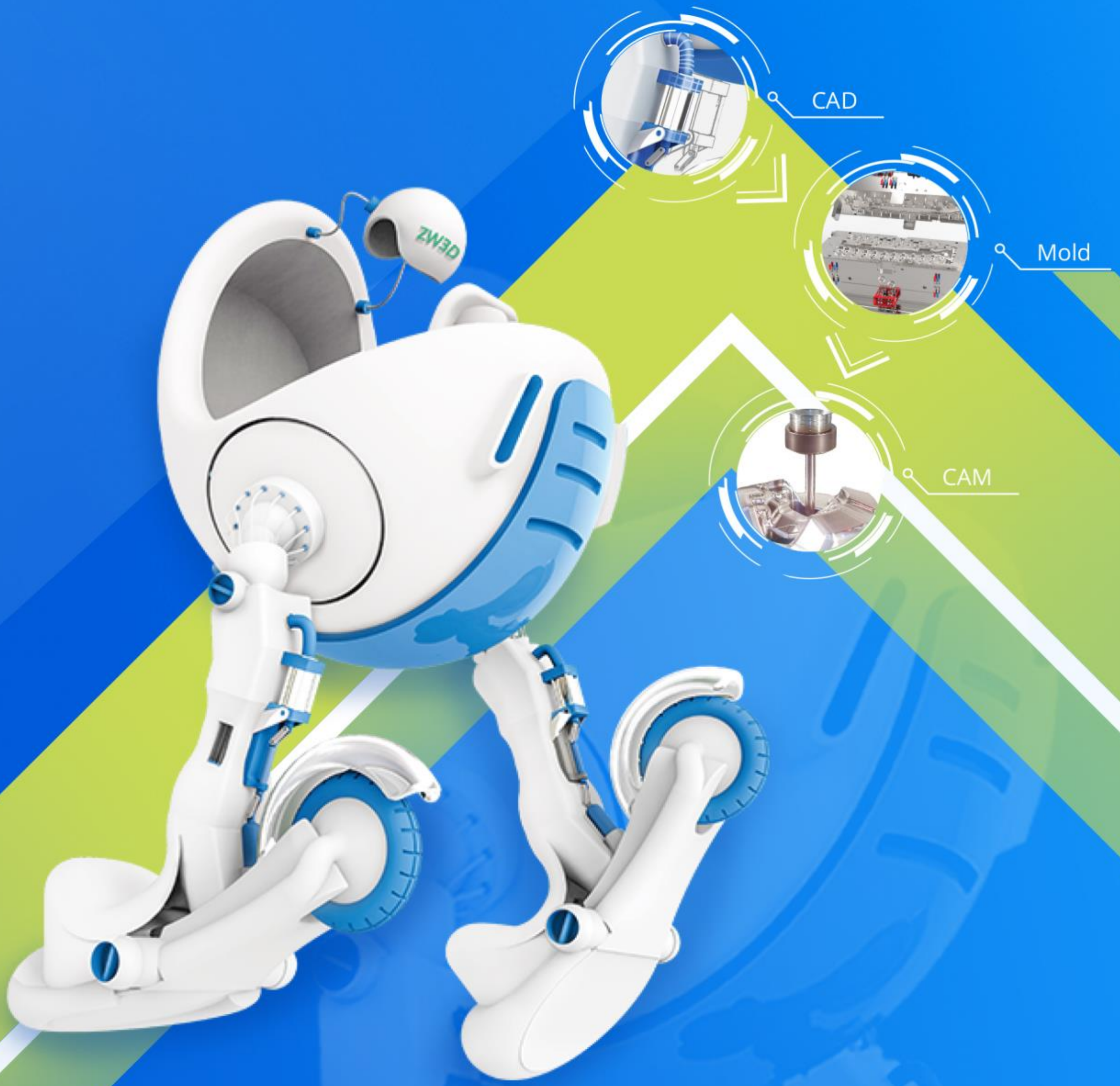
ZW3D Advanced Tutorial

MoldBase Library Customization



ZW3D™ V2023 MoldBase Library Customization

Printed in the P. R. China.

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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 MoldBase Library Customization***, an advanced tutorial.

Thanks for being our user!

The ZW3D Team

Contents

1 Parameters Creation & Model Building

Key Points:

✧Parameters Creation

✧Model Building

Mold Library Rules

The built-in mold library is in the **ZWMold** folder.

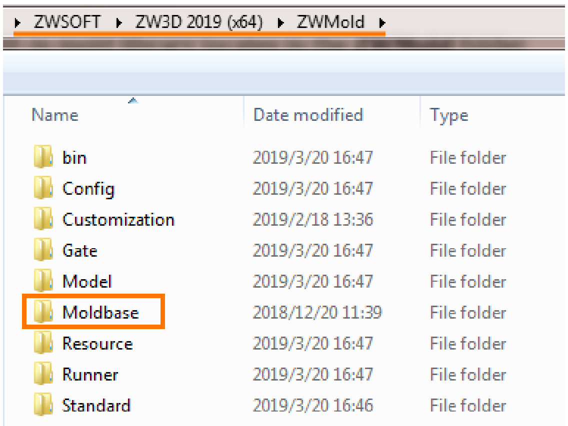


Figure 1 Figure 1 Mold Library Folder

Before we start to customize our mold library, we need to learn some rules of it.

In ZW3D MoldBase dialog, there are ***Supplier***, ***Type*** and ***Class***.

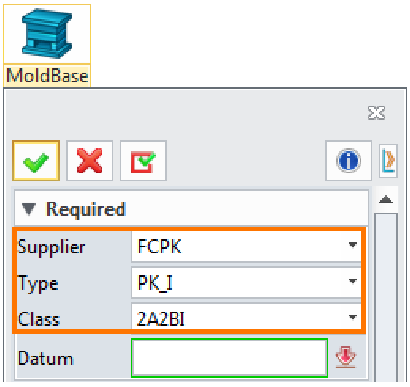


Figure 2 Figure 2 Levels in MoldBase Command

Accordingly, there is a ***Cfg_Moldbase*** excel table to configure the file's context.

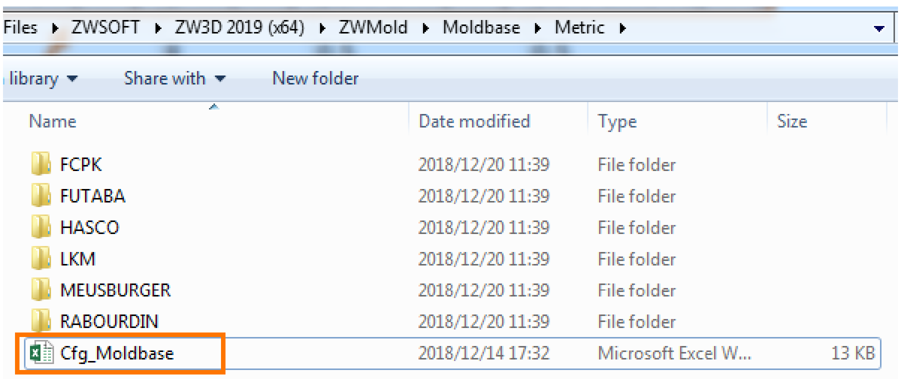
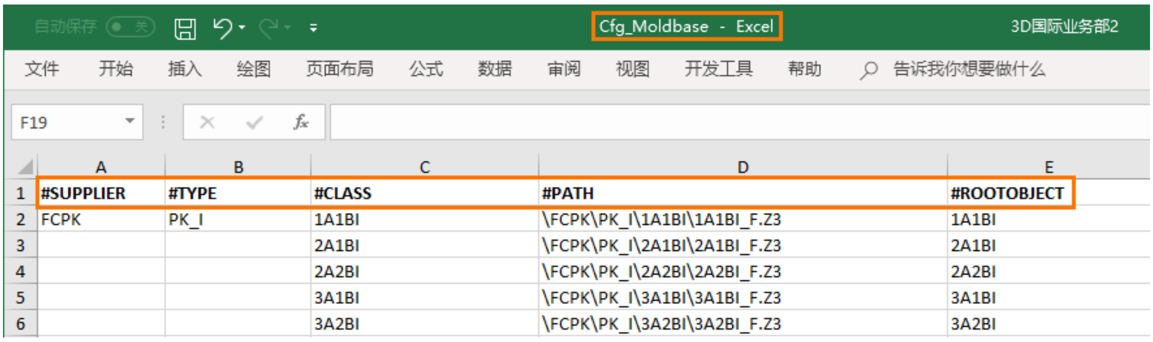


Figure 3 Figure 3 Configuration File

In the ***Cfg_Moldbase*** excel table, there are not only the ***Supplier***, ***Type***, ***Class***, but also the Z3 path and root object.



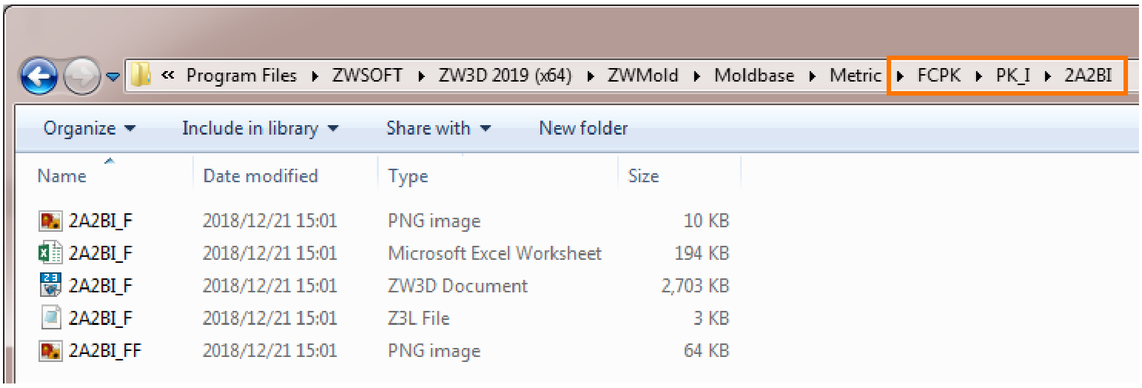
	A	B	C	D	E
1	#SUPPLIER	#TYPE	#CLASS	#PATH	#ROOTOBJECT
2	FCPK	PK_I	1A1BI	\FCPK\PK_I\1A1BI\1A1BI_F.Z3	1A1BI
3			2A1BI	\FCPK\PK_I\2A1BI\2A1BI_F.Z3	2A1BI
4			2A2BI	\FCPK\PK_I\2A2BI\2A2BI_F.Z3	2A2BI
5			3A1BI	\FCPK\PK_I\3A1BI\3A1BI_F.Z3	3A1BI
6			3A2BI	\FCPK\PK_I\3A2BI\3A2BI_F.Z3	3A2BI

Figure 4 Figure 4 Configuration File's Context

The path of the Z3 should be matched with the one in the directory.

Take 2A2BI_F as an example. Its path in the above table is ***\FCPK\PK_I\2A2BI\2A2BI_F.Z3***.

In the directory, it is in below path.



« Program Files ▸ ZWSOFT ▸ ZW3D 2019 (x64) ▸ ZWMold ▸ Moldbase ▸ Metric ▸ FCPK ▸ PK_I ▸ 2A2BI

Name	Date modified	Type	Size
2A2BI_F	2018/12/21 15:01	PNG image	10 KB
2A2BI_F	2018/12/21 15:01	Microsoft Excel Worksheet	194 KB
2A2BI_F	2018/12/21 15:01	ZW3D Document	2,703 KB
2A2BI_F	2018/12/21 15:01	Z3L File	3 KB
2A2BI_FF	2018/12/21 15:01	PNG image	64 KB

Figure 5 Figure 5 Path of the Z3 File

There are five files in the folder. Explanations of them are as below.

1) **2A2BI_F.PNG:** It is an image in the interface of ***Mold Base*** to show some mold info.

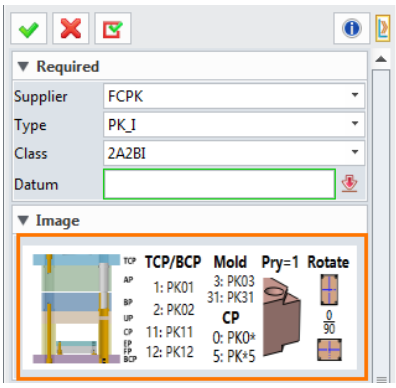


Figure 6 General-View Image

2) **2A2BI_F.xls:** It is an excel table to store parameter groups of the mold base assembly and components.

	A	B	C	D	E	F
47	##PARAMETER					
48	*ZMD_Internal_No	$PRYOON(mm)	$CHAMFER(mm)	$ROTATE(deg)	$DATUM(mm)	$PRY(mm)
49	095x095	0;1	0;1;2;3	0;90	4	8
50	095x095	0;1	0;1;2;3	0;90	4	8
51	100x130	0;1	0;1;2;3	0;90	5	10
52	100x130	0;1	0;1;2;3	0;90	5	10
53	156x156	0;1	0;1;2;3	0;90	6	12
54	156x156	0;1	0;1;2;3	0;90	6	12
55	156x156	0;1	0;1;2;3	0;90	6	12
56	156x156	0;1	0;1;2;3	0;90	6	12
57	156x196	0;1	0;1;2;3	0;90	6	12
58	156x196	0;1	0;1;2;3	0;90	6	12

Figure 7 Parameters in Excel Table

These parameters will be shown in the MoldBase command interface.

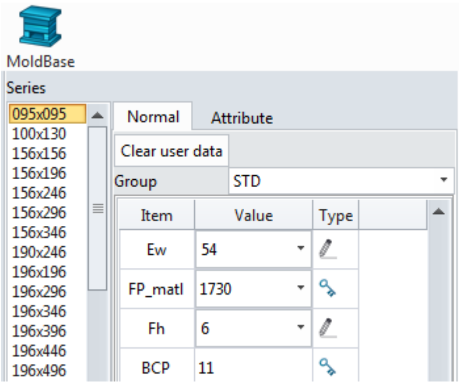
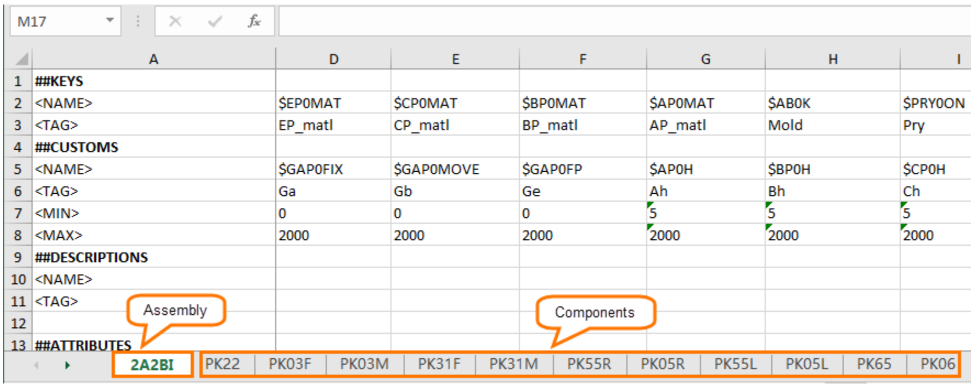


Figure 8 Parameters in MoldBase Command

In the **2A2BI_F.xls** table, there are many tabs. The first tab stores the assembly parameters, the following tabs store components parameters.



	A	D	E	F	G	H	I
1	##KEYS						
2	<NAME>	$EPOMAT	$CPOMAT	$BPOMAT	$APOMAT	$ABOK	$PRYOON
3	<TAG>	EP_matl	CP_matl	BP_matl	AP_matl	Mold	Pry
4	##CUSTOMS						
5	<NAME>	$GAPOFIX	$GAPOMOVE	$GAPOFP	$APOH	$BPOH	$CPOH
6	<TAG>	Ga	Gb	Ge	Ah	Bh	Ch
7	<MIN>	0	0	0	5	5	5
8	<MAX>	2000	2000	2000	2000	2000	2000
9	##DESCRIPTIONS						
10	<NAME>						
11	<TAG>						
12							
13	##ATTRIBUTES						

Figure 9 Tabs in Excel Table

In the **2A2BI** tab, main items are shown as below.

	A	B	C	D	E	F	G	H
1	##KEYS							
2	<NAME>	$BCP0MAT	$FP0MAT	$EP0MAT	$CP0MAT	$BP0MAT	$AP0MAT	$AB0K
3	<TAG>	BCP_matl	FP_matl	EP_matl	CP_matl	BP_matl	AP_matl	Mold
4	##CUSTOMS							
5	<NAME>	$L	$W	$GAP0FIX	$GAP0MOVE	$GAP0FP	$AP0H	$BP0H
6	<TAG>	L	W	Ga	Gb	Ge	Ah	Bh
7	<MIN>	50	50	0	0	0	5	5
8	<MAX>	2000	2000	2000	2000	2000	2000	2000
9	##DESCRIPTIONS							
10	<NAME>							
11	<TAG>							
12								
13	##ATTRIBUTES							
14	Name=2A2BI[*ZMI	Material=<NONE>	Supplier=FCPK					
15								
16	##COMPONENTS							
17	2A2BI_F.Z3:SMm	$d<=$SCBC0M	$l<=$BCP0H+$CP0H+$SCBC0M*0.5					
42								
43	##PARAMETER							
44	*ZMD_Internal_No	$PRY0ON(mm)	$CHAMFER(mm)	$ROTATE(deg)	$DATUM(mm)	$PRY(mm)	$GAP0FIX(mm)	$GAP0MOVE(mm)
45	095x095	0;1	0;1;2;3	0;90	4	8	0.5	0.5
46	095x095	0;1	0;1;2;3	0;90	4	8	0.5	0.5

Figure 10 Main Items

Explanations of them are as below.

a. **##KEYS**: The key parameters of the mold assembly.

	A	B	C	D	E
1	##KEYS				
2	<NAME>	$BCP0MAT	$FP0MAT	$EP0MAT	$CP0MAT
3	<TAG>	BCP_matl	FP_matl	EP_matl	CP_matl

Figure 11 Key Parameters

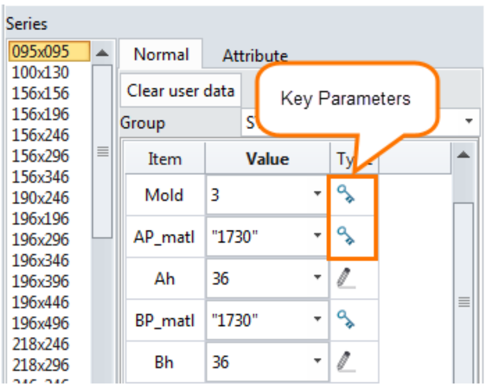


Figure 12 Figure 6 Key Parameters in MoldBase Command

<NAME> The name should be the same as the one in ***##PARAMETER***.

E.g. The ***$BCP0MAT*** is from ***##PARAMETER***.

	A	B	C	J	K	L
1	##KEYS					
2	<NAME>	$BCP0MAT	$FP0MAT	$CHAMFER	$ROTATE	$EF0K
3	<TAG>	BCP_matl	FP_matl	Chamfer	Rotate	CP
43	##PARAMETER					
44	*ZMD_Internal_No	$PRY0ON(mm)	$CHAMFER(mm)	$BCP0MAT	$BCP0H(mm)	$AB0K
45	095x095	0;1	0;1;2;3	1730;2312;2085	12;17	3

Figure 13 Key Parameters from "Parameters"

<TAG> ***TAG Name*** in the ***MoldBase*** Command.

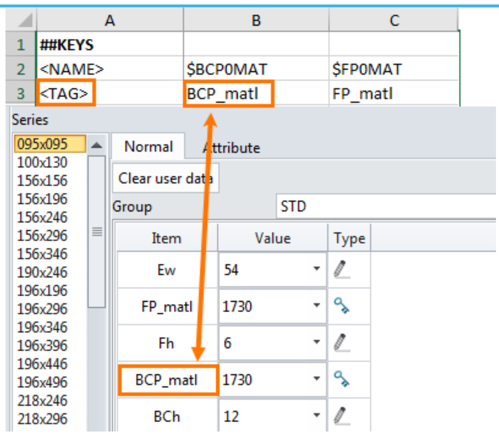


Figure 14 Tab Name in MoldBase Command

b. **##CUSTOMS:** The parameters of the mold assembly that allow users to customize.

4	##CUSTOMS				
5	<NAME>	$L	$W	$GAP0FIX	$GAP0MOVE
6	<TAG>	L	W	Ga	Gb
7	<MIN>	50	50	0	0
8	<MAX>	2000	2000	2000	2000

Figure 15 Customized Parameters

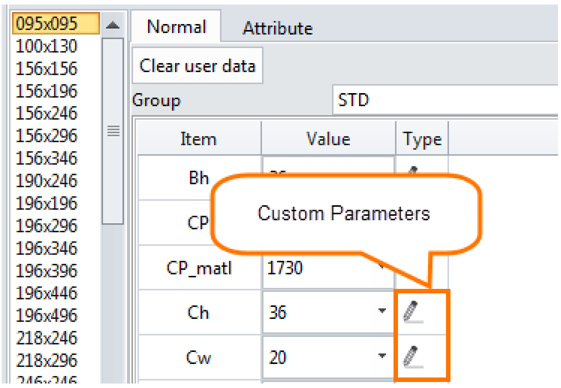


Figure 16 Customized Parameters in MoldBase Command

<NAME> The name should be the same with the one in ***##PARAMETER***.

E.g. The ***$L*** is from ***##PARAMETER***.

