Zytel® 77G33L NC010

NYLON RESIN

DuPont Performance Polymers

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Technical Data

Product Description			
33% Glass Reinforced Polyamide 612			
General			
Material Status	• Commercial: Active		
Literature [1]	• Processing - Injection Molding (English) • Processing - Injection Molding of Glass-reinforced Zytel (English) • Typical Processing for DuPont Engineering Polymers (English)		
UL Yellow Card [2]	• E41938-234360		
Search for UL Yellow Card	• DuPont Performance Polymers • Zytel®		
Availability	• Africa & Middle East • Asia Pacific	• Europe • Latin America	• North America
Filler / Reinforcement	• Glass Fiber, 33% Filler by Weight		
Additive	• Lubricant	• Mold Release	
RoHS Compliance	• Contact Manufacturer		
Automotive Specifications	• ASTM D4066 PA610 G35 A43560 E12 • ASTM D6779 PA051 G35	• CHRYSLER MS-DB-41 CPN4765 • GM GMP.PA612.004	
Forms	• Pellets		
Processing Method	• Injection Molding		
Multi-Point Data	• Isothermal Stress vs. Strain (ISO 11403-1) • Secant Modulus vs. Strain (ISO 11403-1) • Shear Modulus vs. Temperature (ISO 11403-1) • Shear Modulus vs. Temperature, Dynamic (ISO 11403-1) • Tensile Modulus vs. Temperature, Dynamic (ISO 11403-1)		
Part Marking Code (ISO 11469)	• PA612-GF33		
Resin ID (ISO 1043)	• PA612-GF33		

Physical	Dry	Conditioned	Unit	Test Method
Density	1.32	--	g/cm³	ISO 1183
Molding Shrinkage				
Flow : 0.126 in (3.20 mm)	2.0E-3 (0.20)	--	in/in (%)	
Across Flow : 0.126 in (3.20 mm)	0.010 (1.0)	--	in/in (%)	
Across Flow	0.90	--	%	ISO 294-4
Flow	0.30	--	%	ISO 294-4
Water Absorption				ISO 62
73°F (23°C), 24 hr	0.30	--	%	
Saturation, 73°F (23°C), 0.0787 in (2.00 mm)	1.8	--	%	
Equilibrium, 73°F (23°C), 0.0787 in (2.00 mm), 50% RH	0.70	--	%	
Viscosity Number	100	--	cm³/g	ISO 307

Mechanical	Dry	Conditioned	Unit	Test Method
Tensile Modulus	1.38E+6 (9500)	1.15E+6 (7900)	psi (MPa)	ISO 527-2
Tensile Stress (Break)	24700 (170)	20300 (140)	psi (MPa)	ISO 527-2
Tensile Strain (Break)	3.2	3.2	%	ISO 527-2
Flexural Modulus	1.23E+6 (8500)	1.02E+6 (7000)	psi (MPa)	ISO 178
Flexural Stress	37700 (260)	--	psi (MPa)	ISO 178
Compressive Stress	23200 (160)	--	psi (MPa)	ISO 604
Shear Strength	10900 (75.0)	--	psi (MPa)	ASTM D732
Poisson's Ratio	0.34	0.34		ISO 527
Impact	**Dry**	**Conditioned**	**Unit**	**Test Method**
Charpy Notched Impact Strength				ISO 179/1eA
-40°F (-40°C)	5.7 (12)	4.8 (10)	ft·lb/in² (kJ/m²)	
-22°F (-30°C)	5.2 (11)	4.8 (10)	ft·lb/in² (kJ/m²)	
73°F (23°C)	6.2 (13)	5.7 (12)	ft·lb/in² (kJ/m²)	
Charpy Unnotched Impact Strength				ISO 179/1eU
-22°F (-30°C)	29 (60)	31 (65)	ft·lb/in² (kJ/m²)	
73°F (23°C)	38 (80)	43 (90)	ft·lb/in² (kJ/m²)	
Notched Izod Impact Strength				ISO 180/1A
-40°F (-40°C)	5.2 (11)	4.8 (10)	ft·lb/in² (kJ/m²)	
-22°F (-30°C)	5.2 (11)	4.8 (10)	ft·lb/in² (kJ/m²)	
73°F (23°C)	6.2 (13)	5.7 (12)	ft·lb/in² (kJ/m²)	
Unnotched Izod Impact Strength				ISO 180/1U
-22°F (-30°C)	29 (60)	21 (45)	ft·lb/in² (kJ/m²)	
73°F (23°C)	33 (70)	29 (60)	ft·lb/in² (kJ/m²)	
Thermal	**Dry**	**Conditioned**	**Unit**	**Test Method**
Heat Deflection Temperature				
66 psi (0.45 MPa), Unannealed	421 (216)	--	°F (°C)	ISO 75-2/B
264 psi (1.8 MPa), Unannealed	392 (200)	--	°F (°C)	ISO 75-2/A
Glass Transition Temperature [4]	149 (65.0)	131 (55.0)	°F (°C)	ISO 11357-2
Melting Temperature [4]	424 (218)	--	°F (°C)	ISO 11357-3

