TEKLA
A TRIMBLE COMPANY

Tekla Structures

Custom Components Guide

Product version 21.0
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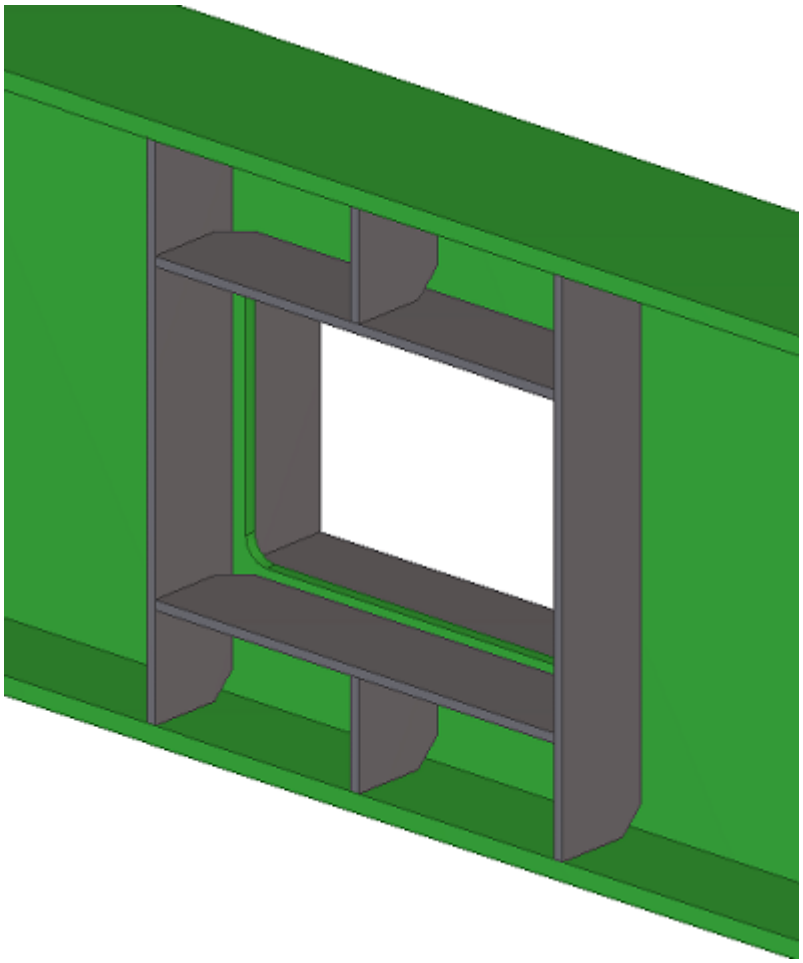
Contents

1 What is a custom component

Tekla Structures contains a set of tools for defining connections, parts, seams and details, called *custom components*. You can create your own custom components.Tekla Structures creates a dialog box for the custom component and you can customize the dialog box to suit your needs.

You can then use custom components in the same way as any Tekla Structures system component.



You can also modify custom components in the custom component editor to create intelligent custom components that automatically adjust to changes in the model.

See also Creating custom components on page 7

Custom component editor on page 19

2 Creating custom components

This section explains how to create custom components and add them to a model.

Click the links below to find out more:

2.1 About creating custom components

You can build custom components either by exploding and modifying an existing component, or by creating the component objects manually.

You then create a custom component by selecting the objects to include in the custom component and specifying the information the user needs to input, for example, main part, secondary parts, or points the user needs to pick. You can add the custom component in a similar location in the model where the custom component was originally created.

To create an intelligent custom component that automatically adjusts to changes in the model, you need to modify your custom component in the custom component editor.

See also

Creating custom components on page 7

Creating a custom component on page 9

Adding a custom component to a model on page 15

Custom component editor on page 19

2.2 Exploding components

When you explode a component, the objects in the component will be separated. You can then remove and modify parts and other objects in the component and use them for creating a custom component.

To explode a component:

1. Click **Detailing** --> **Component** --> **Explode component** .
2. Select the component to explode.

   Tekla Structures separates the objects in the component.

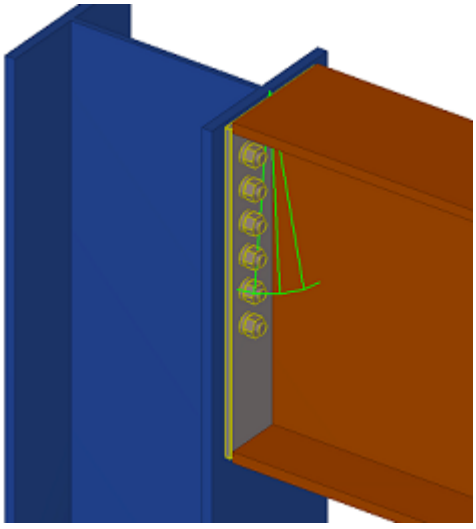
   You can now remove and modify the objects separately.

See also Creating custom components on page 7

Example: Exploding an end plate component on page 8

2.3 Example: Exploding an end plate component

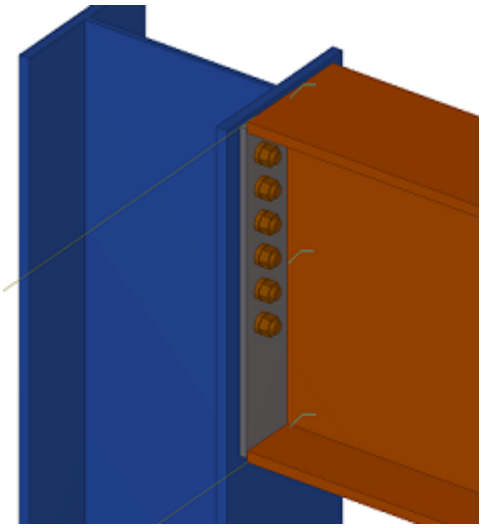
In this example, you will explode an existing end plate component.



To explode an end plate component:

1. Click **Detailing** --> **Component** --> **Explode component** .
2. Select the end plate component.

Tekla Structures separates the objects in the component.



You can now modify the properties of the objects as required. Then you can create a custom connection that is made of the modified end plate component objects.

See also Creating custom components on page 7

Exploding components on page 8

2.4 Creating a custom component

Before you can create a custom component, you need to create a sample component in the model containing all the necessary component objects, such as parts, cuts, fittings, bolts, and so on.

To quickly create a custom component, explode a similar existing component, then change the component objects to suit your needs.

To create a custom component:

1. Click **Detailing** --> **Component** --> **Define Custom Component...** to open the **Custom Component Wizard**.
2. On the **Types/Notes** tab, select the component type in the **Type** list.
3. Enter a **Name** for the component.
4. If needed, modify other properties as required.

   For example, you can define the position of a custom connection relative to the main part.
5. Click **Next**.

6. Select the objects that you want to include in the custom component.
7. Click **Next**.
8. Follow the instructions in the **Custom Component Wizard** to finish creating the custom component.

   The custom component is added to the **Component Catalog**.

See also

Creating custom components on page 7

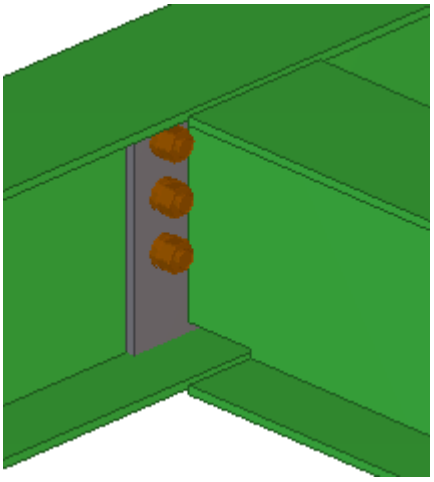
Custom component types on page 10

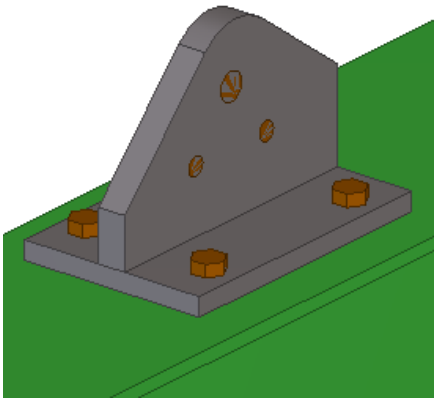
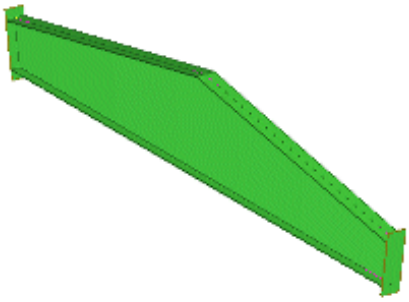
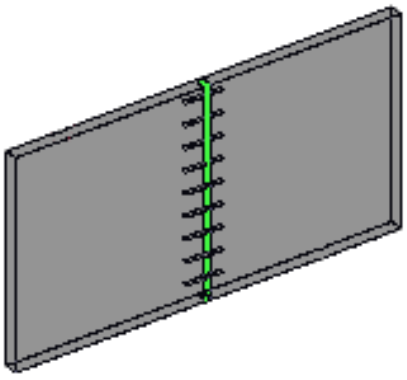
Example: Creating an end plate connection on page 12

Custom Component Wizard properties on page 69

2.5 Custom component types

You can create four types of custom components.

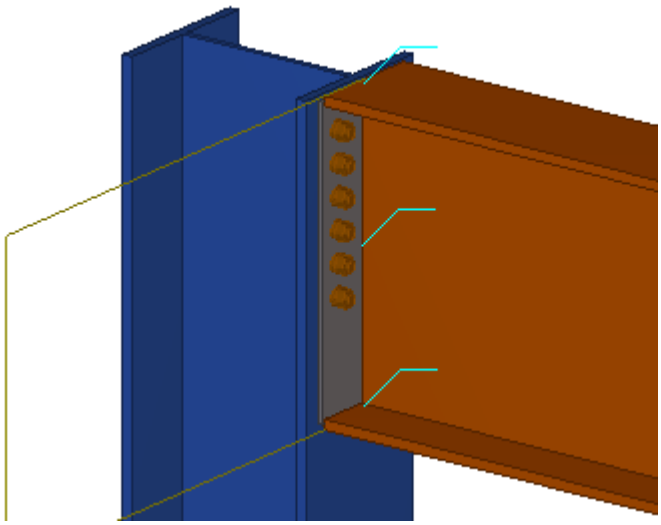
Type	Description	Examples
Connection	Creates connection objects and connects end(s) of secondary part(s) to a main part. The main part may be continuous at the connection point. Component symbol is green. 	End plate and base connections 

Type	Description	Examples
Detail	Creates detail objects and connects them to a single part at a picked location. Component symbol is green. 	Stiffeners, holes, studs, cleats and lifting brackets 
Part	Creates a group of objects that may contain connections and details. Does not get a component symbol.	Built-up beams, frames and sandwich panels 
Seam	Creates seam objects and connects parts along a line picked with two points. The parts are usually parallel. Component symbol is green. 	Panel-to-panel seams 

See also Creating custom components on page 7

2.6 Example: Creating an end plate connection

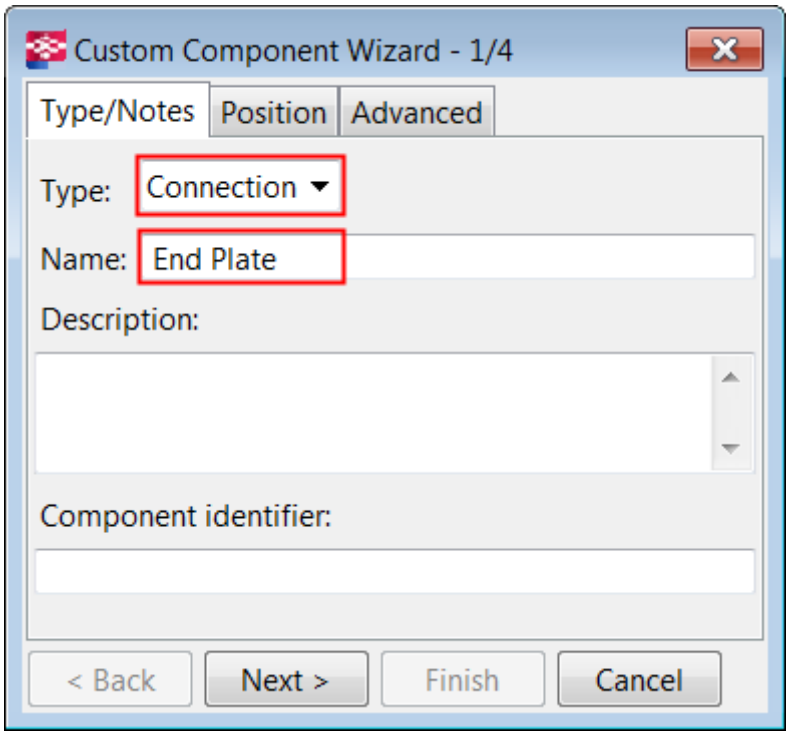
In this example, you will create a custom component based on an existing end plate component that we have exploded.



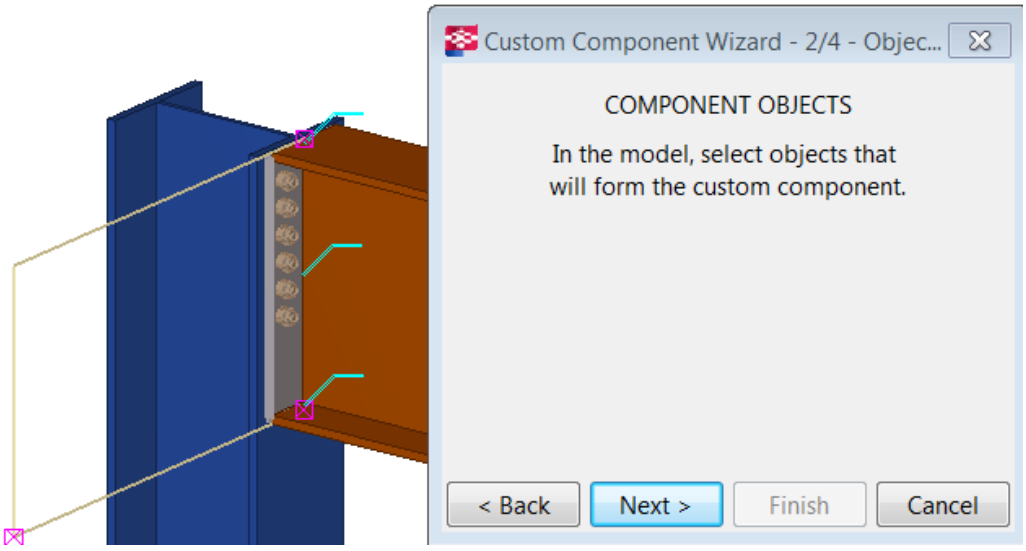
To explode a component, select the component, right-click and select **Explode Component** from the pop-up menu.

To create an end plate connection:

1. Click **Detailing** --> **Component** --> **Define Custom Component...** to open the **Custom Component Wizard**.
2. On the **Type/Notes** tab, set **Type** to **Connection**.
3. Enter a **Name** for the custom component.



4. Click **Next**.
5. Select the objects to use in the custom component.



Use area selection (left to right) to select the objects.

Tekla Structures ignores the main part, secondary parts, grids and component symbols when you are selecting objects to include in the custom component.

6. Click **Next**.

7. Select the column as the main part.

   The main part supports the secondary part.

8. Click **Next**.

9. Select the beam as the secondary part.

   The secondary part is supported by the main part.

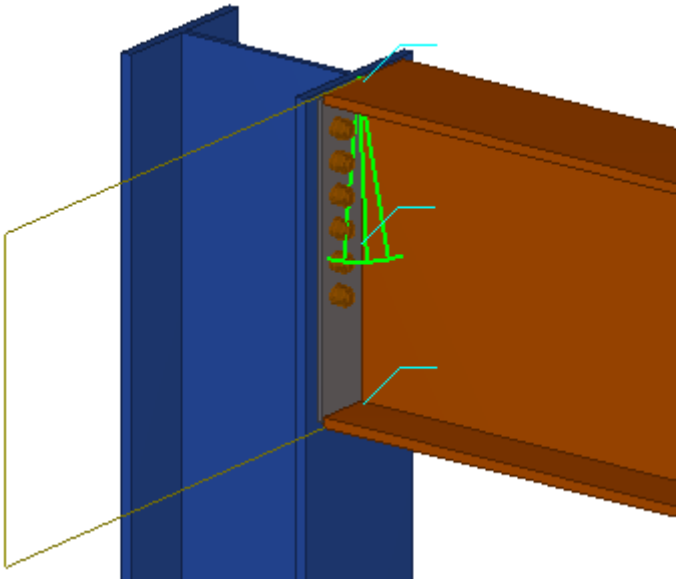
   When you select multiple secondary parts, pay attention to the order of selection. The custom component will use the same selection order when you add the component in a model.

   The maximum number of secondary parts in a custom component is 30.

   ---

10. Click **Finish**.

    Tekla Structures displays a component symbol for the new component.



You have now defined a simple custom component, which you can use in locations similar to where it was originally created. This component is not intelligent and Tekla Structures does not adjust dimensions to suit any changes in the model. To make the custom component intelligent, you need to modify it in the custom component editor.

See also Creating custom components on page 7

Creating a custom component on page 9

Exploding components on page 8

Custom component editor on page 19

2.7 Adding a custom component to a model

To add a custom component to a model:

1. Press **Ctrl+F** to open the **Component Catalog**.
2. Select **Custom** in the list to view all custom components in the **Component Catalog**.
3. Select the custom component you want to add.
4. Follow the instructions on the status bar to add the custom component in the model.
5. If needed, double-click the custom component in the model to modify its properties.

See also Creating custom components on page 7

Adding a custom part to a model and moving it using direct modification on page 15

2.8 Example: Adding an end plate connection to a model

In this example, you will add a previously created end plate connection to a model. Because you have not modified the end plate connection to adapt to different situations in the model, you need to add the custom connection to the similar location where the connection was created. Otherwise the end plate connection may not work as required.

To add the end plate connection to a model:

1. Press **Ctrl + F** to open the **Component Catalog**.
2. Select **Custom** in the list to view custom components.
3. Select the **End Plate** custom connection.

   Tekla Structures displays instructions on the status bar.
4. Select the column as the main part.
5. Select the beam as the secondary part.

   Tekla Structures adds the end plate connection to the model.

See also Creating custom components on page 7

Example: Creating an end plate connection on page 12

Adding a custom component to a model on page 15

2.9 Adding a custom part to a model and moving it using direct modification

You can use direct modification when you add custom parts to Tekla Structures models. You can use direct modification also when you modify the location and rotation of the existing custom parts in the model.

