

# Ultem™ 1010

## MATERIAL DATA SHEET

Ultem 1010 resin is a high-performance FDM thermoplastic offering excellent strength and thermal stability and the ability to withstand steam autoclaving. With food-contact and bio-compatibility certifications, ULTEM 1010 resin is perfect for specialized applications including food-production tools and custom devices. ULTEM 1010 resin offers the highest heat resistance chemical resistance and tensile strength of any FDM thermoplastic and is ideal for an out-of-cabin aerospace applications and under-the-hood automotive apps.

### Quick Facts:

- Highest heat resistance of any FDM
- Can withstand steam autoclaving
- Ideal for out-of-cabin aerospace applications

### Color options:

Natural



MECHANICAL PROPERTIES	TEST METHOD	ENGLISH		METRIC	
		XZ Axis	ZX Axis	XZ Axis	ZX Axis
Tensile Strength (Type 1, 0.125", 0.2"/min)	ASTM D638	11,735 psi	4,209 psi	81 MPa	29 MPa
Tensile Modulus (Type 1, 0.125", 0.2"/min)	ASTM D638	402,000 psi	325,000 psi	2,772 MPa	2,241 MPa
Tensile Elongation at Break (Type 1, 0.125", 0.2"/min)	ASTM D638	3.3%	1.3%	3.3%	1.3%
Tensile Elongation at Yield (Type 1, 0.125", 0.2"/min)	ASTM D638	2.2%	1.2%	2.2%	1.2%
Flexural Strength (Method 1, 0.05"/min)	ASTM D790	20,835 psi	11,184 psi	144 MPa	77 MPa

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MECHANICAL PROPERTIES (Continued)	TEST METHOD	ENGLISH		METRIC	
		XZ Axis	ZX Axis	XZ Axis	ZX Axis
Flexural Modulus (Method 1, 0.05"/min)	ASTM D790	409,000 psi	324,000 psi	2,820 MPa	2,234 MPa
Flexural Strain at Break (Method 1, 0.05"/min)	ASTM D790	No break	2.7%	No break	2.7%
IZOD Impact, notched (Method A, 23°C)	ASTM D256	0.8 ft-lb/in	.04 ft-lb/in	41 J/m	24 J/m
IZOD Impact un-notched (Method A, 23°C)	ASTM D256	6.1 ft-lb/in	2.6 ft-lb/in	327 J/m	138 J/m
Compressive Strength, Yield (Method 1, 0.05"/min)	ASTM D695	19,500 psi	15,100 psi	134 MPa	107 MPa
Compressive Strength, Ultimate (Method 1 0.5"/min)	ASTM D695	No break	15,500 psi	No break	1,125 MPa
Compressive Modulus (Method 1 0.05"/min)	ASTM D695	1,450,000 psi	305,000 psi	10,000 MPa	1,120 MPa

THERMAL PROPERTIES	TEST METHOD	ENGLISH	METRIC
Heat Deflection (HDT) @ 66 psi, 0.125" unannealed	ASTM D648	421°F	216°C
Heat Deflection (HDT) @264 psi, 0.125" unannealed	ASTM D648	415° F	213°C
Vicat Softening Temperature (Rate B/50)	ASTM D1525	416°F	214C
Glass Transition Temperature (Tg)	DSC (SSYS)	419°F	215°C
Coefficient of Thermal Expansion	ASTM E831	26x10-06 in (10 °F)	47µm (m °C)
Coefficient of Thermal Expansion (xflow)	ASTM E831	25x10-06 10 (10 °F)	41µm (m °C)
Melting Point	-----	Not Applicable	Not Applicable

ELECTRICAL PROPERTIES	TEST METHOD	VALUE RANGE
Volume Resistivity	ASTM D257	1.0x10-14 - 8.96x10-15 ohm-cm
Dielectric Constant	ASTM D150-98	2.67
Dissipation Factor	ASTM D150-98	.001
Dielectric Strength	ASTM D149-09, Method A	240 V/mil

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OTHER	TEST METHOD	VALUE
Specific Gravity	ASTM D792	1.27
Rockwell Hardness	ASTM D785	109
Flame Classification	UL94	V0 (1.5 mm), 5VA (3 mm)
UL File Number	-----	E345258
Food Safety Certification	NSF 51	Certified
Bio-compatibility Certification	ISO 10993/USP Class VI	Certified

BURN TESTING		
Horizontal Burn (15 sec)	14 CFR/FAR 25.853	Passed (.060" thick)
Vertical Burn (60 sec)	14 CFR/FAR 25.853	Passed (.060" thick)
Vertical Burn (12 sec)	14 CFR/FAR 25.853	Passed (.060" thick)
45° Ignition	14 CFR/FAR 25.853	Passed (.060" thick)
Heat Release	14 CFR/FAR 25.853	Passed (.060" thick)
NBS Smoke Density (flaming)	ASTM F814/E662	Passed (.060" thick)
NBS Smoke Density (non-flaming)	ASTM F814/E662	Passed (.060" thick)

**System Availability:**

Fortus 450m™

Fortus 900mc™