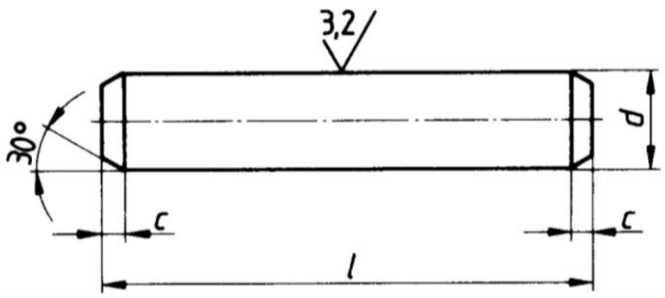
Cadify tutorials
Clevis Pin Tutorial

GOAL OF THIS TUTORIAL

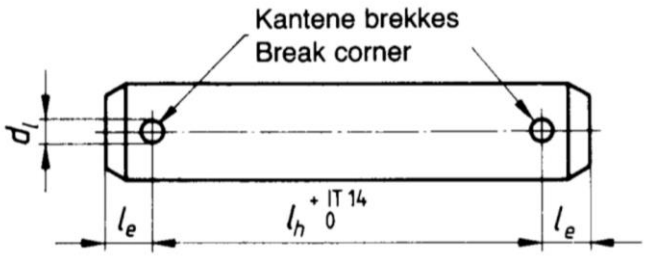
Create a Cadify product based on the ISO 2340 Celvis Pin standard, which has different configurations. Geometry and drive dimensions change between configurations.

Configurations

Type A
Uten splinthull
Without split pin holes



Type B
Med splinthull
With split pin holes



Configuration	Split pin holes	Pin diameter *d*	Total length *l*	Split pin hole diameter d_l	Length between split pin holes l_h
Type A Standard	No	Std(1)	Std(1)	-	-
Type A Custom	No	Std(1)	Custom	-	-
Type B Standard	Yes	Std(1)	Std(1)	Std(2)	Std (3)
Type B Custom	Yes	Std(1)	Std or Custom (3)	Std or Custom (3)	Std or Custom (3)

(1) Available values from a list.
(2) Each pin diameter has a standard specific split pin hole diameter.
(3) Customization can be made in one or more dimensions.

In this tutorial a clevis pin product will be created from scratch. Examples of 3D model and excel file can be found in this links: Excel file *;* SW zip folder

Steps and learning strategies

To simplify the understanding this will be split into steps, each step will add new features. Some of these features belong to Cadify and the rest are Excel functions, both together will be used to create the clevis pin product.

STEP 0 – DRAFT CLEVIS PIN. This part is like the previous tutorials and shows the strategy to draft the pin in concordance with the dimensions shown in the ISO 2340.

STEP 1 – CREATE CADIFY PRODUCT FOR CONFIGURATIONS “TYPE A & B STANDARD”. This step shows how to set up configurations and select values from lists depending on previous selected values.

STEP 2 – ADD CONFIGURATIONS “TYPE A & B CUSTOM”. This step adds extra features needed to select between standard or custom values.

STEP 3 – FORMATTING. This step shows an example of formatting excel sheet and distributing information and formulas in it.

STEP 4 – CREATE DRAWING. This step adds one drawing for both type “A” or “B” pin.

STEP 5 – IMAGES IN SUMMARY TAB. This step adds images to help the user to select proper dimensions.

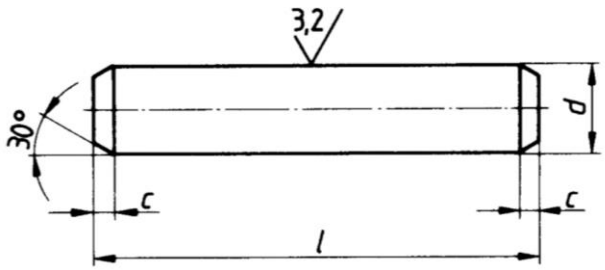
STEP 6 – PRODUCT VALIDATION. This step runs validation tools before publishing.

STEP 0 – DRAFT CLEVIS PIN

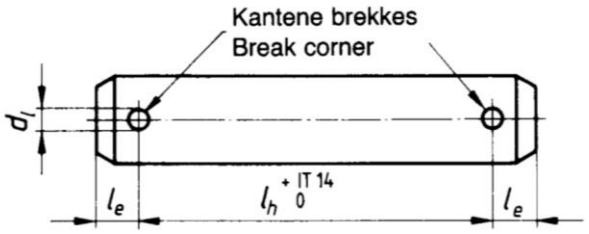
Draft the ISO 2340 clevis pin without head. The dimensions must be in concordance with the ones shown in the standard.

Comment: use a cut-extrude feature to create the split pin holes.

Type A
Uten splinthull
Without split pin holes



Type B
Med splinthull
With split pin holes



Notes, type B

1 Other dimensions, angles and surface roughness value see type A.

2 In cases where a distance l which is not in accordance with $l–2l_e$ is necessary, this distance should be fixed in the designation (see clause 5), but in no case may the values for l_e be smaller than those given in the table.

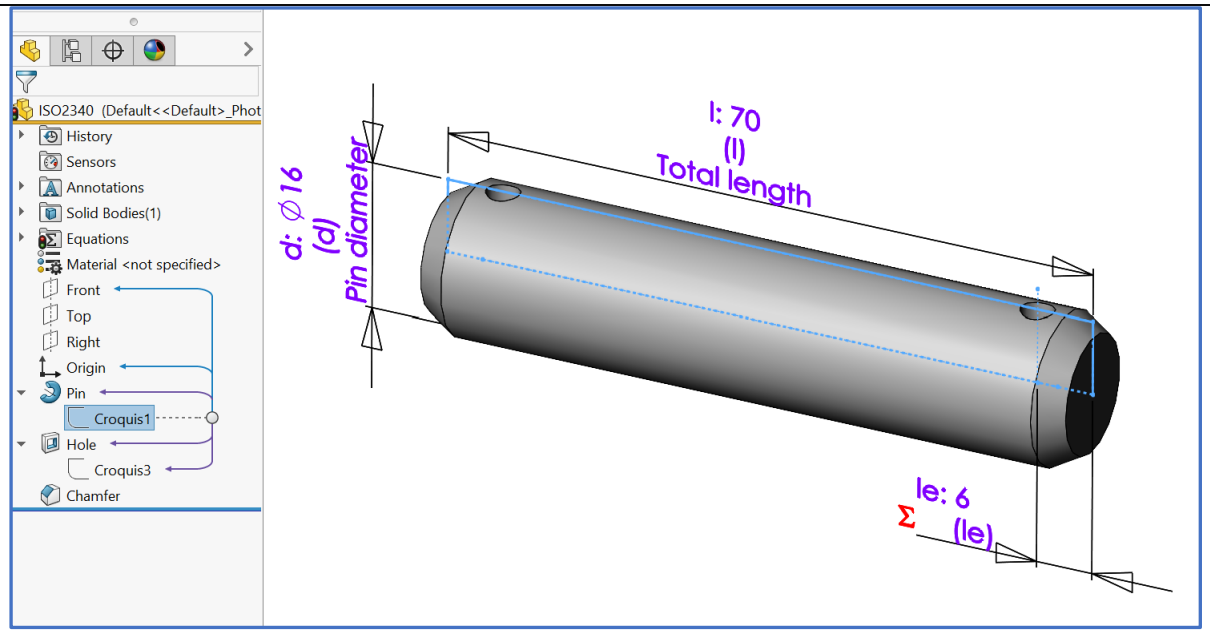
Note
For railway applications and in cases where the split pins are subjected to alternating transverse forces, it is recommended that the next larger split pin and corresponding hole diameter to that specified be used.

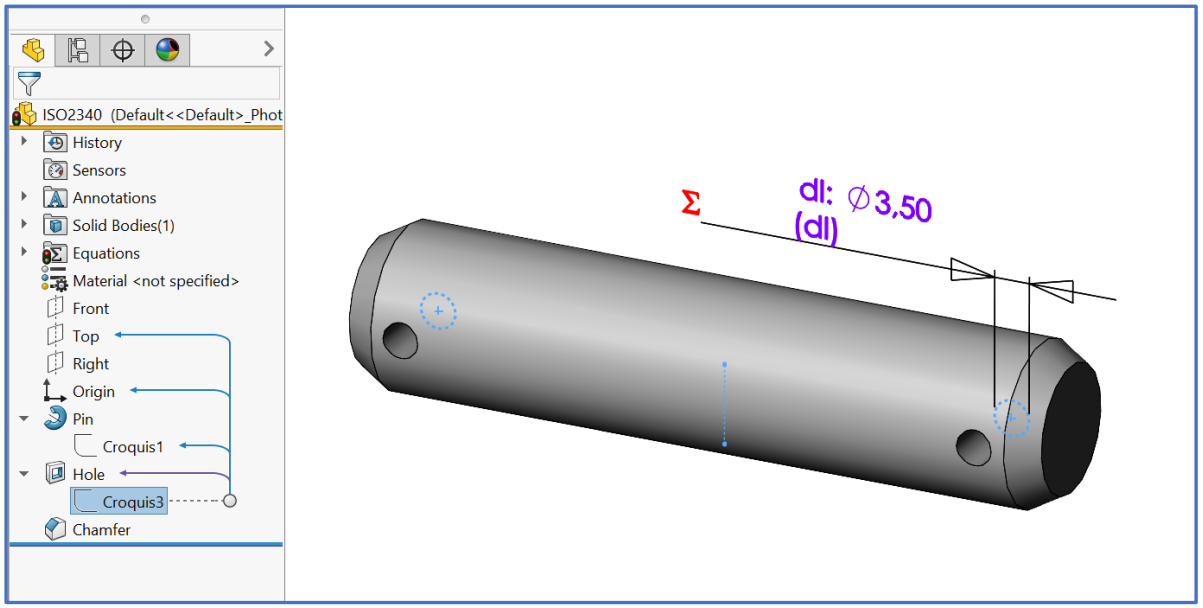
Dimensjoner i millimeter
Dimensions in millimetres

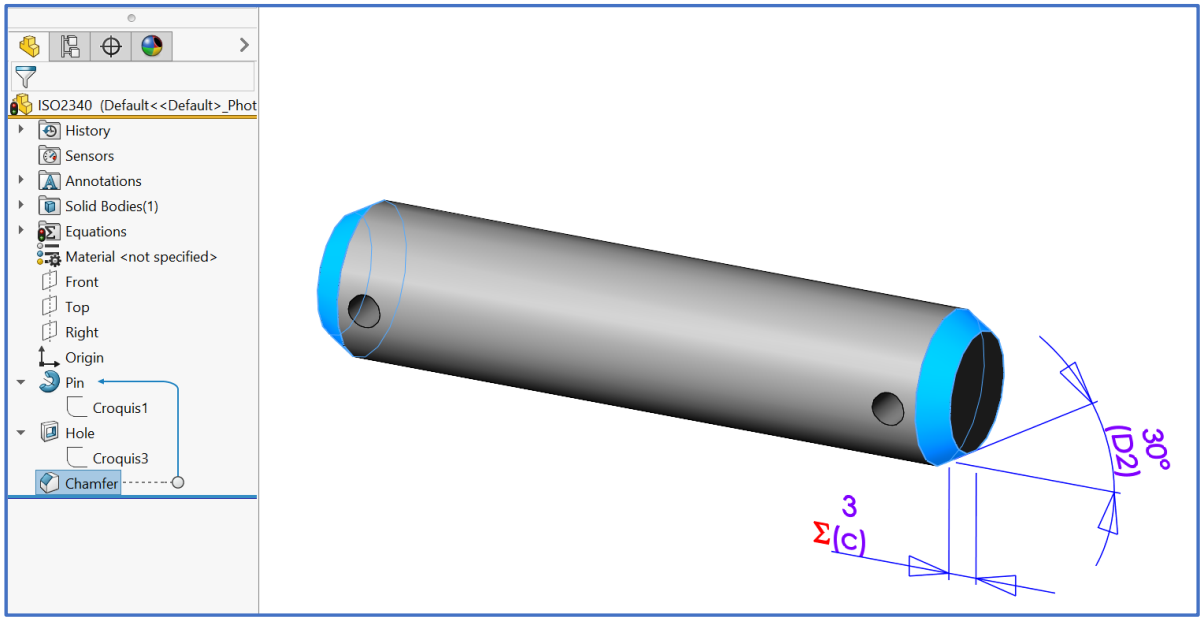
d h11[1]	3	4	5	6	8	10	12	14	16	18	20	22	24	27	30	33	36	40	45	50	55	60	70	80	90	100
d_1 H13[2]	0,8	1	1,2	1,6	2	3,2	3,2	4	4	5	5	5	6,3	6,3	8	8	8	8	10	10	10	10	13	13	13	13
c maks.	1	1	2	2	2	2	3	3	3	3	4	4	4	4	4	4	4	4	4	4	6	6	6	6	6	6
l_e min.	1,6	2,2	2,9	3,2	3,5	4,5	5,5	6	6	7	8	8	9	9	10	10	10	10	12	12	14	14	16	16	16	16

l[3] nom.	min.	maks.
6	5,75	6,25
8	7,75	8,25
10	9,75	10,25
12	11,5	12,5
14	13,5	14,5
16	15,5	16,5
18	17,5	18,5
20	19,5	20,5
22	21,5	22,5
24	23,5	24,5
26	25,5	26,5
28	27,5	28,5
30	29,5	30,5
32	31,5	32,5
35	34,5	35,5
40	39,5	40,5
45	44,5	45,5
50	49,5	50,5
55	54,25	55,75
60	59,25	60,75
65	64,25	65,75
70	69,25	70,75
75	74,25	75,75
80	79,25	80,75
85	84,25	85,75
90	89,25	90,75
95	94,25	95,75
100	99,25	100,75
120	119,25	120,75
140	139,25	140,75
160	159,25	160,75
180	179,25	180,75
200	199,25	200,75

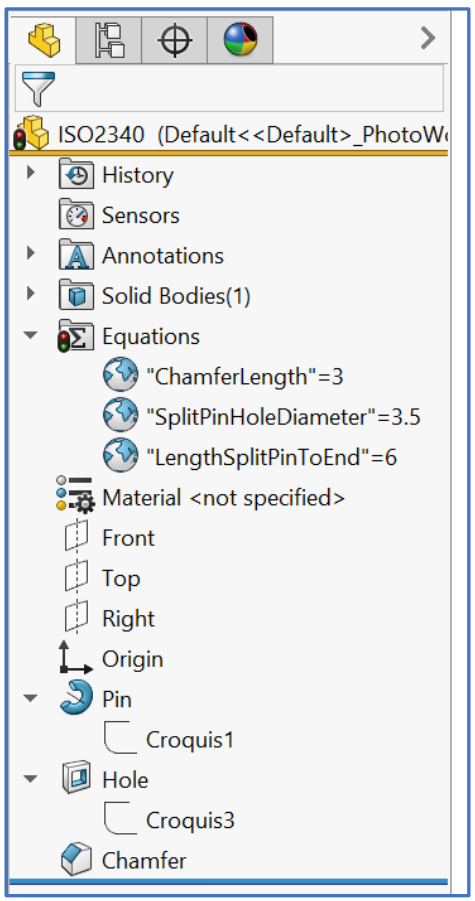
Vanlig lagerførte lengder
Range of commercial lengths


ISO2340 (Default<<Default>_Phot
History
Sensors
Annotations
Solid Bodies(1)
Equations
Material <not specified>
Front
Top
Right
Origin
Pin
Croquis1
Hole
Croquis3
Chamfer
l: 70
(l)
Total length
d: ∅16
(d)
Pin diameter
le: 6
Σ
(le)


ISO2340 (Default<<Default>_Phot
History
Sensors
Annotations
Solid Bodies(1)
Equations
Material <not specified>
Front
Top
Right
Origin
Pin
Croquis1
Hole
Croquis3
Chamfer
Σ
dl: ∅3,50
(dl)


ISO2340 (Default<<Default>_Phot
History
Sensors
Annotations
Solid Bodies(1)
Equations
Material <not specified>
Front
Top
Right
Origin
Pin
Croquis1
Hole
Croquis3
Chamfer
30°
(D2)
3
Σ(c)

Create the shown global variables and link them with the dimensions: “ChamferLength” to “c”; “SplitPinHoleDiameter” to “dl” and”LengthSplitPinToEnd” to “le”.

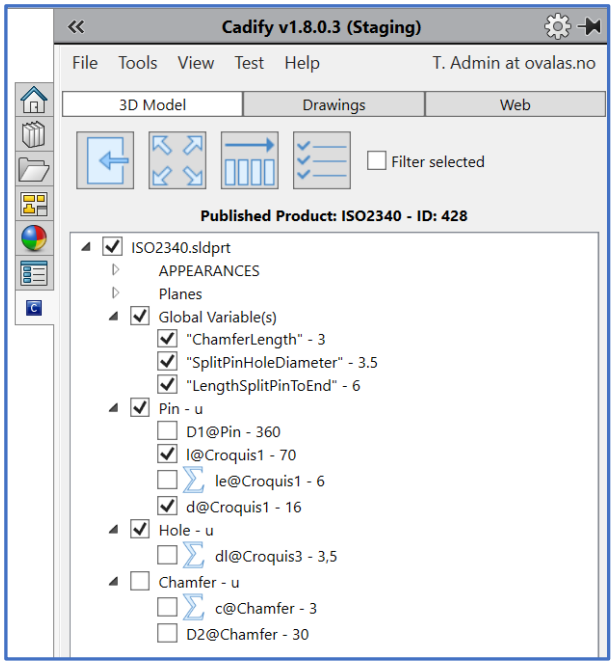


Comment: save as raw before continuing with the tutorial. Regularly save the document.

STEP 1 – CREATE CADIFY PRODUCT FOR CONFIGURATIONS "TYPE A & B STANDARD"

Select dimensions and features to be controlled by Cadify

Select dimensions and features in Cadify "3D Model" tab. The "Hole" features must be selected to control the suppression state of the split pin holes. The 3D model connection section will be automatically updated.