Limitations:

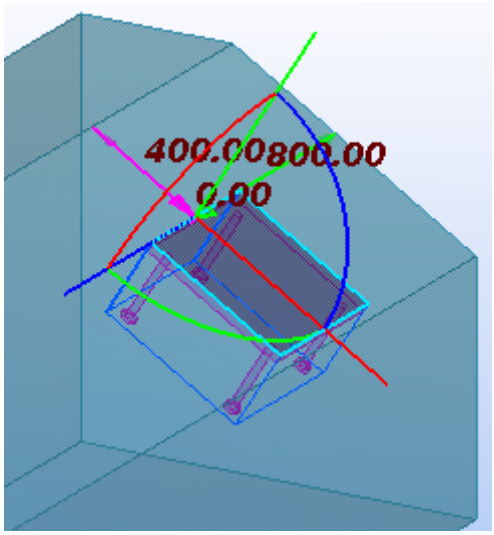
- Direct modification cannot be used to add custom parts to surfaces that have cuts or edge chamfers. You need to hide the cutting parts and edge chamfer objects from the view before you add custom parts on cut or chamfered surfaces using direct modification.
- We do not recommend using direct modification with custom parts that are parametric and in which the input points define the dimensions of the custom part. The preview is simplified, based on the default custom part dimensions, and snapping has a different focus than usually.

To add a custom part to a model using direct modification:

1. Ensure that the **Direct modification** switch  is active.
2. Press **Ctrl+F** to open the **Component Catalog**.
3. Select **Custom** in the list to view all custom components in the **Component Catalog**.
4. Select the custom part you want to add.
5. Move the mouse pointer over part faces and edges in the model, and see how the custom part turns over and adjusts to the part faces.

   If you are adding a custom part to another part, Tekla Structures shows location dimensions from the first input point of the custom part to the nearest part faces.
6. If you are adding a custom part that has only one input point, you can rotate the custom part in 90-degree steps around the work plane y axis by pressing **Tab**.
7. Depending on the number of the custom part input points, pick one or two points to place the custom part in the model.

Tekla Structures shows coordinate axes, rotation handles, and location dimensions that you can use to fine-tune the location and rotation of the custom part.



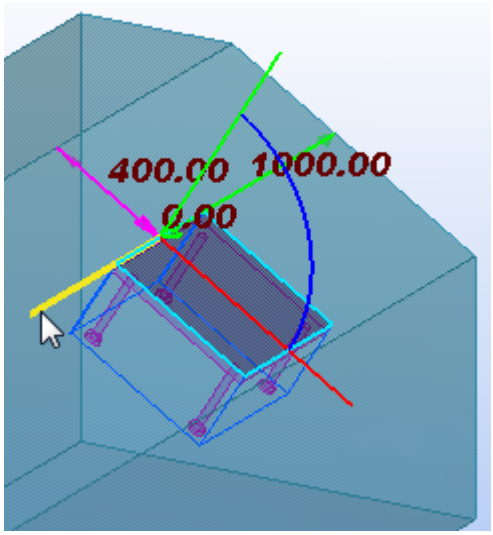
8. If needed, modify the location and rotation of the custom part.

   Do any of the following:

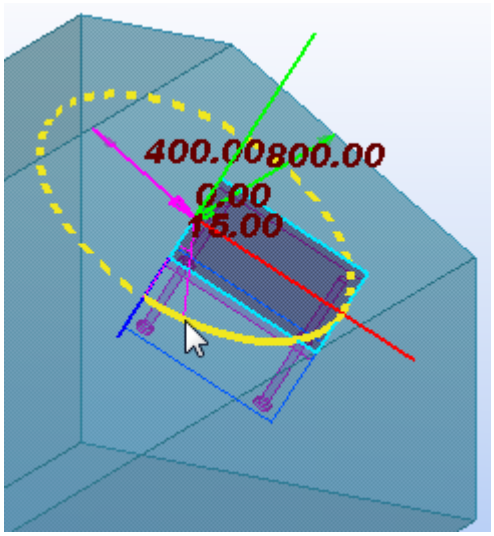
   - When you drag a handle, hold down the **Shift** key to use the snap switches.

     By default, the snap switches are off to make it easier to drag the handle to any location.

   - To move the custom part along any of its coordinate axes, drag the relevant axis handle to a new location.

   - To rotate the custom part around any of its coordinate axes, drag the relevant rotation handle to a new location.



You can also press **Tab** to rotate the custom part in 90-degree steps in the direction of the selected rotation handle.

- To change a location dimension, drag the relevant dimension arrowhead to a new location.
- To move or rotate the custom part by specifying a distance or angle:
  1. Select an axis handle, a rotation handle, or a dimension arrowhead.
  2. Using the keyboard, enter the value with which you want the dimension to change.

     To start with the negative sign (-), use the numeric keypad.

     To enter an absolute value for the dimension, first enter $, then the value.
  3. Press **Enter**, or click **OK** in the **Enter a Numeric Location** dialog box.

9. Click the middle mouse button to confirm the location and rotation, and to add the custom part to the model.
10. If you want to modify an existing custom part in a model:
    a. Ensure that the **Select components** selection switch  is active.
    b. Select the custom part.
    c. Follow the instructions in step 8.
    d. To stop modifying, press **Esc**, or right-click and select **Interrup** from the pop-up menu.

See also Creating custom components on page 7

3 Custom component editor

This section explains what the custom component editor is.

Click the links below to find out more:

3.1 About custom component editor

To make a simple custom component intelligent so that it adapts to changes in the model, you must modify it in the custom component editor. In the custom component editor you can build dependencies between component objects and model objects. For example, you can specify that the size of a stiffener depends on the size of the beam. If you change the size of the beam, the size of the stiffener also changes. You can also add distance variables, for example, to specify the gap between a plate and a beam.

You can modify only the component objects, not the main or secondary parts, in the custom component editor.

See also Custom component editor on page 19

3.2 Opening the custom component editor

Open the custom component editor to modify custom components and create intelligent custom components that adjust to changes in the model.

To open the custom component editor:

1. Click **Detailing** --> **Component** --> **Edit Custom Component** .
2. Select the custom component you want to modify.

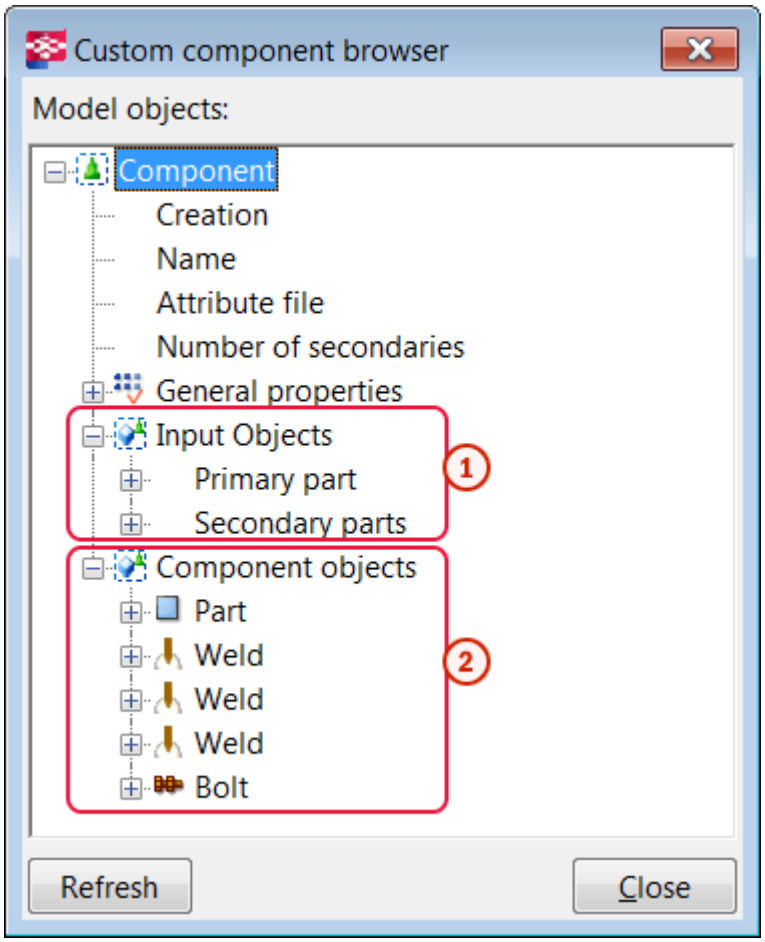
Custom parts do not have a component symbol. To select custom parts, ensure that the **Select components** switch  is active.

The custom component editor opens showing the **Custom component editor** toolbar, **Custom component browser** and four views of the custom component.

See also Custom component editor on page 19

3.3 Custom component browser

The **Custom component browser** shows the contents of a custom component in a hierarchical, tree-like structure.



1 Objects that the custom component is attached to

2 Objects that the custom component creates

The **Custom component browser** works with the custom component editor views. When you select an object in the **Custom component browser**, Tekla Structures highlights the object in the views. Select an object in a custom component editor view and Tekla Structures highlight the object in the **Custom component browser**.

See also Custom component editor on page 19

3.4 Modifying custom component settings

You can modify the following custom component settings after you have created a custom component:

- change the description
- modify the position settings

- allow multiple instances of connection between parts

To change the settings of a custom component:

1. In the custom component editor, click the **Modify custom component settings** button  .
2. Modify the settings in the **Custom component settings** dialog box as required.
3. Click **OK**.

See also Custom component editor on page 19

Type/Notes tab properties on page 69

Position tab properties on page 70

Advanced tab properties on page 70

3.5 Saving a custom component

When you have modified a custom component in the custom component editor, you can save the changes to all copies of the custom component in the model, or save the component with a new name.

To save a custom component, do one of the following:

To	Do this
Save changes in all copies of the custom component	1. Click the **Save component** button  in the custom component editor. 2. Click **Yes** in the **Save confirmation** dialog box.
Save the component with a new name	1. Click the **Save with new name** button  in the custom component editor. 2. Enter a new name for the component.

See also Custom component editor on page 19

3.6 Closing the custom component editor

To close the custom component editor:

1. Click the **Close** button  .

   The **Close custom component editor** message opens.

2. Do one of the following:

   - Click **Yes** to save the changes in the custom component. Tekla Structures applies the changes to all copies of custom component in the model.
   - Click **No** to close the custom component editor without saving the changes.

See also Custom component editor on page 19

4 Variables in custom components

This section explains what variables are and how they are created in the custom component editor.

Click the links below to find out more:

4.1 About variables

Variables are properties of a custom component. You can create variables in the custom component editor, and use them to adapt custom components to changes in your models. Some of the variables appear in the custom component dialog box, others are hidden and are only used in calculations.

There are two types of variables:

- Distance variables
- Parametric variables

A *distance variable* is the distance between two planes, or between a point and a plane. A distance variable binds parts together, or works as a variable reference distance.

A *parametric variable* controls all other properties in a custom component, such as name, material grade and bolt size. Parametric variables are also used in calculations.

See also Variables in custom components on page 24

Distance variables on page 25

Parametric variables on page 31

Variables properties on page 82

Functions in variable formulas on page 86

4.2 Viewing variables

To view the variables:

1. Click the **Display variables** button  on the **Custom component editor** toolbar.

   The **Variables** dialog box opens.

   As the **Component parameters** category is active by default, the dialog box displays all variables in the custom component that you are modifying.

2. If you want to see variables in the current model, such as bindings between a part's end point and a grid plane, select the **Model parameters** category on the left of the dialog box.

See also Variables in custom components on page 24

4.3 Distance variables

Use distance variables to bind objects to planes so that the custom component can adapt to changes in the model, such as different main profile shapes and sizes.

You can bind the following objects to a plane:

- construction plane
- reference points of parts (only custom component objects)
- reference points of bolt groups
- chamfers
- part and polygon cut handles
- line cuts
- reference points of reinforcing bars
- reference points of reinforcement meshes and strands
- fittings

Distance variables can be shown or hidden in the custom component dialog box. Show distance variables when you want to be able to change distance values in the custom component dialog box. Hide distance variables when you only bind objects to plane.

You can create distance variables manually or automatically.

See also

Variables in custom components on page 24

Creating a distance variable manually on page 26

Testing a distance variable on page 27

Example: Creating a distance variable to bind an end plate on page 28

Creating distance variables automatically on page 30

Deleting a distance variable on page 31

Hiding variables in a custom component dialog box on page 55

Creating a distance variable manually

Before you start, ensure that part representation is set to rendered. You can select part surfaces and available planes only in rendered views.

To create a distance variable:

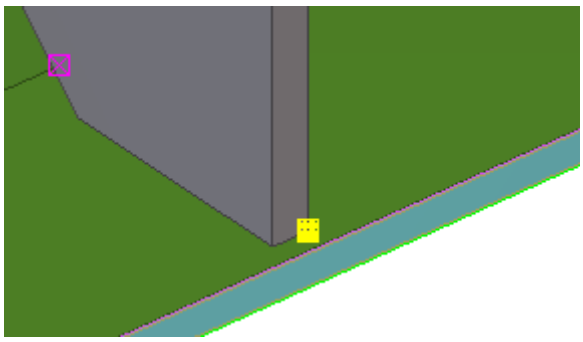
1. Select the reference points that you want to bind to a plane.

   Hold down the **Alt** key and use area selection (from left to right) to select multiple reference points.

2. Do one of the following::

   - Click the **Add fixed distance** button  on the **Custom component editor** toolbar.
   - Right-click a reference point and select **Bind to Plane** on the menu.

3. Move the pointer in a custom component editor view to highlight the plane that you want to bind with the reference points.



If you cannot highlight the correct plane, change the plane type on the **Custom component editor** toolbar.

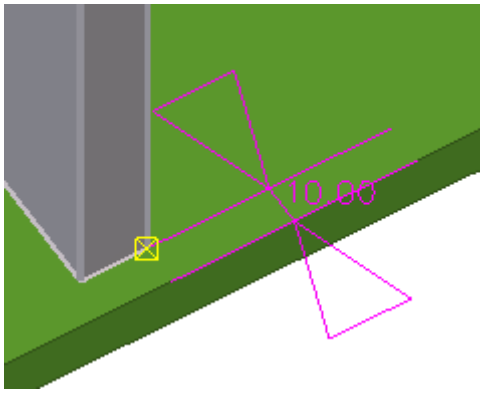
Boundary and component planes work for most profile types, so try to use them whenever you can.

Hide parts and their reference lines if they are obscuring the required plane:

Hold down the **Shift** key, select the part, right-click and select **Hide** in the list.

4. Click the plane to create the distance variable.

   Tekla Structures adds the distance variable in the **Variables** dialog box and displays a distance symbol in the custom component editor views.



You can bind one object to a maximum of three planes.

See also Distance variables on page 25

Plane types on page 77

Example: Creating a distance variable to bind an end plate on page 28

Testing a distance variable

Test the distance variable you created to see changes in the custom component.

To test a distance variable:

1. Double-click the distance symbol in a custom component editor view.

   The **Distance Properties** dialog box opens.

2. Change **Value**.
3. Click **Modify** to see the changes.

You can also test a distance variable in the **Variables** dialog box by changing the **Formula** for the distance variable.

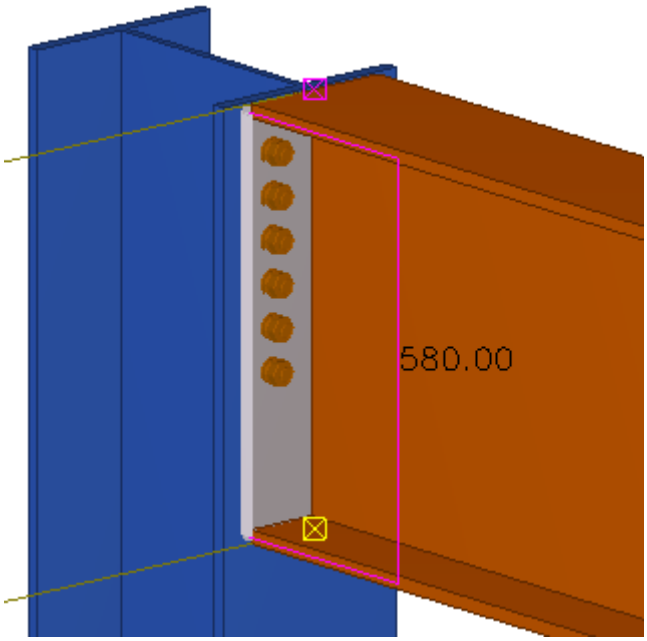
See also Distance variables on page 25

Example: Creating a distance variable to bind an end plate

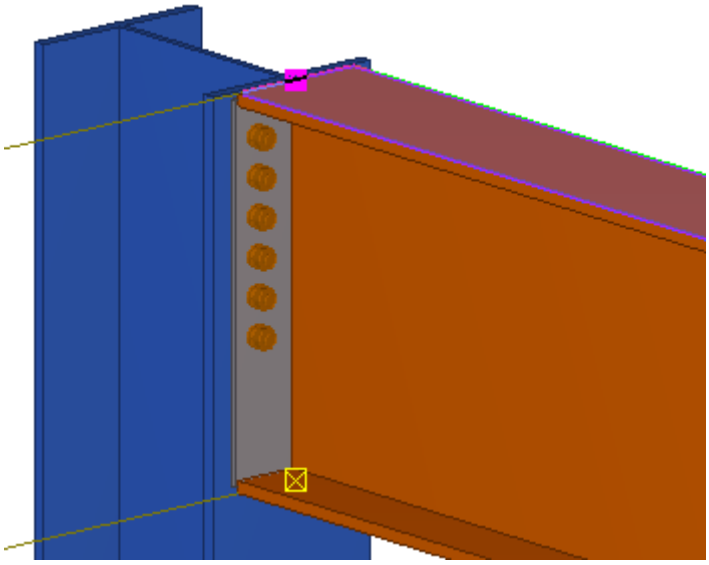
In this example, you will bind the end plate top to the upper side of the beam.

To bind the end plate top to the upper side of the beam:

1. Select the end plate in a custom component editor view to see the end plate handles.



2. Select the top handle of the end plate.
3. Right-click and select **Bind to Plane** on the menu.
4. Move the pointer over the upper side of the beam flange to highlight it.

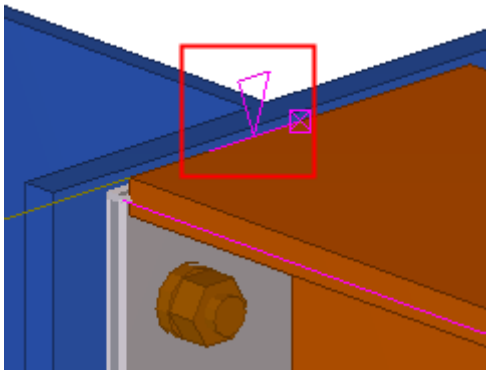


If you cannot highlight the desired plane, change the plane type on the **Custom component editor** toolbar.

