Engineering Base

New Features in Version 2020 R2

April 2020

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Content

1 Common Update Notes

1.1 Migration of Data from Previous Versions

To migrate data from previous Engineering Base versions, you must update the database with the database manager.

How to update a database:

1. Open the **Database Manager** via the Windows **Start menu**.

2. Select the tab **SQL Server Instance** and click **Update databases**.

   The dialog now shows a list of the databases which have not been updated yet. Mark the databases to be updated and start the update.

   You can access databases of previous Engineering Base versions with **Engineering Base** only if they have been updated. Databases not matching the installed Engineering Base version are not displayed in the **Open Database** selection dialog.

2 Extensions To Product Families

2.1 Plant Engineering

2.1.1 New Assistants

2.1.1.1 Standard 3D Portal

You need one of the licenses listed below:	No license required The web service does not require a separate license
Contained in the following business solutions:	EB Process Engineering EB Plant Engineering EB Plant Operation

As of this version of Engineering Base, you can exchange data between EB and 3D systems.

To be able to use the Standard 3D Portal, you have to activate it in the Engineering Base setup during the installation.

1. To do so, select the **Advanced** button in the setup dialog **Choose installation type**.

2. In the subsequent **Custom Setup** dialog, you can then activate the Standard 3D Portal as a sub component of the **Engineering Base Application Server**.
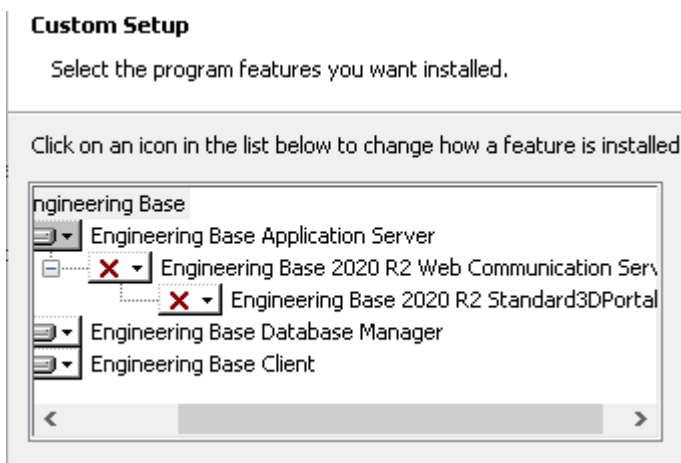
To export 3D data with EB using the Standard 3D Portal