	A	B	C	Q	R	S
1	##KEYS					
2	<NAME>	$BCP0MAT	$FP0MAT			
3	<TAG>	BCP_matl	FP_matl			
4	##CUSTOMS					
5	<NAME>	$L	$W	$GP0Y	$SCEP0M	$SCEP0X
6	<TAG>	L	W	GPy	Me	Xe
7	<MIN>	50	50	10	4	10
8	<MAX>	2000	2000	2000	20	2000
43	##PARAMETER					
44	*ZMD_Internal_No	$PRY0ON(mm)	$CHAMFER(mm)	$W(mm)	$L(mm)	$RP0MAT
45	095x095	0;1	0;1;2;3	95	95	1730;2312;2085

Figure 17 Customized Parameters from “Parameters”

<TAG> ***TAG Name*** in the ***MoldBase*** command.

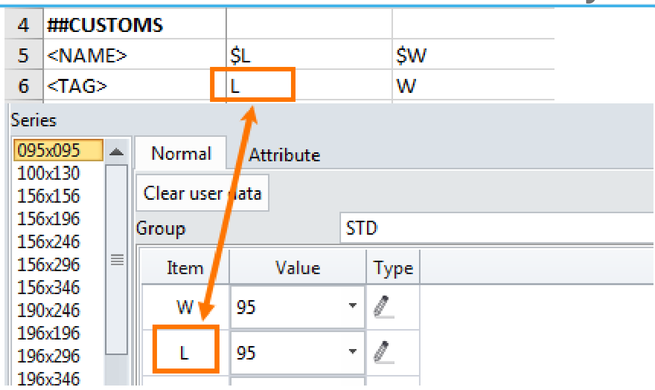


Figure 18 Tag Name in MoldBase Command

<MIN> The minimum value of the parameter you can input.

<MAX> The maximum value of the parameter you can input.

4	##CUSTOMS		
5	<NAME>	$L	$W
6	<TAG>	L	W
7	<MIN>	50	50
8	<MAX>	2000	2000

Figure 19 MIN and MAX Value

c. **##DESCRIPTIONS:** Descriptions for the mold assembly or components.

It is reserved for future use and has no meaning now.

d. **##ATTRIBUTES**: Name, Number, Material, etc. are included in Attributes. They will be shown in the ***Attribute*** tab in ***MoldBase*** command.

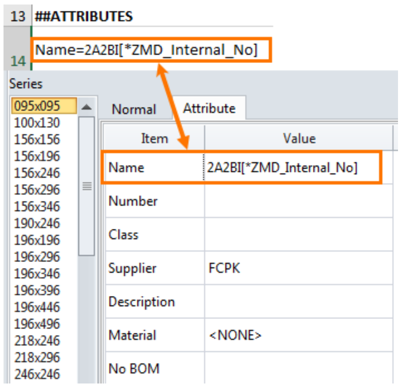


Figure 20 Attributes in MoldBase Command

e. **##COMPONENTS**: Link to the components and define the parameters relationship of ***component & assembly*** or ***component & component***.

Here are rules for ***##COMPONENTS***.

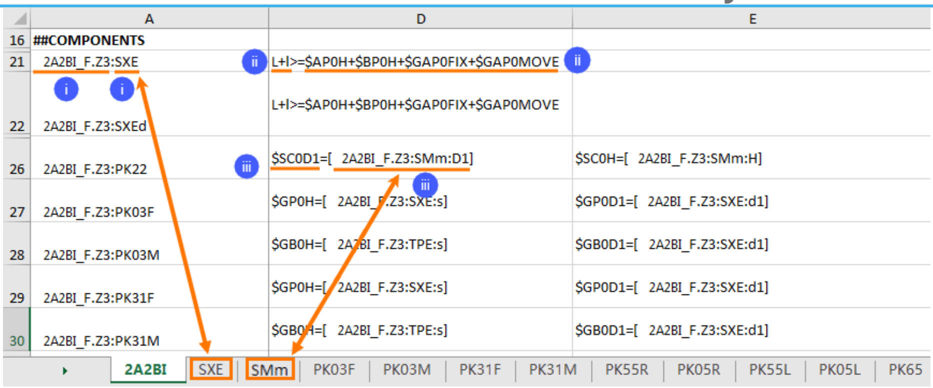


Figure 21 Component Item

i. 2A2BI_F.Z3:SXE

The “**SXE**” component in file 2A2BI_F.Z3.

ii. L+l>=$SAP0H+$BP0H+$GAP0FIX+$GAP0MOVE

L and ***l*** are parameters from the component ***SXE***.

	A	B	C	D	E
16	##PARAMETER				
17		$d1(mm)	$d(mm)	$L(mm)	$l(mm)
18		14	10	25;45;65	12
19		14	10	20;30;50;70	17
20		14	10	25;35;55;75;95	22
21		14	10	20;30;50;70;90	27
22		14	10	25;45;65;85	36
23		14	10	30;45;70	46
24		14	10	35;60	56
25		20	15	35;55;75;95	17
26		20	15	30;50;70;90;110;125;150	22

2A2BI | SXE | PK22 | PK03F | PK03M | PK31F | PK31M | PK55R | PK05R | PK55

Figure 22 Parameters in Components

$AP0H, ***$BP0H***, ***$GAP0FIX*** and ***$GAP0MOVE*** are parameters from the current tab ***2A2BI***.

43	##PARAMETER				
44	*ZMD_Internal_No	$AP0H(mm)	$BP0H(mm)	$GAP0FIX(mm)	$GAP0MOVE(mm)
45	095x095	36;9;12;17;22;27;46;56	36;9;12;17;22;27;46;56	0.5	0.5
46	095x095	36;9;12;17;22;27;46;56	36;9;12;17;22;27;46;56	0.5	0.5
47	100x130	36;9;12;17;22;27;46;56	36;9;12;17;22;27;46;56	0.5	0.5
48	100x130	36;9;12;17;22;27;46;56	36;9;12;17;22;27;46;56	0.5	0.5
49	156x156	17;22;27;36;46;56;66;76;86;96	17;22;27;36;46;56;66;76;86;96	0.5	0.5
50	156x156	17;22;27;36;46;56;66;76;86	17;22;27;36;46;56;66;76;86	0.5	0.5

2A2BI | SXE | PK22 | PK03F | PK03M | PK31F | PK31M | PK55R | PK05R | PK55L

Figure 23 Parameters in Assembly

So the whole line means, for the ***SXE*** component in file 2A2BI_F.Z3, once we input the values of ***$AP0H***, ***$BP0H***, ***$GAP0FIX*** and ***$GAP0MOVE***, it will recommend a value from the list of the ***$L*** and ***$l*** in ***SXE*** tab to make the inequation true.

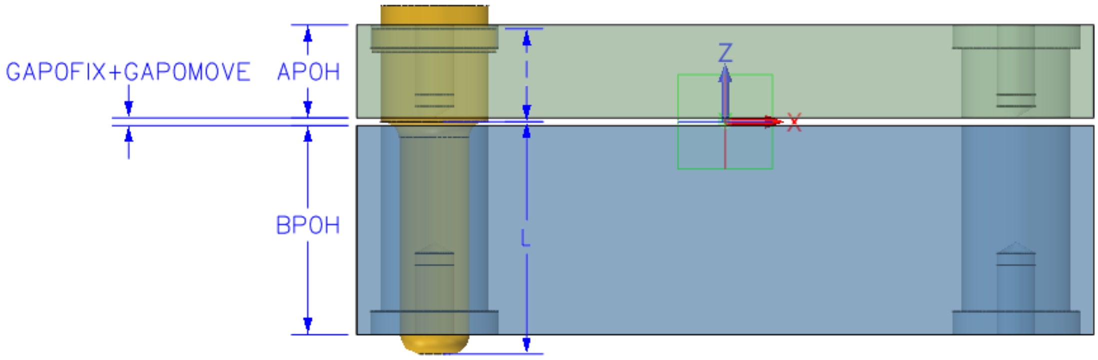


Figure 24 Parameter Relationship in Mold Base

iii. $SCOD1=[2A2BI_F.Z3:SMe:D1]

$SCOD1 is a parameter from the ***2A2BI***.

2A2BI_F.Z3:SMe:D1 is the ***D1*** parameter from the component ***SMe*** in ***2A2BI_F.Z3*** file.

$P(mm)	$L1(mm)	$D0(mm)	$D1(mm)	$D2(mm)	$H(mm)
0.7	1	3.3	4.5	8	5
0.8	1.25	4.2	5.5	10	6
1	1.5	5	6.5	11	7
1.25	2	6.8	9	14	9
1.5	2.5	8.5	11	18	11
1.75	3	10.5	13	20	13
2	3.5	12	15	23	15
2	4	14	18	26	17
2.5	5	17.5	22	32	21

TPE | TUE | SMf | SMm | SMe | WK | PO | PK01 | PK11F

Figure 25 D1 of "SMe"

So the whole line means, the ***$SCOD1*** of ***2A2BI*** should keep the same as the ***$D1*** from ***SMe***.

D1 is the diamter of the nominal diameter of the screw ***SMe***.

SCOD1 is the pocket diameter of the screw ***SMe*** on the plate ***PK06***.

In this way, it ensures that the pocket size is always suitable for the screw.

f. **##PARAMETER:** All parameters in the assembly. Values of all parameters should be listed here.

##PARAMETER					
*ZMD_Internal_No	$ROTATE(deg)	$DATUM(mm)	$PRY(mm)	$GAPOFIX(mm)	$GAPOMOVE(mm)
095x095	0;90	4	8	0.5	0.5
095x095	0;90	4	8	0.5	0.5
100x130	0;90	5	10	0.5	0.5
100x130	0;90	5	10	0.5	0.5
156x156	0;90	6	12	0.5	0.5
156x156	0;90	6	12	0.5	0.5
156x196	0;90	6	12	0.5	0.5
156x196	0;90	6	12	0.5	0.5

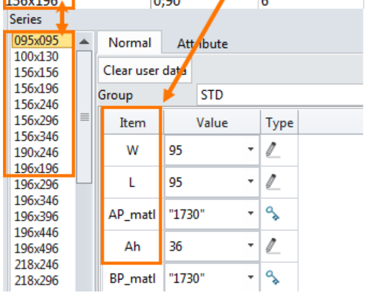


Figure 26 Parameters in Assembly

***ZMD_Internal_No** is a customized attribute to show the general mold series number of the supplier FCPK.

In some field, there are some values. They are separated by "*;*".

37	**##PARAMETER**				
38	*ZMD_Internal_No	$PRYOON(mm)	$CHAMFER(mm)	$TCP0MAT	$TCP0H(mm)
39	Default	0;1	0;1;2;3	1730;2312;2085	22
40	095x095	0;1	0;1;2;3	1730;2312;2085	22
41	100x130	0;1	0;1;2;3	1730;2312;2085	22
42	100x130	0;1	0;1;2;3	1730;2312;2085	22
43	156x156	0;1	0;1;2;3	1730;2312;2085	17;22;27
44	156x156	0;1	0;1;2;3	1730;2312;2085	17;22;27
45	156x156	0;1	0;1;2;3	1730;2312;2085	22;27

Figure 27 Separators on the Table

In the ***MoldBase*** command, they are available for picking.

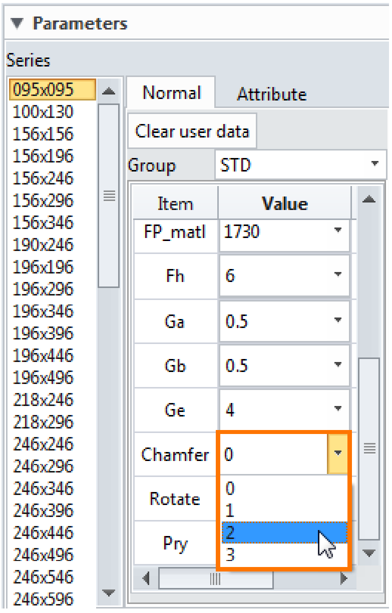


Figure 28 Available Items for Selection

In some field, there are some values. They are ***0;1***.

##PARAMETER				
*ZMD_Internal_No	$PRYOON(mm)	$CHAMFER(mm)	$ROTATE(deg)	$DATUM(mm)
095x095	0;1	0;1;2;3	0;90	4
095x095	0;1	0;1;2;3	0;90	4
100x130	0;1	0;1;2;3	0;90	5
100x130	0;1	0;1;2;3	0;90	5
156x156	0;1	0;1;2;3	0;90	6
156x156	0;1	0;1;2;3	0;90	6
156x156	0;1	0;1;2;3	0;90	6
156x156	0;1	0;1;2;3	0;90	6
156x196	0;1	0;1;2;3	0;90	6
156x196	0;1	0;1;2;3	0;90	6

Figure 29 "0; 1" on the Table

Normally they are used as the conditional suppress. If the value equals to 0, the condition is false; if it equals to 1, the condition is true.

Parameters in component tabs are similar with those in the ***2A2BI*** assembly tab.

3) 2A2BI_F.Z3: The mold assembly file.

Manager

Filter: All | Preview: Off
Find: in Name

Name	Type	Modified	Last Modified
2A2BI	Assembly		2019/2/26 15:44
Fixed_Half	Assembly		2019/2/26 15:43
Moving_Half	Assembly		2019/2/26 15:42
PK01	Part		2018/11/26 19:38
PK03F	Part		2018/11/26 19:39
PK03M	Part		2018/11/26 20:43
PK04	Part		2018/11/26 20:43
PK05L	Part		2018/11/26 20:43
PK05R	Part		2018/11/26 20:43
PK06	Part		2018/11/30 20:10
PK07	Part		2018/11/30 20:09
PK11M	Part		2018/11/26 19:44
PO	Part		2018/11/22 15:16
SLE	Part		2018/11/22 15:16
SLEd	Part		2018/11/22 18:08
SMe	Part		2018/12/11 21:25
SMf	Part		2018/12/11 21:45
SMm	Part		2018/12/11 21:25
STP	Assembly		2019/2/26 16:41
TPE	Part		2018/11/26 20:43
TPEd	Part		2018/11/26 20:43
TUE	Part		2018/12/11 21:26
WK	Part		2018/12/11 21:26

Figure 30 Objects in Z3 File

The parameters in assembly ***2A2BI.Z3*** are matched with those in the Excel ***2A2BI_F.xls***.

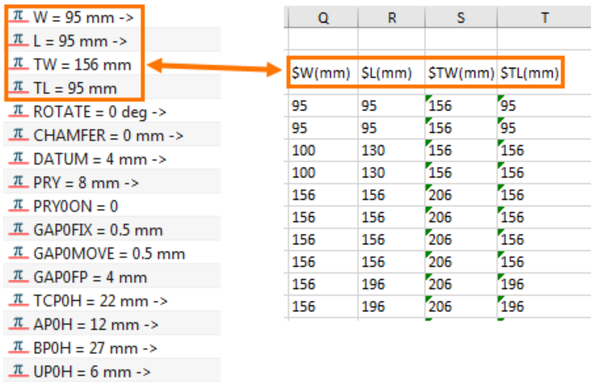


Figure 31 Names of Parameters in Z3 and Excel File

4) 2A2BI_F.z3l: Specify the path of the mold assembly and components.

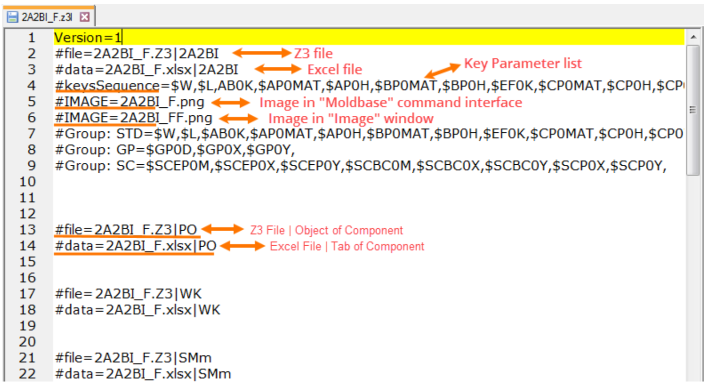


Figure 32 Context of z3l File

i. **#file=2A2BI_F.Z3|2A2BH:** Specify z3 file and object.

ii. **#data=2A2BI_F.xlsx|2A2BH:** Specify excel data and tab name.

iii. **#keysSequence:** Specify key parameters.

iv. **#IMAGE=2A2BI_F.png:** Specify image in ***MoldBase*** command interface.

v. **#IMAGE=2A2BI_FF.png:** Specify image in ***Image*** window.

vi. **#Group:** Specify parameters groups, which will be shown in the MoldBase command.

```
#Group: STD=$W,$L,$TCOK,$TCPOMAT,$TCPOH,$ABOK,$APOMAT,$APOH,$BPOMAT,$BPOH,
$EFOK,$CPOMAT,$CPOH,$CPOW,$EPOMAT,$EPOH,$EPOW,$FPOMAT,$FPOH,$UPOMAT,$UPOH,
$BCOK,$BCPOMAT,$BCPOH,$GAPOFIX,$GAPOMOVE,$GAPOFP,$CHAMFER,$ROTATE,$PRYOON,
#Group: GP=$GPOD,$GPOX,$GPOY,
#Group: SC=$SCEPOM,$SCEPOX,$SCEPOY,$SCBCOM,$SCBCOX,$SCBCOY,$SCPOX,$SCPOY,
```

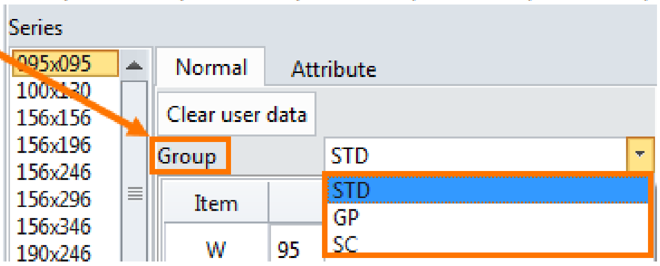


Figure 33 Groups

Group ***STD*** includes W, L ABOK, etc.

Group ***GP*** includes GP0D, GP0X and GP0Y.

Group ***SC*** includes SCEP0M, SCEP0X, SCEP0Y, etc.

vii. **#file=2A2BI_F.Z3|PO**: Specify component file and object.

viii. **#data=2A2BI_F.xlsx|PO**: Specify componet excel data and tab.

5) 2A2BI_FF.png: Image in *Image* window.

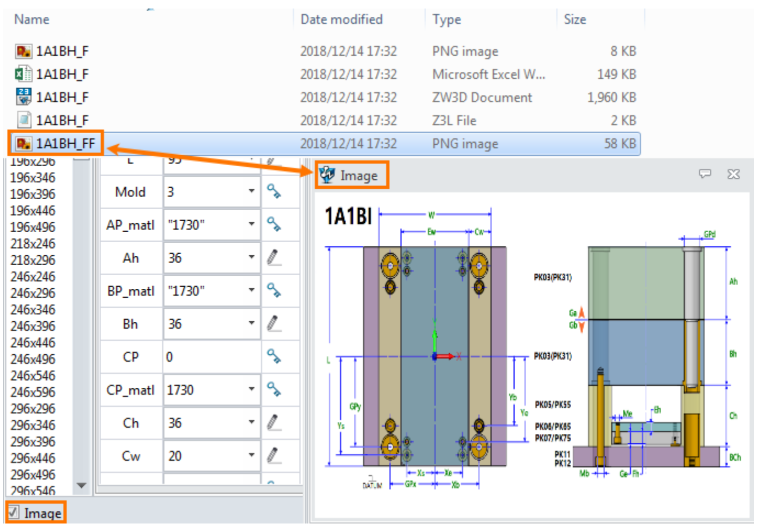


Figure 34 Detail Image

Now that you are clear about the rules, you can start to customize your own mold base library.

Modeling Creation

Parameters Creation

STEP 01 Create assembly structure.

Users need to know every detail about their own mold series from mold structure to data. Take **FCPK 2A2BI** type as an example.

Figure 1 is a general view. The mold assembly consists of fixed half and moving half. Some components belong to the fixed half, and others belong to the moving half.

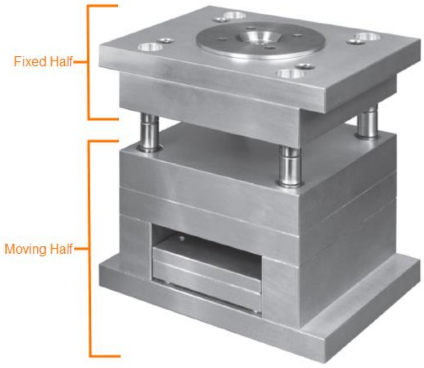


Figure 35 Fixed Half and Moving Half

The general view of the mold base in ZW3D would be like what is shown in figure 36.

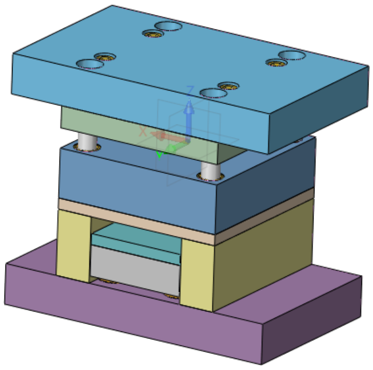


Figure 36 Mold Base in ZW3D

Totally it includes 13 types of components.

