

Technical data sheet PLA

Ultimaker

Chemical name	Polylactic acid
Description	Ultimaker PLA filament provides a no-hassle 3D printing experience thanks to its reliability and good surface quality. Our PLA is made from organic and renewable sources. It's safe, easy to print with and it serves a wide range of applications for both novice and advanced users.
Key features	Good tensile strength and surface quality, easy to work with at high print speeds, user-friendly for both home and office environments, PLA allows the creation of high-resolution parts. There is a wide range of color options available.
Applications	Household tools, toys, educational projects, show objects, prototyping, architectural models, as well as lost casting methods to create metal parts.
Non-suitable for	Food contact and in-vivo applications. Long term outdoor usage or applications where the printed part is exposed to temperatures higher than 50 °C.

Filament specifications

	<u>Value</u>	<u>Method</u>
Diameter	2.85±0.10 mm	-
Max roundness deviation	0.10 mm	-
Net filament weight	350 g / 750 g	-
Filament length	~44 m / ~95 m	-

Color information

<u>Color</u>	<u>Color code</u>
PLA Green	RAL 6018
PLA Black	RAL 9005
PLA Silver Metallic	RAL 9006
PLA White	RAL 9010
PLA Transparent	n/a
PLA Orange	RAL 2008
PLA Blue	RAL 5002
PLA Magenta	RAL 4010
PLA Red	RAL 3020
PLA Yellow	RAL 1003
PLA Pearl White	RAL 1013

Mechanical properties (*)

Injection molding

3D printing

	<u>Typical value</u>	<u>Test method</u>	<u>Typical value</u>	<u>Test method</u>
Tensile modulus	-	-	2346.5 MPa	ISO 527 (1 mm/min)
Tensile stress at yield	-	-	49.5 MPa	ISO 527 (50 mm/min)
Tensile stress at break	-	-	45.6 MPa	ISO 527 (50 mm/min)
Elongation at yield	-	-	3.3 %	ISO 527 (50 mm/min)
Elongation at break	-	-	5.2 %	ISO 527 (50 mm/min)
Flexural strength	-	-	103.0 MPa	ISO 178
Flexural modulus	-	-	3150.0 MPa	ISO 178
Izod impact strength, notched (at 23°C)	-	-	5.1 kJ/m ²	ISO 180
Charpy impact strength (at 23°C)	-	-	-	-
Hardness	-	-	83 (Shore D)	Durometer

Thermal properties

Typical value

Test method

Melt mass-flow rate (MFR)	6.09 g/10min	ISO 1133 (210 °C, 2.16 kg)
Heat deflection (HDT) at 0.455 MPa	-	-
Heat deflection (HDT) at 1.82 MPa	-	-
Glass transition	~60 °C	ISO 11357
Coefficient of thermal expansion	-	-
Melting temperature	145-160 °C	ISO 11357
Thermal shrinkage	-	-

Other properties

Typical value

Test method

Specific gravity	1.24	ASTM D1505
Flame classification	-	-

(*) See notes.

Notes

Properties reported here are average of a typical batch. The 3D printed test specimens were printed in the XY plane, using the normal quality profile in Cura 2.1, an Ultimaker 2+, a 0.4mm nozzle, 90% infill, 210 °C nozzle temperature and 60 °C build plate temperature. The values are the average of 5 white and 5 black specimens for the tensile, flexural, and impact tests. The Shore hardness D was measured in a 7-mm-thick square printed in the XY plane, using the normal quality profile in Cura 2.5, an Ultimaker 3, a 0.4 mm print core and 100% infill. Ultimaker is constantly working on extending the TDS data.

Disclaimer

Any technical information or assistance provided herein is given and accepted at your risk, and neither Ultimaker or its affiliates make any warranty relating to it or because of it. Neither Ultimaker nor its affiliates shall be responsible for the use of this information, or of any product, method or apparatus mentioned, and you must make your own determination of its suitability and completeness for your own use, for the protection of the environment, and for the health and safety of your employees and purchasers of your products. No warranty is made of the merchantability or fitness of any product; and nothing herein waives any of Ultimaker's conditions of sale. Specifications are subject to change without notice.

Version

Version 3.011

Date

16/05/2017

Ultimaker