

MFG468330 – I Want it My Way: Customizing the Inventor Content Center

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D3 Technologies

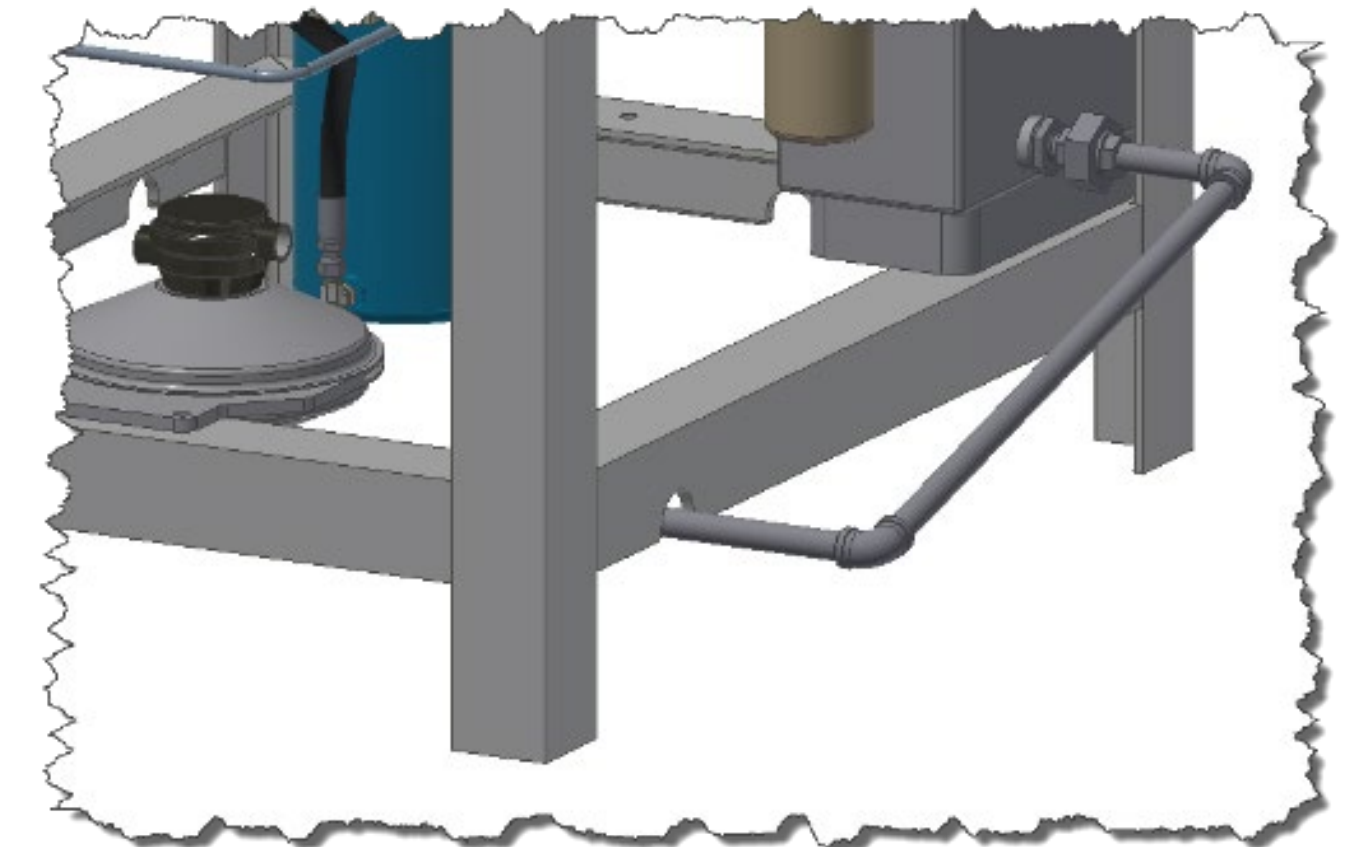
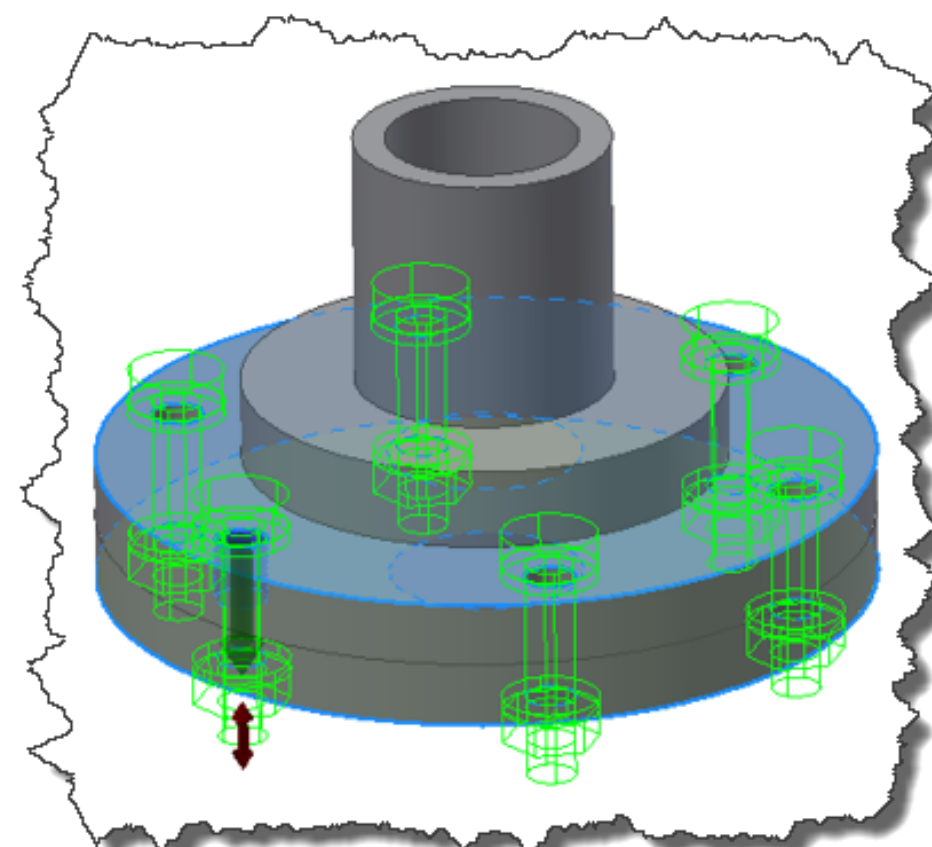
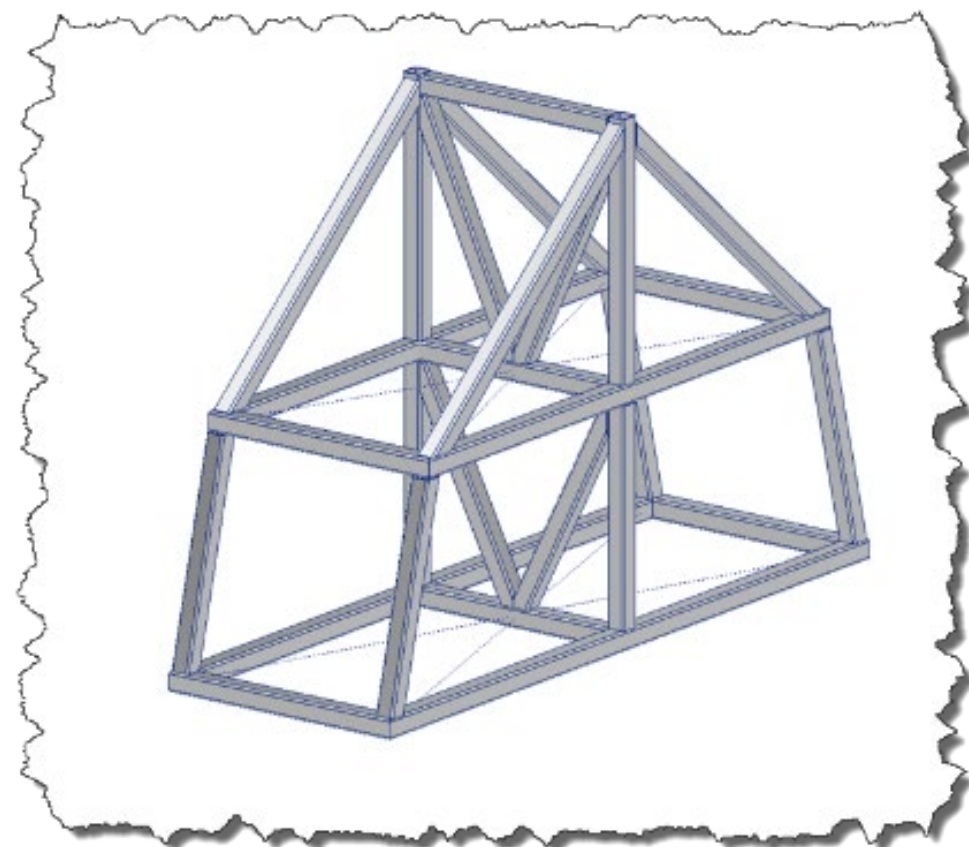
Implementation Consultant

- Autodesk Platinum Partner
- Teach classes on Inventor, AutoCAD, Factory Design Utilities and Navisworks
- Provide technical support
- Consult on design workflows and customer content generation
- Love working with kids, serving in church, the beach and playing basketball!

Why is this important?

The Content Center (CC) is a vast repository of parts that can be utilized in virtually every design scenario, but the components must be modified to utilize **OUR** information!

CC contains parts that can range from generic fasteners to highly specialized piping equipment in a centralized, easily manageable location. Designers are all pulling information from the same location and any modifications or additions are instantly available to the team. Autodesk provides a generous amount of content, but the out-of-the-box content is not specifically configured to any one industry or company and we'll want to add our own company-specific content to the CC. This will truly unlock the full potential of the CC!

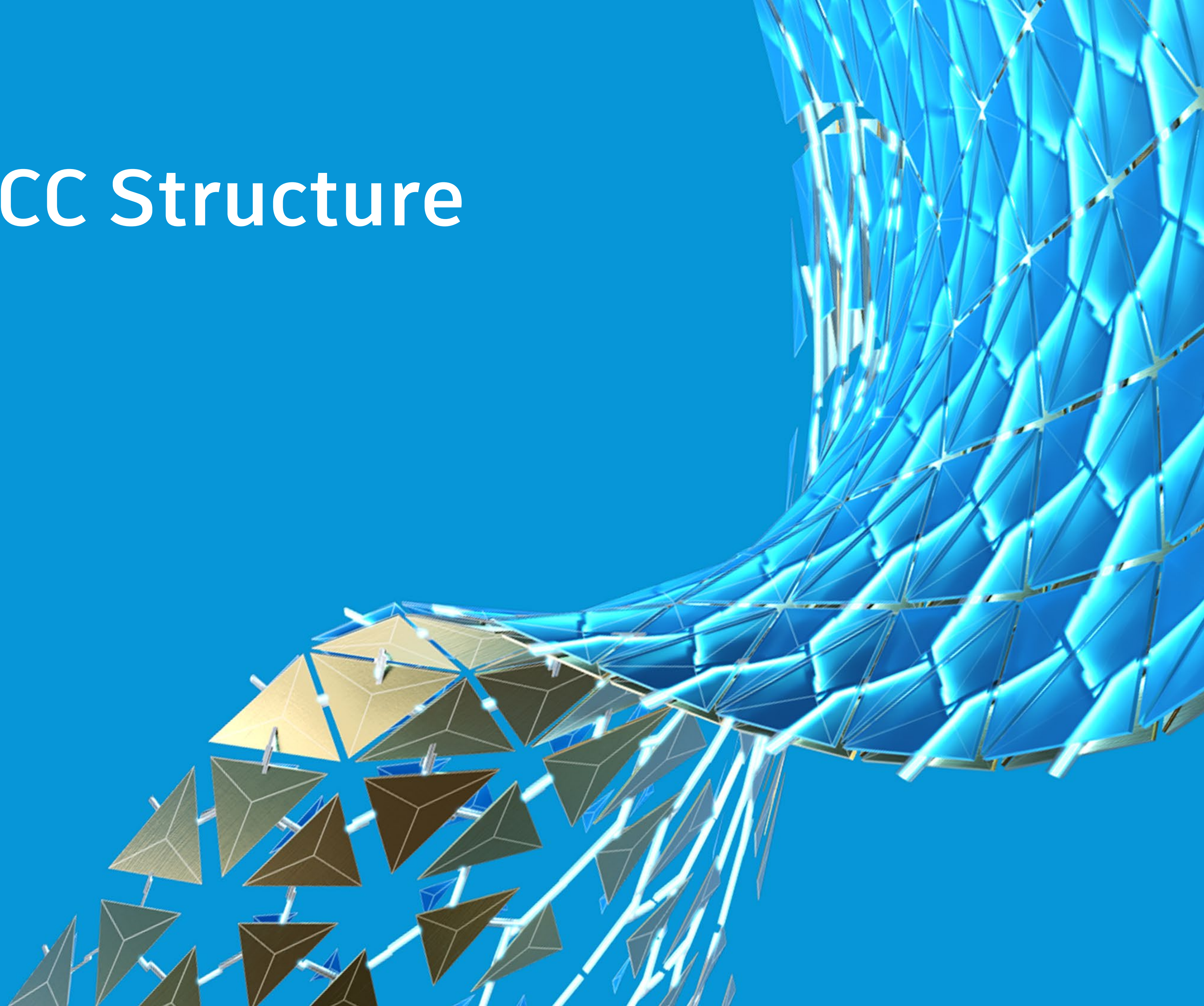


What Are We Customizing?

