

NORYL™ RESIN SE1X

REGION AMERICAS

DESCRIPTION

NORYL™ SE1X resin is a non-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 V0/V1 at 1.5mm along with a UL746C Outdoor Suitability rating of F1. NORYL SE1X resin offers strong electrical performance, low moisture absorption, dimensional stability, and hydrolytic stability. This material is an excellent candidate for indoor and outdoor electrical enclosures, heating ventilation / air conditioning (HVAC) applications, and solar / photovoltaic (PV) junction box applications. *for enhanced processing version, please see NORYL NH5120 resin grade.

TYPICAL PROPERTY VALUES

Revision 20200316

| PROPERTIES | TYPICAL VALUES | UNITS | TEST METHODS |
|---|----------------|-------------------|--------------|
| MECHANICAL | | | |
| Tensile Stress, yld, Type I, 50 mm/min | 65 | MPa | ASTM D 638 |
| Tensile Stress, brk, Type I, 50 mm/min | 53 | MPa | ASTM D 638 |
| Tensile Strain, yld, Type I, 50 mm/min | 4 | % | ASTM D 638 |
| Tensile Strain, brk, Type I, 50 mm/min | 15 | % | ASTM D 638 |
| Tensile Modulus, 50 mm/min | 2500 | MPa | ASTM D 638 |
| Flexural Stress, yld, 1.3 mm/min, 50 mm span | 100 | MPa | ASTM D 790 |
| Flexural Stress, yld, 2.6 mm/min, 100 mm span | 100 | MPa | ASTM D 790 |
| Flexural Modulus, 1.3 mm/min, 50 mm span | 2700 | MPa | ASTM D 790 |
| Flexural Modulus, 2.6 mm/min, 100 mm span | 2400 | MPa | ASTM D 790 |
| Tensile Stress, yield, 50 mm/min | 61 | MPa | ISO 527 |
| Tensile Stress, break, 50 mm/min | 50 | MPa | ISO 527 |
| Tensile Strain, yield, 50 mm/min | 4.3 | % | ISO 527 |
| Tensile Strain, break, 50 mm/min | 20.7 | % | ISO 527 |
| Tensile Modulus, 1 mm/min | 2670 | MPa | ISO 527 |
| Flexural Stress, yield, 2 mm/min | 99 | MPa | ISO 178 |
| Flexural Modulus, 2 mm/min | 2560 | MPa | ISO 178 |
| IMPACT | | | |
| Izod Impact, unnotched, 23°C | 2600 | J/m | ASTM D 4812 |
| Izod Impact, notched, 23°C | 180 | J/m | ASTM D 256 |
| Izod Impact, notched, -30°C | 106 | J/m | ASTM D 256 |
| Instrumented Impact Total Energy, 23°C | 49 | J | ASTM D 3763 |
| Izod Impact, notched 80*10*4 +23°C | 14 | kJ/m ² | ISO 180/1A |
| THERMAL | | | |
| HDT, 0.45 MPa, 3.2 mm, unannealed | 126 | °C | ASTM D 648 |
| HDT, 1.82 MPa, 3.2mm, unannealed | 112 | °C | ASTM D 648 |
| HDT, 0.45 MPa, 6.4 mm, unannealed | 126 | °C | ASTM D 648 |
| HDT, 1.82 MPa, 6.4 mm, unannealed | 118 | °C | ASTM D 648 |
| CTE, -40°C to 40°C, flow | 8.04E-05 | 1/°C | ASTM E 831 |
| CTE, -40°C to 40°C, xflow | 8.81E-05 | 1/°C | ASTM E 831 |
| Vicat Softening Temp, Rate B/50 | 132 | °C | ISO 306 |
| Vicat Softening Temp, Rate B/120 | 135 | °C | ISO 306 |
| HDT/Be, 0.45MPa Edgew 120*10*4 sp=100mm | 129 | °C | ISO 75/Be |

| PROPERTIES | TYPICAL VALUES | UNITS | TEST METHODS |
|---|-----------------------------------|-------------------------|----------------|
| HDT/Ae, 1.8 MPa Edgew 120*10*4 sp=100mm | 115 | °C | ISO 75/Ae |
| Relative Temp Index, Elec ⁽¹⁾ | 110 | °C | UL 746B |
| Relative Temp Index, Mech w/impact ⁽¹⁾ | 105 | °C | UL 746B |
| Relative Temp Index, Mech w/o impact ⁽¹⁾ | 110 | °C | UL 746B |
| PHYSICAL | | | |
| Specific Gravity | 1.1 | - | ASTM D 792 |
| Water Absorption, 24 hours | 0.06 | % | ASTM D 570 |
| Mold Shrinkage, flow, 3.2 mm | 0.5 – 0.7 | % | SABIC method |
| Mold Shrinkage on Tensile Bar, xflow | 0.5 – 0.7 | % | SABIC method |
| Melt Flow Rate, 280°C/5.0 kgf | 8.5 | g/10 min | ASTM D 1238 |
| Melt Volume Rate, MVR at 280°C/5.0 kg | 8 | cm ³ /10 min | ISO 1133 |
| ELECTRICAL | | | |
| Volume Resistivity | 2.3E+16 | Ohm-cm | ASTM D 257 |
| Surface Resistivity | >1.E+15 | Ohm | ASTM D 257 |
| Dielectric Strength, in oil, 3.2 mm | 18.1 | kV/mm | ASTM D 149 |
| Relative Permittivity, 50/60 Hz | 2.52 | - | ASTM D 150 |
| Relative Permittivity, 1 MHz | 2.46 | - | ASTM D 150 |
| Dissipation Factor, 50/60 Hz | 0.0034 | - | ASTM D 150 |
| Dissipation Factor, 1 MHz | 0.0021 | - | ASTM D 150 |
| High Voltage Arc Track Rate {PLC} | 4 | PLC Code | UL 746A |
| Comparative Tracking Index (UL) {PLC} | 1 | PLC Code | UL 746A |
| High Amp Arc Ignition (HAI), PLC 0 | ≥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 | E121562-100107130 | - | - |
| UL Recognized, 94V-0 Flame Class Rating | ≥6 | mm | UL 94 |
| UL Recognized, 94V-1 Flame Class Rating | ≥1.5 | mm | UL 94 |
| Glow Wire Flammability Index, 1.0 mm | 900 | °C | IEC 60695-2-12 |
| Glow Wire Flammability Index, 1.5 mm | 900 | °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 | 700 | °C | IEC 60695-2-13 |
| Glow Wire Ignitability Temperature, 1.5 mm | 700 | °C | IEC 60695-2-13 |
| Glow Wire Ignitability Temperature, 2.0 mm | 725 | °C | IEC 60695-2-13 |
| Glow Wire Ignitability Temperature, 3.0 mm | 725 | °C | IEC 60695-2-13 |
| Radiant Panel Listing | RP100 | - | UL Tested |
| 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 | |

| 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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