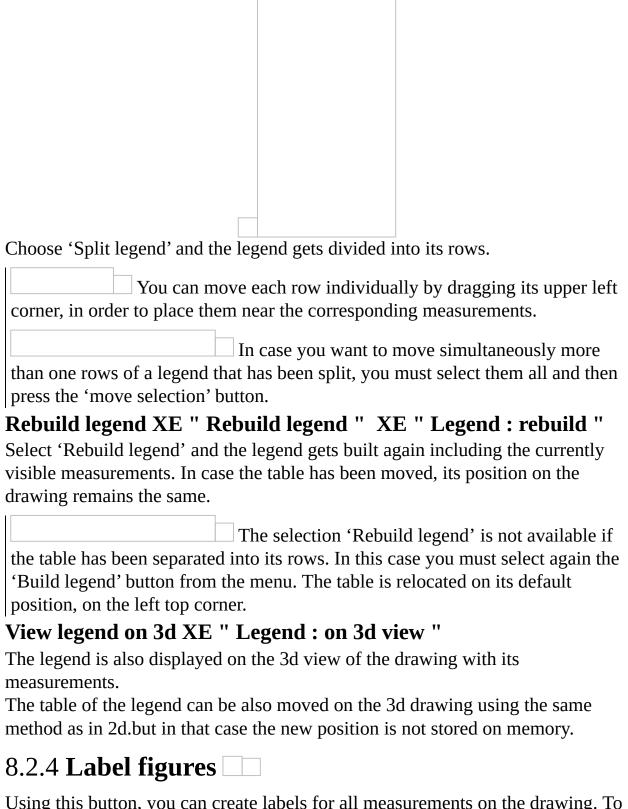
- Measurements: Includes all visible measurements in the drawing
- Measurement labels: Same as 'Measurements', but breaks down each measurement into the figures it consists of. Labels must be created beforehand (See <u>Label figures</u>).
- Items and measurements: Combination of 'Measurements' and 'Items'.
- Items: Displays the work items corresponding to measurements that are visible and linked with a WBS item.

Check the 'on all open sheets' box to create a legend in every open sheet instead of repeating the process manually. Then click $\overline{\mathbf{OK}}$.

The legend belongs to a special layer of the drawing and it can be shown or hidden. (See <u>Drawing layers</u>).

In the first column of the table of the 'Measurements', 'Measurement labels' or 'Items and Measurements' type legend, you see the color of the measurement. In case of item counting, instead of a rectangle of the same color as the measurement, the shape chosen for marking the objects appears. In the rest columns the measurement description, unit and quantity are shown.

The legend includes only visible measurements.
You can move the legend by clicking on its upper left corner and then dragging it.
There can be multiple legends in the same drawing.
Double click on a row to highlight the corresponding figure on the drawing.
The quantity shown in every work row is the total of all measurements, on all drawings and includes also even measurements which are not in drawings.
Split legend XE " Split legend " XE " Legend : split "
By right clicking anywhere on the legend, the following shortcut menu appears:



Using this button, you can create labels for all measurements on the drawing. To do so, make sure that the desired measurements are visible, select them, click on 'Annotations' and then choose 'Label figures' from the drop down menu. The

drawing. The following window appears on the screen:
arawing. The rono wing window appears on the screen.
In this window you can customize the color, font size, numbering and prefix of
the labels that will appear. With the 'Show area dimensions' check box toggled
on, the lengths of the segments around a measured area will also be labeled.
labeled explicitly, along with their value. In the screenshot above, label 3.2
indicates that the 2 nd figure of the 3 rd sub-measurement of a length
measurement is 0.17.
If you have not selected any measurements in particular, then all
visible measurements of the current drawing will be labeled.
8.2.5 Clear labels

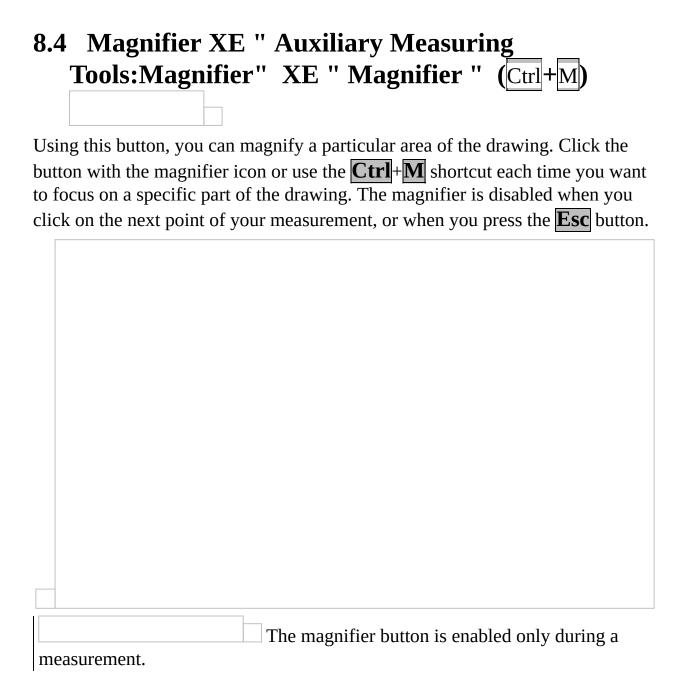
Click this button to delete the labels of all visible measurements. Alternatively, you can hide the label by toggling off the 'Visible' checkbox of the

corresponding measurement in the Drawings or WBS tab

8.3	Define analysis region	XE "	Define	analysis
1	region "			

Using this button you can draw a rectangular area on the drawing in order to define the measurements that will be included in the analysis of the current measurement sheet. Click and drag the cursor to define the region and click again to complete it. Analysis regions on the drawing are distinguished by a red dashed line.

You can define as many analysis regions as you
wish. Each region will appear in a separate tab of the analysis window. If there is no analysis regions defined then the whole drawing is considered as one region.
Note that, for a measurement to be included in the analysis of a region, it must fully surrounded by the region's rectangle.
If a measurement is included in more than one analysis regions, it will be analyzed and appear in all of them.
You can resize an analysis region after its creation Click on it to select and then drag the upper-left or the lower-right handle to change its size. Click again to complete the resizing.
You can delete a region at any time. Click on it to
select and then click the 'Delete selected' button.



	Tools:Deleting Selected "
creat	button allows you to delete the selected lines, curves, or points that were ted on the drawing during the measurements, without deleting the entire surement (See Drawings/Delete measurement
). Cl	OC9EA79F9BACE118C8200AA004BA90B0200000008000000E0000005 ick on the drawing at any point of the measurement layer you wish to delete then click the 'Delete selected' button.
	Deleting selected areas is accompanied by the ate of the relevant measurements results in both 'Drawings' and 'WBS' tab
-	views.

	an copy one or more parts of the same or multiple measurements by ing them on the drawing, pressing this button and moving them around.
Movi	ng is performed by defining the start and end point of a point of reference
These	copies will then be automatically added to their respective measurement
the va	llues of which will be increased.
	To select multiple items, press and hold Shift or use the
selec	tion rectangles, as in CAD software.

8.7	Move selection	XE	"Moving:sel	lection"	
------------	-----------------------	----	-------------	----------	--

Same as before (See <u>Auxiliary measuring tools/Duplicate selection</u>), but without creating copies or modifying measurements.

8.8 Rotation XE "Rotation"
Having selected one or more parts of one or more measurements, you can rotate them using the options shown to the following drop down list.
8.8.1 Rotate
You can rotate the selected measurement around a center of rotation you are asked to define on the drawing.
8.8.2 Rotate anticlockwise 90°
You can rotate the selected measurement 90° anticlockwise.
8.8.3 Rotate clockwise 90°
You can rotate the selected measurement 90° clockwise.
8.8.4 Mirror horizontally
You can rotate the selected measurement around the horizontal axis.
8.8.5 Mirror vertically
You can rotate the selected measurement around the vertical axis.
In order to select more than one objects, you can select them one by one while pressing SHIFT or using rectangular selection frames like you do in a CAD program.

8.9	Zoom-in XE " Auxiliary Measuring Tools:
	Zoom-in" XE " Zoom: -in"
Clic	k this button to enlarge the drawing.
enla	You can also zoom-in by clicking on the part you want to arge and then rolling the mouse wheel forwards.

