Radel® R-5100
polyphenylsulfone

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

Transparent Grade:
- Natural: Radel® R-5100 NT

Opaque Grades:
- Black: Radel® R-5100 BK 937
- Black: Radel® R-5100 BK 937 LF
- Bone: Radel® R-5100 NT 15
- Grey: Radel® R-5100 GY N7
- Grey: Radel® R-5100 GY 874
- Grey: Radel® R-5100 GY 1037
- Grey: Radel® R-5100 GY 1037 LF
- Grey: Radel® R-5100 GY 1137
- Grey: Radel® R-5100 GY 7016
- Blue: Radel® R-5100 BU 1027
- Blue: Radel® R-5100 BU 1197

General

Material Status	• Commercial: Active	
Availability	• Asia Pacific • Europe	• Latin America • North America
Filler / Reinforcement	• Filler	
Features	• Acid Resistant • Autoclave Sterilizable • Base Resistant • Biocompatible • Chemical Resistant • E-beam Sterilizable • Ethylene Oxide Sterilizable • Flame Retardant • General Purpose • Good Sterilizability • Good Thermal Stability	• Heat Sterilizable • High ESCR (Stress Crack Resist.) • High Heat Resistance • Hydrolytically Stable • Radiation (Gamma) Resistant • Radiation Sterilizable • Radiotranslucent • Steam Resistant • Steam Sterilizable • Ultra High Toughness
Uses	• Aerospace Applications • Aircraft Applications • Connectors • Dental Applications • Food Service Applications	• Hospital Goods • Medical Devices • Medical/Healthcare Applications • Plumbing Parts • Surgical Instruments
Agency Ratings	• FAA FAR 25.853a • ISO 10993 [1]	• NSF STD-51 [2] • NSF STD-61 [3]
RoHS Compliance	• RoHS Compliant	
Automotive Specifications	• ASTM D6394 SP0312 [4]	
Appearance	• Black • Colors Available	• Light Beige • Opaque
Forms	• Pellets	

General

Processing Method	• Blow Molding • Extrusion • Film Extrusion • Injection Molding	• Machining • Profile Extrusion • Sheet Extrusion • Thermoforming

Physical	Typical Value	Unit	Test method
Density / Specific Gravity [5]	1.29		ASTM D792
Melt Mass-Flow Rate (MFR) (365°C/5.0 kg)	16	g/10 min	ASTM D1238
Molding Shrinkage			
Flow : 3.18 mm	0.70	%	ASTM D955
Across Flow	0.74	%	ISO 294-4
Flow	0.58	%	ISO 294-4
Water Absorption			
24 hr	0.37	%	ASTM D570
24 hr, 23°C	0.57	%	ISO 62
Saturation, 23°C	1.2	%	Internal Method
Equilibrium	1.1	%	ASTM D570
Equilibrium, 23°C, 50% RH	0.080	%	Internal Method

Mechanical	Typical Value	Unit	Test method
Tensile Modulus			
3.18 mm	2340	MPa	ASTM D638
--	2370	MPa	ISO 527-1
Tensile Strength			
Yield, 3.18 mm	69.6	MPa	ASTM D638
Yield	76.4	MPa	ISO 527-2
Tensile Elongation			
Yield, 3.18 mm	7.2	%	ASTM D638
Yield	7.4	%	ISO 527-2
Break, 3.18 mm	60 to 120	%	ASTM D638
Flexural Modulus			
3.18 mm	2410	MPa	ASTM D790
--	2340	MPa	ISO 178
Flexural Strength			
5.0% Strain, 3.18 mm	91.0	MPa	ASTM D790
--	75.0	MPa	ISO 178
Yield	91.0	MPa	ASTM D790
Compressive Modulus	1730	MPa	ASTM D695
Compressive Strength	98.9	MPa	ASTM D695
Shear Strength	62.7	MPa	ASTM D732
Poisson's Ratio	0.42		ASTM E132

Impact	Typical Value	Unit	Test method
Charpy Notched Impact Strength	56	kJ/m²	ISO 179
Charpy Unnotched Impact Strength	No Break		ISO 179
Notched Izod Impact (3.18 mm)	690	J/m	ASTM D256
Unnotched Izod Impact	No Break		ASTM D4812
Tensile Impact Strength (3.18 mm)	399	kJ/m²	ASTM D1822

Thermal	Typical Value	Unit	Test method
Deflection Temperature Under Load			ASTM D648
0.45 MPa, Unannealed	214	°C	
1.8 MPa, Unannealed, 3.18 mm	207	°C	
Glass Transition Temperature	220	°C	ASTM E1356
CLTE - Flow (3.18 mm)	5.6E-5	cm/cm/°C	ASTM D696
Thermal Conductivity	0.35	W/m/K	ASTM C177

Electrical	Typical Value	Unit	Test method
Volume Resistivity	9.0E+15	ohms·cm	ASTM D257
Dielectric Strength			ASTM D149
0.0254 mm	> 200	kV/mm	
3.18 mm	15	kV/mm	
Dielectric Constant			ASTM D150
60 Hz	3.44		
1 kHz	3.40		

