

# Modifying Parametric Designs

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## Task

In this exercise you will learn how to modify a folding box from the library of resizable standards. You will do this by removing all closing elements on the top of the box and replacing them with a new type of closing system, and as a second step, you will complete the structure with new locking system. Both compound components you will take out from the Synergy Components library.

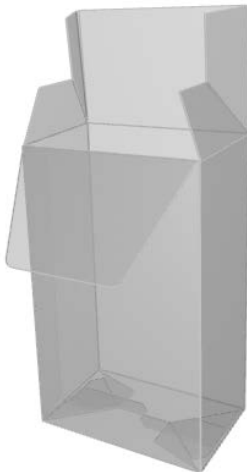
**Exercise box: A.50.45.01.01 Claw-Lock Closure Systems - Winged Flap Closure with Dustproof Flaps.evr.**

Location: EngViewWork6\Standards Library \MM\  
Standards\Folding Carton\ECMA \Long Seam Rectangular\  
A.50.45.01.01 Claw-Lock Closure Systems - Winged Flap Closure with Dustproof Flaps.evr.

Components (Location, Name) 1.Compound Components/Tops and Bottoms/Regular Tucks/ **01 Regular Tuck Lock**  
2.Compound Components/Parts/Tongue Locking Systems/ **30 Tuck Tongue (Centered)**

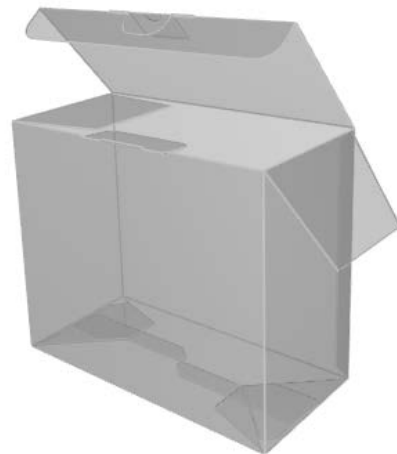
**Library standard A60.45.00.01:**

A (Length) = 90 mm  
B (Width) = 60 mm  
H (Height) = 150 mm

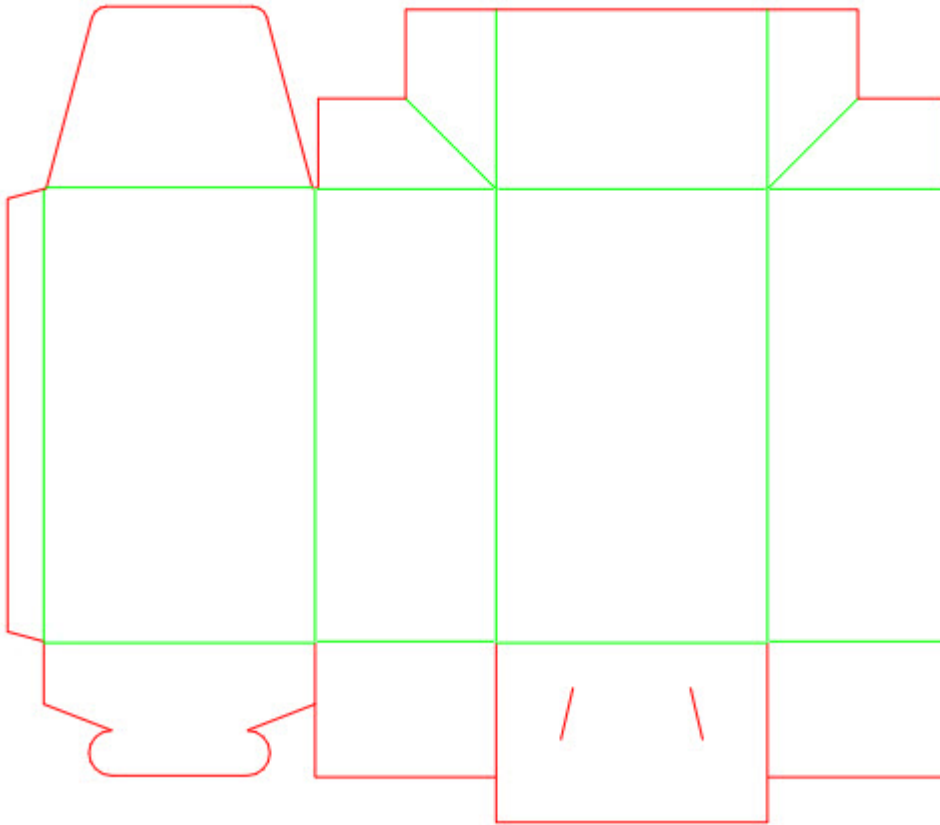


**Modified project:**

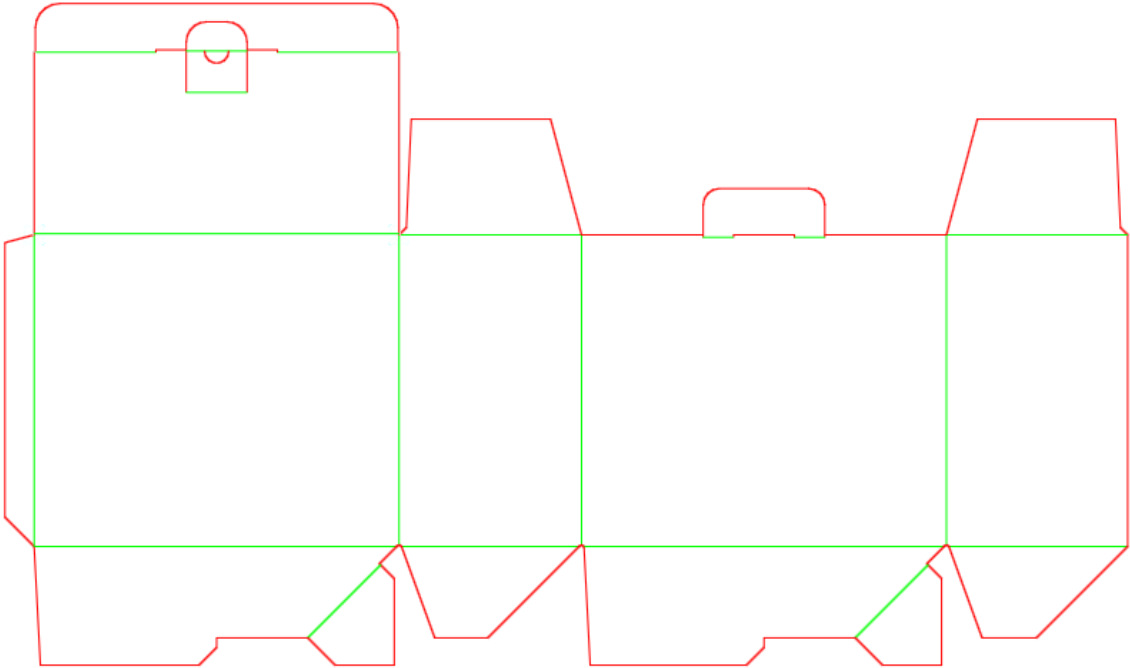
A (Length) = 140 mm  
B (Width) = 75 mm  
H (Height) = 130 mm



## 2D structure of A.50.45.01.01



2D structure of the modified design

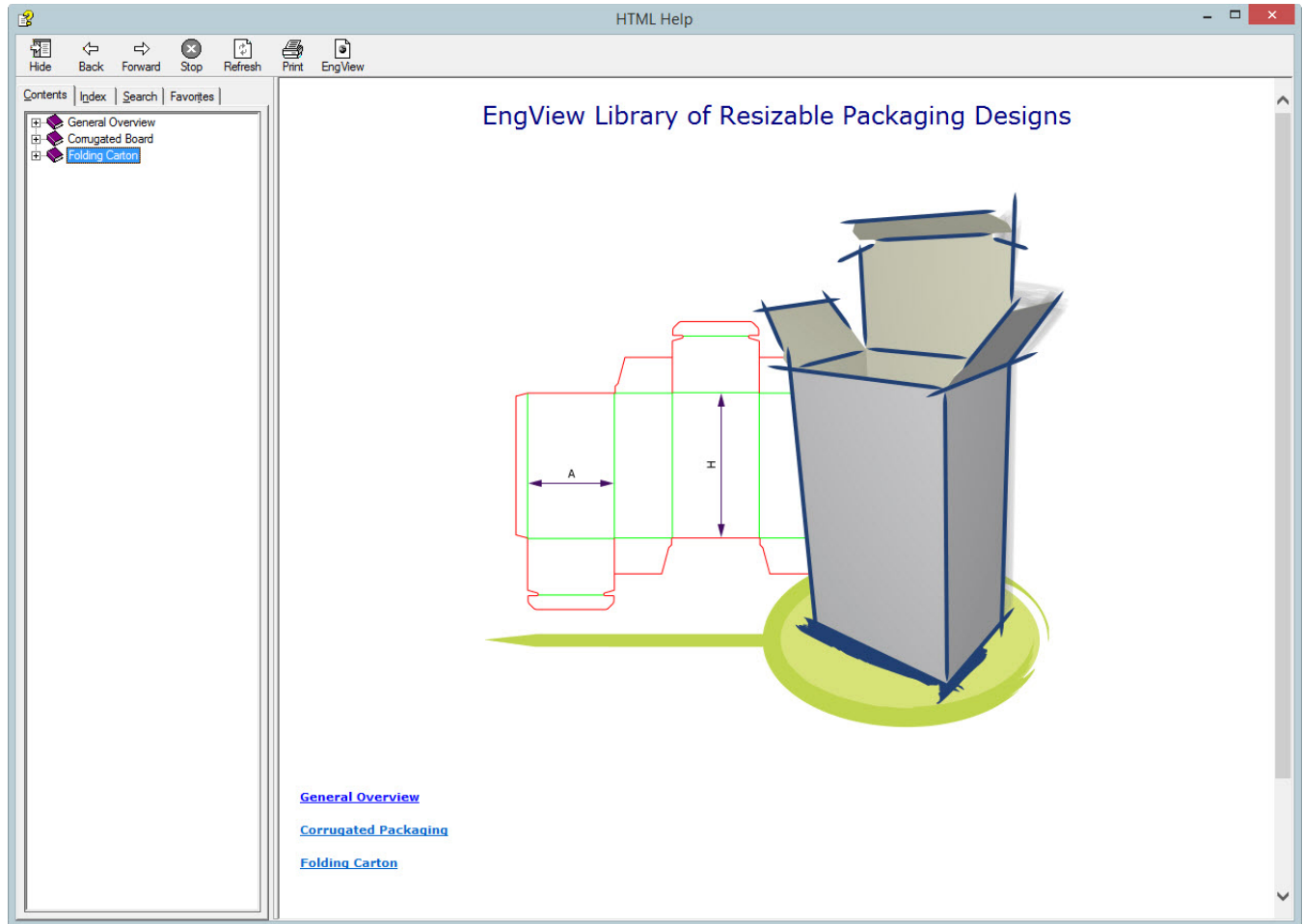


## Opening and Resizing the Standard A.50.45.01.01

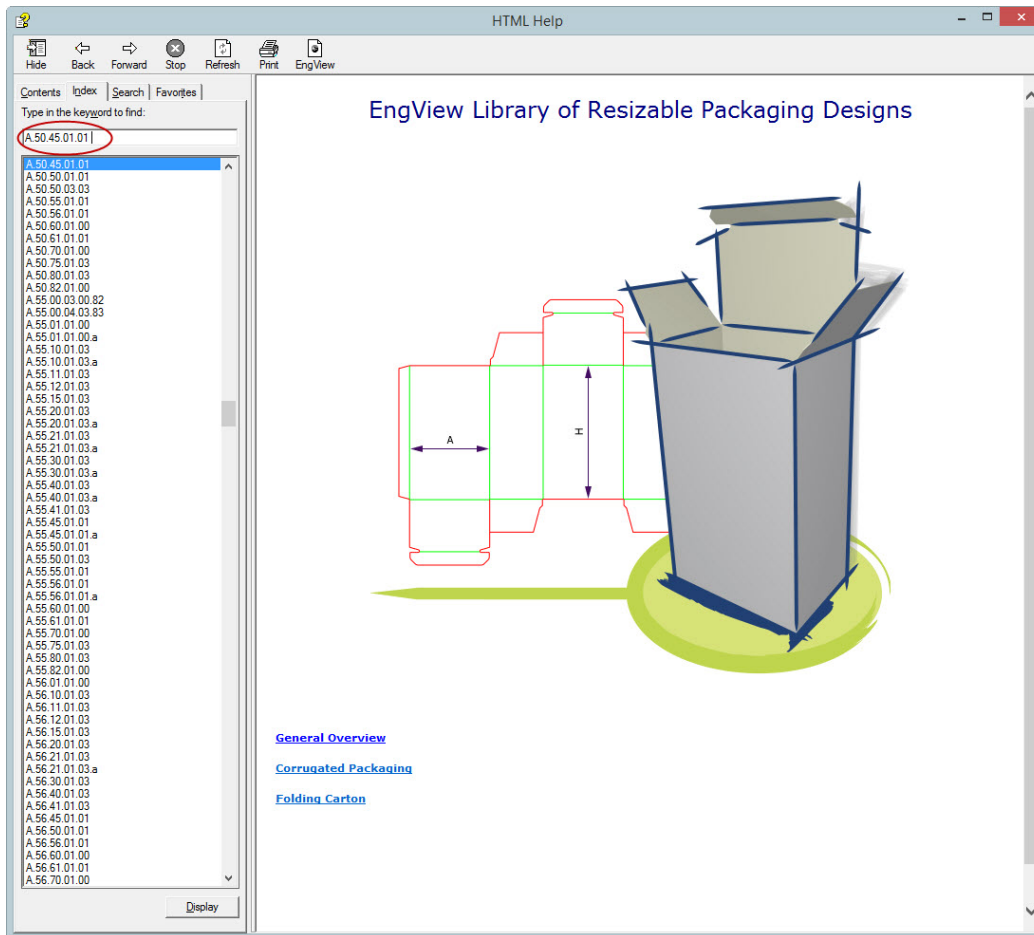
### From the Packaging Library Index

1. To open the index, click your system's **Start** button, in **Programs**, locate the **EngView Systems** group, and then click **Packaging Library Index**.

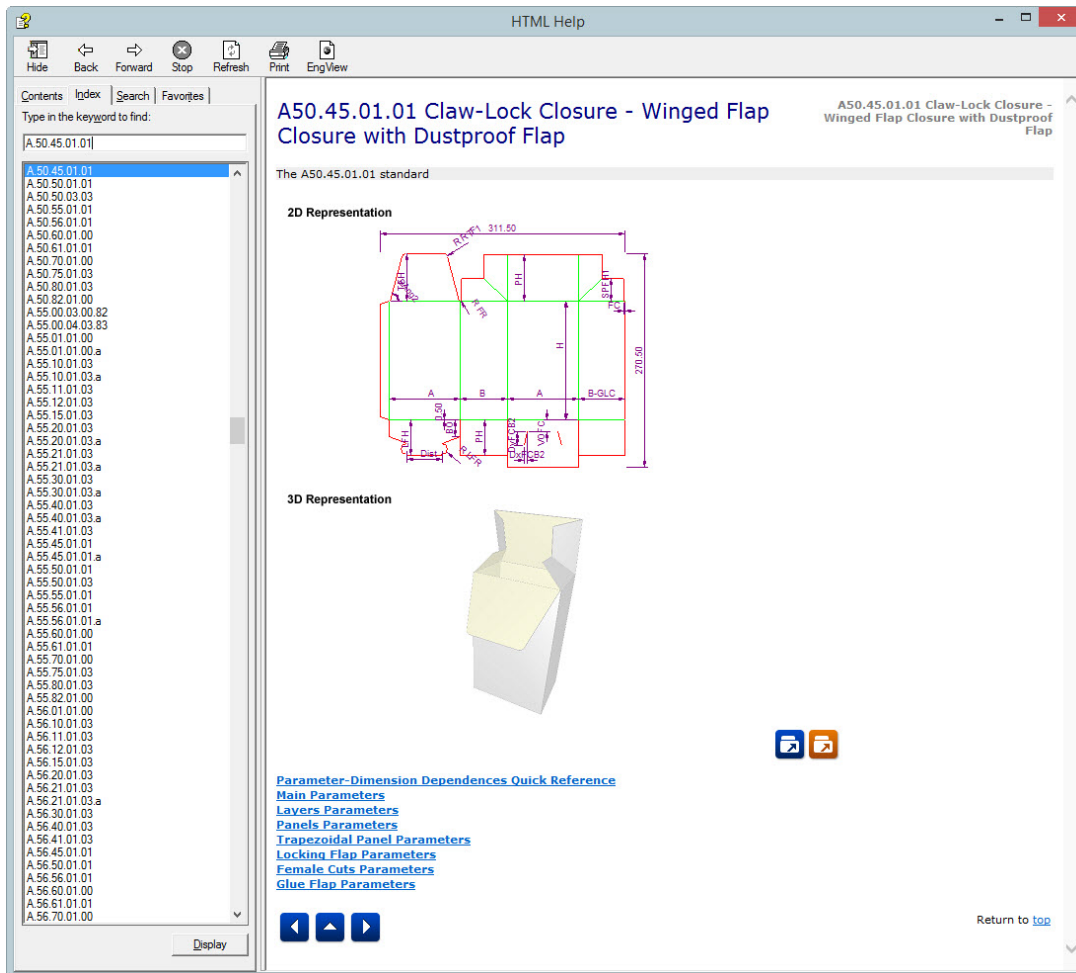
The index opens.



2. Click the Index tab, type the design's ID: A.50.45.01.01, and then click ENTER.




The design appears in the right-hand window.