8.10 Zoom-out XE " Auxiliary Measuring Too	ols:
Zoom-out" XE " Zoom: -out "	
Click this button to zoom out of the drawing.	
You can also zoom out by clicking on the part you reduce and then rolling the mouse wheel backwards.	want to

8.11 Zoom extents	XE'	' Auxiliar	y Measuring	Tools:
Zoom extents "	XE	" Zoom: (extents "	

Click this button to fit the drawing to the dimensions of your screen. The drawing is moved and resized (using the appropriate zoom) so that the entire drawing appears on your screen as large as possible.

8.12 Zoom window	XE " Auxiliary Measuring Tools:
Zoom window"	XE " Zoom: window "

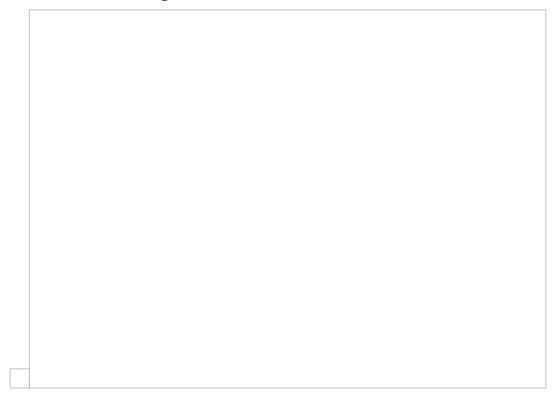
Press this button to zoom in a specific part of the drawing. Click on the drawing and define, by dragging, the desired part where you want to enlarge.

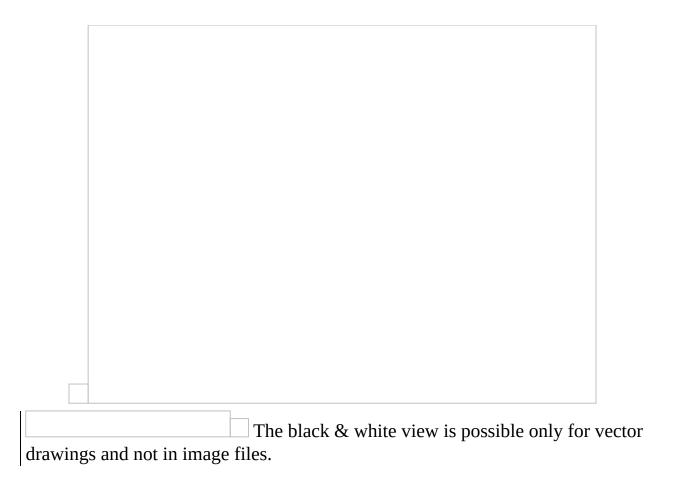
8.13 Refresh XE " Auxiliary Measuring Tools:Refresh" XE "Refresh"

Using this button, you can refresh the current drawing (redraw).

8.14	Black & White AE "	Auxili	iary Meas	suring
To	ols: Black & White view"	' XE ''	Black &	White
vi	ew"			

CAD Drawings usually have plenty of colors and the measurements may not be easily identified. Using this button you can convert the drawing into black & white with only the measurements' layers remaining colored. You can see the difference at the following windows:





8.15 Polar track lock (F8) XE " Auxiliary Measuring Tools: Polar track lock " XE " Polar track lock "

If this button is activated during the measurement procedure, you can exclusively move on specific axes (the step of the track lock angle is set by default to 15°). Alternatively, press the button $\boxed{\textbf{F8}}$. It replaced the «Ortho» option

For changing the polar track lock (See Drawing Measurements settings/ <u>Polar track lock</u>)
On image files, this button is 'on' by default, in order to make the line drawing easier during the measuring procedure.
Using the button F8 you can go within the two situations during the measuring procedure too.
Object snap prevails over Polar track lock.

8.16 Object snaps (Osnaps) XE " Auxiliary Measuring **Tools: Osnaps "XE "Auxiliary Measuring Tools:** Object snaps " XE " Osnaps " XE " Object snaps Using this button, you, can choose to activate object snapping. Set the points where you wish snapping to be possible. The options are shown in the following window: Click **Select all** in order to activate all snaps with one click, **Clear all** in order to disable all of them and **Defaults** in order to reinstate the factory presets. You can enable, disable or change the osnap options as many times as you wish during a measurement. If you modify any of the default osnap options, they

are saved for the current drawing sheet only. These options are saved per pc

user.

8.17 Show zoom-and-pan window XE " Auxiliary Measuring Tools: Zoom-and-pan window "XE" **Zoom-and-pan window** " Using this button you can activate or deactivate the zoom-and-pan window, so that is does or does not show in the lower right part of the screen. In the case of very large files, it is recommended to use alternative ways of zooming and panning, and not the zoom-and-pan

Having the zoom-and-pan window activated, you can pan the drawing by moving the red frame, which marks the part of the drawing that is visible in the right part of the screen. To zoom in or out, move the zoom indicator towards the + and - respectively.

window.

8.18 Compare XE "Compare drawings"
You can compare different versions of a drawing and easily find what has been added, removed or modified.
By clicking on this button the drawing comparison
starts and a new window is opened. After you have finished, press it again to exit the comparison mode.
8.18.1 Select drawing
Choose a drawing from your computer to compare with the current one. You can perform comparisons between image files (.jpg, .png, .pdf) or between vector drawings (.dwg, .dxf) but you cannot mix them up.
8.18.2 Image comparison XE "Compare image
drawings"
This checkbox is activated only in vector drawings. When checked, the drawings will be converted to images and then the comparison will take place.
8.18.3 Sensitivity XE "Sensitivity"
This slider is activated when comparing image files or when you have checked 'Image comparison'. Adjust it to define how great a difference must be in order for it to be marked and displayed.
Try to decrease the sensitivity in order to ignore false positive differences, due to the slightly different scale or the image quality of the two drawings.

8.18.4 Image height XE "Image height"

This field is activated when comparing image files or when you have checked 'Image comparison'. It is the height in pixels of the images when they get compared.

8.18.5 Calibrate XE "Calibrate"

Click on the downwards arrow to view a drop down menu with the following actions:

Type the scale, choose from a list of standard ones, or define it on the new

Set rotation

Rotate the new drawing.

(See <u>Drawings/Drawing properties/Rotation</u>)

Set scale

<i>y</i>	
drawing.	
(See <u>Drawings/Drawing properties/S</u>	Scale)
In image	files, defining the scale on the drawing isn't
perfect in terms of accuracy. Thus t	he two drawings will most likely have a
slightly different scale. If the comp	arison marks everything as being different,
try to decrease the sensitivity or inc	rease your accuracy with a higher zoom
level when defining the scale.	

Set origin

Define the (0,0) point of the new drawing. (See <u>Drawings/Drawing properties/Origin</u>)

	In vector drawings you can use the Objects snaps to
have perfect accuracy.	
	While setting the origin isn't generally required in
vector drawings, unless most likely necessary.	it was changed by their author, in image files it will be

8.18.6 Overlay XE "Overlay"

After you have selected and calibrated the second drawing, press $\overline{\mathbf{OK}}$ and wait while ExtrAXION performs the comparison. Once the execution is completed, the two drawings are displayed overlaid.

- Grey items are identical in both drawings.
- Blue items are found only in the second drawing.
- Red items are found only in the first drawing.
- When an item is changed, then it is colored green.

	Changed items can be detected only	in vector
drawings.		
	To end the comparison and return to	the original
drawing press	again. To view a more detailed comparison	follow the next
instructions.		

8.19 Show drawing's versions comparison XE " Show versions comparison " This button is activated only when you compare two drawings. Press the button to open a new window, where you can move between the first drawing, the second and their overlay by clicking on the respective tabs. (See Auxiliary measuring tools/Compare/Overlay)

8.20 3D View XE "3D View "
Using this button you can see the measurements of the drawing on 3D view. You can see perpendicular to the drawing area measurements and inclined area measurements and point out mistakes that are not visible on 2D view (e.g. wall height less than the roof's base height).
8.20.1 Plot (Ctrl+P) XE "Plot" XE "Drawing: Plot"
Using this button you can plot the drawing's 3D view (See REF _Ref418670507 \h * MERGEFORMAT Print Printing of the current sheet (Ctrl+P) XE "Print: Drawings" XE "Drawing: Printing"
08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000
8.20.2 Export drawing
Using this button you can export the drawing's 3D view to several file types (See Export Drawing XE "Exporting: drawing" XE "Drawing: Exporting "
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E00000

8.20.3 **Rotate 3D**

Using this button you can rotate the model/object. When you activate this button a circle appears on your screen and you can rotate the model/object pressing the left button of the mouse and moving it towards the direction you want.

