



HEXAGON
MANUFACTURING INTELLIGENCE

ALPHACAM 2020.1 2D CAD GEOMETRY



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Contents

Copyright	i
Conventions used in this manual.....	v
Recommended Operating Systems and Hardware for ALPHACAM.....	vi
Supported Operating Systems	vi
ALPHACAM Minimum Specifications.....	vi
Hexagon Customer Portal.....	vii
ALPHACAM esupport.....	viii
Tutored CAD Examples	1
#1 Styles Plate.....	1
Drawing Process Plan based on the Constituent parts:.....	2
Outside Shape	3
Inside rectangle	4
Slot detail.....	6
Edit the internal rectangle.....	7
Creating the 8mm Holes.....	12
Apply the outer chamfers.....	14
#2 Pocketed Plate	16
Create and activate the User Layer.....	18
Base Rectangle	22
Ø12 Holes.....	22
R16.5 Circles	24
Triangle side reference rectangle.....	25
Triangle Geometry Creation	28
New User Layer	28
Base Geometry Creation	29
Triangle Creation using Containing Loop	33
Circles along the diagonal lines.....	38
New User Layer	38
Create the circles.....	39

Triangles Central Circle Creation	41
New User Layer	41
Create the circles	42
Set the correct diameter Method 1	46
Set the correct diameter Method 2	49
Adding the Fillets	50
#3 Housing Plate	51
Constituent parts	53
Order of Production	53
Router CAD Examples	54
#4 Chair Seat.....	54
#5 Desk Top	56
#6 End Plate with Slot	57
#7 Curved Board	58
#8 Sample Door.....	59
#9 Chair Stringer	61
Milling CAD Examples	63
#10 Arched Lever	63
#11 Thin Wall Pocket Plate	64
#12 Support Block	66
#13 Raised Form Block	68
#14 Block with Curved Slot.....	70
#15 Striper plate	71
#16 Push plate.....	73
Generic CAD Examples	75
#17 Securing Plate	75
#18 Clock Face.....	77
Tool Drawings	79
#19 2mm Corner Rounding Cutter	79
#20 EMC4.....	81
#21 Spindle Moulder Body	83

Table of Images

FIGURE 1 - CUSTOMER SUPPORT PORTAL	VII
FIGURE 2 - ESUPPORT PAGE	VIII
FIGURE 3 - STYLES PLATE DIAGRAM	1
FIGURE 4 - STYLES PLATE REFERENCE MODEL	2
FIGURE 5 - FIRST GEOMETRY START POINT	3
FIGURE 6 - FIRST GEOMETRY SECOND POINT	3
FIGURE 7 - CREATED RECTANGLE	3
FIGURE 8 - OFFSET DIALOGUE	4
FIGURE 9 - SELECTING THE GEOMETRY TO OFFSET	4
FIGURE 10 - COMPLETED OFFSET RECTANGLE	5
FIGURE 11 - ACCESSING THE SLOT CREATION OPTION	6
FIGURE 12 - SLOT CREATION DIALOGUE	6
FIGURE 13 - POSITIONING THE SLOT	6
FIGURE 14 - OFFSET COMMAND DIALOGUE	7
FIGURE 15 - OFFSET SELECTED ITEM	7
FIGURE 16 - OFFSET CONSTRUCTION LINE	8
FIGURE 17 - SELECTION OF CUTTING GEOMETRY	8
FIGURE 18 - SELECTION OF ITEM TO REMOVE	9
FIGURE 19 - COMPLETION OF THE JOIN COMMAND	9
FIGURE 20 - FILLET DIALOGUE	10
FIGURE 21 - SELECT THE GEOMETRY TO BUBBLE FILLET	10
FIGURE 22 - APPLIED BUBBLE FILLETS	11
FIGURE 23 - CIRCLE DIAMETER DIALOGUE	12
FIGURE 24 - CIRCLE LOCATION DIALOGUE	12
FIGURE 25 - ARRAY SELECTION PROCESS	12
FIGURE 26 - ARRAY DIALOGUE OPTIONS	13
FIGURE 27 - ARRAYED 8MM CIRCLES	13
FIGURE 28 - SETTINGS FOR CHAMFER COMMAND	14
FIGURE 29 - SELECT OUTSIDE GEOMETRY	14
FIGURE 30 - COMPLETED STYLES PLATE	15
FIGURE 31 - POCKETED PLATE MAIN DRAWING DETAILS	16
FIGURE 32 - POCKETED PLATE REFERENCE MODEL	17
FIGURE 33 - ADDING THE FIRST USER LAYER	18
FIGURE 34 - DEFAULT USER LAYER DIALOGUE	18
FIGURE 35 - ASSIGNED NAME FOR THE LAYER	19
FIGURE 36 - STANDARD COLOUR PALETTE OPTIONS.	19
FIGURE 37 - COLOURS TO AVOID	20
FIGURE 38 - CREATED LAYER DIALOGUE SET TO ACTIVE	20
FIGURE 39 - PROJECT MANAGER WITH ACTIVE USER LAYER	21
FIGURE 40 - ALPHACAM WINDOW TITLE BAR WITH ACTIVE LAYER IN BRACKETS	21
FIGURE 41 - BASE RECTANGLE FOR OUTER PROFILE	22
FIGURE 42 - SNAP THE CIRCLE TO THE CORNER POINT	22
FIGURE 43 - APPLIED Ø12 CIRCLES	23
FIGURE 44 - APPLIED R16.5 CIRCLES	24
FIGURE 45 - OFFSET SETTINGS	25
FIGURE 46 - SELECT THE RECTANGLE	25
FIGURE 47 - <LCLICK> INSIDE THE RECTANGLE TO PLACE THE OFFSET	26
FIGURE 48 - BASE GEOMETRY STRUCTURE	26
FIGURE 49 - SELECTING THE ITEMS TO UNITE	27

FIGURE 50 - COMPLETED OUTER PROFILE	27
FIGURE 51 - ADDING NEXT FIRST USER LAYER	28
FIGURE 52 - CREATED LAYER DIALOGUE SET TO ACTIVE	28
FIGURE 53 - CHANGE FROM OLD LAYER TO ACTIVE	29
FIGURE 54 - <LCLICK> THE OFFSET RECTANGLE	29
FIGURE 55 - INNER RECTANGLE ALTERED TO NEW LAYER	30
FIGURE 56 - TRIANGLE BASE LINES	31
FIGURE 57 - OFFSET OPTIONS FOR TRIANGLE SIDES	32
FIGURE 58 - OFFSET BOTH SIDES	32
FIGURE 59 - GROUPED TRIANGLE BASE GEOMETRIES	33
FIGURE 60 - SELECTED ITEMS TO WORK WITH	34
FIGURE 61 - <LCLICK> IN A TRIANGLE TO ANALYSE IT	35
FIGURE 62 - EXTRACTED CLOSED TRIANGLE BOUNDARY	35
FIGURE 63 - BASE TRIANGLE GEOMETRIES TURNED TO CONSTRUCTION	36
FIGURE 64 - COMPLETED TRIANGLES	37
FIGURE 65 - ADDING NEXT USER LAYER	38
FIGURE 66 - CREATED LAYER DIALOGUE SET TO ACTIVE	38
FIGURE 67 - EQUI-SPACED HOLES SETTINGS	39
FIGURE 68 - SELECTED GUIDE GEOMETRIES	39
FIGURE 69 - CHANGE THE GUIDES TO CONSTRUCTION	40
FIGURE 70 - ADDING NEXT USER LAYER	41
FIGURE 71 - CREATED LAYER DIALOGUE SET TO ACTIVE	41
FIGURE 72 - TANGENT CIRCLE RADIUS NOT KNOWN	42
FIGURE 73 - <LCLICK> THREE SIDES OF THE SAME TRIANGLE	42
FIGURE 74 - ALL POSSIBLE CIRCLES SHOWN	43
FIGURE 75 - <RCLICK> POP UP CONTEXT MENU	44
FIGURE 76 - APPLIED TANGENT CIRCLES	45
FIGURE 77 - ADD-INS MANAGER	46
FIGURE 78 - CHANGE CIRCLE SIZE DIALOGUE	47
FIGURE 79 - SELECTED CIRCLES TO ALTER	47
FIGURE 80 - COMPLETED PROCESS METHOD 1	48
FIGURE 81 - CHANGE CIRCLE SIZE VIA USER LAYERS	49
FIGURE 82 - COMPLETED PROCESS METHOD 2	49
FIGURE 83 - FILLET COMMAND DIALOGUE	50
FIGURE 84 - COMPLETED DRAWING	50
FIGURE 85 - HOUSING PLATE MAIN DRAWING DETAILS	51
FIGURE 86 - HOUSING PLATE SOLID MODEL	52
FIGURE 87 - HOUSING PLATE GEOMETRY CONSTITUENT PARTS	53

Conventions used in this manual

To enable you to use the information in this guide effectively, you need to understand the conventions used in the guide to represent differing types of information.

- Buttons on the screen are represented as the button text in square brackets.
For example: Click on **[OK]**.
- Keys on the keyboard are represented as bold lettering in between **< >** characters.
For example: Press **<Enter>**.
- Ribbon Tab options are represented as a path with the Ribbon Tab in **UPPER** case with sub menus Capitalised and separated with an arrow
For example: Select **FILE > Open**.
- Field names are represented as bold text. And the value to be entered will be represented by Bold Text.
For example: Enter the value **50** in the **Offset** field. Or
When prompted for the X & Y values type **100,50 <Enter>**



Denotes a **<LClick>** or Primary Mouse Button Click.



Denotes a **<RClick>** or Secondary Mouse Button Click.



This is a note. It contains useful or additional information.



This is a reference. It directs you to another part of the user guide.



This is a thought box. It is generally used in exercises and contains a question for you to consider.



This is a highlighted note to emphasise information



This is a warning; it contains information that you must not ignore.



This is a tip. It is generally used in exercises and offers further advice.

1. This is the first line of a number list item
 2. This is the second item of the numbered instructions, which you must
 3. Follow in sequence.
- This is a list
 - of items, in which
 - The order is not important.

Recommended Operating Systems and Hardware for ALPHACAM

Supported Operating Systems

- **Operating System**
- **64bit** operating systems of the following list are supported,
 - **Windows 7** (Professional, Enterprise or Ultimate) SP1 required,
 - **Windows 8.1** Professional and Enterprise,
 - **Windows 10** Professional and Enterprise.
- ALPHACAM will install and run on the 'Home' editions of the above operating systems. However, this is not recommended, and we cannot guarantee to fix any ALPHACAM issues specifically related to these operating systems.
- Nvidia or ATI Open GL Graphics Card with 1Gb dedicated memory



We recommend you keep up to date with the with the [latest Software Updates](#) for the supported operating systems and drivers for your hardware base.



Any Windows Operating system (OS) prior to and including Vista, is not a supported operating system.

ALPHACAM Minimum Specifications



The latest minimum specification can be found at <http://www.alphacam.com/systemrequirements>

This minimum specification is to run any **ALPHACAM Essential** module, you will need to considerably increase the specification if you are working with solid models and producing the NC code for 3D machining and 3, 4, or 5 axis simultaneous machining strategies.

Your minimum specifications should be the fastest processor with the most memory and the highest specification video card that your budget will allow.



If using Autodesk Inventor Files, please check the current Inventor View requirements at [autodesk inventor view](#)

Hexagon Customer Portal

At Hexagon, we strive to provide you and your business with first class technical support and services. The Customer Support Portal allows you the tools you need to receive the best from your software. In addition to generating new and updating existing support cases, the portal allows you:

- Unlimited user logins for your company.
- Access to all your licenses for easy reference.
- Get the latest releases and software update at the touch of a button.
- View what is available on your support and maintenance schedule.
- Reference to the Customer Support Charter at any time.
- View the status of your Technical Support cases.
- View all purchased Professional Services like Training and Consultancy.

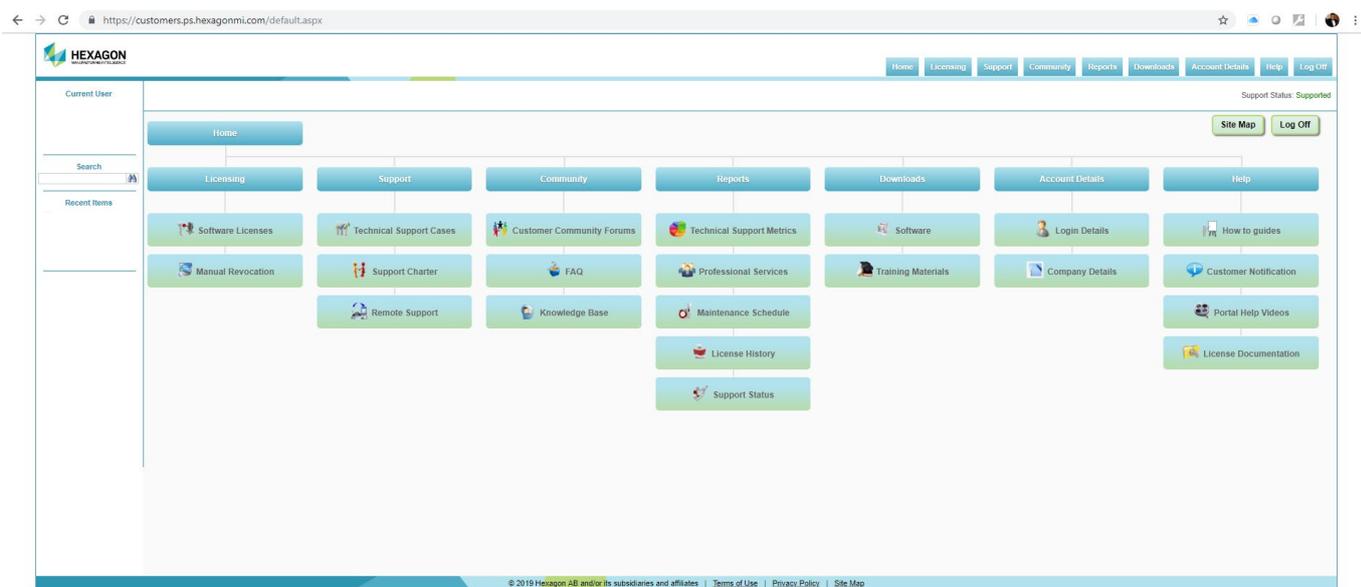
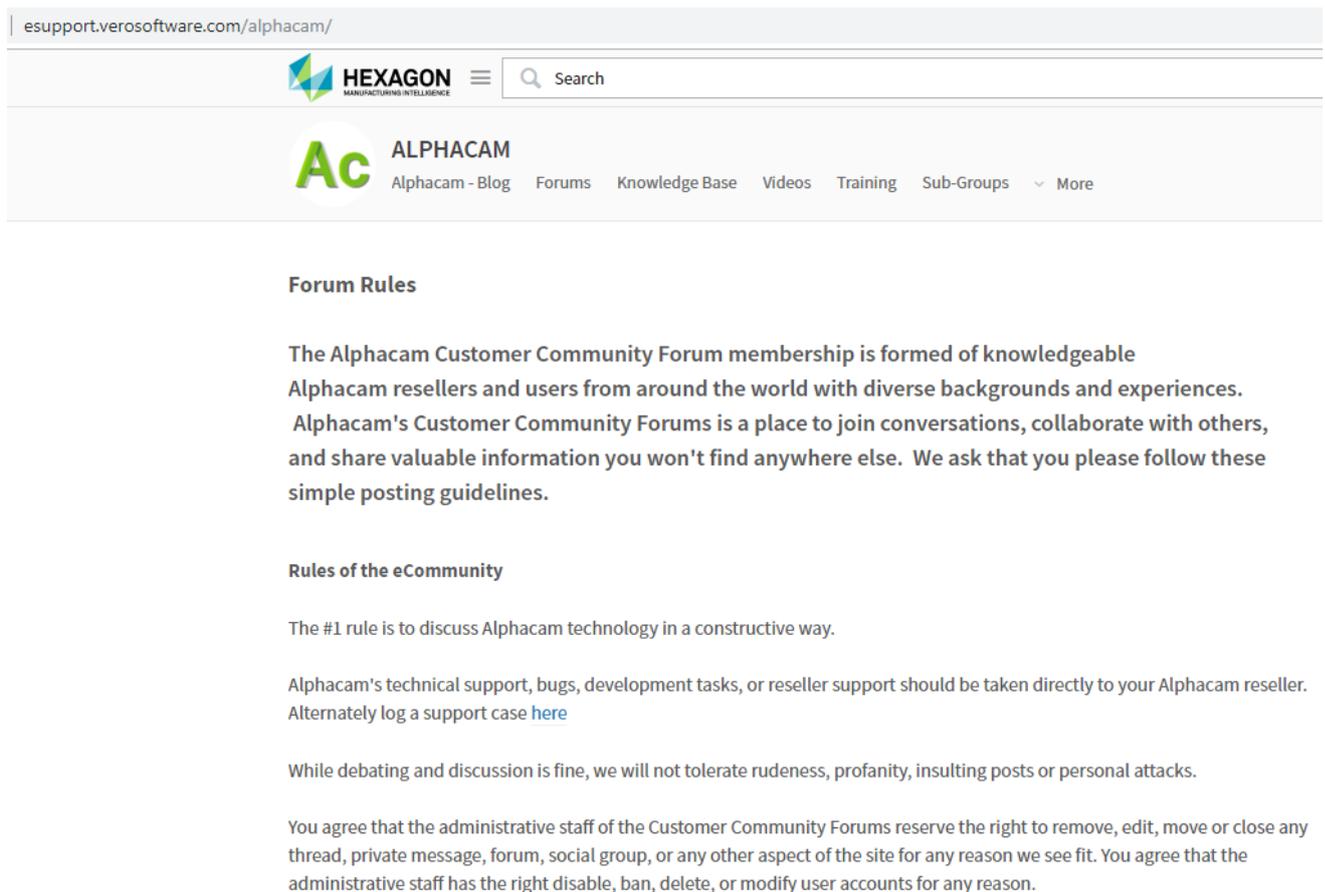


Figure 1 - Customer Support Portal

For the Hexagon Customer Portal visit customers.ps.hexagonmi.com

ALPHACAM esupport

Another location to gain valuable information about using the software or asking other experienced users for assistance are the [esupport forums](#).



The screenshot shows the esupport.verosoftware.com/alphacam/ website. The header includes the Hexagon logo and a search bar. Below the header is a navigation menu with the 'Ac ALPHACAM' logo and links for 'Alphacam - Blog', 'Forums', 'Knowledge Base', 'Videos', 'Training', 'Sub-Groups', and 'More'. The main content area is titled 'Forum Rules' and contains the following text:

Forum Rules

The Alphacam Customer Community Forum membership is formed of knowledgeable Alphacam resellers and users from around the world with diverse backgrounds and experiences. Alphacam's Customer Community Forums is a place to join conversations, collaborate with others, and share valuable information you won't find anywhere else. We ask that you please follow these simple posting guidelines.

Rules of the eCommunity

The #1 rule is to discuss Alphacam technology in a constructive way.

Alphacam's technical support, bugs, development tasks, or reseller support should be taken directly to your Alphacam reseller. Alternately log a support case [here](#)

While debating and discussion is fine, we will not tolerate rudeness, profanity, insulting posts or personal attacks.

You agree that the administrative staff of the Customer Community Forums reserve the right to remove, edit, move or close any thread, private message, forum, social group, or any other aspect of the site for any reason we see fit. You agree that the administrative staff has the right to disable, ban, delete, or modify user accounts for any reason.

Figure 2 - esupport page

Asking a question of the community, using the knowledge base or other available information links could save you time if you have a problem that someone else may already have supplied a solution for.

Tutored CAD Examples

#1 Styles Plate

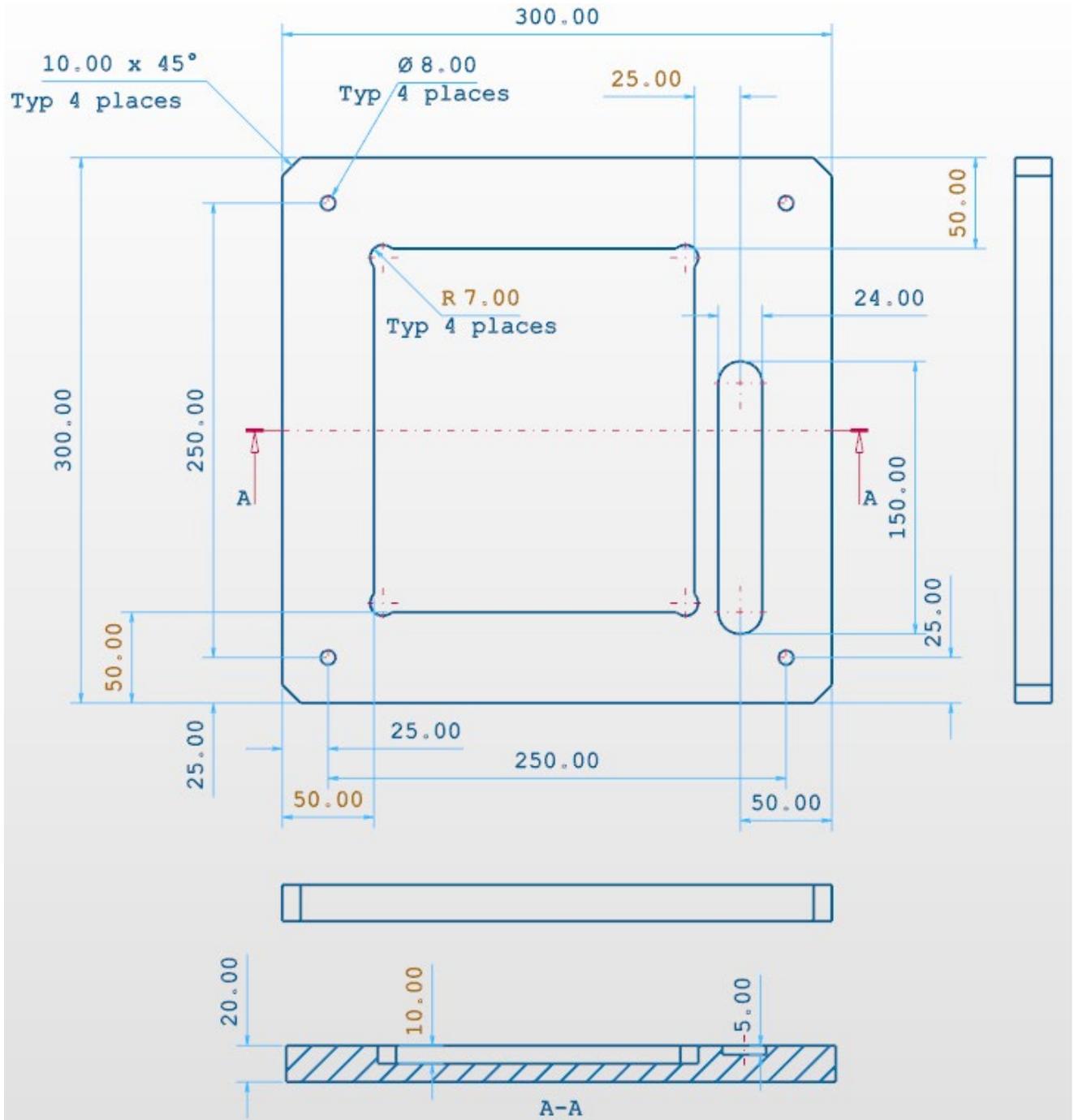


Figure 3 - Styles Plate Diagram

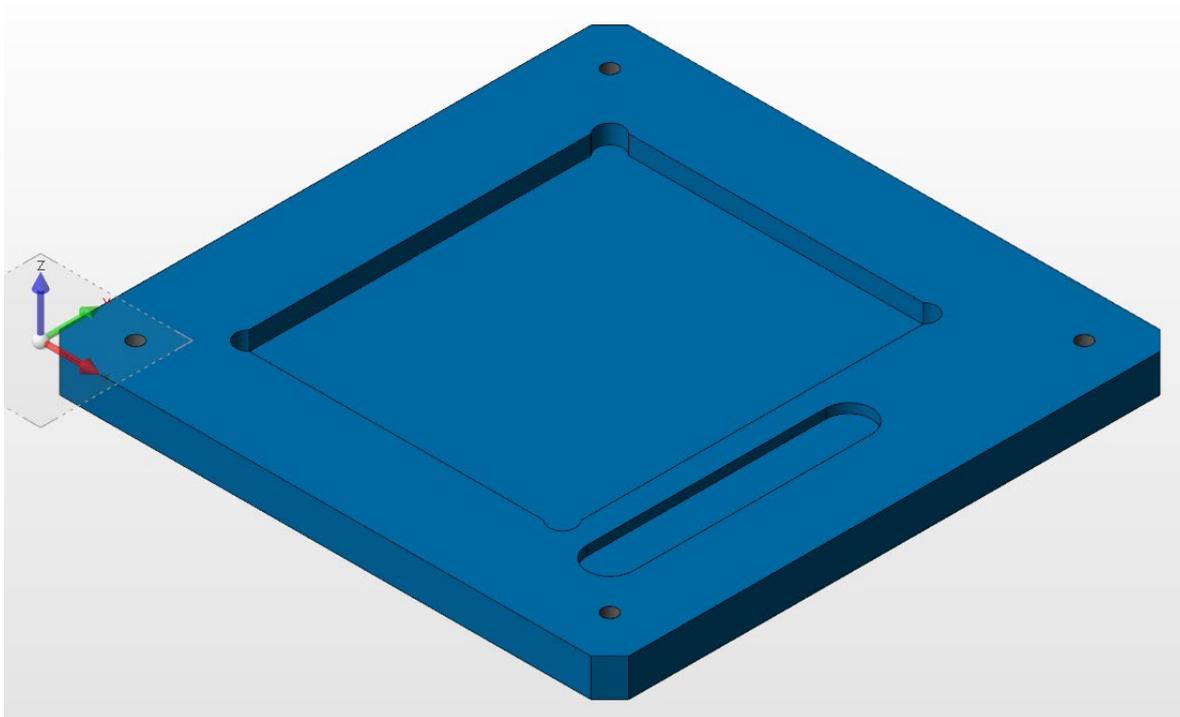


Figure 4 - Styles Plate reference model

These two images form the reference base for the creation of the Styles Plate in ALPHACAM.

It should be noted here that the methods described are many and varied to give the user a good grounding in many of the commands available in ALPHACAM.

It is not the tutor's role to teach an exact method for drawing any of the parts in this manual, but more to give you a good insight into the many methods you can use.



Some of the images in the following instruction set may have options shown that may not be available in the Essential level of ALPHACAM.

Drawing Process Plan based on the Constituent parts:

- Drawing Datum set at the lower left corner.
- Outer 300mm x 300mm Rectangle.
- Inner rectangle 50mm inbound on 3 sides, 75mm on the fourth.
- The inner rectangle has Radius 7 Bubble fillets to relieve the corners.
- Slot 24mm x 150mm positioned 50mm x 50mm from bottom right corner.
- 4 off circles $\varnothing 8$ in 250mm rectangular pattern 25mm x 25mm from datum.
- 4 off $\text{R}10.0 \times 45^\circ$ chamfers on all external corners.

Outside Shape

Select **GEOMETRY > Rectangle** 

The command line will prompt for the **First Corner** type **X0,Y0** then **<LClick> [Ok]** or press **<Enter>**.



Figure 5 - First geometry start point

Then the command line will prompt for the **Second Corner** type **X300,Y300** then **<LClick> [Ok]** or press **<Enter>**.



Figure 6 - First geometry second point

<RClick> to finish the command.

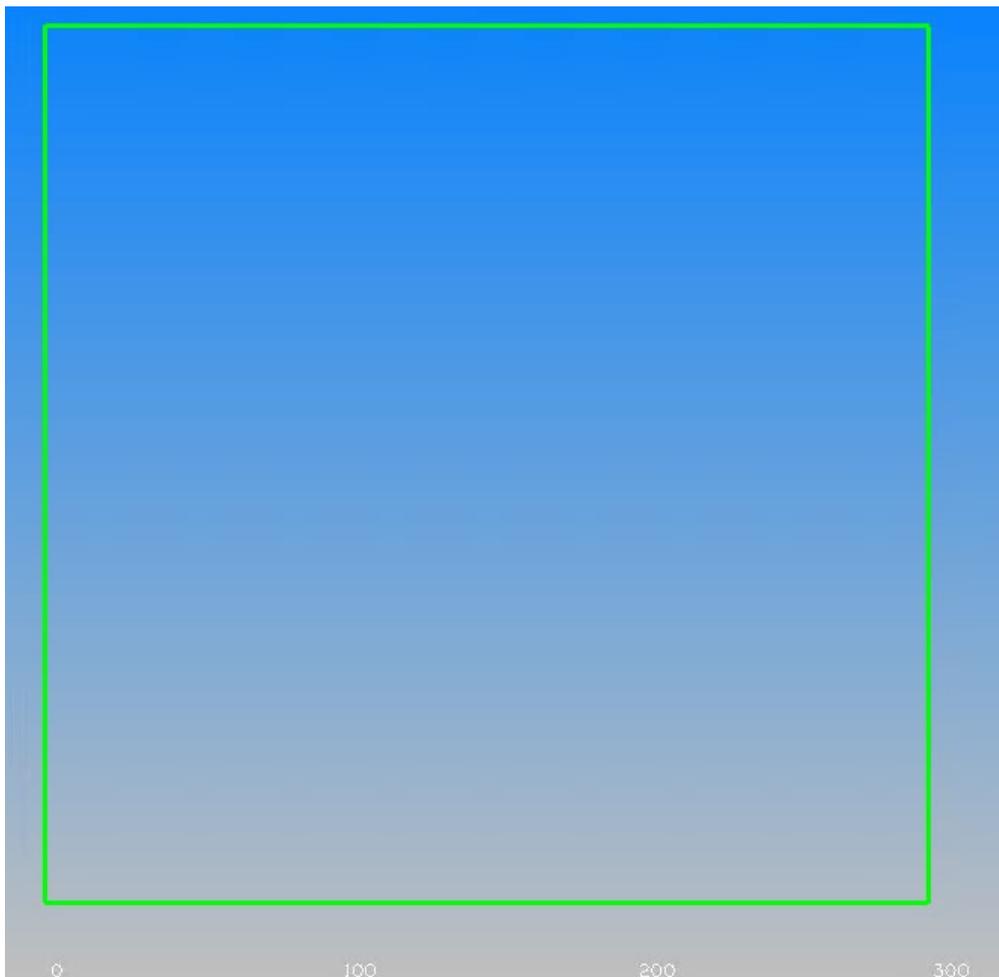


Figure 7 - Created rectangle

Inside rectangle

Select **EDIT > Break Join Etc. > Offset** 

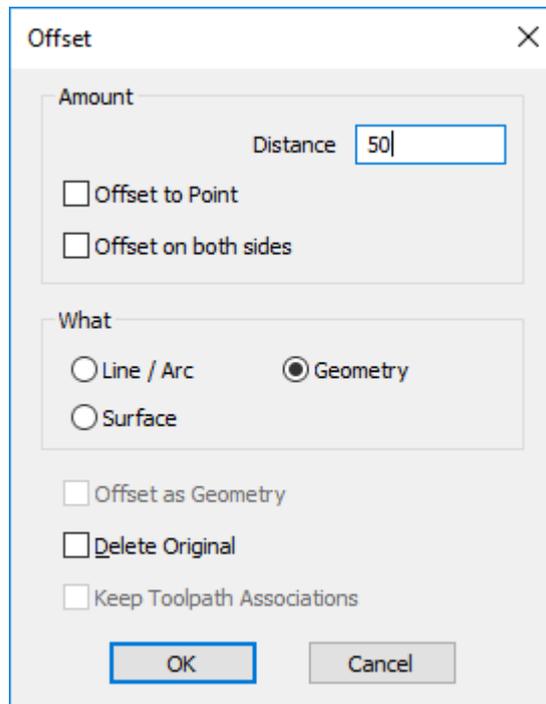


Figure 8 - Offset Dialogue

In the dialogue, set the following options: **Distance = 50, What = Geometry** then select **[Ok]**. The command line will prompt **OFFSET: Select, <LClick>** physically on the rectangle geometry.

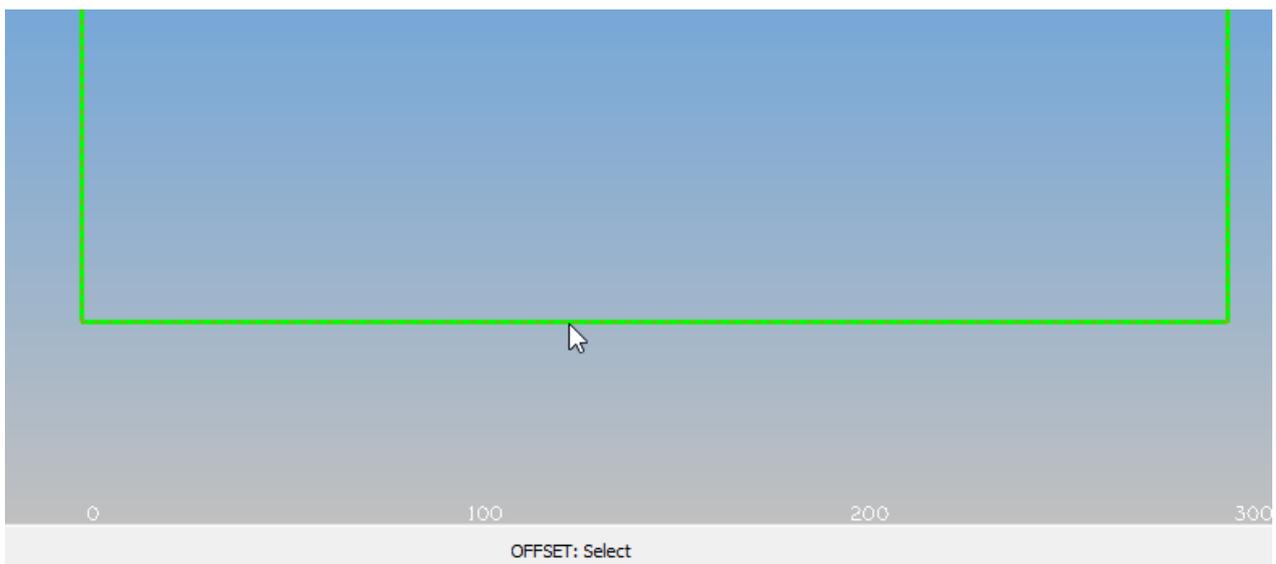


Figure 9 - Selecting the geometry to offset

Then the command line will prompt **OFFSET: Select, <LClick>** a position inside the rectangle. **<RClick>** to finish the command.

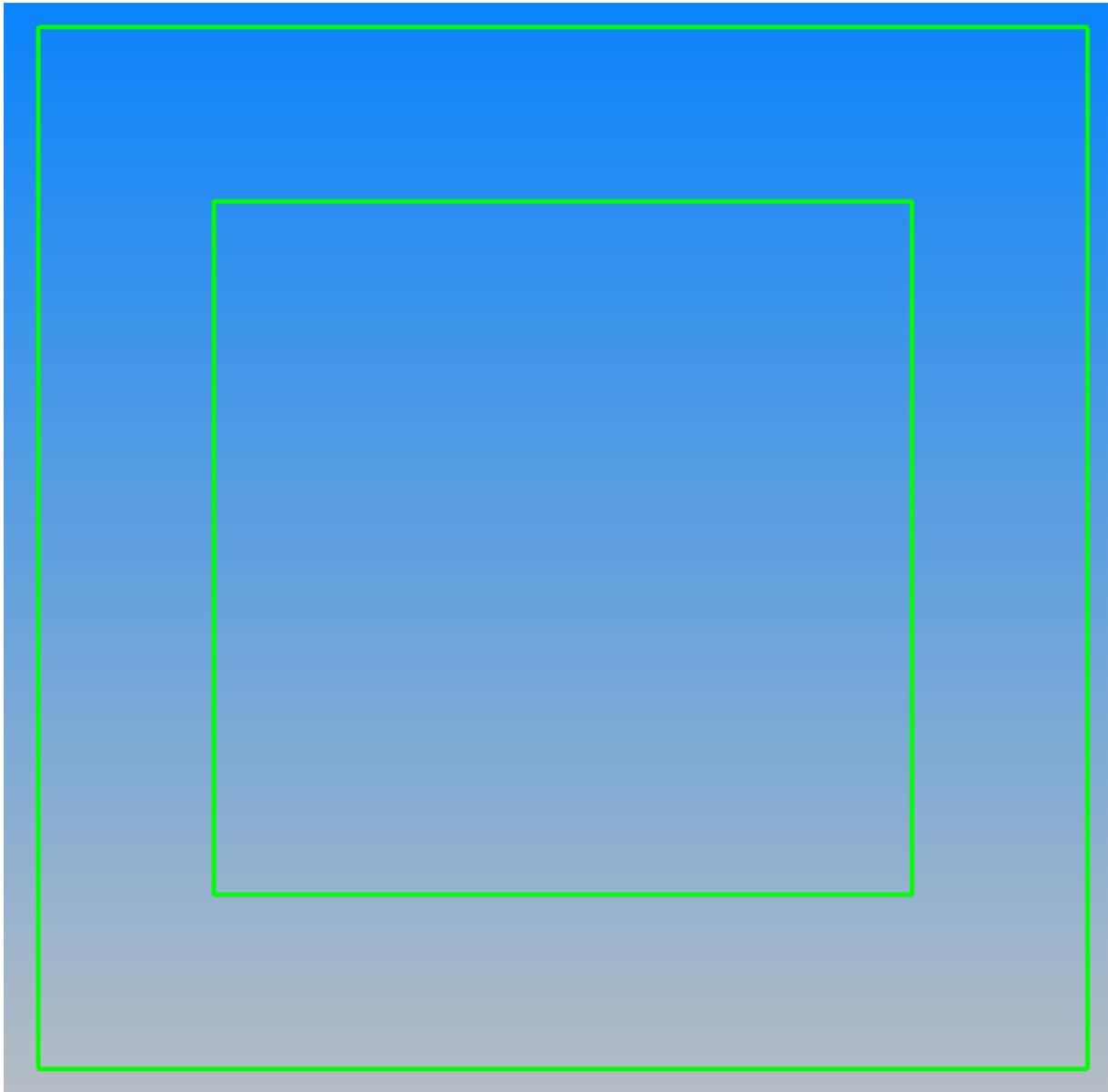


Figure 10 - Completed Offset Rectangle

Slot detail

Select **GEOMETRY > Special Geometries > Slot** 

 Many commands in ALPHACAM use a small triangle to denote a sub menu of more commands, use this to access the Slot command.

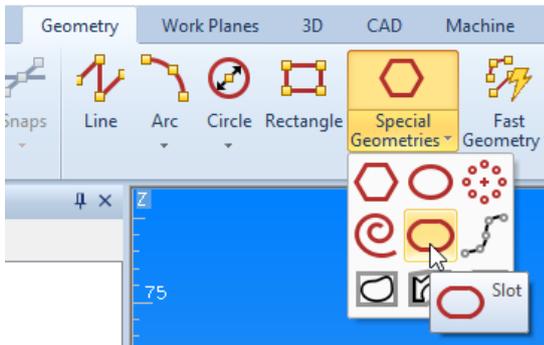


Figure 11 - Accessing the Slot creation option

In the dialogue set the following options:

Overall Length = 150, End Radius = 24/2, Direction Angle = 90 select [Ok].

