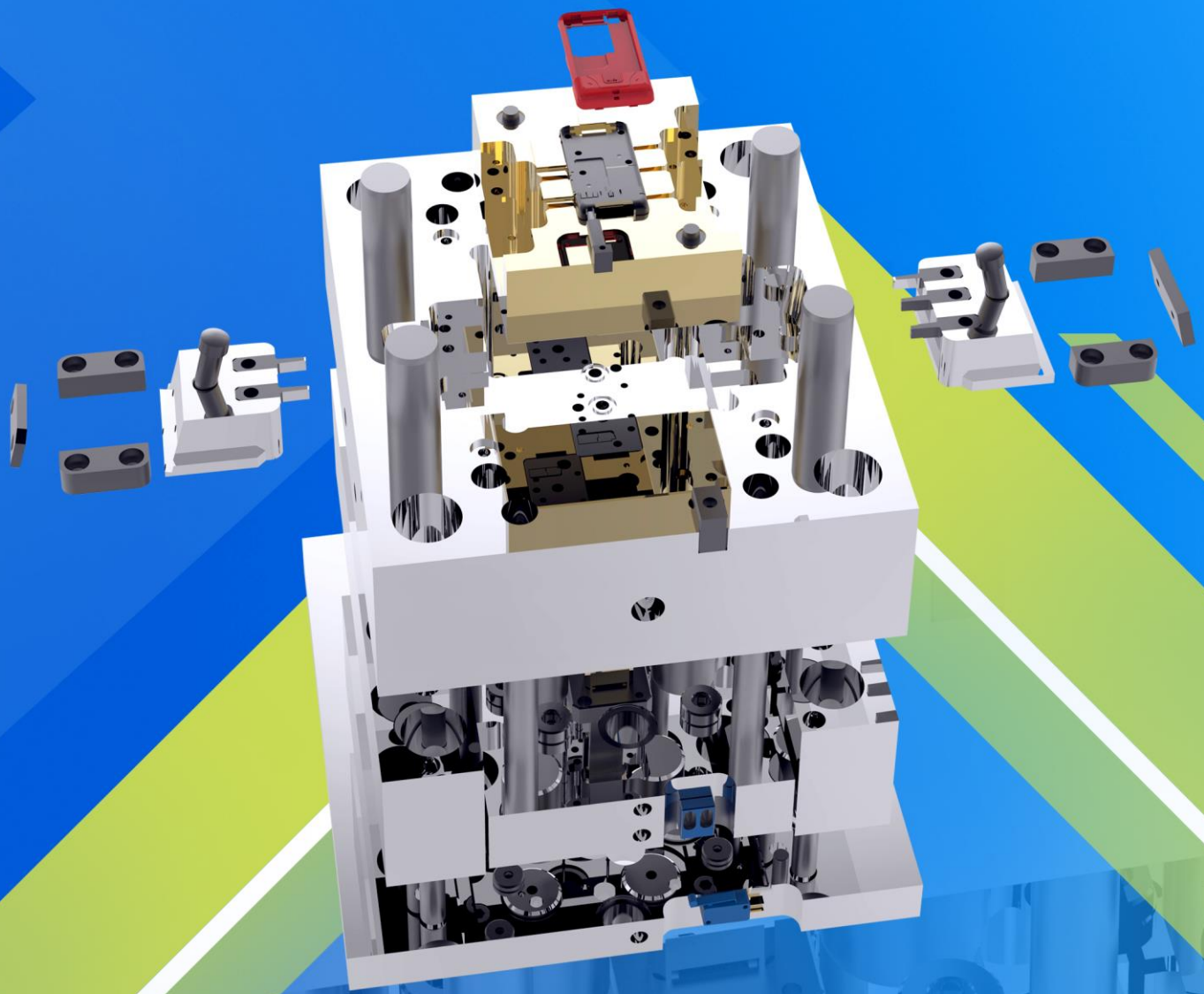
ZW3D Advanced Tutorial

Mold Standard Parts Customization



ZW3D™ V2023 Mold Standard Parts Customization

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Foreword

In this tutorial, we provide various case studies, which are from easy to difficult and combine theory with practice. We hope to improve users' 3D CAD/CAM skills and techniques with ZW3D.

The tutorial bases on our technical engineers' years of experience in the industry and ZW3D, which is the fruit of a lot of efforts and wisdom. We sincerely hope that the tutorial will do help to you, and your precious advice on it is highly welcomed.

There are three series for this tutorial: ***Primary Tutorial***, ***From Entry to Master Tutorial***, and ***Advanced Tutorial***. From easy to difficult, they offer a step-by-step learning process that can meet different user needs.

Primary Tutorial series is for users who have little or no prior 3D CAD/CAM experience. If you are green hands of 3D CAD/CAM software, or if you are a new user of ZW3D, we recommend that you get started with this tutorial. Here you can learn the basic knowledge and concepts of ZW3D, rapidly master the simple operations and workflows of ZW3D, and practice simple cases.

From Entry to Master Tutorial series is for users with basic know-how of 3D CAD/CAM software. If you have experience in 3D CAD/CAM software and want to master common functions of ZW3D, we suggest that you start with this series. Here you can dig deeper into the functions and master more operations of ZW3D.

Advanced Tutorial series is for users with practical experience in 3D CAD/CAM software. If you hope to have a comprehensive command of ZW3D and get the complicated operations done independently, you can choose to learn this series. Here you can learn to use the software more flexibly and get rich experience to increase your efficiency.

What you are learning is ***ZW3D CAD Mold Standard Parts Customization***, an advanced tutorial.

Thanks for being our user!

The ZW3D Team

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In this tutorial, you will learn how to create your own mold standard part library. With the standard screw as an example, you can understand the process better.

Key Points:

- ✧ Build the Parametric Part
- ✧ Define Driving Files for Standard Part
- ✧ Reuse the Library

1 Overview

Mold Standard Parts Customization involves part seriation and library definition. A customized mold standard part library can help speed up the design process, save development time, and reduce mistakes.

Configurations allow designers to create variations of a part with different part attributes, variables, features, and dimensions, or different versions of an assembly with different part configurations, component status, and constraint parameters.

The library can be easily created based on configuration data or defined by the Excel® file. During the design process, you could select the suitable part or assembly to reuse the library and hence, raise efficiency.

1.1 Elements of Standard Parts

The general mold standard parts are normally located in the Installation Directory of ZW3D, for example, …\ZW3D 2020\ZWMold\Standard\.... Take a screw as an example, the general mold standard part command and the corresponding location of DME-Screw-ISO610 are as Figure 1 below shows.

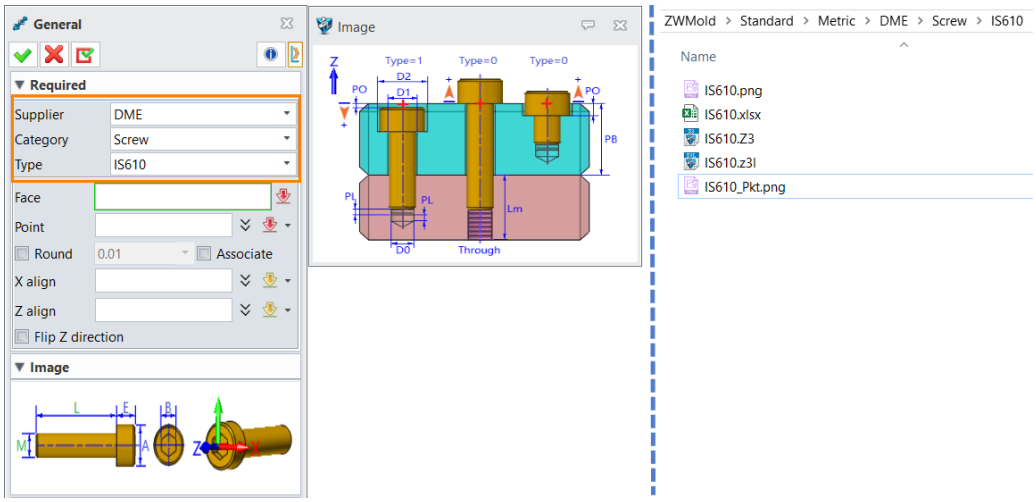


Figure 1 ZW3D General Mold Standard Part

Generally, standard parts consist of several important factors as shown in the figure below.

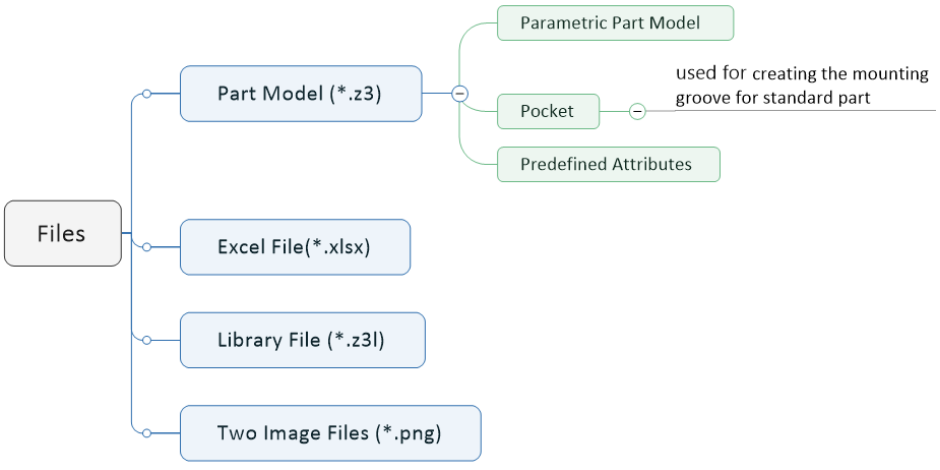


Figure 2 Important Factors of Mold Standard Parts

Compared with the general command, the specific command for standard parts can do the deduction automatically. For example, when creating a parametric screw with it, the correct cavity will be automatically defined after you select several object plates.

Besides the specific command for each standard part, you can also customize the specific standard part in ZW3D. Please note that the necessary parameters for automatic deduction should be included and their names should meet the requirements. For example, when creating the screw, you must include these parameters: $L, $Org, $E, $M, and $Len (Their meanings will be introduced afterward). Also, you should avoid changing the letters of the parameters, otherwise, the parameters will not be recognized or calculated.

1.1.1 Model File

A parametric model is the most basic element of a mold standard part. As shown in the image below, the predefined attributes, required variables and expressions, detailed modeling processes, a standard part, and a pocket shape are essential to one model file.

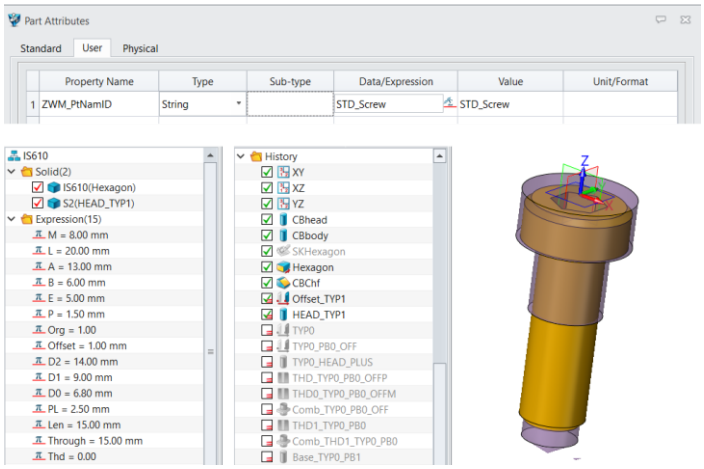


Figure 3 Standard Part Model

1.1.2 Parameter Table

The parameter table includes the expression which drives the model and is divided into key parameter, custom parameter and minor parameter. The details of each parameter are listed below.

Key parameter: multiple sets of data; pull-down menu in panels; need to be set in the function panel.

Custom parameter: ranges of values should be given; need to be set in the function panel.