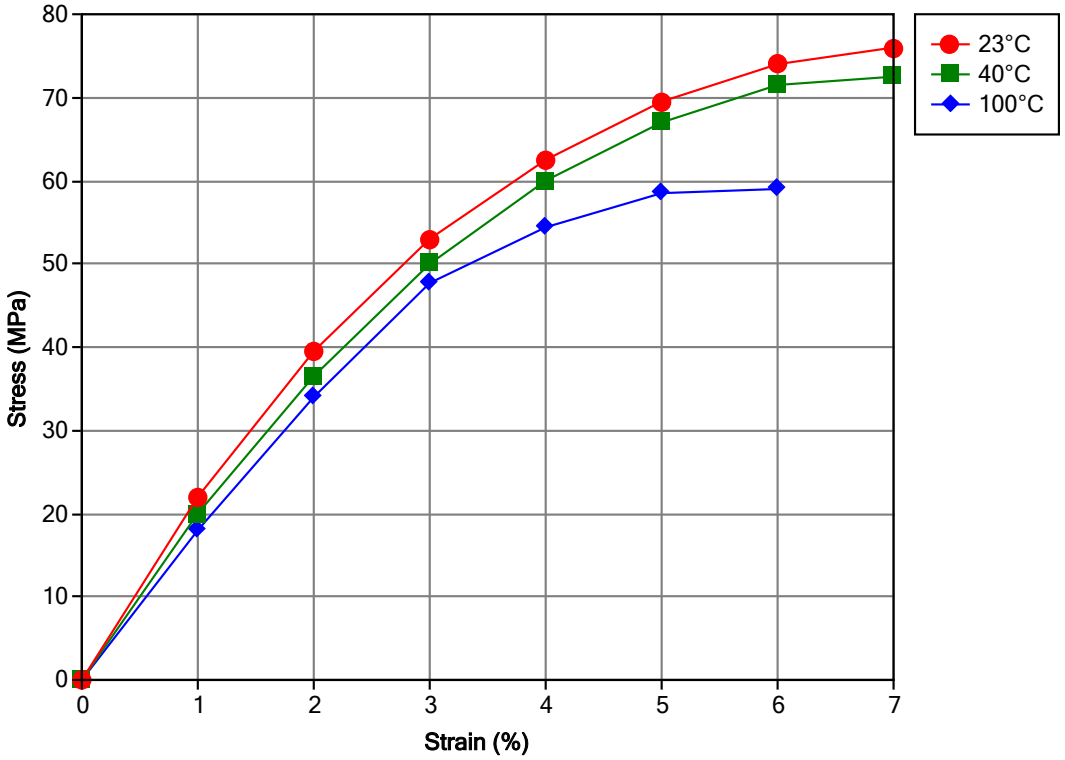
Flammability	Typical Value	Unit	Test method
Flame Rating [6]			UL 94
0.75 mm, ALL colors, UL file E36098	V-0		
Oxygen Index	38	%	ASTM D2863

Optical	Typical Value	Unit	Test method
Refractive Index	1.672		ASTM D542

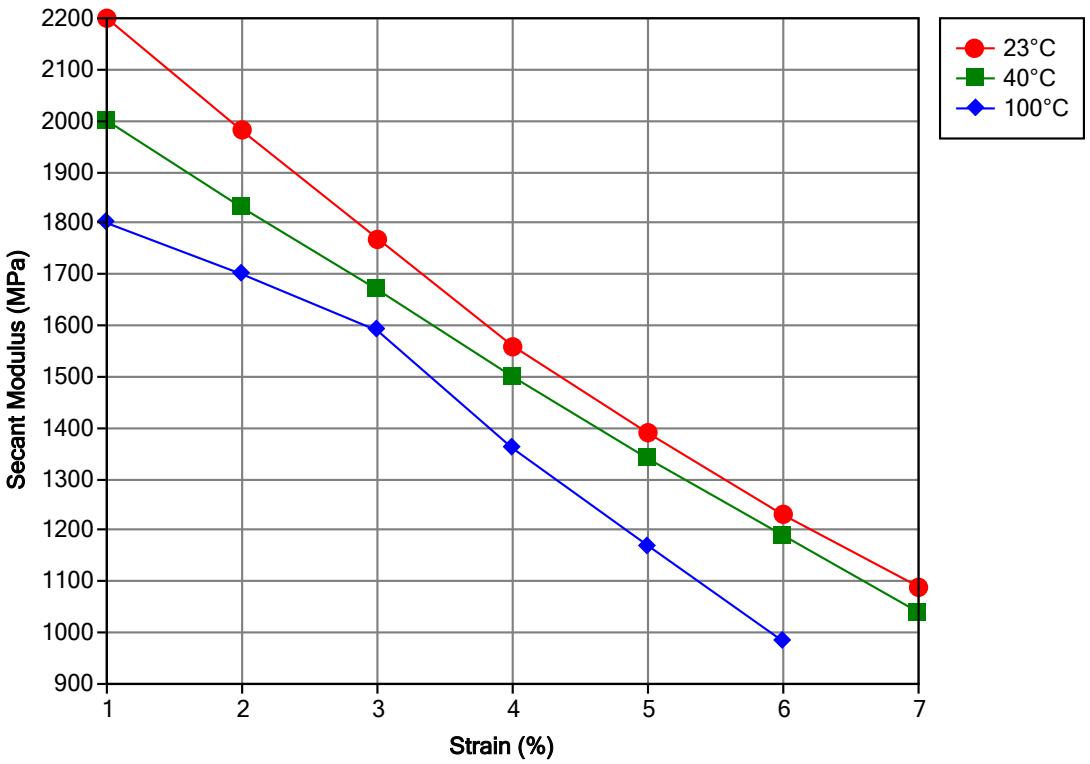
Injection	Typical Value	Unit
Drying Temperature - Desiccant Dryer	135 to 175	°C
Drying Time - Desiccant Dryer	2.0 to 4.0	hr
Suggested Max Moisture	< 0.050	%
Processing (Melt) Temp	365 to 393	°C
Mold Temperature	150 to 163	°C
Injection Rate	Slow-Moderate	
Back Pressure	1.00 to 3.50	MPa
Screw Compression Ratio	1.8:1.0 to 2.6:1.0	