Here you use the boundary plane type. If the part profile changes, the boundary plane is always found.

5. Click the upper side of the beam flange.

   A distance symbol appears in the custom component editor views.



6. If needed, give a descriptive name for the distance variable:

   a. Open the **Variables** dialog box.

b. Change **Label in dialog box** to `Plate Top to Flange Top` for the new distance variable.

If you now change the beam profile, the end plate top follows the upper side of the beam flange due to the binding.

See also Distance variables on page 25

Plane types on page 77

Automatic distance variables

You can create distance variable automatically between the picked objects and the main and the secondary parts of a connection or a detail. Picked objects, or their reference points or handles, are bound to existing planes if the objects, or their reference points or handles, are located exactly on the plane. Tekla Structures creates distance variables from a maximum of three directions to existing planes. Tekla Structures selects planes in the following order:

1. Construction planes
2. Custom components
3. Plane types

See also Distance variables on page 25

Creating distance variables automatically on page 30

Construction planes in custom components on page 35

Plane types on page 77

Creating distance variables automatically

To create distance variables automatically:

1. Click the **Create distances variables automatically** button  on the **Custom component editor** toolbar.
2. Pick an object that has handles.
3. Click the middle mouse button to create distance variables.
4. Check the created variables.

   You can see the distance variables in the **Variables** dialog box and in the custom component editor views.

Limitations You cannot create distance variables automatically for custom parts since they do not have a main part.

See also Distance variables on page 25

Automatic distance variables on page 30

Deleting a distance variable

You cannot change an existing distance binding. You need to delete the existing distance variable and then create a new distance variable to rebind.

To delete a distance variable:

1. Select the distance variable in a custom component editor view.
2. Press **Delete**.

You can also delete variables in the **Variables** dialog box by selecting the variable and clicking the **Delete** button.

See also Distance variables on page 25

4.4 Parametric variables

There are two basic ways to use parametric variables:

- Link parametric variables to properties of custom component objects to change the properties in the custom component dialog box. For example, you can change the object's name, material and profile.
- Use parametric variables for calculating values. For example, you can calculate the position of a stiffener relative to the beam length.

You can decide which parametric variables are shown in the custom component dialog box. Hide the parametric variables that you use only in calculations and show the variables that you can use for changing the properties of the custom component.

See also Variables in custom components on page 24

Creating and linking a parametric variable on page 31

Example: Creating a parametric variable to set end plate material on page 32

Hiding variables in a custom component dialog box on page 55

Creating and linking a parametric variable

To create and link a parametric variable:

1. Open the **Variables** dialog box in the custom component editor.
2. Click the **Add** button.

   A new parametric variable appears in the dialog box.
3. Change **Value type** for the new variable to match the property you want to link.

   For example, change **Value type** to **Material** if you link the parametric variable to the material property of the object.
4. Browse for the object property in the **Custom component browser** as required.

To find the required object more easily in the **Custom component browser**, select the object in a custom component editor view to highlight the object in the **Custom component browser**.

5. Right-click the property and select **Add Equation**.
6. Enter **Name** of the parametric variable after the equal sign.

   The parametric variable is now linked to the object property. To test the parametric variable, change **Value** of the variable.

See also Variables in custom components on page 24

Parametric variables on page 31

Example: Creating a parametric variable to set end plate material on page 32

Example: Creating a parametric variable to set end plate material

In this example, you will create a parametric variable and link it to the end plate material.

To create a parametric variable to set the end plate material:

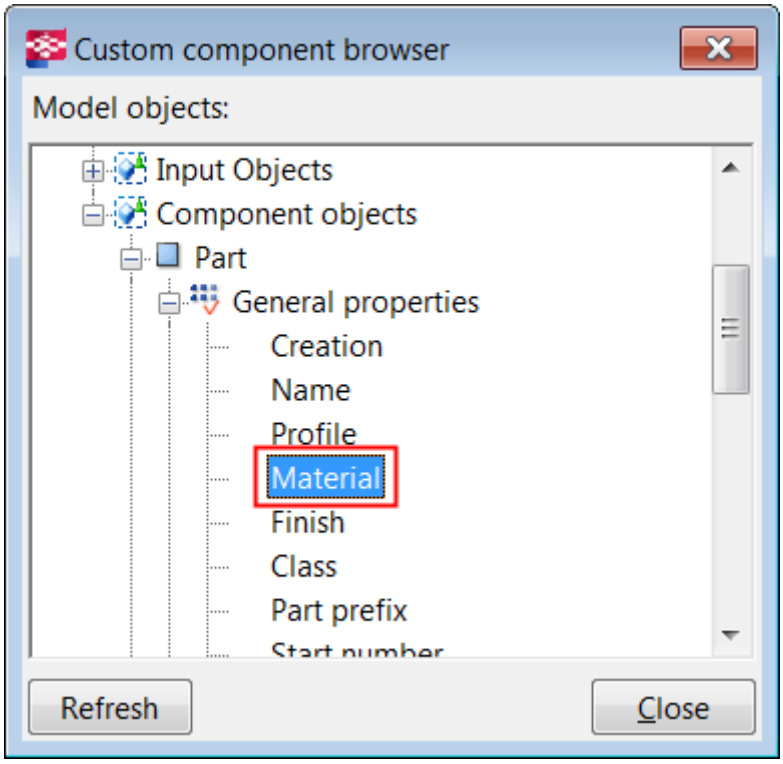
1. Open the **Variables** dialog box in the custom component editor.
2. Click the **Add** button.

   A new parametric variable appears.
3. Change **Value type** for the new variable to **Material**.
4. Enter `End Plate Material` in **Label in dialog box**.

Name	Formula	Value	Value type	Variable type	Visibility	Label in dialog box
P1	0.00	0.00	Material	Parameter	Show	End Plate Material

5. Open the **Custom component browser** in the custom component editor.

6. Select the end plate in a custom component editor view to highlight the end plate in the **Custom component browser**.
7. Browse for the end plate material in the **Custom component browser**.



8. Right-click **Material** and select **Add Equation**.
9. Enter `P1` after the equal sign and press **Enter**.

   You have now linked parametric variable **P1** to the end plate material.

You can now change the end plate material in the custom component dialog box.

See also Variables in custom components on page 24

Parametric variables on page 31

Creating and linking a parametric variable on page 31

4.5 Reference distance variables

Use reference distances variables to measure the distance between two points or a point and a plane. You can then use the reference distance variable in calculations, for example, to determine the spacing of rungs on a ladder.

A reference distance variable changes as you move the objects it refers to. You cannot move objects by changing their reference distance variables.

See also Variables in custom components on page 24

Creating a reference distance variable on page 34

Creating a reference distance variable

To create a reference distance variable:

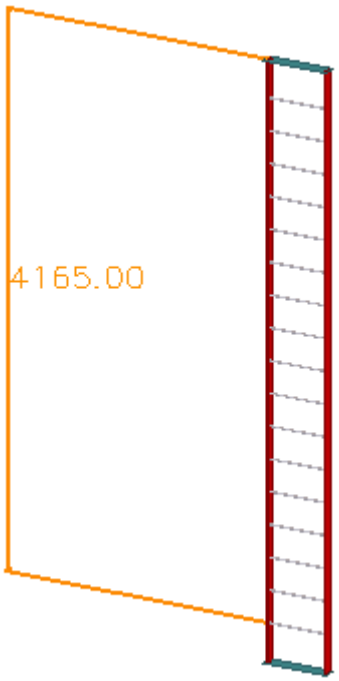
1. Select the reference point that you want to bind to a plane.
2. Click the **Add reference distance** button  on the **Custom component editor** toolbar.
3. Move the pointer in a custom component editor view to highlight the plane that you want to bind with the reference point.

   If you cannot highlight the correct plane, change the plane type on the **Custom component editor** toolbar.

4. Click the plane to create the reference distance variable.

   Tekla Structures adds the reference distance variable in the **Variables** dialog box and displays the reference distance with orange color in the custom component editor views.



See also Variables in custom components on page 24

Reference distance variables on page 33

4.6 Property references

You can copy property references of main and secondary parts and use them to determine the properties of custom components. The property references are dynamic. If a property later changes the reference reflects the change. For example, you can use a beam length reference in variable calculations. If the length changes, the correct value is automatically used in the calculations.

See also Variables in custom components on page 24

Copying a property reference on page 35

Copying a property reference

To copy a reference property:

1. Browse for the object property in the **Custom component browser** as required.

   To find the required object more easily in the **Custom component browser**, select the object in a custom component editor view to highlight the object in the **Custom component browser**.

2. Right-click the property.
3. Select **Copy Reference** in the list.
4. Paste and use the reference as required.

   You can paste the reference to **Formula** of a variable in the **Variables** dialog box to use it in calculation or paste the reference to a custom component object property.

See also Property references on page 35

Example: Determining the number of bolt rows on page 42

4.7 Construction planes in custom components

You may occasionally need to create your own planes and use them to bind and move groups of objects.

See also Variables in custom components on page 24

Creating a construction plane in the custom component editor on page 36

Creating a construction plane in the custom component editor

To create a construction plane:

1. Click the **Add construction plane** button  on the **Custom component editor** toolbar.
2. Pick four points in a custom component editor view.
3. Click the middle mouse button.

   Tekla Structures draws the construction plane.

See also Variables in custom components on page 24

Construction planes in custom components on page 35

Example: Using construction planes for determining the stiffener position on page 43

5 Examples of modifying custom components

This section presents examples on how to modify custom components to make them adapt to changes in models. The examples are independent from each other.

Click the links below to find out more:

5.1 Example: Adding an option to create an object

In this example, you will add an option to select whether or not to create an object in a custom component.

To add an option to create an object in a custom component:

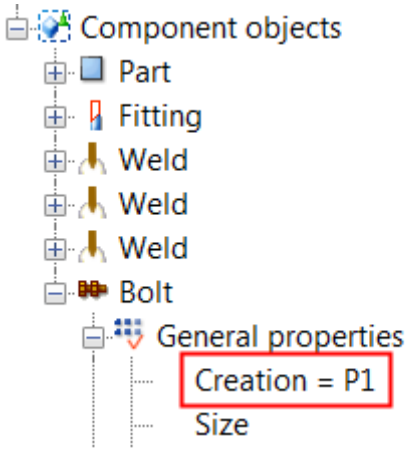
1. Open the **Variables** dialog box in the custom component editor.
2. Create a new parametric variable.
3. Modify the parametric variable.

- Change **Value type** to **Yes/No**.
- Enter a name in **Label in dialog box**.

  Tekla Structures displays the label in the custom component dialog box.

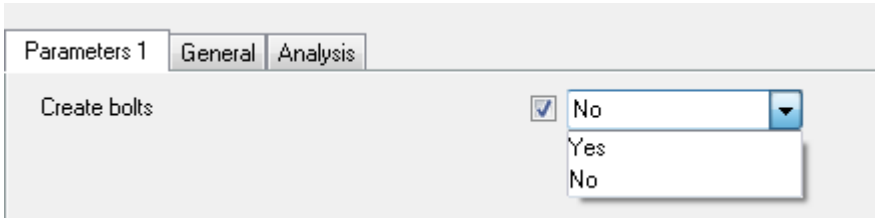
Name	Formula	Value	Value type	Variable type	Visibility	Label in dialog box
P1	0	0	Yes/No	Parameter	Show	Create bolts

4. Open the **Custom component browser** in the custom component editor.
5. Browse for the object in the **Custom component browser**.
6. Link the **Creation** property to the parametric variable.



7. Save the custom component.
8. Close the custom component editor.

You now have the option in the custom component dialog box to create the object.



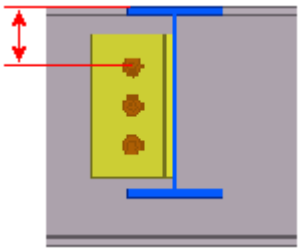
See also Examples of modifying custom components on page 37

Creating and linking a parametric variable on page 31

Variables properties on page 82

5.2 Example: Determining the bolt group distance from the beam flange

In this example, you will determine the bolt group distance from the beam flange.

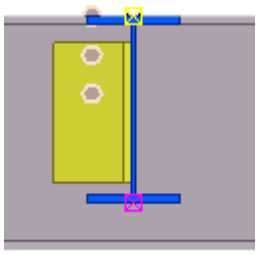


To determine the bolt group distance from the beam flange:

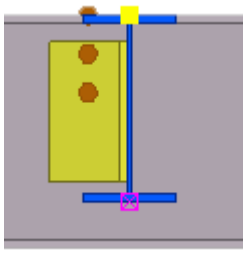
1. Modify the properties of the bolt group.
   a. Double-click the bolt group in the custom component editor.

      The **Bolt Properties** dialog box opens.
   b. Clear all values under the **Offset from** area in the **Bolt Properties** dialog box.
   c. Click **Modify**.

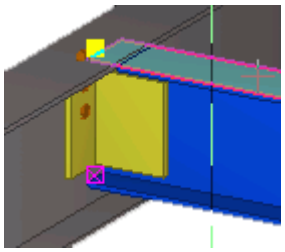
      The bolt group moves to the same level with the start point handle of the bolt group.



2. Bind the bolt group to the beam flange.
   a. Select the bolt group in the custom component editor.
   b. Select the (yellow) top handle.



   c. Right-click and select **Bind to plane** in the list.
   d. Select the top flange of the beam.



A new distance variable appears in the **Variables** dialog box.

3. Open the **Variables** dialog box in the custom component editor.
4. Create a new parametric variable.
5. Modify the parametric variable.
   a. Enter a distance value in **Formula**.
   b. Enter `Vertical distance to bolt` in **Label in dialog box**.
6. Enter `=-P1` in **Formula** to for the distance variable.

Name	Formula	Value	Value type	Variable type	Visibility	Label in dialog box
D1	=-P1	-75.00	Length	Distance	Hide	D1.BOLT.BEAM
P1	75.00	75.00	Length	Parameter	Show	Vertical distance to bolt

7. Save the custom component.
8. Close the custom component editor.

You can now determine the bolt group distance from the beam flange by changing the **Vertical distance to bolt** value in the custom component dialog box.

See also

Examples of modifying custom components on page 37

Creating a distance variable manually on page 26

Creating and linking a parametric variable on page 31

Variables properties on page 82

5.3 Example: Determining the bolt size and bolt standard

In this example, you will create two parametric variables to determine bolt size and bolt standard.

To determine the bolt size and bolt standard:

1. Open the **Variables** dialog box in the custom component editor.
2. Create two new parametric variables.
3. Modify the first parametric variable.

- Change **Value type** to **Bolt size**.

  Tekla Structures automatically adds the suffix `_diameter` to the name of the variables. Do not delete the suffix.

- Enter `Bolt Size` in **Label in dialog box**.

4. Modify the second parametric variable.

   a. Change **Value type** to **Bolt standard**.

   Tekla Structures automatically adds the suffix `_screwdin` to the name of the variable. Do not delete the suffix.

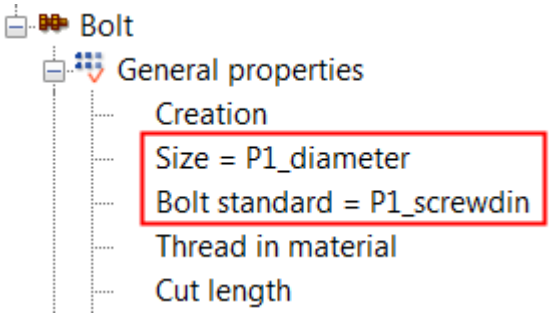
   b. Change the prefix in **Name** of the second variable so that the prefixes for the two variables are same.

Name	Formula	Value	Value type	Variable type	Visibility
P1_diameter	0.00	0.00	Bolt size	Parameter	Show
P1_screwdin	0.00	0.00	Bolt standard	Parameter	Show

The bolt size and bolt standard variables must always have the same prefix, otherwise they do not work.

   c. Enter `Bolt Standard` in **Label in dialog box**.

5. Open the **Custom component browser** in the custom component editor.
6. Link the parametric variables to the bolt group properties in the **Custom component browser**.
   - Link **P1_diameter** to the **Size** property.
   - Link **P1_screwdin** to the **Bolt standard** property.



7. Save the custom component.
8. Close the custom component editor.

You can now determine the bolt size and bolt standard for the custom component in the custom component dialog box.

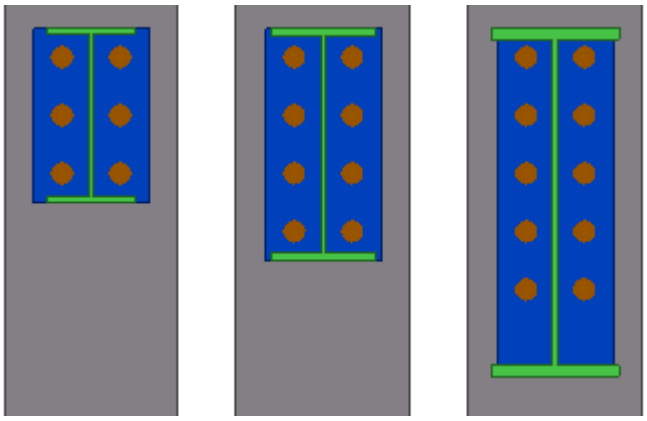
See also Examples of modifying custom components on page 37

Creating and linking a parametric variable on page 31

Variables properties on page 82

5.4 Example: Determining the number of bolt rows

In this example, you will determine the number of bolt rows based on the beam height. You will use `if` statements in calculations.



To determine the number of bolt rows:

1. Open the **Variables** dialog box in the custom component editor.
2. Create a new parametric variable.
3. Change **Value type** to **Number** for the variable.
4. Browse for **Height** of the beam in the **Custom component browser**.
5. Right-click **Height** and select **Copy Reference** in the list.
6. Enter the following `if` statement in **Formula** of the parametric variable:

   ```
   =if (fP(Height,"ID50B8559A-0000-00FD-3133-353432363133")<
   301) then 2 else (if
   (fP(Height,"ID50B8559A-0000-00FD-3133-353432363133")>501)
   then 4 else 3 endif) endif
   ```

   `fP(Height,"ID50B8559A-0000-00FD-3133-353432363133")` is the beam height reference copied from the **Custom component browser**.

   The variable gets its value in the following way:

   - If the beam height is under 301 mm, the value is 2.
   - If the beam height is over 501 mm, the value is 4.
   - If the beam height is between 300 and 500 mm, the value is 3.
7. Create a new parametric variable.
8. Change **Value type** of the new variable to **Distance list**.