First, configure a control system or change an existing control system as a basis for the 3D data communication.
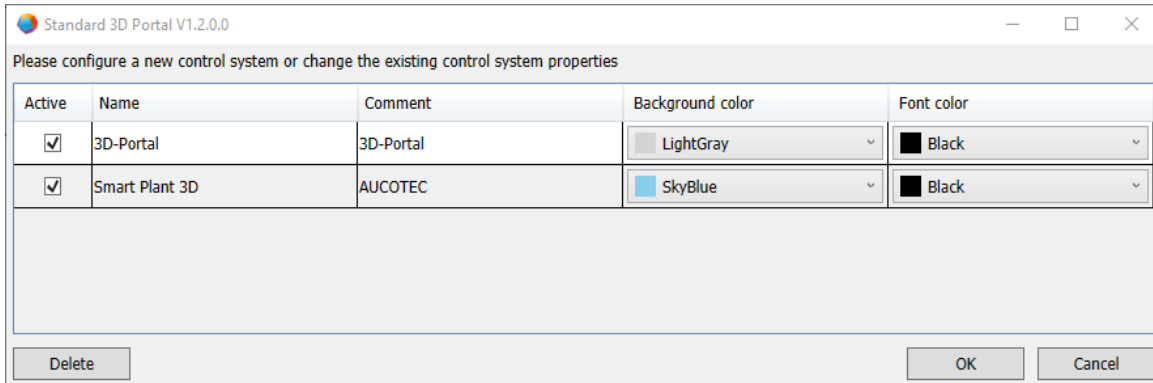
EB provides the available control system configurations as tiles.
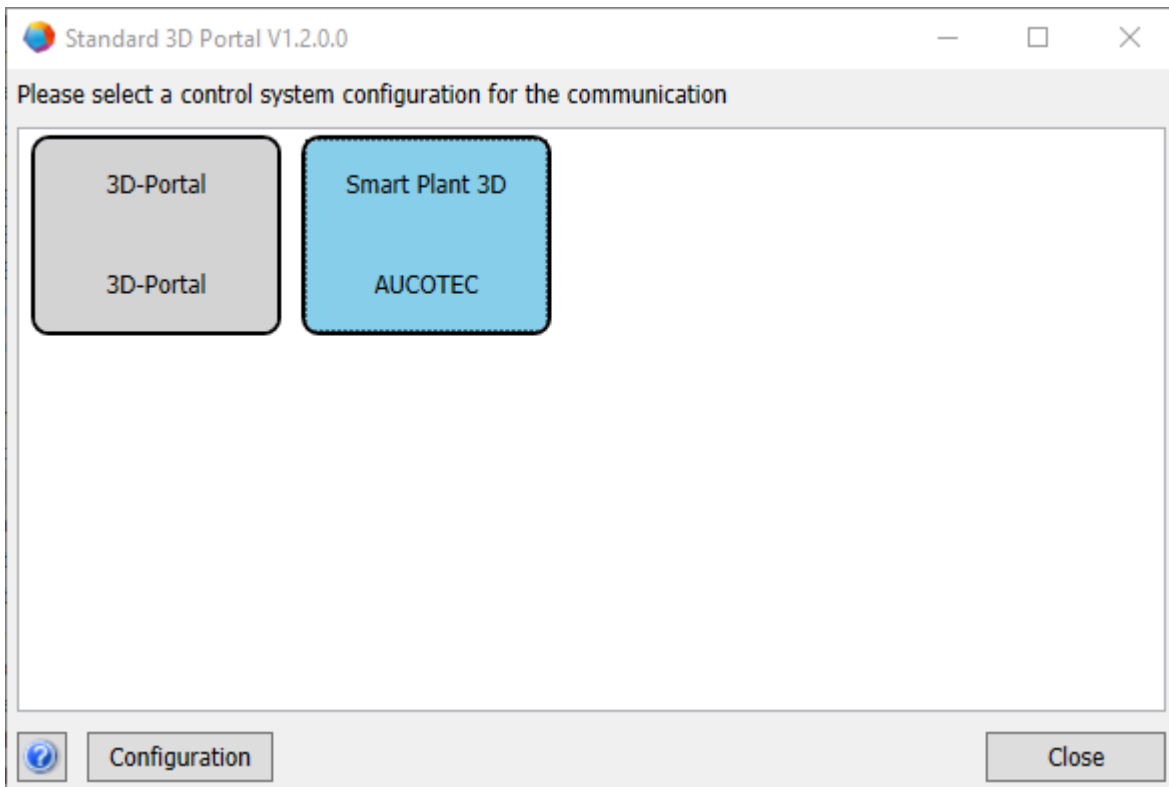
You can export/import the versioned file in the XML format, via ZIP or as a directory/folder.
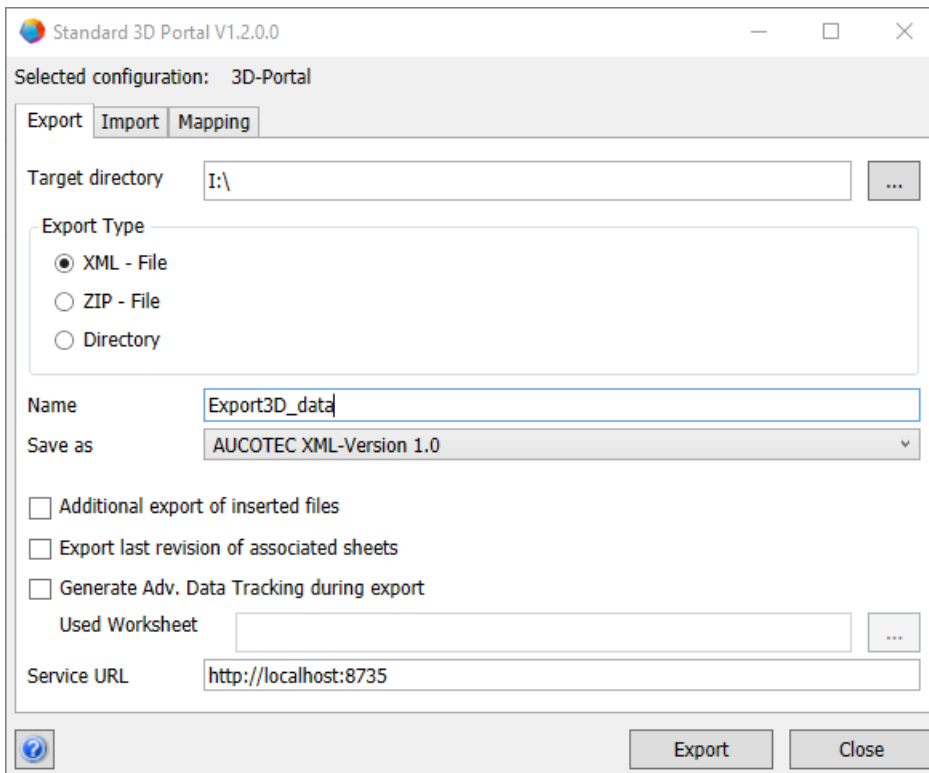
In the **Standard 3D Portal**, you can make the required mapping for various 3D system configurations.

The data **Export** from EB can be made via a standard 3D micro service in conjunction with the web service via a service URL. It uses the mapping of the EB project or the mapping of the database.

In the configuration dialog under **Import**, you can define which mappings you want to import. During the import, a comparison list is available displaying the changes of the mapping.
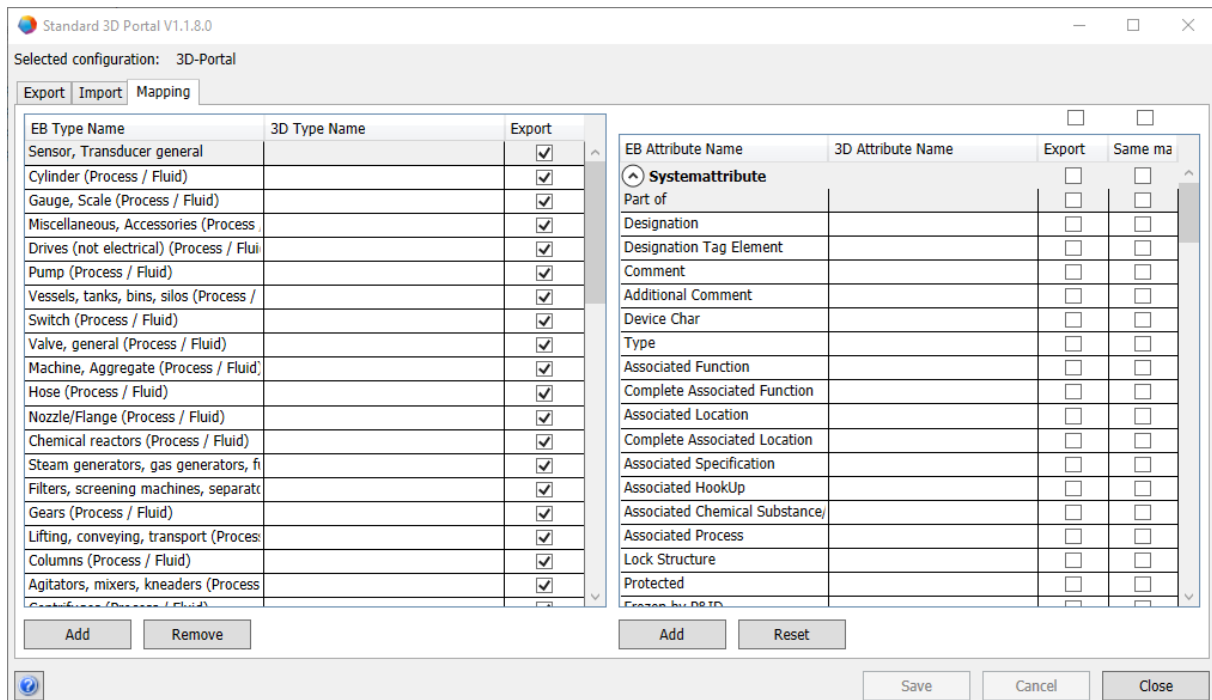
On the Mapping tab, you can select one or several attributes.