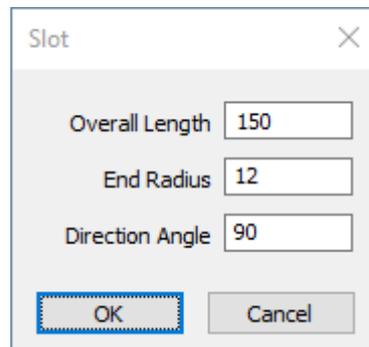


Figure 12 - Slot Creation Dialogue

The command line will prompt Drag to Position or Enter Coordinates.

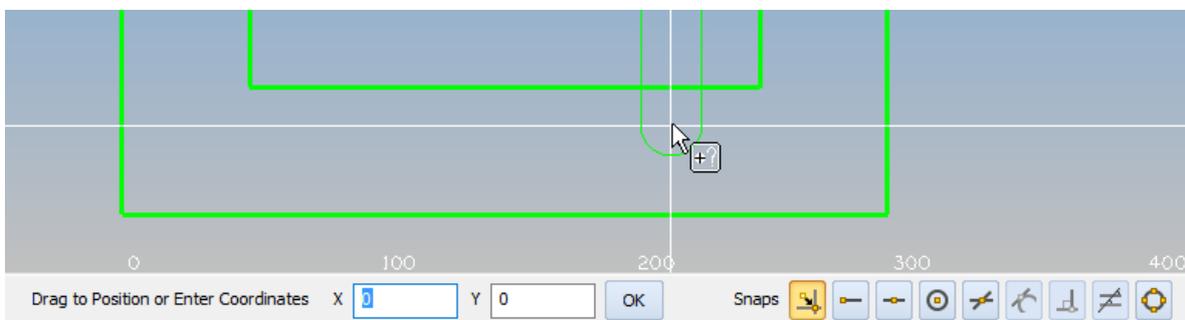


Figure 13 - Positioning the Slot

Press **<F6>** to use the **End of** snap function, then **<LClick>** either the lower horizontal line or the right-hand vertical line to bring up the snap point at bottom right corner of the inner rectangle, or type **X250, Y50 <Enter>**.

Edit the internal rectangle

Select **EDIT > Break Join Etc. > Offset** 

In the dialogue set the following options: **Distance = 25**, for **What** **Line/Arc** then select **[Ok]**.

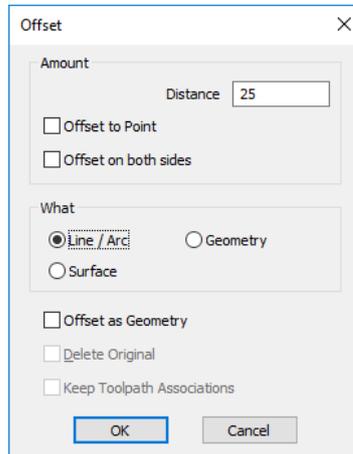


Figure 14 - Offset command dialogue

The command line will prompt **OFFSET: Select, <LClick>** on the right vertical side of the inner rectangle which passes through the slot detail.

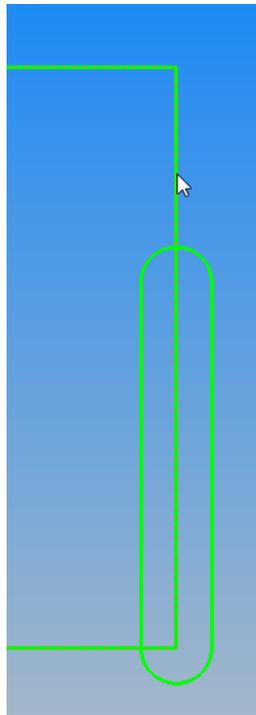


Figure 15 - Offset selected item

Then the command line will prompt **Pick Side to Offset, <LClick>** a position to the left side. **<RClick>** to finish the command.

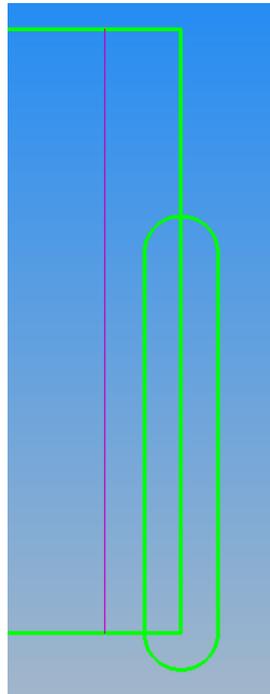


Figure 16 - Offset Construction Line

Select **EDIT > Break Join Etc. > Trim** 

The command line will prompt for the **Cutting Geometry**, select the purple line created by the previous command.

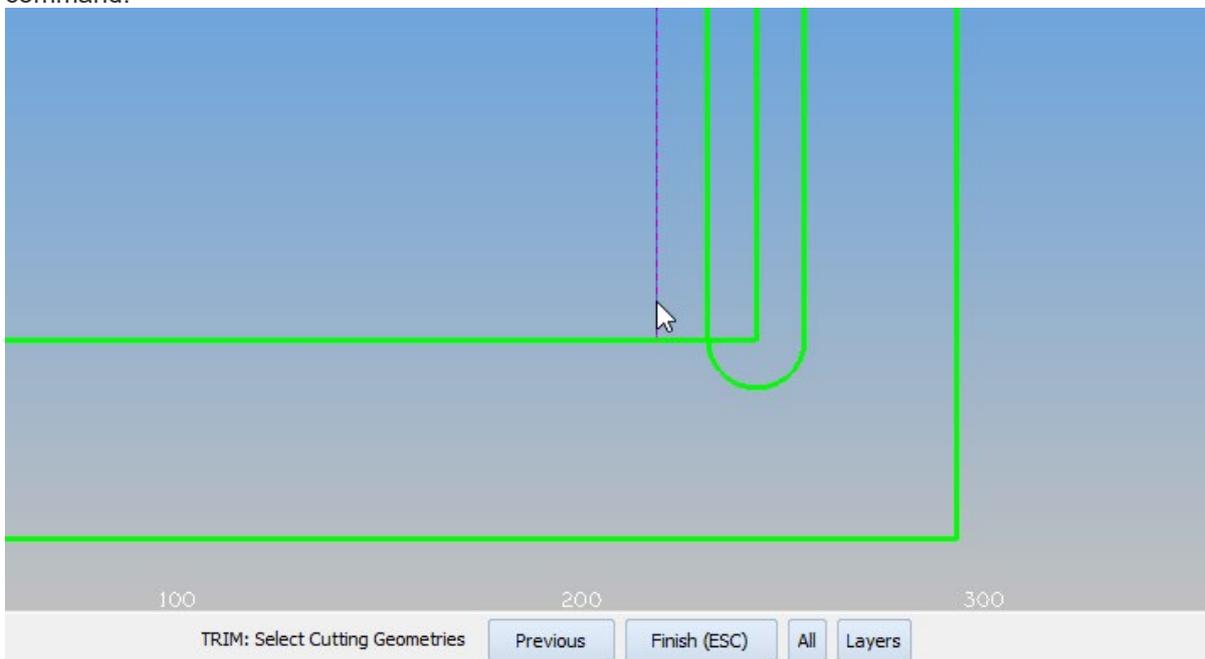


Figure 17 - Selection of Cutting Geometry

Then **<RClick>** or select the **[Finish (Esc)]** button on the prompt bar to finish the selection.
The command line will prompt **Pick Geometry/Tool Path to Trim** pick the vertical line you originally chose for the offset.

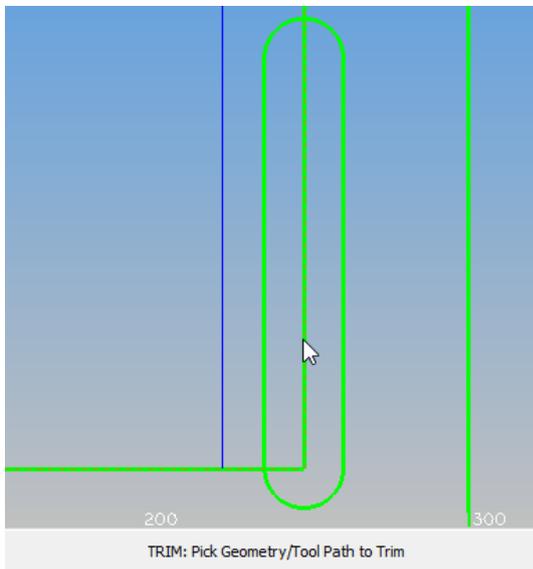


Figure 18 - Selection of item to remove

<RClick> to finish the command.

Select **EDIT > Break Join Etc. > Join**



The command line will prompt **JOIN Select Geometries/Tool Paths**, **<LClick>** on the newly formed inner rectangle geometries.

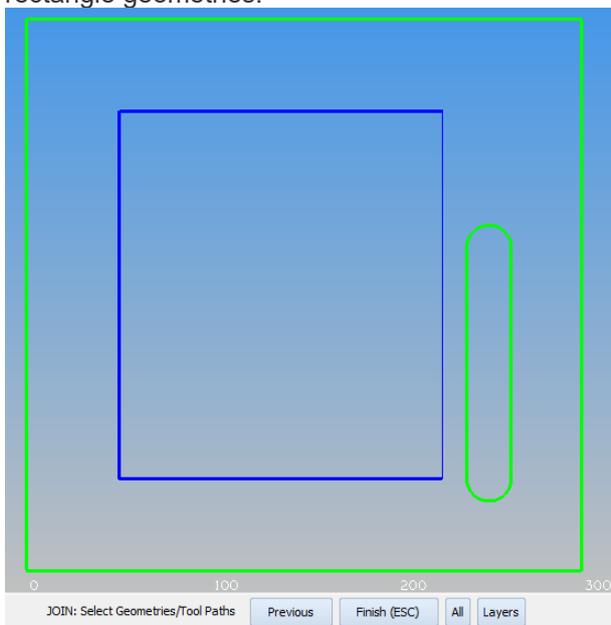


Figure 19 - Completion of the Join command

When all are highlighted **<LClick>** on the **[Finish (Esc)]** button, press **[Esc]** or **<RClick>** to finish the command.

Select **EDIT > Break Join Etc. > Fillet** 

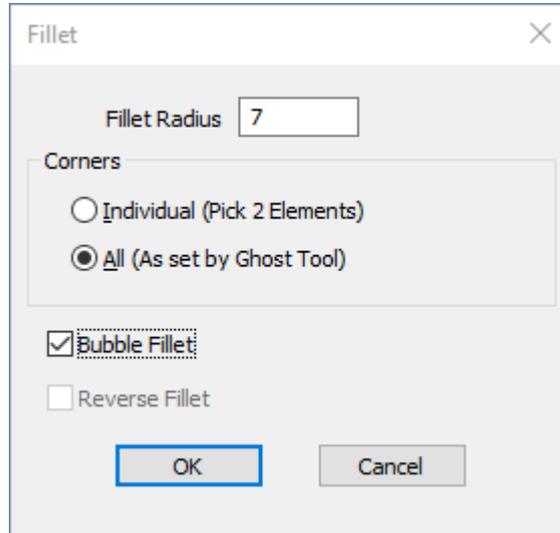


Figure 20 - Fillet Dialogue

In the dialogue set the following options **Radius = 7**, Set **All (As set by Ghost tool)**, Check the **Bubble fillet** option then select **[Ok]**.
The command line will prompt **Fillet Select**

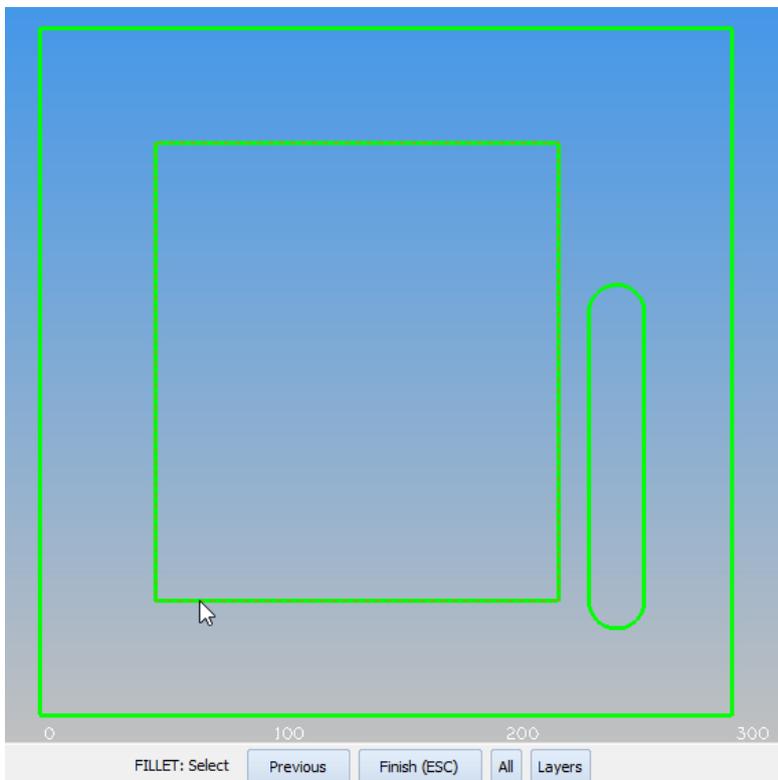


Figure 21 - Select the geometry to Bubble Fillet

<LClick> on the newly joined inner rectangle. **<RClick>** to apply the Fillet, **<RClick>** a second time finish the command.

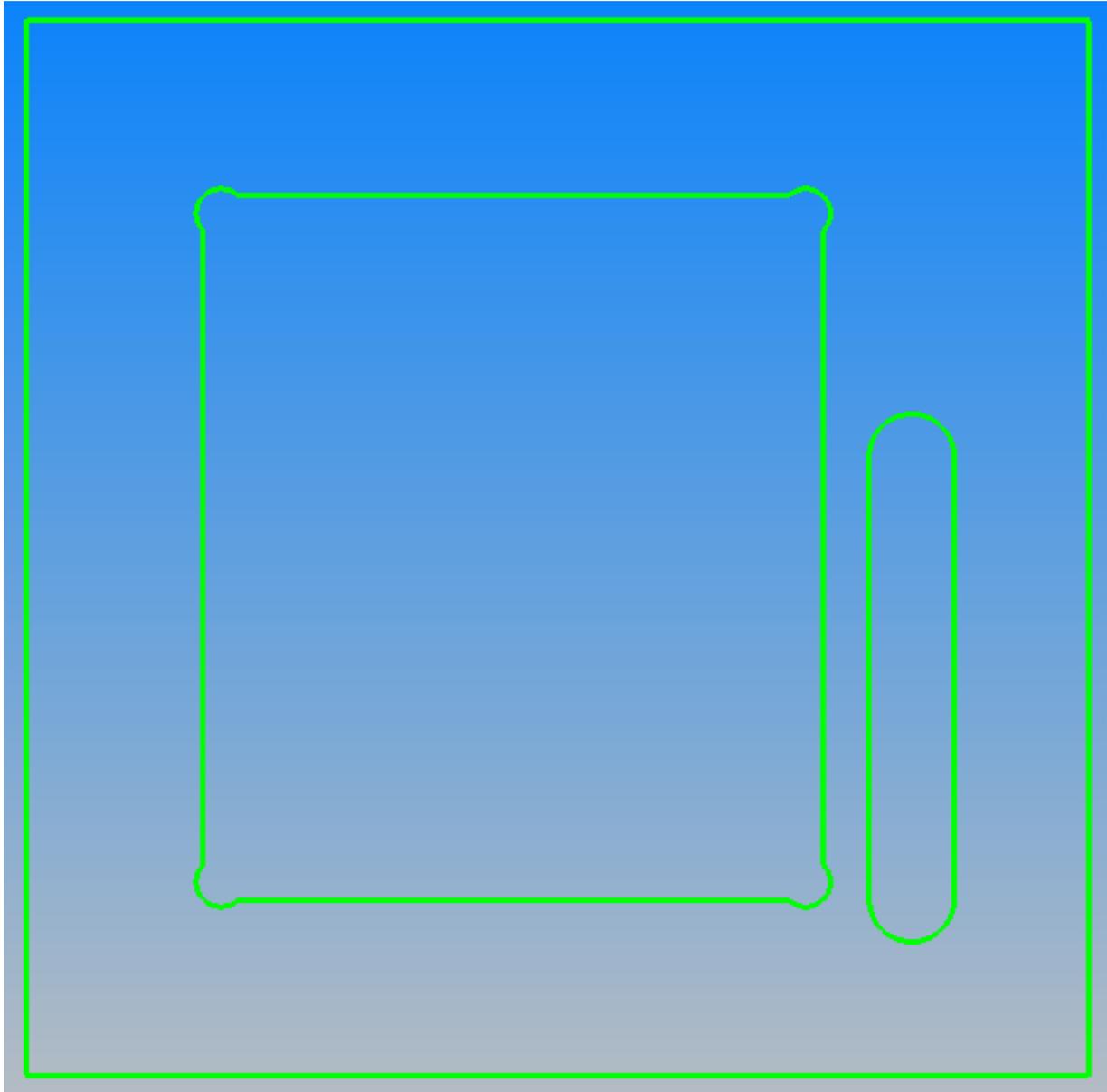


Figure 22 - Applied Bubble fillets

Creating the 8mm Holes

Select **GEOMETRY > Circle > Centre and Diameter** 
The command line will prompt for the **Diameter** type **8 <Enter>**.

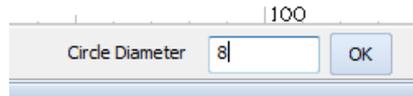


Figure 23 - Circle Diameter Dialogue

The command line will then prompt for the centre position type **25, 25 <Enter>**.

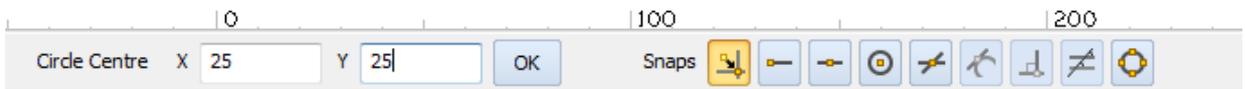


Figure 24 - Circle Location Dialogue

<RClick> to finish the command.

Select **EDIT > Move Copy Etc. > Array** 

The command line will prompt **Array Select, <LClick>** on the circle geometry then **<RClick>** to continue.

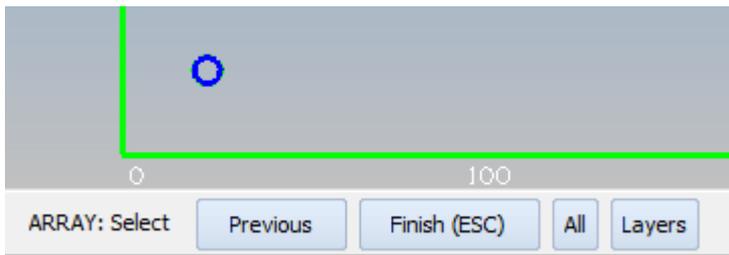


Figure 25 - Array selection process

In the dialogue type the following values **Number in X = 2, Displacement in X = 250, Number in Y = 2, Displacement in Y = 250** then select **[OK]**.

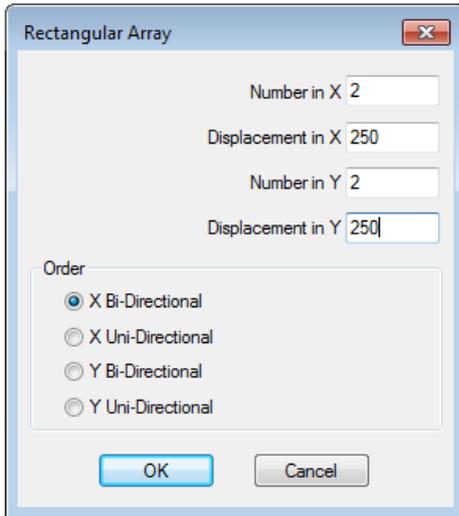


Figure 26 - Array Dialogue Options

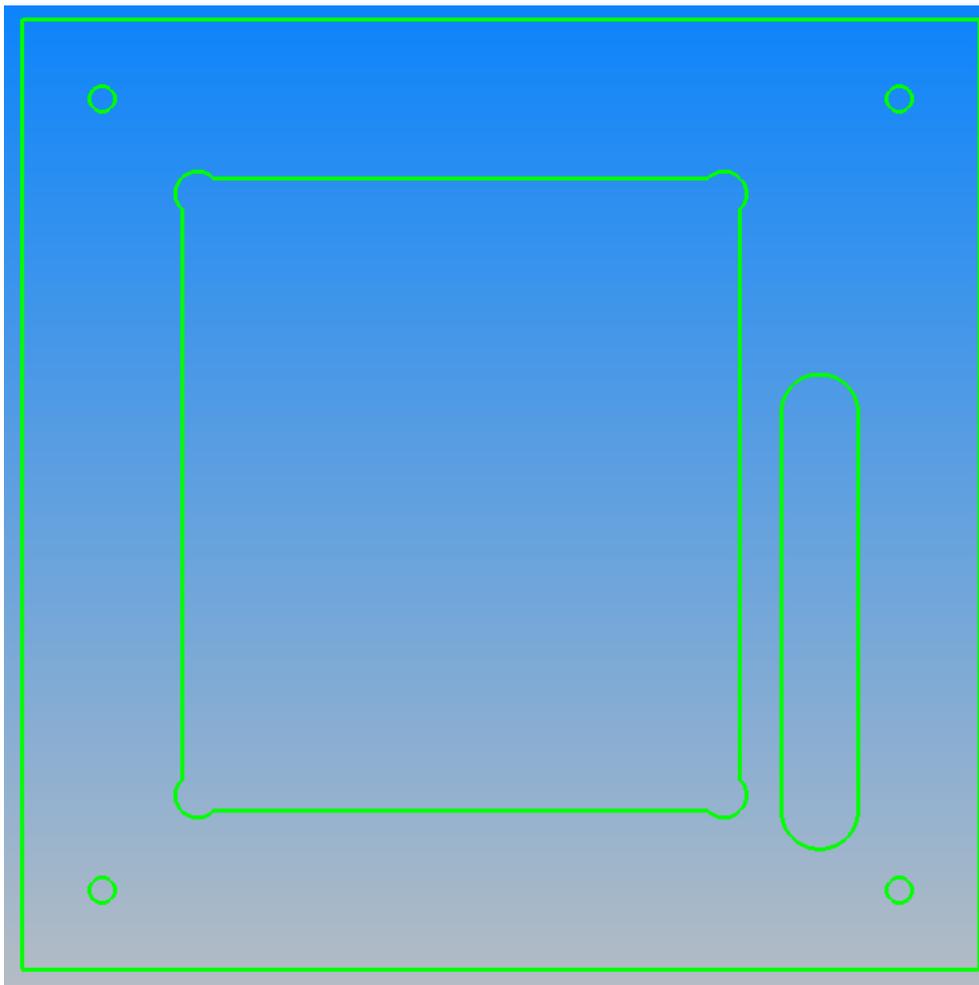


Figure 27 - Arrayed 8mm circles

Apply the outer chamfers

Select **Edit > Chamfer** 

The following dialogue will prompt you for a size for the sides of the Chamfer.
 As this is a 45° Chamfer, both values are set to **10**.
 Set **All (As set by Ghost tool)**

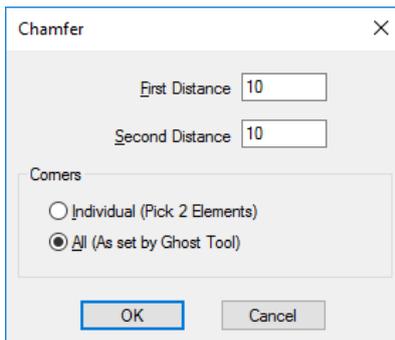


Figure 28 - Settings for Chamfer Command

<LClick> **[OK]** to continue.

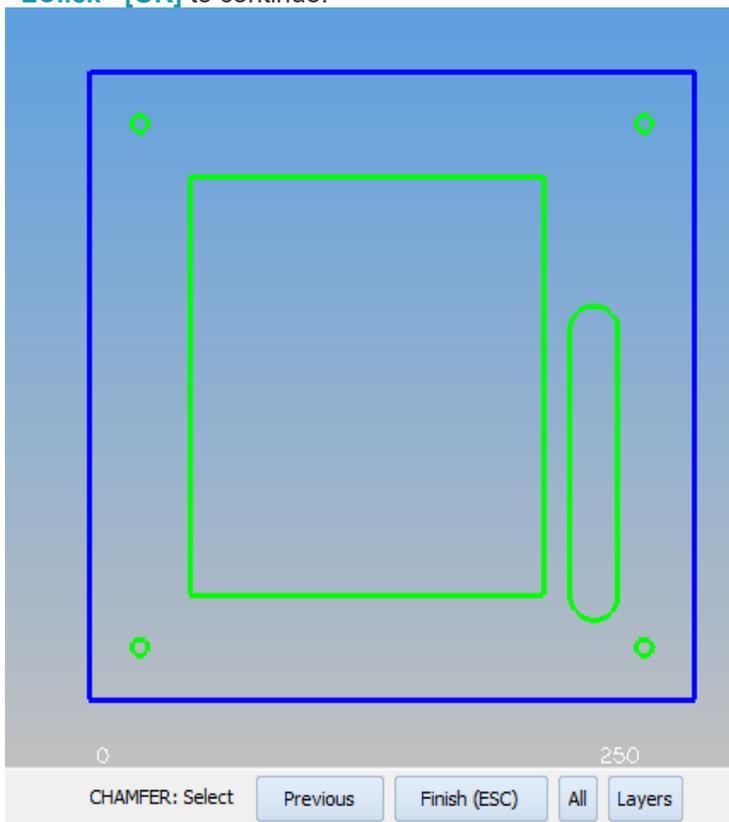


Figure 29 - Select outside geometry

The prompt bar will ask for the geometry to apply the Chamfer to.

<LClick> on the **[Finish (Esc)]** button, press **[Esc]** or <RClick> to apply the Chamfer.

<LClick> on the **[Finish (Esc)]** button, press **[Esc]** or <RClick> a second time to finish the command.

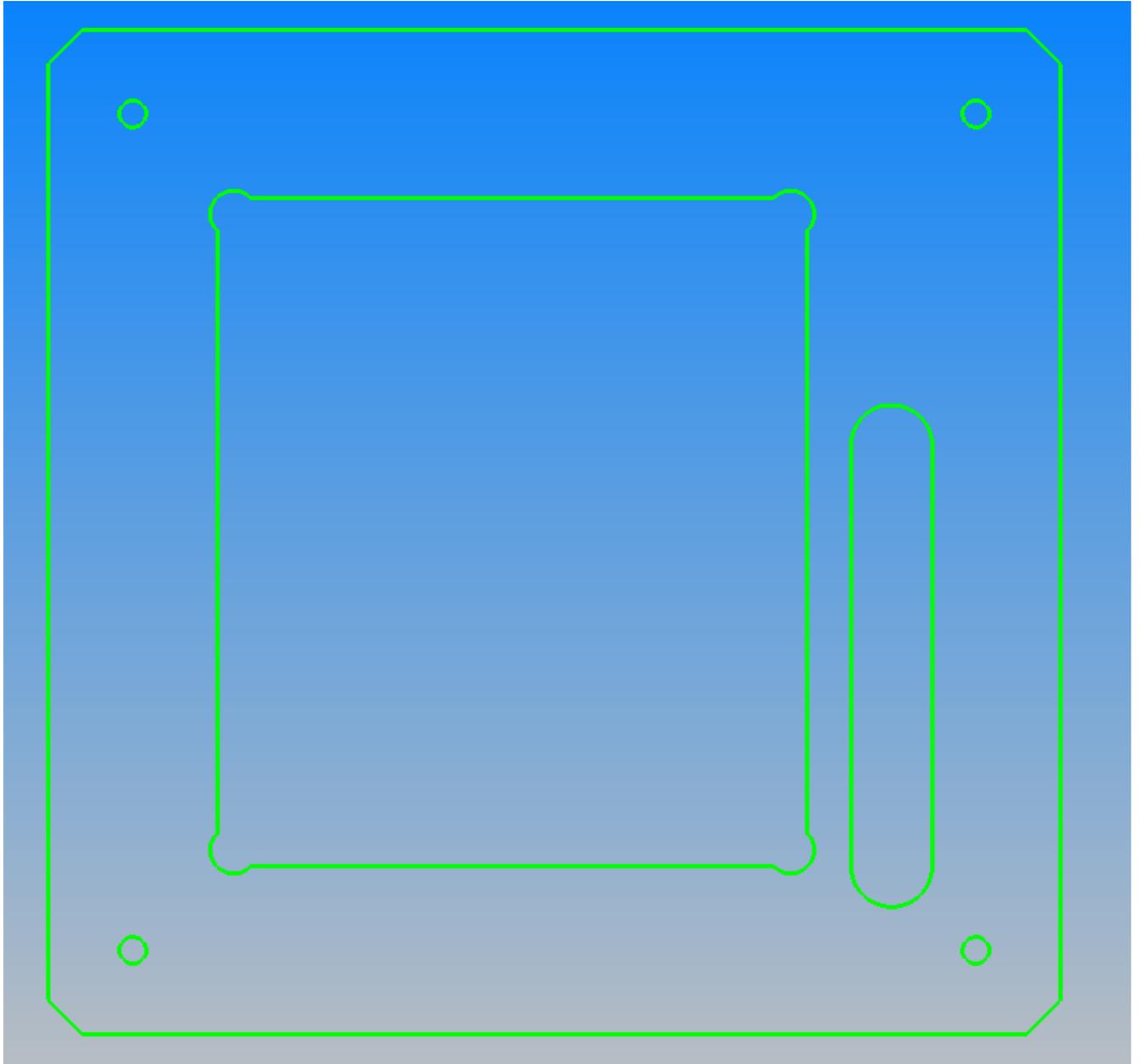


Figure 30 - Completed Styles Plate

Select **FILE > Save**  and navigate to “.... LICOMDIR \ ALPHACAM Trainee Files!” and use **Styles Plate** for the drawing file name then select **[Save]**.

#2 Pocketed Plate

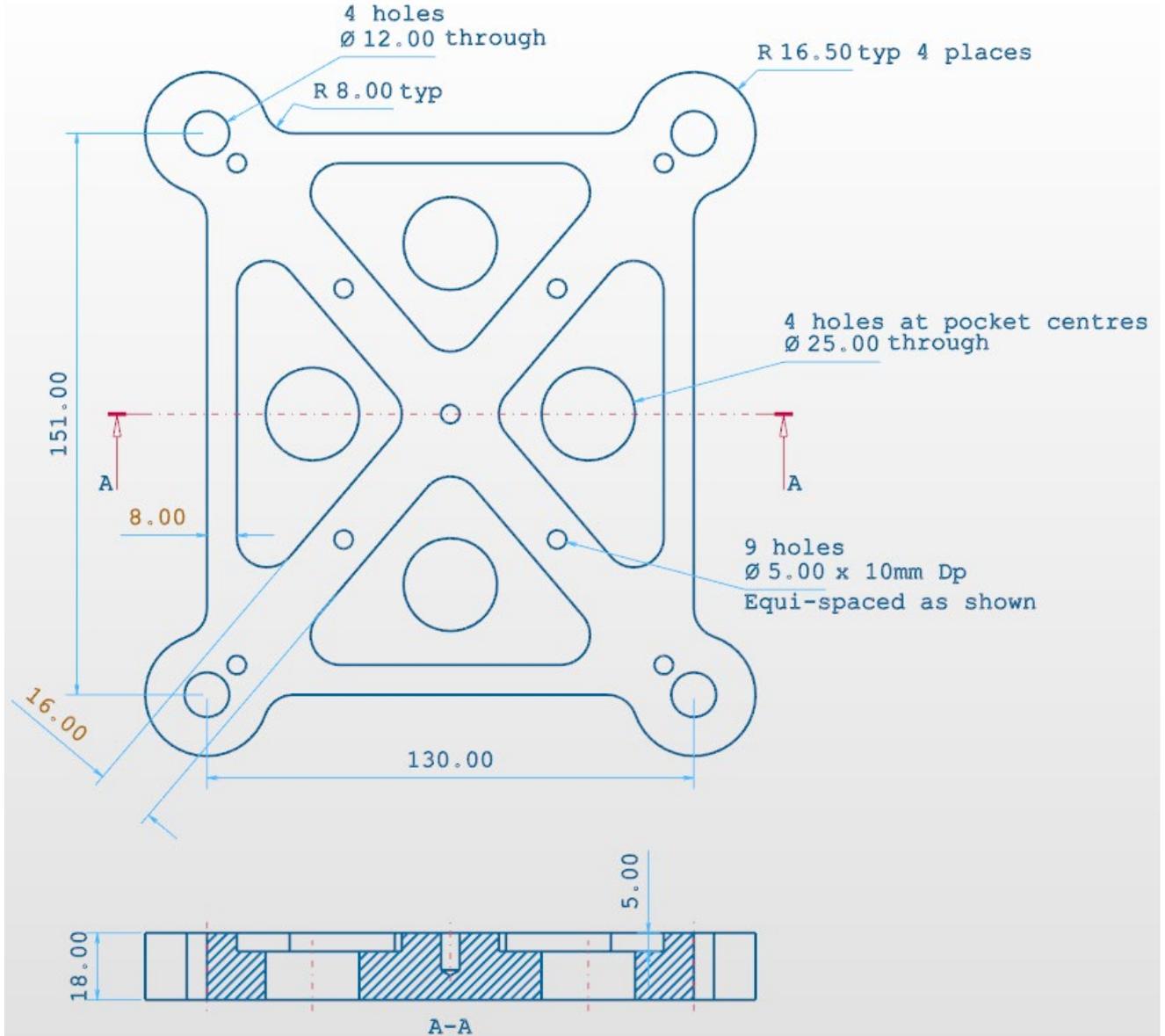


Figure 31 - Pocketed Plate Main Drawing Details

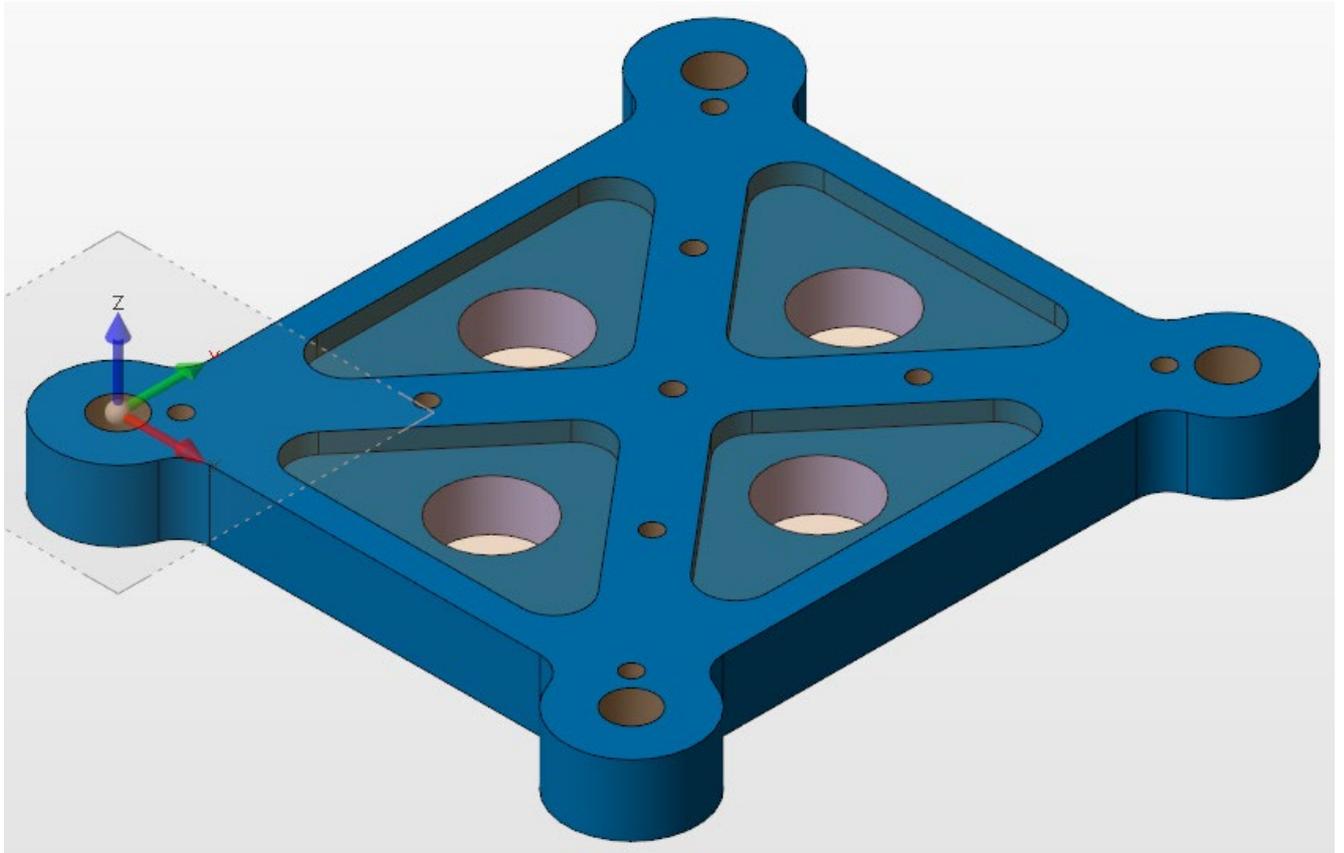


Figure 32 - Pocketed Plate reference model

Create and activate the User Layer

From the Layers page of the Project Manager, **<RClick>** on the entry **User Layers**.

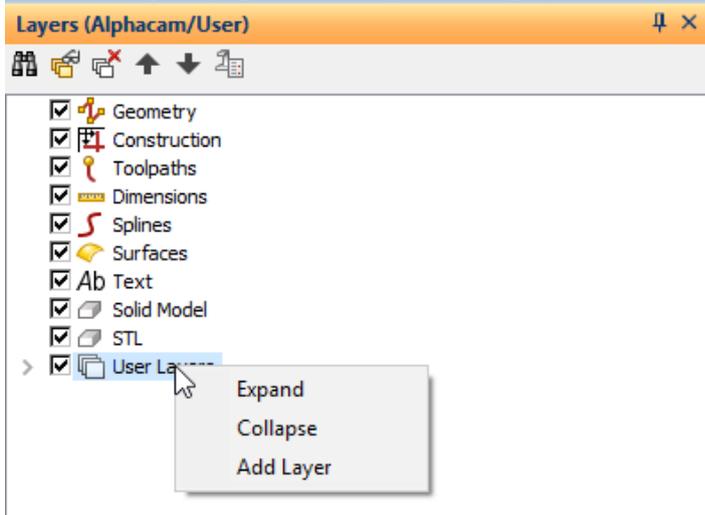


Figure 33 - Adding the first User Layer

From the context menu, select the option **Add Layer**.