9. Enter `=P1+"*"+100` in **Formula** of the new variable.

   In the formula, 100 is the bolt spacing and the P1 value is the number of bolt rows.

Name	Formula	Value	Value type
P1	=if (fP(Height,"ID50B8559A-0000 ...	2	Number
P2	=P1+"*"+100	2*100.00	Distance list

10. Browse for **Bolt group distance x** in **Custom component browser**.
11. Link variable **P2** to **Bolt group distance x**.
12. Save the custom component.
13. Close the custom component editor.

When you now change the beam height, the number of bolt rows also changes.

See also Examples of modifying custom components on page 37

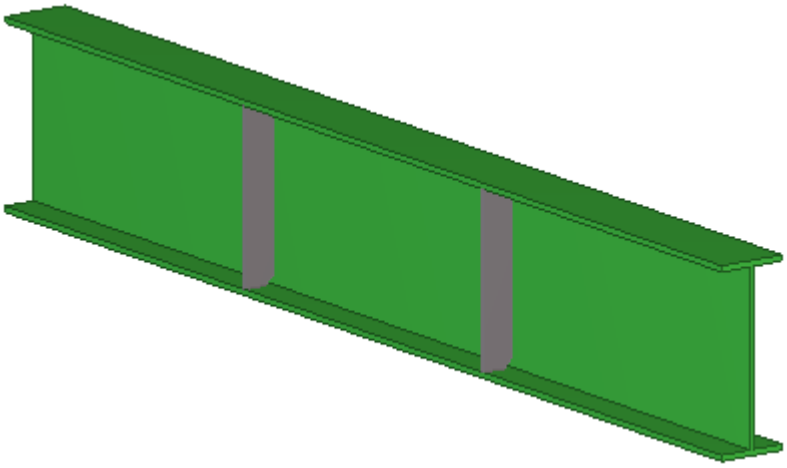
Creating and linking a parametric variable on page 31

Property references on page 35

Variables properties on page 82

5.5 Example: Using construction planes for determining the stiffener position

In this example, you will use construction planes for determining the position of the stiffeners. You will position the stiffeners so that they divide the beam into three equally long sections.



To position the stiffeners using the construction planes:

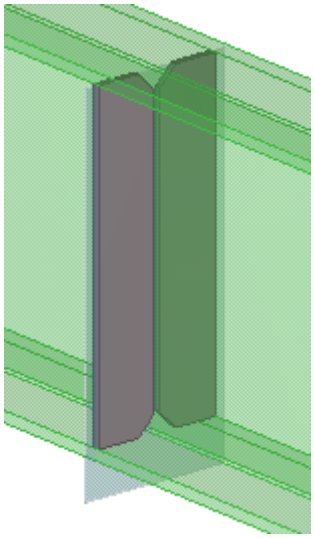
1. Open the **Variables** dialog box in the custom component editor.

2. Create a new parametric variable.
3. Get the GUID of the beam.
   a. Click **Tools** --> **Inquire** --> **Object** .
   b. Select the beam.

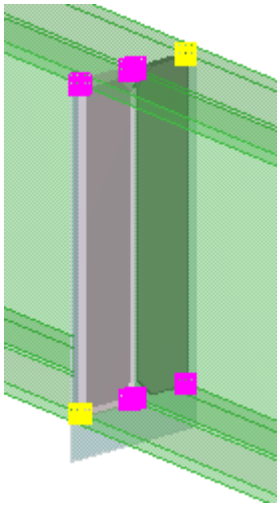
      The **Inquire Object** dialog box opens.
   c. Check the GUID of the beam in the **Inquire Object** dialog box.
4. Modify the parametric variable.
   - Enter `=fTpl("LENGTH","ID4C8B5E24-0000-017D-3132-383432313432")` in **Formula**.

     `ID4C8B5E24-0000-017D-3132-383432313432` is the GUID of the beam.

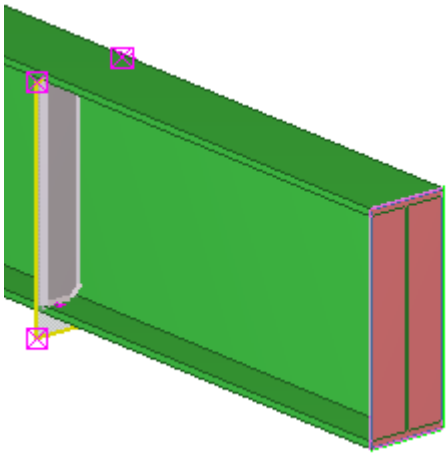
     The value of the variable is now the same as the beam length. If you change the beam length, the value also changes.
   - Enter `Beam Length` in **Label in dialog box**.
5. Create a new parametric variable.
6. Modify the new parametric variable.
   - Enter `=P1/3` in **Formula**.
   - Enter `3rd Points` in **Label in dialog box**.
7. Create a construction plane.
   a. Click the **Add construction plane** button  on the **Custom component editor** toolbar.
   b. Pick the points and then click the middle mouse button to create a construction plane in the center of a stiffener at one end.



8. Bind the stiffener to the construction plane.
   a. Select the stiffener.
   b. Hold down **Alt** and use area selection (from left to right) to select all stiffener handles.



   c. Right-click and select **Bind to plane**.
   d. Bind the stiffener handles to the construction plane.
9. Bind the construction plane to the beam end.
   a. Select the construction plane.
   b. Right-click and select **Bind to plane**.
   c. Bind the construction plane to the beam end.



10. Repeat steps 7 to 9 for the stiffener at the other end.
11. Change **Formula** to `=P2` for the two distance variables that bind the construction planes to the beam ends.
12. Save the custom component.

13. Close the custom component editor.

When you change the beam length, the position of the stiffeners changes so that the stiffeners divide the beam into three equally long sections.

See also

Examples of modifying custom components on page 37

Creating and linking a parametric variable on page 31

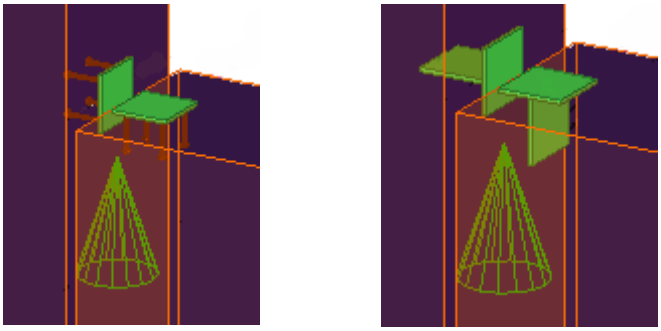
Creating a construction plane in the custom component editor on page 36

Creating a distance variable manually on page 26

Variables properties on page 82

5.6 Example: Replacing sub-components

In this example, you will add an option in the custom component dialog box to replace sub-components with other sub-components.



To replace sub-components in a custom component:

1. Open the **Variables** dialog box in the custom component editor.
2. Create a new parametric variable.
3. Modify the parametric variable.
   a. Change **Value type** to **Component name**.

      Tekla Structures automatically adds the suffix `_name` in the variable name.

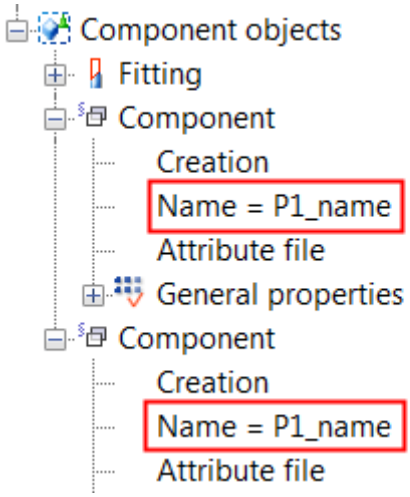
      Do not delete the suffix.

   b. Enter the name of the sub-components in **Formula**.

   c. Enter a descriptive name in **Label in dialog box**.

Name	Formula	Value	Value type	Variable type	Visibility	Label in dialog box
P1_name	castin1	castin1	Component name	Parameter	Show	Cast-in plate

4. Link **P1_name** to the **Name** properties of both sub-components.
   a. Open the **Custom component browser** in the custom component editor.
   b. Browse for the **Name** attribute of a sub-component.
   c. Right-click **Name** and select **Add Equation**.
   d. Enter `P1_name` after the equals sign.
   e. Repeat steps 4b to 4d for the other sub-component.



5. Save the custom component.
6. Close the custom component editor.

You can now change the sub-components using the **Cast-in-plate** option in the custom component dialog box.

See also Examples of modifying custom components on page 37

Creating and linking a parametric variable on page 31

Variables properties on page 82

5.7 Example: Using properties files to modify a sub-component

In this example, you will add an option to use properties files to modify a sub-component in a custom component.

To use properties files to modify a sub-component:

1. Open the **Variables** dialog box in the custom component editor.
2. Create a new parametric variable.
3. Modify the parametric variable.

a. Change **Value type** to **Component attribute file**.

   Tekla Structures automatically adds the suffix `_attrfile` in the variable name. Do not delete the suffix.

b. Enter the name of a properties file in **Formula**.

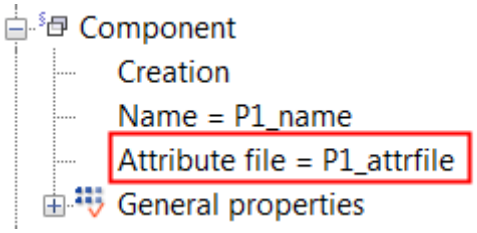
c. Change **Name** of the new variable so that the prefix matches with the variable linked to the component name.

The component name and component attribute file variables must always have the same prefix, otherwise they do not work.

d. Enter a descriptive name in **Label in dialog box**.

Name	Formula	Value	Value type	Variable type	Visibility	Label in dialog box
P1_name	castin1	castin1	Component name	Parameter	Show	Cast-in plate
P1_attrfile	prop1	prop1	Component attribute file	Parameter	Show	Properties file

4. Open the **Custom component browser** in the custom component editor.
5. Link **P1_attrfile** to the **Attribute file** property of the sub-component.



6. Save the custom component.
7. Close the custom component editor.

You can now modify the sub-component using the **Properties file** option in the custom component dialog box.

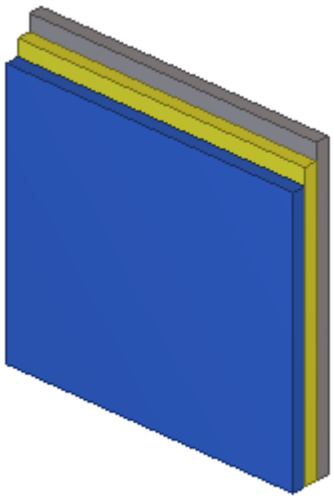
See also Examples of modifying custom components on page 37

Creating and linking a parametric variable on page 31

Variables properties on page 82

5.8 Example: Using user-defined attributes in custom components

In this example, you will link parametric variables to user-defined attributes of the panels. You can then use the user-defined attributes in view filters to show or hide the panels.



To use user-defined attributes in a custom component:

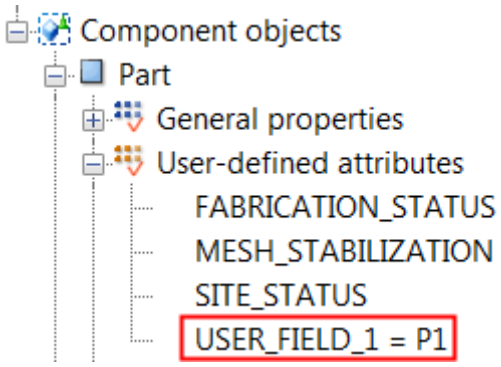
1. Open the **Variables** dialog box in the custom component editor.
2. Create a new parametric variable.
3. Modify the parametric variable.
   - Change **Value type** to **Text**.
   - Enter `Type1` in **Formula**.
   - Enter `Panel1` in **Label in dialog box**.
4. Open the **Custom component browser** in the custom component editor.
5. Browse for **User-defined attributes** of the first panel.

   You will link **P1** to the **USER_FIELD_1** attribute. However, the attribute is not visible in the **Custom component browser**.
6. Make the user-defined attribute visible in the **Custom component browser**.
   a. Double-click first of the panels.

      The panel properties dialog box opens.
   b. Click **User-defined attributes...**.

      The dialog box for user-defined attributes opens.
   c. Go to the **Parameters** tab.
   d. Enter text in the **User field 1** box.
   e. Click **Modify**.
7. Click **Refresh** in the **Custom component browser**.

   USER_FIELD_1 appears under **User-defined attributes** in the **Custom component browser**.
8. Link **P1** to **USER_FIELD_1**.



9. Create two new parametric variables and link them to the user-defined attributes of the other two panels.
10. Save the custom component.
11. Close the custom component editor.

You can now create a view filter and hide or show panels using the **User field 1** attribute and the **Formula** values you entered for the parametric variables in the filter.

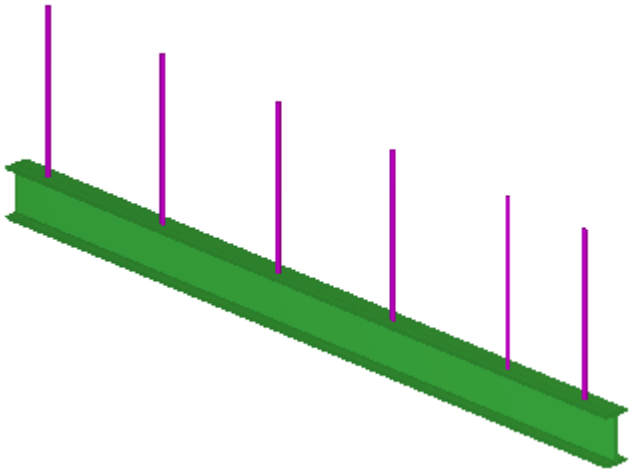
See also Examples of modifying custom components on page 37

Creating and linking a parametric variable on page 31

Variables properties on page 82

5.9 Example: Determining the number of handrail posts using a template attribute

In this example, you will use a template attribute to determine the number of handrail posts based on the beam length. The handrail posts were created at both ends of the beam and one of them was copied with the **Array of objects (29)** component.



To determine the number of handrail posts:

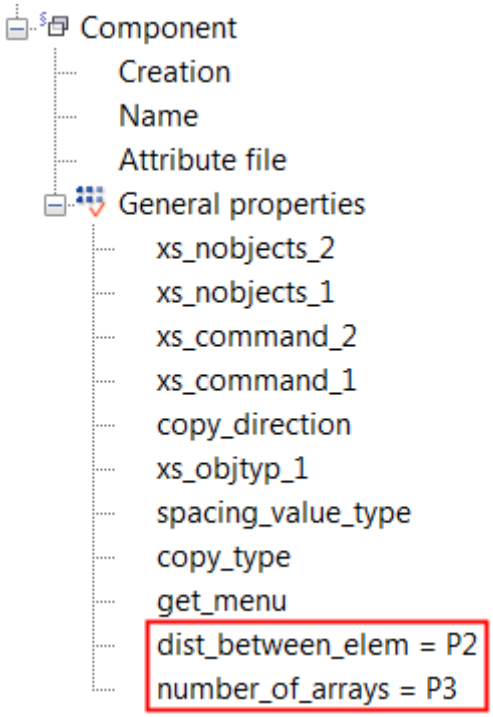
1. Open the **Variables** dialog box in the custom component editor.
2. Create three new parametric variables.
3. Modify parametric variable **P1**.
   - Enter `250` in **Formula**.
   - Enter `End Distance` in **Label in dialog box**.
4. Modify parametric variable **P2**.
   - Enter `900` in **Formula**.
   - Enter `Spacing` in **Label in dialog box**.
5. Modify parametric variable **P3**.
   - Change **Value type** to **Number**.
   - Enter `Number of Posts` in **Label in dialog box**.
6. Inquire the GUID of the beam.
   a. Click **Tools** --> **Inquire** --> **Objects** .
   b. Select the beam.

      The **Inquire Object** dialog box opens.
   c. Check the GUID of the beam in the **Inquire Object** dialog box.
7. Change **Formula** of **P3** to
   `=(fTpl("LENGTH","ID50B8559A-0000-010B-3133-353432373038")-(P1*2))/P2`.

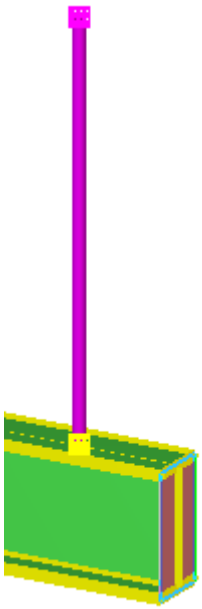
`fTpl("LENGTH","ID50B8559A-0000-010B-3133-353432373038")` is the length template attribute of the beam and `ID50B8559A-0000-010B-3133-353432373038` is the GUID of the beam.

The number of the posts is calculated as follows: first the end distances are subtracted from the beam length and the result is divided by the post spacing.

8. Open the **Custom component browser** in the custom component editor.
9. Link parametric variable **P2** and **P3** to the properties of **Array of objects (29)**.



10. Bind the first post to the beam end.
    a. Select the post in the custom component editor view.
    b. Hold down **Alt** and use area selection (from left to right) to select the post handles.
    c. Right-click and select **Bind to Plane**.
    d. Bind the handles to the beam end.



11. Bind the last post to the other beam end following the instructions in step 10.
12. Modify all distance variables.
    - Change **Formula** to `=P1`.
    - Change **Visibility** to **Hide**.

Name	Formula	Value	Value type	Variable type	Visibility	Label in dialog box
P1	250.00	250.00	Length	Parameter	Show	End Distance
P2	900.00	900.00	Length	Parameter	Show	Spacing
P3	=(fTpl(...	4	Number	Parameter	Show	Number of Posts
D1	=P1	250.00	Length	Distance	Hide	D1.COLUMN.BEAM
D2	=P1	250.00	Length	Distance	Hide	D2.COLUMN.BEAM
D3	=P1	250.00	Length	Distance	Hide	D3.COLUMN.BEAM
D4	=P1	250.00	Length	Distance	Hide	D4.COLUMN.BEAM

13. Save the custom component.
14. Close the custom component editor.

You can now change the spacing and the end distance of the handrail posts in the custom component dialog box. Tekla Structures calculates the number of posts based on the spacing, end distance and the length of the beam.

See also

Examples of modifying custom components on page 37

Creating and linking a parametric variable on page 31

Creating a distance variable manually on page 26

Variables properties on page 82

5.10 Example: Using Excel spreadsheets with custom components

In this example, you will link an Excel spreadsheet to a custom component. For example, you can use Excel spreadsheets to check connections.

