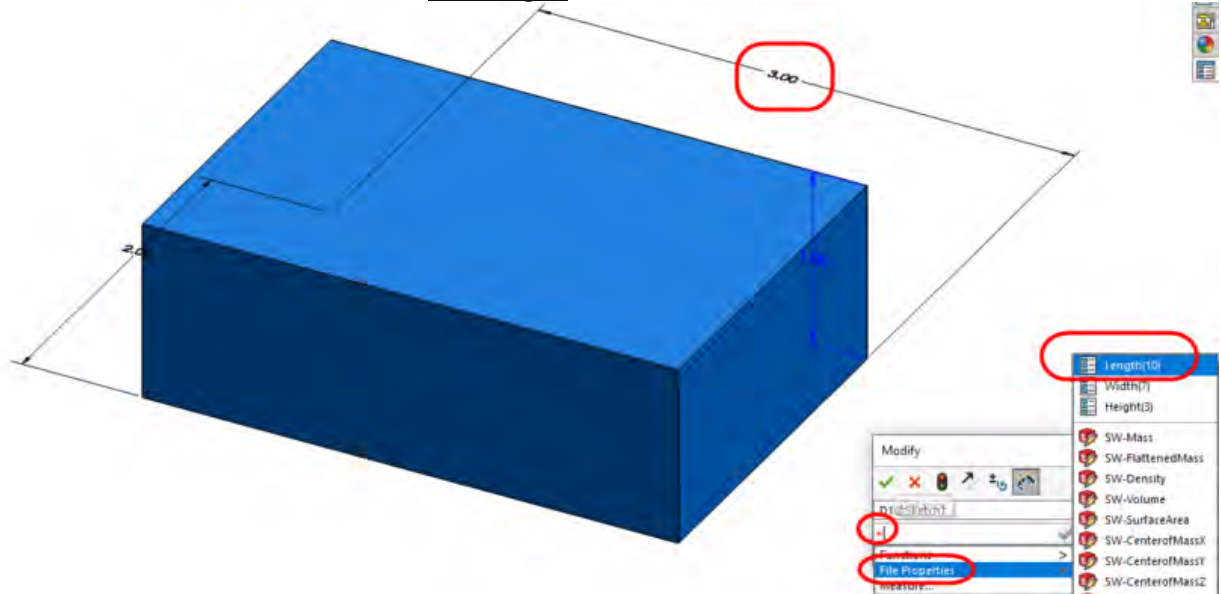


Discover SOLIDWORKS Custom Properties



Alin Vargatu December 4, 2019



Engineers Dislike Performing Data Entry Tasks

There are few things that engineers and designers dislike more than performing clerical tasks, especially data entry. They'd rather spend their time designing, modeling and performing validation studies.

What they hate even more than data entry is having to manually enter the same data more than once—in multiple places. Not only is it a boring operation, but every engineer knows that duplicating data entry is not only costly, but also inherently dangerous:

- It's a significant waste of engineering time.
- There is the potential for there to be contradicting data after revisions are made (if any data record is not updated), which could cause uncertainty in production and purchasing, or even for the wrong product to be ordered, manufactured or delivered.

Data should be stored in one place, then referenced in multiple other places by any stakeholder.

Fortunately, modern parametric CAD platforms like SOLIDWORKS have all the tools needed for enabling users to enter any data only once, in one place, and have it referenced by stakeholders in multiple places. Stakeholders could include but are not limited to:

- Designers
- Engineers
- Checkers
- Managers
- Purchasers
- Sales professionals
- Marketing professionals
- Programmers
- Manufacturing personnel
- Installers
- Dealers
- Suppliers
- Customers

Custom Properties in SOLIDWORKS

Have you ever wondered how many different ways SOLIDWORKS users can enter, modify or read data in SOLIDWORKS? Let's work together to find out!

For the scope of this article, we are focusing on the functionality available in SOLIDWORKS Standard license. We assume that readers have experience in creating, editing and reading custom properties, and are looking for tips and tricks for improving their productivity.

1. Traditional File Properties Menu

The file properties menu is the most popular and probably the least efficient way to enter or read custom properties. Note that it can be accessed with a single click from the standard toolbar (Figure 1).

Pros:

- Very popular
 - Straightforward
 - Access to both Custom properties (file specific) and Configuration Specific properties
- Cons:

- Cumbersome; requires multiple clicks to achieve anything
- Information overload: all properties are listed
- Data cannot be sorted

Tip #1: Copy and paste multiple properties from one file to another:

1. Select the rows you need copied
2. Press CTRL+C
3. Switch to a different file or a different configuration
4. Open the file properties dialog box
5. Select on row
6. Press CTRL+V

2. Property Tabs

The property tab is one of the most efficient tools for inputting, editing and reading custom properties, especially in assemblies.

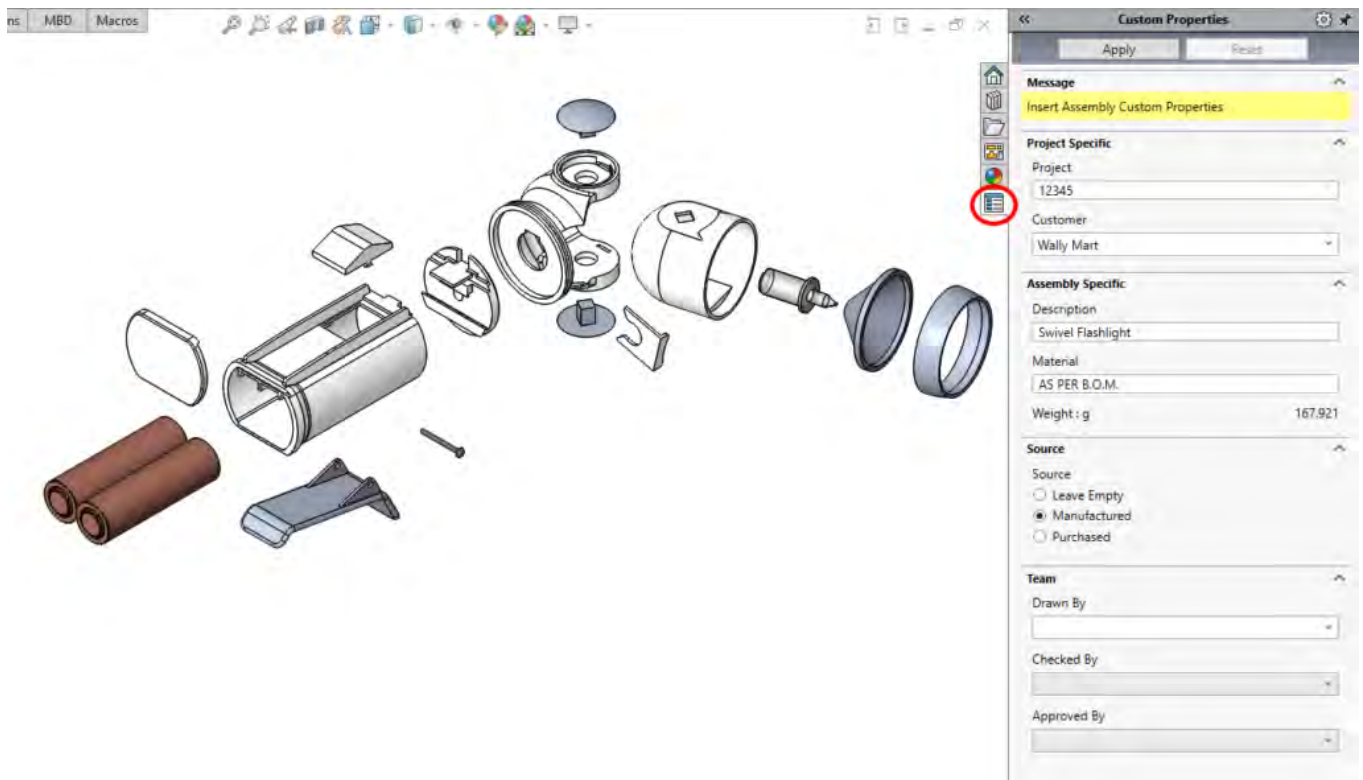


Figure 3. Property tab—Top Level Assembly (with no component selected.)

Pros:

- One-click access
- Instant probing of properties belonging to components selected in the graphics area or FeatureManager design tree
- Customizable interface
- Fosters consistency in a team of SOLIDWORKS users
- Allows for creation of property tabs for: Parts, Assemblies, Drawings and Weldments
- Multiple ways to configure the interface: Text fields, Drop-down lists, Number fields and Decisions (including Checkboxes Yes/No, Radio buttons up to 10 different options, Conditional lists with parent/child relationships using radio buttons, checkboxes or lists)
- Can read data from external files: Text files, Excel spreadsheets
- Allows for bulk data entry for multiple components
- Allows for probing (reading) data from multiple components
- Allows for read-only fields (great for companies mandating that all data be input only in PDM data cards)

Cons:

- There is no universal tab that could work for both part and subassembly files; as a result, when selecting components of different types, the following error shown in Figure 4 is displayed:

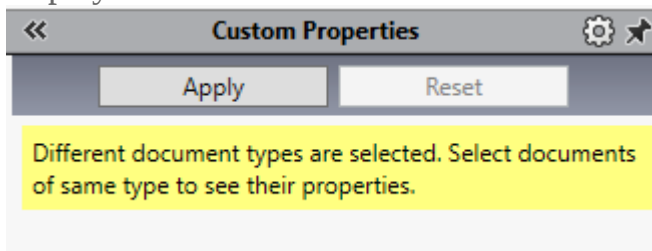


Figure 4. Error message when selecting part and subassemblies components simultaneously.

- When components have data that was previously input via property tabs using different templates—if they are selected simultaneously—the following error shown in Figure 5 is displayed:

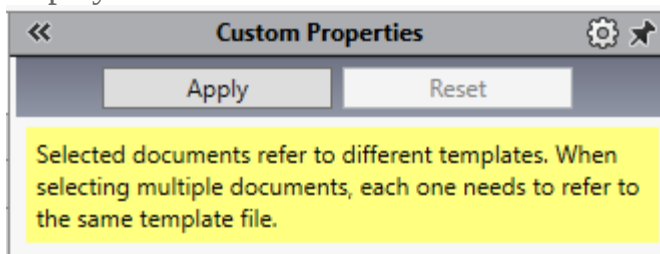


Figure 5. The most frustrating error message when using property tabs.

- Since there is no filter for selecting Cut-List items from the graphics area, using a Weldment-level property tab is cumbersome.
Best practice:

Property tabs should be set up by a CAD admin, or a poweruser and shared by the whole team.

Tip #2: Use Saved Advanced Selection for preselecting in bulk part or subassembly components before using the property tab to edit data in bulk on all selected files:

1. Select the drop-down arrow next to the Select icon (to reduce mouse travel, you can use the Shortcut toolbar, also known as S-key toolbar).
2. Take advantage of the fact that: Part extensions contain the string *sldprt*; and Assembly extensions contain the string *sldasm*.
3. See Figure 6.

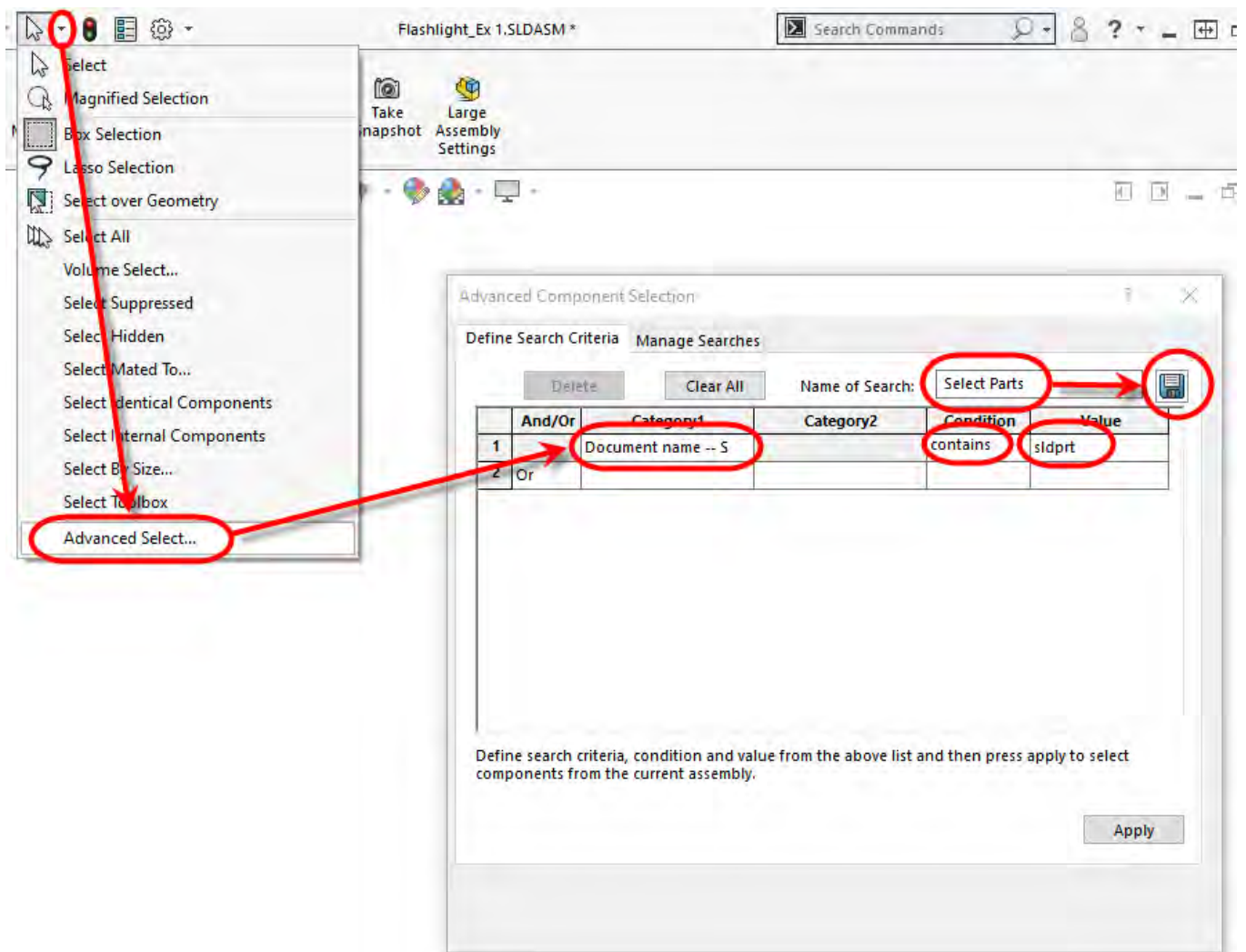


Figure 6. Setting up an Advanced Selection for Part files.