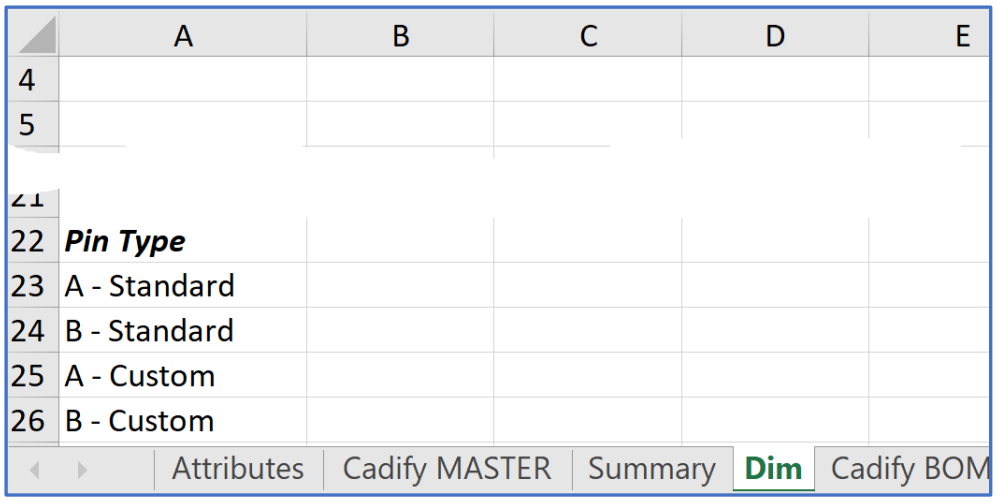


AE	AF	AG	AH	AI
ISO2340.sldprt				
Feature name	Value	Unit	API type	
ISO2340.sldprt			PART<	
Global Variable(s)			GLOBAL VARIABLE<	
"ChamferLength"	3		GLOBAL VARIABLE\	
"SplitPinHoleDiameter"	3,5		GLOBAL VARIABLE\	
"LengthSplitPinToEnd"	6		GLOBAL VARIABLE\	
Global Variable(s)			GLOBAL VARIABLE>	
Pin	u		BODYFEATURE<	
l@Croquis1	70	mm	DIMENSION\	
d@Croquis1	16	mm	DIMENSION\	
Pin			BODYFEATURE>	
Hole	u		BODYFEATURE\	
ISO2340.sldprt			PART>	

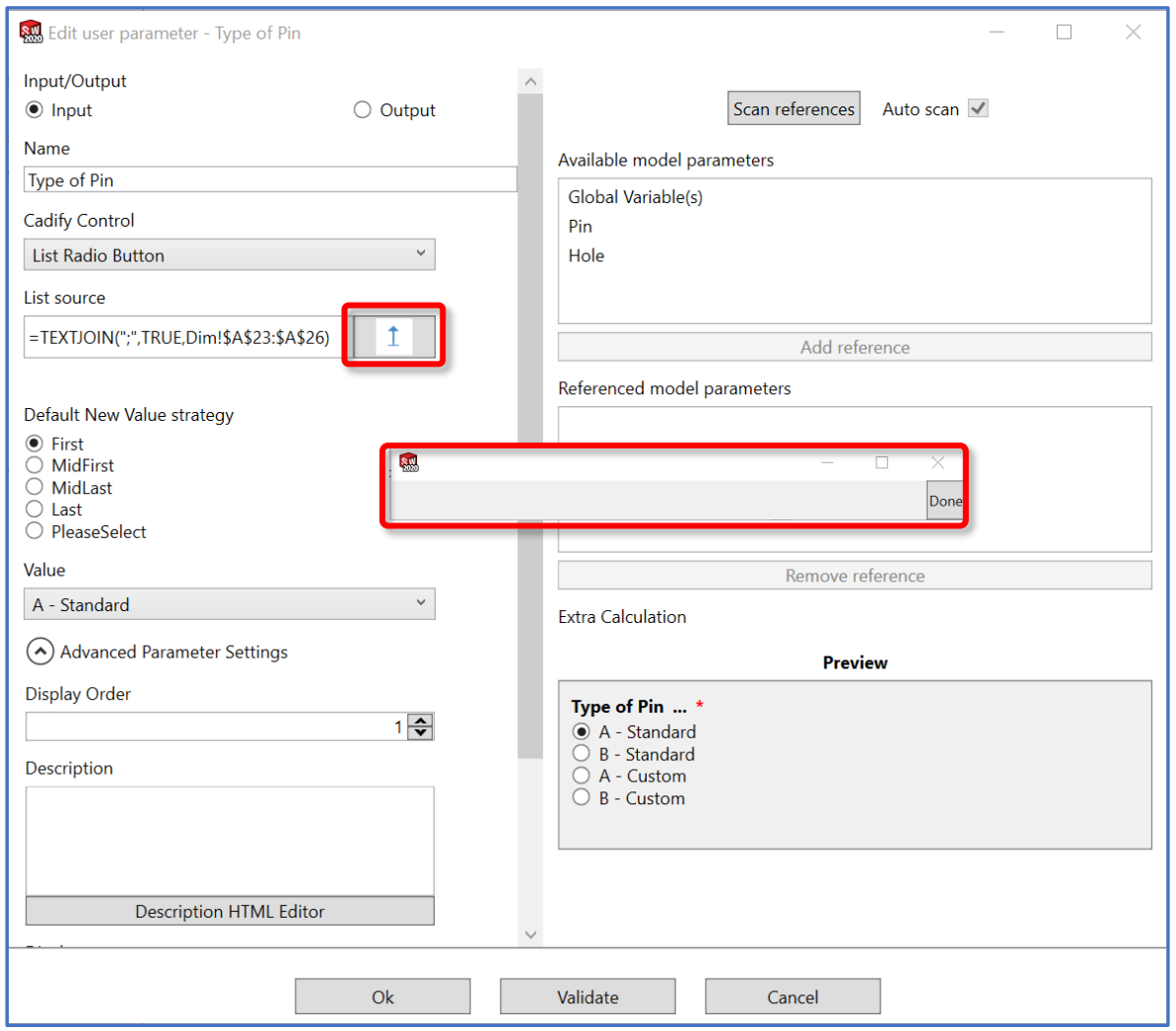
Create a list user's parameter to select configuration

Create a new sheet in Excel (in this tutorial is "Dim"). In this sheet will be added all the data from the standard ISO 2340 and the calculations. Create a list of configurations as shown in the image.

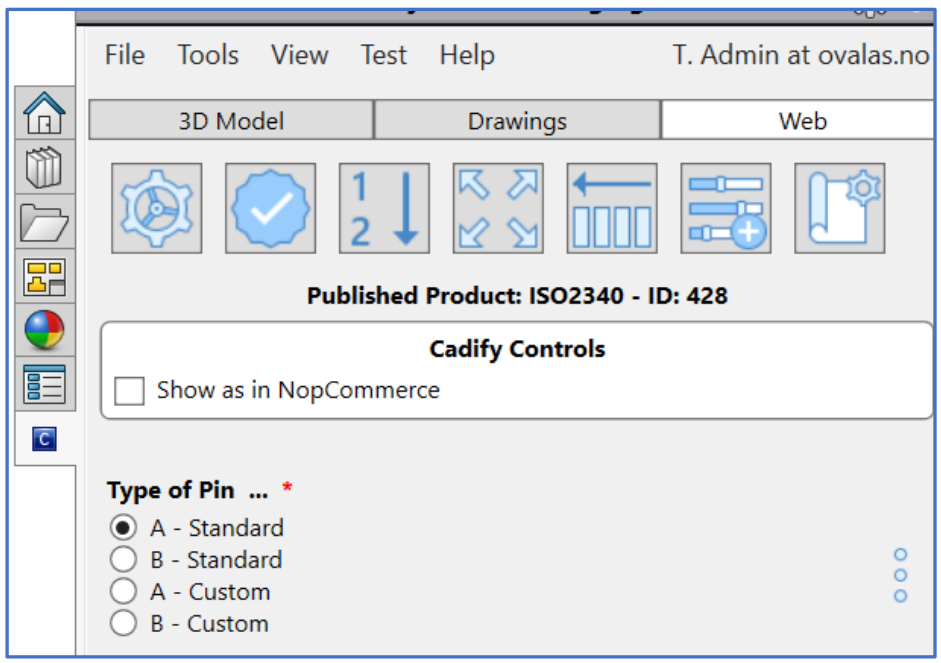
Comment: it's helpful to leave free rows in the top of the sheet, to add extra information or calculations later.



Create a new user's parameter based on the previous list as shown. By clicking on the "List source" button, a window will open where select the cells with the listed values.



Validate and click "ok" to finish the parameter creation.



Prepare information before creating user's parameters

Before creating the parameters, add the data of the ISO 2340 to the "Dim" sheet and apply the Excel's functions: *match*, *index*, *sort* and *filter*.

Comment: the clevis pin diameter is the mandatory value for the rest of the dimensions. That's the reason to use match, index, sort and filter.

	G	H	I	J	K	L	M	O	P
17		Standard values from table below for each diameter						Filtering lenghts for each selected diameter	
18		Pin diameter	Split pin hole diameter	Chamfer length	Split pin distance	Minimum length	Maximum length	Available standard lengths	Lengths for selected diameter
19		d	dl	c	le			l	
20	Row	mm	mm	mm	mm	mm	mm	mm	mm
21	9	C	4	3	6,0	32	160		
22									
23	B 1	3	A 0,8	1	1,6	6	30	6	D 32
24	2	4	1	1	2,2	8	40	8	35
25	3	5	1,2	2	2,9	10	50	10	40
26	4	6	1,6	2	3,2	12	60	12	45
27	5	8	2	2	3,5	16	80	14	50
28	6	10	3,2	2	4,5	20	100	16	55
29	7	12	3,2	3	5,5	24	120	18	60
30	8	14	4	3	6	28	140	20	65
31	9	16	4	3	6	32	160	22	70
32	10	18	5	3	7	35	180	24	75
33	11	20	5	4	8	40	200	26	80
34	12	22	5	4	8	45	200	28	85
35	13	24	6,3	4	9	50	200	30	90
36	14	27	6,3	4	9	55	200	32	95
37	15	30	8	4	10	60	200	35	100
38	16	33	8	4	10	65	200	40	120
39	17	36	8	4	10	70	200	45	140
40	18	40	8	4	10	80	200	50	160
41	19	45	10	4	12	90	200	55	
42	20	50	10	4	12	100	200	60	
43	21	55	10	6	14	120	200	65	
44	22	60	10	6	14	120	200	70	
45	23	70	13	6	16	140	200	75	
46	24	80	13	6	16	160	200	80	
47	25	90	13	6	16	180	200	85	
48	26	100	13	6	16	200	200	90	
49								95	
50								100	
51								120	
52								140	
53								160	
54								180	
55								200	

Cadify MASTER | Summary | Dim | Cadify BOM | Proxy | Lists

	B	C	D	F	G	H
19		260			u	
20		270		ject Button	u	
21	32;35;40;45;50;5	On;20;Require		ength A-Standard	70	mm
22	Pin Diameter ; 3;4;5;6;8;10;12;1	On;10;Required;EDT;pleaseSelect	List Numeric	Pin Diameter	16	mm
23	A - Standard;B - St	On;1;Required;EDT;first	List Radio Button	Type of Pin	B - Custom	

Cell used in Dim!G21 formula. Later in the tutorial this cell creation will be explained.

Attributes | Cadify MASTER | Summary | Dim | Cadify BOM | Proxy | Lists

A: data copied from the standard.

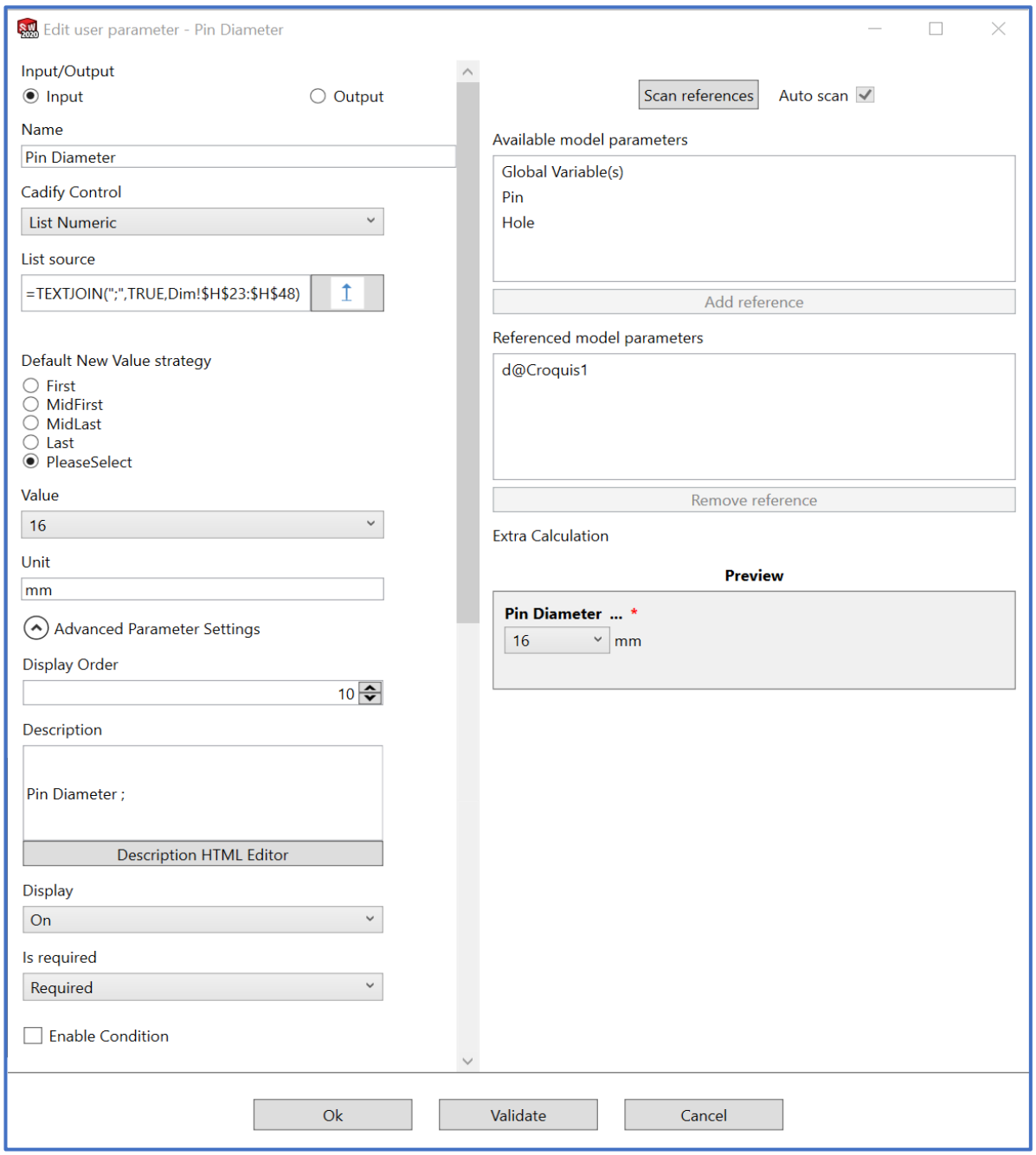
B: numbering rows; it's information added to help Excel programming.

C & D: cells with formulas.

- *G21 = MATCH('Cadify MASTER'!G22;H23:H48;0); this formula returns the row number that matches the selected pin diameter.*
- *I21 = INDEX(I23:I48;G21); this formula returns the "dl" value that corresponds to selected pin diameter.*
- *J21 = INDEX(J23:J48;G21); this formula returns the "c" value that corresponds to selected pin diameter.*
- *K21 = INDEX(K23:K48;G21); this formula returns the "le" value that corresponds to selected pin diameter.*
- *L21 = INDEX(L23:L48;G21); this formula returns the "Minimum length" value that corresponds to selected pin diameter.*
- *M21 = INDEX(M23:M48;G21); this formula returns the "Maximum length" value that corresponds to selected pin diameter.*
- *P23 to P40 = SORT(FILTER(O23:O55;(O23:O55>=L21)*(O23:O55<=M21))); this formula returns the range of lengths that correspond to the selected pin diameter.*

Create user's parameters for the pin diameter

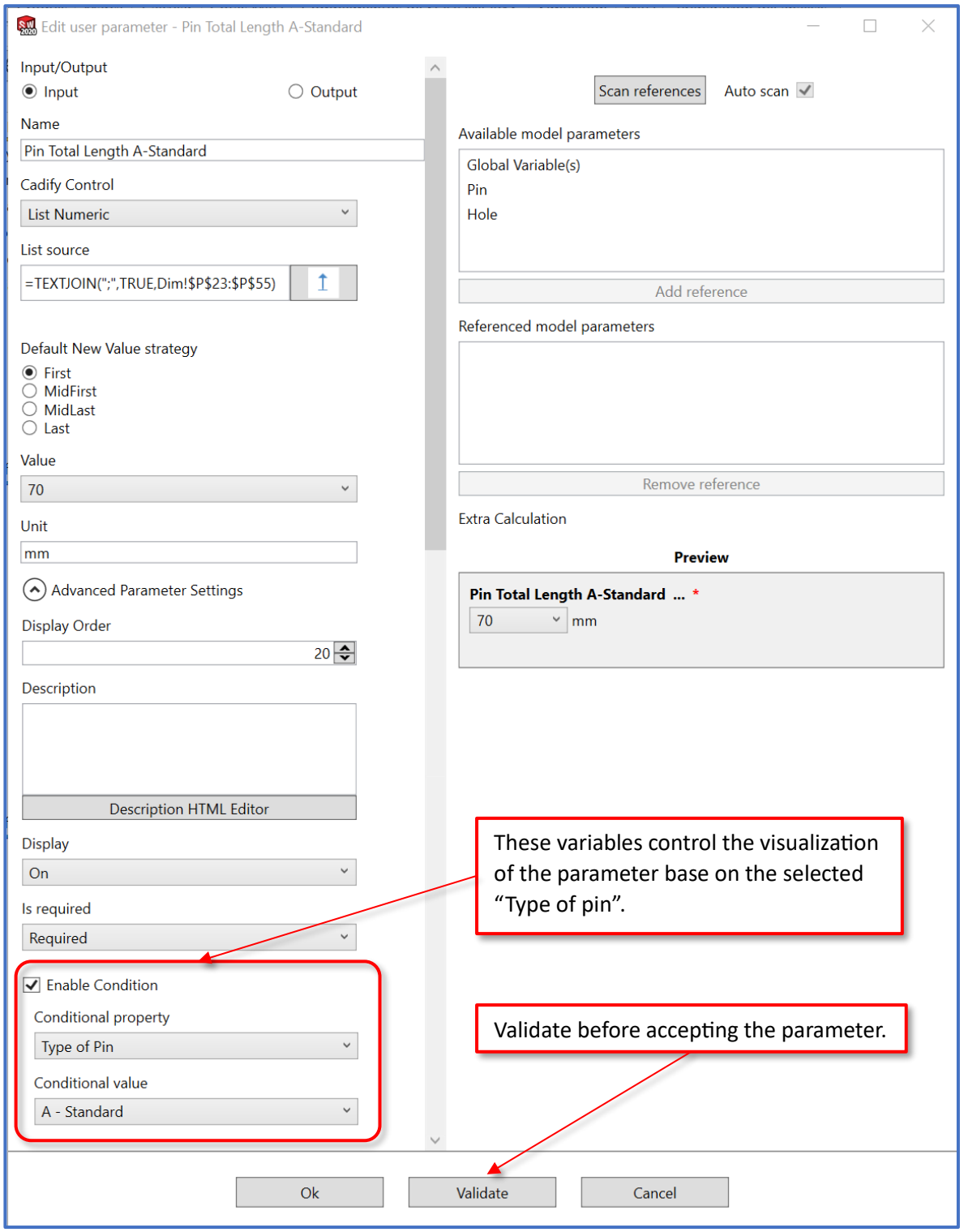
Create the parameter for the pin diameter, that the user will select from the list "Dim!H23:H48".



