

Technical data sheet CPE

Ultimaker

| | |
|------------------|--|
| Chemical name | Copolyester |
| Description | CPE is chemical resistant, strong, tough and demonstrate good dimensional stability. CPE is available in a wide range of colors to choose from, including gray scale for more professional looking models. |
| Key features | Excellent chemical resistance, toughness and dimensional stability, good interlayer adhesion (especially when using the front enclosure add-on), and low levels of ultrafine particles (UFPs) and volatile organic compounds (VOCs). |
| Applications | Visual and functional prototyping and short run manufacturing. |
| Non-suitable for | Food contact and in-vivo applications. Long term outdoor usage or applications where the printed part is exposed to temperatures higher than 70 °C. |

Filament specifications

| | <u>Value</u> | <u>Method</u> |
|-------------------------|--------------|---------------|
| Diameter | 2.85±0.10 mm | - |
| Max roundness deviation | 0.10 mm | - |
| Net filament weight | 750 g | - |
| Net filament length | ~93 m | - |

Color information

| <u>Color</u> | <u>Color code</u> |
|-----------------|---------------------|
| CPE Black | RAL 9017 (est.) |
| CPE White | RAL 9010 (est.) |
| CPE Light Gray | RAL 7035 |
| CPE Dark Gray | RAL 7043 |
| CPE Red | RAL 3028 (est.) |
| CPE Blue | RAL 5012 (est.) |
| CPE Yellow | RAL 1021 (est.) |
| CPE Green | Pantone 368C (est.) |
| CPE Transparent | n/a |

Mechanical properties (*)

Injection molding

3D printing

| | Typical value | Test method | Typical value | Test method |
|---|----------------------|--------------------|-----------------------|------------------------|
| Tensile modulus | 1900 MPa | ASTM D638 | 1537.5 MPa | ISO 527 (1 mm/min) |
| Tensile stress at yield | 50 MPa | ASTM D638 | 41.1 MPa | ISO 527 (50 mm/min) |
| Tensile stress at break | 28 MPa | ASTM D638 | 37.7 MPa | ISO 527 (50 mm/min) |
| Elongation at yield | 5 % | ASTM D638 | 4.7 % | ISO 527 (50 mm/min) |
| Elongation at break | 100 % | ASTM D638 | 5.1 % | ISO 527 (50 mm/min) |
| Flexural strength | - | - | 79.5 MPa | ISO 178 |
| Flexural modulus | 2100 MPa | ASTM D790 | 1990.0 MPa | ISO 178 |
| Izod impact strength, notched (at 23°C) | 95 J/m | ASTM D256 | 4.0 kJ/m ² | ISO 180 |
| Charpy impact strength (at 23°C) | - | - | - | - |
| Hardness | 108 (Rockwell) | ASTM D785 | 72 (Shore D) | Durometer |

Thermal properties

Typical value

Test method

| | | |
|------------------------------------|-----------------------------|-------------------------------|
| Melt mass-flow rate (MFR) | 13.2 g/10min | ISO 1133 (240 °C, 2.16 kg) |
| Heat deflection (HDT) at 0.455 MPa | 70 °C | ASTM D648 |
| Heat deflection (HDT) at 1.82 MPa | 62 °C | ASTM D648 |
| Glass transition | ~ 82 °C | DSC |
| Coefficient of thermal expansion | 7·10 ⁻⁵ mm/mm °C | ASTM E693 |
| Melting temperature | Not relevant (amorphous) | - |
| Thermal shrinkage | - | - |

Other properties

Typical value

Test method

| | | |
|----------------------|--|-----------|
| Specific gravity | 1.27 | ASTM D792 |
| Flame classification | Not tested (typically HB when molded) | - |

(*) See notes.

Notes

Properties reported here are average of a typical batch. The 3D printed test specimens were printed in the XY plane, using the normal quality profile in Cura 2.1, an Ultimaker 2+, a 0.4 mm nozzle, 90% infill, 250 °C nozzle temperature and 70 °C build plate temperature. The values are the average of 5 white and 5 black specimens for the tensile, flexural, and impact tests. The Shore hardness D was measured in a 7-mm-thick square printed in the XY plane, using the normal quality profile in Cura 2.5, an Ultimaker 3, a 0.4 mm print core and 100% infill. Ultimaker is constantly working on extending the TDS data.

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