

Celanese Zytel® 135F

Categories: Polymer; Thermoplastic; Nylon (Polyamide PA); Nylon 66 (PA66)

Material Notes: Unreinforced, Nucleated, Polyamide 66

Former DuPont product acquired by Celanese in 2022.

Physical Properties	Metric	English	Comments
Density	1.14 g/cc	0.0412 lb/in ³	DAM; ISO 1183
Melt Density	1.01 g/cc @Temperature 290 °C	0.0365 lb/in ³ @Temperature 554 °F	
Water Absorption	8.5 % @Thickness 2.00 mm	8.5 % @Thickness 0.0787 in	DAM; Sim. to ISO 62
Moisture Absorption	2.70 % @Thickness 2.00 mm	2.70 % @Thickness 0.0787 in	DAM; Sim. to ISO 62
Viscosity Number	150 cm ³ /g	1.50 dl/g	Sulfuric acid 96%; ISO 307, 1157, 1628
Linear Mold Shrinkage, Flow	0.0070 cm/cm	0.0070 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
Hardness, Rockwell M	64	64	50% RH; ISO 2039-2
	87	87	DAM; ISO 2039-2
Hardness, Rockwell R	116	116	50% RH; ISO 2039-2
	123	123	DAM; ISO 2039-2
Tensile Strength, Yield	67.0 MPa	9720 psi	50% RH; ISO 527-1/-2
	98.0 MPa	14200 psi	DAM; ISO 527-1/-2
Elongation at Break	4.5 %	4.5 %	parallel; DAM; ISO 527-3
	13 %	13 %	Nominal; DAM; ISO 527-1/-2
	50 %	50 %	Nominal; 50% RH; ISO 527-1/-2
Elongation at Yield	4.5 %	4.5 %	DAM; ISO 527-1/-2
	18 %	18 %	50% RH; ISO 527-1/-2
Tensile Modulus	2.00 GPa	290 ksi	50% RH; ISO 527-1/-2
	3.60 GPa	522 ksi	DAM; ISO 527-1/-2
Flexural Strength	110 MPa @Strain 3.5 %	16000 psi @Strain 3.5 %	DAM; ISO 178
Flexural Modulus	3.30 GPa	479 ksi	DAM; ISO 178
Poissons Ratio	0.36	0.36	DAM
	0.40	0.40	50% RH
Izod Impact, Notched (ISO)	2.00 kJ/m ² @Temperature -30.0 °C	0.952 ft-lb/in ² @Temperature -22.0 °F	50% RH; ISO 180/1A
	3.00 kJ/m ² @Temperature -30.0 °C	1.43 ft-lb/in ² @Temperature -22.0 °F	DAM; ISO 180/1A
	3.50 kJ/m ² @Temperature 23.0 °C	1.67 ft-lb/in ² @Temperature 73.4 °F	DAM; ISO 180/1A
	9.00 kJ/m ² @Temperature 23.0 °C	4.28 ft-lb/in ² @Temperature 73.4 °F	50% RH; ISO 180/1A
Charpy Impact Unnotched	NB @Temperature -30.0 °C	NB @Temperature -22.0 °F	50% RH; ISO 179/1eU

Charpy Impact, Notched	NB @Temperature -30.0 °C	NB @Temperature -22.0 °F	DAM; ISO 179/1eU
	NB @Temperature 23.0 °C	NB @Temperature 73.4 °F	50% RH; ISO 179/1eU
	NB @Temperature 23.0 °C	NB @Temperature 73.4 °F	DAM; ISO 179/1eU
	0.250 J/cm ² @Temperature -30.0 °C	1.19 ft-lb/in ² @Temperature -22.0 °F	50% RH; ISO 179/1eA
	0.300 J/cm ² @Temperature -30.0 °C	1.43 ft-lb/in ² @Temperature -22.0 °F	DAM; ISO 179/1eA
	0.400 J/cm ² @Temperature 23.0 °C	1.90 ft-lb/in ² @Temperature 73.4 °F	DAM; ISO 179/1eA
	0.900 J/cm ² @Temperature 23.0 °C	4.28 ft-lb/in ² @Temperature 73.4 °F	50% RH; ISO 179/1eA
Tensile Creep Modulus, 1 hour	2000 MPa	290000 psi	1h; 50% RH; ISO 899-1
Tensile Creep Modulus, 1000 hours	1280 MPa	186000 psi	1000h; 50% RH; ISO 899-1