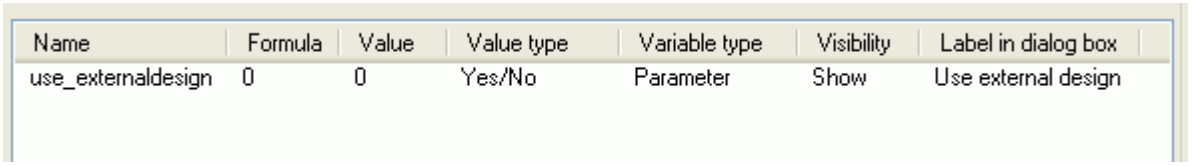
The name of the spreadsheet file must be `component_"component_name".xls`. For example, `component_stiffener.xls` for a custom component named stiffener.

Tekla Structures searches for the spreadsheets in the following locations:

- In the model folder: `..\<model>\exceldesign\`
- In the folder defined with the `XS_EXTERNAL_EXCEL_DESIGN_PATH` advanced option.

To use Excel spreadsheets with custom components:

1. Open the **Variables** dialog box in the custom component editor.
2. Create a new parametric variable.
3. Modify the parametric variable.
   a. Change **Value type** to **Yes/No**.
   b. Enter `use_externaldesign` in **Name**.
   c. Enter `Use external design` in **Label in dialog box**.



Name	Formula	Value	Value type	Variable type	Visibility	Label in dialog box
use_externaldesign	0	0	Yes/No	Parameter	Show	Use external design

4. Save the custom component.
5. Close the custom component editor.

The custom component dialog box now contains the **Use external design** option.

See also Examples of modifying custom components on page 37

Creating and linking a parametric variable on page 31

Variables properties on page 82

6 Modifying the custom component dialog box

This section explains how to modify the custom component dialog box. For example, you can decide which variables are visible in the dialog box, and you can add images, tabs and lists to the dialog box.

Click the links below to find out more:

- Hiding variables in a custom component dialog box on page 55
- Custom component dialog box file on page 55
- Custom Component Dialog Editor on page 56

6.1 Hiding variables in a custom component dialog box

By default, Tekla Structures displays distance variables whose value is more than zero and parametric variables in the custom component dialog box. You can hide the variables if required.

To hide a variable in a custom component dialog box:

1. Open the **Variables** dialog box in the custom component editor.
2. Change **Visibility** of the variable to **Hide**.
3. Save the custom component.
4. Close the custom component editor.

See also Modifying the custom component dialog box on page 55

Viewing variables on page 25

6.2 Custom component dialog box file

When you create a new custom component, Tekla Structures automatically creates the input file that defines the custom component dialog box. The input file is located in the `CustomComponentDialogFiles` folder under the model folder. The input file has the same name as the custom component and the file name extension is `.inp`.

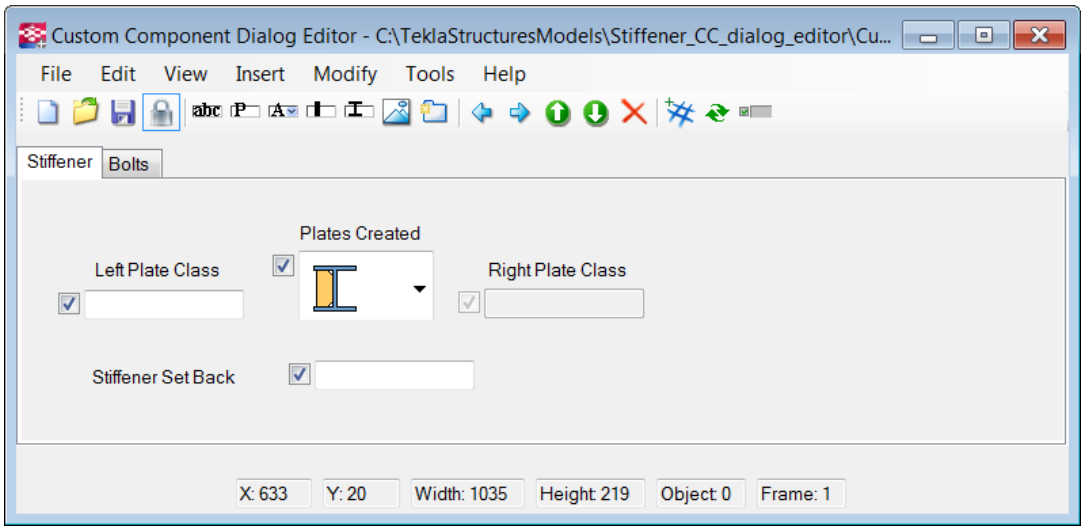
When you modify a custom component, Tekla Structures automatically creates a backup file of the input file. The backup file has the extension `.inp_bak`, and it is located in the `CustomComponentDialogFiles` folder under the model folder. Tekla Structures displays a notification when the backup file is created.

See also Opening a custom component dialog box file in Custom Component Dialog Editor on page 57

Preventing modifications of the custom component dialog box on page 63

6.3 Custom Component Dialog Editor

Custom Component Dialog Editor is a tool for editing your custom component dialog box. You can use **Custom Component Dialog Editor** for adding and arranging dialog box items, such as images, tabs and lists.



See also Opening a custom component dialog box file in Custom Component Dialog Editor on page 57

Moving items in a custom component dialog box on page 57

Adding an image in a custom component dialog box on page 57

Adding and renaming a tab in a custom component dialog box on page 58

Example: Modifying the dialog box of a stiffener detail on page 58

Setting the options for Custom Component Dialog Editor

To set the options for **Custom Component Dialog Editor**:

1. Click **Tools** --> **Options** .
2. Define the options as needed.

   By default, the image folder is `..\ProgramData\TeklaStructures\<version>\Bitmaps`. You can revert to the default folder by clicking **Default**.
3. Click **Apply** and **OK**.

Opening a custom component dialog box file in Custom Component Dialog Editor

To open a custom component dialog box file in **Custom Component Dialog Editor**:

1. Click **Detailing** --> **Component** --> **Edit Custom Component Dialog Box** .
2. Select the custom component in the model.

   The custom component dialog box file opens in **Custom Component Dialog Editor**.

You can also right-click a custom component in the model or in the **Component Catalog** and select **Edit Custom Component Dialog Box** from the pop-up menu to open the custom component dialog file for editing.

See also Custom component dialog box file on page 55

Moving items in a custom component dialog box

To move an item in the custom component dialog box, drag the item to the new position.

You can select multiple items by holding down the **Ctrl** key and clicking the items, or by using area selection. You can then drag all the items at once.

You can also use the copy, cut and paste commands. For example, to move items to another tab, select the items, press **Ctrl + X**, go to another tab and press **Ctrl + V**.

Adding an image in a custom component dialog box

You can add images in a custom component dialog box to make your custom component easier to use.

To add an image in a custom component dialog box:

1. Click **Insert** --> **Picture** .

   The **Open** dialog box opens. It shows the contents of the folder that is set to **Image Folder** in **Options**.

   Store all your custom component dialog box images to the image folder.

2. Select the image.

   The image must be in the bitmap (`.bmp`) format.

3. Click **Open**.

4. Drag the image to the correct position.

Adding and renaming a tab in a custom component dialog box

To add and rename a tab in a custom component dialog box:

1. Click **Insert** --> **Tab Page** .

2. Double-click the new tab.

3. Enter a new name and press **Enter**.

Example: Modifying the dialog box of a stiffener detail

This example shows how to modify the dialog box of a stiffener detail in **Custom Component Dialog Editor** to make it easier to adjust the stiffener in the model. The workflow consists of three tasks:

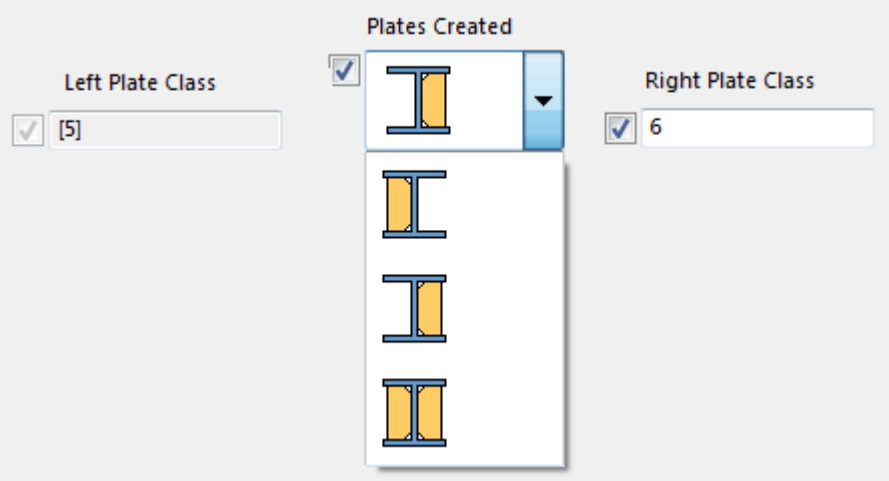
1. Example: Adding a list with images in a stiffener dialog box on page 59

2. Example: Arranging text boxes and labels in a stiffener dialog box on page 61

3. Example: Dimming unavailable options in a stiffener dialog box on page 62

After completing the tasks, you will have the following improvements in the stiffener dialog box:

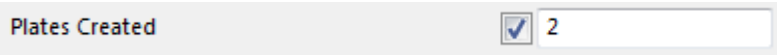
- Creation of stiffener plate is controlled using a list with images.
- Unavailable options are dimmed.
- The list, text boxes and labels are arranged nicely.



Example: Adding a list with images in a stiffener dialog box

Start by adding a list with images in the stiffener dialog box. This task is phase 1 in the workflow Example: Modifying the dialog box of a stiffener detail on page 58.

The dialog box of the stiffener has the text box shown below. The user needs to know the values (0 is left, 1 is right and 2 is both plates) that control the creation of stiffener plates. You will replace the text box with a list that is easier to use.

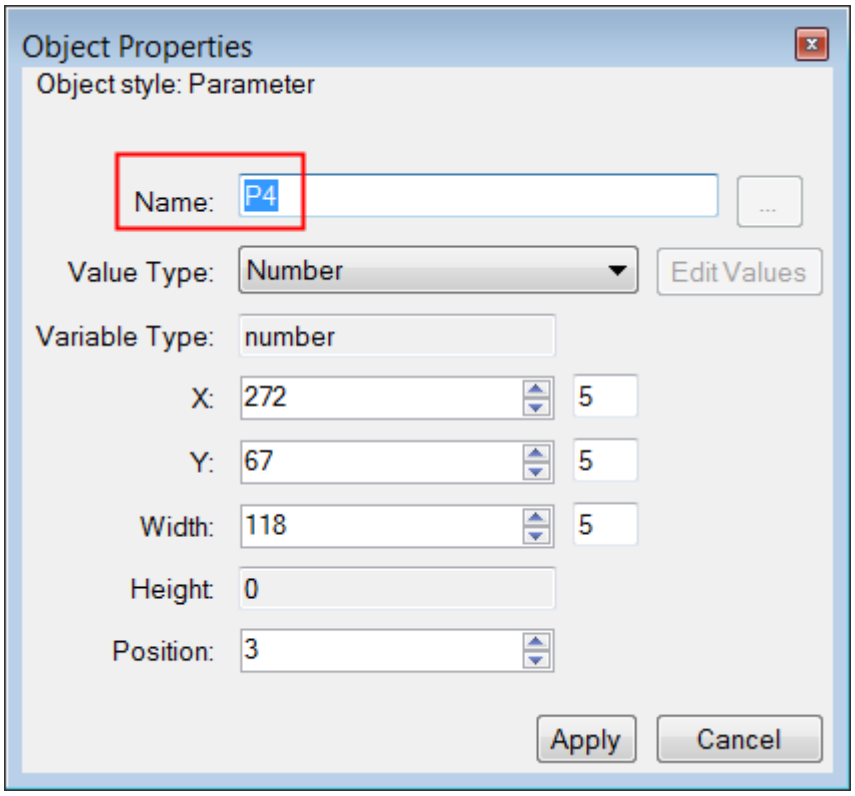


To replace the text box with a list in the dialog box:

1. Check the name of the parametric variable that controls the plate creation.
   a. Double-click the **Plates Created** text box in **Custom Component Dialog Editor**.

      The **Object Properties** dialog box opens.

   b. Check **Name** of the parametric variable in the **Object Properties** dialog box.



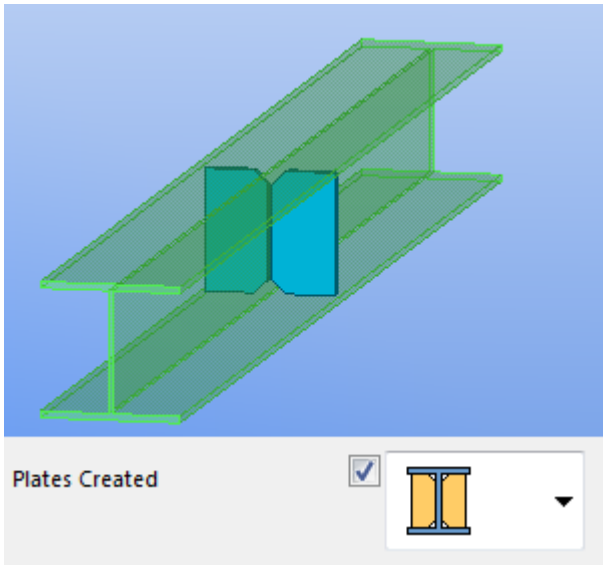
2. Select the text box and press **Delete**.
3. Add a new attribute (list).
   a. Click **Insert** --> **Attribute**.
   b. Drag the attribute to a suitable location.
4. Double-click the new attribute to edit its properties.
5. Enter `P4` as **Name** for the attribute.

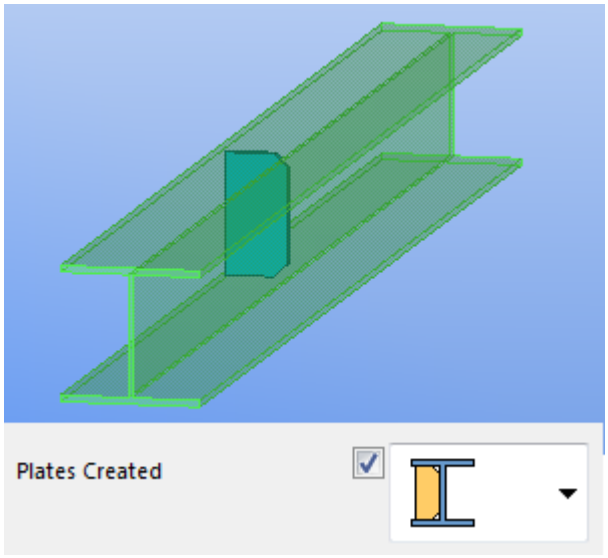
   Now the attribute is linked to the parametric variable that controls the plate creation.
6. Click **Edit Values** to add the list items.
7. Add the image for the left plate.
   a. Click **Browse Add...**.
   b. Browse to the correct folder.
   c. Select a suitable image.
   d. Click **Open**.
8. Add the image for right plate and then for both plates in the same way as for the left plate.
9. In the **Edit Attribute Values** dialog box, select the image of both plates and then click **Default** to make the attribute the default value.

CC_Left.xbm
CC_Right.xbm
CC_Both.xbm (def...

10. Click **OK**.
11. Click **Apply** in the **Object Properties** dialog box.
12. Save changes in **Custom Component Dialog Editor**.

Now you can select the plates that you want to create more easily.





Example: Arranging text boxes and labels in a stiffener dialog box

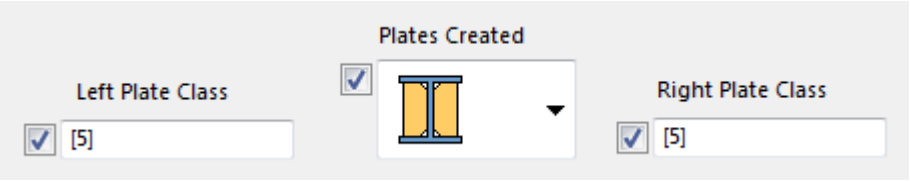
After adding the list in the stiffener dialog box, you can arrange the text boxes and labels around the list in the dialog box. This task is phase 2 in the workflow Example: Modifying the dialog box of a stiffener detail on page 58.

The dialog box looks like the following before the text boxes and labels are arranged:

To arrange the text boxes and labels in the stiffener dialog box:

1. Drag the text box that controls the left plate class to the left side of the list.
2. Drag the **Left Plate Class** label above the corresponding text box.
3. Drag the text box that controls the right plate class to the right side of the list.
4. Drag the **Right Plate Class** label above the corresponding text box.
5. Drag the list label above the list.
6. Save the changes.

Now the list, text boxes and labels are arranged nicely.



See also Moving items in a custom component dialog box on page 57

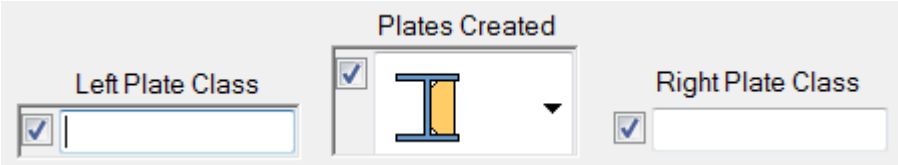
Example: Dimming unavailable options in a stiffener dialog box

After arranging the text boxes and labels, dim the unavailable options in the stiffener dialog box. This task is phase 3 in the workflow Example: Modifying the dialog box of a stiffener detail on page 58.

To dim the unavailable options:

1. Dim the **Left Plate Class** text box, when only the right stiffener plate is created in the model.
   a. Select the image for the right plate in the **Plates Created** list.

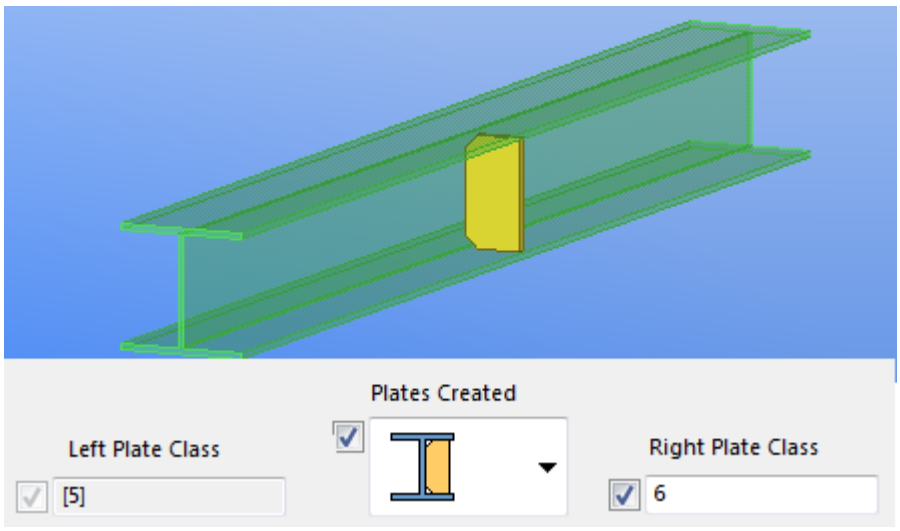
b. Hold down the **Ctrl** key and select the **Left Plate Class** text box.



c. Click the **Toggle Visibility** button.

