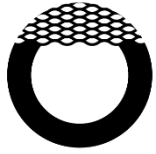


Technical Data Sheet

PolyMide™ PA6-CF

www.polymaker.com

V5.1



PolyMide™ PA6-CF

PolyMide™ PA6-CF is a carbon fiber reinforced PA6 (Nylon 6) filament. The carbon fiber reinforcement provides significantly improved stiffness, strength and heat resistance with outstanding layer adhesion.

PHYSICAL PROPERTIES

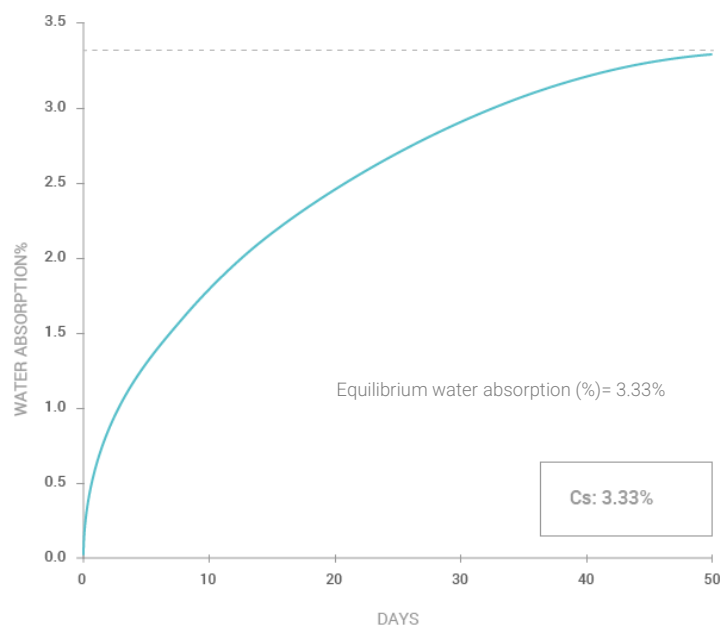
| Property | Testing Method | Typical Value |
|------------------------------------|---------------------------------|--------------------------------|
| Density | ISO1183, GB/T1033 | 1.17 g/cm ³ at 23°C |
| Melt index | 300°C, 2.16 kg | 20.5 g/10min |
| Light transmission | N/A | N/A |
| Flame retardancy | N/A | N/A |
| Sheet Resistance in Moisture State | ASTM D991 (GB/T 2439, ISO 1853) | 1 – 10 (10 ⁸ Ω/sq) |

CHEMICAL RESISTANCE DATA

| Property | Testing Method |
|---------------------------|------------------|
| Effect of weak acids | Not resistant |
| Effect of strong acids | Not resistant |
| Effect of weak alkalis | Slight resistant |
| Effect of strong alkalis | Not resistant |
| Effect of organic solvent | Not resistant |
| Effect of oils and grease | Resistance |

