### Ultimaker

# Technical data sheet CPE+

| Chemical composition | See CPE+ safety data sheet, section 3   |  |  |
|----------------------|---|--|--|
| Description          | CPE+ is chemical and temperature resistant, tough, and demonstrates good dimensional stability. CPE+ shows higher temperature resistance and increased impact strength than regular CPE   |  |  |
| Key features         | Excellent chemical resistance, temperature resistance, toughness, and<br>dimensional stability. Good interlayer adhesion (especially when using<br>the front enclosure add-on). Good bed adhesion (especially when using<br>the adhesion sheets). And low levels of ultrafine particles (UFPs) and<br>volatile organic compounds (VOCs). Allows printing of translucent parts<br>with the transparent filament option |  |  |
| Applications         | Visual and functional prototyping and short-run manufacturing   |  |  |
| Non-suitable for     | Food contact and <i>in vivo</i> applications. Long term outdoor usage or applications where the printed part is exposed to temperatures higher than 100 °C  |  |  |

## **Filament specifications**

|                         | Value          | Method |
|-------------------------|----------------|--------|
| Diameter                | 2.85 ± 0.10 mm | -      |
| Max roundness deviation | 0.10 mm        | -      |
| Net filament weight     | 700 g          | -      |
| Filament length         | ~ 93 m         | -      |

## Color information

| Color code      |
|-----------------|
| N/A             |
| RAL 9005        |
| RAL 9010 (est.) |
|                 |

# Mechanical properties\*

|  | Injection molding |             | 3D printing           |                        |
|--|-------------------|-------------|-----------------------|------------------------|
|  | Typical value     | Test method | Typical value         | Test method            |
| Tensile modulus                          | 1,575 MPa         | ASTM D638   | 1,128.5 MPa           | ISO 527<br>(1 mm/min)  |
| Tensile stress at yield                  | 43 MPa            | ASTM D638   | 35.2 MPa              | ISO 527<br>(50 mm/min) |
| Tensile stress at break                  | 52 MPa            | ASTM D638   | 33 MPa                | ISO 527<br>(50 mm/min) |
| Elongation at yield                      | 7%                | ASTM D638   | 6%                    | ISO 527<br>(50 mm/min) |
| Elongation at break                      | 210%              | ASTM D638   | 6.6%                  | ISO 527<br>(50 mm/min) |
| Flexural strength                        | 64 MPa            | ASTM D790   | 65 MPa                | ISO 178                |
| Flexural modulus                         | 1,575 MPa         | ASTM D790   | 1,555 MPa             | ISO 178                |
| Izod impact strength, notched (at 23 °C) | 860 J/m           | ASTM D256   | 6.2 kJ/m <sup>2</sup> | ISO 180                |
| Charpy impact strength (at 23 °C)        | -                 | -           | -                     |                        |
| Hardness                                 | 111 (Rockwell)    | ASTM D785   | 75 (Shore D)          | Durometer              |

## Electrical properties\*

|                                | Typical value | Test method | Typical value | Test method  |
|--------------------------------|---------------|-------------|---------------|--------------|
| Dissipation factor (at 1 MHz)  | -             | -           | 0.015         | ASTM D150-11 |
| Dielectric constant (at 1 MHz) | -             | -           | 2.77          | ASTM D150-11 |

## Thermal properties

|                                  | Typical value | Test method                  |
|----------------------------------|---------------|------------------------------|
| Melt mass-flow rate (MFR)        | 8.5 g/10 min  | ISO 1133<br>(260 °C, 1.2 kg) |
| Heat detection (at 0.455 MPa)    | 94 °C         | ASTM D648                    |
| Heat deflection (at 1.82 MPa)    | 81 °C         | ASTM D648                    |
| Vicat softening temperature      | -             | -                            |
| Glass transition                 | -             | -                            |
| Coefficient of thermal expansion | -             | -                            |
| Melting temperature              | -             | -                            |
| Thermal shrinkage                | -             | -                            |

\*See notes

#### Other properties

|                      | Value | Test method |
|----------------------|-------|-------------|
| Specific gravity     | 1.18  | ASTM D792   |
| Flame classification | -     | -           |

#### 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 Ultimaker Cura 2.1, an Ultimaker 2+, a 0.4 mm nozzle, 90% infill, 260 °C nozzle temperature, and 110 °C build plate temperature. The values are the average of five natural, five white, and five black specimens for the tensile, flexural, and impact tests. The Shore hardness D was measured in a 7-mm-thick square using the normal quality profile in Ultimaker Cura 2.5, an Ultimaker 3, a 0.4 mm print core, and 100% infill. The electrical properties were measured on a 54-mm-diameter disk with 3 mm thickness printed in the XY plane, using the fine quality profile (0.1 mm layer height) in Ultimaker Cura 3.2.1, 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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