ULTEM™ Resin HU1000

DESCRIPTION

ULTEM HU1000 resin is an unreinforced amorphous polyetherimide (PEI) resin that may a high glass transition temperature (Tg) of 217°C. The intended use for this material is in medical devices and pharmaceutical applications. The material is biocompatible (ISO 10993 or USP Class VI) and Healthcare management of change applies. The material may offer Steam-, Hydrogen Peroxide-, Gamma-, EtO-, UV-C- and E-beam resistance for repeated sterilization cycles. Features are excellent mechanical, electrical and dimensional properties up to high temperatures. The material may offer very good chemical resistance for an amorphous material and is inherently flame retardant offering UL94 V0 and 5V ratings. The material is RoHS compliant. The base material is transparent amber colored but is also available in custom colors - transparent and opaque.

This material is food contact compliant in most jurisdictions – exceptions may exist, request a declaration for details.

ISCC+ certified renewable bio-based solutions are available for this grade via differentiated color nomenclature.

GENERAL INFORMATION	
Features	Flame Retardant, Chemical Resistance, Hydrolytic Stability, Low Warpage, Amorphous, Low Shrinkage, IR Transparent, Low Moisture Absorption, UV-C resistant, Bio-Renewable, Transparent/Translucent, Biocompatability-ISO10993, Food contact, Healthcare/Formula lock, Non Cl/Br flame retardant, Non halogenated flame retardant, Autoclave/Steam sterilizable, Creep resistant, Dimensional stability, High stiffness/Strength, High temperature resistance, Sterilizable, No PFAS intentionally added, Additive Manufacturing
Fillers	Unreinforced
Polymer Types	Polyetherimide (PEI)
Processing Techniques	Additive manufacturing, Extrusion Blow Molding, Film Extrusion, Injection Molding, Profile Extrusion, Extrusion, Extrusion compounding, Compression molding, Injection compression molding, Foam Extrusion

INDUSTRY	SUB INDUSTRY
Hygiene and Healthcare	Pharmaceutical Packaging and Drug Delivery, Surgical devices, General Healthcare, Patient Testing

TYPICAL PROPERTY VALUES

Revision 20260507

PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
MECHANICAL [1]			
Tensile Stress, yield, 50 mm/min	110	MPa	ISO 527
Tensile Strain, yield, 50 mm/min	6	%	ISO 527
Tensile Strain, break, 50 mm/min	50	%	ISO 527
Tensile Modulus, 1 mm/min	3200	MPa	ISO 527
Flexural Stress, yield, 2 mm/min	160	MPa	ISO 178
Flexural Modulus, 2 mm/min	3300	MPa	ISO 178
Ball Indentation Hardness, H358/30	140	MPa	ISO 2039-1
Hardness, Rockwell M	106	-	ISO 2039-2
Tensile Stress, yld, Type I, 50 mm/min	115	MPa	ASTM D638
Tensile Strain, yld, Type I, 50 mm/min	7	%	ASTM D638
Tensile Strain, brk, Type I, 50 mm/min	60	%	ASTM D638
Tensile Stress, yld, Type I, 5 mm/min	110	MPa	ASTM D638
Tensile Strain, yld, Type I, 5 mm/min	7	%	ASTM D638
Tensile Strain, brk, Type I, 5 mm/min	60	%	ASTM D638
Tensile Modulus, 5 mm/min	3350	MPa	ASTM D638

