

**ULTEM\* 1000 Resin**GE Plastics - *Polyether Imide*

Unit System:

**Actions**[Legend \(Open\)](#)**General Information****Product Description**

Transparent, standard flow Polyetherimide (Tg 217C). ECO Conforming, UL94 V0 and 5VA listing. US FDA and EU Food Contact compliant, NSF 51 listing, ISO 10993 compliant in natural color.

**General**

Material Status	• Commercial: Active
Availability	• North America
Test Standards Available	• ASTM
Features	• Food Contact Acceptable
Agency Ratings	<ul style="list-style-type: none"> <li>• EU Eco</li> <li>• EU Food Contact, Unspecified Rating</li> <li>• FDA Food Contact, Unspecified Rating</li> <li>• ISO 10993</li> <li>• NSF 51</li> </ul>
Automotive Specifications	<ul style="list-style-type: none"> <li>• FORD WSK-M4D716-A</li> <li>• GM GMP.PEI.001</li> </ul>
Appearance	• Transparent
Forms	• Pellets
Processing Method	<ul style="list-style-type: none"> <li>• Extrusion Blow Molding</li> <li>• Injection Molding</li> </ul>
Multi-Point Data	<ul style="list-style-type: none"> <li>• Coefficient of Thermal Expansion vs. Temperature (ASTM E831)</li> <li>• Compressive Stress vs. Strain (ASTM D695)</li> <li>• Elastic Modulus vs Temperature (ASTM D4065)</li> <li>• Flexural DMA (ASTM D4065)</li> <li>• Instrumented Impact (Energy) (ASTM D3763)</li> <li>• Instrumented Impact (Load) (ASTM D3763)</li> <li>• Pressure-Volume-Temperature (PVT - Zoller Method)</li> <li>• Shear DMA (ASTM D4065)</li> <li>• Specific Heat vs. Temperature (ASTM D3417)</li> <li>• Tensile Creep (ASTM D2990)</li> <li>• Tensile Fatigue</li> <li>• Tensile Stress vs. Strain (ASTM D638)</li> <li>• Thermal Conductivity vs. Temperature (ASTM E1530)</li> <li>• Viscosity vs. Shear Rate (ASTM D3835)</li> </ul>

**ASTM and ISO Properties <sup>1</sup>**

Physical	Nominal Value Unit	Test Method
Density -Specific Gravity	1.27 sp gr 23/23°C	ASTM D792
Melt Mass-Flow Rate (MFR) (337°C/6.6 kg)	9.0 g/10 min	ASTM D1238
Mold Shrink, Linear-Flow (0.126 in)	0.0050 to 0.0070 in/in	ASTM D955
Water Absorption @ 24 hrs	0.25 %	ASTM D570