Minor parameter: important but does not need to be designated or displayed on the panel.

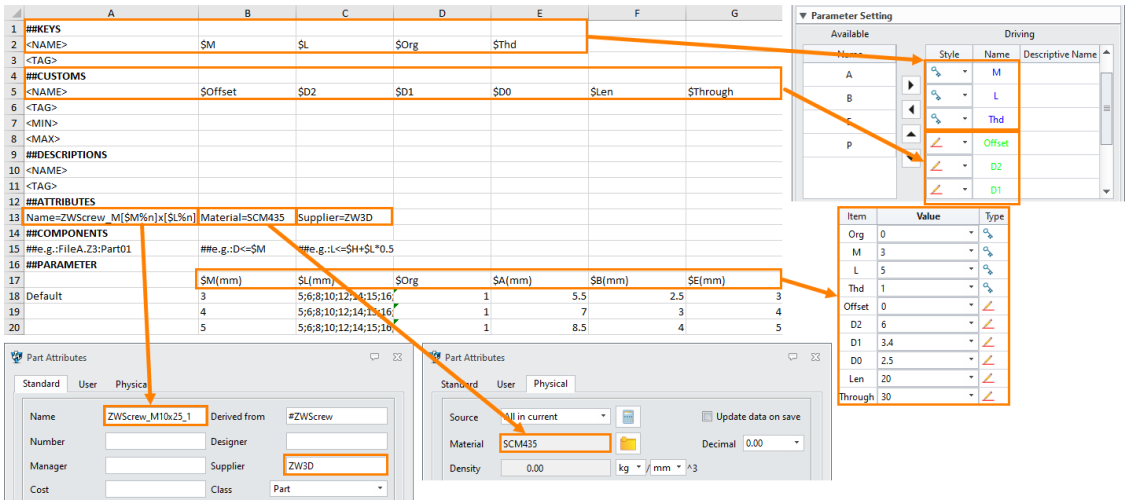


Figure 4 Parameter Table

1.1.3 Z3l File

A .Z3l file is used for creating the connections between the parameter file and the model, parameter sequence, image, etc.

Figure 5 Z3l File

1.1.4 Images

Every standard part consists of 2 corresponding images: a dimensions image (recommended pixels:350*100) and an assembly image (recommended pixels: 400*300).

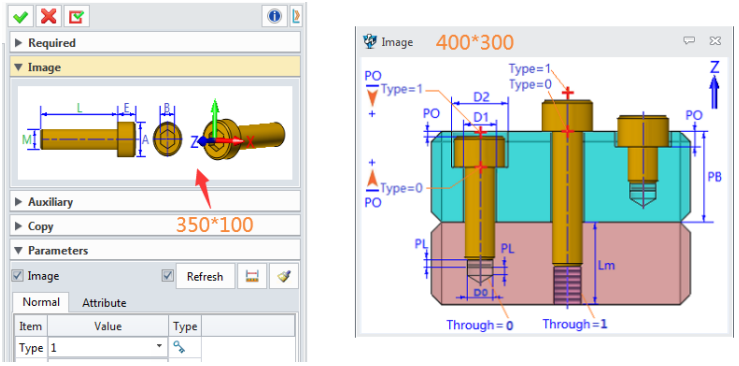


Figure 6 Images

2 Build the Parametric Part

Apart from normal standard parts, mold standard parts consist of part modelling and pocket modelling. Furthermore, there can be different mounting conditions in one model, such as countersunk and flat head for screws.

In this case, we are creating the expressions of screws as the figure below shows.

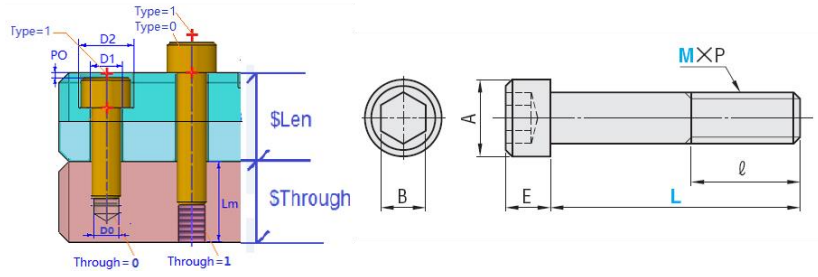


Figure 7 Standard Screws

As mentioned in **Chapter 1.1**, in ZW3D, each mold standard part has a specific command. In this case, the standard screw includes 6 expressions: $L, $Org (Type), $E, $M, $Len (PB), and $Through (Lm). And the first five expressions are necessary.

For part modelling: $M, $L, $A, $E, $P

For pocket modelling: $D1, $D2, $D0, $Len (PB), $Through (Lm), $Thd (0,1)

There are two kinds of mounting conditions for screws: when Org = 1, the screw will be mounted as a countersunk screw; when Org = 0, it will be a flat head screw. In ZW3D, you can achieve different part status with conditional suppress.

2.1 Part Modeling

Before starting the standard part modeling, make sure that you set the part attributes and variables. In this part, you will learn the process of creating a mold standard part.

2.1.1 Set the Category of Standard Parts

Since there are different categories of mold standard parts, you need to predefine the category with part attributes before creating the part model. With the category settings for standard parts recognized in ZW3D, interference and overcut for both parts and pockets will be prevented.

After setting the category, different layers for parts and pockets after the names of part attributes will be created automatically according to the category ID. Normally, parts and pockets are in different layers and all the pockets are in the same layer.

Below are the categories of mold standard parts in ZW3D.

- **STD_Cooling**
- **STD_Ejector**
- **STD_EJP**
- **STD_EJS**
- **STD_Guide**
- **STD_Insulator**
- **STD_Lifter**
- **STD_Runner**
- **STD_Opening**
- **STD_Positioning**
- **STD_Screw**
- **STD_Slider**
- **STD_Spring**

Firstly, set the attributes of the mold standard screw by following the steps below.

STEP 01 Create a new part, **ZWScrew.z3**, in ZW3D.

STEP 02 Go to ***Tools*** *Ribbon Tab->****Attributes****->****Part***.

STEP 03 Go to ***User*** tab->Set **ZWM_PtNam** as the Property Name->Set **STD_Screw** as Data->Click ***Apply***.

Note: ZWM_PtNam *is a text attribute. The prefix* **STD_** *indicates a standard part.* ***Screw*** *represents the category of this standards part. The figure below shows the part attributes.*

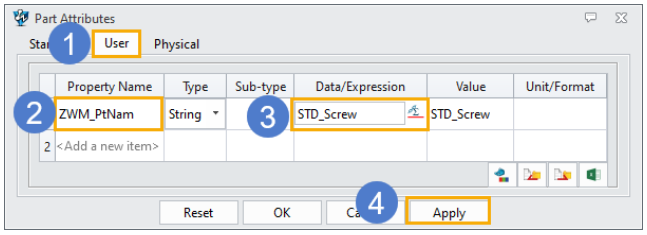


Figure 8 User Settings of Part Attributes

2.1.2 Remove Default Material

Next, you need to remove the default material by clicking the ***Physical*** tab in the Part Attributes dialog, setting the material to **<NONE>** in the Material Attributes section, and clicking ***OK***.

The part attributes will automatically be inherited to shape attributes. However, the pocket is only used for Boolean calculation. Therefore, the default material of the pocket should be removed.

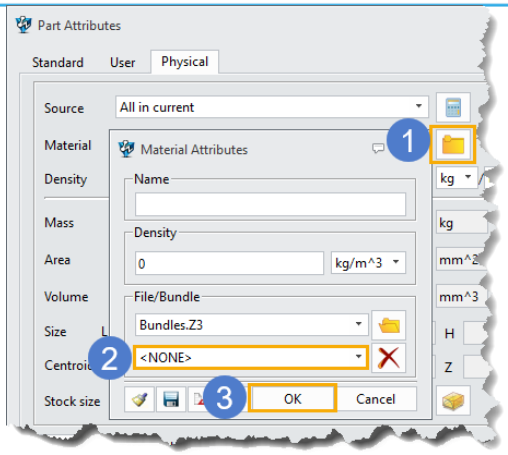


Figure 9 Physical Setting of Part Attributes

2.1.3 Define Variables

STEP 01 Invoke the ***Equation Manager*** from the ***Tools*** Ribbon Tab and define the needed variables. For example, to specify the value of the variable M to be 8mm, just select ***Length*** as the Type and input **M** as the Name and **8** as the Expression. Then, click and ***Apply***.

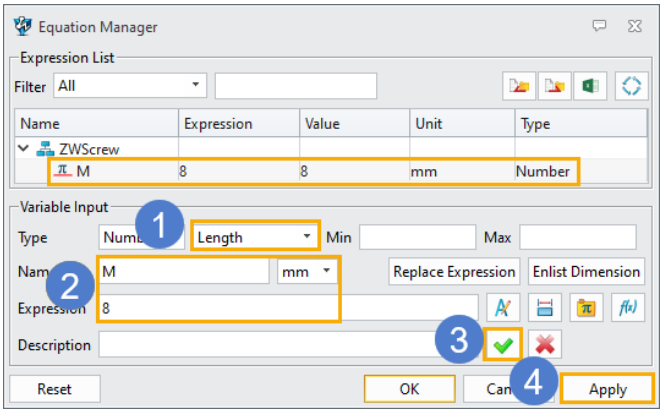


Figure 10 Equation Manager

STEP 02 Input the needed variables in the ***Equation Manager*** and click ***Apply***, as shown in Figure 11. All the defined variables are recorded in the History Manager.

Note: *Generally, there are 4 types of expressions: Length, Angle, Constant, and String. As for constants, normally, their values are 0, 1, and 2, and they are used for conditional suppress.*

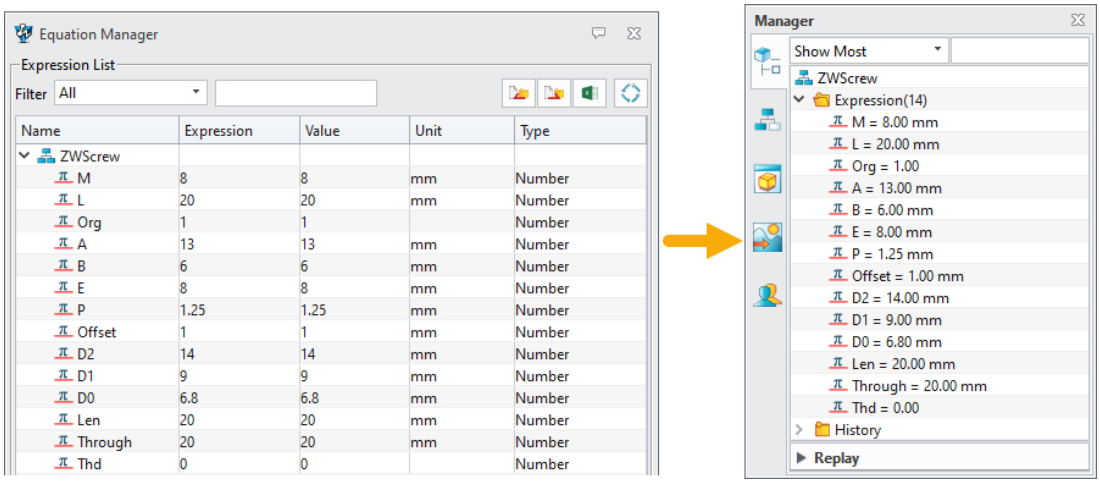


Figure 11 Inputting the Needed Variables

2.1.4 Design Part

Note: *Make sure that you set the coordinate system origin as the center of the standard part model and the normal of the selected face is collinear with the Z axis.*

STEP 01 Build the screwhead with the ***Cylinder*** command. Set the expression **A** as its diameter and **-E** as its length, as shown in Figure 12.

Note: *After creating the first feature, the attributes, including the face attribute, part catalog, and material, must be defined. Otherwise, they will not be added to other specifications, for example, conditional suppress. Therefore, attributes need defining every time a new solid is created.*

STEP 02 Right-click on the solid in the ***History Manager***, select ***Face Attributes***, and set the color to green, as shown in Figure 13.