MOISTURE ABSORPTION CURVE

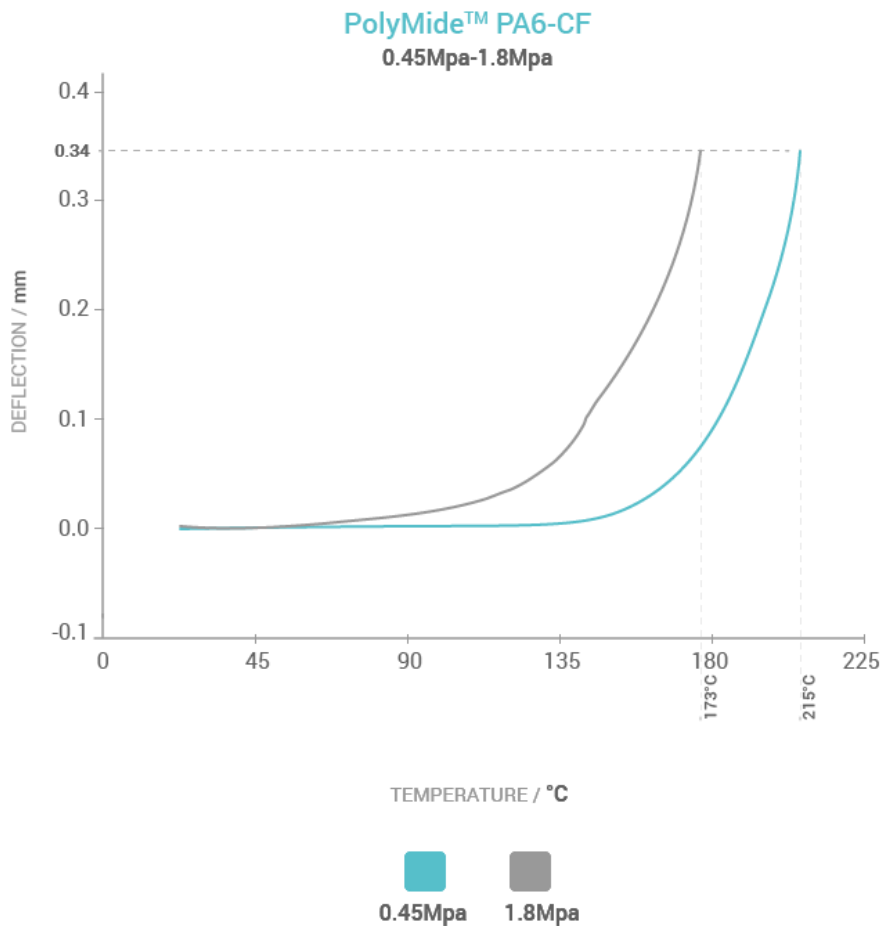
PolyMide™ PA6-CF
70%RH - 23°C



THERMAL PROPERTIES

| Property | Testing Method | Typical Value |
|------------------------------|--------------------|---------------|
| Glass transition temperature | DSC, 10°C/min | 74.2 °C |
| Melting temperature | DSC, 10°C/min | 218.5 °C |
| Crystallization temperature | DSC, 10°C/min | 184.6 °C |
| Decomposition temperature | TGA, 20°C/min | >370 °C |
| Vicat softening temperature | ISO 306, GB/T 1633 | N/A |
| Heat deflection temperature | ISO 75 1.8MPa | 173 °C |
| Heat deflection temperature | ISO 75 0.45MPa | 215 °C |
| Thermal conductivity | N/A | N/A |
| Heat shrinkage rate | N/A | N/A |

HDT CURVE



MECHANICAL PROPERTIES (Dry status)

| Property | Testing Method | Typical Value |
|------------------------------|--------------------|-------------------------------|
| Young's modulus (X-Y) | ISO 527, GB/T 1040 | 7453 ± 656 MPa |
| Young's modulus (Z) | | 4354 ± 206 MPa |
| Tensile strength (X-Y) | ISO 527, GB/T 1040 | 105. ± 5.0 MPa |
| Tensile strength (Z) | | 67.7 ± 4.7 MPa |
| Elongation at break (X-Y) | ISO 527, GB/T 1040 | 3.0 ± 0.3 % |
| Elongation at break (Z) | | 2.5 ± 0.7 % |
| Bending modulus (X-Y) | ISO 178, GB/T 9341 | 8339 ± 369 MPa |
| Bending modulus (Z) | | N/A |
| Bending strength (X-Y) | ISO 178, GB/T 9341 | 169.0 ± 4.7 MPa |
| Bending strength (Z) | | N/A |
| Charpy impact strength (X-Y) | ISO 179, GB/T 1043 | 13.34 ± 0.5 kJ/m ² |
| Charpy impact strength (Z) | | N/A |

Note:

All specimens were annealed at 80°C for 6h and dried for 48h prior to testing

MECHANICAL PROPERTIES (Moisture Conditioned)

| Property | Testing Method | Typical Value |
|------------------------------|--------------------|-------------------------------|
| Young's modulus (X-Y) | ISO 527, GB/T 1040 | 5666 ± 469 MPa |
| Young's modulus (Z) | | 4713 ± 282 MPa |
| Tensile strength (X-Y) | ISO 527, GB/T 1040 | 81.7 ± 6.0 MPa |
| Tensile strength (Z) | | 64.4 ± 5.6 MPa |
| Elongation at break (X-Y) | ISO 527, GB/T 1040 | 4.6 ± 0.5 % |
| Elongation at break (Z) | | 1.8 ± 0.4 % |
| Bending modulus (X-Y) | ISO 178, GB/T 9341 | 6387 ± 1120 MPa |
| Bending modulus (Z) | | N/A |
| Bending strength (X-Y) | ISO 178, GB/T 9341 | 152.2 ± 15.7 MPa |
| Bending strength (Z) | | N/A |
| Charpy impact strength (X-Y) | ISO 179, GB/T 1043 | 32.8 ± 1.03 kJ/m ² |
| Charpy impact strength (Z) | | N/A |

Note:

All specimens were annealed at 80 °C for 6h, and conditioned at 70% relative humidity and ambient temperature for 15 days prior to testing.

