Nylon Powder 3D Printing Submission Guide
FormLabs FUSE+

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DIGITAL
FABRICATION

Using this Manual

Each page in this manual follows a general layout of two columns. Read left, to right to the bottom of each column, then move to the next.

Important keywords are highlighted in red

On images, areas of interest are highlighted with red arrows or squares/circles.

Table of contents

The table of contents can be found on the next page. Chapter titles and sections are hyperlinked. You can click on a chapter title or a section to quickly navigate.

About this Manual

This manual was revised on 1/28/2025

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Introduction

The Formlabs Fuse+ excels with its advanced laser sintering technology, allowing the use of high-performance materials like PA12, TPU, and carbon-filled composites. This capability supports intricate, durable prints with superior mechanical properties. Its heated build chamber and automatic powder recycling system streamline the printing process, while the built-in sensors ensure precise control. The Fuse+ is ideal for professionals seeking high-quality, functional prototypes or small-batch production parts.

Note: Nylon 12 is the ONLY available printing material.

Software:
Formlabs PreForm

System Requirement:
Windows 8, 8.1, 10, 11
Mac OS X 10.15 or higher

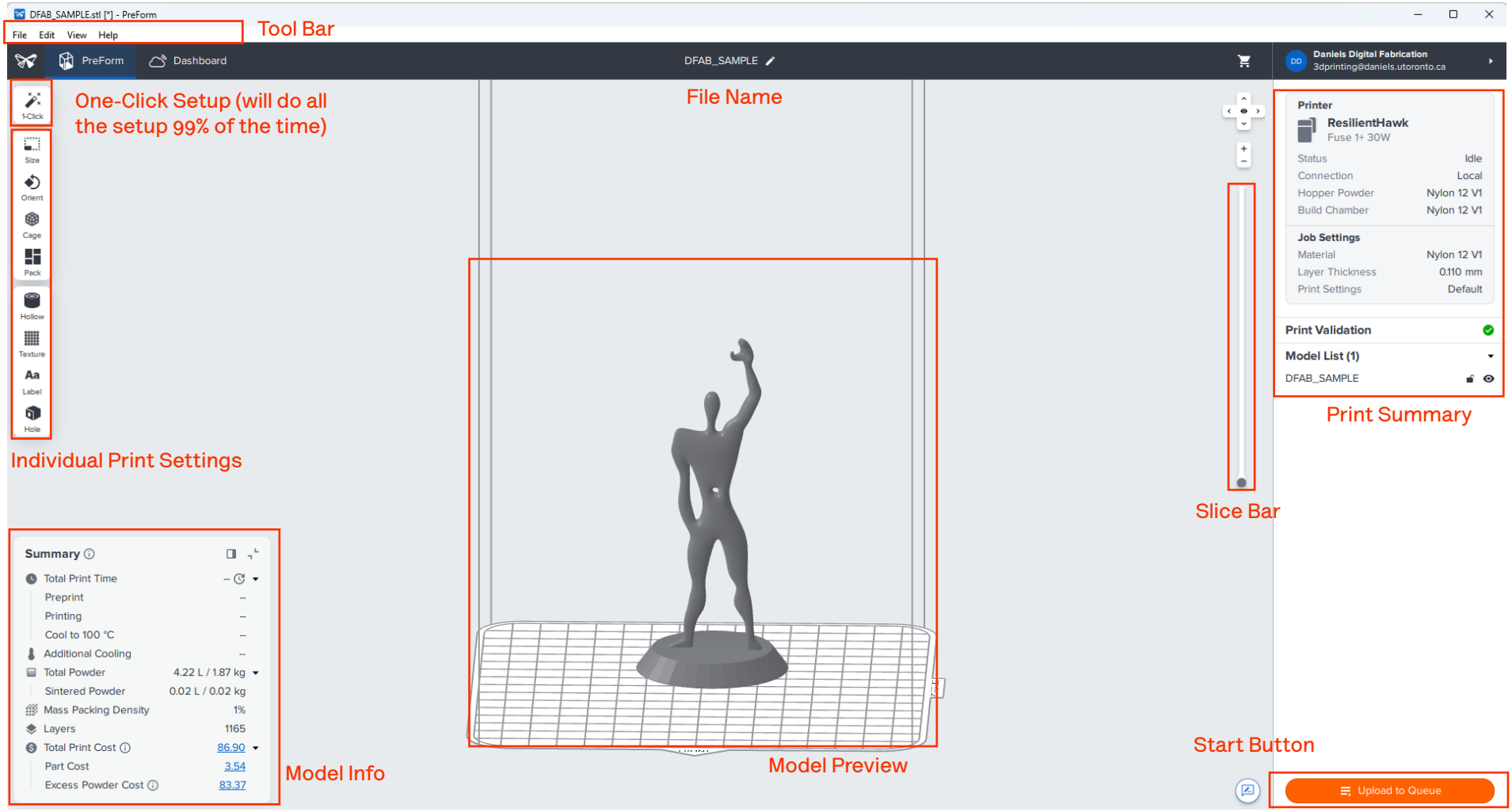
Maximum Build Size:
330 x 240 x 300 mm
12.9 x 9.4 x 11.8 in

Model Materials:
Nylon 12 $0.15/g + $7 cleaning fee

Layer Thickness (resolution, mm):
0.06
0.1
0.15
0.2
0.3

Formlabs PreForm UI

Formlabs PreForm is the primary slicer used to process files for 3d print, below are annotations for features of the UI.



