FUSED DEPOSITION MODELING

ULTEM 9085

High-Performance Thermoplastic for Mission-Critical Applications



ULTEM 9085 is a highly versatile and reliable thermoplastic that has earned its reputation as a go-to material for demanding applications. Its exceptional strength-to-weight ratio, heat resistance, flame, smoke, and toxicity rating, and documented traceability make it an ideal choice for industries seeking reliable and high-performance solutions. Stratasys ULTEM 9085 is UL 94 V-0 listed on its UL Blue Card.

BUILD VOLUME	LEAD TIME	LAYER HEIGHT	TOLERANCE
914 × 610 × 914 mm	**2-4 business days**	**0.254-0.330 mm**	**±0.25 mm or ±0.3%, whichever is greater**

MECHANICAL PROPERTIES

ULTEM 9085 delivers dependable strength and impact resistance for aircraft cabin components and ducting, brackets and housings. Its balanced mechanical profile handles demanding load conditions, with strength, elongation and impact resistance far higher along the layers than across them.

XZ values come from specimens printed on edge and ZX values from upright specimens loaded across the layers, so orient loaded features, mounting tabs and clips along the build plane and size parts against the ZX figures.

PROPERTY	VALUE	TEST STANDARD
Tensile Strength at Yield (XZ)	**69.2 MPa**	ASTM D638
Tensile Strength at Break (XZ)	**68.1 MPa**	ASTM D638
Tensile Strength at Break (ZX)	**39.4 MPa**	ASTM D638
Tensile Modulus (XZ)	**2520 MPa**	ASTM D638
Tensile Modulus (ZX)	**2410 MPa**	ASTM D638
Elongation at Yield (XZ)	**5.4 %**	ASTM D638
Elongation at Break (XZ)	**5.4 %**	ASTM D638
Elongation at Break (ZX)	**1.9 %**	ASTM D638
Flexural Strength (XZ)	**104 MPa**	ASTM D790, Procedure A
Flexural Strength (ZX)	**73.1 MPa**	ASTM D790, Procedure A
Flexural Modulus (XZ)	**2400 MPa**	ASTM D790, Procedure A
Flexural Modulus (ZX)	**2130 MPa**	ASTM D790, Procedure A
Flexural Strain at Break (XZ)	**No break (test stopped at 5%)**	ASTM D790, Procedure A
Flexural Strain at Break (ZX)	**3.7 %**	ASTM D790, Procedure A
Compressive Peak Strength (XZ)	**139 MPa**	ASTM D695
Compressive Modulus (XZ)	**2220 MPa**	ASTM D695
Compressive Modulus (ZX)	**2280 MPa**	ASTM D695

Izod Impact, Notched (XZ)	**88.5 J/m**	ASTM D256
Izod Impact, Notched (ZX)	**39.2 J/m**	ASTM D256
Izod Impact, Unnotched (XZ)	**647 J/m**	ASTM D4812
Izod Impact, Unnotched (ZX)	**187 J/m**	ASTM D4812

THERMAL PROPERTIES

Heat deflection is measured at two loads and in two print directions, and ULTEM 9085 holds its shape close to its glass transition temperature at both, so parts keep their dimensional accuracy in elevated temperature environments, from aircraft cabins to equipment near heat sources.

The retained-strength values show how much of its room-temperature strength the material keeps as it warms, so size parts for their real service temperature rather than the deflection point. In the cold it gets stronger, reaching 157% of its room-temperature strength at break at −54 °C, and the expansion coefficients help size clearances on assemblies that see temperature swings.

PROPERTY	VALUE	TEST STANDARD
HDT @ 0.45 MPa / 66 psi (XY / XZ)	**178.2 / 178.4 °C**	ASTM D648, Method B
HDT @ 1.82 MPa / 264 psi (XY / XZ)	**170.2 / 172.6 °C**	ASTM D648, Method B
Glass Transition Temperature (molded)	**177.3 °C**	ASTM D7426, inflection point
Coefficient of Thermal Expansion (XY, −50 to 80 °C)	**44.89 ×10^{-6}/K**	ASTM E831
Coefficient of Thermal Expansion (XY, 80 to 160 °C)	**31.35 ×10^{-6}/K**	ASTM E831
Coefficient of Thermal Expansion (XZ, −50 to 60 °C)	**44.45 ×10^{-6}/K**	ASTM E831
Coefficient of Thermal Expansion (XZ, 60 to 160 °C)	**32.31 ×10^{-6}/K**	ASTM E831
Thermal Conductivity @ 30 °C (molded)	**0.21 W/m·K**	ASTM E1952
Strength at Break Retained @ 82 °C (ZX)	**102 %**	ASTM D638
Strength at Break Retained @ 104 °C (ZX)	**87 %**	ASTM D638
Strength at Break Retained @ 132 °C (ZX)	**70 %**	ASTM D638
Strength at Break Retained @ 149 °C (ZX)	**55 %**	ASTM D638

PHYSICAL PROPERTIES

Low density makes ULTEM 9085 parts lightweight yet durable, and consistent surface quality keeps critical features in tolerance and downstream finishing predictable. The oxygen index shows how much oxygen the material needs to keep burning, well above the level of normal air, which underpins its flame retardancy.