Depending on where you place the cursor according to the circle, the rotation type changes as well as the cursor's shape. There are the two following cases:

Placement of the cursor in the circle.

If you press the left button of the mouse while the cursor is in the area inside the circle and move the mouse keeping its left button pressed, you can rotate the model in three dimensions.

Placement of the cursor out of the circle.

If you press the left button of the mouse while the cursor is out of the circle and move the mouse keeping its left button pressed, you can rotate the model around the level that is defined by x, y axes.

8.20.4 Views

Clicking this button appear many preset viewpoint options, which you can see at the following window:

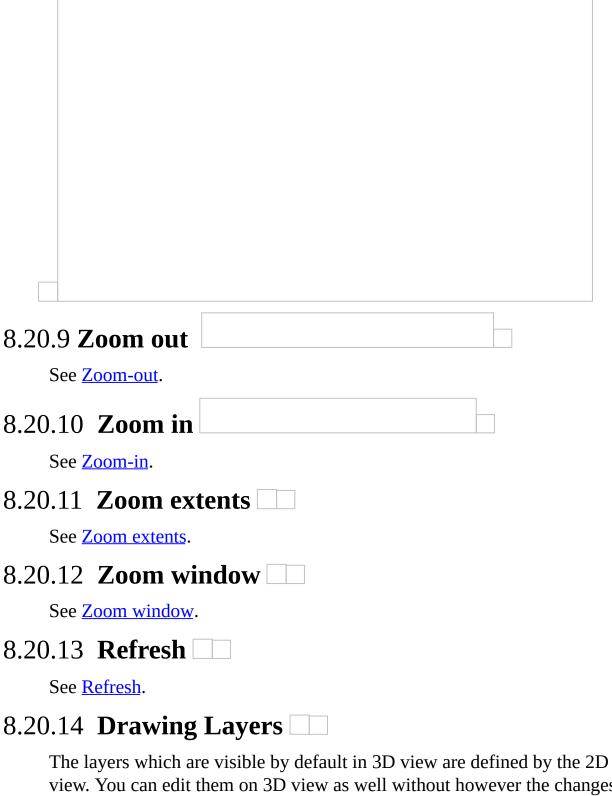


Top: You can see the 3D model from the top.

Bottom: You can see the 3D model from the bottom.
Left: You can see the 3D model from the left.
Right: You can see the 3D model from the right.
Front : You can see the 3D model from the front.
Back: You can see the 3D model from the back.
NE : You can see the model from the Northeast direction.
NW : You can see the model from the Northwest direction.
SE : You can see the model from the Southeast direction.
SW : You can see the model from the Southwest direction.
8.20.5 Render
Using this button you can see the model as a compact, colored solid.
8.20.6 Shade on

This button has the same features with the previous one 'Render', with the difference that the model's edges are emphasized.

8.20.7 J	Hide 🗆				
	this button you c nd hide the ones				that are in the
8.20.8	Wire				
	this button you c eir edges.	an depict 3D	objects into	transparent fo	orm and view



view. You can edit them on 3D view as well without however the changes being saved when you return to the 2D view. See **Drawing Layers**.

8.20.15 **Black & White**

See Black & White.

9 Work items XE "Work Items"

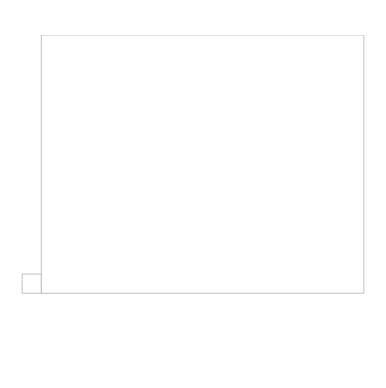
9.1 General

After opening an existing project, the 'Work Items' table appears, where you can view all of your project's work items as you entered them in the WBS (See General/WBS (Ctrl+B) XE "WBS" XE "Budget" XE "BOQ" XE "Options -
commands project: Work Breakdown Structure " OBD0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F
), as well as the measurements you have linked with each work item.
The 'Work Items' tree view table, by default, shows in columns the description of
WBS work-items and measurements, the measurement sheets from which the
measurements were derived, the measurement unit, the quantity, the color and the 'Visible' check box. Using the filtering, grouping, column selection, and
sorting tools, you have many options of setting the number, the form, and the
type of the data you wish to view (See Appendix/ <u>Filters/Sorting</u> 08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F
).
The quantity (result value) of a measurement in the

'WBS' tree view might be different of the quantity of the same measurement the 'Drawings' tree view. This is due to the reason that in the 'Drawings' transpear the quantities of the primary measurements, while in the 'WBS' tab appear the quantities that have been associated (linked) to each work item might have been modified by an expression formula (See Measurement in image files/Types and method of measurement/Work item 08D0C9EA79F9BACE118C8200AA004BA90B0200000000800000000000000000000000000	and
	.1
Only measurements that are checked as 'Visible' appear in current drawing window. Click the 'Visible' check box of a measurement to	
change its status or double click on the measurement row to make it visible	
Click on the header of the 'Drawing', 'Unit' and 'Quantity' fields etc. in order	r to
sort the table's contents based on the above fields (See Appendix/ <u>Filters/So</u>	_
<u>08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E000</u>).	<u>00051</u>
By double-clicking on a work item that contains measurements, you can coor expand them. Alternatively, you can click on the 6 downward arrow sym collapse and on the 4 right-ward arrow to expand.	-

If a work item includes more than one measurement on the same drawing, e.g. ceramic floors, by double-clicking on one of its measurements, the

		are enabled.		
	When yo	ı double click for the	first time on a measuren	nent of
	nt sheet that is	either closed or open	but not current, then on	ly the
neasureme	nt sheet that is nts that are as	either closed or open ociated with the same	but not current, then on work item appear in the	ly the
measureme drawing wi	nt sheet that is nts that are as ndow. All oth	either closed or open ociated with the same r measurements rema	but not current, then on work item appear in the in invisible. This way, tr	ly the
neasureme drawing wi	nt sheet that is nts that are as ndow. All oth	either closed or open ociated with the same	but not current, then on work item appear in the in invisible. This way, tr	ly the



	New non-drawing measurement				
	XE " Measurement: Non-				
]	Drawing"				
meası includ	outton allows you to enter a measurement which either you do not want to are on the drawing or cannot be measured on the drawing, but you wish to be it in the WBS quantities anyway. The following window will appear or screen:				
Set th	e 'Quantity', the 'Description', the 'Category', the 'Work Item', the 'Color',				
the 'U	e 'Quantity', the 'Description', the 'Category', the 'Work Item', the 'Color', nit' and any notes you wish (See Measuring in Image Files/Types &				
the 'U	nit' and any notes you wish (See Measuring in Image Files/Types &				
the 'U Metho	nit' and any notes you wish (See Measuring in Image Files/Types & od of Measurement/ <u>Object count</u> XE "Item Counting" XE"Counting item				
the 'U Metho 08D0	nit' and any notes you wish (See Measuring in Image Files/Types &				
the 'U Metho 08D0	nit' and any notes you wish (See Measuring in Image Files/Types & od of Measurement/Object count XE "Item Counting" XE"Counting item C9EA79F9BACE118C8200AA004BA90B02000000080000000E00000000000000000000				
the 'U Metho 08D0) and	nit' and any notes you wish (See Measuring in Image Files/Types & od of Measurement/Object count XE "Item Counting" XE"Counting item C9EA79F9BACE118C8200AA004BA90B02000000080000000E000000 click OK. Since this measurement is not related to any				
the 'U Metho 08D0) and draw inclu	nit' and any notes you wish (See Measuring in Image Files/Types & od of Measurement/Object count XE "Item Counting" XE"Counting item C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000				
the 'U Metho 08D0') and draw inclu WBS	nit' and any notes you wish (See Measuring in Image Files/Types & od of Measurement/Object count XE "Item Counting" XE"Counting item C9EA79F9BACE118C8200AA004BA90B02000000080000000E00000000000000000000				

9.3 Delete non-drawing measurement XE " Delete:
Non-Drawing Measurement" XE " Measurement:
Delete a Non-Drawing Measurement"
This button is enabled only when you have selected an existing non-drawing measurement, so that you can delete it. Select the measurement and click
. The application will prompt you to confirm your selection.