2.1.2   Existing Connections are Maintained

As of this version of Engineering Base, existing connections are maintained on changing a shape.

If the **Smart Diagram Mode** is activated, you can rotate, enlarge or decrease the size of a shape without losing the existing connections.

* Once you have changed the shape, EB arranges the connections right-angled between the respective shapes.

Existing connections are maintained on sheets with the following smart diagram types activated:

* Process Flow Diagram (PFD)
* P&I Diagram
* System Control Diagram (SCD)

3 Redesign and Extension of Assistants

3.1 Enhancements of the "Smart PDF" Assistant

You need one of the licenses listed below:	EB Basic Engineering
	EB Process Engineering
	EB Detail Engineering
	EB Plant Engineering
	EB PTD Plant
	EB PTD Detail
	EB PTD Project
	EB EVU / PTD
	EB Plant Operation
	EB Data Editor
	EB Electrical Pro
	EB Instrumentation Detail
	EB Instrumentation Pro
	EB Fluid
	SmartPDF
Contained in the following business solutions:	Electrical / Instrumentation Detail Engineering International Standards
	Power
	Electrical USA Standards
	Instrumentation Basic Engineering
	System Engineering Harness Design
	Automotive Harness Design
	Fluid
	Minerals Processing
	Plant Engineering - FEED & Process
	Plant Engineering - Detail

Using the assistant, you can convert a project into a PDF file. In the PDF, a tree structure is created which enables you to navigate between Equipment, Functions and/or cross-references for potentials/substances (including signals). PDF files saved in the documents can also be inserted. Hyperlinks at objects can be transferred into PDF.

3.1.1 Optimized User Interface

As of this version of Engineering Base, the **Smart PDF** assistant has been adapted to the look and feel of the existing assistants.

- Using the Help button, you can access the relevant topic in the context-sensitive online help.
- The Help button is available at all menu levels of the assistant.

All previous **Smart PDF** functions have been included in the optimized graphics interface.

Under "Options", the following menu levels are available:

- Select sheets
- Bookmark and tooltips
- Add PDF from file system
- Add hyperlinks
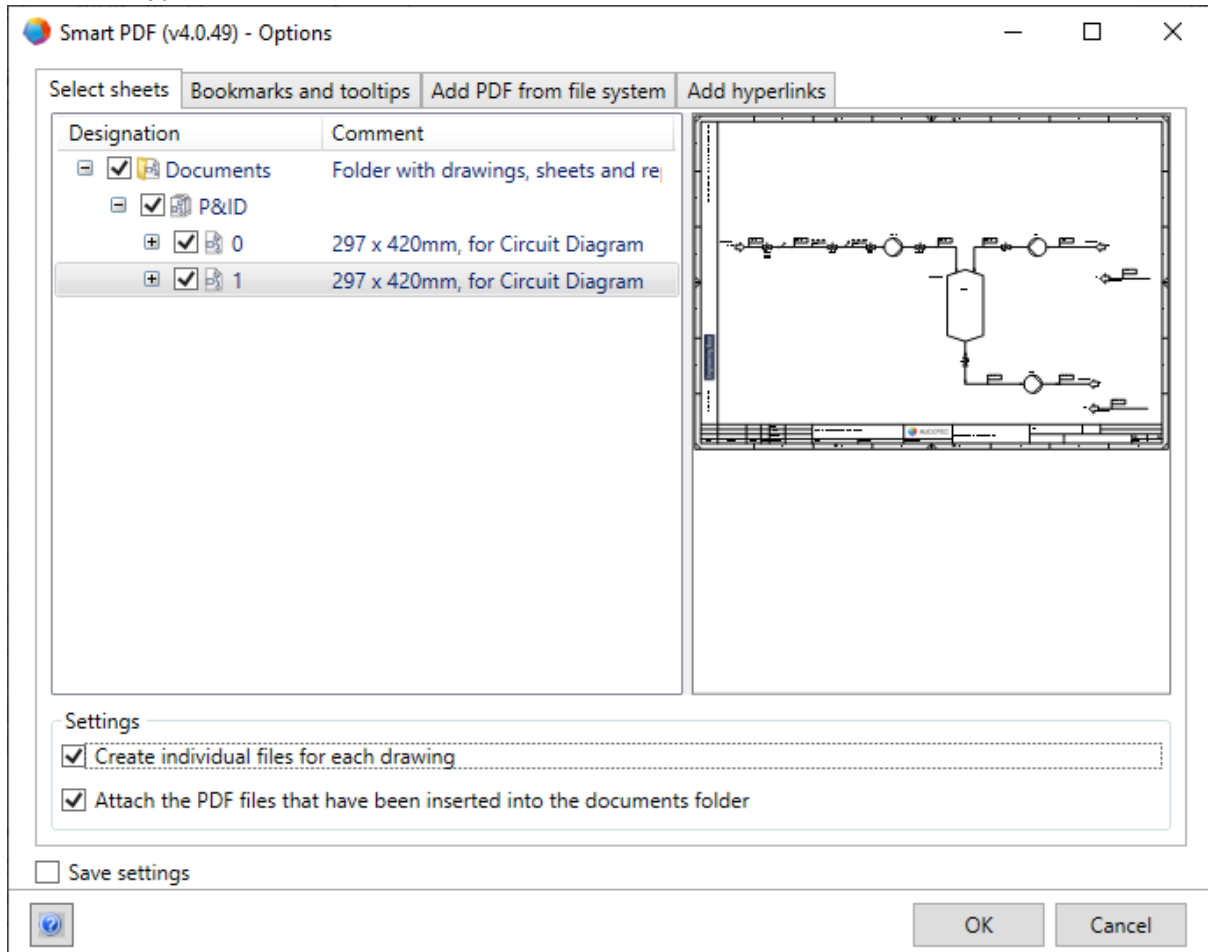
3.1.2 Taking Over PDF Documents Linked via Hyperlink into SmartPDF

In the **Smart PDF** assistant, you can use the **Add hyperlinks** tab to define an attribute into which you can enter hyperlinks at objects. These hyperlinks will then be available at the object in the created PDF.

