# Radel® R-5100

Polyphenylsulfone

**Solvay Specialty Polymers**

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## Technical Data

### Product Description

Radel® R-5100 is an opaque, general purpose polyphenylsulfone (PPSU) for injection molding, that offers exceptional hydrolytic stability, and toughness superior to other commercially-available, high-temperature engineering resins. This resin also offers a high deflection temperature and outstanding resistance to environmental stress cracking. Radel® polymers are inherently flame retardant, provide excellent thermal stability and possess good electrical properties.

- Black: Radel® R-5100 BK937
- Bone: Radel® R-5100 NT15
- Grey: Radel® R-5100 GY1137
- Grey: Radel® R-5100 GY1037
- Grey: Radel® R-5100 GY874
- Red: Radel® R-5100 RD1018
- Orange: Radel® R-5100 OR1145
- Yellow: Radel® R-5100 YL1337
- Green: Radel® R-5100 GN1007
- Blue: Radel® R-5100 BU1027
- Violet: Radel® R-5100 VT2582
- Brown: Radel® R-5100 BN1164

### General

| | | | |
|---|---|---|---|
| Material Status | • Commercial: Active | | |
| Literature [1] | • Technical Datasheet | | |
| UL Yellow Card [2] | • E36098-628748 | | |
| Search for UL Yellow Card | • Solvay Specialty Polymers<br>• Radel® | | |
| Availability | • Asia Pacific<br>• Europe | • Latin America<br>• North America | |
| Filler / Reinforcement | • Filler | | |
| Features | • Acid Resistant<br>• Autoclave Sterilizable<br>• Base Resistant<br>• Biocompatible<br>• Chemical Resistant<br>• E-beam Sterilizable<br>• Ethylene Oxide Sterilizable | • Flame Retardant<br>• General Purpose<br>• Good Sterilizability<br>• Good Thermal Stability<br>• Heat Sterilizable<br>• High ESCR (Stress Crack Resist.)<br>• High Heat Resistance | • Hydrolytically Stable<br>• Radiation (Gamma) Resistant<br>• Radiation Sterilizable<br>• Radiotranslucent<br>• Steam Resistant<br>• Steam Sterilizable<br>• Ultra High Toughness |
| Uses | • Aerospace Applications<br>• Aircraft Applications<br>• Connectors<br>• Dental Applications | • Food Service Applications<br>• Hospital Goods<br>• Medical Devices<br>• Medical/Healthcare Applications | • Plumbing Parts<br>• Surgical Instruments |
| Agency Ratings | • FAA FAR 25.853a<br>• ISO 10993 [3] | • NSF STD-51 [4]<br>• NSF STD-61 [5] | |
| RoHS Compliance | • RoHS Compliant | | |
| Automotive Specifications | • ASTM D6394 SP0312 | | |
| Appearance | • Black<br>• Colors Available | • Light Beige<br>• Opaque | |
| Forms | • Pellets | | |
| Processing Method | • Blow Molding<br>• Extrusion<br>• Film Extrusion | • Injection Molding<br>• Machining<br>• Profile Extrusion | • Sheet Extrusion<br>• Thermoforming |
| Multi-Point Data | • Isothermal Stress vs. Strain (ISO 11403-1) | • Secant Modulus vs. Strain (ISO 11403-1) | • Viscosity vs. Shear Rate (ISO 11403-2) |