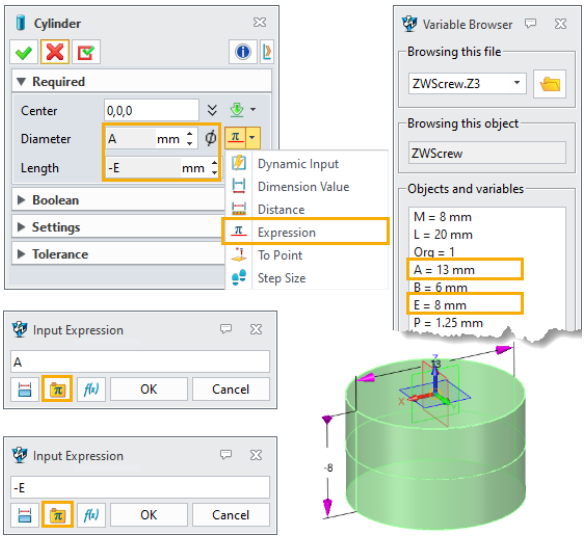


Figure 12 Setting Parameters with Expressions

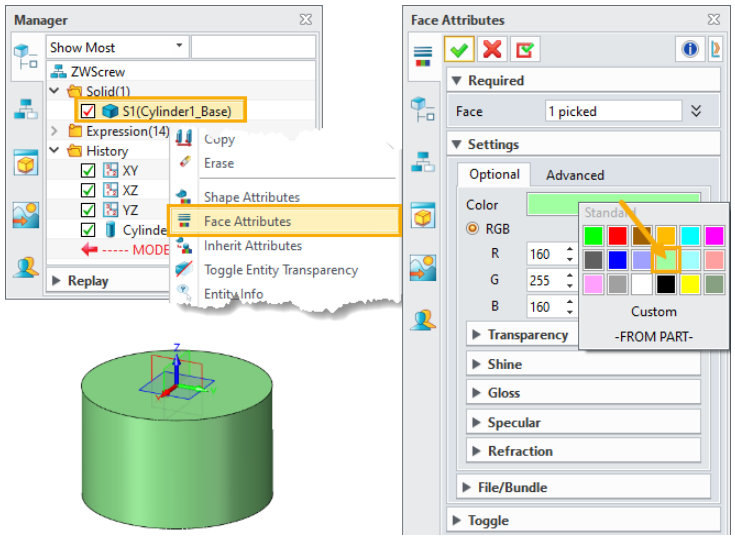


Figure 13 Set the Color of Face Attributes

STEP 03 Right-click on the solid in the ***History Manager***, select ***Shape Attributes***, click ***User*** and then the ***Inherit attributes from part*** and ***Apply*** buttons in the ***Shape Attributes*** dialog.

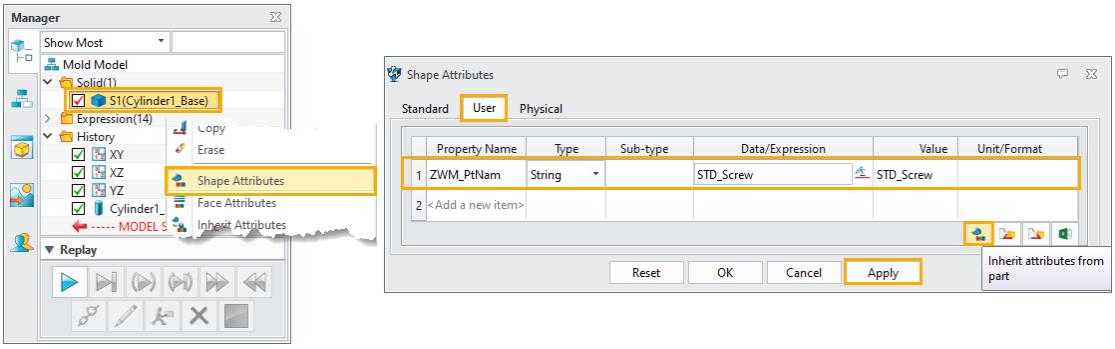


Figure 14 Setting the Shape Attributes

STEP 04 Click ***Physical*** in the ***Shape Attributes*** dialog, set **Steel-carbon-tool** as the Material, and click ***OK.***

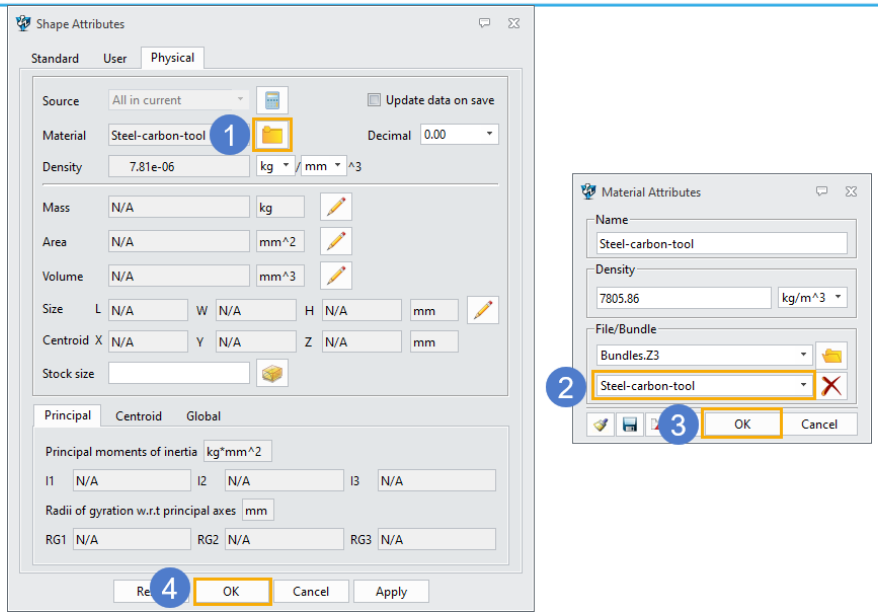


Figure 15 Physical Settings of Shape Attributes

Then, it's time to create the remaining parts of the screw.

STEP 05 Create the screw feature with the ***Cylinder*** command. Set the expression **M** as its Diameter and **–(E+L)** as its Length, and select the ***Add*** Boolen operation.

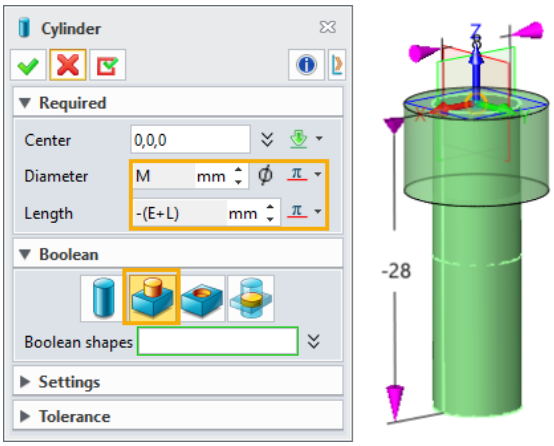


Figure 16 Setting Parameters with the Expression

STEP 06 Create the hex socket by creating a hexagon on the screwhead with the ***Sketch*** command first. Then, set the expression **B** as Sketch1_d0 in the ***Input Dimension Value*** dialog and make sure the sketch is well defined, as shown in Figure 17.

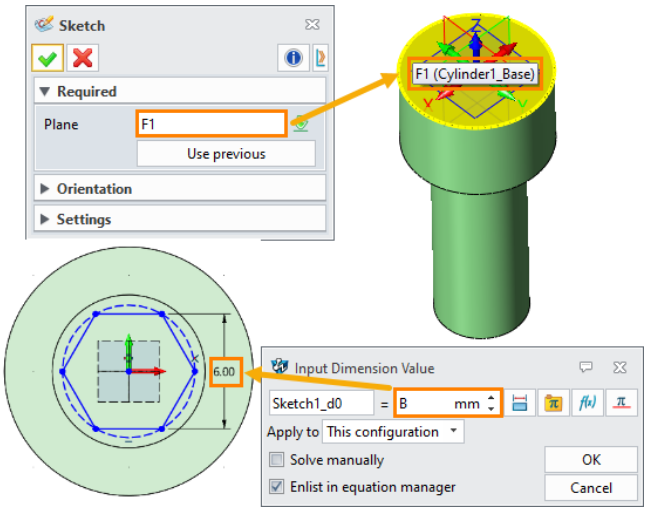


Figure 17 Creating a Hexagon on the Screwhead

STEP 07 ***Extrude*** the hexagonal sketch with ***Remove*** in the Boolean shape, set **0** as Start and expression **-E/2** as End, and then add the ***Chamfer*** with **0.5 mm** Setback, as shown in Figure 18.

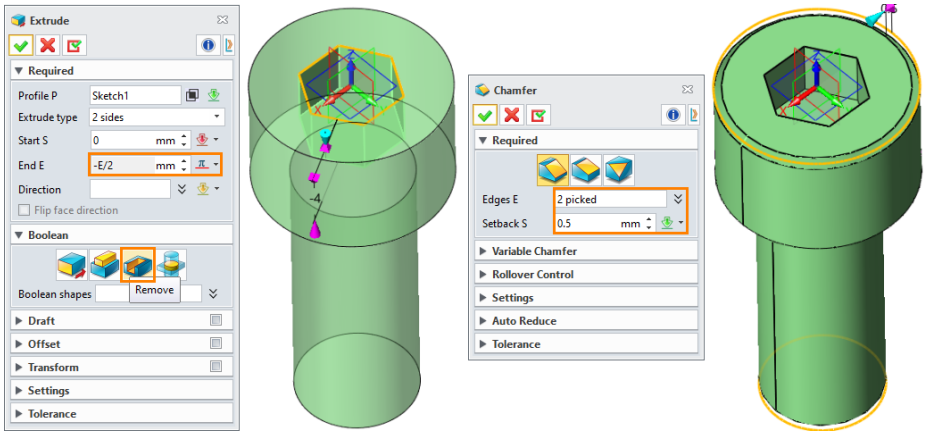


Figure 18 Finishing the Screw Modelling

2.2 Pocket Modelling

In this part, we are creating the pocket for the screw, which is used for generating the mounting groove for standard parts. The steps are similar to those of screw part modeling, but only involve Boolean calculations.

STEP 01 For a clearer view, we can blank the screw solid created in the last steps by right-clicking on **S1(Cylinder1_Base)** and clicking ***Blank***.

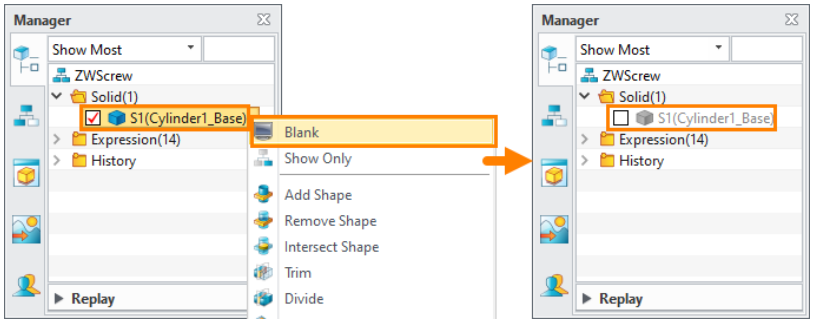


Figure 19 Blanking the Screw Solid

STEP 02 Create the first pocket feature with the ***Cylinder*** command. Set the expression **D1** as the Diamter and the expression **-Len** as the Length. As for ***Face Attributes***, set the **Color** to be pink and **Transparency** to 60%.