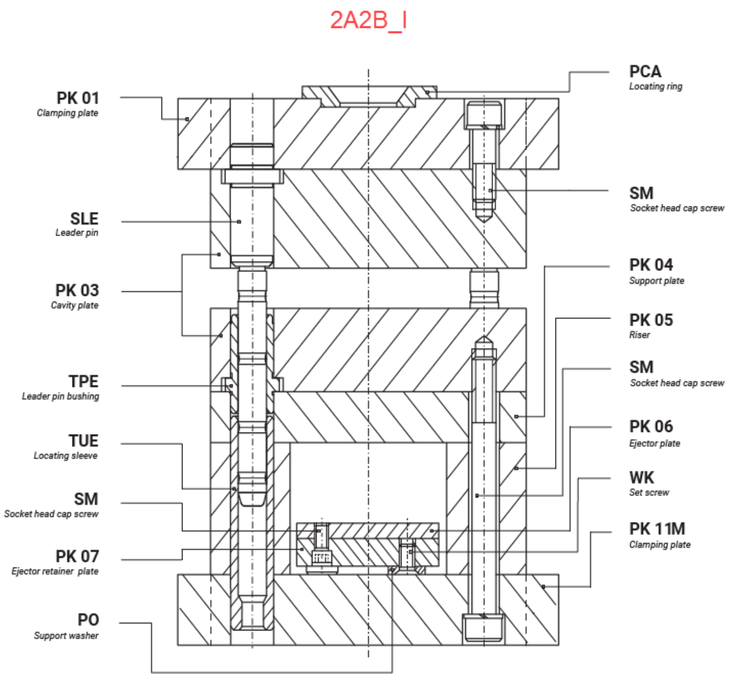


Figure 37 Components of the Mold Base

The information of components is as below.

PK01 (Top clamping plate)	The plate to fix the fixed half on the bench.
SLE (Leader pin)	Match with **TPE** (Leader pin bushing) to guide the relative movement between fixed and moved halves. There are 4 **SLE**, one is different from other three. We name the special one as **SLEd**.
PK03 (Cavity plate)	Include a plate for cavity (**PK03F**) and the other plate (**PK03M**) for core.
TPE (Leader pin bushing)	Match with **SLE** (Leader pin) to guide the relative movement between fixed and moved halves. There are 4 **TPE**, one is different from other three. We name the special one as **TPEd**.
TUE (Locating sleeve)	Locate the long **SLE** (Leader pin).
SM (Socket head cap screw)	Link and fasten components tightly. The SM in the fixed half is named as **SMf**, the ones in the moving half are named as **SMm**, and the ones on the ejector plate are named as **SMe**.
PK07 (Ejector plate)	Pass the force of machine to the ejector pin, so that it can eject the products.
PO (Support washer)	Support the ejector plate to keep it away from **PK11M** (Bottom clamping plate).
PCA (Locating ring)	Match the sprue bush with the nozzle of injection machine.
PK04 (Support plate)	The plate under parting pressure to avoid needless movement of molding parts.
PK05 (Riser)	Adjust clamping height to ensure there is enough space for ejection. There are two Risers, **PK05L** and **PK05R**.
PK06 (Ejector retainer plate)	The plate to fix the ejector pins and return pins.
WK (Set Screw)	Link and fasten **PO** (Support washer).
PK11M (Bottom clamping plate)	The plate to fix the moved half on the moving table.

***Notes**:*

*Normally the PCA is not considered in the mold base assembly, so in this tutorial, we will ignore the **PCA**.*

The **WK** is always assembly matched with **PO**.

After clearing up the above information, a structure tree comes out.

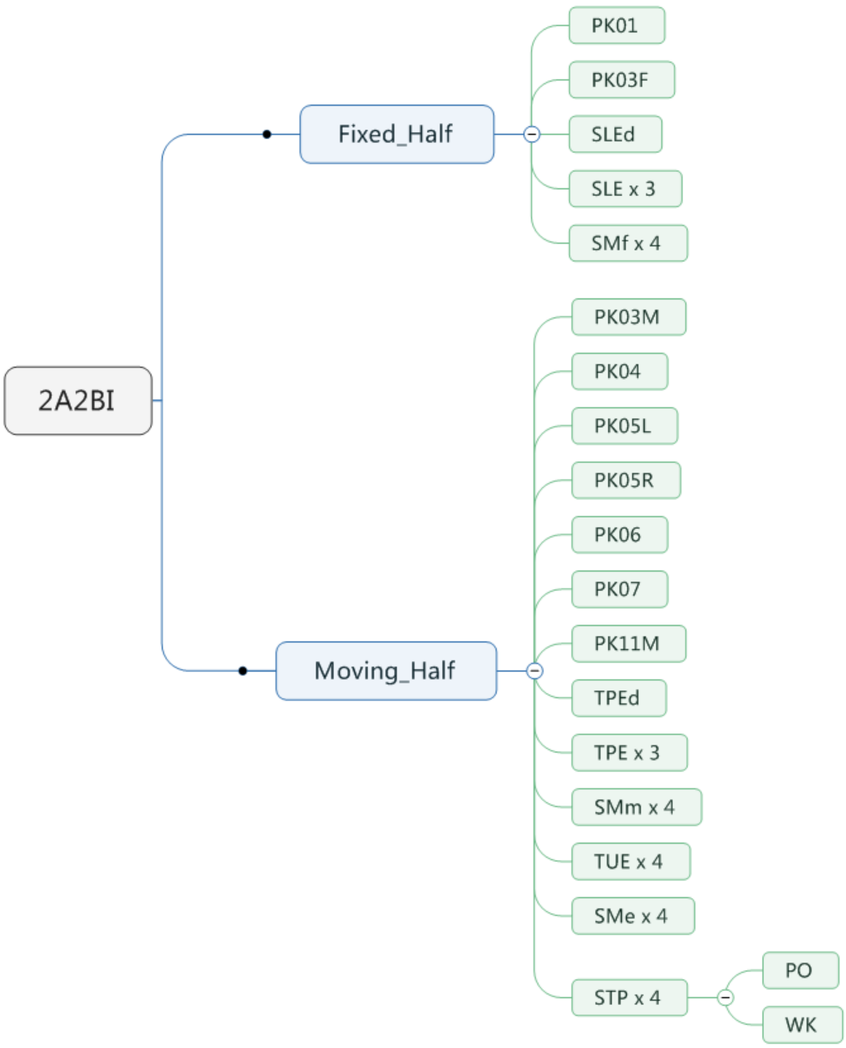


Figure 38 Mold Assembly Structure

Accordingly, you can create an assembly in ZW3D as below.

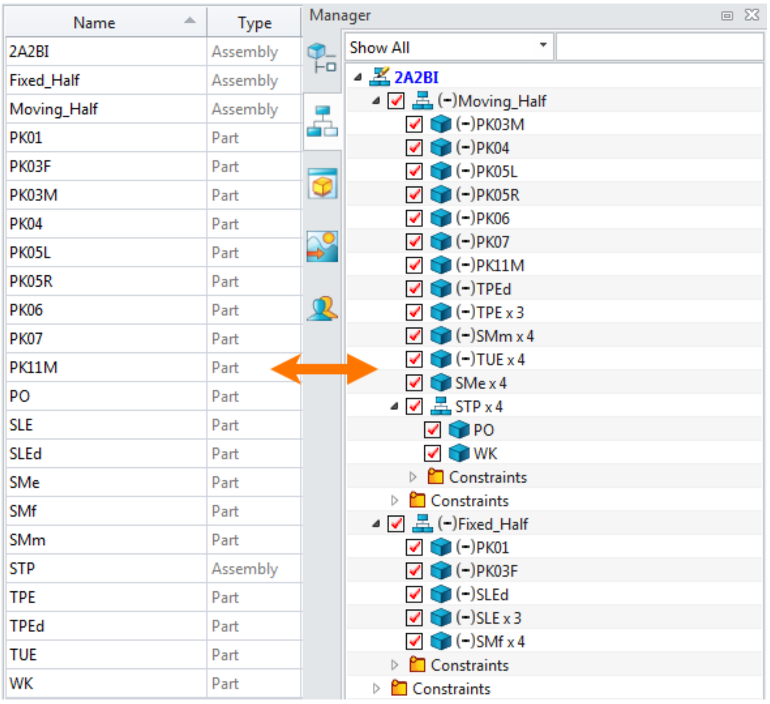


Figure 39 Mold Structure in ZW3D

Save it in the below folder.

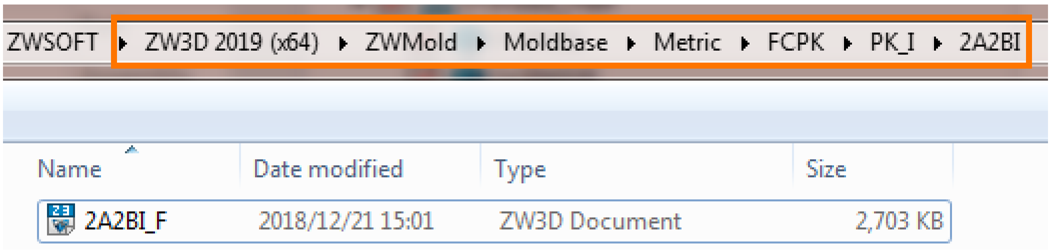


Figure 40 Path of the Z3 File

After building up the structure of the assembly, you can start to add variables for the parameters of components.

STEP 02 Create variables for the main assembly.

Consult the manual of mold base for main parameters of all components.

Take the main W and L as an example. Values of all series are as below.

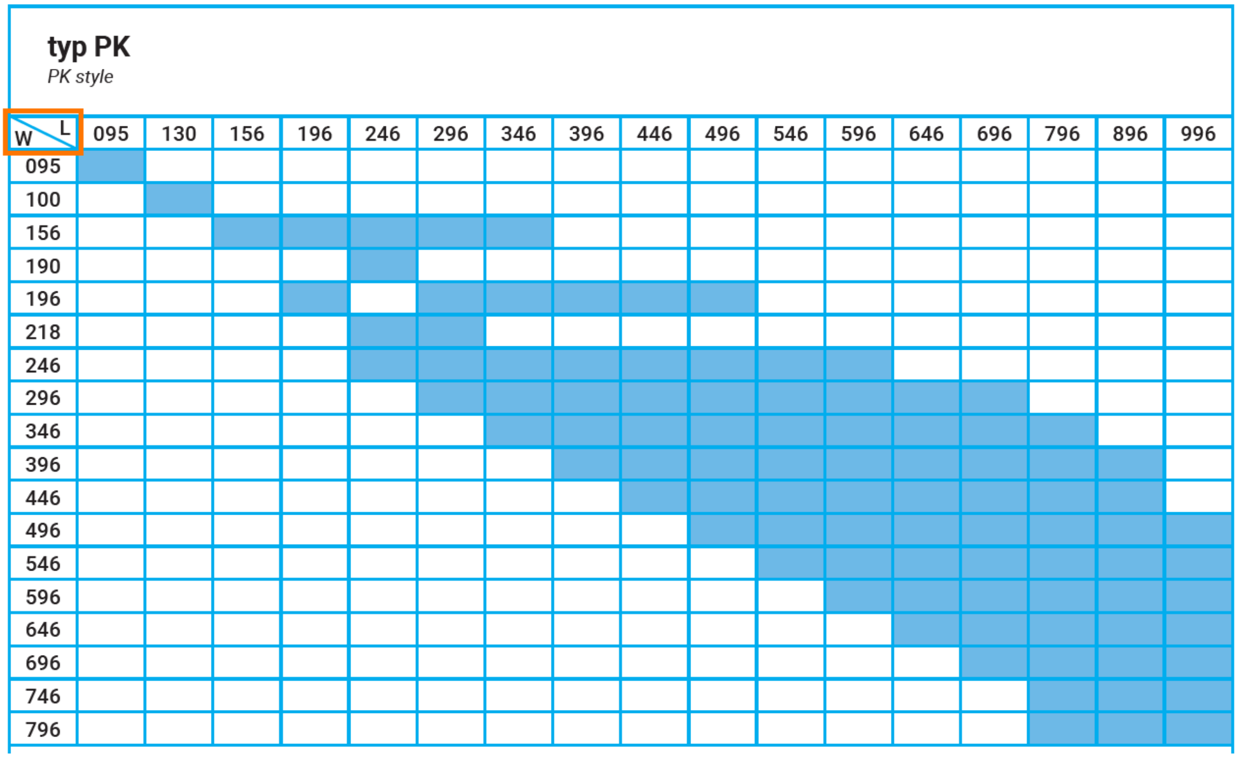


Figure 41 Main Width and Length

Go to the main assembly ***2A2BI***, use ***Equation Manager***.

Follow the below steps to create variables ***W*** and ***L***.

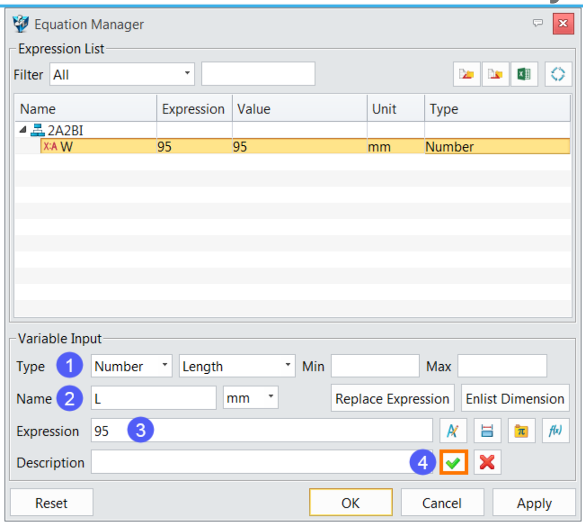
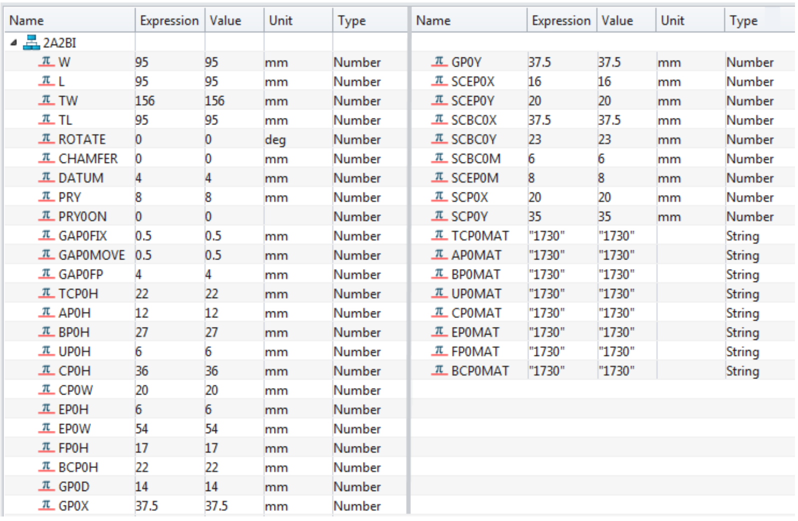


Figure 42 Create Variables for W and L

Follow the same steps to create other variables.



Name	Expression	Value	Unit	Type
2A2BI				
W	95	95	mm	Number
L	95	95	mm	Number
TW	156	156	mm	Number
TL	95	95	mm	Number
ROTATE	0	0	deg	Number
CHAMFER	0	0	mm	Number
DATUM	4	4	mm	Number
PRY	8	8	mm	Number
PRY0ON	0	0		Number
GAP0FIX	0.5	0.5	mm	Number
GAP0MOVE	0.5	0.5	mm	Number
GAP0FP	4	4	mm	Number
TCP0H	22	22	mm	Number
AP0H	12	12	mm	Number
BP0H	27	27	mm	Number
UP0H	6	6	mm	Number
CP0H	36	36	mm	Number
CP0W	20	20	mm	Number
EP0H	6	6	mm	Number
EP0W	54	54	mm	Number
FP0H	17	17	mm	Number
BCP0H	22	22	mm	Number
GP0D	14	14	mm	Number
GP0X	37.5	37.5	mm	Number

Name	Expression	Value	Unit	Type
GP0Y	37.5	37.5	mm	Number
SCEP0X	16	16	mm	Number
SCEP0Y	20	20	mm	Number
SCBC0X	37.5	37.5	mm	Number
SCBC0Y	23	23	mm	Number
SCBC0M	6	6	mm	Number
SCEP0M	8	8	mm	Number
SCP0X	20	20	mm	Number
SCP0Y	35	35	mm	Number
TCP0MAT	"1730"	"1730"		String
AP0MAT	"1730"	"1730"		String
BP0MAT	"1730"	"1730"		String
UP0MAT	"1730"	"1730"		String
CP0MAT	"1730"	"1730"		String
EP0MAT	"1730"	"1730"		String
FP0MAT	"1730"	"1730"		String
BCP0MAT	"1730"	"1730"		String

Figure 43 Create All Variables

Notes:

Pick the right type for the variable, otherwise it may fail to drive the corresponding parameters.

Here are meanings of the variables.

1) L + W

The main length and width of plates like plate A, plate B, etc.

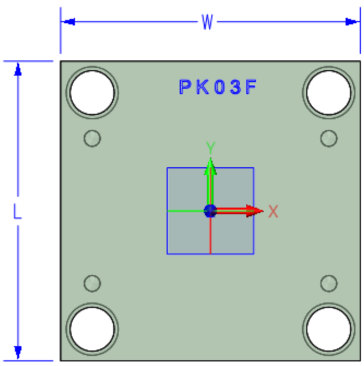


Figure 44 “W” and “L”

2) TL + TW

The length and width of **PK01**.

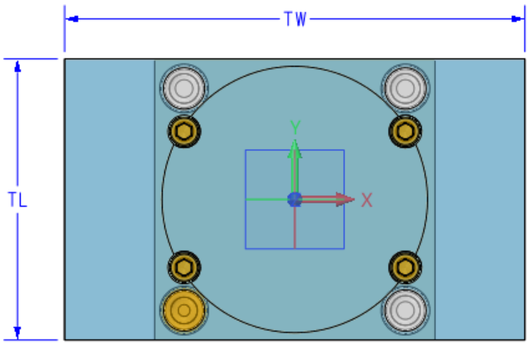


Figure 45 "TW" and "TL"

3) Rotate

Rotation angle of the mold. The default value is 0.

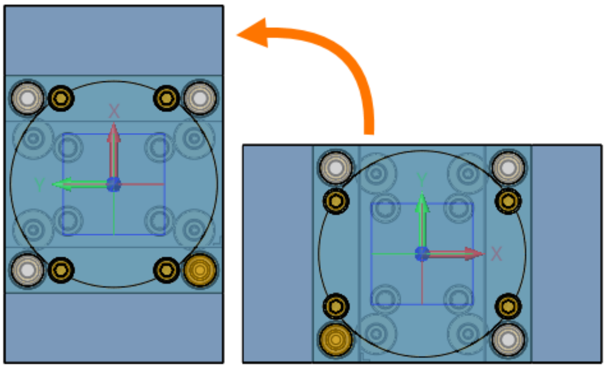


Figure 46 "Rotate"

4) Chamfer

The chamfer value of all plates.

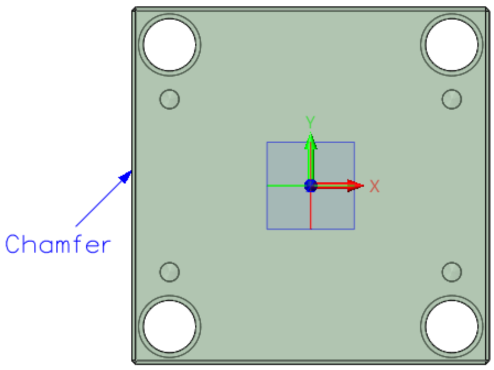


Figure 47 "Chamfer"

5) Datum

The Length of the DATUM MARK on **PK06**.

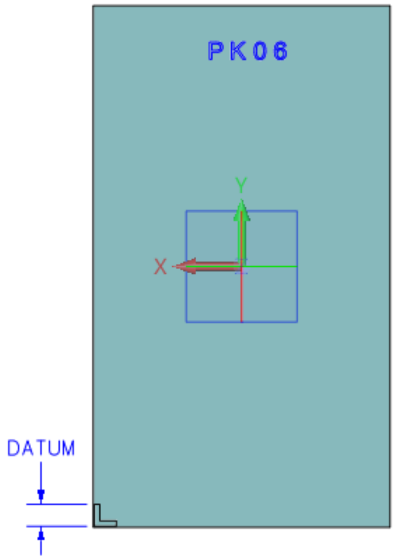


Figure 48　　Figure 7 “Datum”

6) PRY

The length of pry angle at the plates’ corners.

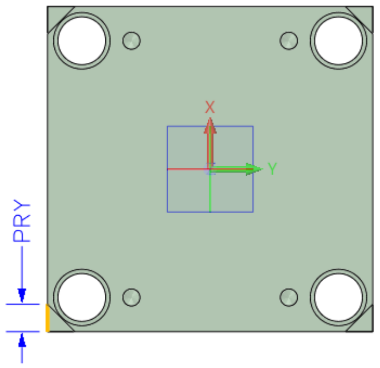


Figure 49　　“PRY”

7) PRY0ON

A constant to decide whether the ***pry angle*** is suppressed or not. (More details will be shown at Page 64.)

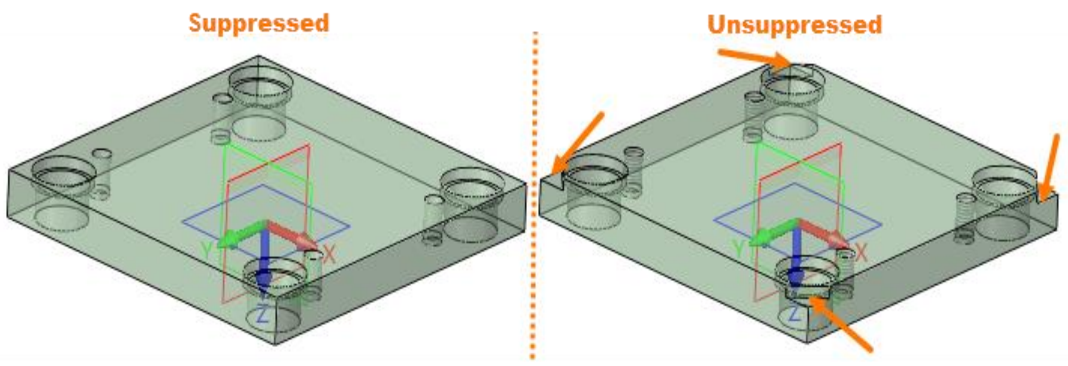


Figure 50　　“PRY0ON”

8) GAP0FIX and GAP0MOVE

Gap of fixed side and moving side. The default value of them is 0.5mm.

