

Technical Data Sheet

Ryton[®] R-4 polyphenylene sulfide

Ryton® R-4 and R-4-02 40% glass fiber reinforced polyphenylene sulfide compounds provide a good combination of mechanical and electrical properties with

outstanding chemical resistance, even at elevated temperatures.

Availability Asia Pacific Europe North America Europe North America Features Chemical Resistant Good Electrical Properties Jese Automotive Applications RoHS Compliance RoHS Compliance RoHS Compliant Automotive Applications FORD ESF-M4D388-A3 Appearance Natural Color Forms Pellets Processing Method Injection Molding Physical Tipical Value Unit Test method Density / Specific Gravity 1.69 ASTM D792 Molding Shrinkage Flow : 3.20 mm 0.20 % Astm D574 Mater Absorption (24 hr, 23°C) 0.020 % ASTM D574 Tipical Value Unit Test method Test method So MPa ASTM D574 Tipical Value Unit Test method So Sc 27-3 Test method So MPa ASTM D633 Break 1.1 % ASTM D634 Break 1.2 % So 527-3 Test method So 527-3 Testal Modulus ASTM D534 Test Method ASTM D536 Test Method So 527-4 Test Method Test Meth	General				
Availability • Europe • North America Filler / Reinforcement • Glass Fiber, 40% Filler by Weight Features • Chemical Resistant • Good Electrical Properties Jases • Automotive Applications • Good Electrical Properties Sess • Automotive Applications • FORD ESF-M4D388-A3 Automotive Specifications • FORD ESF-M4D388-A3 Appearance • Natural Color Forms • Pellets Processing Method • Injection Molding Physical Typical Value Unit Test method Density / Specific Gravity 1.69 ASTM D792 Molding Shrinkage - - Flow : 3.20 mm 0.20 % ASTM D570 Machanical Typical Value Unit Test method Tensile Strength - - 159 MPa ASTM D630 159 MPa ASTM D630 159 MPa ASTM D630 150 MPa ISO 527-4 Fexural Modulus - - 150 MPa ASTM D630 Break 1.1 % ASTM D630	Material Status	Commercial: Active			
Europe • North Annerica Filler / Reinforcement • Glass Fiber, 40% Filler by Weight Features • Chemical Resistant • Good Electrical Properties Jses • Automotive Applications ROHS Compliance • RoHS Compliant Automotive Specifications • FORD ESF-M4D38A3 Appearance • Natural Color Forms • Pellets Processing Method • Injection Molding Physical Typical Value Unit Density / Specific Gravity 1.69 Across Flow : 3.20 mm 0.20 % Across Flow : 3.20 mm 0.20 % Mater Absorption (24 hr, 23°C) 0.020 % Vechanical Typical Value Unit Test method 150 MPa Flow : 3.20 mm 0.50 % Wechanical Typical Value Unit Test method 150 MPa Feak 1.1 % ASTM D537 Processition 150 MPa Feaval Modulus 1.2 % 14000 MPa 14000 MPa 14000 MPa 221 MPa <td rowspan="2">Availability</td> <td>Asia Pacific</td> <td></td> <td></td> <td></td>	Availability	Asia Pacific			
Features • Chemical Resistant • Good Electrical Properties Jses • Automotive Applications RoHS Compliance • RoHS Compliant Automotive Specifications • FORD ESF-M4D388-A3 Appearance • Natural Color Forms • Pellets Processing Method • Injection Molding Physical Typical Value Unit Processing Method • Injection Molding Physical Typical Value Unit Pensity / Specific Gravity 1.69 AsTM D73 Molding Shrinkage Flow : 3.20 mm 0.20 % Across Flow : 3.20 mm 0.20 % Across Flow : 3.20 mm 0.50 % Water Absorption (24 hr, 23°C) 0.020 % Mechanical Typical Value Unit Test methor resile Strength 159 MPa ASTM D633 150 MPa Iso 527-4 Tensile Elongation 150 MPa Iso 527-4 Flexural Modulus 150 MPa ASTM D634 150 MPa ASTM D794 Iso 174 Flexural Modulus </td <td>• Europe</td> <td> Nort </td> <td>h America</td> <td></td>		• Europe	 Nort 	h America	
