

PolySmooth™

PolySmooth™ is PVB based filament featuring excellent printability, balanced mechanical properties, and "polishability".

Physical Properties

Property	Testing method	Typical value
Density	ASTM D792 (ISO 1183, GB/T 1033)	1.08 - 1.10 (g/cm ³ at 21.5 °C)
Glass transition temperature	DSC, 10 °C/min	70 (°C)
Vicat Softening temperature	ASTM D1525 (ISO 306 GB/T 1633)	Natural: 67 (°C) Colored: 70 (°C) Transparent: 70 (°C)
Melt index	210 °C, 2.16 kg	6.6 - 6.7 (g/10 min)
Decomposition temperature	TGA, 20 °C/min	260 (°C)

Tested with 3D printed specimen of 100% infill

Mechanical Properties

Property	Testing method	Typical value
Young's modulus (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	Natural: 1745 ± 151 (MPa) Colored: 2047 ± 111 (MPa) Transparent: 2092 ± 152 (MPa)
Tensile strength (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	Natural: 35.7 ± 1.7 (MPa) Colored: 39.8 ± 0.7 (MPa) Transparent: 44.1 ± 0.8 (MPa)
Elongation at break (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	Natural: 5.8 ± 0.9 (%) Colored: 4.5 ± 1.4 (%) Transparent: 3.4 ± 0.4 (%)
Bending modulus	ASTMD790 (ISO 178, GB/T 9341)	Natural: 1198 ± 173 (MPa) Colored: 1846 ± 109 (MPa) Transparent: 2062 ± 29 (MPa)
Bending strength	ASTMD790 (ISO 178, GB/T 9341)	Natural: 60.2 ± 1.6 (MPa) Colored: 64.9 ± 1.2 (MPa) Transparent: 76.2 ± 2.3 (MPa)
Charpy impact strength	ASTM D256 (ISO 179, GB/T 1043)	Natural: 9.6 ± 0.9 (kJ/m ²) Colored: 9.2 ± 1.2 (kJ/m ²) Transparent: 5.2 ± 0.3 (kJ/m ²)

All testing specimens were printed under the following conditions:

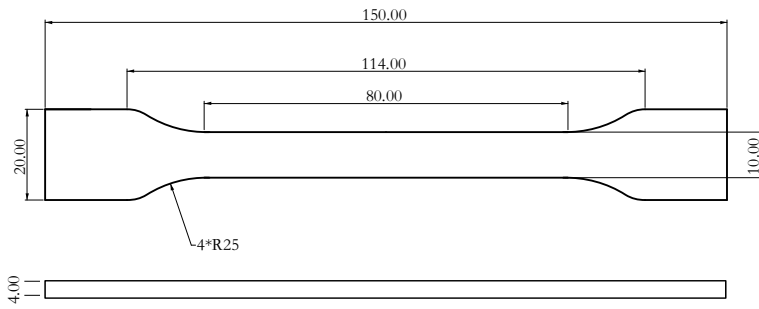
nozzle temperature = 220 °C, printing speed = 45 mm/s, build plate temperature = 60 °C, infill = 100%

All specimens were conditioned at room temperature for 24h prior to testing

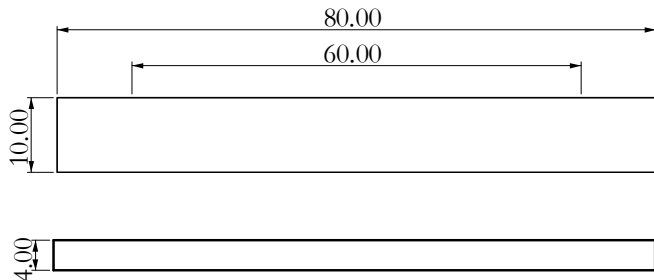
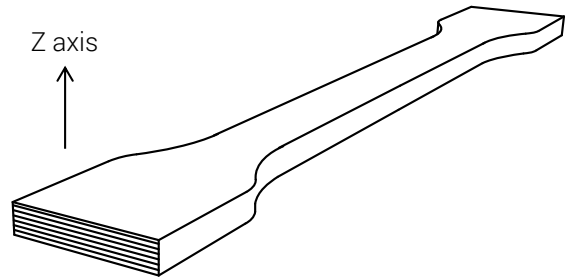
Recommended printing conditions

