

# NORYL™ RESIN 731F

REGION ASIA

## DESCRIPTION

NORYL 731F resin is a non-reinforced blend of polyphenylene ether (PPE) + polystyrene (PS). This NSF/ANSI 61\* listed for potable water use, FDA Food Contact compliant, injection moldable grade exhibits good surface appearance, high ductility, and good impact resistance along with low moisture absorption, creep resistance, dimensional stability, and hydrolytic stability. NORYL 731F resin is an excellent candidate for a variety of water management applications such as valves, filtration components, and water meter internals.

| GENERAL INFORMATION   |  |
|-----------------------|--|
| Features              | Hydrolytic Stability, Low Warpage, Amorphous, Low Shrinkage, Low Corrosivity, Low Moisture Absorption, Low Specific Gravity, Food contact, Potable water safe, Dimensional stability, High stiffness/Strength, No PFAS intentionally added |
| Fillers               | Unreinforced   |
| Polymer Types         | Polyphenylene Ether + PS (PPE+PS)  |
| Processing Techniques | Injection Molding  |

| INDUSTRY                  | SUB INDUSTRY                      |
|---------------------------|-----------------------------------|
| Building and Construction | Water Management                  |
| Hygiene and Healthcare    | Personal and Professional Hygiene |

## TYPICAL PROPERTY VALUES

Revision 20241015

| PROPERTIES                                    | TYPICAL VALUES | UNITS | TEST METHODS |
|---|----------------|-------|--------------|
| MECHANICAL <sup>(1)</sup>                     |                |       |              |
| Tensile Stress, yld, Type I, 50 mm/min        | 58             | MPa   | ASTM D638    |
| Tensile Stress, brk, Type I, 50 mm/min        | 49             | MPa   | ASTM D638    |
| Tensile Strain, yld, Type I, 50 mm/min        | 7.2            | %     | ASTM D638    |
| Tensile Strain, brk, Type I, 50 mm/min        | 28.1           | %     | ASTM D638    |
| Tensile Modulus, 50 mm/min                    | 2860           | MPa   | ASTM D638    |
| Flexural Stress, yld, 1.3 mm/min, 50 mm span  | 90             | MPa   | ASTM D790    |
| Flexural Stress, yld, 2.6 mm/min, 100 mm span | 89             | MPa   | ASTM D790    |
| Flexural Modulus, 1.3 mm/min, 50 mm span      | 2640           | MPa   | ASTM D790    |
| Flexural Modulus, 2.6 mm/min, 100 mm span     | 2420           | MPa   | ASTM D790    |
| Hardness, Rockwell R                          | 119            | -     | ASTM D785    |
| Tensile Stress, yield, 50 mm/min              | 57             | MPa   | ISO 527      |
| Tensile Stress, break, 50 mm/min              | 51             | MPa   | ISO 527      |
| Tensile Strain, yield, 50 mm/min              | 3.5            | %     | ISO 527      |
| Tensile Strain, break, 50 mm/min              | 17             | %     | ISO 527      |
| Tensile Modulus, 1 mm/min                     | 2700           | MPa   | ISO 527      |
| Flexural Stress, yield, 2 mm/min              | 95             | MPa   | ISO 178      |
| Flexural Modulus, 2 mm/min                    | 2550           | MPa   | ISO 178      |
| IMPACT <sup>(1)</sup>                         |                |       |              |
| Izod Impact, notched, 23°C                    | 213            | J/m   | ASTM D256    |
| Izod Impact, notched, -40°C                   | 133            | J/m   | ASTM D256    |

