



## ULTEM\*PEI

- High dielectric strength
- UL 94-V-0 rated with low smoke
- Available in glass-reinforced grades
- High strength and performs in continuous use to 340°F (170°C)

Ultem 1000 polyetherimide is an amorphous polymer offering high strength and excellent flame and heat resistance. It performs continuously to 340°F (170°C), making it ideal for high strength/ high heat applications, and those requiring consistent dielectric properties over a wide frequency range. It is hydrolysis resistant, highly resistant to acidic solutions and capable of withstanding repeated autoclaving cycles.

Ultem 2100, 2200 and 2300 are glass-reinforced versions (10, 20, and 30%, respectively) of Ultem 1000 which provide even greater rigidity and improved dimensional stability while maintaining many of the useful characteristics of basic Ultem. Ultem 1000 is FDA and USP Class VI compliant. FDA compliant colors of Ultem are also available on a custom basis.

Ultem commonly is machined into parts for reusable medical devices, analytical instrumentation, electrical/electronic insulators (including many semiconductor process components) and a variety of structural components requiring high strength and rigidity at elevated temperatures.

Port Plastics offers Ultem 1000 and Ultem 2300 as standard products, and will custom quote Ultem 2100, 2200 and specialty grades of Ultem.

### Proven Applications

#### Structural probes

Surgical probes machined from Ultem rod are autoclavable, and offer high strength and rigidity. *(Prior materials: Acetal, Polysulfone)*

#### Manifolds

In pharmaceutical process equipment, manifolds machined from Ultem plate offer resistance to hot chemical solutions and daily sanitizing. *(Prior material: Aluminum)*

#### Insulators

High frequency insulators used in microwave communications equipment are machined from Ultem stock shapes. *(Prior material: Ceramic)*

#### Clamps

High voltage and flame resistance of Ultem make it ideal for clamps used to connect printed circuit boards to video display units used in airplanes, tanks and ships. *(Prior material: Acetal)*

#### Engineering Notes:

Since Ultem is an amorphous material, selection of appropriate non-aromatic coolants during machining is important. Care must also be used in selecting adhesives and designing press fit components to avoid stress cracking.

Extruded	Rod	Disc	Plate	Tubular Bar	Other
Ultem* 1000 PEI	.125"- 6.0"	-	.250"-2.0" (A)	Quote on request	-
Ultem* 2300 PEI	.500"- 6.0"	-	.375"-2.0" (A)	-	-

Key: A = 12" wide x 24" long



# Ultem 1000 - Polyetherimide



		ULTEM 1000	ULTEM 2300
<b>MECHANICAL PROPERTIES</b>	<b>ASTM</b>	<b>VALUE</b>	<b>VALUE</b>
Specific Gravity	D792	1.28	1.51
Tensile Strength, psi	D638	16,500	17,000
Tensile Modulus, psi	D638	475,000	800,000
Elongation, %	D638	80	3
Flexural Strength, psi	D790	20,000	30,000
Flexural Modulus, psi	D790	500,000	900,000
Shear Strength, psi	D732	15,000	-
Compressive Strength, psi	D695, 10% Def.	22,000	32,000
Compressive Modulus, psi	D695	480,000	625,000
Hardness, Rockwell M	D785	112	114
Hardness, Rockwell R	D785	125	127
Izod Impact (Notched), ft-lb/in	D256 Type A	0.5	1
Coefficient of Friction, Dynamic	Dry vs. Steel,	0.42	-
Limiting PV, psi-fpm	PTM55010	1,875	1,000
k (wear) factor, 10-10in3-min/lb-ft-hr	PTM55010	999	999
<b>THERMAL PROPERTIES</b>			
Coefficient of Thermal Expansion,	E831 (TMA)	0.31	0.11
Deflection Temperature 264 psi, °F	D648	392	410
Tg-Glass Transition (Amorphous), °F	D3418	419	419
Continuous Service in Air (Max), °F	Without Load	340	340
Thermal Conductivity, BTU-in/hr-ft <sup>2</sup> -°F		0.9	-
<b>ELECTRICAL PROPERTIES</b>			
Dielectric Strength, Volts/mil	D149(2)	830	770
Volume Resistivity, Ohm-cm	D257	1E+15	1E+15
Dielectric Constant, 1 MHz	ASTM D150(2)	3.5	3.7
Dissipation Factor, 1 MHz	ASTM D150(2)	0.0013	0.0015
<b>CHEMICAL PROPERTIES</b>			
Water Absorption Immersion, %	24 hr	0.25	0.18
Water Absorption, %	Saturation	1.25	0.9
Acids, Weak (acetic, dilute HCl)		3	3
Acids, Strong (conc. HCl or sulfuric)		3	3
Alkalies, Weak (dilute NaOH)		2	2
Alkalies, Strong (conc. NaOH)		1	1
Hydrocarbons, Aromatic (toluene)		2	2
Hydrocarbons, Aliphatic (gasoline)		3	3
Ketones, Esters (acetone)		3	3
Ethers (diethyl ether, THF)		3	3
Chlorinated Solvents (methylene chloride)		1	1
Alcohols (methanol, anti-freeze)		3	3
Inorganic Salt Solutions (NaCl, KCl)		3	3
Continuous Sunlight		3	3
Steam		3	3
1= Unacceptable, 2= Limited Service, 3= Acceptable Service			
<b>COMPLIANCE</b>			
Flammability, UL94 (5=V-0; 4=V-1; 3=V-2; 1=HB) V-O UL94		5 (VO)	5 (VO)
FDA(1=Yes)		0 Compliant	0 Compliant
USDA(1=Yes)		0 Compliant	0 Compliant
NSF (1=Yes)		0 Compliant	0 Compliant
3A-Dairy (1=Yes)		0 Compliant	0 Compliant
Canada AG (1=Yes)		0 Compliant	0 Compliant
USPClass VI (1=Yes)		1 Not Compliant	1 Not Compliant