Water Absorption @ Equil (73 °F)	1.3 %	ASTM D570
<b>Mechanical</b>	<b>Nominal Value Unit</b>	<b>Test Method</b>
Tensile Modulus <sup>2</sup>	520000 psi	ASTM D638
Tensile Strength @ Yield <sup>3</sup>	16000 psi	ASTM D638
Tensile Elongation @ Yld <sup>3</sup>	7.0 %	ASTM D638
Tensile Elongation @ Brk <sup>3</sup>	60 %	ASTM D638
Flexural Modulus (3.94 in Span) <sup>4</sup>	510000 psi	ASTM D790
Flexural Strength @ Yield (3.94 in Span) <sup>4</sup>	24000 psi	ASTM D790
Poisson's Ratio	0.36	ASTM E132
Taber Abrasion Resistance (1000 Cycles) <sup>5</sup>	10.0 mg	ASTM D1044
<b>Impact</b>	<b>Nominal Value Unit</b>	<b>Test Method</b>
Notched Izod Impact (73 °F)	1.00 ft-lb/in	ASTM D256
Unnotched Izod Impact (73 °F)	25.0 ft-lb/in	ASTM D256
Reverse Notch Izod Impact (0.126 in)	25 ft-lb/in	ASTM D256
Gardner Impact (73 °F)	324 in-lb	ASTM D3029
<b>Hardness</b>	<b>Nominal Value Unit</b>	<b>Test Method</b>
Rockwell Hardness (M-Scale)	109	ASTM D785
<b>Thermal</b>	<b>Nominal Value Unit</b>	<b>Test Method</b>
DTUL @66psi - Unannealed (0.252 in)	410 °F	ASTM D648
DTUL @264psi - Unannealed (0.252 in)	394 °F	ASTM D648
Vicat Softening Point (Rate B, Loading 2 (50 N))	426 °F	ASTM D1525
CLTE, Flow (TMA) (-4 to 302°F (-20 to 150°C))	0.000031 in/in/°F	ASTM E831
CLTE, Transverse (TMA) (-4 to 302°F (-20 to 150°C))	0.000030 in/in/°F	ASTM E831
Thermal Conductivity	1.5 Btu-in/hr/ft <sup>2</sup> /°F	ASTM C177
<b>Electrical</b>	<b>Nominal Value Unit</b>	<b>Test Method</b>
Volume Resistivity	1.0E+17 ohm-cm	ASTM D257
Dielectric Strength		ASTM D149
(0.0630 in, in Air)	831 V/mil	
(0.0630 in, in Oil)	710 V/mil	
(0.126 in, in Oil)	500 V/mil	
Dielectric Constant		ASTM D150
(100 Hz)	3.150	
(1000 Hz)	3.150	
Dissipation Factor		ASTM D150
(100 Hz)	0.0015	
(1000 Hz)	0.0012	
(2E+9 Hz)	0.0025	
Arc Resistance (PLC) (Tungsten Electrode)	PLC 5	ASTM D495
<b>Flammability</b>	<b>Nominal Value Unit</b>	<b>Test Method</b>
Limiting Oxygen Index	47 %	ASTM D2863
<b>UL 746</b>	<b>Nominal Value Unit</b>	<b>Test Method</b>
RTI Str	338 °F	UL 746
RTI Imp	338 °F	UL 746
RTI Elec	338 °F	UL 746

Comparative Tracking Index (CTI) (PLC)	PLC 4	UL 746
High Voltage Arc Tracking Rate (HVTR) (PLC)	PLC 2	UL 746
Hot-wire Ignition (HWI) (PLC)	PLC 1	UL 746
High Amp Arc Ignition (HAI) (PLC)	PLC 3	UL 746

**Additional Properties**

The value listed as Poisson Ratio, ASTM E132, was tested in accordance with ASTM D638.

The value listed as Unnotched Izod Impact, ASTM D256, was tested in accordance with ASTM D4812.

CSA File No. (See File for Complete Listing): LS88480

NBS Smoke Density, ASTM E662, Flaming, Ds 4 min: 0.7

## Processing Information

Injection	Nominal Value	Unit
Drying Temperature	300	°F
Drying Time	4.0 to 6.0	hr
Drying Time, Maximum	24	hr
Suggested Max Moisture	0.020	%
Suggested Shot Size	40 to 60	%
Rear Temperature	630 to 750	°F
Middle Temperature	640 to 750	°F
Front Temperature	650 to 750	°F
Nozzle Temperature	650 to 750	°F
Processing (Melt) Temp	660 to 750	°F
Mold Temperature	275 to 325	°F
Back Pressure	50.0 to 100.0	psi
Screw Speed	40 to 70	rpm
Vent Depth	0.0010 to 0.0030	in

Extrusion	Nominal Value	Unit
Drying Temperature	280 to 300	°F
Drying Time	4.0 to 6.0	hr
Suggested Max Moisture	0.0100 to 0.020	%
Cylinder Zone 1 Temp.	615 to 660	°F
Cylinder Zone 2 Temp.	625 to 675	°F
Cylinder Zone 3 Temp.	625 to 675	°F
Cylinder Zone 4 Temp.	625 to 675	°F
Adapter Temperature	625 to 675	°F
Die Temperature	620 to 675	°F

**Extrusion Notes**

Extrusion Blow Molding Parameters:

-Drying Time (Cumulative): 24 hrs

-Head - Zone 6 - Top Temperature: 329 to 357°C

-Head - Zone 7 - Bottom Temperature: 329 to 357°C

-Melt Temperature (Parison): 321 to 357°C

-Mold Temperature: 66 to 177°C

-Screw Speed: 10 to 70 rpm

## Notes

<sup>1</sup> Typical properties: these are not to be construed as specifications.

2 0.20 in/min

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3 Type I, 0.20 in/min

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4 0.10 in/min

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5 1000 gm, CS-17 Wheel

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