Formlabs PreForm Download

https://formlabs.com/software/preform/

Formulabs PreForm is a free slicer that will process digital files for 3d printing, please click on the web link above to navigate to the downloads.

Click on the installer that's compatible with your device

Small form is needed to download

After the download has completed, run the installer

Follow the Installation wizard to complete installer

PreForm®

Powerful 3D Print Preparation Software

Prepare your prints automatically in minutes and upload them seamlessly to your Formlabs SLA or SLS 3D printers. PreForm has all the tools you need to achieve professional-quality prints. Offered totally for free, with no licenses, annual fees, or installation limits, PreForm ensures your workflow is smooth and worry-free.

Download PreForm (Mac)

OS X 10.12 or higher

Requirements

Download PreForm (Windows)

Windows 7 (64-bit) or higher

Requirements

Download PreForm

Fill out the form below to begin downloading PreForm

First Name *

Last Name *

Business email *

Phone *

+1

How Would You Describe Yourself *

– Select –

Country or Region *

– Select –

How do you plan to use PreForm?

– Select –

Download PreForm

Checking Geometry

To ensure a successful print, please check the following for the geometry that you wish to print:

Select your geometry to check if your model is enclosed. If the command displays "_ open _____ added to selection" perform necessary edits to the geometry to enclose it.

Type "Show Edge" in the command bar to prompt the Edge Analysis Window to check for any naked edge.

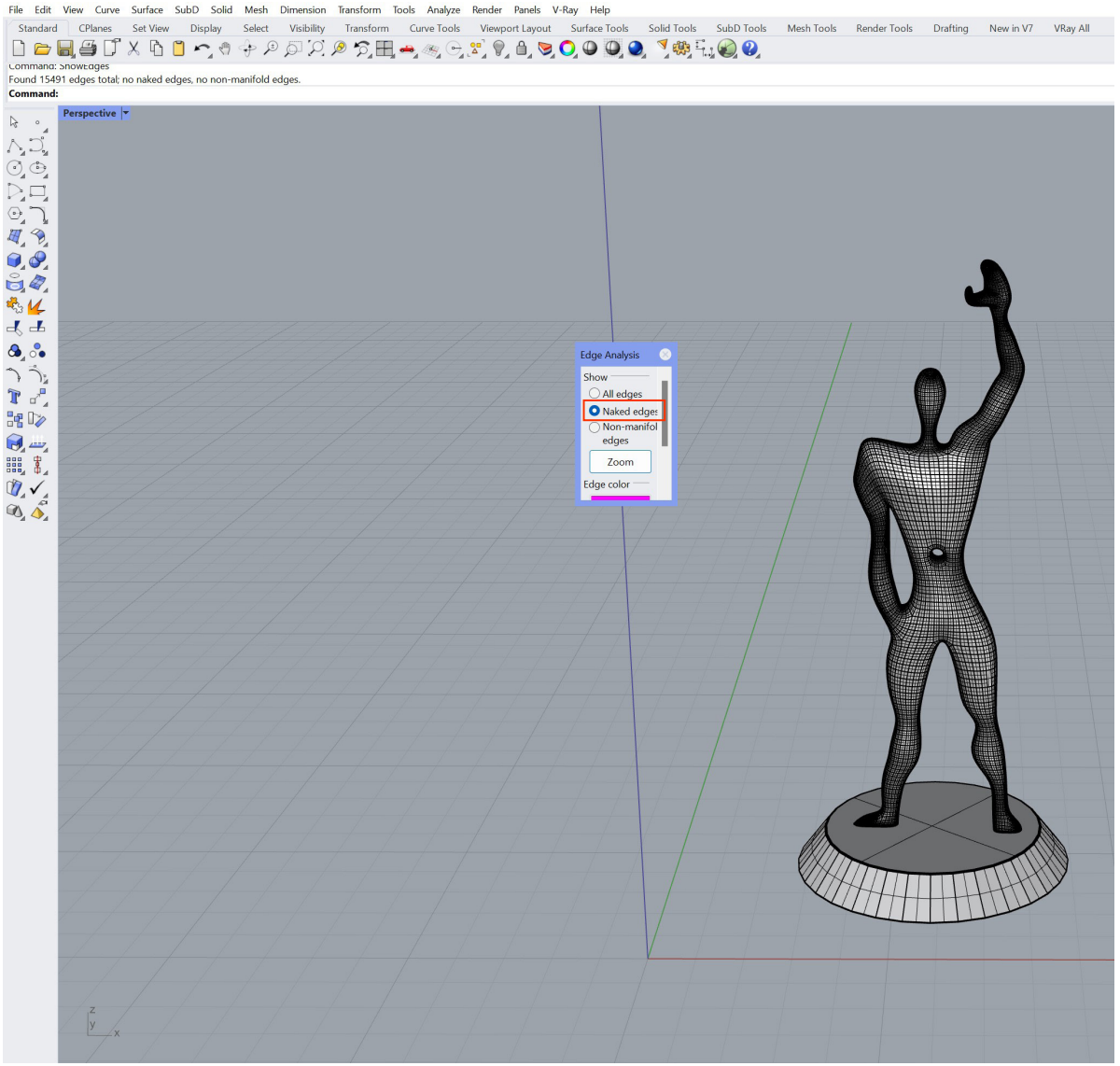
If your geometry has no unclosed-edges, the command bar will return the following: Found (#) of edges total; no naked edges, no non-manifold edges.