2. Deselect all dialog box objects.
3. Dim the **Right Plate Class** text box, when only the left stiffener plate is created in the model.
   a. Select the image for the left plate in the **Plates Created** list.
   b. Hold down the **Ctrl** key and select the **Right Plate Class** text box.
   c. Click the **Toggle Visibility** button.
4. Save the changes.

Now the **Left Plate Class** text box is not available when only the right plate is created and vice versa.



Preventing modifications of the custom component dialog box

You can lock the dialog box file (`.inp`) to prevent accidental modifications. If the file is not locked, and someone else updates the custom component in the custom component editor, all your modifications to the dialog box will be lost.

To prevent modifications of the `.inp` file, click the **Lock/Unlock** button to the locked state  in **Custom Component Dialog Editor**.

You can modify the custom component in the custom component editor when the `.inp` file is locked, but the `.inp` file will not be updated. However, you can modify the dialog box in **Custom Component Dialog Editor** even if the `.inp` file is locked.

See also Custom component dialog box file on page 55

7 Managing custom components

This section explains how to manage custom components. You can export and import custom components and prevent other users from modifying the custom components.

Click the links below to find out more:

7.1 Exporting custom components

You can export custom components to a file, and then import the file to another model. If the custom component contains sketched cross sections, you need to export both the sketches and the component.

To export custom components:

1. Press **Ctrl + F** to open the **Component Catalog**.
2. Select the custom components in the **Component Catalog**.
3. Right-click and select **Export...**.

   The **Export components** dialog box opens.
4. Browse for the folder where you want to save the file.
5. Enter a name for the export file in the **Selection** box.

   By default, the file name extension is `.uel`.
6. Click **OK** to export the custom components.

Do not change the name of the `.uel` file after exporting the custom components.

You can export custom components to separate files by selecting the custom components in the **Component Catalog**, right-clicking and selecting **Export into separate files** on the menu.

You can also upload custom components to Tekla Warehouse.

See also Managing custom components on page 65

Importing custom components on page 66

Tips for sharing custom components on page 100

7.2 Importing custom components

To import custom components to a model:

1. Press **Ctrl + F** to open the **Component Catalog**.
2. Right-click the component list and select **Import...**.

   The **Import Components** dialog box opens.
3. Browse for the folder that contains the export file.
4. Select the export file.
5. Click **OK** to import the custom components.

If the custom component contains sketched cross sections, you need to import both the sketches and the component.

You can import custom components to a new model automatically by using the `XS_UEL_IMPORT_FOLDER` advanced option.

Export all custom components to certain folders and refer to these folders in the `XS_UEL_IMPORT_FOLDER` advanced option to easily import the custom components to new models.

You can also download custom components from Tekla Warehouse.

See also Managing custom components on page 65

Exporting custom components on page 65

Tips for sharing custom components on page 100

7.3 Protecting custom components with passwords

You can set a password for a custom component to prevent others from modifying the custom component. You can add password-protected custom components to models as usual.

To set a password for a custom component

1. Select the custom component in a model.
2. Right-click the custom component and select **Edit Custom Component**.

   The custom component editor opens.
3. Click the **Display variables** button  on the **Custom component editor** toolbar.

   The **Variables** dialog box opens.
4. Click **Add** to create a new variable.
5. Enter `Password` in **Name**.
6. Enter the desired password in **Formula**.
7. Save the custom component.
8. Close the custom component editor.

Tekla Structures now asks for the password when you try to open the custom component in the custom component editor.

See also Managing custom components on page 65

7.4 Preventing actions on custom components in Component Catalog

You can prevent the following actions on custom components in the **Component Catalog**:

- deleting
- importing
- adding to favorites
- adding to search results
- changing image
- editing keywords
- removing from search results

To prevent the actions on custom components in the **Component Catalog**:

1. Click **Files** --> **Open Model Folder** .
2. Right-click the `ComponentCatalog.txt` file in the model folder.
3. Select **Properties** on the menu.

   The file properties dialog box opens.
4. Select the **Read-only** check box on the **General** tab.
5. Click **OK**.

See also Managing custom components on page 65

8 Custom component settings

This section provides more information about the various custom component settings, plane types, variable types and variable functions.

Click the links below to find out more:

8.1 Custom Component Wizard properties

This section provides more information about the properties in the **Custom Component Wizard**.

Click the links below to find out more:

Type/Notes tab properties

The **Type/Notes** tab contains the following properties:

Option	Description
Type	Select the type of the custom component. Type affects how you insert the custom component in the model. Type also defines if the custom component connects to existing parts.
Name	A unique name of the custom component.
Description	A short description of the custom component. Tekla Structures shows the description in the **Component Catalog**.
Component identifier	To show this in drawings, include **Code** in the **Connection Mark Properties** dialog box.

See also Custom Component Wizard properties on page 69

Custom component types on page 10

Position tab properties

The **Position** tab contains the following properties:

Option	Description	Note
Up direction	Sets the default up direction.	Not available for parts.
Position type	Position (or origin) of the component, relative to the main part.	Not available for details and parts.

See also Custom Component Wizard properties on page 69

Position types on page 71

Advanced tab properties

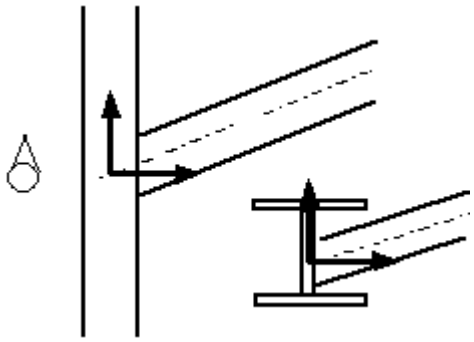
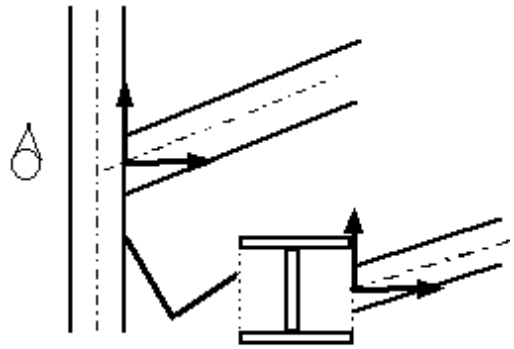
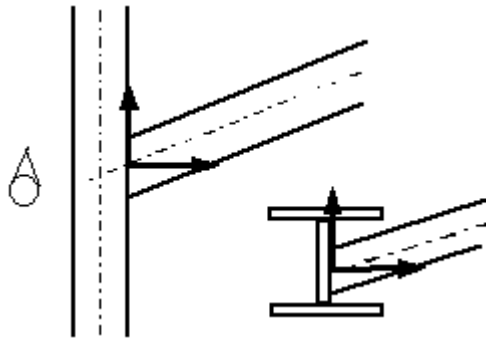
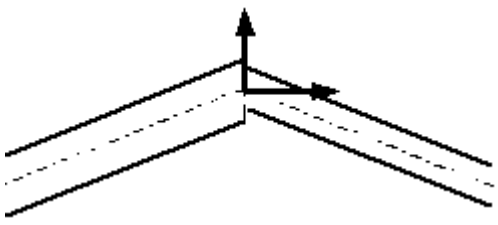
The **Advanced** tab contains the following properties:

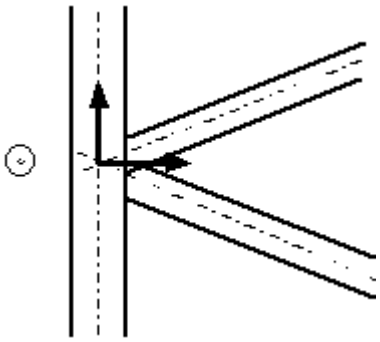
Option	Description	Note
Detail type	Determines on which side of the main part the component is located. The options are: • **Intermediate detail** Tekla Structures creates all components on the same side of the main part • **End detail** Tekla Structures creates all components on the side of the main part closest to the details Only affects asymmetric components.	Only available for details and seams
Definition point position in relation to primary part	Determines the position you pick to create the detail, relative to the main part.	Only available for details
Definition point position in relation to secondary part	Determines where the component is created, relative to the secondary part.	Only available for connections and seams
Allow multiple instances of connection between same parts	Select to create many components to the same main part, in different locations.	Only available for connections and seams
Exact positions	Select to position the seam based on the positions you pick in the model. Clear the check box to let Tekla Structures use automatic seam recognition to position the seam. This is useful especially with warped seams.	Only available for seams
Use the center of the bounding box in positioning	Select to position the custom part based on the center of its bounding box (the box that surrounds the actual part profile).	Only available for parts

See also Custom Component Wizard properties on page 69

Position types

Position type determines the location of the objects that the custom component creates, relative to the main part. The options are:

Option	Description	Example
Middle	Where the center lines of the main and secondary parts intersect.	
Box plane	Where the main part box and the center line of the secondary part intersect.	
Collision plane	Where the main part and the center line of the secondary part intersect.	
Endend plane	Where the center line of the secondary part hits the end of the main part.	

Option	Description	Example
Gusset plane	Where the center lines of the main part and the first secondary part intersect. The x direction is perpendicular to the center line of the main part.	

See also Custom Component Wizard properties on page 69

8.2 Default custom component dialog box properties

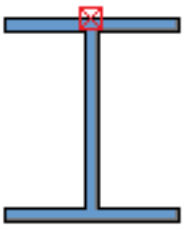
When you create a custom component, Tekla Structures automatically creates a dialog box for the component. The dialog box contains the **Position** tab for parts and the **General** tab for connections, details and seams.

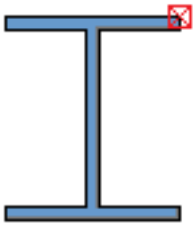
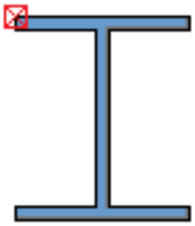
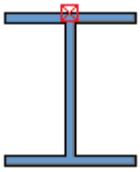
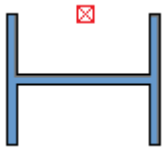
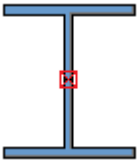
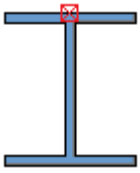
See also Default dialog box properties of connections, details and seams on page 76

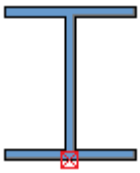
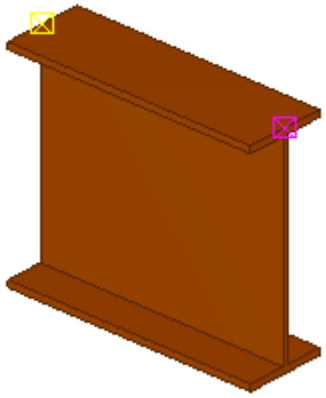
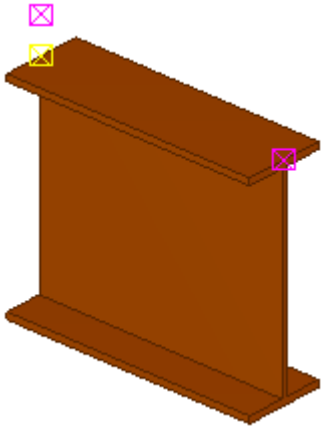
Default dialog box properties of parts on page 73

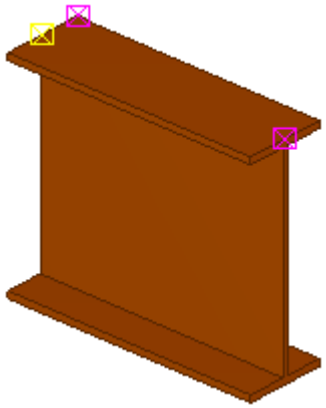
Default dialog box properties of parts

By default, a custom part dialog box contains the **Position** tab. The **Position** tab has the following properties:

Option	Description	Example
On plane	Changes part location on work plane.	**Middle** 

Option	Description	Example
		Right 
		Left 
Rotation	Rotates part in steps of 90 degrees.	**Top** and **Below** 
		Front and **Back** 
At depth	Changes part location perpendicular to work plane.	**Middle** 
		Front 

Option	Description	Example
		Behind 
Show third handle	Sets the third handle of a nested custom part visible in the desired direction. You can bind the third handle in the desired direction and thus force the part to follow the rotation of another part.	**None** 
		Above 

Option	Description	Example
		On the left 

See also Default custom component dialog box properties on page 73

Default dialog box properties of connections, details and seams

By default, a custom component dialog box of connections, details and seams contains the **General** tab. The **General** tab has the following properties:

Option	Description	Note
Up direction	Indicates how the component is rotated around the secondary part, relative to the current work plane. If there are no secondary parts, Tekla Structures rotates the connection around the main part.	
Position in relation to primary part	The creation point of the component relative to the main part.	Only available for details.
Position in relation to secondary part	Tekla Structures automatically places the component according to the selected option.	Available for seams by default. To use this property in connections, select the **Allow multiple instances of connection between same parts** check box on the **Advanced** tab when you create the component.
Place to picked positions	Select to place the seam at the points you pick.	Only available for seams

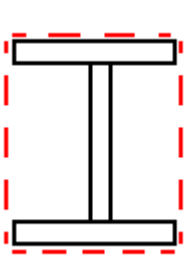
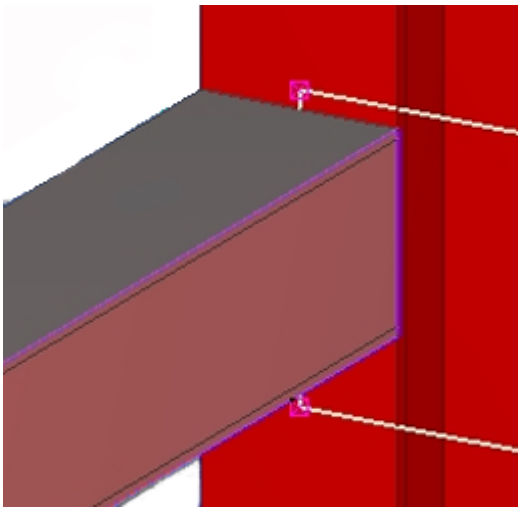
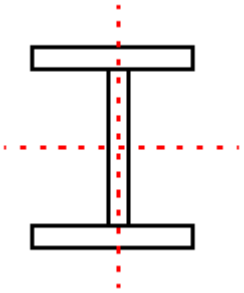
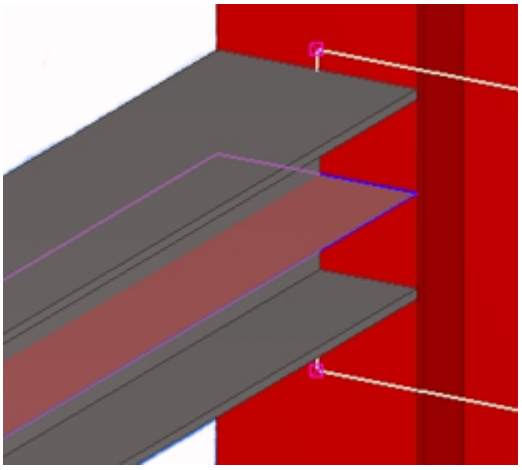
Option	Description	Note
Detail type	Determines on which side of the main part the component is located. The options are: • **Intermediate detail** Tekla Structures creates all components on the same side of the main part. • **End detail** Tekla Structures creates all components on the side of the main part closest to the details. Only affects asymmetric components.	Only available for details
Locked	**Yes** prevents modifying the properties.	
Class	The class of the parts that the custom component creates.	
Connection code	Identifies the component. You can display this connection code in connection marks in drawings.	
AutoDefaults rule group	The rule group used for setting the connection properties.	
AutoConnection rule group	The rule group Tekla Structures uses to select the connection.	

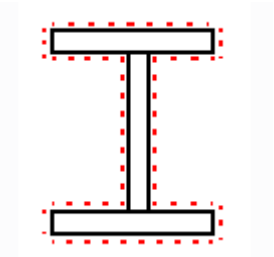
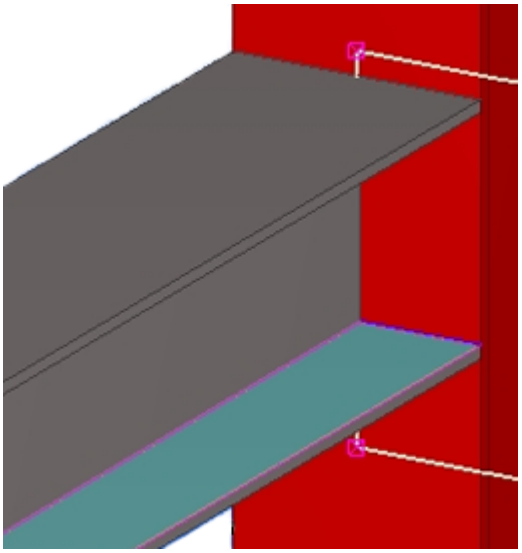
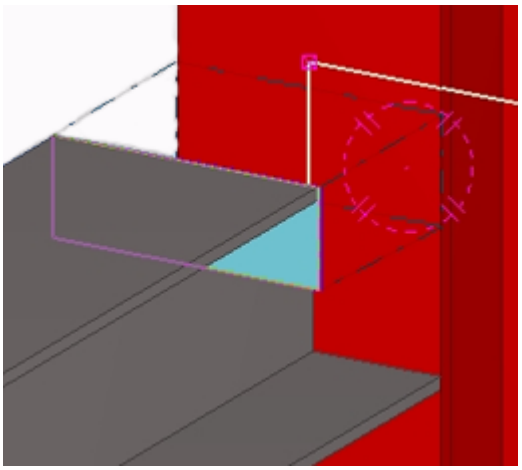
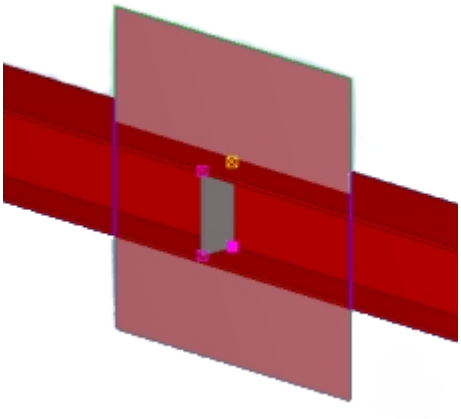
See also Default custom component dialog box properties on page 73

8.3 Plane types

You use planes when you create distance variables. For example, you can bind the reference point of a plate to the top plane of a beam. You can change the plane type to bind the reference object to the required plane.