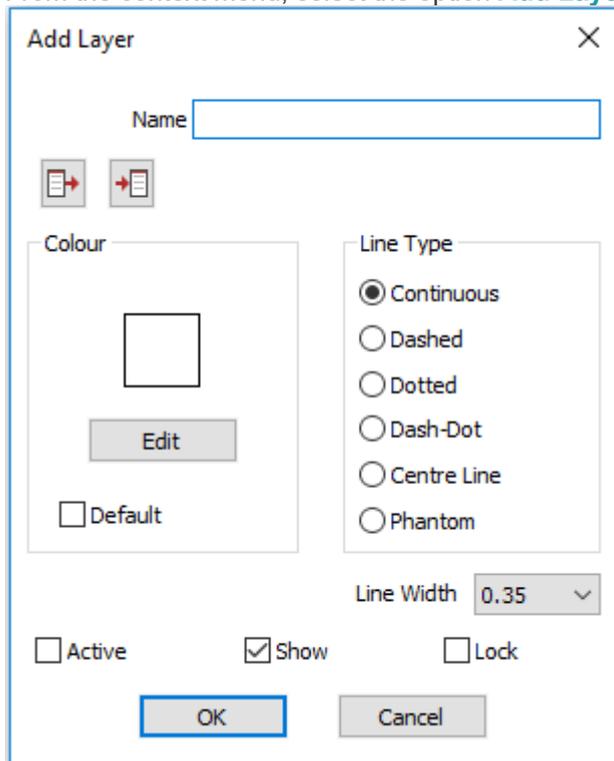


Figure 34 - Default User Layer Dialogue

In the dialogue, we will set a suitable name, chose a colour for the layer and set whether it is to be the active drawing layer we wish to use next.

For the Name, we will use **Outer Profile**.

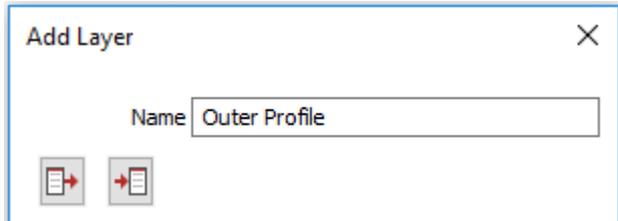


Figure 35 - Assigned name for the layer

The two buttons below the **Name** section allow for you to **Save** or **Load** a specific User Layer set up. This will include the colour preference and Line Type which has previously been saved. This can save you time when you want to generate a standard layout.

<LClick> on the **[Edit]** button to access the colour options.

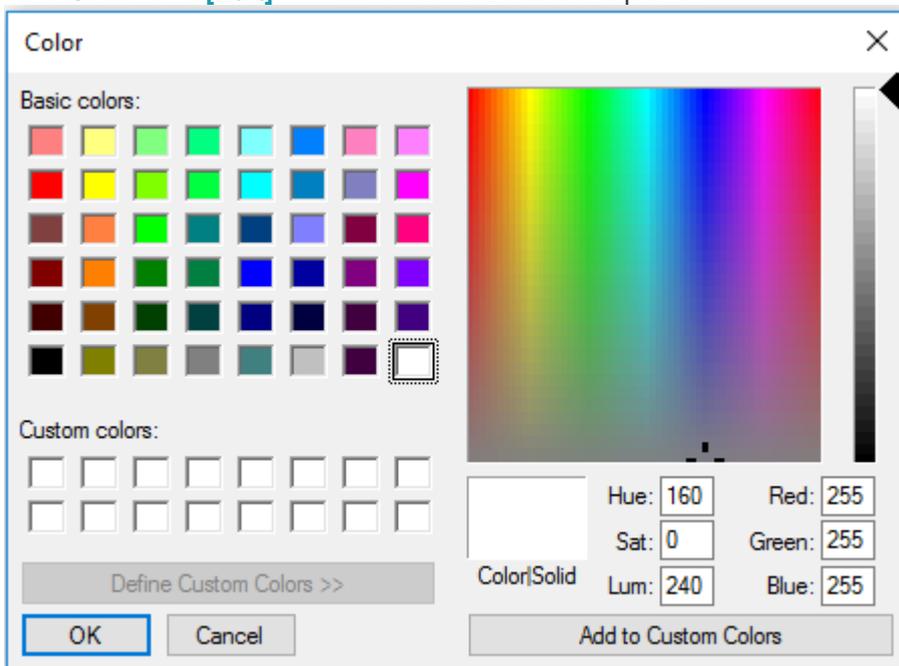


Figure 36 - Standard colour palette options.

You may select any of the predefined colours by <LClick> on the colour square, or you can select by clicking on the larger colour palette area.

Once you start to use this function more, you may wish to use the **Add to Custom Colours** to populate these for future use.

Select any colour you wish, with a word of caution.

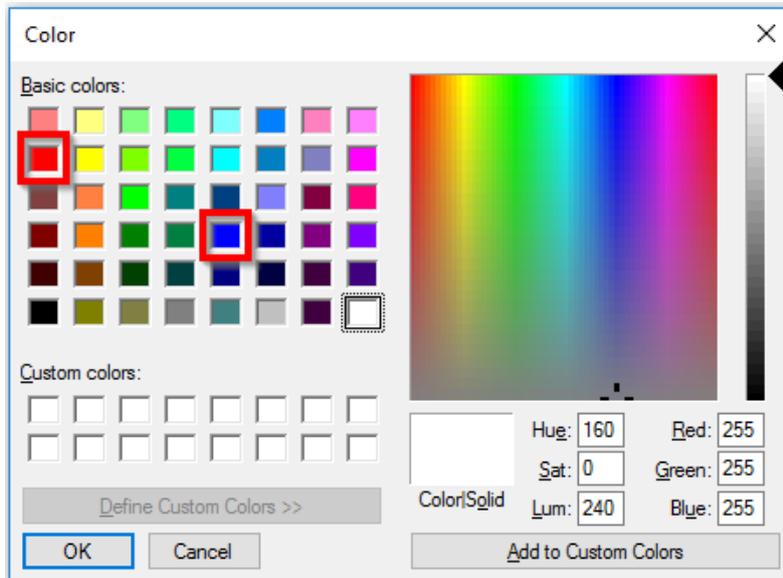


Figure 37 - Colours to avoid

On a default install of ALPHACAM, the two colours indicated in the image above have specific functionality and you should not use them.

Once you have selected your colour, **<LClick> [OK]** to return to the User Layer set up dialogue.

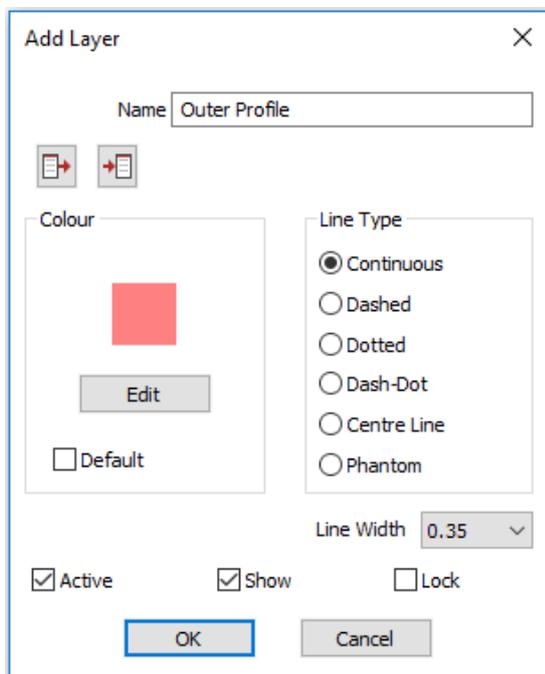


Figure 38 - Created layer dialogue set to Active

Lastly on the dialogue make the **Active** valid so that all your drawing creation will occur on this new layer. **<LClick> [OK]** to complete.

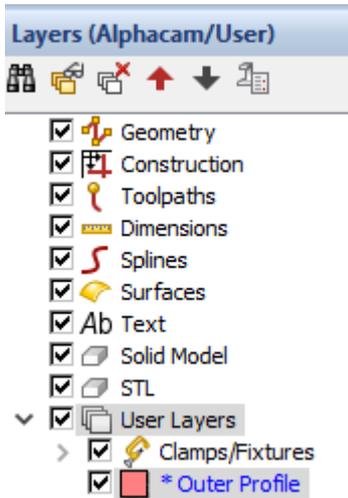


Figure 39 - Project Manager with Active User Layer

You can now see the new **User Layer** added, highlighted in blue and with a star to tell you this is your current active drawing layer.



Figure 40 - ALPHACAM window Title Bar with Active Layer in brackets



It is worth noting that the active User Layer will also be shown in brackets on the Title Bar of your ALPHACAM window, saving you the trouble of having to look at the Project Manager every time you need to check.

Base Rectangle

Select **GEOMETRY > Rectangle** 
Create a rectangle from **X0, Y0 <Enter>** to **X130, Y151 <Enter>**.
<RClick> to finish the command.

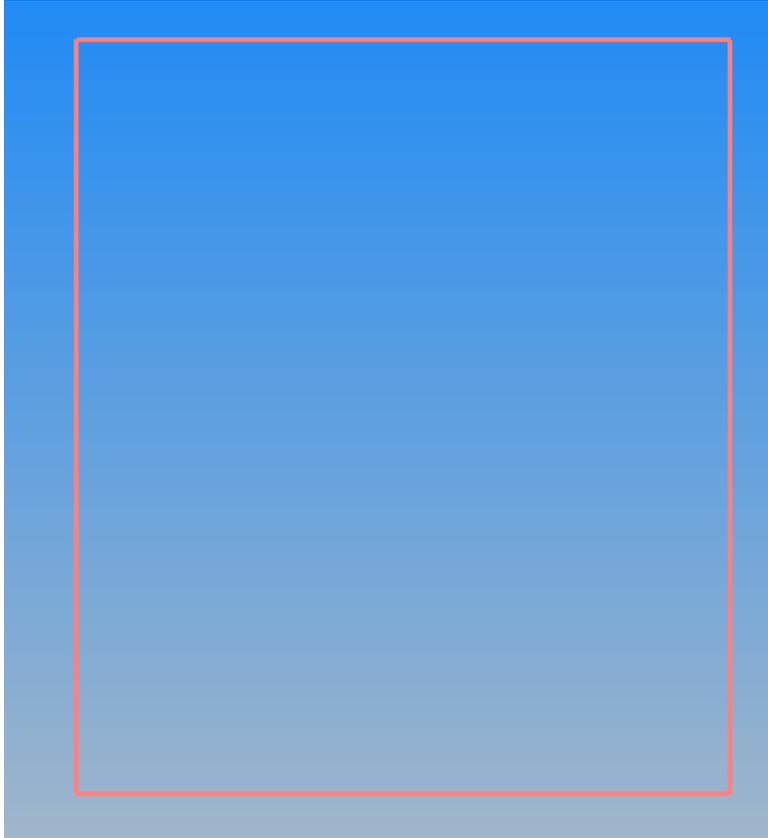


Figure 41 - Base Rectangle for Outer Profile

Ø12 Holes

Select **GEOMETRY > Circle > Centre and Diameter** 
For the **Diameter** type **12 <Enter>**.
The command line will then prompt for the centre position, using **<F6>** snap to each corner of the rectangle.

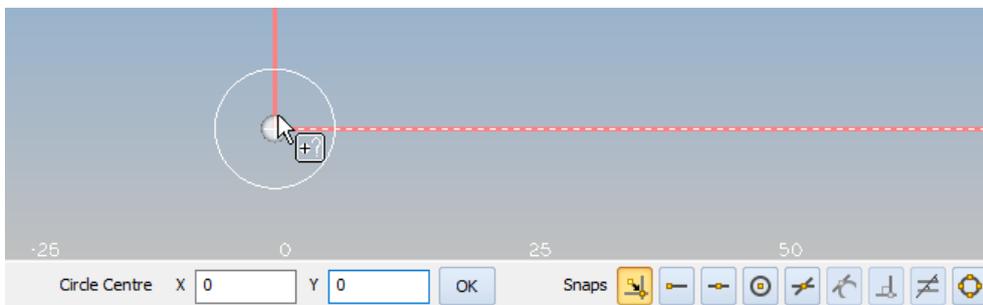


Figure 42 - Snap the circle to the corner point



<LClick> in the drawing area is the same as <LClick> on the [Ok] option to accept the current circle size.



Having the Auto-snap function <F2> active will make placing the circles easier than using the <F6> option.

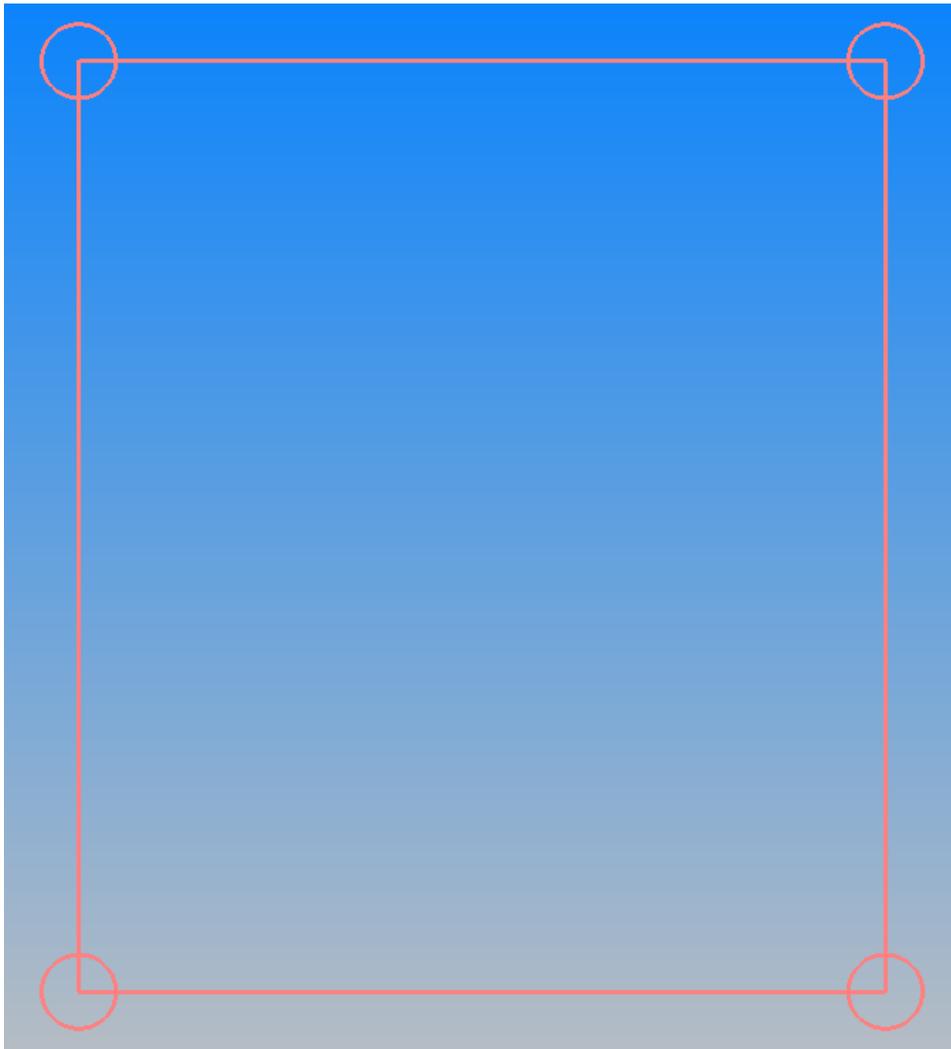


Figure 43 - Applied Ø12 circles

R16.5 Circles

Select **GEOMETRY > Circle > Centre and Radius** 
Create four R16.5 circles in the same location as the previous four circles.
<RClick> to finish the command.

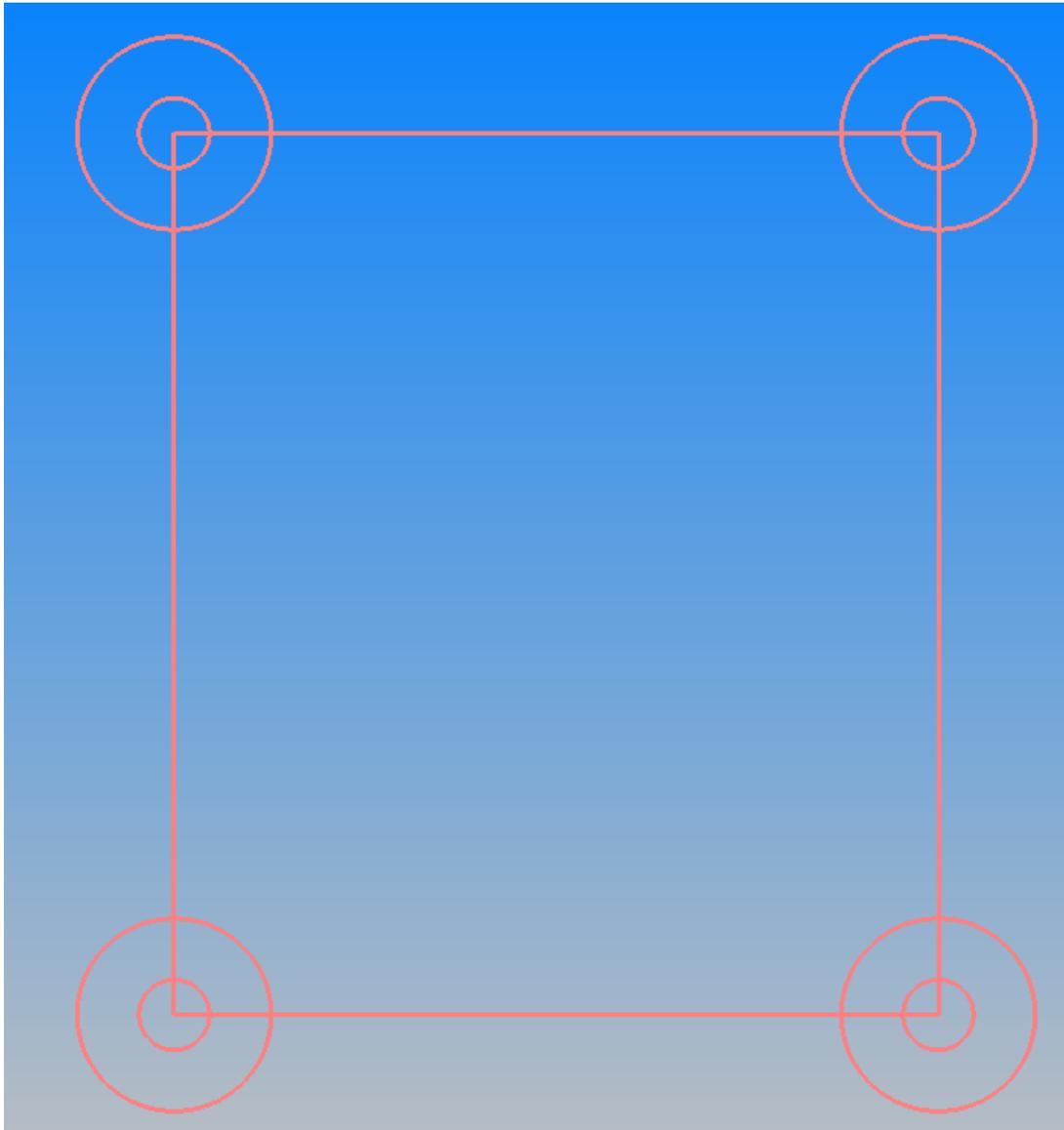


Figure 44 - Applied R16.5 circles

Triangle side reference rectangle

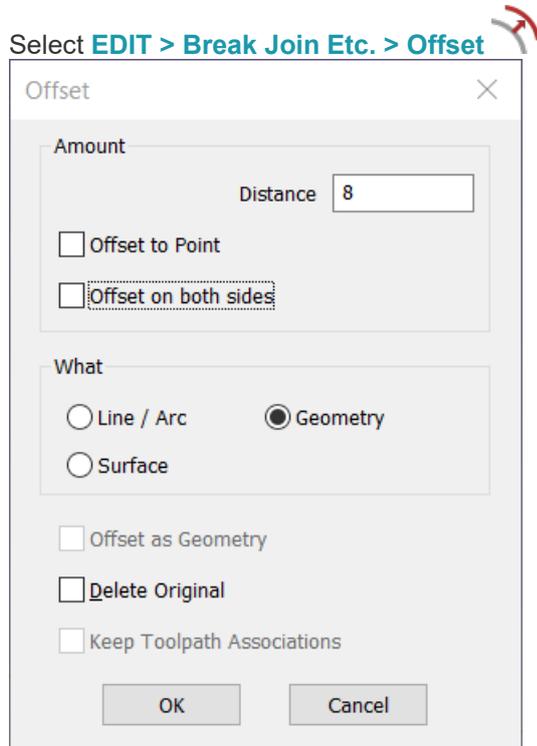


Figure 45 - Offset settings

In the dialogue set the following options: **Distance = 8**, for **What = Geometry** then select **[Ok]**.

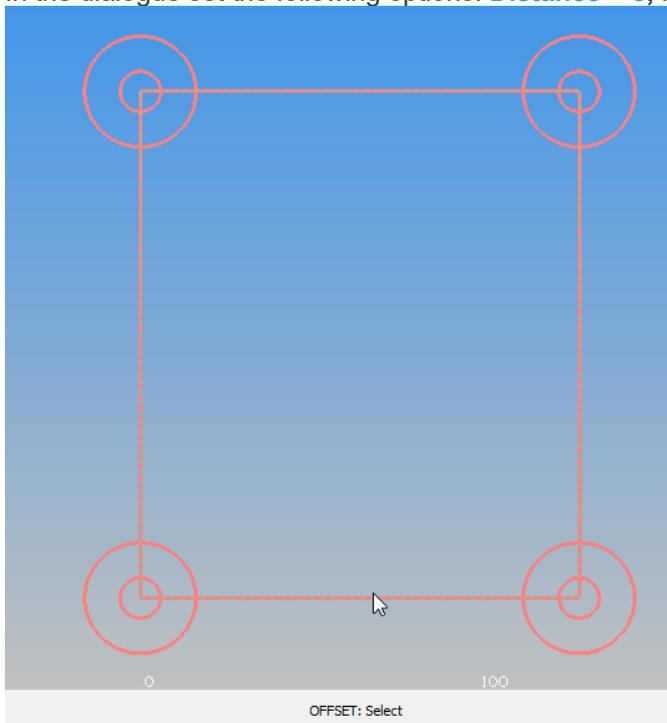


Figure 46 - Select the rectangle

The command line will prompt **OFFSET Select, <LClick>** on the rectangle.

Then the command line will prompt Pick Side to Offset

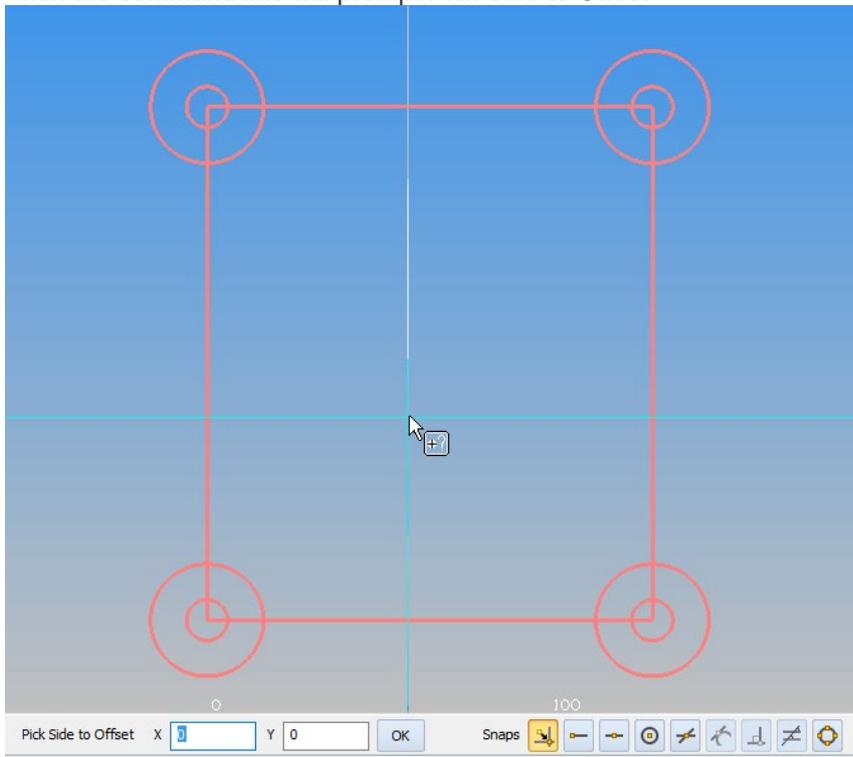


Figure 47 - <LClick> inside the rectangle to place the offset

<LClick> a position to the inside of the original.
<RClick> to finish the command.

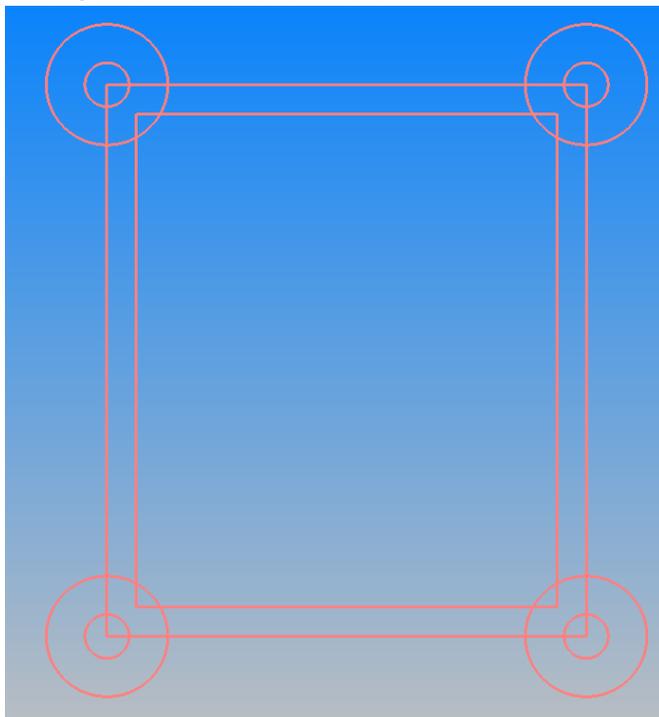


Figure 48 - Base geometry structure

Use **EDIT > Fabricate > Unite** 
Select outer rectangle and R16.5 circles

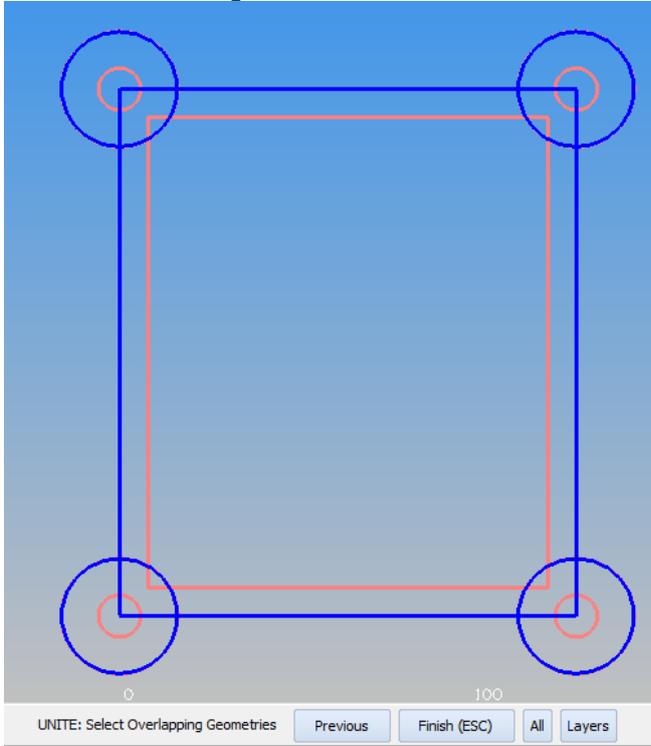


Figure 49 - Selecting the items to Unite

<RClick> to finish.

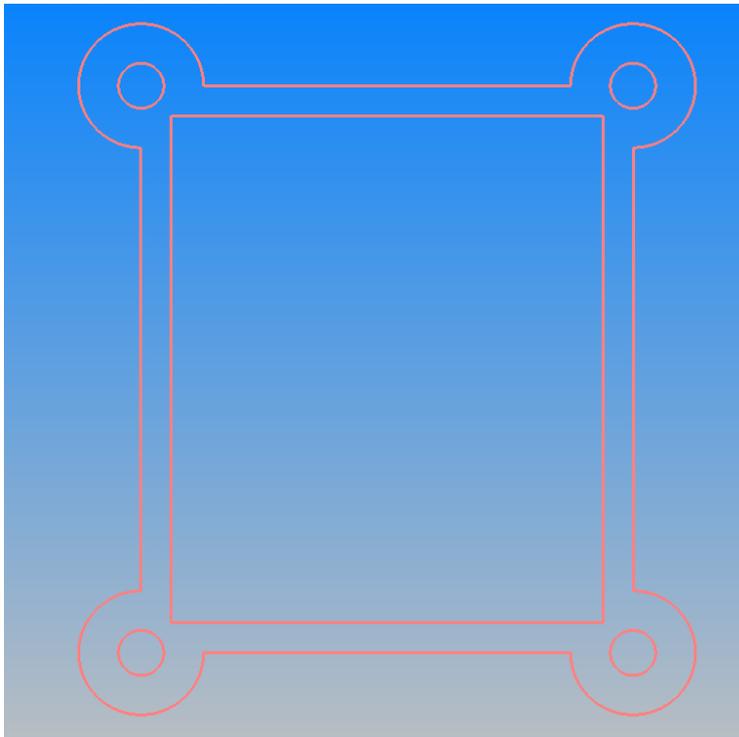


Figure 50 - Completed Outer Profile

Triangle Geometry Creation

New User Layer

From the Layer page of the Project Manager, **<RClick>** on the entry User Layers.

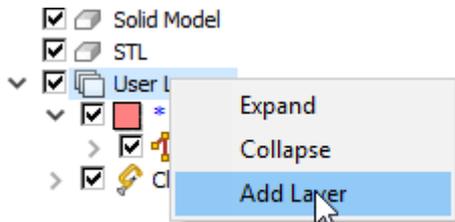


Figure 51 - Adding next first User Layer

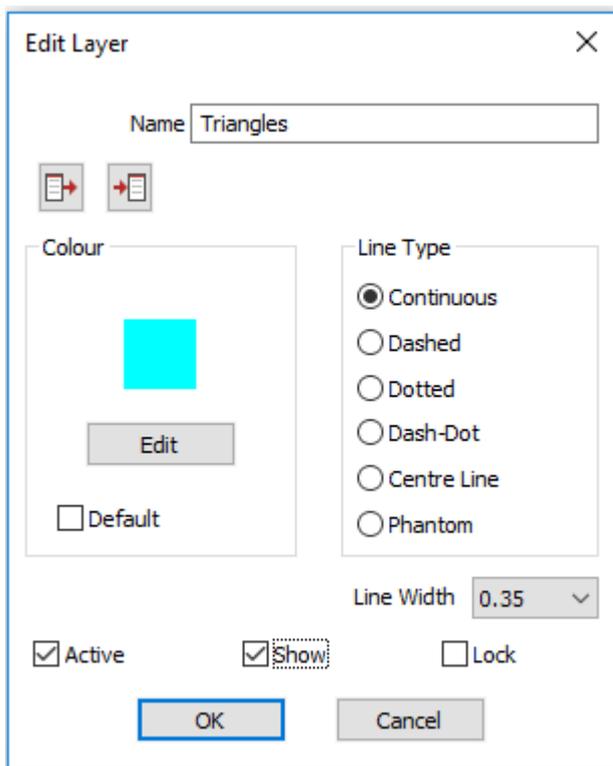


Figure 52 - Created layer dialogue set to Active

Lastly on the dialogue make the **Active** valid so that all your drawing creation will occur on this new layer. **<LClick> [OK]** to complete.

Base Geometry Creation

Select **EDIT > Change** 

Make the options as shown below so that you can move the inner rectangle from its current User Layer (Outer Profile) onto the new Triangles User Layer.

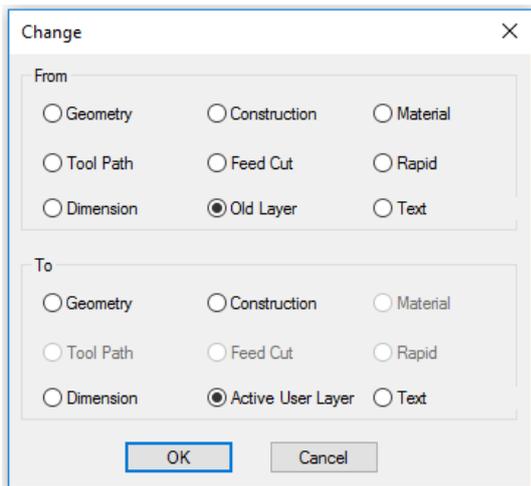


Figure 53 - Change from Old Layer to Active

When prompted, **<LClick>** the inner rectangle to select

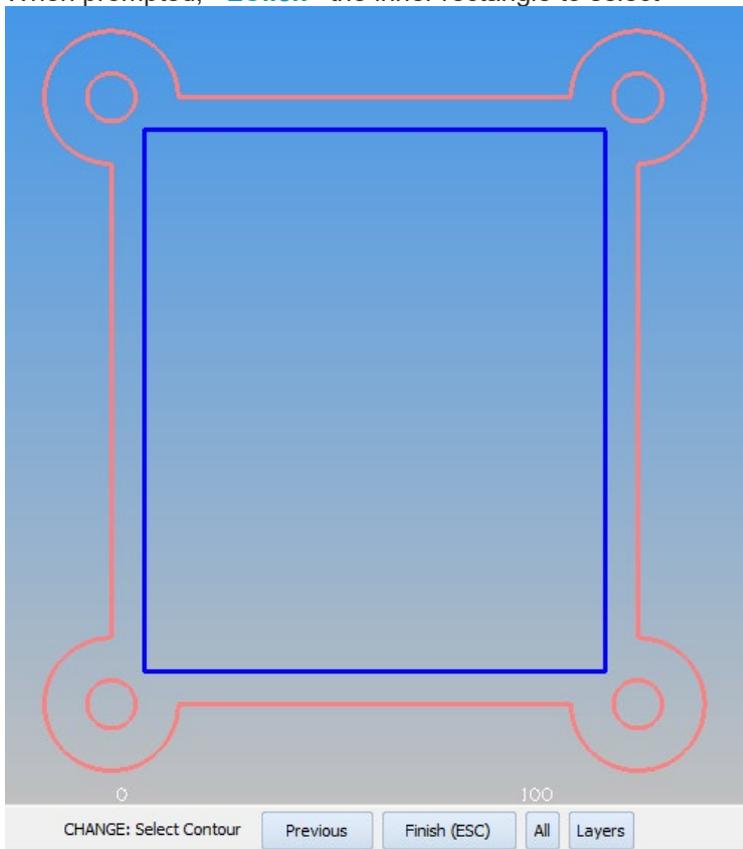


Figure 54 - <LClick> the offset rectangle

<RClick> to finish the process.

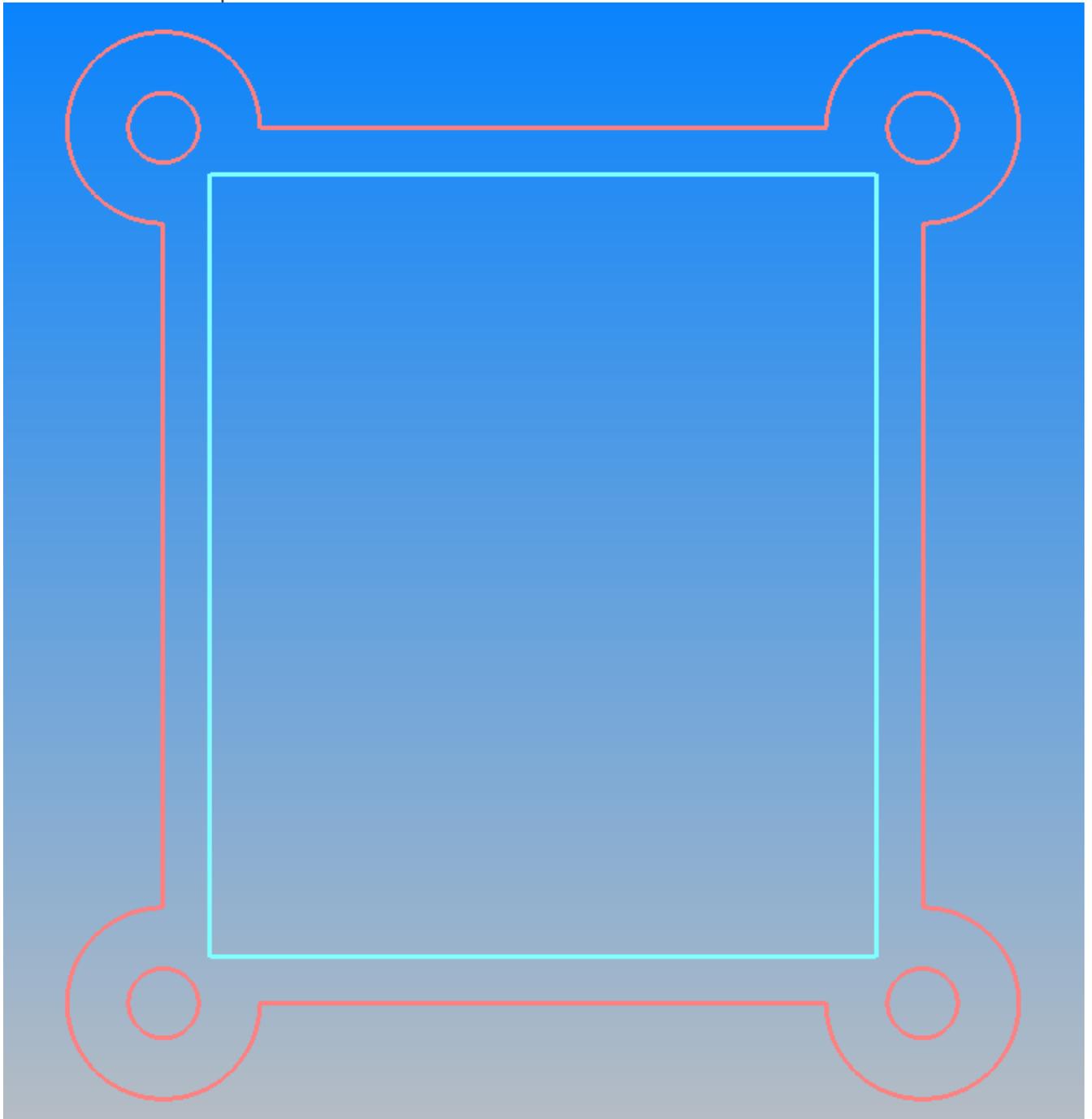


Figure 55 - Inner rectangle altered to new layer



Select **GEOMETRY > Line** 

Create two separate diagonal lines from the corners of the new offset rectangle.
Make sure that you **<RClick>** after the first created line to finish the command.
Then repeat the process for the second line.