Add the saved Search to Favorites. Optionally, Export the search for the benefit of the whole engineering team (shown in Figure 7):

- Select the search(es)
- Click on “Export Search...”

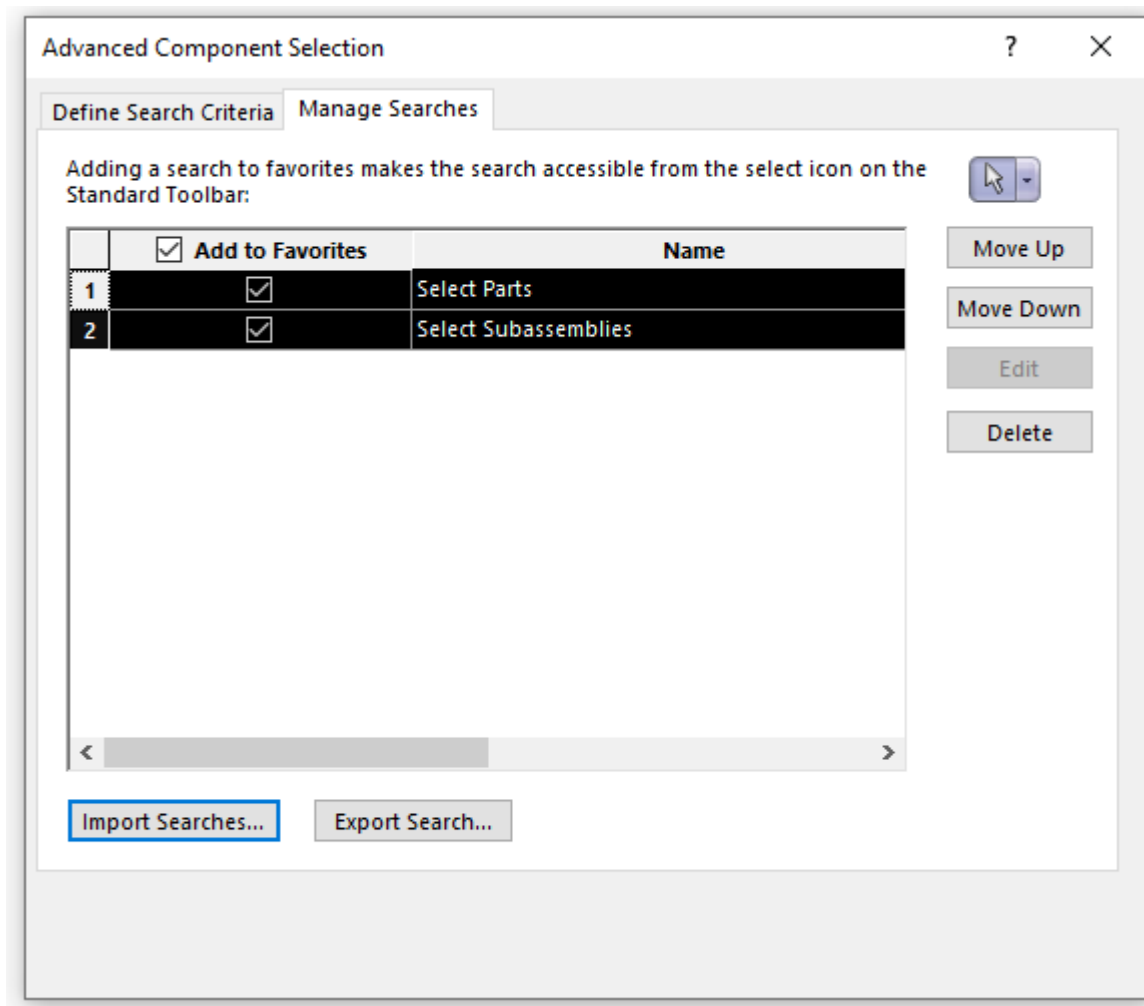


Figure 7. Ensure team-level consistency by sharing this search with the whole team.
New menu items become available in the Select drop-down menu.

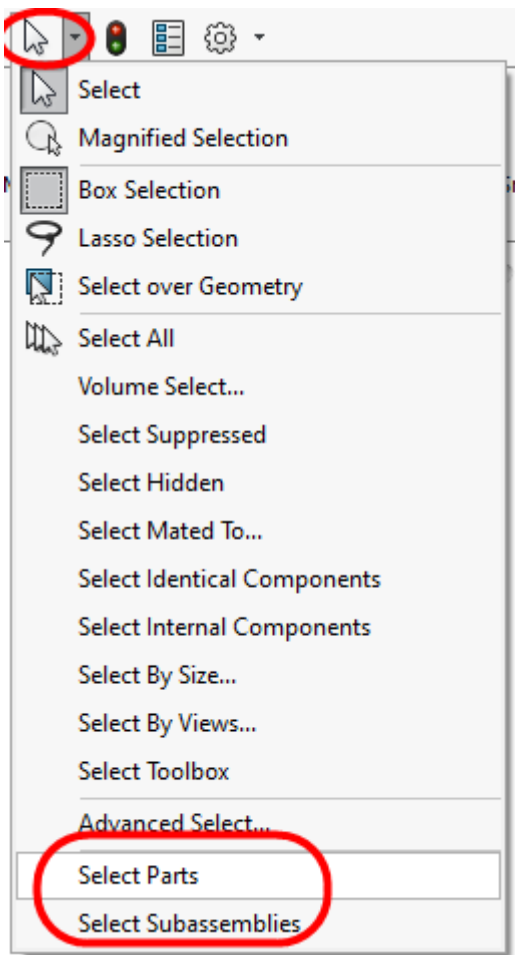


Figure 8. Bulk Selection is enabled.

The time savings are impressive when multiple components share custom property values as shown in Figure 9.

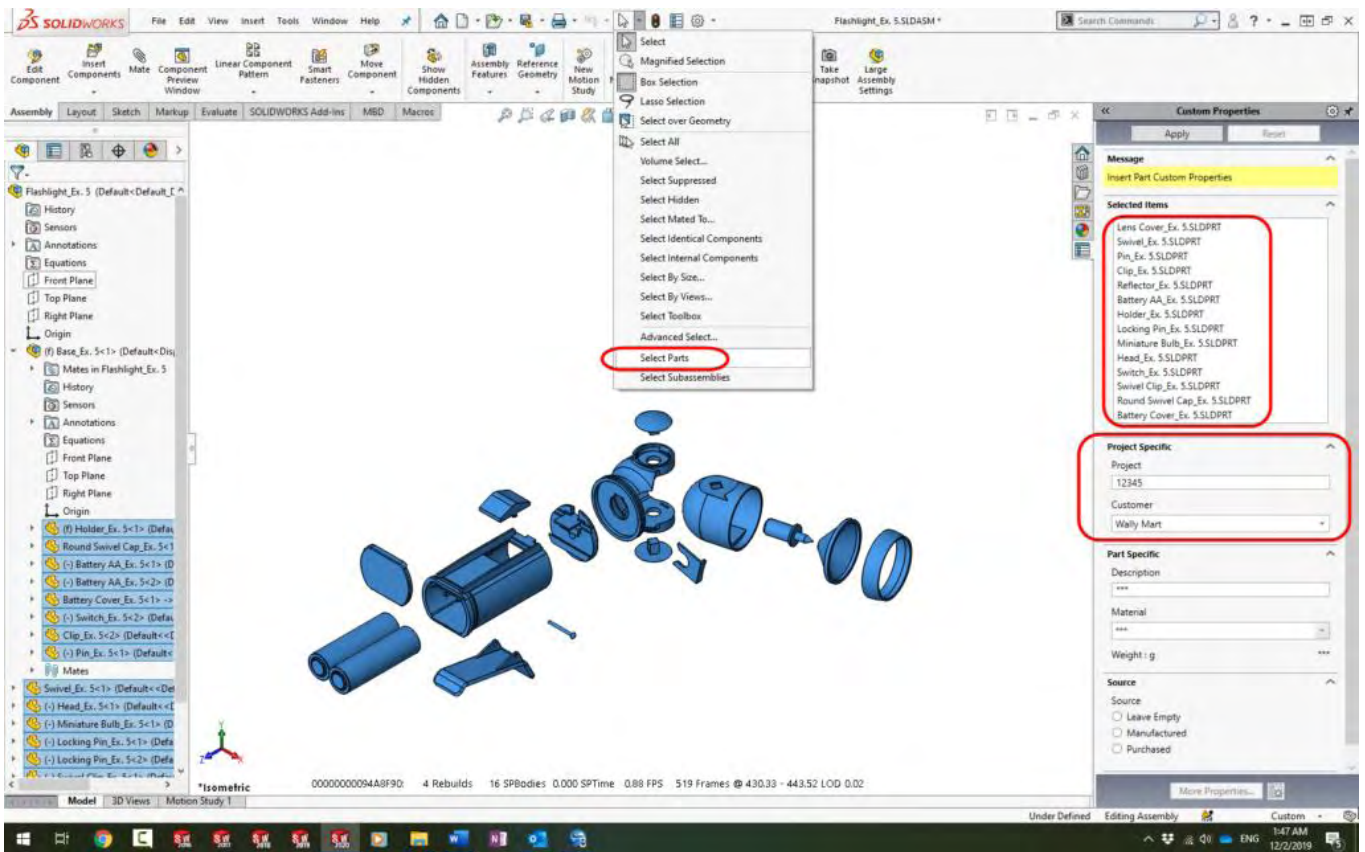


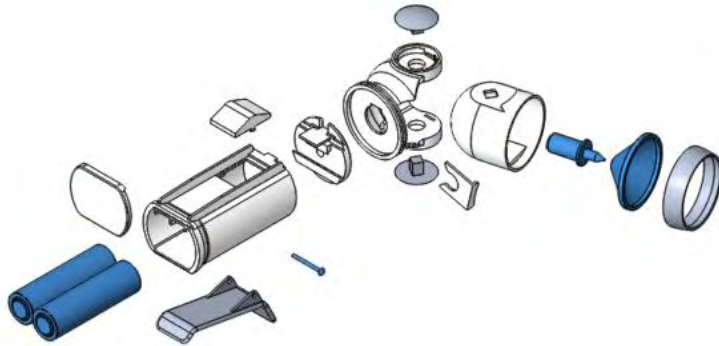
Figure 9. Common values for all parts of this assembly.

3. Bill of Materials

In SOLIDWORKS, the bill of materials (BOM) can be inserted in assemblies and drawings as BOM tables. If set up properly, they can offer users a simple way to read and write parametric custom properties.

Pros:

- Selecting a component in the graphics area or FeatureManager design tree highlights the corresponding row in the BOM.
- Selecting one or more rows in the BOM also selects the corresponding components in the graphics area and FeatureManager design tree.



ITEM NO.	FILE NAME	DESCRIPTION	QTY.	MATERIAL/VENDOR
1	Base_Ex. 5	BASE, SUB-ASSEMBLY	1	AS PER B.O.M.
1.1	Holder_Ex. 5	HOLDER	1	PS HI
1.2	Round Swivel Cap_Ex. 5	CAP, ROUND SWIVEL	1	PS HI
1.3	Battery_AA_Ex. 5	AA BATTERY	2	Cheap Cells
1.4	Battery Cover_Ex. 5	COVER, BATTERY	1	PS HI
1.5	Switch_Ex. 5	SWITCH	1	PS HI
1.6	Clip_Ex. 5	CLIP	1	6061 Alloy
1.7	Pin_Ex. 5	PIN	1	Pins Unlimited
2	Swivel_Ex. 5	SWIVEL	1	PS HI
3	Head_Ex. 5	HEAD	1	PS HI
4	Miniature Bulb_Ex. 5	LIGHT BULB	1	Optic Stuff Makers
5	Locking Pin_Ex. 5	PIN, LOCKING	2	6061 Alloy
6	Swivel Clip_Ex. 5	CLIP, SWIVEL	1	PS HI
7	Reflector_Ex. 5	REFLECTOR	1	Optic Stuff Makers
8	Lens Cover_Ex. 5	COVER, LENS	1	6061 Alloy

Figure 10. Selected components are purchased (notice that the vendor, not the material, is listed).

- BOM columns could contain equations. In Figure 12, such an equation is used to list the Material for Manufactured components and the Vendor for Purchased components.
- Properties can be parametrically modified directly from the BOM. Make sure the option “Keep Link” is used when editing a BOM cell (see Figure 11).

