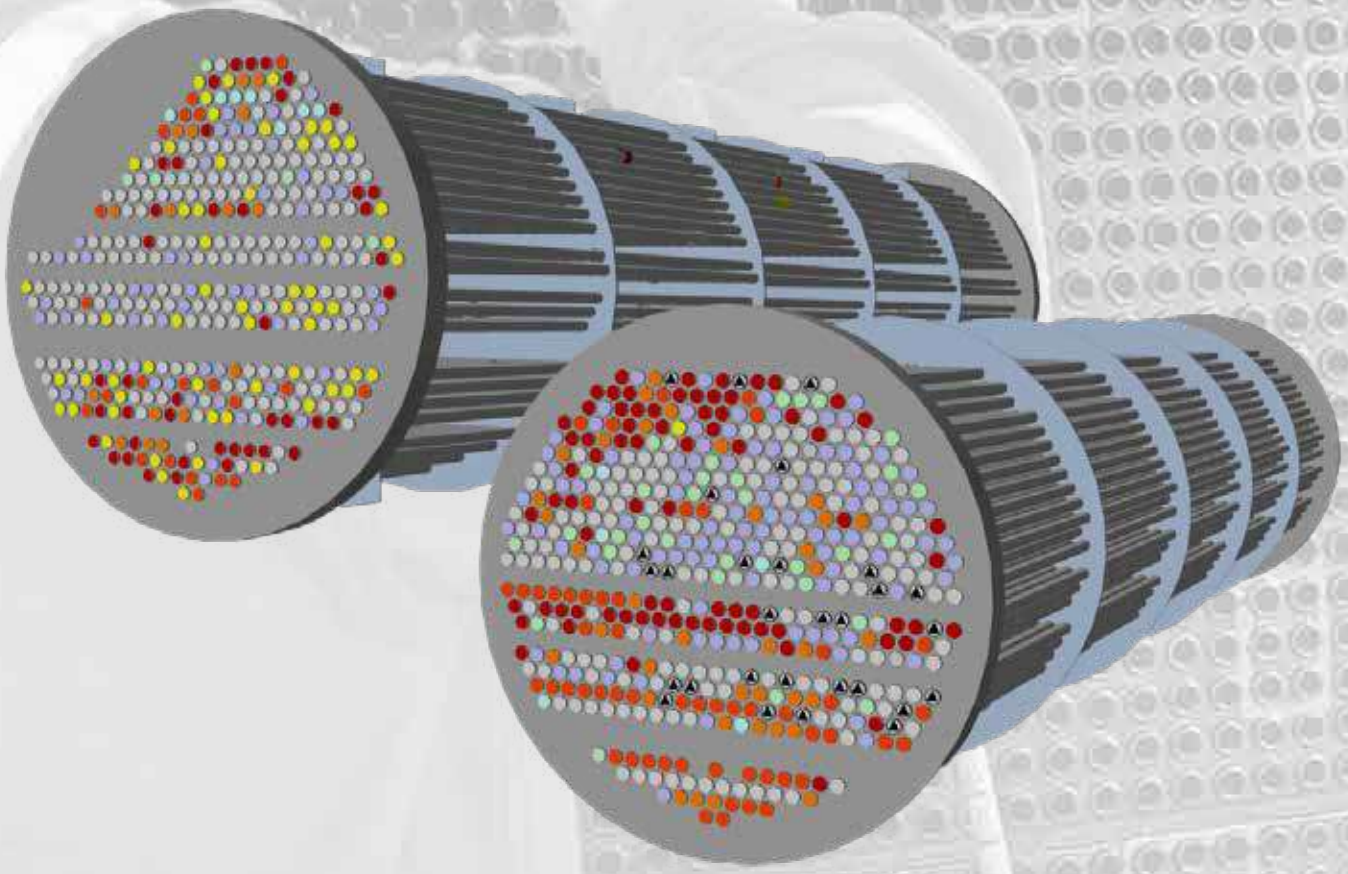
Eddyfi Technologies

Beyond current

Getting Started with

TUBEPRO™6



Revision History		
Revision	**Description**	**Date**
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E-LEARNING

This document describes the software's menus and functions. If you are a new TubePro 6 user, we recommend that you first listen to the e-learning available from the Eddyfi Academy to understand the software's general workflow.

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BACKSTAGE

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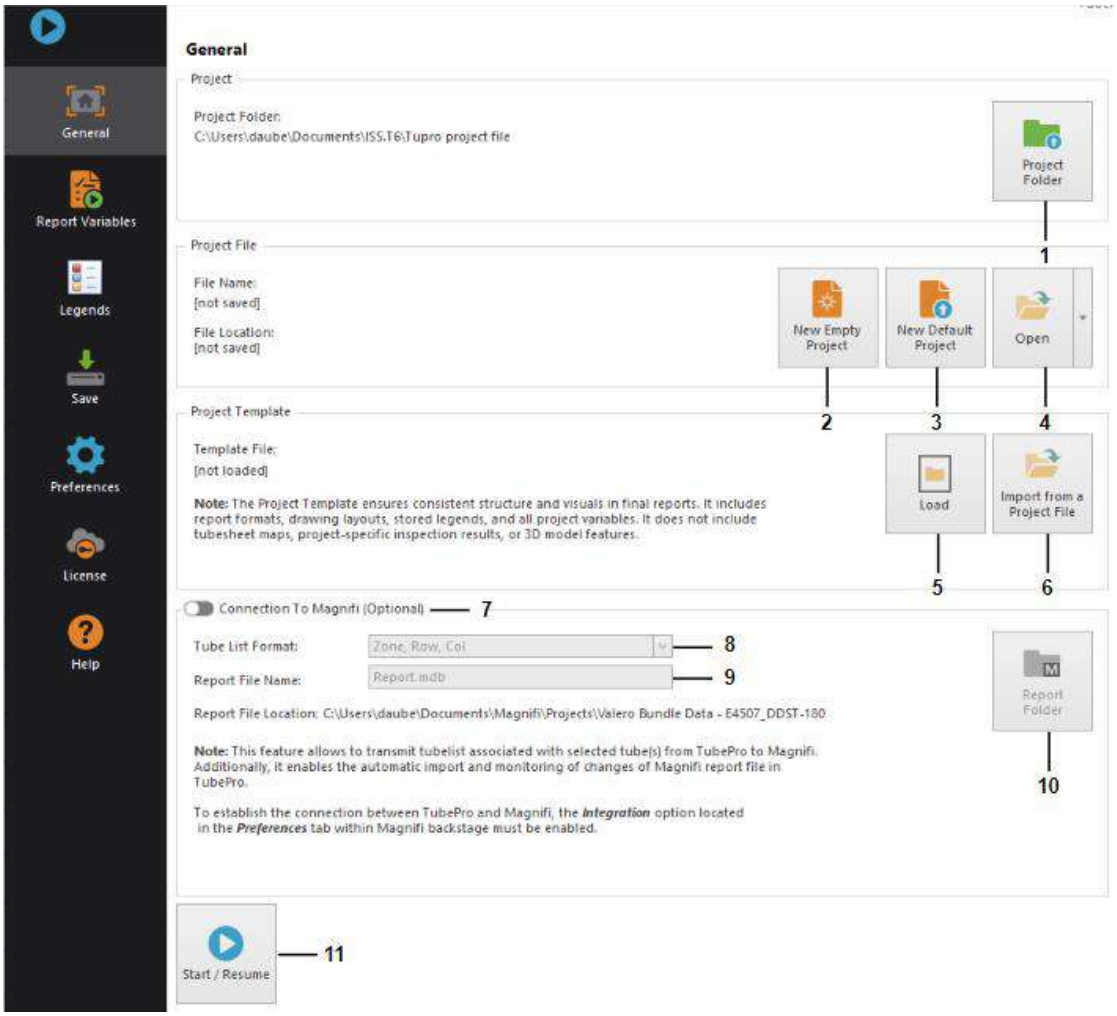
GENERAL

The General tab lets you manage the location of your project folder and the starting point for your report. You can use an empty project, an existing project or a template (explained below). It is also in this tab that the report folder of Magnifi can be selected in order to link TubePro and Magnifi.



1. Determines the default directory for saving project-specific elements such as the project file, drawings, maps, etc.
2. Create an empty project. This project will contain no default settings except for a group of variables and a legend.
7. Activate Magnifi connection. This option is used to send a tube list directly to Magnifi from TubePro (Tubesheet navigation tab), and to automatically synchronize defects entered in Magnifi with TubePro's Inspection data. Software synchronization functions are explained later in this document.

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3. Loads a default project. **Note:** The default project template can be changed using the Set Default Template function in the Backstage Save tab.
4. Loads a previously saved project.
5. Loads a previously saved template. **Note:** A template is a file containing all the elements of the report except the Tubesheet, 3D map and Inspection data. Legends, variables, defect table configuration, drawings and Word pages are all part of the Template. A report can be made by updating the inspection-specific elements and refreshing the Template elements.
6. Loads a template from the selected project.
8. Selects the correct format for the tube list. **Note:** This format must be set in the same way in Magnifi to enable synchronization of the 2 programs.
9. Name of report file generated by Magnifi. This name can be manually modified to match the file to be synchronized.
10. Folder in which the Magnifi-generated report file is stored.
11. Accesses the Frontstage.

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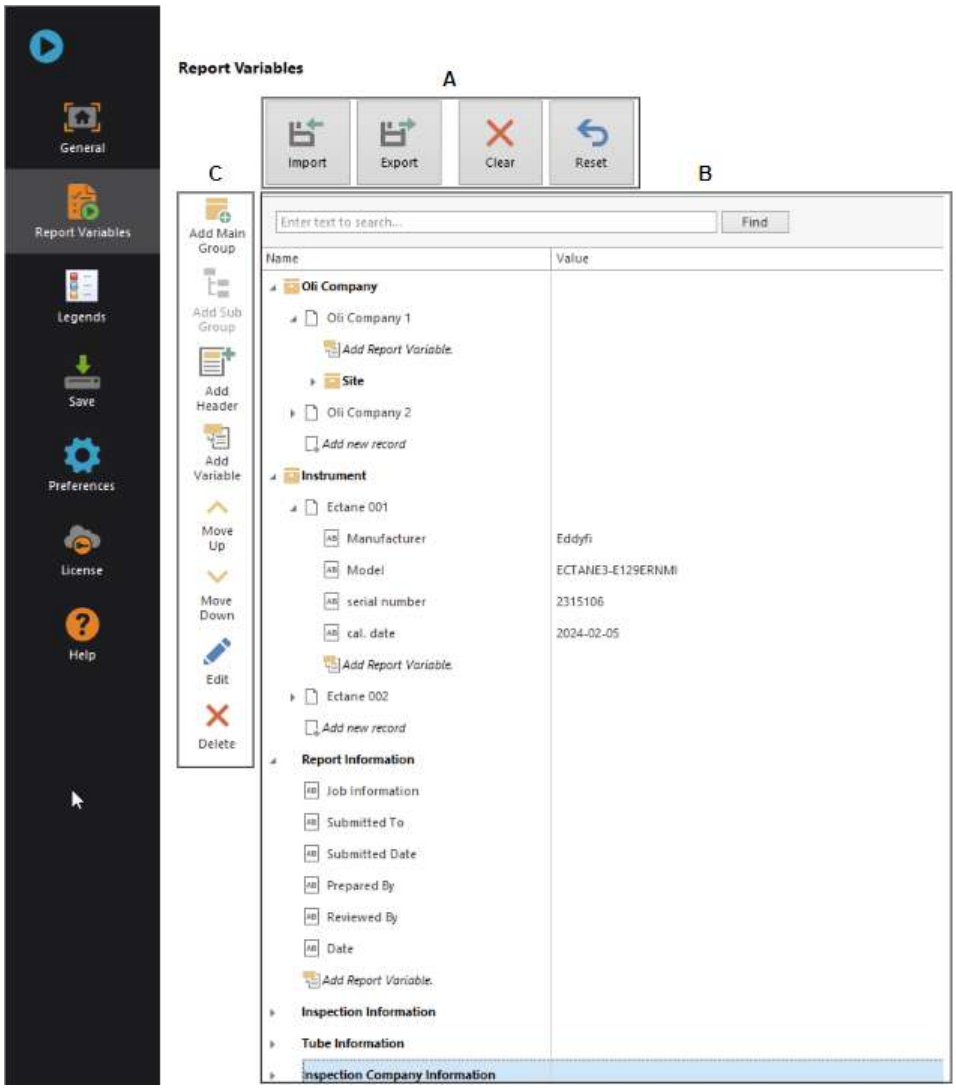
REPORT VARIABLES

Report variables are a list of variables and their values created by the user. Once created in the Backstage, these variables appear in the Frontstage in the Project tab (at the right of the screen) where they can be inserted (drag & dropped) in the report wherever text is used, such a drawing elements, defect table header and footer and the Word or Excel report. For example, we might have a variable named Customer Name. If we change the customer's name in the variable, the value will also change in all the places where this variable has been inserted in the report. Report variables are included in the Report Template. If we use a previously parameterized template to create a new report, all we have to do is update the variable values so that these fields are updated in the report. Variables can be independent, but they can also be linked together and automatically filled from a chosen value using the Group and the Sub Group functions.



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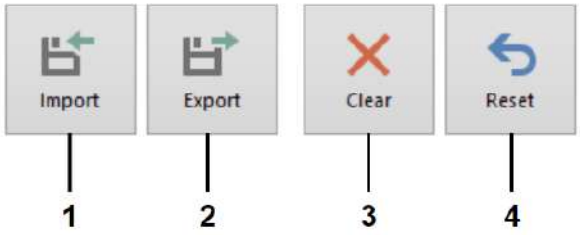
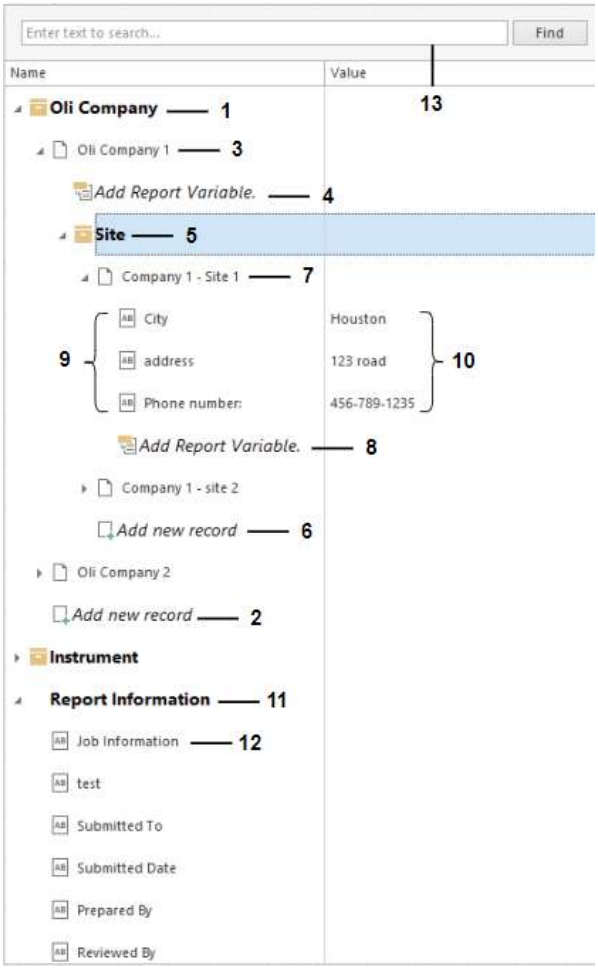
A. Report variables list options



1. Import a list of variables and their values from a previously saved file (.T6RVF). Such a file can be used to standardize and share information within an inspection company.
2. Allows to export a list of variables and their values. Creates a .T6RVF file.
3. Deletes all variables in the list.
4. Remove all current variables and load the default variables.

B. Report variables list



1. Group name.
2. Add a group value (record).
3. Group record.
4. Add a variable under the group record.
5. Sub group name.
6. Add a sub group value (record).
7. Sub group record.
8. Add a variable under the sub group.
9. Variables.
10. Variables values. The fields to the right of the variable can be edited.
11. Header.
12. Variables not linked to a group or sub group.
13. Search bar. Used to find an item in the list.

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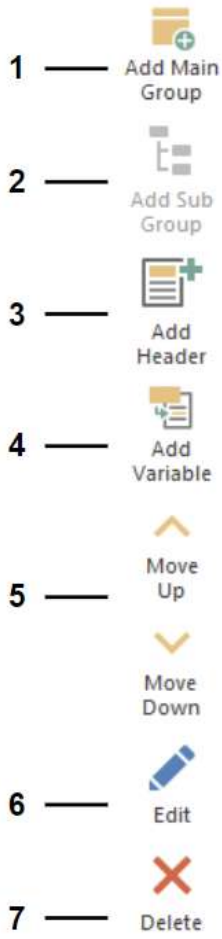
C. Report variables editing



1. Create groups of variables that share the same fields. For example, we can create a group for the instruments we own. Each instrument defined in this group could have the variables Manufacturer, Model, Serial number, and Calibration date, but with its own values. See below for an example of how this function can be used.
2. Adds a Sub Group. Works in a similar way to a group, but applies to a group record. **Note:** This button is activated when a group is selected in the list. See below for an example of how this function can be used.
3. Adds a header to a variable group. This header is also visible in the Frontstage.
4. Adds a variable. A window appears in which you must enter a name for the variable and select a variable type. Possible types are: Text, Date, Number, Image, List or Yes/No. **Note:** If variables are not part of a group or subgroup, they value can be edited directly in the Frontstage.
5. Changes the order of items in the list.
6. Edit the selected item.
7. Deletes the item selected in the list.

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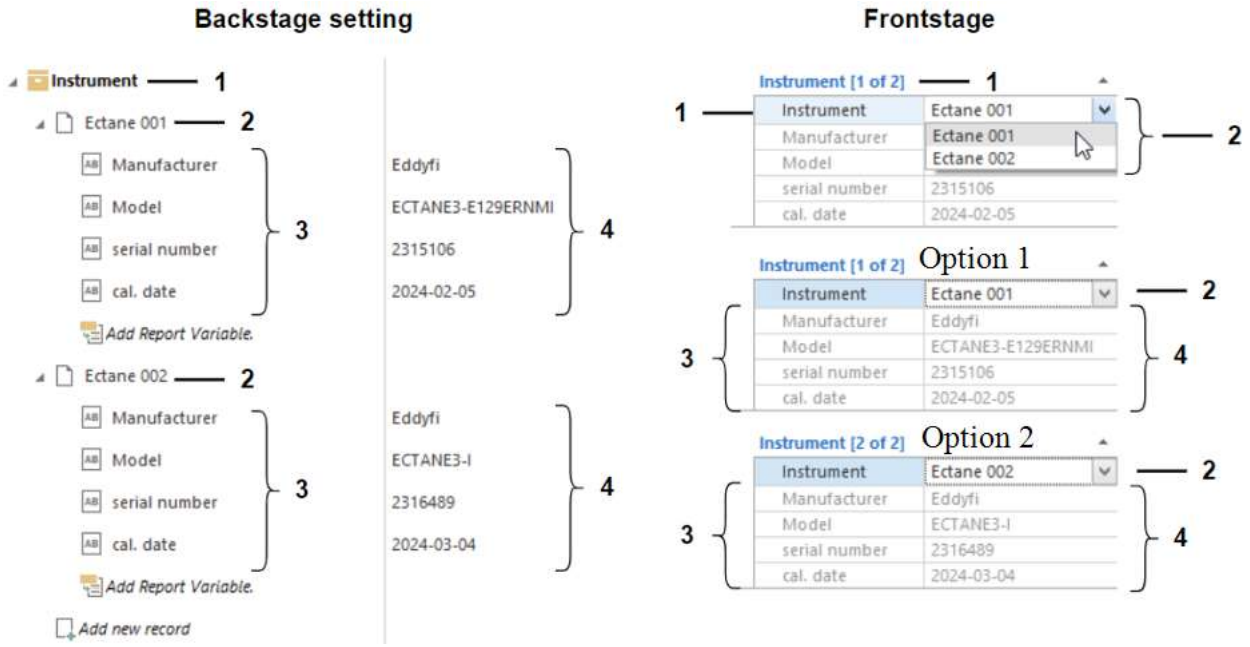
1. Add Main Group

The following figures show an example where a group has been created to list instruments (**1**). Two Records have been added to the Instrument group: Ectane 001 and Ectane 002 (**2**). The Manufacturer, Model, Serial Number and Cal. Date variables have also been created (**3**), and can be found under Ectane 001 and Ectane 002. Records in the same group will always have the same variables. On the right are the values of the variables under Ectane 001 and Ectane 002 that have been filled in manually (**4**).

This configuration displays a drop-down in the Frontstage (at the right) showing the instruments named Ectane 001 and Ectane 002. When the user selects an instrument, the fields associated with it automatically change to match what was previously defined (**4**). Every place in the report where variables have been inserted will be updated automatically when an instrument is selected in the variable list in Frontstage.



1. Group name.
2. Group value (record).
3. Record variables.
4. Record variables values.

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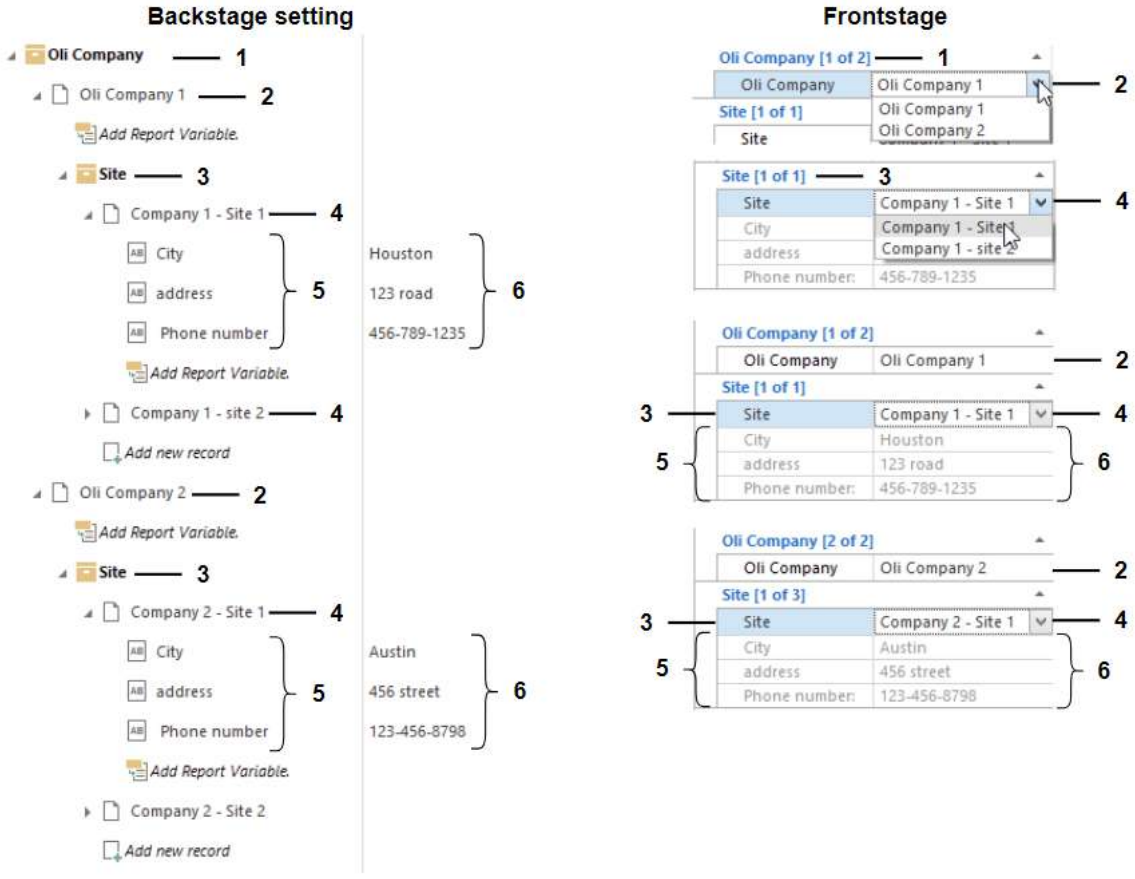
2. Add Sub Group

The following figure shows an example of a group created for oil companies. The group has been named Oil Companies (**1**) and 2 records have been added in this group: Oli Company 1 and Oli Company 2 (**2**). For each of these oil companies, 2 sites were created. To do this, a subgroup named Site (**3**) was added below the Oil Company group and 2 Records were created below the Site subgroup for each oil company (**4**): Company 1 - Site 1 and Company 1 - Site 2 for Oli Company 1, and Company 2 - Site 1 and Company 2 - Site 2 for Oli Company 2. Three variables were then added under a Record of the site subgroup (**5**): City, address and Phone number. For each site, these variables were filled in with the appropriate values (**6**).

This configuration created 2 drop-down levels in the Frontstage. First, it is possible to select the oil company (**2**), then the second drop-down shows the sites associated with the previously selected oil company (**4**). When we select the site, the variables City, address, and Phone number (**5**) are automatically filled with the configured values (**6**).



1. Group name.
2. Group value (record).
3. Sub Group name.
4. Sub Group value (record).
5. Sub Group record variables.
6. Sub Group record variables values.

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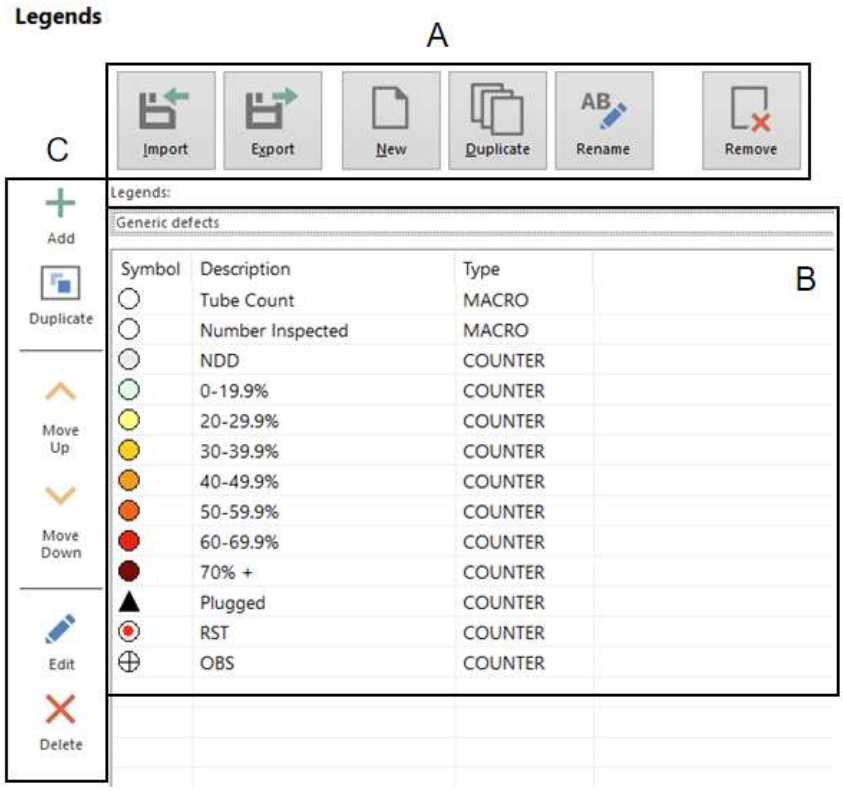
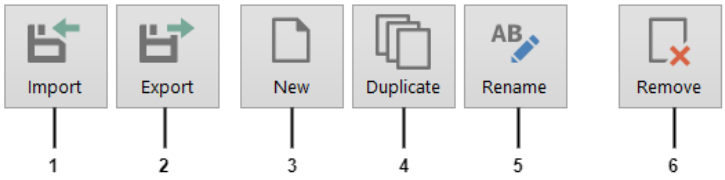
LEGENDS

Legends are used to assign a color or shape to a range of values present in the inspection data. In the frontstage, the Tube Map Results Table uses legend entries to display and sort data. Legends are also used to show indications on tubesheet representations and 3D models.



A. Legend Options



1. Import an existing legend from a previously saved file (.RMSLEG).
2. Export the active legend by creating a .RMSLEG file.
3. Create a new legend.
4. Duplicate the active legend.
5. Rename the active legend.

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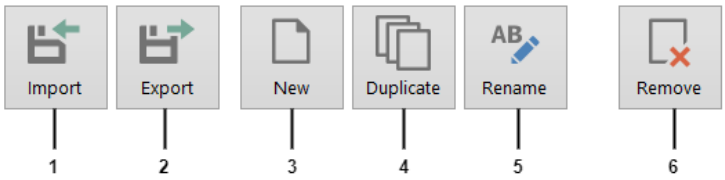
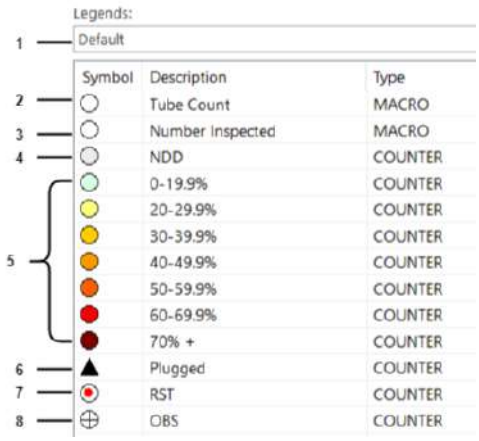


6. Remove the active legend from the project.

B. Default Legend items



1. Move from one legend to another.
2. Total number of tubes in the tube sheet.
3. Total number of tubes that have been inspected. **Note:** This includes all tubes that have an element entered in the Code field in the Inspection Data section of Frontstage.
4. Legend counter of tubes that have no defects detected (Code NDD in the Inspection Data section).
5. Legend defects counters. Conditions to be met are separated by percentages.
6. Legend counter of tubes that are plugged (Code PLG).
7. Legend counter of tubes that are restricted (Code RST or RSTR).
8. Legend counter of tubes that are obstructed (Code OBS).

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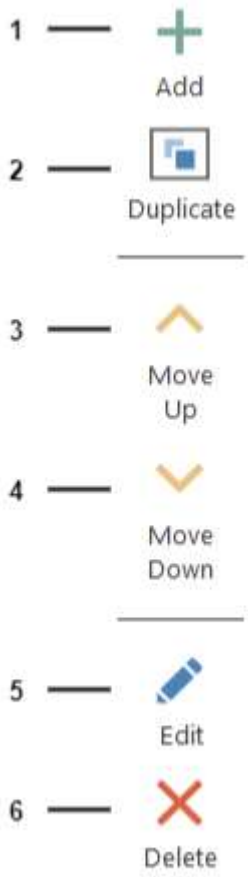
C. Legends edition



1. Add a new item to the legend.
2. Duplicate an existing item in the legend.
3. Move up the selected item in the legend. **Note:** The order of the legend is important. If, for example, the characteristics of a tube make 2 elements of the legend active. The item higher up in the list takes precedence.
4. Move down the selected item in the legend.
5. Opens the window editor to edit the selected item.
6. Delete the selected item from the legend.