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| Physical | Nominal Value (English) | Nominal Value (SI) | Test Method |
|---|---|---|---|
| Density / Specific Gravity | 1.30 | 1.30 g/cm³ | ASTM D792 |
| Melt Mass-Flow Rate (MFR) | 14 to 20 g/10 min | 14 to 20 g/10 min | ASTM D1238 |
| Molding Shrinkage - Flow | 7.0E-3 in/in | 0.70 % | ASTM D955 |
| Water Absorption (24 hr) | 0.37 % | 0.37 % | ASTM D570 |
| **Mechanical** | **Nominal Value (English)** | **Nominal Value (SI)** | **Test Method** |
| Tensile Modulus | 340000 psi | 2340 MPa | ASTM D638 |
| Tensile Strength | | | ASTM D638 |
| Yield | 10100 psi | 69.6 MPa | |
| Break | 10100 psi | 69.6 MPa | |
| Tensile Elongation | | | ASTM D638 |
| Yield | 7.2 % | 7.2 % | |
| Break | 60 % | 60 % | |
| Flexural Modulus | 350000 psi | 2410 MPa | ASTM D790 |
| Flexural Strength (Yield) | 13200 psi | 91.0 MPa | ASTM D790 |
| Compressive Modulus | 251000 psi | 1730 MPa | ASTM D695 |
| Compressive Strength | 14400 psi | 98.9 MPa | ASTM D695 |
| Shear Strength | 9100 psi | 62.7 MPa | ASTM D732 |
| Poisson's Ratio | 0.42 | 0.42 | ASTM E132 |
| **Impact** | **Nominal Value (English)** | **Nominal Value (SI)** | **Test Method** |
| Notched Izod Impact | 13 ft·lb/in | 690 J/m | ASTM D256 |
| Unnotched Izod Impact | No Break | No Break | ASTM D256 |
| Tensile Impact Strength | 190 ft·lb/in² | 399 kJ/m² | ASTM D1822 |
| **Thermal** | **Nominal Value (English)** | **Nominal Value (SI)** | **Test Method** |
| Deflection Temperature Under Load | | | ASTM D648 |
| 66 psi (0.45 MPa), Unannealed | 417 °F | 214 °C | |
| 264 psi (1.8 MPa), Unannealed | 405 °F | 207 °C | |
| Glass Transition Temperature | 428 °F | 220 °C | ASTM E1356 |
| CLTE - Flow | 3.1E-5 in/in/°F | 5.6E-5 cm/cm/°C | ASTM D696 |
| Thermal Conductivity | 2.4 Btu·in/hr/ft²/°F | 0.35 W/m/K | ASTM C177 |
| **Electrical** | **Nominal Value (English)** | **Nominal Value (SI)** | **Test Method** |
| Volume Resistivity | 9.0E+15 ohms·cm | 9.0E+15 ohms·cm | ASTM D257 |
| Dielectric Strength | 360 V/mil | 14 kV/mm | ASTM D149 |
| Dielectric Constant | | | ASTM D150 |
| 60 Hz | 3.44 | 3.44 | |
| 1 kHz | 3.40 | 3.40 | |
| **Flammability** | **Nominal Value (English)** | **Nominal Value (SI)** | **Test Method** |
| Flame Rating [7] | | | UL 94 |
| 0.030 in (0.75 mm), ALL colors, UL file E36098 | V-0 | V-0 | |
| Oxygen Index | 38 % | 38 % | ASTM D2863 |
| **Optical** | **Nominal Value (English)** | **Nominal Value (SI)** | **Test Method** |
| Refractive Index | 1.672 | 1.672 | ASTM D542 |

| Injection | Nominal Value (English) | Nominal Value (SI) |
|---|---|---|
| Drying Temperature | 300 °F | 149 °C |
| Drying Time | 2.5 hr | 2.5 hr |
| Suggested Max Moisture | 0.050 % | 0.050 % |
| Rear Temperature | 610 °F | 321 °C |
| Middle Temperature | 660 °F | 349 °C |
| Front Temperature | 660 °F | 349 °C |
| Processing (Melt) Temp | 650 to 730 °F | 343 to 388 °C |
| Mold Temperature | 280 to 325 °F | 138 to 163 °C |





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| Injection | Nominal Value (English) | Nominal Value (SI) |
|---|---|---|
| Back Pressure | 50.0 to 100 psi | 0.345 to 0.689 MPa |
| Screw Compression Ratio | 2.2:1.0 | 2.2:1.0 |



