

ULTEM 9085

Production-grade Thermoplastic



ULTEM™ 9085 resin is a flame-retardant high-performance thermoplastic for digital manufacturing and rapid prototyping. It is ideal for the transportation industry due to its high strength-to-weight ratio and its FST (flame, smoke and toxicity) rating. Combined with a Fortus® 3D Printer, ULTEM 9085 resin allows design and manufacturing engineers to produce fully functional parts that are ideal for advanced functional prototypes or end use without the cost or lead time of traditional tooling.

Certified ULTEM 9085 meets more stringent test criteria and retains material traceability required by the aerospace industry. Certificates of Analysis for both raw material and filament are supplied, documenting test results and identification to match filament manufacturing lot number to raw material lot number. This allows traceability from printed part back to raw material. A Certificate of Conformance certifies that the material is manufactured per specification.

| MECHANICAL PROPERTIES ¹ | TEST METHOD | ENGLISH | | METRIC | |
|--|-------------|----------------|----------------|----------------|----------------|
| | | XZ Orientation | ZX Orientation | XZ Orientation | ZX Orientation |
| Tensile Strength, Yield (Type 1, 0.125", 0.2"/min) | ASTM D638 | 6,800 psi | 4,800 psi | 47 MPa | 33 MPa |
| Tensile Strength, Ultimate (Type 1, 0.125", 0.2"/min) | ASTM D638 | 9,950 psi | 6,100 psi | 69 MPa | 42 MPa |
| Tensile Modulus (Type 1, 0.125", 0.2"/min) | ASTM D638 | 312,000 psi | 329,000 psi | 2,150 MPa | 2,270 MPa |
| Tensile Elongation at Break (Type 1, 0.125", 0.2"/min) | ASTM D638 | 5.8% | 2.2% | 5.8% | 2.2% |
| Tensile Elongation at Yield (Type 1, 0.125", 0.2"/min) | ASTM D638 | 2.2% | 1.7% | 2.2% | 1.7% |
| Flexural Strength (Method 1, 0.05"/min) | ASTM D790 | 16,200 psi | 9,900 psi | 112 MPa | 68 MPa |
| Flexural Modulus (Method 1, 0.05"/min) | ASTM D790 | 331,000 psi | 297,000 psi | 2,300 MPa | 2,050 MPa |
| Flexural Strain at Break (Method 1, 0.05"/min) | ASTM D790 | No break | 3.7% | No break | 3.7% |
| IZOD Impact, notched (Method A, 23 °C) | ASTM D256 | 2.2 ft-lb/in | 0.9 ft-lb/in | 120 J/m | 48 J/m |
| IZOD Impact, un-notched (Method A, 23 °C) | ASTM D256 | 14.6 ft-lb/in | 3.2 ft-lb/in | 781 J/m | 172 J/m |
| Compressive Strength, Yield (Method 1, 0.05"/min) | ASTM D695 | 14,500 psi | 12,700 psi | 100 MPa | 87 MPa |
| Compressive Strength, Ultimate (Method 1, 0.05"/min) | ASTM D695 | 26,200 psi | 13,100 psi | 181 MPa | 90 MPa |
| Compressive Modulus (Method 1, 0.05"/min) | ASTM D695 | 1,030,000 psi | 251,000 psi | 7,012 MPa | 1,731 MPa |

| THERMAL PROPERTIES ² | TEST METHOD | ENGLISH | METRIC |
|--|-------------|----------------------------------|-----------------------------|
| Heat Deflection (HDT) @ 264 psi, 0.125" unannealed | ASTM D648 | 307 °F | 153 °C |
| Glass Transition Temperature (Tg) | DSC (SSYS) | 367 °F | 186 °C |
| Coefficient of Thermal Expansion | ASTM E831 | 3.67x10 ⁻⁵ in/(in·°F) | 65.27 μm/(m·°C) |
| Melting Point | ----- | Not Applicable ³ | Not Applicable ³ |



