Assembly instructions for Deadman's cockpit plans v. 2.0

Table of Contents

Foreword

This is a set of instruction on how to assembly the cockpit based upon Deadman's plans. This is not an exhausting step-by-step instructions, however it strives to highlight some areas where there is a potential that misunderstandings can occur. The manual is based upon the experience and lessons learned during the Alpha-building of one of the first cockpits.

The end result will vary depending on how much attention to details is paid during the building phase. However since the plans are designed for normal tools and not a CNC there is a leeway on the measurements. It should be said, that the higher accuracy and attention to details the better the result.

The layout have been designed so that end user can add wheels so that it can be pushed around. Since this Alpha-builder haven't added wheels they are not shown.

This Alpha-builder is based in Europe and therefore materials are found from a metric base, however in the instructions imperial measurements are set as primary as this is base of Deadman's drawings.

Note! Adhere to blue marked "**Note!**" as they provide you with information where you have to use cautions when cutting, explanation of the building design etc.

Note! The plans are released under Attribution-NonCommercial 4.0 International (http://creativecommons.org/licenses/by-nc/4.0/)

Note! Do NOT purchase cheap lumber! You want it as straight as you can find to avoid problem during the assembly

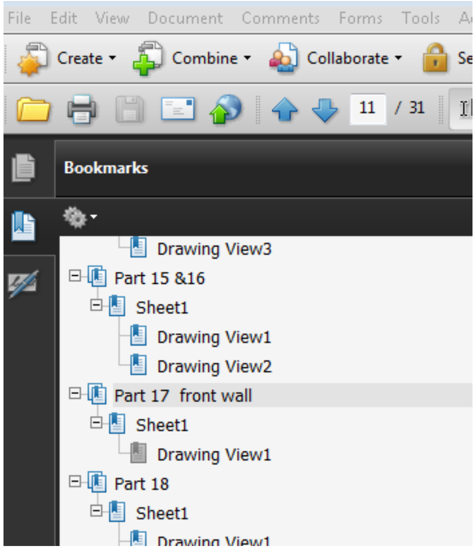
Note! The drawings come after the instruction and consist of two section. One section containing part measurements and one section containing layout diagrams.

Note! Since the material thickness differs from availability the plans have sought to illuminate these differences.

Note! Whenever a new section is started the headline is the same as on the pdf drawing. When reading an instruction make sure you look at the same drawing.

Note! Although greatest care has been taken during the write-up there may be typing errors in the instruction. Therefore double check the instructions and drawings before making cuts and assembly.

Note! Some of the drawing sheets are in 1:1 and do not have a headline. In order to see the drawing number enable book mark in the Adobe Reader, see below



Tools

The tools used during the Alpha-build includes the following:

1. Hand held tools such as; wood saw, hammer, screwdriver, wrenches etc.
2. Battery powered drilling machine
3. Jigsaw
4. Miter saw
5. Table saw (optional)
6. Circular saw (guided)
7. Belt sander
8. Sand paper, paint brushes etc.

Costs

Alpha builder has used materials in the amount of $775.00 USD (Northern Europe).

The breakdown of the costs are roughly:

Wood	$315.00 USD this includes transport
Aluminum	$130.00 USD
Screws	$35.00 USD There are leftovers from the boxes
Paint	$280.00 USD Includes paint roles, wood filler etc.
Misc.	$20.00 USD Includes the large print of canopy bow.

Note! This includes the structure of the cockpit but does **not** include center pedestal, Main Instrument Panel nor right and Left side panels.

List of parts used are at the end of the manual. Please note that due to the available plate size of plywood and the dimensions of the construction elements there is a considerable amount of “waste” material. However good planning of the cutting process it is possible to get decent “waste” plates that can be used for other things, such as shelves etc.

Time consumption

This Alpha builder has used **app. 75 hours** for the project so far. This does not include the time consumption for writing the manual, but does include figuring out the best way to proceed.

Materials

The major materials used for the cockpit are:

2 sheets	Plywood ¾” [18mm] thickness, 4'x8' [2440x1220mm]
1 sheet	Plywood ½” [12mm] thickness, 4'x8' [2440x1220mm]
12ft [3m]	Pine wood 1¾ x 1¾ [45x45mm]
2 pieces	Pillar 4 ¾”x4 ¾” x 25” [75x75x630mm]
18ft [5.5m]	Beams 2” x 8” [45x195mm]
3 sheet	Aluminum 0.0625" 12" x 24" [1.6mm thick, 300x600mm]
2 pieces	Aluminum angles 1 ¼ x 1 ¼ 0.1875 thick 6063-T52, 7 feet [30x30mm, 2mm thick, 2m long]
2 pieces	Aluminum angles ¾ x ¾ 0.0625" 7 feet long [20x20mm, 1.5mm thick, 2m long]
2 pieces	Aluminum channel

Screws, wood and aluminum primer, wood and aluminum paint, glue etc.

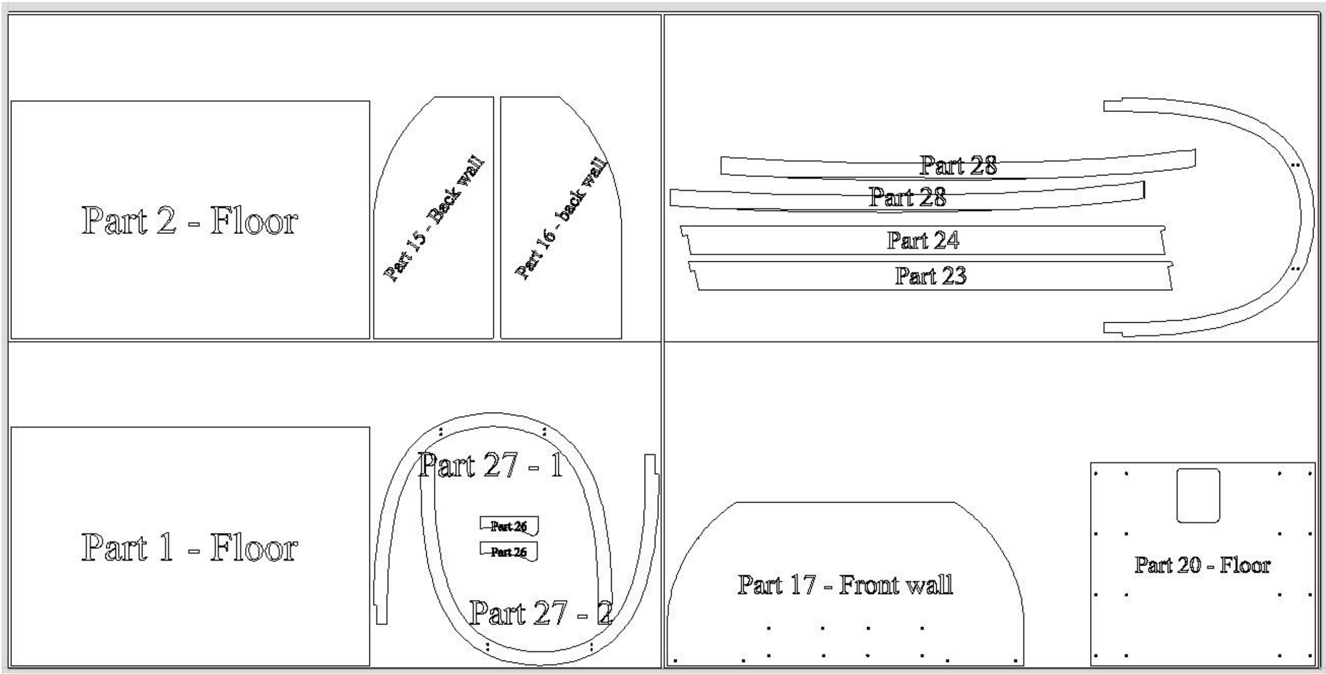
For a through list of material check out final chapter Bill of Materials

Note! This build does currently not include the fake ejection seat rails due to time constraints. In one of the last chapters is a preliminary how-to-make from left over wood. However this is currently not finished.

Cutting

This part of the manual will handle cutting of the major parts. Smaller parts, which are going to be used to fit the major parts together which be done in the assembly phase.

Cut layout suggestion



Floor – Parts 1&2

Floor consist of two plates with dimensions shown in see Part 1&2, ¾" [18mm] thick. Due to the size the floor plates need to be cut on two separate ¾" [18mm] Plywood plates. The cutting is done using the guided circular saw which leaves a nice clean cut. Plates are sanded to remove sharp edges. Recheck that plates are properly square before proceeding to next step.

Center pedestal support– Parts 3&4

The center pedestal support are done from the beams 2x8 "(45x195mm), cut to length using the miter saw to give a straight 90º cut. The height of the beams 7" [178mm] are cut using the table saw, but due to the height of the beams they can also be done using a guided circular saw. See sheet Part 3&4 for measurements.

After center pedestal support Part 3&4 are on correct size, drill the three holes in each piece. These holes will serve at cable through holes later on.

Sand the beams to remove sharp edges.

Note! If possible and depending on the quality of the beam it may be beneficial to have them planed so they appear as fully square cross section.

Note! The thickness of the beams may vary from builder to builder. The plans are done so that this variations is put places where it will matter the least.

Floor support long – Parts 7&8

The floor support long are done from the beams 2'x 8 " (45x195mm), cut to length these run from the front wall to the back. In case the thickness of your front and back wall differs significantly from ¾" [18mm] you will have to determine the length by subtract the thickness of the front and back wall from the total length of the floor plates Part 1&2.

Cut using the miter saw to give a straight 90º cut. The height of the beams 7" [178mm] are cut using the table saw if available, however due to the height of the beams they can just as well be done using a guided circular saw.

Use the guided circular saw to make the cut out for the cockpit floor plate Part 20. Securely clamp the guided rail to the beam before starting the cut.

Note! The depth of the cut will depend on the thickness of your cockpit floor plate Part 20. In case your cockpit floor plate is ¾" [18mm] the remaining height should be 6.25" [160mm].

Take care not to run the guided circular saw too far. The cut is finished at both end using the jigsaw. Jigsaw is also used for the cross cut.

After floor support long Part 7&8 are on correct size, drill the three holes in each piece. These holes will serve at cable

through holes later on.

Sand the beams to remove sharp edges.

Note! If possible and depending on the quality of the beam it may be beneficial to have them planed so they become as fully square cross section.

Note! The thickness of the beams may vary from builder to builder. The plans are been made so that this play is put places where it will matter the least.

Outer beams – Part 10 (2x)

The outer beams are done from the beams 2'x 8 " (45x195mm), cut to length using the miter saw to give a straight 90º cut. The height of the beams must be same as the height cutout in floor support long Part 7&8, i.e. 6.25” [160mm]. The cut is done using the table saw, but due to the height of the beam they can also be done using a guided circular saw.

Note! The height of the beams may vary depending on the thickness of your cockpit floor material Part 20. Make sure this height corresponds to the height cutout done in Floor Support Long Part 7&8.

Sand remove sharp edges.

Note! If possible and depending on the quality of the beam it may be beneficial to have them planed so they appear as fully square cross section.

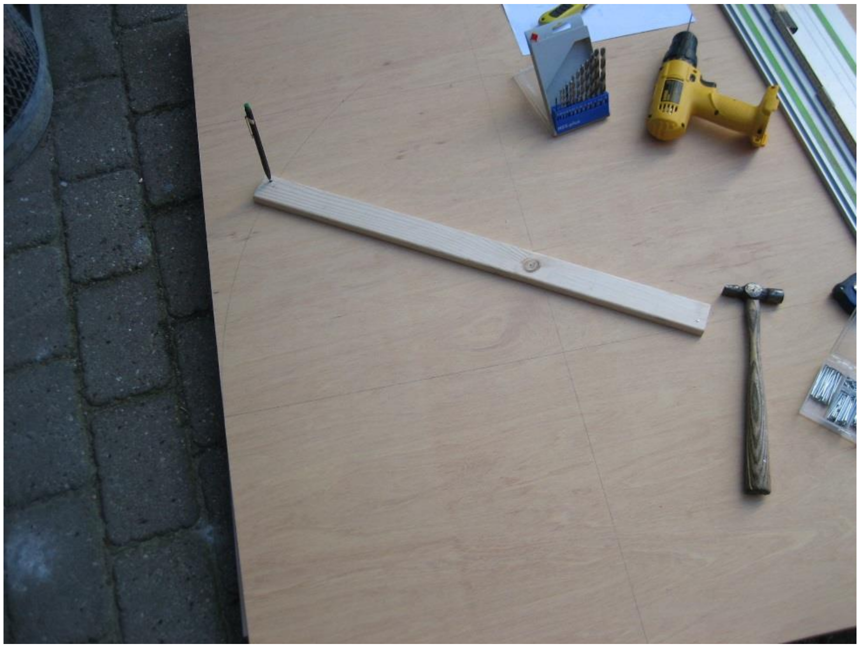
Note! The thickness of the beams may vary from builder to builder. The plans are been made so that this play is put places where it will not matter.

Rear walls – Parts 15&16

The rear walls are done using ¾” [18mm] Plywood sheet and both are done on same sheet. Mark the straight lines up on the wood using a pencil. Make a mental note that lower left corner of the left piece is (x,y) = (0,0).

Find relatively thin piece of wood at least 27” [670mm] long. Drill two 1/8” [2-3mm] holes in this piece of wood with a spacing of exactly 25” [635mm]. This will be used to make the curve of the rear walls.

From lower left corner of left piece go right 25” [635mm] and up 16.25” [413mm] and make a mark. Place a small nail in one of the holes in the curvature tool. Align the nail with the mark point (25”, 16.25”) [635mm, 413mm] and tap the nail with a hammer to secure the curvature tool into place, making sure that the tool can rotate around the nail.



Place a pencil in the other hole of the curvature tool and make the curve of the back wall. Repeat procedure for the other rear wall.

Cut both rear wall using guided circular saw for the straight cut and a jigsaw for the circular cuts.

Sand the beams to remove sharp edges.

Note! The use of the curvature tool will leave a small hole from the nail in the plate. It can easily be filled be an appropriate wood filler afterwards.

Front wall – Part 17

The front wall is done using ¾" [18mm] Plywood sheet and are done on opposite sheet as the rear walls were done. Mark the plate's straight lines up on the wood using a pencil.

Find curvature tools from the rear walls and drill a third 1⁄8" [2-3mm] holes, 22" [560mm] from the reference hole. Now it can act as curvature tool for the front wall.

Note! Make a distinct marking to avoid mixing this hole with the one used for the rear wall.

From lower left corner of left piece go right 22" [560mm] and up 5.375" [137mm] and make a mark. Place a small nail in one of the holes in the curvature tool. Align the nail with the mark point (22", 5.375") [560mm, 137mm] and tap the nail with a hammer to secure the curvature tool into place, making sure that the tool can rotate around the nail.

Place a pencil in the other hole of the curvature tool and make the curve of the front wall.

Cut the front rear wall using guided circular saw for the straight cut and a jigsaw for the circular cuts.

Note! It is difficult to get a smooth curve using the jigsaw. To get good curve use the belt sander moving in fluid motions along the curve.

Sand the beams to remove sharp edges.

Note! The use of the curvature tool will leave a small hole from the nail in the plate. It can easily be filled be an appropriate wood filler afterwards.

Cockpit floor – Part 20

Using ¾" [18mm] Plywood and cut to dimensions as seen on Part 20.

Note! Wait with drilling screw holes as the center line will depend on the thickness of the beams.

The best way to do this is to drill the screw holes once the structural support beams Part 7&8 as well as outer beams Part 10 have been attached to the cockpit bottom plates Part 1&2. Then the cockpit floor plate Part 20 can be laid on top of the beams and center lines marked.

Sand to remove sharp edges.

Vertical MIP support – Parts 21&22

These are made of 3"x3" [75x75mm] pillar wood. Adjust the miter saw to a cut of 10º. Mark the max length of the vertical MIP support and cut it using the miter saw.

Note! Take care when cutting. The cut should be placed so that the max length is met as seen on sheet Part 21&22, 24.72" [628mm].

Note! The design has been made so the dimensions of the pillar has the least impact. In reality it doesn't matter if the cross section of the pillar is 3"x3" [75x75mm] or 4"x4" [100x100mm].

When both vertical MIP support have been cut to length, clamp them together having the max length facing up. Mark 21.25” [540mm] from the bottom of the supports as seen in the drawings.

Adjust the guided circular saw to 10º cut, depth 0.875” [22mm].

Align the guide rail with 21.25” [540mm] mark.

And make the cut 7/8” [22mm] deep.

Place the vertical MIP in a wise and mark the 90º cutout piece. Remove the remaining material using a hand saw.

Sand to remove sharp edges.

Canopy support beams, vertical – Parts 23&24

These are made from ½” [12mm] Plywood. Height is 4¼" [108mm] and overall length is 71.11” [1810mm]. Cut the long side with the guided circular saw. Adjust the miter saw to 10º and cut the ends.

Note! Each side length shall be 71” [1810mm] after the 10º cut.

The cutouts depends on the thickness of the rear and front walls. In this case ¾” [18mm]. Cut the rear cutouts on both pieces using a fine handsaw.

Make the forward cutout same size as the rear ones. This is insufficient for the forward end but will be adjusted during the fitting phase.

Note! The front cutout will need fine tuning during the assembly.

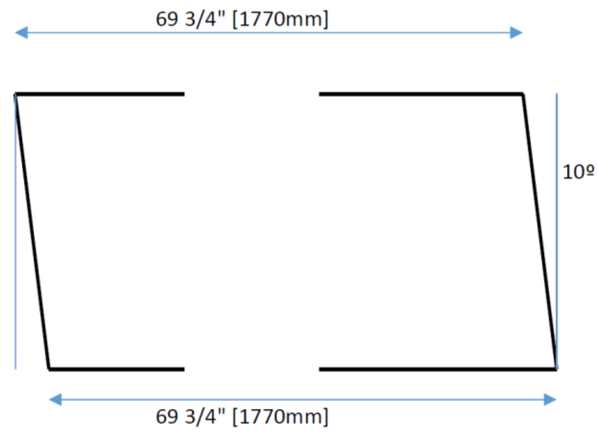
Sand to remove sharp edges.

Canopy support beams, horizontal – Part 28 (2x)

These are made from ½” [12mm] Plywood. Height is 6” [150mm] and overall length is 69 ¾” [1770mm]. Cut the long side with the guided circular saw (0º).

Note! Each plane side length shall be 69 ¾” [1770mm].

Adjust the guided circular saw to 10º and cut the ends.



Note! Take great care the end cuts are parallel. Otherwise it won’t fit afterwards.

Note! Width and shape is left until fitting.

Sand to remove sharp edges.

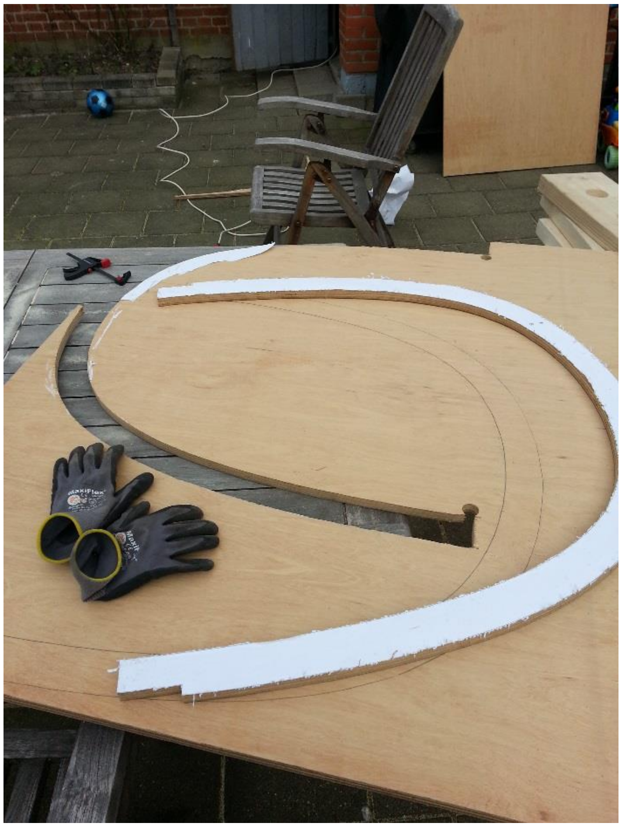
Canopy bow – Parts 27A

Have a professional printing company make one copy of the pdf 1:1.

Note! Double check the measurements of the printed copy in order to ensure that it has been printed to exactly 1:1. If not it may cause severe headache later when parts doesn’t fit together

Cut away excess paper from the outside of the 1:1 printout. Glue the printout lightly to the ¾” [18mm] Plywood.

Using a jigsaw cut our one piece of the canopy bow.



Note! Remember to drill the holes which will be used to attach Part 28 to the canopy bow.

Using the first canopy bow as a template for the remaining two ones. Mark the second canopy bow on ¾" [18mm] Plywood and the third canopy bow on ½" [12mm] Plywood. Cut both using a jigsaw.

Note! At this point do not sand the parts yet. It is unlikely that they will end up being a 100% match thus sanding is left for later to get an even canopy bow

Aluminum parts – Parts 5&6&25

Parts 5&6&25 are done in 0.0625" [1.6mm] aluminum sheet, cut very carefully with a jigsaw using a metal blade.

Note! When cutting the aluminum remember to use gloves. Also clamp some wooden pieces to the aluminum plates to reduce the change of the blade snagging which will cause the plate to follow the blade.

Note! Once cut ensure adequate grinding of all the edges to avoid sharp edges.

Once done carefully mark the drill holes and drill them with a 1/8" [3mm] drill. Screws used at oval head # 8 or [4mm]. Then counter sink all marked as countersunk.

Note! To ensure correct countersunk depth it is advisable to get a counter sunk bit with a depth adjustment on.

Bend the plates into shape indicated on the drawing.

Foot well support placement

While having the beam Parts 3, 4, 7 & 8 available make marking for the small support beams for the foot wells. The foot wells are bend aluminum plates Parts 5&6. It is however beneficial to attach the supports for them at this point. It can be done later but the space between the beams are only 6½" [165mm] (width of the foot wells) which makes mounting a little difficult.

In this Alpha-build the foot well supports are done in ¾ x ¾ [20x20mm] wood and they were attached later in the process which was less easy.

Use Foot well support placement drawing and mark the positions of the supports and attach them to the beams. The foot well aft part slopes downwards by 10º from horizontal.

Note! Take care that the support are correctly placed taking into account front/rear end of the beams Parts 3&4.

Cockpit structural assembly

This section will handle the assembly of the individual parts. All measurements are from the center line and same end (ref. end – right hand side of drawings). This will ensure that small in corrections in the cutting won't have too much impact on the assembly phase.

Cockpit foot print – Layout 2

Place Parts 1&2 next to each other as seen on below picture.

Mark the center line (left/right, shown as dashed line) at two places and make a line using a ruler & pencil. From the center line mark 4” [101.5mm] left and right. These lines will serve as outside position of the center pedestal support Part 3&4.

Note! It is very important that the measurements of 8” [203mm] between the outsides of the center pedestal support are met, as this is the measurements for the center pedestal.

From these line mark up half the width of the beams towards the center. This mark will serve as center for the screws.

Floor support long – Layout 3

From the center line mark 10.5” [266.5mm] on left and right side. This will be the inner position of the floor support long Part 7&8.

Note! It is very important that the measurements of 21” [533mm] between the inside of the floor support long Part 7&8 are met.

From these line mark up half the width of the beams away from the center. This mark will serve as center for the screws.

Outer side support – Layout 4

From the center line mark 16.5” [419mm] on the right and left side. This will be outer position of the side support Part #10.

