

Technical data sheet PC

Ultimaker

Chemical composition

See PC safety data sheet, section 3

Description

With Ultimaker PC filament, you can print strong and tough parts that retain dimensional stability when subjected to temperatures as high as 110 °C. Our PC is engineered to be printed at moderate temperatures compared to other PC filaments and shows minimized warping to provide a seamless 3D printing experience

Key features

High toughness (especially for the non-transparent filament options), temperature resistance, flame retardant characteristics, dimensionally stable, strong interlayer bonding (especially when using the front enclosure add-on), good bed adhesion (especially when using adhesion sheets). Allows printing of translucent parts with the transparent filament option

Applications

Lighting, molds, engineering parts, tools, functional prototyping, and short-run manufacturing

Non-suitable for

Food contact and *in vivo* applications. Applications where the printed part is exposed to temperatures higher than 110 °C

Filament specifications

	Value	Method
Diameter	2.85 ± 0.05 mm	Ultra-fast CCS-based, dual-axis diameter gauge
Max roundness deviation	0.05 mm	Ultra-fast CCS-based, dual-axis diameter gauge
Net filament weight	750 g	-
Filament length	~ 99 m	-

Color information

Color	Color code
PC Transparent	N/A
PC Black	RAL 9005
PC White	RAL 9003

Mechanical properties*

	Injection molding		3D printing	
	Typical value	Test method	Typical value	Test method
Tensile modulus**	-	-	2,134 MPa (t) 1,904 MPa (b/w)	ISO 527 (1 mm/min)
Tensile stress at yield	-	-	-	-
Tensile stress at break	-	-	76.4 MPa (t) 53.7 MPa (b/w)	ISO 527 (50 mm/min)
Elongation at yield	-	-	-	-
Elongation at break	-	-	6.4% (t) 5.9% (b/w)	ISO 527 (50 mm/min)
Flexural strength	-	-	111 MPa (t) 95.5 MPa (b/w)	ISO 178
Flexural modulus	-	-	2,410 MPa (t) 2,310 MPa (b/w)	ISO 178
Izod impact strength, notched (at 23 °C)	-	-	4.1 kJ/m ² (t) 14.8 kJ/m ² (b/w)	ISO 180
Charpy impact strength (at 23 °C)	-	-	-	-
Hardness	-	-	82 (Shore D)(t) 80 (Shore D)(b/w)	Durometer

Electrical properties*

	Typical value	Test method	Typical value	Test method
Dissipation factor (at 1 MHz)	-	-	0.005 (t) 0.012 (b/w)	ASTM D150-11
Dielectric constant (at 1 MHz)	-	-	2.62 (t) 2.76 (b/w)	ASTM D150-11

Thermal properties

	Typical value	Test method
Melt mass-flow rate (MFR)	32 - 35 g/10 min (t) 23 - 26 g/10 min (b/w)	(300 °C, 1.2 kg)
Heat detection (at 0.455 MPa)	-	-
Heat deflection (at 1.82 MPa)	-	-
Vicat softening temperature	-	-
Glass transition	112 - 113 °C	DSC, 10 °C/min
Coefficient of thermal expansion	-	-
Melting temperature	-	-
Thermal shrinkage	-	-

*See notes

** (t) Transparent. (b/w) Black and White

Other properties

	Value	Test method
Specific gravity	1.18 - 1.20	ASTM D792
Flame classification	Preliminary tested (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 Ultimaker Cura 2.1, an Ultimaker 2+, a 0.4 mm nozzle, 90% infill, 260 °C nozzle temperature, and 110 °C build plate temperature. The values are the average of five transparent, five white, and five 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 Ultimaker Cura 2.5, an Ultimaker 3, a 0.4 mm print core, and 100% infill. The electrical properties were measured on a 54-mm-diameter disk with 3 mm thickness printed in the XY plane, using the fine quality profile (0.1 mm layer height) in Ultimaker Cura 3.2.1, an Ultimaker 3, a 0.4 mm print core, and 100% infill. Ultimaker is constantly working on extending the TDS data.

Ultimaker PC could pass V-2 (UL94) at thickness > 1 mm when printed with 100% infill. Lower infill may lead to reduced flame retardancy performance.

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Version	Version 4.002
Date	November 19, 2018