Thermal	Dry	Conditioned	Unit	Test Method
CLTE				ISO 11359-2
Flow	1.1E-5 (2.0E-5)	--	in/in/°F (cm/cm/°C)	
Flow : -40 to 73°F (-40 to 23°C)	1.4E-5 (2.6E-5)	--	in/in/°F (cm/cm/°C)	
Flow : 131 to 320°F (55 to 160°C)	7.8E-6 (1.4E-5)	--	in/in/°F (cm/cm/°C)	
Transverse	6.1E-5 (1.1E-4)	--	in/in/°F (cm/cm/°C)	
Transverse : -40 to 73°F (-40 to 23°C)	4.6E-5 (8.3E-5)	--	in/in/°F (cm/cm/°C)	
Transverse : 131 to 320°F (55 to 160°C)	8.9E-5 (1.6E-4)	--	in/in/°F (cm/cm/°C)	
Effective Thermal Diffusivity	7.50E-8	--	m²/s	

Electrical	Dry	Conditioned	Unit	Test Method
Surface Resistivity	--	1.0E+12	ohms	IEC 62631-3-2
Volume Resistivity	1.0E+15	1.0E+12	ohms·cm	IEC 62631-3-1
Electric Strength	840 (33)	760 (30)	V/mil (kV/mm)	IEC 60243-1
Relative Permittivity				IEC 62631-2-1
1 MHz	3.70	--		
100 Hz	4.10	--		
Dissipation Factor				IEC 62631-2-1
100 Hz	0.014	--		
1 MHz	0.020	--		
Comparative Tracking Index	600	--	V	IEC 60112