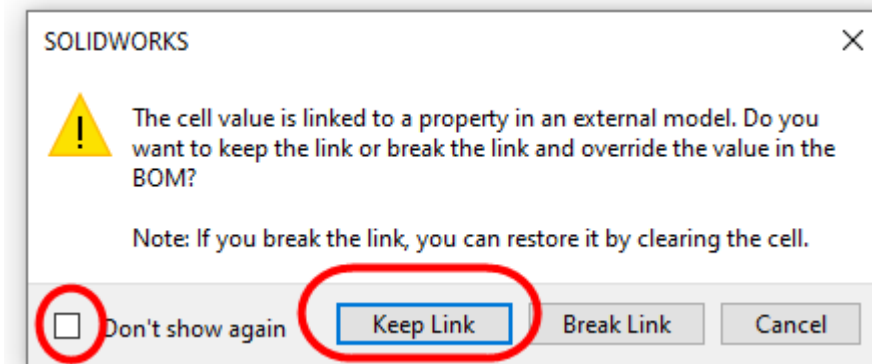


Figure 11 – Maintain the parametric link between the BOM and its components.

= IF('Source'='PURCHASED';'Vendor';'Material')

Functions Custom properties Columns Precision

	A	B	C	D	E
	ITEM NO.	FILE NAME	DESCRIPTION	QTY.	MATERIAL/VENDOR
	1	Base_Ex. 5	BASE, SUB-ASSEMBLY	1	AS PER B.O.M.
	1.1	Holder_Ex. 5	HOLDER	1	PS HI
	1.2	Round Swivel Cap_Ex. 5	CAP, ROUND SWIVEL	1	PS HI
	1.3	Battery_AA_Ex. 5	AA BATTERY	2	Cheap Cells
	1.4	Battery Cover_Ex. 5	COVER, BATTERY	1	PS HI
	1.5	Switch_Ex. 5	SWITCH	1	PS HI
	1.6	Clip_Ex. 5	CLIP	1	6061 Alloy
	1.7	Pin_Ex. 5	PIN	1	Pins Unlimited
10	2	Swivel_Ex. 5	SWIVEL	1	PS HI
11	3	Head_Ex. 5	HEAD	1	PS HI
12	4	Miniature Bulb_Ex. 5	LIGHT BULB	1	Optic Stuff Makers
13	5	Locking Pin_Ex. 5	PIN, LOCKING	2	6061 Alloy
14	6	Swivel Clip_Ex. 5	CLIP, SWIVEL	1	PS HI
15	7	Reflector_Ex. 5	REFLECTOR	1	Optic Stuff Makers
16	8	Lens Cover_Ex. 5	COVER, LENS	1	6061 Alloy

	E	F
	VENDOR	MATERIAL
	Bendall Inc.	1045 Steel, cold drawn
	Manufactured	AISI 304
	Manufactured	AISI 304
	Pins Unlimited	1045 Steel, cold drawn

Figure 12. Equations using custom properties values.

Cons:

- Untrained users might manually change BOM values without keeping the link to the components.

Tip #3: In assemblies, insert BOMs in the Notes Area annotation view to ensure that it is a static object when the viewport is manipulated (see Figure 13).

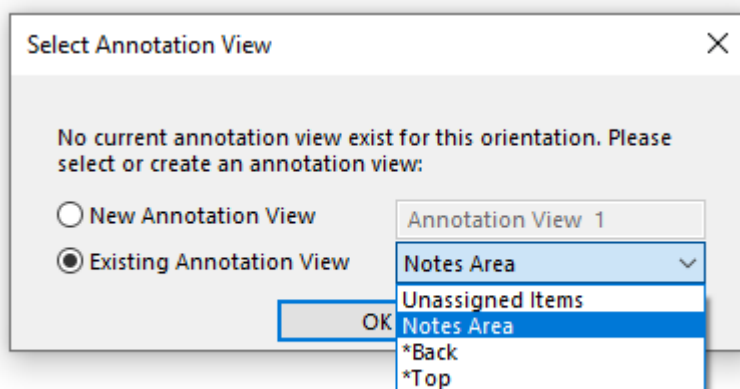


Figure 13. All entities in the Notes Area are not rotating with the viewport.

4. FeatureManager Tree Filter

Typing custom properties values in the Filter is a fast way to list only the components that meet the criteria in the FeatureManager design tree.

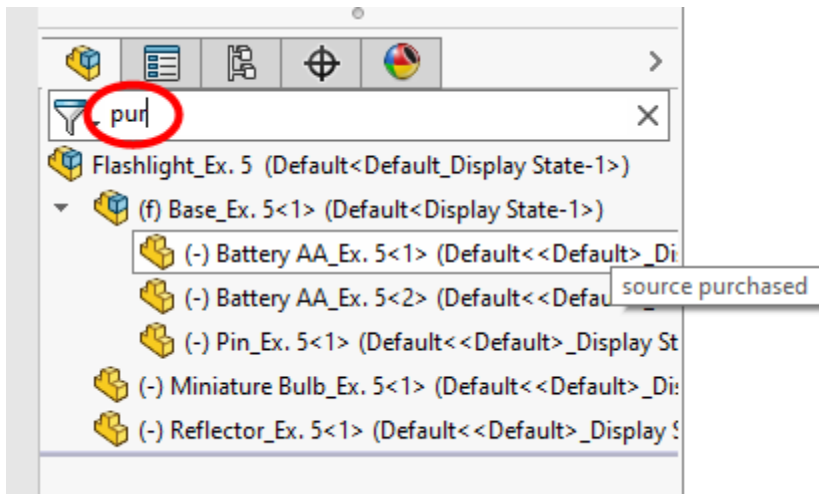


Figure 14. All components that have a custom property with a value containing the string “pur” are listed. In this case, they are the Purchased items.

5. Advanced Selections Based on Custom Properties Values

Each company has certain properties that define some components more than others. Creating and saving advanced selections could significantly reduce the amount of time spent repeatedly selecting components in bulk based on popular criteria as shown in Figure 15.

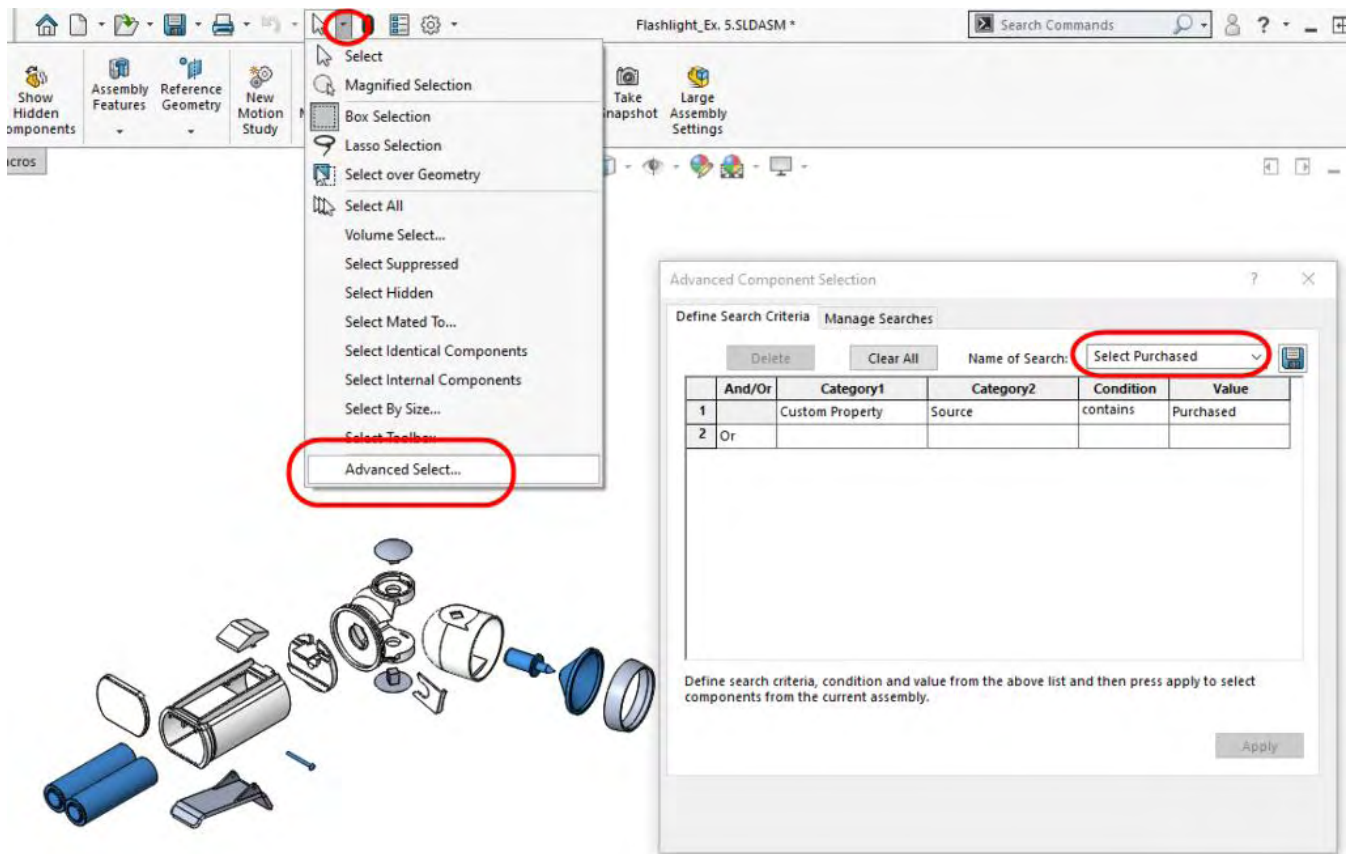


Figure 15.A quick way to select all purchased components.

Tip #4: Complex selection criteria can be created using AND/OR operators.

6. Title Blocks in Assembly Files

Custom properties can be parametrically displayed in Title Block Tables in assembly files.

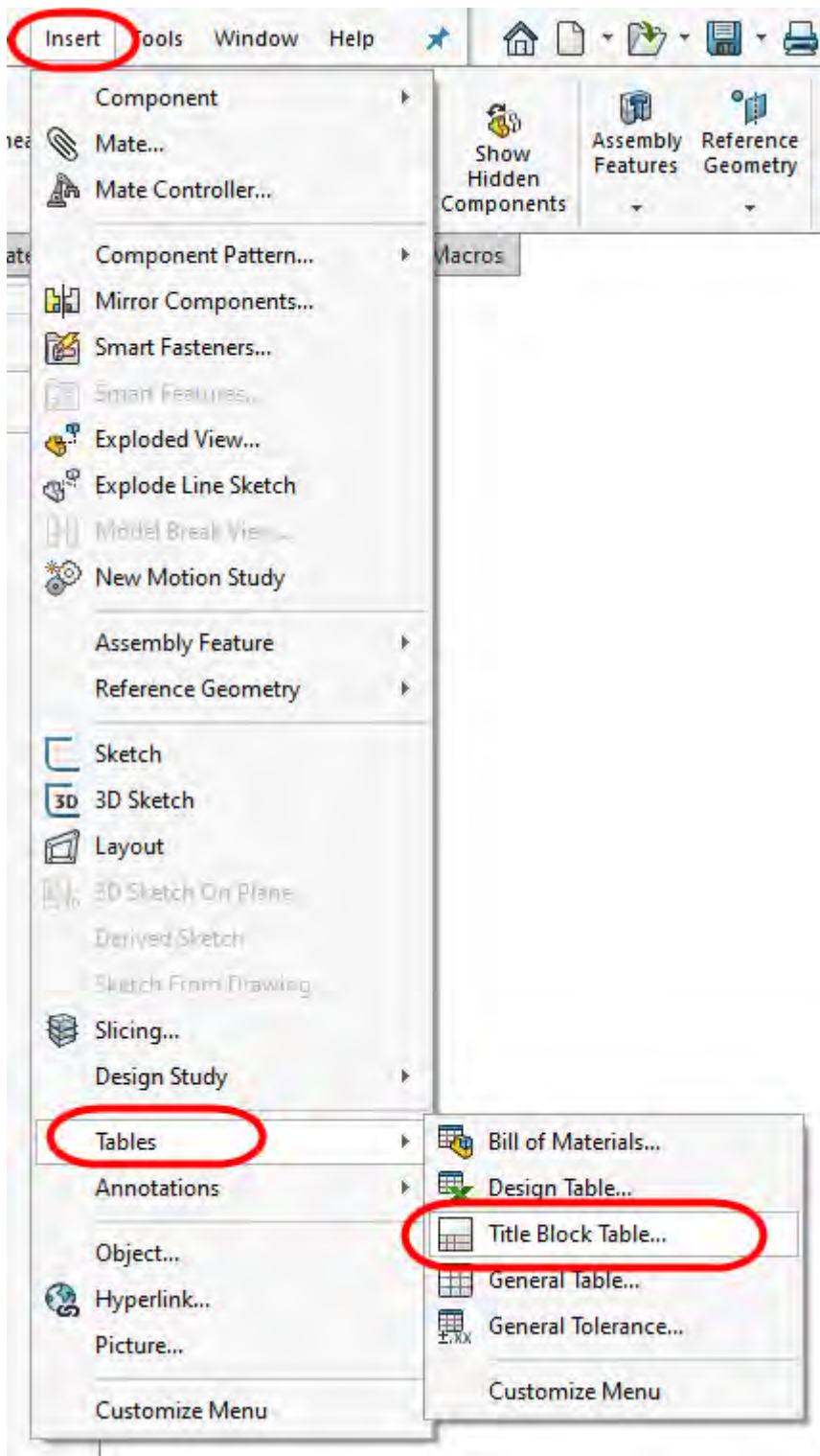


Figure 16. Displaying custom properties in Title Block Tables.

