3D Printing

In the Chemistry Instrument Shop

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October 25, 2023

3D Printing

- can be cheap
- slow (wall time)
- fast (human time)

Types of 3D Printing

- stereolithography (SLA)
- selective laser sintering (SLS)
- fused deposition modeling (FDM)

Our Printer

UPrint SE Plus

- only one material: ABS
- soluble support (proprietary)
- build plates
- temperature controlled environment
- layer thickness 10 thousandths of an inch
- minimum wall thickness 36 thousandths of an inch
- build volume 8”x8”x6”

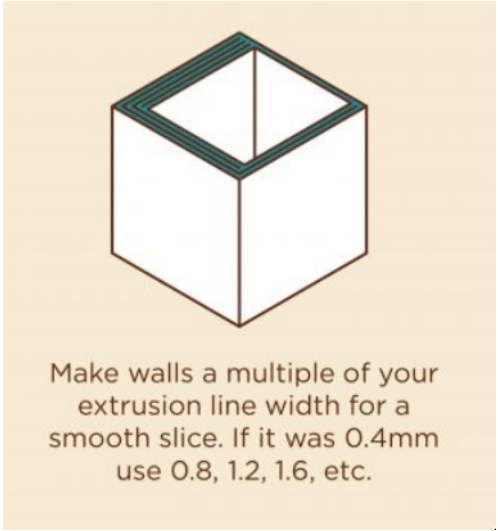
ABS

Acrylonitrile butadiene styrene

- glass transition 105 C
- poor chemical compatibility with organic solvents
- $3 per cubic inch

Design Tips

Design Tips


Make walls a multiple of your extrusion line width for a smooth slice. If it was 0.4mm use 0.8, 1.2, 1.6, etc.

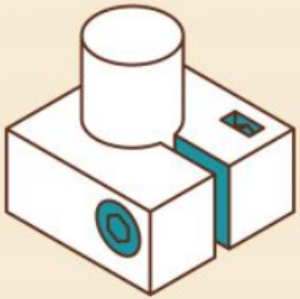
Design Tips

Filament must be laid upon existing material, so avoid steep overhangs to reduce the need for support.

Design Tips

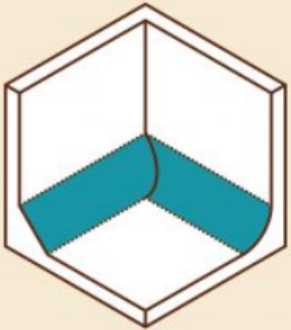

Vertical holes are fine, but horizontal ones should be tear-drop shaped to mitigate steep overhangs.

Design Tips



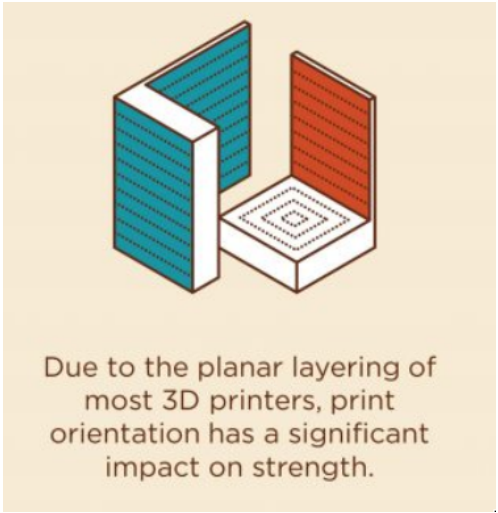
A slit, bolt and trapped nut can be added to holes to allow them to be tightened around another part.

Design Tips

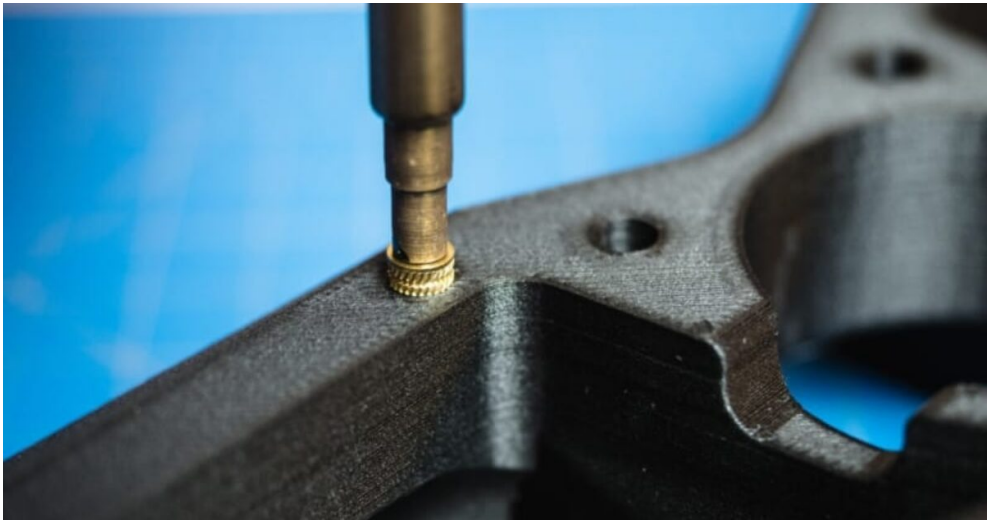


Adding a fillet or chamfer between a wall and base strengthens the join by adding more interface.

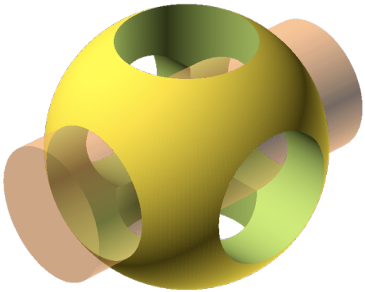
Design Tips


Due to the planar layering of most 3D printers, print orientation has a significant impact on strength.

Design Tips



Design Tips



OpenScad

Conclusion

Thanks for your attention!