

Technical Data Sheet

PolySonic™ PLA

www.polymaker.com

V5.3



PolySonic™ PLA is a revolutionary high-speed 3D printing filament, the ultimate game-changer in additive manufacturing. With its lightning-fast extrusion rate, cutting-edge precision, and exceptional layer adhesion you can ramp up the speed of your 3D printer and witness new levels of productivity. Accelerate your workflow without compromising on strength or quality.

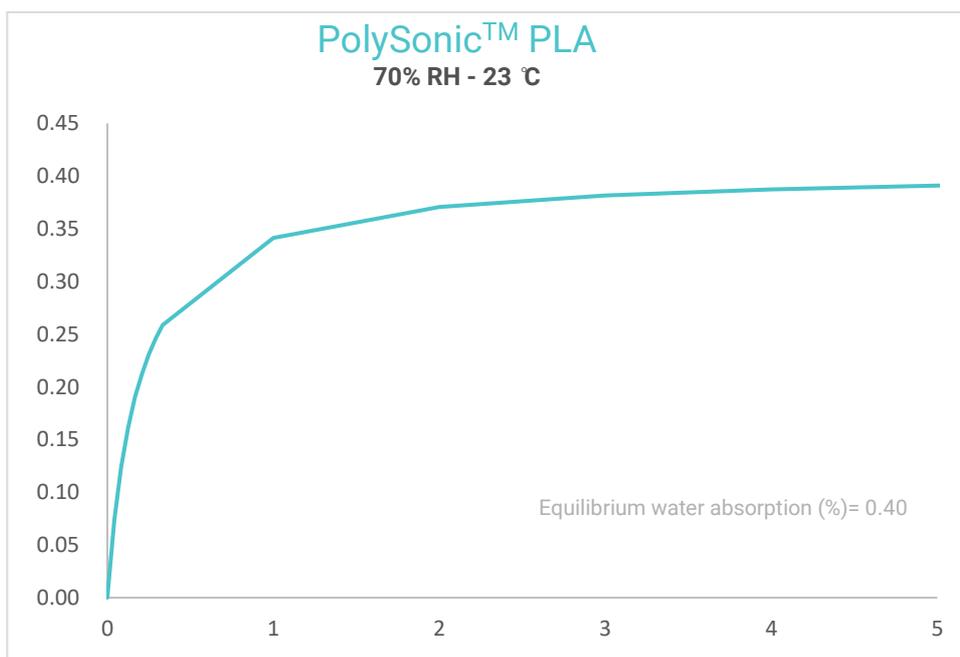
PHYSICAL PROPERTIES

| Property | Testing Method | Typical Value |
|--------------------|-------------------|----------------------------------|
| Density | ISO1183, GB/T1033 | 1.23 g/cm ³ at 21.5°C |
| Melt index | 210°C, 2.16 kg | 15.4 g/10min |
| Light transmission | N/A | N/A |
| Flame retardancy | N/A | N/A |

CHEMICAL RESISTANCE DATA

| Property | Testing Method |
|---------------------------|-------------------|
| Effect of weak acids | Not resistant |
| Effect of strong acids | Not resistant |
| Effect of weak alkalis | Not resistant |
| Effect of strong alkalis | Not resistant |
| Effect of organic solvent | No data available |
| Effect of oils and grease | No data available |

MOISTURE ABSORPTION



THERMAL PROPERTIES

| Property | Testing Method | Typical Value |
|------------------------------|--------------------|---------------|
| Glass transition temperature | DSC, 10°C/min | 59 °C |
| Melting temperature | DSC, 10°C/min | 164 °C |
| Crystallization temperature | DSC, 10°C/min | 96 °C |
| Decomposition temperature | TGA, 20°C/min | 370 °C |
| Vicat softening temperature | ISO 306, GB/T 1633 | 61 °C |
| Heat deflection temperature | ISO 75 1.8MPa | 52 °C |
| Heat deflection temperature | ISO 75 0.45MPa | 53 °C |
| Thermal conductivity | N/A | N/A |
| Heat shrinkage rate | N/A | N/A |

MECHANICAL PROPERTIES - Classic Speed

* Based on 0.4 mm nozzle and 0.2mm layer thickness. Classic printing speed = 46.7mm/s, printing temperature = 210 °C

| Property | Testing Method | Typical Value |
|------------------------------|--------------------|-----------------------------|
| Young's modulus (X-Y) | ISO 527, GB/T 1040 | 2878.3 ± 74.3 MPa |
| Young's modulus (Z) | | 2689.8 ± 92.0 MPa |
| Tensile strength (X-Y) | ISO 527, GB/T 1040 | 46.0 ± 0.5 MPa |
| Tensile strength (Z) | | 37.3 ± 0.7 MPa |
| Elongation at break (X-Y) | ISO 527, GB/T 1040 | 21.5 ± 5.02 % |
| Elongation at break (Z) | | 4.2 ± 2.0 % |
| Bending modulus (X-Y) | ISO 178, GB/T 9341 | 2868.2 ± 78.4 MPa |
| Bending modulus (Z) | | N/A |
| Bending strength (X-Y) | ISO 178, GB/T 9341 | 76.5 ± 0.9 MPa |
| Bending strength (Z) | | N/A |
| Charpy impact strength (X-Y) | ISO 179, GB/T 1043 | 6.1 ± 0.6 kJ/m ² |
| Charpy impact strength (Z) | | N/A |

