Technical Note

Guidelines for Printing Props

Everything you need to know to make amazing props using LC Titan and Photocentric resins

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Material Choice

Choosing the right material is essential in getting the ideal part for your application.

The props industry 3D printing divides into prototyping and end-use parts (including indoor and outdoor) sectors. For both, materials must provide strength, toughness (high impact strength) and some flexibility.

End-use parts sometimes also need be flame resistant by their nature or by virtue of a coating.

For outdoor end-use parts, they require materials that can survive withstanding humidity, UV and weathering.

We recommend using our Durable DL110H for most prop applications or Hard Black for easy affordable prototyping. Durable DL110H has great impact strength and high elongation at break, good HDT and great aging resistance, perfectly suiting the requirements of end-use parts.

Preparing your File

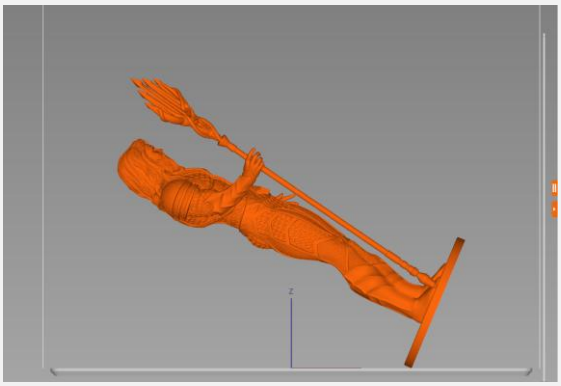
Hollowing and Minimum Wall Thickness

The minimum recommended wall thickness is 4-5mm with an infill of 2 x 20mm (which means a 2mm thick infill in a 20mm cell size). These numbers will give you both a lightweight and strong structure. If you have a very complex shape, use a 2 x 10mm infill. This is because when hollow, the complex part inside the model may have unsupported islands, which will cause printing issues, and a denser infill compensates for this. It is also more likely to support all hidden, internal overhangs.

Hollowing is needed in all large areas to reduce resin usage, maintain strength and prevent warpage. Use hollowing when the model has areas larger in the xy axis than 80x80mm (for the DL110 range) or 30x30mm (for the Hard range).

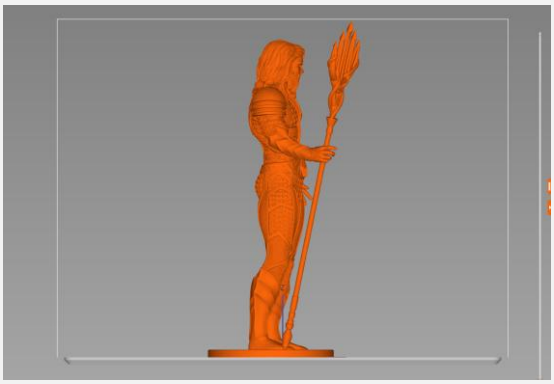
Preparing your File in Photocentric Studio

Upload your file into Photocentric Studio, orientate the part in the way that requires the minimal number of supports, and the minimal XY surface area throughout its print. If the model can self-support, there's no need to orient and support it. If not, orient the print so that the supports are anchored on the B-surface or a less visible side.



Incorrect orientation

Printing at this angle will reduce print time, but increase post processing time. Supports may reduce the details

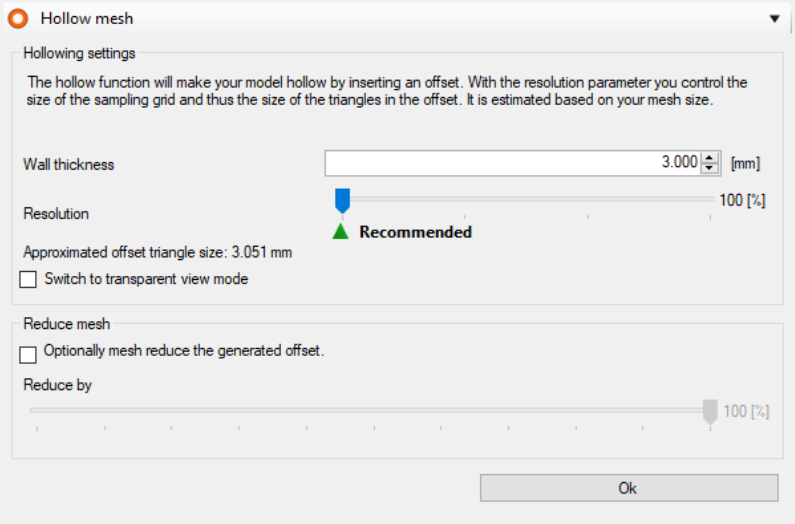


Correct orientation

Printing vertically requires minimal supports on the bottom of the part and on one hand, the rest is self-supporting

To hollow click on ‘Hollow Mesh’ 

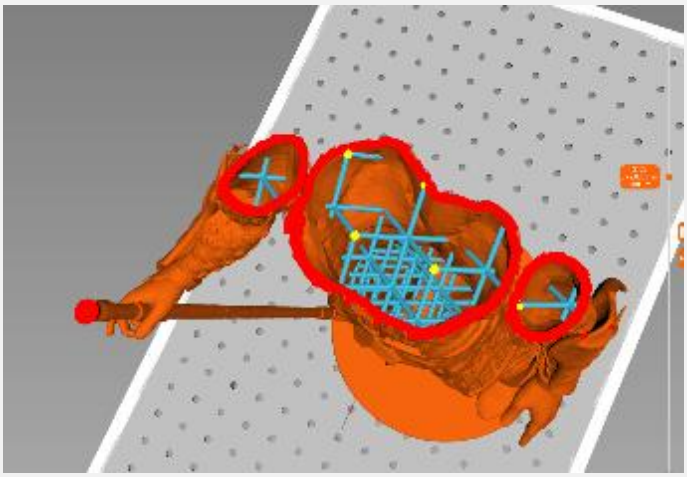
Then select ‘Wall thickness’ and set to 3mm



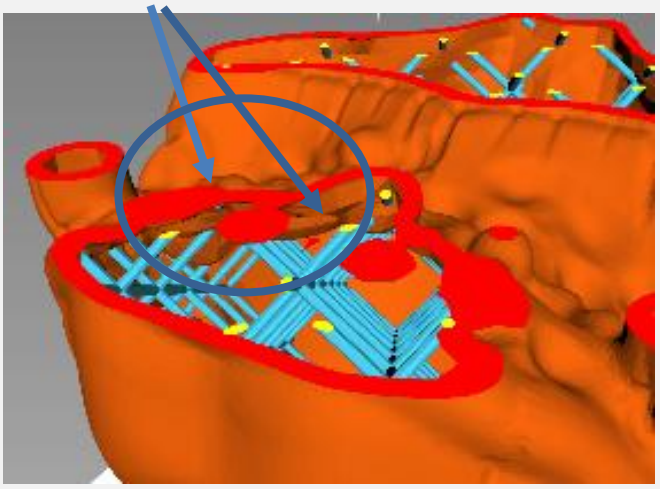
Choose an infill diameter of 2mm, and a cell size of 20mm 

The cell size can be reduced to increase infill density, depending on the model size and shape. Smaller cell sizes will increase the total weight of final part. It is important to add infill as it not only makes part stronger but also supports the model’s internal shell.

After the infill has been added, use the slide bar to go up through the layers to see if there are any unsupported islands inside the structure.



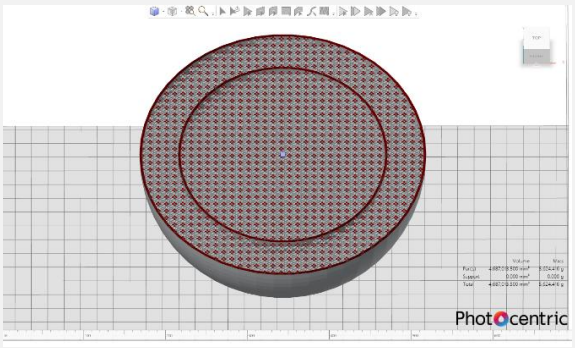
Using the slide bar to check the floating islands



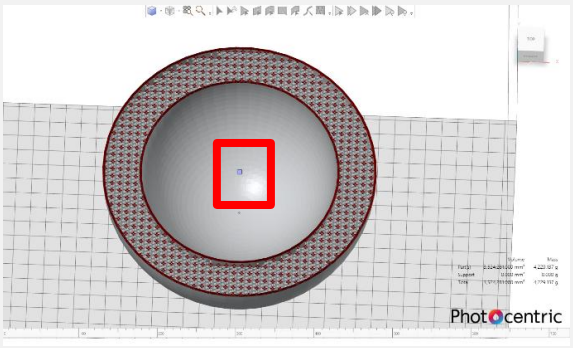
Unsupported islands inside the part

Double walls hollowing

Additionally, to reduce the weight of the part (for large sized parts), we recommend ‘double walls hollowing’ the parts. First hollow the parts with 50-100mm wall thickness. After, add a small drain hole in the shell to break the surface. Now you can hollow the shell second time and add infill. This will reduce the weight of total part and at the same time maintain its strength.



