

# 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 x 10 <sup>-5</sup>	1.8 x 10 <sup>-5</sup>	1.4 x 10 <sup>-5</sup>	1.1 x 10 <sup>-5</sup>
	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, 1kHz, 50% RH	D150	-	-	-	-	-
	Dissipation Factor, 1kHz, 50% RH, 73°F (23°C)	D150	-	3.15	3.5	3.5	3.7
	Volume Resistivity, 1/16"	D257	ohm-cm	0.0013	0.0014	0.0015	0.0015
				1.0 x 10 <sup>17</sup>	1.0 x 10 <sup>17</sup>	7.0 x 10 <sup>16</sup>	3.0 x 10 <sup>16</sup>

This information is only to assist and advise you on current technical knowledge and is given without obligation or liability. All trade and patent rights should be observed. All rights reserved. Data obtained from extruded shapes material. ULTEM® Sabic Innovative. \*Extruded. \*\*Injection Molded.

## 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.*



DISTRIBUTED BY

HEADQUARTERS  
365 Meadowlands Boulevard  
Washington, Pennsylvania 15301

**Telephone:** 800-243-3221 Sales  
800-869-4029 Technical  
**Fax:** 724-746-9209

e-mail: sales@ensinger-ind.com