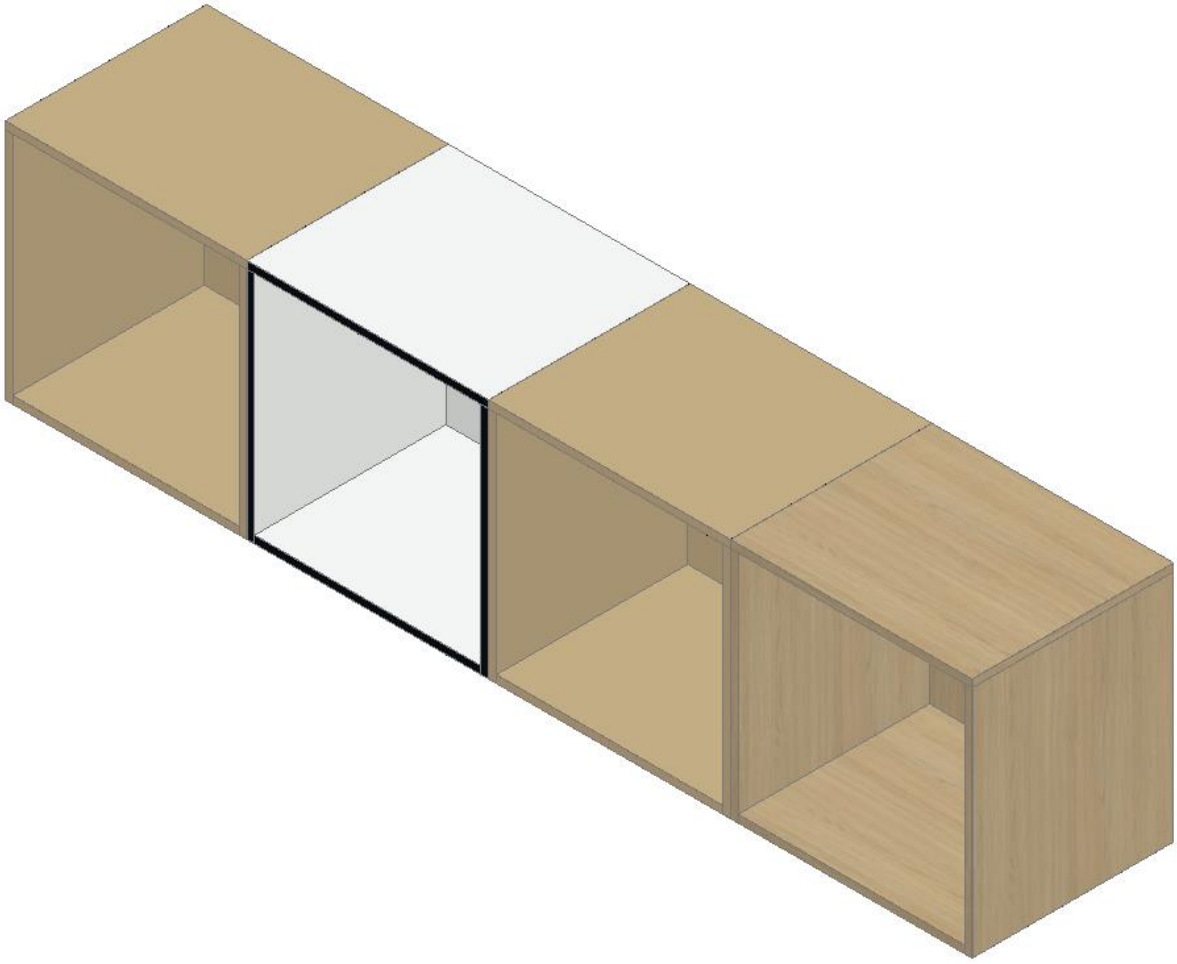
Training Creating Data / Variable: Working with material variables



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Content

1. Introduction

Objectives of this exercise

- Create and use material variables and profile variables
- Recognize the flexibility that using variables makes possible
- Create and use value sets

The abbreviations used

• **CP**	Construction Principle
• **PD**	Part Definition
• **_C_**	Set in the name of data objects instead of "_C_" e.g. "M_" for "Miller" to mark the data object as your own.
• **_Customer**	This abbreviation is applied for naming folders in the data system. Replace this term with your firm's name in your own system, e.g. "_Miller".

Preparation

Prior to this exercise, please **turn off** the **Article Mode**. You can find the button in the AutoCAD status bar.

Article Mode **active**:

Article Mode **inactive**:

Prerequisites

- Construction rules "Type_A" have been created.
- All CPs of the construction rule "Type_A" are created as customer-specific ("_C_*).
- All PDs of the CPs used in the construction rule "Type_A" are created as customer-specific (_C_*).
- The previous exercise "Number Variables, Connection Situation and Descriptors" has been completed successfully.

2. Thoughts before beginning to create data

2.1 How flexible should I set up my product data?

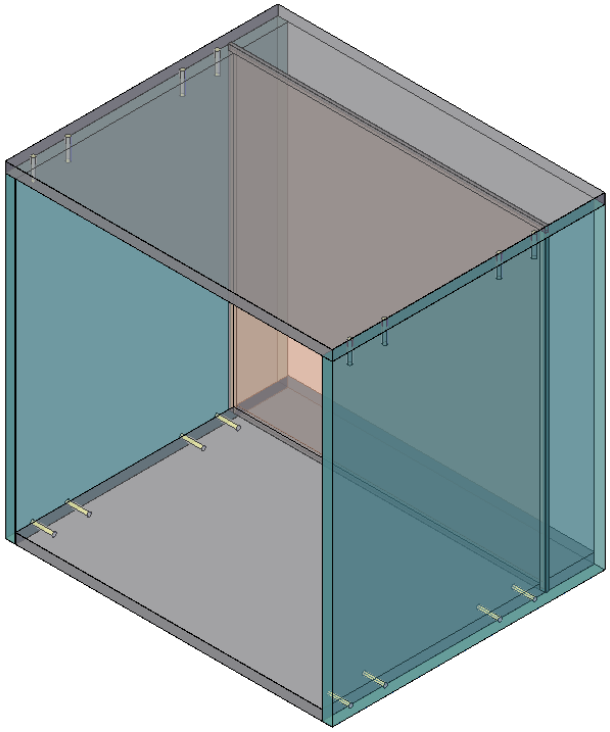
Before you begin to create data, first determine how flexible you want your product data to be. Too little or too much flexibility can lead to unnecessary costs for your company.

- The flexibility that you fail to implement at the outset of creating data either leads to costs during subsequent implementation and/or during daily order processing.
- Unnecessary high levels of flexibility lead to permanently high costs for data maintenance. Extremely complex data structures can lead to dependency on individual members of staff.

Consequently, please try to analyze and ascertain your job order spectrum; determine at which points you require flexibility of your data (or the flexibility you wish to offer your customers).

3. The task

The depicted cabinet will serve as an example of making use of the functionalities the **variables** offer.



The following part properties of the cabinet are to be created using variables:

- Back panel inset (already implemented in the previous exercise)
- Type of carcass connectors (already implemented in the previous exercise)
- Core material for top shelf, bottom shelf, exteriors, back panel, front
- Surface for top shelf, bottom shelf, exteriors, back panel, front
- Edging for top shelf, bottom shelf, exteriors, front

4. Composing the structure of the variables

Before you create variables, you should think about the structure of the variable families and variables as well as the names of the variables.

The structure of variable families and variables:

- If you do not have any experience or have not developed your own ideas, you should first make use of the structure of variables presented under “Getting Started”.
- Begin the names of your variable families and, in particular, the names of the variables with “_”. This will ensure “your” variables will always be displayed at the top of lists of variables.
- Keep the names of number variables as short as possible, because those variables are also used in formulas.
- Develop meaningful naming conventions for your variables.
- Ensure the naming convention of the variables within a family supports an alphabetic order.
- Avoid making typing errors in the variable names, because these can only be corrected later with a lot of effort.

In this exercise you will be adding the variable family “**_Material**” to the structure of the variables:

Variable Family

Variable

Category; Notes

					Category	Notes
_Customer						
	_Construction					
		_Carcass_construction				
			_Dimensions			
				_BPI	_Carcass	Dimension of the back panel inset
			_Connectors			
				_C1L	_Carcass	Connection situation left
				_C1R	_Carcass	Connection situation right
	_Material					
		_Case_1			_case	Variable family 1 for carcass
			_MAT_1_TS		_case	Core material 1 top shelf
			_MAT_1_BS		_case	Core material 1 bottom shelf
			_MAT_1_SP		_case	Core material 1 side panel
			_MAT_1_BP		_case	Core material 1 back panel
			_SURF_1_TS_top		_case	Surface 1 top shelf top
			_SURF_1_TS_bottom		_case	Surface 1 top shelf bottom
			_SURF_1_BS_top		_case	Surface 1 bottom shelf top
			_SURF_1_BS_bottom		_case	Surface 1 bottom shelf bottom
			_SURF_1_LS_top		_case	Surface 1 side panel left top
			_SURF_1_LS_bottom		_case	Surface 1 side panel left bottom
			_SURF_1_RS_top		_case	Surface 1 side panel right top
			_SURF_1_RS_bottom		_case	Surface 1 side panel right bottom
			_SURF_1_BP_top		_case	Surface 1 back panel top
			_SURF_1_BP_bottom		_case	Surface 1 back panel bottom
			_PRF_1_TS		_case	Edging 1 top shelf
			_PRF_1_BS		_case	Edging 1 bottom shelf
			_PRF_1_SP		_case	Edging 1 side panel
		_Front_1			_Front	Variable family 1 for front
			_MAT_1_D		_Front	Core material 1 door
			_MAT_1_DR		_Front	Core material 1 drawer
			_SURF_1_D_top		_Front	Surface 1 door top
			_SURF_1_D_bottom		_Front	Surface 1 door bottom
			_SURF_1_DR_top		_Front	Surface 1 drawer top
			_SURF_1_DR_bottom		_Front	Surface 1 drawer bottom
			_PRF_D		_Front	Edging 1 door
			_PRF_DR		_Front	Edging 1 drawer
			_PRF_1_Front_SP		_Front	Edging Side panel front in front color

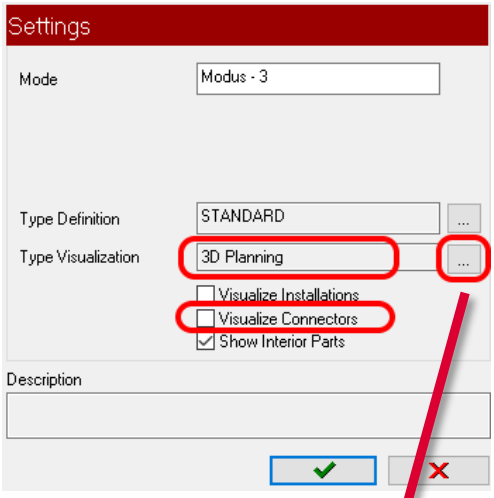
Hint

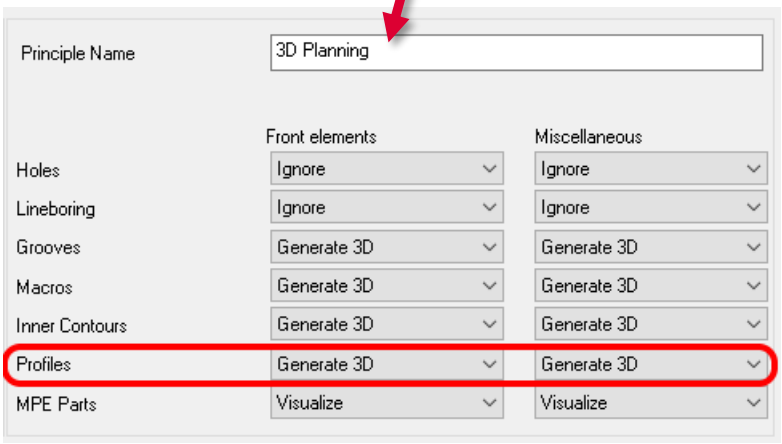
You can use a maximum of 29 characters for the names of variable families and variables!

You can use a maximum of 50 characters for the names of value sets (value sets are discussed later).

5. Set up Visu Manager

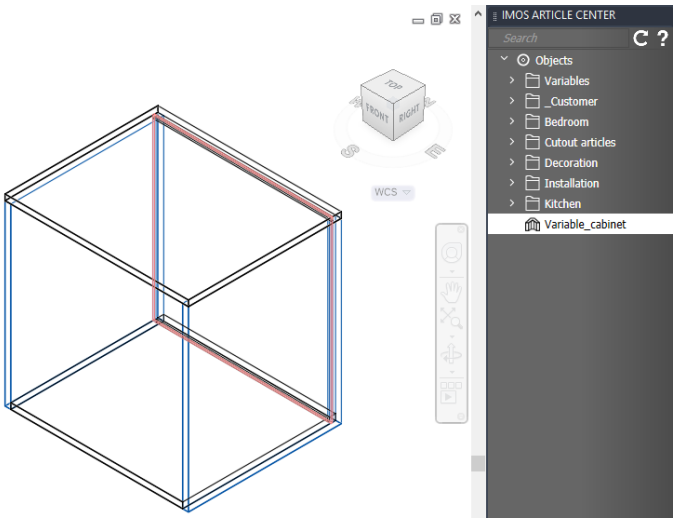
As the connectors are of no significance in this exercise, please set up the Visu Manager as shown in the screenshot. Ensure that “**Profiles**” are displayed in Type Visualization “**3D Planning**”.





6. Position the test cabinet in the graphic

Your database already includes the article “**Variable_cabinet**” from the previous exercise “Number Variables, Connection Situation; Descriptors”. Insert the cabinet into the graphic.



