

# NORYL™ RESIN GFN3

REGION ASIA

## DESCRIPTION

NORYL GFN3 resin is a 30% glass fiber reinforced blend of polyphenylene ether (PPE) + polystyrene (PS). This general-purpose injection moldable grade exhibits very low moisture absorption, high strength, hydrolytic stability, Low warpage, low specific gravity, and dimensional stability. NORYL GFN3 carries a UL746C outdoor suitability rating of F2 and is an excellent candidate for a variety of indoor and outdoor applications including construction, electrical components + displays, lawn and garden equipment. \*See NORYL GFN3F resin for FDA food compliant / NSF version.

| GENERAL INFORMATION   |  |
|-----------------------|--|
| Features              | Flame Retardant, Hydrolytic Stability, Low Warpage, Amorphous, Low Shrinkage, Low Moisture Absorption, Low Specific Gravity, Non Cl/Br flame retardant, Non halogenated flame retardant, Dimensional stability, High stiffness/Strength, No PFAS intentionally added |
| Fillers               | Glass Fiber  |
| Polymer Types         | Polyphenylene Ether + PS (PPE+PS)  |
| Processing Techniques | Injection Molding  |

| INDUSTRY                   | SUB INDUSTRY   |
|----------------------------|--|
| Building and Construction  | Building Component                                       |
| Consumer                   | Commercial Appliance                                     |
| Electrical and Electronics | Electronic Components, Mobile Phone - Computer - Tablets |

## TYPICAL PROPERTY VALUES

Revision 20231109

| PROPERTIES                                   | TYPICAL VALUES | UNITS             | TEST METHODS |
|--|----------------|-------------------|--------------|
| <b>MECHANICAL <sup>(1)</sup></b>             |                |                   |              |
| Tensile Stress, brk, Type I, 50 mm/min       | 130            | MPa               | ASTM D638    |
| Tensile Strain, brk, Type I, 50 mm/min       | 3              | %                 | ASTM D638    |
| Tensile Modulus, 5 mm/min                    | 8600           | MPa               | ASTM D638    |
| Flexural Stress, yld, 1.3 mm/min, 50 mm span | 160            | MPa               | ASTM D790    |
| Flexural Modulus, 1.3 mm/min, 50 mm span     | 7200           | MPa               | ASTM D790    |
| Tensile Stress, break, 50 mm/min             | 110            | MPa               | ISO 527      |
| Tensile Strain, break, 50 mm/min             | 2.5            | %                 | ISO 527      |
| Tensile Modulus, 1 mm/min                    | 8200           | MPa               | ISO 527      |
| Flexural Stress, yield, 2 mm/min             | 160            | MPa               | ISO 178      |
| Flexural Modulus, 2 mm/min                   | 6800           | MPa               | ISO 178      |
| <b>IMPACT <sup>(1)</sup></b>                 |                |                   |              |
| Izod Impact, unnotched, 23°C                 | 590            | J/m               | ASTM D4812   |
| Izod Impact, notched, 23°C                   | 100            | J/m               | ASTM D256    |
| Izod Impact, notched, -30°C                  | 120            | J/m               | ASTM D256    |
| Instrumented Dart Impact Total Energy, 23°C  | 20             | J                 | ASTM D3763   |
| Izod Impact, unnotched 80*10*4 +23°C         | 30             | kJ/m <sup>2</sup> | ISO 180/1U   |
| Izod Impact, notched 80*10*4 +23°C           | 11             | kJ/m <sup>2</sup> | ISO 180/1A   |
| Izod Impact, notched 80*10*4 -30°C           | 10             | kJ/m <sup>2</sup> | ISO 180/1A   |
| Charpy 23°C, V-notch Edgew 80*10*4 sp=62mm   | 8              | kJ/m <sup>2</sup> | ISO 179/1eA  |