If this is the case, proceed to:
Generating the Mesh and Exporting File

If the command tab says the geometry has naked edges:

Select NakedEdge option in the prompt window to check for unclosed edges.

Recreate the surface so there are no naked edges.



Exporting file

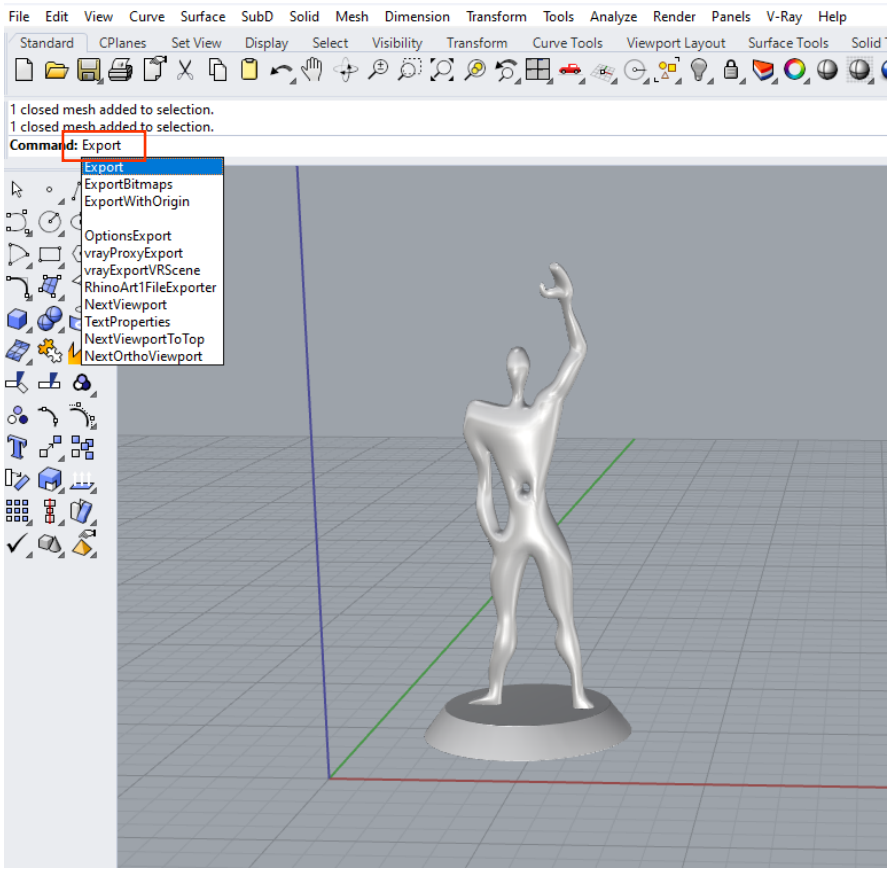
3MF

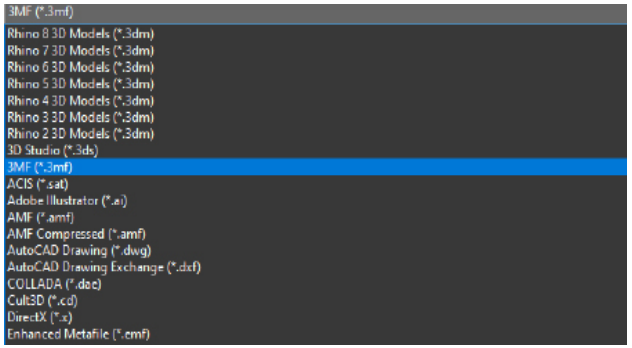
3FM is the supported format for PreForm to process which is becoming the industry standard

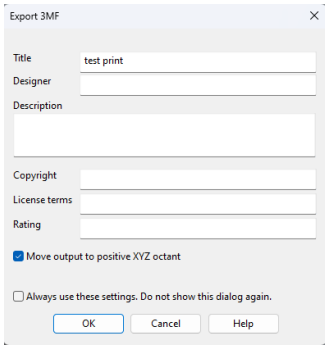
To Export for print

Select the converted mesh geometries in rhino, and type “Export” in the command bar.

And you can choose from the 3MF supported file format.





