

# TECHNICAL DATA SHEET

V1.0



By polymaker



## FIBERON™ PA6-CF20

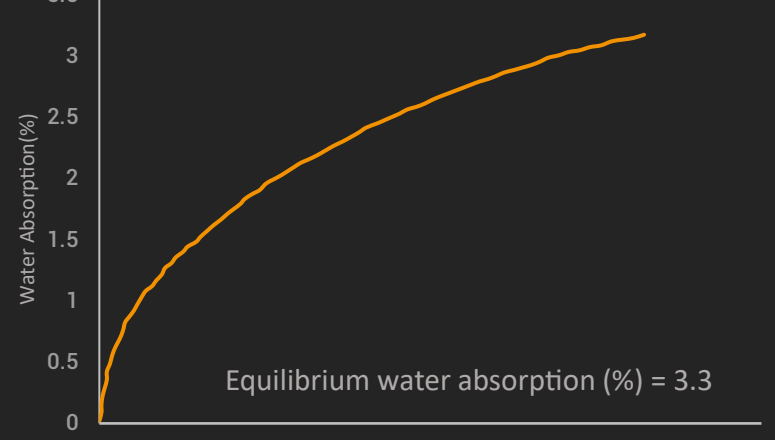
Fiberon™ PA6-CF20 is a carbon fiber reinforced PA6 (Nylon 6) filament. The carbon fiber reinforcement provides significantly improved stiffness, strength and heat resistance with outstanding layer adhesion.

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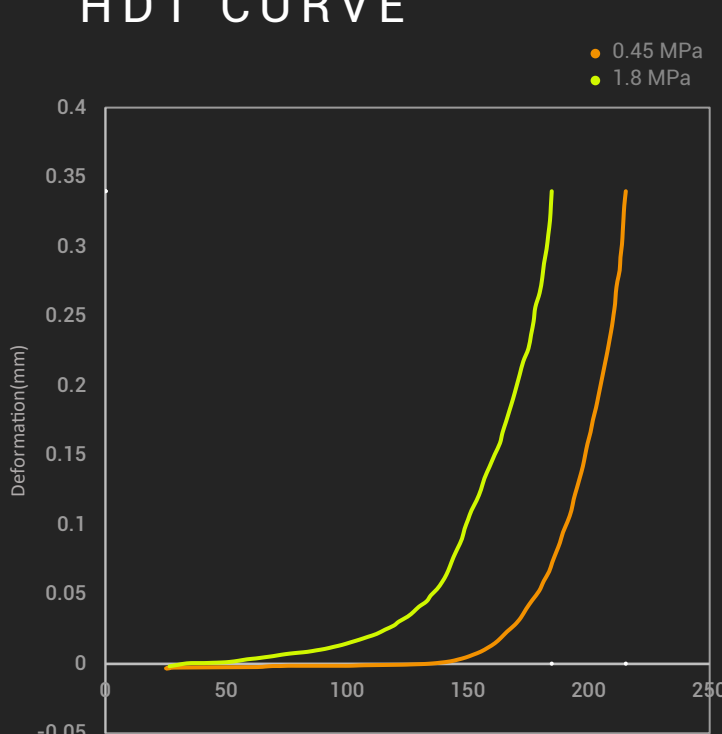
### PHYSICAL PROPERTIES

| PROPERTY                | TESTING METHOD    | TYPICAL VALUE                  |
|-------------------------|-------------------|--------------------------------|
| Density                 | ISO1183, GB/T1033 | 1.17 g/cm <sup>3</sup> at 23°C |
| Melt index              | 300°C, 2.16 kg    | 20.5 g/10min                   |
| Flame retardancy        | UL 94, 1.5mm      | HB                             |
| Surface Resistivity (Ω) | ANSI ESD S11.11   | OL, >10 <sup>12</sup> Ω        |

### MOISTURE ABSORPTION CURVE



### HDT CURVE



### THERMAL PROPERTIES

| PROPERTY               | TESTING METHOD     | TYPICAL VALUE |
|------------------------|--------------------|---------------|
| Glass transition temp. | DSC, 10°C/min      | 74.2 °C       |
| Melting temperature    | DSC, 10°C/min      | 218.5 °C      |
| Crystallization temp.  | DSC, 10°C/min      | 184.6 °C      |
| Decomposition temp.    | TGA, 20°C/min      | 446.2 °C      |
| Vicat softening temp.  | ISO 306, GB/T 1633 | N/A           |
| Heat deflection temp.  | ISO 75 1.8MPa      | 173 °C        |
| Heat deflection temp.  | ISO 75 0.45MPa     | 215 °C        |

