

TECHNICAL DATA



# PU20CF-PESU

P r o d u c t   D e m o n s t r a t i o n



## ■ Material Overview

PU20CF is a 20% carbon fiber-reinforced PESU pellet material designed for high-temperature composite molding. It combines the excellent thermal and chemical resistance of PESU with the high strength, stiffness, and low warpage characteristics of carbon fiber. With a heat deflection temperature of up to 200°C, it is ideal for demanding mold applications requiring dimensional stability, durability, and cost-efficient production.

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## ■ Main Features

- ① Excellent heat resistance for high-temperature tooling applications
- ② High strength and stiffness with carbon fiber reinforcement
- ③ Low warpage for improved dimensional stability
- ④ Improved chemical resistance for harsh industrial environments
- ⑤ Large-format 3D printing with lower costs

## ■ Physical Properties

| Property                             | Test Method                     | Typical Value |
|--------------------------------------|---------------------------------|---------------|
| Density (g/cm <sup>3</sup> , 21.5°C) | ASTM D792 (ISO 1183, GB/T 1033) | 1.48          |
| Melt Index (g/10 min)                | 337°C, 6.6 kg                   | 17.5          |
| Glass Transition Temperature (°C)    | DSC, 10°C/min                   | 220           |
| Heat Deflection Temperature (°C)     | ISO 75 1.8MPa<br>0.45MPa        | 214<br>220    |

## ■ Mechanical Properties<sup>1</sup>

| Property                      | Test Method                    | Typical Value |
|-------------------------------|--------------------------------|---------------|
| Young's Modulus (MPa) (X-Y)   | ASTM D638 (ISO 527, GB/T 1040) | 9404 ± 477    |
| Tensile Strength (MPa) (X-Y)  | ASTM D638 (ISO 527, GB/T 1040) | 74.6 ± 7      |
| Elongation at Break (%) (X-Y) | ASTM D638 (ISO 527, GB/T 1040) | 1.01 ± 0.14   |
| Flexural Modulus (MPa) (X-Y)  | ASTM D790 (ISO 178, GB/T 9341) | 8764 ± 951    |
| Flexural Strength (MPa) (X-Y) | ASTM D790 (ISO 178, GB/T 9341) | 117 ± 6.4     |
| Young's Modulus (MPa) (Z)     | ASTM D638 (ISO 527, GB/T 1040) | 3848 ± 227    |
| Tensile Strength (MPa) (Z)    | ASTM D638 (ISO 527, GB/T 1040) | 30.6 ± 2.6    |
| Elongation at Break (%) (Z)   | ASTM D638 (ISO 527, GB/T 1040) | 0.87 ± 0.11   |
| Flexural Modulus (MPa) (Z)    | ASTM D790 (ISO 178, GB/T 9341) | 3716 ± 235    |
| Flexural Strength (MPa) (Z)   | ASTM D790 (ISO 178, GB/T 9341) | 47.8 ± 3.3    |

<sup>1</sup> Specimens were printed using a 340°C nozzle temperature, 8mm nozzle diameter, 22mm shell width, and 3mm layer height. The single-layer printing time was 50 seconds with an extrusion output of 14 kg/h at an ambient temperature of 25°C. Specimens were printed with 100% solid infill.

## ■ Recommended Printing Conditions

| Parameter                      | Recommended Setting                         |
|--------------------------------|---------------------------------------------|
| Drying Temperature (°C)        | 150-165 (Equipped with dehumidifying dryer) |
| Drying Time (Hours)            | ≥4                                          |
| Maximum Moisture Content (%)   | 0.06                                        |
| Barrel Zone 1 Temperature (°C) | 300 – 320                                   |
| Barrel Zone 2 Temperature (°C) | 315 – 335                                   |
| Barrel Zone 3 Temperature (°C) | 325 – 345                                   |
| Nozzle Temperature (°C)        | 330 – 350                                   |

### Other Recommendations

- **Short Pauses:**

If printing is stopped for a short duration (e.g., 1–60 minutes), it is recommended to keep the extruder running at a low flow rate (e.g., 2 kg/h) to ensure continuous material supply and avoid long periods of stagnation or screw idling.

- **Long Pauses:**

If printing is stopped for several hours, use high-temperature specialty purging material to clean the extruder.

- **Drying Equipment:**

Drying must be performed using the machine equipped with a dehumidifying dryer.

- **Air Exposure:**

Once dried, the material should not be left in the air for a long time before entering the printer screw; recommended exposure time should not exceed 15 minutes; stricter control is required in humid environments.