| PROPERTIES  | TYPICAL VALUES                 | UNITS                   | TEST METHODS |
|---|--------------------------------|-------------------------|--------------|
| <b>THERMAL <sup>(1)</sup></b>                       |                                |                         |              |
| Vicat Softening Temp, Rate B/50                     | 147                            | °C                      | ASTM D1525   |
| HDT, 0.45 MPa, 3.2 mm, unannealed                   | 147                            | °C                      | ASTM D648    |
| HDT, 1.82 MPa, 3.2mm, unannealed                    | 139                            | °C                      | ASTM D648    |
| CTE, -40°C to 40°C, flow                            | 2.1E-05                        | 1/°C                    | ASTM E831    |
| CTE, -40°C to 40°C, xflow                           | 7.5E-05                        | 1/°C                    | ASTM E831    |
| CTE, -40°C to 40°C, flow                            | 2.3E-05                        | 1/°C                    | ISO 11359-2  |
| CTE, -40°C to 40°C, xflow                           | 7.E-05                         | 1/°C                    | ISO 11359-2  |
| Vicat Softening Temp, Rate B/50                     | 147                            | °C                      | ISO 306      |
| Vicat Softening Temp, Rate B/120                    | 149                            | °C                      | ISO 306      |
| HDT/Af, 1.8 MPa Flatw 80*10*4 sp=64mm               | 139                            | °C                      | ISO 75/Af    |
| Relative Temp Index, Elec <sup>(2)</sup>            | 90                             | °C                      | UL 746B      |
| Relative Temp Index, Mech w/impact <sup>(2)</sup>   | 90                             | °C                      | UL 746B      |
| Relative Temp Index, Mech w/o impact <sup>(2)</sup> | 90                             | °C                      | UL 746B      |
| <b>PHYSICAL <sup>(1)</sup></b>                      |                                |                         |              |
| Specific Gravity                                    | 1.31                           | -                       | ASTM D792    |
| Mold Shrinkage, flow, 3.2 mm <sup>(3)</sup>         | 0.1 – 0.4                      | %                       | SABIC method |
| Melt Flow Rate, 280°C/5.0 kgf                       | 3.2                            | g/10 min                | ASTM D1238   |
| Water Absorption, (23°C/saturated)                  | 0.1                            | %                       | ISO 62-1     |
| Moisture Absorption (23°C / 50% RH)                 | 0.04                           | %                       | ISO 62       |
| Melt Volume Rate, MVR at 280°C/5.0 kg               | 2                              | cm <sup>3</sup> /10 min | ISO 1133     |
| <b>ELECTRICAL <sup>(1)</sup></b>                    |                                |                         |              |
| Comparative Tracking Index (UL) {PLC}               | 4                              | PLC Code                | UL 746A      |
| High Amp Arc Ignition (HAI), PLC 4                  | ≥1.5                           | mm                      | UL 746A      |
| Hot-Wire Ignition (HWI), PLC 0                      | ≥1.5                           | mm                      | UL 746A      |
| High Voltage Arc Track Rate {PLC}                   | 3                              | PLC Code                | UL 746A      |
| Arc Resistance, Tungsten {PLC}                      | 6                              | PLC Code                | ASTM D495    |
| <b>FLAME CHARACTERISTICS <sup>(2)</sup></b>         |                                |                         |              |
| UL Yellow Card Link                                 | <a href="#">E207780-228546</a> | -                       | -            |
| UL Yellow Card Link 2                               | <a href="#">E45587-237022</a>  | -                       | -            |
| UL Recognized, 94HB Flame Class Rating              | ≥1.5                           | mm                      | UL 94        |
| UV-light, water exposure/immersion                  | F2                             | -                       | UL 746C      |
| <b>INJECTION MOLDING <sup>(4)</sup></b>             |                                |                         |              |
| 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                     |              |

| PROPERTIES            | TYPICAL VALUES | UNITS | TEST METHODS |
|-----------------------|----------------|-------|--------------|
| Shot to Cylinder Size | 30 – 70        | %     |              |

- (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, colors and regions. 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) 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.

## ADDITIONAL PRODUCT NOTES

No PFAS intentionally added: The grade listed in this document does not contain PFAS intentionally added during Seller's manufacturing process and is not expected to contain unintentional PFAS impurities. Each user is responsible for evaluating the presence of unintentional PFAS impurities.

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