

NORYL™ SE1X resin

Polyphenylene Ether + PS

SABIC Innovative Plastics

Message:

PPE+PS blend. Unfilled. Non-brominated, non-chlorinated FR system. UL94 V1, UL746C F1. Dielectric strength. Suitable for E/E market indoor/outdoor applications.

General Information			
UL YellowCard	E121562-100107130		
Additive	Flame Retardant		
Features	Bromine Free		
	Chlorine Free		
	Flame Retardant		
Uses	Electrical/Electronic Applications		
	Outdoor Applications		
Processing Method	Injection Molding		
Multi-Point Data	Coefficient of Thermal Expansion vs. Temperature (ASTM E831)		
	Compressive Stress vs. Strain (ASTM D695)		
	Elastic Modulus vs Temperature (ASTM D4065)		
	Flexural DMA (ASTM D4065)		
	Pressure-Volume-Temperature (PVT - Zoller Method)		
	Shear DMA (ASTM D4065)		
	Specific Heat vs. Temperature (ASTM D3417)		
	Tensile Creep (ASTM D2990)		
	Tensile Fatigue		
	Tensile Stress vs. Strain (ASTM D638)		
Physical	Thermal Conductivity vs. Temperature (ASTM E1530)		
	Viscosity vs. Shear Rate (ASTM D3835)		
	Nominal Value	Unit	Test Method
	Specific Gravity	1.09	g/cm ³ ASTM D792
	Melt Mass-Flow Rate (MFR) (280°C/5.0 kg)	8.5	g/10 min ASTM D1238
	Melt Volume-Flow Rate (MVR) (280°C/5.0 kg)	8.70	cm ³ /10min ISO 1133
	Molding Shrinkage		Internal Method
	Flow : 3.20 mm	0.50 to 0.70	%
	Across Flow ¹	0.50 to 0.70	%
	Water Absorption (24 hr)	0.060	% ASTM D570
	Outdoor Suitability	f1	UL 746C

Mechanical	Nominal Value	Unit	Test Method
Tensile Modulus			
-- ²	2500	MPa	ASTM D638
--	2670	MPa	ISO 527-2/1
Tensile Strength			
Yield ³	65.0	MPa	ASTM D638
Yield	61.3	MPa	ISO 527-2/50
Break ⁴	53.1	MPa	ASTM D638
Break	50.8	MPa	ISO 527-2/50
Tensile Elongation			
Yield ⁵	4.0	%	ASTM D638
Yield	4.3	%	ISO 527-2/50
Break ⁶	15	%	ASTM D638
Break	21	%	ISO 527-2/50
Flexural Modulus			
50.0 mm Span ⁷	2700	MPa	ASTM D790
100 mm Span ⁸	2400	MPa	ASTM D790
-- ⁹	2560	MPa	ISO 178
Flexural Stress			
--	99.5	MPa	ISO 178
Yield, 50.0 mm Span ¹⁰	100	MPa	ASTM D790
Yield, 100 mm Span ¹¹	98.0	MPa	ASTM D790
Impact	Nominal Value	Unit	Test Method
Notched Izod Impact			
-30°C	110	J/m	ASTM D256
23°C	180	J/m	ASTM D256
23°C ¹²	15	kJ/m ²	ISO 180/1A
Unnotched Izod Impact (23°C)	2600	J/m	ASTM D4812
Instrumented Dart Impact (23°C, Total Energy)	49.7	J	ASTM D3763
Thermal	Nominal Value	Unit	Test Method
Deflection Temperature Under Load			
0.45 MPa, Unannealed, 3.20 mm	127	°C	ASTM D648
0.45 MPa, Unannealed, 6.40 mm	129	°C	ASTM D648
0.45 MPa, Unannealed, 100 mm Span ¹³	129	°C	ISO 75-2/Be
1.8 MPa, Unannealed, 3.20 mm	113	°C	ASTM D648
1.8 MPa, Unannealed, 6.40 mm	118	°C	ASTM D648
1.8 MPa, Unannealed, 100 mm Span ¹⁴	115	°C	ISO 75-2/Ae
Vicat Softening Temperature			
--	132	°C	ISO 306/B50
--	135	°C	ISO 306/B120
CLTE			ASTM E831

Flow : -40 to 40°C	8.0E-5	cm/cm/°C	
Transverse : -40 to 40°C	8.8E-5	cm/cm/°C	
RTI Elec	110	°C	UL 746
RTI Imp	105	°C	UL 746
RTI Str	110	°C	UL 746
Electrical	Nominal Value	Unit	Test Method
Surface Resistivity	> 1.0E+15	ohms	ASTM D257
Volume Resistivity	2.3E+16	ohms·cm	ASTM D257
Dielectric Strength (3.20 mm, in Oil)	18	kV/mm	ASTM D149
Dielectric Constant			ASTM D150
50 Hz	2.52		
60 Hz	2.52		
1 MHz	2.46		
Dissipation Factor			ASTM D150
50 Hz	3.4E-3		
60 Hz	3.4E-3		
1 MHz	2.1E-3		
Arc Resistance ¹⁵	PLC 6		ASTM D495
Comparative Tracking Index (CTI)	PLC 1		UL 746
High Voltage Arc Tracking Rate (HVTR)	PLC 4		UL 746
Flammability	Nominal Value	Unit	Test Method
Flame Rating			UL 94
1.47 mm	V-1		
5.99 mm	V-0		
Radiant Panel Listing (UL)	RP100		
Injection	Nominal Value	Unit	
Drying Temperature	104 to 110	°C	
Drying Time	3.0 to 4.0	hr	
Drying Time, Maximum	8.0	hr	
Suggested Max Moisture	0.020	%	
Suggested Shot Size	30 to 70	%	
Rear Temperature	249 to 299	°C	
Middle Temperature	260 to 304	°C	
Front Temperature	271 to 310	°C	
Nozzle Temperature	282 to 310	°C	
Processing (Melt) Temp	282 to 310	°C	
Mold Temperature	76.7 to 104	°C	
Back Pressure	0.345 to 0.689	MPa	
Screw Speed	20 to 100	rpm	
NOTE			
1.	Tensile Bar		
2.	50 mm/min		

3.	Type I, 50 mm/min
4.	Type I, 50 mm/min
5.	Type I, 50 mm/min
6.	Type I, 50 mm/min
7.	1.3 mm/min
8.	2.6 mm/min
9.	2.0 mm/min
10.	1.3 mm/min
11.	2.6 mm/min
12.	80*10*4
13.	120*10*4 mm
14.	120*10*4 mm
15.	Tungsten Electrode

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