

# Material List and Spec Sheets

Material	Description	Page
ABS	ABS-M30	Page 2 - 3
	ABS-M30i	
	ABSi	
	ABS-ESD7	
ABS-like	ASA	
PA	Nylon 12 CF	
	Nylon 12	
	Nylon6	
PC	PC-ABS	
	PC-ISO	
	PC	
PEI	ULTEM1010	
	ULTEM9085	
PLA	Tough PLA	Page 4 - 5
PPSF/PPSU		
TPU	TPU92A	

## FDM Materials

# ABS

### Key Features

- Toughness and heat resistance
- Superior aesthetics
- Minimal warping
- Reliable bed adhesion

### Non-Suitable For

- Food contact and in vivo applications
- Parts exposed to long term UV light
- Parts exposed to temperatures higher than 87°C

### Filament Specifications

	Method (standard)	Value
Diameter	-	2.85 ± 0.10 mm
Max roundness deviations	-	0.10 mm
Net filament weight	-	750 gr
Filament length	-	~ 107 m

### Colour Specifications

Black	RAL 9017
White	RAL 9003
Red	RAL 3020
Blue	RAL 5002
Silver	RAL 9006
Pearl Gold	RAL 1036
Green	RAL 6018
Orange	RAL 2008
Yellow	RAL 1023
Gray	RAL 7011

# FDM Materials

# ABS

## Mechanical Properties

	Test Method	Typical Value		
		XY (Flat)	YZ (Side)	Z (Up)
Tensile (Young's) modulus	ASTM D3039 (1 mm/min)	1962 ± 31 MPa	1931 ± 68 MPa	1699 ± 113 MPa
Tensile stress at yield	ASTM D3039 (5 mm/min)	38.1 ± 0.3 MPa	38.2 ± 0.4 MPa	No yield
Tensile stress at break	ASTM D3039 (5 mm/min)	33.9 ± 1.5 MPa	35.7 ± 1.0 MPa	19.0 ± 0.6 MPa
Elongation at yield	ASTM D3039 (5 mm/min)	4.1 ± 0.1%	4.1 ± 0.1%	No yield
Elongation at break	ASTM D3039 (5 mm/min)	4.6 ± 0.3%	4.5 ± 0.2%	2.0 ± 0.1%
Flexural modulus	ISO 178 (1 mm/min)	1430 ± 83 MPa	1470 ± 48 MPa	1317 ± 28 MPa
Flexural strength	ISO 178 (5 mm/min)	61.1 ± 3.2 MPa at 5.1% strain	60.2 ± 0.6 MPa at 5.3% strain	21.5 ± 1.8 MPa at 1.5% strain
Flexural strain at break (at 23 °C)	ISO 178 (5 mm/min)	No break (>10%)	No break (>10%)	1.5 ± 0.1%
Charpy impact strength	ISO 179-1 / 1eB (notched)	14.2 ± 1.2 kJ/m2 (hinge)		
Hardness	ISO 7619-1 (durometer, shore D)	76 Shore D		

## Mechanical Properties

	Test Method	Typical Value
Melt mass-flow rate (MFR)	ISO 1133 (260 °C, 5 kg)	41 g / 10 min
Heat deflection (HDT) at 0.455 MPa*	ISO 75-2 / B	86.6 ± 0.4 °C
Vicat softening temperature	ISO 306 / A120	93.8 ± 0.7 °C
Glass transition	ISO 11357 (DSC, 10 °C / min)	100.5 °C
Melting temperature	ISO 11357 (DSC, 10 °C / min)	- (amorphous)

## Other Properties

Specific gravity	ISO 1183	1.1 g / cm3
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# 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/m <sup>2</sup> (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 / cm <sup>3</sup>
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