Proto-pasta

Technical Data Sheet Rev .1

Brass Fill, Bronze Fill, Copper Fill HTPLA

Brass, Bronze, and Copper HTPLA print like plastic but finish like real metal for beautiful, durable parts from most standard 3D printers. These three metal composites can be heat treated to firm up parts and hold shape up to near melting (175C).

Material Properties

Properties	Value/Description
Base material	Heat treatable PLA w/ high temp resistance
Characteristics	low odor, non-toxic, renewably sourced
Molecular structure	Amorphous or partially crystalline *(Amorphous as printed, part crystalline when heat-treated) (Melting resets crystalline structure to amorphous state)*
Additives	Metal Powder
Max particle size	250 microns
Density	approx. 2.3 g/cc
Length	approx. 194 m/kg (1.75 mm) & 72 m/kg (2.85 mm)
Min bend diameter	30 mm (1.75 mm) & 55 mm (2.85 mm)
Glass transition (Tg) onset	approx. 60 deg C (140 deg F)
Melt point (Tm) onset	approx. 155 deg C (310 deg F)
Max use	Tg for amorphous, Tm for crystalline

Use limit is geometry, load & condition dependent

Print Settings

(Based on Ultimaker s5 .15mm Profile)

Setting	Value
Nozzle Temperature [°C]	**195**
Heated Bed Temperature [°C]	**60**
Print Speed [mm/s]	**20-30**
Flow Rate/Extrusion Multiplier [%]	**100**
Extrusion Width [mm]	**.65 (.05mm larger than nozzle size)**
Volume Flow Rate [mm³/s]	**2-3**

Heat Treating **(for heat-treating only)**

HTPLA is a semi-crystalline grade of PLA optimized for heat-treating for higher temperature use. Prior to printing, HTPLA parts should be scaled in the slicer to compensate for shrinkage when heat treating.

(Please note that all values for heat-treating are process dependent and may vary between users)

Part Axis	Percentage
Scale Values (x/y-axis)	101.5%
Scale Values (z-axis)	99%

(a large range of temperatures & times can yield acceptable results)

Typical Heat Treat Temperature	Typical Heat Treat Time
95-110 °C	**10+ minutes**

For a more in-depth look at brass, bronze, and copper please view proto-pasta.com/copper-alloys

Results may vary based on print settings as well as print quality