7. Create data

7.1 Creating variable families

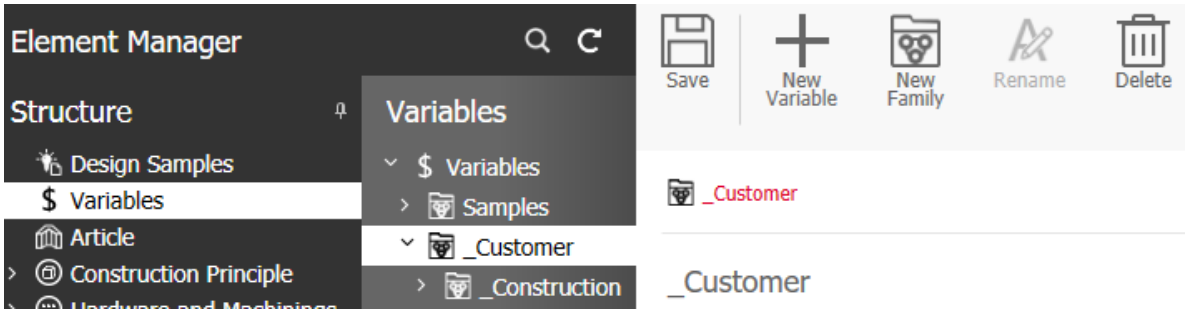
First create the required variable families “_Material” and “_Case_1”.

_Construction					
	_Carcass_construction				
		_Dimensions			
			_BPI	_Carcass	Dimension of the back panel inset
		_Connectors			
			_C1L	_Carcass	Connection situation left
			_C1R	_Carcass	Connection situation right
_Material					
	_Case_1			_case	Variable family 1 for carcass

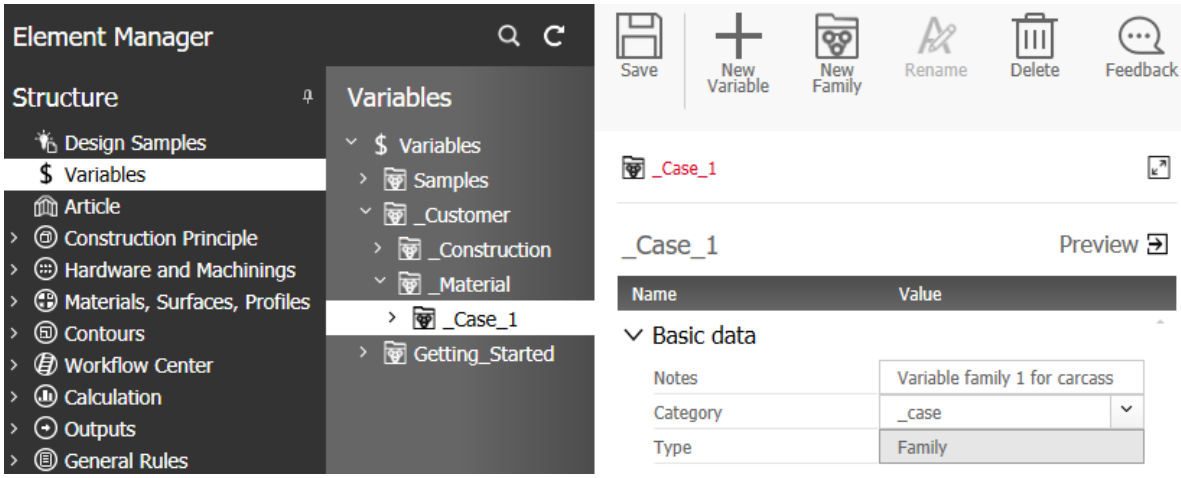
Hint

In this exercise you will also initially carry out data maintenance in the Element Manager of the Organizer; you will then test this data in the graphic.

In addition to the graphic, please launch the Organizer and then the Element Manager. Select the node “Variables” and then the family “_Customer”, which you created in the previous exercise.



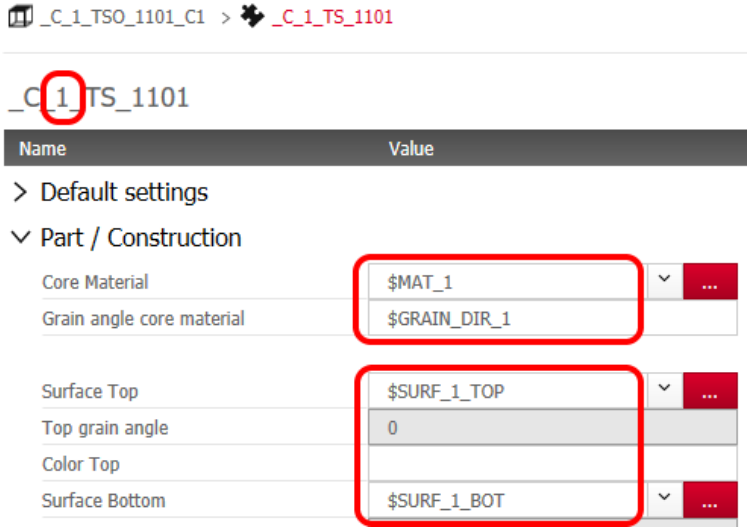
Now create the variable families “_Material” and “_Case_1”. Remember to also assign a note and the category “_case”.



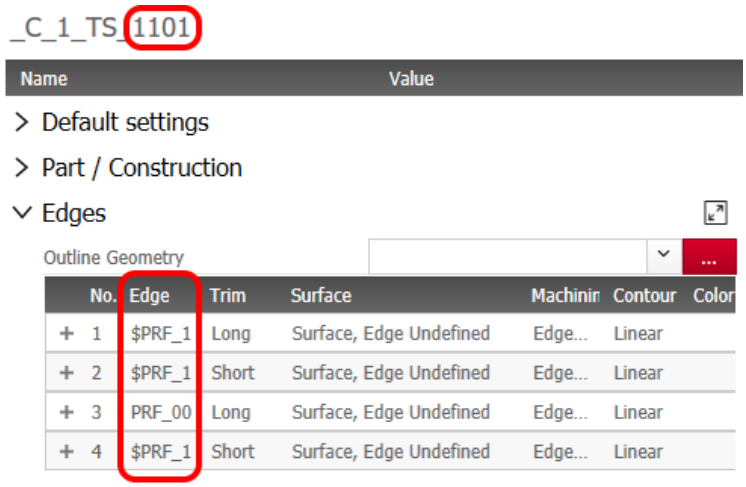
7.2 Creating variables in the family “_Case_1”

7.2.1 Delivery data

In the exercises “Construction Principles” and “Part Definitions” you learned that a digit in the fourth position in the element names of the PDs indicates from which variable family (or rather with which variables) the core material and the surface for this PD are defined.

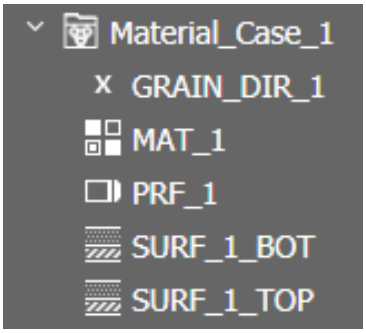


The digits making up the edging code also indicate the profile variable used.



All material, surface and profile variables with a “1” in their name are created in the delivery data in variable families which also contain the digit “1” in their name. That makes it possible to assign variables and families without ambiguity.

In line with this convention you will include a “1” in the name of all variables you create in the variable family “_Case_1”.



7.2.2 Creating variables

Now create the following variables in the variable family “_Case_1”. You know the details of this process from the previous exercise.

Tip

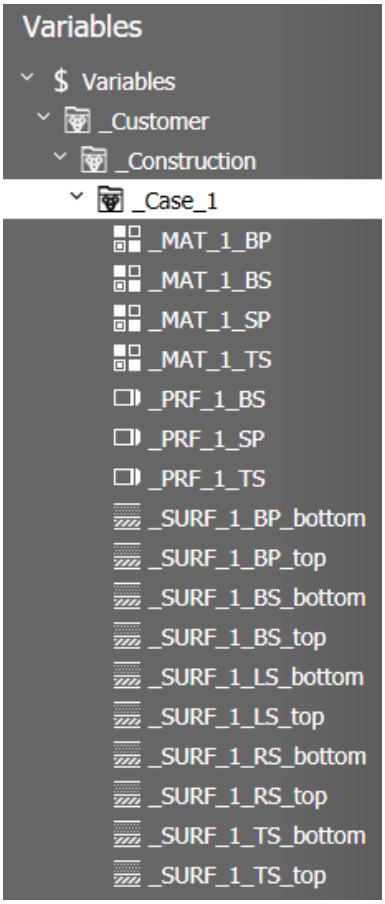
You do not change the type of a variable; you can simply save a previously saved variable under a different name and alter the attribute values. That will allow you to work faster and with more certainty than if you create each variable from scratch.

Use “New variable” only if you wish to create a variable of a different type.

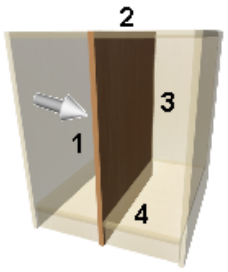
_Case_1			_case	Variable family 1 for carcass	Family	
	_MAT_1_TS		_case	Core material 1 top shelf	Material	iX_PB19_MEL_White_M
	_MAT_1_BS		_case	Core material 1 bottom shelf	Material	iX_PB19_MEL_White_M
	_MAT_1_SP		_case	Core material 1 side panel	Material	iX_PB19_MEL_White_M
	_MAT_1_BP		_case	Core material 1 back panel	Material	iX_PB08_MEL_White_M
	_SURF_1_TS_top		_case	Surface 1 top shelf top	Surface	NO_SURF
	_SURF_1_TS_bottom		_case	Surface 1 top shelf bottom	Surface	NO_SURF
	_SURF_1_BS_top		_case	Surface 1 bottom shelf top	Surface	NO_SURF
	_SURF_1_BS_bottom		_case	Surface 1 bottom shelf bottom	Surface	NO_SURF
	_SURF_1_LS_top		_case	Surface 1 side panel left top	Surface	NO_SURF
	_SURF_1_LS_bottom		_case	Surface 1 side panel left bottom	Surface	NO_SURF
	_SURF_1_RS_top		_case	Surface 1 side panel right top	Surface	NO_SURF
	_SURF_1_RS_bottom		_case	Surface 1 side panel right bottom	Surface	NO_SURF
	_SURF_1_BP_top		_case	Surface 1 back panel top	Surface	NO_SURF
	_SURF_1_BP_bottom		_case	Surface 1 back panel bottom	Surface	NO_SURF
	_PRF_1_TS		_case	Edging 1 top shelf	Profile name	iX_MEL_Black_03mm_M
	_PRF_1_BS		_case	Edging 1 bottom shelf	Profile name	iX_MEL_Black_03mm_M
	_PRF_1_SP		_case	Edging 1 side panel	Profile name	iX_MEL_Black_03mm_M

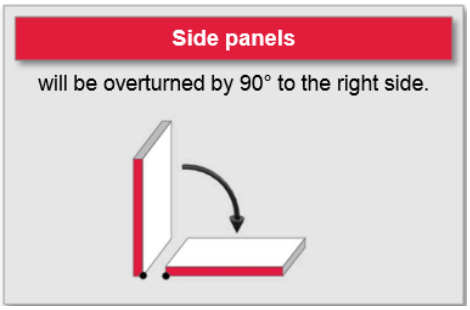
By creating variables for surfaces, you have the opportunity to define a chipboard as article-related or order-related material later on and then to cover this on the top and bottom sides with different surfaces, for example with face veneer and inside veneer.

To sort the created variables alphabetically press **F5**!



As far as the outsides are concerned you must remember that due to part rotation the top side of a left outside part faces out, and that the top side of a right outside part faces in. That is why there are special variables to cover the top and bottom surfaces as well as for the left and right sides.





Hint 1

It is not possible to alter the type of variable once it has been saved! If you have saved a variable set with a wrong “Type”, delete the variable; create a new variable and set the right type.

Hint 2

You can use the category later to search for variables. Create your own categories simply by writing category names in the selection field.

Once saved, you can call up your own categories from the pull-down menu. Create your own categories with a prefixed “_”, so they appear at the top of the list.

7.2.3 Using the variables

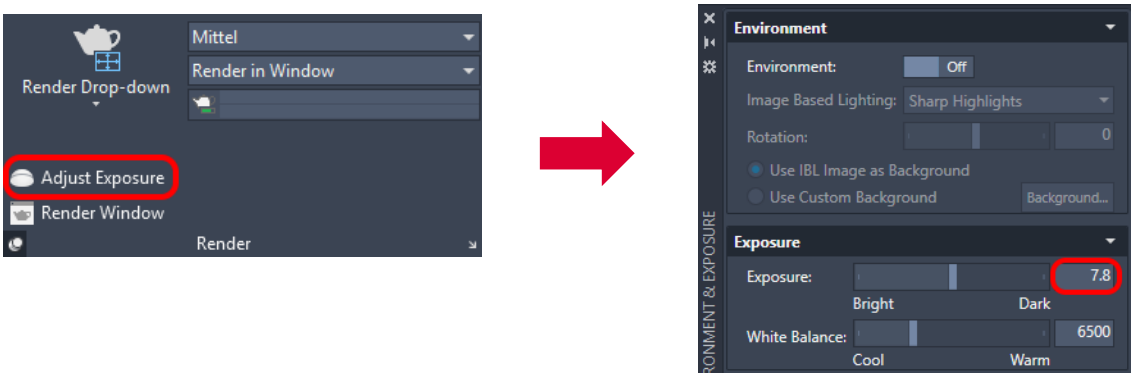
You know from the exercises covering part definitions (PD) that the materials, surfaces and edgings for a part are saved in the PD. Consequently, you will now assign the variables you have just created to the PD which are used by our article “Variable_cabinet”.

So that you can immediately see the effects the altered data has, set the **Order-related Variables** for material and profile of the article “Variable_cabinet” to the values displayed below.