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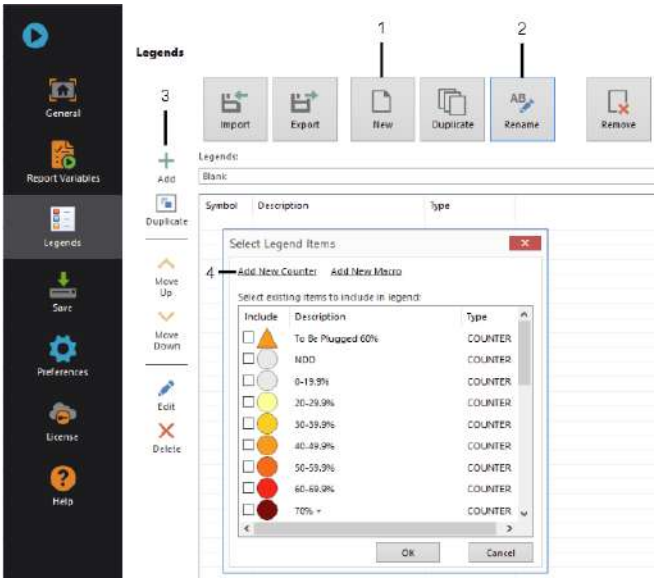
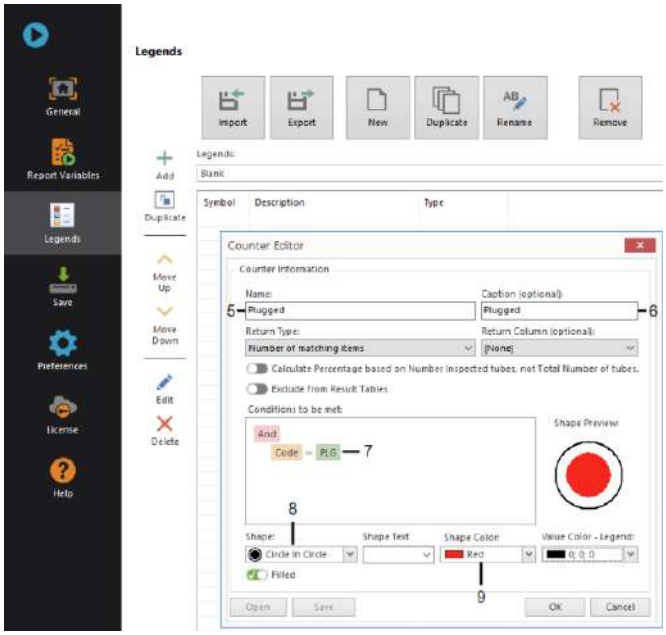
1. Create a new legend element from scratch

The following figure shows an example on how to create a new Restricted counter from a blank Legend.



1. Create a new legend.
2. Rename it.
3. Click the Add button.
4. Add a new counter.



5. Change the name to Plugged.
6. Change the caption to Plugged.
7. Change the condition to an And and enter the formula Code = PLG.
8. Change the shape to Circle in Circle.
9. Change the shape color to red.

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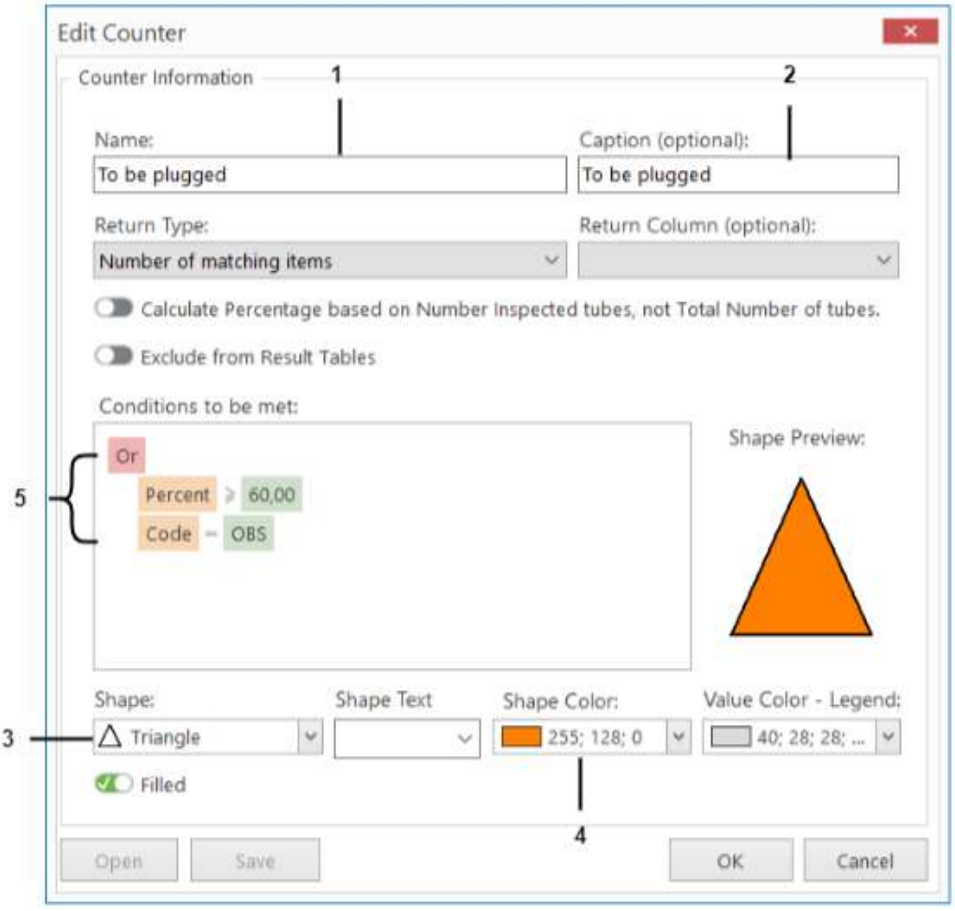
2. Create a counter with OR conditions

In the following example, we'll show how to set up a counter so that it includes all the tubes that need to be plugged. We will use 2 conditions for this: the tube has a defect of more than 60% or the tube is obstructed.

As shown previously, a new counter needs to be added and its editor opened. Once that is done, the counter name can be changed to *To be Plugged* **(1)**. The caption can be changed for the same name **(2)**. The shape will be set as a triangle **(3)** in the colour orange **(4)**. Next, the *And* condition that is present by default needs to be switched to an *Or* condition, which is done by simply clicking on the *And* in red and changing it. The percent value can be changed to 60.00 by clicking the green number after *Percent* and its conditions ≥ can be customized by also clicking on it and selecting the correct one. Lastly, the *Code* condition can be added by clicking the + sign on the side of the *Or*, then modifying the sign in the middle to an = sign, and writing the code *OBS* on the right **(5)**.



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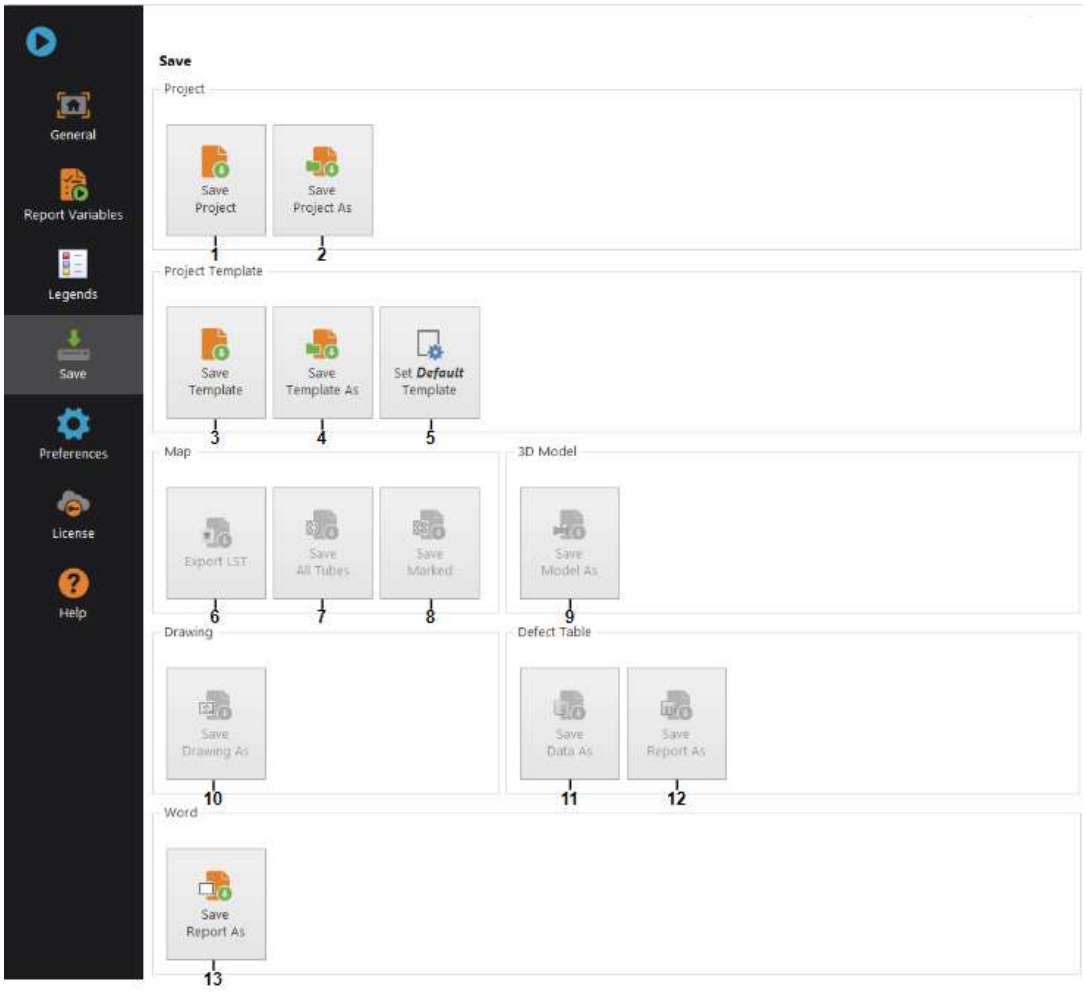
SAVE

The Save tab lets you save the current project or sub-elements of it.



1. Saves a project in the folder defined in the General tab.
2. Saves a project in the selected folder.
3. Saves a template from the active project in the project folder.
4. Saves a template from the active project in the selected folder.
6. Exports a tube list (.LST) that can be used by acquisition software such as Magnifi from the tubes selected in the Tubesheet navigation tab.
7. Saves tubes created in the Tubesheet navigation tab (.MAP). There's an option to save all tubes, only selected tubes or an active tube section when this button is clicked. This file can be used to re-import the tube sheet representation into a project.

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5. Use the active project to define the default template. When a default project is loaded in the general tab, the template used will be the one defined with this button. The template will contain the entire project, with the exception of inspection-specific items (Tubesheet, 3D model and Inspection data). The purpose of the template is to speed up report creation by having to parameterize only inspection-specific information. The aim is for the rest of the report to update automatically with this information.

8. Saves the selected tubes created in the Tubesheet navigation tab (.MAP).

9. Saves the 3D model in PDF format.

10. Saves the active drawing in the Frontstage (.T5DWG).

11. Saves data contained in Inspection Data (.RMSDS).

12. Saves the defect table in PDF format.

13. Saves the word file in the selected location.

Note: Some buttons may be grayed out. To activate these buttons, the navigation tabs to which they refer must be active in the Frontstage. For example, the 3D Model navigation tab must be open to save the 3D model.

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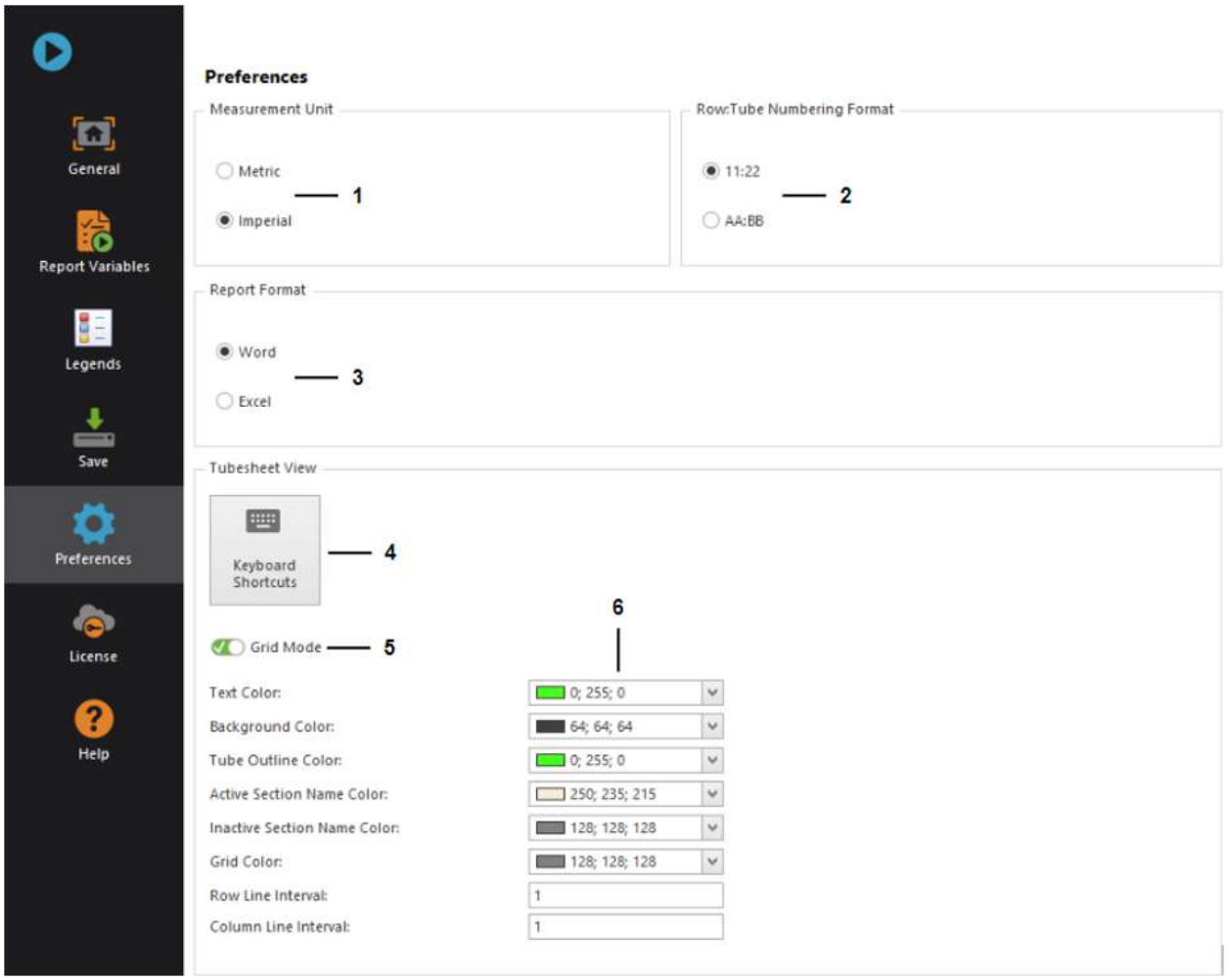
PREFERENCES



1. Changes units throughout the program.
2. Changes tube numbering format.
3. Select whether the main part of the report should be in Word or Excel format. The navigation tab and functions in the Frontstage will change accordingly. **Note:** Using a Word format is recommended for new report creation.
5. Enables or disables grid mode in the Tubesheet navigation tab. This function allows tubes to be placed in a pre-established pattern, so that they are always properly aligned. When this mode is activated, it is not possible to place a tube anywhere other than on the grid. Some actions will activate grid mode (e.g. automatic tube alignment) and others will deactivate it (e.g. automatic tube detection from an image). When tubes cannot be placed on a pattern, grid mode cannot be reactivated and this button will be grayed out.

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4. View and modify keyboard shortcuts that can be used to activate functions in the Tubesheet navigation tab. See below for more information.

6. Adjusts the colors in the Frontstage Tubesheet tab.

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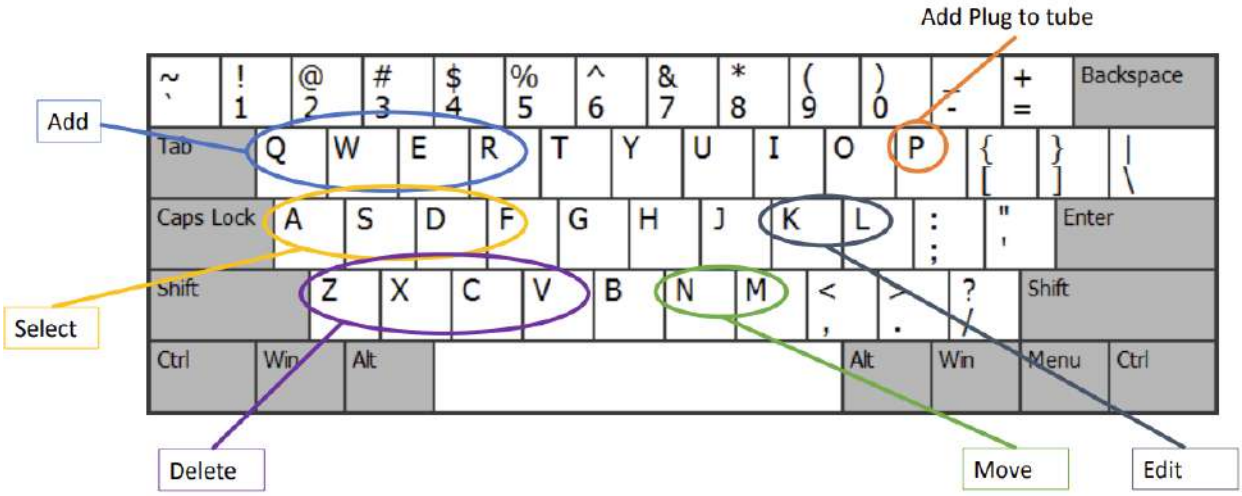
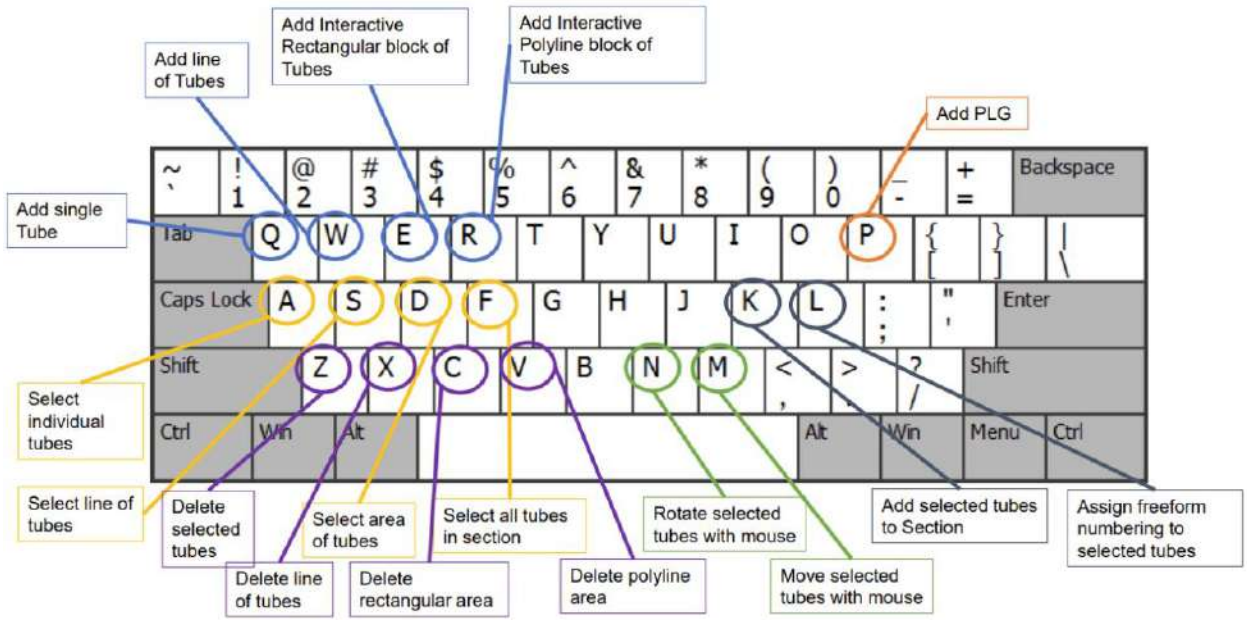
Keyboard Shortcuts

Keyboard shortcuts are configured to make functions quicker to perform than pointing-and-clicking with the mouse. The shortcuts altered in the Backstage will affect the shortcuts used in the Frontstage. A general description of the keyboard functions is given immediately below in the first image, and more detailed descriptions are given in the second image.





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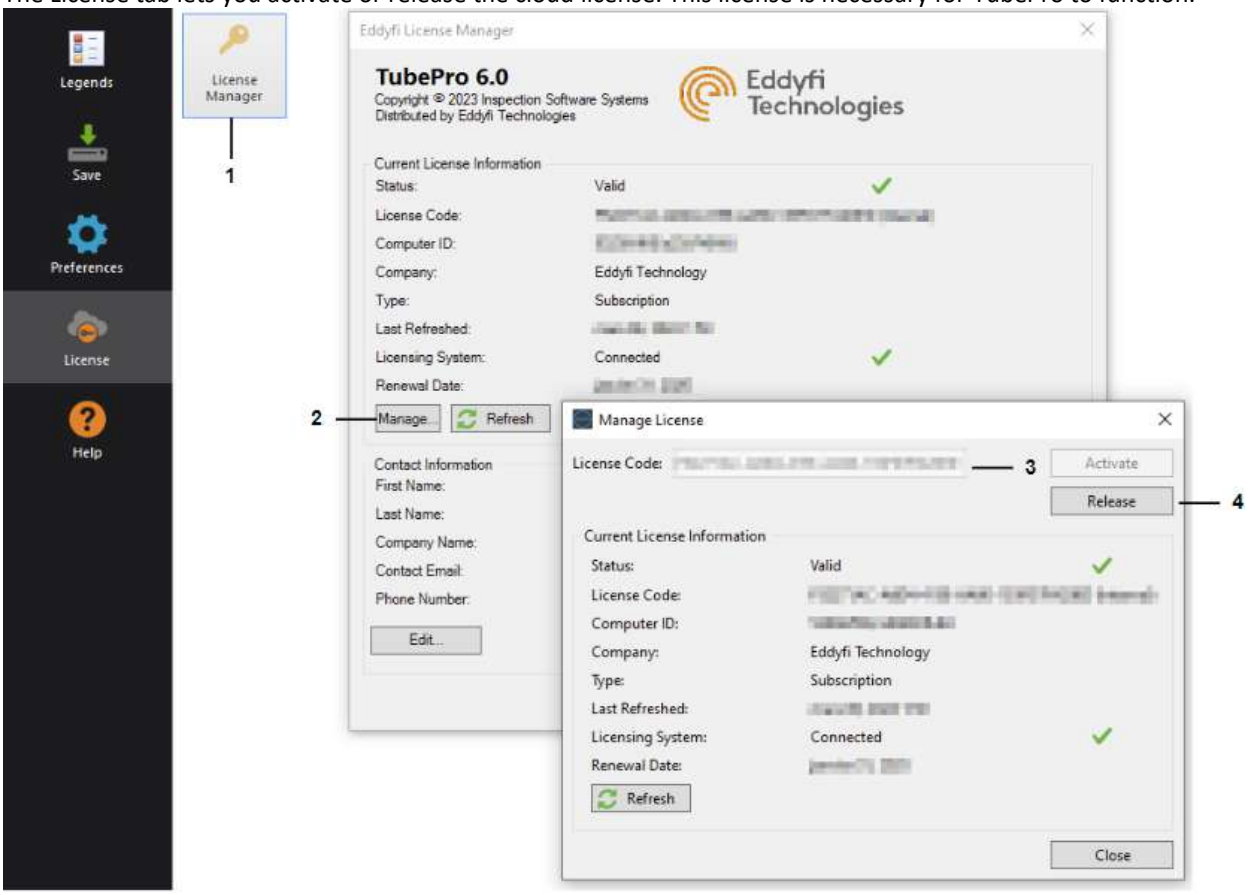
LICENSE

The License tab lets you activate or release the cloud license. This license is necessary for TubePro to function.



1. Opens the Eddyfi License Manager window.
2. Opens the Manage License window.
3. TubePro uses a cloud license. To activate this license, you must enter the license code provided to you when you purchased the software in this field and click on Activate. You must also have an internet connection at the time of activation. Once activated, TubePro can be used without reconnecting to the internet for 1 year.
4. If you wish to share your license, it is possible to release it and transmit the code to the person who wishes to use the software. An internet connection is required for the license to be released.

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FRONTSTAGE

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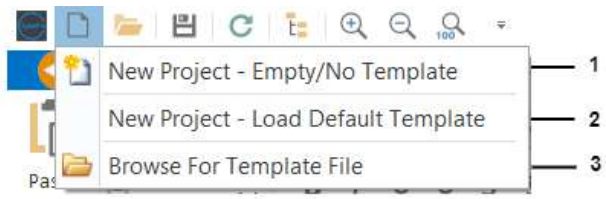
QUICK ACCESS TOOLBAR

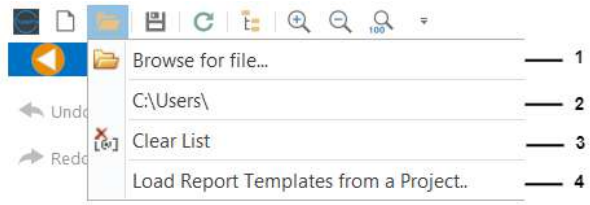
In all sections, the user has access to the same toolbar at the top left of the window.

A. New project options



1. Start a new empty project from scratch.
2. Start a new project with the default template.
3. Start a new project by opening an existing template.

B. Open project options



1. Browse folders to open an existing project.
2. Open the last project opened (if more has been previously opened, the list will be longer).
3. Clear the list of previously opened projects.
4. Load a template that is sourced from an existing project. Only the template will be opened and not the project (does not include Tubesheet map, project-specific inspection results or 3D model features).

C. General tools

1. Save the active project.
2. Refresh the report.
3. Reopen the project browser after it was closed.

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4. Zoom in.
5. Zoom out.
6. Zoom all to 100%.
7. Customize the quick access toolbar, such as selecting the wanted components and moving the toolbar.

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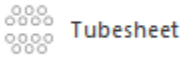
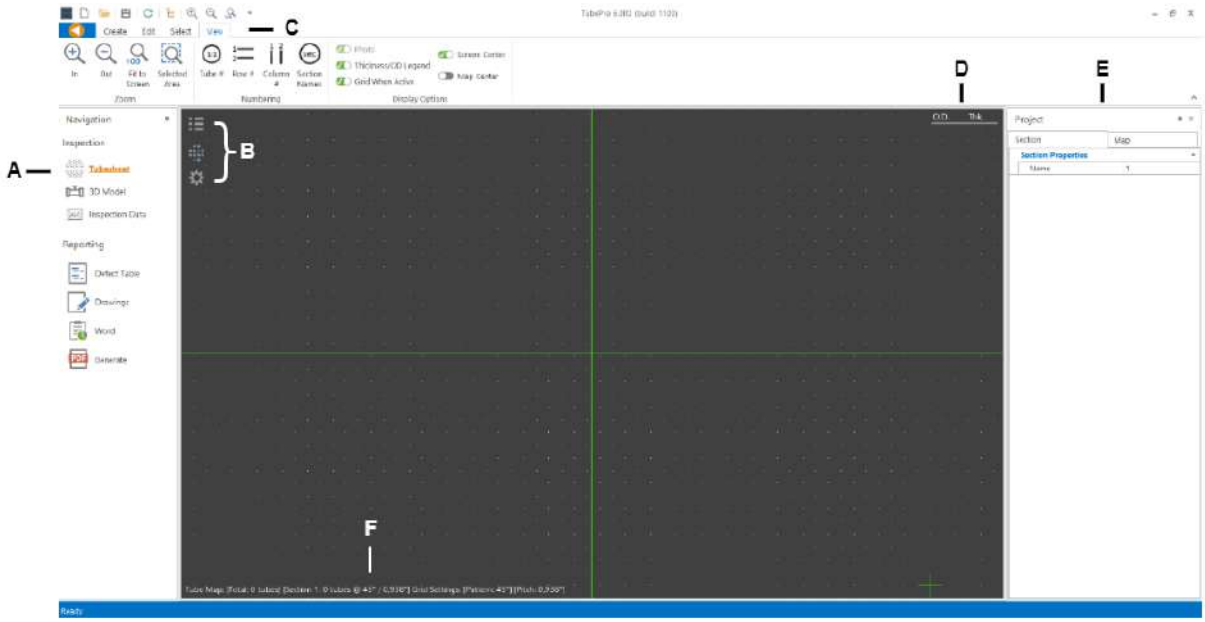
TUBESHEET



The Tubesheet navigation tab is mainly used to draw the tubes on the heat exchanger's tube sheet. It can also be used to produce a list of tubes to be inspected, which can be imported by data acquisition software such as Magnifi. The selected navigation tab is highlighted in orange **(A)**. It is possible to hide or show the result table, the defects in the tubes and to modify the result table display settings **(B)**. The different ribbons available (Create, Edit, Select and View) offers functions and are grouped by usage **(C)**. The thickness of the tubes and their outside diameters (OD) can be shown when the function is toggled in the view ribbon **(D)**. The Project browser **(E)** has two sections, the Sections Properties, which allows the user to select the section of tubes needed, and the Map section which gives the following information: the total number of tubes, the number of selected tubes, the percentages of selected tubes, the number of tubes in a specific section and allows to user to show or hide a section of tubes. At the bottom of the screen, the tube map general information is shown: the total number of tubes, the number of tubes in each section, the pattern and pitch of the section, and the grid settings (pattern and pitch) **(F)**.