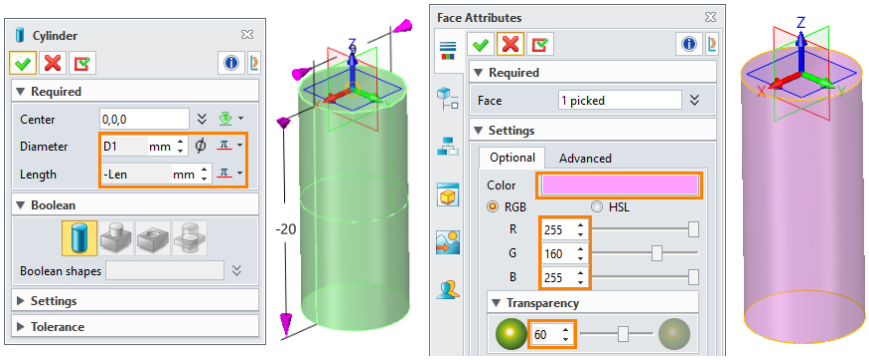


Figure 20 Creating the First Pocket

STEP 03 Click ***User*** and then the ***Inherit attributes from part*** button in the ***Shape Attributes*** dialog. Change the **Data/Experssion** to **STD_PKT** and click ***Apply*** and ***OK***, as shown in Figure 21.

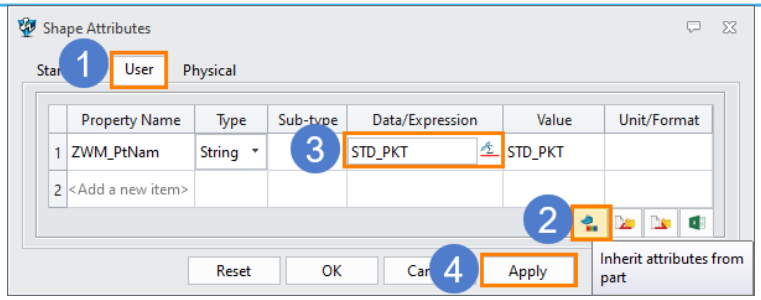


Figure 21 Setting the Shape Attributes

Note: *Material settings are not needed for pockets.*

STEP 04 Define the pocket following ***Tools*** Ribbon Tab->***Library***->***Set Pocket***, and then tick the pocket shape as shown in Figure 22.

Note: *Such settings should be applied to every pocket, otherwise the pockets cannot be recognized during Boolean calculations.*

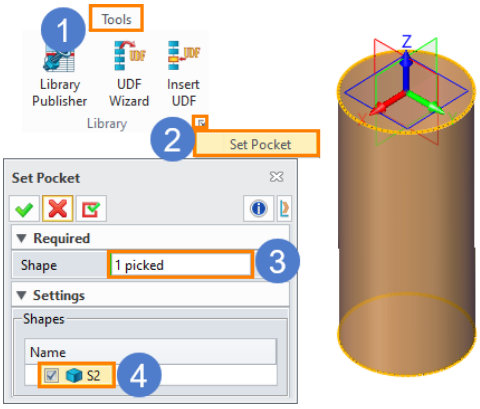


Figure 22 Defining the Pocket

STEP 05 Create the pocket feature for the screwhead with the ***Cylinder*** command. Set the expression **D2** as the Diamter and the expression **-E** as the Length. As for ***Face Attributes***, set the **Color** to be pink and **Transparency** to 60% as shown in Figure 23.

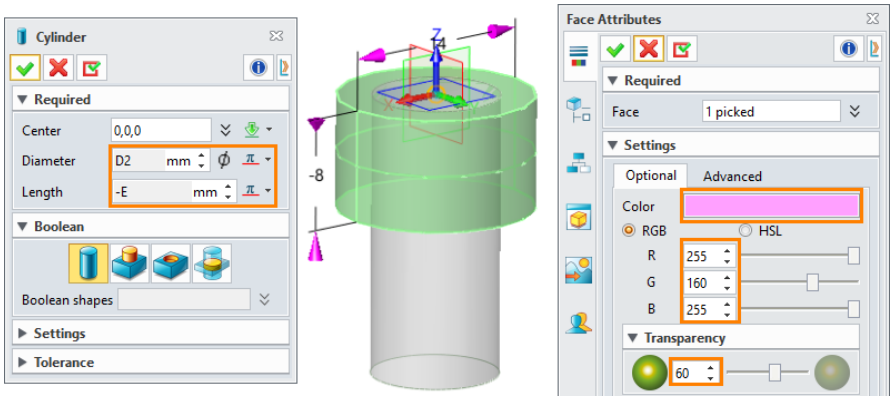


Figure 23 Creating the Pocket for the Screwhead

Now, we have finished pocket modeling for the countersunk screw. Next, we will create the pocket for the flat head screw. Since its screwhead is above the mounting object, the pocket should be moved.

STEP 06 Unblank **S1(Cylinder_Base)** and then blank **S2(Cylinder_Base)**. Set the ***Attribute Filter*** to **Shape** and then the sunk screw following ***Shape***->***Basic Editing***->***Move***. Select both the screw body(S1) and the screwhead pocket (S3), move the entities along the **Z axis**, and set the expression **E** as the Distance.

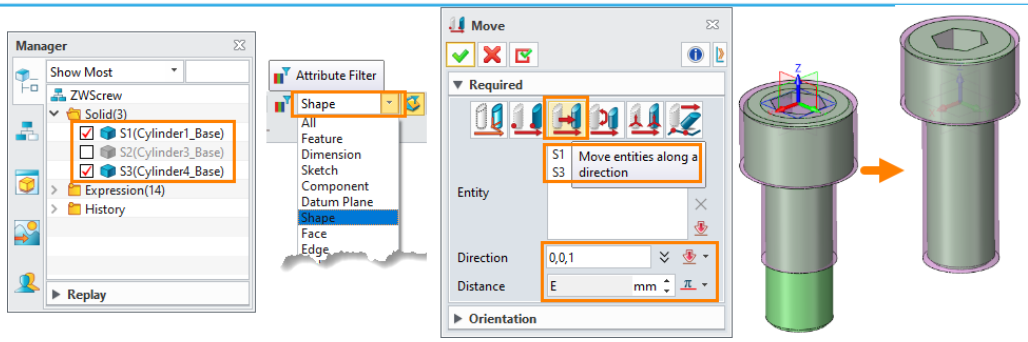


Figure 24 Setting the Sunk Screw

STEP 07 To switch between 2 types of screw mounting status, we can set the conditional suppress by right-clicking on the blank area of the History Manager, selecting ***Conditional Suppress***, ticking the **(Move1)** feature, inputting **Org=1** under the Expression row, and clicking ***Apply*** and then ***OK***, as shown in Figure 25.

Note: *As mentioned at the beginning of this chapter, there are two kinds of mounting. When Org=1, the* ***Move*** *command will be suppressed and the screw will be mounted as a countersunk screw; when Org=0, it will be a flat head screw.*

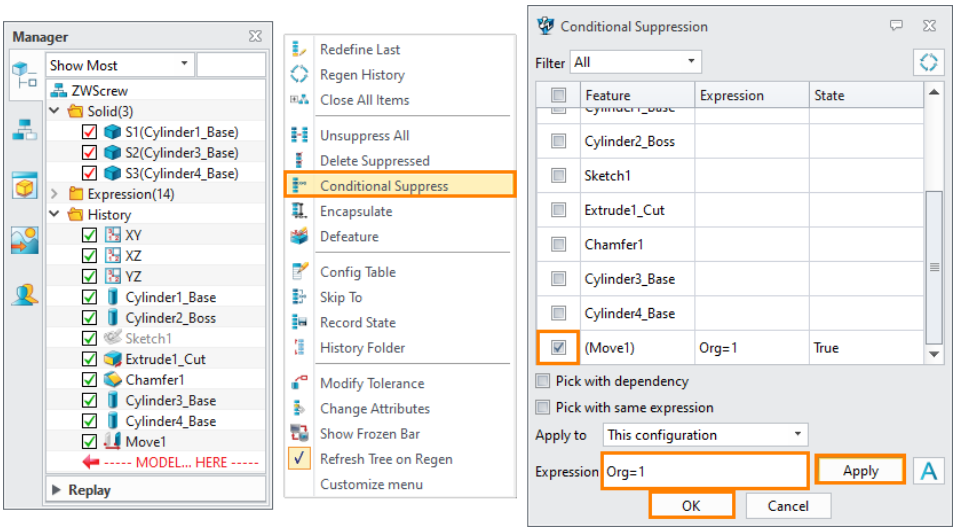


Figure 25 Conditional Suppress

STEP 08 Set the body offset for the countersunk screw following ***Shape->Basic Editing->Move***. Select both the screw body (S1) and the screwhead pocket (S3), move the entities along the **-Z axis**, and set the expression **Offset** as the Distance, as shown in Figure 26.

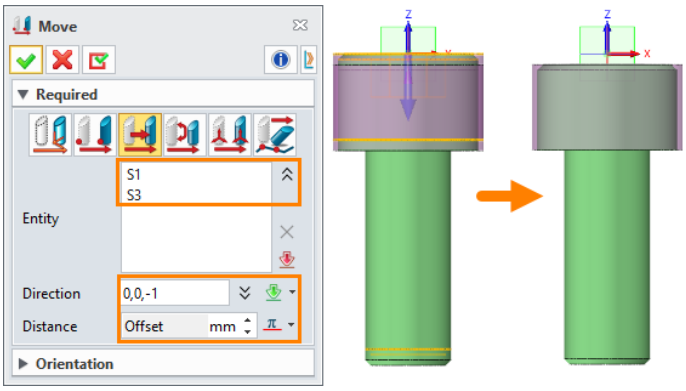


Figure 26 Move

STEP 09 Set the face offset for the countersunk screw pocket following ***Shape->Edit Shape->Face Offset***. Select the top face of the screwhead pocket and set the expression **Offset** as the Offset T as shown in Figure 27. Then, rename this step as **Offset** by right-clicking on it in the History Manager and using the ***Rename*** function.

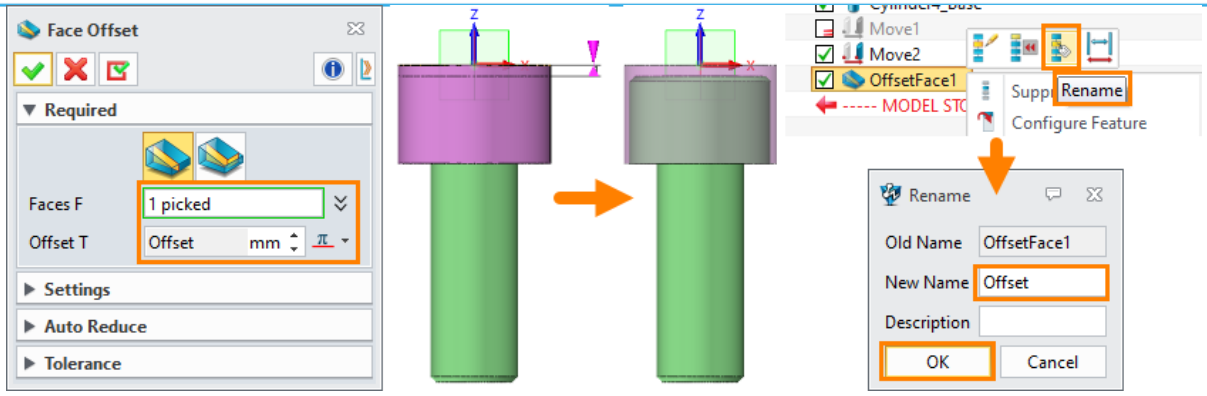


Figure 27 Face Offset

STEP 10 Set the conditional suppress by ticking the ***Offset*** feature, inputting **Org=0** under the Expression row, and then clicking ***Apply*** and ***OK***, as shown in Figure 28.

STEP 11 Unblank **S2(Cylinder_Base)** and combine the pockets following ***Shape->Edit Shape->Add Shape***. Then, select two separate pockets (S2 and S3) respectively in the **Base** and **Added** sections, as shown in Figure 29.