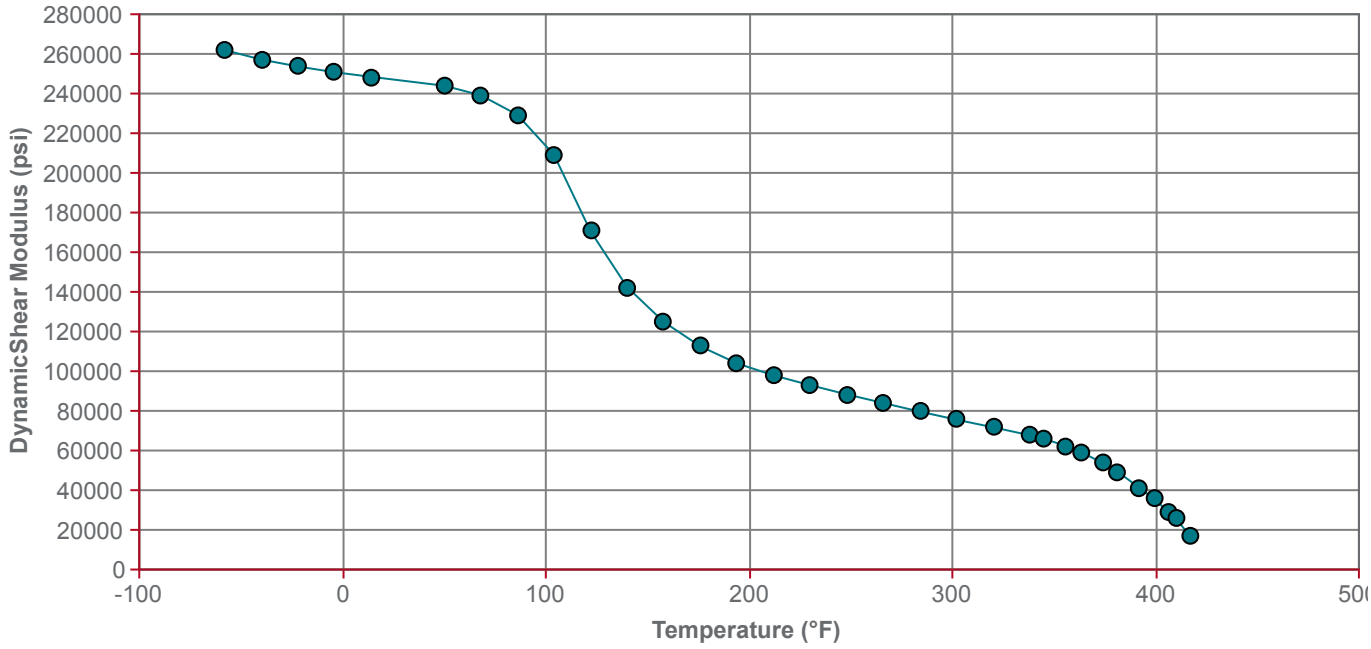
Flammability	Dry	Conditioned	Unit	Test Method
Burning Rate [5] (0.0394 in (1.00 mm))	0.91 (23)	--	in/min (mm/min)	ISO 3795
Flame Rating				UL 94 IEC 60695-11-10, -20
0.028 in (0.70 mm)	HB	--		
0.06 in (1.5 mm)	HB	--		
Oxygen Index	23	--	%	ISO 4589-2
FMVSS Flammability	B	--		FMVSS 302
Fogging - G-value (condensate)	1.0E-4	--	g	ISO 6452

Fill Analysis	Dry	Conditioned	Unit
Ejection Temperature	410 (210)	--	°F (°C)
Specific Heat Capacity of Melt	0.509 (2130)	--	Btu/lb/°F (J/kg/°C)
Thermal Conductivity of Melt	1.8 (0.26)	--	Btu·in/hr/ft²/°F (W/m/K)

Injection	Dry (English)	Dry (SI)
Drying Temperature	176 °F	80 °C
Drying Time - Desiccant Dryer	2.0 to 4.0 hr	2.0 to 4.0 hr

Injection	Dry (English)	Dry (SI)
Suggested Max Moisture	0.20 %	0.20 %
Processing (Melt) Temp	536 to 572 °F	280 to 300 °C
Melt Temperature, Optimum	554 °F	290 °C
Mold Temperature	158 to 248 °F	70 to 120 °C
Mold Temperature, Optimum	212 °F	100 °C
Holding Pressure	7250 to 14500 psi	50.0 to 100 MPa
Drying Recommended	yes	yes
Hold Pressure Time	3.00 s/mm	3.00 s/mm
Maximum Screw Tangential Speed	472 in/min	12 m/min

Shear Modulus vs. Temperature, Dynamic (ISO 11403-1)