9.4 New measurement XE "New:measurement"
You can start a new measurement while viewing the WBS tab without even
opening a drawing, using the, and and buttons. With the WBS work-item you wish to
measure selected, click the 'New measurement' button .
As you can see on the right, the measurement type is selected according to the measurement unit of the WBS work-item. On the left, select the measurement sheet you want from the list of sheets and click OK .
You can add new drawings to the project directly from this window by clicking the 'Add drawing button'.

specific one from selected opens appears. When field in the meaning Files/Ty Counting XE'	f measurement, and click OK . For custom measurements, som the drop down menu. The measurement sheet you have (if not already open) and the corresponding measurement of you start a measurement from a WBS work-item, the 'Work assurement parameters window is pre-selected (See Measure WP) when the work were the work of Measurement and the work of Measurement of Meas	wind rk it ing i
). 		
).	Each measurement sheet name in the list is he name of the underlying drawing to facilitate its identification.	
).		ation

9.5 Exporting WBS XE "Exporting:WBS-measurements"

This button allows you to export work items and measurements to a table where you can make adjustments on their appearance e.g. hiding or moving columns etc. before you make the final export to an Excel table.

9.5.1 Export WBS

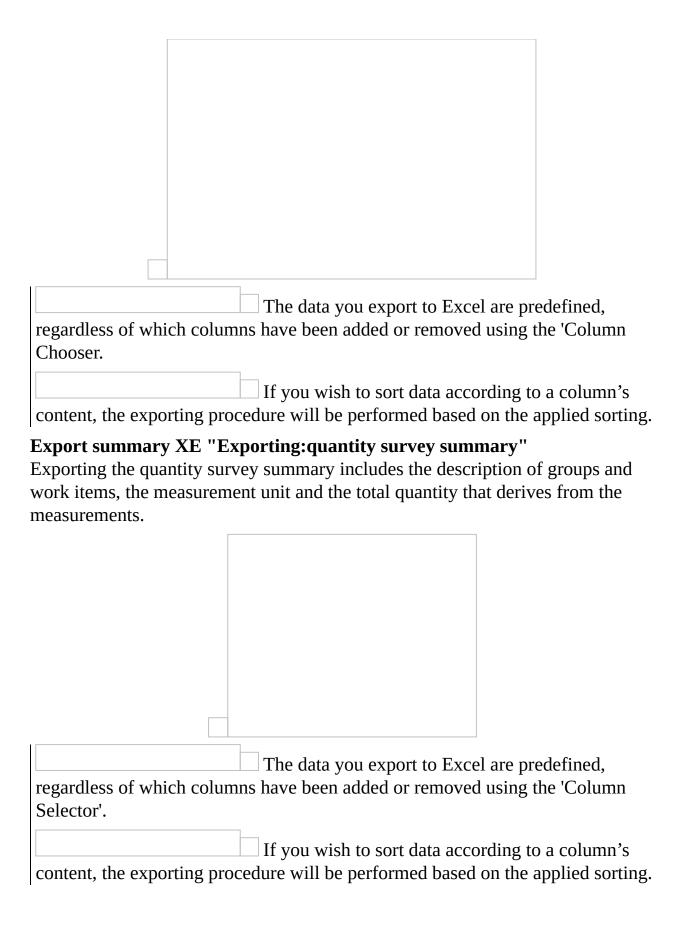
Click on the header of any column to sort the table contents based on the above-

Click on the header of any column to sort the table contents based on the above-mentioned fields (See Appendix/<u>Filters/Sorting</u> 08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F

You can also apply ascending or descending sorting by right-clicking on any of	_
the columns and using the corresponding option from the popup menus. Finally, use the 'Column chooser' to add or remove columns from the default table (See	
Appendix/ <u>Filters/Sorting</u>	
<u>08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000005</u>).	<u>1</u>
Exporting to Excel "Exporting to Excel"	
"Exporting:to Excel"	
"Exporting:to Excel" Click the button of the above table to save it as an .xls file. Specify the location and filename you wish to use. The application offers you	
" Exporting:to Excel " Click the button of the above table to save it as an .xls file.	

ou entered them in their respective locations (See General/WBS (Ctrl+B) XE
WBS" XE "Budget" XE "BOQ" XE "Options - commands project: Work
Breakdown Structure "
8D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
, the total quantity of each work item, and the cost is exported to Excel.
The data you export to Excel are predefined,
regardless of which columns have been added or removed using the 'Column
Chooser'. The Excel sheet is ready for easy sorting or filtering.
If you wish to sort data according to a column's
content, the exporting procedure will be performed based on the applied sorting
Export details XE "Exporting:analytical quantity survey"
By selecting 'Export details', you can export a table to Excel, with the

By selecting 'Export details', you can export a table to Excel, with the measurements that are linked to each work item appearing below it, and the following measurement details: description, measurement sheet of origin, measurement unit, quantity (partial or total), numeric analysis of the result, and notes. The measurements and their details appear in the Excel table in blue font, in order to be easily visible.

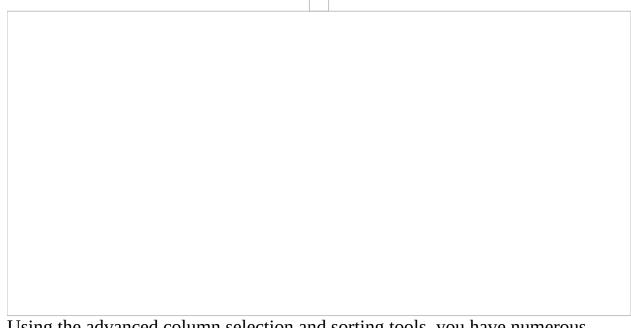


Export work items XE "Exporting:Form Details"

By selecting the 'Export work items' option, you can export the work items table by applying any column choice or data sorting you wish. Basically, you export the table to Excel as viewed in the application (WYSIWYG). The measurements, along with their details, appear in blue font, as in the case of the detailed quantity survey.

9.5.2 Export WBS measurements

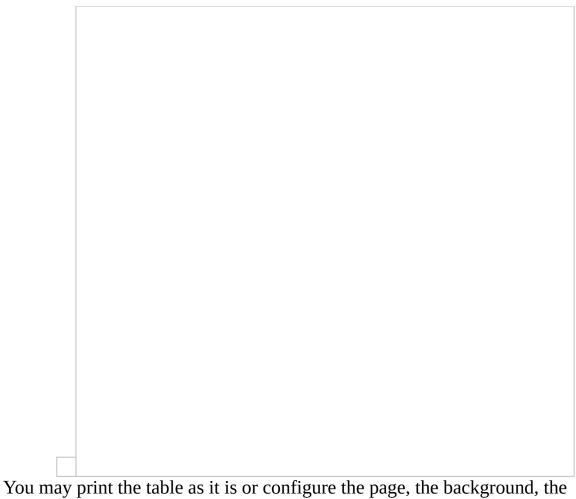
This table includes all the WBS work item details, along with their linked measurements and their details. This data appears in the following columns: 'Drawing', 'Sheet', 'Category', 'Description', 'Color', 'Unit, 'Quantity', 'Expression', 'Notes', 'Work item', 'Calculation'. Each measurement can be viewed more than once, depending on the number of the work items with which it is linked. For this reason, along with each work item appears the function that produces its quantity value.



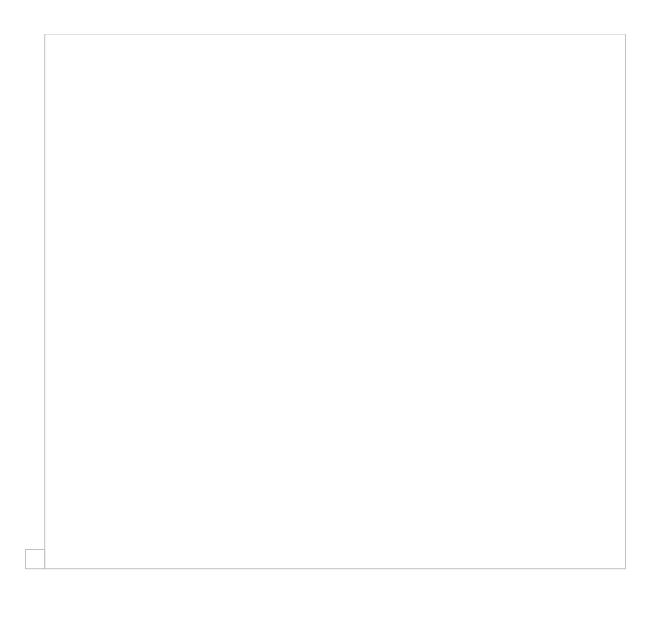
Using the advanced column selection and sorting tools, you have numerous options of setting the number, the form and the type of data you wish to view or to export. (See Appendix/<u>Filters/Sorting</u> <u>08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F</u>). Click on the header of any column to sort the table contents based on the above-mentioned fields (See Appendix/<u>Filters/Sorting</u> <u>08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F</u>

<i>)</i> .
You can also apply ascending or descending sorting by right-clicking on any of
the columns and using the respective option from the popup menus. Finally, use
the 'Column Chooser' to add or remove columns from the default table (See
Appendix/ <u>Filters/Sorting</u>
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005I
).
Export to Excel XE
"Exporting:to Excel"
Click the button of the above table to save it as an .xls file.
Input the location and the filename you wish to use.
Print XE "Print: tables"
Click this button to print the work item table. Printing includes the table's details,

Click this button to print the work item table. Printing includes the table's details, as you have selected them to appear on the screen, e.g. any sorting or addition/removal of columns is preserved. Print preview appears on your screen.