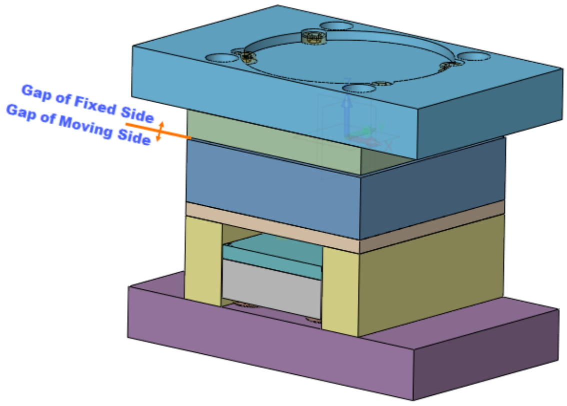


Figure 51 “GAP0FIX” and “GAP0MOVE

9) GAP0FP

The gap of **PK07**.

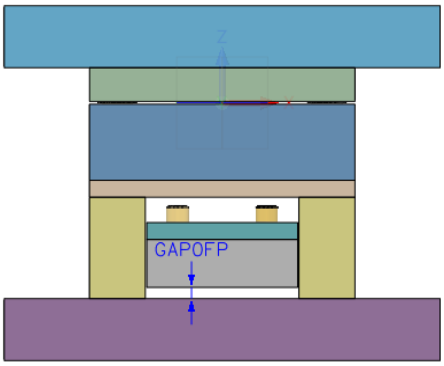


Figure 52 “GAP0FP”

10) TCP0H, AP0H, BP0H, UP0H, CP0H, EP0H, FP0H and BCP0H.

The height of different plates.

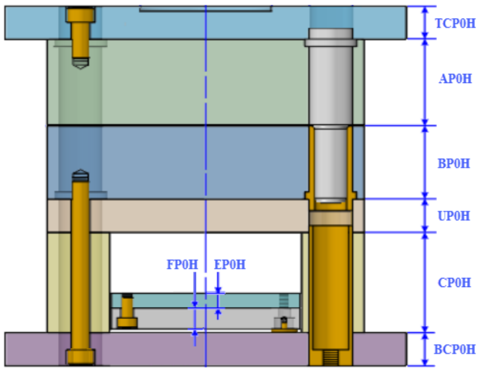


Figure 53 Plates Thickness

11) CP0W and EP0W

The Width of **PK05** and **PK06**.

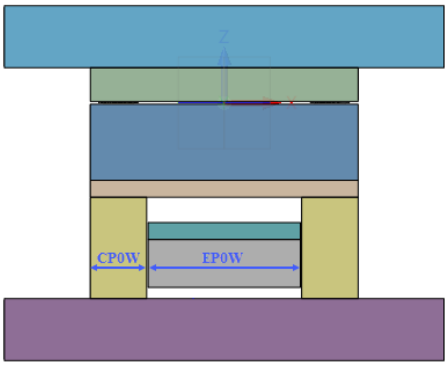


Figure 54 "CP0W" and "EP0W"

12) GP0D, SCBC0M, SCEP0M, SCP0M will be used in some inequation for judgement in ***##Components*** at Page 95.

13) GP0X and GP0Y

The X coordinate and Y coordinate of the ***SLE*** pockets.

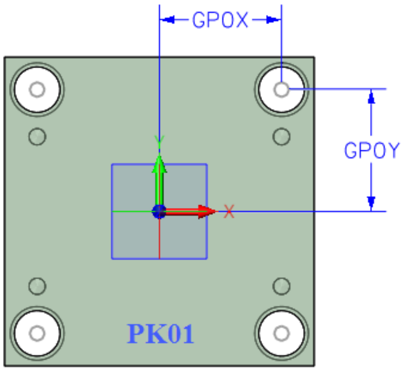


Figure 55 "GP0X" and "GP0Y"

14) SCEP0X and SCEP0Y

The X coordinate and Y coordinate of the ***SMe*** pockets.

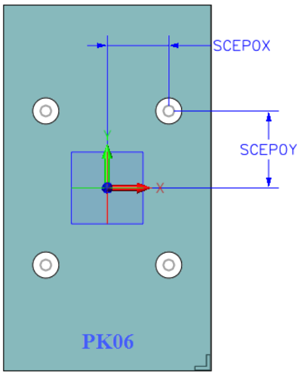


Figure 56 Figure 8 "SCEP0X" and "SCEP0Y"

15) SCBC0X and SCBC0Y

The X coordinate and Y coordinate of the ***SMm*** pockets.

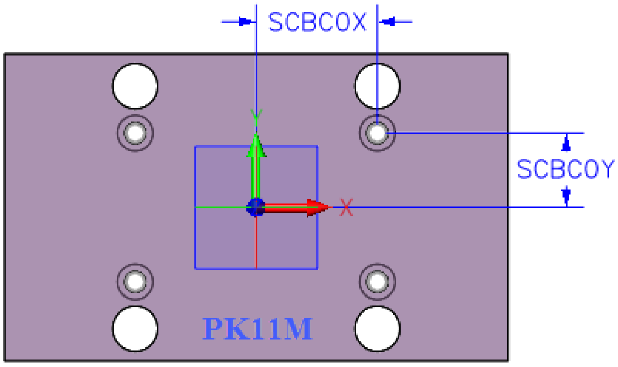


Figure 57 “SCBP0X” and “SCBP0Y”

16) SCP0X and SCP0Y

The X coordinate and Y coordinate of the **WK** pockets.

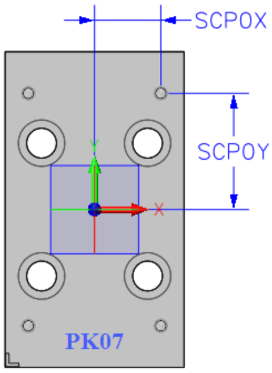


Figure 58 “SCP0X” and “SCP0Y”

17) TCP0MAT, AP0MAT, BP0MAT, UP0MAT, CP0MAT, EP0MAT, FP0MAT and BCP0MAT.

Materials of plates, which could be shown in the BOM table.

STEP 03 Create variables for every single part.

After finishing variables in main assembly, we need to create variables for all components.

A) PK01

Name	Expression	Value	Unit	Type
PK01				
W	[2A2BI:W]	95	mm	Number
L	[2A2BI:L]	95	mm	Number
h	[2A2BI:TCP0H]	22	mm	Number
Mat	[2A2BI:TCP0MAT]	"1730"		String
GB0D	14	14	mm	Number
SC0D2	11	11	mm	Number
SC0D1	6.5	6.5	mm	Number
SC0H	7	7	mm	Number

Figure 59 Variables of PK01

1) W, L, h, Mat are linked to the corresponding variables in assembly **2A2BI**.

2) GB0D, diameter of SLE pockets on **PK01**.

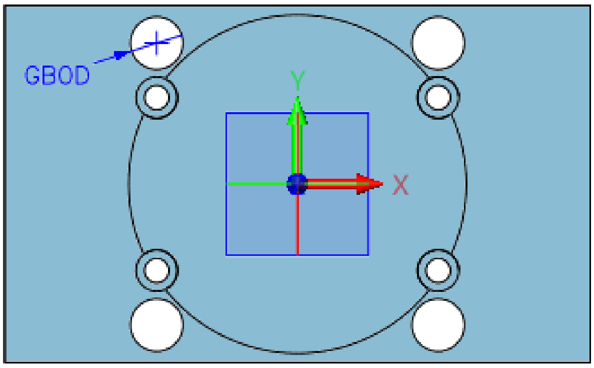


Figure 60 "GBOD"

3) SCOD2 and SCOD1, head diameter and body diameter of **SMf** pocket.

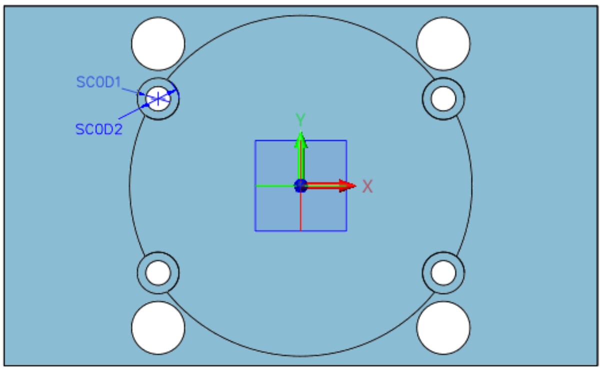


Figure 61 "SCOD2" and "SCOD1"

4) SCOH, head height of **SMF** pocket.

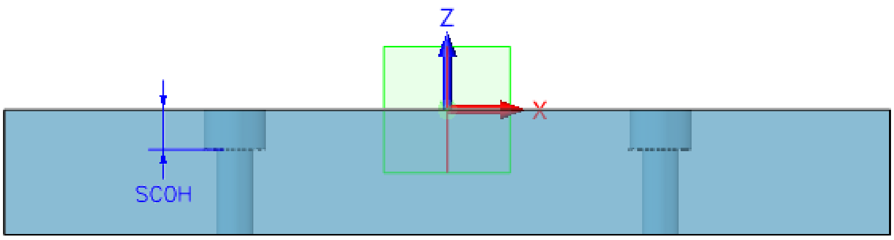


Figure 62 "SCOH"

B) PK03F

Name	Expression	Value	Unit	Type
PK03F				
W	[2A2BI:W]	95	mm	Number
L	[2A2BI:L]	95	mm	Number
h	[2A2BI:APOH]	12	mm	Number
Mat	[2A2BI:APOMAT]	"1730"		String
GPOD2	16.5	16.5	mm	Number
GPOH	3	3	mm	Number
GPOD1	14	14	mm	Number
M	6	6	mm	Number
P	1	1	mm	Number
L1	1.5	1.5	mm	Number
D0	5	5	mm	Number

Figure 63 Variables of PK03F

1) W, L, h, Mat are linked to the corresponding variables in assembly **2A2BI**.

2) GPOD2 and GPOD1, head diameter and body diameter of **SLE/SLEd** pocket.

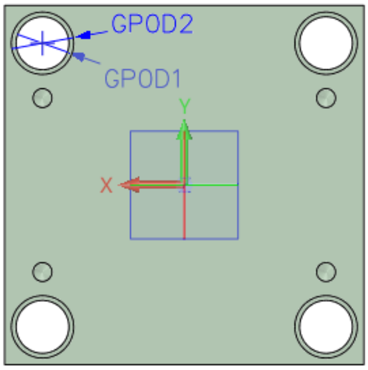


Figure 64 “GP0D2” and “GP0D1”

3) GP0H, head height of **SLE/SLEd** pocket.

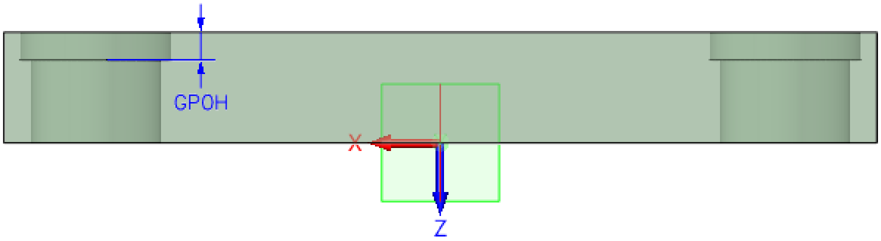


Figure 65 “GP0H”

4) M, P, thread diameter and pitch of the **SMf** pocket.

L1, D0, the extended length and diameter of the **SMf** pocket.

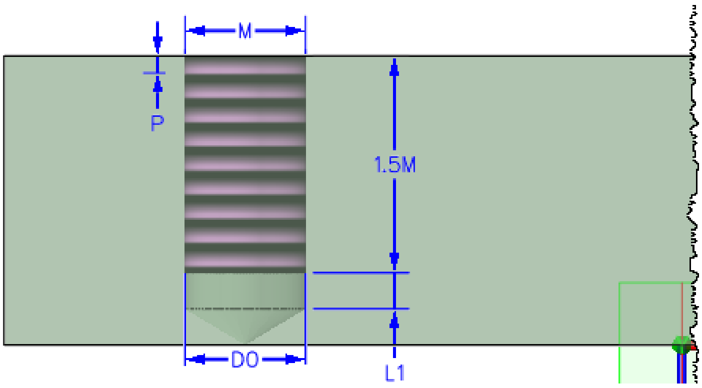


Figure 66 Variables of “SMf” Pocket

C) SLE

Name	Expression	Value	Unit	Type
SLE				
d	10	10	mm	Number
d1	14	14	mm	Number
s	3	3	mm	Number
L	30	30	mm	Number
d2	16	16	mm	Number
l	12	12	mm	Number
f	3	3	mm	Number

Figure 67 Variables of “SLE”

All variables are shown as below.

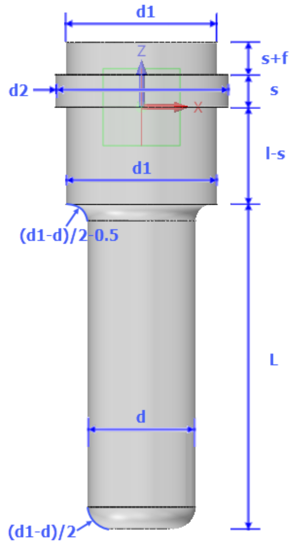


Figure 68 All Variables Shown in “SLE” Model

D) SLEd

The variables of SLEd are the same as those in SLEd. The only difference is the value of ***d***.

Name	Expression	Value	Unit	Type
SLEd				
d	9	9	mm	Number
d1	14	14	mm	Number
s	3	3	mm	Number
L	30	30	mm	Number
d2	16	16	mm	Number
l	12	12	mm	Number
f	3	3	mm	Number

Figure 69 Variables of “SLEd”

E) SMf

Name	Expression	Value	Unit	Type
SMf				
d	6	6	mm	Number
l	22	22	mm	Number
dk	10	10	mm	Number
s	5	5	mm	Number
P	1	1	mm	Number

Figure 70 Variables of “SMf”

1) All variables are shown as below.

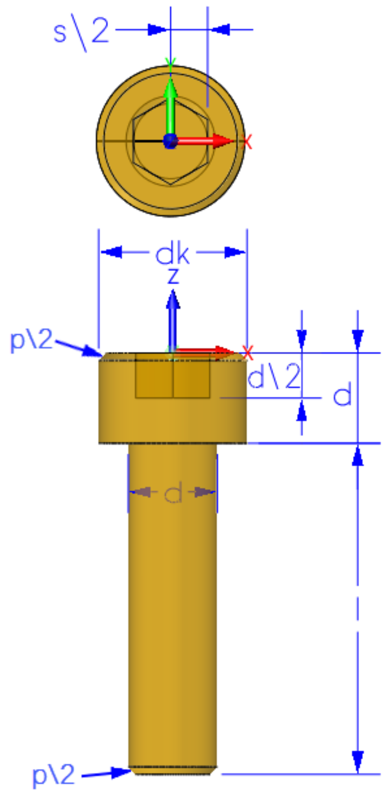


Figure 71 All Variables Shown in “SMf” Model

F) PK03M

Name	Expression	Value	Unit	Type
PK03M				
W	[2A2BI:W]	95	mm	Number
L	[2A2BI:L]	95	mm	Number
h	[2A2BI:BP0H]	27	mm	Number
Mat	[2A2BI:BP0MAT]	"1730"		String
M	6	6	mm	Number
D0	5	5	mm	Number
L1	1.5	1.5	mm	Number
P	1	1	mm	Number
GB0D2	16.5	16.5	mm	Number
GB0H	3	3	mm	Number
GB0D1	14	14	mm	Number

Figure 72 Variables of “PK03M”

1) W, L, h, Mat are linked to the corresponding variables in assembly **2A2BI**.
2) M, P, thread diameter and pitch of the **SMm** pocket.

   L1, D0, the extended length and diameter of the **SMm** pocket.

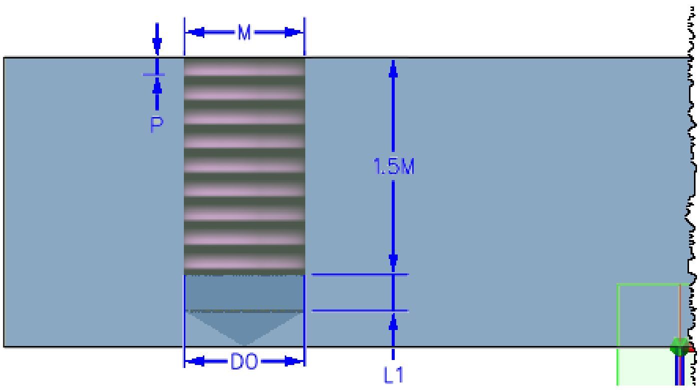


Figure 73 Variables of “SMm” Pocket

3) GB0D2, GB0H, GB0D1, head diameter, head height and diameter of **TPE** pocket.

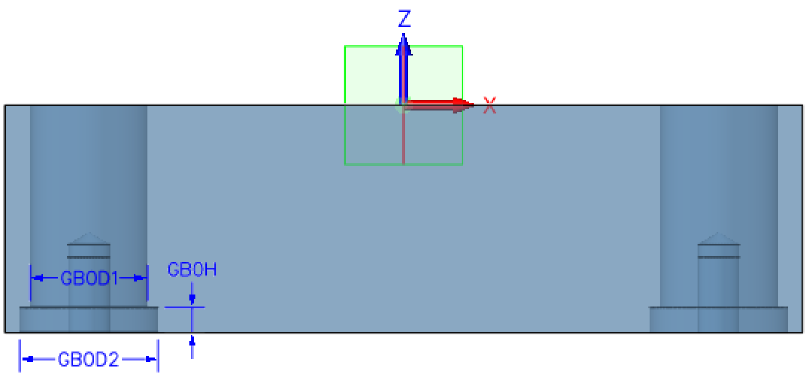


Figure 74 Variables of “TPE” Pocket

G) PK04

Name	Expression	Value	Unit	Type
PK04				
W	[2A2BI:W]	95	mm	Number
L	[2A2BI:L]	95	mm	Number
h	[2A2BI:UP0H]	6	mm	Number
Mat	[2A2BI:UP0MAT]	"1730"		String
GB0D	14	14	mm	Number
SC0D	6.5	6.5	mm	Number

Figure 75 Variables of “PK04”

1) W, L, h, Mat are linked to the corresponding variables in assembly **2A2BI**.

2) GB0D and SC0D, diameter of **TPE** pocket and diameter of **SMm** pocket.

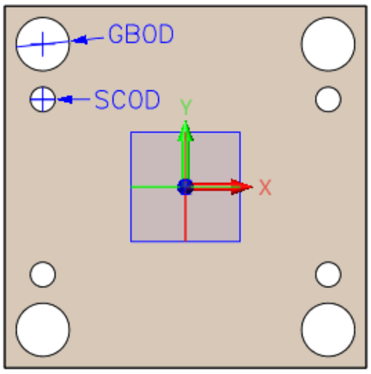


Figure 76 “GB0D” and “SC0D”

H) PK05L

Name	Expression	Value	Unit	Type
PK05L				
W	[2A2BI:W]	95	mm	Number
L	[2A2BI:L]	95	mm	Number
h	[2A2BI:CP0H]	36	mm	Number
Mat	[2A2BI:CP0MAT]	"1730"		String
GB0D	14	14	mm	Number
SC0D	6.5	6.5	mm	Number

Figure 77 Variables of “PK05L”

1) W, L, h, Mat are linked to the corresponding variables in assembly **2A2BI**.

2) GB0D and SC0D, diameter of **TPE** pocket and diameter of **SMm** pocket.

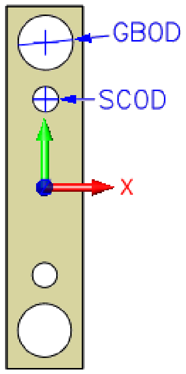


Figure 78 “GBOD” and “SCOD”

I) PK05R

1) Variables in PK05R are the same as those in PK05L.

Name	Expression	Value	Unit	Type
PK05R				
W	[2A2BI:W]	95	mm	Number
L	[2A2BI:L]	95	mm	Number
h	[2A2BI:CP0H]	36	mm	Number
Mat	[2A2BI:CP0MAT]	"1730"		String
GB0D	14	14	mm	Number
SC0D	6.5	6.5	mm	Number

Figure 79 Variables of “PK05R”

J) PK06

Name	Expression	Value	Unit	Type
PK06				
W	[2A2BI:W]	95	mm	Number
L	[2A2BI:L]	95	mm	Number
h	[2A2BI:EP0H]	6	mm	Number
Mat	[2A2BI:EP0MAT]	"1730"		String
M	8	8	mm	Number
SC0D	6.8	6.8	mm	Number
SC0P	1.25	1.25	mm	Number

Figure 80 Variables of “PK06”

1) W, L, h, Mat are linked to the corresponding variables in assembly **2A2BI**.

2) SC0D and SC0P, diameter and pitch of the **SMe** Pocket.

