Proof of Concept Center
Stratasys F370 3D Printer
FDM 3D Printing Guidelines

Introduction The main rapid prototyping machine used at the POCC is the F370 by Stratasys. It is an additive printer that uses thermoplastics to create parts from Solid Modeling/STL files, which can be produced by any modern 3D modeling software package. Solidworks, Autodesk Fusion 360, etc…	

Design For Manufacturability: Clearances and Dimensions

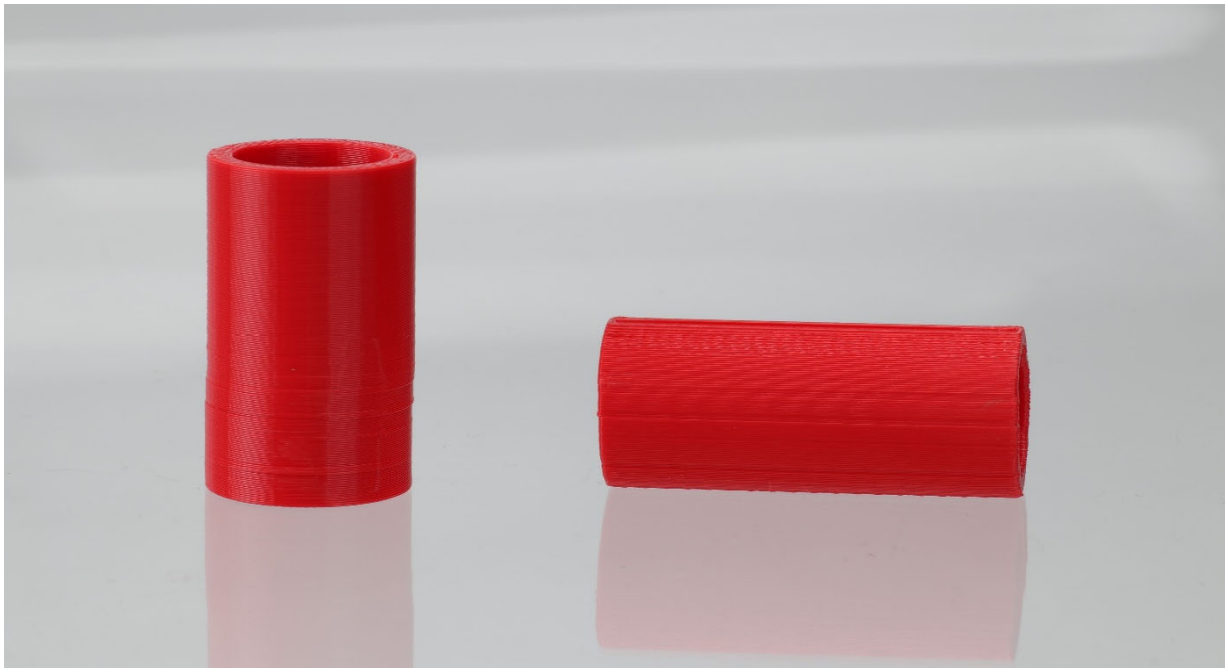
When designing your part, keep these numbers in mind. They are only meant to be a starting place, and you are encouraged to experiment and learn what works for you. Please use the minimum “safe” wall thickness and clearance if you want to be sure that your part will print correctly. If you choose to ignore these minimums, you do so at your own risk and will have to pay for the parts even if they do not print properly.

Properties	**F270**
Maximum Part Dimensions	14”(355mm) x 10”(254mm) x 14”(355mm)
Material / Color / Properties	PLA, ABS, ASA, PC-ABS, Diran-410(Nylon) and TPU
Bead Height / Slice Height [1]	0.005”-.013”(127 microns to 330 microns)
Bead Width [2]	0.014” - 0.028”
XY Dimensional Tolerance	± 0.008”
Minimum “safe” wall thickness	0.125”
Minimum wall thickness	0.036”
Minimum “safe” clearance between surfaces	0.020”
Minimum clearance between surfaces	0.007”

[1] The Bead Height, also called the Slice Height, is the vertical thickness of an individual layer of plastic. Unless your part is an exact integer multiple of this value (which would be rare), your part will be slightly shorter. Your design should tolerate this. If you need parts with greater precision, 3D Printing may not be a good solution for you.

[2] The Bead Width is the horizontal thickness of a single strand of plastic. If your part has a wall that is 0.100 inches thick, it can be made with six 0.015 inch beads and a 0.010 inch air gap. There will always be tiny air gaps inside 3D printed parts. Be aware though, the 3D printer can not print fractions of a bead, so the dimensions of your part will come out slightly larger or smaller than desired, because they will always be integer multiples of the bead size.

Print Orientation



FDM 3D printers print a part one layer at a time. The orientation of the part will determine what direction do the layers run relative to the part. This affects the surface finish and the strength of the part. The image shows the same part printed in two different orientations. The right one has a rough surface finish but is much stronger whereas the left one has a smooth surface finish but is much weaker. If you care about which orientation you want your part to be, please specify in the form. Further information about part orientation in FDM 3D printing can be found here.

FDM Material and Part Examples:

PLA is Idea for low-cost concept modeling and 3D printing form, fit and function prototypes fast.

ABS is a Rigid Plastic ideal for concept modeling, functional prototyping, manufacturing tools and end use parts.

ASA is a Strong UV resistant choice for outdoor-use of end user parts.

Diran-410 (Nylon) Tough and Resistance to hydrocarbon-based chemicals. Good for Fixtures/Jigs and for low friction non-marring applications.

TPU – Shore A – 92 hardness. Flexible Elastomer