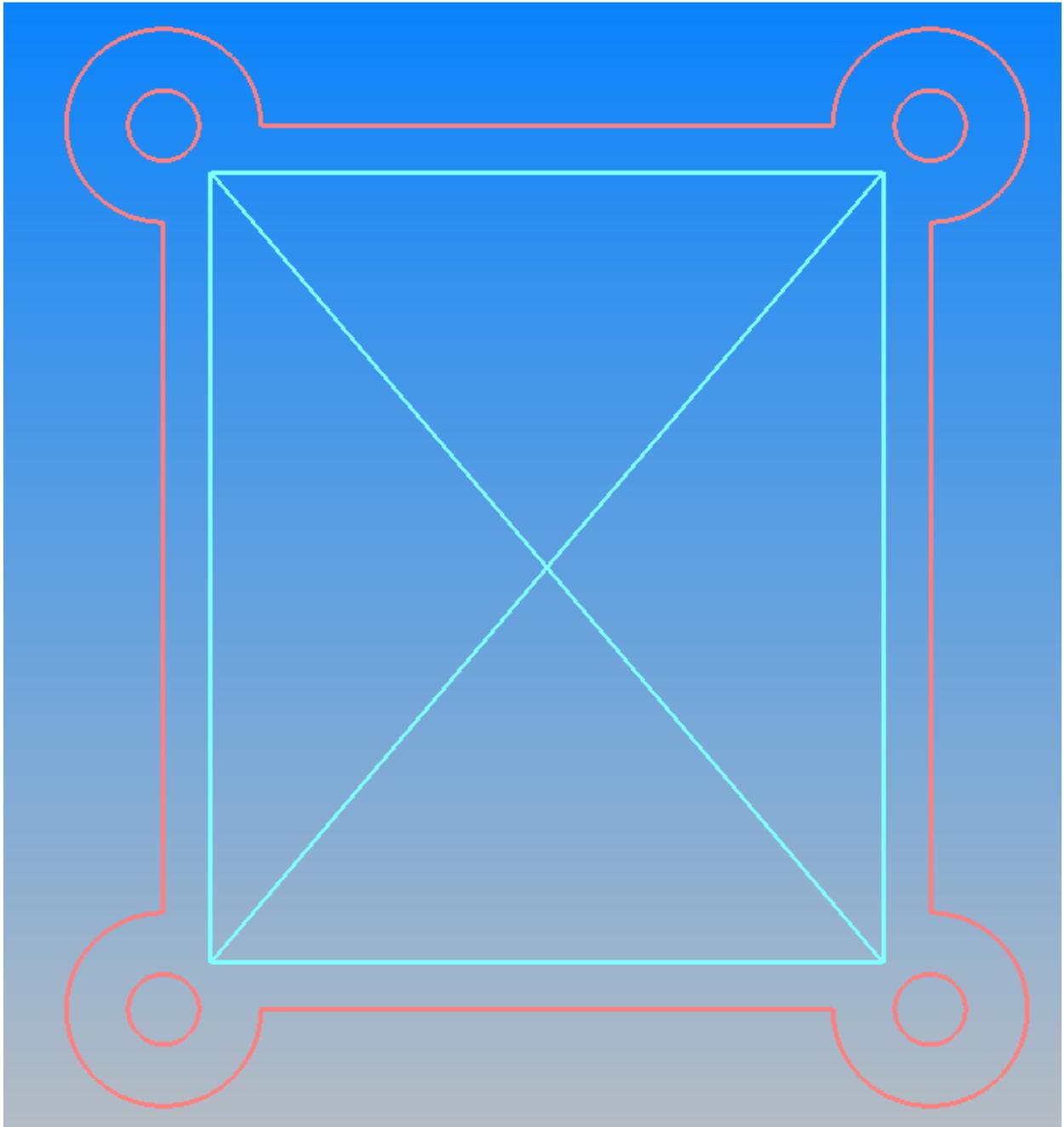


Figure 56 - Triangle base lines

Select **EDIT > Break Join Etc. > Offset** 
 In the dialogue set the following options: **Distance = 8**, **Offset on both sides**, for **What =  Geometry** then select **[Ok]**.

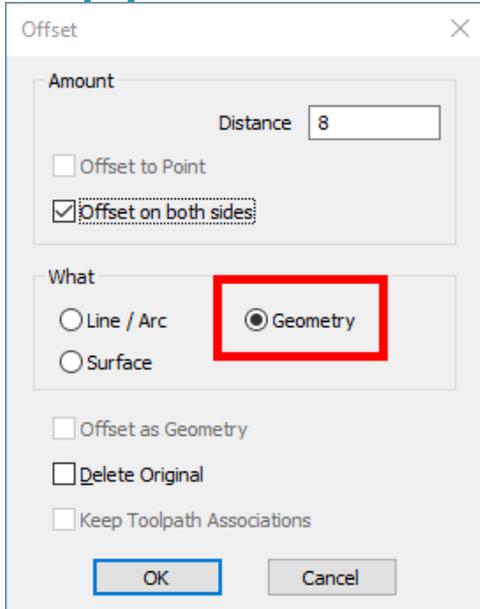


Figure 57 - Offset options for triangle sides

The command line will prompt **OFFSET Select, <LClick>** on each diagonal line to create the offsets.

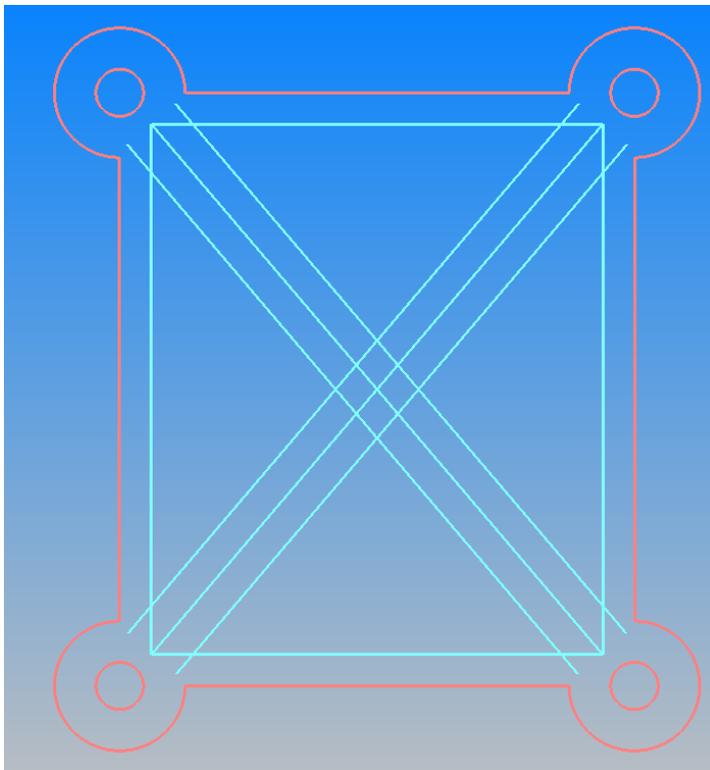


Figure 58 – Offset Both Sides

<RClick> to finish the command.

Triangle Creation using Containing Loop

The method used to create the triangles is a useful option for generating complex geometries from overlapping items. Using this method to create these four triangles demonstrates by repetition how to use the command.

 Containing Loop **WILL NOT** work with Construction Geometries.

As we will be picking the same geometries more than once, Select **EDIT > Group**  Then select all the four diagonals and the inner rectangle.

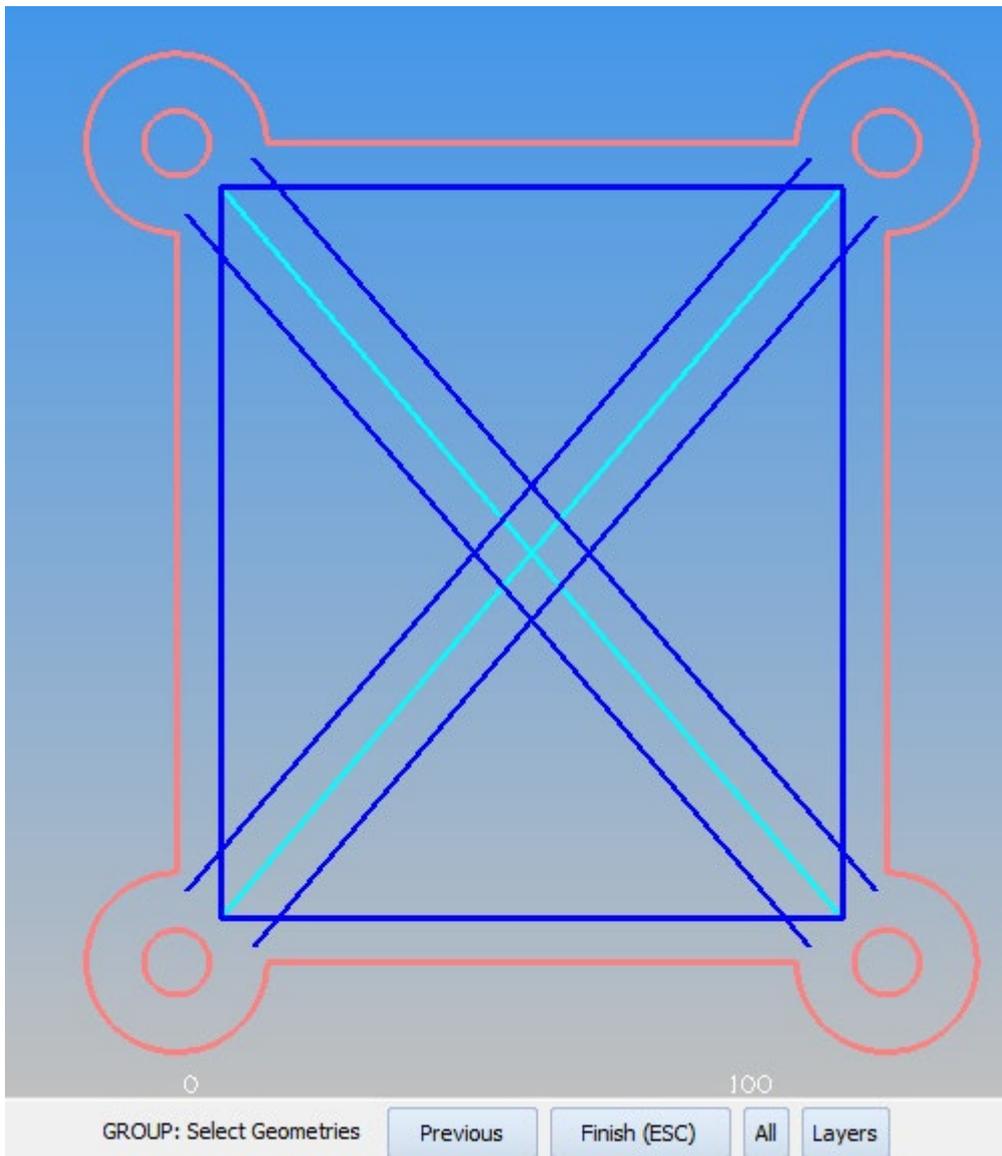


Figure 59 - Grouped triangle base geometries

<RClick> twice to finish the command.

Use **EDIT > Fabricate > Containing Loop** 

<LClick> a diagonal or the inner rectangle geometry (this will select all in the items that we grouped).

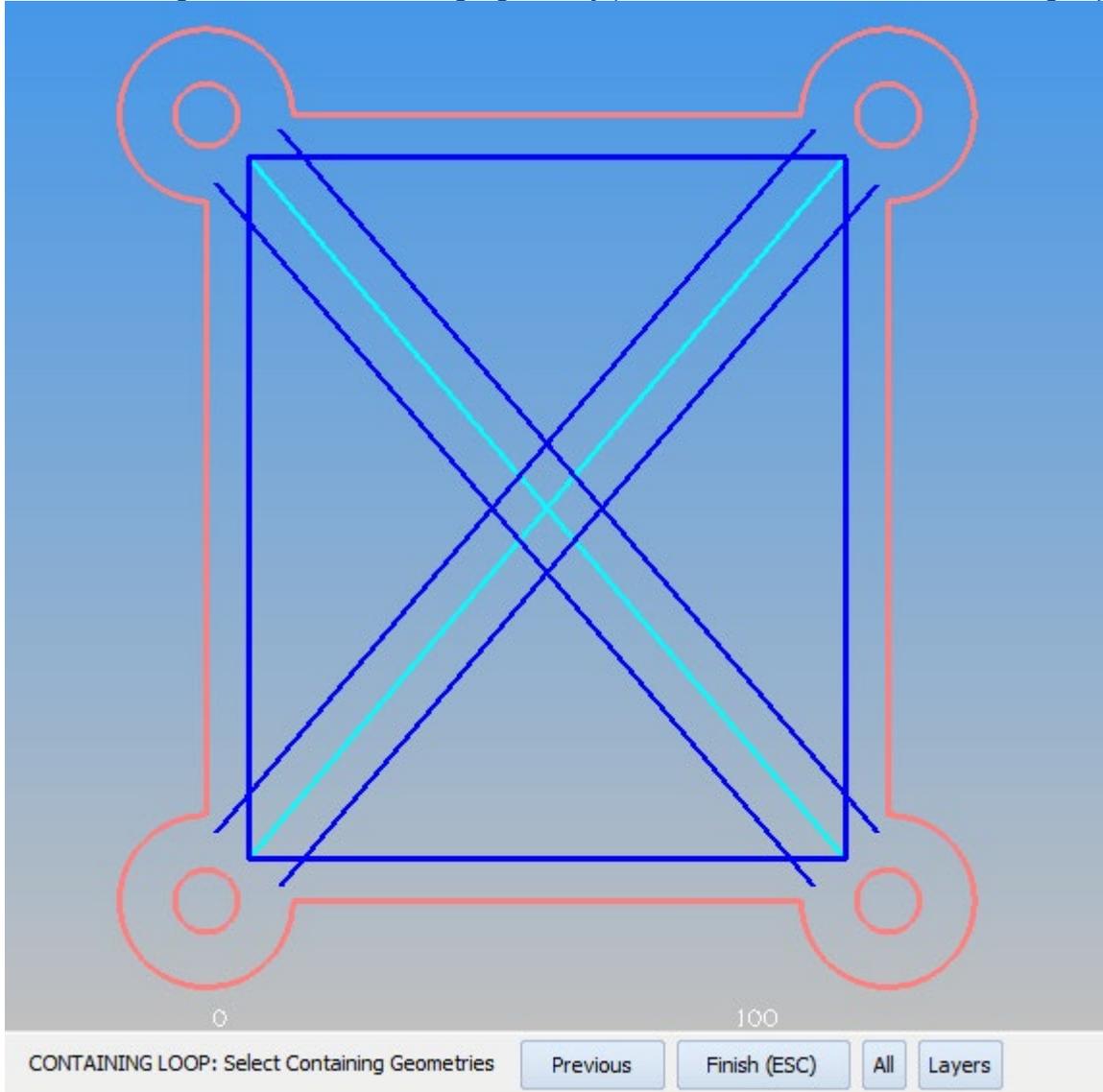


Figure 60 - Selected items to work with

Then **<RClick>** or **[Finish (ESC)]** to continue.

Position the cursor inside a triangle then **<LClick>** to create the closed boundary.

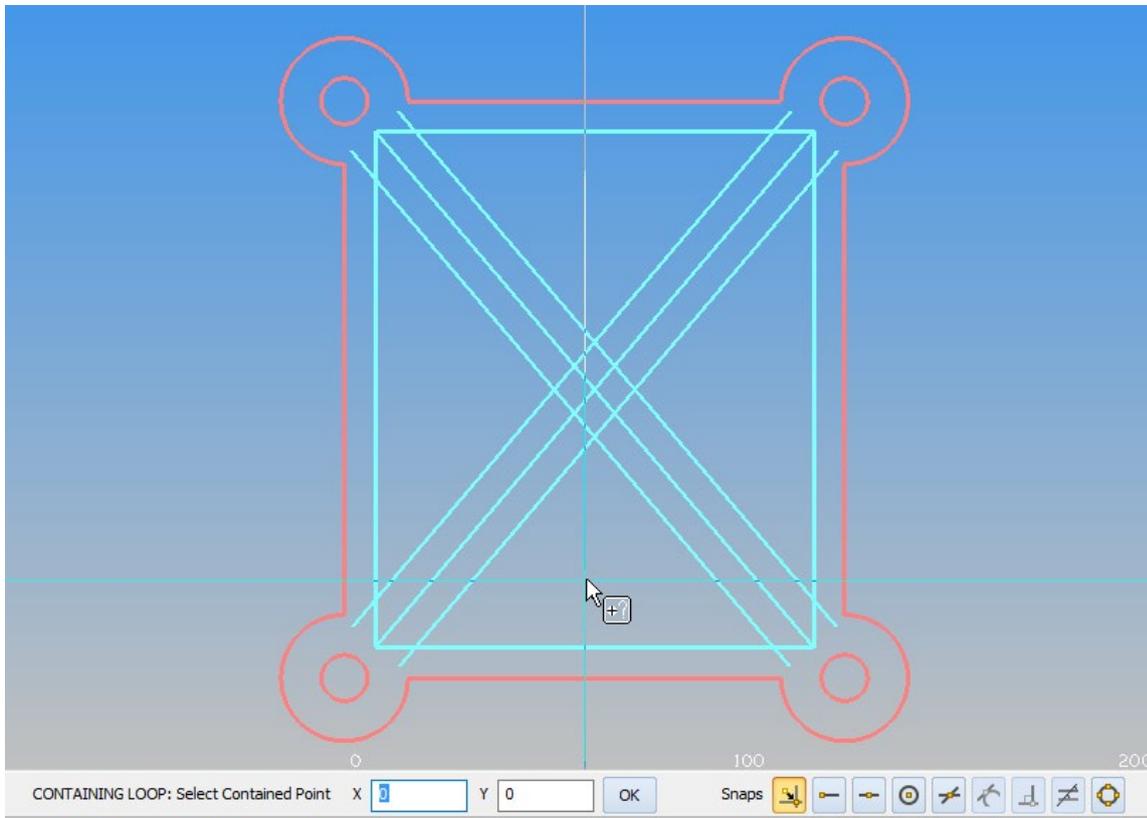


Figure 61 - <LClick> in a triangle to analyse it

The system allows you to move this boundary to a new position if you wish to.

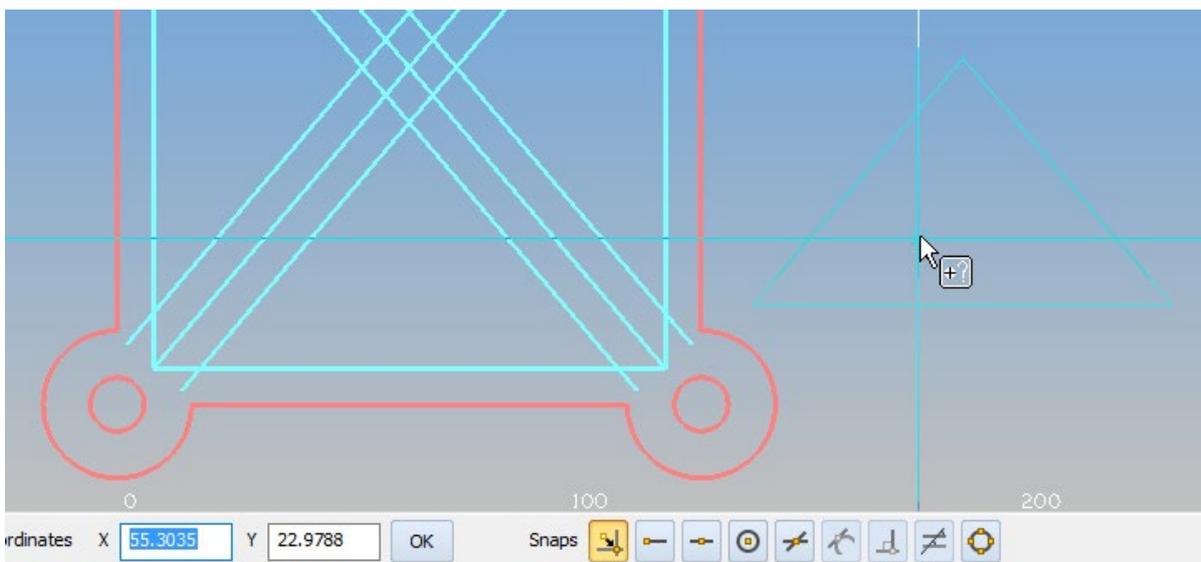


Figure 62 - Extracted closed triangle boundary

In this case example, we need the triangles to remain exactly where they are so **<RClick>** to finish, to leave the closed boundary in its created position.

Repeat the process as follows for the three remaining locations;

1. Press **<Space Bar>** to repeat the last used ALPHACAM command,
2. Select **[Previous]** from the prompt bar,
3. Then **[Finish (ESC)]** from the prompt bar,
4. Position the cursor inside a triangle not already drawn and **<LClick>**,
5. Then **<RClick>** to leave it in its created position and finish.



If you cancel the command or use a differing command, the **<Space Bar>** method will not function and you will need to repeat the process using the actual command from the ribbon.

Use **EDIT > Change**



Change From **Geometry** To **Construction**, select **[Previous]**, **<RClick>** to Finish.

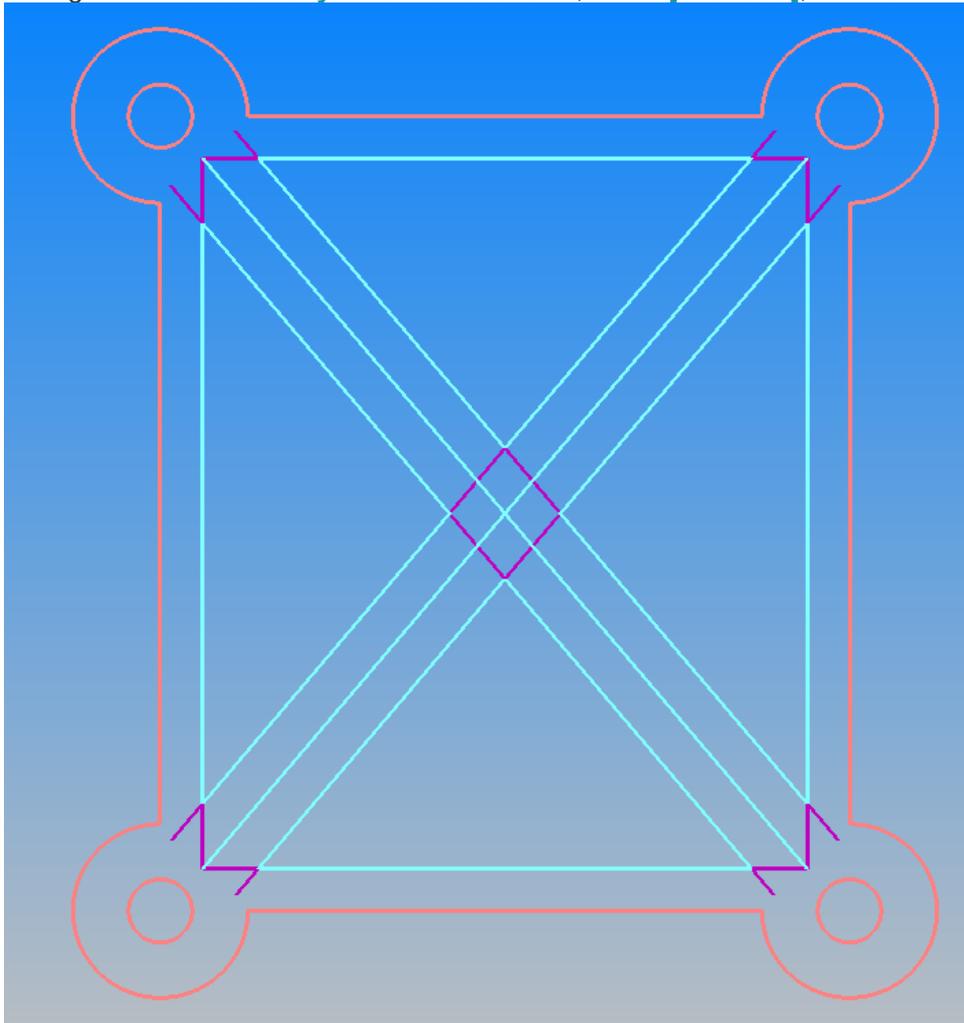


Figure 63 - Base triangle geometries turned to Construction

Then turn off the **Construction** layer in the project manager by unticking the small box.

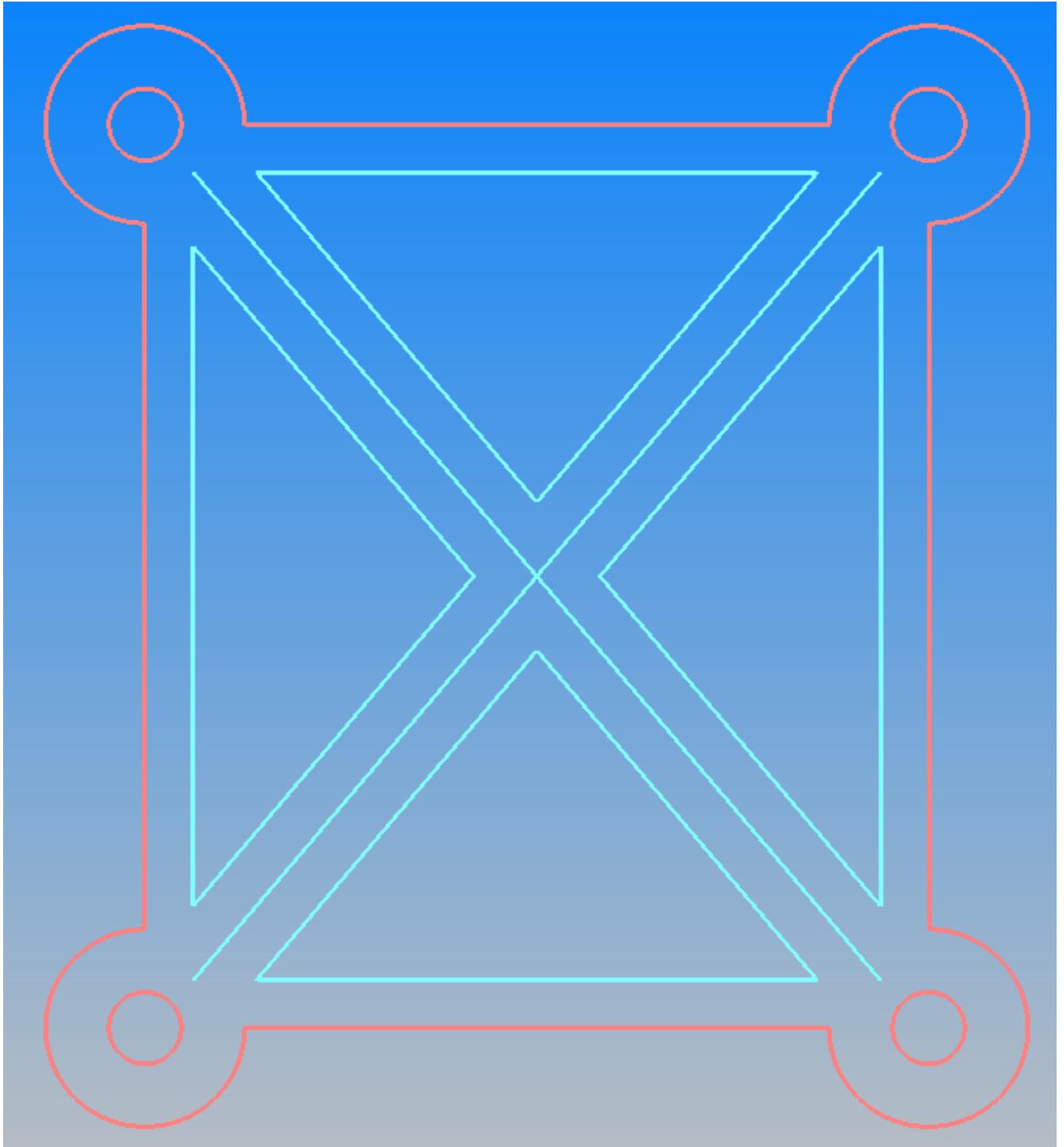


Figure 64 - Completed triangles

Circles along the diagonal lines

New User Layer

From the Layer page of the Project Manager, **<RClick>** on the entry User Layers.

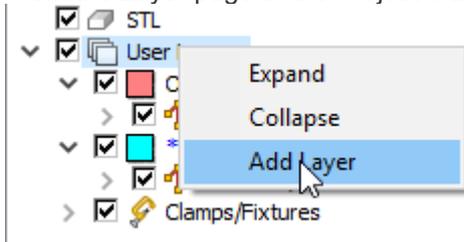


Figure 65 - Adding next User Layer

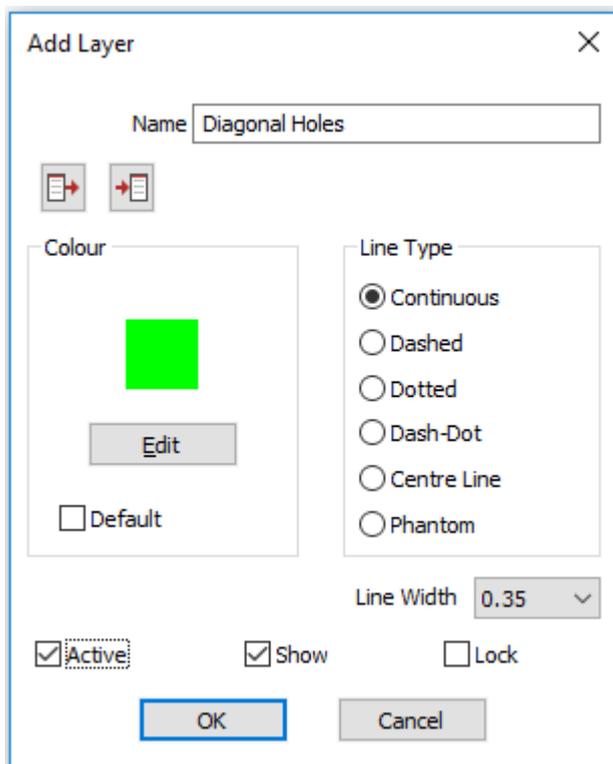


Figure 66 - Created layer dialogue set to Active

Lastly on the dialogue make the **Active** valid so that all your drawing creation will occur on this new layer.
<LClick> [OK] to complete.

Create the circles

Use **GEOMETRY > Special Geometries > Equi-Spaced Holes Along Curve** 

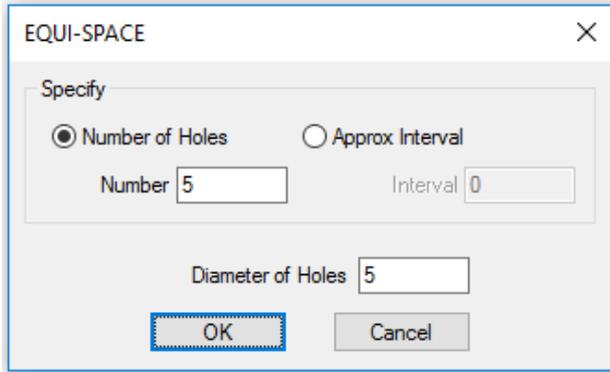


Figure 67 - Equi-spaced holes settings

Set **Number of Holes** to 5 and **Diameter of Holes** to 5,
<LClick> **[OK]** to continue.

<LClick> both original diagonal lines to create the hole positions.

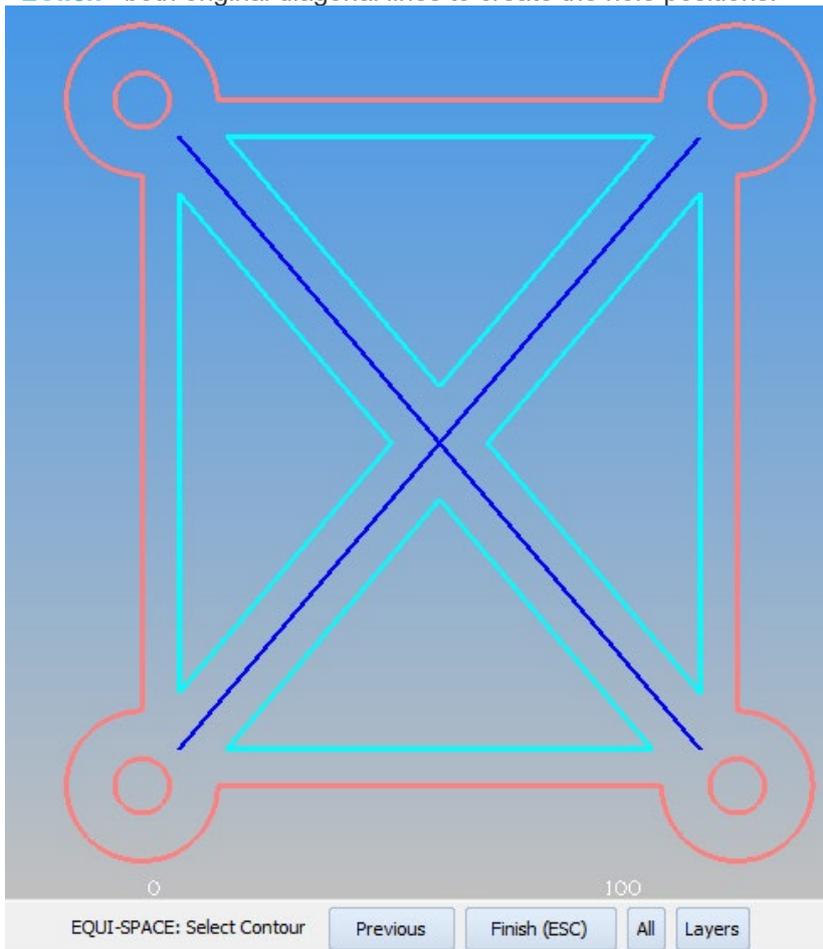


Figure 68 - Selected guide geometries

<RClick> to finish.

Use **EDIT > Change** 

Set in the **From** section  **Geometry**, and in the **To** section  **Construction** then **<LClick>** on the 2 diagonal centre lines.

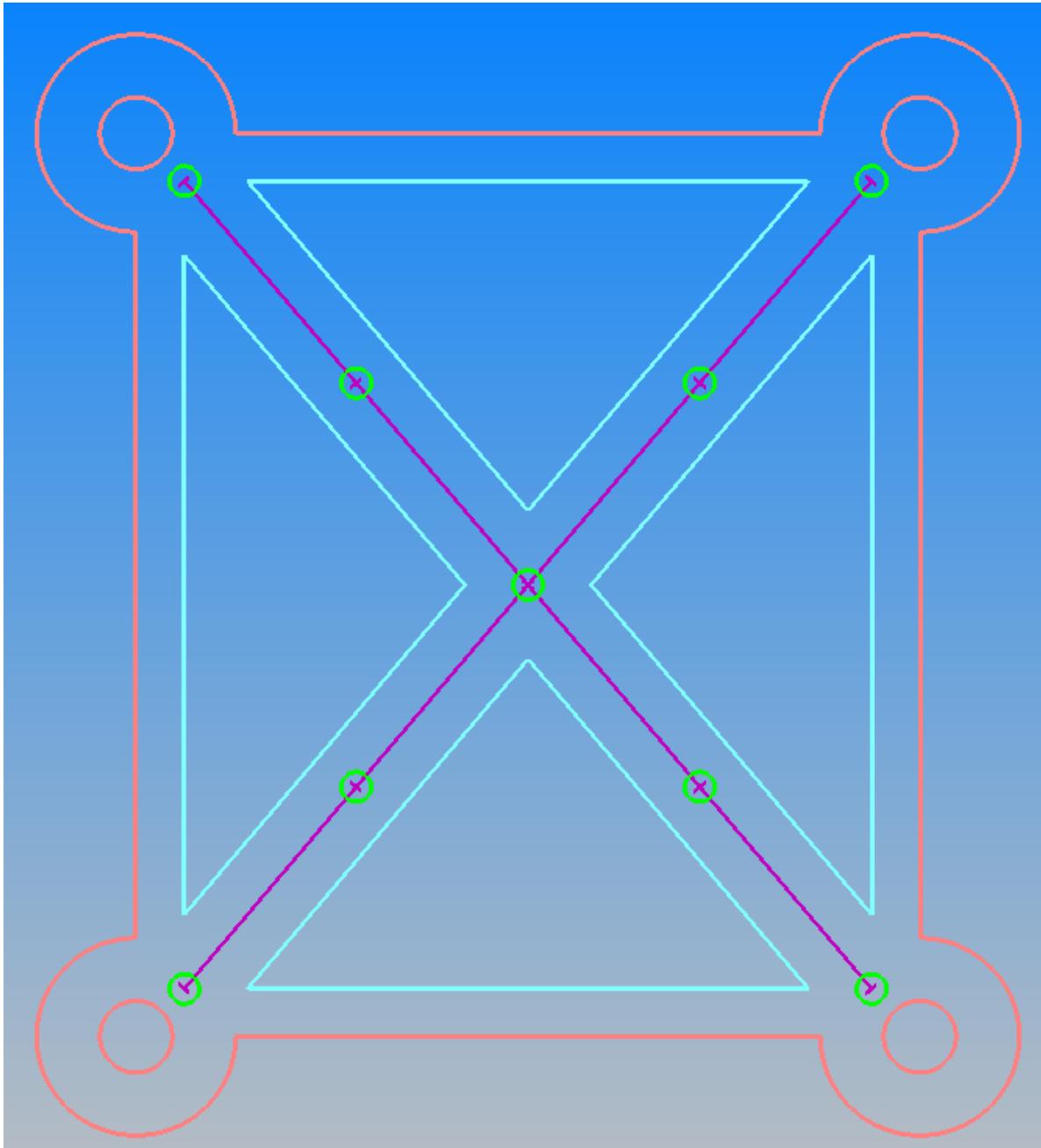


Figure 69 - Change the guides to Construction

<RClick> to finish. Then turn off the Construction layer in the project manager.



Remember to delete one of the centre circles as there will be two created where the lines cross.

Triangles Central Circle Creation

New User Layer

From the Layer page of the Project Manager, **<RClick>** on the entry User Layers.

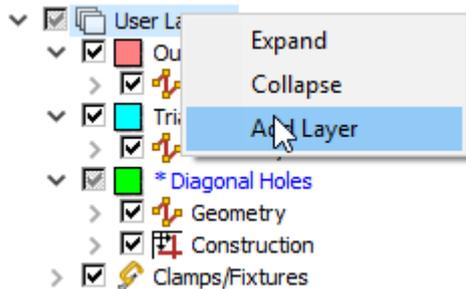


Figure 70 - Adding next User Layer

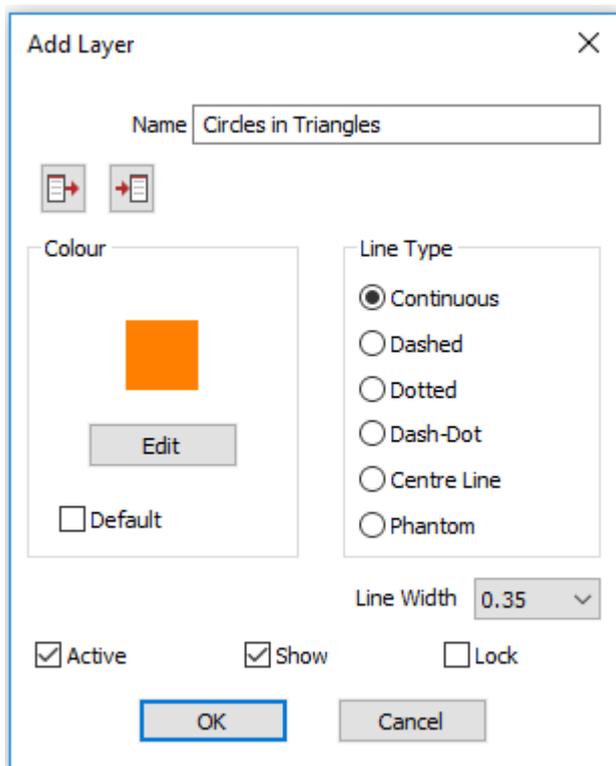


Figure 71 - Created layer dialogue set to Active

Lastly on the dialogue make the **Active** valid so that all your drawing creation will occur on this new layer. **<LClick> [OK]** to complete.