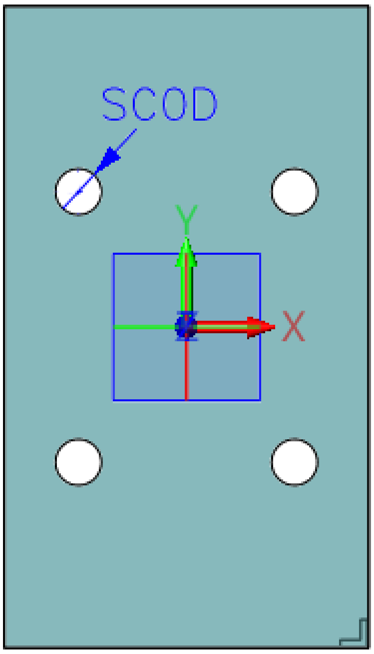


Figure 81 “SC0D” and “SC0P”

K) **PK07**

Name	Expression	Value	Unit	Type
PK07				
W	[2A2BI:W]	95	mm	Number
L	[2A2BI:L]	95	mm	Number
h	[2A2BI:FP0H]	17	mm	Number
Mat	[2A2BI:FP0MAT]	"1730"		String
SC0D2	14	14	mm	Number
SC0D1	9	9	mm	Number
SC0H	9	9	mm	Number
SC0M	8	8	mm	Number
SP0M	4	4	mm	Number
SP0D	3.3	3.3	mm	Number
SP0P	0.7	0.7	mm	Number

Figure 82 Variables of “PK07”

1) W, L, h, Mat are linked to the corresponding variables in assembly **2A2BI**.
2) SC0D2, SC0D1, SC0H, SC0M, head diameter, diameter, head height and thread diameter of the **SMe** pocket on **PK07**.

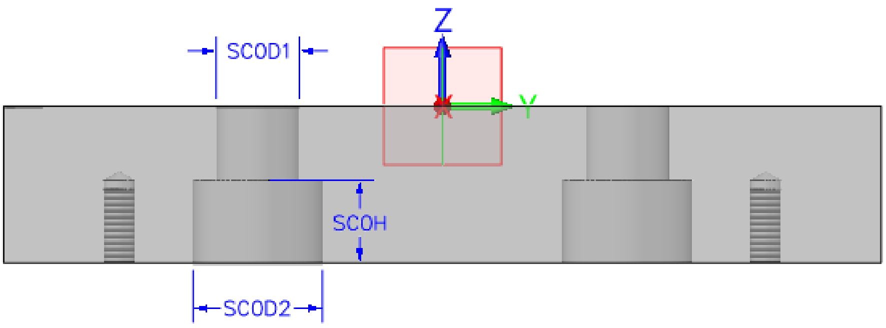


Figure 83 Variables of “SMe” Pocket

3) SP0M, SP0D, SP0P, thread diameter, diameter and pitch of **WK** pocket.

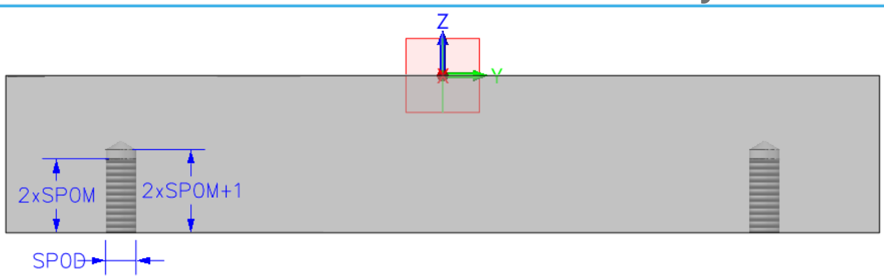


Figure 84 Variables of “WK” Pocket

L) PK11M

Name	Expression	Value	Unit	Type
PK11M				
W	[2A2BI:W]	95	mm	Number
L	[2A2BI:L]	95	mm	Number
h	[2A2BI:BCP0H]	22	mm	Number
Mat	[2A2BI:BCP0MAT]	"1730"		String
SCOD2	11	11	mm	Number
SCOH	7	7	mm	Number
SCOD1	6.5	6.5	mm	Number
GBOD	14	14	mm	Number

Figure 85 Variables of “PK11M”

1) W, L, h, Mat are linked to the corresponding variables in assembly **2A2BI**.
2) SCOD2, SCOH, SCOD1, head diameter, head height, diameter of the **SMe** pocket.
   GBOD, diameter of **TUE** pocket on **PK11M**.

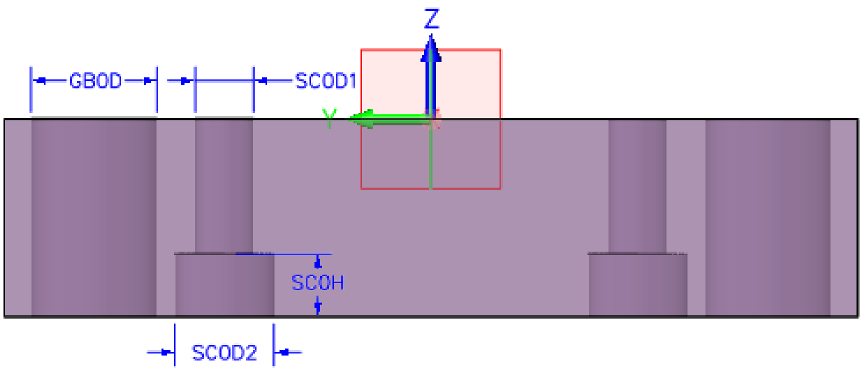


Figure 86 Variables of “TUE” Pocket

M) TPE/TPEd

Name	Expression	Value	Unit	Type
TPE				
d	10	10	mm	Number
f	3	3	mm	Number
d2	16	16	mm	Number
d1	14	14	mm	Number
s	3	3	mm	Number
L	27	27	mm	Number

Figure 87 Variables of “TPE/TPEd”

1) All variables are shown as below.

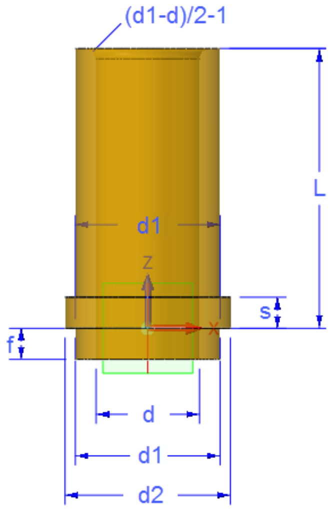


Figure 88 All Variables of “TPE/TPEd” Model

N) SMm

Name	Expression	Value	Unit	Type
SMm				
d	6	6	mm	Number
l	65	65	mm	Number
dk	10	10	mm	Number
s	5	5	mm	Number
P	1	1	mm	Number

Figure 89 Variables of “SMm”

1) All variables are shown as below.

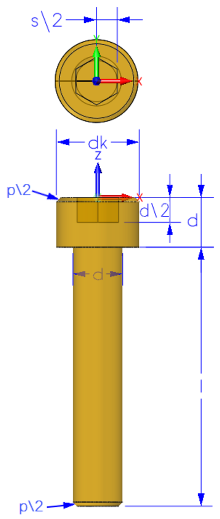


Figure 90 All Variables of “SMm” Model

O) TUE

Name	Expression	Value	Unit	Type
TUE				
d1	11	11	mm	Number
l	50	50	mm	Number
d3	14	14	mm	Number
l1	8	8	mm	Number
d2	6.8	6.8	mm	Number
M	8	8	mm	Number
P	1.25	1.25	mm	Number

Figure 91 Variables of “TUE”

1) All variables are shown as below.

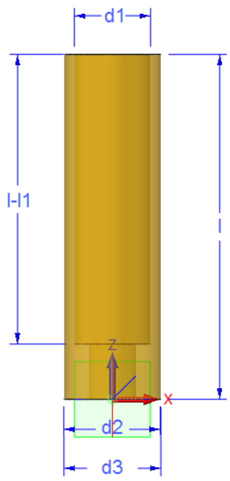


Figure 92 All Variables of “TUE” Model

P) SMe

Name	Expression	Value	Unit	Type
SMe				
d	8	8	mm	Number
l	20	20	mm	Number
dk	13	13	mm	Number
s	6	6	mm	Number
P	1.25	1.25	mm	Number

Figure 93 Variables of “SMe”

1) All variables are shown as below.

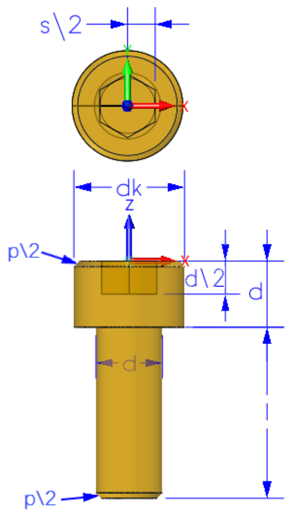


Figure 94 All Variables of “SMe” Model

Q) PO

Name	Expression	Value	Unit	Type
PO				
d	18	18	mm	Number
h	3	3	mm	Number
d1	4.3	4.3	mm	Number
t	0.4	0.4	mm	Number

Figure 95 Variables of “PO”

1) All variables are shown as below.

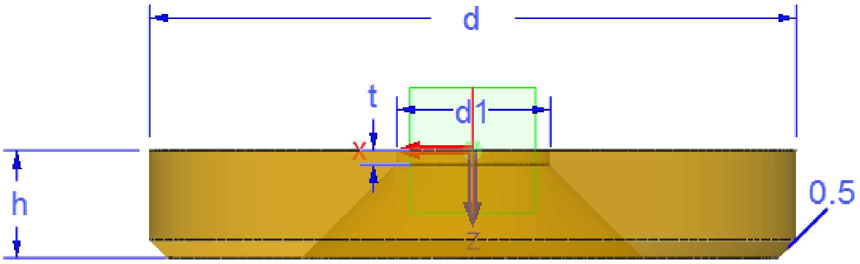


Figure 96 All Variables of “PO” Model

R) WK

Name	Expression	Value	Unit	Type
WK				
d	4	4	mm	Number
l	8	8	mm	Number
k	2.3	2.3	mm	Number
dk	8	8	mm	Number
s	2.5	2.5	mm	Number
P	0.7	0.7	mm	Number

Figure 97 Variables of “WK”

1) All variables are shown as below.

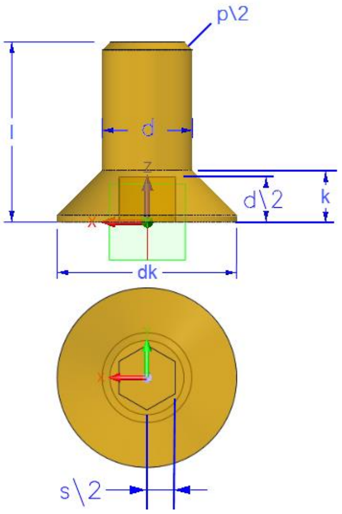


Figure 98 All Variables of “WK” Model

Model Building

Build up model for every component.

Components can be classified as below.

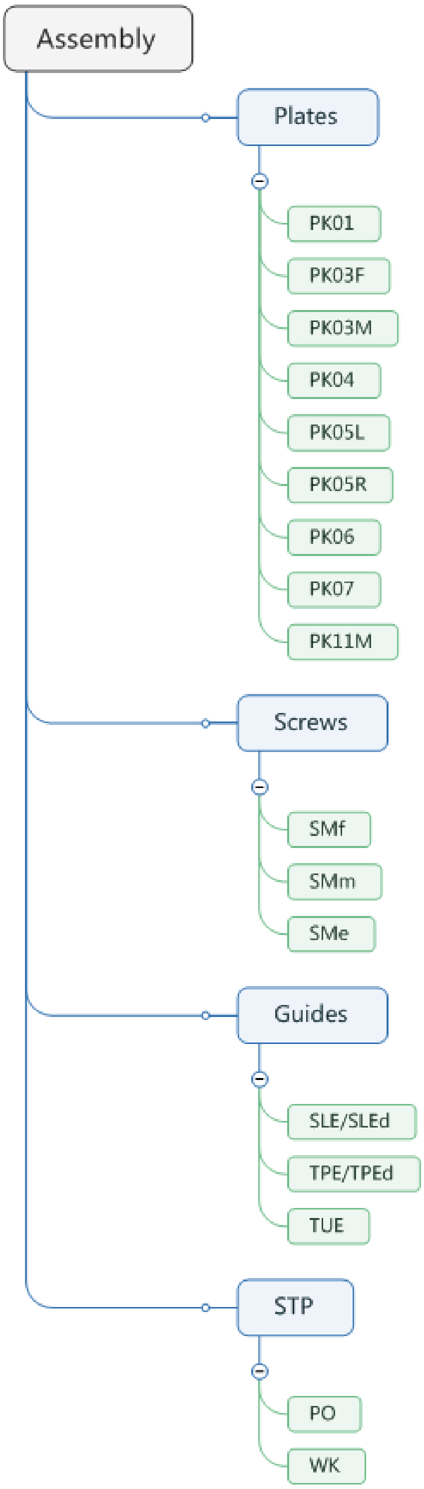


Figure 99 Classification of the Components

STEP 1 Take **PK03M**, **SMf**, **SLE/SLEd** and **PO** as examples to guide you how to build up models for these kinds of components.

A) PK03M

1) Create a block as below.

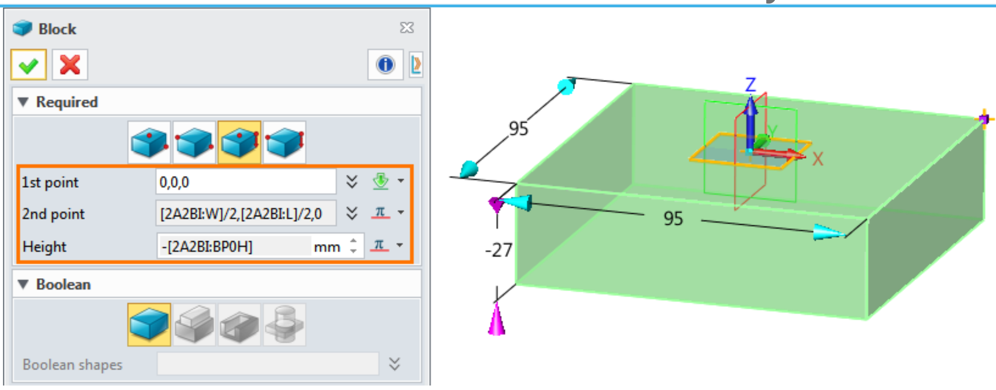


Figure 100 Create a Block

2) Create a sketch for the location of **SLE/SLEd** pocket. The dimensions are called from [2A2BI:GP0X] and [2A2BI:GP0Y].

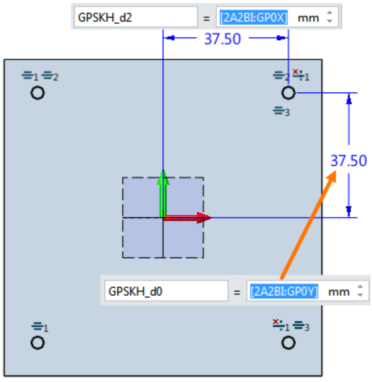


Figure 101 Create Sketch Points for "SLE/SLEd" Pocket

3) Create pockets for **SLE/SLEd**.

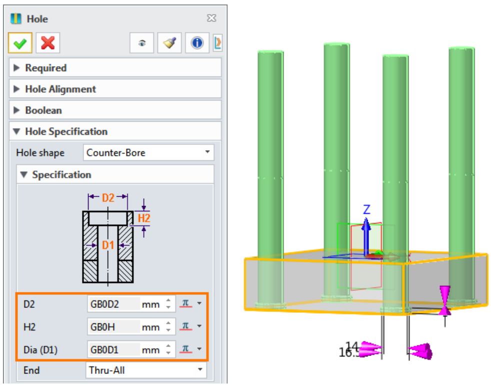


Figure 102 Create Pockets for "SLE/SLEd"

4) Create a sketch for the location of **SMm** pocket. The dimensions are called from [2A2BI:SCBC0X] and [2A2BI:SCBC0Y].

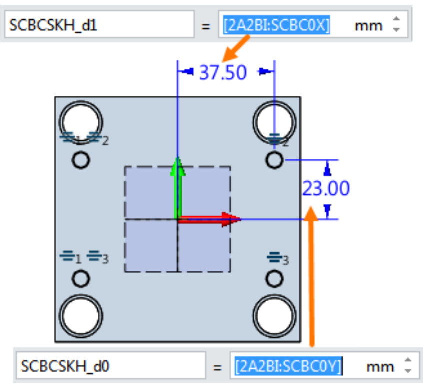


Figure 103 Create Sketch Points for "SMm" Pocket

5) Create pockets for **SMm**.

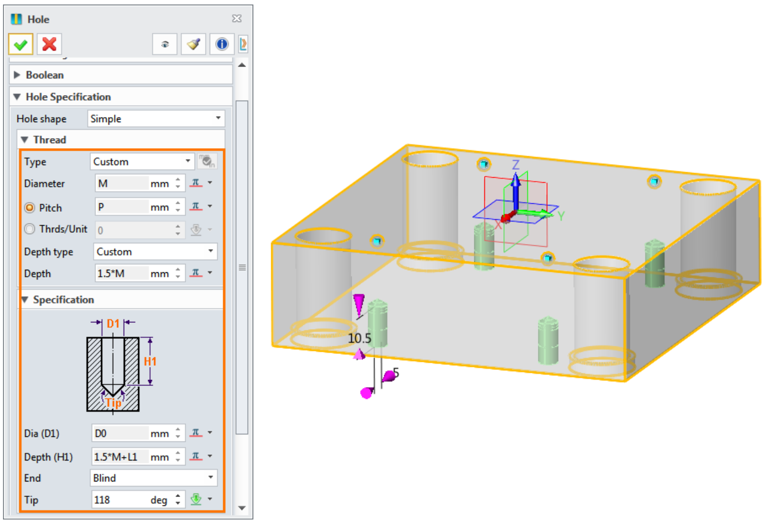


Figure 104 Create Pockets for “SMm”

6) Add chamfer on all external edges. The chamfer’s value is called from [2A2BI:CHAMFER].

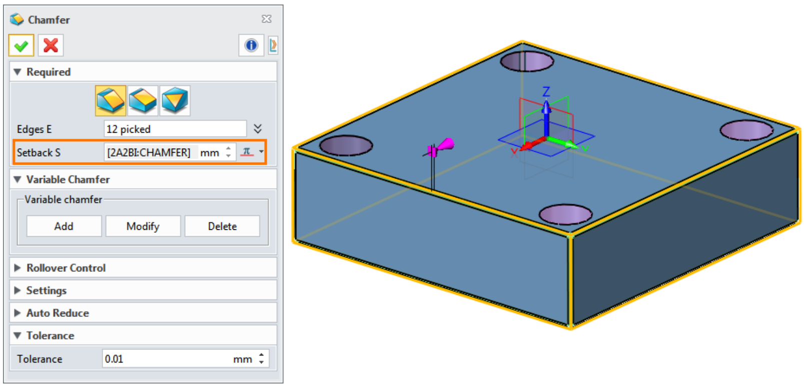


Figure 105 Add a Chamfer

7) Create a sketch for the pry angle. The length value is called from [2A2BI:PRY].

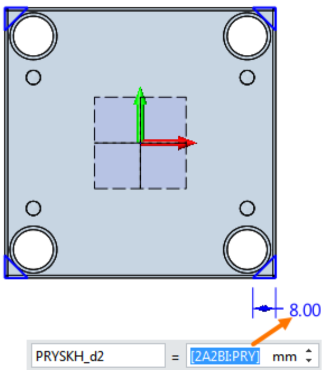


Figure 106 Create a Sketch for the Pry Angle

8) Extrude and cut the pry angle.

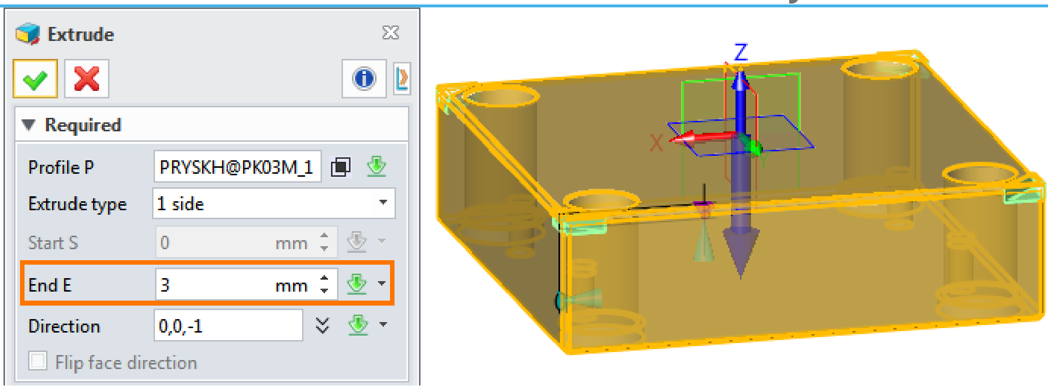


Figure 107 Extrude and Cut the Pry Angle

9) Rotate the plate. The angle is called from [2A2BI:ROTATE].

