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3D PRINTING MATERIALS 2021

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A brand of BASF - We create chemistry
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Industrial 3D printing is at your fingertips with High-Performance materials and professional technologies provided by BASF Forward AM, processed by Sculpteo.

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# Table of Contents

## Powder Bed Fusion (PBF)

<table>
<thead>
<tr>
<th>Process</th>
<th>Powder</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLS</td>
<td>Ultrasint® PA11 07</td>
</tr>
<tr>
<td></td>
<td>Ultrasint® PA11 CF 09</td>
</tr>
<tr>
<td></td>
<td>Ultrasint® PA11 ESD 11</td>
</tr>
<tr>
<td></td>
<td>Ultrasint® PP 13</td>
</tr>
<tr>
<td></td>
<td>Ultrasint® PA6 FR 15</td>
</tr>
<tr>
<td></td>
<td>Ultrasint® PA6 MF 17</td>
</tr>
<tr>
<td></td>
<td>Ultrasint® TPU 19</td>
</tr>
<tr>
<td>MJF</td>
<td>Ultrasint® PA11 07</td>
</tr>
<tr>
<td></td>
<td>Ultrasint® PP 13</td>
</tr>
<tr>
<td></td>
<td>Ultrasint® TPU 19</td>
</tr>
</tbody>
</table>

## Photopolymers (LFS) Resins

<table>
<thead>
<tr>
<th>Process</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLP / LCD</td>
<td>Ultracur3D® EPD 1006 23</td>
</tr>
<tr>
<td></td>
<td>Ultracur3D® RG 35 25</td>
</tr>
<tr>
<td></td>
<td>Ultracur3D® ST 45 27</td>
</tr>
<tr>
<td></td>
<td>Ultracur3D® ST 45 B 29</td>
</tr>
</tbody>
</table>

## Fused Filaments Fabrication (FFF)

<table>
<thead>
<tr>
<th>Process</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Rep® FDM</td>
<td>Ultrafuse® PLA 33</td>
</tr>
<tr>
<td>FDM</td>
<td>Ultrafuse® Stainless Steel 316L 35</td>
</tr>
<tr>
<td></td>
<td>Ultrafuse® Stainless Steel 17-4 PH 37</td>
</tr>
</tbody>
</table>
1. POWDER BED FUSION POLYMERS

Explore the line of performance polymers that are perfectly adapted to scaled 3D printing production for any application.
## Polymers Technical Properties Comparison

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>TENSILE MODULUS</th>
<th>TENSILE STRENGTH</th>
<th>ELONGATION AT BREAK</th>
<th>MELTING POINT</th>
<th>HARDNESS SHORE</th>
<th>CHARPY IMPACT NOTCHED</th>
<th>CHARPY IMPACT UNNOTCHED</th>
<th>HDT B (0.45 MPa, DRY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultrasint® TPU 88A</td>
<td>75 MPa</td>
<td>8 MPa</td>
<td>270 %</td>
<td>-</td>
<td>88-90 A</td>
<td>no break</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ultrasint® PA6 FR</td>
<td>2450 MPa</td>
<td>41 MPa</td>
<td>2.6 %</td>
<td>218 °C</td>
<td>-</td>
<td>1.6 kJ/m²</td>
<td>7.4 kJ/m²</td>
<td>207 °C</td>
</tr>
<tr>
<td>Ultrasint® PA6 MF</td>
<td>3300 MPa</td>
<td>62 MPa</td>
<td>7 %</td>
<td>219 °C</td>
<td>-</td>
<td>3.1 kJ/m²</td>
<td>27.8 kJ/m²</td>
<td>209 °C</td>
</tr>
<tr>
<td>SLS Ultrasint® PP nat 01</td>
<td>1400 MPa</td>
<td>28 MPa</td>
<td>X: 30 %</td>
<td>140 °C</td>
<td>-</td>
<td>3.3 kJ/m²</td>
<td>29 kJ/m²</td>
<td>102 °C</td>
</tr>
<tr>
<td>Ultrasint® PA11</td>
<td>XY: 1750 MPa Z: 1800 MPa</td>
<td>XY: 52 MPa Z: 54 MPa</td>
<td>XY: &gt;150% (Tensile)</td>
<td>203 °C</td>
<td>-</td>
<td>XY: 5.1 MPa Z: 3.9 MPa</td>
<td>XY: 184 MPa Z: 85 MPa</td>
<td>176 °C</td>
</tr>
<tr>
<td>Ultrasint® PA11 ESD</td>
<td>XY: 3150 MPa Z: 2150 MPa</td>
<td>XY: 65 MPa Z: 55 MPa</td>
<td>XY: 37% (Tensile) Z: 49% (Tensile)</td>
<td>204 °C</td>
<td>-</td>
<td>XY: 6.6 MPa Z: 4.7 MPa</td>
<td>XY: 80 MPa Z: 90 MPa</td>
<td>186 °C</td>
</tr>
<tr>
<td>Ultrasint® PA11 CF</td>
<td>XY: 5900 MPa Z: 2500 MPa</td>
<td>XY: 82 MPa Z: 55 MPa</td>
<td>XY: 7% (Tensile) Z: 11% (Tensile)</td>
<td>202 °C</td>
<td>-</td>
<td>XY: 6.4 MPa Z: 4.7 MPa</td>
<td>XY: 54 MPa Z: 33 MPa</td>
<td>189 °C</td>
</tr>
<tr>
<td>MJF PP</td>
<td>1600 MPa</td>
<td>30 MPa</td>
<td>X/Y: 20% Z: 18%</td>
<td>187 °C</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100 °C</td>
</tr>
<tr>
<td>Ultrasint® TPU01</td>
<td>75 MPa</td>
<td>9 MPa</td>
<td>220%</td>
<td>120-150 °C</td>
<td>88 A</td>
<td>no break</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PA11</td>
<td>XY: 1700 MPa Z: 1800 MPa</td>
<td>XY: 54 MPa Z: 54 MPa</td>
<td>XY: 40% Z: 25%</td>
<td>-</td>
<td>-</td>
<td>XY: 7.0 kJ/m² Z: 4.5 kJ/m² (Izod)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>FDM PLA Big-Rep</td>
<td>-</td>
<td>60 MPa</td>
<td>-</td>
<td>-</td>
<td>60 D</td>
<td>7.5 kJ/m²</td>
<td>-</td>
<td>40 °C</td>
</tr>
</tbody>
</table>