### MECHANICAL PROPERTIES - DRY STATUS

| PROPERTY                                | TESTING METHOD     | TYPICAL VALUE                |
|---|--------------------|------------------------------|
| Young's modulus (X-Y)                   | ISO 527, GB/T 1040 | 8636.5 ± 211.4 MPa           |
| Young's modulus (Z)                     |                    | 3759.5 ± 118.5 MPa           |
| Tensile strength (X-Y)                  | ISO 527, GB/T 1040 | 109.3 ± 2.4 MPa              |
| Tensile strength (Z)                    |                    | 54.0 ± 5.2 MPa               |
| Elongation at break (X-Y)               | ISO 527, GB/T 1040 | 2.1 ± 0.2%                   |
| Elongation at break (Z)                 |                    | 1.9 ± 0.4%                   |
| Bending modulus (X-Y)                   | ISO 178, GB/T 9341 | 7037.6 ± 205.4 MPa           |
| Bending modulus (Z)                     |                    | N/A                          |
| Bending strength (X-Y)                  | ISO 306, GB/T 1633 | 161.0 ± 3.9 MPa              |
| Bending strength (Z)                    |                    | N/A                          |
| Charpy impact strength (X-Y) notched    | ISO 179, GB/T 1043 | 11.0 ± 0.3 kJ/m <sup>2</sup> |
| Charpy impact strength (X-Y) un-notched |                    | 24.0 ± 1.0 kJ/m <sup>2</sup> |
| Charpy impact strength (Z) un-notched   |                    | N/A                          |

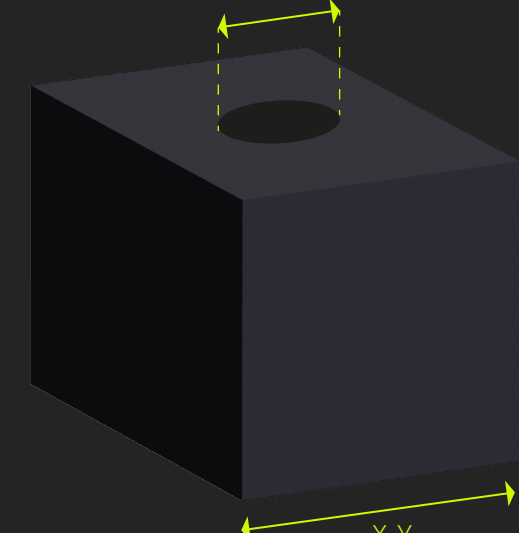
\*All specimens were annealed at 100°C for 16h.

### MECHANICAL PROPERTIES - WET STATUS

| PROPERTY                                | TESTING METHOD     | TYPICAL VALUE                |
|---|--------------------|------------------------------|
| Young's modulus (X-Y)                   | ISO 527, GB/T 1040 | 2508.1 ± 82.6 MPa            |
| Young's modulus (Z)                     |                    | 1056.1 ± 127.9 MPa           |
| Tensile strength (X-Y)                  | ISO 527, GB/T 1040 | 54.7 ± 1.1 MPa               |
| Tensile strength (Z)                    |                    | 25.5 ± 1.2 MPa               |
| Elongation at break (X-Y)               | ISO 527, GB/T 1040 | 7.0 ± 0.9%                   |
| Elongation at break (Z)                 |                    | 6.7 ± 1.7%                   |
| Bending modulus (X-Y)                   | ISO 178, GB/T 9341 | 2286.2 ± 185.2 MPa           |
| Bending modulus (Z)                     |                    | N/A                          |
| Bending strength (X-Y)                  | ISO 306, GB/T 1633 | 64.9 ± 4.9 MPa               |
| Bending strength (Z)                    |                    | N/A                          |
| Charpy impact strength (X-Y) notched    | ISO 179, GB/T 1043 | 35.6 ± 1.2 kJ/m <sup>2</sup> |
| Charpy impact strength (X-Y) un-notched |                    | N/A                          |
| Charpy impact strength (Z) un-notched   |                    | N/A                          |

\*All specimens were annealed at 100°C for 16h, and immersed in water at 60°C for 48h prior to testing. The average moisture content of specimens is 5.30%

### SHRINKAGE TESTING



|          | MODEL SIZE | AFTER PRINTING | AFTER ANNEALING |
|----------|------------|----------------|-----------------|
| X-Y      | 40mm       | 40.10mm        | 40.08mm         |
| Z        | 40mm       | 39.90mm        | 39.86mm         |
| Diameter | 10mm       | 9.73mm         | 9.71mm          |

