# NORYL™ RESIN N190

REGION EUROPE

## DESCRIPTION

NORYL™ N190 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 5VA at 3mm and V0 at 1.5mm along with UL746C Outdoor Suitability rating of F1. NORYL N190 resin exhibits high impact 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. *This grade is also referred to as NORYL N1900 in several regions.

## TYPICAL PROPERTY VALUES

Revision 20191031

| PROPERTIES | TYPICAL VALUES | UNITS | TEST METHODS |
|---|---|---|---|
| MECHANICAL | | | |
| Tensile Stress, yield, 50 mm/min | 50 | MPa | ISO 527 |
| Tensile Stress, break, 50 mm/min | 40 | MPa | ISO 527 |
| Tensile Strain, yield, 50 mm/min | 3 | % | ISO 527 |
| Tensile Strain, break, 50 mm/min | 20 | % | ISO 527 |
| Tensile Modulus, 1 mm/min | 2300 | MPa | ISO 527 |
| Flexural Stress, yield, 2 mm/min | 75 | MPa | ISO 178 |
| Flexural Modulus, 2 mm/min | 2200 | MPa | ISO 178 |
| Ball Indentation Hardness, H358/30 | 87 | MPa | ISO 2039-1 |
| IMPACT | | | |
| Izod Impact, notched 80*10*4 +23°C | 10 | kJ/m² | ISO 180/1A |
| Izod Impact, notched 80*10*4 -30°C | 6 | kJ/m² | ISO 180/1A |
| Charpy 23°C, V-notch Edgew 80*10*4 sp=62mm | 10 | kJ/m² | ISO 179/1eA |
| Charpy -30°C, V-notch Edgew 80*10*4 sp=62mm | 5 | kJ/m² | ISO 179/1eA |
| THERMAL | | | |
| Thermal Conductivity | 0.25 | W/m·°C | ISO 8302 |
| CTE, 23°C to 80°C, flow | 7.E-05 | 1/°C | ISO 11359-2 |
| CTE, 23°C to 80°C, xflow | 9.E-05 | 1/°C | ISO 11359-2 |
| Ball Pressure Test, 75°C +/- 2°C | PASSES | - | IEC 60695-10-2 |
| Ball Pressure Test, approximate maximum | 95 | °C | IEC 60695-10-2 |
| Vicat Softening Temp, Rate A/50 | 110 | °C | ISO 306 |
| Vicat Softening Temp, Rate B/50 | 95 | °C | ISO 306 |
| Vicat Softening Temp, Rate B/120 | 105 | °C | ISO 306 |
| HDT/Be, 0.45MPa Edgew 120*10*4 sp=100mm | 90 | °C | ISO 75/Be |
| HDT/Ae, 1.8 MPa Edgew 120*10*4 sp=100mm | 80 | °C | ISO 75/Ae |
| Relative Temp Index, Elec [1] | 95 | °C | UL 746B |
| Relative Temp Index, Mech w/impact [1] | 80 | °C | UL 746B |
| Relative Temp Index, Mech w/o impact [1] | 95 | °C | UL 746B |
| PHYSICAL | | | |
| Mold Shrinkage on Tensile Bar, flow | 0.5 – 0.7 | % | SABIC method |
| Density | 1.1 | g/cm³ | ISO 1183 |
| Water Absorption, (23°C/sat) | 0.32 | % | ISO 62 |
| Moisture Absorption (23°C / 50% RH) | 0.06 | % | ISO 62 |

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| PROPERTIES | TYPICAL VALUES | UNITS | TEST METHODS |
|---|---|---|---|
| Melt Volume Rate, MVR at 280°C/2.16 kg | 8 | cm³/10 min | ISO 1133 |
| ELECTRICAL | | | |
| Volume Resistivity | 1.E+15 | Ohm-cm | IEC 60093 |
| Surface Resistivity, ROA | >1.E+15 | Ohm | IEC 60093 |
| Relative Permittivity, 1 MHz | 2.6 | - | IEC 60250 |
| Dissipation Factor, 50/60 Hz | 0.0004 | - | IEC 60250 |
| Dissipation Factor, 1 MHz | 0.0009 | - | IEC 60250 |
| Comparative Tracking Index (2) | 250 | V | IEC 60112 |
| Relative Permittivity, 50/60 Hz | 2.7 | - | IEC 60250 |
| Comparative Tracking Index (UL) {PLC} | 1 | PLC Code | UL 746A |
| High Amp Arc Ignition (HAI), PLC 1 | ≥1.5 | mm | UL 746A |
| Hot-Wire Ignition (HWI), PLC 1 | ≥1.5 | mm | UL 746A |
| High Voltage Arc Track Rate {PLC} | 4 | PLC Code | UL 746A |
| Arc Resistance, Tungsten {PLC} | 6 | PLC Code | ASTM D 495 |
| FLAME CHARACTERISTICS (1) | | | |
| UL Yellow Card Link | E45329-236763 | - | - |
| UL Recognized, 94-5VA Flame Class Rating | ≥3 | mm | UL 94 |
| UL Recognized, 94V-0 Flame Class Rating | ≥1.5 | mm | UL 94 |
| Glow Wire Flammability Index 960°C, passes at (2) | 3.2 | mm | IEC 60695-2-12 |
| UV-light, water exposure/immersion | F1 | - | UL 746C |
| Oxygen Index (LOI) | 30 | % | ISO 4589 |
| INJECTION MOLDING | | | |
| Drying Temperature | 80 – 100 | °C | |
| Drying Time | 2 – 3 | hrs | |
| Melt Temperature | 260 – 280 | °C | |
| Nozzle Temperature | 240 – 260 | °C | |
| Front - Zone 3 Temperature | 260 – 280 | °C | |
| Middle - Zone 2 Temperature | 240 – 260 | °C | |
| Rear - Zone 1 Temperature | 220 – 240 | °C | |
| Hopper Temperature | 60 – 80 | °C | |
| Mold Temperature | 60 – 80 | °C | |

(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.

(2) Value shown here is based on internal measurement.

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