# NORYL™ RESIN HNA033

REGION AMERICAS

## DESCRIPTION

NORYL HNA033 resin is a non-reinforced blend of polyphenylene ether (PPE) + polystyrene (PS). This injection moldable grade is heat stabilized and impact modified and was designed to withstand high heat autoclave sterilization <350 cycles. In addition, this grade is US FDA approved, biocompatible (ISO10993 or USP Class VI), RoHS compliant, and it is subject to SABIC's Healthcare management of change and formulation lock. NORYL HNA033 resin may be an excellent candidate for applications requiring multiple sterilization cycles such as disposable dental xray mouth guards and surgical stapler components.

| GENERAL INFORMATION | |
|---|---|
| **Features** | Chemical Resistance, Heat Stabilized, Hydrolytic Stability, Low Warpage, Amorphous, Low Shrinkage, Low Moisture Absorption, Low Specific Gravity, Biocompatability-ISO10993, Food contact, Healthcare/Formula lock, Autoclave/Steam sterilizable, Dimensional stability, High stiffness/Strength, Sterilizable, No PFAS intentionally added |
| **Fillers** | Unreinforced |
| **Polymer Types** | Polyphenylene Ether + PS (PPE+PS) |
| **Processing Techniques** | Injection Molding |

| INDUSTRY | SUB INDUSTRY |
|---|---|
| Hygiene and Healthcare | Pharmaceutical Packaging and Drug Delivery, Surgical devices, General Healthcare, Patient Testing |

## TYPICAL PROPERTY VALUES

Revision 20251031

| PROPERTIES | TYPICAL VALUES | UNITS | TEST METHODS |
|---|---|---|---|
| MECHANICAL [1] | | | |
| **Tensile Stress, yld, Type I, 50 mm/min** | 71 | MPa | ASTM D638 |
| **Tensile Stress, brk, Type I, 50 mm/min** | 57 | MPa | ASTM D638 |
| **Tensile Strain, yld, Type I, 50 mm/min** | 5.3 | % | ASTM D638 |
| **Tensile Strain, brk, Type I, 50 mm/min** | 30 | % | ASTM D638 |
| **Tensile Modulus, 5 mm/min** | 2310 | MPa | ASTM D638 |
| **Flexural Stress, yld, 1.3 mm/min, 50 mm span** | 100 | MPa | ASTM D790 |
| **Flexural Modulus, 1.3 mm/min, 50 mm span** | 2460 | MPa | ASTM D790 |
| **Tensile Stress, yield, 50 mm/min** | 68 | MPa | ISO 527 |
| **Tensile Stress, break, 50 mm/min** | 55 | MPa | ISO 527 |
| **Tensile Strain, yield, 50 mm/min** | 5.2 | % | ISO 527 |
| **Tensile Strain, break, 50 mm/min** | 14.8 | % | ISO 527 |
| **Tensile Modulus, 1 mm/min** | 2600 | MPa | ISO 527 |
| **Flexural Stress, yield, 2 mm/min** | 107 | MPa | ISO 178 |
| **Flexural Modulus, 2 mm/min** | 2590 | MPa | ISO 178 |
| IMPACT [1] | | | |
| **Izod Impact, notched, 23°C** | 192 | J/m | ASTM D256 |
| **Izod Impact, notched, -30°C** | 144 | J/m | ASTM D256 |
| **Instrumented Dart Impact Total Energy, 23°C** | 47 | J | ASTM D3763 |
| **Izod Impact, notched 80*10*4 +23°C** | 16 | kJ/m² | ISO 180/1A |

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| PROPERTIES | TYPICAL VALUES | UNITS | TEST METHODS |
|---|---|---|---|
| Izod Impact, notched 80*10*4 -30°C | 10 | kJ/m² | ISO 180/1A |
| Charpy 23°C, V-notch Edgew 80*10*4 sp=62mm | 15 | kJ/m² | ISO 179/1eA |
| THERMAL [1] | | | |
| Vicat Softening Temp, Rate B/50 | 161 | °C | ASTM D1525 |
| HDT, 1.82 MPa, 3.2mm, unannealed | 140 | °C | ASTM D648 |
| CTE, -40°C to 40°C, flow | 7.09E-05 | 1/°C | ASTM E831 |
| CTE, -40°C to 40°C, xflow | 6.87E-05 | 1/°C | ASTM E831 |
| CTE, -40°C to 40°C, flow | 7.09E-05 | 1/°C | ISO 11359-2 |
| CTE, -40°C to 40°C, xflow | 6.87E-05 | 1/°C | ISO 11359-2 |
| Vicat Softening Temp, Rate B/50 | 160 | °C | ISO 306 |
| Vicat Softening Temp, Rate B/120 | 162 | °C | ISO 306 |
| HDT/Af, 1.8 MPa Flatw 80*10*4 sp=64mm | 141 | °C | ISO 75/Af |
| PHYSICAL [1] | | | |
| Specific Gravity | 1.08 | - | ASTM D792 |
| Mold Shrinkage, flow, 3.2 mm [2] | 0.7 – 0.9 | % | SABIC method |
| Melt Flow Rate, 300°C/5.0 kgf | 8.3 | g/10 min | ASTM D1238 |
| Density | 1.08 | g/cm³ | ISO 1183 |
| Water Absorption, (23°C/saturated) | 0.15 | % | ISO 62-1 |
| Moisture Absorption (23°C / 50% RH) | 0.05 | % | ISO 62 |
| Melt Volume Rate, MVR at 300°C/5.0 kg | 8 | cm³/10 min | ISO 1133 |
| INJECTION MOLDING [3] | | | |
| 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) 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.

(3) 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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