You can bind reference objects to the following planes:

Plane type	Description	Example
Boundary planes	The edges of a box surrounding a profile 	
Center planes	The center planes of a profile 	

Plane type	Description	Example
Outline planes	The outer and inner surfaces of a profile 	
Cut planes	If parts contain line, part, or polygon cuts, this option selects the cut surfaces. Fittings cannot be selected.	
Component planes	Depends on the component type and **Position type** of the custom component.	

Plane type	Description	Example
Grid planes	Shows grid planes. This plane type is only available in models and sketches.	

See also Creating a distance variable manually on page 26

Example: Detail component planes on page 80

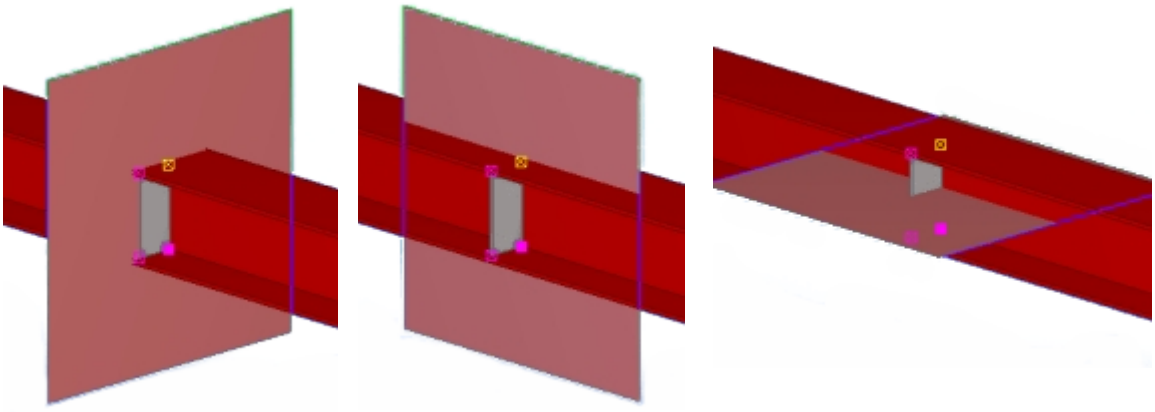
Example: Connection component planes on page 80

Example: Seam component planes on page 81

Example: Part component planes on page 82

Example: Detail component planes

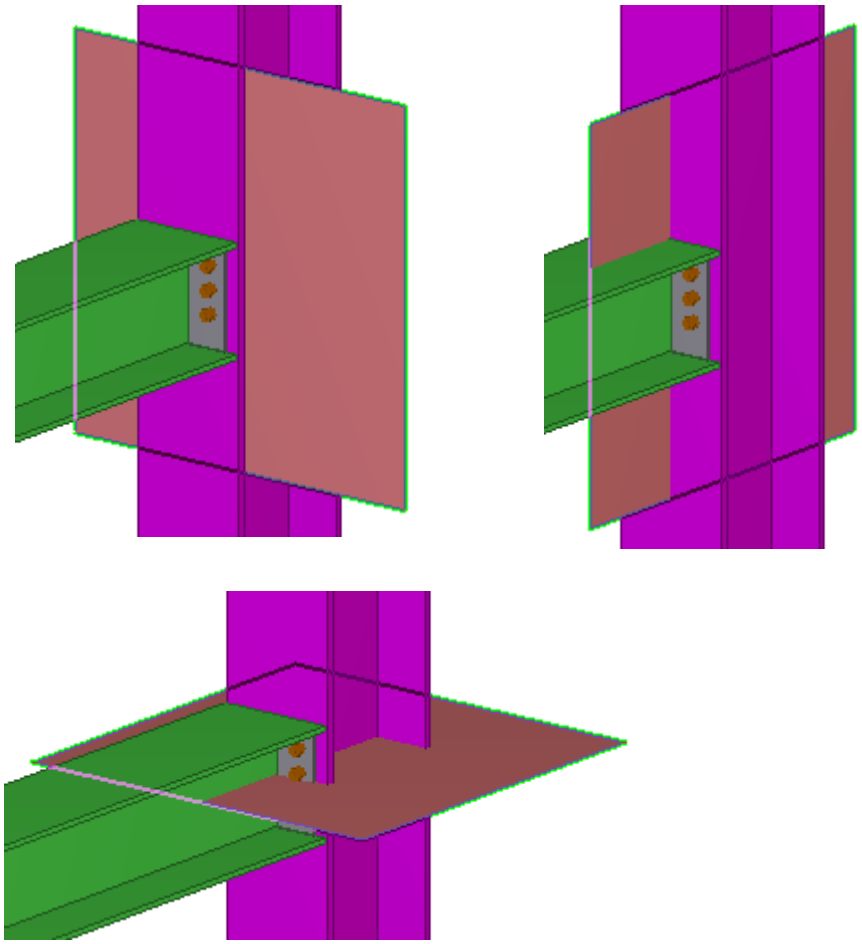
See below for examples of a detail's component planes.



See also Plane types on page 77

Example: Connection component planes

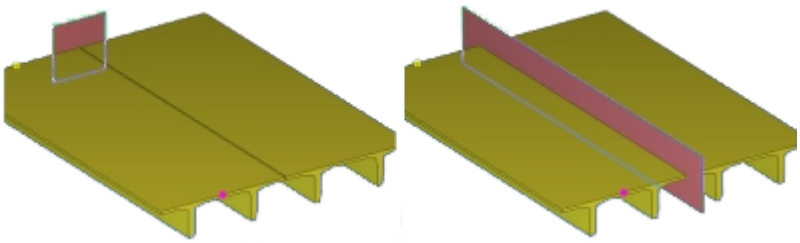
See below for examples of a connection's component planes.

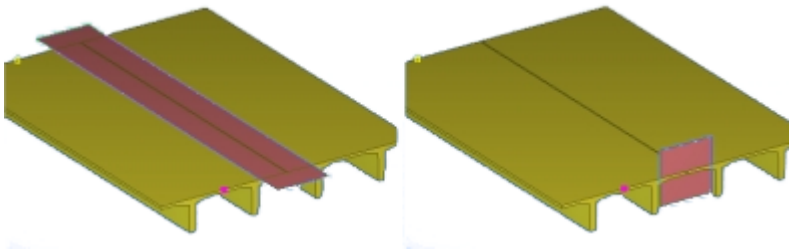


See also Plane types on page 77

Example: Seam component planes

See below for examples of a seam's component planes.

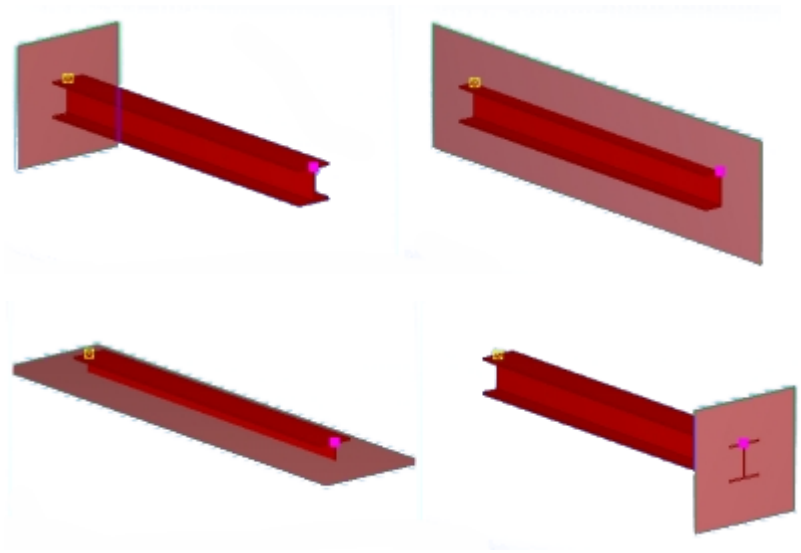




See also Plane types on page 77

Example: Part component planes

See below for examples of a part's component planes.



See also Plane types on page 77

8.4 Variables properties

You can determine the following properties for variables in the **Variables** dialog box:

Option	Description
Name	A unique name of a variable. Use this name to refer to the variable in the custom component editor. The maximum length is 19 characters.
Formula	Can contain a value or a formula. Formulas begin with =.

Option	Description
Value	Shows the current value in **Formula**.
Value type	Determines the type of value that you can enter.
Variable type	Distance or parametric variable
Visibility	**Hide** or **Show** Set to **Show** to display the variable in the custom component dialog box.
Label in dialog box	The name of the variable that Tekla Structures displays in the custom component dialog box. The maximum length is 30 characters.

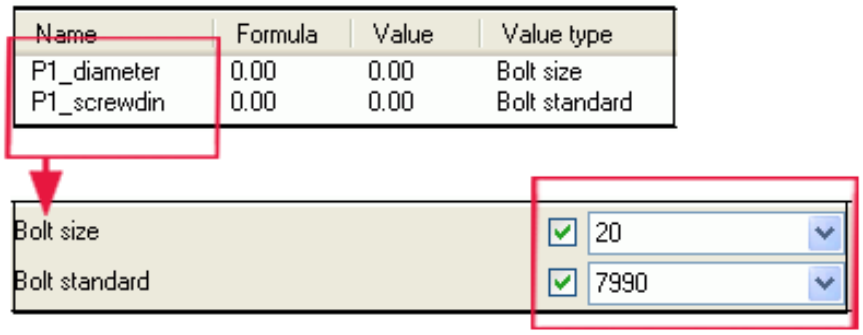
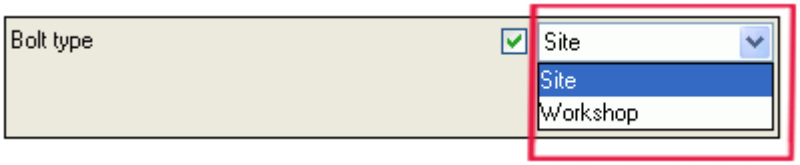
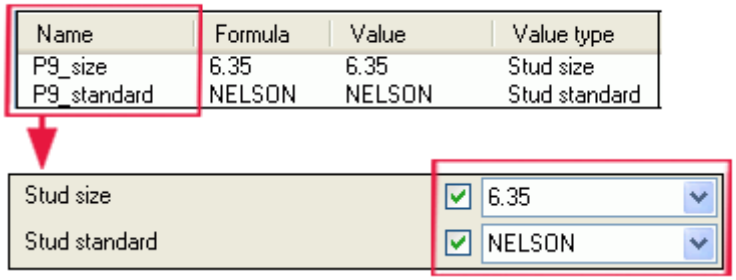
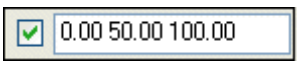
See also Value types on page 83

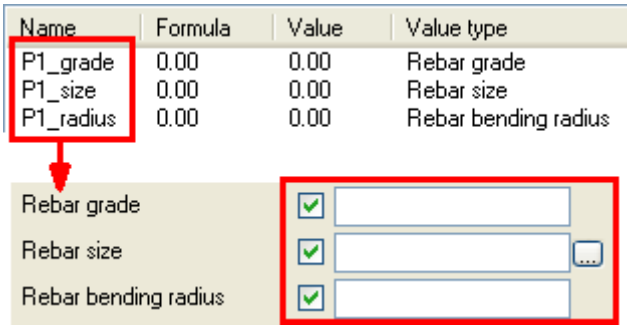
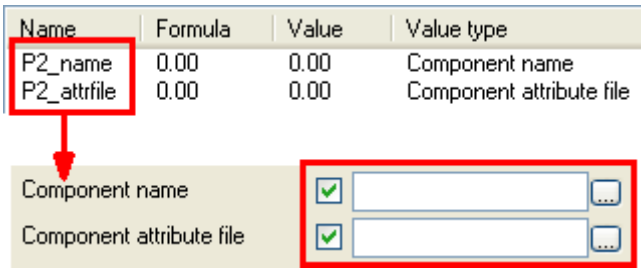
Variables in custom components on page 24

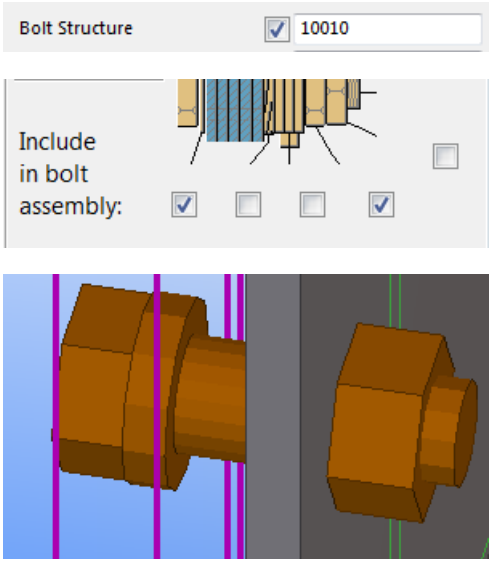
Value types

The value type determines what kind of value you can enter for the variable. Tekla Structures has the following value types for variables:

Option	Description
Number	A whole (integer) number. Use for quantity and multiplier.
Length	A decimal (floating point) number. Use for lengths and distances. Length numbers have unit (mm, inch, etc.) and are rounded to two decimal places.
Text	A text (ASCII) string.
Factor	A decimal value without a unit. You can set the number of decimals for the value type in **Tools** --> **Options** --> **Options...** --> **Units and decimals** .
Angle	A decimal number type for storing angles, stored to one decimal place, in radians.
Material	A data type associated with the material catalog. Use to select material from the standard material dialog.
Profile	A data type associated with the profile catalog. Use to select profile from the standard profile dialog.
Bolt size **Bolt standard**	Data types linked to the bolt catalog. **Bolt size** works with **Bolt standard**. They have fixed naming: `Px_diameter` and `Px_screwdin`. Do not change the fixed name. To show values for these in the component's dialog box, `x` must be the same for both, for example, `P1_diameter` and `P1_screwdin`.

Option	Description
	
Bolt type	For determining the bolt type (site/workshop) in the custom component dialog box. Linked to the **Bolt type** property of bolts in **Custom component browser**. 
Stud size **Stud standard**	Data types linked to the bolt catalog. **Stud size** works with **Stud standard**. They have fixed naming: `Px_size` and `Px_standard`. Do not change the fixed name. To show values for these in the component's dialog box, `x` must be the same for both, for example, `P9_size` and `P9_standard`. 
Distance list	Use with options with several length values, such as bolt spacings. Use space as a separator between the distances. 
Weld type	A data type for selecting weld type. 
Chamfer type	A data type for determining the shape of a chamfer.
Welding site	A data type for determining the welding place: workshop or building site.

Option	Description
Rebar grade **Rebar size** **Rebar bending radius**	Data types linked to reinforcement catalog. **Rebar grade**, **Rebar size**, and **Rebar bending radius** work together. They have fixed naming format: `Px_grade`, `Px_size`, and `Px_radius` where the `x` is a number. Do not change the fixed name. To show values for these in the component's dialog box, `x` must be the same for all, for example, `P1_grade`, `P1_size`, and `P1_radius`. 
Reinforcement mesh	For determining meshes in custom components. Linked to the **Catalog name** property of reinforcement meshes in the **Custom component browser**.
Component name	For replacing a sub-component inside a custom component with another sub-component. Linked to the **Name** property of objects in the **Custom component browser**.
Component attribute file	For setting the properties of a sub-component inside a custom component. Works with **Component name** using the format `Px_name` and `Px_attrfile`, where the `x` is a number. Do not change the fixed name. To show values for these in the component's dialog box, `x` must be the same for both, for example, `P2_name` and `P2_attrfile`. 
Yes/No	For determining whether or not Tekla Structures creates an object in a custom component. Linked to the **Creation** property of objects in the **Custom component browser**. 

Option	Description
Bitmask	For defining bolt assembly (nuts and washers) and parts with slotted holes. Linked to the **Bolt structure** and **Parts with slotted holes** properties of bolts in the **Custom component browser**. The value is a five-digit series of ones and zeros. This relates to the check boxes in the **Bolt Properties** dialog box. 1 means that a check box is selected, 0 means that a check box is clear. In the example below, the value of 10010 means that a bolt with a washer and a nut is created in the bolt assembly. 

See also Variables properties on page 82

Variables in custom components on page 24

8.5 Functions in variable formulas

This section provides information on the functions that you can use in variable formulas.

Formulas always begin with the equal sign (=).

Click the links below to find out more:

- Arithmetic operators on page 87
- Logical and comparison operators on page 87
- Reference functions on page 88
- ASCII file as a reference function on page 89
- Mathematical functions on page 90
- Statistical functions on page 91

Arithmetic operators

You can use the following arithmetic operators in variable formulas:

Operator	Description	Notes
+	addition	Use also to create strings of parameters.
-	subtraction	
*	multiplication	Multiplication is faster than division. `=D1*0.5` is faster than `=D1/2`
/	division	

See also Functions in variable formulas on page 86

Logical and comparison operators

You can use **if-then-else** statements to test a condition and set the value according to the result.

```
=if (D1>200) then 20 else 10 endif
```

You can also use the following operators inside the if statement:

Operator	Description	Example
==	both sides are equal	
!=	sides are not equal	
<	left side is smaller	
<=	left side is smaller or equal	
>	right side is smaller	
>=	right side is smaller or equal	

Operator	Description	Example
&&&	logical AND both conditions must be true	`=if (D1==200 && D2<40) then 6 else 0 endif` If D1 is 200 and D2 smaller than 40, the result is 6, otherwise 0.
||	logical OR only one condition must be true	`=if (D1==200 || D2<40) then 6 else 0 endif` If D1 is 200 or D2 is smaller than 40, the result is 6, otherwise 0.

See also Functions in variable formulas on page 86

Example: Determining the number of bolt rows on page 42

Reference functions

A reference function refers to the property of another object, such as the plate thickness of a secondary part. Tekla Structures refers to the object on the system level, so if the object property changes, so does the reference function value.

