# Ryton® R-4-200NA
## polyphenylene sulfide

Ryton® R-4-200NA and R-4-200BL 40% glass fiber reinforced polyphenylene sulfide compounds provide enhanced mechanical strength and low maintenance molding using conventional molding equipment

| General | | |
|---|---|---|
| Material Status | • Commercial: Active | |
| Availability | • Asia Pacific<br>• Europe | • Latin America<br>• North America |
| Filler / Reinforcement | • Glass Fiber, 40% Filler by Weight | |
| Features | • Good Strength | |
| Uses | • Automotive Applications | |
| RoHS Compliance | • RoHS Compliant | |
| Automotive Specifications | • FORD WSL-M4D807-A | • STELLANTIS SPA X62 5101 |
| Appearance | • Natural Color | |
| Forms | • Pellets | |
| Processing Method | • Injection Molding | |

| Physical | Typical Value | Unit | Test method |
|---|---|---|---|
| Density / Specific Gravity | 1.68 | | ASTM D792 |
| Molding Shrinkage [1] | | | Internal Method |
| Flow : 3.20 mm | 0.20 | % | |
| Across Flow : 3.20 mm | 0.50 | % | |
| Water Absorption | | | |
| 24 hr | 0.020 | % | ASTM D570 |
| 24 hr, 23°C | 0.030 | % | ISO 62 |
| Saturation, 23°C | 0.26 | % | Internal Method |
| Equilibrium, 23°C, 50% RH | 0.25 | % | Internal Method |

| Mechanical | Typical Value | Unit | Test method |
|---|---|---|---|
| Tensile Modulus | 15700 | MPa | ISO 527-1 |
| Tensile Stress | | | |
| -- | 200 | MPa | ISO 527-2 |
| -- | 193 | MPa | ASTM D638 |
| -- [2] | 194 | MPa | ISO 527-2 |
| Tensile Strain | | | |
| Break | 1.7 | % | ISO 527-2 |
| Break | 1.6 | % | ASTM D638 |
| Break [2] | 1.8 | % | ISO 527-2 |

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| Mechanical | Typical Value | Unit | Test method |
|---|---|---|---|
| Flexural Modulus | | | |
| -- | 14500 | MPa | ASTM D790 |
| -- | 14000 | MPa | ISO 178 |
| Flexural Stress | | | |
| -- | 285 | MPa | ISO 178 |
| -- | 269 | MPa | ASTM D790 |
| Compressive Strength | 275 | MPa | ASTM D695 |
| Shear Strength | 96.0 | MPa | ASTM D732 |
| Poisson's Ratio | 0.40 | | ISO 527 |

| Impact | Typical Value | Unit | Test method |
|---|---|---|---|
| Charpy Notched Impact Strength | | | ISO 179 |
| -- | 8.7 | kJ/m² | |
| -- [2] | 8.8 | kJ/m² | |
| Charpy Unnotched Impact Strength | 53 | kJ/m² | ISO 179 |
| Notched Izod Impact | | | |
| 3.18 mm | 91 | J/m | ASTM D256 |
| -- | 9.0 | kJ/m² | ISO 180/A |
| Unnotched Izod Impact | | | |
| 3.18 mm | 640 | J/m | ASTM D4812 |
| -- | 40 | kJ/m² | ISO 180 |

| Hardness | Typical Value | Unit | Test method |
|---|---|---|---|
| Rockwell Hardness | | | ASTM D785 |
| M-Scale | 100 | | |
| R-Scale | 120 | | |

| Thermal | Typical Value | Unit | Test method |
|---|---|---|---|
| Deflection Temperature Under Load | | | ASTM D648 |
| 1.8 MPa, Unannealed | 265 | °C | |
| Melting Temperature | 280 | °C | ISO 11357-3 |
| CLTE | | | ASTM E831 |
| Flow : -50 to 50°C | 1.5E-5 | cm/cm/°C | |
| Flow : 100 to 200°C | 1.0E-5 | cm/cm/°C | |
| Transverse : -50 to 50°C | 4.0E-5 | cm/cm/°C | |
| Transverse : 100 to 200°C | 8.5E-5 | cm/cm/°C | |
| Thermal Conductivity | 0.33 | W/m/K | ASTM E1530 |
| UL Temperature Rating | 200 to 220 | °C | UL 746B |

| Electrical | Typical Value | Unit | Test method |
|---|---|---|---|
| Surface Resistivity | 1.0E+16 | ohms | ASTM D257 |
| Volume Resistivity | 1.0E+16 | ohms·cm | ASTM D257 |
| Dielectric Strength | 22 | kV/mm | ASTM D149 |

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| Electrical | Typical Value | Unit | Test method |
|---|---|---|---|
| Dielectric Constant | | | ASTM D150 |
| 25°C, 1 kHz | 3.90 | | |
| 25°C, 1 MHz | 3.80 | | |
| Dissipation Factor | | | ASTM D150 |
| 25°C, 1 kHz | 2.0E-3 | | |
| 25°C, 1 MHz | 2.0E-3 | | |
| Arc Resistance | 125 | sec | ASTM D495 |
| Comparative Tracking Index (CTI) | PLC 4 | | UL 746A |
| Comparative Tracking Index | 175 | V | IEC 60112 |
| Insulation Resistance [3] (90°C) | 1.0E+11 | ohms | |

| Flammability | Typical Value | Unit | Test method |
|---|---|---|---|
| Flame Rating (1.5 mm) | V-0 | | UL 94 |
| Oxygen Index | 57 | % | ASTM D2863 |

| Injection | Typical Value | Unit |
|---|---|---|
| Drying Temperature | 135 to 150 | °C |
| Drying Time | 2.0 to 4.0 | hr |
| Rear Temperature | 295 to 315 | °C |
| Middle Temperature | 305 to 325 | °C |
| Front Temperature | 315 to 345 | °C |
| Nozzle Temperature | 305 to 325 | °C |
| Processing (Melt) Temp | 320 to 330 | °C |
| Mold Temperature | 135 to 150 | °C |

## Notes

Typical properties: these are not to be construed as specifications.

[1] Measured on 102 mm x 102 mm x 3.2 mm plaques, edge gated.

[2] Conditioned data is meant to simulate 23°C 50% RH equilibrium values. Conditioning of specimens was achieved per ISO 1110 by exposing specimens for 11 days, 70°C and 62% RH.

[3] 95%RH, 48 hr

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