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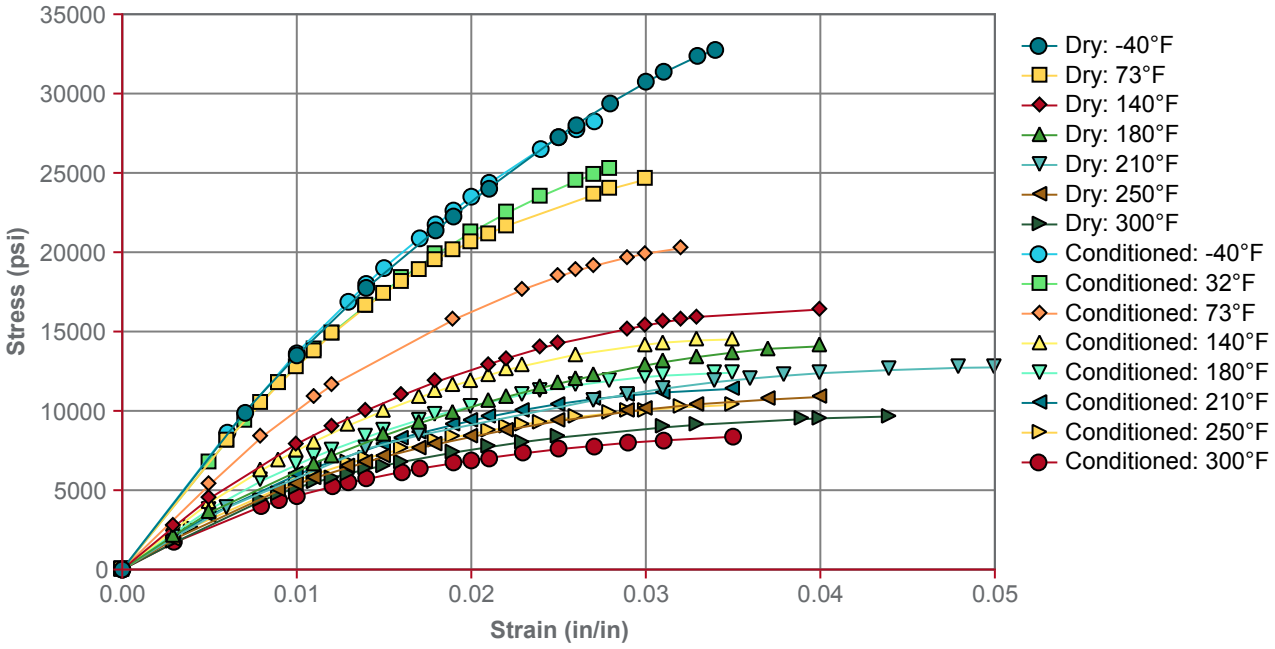