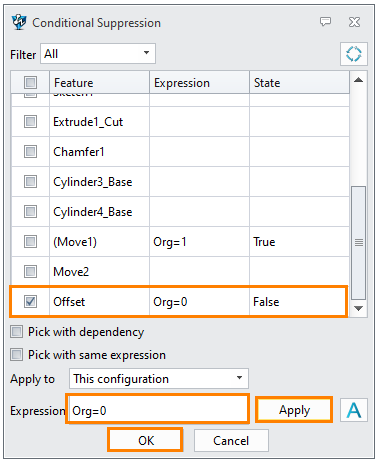


Figure 28 Conditional Suppress

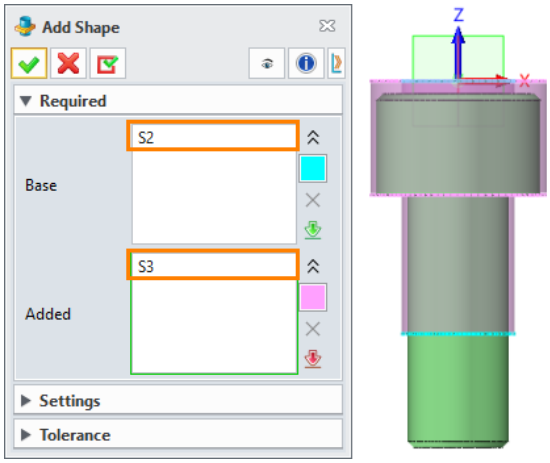


Figure 29 Add Shape

Figure 30 illustrates the results of pockets with different **Org** values.

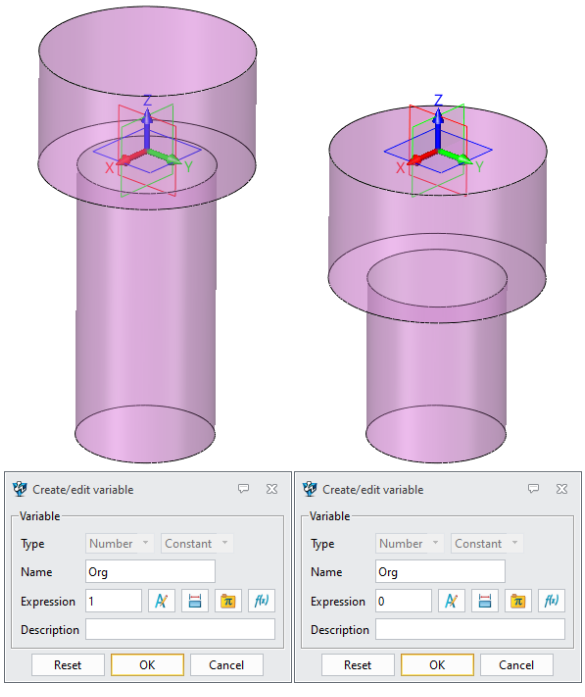


Figure 30 Pockets of Different Org Values

2.3 Thread Pocket

In this case, the tapping can be applied to 3 different types of screws (Countersunk head screw, Flat head screw, and Through-hole). And the expressions of the length of thread pocket in different conditions are as follows.

- **Countersunk head screw:** $Org=1, Thread length=$E+$L+$Offset+2*$P
- **Flat head screw:** $Org=0, Thread length=$L+$Offset+2*$P
- **Through-hole:** Thread length=$Len+$Through

Next, we are creating the thread hole.

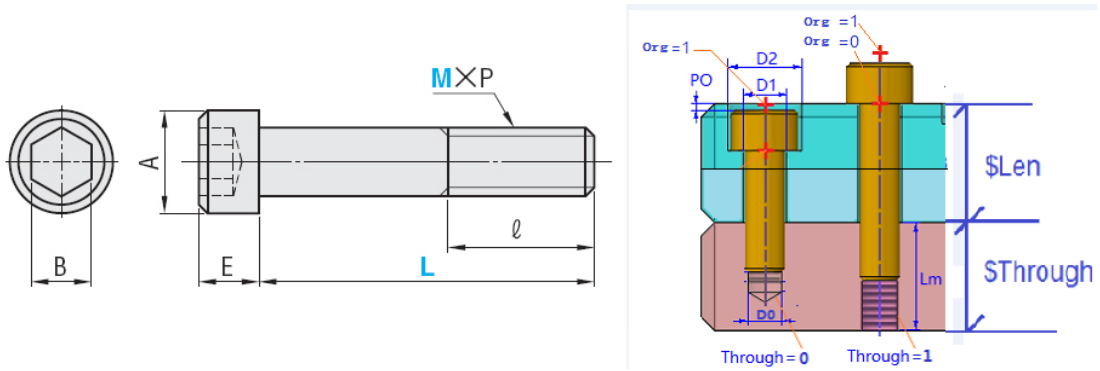


Figure 31 A Schematic Diagram of Screws

2.3.1 Countersunk Head Screw

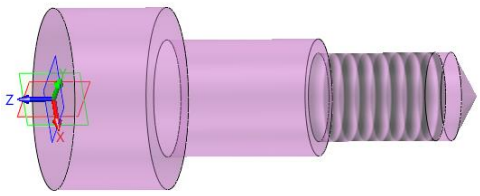


Figure 32 Countersunk Head Screw

STEP 01 Blank S1 and S2 in the History Manager and create the tapping following ***Shape***->***Engineering Feature***->***Hole***. Select ***Thread hole*** in the Required section. Set the **origin** as the insertion point and **-Z (0,0,-1)** as the Dircetion, then set **M** as the Diameter, **P** as the Pitch, **Custom** as the Depth type, **Offset+E+L+P** as the Depth, **D0** as the Dia (D1), **Offset+E+L+2*P** as the Depth (H1), as shown in Figure 33.

STEP 02 For the ***Face Attributes*** of the thread hole, set the **Color** to be pink and **Transparency** to 60% as shown in Figure 34.

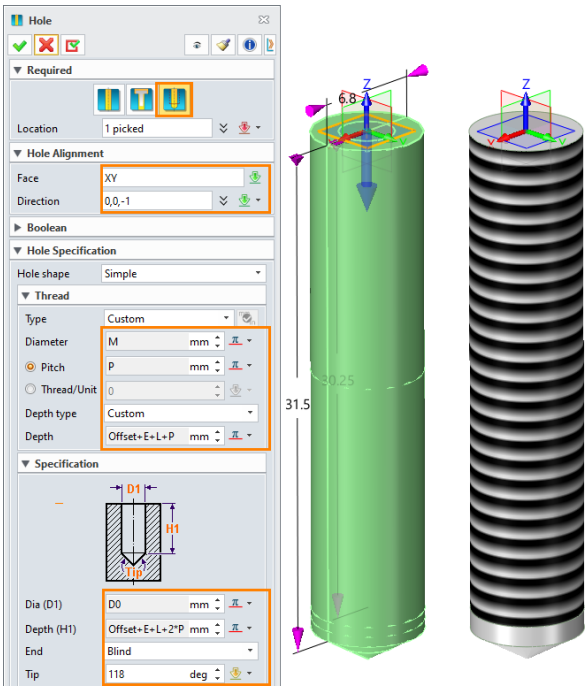


Figure 33 Countersunk Head Tapping Screw

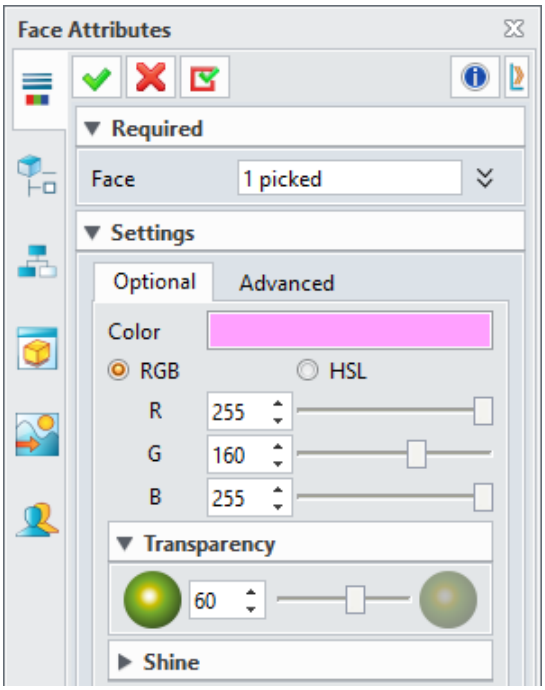


Figure 34 Face Attributes

STEP 03 Unblank S2 and combine the pockets following ***Shape->Edit Shape->Add Shape***, then select two separate pockets (S2 and S4) respectively in the Base and Added sections as shown in Figure 35.

STEP 04 Set the conditional suppress by ticking the **Hole1** and **Combine2_Add** features, inputting **(Org=0)|(Thd=1)** under the Expression row and clicking ***Apply*** and ***OK***, as shown in Figure 36.

Note: *Thd=1 means Through-hole.*

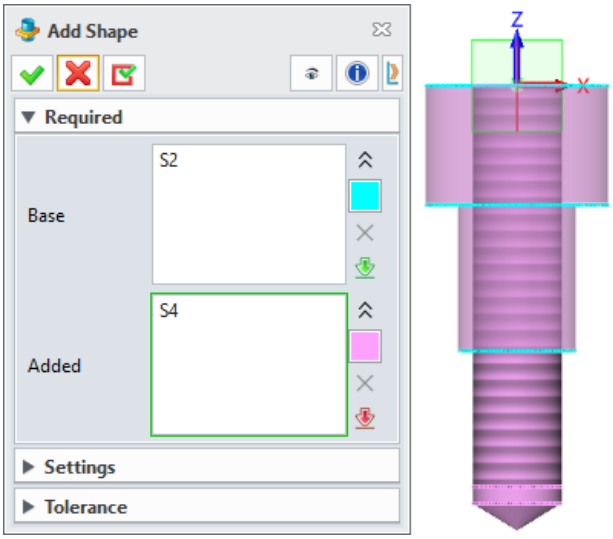


Figure 35 Combining the Pockets

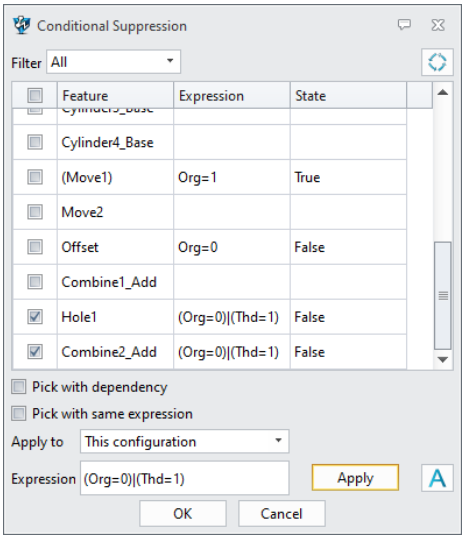


Figure 36 Conditional Suppress

2.3.2 Flat Head Screw

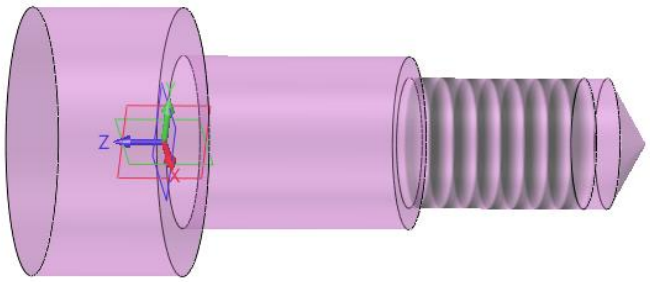


Figure 37 Flat Head Screw

STEP 01 Set the expressions of ***Org*** and ***Offset*** to **0** in the History Manager as shown in Figure 38.