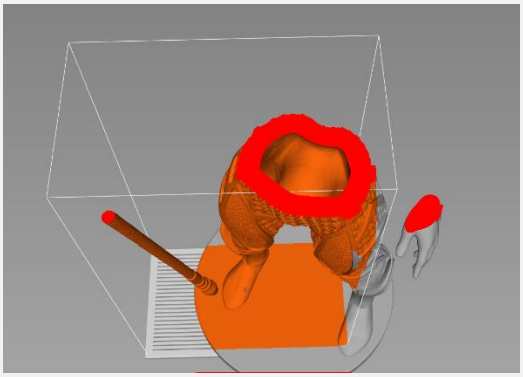
With no drain hole prior to second hollowing step, infill will fill the whole shell



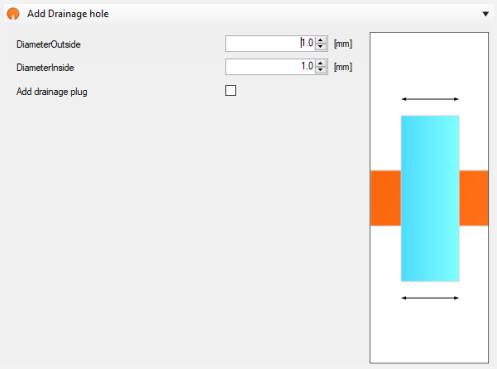
With a small drain hole prior to second hollowing step, infill will fill only the space between double walls

Example of double walls hollowing

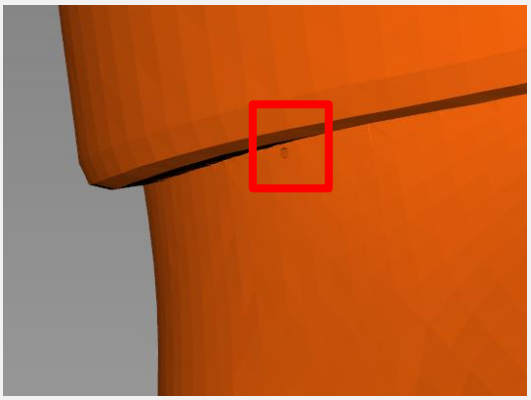
Step 1



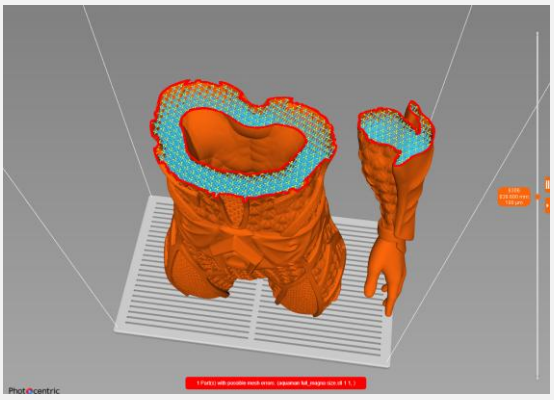
Step 2



Step 3



Step4

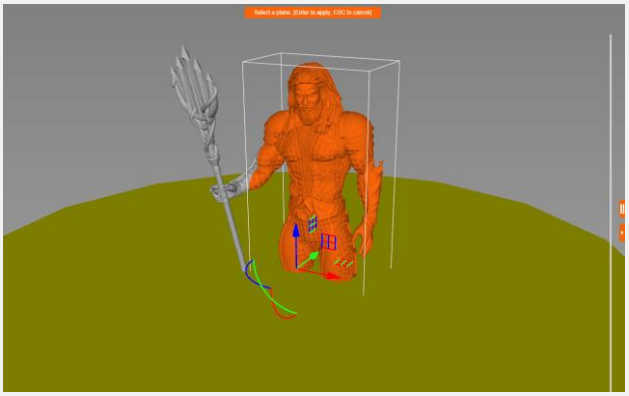


Cutting Parts

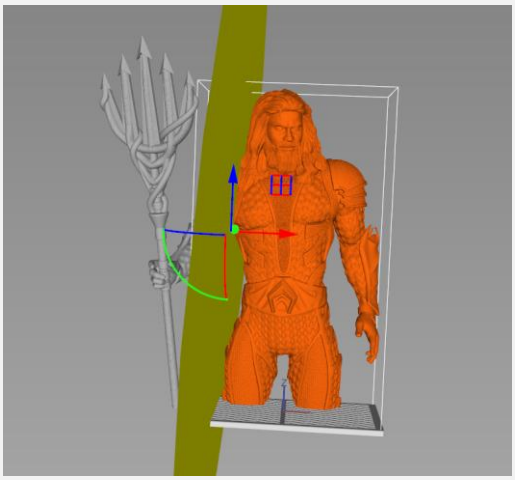
Use the ‘Cutting tool’ for cutting the part into smaller pieces. 

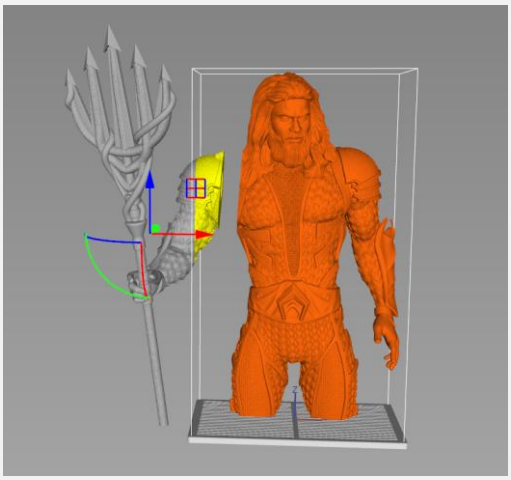
If the part doesn’t fit into Titan build volume, you can cut the model to suitable pieces.

For example, for this model; cut the legs off to split the body into an upper and lower half. The cut should allow the head to comfortably sit with within the height of the Titan build volume. Then cut the length of arm off that is outside the build volume.



First Step- cutting the legs off to split the body into an upper and lower half

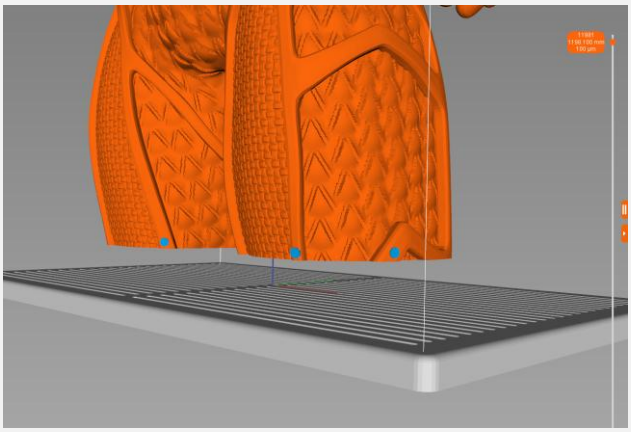




Second step - Cutting the length of arm off that is outside the build volume

Adding Drain Holes and Air Vent Holes

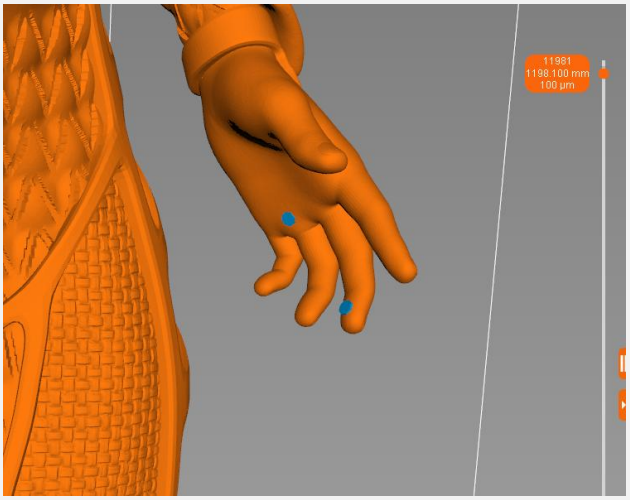
Air vent holes are needed to reduce the cupping effect during the printing process. Without these holes, lines and/or blow-out holes can appear in the part. These holes should be placed close to where the part is joined to the platform. In Studio, Air vent holes are same as drain holes, where you locate them make them air vent holes. Add 10mm air vent holes on the bottom of the part just above the platform. These holes are needed to reduce the cupping effect.



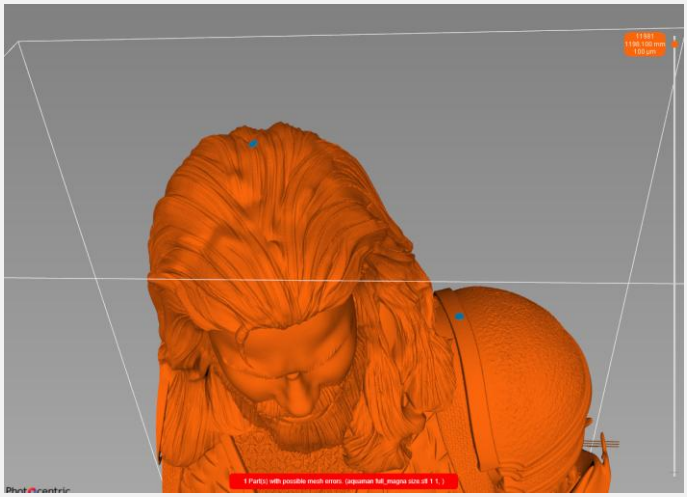
Examples of air vents

Drain holes are needed to drain resin from the print and to drain washing liquid during washing process and must be added to every cavity to avoid prominent lines and the part delaminating.

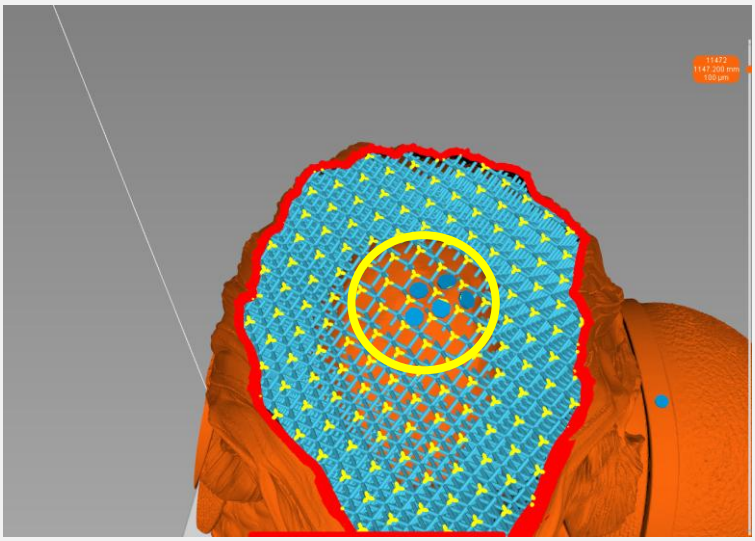
You need to add drain holes in any enclosed area to be able drain the part after the print finishes (shown here in the hand and head). These holes will allow you to wash the part properly and drain all solvent and water after post processing. For example for double wall hollowed parts, you need to add drain holes for both inner and outer shells (below screenshots).