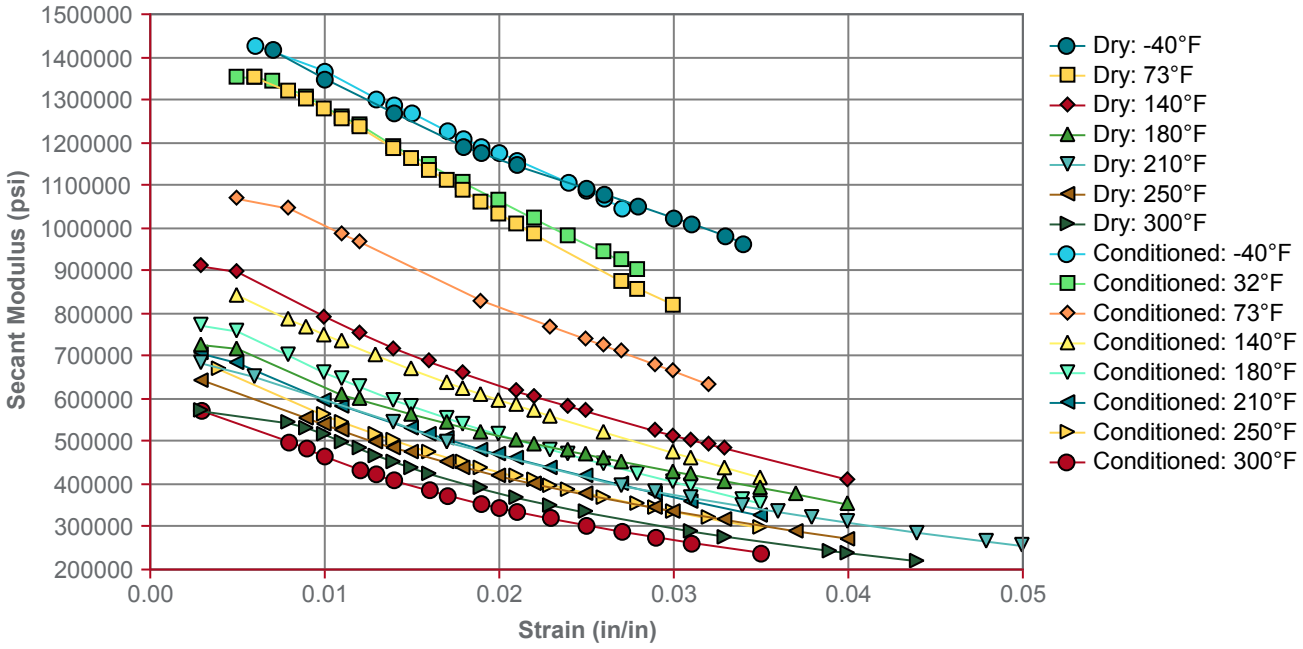
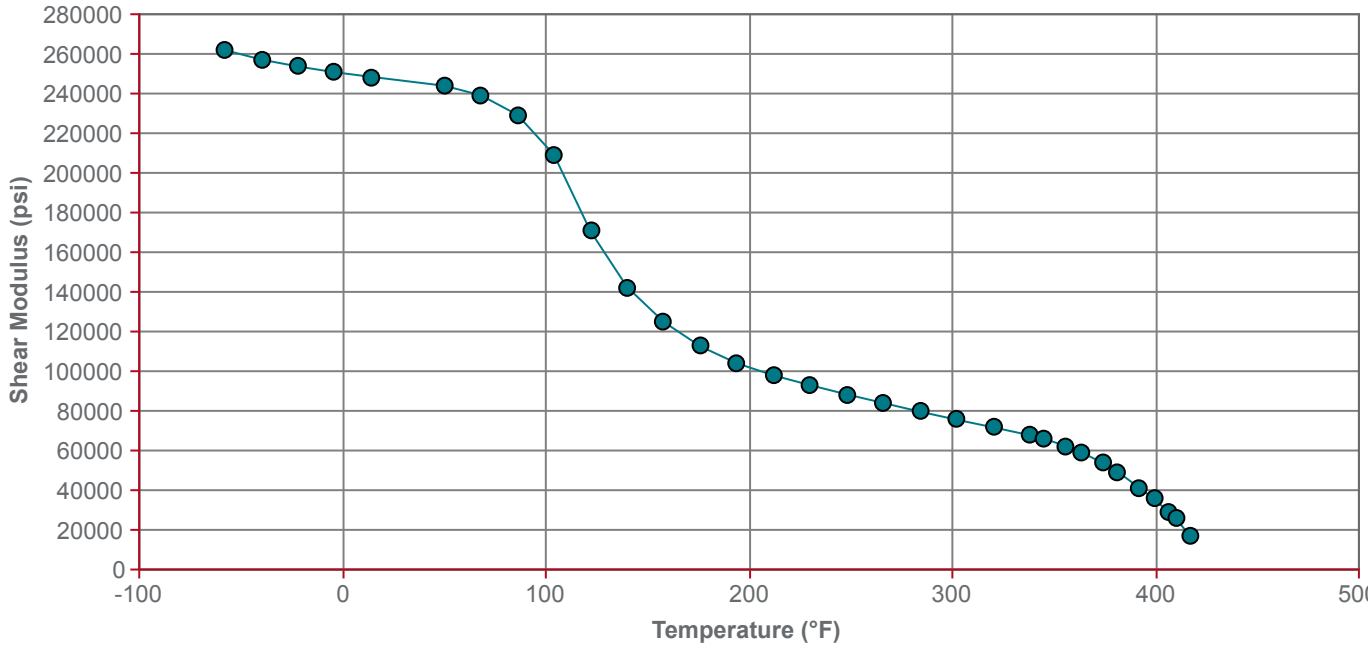
Isothermal Stress vs. Strain (ISO 11403-1)



