# NORYL™ RESIN SE1GFN2

REGION ASIA

## DESCRIPTION

NORYL™ SE1GFN2 resin is a 20% glass 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 V1 at 1.5mm along with UL746C Outdoor Suitability rating of F1 and RTI of 110C. NORYL SE1GFN2 exhibits high heat resistance, good dielectric strength, dimensional stability, hydrolytic stability, and very low moisture absorption. This material is an excellent candidate for a variety of applications such as solar frames, unattended power supply (UPS) inverter/charger, indoor and outdoor electrical enclosures / housings / connectors, and wall plates / sockets / switches.

## TYPICAL PROPERTY VALUES

Revision 20190717

| PROPERTIES | TYPICAL VALUES | UNITS | TEST METHODS |
|---|---|---|---|
| MECHANICAL | | | |
| Tensile Stress, brk, Type I, 50 mm/min | 120 | MPa | ASTM D 638 |
| Tensile Strain, brk, Type I, 50 mm/min | 3 | % | ASTM D 638 |
| Tensile Modulus, 5 mm/min | 7100 | MPa | ASTM D 638 |
| Flexural Stress, yld, 1.3 mm/min, 50 mm span | 140 | MPa | ASTM D 790 |
| Flexural Modulus, 1.3 mm/min, 50 mm span | 5500 | MPa | ASTM D 790 |
| Tensile Stress, break, 50 mm/min | 100 | MPa | ISO 527 |
| Tensile Strain, break, 50 mm/min | 2.5 | % | ISO 527 |
| Tensile Modulus, 1 mm/min | 6400 | MPa | ISO 527 |
| Flexural Stress, yield, 2 mm/min | 150 | MPa | ISO 178 |
| Flexural Modulus, 2 mm/min | 5600 | MPa | ISO 178 |
| IMPACT | | | |
| Izod Impact, unnotched, 23°C | 520 | J/m | ASTM D 4812 |
| Izod Impact, notched, 23°C | 100 | J/m | ASTM D 256 |
| Izod Impact, notched, -30°C | 90 | J/m | ASTM D 256 |
| Instrumented Impact Total Energy, 23°C | 18 | J | ASTM D 3763 |
| Izod Impact, unnotched 80*10*4 +23°C | 28 | kJ/m² | ISO 180/1U |
| Izod Impact, unnotched 80*10*4 -30°C | 27 | kJ/m² | ISO 180/1U |
| Izod Impact, notched 80*10*4 +23°C | 9 | kJ/m² | ISO 180/1A |
| Izod Impact, notched 80*10*4 -30°C | 8 | kJ/m² | ISO 180/1A |
| Charpy Impact, notched, 23°C | 7 | kJ/m² | ISO 179/2C |
| THERMAL | | | |
| Vicat Softening Temp, Rate B/50 | 142 | °C | ASTM D 1525 |
| HDT, 0.45 MPa, 3.2 mm, unannealed | 142 | °C | ASTM D 648 |
| HDT, 1.82 MPa, 3.2mm, unannealed | 134 | °C | ASTM D 648 |
| CTE, -40°C to 40°C, flow | 2.5E-05 | 1/°C | ASTM E 831 |
| CTE, -40°C to 40°C, xflow | 7.5E-05 | 1/°C | ASTM E 831 |
| CTE, -40°C to 40°C, flow | 3.E-05 | 1/°C | ISO 11359-2 |
| CTE, -40°C to 40°C, xflow | 7.5E-05 | 1/°C | ISO 11359-2 |
| Vicat Softening Temp, Rate B/50 | 142 | °C | ISO 306 |
| Vicat Softening Temp, Rate B/120 | 144 | °C | ISO 306 |
| HDT/Af, 1.8 MPa Flatw 80*10*4 sp=64mm | 133 | °C | ISO 75/Af |
| Relative Temp Index, Elec [1] | 110 | °C | UL 746B |

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| PROPERTIES | TYPICAL VALUES | UNITS | TEST METHODS |
|---|---|---|---|
| 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 | 1.23 | - | ASTM D 792 |
| Mold Shrinkage, flow, 3.2 mm | 0.2 – 0.5 | % | SABIC method |
| Melt Flow Rate, 280°C/5.0 kgf | 3.5 | g/10 min | ASTM D 1238 |
| Water Absorption, 23°C/24hrs | 0.11 | % | ISO 62-1 |
| Moisture Absorption, 50% RH, Equilibrium | 0.04 | % | ISO 62-4 |
| Melt Volume Rate, MVR at 280°C/5.0 kg | 3 | cm³/10 min | ISO 1133 |
| ELECTRICAL | | | |
| Volume Resistivity | 2.04E+16 | Ohm-cm | ASTM D 257 |
| Surface Resistivity | 1.34E+17 | Ohm | ASTM D 257 |
| Dielectric Strength, in oil, 1.6 mm | 26.2 | kV/mm | ASTM D 149 |
| Relative Permittivity, 1 MHz | 2.93 | - | ASTM D 150 |
| Dissipation Factor, 1 MHz | 0.0034 | - | ASTM D 150 |
| Volume Resistivity | 2.04E+16 | Ohm-cm | IEC 60093 |
| Surface Resistivity, ROA | 1.34E+17 | Ohm | IEC 60093 |
| Dielectric Strength in oil, 1.5mm | 26.2 | kV/mm | IEC 60243-1 |
| Relative Permittivity, 1 MHz | 2.9 | - | IEC 60250 |
| Dissipation Factor, 1 MHz | 0.0034 | - | IEC 60250 |
| Comparative Tracking Index (UL) {PLC} | 2 | PLC Code | UL 746A |
| High Voltage Arc Track Rate {PLC} | 4 | PLC Code | UL 746A |
| High Amp Arc Ignition (HAI), PLC 2 | ≥1.5 | mm | UL 746A |
| High Amp Arc Ignition (HAI), PLC 4 | ≥0.4 | mm | UL 746A |
| Hot-Wire Ignition (HWI), PLC 0 | ≥0.71 | mm | UL 746A |
| Hot-Wire Ignition (HWI), PLC 2 | ≥0.4 | mm | UL 746A |
| FLAME CHARACTERISTICS [1] | | | |
| UL Yellow Card Link | E207780-228590 | - | - |
| UL Yellow Card Link 2 | E45587-100036373 | - | - |
| UL Recognized, 94-5VA Flame Class Rating | ≥2.5 | mm | UL 94 |
| UL Recognized, 94V-1 Flame Class Rating | ≥0.4 | mm | UL 94 |
| INJECTION MOLDING | | | |
| Drying Temperature | 110 – 120 | °C | |
| Drying Time | 3 – 4 | hrs | |
| Drying Time (Cumulative) | 8 | hrs | |
| Maximum Moisture Content | 0.02 | % | |
| Melt Temperature | 300 – 325 | °C | |
| Nozzle Temperature | 300 – 325 | °C | |
| Front - Zone 3 Temperature | 290 – 325 | °C | |
| Middle - Zone 2 Temperature | 275 – 320 | °C | |
| Rear - Zone 1 Temperature | 265 – 315 | °C | |
| Mold Temperature | 80 – 110 | °C | |
| Back Pressure | 0.3 – 0.7 | MPa | |
| Screw Speed | 20 – 100 | rpm | |
| Shot to Cylinder Size | 30 – 70 | % | |

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(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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