

# PLA



PLA is a renewable plastic material offered as a low-cost material option for fast-draft part iterations. Available on the office-friendly Stratasys F123™ Series 3D printers, PLA offers a higher stiffness than ABS and its low melting point and HDT mean less heat and power required to print parts.

PLA works well at high speeds, specifically fast-draft mode on the Stratasys F123 Series, for quick concept verification and design development. PLA offers good tensile strength and is available in a wide range of colors, including a variety of translucent colors. Ideal applications for PLA include fast, early concept modeling and low-cost prototyping.

Mechanical Properties <sup>1</sup>	Test Method	Value	
		XZ Axis	ZX Axis
Tensile Strength, Yield (Type 1, 0.125", 0.2"/min)	ASTM D638	45 MPa (6,580 psi)	26 MPa (3,790 psi)
Tensile Strength, Ultimate (Type 1, 0.125", 0.2"/min)	ASTM D638	48 MPa (6,990 psi)	26 MPa (3,830 psi)
Tensile Modulus (Type 1, 0.125", 0.2"/min)	ASTM D638	3,039 MPa (440,730 psi)	2,539 MPa (368,200 psi)
Elongation at Break (Type 1, 0.125", 0.2"/min)	ASTM D638	2.5% (2.5%)	1.0% (1.0%)
Elongation at Yield (Type 1, 0.125", 0.2"/min)	ASTM D638	1.5% (1.5%)	1.0% (1.0%)
Flexural Strength (Method 1, 0.05"/min)	ASTM D790	84 MPa (12,190 psi)	45 MPa (6,570 psi)
Flexural Modulus (Method 1, 0.05"/min)	ASTM D790	2,930 MPa (425,010 psi)	2,470 MPa (358,290 psi)
Flexural Strain at Break	ASTM D790	4.1% (4.1%)	1.9% (1.9%)
IZOD impact - notched (Method A, 23 °C)	ASTM D256	27 J/m (0.5 ft-lb/in)	N/A (N/A)
IZOD impact - unnotched (Method A, 23 °C)	ASTM D256	192 J/m (3.6 ft-lb/in)	N/A (N/A)

Thermal Properties	Test Method	Value
Heat Deflection (HDT) @ 66 psi	ASTM D648	53 °C (127 °F)
Heat Deflection (HDT) @ 264 psi	ASTM D648	51 °C (124 °F)
Vicat Softening Temperature (Rate B/50)	ASTM D1525	54 °C (129 °F)
Glass Transition Temperature (Tg)	DMA (SSYS)	63 °C (145 °F)
Coefficient of Thermal Expansion (flow)	ASTM E831	101x10 <sup>-06</sup> μm/(m·°C) (56x10 <sup>-06</sup> μin/(in·°F))
Coefficient of Thermal Expansion (xflow)	ASTM E831	102x10 <sup>-06</sup> μm/(m·°C) (57x10 <sup>-06</sup> μin/(in·°F))

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Other	Test Method	Value
Specific Gravity	ASTM D792	1.264 g/cc

System Availability	Layer Thickness Capability	Value	
		XY	ZX
Volume Resistivity	ASTM D257	2.9E+15 ohm-cm	3.24E+15 ohm-cm
Dielectric Constant	ASTM D150-98	1.51	2.33
Dissipation Factor	ASTM D150-98	0.003	0.005
Dielectric Strength	ASTM D149-09, Method A	154 V/mil	293 V/mil

System Availability	Layer Thickness Capability	Support Structure	Available Colors
F123 Series	0.010 in. (0.254 mm)	Breakaway	<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: black; margin-right: 5px;"></span> Black</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: white; border: 1px solid black; margin-right: 5px;"></span> White</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: green; margin-right: 5px;"></span> Green</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: red; margin-right: 5px;"></span> Red</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: gray; margin-right: 5px;"></span> Medium Gray</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #f0f0f0; margin-right: 5px;"></span> Natural Trans</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: yellow; margin-right: 5px;"></span> Yellow Trans</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: lightgray; margin-right: 5px;"></span> Light Gray</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: blue; margin-right: 5px;"></span> Blue</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #ff0000; border: 1px solid red; margin-right: 5px;"></span> Red Trans</li> </ul>

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