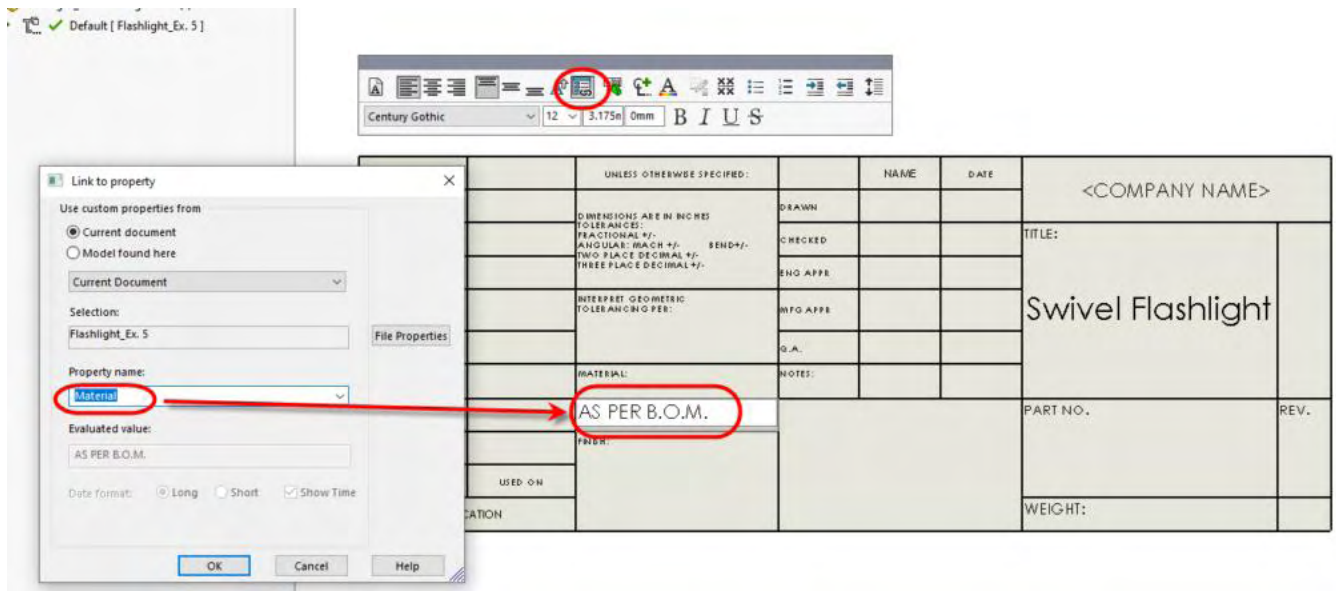


Figure 17. Cell linked to custom property Material in assembly Title Block.

Tip #5: In assemblies, insert the Title Block table in the Notes Area annotation view to ensure that it is a static object when the viewport is manipulated.

7. Notes in Sketch, Part, Assembly or Drawing

Notes is one of the best tools for reading custom properties values from anywhere inside the referenced model, or in the current document.

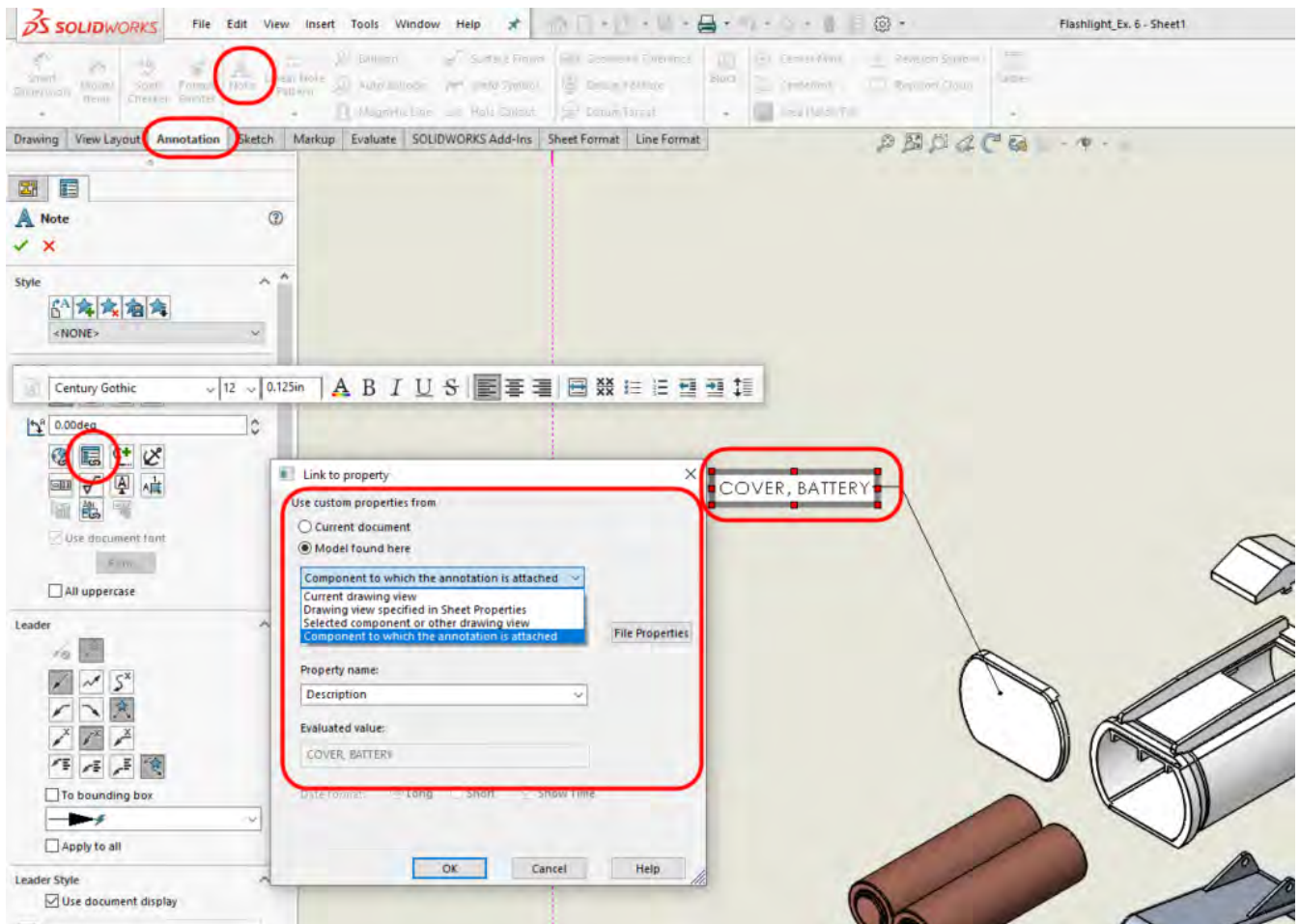


Figure 18. Notes can read data from anywhere in the model or drawing.

Notes can be created in:

- Sketches
- Parts
- Assemblies
- Drawing sheet formats (usually in title blocks)
- Drawing sheets
- Drawing views

Notes can read information from:

- Current document
- Current drawing view
- Default drawing view (the one specified in Sheet Properties)
- Selected component
- Other drawing view

- Component to which the annotation is attached
Tip #6: Link an annotation to the custom property of a subassembly.

In the Link to Property dialog box, you can select a custom property from any model in the drawing without a preselection or leader attachment.

To link an annotation to the custom property of a subassembly:

1. In a drawing view of an assembly that contains a subassembly, create a note with a leader that is attached to a subassembly component.
2. While creating the note, in the Note PropertyManager, under Text Format, select “Link to Property”.
3. In the Link to Property dialog box, under Use custom properties from, select “Model found here.”
4. In the list, click “Selected component or other drawing view.”
5. In the drawing view, right-click the component and click “Select Other.”
6. Select the subassembly.
7. In Property name, select the custom property.
8. In the Link to Property dialog box, click OK.
9. Close the PropertyManager.

8. Editing Custom Property Values from Drawing Title Blocks

Custom properties from parts and assemblies can be parametrically edited in drawings.

For that, “Title Block Fields” must be defined in the drawing template:

1. Edit the sheet format.
2. Right-click on the empty area.
3. Select “Title Block Fields.”

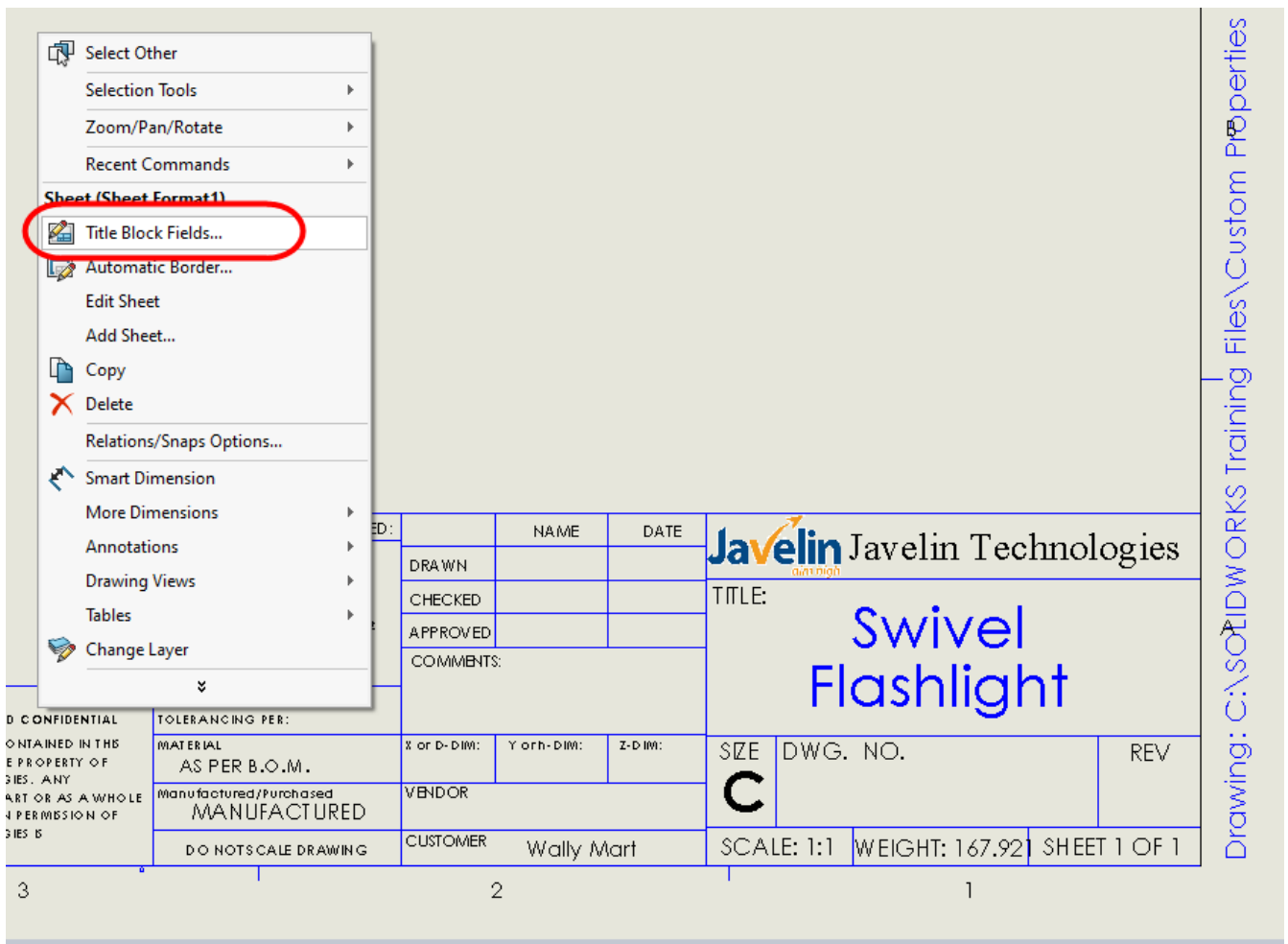


Figure 19. Defining Title Block Fields.

- Resize the rectangle that appears in such a way that all the desired fields to be edited are inside it.
- Select the fields to be edited by the user.

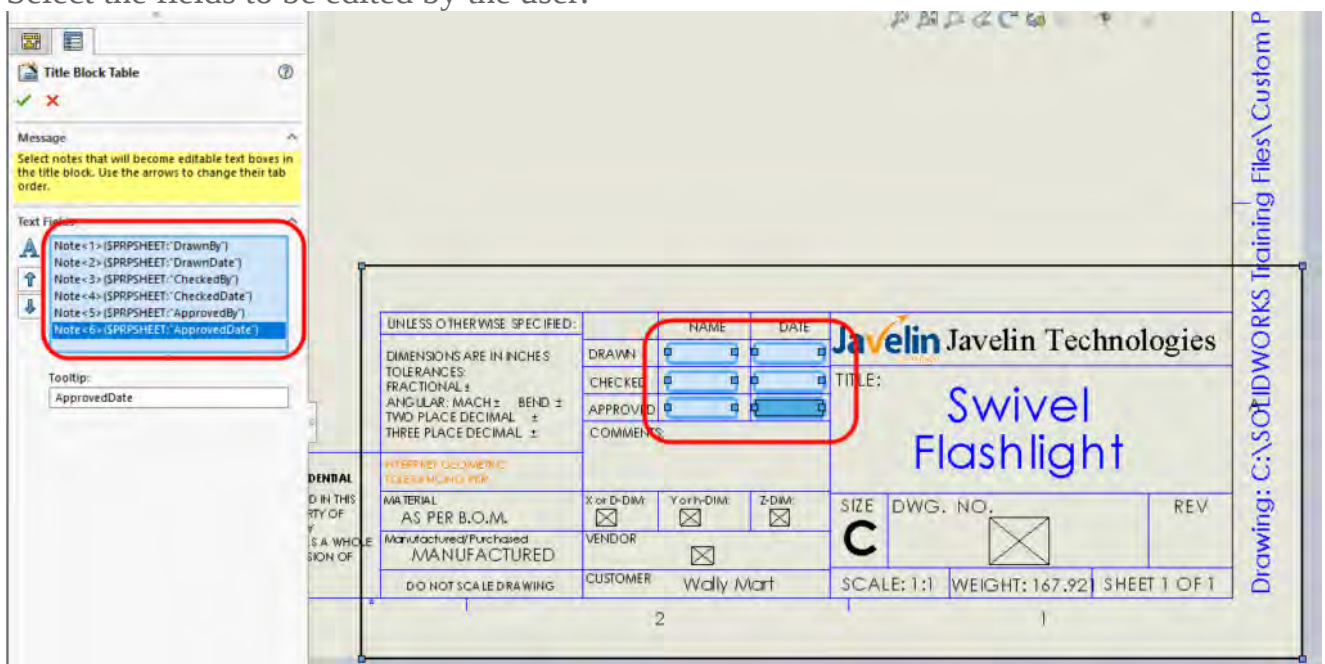


Figure 20. Selecting the files to be edited.