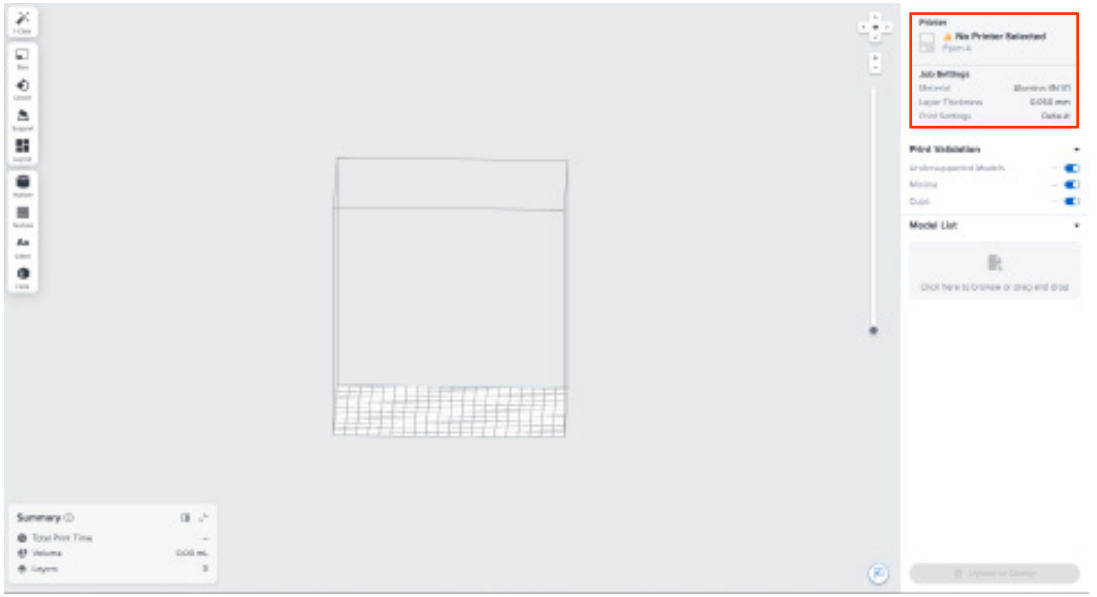


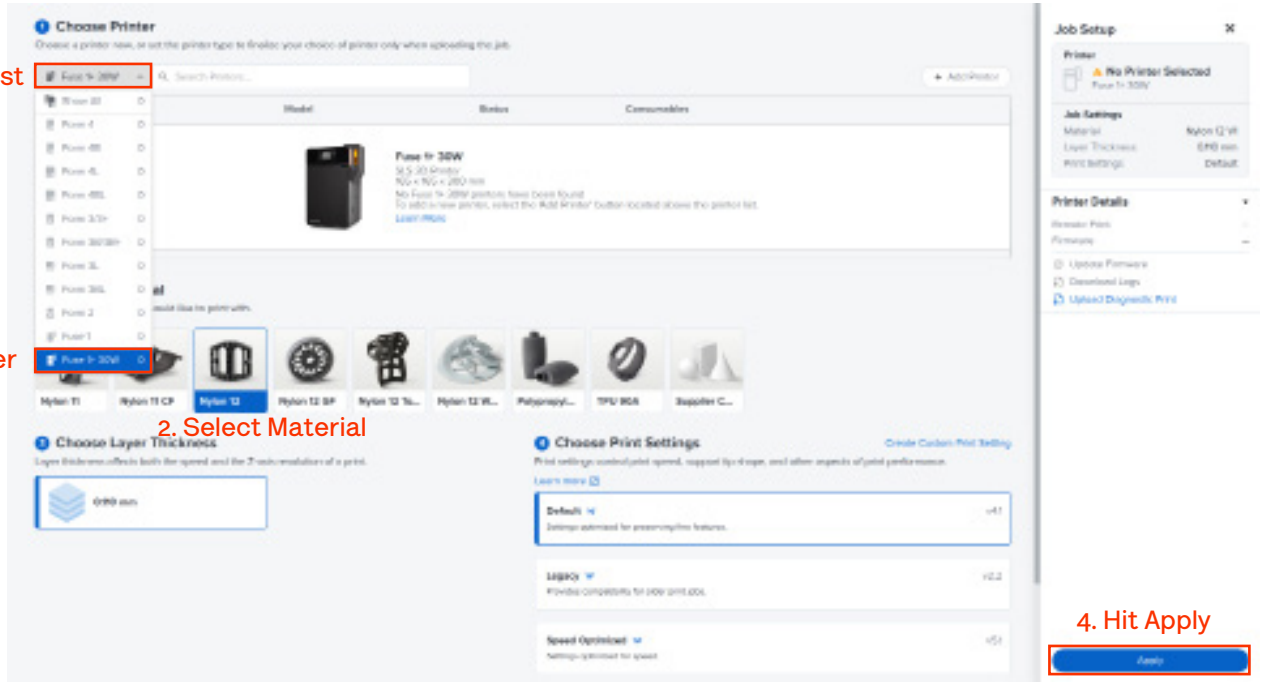
Formulabs PreForm: Workflow

Setting the Printer

Select the printer tab at the top right of the interface to open the printer settings.

1. Under the printer tab, select Fuse 1+ 30W
2. Select Nylon 12 as the material
3. The layer thickness is set default to 0.110mm
4. Hit “Apply” on the bottom right.