This information and values are presented as guidance only and based on Sculpteo's knowledge and experience. It is believed to be accurate, however all guarantees are explicitly denied. This document was updated April 2021.
Ultrasint® PA11

High impact resistance
Bio-sourced
Durable
Available with: SLS & MJF

Multi Jet Fusion PA11

Performance
Aesthetic
Production
Prototype

Durable
Able to withstand high stress

Bio-sourced
Bio-derived from sustainable castor oil

Mechanical loads resistance
Exceptionally high toughness

High impact resistance
Charpy impact unnotched of 198 kJ/m²
### Design Guidelines (SLS)

**Maximum Size:**
190 mm x 240 mm x 315 mm

**Minimum Wall Thickness:**
0.8mm

**Hollowing and assembly:**
Hollowing: Yes 0.5mm

**Embossed & Engraved Details:**
- Embossed: 0.5mm
- Engraved: 0.5mm

**Enclosed & Interlocking:**
- Enclosed parts: Yes
- Interlocking parts: Yes

**Stemmed Elements:**
- Support: 0.8mm
- Without support: 1.5mm

**Printing Resolution:**
- Standard layer thickness: 100µm
- Accuracy: ± 0.3% (min of ± 0.3mm)

**Clearances and spacing:**
- Minimum spacing: 0.5mm
- Minimum Clearance: 0.5mm

### Technical Specifications (SLS)

#### Mechanical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Conditions</th>
<th>Value (dry)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elongation at break</td>
<td>ISO 527-2 (23°C)</td>
<td>X: 28%, Z: 24%</td>
</tr>
<tr>
<td>Tensile Modulus</td>
<td>ISO 527-2 (23°C)</td>
<td>X: 1750 MPa, Z: 1800 MPa</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>ISO 527-2 (23°C)</td>
<td>X: 52 MPa, Z: 54 MPa</td>
</tr>
<tr>
<td>Izod Impact strength (notched)</td>
<td>ISO 180</td>
<td>X: 6.5 kJ/m², Z: 4.8 kJ/m²</td>
</tr>
<tr>
<td>Printed part density</td>
<td>DIN EN ISO 1183-1</td>
<td>1.02 g/cm³</td>
</tr>
<tr>
<td>Heat Resistance HDT / B</td>
<td>ISO 75-2</td>
<td>176 °C</td>
</tr>
</tbody>
</table>

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For technical specifications and design guidelines of Multi Jet Fusion PA11, visit sculpteo.com
PA11 CF
Carbon Fiber

Available with: SLS

Performance | Aesthetic | Production | Prototype
--- | --- | --- | ---

**High strength**
Tensile strength of X: 82 MPa, Z: 55 MPa

**Bio-sourced**
Bio-derived powder, made from castor oil

**Extremely high rigidity**
Young’s modulus of 4500 MPa

**High impact resistance**
Charpy impact unnotched of 63 kJ/m² can be a good option to replace metal parts
Design Guidelines

Minimum Wall Thickness:
1mm

Embossed & Engraved Details:
- Embossed: 0.5mm
- Engraved: 0.5mm

Enclosed & Interlocking:
- Enclosed parts: Yes
- Interlocking parts: Yes

Hollowing and assembly:
- Hollowing: Yes; 5mm

Printing Resolution:
- Standard layer thickness: 100µm
- Accuracy: ± 0.3% (min of ± 0.3mm)