CC utilizes and allows the modification of TONS of information, so we'll focus on the big picture and modify characteristics that everyone can benefit from

- Create and modify CC library structures to better organize components
- Refine and modify the CC family tables to better suit our needs
- Add new CC families for company-specific designs
- Improve the end-designer's experience by streamlining selection options

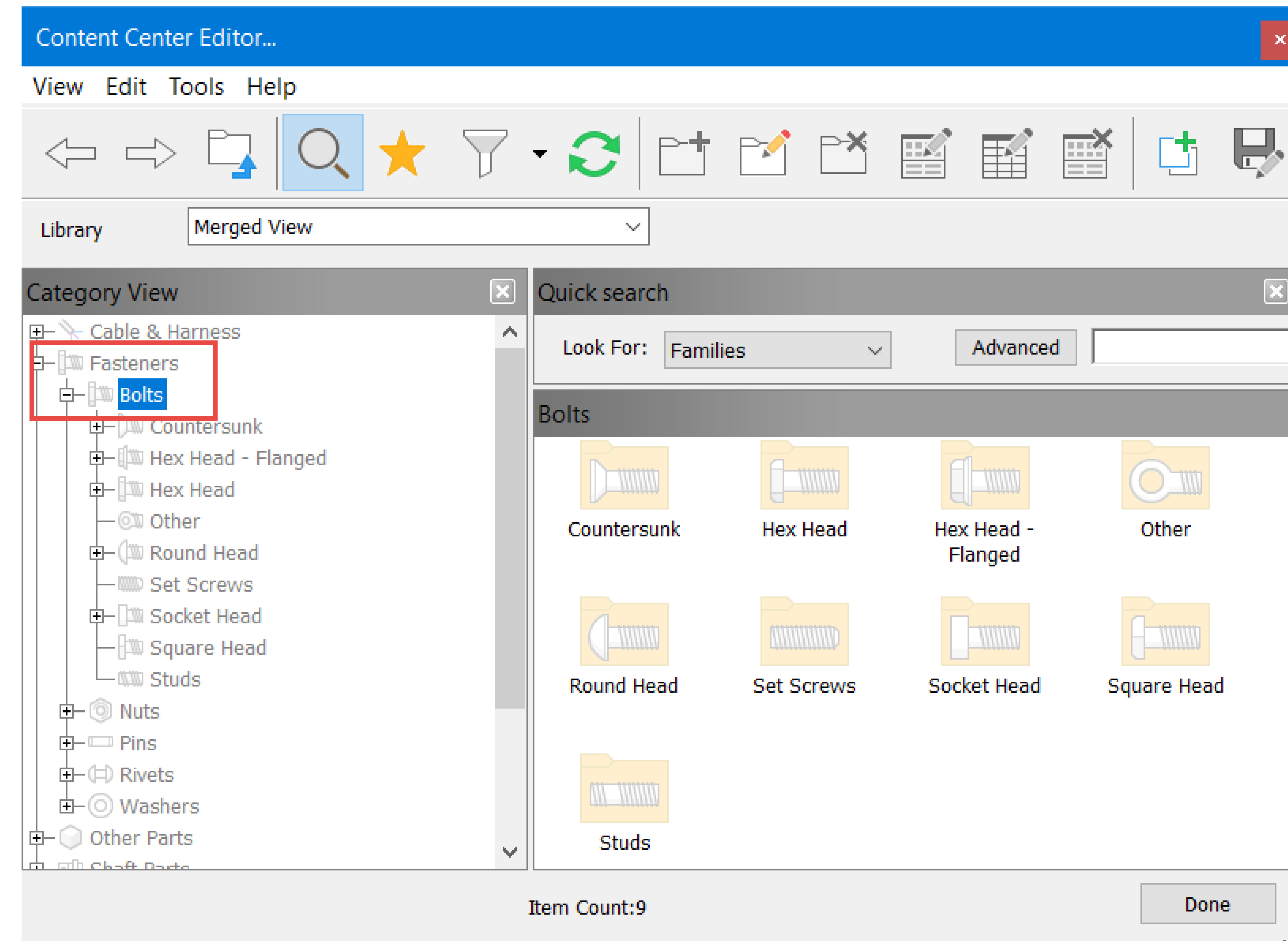
Controlling CC Structure



CC Structure

CC structure is important because each design accelerator requires components to be stored in specific locations

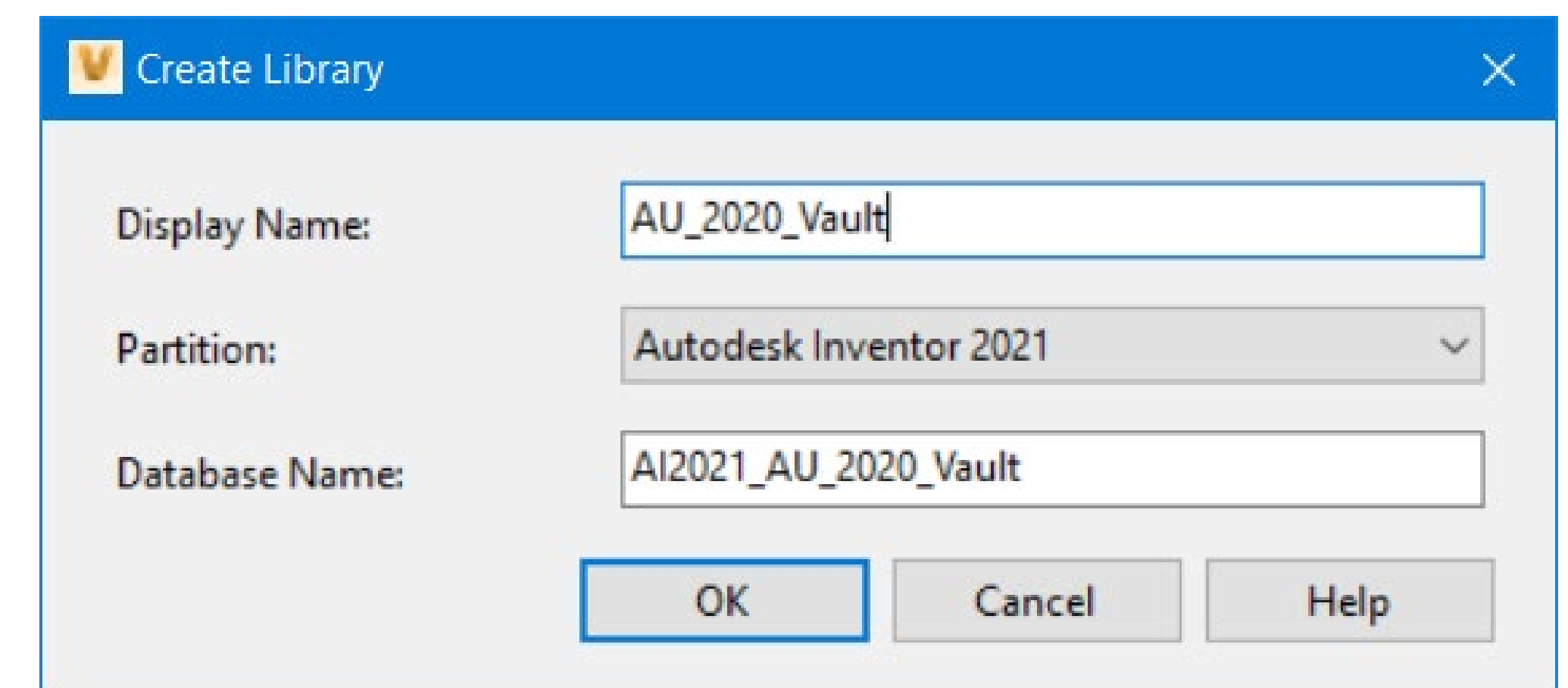
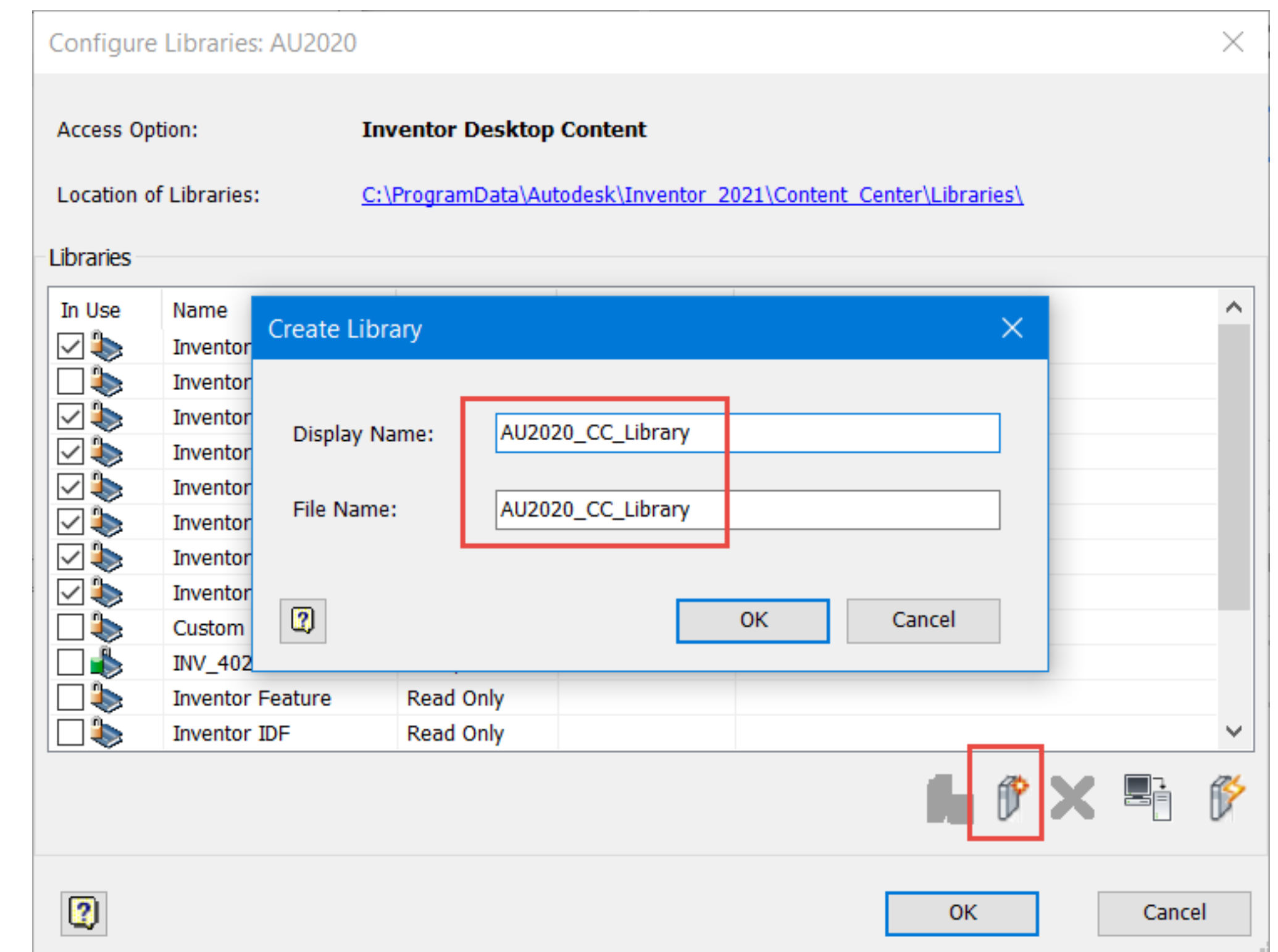
- **Top-level categories contain all variations**
 - Subcategories help differentiate unique variations, such as fasteners
 - Families are stored within both Top-level and subcategories