Import File

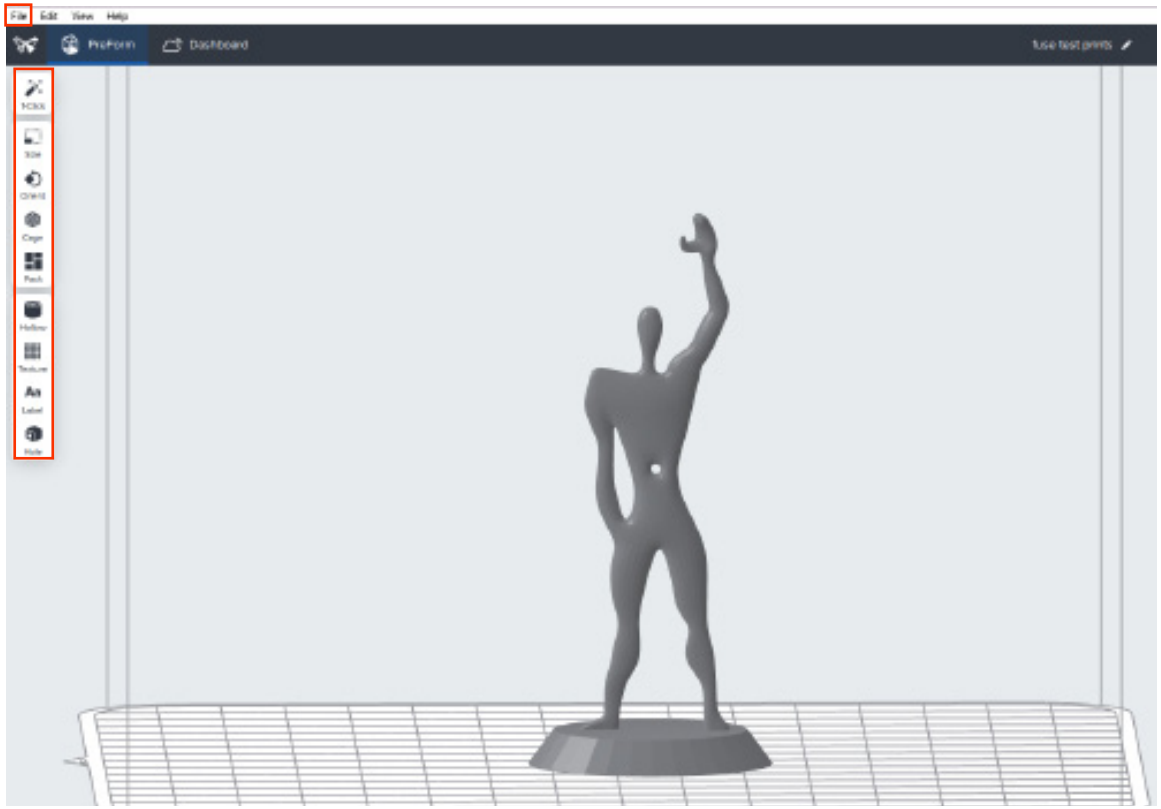
Files can be imported by using the Import function under the “File” tab on the top left of the UI by selecting the desired 3MF file

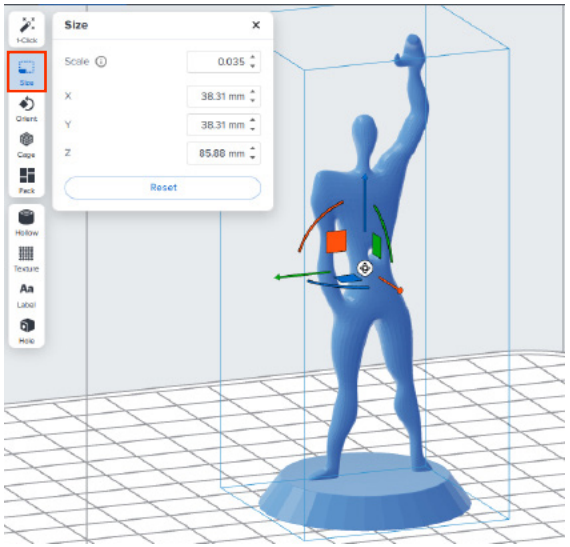
Or

Simply drag the 3MF file with the cursor inside the print plate in the model preview of the UI

PreFrom’s base unit are in MM, make sure when creating the geometry in Rhino, the units are set to MM in properties.

Otherwise, you also have the option to scale the geometry in PreForm via Size located on the top left of the screen.





Formulabs PreForm: Print Settings

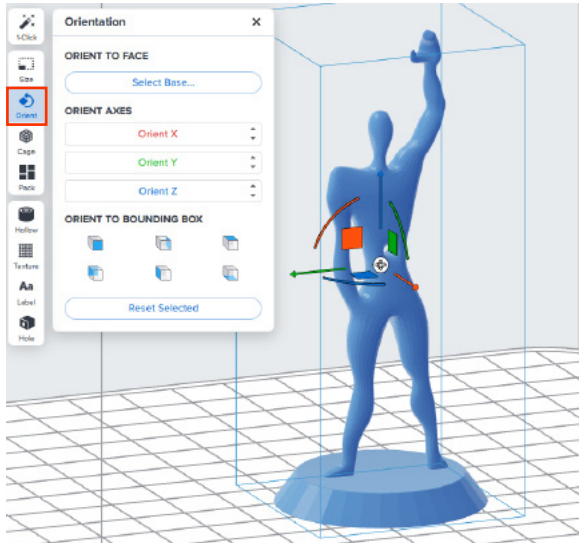
You can also orient the geometry in the PreForm Software.

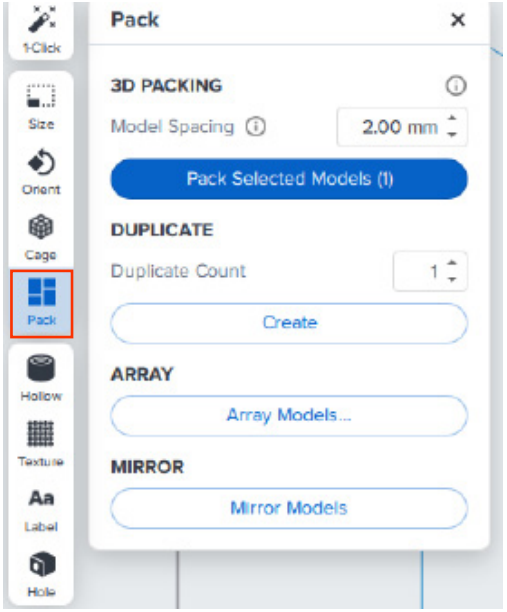
First select the geometry you wish to alter, then you can either choose to Move, Scale, or Rotate the geometry. The 1-Click button will do most of the setup by itself.