Clearances and spacing:
- Minimum spacing: 0.5mm
- Minimum Clearance: 0.5mm

Stemmed Elements:
- Support: 1.5mm
- Without support: 1.5mm

Technical Specifications

Mechanical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Conditions</th>
<th>Value (dry)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Modulus</td>
<td>ISO 527-2</td>
<td>X: 5900 MPa, Z: 2500 MPa</td>
</tr>
<tr>
<td>Charpy Impact unnotched</td>
<td>ISO 179-1</td>
<td>X: 54 kJ/m², Z: 33 kJ/m²</td>
</tr>
<tr>
<td>Elongation at break</td>
<td>ISO 527-2</td>
<td>X: 7%, Z: 11%</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>ISO 527-2</td>
<td>X: 82 MPa, Z: 55 MPa</td>
</tr>
<tr>
<td>Heat Resistance HDT / B</td>
<td>ISO 75-2</td>
<td>189 °C</td>
</tr>
<tr>
<td>Printed part density</td>
<td>DIN EN ISO 1183-1</td>
<td>1.07 g/cm³</td>
</tr>
</tbody>
</table>

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**PA11 ESD**

**Electrostatic Discharge**

*Available with: SLS*

**Performance**
- **Durable**
  - Optimal for the rapid construction of durable jigs and fixtures for electronics

**Aesthetic**
- **Bio-sourced**
  - Bio-derived powder, made from castor oil

**Production**
- **High strength**
  - Tensile strength of 55 MPa

**Prototype**
- **Electrostatic discharging safety**
  - ESD properties to reduce the risk of electrostatically induced failure and damage

---

**Polymers - 11**
Design Guidelines

Maximum Size:
150 mm x 200 mm x 250 mm

Minimum Wall Thickness:
0.7mm

Embossed & Engraved Details:
Embossed: 0.5mm
Engraved: 0.5mm

Enclosed & Interlocking:
Enclosed parts: Yes
Interlocking parts: Yes

Stemmed Elements:
Support: 0.7mm
Without support: 1mm

Hollowing and assembly:
Hollowing: Yes: 5mm

Printing Resolution:
Standard layer thickness: 100µm
Accuracy: ± 0.4% (min of ± 0.4mm)

Clearances and spacing:
Minimum spacing: 0.5mm
Minimum Clearance: 0.5mm

Technical Specifications

Mechanical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Conditions</th>
<th>Value (dry)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific volume resistivity</td>
<td>IEC 62631-3-1</td>
<td>X: 2.3 - 106, Z: 2.1 - 104 Ω.m</td>
</tr>
<tr>
<td>Tensile Modulus</td>
<td>ISO 527-2 (23°C)</td>
<td>X: 3150 MPa, Z: 2150 MPa</td>
</tr>
<tr>
<td>Elongation at break</td>
<td>ISO 527-2 (23°C)</td>
<td>X: 20%, Z: 23%</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>ISO 527-2 (23°C)</td>
<td>X: 65 MPa, Z: 55 MPa</td>
</tr>
<tr>
<td>Charpy Impact unnotched</td>
<td>ISO 179-1</td>
<td>X: 80 kJ/m², Z: 90 kJ/m²</td>
</tr>
<tr>
<td>Heat Resistance HDT / B</td>
<td>ISO 75-2</td>
<td>186 °C</td>
</tr>
<tr>
<td>Printed part density</td>
<td>DIN EN ISO 1183-1</td>
<td>1.07 g/cm³</td>
</tr>
</tbody>
</table>

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High rigidity
Exceptional media tightness, ductility and stiffness

High elongation at break
Elongation at break: 20% (XY), 18% (Z)

Low moisture absorption
Suitable for industrial manufacturing applications

High Chemical Resistance
Suitable for media flow and storage components

Ultrasint® PP nat 01 (SLS)

Multi Jet Fusion PP

Available with: SLS & MJF
Design Guidelines (SLS)

- **Maximum Size:**
  - 260 x 260 x 300 mm

- **Minimum Wall Thickness:**
  - Flexible: 1mm
  - Embossed: 0.7mm
  - Engraved: 0.7mm

- **Enclosed & Interlocking:**
  - Enclosed parts: Yes
  - Interlocking parts: Yes

- **Hollowing and assembly:**
  - Hollowing: Yes
  - Hollowing: Yes

- **Printing Resolution:**
  - Standard layer thickness: 120µm

- **Clearances and spacing:**
  - Minimum spacing: 0.7mm
  - Minimum Clearance: 0.7mm

- **Stemmed Elements:**
  - Support: 1mm
  - Without support: 1.2mm

Technical Specifications (SLS)

<table>
<thead>
<tr>
<th>Mechanical Properties</th>
<th>Conditions</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charpy Impact unnotched</td>
<td>ISO 179-1</td>
<td>29 kJ/m²</td>
</tr>
<tr>
<td>Tensile Modulus</td>
<td>DIN EN ISO 527-2</td>
<td>1400 MPa</td>
</tr>
<tr>
<td>Tensile strength</td>
<td>DIN EN ISO 527-2</td>
<td>28 MPa</td>
</tr>
<tr>
<td>Elongation at break</td>
<td>DIN EN ISO 527-2</td>
<td>X: 30% ; Z:10%</td>
</tr>
<tr>
<td>HDT B (0.45 MPa, dry)</td>
<td>ISO 75-2</td>
<td>102 °C</td>
</tr>
</tbody>
</table>