First Things First – Create a Custom Library

In order to Modify CC Structure a custom CC library must be generated

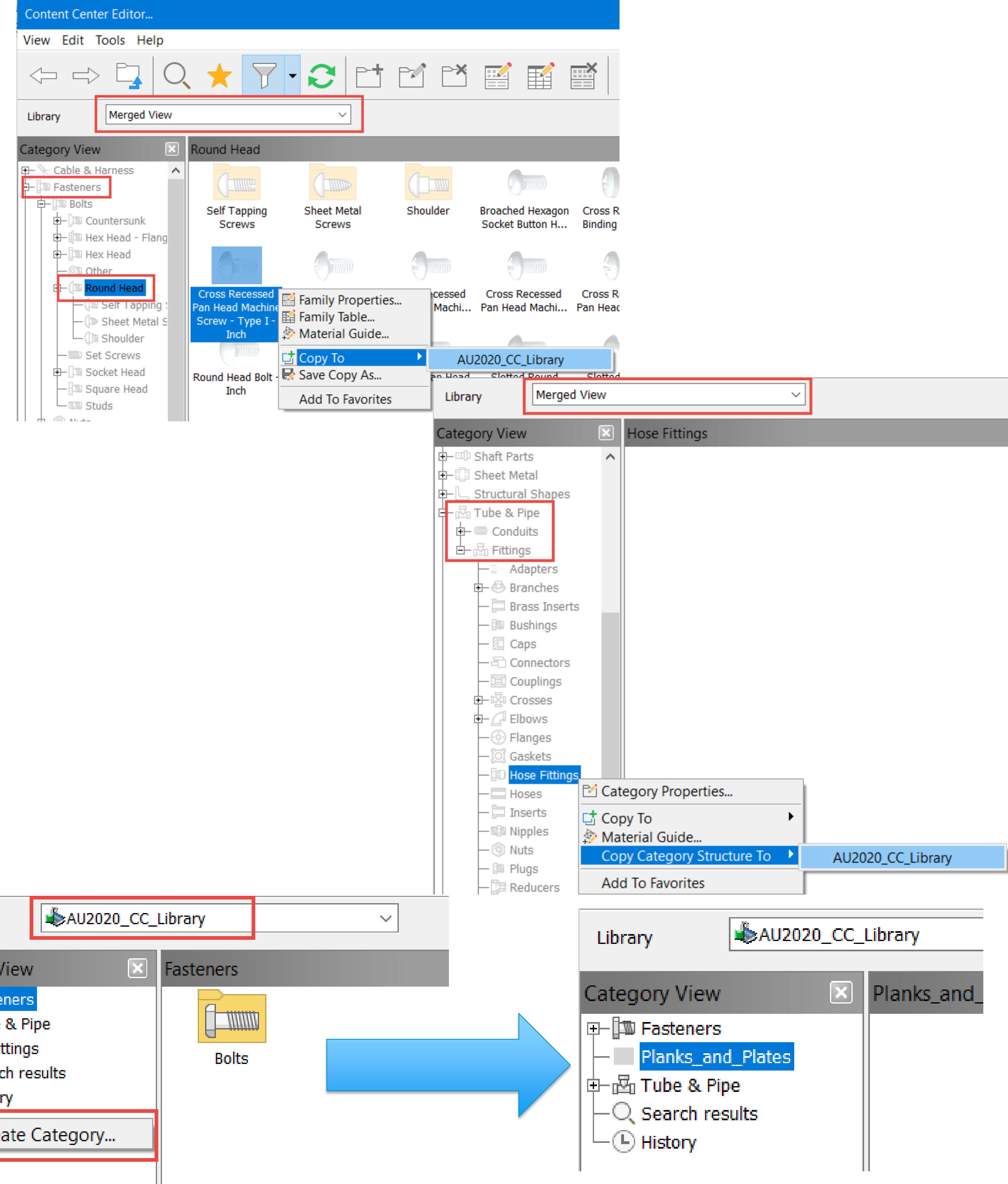
- Custom libraries can be created in two ways
 - Within the Inventor project file
 - Within the Vault ADMS Console



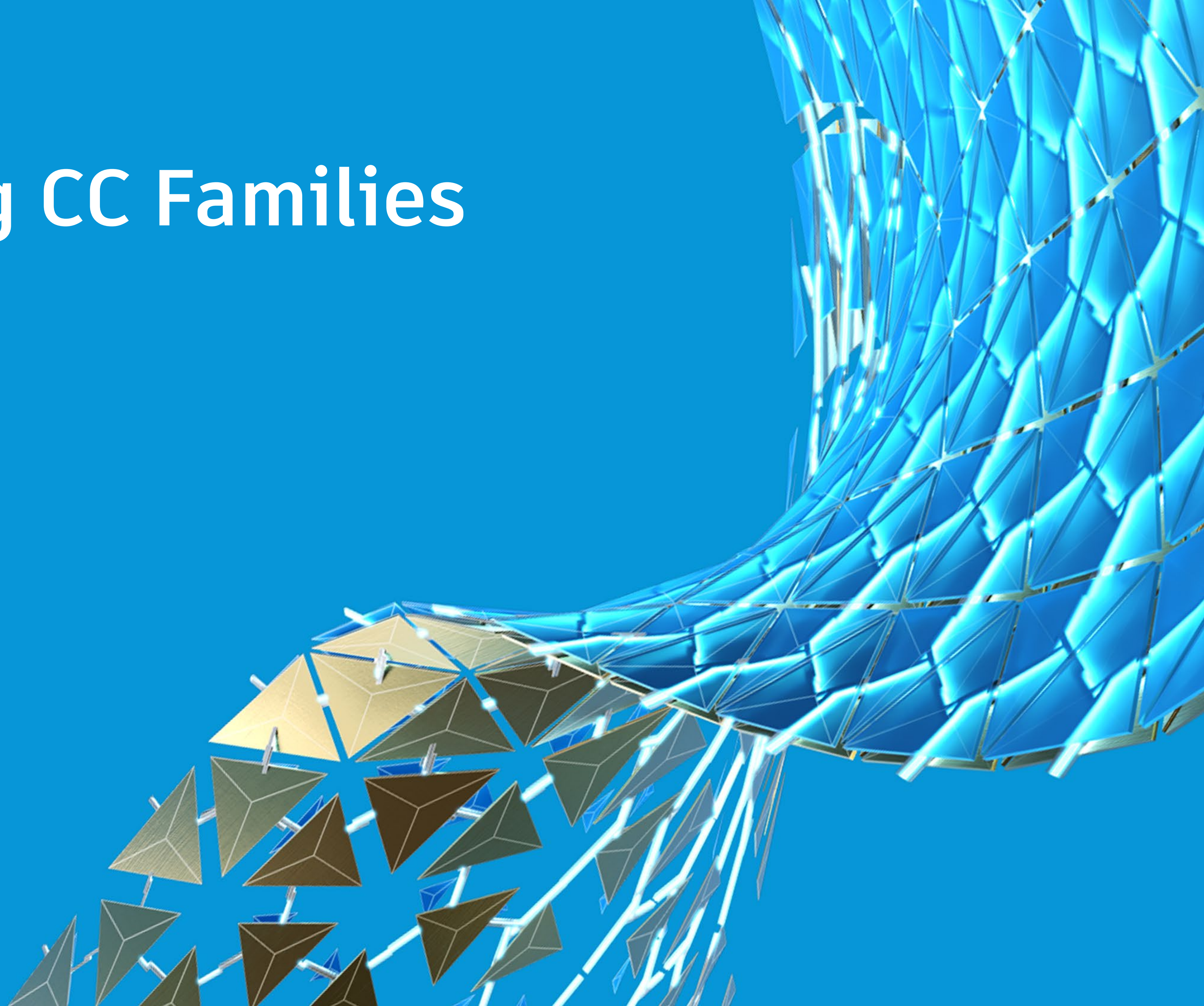
Time for Some Restructuring

Armed with a custom library, the CC structure can be modified to set the stage for family customization and / or new family publishing

- **Copy To / Save As an existing family to the custom library**
 - Use “Copy to” if the original family can change and want the copied family to adapt to the changes.
 - Use “Save As” for a fully independent family
- **Copy the CC structure to the custom library**
 - Best for publishing new content, where only structure is required beforehand
- **Create a new top-level custom category**
 - Use only for component not used in Design Accelerators



Customizing CC Families



How to Customize a CC Family

FAMILY PROPERTIES

The name of the family and the location where generated CC files are stored can be customized, as well as the icon graphics

FAMILY TABLE

This is the most important portion to customize, as the family table drives the component sizing, naming and all other component meta data

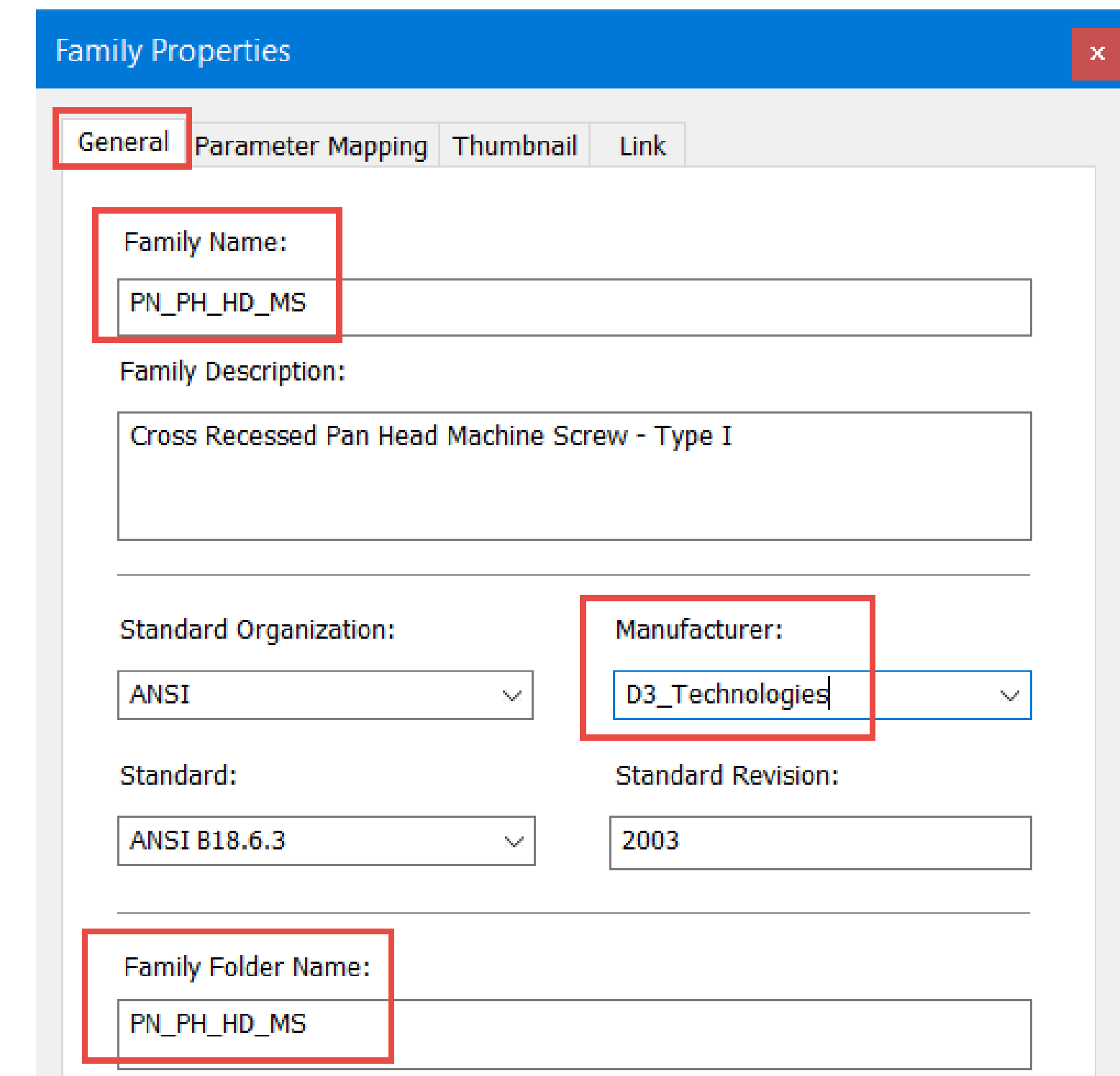
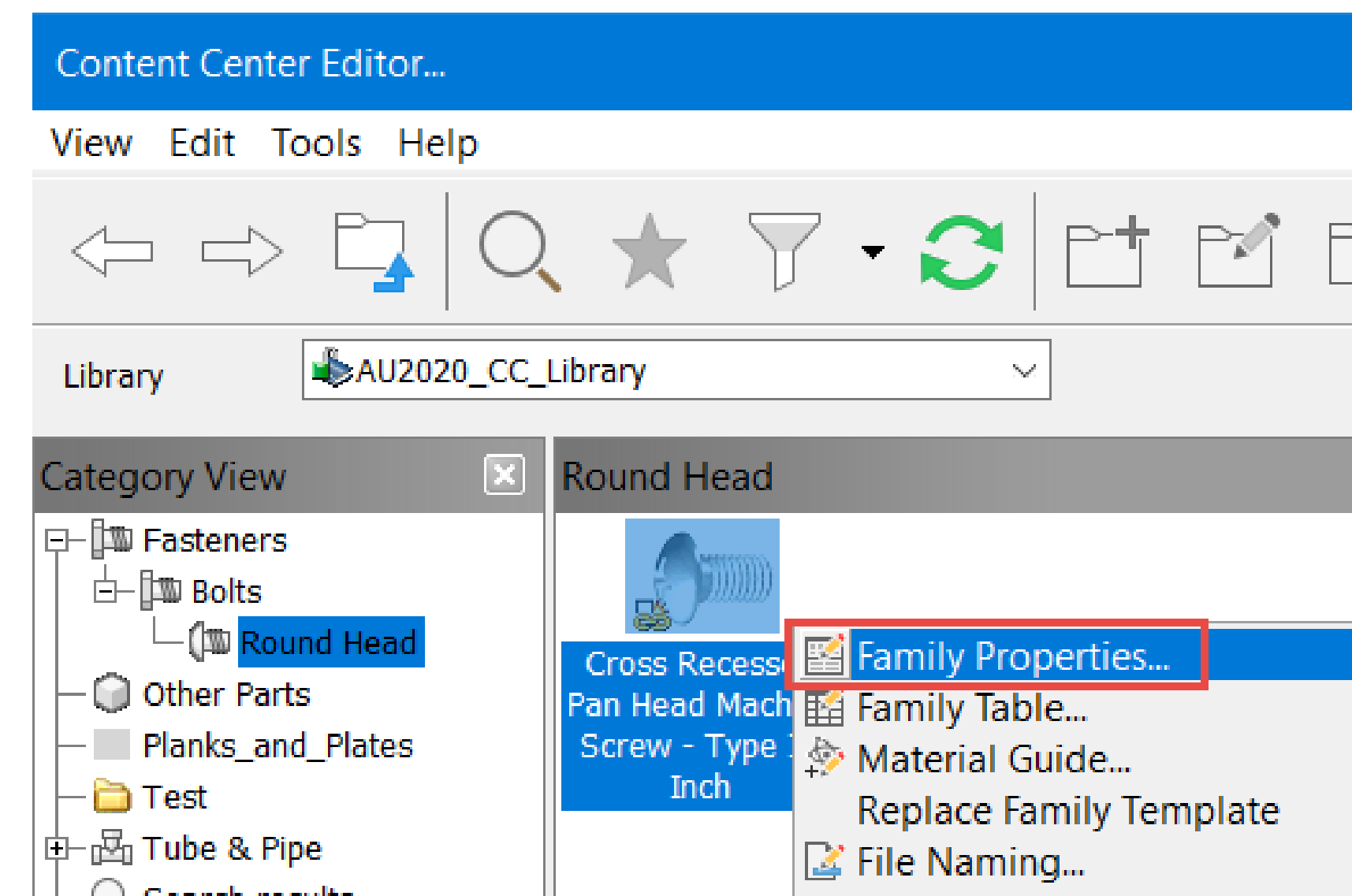
FAMILY MODEL TEMPLATE