As of this version of Engineering Base, you can enter the absolute path to external PDF files into this attribute. On creating the PDF, the assistant saves the external document in the appendix of the PDF.

If you click the object in the created PDF, the linked PDF opens in a new tab.

3.2 Merge Device Assistant with Graphic Preview

You need one of the licenses listed below:	Engineering Base (Evaluation Version)
	Engineering Base Instrumentation Pro Add-On License
	Engineering Base Electrical Pro Add-On License
	Engineering Base Electrical Add-On License
	Engineering Base Power Add-On License
	Engineering Base Cable Add-On License
	Engineering Base PlantDesign Add-On License
	Engineering Base Explorer Add-On License
	Engineering Base Cable Logic VOBES Add-On License
	Engineering Base Cables Pro Add-On License
	Engineering Base Cable Logic Add-On License
	Engineering Base Instrumentation Detail Add-On License
	Ovation Documentation Builder - I&C Designer Add-On (Module 1056)
	Ovation Documentation Builder - I&C Developer Add-On (Module 1076)
	Instrumentation Explorer AddOn
	EB Detail Engineering
	EB Plant Engineering
	EB Plant Engineering (Campus)
	EB Plant Operation
	EB Instrumentation Basic
	ODB Engineering
	ODB Plant Operation
	EB Data Editor
	EB Plant PTD
	EB Rail Industry OEM
	EB Rail Industry – Advanced modular Engineering
Contained in the following business solutions:	Electrical / Instrumentation Detail Engineering International Standards
	Power
	Electrical USA Standards
	Instrumentation Basic Engineering
	System Engineering Harness Design
	Automotive Harness Design
	Minerals Processing
	Plant Engineering - FEED & Process
	Plant Engineering - Detail

Use this assistant to merge and separate functional and real physical devices. That way, you can, for instance, comfortably assign free channel symbols (functional inputs/outputs) to the inputs/outputs of automation systems or input/output boards (physical inputs/outputs).

- During the assignment, the attributes defined for the device type via the **Options** dialog are transferred from the functional to the physical device.
- The sub structures of the functional device are merged with those of the physical device.

As of this version of Engineering Base, the assistant provides you with a graphic preview for the functional devices. With that preview, a comfortable check function is available for you before you execute the assignment. For that purpose, use the shortcut menu of the functional devices in Visio to open the sheets on which the functional devices are represented.

For that purpose, use the shortcut menu of the required device to open the sheets on which that device is represented. In the preview pane of Visio, the previously selected device is highlighted in magenta. Close this view by ending the assistant.

3.3 Extensions to "Route Wires and Cables into Bundles"

As of this version of Engineering Base, you can use single or multiple selections to select wires and cables for the routing. So far, the **Route Wires and Cables into Bundles** assistant could only be executed on harnesses, topology folders or projects.

Now, you can additionally fix cables on their existing routes. To do so, activate the **Exclude from Routing** attribute. However, in case these cables have already been routed, they are taken into account for the calculation of the diameter and the filling level.

The following new setting options and functions are available in the **Route Wires and Cables into Bundles** assistant under **Routing Assistant Settings**:

Tab General: Save routing path

If you select option **Save routing path at wires/cables**, the routed course of the wires/cables through the segments is entered into attribute **Route** (AID 10869). The individual positions of the route are then separated from each other by a freely selectable separator.

Tab Filling Level Calculation:

The filling level at cable ducts or feedthroughs can be calculated by indicating the occupied area, which is defined at these objects in attribute **Occupied Area** (AID 40791).

For cable ducts and feedthroughs respectively, you can define a general maximum filling level in % in the settings of the Routing assistant. To be able to deviate from that default value at specific objects, you can enter a specific value into the **Maximum Filling Level in % (Cable Duct)** attribute at that object.

On the **Filling Level Calculation** tab, you can make the following settings:

- Define default values for the maximum filling level of cable ducts and feedthroughs.
- Select on which basis EB is to calculate the filling level: Either based on the calculated segment diameter, or based on the summed wire/cable diameters.
- Select whether EB is to search for alternative routes or whether EB is to display conflicts if the filling level is exceeded.
- If you have selected **Show routing conflicts if wires/cables could not be routed due to the maximum filling level/maximum diameter** as an option, the **Routing: Conflicts Overview** dialog is displayed if conflicts have occurred.

The calculated filling level is written into the **Filling rate in %** attribute at the cable duct or the feedthrough.

Resetting the routing

As of this version of Engineering Base, you can remove individual routed cables from a route. On removing the cable, the effects on the route, for instance filling level calculations along the entire route, are recalculated.

To reset a routing:

1. Select the routed cable.

2. On the shortcut menu, select **Select Assistant**.

3. Start the **Route Wires and Cables into Bundles** assistant/**Clear Routing Information**.

Manual assignment of route sections

The assistant can now also take into account manually assigned route sections. That way, you can define specific sections or manually assign entire routes and have all relevant calculations executed, for instance the calculation of diameters.

Execution using transfer parameters

The assistant has been extended by various transfer parameters, so that it can now be entirely integrated into other workflows with specific assistants.

What happens during the routing?

