PolyCore PETG-1000

Technical Data Sheet (Ver. 2.0, last updated: Dec, 2023)

PolyCore™ PETG-1000 is cost-effective PETG pellet with good printability and unique aesthetic effect, specially designed for Medium Area Additive Manufacturing (MAAM) and Big Area Additive manufacturing (BAAM) technology. It is suitable for indoor applications such as furniture, luminaires and decoration.

Basic Properties

Property	Testing Method	Typical Value
Density (g/cm^3 at 21.5 °C)	ASTM D792 (ISO 1183, GB/T 1033)	1.3
Melt index (g/10 min)	240 °C, 2.16 kg	11
Glass transition temperature (°C)	DSC, 10 °C/min	81
Vicat Softening temperature (°C)	ASTM D1525 (ISO 306 GB/T 1633)	84
Heat Deflection Temperature (°C)	ISO 75 1.8MPa 0.45MPa	62 70

Mechanical Properties1

Property	Testing Method	Typical Value
Young's modulus (MPa)	ASTM D638 (ISO 527, GB/T 1040)	2237 ± 49
Tensile strength (MPa)	ASTM D638 (ISO527, GB/T 1040)	50 ± 1.1
Elongation at break (%)	ASTM D638 (ISO527, GB/T 1040)	4.5 ± 0.9
Bending modulus (MPa)	ASTM D790 (ISO 178, GB/T 9341)	2150 ± 64
Bending strength (MPa)	ASTM D790 (ISO 178, GB/T 9341)	71 ± 2.4

1. Tested with injection molding specimens

Mechanical Properties1

Property	Testing Method	Typical Value
Young's modulus (MPa) (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	1744 ± 105
Tensile strength (MPa) (X-Y)	ASTM D638 (ISO527, GB/T 1040)	37.4 ± 5.8
Elongation at break (%) (X-Y)	ASTM D638 (ISO527, GB/T 1040)	11.2 ± 2.7
Bending modulus (MPa) (X-Y)	ASTM D790 (ISO 178, GB/T 9341)	1831 ± 110

Bending strength (MPa) (X-Y)	ASTM D790 (ISO 178, GB/T 9341)	41.4 ± 3.4
Charpy Impact strength (kJ/m^2) (X-Y)	ASTM D256 (ISO 179, GB/T 1043)	36.5 ± 3.0
Young's modulus (MPa) (Z)	ASTM D638 (ISO 527, GB/T 1040)	1431 ± 87
Tensile strength (MPa) (Z)	ASTM D638 (ISO527, GB/T 1040)	30.7 ± 5.0
Elongation at break (%) (Z)	ASTM D638 (ISO527, GB/T 1040)	3.6 ± 1.2
Bending modulus (MPa) (Z)	ASTM D790 (ISO 178, GB/T 9341)	1273 ± 58
Bending strength (MPa) (Z)	ASTM D790 (ISO 178, GB/T 9341)	36.1 ± 5.7
Charpy Impact strength (kJ/m^2) (Z)	ASTM D256 (ISO 179, GB/T 1043)	31.6 ± 2.2

1. Tested with the specimens printed under following conditions:
Nozzle temperature = 240°C, Nozzle diameter: 8mm, Shell width = 14mm, Layer height = 3mm, Layer time = 115s,
Room temperature = 15°C ,100% solid specimens.

Recommended Printing Conditions

Parameter	Recommended Setting
Drying temperature (°C)	70
Drying Time (h)	8
Maximum moisture content (%)	0.54
Barrel – zone 1 temperature (°C)	170 - 190
Barrel – zone 2 temperature (°C)	220 - 240
Barrel – zone 3 temperature (°C)	220 - 240
Nozzle temperature (°C)	210 - 230
Bed temperature (°C)	40 - 70

Other Comments

- It is recommended to stop feeding and continue extruding until the extruder is fully empty, if the printing stops in a short term, such as 10-30 min.
- It is recommended to stop feeding and continue extruding until the extruder is fully empty, then use polyethylene (PE) to clean the extruder, if the printing stop in a long term, such as several hours. It is helpful to avoid the carbonization of material and keep extruder working in a good condition

Recommended Printing Parameters

	Tr = 40℃ Width=22mm Height=3mm	Tr = 40℃ Width=16mm Height=3mm	Tr = 40℃ Width=5mm Height=2mm	Tr = 25℃ Width=22mm Height=3mm	Tr = 25℃ Width=16mm Height=3mm	Tr = 25℃ Width=5mm Height=2mm	Tr = 10℃ Width=22mm Height=3mm	Tr = 10℃ Width=16mm Height=3mm	Tr = 10℃ Width=5mm Height=2mm
Top layer Temperature	Layer Time (s)	Layer Time (s)	Layer Time (s)	Layer Time (s)	Layer Time (s)	Layer Time (s)	Layer Time (s)	Layer Time (s)	Layer Time (s)
150 ℃	103	100	80	90	86	66	78	74	53
140 ℃	129	124	102	112	107	83	96	91	68
130 ℃	161	155	130	138	133	106	119	113	86
120 ℃	200	194	165	172	165	134	147	139	109
110 ℃	249	242	210	213	205	170	182	173	138
100 ℃	311	303	267	265	255	216	224	214	174
90 ℃	387	379	340	329	316	274	277	264	221
80 ℃	482	474	433	408	393	348	343	327	279
70 ℃	601	593	551	506	488	442	424	405	354
60 ℃	749	741	702	628	608	560	524	501	448

1：Definition of each concept

- Layer time: the time spent for depositing one layer of the printed part.
- Top layer temperature: the instantaneous temperature of a specific point on the topmost completed layer, measured when the nozzle printing the current layer is positioned directly above it.
- Width: the cross-sectional dimension of the printed layer, perpendicular to the direction of the print nozzle's movement.
- Height: the vertical dimension of the printed object, or the layer thickness during pellet printing.
- Tr: room temperature when starting pellet printing.

2： The top layer temperature should range between the material's glass transition temperature (Tg) and its non-collapse printing temperature for optimal mechanical properties and dimensional stability.

3：Above data is inferred based on a melt temperature of 240°C at nozzle exit and a 1m*1m*1m square frame model.

4：The simulation condition is based on a closed room without additional air disturbances, and assumes some environment temperature increasement.

5：Above data is inferred based on the thermal history simulation software, Dragon, by Helio Additive. It should be used for reference only. For a more detailed analysis, please contact Polymaker.

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 particular use or application. Playmaker shall not be made liable for any damage, injury or loss induced from the use of Polymaker materials in any particular application.