Create the circles

Use **GEOMETRY > Circle > Tangent Circle - Radius NOT KNOWN**



Select **[3 Lines]** as the option in the dialogue box.

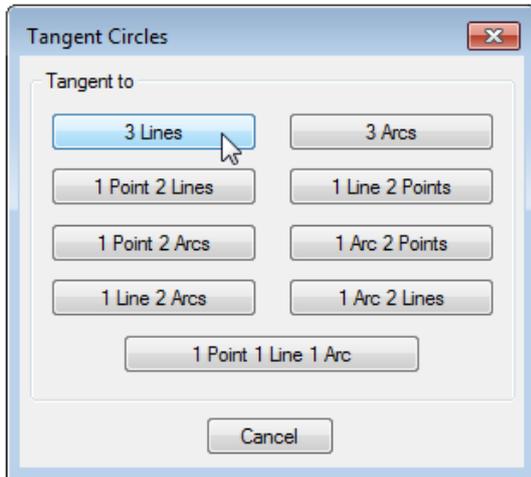


Figure 72 - Tangent Circle Radius Not known

Choose the three sides of any of the triangles.

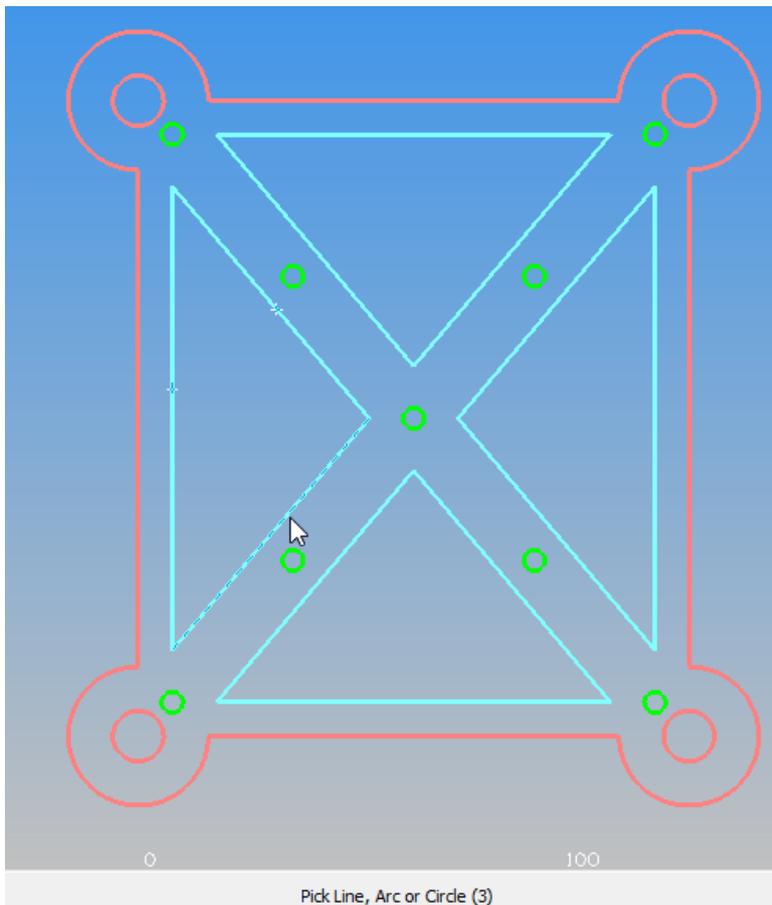


Figure 73 - <LClick> three sides of the same triangle

The drawing area will display all possible locations of the tangent circles based on your selection.

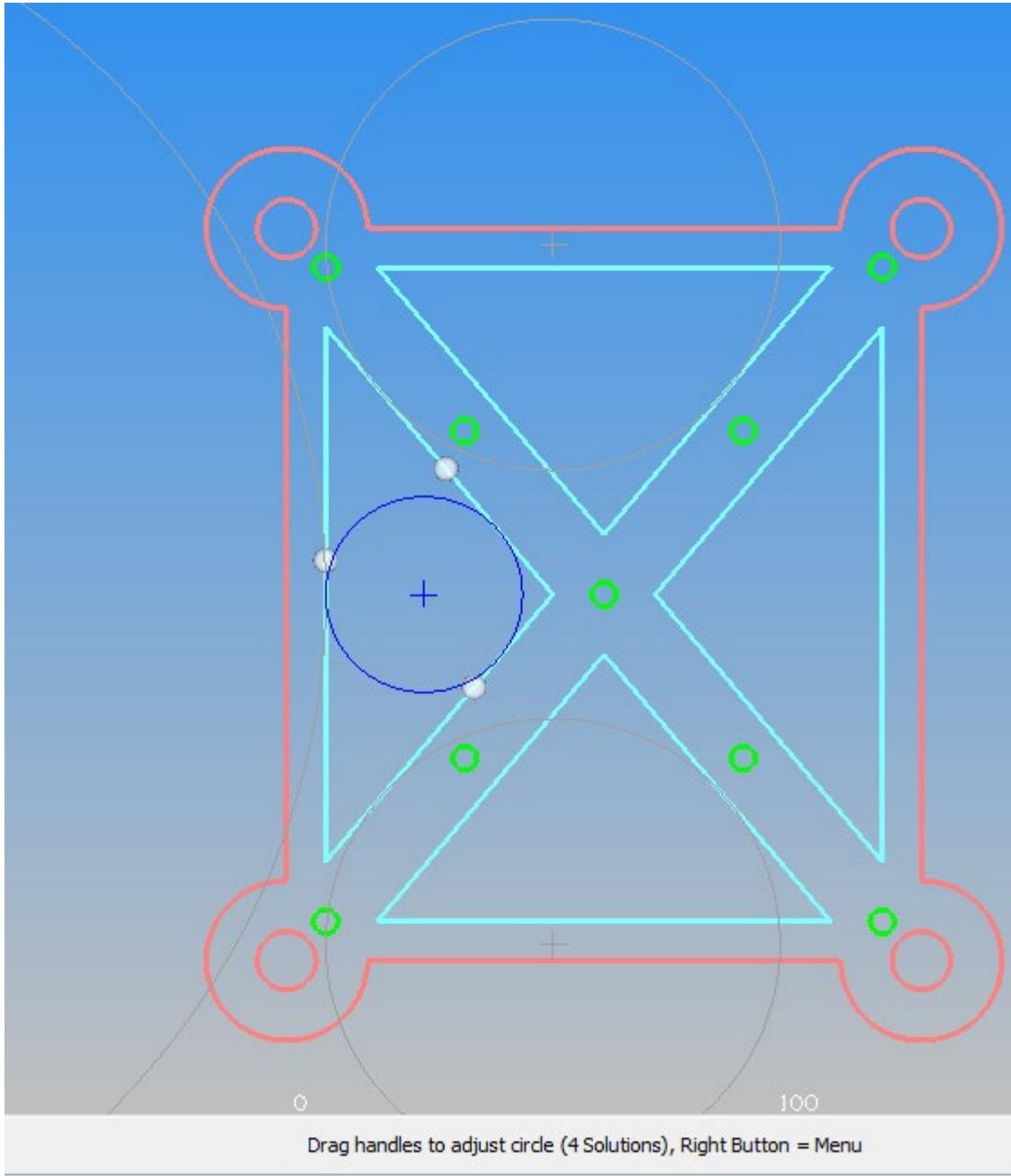


Figure 74 - All possible circles shown

<RClick> to pop up a menu and select **[Accept highlighted circle]** if the circle is within the triangle, if not, choose **[Next Circle]** until the correct one is displayed in Blue.

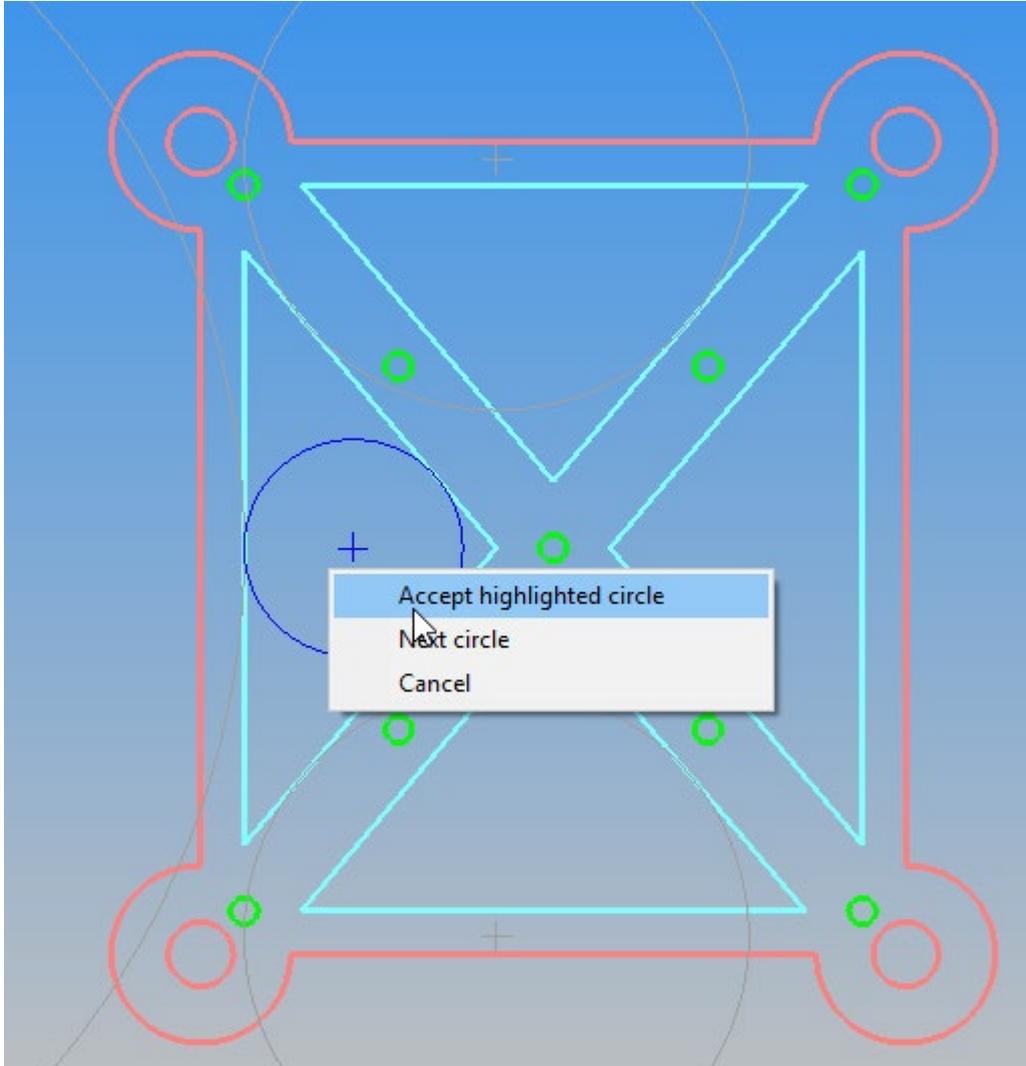


Figure 75 - <RClick> pop up context menu

This will create a circle that is tangent to the triangle sides and whose centre point is at the centre of the triangle.

Repeat this for the other three triangles. **<RClick>** to finish.



Note that if you **<LClick>** roughly where you think the tangency point will be, the initial highlighted circle is more likely to be the one you will need.

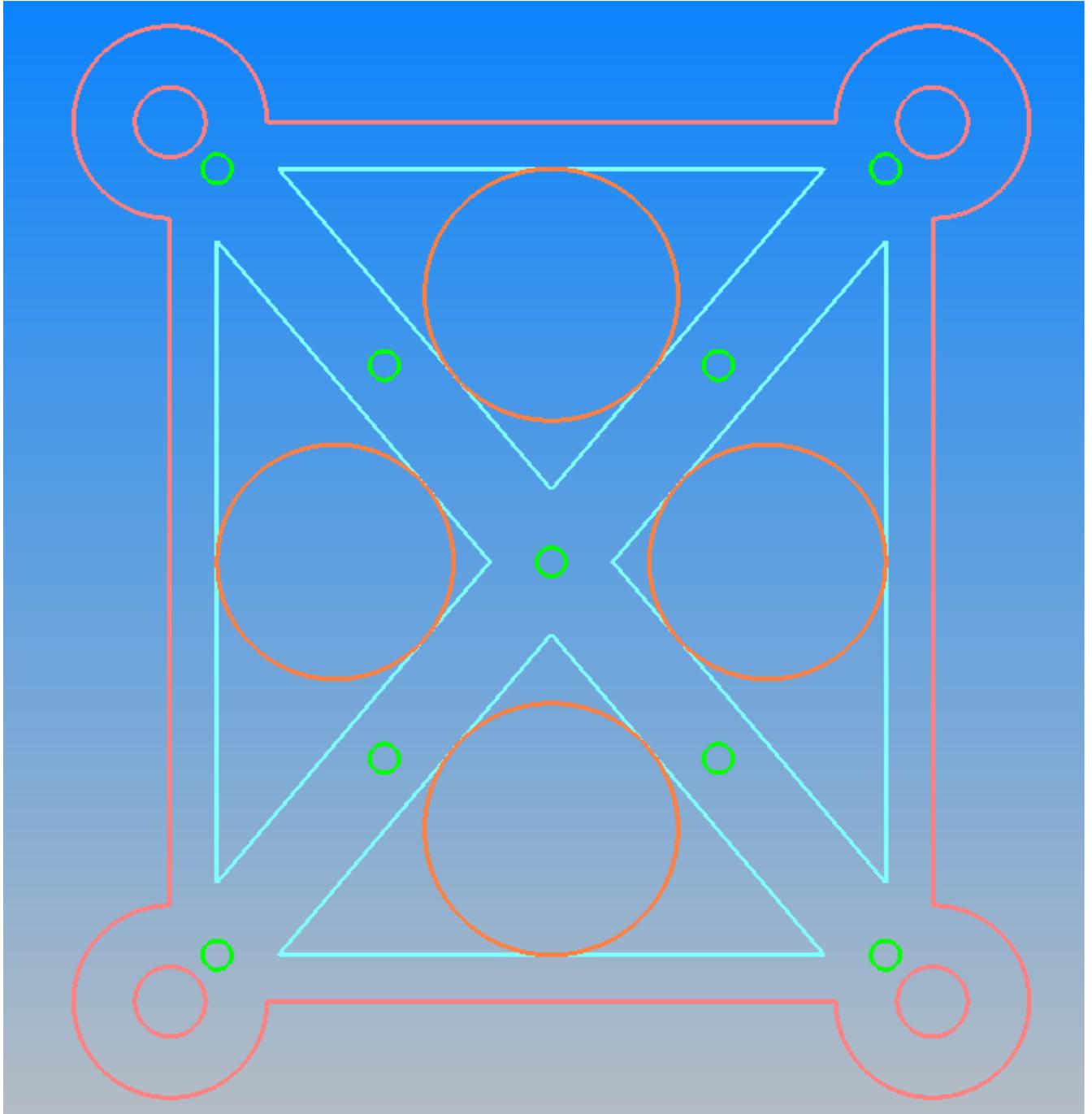


Figure 76 - Applied tangent circles

Set the correct diameter Method 1

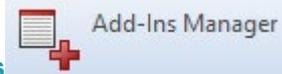
Now we have the correct location for the triangle centre, we could draw in four brand new circles of the correct size.

A neater method is to alter the ones we have already drawn.

Use **EDIT > Change Circle Size**,



If this option is unavailable, you will need to turn on this added function.



Select **Add-Ins/Macros > Add-ins**

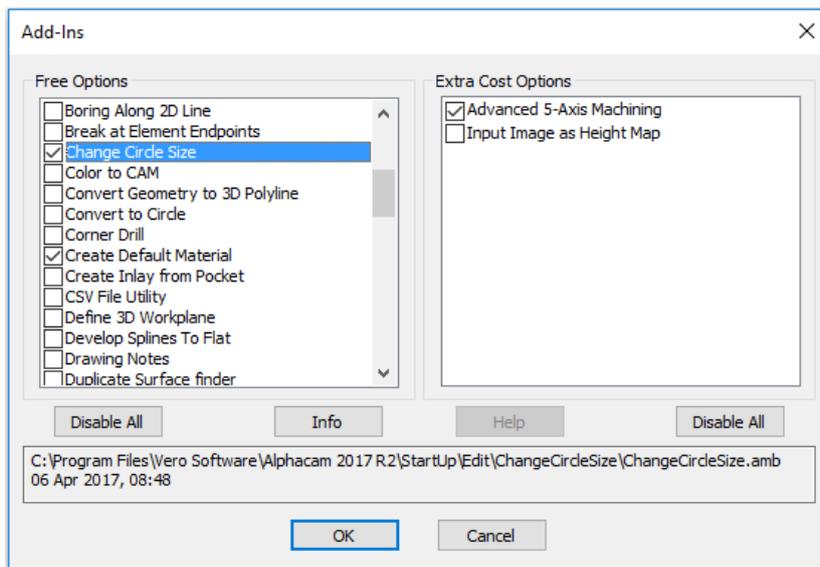


Figure 77 - Add-Ins Manager

Locate **Change Circle Size** on the left side list.

Tick the box to make the option available.



Note, <LClick> on **[Info]** will tell you where the selected command will be added to on the Ribbon.

Use **EDIT > Change Circle Size**, 

Set the option for all selected circles and the new diameter to **25**,

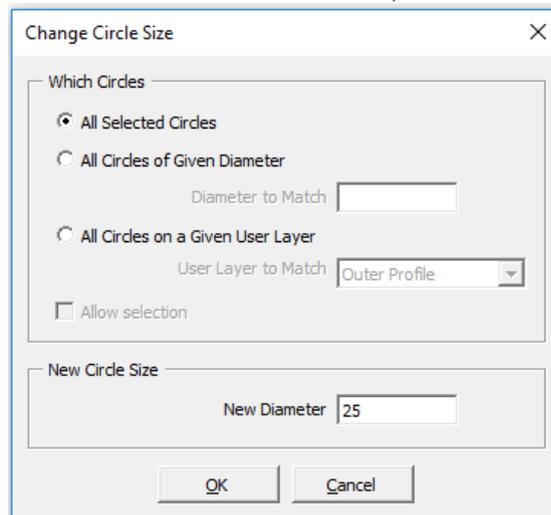


Figure 78 - Change Circle Size Dialogue

<LClick> [OK] to continue, then **<LClick>** the four tangent circles as the items to alter.

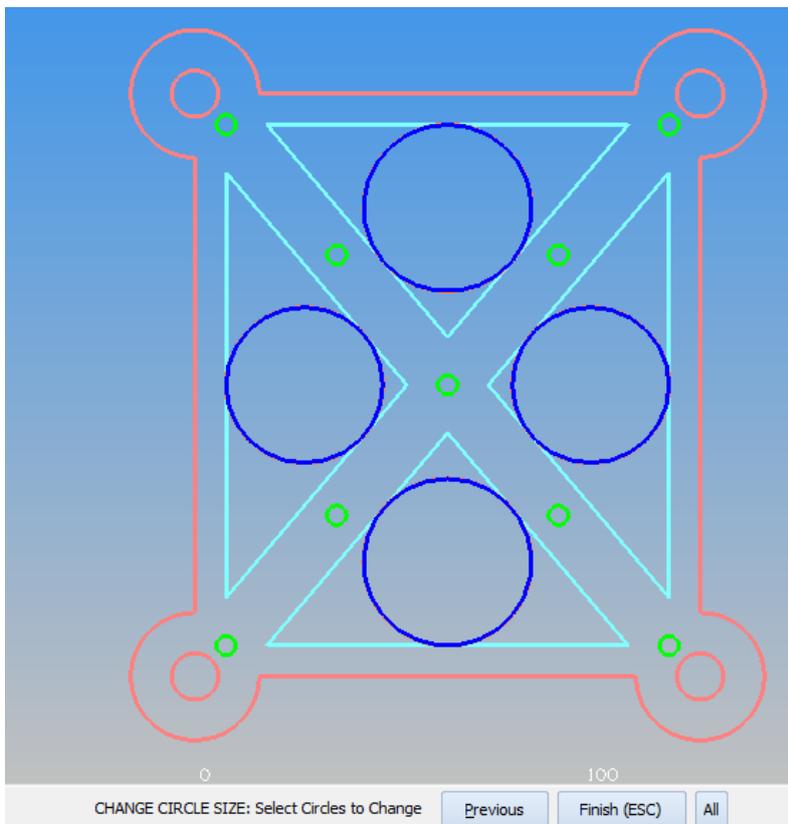


Figure 79 - Selected Circles to alter

<RClick> to finish.

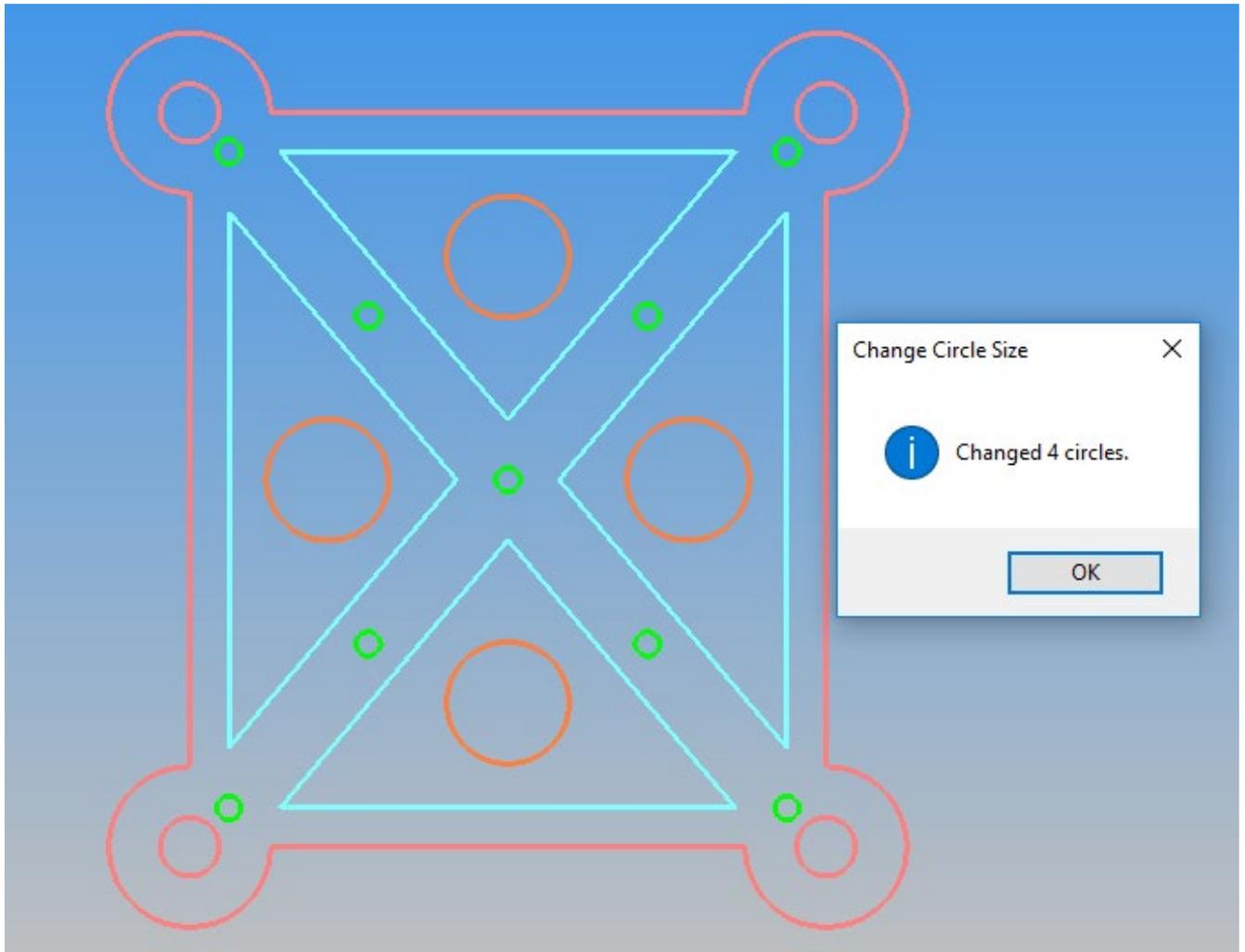


Figure 80 - Completed process method 1

Set the correct diameter Method 2

As we have set the drawing to use **User Layers**, there is an option on the **Change Circle Size** dialogue that can assist us.

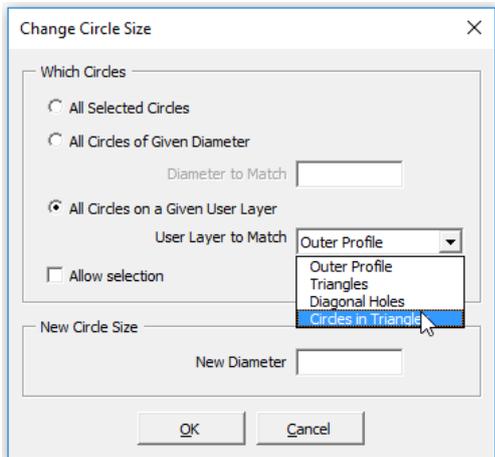


Figure 81 - Change Circle Size via User Layers

Select the required User Layer from the drop down box, then **<LClick> [OK]** to finish.

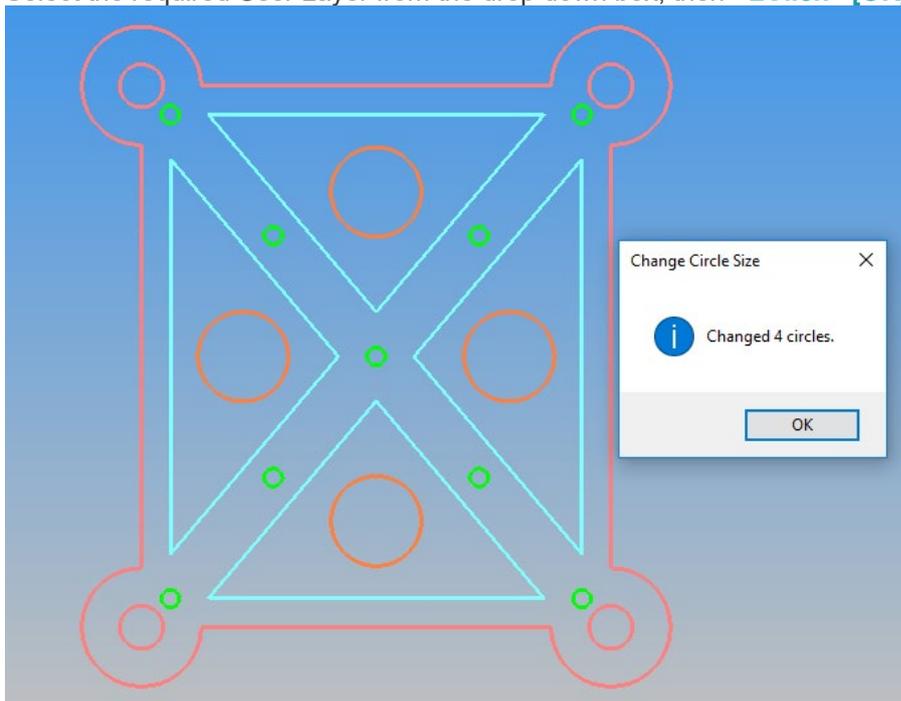


Figure 82 - Completed process method 2

The result from using this method is still the same but you do not need to **<LClick>** on any circles as the entire layer is chosen.

If you did not wish to change every circle on the selected **User Layer** then you can use the **Allow selection** option.

Once you have selected **[OK]** to continue, you are then requested to **<LClick>** on the circles you wish to alter. Any circles on a whole drawing can be selected, **BUT** only the actual circles on the chosen **User Layer** will be altered.

Adding the Fillets

Use **EDIT > Break Join Etc. > Fillet** 

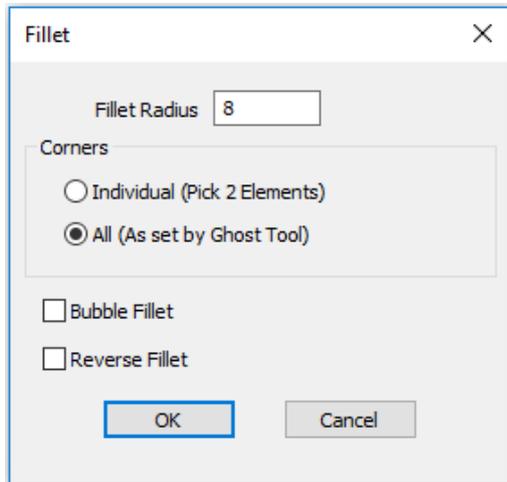


Figure 83 - Fillet Command dialogue

Fillet 8 mm radius setting **All (As set by Ghost Tool)** then on the prompt bar select **[All]**, then **[Finish (ESC)]** to apply the fillet,

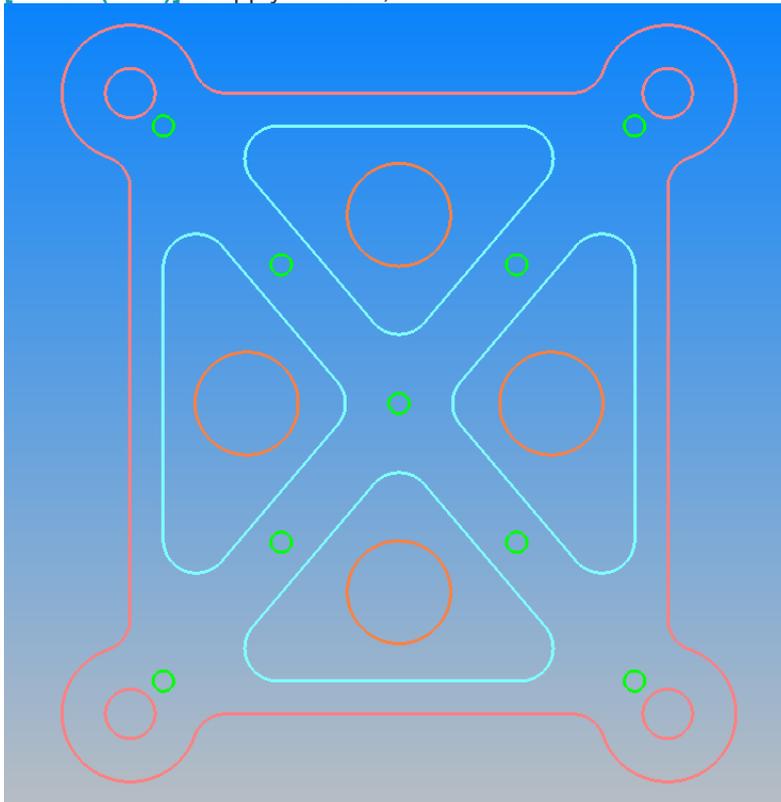


Figure 84 - Completed drawing

Then **[Finish (ESC)]** again to complete the command.

Select **FILE > Save**  and navigate to **“...LICOMDIR \ ALPHACAM Trainee Files\”** folder and use **Pocketed Plate** for the drawing file name then select **[Save]**.

#3 Housing Plate

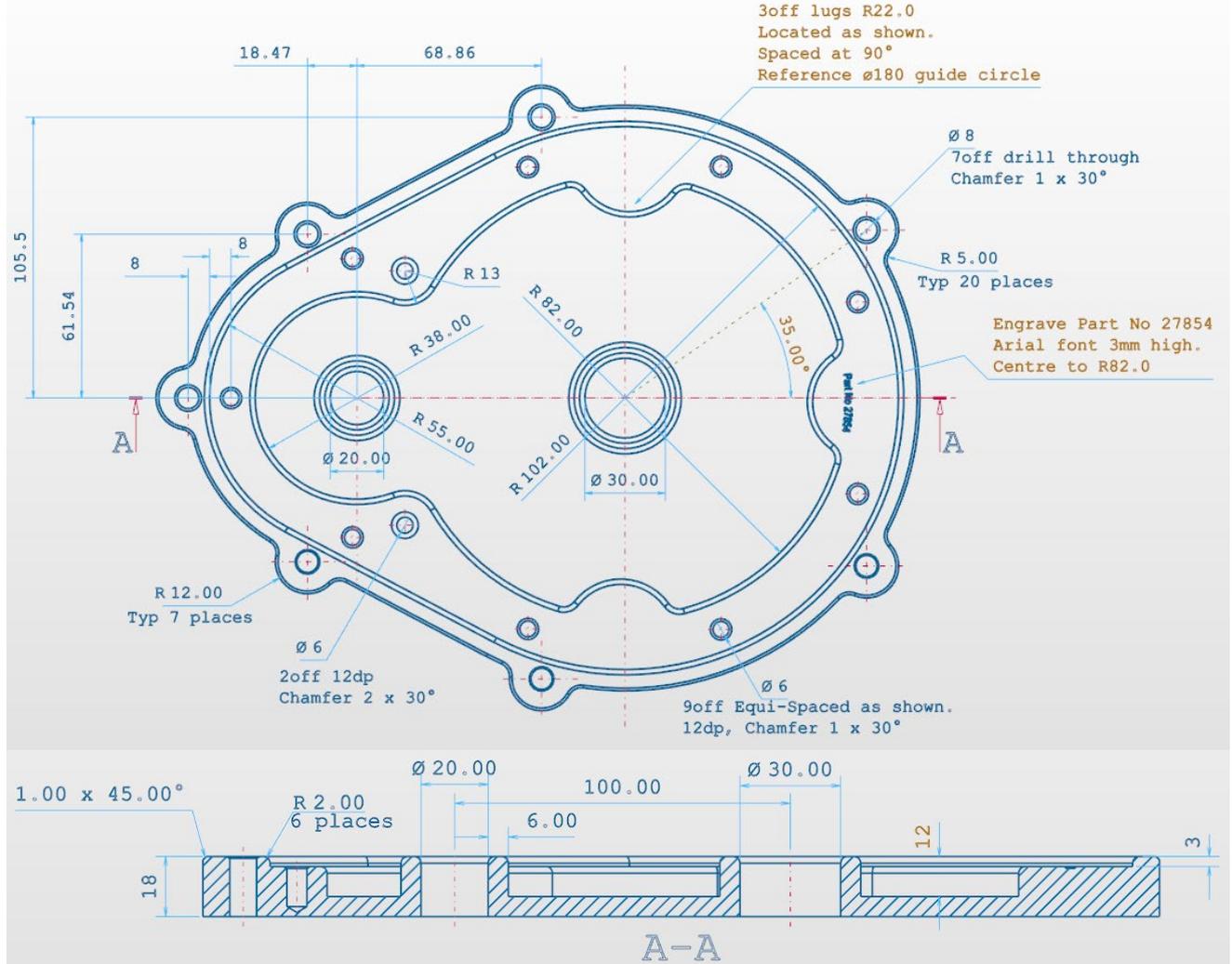


Figure 85 - Housing Plate Main Drawing Details



This actual document does not contain any instruction set for creating the Housing Plate.



Please see the separate included document **ALP TRG 110 Housing Plate Geometry Creation 2020.1**

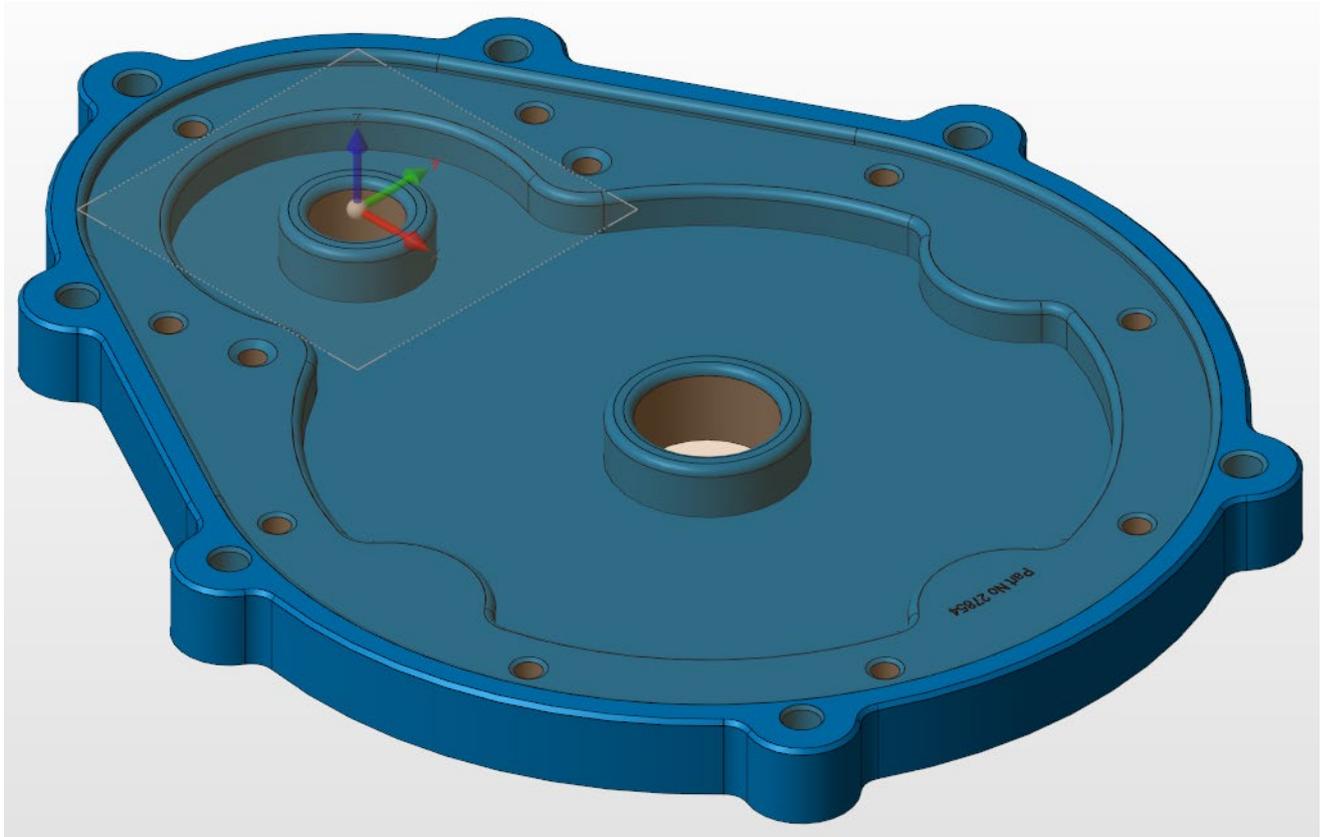


Figure 86 - Housing Plate Solid Model

This is a tutored example, the tutor will discuss and formulate the drawing process plan prior to taking you through the geometry creation process step by step.