You may print the table as it is or configure the page, the background, the margins and other printing preferences. You may also export the file in various formats (.pdf, .xls, .html, .rtf etc.) or even send a copy of the table directly by email.



9.6	Edit measurement		
`	Drawings/ <u>Edit measurement</u> 2 C9EA79F9BACE118C8200A		0000005F
).			

9.7 Measurement analysis XE "Measurement analysis" XE "Analysis: measurement"

From the 'WBS' tab select a work item (not a measurement), press 'Measurement analysis —' and wait as a new window is opened. This window is similar to the one opened if you use 'Measurement analysis —' from the 'Drawings' tab (See Drawings/Measurement analysis — XE "Measurements:analysis" — 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000	

- However, there are a few new columns displayed, such as: The calculation **formula** column, which is empty unless one was created when you linked a measurement to the work item. There actually two columns; one where the variables are written as names and one where they are substituted by their values.
- The **parameter** column, where the parameters of a **custom measurement** are shown, if you created a formula containing them during linking the measurement to the work item.
- The **work item value** column, which displays the number shown in the 'WBS' tab under this work item. This is the result of the aforementioned formula, while the primary result of the measurement is the count, length, area or volume measured directly on the drawing. The

latter, which is shown in the 'Drawings' tab, might be used in a formula in order to produce the value corresponding to a work item (See <u>Drawings</u>).
If you press 'Measurement analysis while having selected a measurement, you won't see this kind of window but a window like the one that appears if you press from the 'Drawings' tab.

9.8	Duplicate measurement
(See I	Drawings/ <u>Duplicate measurement</u>
08D0	<u>C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F</u>
).	

9.9	Continue measurement
•	Drawings/Continue measurement XE "Continue measurement" XE "
	urement: Continue"
08D00	C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
).	

9.10 Continue measurement (subtract) XE "Continue measurement (subtract)"
(See Drawings/Continue measurement (subtract) XE "Continue measurement
(subtract)"
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F
).

9.11 Show all measurements	
(See Drawings/Show all measurements XE	"Measurements:Show all"
08D0C9EA79F9BACE118C8200AA004B).	A90B02000000080000000E0000005F

9.12 Hide all measurements
(See Drawings/ <u>Hide all measurements</u> XE "Measurements:Hide all" 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F).

9.13 Copy visible measurements	
(See Drawings/Copy visible measurements XE "Measurements:Copying"	
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E00000000000000000000)05I

9.14 P	aste measurem	ents XE "	Paste measu	rements"
(See Drav	wings/ <u>Paste measurem</u>	ents XE "Meas	surements:Pasting	"
08D0C9E	EA79F9BACE118C820	00AA004BA90	B0200000008000	00000E0000005I
).				

10 Measurement analysis XE "Measurement analysis:general"

10.1 General

Measurements analysis is the procedure through which you can preview and print the analysis of selected measurements including dimensions marking and details of surfaces.

The selected measurements are printed on template sheets of various sizes (A3, A4 etc), in separate pages or all in one. Calculation expressions and results of the analysis are printed at designated parts of the template sheets. Analysis of surface area can be carried out using triangles only or using rectangular, trapezoid, triangular and curved shapes (See Measurement in image files/Measuring area/Analysis in triangles

<u>08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F</u>). Triangle calculations are performed using the Heron's formula:

that is:	T = SQRT((a+b+c)*(-a+b+c)*(a+b-c)/16)
where a b c are	he lengths of the triangle sides.
	You can select and set various parameters which
affect the temp	ate sheet appearance as, for example, colors, column widths and
formulas (See	General/Settings/ <u>Measurement analysis parameters</u>
08D0C9EA79I	9BACE118C8200AA004BA90B02000000080000000E0000005
).	

Note, also, that measurement analysis can be done either overall in which case it includes all measurements, or selectively by defining analysis regions (See Auxiliary tools/Analysis regions).

10.2 Overall measurement analysis XE "Measurement analysis:overall"

Click the 'Export measurements' button of the 'Drawings' tab. At the 'Measurements' window that appears click the 'Measurement analysis'
button and, from the list of the templates provided by ALCONSOFT, select the one you wish to use for the analysis.
Using the filters you can limit the number of
measurements to be included in the analysis (See Appendix/Filters/Sorting
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
). Another way to "isolate" the measurements you want to be included in the analysis is to define one or more analysis regions (See Auxiliary measuring tools/
Define analysis region, in which case each region will be analyzed and printed in a separate page of the template sheet.
If there are no filters, all measurements will be
analyzed.
When the analysis includes a high number of
measurements with too many shapes, then it might be time consuming. Click
the Cancel button if you wish to stop the procedure after the analysis of the
current measurement is completed. You can preview and print the analysis of
the pages that have been created before interrupting the analysis.

Zoom in using the mouse wheel for a clear view of each page.	0
Using Print and Plot buttons you can print the current	t page of
the analysis. Plot prints the whole drawing while Print prints each page separately.	
The appearance of the page depends on the selected template.	
Work items associated with the measurements and their quantities are pr	
the work breakdown structure (WBS) region. In the CALCULATIONS	•
the detailed numbers and expressions of every measurement part are pre	
The part of the drawing related to the measurement is printed in the IMA region while in the PLAN region there is a thumbnail of the whole draw	
where the measurement position is marked with a sharp color.	, , , , ,

ALCONSOFT provides ready to use templates with various ways of organizing and positioning of the above regions. These templates have various sizes (A3, A4 etc) and orientations and new ones are frequently added. Templates are files located into the template subfolder of the application folder.

10.2.1 Analysis parameters

Using this button a window appears where you can set various parameters of the measurement analysis templates.

Select:

- the image height for the export to .xls file Select also the color you wish to be used for:
 - drawing area segments
 - drawing dimension lines and numbers
 - drawing measurements
 - thumbnail figures background
 - thumbnail background filling
 - drawing thumbnail figures

Select also or type:

the arrow size in mm

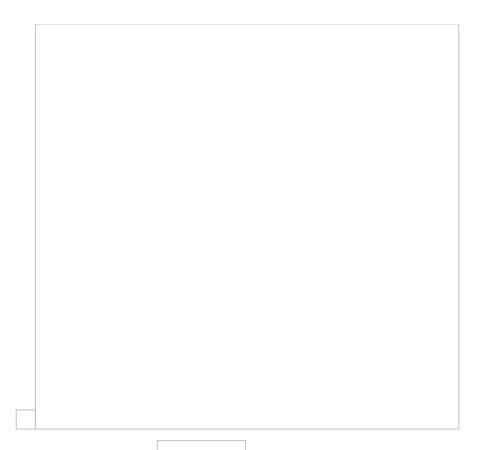
- the characters height in mm
- the measurements table column widths in cm, separated by semicolons
- the scale line width in cm
- the WBS table columns widths

Finally you can select which measurement types you want to show on the analysis sheets. The default setting is to show all except object counting.

Notice that only the layers of the drawing which are visible
before pressing the analysis button, are shown on the measurement analysis
window. If you wish to exclude certain measurements irrespective of their type,
you can simply make them invisible before you start the analysis procedure.
Setting the right values of the parameters results in
better appearance of the analysis sheets. For example you can avoid character
overlapping you can decrease their height.
If you click the 'Defaults' button all analysis parameter values are set to
their defaults irrespective of any changes you have made.
10.2.2 Export to Excel
XF "Fynarting to Fycel"

AE Exporting: to Excel

Using this button you can export the data to .xls format file. Type the name of the new file and click 'Yes' to immediately open the file containing your data.