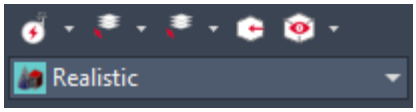
Name	In orde	Type	Default Value	Order Value	Articlevalue
Getting_Started	No	Family		←	←
Basic_Data	No	Family		←	←
Materials_Case	No	Family		←	←
Material_Back_1	No	Family		←	←
GRAIN_DIR_BK_1	Yes	Number	0	0	←
MAT_BK_1	Yes	Material	iX_PB05_MEL_White_G	iX_PB05_MEL_White_G	iX_PB19_MEL_iRed_M
SURF_BK_1_BOT	Yes	Surface	NO_SURF	NO_SURF	←
SURF_BK_1_TOP	Yes	Surface	NO_SURF	NO_SURF	←
Material_Case_1	No	Family		←	←
GRAIN_DIR_1	Yes	Number	0	0	←
PRF_1	Yes	Profile name	iX_MEL_WHITE_03mm_G	iX_MEL_WHITE_03mm_G	iX_MEL_iRed_03mm_G
MAT_1	Yes	Material	iX_PB19_MEL_White_G	iX_PB19_MEL_White_G	iX_PB19_MEL_iRed_G
SURF_1_BOT	Yes	Surface	NO_SURF	NO_SURF	←
SURF_1_TOP	Yes	Surface	NO_SURF	NO_SURF	←

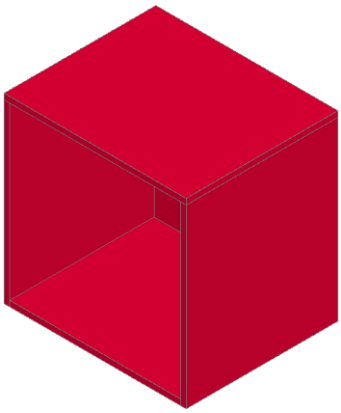
Tip

Set **Exposure** to **7.8**”



….and AutoCAD visualization to “**Realistic**”.



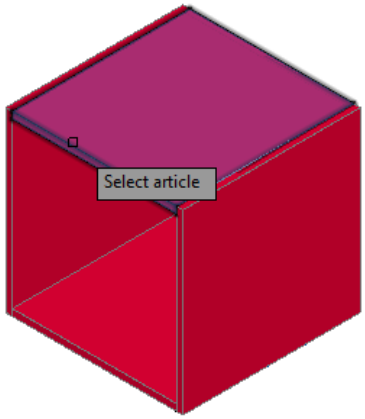


7.2.3.1 Top shelf

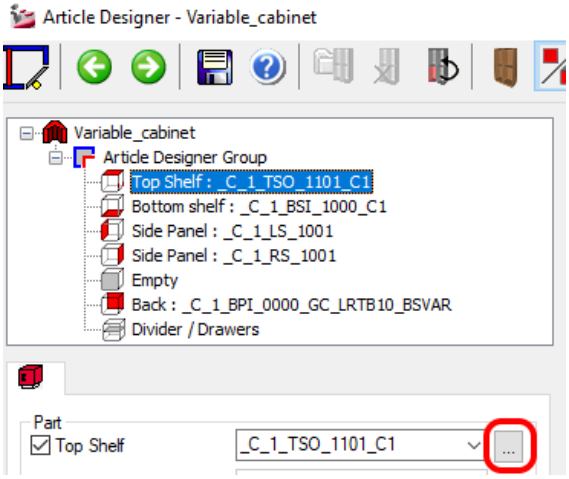
Enter the variables you have just created as the value in the PD of the **top shelf**.

Modify Article

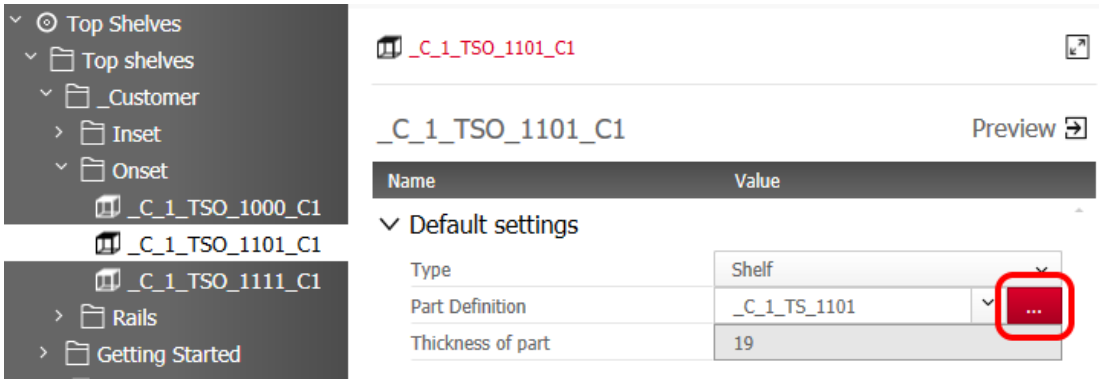
…then select article at **TS**

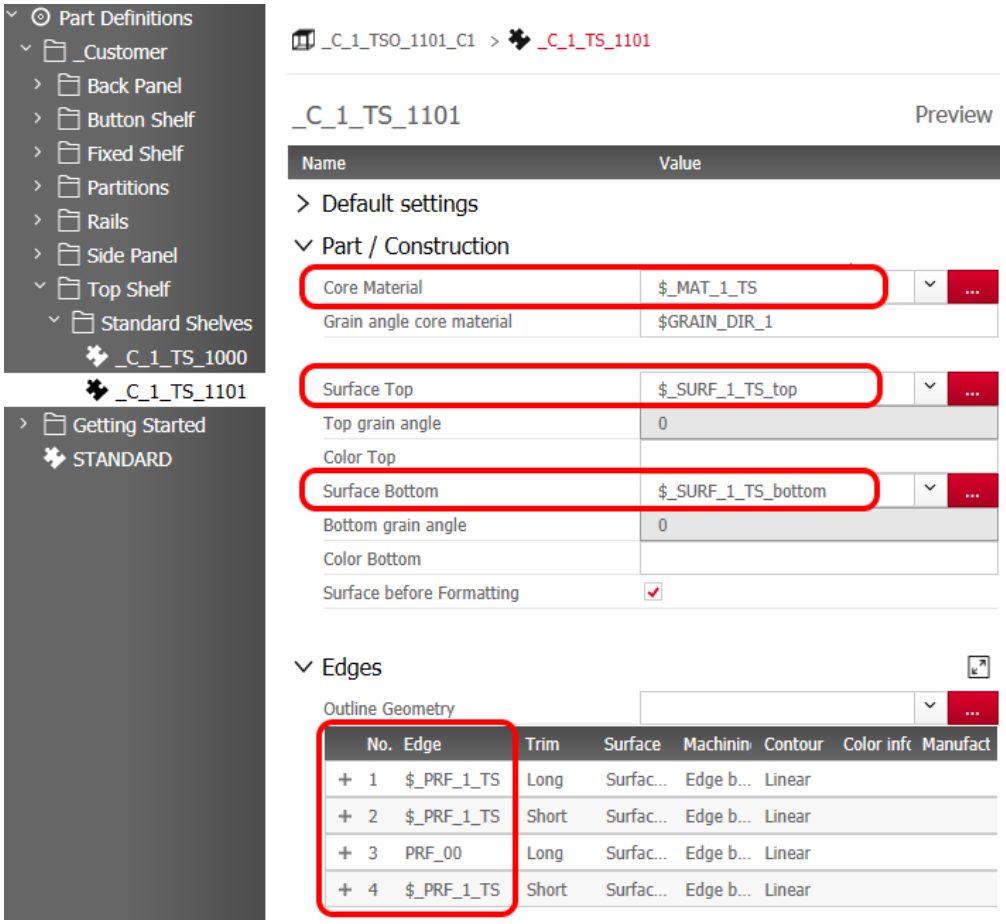


… Open the **Element Manager**



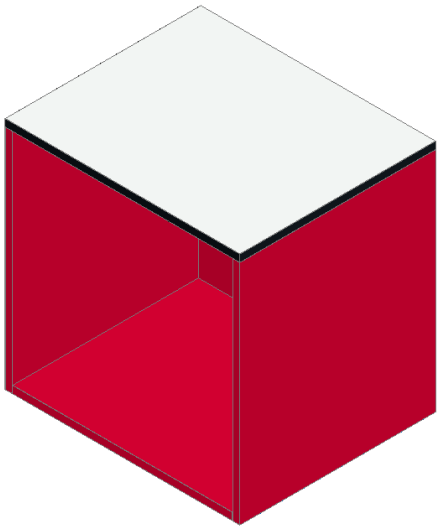
…then open the **PD** in the **CP**





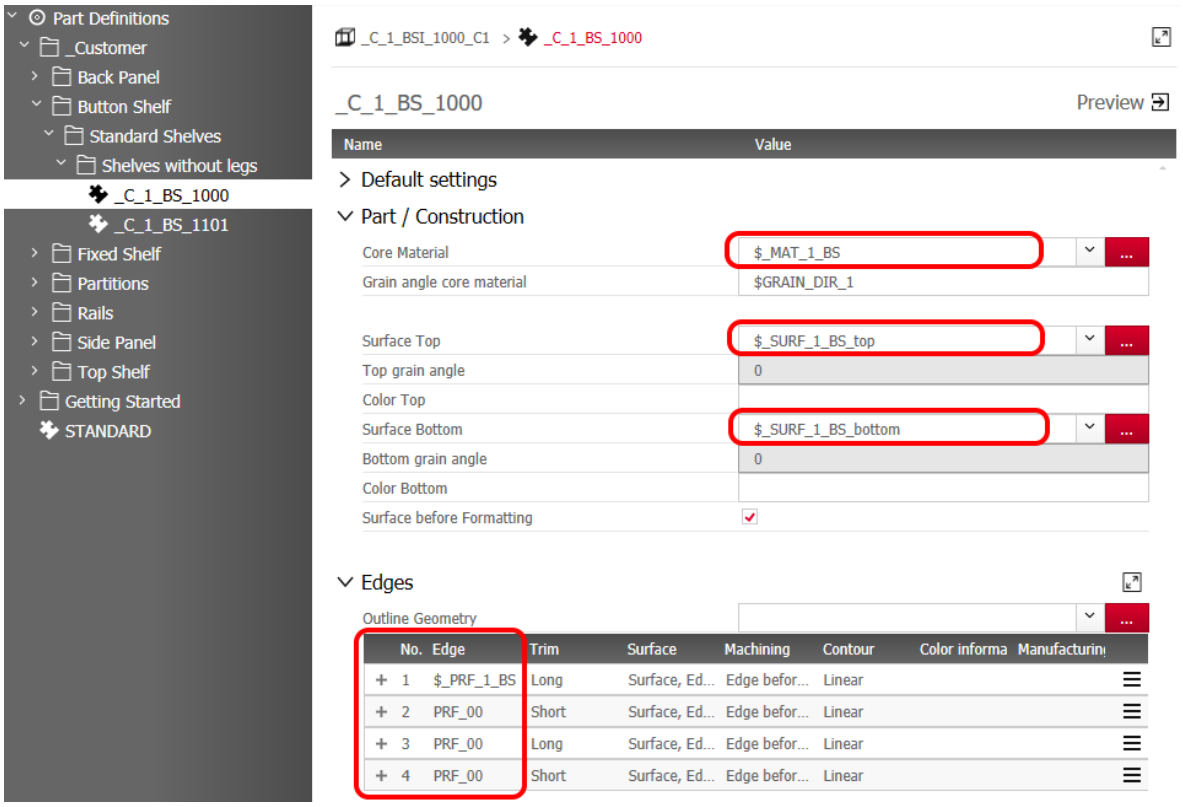
…Enter the values in the **PD** and save.

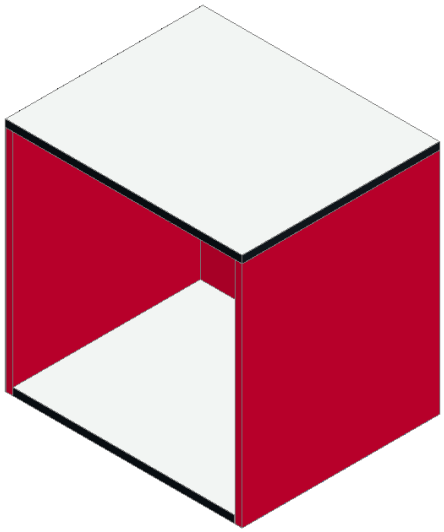
Then click "**Apply**" in each respective case to return to the Article Designer step by step.
Click ✔ to exit the Article Designer (in this case it is not necessary to save anything in the Article Designer).
The top shelf of your article will now be displayed with the default values of the variables you have just created (material "19mm white matt" and edges "0.3mm black matt")



7.2.3.2 Bottom shelf

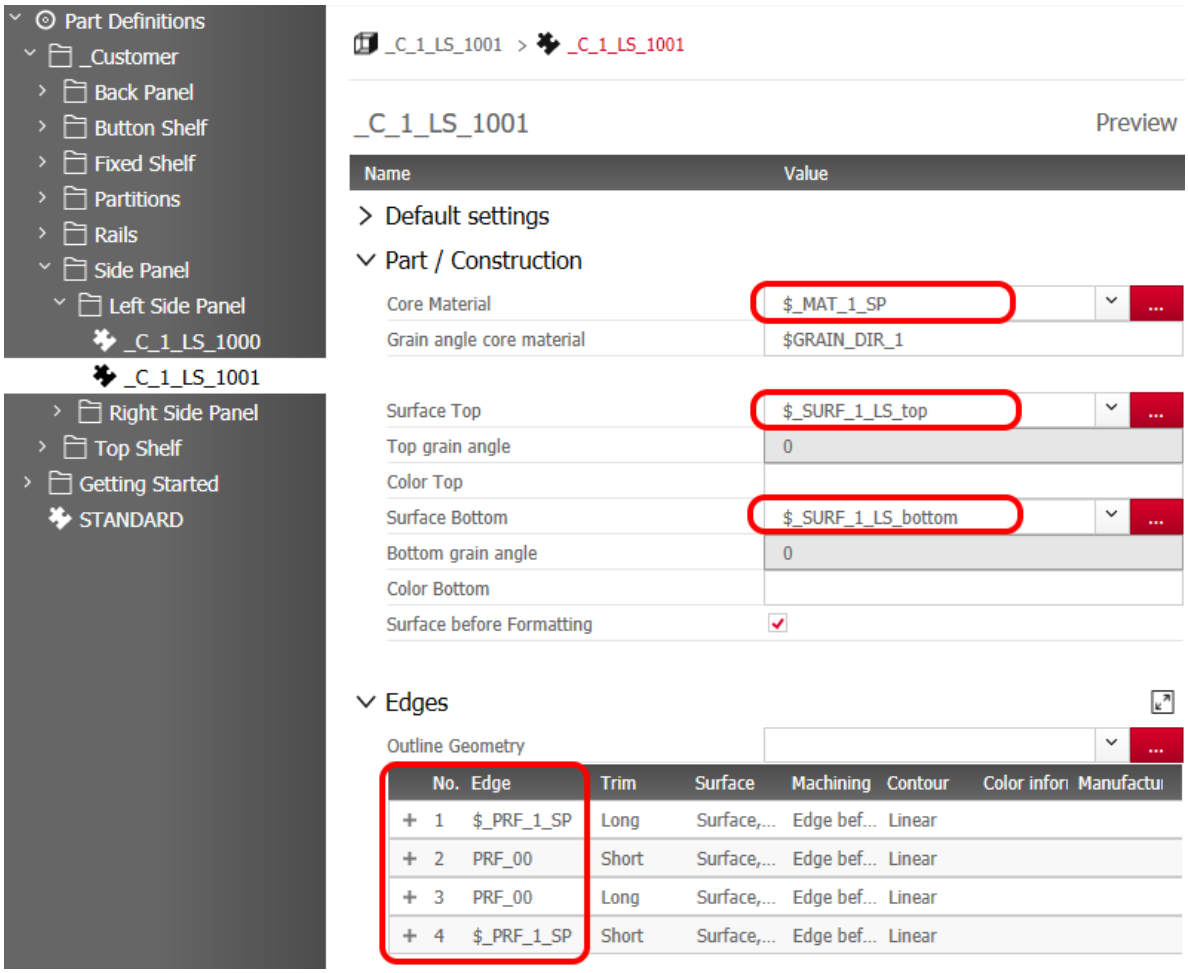
Repeat the steps shown above, this time for the **bottom shelf** of the article.