Applications

- Dashboard parts and car interior components
- Structural/mechanical parts
- Airflow and Fluid systems
- Pipes, tubes and machinery
- Tooling, jigs and fixtures
- Fluid reservoirs and manifolds

For technical specifications and design guidelines of Multi Jet Fusion PP, visit sculpteo.com

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PA6 FR
Flame Retardant

Available with: SLS

Performance | Aesthetic | Production | Prototype
--- | --- | --- | ---
Flame-Retardant
V2 rating (UL 94V) UL Blue Card certified

Halogen-Free
Halogen-free flame-retardant (FR) additive

Very High Rigidity
Tensile Modulus of 2450 MPa

Thermal Resistance
Melting temperature of 218 °C & Glow Wire Flammability Index (GWFI) up to 960 °C

Polymers - 15
**Design Guidelines**

**Minimum Wall Thickness:**
- Flexible: 1.5mm
- Embossed: 0.5mm
- Engraved: 0.5mm

**Enclosed & Interlocking:**
- Enclosed parts: Yes
- Interlocking parts: Yes

**Hollowing and assembly:**
- Hollowing: Yes

**Printing Resolution:**
- Standard layer thickness: 100μm

**Clearances and spacing:**
- Minimum spacing: 0.5mm
- Minimum Clearance: 0.5mm

**Stemmed Elements:**
- Support: 1.5mm
- Without support: 1.5mm

**Maximum Size:**
360 x 360 x 420 mm

---

**Technical Specifications**

<table>
<thead>
<tr>
<th>Mechanical Properties</th>
<th>Conditions</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charpy Impact unnotched</td>
<td>ISO 179-1</td>
<td>7.4 kJ/m²</td>
</tr>
<tr>
<td>Tensile Modulus</td>
<td>DIN EN ISO 527-2</td>
<td>2450 MPa</td>
</tr>
<tr>
<td>Tensile strength</td>
<td>DIN EN ISO 527-2</td>
<td>41 MPa</td>
</tr>
<tr>
<td>Elongation at break</td>
<td>DIN EN ISO 527-2</td>
<td>2.6%</td>
</tr>
<tr>
<td>HDT B (0.45 MPa, dry)</td>
<td>ISO 75-2</td>
<td>207 °C</td>
</tr>
</tbody>
</table>

---

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PA6 MF
Mineral Filled

Available with: SLS

Performance

Extremely High Rigidity
Tensile Modulus: 3300 MPa. Able to handle all heat, vibration and static loads

Media tightness
Well-suited to media flow and storage parts

Aesthetic

Durable
Suitable for tooling equipment, molds, or any multi-purpose industrial goods

Production

Heat Resistance
HDT/B: 207°C and melting point of 220°C

Prototype
Ultrasint® PA6 MF

Suited For:
- Transportation
- Automotive
- Aerospace
- Electronics

Applications
- Tooling equipment and jigs
- Structural/mechanical parts
- Functional prototypes
- Molds
- Engine bay parts
- Media flow and storage parts

Design Guidelines

- **Maximum Size:**
  - 360 x 360 x 420 mm

- **Minimum Wall Thickness:**
  - 1.5mm

- **Embossed & Engraved Details:**
  - Embossed: 0.7mm
  - Engraved: 0.7mm

- **Enclosed & Interlocking:**
  - Enclosed parts: Yes
  - Interlocking parts: Yes

- **Hollowing and assembly:**
  - Hollowing: Yes

- **Printing Resolution:**
  - Standard layer thickness: 100μm

- **Stemmed Elements:**
  - Support: 1.5mm
  - Without support: 1.5mm

- **Clearances and spacing:**
  - Minimum spacing: 0.5mm
  - Minimum Clearance: 0.5mm

Technical Specifications

<table>
<thead>
<tr>
<th>Mechanical Properties</th>
<th>Conditions</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charpy Impact unnotched</td>
<td>ISO 179-1</td>
<td>28 kJ/m²</td>
</tr>
<tr>
<td>Tensile Modulus</td>
<td>DIN EN ISO 527-2</td>
<td>3300 MPa</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>DIN EN ISO 527-2</td>
<td>62 MPa</td>
</tr>
<tr>
<td>Elongation at break</td>
<td>DIN EN ISO 527-2</td>
<td>7%</td>
</tr>
<tr>
<td>HDT B (0.45 MPa, dry)</td>
<td>ISO 75-2</td>
<td>209 °C</td>
</tr>
</tbody>
</table>

