



Polymaker™ PC-PBT



Industrial

For other languages, please visit
www.polymaker.com

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Printing with Polymaker™ PC-PBT

Polymaker™ PC-PBT

Polymaker™ PC-PBT is a PC/PBT polymer blend which offers good heat resistance and toughness at low temperature (-20 °C/-30 °C). Polymaker™ PC-PBT also features good chemical resistance.



Printing settings

Nozzle Temperature:	260-280 °C
Bed Temperature:	100-115 °C
Chamber Temperature:	100-110 °C
Printing Speed:	30-50 mm/s
Cooling Fan:	OFF

Note: Settings are based on 0.4 mm nozzle, and may vary with different printers and nozzle diameters.



Bed surface

Polymaker™ PC-PBT can be printed on almost any surface with a thin coat of Magigoo PC. We recommend a flex plate to facilitate the removal of the model from the plate.

—— **High temperature conditions**

We recommend a full metal hot end that can maintain a stable temperature of at least 260 °C. We also recommend to use a heated chamber capable of reaching at least 80 °C.

—— **Annealing Polymaker™ PC-PBT parts**

We recommend annealing all models printed in Polymaker™ PC-PBT. This allows users to take full advantage of the mechanical and thermal properties.

The annealing process consists of putting the model in an oven at 90 °C for 2 hours.

—— **Support material**

PolyDissolve™ S2 is the recommended support material for Polymaker™ PC-PBT.

For more information, please visit
www.polymaker.com

PCP: Profile Creation Process

The profile creation process (PCP) allows users to rapidly develop a printing profile for any given material/printer. During this process is important to consider all of these factors to build a successful profile.

- Geometry
- Material
- Printer
- Environment
- Purpose

Polymaker developed the PCP to assist customers in creating their own tailored print profiles; taking into account the material, printer, environment as well as the models geometry and purpose. Additionally, the PCP allows individuals to develop their own knowledge and troubleshooting skills.

The PCP is available on www.polymaker.com

The PCP is divided in 5 steps:

It uses less than 300g of materials and less than 7h of working time.

- Step 1: Extrusion Flow
- Step 2: Flow Management
- Step 3: Cooling Fan
- Step 4: Warpage
- Step 5: Fine Details

Each of these steps has a specific objective and introduces an important concept about the FFF 3D printing process. Each step will also give you the possibility to push your test further for more accurate results.

Polymaker PC materials



Specialty



Specialty



PolyMax™



PolyMax™



PolyLite™

	PC-ABS	PC-PBT	PC-FR	PC	PC
Young's modulus (MPa)	1832	1986	2634	2048	2307
Tensile strength (MPa)	39.9	41.8	67	59.7	62.7
Elongation at break (%)	4.2	4.6	3.9	12.2	3.2
Bending modulus (MPa)	2081	1933	2518	2044	2477
Bending strength (MPa)	66.3	64.4	96.6	94.1	100.4
Charpy impact strength (kJ/m ²)	25.8	21.4	11.7*	25.1	3.4

*The flame retardant significantly reduces the toughness of the raw PC material but the composition still provides a good balance between mechanical properties and flame retardant performance.

Note: Tested with 3D printed specimens.

Polymaker™ PC-PBT

Polymaker™ PC-PBT features two main properties which distinguish it from the other Polymaker PC materials:

Good chemical resistance

Polymaker™ PC-PBT is resistant to hydrocarbons, alcohols, organic acids, inorganic aqueous salts, and dilute base and acid solutions. This makes them suitable for applications requiring resistance to intermittent contact with many lubricants, solvents, fuels, oils, cleaning agents, and other automotive-type chemicals.

Note: Polymaker™ PC-PBT is not resistant to strong alkalis or chlorinated, aromatic, ketone- or ester-containing solvents.

Note: Additional influence parameters of the chemical resistance properties of material are the:

- Composition of the surrounding media
- Temperature
- Duration of exposure

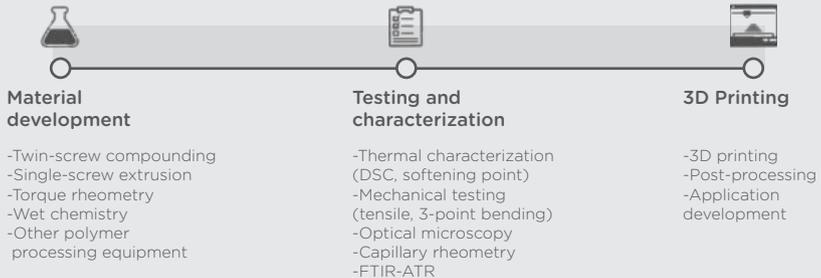
It is essential to test them under actual operating conditions first.

