polymaker

Innovators in 3D printing

Technical Data Sheet

Polymaker™ HT-PLA-GF

www.polymaker.com

V1.0

Polymaker™ HT-PLA-GF

Polymaker™ HT-PLA-GF offers ABS-like heat resistance after annealing while maintaining PLA's ease of printing. It's ideal for applications requiring high thermal stability, withstanding mechanical stress and temperatures up to 130°C without softening or failing.

PHYSICAL PROPERTIES

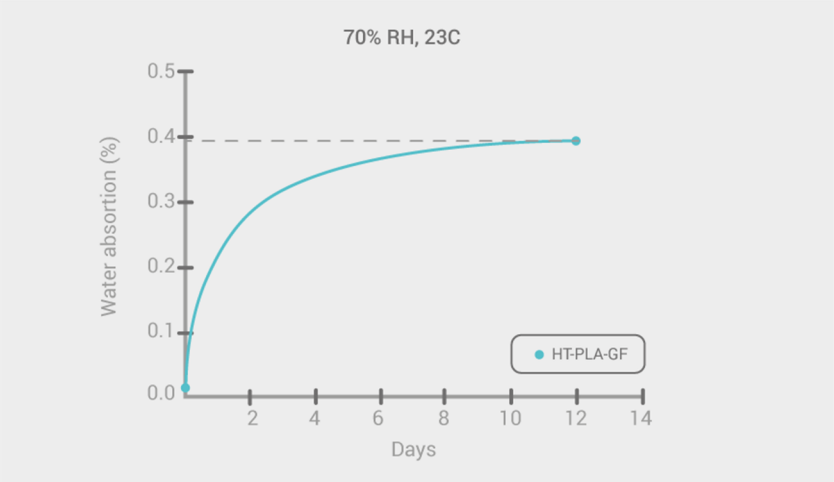
Property	Testing Method	Typical Value
Density	ISO1183, GB/T1033	1.337 g/cm3 at 23°C
Melt index	210°C, 2.16 kg	22.9 g/10min
Light transmission	N/A	N/A
Flame retardancy	N/A	N/A

CHEMICAL RESISTANCE DATA

Property	Typical Value
Effect of weak acids	Good
Effect of strong acids	Poor
Effect of weak alkalis	Fair
Effect of strong alkalis	Poor
Effect of oils and grease	Good

Note:
Good: Material may get minor attack after long periods of storage with chemical at ambient temperature
Fair: Material can be used for short time contact with chemicals at ambient temperature
Poor: Material becomes unstable on contact with chemical at ambient temperature