Examples of drain holes added to every cavity



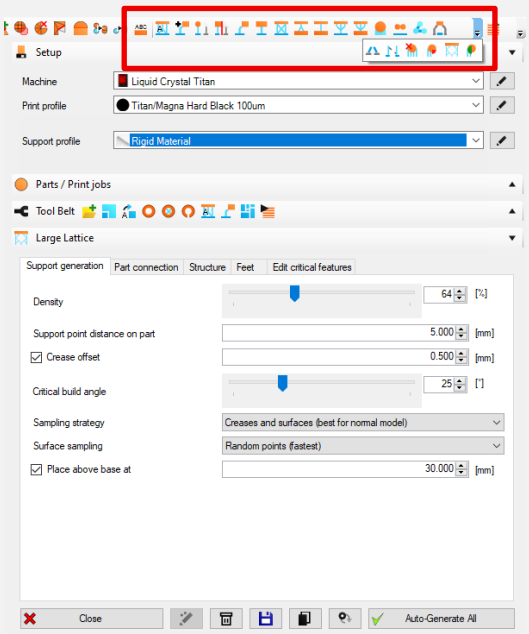
Examples of drain holes added to every cavity



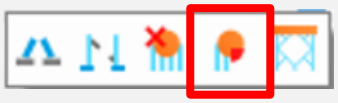
Examples of drain holes for the outer shells

Adding Supports

Use Supports Tool Bar to add supports. Choose between Manual and Automatic supports to generate. Choose the right Support profile for material you are using.



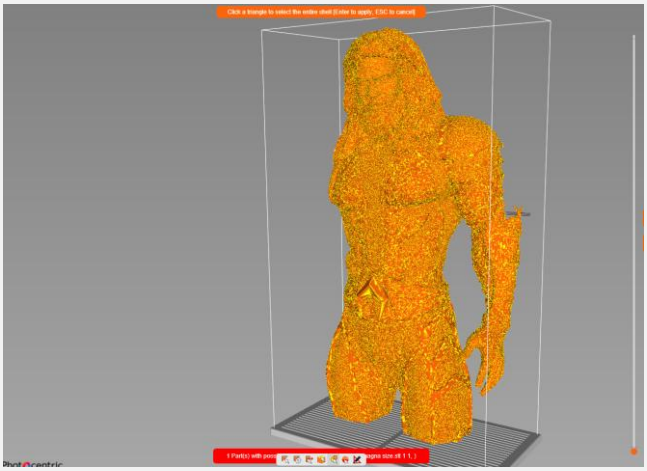
To ensure some surfaces don't have supports on them, before generating supports, use the marking feature (Photocentric Pro version only).



When you click on it you will be able to mark the non-supported areas (Photocentric Studio Pro only).

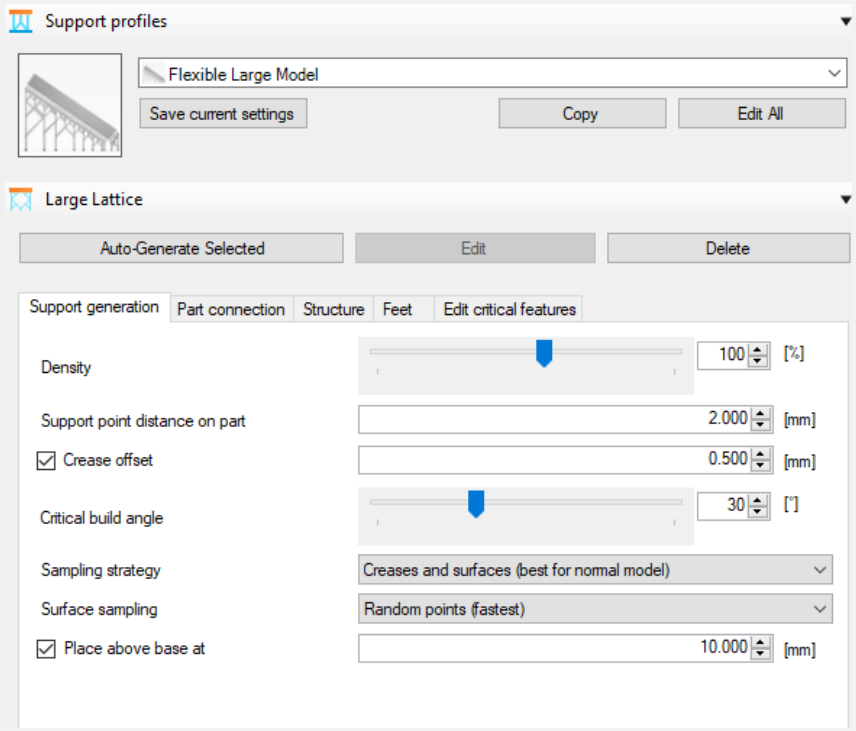
Once you activate it, use the tool belt below to mark the areas you want to remain unsupported.

Then click 'Enter' to activate these areas, and all the marked areas will not have supports on them.

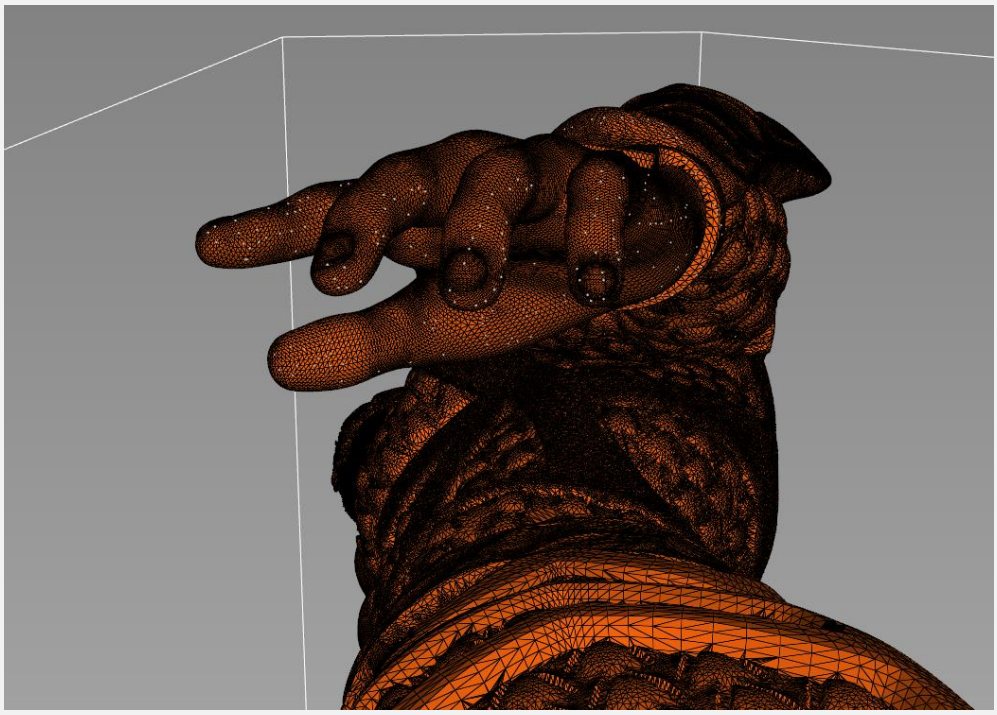


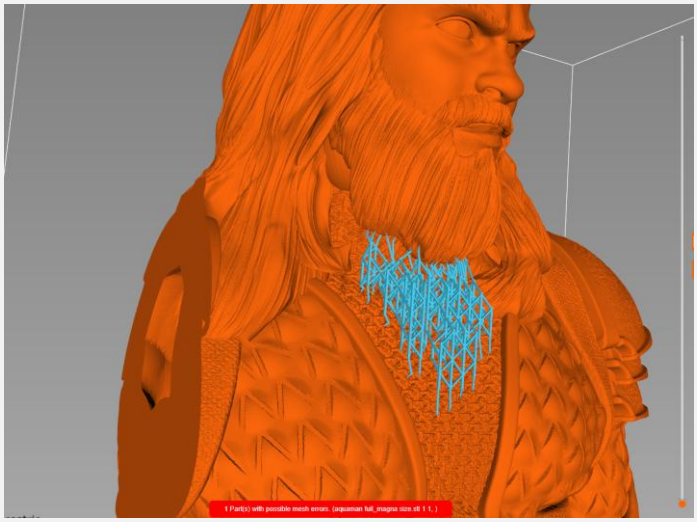
After generating the supports, check that all the lowest points are adequately supported. Depending upon the

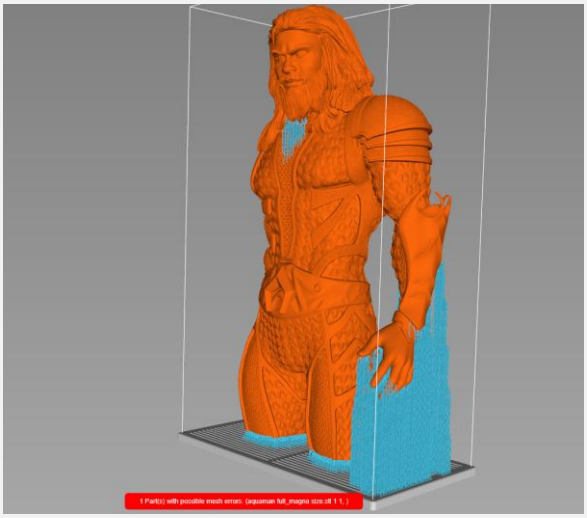
complexity of the part's mesh, some areas may remain have insufficient supports. Use the ‘Edit’ button on the right-hand side of the screen to manually adjust the supports as needed.



When you click the ‘Edit All’ button, only the contact points for the supports will be displayed. Clicking on any of any existing support points will delete them, while clicking on any other area will add a new contact point there.