Low outgassing in ASTM E595 vacuum testing suits enclosed and space hardware, and stress at break is practically unchanged after accelerated UV exposure, so parts hold their strength under cabin lighting and sunlight.

PROPERTY	VALUE	TEST STANDARD
Specific Gravity (molded)	**1.27**	ASTM D792
Limiting Oxygen Index (0.55 / 10.5 mm, XY)	**37.2 / 47.9 %**	ISO 4589-2
Outgassing, Total Mass Loss	**0.33–0.37 %**	ASTM E595
Outgassing, Collected Volatile Condensable Material	**< 0.01–0.02 %**	ASTM E595
Outgassing, Water Vapor Recovered	**0.22–0.38 %**	ASTM E595
Change in Stress at Break after 1,000 h UV (CG, ZX)	**−0.1 %**	ASTM G154

ELECTRICAL PROPERTIES

High volume resistivity and a low dielectric constant make ULTEM 9085 a dependable insulator for electrical housings, connectors, insulating features and functional prototypes.

Dielectric constant is given at 1 kHz and 2 MHz in two print directions, and dissipation factor at both frequencies. Low values mean low dielectric losses in signal-sensitive or high-frequency parts.

PROPERTY	VALUE	TEST STANDARD
Volume Resistivity (molded)	**> 6.89×10^{15} Ω·cm**	ASTM D257
Dielectric Constant @ 1 kHz (XY / XZ)	**2.80 / 2.87**	ASTM D150
Dielectric Constant @ 2 MHz (XY / XZ)	**2.65 / 2.73**	ASTM D150
Dissipation Factor @ 1 kHz	**0.002**	ASTM D150
Dissipation Factor @ 2 MHz	**0.010**	ASTM D150
Dielectric Strength	**4.3–11.4 kV/mm**	ASTM D149, Method A

CHEMICAL PROPERTIES

ULTEM 9085 is rated on a relative scale for common chemical classes. It resists petroleum fuels, washer fluid, water and weak bases, and holds up well to aliphatic and aromatic hydrocarbons, alcohols, esters, motor oil, greases, coolant, weak acids and strong bases. Resistance is limited to ketones, strong acids, brake fluid and transmission fluid, while halogenated hydrocarbons and phenols attack it.

The ratings are relative and not based on specific testing, so treat them as screening guidance and confirm them with application-specific testing before production release.

CHEMICAL	RATING
Petroleum fuels	**Excellent**
Windshield washer fluid	**Excellent**
Weak bases (pH 8–10)	**Excellent**
Deionized water	**Excellent**
Aliphatic hydrocarbons	**Good**
Aromatic hydrocarbons	**Good**
Alcohol / ethanol	**Good**
Esters	**Good**
Motor oil	**Good**
Petroleum greases	**Good**
Silicone greases and oils	**Good**
Antifreeze / engine coolant	**Good**
Weak acids (pH 3–6)	**Good**
Strong bases (pH > 10)	**Good**
Ketones (MEK, acetone)	**Limited**
Strong acids (pH < 3)	**Limited**
Transmission fluid	**Limited**
Brake fluid	**Limited**

Halogenated hydrocarbons (CFCs)	**Poor**
Phenols	**Poor**

COMPLIANCE

Stratasys ULTEM 9085 is inherently flame retardant, with a UL 94 V-0 listing on its UL Blue Card. It is tested to the aircraft, rail and bus fire standards listed here, along with ASTM E595 outgassing; the tests show compliance with each tested standard, not certification, so aircraft and vehicle programs start their part qualification from this supplier data.

Stratasys ULTEM 9085 has no published biocompatibility or food-contact data; ULTEM 1010 carries those for its certified grade.

STANDARD	STATUS
UL 94 flammability UL Blue Card E345258: V-0 from 0.508 mm (horizontal build) and 1.016 mm (vertical build) at 0.254 mm layers	V-0
14 CFR 25.853 (FAR 25.853) 60 s and 12 s vertical burn, 15 s horizontal burn and heat release requirements met on F900-printed samples	Stratasys tested
BSS 7238 & BSS 7239 Smoke density and toxic gas emission requirements met (Boeing test methods)	Stratasys tested
AITM 2.0007B & AITM 3.0005 Smoke density and toxic gas emission requirements met (Airbus test methods)	Stratasys tested
ASTM E595 (Outgassing) TML 0.33–0.37% and CVCM ≤ 0.02% across tested natural and black samples	Stratasys tested
EN 45545-2 (Rail) R1, R6, R7, R17 HL2 at 1 mm and HL3 at 10 mm; R2, R3 HL3; R22, R23 to HL3 in thin XY sections	Stratasys tested
NFPA 130 (Transit) ASTM E162 flame spread index 0 at 12.7 mm; ASTM E662 smoke and ASTM E1354 heat release reported at 3 and 10 mm (certified grade)	Stratasys tested
UN ECE Regulation 118 (Buses) Horizontal burning, melting behaviour and vertical burn passed at 3 mm (certified grade, XY)	Stratasys tested

MANUFACTURING

Colours & finishes	**Natural tan or black; support removal, sanding, bead blasting, painting and machining**