

3D PRINTING GUIDE

Slicer/Printer Settings

Supports: Supports help prints with overhangs and unique geometries print without failing. Not adding supports can cause certain parts to deform while printing.

Infill Patterns: Depending on the needs of the part, different infill patterns can be used to improve strength and stability in different directions.

Infill Densities: Increasing the infill density strengthens the overall part.

Perimeters: Adding more perimeters to the part in the slicer can strengthen the walls of the part. This is especially useful when needing to strengthen a part without using too much material or adding too much weight.

Print Beds: Different print beds influence the patterns and textures along the horizontal surface of the print. Some examples include carbon fiber texture, iridescent surfaces, powdered surfaces, and smooth surfaces.

Pauses: Pauses can be added during slicing to insert materials (e.g. magnets and mesh) or change the filament color before resuming the print.

Design Considerations

Filaments: Different filaments can be used for different needs. PLA is the most commonly used filament and great for prototyping. PETG is heat resistant and slightly stronger than PLA, so it is commonly used in motorsports and other applications. TPU is flexible and can be used when parts need to be deformed or stretched.

Tolerances: Placing tolerances, or slight gaps in size, between two connecting parts can influence how they fit together. Leaving no tolerance between the pieces would make it difficult to connect them.

Fillets: Vertical edge fillets improve the quality of prints by making sharp turns less harsh, aka reducing inertia during sharp turns. Placing a fillet between two walls strengthens the joint.

Chamfers: Placing a chamfer between two walls strengthens the joint.

Overhangs: 3D printers can print parts with overhangs of 45 degree or less without any supports. Overhangs of over 45 degrees need supports added.

Connecting Parts: Multiple 3D printed parts can be fit together in different ways. For example, two parts can be designed and toleranced to be slotted together (e.g. joystick and spiral) or parts can be printed as interlocking pieces (e.g. chain and bug).