3. To open the design in Package & Display Designer, click the blue icon .

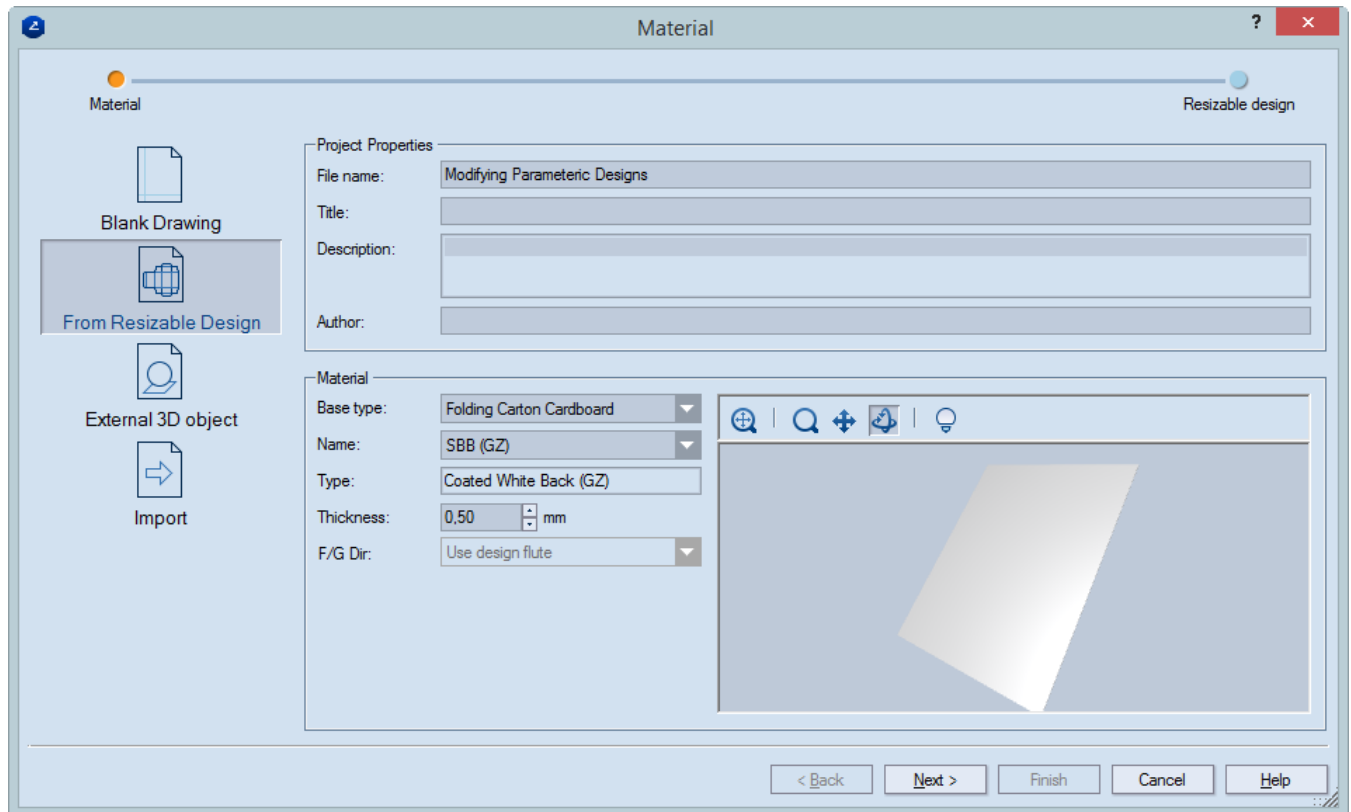
Package & Display Designer starts, opening the design in its 3D view.

### From Package & Display Designer

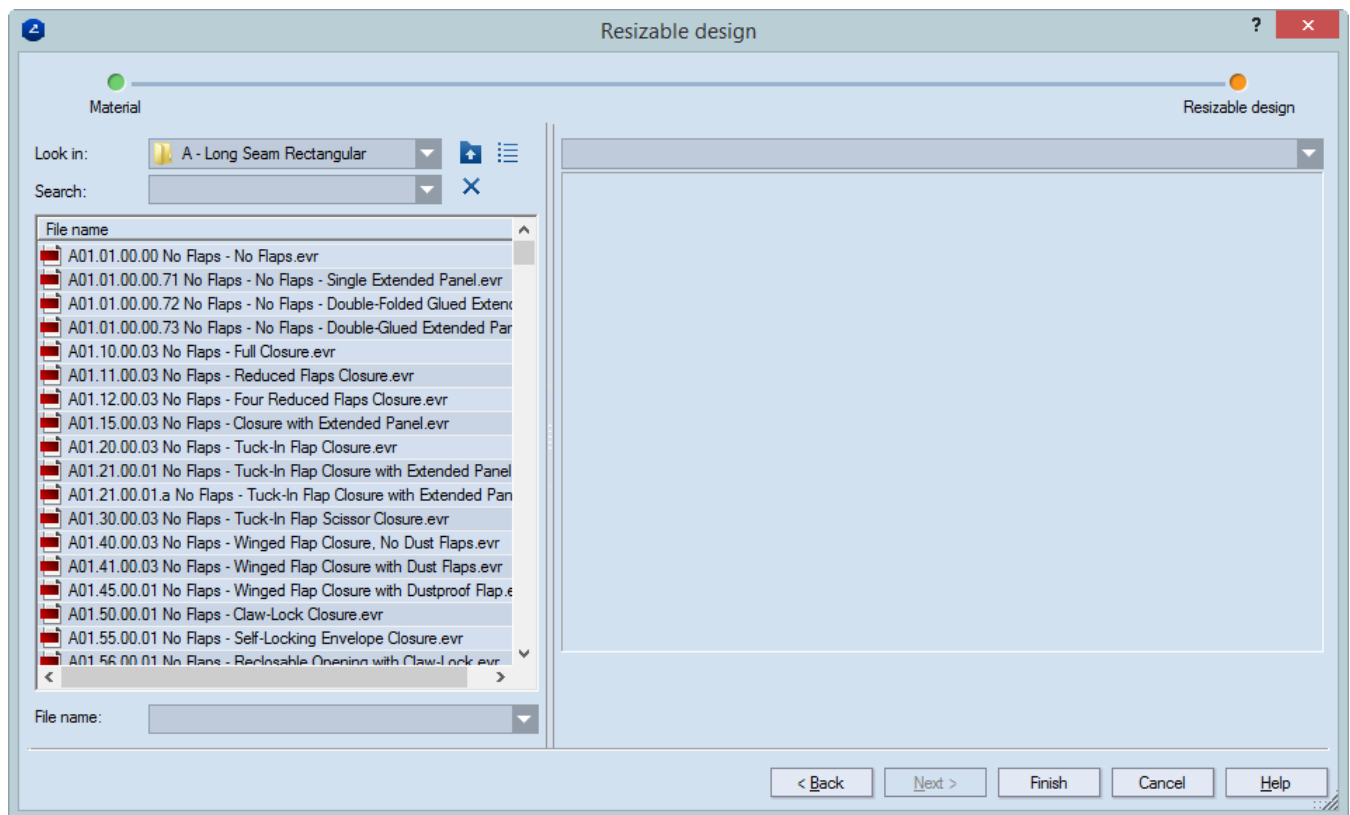
1. Start the program.
2. To begin opening the design, do any of the following:
  - On the **File** menu, click **New**.
  - In the toolbar, click the **New Project** .

The **Material** dialog box appears.



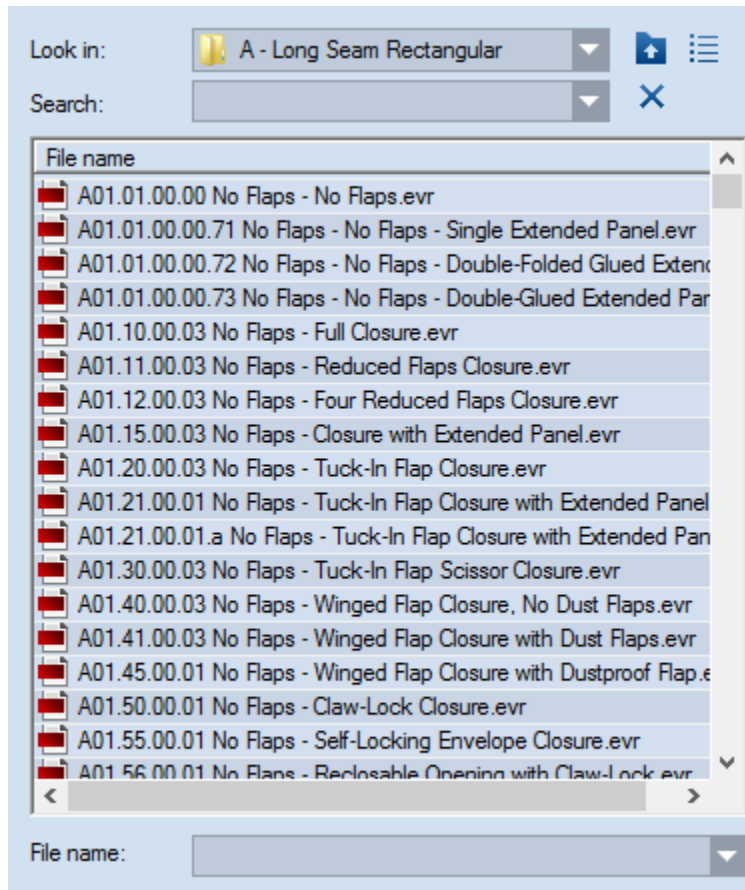


3. Click **From Resizable Design**.
4. In **Base type**, select Folding Carton Cardboard, and then, in **Name**, select the material that you want to work with.
5. To proceed, click **Next**.



6. To start searching for the design, in **Look in**, browse the sequence: Folding Carton | ECMA | A – Long Seam Rectangular.

A list of designs appears



7. To locate the design, in **Search** type the design's name: A50.45.01.01 Winged Flap Closure With Dustproof Flap.

NOTE: Notice that the list of designs grows shorter with each new symbol you type.

8. After you have typed the design's ID, select the design in the list.

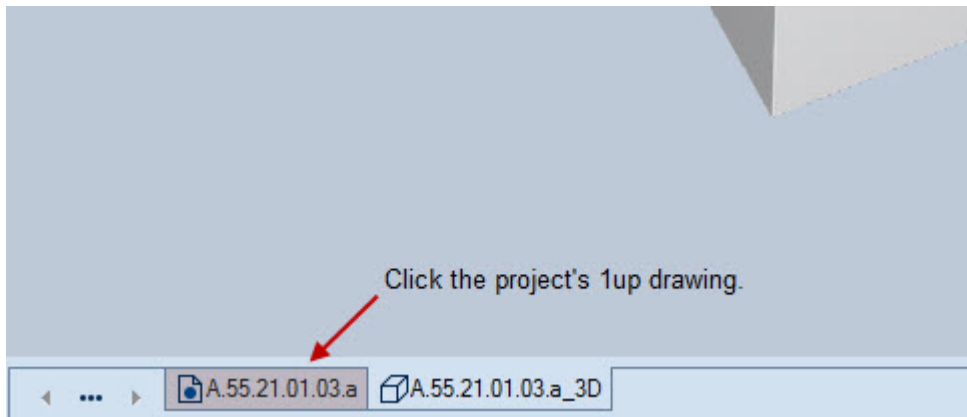
NOTE: Notice that the design is visualized in the preview zone in the right-hand area.

9. To open the design, click **Finish**.

The design opens in its 3D view.

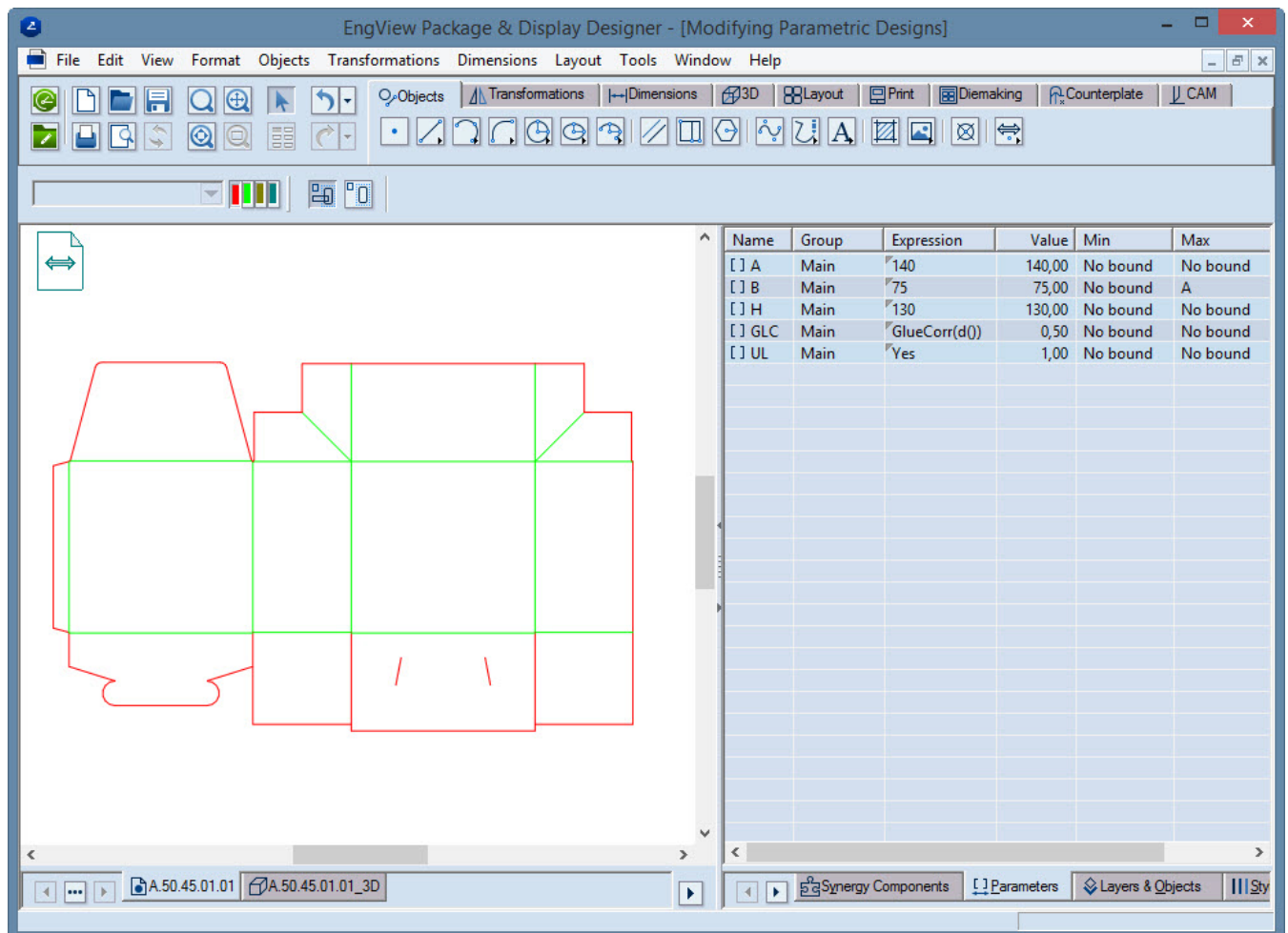
## Preparing the Work Environment

1. To switch to the 2D view, in the graphical area, click the 1p drawing tab (pictured).



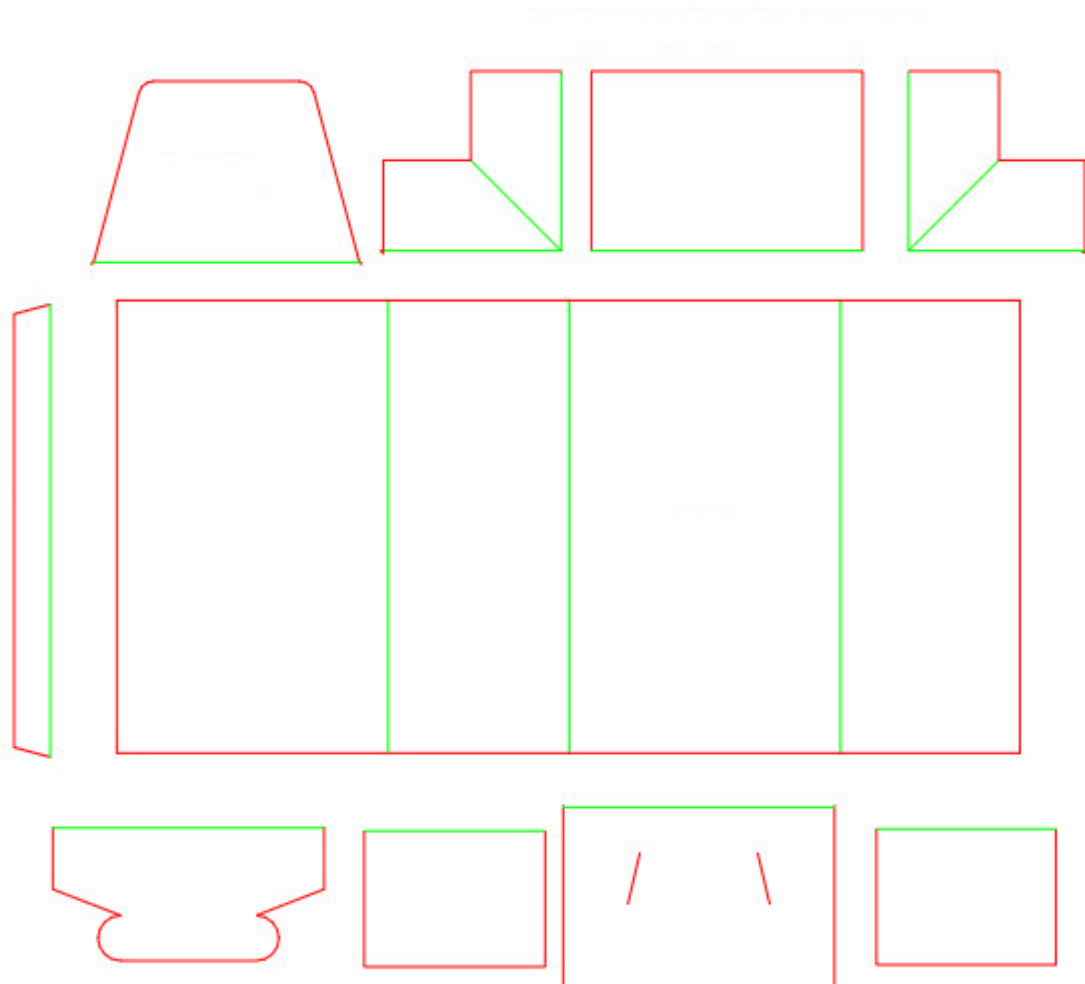
- After the file is opened, resize the structure: In the **Parameters** tab, in the **Expression** column modifying the expressions of the main parameters: Make A=140; B=75 and H=130.

NOTE: For each value, press ENTER after typing the value. This confirms it.



## Deleting Components

A resizable design is composed of different parts (components).



**Crash lock (auto closure) bottom**

We begin modifying the resizable design by removing the top components and replacing them with new compound components from the **Synergy Components** library.

1. Select the top of the design.

Consider the objects that you want to select, and then press the selection buttons on the toolbar. The options are:



**Select with Intersect** Selects all the objects that fall within the rectangle, either entirely or partially.



**Select Outside Objects** Selects all objects that are entirely outside the rectangle.

The two buttons can be used independently. This produces four selection scenarios:



— Selects the objects that are inside the selection rectangle, either entirely or partially. Objects that are entirely outside the selection rectangle are not selected.



— Selects the objects that are entirely inside the selection rectangle.

