

FDM Materials

Tough PLA

Key Features

- Impact strength similar as and higher stiffness compared to Ultimaker ABS
- Matte surface finish quality
- More reliable than ABS for larger prints, with no delamination or warping.

Non Suitable For

- Food contact and in vivo applications
- Long term outdoor usage
- Parts exposed to temperatures higher than 58 °C

Filament Specifications

	Method (standard)	Value
Diameter	-	2.85 ± 0.05 mm
Max roundness deviations	-	0.05 mm
Net filament weight	-	750 g
Filament length	-	~96 m

Colour Specifications

Black	RAL 9017
White	RAL 9003
Green	RAL 6038
Red	RAL 3018
Gray	RAL 7000
Yellow	RAL 1018
Blue	RAL 5019

FDM Materials

Tough PLA

Mechanical Properties

	Test Method	Typical Value		
		XY (Flat)	YZ (Side)	Z (Up)
Tensile (Young's) modulus	ASTM D3039 (1 mm/min)	2797 ± 151 MPa	2797 ± 99 MPa	2696 ± 180 MPa
Tensile stress at yield	ASTM D3039 (5 mm/min)	45.3 ± 2.0 MPa	47.5 ± 0.5 MPa	33.4 ± 0.5 MPa
Tensile stress at break	ASTM D3039 (5 mm/min)	27.5 ± 7.8 MPa	31.3 ± 4.4 MPa	32.5 ± 0.8 MPa
Elongation at yield	ASTM D3039 (5 mm/min)	3.2 ± 0.0%	3.5 ± 0.0%	2.6 ± 0.1%
Elongation at break	ASTM D3039 (5 mm/min)	9.4 ± 1.9%	8.2 ± 1.8%	3.1 ± 0.7%
Flexural modulus	ISO 178 (1 mm/min)	2882 ± 61 MPa	2503 ± 45 MPa	2358 ± 78 MPa
Flexural strength	ISO 178 (5 mm/min)	91.6 ± 1.3 MPa at 4.1% strain	83.0 ± 1.4 MPa at 4.4% strain	61.3 ± 5.2 MPa at 3.4% strain
Flexural strain at break (at 23 °C)	ISO 178 (5 mm/min)	No break (>10%)	No break (>10%)	3.4 ± 0.5%
Charpy impact strength	ISO 179-1 / 1eB (notched)	8.9 ± 0.8 kJ/m2 (hinge)		
Hardness	ISO 7619-1 (durometer, shore D)	80Shore D		

Mechanical Properties

	Test Method	Typical Value
Melt mass-flow rate (MFR)	ISO 1133 (210 °C, 2.16 kg)	6 - 7 g / 10 min
Heat deflection (HDT) at 0.455 MPa*	ISO 75-2 / B	58.3 ± 0.7 °C
Vicat softening temperature	ISO 306 / A120	63.7 ± 0.3 °C
Glass transition	ISO 11357 (DSC, 10 °C / min)	59 °C
Melting temperature	ISO 11357 (DSC, 10 °C / min)	152 °C

Other Properties

Specific gravity	ISO 1183	1.22 g / cm3
------------------	----------	--------------