Extrusion	Typical Value	Unit
Drying Temperature	135 to 175	°C
Drying Time	4.0 to 8.0	hr
Suggested Max Moisture	< 0.010	%
Melt Temperature	343 to 400	°C

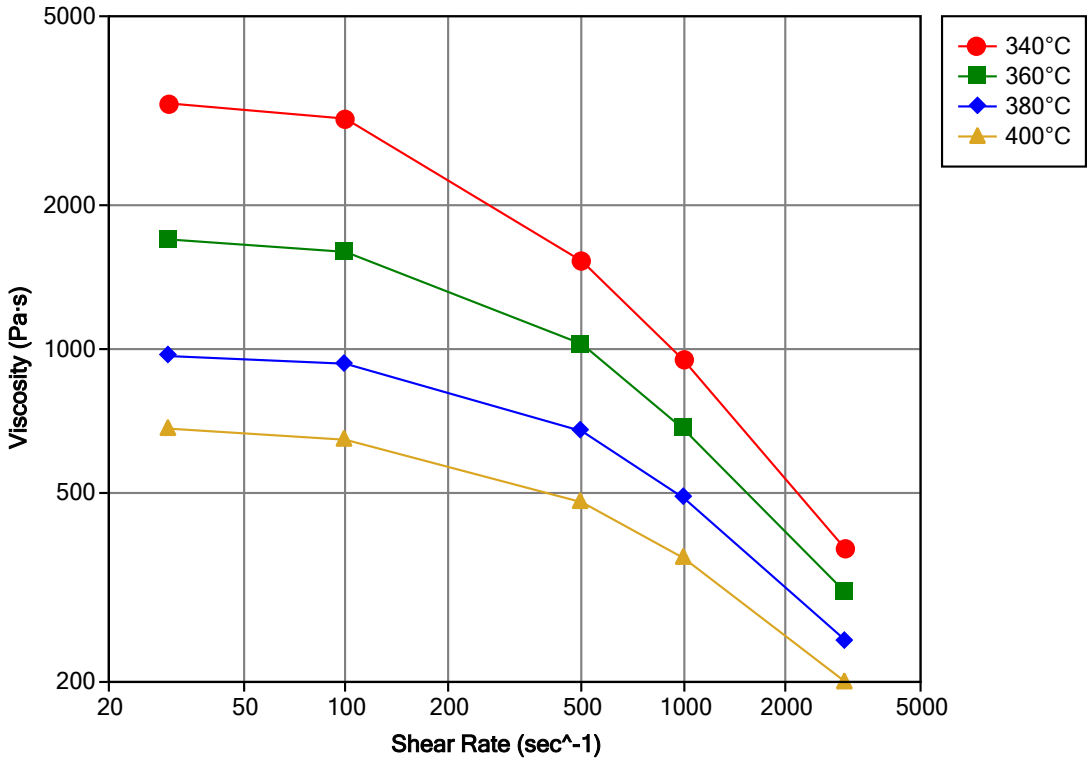
Isothermal Stress vs. Strain (ISO 11403)



Secant Modulus vs. Strain (ISO 11403)



Viscosity vs. Shear Rate (ISO 11403)



Notes

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

[1] For limited exposure (less than 24 hours). ISO 10993 not compliant for GY 1037 LF or BK 937 LF.

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

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

[4] Latest version of the standard applies. Note that this ASTM call is also listed under ASTM F1960 for compliance of unreinforced sulfone plastic materials for use to that end use standard.

[5] Base resin and transparent colors; Opaque colors can be up to 1.35

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

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