RECOMMENDED PRINTING CONDITIONS

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

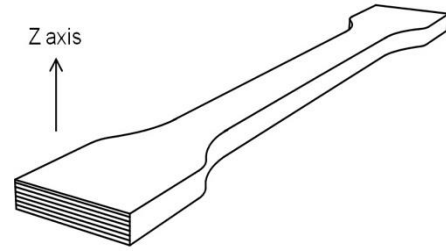
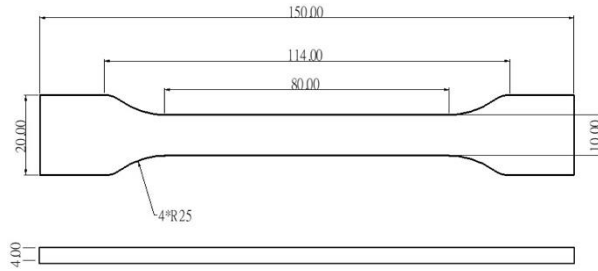
| Parameter | |
|------------------------------|-----------------------------|
| Nozzle temperature | 280 – 300 (°C) |
| Build surface material | BuildTak®, Glass, Blue Tape |
| Build surface treatment | Glue, Magigoo |
| Build plate temperature | 25 - 50 (°C) |
| Cooling fan | OFF |
| Printing speed | 30-60 (mm/s) |
| Raft separation distance | 0.1-0.2 (mm) |
| Retraction distance | 3 (mm) |
| Retraction speed | 40 (mm/s) |
| Environmental temperature | Room temperature - 50 (°C) |
| Threshold overhang angle | 45 (°) |
| Recommended support material | PolyDissolve™ S1 |

Note:

- Abrasion of the brass nozzle happens frequently when printing PolyMide™ PA6-CF. Normally, the life of a brass nozzle would be approximately 9h. A wear-resistance nozzle, such as hardened steel and ruby nozzle, is highly recommended to be used with PolyMide™ PA6-CF.
- PolyMide™ PA6-CF is sensitive to moisture and should always be stored and used under dry conditions (relative humidity below 20%).
- If PolyMide™ PA6-CF is used as the support material for itself, please remove the support structure before excessive moisture absorption. Otherwise the support structure can be permanently bonded to the model.
- After the printing process, it is recommended to anneal the model in the oven at 80 - 100°C for 6 hours.
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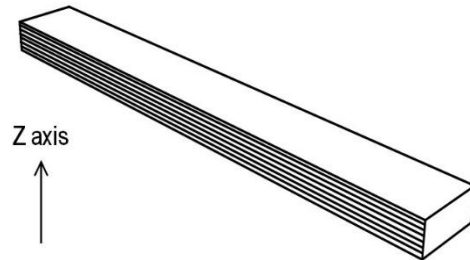
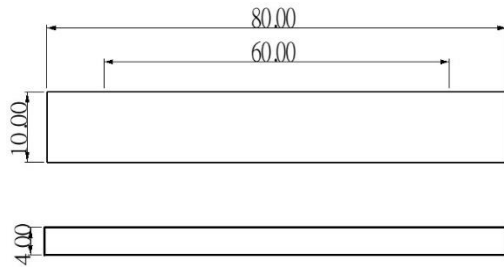
TENSILE TESTING SPECIMEN

ISO 527, GB/T 1040



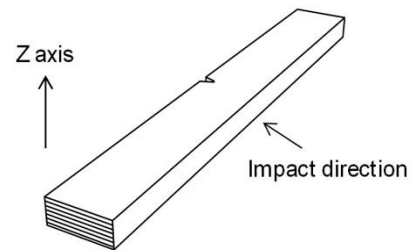
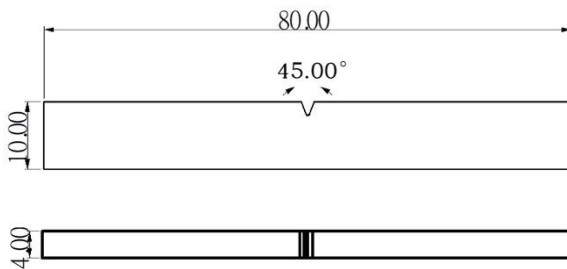
FLEXURAL TESTING SPECIMEN

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 | 300 °C |
| Bed temperature | 45 °C |
| Shell | 2 |
| Top & bottom layer | 4 |
| Infill | 100% |
| Environmental temperature | 50 °C |
| Cooling fan | OFF |

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.