10.2.3 Edit drawing

Using this button a window appears where you can edit the drawing. In this window you can move the various parts of the drawing in order to achieve the best result

Using the button you can export the drawing that is shown on the above
window and save it in any form you want. Except from moving drawing's sections, you can even delete them by using the button.
When the editing is complete click the Save and Close button to see your changes on the main drawing and print it.
Note that the changes you make are not preserved if you repeat the analysis procedure.
Use the 'exit' button to quit the editing window and the overall measurement analysis without saving any changes.

10.3 Measurement analysis by region XE "Measurement analysis:by region"

If you do not wish the overall analysis of all measurements of the current measurement sheet, then you can define one or more analysis regions on the drawing (See Auxiliary measuring tools/

<u>Define analysis region</u>).

If you define more than one analysis region then each region is analyzed and printed in a separate page of the analysis sheet. You can preview these pages at the 'Measurement analysis' window which appears when you click the Measurement analysis button and select a template. You can navigate through the pages by clicking on their tabs. All other features of the overall measurement analysis such as exporting, printing, editing and parameter setting, apply to the measurement analysis by region as well.

Note that, for a measurement to be included in the analysis of a region, it must fully surrounded by the region's rectangle. Furthermore, if a measurement is included in more than one analysis regions, it will be analyzed and appear in all of them.

10.3.1 **All pages**

Click this button to show all pages on a common background.

Click again to show each page separately.		
Finally, using the button you can export and save the drawing as i	it ic	
shown on your screen. You can save it in any form you want, even as a d	lwg file.	
T 1. 1. 1	CAD	
In case you want to edit the drawing using your CAD		
program, you'll have to use the 'explode' command, to have access to all		
objects.		

11 XE "Appendix" Appendix

11.1 Filters/Sorting XE "Filters/Sorting"

All list display customization options are available by right-clicking on the header row and selecting the respective option from the pop-up menu.



11.1.1 Data Sorting XE "Filters/Sorting:Data Sorting"

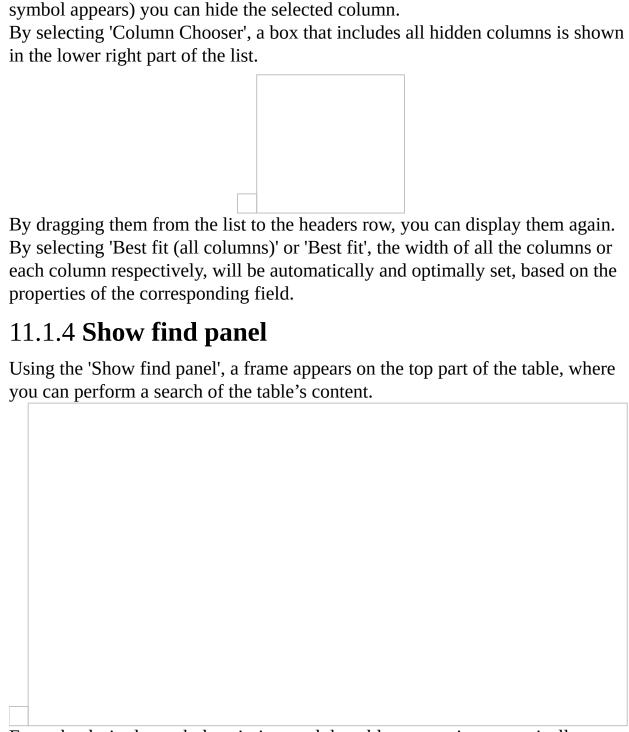
Using the 'Ascending/Descending sorting' options you can sort the list whenever you wish, based on any column. Sorting is also done by clicking on the respective header. By selecting 'Clear sorting', the entries are sorted by their creation date.

11.1.2 Grouping XE "Filters/Sorting:Grouping"

By selecting 'Group by this column', or by dragging the header to the Grouping Area (the row above headers), you group the list based on the corresponding column. By repeating this procedure with other columns, you can achieve multiple grouping with any desired combination sequence.

11.1.3 Show/Hide/Best fit XE "Filters/Sorting:Show/Hide Columns"

You can show or hide each one of the list's columns at your discretion. By selecting 'Remove This column' or by dragging the header downwards (a large X



Enter the desired search description, and the table content is automatically narrowed to the search criteria, which appear marked in a bold yellow color.

11.1.5 Show Auto Filter Row	
Using the 'Show Auto Filter Row' option, a special line with the (filter) symbol appears over the table's top row, on the left.	
In each of the columns, select or type in the desired filter criteria, in order to	

In each of the columns, select or type in the desired filter criteria, in order to filter the table content.

The crit	teria you set appear in the automatic filter line, as well as at the botton	n of
are table		
	tive ways of filter application and their modification are thoroughly ed in the following pages.	
	6 Record filters XE "Filters/Sorting:Entry	

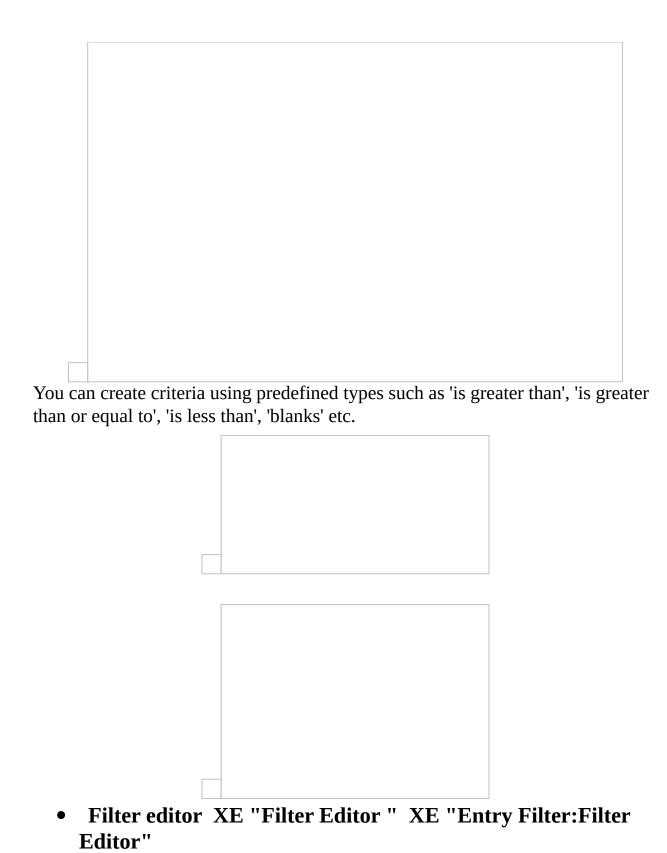
11.1.6 Record filters XE "Filters/Sorting:Entry Filter"

Quick data filter

XE "Entry Filter:Quick Data Filter" You can display a subset of the entries in a list by clicking on the (filter) symbol that appears when you hover your cursor over a column header. This action displays a list, in which you can either quickly select an item depending on the field type, or select 'Custom' to set a more complex filter.

Click on the 'Custom' option in each column to apply a more complex filter to

the table contents. Filters work either integrally or disjunctively. The criteria may be either both true ('and') or one of them true ('or').
The criteria used appear in the lower left part of the screen.
You can remove a filter by clicking at the lower left part of the window.
You can also temporarily disable the filter by clicking on the right. By clicking again, you can re-enable it.
The filters you apply are stored until you exit the application. You may recall any of them by clicking the right arrow key and selecting from the list (drop down menu).