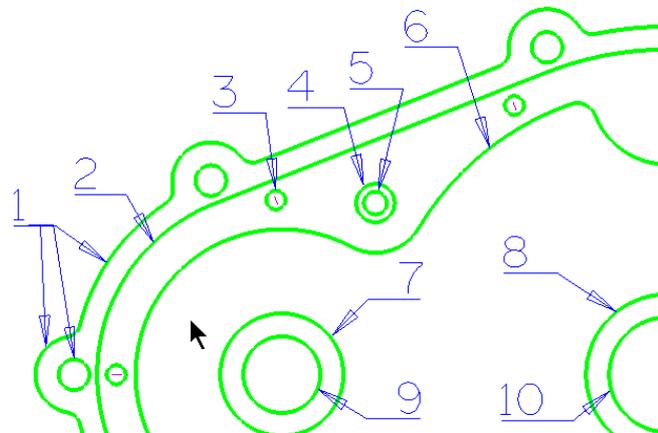


Figure 87 - Housing Plate Geometry Constituent Parts

Constituent parts

1. Datum Position to be selected by discussing with the tutor.
2. Outer Profile same as profile 2, 8mm bigger with $\varnothing 8$ holes and R12 lugs with 5 mm fillets.
3. Closed profile made up of 2 circles R55 and R102 and 2 tangent lines.
4. 9 holes $\varnothing 6$ equi-spaced on profile 8mm inside of profile 2 starting at left most quadrant point.
5. $\varnothing 10$ mm chamfer circle at centre of 13mm fillet.
6. $\varnothing 6$ mm circle at centre of 13mm fillet.
7. Figure of 8 with circles R38 & R82, with 3off R22 indents on $\varnothing 180$ circle, 5mm fillets to indents plus 2off 13mm radius fillets.
8. Circle 6mm bigger than profile 9.
9. Circle 6mm bigger than profile 10.
10. Circle $\varnothing 20$
11. Circle $\varnothing 30$.
12. 3mm Arial Font text "Part No 27854" centred on R82 radius

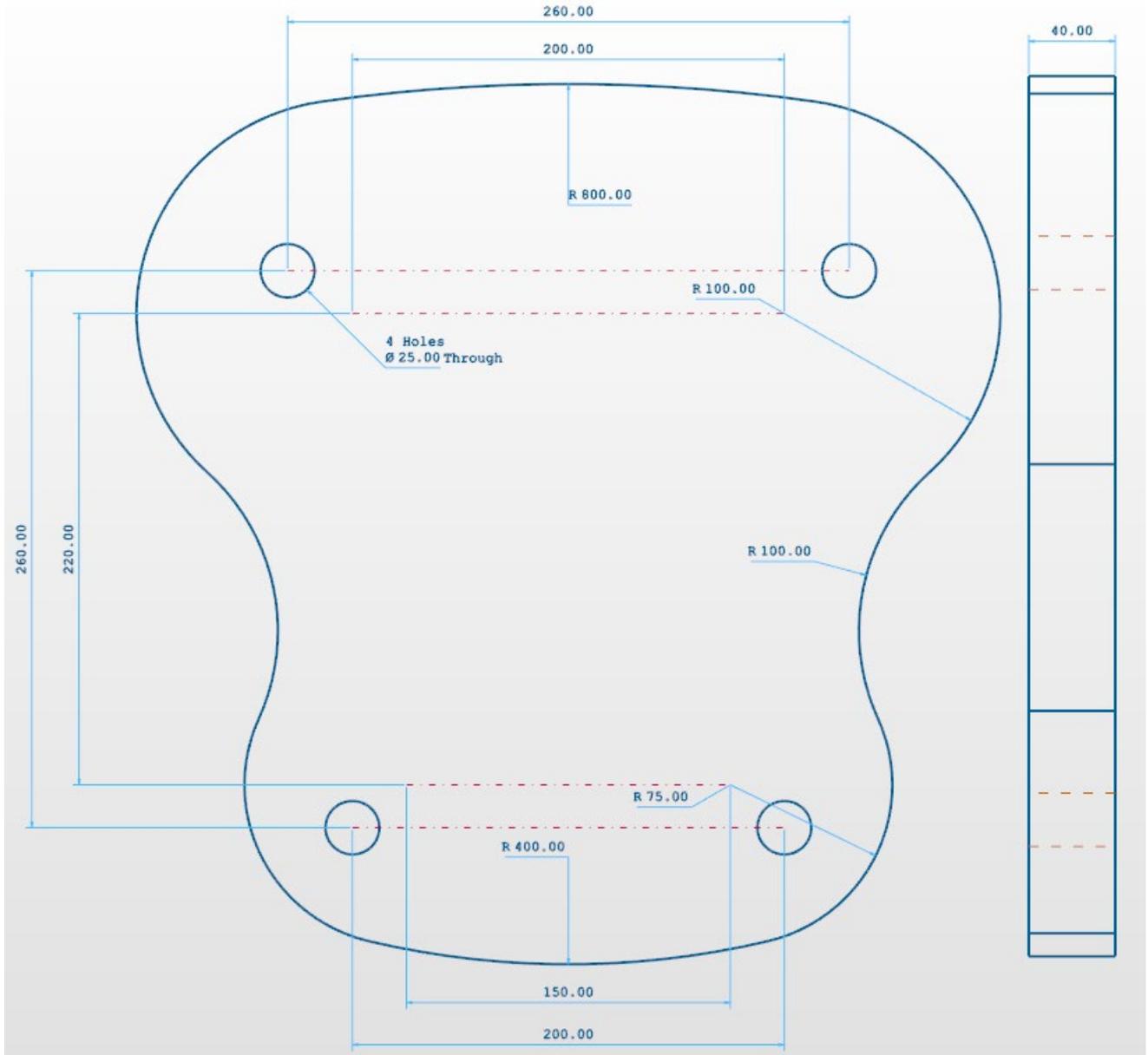
Order of Production

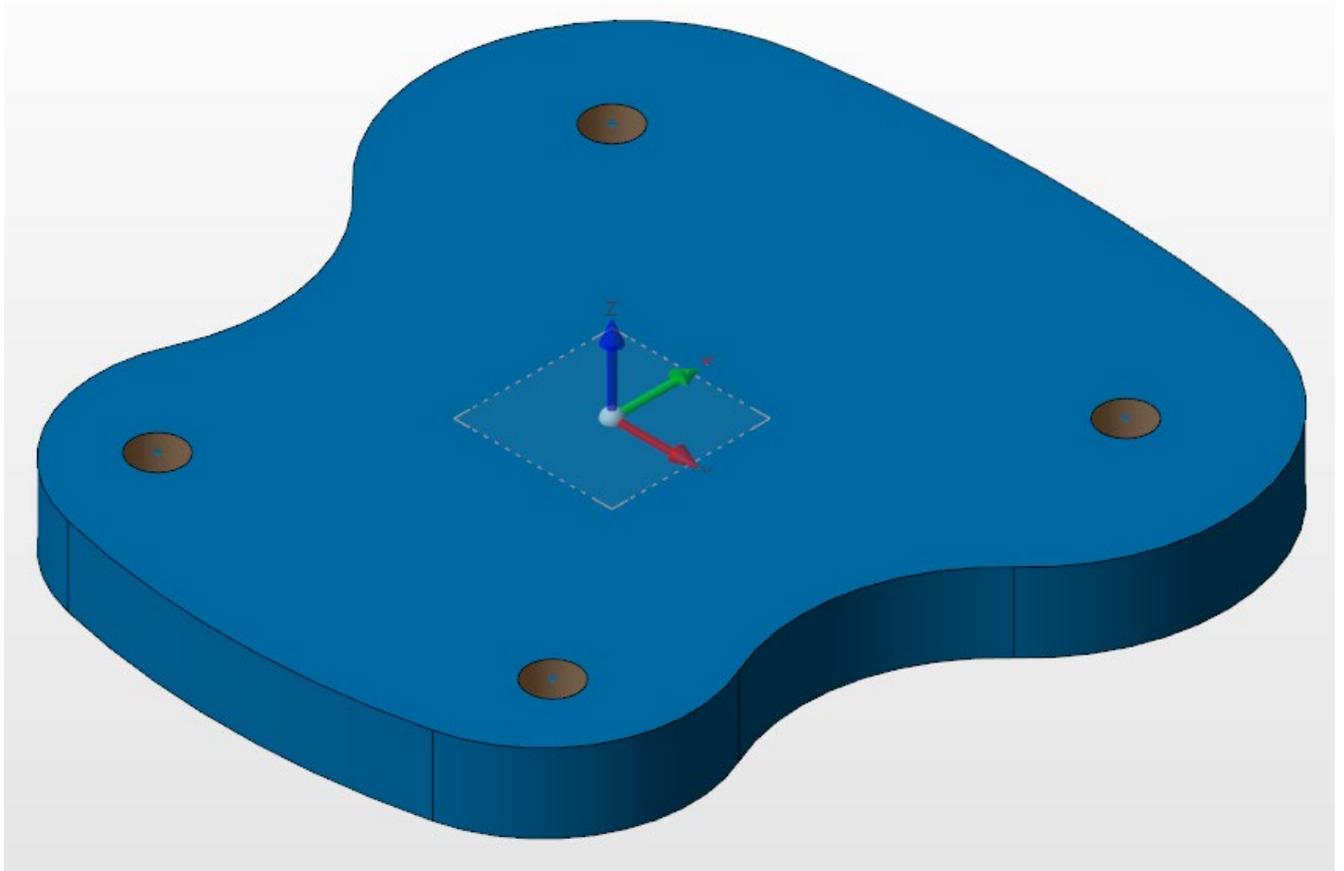
Profiles 9,10,7,8,6, 2,3,1,5,4,11

Due to the nature of how the Housing Plate is created, an individual pdf is supplied with the course material. Please refer to the [Housing Plate Geometry Creation](#) pdf on the for full details.

Router CAD Examples

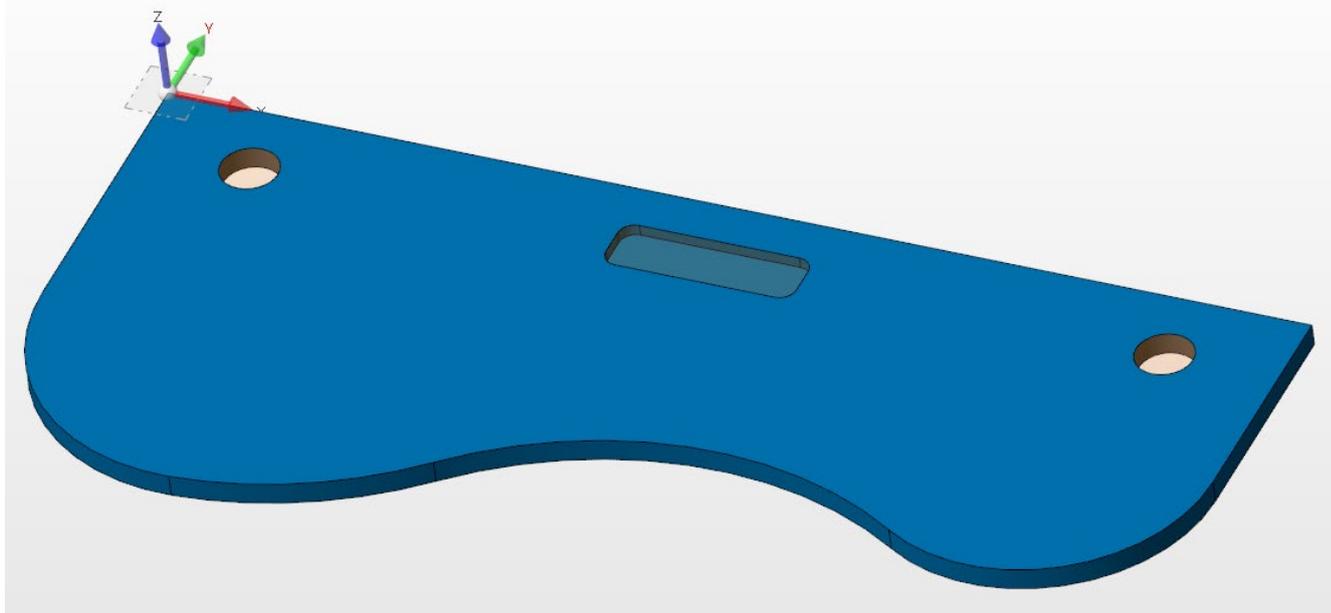
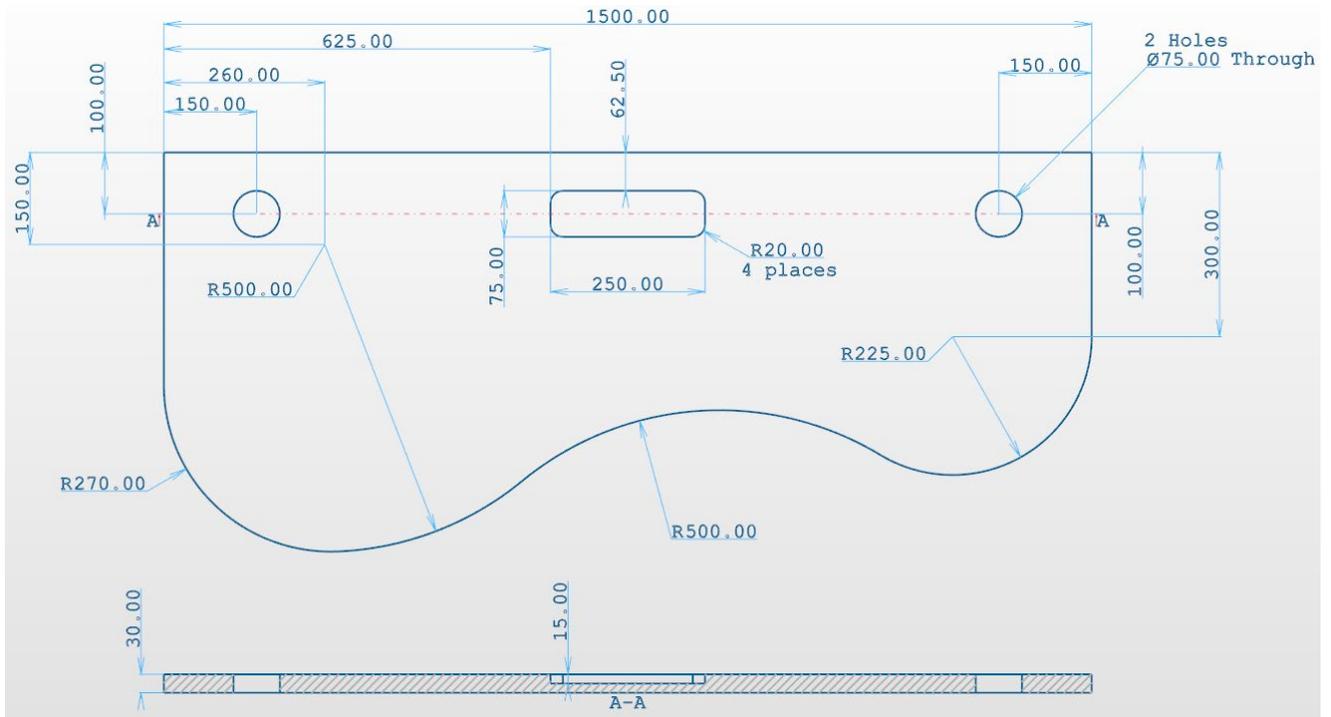
#4 Chair Seat



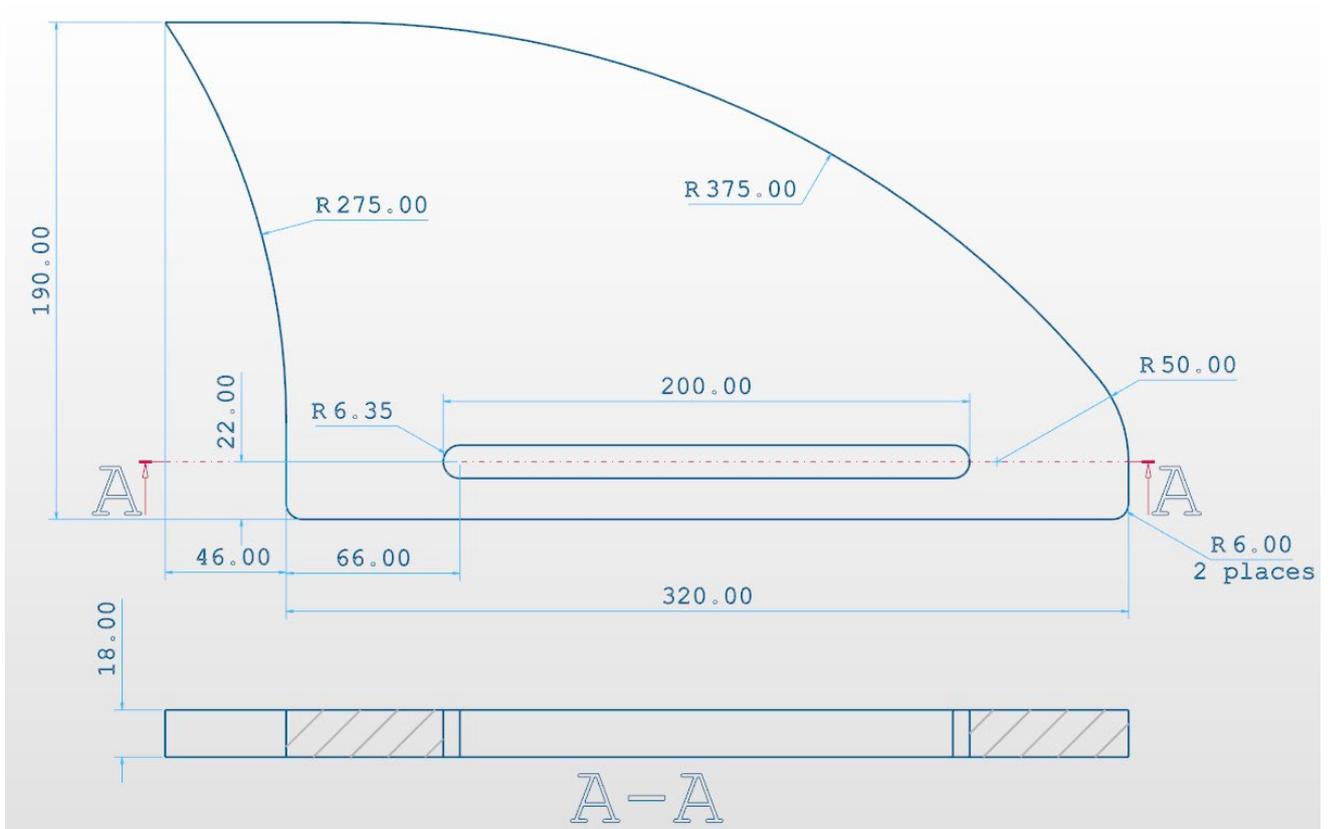


- This item is symmetrical in X.

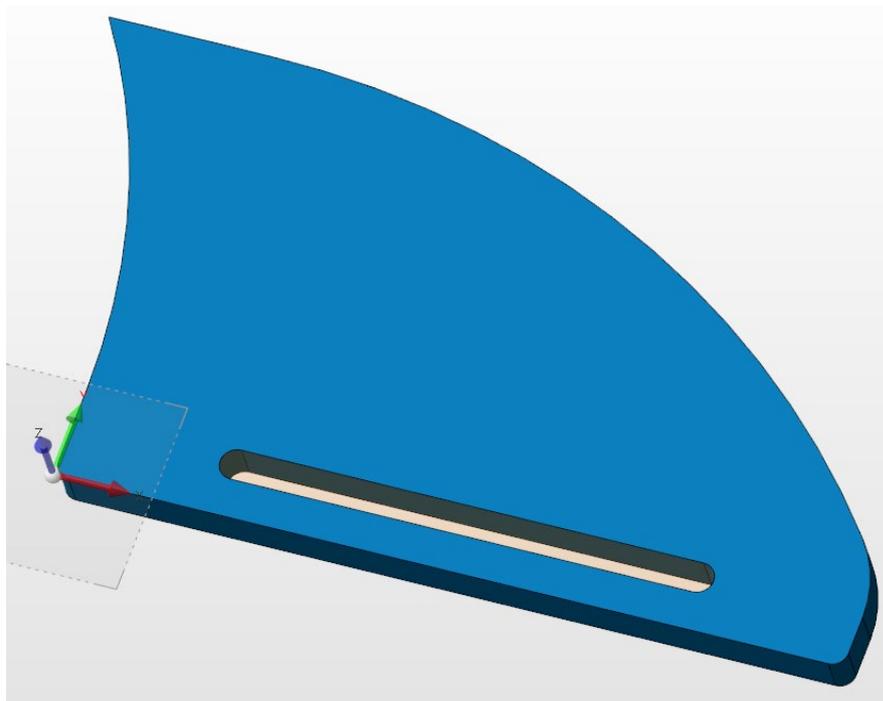
#5 Desk Top



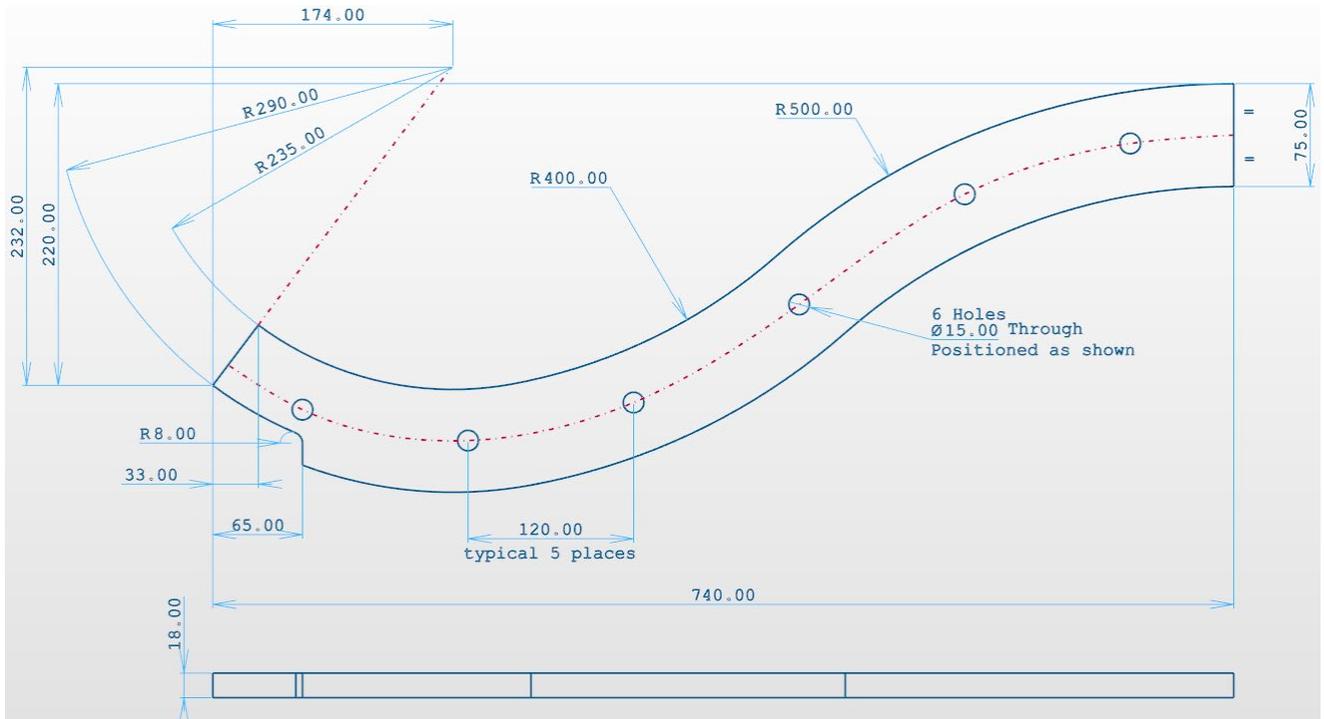
#6 End Plate with Slot



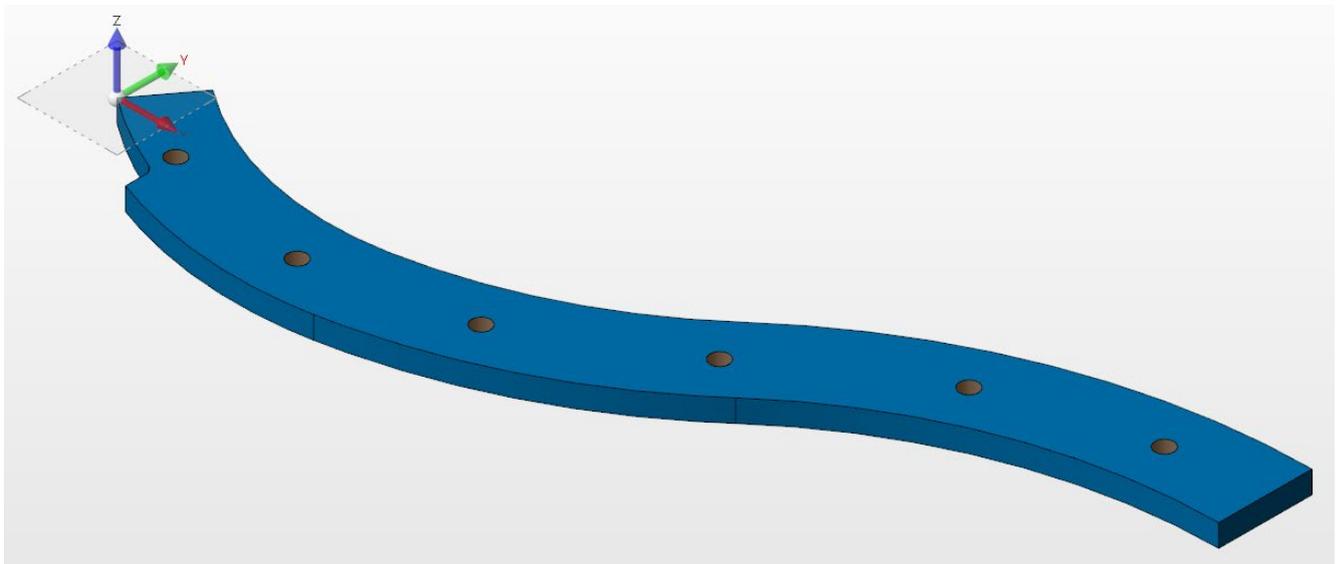
- There is a small horizontal line at the top of the component.

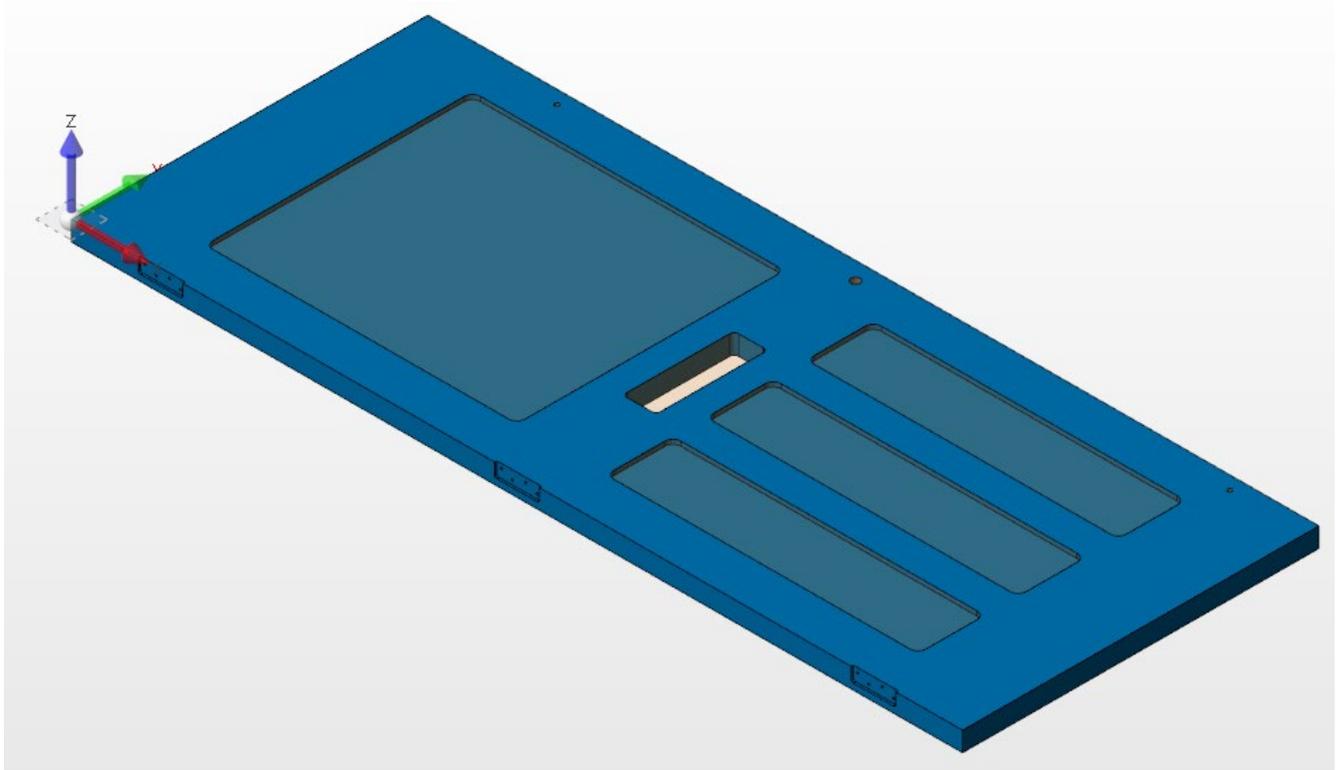


#7 Curved Board



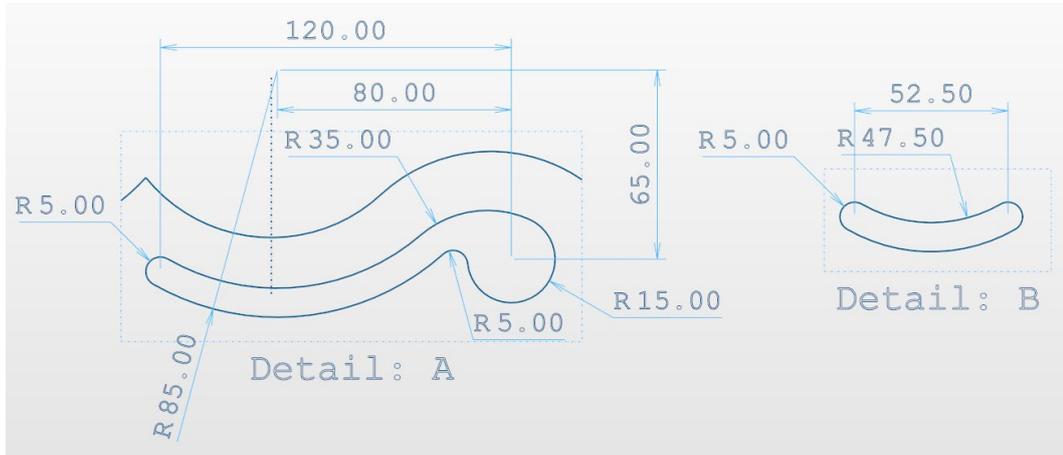
- Draw the top profile and use Offset to get the bottom profile.



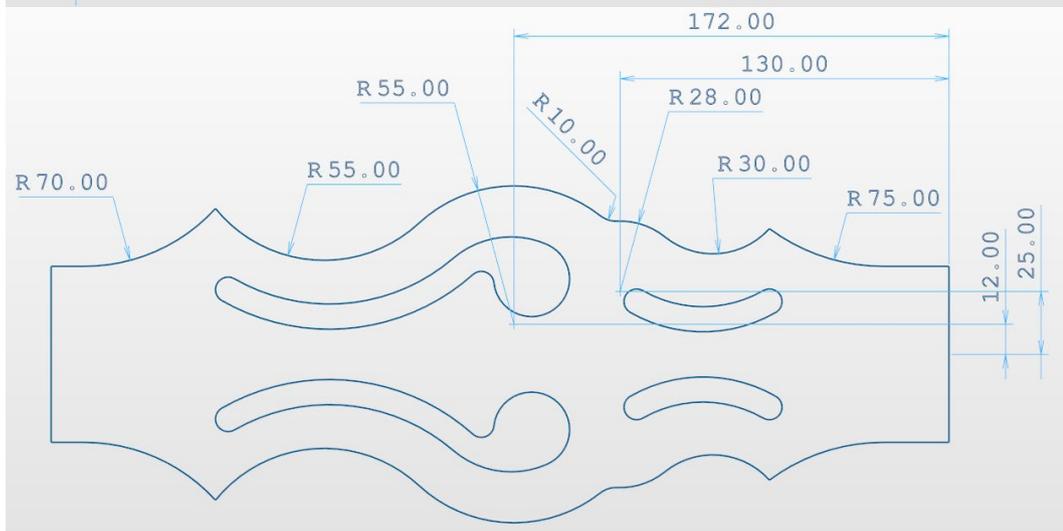
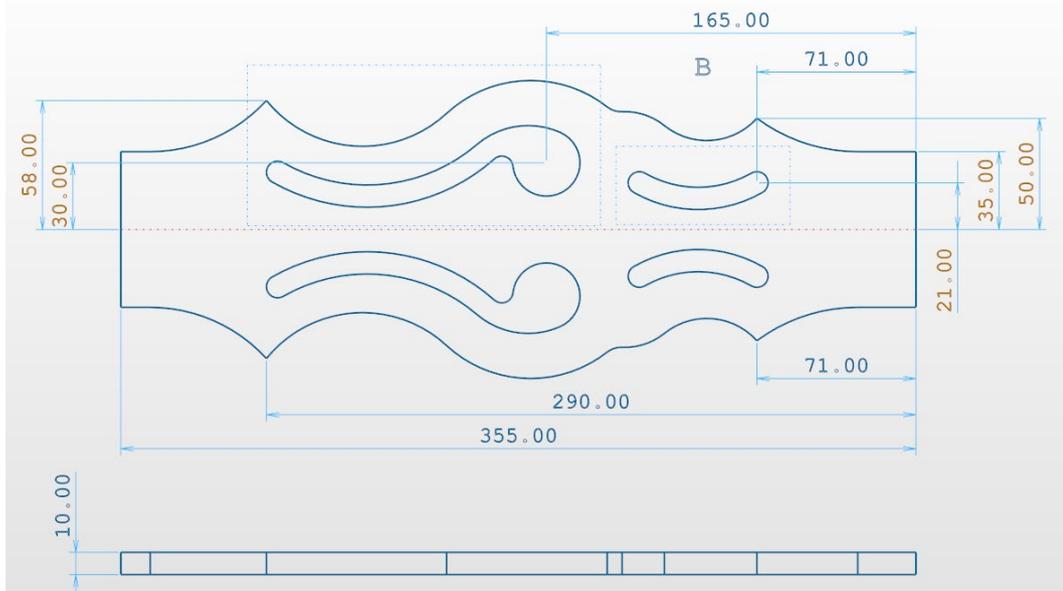




#9 Chair Stringer



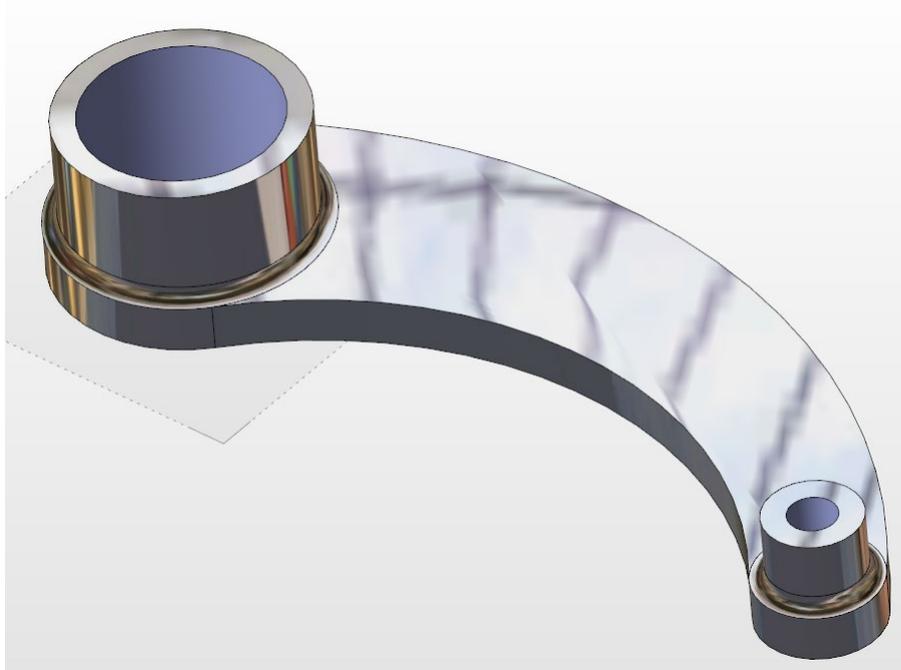
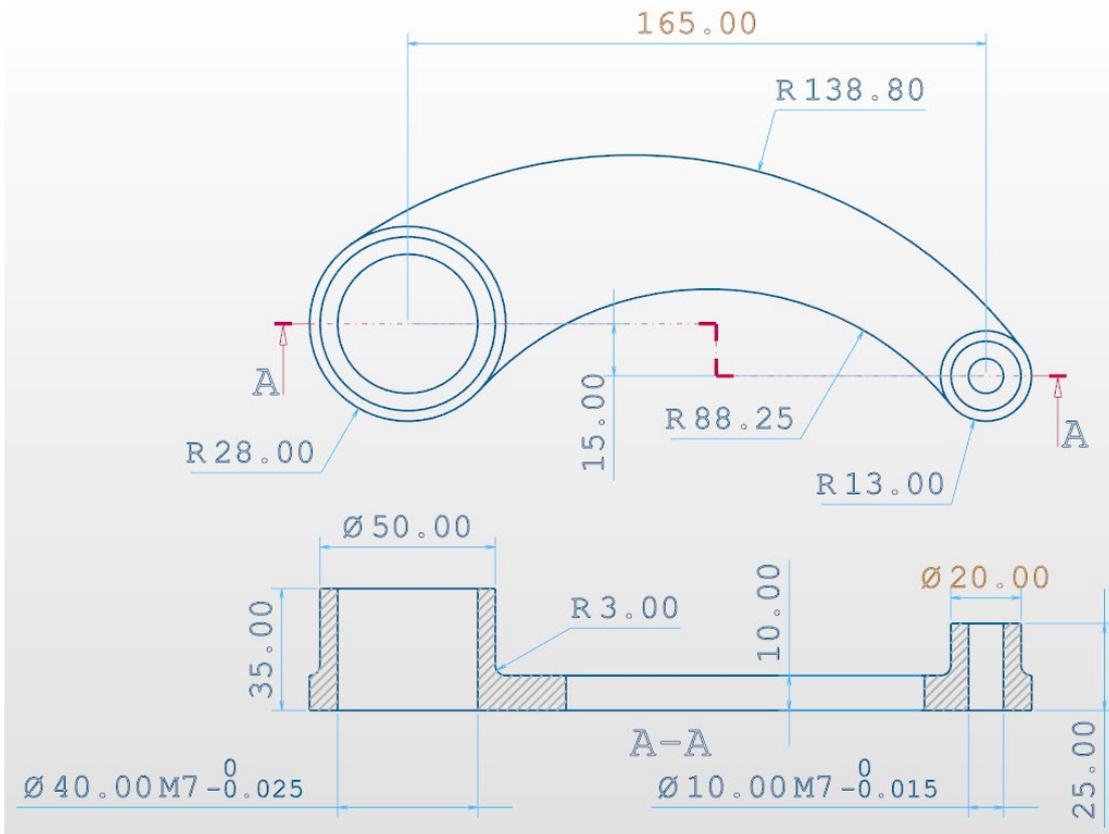
A