- Return to the sheet.
- Save the drawing template.

Follow these steps when the user needs to edit any of the custom properties in the title block editable fields:

- Right-click in the title block area.
- Select “Enter Title Block Data”.

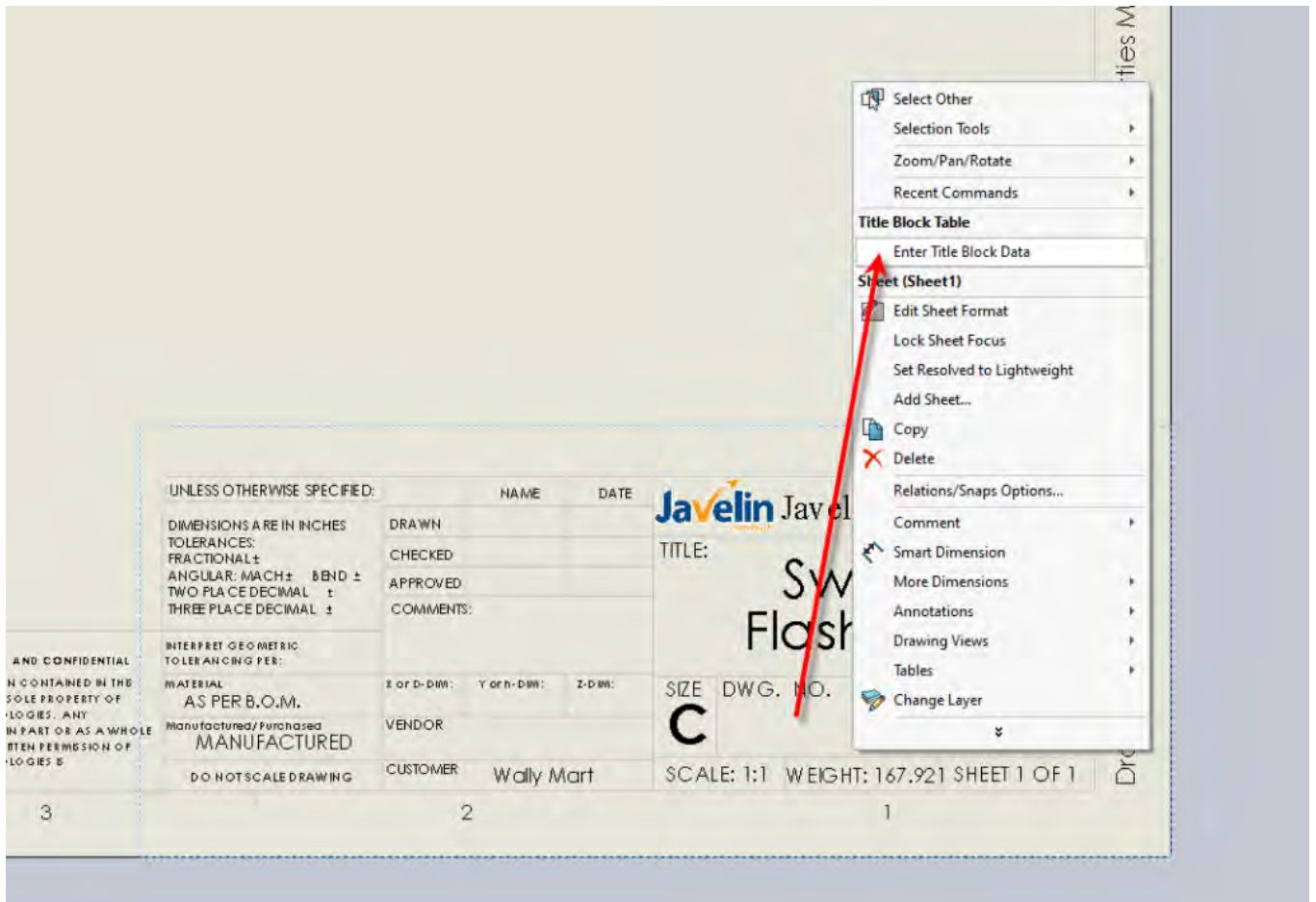


Figure 21. Editing the custom properties in the Title Block Field.

- Input data in the Title Block Fields.

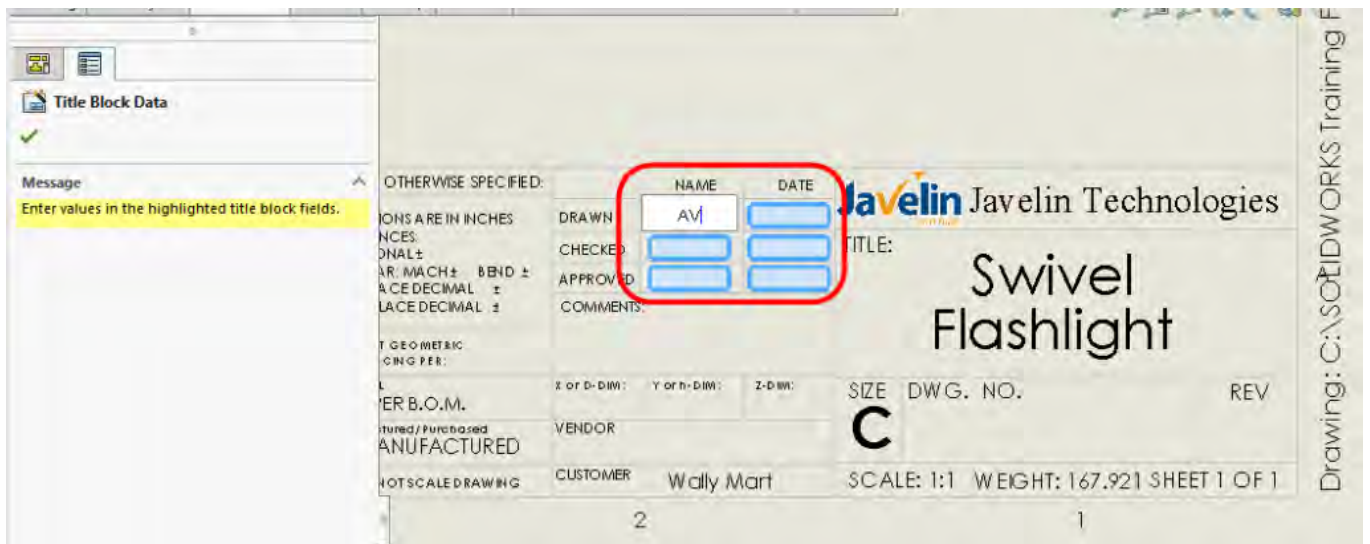


Figure 22. Inputting data in the Title Block Fields.

- The input data transfers parametrically as a custom properties value in the model.



Figure 23. The data becomes a custom properties value.

Best Practice: Avoid using this functionality. All data should be input in the model or in the PDM data card.

9. Custom Properties in Assembly Visualization

The Assembly Visualization tool relies heavily on custom properties. As explained in detail in the article [“The X-Ray Machine for SOLIDWORKS Assemblies,”](#) Assembly Visualization uses custom properties for:

- Probing values
- Grouping components
- Sorting components
- Coloring components
- Hiding and showing components

As shown in that article, custom properties values can be parametrically created or edited inside Assembly Visualization.

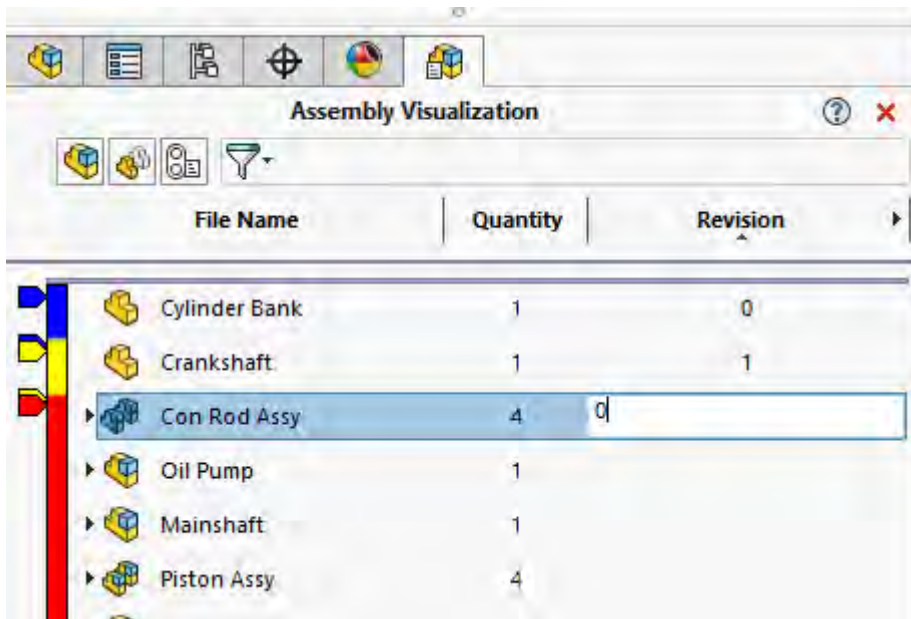


Figure 24. Inputting a value will add a new Revision property in the component file.

10. Configuration Tables

Configuration-specific properties can be easily managed in configuration tables. Properties can be:

- Created
- Modified

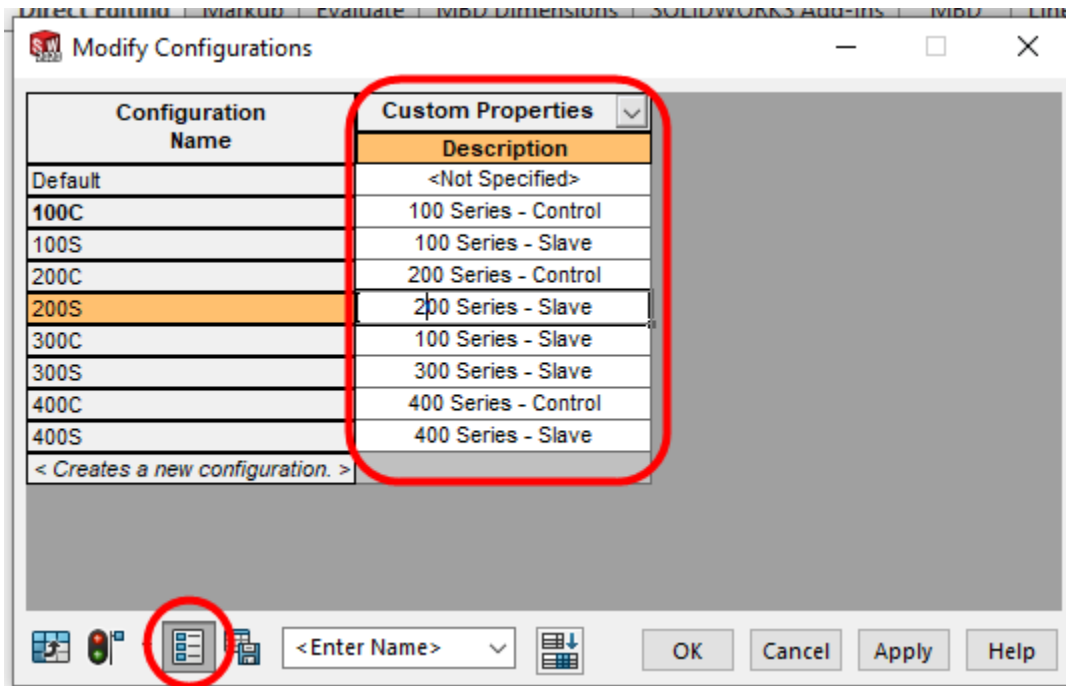


Figure 25. Creating and modifying properties.

11. Design Tables

Design tables use the power of Excel to create and edit custom properties.

Design Table for: Speaker_ &									
	\$DESCRIPTION	\$COLOR	\$DISPLAYSTATE	D1@Sketch6	\$STATE@Tweeter, Rectangular	\$STATE@Tweeter, Dome	\$STATE@Volume Control	\$STATE@ Tweeter, Rounded	\$PRP@Description
Default	Default	11186465	<Default>_Display State 1	20 U	U	U	U		
100C	100C	11186465	Display State-3	20 S	S	U	U		100-Series - Control
100S	100S	11186465	Display State-4	20 S	S	S	U		100-Series - Slave
200C	200C	11186465	Display State-5	20 U	S	U	S		200-Series - Control
200S	200S	11186465	Display State-6	20 U	S	S	S		200-Series - Slave
300C	300C	11186465	Display State-8	15 U	S	U	S		300-Series - Control
300S	300S	11186465	Display State-9	15 U	S	S	S		300-Series - Slave
400C	400C	11186465	Display State-10	20 S	U	U	S		400-Series - Control
400S	400S	11186465	Display State-11	20 S	U	S	S		400-Series - Slave

Figure 26. Using Excel to create and edit custom properties.