Create Ribbon

The Create ribbon menu is used to create the tube sheet map associated with the inspected bundle. This menu allows to load the tube sheet *.map file directly, if available. Otherwise, there are two separate processes for creating the tube sheet map:

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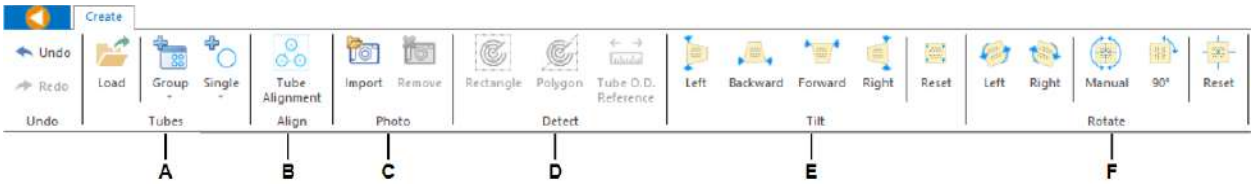
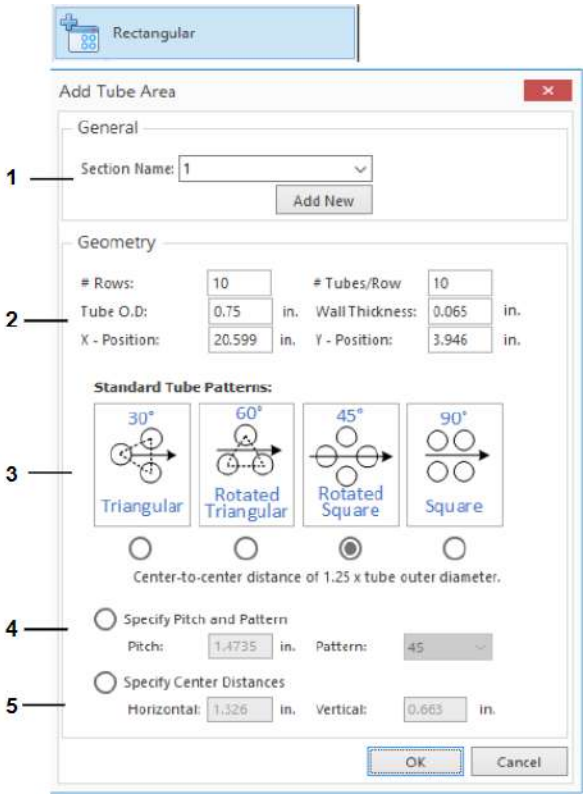
- Creation of a tubesheet map by adding a singular block or group (rectangular or circular) of tubes with user-specified properties.
- Automatic tube detection from an imported photo or PDF drawing of a tube sheet.



A. Tubes

Define Group – Rectangular



1. Select the tube section to which you want to add the tubes. It is also possible to create a new tube section for the tubes to be added. **Note**: There can only be one tube pattern for a given tube section. To create a tube sheet with multiple patterns, the user must create different sections as explained in Edit section D: Assign.
2. Defines the number of rows and columns in the group, as well as the external diameter and thickness of the tubes.
3. Selects a standard tube pattern according to TEMA. Tubes will have a center-to-center spacing of 1.25 times their external diameter.
4. Allows you to set a center-to-center tube distance (pitch) and choose the angle of the pattern.
5. Allows you to define the center-to-center distance of the tubes. A horizontal and vertical distance must be entered. With this option, a square pattern is automatically selected.

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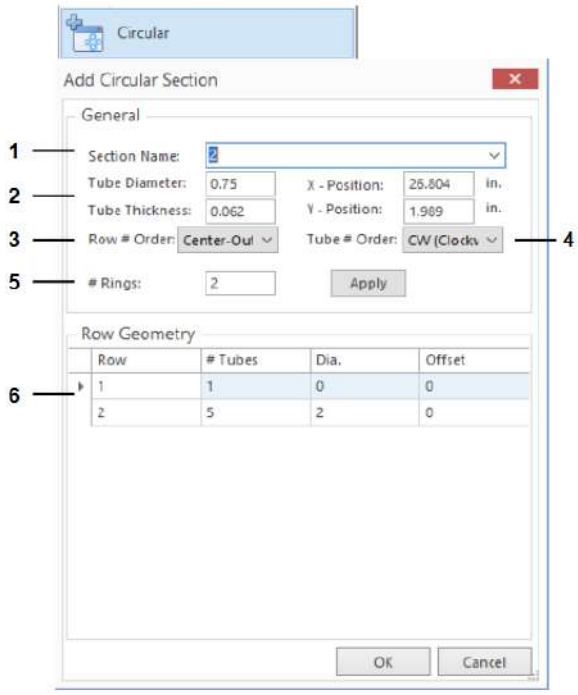
Define Group - Circular



1. Select the tube section to which you want to add the tubes. It is also possible to create a new tube section for the tubes to be added. **Note**: There can only be one pattern for a given tube section.
2. Tube diameter and thickness and offset of the circle center on the X and Y axis, relative to the center of the 2D model.
3. Defines the starting point for numbering. For the Center-Out option, the first row of tubes will be the highest. For the Out-Center option, the first row of tubes will be the center row.
4. Defines the tube number incrementation direction. It can be set clockwise or counterclockwise.
5. Number of rings in the tube section.
6. Define the number of tubes for each row and the diameter of each row. The offset is the angle at which the tube group will be rotated. If, for example, a value of 45 is entered, the highest tube will be moved 45 degrees from the center and its initial position.

Interactive – Rectangular

When this button is activated, tubes will be added to the 2D map within a rectangle drawn by the user. **Note:** The grid mode must be activated for this option to be available.

Interactive - Polygon

When this button is activated, tubes will be added to the 2D map within a polygon drawn by the user. **Note:** The grid mode must be activated for this option to be available.

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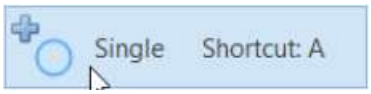
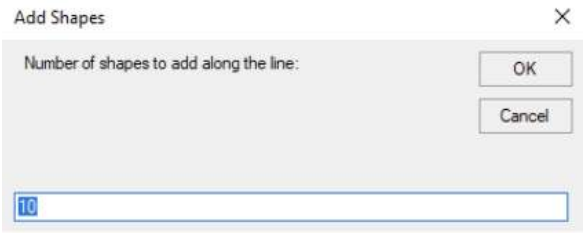
Single



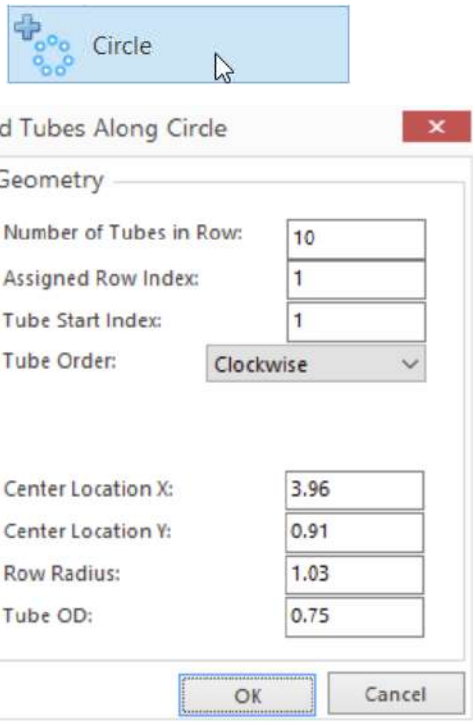
Adds a single tube at the clicked location. **Note:** This tool can also be used to unplug a previously plugged tube.

Line



Adds tubes along a line drawn in the 2D map. When not in grid mode, the user must enter the desired number of tubes.

Circle



1. Number of tubes included in the tube circle.
2. Circle row number.
3. Tube starting index. The first tube will be the highest.
4. Tube numbering direction.
5. Circle center offset on X and Y axis, relative to 2D model center. **Note:** The visibility of this center can be activated from the View ribbon.
6. Tube circle radius.
7. Outside diameter of tubes included in the circle.

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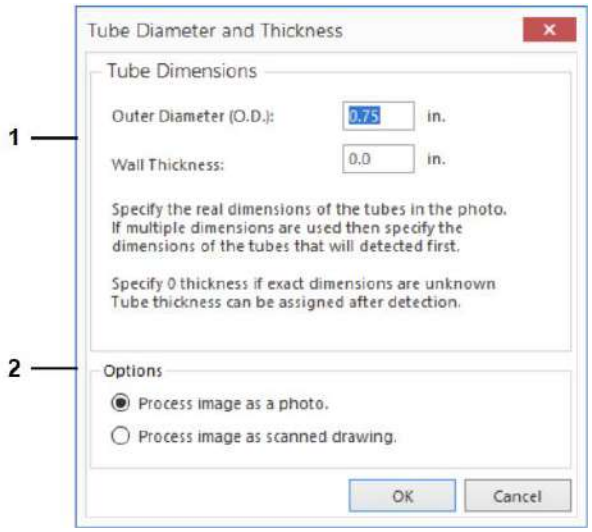
B. Photo

Photo

Add or remove a tube sheet image in the background to automatically detect tubes on it with the Detect functions (described later).

The detection algorithm will perform better using high quality pictures, centered and as parallel as possible to the actual tube sheet.

Note: Grid mode is automatically disabled when a photo is imported. It is reactivated if the Tube Alignment function is used.



This window appears when an image is imported.

1. External diameter and thickness of the first tube detected (using the Detect group of functions). These values are used to scale the TubePro exchanger model according to the image. The software will detect the internal diameter of the tubes and use it as the dimensional reference. This enables all other dimensions of the exchanger to be set in relation to this reference and the associated image. **Note:** The algorithm detects the tube ID rather than the tube OD and uses the specified thickness to scale the tube OD in the photo. Due to welding shadows around tubes in certain photos, the diameter of the tube-hole may be calculated slightly larger. Therefore, when the thickness is added to the ID of the tube, the OD of adjacent tubes might touch or overlap. As a result, the detection may be more accurate if users specify a wall thickness of 0 before using the photo detection algorithm. After detecting the tubes, the wall thickness can be set it to a desired value.
2. TubePro lets you import a photo or technical drawing. Selecting the right format will improve automatic tube detection.

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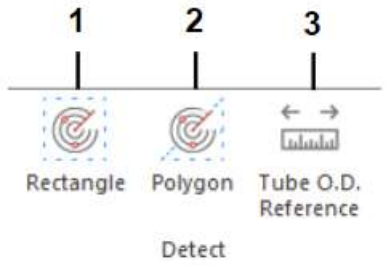
C. Detect

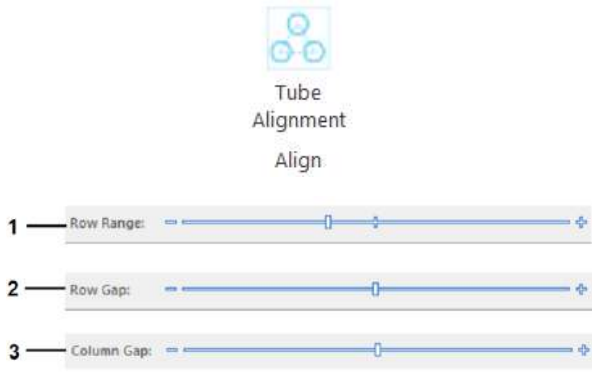


Before using the detection tools, the user must set the picture as straight as possible using the tools in the Tilt and Rotate sections.

Function group for detecting tubes from an imported photo.

1. Detects tubes in an imported image included in a rectangle drawn in 2D view.
2. Detects tubes in an image included in the polygon drawn in View 2D. **Note:** Functions 1 & 2 can be applied several times to the same area. Retrying detection on fewer tubes can improve automatic detection.
3. Redefines the tube dimensional reference entered when the image was first imported.

D. Align



The software will realign the tubes automatically to the closest standard pattern seen in the Tubes section.

When this button is pressed, the software shows the suggested tube placement in white. Adjustments to the recommendation can be made with the sliding bars at the top of the drawing area. Press OK to apply the suggestion.

1. Adjust vertical tolerance to include tubes in the same row.
2. Increases distance between rows.
3. Increases distance between columns.

Once the tubes have been repositioned, the software automatically activates grid mode. This mode can be deactivated from the backstage if desired.

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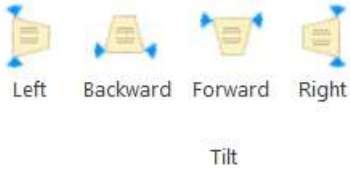
E. Tilt



Function group that adjusts the image to straighten it. A straight tube sheet image facilitates 2D model creation.

F. Rotate

Function group used to rotate the imported image.

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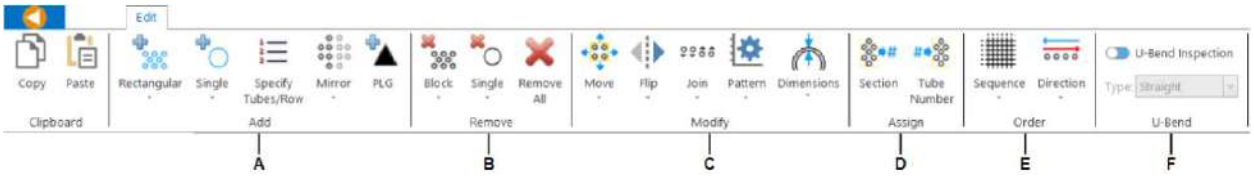
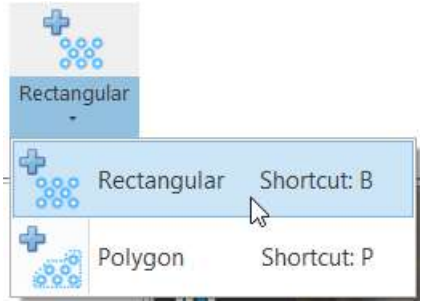
Edit Ribbon

Once all tubes or most of them are added to the map, the user can use the tools in the Edit ribbon to modify the map, set settings such as tube dimensions and section names and adjust the numbering.



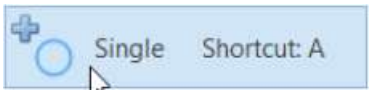
A. Add

Interactive



See section Interactive – Rectangular and Interactive – Polygon section above. (add link)

Single



See Single section above.

Line

See Line section above.

Circle

See Circle section above.

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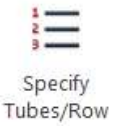
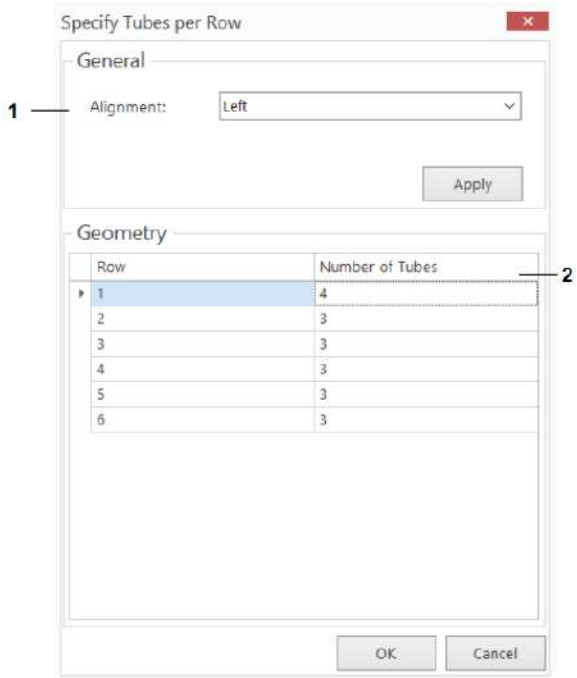
Specify Tubes/Row

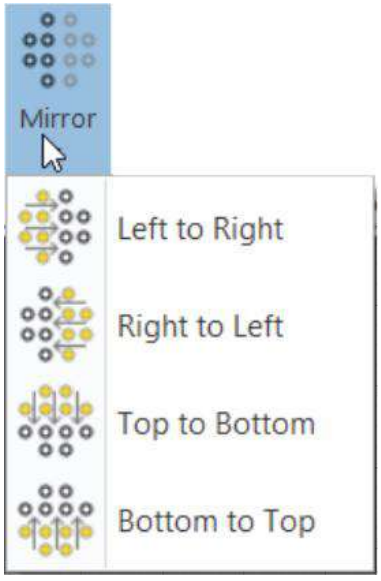




Allows you to redefine the number of tubes per row in a tube section.

1. Direction defining the reference for tube alignment. If, for example, the alignment is made to the left and we add a tube to a row, this tube will be added to the right to keep the tubes aligned to the left.
2. Allows you to change the number of tubes per row.

Mirror



Creates a mirror image of the selected tubes. The reflection line is defined according to one of the 4 options.

Note: The software might automatically create an additional pivot tube line in some cases. This line can sometimes be useful for drawing exchanger tubes but can easily be deleted if not required.

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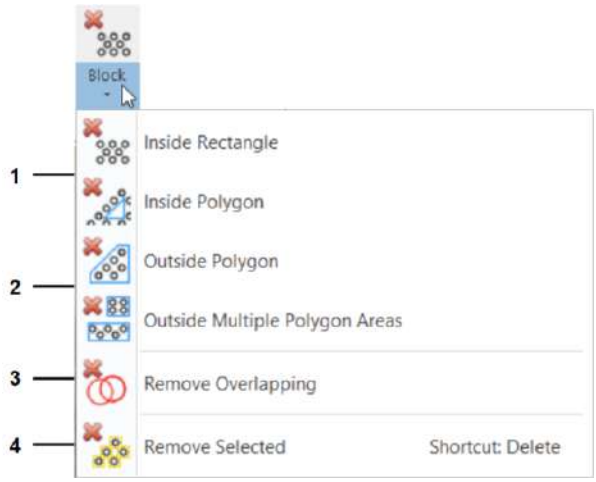
PLG

Selecting this option and clicking on a tube in the drawing area will set that tube to Plugged (PLG) in the defects list (Inspection Data section). The Plugged icon will also be displayed in the 2D tube view.

Note: If a tube section is set as a U-bend (Edit ribbon of the Tubesheet tab), setting a tube to plugged will automatically mark both ends of the tube as plugged.

Note: The add single tube button can also be used to unplug a previously plugged tube.

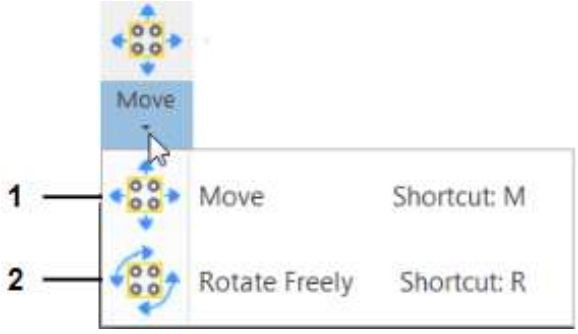
B. Remove



1. Deletes tubes inside the traced shape.
2. Deletes tubes outside the shape(s). Once the selection is finished, the user must press enter to delete.
3. Erase tubes that are superimposed. The software removes the tube that is most likely to be the one to be removed.
4. Deletes selected tubes.

C. Modify

Move



Tubes must be selected before activating this feature.

1. Moves selected tubes. When activated, the user must first select a starting point anywhere on the map and then select the destination point.

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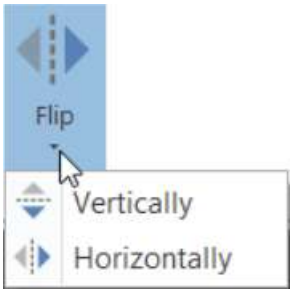
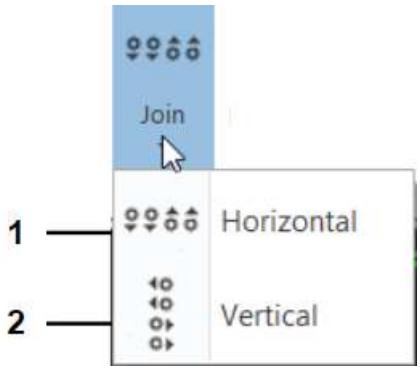
1. Rotates selected tubes. First select a pivot point, then a reference and a destination point. The tubes will be rotated by the angle defined by these three points. **Note**: This function cannot be used if the system is in grid mode.

Flip



Buttons to flip the tube group. The axis of reflection will be the middle of the chosen tube group.

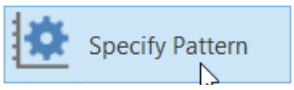
Join



Allows to join tubes so that they are on the same line. These functions are used when Grid mode is deactivated and tubes that are not perfectly aligned should be.

1. For the Horizontal option, tubes will be placed on the same horizontal line. The position of this line is defined by the highest tube.
2. For the Vertical option, tubes will be placed on the same vertical line. The position of this line is defined by the highest tube.

Pattern



Allows you to redefine the pattern and tube dimensions of the selected tube section.

1. Tube section name.
2. See Define Group - Rectangular

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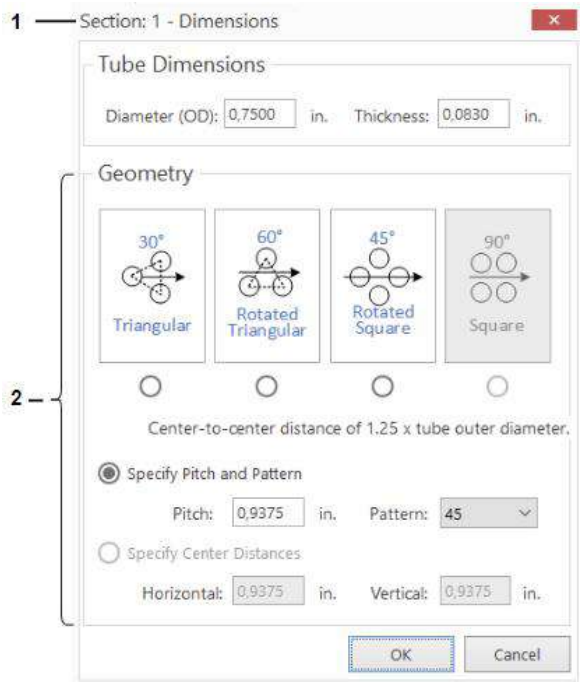
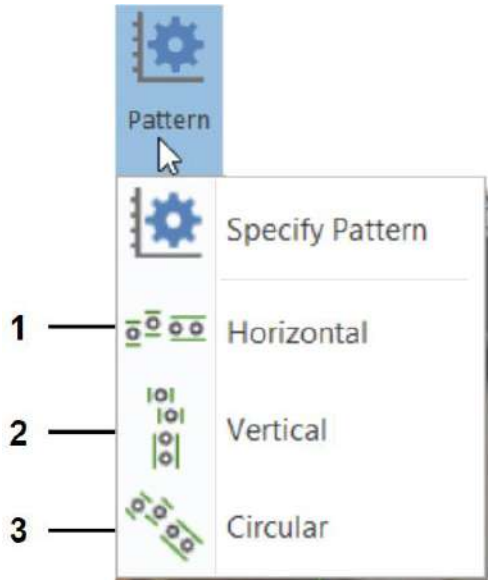


Horizontal, Vertical and Circular



1. Automatically aligns the lines in a group of tubes. This function can be applied to a group with several lines.
2. Automatically aligns the columns of a tube group. This function can be applied to a group with several columns.
3. Automatically aligns tubes in a group of tubes to form a circle. This function can be applied to a group with several circles.

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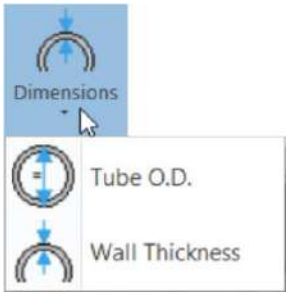
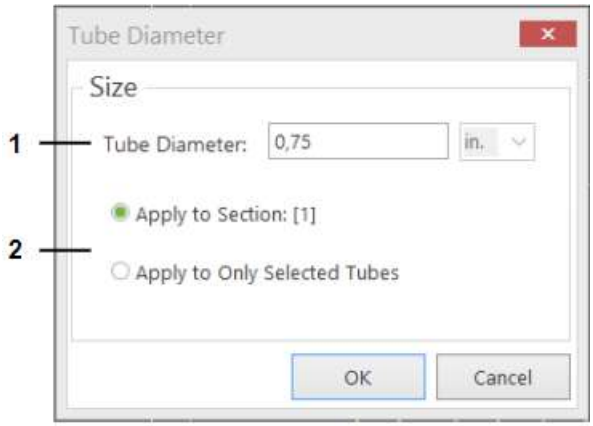
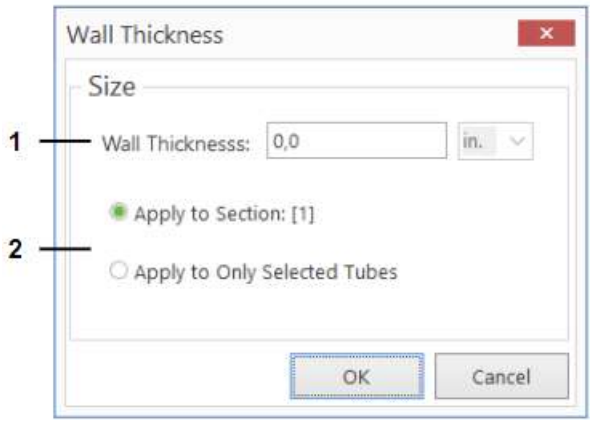
Dimensions



Allows you to redefine tube dimensions.





1. Change tube diameter or thickness.
2. The modification can be applied to the active tube section or to selected tubes.

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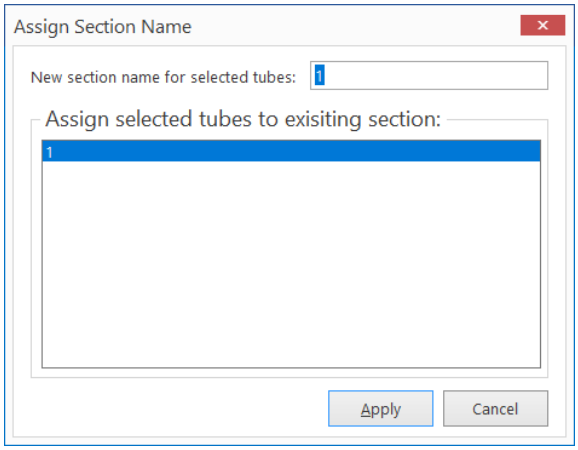
D. Assign

Section



Reassigns a tube section name for the selected tubes.

Tube Number

1. Sets the starting tube numbering of the selected tube section to the desired value (row and tube number).
2. Change tube numbering across the selected row(s). The incrementation, direction and number of the first tube and row can be defined.
3. Changes the numbering of tubes with a directional sequence previously defined with the Sequence button.

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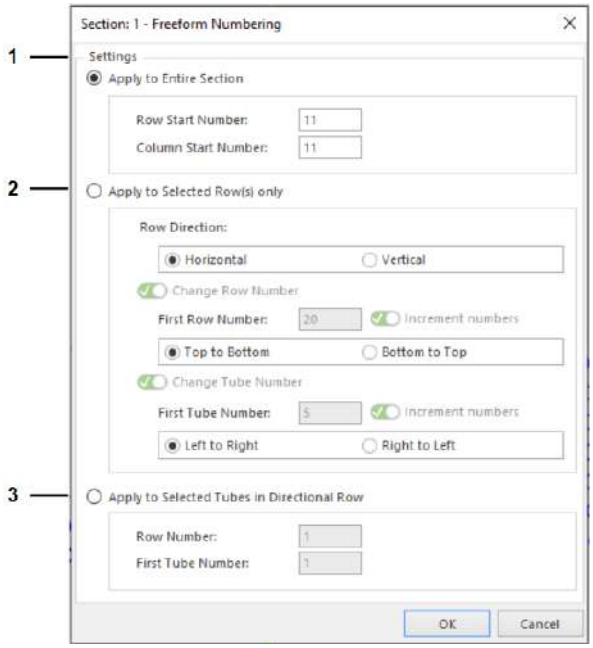
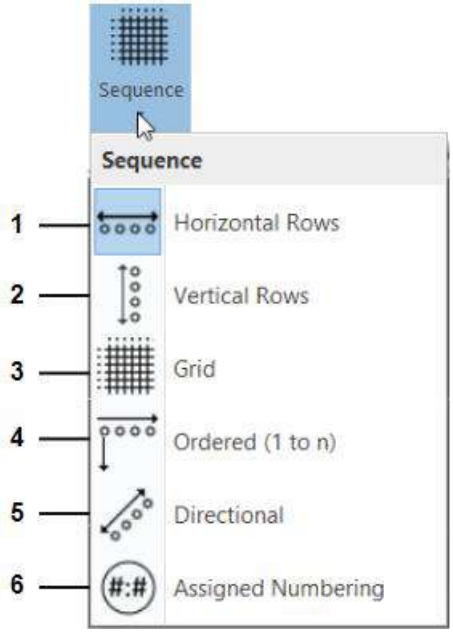


E. Order

Sequence



1. Row numbers are incremented from top to bottom. Horizontal rows share the same row number. For example, for a group of tubes with a square pattern, the first tube in the first row will be 1:1 and the first tube in the second row will be 2:1.

2. Row numbers are incremented from left to right. Vertical rows share the same row number. For example, for a square tube group with a square pattern, the first tube in the first row will be 1:1 and the second tube in the first row will be 2:1.

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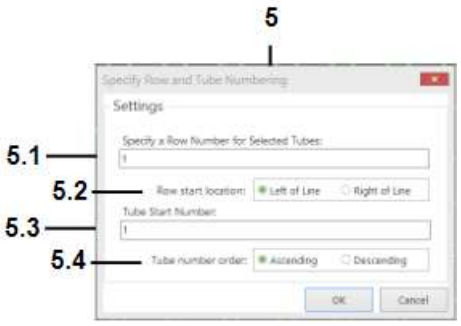
3. Tube number incrementation is defined by the position of the tubes in a grid.

4. Tubes have only one number. The numbering runs from left to right and top to bottom.

5. Rearrange tube numbering according to the orientation specified by drawing a line. First select the tubes to be modified. Once the Directional icon is selected, draw the line defining the numbering orientation. **5.1** Defines the number of the first row of selected tubes. **5.2** Defines whether the starting point of the row is from the left or from the right. **5.3** Defines the number from which the first tube in each row starts. **5.4** Defines whether tubes are numbered from right to left or left to right.



6. Tube numbering was established using Freeform Numbering. Switching from this sequence to another will erase the manual assignment previously established. **NOTE:** You can't use this option if you want to reassign numbers using the tube number button.

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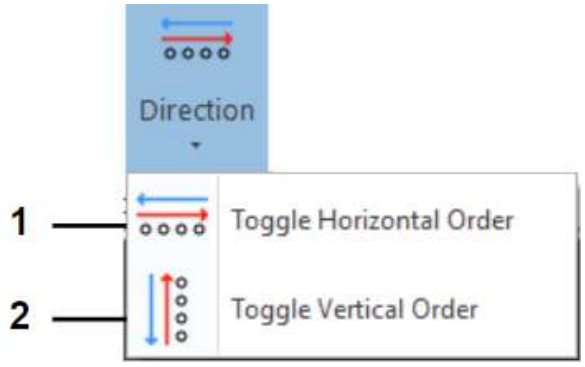
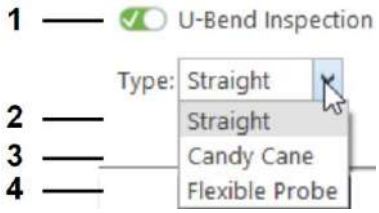
Direction

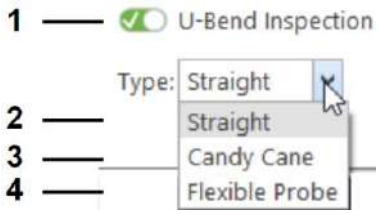


1. Reverse horizontal tube numbering.
2. Reverse vertical tube numbering.

F. U-Bend



Automatically fills plugged tubes and/or indications symmetrically for the 2 ends of U-shaped tubes. **Note:** This function must be used to make simple exchangers and applies to each tube section individually (Tubes are connected within the same tube section). It cannot be used to link tube sections together. Linking sections together can be done using the U-Bend editor in the 3D model. Note also that each tube must have an independent number even if they are connected.



