



# ULTEM 9085

## PRODUCTION-GRADE THERMOPLASTIC FOR FORTUS 3D PRINTERS

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 <sup>1</sup>	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 <sup>2</sup>	TEST METHOD	ENGLISH	METRIC
Heat Deflection (HDT) @ 264 psi, 0.125" unannealed	ASTM D648	307 °F	153 °C
Glass Transition Temperature (T <sub>g</sub> )	DSC (SSYS)	367 °F	186 °C
Coefficient of Thermal Expansion	ASTM E831	3.67x10 <sup>-5</sup> in/(in·°F)	65.27 μm/(m·°C)
Melting Point	-----	Not Applicable <sup>3</sup>	Not Applicable <sup>3</sup>



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### At the core:

#### 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.

#### Meet production demands

FDM systems are as versatile and durable as the parts they produce. Advanced FDM 3D Printers boast the largest build envelopes and material capacities in their class, delivering longer, uninterrupted build times, bigger parts and higher quantities than other additive manufacturing systems, delivering high throughput, duty cycles and utilization rates.

#### Opening the way for new possibilities

FDM 3D Printers streamline processes from design through manufacturing, reducing costs and eliminating traditional barriers along the way. Industries can cut lead times and costs, products turn out better and get to market faster.

#### No special facilities needed

FDM 3D Printers are easy to operate and maintain compared to other additive fabrication systems because there are no messy powders or resins to handle and contain, and no special venting is required because FDM systems don't produce noxious fumes, chemicals or waste.

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

OTHER <sup>2</sup>	TEST METHOD	VALUE
<a href="#">Specific Gravity</a>	ASTM D792	1.34
<a href="#">Rockwell Hardness</a>	ASTM D785	---
<a href="#">Oxygen Index</a>	ASTM D2863	0.49
<a href="#">OSU Total Heat Release (2 min test, .060" thick)</a>	FAR 25.853	16 kW min/m <sup>2</sup>
<a href="#">Outgassing</a>		
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)
<a href="#">Fungus Resistance (Method 508.6)</a>	MIL-STD-810G	Passed
<a href="#">Burn Testing</a>		
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)
<a href="#">Heat Release</a>	14 CFR/FAR 25.853	Passed (0.060" thick)
<a href="#">NBS Smoke Density (flaming)</a>	ASTM F814/E662	Passed (0.060" thick)
<a href="#">NBS Smoke Density (non-flaming)</a>	ASTM F814/E662	Passed (0.060" thick)



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## PRODUCTION-GRADE THERMOPLASTIC FOR FORTUS 3D PRINTERS

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.

<sup>1</sup>Build orientation is on side long edge.

<sup>2</sup>Literature value unless otherwise noted.

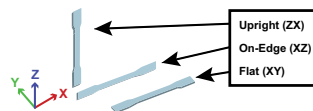
<sup>3</sup>Due to amorphous nature, material does not display a melting point.

<sup>4</sup>All 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"



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