The assistant establishes which wires are connected to which devices, for instance connectors, assigns them to the topology pins and calculates the wire lengths resp. the cable lengths. The total cross-section or the total filling degree of the segments is calculated from the single cross-sections.

The result of the routing is displayed in a report which shows the following information:

- Which wires or cables have been routed.
- Warning in case of missing destinations and other errors.
- Error in case the maximum filling level or diameter has been exceeded.
- List of wires or cables that could not be routed due to missing destinations.

4 New Assistants

4.1 The "Highlight Routed Wires" Assistant

You need one of the licenses listed below:	EB Cable Manufacturing EB Cable Pro Add-On EB Cable Logic Add-On EB Cable Harness Design Add-On EB Cable Logic VOBES Add-On EB Rail Industry OEM EB Rail Industry – Advanced modular Engineering
Contained in the following business solutions:	Automotive Engineering Harness Design (Cable AM) System Engineering Harness (Cable SE)

Use the **Highlight Routed Wires** assistant to highlight routed wires and cables within a harness in a 2D drawing, so that the segments through which these cables/wires run are graphically highlighted.

- The assistant can be started from an object in the Engineering Base Explorer or on an opened drawing.
- The assistant can be started from all wires, cables, segments and devices below a harness.

4.2 "Central Quality Assistant"

You need one of the licenses listed below:	EB Plant Engineering EB PTD Plant EB PTD Project EB EVU
Contained in the following business solutions:	Electrical / Instrumentation Detail Engineering International Standards Power Electrical USA Standards Instrumentation Basic Engineering System Engineering Harness Design Automotive Harness Design Fluid Minerals Processing Plant Engineering - FEED & Process Plant Engineering - Detail

4.2.1 Central Assistant and test report

This assistant supports you in planning power engineering plants according to the EVU (PTD) standard. EB checks the selected project or the selected plant sections in line with the EVU guidelines. The test report also contains a detailed description of the checks and their application.
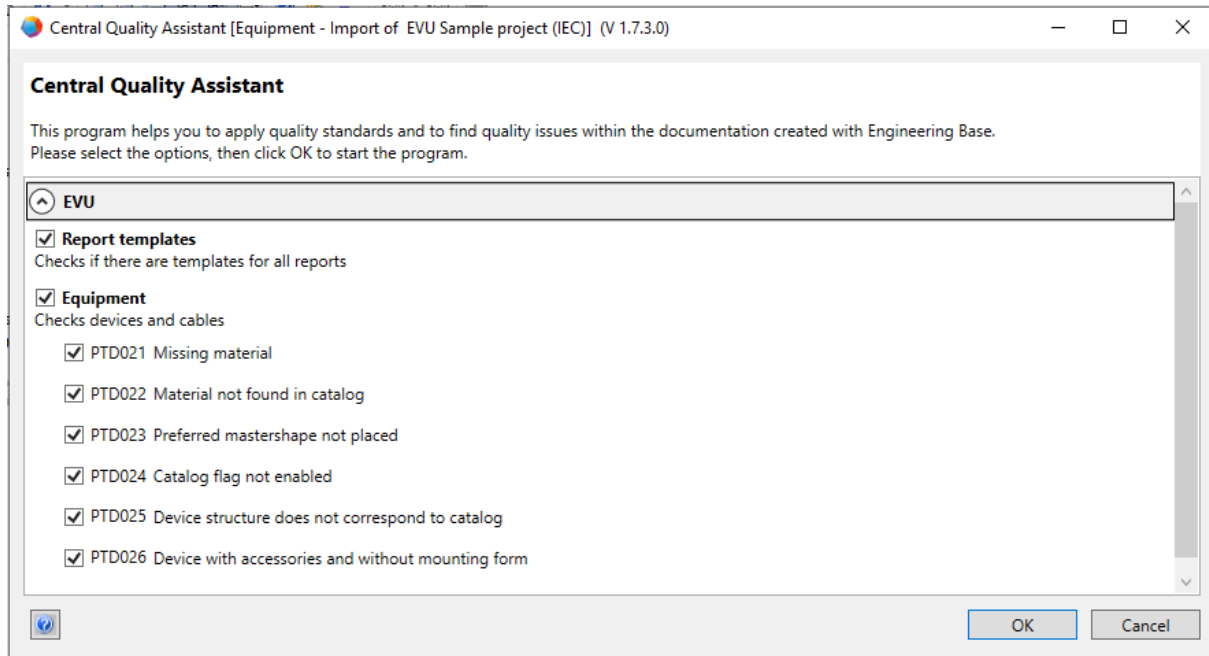
4.2.2 Checking equipment

Using the Central Quality Assistant, you can specifically select and deselect objects for quality checks evaluating their conformity with the EVU standard.

The following objects can be checked:

- devices and cables
- report templates

The assistant can be executed from the following objects:

- project
- the **Equipment** folder
- the **Documents** folder
- objects contained in these folders

Test report as a PDF

The quality check results in a status sheet containing a tabular overview of the checked objects and an automatically generated test badge with a label according to DIN 40719. After the checks, the status sheet is available as a PDF file in the EB Explorer.

4.3 Attributes Manager

| You need one of the licenses listed below:	Is included in all licenses excepting the following ones: EB View EB Maintenance
Contained in the following business solutions:	Electrical / Instrumentation Detail Engineering International Standards Power Electrical USA Standards Instrumentation Basic Engineering System Engineering Harness Design Automotive Harness Design Fluid Minerals Processing Plant Engineering - FEED & Process Plant Engineering - Detail

Using this assistant, you can edit attributes, type definitions and a mapping table.

Using the Attributes Manager, you can do the following things:

- Check in which type definitions an attribute is used
- Create new attributes
- Delete attributes
- Change the configuration of the dialog fields for one or several object types. Here, you can carry out all actions which are also available on defining dialogs with multi selection:
    - define new tabs
    - delete tabs
    - add an attribute
    - remove an attribute
- Edit an Excel table for the mapping of attributes. This mapping table can, for instance, be used as the basis for the XML file of the attribute mapping in the Database Manager.