1. Consider the tube section(s) as having U-shaped tubes. By default, correspondence is from top to bottom. If, for example, a tube section has 10 tubes by 10 tubes (square pattern with horizontal rows). Tubes 1:1 and 10:1 will be considered connected. **Note:** The orientation of the link between the tubes (horizontal or vertical) can be changed by using the U-Bend Editor in the 3D model.
2. The inspection is considered to have been carried out by a rigid probe. For instance, defects in the top group of the U-tube are shown independently of those in the bottom group. However, identifying a tube as plugged in the top group will also show the bottom group of the tube as plugged (see image below).

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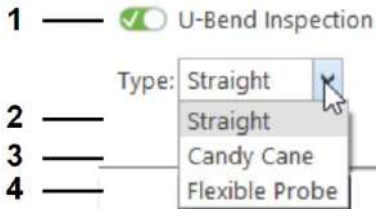
a.

3. The inspection is considered to have been carried out by a flexible probe. The data for the top straight section and the bend is saved in one single data file. A second data file represent the bottom straight section.



4. The inspection is considered to have been carried out by a flexible probe and the data for the entire tube, both top and bottom straights and the bend, is saved in one single data file. Defects in the top group of the U-tube are shown in the same way as those in the bottom group (vertical u-bend). If a defect is entered in the top group of the tube, it will also be shown in the bottom group (see example below). After selecting this option and moving to the 3D model section, the user will notice that the defects are properly represented in the straights as well as the bent area. **Note:** Each tube must have an independent number even if they are connected.

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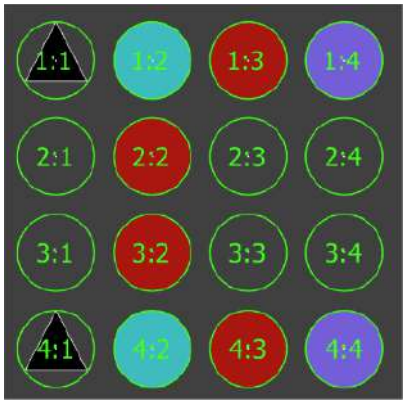

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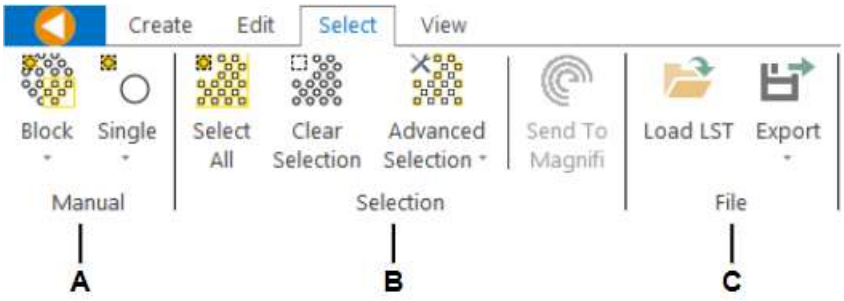
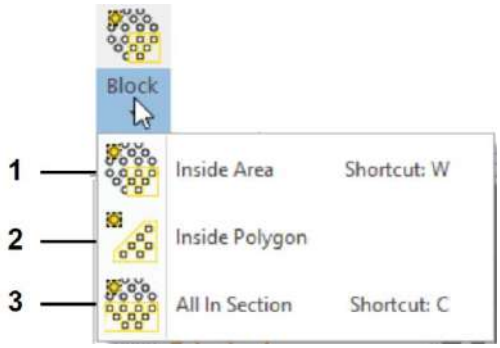
Select Ribbon

The Select ribbon is used once the tubesheet is considered completed. It allows the user to select parts of the tubesheet to send to Magnifi for an upcoming inspection.



A. Manual

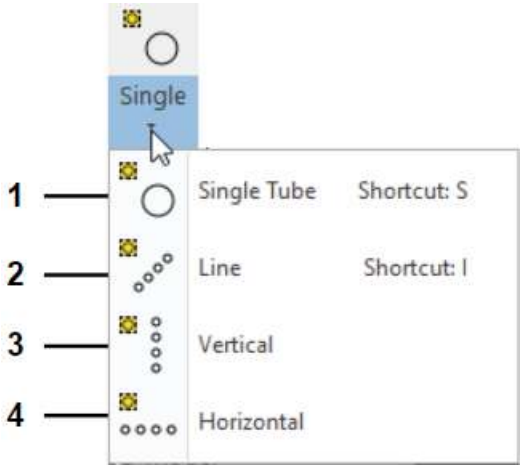
Block



Selects a group of tubes.

1. Selects tubes within a rectangle drawn in the tube sheet model.
2. Selects tubes within a polygon drawn in the tube sheet model.
3. Selects all tubes in the active tube section.

Single



1. Selects only 1 tube at a time.
2. Allows you to select a line of tubes. Draw a line on the screen over the tubes you wish to select.
3. Allows you to select all the tubes visible on the screen on a vertical line by selecting a tube on this line.
4. Select all tubes visible on screen on a horizontal line by selecting a tube on this line.

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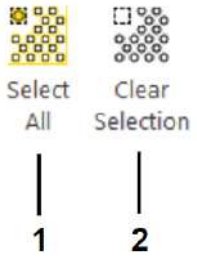
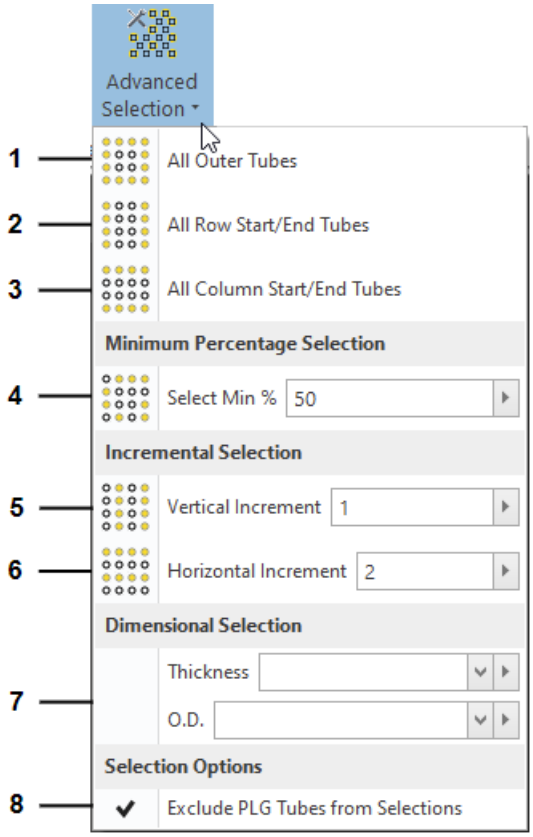
B. Selection

Select All & Clear Selection



1. Select all tubes.
2. Clear the selection.

Advanced Selection



Allows you to select tubes according to certain rules. To perform the selection with some functions, the arrow on the right-side must be pressed. **Note:** Selection is additive, meaning that using 2 options will select all tubes specified by these 2 options.

1. Selects all outer tubes.
2. Selects all tubes at the beginning and end of a row.
3. Selects all tubes at the beginning and end of a column.
4. Randomly selects a number of tubes specified by the percentage entered.
5. Selects one row out of X.
6. Selects a column on X.
7. Selects only tubes with specified dimensions.
8. Excludes plugged tubes from selection.

Note: These options apply to all tube sections of the tube sheet.

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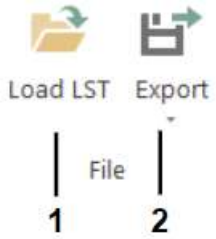
Send to Magnifi

Once you've selected the tubes to be inspected and clicked this button, TubePro will send an .xml file to Magnfi's Project folder. To activate the connection, go to Magnifi Backstage, General tab, press the Import List button and import the .xml file. Following this action, the tube list will be present in Magnifi's Frontstage. Indications entered in Magnifi can be automatically synchronized in TubePro by activating the Sync Magnifi Data button in TubePro's Inspection Data navigation tab. **Note:** For this option to be available, the connection with Magnifi in Tubepro's backstage must first have been configured.

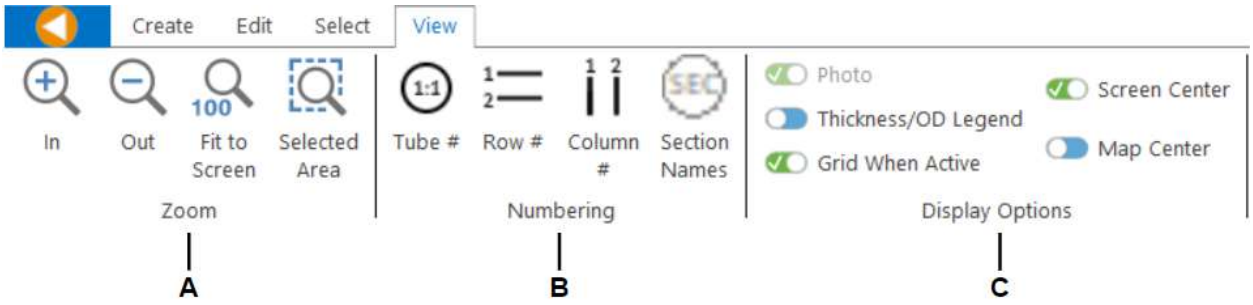
C. File



1. Load a .LST containing a tube list in order to select tubes in TubePro.
2. Export a list (.LST) containing the tube list currently selected in the TubePro interface. This file can be imported by the acquisition software to create a list of tubes to be inspected.

   It is also possible to export a .MAP or a .DXF file which contains the tubes drawn in the Tubesheet navigation tab. This file can be reimported by TubePro and used in another project.

View Ribbon



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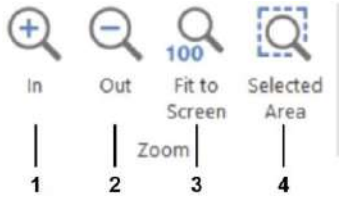
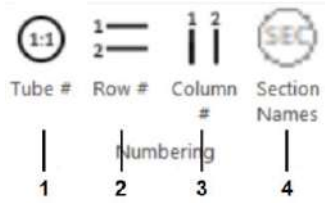
A. Zoom



1. Zoom in.
2. Zoom out.
3. Re-screen to see all drawn tubes.
4. Re-screen to see defined area.

B. Numbering



1. Shows numbering inside tubes.
2. Shows row numbers on each side of the tube group.
3. Shows column numbers at the top and bottom of each tube group.
4. Shows the tube section name(s) in the center of the tube section(s).

Note: leaving the cursor on a tube also displays the tube number.

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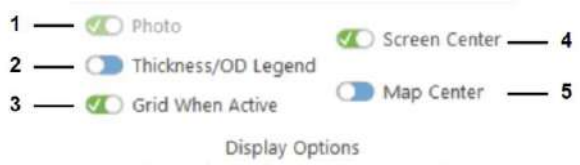
C. Display Options



1. Hides the photo if one has been previously imported using the Import button in the Edit ribbon.
2. Displays a table in the top right corner of the view of the color code associates with the various tube outer diameter and wall thickness values found in the tube sheet map.
3. Displays or hides the grid if grid mode is enabled. The grid is activated/deactivated in the backstage.
4. Display 2 perpendicular lines. The intersection of the lines represents the center of the map. Can be used to align new tubes when grid mode is inactive.
5. Shows the drawing's central reference point. The coordinates described in some tube creation menus refer to this point.

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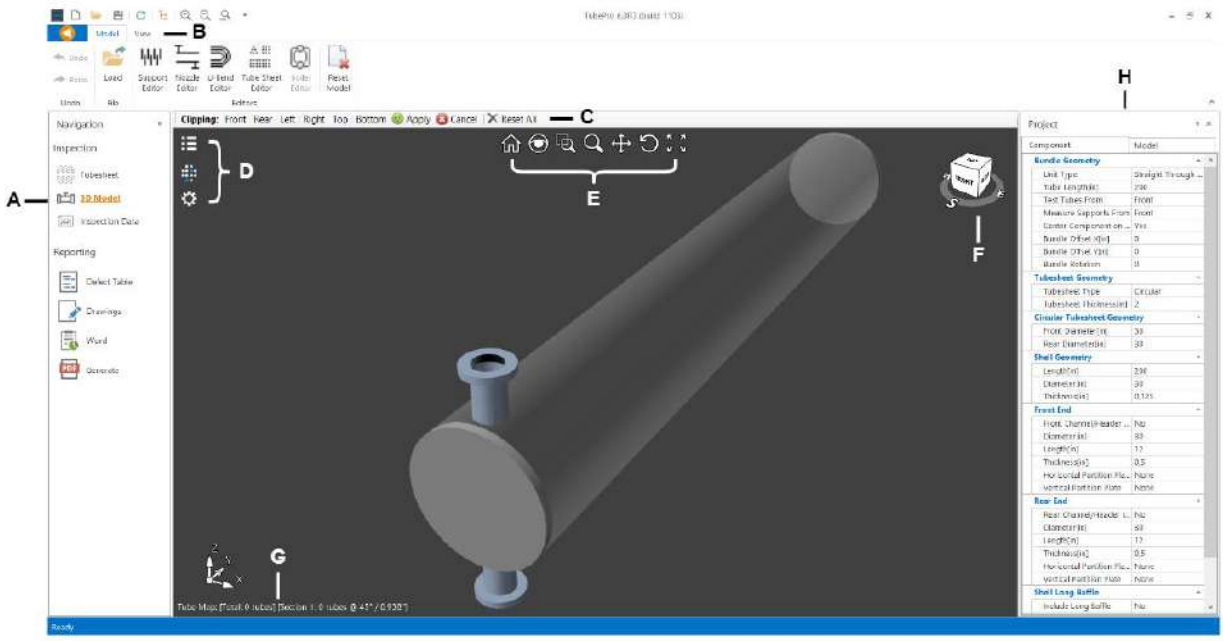
3D MODEL

3D Model

The 3D Model navigation tab is where the 3D representation of the exchanger is configured. The selected navigation tab is highlighted in orange **(A)**. The different ribbons available (Model and View) offer different functions grouped by their use **(B)**. The clipping toolbar **(C)** will be described below. It is possible to hide or show the result table, the defects in the tubes and to modify the result table display settings **(D)**. The view options can be used for a better visualisation of the model **(E).** The cube **(F)** is used to rotate the 3D representation. At the bottom of the screen, the 3D model general information is showed: the total number of tubes, the tube numbers in each section, the pattern and pitch of the section **(G)**. The project browser on the right allows the user to customize the 3D model and will be described bellow **(H)**.



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View options

1. Reset to the default view for the snapshot.
2. Use a magnifying glass to zoom locally with the mouse.
3. Zoom in with a zoom window.
4. Zoom in or out on the snapshot with a right click and dragging the mouse up or down.
5. Move the visual plan of the representation without rotating it.
6. Rotate the representation.
7. Zoom with the best fit for the representation.
8. Rotate the cube to rotate the representation. Select from the available view angles.

Clipping Toolbar

The clipping toolbar is used to adjust the view by clipping away parts of the model. It allows the user to see the internal components of the 3D model.

1. Select the side needed to be clipped and move the cursor to adjust the depth of the clipping.
2. Apply the clipping to the 3D model or cancel it.
3. Reset all clipping modifications.

Project Menu

The project menu in 3D model is composed of 2 tabs, Component and Model.

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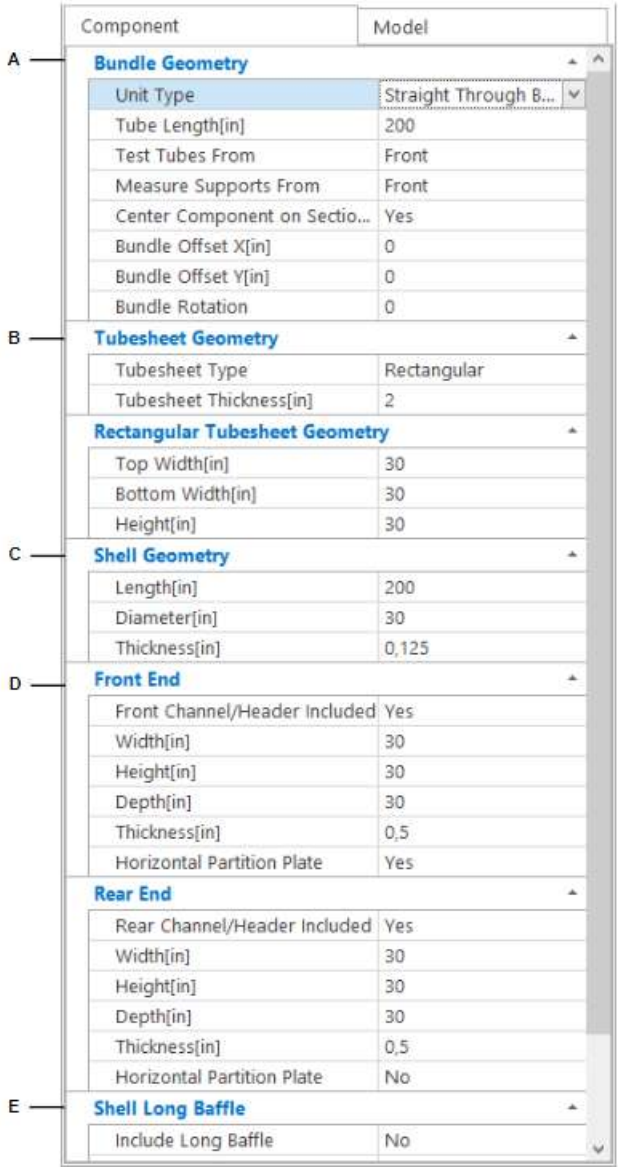
Component Tab

The component tab allows the user to customise the 3D view, such as the geometry of the tube sheet or the bundle. The support plates, nozzles, u-bend, tube sheet and boiler have their own editors that can be found in the Model ribbon, which will be described later.



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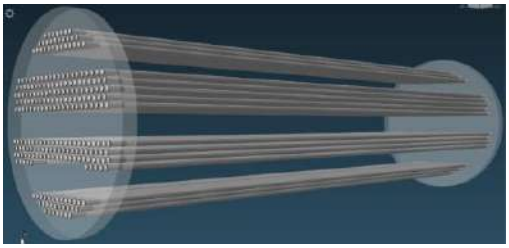
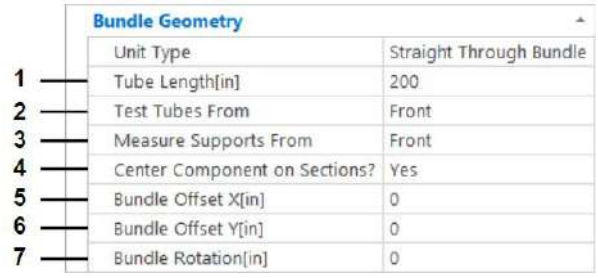
A. Bundle Geometry

1. Bundle type:

- Straight Through Bundle. The tubes are straight inside the bundle.
- U-Bend section. The heat exchanger has U-shaped tubes. Allows different tube sections to be linked together with the U-Bend editor. When the U-bend inspection is toggled on in the Edit ribbon of the Tubesheet section, this is automatically selected.
- Mud and Steam Drum Boiler. Allows you to set up the exchanger as a Mud and Steam Drum Boiler. If this option is selected, the fields in the Component tab will change (see below) and the Boiler Editor button in the Model ribbon will be available if you select this option in the Dimensioning field.

Unit Type – Straight Through Bundle & U-Bend





1. Length of exchanger tubes.
2. Point of origin for defect location. Can be defined as the front or rear of the exchanger.
3. Reference point for locating support plates. Can be defined as the front or rear of the exchanger.
4. Determines whether the center of the tube sheet is the same as that of the tube sections, or is associated with a fixed point in the space.
5. Distance on the right, when looking at the exchanger from the front, between the center of the tubes (or a fixed point in space see 4.) and the center of the tube sheet.
6. Distance upwards, when looking at the exchanger from the front, between the center of the tubes (or a fixed point in space see 4.) and the center of the tube sheet.

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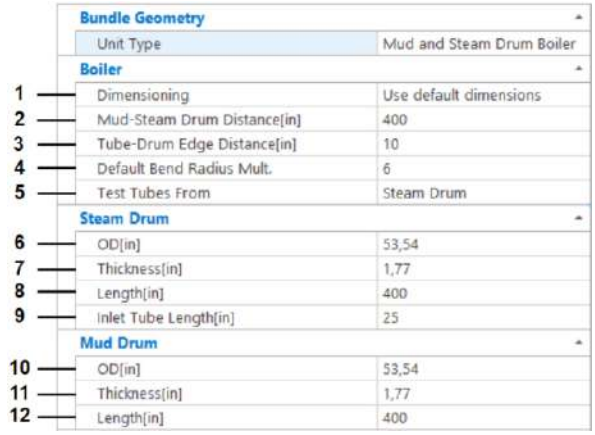
7. Angle of rotation of the shell in relation to the tubes.

Unit Type – Mud and Steam Drum Boiler



1. Allows you to use the default values, or activate Boiler Editor (in the Model ribbon) to use more advanced parameters to adjust the model.
2. Distance between Mud drum and steam drum.
3. Axial distance between the drum edge and the first tube location.
4. Tube bending radius where bends are present.
5. Reference position for defect location. Can be defined as steam drum or mud drum.
6. Steam drum outer diameter.
7. Steam drum thickness.
8. Steam drum length.
9. Tube length from drum to first bend.
10. Mud drum outer diameter.
11. Mud drum thickness.
12. Mud drum length.

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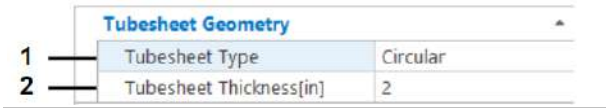
B. Tubesheet Geometry



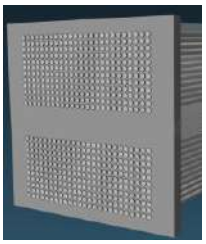
1. Type of Tubesheet:
   - Circular
   - Rectangular

Note: Further options can be found in the Tubesheet editor.

Circular

1. Outer diameter of front Tube sheet. Used only when Tube sheet is circular.
2. Outer diameter of rear Tube sheet.

Rectangular



1. Length of top of Tubesheet.
2. Length of bottom of Tubesheet.
3. Height of the Tubesheet.

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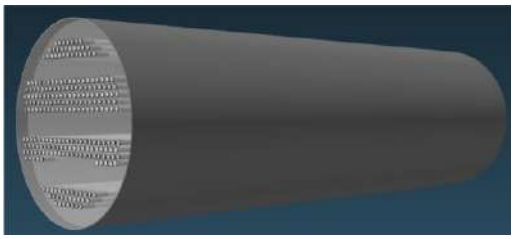
C. Shell Geometry

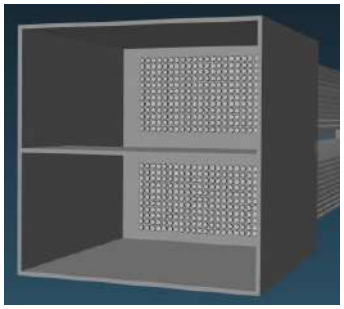


	Shell Geometry	
1	Length[in]	200
2	Diameter[in]	22
3	Thickness[in]	0,125

1. Shell length.
2. Shell diameter.
3. Shell thickness.

D. Front & Rear End

Rectangular Tubesheet



	Front End	
	Front Channel/Header Included	No
1	Width[in]	22
2	Height[in]	15
3	Depth[in]	15
4	Thickness[in]	0,5
5	Horizontal Partition Plate	No

1. Channel/Header width.
2. Channel/Header height.
3. Channel/Header depth.
4. Channel/Header thickness.
5. Include horizontal flat partition plate.

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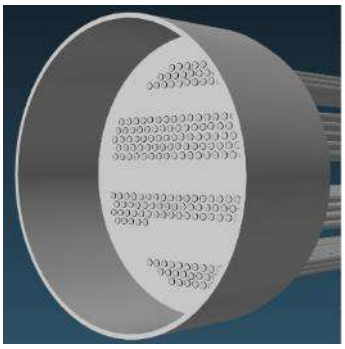

Front End	
Front Channel/Header Incl...	Yes
1 Diameter[in]	30
2 Length[in]	12
3 Thickness[in]	0,5
4 Horizontal Partition Plate	Full
5 Vertical Partition Plate	Full

1. Channel/Header diameter.
2. Channel/Header length.
3. Channel/Header thickness.
4. Include a horizontal partition plate (see below).
5. Include a vertical partition plate (see below).

Horizontal Partition Plate

1. Includes a flat partition plate from left to right across the entire width of the Channel/Header.

2. Does not include a flat partition.
3. Includes a flat partition from the center to the left of the channel/header.

4. Includes a flat partition from the center to the right of the channel/header.

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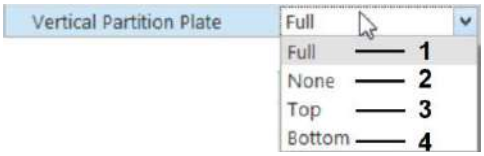
Vertical Partition Plate

1. Includes a flat partition plate from top to bottom over the entire height of the Channel/Header.

2. Does not include a flat partition.
3. Includes a flat partition from the center to the top of the channel/header.



4. Includes a flat partition from the center to the bottom of the channel/header.

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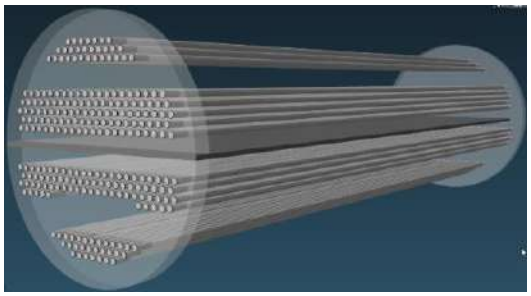
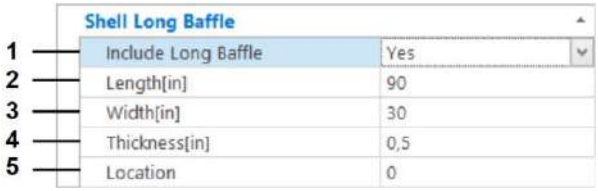
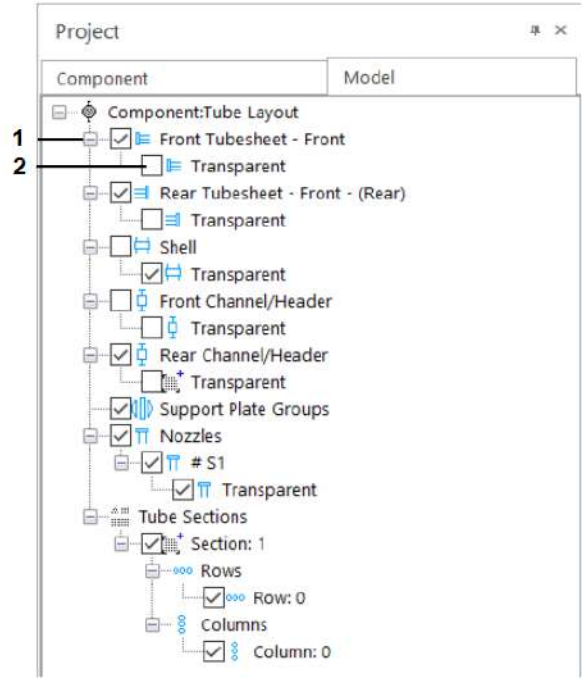
E. Shell Long Baffle





1. Add a long baffle to the exchanger.
2. Length of long baffle
3. Width of long baffle
4. Thickness of long baffle
5. Longitudinal starting position from front tube sheet.

Project Model



1. Makes the associated component invisible in the 3D model.
2. Makes the associated component transparent in the 3D model.

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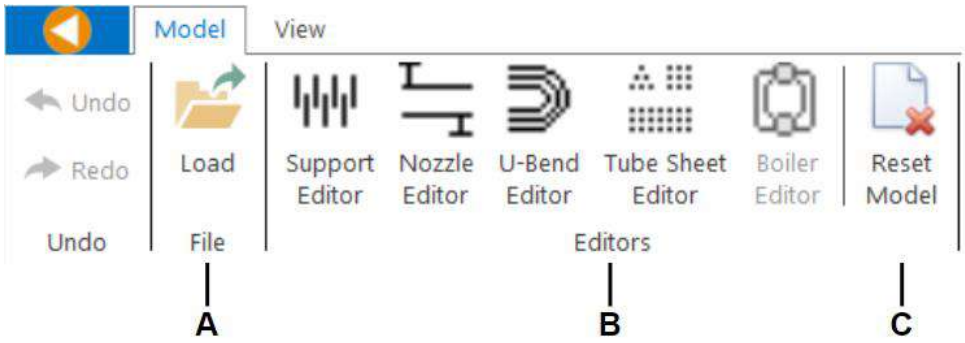
Model Ribbon

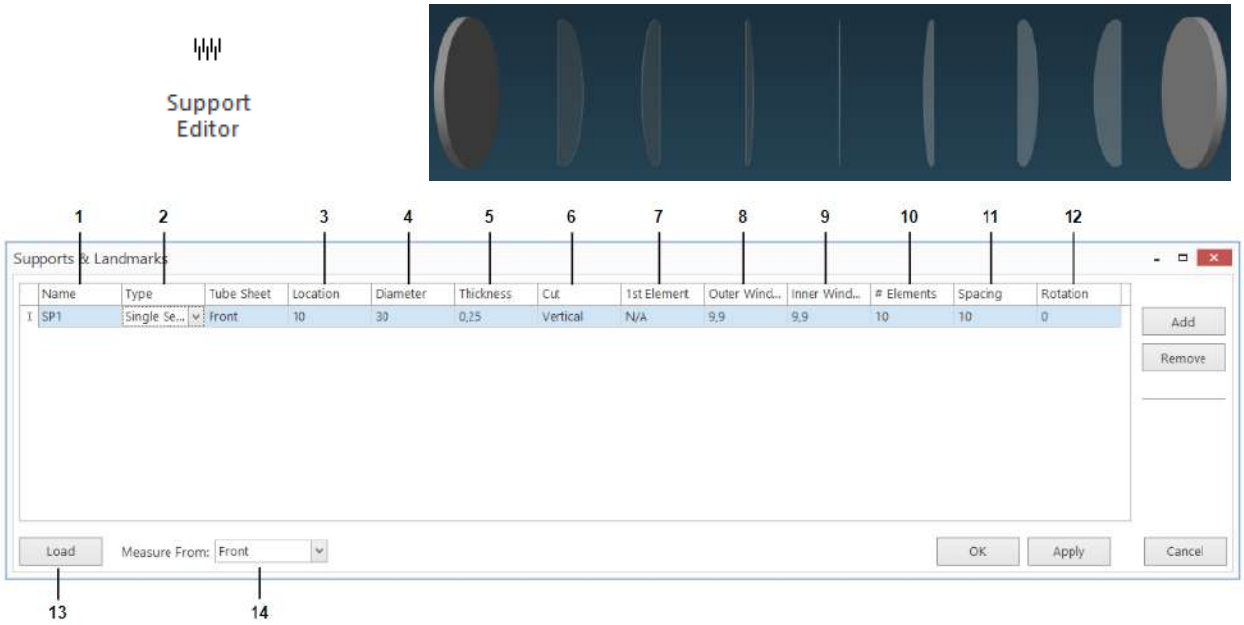


A. File

Loads a previously saved 3D model.