Low temperature impact resistance

Polymaker™ PC-PBT has a high resistance to impact. It also features an excellent low temperature toughness keeping more than 70% of its impact resistance at -30°C.

Material Development

If your application requires a specific material that is not yet available in the market, consider our custom development service. With our talented material scientists and application engineers, we are ready to develop the necessary materials to enable your unique application.



Our state-of-the art R&D facilities allow us to engineer materials at different levels and fully optimize them for 3D printing. Our goal is to deliver materials with the right combination of properties/functions, processability and form to suit your needs!



Polymaker products



PolyLite™

PLA
PETG
ABS
PC
ASA



PolyMax™

PLA
PETG
PC
⚙️ PC-FR



PolyFlex™

TPU95



PolyMide™

CoPA
⚙️ PA6-CF
⚙️ PA6-GF



PolyDissolve™

S1
S2



Specialty

PolyWood™
PolySmooth™
PolySupport™
PolyCast™
⚙️ Polymaker™ PC-PBT
⚙️ Polymaker™ PC-ABS



Hardware

PolyBox™
Polysher™

More products
coming soon...

Industrial range: 

Technologies

JAM-FREE™

Regular PLA



With Jam-Free™



ASH-FREE™

Without Ash-Free™
Ash content: 0.5%



With Ash-Free™
Ash content: 0.003%



WARP-FREE™

Regular Nylon



With Warp-Free™



STABILIZED FOAMING™

Wood



Stabilized Foaming™



LAYER-FREE™

Rough surface



With Layer-Free™



FIBER ADHESION™



NANO-REINFORCEMENT



About Polymaker

Our Values



Customer
Oriented



Responsible



Entrepreneurial



Embracing
Innovation

Mission

Polymaker is committed to lowering the barriers to innovation and manufacturing, by continuously developing advanced 3D printing material technologies for industries and consumers.

Contact us

For any inquiries please contact:

inquiry@polymaker.com

For technical support please contact:

support@polymaker.com

The information provided in this document is intended to serve as basic guidelines on how particular product can be used. Users can adjust the printing conditions based on their needs and actual situations. It is normal for the product to be used outside of the recommended ranges of conditions. 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. Polymaker shall not be made liable for any damage, injury or loss induced from the use of Polymaker materials in any particular application



polymaker

Polymaker™ PC-PBT

Polymaker™ PC-PBT is a PC/PBT alloy based filament designed specifically for FDM/FFF 3D printing. It offers great chemical resistance, low temperature impact and superior printing quality

Physical Properties

Property	Testing method	Typical value
Density	ASTM D792 (ISO 1183, GB/T 1033)	1.2 (g/cm ³ at 21.5°C)
Melt index	260 °C, 5 kg	16-22 (g/10 min)
Vicat Softening temperature	ASTM D1525 (ISO 306 GB/T 1633)	139 (°C)
Glass transition temperature	DSC, 10 °C/min	140 (°C)
Melting temperature	DSC, 10 °C/min	223 (°C)
Crystallization temperature	DSC, 10 °C/min	186 (°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)	1986 ± 85 (MPa)
Tensile strength (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	41.8 ± 0.9 (MPa)
Elongation at break (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	4.6 ± 0.7 (%)
Bending modulus (X-Y)	ASTMD790 (ISO 178, GB/T 9341)	1933 ± 83 (MPa)
Bending strength (X-Y)	ASTMD790 (ISO 178, GB/T 9341)	64.4 ± 0.3 (MPa)
Charpy impact strength (X-Y)	ASTM D256 (ISO 179, GB/T 1043)	21.4 ± 3 (kJ/m ²)
Young's modulus (Z)	ASTM D638 (ISO 527, GB/T 1040)	2101 ± 193 (MPa)
Tensile strength (X-Y)	ASTM D638 (ISO 527, GB/T 1040)	31.1 ± 0.8 (MPa)
Elongation at break (Z)	ASTM D638 (ISO 527, GB/T 1040)	1.83 ± 0.2 (%)

All testing specimens were printed under the following conditions:

nozzle temperature = 260 °C, printing speed = 60 mm/s, build plate temperature = 110 °C, infill = 100%, Chamber temperature = 80 °C