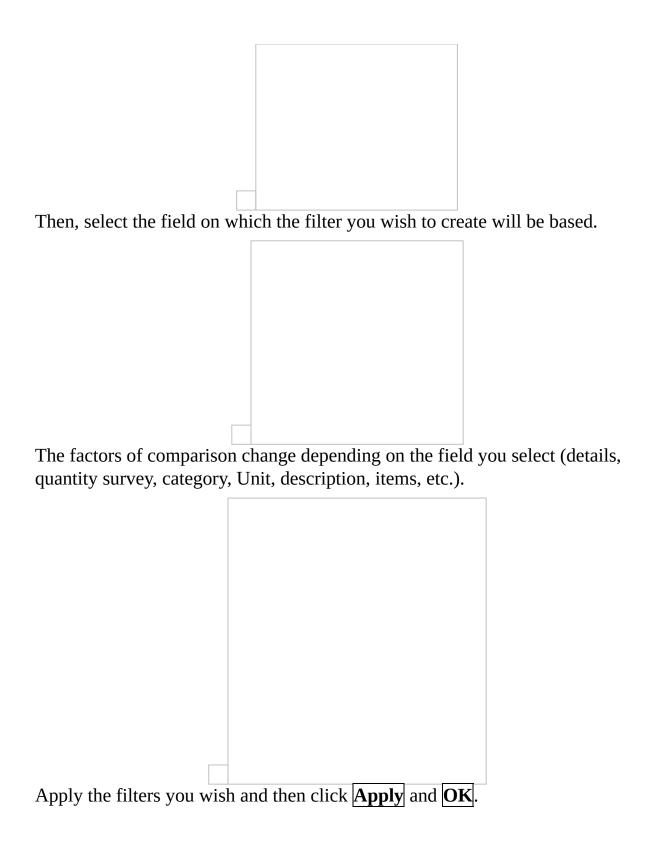


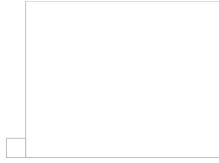
Using the Filter editor at the lower right part of the window or in the shortcut menu, you can create a filter that only displays the entries that comply with



By selecting + you can 'add a new condition to this group' and you have the ability to create multiple combinations between the data in the table's columns. Each criterion consists of **one field**, **one factor** (e.g. contains, is equal to, etc.) and **one value**, which should be entered or selected from a list. You can add as many criteria as you wish, which are combined together with (and) or (or / either). Once you create the filter, click **OK** or **Apply** and the list will display only the entries that comply with the filter's criteria.

The initial filter you apply may include or exclude the subsequent options.





Changing column width and position

XE "Filters/Sorting:Changing column width and position" You can change the width of each column by clicking and dragging with your cursor the separation lines between two field headers, to the left or to the right. You may also change the fields' order by selecting the header of any column you wish to move and dragging it to a new place.

11.2 Special Software Requirements

In order to run ExtrAXION, Microsoft.net Framework 4 needs to be installed.

11.3 Functions

11.3.1 **ABS**

Returns the absolute value of a number, a number without its sign.

Syntax

ABS(number)

Number is the true number whose absolute value you need.

11.3.2 **ACOS**

Returns the arccosine of a number, the angle whose cosine is this number. The angle is in radians, in the range from 0 to pi.

Syntax

ACOS(number)

Number is the cosine of the desired angle, and must be a number between -1 and 1.

11.3.3 **ASIN**

Returns the arcsine of a number, the angle whose sine is this number. The angle is in radians, in the range -pi/2 to pi/2.

Syntax

ASIN(number)

Number is the sine of the desired angle, and must be a number between -1 and 1.

Comments

In order to express the arcsine in degrees, you have to multiply the result by 180/pi(), or use the DEGREES function.

11.3.4 **ATAN**

Returns the arctangent of a number, the angle whose sine is this number. The angle is in radians, in the range –pi/2 to pi/2.

Syntax

ATAN(number)

Number is the tangent of the desired angle

Comment

In order to express the arctangent in degrees, you have to multiply the result by

180/pi(), or use the DEGREES function.

11.3.5 **ATAN2**

Returns the arctangent of the specified x and y coordinates (the angle of a line that crosses the origin (0,0) and a point with x_num, y_num coordinates). The angle is in radians, in the range -pi to pi, excluding the value -pi.

Syntax

ATAN2(x_num;y_num)

X_num is the point's x coordinate.

Y_num is the point's y coordinate.

Comment

A positive result signifies a counterclockwise angle with the x axis, while a negative result signifies a clockwise angle.

ATAN2(a;b) equals ATAN(b/a), but in the ATAN2 function, a can be equal to 0. If the x_num and y_num values are 0, the ATAN2 function returns the error value #DIV /0!.

In order to express the arctangent in degrees, you have to multiply the result by 180/pi(), or use the DEGREES function.

11.3.6 **CEILING**

Rounds the number up, to the nearest integer or to the nearest multiple of significance. For example, if you wish to use cents in your transactions, and the price of an item is 9\$ 36 cents, use the =CEILING(936; 10) to round the prices to the next dime.

Syntax

CEILING(number, significance)

Number is the value you wish to round.

Significance is the multiple based on which you wish the rounding to be performed. **Comment**

If one of the entries is not numeral, the CEILING function returns the error value #VALUE!.

Regardless of the number's sign, a value is rounded up when it is adjusted away from zero. If the number is an exact multiple of the Significance entry, then the value is not rounded.

If the entries Number and Significance have different signs, the CEILING function returns the error value #NUM!.

11.3.7 **COS**

Returns the cosine of the given angle.

Syntax

COS(number)

Number is the angle (in radians) whose cosine you desire.

Comment

If the angle is in degrees, you have to multiply the result by pi()/180, or use the RADIANS function, in order to convert it to radians.

Example

The example will be easier, if you copy it to an empty worksheet.

11.3.8 **COSH**

Returns the hyperbolic cosine of the given angle.

Syntax

COSH(number)

Number is any real number, whose hyperbolic cosine you need.

Comment

The hyperbolic cosine definition is:

11.3.9 **EXP**

Returns e raised to the power of a given number. The constant 'e' is equal to 2,71828182845904 and constitutes the basis of the natural logarithm.

Syntax

EXP(number)

Number is the exponent that is applied to the base e.

Comment

In order to calculate the powers of other bases, use the factor of raising to a power (^).

The EXP function is the reverse of the LN function, a number's natural logarithm.

11.3.10 **FACT**

Returns the factorial of a number, equal to 1*2*3*...*number.

Syntax

FACT(number)

Number is the non-negative number whose factorial you wish to calculate. If the entry Number is not an integer, the decimal digits are cut off

11.3.11 **FLOOR**

Rounds a number down, to the nearest specified multiple of significance.

Syntax

FLOOR(number;significance)

Number is the numeral value you wish to round.

Significance the multiple based on which you wish the rounding to be performed.

Comment

If either of the entries is non-numeral, the FLOOR function returns the error value #VALUE!.

If the entries Number and Significance have different signs, the FLOOR function returns the error value #NUM!.

Regardless of the number's sign, a value is rounded down when it is adjusted away from zero. If the entry Number is an exact multiple of the entry Significance, then the value is not rounded.

11.3.12 **LOG**

Returns the logarithm of a number to the base you specify.

Syntax

LOG(number;base)

Number is the positive real number whose logarithm you desire.

Base is the logarithm's base. If the entry Base is skipped, it is considered to be equal to 10.

11.3.13 **PI**

Returns the number 3,14159265358979, the mathematical constant pi, with 15 decimal digits precision.

Syntax

PI()

11.3.14 **ROUND**

Rounds a number to the specified number of digits.

Syntax

ROUND(number;num_digits)

Number is the number you wish to round.

Num_digits specifies the number of digits to which you want to round the number. **Comment**

If the entry num_digits is greater than zero, then the number is rounded to the specified number of decimal digits.

If the entry num_digits is 0, then the number is rounded to the nearest integer. If the entry num_digits is lower than zero, the the number is rounded to the specified number of decimal digits, to the left of the decimal point.

11.3.15 **SIGN**

Returns the sign of a number. It returns the value 1 if the number is positive, 0 if it is 0, and -1 if it is negative.

Syntax

SIGN(number)

Number is any real number.

11.3.16 **SIN**

Returns the sine of a desired angle.

Syntax

SIN(number)

Number is the angle whose sine you desire, expressed in radians.

Comment

If the angle is in degrees, you have to multiply the result by pi()/180, or use the RADIANS function, in order to convert it to radians.

11.3.17 **SINH**

Returns the hyperbolic sine of the given angle.

Syntax

SINH(number)

Number is any real number.

Comment

The hyperbolic sine definition is:



11.3.18 **SQRT**

Returns the square root of a number.

Syntax

SQRT(number)

Number is the number whose square root you desire

Comment

If the entry Number is a negative number, the SQRT function returns the error value #NUM!.

11.3.19 **TRUNC**

Truncates a number to an integer by removing the decimal (or fractional) part of the number.

Syntax

TRUNC(number; num_digits)

Number is the number whose decimal digits you wish to truncate. Num_digits is the number of decimal digits that remain after the truncation. The default value of the entry num_digits is 0 (zero).