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Advanced FDM Technology

FDM® (fused deposition modeling) technology works with engineering-grade thermoplastics to build strong, long-lasting and dimensionally stable parts with the best accuracy and repeatability of any 3D printing technology. These parts are tough enough to be used as advanced conceptual models, functional prototypes, manufacturing tools and production parts.

| ELECTRICAL PROPERTIES | TEST METHOD | VALUE RANGE |
|----------------------------|------------------------|---|
| Volume Resistivity | ASTM D257 | 4.9 x10 ¹⁵ - 8.2x10 ¹⁵ ohm-cm |
| Dielectric Constant | ASTM D150-98 | 3 - 3.2 |
| Dissipation Factor | ASTM D150-98 | .0026 - .0027 |
| Dielectric Strength | ASTM D149-09, Method A | 110 - 290 V/mil |

| OTHER ² | TEST METHOD | VALUE |
|---|-------------------|--------------------------|
| Specific Gravity | ASTM D792 | 1.34 |
| Rockwell Hardness | ASTM D785 | --- |
| Oxygen Index | ASTM D2863 | 0.49 |
| OSU Total Heat Release (2 min test, .060" thick) | FAR 25.853 | 16 kW min/m ² |
| Outgassing | | |
| Total Mass Loss (TML) | ASTM E595 | 0.41% (1.00% maximum) |
| Collected Volatile Condensable Material (CVCM) | ASTM E595 | -0.1% (0.10% maximum) |
| Water Vapor Recovered (WVR) | ASTM E595 | -0.37% (report) |
| Fungus Resistance (Method 508.6) | MIL-STD-810G | Passed |
| Burn Testing | | |
| Horizontal Burn (15 sec) | 14 CFR/FAR 25.853 | Passed (0.060" thick) |
| Vertical Burn (60 sec) | 14 CFR/FAR 25.853 | Passed (0.060" thick) |
| Vertical Burn (12 sec) | 14 CFR/FAR 25.853 | Passed (0.060" thick) |
| 45° Ignition | 14 CFR/FAR 25.853 | Passed (0.060" thick) |
| Heat Release | 14 CFR/FAR 25.853 | Passed (0.060" thick) |
| NBS Smoke Density (flaming) | ASTM F814/E662 | Passed (0.060" thick) |
| NBS Smoke Density (non-flaming) | ASTM F814/E662 | Passed (0.060" thick) |



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| SYSTEM AVAILABILITY | LAYER THICKNESS CAPABILITY | SUPPORT STRUCTURE | AVAILABLE COLORS |
|--------------------------------|--|-------------------|--|
| Fortus 450mc™ Fortus 900mc™ | 0.013 inch (0.330 mm) 0.010 inch (0.254 mm) | Breakaway | Tan (Natural) Black Certified ULTEM 9085 is available only in Tan (Natural). |

The performance characteristics of these materials may vary according to application, operating conditions, or end use. Each user is responsible for determining that the Stratasys material is safe, lawful, and technically suitable for the intended application, as well as for identifying the proper disposal (or recycling) method consistent with applicable environmental laws and regulations. Stratasys makes no warranties of any kind, express or implied, including, but not limited to, the warranties of merchantability, fitness for a particular use, or warranty against patent infringement.

The information presented in this document are typical values intended for reference and comparison purposes only. They should not be used for design specifications or quality control purposes. End-use material performance can be impacted (+/-) by, but not limited to, part design, end-use conditions, test conditions, color, etc. Actual values will vary with build conditions. Tested parts were built on Fortus 400mc™ @ 0.010" (0.254 mm) slice. Product specifications are subject to change without notice.

¹Build orientation is on side long edge.

²Literature value unless otherwise noted.

³Due to amorphous nature, material does not display a melting point.

⁴All Electrical Property values were generated from the average of test plaques built with default part density (solid). Test plaques were 4.0 x 4.0 x 0.1 inches (102 x 102 x 2.5 mm) and were built both in the flat and vertical orientation. The range of values is mostly the result of the difference in properties of test plaques built in the flat vs. vertical orientation.

XZ = X or "on edge"

XY = Y or "flat"

ZX = or "upright"

