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Celanese Zytel® E51HSB

Categories:Polymer; Thermoplastic; Nylon (Polyamide PA); Nylon 66 (PA66)
Material Notes:Unreinforced, Heat Stabilized, High Viscosity Polyamide 66
Former DuPont product acquired by Celanese in 2022.

Physical Properties	Metric	English	Comments
Density	1.14 g/cc	0.0412 lb/in³	DAM; ISO 1183
Melt Density	0.980 g/cc @Temperature 295 °C	0.0354 lb/in³ @Temperature 563 °F	
Water Absorption	8.5 % @Thickness 2.00 mm	8.5 % @Thickness 0.0787 in	DAM; Sim. to ISO 62
Moisture Absorption	2.60 % @Thickness 2.00 mm	2.60 % @Thickness 0.0787 in	DAM; Sim. to ISO 62
Viscosity Number	310 cm³/g	3.10 dl/g	90% formic acid; ISO 307, 1157, 1628
Linear Mold Shrinkage, Flow	0.013 cm/cm	0.013 in/in	DAM; ISO 294-4, 2577
Linear Mold Shrinkage, Transverse	0.013 cm/cm	0.013 in/in	DAM; ISO 294-4, 2577

Mechanical Properties	Metric	English	Comments
Tensile Strength, Yield	55.0 MPa	7980 psi	50% RH; ISO 527-1/-2
	84.0 MPa	12200 psi	DAM; ISO 527-1/-2
Elongation at Break	35 %	35 %	Nominal; DAM; ISO 527-1/-2
Elongation at Yield	4.3 %	4.3 %	DAM; ISO 527-1/-2
	29 %	29 %	50% RH; ISO 527-1/-2
Tensile Modulus	1.20 GPa	174 ksi	50% RH; ISO 527-1/-2
	3.10 GPa	450 ksi	DAM; ISO 527-1/-2
Flexural Strength	95.0 MPa @Strain 3.5 %	13800 psi @Strain 3.5 %	DAM; ISO 178
Flexural Modulus	2.80 GPa	406 ksi	DAM; ISO 178
Poissons Ratio	0.37	0.37	DAM
	0.44	0.44	50% RH
Izod Impact, Notched (ISO)	6.00 kJ/m² @Temperature 23.0 °C	2.86 ft-lb/in² @Temperature 73.4 °F	DAM; ISO 180/1A
Charpy Impact Unnotched	NB @Temperature 23.0 °C	NB @Temperature 73.4 °F	DAM; ISO 179/1eU
Charpy Impact, Notched	0.400 J/cm² @Temperature -30.0 °C	1.90 ft-lb/in² @Temperature -22.0 °F	50% RH; ISO 179/1eA
	0.600 J/cm² @Temperature -30.0 °C	2.86 ft-lb/in² @Temperature -22.0 °F	DAM; ISO 179/1eA
	0.700 J/cm² @Temperature 23.0 °C	3.33 ft-lb/in² @Temperature 73.4 °F	DAM; ISO 179/1eA
	2.10 J/cm² @Temperature 23.0 °C	9.99 ft-lb/in² @Temperature 73.4 °F	50% RH; ISO 179/1eA

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Electrical Properties	Metric	English	Comments
Volume Resistivity	1.00e+13 ohm-cm	1.00e+13 ohm-cm	50% RH; IEC 62631-3-1
	>= 1.00e+15 ohm-cm	>= 1.00e+15 ohm-cm	DAM; IEC 62631-3-1
Comparative Tracking Index	600 V	600 V	DAM; IEC 60112

Thermal Properties	Metric	English	Comments
CTE, linear, Parallel to Flow	100 µm/m-°C	55.6 µin/in-°F	DAM; ISO 11359-1/-2
CTE, linear, Transverse to Flow	100 µm/m-°C	55.6 µin/in-°F	DAM; ISO 11359-1/-2
Specific Heat Capacity	2.79 J/g-°C @Temperature 295 °C	0.667 BTU/lb-°F @Temperature 563 °F	Melt
Thermal Conductivity	0.160 W/m-K @Temperature 295 °C	1.11 BTU-in/hr-ft²-°F @Temperature 563 °F	Melt
Melting Point	262 °C	504 °F	10°C/min; DAM; ISO 11357-1/-3
Deflection Temperature at 0.46 MPa (66 psi)	200 °C	392 °F	DAM; ISO 75-1/-2
Deflection Temperature at 1.8 MPa (264 psi)	70.0 °C	158 °F	DAM; ISO 75-1/-2
Vicat Softening Point	221 °C	430 °F	50°C/h, 50N; DAM; ISO 306
Glass Transition Temp, Tg	20.0 °C	68.0 °F	10°C/min; 50% RH; ISO 11357-1/-2
	70.0 °C	158 °F	10°C/min; DAM; ISO 11357-1/-2
Oxygen Index	20 %	20 %	DAM; ISO 4589-1/-2

Processing Properties	Metric	English	Comments
Melt Temperature	285 °C	545 °F	Optimum, Extrusion
	280 - 290 °C	536 - 554 °F	Range, Extrusion
	290 - 300 °C	554 - 572 °F	Optimum, Injection
	290 - 300 °C	554 - 572 °F	Range, Injection
Mold Temperature	70.0 °C	158 °F	Optimum, Injection
	50.0 - 90.0 °C	122 - 194 °F	Injection
Ejection Temperature	190 °C	374 °F	Injection
Drying Temperature	80.0 °C	176 °F	Injection
	80.0 °C	176 °F	Extrusion

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Dry Time	2.00 - 4.00 hour	2.00 - 4.00 hour	Injection, Dehumidified Dryer
	4.00 - 6.00 hour	4.00 - 6.00 hour	Extrusion, Dehumidified Dryer
Moisture Content	<= 0.050 %	<= 0.050 %	Extrusion
	<= 0.050 %	<= 0.050 %	Injection
Hold Pressure	50.0 - 100 MPa	7250 - 14500 psi	Range, Injection

Descriptive Properties		
Additives	Release agent	
Drying Recommended	yes	Injection
FMVSS Class	DNI	ISO 3795 (FMVSS 302)
ISO designation	ISO 16396-PA66,,M1G1HNR,S32-030	
Max. screw tangential speed (m/s)	0.4	Injection
Part Marking Code	>PA66<	ISO 11469
Polymer	PA66	
Processing Hold Pressure Time (s/mm)	4	Injection
Resin Identification	PA66	ISO 1043