

# ULTEM®

(polyetherimide)

ULTEM® is an amorphous thermoplastic polyetherimide (PEI) material which combines exceptional mechanical, thermal, and electrical properties. Natural ULTEM®

1000 (unreinforced) is a translucent amber material. The addition of glass fiber reinforcement to the basic ULTEM®, coupled with Ensinger's proprietary extrusion techniques,

provides the ULTEM® with both greater tensile strength and rigidity while at the same time improving dimensional stability.

- **Excellent mechanical strength**  
ULTEM® exhibits high tensile strength at room temperature and retains a significant portion of this strength at elevated temperatures. Glass fibers further increase high-temperature strength.
- **Outstanding heat resistance**  
ULTEM® retains its physical properties at elevated temperatures.
- **Exceptional resistance to environmental forces**  
Environmental characteristics of ULTEM® include its stress resistance
- **Inherent flame resistance with low smoke evolution**
- **High mechanical strength**
- **High dielectric strength and stability**  
The high dielectric strength and constant values of ULTEM® make it an excellent electrical insulator UL 94 V-O
- **Low dissipation factor over a wide range of frequencies**
- **Excellent machinability and finishing characteristics**  
ULTEM® can be easily machined with conventional metalworking tools, painted, hot stamped, printed, or metallized.
- **Resin used in natural grade are FDA, USP Class VI and NSF compliant**

*ULTEM® has many applications in medical, electronic/electrical, microwave, automotive, and aircraft industries.*

# TYPICAL PROPERTY VALUES

PROPERTIES	ASTM Test Method	Units	ULTEM®*	ULTEM®** 10% Glass Reinforced	ULTEM®** 20% Glass Reinforced	ULTEM®** 30% Glass Reinforced	
<b>PHYSICAL</b>	Specific Gravity	D792	-	1.27	1.34	1.42	1.51
	Water Absorption, @24 hours, 73°F (23C)	D570	%	0.25	0.21	0.19	0.16
	@Equilibrium, 73°F (23C)			1.25	1.20	1.10	0.90
<b>MECHANICAL</b>	Tensile Strength, Break, 73°F	D638	psi	15,200	16,600	20,100	17,500
	Tensile Modulus, 73°F	D638	psi	430,000	650,000	1,000,000	900,000
	Elongation, Break, 73°F	D638	%	40	6	3	3
	Elongation, Yield, 73°F	D638	%	7-8	5	N/A	N/A
	Flexural Strength, 73°F	D790	psi	22,000	28,000	30,000	25,000
	Flexural Modulus, 73°F	D790	psi	480,000	650,000	900,000	750,000
	Izod Impact Strength, Notched, 73°F	D256	ft-lbs/in	1.0	1.1	1.6	1.1
	Rockwell Hardness	D785	"M" Scale	109	114	114	110
	Compressive Strength	D695	psi	21,900	22,000	28,700	30,700
	Compressive Modulus	D695	psi	480,000	541,000	809,000	938,000
	Shear Strength, Ultimate	-	psi	15,000	13,000	13,500	14,000
<b>THERMAL</b>	Deflection Temperature	D648	°F	-	-	-	-
	@ 66 psi, 1/4"	-	°F	410	410	410	414
	@264 psi, 1/4"	-	°F	394	405	408	410
	Coefficient of Thermal Expansion, Flow	D696	in/in-°F	$3.1 \times 10^{-5}$	$1.8 \times 10^{-5}$	$1.4 \times 10^{-5}$	$1.1 \times 10^{-5}$
	Vicat Softening Point	D1525	°F	426	-	-	-
	Thermal Conductivity	D2214	BTU-in/hr-ft <sup>2</sup> -°F	1.5	1.22	1.43	1.56
Flammability	UL94	-	V-0	V-0	V-0	V-0	
<b>ELECTRICAL</b>	Dielectric Strength, In Oil	D149	V/mil	710	700	670	630
	In Air	-	-	830	-	-	770
	Dielectric Constant,	D150	-	-	-	-	-
	1kHz, 50% RH	-	-	3.15	3.5	3.5	3.7
	Dissipation Factor	D150	-	-	-	-	-
	1kHz, 50% RH, 73°F (23°C)	-	-	0.0013	0.0014	0.0015	0.0015
Volume Resistivity, 1/16"	D257	ohm-cm	$1.0 \times 10^{17}$	$1.0 \times 10^{17}$	$7.0 \times 10^{16}$	$3.0 \times 10^{16}$	

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## MATERIAL AVAILABILITY

**Rods:** Diameters: 3/16" to 6"  
Length 3/16" to 4-3/4" - 10'  
5" to 6" - 5' (only natural material)

**Plates:** 1/4" to 4" thickness inclusive are 2' x 4'

## Primary Specification (Resin) (Typical)

**Ultem® Unreinforced** ASTM-D-5205 PEI0113  
**Ultem® 20% Glass Reinforced** ASTM-D-5205 PEI0110G20 A99269 159MPa, 7586MPa, 208C  
**Ultem® 30% Glass Reinforced** ASTM-D-5205 PEI0110G30 A96299 159MPa, 224MPa, 208C

*Profiles, tubes, and special sizes are custom-produced on request.*



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