MECHANICAL PROPERTIES - High Speed

* Based on 0.4 mm nozzle and 0.2mm layer thickness. High printing speed = 300mm/s, printing temperature = 230 °C

| Property | Testing Method | Typical Value |
|------------------------------|--------------------|-----------------------------|
| Young's modulus (X-Y) | ISO 527, GB/T 1040 | 2649.7 ± 78.3 MPa |
| Young's modulus (Z) | | 2433.4 ± 79.4 MPa |
| Tensile strength (X-Y) | ISO 527, GB/T 1040 | 43.9 ± 0.4 MPa |
| Tensile strength (Z) | | 32.4 ± 0.4 MPa |
| Elongation at break (X-Y) | ISO 527, GB/T 1040 | 15.1 ± 3.9 % |
| Elongation at break (Z) | | 3.3 ± 0.5 % |
| Bending modulus (X-Y) | ISO 178, GB/T 9341 | 2797.9 ± 40.7 MPa |
| Bending modulus (Z) | | N/A |
| Bending strength (X-Y) | ISO 178, GB/T 9341 | 71.4 ± 0.6 MPa |
| Bending strength (Z) | | N/A |
| Charpy impact strength (X-Y) | ISO 179, GB/T 1043 | 5.0 ± 0.5 kJ/m ² |
| Charpy impact strength (Z) | | N/A |

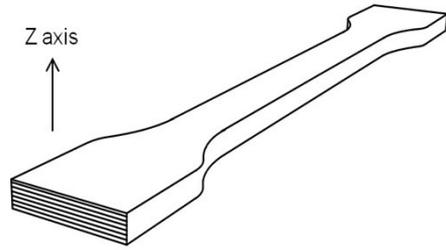
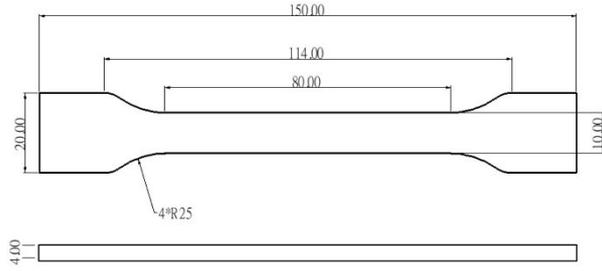
RECOMMENDED PRINTING CONDITIONS

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

| Parameter | |
|------------------------------|--|
| Nozzle temperature | Classic :190-210 °C High-speed: 210-230 °C |
| Build surface treatment | Glue when needed |
| Build plate temperature | 30 - 60 (°C) |
| Cooling fan | 100% |
| Printing speed | Classic :50-100mm/s High-speed: 100-300mm/s |
| Retraction distance | 0.5 - 3 (mm) |
| Retraction speed | 30 - 60 (mm/s) |
| Closure Chamber | No needed |
| Recommended support material | PolySupport™ and PolyDissolve™ S1 |
| Drying setting | 55°C for 6h |

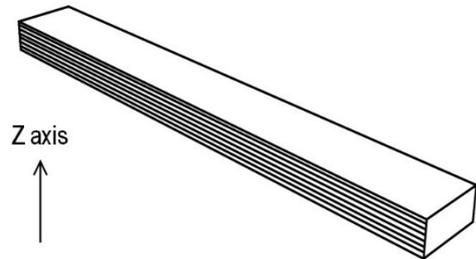
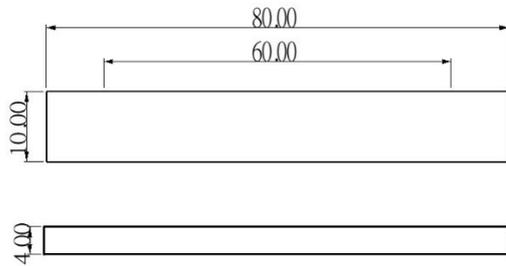
TENSILE TESTING SPECIMEN

ISO 527, GB/T 1040



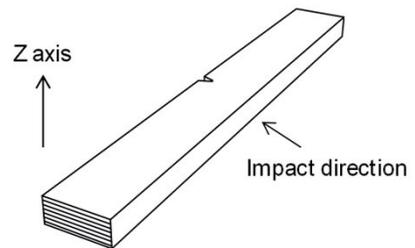
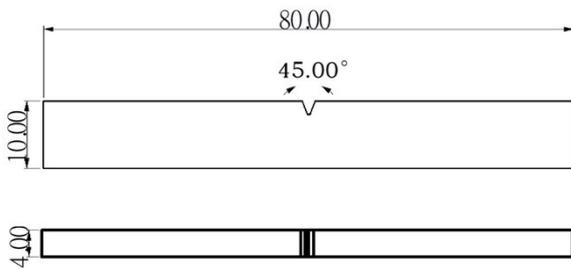
FLEXURAL TESTING SPECIMEN

ISO 178, GB/T 9341



IMPACT TESTING SPECIMEN

ISO 179, GB/T 1043



HOW TO MAKE SPECIMENS

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

| | |
|---------------------------|---------------|
| Printing temperature | 210 °C/230 °C |
| Bed temperature | 25 °C |
| Shell | 2 |
| Top & bottom layer | 3 |
| Infill | 100 % |
| Environmental temperature | 25 °C |
| 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.