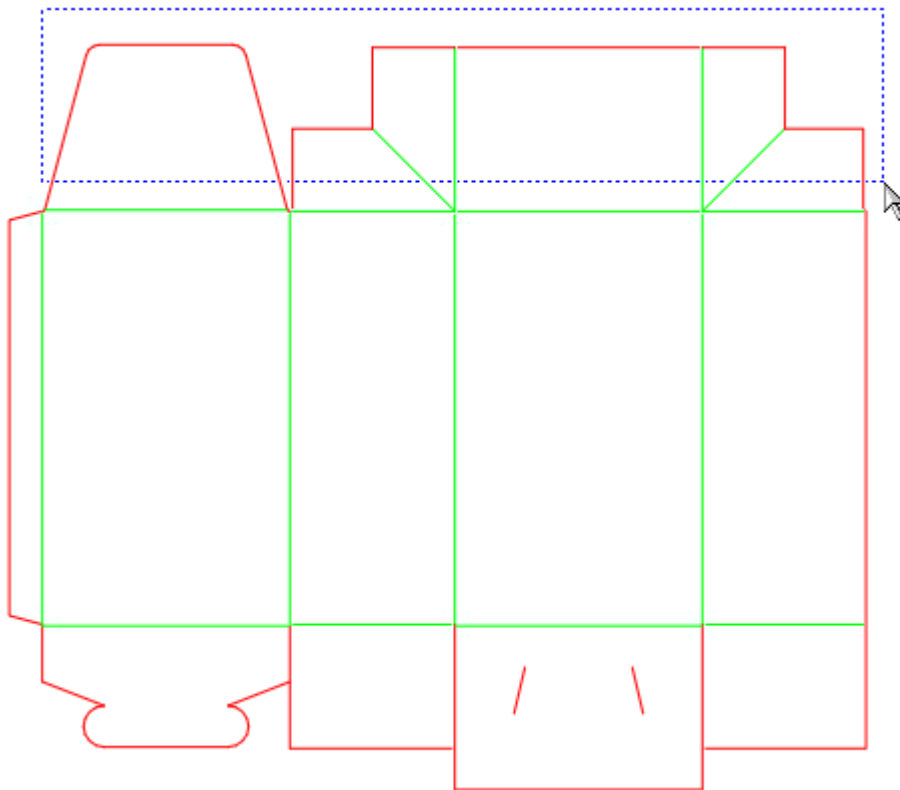


— Selects the objects that are entirely outside the selection rectangle. Objects that are inside the rectangle, either entirely or partially, are not selected.

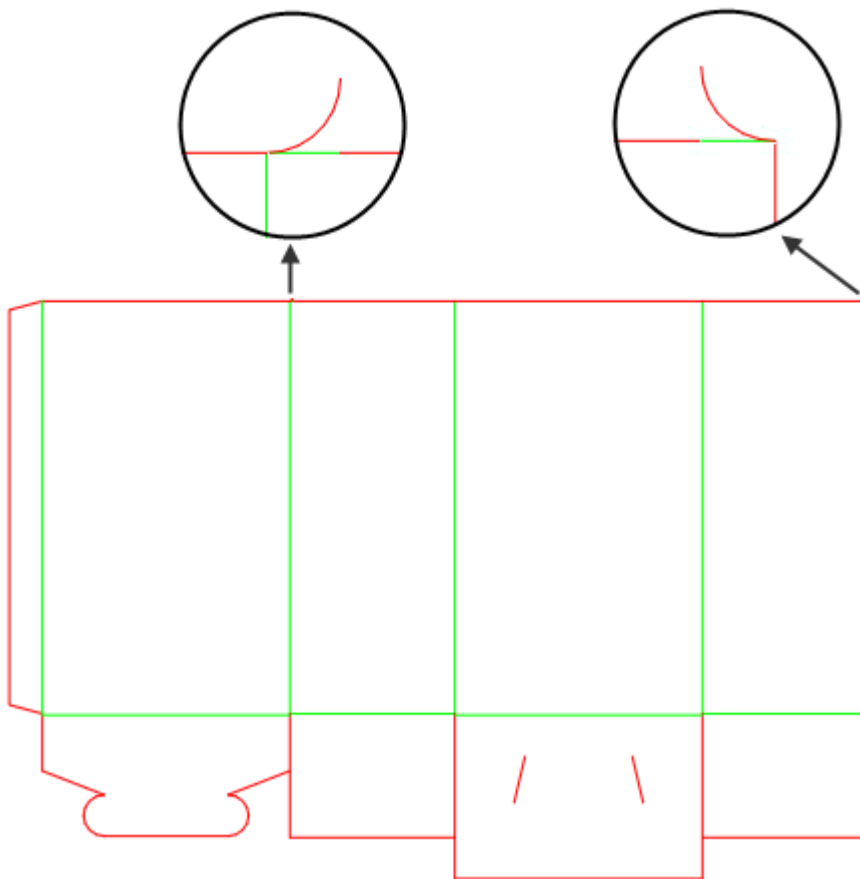


— Selects the objects that are outside the selection rectangle, either entirely or partially. Objects that are entirely inside the rectangle are not selected.

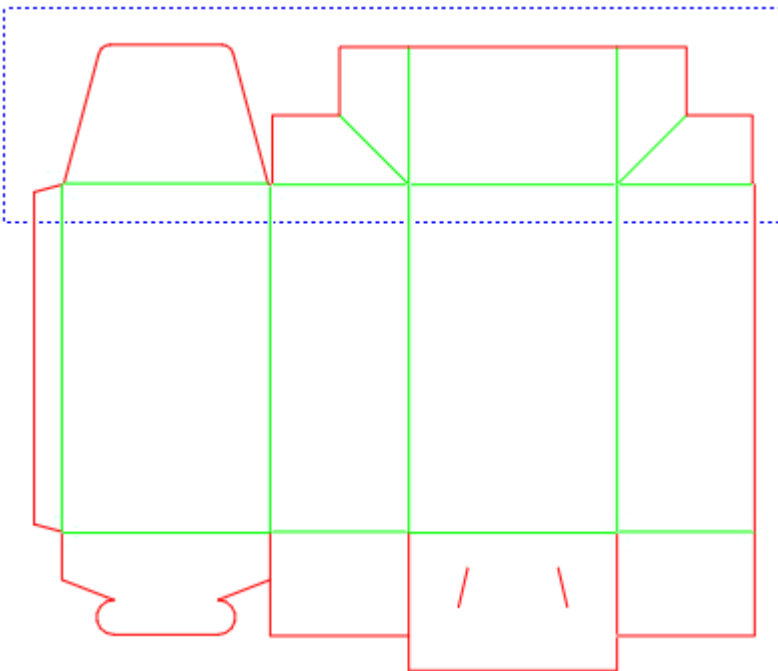
If we choose the first mode and select this way:



we could miss some tiny elements:



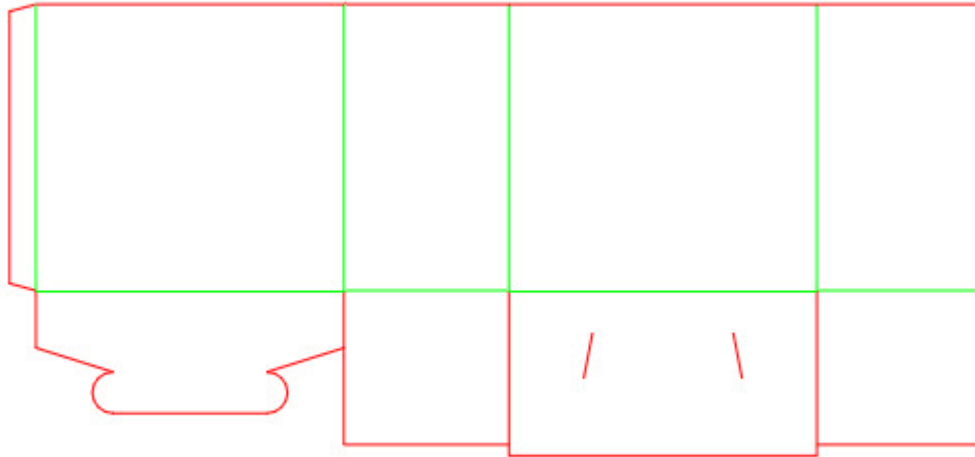
That is why when an entire top or bottom are to be deleted, it's best if we use the second mode.



2. To delete the selection, do any of the following:

- In the graphical area, right-click a blank area, and then click **Delete** on the context menu.
- On the **Edit** menu, click **Delete**.
- Press CTRL + DELETE.

After the deletion, the drawing should look like this:



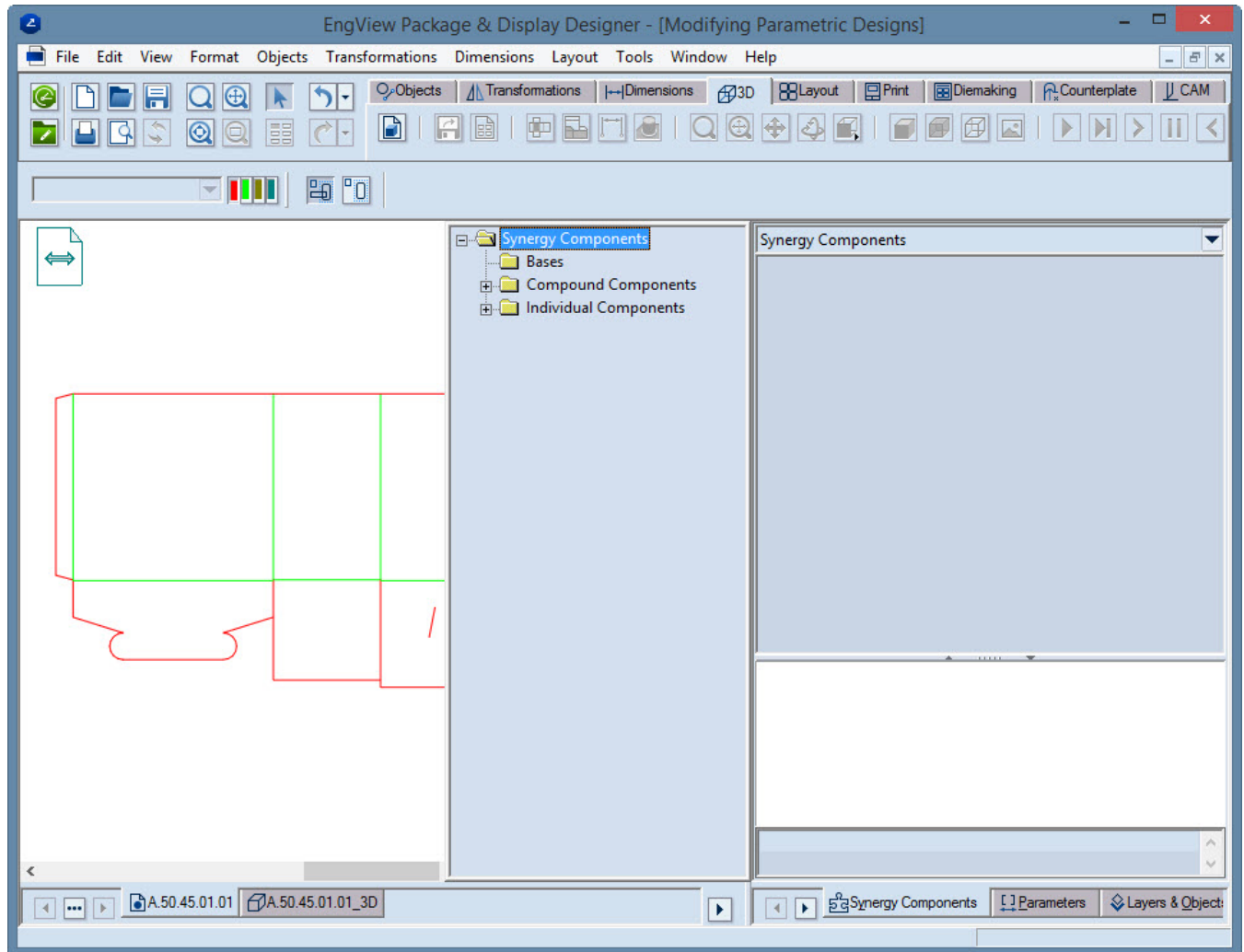


## Attaching Synergy Components to the Design's Structure

The Synergy Components library is a collection of ready-to-use parametric components used in assembling a 2D structural design.

1. Click the **Synergy Components** dropdown menu, and then click the **Synergy Components** folder.

The subfolder structure appears.

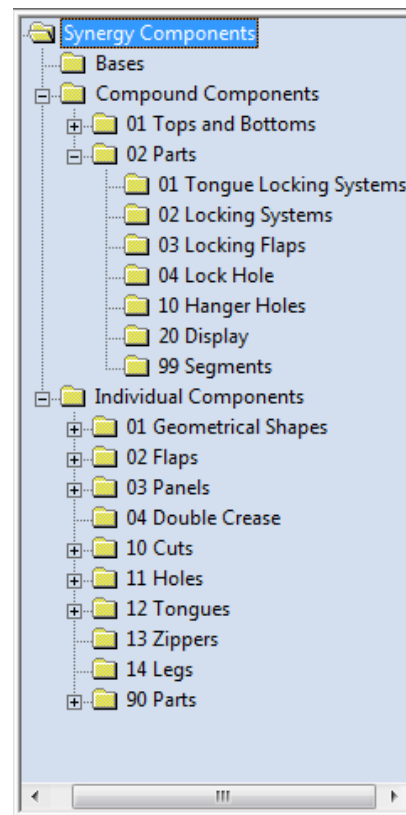


The library consists of three major groups of components:

**Bases** A base component is the foundation on which other components are attached to make up a resizable design. Each resizable design can have only one base, to which you attach single or compound components or whole parts of boxes.

**Compound Components** A compound component is made up of one or several individual (single) components. It represents a ready part of a design — for example, top, bottom, whole locks. It has two or more active control points on which it is attached during the assembly of a resizable design.

**Individual Components** A single component is part of the design attached to the base to assemble a resizable design or to create a compound component. The single component has two active control points.



In our case we will attach a new top by using a compound component. There are two techniques of doing this:

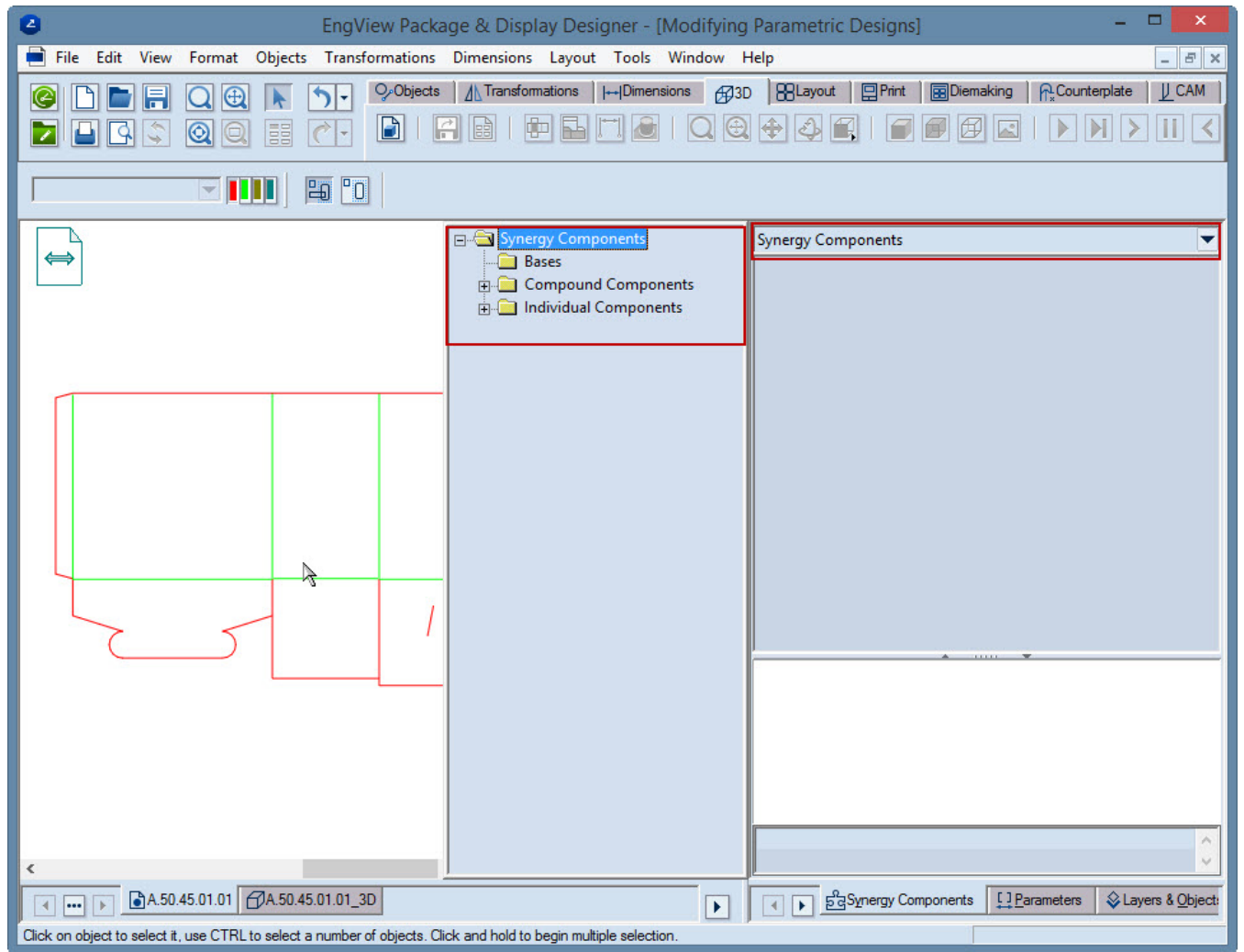
**Modifying without further parameter control** The new components will be well calculated according to the current length and width of the box, but when new values are entered for length or width, the newly attached components will not recalculate. This technique is mostly used when we need to edit the drawing only once – that is, when we know that no further changes for width and length will be made in the drawing.

**Modifying with further parameter control (Advanced Parameter Matching)** The new structure will be well calculated according to the length and the width of the box, and when new values are entered for the length and the width, we will always have a well-recomputed design. This is used when we will make further changes to the design's sizes after the new top has been attached.