| PROPERTIES  | TYPICAL VALUES                 | UNITS      | TEST METHODS |
|---|--------------------------------|------------|--------------|
| Gardner, -30°C                                      | 25                             | J          | ASTM D3029   |
| Gardner, -40°C                                      | 5                              | J          | ASTM D3029   |
| Instrumented Dart Impact Total Energy, 23°C         | 48                             | J          | ASTM D3763   |
| Izod Impact, notched 80*10*4 +23°C                  | 17                             | kJ/m²      | ISO 180/1A   |
| Izod Impact, notched 80*10*4 -30°C                  | 5                              | kJ/m²      | ISO 180/1A   |
| Charpy 23°C, V-notch Edgew 80*10*4 sp=62mm          | 17                             | kJ/m²      | ISO 179/1eA  |
| THERMAL <sup>(1)</sup>                              |                                |            |              |
| Vicat Softening Temp, Rate B/50                     | 148                            | °C         | ASTM D1525   |
| HDT, 0.45 MPa, 3.2 mm, unannealed                   | 131                            | °C         | ASTM D648    |
| HDT, 1.82 MPa, 3.2mm, unannealed                    | 117                            | °C         | ASTM D648    |
| HDT, 0.45 MPa, 6.4 mm, unannealed                   | 137                            | °C         | ASTM D648    |
| HDT, 1.82 MPa, 6.4 mm, unannealed                   | 126                            | °C         | ASTM D648    |
| CTE, -40°C to 40°C, flow                            | 9.18E-05                       | 1/°C       | ASTM E831    |
| CTE, -40°C to 40°C, xflow                           | 9.54E-05                       | 1/°C       | ASTM E831    |
| CTE, -40°C to 40°C, flow                            | 9.18E-05                       | 1/°C       | ISO 11359-2  |
| CTE, -40°C to 40°C, xflow                           | 9.54E-05                       | 1/°C       | ISO 11359-2  |
| Vicat Softening Temp, Rate B/50                     | 140                            | °C         | ISO 306      |
| Vicat Softening Temp, Rate B/120                    | 143                            | °C         | ISO 306      |
| HDT/Af, 1.8 MPa Flatw 80*10*4 sp=64mm               | 120                            | °C         | ISO 75/Af    |
| Relative Temp Index, Elec <sup>(2)</sup>            | 105                            | °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> | 105                            | °C         | UL 746B      |
| PHYSICAL <sup>(1)</sup>                             |                                |            |              |
| Specific Gravity                                    | 1.06                           | -          | ASTM D792    |
| Water Absorption, (23°C/24hrs)                      | 0.06                           | %          | ASTM D570    |
| Mold Shrinkage, flow, 3.2 mm <sup>(3)</sup>         | 0.5 – 0.7                      | %          | SABIC method |
| Mold Shrinkage, xflow, 3.2 mm <sup>(3)</sup>        | 0.5 – 0.7                      | %          | SABIC method |
| Melt Flow Rate, 280°C/5.0 kgf                       | 9.2                            | g/10 min   | ASTM D1238   |
| Density   | 1.06                           | g/cm³      | ISO 1183     |
| Water Absorption, (23°C/saturated)                  | 0.23                           | %          | ISO 62-1     |
| Moisture Absorption (23°C / 50% RH)                 | 0.06                           | %          | ISO 62       |
| Melt Volume Rate, MVR at 280°C/5.0 kg               | 9                              | cm³/10 min | ISO 1133     |
| ELECTRICAL <sup>(1)</sup>                           |                                |            |              |
| Dielectric Strength, in oil, 3.2 mm                 | 21.6                           | kV/mm      | ASTM D149    |
| Relative Permittivity, 50/60 Hz                     | 2.65                           | -          | ASTM D150    |
| Dissipation Factor, 50/60 Hz                        | 0.0004                         | -          | ASTM D150    |
| High Voltage Arc Track Rate {PLC}                   | 4                              | PLC Code   | UL 746A      |
| Comparative Tracking Index (UL) {PLC}               | 2                              | PLC Code   | UL 746A      |
| High Amp Arc Ignition (HAI), PLC 3                  | ≥1.5                           | mm         | UL 746A      |
| Hot-Wire Ignition (HWI), PLC 1                      | ≥1.5                           | mm         | UL 746A      |
| Hot-Wire Ignition (HWI), PLC 2                      | ≥3                             | mm         | UL 746A      |
| Arc Resistance, Tungsten {PLC}                      | 6                              | PLC Code   | ASTM D495    |
| FLAME CHARACTERISTICS <sup>(2)</sup>                |                                |            |              |
| UL Yellow Card Link                                 | <a href="#">E207780-228539</a> | -          | -            |
| UL Yellow Card Link 2                               | <a href="#">E45587-237006</a>  | -          | -            |

| PROPERTIES                              | TYPICAL VALUES | UNITS | TEST METHODS |
|---|----------------|-------|--------------|
| UL Recognized, 94HB Flame Class Rating  | ≥1.5           | mm    | UL 94        |
| Oxygen Index (LOI)                      | 22             | %     | ASTM D2863   |
| <b>INJECTION MOLDING <sup>(4)</sup></b> |                |       |              |
| 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    |              |
| 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) 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 and colors. 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.

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