Each family is based on an actual Inventor part template, which can be modified if geometric changes or additional iProperties are required

Family Properties

These are properties that all members of a family share

- **Family Name**
 - This is the name that designers will use to search for the proper components
- **Family Folder Name**
 - This is where Inventor will store components generated from the CC
- **Manufacturer**
 - This is useful for CC-wide filters that streamline the component selection process



Family Table – Add Custom Columns

The family table is a large data base with row-upon-row of data. This data is generically provided from Autodesk, so customization is required. The first item is to create custom data columns modified in the CC

- Manual Data Entry
 - These data columns are generated inside of the family table and manually populated (or slightly automated with custom expressions)
 - Can be mapped to existing iProperties for use in assembly modeling and BOM

Family Table:PN_PH_HD_MS

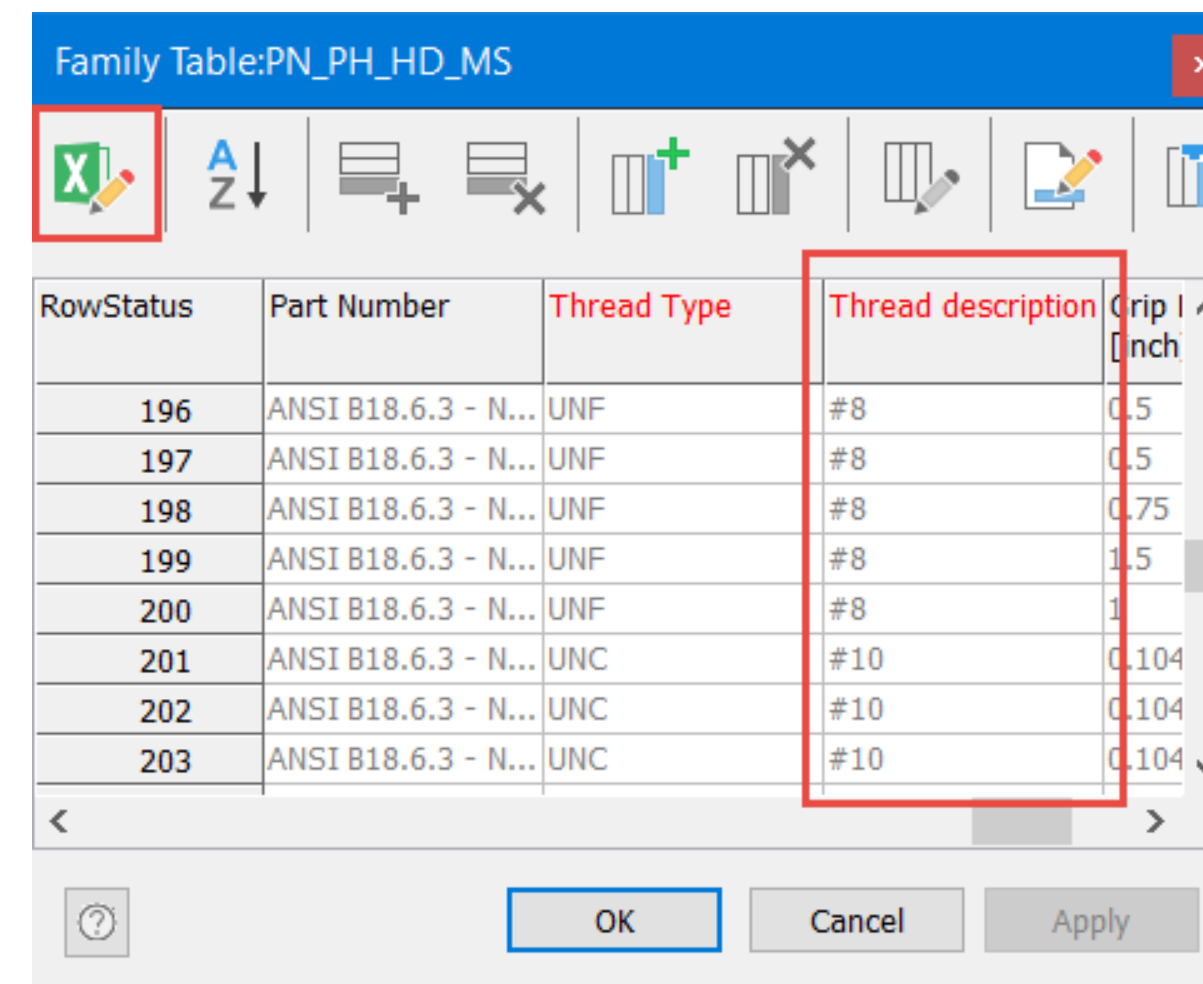
RowStatus	Designation	Thread per Unit	Nominal Length [inch]
1	No. 0 - 80 - 3/16	80	0.1875
2	No. 0 - 80 - 1/4	80	0.25
3	No. 0 - 80 - 3/8	80	0.375
4	No. 0 - 72 - 3/16	72	0.1875
5	No. 0 - 72 - 1/4	72	0.25
6	No. 0 - 72 - 3/8	72	0.375
7	No. 1 - 64 - 3/16	64	0.1875
8	No. 1 - 64 - 1/4	64	0.25
9	No. 1 - 64 - 3/8	64	0.375
10	No. 1 - 72 - 3/16	72	0.1875
11	No. 1 - 72 - 1/4	72	0.25
12	No. 1 - 72 - 3/8	72	0.375
13	No. 2 - 56 - 1/8	56	0.125
14	No. 2 - 56 - 3/16	56	0.1875
15	No. 2 - 56 - 1/4	56	0.25
16	No. 2 - 56 - 5/16	56	0.3125
17	No. 2 - 56 - 3/8	56	0.375
18	No. 2 - 56 - 7/16	56	0.4375
19	No. 2 - 56 - 1/2	56	0.5
20	No. 2 - 56 - 5/8	56	0.625
21	No. 2 - 56 - 3/4	56	0.75

RowStatus	Thread description	Grip Length [inch]	Vendor
1	#0 (0-80 UNF)	0.03125	Fastenal
2	#0 (0-80 UNF)	0.03125	Fastenal
3	#0 (0-80 UNF)	0.03125	Fastenal
4	#0 (0-72 UNF)	0.03472222	Fastenal
5	#0 (0-72 UNF)	0.03472222	Fastenal
6	#0 (0-72 UNF)	0.03472222	Fastenal
7	#1	0.0390625	Fastenal
8	#1	0.0390625	Fastenal

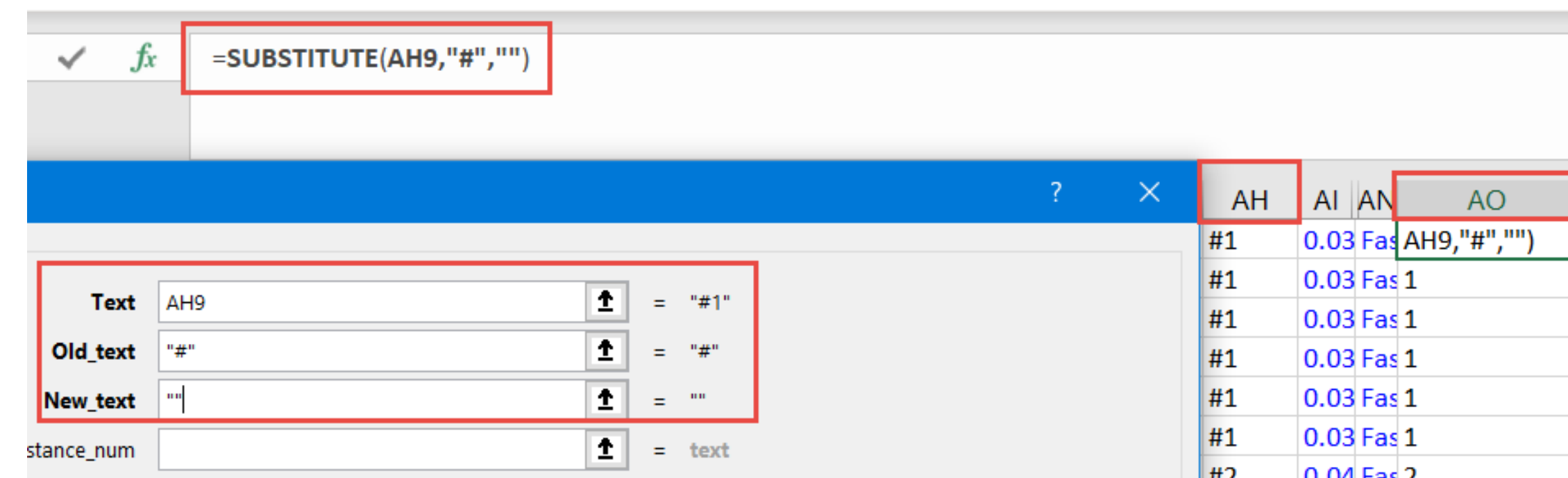
Family Table – Add Custom Columns (Cont.)

The family table is a large data base with row-upon-row of data. This data is generically provided from Autodesk, so customization is required. The second item is to create custom data columns that are modified in Excel

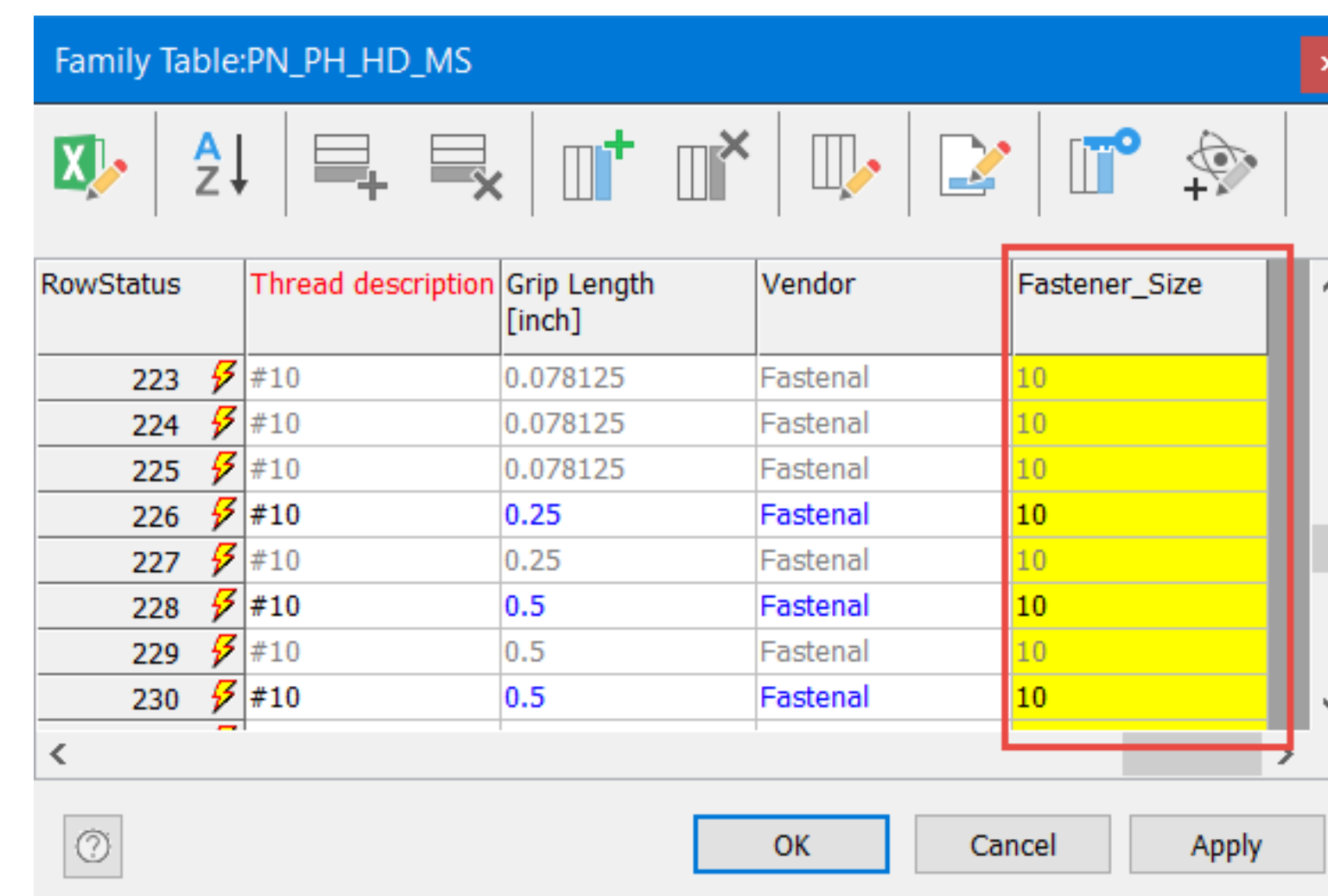
- Generate the column
 - This can be done in Excel or the family table
- Utilize Excel for advanced data manipulation
 - Note that since the family table is a database, any Excel functionality will be lost when the table is updated. The table data is correct, but the formulas are replaced with the resulting text