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**TPU**

**Resistant**
Charpy Impact notched: No Break.

**Highly flexible**
Shore A 88: Rubber-like elasticity and flexibility

**High UV stability**
UV stable and also offers good hydrolysis resistance

**Great shock absorption**
Rebound resilience: 63%. High rebound, good fatigue behavior

*Available with: SLS & MJF*

---

**Ultrasint® TPU 88A**

**Shore A 88: Rubber-like elasticity and flexibility**

**Charpy Impact notched:**
No Break.

**High rebound, good fatigue behavior**

---

**MJF TPU01**

**Polymers - 19**
**Design Guidelines (SLS)**

- **Maximum Size:**
  - 300 x 300 x 300 mm

- **Minimum Wall Thickness:**
  - 0.8mm

- **Embossed & Engraved Details:**
  - Embossed: 0.7mm
  - Engraved: 0.7mm

- **Enclosed & Interlocking:**
  - Enclosed parts: Yes
  - Interlocking parts: Yes

- **Hollowing and assembly:**
  - Hollowing: Yes

- **Stemmed Elements:**
  - Support: 1mm
  - Without support: 1.2mm

- **Printing Resolution:**
  - Standard layer thickness: 100µm

- **Clearances and spacing:**
  - Minimum spacing: 0.5mm
  - Minimum clearance: 0.5mm

**Technical Specifications (SLS)**

<table>
<thead>
<tr>
<th>Mechanical Properties</th>
<th>Conditions</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charpy Impact notched</td>
<td>DIN EN ISO 179-1</td>
<td>no break</td>
</tr>
<tr>
<td>Hardness Shore A</td>
<td>DIN EN ISO 7619-1</td>
<td>88-90</td>
</tr>
<tr>
<td>Tensile Modulus</td>
<td>ISO 527-2, 1A</td>
<td>75 MPa</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>DIN 53504, S2</td>
<td>8 MPa</td>
</tr>
<tr>
<td>Elongation at break</td>
<td>DIN 53504, S2</td>
<td>270%</td>
</tr>
<tr>
<td>Rebound Resilience</td>
<td>DIN 53512</td>
<td>63%</td>
</tr>
</tbody>
</table>

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For technical specifications and design guidelines of MJF TPU01, visit sculpteo.com
Take a look at the wide range of resins BASF-Forward AM & Sculpteo has to offer for highly detailed parts comparable to injection molding.
# Resins Technical Properties Comparison

<table>
<thead>
<tr>
<th></th>
<th>TENSILE MODULUS</th>
<th>TENSILE STRENGTH</th>
<th>ELONGATION AT BREAK</th>
<th>HARDNESS SHORE</th>
<th>IMPACT STRENGTH (Izod Notched)</th>
<th>GLASS TRANSITION TEMPERATURE</th>
<th>HDT-B</th>
<th>DENSITY</th>
<th>FLEXURAL MODULUS</th>
<th>FLEXURAL STRENGTH</th>
<th>TEAR STRENGTH, DIE C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DLP / LCD</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultracur3D® EPD 1006 3D</td>
<td>1500 MPa</td>
<td>40 MPa</td>
<td>25.2%</td>
<td>79 (Shore D)</td>
<td>35 J/m (23° Machined)</td>
<td>-</td>
<td>44° C</td>
<td>1.2 g/cm³</td>
<td>1460 MPa</td>
<td>52 MPa</td>
<td>-</td>
</tr>
<tr>
<td>Ultracur3D® ST 45</td>
<td>2300 MPa</td>
<td>62 MPa</td>
<td>25%</td>
<td>81 (Shore D)</td>
<td>20.8 J/m (23° Machined)</td>
<td>-</td>
<td>73°C</td>
<td>1.2 g/cm³</td>
<td>2430 MPa</td>
<td>109 MPa</td>
<td>-</td>
</tr>
<tr>
<td>Ultracur3D® ST 45 B</td>
<td>2040 MPa</td>
<td>52.5 MPa</td>
<td>21.4%</td>
<td>81 (Shore D)</td>
<td>20.56 J/m (23° Machined)</td>
<td>-</td>
<td>63°C</td>
<td>1.2 g/cm³</td>
<td>2140 MPa</td>
<td>93.9 MPa</td>
<td>-</td>
</tr>
<tr>
<td>Ultracur3D® RG 35</td>
<td>2600 MPa</td>
<td>80 MPa</td>
<td>6%</td>
<td>85 (Shore D)</td>
<td>10 J/m (23° Machined)</td>
<td>-</td>
<td>83°C</td>
<td>1.2 g/cm³</td>
<td>2400 MPa</td>
<td>110 MPa</td>
<td>-</td>
</tr>
</tbody>
</table>

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Ultracur3D®
EPD 1006
Available with: LCD

- **Performance**
  - **Flexibility**
    - Elongation at Break of 25.2% and a Shore D of 79
  - **Good Toughness**
    - With a Tensile Strength of 40 MPa
  - **Highly Detailed**
    - Minimum size of details of 0.3 mm & Accuracy of 100μm

- **Aesthetic**
  - XL parts
    - Large-scale 3D printing up to 510 x 280 x 350 mm