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RoHS Compliance • RoHS Compliant Automotive Specifications • FORD ESF-M4D388-A3 Appearance • Natural Color Forms • Pellets Processing Method • Injection Molding Physical Typical Value Unit Density / Specific Gravity 1.69 Across Flow : 3.20 mm 0.20 % Across Flow : 3.20 mm 0.50 % Water Absorption (24 hr, 23°C) 0.020 % Vale Absorption (24 hr, 23°C) 0.020 % Mater Absorption (24 hr, 23°C) 0.020 % Presk Typical Value Unit Test method 159 MPa ASTM D570 0.020 % Valer Absorption (24 hr, 23°C) 0.020 % Mater Absorption (24 hr, 23°C) 0.020 % Mater Absorption (24 hr, 23°C) 0.020 % Fensile Elongation ISO 527-2 Tensile Elongation ISO 527-2 Break 1.1 % ASTM D630 Break 1.2 % ISO 527-2 Flexural Modulus	Features	Chemical Resistant Good Electrical Properties			
Automotive Specifications • FORD ESF-M4D388-A3 Appearance • Natural Color Forms • Pellets Processing Method • Injection Molding Physical Typical Value Unit Density / Specific Gravity 1.69 Density / Specific Gravity 1.69 Molding Shrinkage 0.20 % Flow : 3.20 mm 0.20 % Across Flow : 3.20 mm 0.50 % Water Absorption (24 hr, 23°C) 0.020 % Mochanical Typical Value Unit Test method 150 MPa Fensile Strength 150 MPa 159 MPa ASTM D633 150 MPa ISO 527-4 Flexak 1.1 % ASTM D634 Break 1.2 % ISO 527-4 Flexural Modulus 14500 MPa ASTM D634 14500 MPa ASTM D794 14500 MPa ASTM D794 14500 MPa ASTM D794 14500 MPa ASTM D794 14000 MPa ISO 174 Flexural Strength	Uses	 Automotive Applications 			
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14000 MPa ISO 178 Flexural Strength 221 MPa ASTM D790 220 MPa ISO 178 Compressive Strength 270 MPa ASTM D698	Flexural Modulus				
Flexural Strength221 MPaASTM D790220 MPaISO 178Compressive Strength270 MPaASTM D698			14500 MI	Pa	ASTM D790
221 MPa ASTM D790 220 MPa ISO 178 Compressive Strength 270 MPa ASTM D698			14000 MI	Pa	ISO 178
220 MPaISO 178Compressive Strength270 MPaASTM D695	Flexural Strength				
Compressive Strength 270 MPa ASTM D695					ASTM D790
			220 MI	Pa	ISO 178
Poisson's Ratio 0.38	Compressive Strength		270 MI	Pa	ASTM D695
	Poisson's Ratio		0.38		

Impact	Typical Value Unit	Test method
Notched Izod Impact		
3.18 mm	91 J/m	ASTM D256
	9.0 kJ/m ²	ISO 180/A
Unnotched Izod Impact		
3.18 mm	400 J/m	ASTM D4812
	25 kJ/m ²	ISO 180
Hardness	Typical Value Unit	Test method
Rockwell Hardness		ASTM D785
M-Scale	104	
R-Scale	122	
Thermal	Typical Value Unit	Test method
Deflection Temperature Under Load		ASTM D648
1.8 MPa, Unannealed	265 °C	
CLTE		ASTM E831
Flow : -50 to 50°C	2.0E-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	8.0E-5 cm/cm/°C	
Thermal Conductivity	0.32 W/m/K	
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	20 kV/mm	ASTM D149
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 ¹ (90°C)	1.0E+11 ohms	

Flammability		Typical Value Unit	Test method
Flame Rating (1.6 mm)	•	V-0 5VA	UL 94
Oxygen Index		47 %	ASTM D2863

Notes

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

¹ 95%RH, 48 hr

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Progress beyond

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