\*Model infill 30%

### RECOMMENDED PRINTING CONDITIONS

|                         |            |                          |               |
|-------------------------|------------|--------------------------|---------------|
| Nozzle temperature      | 280-300 °C | Printing speed           | Up to 300mm/s |
| Build plate temperature | 40-50 °C   | Drying temp. and time    | 100 °C/10H    |
| Chamber temperature     | Room Temp. | Annealing temp. and time | 100 °C/16H    |
| Cooling fan             | OFF        |                          |               |



PolyDissolve™ S1

Recommended support material

### NOTE

Abrasion of the brass nozzle happens frequently when printing Fiberon™ PA6-CF20. 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 Fiberon™ PA6-CF20.

Fiberon™ PA6-CF20 is sensitive to moisture and should always be stored and used under dry conditions (relative humidity below 20%).

If Fiberon™ PA6-CF20 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 100°C for 16 hours.

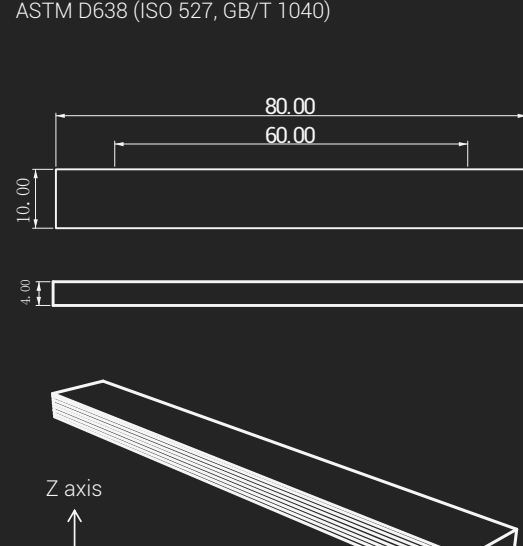
### HOW TO MAKE SPECIMENS

|                      |        |
|----------------------|--------|
| Printing temperature | 300 °C |
| Bed temperature      | 50 °C  |
| Top & bottom layer   | 3      |

|             |      |
|-------------|------|
| Infill      | 100% |
| Shell       | 2    |
| Cooling fan | OFF  |

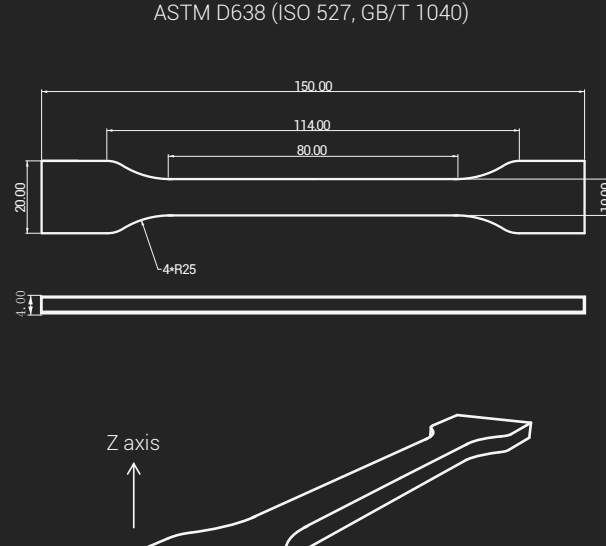
#### FLEXURAL TESTING SPECIMEN

ASTM D638 (ISO 527, GB/T 1040)



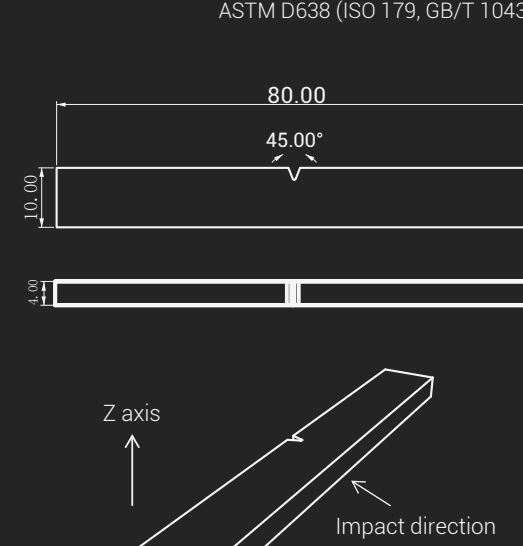
#### TENSILE TESTING SPECIMEN

ASTM D638 (ISO 527, GB/T 1040)