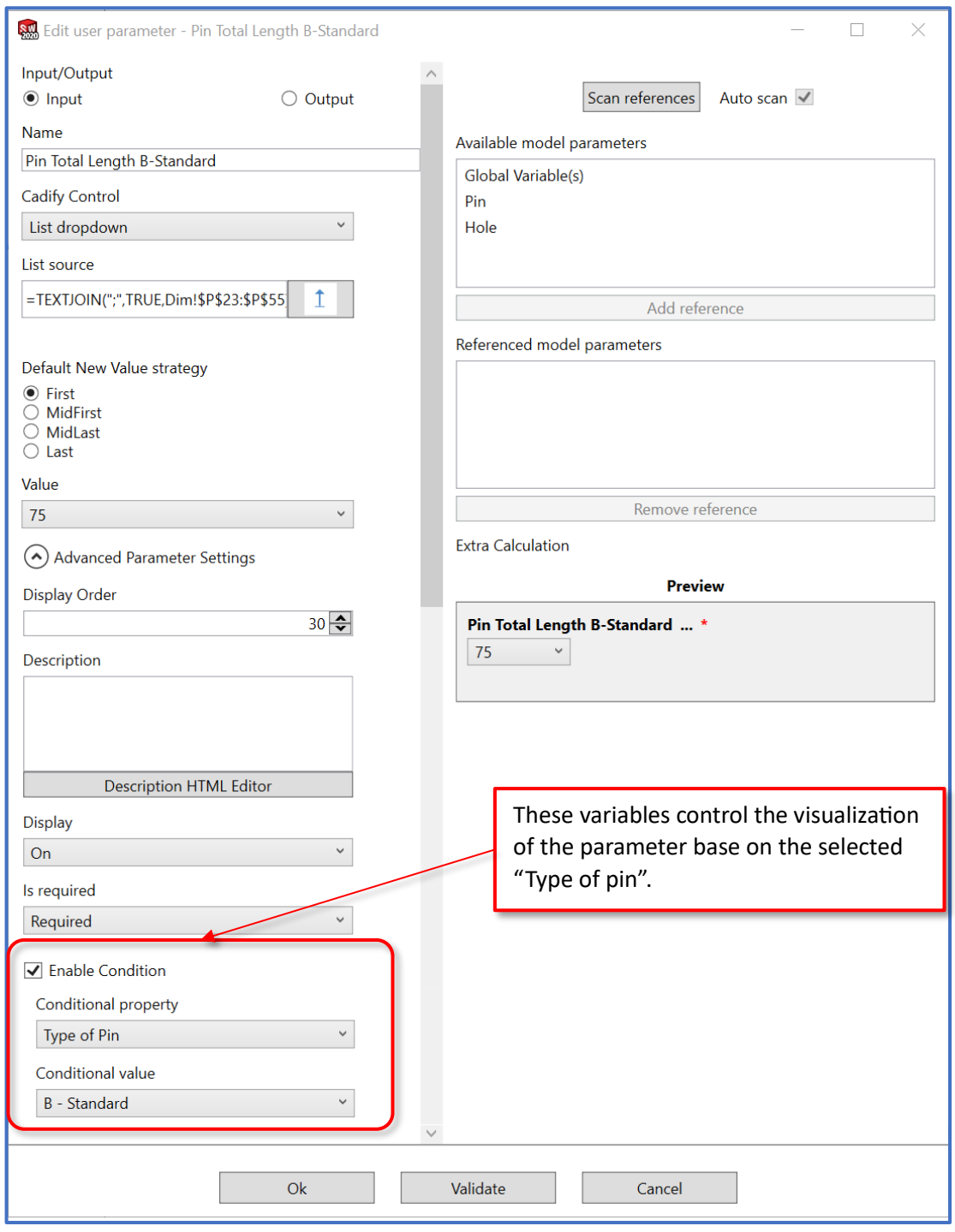
Create user's parameters for the pin length

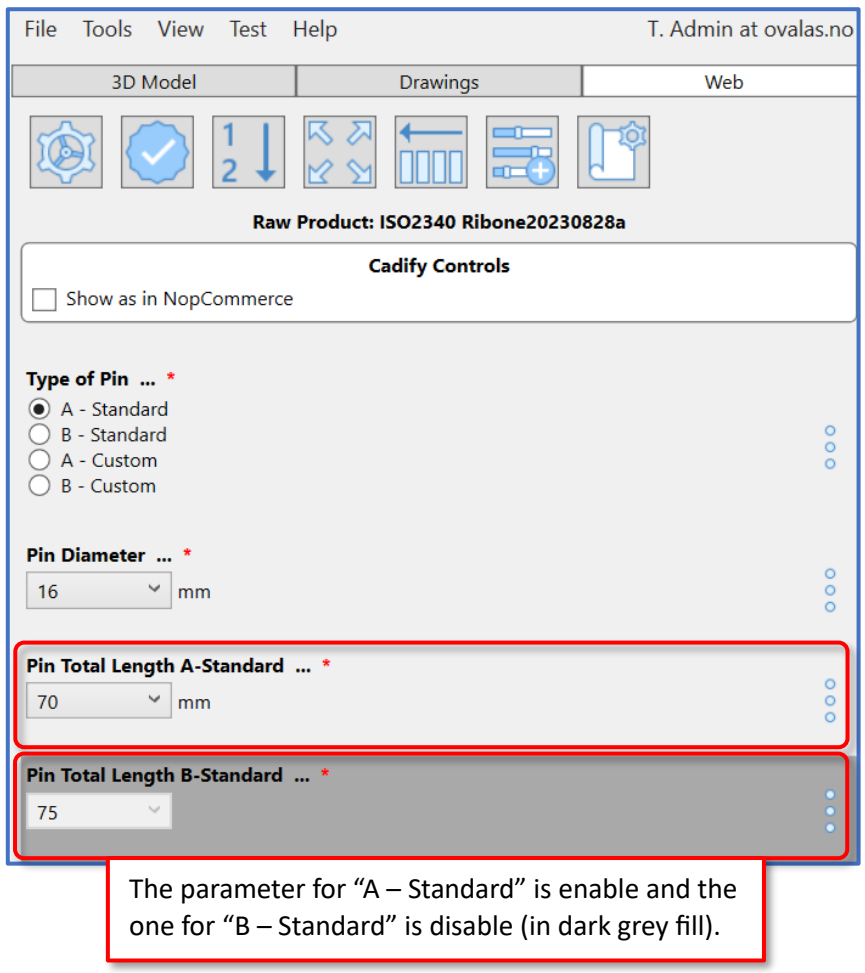
For Cadify programming purposes, each pin configuration requires individual length's parameter. In both parameters the available values are those listed by the standard.

Create parameter for the "A – Standard" configuration.



Create parameter for the “B – Standard” configuration.





Create the formulas to select the length's parameter in concordance with type of pin.

	T	U	V	W	X
17					
18		Type of Pin	Le	B-Custom length	Total length
19					
20			mm	mm	mm
21		A	6	70	70
22					

Detail from "Dim" sheet.

Cell with formula to select the proper length parameter.

	A
19	
20	
21	
22	***Pin Type***
23	A - Standard
24	B - Standard
25	A - Custom
26	B - Custom

Detail from "Dim" sheet, showing reference cells used in the formula.

	A	B	C	D	E	F	G	H
7	Range of numeric value: Minimum, Maximum, DecimalPlaces, Increment For Instance: 100;2;1;5							
8	Range of the list: Min:StartCell;Max:EndCell - For Instance: A1;A5							
9	Range of the logic values:Min:u - unsuppressed; Max:s - suppressed							
10	Project Name:	ISO2340.SLDPRT						
11	Language:	en-US						
12	**Advanced Parameter Settings**							**Basic Pa**
13								
14	**Display Name ; Description**	**List values**	**CT Settings**	**Condition**	**Control Type**	**Name**	**Value**	**Unit**
15		32;35;40;45;50;55;60;65;7(	On;20;Required;EDT;firs	Type of Pin;A - Standard	List Numeric	Pin Total Length A-Standard	70	mm
16	Pin Diameter ;	3;4;5;6;8;10;12;14;16;18;2(	On;10;Required;EDT;pleaseSelect		List Numeric	Pin Diameter	16	mm
17		A - Standard;B - Standard;,	On;1;Required;EDT;first		List Radio Button	Type of Pin	A - Standard	
18	5	0,8;1;1,2;1,6;2;2,5;3,2;3,5;4	On;60;Optional;EDT;firs	Type of Pin;B - Custom	List dropdown	Custom Split Pin Hole Diameter	3,5	mm
19		32;35;40;45;50;55;60;65;7(	On;30;Required;EDT;firs	Type of Pin;B - Standard	List dropdown	Pin Total Length B-Standard	75	
20		10;;100;	On;40;Optional;EDT;firs	Type of Pin;A - Custom	Numerical	Pin Total Length A-Custom	50	mm
21		10;Minimun is 10 mm;160;	On;62;Optional;EDT;firs	Type of Pin;B - Custom	Numerical	Custom holes distance	58	mm
22		70;;172;;1	On;70;Optional;EDT;firs	Type of Pin;B - Custom	Spinbox Up Down	Pin Total Length B-Custom	70	mm

Detail from "Cadify MASTER" sheet, showing reference cells used in the formula.

	AE	AF	AG	AH
1	ISO2340.sldprt			
2	Feature name	Value	Unit	API type
3	ISO2340.sldprt			PART<
4	Global Variable(s)			GLOBAL VARIABLE<
5	"ChamferLength"	3		GLOBAL VARIABLE\
6	"SplitPinHoleDiameter"	4		GLOBAL VARIABLE\
7	"LengthSplitPinToEnd"	6		GLOBAL VARIABLE\
8	Global Variable(s)			GLOBAL VARIABLE>
9	Pin	u		BODYFEATURE<
10	l@Croquis1	70	mm	DIMENSION\
11	d@Croquis1	16	mm	DIMENSION\
12	Pin			BODYFEATURE>
13	Hole	s		BODYFEATURE\
14	ISO2340.sldprt			PART>

Detail from "Cadify MASTER" sheet, this cell links the length's value to the 3D model.

- *Dim!W21 = IF('Cadify MASTER'!G17=Dim!A23;'Cadify MASTER'!G15;IF('Cadify MASTER'!G17=Dim!A24;'Cadify MASTER'!G19;IF('Cadify MASTER'!G17=Dim!A25;'Cadify MASTER'!G20;W21))), this formula returns the length value in concordance with the selected type of pin. The underlined part of the formula corresponds to the A & B custom lengths (it will be explained later in this tutorial)*
- *'Cadify MASTER'!AF10 = Dim!X21, this formula returns the selected length's value.*

Control of the hole suppress state based on configuration A or B

The difference between types of pin A or B is the split pin hole: type A without and type B with. To apply this, it is necessary to create a formula to control the suppress state of the Solidworks hole feature.

Create a formula that returns type of pin: “A” or “B” (Dim!U21). Create a formula that returns the suppress status: “u” or “s” (Dim!S21) and link this status to the 3D model.

	S	T	U	V	W	X
17						
	Detail from “Dim” sheet.				B-Custom length	Total length
18			Type of Pin	Le		
19						
20	Hole status			mm	mm	mm
21	s		A	6	70	70
22						

	AE	AF	AG	AH
1	ISO2340.sldprt			
2	Feature name	Detail from “Cadify MASTER” sheet.		
3	ISO2340.sldprt			PART<
4	Global Variable(s)			GLOBAL VARIABLE<
5	"ChamferLength"	3		GLOBAL VARIABLE\
6	"SplitPinHoleDiameter"	4		GLOBAL VARIABLE\
7	"LengthSplitPinToEnd"	6		GLOBAL VARIABLE\
8	Global Variable(s)			GLOBAL VARIABLE>
9	Pin	u		BODYFEATURE<
10	l@Croquis1	70	mm	DIMENSION\
11	d@Croquis1	16	mm	DIMENSION\
12	Pin			BODYFEATURE>
13	Hole	s		BODYFEATURE\
14	ISO2340.sldprt			PART>

- *Dim!S21 = IF(OR('Cadify MASTER'!G17=A23;'Cadify MASTER'!G17=A25);"s";"u"); this formula returns the suppress state: “u” – unsuppressed; “s” – suppressed.*
- *Dim!U21 = IF(OR('Cadify MASTER'!G17=A23;'Cadify MASTER'!G17=A25);"A";IF(OR('Cadify MASTER'!G17=A24;'Cadify MASTER'!G17=A26);"B";"Error")); this formula returns the type of selected pin: A (standard and custom) or B (standard and custom) based on the user’s selection.*
- *‘Cadify MASTER’!AF13 = Dim!S21; this formula links the suppression status to the 3D model.*

A good strategy is to keep formulas and functions in “Dim” sheet and link them in “CadifyMaster” to avoid any accidentally modifications (instead of writing formulas in “Cadidfy MASTER” sheet). In this tutorial this strategy is applied to.

Link split pin holes data to 3D model

	AE	AF	AG	AH
1	ISO2340.sldprt			
2	Feature name			
3	ISO2340.sldprt			PART<
4	Global Variable(s)			GLOBAL VARIABLE<
5	"ChamferLength"	3		GLOBAL VARIABLE\
6	"SplitPinHoleDiameter"	4		GLOBAL VARIABLE\
7	"LengthSplitPinToEnd"	6		GLOBAL VARIABLE\
8	Global Variable(s)			GLOBAL VARIABLE>
9	Pin	u		BODYFEATURE<
10	l@Croquis1	70	mm	DIMENSION\
11	d@Croquis1	16	mm	DIMENSION\
12	Pin			BODYFEATURE>
13	Hole	s		BODYFEATURE\
14	ISO2340.sldprt			PART>

Detail from “Cadify MASTER” sheet.

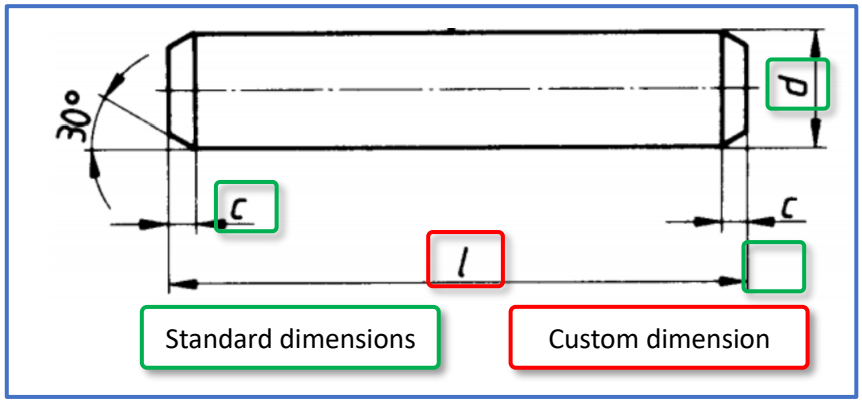
- *‘Cadify MASTER’!AF5 = Dim!J21; this formula links the chamfer’s length to the 3D model.*
- *‘Cadify MASTER’!AF6 = Dim!I21; this formula links the split pin hole diameter to the 3D model.*
- *‘Cadify MASTER’!AF7 = Dim!K21; this formula links the “le” dimension to the 3D model.*

The values in the cells Dim!I21 / Dim!J21 / Dim!K21 are in concordance to standard value of the selected pin diameter. The formulas in cells ‘Cadify MASTER’!AF6 / ‘Cadify MASTER’!AF7 will be modified later.

STEP 2 – ADD CONFIGURATIONS “TYPE A & B CUSTOM”

Customization for type “A” of pins

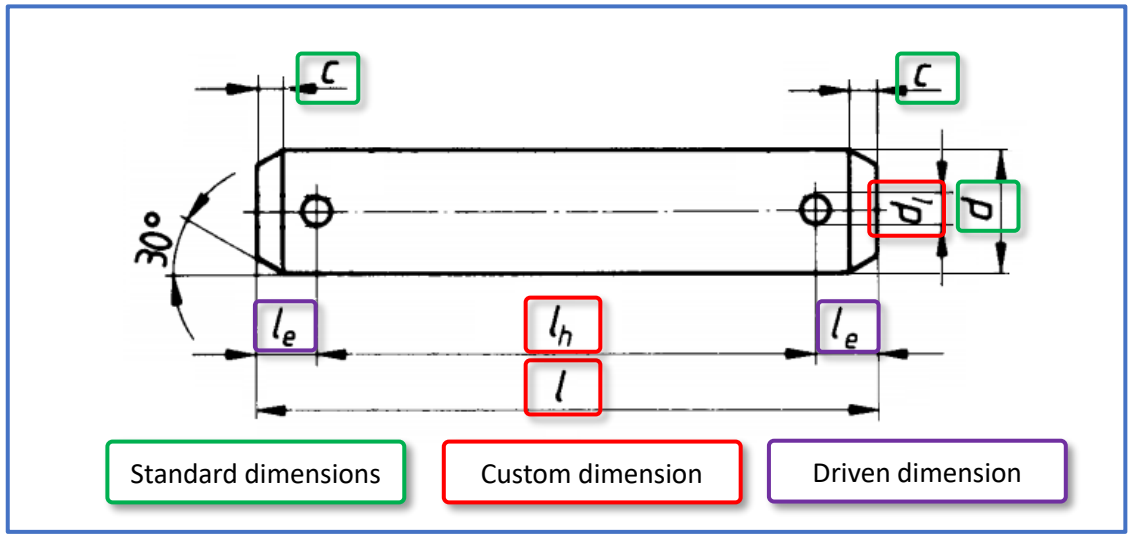
ISO 2340 allows to specify custom length for “A” type of pin, but diameter and chamfer must be standard. Next image shows an example of this situation and its corresponding designation.



Designation example: **Clevis pin ISO 2340 - A – 20 x 155 – St**, it’s steel type “A” pin, Ø 20 mm and 155 mm length.

Customization for type “B” of pins

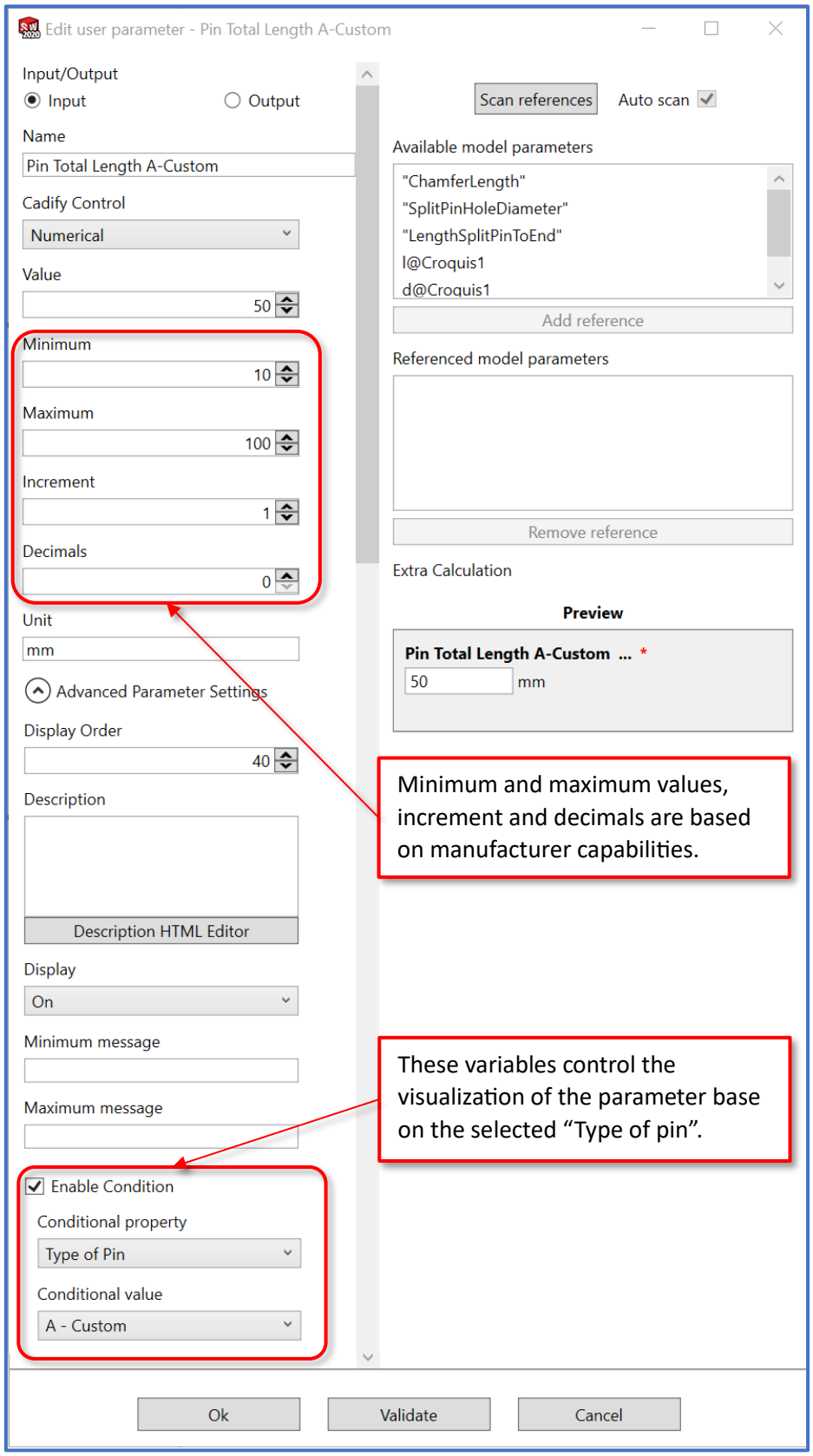
ISO 2340 allows to specify custom total length, distance between split pin holes and their diameter, while pin diameter and chamfer keep as standard values. The custom dimensions can be combined with the standard ones.

