

# 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 <sup>2</sup>	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.

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Version

Version 3.011

Date

16/05/2017

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