B. Editors

Support Editor



1. Name given to support plates. The names of the various components can be displayed in the view ribbon.
8. Portion from the edge of the exchanger where there is no support plate. Used to adjust the length of partial support plates.

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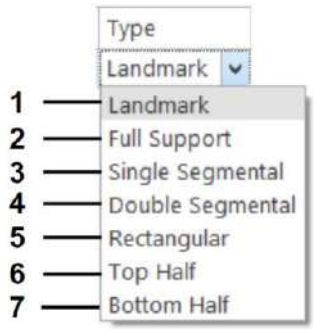
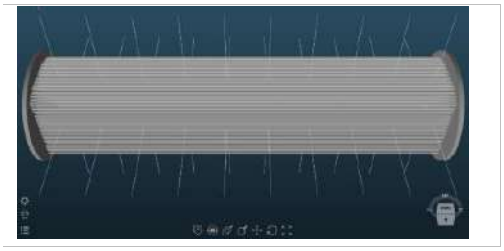
2. Type of support plate (see below for details).
3. Position of first support plate from beginning or end tube sheet (specified in 14.).
4. Support plate diameter.
5. Thickness of support plates.
6. Orientation of support plates (horizontal or vertical, or top or bottom, depending on type selected).
7. Orientation of first support plate (applies to certain tube sheet types only).
9. Portion centered in the center of the exchanger where there is no support plate. Used to adjust the dimensions of double segmental plates.
10. Number of elements of selected type in exchanger.
11. Spacing between elements.
12. Angle of rotation of the elements defined from the center of the exchanger.
13. Loads a previously saved model.
14. Reference for element position. Can be the front or rear of the exchanger.

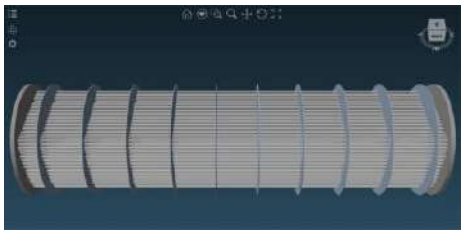
Type



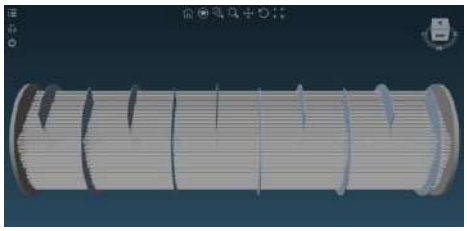
1. Landmark.



2. Support that covers the whole shell section



3. Partial supports. The plates alternate side by side.



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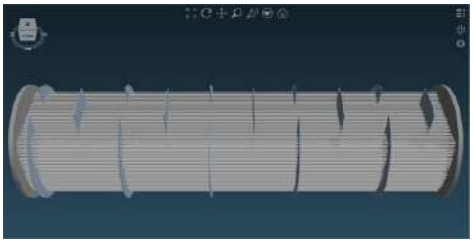
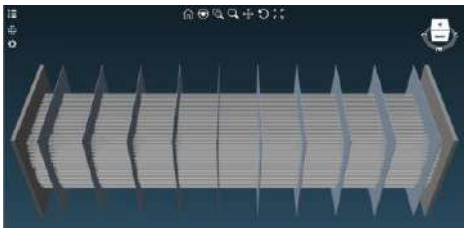
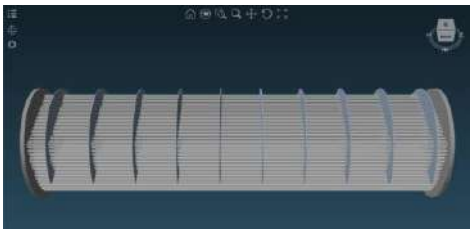
4. Each plate group consists of a partial plate in the center and two other plates further to the sides that are on the same axial point on the exchanger.



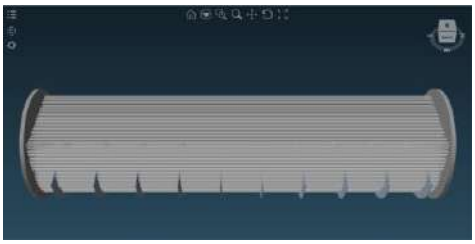
5. Rectangular support



6. Partial plates only on the top of the exchanger



7. Partial plates only on bottom of exchanger



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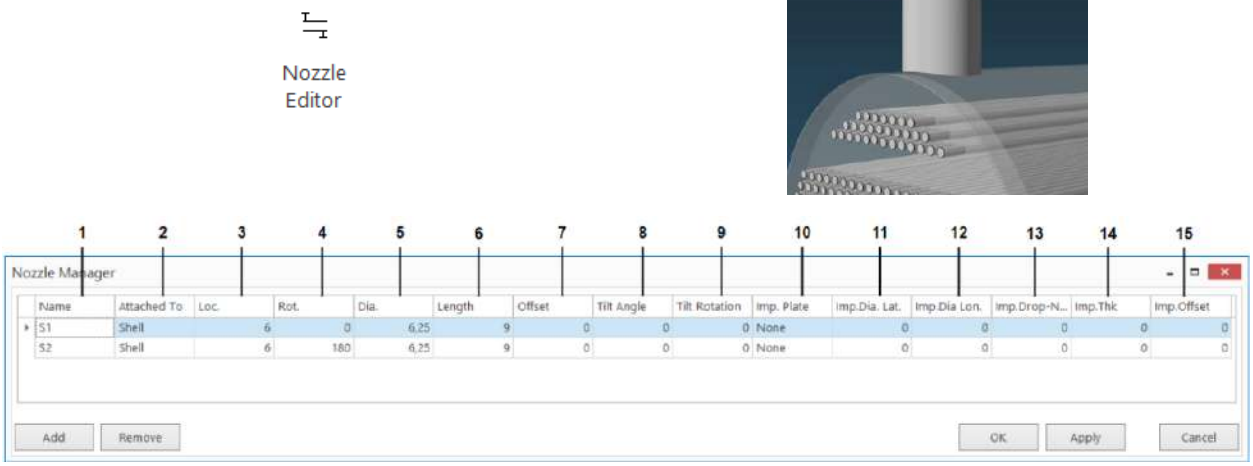
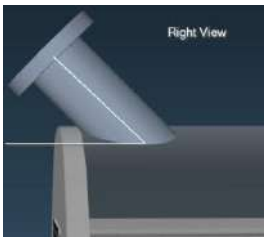
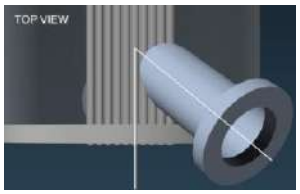


1. Nozzle names. The names of the various components can be displayed in the view ribbon.
2. Where the nozzle is attached:
    a. The nozzle is attached to the shell.
    b. Nozzle is attached to Front Channel//Header
    c. Nozzle is attached to Rear Channel/Header
3. Axial distance from end of Shell if Shell is defined in *Attached to* field.

    If the Nozzle is attached to a Channel/Header, it is placed in the center of the Channel/Header. The *Loc.* Field defines the position of the nozzle from the edge of the Channel/Header.
4. Rotation of the nozzle in degrees relative to the center of the exchanger. The original position (Rot. = 0) is located at the top of the component defined in 2.
8. Angle between a line drawn through the center of the nozzle and the axis of the tubes (Projection on the right plane).



9. Angle between a line drawn through the center of the nozzle and the axis of the tubes (Projection on the top plane).



10. Defines whether a flat impingement plate is present or what type is present:
    - Circular.
    - Rectangular.
    - Rod.

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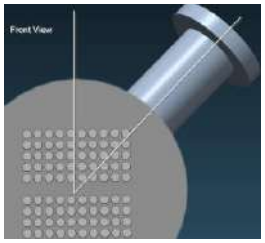

5. Nozzle diameter.
6. Nozzle length.
7. Distance perpendicular to the tubes between top of shell and center of nozzle.

11. Lateral dimension (perpendicular to the tubes) of the impingement plate.
12. Longitudinal dimension (parallel to tubes) of impingement plate.
13. Distance between the end of the nozzle and the beginning of the plate in the nozzle axis.
14. Thickness of impingement plate.
15. Distance between the center of the impingement plate and the center of the nozzle in the direction perpendicular to the tubes.

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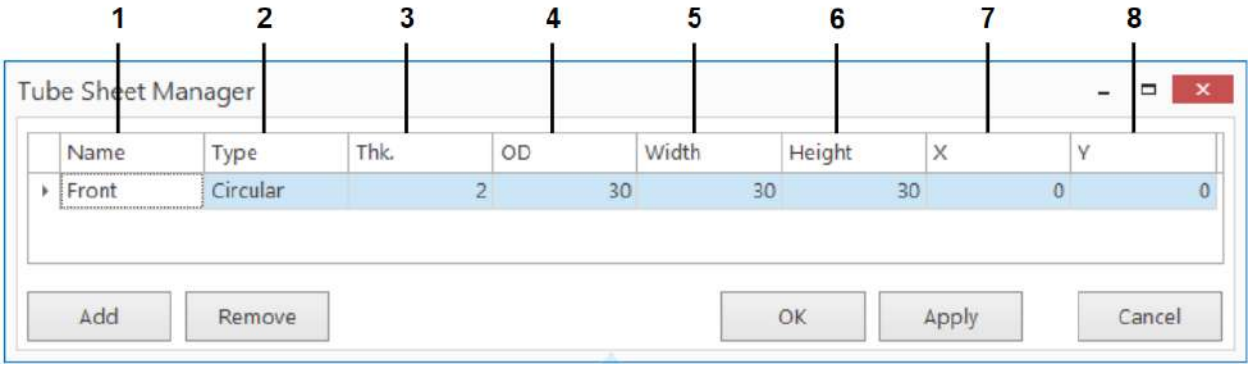

1. Tube Sheet names. The names of the various components can be displayed in the view ribbon.
2. Type of Tube Sheet support:
    - Circular
    - Rectangular
3. Tube sheet thickness.
4. Tube sheet outer diameter. Used only when Tube sheet is circular.
5. Tube sheet width.
6. Tube sheet height.
7. Distance to the right when looking at the exchanger center between the center of the tube section and the center of the Tube sheet.
8. Distance upwards when looking at the exchanger at the center between the center of the tube section and the center of the Tube sheet.

Note: Two Tube sheets are created at each end of the tube sections by adding an item in the Tube Sheet Manager list (if a Straight Through Bundle is selected).

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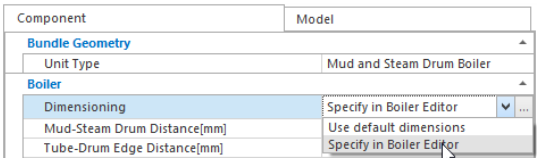
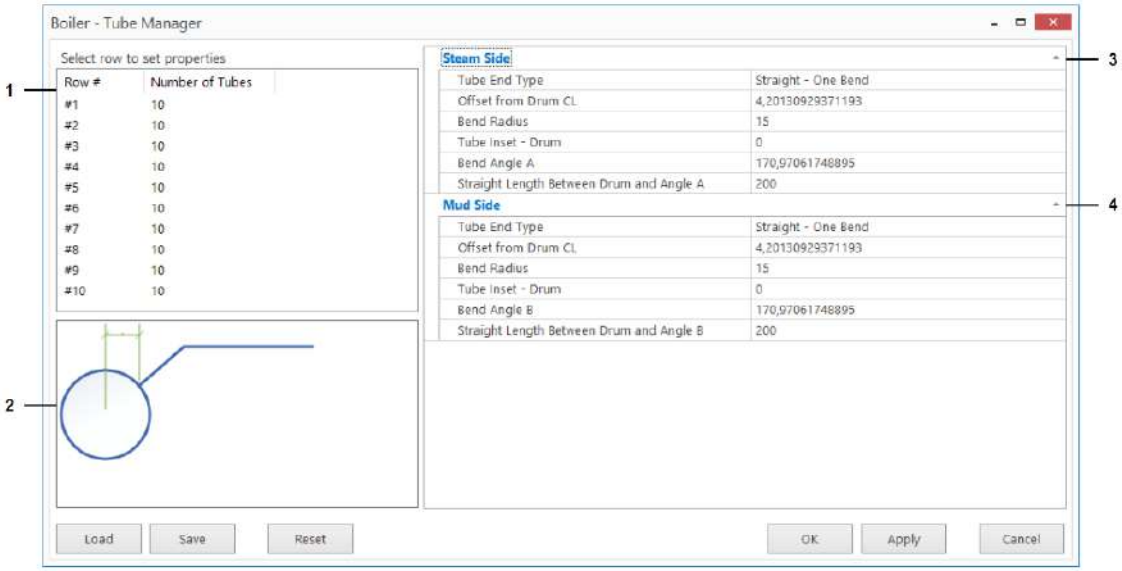
To access the Boiler editor, the Specify in Boiler Editor options in the figure on the right must be selected.





1. Rows and number of tubes per row. Clicking on one of these rows will show the parameters associated with that row on the right.
2. Diagram showing parameters on the right. Clicking on a parameter will change the diagram.
3. Parameters associated with the Steam side. The description of the parameters is shown in the diagram in 2.
4. Parameters associated with the Mud side. The description of the parameters is shown in the diagram in 2.

C. Reset Model

Reset the model to the default values.

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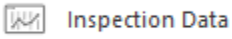
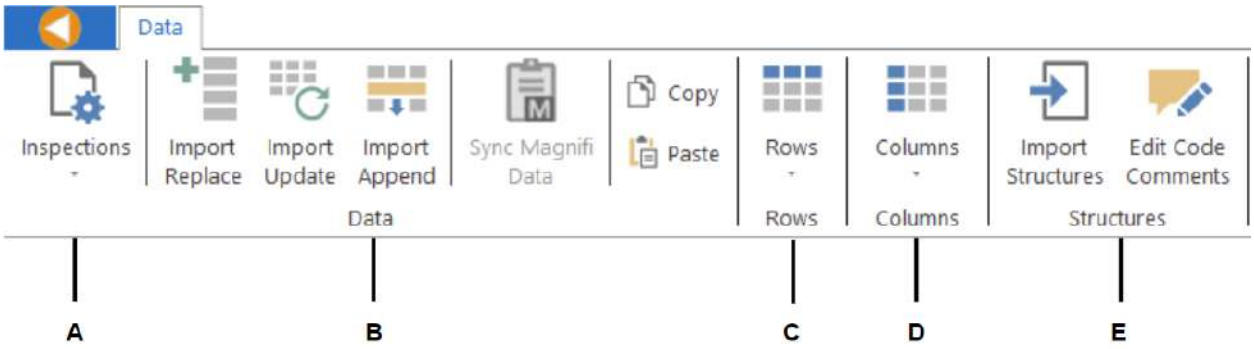
INSPECTION DATA

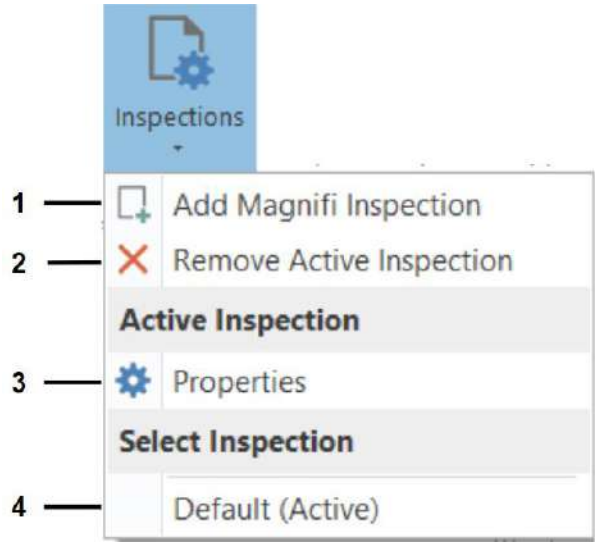


The Inspection Data navigation tab is used to manage inspection data. It is from here that we import the data analysis files from data acquisition software such as Magnifi. This is the database that is used throughout the software to, among other things, show indications on the tube sheet or produce a table with the number of tubes by importance of defect. This database is changed from one inspection to the next. **Note:** It is not in this part of the software that we build the table that will be presented in the final report; this table is parameterized in the Defect Table navigation tab.

Data Ribbon



A. Inspections



1. Add an inspection. This option can be used to access a previous inspection of the component. These 2 inspections (the new and the old) can be used to compare data over time. **Note:** See the description of the Columns button above for an example of how data from a previous inspection can be used to produce a report. Note also that a second inspection can only be added if the data comes from Magnifi.
2. Deletes the active inspection (the one currently visible in the Inspection data navigation tab).

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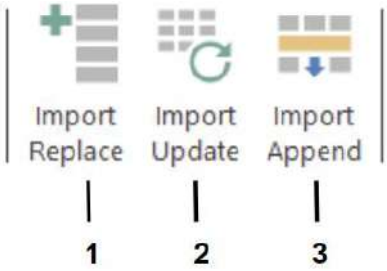
3. Allows you to modify inspection-related properties, such as the name of the inspection or the date on which it was carried out. Custom parameters can also be added.
4. Selects the active inspection.

B. Data



1. Remove all existing data and replace it with new imported data.
2. Update tubes with data imported. Tubes that do not have new data keep their existing data.
3. Keep all existing data and import additional data.

To access this button, the Connection to Magnifi button in the General tab of the Backstage must be toggled on and synchronization must have been established between Magnifi and TubePro (see Send To Magnifi button description). This function automatically synchronizes changes made to the report in the specified Magnifi project folder. If an indication or a tube is added to the Magnifi report, it will automatically be added to TubePro's Inspection Data.

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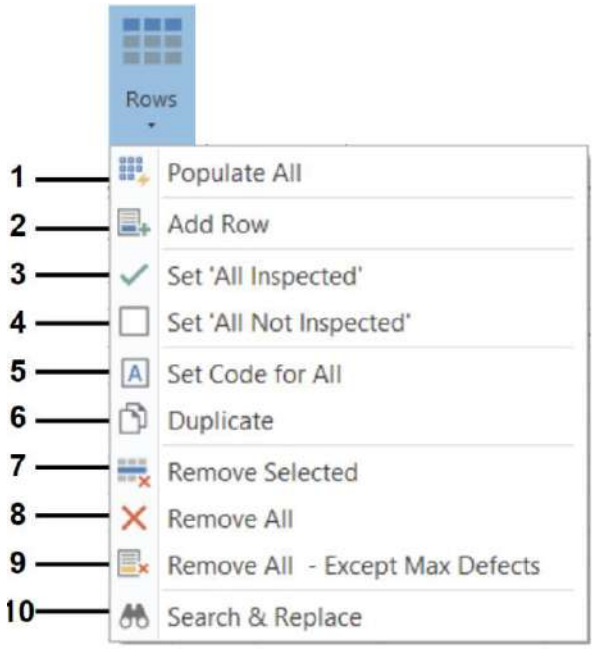
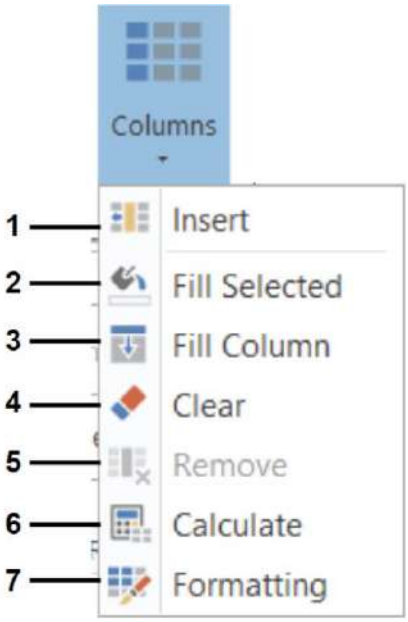
C. Rows



1. Adds one row per tube from the Tubesheet navigation tab information. If All data is removed with button 8, every tube can be added once with the Populate All option.
2. Add a new empty row.
3. Sets all the tubes to inspected with 0% wall loss.
4. Reset all the defects with no value.
5. Sets the same Code for all rows.
6. Duplicates the selected row.
7. Remove the selected row(s).
8. Remove all rows.
9. Allows only one row per tube. If a tube includes several defects. Only the most important defect is kept.
10. Find a row value in a chosen column and replace it.

D. Column



1. Insert a new column.
2. Fill the selected column with the same value.
3. Fill a whole column with the same value.
4. Clears all the values of the selected column.
5. Remove the selected column. **Note**: The default columns cannot be removed permanently but can be hidden.
6. Updates the calculated value. If you are adding formulas, this option Must be used to execute the formula.
7. Edit the column formatting.

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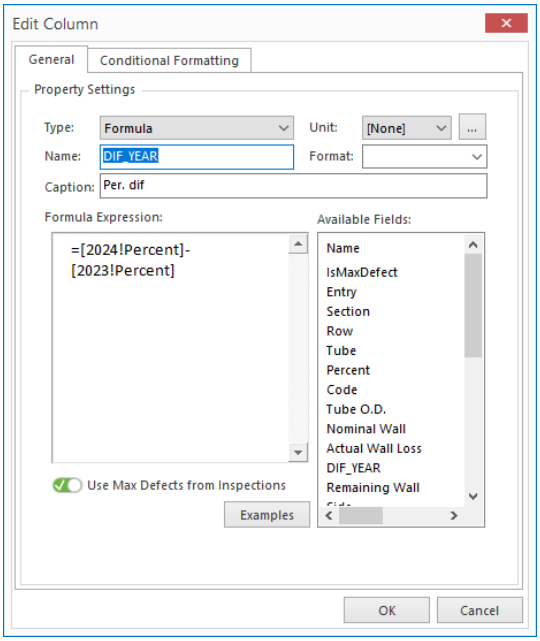
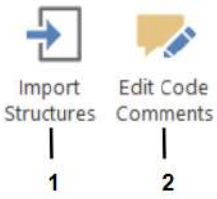
Create a column using data from 2 inspections

It is possible to refer to an inspection other than the current one in the active Inspection data table. This option can be used, for example, to compare the results of 2 inspections that took place in different years. To do this, create a new column using the Insert button. A window will appear, allowing you to choose the data type and column name (Caption). If you want, for example, to subtract the percentage of thickness of tubes from one year to the next, you can use the formula shown below. In this example, the inspection names were 2024 and 2023.



E. Structures



1. Add or Remove import type structure templates to import various types of data (Eddyfi Magnifi MDB, Eddyfi Magnifi TXT, etc.).
2. Edit the Comments automatically appearing in the Comment column related to the codes added in the Code column.

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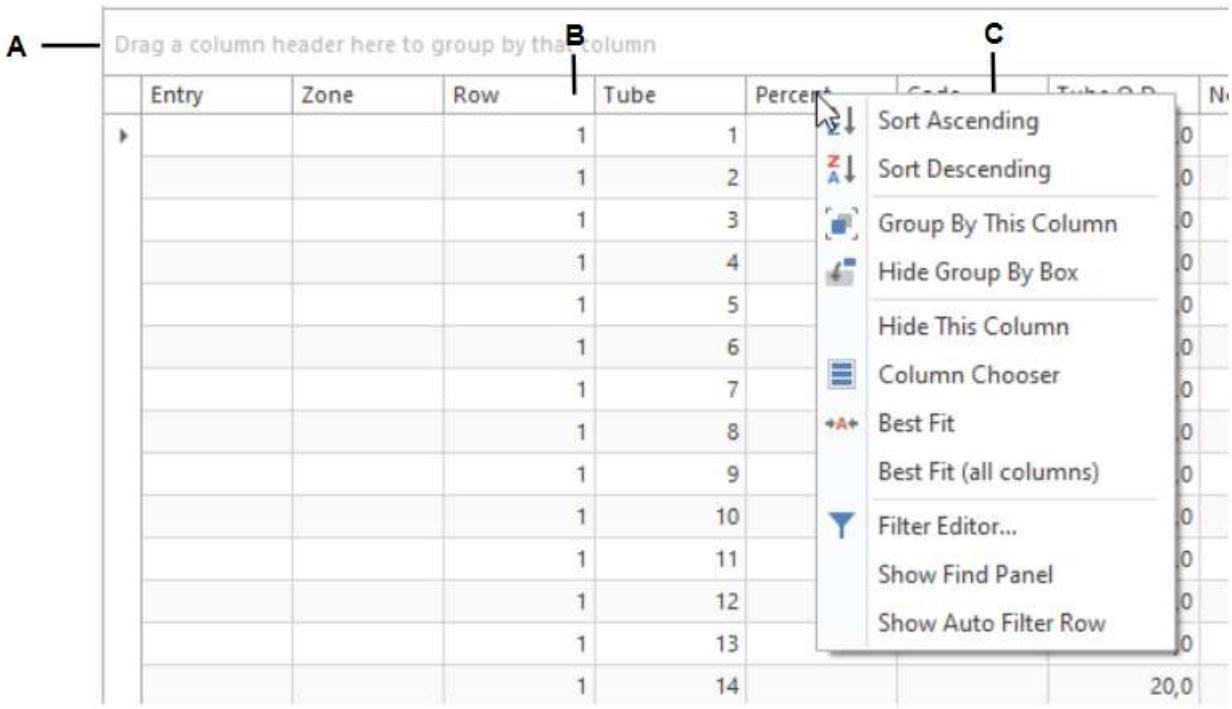
Inspection Data Table

The inspection data table is where the data is imported. Columns can be modified manually or by importing a data structure corresponding to the inspection data from the acquisition software (this function is described above).

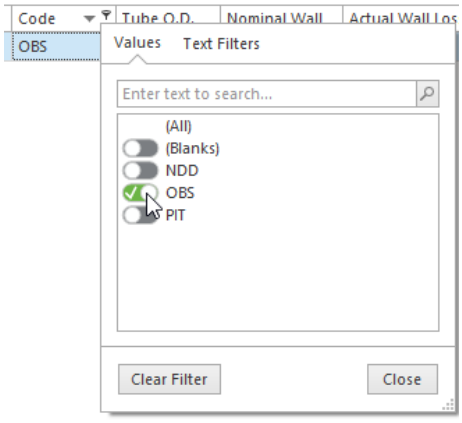


A. Sorting

To sort the table by field, drag and drop a column header into the A zone.

B. Filtering

To filter data, press the funnel next to a column header.



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C. Right click on a column name

1. Sort the selected column in ascending order.
2. Sort the selected column in descending order.
3. The name of the column used for sorting will be placed at the top of the table.
4. You can drag a column header into the section above the table to group data by column (or use function 3.). Press this button to hide the section of the interface for this option.
5. Hide the selected column.
6. Open the column chooser to add columns that are hidden. Double click on a column to add it to the table.
7. Modify the width of the selected column to automatically give the best fit with its content.
8. Modify the width of all columns to automatically give the best fit with its content.
9. Open a filter window to add conditions and groups to a column, therefore filtering the information regarding the filter added.
10. Opens a window to search a value or word in the table and highlight it.
11. Shows the condition associated with the column in a row after the column header.

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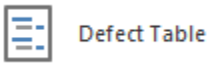
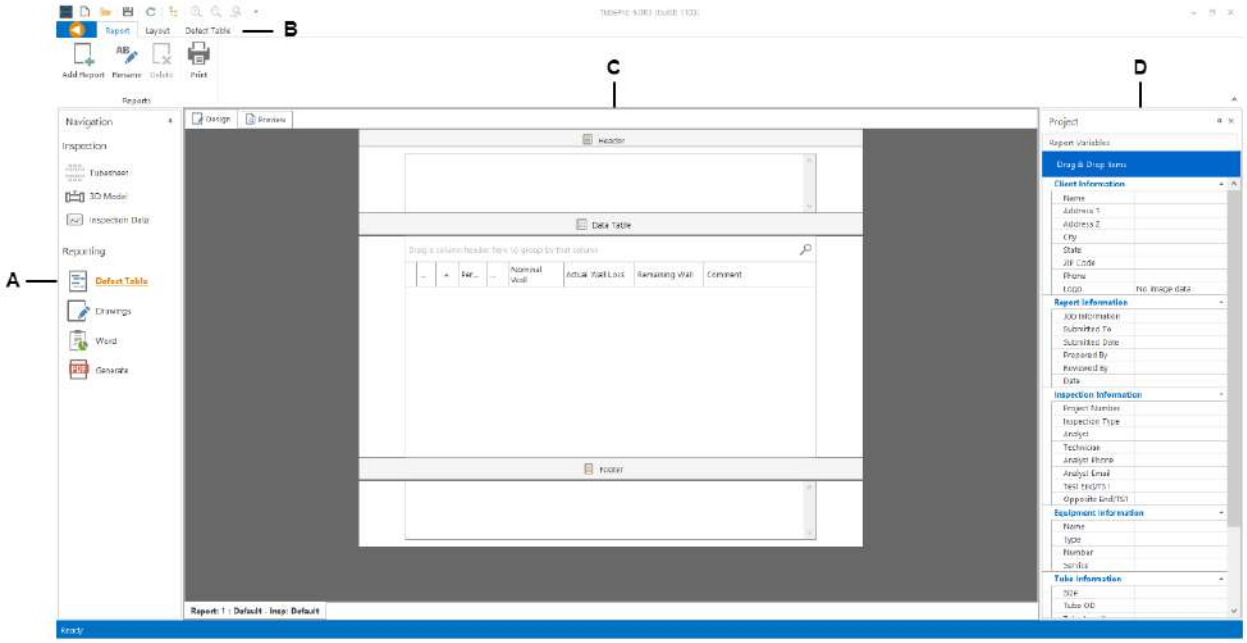
DEFECT TABLE

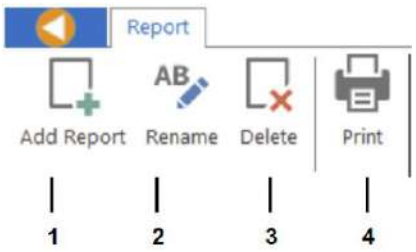


The Defect Table navigation tab enables users to refine the presentation of inspection data within the final report. This involves tasks such as hiding or renaming columns, modifying header/footer details, altering font styles, and more.

The selected navigation tab is highlighted in orange **(A)**. The different ribbons available (Report, Layout, and Defect Table) offer different functions grouped by usage **(B)**. The header, footer and table can be customized for different data setups, as presented later **(C)**. The Project browser **(D)** contains all the report variables.



Report Ribbon



1. Add a new defect table report.
2. Rename the active defect table.
3. Delete the active defect table.
4. Print the active defect table.