- **Production**
  - XL parts

- **Prototype**
Design Guidelines

- **Maximum Size:**
  - 510 x 280 x 350 mm

- **Minimum Wall Thickness:**
  - 0.6mm

- **Embossed & Engraved Details:**
  - Embossed: 0.3 mm
  - Engraved: 0.3 mm

- **Enclosed & Interlocking:**
  - Enclosed parts: No
  - Interlocking parts: No

- **Stemmed Elements:**
  - Support: 0.6mm
  - Without support: 1mm

- **Hollowing and assembly:**
  - Hollowing: No

- **Printing Resolution:**
  - Standard layer thickness: 100µm
  - Accuracy: ± 100µm (Over 90% of scanned data within +/- µm)

- **Clearances and spacing:**
  - Minimum spacing: 0.4mm
  - Minimum Clearance: 0.4mm

Technical Specifications

<table>
<thead>
<tr>
<th>Mechanical Properties</th>
<th>Conditions</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDT B (0.45 MPa)</td>
<td>ASTM D648</td>
<td>44°C</td>
</tr>
<tr>
<td>Elastic Modulus</td>
<td>ASTM D638</td>
<td>1500 MPa</td>
</tr>
<tr>
<td>Tensile strength</td>
<td>ASTM D638</td>
<td>40 MPa</td>
</tr>
<tr>
<td>Elongation at break</td>
<td>ASTM D638</td>
<td>25.2%</td>
</tr>
<tr>
<td>Charpy notched, 23 °C</td>
<td>ISO 179-1</td>
<td>2.5 kJ/m²</td>
</tr>
</tbody>
</table>

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**Ultracur3D® RG 35**

Available with: DLP

<table>
<thead>
<tr>
<th>Performance</th>
<th>Aesthetic</th>
<th>Production</th>
<th>Prototype</th>
</tr>
</thead>
</table>

- **High stability and stiffness**
  - Tensile Strength of 80 MPa and E Modulus of 2600 MPa

- **UV stability**
  - Keeps its mechanical properties even when exposed to UV light

- **Low water intake**
  - Adapted to produce parts in situations where humidity or fluids are involved

- **Light management**
  - Suited to manufacture translucent parts requiring light diffusion

Resins - 25
Design Guidelines

- **Minimum Wall Thickness:** 0.6mm
- **Embossed & Engraved Details:**
  - Embossed: 0.3mm
  - Engraved: 0.3mm
- **Enclosed & Interlocking:**
  - Enclosed parts: No
  - Interlocking parts: No
- **Hollowing and assembly:**
  - Hollowing: No
  - Assembly: No
- **Printing Resolution:**
  - Standard layer thickness: 100µm
  - Accuracy: ± 200µm
- **Clearances and spacing:**
  - Minimum spacing: 0.4mm
  - Minimum Clearance: -mm
- **Stemmed Elements:**
  - Support: 0.6mm
  - Without support: 1mm

Technical Specifications

### Mechanical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Conditions</th>
<th>Value (post-cured)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elongation at Break</td>
<td>ASTM D 638</td>
<td>6%</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>ASTM D 638</td>
<td>80 MPa</td>
</tr>
<tr>
<td>E Modulus</td>
<td>ASTM D 638</td>
<td>2 600 MPa</td>
</tr>
<tr>
<td>Charpy notched, 23 °C</td>
<td>ISO 179-1</td>
<td>0.6 kJ/m²</td>
</tr>
<tr>
<td>HDT (0.45 MPa)</td>
<td>ASTM D 648</td>
<td>83°C</td>
</tr>
</tbody>
</table>

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Ultracur3D®
ST 45
Available with: DLP

Performance | Aesthetic | Production | Prototype
Impact Resistance
Charpy notched of 1.39 kJ/m² & Elongation at break of 25%
Long-term toughness
Tensile Strength of 62 MPa
Highly Detailed
Offers a great freedom of design and allows high level of details
Biocompatible
Suited for medical projects
**Ultracur3D® ST 45**

**Design Guidelines**

- **Minimum Wall Thickness:** 0.6mm
- **Embossing:** 0.3mm
- **Engraving:** 0.3mm
- **Enclosed parts:** No
- **Interlocking parts:** No
- **Hollowing:** Yes
- **Assembly:** -
- **Printing Resolution:**
  - Standard layer thickness: 100µm
  - Accuracy: ± 200µm
- **Clearances and spacing:**
  - Minimum spacing: 0.4mm
  - Minimum Clearance: -mm
- **Stemmed Elements:**
  - Support: 0.6mm
  - Without support: 1mm

**Technical Specifications**

**Mechanical Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Conditions</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>ASTM D638</td>
<td>62 MPa</td>
</tr>
<tr>
<td>E Modulus</td>
<td>ASTM D638</td>
<td>2 300 MPa</td>
</tr>
<tr>
<td>Elongation at Break</td>
<td>ASTM D638</td>
<td>25 %</td>
</tr>
<tr>
<td>Charpy notched, 23 °C</td>
<td>ISO 179-1</td>
<td>1.39 kJ/m2</td>
</tr>
<tr>
<td>HDT (0.45 MPa)</td>
<td>ASTM D648</td>
<td>73°C</td>
</tr>
</tbody>
</table>