Note! It is very important that the measurements of 33” [838mm] between the outside of the outer beams are met.

From these line mark up half the width of the beams towards the center. This mark will serve as center for the screws.

Beam fixing holes

Drill holes for the screws one the center lines marked at lateral intervals of app. 8” [200mm]. It’s a good idea to place the beams unto the cockpit bottom plates in the correct positions to get an idea of where the holes should be drilled.

Note! The floor support long Part7&8 as well as center pedestal support Part 3&4 shall be positioned ¾” [18mm] (front wall thickness) left of the ref. end.

Note! The forward end of the outer side support Part 10 shall be positioned 21.25” [540mm] from the ref. end as seen on Layout 4.

Attaching beam to floor

To ensure correct positioning of floor support long, place a ¾" [18mm] Plywood plate on the floor and place one of the floor plate vertically next to it as seen below. Place the floor support long Part 7&8 vertically unto the ¾" [18mm] Plywood to ensure front end is in the correct position.

Attached the floor support long to the front floor plates using screws.

Attach the center pedestal support Part 3&4 in the same manner as the floor support long.

Place the second floor plate on top of the first one and screw in onto the floor support long.

Attach the outer beams in similar manner ensuring that the rear most edge aligns with the rear part of the recess in the floor support long.

Note! Ensure that the angle between floor and beams are 90º.

Note! Ensure that the beams are correctly aligned according to the markings done. Double check the following measurements;

A. Outside measurements of center pedestal support Part 3&4 is 8” [203mm].

B. Inner measurements between floor support long Part 7&8 is 21” [533mm]

C. Outside measurements between outer side support Part 10 is 33” [838mm]

Rip corners – Parts 18

This doesn’t have to be anything in particular. This Alpha-build was done with 2”x2” [45x45mm]. Measure the distance from the outer side of the floor support long to the outer edge of the floor plate and subtract 1/8” [3mm] (skin thickness). Cut them to length using the miter saw and screw them onto the floor plates in all four corners making sure that they do not extend beyond the floor support long. This will ensure that there is enough room for the front and rear walls

Front and rear wall

Once floor structure is back in correct position place the front wall Part 17 unto the floor plates and against the end of the beams. In this way the forward most side of the front wall should be flush with the floor plate.

Screw the front wall Part 17 into the floor support long Part 7&8 as well as the rip corners Part 18 and center pedestal support Part 3&4.

Note! The width of the front wall is app. ¼” [6mm] narrower than the floor plate. This is for the later attachment of the cockpit skins. Make sure the front wall is positioned so that there is equal gap at either side.

Position place the rear walls Part 15&16 unto the floor plates and against the end of the floor support long. In this way the rear most side of the rear wall should be flush with the floor plate.

Screw the front wall Part 15&16 into the floor support long Part 7&8 as well as the rip corners Part 18.

Note! To ensure adequate room for the later attachment of the cockpit skins, make sure the outer edge of the rear walls Part 15&16 are 1/8” [3mm] further in than the edge of the floor plate.

Cockpit floor

Place the cockpit floor into the recess of the floor support long Part 7&8. Ensure that the outer side support Part 10 align with the outer edges of the cockpit floor.

Use a pencil to mark positions of the beams against the cockpit floor plate and make screw holes in the middle of the beams.

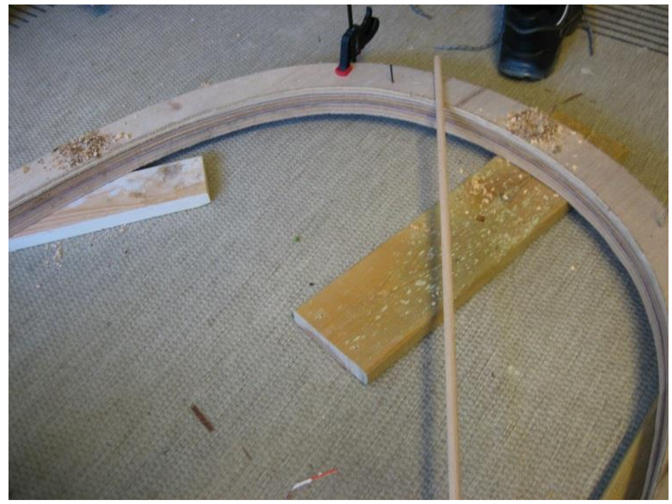
Secure the cockpit floor plate to the beams using screws.

Status so far

Canopy bow assembly

Plate the three canopy bows on top of each other, ensuring that the rear most is the ½" [12mm] Plywood. Align them the best way possible. Due to the fabrication method there is bound to be some difference between the three sections of the canopy bow. Don't worry about it.

Once the three canopy bows are aligned best possible way, fix them against each other using clamps. Drill three holes (top and each sides) same dimension as a piece of round wood bar.



These three pieces of round wood will ensure that the canopy bows doesn't slide when gluing them together.

Gluing

Apply glue on canopy bows and fix them together using the round wood bars to secure their position. Apply as many clamps as possible to ensure sufficient pressure while glue is drying up.

Sanding

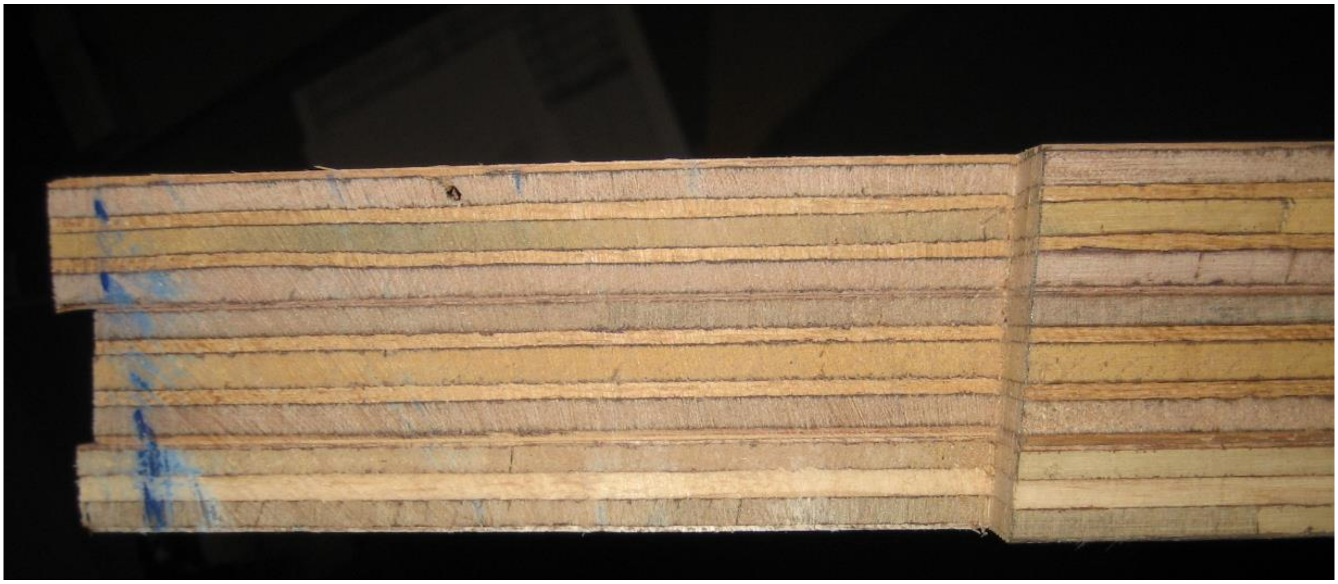
Once the glue is fully hardened use the belt sander to get an even outer and inner curve finish.

Do not grind excessively. In cases where one of the canopy bows have a dent compared to the others, simply grind to the best result. The dent can be filled with wood filler and the sanded to perfection afterwards.

Connection surface

Prepare the connection surface between the canopy bow and the vertical canopy support pieces so that the canopy bow are as described in Part 27C.

Sand remove sharp edges. The canopy bow corners should be rounded.



Preparation for canopy support beams

This section will deal with the markings and cutout needed to get the canopy bow installed at a later step

Vertical MIP support

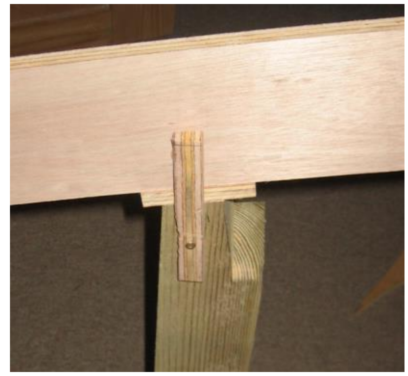
Place the vertical MIP support on the outside of the outer beams and clamp them securely against the outer beams.

Note! Ensure that the aft side of the vertical MIP support Part 21&22 are exactly 24 ¾" [629 mm] from the front wall as seen on 7 Layout. Otherwise the angles will not match up.

Drill two 3⁄8" [10mm] holes through vertical MIP support and outer beams.

Apply two 100 carriage bolts and bolt the vertical MIP support Part 21&22 to the outer side support Part 10.

Vertical canopy support pieces – Layout 8

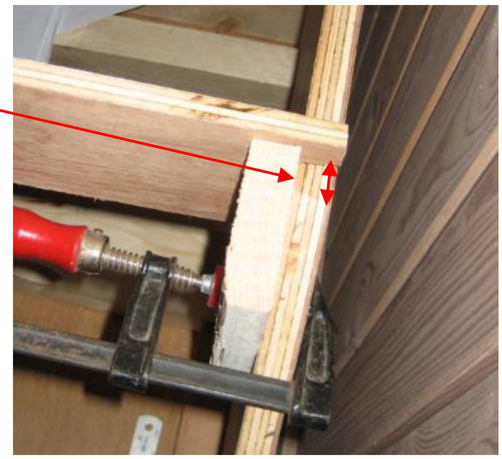


Mark ½” [12mm] in from the curve on all three walls and place some wood block with a clamp to act as a stopper for the vertical canopy support pieces.

Place a small ½” [12mm] Plywood piece on top of the vertical MIP supports Part 21&22 to act as the later horizontal canopy support piece #28.

Place the vertical canopy support piece Part 23&24 into its position on the rear walls.

½” [12mm] distance



And adjust the forward cutouts unto the forward part of the vertical canopy support pieces rests correctly on the front wall Part 17 as well as the ½” [12mm] Plywood on top of the vertical MIP support Part 21&22.

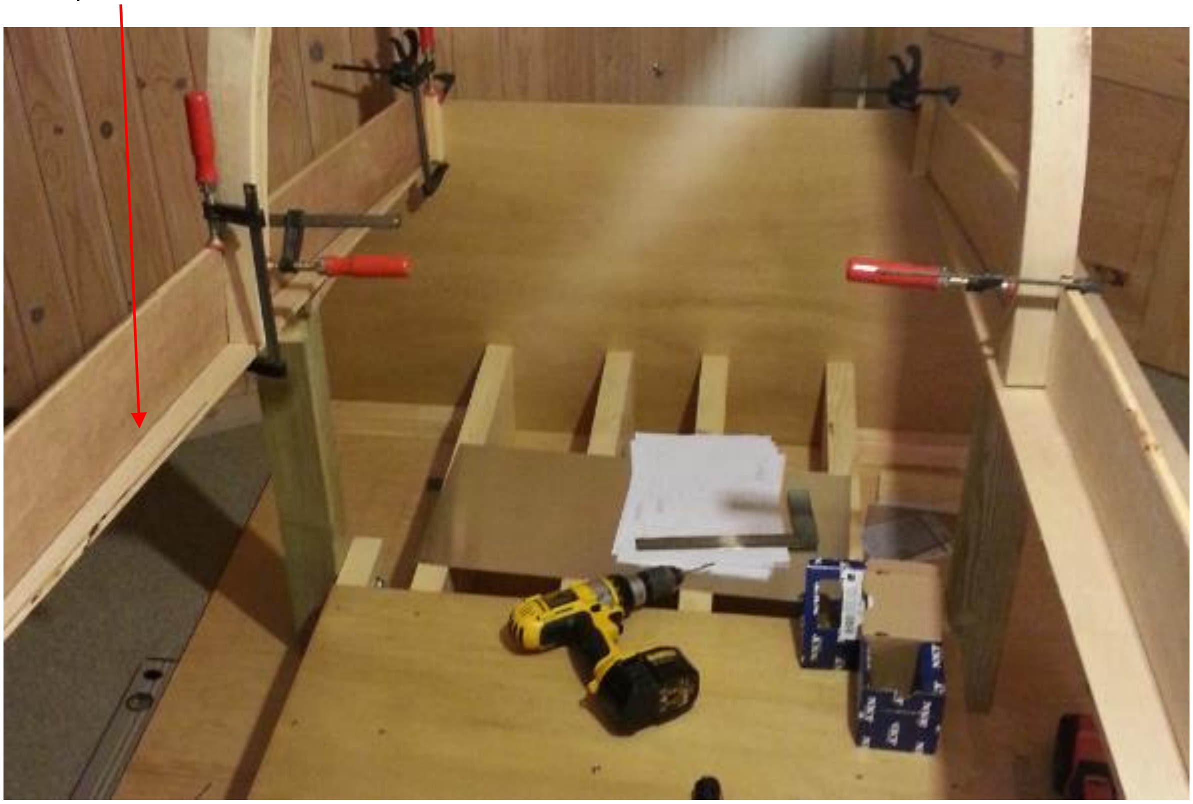
Once front and rear cutouts are in place, clamp the canopy bow Part 27 to the vertical canopy support piece. The rear surface of the canopy bow Part 27 must be 32 ¾” [853mm] from the forward edge of the front wall Part 17 (Layout 8).

Horizontal canopy support pieces – Layout 8

With the vertical canopy support Part 23&24 clamped into place, remove the ½" [12mm] distance piece from the vertical MIP support Part 21&22.

Slide the horizontal canopy support Part 28 underneath the vertical canopy support Part 23&24 so that it rests on top of the vertical MIP supports Part 21&22.

Use a pencil where the vertical meets the horizontal on the inside.



Remove and cut the horizontal canopy support Part 28 pieces according to the pencil marks using a jigsaw. To clear the cut use the belt sander to achieve the optimum shape.

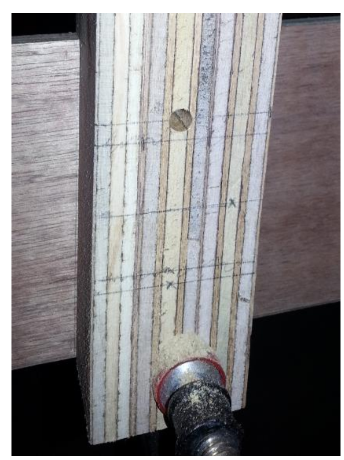
Assembly of canopy support beams

To ease the assembly ¾"x¾" [20x20mm] piece of wood was used. First it was bend and attached to the horizontal canopy support Part 28 piece using screws & glue.

When the glue had dried up the process is replicated, this time attaching the vertical canopy support Part 23&24.

Note! *After the assembly of vertical canopy support Part 23&24 pieces and horizontal canopy support Part 28 pieces, this complete assembly is referred to as Canopy support beam.*

Canopy bow mounting

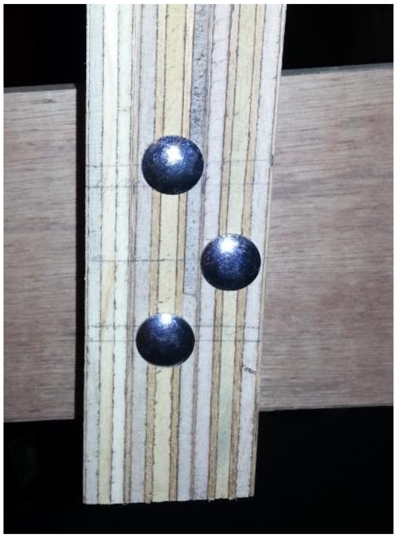


The newly dried canopy support beams are place into their correct positions. The canopy bow in then clamped into its correct position.

The inside of the canopy bow is marked according to Part 27C. Once done, ¼" [6mm] holes a drilled through the canopy bow and the vertical canopy support piece.

The inside hole are then drilled with a [7mm] drill, app. [5mm] deep. This is to ensure that the Plywood does not crack when the carriage bolts are tightened.

Attached 6 pieces of ¼” [6mm] carriage bolts to secure the canopy bow to the canopy support beams.



Mark and remove excess canopy bow material which protrude below the underside of the canopy support beams. Cut and grind the inside lower edged of the canopy bow to give it a smooth rounding.

Status so far

Canopy support beam – width

Place a long straight piece of angle aluminum bar unto the horizontal part of the canopy support beams, resting against the front and rear walls. Mark with a line and cut the canopy support beams to width.

Final canopy support beam fixtures

To ensure that the canopy support beam can securely be fixed to front and rear walls small pieces of ¾”x¾” [20x20mm] wood pieces are prepared.

Note! One side on each piece is angled to get proper resting surface toward the canopy support beam.

Once done glue and screw those into place while the canopy support beams and canopy bows are in correct position.

Note! Do not attach the canopy support beams yet.

Painting

Once builder is satisfied with the sanding of all the wooden parts, the surfaces shall be prepare with a good wood primer. The final finish of the wood surfaces in particular depends on the toughness of the sanding process.

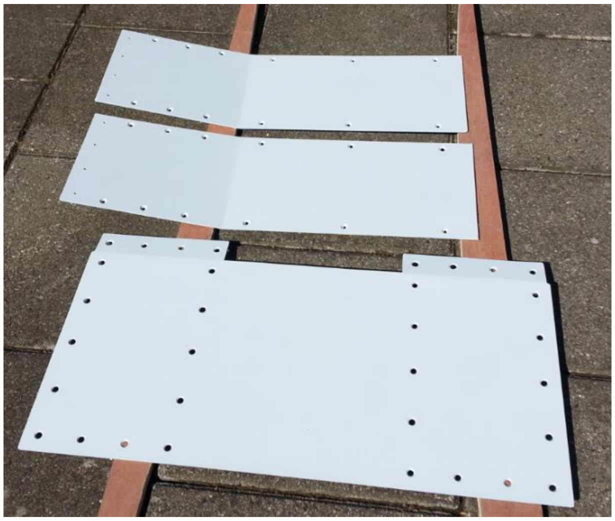
Sand down the aluminum parts and prep with a good acid based primer.

All grey surfaces are originally **FS36231**. This Alpha builder have been unable to locate Federal Standard paint in Europe.

As a substitute RAL7040 has been used for all wooden parts. For the aluminum and metal parts RAL7001 has been used as it was available in spray can.

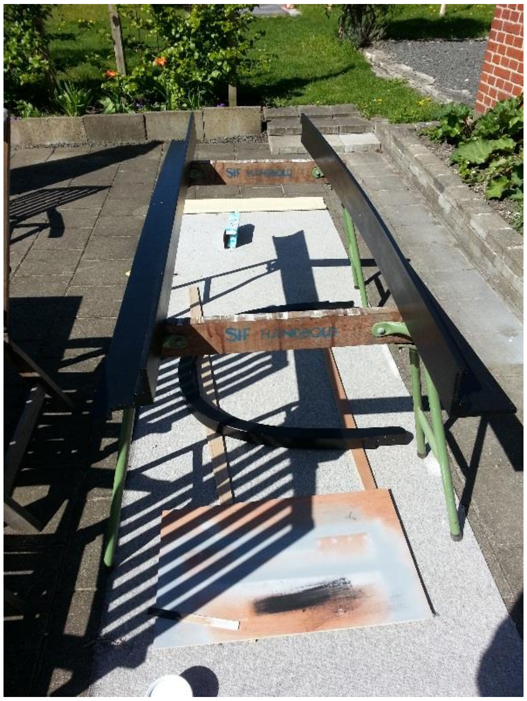
Oval head screws have been sanded and given same primer and paint as the aluminum parts. The carriage bolts have had their heads sanded, primed with same primer as aluminum parts and given a matt black spray paint.

Priming aluminum part



Final paint aluminum parts and oval head screws

Priming wood parts



Final paint on wooden parts

Assembly of painted parts

Once parts have been painted carefully assembly according to preciously procedure.

Status so far

Skin production

Preferably the skins are made of grey colored PVC material 1/8" [3mm] thick. As this Alpha builder was unable to find anything suitable I have gone for 1/8" [3mm] Masonite plate with white surface.

One of the design feature is the possibility to relatively easy remove the skins for easy access to cockpit panels. The design is also build so that as few obstructions as possible are in place once the skins have been removed.

Note! Currently it is uncertain how well primer and paint will adhere to the white surface, thus it may be more beneficial to use unpainted Masonite plate.

Note! As of current build progress it is uncertain what will happen to the painted surface of the skin when being bend for removal and installation. Correctly grey colored PVC sheet is the preferred material.

In order to facilitate air flow beneath the pit (located in a basement) the whole pit is raised on some wooden beam app. 2" [50mm] height. This is to avoid moisture problems when enclosing the carpet by the large surface of the pit bottom.

This also gives another benefit when having to do the skins. It provides a little extra material which need to be cut off later. The whole skin process is basically by roughly cutting the skins to size. Then measure and mark for additional material removal. This process is done until result is satisfactory. Therefore different builder's different tolerances on the production should not have a great influence on the final skin result.

Rough measurement

The overall length of the pit should be 70" [1778mm], double check!

Cut the overall skin length longer than the overall pit length, e.g. cut skins to at least 71" [1805mm] and then afterwards cut to fit exactly.

Note! Add at least 1" [25mm] to the overall pit length to ensure there is enough skin length to get a snug fit. The fact is that the curvature of the front and rear wall are not parallel thus if cut to exact cockpit length the skin will fall short some places.

Identify the skin height at the rear wall Part 15&16 by measuring the length from the floor following the rear wall Part 15&16 until the top of the canopy support beam (top part of vertical canopy support piece). With a 2” [50mm] air spacing below the height should be in the vicinity of 42 ½” [1080mm].

Repeat the procedure at the front wall. With a 2” [50mm] air spacing below the height should be in the vicinity of 30 ¾” [780mm].

Mark the measurements on the skin material and make the cut from front end to rear end.

Preliminary attachment

Place the skins on the floor and use masking tape to hold it in rough position.

Reason for putting the roughly cut skins on the floor is that it will give builder an additional 2” [50mm] of safety in case a cut goes wrong.

Several layers of masking tape may be needed to hold the skin in place.

Use a pencil to mark the material to be removed in order to get the correct shape that will follow the curvature of the canopy support beams.

Cut the skin from the inside using a jigsaw. To get a nice cut use a fine toothed blade. The one used in the picture is actually for metal but works nicely.

The skin is now cut roughly to size and are ready for later adjustment and final fitting.

Place the skins next to the cockpit confirming that the cutouts are following the curve of the canopy support beam.

Note! No need for a tight fit yet.

Note! If the complete pit has been placed on top of some wooden beam as shown in this instruction, the skin will be too high. No need to remove excess material yet. Leave it on until skin is ready to be put into place.

Aluminum skin retainer bar

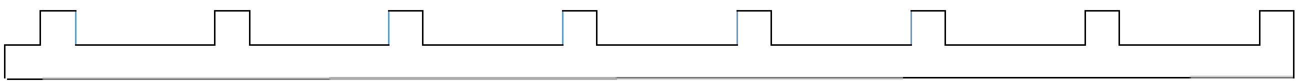
In order to have the skin stay on the pit we have to build skin retainers (upper and lower). The skin will be wedged in between the upper and lower skin retainers with the least tools needed to remove the skins.

Upper skin retainer

There are several methods of doing the upper. One would be having an aluminum flat bar app. 2.4” [60mm] wide and then mark the curvature of the vertical canopy support Part 23&24 piece unto it. Next would be to make fingers which shall serve as attachment point.