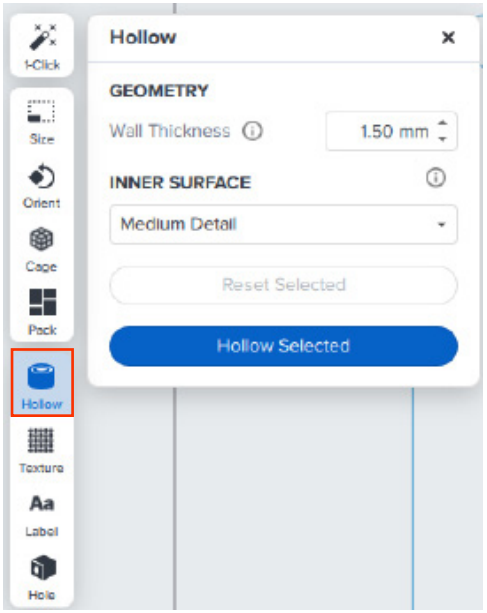
There are additional settings which are necessary to improve your file for printing in many ways; such as reduce the amount of time to print, reducing the cost, enhance the structural integrity your geometry, etc.

Additionally, you can pack the geometry to reduce time and wasted powder, set the thickness of the printed walls, among other things, all through the tool bar at the left.

Others are better left to the default setting.



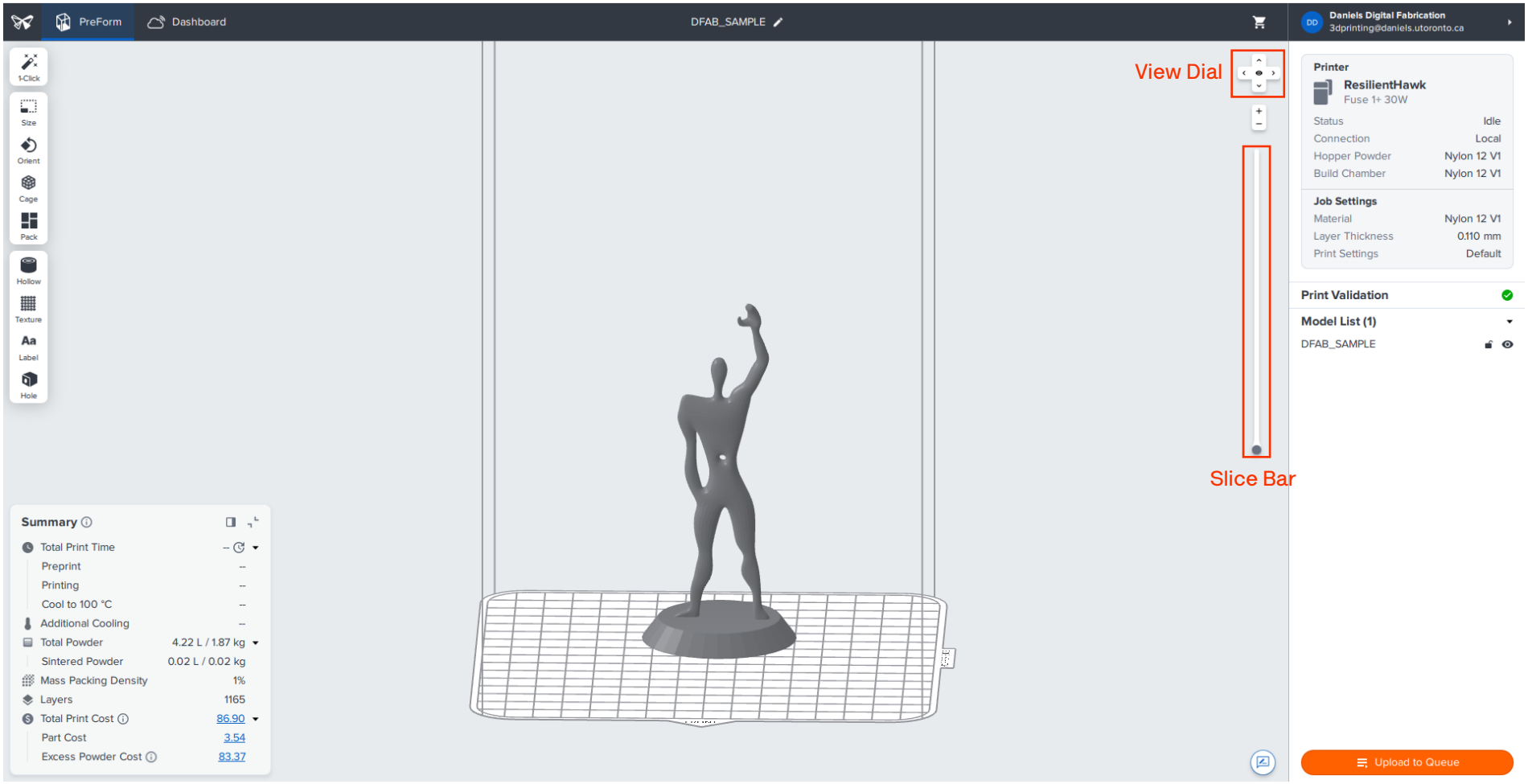




Slice Preview

Using the view dial, you can alter between top, bottom, left, and right.