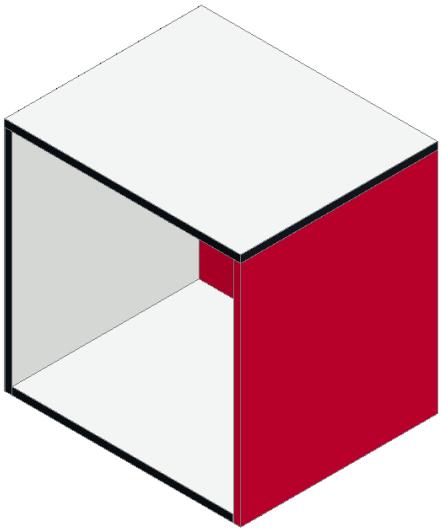




7.2.3.3 Left side panel

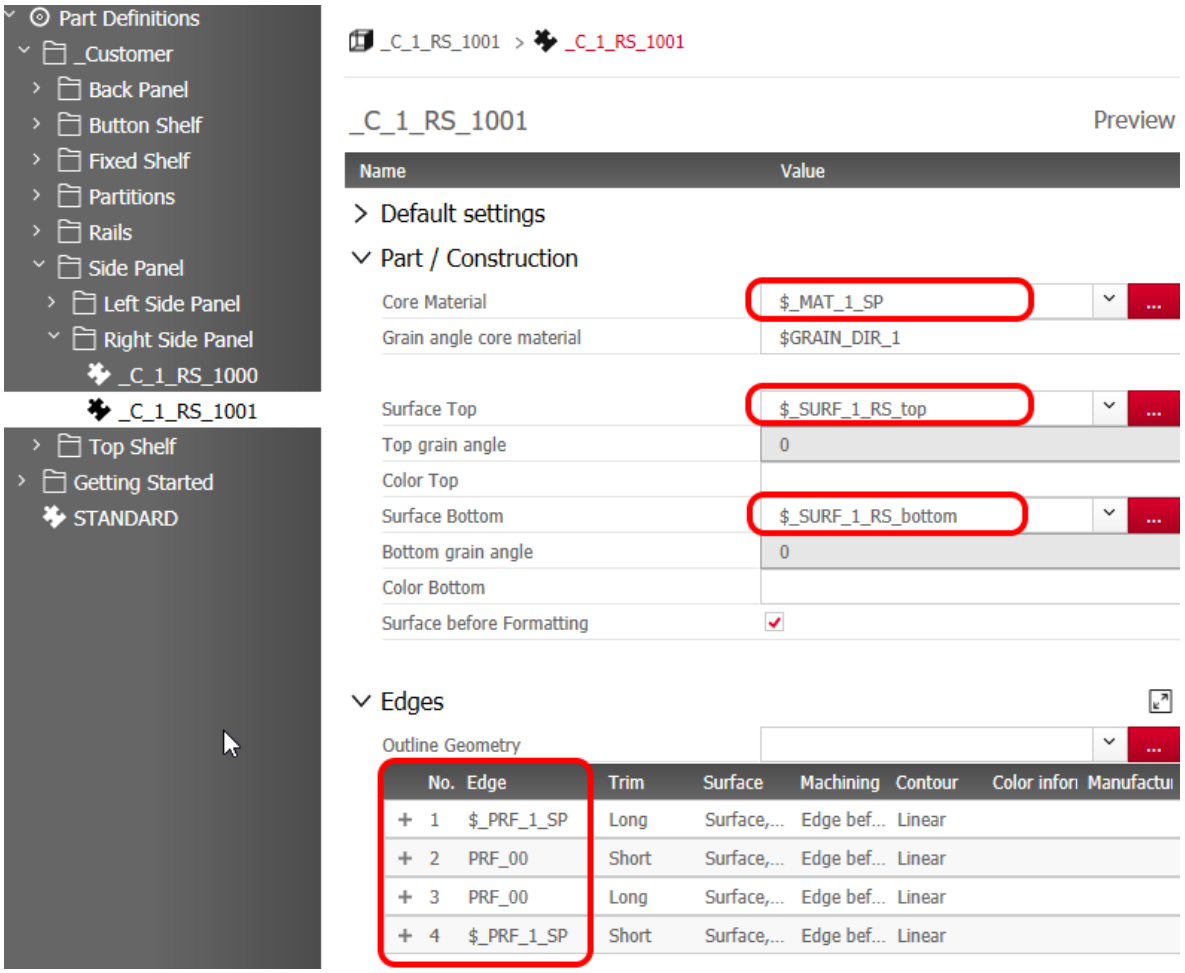
Repeat the steps shown above, this time for the **left side panel** part of the article.

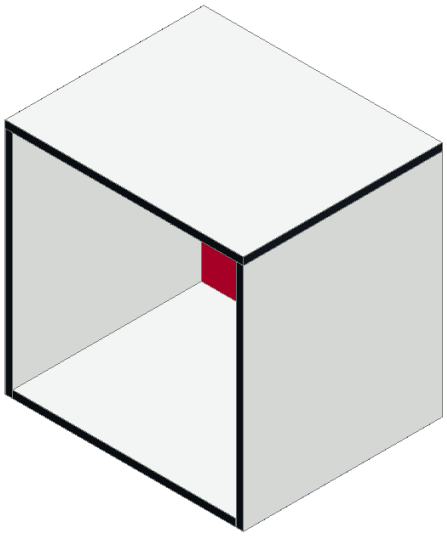




7.2.3.4 Right side panel

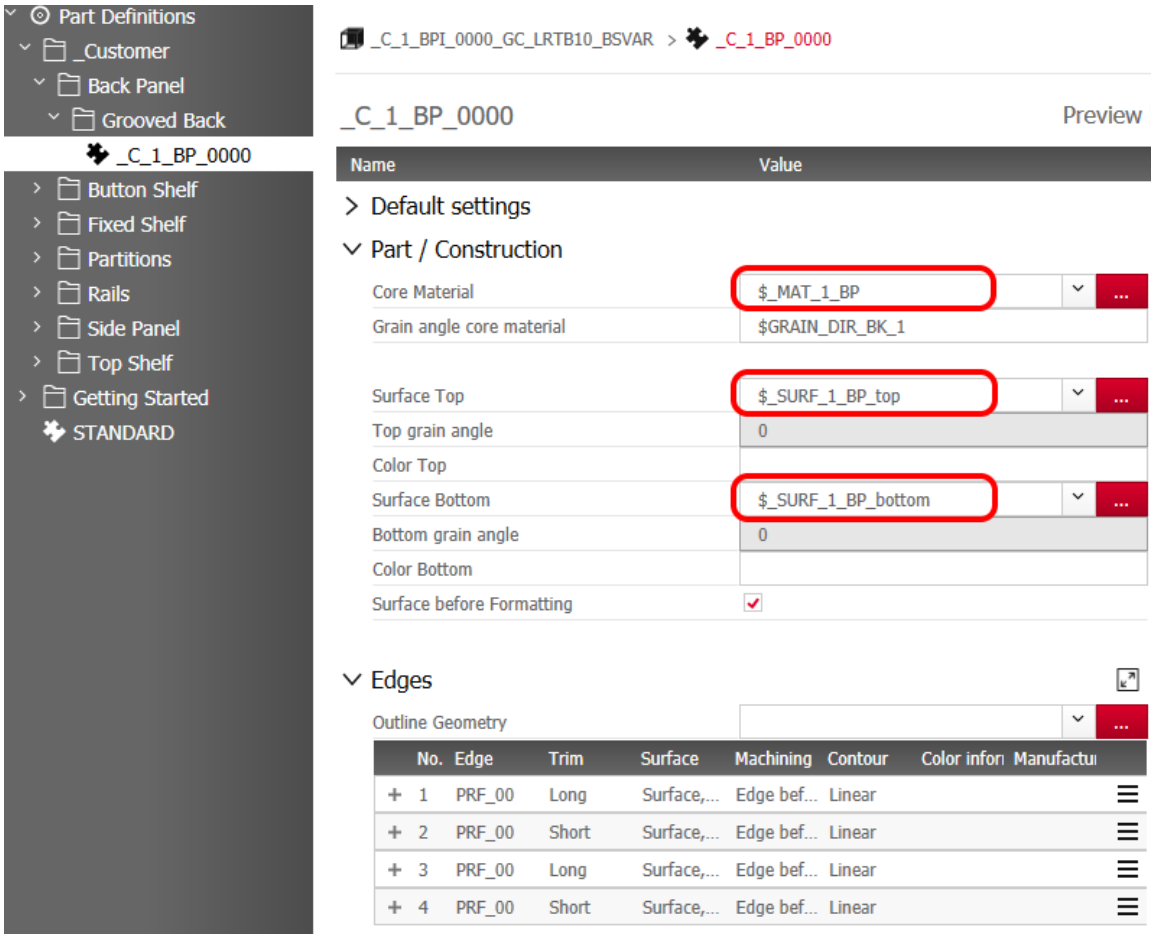
Repeat the steps shown above, this time for the **right side panel** part of the article.

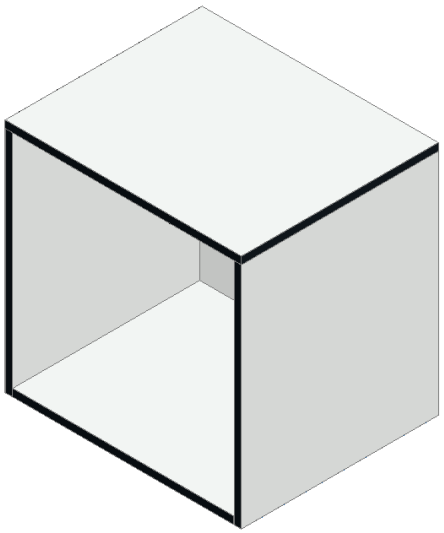




7.2.3.5 Back panel

Repeat the steps shown above, this time for the **back panel** of the article.





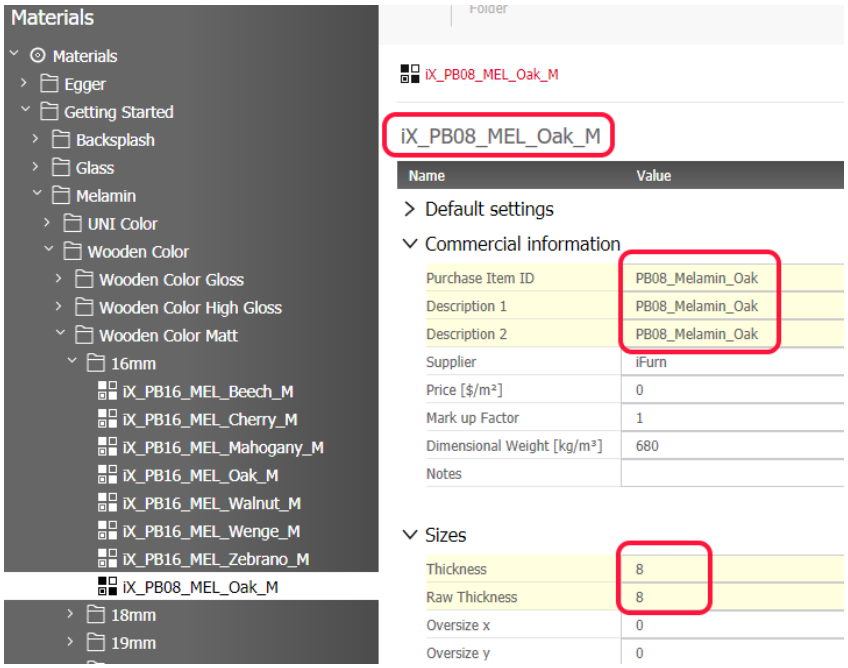
Your article “Variable_cabinet” now uses the variables you created yourself.

