Hexion Bakelite™ PF 4111 Phenolic Formaldehyde Resin, Improved Electrical Properties, Ammonia Free, Resistant to High Temperatures, Low Shrinkage, High Arc Resistance, UL Listed, Acetic Acid Free, Copper Adhesive

Category : Polymer , Thermoset , Filled/Reinforced Thermoset , Phenolic

Material Notes:

Phenolic molding compound, inorganically filled, glass fiber reinforced, ammonia and acetic acid free, electrically high grade, high temperature stability, high mechanical strength, copper-adhesive, UL listed molding compound 0.75 mm/V-0 (BK).Application areas: Commutators (starter motors, fuel pumps, actuators, HVAC motors, fan motors, window lift motors, ABS, wiper motors, garden appliances, household appliances, power tools, universal motors).Information provided by Bakelite AGBakelite AG became a part of Hexion in 2005.

Order this product through the following link:
http://www.lookpolymers.com/polymer_Hexion-Bakelite-PF-4111-Phenolic-Formaldehyde-Resin-Improved-Electrical-Properties-Ammonia-Free-Resistant-to-High-Temperatures-Low-Shrinkage-High-Arc-Resistance-UL-Listed-Acetic-Acid-Free-Copper-Adhesive.php

Physical Properties	Metric	English	Comments
Density	1.87 g/cc	0.0676 lb/in³	ISO 1183
Apparent Bulk Density	0.800 g/cc	0.0289 lb/in³	ISO 60
Linear Mold Shrinkage, Flow	-0.000100 cm/cm	-0.000100 in/in	Compression molding; ISO 2577

Mechanical Properties	Metric	English	Comments
Flexural Strength	125 MPa	18100 psi	2 mm/min; ISO 178
Flexural Modulus	15.0 GPa	2180 ksi	ISO 178
Charpy Impact Unnotched	0.850 J/cm² @Temperature 23.0 °C	4.05 ft-lb/in² @Temperature 73.4 °F	ISO 179-1/2 eU
Charpy Impact, Notched	0.250 J/cm² @Temperature 23.0 °C	1.19 ft-lb/in² @Temperature 73.4 °F	ISO 179-1/2 eA

Thermal Properties	Metric	English	Comments
Maximum Service Temperature, Air	170 °C	338 °F	<20000 hours; IEC 60216-P1
	220 °C	428 °F	< 50 hours; IEC 60216-P1
Deflection Temperature at 8.0 MPa	185 °C	365 °F	ISO 75-2
UL RTI, Electrical	150 °C @Thickness 0.750 mm	302 °F @Thickness 0.0295 in	BK
UL RTI, Mechanical with Impact	150 °C @Thickness 0.750 mm	302 °F @Thickness 0.0295 in	BK

Thermal Properties	Metric	English	Comments
UL RTI, Mechanical without Impact	@Thickness 0.750 mm	@Thickness 0.0295 in	BK
Flammability, UL94	V-0 @Thickness 0.750 mm	V-0 @Thickness 0.0295 in	BK
Shrinkage	0.140 % @Temperature 110 °C	0.140 % @Temperature 230 °F	Compression molding; ISO 2577

Electrical Properties	Metric	English	Comments
Volume Resistivity	1.00e+12 ohm-cm	1.00e+12 ohm-cm	IEC 60093
Surface Resistance	1.00e+11 ohm	1.00e+11 ohm	IEC 60093
Dielectric Constant	6.5 @Frequency 100 Hz	6.5 @Frequency 100 Hz	IEC 60250
Dielectric Strength	30.0 kV/mm @Thickness 1.00 mm	762 kV/in @Thickness 0.0394 in	IEC 60243-P1
Dissipation Factor	0.050 @Frequency 100 Hz	0.050 @Frequency 100 Hz	IEC 60250
Arc Resistance	185 - 190 sec	185 - 190 sec	ASTM D495
High Voltage Arc Resistance to Ignition (HVAR)	>= 300 sec @Thickness 0.750 mm	>= 300 sec @Thickness 0.0295 in	BK
Comparative Tracking Index	225 V	225 V	Test liquid A; IEC 60112
Hot Wire Ignition, HWI	60 - 120 sec @Thickness 0.750 mm	60 - 120 sec @Thickness 0.0295 in	BK
	>= 120 sec @Thickness 1.50 mm	>= 120 sec @Thickness 0.0591 in	(BK)
High Amp Arc Ignition, HAI	0.00 - 15 arcs @Thickness 0.750 mm	0.00 - 15 arcs @Thickness 0.0295 in	BK
High Voltage Arc-Tracking Rate, HVTR	0.000 - 10.0 mm/min @Thickness 3.00 mm	0.000 - 0.394 in/min @Thickness 0.118 in	BK

Processing Properties	Metric	English	Comments
Feed Temperature	60.0 - 75.0 °C	140 - 167 °F	Injection molding

Processing Properties	Metric	English	Comments
Nozzle Temperature	80.0 - 100 °C	176 - 212 °F	Injection molding
Melt Temperature	80.0 - 100 °C	176 - 212 °F	Injection molding
Mold Temperature	160 - 190 °C	320 - 374 °F	Injection molding
	160 - 190 °C	320 - 374 °F	Compression molding
Injection Pressure	>= 15.0 MPa	>= 2180 psi	Compression and injection cavity mold pressure
Back Pressure	0.500 - 2.00 MPa	72.5 - 290 psi	Injection molding
Cure Time	0.167 - 0.333 min	0.00278 - 0.00556 hour	Per 1 mm of wall thickness, injection molding
	0.333 - 0.667 min	0.00556 - 0.0111 hour	Per 1 mm of wall thickness, compression molding

Descriptive Properties	Value	Comments
Chromatic Spectrum	All Colors	
Creep Rupture Strength	Very Good	
Holding Pressure	Approximately 40-60% of injection pressure	
Media Resistance	Very Good	
Moisture Absorption	6 mg	ISO 62, 24 hours at 23°C
Reserves by Peak Temperature	Very High	
Thermal Expansion	Very Slight	

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