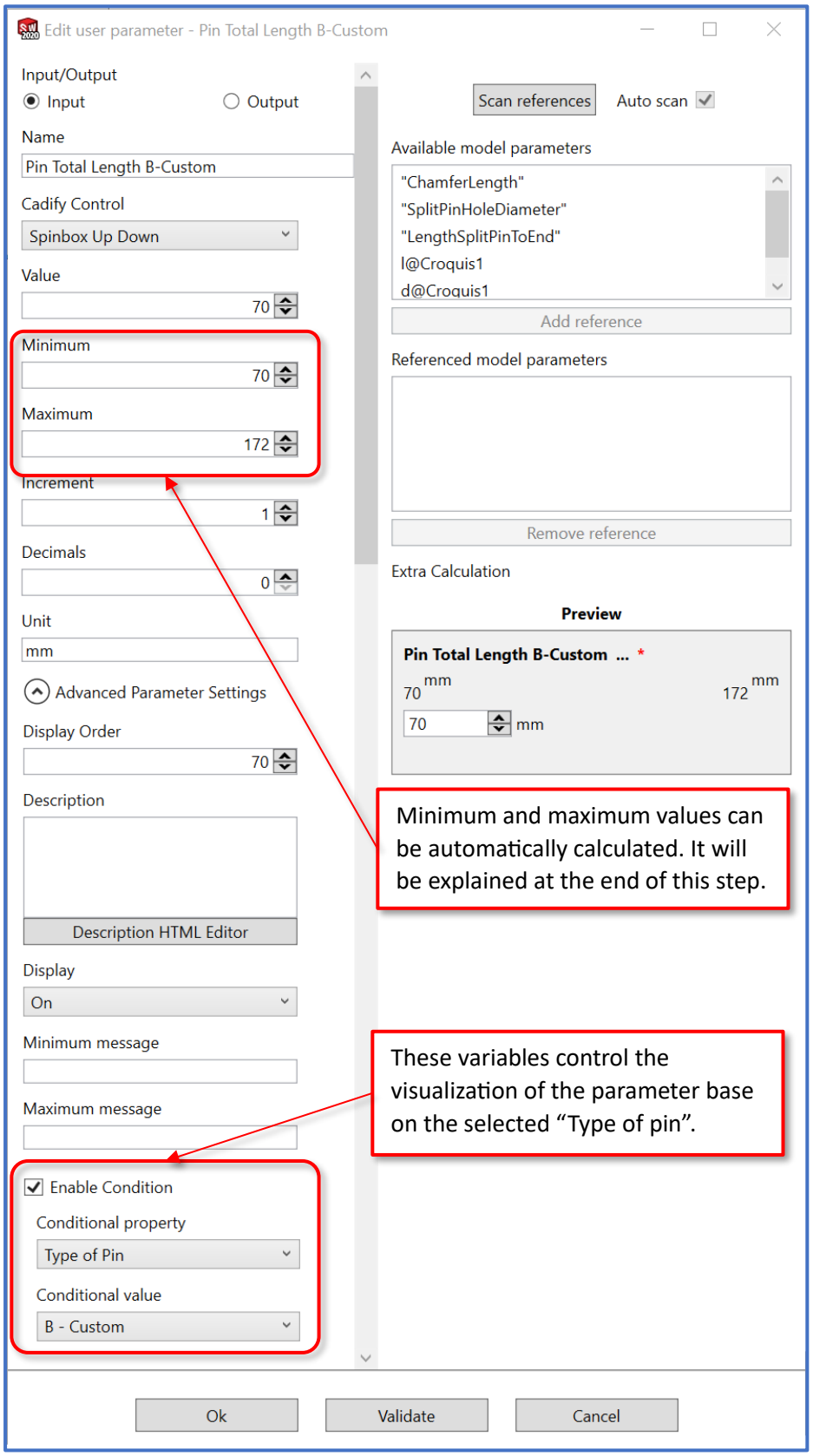


Designation example: **Clevis pin ISO 2340 - A – 20 x 155 x 145 x 4 – St**, it’s steel type “B” pin, Ø 20 mm, 155 mm length, 145 mm distance between holes and their diameter is 4 mm.

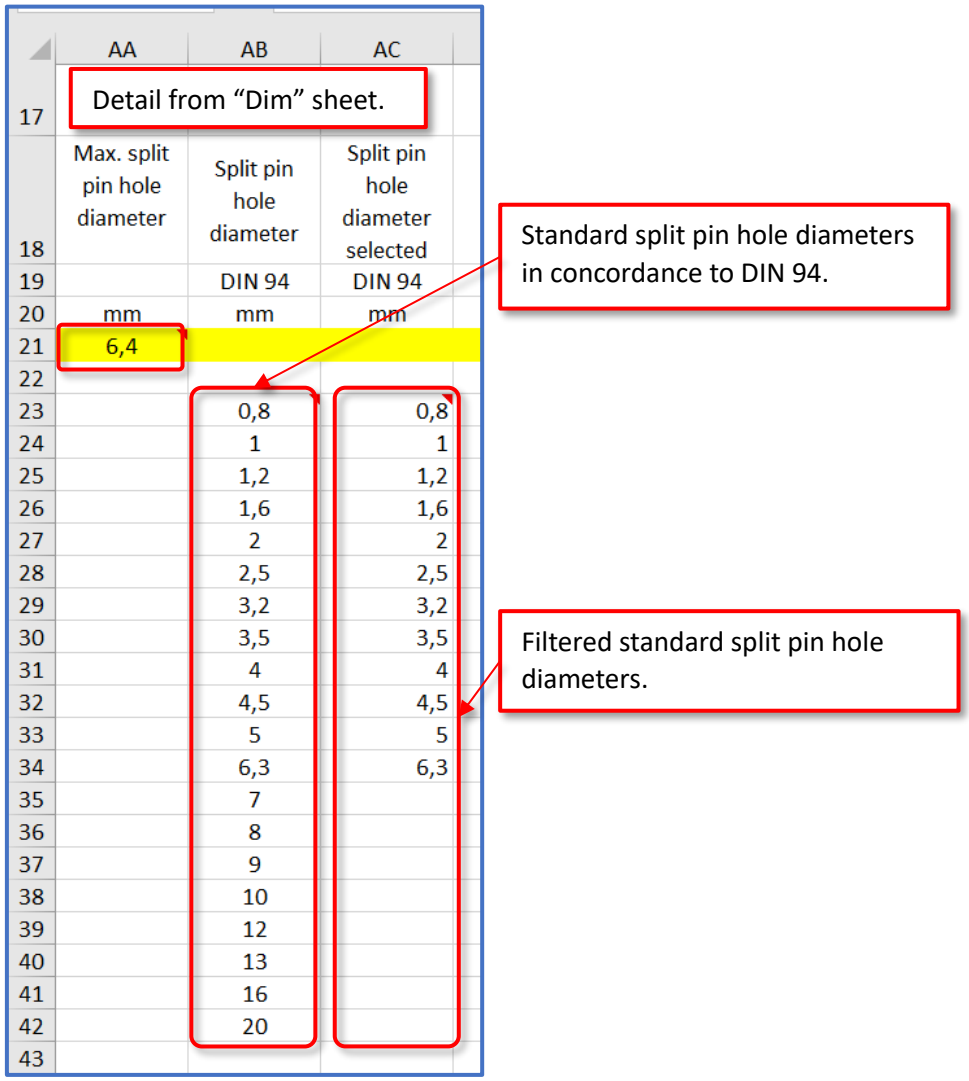
Creating user's parameters for custom dimensions

Create parameters for "A – Custom" length and "B – Custom" length.





Create a list of the available custom diameters for split pin holes (in concordance to DIN 94).

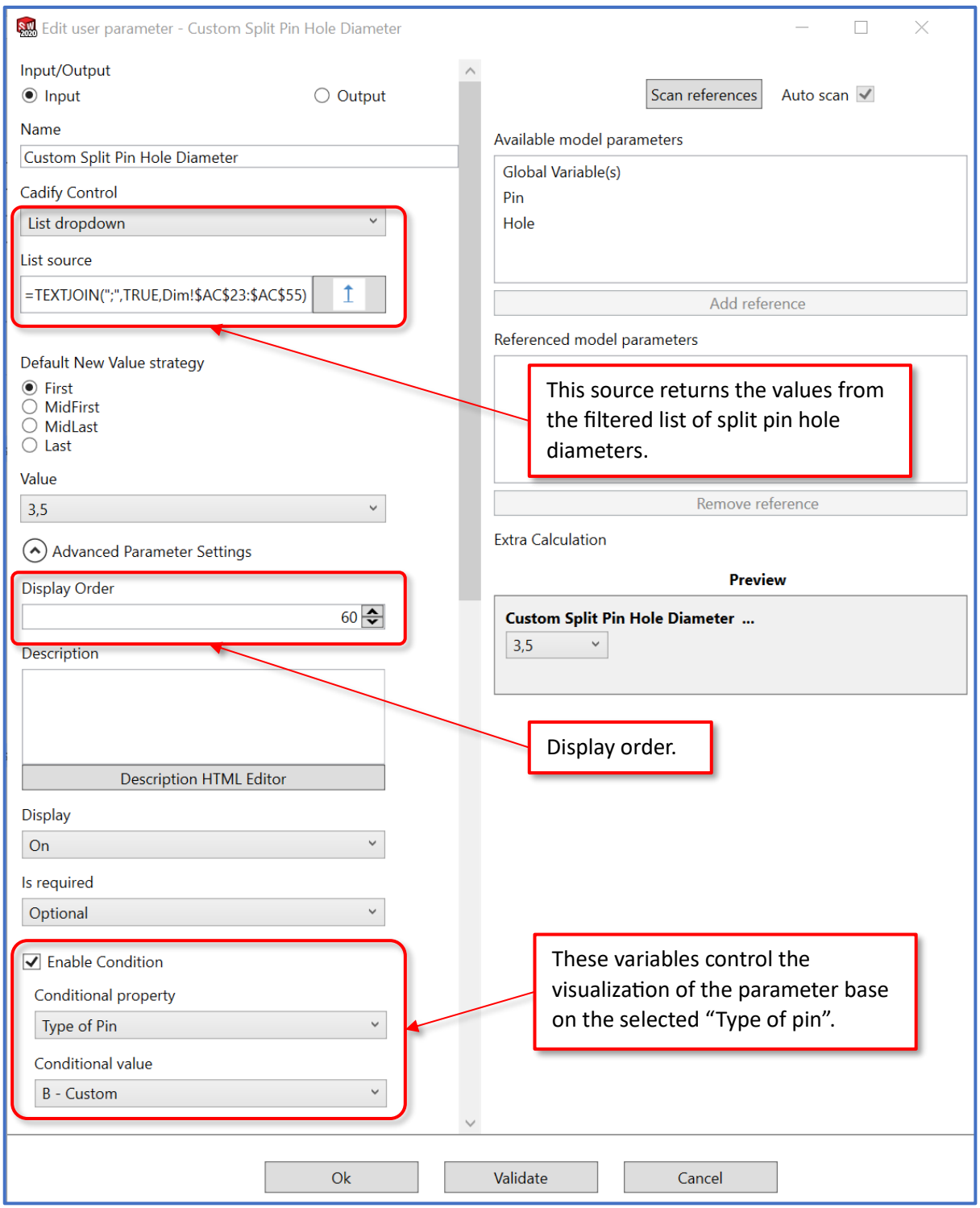


	AA	AB	AC
17	Detail from “Dim” sheet.		
18	Max. split pin hole diameter	Split pin hole diameter	Split pin hole diameter selected
19		DIN 94	DIN 94
20	mm	mm	mm
21	6,4		
22			
23		0,8	0,8
24		1	1
25		1,2	1,2
26		1,6	1,6
27		2	2
28		2,5	2,5
29		3,2	3,2
30		3,5	3,5
31		4	4
32		4,5	4,5
33		5	5
34		6,3	6,3
35		7	
36		8	
37		9	
38		10	
39		12	
40		13	
41		16	
42		20	
43			

- *Dim!AA21 = 'Cadify MASTER'!G16*0,4; this formula returns the maximum value for the custom split pin hole diameter. This is a manufacturer's criteria.*
- *Dim!AC23 = SORT(FILTER(AB23:AB42;(AB23:AB42<=AA21))); this formula returns a list of the custom available split pin hole diameters.*

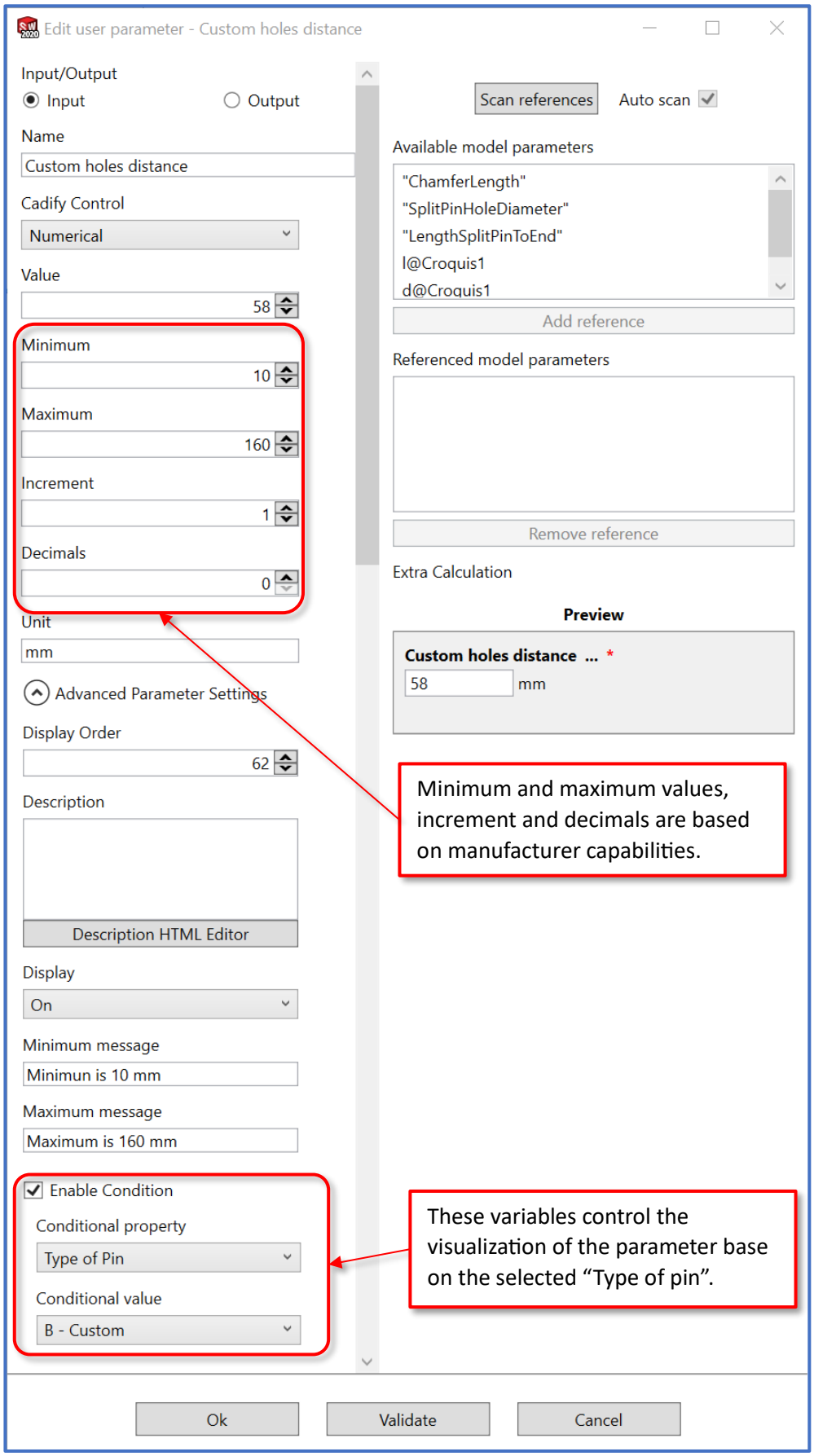
Comment: the chosen criteria for the custom split pin hole diameters is that the user can select a different value that the one in ISO 2340 for the selected clevis pin diameter, but in concordance to the listed values in DIN 94. The available values for each clevis pin diameter are minimum or equal to 40% of this one. This criteria may change depending on the manufacturer’s choices.

Create parameter for the custom split pin diameter.



The display order indicates the relative position of the parameter in the web. Use this value to define the order that parameters will be shown. It is not mandatory to put consecutive values. A good strategy is to put values from ten to ten, this will be very helpful when new parameters must be shown between two existing ones.

Create parameters for split pin holes distance.



Modifying "l_e" and "d_l" for "B – Custom" type of pin

Create a new formula where the values of "l_e" and "d_l" will be different from the standard ones when "B – Custom" type of pin is selected. Update the formulas in 'Cadify MASTER'! sheet.