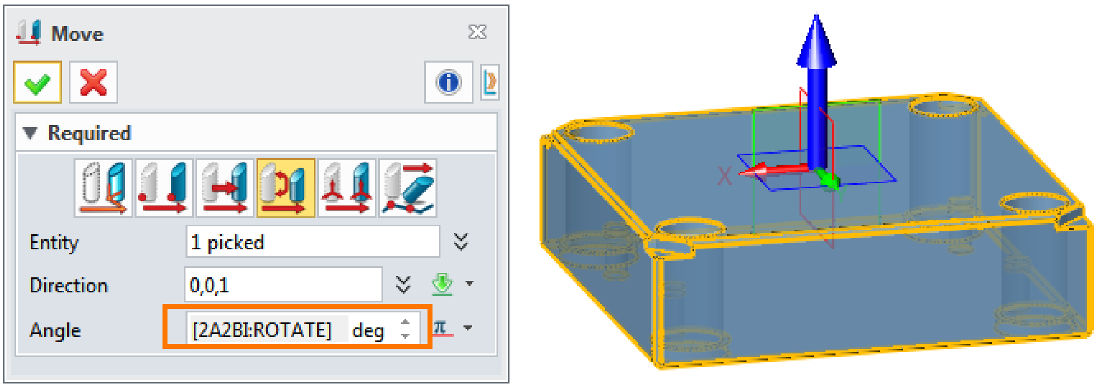


Figure 108 Rotation Angle

Now we have finished building up the model.

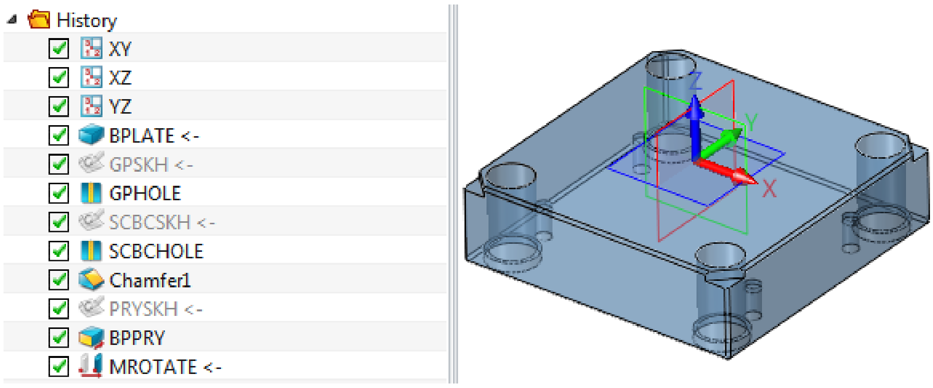


Figure 109 Finish PK03M Model

For the feature chamfer, pry angle, they are suppressed in some conditions.

10) Use ***Conditional Suppress***.

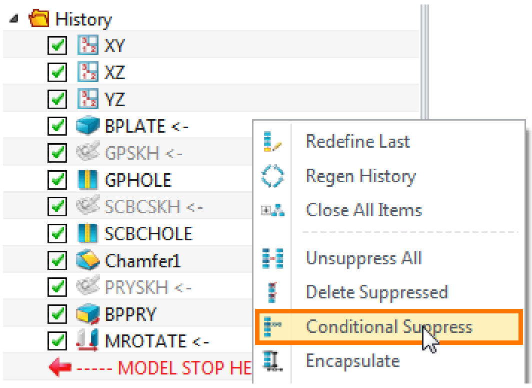


Figure 110 Conditional Suppress

Set conditional expression as below.

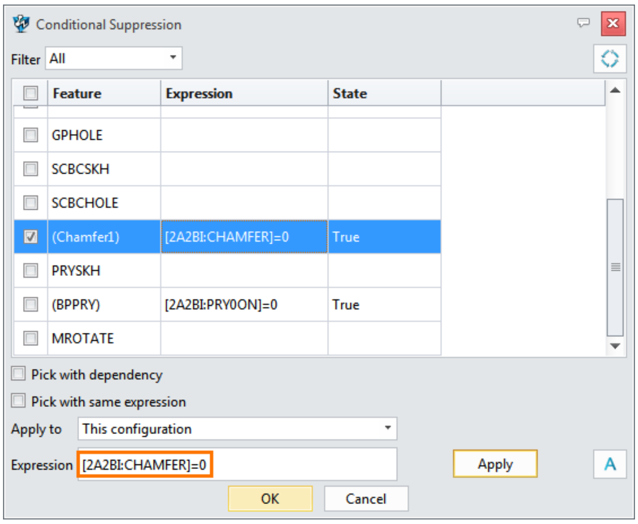


Figure 111 Conditional Expression

Notes: *Here is explanation for conditional suppression.*

Ⅰ) If [2A2BI:CHAMFER]=0 is true, the ***Chamfer1*** feature will be suppressed.

Ⅱ) If [2A2BI:PRY0ON]=0 is true, the ***BPPRY*** feature will be suppressed.

After setting these conditional suppressions, let's go back to see what's the difference.

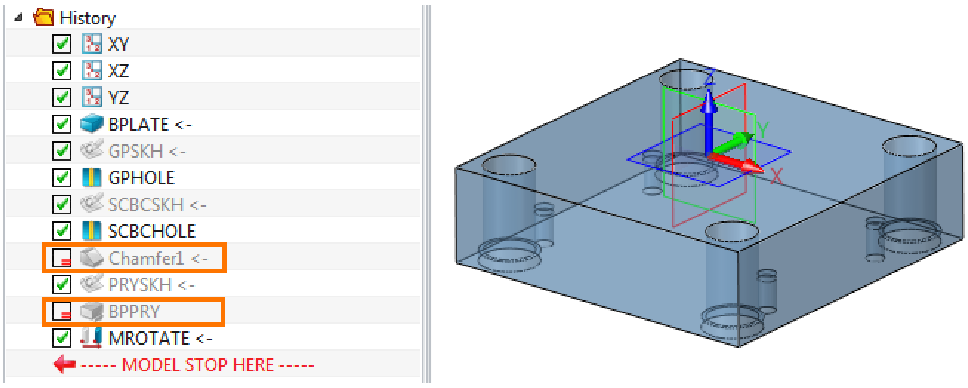


Figure 112 Suppressed Features

The Chamfer1 and BPPRY has been suppressed.

*** Extension**

Rules of Equations

1. Common operators,

"+"(Plus), "-"(Minus), "*"(Multiply), "/"(Divide), "^" (Power)

E.g. A = -3 + 30 B =A/2

2. Common functions,

cos(), sin(), tan() ,abs(), sqrt(), ln(), log()

E.g. C = 3*sin(30)

3. Logical operation,

"!"(logical negation), "&"(logical conjunction), "|"(logical disjunction)

E.g. D=(!(C&1)=0)

4. Conditional operators,

“<”(less than), “>”(greater than), “=”(equal to)

E = D>0

5. Conditional statement,

(condition expression) then (expression1) else (expression2)

E.g. F = ((C=1) & (D=1))

6. Others,

“( )”(bracket), used to change the calculation order.

Equation in bracket will be run first.

E.g. G=3, H=2,

Formula 1, I= G+H*2, result, I=7

Formula 2, I= (G+H)*2, result, I=10

B) SMf

1) Create a cylinder as the head of the screw.

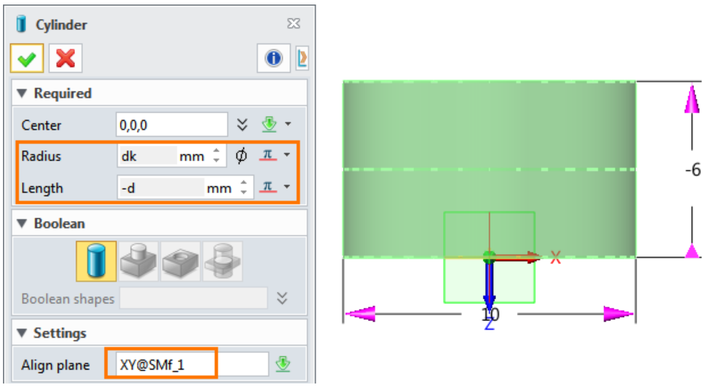


Figure 113 Create the Screw Head

2) Create another cylinder as the body of the screw.

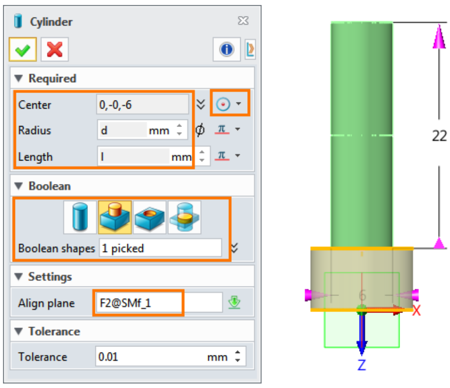


Figure 114 Create the Screw Body

3) Create a sketch for the hex pocket.

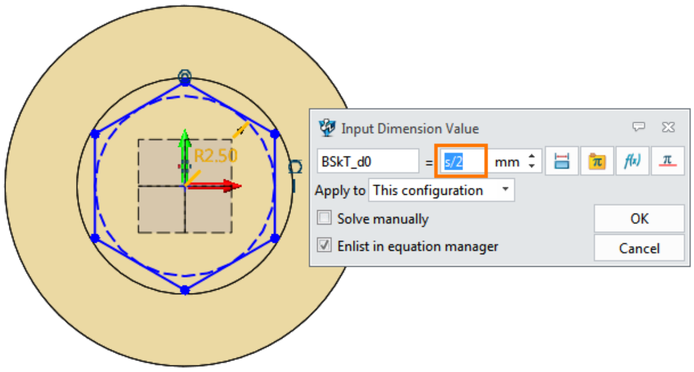


Figure 115 Create a Sketch for the Hex

4) Extrude the sketch to cut a pocket.

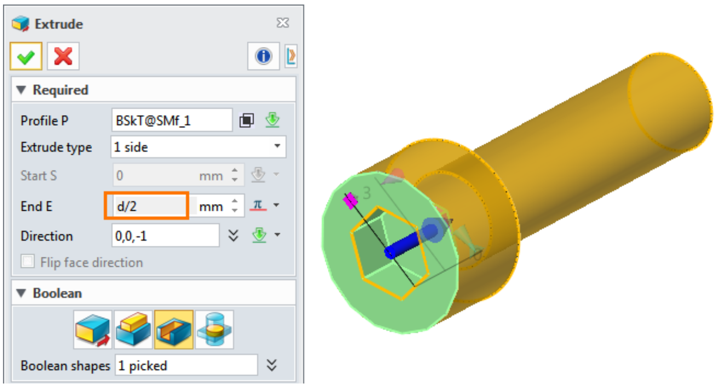


Figure 116 Extrude and Cut the Hex

5) Add chamfers on the top and bottom edges.

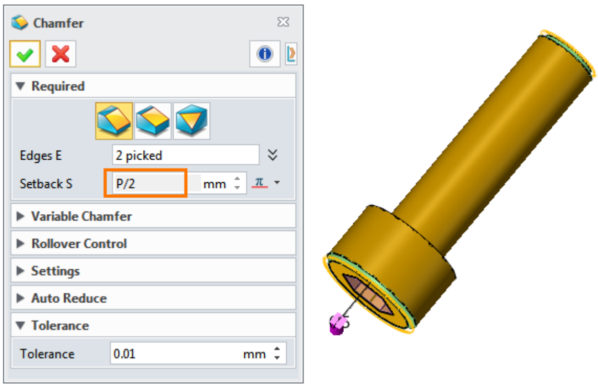


Figure 117 Add Chamfers

The **SMf** model has been finished.

C) SLE

1) Create the shoulder.

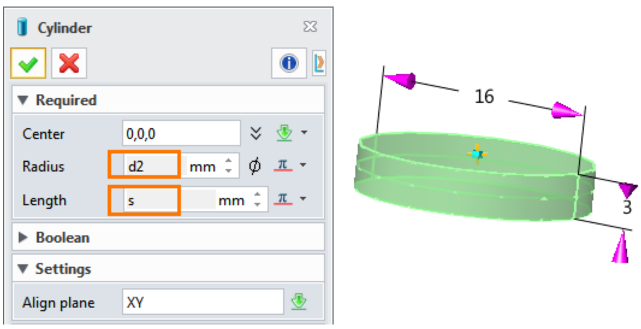


Figure 118 Create the Shoulder

2) Create the head.

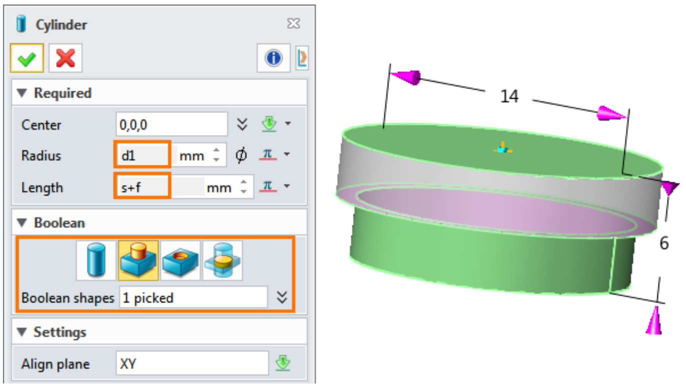


Figure 119 Figure 9 Create the Head

3) Create the body shoulder.

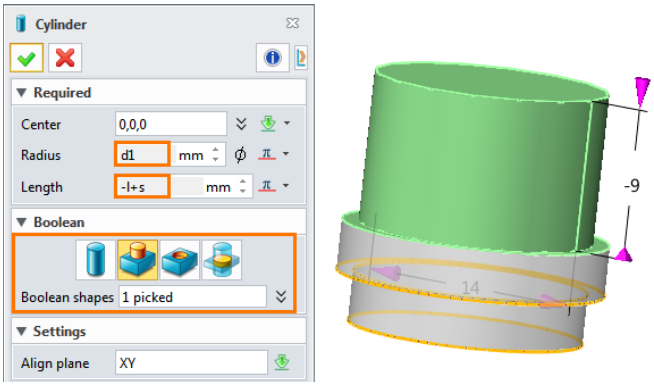


Figure 120 Create the Body Shoulder

4) Create the body.

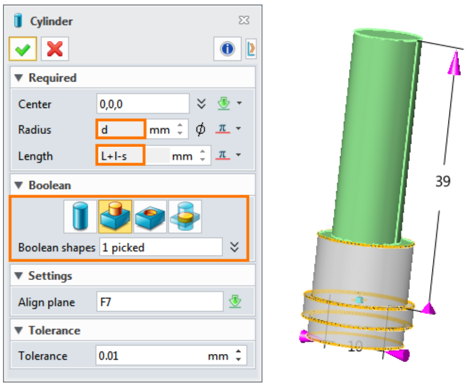


Figure 121 Create the Body

5) Add a fillet on the bottom edge.

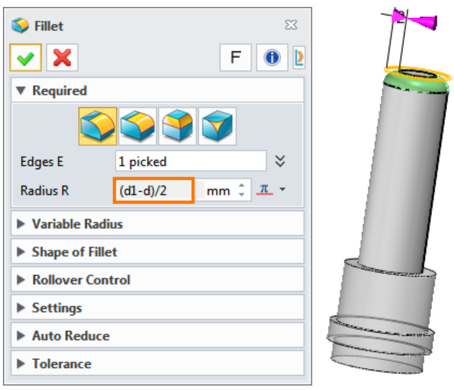


Figure 122 Add a Fillet on the Top Edge

6) Add a fillet on the edge between body shoulder and body.

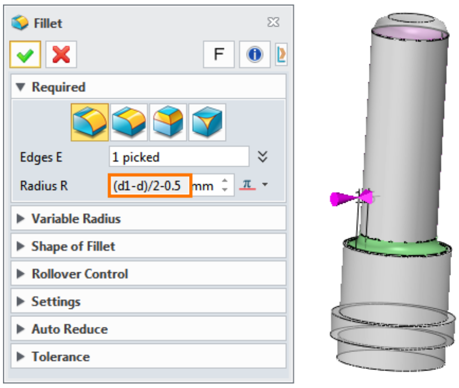


Figure 123 Add a Fillet on the Shoulder

Then **SLE** model has been finished.

D) PO

1) Create the body for **PO**.

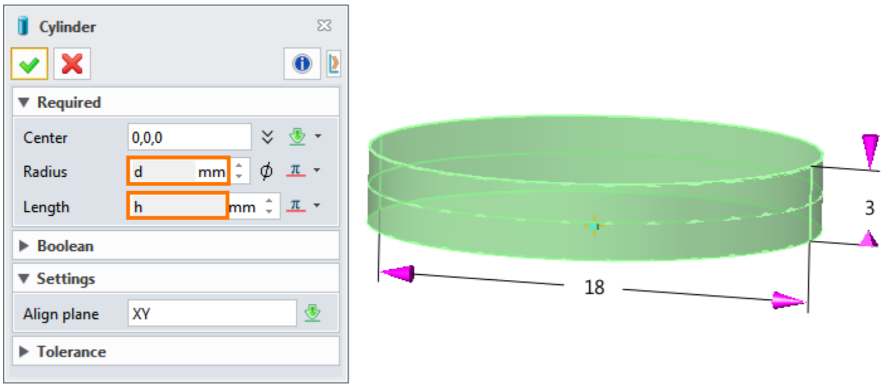


Figure 124 Create the Body

2) Create a sketch for the pocket.

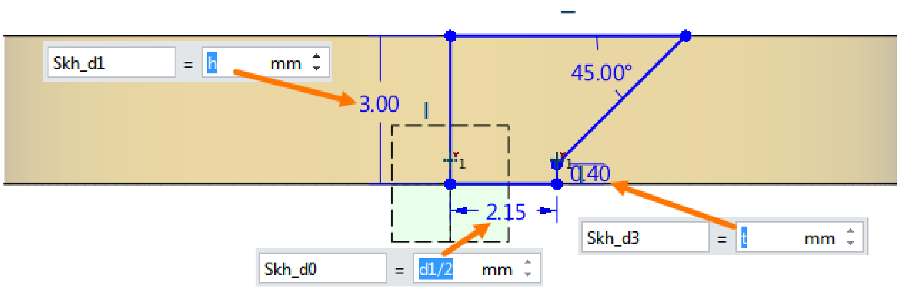


Figure 125 Create a Sketch for the pocket

3) Revolve the sketch and cut the body.

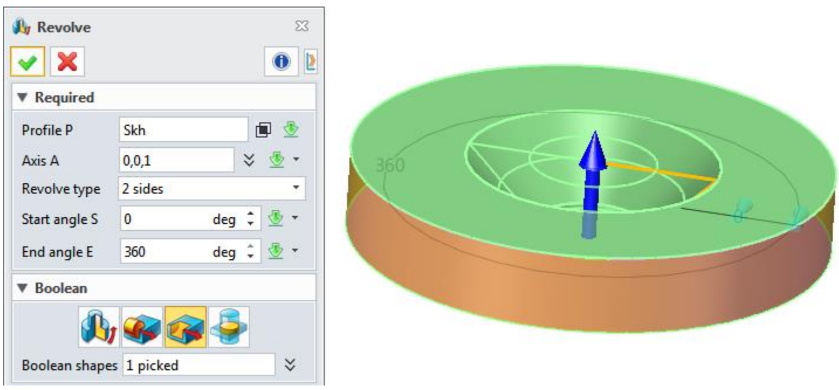


Figure 126 Revolve and Cut the Body

4) Add a chamfer on the external edge of the top face.

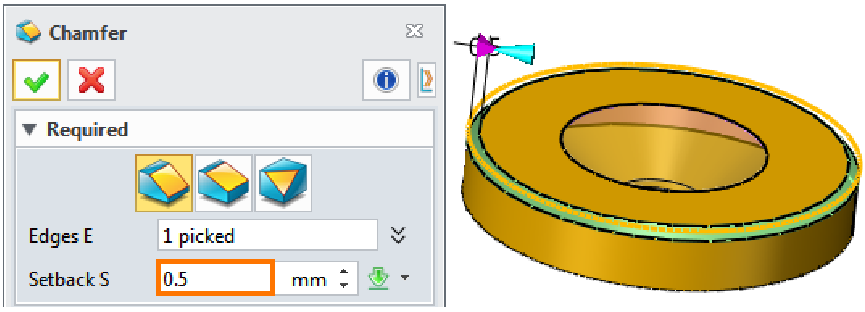


Figure 127 Add a Chamfer

Now **PO** model has been finished.

STEP 2 Follow similar steps to finish the modeling of the rest components.

After finishing modeling, the result is as below.

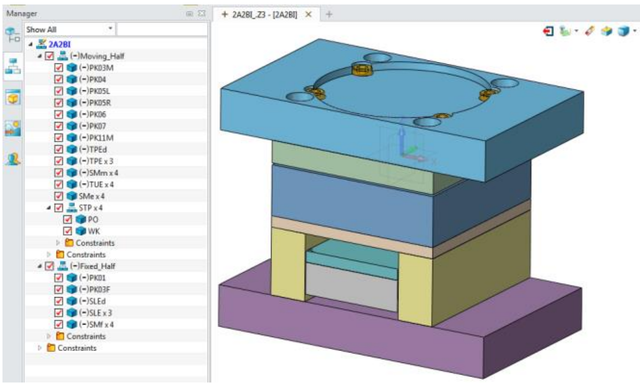


Figure 128 Final Result

STEP 3 Add Constraints at where necessary.

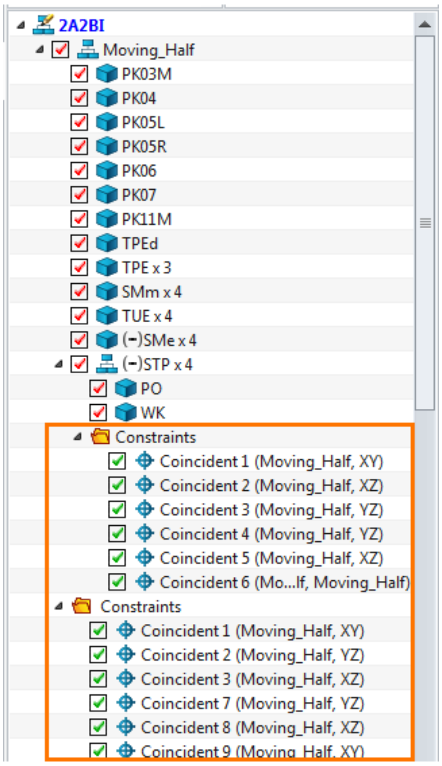


Figure 129 Add Constraints

STEP 4 Then add conditional suppressions on **SMe** and **STP**.