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PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
Flexural Stress, yld, 1.3 mm/min, 50 mm span	165	MPa	ASTM D790
Flexural Modulus, 1.3 mm/min, 50 mm span	3200	MPa	ASTM D790
Flexural Stress, yld, 2.6 mm/min, 100 mm span	160	MPa	ASTM D790
Flexural Modulus, 2.6 mm/min, 100 mm span	3400	MPa	ASTM D790
Hardness, Rockwell M	109	-	ASTM D785
Taber Abrasion, CS-17, 1 kg	10	mg/1000cy	ASTM D1044
IMPACT [1]			
Izod Impact, Unnotched			
80*10*4 +23°C	NB	kJ/m²	ISO 180/1U
80*10*4 -30°C	NB	kJ/m²	ISO 180/1U
23°C	1800	J/m	ASTM D4812
-30°C	1540	J/m	ASTM D4812
Izod impact, notched			
80*10*4 +23°C	6	kJ/m²	ISO 180/1A
80*10*4 -30°C	6	kJ/m²	ISO 180/1A
23°C	53	J/m	ASTM D256
-30°C	50	J/m	ASTM D256
Charpy 23°C, V-notch Edgew 80*10*4 sp=62mm	4	kJ/m²	ISO 179/1eA
Charpy -30°C, V-notch Edgew 80*10*4 sp=62mm	4	kJ/m²	ISO 179/1eA
Izod Impact, Reverse Notched, 3.2 mm	1335	J/m	ASTM D256
Gardner, 23°C	36	J	ASTM D3029
THERMAL [1]			
HDT/Bf, 0.45 MPa Flatw 80*10*4 sp=64mm	209	°C	ISO 75/Bf
HDT/Af, 1.8 MPa Flatw 80*10*4 sp=64mm	192	°C	ISO 75/Af
Vicat Softening Temp, Rate A/50	215	°C	ISO 306
Vicat Softening Temp, Rate B/50	211	°C	ISO 306
Vicat Softening Temp, Rate B/120	212	°C	ISO 306
CTE, -40°C to 150°C, flow	5.2E-05	1/°C	ISO 11359-2
CTE, -40°C to 150°C, xflow	5.2E-05	1/°C	ISO 11359-2
Ball Pressure Test, 125°C +/- 2°C	PASS	-	IEC 60695-10-2
Thermal Conductivity	0.22	W/m-°C	ISO 8302
HDT, 0.45 MPa, 6.4 mm, unannealed	210	°C	ASTM D648
HDT, 1.82 MPa, 6.4 mm, unannealed	201	°C	ASTM D648
HDT, 0.45 MPa, 3.2 mm, unannealed	207	°C	ASTM D648
HDT, 1.82 MPa, 3.2mm, unannealed	190	°C	ASTM D648
Vicat Softening Temp, Rate B/50	211	°C	ASTM D1525
CTE, -20°C to 150°C, flow	5.2E-05	1/°C	ASTM E831
CTE, -20°C to 150°C, xflow	5.2E-05	1/°C	ASTM E831
Thermal Conductivity	0.22	W/m-°C	ASTM C177
Relative Temp Index, Elec [2]	170	°C	UL 746B
Relative Temp Index, Mech w/impact [2]	170	°C	UL 746B
Relative Temp Index, Mech w/o impact [2]	170	°C	UL 746B
PHYSICAL [1]			
Density	1.27	g/cm³	ISO 1183
Moisture Absorption, (23°C/50% RH/24hrs)	0.2	%	ISO 62-4

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PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
Moisture Absorption, (23°C/50% RH/Equilibrium)	0.7	%	ISO 62-4
Water Absorption, (23°C/24hrs)	0.25	%	ISO 62-1
Water Absorption, (23°C/saturated)	1.25	%	ISO 62-1
Melt Volume Rate			
360°C/5.0 kg	13	cm³/10 min	ISO 1133
Specific Gravity	1.27	-	ASTM D792
Water Absorption, (23°C/24hrs)	0.25	%	ASTM D570
Water Absorption, (23°C/Saturated)	1.25	%	ASTM D570
Melt Flow Rate			
337°C/6.6 kgf	9	g/10 min	ASTM D1238
Poisson's Ratio	0.36	-	ASTM E132
Mold Shrinkage, flow, 3.2 mm [3]	0.5 – 0.7	%	SABIC method
Mold Shrinkage, xflow, 3.2 mm [3]	0.5 – 0.7	%	SABIC method
ELECTRICAL [1]			
Volume Resistivity	1.E+15	Ω.cm	IEC 60093
Surface Resistivity, ROA	>1.E+15	Ω	IEC 60093
Dielectric Strength, in oil, 0.8 mm	33	kV/mm	IEC 60243-1
Dielectric Strength, in oil, 1.6 mm	25	kV/mm	IEC 60243-1
Dielectric Strength, in oil, 3.2 mm	16	kV/mm	IEC 60243-1
Relative Permittivity, 1 MHz	2.9	-	IEC 60250
Dissipation Factor			
50/60 Hz	0.0005	-	IEC 60250
1 MHz	0.006	-	IEC 60250
at 1.1 GHz [4]	0.0012	-	-
at 5 GHz [4]	0.0024	-	-
at 10 GHz [4]	0.0027	-	-
100 Hz	0.0015	-	ASTM D150
1 kHz	0.0012	-	ASTM D150
Relative Permittivity, 50/60 Hz	2.9	-	IEC 60250
Dielectric Constant			
at 1.1 GHz [4]	3.01	-	-
at 5 GHz [4]	3.02	-	-
at 10 GHz [4]	3.02	-	-
Comparative Tracking Index [5]	150	V	IEC 60112
Comparative Tracking Index, M [5]	100	V	IEC 60112
Volume Resistivity	1.E+17	Ω.cm	ASTM D257
Dielectric Strength, in air, 1.6 mm	32.7	kV/mm	ASTM D149
Dielectric Strength, in oil, 1.6 mm	28.0	kV/mm	ASTM D149
Dielectric Strength, in oil, 3.2 mm	19.7	kV/mm	ASTM D149
Relative Permittivity, 100 Hz	3.15	-	ASTM D150
Relative Permittivity, 1 kHz	3.15	-	ASTM D150
Comparative Tracking Index (UL) {PLC} [2]	4	PLC Code	UL 746A
Hot-Wire Ignition (HWI), PLC 1 [2]	≥3	mm	UL 746A
Hot-Wire Ignition (HWI), PLC 2 [2]	≥0.75	mm	UL 746A
High Amp Arc Ignition (HAI), PLC 3 [2]	≥3	mm	UL 746A