#### IMPACT TESTING SPECIMEN

ASTM D638 (ISO 179, GB/T 1043)



### DISCLAIMER

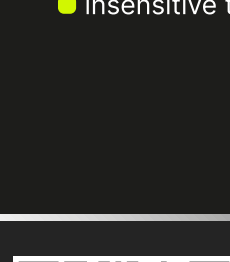
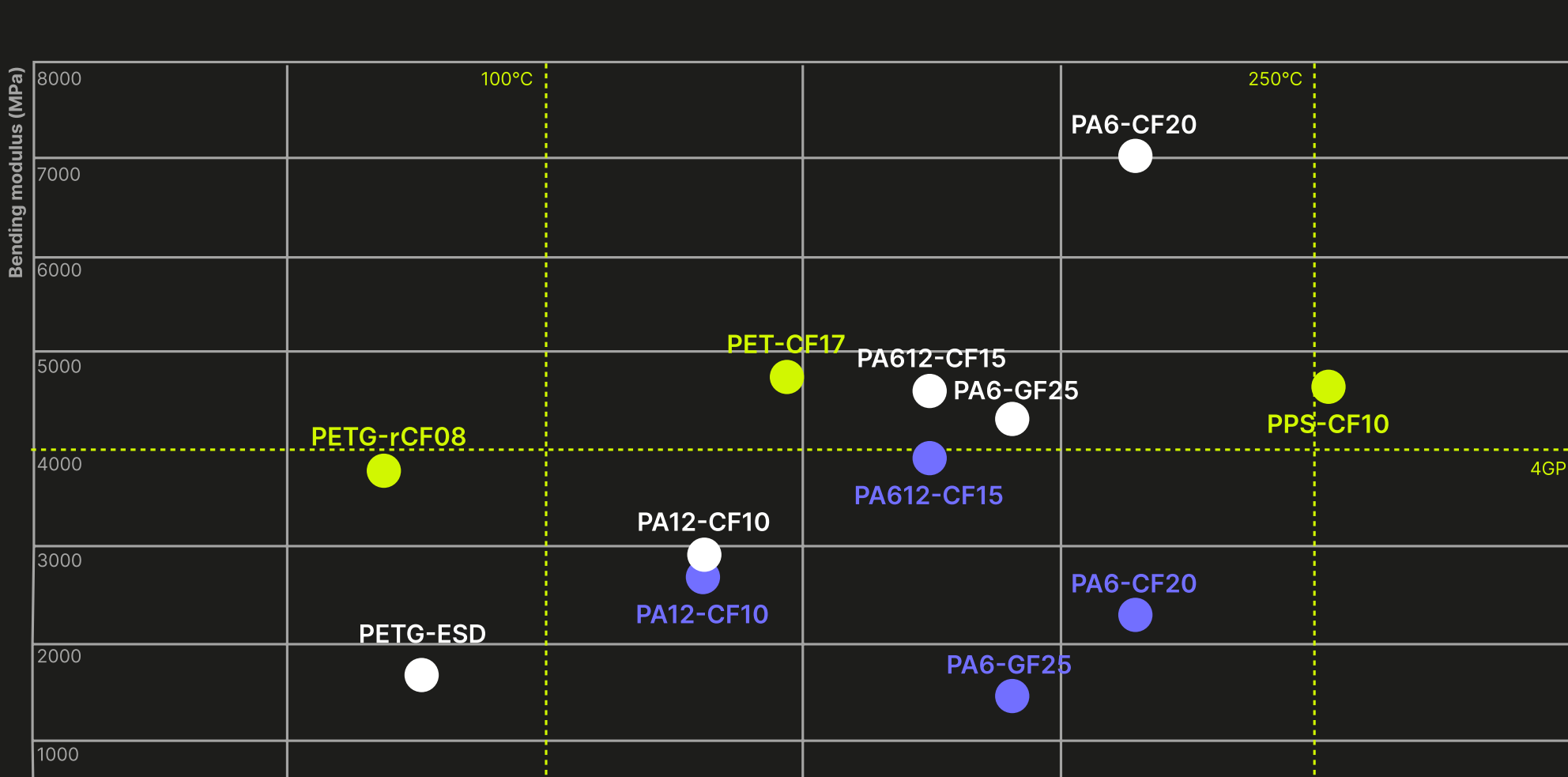
The typical values presented in this data sheet are intended for reference and comparison purposes only. They should not be used for design specifications or quality control purposes. Actual values may vary significantly with printing conditions. End-use performance of printed parts depends not only 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.



### MATERIALS COMPARISON

Heat resistance - Stiffness



FIBERON WEBSITE