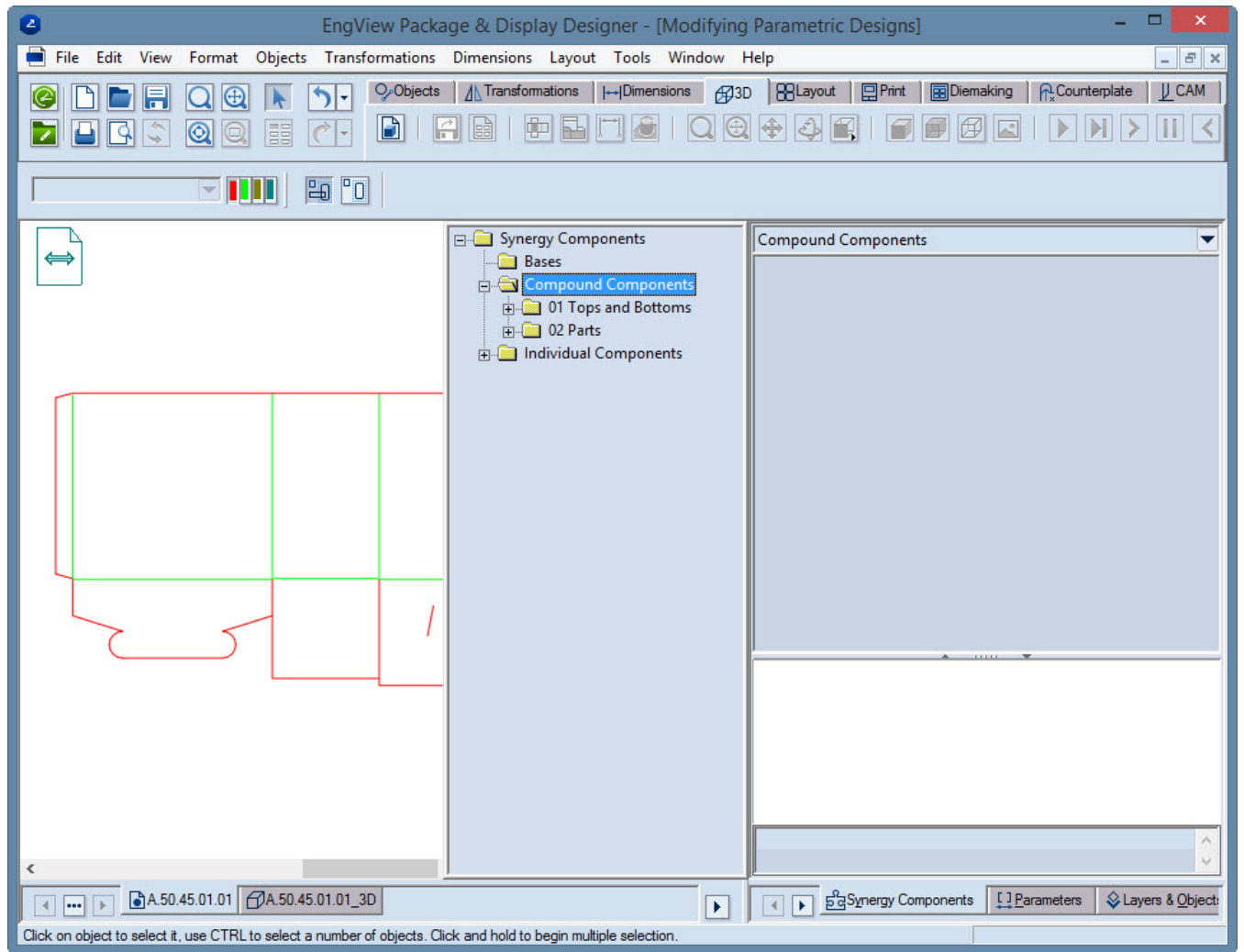
We will do the composition of the structure by exploring the two techniques.

### Modifying without parameter-controlled resizing

1. On the **Tools** menu, click **Options**, and then click the **Synergy** tab.
2. In the Show area, ensure that the **Advanced parameter matching** check box is not selected.
3. Click the Synergy Components dropdown menu, and then click the **Synergy Components** folder.

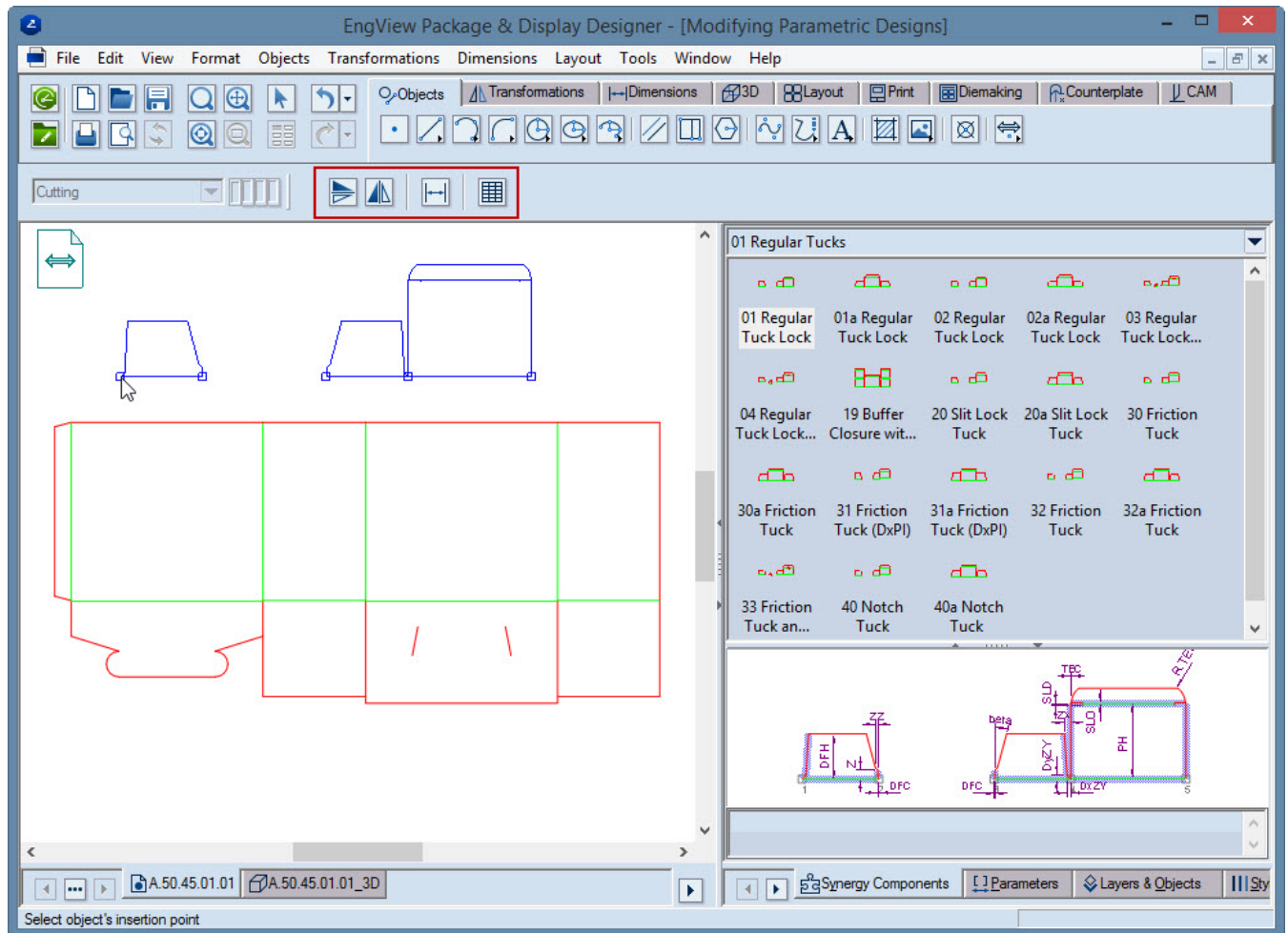


The **Synergy Components** folder tree appears.



4. Browse the sequence Compound Components | 01 Tops and Bottoms | 01 Regular Tucks.  
A list preview of the available components appears in the right-hand area.





NOTE: When you drag a component to the graphical area, four modes become available:



– Horizontal mirror (flips the component along the y-axis)



– Vertical mirror (flips the component along the x-axis)



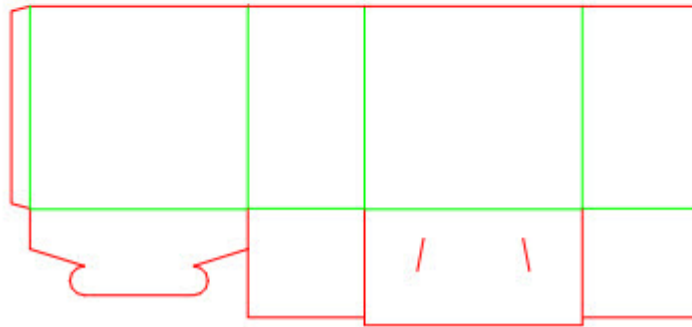
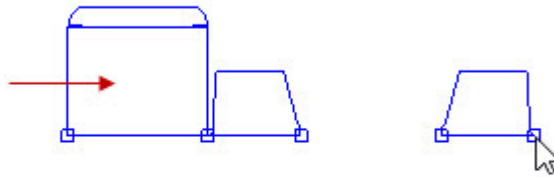
– Shows the dimensions set for the component



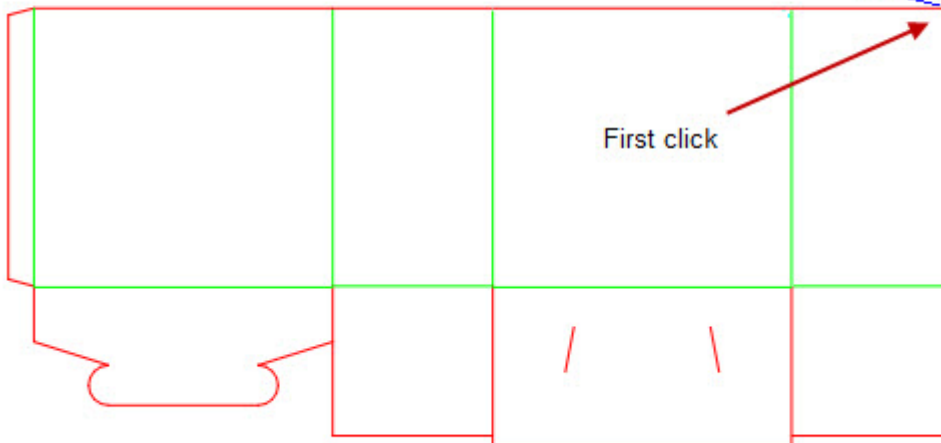
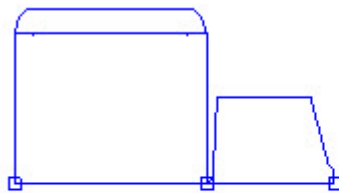
– For a selected component, opens the component's parameters table.

Sometimes, however, we need to mirror a component to be able to attach it correctly and create a valid design. In this case we use the **Horizontal Mirror**  or the **Vertical Mirror**  buttons.

6. Click **Vertical Mirror**  to mirror the component.

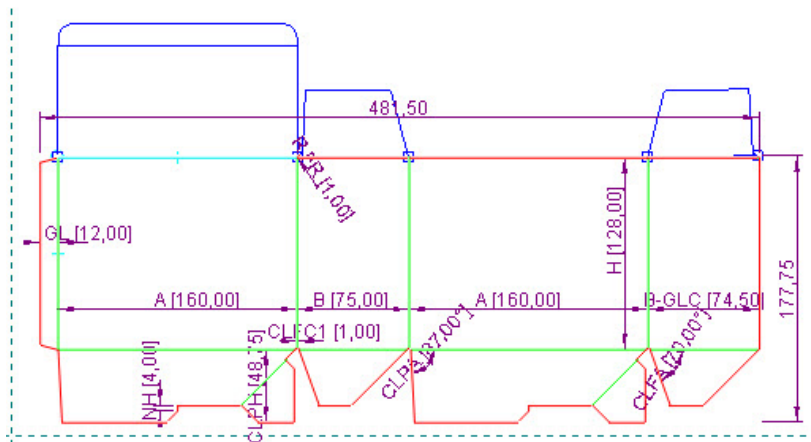


7. Start attaching the mirrored compound component to the base from right to left. Position the first active point of the component on the first point of the base (pictured).



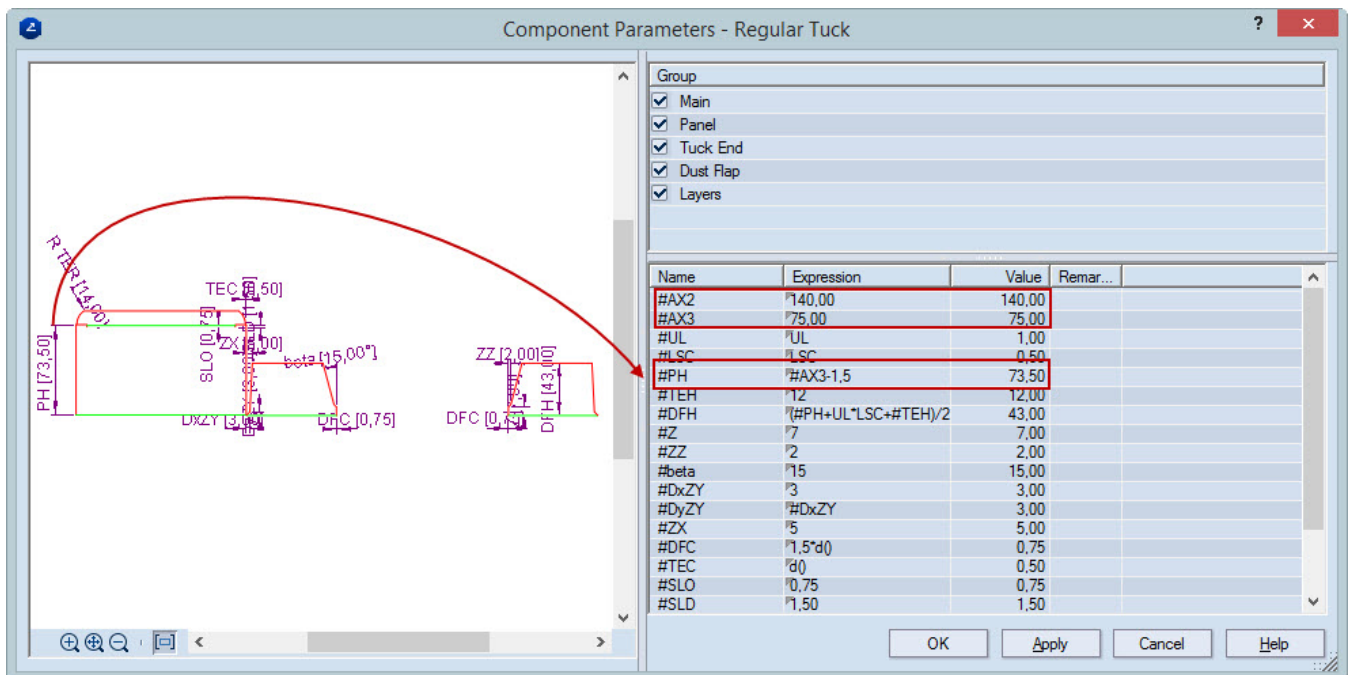


8. Position the second active point on the first folding line and click to attach the point. Position the rest of the active points in the same way, finishing in the left base corner:



After you have attached the last point of the component, the **Component Parameters** dialog appears. Note that the parameters #AX2 and #AX3 have adopted the values of the distances that form during the clicks we made. #AX2 adopts the distance between the second and the third clicks; #AX3 adopts the distance between the third and the fourth clicks.

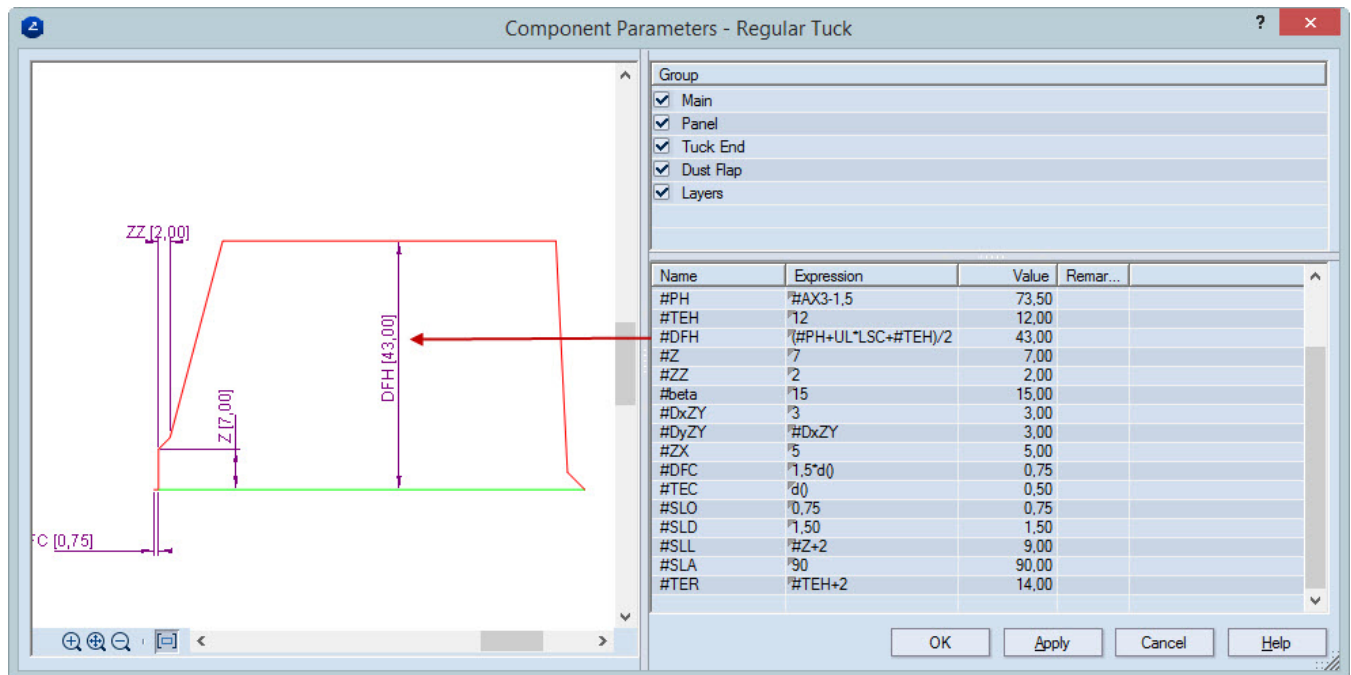
In fact, these distances are the length and the width of the box. Owing to this, the new top was resized according to the base, because formulas exist in the compound component that resize it while it is being attached. In our case this is a panel that has the distance #PH:



Notice that the height of this panel — #PH — is computed in relation to the extracted distance #AX3, which is 75.