Parameter	
Nozzle temperature	200 - 230 (°C)
Build Surface material	Glass, Blue Tape, BuildTak®
Build surface treatment	None, Applying PVA glue to the build surface
Build plate temperature	0 - 70 (°C)
Cooling fan	Turned on
Printing speed	40 - 90 (mm/s)
Raft separation distance	0.1 - 0.14 (mm)
Retraction distance	1-3 (mm)
Retraction speed	30 - 40 (mm/s)
Recommended environmental temperature	20 - 30 (°C)
Threshold overhang angle	60 (°)
Recommended support material	PVA

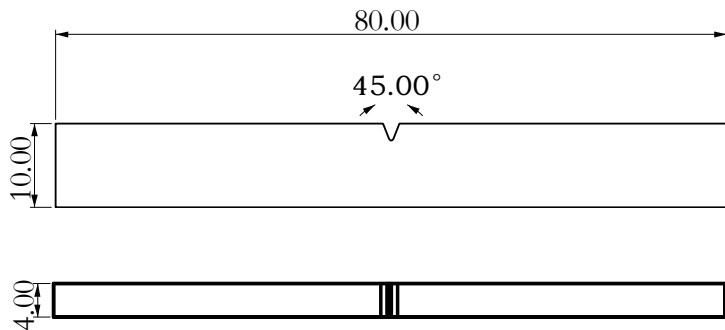
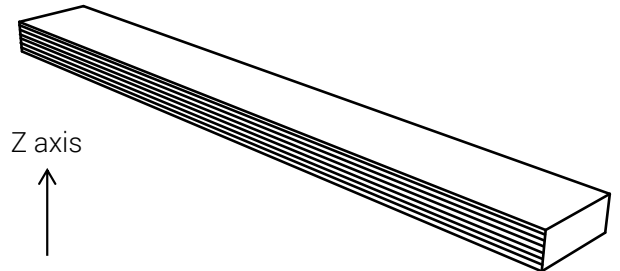
Based on 0.4 mm nozzle and Simplify 3D v.4.0. Printing conditions may vary with different nozzle diameters



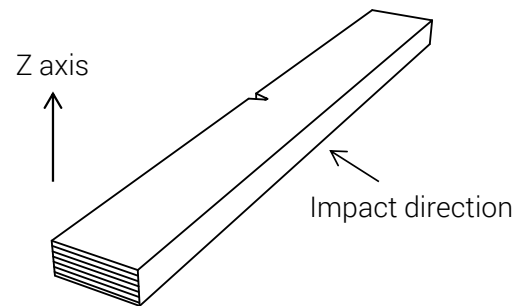
Tensile testing specimen; ASTM D638 (ISO 527, GB/T 1040)



Flexural testing specimen; ASTM D790 (ISO 178, GB/T 9341)



Impact testing specimen; ASTM D256 (ISO 179, GB/T 1043)



Disclaimer:

The typical values presented in this data sheet are intended for reference and comparison purposes only. They should not be used for design specifications or quality control purposes. Actual values may vary significantly with printing conditions. End- use performance of printed parts depends not only on materials, but also on part design, environmental conditions, printing conditions, etc. Product specifications are subject to change without notice.

Each user is responsible for determining the safety, lawfulness, technical suitability, and disposal/recycling practices of Polymaker materials for the intended application. Polymaker makes no warranty of any kind, unless announced separately, to the fitness for any use or application. Polymaker shall not be made liable for any damage, injury or loss induced from the use of Polymaker materials in any application.