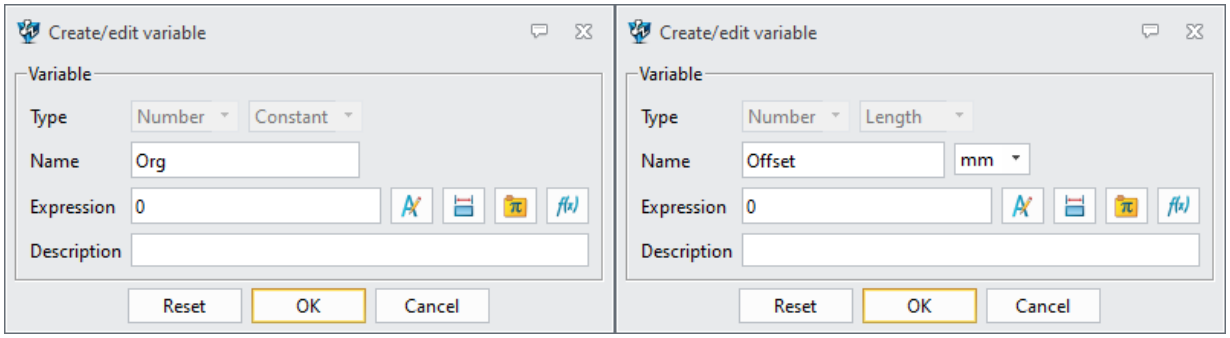


Figure 38 Setting Org and Offset

STEP 02 Blank all the solids in the History Manager and create the tapping following ***Shape->Engineering Feature->Hole***. Select ***Thread hole*** in the Required section. Set the **origin** as the insertion point and the **-Z(0,0,-1)** as the Dircetion, then set **M** as the Diameter, **P** as the Pitch, **Custom** as the Depth type, **Offset+L+P** as the Depth, **D0** as the Dia (D1), **Offset+L+2*P** as the Depth (H1), as shown in Figure 39.

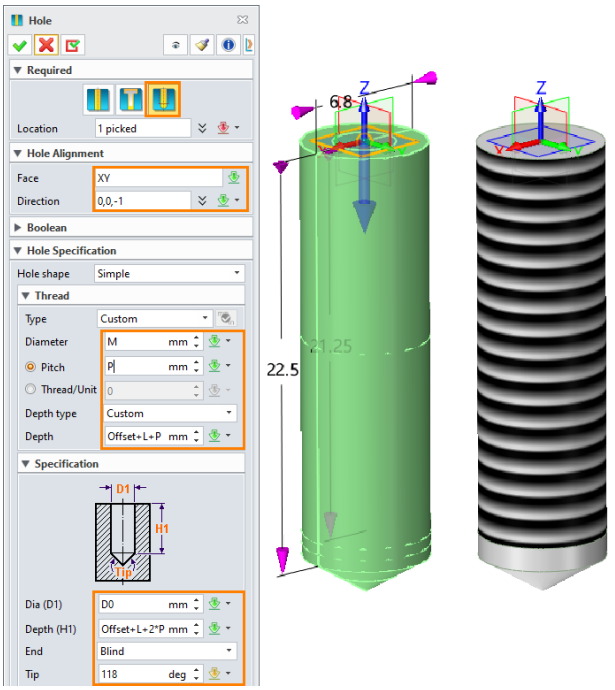


Figure 39 Flat Head Tapping Screw

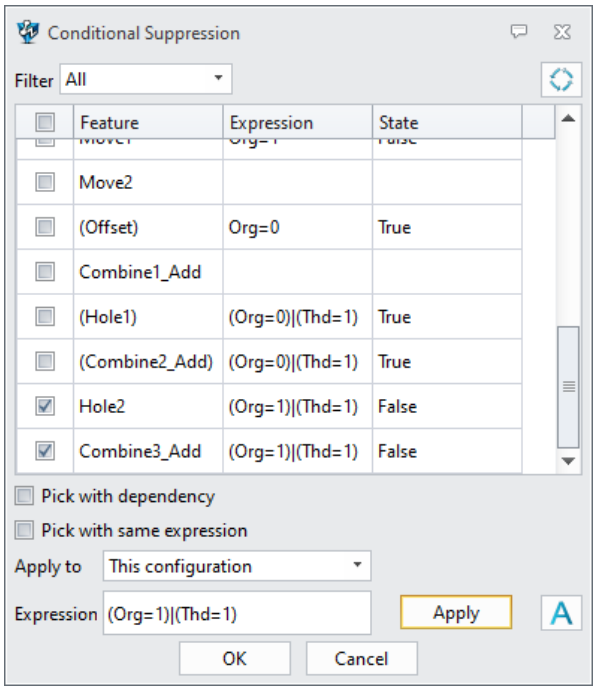


Figure 40 Conditional Suppress

STEP 03 Repeat steps 02 and 03 of **Chapter 2.3.1 Countersunk Head Screw**.

STEP 04 Set the conditional suppress by ticking the **Hole2** and **Combine3_Add** features, inputting **(Org=1)|(Thd=1)** under the Expression row, and clicking ***Apply*** and ***OK***, as shown in Figure 40.

2.3.3 Through-Hole

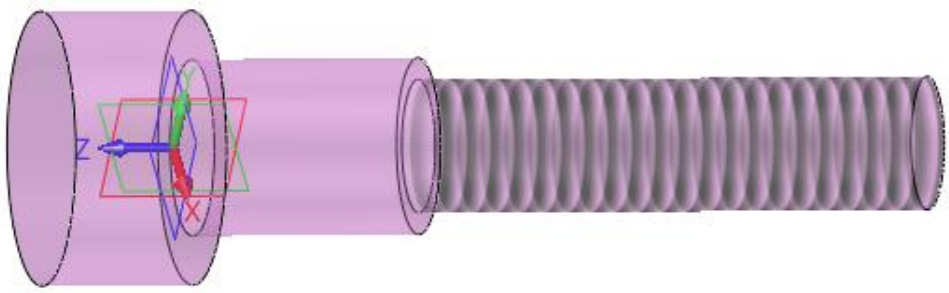


Figure 41 Through-Hole

STEP 01 Set the expression of **Thd** to **1** in the History Manager as shown in Figure 42.

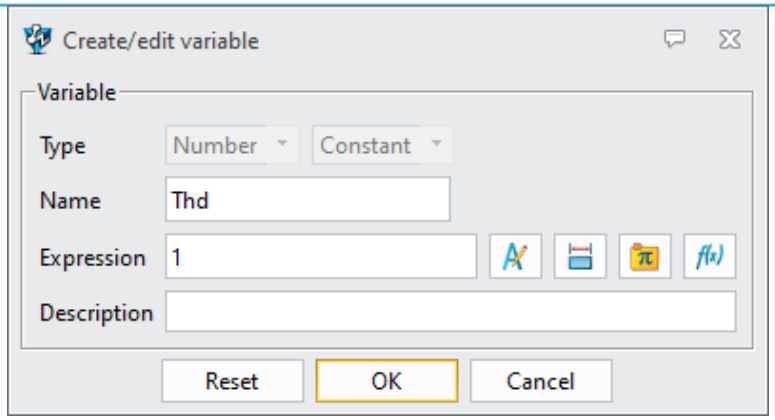


Figure 42 Setting Thd

STEP 02 Blank all the solids in the History Manager and create the tapping following ***Shape->Engineering Feature->Hole***. Select ***Thread hole*** in the Required section. Set the **origin** as the insertion point and the **-Z(0,0,-1)** as the Dircetion, then set **M** as the Diameter, **P** as the Pitch, **Custom** as the Depth type, **Len+Through** as the Depth, **D0** as the Dia (D1), **Len+Through** as the Depth (H1), and the Tip with **0** deg, as shown in Figure 43.

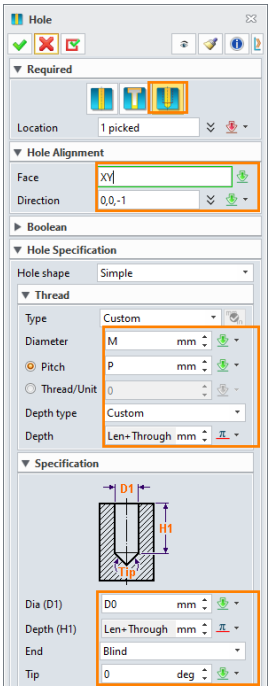


Figure 43 Through-Hole Tapping

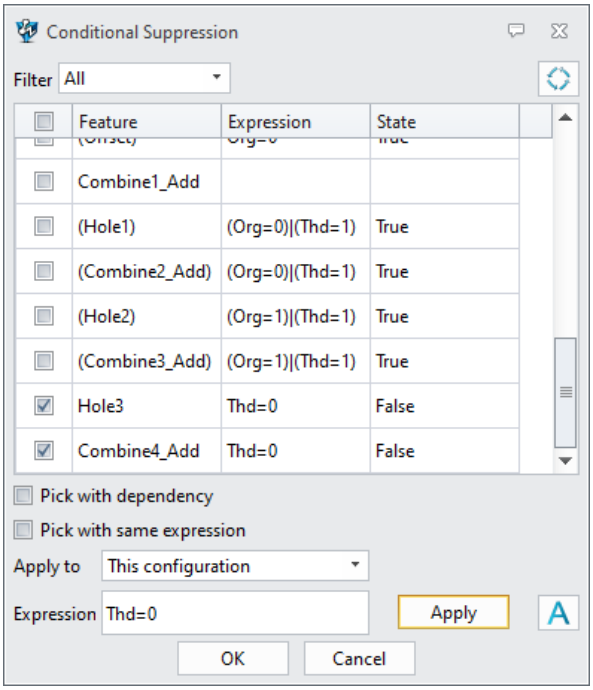


Figure 44 Conditional Suppress

STEP 03 Repeat steps 02 and 03 of **Chapter 2.3.1 Countersunk Head Screw**.

STEP 04 Set the conditional suppress by ticking the **Hole3** and **Combine4_Add** features, inputting **Thd=0** under the Expression row, and clicking ***Apply*** and ***OK***, as shown in Figure 44.

2.3.4 Define Pockets

To define the pockets for 3 different types of screws, you can refer to **Chapter 2.2**.

Countersunk head screw: Org=1, Offset=1mm, Thd=0

Flat head screw: Org=0, Offset=0mm, Thd=0

Through-hole: Org=0, Offset=0mm, Thd=1

3 Define Driving Files

3.1 Define the Library Data

After creating the parametric screws, you need to configure the attribute specifications in Excel® and Z3l files.

STEP 01 Put the images for assembly and dimensions in the folder where the model is stored, following ***Tools***->***Library***->***Library Publisher***. Then, click the folder icon from ***Legend*** and choose the dimensions image as shown in Figure 45.

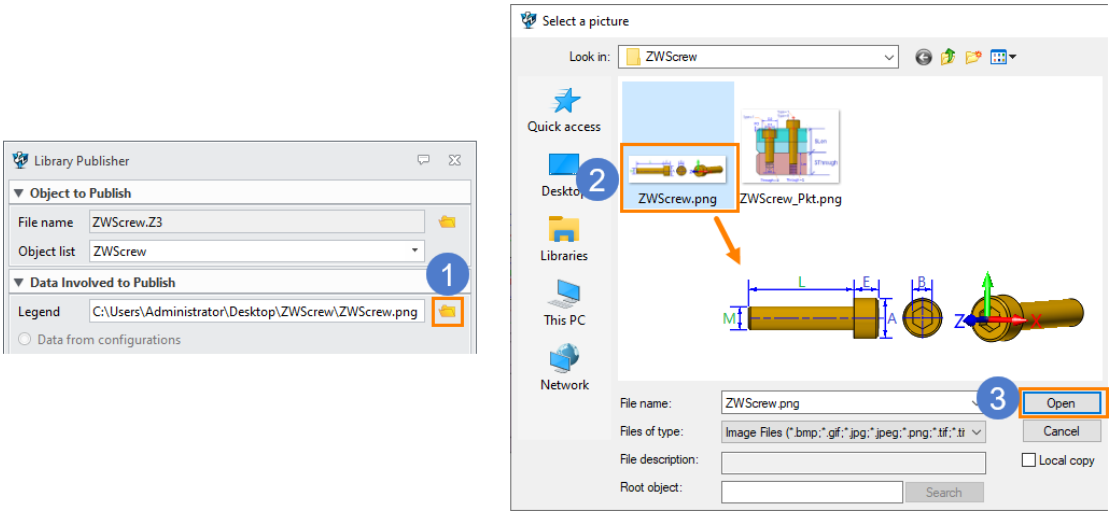


Figure 45 Legend Settings

STEP 02 Click ***Data from excel*** from ***Library Publisher*** and an Excel® file will be created automatically. Then, click ***Manage parameter***, select all the parameters under the ***Expression*** folder, click ***Apply*** and ***OK*** as shown below.