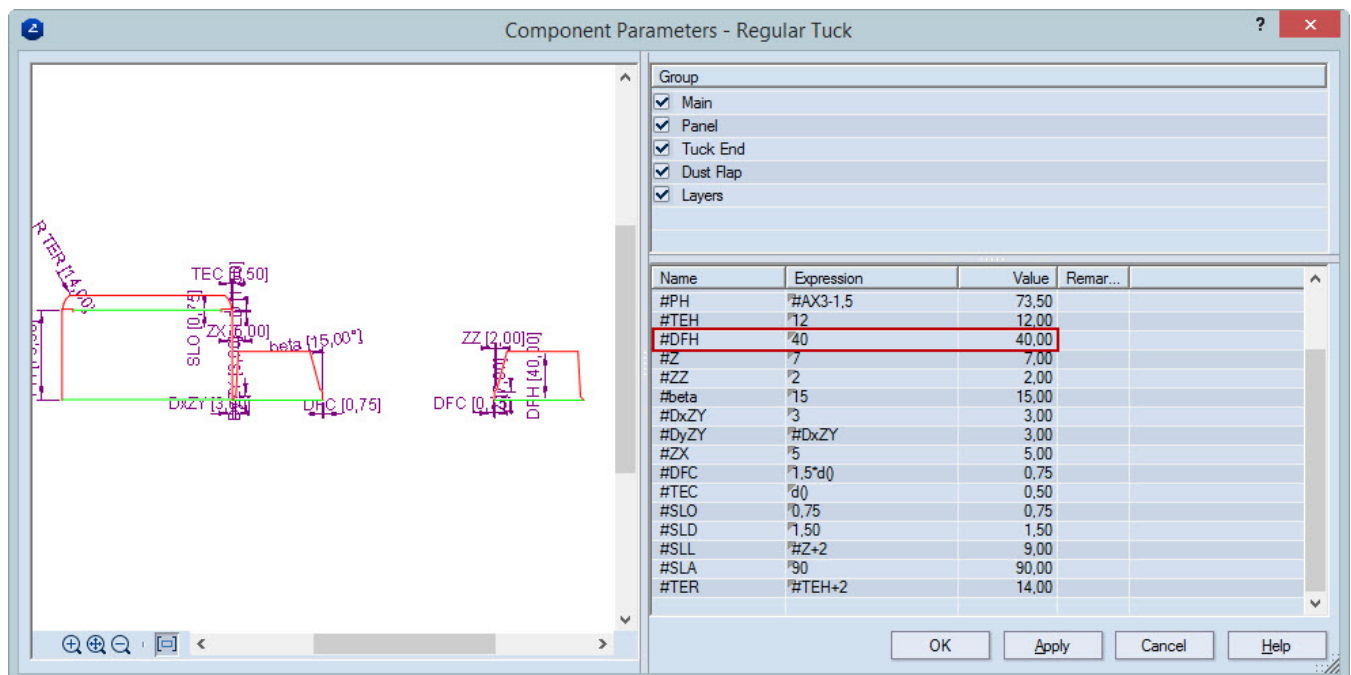


At this step we can edit the parameter values for all parts of the top. For example, the height of the dust flaps (#DFH).



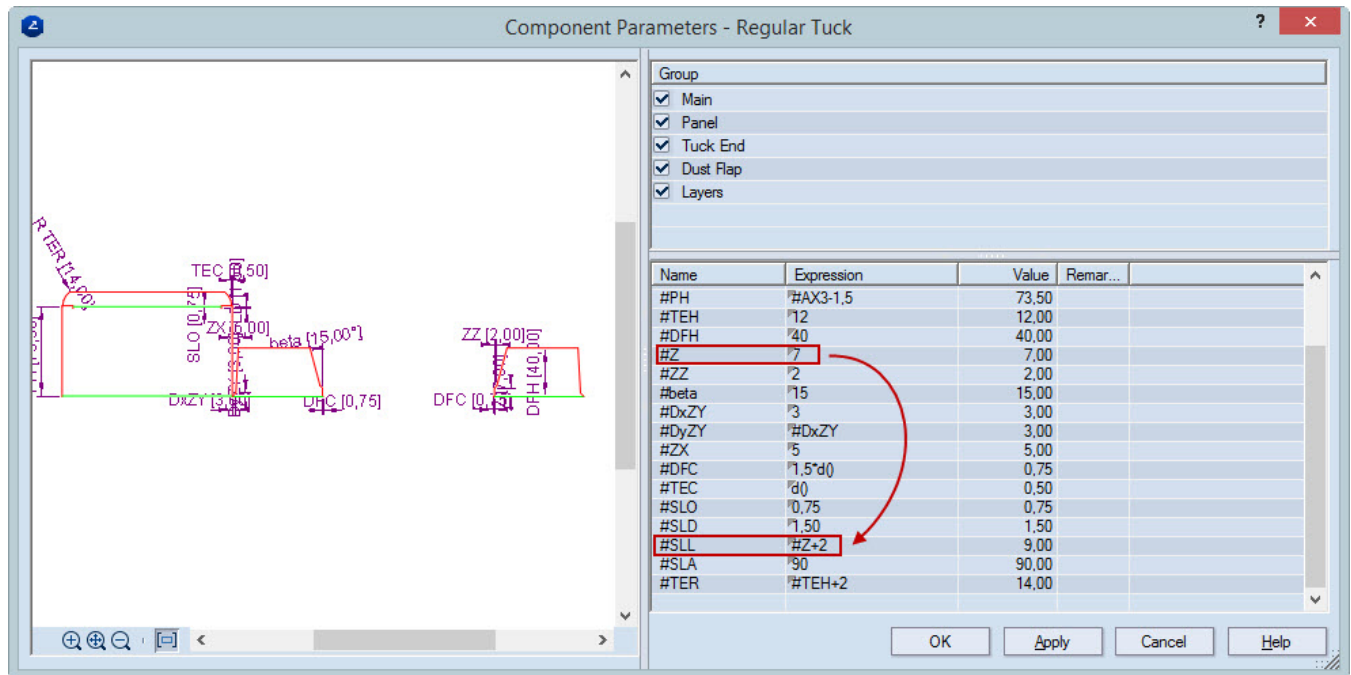
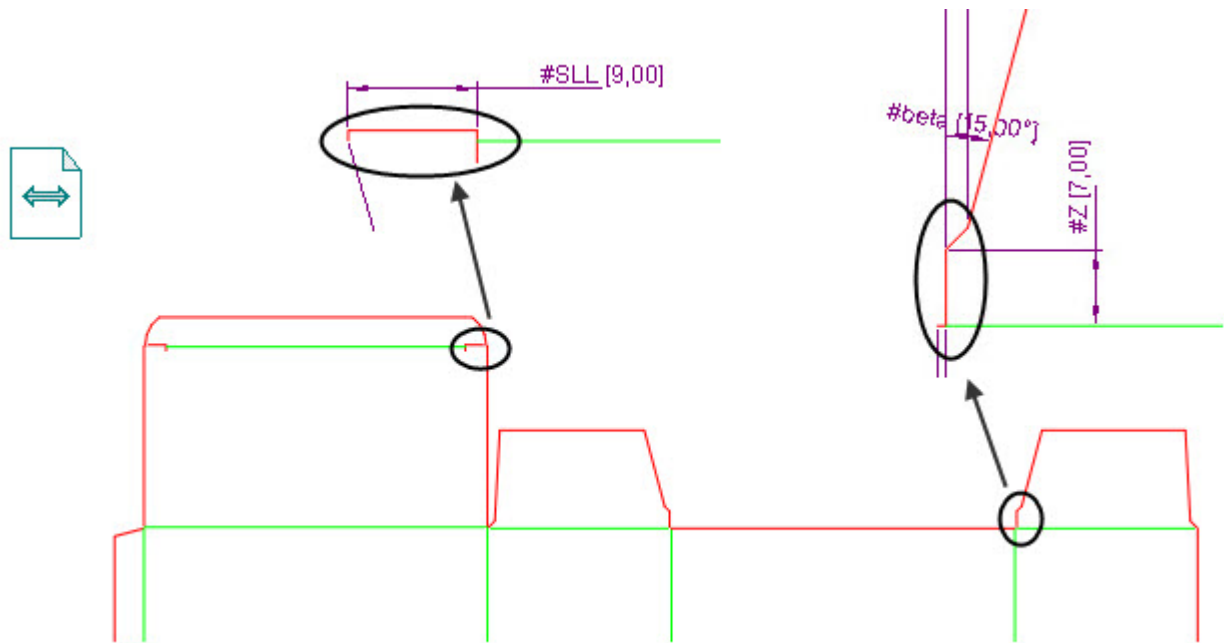
9. Click in the **Expression** field, and type 40.

Note that the heights of the two flaps have changed.



**IMPORTANT:** Dependencies between concrete parts or distances can be preset in compound components. In the current compound component such distances are Z и SLL. These parts or

distances take part in the top's locking system, which is why a dependency has been preset between them.



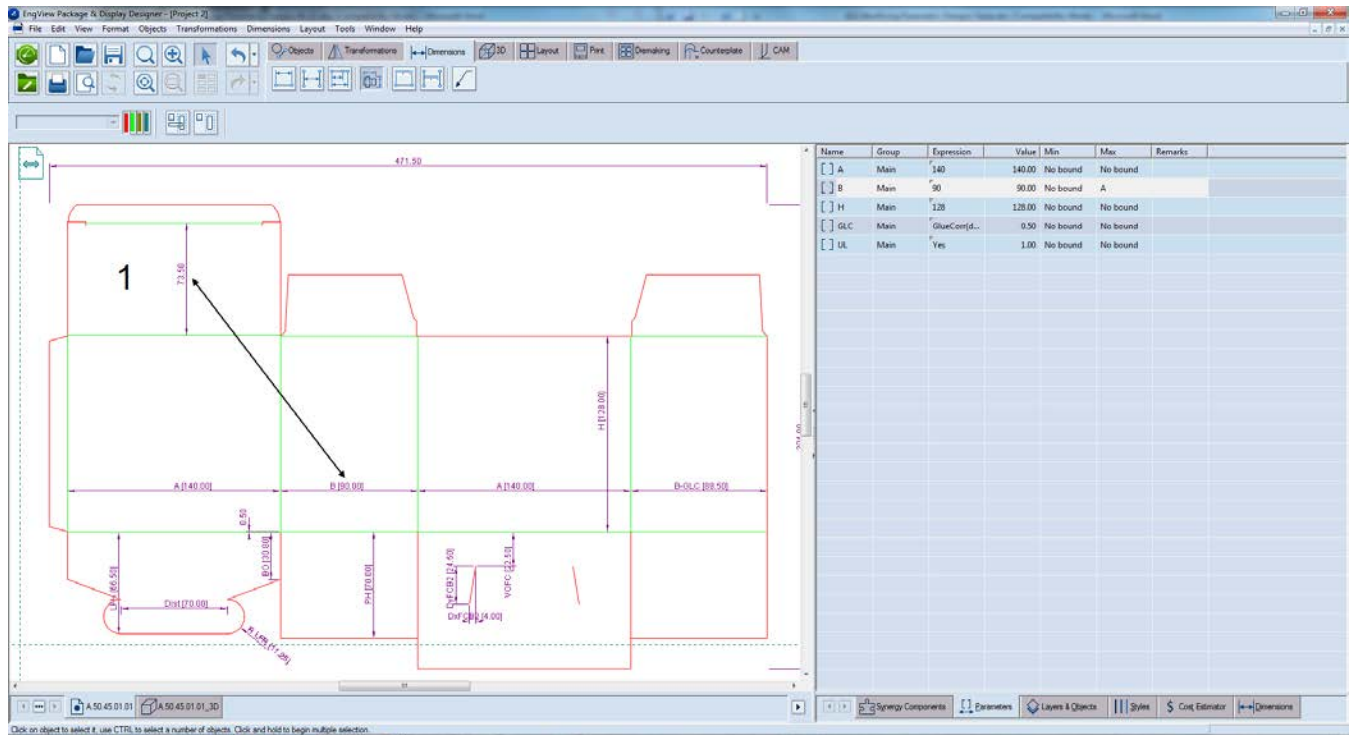
10. Let us now change the value of #Z: Make it 10.

The slit's length has updated.

11. To confirm the values, click **OK**.

The component is now attached to and resized according to the base.





Additionally, note that once the compound component has been attached to the base the compound component breaks down to individual components.



*After the component has been attached, it no longer consists of a single drawing but is broken down to the four individual components it was originally made up of.*

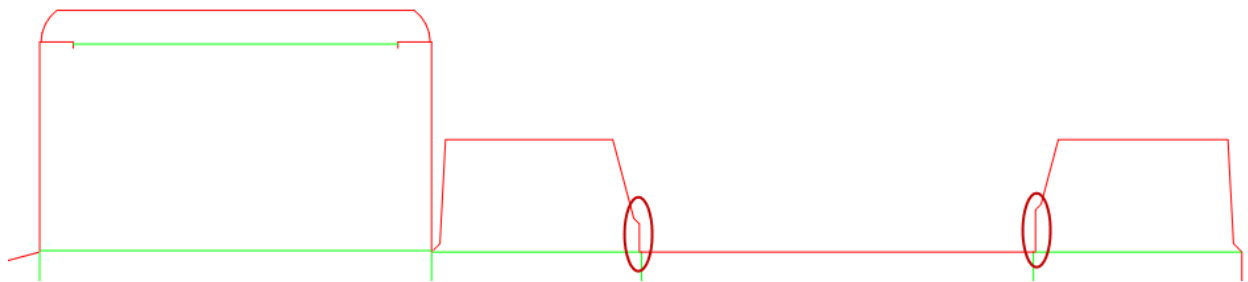
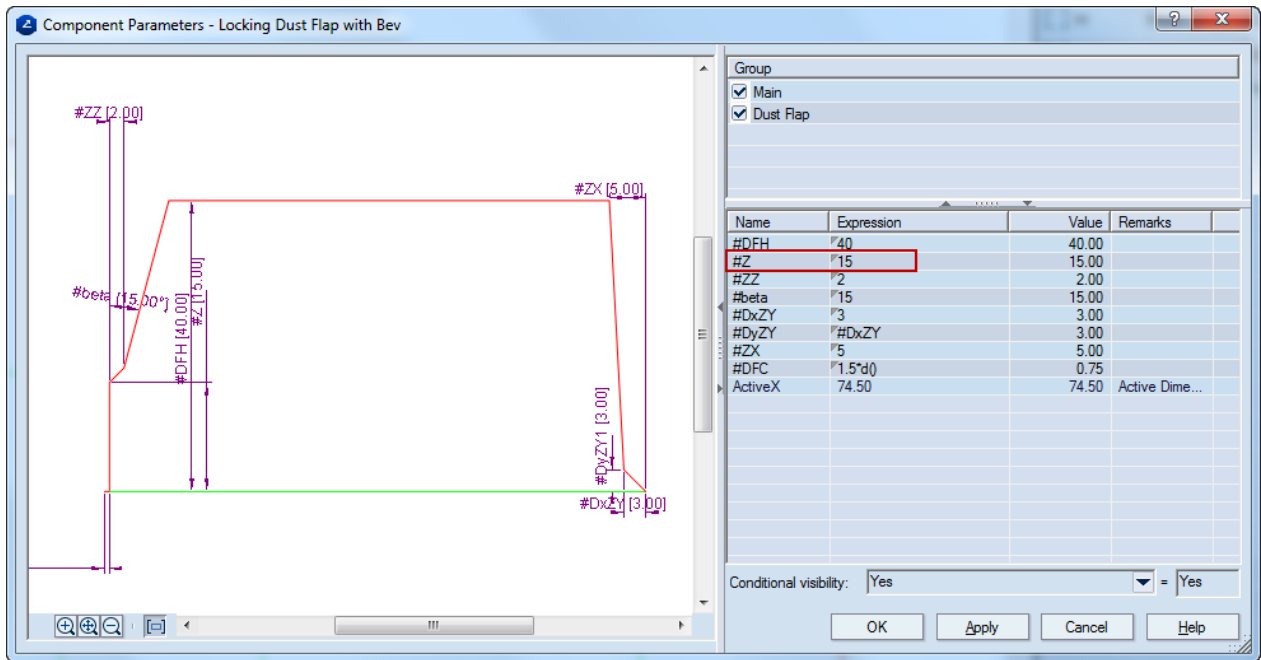
These components no longer have dependencies between them. This means that if we need to edit a distance after the compound component has been attached, other distances linked to that distance in the other individual components will not recalculate automatically and must be edited separately.

For example, if we need to change the size of the top's locking system, we need to edit three components: the two flaps and the tuck-end.

We begin by changing the #Z distance. To do this, we need to open the **Component Parameters** table of the flaps.

12. Double-click one of the flaps and make #Z=15, and then click **OK**.

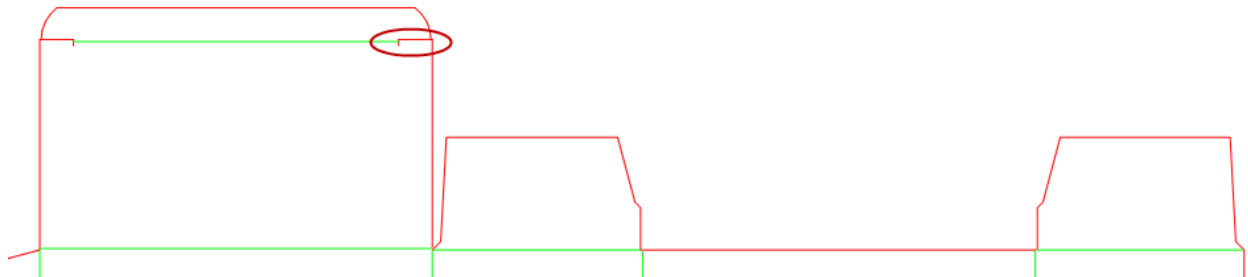
NOTE: To click a components, click any of the line that make it up.



Note that only one of the flaps has changed.

13. Repeat Step 12 for the second flap.

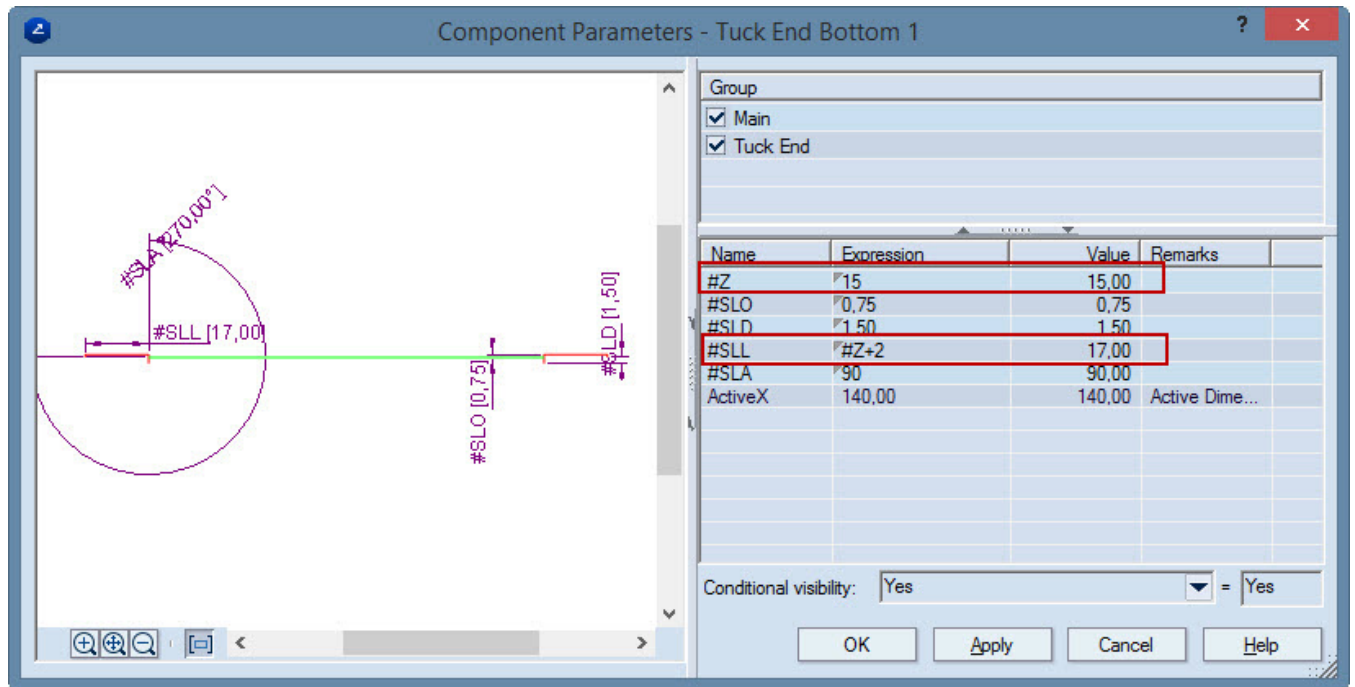
We already mentioned that parts of the flaps take part in the top's locking system. That is, once we have changed them, we need also change the slit of the tuck-end.