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PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
High Amp Arc Ignition (HAI), PLC 4 [2]	≥0.75	mm	UL 746A
High Voltage Arc Track Rate {PLC} [2]	2	PLC Code	UL 746A
Arc Resistance, Tungsten {PLC} [2]	5	PLC Code	ASTM D495
FLAME CHARACTERISTICS [2]			
UL Yellow Card Link	E121562-100044765	-	-
UL Recognized, 94-5VA Flame Class Rating	≥3	mm	UL 94
UL Recognized, 94V-0 Flame Class Rating	≥0.75	mm	UL 94
UL Recognized, 94V-2 Flame Class Rating	≥0.4	mm	UL 94
Oxygen Index (LOI)	47	%	ASTM D2863
Oxygen Index (LOI)	47	%	ISO 4589
NBS Smoke Density, Flaming, Ds 4 min	0.7	-	ASTM E662
INJECTION MOLDING [6]			
Drying Temperature	150	°C	
Drying Time	4 – 6	Hrs	
Drying Time (Cumulative)	24	Hrs	
Maximum Moisture Content	0.02	%	
Melt Temperature	350 – 410	°C	
Nozzle Temperature	345 – 405	°C	
Front - Zone 3 Temperature	345 – 415	°C	
Middle - Zone 2 Temperature	340 – 405	°C	
Rear - Zone 1 Temperature	330 – 400	°C	
Mold Temperature	135 – 180	°C	
Back Pressure	0.3 – 0.7	MPa	
Screw speed (Circumferential speed)	0.2 – 0.3	m/s	
Shot to Cylinder Size	40 – 60	%	
Vent Depth	0.025 – 0.076	mm	
EXTRUSION BLOW MOLDING			
Drying Temperature	140 – 150	°C	
Drying Time	4 – 6	Hrs	
Drying Time (Cumulative)	24	Hrs	
Maximum Moisture Content	0.01 – 0.02	%	
Melt Temperature (Parison)	320 – 355	°C	
Barrel - Zone 1 Temperature	325 – 350	°C	
Barrel - Zone 2 Temperature	330 – 355	°C	
Barrel - Zone 3 Temperature	330 – 355	°C	
Barrel - Zone 4 Temperature	330 – 355	°C	
Adapter - Zone 5 Temperature	330 – 355	°C	
Head - Zone 6 - Top Temperature	330 – 355	°C	
Head - Zone 7 - Bottom Temperature	330 – 355	°C	
Screw Speed	10 – 70	rpm	
Mold Temperature	65 – 175	°C	
Die Temperature	325 – 355	°C	

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(1) The information stated on Technical Datasheets should be used as indicative only for material selection purposes and not be utilized as specification or used for part or tool design.
(2) UL Ratings shown on the technical datasheet might not cover the full range of thicknesses and colors. For details, please see the UL Yellow Card.
(3) Measurements made from laboratory test coupon. Actual shrinkage may vary outside of range due to differences in processing conditions, equipment, part geometry and tool design. It is recommended that mold shrinkage studies be performed with surrogate or legacy tooling prior to cutting tools for new molded article.
(4) Based on SPDR testing technique on dry as molded specimens.
(5) Value shown here is based on internal measurement.
(6) Injection Molding parameters are only mentioned as general guidelines. These may not apply or may need adjustment in specific situations such as low shot sizes, large part molding, thin wall molding and gas-assist molding.

MORE INFORMATION

For curve data and CAE cards, please visit and register at https://materialfinder.sabic-specialties.com

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