This Alpha build has utilized 1.25”x1.25” [30x30mm] angled aluminum bar. It was readily available and relatively cheap.

Start by marking where the front and rear most finger is to be situated in correlation to the front and rear wall, i.e. there should be app. ¾” [18mm] of aluminum bar on the outside of the first/last finger.

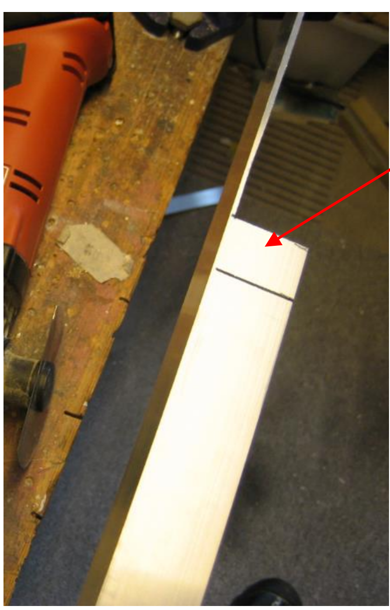


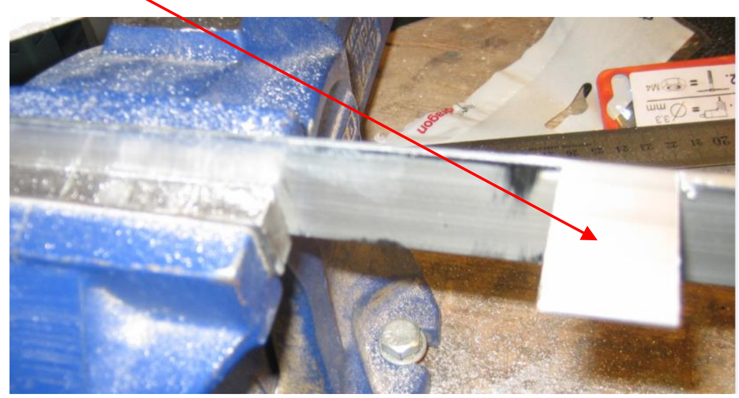
This will ensure that the retainer bar goes the whole length of the cockpit.

The even space out additional finger. This build has been done with fingers ¾” [20mm] wide and a distance of 7½”-8” [200mm] between end of one finger to start the next one.

Cut the fingers free from excessive material. The lateral cuts have been done by a multi-cutter but can be done using a jigsaw with a metal blade.

Fingers



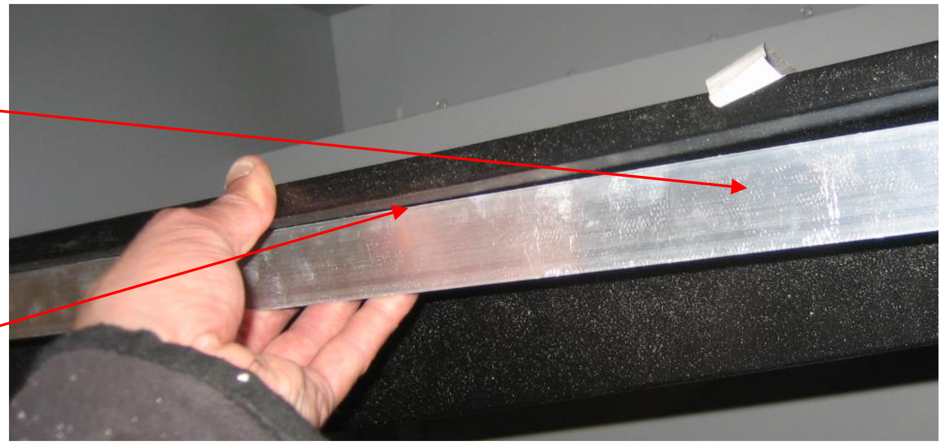


File off excessive material so that bar in nice and smooth between the fingers.

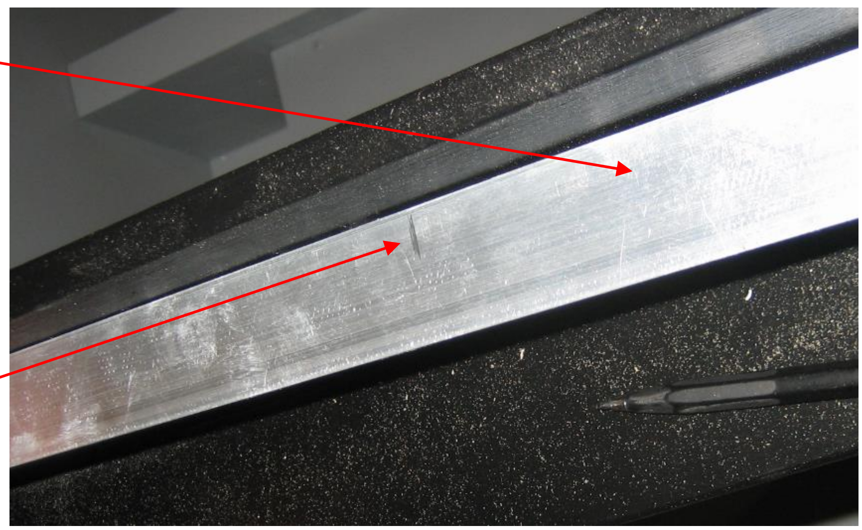
Making curvature on a flat bar

The uncut side of the aluminum angle bar is still straight and that need to be a curve in order for it to follow the curvature of the canopy support beams.

Align the retainer bar in the front end of the canopy support beams. There should be a descent straight stretch of canopy support beam there.



Use a pencil to mark where a gap between the canopy support beam and skin retainer bar start to occur. It doesn’t have to be with millimeter precision as it can be dealt with in the following process.



Move the skin retainer bar to a suitable work location. The floor should be rock solid e.g. concrete.

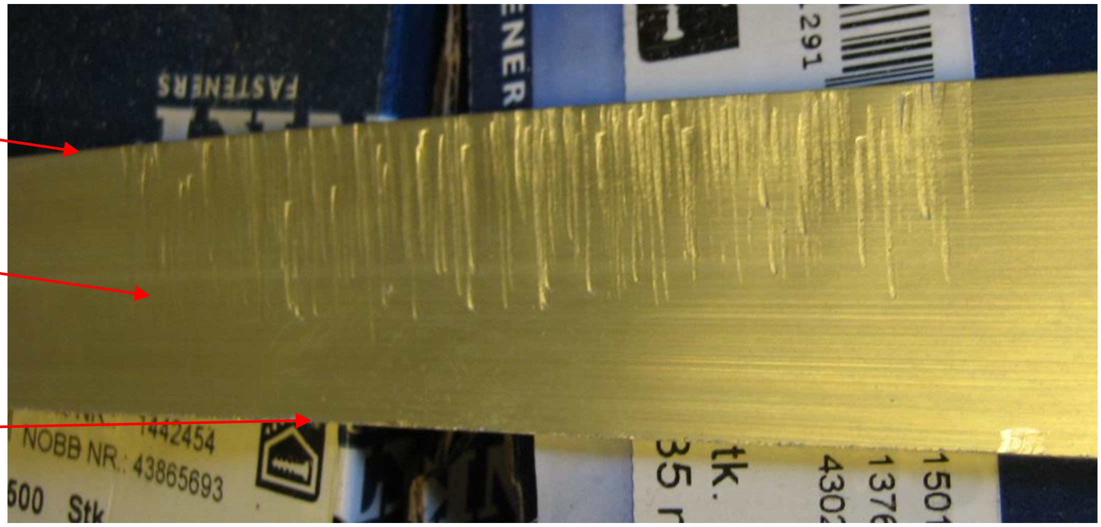
Place a hard piece of material/brick on the concrete and place a piece of scrap aluminum on top of the brick. This scrap aluminum will server to protect the top side of the skin retainer bar once the bending process starts.

The bending process involves using a hammer to make small marking into the lower outside of the skin retainer on an area app. 100mm long. This causes material to be pressed into the skin retainer which in turns reacts by expanding.

Lower outside edge of skin retainer

Lower side of skin retainer

Lower inside edge of skin retainer



[**Note!** As the procedure is done **only to outside** of the skin retainer, the expansion only occurs to the outside. Therefore the bar will be bending.]

The hammer needed should be something like this:

Flat pointed side of hammer

It’s the flat pointed side of the hammer which is to be used, causing the line hammering. Try and hit the aluminum bar as straight as possible as this will give the best result.

Note! Hammer gently! No need to use brute force. It’s more than enough to hold the hammer in it’s head with one hand and use the wrist to create the hammering force.

Note! Hit the aluminum more times lighter is better than fewer time hard.

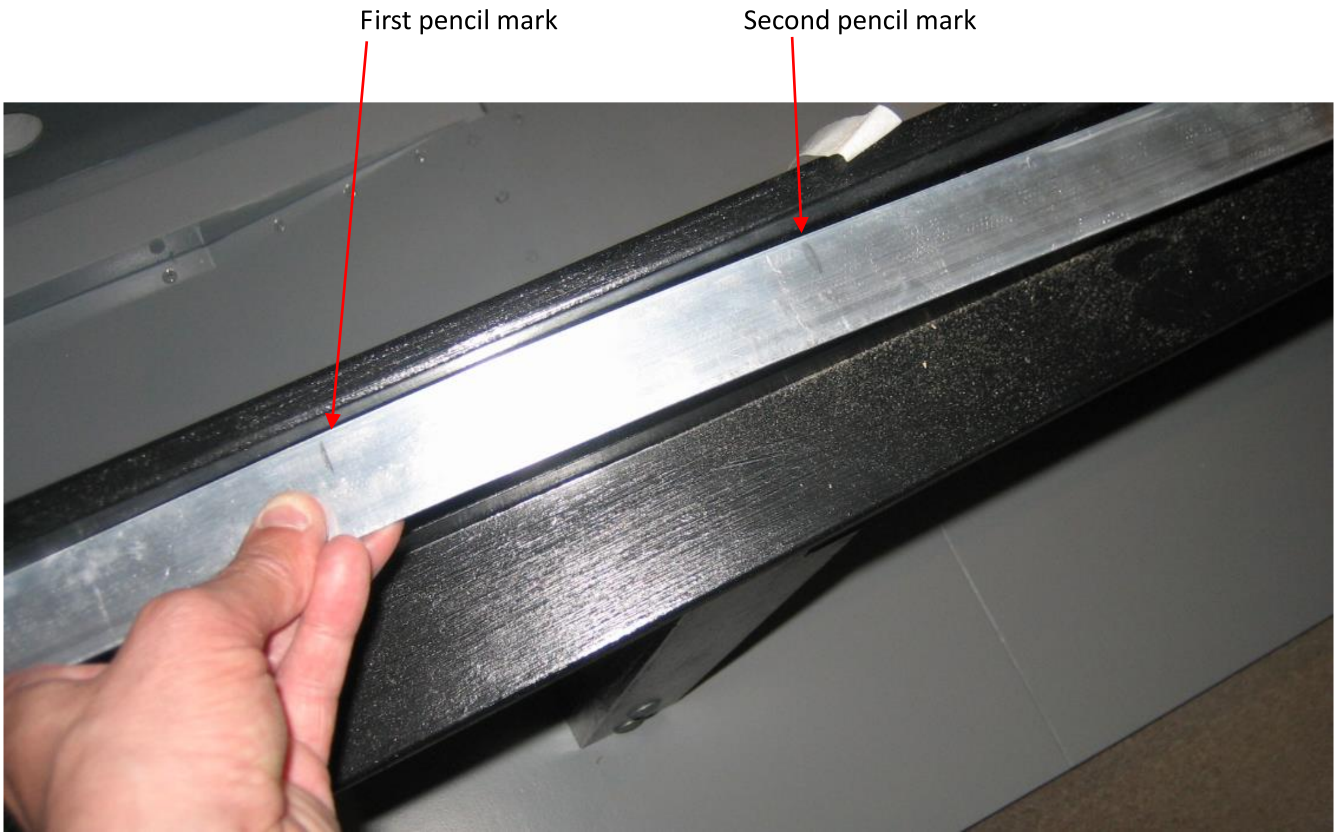
Note! A good procedure is also to hammer a little time then bring the bar in to the pit for testing. Then evaluate whether further hammering is needed or whether you should go to next spot. You will be surprised how little work it take to get the bending started.

This YT clip should provide an idea of the procedure involved: https://youtu.be/GDDm7Ifror8

Time:

0:14 to 0:29	I am marking the area which I intend to be hammering for the bending process. The marked area is on the lower outside of the retainer bar opposite of the gap mark
0:43	Retainer bar is placed on top of the scrap aluminum which is on top of the brick
0:48	Indicate where to hit the bar (marked area) with flat pointed side of the hammer.

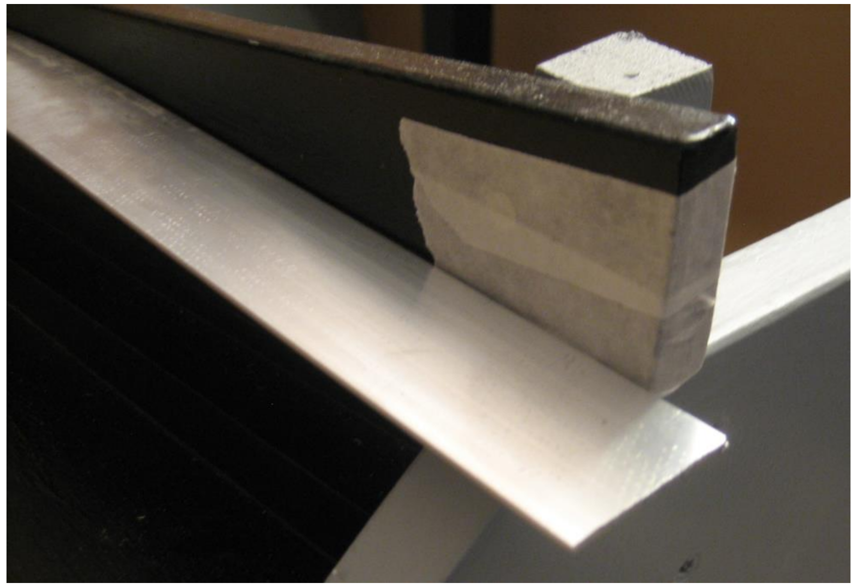
When first bend has been done to your satisfaction, align the skin retainer against the canopy support beam again. Now the skin retainer is flush at the first pencil mark. Go further towards the rear end and find the next place where a gap is forming. Mark the second gap with a pencil mark.



Repeat the procedure until the skin retainer bar is flush the canopy support beam throughout the whole length: https://youtu.be/ODIOCnxlfHE

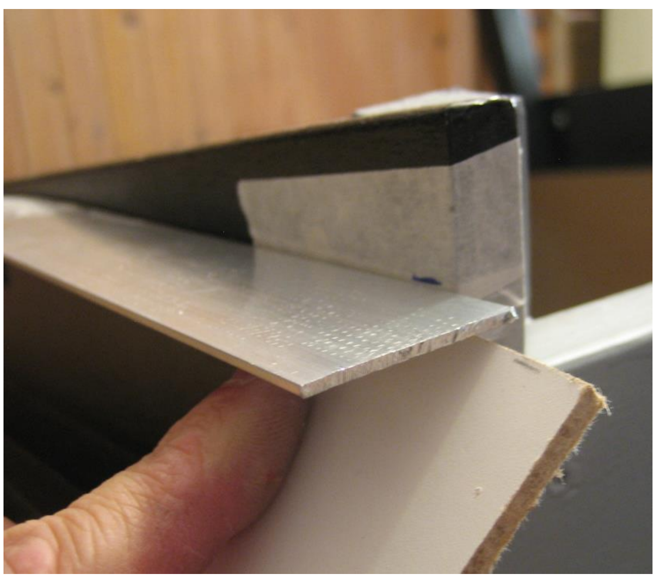
Positioning the skin retainer bar

Next step is to attach the skin retainer bar to the canopy support beam.



First start by applying masking tape to the vertical canopy support Part 23&24 pieces at front and rear wall. These pieces will serve at marking points.

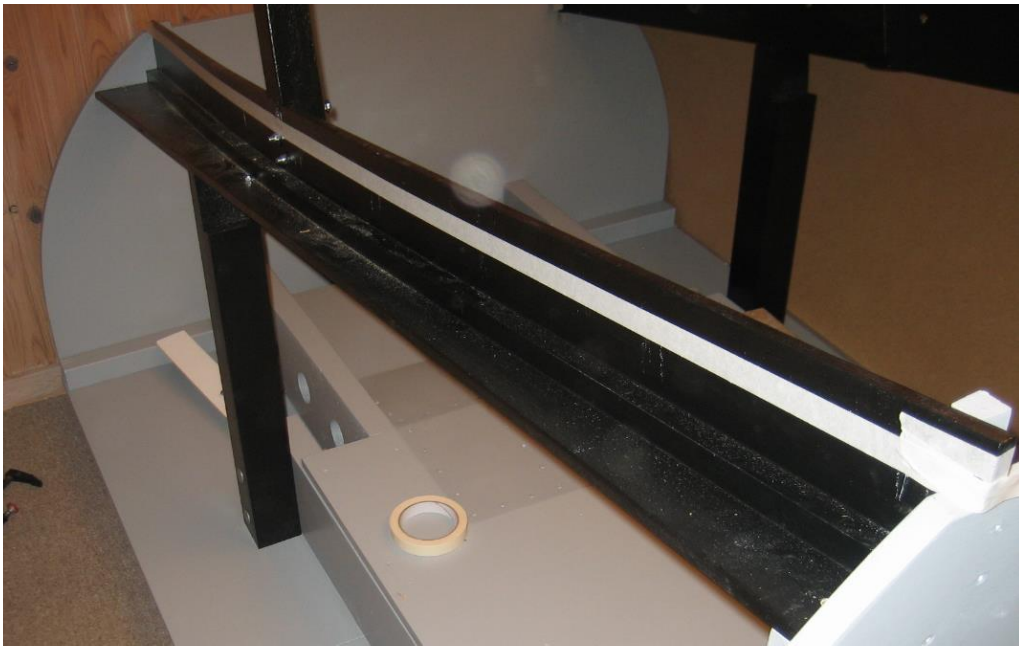
Use a piece of scrap skin material to get an idea of how the skin will follow the curves of the rear wall. Make a marking showing the top of the skin retainer bar when scrap skin piece is in its proper position.

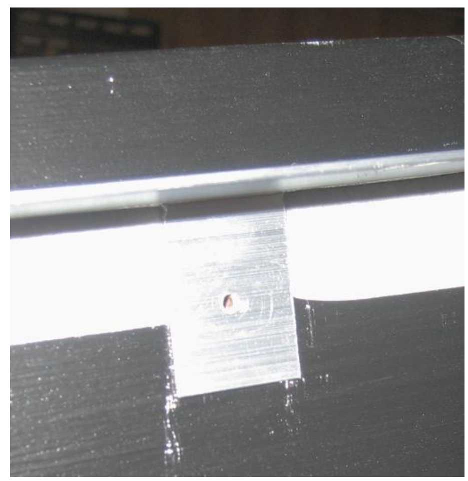


Repeat the procedure at the front end of the canopy support beam. Now there are markings at either end of the canopy support beams.

Attach masking tape to the front wall so that the top of the masking tape is flush with the mark. Roll out enough tape to reach the rear wall, and aim the top of the tape to be flush with the rear most mark.

The result should look like this:





Now there is a “straight” line between front and rear marking following the curvature of the canopy support beam.

Align the top of the skin retainer bar with the top of the masking tape and clamp it into place using several clamps preferably at every finger to keep the skin retainer fixed.

Drill a 1/8” [3mm] hole through a finger and all the way through the vertical canopy support Part 23&24.

Then drill a 0.2” [5mm] hole through the aluminum finger and stop when through the aluminum part.

Note! Do not drill all the way through the canopy support beam from the outside in as it may cause rupture of the wood on the inside where it can be seen.

Drill 0.2” [5mm] hole through the vertical canopy support Part 23&24 but this time from the inside out.

Attach the skin retainer finger with a 0.2” [5mm] carriage bolt from the inside and secure it with washer and nut.

Then move on to fixing the next finger until the skin retainer is fully fixed to the canopy support beam. Repeat the procedure for the other skin retainer.

Note! Depending on the position of the skin retainer it may come into conflict with one of the nuts securing the canopy bow. It may therefore be necessary to make a small cutout in the skin retainer, but this will only be evident once the skin retainer and skin is in place.

Note! At this point the upper skin retainer still has a 90º angle between fingers and uncut part. This will be bend in a later process. Just leave for now.

Lower skin retainer bar

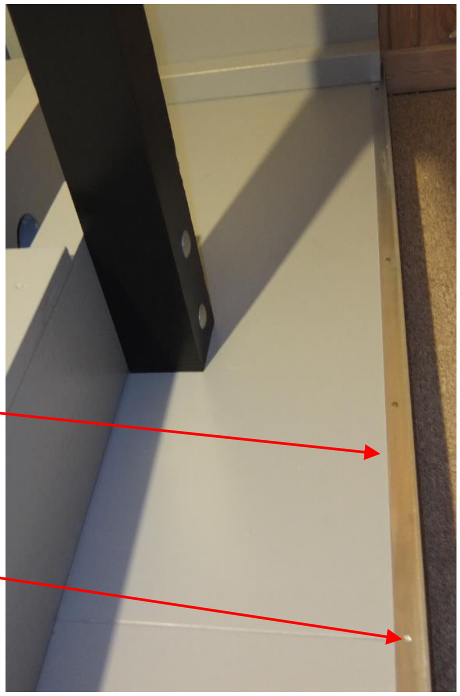
To keep the lower side of the skin in place a piece of ¾”x¾” [20x20mm] aluminum bar will be attached to the cockpit floor.

Measure the cutout for rip corners Part 18 as well as front and rear wall. The easiest way of doing so it so align the aluminum bar and mark it with a pencil. Make a cutout equal to shown picture.

Important is try and align a piece of scrap skin material to the inside as this will ensure that the skin fits nice and snug against the front and rear wall.

Drill 1/8" [3mm] holes in the lower skin retainer for every 7½"-8" [200mm] and secure the lower skin retainer to the cockpit floor plates Part 1&2 using [2.5x15mm] screws.

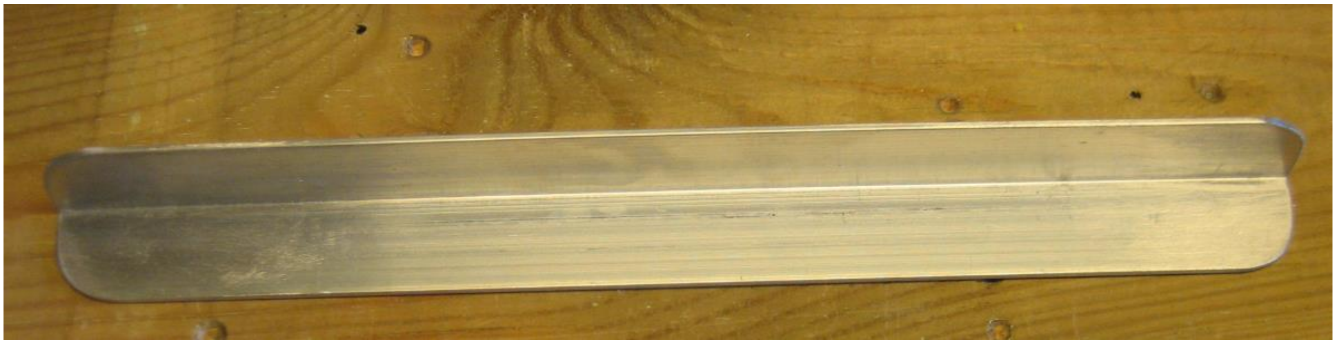
Result



Note! If using 7½"-8" [200mm] between all holes the lower skin retainer may end up having a screw where the two floor plates Plate 1&2 meet. Adjust distance to avoid this.