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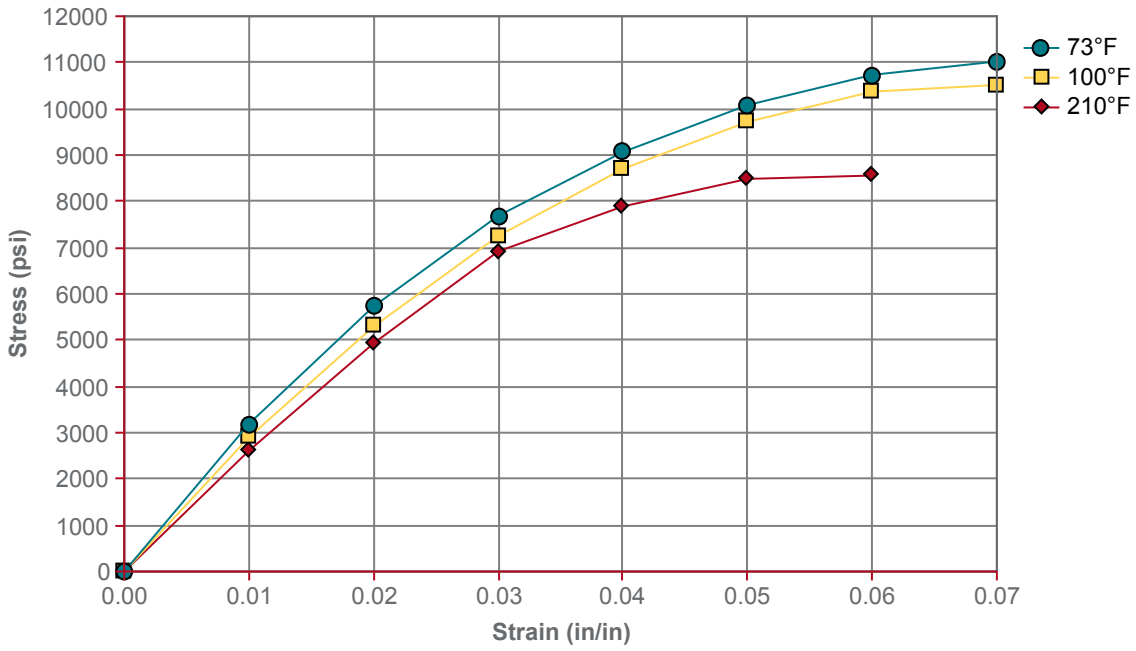
## Isothermal Stress vs. Strain (ISO 11403-1)





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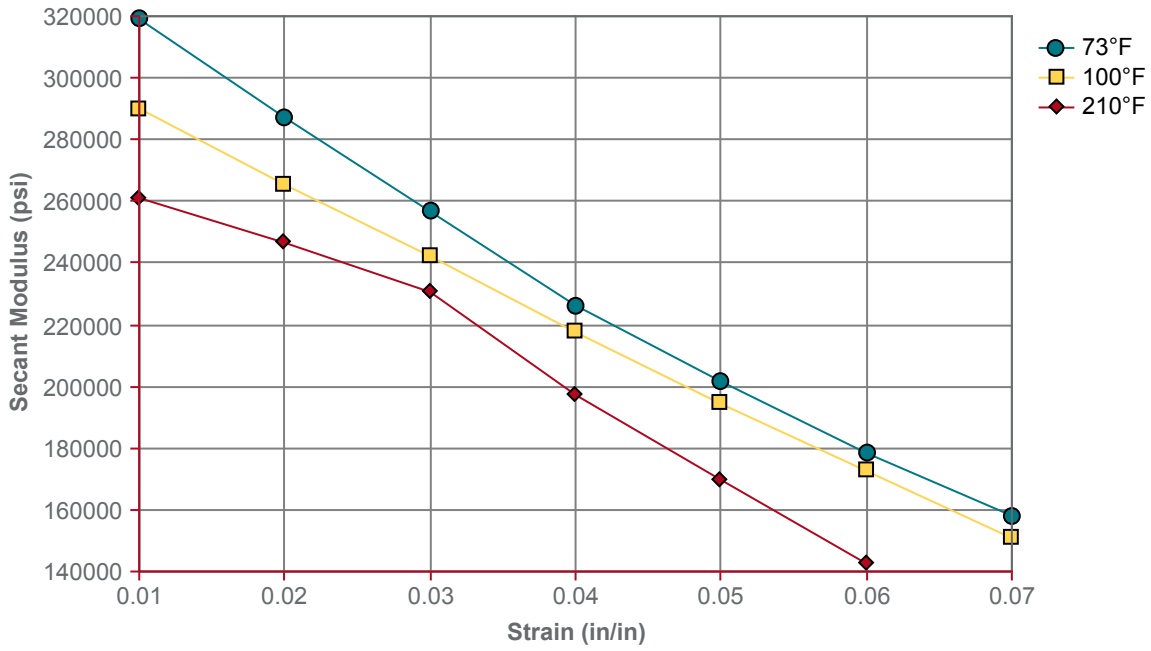
## Secant Modulus vs. Strain (ISO 11403-1)