RowStatus	Part Number	Thread Type	Thread description	Grip Length [inch]
196	ANSI B18.6.3 - N...	UNF	#8	0.5
197	ANSI B18.6.3 - N...	UNF	#8	0.5
198	ANSI B18.6.3 - N...	UNF	#8	0.75
199	ANSI B18.6.3 - N...	UNF	#8	1.5
200	ANSI B18.6.3 - N...	UNF	#8	1
201	ANSI B18.6.3 - N...	UNC	#10	0.104
202	ANSI B18.6.3 - N...	UNC	#10	0.104
203	ANSI B18.6.3 - N...	UNC	#10	0.104



	AH	AI	AO
#1	0.03 Fas		0.03 Fas
#1	0.03 Fas		0.03 Fas
#1	0.03 Fas		0.03 Fas
#1	0.03 Fas		0.03 Fas
#1	0.03 Fas		0.03 Fas
#1	0.03 Fas		0.03 Fas
#2	0.04 Fas		0.04 Fas



RowStatus	Thread description	Grip Length [inch]	Vendor	Fastener_Size
223	#10	0.078125	Fastenal	10
224	#10	0.078125	Fastenal	10
225	#10	0.078125	Fastenal	10
226	#10	0.25	Fastenal	10
227	#10	0.25	Fastenal	10
228	#10	0.5	Fastenal	10
229	#10	0.5	Fastenal	10
230	#10	0.5	Fastenal	10

File Naming and Part Numbers

There are a lots of useful out-of-the-box families, but the File Names and Part Numbers do not align with any specific company's business processes

- **Manually Manipulate the Data**
 - File Names and Part Numbers can be keyed in manually
- **Utilize Custom Expressions**
 - Column data is driven via an expression combining text strings and additional column properties
- **Utilize Excel**
 - Excel formulas and CONCATENATE can be used, but will be replaced by resulting text

Family Table:PN_PH_HD_MS

RowStatus	Size Designation	File Name	Material	Part Number
220	No. 10 - 32 - 3/8	ANSI B18.6.3 - 1...	Steel, Mild	ANSI B18.6.3 - No. 10 - 32 - 3/8, CRPHMSTII(2)
221	No. 10 - 32 - 7/16	ANSI B18.6.3 - 1...	Steel, Mild	ANSI B18.6.3 - No. 10 - 32 - 7/16, CRPHMSTII(2)
222	No. 10 - 32 - 1/2	ANSI B18.6.3 - 1...	Steel, Mild	ANSI B18.6.3 - No. 10 - 32 - 1/2, CRPHMSTII(2)
223	No. 10 - 32 - 5/8	ANSI B18.6.3 - 1...	Steel, Mild	ANSI B18.6.3 - No. 10 - 32 - 5/8, CRPHMSTII(2)
224	No. 10 - 32 - 3/4	ANSI B18.6.3 - 1...	Steel, Mild	ANSI B18.6.3 - No. 10 - 32 - 3/4, CRPHMSTII(2)
225	No. 10 - 32 - 7/8	ANSI B18.6.3 - 1...	Steel, Mild	ANSI B18.6.3 - No. 10 - 32 - 7/8, CRPHMSTII(2)
226	No. 10 - 32 - 1	ANSI B18.6.3 - 1...	Steel, Mild	ANSI B18.6.3 - No. 10 - 32 - 1, CRPHMSTII(2)
227	No. 10 - 32 - 1 1/4	ANSI B18.6.3 - 1...	Steel, Mild	ANSI B18.6.3 - No. 10 - 32 - 1 1/4, CRPHMSTII(2)

Family Table:PN_PH_HD_MS

RowStatus	Size Designation	File Name	Material	Part Number
220	No. 10 - 32 - 3/8	ANSI B18.6.3 - 1...	Steel, Mild	ANSI B18.6.3 - No. 10 - 32 - 3/8, CRPHMSTII(2)
221	No. 10 - 32 - 7/16	ANSI B18.6.3 - 1...	Steel, Mild	ANSI B18.6.3 - No. 10 - 32 - 7/16, CRPHMSTII(2)
222	No. 10 - 32 - 1/2	ANSI B18.6.3 - 1...	Steel, Mild	29049
223	No. 10 - 32 - 5/8	ANSI B18.6.3 - 1...	Steel, Mild	ANSI B18.6.3 - No. 10 - 32 - 5/8, CRPHMSTII(2)
				ANSI B18.6.3 - No. 10 - 32 - 3/4, CRPHMSTII(2)
				ANSI B18.6.3 - No. 10 - 32 - 7/8, CRPHMSTII(2)
				ANSI B18.6.3 - No. 10 - 32 - 1, CRPHMSTII(2)
				ANSI B18.6.3 - No. 10 - 32 - 1 1/4, CRPHMSTII(2)

Column Properties

Column Name: Data Type: String

Column Caption: Units:

☒ Expression
☐ Expression Column

Expression:

Map To Inventor Property:

Family Table:PN_PH_HD_MS

RowStatus	Size Designation	File Name	Material	Part Number
220	No. 10 - 32 - 3/8	PN_PH_HD_MS_32_0.375	Steel, Mild	PN_PH_HD_MS_32_0.375
221	No. 10 - 32 - 7/16	PN_PH_HD_MS_32_0.4375	Steel, Mild	PN_PH_HD_MS_32_0.4375
222	No. 10 - 32 - 1/2	PN_PH_HD_MS_10_32_0.5	Steel, Mild	PN_PH_HD_MS_10_32_0.5
223	No. 10 - 32 - 5/8	PN_PH_HD_MS_10_32_0.625	Steel, Mild	PN_PH_HD_MS_10_32_0.625
224	No. 10 - 32 - 3/4	PN_PH_HD_MS_10_32_0.75	Steel, Mild	PN_PH_HD_MS_10_32_0.75
225	No. 10 - 32 - 7/8	PN_PH_HD_MS_10_32_0.875	Steel, Mild	PN_PH_HD_MS_10_32_0.875
226	No. 10 - 32 - 1	PN_PH_HD_MS_10_32_1	Steel, Mild	PN_PH_HD_MS_10_32_1
227	No. 10 - 32 - 1 1/4	PN_PH_HD_MS_10_32_1.25	Steel, Mild	PN_PH_HD_MS_10_32_1.25

Pare Down Available Rows

In order to assist with lean manufacturing and design efforts, it is essential to stock and use standardized components. Editing the available data rows aids in this effort

- **Remove Sizes Not Desired**
 - If the smallest fastener size is a #10, remove all #0 through #8 sizes
- **Remove Specific Versions Not Desired**
 - Specific sizes can be standardized by removing unnecessary rows, such as #10 x 1/4" long SMS
- **Delete vs Suppressing Rows**
 - Deleting is permanent and will require row creation if data is required in the future
 - Suppression preserves the row data, but data is hidden from the end designers

Family Table:PN_PH_HD_MS			Family Table:PN_PH_HD_MS				
RowStatus	Designation	Thread per U	RowStatus	Designation	Thread per Unit	Nominal Length [inch]	Nominal Length [inch]
1	No. 0 - 80 - 3/16	80	211	No. 10 - 24 - 1 1/2	24	1.5	0.19
2	No. 0 - 80 - 1/4	80	212	No. 10 - 24 - 1 3/4	24	1.75	0.19
3	No. 0 - 80 - 3/8	80	213	No. 10 - 24 - 2	24	2	0.19
4	No. 0 - 72 - 3/16	72	214	No. 10 - 24 - 2 1/4	24	2.25	0.19
5	No. 0 - 72 - 1/4	72	215	No. 10 - 24 - 2 1/2	24	2.5	0.19
6	No. 0 - 72 - 3/8	72	216	No. 10 - 24 - 2 3/4	24	2.75	0.19
7	No. 1 - 64 - 3/16	64	217	No. 10 - 24 - 3	24	3	0.19
8	No. 1 - 64 - 1/4	64	218			0.25	0.19
9	No. 1 - 64 - 3/8	64	219			0.3125	0.19
10	No. 1 - 72 - 3/16	72	220			0.375	0.19
11	No. 1 - 72 - 1/4	72	221			0.4375	0.19
12	No. 1 - 72 - 3/8	72	222			0.5	0.19
13	No. 2 - 56 - 1/8	56	223			0.625	0.19
			224			0.75	0.19
			225			0.875	0.19
			226			1	0.19
			227			1.25	0.19
						1.5	0.19
						1.75	0.19
						2	0.19
						2.25	0.19

Family Table:PN_PH_HD_MS

RowStatus	Designation	Thread per Unit	Nominal Length [inch]
217	No. 10 - 24 - 3	24	3
218	No. 10 - 32 - 1/4	32	0.25
219	No. 10 - 32 - 5/16	32	0.3125
220	No. 10 - 32 - 3/8	32	0.375
221	No. 10 - 32 - 7/16	32	0.4375
222	No. 10 - 32 - 1/2	32	0.5
223	No. 10 - 32 - 5/8	32	0.625
224	No. 10 - 32 - 3/4	32	0.75
225	No. 10 - 32 - 7/8	32	0.875
226	No. 10 - 32 - 1	32	1
227	No. 10 - 32 - 1 1/4	32	1.25
228	No. 10 - 32 - 1 1/2	32	1.5
229	No. 10 - 32 - 1 3/4	32	1.75
230	No. 10 - 32 - 2	32	2
231	No. 10 - 32 - 2 1/4	32	2.25
232	No. 10 - 32 - 2 1/2	32	2.5
233	No. 10 - 32 - 2 3/4	32	2.75
234			3
235			0.375
236			0.5
237			0.625
238			0.75
239			0.875

PN_PH_HD_MS

Select Table View Family Info

Thread description	Nominal Length (inch)	Thread Type
#10	0.5	UNF
#12	1	
1/4	1.5	
5/16	2	
3/8	2.5	
7/16	3	
1/2		
9/16		
5/8		
3/4		

☐ As Custom
 ☐ Use iMate
 ☒ As Standard

OK Cancel Apply

Replace the Family Model Template

Every family is based upon an actual Inventor part model template, which defines the geometry and available meta data. This template must be replaced for geometric updates or meta data additions