Corner skin retainer

The leftover/cut off from the lower retainer bar can be used for a rear corner retainer if needed. Round all the corners.



The outside corner can be filed down and rounded to remove the sharp edge.

Drill two 1/8” [3mm] holes in one of the sides used to attach the corner skin retainer to the rear wall.

Skin adjustment and attachment

Place the skin next to the cockpit leaning against the front and rear wall. Check that the upper edge of the skin can fit under the un-bend upper skin retainer.

Upper skin retainer vs skin fitting.

While leaning against the front and rear wall of the cockpit as well as fitting under the upper skin retainer gently bend the upper skin retainer downwards against the skin.

Note! The bending should preferably be done a little at a time at each fingers to try and keep the bar from making wave patterns although hard to avoid.

Skin height cut

As the cockpit is standing on 2” [50mm] beams the skin is at this point resting on the floor and are therefore more than 2” [50mm] too high.

Measure the distance between floor and upper part of cockpit floor at both front and rear wall.

Mark the measured distances on the skin and cut away excessive material.

Final adjustments

Slide the newly cut skin in between the front/rear wall and the lower skin retainer. Gently bend the skin into shape ensuring that it follows the curve of front and rear wall. Leave the skin resting on top of the upper skin retainer.

Check whether the skin is too high;

1. If the skin is not lying flat against the upper skin retainer then it is too high at that particular point.
2. If the skin is lying flat against the top of the upper skin retainer but is touching the vertical support piece then it is a little too high at that particular point

Mark the places where the skin is too high with a pencil. The marking shall be done at the top of the skin.

Use masking tape to align the marks in order to have a reference where to cut.

Remove excess skin material using the jig-saw and re-fit skin unto pit.

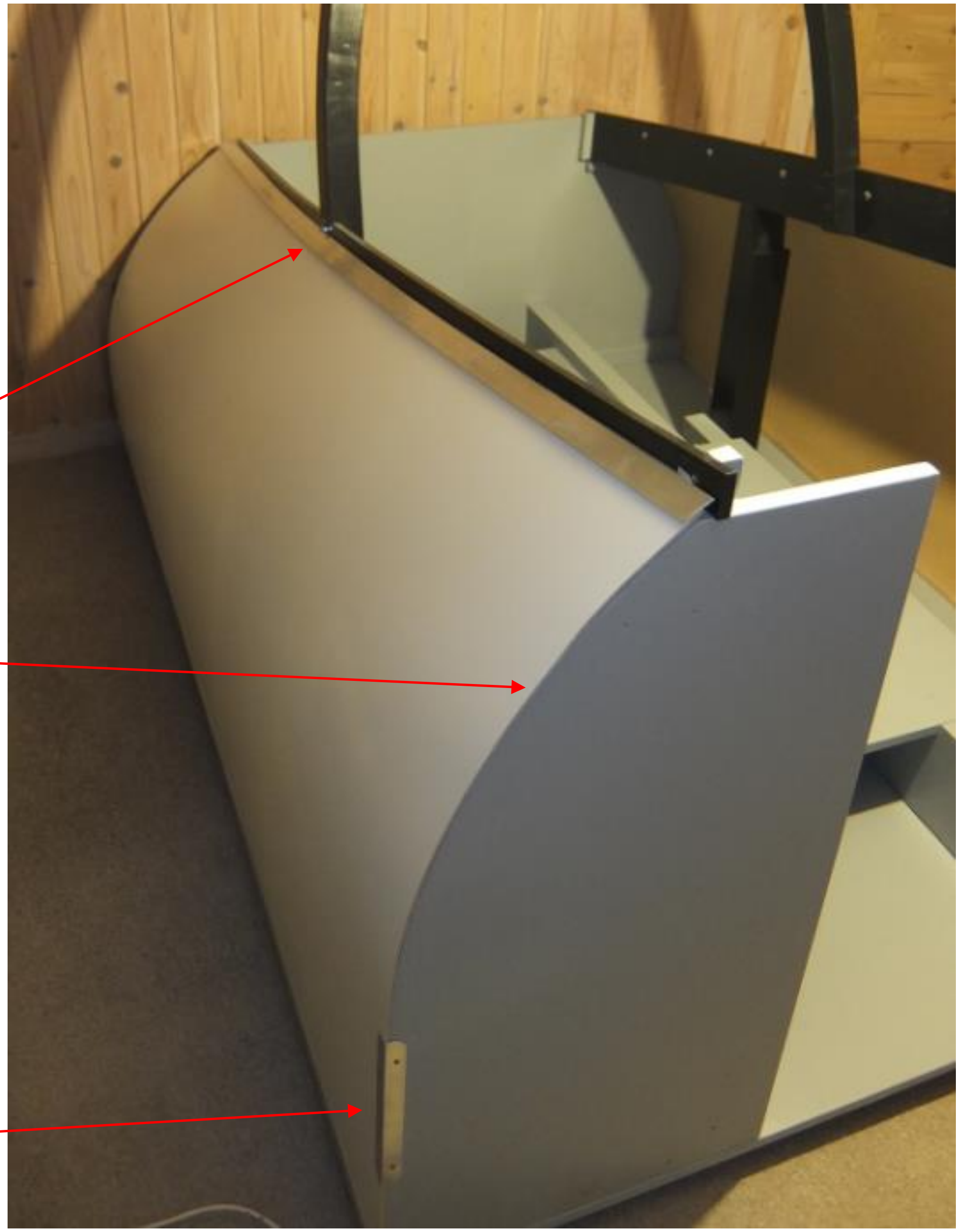
Note! It is better to remove small slices of skin at a time than too much in one go.

Repeat process until the skin can be pushed underneath the upper skin retainer. Once fit underneath the upper skin retainer correct height of the skin can be estimated using following method:

1. It should be possible to press the skin slightly downwards at the position of the finger. If not the skin is a little too high and will bend outwards.
2. Hold the skin in place at the rear wall on the vertical piece of the wall. If the skin bends outwards on the curved part it is wedged too tightly under the upper skin retainer and further material need to be removed.
3. Hold the skin in place at the front wall on the vertical piece of the wall. If the skin bends outwards on the curved part it is wedged too tightly under the upper skin retainer and further material need to be removed.

Repeat process until the skin can be fitted snugly in between upper and lower skin retainer is able to follow the front and rear wall curves using only slight pressure at the vertical piece of the rear wall.

Attach the corner skin retainer using [2.5x15mm] screws to keep the skin in place at the rear wall



Upper skin retainer

Snug fit

Corner skin retainer

Done! Almost

Ejection Seat rails

This Alpha build has been unable to find suitable aluminum for the ejection seat rails. Thus leftovers from the beams [45x195mm] has been used to fabricate lookalikes.

The beams have been cut in 0.3” [7mm] wide slices (6 pieces) 55” [1400mm] long, four of which have been cut down further to 25mm wide.

These will be assembled into ejection seat rails. Currently that part of the building process is unfinished.

Final painting

In order to facilitate final painting the following parts needs to be removed at the final adjustment:

1. Right and left corner skin retainers.
2. Right and left skins.
3. Right and left upper skin retainers.
4. Carriage bolts for right and left upper retainers.
5. Right and left lower skin retainers

Aluminum parts

Sand all aluminum parts, prime them with a good aluminum primer.

Upper skin retainer should be painted matt black.

Lower and corner skin retainer shall be painted grey according to spec.

Skins painting

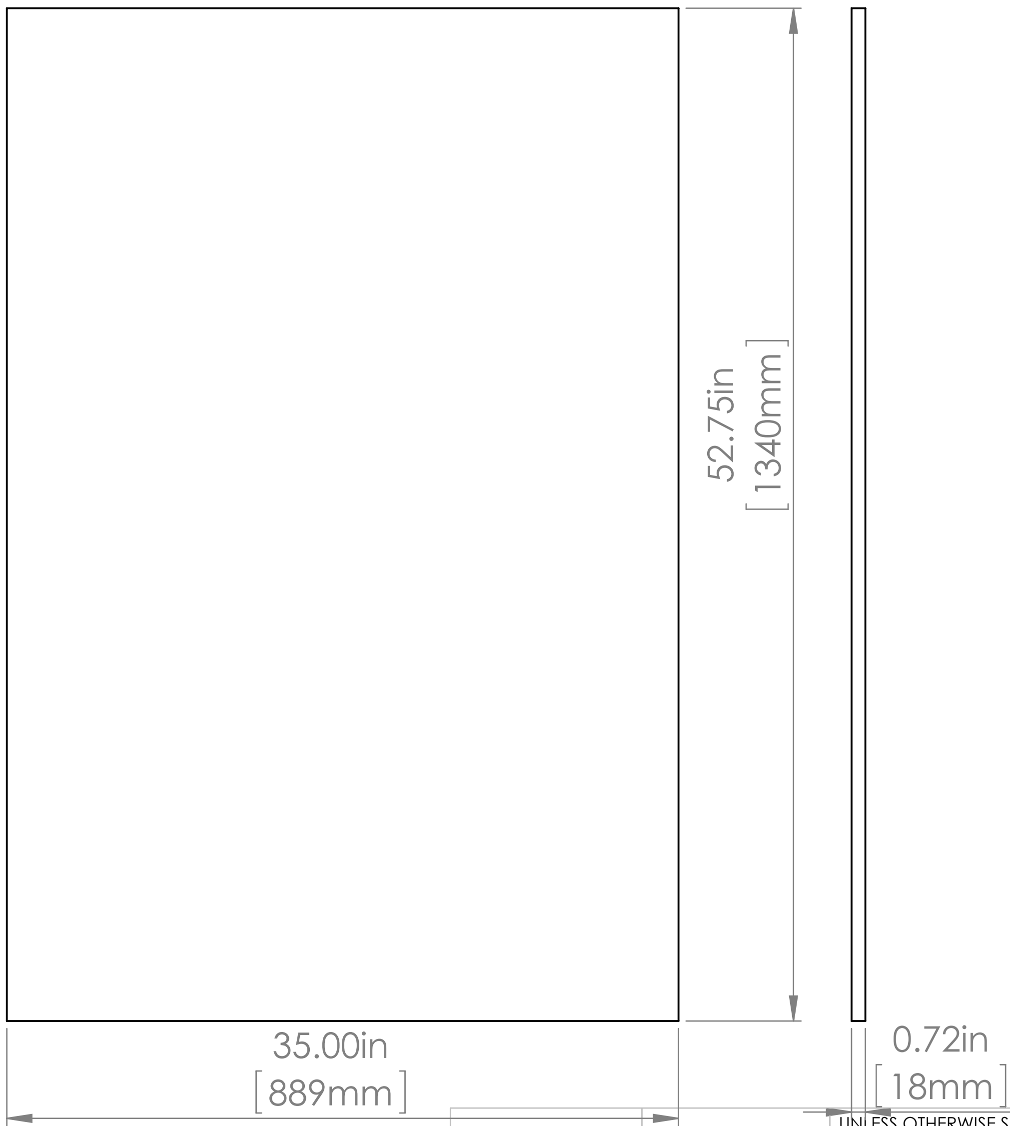
As mentioned in the beginning paint has currently not been applied to the skins as they are with a white surface. As of writing it is unknown how the paint with adhere to the surface and also how primer/paint will reach to the bending of the skins during assembly and disassembly.

Bill of material

No.	Units	Item	Total price USD
2	Pce	Plywood 18mm, 2440x1220mm	135
1	Pce	Plywood 12mm, 2440x1220mm	51
1	Pce	Pine 45x45mm, 3m	4
2	Pce	Pillar, 75x75mm	21
1	Pce	Beam, 45x195mm, 5.1m	22
1	Pce	Beam, 45x195mm, 3.6m	16
1	Box	Screws 4x50mm, 200pce	7
1	Pce	Transport	44
1	Pce	Large printout canopy bow	15
4	Pce	Carriage bolt, M10x100mm	8
6	Pce	Carriage bolt, M6x60mm, incl. Washer and lock nut	3
3	Pce	Pine 20x20, 2.40m	21
1	Box	Screws 3.5x25mm, 200 pce	9
1	Pce	Wood filler, 50ml	7
1	Box	Oval screws M4 – 10 pce	1
1	Box	Oval screws 4.2mm – 5+0 pce	5
1	Pce	Aluminium primer spray	18
1	Pce	Grey paint spray	7
1	Pce	M4 tap	4
1	Pce	Wood paint, black 0.38L	29
1	Box	Brush set 3x	3
3	Pce	Aluminium sheet 1.6mm 300x600mm	66
1	Pce	Carriage bolt, M5x20mm	1
1	Pce	Carriage bolt, M5x50mm	0
1	Pce	Locknuts M5	1
2	Pce	Aluminium angle, 30x30mm, 2m	23
1	Pce	Wood primer 3L	103
1	Pce	Wood paint RAL7040, 2.8L	99
2	Pce	Paint roles, ultra smooth	14
2	Pce	Aluminium angle, 20x20mm, 2m	21
1	Box	Screws 2.5x15mm	7

Apart for the obvious plywood as leftover there is currently about 1L wood primer and 1L wood paint left. Of the large bows of screws about half is left.

You will need to cut two pieces of 18mm-3/4 inch plywood quality and grade are your personal choice.
Each piece will be combined to make the floor. It is extremely important these be cut correctly and straight for the further lay out of the cockpit.



UNLESS OTHERWISE SPECIFIED:		NAME	DATE	
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±	DRAWN			
	CHECKED			TITLE: Part 1 & 2 Floor Plates
	ENG APPR.			
	MFG APPR.			
INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.			
MATERIAL	COMMENTS:			SIZE A DWG. NO. floor plate REV
FINISH				
DO NOT SCALE DRAWING				SCALE: 1:10 WEIGHT: SHEET 1 OF 1

NEXT ASSY	USED ON
APPLICATION	

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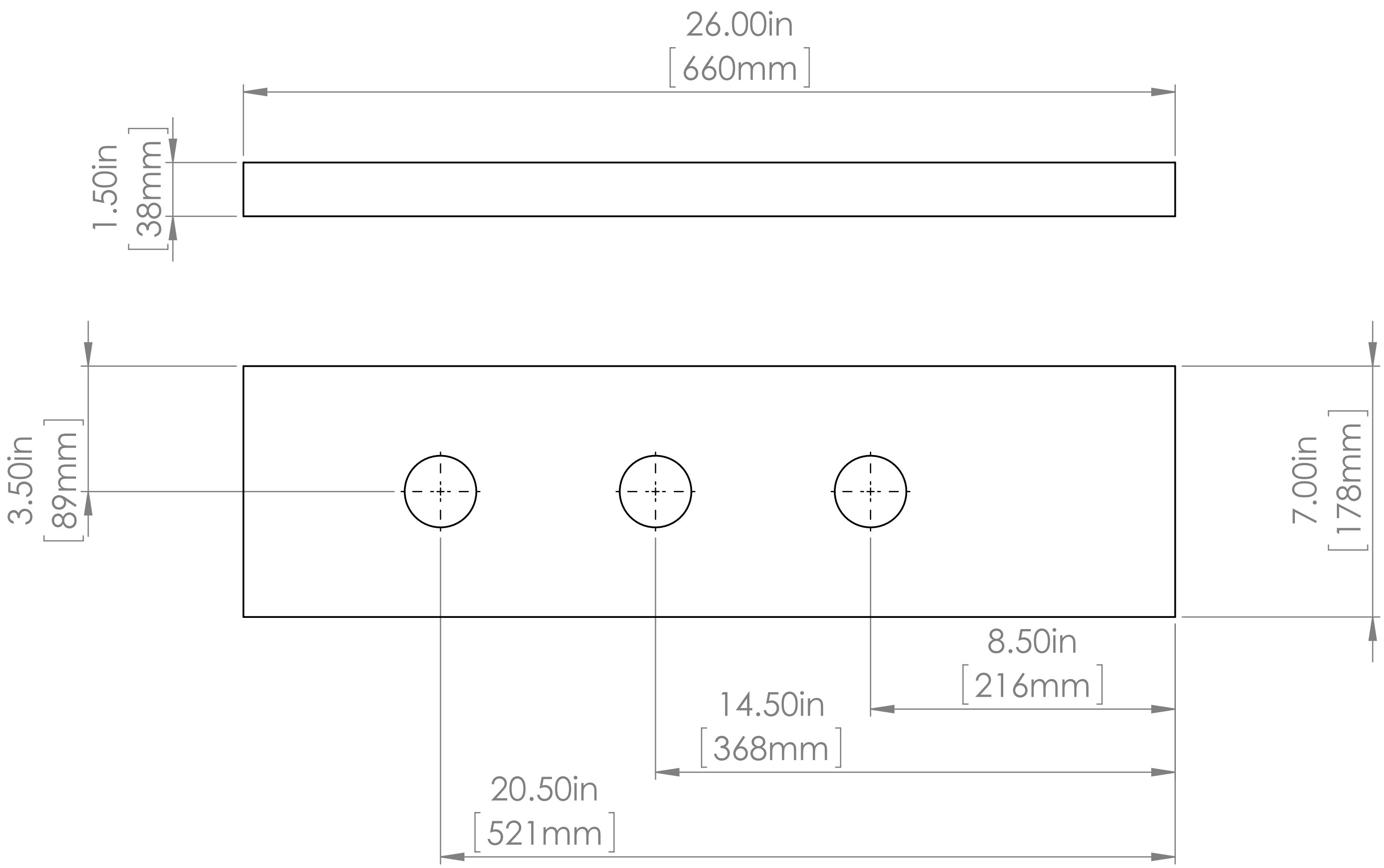
5 4 3 2 1

Part 3 &4 are the inside floor supports that will hold the pedestal and the inside of the foot wells floors.



Front of cockpit

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
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		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL	COMMENTS:		
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APPLICATION		DO NOT SCALE DRAWING			

TITLE: Center Pedistal suports

SIZE A | DWG. NO. Part 3 & 4 | REV

SCALE: 1:5 | WEIGHT: | SHEET 1 OF 1

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5 4 3 2 1

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	FINISH:	DEBUR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING / REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

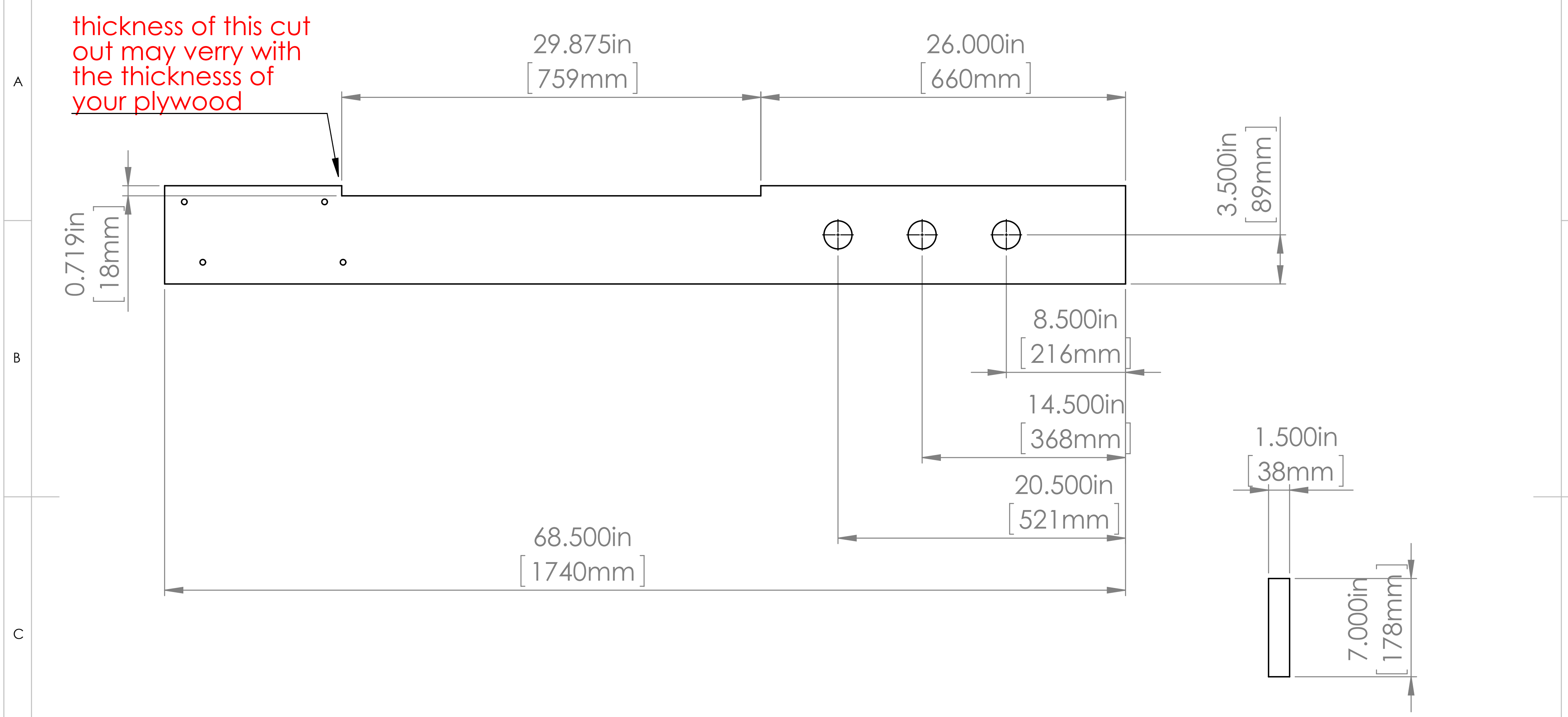
MATERIAL:

WEIGHT:

TITLE: Foot wells Made from 14 gauge Aluminum 0.641 inch 1.62 mm

DWG NO. Part 5 & 6 A1

SCALE:1:1 SHEET 1 OF 1



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DEBUR AND BREAK SHARP EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

TITLE: Floor supports Long

MATERIAL:

DWG NO. part 7 & 8

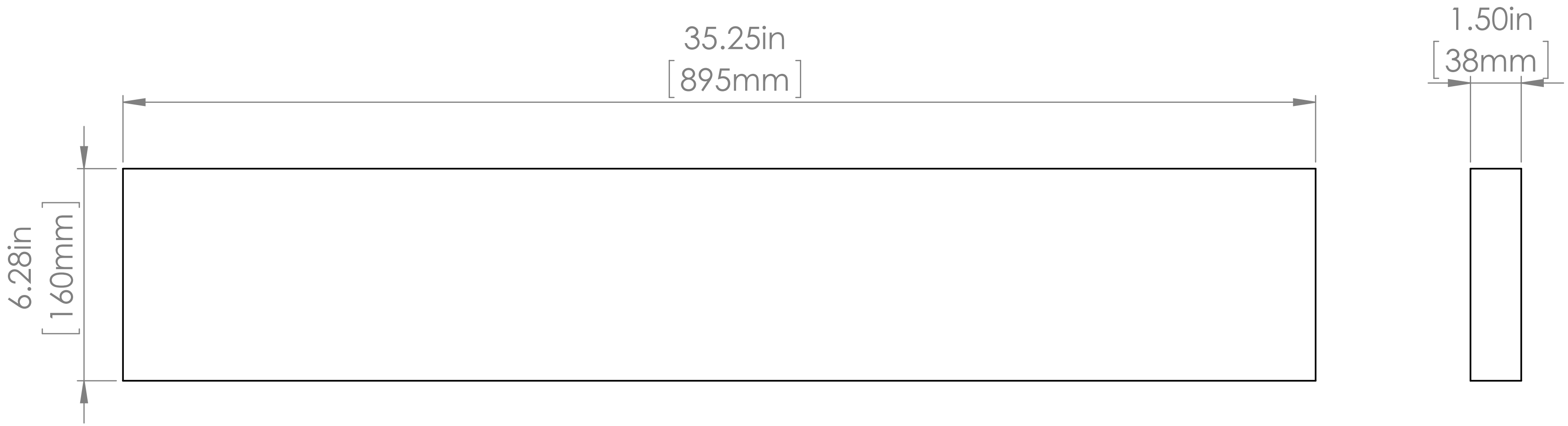
A4

WEIGHT:

SCALE:1:10

SHEET 1 OF 1

Hight may very do to thickness of plywood. You will cut two of these and they will be 7 inches tall minus the thickness of the ply wood you use



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	FINISH:		DEBUR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION
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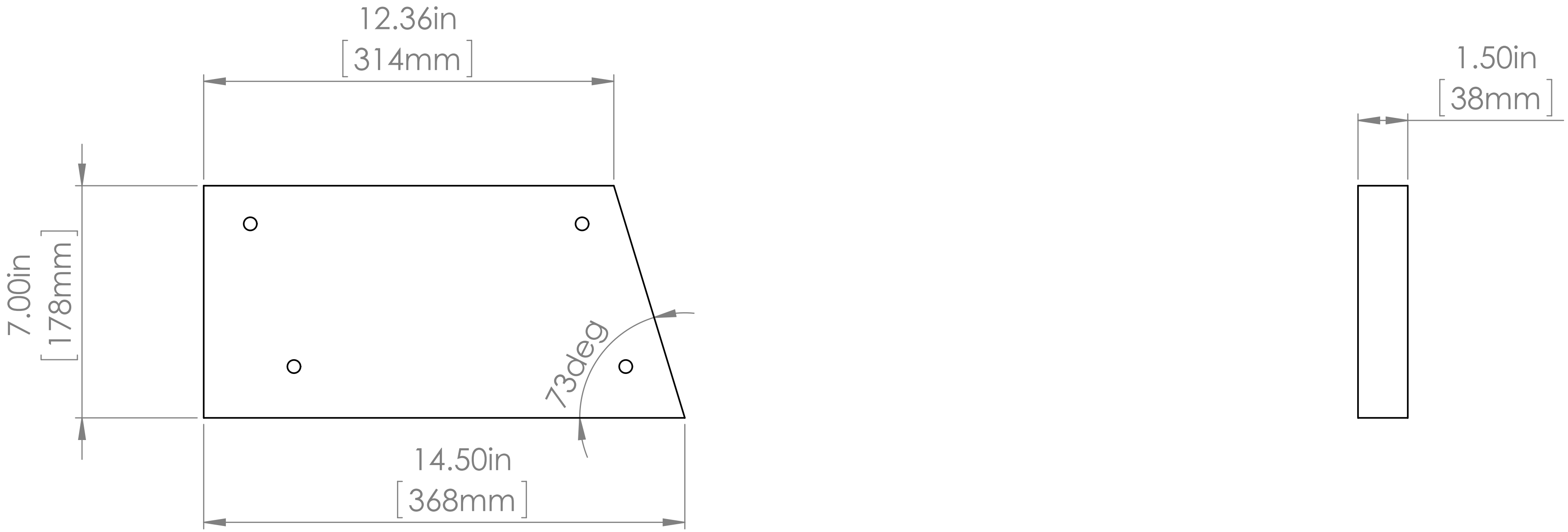
DRAWN					
CHK'D					
APPV'D					
MFG					
Q.A			MATERIAL:	DWG NO. Part 10	A4
			WEIGHT:	SCALE:1:5	SHEET 1 OF 1

cut two of these and they are
placed next to parts 7&8 the long
floor supports flush with the back



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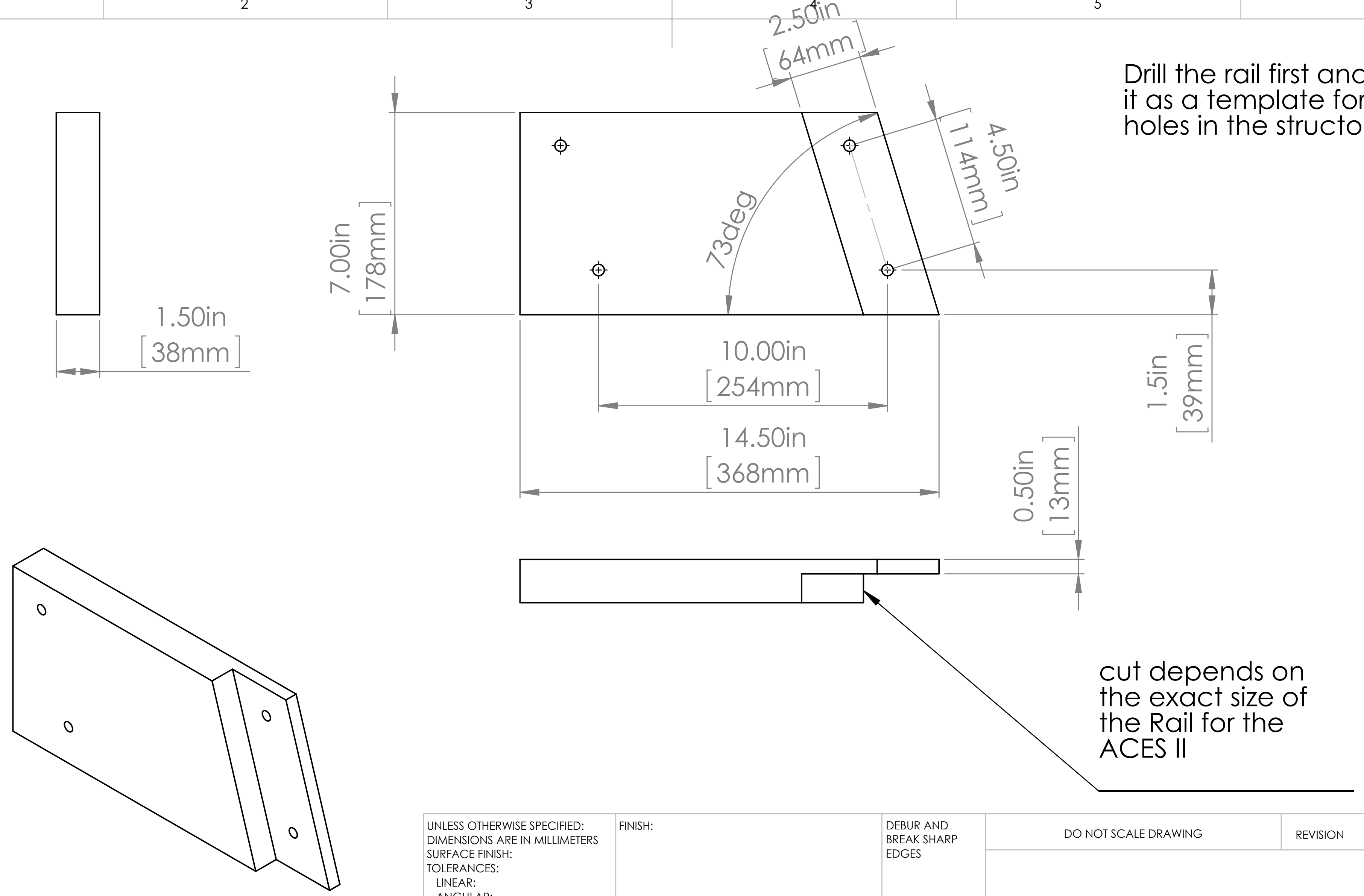
DRAWN					
CHK'D					
APPV'D					
MFG					
Q.A				MATERIAL:	DWG NO. Part 11	A4
				WEIGHT:	SCALE:1:5	SHEET 1 OF 1



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	FINISH:	DEBUR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

TITLE: ACES II Rail attachment

MATERIAL:

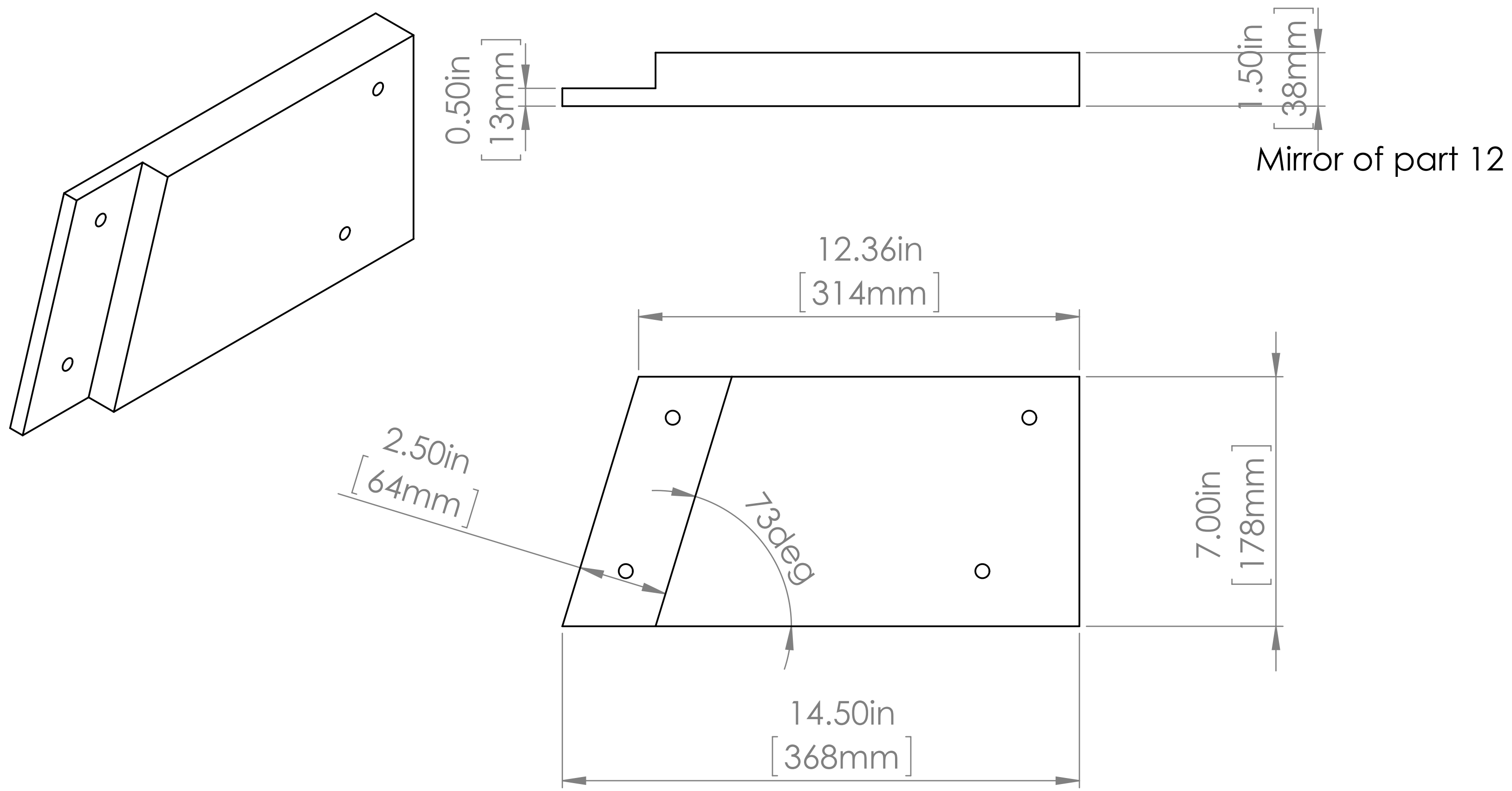
WEIGHT:

DWG NO. Part 12

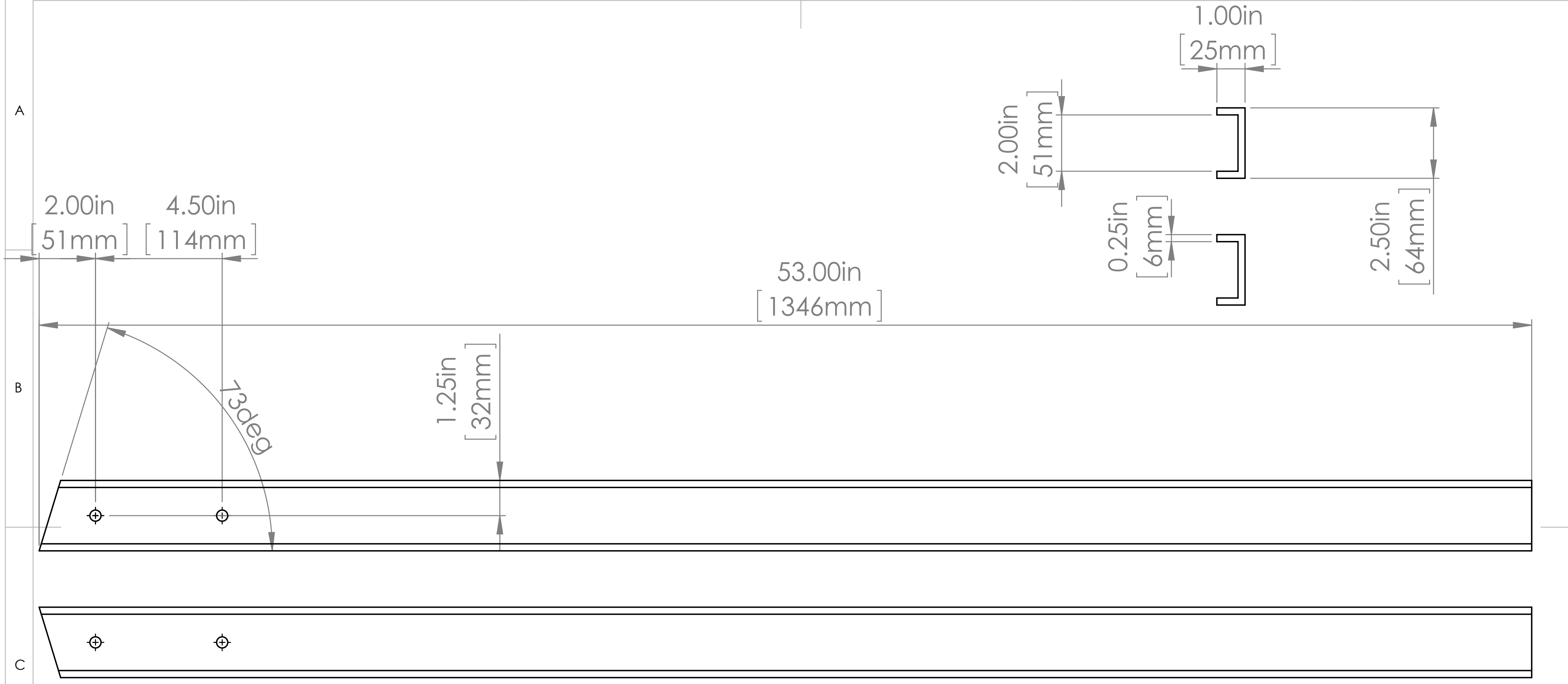
A4

SCALE:1:5

SHEET 1 OF 1



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	FINISH:		DEBUR AND BREAK SHARP EDGES		DO NOT SCALE DRAWING	REVISION
	NAME	SIGNATURE	DATE		TITLE:	
DRAWN						
CHK'D						
APPV'D						
MFG						
Q.A				MATERIAL:	DWG NO. Part 13	A4
				WEIGHT:	SCALE:1:5	SHEET 1 OF 1



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBUR AND BREAK SHARP EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

TITLE: The Rails can be made from Aluminum or from wood. They are not actually supporting the ACES II Ejection seat

MATERIAL:

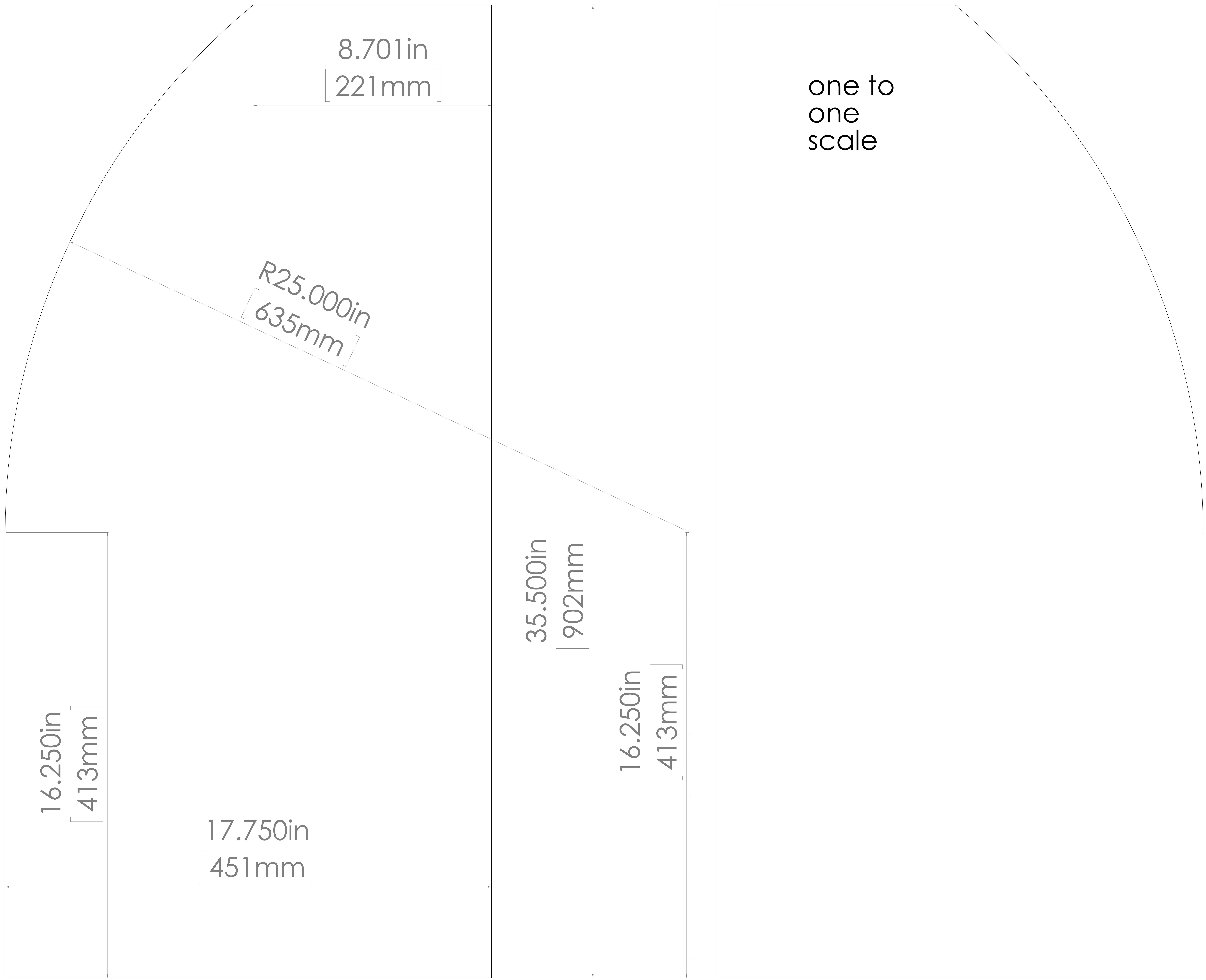
DWG NO. Part 14 Rails

A4

WEIGHT:

SCALE:1:5

SHEET 1 OF 1


8.701in
221mm
R25.000in
635mm
35.500in
902mm
16.250in
413mm
16.250in
413mm
17.750in
451mm
one to
one
scale

Scale 1 to 1


32.000in
813mm
24.000in
610mm
R22in
560mm
R22in
560mm
R22in
560mm
5.375in
137mm
52.500in
1334mm

Rip 4 corner blocks out of some scrap 2x4

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBUR AND BREAK SHARP EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

TITLE:

MATERIAL:

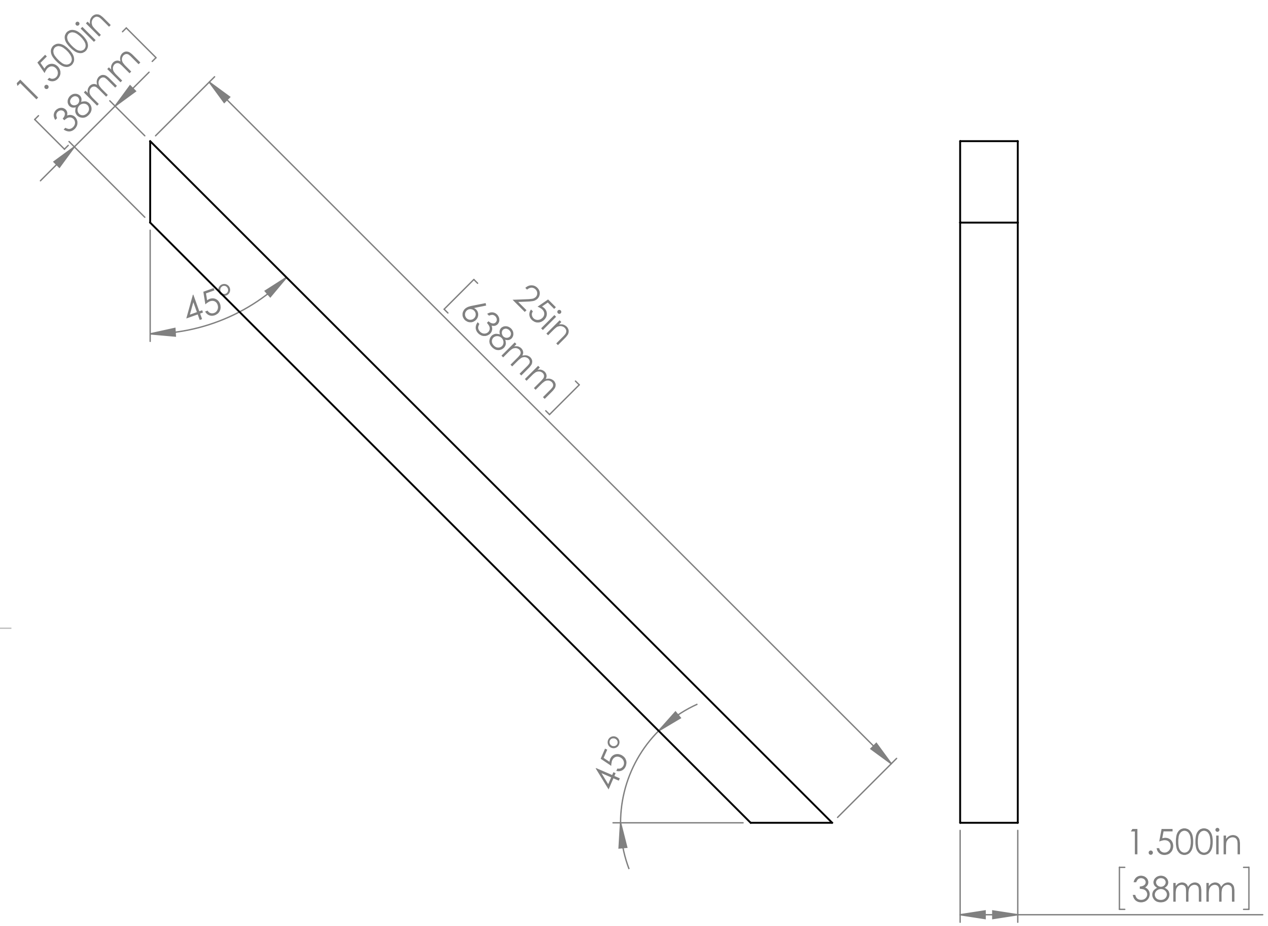
WEIGHT:

DWG NO. Part 18

A4

SCALE:1:2

SHEET 1 OF 1



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBUR AND BREAK SHARP EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

TITLE:

MATERIAL:

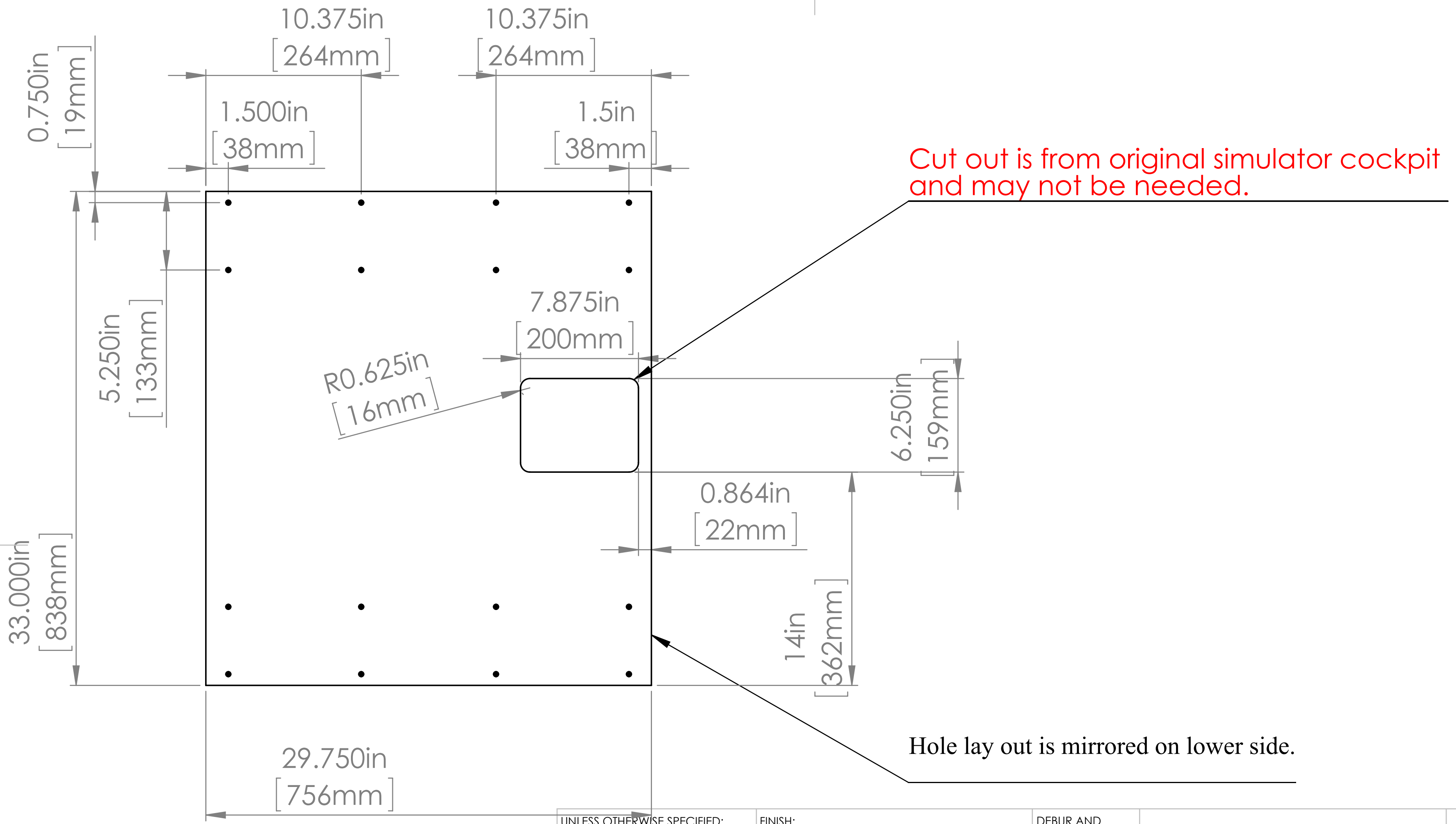
WEIGHT:

DWG NO. Part 19

A4

SCALE:1:5

SHEET 1 OF 1



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBUR AND
BREAK SHARP
EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

TITLE:

MATERIAL:

DWG NO.

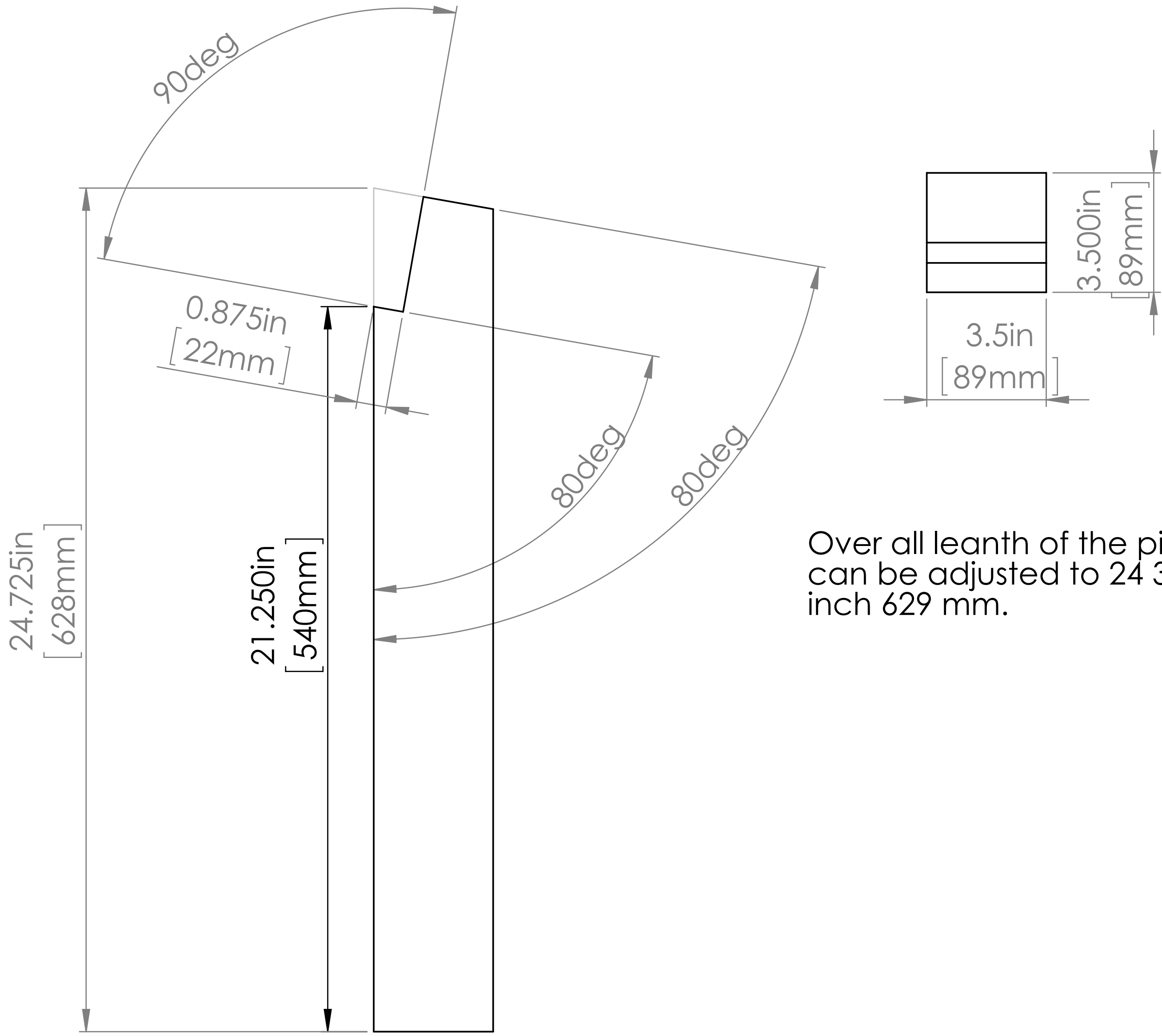
Part 20

A4

WEIGHT:

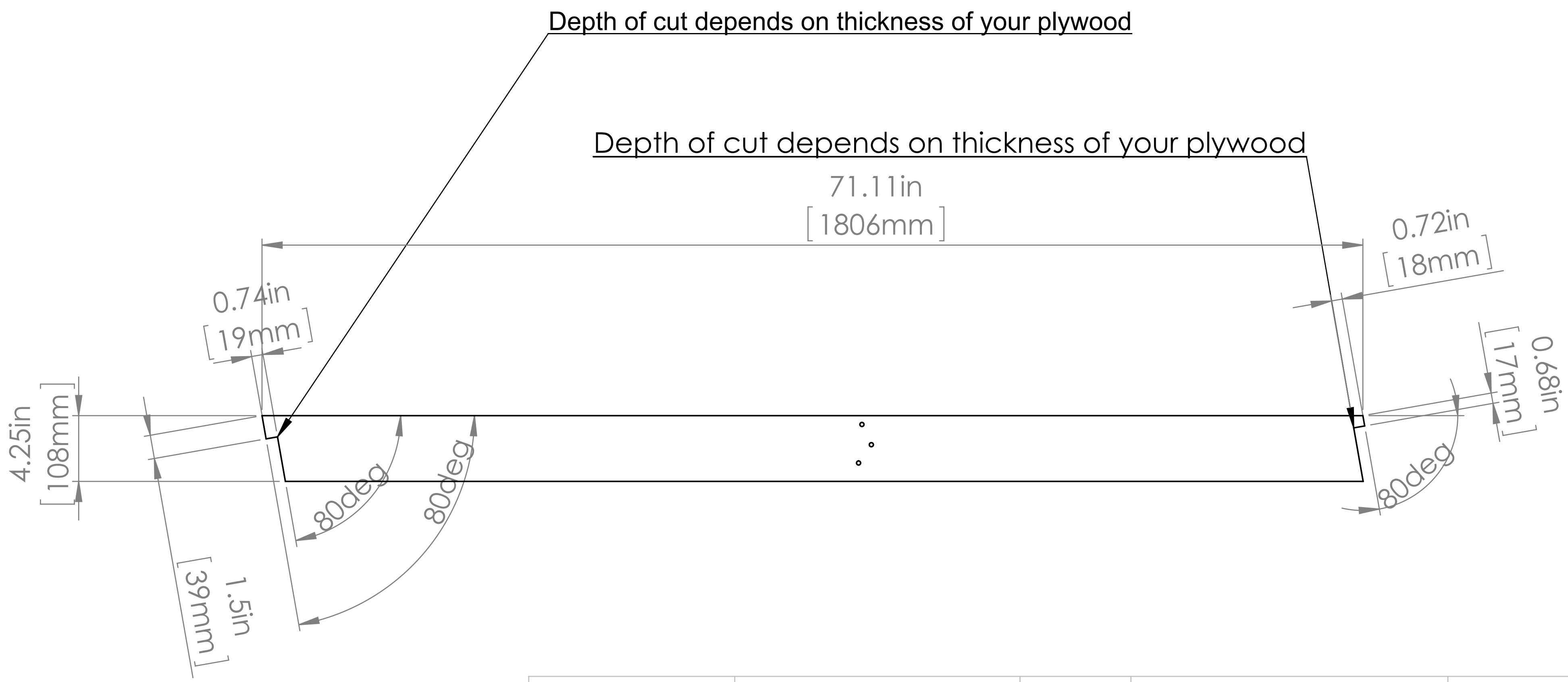
SCALE:1:10

SHEET 1 OF 1

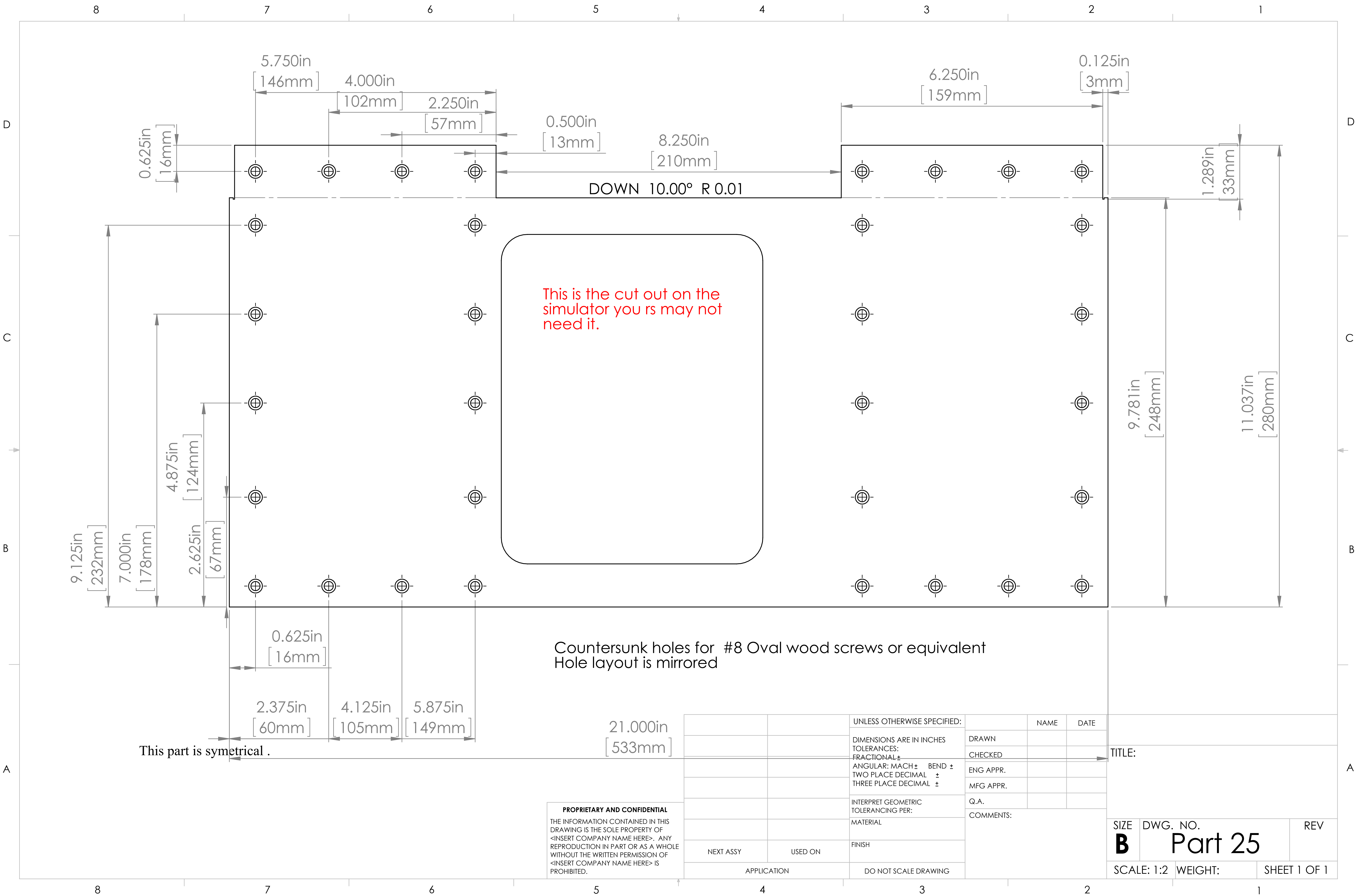


Over all leanth of the pices can be adjusted to 24 3/4 inch 629 mm.

you will need two of these over all length 71.25 these will be hand fited so expect some sanding.
end cuts are at 10 degs



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:			FINISH:		DEBUR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION
	NAME	SIGNATURE	DATE			TITLE:	
DRAWN							
CHK'D							
APPV'D							
MFG							
Q.A				MATERIAL:		DWG NO. Part 23 & 24	A4
				WEIGHT:		SCALE:1:10	SHEET 1 OF 1


5.750in [146mm]
4.000in [102mm]
2.250in [57mm]
0.500in [13mm]
8.250in [210mm]
6.250in [159mm]
0.125in [3mm]
0.625in [16mm]
1.289in [33mm]
DOWN 10.00° R 0.01
This is the cut out on the simulator you rs may not need it.
9.125in [232mm]
7.000in [178mm]
4.875in [124mm]
2.625in [67mm]
9.781in [248mm]
11.037in [280mm]
0.625in [16mm]
2.375in [60mm]
4.125in [105mm]
5.875in [149mm]
21.000in [533mm]
Countersunk holes for #8 Oval wood screws or equivalent
Hole layout is mirrored
This part is symetrical .
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±
INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL
FINISH
NAME
DATE
DRAWN
CHECKED
ENG APPR.
MFG APPR.
Q.A.
COMMENTS:
TITLE:
PROPRIETARY AND CONFIDENTIAL
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NEXT ASSY
USED ON
APPLICATION
DO NOT SCALE DRAWING
SIZE
B
DWG. NO.
Part 25
REV
SCALE: 1:2
WEIGHT:
SHEET 1 OF 1

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBUR AND BREAK SHARP EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

MATERIAL:

WEIGHT:

TITLE:

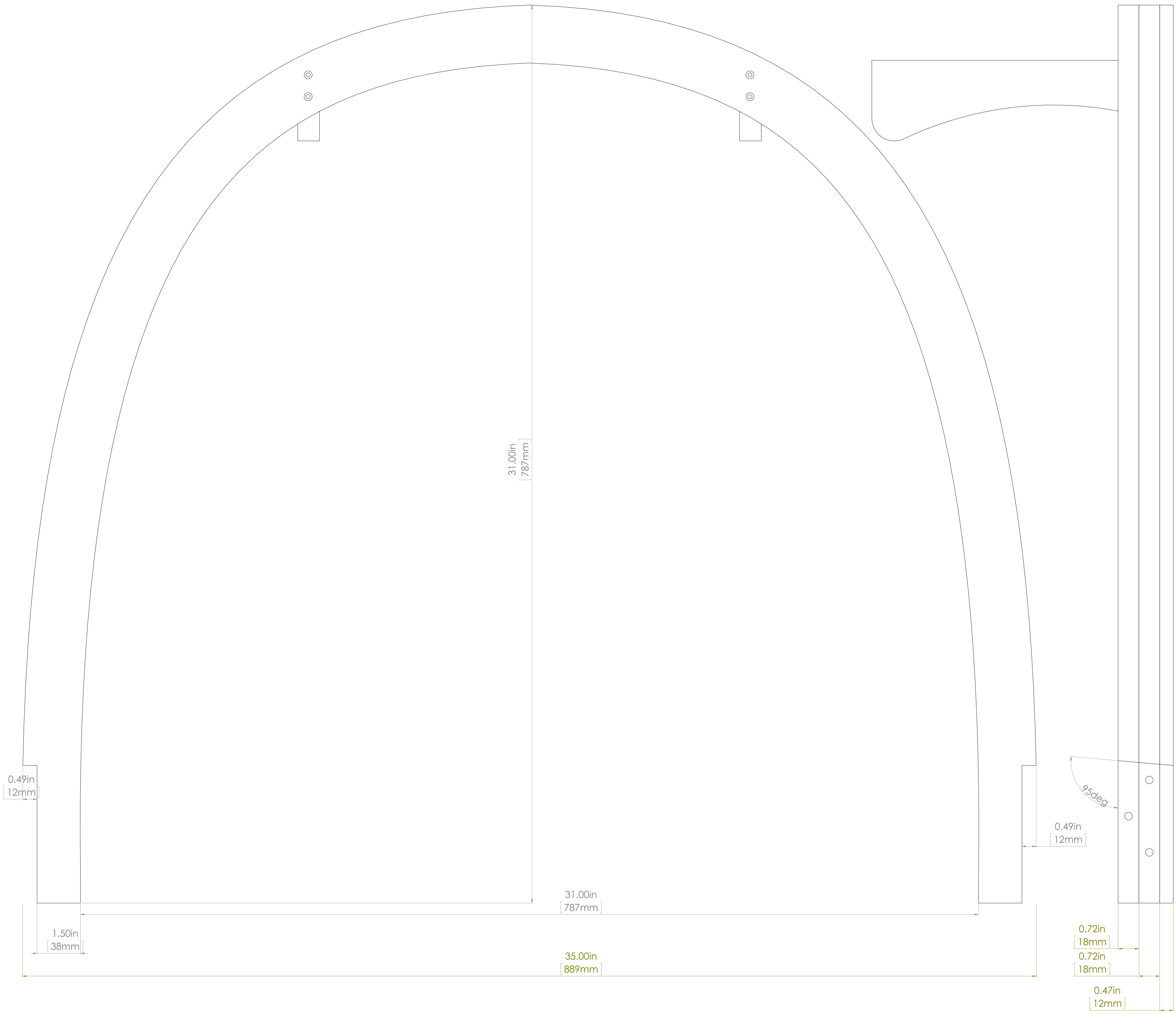
This layot is 1 to 1 and can be printed, checked and traced for cutting the two hangers