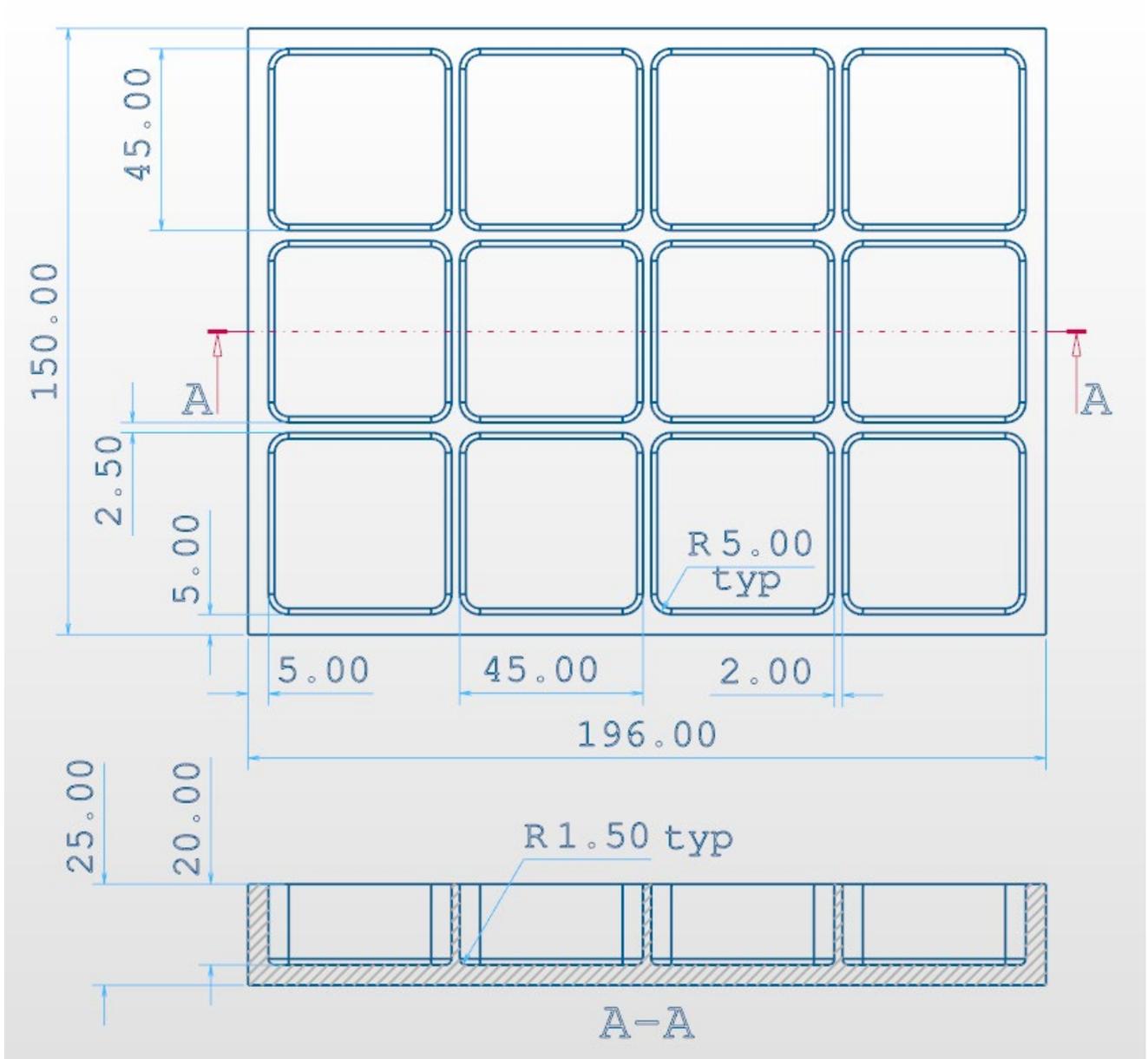


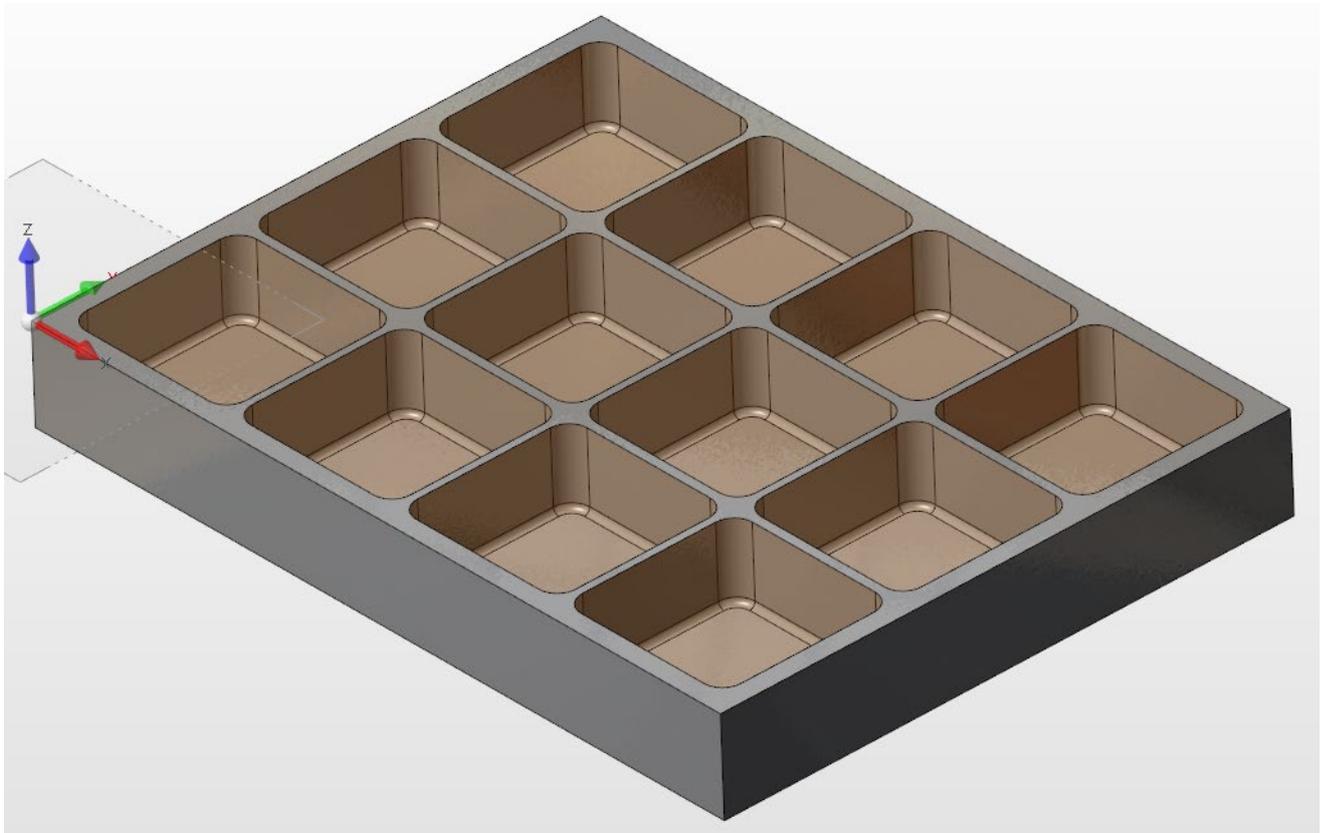
Milling CAD Examples

#10 Arched Lever

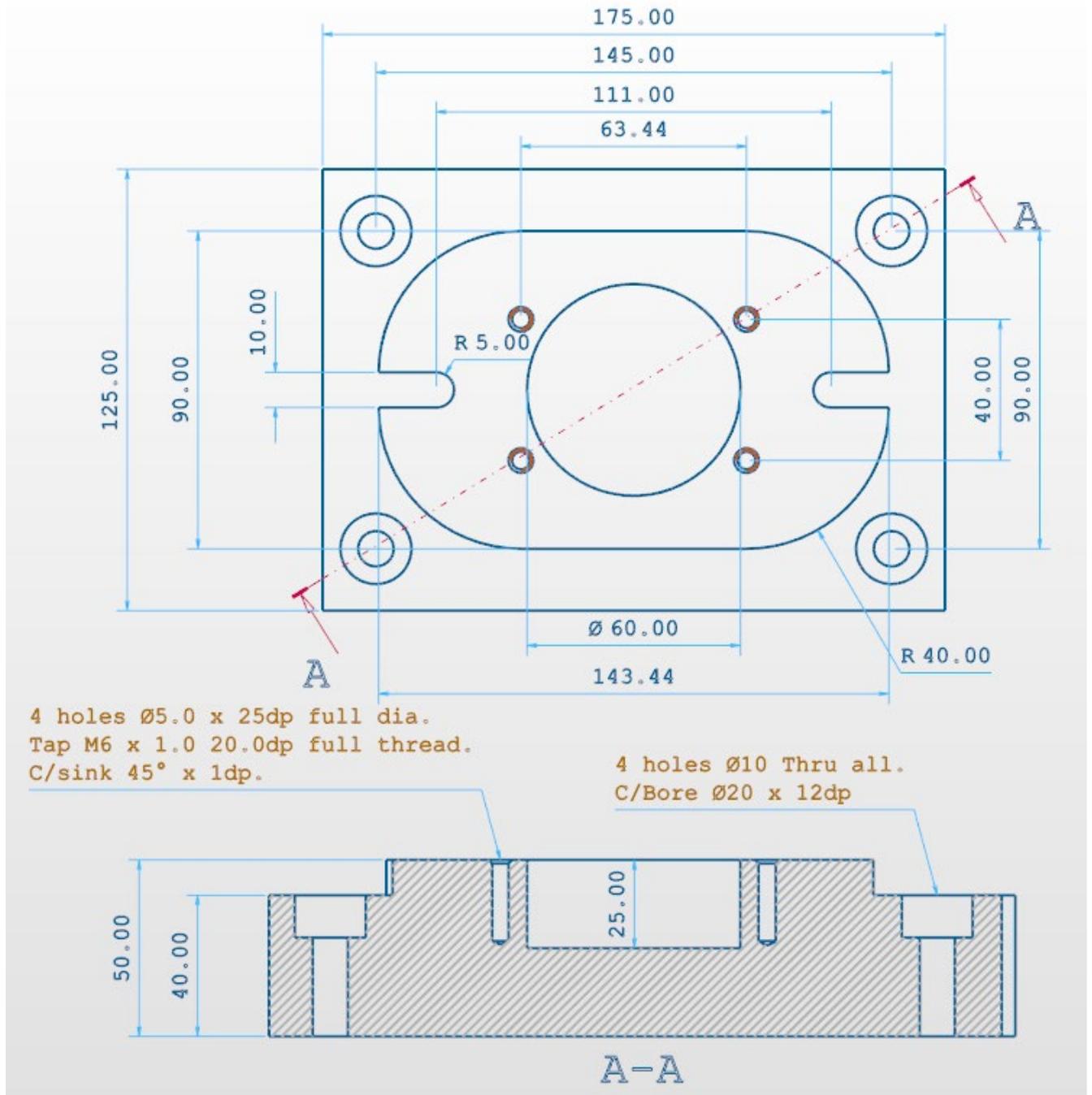


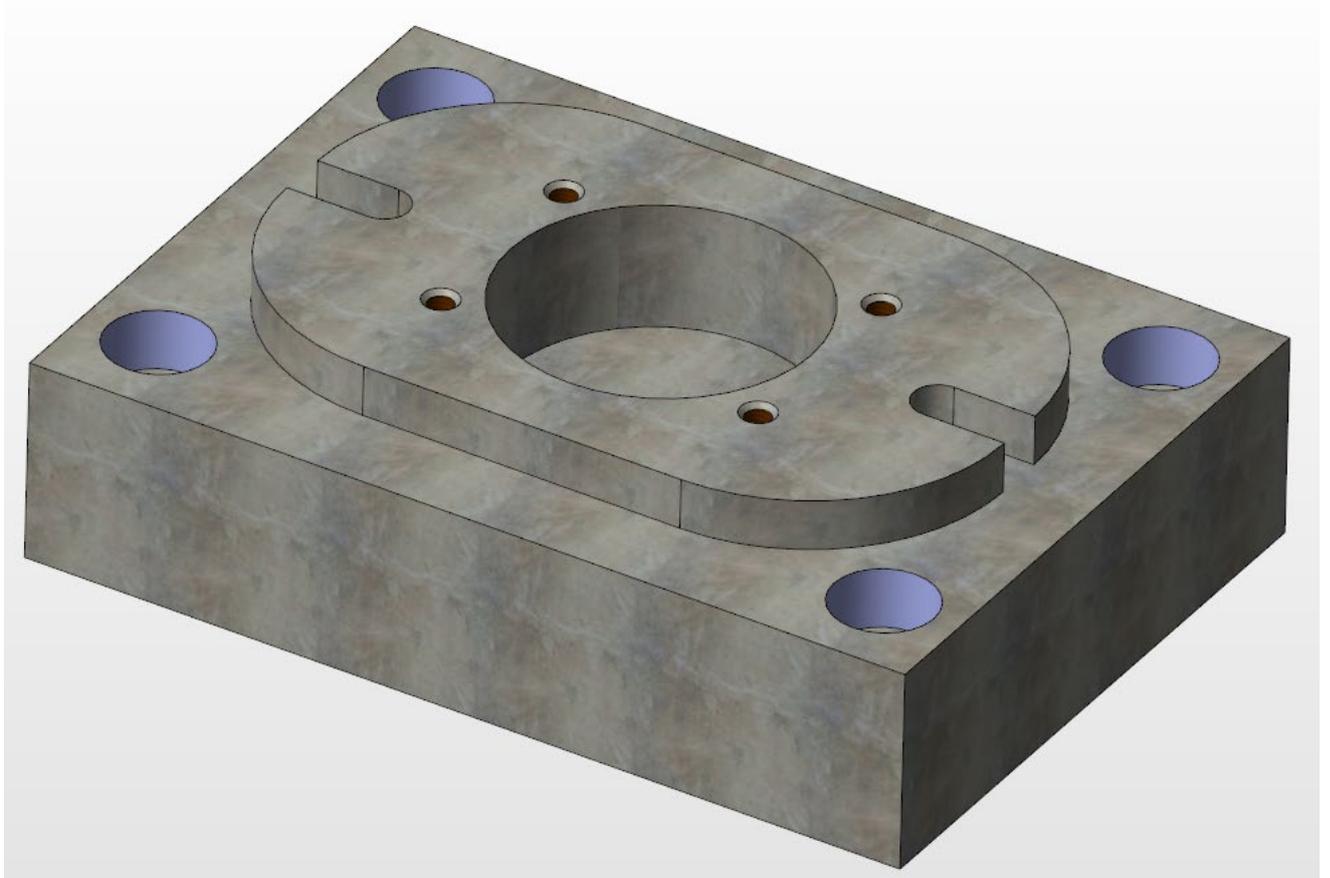
#11 Thin Wall Pocket Plate



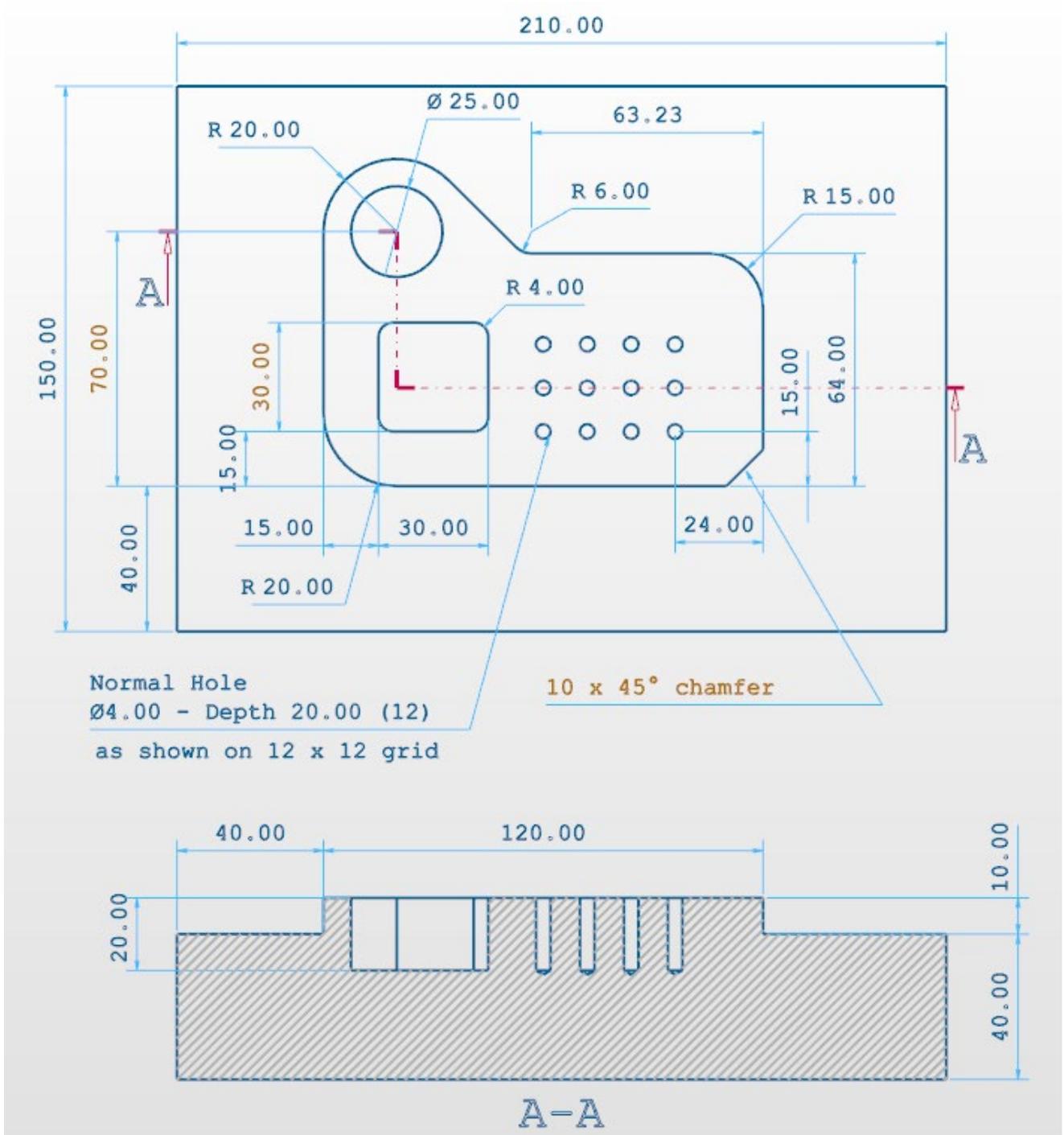


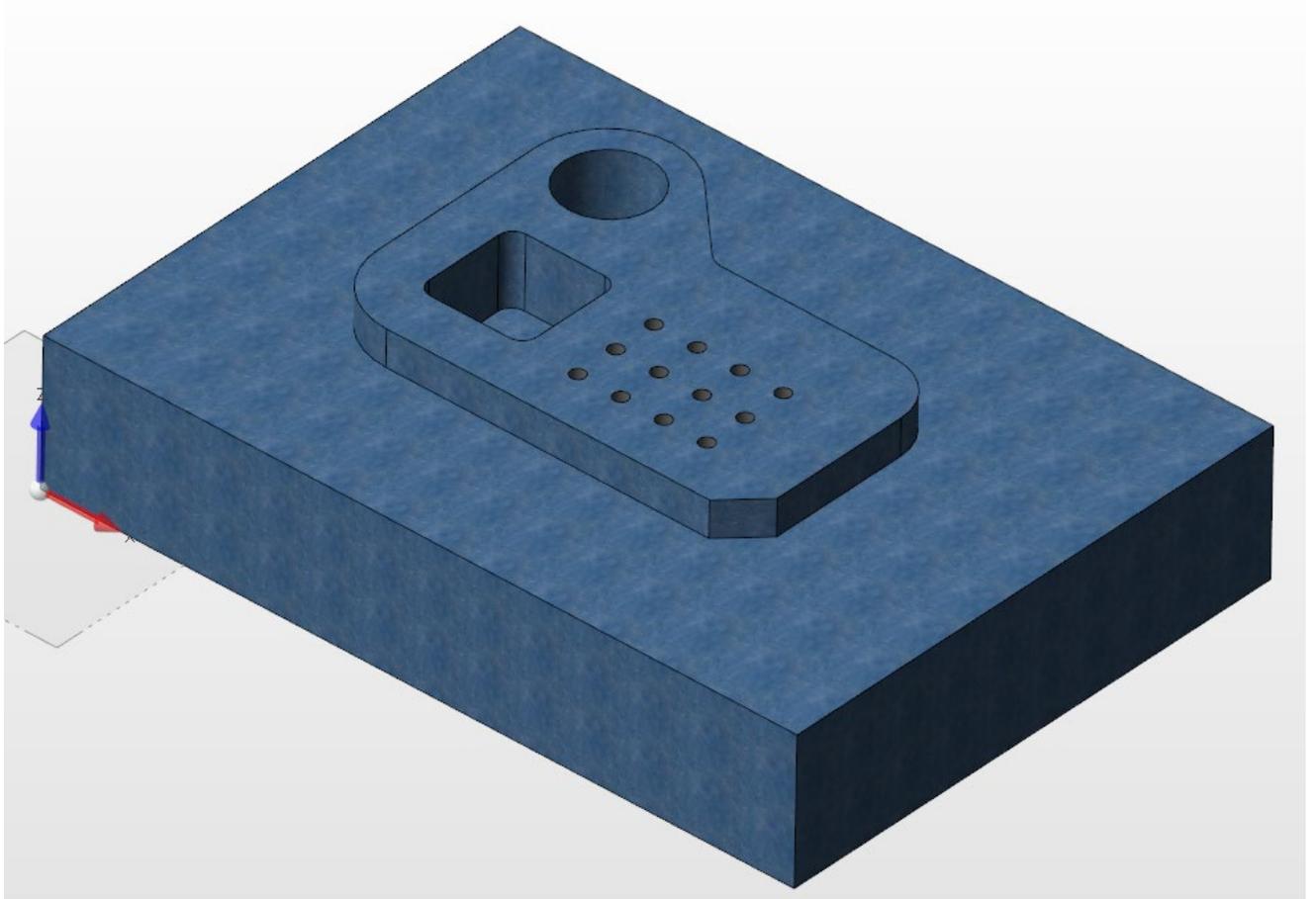
#12 Support Block



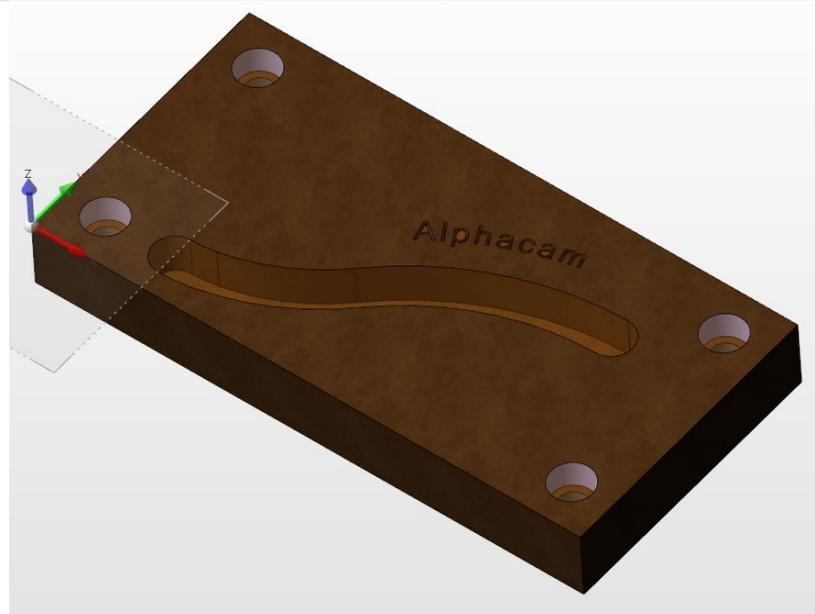
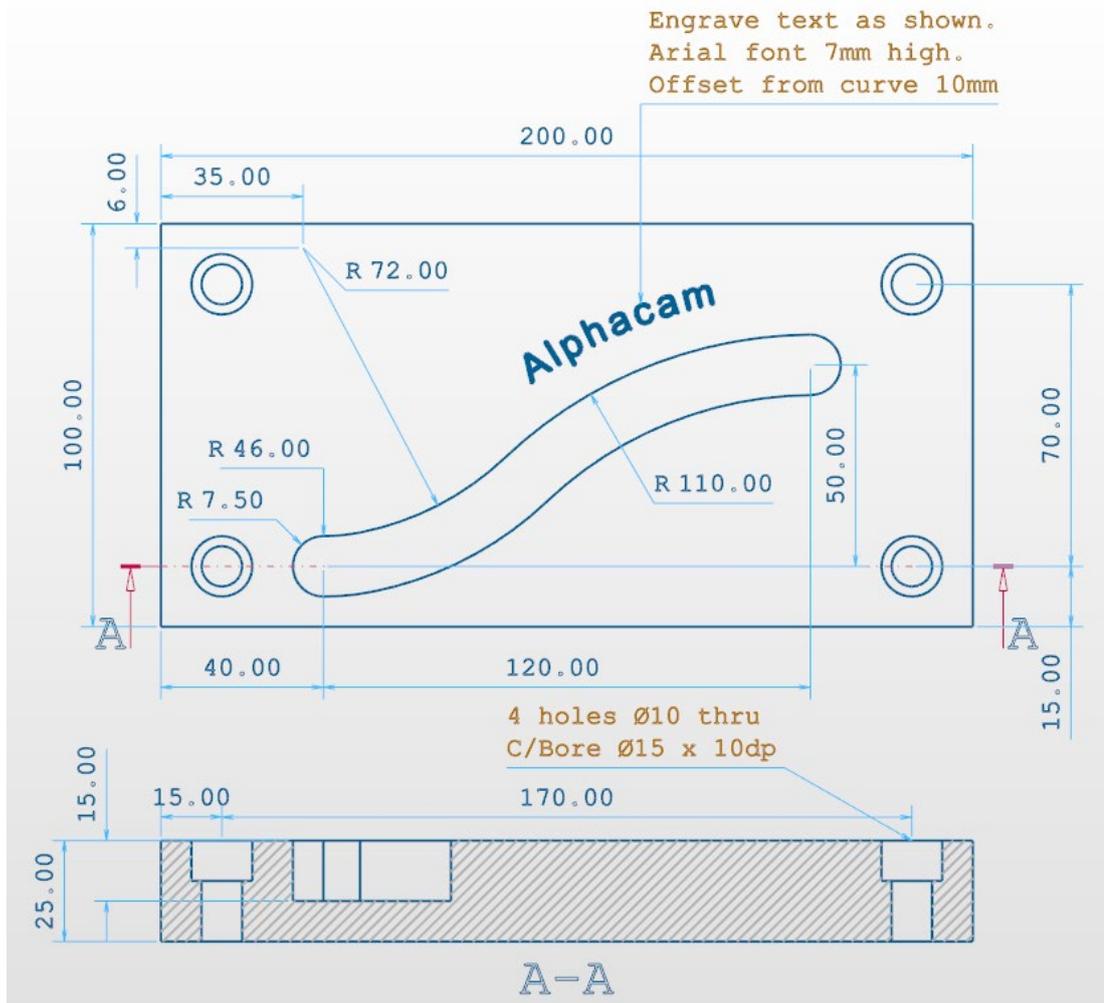


