NORYL™ RESIN HS2000X

REGION AMERICAS

DESCRIPTION

NORYL™ HS2000X resin is a 17% mineral reinforced blend of polyphenylene ether (PPE) + high impact polystyrene (HIPS). This injection moldable grade contains non-brominated, non-chlorinated flame retardant and carries a UL94 flame rating of 5VA at 2mm and V0 at 1.5m along with UL746C Outdoor Suitability rating of F1. NORYL HS2000X resin exhibits strong electrical performance, dimensional stability, very low moisture absorption, and hydrolytic stability. This material is an excellent candidate for electronic / electrical indoor and outdoor applications including air conditioner parts, smoke detector covers, pool + spa pump parts and housings.

TYPICAL PROPERTY VALUES

Revision 20190717

PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
MECHANICAL			
Tensile Stress, yld, Type I, 5 mm/min	74	MPa	ASTM D 638
Tensile Stress, brk, Type I, 5 mm/min	60	MPa	ASTM D 638
Tensile Strain, yield	3.8	%	ASTM D 638
Tensile Strain, brk, Type I, 5 mm/min	8.4	%	ASTM D 638
Tensile Modulus, 5 mm/min	3650	MPa	ASTM D 638
Flexural Stress, brk, 1.3 mm/min, 50 mm span	117	MPa	ASTM D 790
Flexural Stress, yld, 2.6 mm/min, 100 mm span	117	MPa	ASTM D 790
Flexural Modulus, 1.3 mm/min, 50 mm span	3670	MPa	ASTM D 790
Flexural Modulus, 2.6 mm/min, 100 mm span	3550	MPa	ASTM D 790
Tensile Stress, yield	71	MPa	ISO 527
Tensile Stress, break	57	MPa	ISO 527
Tensile Strain, yield	3.7	%	ISO 527
Tensile Strain, break	10.5	%	ISO 527
Tensile Modulus, 1 mm/min	4000	MPa	ISO 527
Flexural Stress	117	MPa	ISO 178
Flexural Modulus	3800	MPa	ISO 178
IMPACT			
Izod Impact, unnotched, 23°C	2230	J/m	ASTM D 4812
Izod Impact, notched, 23°C	131	J/m	ASTM D 256
Izod Impact, Reverse Notched, 3.2 mm	811	J/m	ASTM D 256
Instrumented Impact Total Energy, 23°C	443	J	ASTM D 3763
Izod Impact, notched 80*10*4 +23°C	9	kJ/m²	ISO 180/1A
Charpy Impact, notched, 23°C	10	kJ/m²	ISO 179/2C
THERMAL			
HDT, 0.45 MPa, 3.2 mm, unannealed	117	°C	ASTM D 648
HDT, 1.82 MPa, 3.2mm, unannealed	108	°C	ASTM D 648
HDT, 0.45 MPa, 6.4 mm, unannealed	128	°C	ASTM D 648
HDT, 1.82 MPa, 6.4 mm, unannealed	116	°C	ASTM D 648
CTE, -40°C to 40°C, flow	7.06E-05	1/°C	ASTM E 831
CTE, -40°C to 40°C, xflow	7.76E-05	1/°C	ASTM E 831
Vicat Softening Temp, Rate B/50	132	°C	ISO 306
Vicat Softening Temp, Rate B/120	136	°C	ISO 306

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HDT/Be, 0.45MPa Edgew 120*10*4 sp=100mm	126	°C	ISO 75/Be
HDT/Ae, 1.8 MPa Edgew 120*10*4 sp=100mm	111	°C	ISO 75/Ae
Relative Temp Index, Elec [1]	100	°C	UL 746B
Relative Temp Index, Mech w/impact [1]	85	°C	UL 746B
Relative Temp Index, Mech w/o impact [1]	100	°C	UL 746B
PHYSICAL			
Specific Gravity	1.25	-	ASTM D 792
Mold Shrinkage, flow, 3.2 mm	0.5 – 0.7	%	SABIC method
Melt Flow Rate, 280°C/5.0 kgf	7.6	g/10 min	ASTM D 1238
Melt Flow Rate, 300°C/5.0 kgf	7.6	g/10 min	ASTM D 1238
Melt Volume Rate, MVR at 280°C/5.0 kg	6	cm³/10 min	ISO 1133
Melt Volume Rate, MVR at 300°C/5.0 kg	6	cm³/10 min	ISO 1133
ELECTRICAL			
Volume Resistivity	1.2E+16	Ohm-cm	ASTM D 257
Surface Resistivity	>1.E+16	Ohm	ASTM D 257
Dielectric Strength, in oil, 3.2 mm	17.3	kV/mm	ASTM D 149
Relative Permittivity, 50/60 Hz	2.89	-	ASTM D 150
Relative Permittivity, 1 MHz	2.7	-	ASTM D 150
Dissipation Factor, 50/60 Hz	0.017	-	ASTM D 150
Dissipation Factor, 1 MHz	0.0044	-	ASTM D 150
High Voltage Arc Track Rate {PLC}	3	PLC Code	UL 746A
Comparative Tracking Index (UL) {PLC}	2	PLC Code	UL 746A
High Amp Arc Ignition (HAI), PLC 2	≥3	mm	UL 746A
High Amp Arc Ignition (HAI), PLC 3	≥1.5	mm	UL 746A
Hot-Wire Ignition (HWI), PLC 0	≥1.5	mm	UL 746A
Arc Resistance, Tungsten {PLC}	6	PLC Code	ASTM D 495
FLAME CHARACTERISTICS [1]			
UL Yellow Card Link	E121562-221170	-	-
UL Recognized, 94-5VA Flame Class Rating	≥2	mm	UL 94
UL Recognized, 94V-0 Flame Class Rating	≥1.5	mm	UL 94
Radiant Panel Listing	☑	-	UL Tested
Glow Wire Flammability Index, 1.0 mm	960	°C	IEC 60695-2-12
Glow Wire Flammability Index, 2.0 mm	960	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3.0 mm	960	°C	IEC 60695-2-12
Glow Wire Ignitability Temperature, 1.0 mm	850	°C	IEC 60695-2-13
Glow Wire Ignitability Temperature, 2.0 mm	800	°C	IEC 60695-2-13
Glow Wire Ignitability Temperature, 3.0 mm	800	°C	IEC 60695-2-13
UV-light, water exposure/immersion	F1	-	UL 746C
INJECTION MOLDING			
Drying Temperature	105 – 110	°C	
Drying Time	3 – 4	hrs	
Drying Time (Cumulative)	8	hrs	
Maximum Moisture Content	0.02	%	
Melt Temperature	280 – 310	°C	
Nozzle Temperature	280 – 310	°C	

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PROPERTIES	TYPICAL VALUES	UNITS	TEST METHODS
Front - Zone 3 Temperature	270 – 310	°C	
Middle - Zone 2 Temperature	260 – 305	°C	
Rear - Zone 1 Temperature	250 – 300	°C	
Mold Temperature	75 – 105	°C	
Back Pressure	0.3 – 0.7	MPa	
Screw Speed	20 – 100	rpm	
Shot to Cylinder Size	30 – 70	%	

(1) 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.

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