	U	V	W	X	Y	Z
17	Detail from "Dim" sheet.					
			B custom length	Total length		Split pin hole diameter
18	Type of Pin	Le				
19						dl
20		mm	mm	mm		mm
21	B	15	70	70		3,5

	AE	AF	AG	AH
1	ISO2340.sldprt			
2	Feature name	Detail from "Cadify MASTER" sheet.		
3	ISO2340.sldprt			PART<
4	Global Variable(s)			GLOBAL VARIABLE<
5	"ChamferLength"	3		GLOBAL VARIABLE\
6	"SplitPinHoleDiameter"	4		GLOBAL VARIABLE\
7	"LengthSplitPinToEnd"	6		GLOBAL VARIABLE\
8	Global Variable(s)			GLOBAL VARIABLE>
9	Pin	u		BODYFEATURE<
10	l@Croquis1	70	mm	DIMENSION\
11	d@Croquis1	16	mm	DIMENSION\
12	Pin			BODYFEATURE>
13	Hole	s		BODYFEATURE\
14	ISO2340.sldprt			PART>

- *Dim!V21 = IF(OR('Cadify MASTER'!G17=Dim!A23; 'Cadify MASTER'!G17=Dim!A24; 'Cadify MASTER'!G17=Dim!A25);Dim!K21;(W21-'Cadify MASTER'!G21)/2); this formula returns custom "l_e" value for "B – Custom" type of pin, and the standard value for the other types of pin.*
- *Dim!Z21 = =IF('Cadify MASTER'!G17=A26;'Cadify MASTER'!G18;I21); this formula returns the custom "d_l" value for "B – Custom" type of pin and the standard value for the other types of pin.*
- *'Cadify MASTER'!AF6 = Dim!Z21; this formula links the split pin hole diameter to the 3D model.*
- *'Cadify MASTER'!AF7 = Dim!V21; this formula links the "le" dimension to the 3D model.*

Comment: the last two formulas modify the ones shown in "Link split pin holes data to 3D model"

Adding formulas for minimum and maximum values

Add formula for minimum and maximum values of “B-Custom” length.

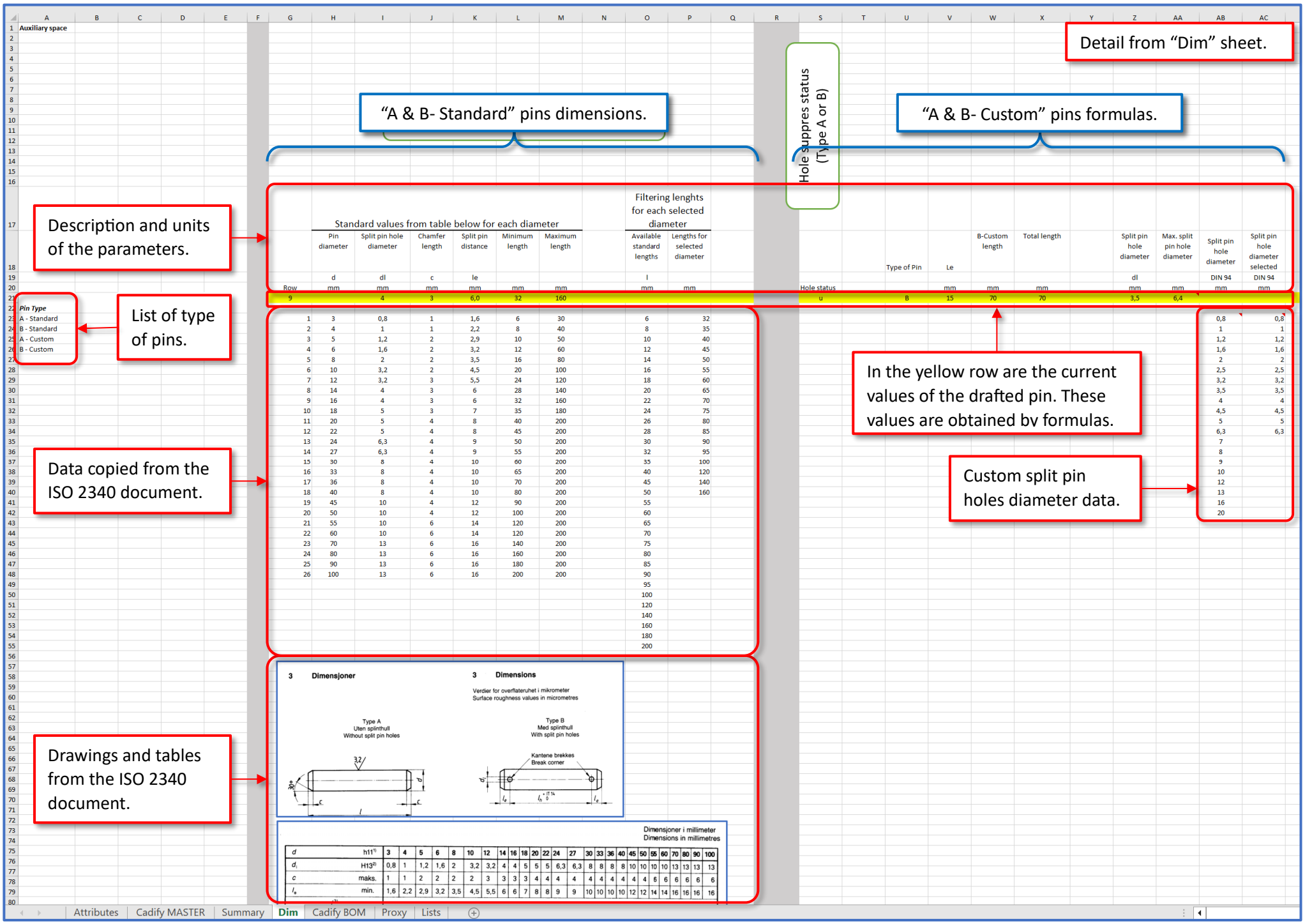
	D	E	F	G	H	I	J	K	L
10	Detail from “Cadify MASTER” sheet.								
11									
12		Basic Parameter Settings							
13									
14	**Condition**	**Control Type**	**Name**	**Value**	**Unit**	**Min**	**Min message**	**Max**	**Max message**
15	Type of Pin;A - Standard	List Numeric	Pin Total Length A-Standard	70	mm				
16	pleaseSelect	List Numeric	Pin Diameter	16	mm				
17	rst	List Radio Button	Type of Pin	B - Custom					
18	Type of Pin;B - Custom	List dropdown	Custom Split Pin Hole Diameter	3,5	mm				
19	Type of Pin;B - Standard	List dropdown	Pin Total Length B-Standard	75					
20	Type of Pin;A - Custom	Numerical	Pin Total Length A-Custom	50	mm	10		100	
21	Type of Pin;B - Custom	Numerical	Custom holes distance	58	mm	10	Minimun is 10 mm	160	Maximum is 160 mm
22	Type of Pin;B - Custom	Spinbox Up Down	Pin Total Length B-Custom	70	mm	70	Minimun is 70 mm	172	Maximum is 172 mm

- *‘Cadify MASTER’!I22 = G21+2*Dim!K21; this formula returns the minimum value as the addition of “Custom holes distance” and “l_e”. This is a manufacturer's criteria.*
- *‘Cadify MASTER’!J22 = CONCAT("Minimun is ";I22; " mm"); this formula returns the message with the minimum value.*
- *‘Cadify MASTER’!K22 = K21+2*Dim!V21; this formula returns the maximum value as the addition of “Maximum Custom holes distance” and “l_e”. This is a manufacturer's criteria.*
- *‘Cadify MASTER’!L22 = CONCAT("Minimun is ";I22; " mm"); this formula returns the message with the maximum value.*

STEP 3 – FORMATTING

Some formatting advice

A good strategy is to apply formatting that helps the edition of Excel sheets. An example can be shown in “Dim!” sheet.

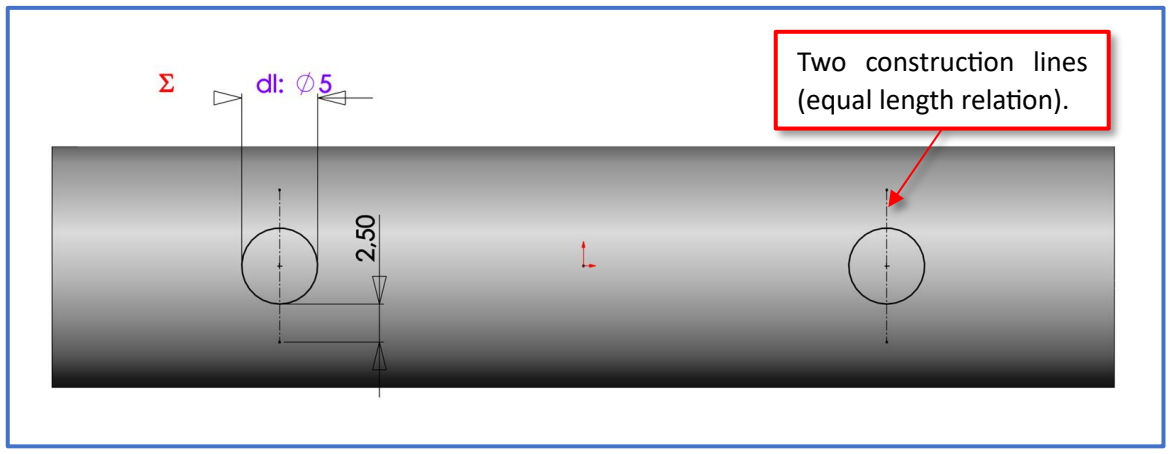


Comment: “Attributes / Cadify MASTERS / Summary / Cadify BOM / Proxy / Lists” sheets have a default formatting that is not recommended to modify.

STEP 4 – CREATE DRAWING

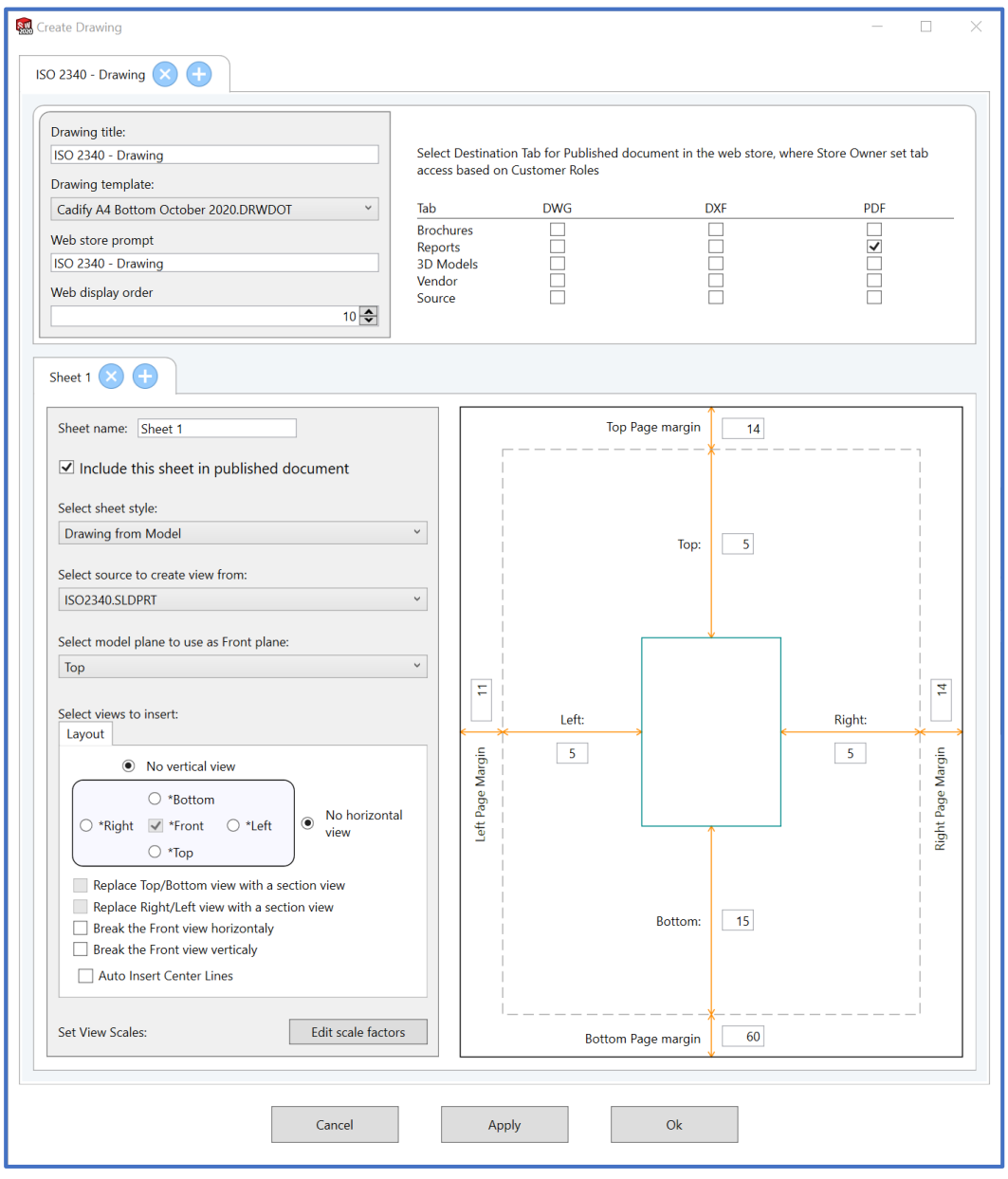
Modify current sketch

Open the sketch “Croquis3@Hole” and add construction lines as shown. These lines will be used as center marks in the drawing.



Create drawing

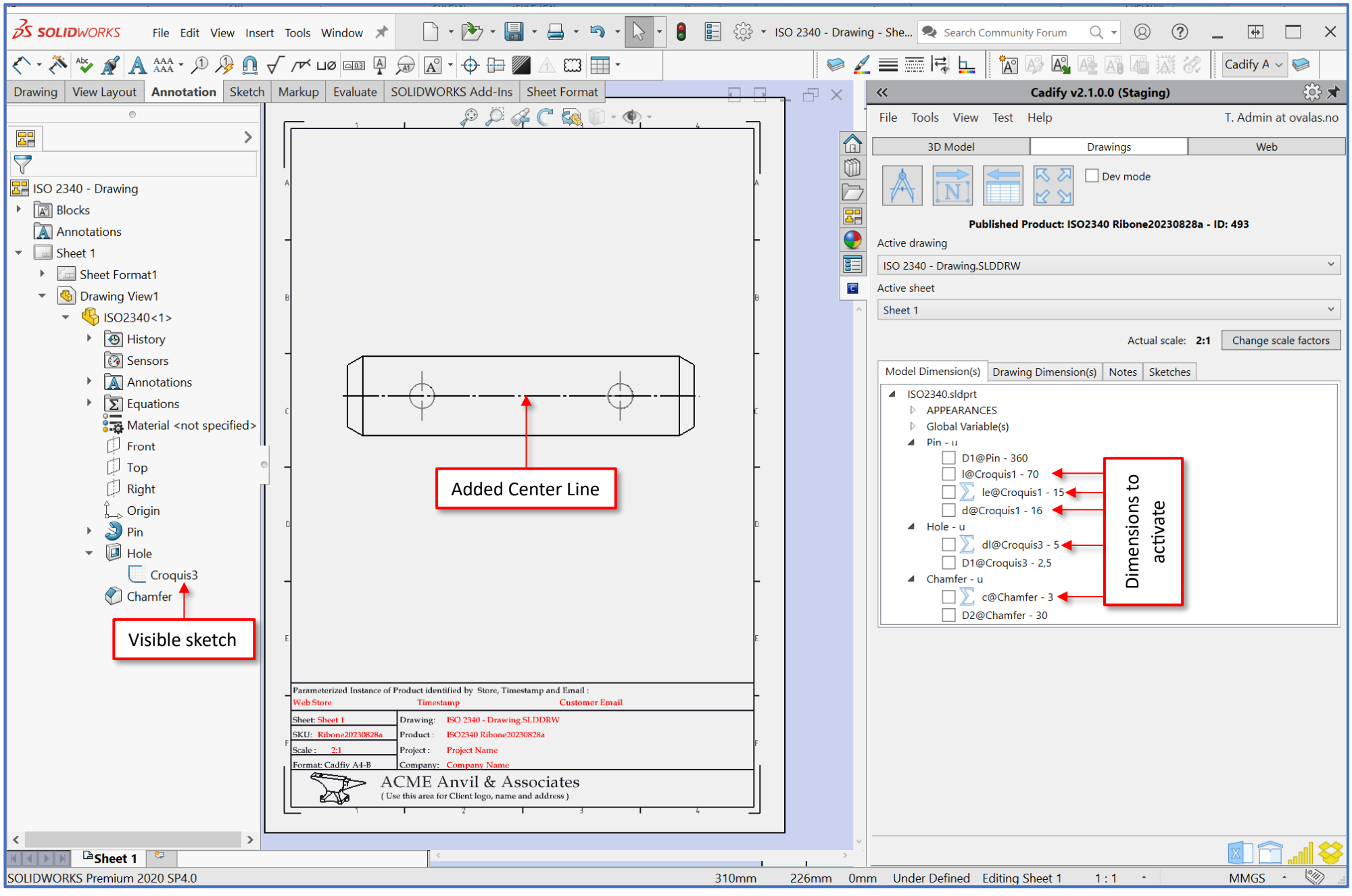
In Cadify tab, open “Tool > Create drawing” and configure as shown in the next image. Then click on “Ok”. Before creating drawing any “B” type must be activated.

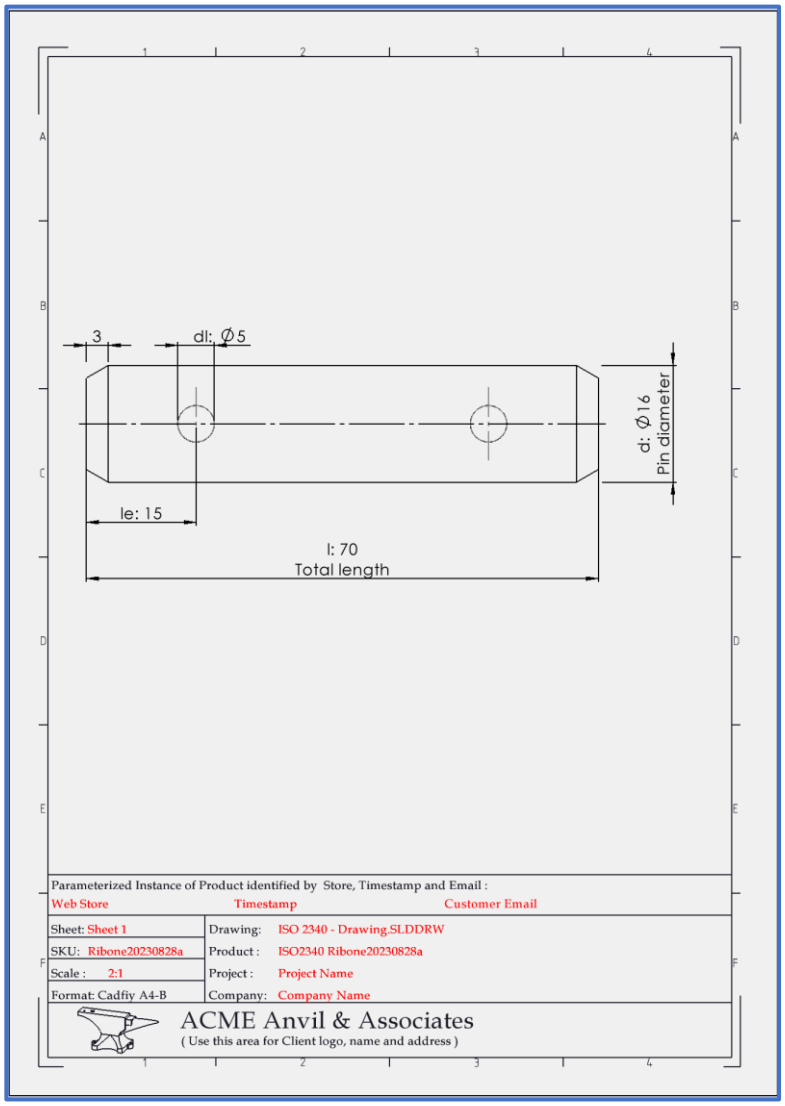


After drawing is created:

- Delete any Center Mark that may have been automatically created.
- Make visible “Croquis3@Hole”.
- Add Center Line of the pin itself.
- Add dimensions.