To start the Attributes Manager

1. Start the Attributes Manager via the shortcut menu of the **Attributes** folder.
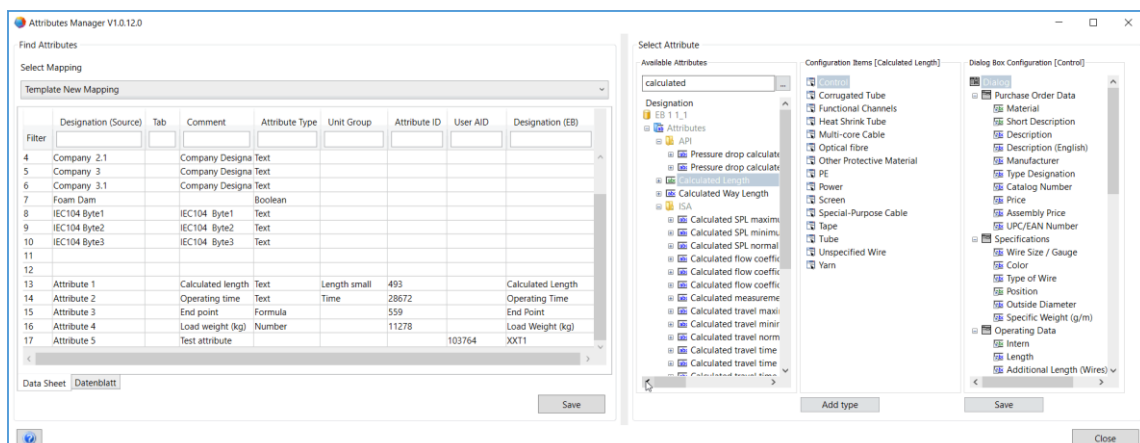
The **Attributes Manager** dialog is divided into two sections

- In the **Select Attribute** area, the following actions are available:
  - o searching for attributes and their use in type definitions
  - o all actions that you can execute using the **Define Dialog** function with multi selection.
- In the **Find Attributes** area, you can assign attributes in Engineering Base to the attributes entered in the mapping table.

  The mapping table is an Excel table which has to have a specific column structure. You can only edit the table manually outside of the assistant.

4.3.1 The "Select Attribute" Area

The **Select Attribute** area consists of three list panes:

- **Available Attributes**: List of all available attributes that you can restrict via a filter

  Using the ⬚ button in the filter row, you can define how you want to filter the attributes.

  - **Contains all:** Displays all attributes whose names contain at least one of the listed terms. This is the default setting.
  - **Contains each word:** Displays all attributes whose names contain every listed term.
  - **Starts with:** Displays all attributes whose names begin with the entered term.
  - **Ends with:** Displays all attributes whose names end with the entered term.
  - **Exact match:** Displays all attributes whose name is identical to the entered terms.

  Via the shortcut menu of an attribute, the following options are available:

  - **Open:** opens the Properties dialog of the attribute
  - **Map Attribute:** inserts the attribute into the selected row of the mapping table.
  - **Find Types:** the configuration items area displays all type definitions containing the attribute
  - **Delete:** deletes the attribute
- **Configuration Items**: list of all type definitions containing the selected attribute

  Using the **Add type** button, you can add further type definitions to be able to edit them in the **Dialog Box Configuration** area.

- **Dialog Box Configuration**: The definition of the dialog field is displayed for the selected type definition below Configuration Items.

  Via **Save**, all changes to the type definitions are saved.

Starting from the **Dialog Box Configuration** area, you can add dialog box tabs and attributes to all objects of the configuration items list, or you can delete these tabs and attributes.

4.3.2 The "Find Attributes" Area

In this area, you can search for suitable EB attributes for attributes entered into the mapping table (Excel table), and you can copy them into the Excel table together with their attribute ID.

To edit the mapping table

1. In the **Find Attributes** area under **Select mapping**, use the arrow key to select the required mapping or one of the following options

   - <Open file>:
     Select a suitable Excel file via the file selection dialog.

   - <New>
     In the **New Mapping** dialog, enter the required name and further information on the mapping table. The empty Excel table is created in the database templates/**Configurations/Attributes Manager**. In the Excel table, enter the attributes to be mapped.

   The mapping table contains the following columns:

   - Designation (Source)
   - Tab
   - Comment
   - Attribute Type
   - Unit Group
   - Attribute ID*
   - User AID*
   - Designation (EB)*

   The columns marked with an asterisk (*) are filled by the Attributes Manager. Manually entered values from the Excel file are overwritten.

2. Select a row of the table and, on the shortcut menu, select the method according to which you want to search for the attributes in the **Available Attributes** area.

   - Find by Designation (Source)
     The value of **Designation (Source)** is taken over into the filter row of the **Available Attributes** list pane, and the filter is activated.

   - Find by Designation (EB)
     If the table has an entry in column **Designation (EB)**, it is taken over into the filter row of the **Available Attributes** list pane and the filter is activated.

3. Select the required attribute from the filtered list and click **Map Attribute** on the shortcut menu.

   The attribute name is saved in cell **Designation (EB)** in the selected row of the mapping table. Depending on whether the selected attribute is a user attribute, the attribute ID is written into cell **User AID**, otherwise it is written into cell **Attribute ID**.

4. Click **Save** and select whether the changed mapping table is to be saved as a new configuration.

5 Extensions to Worksheets

5.1 Display of Worksheet Data as Pie or Bar Charts

As of this version of Engineering Base, you can create pie charts and bar charts on worksheets to graphically represent statistical analyses of your data.

You can only define these charts for columns whose content can be counted or summed. You can represent the calculated quantities or sub totals as charts.

If you want to display sub totals (block sums), you first have to define a column whose characteristics can be counted.

To define charts on worksheets

1. On the worksheet, select the column whose column content characteristics are to be used as the values on the x axis of a bar chart and as the designations of the circle segments of a pie chart (**Group by**).