14. Double-click the tuck-end.

15. In the table that appears, make #Z=15.

As a result of the formula, the SLL parameter has changed.

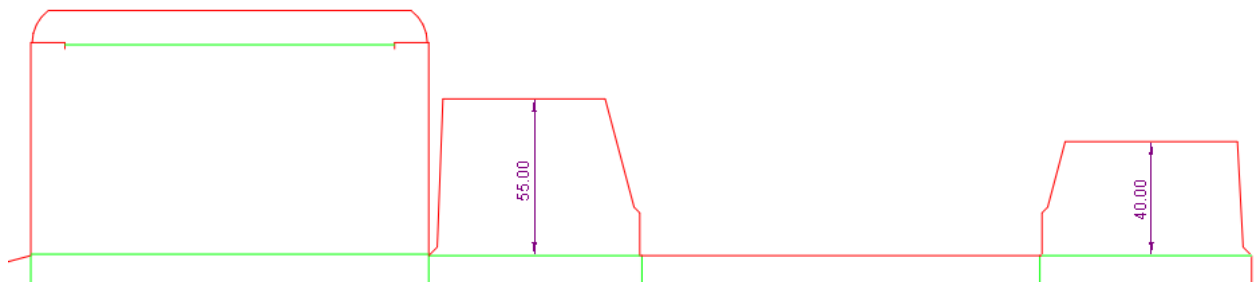


Now we are going to edit the heights of the flaps.

16. Double-click any of the flaps.

17. Make #DFH=55, and then click **OK**.

Note that only one of the flaps has changed.

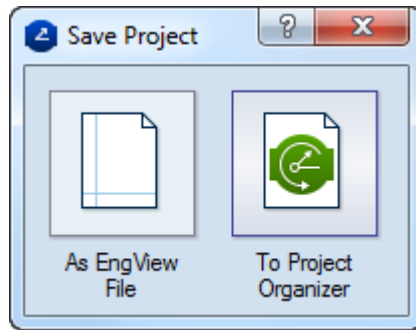


18. Repeat Steps 16 and 17 for the second flap.

19. Save the changes to the file: On the **File** menu, click **Save**.

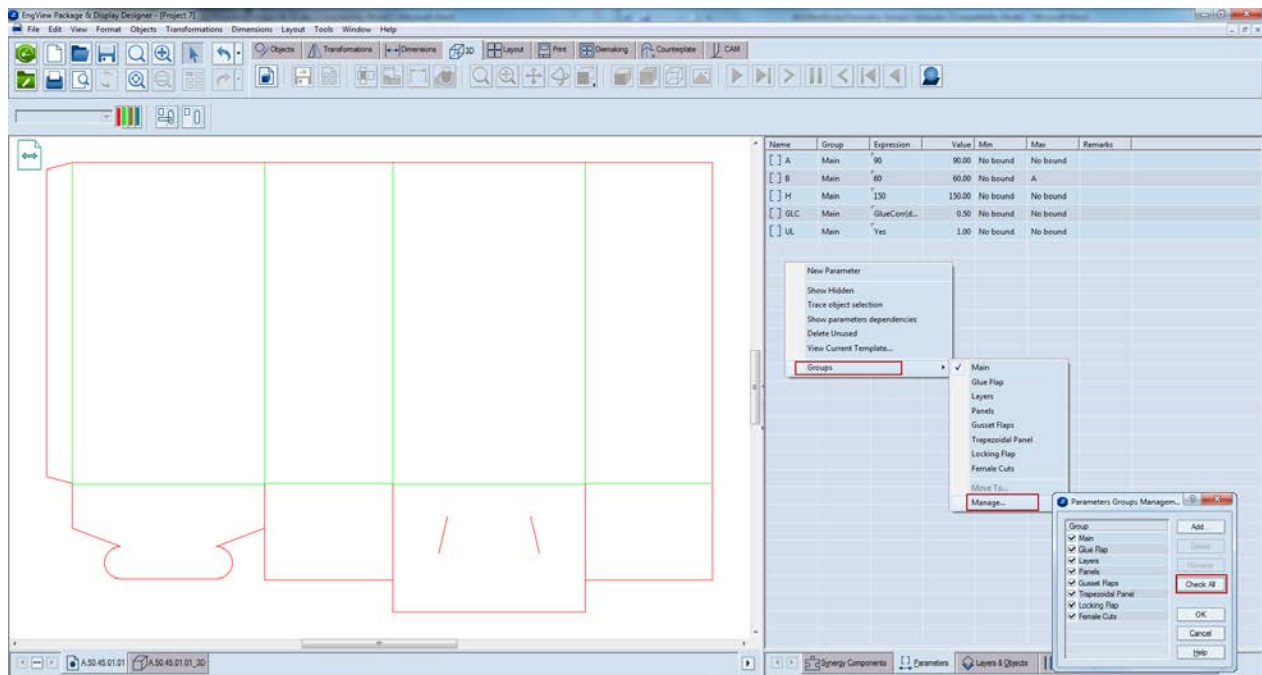
NOTE: There are two ways for saving the file:

- **As EngView File** Saves the file into a default location predefined in the user interface at Tools | Options | File Locations | Working Folders | EVD files. Alternatively, you can browse a location.
- **To Project Organizer** Saves the file into the database of **Project Organizer**, the EngView data management program. This option is unavailable if this software is not part of your configuration.

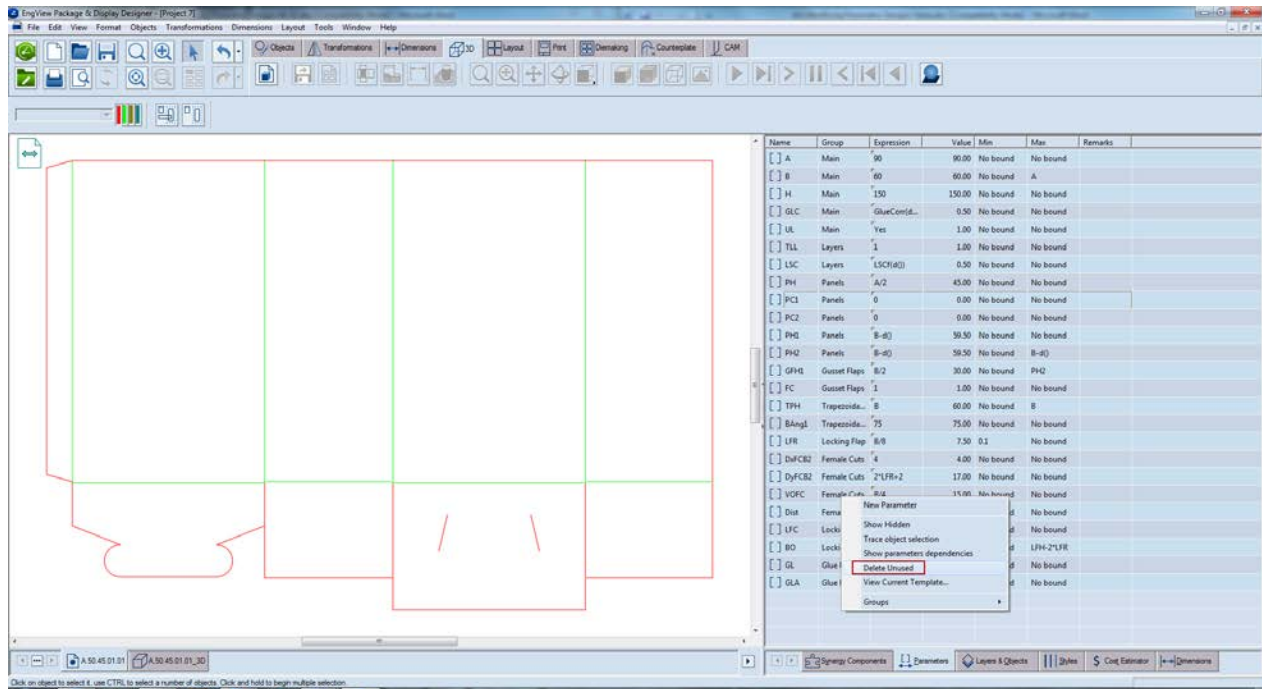


## Modifying with parameter-controlled resizing (Advanced Parameter Matching)

1. Open the resizable design A.50.45.01.01 Claw-Lock Closure Systems – Winged Flap Closure with Dustproof Flaps.evr.
2. Delete the design's top.
3. In the **Parameters** tab, right-click, point to **Groups**, and then click **Check All**.



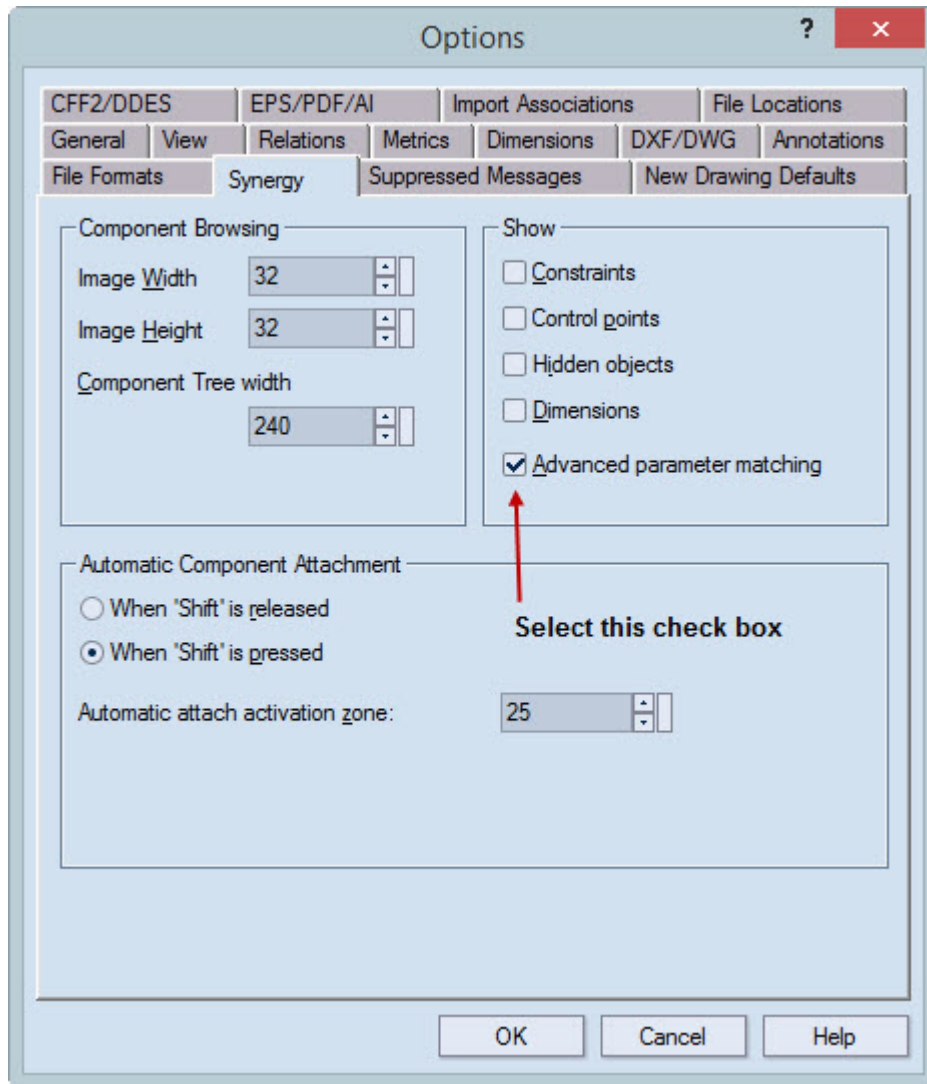
4. After all the parameters are listed in the table, right-click, and then click **Delete Unused**.



*The parameters that have no roles in the design have been deleted.*

5. Make A=140, B=75, and H=130.
6. On the **Tools** menu, click **Options**, and then click the **Synergy** tab. In the Show area, select the **Advanced parameter matching** check box.





Turning on this functionality enables editing the resizable structure by changing the values of parameters after components have been attached.

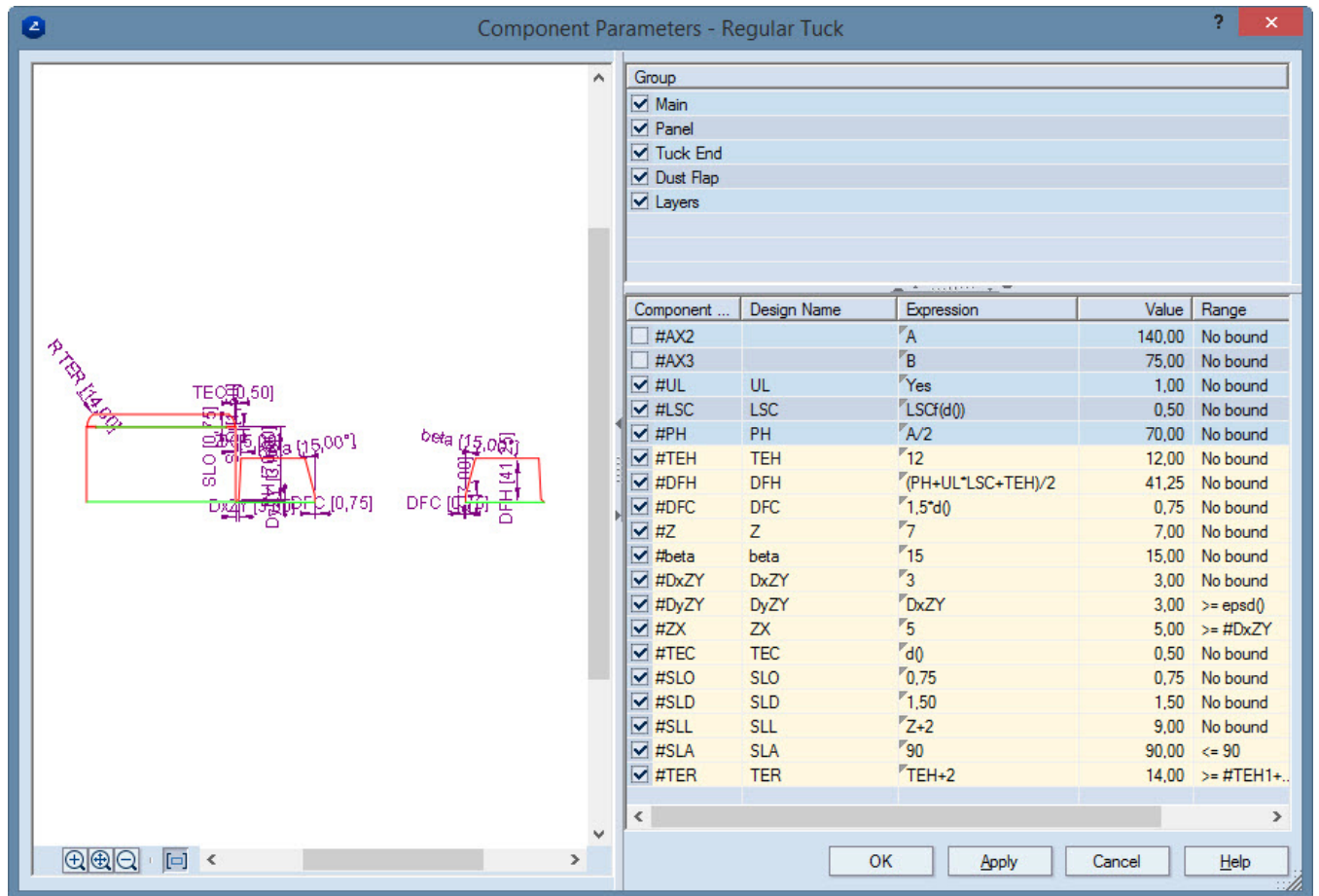
After a component — compound or individual — has been attached its parameters are moved to the project's list.

The benefit here is that during attachment of compound components, the parameters of the compound component became dependable on those of the base. For example, if we change the width of the box, the top panel will recalculate automatically. Another benefit is that the dependencies between the parts of the compound component are preserved.

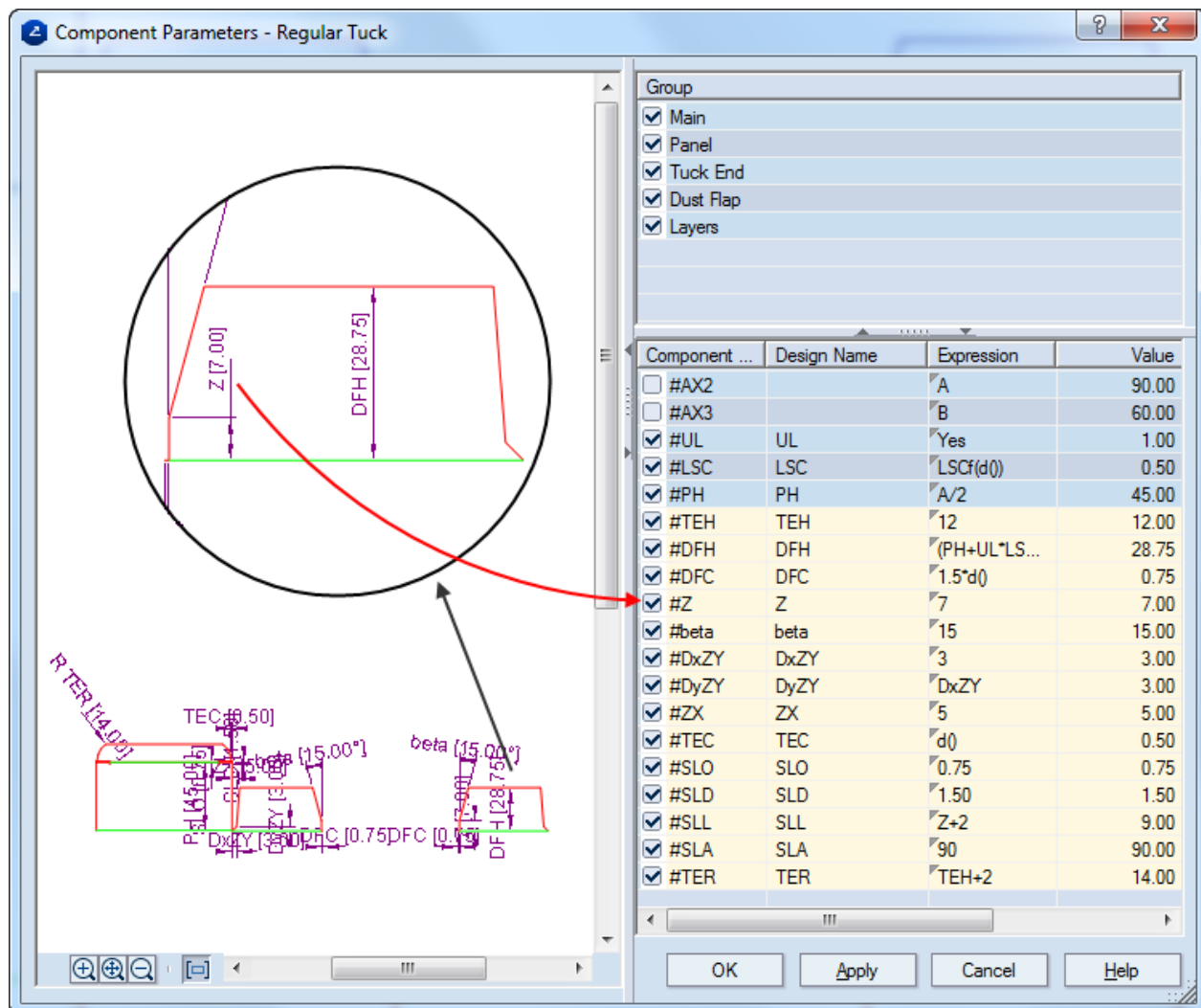
7. Browse the sequence Compound Components | 01 Tops and Bottoms | 01 Regular Tucks, and then attach the component 02 Regular Tuck Lock.