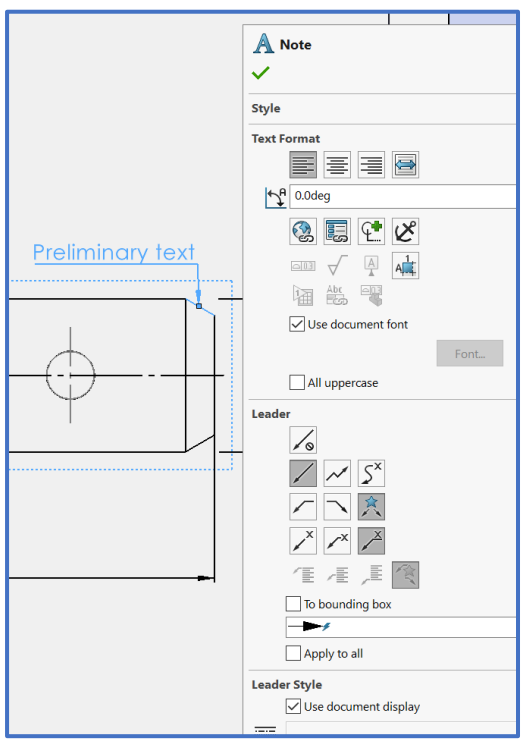
Comment: chamfer’s angle dimension will be added later as a “Relative Note”.



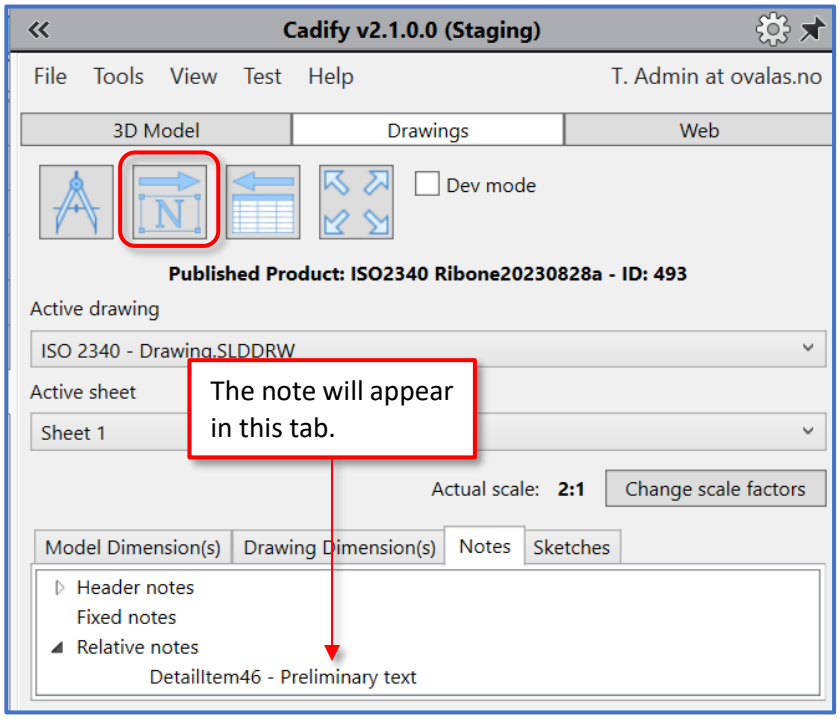


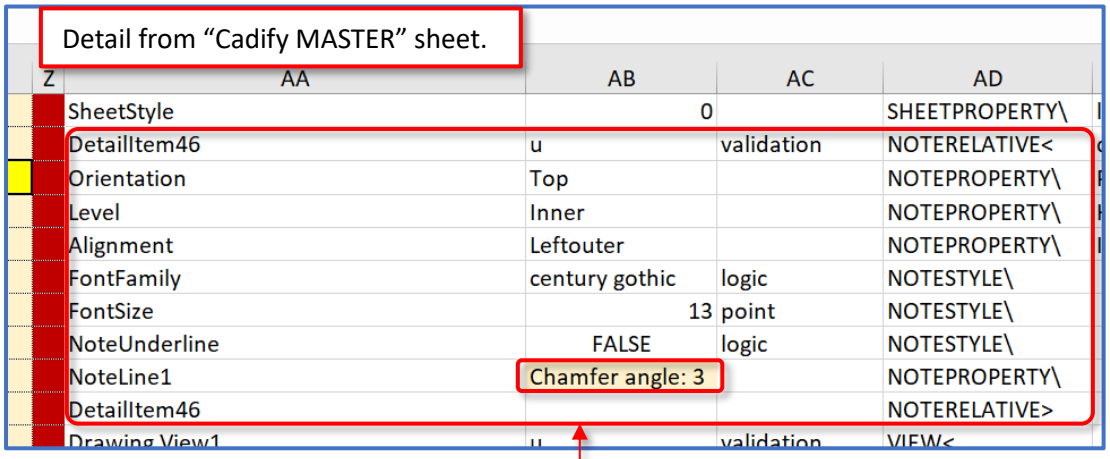
Add “Relative Note”

Add a leader as shown in the image.



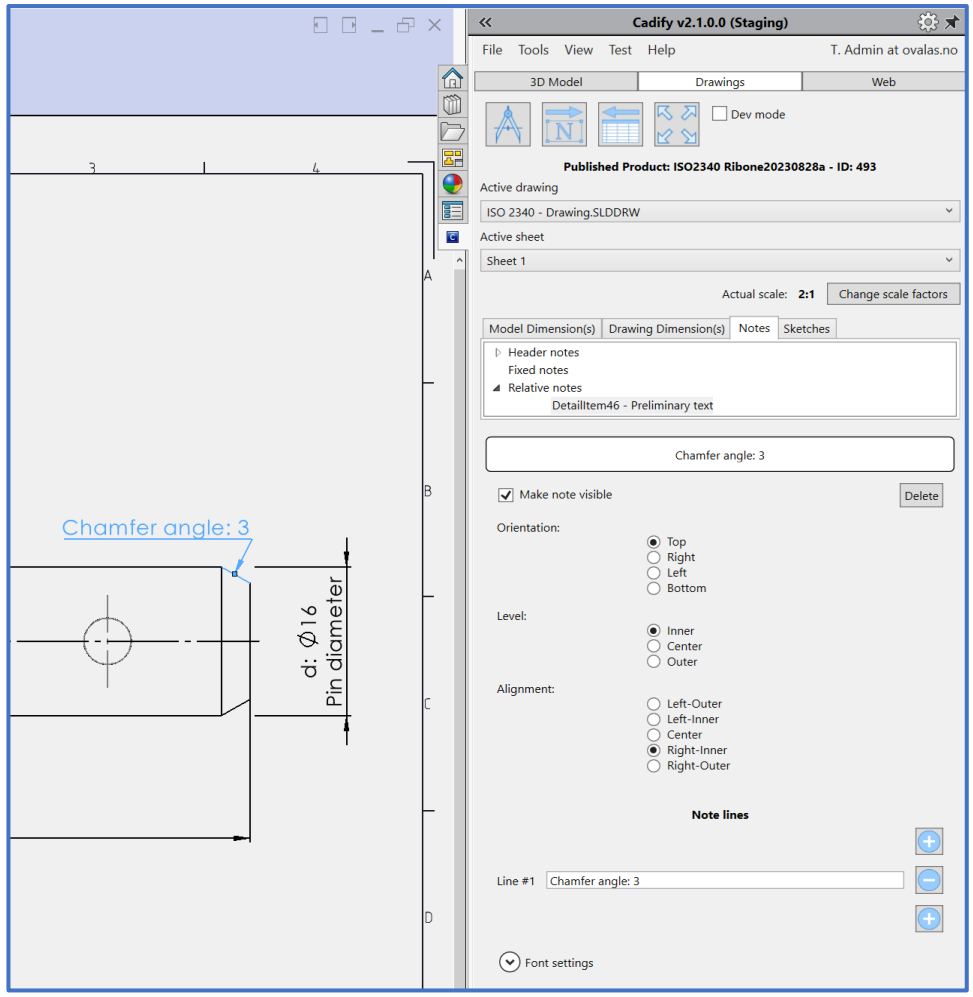
In “Cadify” tab click on the mark button that read and upload the notes to Excel file (Cadify MASTER sheet), where the note’s properties can be controlled by formulas.





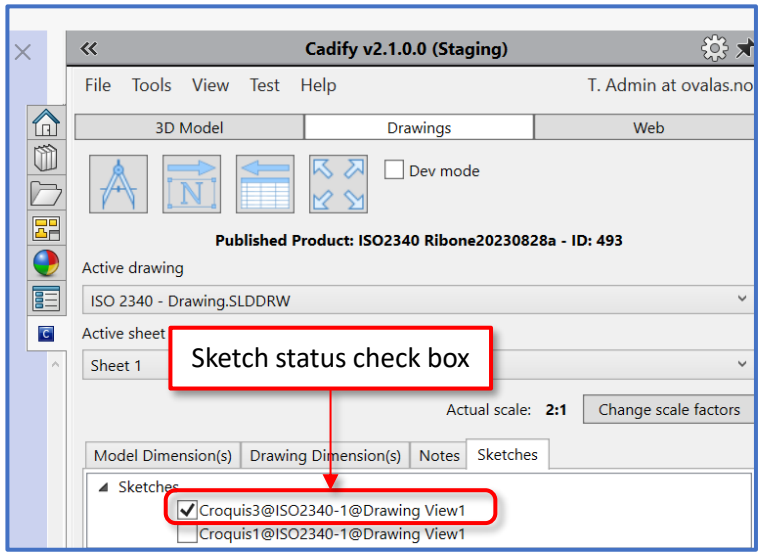
- *‘Cadify MASTER’!AB18 =CONCAT("Chamfer angle: "; Dim!J21); this formula returns the note including the value of the chamfer angle.*

In the “Web” tab click on the “Update” button to update the drawing. In the “Drawing” tab configure the note’s properties.

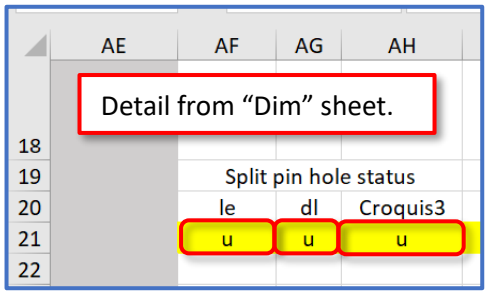


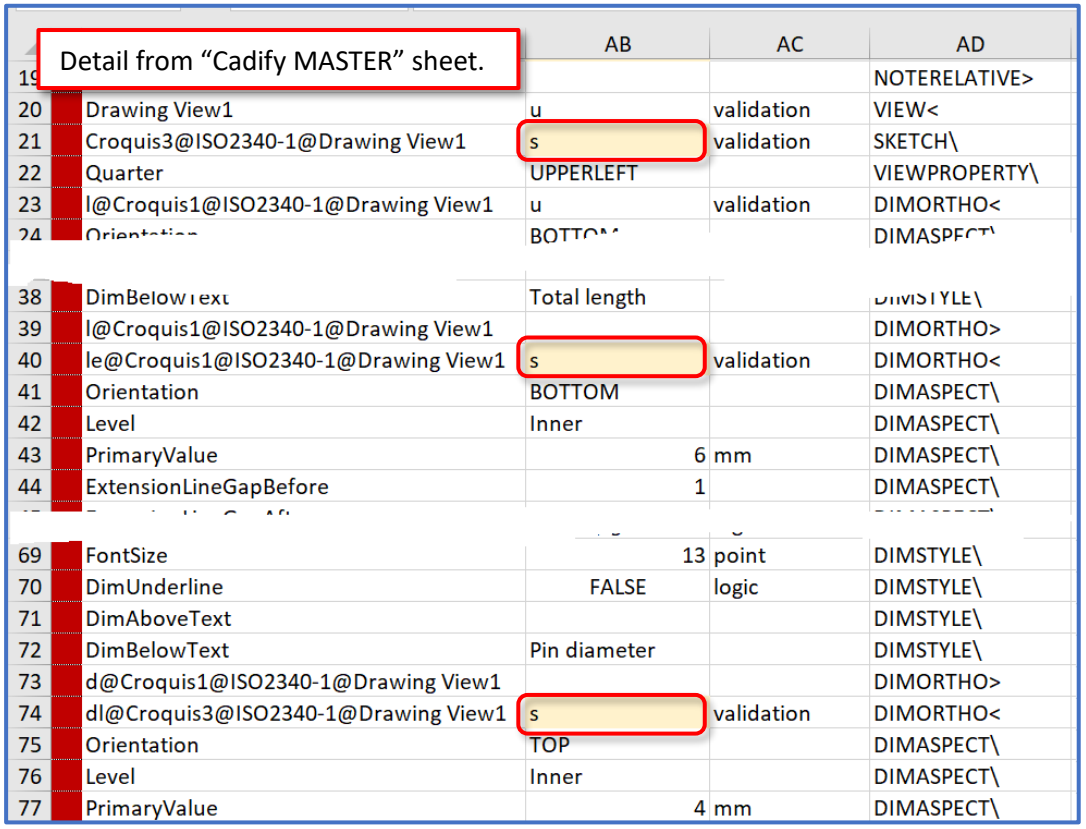
Modify drawing for type “A” pins

Activate sketch status for “Croquis3”. This allows to hide or make visible the sketch. This property will be used to hide the “center marks” for type “A” pins.



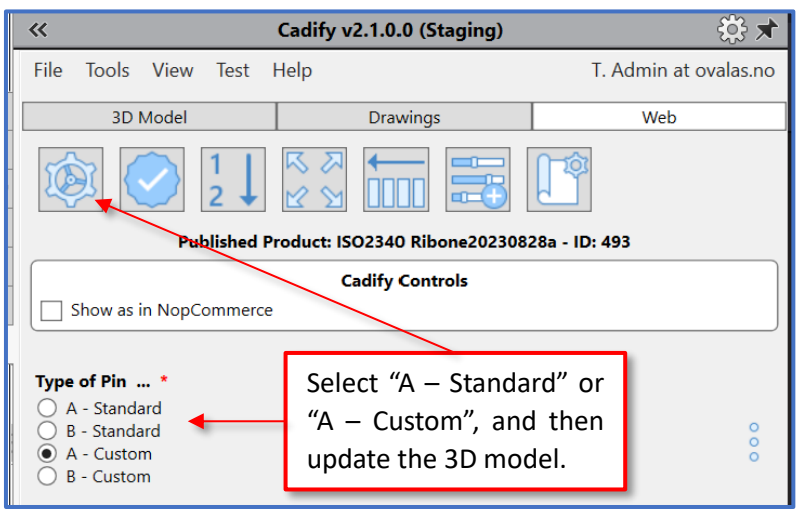
Create formulas to control the drawing feature’s status and link these status to the 3D model.



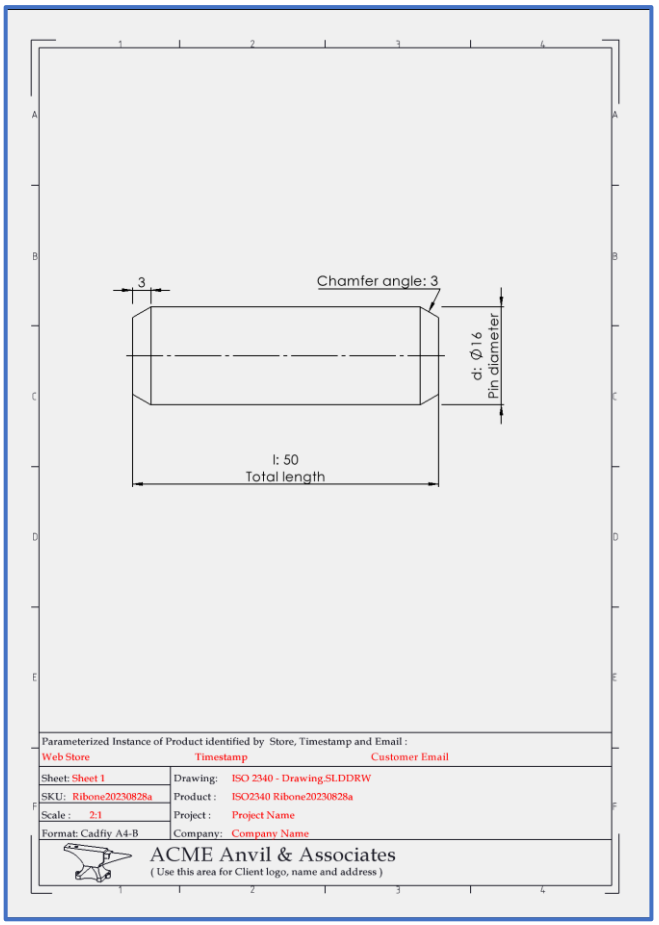


- *Dim!AF21 = IF(OR('Cadify MASTER'!G17=A23;'Cadify MASTER'!G17=A25);"s";"u"); this formula returns the suppress state for "l_e" dimension: "u" – unsuppressed; "s" – suppressed, based on type of pin.*
- *Dim!AG21 = IF(OR('Cadify MASTER'!G17=A23;'Cadify MASTER'!G17=A25);"s";"u"); this formula returns the suppress state for "d_l" dimension: "u" – unsuppressed; "s" – suppressed, based on type of pin.*
- *Dim!AH21 = IF(OR('Cadify MASTER'!G17=A23;'Cadify MASTER'!G17=A25);"s";"u"); this formula returns the suppress state for "Croquis3": "u" – unsuppressed; "s" – suppressed, based on type of pin.*
- *'Cadify MASTER'!AB21 = Dim!AH21; ; this formula links the suppression status to the 3D model.*
- *'Cadify MASTER'!AB40 = Dim!AF21; ; this formula links the suppression status to the 3D model.*
- *'Cadify MASTER'!AB74 = Dim!AG21; ; this formula links the suppression status to the 3D model.*

Change the type of pin and update the 3D model.