MOISTURE ABSORPTION CURVE



ENVIRONMENTAL PERFORMANCE

Property	Typical Value
Hydrothermal aging	N/A
UV aging	N/A

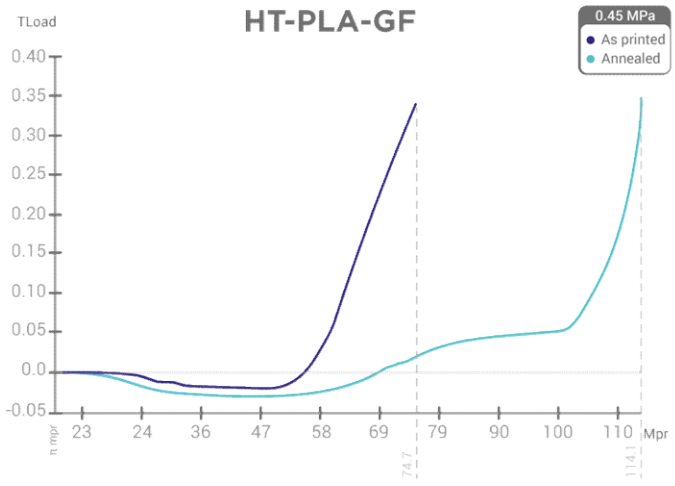
DIMENSIONAL STABILITY

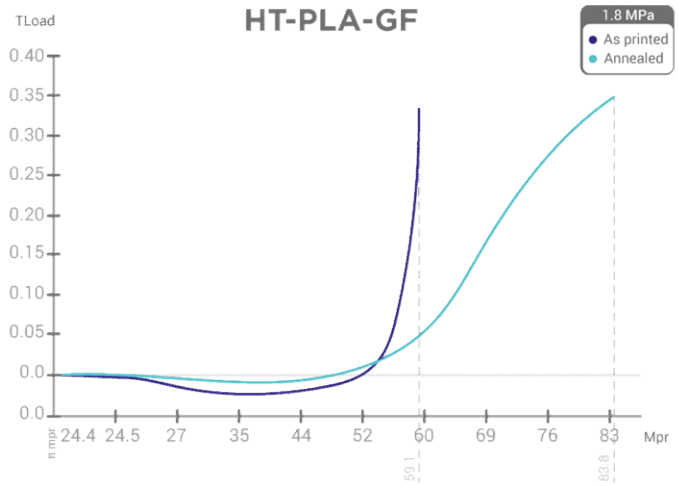
Property	Typical Value
Shrinkage (X-Y)	0.05%
Shrinkage (Z)	0.05%
Shrinkage (D)	0.10%

THERMAL PROPERTIES

Property	Testing Method	Typical Value	
Glass transition temperature	DSC, 10°C/min	59.76°C	
Melting temperature	DSC, 10°C/min	174.87°C	
Crystallization temperature	DSC, 10°C/min	81.56°C	
Decomposition temperature	TGA, 20°C/min	348.15°C	
Vicat softening temperature	ISO 306, GB/T 1633	145.2°C	(as printed)
Heat deflection temperature	ISO 75 1.8MPa	57.8°C	(as printed)
Heat deflection temperature	ISO 75 0.45MPa	75°C	(as printed)
Vicat softening temperature	ISO 306, GB/T 1633	148.3°C	(annealed)
Heat deflection temperature	ISO 75 1.8MPa	84°C	(annealed)
Heat deflection temperature	ISO 75 0.45MPa	114.7°C	(annealed)

HDT CURVE





MECHANICAL PROPERTIES (as printed)

Property	Testing Method	Typical Value
Young's modulus (X-Y)	ISO 527, GB/T 1040	3793.85±129.17 MPa
Young's modulus (Z)		3018.1±83.42 MPa
Tensile strength (X-Y)	ISO 527, GB/T 1040	50.09±0.73 MPa
Tensile strength (Z)		23.68±1.28 MPa
Elongation at break (X-Y)	ISO 527, GB/T 1040	2.77±0.45 %
Elongation at break (Z)		0.85±0.05 %
Bending modulus (X-Y)	ISO 178, GB/T 9341	3684.87±115.49 MPa
Bending modulus (Z)		2197.76±269.42 MPa
Bending strength (X-Y)	ISO 178, GB/T 9341	86.41±1.38 MPa
Bending strength (Z)		29.21±1.42 MPa
Notched Charpy impact strength (X-Y)	ISO 179, GB/T 1043	5.31±0.46 kJ/m2
Notched Charpy impact strength (Z)		4.28±0.18 kJ/m2

MECHANICAL PROPERTIES (after annealing)

Property	Testing Method	Typical Value
Young's modulus (X-Y)	ISO 527, GB/T 1040	4206.91±182.01 MPa
Young's modulus (Z)		3052.15±101.57 MPa
Tensile strength (X-Y)	ISO 527, GB/T 1040	50.2±0.93 MPa
Tensile strength (Z)		22.46±1.54 Mpa
Elongation at break (X-Y)	ISO 527, GB/T 1040	2.3±0.2 %
Elongation at break (Z)		0.79±0.07 %
Bending modulus (X-Y)	ISO 178, GB/T 9341	3948.4±67.03 MPa
Bending modulus (Z)		1953.62±260.81 Mpa
Bending strength (X-Y)	ISO 178, GB/T 9341	87.76±1.96 MPa
Bending strength (Z)		29.17±2.69 MPa
Notched Charpy impact strength (X-Y)	ISO 179, GB/T 1043	4.92±0.5 MPa
Notched Charpy impact strength (Z)		4.37±0.27 MPa

RECOMMENDED PRINTING CONDITIONS

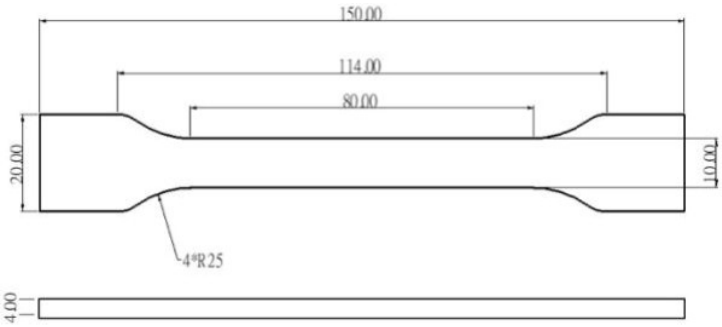
Parameter	
Nozzle temperature	210-230 (°C)
Build surface treatment	PC and Texture PEI (Glue when needed)
Build plate temperature	25-60 (°C)
Cooling fan	ON
Printing speed	Up to 350 (mm/s)
Retraction distance	1-3 (mm)
Retraction speed	20-40 (mm/s)
Closure chamber	Not needed
Recommended support material	-
Drying setting	60°C for 6h
Annealing temperature	80-100 (°C) (Recommended 100°C)
Annealing time	20-30 Mins (Recommended 30 mins)
Additional requirements	Hardened nozzle & print annealing

