3D Printing Filament

TECHNICAL DATA SHEET - PRO Series Tough PLA

Commercial name: MatterHackers PRO Series Tough PLA
Raw material: Polylactic Acid
Designation: 3D printing applications
Manufacturer: MatterHackers, Inc

Material Specifications

PROPERTY	VALUE	TEST METHOD - ISO
Density	1.22 g/cm³	D792
Melting Point	165-180°C	D1238
Tensile Modulus	2,865 MPa	D638
Tensile Strength	40 MPa	D638
Impact Strength	160 J/m	D256
Heat deflection temp. HDT/A	75-80°C	D3418
Flexural Strength	73 MPa	D790
Flexural Modulus	350 MPa	D790

Filament Specifications

PROPERTY	VALUE
Diameter 1.75mm	1.75 ± 0.02 mm
Diameter 2.85mm	2.85 ± 0.02 mm
Suggested print temperature	190-230°C
Suggested print speed	40 mm/s
Suggested bed temperature	60-70°C

Annealing process:
Recommended Annealing Temperature: 110-120°C
Annealing can be carried out in an oven or some other medium of heat-transfer, such as a hot water bath. Make sure to follow safety procedures that are appropriate for working around elevated temperatures. Below is a general guideline to anneal parts printed.

1. Preheat the oven to an anneal temperature range of (110°C-120°C).
2. Measure temperature at various locations in the oven to ensure absence of hot/cold spots. Uneven heating can lead to unexpected warpage and sub-optimal performance of the part
3. Place the printed part in the oven and start the timer. Typical time to anneal parts with wall-thickness of 0.125 in (~3.18 mm) is around 20 minutes, but this time is dependent on wall thickness.
4. For large dimension parts, it is common to use support fixtures (e.g.-aluminum jigs) during the annealing process
5. Once removed from the oven, let the part cool in ambient conditions. Minimize handling, as inside of the part will likely remain at elevated temperatures longer than the outside.
6. If using a water-bath to anneal, the part may have to be at temperature for a slightly longer time to crystallize (since the water-bath cannot be at 110°C-120°C).
7. Measure dimensions of the part prior to annealing and again after, to determine shrink.