Additive Manufacture part submission

Part Submission:

Students requiring parts for school projects may submit parts for the related course through WebHomework:

https://engrapps.uncc.edu/webapps/webhomework/main/login

You will have access to a course named AdditiveManufacture_#### where the four digit number corresponds to your design course you and for which you are building parts.

Part names will be adjusted through webHomework:

- Part is submitted by a student as **my_wheel.stl**
- Renamed to incorporate your username and assignment number by web Homework: **HW01_ndniner_my_wheel.stl**
- Retrieved file renamed to include course number, username and assignment: 3156_HW01_ndniner.stl (and spreadsheet with the same name: 3156_HW01_ndniner.xlsx to keep them together)

These adjustments allow us to track parts by course, user/team, and part. This will also limit each file to one STL and XLSX. Addition submissions to the same assignment will be skipped because there will already be a file name

Submit one **STL** (**ST**ereo**L**ithography saved from CAD) part and one **XLSX** (Excel spreadsheet to estimate cost). To a single assignment. These files must be separately – **do not** zip the files. Additional parts or new versions of parts already built must be submitted in the same manner to ***new assignments***.

- Additional parts submitted to an existing submission will be skipped during file retrieval.
- Excel and STL parts must be submitted to the same assignment to keep the material/quantity/colors correct – if these files are not submitted to the same folder we cannot guarantee that you will receive parts as requested.
- Single parts only. (Exception for a functioning assembly that **must** be built as one object) Parts will be added to the machine as space allows in an orientation that maximizes strength. Order fulfillment may depend upon material/color loaded at the time of retrieval.

File Format

All part files must be STL. Part or machine code files will not be accepted. You will use a preprocessor to help estimate the volume of material for your spreadsheet and have some idea of the time it will take to build the parts. The machine code that is generated is only for the machine you have selected and cannot be used in any of the other machines so the STL file is necessary to generate correct code for the appropriate machine. Minimize chord height for best resolution.

Part Features

Wall thickness should not be greater than .100” – if you think you require something thicker than this please contact me. Using ribs for stiffening and bosses for holes should allow you to make parts with less material – reducing volume of material and build time. This is a designed part so you should be able to create a part with appropriate strength and minimal material with a sufficient factor of safety.

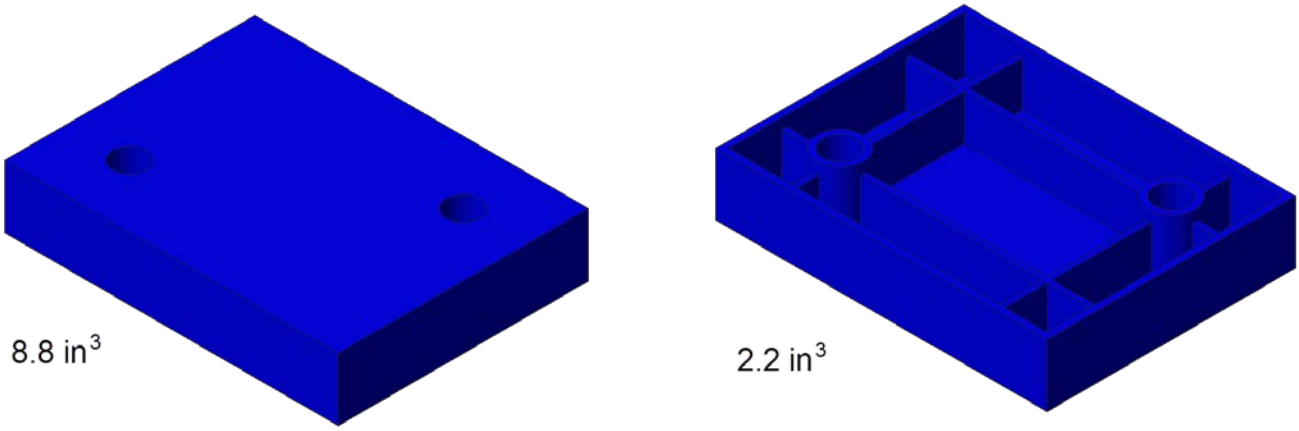
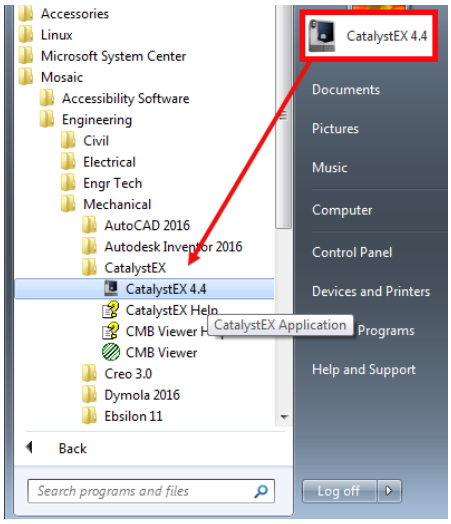