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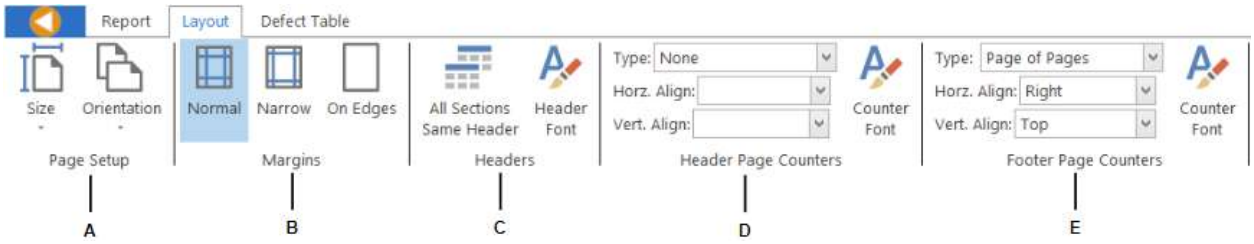
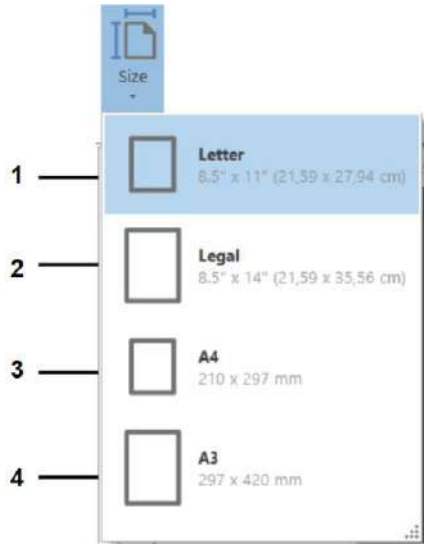
Layout Ribbon



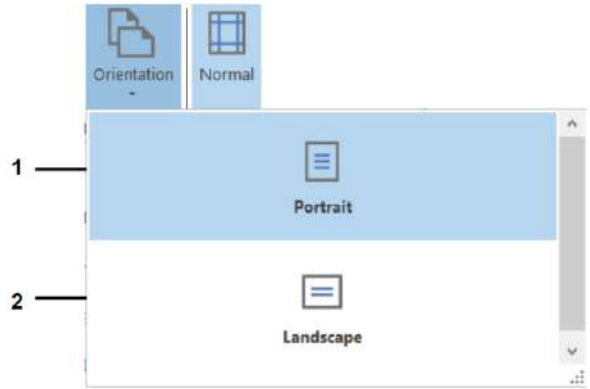
A. Page Setup

Size



1. Change the size of the Defect Table in the Report Letter format.
2. Change the size of the Defect Table in the Report to Legal format.
3. Change the size of the Defect Table in the Report to A4 format.
4. Change the size of the Defect Table in the Report to A3 format.

Orientation



1. Change the orientation of the Defect Table in the Report to Portrait.
2. Change the orientation of the Defect Table in the Report to Landscape.

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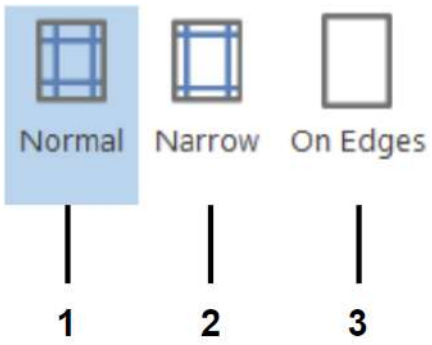
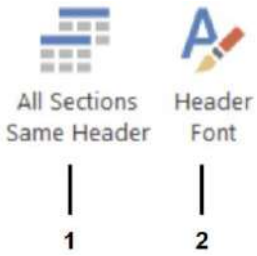
B. Margins



1. Change the Margins of the Report page to normal.
2. Change the Margins of the Report page to Narrow.
3. Change the Margins of the Report page to be on the Edges. **Note:** Headers and footers are not accessible when margins are on edges. If you're opening a project or template, be sure to set the margin option to Normal or Narrow if you want to add a header or a footer.

C. Headers



1. When clicked, all tube sections (different tabs) will have the same header in the Report.
2. Opens the font window to modify the font of the header (size, style, etc).

D. Header & Footer Page Counter

1. Select the pagination configuration format type.
2. Select the horizontal alignment, left, center or right.
3. Select the vertical alignment, left, center or right.
4. Opens the font window to modify the font of the page counter (size, style, etc.).

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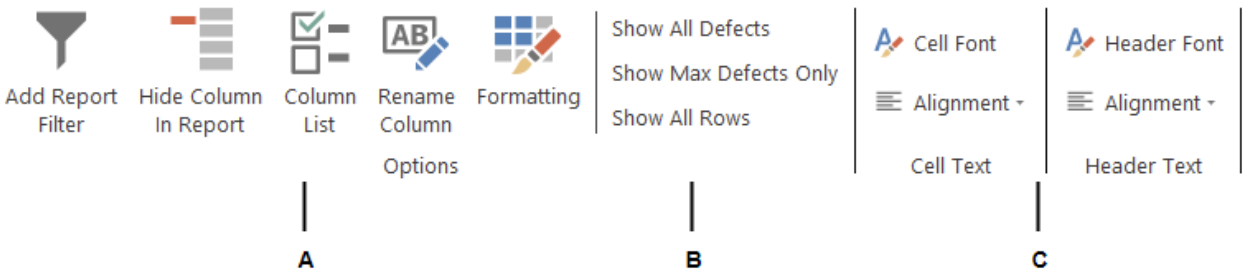
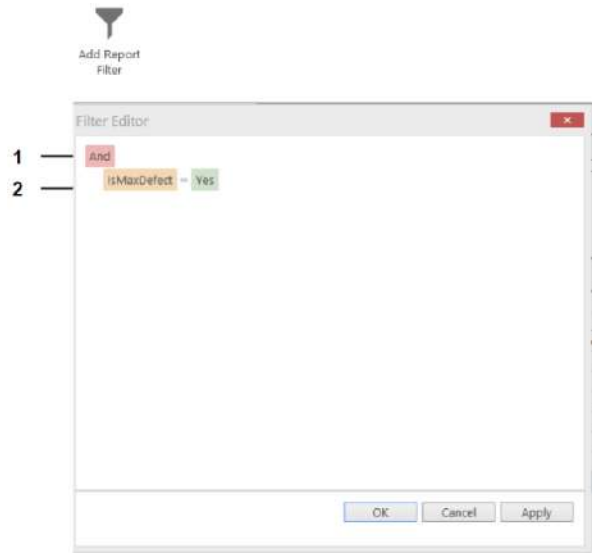
Defect Table Ribbon



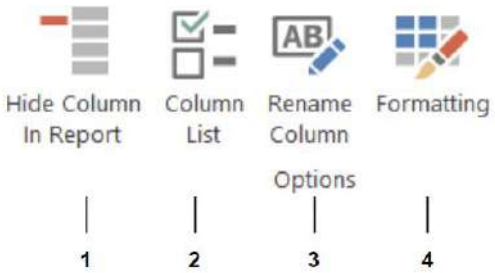
A. Options

Add Report Filter



1. Add a condition or a group as a filter for the defects shown in the data report.
2. Change entry for the condition and its value to be respected.

Other options



1. When this button is active for a column (you must click on a cell in the column), this column will not be in the final data report generated but will still be visible in the Defect Table navigation tab.
2. Opens a window with the list of possible columns to add into the data report. Double clicking or drag a column will add it to the defect table.
3. Rename the selected column.

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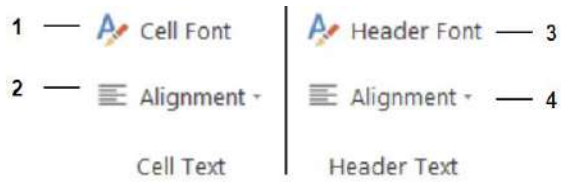
4. Allows you to change the parameters of a column (e.g. its name).

B. Show options

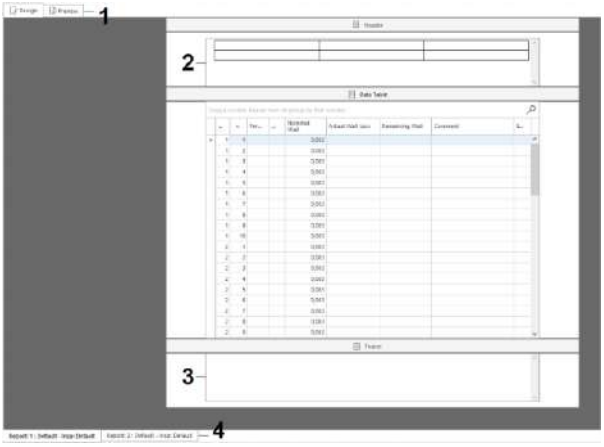
5. Only shows tubes with defects in the data report.
6. Show only the most important indications. If, for example, a tube has 2 pits 40% and 80% deep, only the 80% defect will be shown.
7. Shows all entries for each tube.

C. Cell and Header Text



1. Opens the window to modify the font of the cells in the selected column.
2. Modify the alignment of the text in the cells of the selected column.
3. Opens the window to modify the font of all the headers.
4. Modify the alignment of all the headers.

Defect Table



1. Provides a preview of what the Defect Table will look like in the PDF file.
2. Editable area where information can be added.
3. See 2 above.
4. Tabs showing the various Defect tables. Several defect tables can be present (different tabs) if your exchanger has several tube sections or if you have 2 inspections of the same exchanger on different dates.

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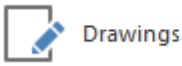
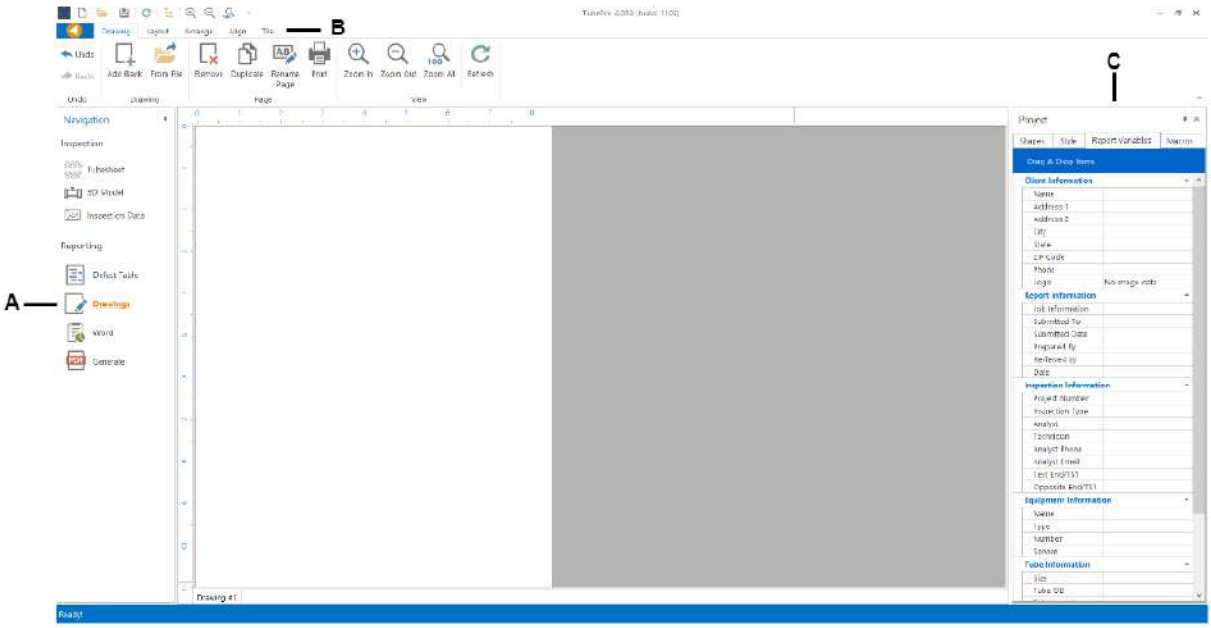
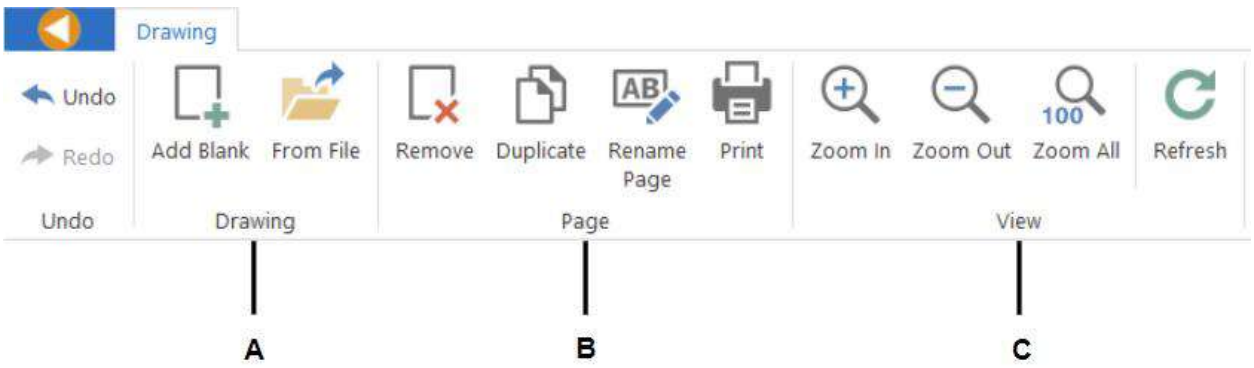
DRAWINGS



Drawings navigation tab is used for technical drawings. From this tab, you can create title blocks, insert results tables and tube sheet views, or 3D models with legends associated with selected inspection data. The selected navigation tab is highlighted in orange **(A)**. The different ribbons available (Drawing, Layout, Arrange, Align and Tile) offer different functions and are grouped by usage. They are used to adjust the items added in the drawings **(B)**. The Project bowser **(C)** has four sections (Shapes, Style, Report Variables and Macros) and is used to insert elements to the drawings.



Drawing Ribbon



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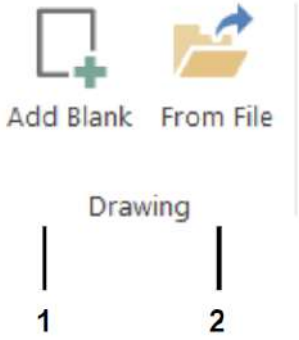
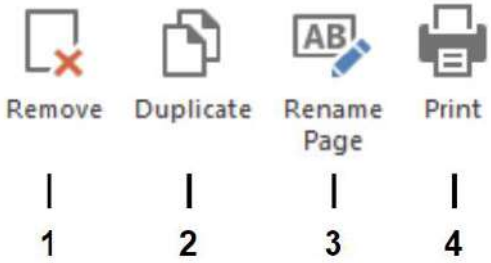
A. Drawing



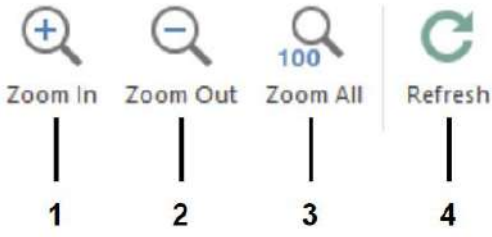
1. Create a new drawing by opening the "New Drawing" window and selecting the existing template.
2. Create a new drawing based on an existing file.

B. Page



1. Remove the drawing currently opened from the project.
2. Duplicate the drawing currently opened. **Note:** If you duplicate a drawing page, duplicate elements such as 2D or 3D models will be linked. A modification made to these elements will change all the elements to which they are linked as well. If you want to create an independent element, you need to drag and drop a new element from the Shapes list.
3. Rename the drawing currently opened.
4. Print the drawing currently opened.

C. View



1. Zoom in on the drawing.
2. Zoom out on the drawing.
3. Zoom with the best fit to see all the components.
4. Refresh the drawing to update all elements.

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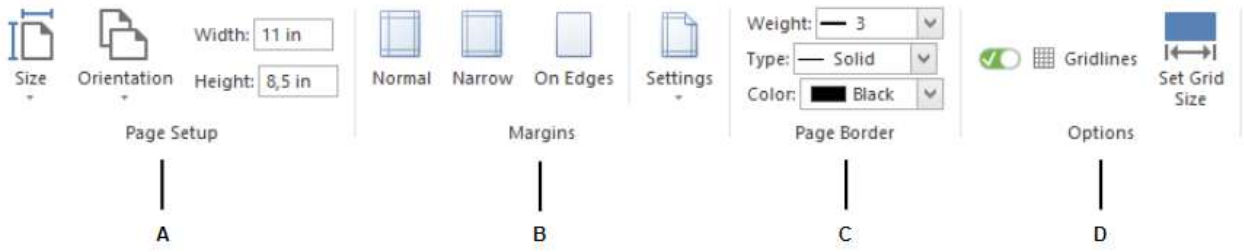
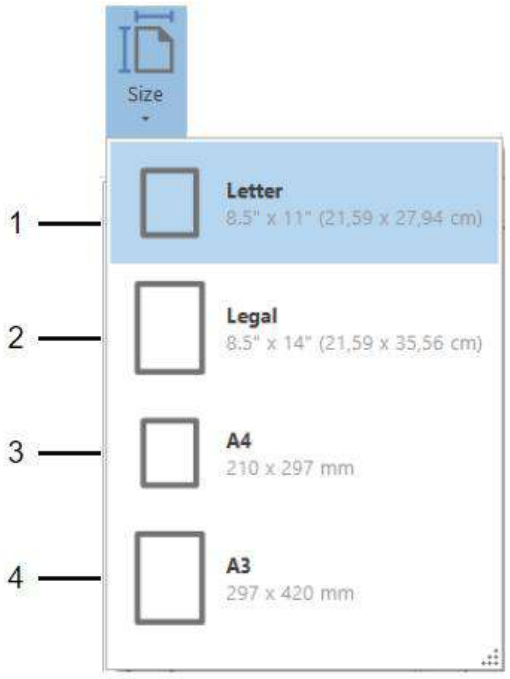
Layout Ribbon



A. Page setup

Size



1. Change the size of the Defect Table in the Report Letter format.
2. Change the size of the Defect Table in the Report to Legal format.
3. Change the size of the Defect Table in the Report to A4 format.
4. Change the size of the Defect Table in the Report to A3 format.

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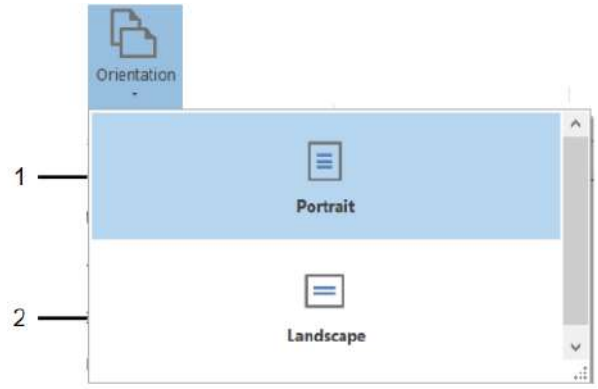
Orientation

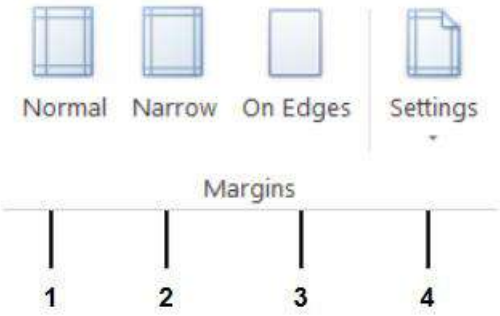


1. Change the orientation of the Defect Table in the Report to Portrait.
2. Change the orientation of the Defect Table in the Report to Landscape.

Width and Height

1. Customize the width of the drawing.
2. Customize the height of the drawing.

B. Margins



1. Change the margins to normal.
2. Change the margins to narrow.
3. Change the margins to be on the edges of the page.
4. Customize the margins with the options shown in the margin settings, seen below.

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C. Page Border

1. Modify the weight of the margin lines.
2. Modify the type of line for the margins. By default, it is left empty. This means the margin lines are not displayed. To activate their display, a type must be selected.
3. Modify the color of the margin lines.

D. Options

1. Toggle to show or hide the gridlines. When the gridlines are activated, any items such as lines, table and images will automatically align on this grid.
2. Modify the size of the grid.

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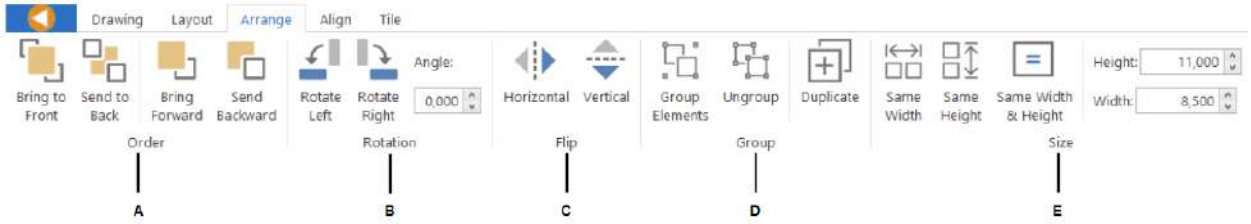
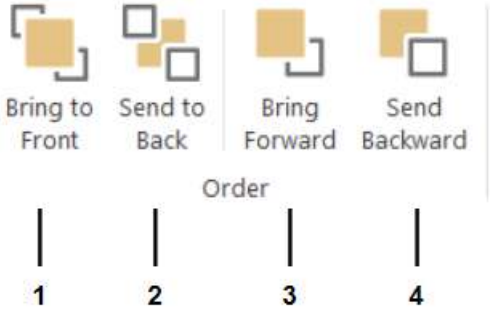
Arrange Ribbon



A. Order



1. Bring the selected item to the front of all the other items.
2. Send the selected item behind all of the other items.
3. Bring the selected item forward once.
4. Send the selected item backward once.

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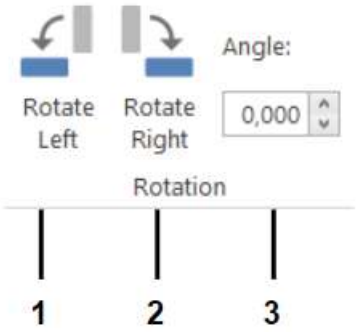
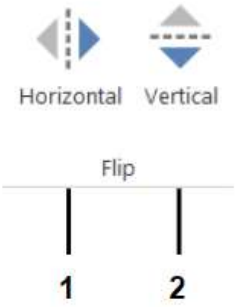
B. Rotation



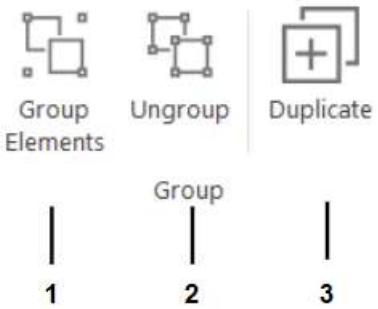
1. Rotate the item 90 degrees to the left.
2. Rotate the item 90 degrees to the right.
3. Rotate the item with a custom angle.

C. Flip



1. Flip the item horizontally.
2. Flip the item vertically.

D. Group



1. Group elements together. For example, take two items that are separated, select both of them by holding Ctrl and clicking on the items and click group. The elements will now be considered as one and can be moved and modified together.
2. Ungroup elements. Take an element that is grouped and separate it into all its smaller components.
3. Duplicate an item.

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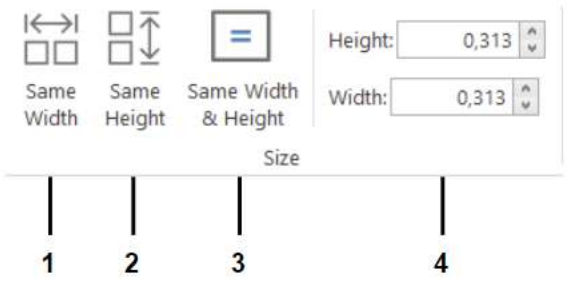
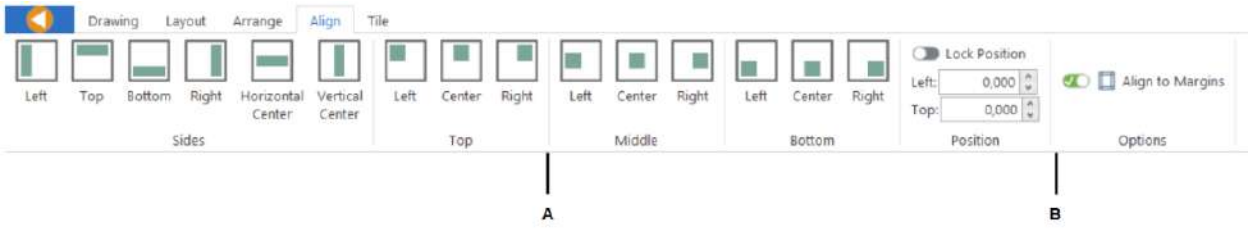
Note: An element like a tube map that has its own editor, when ungrouped, will behave as individual shapes. It will be possible to regroup it, but it will stay as a shape and its editor will not be accessible anymore.

E. Size

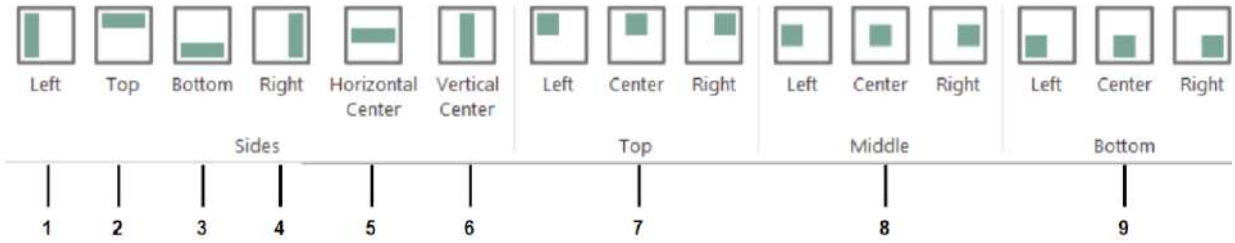


1. Make selected items the same width.
2. Make selected items the same height.
3. Make selected items the same width and height.
4. Customize the height and width of the selected items.

Align Ribbon



A. Align Functions



1. Align the elements to the left of the page.
2. Align the elements to the top of the page.
3. Align the elements to the bottom of the page.
4. Align the elements to the right of the page.
5. Align the elements to the horizontal center of the page.

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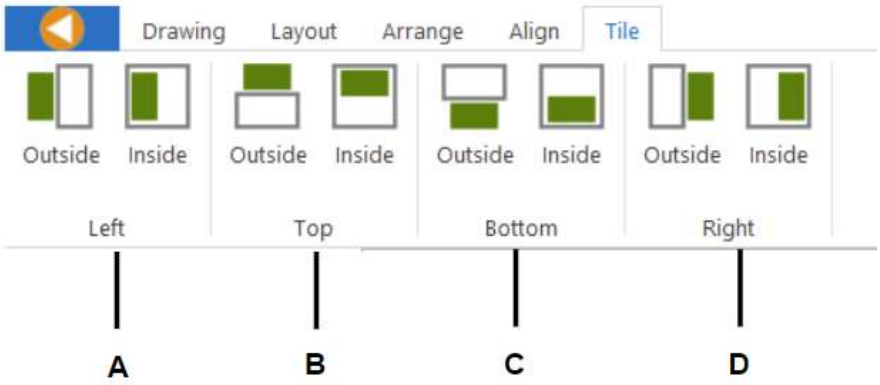
6. Align the elements to the vertical center of the page.
7. Align the elements to the top left, center or right of the page.
8. Align the elements to the middle left, center or right of the page.
9. Align the elements to the bottom left, center or right of the page.

Note: If you select 2 items, the first item will be the reference. The second element will move according to this reference. If you select just one element, the reference will be the complete page.

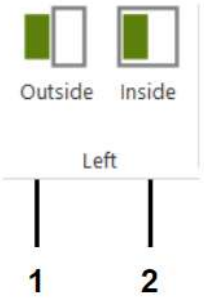
B. Position and Options

1. Lock the position of selected elements.
2. Customize the horizontal locked position.
3. Customize the vertical locked position.
4. Align the selected elements to the margins by default.

Tile Ribbon



A. Left



1. Tile the selected object to the outside left.
2. Tile the selected object to the inside left.

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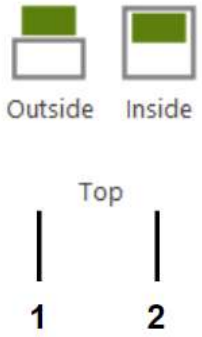
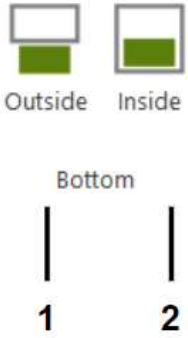
B. Top



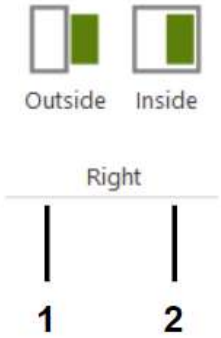
1. Tile the selected object to the outside top.
2. Tile the selected object to the inside top.

C. Bottom



1. Tile the selected object to the outside bottom.
2. Tile the selected object to the inside bottom.

D. Right



1. Tile the selected object to the outside right.
2. Tile the selected object to the inside right.

Note: If you select 2 items or more, the first item will be the reference. The other element(s) will move according to this element.

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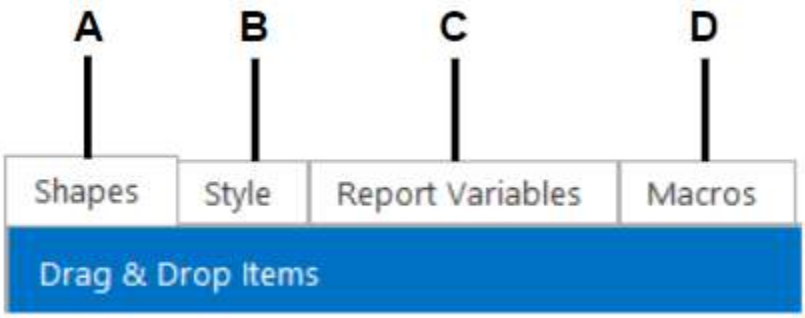
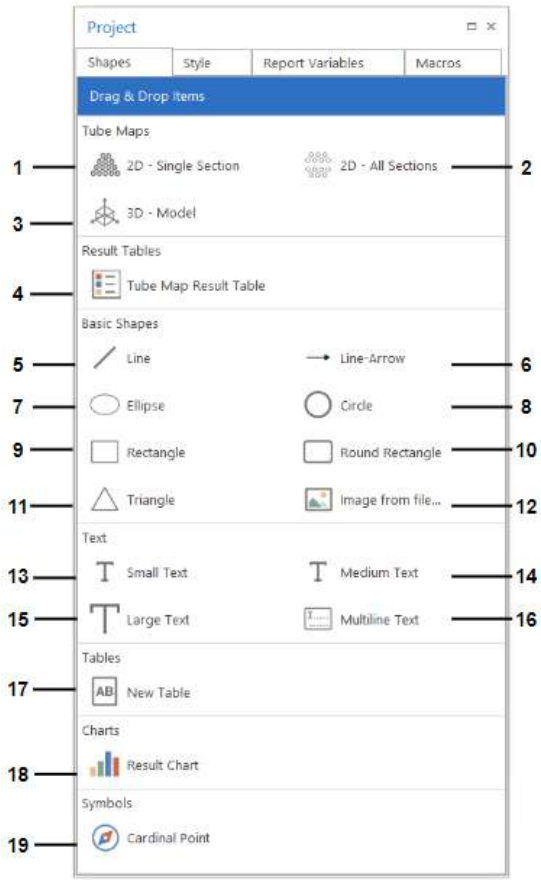
Project Window



A. Shapes



1. Drag and drop a singular tube section of the Tubesheet map. See A1 below for more information.
2. Drag and drop all tube sections of the Tubesheet map.
3. Drag and drop the 3D model view. See A3 below for more information.
4. Drag and drop a result table. See A4 below for more information.
5. – **11**. Drag and drop a basic shape.
12. Drag and drop an image from a file. When double clicking on it, the "Edit Image" window opens to modify it – see A12 below for more information.