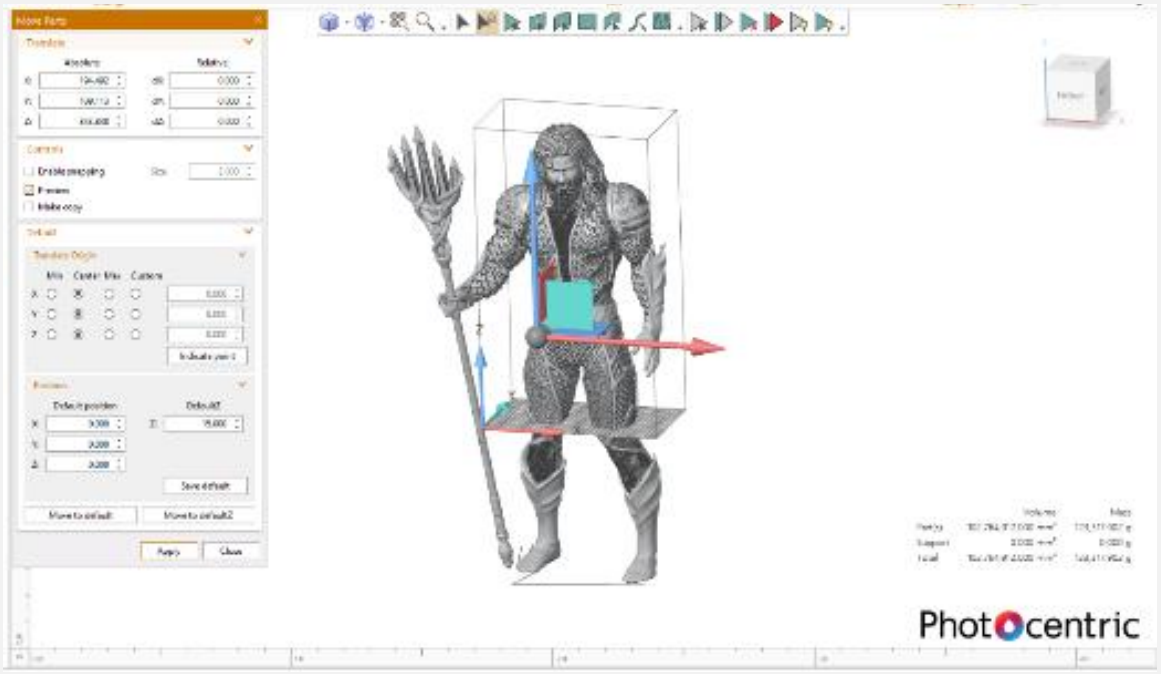
Ensure that the supports are strong enough to hold the weight of the part and remain stable under peeling and gravitational forces.

Preparing your file in VoxelDance Additive Software

Orientating the part

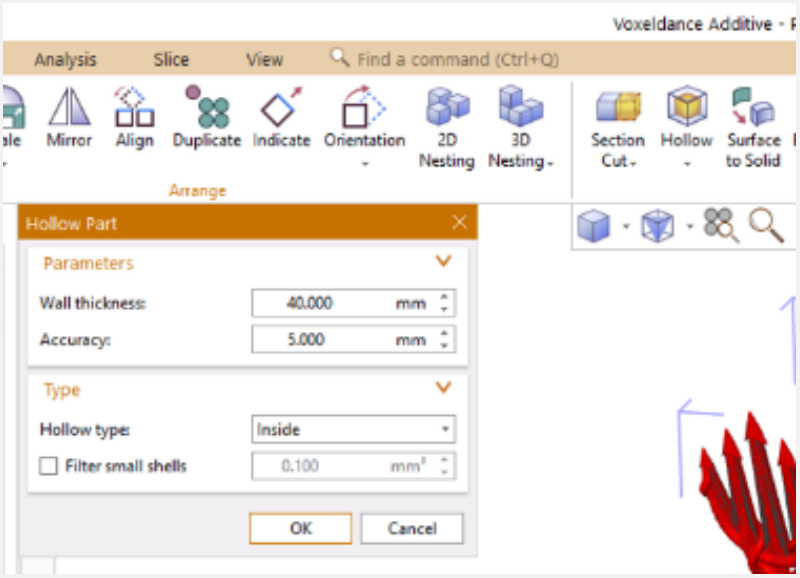
If the part is larger than build plate, orientate it in such a way to minimise the number of pieces you need to print.

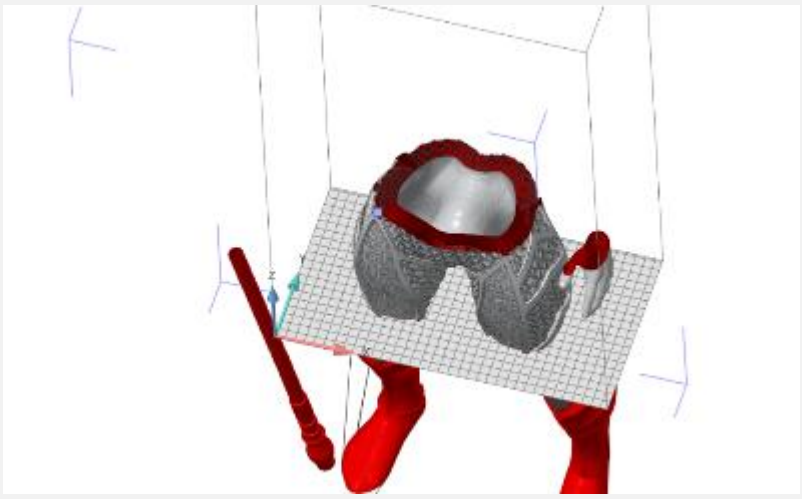
In the example below, the best option is to print the part vertically, cutting the statue just above the knee and just before the trident-holding hand.



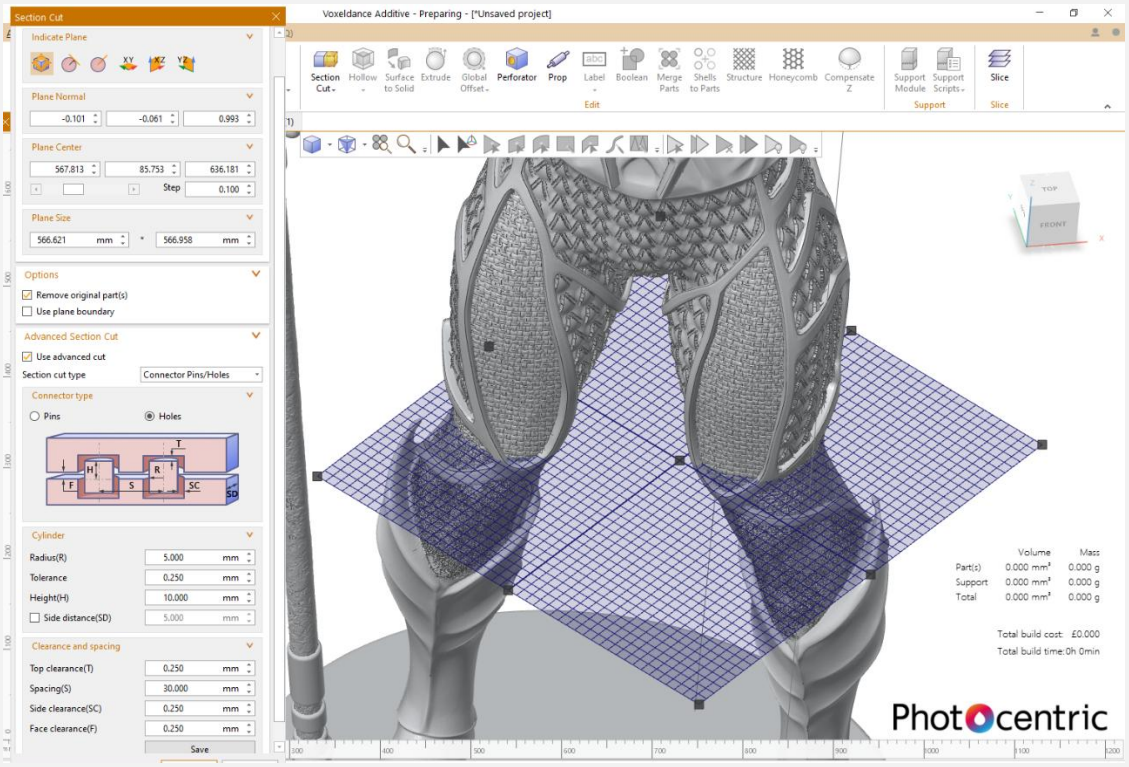
Cutting the part

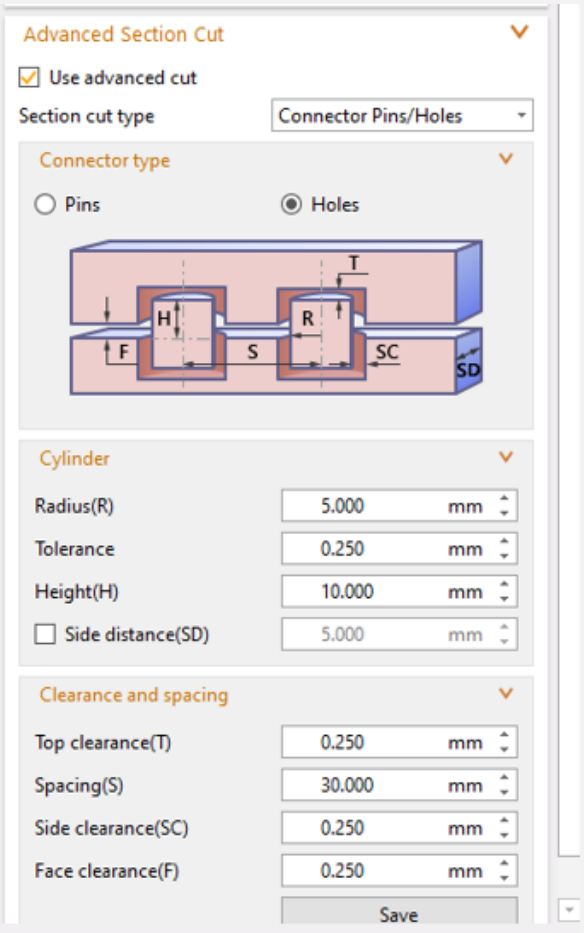
The size of this part is 2m before cutting, to minimize its total weight hollow it with a 40mm wall thickness. Then to hollow again and add infill after the part is cut into smaller pieces.