8. Creating back panel material

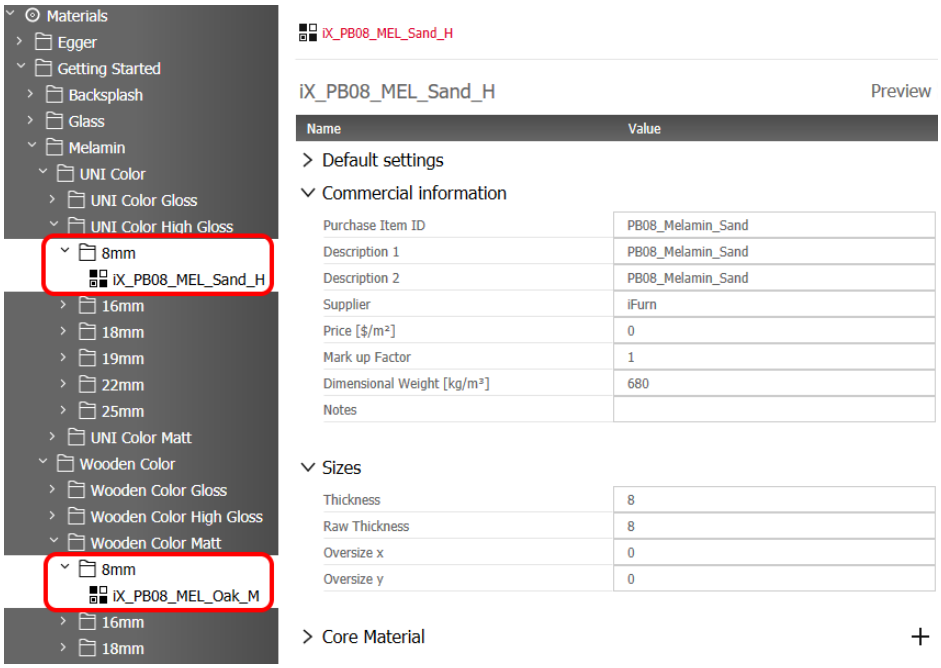
To enable you to make the settings shown below, please create 8mm material in the following colors:

- iX_PB08_MEL_Oak_M
- iX_PB08_MEL_Sand_H

To do so, use material principles in **16mm** thickness, for example, and alter the following values.

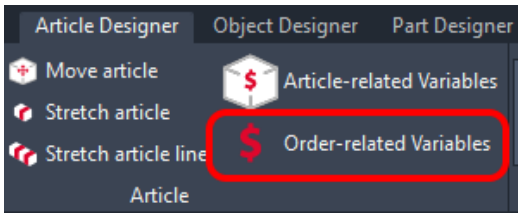


Save the new material principles in the corresponding folders.



9. Setting the order-related values

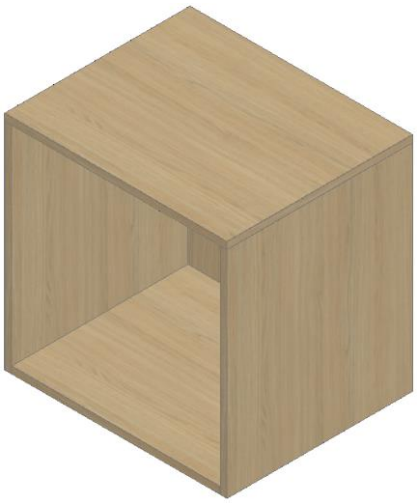
Open the Order-related Variables and set the values as depicted below.



… and set the values as depicted below.

Name	In order	Type	Default Value	Order Value
Samples	No	Family		
_Customer	No	Family		
_Construction	No	Family		
_Material	No	Family		
_Case_1	No	Family		
_PRF_1_TS	Yes	Profile name	iX_MEL_Black_03mm_M	iX_MEL_Oak_03mm_M
_PRF_1_BS	Yes	Profile name	iX_MEL_Black_03mm_M	iX_MEL_Oak_03mm_M
_PRF_1_SP	Yes	Profile name	iX_MEL_Black_03mm_M	iX_MEL_Oak_03mm_M
_MAT_1_BP	Yes	Material	iX_PB08_MEL_White_M	iX_PB08_MEL_Oak_M
_MAT_1_TS	Yes	Material	iX_PB19_MEL_White_M	iX_PB19_MEL_Oak_M
_MAT_1_BS	Yes	Material	iX_PB19_MEL_White_M	iX_PB19_MEL_Oak_M
_MAT_1_SP	Yes	Material	iX_PB19_MEL_White_M	iX_PB19_MEL_Oak_M
_SURF_1_TS_top	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_TS_bottom	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_BS_bottom	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_BS_top	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_LS_top	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_LS_bottom	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_RS_bottom	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_RS_top	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_BP_top	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_BP_bottom	Yes	Surface	NO_SURF	NO_SURF

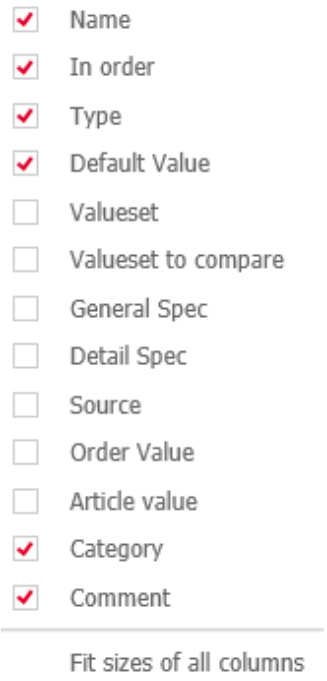
Create the article using the values you just set.



10. Creating variables in the dialog box “Order-related Variables”

It is also possible to undertake main data maintenance of variable families and variables in the dialog box “Order-related Variables”.

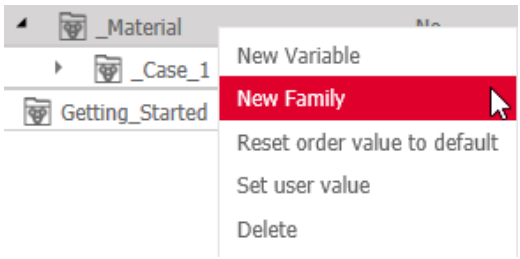
Open the **Order-related Variables** then select the settings as depicted in the visible right-hand column (right-click in the header row):



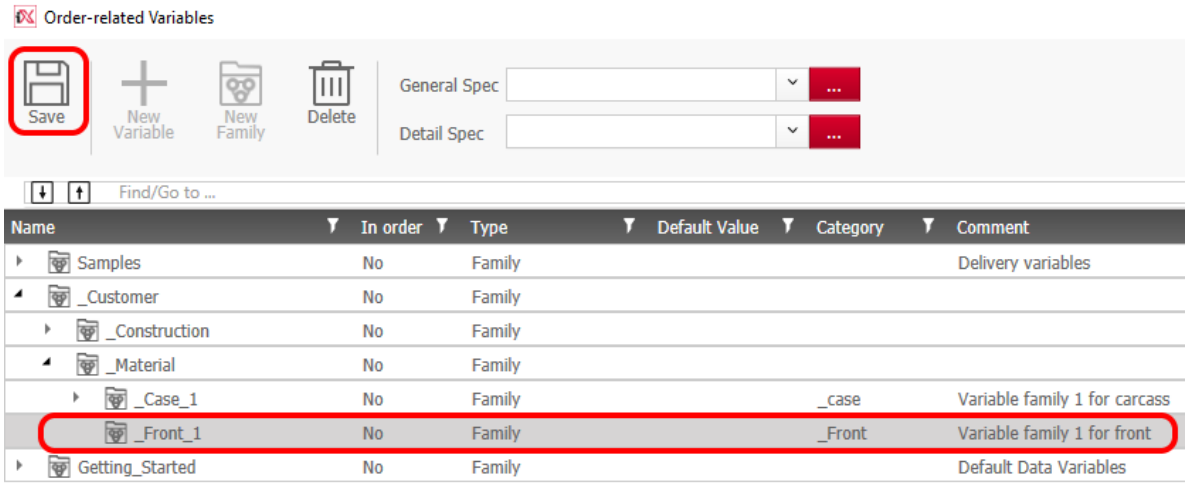
Now create the following variable families and variables.

_Front_1			_Front	Variable family 1 for front	Family	
	_MAT_1_D		_Front	Core material 1 door	Material	iX_PB19_MEL_Oak_M
	_MAT_1_DR		_Front	Core material 1 drawer	Material	iX_PB19_MEL_Oak_M
	_SURF_1_D_top		_Front	Surface 1 door top	Surface	NO_SURF
	_SURF_1_D_bottom		_Front	Surface 1 door bottom	Surface	NO_SURF
	_SURF_1_DR_top		_Front	Surface 1 drawer top	Surface	NO_SURF
	_SURF_1_DR_bottom		_Front	Surface 1 drawer bottom	Surface	NO_SURF
	_PRF_D		_Front	Edging 1 door	Profile name	iX_ABS_Oak_2mm_M
	_PRF_DR		_Front	Edging 1 drawer	Profile name	iX_ABS_Oak_2mm_M
	_PRF_1_Front_SP		_Front	Edging Side panel front in front color	Profile name	iX_MEL_Oak_03mm_M

Right-click the variable family “**_Material**” to open a shortcut menu from where you are able to create a new variable family (**New Family**).



Enter “_Front_1” as the variable family. Complete the Category and Comment columns. The new entries are highlighted yellow, the Save button is activated. Save the new variable family.



Name	In order	Type	Default Value	Category	Comment
Samples	No	Family			Delivery variables
_Customer	No	Family			
_Construction	No	Family			
_Material	No	Family			
_Case_1	No	Family		_case	Variable family 1 for carcass
_Front_1	No	Family		_Front	Variable family 1 for front
Getting_Started	No	Family			Default Data Variables

Now enter the variables and their values detailed above in the variable family “**_Front_1**”. You can either type in the entries, perform a “copy/insert” operation or select the entries via the red 3-Point-Button in the Element Manager. Save your new variables.

Name	In order	Type	Default Value	Category	Comment
Samples	No	Family			Delivery variables
_Customer	No	Family			
_Construction	No	Family			
_Material	No	Family			
_Case_1	No	Family		_case	Variable family 1 for carcass
_Front_1	No	Family		_Front	Variable family 1 for front
_MAT_1_D	No	Material	iX_PB19_MEL_Oak_M	_Front	Core material 1 door
_MAT_1_DR	No	Material	iX_PB19_MEL_Oak_M	_Front	Core material 1 drawer
_SURF_1_D_top	No	Surface	NO_SURF	_Front	Surface 1 door top
_SURF_1_D_bottom	No	Surface	NO_SURF	_Front	Surface 1 door bottom
_SURF_1_DR_bottom	No	Surface	NO_SURF	_Front	Surface 1 drawer bottom
_SURF_1_DR_top	No	Surface	NO_SURF	_Front	Surface 1 drawer top
_PRF_1_D	No	Profile name	iX_ABS_Oak_2mm_M	_Front	Edging 1 door
_PRF_1_DR	No	Profile name	iX_ABS_Oak_2mm_M	_Front	Edging 1 drawer
_PRF_1_Front_SP	No	Profile name	iX_MEL_Oak_03mm_M	_Front	Edging Side panel front in front color
Getting_Started	No	Family			Default Data Variables

Close the dialog box “**Order-related Variables**”. You will use these variables later in the exercise.

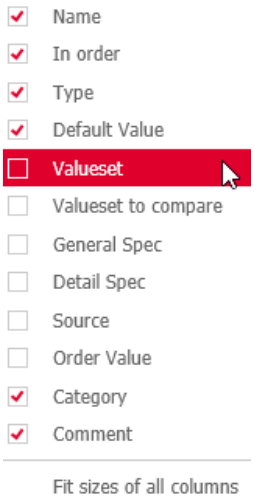
11. Create a value set

Now create a value set “**19mm Oak matt NB**” so that it is only necessary to make a single entry later on to set the “Carcass material variables”. It is possible to save the settings for all variables belonging to a family in value sets and call them up again later.

11.1 Create a value set in the dialog box “Order-related variables”

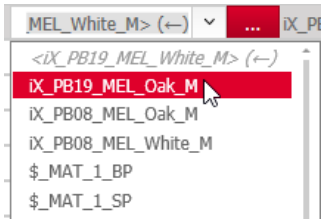
It is possible to create value sets in the dialog box “Order-related Variables”. Consequently, open the Order-related Variables again.

If the column **Valueset** is not visible in your dialog box, proceed as follows: right-click on the title bar of the variables dialog box and select the column **Valueset** check box.



11.1.1 Create value sets for the variable family “_Case_1”

Set your desired values for the individual variables of the family “_Case_1” with the aid of the drop-down list.



Name	In order	Type	Default Value	Valueset	Order Value
Samples	No	Family		←	
_Customer	No	Family		←	
_Construction	No	Family		←	
_Material	No	Family		←	
_Case_1	No	Family		←	
_PRF_1_TS	Yes	Profile name	iX_MEL_Black_03mm_M	iX_MEL_Oak_03mm_M	iX_MEL_Oak_03mm_M
_PRF_1_BS	Yes	Profile name	iX_MEL_Black_03mm_M	iX_MEL_Oak_03mm_M	iX_MEL_Oak_03mm_M
_PRF_1_SP	Yes	Profile name	iX_MEL_Black_03mm_M	iX_MEL_Oak_03mm_M	iX_MEL_Oak_03mm_M
_MAT_1_BP	Yes	Material	iX_PB08_MEL_White_M	iX_PB08_MEL_Oak_M	iX_PB08_MEL_Oak_M
_MAT_1_TS	Yes	Material	iX_PB19_MEL_White_M	iX_PB19_MEL_Oak_M	iX_PB19_MEL_Oak_M
_MAT_1_BS	Yes	Material	iX_PB19_MEL_White_M	iX_PB19_MEL_Oak_M	iX_PB19_MEL_Oak_M
_MAT_1_SP	Yes	Material	iX_PB19_MEL_White_M	iX_PB19_MEL_Oak_M	iX_PB19_MEL_Oak_M
_SURF_1_TS_top	Yes	Surface	NO_SURF	NO_SURF	NO_SURF
_SURF_1_TS_bottom	Yes	Surface	NO_SURF	NO_SURF	NO_SURF
_SURF_1_BS_bottom	Yes	Surface	NO_SURF	NO_SURF	NO_SURF
_SURF_1_BS_top	Yes	Surface	NO_SURF	NO_SURF	NO_SURF
_SURF_1_LS_top	Yes	Surface	NO_SURF	NO_SURF	NO_SURF
_SURF_1_LS_bottom	Yes	Surface	NO_SURF	NO_SURF	NO_SURF
_SURF_1_RS_bottom	Yes	Surface	NO_SURF	NO_SURF	NO_SURF
_SURF_1_RS_top	Yes	Surface	NO_SURF	NO_SURF	NO_SURF
_SURF_1_BP_top	Yes	Surface	NO_SURF	NO_SURF	NO_SURF
_SURF_1_BP_bottom	Yes	Surface	NO_SURF	NO_SURF	NO_SURF

Hint

If you enter an explicit value, then this value is saved in the value set.