Electrical Properties	Metric	English	Comments
Dielectric Constant	3.8 @Frequency 1e+6 Hz	3.8 @Frequency 1e+6 Hz	DAM; IEC 62631-2-1
	3.9 @Frequency 1e+6 Hz	3.9 @Frequency 1e+6 Hz	50% RH; IEC 62631-2-1
	3.9 @Frequency 100 Hz	3.9 @Frequency 100 Hz	DAM; IEC 62631-2-1
	8.7 @Frequency 100 Hz	8.7 @Frequency 100 Hz	50% RH; IEC 62631-2-1
Dissipation Factor	0.0070 @Frequency 100 Hz	0.0070 @Frequency 100 Hz	DAM; IEC 62631-2-1
	0.020 @Frequency 1e+6 Hz	0.020 @Frequency 1e+6 Hz	DAM; IEC 62631-2-1
	0.060 @Frequency 1e+6 Hz	0.060 @Frequency 1e+6 Hz	50% RH; IEC 62631-2-1
	0.24 @Frequency 100 Hz	0.24 @Frequency 100 Hz	50% RH; IEC 62631-2-1
Comparative Tracking Index	600 V	600 V	DAM; IEC 60112

Thermal Properties	Metric	English	Comments
CTE, linear, Parallel to Flow	121 µm/m-°C	67.2 µin/in-°F	DAM; ISO 11359-1/-2
CTE, linear, Transverse to Flow	121 µm/m-°C	67.2 µin/in-°F	DAM; ISO 11359-1/-2
Specific Heat Capacity	2.79 J/g-°C @Temperature 290 °C	0.667 BTU/lb-°F @Temperature 554 °F	Melt
Thermal Conductivity	0.160 W/m-K @Temperature 290 °C	1.11 BTU-in/hr-ft ² -°F @Temperature 554 °F	Melt
Melting Point	263 °C	505 °F	10°C/min; DAM; ISO 11357-1/-3
Deflection Temperature at 0.46 MPa (66 psi)	210 °C	410 °F	DAM; ISO 75-1/-2

Deflection Temperature at 1.8 MPa (264 psi)	75.0 °C	167 °F	DAM; ISO 75-1/-2
Vicat Softening Point	245 °C	473 °F	50°C/h, 50N; DAM; ISO 306
Glass Transition Temp, Tg	40.0 °C	104 °F	10°C/min; 50% RH; ISO 11357-1/-2
	60.0 °C	140 °F	10°C/min; DAM; ISO 11357-1/-2
Flammability, UL94	V-2 @Thickness 0.710 mm	V-2 @Thickness 0.0280 in	DAM; IEC 60695-11-10
	V-2 @Thickness 1.50 mm	V-2 @Thickness 0.0591 in	DAM; IEC 60695-11-10
Glow Wire Ignition Temperature	725 °C @Thickness 0.750 mm	1340 °F @Thickness 0.0295 in	DAM; IEC 60695-2-13
	750 °C @Thickness 1.50 mm	1380 °F @Thickness 0.0591 in	DAM; IEC 60695-2-13
	800 °C @Thickness 3.00 mm	1470 °F @Thickness 0.118 in	DAM; IEC 60695-2-13
Processing Properties	Metric	English	Comments
Melt Temperature	290 °C	554 °F	Optimum, Injection
	280 - 300 °C	536 - 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
Dry Time	2.00 - 4.00 hour	2.00 - 4.00 hour	Injection, Dehumidified Dryer
Moisture Content	<= 0.20 %	<= 0.20 %	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,,M1G1NR,S14-040		
Max. screw tangential speed (m/s)	0.3		Injection
Part Marking Code	>PA66<		ISO 11469
Polymer	PA66		
Processing Hold Pressure Time (s/mm)	3.5		Injection
Regional Availability	Asia Pacific Europe Near East/Africa		
Resin Identification	PA66		ISO 1043