Tip #6: Use the following syntax to define custom properties in Design Tables: PRP@Property.

12. Configuration Publisher

The Configuration Publisher can be used to:

- Make it easier to select the desired configuration using model parameters, as the component is inserted in the assembly.

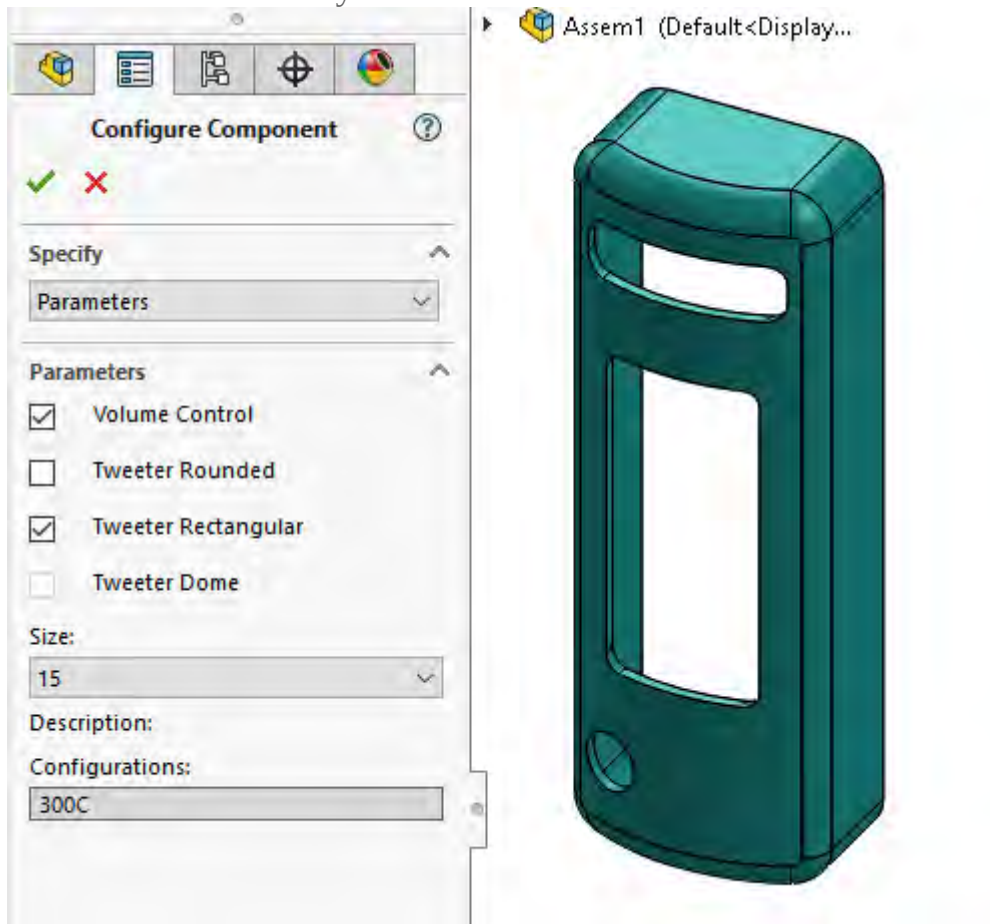


Figure 27. Using Configuration Publisher.

- Use an existing configuration or create new ones on the fly, based on a set of rules (similar to the Toolbox Configurator's functionality)

It is worth noting that in the second mode, users can create new configurations and assign new configuration-specific custom property values.

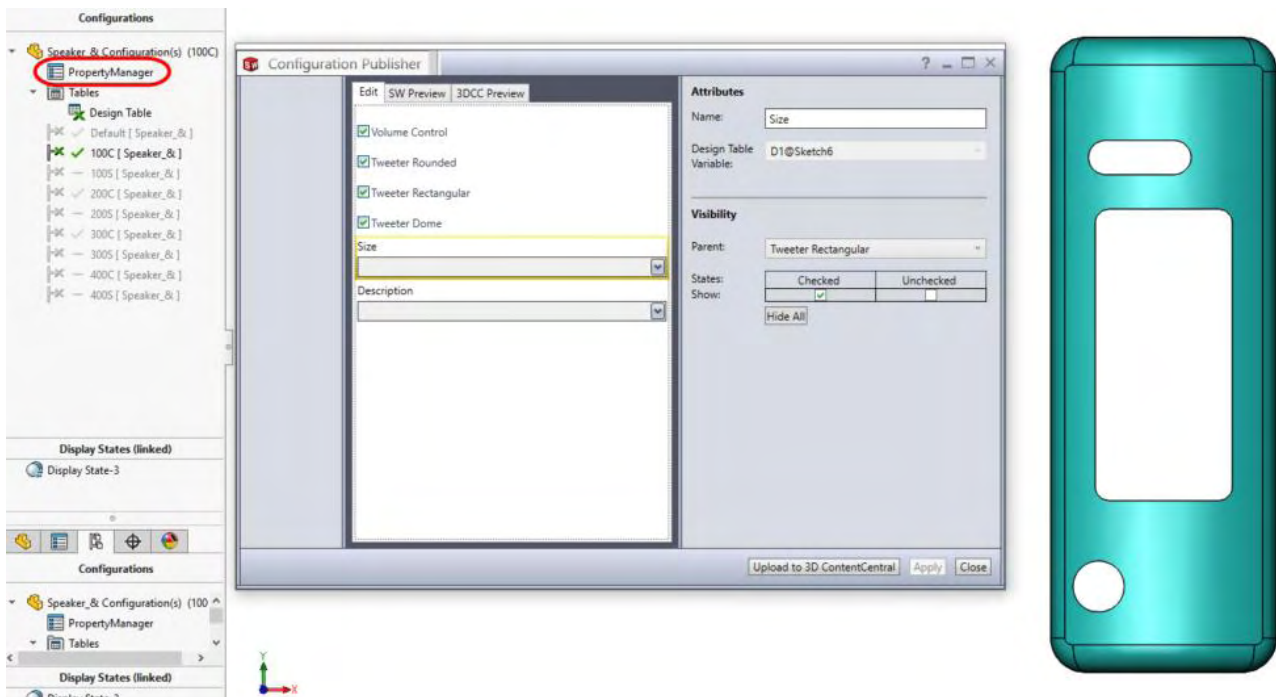


Figure 28. Defining the Property Manager.

13. Component Properties

The Component Properties is the only way to access a component's Description property in Large Design Review mode. While it is true that it works in Lightweight and Resolved modes too (as shown in Figure 28), there are better tools for that.

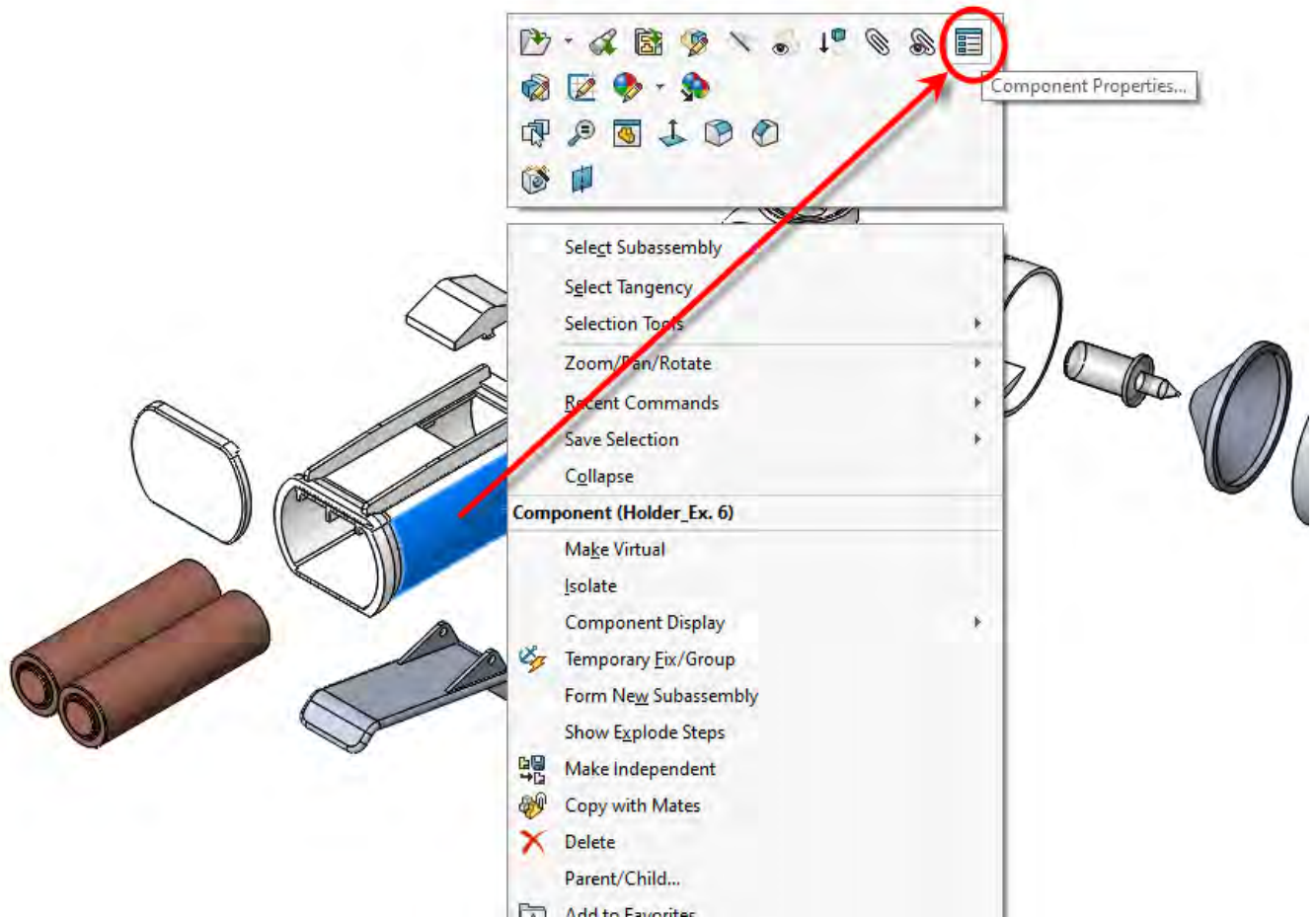


Figure 29. Right-click to access the Component Properties.

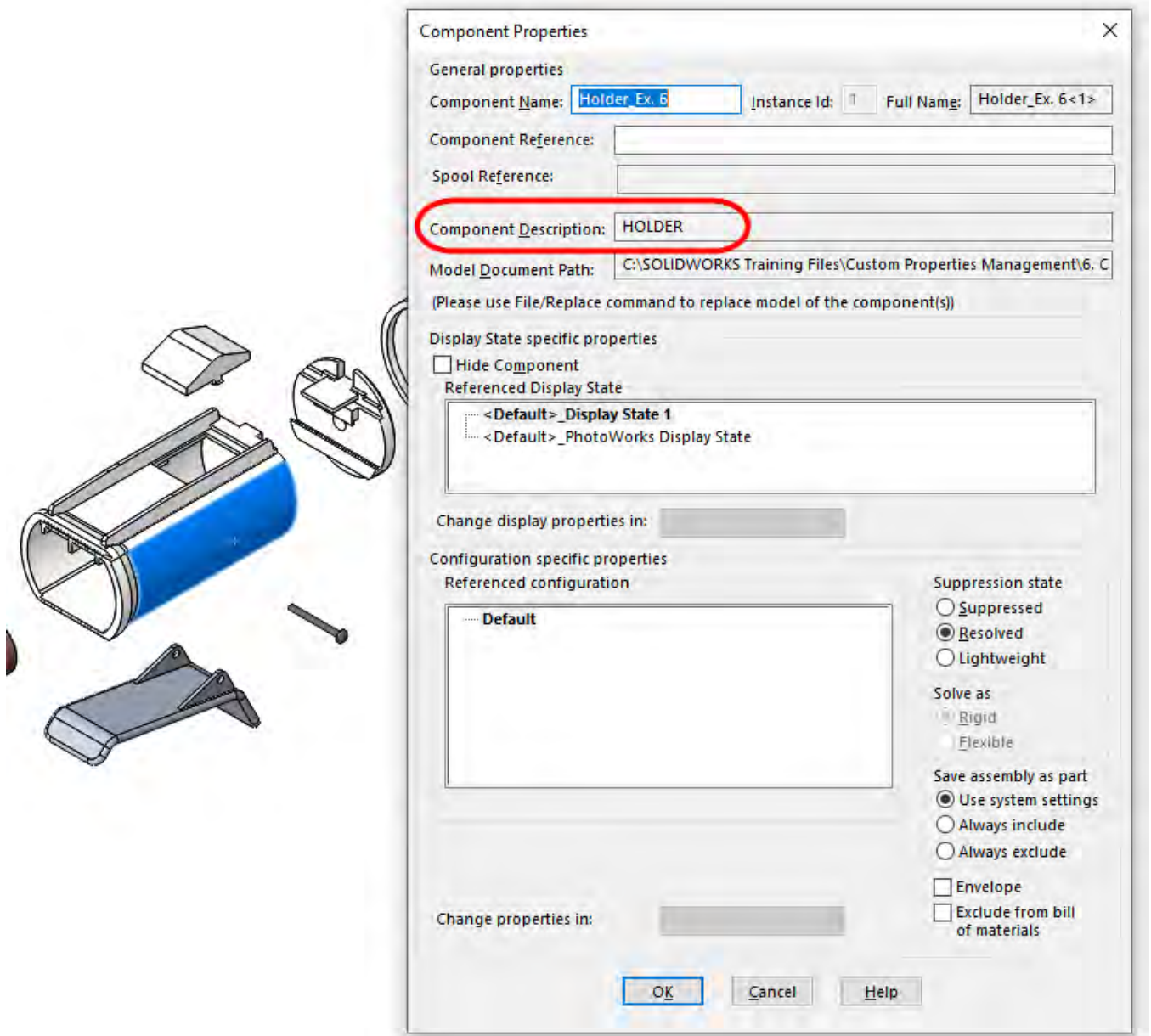


Figure 30. The Description value is listed.