2. To do so, click ⇕ (Count) on the toolbar.

   On the worksheet, the new column **Counted** displays how often the different column contents occur in the counted column.

   The 🕐 ˅ icon (Configure charts for this worksheet) is now active.

   The values in the **Counted** column are used as the values on the y axis of the bar chart and they define the size of the circle segment of a pie chart for the first **Counted** chart.

To establish the sub totals of another column per characteristics of the counted column

1. Select the required column and click Σᴀ (Sum) on the toolbar.

2. Repeat this procedure for all required columns.

3. Click the 🕐 ˅ icon.

4. In the opened properties dialog of the worksheet, define which chart type is to be used for the analyses.

   The possible choices are:

   - Pie chart
   - Bar chart
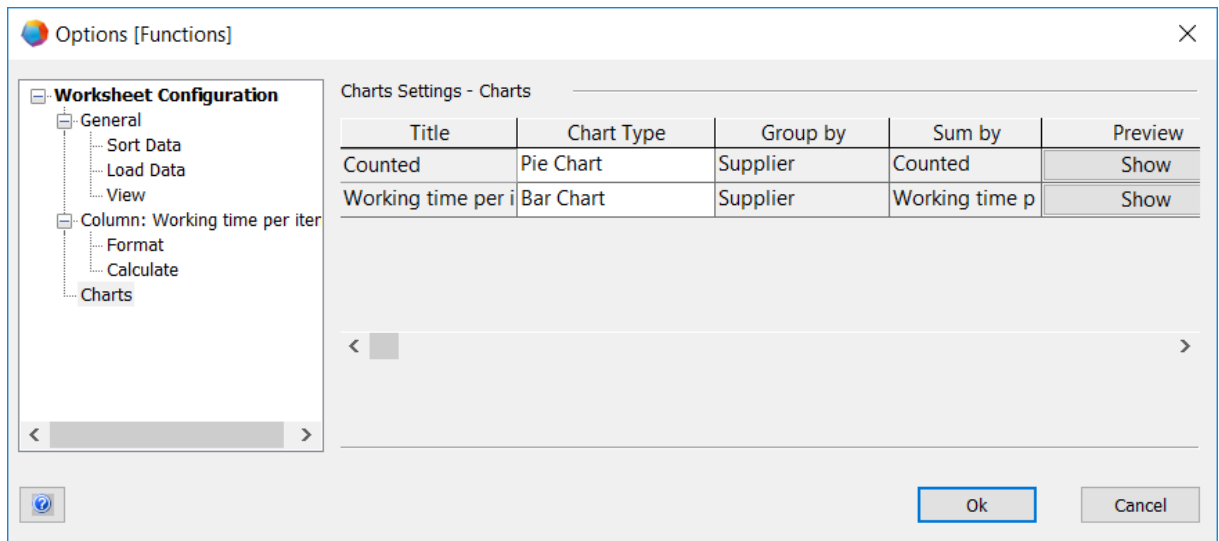
5. In the **Preview** column, you can display the chart via "Show".

6. Save your entries via **OK**.

On the worksheet, the predefined charts are now displayed via the arrow key next to the charts icon. Clicking the chart opens the respective chart.

Save the worksheet to ensure that the chart definition is saved for the worksheet.

Examples:

Chart **Counted**: How many process steps have been assigned to the suppliers (A-D)?
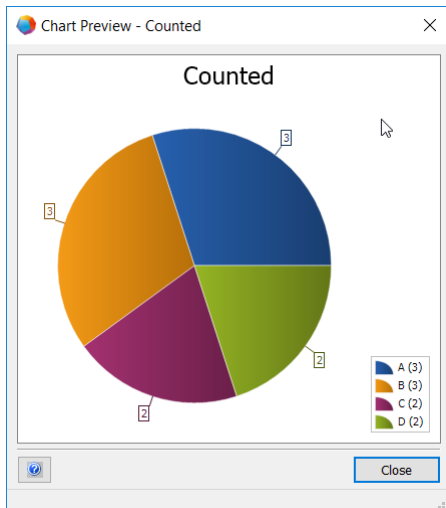
Chart **Working time per item**: How much working time have the suppliers planned for their tasks?
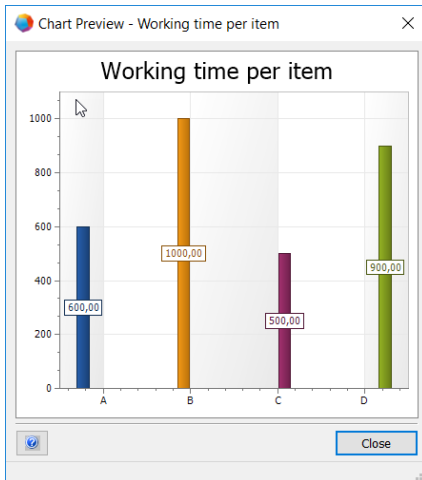
5.2   Modified Worksheet Template "Worksheets"

As of this version of Engineering Base, the modified **Worksheets** worksheet is available as a template in the **Standard** template project under **Templates**/**Worksheets**/**Favorites**.

If you open this worksheet on the **Worksheets** folder, all worksheets of the folder are listed with the following information:

- Designation
- Comment
- Use for Revision
- Contains charts

6 Releases

6.1 Release for Microsoft SQL Server 2019

As of this version of Engineering Base, Microsoft SQL Server 2019 can be used.

If you have bought Engineering Base together with SQL Server licenses, setups to install SQL Server for the use with Engineering Base are available.

After a manual installation of a SQL Server 2019, you can set up a SQL Server 2019 instance for the use in Engineering Base at any time via the Engineering Base setup or the Engineering Base Database Manager.

First, install the SQL Server 2019 setup. Then, install Engineering Base.

7 Miscellaneous

7.1 New Function Types

As of this version of Engineering Base, the following function types are available for all business solutions:

- Alarm
- Function Block
- PCE Control Function
- PCE Loop

7.2 New entry formats

As of this version of Engineering Base, you can enter further fractions into fields with measuring units.