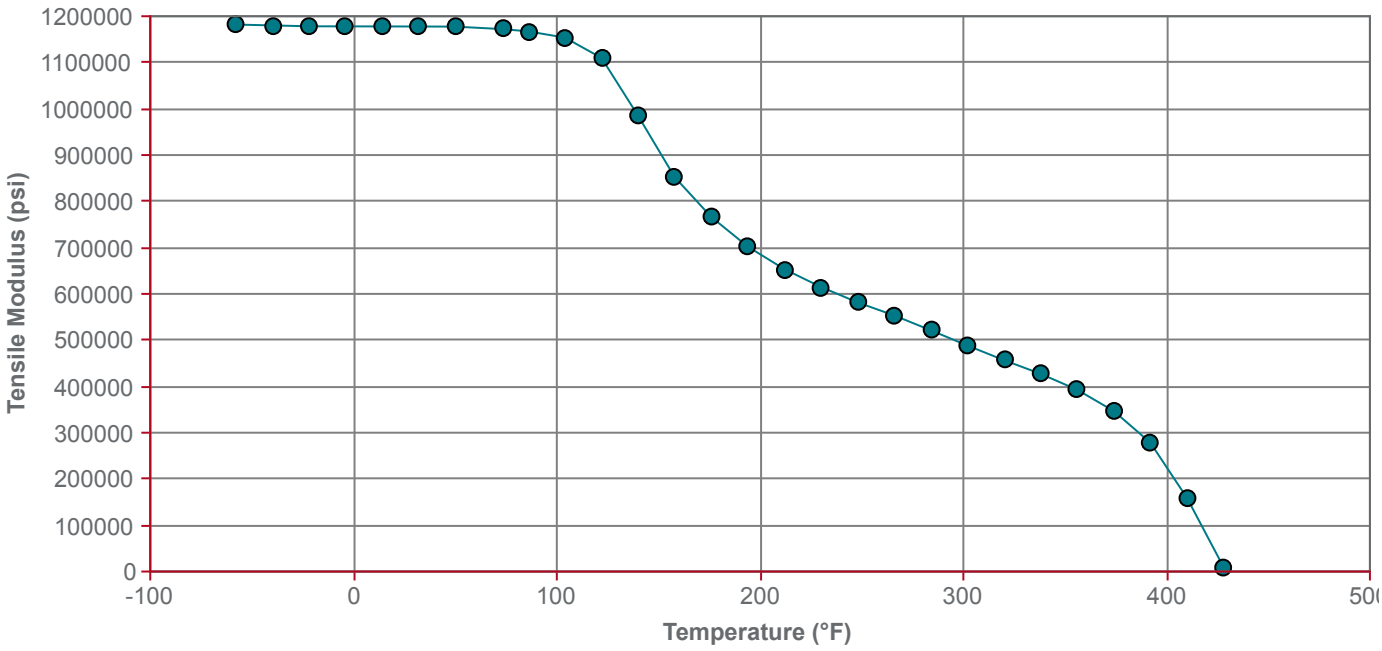
Secant Modulus vs. Strain (ISO 11403-1)



Shear Modulus vs. Temperature (ISO 11403-1)



Tensile Modulus vs. Temperature, Dynamic (ISO 11403-1)



Notes

[1] These links provide you with access to supplier literature. We work hard to keep them up to date; however you may find the most current literature from the supplier.

[2] A UL Yellow Card contains UL-verified flammability and electrical characteristics. UL Prospector continually works to link Yellow Cards to individual plastic materials in Prospector, however this list may not include all of the appropriate links. It is important that you verify the association between these Yellow Cards and the plastic material found in Prospector. For a complete listing of Yellow Cards, visit the UL Yellow Card Search.

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

[4] 10°C/min

[5] FMVSS 302