If the [2A2B:L]<156 is true, **SMe** and **STP** will be suppressed.

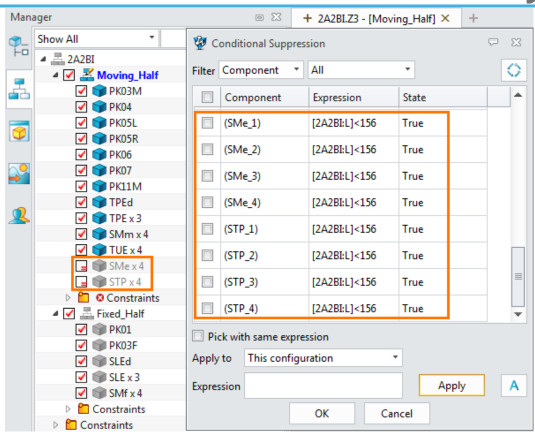


Figure 130 Conditional Suppression on Components

STEP 5 Set attribute for the plates.

1) Use ***Set Attribute*** in mold module. Click ***TC Plate*** and pick ***PK01***.

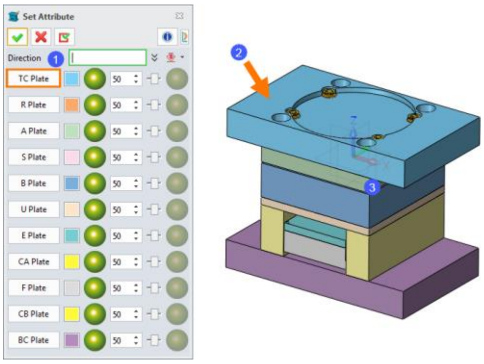


Figure 131 Set Plate Attribute

Then the TC plate attribute will be written in the part attribute of ***PK01***.

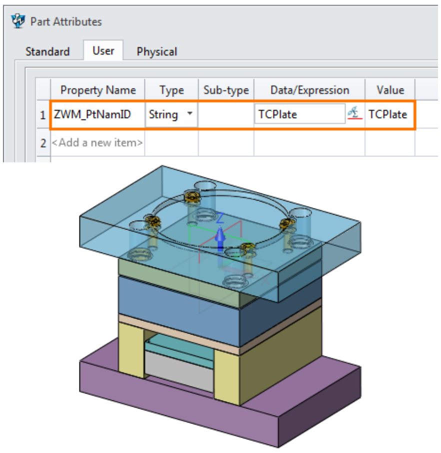


Figure 132 Plate Attribute in “Part Attribute”

This attribute will help you automatically recognize the plate when you insert components.

The plate attributes are matched as below.

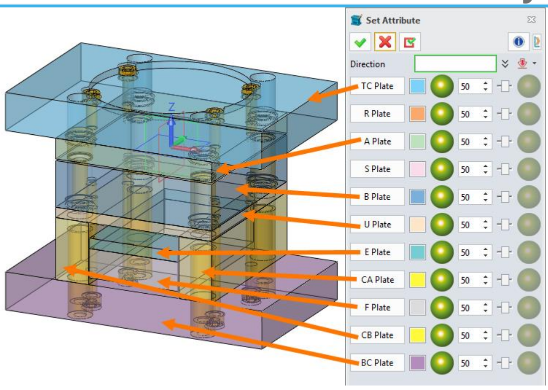


Figure 133 Set Attribute for All Plates

Up to now, you have finished building up the mold assembly.

2 Generate Excel Table & z3l

Key Points:

✧Generate excel table and z3l

✧Rules of table

✧Edit table and z3l

2.1 Data Table Generation

2.1.1 Excel and z3l Creation

STEP 01 Go to ***Tool*** tab, then use ***Library Publisher***.

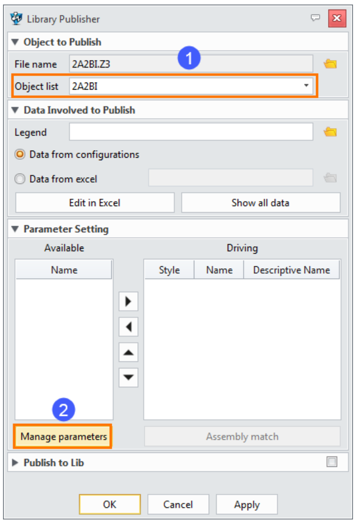


Figure 134 Library Publisher

It will switch to ***Config Table***.

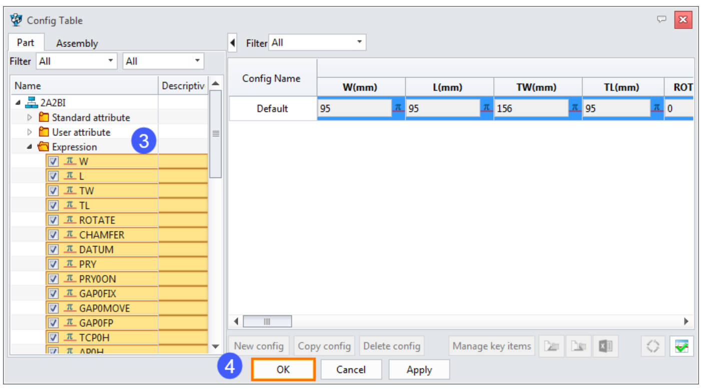


Figure 135 Configure Variables

STEP 02 Pick all variables to configure them, and click OK.

It will jump back to the ***Library Publisher***. All variables will be shown in the below list.

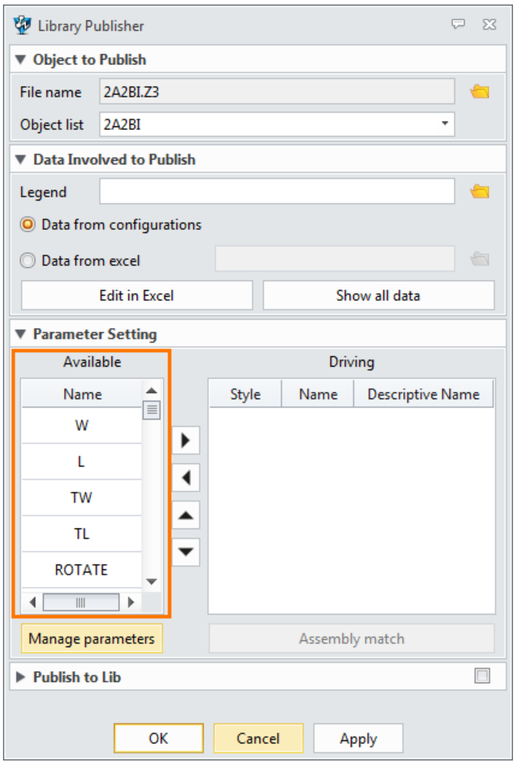


Figure 136 Available Variable List

STEP 03 Right-click some variables to set the ***Key*** and ***Custom*** parameters.

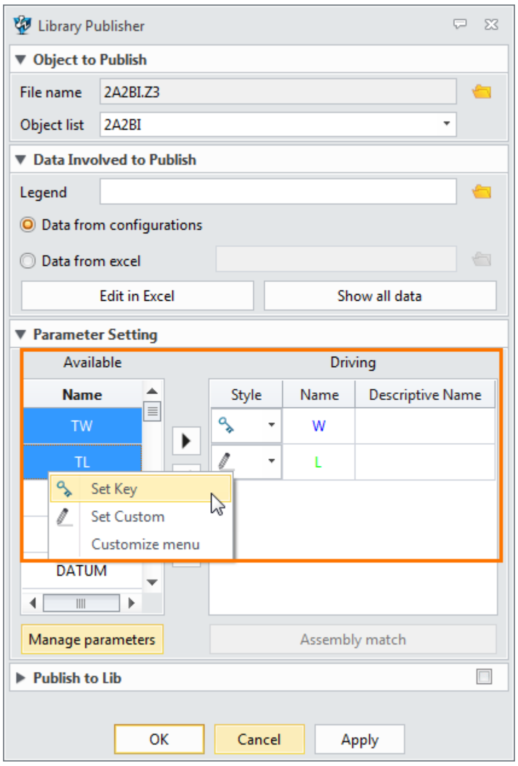


Figure 137 Set Key and Custom Parameters

STEP 04 After finishing the setting, click ***Data from excel***.

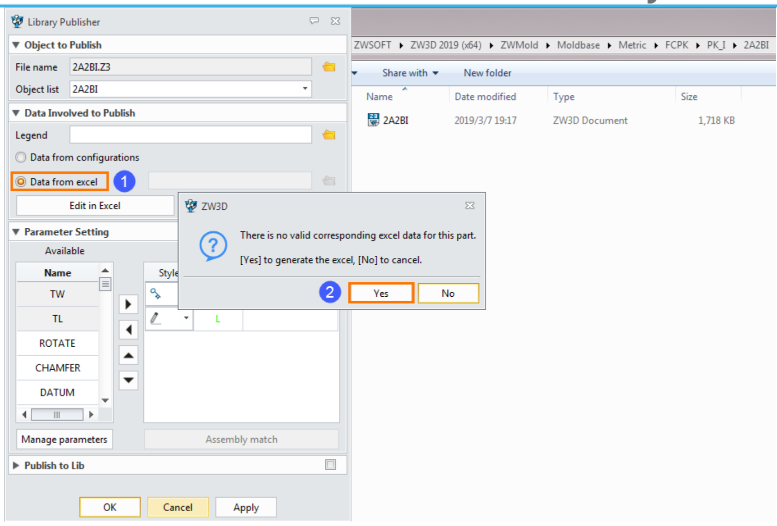


Figure 138 General Excel Table and z3l

It will automatically create excel file and txt file in the same folder of the z3l file.

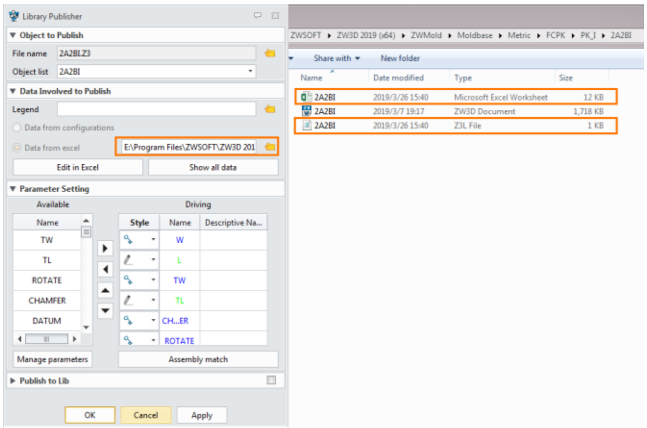


Figure 139 Excel Table and z3l in Folder

STEP 05 Open the 2A2BI.xls file, then we can see the 2A2BI tab has been created as below.

	A	B	C	D	E	F
1	**##KEYS**					
2	<NAME>	$BCPOMAT	$FPOMAT	$EPOMAT	$CPOMAT	$UPOMAT
3	<TAG>					
4	**##CUSTOMS**					
5	<NAME>	$L	$W	$GAPOFIX	$GAPOMOVE	$GAPOFP
6	<TAG>					
7	<MIN>					
8	<MAX>					
9						
10	**##DESCRIPTIONS**					
11	<NAME>					
12	<TAG>					
13	**##PARAMETER**					
14		$PRYOON(mm)	$CHAMFER(mm)	$ROTATE(deg)	$DATUM(mm)	$PRY(mm)
15	Default	0;1	0;1;2;3	0;90	4	8
16						
17						

2A2BI Sheet1

Figure 140 Assembly Tab in Excel

STEP 06 Close the excel file. Go back to ZW3D and activate the component ***PK01***.

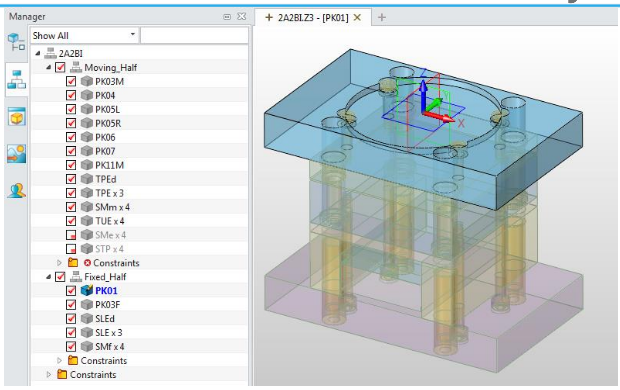


Figure 141 Activate PK01

STEP 07 Go to ***Tool*** tab, then use ***Library Publisher***

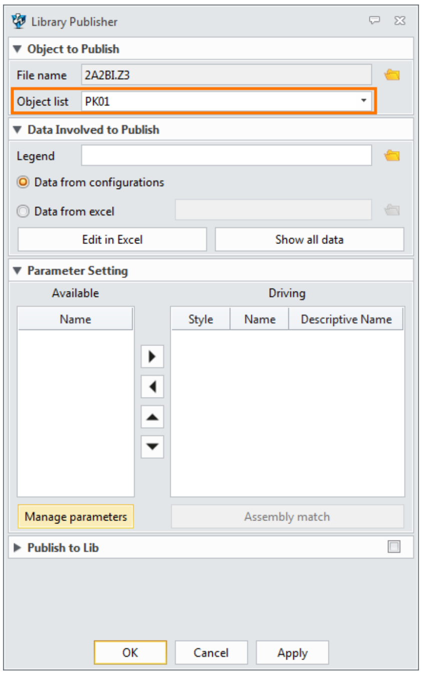


Figure 142 Publish PK01

STEP 08 Repeat the same steps as the ***2A2BI*** assembly.

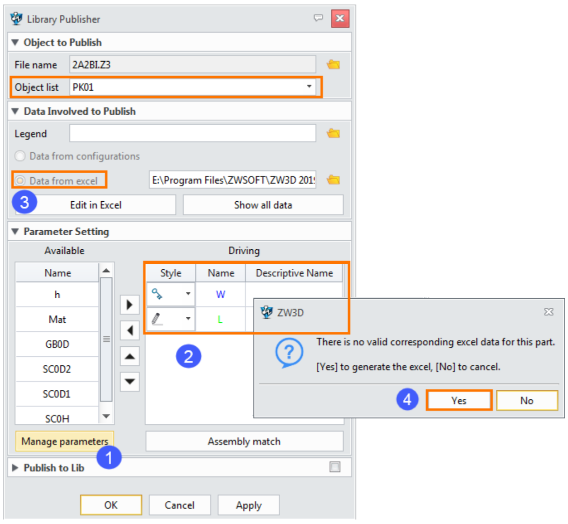
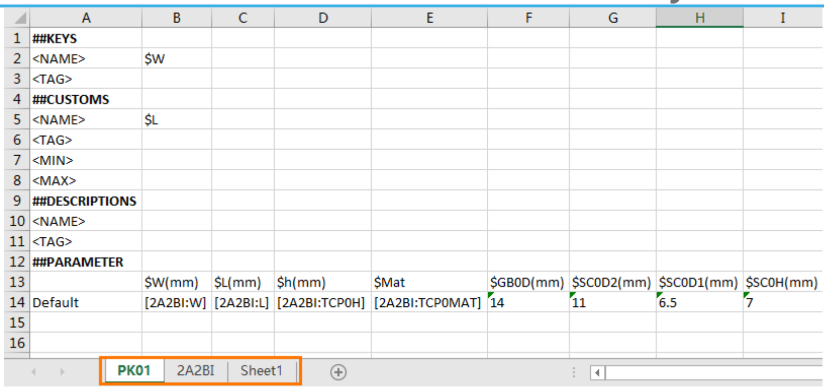


Figure 143 General Excel for PK01

STEP 09 Open the excel table ***2A2BI.xls*** again. The ***PK01*** tab has been created.



	A	B	C	D	E	F	G	H	I
1	##KEYS								
2	<NAME>	$W							
3	<TAG>								
4	##CUSTOMS								
5	<NAME>	$L							
6	<TAG>								
7	<MIN>								
8	<MAX>								
9	##DESCRIPTIONS								
10	<NAME>								
11	<TAG>								
12	##PARAMETER								
13		$W(mm)	$L(mm)	$h(mm)	$Mat	$GB0D(mm)	$SC0D2(mm)	$SC0D1(mm)	$SC0H(mm)
14	Default	[2A2BI:W]	[2A2BI:L]	[2A2BI:TCP0H]	[2A2BI:TCP0MAT]	14	11	6.5	7
15									
16									

Figure 144 PK01Tab in Excel

STEP 10 Continue to generate the excel data for other components. The results are shown as below.

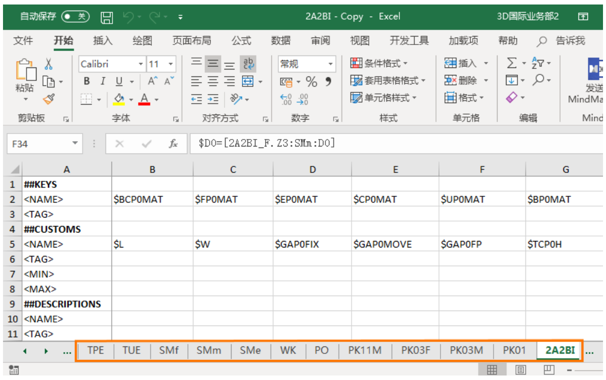


Figure 145 All Tabs in the Excel Table

STEP 11 Move 2A2BI tab to the first place.

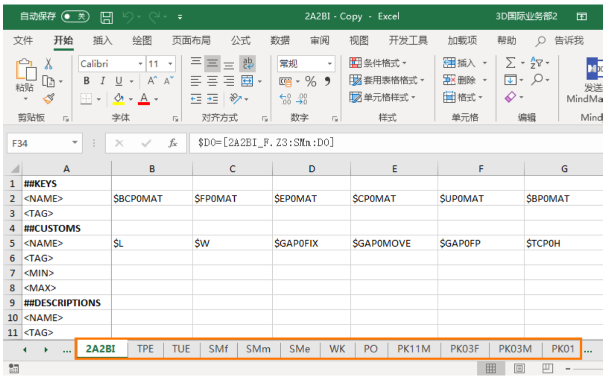


Figure 146 Figure 10 Adjust the Tab Order

Notes: *The sub-assemblies* ***Fixed_Half****,* ***Moving_Half*** *and* ***STP*** *have no parameters inside them, so there is no need to generate excel tab for it.*

STEP 12 Open the txt file. The assembly and components objects are automatically specified.

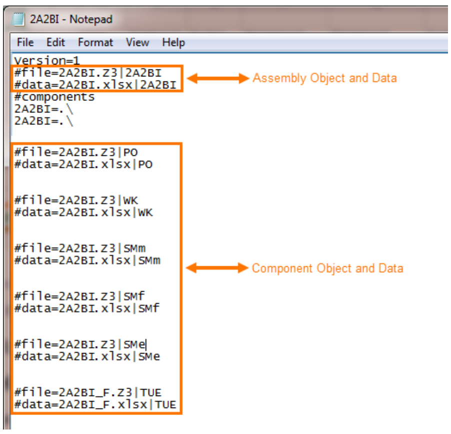


Figure 147 Generated z3l File

2.1.2 Excel and z3l Editing

1) Edit the excel file.

STEP 1 Open the 2A2BI.xls file. Add ***attributes*** and ***components*** items in the assembly ***2A2BI*** tab.

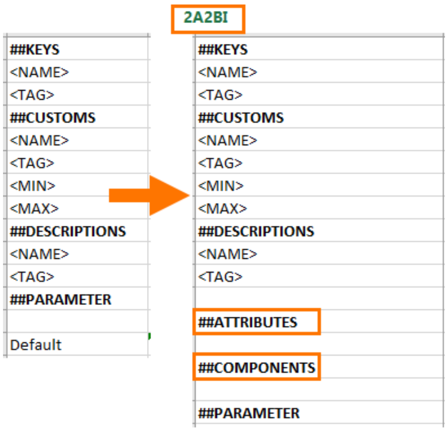


Figure 148 Add “##ATTRIBUTES” and “##COMPONENTS”

STEP 2 Add tags for all keys and custom parameters.

	A	B	C	D	E	F
1	##KEYS					
2	<NAME>	$BCP0MAT	$FP0MAT	$EP0MAT	$CP0MAT	$UP0MAT
3	<TAG>	BCP_matl	FP_matl	EP_matl	CP_matl	UP_matl
4	##CUSTOMS					
5	<NAME>	$L	$W	$GAP0FIX	$GAP0MOVE	$GAP0FP
6	<TAG>	L	W	Ga	Gb	Ge
7	<MIN>					
8	<MAX>					

Figure 149 Add Tags

STEP 3 Add <MIN> and <MAX> for all custom parameters. The values can be consulted from FCPK manual.