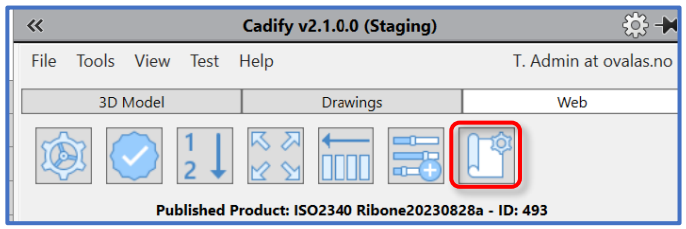


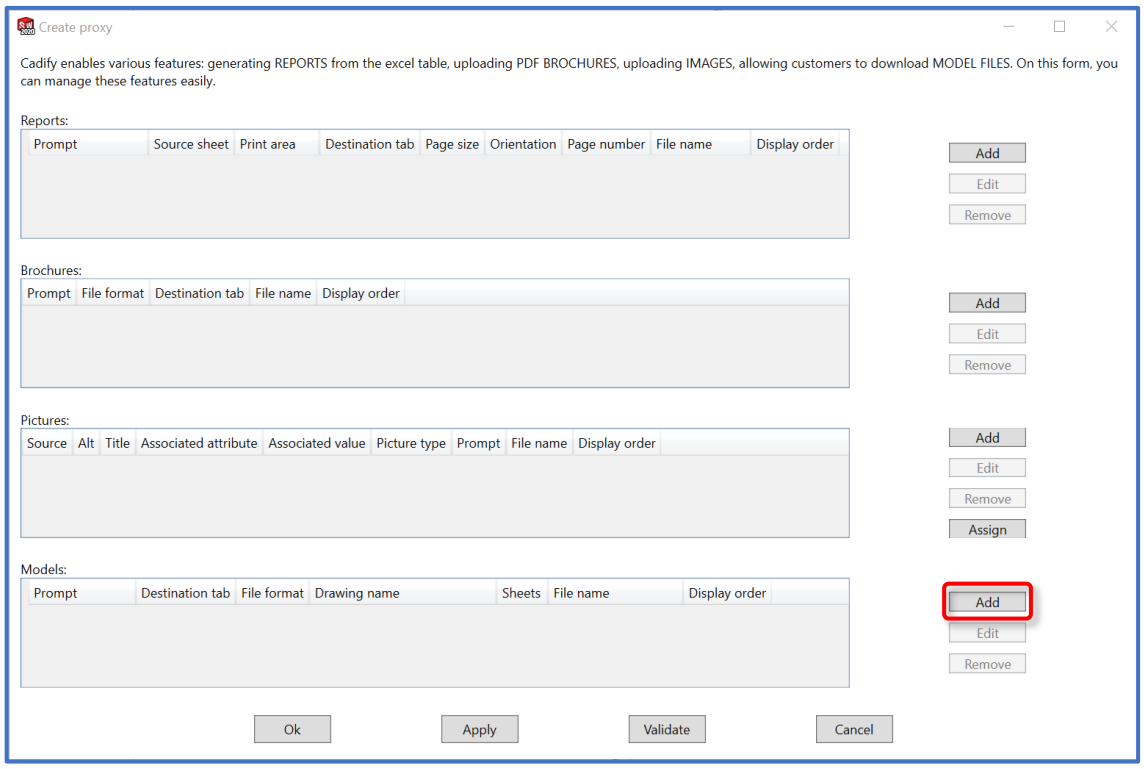
The next image shows the drawing for type "A" pins.

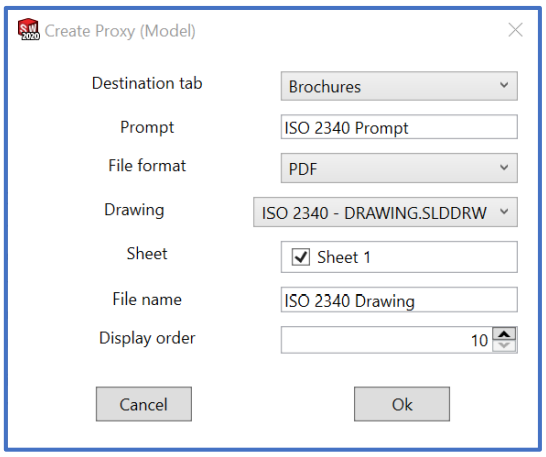


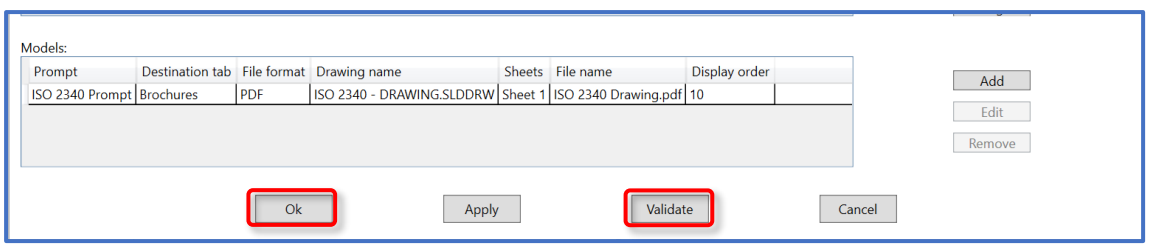
Create proxy for drawing

In Cadify “Web” tab, click on “Create or Edit Proxy” and complete the “Create proxy (Model)” windows as shown (click on “Add” to create a new row); then click on “Validate” and “Ok”.





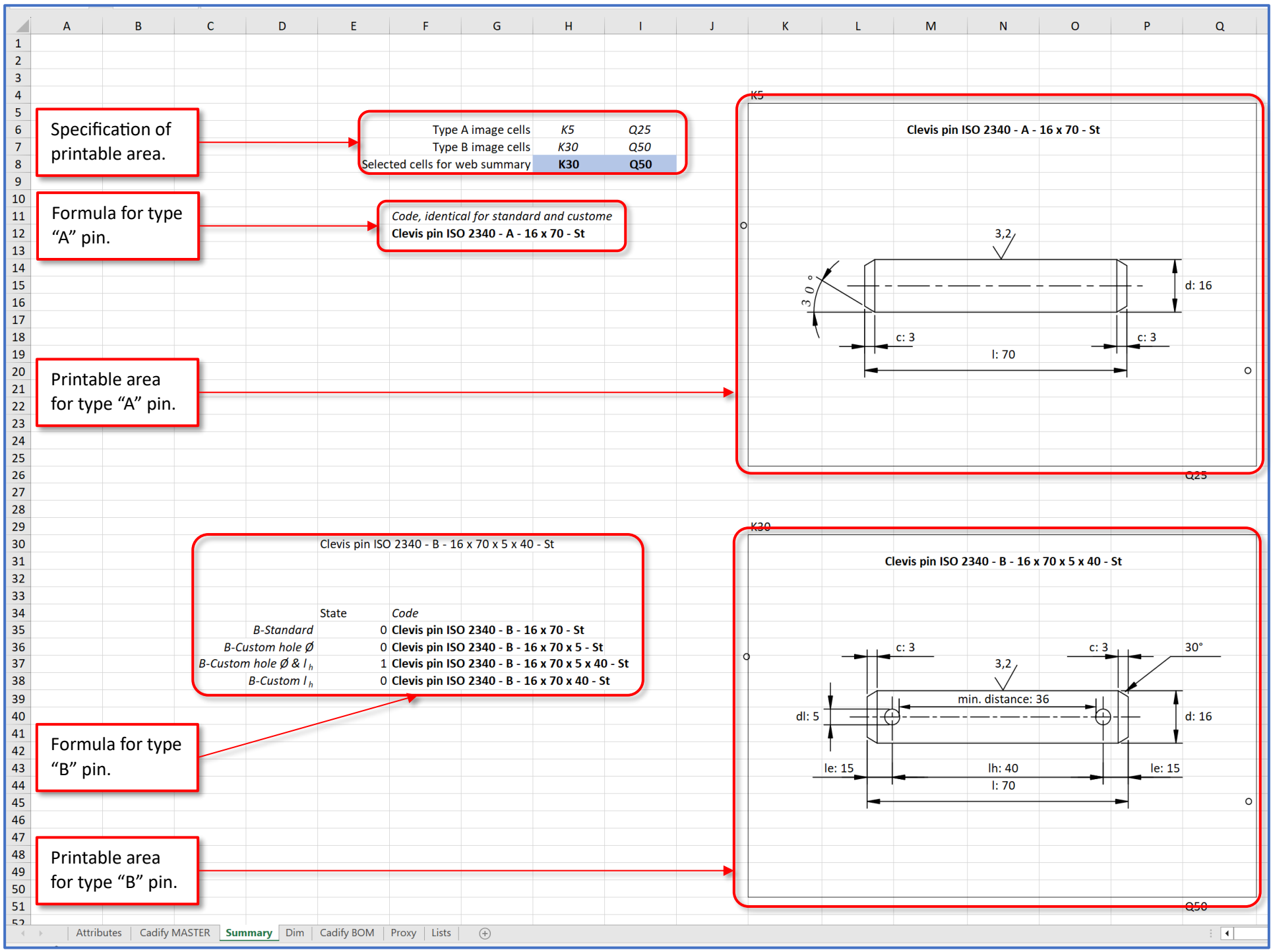




STEP 5 – IMAGES IN SUMMARY TAB

Create images in the summary tab that will help the user during parameters identification and selection. These images will have dimensions which will be updated while the parameters are changed by the user.

View of summary tab



Images: type of file and dimensions

The concept behind summary tab images has two parts:

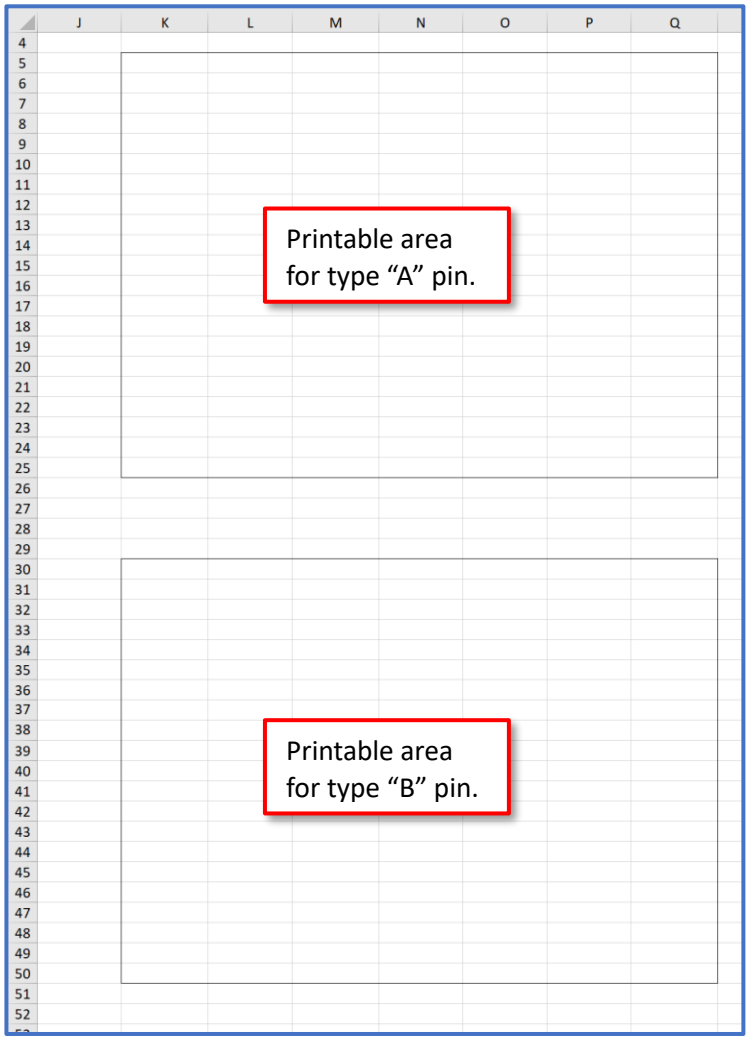
- Static ".svg" image (scalable vector graphics).
- Value of the dimensions, as formulas in cells, to be over impose the images.

The size and proportions of the images depend on the product itself. The dimensions must be drawn in coordination with excel cells in such a way that the values appear aligned with the dimensions. The values of the dimensions will be linked to the user's parameters.

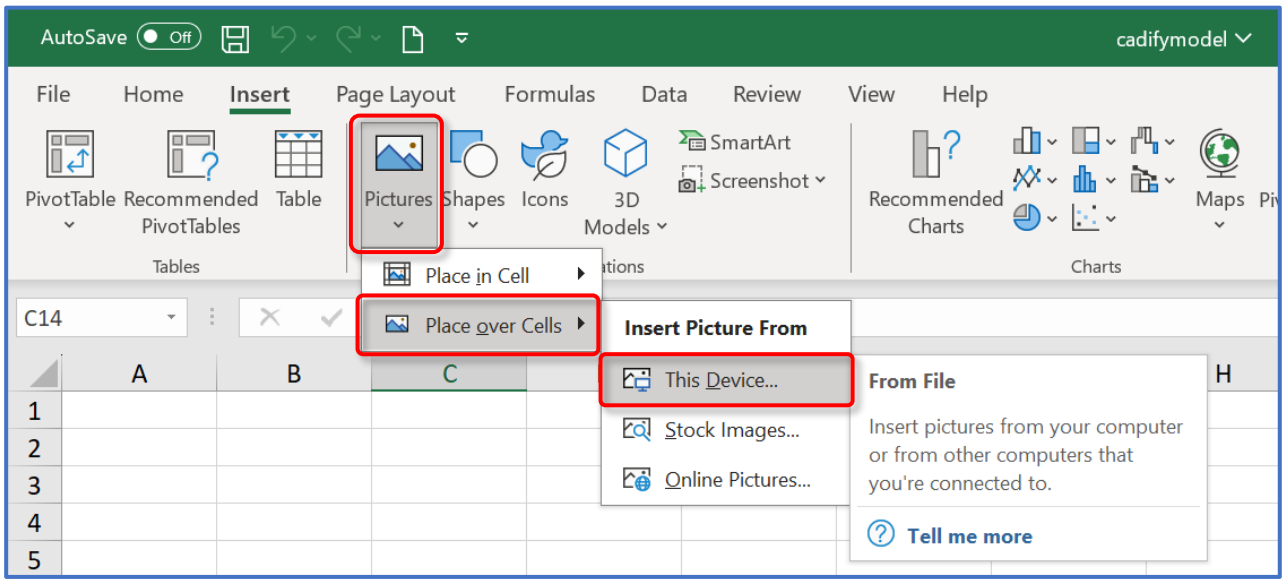
Create printable area and insert images

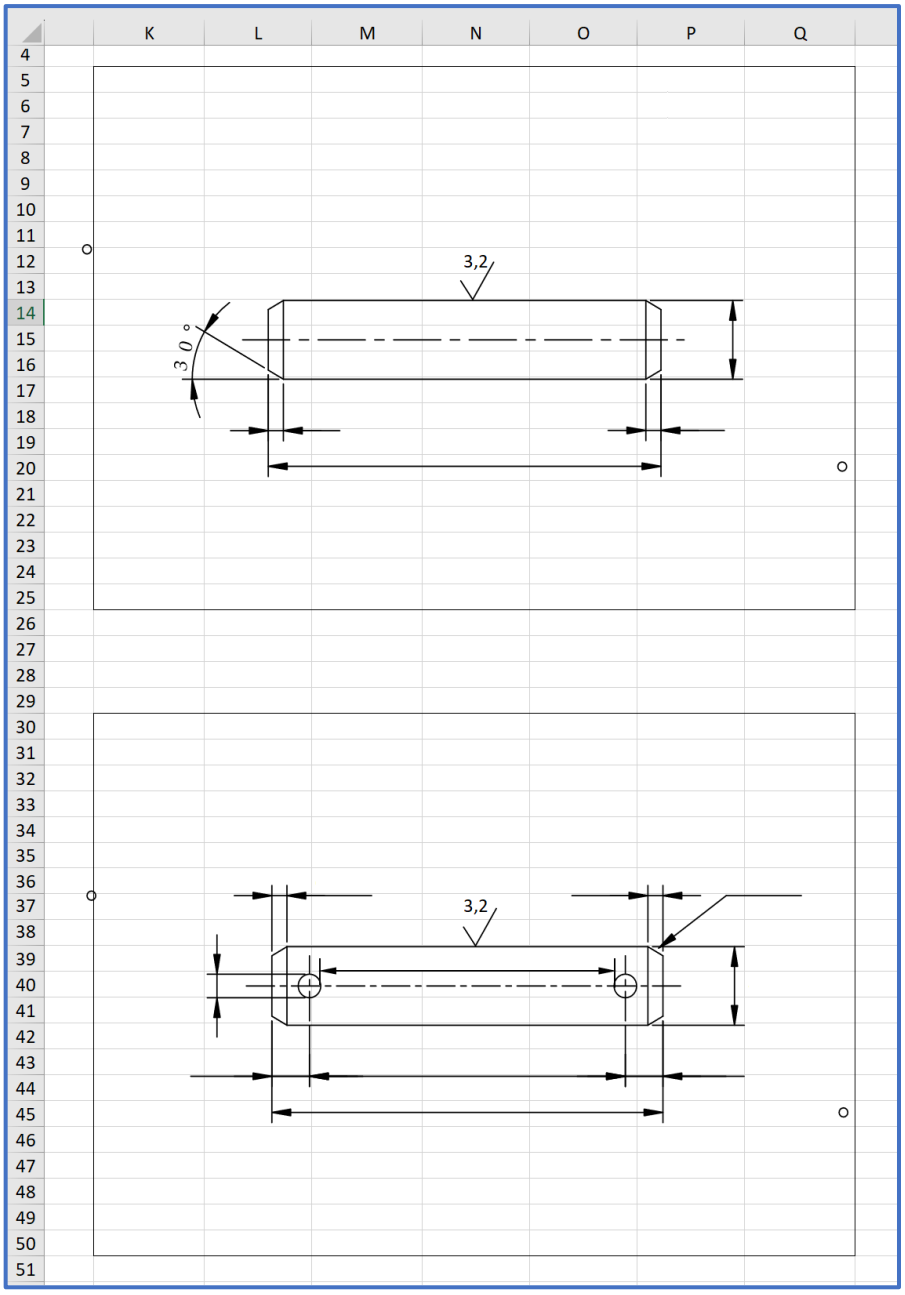
Comment: ".svg" images can be created with Paint, AutoCAD, etc.

In summary tab define the printable area by adding border.

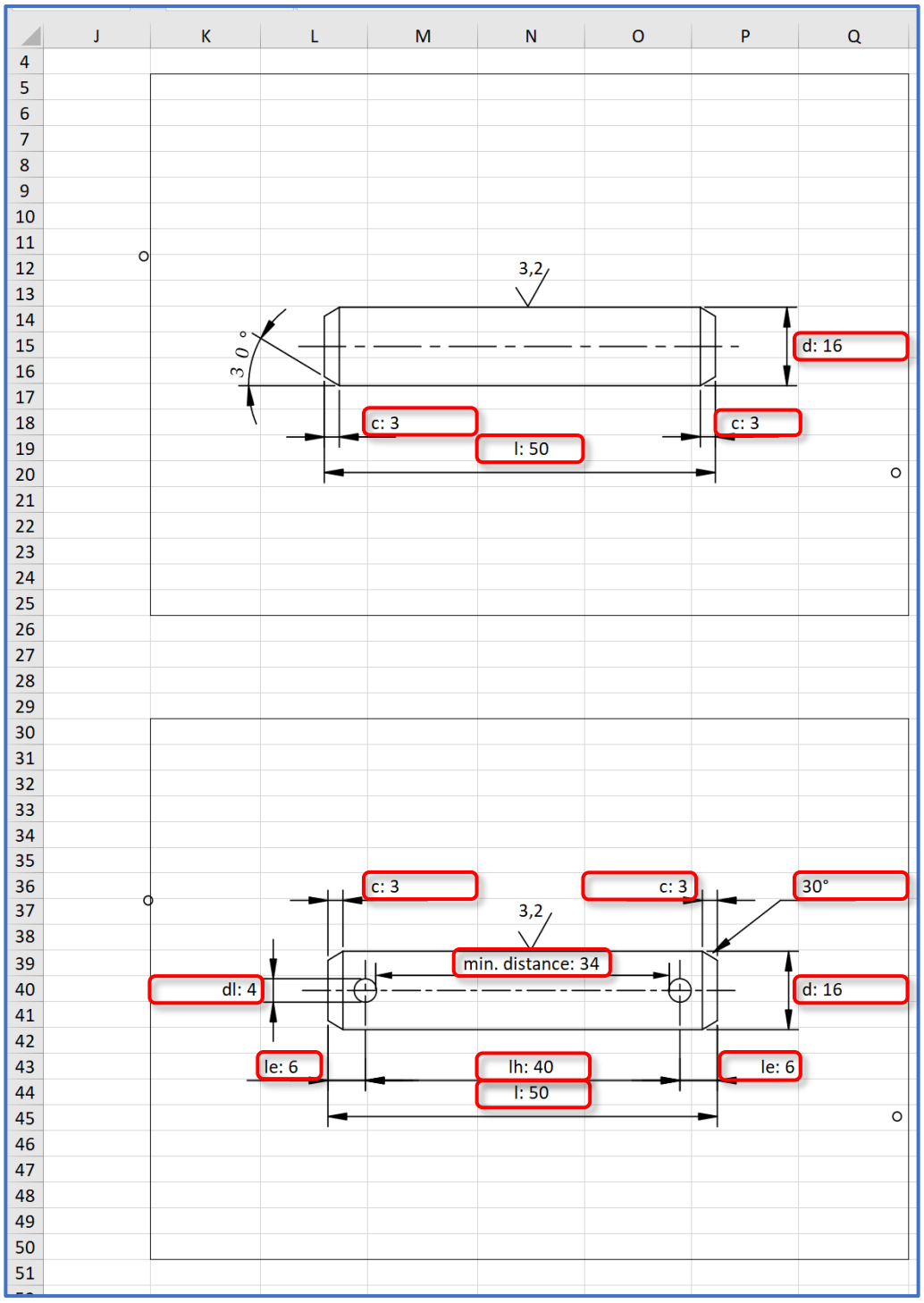


Insert images over the cells.