_MAT_1_BP	Yes	Material	iX_PB08_MEL_White_M	iX_PB08_MEL_Oak_M

However, if you select "**Apply default value**" …

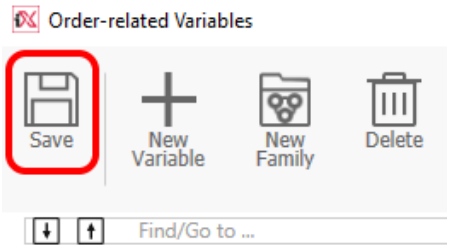
_MAT_1_BP	Yes	Material	iX_PB08_MEL_White_M	←

… the value set will always use the respective current default value.

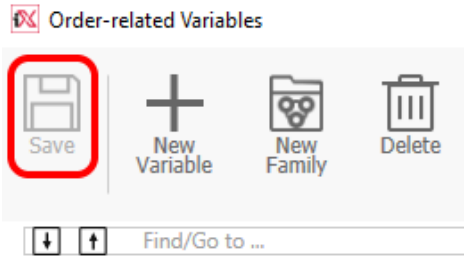
Now enter the desired name for the value set in the family "**_Case_1**" row, then press ENTER to complete the entry.

Name	In order	Type	Default Value	Valueset
Samples	No	Family		←
_Customer	No	Family		←
_Construction	No	Family		←
_Material	No	Family		←
_Case_1	No	Family		19mm Oak matt NB
_PRF_1_TS	Yes	Profile name	iX_MEL_Black_03mm_M	iX_MEL_Oak_03mm_M
_PRF_1_BS	Yes	Profile name	iX_MEL_Black_03mm_M	iX_MEL_Oak_03mm_M

Finally, click on **Save** to save your new value set.



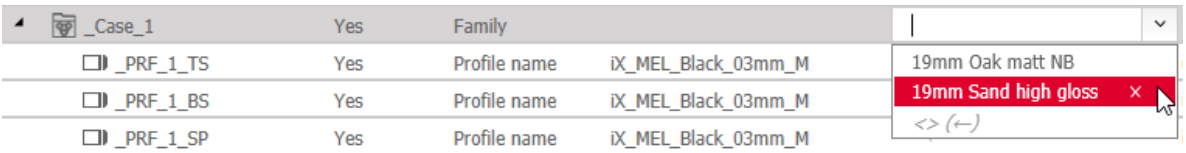
Once your value set is saved, the Save button is grayed out and no longer available.



Now create another value set: "**19mm Sand high gloss**".

Name	In order	Type	Default Value	Valueset
Samples	No	Family		←
_Customer	No	Family		←
_Construction	No	Family		←
_Carcass_construction	No	Family		←
_Connectors	No	Family		←
_Dimensions	No	Family		←
_Material	No	Family		←
_Case_1	No	Family		19mm Sand high gloss
_PRF_1_TS	Yes	Profile name	iX_MEL_Black_03mm_M	iX_MEL_Sand_03mm_H
_PRF_1_BS	Yes	Profile name	iX_MEL_Black_03mm_M	iX_MEL_Sand_03mm_H
_PRF_1_SP	Yes	Profile name	iX_MEL_Black_03mm_M	iX_MEL_Sand_03mm_H
_MAT_1_BP	Yes	Material	iX_PB08_MEL_White_M	iX_PB08_MEL_Sand_H
_MAT_1_TS	Yes	Material	iX_PB19_MEL_White_M	iX_PB19_MEL_Sand_H
_MAT_1_BS	Yes	Material	iX_PB19_MEL_White_M	iX_PB19_MEL_Sand_H
_MAT_1_SP	Yes	Material	iX_PB19_MEL_White_M	iX_PB19_MEL_Sand_H
_SURF_1_TS_top	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_TS_bottom	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_BS_bottom	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_BS_top	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_LS_top	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_LS_bottom	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_RS_bottom	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_RS_top	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_BP_top	Yes	Surface	NO_SURF	NO_SURF
_SURF_1_BP_bottom	Yes	Surface	NO_SURF	NO_SURF

You have now created two value sets for the variable family “_Case_1”.



Hide the column “**Valueset**” again, then close the dialog box “Order-related Variables”.

11.1.2 Create value sets for the variable family “_Front_1”

Now create the value sets “19mm Oak matt NB” and “19mm Black high gloss” for the variable family “_Front_1” by yourself.

“**19mm Oak matt NB**”:

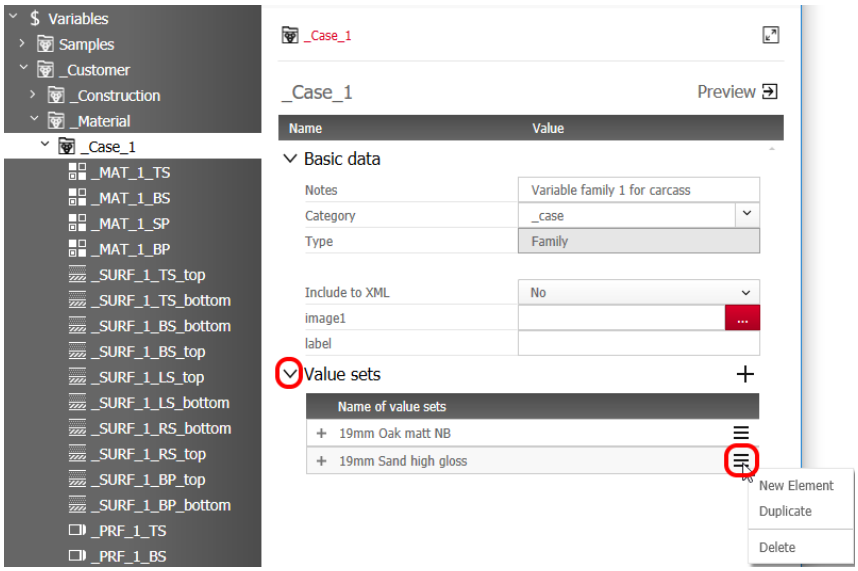
Name	Type	Default Value	Valueset
Samples	Family		←
_Customer	Family		←
_Construction	Family		←
_Material	Family		←
_Front_1	Family		19mm Oak matt NB
_MAT_1_D	Material	iX_PB19_MEL_Oak_M	iX_PB19_MEL_Oak_M
_MAT_1_DR	Material	iX_PB19_MEL_Oak_M	iX_PB19_MEL_Oak_M
_SURF_1_D_top	Surface	NO_SURF	NO_SURF
_SURF_1_D_bottom	Surface	NO_SURF	NO_SURF
_SURF_1_DR_bottom	Surface	NO_SURF	NO_SURF
_SURF_1_DR_top	Surface	NO_SURF	NO_SURF
_PRF_1_D	Profile name	iX_ABS_Oak_2mm_M	iX_ABS_Oak_2mm_M
_PRF_1_DR	Profile name	iX_ABS_Oak_2mm_M	iX_ABS_Oak_2mm_M
_PRF_1_Front_SP	Profile name	iX_MEL_Oak_03mm_M	iX_MEL_Oak_03mm_M

“**19mm Black high gloss**”:

Name	Type	Default Value	Valueset
Samples	Family		←
_Customer	Family		←
_Construction	Family		←
_Material	Family		←
_Front_1	Family		19mm Black high gloss
_MAT_1_D	Material	iX_PB19_MEL_Oak_M	iX_PB19_MEL_Black_H
_MAT_1_DR	Material	iX_PB19_MEL_Oak_M	iX_PB19_MEL_Black_H
_SURF_1_D_top	Surface	NO_SURF	NO_SURF
_SURF_1_D_bottom	Surface	NO_SURF	NO_SURF
_SURF_1_DR_bottom	Surface	NO_SURF	NO_SURF
_SURF_1_DR_top	Surface	NO_SURF	NO_SURF
_PRF_1_D	Profile name	iX_ABS_Oak_2mm_M	iX_ABS_Black_2mm_H
_PRF_1_DR	Profile name	iX_ABS_Oak_2mm_M	iX_ABS_Black_2mm_H
_PRF_1_Front_SP	Profile name	iX_MEL_Oak_03mm_M	iX_MEL_Black_03mm_H

11.2 Create value set in the Element Manager

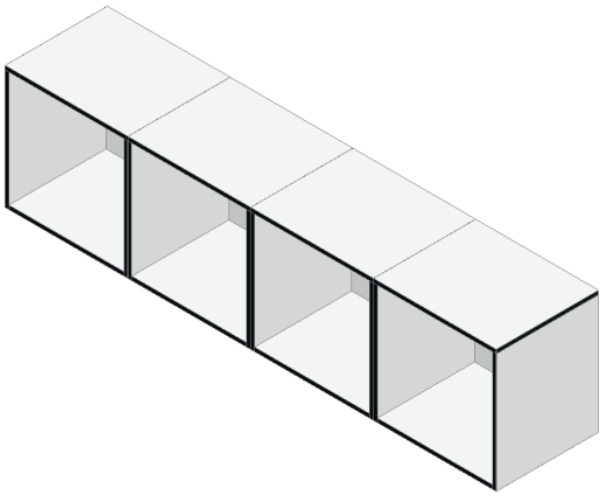
Alternatively, you also have the option of creating value sets in the Element Manager. Open the desired variable family and the node value sets. To create new value sets, click on the **sandwich button**.



12. Use value set

In the graphic, open a new order and plan your article “**Variable_Article**” **4x**.

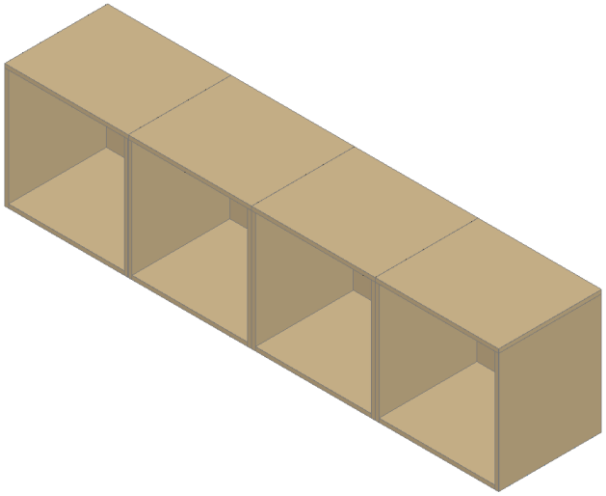
The articles will be generated using your default values.



Now alter the values of the **Order-related Variables** for the family “_Case_1” with the value set “**19mm Sand high gloss**”.

Name	Type	Default Value	Valueset	Order Value
Samples	Family		←	
_Customer	Family		←	
_Construction	Family		←	
_Material	Family		←	
_Front_1	Family		←	
_Case_1	Family		←	19mm Sand high gloss

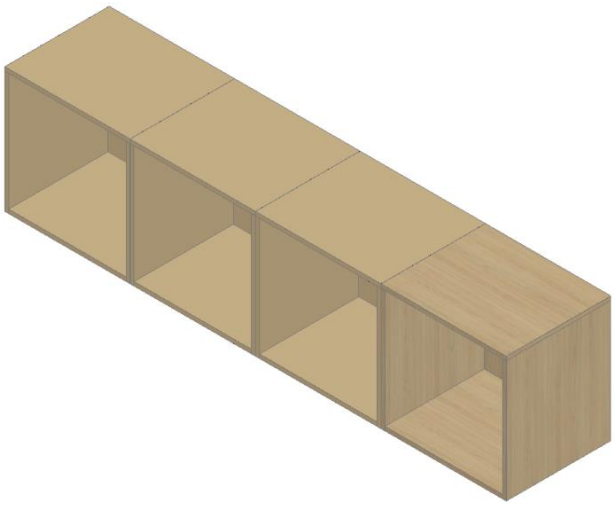
Now regenerate the article in the graphic.



Now alter the **Article-related Variables** for the **outer right-hand article** …

Name	Type	Default Value	Order Value	Article value
_Customer	Family			←
_Construction	Family			←
_Material	Family			←
_Case_1	Family		19mm Sand high gloss	19mm Oak matt NB

... and regenerate the article in the graphic. The outer right-hand article will now be implemented with “**19mm Oak matt NB**”.

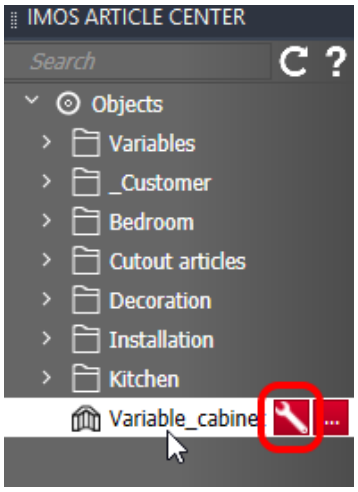


13. Modify article “Variable_cabinet”

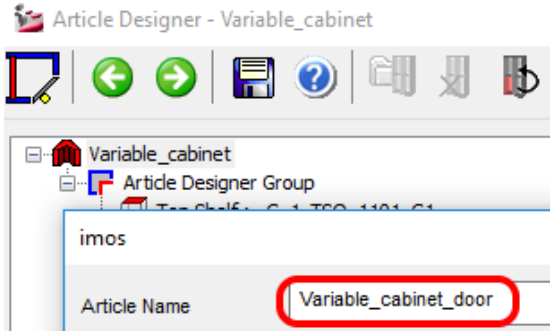
Until now, your article “Variable_cabinet” has used only variables belonging to the family “_Case_1”. To be able to use value sets in the variable family of a higher level in the hierarchy (for example “_Material”), which use value sets of lower hierarchy levels, you will need to modify your article “Variable_cabinet”.