8. Before attaching the component, use the Vertical Mirror functionality  to mirror the component.

After the last point of the component has been attached, the **Component Parameters** dialog opens automatically. The table represents the full list of component's parameters.



As we are working in the Advanced Parameter Matching mode, there are check boxes in front of the names of the dimensions. What does this mean? Let us take a look at the ninth row, displaying #Z. We can see that the distance named #Z will be linked to the parameter Z (displayed in the **Design Name** column), which will appear in the parameters list with the expression 7. As a result, this distance will become editable by changing the expression of the parameter Z.



NOTE: As we have #Z distances in both flaps, the parameter Z will control both flaps at the same time.

Let's pay attention to the distances #AX2 and #AX3 on the top of the list.

We already know that during attachment of the compound component, the program extracts the distances between the clicks and send this data to #AX2 and #AX3. Thanks to the Advanced Parameter Matching functionality, the program detects that parameters exist that have these values and links #AX2 and #AX3 automatically with these existing parameters (A and B here) in the **Expression** column.

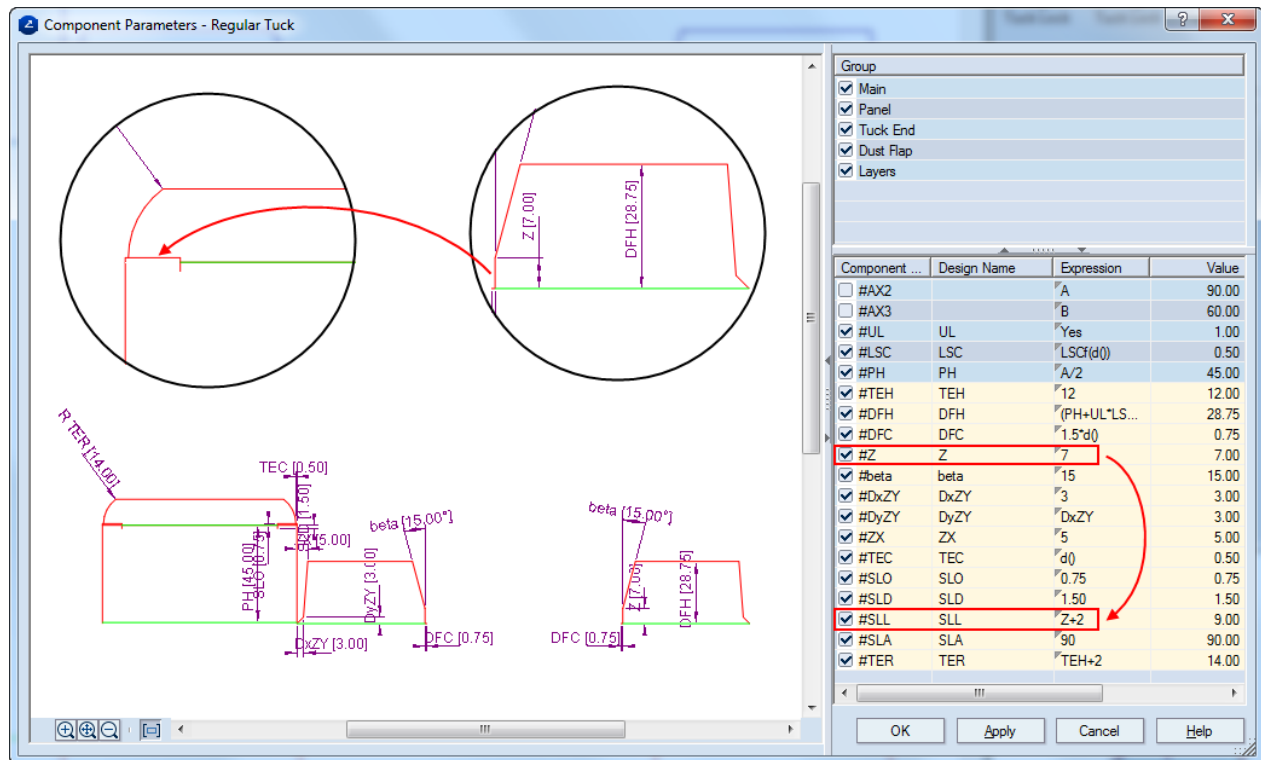
**IMPORTANT:** The local parameters #AX2 and AX3 link the structure that we attach to the base. That is why it is critical that the expressions of these parameters must contain the parameters that control the design's main sizes – in this case these are the parameters A and B. In this way the attached bottom will be recomputed when the expressions of A and B change.

By default, the two parameters are not selected, because they have been substituted by the existing parameters A and B.

Why are some rows with selected check boxes highlighted in yellow?

These rows are highlighted in yellow, because the parameters (in the **Design Name** column), which will be linked to the component's dimension lines, are new for the drawing; they are not listed in the parameters list. Highlighting the parameters means that the parameters named THE, DFH, DFC, Z and others will be added to the **Parameters** tab list. In this way, the corresponding distances will be editable through these parameters.

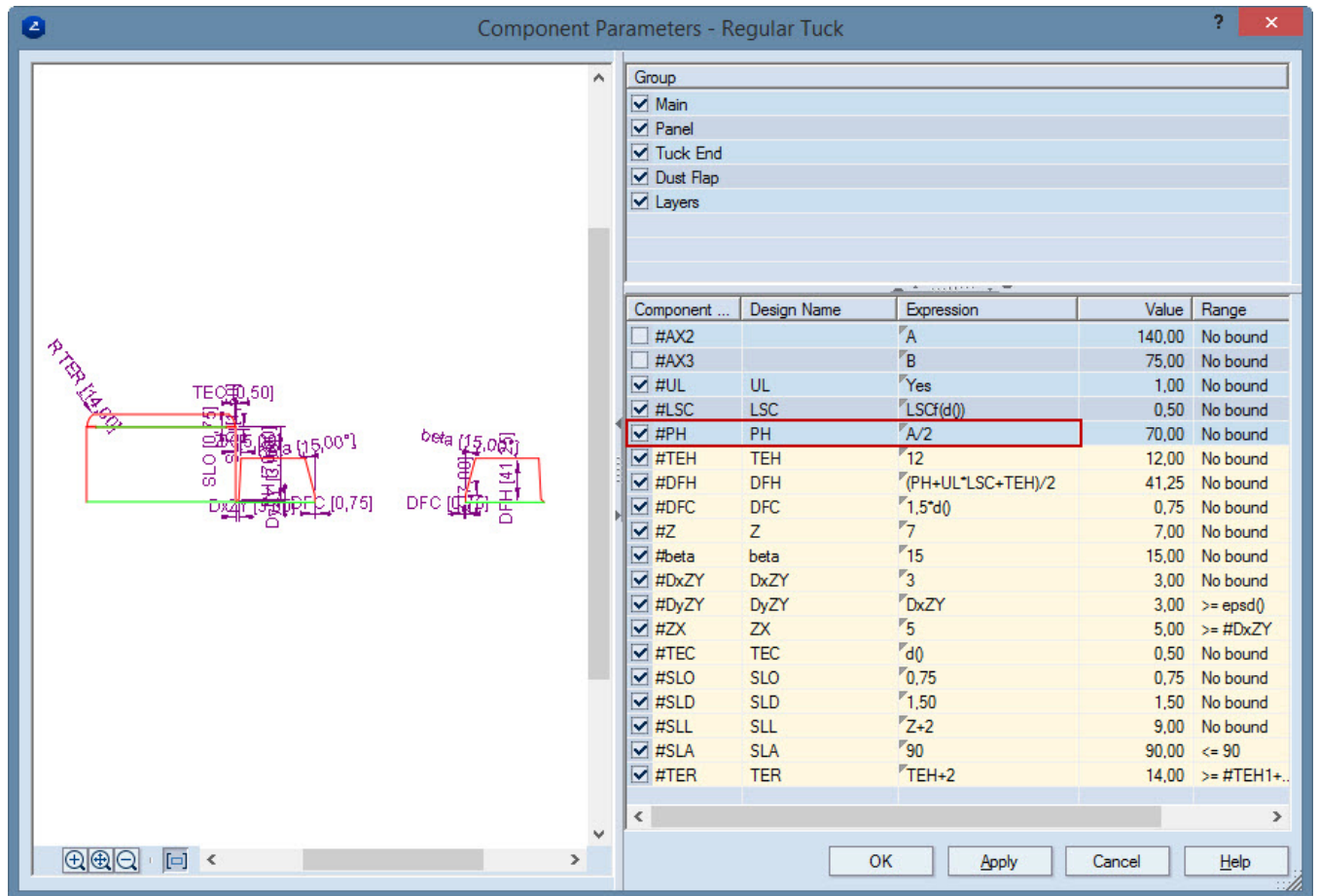
Also, the parameters in the compound component will go to the drawing's parameters list together with the dependences between parameters predefined in the compound component. For example, the parameter SLL depends on the parameter Z.



### Why some rows with selected check boxes are not highlighted?

The grey-highlighted rows mean that parameters that have these names already exist in the parameter list. This means that the expressions of these existing parameters will override the expressions of the parameters in the compound components.

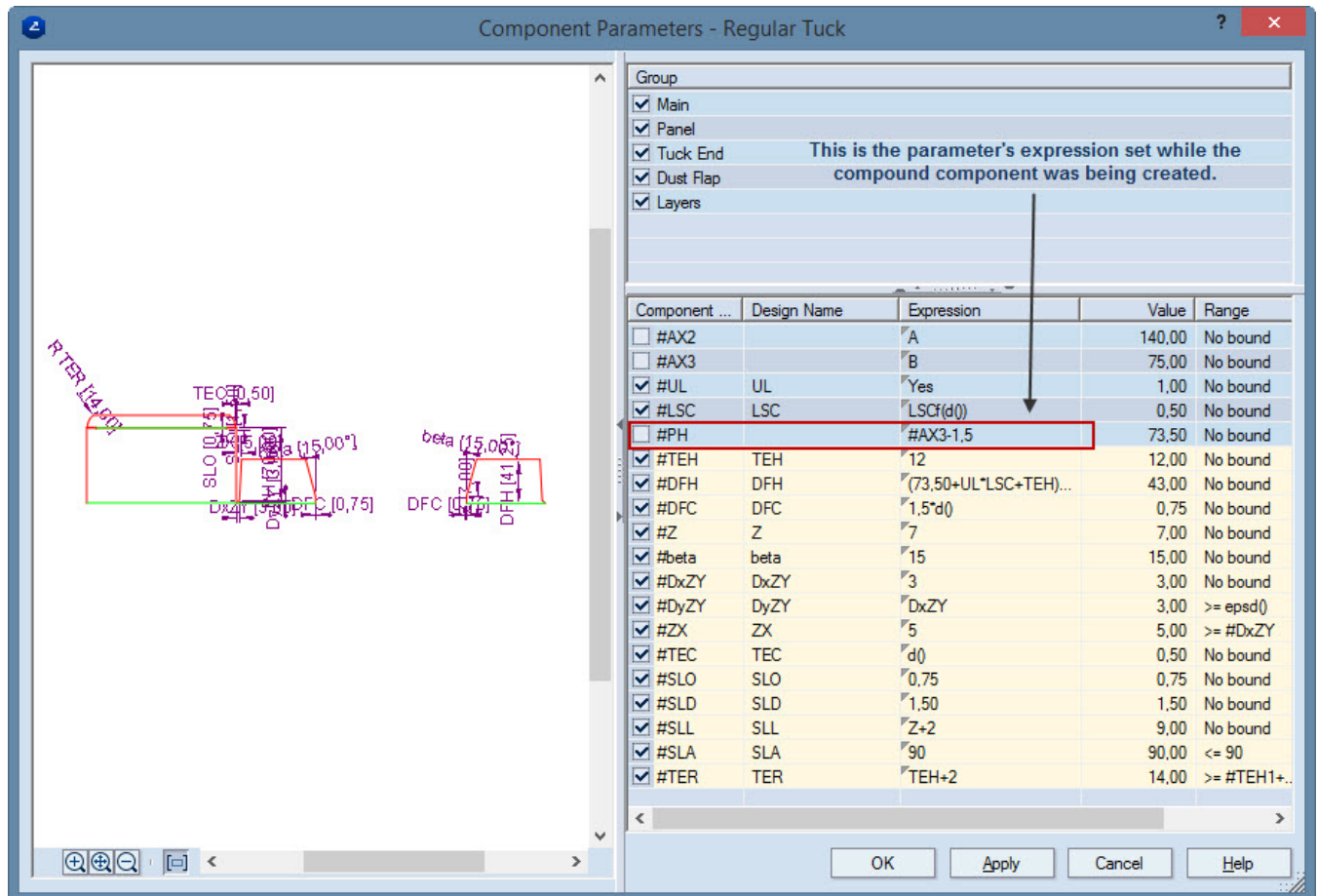
For example, the parameter PH=A/2 had existed in the drawing's parameter list before we attached the new flap. (The parameter controls the flap's height in the box's bottom.)



But in the new compound component the parameter PH is linked to the height of the panel, and it needs to be AX3-1.5. If we leave things as they are, we would have one parameter that controls two different panels that have different functions. This must not be. That is why we will create a new parameter that will control the panel's height in the new top.

9. Clear the check box in front of the #PH distance.

The **Design Name** field is now empty and the formula preset for the compound component has appeared in the **Expression** field.



10. Click the **Expression** field, and then type *PH1* in it.

Note that no dialog box appeared for creating a new parameter. This means that a parameter named PH1 already exists. This means that we need to create a new parameter.

11. To obtain the formula set originally in the compound component, select the check box in front of the #PH, and then clear it. Then in the **Expression** field type PH2.

A dialog box appears for creating a new parameter. Note that in **Expression**, we see the formula originally set for the component. Which is what we need to have.

**New Parameter**

Name: PH2

Type: ☒ Expression  
☐ Selection

Expression: B-1.5

Min:

Max:

Description:

Scope: ☒ Local  
☐ Global

Group

- ☐ Main
- ☐ Glue Flap
- ☐ Layers
- ☐ Panels
- ☐ Gusset Flaps

OK Cancel Help

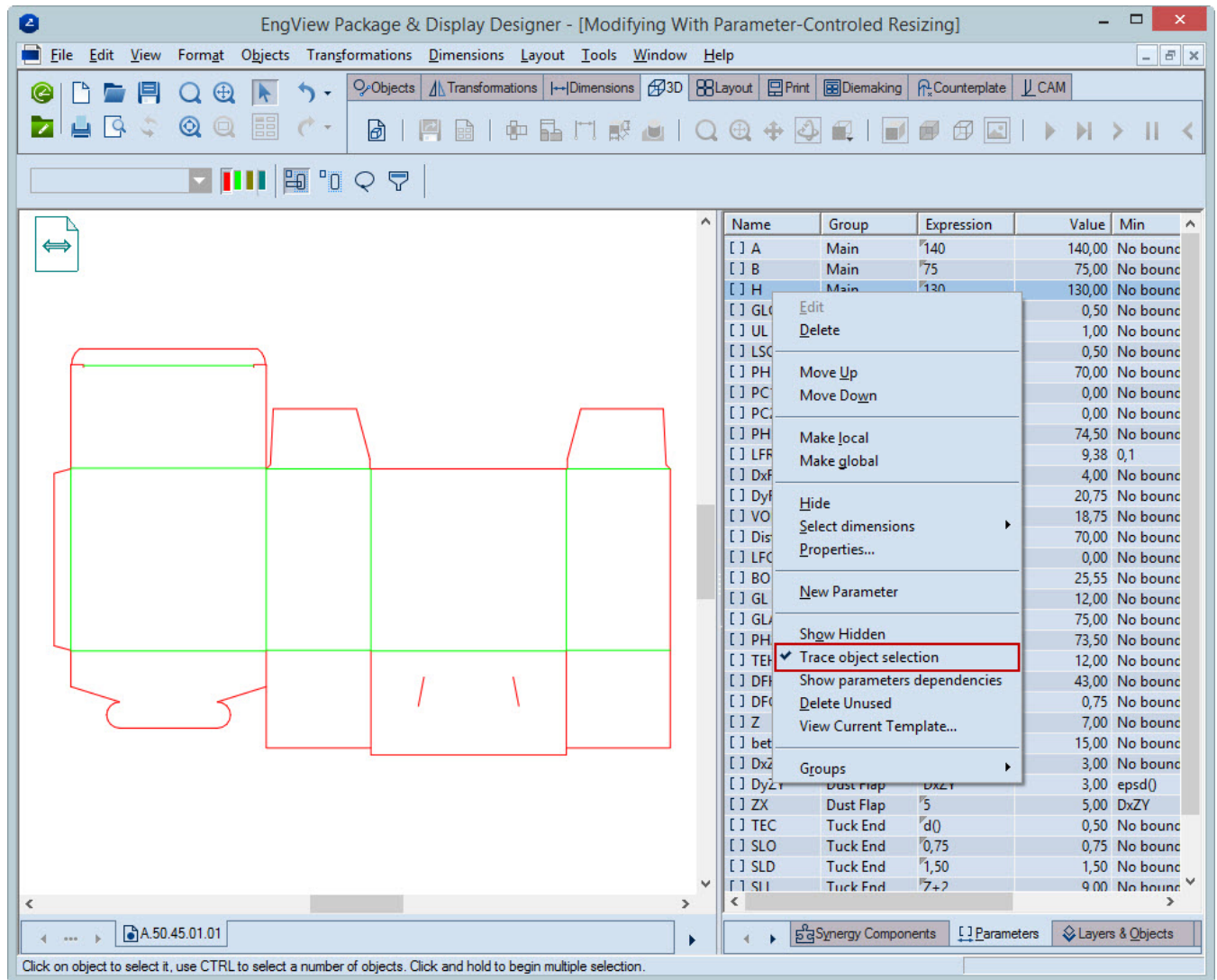
12. Click **OK**.