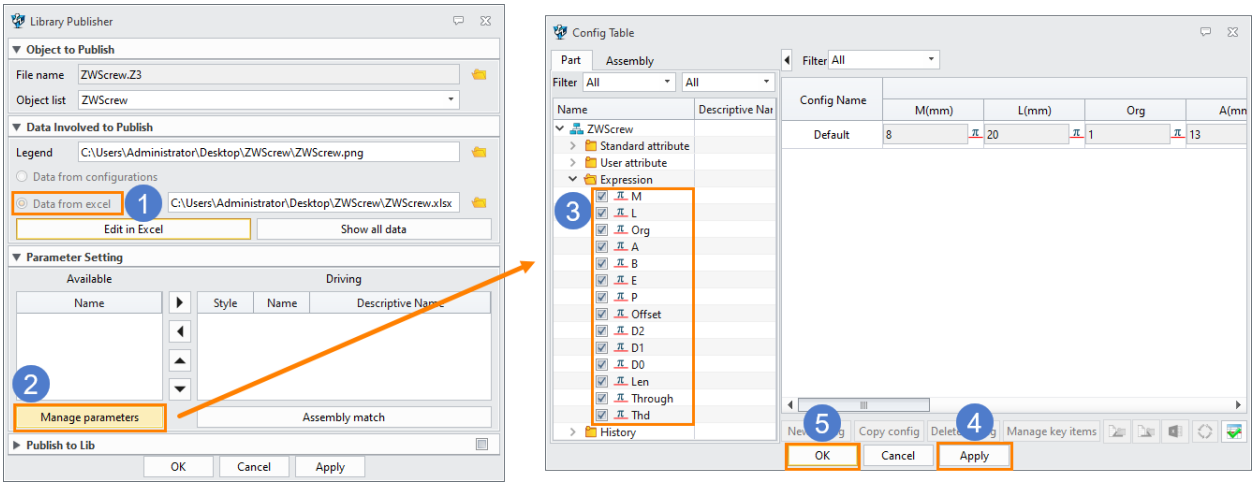


Figure 46 Config Table

STEP 03 Select the all the values except **A**, **B**, **E**, **P** from the **Available** column on the left side and click the right arrow to move them to the **Driving** column on the right side. Set **$Org**, **$M**, **$L**, and **$Thd** as **key parameters** while setting **$offset**, **$D2**, **$D1**, **$D0**, **$Len**, and **$Through** as **custom parameters** from the drop-down menu. After clicking ***OK***, an Excel® file **ZWScrew.xlsx** and a **.z3l** file will be created in the folder where the model is stored.

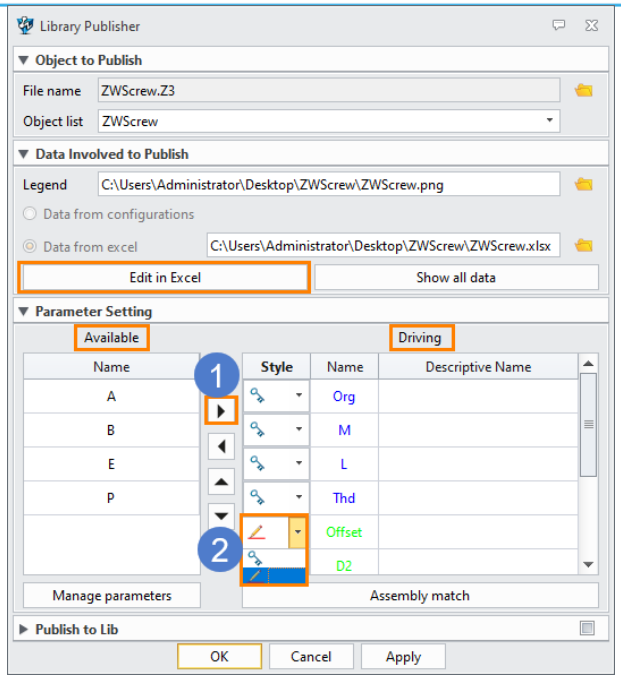


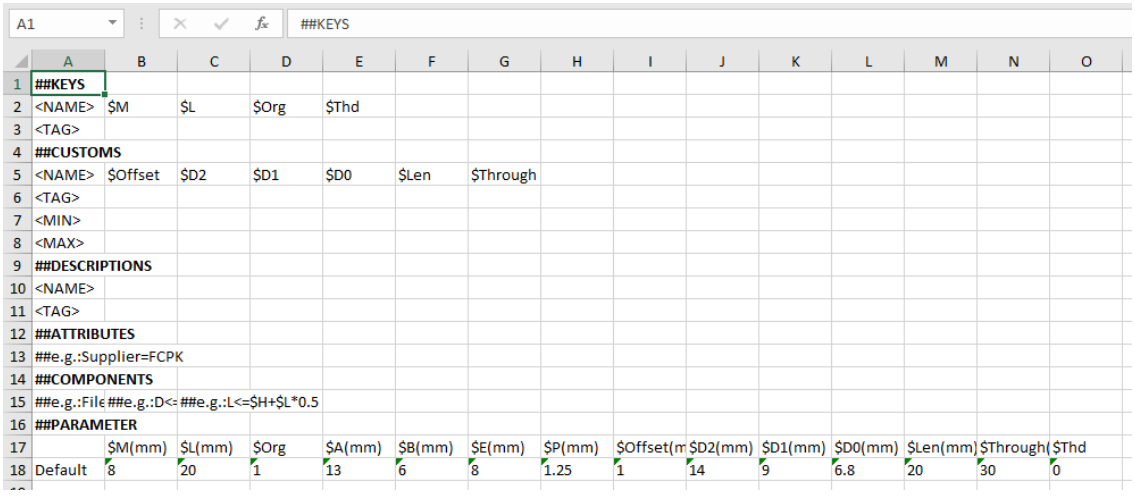
Figure 47 Parameter Settings

Next, input the standard screw parameters.

Method 1: Edit in Excel® from the Library Publisher.

Method 2: Directly open and edit the Excel® file, which is highly recommended.

STEP 04 Open the Excel® file **ZWScrew.xlsx**.



A1 ##KEYS

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	**##KEYS**														
2	<NAME>	$M	$L	$Org	$Thd										
3	<TAG>														
4	**##CUSTOMS**														
5	<NAME>	$Offset	$D2	$D1	$D0	$Len	$Through								
6	<TAG>														
7	<MIN>														
8	<MAX>														
9	**##DESCRIPTIONS**														
10	<NAME>														
11	<TAG>														
12	**##ATTRIBUTES**														
13	##e.g.:Supplier=FCPK														
14	**##COMPONENTS**														
15	##e.g.:File	##e.g.:D<=	##e.g.:L<=$H+$L*0.5												
16	**##PARAMETER**														
17		$M(mm)	$L(mm)	$Org	$A(mm)	$B(mm)	$E(mm)	$P(mm)	$Offset(m	$D2(mm)	$D1(mm)	$D0(mm)	$Len(mm)	$Through(	$Thd
18	Default	8	20	1	13	6	8	1.25	1	14	9	6.8	20	30	0

Figure 48 ZWScrew.xlsx

STEP 05 Input the screw parameters as shown below in **ZWScrew.xlsx**. Since **Len** and **Through** are custom parameters, you can assign any value to them. Input the contents for ZWScrew attributes (**Name=ZWScrew_M[$M%n]x[$L%n], Material=SCM435, Supplier=ZW3D**) and save the file.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	##KEYS														
2	<NAME>	$M	$L	$Org	$Thd										
3	<TAG>														
4	##CUSTOMS														
5	<NAME>	$Offset	$D2	$D1	$D0	$Len	$Through								
6	<TAG>														
7	<MIN>														
8	<MAX>														
9	##DESCRIPTIONS														
10	<NAME>														
11	<TAG>														
12	##ATTRIBUTES														
13	Name=ZWScrew_M[$M%n]x[$L%n]	Material=SCM435	Supplier=ZW3D												
14	##COMPONENTS														
15	##e.g.:FileA.Z3:Part01	##e.g.:D<=$M	##e.g.:L<=$H+$L*0.5												
16	##PARAMETER														
17		$M(mm)	$L(mm)	$Org	$A(mm)	$B(mm)	$E(mm)	$P(mm)	$Offset(mm)	$D2(mm)	$D1(mm)	$D0(mm)	$Len(mm)	$Through(mm)	$Thd
18	Default	3	5;6;8;10;12;14;15;16;18;20;22;25;30;35;40;45;50;55;60;65;	1	5.5	2.5	3	0.5	1	6	3.4	2.5	20	30	0;1
19		4	5;6;8;10;12;14;15;16;18;20;22;25;30;35;40;45;50;55;60;65;70;75;	1	7	3	4	0.7	1	8	4.5	3.3	20	30	0;1
20		5	5;6;8;10;12;14;15;16;18;20;22;25;30;35;40;45;50;55;60;65;70;75;80;85;90;95;100;110;120;130;140;	1	8.5	4	5	0.8	1	10	5.5	4.2	20	30	0;1
21		6	6;8;10;12;14;15;16;18;20;22;25;30;35;40;45;50;55;60;65;70;75;80;85;90;95;100;110;120;130;140;150;	1	10	5	6	1	1	11	6.5	5	20	30	0;1
22		8	10;12;15;16;18;20;22;25;30;35;40;45;50;55;60;65;70;75;80;85;90;95;100;110;120;130;140;150;160;	1	13	6	8	1.25	1	14	9	6.8	20	30	0;1
23		10	10;12;15;20;22;25;30;35;40;45;50;55;60;65;70;75;80;85;90;95;100;110;120;130;140;150;160;170;180;190;200;210;	1	16	8	10	1.5	1	18	11	8.5	20	30	0;1
24		12	15;20;25;30;35;40;45;50;55;60;65;70;75;80;85;90;95;100;110;120;130;140;150;160;170;180;190;200;210;	1	18	10	12	1.75	1	20	13	10.5	20	30	0;1
25		16	20;25;30;35;40;45;50;55;60;65;70;75;80;85;90;95;100;110;120;130;140;150;160;170;180;190;200;210;220;230;240;	1	24	14	16	2	1	26	18	14	20	30	0;1
26		20	40;45;50;55;60;65;70;80;90;95;100;110;120;130;140;150;160;170;180;190;200;210;220;230;240;250;	1	30	17	20	2.5	1	32	22	17.5	20	30	0;1
27		24	50;60;70;80;90;100;120;140;150;	1	36	19	24	3	1	39	26	21	20	30	0;1
28		3	5;6;8;10;12;14;15;16;18;20;22;25;30;35;40;45;50;55;60;65;	0	5.5	2.5	3	0.5	0	6	3.4	2.5	20	30	0;1
29		4	5;6;8;10;12;14;15;16;18;20;22;25;30;35;40;45;50;55;60;65;70;75;	0	7	3	4	0.7	0	8	4.5	3.3	20	30	0;1
30		5	5;6;8;10;12;14;15;16;18;20;22;25;30;35;40;45;50;55;60;65;70;75;80;85;90;95;100;110;120;130;140;	0	8.5	4	5	0.8	0	10	5.5	4.2	20	30	0;1
31		6	6;8;10;12;14;15;16;18;20;22;25;30;35;40;45;50;55;60;65;70;75;80;85;90;95;100;110;120;130;140;150;	0	10	5	6	1	0	11	6.5	5	20	30	0;1
32		8	10;12;15;16;18;20;22;25;30;35;40;45;50;55;60;65;70;75;80;85;90;95;100;110;120;130;140;150;160;	0	13	6	8	1.25	0	14	9	6.8	20	30	0;1
33		10	10;12;15;20;22;25;30;35;40;45;50;55;60;65;70;75;80;85;90;95;100;110;120;130;140;150;160;170;180;190;200;210;	0	16	8	10	1.5	0	18	11	8.5	20	30	0;1
34		12	15;20;25;30;35;40;45;50;55;60;65;70;75;80;85;90;95;100;110;120;130;140;150;160;170;180;190;200;210;	0	18	10	12	1.75	0	20	13	10.5	20	30	0;1
35		16	20;25;30;35;40;45;50;55;60;65;70;75;80;85;90;95;100;110;120;130;140;150;160;170;180;190;200;210;220;230;240;	0	24	14	16	2	0	26	18	14	20	30	0;1
36		20	40;45;50;55;60;65;70;80;90;95;100;110;120;130;140;150;160;170;180;190;200;210;220;230;240;250;	0	30	17	20	2.5	0	32	22	17.5	20	30	0;1
37		24	50;60;70;80;90;100;120;140;150;	0	36	19	24	3	0	39	26	21	20	30	0;1

Figure 49 Inputting Screw Parameters

Note: *Make sure that the names of all the expressions are the same as the expressions in the Z3 model and that the separator is* ***;*** *for the key parameter* ***$L(mm)*** so that ZW3D can recognize and separate it into independent values.