- **Geometric Updates**

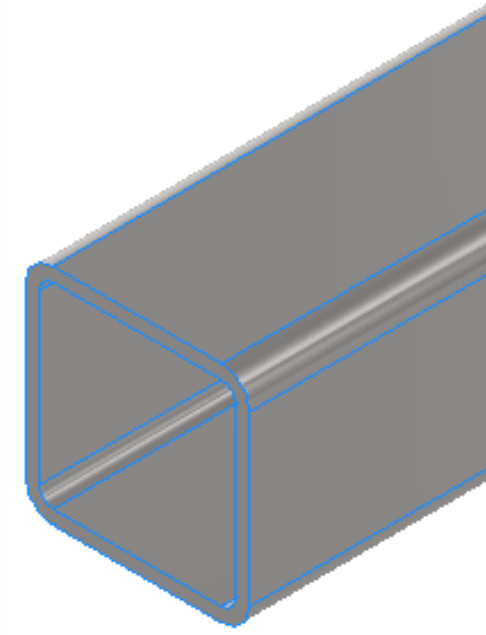
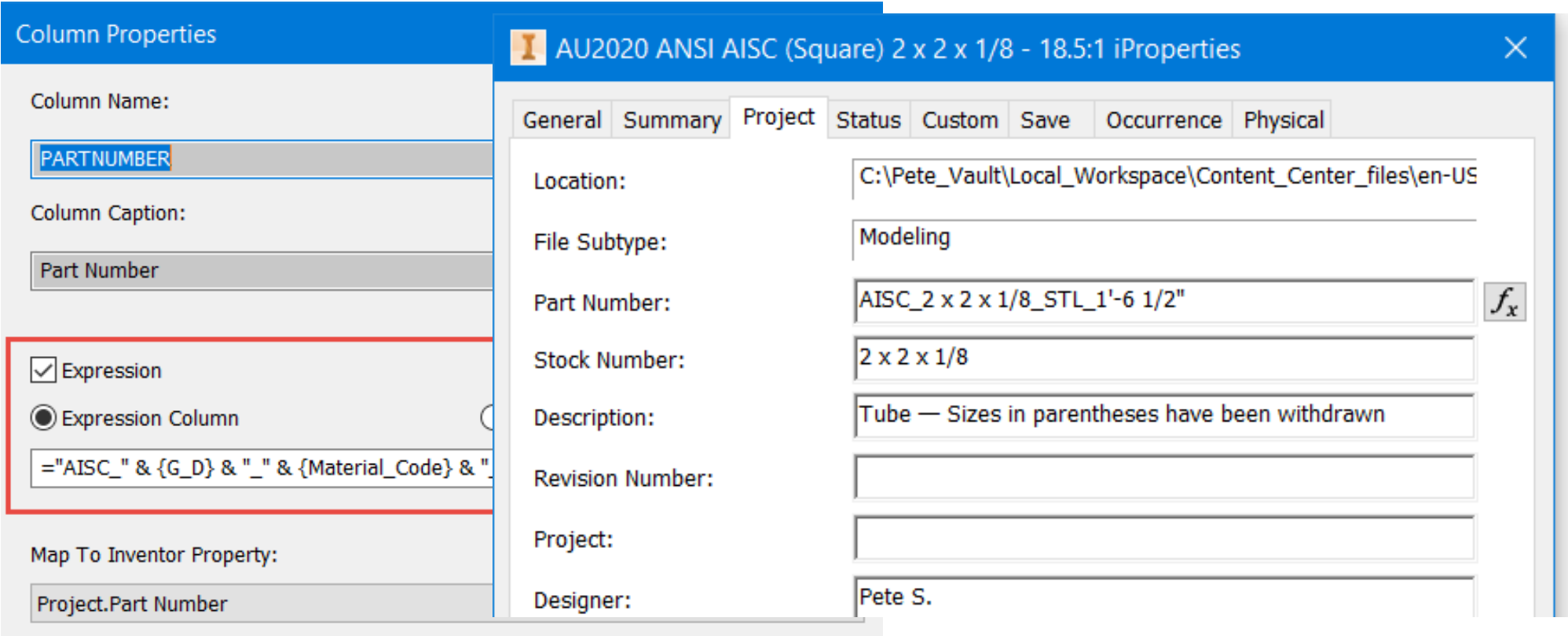
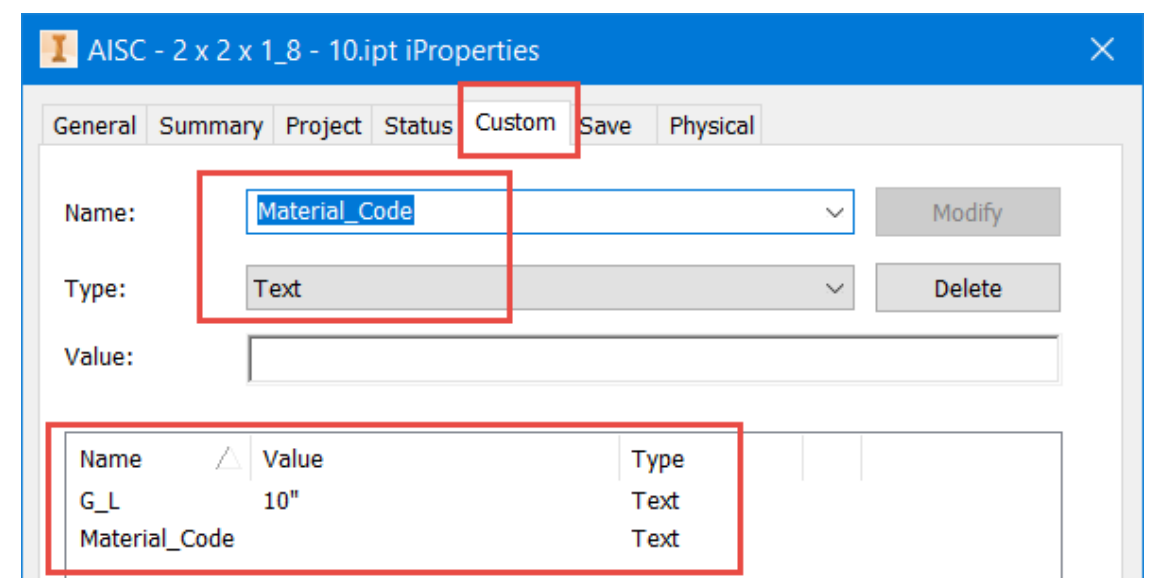
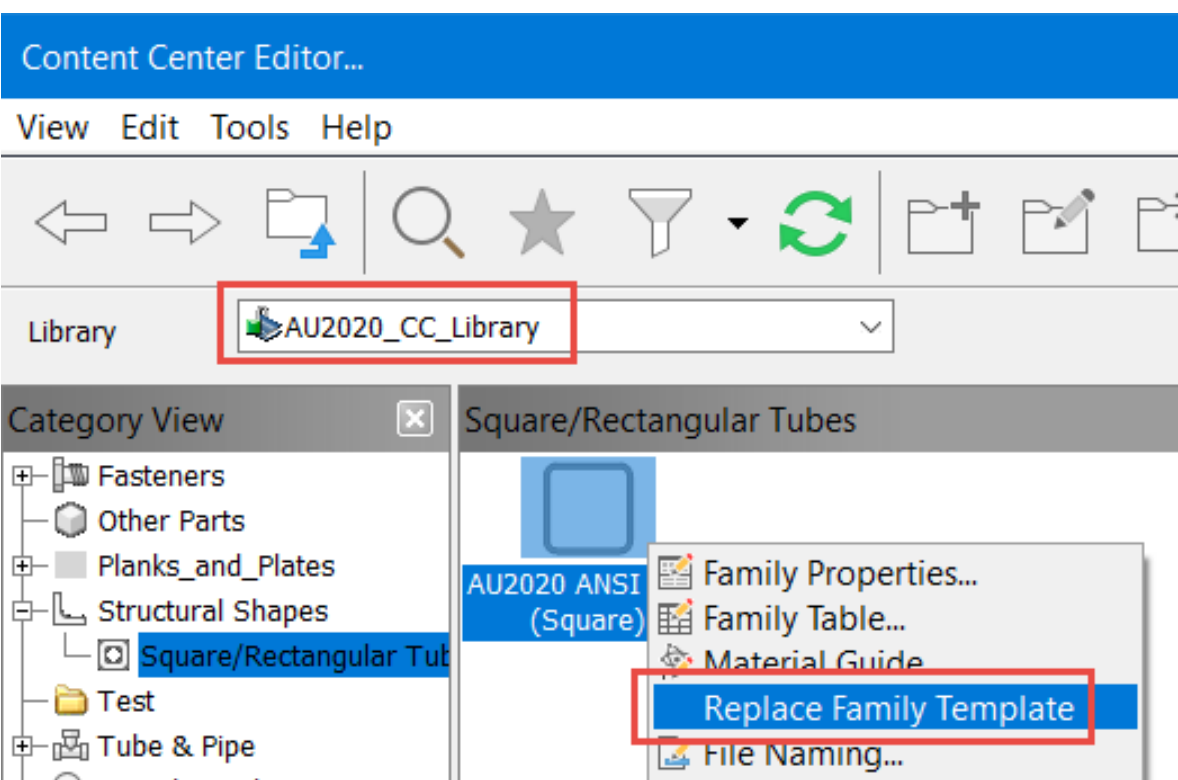
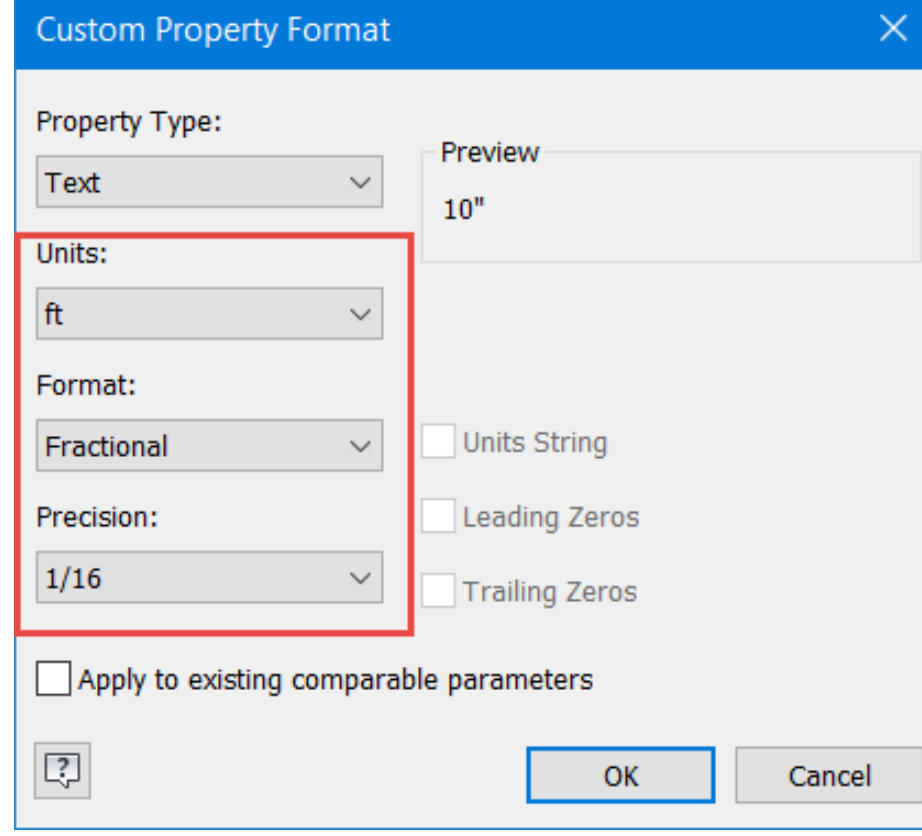
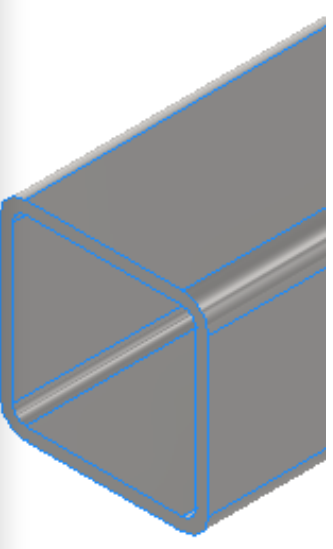
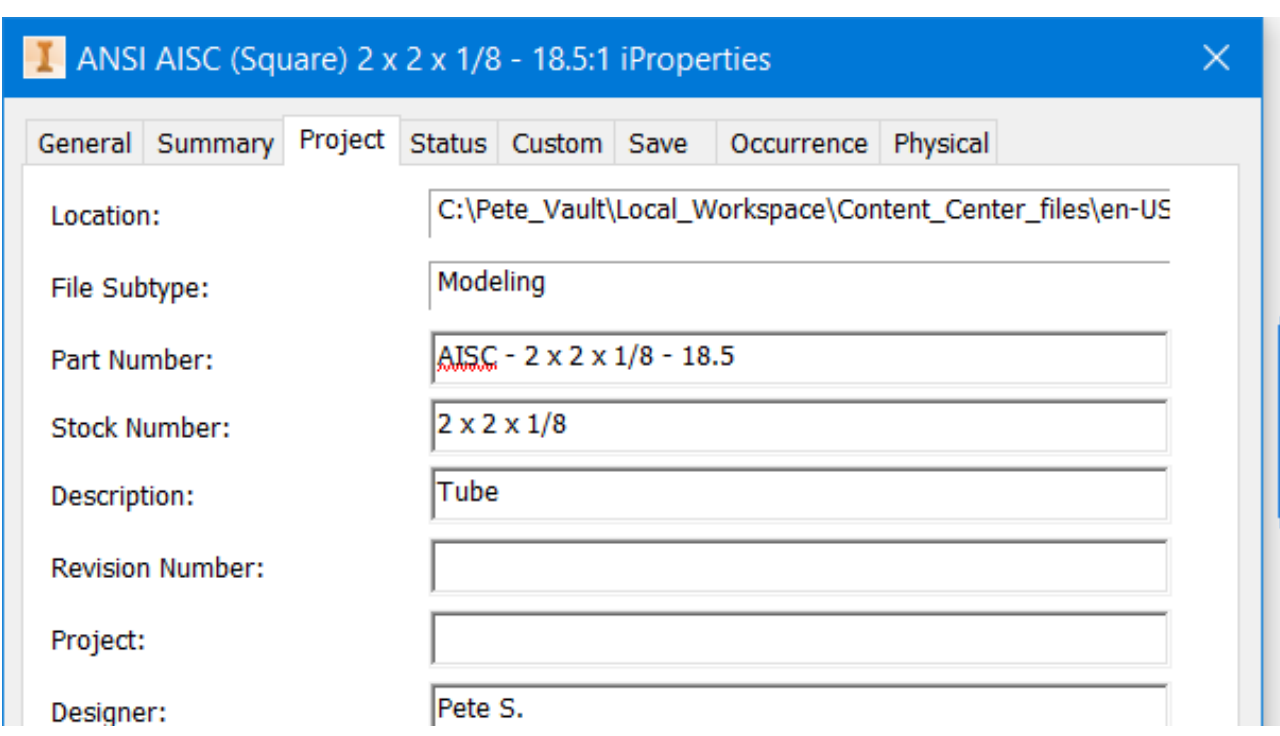
- Any geometric changes must be published via a family template replacement

- **Custom iProperties**

- Custom iProperties must be added to the family template to be accessible to the family table

- **Meta Data Modifications**

- Parameter and other updates must be published as a template replacement to be accessible by the table



Publishing New CC Content



What Can be Published?