We now have a parameter that controls the panel's height in the new top.

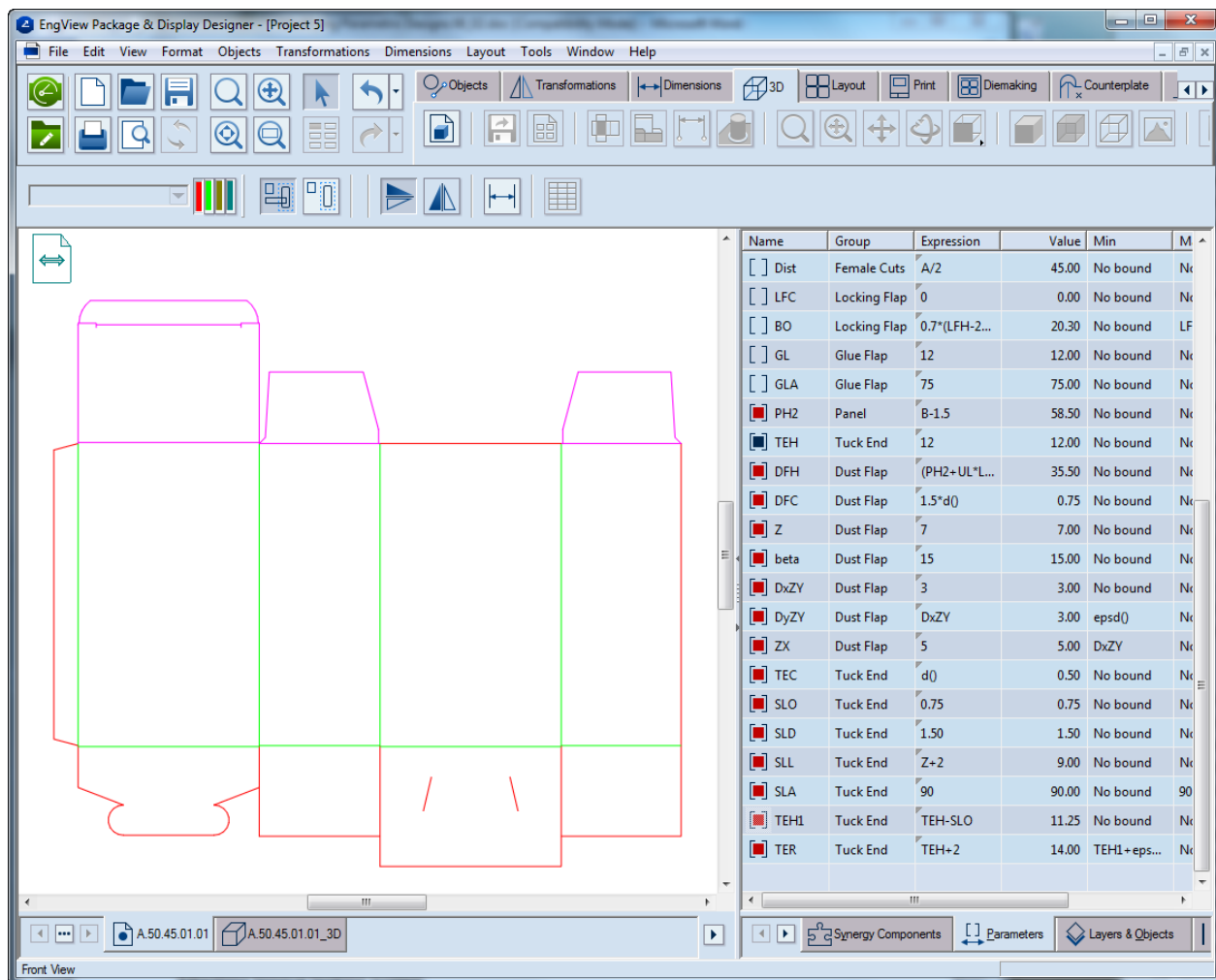








16. To quickly find the parameters linked to the new top, select its components.



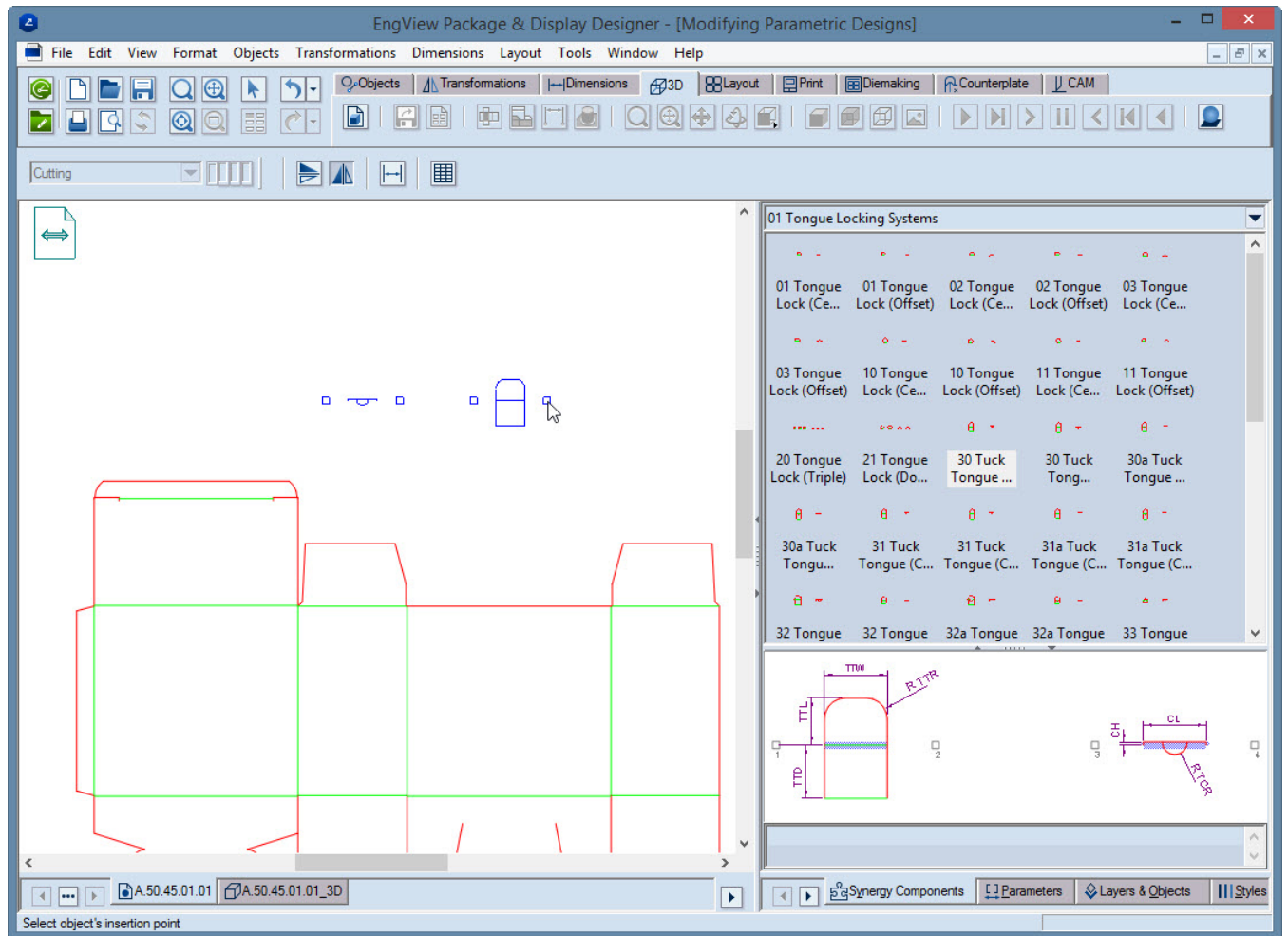
17. Make  $Z=15$ .

Both flaps have been modified, and the slit (parameter SLL) was recalculated automatically.

### Attaching a Tongue Locking System

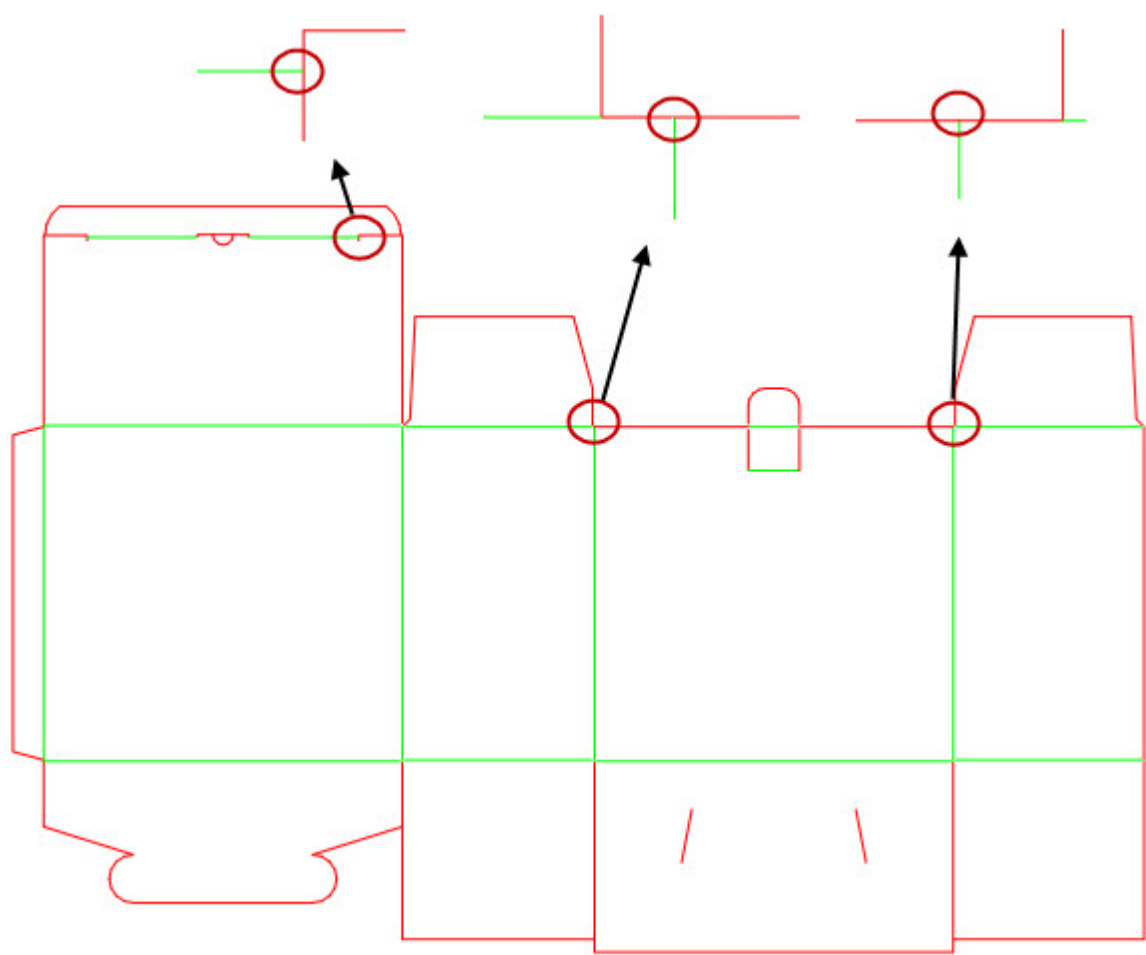
In addition to the top closing system, we can add locking elements.

1. Browse the sequence: Synergy Components Tab | Synergy Components | Compound Components | Parts | Tongue Locking Systems.
2. Select the 30 Tuck Tongue (Centered) component, and then drag it into the graphical area.
3. Mirror the component vertically in order to prepare it for correct snapping towards the basic structure.

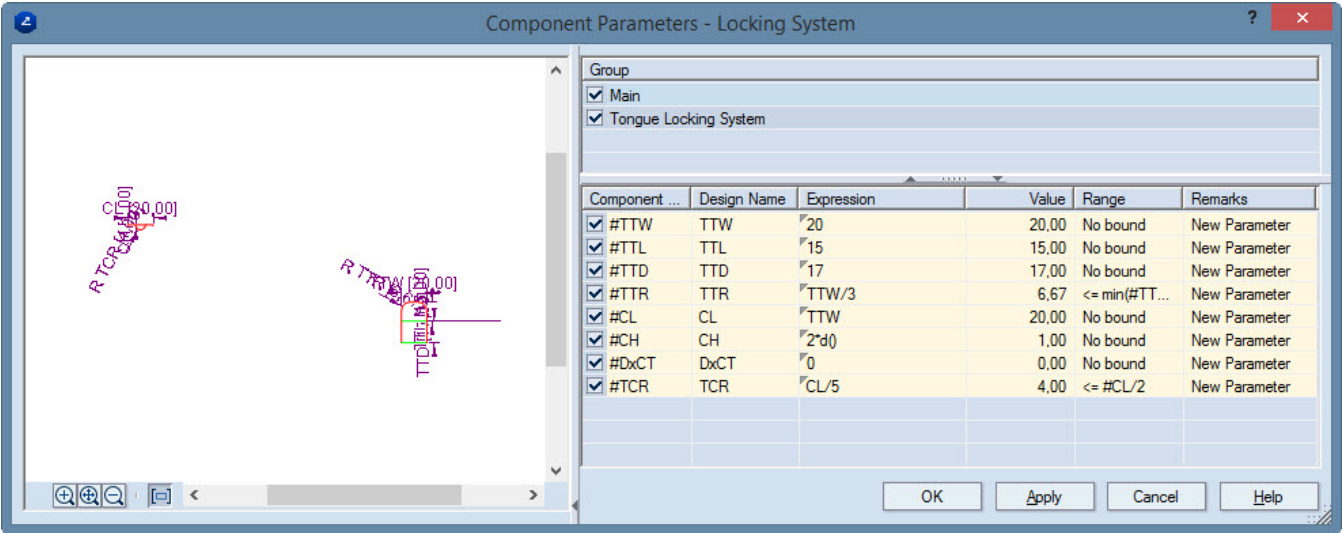


4. Start attaching the active points of the components from right to left on the base structure (pictured). We need to pay attention to which control points the new components are attached so

that they are correctly centered on the structure.

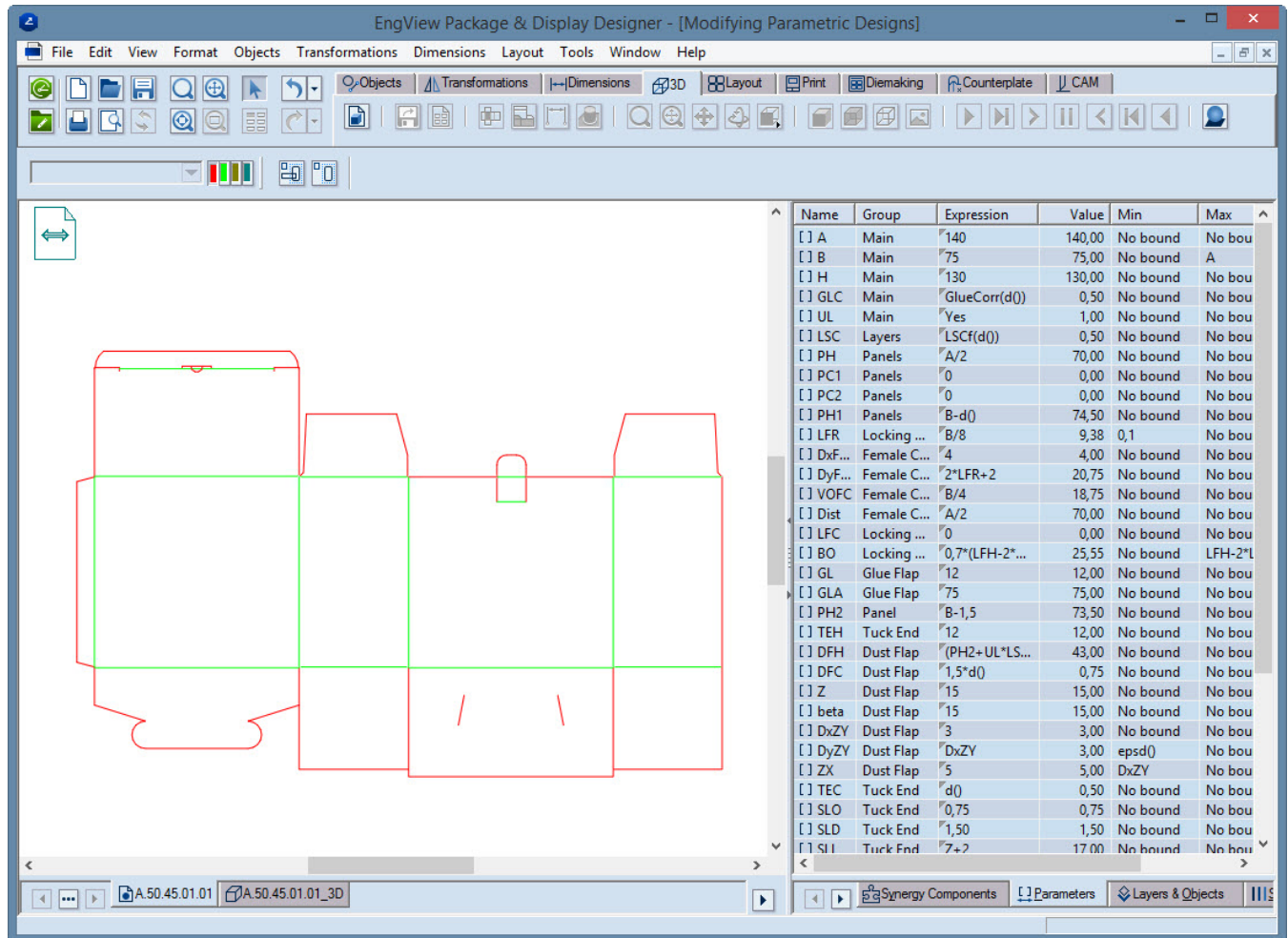


After the last active point is attached, the **Component Parameters** dialog opens.



The highlighted rows indicate that all the parameters in the component are new for the project and will be included in the project's parameter list after **OK** is clicked.

5. Click **OK**.



NOTE: The new parameters came with the expressions set in the compound component. That is why the dependency between the tongue width (TTW) and that of the slit (CL) was transferred also in the project's parameter list.

6. Save the file.