DWG NO. Part 26

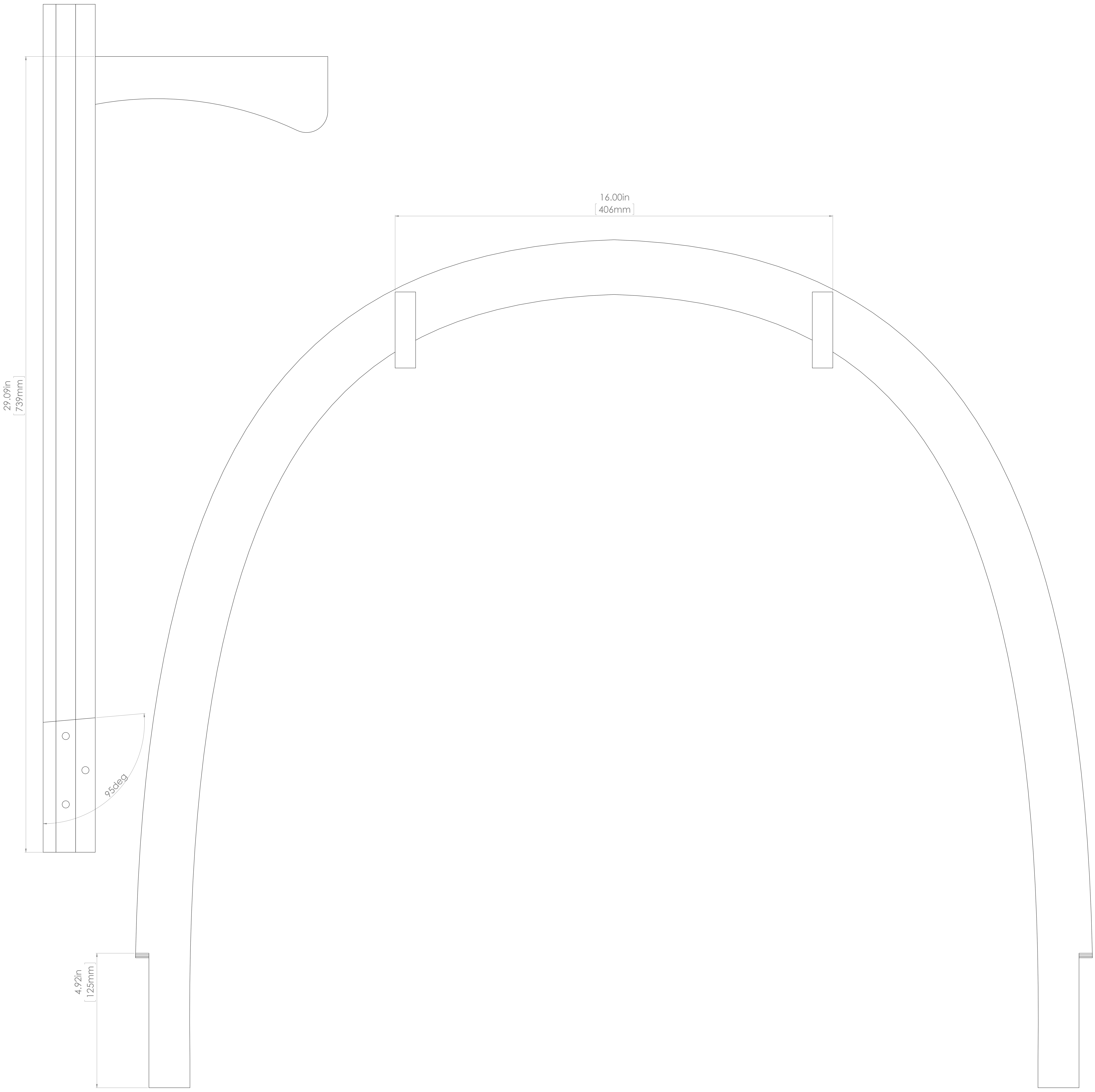
A4

SCALE:1:1

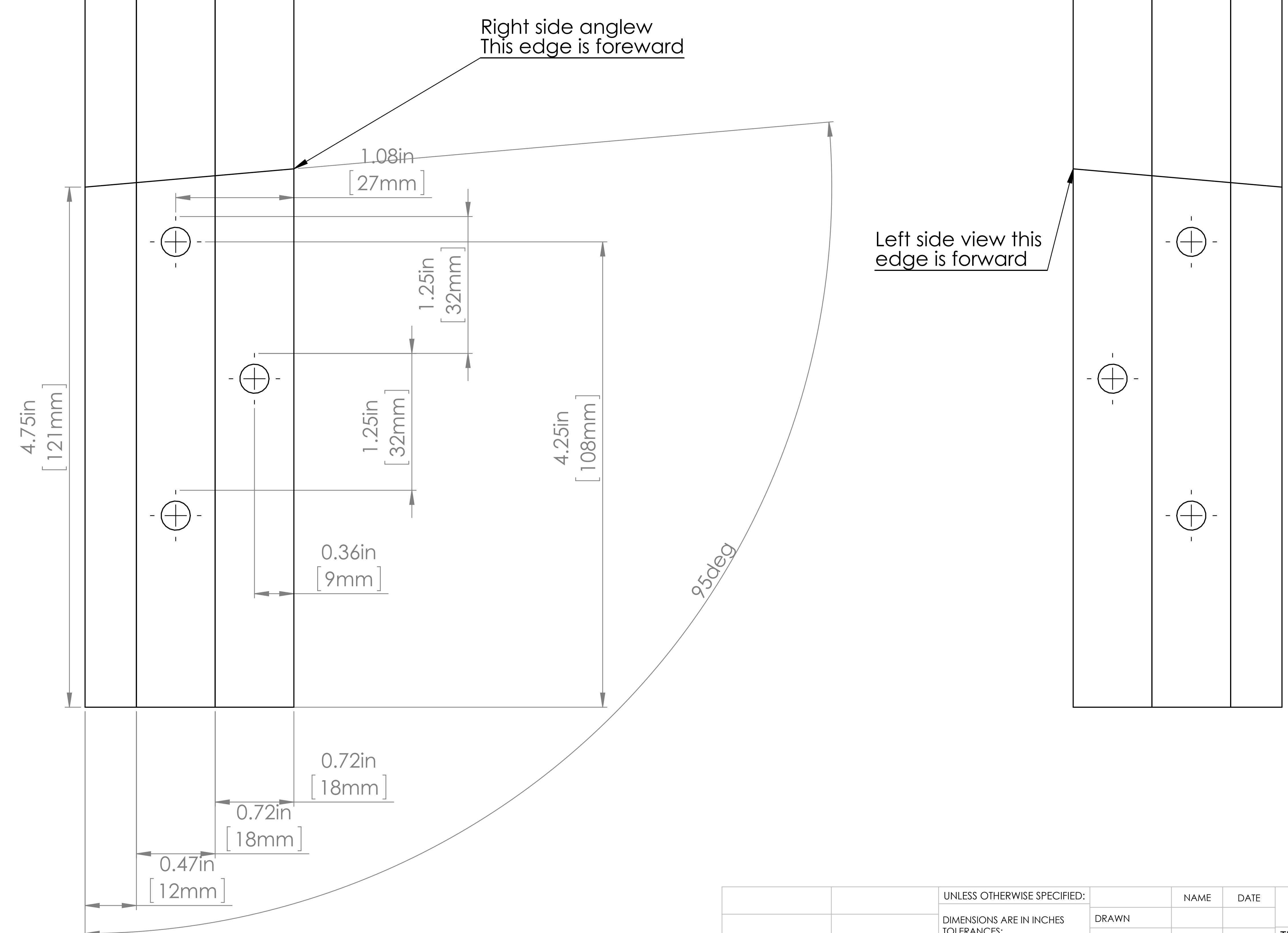
SHEET 1 OF 1



31.00in
787mm
0.49in
12mm
95deg
0.49in
12mm
31.00in
787mm
1.50in
38mm
35.00in
889mm
0.72in
18mm
0.72in
18mm
0.47in
12mm



16.00in
[406mm]
29.09in
[739mm]
95deg
4.92in
[125mm]



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NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL

FINISH

DO NOT SCALE DRAWING

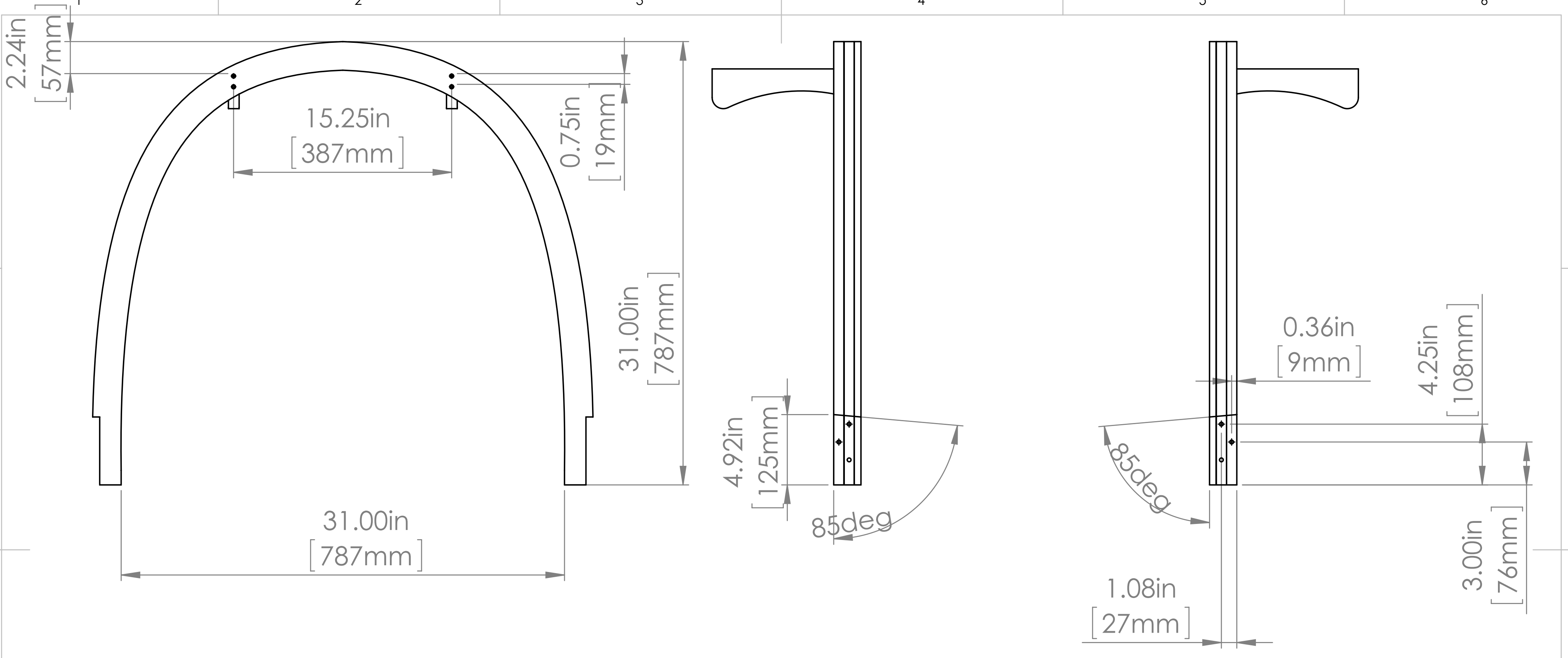
	NAME	DATE
DRAWN		
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

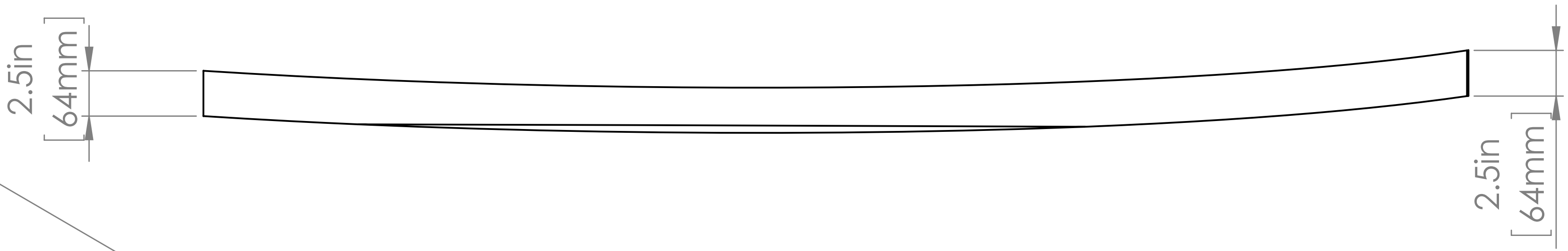
TITLE:

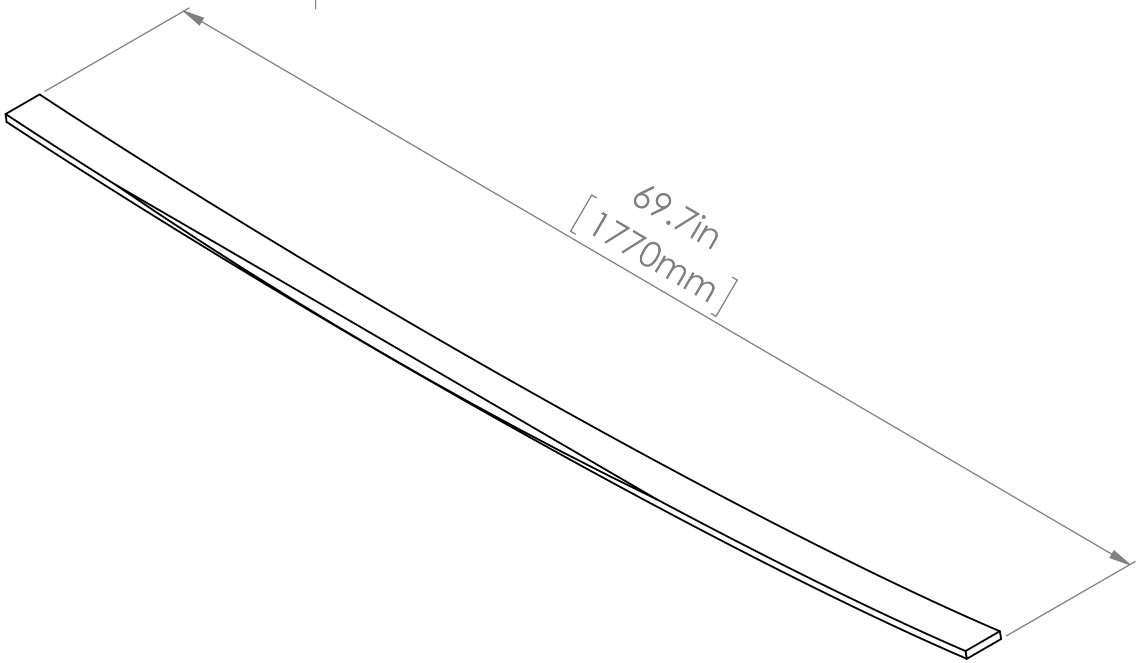
SIZE **B** DWG. NO. part 27 C REV

SCALE: 1:1 WEIGHT: SHEET 1 OF 1



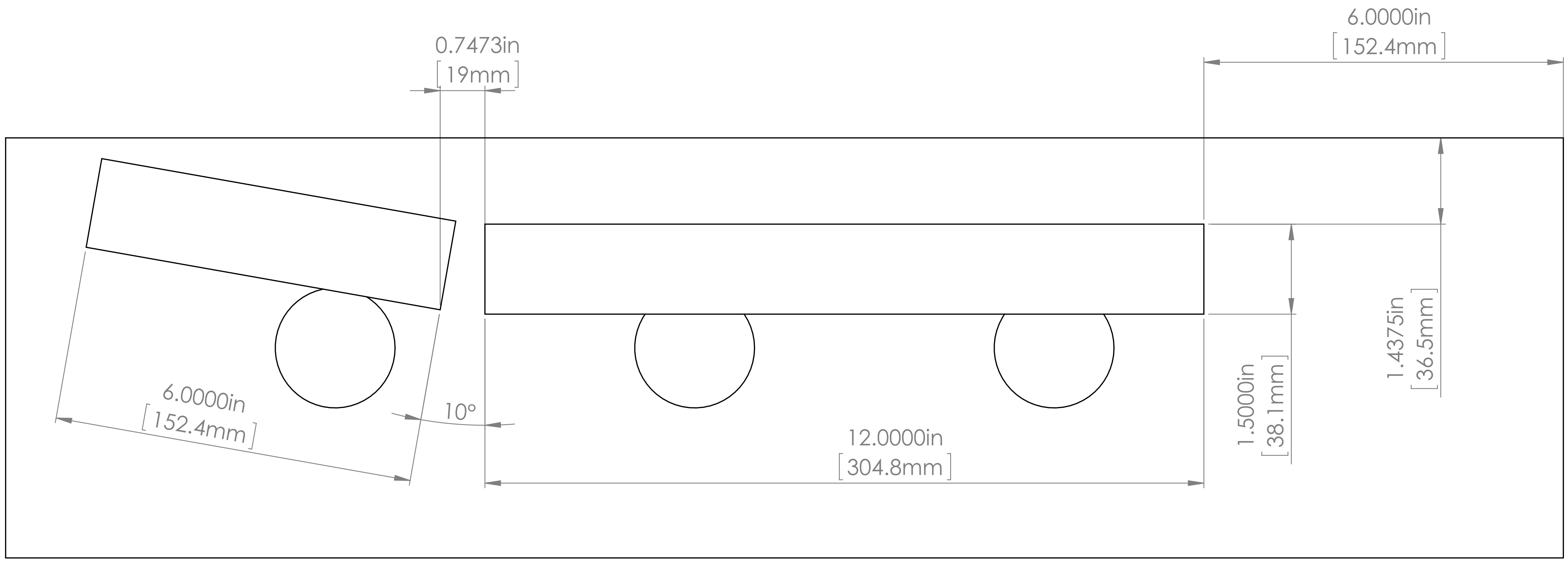
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		FINISH:		DEBUR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION
	NAME	SIGNATURE	DATE		TITLE:	
DRAWN						
CHK'D						
APPV'D						
MFG						
Q.A				MATERIAL:	DWG NO. Part 27	A4
				WEIGHT:	SCALE:1:10	SHEET 1 OF 1





.5 or 12 mm Ply wood inside curvature will need to be scribe off of vertical parts 23&24. out side curve will basic fallow in side but will need chamfered for skin to cover it.

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:			FINISH:		DEBUR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION
	NAME	SIGNATURE	DATE			TITLE:	
DRAWN							
CHK'D							
APPV'D							
MFG							
Q.A				MATERIAL:		DWG NO. Part 28	A4
				WEIGHT:		SCALE:1:10	SHEET 1 OF 1



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NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±

INTERPRET GEOMETRIC TOLERANCING PER:

MATERIAL

FINISH

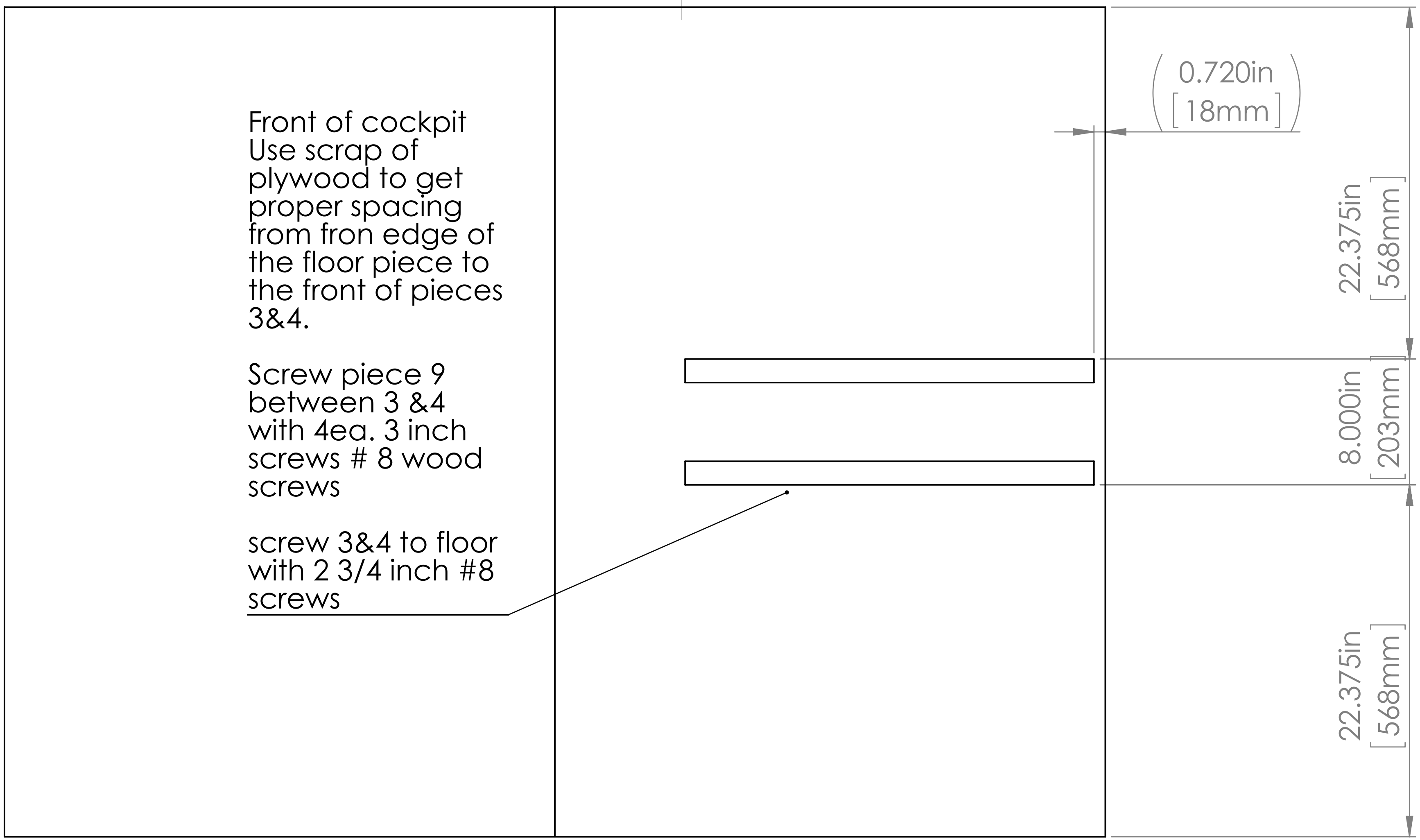
DO NOT SCALE DRAWING

	NAME	DATE
DRAWN		
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

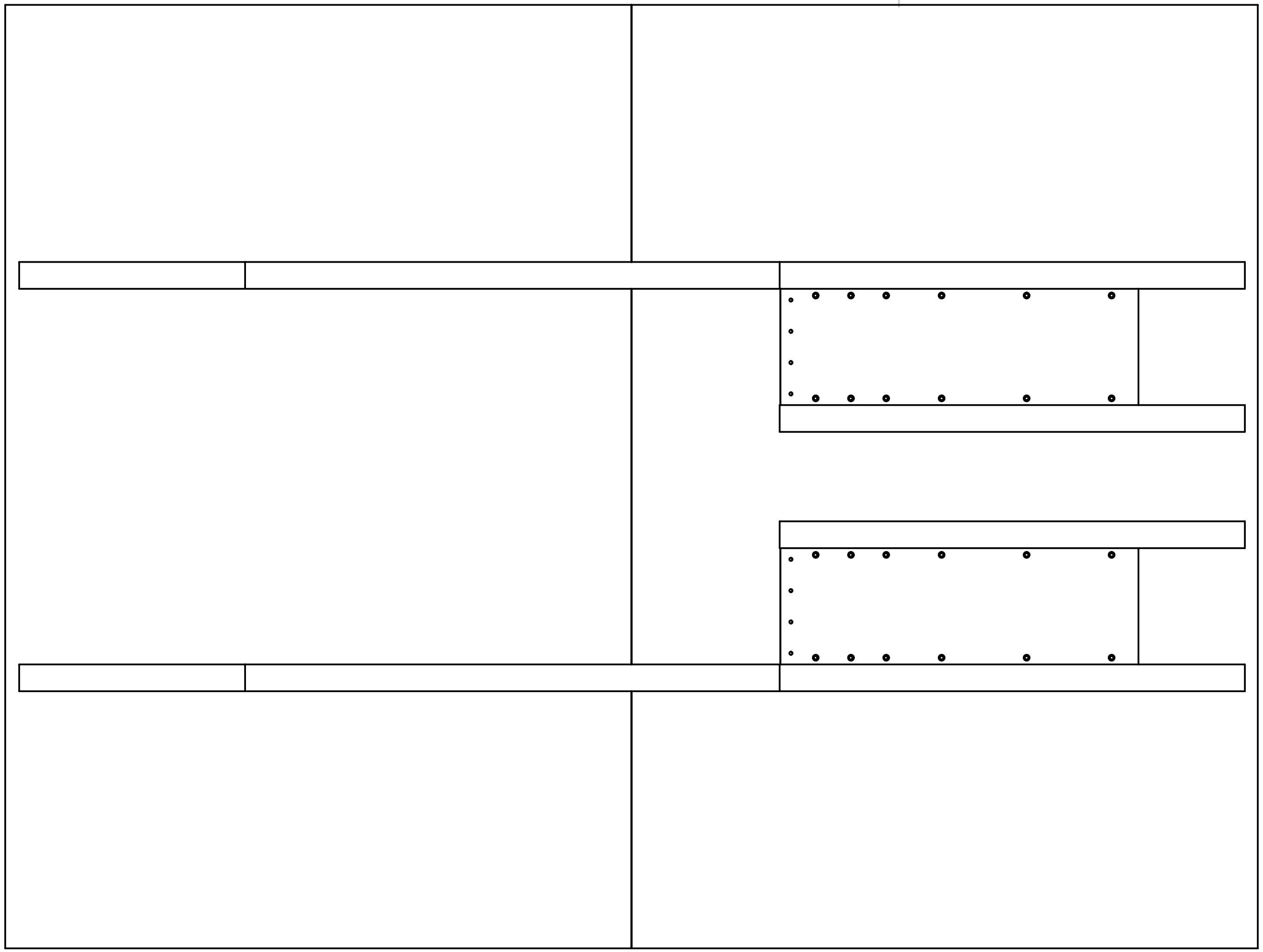
COMMENTS:

TITLE:

SIZE	DWG. NO.	REV
B	Foot well support placment	
SCALE: 1:2	WEIGHT:	SHEET 1 OF 1



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	FINISH:			DEBUR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION
	NAME	SIGNATURE	DATE		TITLE:	
DRAWN						
CHK'D						
APPV'D						
MFG						
Q.A				MATERIAL:	DWG NO. 2 Layout	A4
				WEIGHT:	SCALE:1:10	SHEET 1 OF 1



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBUR AND BREAK SHARP EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

TITLE:

MATERIAL:

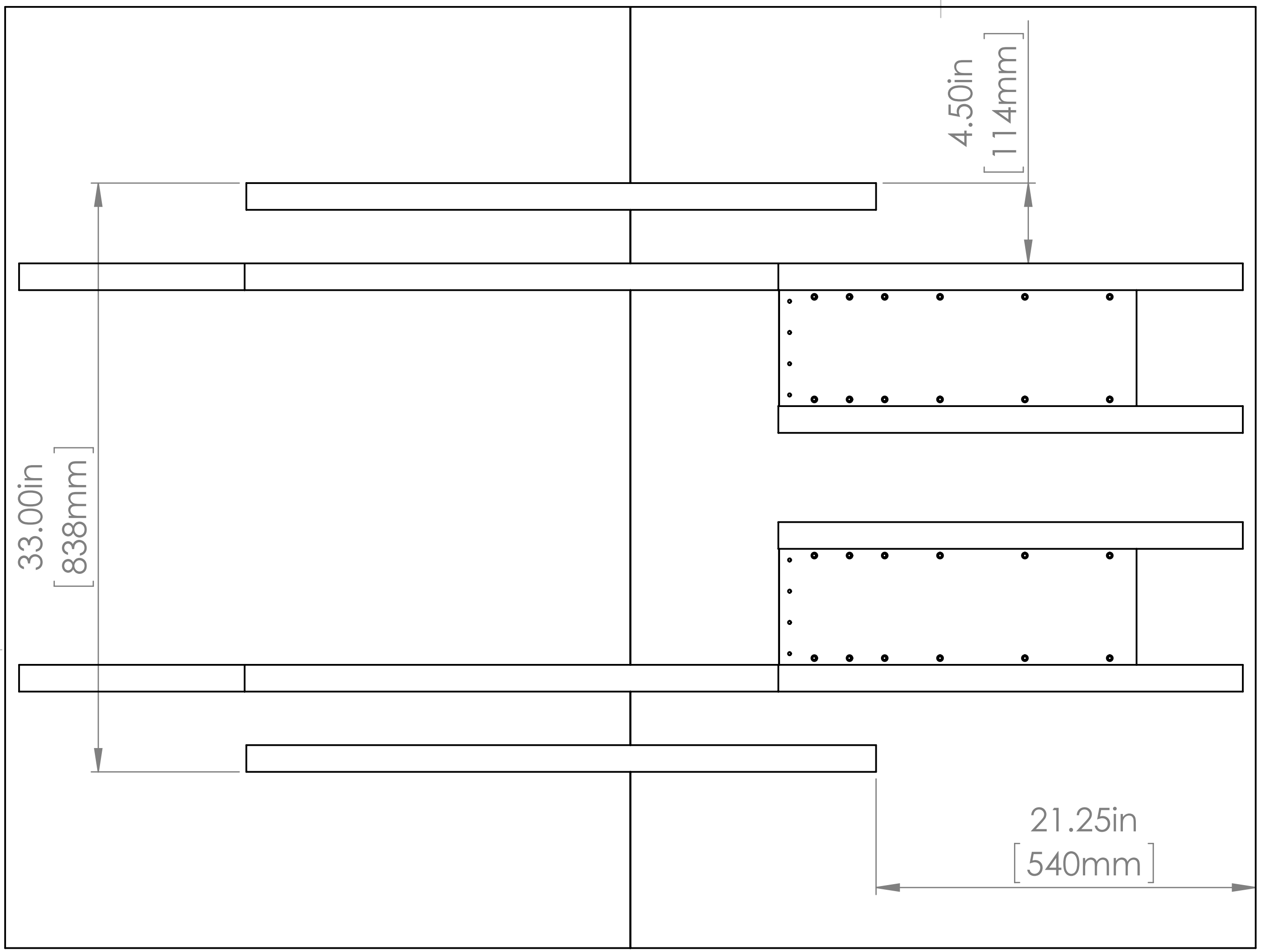
WEIGHT:

DWG NO. 3 Layout

A4

SCALE:1:10

SHEET 1 OF 1



UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBUR AND BREAK SHARP EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

TITLE:

MATERIAL:

DWG NO.

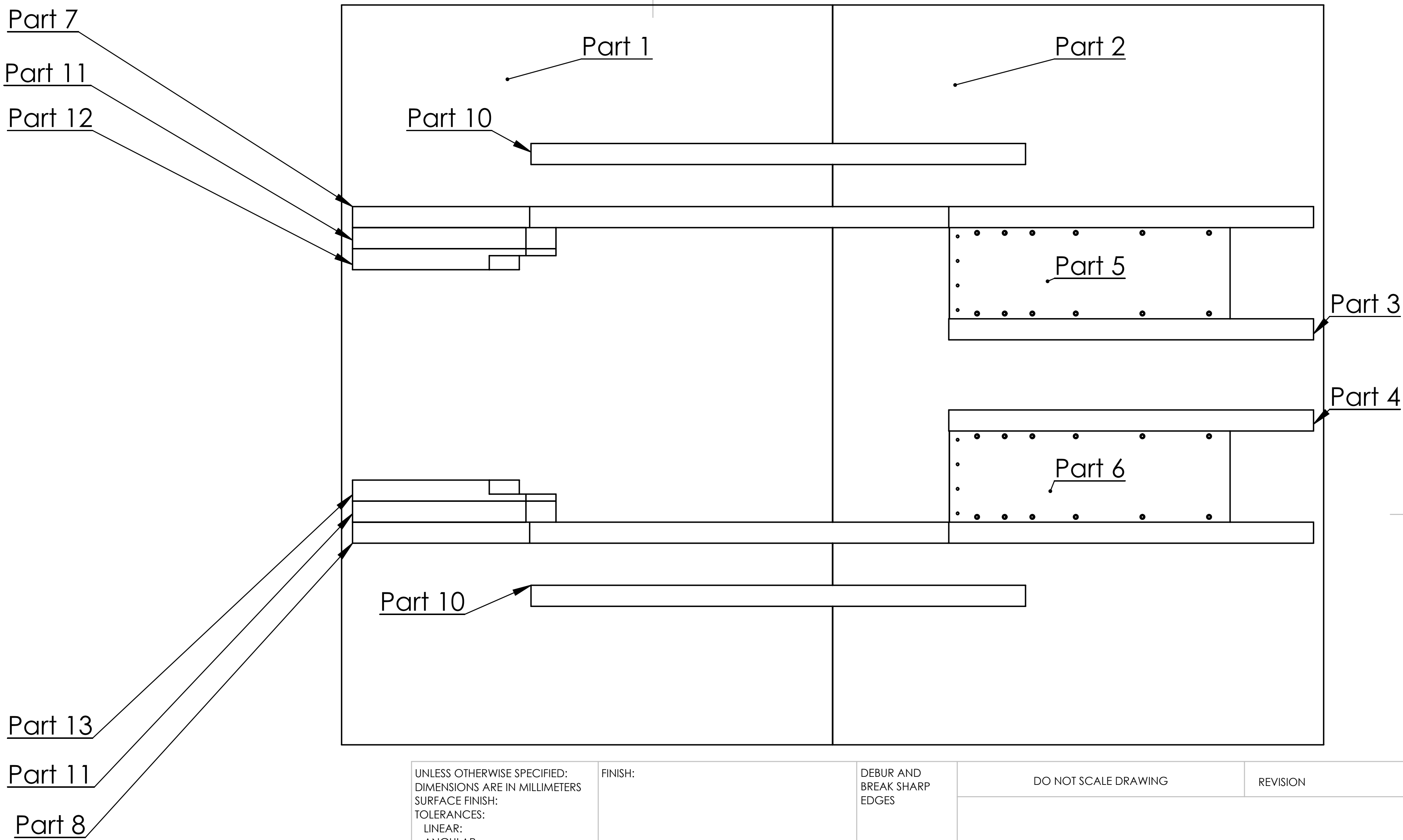
4 Layout

A4

WEIGHT:

SCALE:1:10

SHEET 1 OF 1



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	FINISH:	DEBUR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

MATERIAL:

WEIGHT:

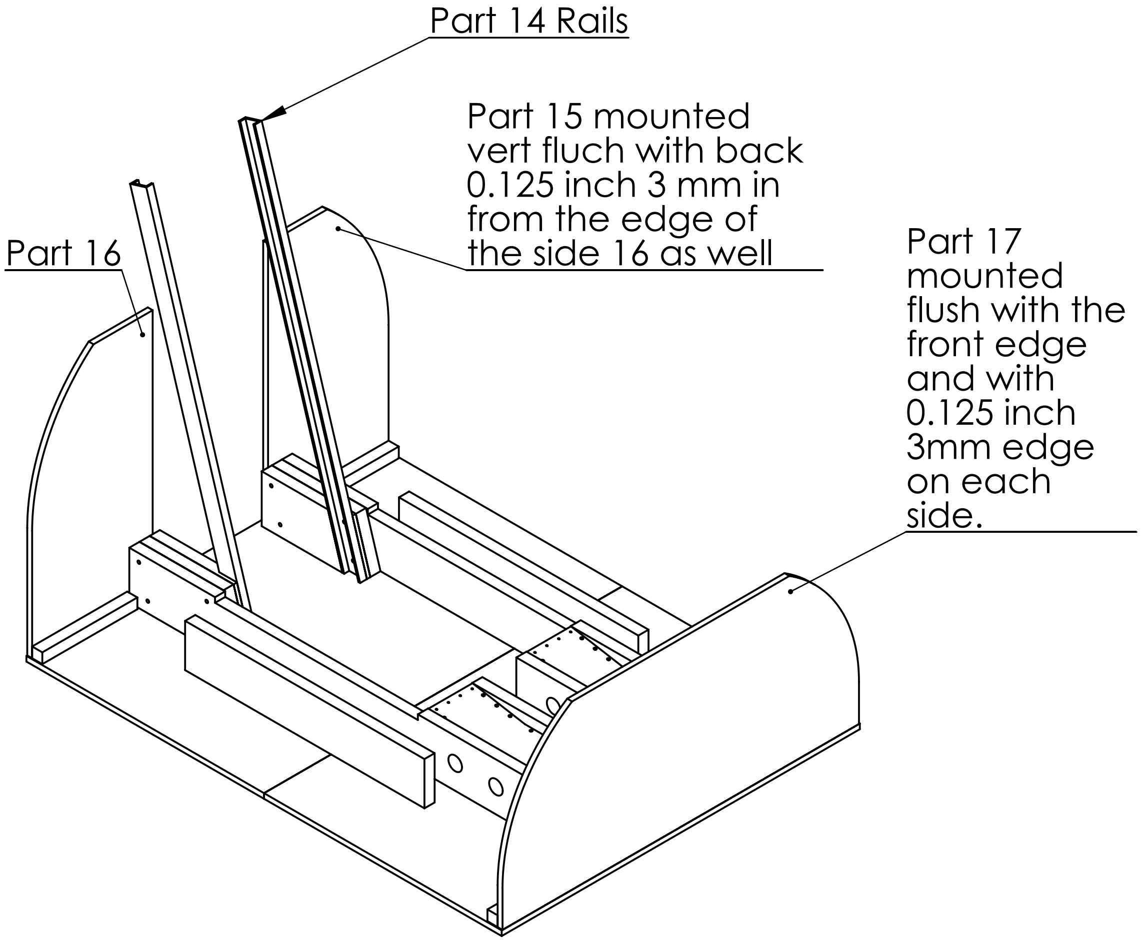
TITLE:

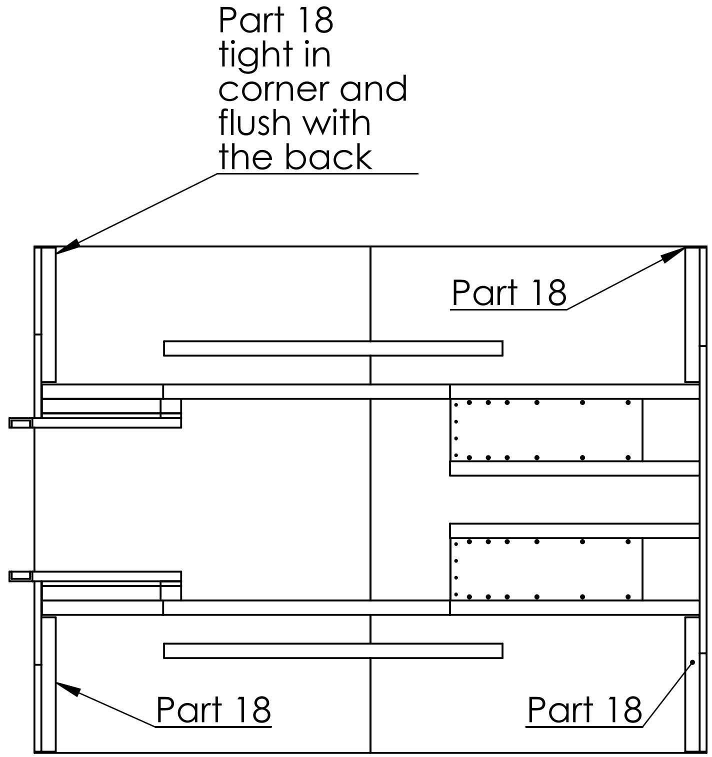
DWG NO. 5 Layout

A4

SCALE:1:10

SHEET 1 OF 1





UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	FINISH:	DEBUR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION

	NAME	SIGNATURE	DATE		
DRAWN					
CHK'D					
APPV'D					
MFG					
Q.A				MATERIAL:	
				WEIGHT:	

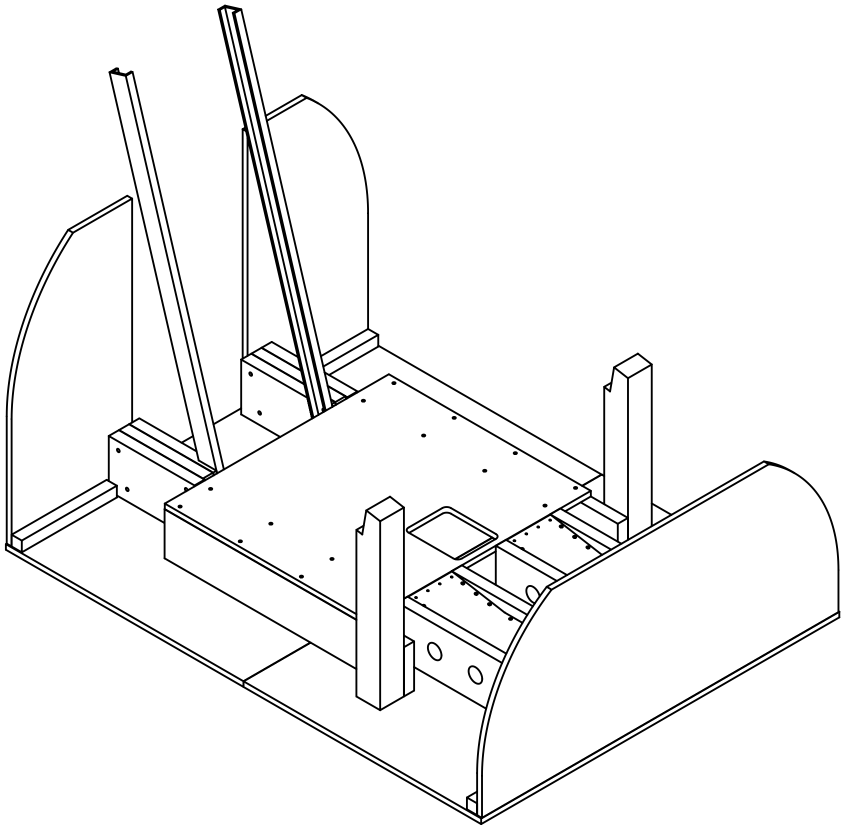
TITLE:

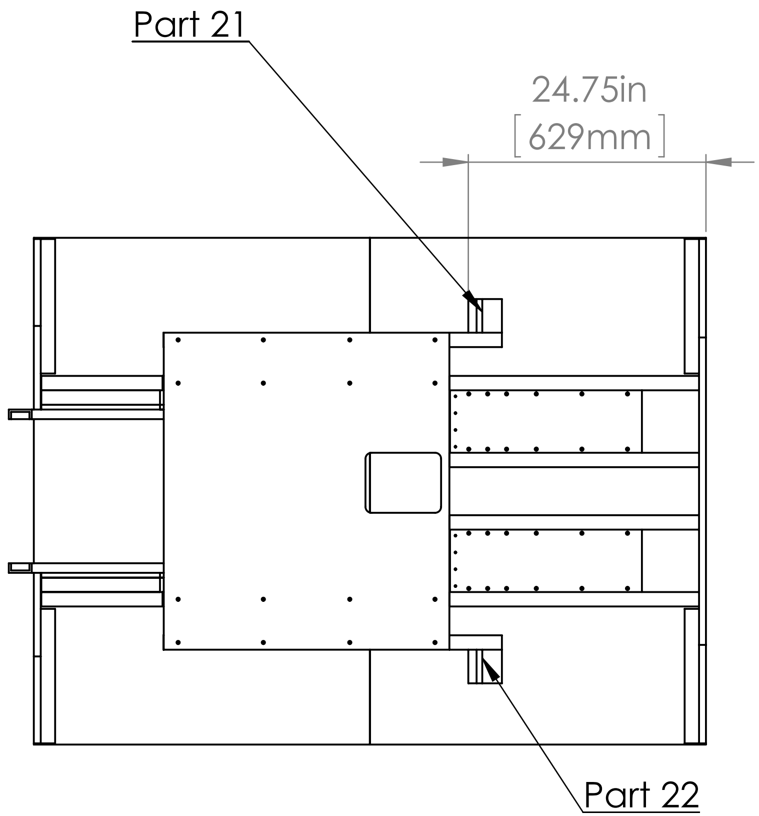
DWG NO. 6 Layout

A4

SCALE:1:20

SHEET 1 OF 1





UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBUR AND BREAK SHARP EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

TITLE:

MATERIAL:

WEIGHT:

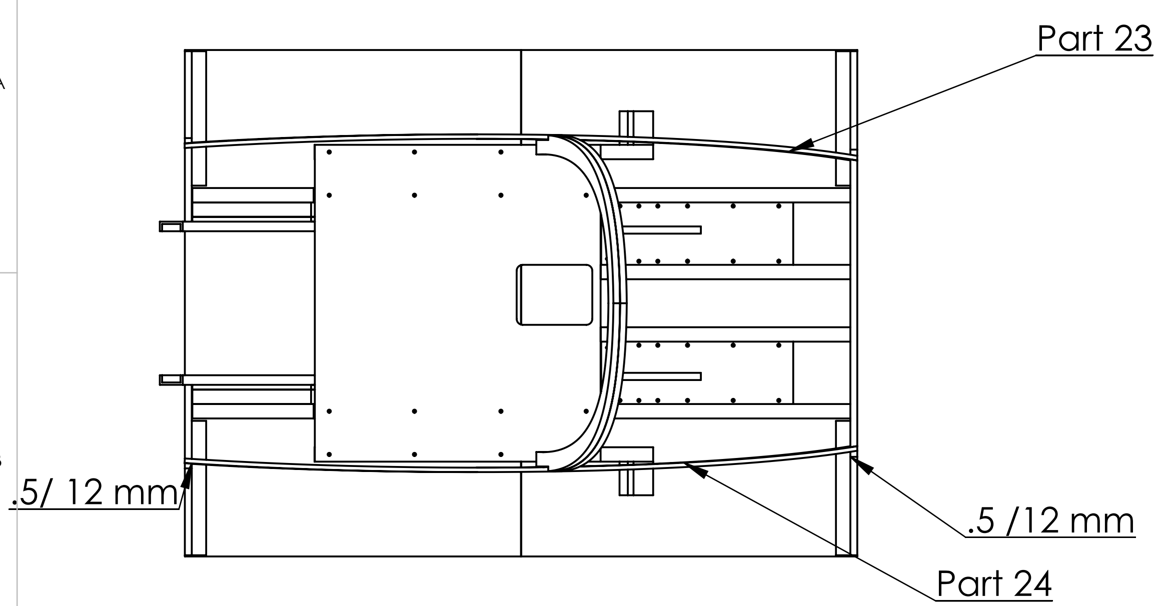
DWG NO.

7 Layout

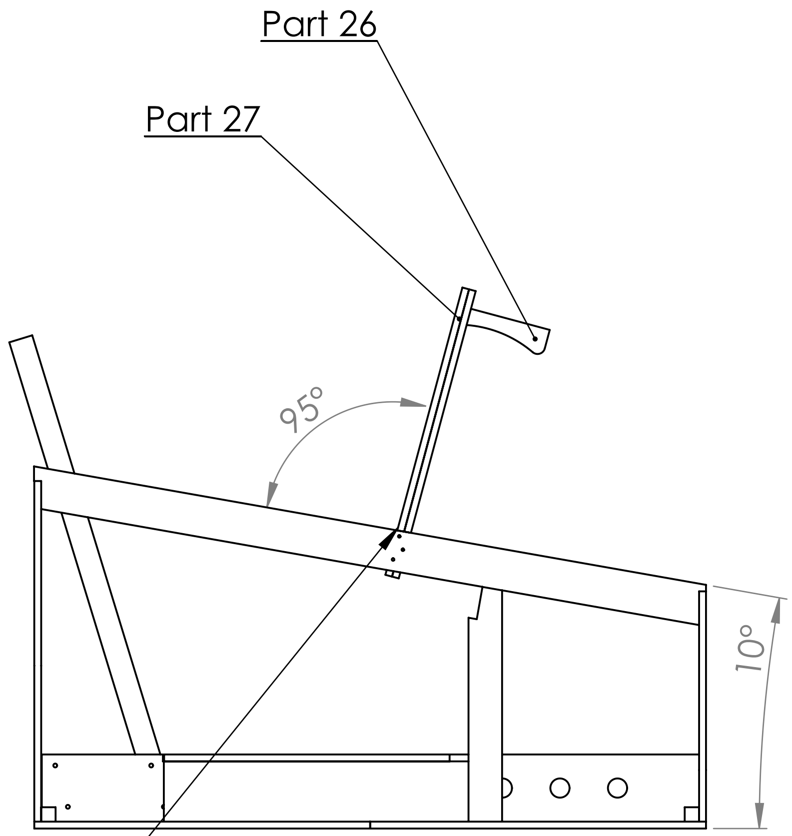
A4

SCALE:1:20

SHEET 1 OF 1



front and rear of part 23 and 24 are .5 or 12mm in from the inside edges of the front and back wall



from the lip of the bow to the front edge of the vert canopy support 32.75in 832 mm

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	FINISH:		DEBUR AND BREAK SHARP EDGES		DO NOT SCALE DRAWING	REVISION
	NAME	SIGNATURE	DATE		TITLE:	
DRAWN						
CHK'D						
APPV'D						
MFG						
Q.A			MATERIAL:		DWG NO. 8 Layout	A4
			WEIGHT:		SCALE:1:20	SHEET 1 OF 1