3.2 Match Z3l File

Open **ZWScrew.z3l** with Notepad® and add **#IMAGE=ZWScrew_Pkt.png** (the second picture of ZWScrew) to it so that it will display in ZW3D while you are using it.

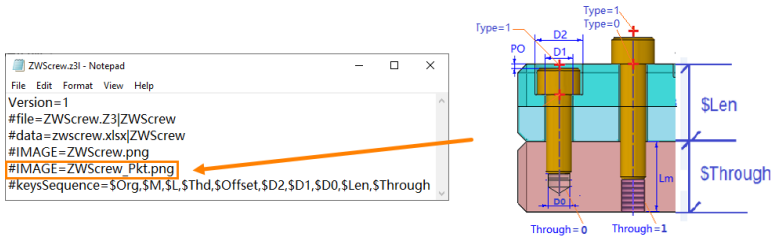


Figure 50 Editing the Z3l File

3.3 Configure Files

Place the whole folder of the standard screw into the standard file folder in the installation directory of ZW3D.

STEP 01 Create a new folder **Screw** in …\Program Files\ZWSOFT\ZW3D 2020\ZWMold\Standard\Metric \ZW3D and then put the whole **ZWScrew** folder under **Screw**.

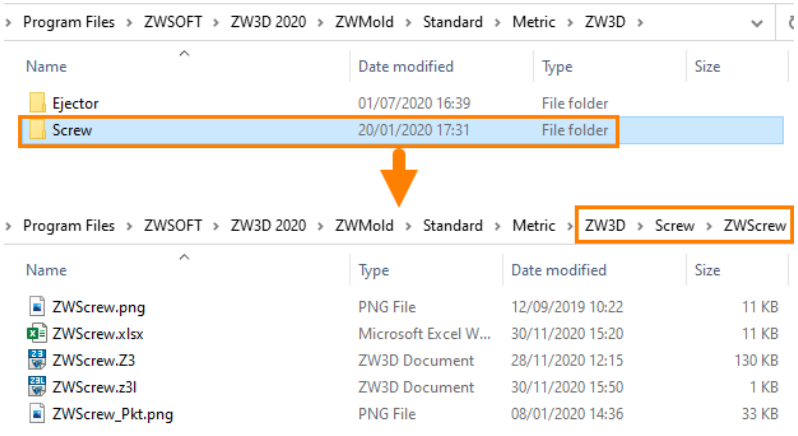
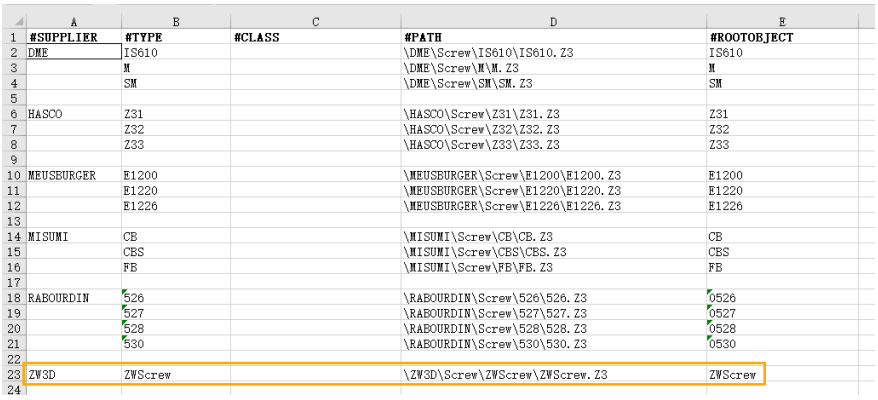


Figure 51 Placing the ZWScrew folder

STEP 02 Modify **Cfg_Screw.xlsx** (a dedicated command for screws) in …\Program Files\ZWSOFT\ZW3D 2020\ZWMold\Standard\Metric as the figure below shows and then save it.



	A	B	C	D	E
1	**#SUPPLIER**	**#TYPE**	**#CLASS**	**#PATH**	**#ROOTOBJECT**
2	DME	IS610		\DME\Screw\IS610\IS610.Z3	IS610
3		M		\DME\Screw\M\M.Z3	M
4		SM		\DME\Screw\SM\SM.Z3	SM
5					
6	HASCO	Z31		\HASCO\Screw\Z31\Z31.Z3	Z31
7		Z32		\HASCO\Screw\Z32\Z32.Z3	Z32
8		Z33		\HASCO\Screw\Z33\Z33.Z3	Z33
9					
10	MEUSBURGER	E1200		\MEUSBURGER\Screw\E1200\E1200.Z3	E1200
11		E1220		\MEUSBURGER\Screw\E1220\E1220.Z3	E1220
12		E1226		\MEUSBURGER\Screw\E1226\E1226.Z3	E1226
13					
14	MISUMI	CB		\MISUMI\Screw\CB\CB.Z3	CB
15		CBS		\MISUMI\Screw\CBS\CBS.Z3	CBS
16		FB		\MISUMI\Screw\FB\FB.Z3	FB
17					
18	RABOURDIN	526		\RABOURDIN\Screw\526\526.Z3	0526
19		527		\RABOURDIN\Screw\527\527.Z3	0527
20		528		\RABOURDIN\Screw\528\528.Z3	0528
21		530		\RABOURDIN\Screw\530\530.Z3	0530
22					
23	ZW3D	ZWScrew		\ZW3D\Screw\ZWScrew\ZWScrew.Z3	ZWScrew
24					

Figure 52 Modifying Cfg_Screw.xlsx

Now, we have finished the standard ZWScrew customization. Next, we will reuse it from the standard part library in ZW3D.

4 Reuse Mold Library

With the standard mold screw already created in the ZW3D mold library, we can easily reuse it from the ***Library*** panel under the ***Mold*** Ribbon Tab.

STEP 01 Click **Screw** in the Mold Library as shown in Figure 53.

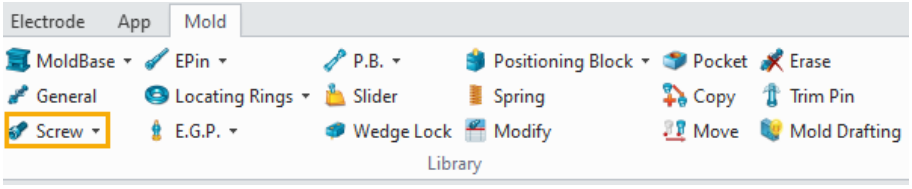


Figure 53 Mold Library

STEP 02 Select **ZW3D** as the Supplier and **ZWScrew** as the Type, then determine the parameters and choose the insertion plate and point as shown in Figure 54.

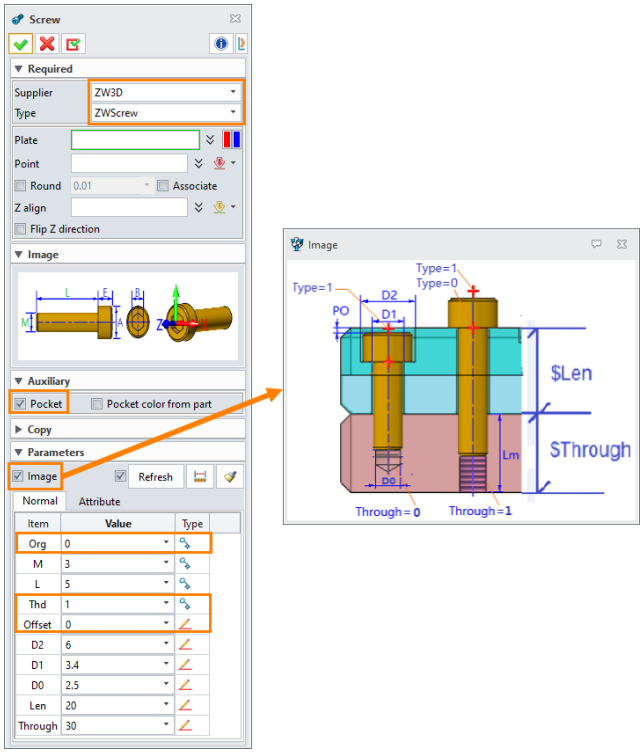


Figure 54 Reuse Mold Library

Below are the examples of 4 different ZWScrew mounting conditions. from left to right they are Countersunk head screw, Flat head screw, Through-hole with flat head screw and Through-hole with countersunk head screw.

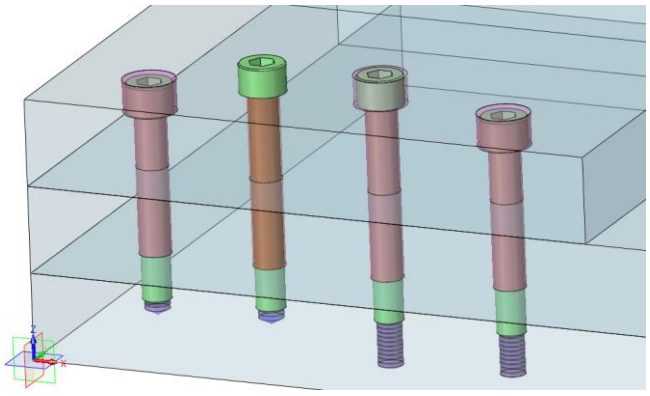


Figure 55 Four ZWScrew Mounting Conditions

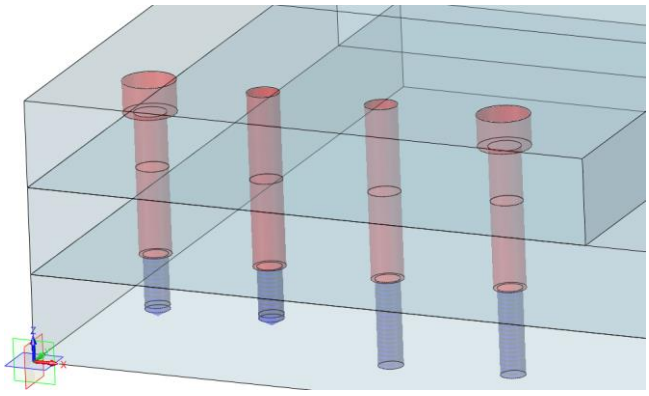


Figure 56 Four Pockets Conditions