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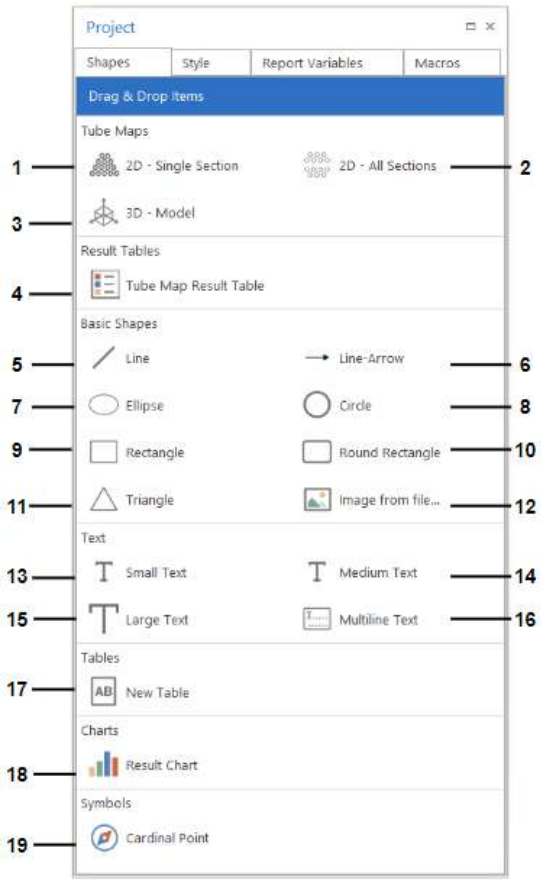

13. Drag and drop a single line of small text.
14. Drag and drop a single line of medium text.
15. Drag and drop a single line of large text.
16. Drag and drop a paragraph of text.
17. Drag and drop a new table. The ''Table Designer'' window will open and is used to customize the table. See A17 below for more information.
18. Drag and drop a result chart. See A18 below for more information.
19. Drag and drop a cardinal point. When double clicking on it, the "Edit Image" window opens to modify it – see A12 below for more information.

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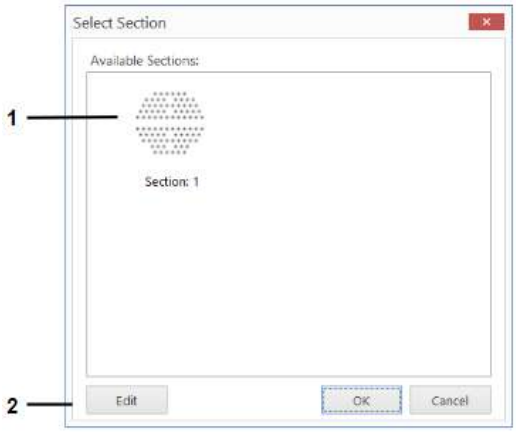
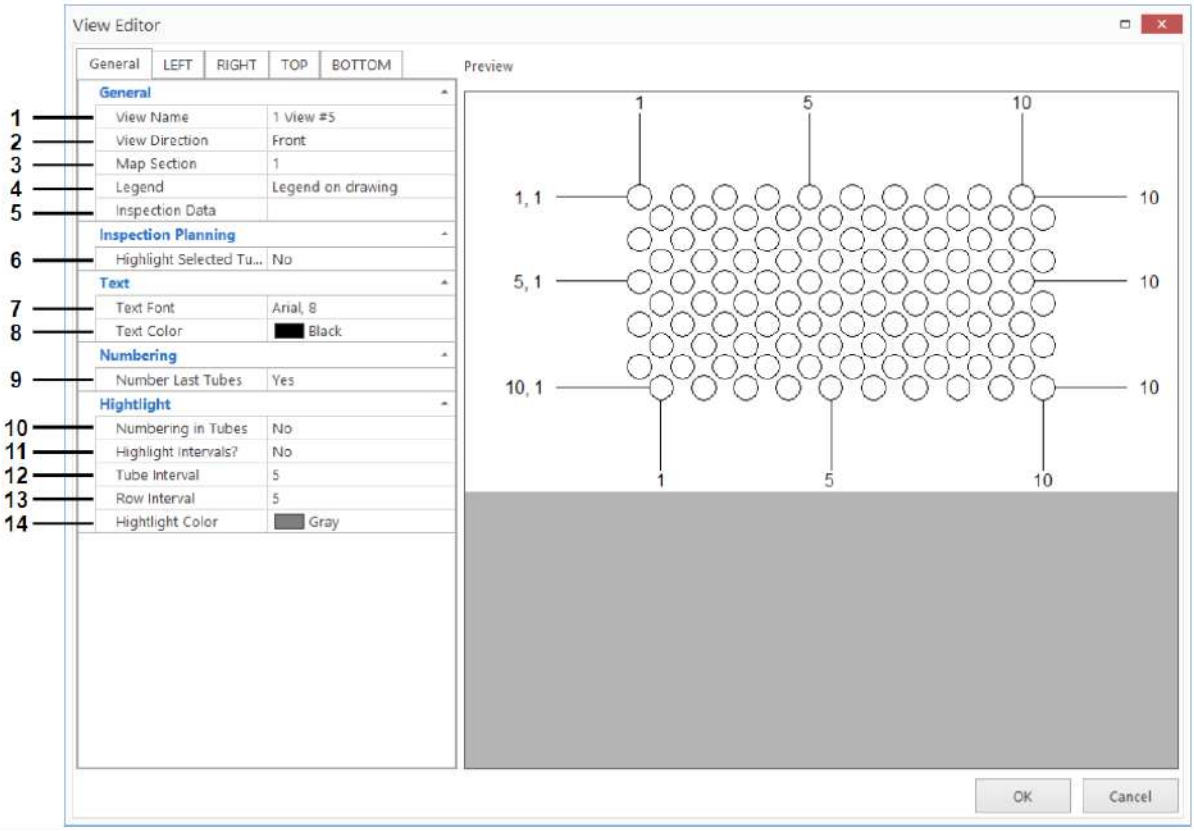
A-1 2D - Single Section



1. Select the tube map section of choice.
2. Open the ''View Editor'' window to customize the singular section view. See below for details. **Note:** After creating the map, the View Editor is accessible by double-clicking on the 2D map.



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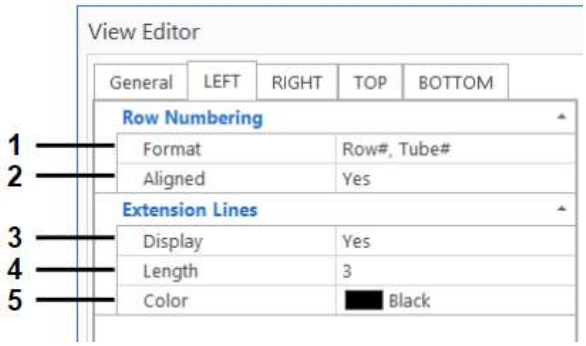
1. Modify the name of the view.
2. Select the view direction of the tube sheet from front or rear.
3. Select which tube section of the whole tube sheet is displayed.
4. Select the legend for the tube sheet.
5. Select the inspection data database needed.
6. Highlight the tubes that are selected in the Tubesheet navigation tab.
7. Modify the font of the text.
8. Modify the color of the text.
9. Show or hide the numbering for the last tubes.
10. Show or hide the numbering inside the tubes.
11. Highlight only the tubes in which the tube's numbering appears.
12. Modify the tube interval in which the numbering occurs.
13. Modify the row interval in which the numbering occurs.
14. Modify the color of the highlighted tubes.



1. Modify the format of the row numbering on the left side of the tube sheet.
2. Align every row numbering format together.
3. Add or remove the row extension lines.
4. Customize the length of the row extension line.
5. Modify the color of the extension lines.

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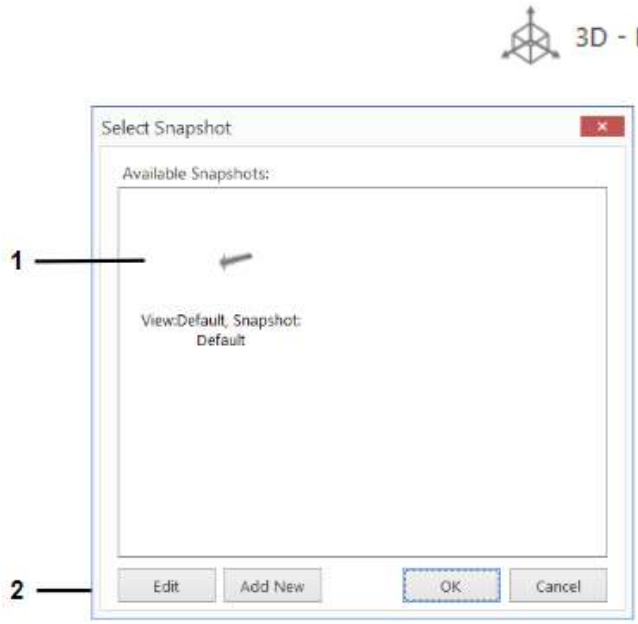
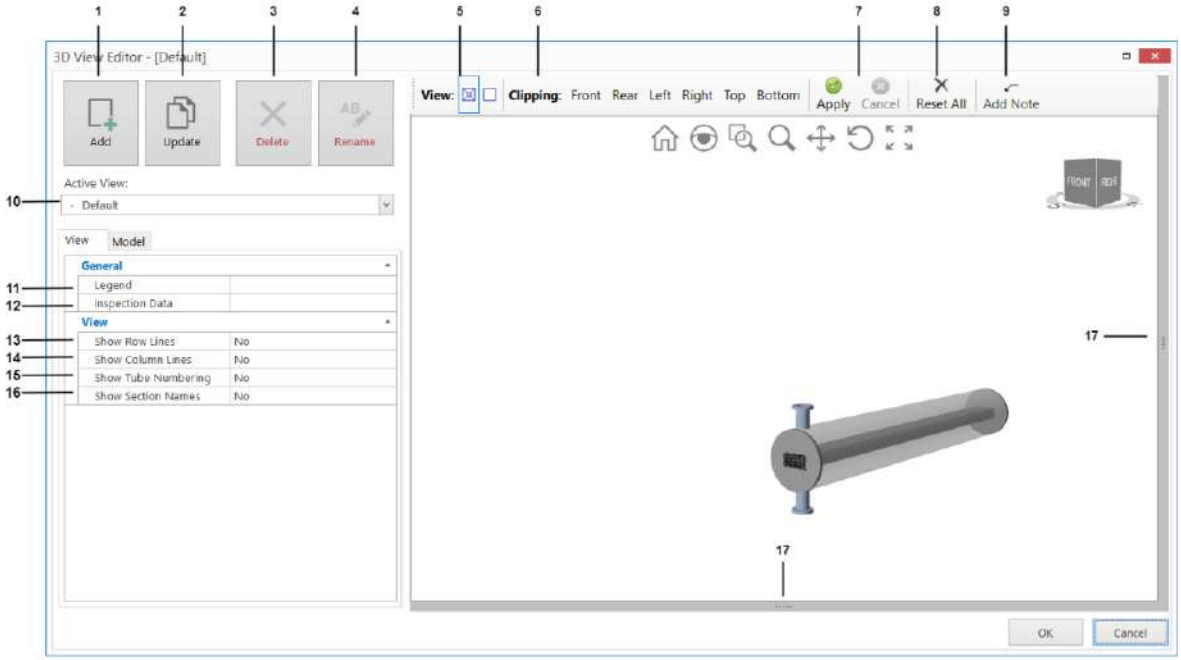
A-3 3D - Model



1. Select the 3D view snapshot of choice.
2. Open the ''3D View Editor - [Default]'' to customize the 3D view. See below for details. **Note:** After creating the map, the 3D View Editor is accessible by double-clicking on the 2D map.

View



1. Add the current view as a new snapshot.

11. Select the legend for the 3D view snapshot.

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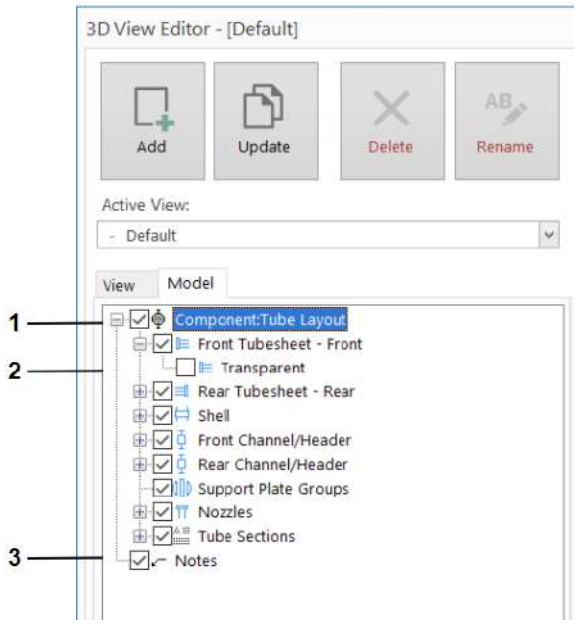
2. Update the active snapshot with the view currently shown in the 3D View Editor window.
3. Delete the current snapshot from the view.
4. Rename the current snapshot.
5. Change the view of the snapshot to perspective or orthographic.
6. Clip the view with the options front, rear, left, right, top or bottom.
7. Apply or cancel the clipping previously done.
8. Reset all clipping.
9. Add a note to the snapshot.
10. Change the active view of the snapshot.
12. Select the inspection data database.
13. Show or hide row extension lines and numbering.
14. Show or hide column extension lines and numbering.
15. Show or hide the numbering inside the tubes.
16. Show or hide the tube section names.
17. Adjust the size of the canvas.

Model



1. Clicking on the plus or minus sign will show all the tube's components.
2. For every component, click to modify the transparency of the element.
3. Click to show or hide notes on the snapshot.

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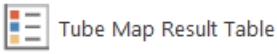
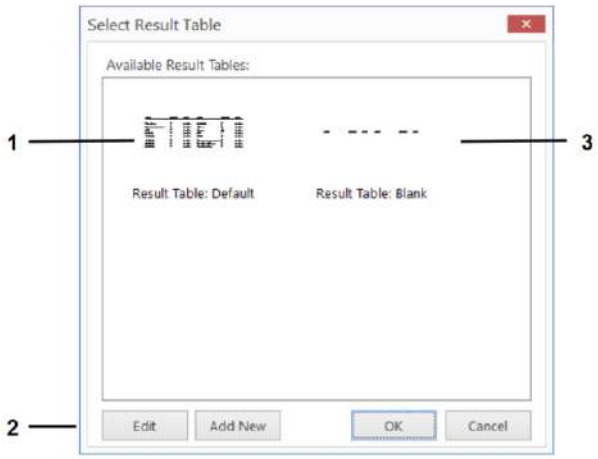
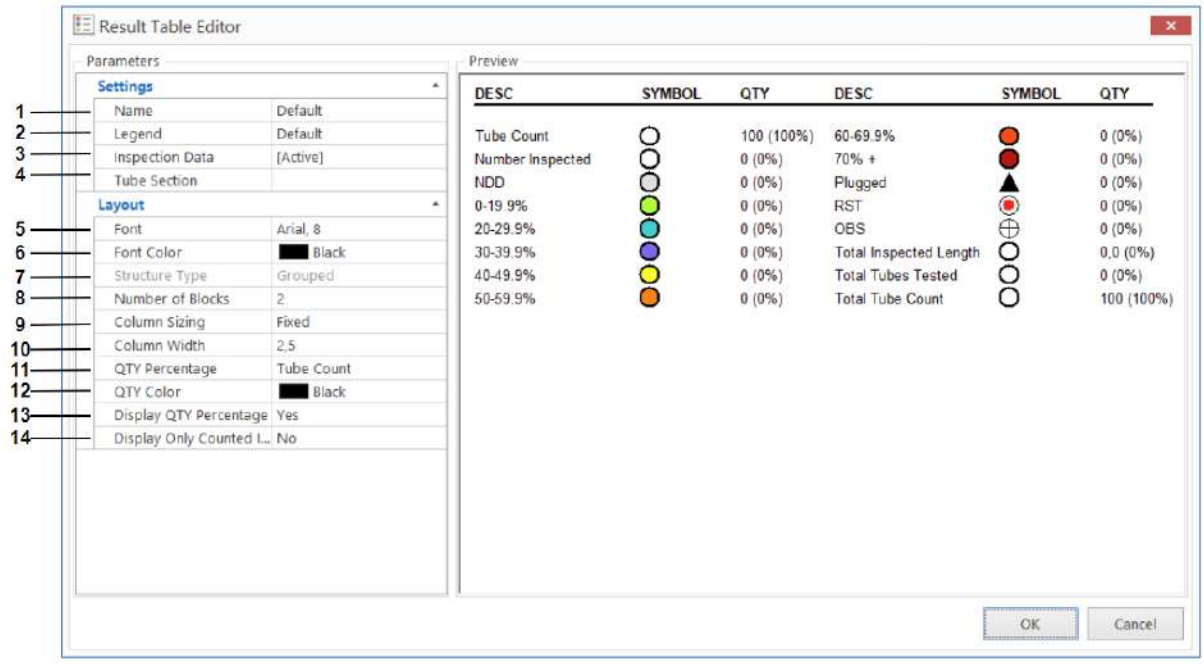
A-4 Tube Map Result Table



The result table is a comprehensive visualization that integrates inspection findings with the corresponding Tubesheet map. This presentation displays the numerical results in the table with its corresponding legend ranges. This feature enhances the report's readability and provides a clear link between data and visual representation.



1. Select the default version of the result table.
2. Opens the "Result Table Editor" window to customize the result table. See below for more details.
3. Select the blank version of the result table to create it from scratch.



1. Change the name of the result table.
2. Select the legend for the result table.
8. Number of columns for the result table.
9. Select the column sizing to fixed or automatic.

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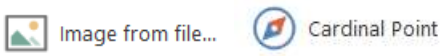
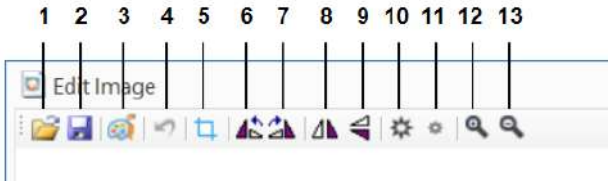
3. Select the inspection data database for the result table.
4. Select the tube section used in the result table.
5. Modify the font of the text.
6. Modify the color of the text.
7. Structure type of the result table, grouped.
10. Customize the column width.
11. Select the QTY Percentage column to be the number of tubes inspected or the tube count.
12. Modify the color of the QTY column elements.
13. Show or hide the QTY percentages.
14. Show only counted items.

A-12 Edit Image





1. Open an image file.
2. Save image as.
3. Edit image in Paint.
4. Undo last change.
5. Crop image.
6. Rotate the image to the left.
7. Rotate the image to the right.
8. Flip the image horizontally.
9. Flip the image vertically.
10. Increase the brightness of the image.
11. Decrease the brightness of the image.
12. Zoom in on the image.
13. Zoom out on the image.

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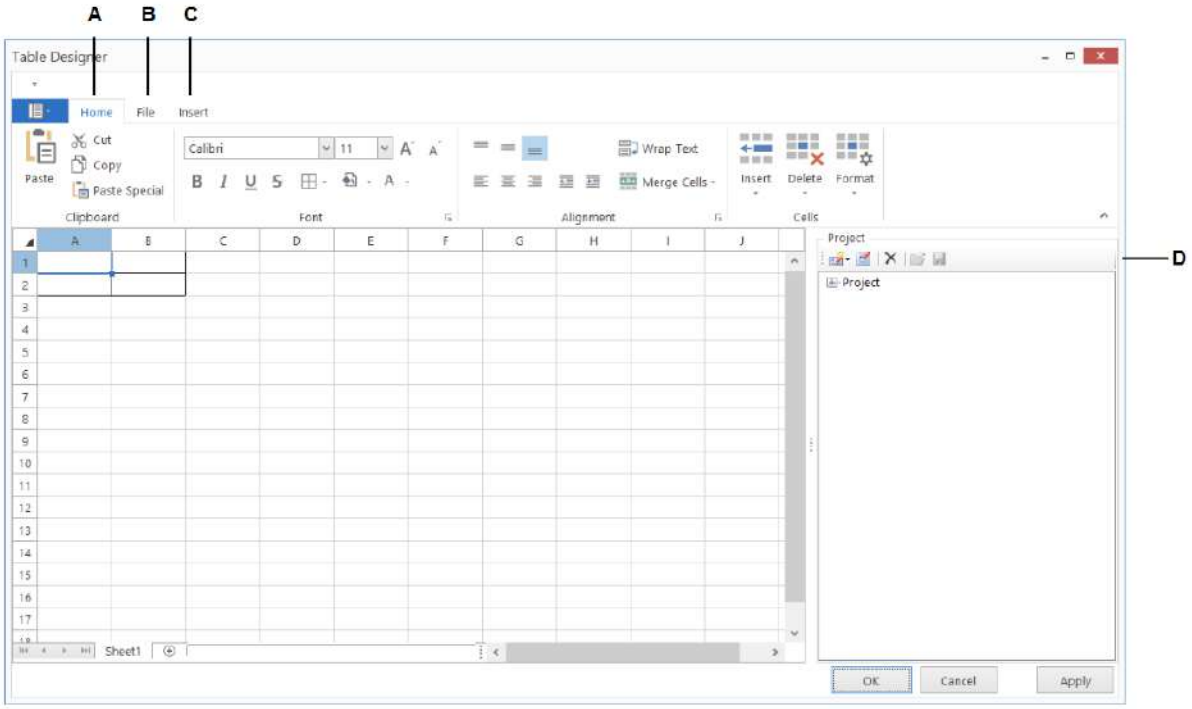
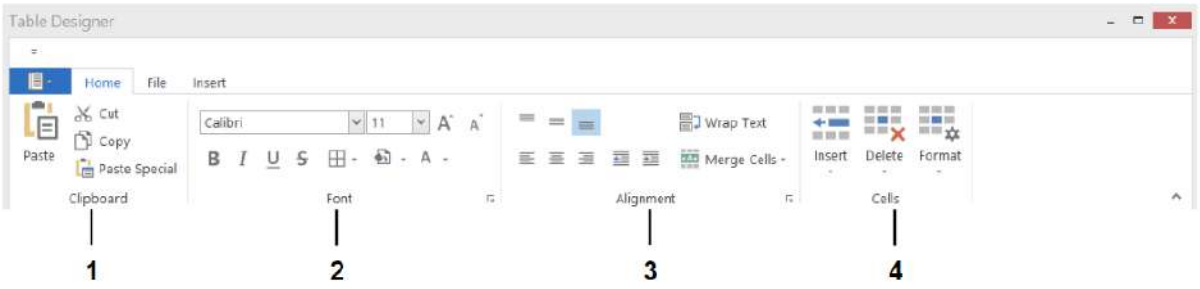
A-17 Table Designer Window

To add text and variables to the drawings, it is preferable to insert them inside a Table element. This will allow the user to align the information properly and facilitate editing.



A. Home



1. Clipboard functions such as cut, copy, paste and paste special.

3. Alignment functions such as center, indent, merging of cells, and wrap text (making all content visible within a cell by displaying it on multiple lines).

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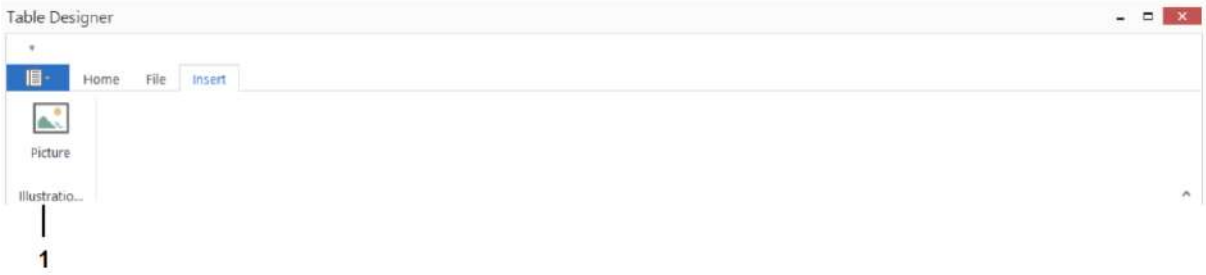
2. Font functions such as modifying the font, size of the font, bold text, italic text, add borders to the table, color to the background of selected cells, etc.

4. Cell functions such as inserting a new row or column, deleting one, change the row height or column width, hide cells, etc.

B. File

1. Create a new empty document.
2. Open an existing table.
3. Save the table.
4. Save as the table.
5. Send the document directly to the default printer.
6. Select a printer and print the document.
7. Preview the document before printing.
8. Undo or redo an action.

C. Insert



1. Insert a picture from a file.

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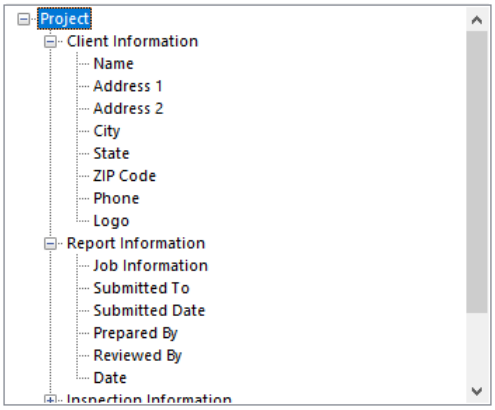
D. Drag and drop variables



Access to the report variables set in the backstage. Drag and drop a variable to add it to a cell in the table.

Note: The most efficient way to use a table properly would be to adjust the width and height of the cells directly in the table editor. This will ensure a better rendering and a consistent output.

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A-18 Result Chart Window

1. If a result chart was previously made, the Edit button will open the ''Chart Editor - Basic'' window to customize it.
2. If no result chart exists, the Add New button will open the ''Chart Editor - Basic'' window to create one (see below).

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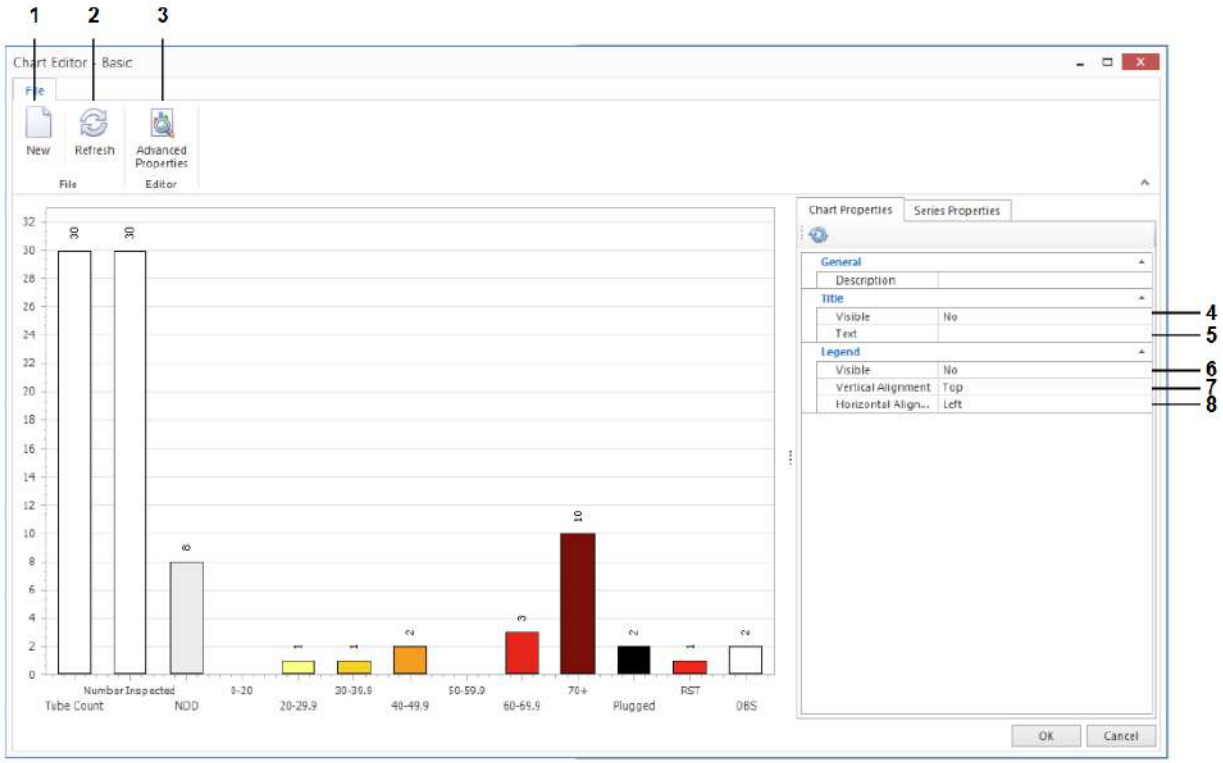
Basic chart editor – Chart Properties



1. Add a new result chart.
2. Refresh the result chart to update its elements.
3. Access to the advanced properties of the chart.
4. Show or hide the chart title.
5. Set a chart title.
6. Show or hide the legend of the result chart.
7. Set the vertical alignment for the legend.
8. Set the horizontal alignment for the legend.