13.1 Add a door to the article “Variable_cabinet”

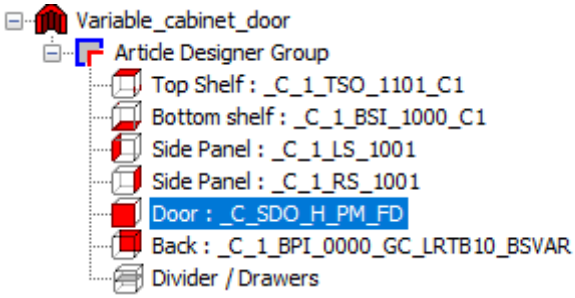
Open the article "Variable_Cabinet" in the Article Designer with a click on the wrench symbol in the imos Article Center.



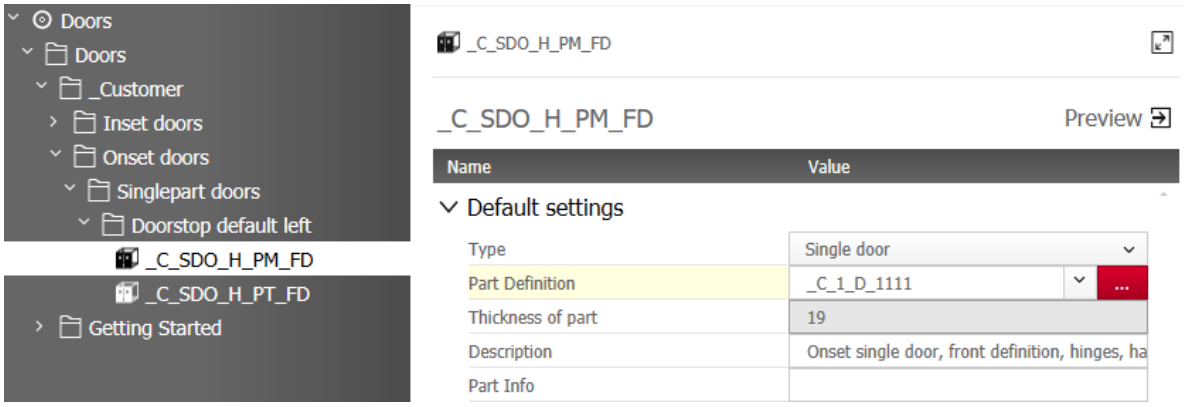
Save the article under the name “**Variable_cabinet_door**”.



Insert a **door** by double-clicking the corresponding article.

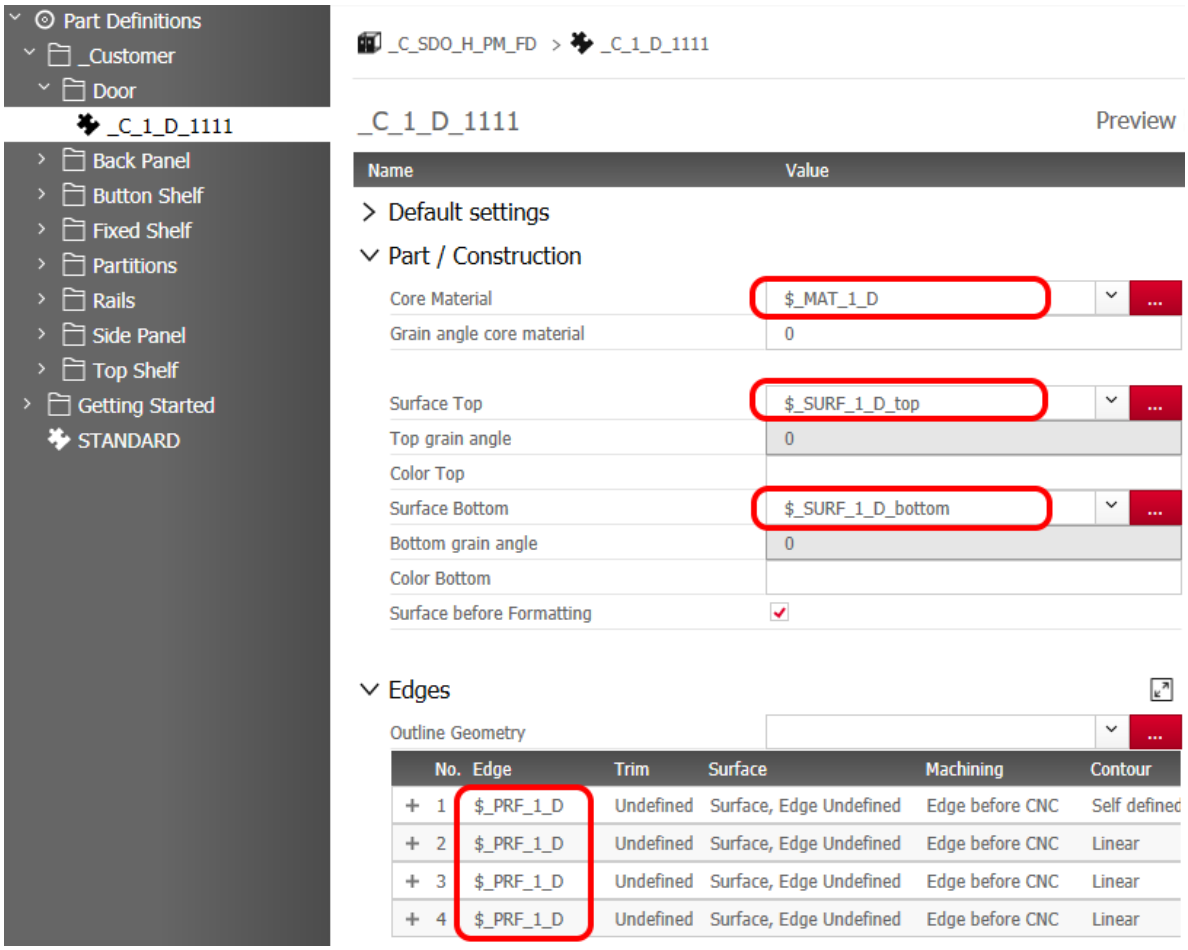


Assign the PD "**_C_1_D_1111**" to the CP, which you should create from the PD "PD_1_T_1111". If it is not available; then save it to your customer-specific folder.

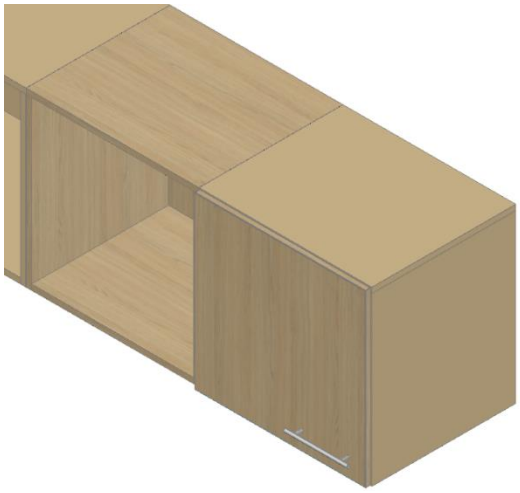


Open the PD of the door, then enter the variables from the family "_Front_1".

The variable "_PRF_1_Front_SP" is not considered for the purpose of this exercise. This variable can be included later as a value for Edge 1 of the carcass parts (TS, BS, SPL and SPR) to apply an edging to the front edge of the carcass in the same color as the front.



Save the **PD, CP and article**, and insert the new article with the door in your drawing.



The carcass is displayed with the order-related settings applied to the variable family "_Case_1".

No order-related settings have yet been undertaken for the variable family "_Front_1"; consequently, the door is displayed with the default values for the material and profile variables.

14. Value sets in value sets

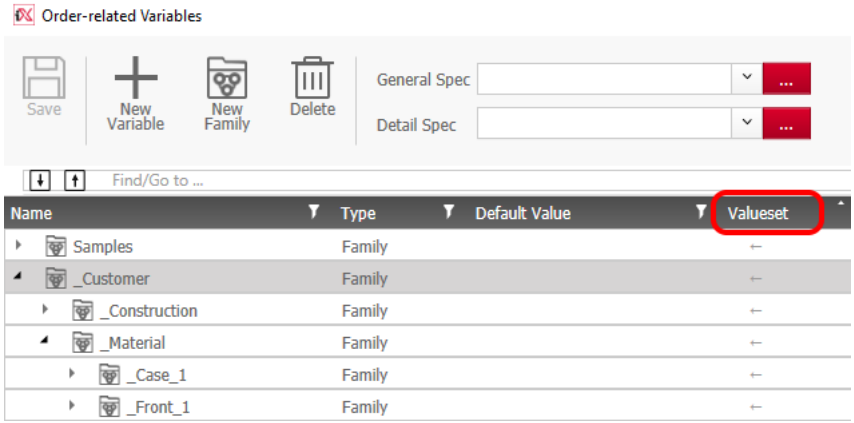
Until now, you have created value sets for the respective lowest hierarchy level of our structure of variables. There are no further variable families below the variable families "_Case_1" and "_Front_1". However, it is also possible to create value sets in the variable family of a higher hierarchy level (for example, "_Material"), which use the value sets from lower hierarchy levels.

14.1 Create nested value sets

Using the value sets of the variable family "_Material" the following definitions for the article "Variable_cabinet_door" can be set with a single value.

- Front: **19mm Black high gloss** Carcass (_Case_1): **19mm Sand high gloss**
- Front: **19mm Oak matt NB** Carcass (_Case_1): **19mm Oak matt NB**

Open the **Order-related Variables** and make column **"Valueset"** visible.



Set the value sets of the variable families “_Front_1” and “_Case_1” as depicted below.

_Material	No	Family	←
_Case_1	Yes	Family	19mm Sand high gloss
_Front_1	No	Family	19mm Black high gloss

Enter the desired name of the value set for the family “**_Material**”. Press ENTER to complete the entry. This activates the Save button.

Hint

The name of a value set must not exceed a maximum of **50 characters**.

Name	Type	Default Value	Valueset
Samples	Family		←
_Customer	Family		←
_Construction	Family		←
_Material	Family		F19mmBlackHG_C19mmSandHG
_Case_1	Family		19mm Sand high gloss
_Front_1	Family		19mm Black high gloss
Getting_Started	Family		←

Save the created value set and close the order-related dialog box.

Now create the second value set for the family “_Material” by yourself using the steps described above.

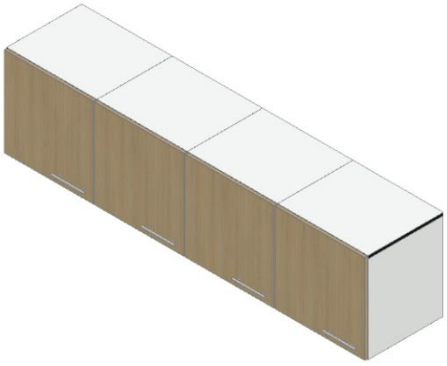
Name	Type	Default Value	Valueset
Samples	Family		←
_Customer	Family		←
_Construction	Family		←
_Material	Family		F19mmOakM_C19mmOakM
_Case_1	Family		19mm Oak matt NB
_Front_1	Family		19mm Oak matt NB
Getting_Started	Family		←

Hint

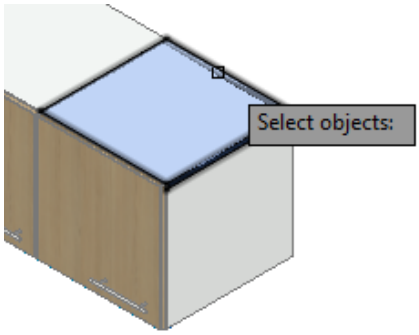
It is also possible to create nested value sets in the **Element Manager**.

14.2 Using nested article-related value sets

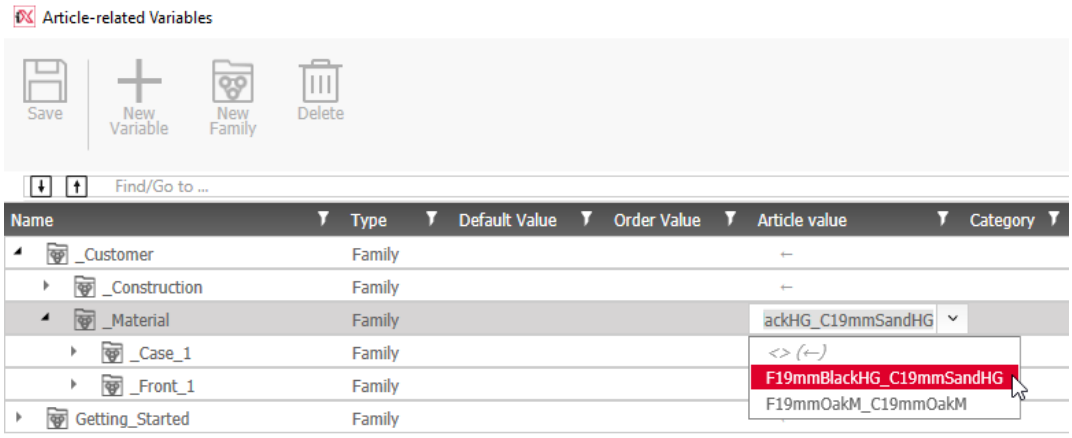
First open a new order and plan the article “Variable_cabinet_door” **4x**. As no order-related values have yet been set for the variables, the articles are depicted using the default values of the respective variables.



To apply the nested value sets, initially use the dialog box “**Article-related Variables**” and select the outer right-hand article.



In the dialog box “Article-related Variables”, set the value set “**F19mmBlackHG_C19mmSandHG**” in the family “**_Material**”.