STANDALONE COMPONENTS

Unique components can be published to server specific purposes with new rows potentially added in the family table

IPARTS

For common groups of components or as an easier way of establishing key columns for the family table, an iPart is a great way to get started

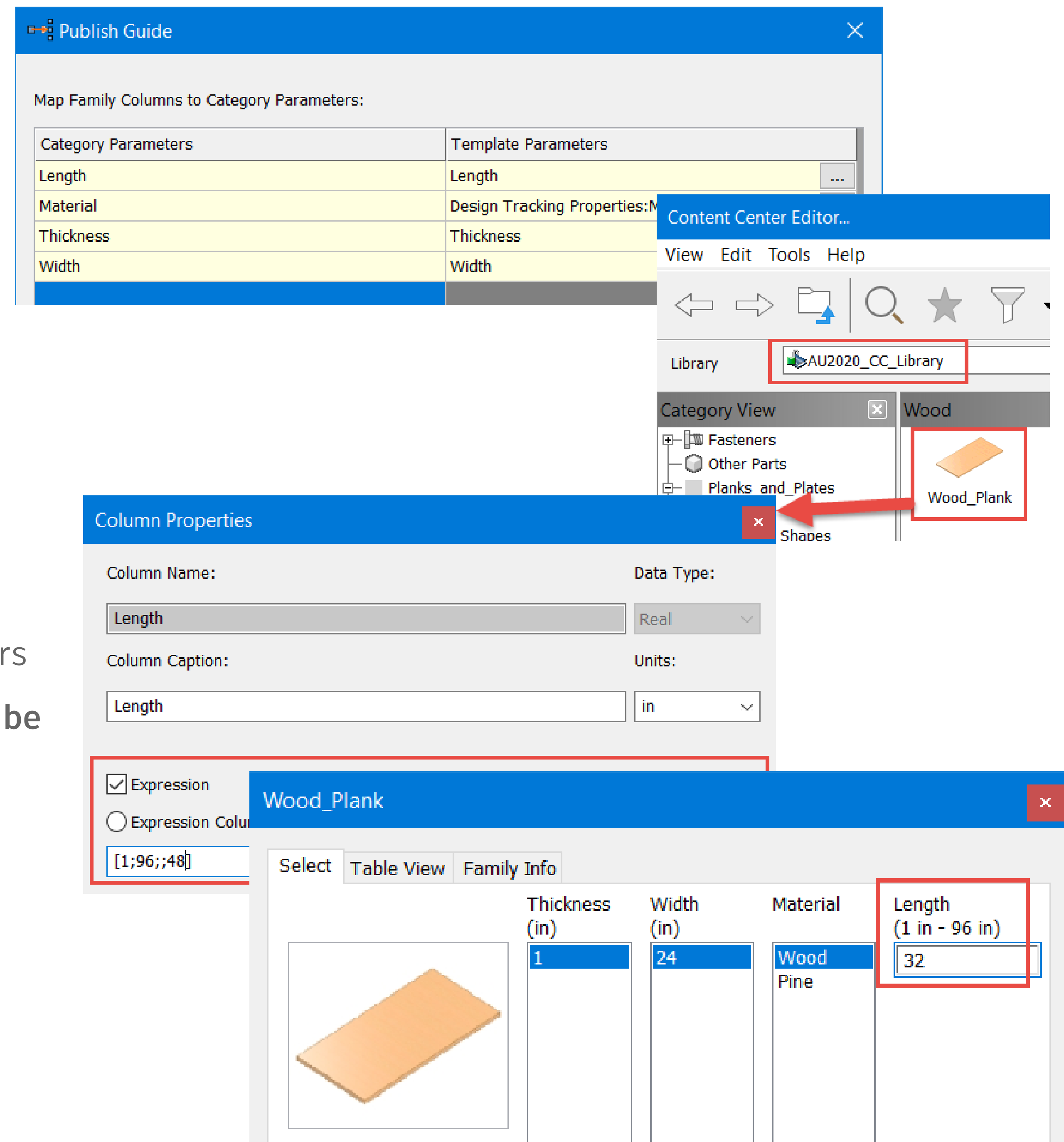
SPECIALTY AUTHORED CONTENT

When working to expand the content for use with the Design Accelerators, special features must be added to author the components for these unique situations

Standalone Components

These components are often unique or can be customized in the family table to handle the different size requirements

- Key values are determined from the category properties
 - Category properties are mapped to key parameters
- Additional sizing and parameter customization can be added in the family table
 - Adding a custom column expression allows designers to customize a component's size when placing from the CC



iPart Components

These components are usually part of a “family” with different sizes and configurations, which can be built ahead of time in the iPart table

- Category properties are mapped to the iPart table columns
- iPart table rows convert to CC family table rows
- Custom parameter columns in the iPart table automatically convert to custom column expressions in the family table

Parameters

Properties

Suppression

iFeatures

iMates

Work Features

Threads

Other

Plank_iPart.ipt

Extrusion1

x= Length [48 in]

x= Thickness [1.0 in]

x= Width [24 in]

x= d0 [Width]

x= d1 [Length]

x= d2 [Thickness]

Name

Length

Width

Thickness

	Member	Part Number	Length	Width	Thickness	Material
1	Wood_1_24_48	Wood_1_24_48	48 in	24 in	1.0 in	Wood
2	Wood_1_12_48	Wood_1_12_48	48 in	12 in	1.0 in	Wood
3	Wood_1_18_48	Wood_1_18_48	48 in	18 in	1.0 in	Wood
4	Wood_0.75_24_48	Wood_0.75_24_48	48 in	24 in	0.75 in	Wood
5	Wood_0.75_12_48	Wood_0.75_12_48	48 in	12 in	0.75 in	Wood
6	Wood_0.75_18_48	Wood_0.75_18_48	48 in	18 in	0.75 in	Wood

Length

48 in

48 in

48 in

48 in

48 in

48 in

48 in

Delete Column

Key

Custom Parameter Column

Specify Range for Column...

Specify Increment for Column...

File Name Column

Appearance Column

Material Column

Family Table:Plank_iPart

X

A Z

RowStatus	Member	Part Number [Pr...	Length [in]
1	Wood_1_24_48	Wood_1_24_48	48
2	Wood_1_12_48	Wood_1_12_48	48
3	Wood_1_18_48	Wood_1_18_48	48
4	Wood_0.75_24_48	Wood_0.75_24_48	48
5	Wood_0.75_12_48	Wood_0.75_12_48	48
6	Wood_0.75_18_48	Wood_0.75_18_48	48

Column Properties

Column Name: Length

Data Type: Real

Column Caption: Length

Units: in

☒ Expression

☐ Expression Column

☒ Custom Column

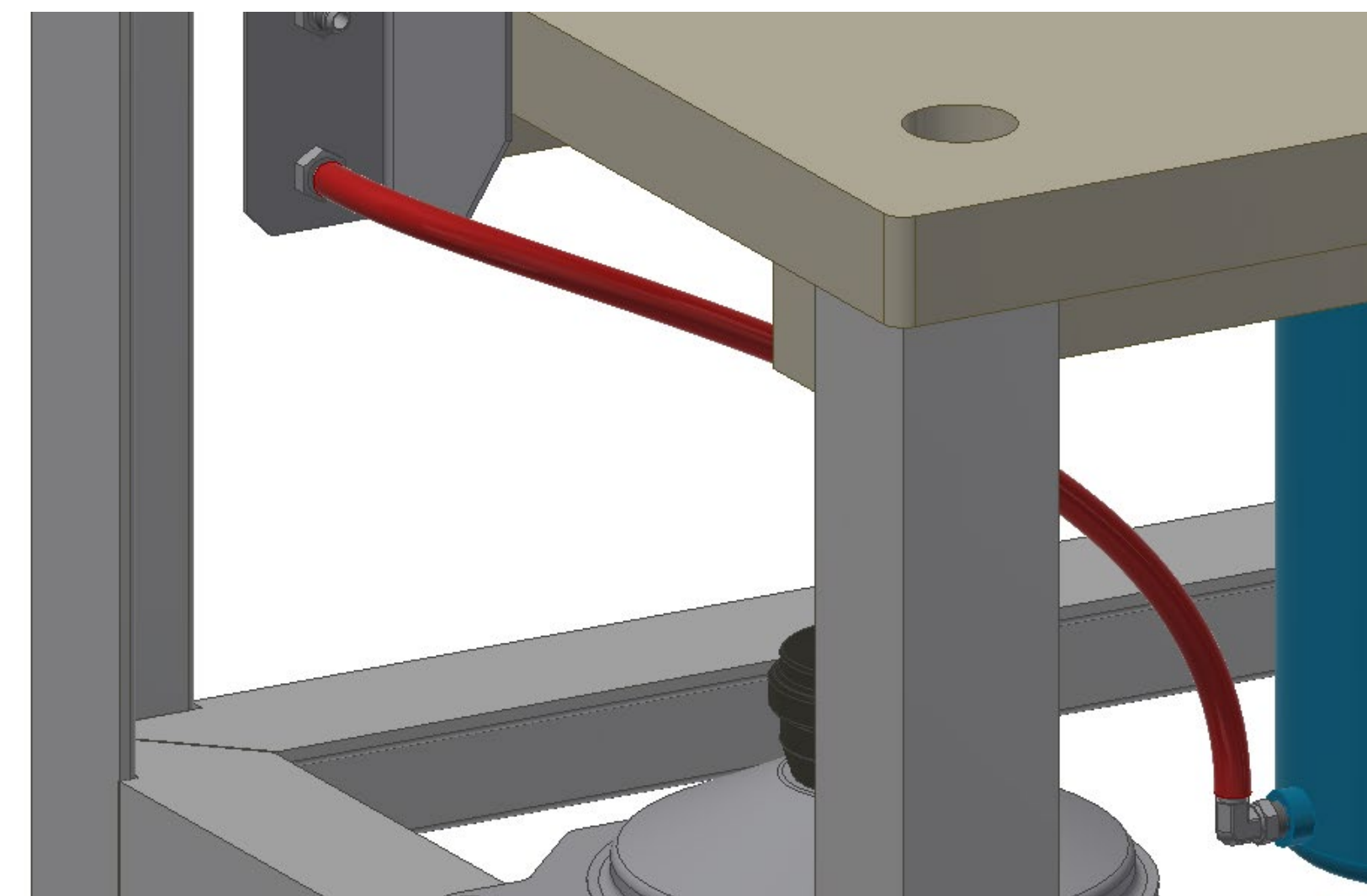
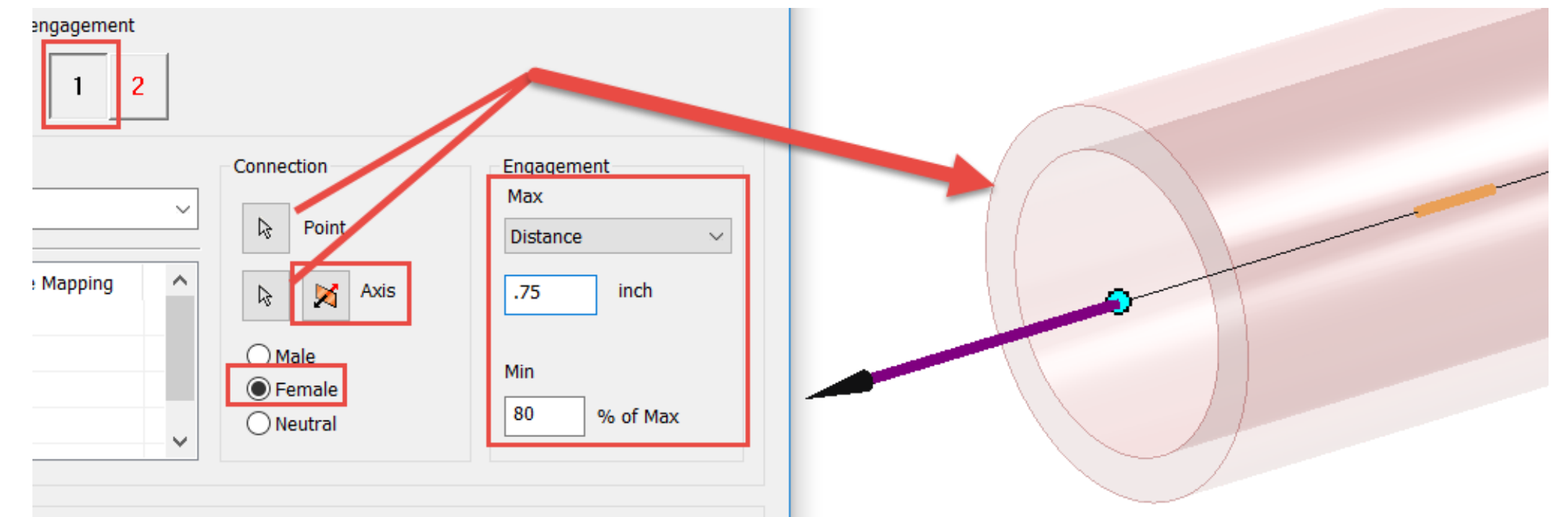
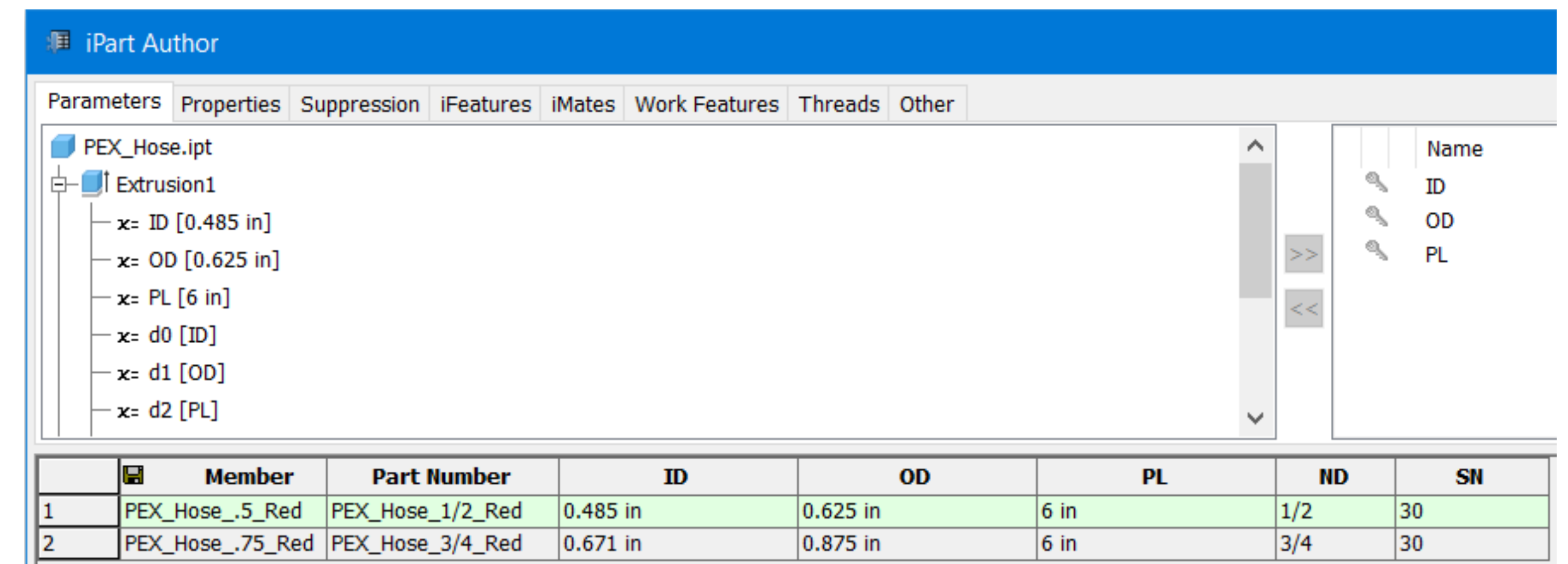
[1 ;96 ;;48]