Using the top view, drag the scale bar up to check for any breaks in the model

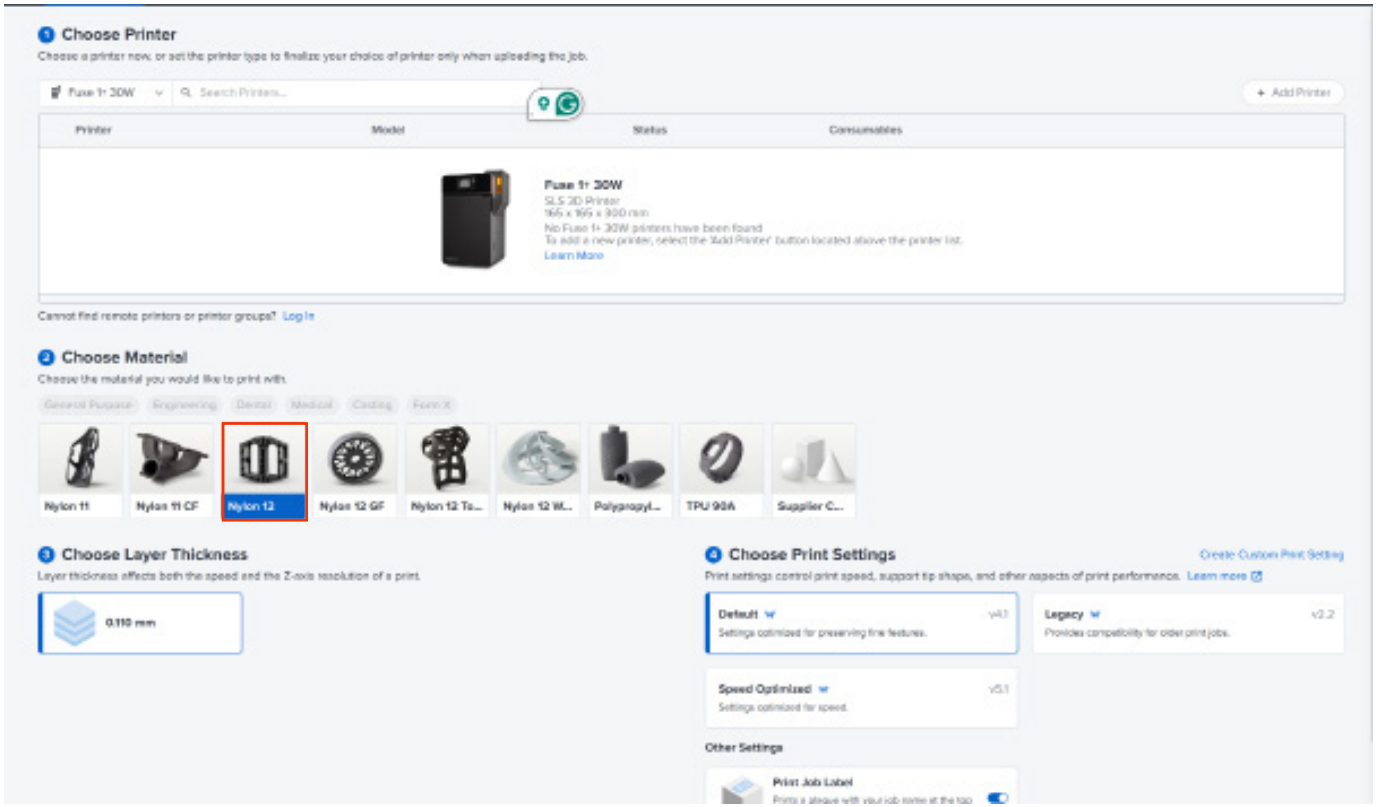


Printing Material

Select the printer tab at the top right of the interface to open the printer settings.

Under the printer tab, make sure Nylon 12 is selected as the chosen material

Nylon 12 is the ONLY available printing material



Infill and Hollowing

The PreForm Software will allow you to hollow out your geometry within the software rather than you needing to do it in rhino.

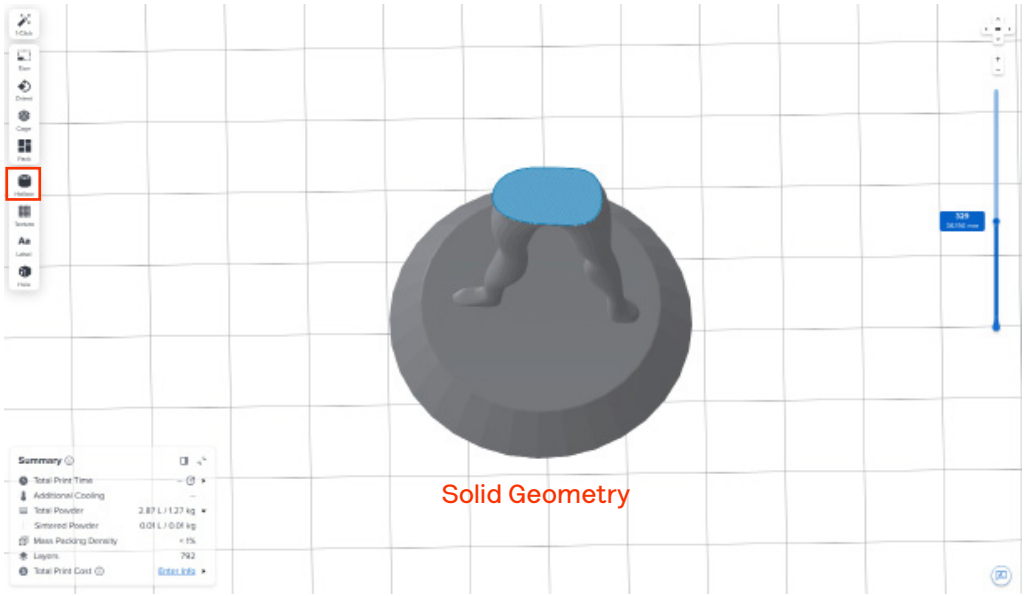
First select the geometry you wish to alter, then you can either choose Hollow.