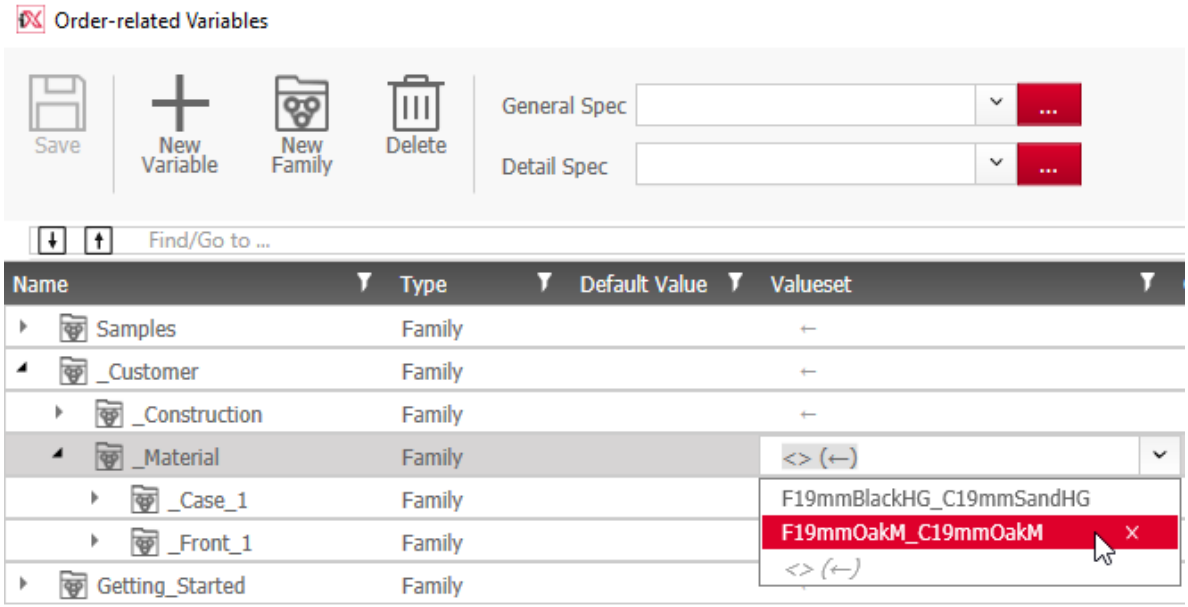
Click on 

to exit the dialog box “Article-related Variables” and regenerate the article.

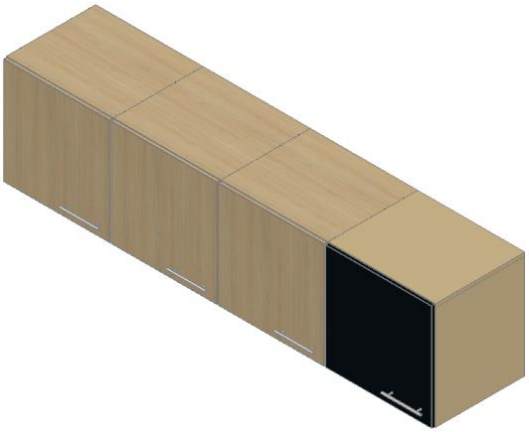
14.3 Use nested order-related value sets

Now open the dialog box “**Order-related Variables**”.

In the dialog box “Order-related Variables”, set the value set “**F19mmOakM_C19mmOakM**” in the family “**_Material**”.



Click on  to exit the dialog box “Order-related Variables” and regenerate the order.



Hint

All articles belonging to the order are now generated using the new order-related values. However, previously defined article-related values are not altered!

Article-related variable values are protected when changes are made to order-related variable values.

15. Variables for surfacing

Use the knowledge you have acquired so far to draw up a variable setting for the following situation. Think about part rotation in mind to ensure you set the top and bottom sides of the parts properly.

Carcass (_Case_1):

- Core material 19mm chipboard
- Inside HPL light-gray gloss
- Outside HPL black gloss
- Edges melamine 0.3mm black gloss
- 8mm melamine on both sides light-gray gloss applied directly to the surface

Front:

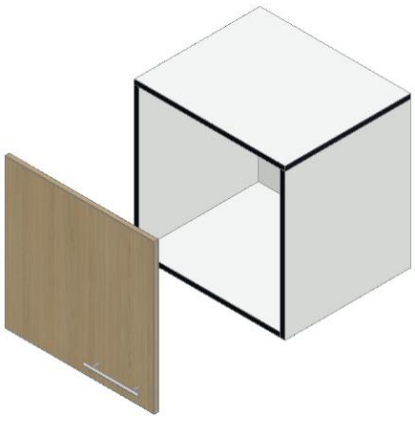
- Inside cherry wood matt veneer
- Outside cherry wood matt veneer
- Edges cherry wood matt veneer

15.1 Initial situation with default values

To make it easier to visualize, the front and handle were moved forward by **500mm**.

Hint

To be able to move parts please **activate 3D editing**. You will learn about this function in more detail in the exercise covering the Part Designer “Designing with tilted parts”.

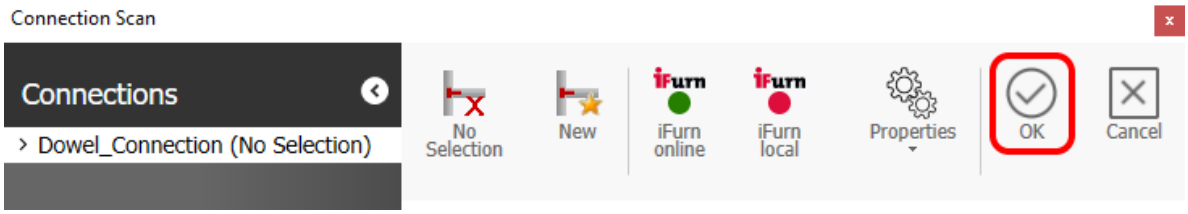


15.2 Variable settings

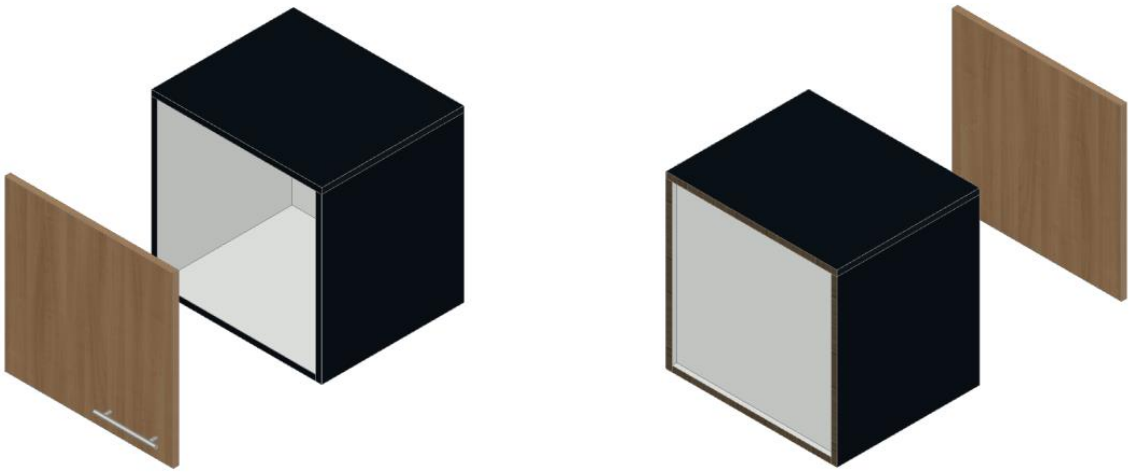
Name	Type	Default Value	Order Value	Category
Samples	Family			
_Customer	Family			
_Construction	Family			
_Material	Family			
_Case_1	Family			_case
_MAT_1_TS	Material	iX_PB19_MEL_White_M	iX_PB19_Raw	_case
_MAT_1_BS	Material	iX_PB19_MEL_White_M	iX_PB19_Raw	_case
_MAT_1_SP	Material	iX_PB19_MEL_White_M	iX_PB19_Raw	_case
_MAT_1_BP	Material	iX_PB08_MEL_White_M	iX_PB08_Raw	_case
_SURF_1_TS_top	Surface	NO_SURF	iX_HPL_Black_G	_case
_SURF_1_TS_bottom	Surface	NO_SURF	iX_HPL_Grey_Light_G	_case
_SURF_1_BS_bottom	Surface	NO_SURF	iX_HPL_Black_G	_case
_SURF_1_BS_top	Surface	NO_SURF	iX_HPL_Grey_Light_G	_case
_SURF_1_LS_top	Surface	NO_SURF	iX_HPL_Black_G	_case
_SURF_1_LS_bottom	Surface	NO_SURF	iX_HPL_Grey_Light_G	_case
_SURF_1_RS_bottom	Surface	NO_SURF	iX_HPL_Black_G	_case
_SURF_1_RS_top	Surface	NO_SURF	iX_HPL_Grey_Light_G	_case
_SURF_1_BP_top	Surface	NO_SURF	iX_HPL_Grey_Light_G	_case
_SURF_1_BP_bottom	Surface	NO_SURF	iX_HPL_Grey_Light_G	_case
_PRF_1_TS	Profile name	iX_MEL_Black_03mm_M	iX_MEL_Black_03mm_G	_case
_PRF_1_BS	Profile name	iX_MEL_Black_03mm_M	iX_MEL_Black_03mm_G	_case
_PRF_1_SP	Profile name	iX_MEL_Black_03mm_M	iX_MEL_Black_03mm_G	_case
_Front_1	Family			_Front
_MAT_1_D	Material	iX_PB19_MEL_Oak_M	iX_PB19_Raw	_Front
_MAT_1_DR	Material	iX_PB19_MEL_Oak_M		_Front
_SURF_1_D_top	Surface	NO_SURF	iX_V_Cherry_M	_Front
_SURF_1_D_bottom	Surface	NO_SURF	iX_V_Cherry_M	_Front
_SURF_1_DR_bottom	Surface	NO_SURF		_Front
_SURF_1_DR_top	Surface	NO_SURF		_Front
_PRF_1_D	Profile name	iX_ABS_Oak_2mm_M	iX_V_Cherry_05mm_M	_Front
_PRF_1_DR	Profile name	iX_ABS_Oak_2mm_M		_Front
_PRF_1_Front_SP	Profile name	iX_MEL_Oak_03mm_M		_Front
Getting_Started	Family			

Hint

If the Connection Scan appears when the article is being generated, this is because the thickness of the carcass parts (19mm chipboard + 2x 0.8mm HPL = 20.6mm) exceeds the defined limits for the screw connector set. As the carcass connection is of no significance for this exercise, in this case please click on **OK** in the Connection Scan.



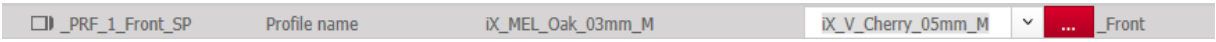
15.3 Target situation



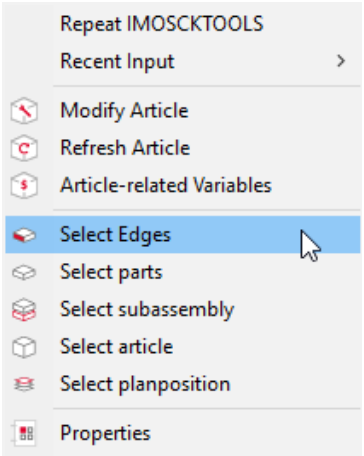
16. Front edge of the carcass in front color

Modify the front edge of the carcass parts (top shelf, sides and bottom shelf) to “Edge in front color”.

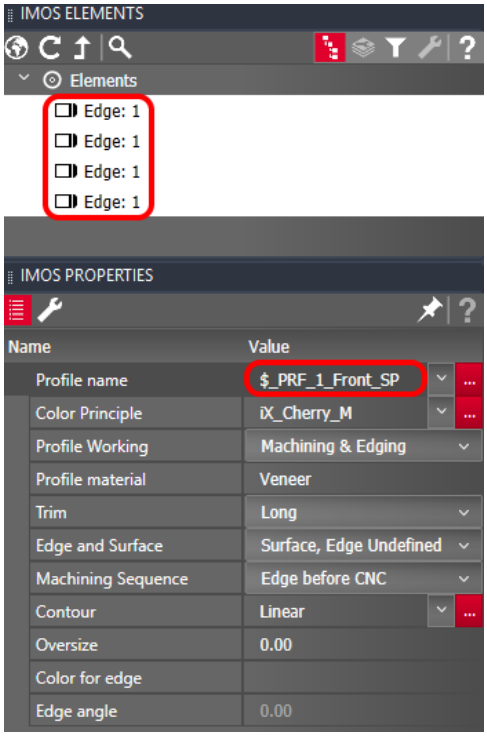
To do so, enter the value “**iX_V_Cherry_05mm_M**” in the dialog box **Order-related Variables** for the variable “**_PRF_1_Front_SP**”.

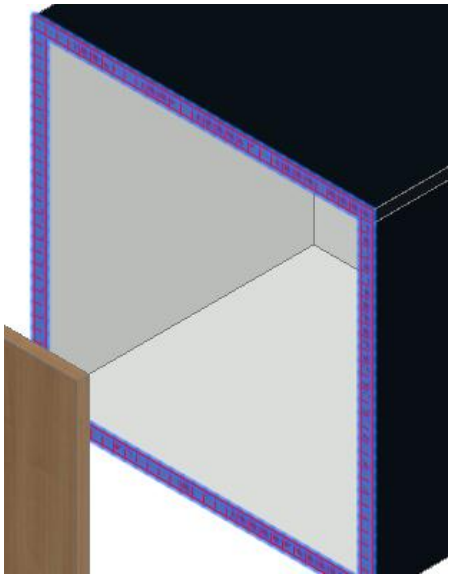


Select the 4 front carcass edges via “**Select Edges**”.

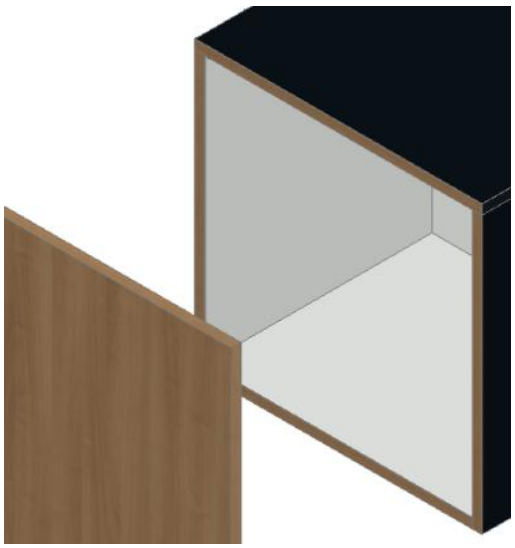


Set the variable “**$_PRF_1_Front_SP**” as the value for the profile name.





The front carcass edges will now be implemented in the front color.



Now also try to build a data model in which entries in the profiles of the PD and appropriately formulated value sets make the setting for the front edges in the front color.