14. Treehouse

Treehouse is a free application that is installed along with SOLIDWORKS. Among its many other capabilities, Treehouse allows users to read and modify custom properties.

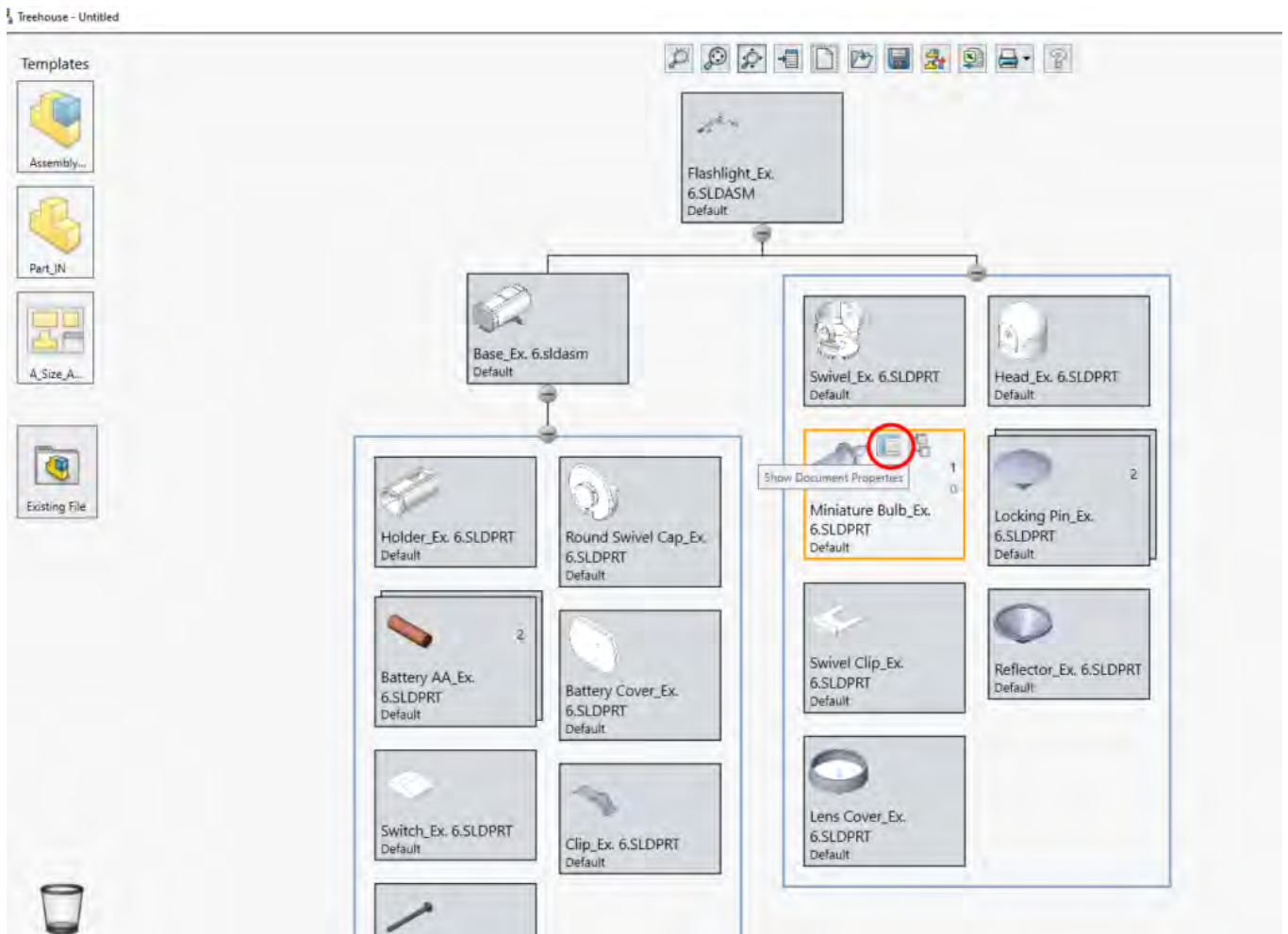


Figure 31. Hover with the mouse over a tile and select Show Document Properties.

Both Custom and Configuration specific properties can be read and edited. Additionally, new properties can be added.

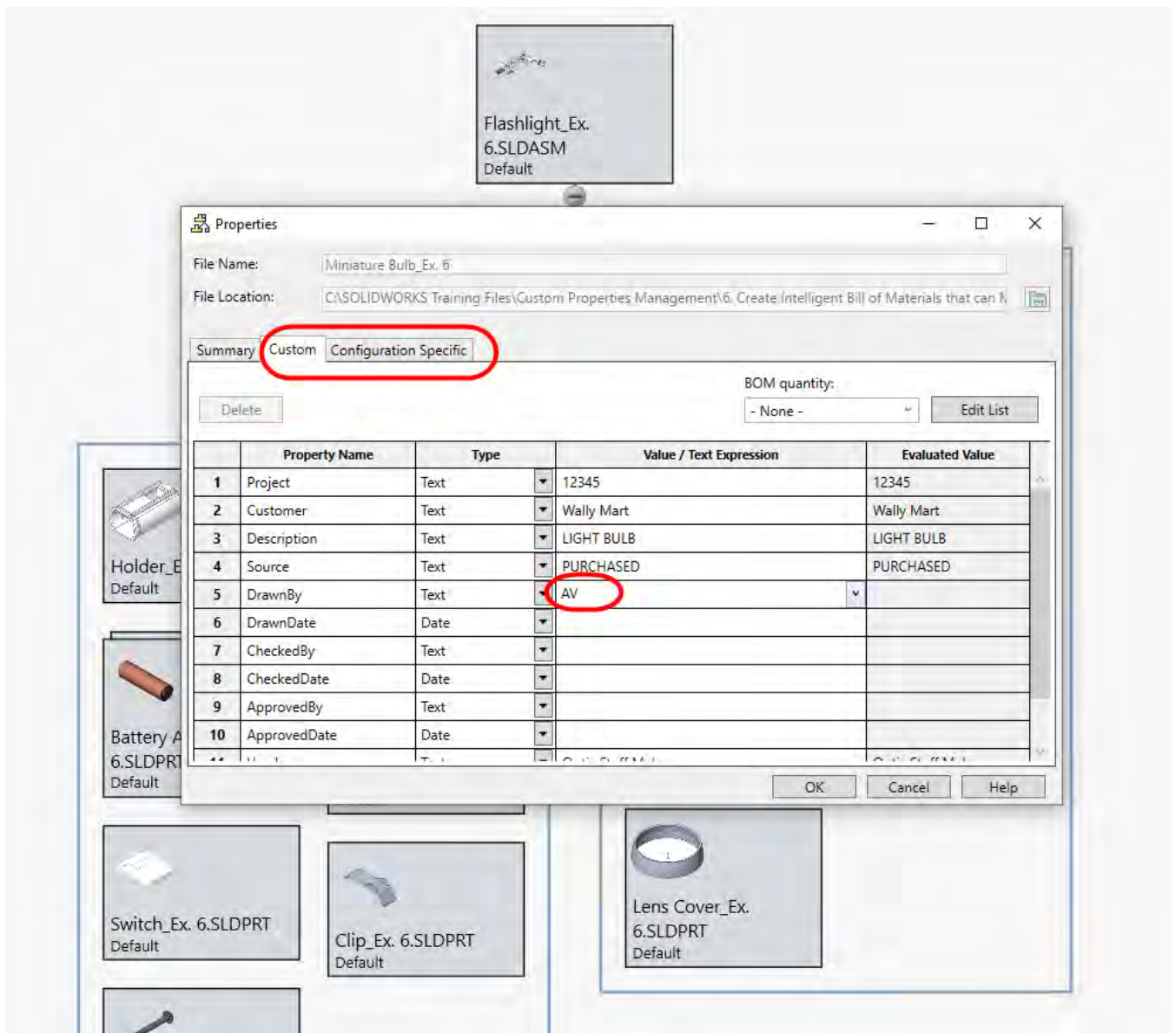


Figure 32. Both Custom and Configuration Specific properties can be read and edited.

15. Replace Global Variables with Custom Properties

When creating equations, consider using custom properties instead of global variables. They are easier to control and much more robust.

In an ideal setup, the use of custom properties is controlled by a property tab.

A quick way to use them in equations is by editing dimensions as shown in Figure 33.

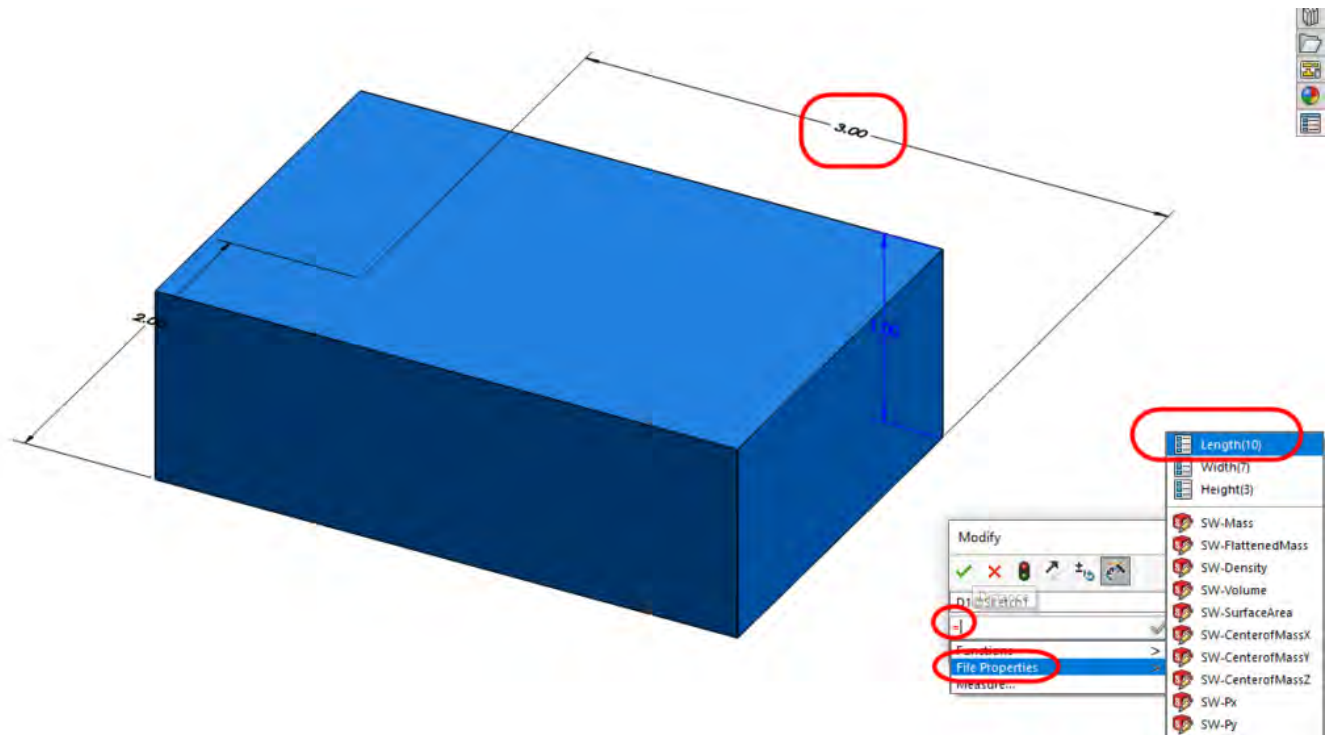


Figure 33. Use the “=” sign to start an equation instead of typing a dimension value.
Such a model provides users with the ability to visually control its sizes using a property tab.