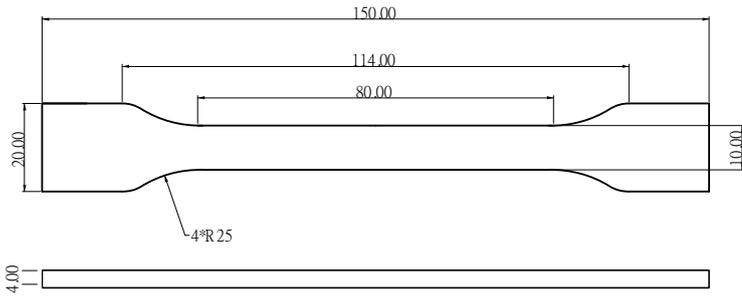
All specimens were conditioned at room temperature for 24h prior to testing

Recommended printing conditions

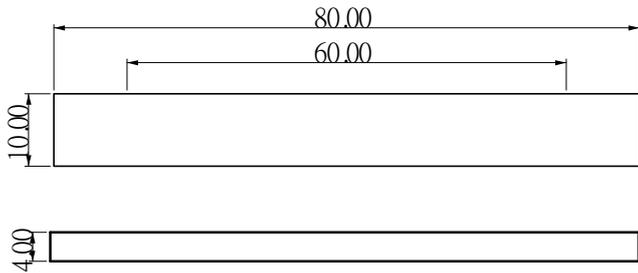
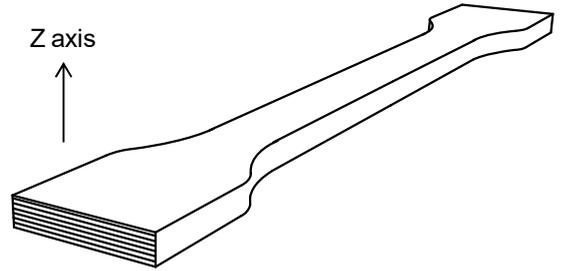
Parameter	
Nozzle temperature	260-270 (°C)
Build Surface material	BuildTak®
Build plate temperature	100-110 (°C)
Cooling fan	Turned off
Printing speed	40-60 (mm/s)
Raft separation distance	0.2 (mm)
Retraction distance	1-3 (mm)
Retraction speed	60 (mm/s)
Recommended environmental temperature	>80 (°C)
Threshold overhang angle	45 (°)
Recommended support material	PolyDissolve S2

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

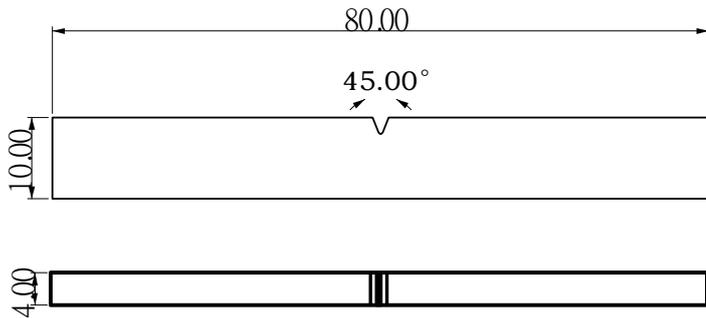
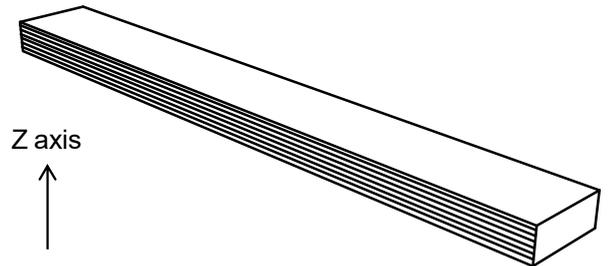
- For better part strength and to relieve the residual stress, annealing the parts at 90°C for 1 hour right after printing
- Polymaker™ PC-PBT needs be dried before printed, if it has been stored in air for long time



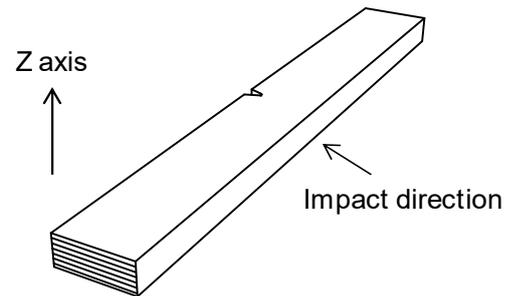
Tensile testing specimen; ASTM D638 (ISO 527, GB/T 1040)



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.