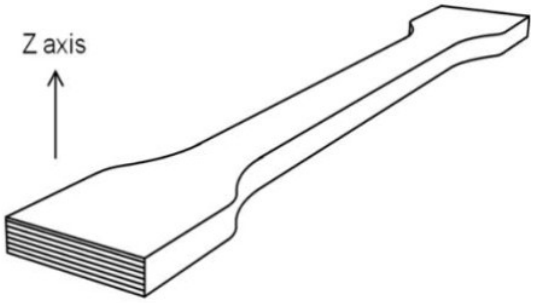
*Based on 0.4mm nozzle. Printing conditions may vary with different nozzle diameters.

Note:
Thin parts may require the lower annealing temperature to prevent warping.

TENSILE TESTING SPECIMEN

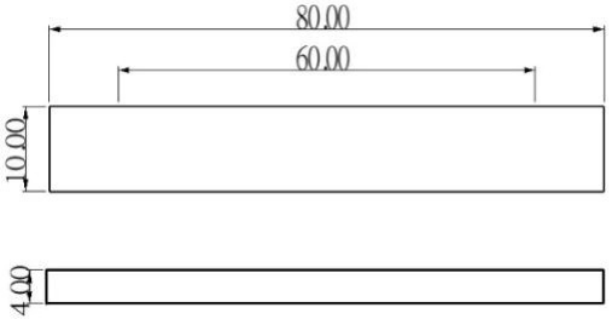
ISO 527, GB/T 1040

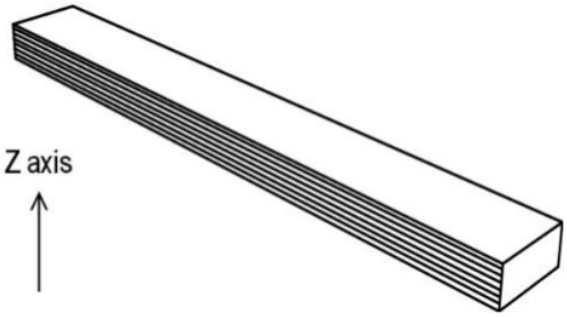




FLEXURAL TESTING SPECIMEN

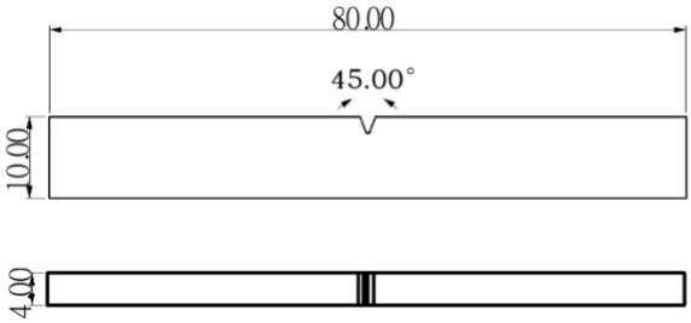
ISO 178, GB/T 9341

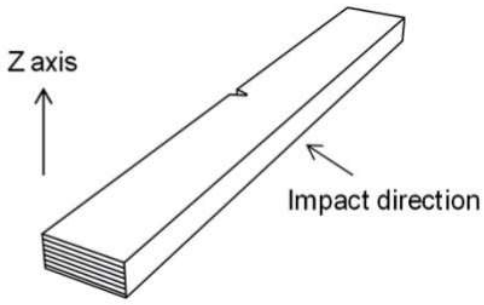




IMPACT TESTING SPECIMEN

ISO 179, GB/T 1043





HOW TO MAKE SPECIMENS

Printing temperature	230°C
Bed temperature	50°C
Shell	2
Top & bottom layer	3
Infill	100%
Environmental temerature	Ambient temperature
Cooling fan	ON

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.