Map To Inventor Property:

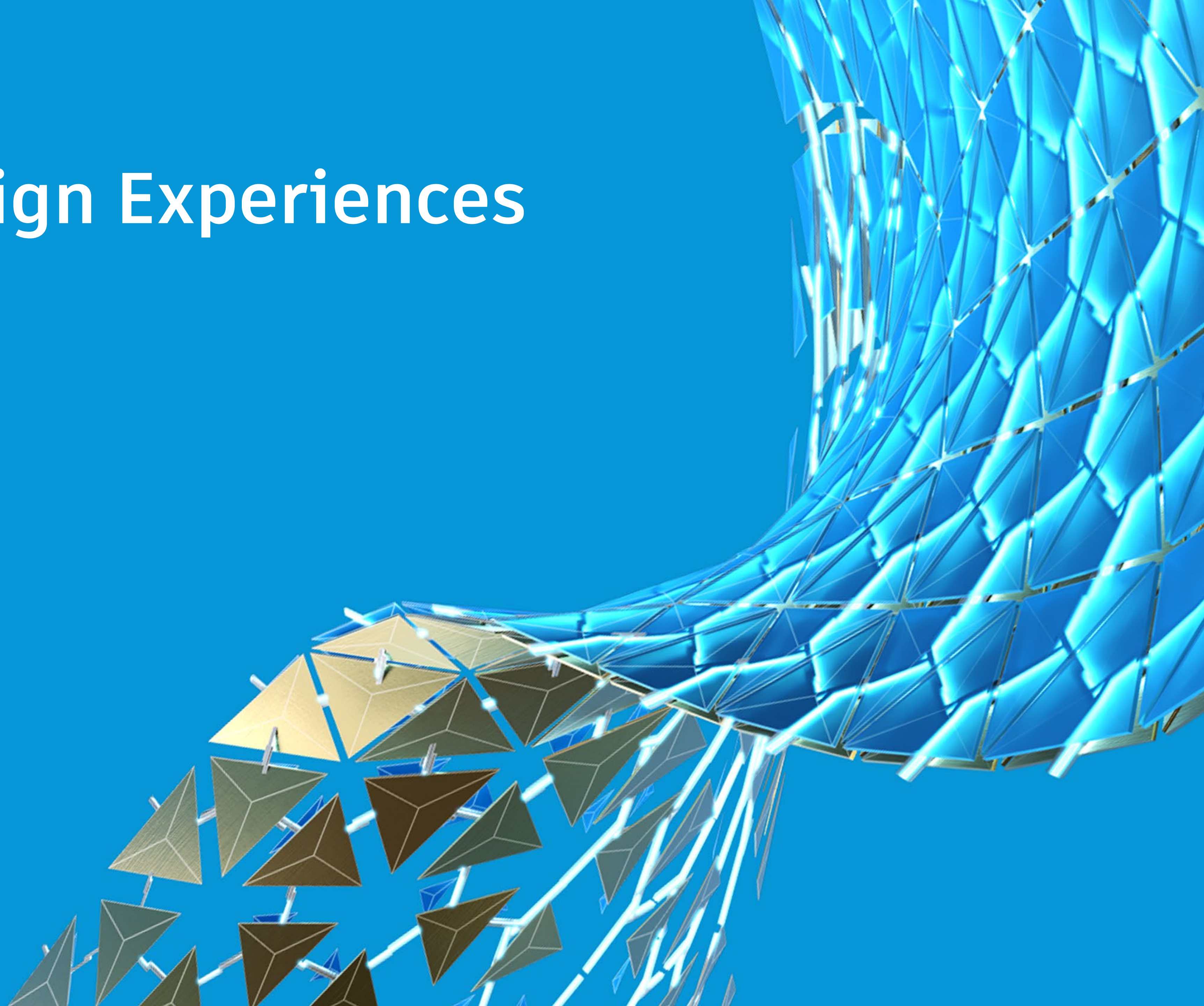
Specialty Authored Content

The Design Accelerators require certain characteristics for published components to enable the efficient functionality

- Specific features must be authored for each component class
 - Each CC category has unique requirements for the Design Accelerators
- Additional Design Accelerator functionality may be required
 - In order to utilize the newly published CC families, additional styles may be required, as in the Tube & Pipe environment



Improve Design Experiences



What Kind of Improvements?

CUSTOM COLUMNS

Some custom columns can be created to help clarify selection options or help guide designers to the proper selections

CUSTOM SELECTION FILTERS

By customizing the family properties of “Standard” and “Manufacturer” custom filters can be implemented to emphasize company approved CC families


Custom Columns

Custom columns can be added to guide designers to the proper component selections

- **Rename Columns to Aid in Selection**
 - Sometimes column names are unclear, so a simple name change is sufficient
- **Create New Columns for Clarity**
 - Creating new columns that combine other column data is often the best solution

PN_PH_HD_MS

SelectTable ViewFamily Info



Thread description	Nominal Length (inch)	Thread Type
#10	0.375	UNC
#12	0.5	UNF
1/4	0.625	
5/16	0.75	
3/8	0.875	
7/16		
1/2		
9/16		
5/8		
3/4		

Column Properties

Column Name:
Thread_Pitch

Column Caption:
Thread Pitch

Data Type:
String

Units:

Key Columns Options


Table Columns:
Post
Radius(KKR)
Radius(R)
Shank Diameter min.
Thread description(THREADESC)
Thread Diameter
Thread Length
Thread Open Angle
Thread per Unit
Thread Run-out(GAL)
Thread Run-out(GUL)
Thread Type(THREADTYPE)
Thread Type(TS)
Vendor

Key Columns:
Thread description(SIZE_SEL)
Nominal Length
Thread Pitch

Bottom Column

PN_PH_HD_MS

SelectTable ViewFamily Info

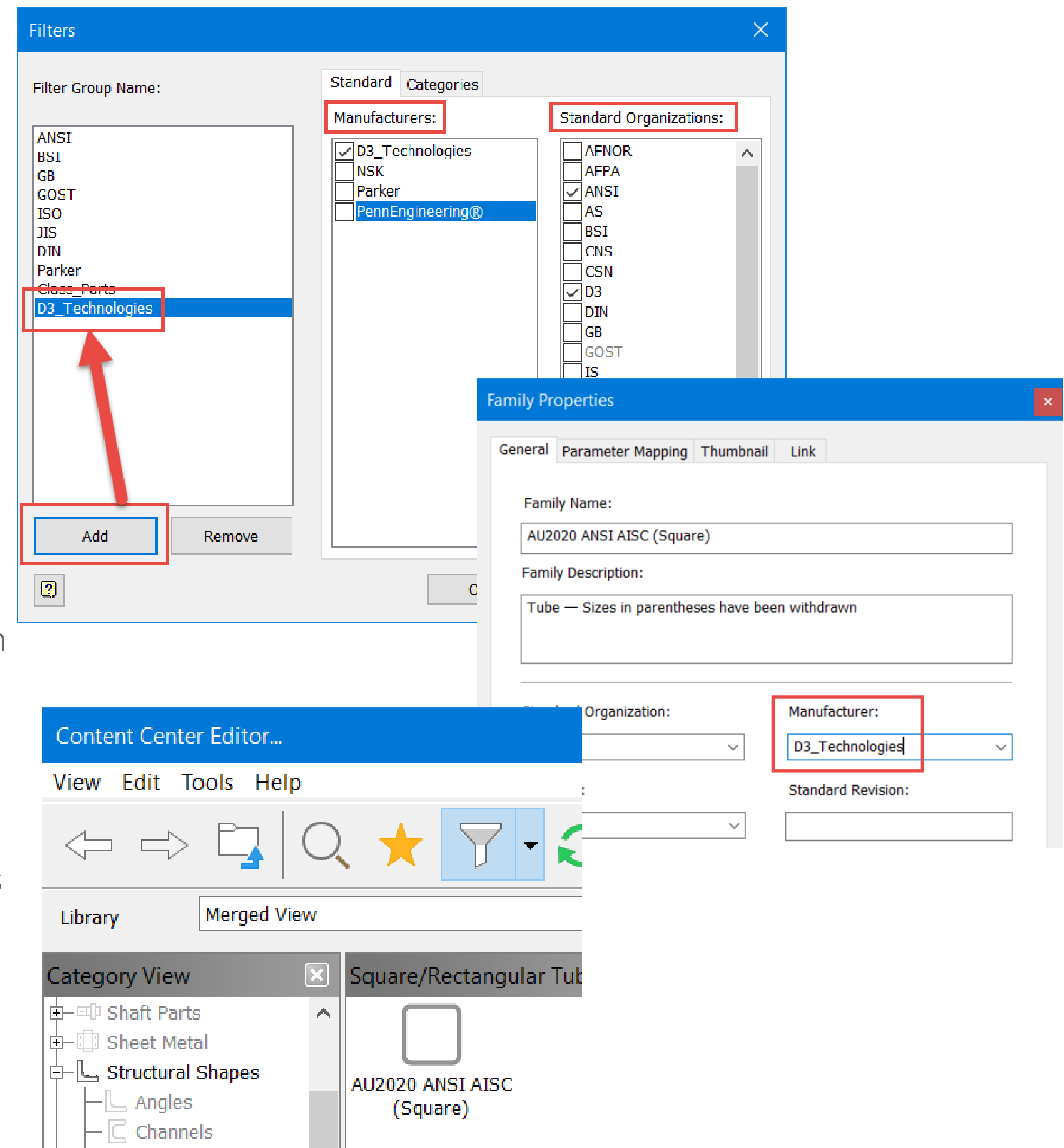


Thread description	Nominal Length (inch)	Thread Pitch
#10	0.375	20_UNC
#12	0.5	28_UNF
1/4	0.625	
5/16	0.75	
3/8	0.875	
7/16	1	
1/2	1.25	
9/16	1.5	
5/8	1.75	
3/4	2	
	2.5	

Custom Selection Filters

Custom filters can be implemented to highlight company approved CC families

- Modify Family Properties “Standard” and / or “Manufacturer”
 - Utilize the company name in the “Manufacturer” family property, and the “Standard” property when necessary
- Create a custom filter based on the “Manufacturer” and “Standard” properties
 - These filters help streamline the selection process



Special Thanks!

- God for this wonderful opportunity and literally every breath I take
- Scott Dibben for allowing me to explore my zany ideas at work
- Dan Hunsucker for helping me learn more about the CC over the years
- My customers who ask so many great questions and help drive much of my research
- All of you for being great sports and participating in this rather unique AU experience

A large, elegant, handwritten-style graphic of the words "Thank You" in a cursive script. The letters are black and have a soft, glowing white outline, giving it a three-dimensional or ethereal appearance. The "T" is particularly large and stylized, with a long horizontal stroke that loops around the "hank". The "You" is written in a fluid, connected cursive style.



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