	A	B	C	D	E	F
1	##KEYS					
2	<NAME>	$BCP0MAT	$FP0MAT	$EP0MAT	$CP0MAT	$UP0MAT
3	<TAG>	BCP_matl	FP_matl	EP_matl	CP_matl	UP_matl
4	##CUSTOMS					
5	<NAME>	$L	$W	$GAP0FIX	$GAP0MOVE	$GAP0FP
6	<TAG>	L	W	Ga	Gb	Ge
7	<MIN>	50	50	0	0	0
8	<MAX>	2000	2000	2000	2000	2000

Figure 150 Add “MIN” and “MAX”

STEP 4 Add Attributes ***Name***, ***Material*** and ***Supplier*** in the assembly ***2A2B***

	A	B	C	D
4	##CUSTOMS			
5	<NAME>	$L	$W	$GAP0FIX
6	<TAG>	L	W	Ga
7	<MIN>	50	50	0
8	<MAX>	2000	2000	2000
9	##DESCRIPTIONS			
10	<NAME>			
11	<TAG>			
12				
13	##ATTRIBUTES			
14	Name=2A2BI[*ZMD_Internal_No]	Material=<NONE>	Supplier=FCPK	

Figure 151 Add Attributes

They are matched with the items in ***MoldBase*** command.

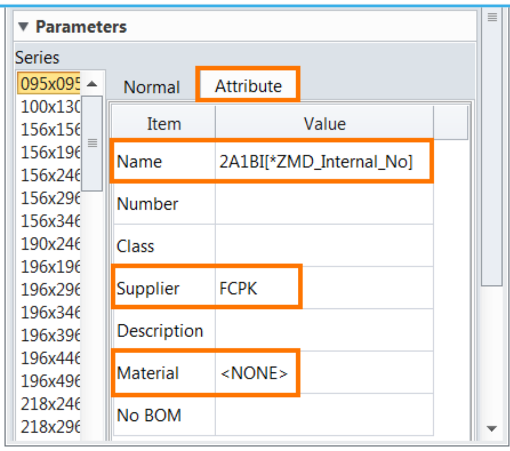


Figure 152 Attributes in MoldBase Command

[*ZMD_Internal_No] is a customized parameter for the mold series. For example, if you insert the series 095x095, the name of the inserted mold assembly will be ***2A2BI095x095***.

The default value of Material is <NONE>, and you can change it before inserting.

STEP 5 Add expressions under the ***Component*** item.

This part is the most difficult part in this tutorial. It requires users to equip with basic knowledge of parametric design.

Firstly, you need to know what's the meaning of all parameters, and which dimensions they drive.

Secondly, you need to know the relationship among parameters and know how to use equation and inequation.

Thirdly, you need to be familiar with the mold structure and know the relationship among components, like the mate of guide pin and pillar.

Then you can add equations or inequations for each component.

16	**##COMPONENTS**							
17	2A2BI_F.Z3:SMm	$d<=$SCBC0M	$l<=$BCP0H+$CP0H+$UP0H+$SCBC0M*0.5					
18	2A2BI_F.Z3:SMe	$d<=$SCEP0M	$l<=$FP0H+$EP0H-$SCEP0M-1					
19	2A2BI_F.Z3:SMf	$d<=$SCBC0M	$l<=$TCP0H+$SCBC0M*0.5					
20	2A2BI_F.Z3:WK	$d<=$SCP0M						
21	2A2BI_F.Z3:PO	$d1>=$SCP0M						
22	2A2BI_F.Z3:SLE	$d1<=$GP0D	$l<=$AP0H	L+l>=$AP0H+$BP0H+$GAP0FIX+$GAP0MOVE				
23	2A2BI_F.Z3:SLEd	$d1<=$GP0D	$l<=$AP0H	L+l>=$AP0H+$BP0H+$GAP0FIX+$GAP0MOVE				
24	2A2BI_F.Z3:TPE	$d1<=$GP0D	$L<=$BP0H					
25	2A2BI_F.Z3:TPEd	$d1<=$GP0D	$L<=$BP0H					
26	2A2BI_F.Z3:TUE	$d3<=$GP0D	$l>$BCP0H+$CP0H					
27	2A2BI_F.Z3:PK01	$GB0D<=$GP0D	$SC0D2=[2A2BI_F.Z3:SMf:D2]	$SC0D1=[2A2BI_F.Z3:SMf:D1]	$SC0H=[2A2BI_F.Z3:SMf:H]			
28	2A2BI_F.Z3:PK11M	$GB0D<=$GP0D	$SC0D2=[2A2BI_F.Z3:SMm:D2]	$SC0D1=[2A2BI_F.Z3:SMm:D1]	$SC0H=[2A2BI_F.Z3:SMm:H]			
29	2A2BI_F.Z3:PK03F	$M<=$SCBC0M	$GP0D2>[2A2BI_F.Z3:SLE:d2]	$GP0H=[2A2BI_F.Z3:SLE:s]	$GP0D1=[2A2BI_F.Z3:SLE:d1]	$D0=[2A2BI_F.Z3:SMf:D0]	$P=[2A2BI_F.Z3:SMf:P]	$L1=[2A2BI_F.Z3:SMf:L1]
30	2A2BI_F.Z3:PK03M	$M<=$SCBC0M	$GB0D2>[2A2BI_F.Z3:TPE:d2]	$GB0H=[2A2BI_F.Z3:TPE:s]	$GB0D1=[2A2BI_F.Z3:SLE:d1]	$D0=[2A2BI_F.Z3:SMm:D0]	$P=[2A2BI_F.Z3:SMm:P]	$L1=[2A2BI_F.Z3:SMm:L1]
31	2A2BI_F.Z3:PK04	$GB0D=[2A2BI_F.Z3:SLE:d1]	$SC0D=[2A2BI_F.Z3:SMm:D1]					
32	2A2BI_F.Z3:PK05L	$GB0D=[2A2BI_F.Z3:SLE:d1]	$SC0D=[2A2BI_F.Z3:SMm:D1]					
33	2A2BI_F.Z3:PK05R	$GB0D=[2A2BI_F.Z3:SLE:d1]	$SC0D=[2A2BI_F.Z3:SMm:D1]					
34	2A2BI_F.Z3:PK06	$M<=$SCEP0M	$SC0D=[2A2BI_F.Z3:SMe:D0]	$SC0P=[2A2BI_F.Z3:SMe:P]				
35	2A2BI_F.Z3:PK07	$SC0M<=$SCEP0M	$SC0D2=[2A2BI_F.Z3:SMe:D2]	$SC0H=[2A2BI_F.Z3:SMe:H]	$SC0D1=[2A2BI_F.Z3:SMe:D1]	$SP0M=[2A2BI_F.Z3:WK:d]	$SP0D=[2A2BI_F.Z3:WK:D0]	$SP0P=[2A2BI_F.Z3:WK:P]

Figure 153 Components Relations

STEP 6 Add ****ZMD_Internal_No*** under ***##Parameter*** in the assembly ***2A2B***.

##PARAMETER						
*ZMD_Internal_No	$PRY0ON(mm)	$CHAMFER(mm)	$ROTATE(deg)	$DATUM(mm)	$PRY(mm)	$GAP0FIX(mm)
Default	0;1	0;1;2;3	0;90	4	8	0.5

Figure 154 Add "ZMD_Internal_No"

STEP 7 Add ***attributes*** item in every component tab. Take PK01 as an example.

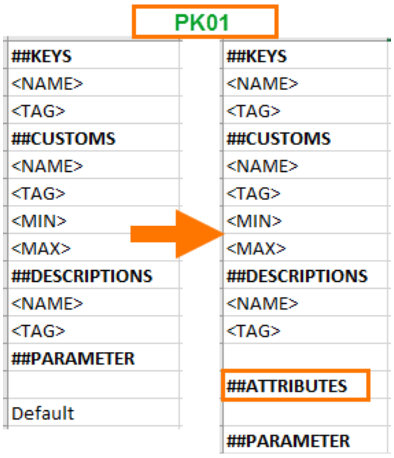


Figure 155 Add "##ATTRIBUTES" in Components

STEP 8 Add ***Name***, ***Number***, ***Material***, and ***Supplier*** under ***##ATTRIBUTES*** in components.

For the components, the material is driven by the string variable ***$Mat***.

1	##KEYS			
2	<NAME>			
3	<TAG>			
4	##CUSTOMS			
5	<NAME>			
6	<TAG>			
7	<MIN>			
8	<MAX>			
9	##DESCRIPTIONS			
10	<NAME>			
11	<TAG>			
12				
13	##ATTRIBUTES			
14	Name=PK01_[$W%n]x[$L%n]x[$h%n]	Number=PK01-[$W%n]x[$L%n]x[$h%n]/[$Mat]	Material=[$Mat]	Supplier=FCPK
15				
16	##PARAMETER			
17		$GB0D(mm)	$SC0D2(mm)	$SC0D1(mm)
18		14;20;26;30;42;54	8;10;11;14;18;20;23;26;32;	4.5;5.5;6.5;9;11;13;15;18;22

Figure 156 Add Attributes in Components

STEP 9 Save the excel table.

1) Edit the z3l file

STEP 1 Open the z3l file.

a) Delete the item ***#components***.

b) Add item ***keysSequence***, and add all key parameters.

c) Change items ***2A2BI=.*** to ***#IMAGE***.

d) Add ***Group*** items with parameters included.

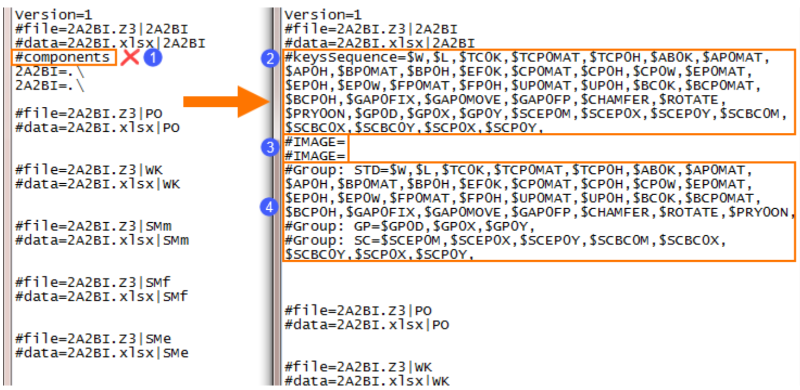


Figure 157 Add Items in z3l

Notes:

*Key parameters should be the same with those in the **2A2BI** tab of the excel file.*

The parameters in ***Group*** should be picked from the key parameters.

STEP 2 Save the zl3 file.

3 Link to Images

Key Points:
- ✧Link to images
- ✧Edit configuration files
- ✧Record data

3.1 Add Images

STEP 1 Create an image named ***2A2BI_F*** in the same folder of ***2A2BI.z3***.

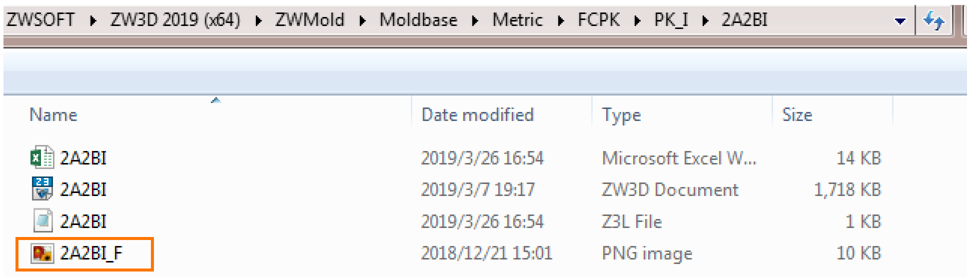


Figure 158 Add General-View Image

STEP 2 Add some general information about the mold in the image.

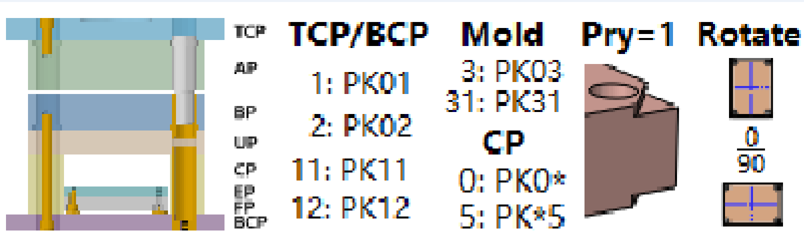


Figure 159 General-View Image

STEP 3 Create another image named ***2A2BI_FF*** in the same folder.

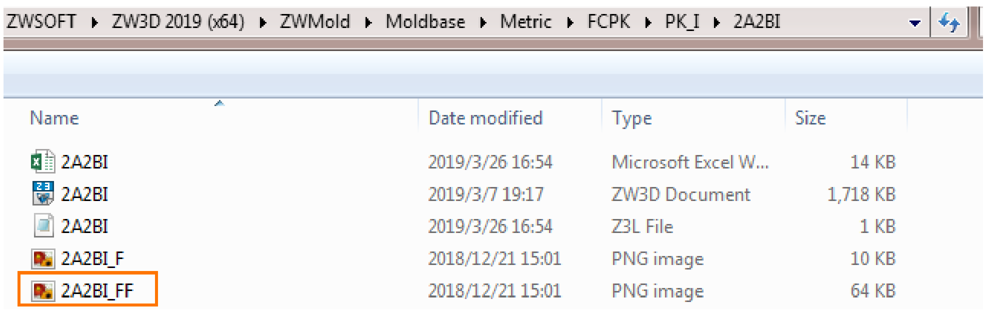


Figure 160 Add Detailed Image

STEP 4 Add some important parameters in this image for illustration.

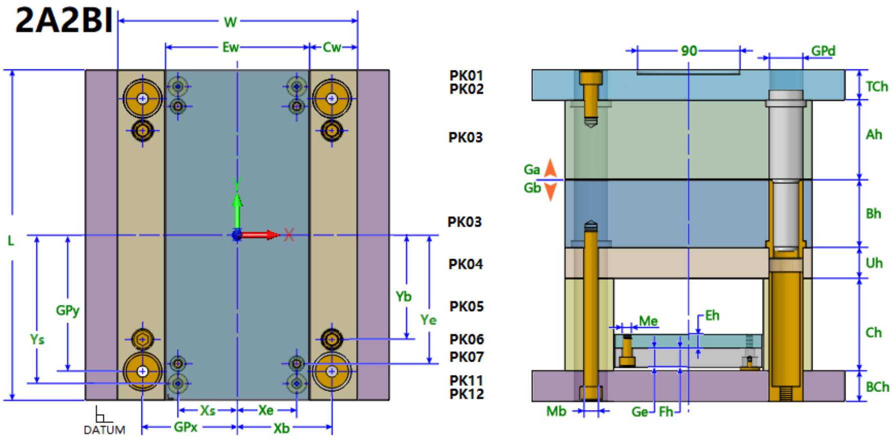


Figure 161 Detailed Image

STEP 5 Add these two images' name to the z3l file.

```
version=1
#file=2A2BI.z3|2A2BI
#data=2A2BI.xlsx|2A2BI
#keysSequence=$W,$L,$TCOK,$TCPOMAT,$TCPOH,$ABOK,$APOMAT,
$APOH,$BPOMAT,$BPOH,$EFOK,$CPOMAT,$CPOH,$CPOW,$EPOMAT,
$EPOH,$EPOW,$FPOMAT,$FPOH,$UPOMAT,$UPOH,$BCOK,$BCPOMAT,
$BCPOH,$GAPOFIX,$GAPOMOVE,$GAPOFP,$CHAMFER,$ROTATE,
$PRYOON,$GPOD,$GPOX,$GPOY,$SCEPOM,$SCEPOX,$SCEPOY,$SCBCOM,
$SCBCOX,$SCBCOY,$SCPOX,$SCPOY,
#IMAGE=2A2BI_F.png
#IMAGE=2A2BI_FF.png
#Group: STD=$W,$L,$TCOK,$TCPOMAT,$TCPOH,$ABOK,$APOMAT,
$APOH,$BPOMAT,$BPOH,$EFOK,$CPOMAT,$CPOH,$CPOW,$EPOMAT,
$EPOH,$EPOW,$FPOMAT,$FPOH,$UPOMAT,$UPOH,$BCOK,$BCPOMAT,
$BCPOH,$GAPOFIX,$GAPOMOVE,$GAPOFP,$CHAMFER,$ROTATE,$PRYOON,
#Group: GP=$GPOD,$GPOX,$GPOY,
#Group: SC=$SCEPOM,$SCEPOX,$SCEPOY,$SCBCOM,$SCBCOX,
$SCBCOY,$SCPOX,$SCPOY,
```

Figure 162 Specify the Images

3.2 Configuration File Modification

STEP 1 Open the configuration file of the mold base in the ***Metric*** folder.

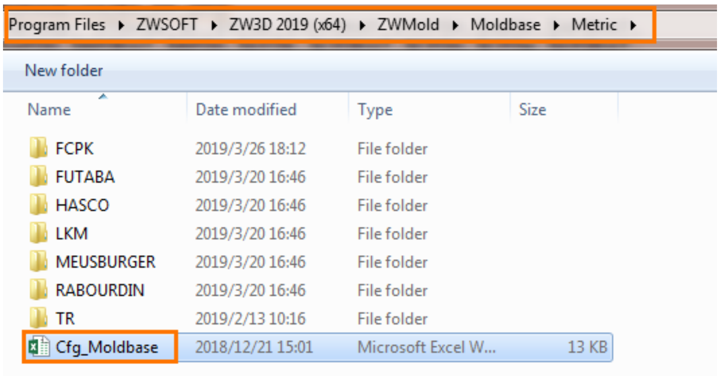


Figure 163 Configuration File

STEP 2 Add the information of supplier, type, class, path of the z3 file and object in root manager to the configuration file.

	A	B	C	D	E
1	#SUPPLIER	#TYPE	#CLASS	#PATH	#ROOTOBJECT
2	FCPK	PK_I	1A1BI	\FCPK\PK_I\1A1BI\1A1BI_F.Z3	1A1BI
3			2A1BI	\FCPK\PK_I\2A1BI\2A1BI_F.Z3	2A1BI
4			2A2BI	\FCPK\PK_I\2A2BI\2A2BI.Z3	2A2BI
5			3A1BI	\FCPK\PK_I\3A1BI\3A1BI_F.Z3	3A1BI
6			3A2BI	\FCPK\PK_I\3A2BI\3A2BI_F.Z3	3A2BI
7		PK_H	1A1BH	\FCPK\PK_H\1A1BH\1A1BH_F.Z3	1A1BH
8			2A1BH	\FCPK\PK_H\2A1BH\2A1BH_F.Z3	2A1BH
9			2A2BH	\FCPK\PK_H\2A2BH\2A2BH_F.Z3	2A2BH
10			3A1BH	\FCPK\PK_H\3A1BH\3A1BH_F.Z3	3A1BH
11			3A2BH	\FCPK\PK_H\3A2BH\3A2BH_F.Z3	3A2BH

Figure 164 Add Information of the Mold Assembly

3.3 Data Record

STEP 1 Open the excel file. Add all series numbers and values for all variables.

47	##PARAMETER				
48	*ZMD_Internal_No	$PRYOON(mm)	$CHAMFER(mm)	$ROTATE(deg)	$DATUM(mm)
49	095x095	0;1	0;1;2;3	0;90	4
50	095x095	0;1	0;1;2;3	0;90	4
51	100x130	0;1	0;1;2;3	0;90	5
52	100x130	0;1	0;1;2;3	0;90	5
53	156x156	0;1	0;1;2;3	0;90	6
54	156x156	0;1	0;1;2;3	0;90	6
55	156x156	0;1	0;1;2;3	0;90	6
56	156x156	0;1	0;1;2;3	0;90	6
57	156x196	0;1	0;1;2;3	0;90	6
58	156x196	0;1	0;1;2;3	0;90	6
59	156x196	0;1	0;1;2;3	0;90	6
60	156x196	0;1	0;1;2;3	0;90	6
61	156x246	0;1	0;1;2;3	0;90	6
62	156x246	0;1	0;1;2;3	0;90	6

2A2BI | SLEd | SLE | TPEd | TPE | TUE | SMf | SMm | SMe | WK

Figure 165 Record Data

They will be shown in ***MoldBase*** command.

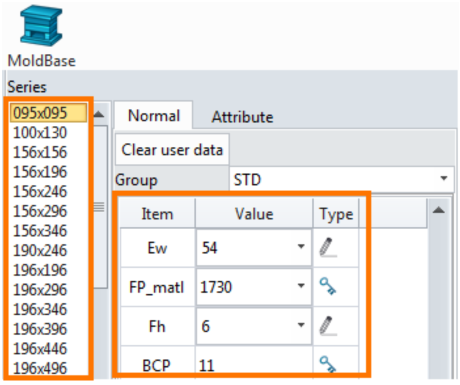


Figure 166 Data Shown in MoldBase Command

STEP 2 Add values for variables of all components.

##PARAMETER							
	$d1(mm)	$d(mm)	$L(mm)	$l(mm)	$s(mm)	$d2(mm)	$f(mm)
	14	9	25;45;65	12	3	16	3
	14	9	20;30;50;70	17	3	16	3
	14	9	25;35;55;75;95	22	3	16	3
	14	9	20;30;50;70;90	27	3	16	3
	14	9	25;45;65;85	36	3	16	3
	14	9	30;45;70	46	3	16	3
	14	9	35;60	56	3	16	3
	20	14	35;55;75;95	17	6	25	9

2A2BI | SLEd | SLE | TPEd | TPE | TUE | SMf | SMm | SMe | WK | PO | PK01

Figure 167 Data in Component Tabs

In the component tabs, you don't have to add series numbers again.

Now you have finished your own library.

4 Summary

It is recommended that you learn ZW3D before trying to customize your own assembly. It requires you to get a good command of parameter design, assembly design and mold knowledge.

The method we have mentioned above is flexible. You can follow the tutorials strictly or you can adjust your steps according to your requirements. For example, if you don't want to add relationships between components, you can use more variables. If you are a ***Shape-Mode*** user, you don't have to add constraints.

Once you know how to make one library, you'll know how to make all the others and which suits you better.

Thanks for learning this tutorial, if you have any questions, feel free to contact us at *sales@zwsoft.com*.