Figure 1: a 3x4x.75 block with two holes - unshelled and shelled

Remember that our Additive Manufacturing equipment works by slicing the part into multiple layers and then building layers of material – this process results in material that can be very anisotropic. You will not have the same strength in all directions and you will not have the same resolution in all directions. Typical layer height is .010” so if you are printing a .030-.060 diameter feature you will have two options – a cylinder with close-to-cylindrical surfaces built vertical or a non-cylindrical surface built horizontal – these vertical cylinders have very little mechanical strength.

Avoid blind holes if possible. Blind holes, especially those with a large depth-to-radius ratio, require much more time to remove the material with the solvent process. You can create a hole with a smaller radius to complete the through hole and improve support removal. Blind holes are acceptable - you may still use blind holes and some may be required for enclosures – but know that it will take longer to deliver your parts.

Calculating values:

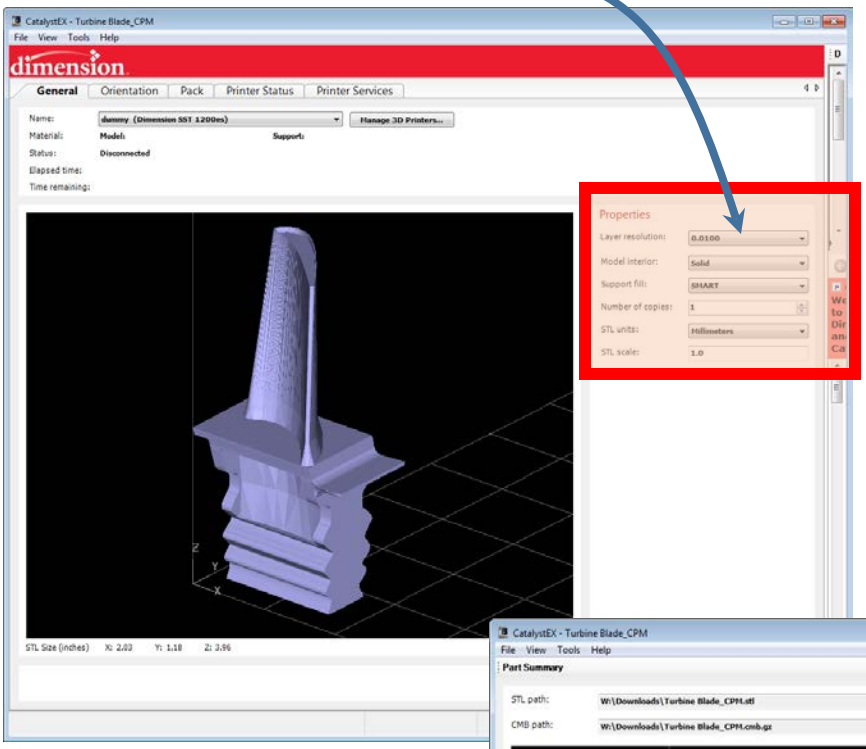


Material volume should be calculated using Catalyst. For parts that do not fit the build envelope please contact Dr. Raquet.

Open Catalyst on Mosaic under Engineering>Mechanical:

Inside the application, open an STL file.

Make sure that the Model interior is set to Solid unless you desire to have a part that does not have full density.



Once the part is oriented as desired you may Process the STL (under the orientation tab). This will calculate toolpaths and generate machine code. In addition, you can obtain the volume of material that will be consumed.

Under the Tools tab select Part Summary…

This will provide all of the information for the spreadsheet: Build time, Model material and Support material.