Function	Description	Example
`fTpl("template attribute", "object GUID")`	Returns the value of template attribute with given object GUID.	`=fTpl("WEIGHT","ID50B8559A-0000-010B-3133-353432373038")` returns the weight of an object whose GUID is ID50B8559A-0000-010B-3133-353432373038.
`fP("user-defined attribute", "object GUID")`	Returns the value of user-defined attribute with given object GUID.	`=fP("comment", "ID50B8559A-0000-010B-3133-353432373038")` returns the user-defined attribute **comment** of an object whose GUID is ID50B8559A-0000-010B-3133-353432373038.
`fValueOf("parameter")`	Returns the value of the parameter.	If the equation is `=P2+"*"+P3`, the result is `P2*P3` With `=fValueOf("P2")+"*"+fValueOf("P3")`, where P2=780 and P3=480, the result is `780*480`

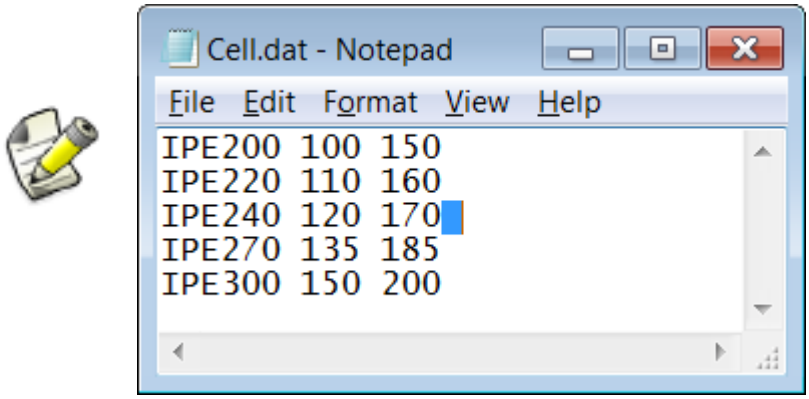
See also Functions in variable formulas on page 86

Example: Using construction planes for determining the stiffener position on page 43

ASCII file as a reference function

You can refer to ASCII files to get data.

Enter a space at the end of each row in the ASCII file. Otherwise the information is not read correctly.



Tekla Structures searches for the files as system files in the following order:

1. model
2. `..\TeklaStructuresModels\<model>\CustomComponentDialogFiles\`
3. project (set with advanced option `XS_PROJECT`)
4. firm (set with advanced option `XS_FIRM`)
5. system (set with advanced option `XS_SYSTEM`)

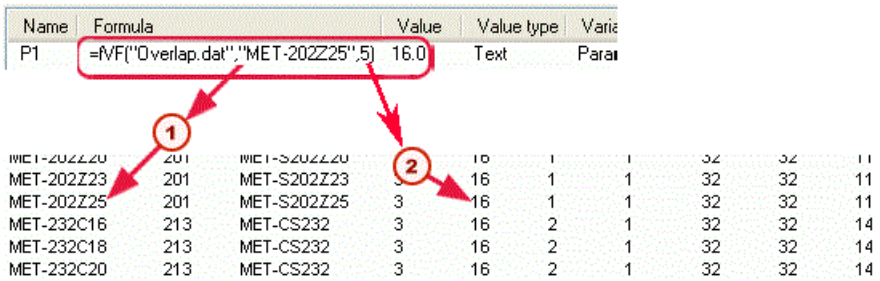
The format for reading files is the following:

```
fVF("filename", "key_value_of_row", column_number)
```

- Key value of row is a unique text value.
- Column number is an index starting from 1.

Example The `=fVF("Overlap.dat", "MET-202Z25", 5)` function is in **Formula** in the **Variables** dialog box.

The function gets the value `16.0` for profile `MET-202Z25`, from the `Overlap.dat` file.



1 Key value of row (MET-202Z25)

2 Column number (5)

See also Functions in variable formulas on page 86

Mathematical functions

You can use the following mathematical functions in variable formulas:

Function	Description	Example
fabs(parameter)	Returns the absolute value of the parameter	`=fabs(D1)` returns 15 if D1 = -15
exp(power)	Returns `e` raised to the power `e` is Euler's number.	`=exp(D1)` returns 7.39 if D1 = 2
ln(parameter)	Returns natural logarithm of the parameter (base number `e`)	`=ln(P2)` returns 2.71 if P2 = 15
log(parameter)	Returns the logarithm of the parameter (base number 10)	`=log(D1)` returns 2 if D1=100
sqrt(parameter)	Returns the square root of the parameter	`=sqrt(D1)` returns 4 if D1 = 16
mod(dividend, divider)	Returns the modulo of the division	`=mod(D1, 5)` returns 1 if D1 = 16
pow(base number, power)	Returns the base number raised to the specified power	`=pow(D1, D2)` returns 9 if D1 = 3 and D2 = 2

Function	Description	Example
hypot(side1,side2)	Returns the hypotenuse  1 side1 2 hypotenuse 3 side2	`=hypot(D1, D2)` returns 5 if D1 = 3 and D2 = 4
n!(parameter)	Returns the factorial of the parameter	`=n!(P2)` returns 24 if P2 = 4 (1*2*3*4)
round(parameter, accuracy)	Returns the parameter rounded off to the given accuracy	`=round(P1, 0.1)` returns 10.600 if P1 = 10.567
PI	Returns the value of pi to 31 decimal places	`=PI` returns 3.14159265358979323846264338327 95

See also Functions in variable formulas on page 86

Statistical functions

You can use the following statistical functions in variable formulas:

Function	Description	Example (P1 = 1.4 P2 = 2.3)
ceil()	Returns the smallest whole number greater than or equal to the parameter	`=ceil(P1)` returns 2
floor()	Returns the largest whole number less than or equal to the parameter	`=floor(P1)` returns 1
min()	Returns the smallest of the parameters	`=min(P1, P2)` returns 1.4
max()	Returns the largest of the parameters	`=max(P1, P2)` returns 2.3
sum()	Sum of the parameters	`=sum(P1, P2)` returns 3.7

Function	Description	Example (P1 = 1.4 P2 = 2.3)
sqsum()	Sum of the squared parameters: (parameter1)2 + (parameter2)2	`=sqsum(P1, P2)` returns 7.25
ave()	Average of the parameters	`=ave(P1, P2)` returns 1.85
sqave()	Average of the squared parameters	`=sqave(P1, P2)` returns 3.625

See also Functions in variable formulas on page 86

Example: Ceil and floor statistical functions on page 98

Data type conversion functions

The units depend on the settings in **Tools** --> **Options** --> **Options** --> **Units and decimals** .

You can use the following data type conversion functions in variable formulas:

Function	Description	Example
int()	Converts data to integer	Useful especially for calculating profile dimensions: `=int(100.0132222000)` returns 100, if decimals are set to 0 in the **Options** dialog box
double()	Converts data to a double	
string()	Converts data to string	
imp()	Converts imperial units Use this function in calculations instead of imperial units. You cannot use imperial units directly in calculations.	For the following examples, length unit is set to mm and decimals are set to 2 in the **Options** dialog box. `=imp(1,1,1,2)` meaning 1 foot 1 1/2 inch returns 342.90 mm `=imp(1,1,2)` meaning 1 1/2 inches returns 38.10 mm `=imp(1,2)` meaning 1/2 inches returns 12.70 mm `=imp(1)` meaning 1 inch returns 25.40 mm `=3'/3"` is not possible, but `=imp(36)/imp(3)` is ok

Function	Description	Example
vwu(value, unit)	Converts the length values and angle values. The available units are: • "ft" ("feet", "foot") • "in" ("inch", "inches") • "m" • "cm" • "mm" • "rad" • "deg"	`=vwu(4.0,"in")` returns 101.60 mm, if length unit is set to mm and decimals are set to 2 in the **Options** dialog box `=vwu(2.0,"rad")` returns 114.59 degrees, if angle is set to degrees and decimals are set to 2 in the **Options** dialog box

See also Functions in variable formulas on page 86

String operations

Strings must be inside quotation marks in variable formulas. For example, to define profile size PL100*10 with two variables P2 = 100 and P3 = 10, enter the formula as follows:

```
="PL"+P2+"*"+P3
```

Tekla Structures handles bolt spacings as strings. To define bolt spacing, set **Value type** to **Distance list** and enter the formula like this:

```
=P1+" "+P2
```

This results in 100 200, if P1 = 100 (**length**) and P2 = 200 (**length**).

You can use the following string operations in variable formulas:

Operation	Description	Example (P1 = "PL100*10")
match(parameter1, parameter2)	Returns 1 if parameters are equal and 0 if different. You can also use wildcards `*`, `?`, and `[ ]` with the match function.	`=match(P1, "PL100*10")` returns 1 Accept all profiles starting with PFC: `=match(P4, "PFC*")` Accept profiles starting with PFC, and height starts with 2,3,4 or 5: `=match(P4, "PFC[2345]*")` Accept profiles starting with PFC, heights are 200,300,400 or 500 and width starts with 7: `=match(P4, "PFC[2345]00?7")`

Operation	Description	Example (P1 = "PL100*10")
length(parameter)	Returns the number of characters in the parameter.	`=length(P1)` returns 8
find(parameter, string)	Returns the order number (starting at zero) of the specified string and -1 if the specified string is not found from the parameter.	`=find(P1, "*")` returns 5
getat(parameter, n)	Returns the n:th (starting at zero) character from the parameter.	`=getat(P1, 1)` returns "L"
setat(parameter, n, character)	Sets the n:th (starting at zero) character to the specified character in the parameter.	`=setat(P1, 0, "B")` returns "BL100*10"
mid(string, n, x)	Returns x characters from the string starting from n:th (starting at zero) character. If you leave out the last argument (x), returns the last part of the string.	`=mid(P1,2,3)` returns "100"
reverse(string)	Reverses the given string.	`=reverse(P1)` returns "01*001LP"

See also Functions in variable formulas on page 86

Trigonometric functions

When you use trigonometric functions in variable formulas, you need to include a prefix to define the unit. If you do not include a prefix, Tekla Structures uses radians as the default unit.

- d is degree. For example, `sin(d180)`
- r is radians (default). For example, `sin(r3.14)` or `sin(3.14)`

You can use the following trigonometric functions in variable formulas:

Function	Description	Example
sin()	Returns the sine value	`=sin(d45)` returns 0.71
cos()	Returns the cosine value	`=cos(d45)` returns 0.71
tan()	Returns the tangent value	`=tan(d45)` returns 1.00
asin()	Inverse function of sin(), return value in radians	`=asin(d45)` returns 0.90
acos()	Inverse function of cos(), return value in radians	`=acos(d45)` returns 0.67
atan()	Inverse function of tan(), return value in radians	`=atan(d45)` returns 0.67

Function	Description	Example
sinh()	Returns the hyperbolical sine value	`=sinh(d45)` returns 0.87
cosh()	Returns the hyperbolical cosine value	`=cosh(d45)` returns 1.32
tanh()	Returns the hyperbolical tangent value	`=tanh(d45)` returns 0.66
atan2()	Returns the angle whose tangent is the quotient of the two numbers. Return value in radians	`=atan2(1,3)` returns 0.32

See also Functions in variable formulas on page 86

Market size function

Use market size in a custom component to select a suitable plate dimension (usually plate thickness) from the available market sizes. For example, a plate's thickness should match the web of a beam.

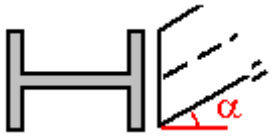
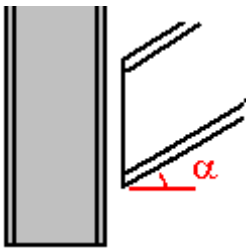
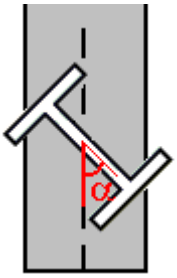
Function	Description	Example
fMarketSize(material, thickness, extrastep)	Returns the next available market size for the material from the `marketsize.dat` file, based on the thickness you specify. The file must be in the `..\environments\your_environment\profil` folder or the system folder. For extrastep enter a number to define the increment to the next size (default is 0).	`=fMarketSize("S235JR", 10, 0)`

See also Functions in variable formulas on page 86

Example: Market size function on page 98

Framing condition functions

Use the following functions return the skew, slope, and cant angle of the secondary beam relative to the main part (column or beam):

Function	Description	Example
fAD("skew", GUID)	Returns the skewed angle of the secondary part whose GUID is given. 	`=fAD("skew","ID50B8559A-0000-010B-3133-353432373038")` returns 45 ID50B8559A-0000-010B-3133-353432373038 is the GUID of the secondary part, which is at a 45 degree angle to the main part.
fAD("slope", GUID)	Returns the sloped angle of the secondary part whose GUID is given. 	`=fAD("slope","ID50B8559A-0000-010B-3133-353432373038")`
fAD("cant", GUID)	Returns the cant angle of rotated secondary part whose GUID is given. 	`=fAD("cant","ID50B8559A-0000-010B-3133-353432373038")`

Limitations These functions do not return positive and negative slope and skew values. It is not possible to determine up or down slope and left or right skew with these functions.

Maximum skew angle to return is 45 degrees.

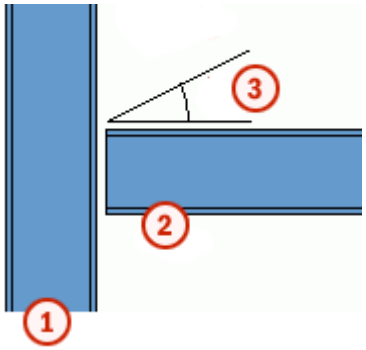
See also Functions in variable formulas on page 86

Example: Skew and slope framing conditions on page 96

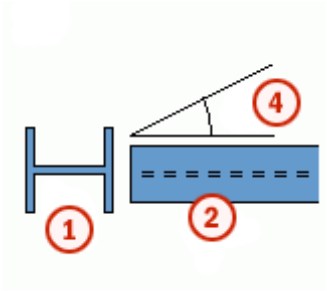
Example: Skew and slope framing conditions

The slope and skew are relative to a beam framing into a column.

Side view



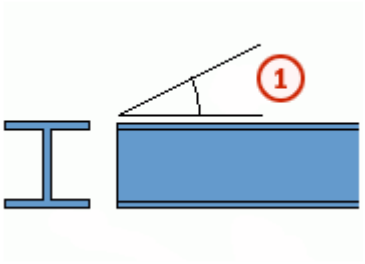
Top view



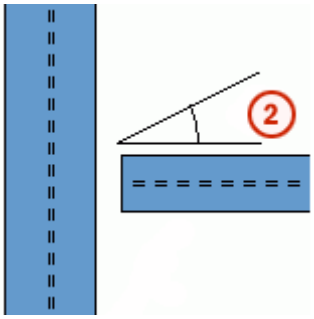
1. Column
2. Beam
3. **Slope**
4. **Skew**

With two beams, the **slope** is actually the horizontal skew of the beam framing into the other beam, and the vertical slope of the beam relative to the main is actually the **skew** angle.

Side view



Top view



1. **Skew**
2. **Slope**

See also Functions in variable formulas on page 86

Framing condition functions on page 95

Example: Ceil and floor statistical functions

You have the following parametric variables:

- Beam length: P1 = 3500
- Post spacing: P2 = 450

P1 / P2 = 7.7778

You can use the `ceil` and `floor` statistical functions to round the value and then use the rounded value as the number of beam posts:

- `=ceil(P1/P2)` returns 8
- `=floor(P1/P2)` returns 7

See also Functions in variable formulas on page 86

Statistical functions on page 91

Example: Market size function

You have the following data in `marketsize.dat`:

```
S235JR,
6,9,12,16,19,22SS400,1.6,2.3,3.2,4.5,6,9,12,16,19,22,25,28,32,38DEFAULT,
6,9,12,16,19,22,25,28,32,38
```

The first item in a row is a material grade followed by available plate thicknesses in millimeters. The DEFAULT line lists the thicknesses available in all other material grades.

With the above data, the function `=fMarketSize("S235JR",10,0)` would return 12, and `=fMarketSize("S235JR",10,1)` would return 16 (one size up).

See also Market size function on page 95

9 Custom component tips

This section provides useful hints and tips that help you create and use custom components more efficiently.

Click the links below to find out more:

9.1 Tips for creating custom components

These tips help you in creating useful custom components.

- **Enter short, logical names for custom components.**

  Use the description field to describe the component and explain what it does.

- **Create simple components for specific situations.**

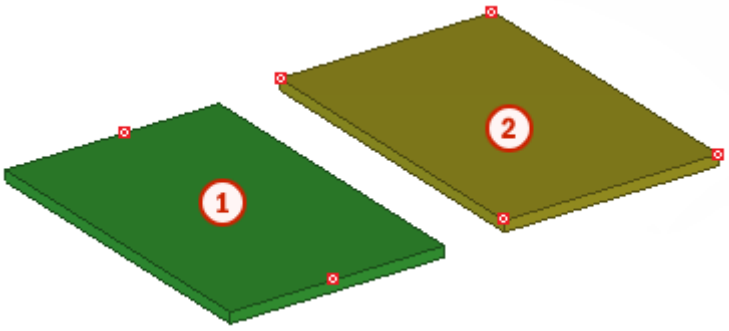
  It is faster and easier to model simple components. They are also much easier to use. Avoid creating a 'super' component to use in every possible situation.

- **Consider creating a component model.**

  Use the model to create and test custom components.

- **Use the simplest part you can.**

  For example, if all you need is a rectangular shape, use a rectangular plate, not a contour plate. Rectangular plates only have two handles, so you only need to create a few bindings to manipulate them. Contour plates require more because they have four handles.



1 Rectangular plate

2 Contour plate

- **Only model parts as accurately as you need.**

  If the only part information required is a part mark on the GA drawing and a quantity on the materials list, create a simple bar or plate. If you later need to include the part in a detailed view, simply re-model the part more accurately.

- **Model embeds as custom parts and include them in components.**

See also Custom component tips on page 99

9.2 Tips for sharing custom components

These tips help you in sharing custom components.

- **Use Tekla Warehouse for sharing and storing custom components.**
- **Store custom components together.**

  It makes them easy to find and export.

- **Provide essential information**

  If you distribute your component to other users, remember to list the profiles it works with.

- **Use library profiles when possible.**

  Then you do not have to copy user-defined profiles when you copy the component to other locations.

- **Remember to copy user-defined profile cross sections with your custom component.**

See also Custom component tips on page 99

Managing custom components on page 65

9.3 Existing custom components in a new Tekla Structures version

When you start using a new version of Tekla Structures, always check that custom components created in older versions work correctly in the new version.

When you open custom components created with an older version of Tekla Structures in the custom component editor, and the new version contains improvements requiring update, Tekla Structures asks whether you want to update the component. If you do not update the component, it works in the same manner as in the version where it was originally created, but you do not gain the benefits of the improvements.

If you choose to update the component, you need to check and sometimes recreate dimensions depending on the improvements. When you delete a dimension and create a new one (even with the same name), the equations containing the dimension also need to be modified, because the dependency created by the equation is lost when a dimension is deleted. You can recreate the dimensions and modify the equations in the custom component editor.

See also Custom component tips on page 99

10 Disclaimer

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