On entering data in dialogs and worksheets, the following notations are valid:

- "1/8" instead of "0.125"
- "3/8" instead of "0.375"

You can also combine these fractions with integers. For instance, entering 2 1/8 " is valid.

7.3 System of Units

7.3.1 Converted Input Values Visible Universally

As of this version of Engineering Base, the system of units that you have selected applies to all converted values in the input mask, the attributes list and on worksheets.

- EB stores the input values in the database using the entered accuracy. EB displays rounded values, based upon the set system of units with the configured accuracy.
- The original input value including all decimal places is visible at the respective unit as a mouseover effect of the converted value.
- If an input field is activated, the value saved in the database is visible with all existing decimal places.

Project-related system of units

Change the project-related unit via the **project properties**, under **Engineering/System of Units**.

The following options affecting diagrams and sheets are available:

- "Display input values graphically"
- "Display input values alphanumerically"

User-defined view on systems of units

If you have defined a user-specific system of units, that view is available independent from any project. In that case, the following aspects have also been changed: Display, print and export of diagrams and worksheet-based reports.

Change user-specific units under:

- Extras/Options/Unit View Configuration or
- by right-clicking the database: Properties/Unit View Configuration

7.3.2 Selected System of Units Visible on Reports

As of this version of Engineering Base, the selected system of units is visible on the reports.

- You can define the system of units on a project-related basis, via: **Project Properties/Engineering/System of Units**.
- If you have defined a user-specific system of units, EB will always display the user-defined view on the reports.
- You can set the user-specific view in the database options. This view takes precedence over the project-related configuration of the system of units.

Activating/deactivating the specific display of the entry values on reports

This setting option is only applicable to the worksheet embedded in Visio. The following option is activated by default for worksheets embedded in Visio: **Worksheet configuration/General/View:** Use project/user settings for units.

To render this setting effective, one or both of the following options must be activated:

- **Display input values alphanumerically**
- **Display input values graphically**

These options can either be set on a project-related or a user-specific basis.

7.3.3 Database Settings for Attribute Comments

As of this version of Engineering Base, the **Attribute View** setting in the properties dialog of your database contains two new options for attribute comments:

Show comments for attributes in dialogs and attribute list

If this option is activated, the following two columns become available in the attributes list and in dialogs for every attribute: First column: Enter values, second column: Enter comments. The two columns are not available for project and folder attributes.

Replacing and updating the contents of the attribute comments is done in line with the replacement rules defined in the attribute properties.

On changing object data by selecting specification objects and material, this option is taken into account.

If this option is selected, the contents of the attribute comments are changed or deleted during a replacement and update. The attribute properties, not the attribute comment properties, are taken into account.

If this option is not selected, the properties of the attribute comments such as **Manual Entry** are taken into account. Existing comments are not generally changed or deleted during a replacement and update.

On creating a new database, the following option is set by default: **Show comments for attributes in dialogs and attribute list**

💡 As of this version of Engineering Base, the key **AttributesWithComments** under **Database Settings**/**Custom Settings** is no longer available.

Should existing databases use the key **AttributesWithComments**, the two options are automatically selected during a database update to ensure compatibility with the previous updating behavior of the database.

7.4 Database Manager - Central Procedure for Database Optimization

As of this version of Engineering Base, the Database Manager has a central procedure "spMT_Optimize" (StoredProcedure). This procedure combines the functions to optimize a database.

- The individual functions can be executed via call parameters.
- The SQL Server statistics concerning the table contents of a database can be updated.
- Logging is available for the last performed action.

This procedure can also be called via SQL Server Maintenance Job.

7.5 Property "Released" for Attributes

As of this version of Engineering Base, you can write-protect the contents of specific attributes with the "Released" property set. This write-protection can then only be removed by specific users and user groups. That way, the attribute contents are protected from any changes via the "Released" property. The entry fields of the attributes that have been write-protected via "Released" are highlighted in EB in a dark yellow.

Right-click the required attribute field, then select **Properties** on the shortcut menu. This opens the **Properties** dialog.
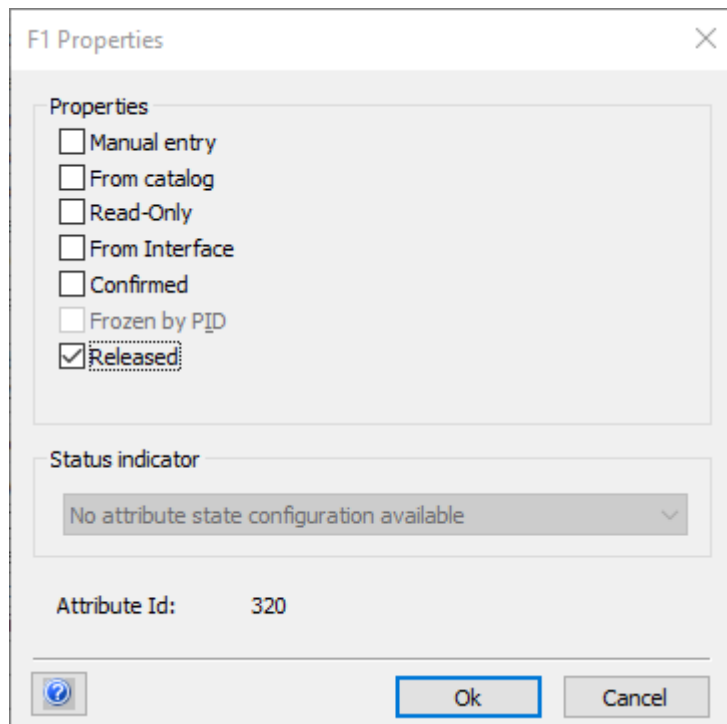
The following rules apply:

- By default, the status is not set in copies of an object. The status is only maintained on copying a project.
- The property can be deactivated depending on the user rights.
- If attribute comments are activated, you can additionally use the "Released" property for the comments.