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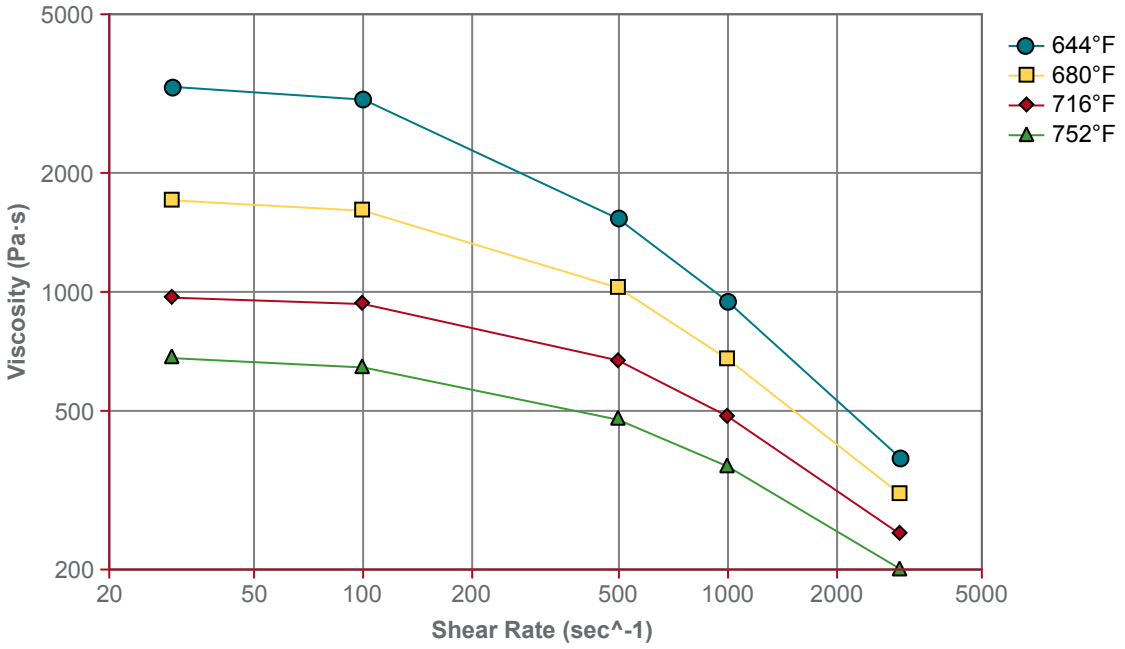
## Viscosity vs. Shear Rate (ISO 11403-2)



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## Notes

[1] These links provide you with access to supplier literature. We work hard to keep them up to date; however you may find the most current literature from the supplier.

[2] A UL Yellow Card contains UL-verified flammability and electrical characteristics. UL Prospector continually works to link Yellow Cards to individual plastic materials in Prospector, however this list may not include all of the appropriate links. It is important that you verify the association between these Yellow Cards and the plastic material found in Prospector. For a complete listing of Yellow Cards, visit the UL Yellow Card Search.

[3] For limited exposure (less than 24 hours).

[4] NSF STD-51 compliant for NT15 only.

[5] NSF STD-61 compliant for BK937, NT15 and GY1037 only. Tested at 82 °C (180 °F) (Commercial Hot).

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

[7] These flammability ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions.



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