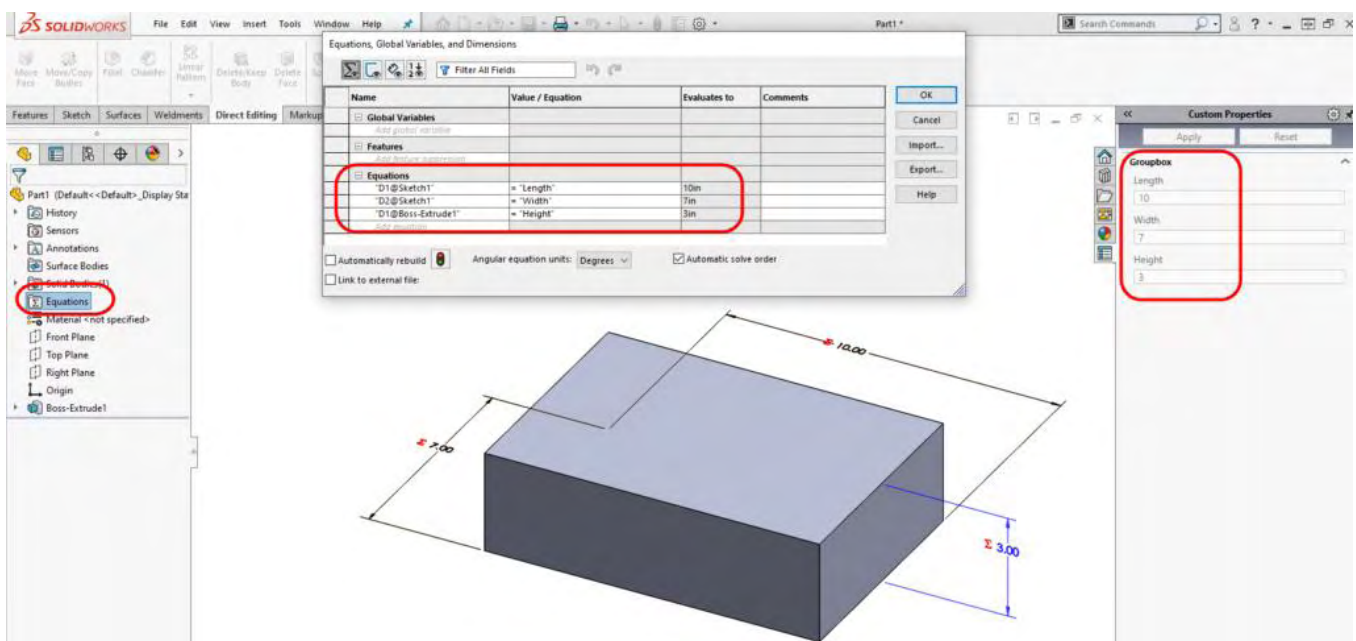


Figure 34. Using the property tab.

16. Using SOLIDWORKS Task Scheduler

The Task Scheduler is a great solution for scheduling tasks to update custom properties in SOLIDWORKS documents. You can update custom properties in individual files or in all files of a specified type within a folder.

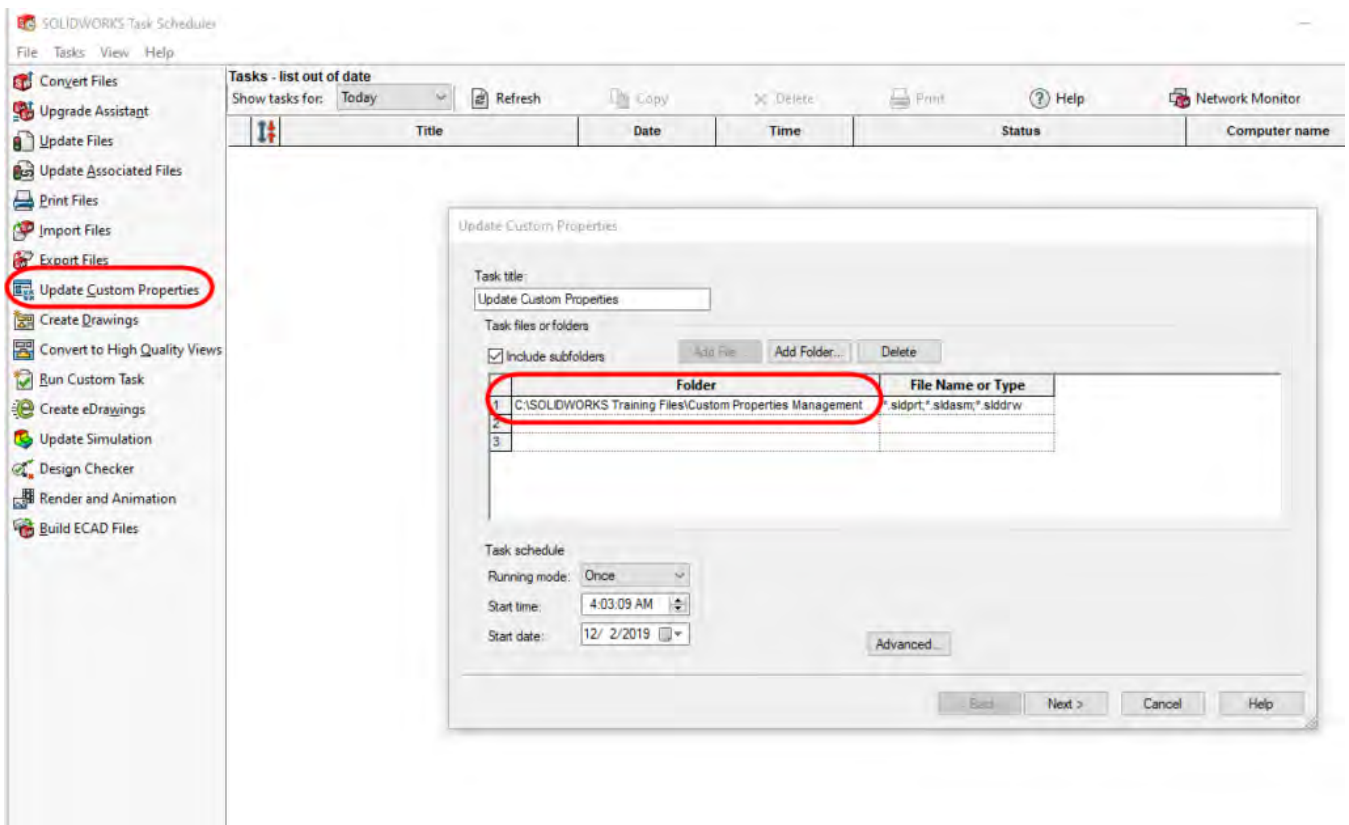


Figure 35. Specifying the folder(s) or file(s) to be processed.

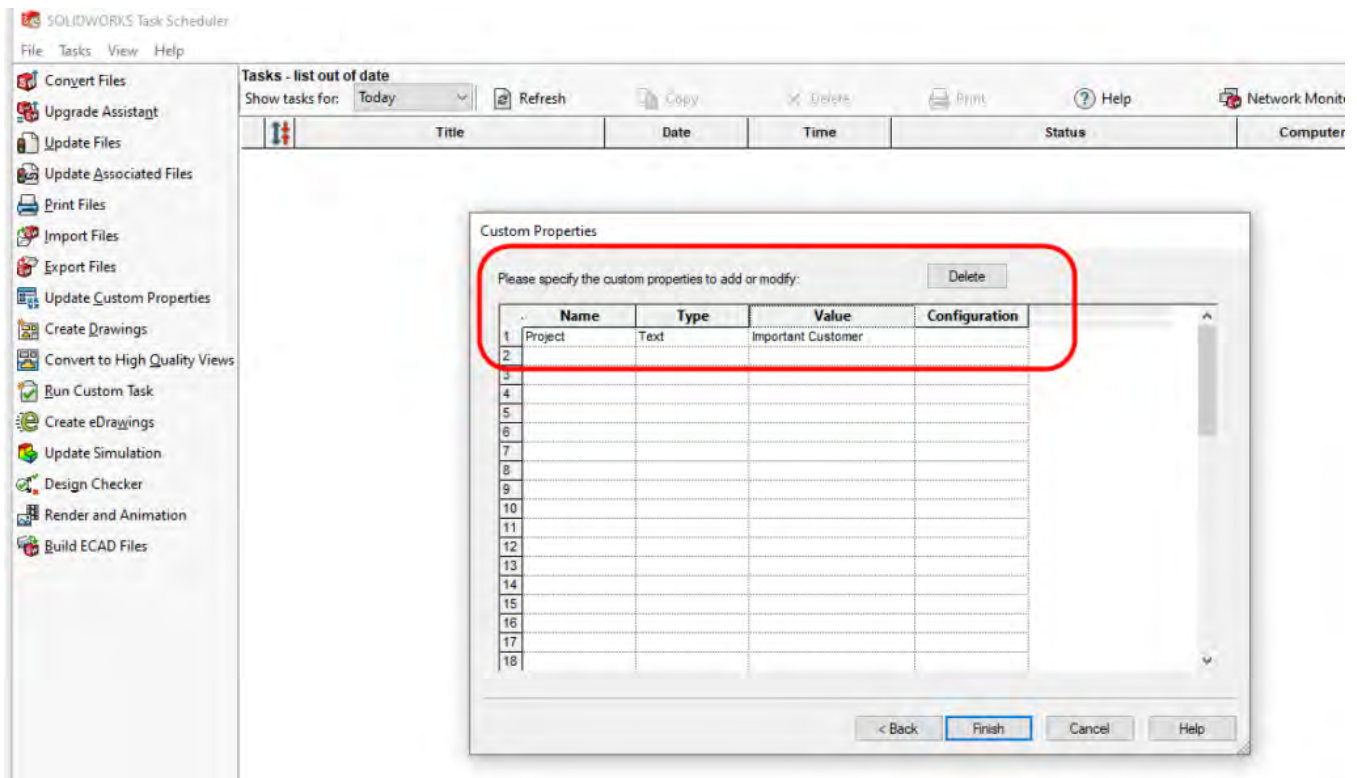


Figure 36. Specifying custom properties and their values to be added or modified.

Pros:

- Process multiple files in bulk.
- Capability to select the workstation to process the task.

- Capability to run unsupervised processes.

Cons:

- Cannot delete properties (workaround: overwrite values with a blank space).
- If SOLIDWORKS crashes, the task will not be restarted.

Tip #7: There are better free alternatives available, as described in item 17.

17. Using Free Third-Party Applications

In a future article, we will present some of the most effective ways to manage properties using free solutions available for download. Most of them are enhanced versions of the SOLIDWORKS Task Scheduler.

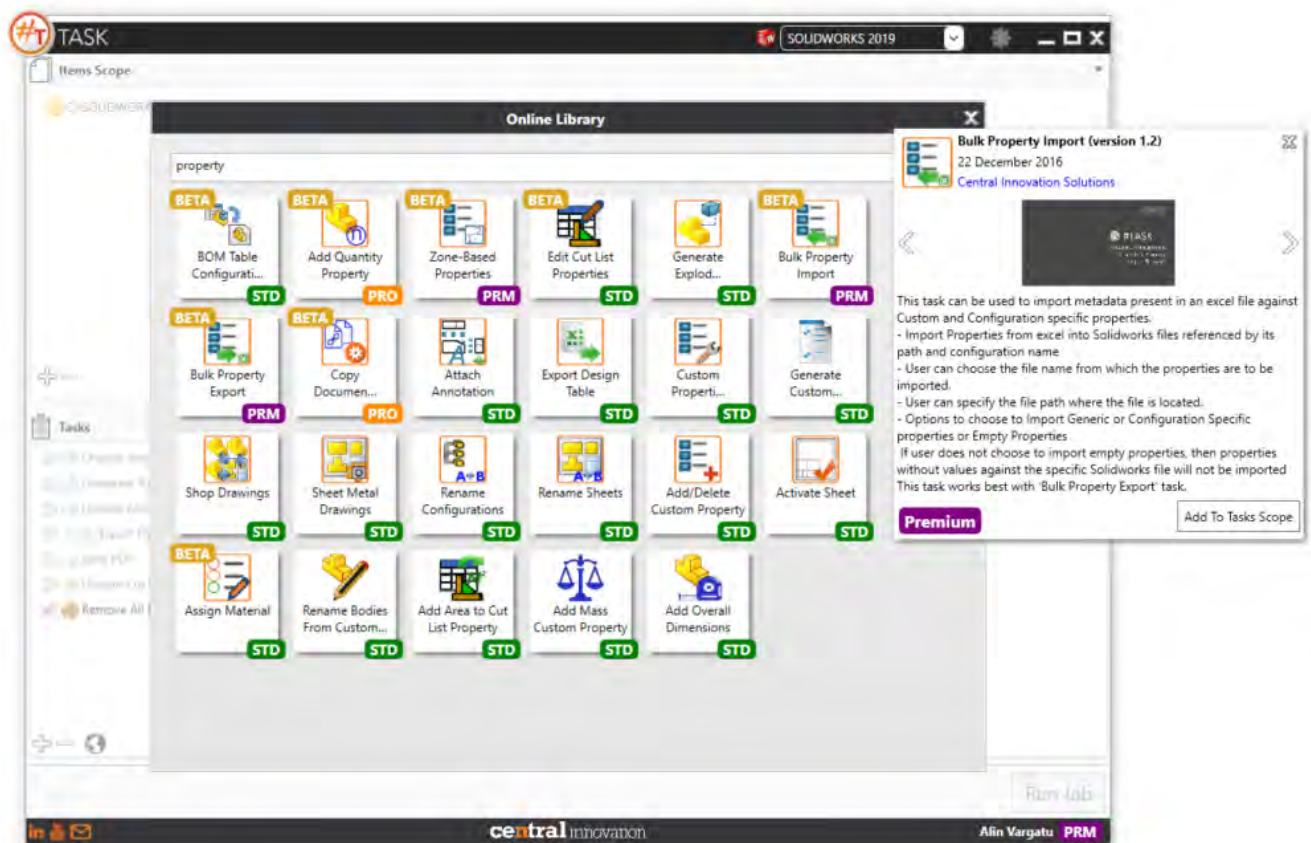


Figure 37. Example of property-related batch processing tasks using #TASK application.

Conclusion

This article attempted to list most of the areas in SOLIDWORKS Standard products where custom properties could be created, read, edited or used.

We are sure we missed many other tools and techniques that take advantage of parametric custom properties. Please join in this brainstorming and share your favorite tips and tricks in the comments below.

And, please, tell all your colleagues to avoid duplicating data