Comment

The TRUNC and INT functions are similar, as both return an integer. The TRUNC function removes the decimal part of a number, while the INT function rounds the number down, to the closest integer, based on the number's decimal part. The INT function is different from the TRUNC function only in the handling of negative numbers: The formula TRUNC(-4,3) returns the value -4, while the formula INT(-4,3) returns the value -5, because -5 is the nearest downward integer.

11.4 SQL Server Installation

If you want to store your projects on an SQL Server database you should have access to an SQL Server instance with mixed mode authentication. If not, you must install it first. For example the **SLQ Server 2008 R2 Express** version can be downloaded for free from Microsoft's website: www.microsft.com and more specifically from the link: http://www.microsoft.com/en-us/download/details.aspx?id=30438

• For 64 bit systems select the 1st file:

SQLEXPR_x64_ENU.exe

122.4 MB

• For 32 bit systems select the 3rd file:

SQLEXPR32_x86_ENU.exe

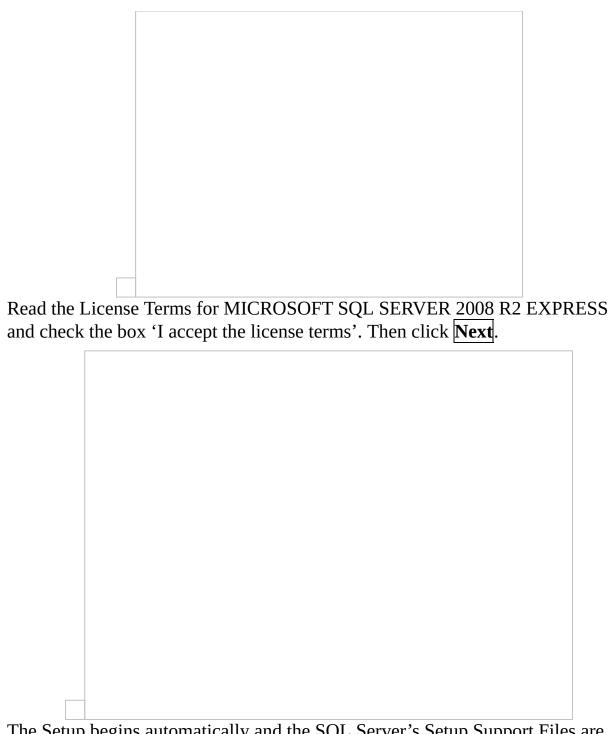
97.4 MB

- 1. If you do have a server within your organization it is recommended that you do the SQL Server installation on the server, so that the database of the measurements is centralized.
- 2. If you do not have a server or if you want to work at your laptop without connecting to the server then install the SQL server at your PC.

Save on your hard disc the SQL Server's setup file and run it to start the installation.

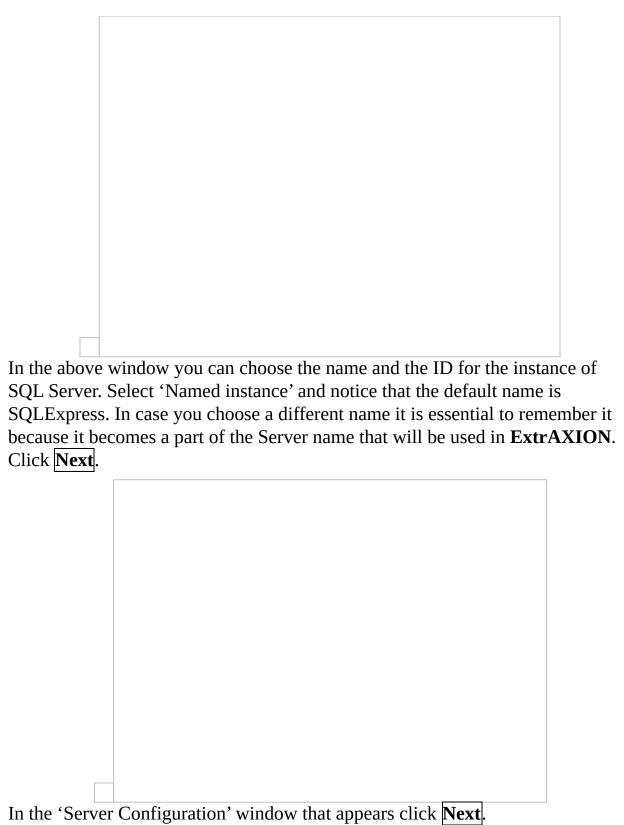


After the folder extraction is completed, the window of 'SQL Server Installation Center' shows up. Select 'New installation or add features to an existing installation' in order to launch the installation wizard.

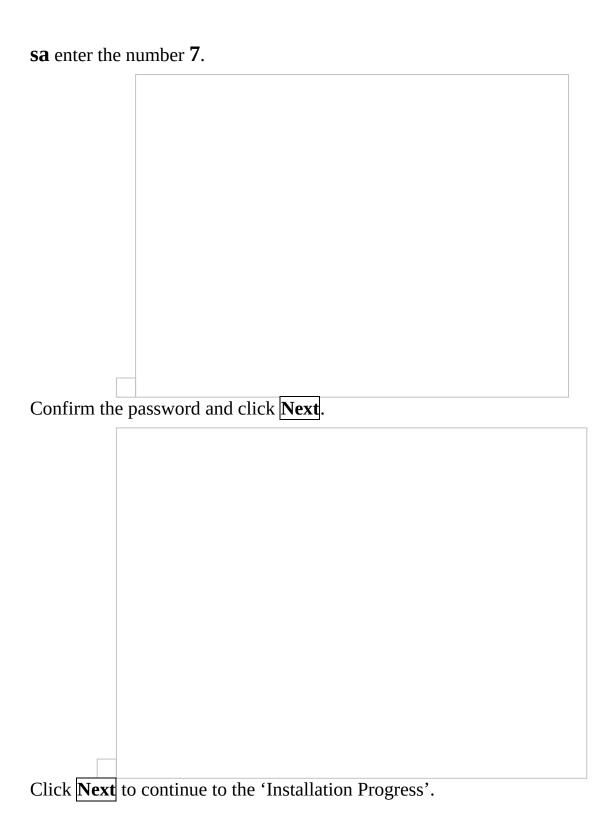


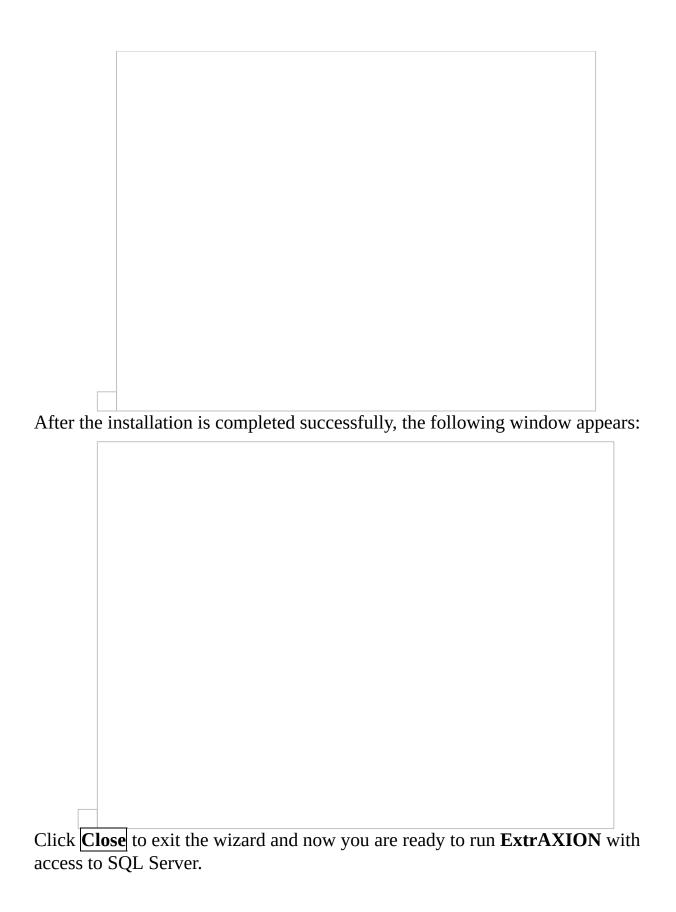
The Setup begins automatically and the SQL Server's Setup Support Files are being installed.

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	ly the 'Database Engine Services' box and click Next .	nows up:



In the 'Server Configuration' window that appears click **Next**. Then in the 'Database Engine Configuration' window, select 'Mixed mode (SQL Server authentication and Windows authentication)' and as a password for user





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