**Applications**

- Medical tools
- Prototyping
- End-use products
- Functional testing, patterns, and models
- Transparent parts
- Electronic casings
- Jigs and fixtures

**Suited For:**

- Consumer goods
- Healthcare
- Electronics
- Manufacturing
- Industrial Prototyping

**Important:** This material is not adapted for parts in contact with fluids.

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Performance

Impact Resistance
Charpy notched of 2.66 kJ/m² & Elongation at break of 21.4%

Long-term toughness
Tensile Strength of 52.5 MPa

Aesthetic

Complex parts
Perfect for complex aesthetic parts with a good surface finishing

Production

Highly Detailed
High accuracy of ± 200µm

Prototype

Ultracur3D® ST 45 B
Available with: DLP

Tensile Strength of 52.5 MPa

Ultracur3D® ST 45 B
Available with: DLP

Tensile Strength of 52.5 MPa
### Design Guidelines

**Maximum Size:**
192 × 108 × 330 mm

**Minimum Wall Thickness:**
0.6mm

**Embossed & Engraved Details:**
- Embossing: 0.3mm
- Engraving: 0.3mm

**Enclosed & Interlocking:**
- Enclosed parts: No
- Interlocking parts: No

**Stemmed Elements:**
- Support: 0.6mm
- Without support: 1mm

**Hollowing and assembly:**
- Hollowing: Yes
- Assembly: -

**Printing Resolution:**
- Standard layer thickness: 100µm
- Accuracy: ± 200µm

**Clearances and spacing:**
- Minimum spacing: 0.4mm
- Minimum Clearance: -mm

### Technical Specifications

**Mechanical Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Conditions</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>ASTM D638</td>
<td>52.5 MPa</td>
</tr>
<tr>
<td>E Modulus</td>
<td>ASTM D638</td>
<td>2,040 MPa</td>
</tr>
<tr>
<td>Elongation at Break</td>
<td>ASTM D638</td>
<td>21.4 %</td>
</tr>
<tr>
<td>Charpy notched, 23 °C</td>
<td>ISO 179-1</td>
<td>2.66 kJ/m2</td>
</tr>
<tr>
<td>HDT (0.45 MPa)</td>
<td>ASTM D648</td>
<td>63°C</td>
</tr>
</tbody>
</table>

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Discover the line of 3D printing metal and polymers materials for FDM technologies.
# Metals Technical Properties Comparison

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<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>TENSILE MODULUS</th>
<th>TENSILE STRENGTH</th>
<th>ELONGATION AT BREAK</th>
<th>MELTING POINT</th>
<th>YIELD STRENGTH</th>
<th>CHARPY IMPACT NOTCHED</th>
<th>HARDNESS</th>
<th>DENSITY</th>
<th>COMPOSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultrafuse® 316L</td>
<td>-</td>
<td>XY: 561 MPa Z: 521 MPa</td>
<td>XY: 53% ZX: 36%</td>
<td>-</td>
<td>XY: 251 MPa Z: 234 MPa</td>
<td>111 J/cm²</td>
<td>XY: 128 HV10 Z: 128 HV10</td>
<td>7.85 g/cm³ (Sintered part)</td>
<td>-</td>
</tr>
<tr>
<td>Ultrafuse® 17-4 PH</td>
<td>-</td>
<td>XY: 760 MPa Z: 730 MPa</td>
<td>XY: 4% ZX: 3%</td>
<td>-</td>
<td>XY: 680 MPa Z: 700 MPa</td>
<td>TBA</td>
<td>257 HV 10 (Vickers)</td>
<td>&gt;7.6 g/cm³ (Sintered part)</td>
<td>-</td>
</tr>
</tbody>
</table>
XXL parts

Bio-sourced & Recyclable

Performance | Aesthetic | Production | Prototype
---|---|---|---

Large-scale 3D printing up to 1m x 1m x 1m

Affordable and reliable bioplastic that can be recycled

Food safe

Safe for contact with food

Highly versatile properties

Has good strength and stiffness

PLA

Available with: Big-Rep® FDM

Polymers - 33
**PLA Big-Rep®**

**Suited For:**
- Construction
- Signage
- Arts
- Consumer goods
- Architecture & Design
- Marketing displays

**Applications**
- Promotional items
- Artistic projects
- Pattern making
- Tooling parts
- End-use products
- Industrial parts

**Technical Specifications**

**Mechanical Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Conditions</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>-</td>
<td>1.24 g/cm³</td>
</tr>
<tr>
<td>Flexural Modulus</td>
<td>ISO 178</td>
<td>3800 MPa</td>
</tr>
<tr>
<td>Tensile strength</td>
<td>ISO 527</td>
<td>60 MPa</td>
</tr>
<tr>
<td>Impact Strength Notched</td>
<td>-</td>
<td>7.5 kJ/m²</td>
</tr>
<tr>
<td>Heat Resistance HDT / B</td>
<td>ISO 75</td>
<td>40 °C</td>
</tr>
<tr>
<td>Hardness Shore D</td>
<td>-</td>
<td>60</td>
</tr>
</tbody>
</table>