Set your desired Wall Thickness. Model regions thinner than twice the selected Wall Thickness will not be hollowed.

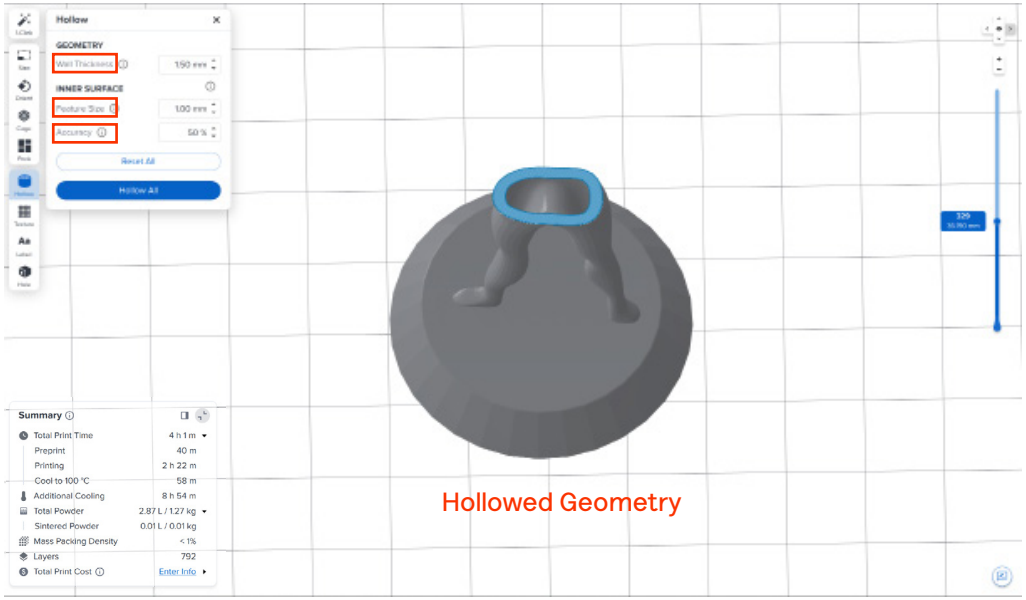
Feature Size smoothens internal surfaces when the value is reduced. PreForm may take longer to hollow the model and generate a larger FORM file.

Accuracy changes how closely internal features match outer features depending on Wall Thickness. Increasing Accuracy improves the quality of the internal surfaces of the hollowed model, but it may take longer to hollow the model.

Make sure to create a drainage hole at the bottom of the geometry to allow excess loose powder to escape the geometry.



Solid Geometry



Hollowed Geometry

Print Estimate

Slice the geometry when ready, and the estimated time and material required will display on the bottom left.

Fuse (grey) $ 0.15/g + $7 cleaning fee

Refer to the cost of the material/g, you can calculate the cost of your print.

If the cost is beyond your expected value, refer back to sections in the Print setting to find methods to reduce the cost. Whether its reduce the density of the model via the infill setting, or reduce to overall quality of the model via Profile layer height.

Save for Submission

When satisfied with all settings and configuration, save your file as an 3MF File:

Tool bar > File >Export Selected > file convention 3MF
All files are to be submitted via FTP and an email should be sent to

3dprinting@daniels.utoronto.ca

notifying the DFAB office there has been a new submission.

Always include in the email

First and Last name of the student
File names

* Failure to do so will result in your print not be processed and queued for printing

Determining Cost

Cost estimate will be done once the print is completed and weighed.

- The grammage will be determined using a scale after initial cleanup is done of excess powder.
- Refer to the image on how much powder remains when the cost is estimated
- The cost will be $0.15/g, with an added $7 cleaning fee for post-processing the print (note: the fee is per submission, not per printed piece)

Submission: File naming convention

Copy and paste your .3mf file(s) into the newly created folder, named as:

lastname_firstname_date

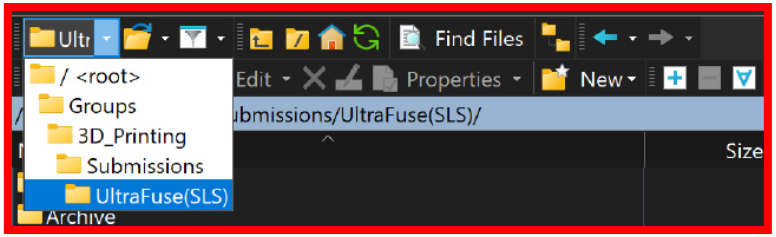
with following format:

lastname_firstname_date.3mf

Upload to submission folder

Upload the entire folder to the submission folder on FTP:

roots > Groups > 3D_printing > Submissions > UltraFuse (SLS)



You can follow the instruction on how to download the FTP on the Daniels Website

https://www.daniels.utoronto.ca/search?s=ftp

End Of Manual