#13 Raised Form Block

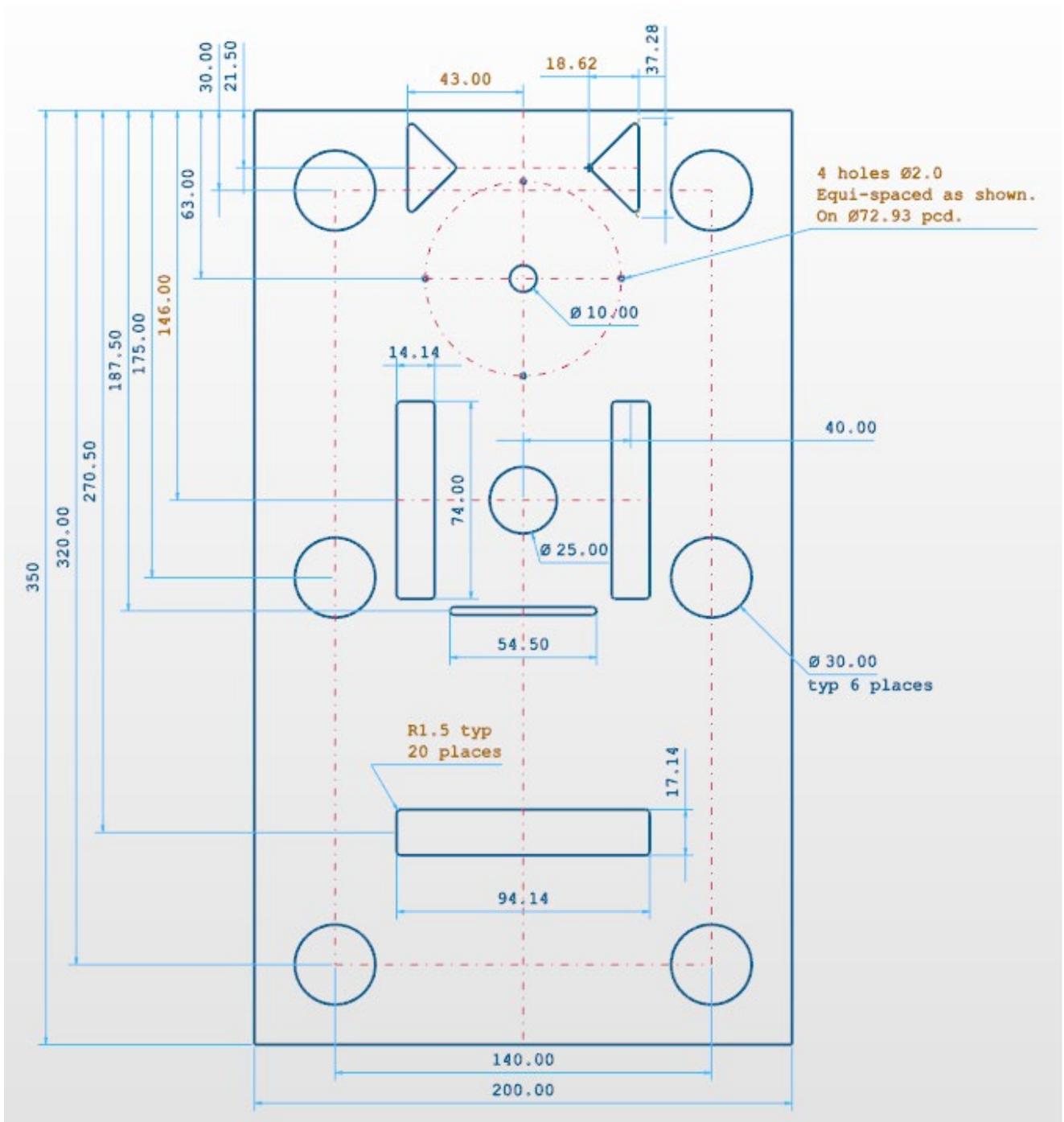


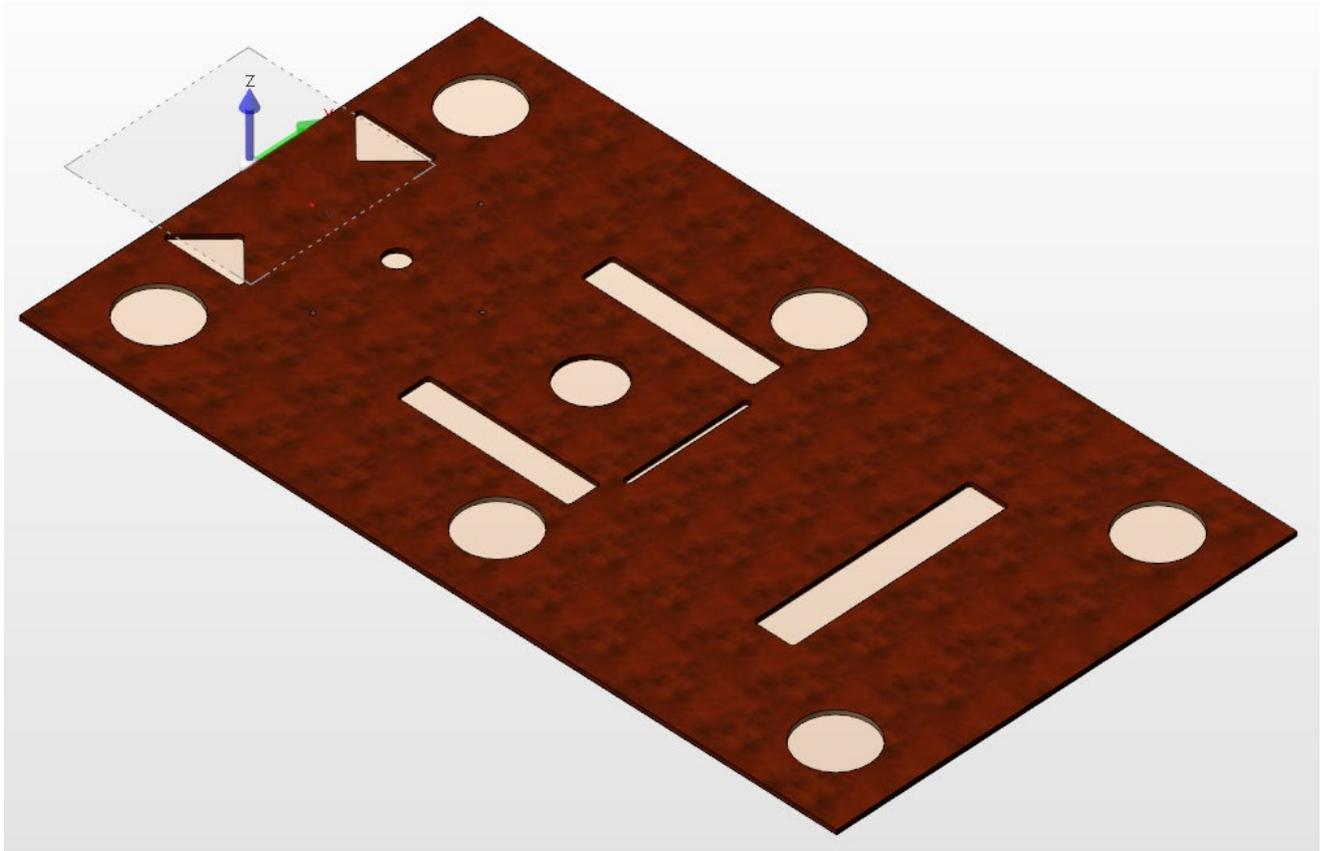


#14 Block with Curved Slot

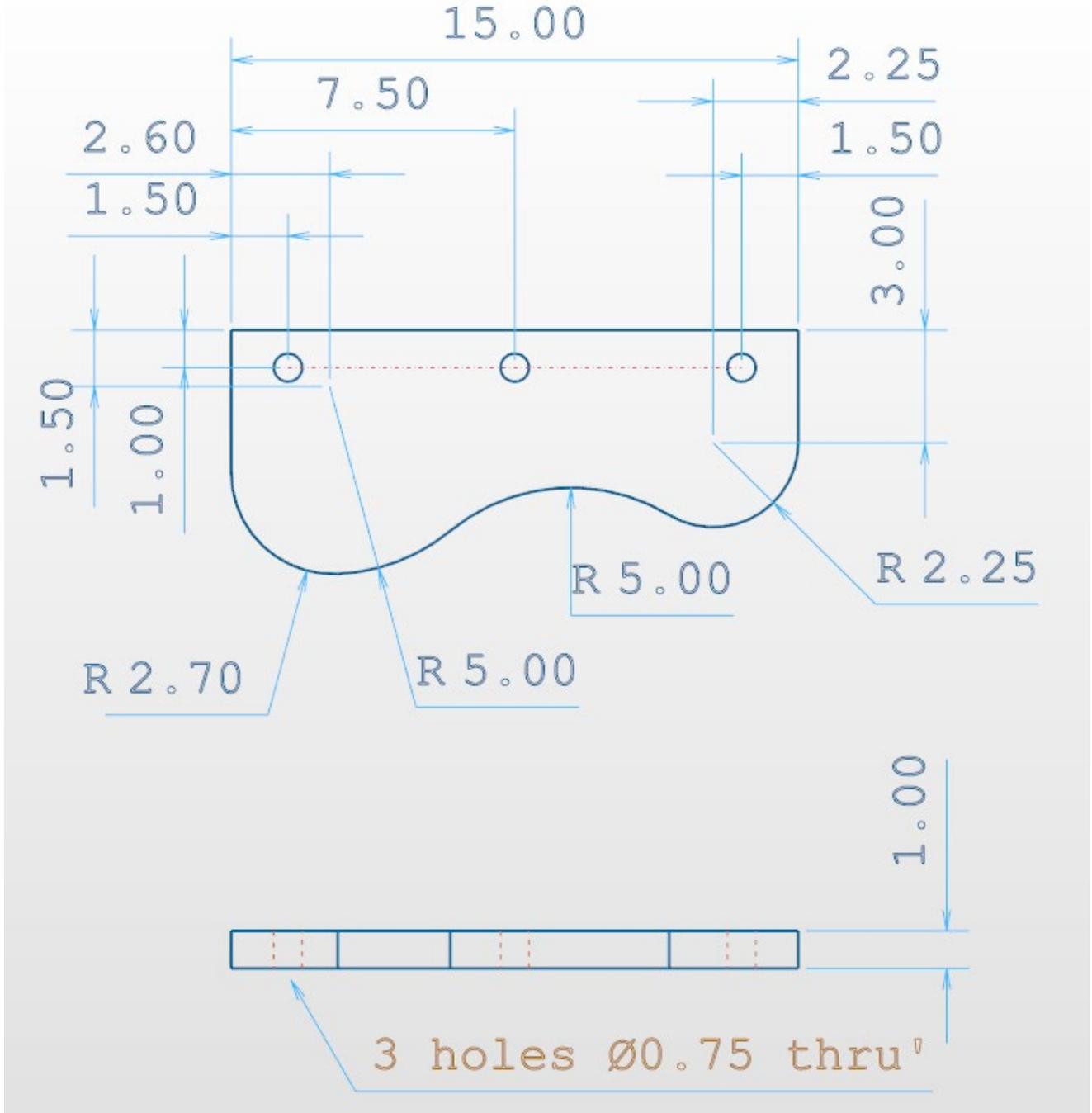


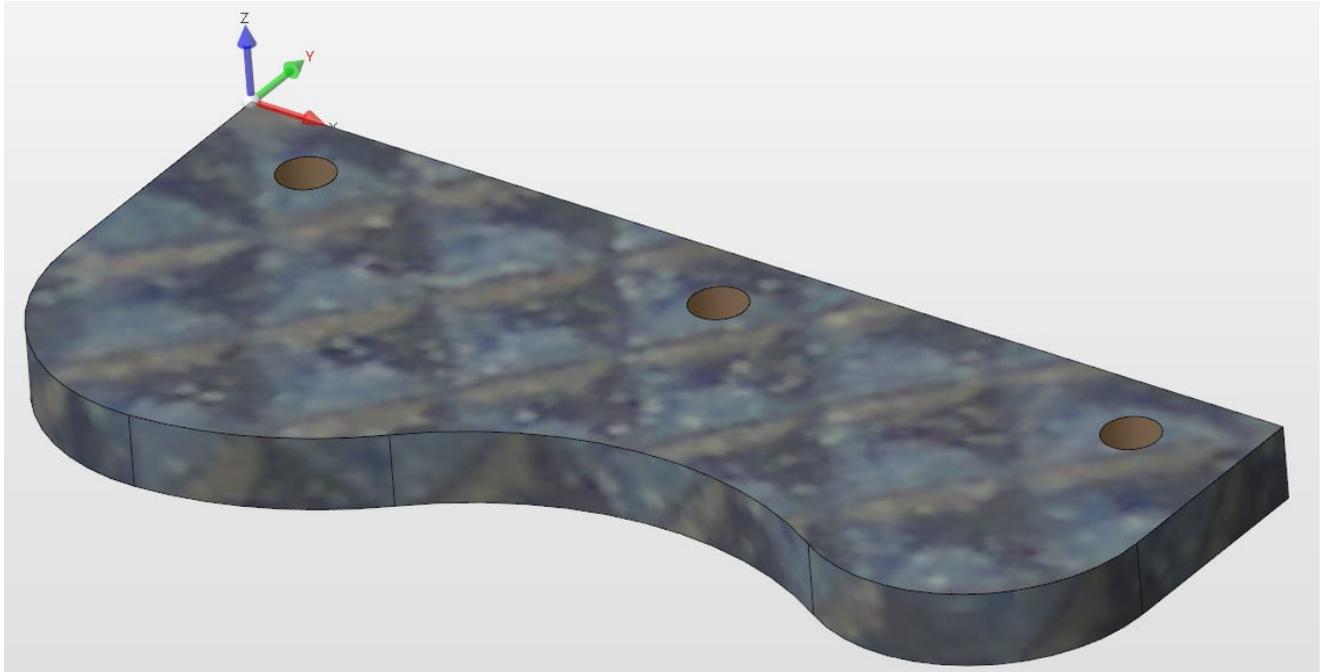
#15 Striper plate





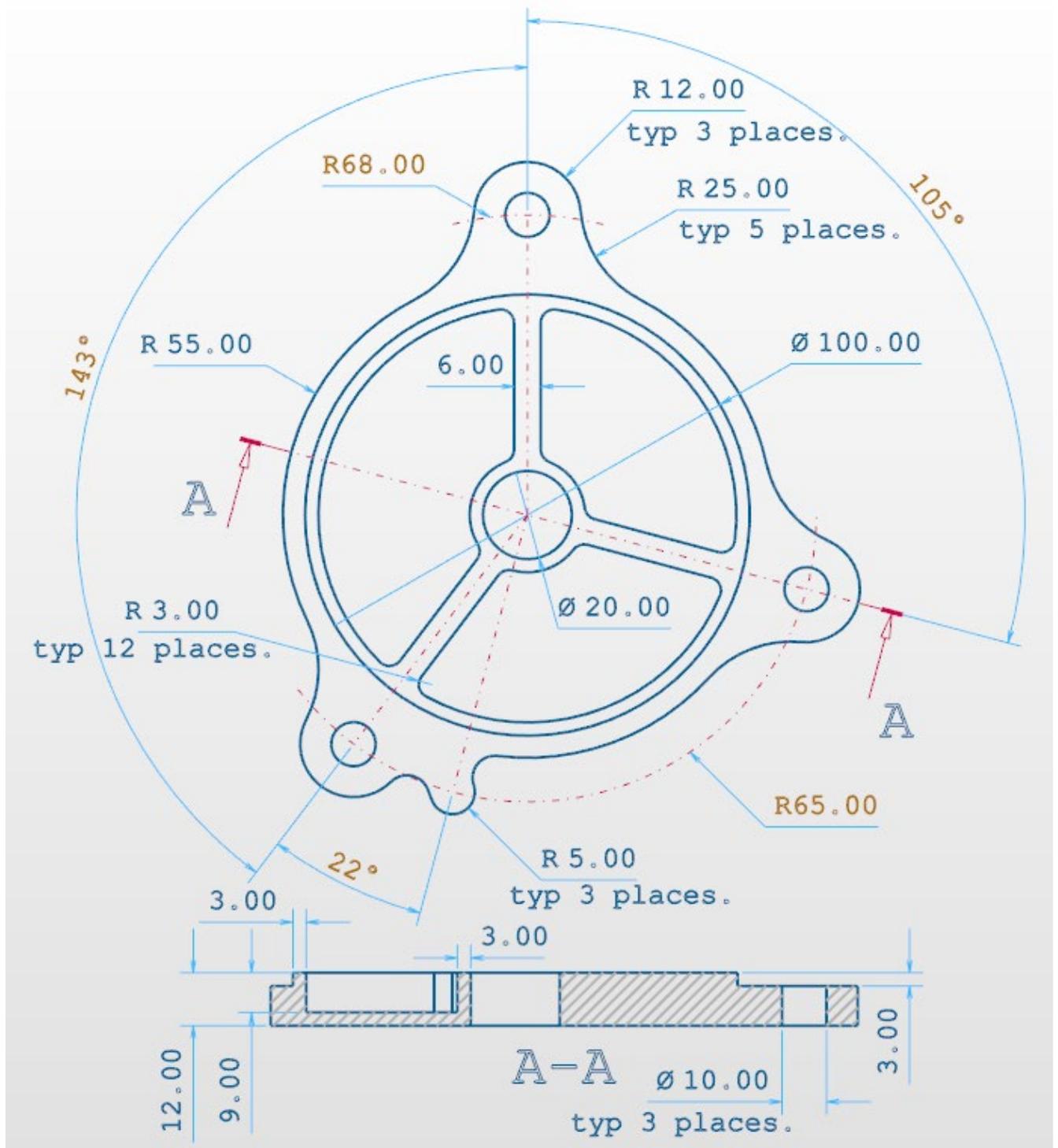
#16 Push plate

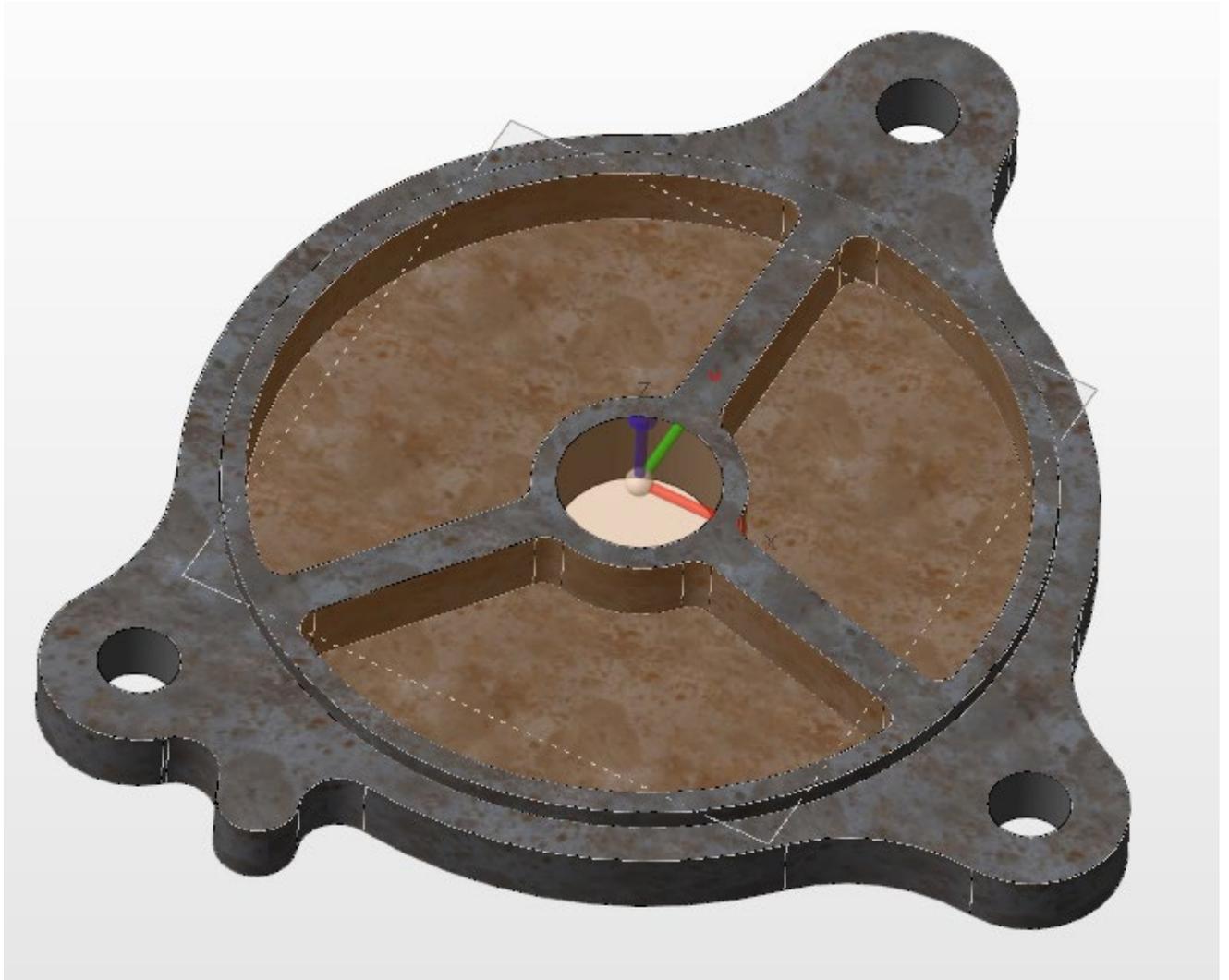




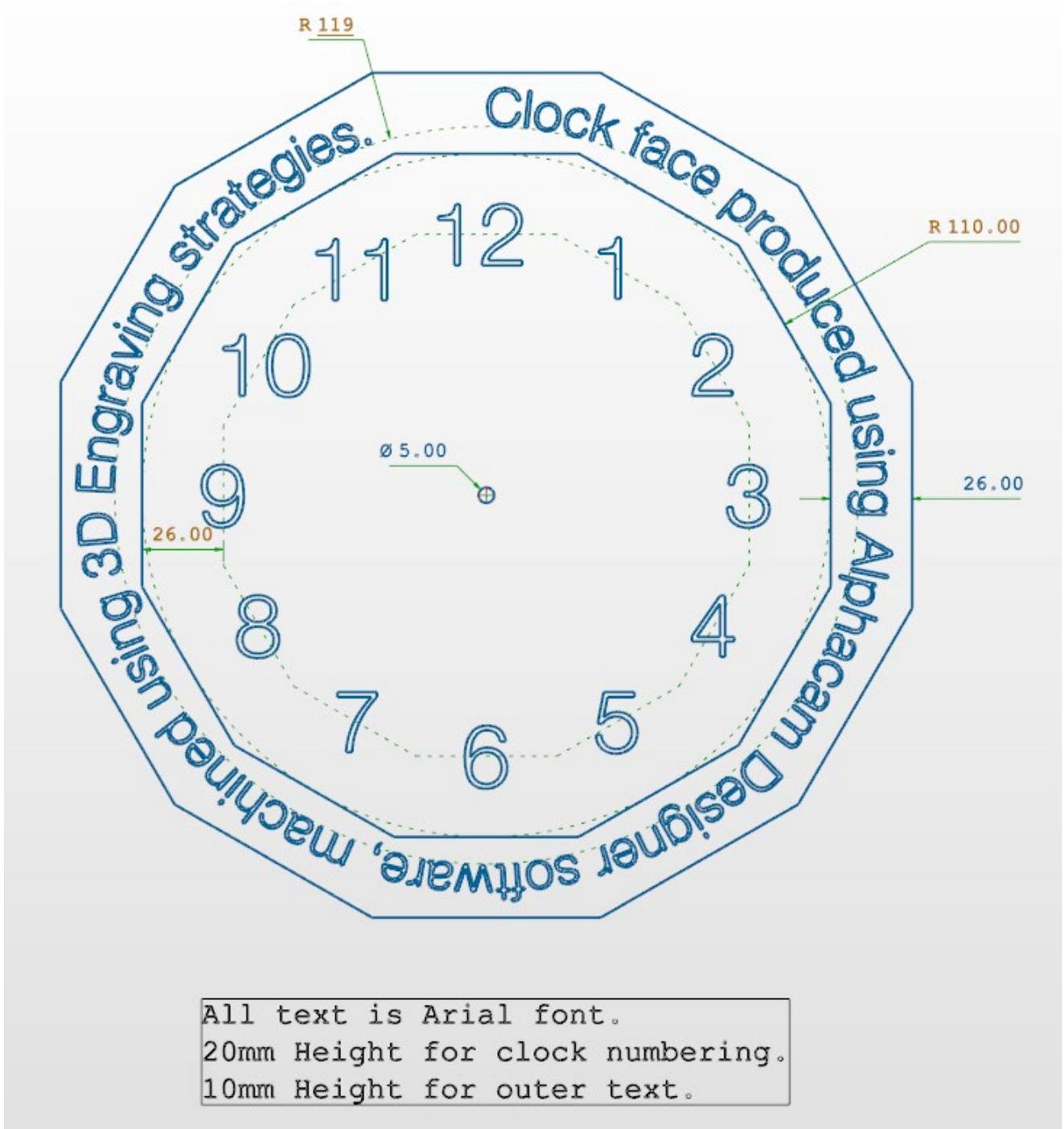
Generic CAD Examples

#17 Securing Plate

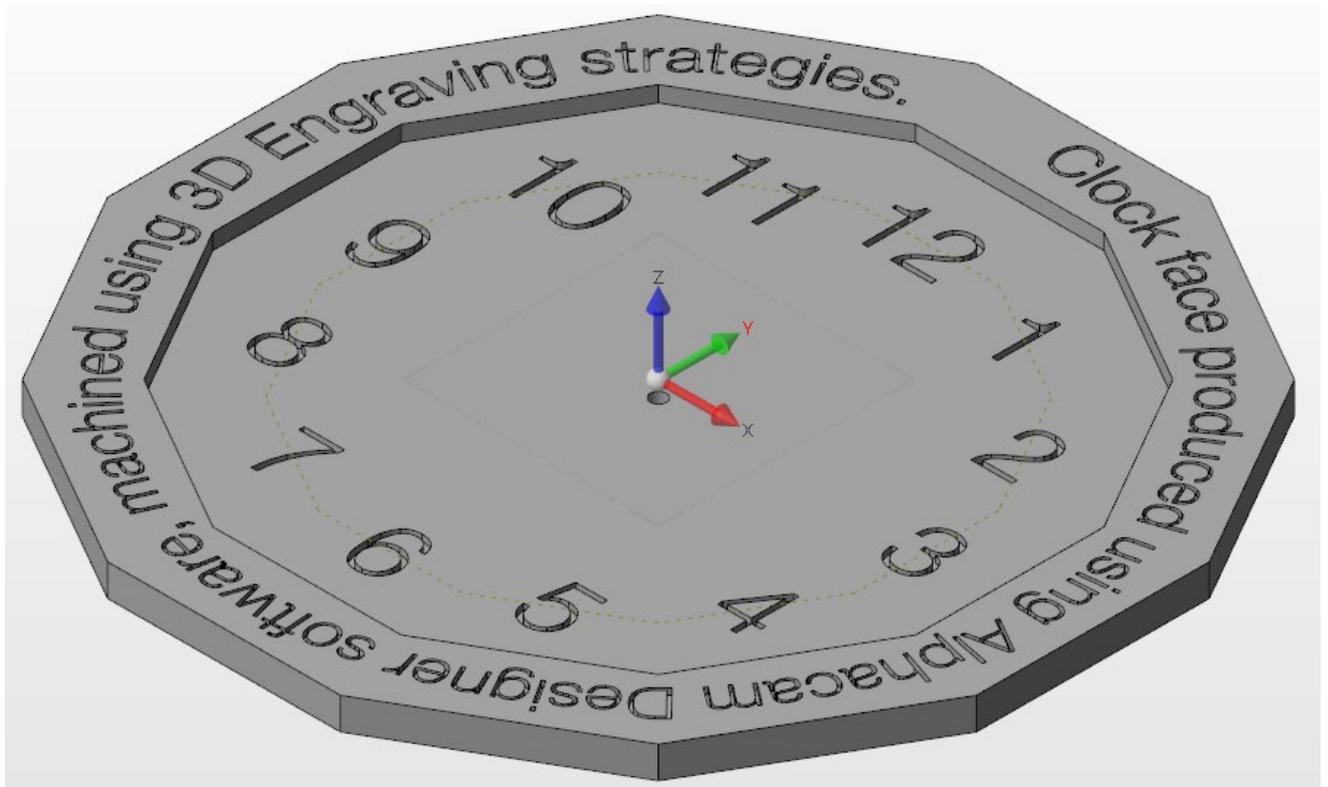




#18 Clock Face

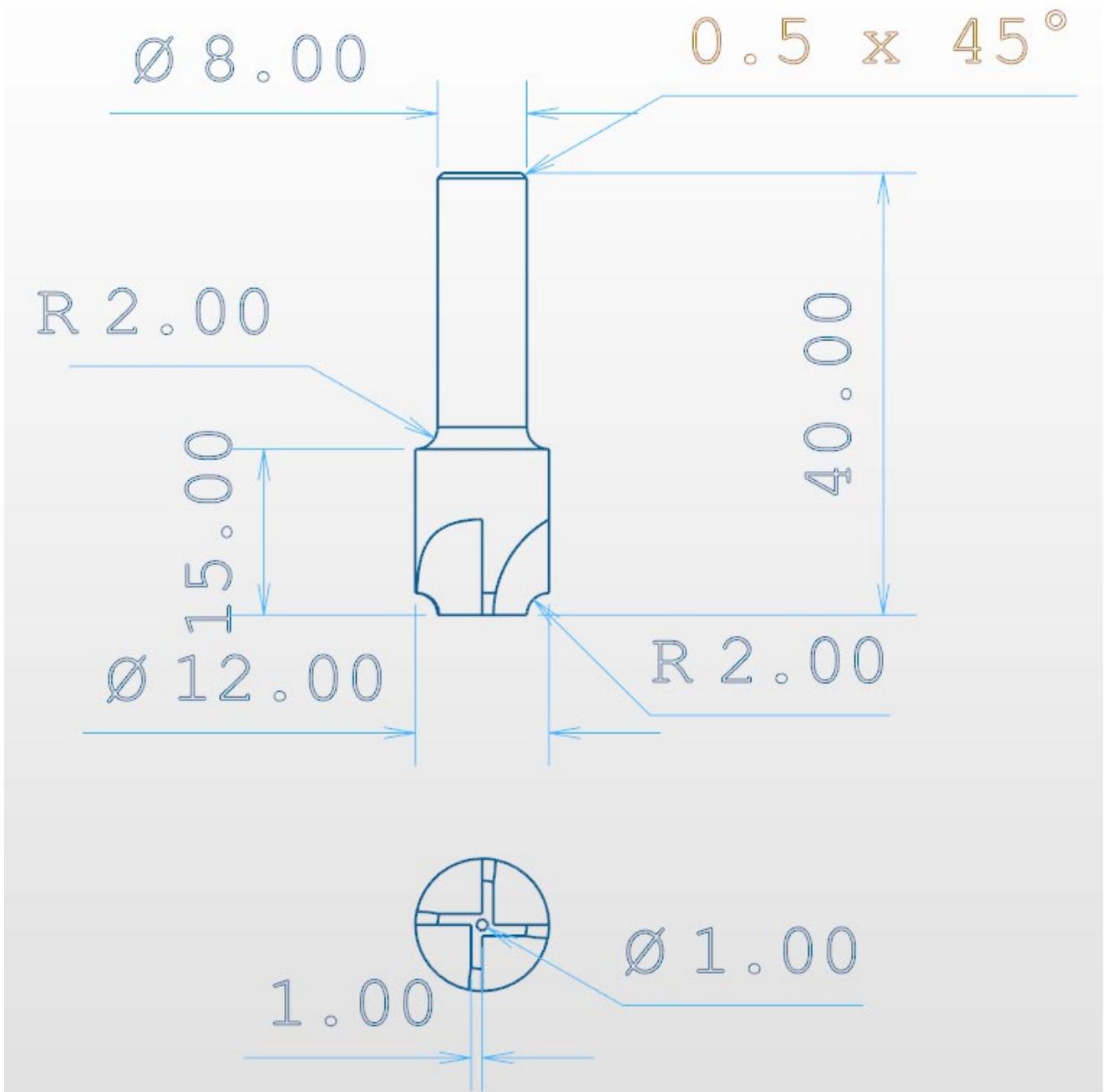


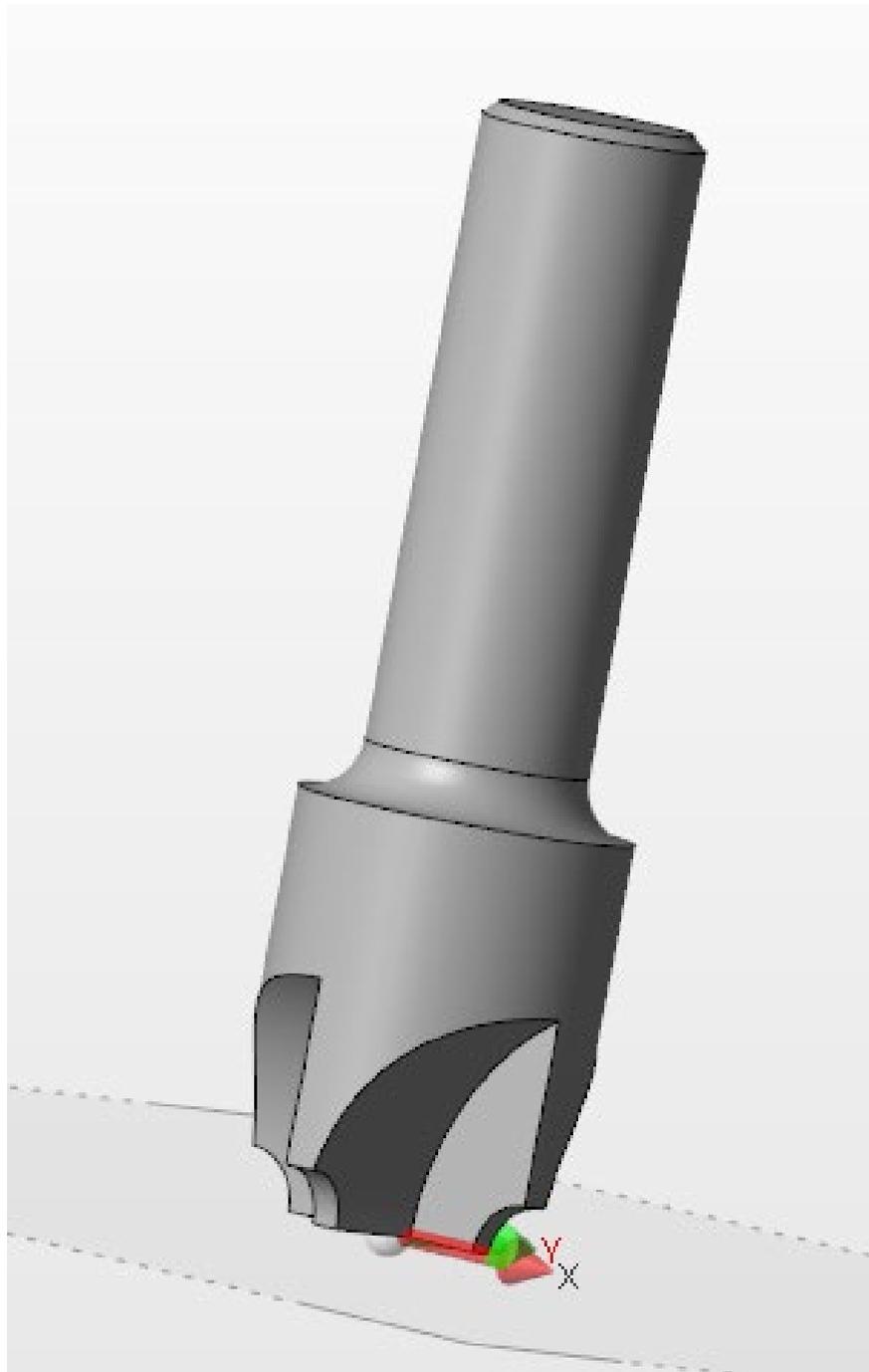
Position the numbers using point and centre then move them down by 10mm



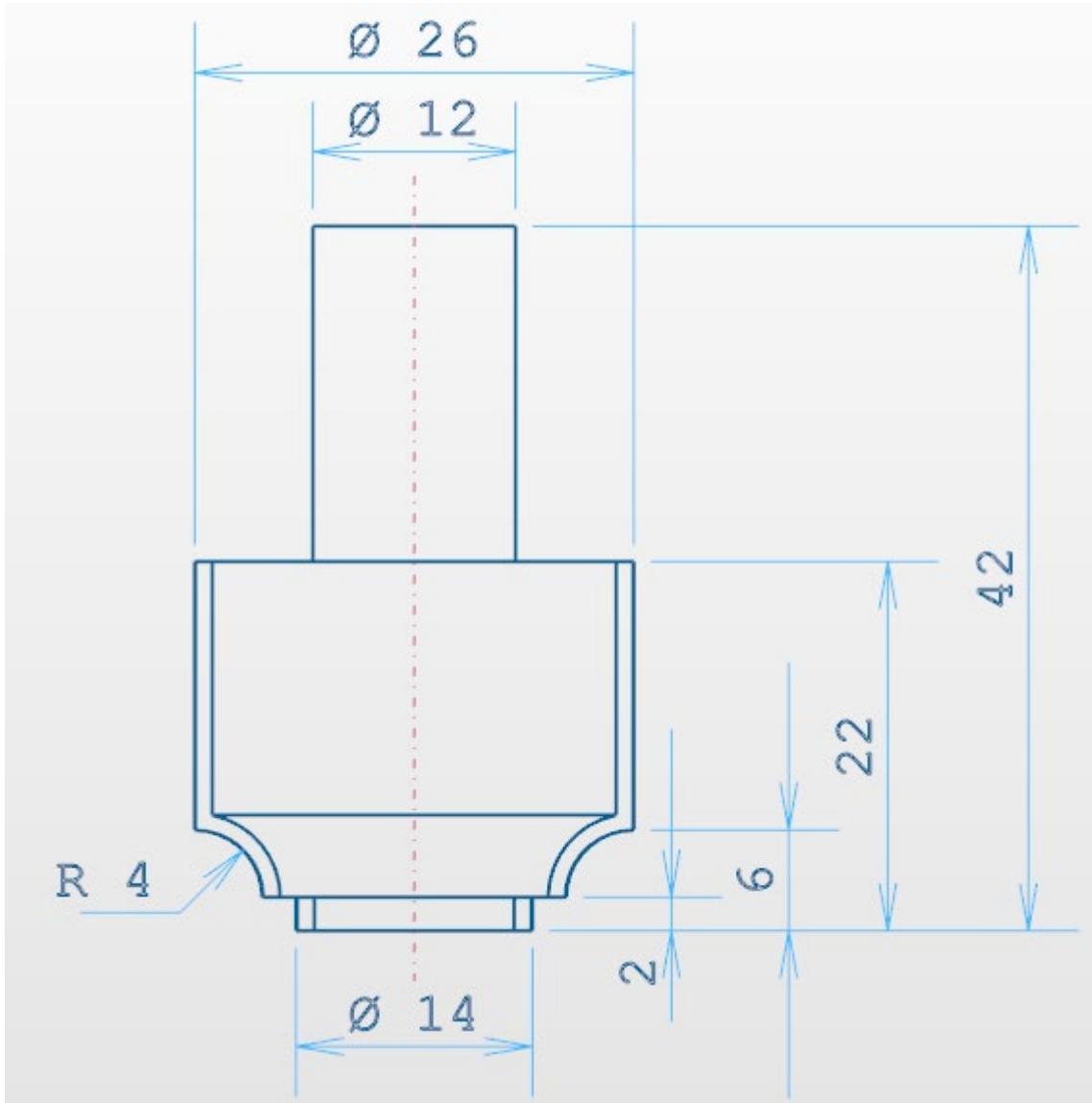
Tool Drawings

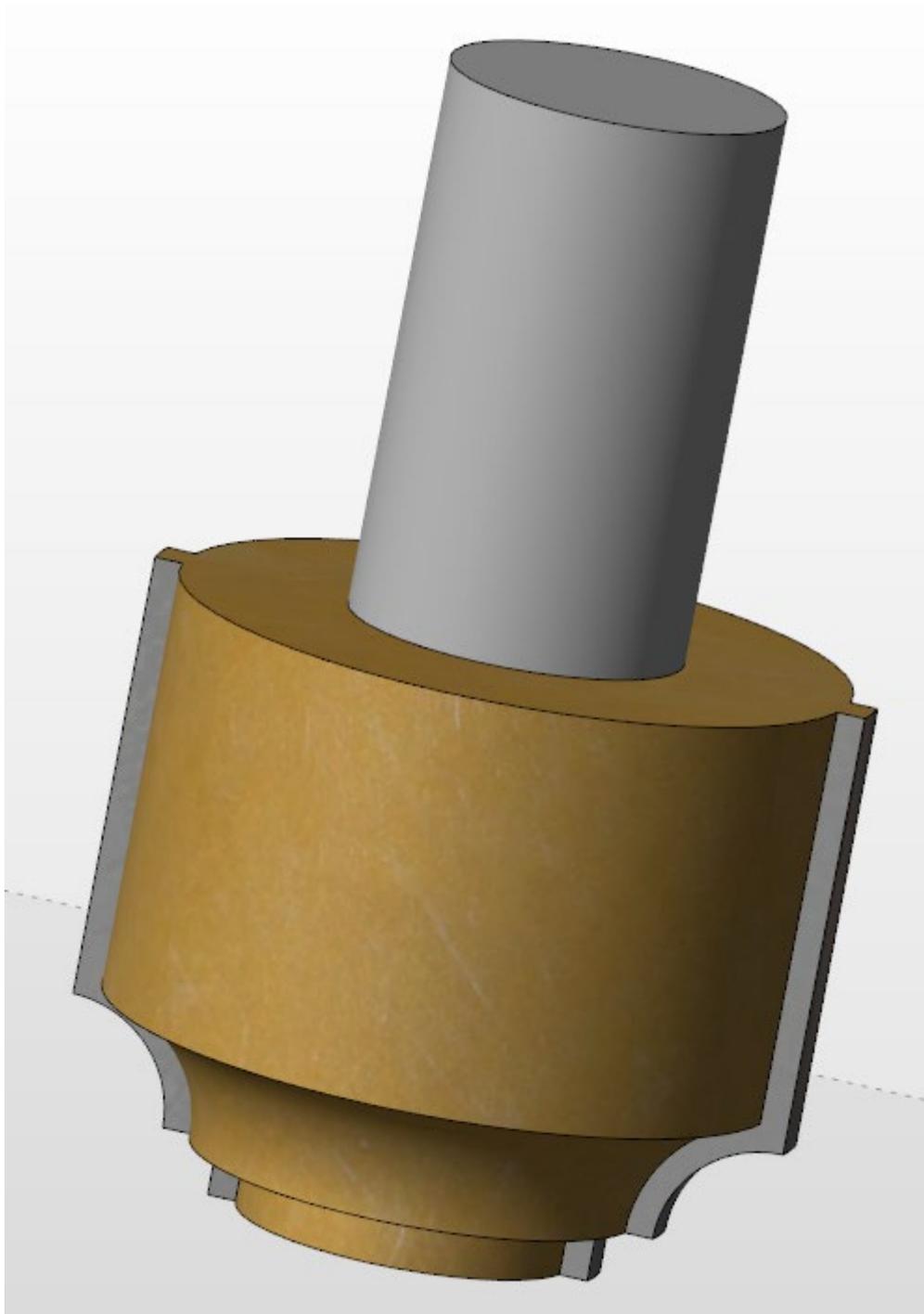
#19 2mm Corner Rounding Cutter



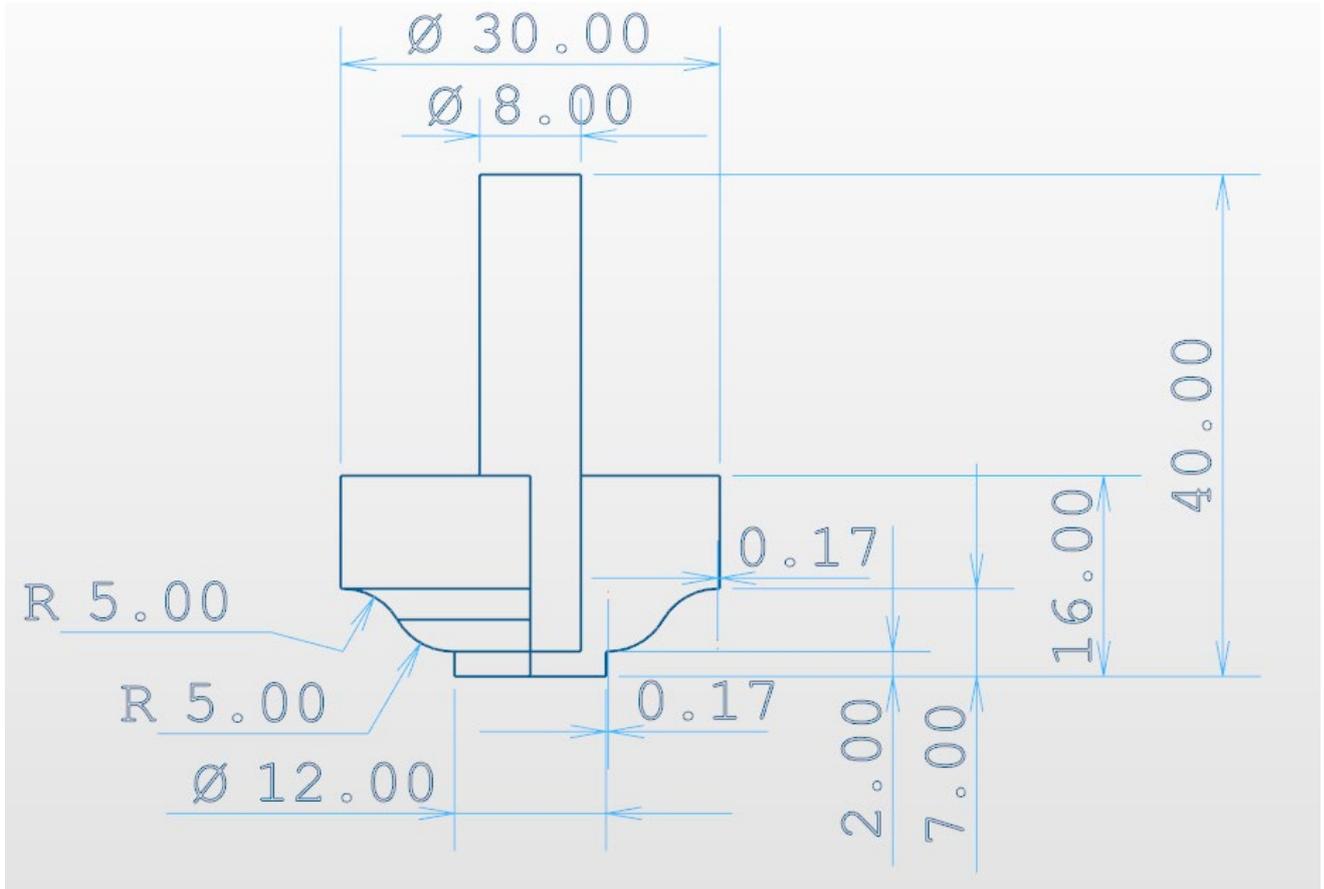


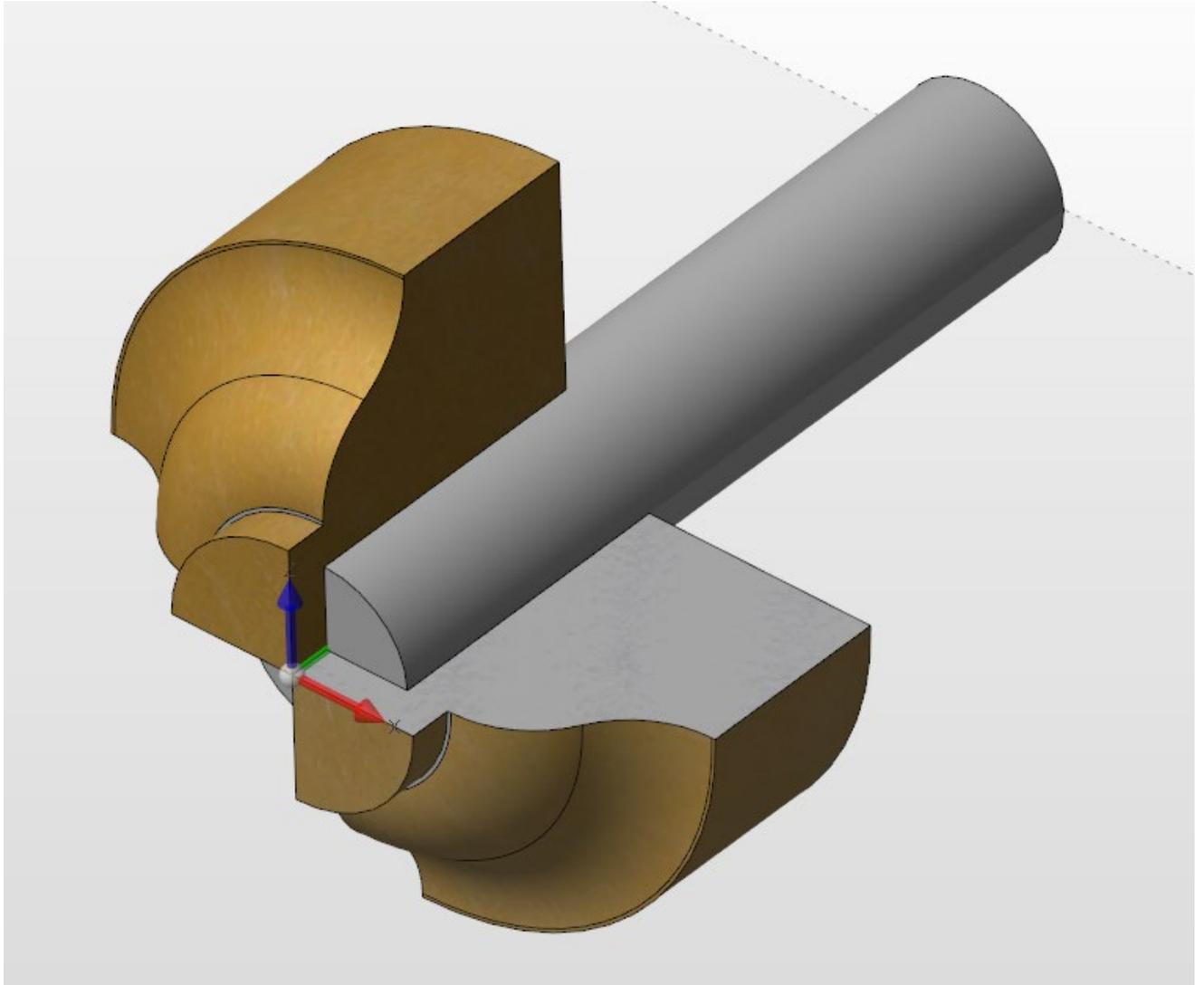
#20 EMC4





#21 Spindle Moulder Body





Version amendments

V	Amendment Description	A	Software Version	Amended Date
15	Updating document to minor formatting changes.	1	2020.1	02/10/2019
15	Template altered to Hexagon branding. Designer models used for images.	0	2020.0	15/03/2019



ALPHACAM

Floor Two
No. One, Waterside Drive
Arlington Business Park
Theale
Reading
Berkshire
RG7 4SA
United Kingdom

Tel. +44 (0) 1189 226677
Email. alphacaminfo@hexagon.com
Web. www.alphacam.com

Support. support.alphacam.uk@hexagon.com
Portal. customers.ps.hexagonmi.com