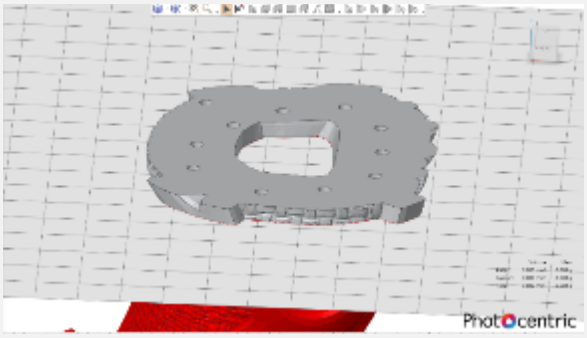


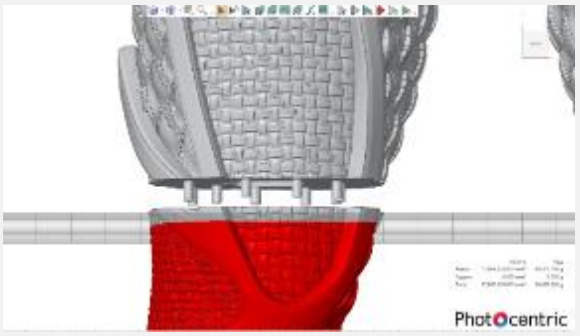
Once the shell has been created cut the model using the advance cutting tool. Advanced tooling allows you create a connection pin instead of plane cut. Pins make it easier to assemble and align the parts, and makes a stronger connection when it is later bonded together.



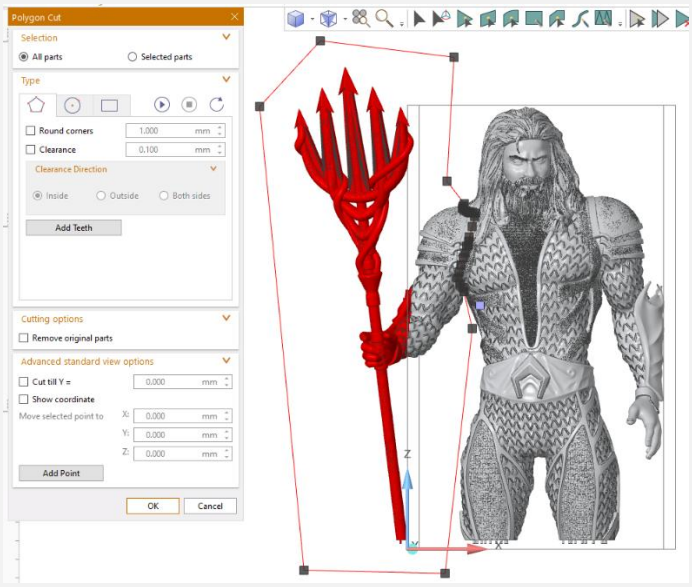


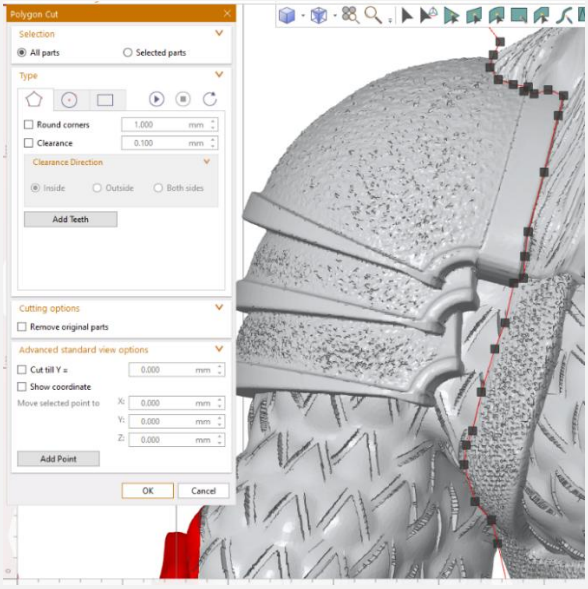
Set a clearance of 0.25mm in all directions for best fit. Without this clearance the pins may not fit into their holes and it wouldnt leave any space for the adhesive.

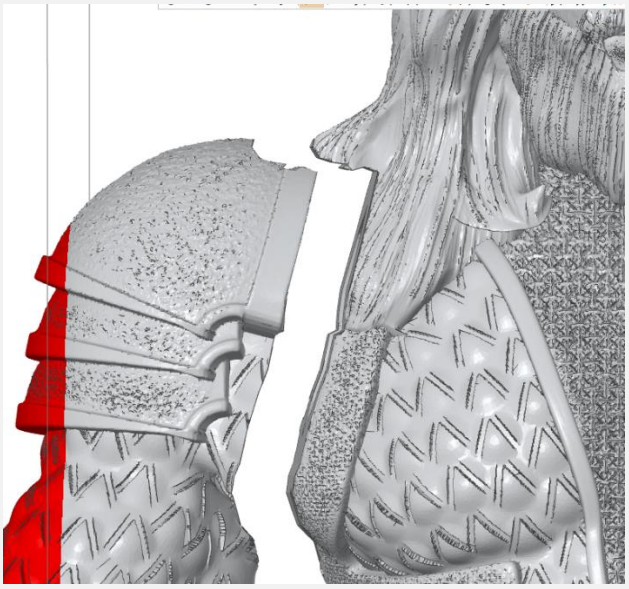




For more complicated parts use the Polygon cut option. This tool allows you to cut the part in the shape and location to hide the bonding line.



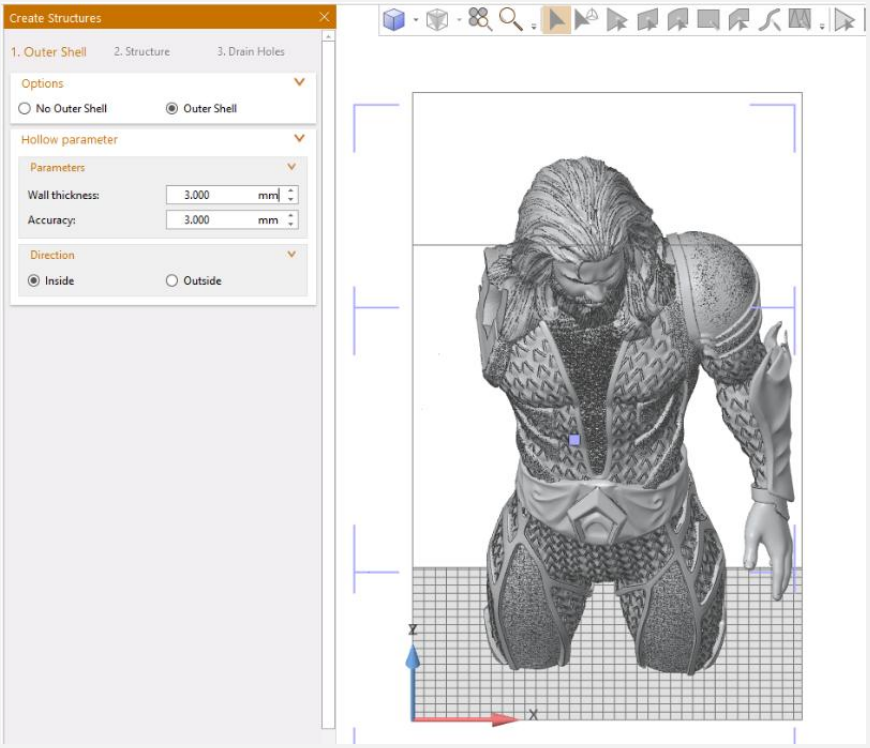




Export the cut parts as separate STL files to print them individually.

Hollowing

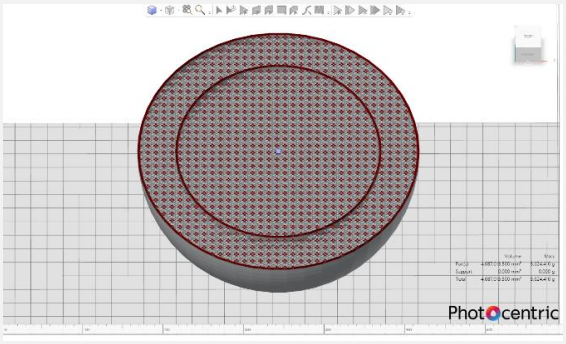
Hollow and infill the parts to reduce the weight and retain stiffness. Click on ‘Structure’ and select ‘Wall thickness’ of 3mm and select ‘Accuracy’ at 2-3mm.



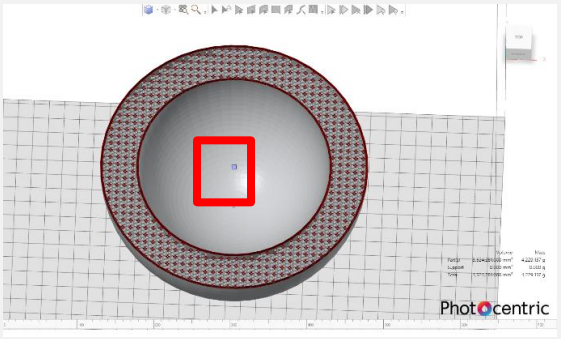
Double walls hollowing

If you attempt to print the entire part as a single piece to minimise the resin usage, hollow parts with double walls.

First create a 30–50 mm shell as described in previous steps. Then, you must first add a 1 mm hole (drain hole) through the shell to break the surface and then hollow the part. Without this hole, the software will fill in all cavities with internal structures.



With no drain hole prior to second hollowing step, infill will fill the whole shell



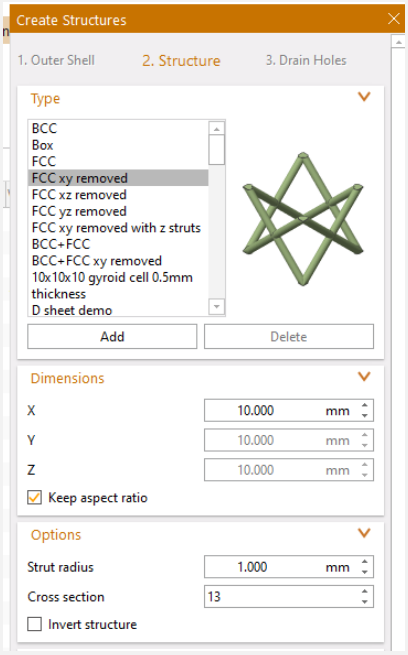
With a small drain hole prior to second hollowing step, infill will fill only the space between double walls

Wall thickness

The recommended wall thickness is 3mm. If the final part is larger than the Titan's build volume, and it will not have a metal frame inside the part, then the wall thickness will need to be increased to 5mm. For very large parts you should use an internal metal structure.