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**Design Guidelines**

- **Maximum Size:** 1 x 1 x 1 m
- **Minimum Wall Thickness:** 2.2mm
- **Embossed & Engraved Details:**
  - Embossed: 2.4mm
  - Engraved: 2.4mm
- **Enclosed & Interlocking:**
  - Enclosed parts: No
  - Interlocking parts: No
- **Stemmed Elements:** 2.2mm
- **Hollowing and assembly:**
  - Hollowing: No
  - Assembly: Yes, min space: 1mm
- **Printing Resolution:**
  - Standard layer thickness: 0.6mm

**Suggested For:**
- Construction
- Signage
- Arts
- Consumer goods
- Architecture & Design
- Marketing displays
Stainless Steel 316L

Available with: FDM

- Impact Resistance
  - Impact Strength Charpy (notched) of 111 J/cm²
- Hardness and strength
  - Vickers Hardness HV10 of 128
- Corrosion Resistant
  - Composed of high amounts of chromium
- Heat resistant
  - Very high melting point of 1371 °C

Performance Aesthetic Production Prototype
Design Guidelines (FDM)

Minimum Wall Thickness:
1 mm

Embossed & Engraved Details:
Embosed: 0.60 mm – 1 mm
Engraved: 0.40 mm – 1 mm

Enclosed & Interlocking:
Enclosed parts: No
Interlocking parts: No

Hollowing and assembly:
Hollowing: No
Assembly: No

Printing Resolution:
Standard layer thickness: 150µm

Clearances and spacing:
Minimum spacing: 0.6mm
Minimum hole diameter: 1.5mm

Technical Specifications (FDM)

<table>
<thead>
<tr>
<th>Mechanical Properties</th>
<th>Conditions</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield Strength, Rp 0.2</td>
<td>DIN EN ISO 6892-1</td>
<td>XY: 251 MPa / ZX: 234 MPa</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>DIN EN ISO 6892-1</td>
<td>XY: 561 MPa / ZX: 521 MPa</td>
</tr>
<tr>
<td>Impact Charpy notched</td>
<td>DIN EN ISO 148:201</td>
<td>111 J/cm²</td>
</tr>
<tr>
<td>Elongation at break</td>
<td>DIN EN ISO 6892-1</td>
<td>XY: 53% / ZX: 36%</td>
</tr>
<tr>
<td>Vickers Hardness</td>
<td>DIN EN ISO 6507-1</td>
<td>128 HV10</td>
</tr>
</tbody>
</table>

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**Stainless Steel 17-4 PH**

Available with: FDM

<table>
<thead>
<tr>
<th>Performance</th>
<th>Aesthetic</th>
<th>Production</th>
<th>Prototype</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Strong" /></td>
<td><img src="image" alt="Hardness" /></td>
<td><img src="image" alt="Durable" /></td>
<td><img src="image" alt="Low Deformability" /></td>
</tr>
<tr>
<td>Tensile strength of 950 MPa</td>
<td>Vickers Hardness HV10 of 257</td>
<td>Excellent mechanical properties for advanced applications</td>
<td>Yield strength of 720 MPa</td>
</tr>
</tbody>
</table>
Design Guidelines

**Minimum Wall Thickness:**
1 mm

**Embossed & Engraved Details:**
- Embossed: 0.60 mm – 1 mm
- Engraved: 0.40 mm – 1 mm

**Enclosed & Interlocking:**
- Enclosed parts: No
- Interlocking parts: No

**Hollowing and assembly:**
- Hollowing: No
- Assembly: No

**Printing Resolution:**
- Standard layer thickness: 150µm

**Clearances and spacing:**
- Minimum spacing: 0.6mm
- Minimum hole diameter: 1.5mm

**Stemmed Elements:**
- Support: 0.8mm
- Without support: 1mm

Technical Specifications

<table>
<thead>
<tr>
<th>Mechanical Properties</th>
<th>Conditions</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield Strength, Rp 0.2</td>
<td>DIN EN ISO 6892-1</td>
<td>XY: 680 MPa / ZX: 700 MPa</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>DIN EN ISO 6892-1</td>
<td>XY: 760 MPa / ZX: 730 MPa</td>
</tr>
<tr>
<td>Impact Charpy notched</td>
<td>DIN EN ISO 148:2017-05</td>
<td>TBA</td>
</tr>
<tr>
<td>Elongation at break</td>
<td>DIN EN ISO 6892-1</td>
<td>XY: 4% / ZX: 3%</td>
</tr>
<tr>
<td>Vickers Hardness</td>
<td>DIN EN ISO 6507-1</td>
<td>257 HV10</td>
</tr>
</tbody>
</table>

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Have a 3D printing project in mind?

Make the most of 3D Printing for your business!

3D printing and laser cutting with a professional manufacturing partner can give your company a competitive advantage and help you accelerate product development and on-demand production.

Tell us about your commercial project and see what Sculpteo & BASF-Forward AM can do for your business.

Get in touch with our Sales Team:

hello@sculpteo.com