

# Ryton® R-4-220BL

## polyphenylene sulfide

Ryton® R-4-220NA and R-4-220BL 40% glass fiber reinforced polyphenylene sulfide compounds provide enhanced mechanical strength after

constant or repeated exposure to high temperature water.

### General

Material Status	• Commercial: Active	
Availability	• Asia Pacific • Europe	• Latin America • North America
Filler / Reinforcement	• Glass Fiber, 40% Filler by Weight	
Features	• Good Strength	
Uses	• Automotive Applications	
RoHS Compliance	• RoHS Compliant	
Automotive Specifications	• CHRYSLER MS-DB-570 CPN3502 Color: Black • FORD WSL-M4D807-A	• GM GMP.PPS.001
Appearance	• Black	
Forms	• Pellets	
Processing Method	• Injection Molding	

### Physical

	Typical Value	Unit	Test method
Density / Specific Gravity	1.68		ASTM D792
Molding Shrinkage			ISO 294-4
Across Flow : 3.20 mm	0.50	%	
Flow : 3.20 mm	0.20	%	
Water Absorption			
24 hr, 23°C	0.021	%	ISO 62
Saturation, 23°C	0.14	%	Internal Method

### Mechanical

	Typical Value	Unit	Test method
Tensile Modulus			ISO 527-2
--	16000	MPa	
-- <sup>1</sup>	16100	MPa	
Tensile Stress			
--	175	MPa	ISO 527-2
--	172	MPa	ASTM D638
-- <sup>1</sup>	176	MPa	ISO 527-2
Tensile Strain (Break)	1.5	%	ISO 527-2 ASTM D638
Flexural Modulus			
--	14500	MPa	ASTM D790
--	14000	MPa	ISO 178

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Mechanical	Typical Value	Unit	Test method
Flexural Strength			
--	248	MPa	ASTM D790
--	250	MPa	ISO 178
Compressive Strength	275	MPa	ASTM D695
Poisson's Ratio	0.37		ISO 527

Impact	Typical Value	Unit	Test method
Charpy Notched Impact Strength			ISO 179
--	7.9	kJ/m <sup>2</sup>	
-- <sup>1</sup>	7.5	kJ/m <sup>2</sup>	
Charpy Unnotched Impact Strength			ISO 179
--	45	kJ/m <sup>2</sup>	
-- <sup>1</sup>	42	kJ/m <sup>2</sup>	
Notched Izod Impact			
3.18 mm	80	J/m	ASTM D256
--	8.0	kJ/m <sup>2</sup>	ISO 180/A
Unnotched Izod Impact			
3.18 mm	480	J/m	ASTM D4812
--	30	kJ/m <sup>2</sup>	ISO 180

Hardness	Typical Value	Unit	Test method
Rockwell Hardness			ASTM D785
M-Scale	103		
R-Scale	122		

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	1.5E-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	0.31	W/m/K	Internal Method
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
Dielectric Constant			ASTM D150
25°C, 1 kHz	3.80		
25°C, 1 MHz	3.80		

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Electrical	Typical Value	Unit	Test method
Dissipation Factor			ASTM D150
25°C, 1 kHz	2.0E-3		
25°C, 1 MHz	3.0E-3		
Arc Resistance	125	sec	ASTM D495
Comparative Tracking Index (CTI)	175	V	IEC 60112
Comparative Tracking Index (CTI)	PLC 4		UL 746A

Flammability	Typical Value	Unit	Test method
Flame Rating (0.8 mm)	V-0		UL 94
Oxygen Index	45	%	ASTM D2863

Additional Information	Typical Value	Unit
Hydrolytic Stability <sup>2</sup>		
Tensile Strength Retained	> 80	%
Weight Gain	< 1.0	%

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.

<sup>1</sup> 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.

<sup>2</sup> Test specimens aged 1000 hours in water at 140°C (284°F)

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