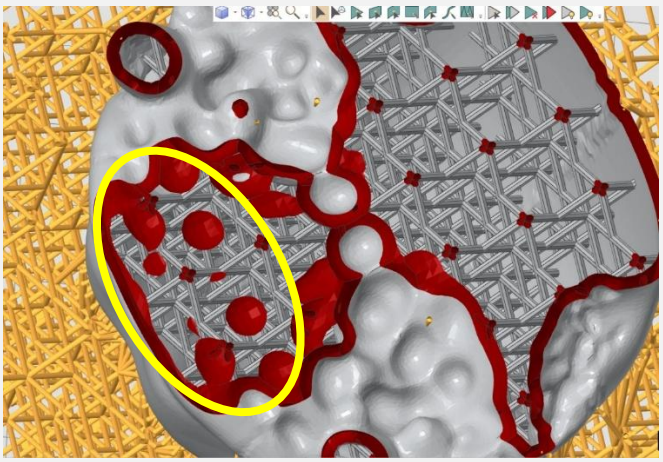
Infill

We recommend selecting 'FCC XY removed' due to its simplicity, light weight, and stiffness. Select a Strut radius of 1mm.



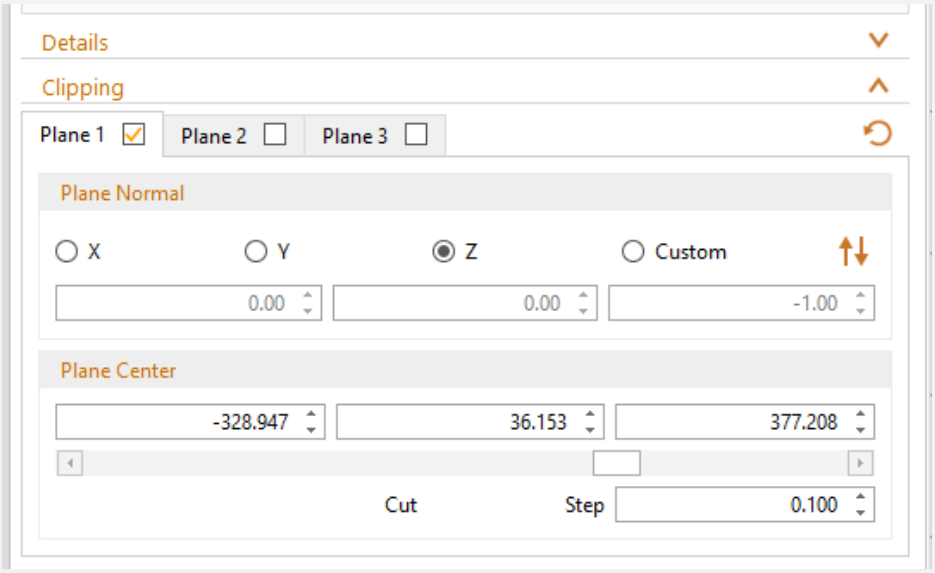
Dimensions 10x10x10mm- this is stronger and heavier with better internal island supports.

Dimensions 20x20x20mm- this is light weight, but it has a higher risk of creating unsupported internal islands, you will need to manually check layers to be sure there are no islands, if there are you should support them manually.



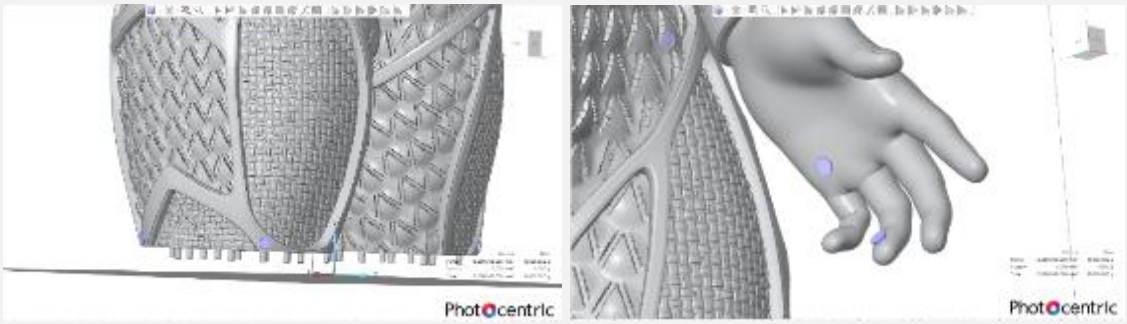
Unsupported internal islands

To see inside the part, click on Clipping and select Plane and direction Z.

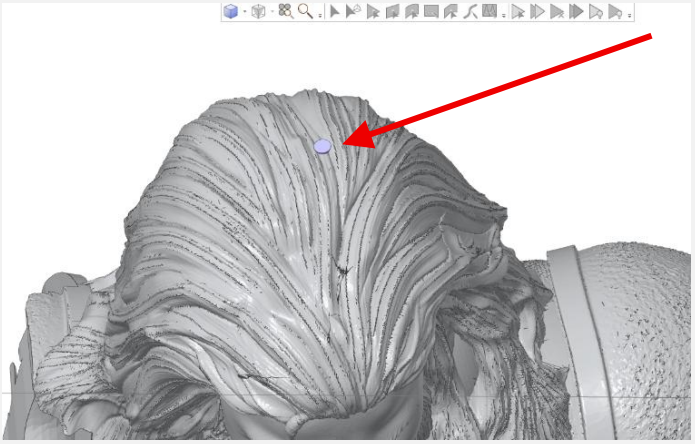


Drain holes

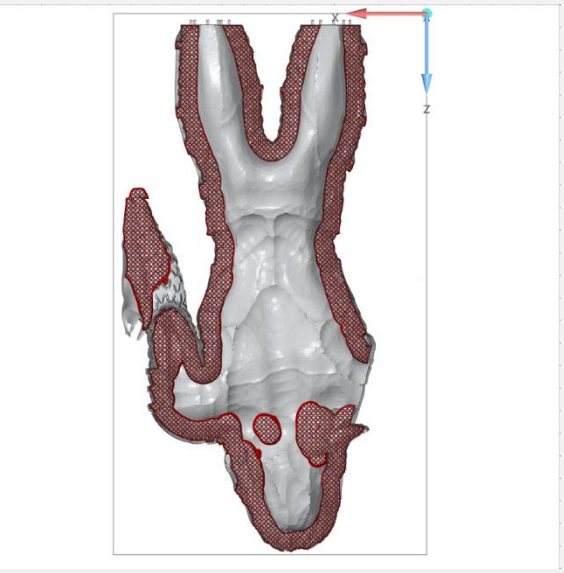
After generating the infill, you must add drain holes in all the individual cavities. These holes work as air vents and help prevent delamination lines forming on the part. Place the drain holes as close to the platform as possible, oriented horizontally. These will minimise the cupping effect and avoid the buildup of pressure inside the shell during platform movement.

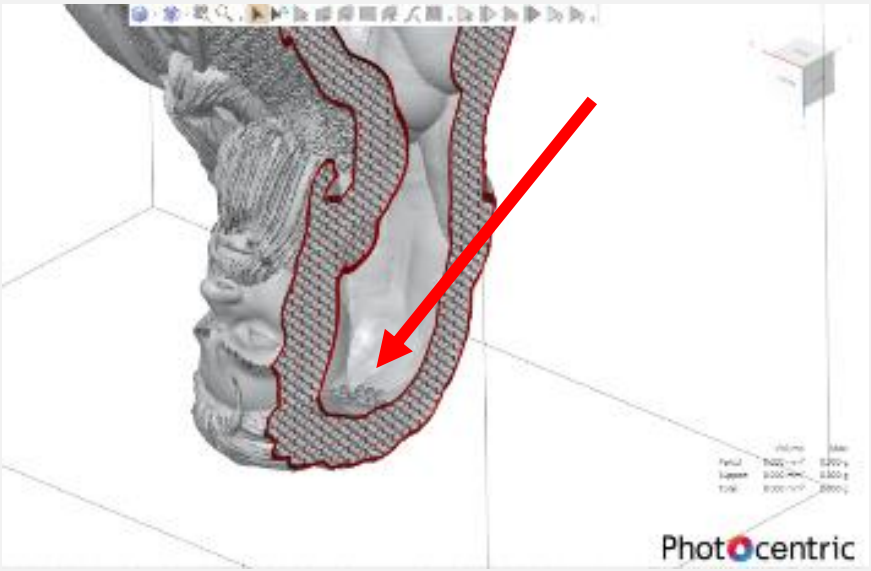


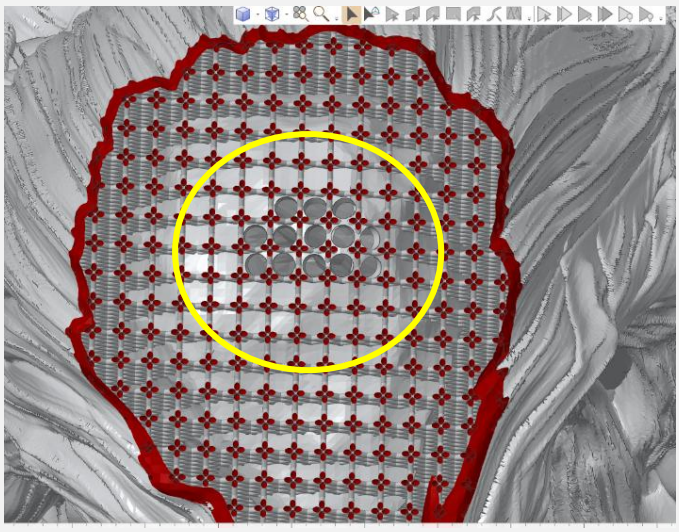
Additional holes must be added to the ends of each shell on the part. These smaller holes are necessary for draining resin at the end of the print and for allowing solvent to drain away during washing



As this part is a hollow shell, there must be enough holes inside the part to allow resin and washing solvent to drain, this will avoid trapping liquid inside the part.