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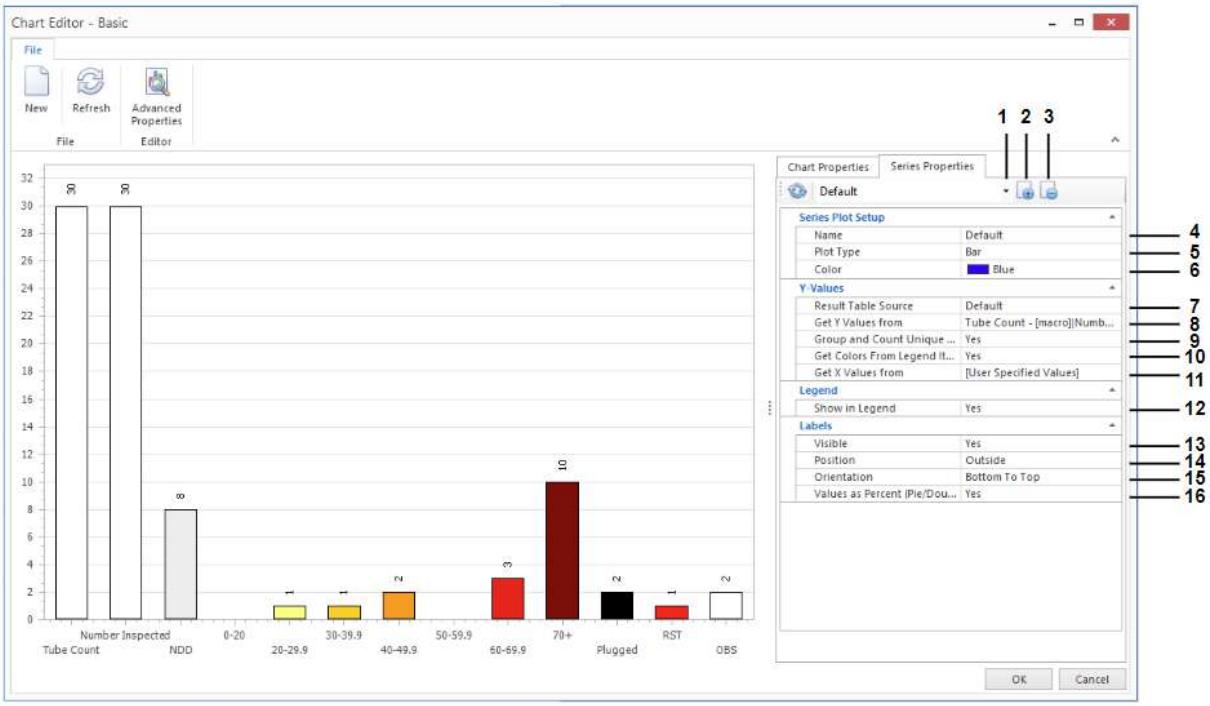
Basic Chart Editor – Series Properties



1. Select the series plot.
2. Add a new series plot.
3. Delete series plot.
4. Modify the name of the active series plot.
5. Select the type of plot (ex.: Pie, line, steps, point, etc.).
6. Modify the color or the plot. **Note:** The Get Colors From Legends Items parameter must be set to No for this color to be applied.
7. Select the data source legend.
8. Select the Y values elements needed.
9. Groups single values into a category.
10. Select the X value elements needed.
11. Show or hide the label values of every item.
12. Show legend.
13. Makes labels visible.
14. Change the position of the label's values.
15. Change the orientation of the label's values.
16. Show values in percent.

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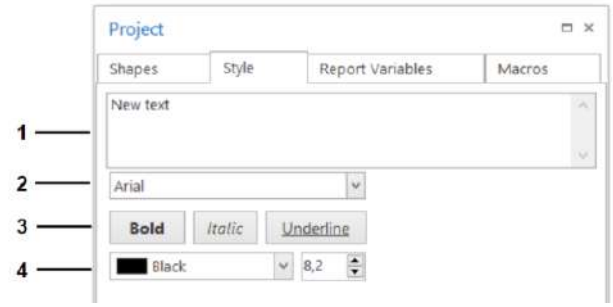
B. Style

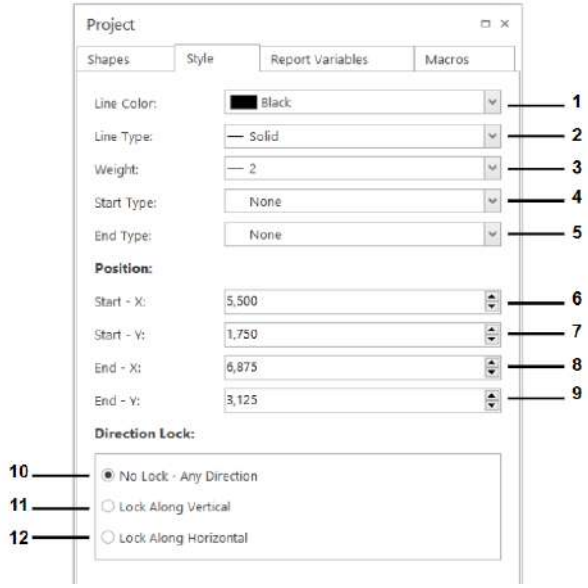
What's displayed in the Style tab changes according to the element selected.

Text



1. Modify the text.
2. Modify the font of the text.
3. Make the text bold, in italic and/or underlined.
4. Modify the color and size of the text.

Line or Arrow



1. Modify the color of the line.
2. Modify the type of line.
3. Modify the thickness of the line.
4. Add an object to the beginning of the line.
5. Add an object to the end of the line.
6. Modify the starting X position.
7. Modify the starting Y position.
8. Modify the ending X position.
9. Modify the ending Y position.
10. Set no lock to any direction.
11. Set a lock on the vertical direction.
12. Set a lock on the horizontal direction.

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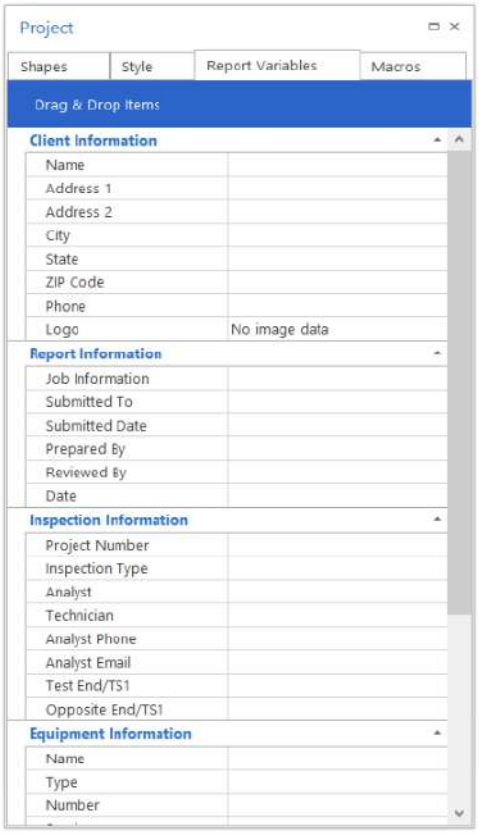
Circle, Ellipse, Rectangle, Rounded rectangle, or Triangle

1. Modify the color of the border of the shape.
2. Modify the type of border of the shape.
3. Modify the thickness of the border of the shape.
4. Modify the fill color of the shape.
5. Modify the type of shadow of the shape.
6. Modify the pattern inside the shape.
7. Modify the distance of the shape and its shadow.

C. Report Variables



Find all the report variables that were added in the backstage. Drag and drop an item to add it to the drawing.

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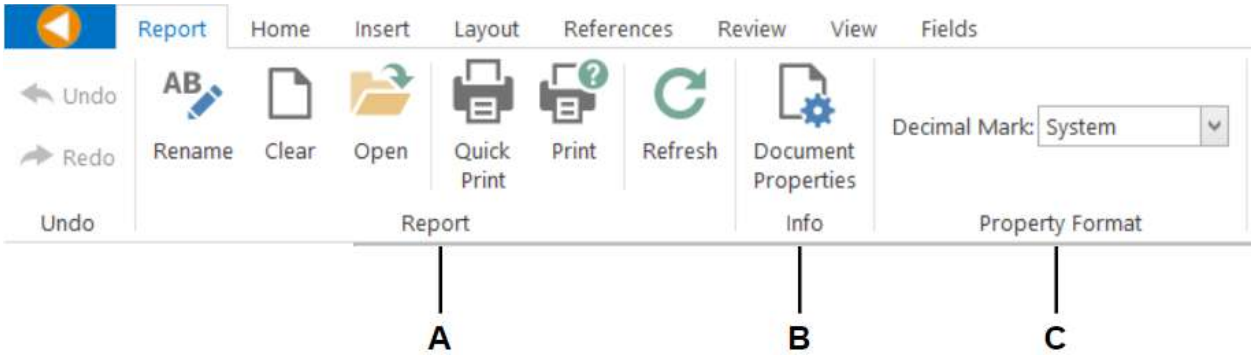
WORD

The word section is the core of the report. This section contains, among other things, the title page, table of contents, summaries, description of the work carried out, description of the technology used and recommendations.

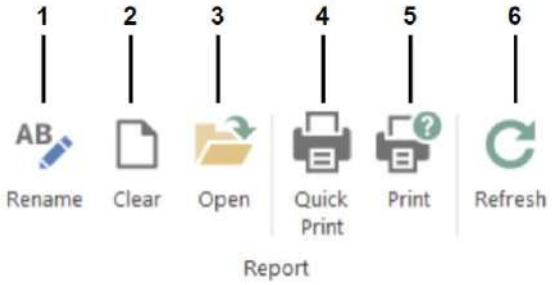
Some of the functionalities under the Word navigation tab are directly related to those found in Microsoft Word and will not be explained in detail.

For users who prefer to use Excel, they can change the type of report from the Backstage, in the preference menu.

Report Ribbon



A. Report



1. Rename the current report.
2. Clear all content from the main report document.
3. Open text from a supported file format.
4. Send the document directly to the default printer without making changes.
5. Open the print options menu to select printer, number of copies, etc.
6. Refresh the document.

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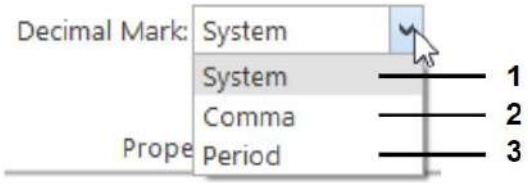
B. Info

1. View and edit the document properties and metadata.

C. Property Format



Choose the decimal mark system used in the report.

1. Use the system default decimal marker.
2. Use a comma decimal marker (e.g. 1,25).
3. Use a period decimal marker (e.g. 1.25).

Home Ribbon

1. Copy or paste from the system clipboard.
2. Edit the size and formatting of the font.
3. Edit the formatting of paragraph text.
4. Format text into pre-defined header levels. These headers will appear in the table of contents of the report.
5. Find or replace text within the document.

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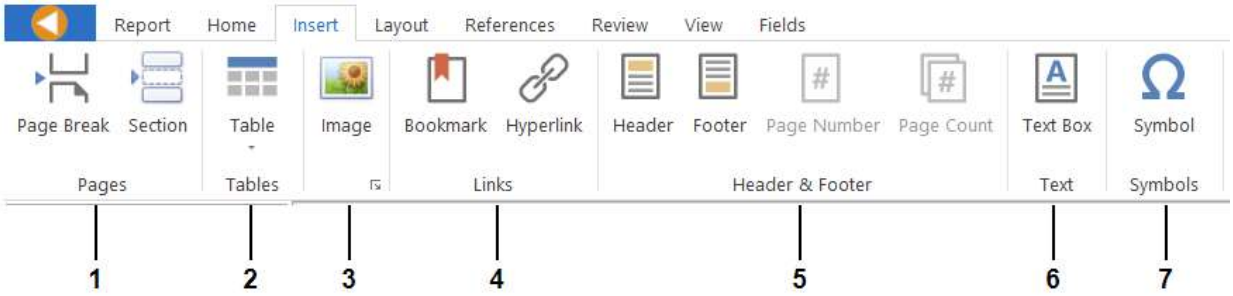
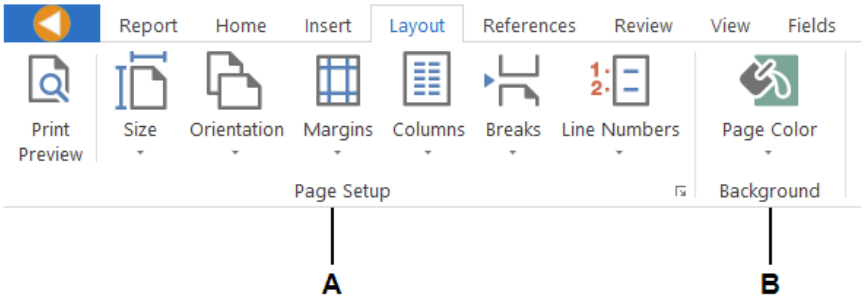
Insert Ribbon

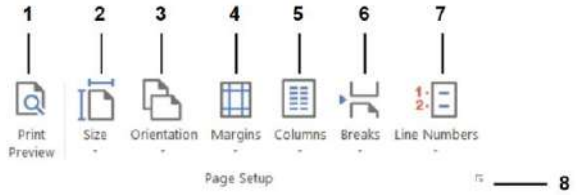


1. Insert a page or section break.
2. Insert a table.
3. Insert image from a file.
4. Insert a bookmark or hyperlink.
5. Insert a header or footer and edit the page numbering and counting.
6. Insert a text box.
7. Insert a symbol from a list.

Layout Ribbon



A. Page Setup



1. View a print preview of the content of the Word section.

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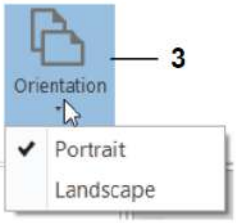
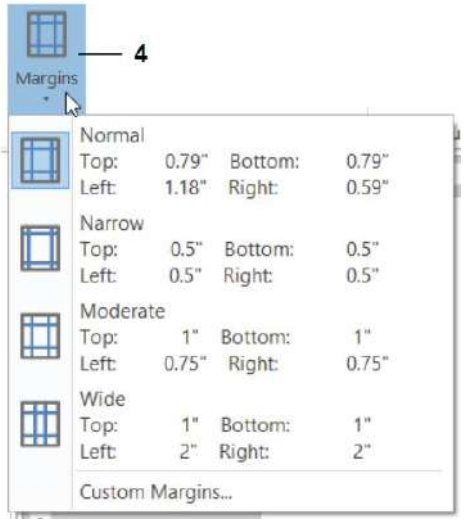
2. Choose the page and paper size.



3. Choose between a portrait or landscape page layout.



4. Choose the margins applied to the page.

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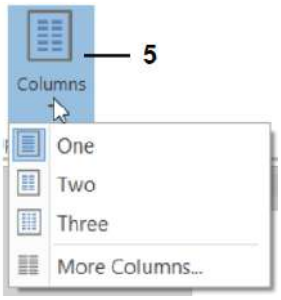
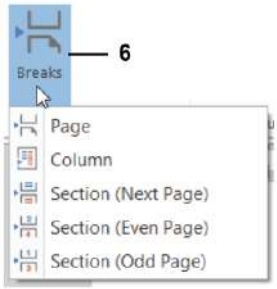
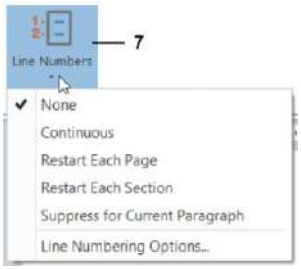


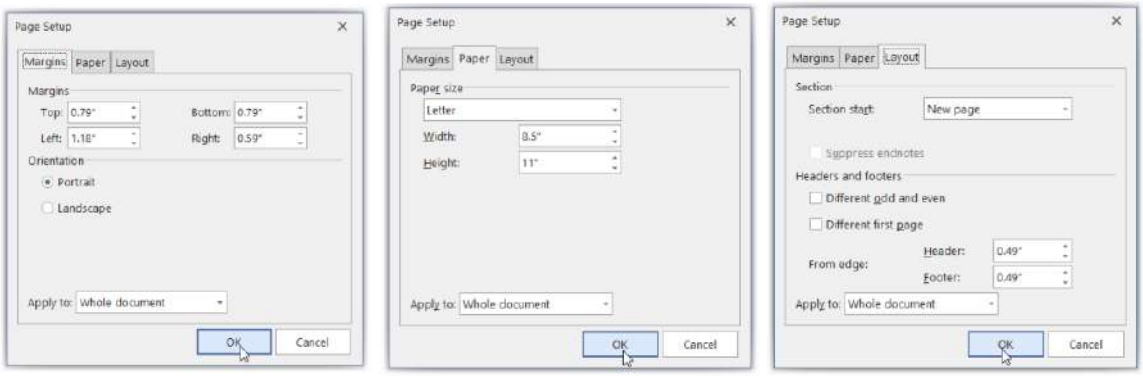
5. Apply columns to the page formatting.



6. Apply different page breaks to the document.



7. Add line numbers in the margins alongside each line in the document.



8. Edit the page setup in a compact menu and choose to apply the changes to the whole document. Under the Layout tab, choose to apply headers and footers to every other page, or to have a different first page.

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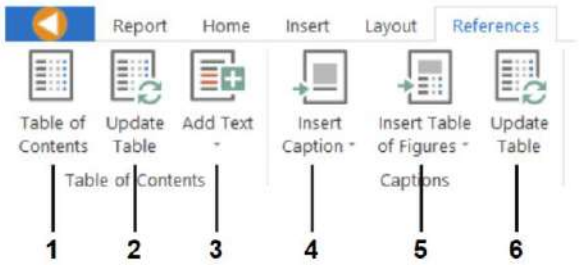
B. Background

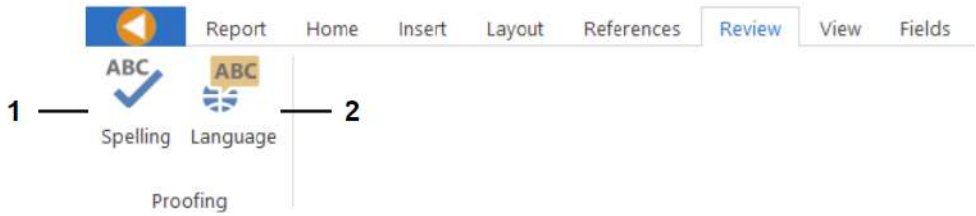
1. Choose the page fill colour from the list of available colours.

References Ribbon



1. Insert a table of contents.
2. Update the table of contents.
3. Choose the header level for the selected paragraph to add it to the table of contents.
4. Insert a numbered caption.
5. Insert a table of figures.
6. Update the selected table.

Review Ribbon



1. Review the spelling based on the selected language.
2. Select the appropriate language used in the document. This language is used for the spell check.

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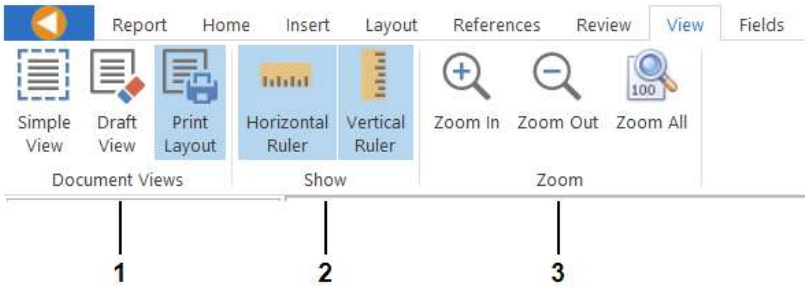
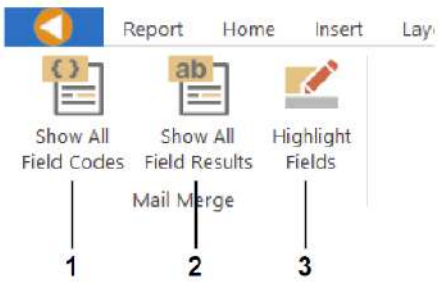
View Ribbon



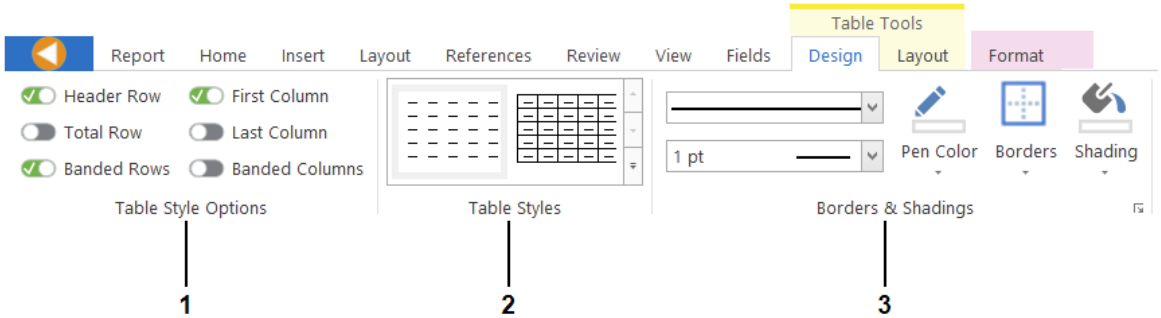
1. View the document as a simple memo layout, in draft layout, or in print layout (default).
2. View the horizontal and vertical rulers at the limits of the page.
3. Zoom in, out, or zoom to see all pages in the document.

Fields Ribbon



1. View the document markup – show the field codes used for each dynamic element. The field codes are the codes used by the program to display each variables.
2. Toggle the view of the dynamic field codes to show their variable values. When selected, the actual variable value entered by the user will be displayed.
3. Toggle the highlighting of the report variables within the document to be on or off.

Table Tools – Design Ribbon



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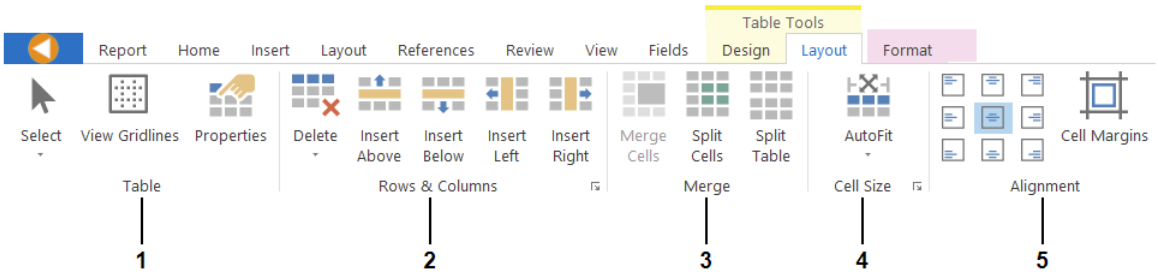
1. Choose different table style options. For more information, hover your mouse over each selection.
2. Change the visual style applied to the table (view/hide boarders, etc.).
3. Adjust the boarder thickness, style, activate the boarder painter, and choose the shading applied to the selected cell.

Note: This ribbon is only visible when a table is selected.

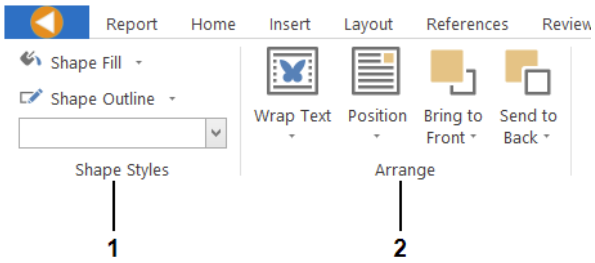
Table Tools – Layout Ribbon



1. Select the current cell, row, column, etc., toggle the view of the table gridlines, and view the table properties.
2. Delete or insert rows or columns.
3. Merge or split cells, split table.
4. Automatically resize the column widths according to the content within them, the page width, or lock the column width.
5. Adjust the alignment of content within the cells and adjust cell margins.

Note: This ribbon is only visible when a table is selected.

Picture Tools – Format Ribbon



1. Adjust the fill, outline and outline weight applied to the selected picture.
2. Adjust the positioning of the selected picture on the page – wrap text around picture, position the object on the page, bring to front, or send to back.

Note: This ribbon is only visible when an image is selected.

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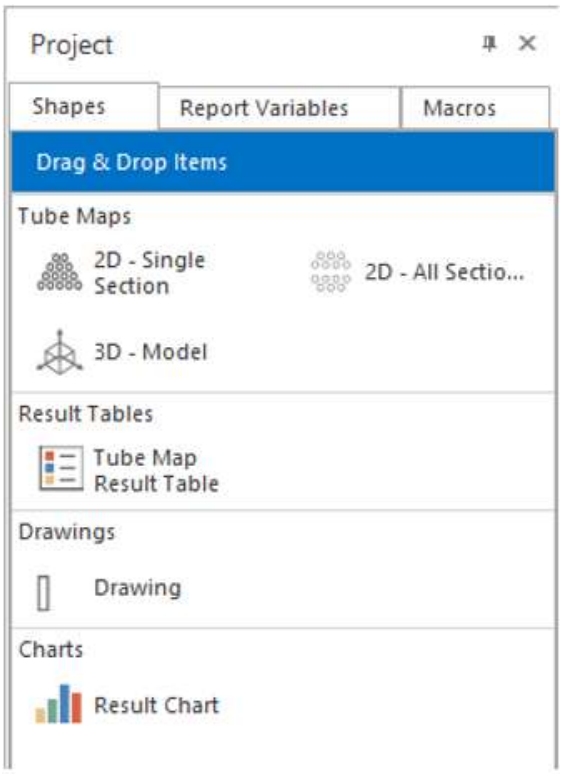
Project Window



The Project Window visible in the Word Section is very similar to the options available in the Drawing Section. Please refer to this section for more information.

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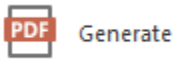
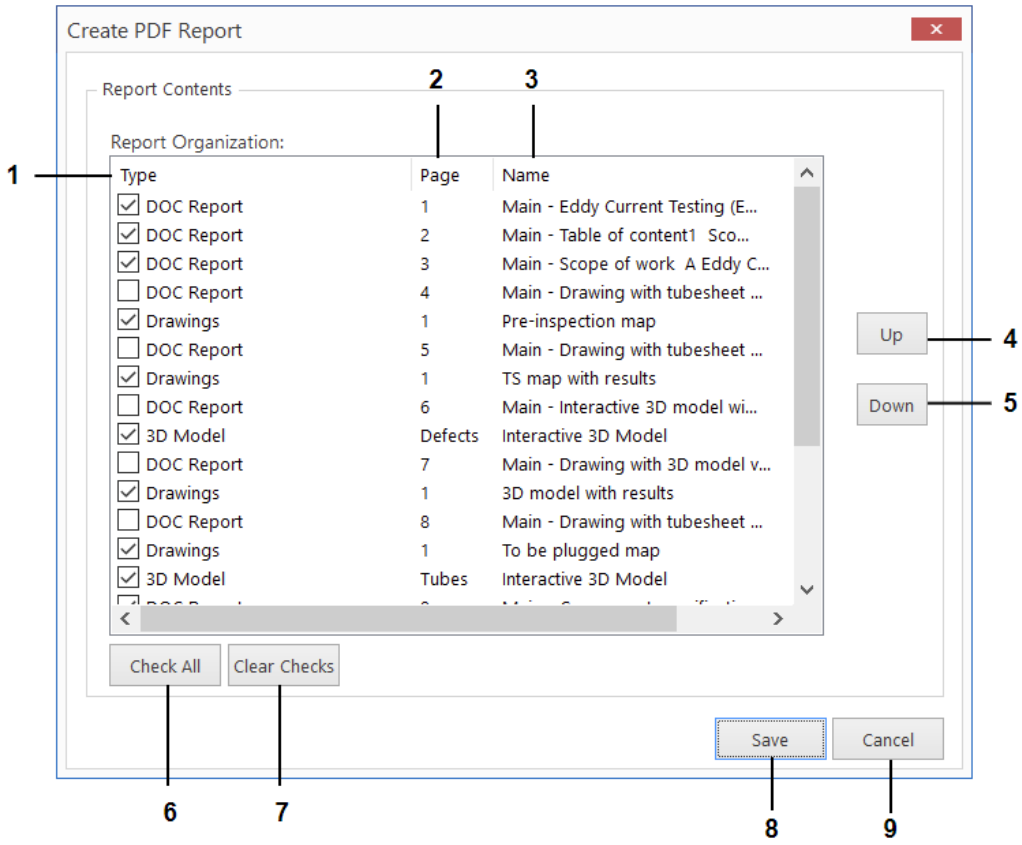
GENERATE



The Generate button is used to generate the PDF of the final report.



1. Select or deselect the page from appearing in the report. The page type is based on where in the reporting process the page was created.
2. The page number given here is the stated page within the original section.
3. The name is the name given to the page upon creation in the respective section.
4. Move a page up within the list. The order chosen in the list will be the order in the PDF file.
5. Move a page down within the list.
6. Check all boxes to have all pages appear in the report.
7. Clear all check boxes to remove all pages from the report and start from scratch.
8. Save the PDF report. A system dialog box will open to save the document.
9. Cancel saving.

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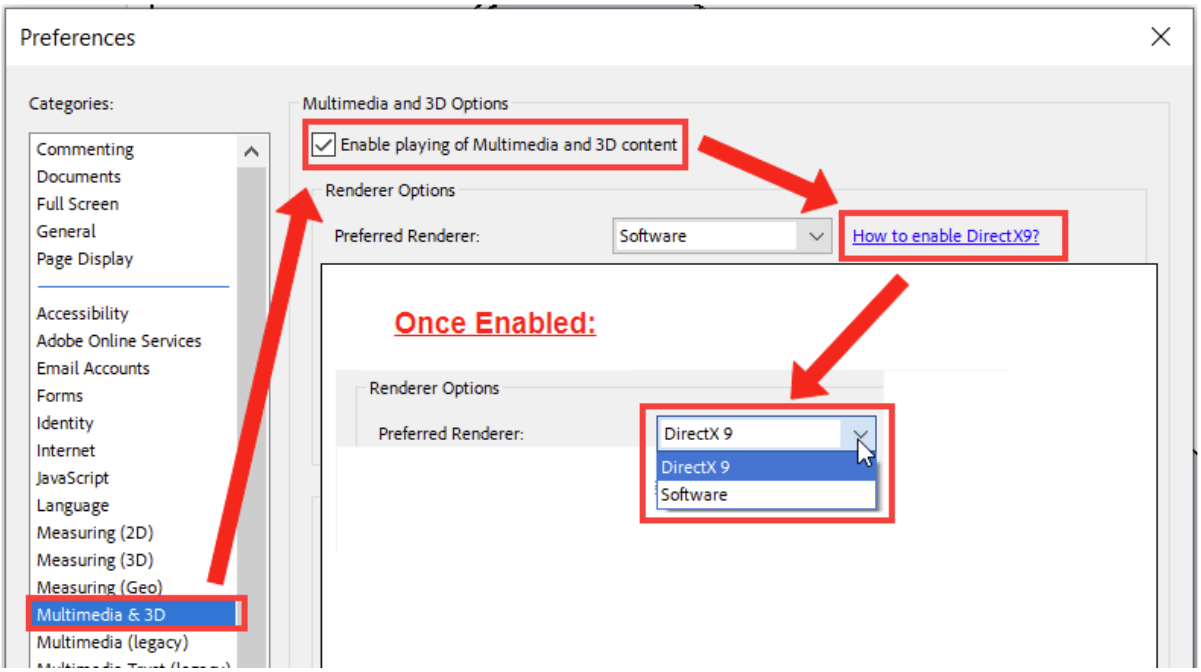
Note: To view 3D content in Adobe Acrobat, go to Preferences and select Multimedia & 3D. Click the checkbox to enable 3D content. We recommend enabling DirectX 9 for high-resolution rendering. This can be done by clicking the link in the window. Once installed, DirectX 9 will appear as an available renderer.



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