K
L
M
N
O
P
Q
3,2
3 0 °
3,2

Add values of dimensions



- *Summary!Q15 = CONCAT("d: ";'Cadify MASTER'!G16); this formula returns the value of “d”.*
- *Summary!M18 = CONCAT("c: ";Dim!J21); this formula returns the value of “c”.*
- *Summary!P18 = CONCAT("c: ";Dim!J21); this formula returns the value of “c”.*
- *Summary!N19 = CONCAT("l: ";Dim!X21); this formula returns the value of “l”.*
- *Summary!M36 = CONCAT("c: ";Dim!J21); this formula returns the value of “c”.*
- *Summary!O36 = CONCAT("c: ";Dim!J21); this formula returns the value of “c”.*
- *Summary!Q36 = 30°; this formula returns the angle of the chamfer.*
- *Summary!N39 = CONCAT("min. distance: ";Dim!X21-2*Dim!V21-Dim!I21); this formula returns the value of the minimum distance between holes.*
- *Summary!K40 = CONCAT("dl: ";Dim!Z21); this formula returns the value of “d_l”.*
- *Summary!Q40 = CONCAT("d: ";'Cadify MASTER'!G16); this formula returns the value of “”.*

- *Summary!L43 = CONCAT("le: ";Dim!V21); this formula returns the value of "l_e".*
- *Summary!N43 = CONCAT("lh: ";'Cadify MASTER'!G21); this formula returns the value of "l_h".*
- *Summary!P43 = CONCAT("le: ";Dim!V21); this formula returns the value of "l_e".*
- *Summary!N44 = CONCAT("l: ";Dim!X21); this formula returns the value of "l".*

Create formulas for the pin's description

ISO 2340 specifies how to describe the pins based on their type and if they are standard or custom (the descriptions vary based on which dimensions are custom). See next image.

5 Designation

Example for the designation of a clevis pin, steel, type B, with nominal diameter d = 20 mm and nominal length l = 100 mm:

Clevis pin ISO 2340 – B – 20 × 100 – St

Example for the same pin with a split pin hole of ∅ 6,3 mm:

Clevis pin ISO 2340 – B – 20 × 100 × 6,3 – St

Example for the same pin with distance l_h = 80 mm:

Clevis pin ISO 2340 – B – 20 × 100 × 6,3 × 80 – St

Example for the same pin with a standard split pin hole:

Clevis pin ISO 2340 – B – 20 × 100 × 80 St

Type A image cells	*K5*	*Q25*
Type B image cells	*K30*	*Q50*
Selected cells for web summary	**K30**	**Q50**

Code, identical for standard and custome

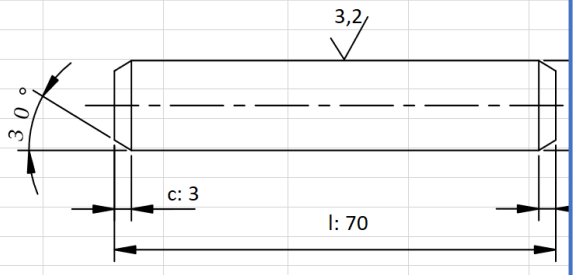
Clevis pin ISO 2340 - A - 16 x 70 - St

Clevis pin ISO 2340 - B - 16 x 70 x 5 x 40 - St

	State	*Code*
B-Standard	0	**Clevis pin ISO 2340 - B - 16 x 70 - St**
B-Custom hole Ø	0	**Clevis pin ISO 2340 - B - 16 x 70 x 5 - St**
B-Custom hole Ø & l_h	1	**Clevis pin ISO 2340 - B - 16 x 70 x 5 x 40 - St**
B-Custom l_h	0	**Clevis pin ISO 2340 - B - 16 x 70 x 40 - St**

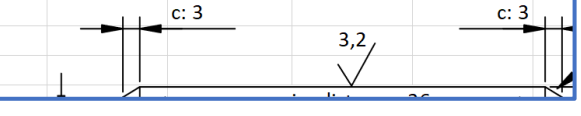
K5

Clevis pin ISO 2340 - A - 16 x 70 - St



K30

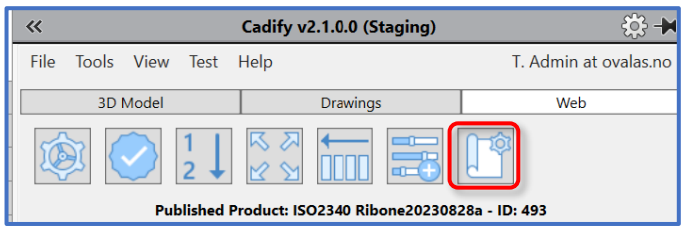
Clevis pin ISO 2340 - B - 16 x 70 x 5 x 40 - St

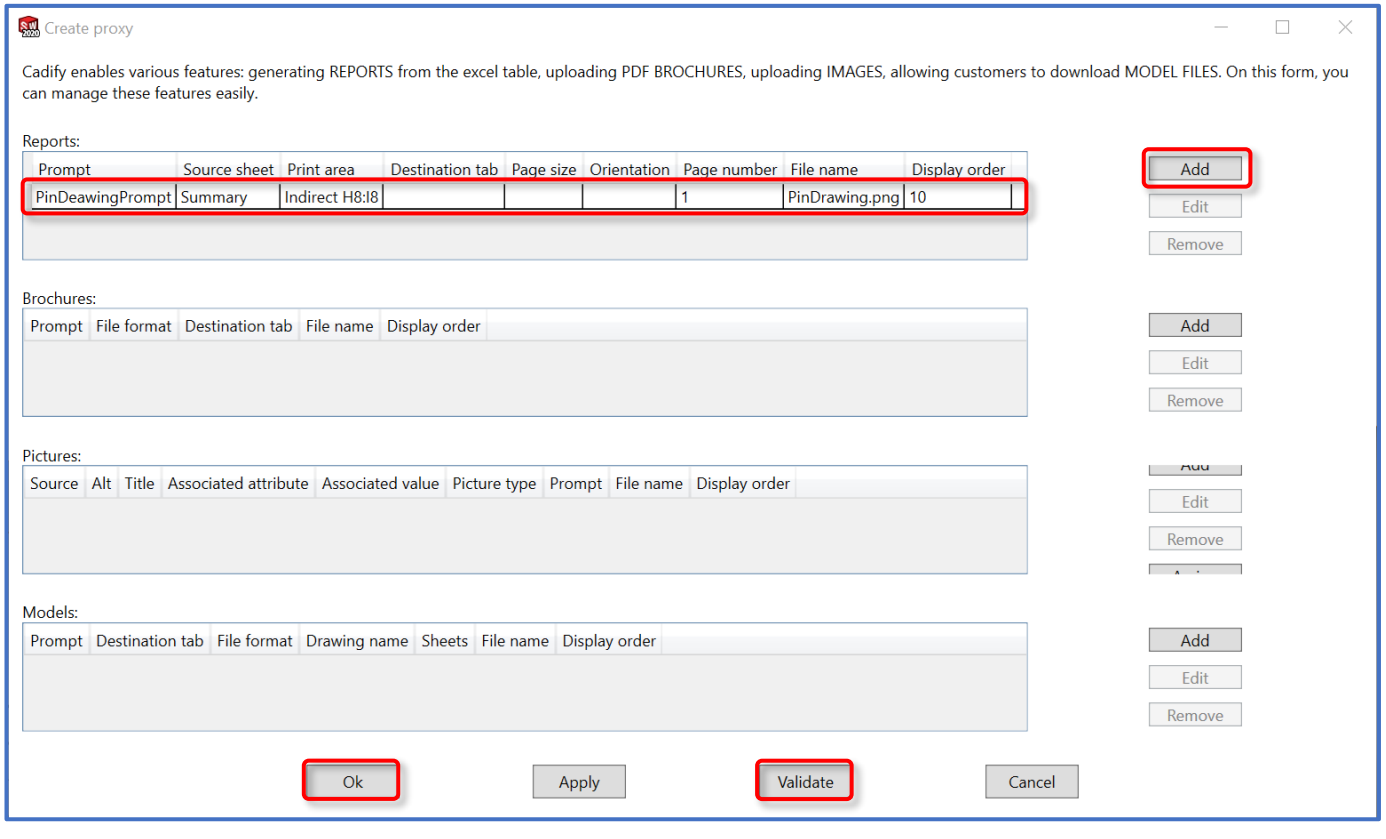


- *Summary!F12 = CONCAT("Clevis pin ISO 2340 - A - ";'Cadify MASTER'!G16;" x ";Dim!X21; " - St"); this formula returns description for type "A" pin (standard & custom).*
- *Summary!N6 = F12; this formula returns the description of previous item.*
- *Summary!E35 = IF(OR('Cadify MASTER'!G17=Dim!A24;AND('Cadify MASTER'!G17=Dim!A26;Dim!Z21=Dim!I21;Dim!V21=Dim!K21));1;0); this formula returns "1" if the pin is "B – Standard" and "0" in the other cases.*
- *Summary!F35 = CONCAT("Clevis pin ISO 2340 - B - ";'Cadify MASTER'!G16;" x ";Dim!X21; " - St"); this formula returns description for previous item case.*
- *Summary!E36 = IF(AND('Cadify MASTER'!G17=Dim!A26;NOT(Dim!Z21=Dim!I21);Dim!V21=Dim!K21);1;0); this formula returns "1" if the pin is "B – Custom" only with "d_l" different from standard value; and "0" in the other cases.*
- *Summary!F36 = CONCAT("Clevis pin ISO 2340 - B - ";'Cadify MASTER'!G16;" x ";Dim!X21;" x ";Dim!Z21; " - St"); this formula returns description for previous item case.*
- *Summary!E37 = IF(AND('Cadify MASTER'!G17=Dim!A26;NOT(Dim!Z21=Dim!I21);NOT(Dim!V21=Dim!K21));1;0) ; this formula returns 1" if the pin is "B – Custom" with "d_l" & "l_h" different from standard value; and "0" in the other cases.*
- *Summary!F37 = CONCAT("Clevis pin ISO 2340 - B - ";'Cadify MASTER'!G16;" x ";Dim!X21;" x ";Dim!Z21;" x ";'Cadify MASTER'!G21; " - St"); this formula returns description for previous item case.*
- *Summary!E38 = IF(AND('Cadify MASTER'!G17=Dim!A26;Dim!Z21=Dim!I21;NOT(Dim!V21=Dim!K21));1;0); this formula returns "1" if the pin is "B – Custom" only with "l_h" different from standard value; and "0" in the other cases.*
- *Summary!F38 = CONCAT("Clevis pin ISO 2340 - B - ";'Cadify MASTER'!G16;" x ";Dim!X21;" x ";'Cadify MASTER'!G21; " - St"); this formula returns description for previous item case.*
- *Summary!E30 = VLOOKUP(1;E35:F38;2;FALSE); this formula returns the description of the row which state is "1".*
- *Summary!N31 = E30; this formula returns the description of previous item.*

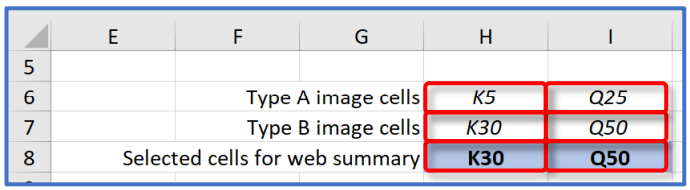
Create proxy for the printable area

In Cadify "Web" tab, click on "Create or Edit Proxy" and complete the "Create proxy" windows as shown (click on "Add" to create a new row); then click on "Validate" and "Ok".





In “Summary” tab create the formulas to select image for type “A” or “B”. The proxy read cells “H8:I8” to select the printable area.



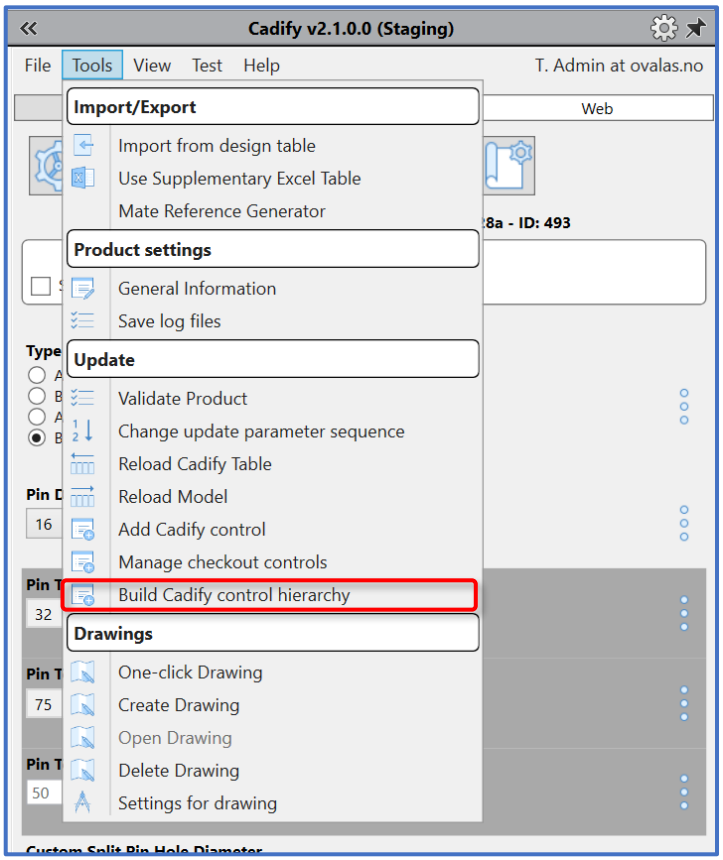
	E	F	G	H	I
5					
6			Type A image cells	*K5*	*Q25*
7			Type B image cells	*K30*	*Q50*
8			Selected cells for web summary	**K30**	**Q50**

- *Summary!H6 = K5; this is the top-left cell of type “A” pin printable area.*
- *Summary!I6 = Q25; this is the bottom-right cell of type “A” pin printable area.*
- *Summary!H7 = K30; this is the top-left cell of type “B” pin printable area.*
- *Summary!I7 = Q50; this is the bottom-right cell of type “B” pin printable area.*
- *Summary!H8 = IF(Dim!U21="A";H6;H7); this formula returns the top-left cell of the printable area based on the selected type of pin.*
- *Summary!I8 = IF(Dim!U21="A";I6;I7); this formula returns the bottom-right cell of the printable area based on the selected type of pin.*

STEP 6 – PRODUCT VALIDATION

Build Cadify control hierarchy

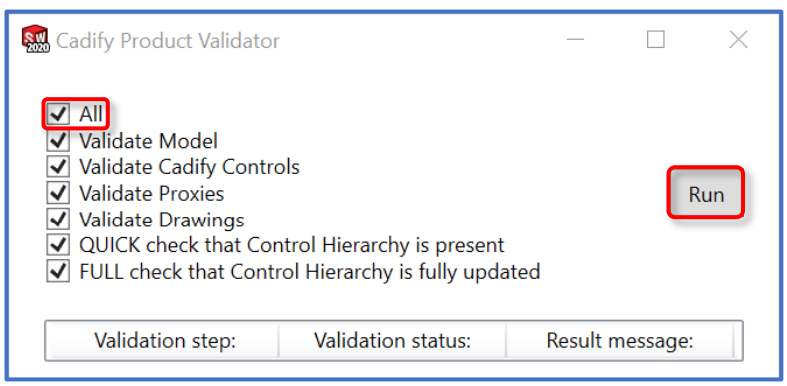
In “Cadify” tab select “Tools > Build Cadify control hierarchy”. This tool identifies parameters hierarchy and adds the dependencies for each in the “References” column.



	Condition	Control Type	Name	Value	Unit	Min	Min message	Max	Max message	Decimal	Increment	Type	References
			Basic Parameter Settings										
	;EDT;Type of Pin;A - Standard	List Numeric	Pin Total Length A-Standard	32	mm					0		Input	
	;EDT;pleaseSelect	List Numeric	Pin Diameter	16	mm					0		Input	Pin Total Length A-Standard;Pin Total Length B-Standard;Custom Split Pin Hole Diameter;Custom holes distance;Pin Total Length B-Custom
	EDT;first	List Radio Button	Type of Pin	B - Custom								Input	Pin Total Length B-Custom
	EDT;Type of Pin;B - Custom	List dropdown	Custom Split Pin Hole Diameter	5	mm							Input	
	;EDT;Type of Pin;B - Standard	List dropdown	Pin Total Length B-Standard	75								Input	
	EDT;Type of Pin;A - Custom	Numerical	Pin Total Length A-Custom	50	mm	10		100		0	1	Input	
	EDT;Type of Pin;B - Custom	Numerical	Custom holes distance	40	mm	10	Minimun is 10 mm	160	Maximum is 160 mm	0	1	Input	Pin Total Length B-Custom
	EDT;Type of Pin;B - Custom	Spinbox Up Down	Pin Total Length B-Custom	70	mm	52	Minimun is 52 mm	190	Maximum is 190 mm	0	1	Input	Pin Total Length B-Custom
		CalculateBtn	Calculate Button	u								Checkout	
		PriceTxt	Price Text	u								Checkout	
		Add2CartBtn	Add To Cart Button	u								Checkout	
		SelAddressCbx	Select Address Combobox	u								Checkout	
		Add2PrjBtn	Add To Project Button	u								Checkout	
		EmailBtn	Email Button	u								Checkout	

Validate product

In “Cadify” tab select “Tools > Validate product”. In “Cadify Product Validator” select "All” and click on “Run”.



In this product all validations are ok. The product is ready to be published. Follow instructions in previous tutorials to publish it.