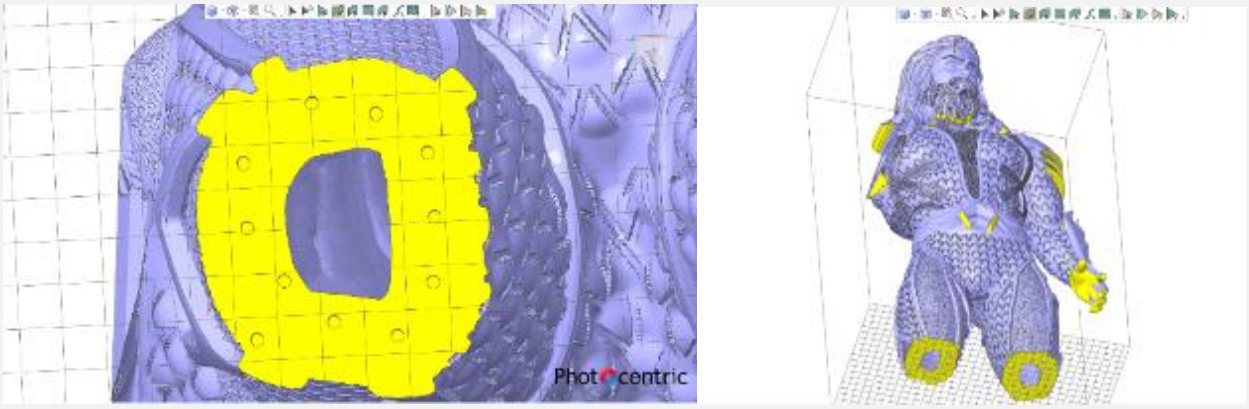




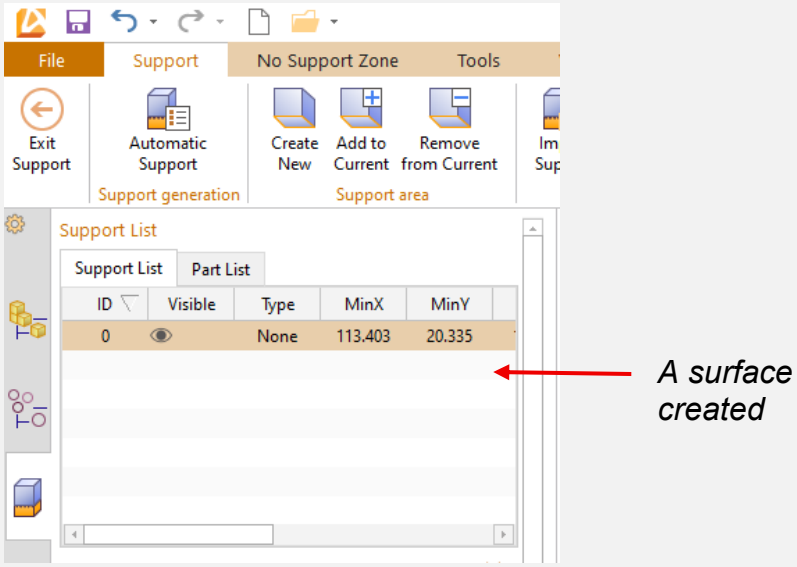
Supporting

When printing highly textured props the easiest and fastest way to support the part is to mark areas where supports can be placed.

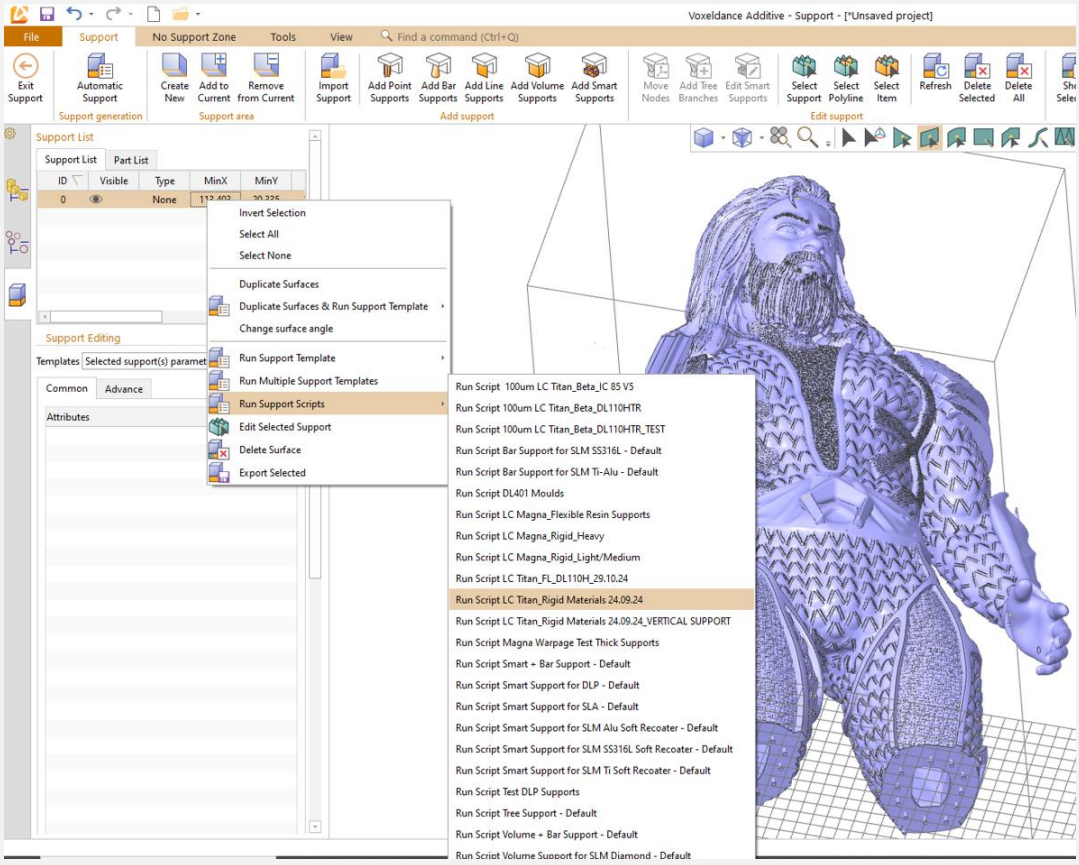
Use Marking tools to mark areas on your part where you want or don’t want to put supports, and to create a Surface.

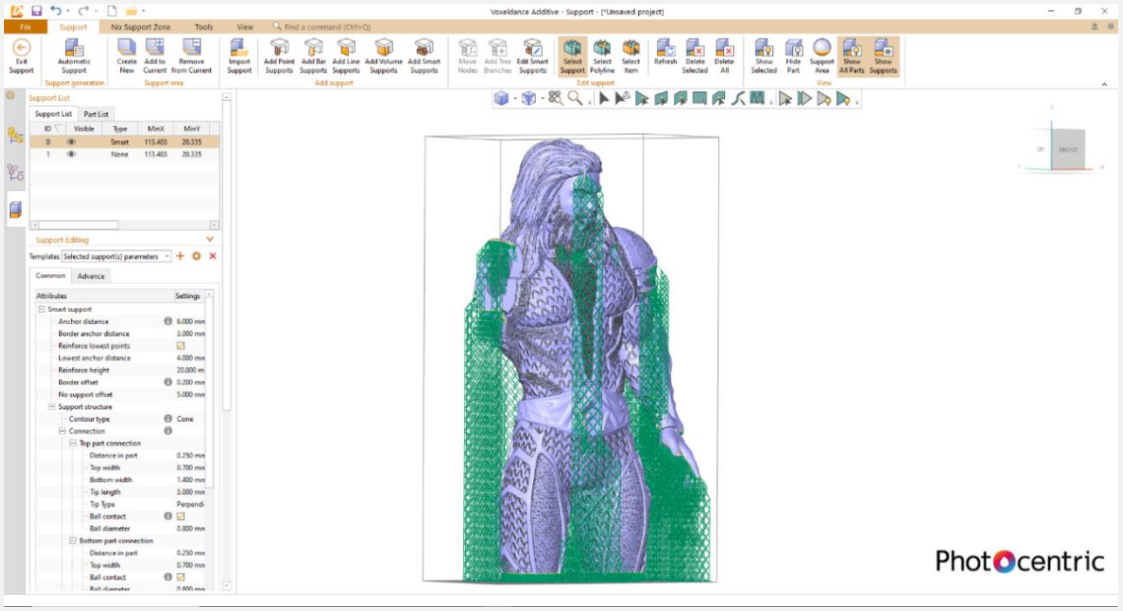


Creating a surface



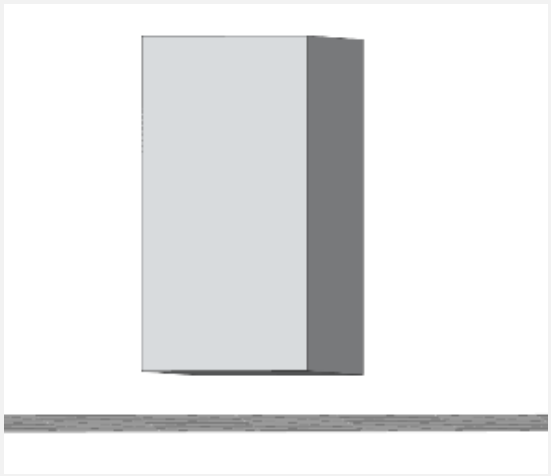
Right click on the surface just created click ‘Run support Script’, choose the support script you want apply to this particular surface.

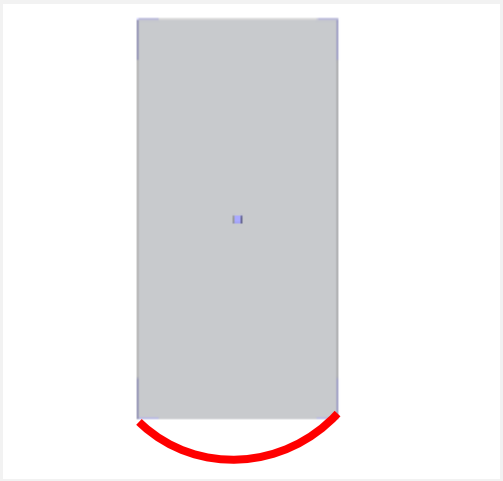

Voxeldance Additive - Support - [*Unsaved project]
File
Support
No Support Zone
Tools
View
Find a command (Ctrl+Q)
Exit Support
Automatic Support
Support generation
Create New
Add to Current
Remove from Current
Support area
Import Support
Add Point Supports
Add Bar Supports
Add Line Supports
Add Volume Supports
Add Smart Supports
Add support
Move Nodes
Add Tree Branches
Edit Smart Supports
Select Support
Select Polyline
Select Item
Edit support
Refresh
Delete Selected
Delete All
Support List
Support List
Part List
ID
Visible
Type
MinX
MinY
0
None
Support Editing
Templates
Selected support(s) paramet
Common
Advance
Attributes
Invert Selection
Select All
Select None
Duplicate Surfaces
Duplicate Surfaces & Run Support Template
Change surface angle
Run Support Template
Run Multiple Support Templates
Run Support Scripts
Edit Selected Support
Delete Surface
Export Selected
Run Script 100um LC Titan_Beta_IC 85 V5
Run Script 100um LC Titan_Beta_DL110HTR
Run Script 100um LC Titan_Beta_DL110HTR_TEST
Run Script Bar Support for SLM SS316L - Default
Run Script Bar Support for SLM Ti-Alu - Default
Run Script DL401 Moulds
Run Script LC Magna_Flexible Resin Supports
Run Script LC Magna_Rigid_Heavy
Run Script LC Magna_Rigid_Light/Medium
Run Script LC Titan_FL_DL110H_29.10.24
Run Script LC Titan_Rigid Materials 24.09.24
Run Script LC Titan_Rigid Materials 24.09.24_VERTICAL SUPPORT
Run Script Magna Warpage Test Thick Supports
Run Script Smart + Bar Support - Default
Run Script Smart Support for DLP - Default
Run Script Smart Support for SLA - Default
Run Script Smart Support for SLM Alu Soft Recoater - Default
Run Script Smart Support for SLM SS316L Soft Recoater - Default
Run Script Smart Support for SLM Ti Soft Recoater - Default
Run Script Test DLP Supports
Run Script Tree Support - Default
Run Script Volume + Bar Support - Default
Run Script Volume Support for SLM Diamond - Default


Photocentric

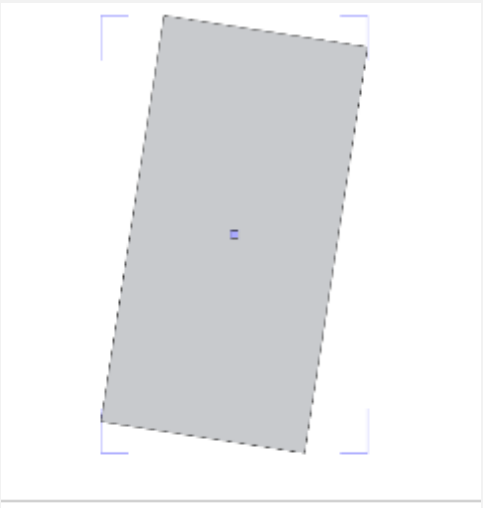
Tips and Tricks

Avoid printing flat parts horizontal or perpendicular to the build plate, as the bottom of the part will warp.

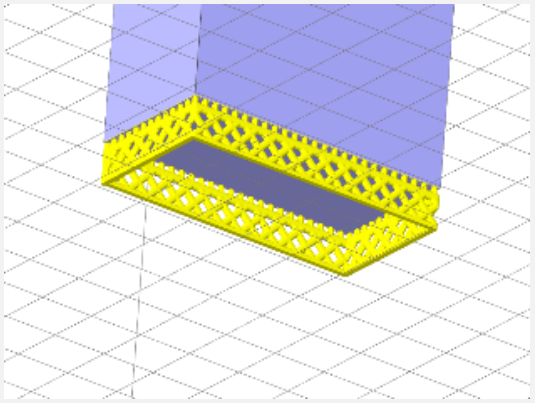




Instead, always orientate the part so that the bottom of the part starts from a small surface, and progressively gets larger, this protects parts from warpage.



If it is not possible to position the part at an angle with the flat bottom and it has to be parallel to the build plate, use wall supports or line (array) supports along all edges. These supports are thicker and will provide better stability for the first layers. However, they will be more difficult to remove after printing.



Gluing Parts Together

Preparation

Gluing parts requires careful preparation, especially for larger or heavier components.

For very large parts you should incorporate a metal structure inside the part to ensure stability. Designing and accommodating the metal structure prior to printing is strongly advised to ensure optimal results.

Proper surface preparation is crucial for achieving a strong bond when gluing multiple components.

Abrade bonding surfaces with 60–80 grit sandpaper to improve adhesion.

After abrasion, clean both surfaces with IPA to remove all dust and any residue

Adhesive selection

We recommend using **Permabond PT326 Rigid Polyurethane Adhesive**.

This is a two-part adhesive that cures to a handleable state in 60–90 minutes at 23°C and fully cures in 4–5 days. It will cure in just 30 minutes at 90°C.

This adhesive offers excellent elongation at break and high durability under heat and outdoor conditions.

Alternative Adhesives

VuduGlu VM100 Black MMA Structural Acrylic Adhesive

3M™ Scotch-Weld™ DP810 Acrylic Adhesive

Super Glue for small parts or components- it is brittle and unsuitable for large models or parts exposed to outdoor conditions.

Applying Adhesive

Apply a thin and even layer of adhesive to both bonding surfaces. Clamp the parts together and allow the adhesive to dry completely.

Finishing the Joints

Once the adhesive has dried, use sanding tools to remove any excess glue from the joints. Sand the entire part in preparation for painting.

Addressing Joint Imperfections

If there are any uneven areas, holes, or gaps in the joints, use the same resin and a UV torch to fill them. After curing, sand the area to ensure the joints are smooth and seamless.

Black Lightproof Syringes available in various sizes and are ideal for holding photopolymer. (An example here)

A UV405nm laser or torch are ideal for curing photopolymer. (An example here)

Painting

Remove all support marks and use sandpaper and various sanding tools and increase the grit if needed. After sanding, clean the part with compressed air, then wipe the part with IPA. Make sure there is no uncured resin left inside of the part, or solvent inside hollow parts, which can eventually damage the paint and create cracking.

Primers for 3D Printed Props

Primers are essential for smoothing out the layer lines and providing a solid base for the paint to adhere to.

Recommended Primers

Rust-Oleum Filler Primer- Designed to fill small imperfections like layer lines. Sands easily for a smooth finish. Available in spray form.

Tamiya Surface Primer- High-quality primer often used for model kits. Thin, even coat without obscuring details. Great for detailed props and miniatures.

Dupli-Color Sandable Primer- Automotive-grade primer. Sandable and offers a durable base coat.

Zinsser Bulls Eye 1-2-3 Primer- Multi-surface primer with good adhesion. Water-based and low odour. Ideal for foam props or mixed-material projects.

Priming

Clean the print thoroughly to remove oils and dust. Apply thin, even coats, and sand between applications for a smooth finish. Use a filler primer for prints with noticeable layer lines.

Paints for Props

The type of paint you choose depends on the desired finish and durability.

Acrylic Paints

Excellent for detailed work and hand-painting. Durable when sealed with a clear coat.

Recommended brands: Vallejo, Citadel, Army Painter, or Liquitex.

Spray Paints

Provide an even finish and are great for larger props. Wide colour selection, including metallic and specialty finishes.

Recommended brands: Rust-Oleum Painter’s Touch 2X, Krylon ColorMaster, Montana Gold.

Airbrush Paints

Best for achieving gradients, fine details, and smooth coverage.

Recommended brands: Createx, Vallejo Air, Badger Minitaire.

Specialty Paints-

Metallics: Rub 'n Buff or Molotow Liquid Chrome for realistic metal finishes.

Glow Paints: Krylon Glowz for glowing effects.

Heat-Resistant Paints: For props exposed to high temperatures, consider Rust-Oleum High Heat.

Clear Coats and Sealers

These will protect the paint and add durability-

Matte Finish: Testors Dullcote or Rust-Oleum Matte Clear.

Gloss Finish: Krylon Crystal Clear or Tamiya Clear Gloss.

Weathering Protection: Use a UV-resistant sealer for outdoor props.

Flame Retardant Spray Paints

Applying a flame-retardant finish to props is necessary if the use case conditions require them.

While not inherently flame retardant, high-heat spray paints can withstand elevated temperatures and provide some level of protection. These paints are formulated to endure high temperatures, up to 700°C, and are ideal for parts exposed to heat. However, they may not offer the same level of flame resistance as flame-retardant materials.

Release Agent

Before creating a mould from 3D printed resin patterns, finish the pattern to the desired surface quality. Seal it with a suitable primer to reduce porosity, then apply a release agent to ensure easy and clean mould removal.

Silicone moulds

For silicone moulds (resin won't chemically bond, but mechanical grip can still happen)

Ease Release™ 200 – easy aerosol spray, good for most resins.

Petrolease – liquid release, brushed or sprayed for better control.

Mann Ease Release™ 800 – if you need high detail and low build-up.

Polyurethane or Epoxy moulds

For polyurethane or epoxy moulds (higher risk of sticking)

PVA (Polyvinyl Alcohol) – excellent barrier layer; spray or brush on, dries to a thin film.

Carnauba wax (e.g., Meguiar's Mirror Glaze #8) – buff to a smooth finish, then optionally top with PVA for extra security.

Freeman Wax Release – widely used in resin-to-resin tooling.

Industrial-grade options

Zyvax Sealer GP + Zyvax Release – seals porous resin surfaces and ensures clean release.

Chemlease 41-90 EZ – for repeated moulding cycles with minimal build-up.

Photocentric

Reimagine Your Prop Production With Photocentric

Liquid Crystal
TITAN

Neptune model designed by Sanix3D

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