Zytel® 77G33L NC010 NYLON RESIN

DuPont Performance Polymers

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Technical Data

33% Glass Reinforced Polyamide 61	2		
eneral			
Material Status	Commercial: Active		
Literature ¹	 Processing - Injection Moldin Processing - Injection Moldin Typical Processing for DuPc 	ng of Glass-reinforced Zytel (E	
UL Yellow Card ²	• E41938-234360		
Search for UL Yellow Card	DuPont Performance Polym Zytel®	ers	
Availability	Africa & Middle EastAsia Pacific	EuropeLatin America	North America
Filler / Reinforcement	 Glass Fiber, 33% Filler by W 	/eight	
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 Secant Modulus vs. Strain (I Shear Modulus vs. Tempera Shear Modulus vs. Tempera Tensile Modulus vs. Tempera 	SO 11403-1) ture (ISO 11403-1) ture, 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

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AdechanicalDryConditionedUnitTest MethodTensile Modulus $1.38E+6$ (1500) $1.5E+6$ (700) 0.81 (NPa)180 527-2Tensile Stress (Break) 24700 (170) 20300 (140) 0.81 (NPa)180 527-2Tensile Strain (Break) 3.2 3.2 3.2 5.2 Flexural Modulus $1.23E+6$ (1600) $1.02E+6$ (7000) 0.81 (NPa)180 178Flexural Stress 2.320 $-$ (NPa) 0.178 180 178Compressive Stress 2.3200 (1600) $-$ (NPa) 0.604 180 604Shear Strength 10900 (7600) $-$ (NPa) 0.604 180 604Shear Strength 10900 (7600) $-$ (NPa) 0.604 180 1792Poisson's Ratio 0.34 0.34 0.34 $1.50 527$ Charpy Notched Impact Strength 5.7 (13) 4.8 (1600) $1.50 179/40$ -40° (40°C)(11) (13)(10) (10) $1.50 179/40$ -22° ($c_{3}0^{\circ}$) 6.2 (600 5.7 (1.50°) $1.50 179/140$ -22° ($c_{3}0^{\circ}$) 6.0 (600 6.0 (600 $1.50 179/140$ -22° ($c_{3}0^{\circ}$) 6.0 (1.50°) $1.50 180/1A$ -22° ($c_{3}0^{\circ}$) 6.0 (1.50°) $1.50 180/1A$ -22° ($c_{3}0^{\circ}$) 6.2 (600°) 6.2 (600°) $1.50 180/1A$ -22° ($c_{3}0^{\circ}$) 6.2 (600°) $1.50 180/1A$ -22° ($c_{3}0^{\circ}$) <td< th=""><th>Point Performance Polymers</th><th></th><th></th><th></th><th></th></td<>	Point Performance Polymers				
Infinite Modulus (MFa) (MODULS (MFa) (MFa) (SO 527-2 Tensile Stress (Break) 2700 (110) 20300 (140) Pail (MFa) (SO 527-2 Fiexural Modulus 3.2 3.2 % (SO 527-2 Fiexural Modulus (2500) (MFa) (SO 178 Fiexural Modulus (2600) - (MFa) (SO 178 Compressive Stress (2600) - (MFa) (SO 604 Shear Strength (150) - (MFa) (SO 604 Shear Strength (150) - (MFa) (SO 604 Compressive Stress (160) - (MFa) (SO 178) Poisson's Ratio 0.34 0.34 Unit Test Method -40°F (-40°C) (12) (10) (KJm ⁺) - -22°F (-30°C) (52 4.8 ft-b/m ⁺ -22°F (-30°C) (60) (65) (KJm ⁺) - -22°F (-30°C) (11) (10) (KJm ⁺) - -22°F (-30°C) (20)	Mechanical	Dry	Conditioned	Unit	Test Method
International Stress (Break) (170) (140) (MPa) (SO 227-2 Tensile Strain (Break) 3.2 3.2 % ISO 527-2 Flexural Modulus 1.23E+6 (17000) (MPa) ISO 178 Flexural Stress 23200 (MPa) ISO 178 Compressive Stress (160) - (MPa) ISO 604 Shear Strength 19900 (MPa) ASTM 0732 Poisson's Ratio 0.34 0.34 Unit Test Method Charpy Notched Impact Strength ISO 178/164 ISO 178/164 ISO 179/164 -40°F (-40°C) (12) (10) (KJm ²) -22°F (-30°C) (11) (10) (KJm ²) -22°F (-30°C) (60) (65) (KJm ²) -22°F (-30°C) (13) (12) (KJm ²) -22°F (-30°C) (60) (65) (KJm ²) -22°F (-30°C) (11) (10) (KJm ²)	Tensile Modulus				ISO 527-2
Interset 3.2 3.2 1.50 527-2 Flexural Modulus 1,23E+6 (8500) 0.2 0.1 0.1 150 527-2 Flexural Modulus 1,23E+6 (8500) 0.1 0.1 150 527-2 Flexural Stress 1,22E+6 (1600) 0.1 150 527 Compressive Stress 1,2200 0.1 150 527 Shear Strength 1,0900 0.1 150 527 Poisson's Ratio 0.34 0.34 0.34 0.50 27 Poisson's Ratio 0.34 0.34 0.34 150 527 Poisson's Ratio 0.34 0.34 0.34 150 527 Poisson's Ratio 0.34 0.34 150 527 Charpy Notched Impact Strength ISO 179/16A ISO 179/16A -40°F (-40°C) 5.2 4.8 ft:bl/m² -22°F (-30°C) (11) (10) (KJ/m²) Charpy Unnotched Impact Strength ISO 179/16A ISO 179/16A -22°F (-30°C) (5.2 4.8 ft:bl/m² </td <td>Tensile Stress (Break)</td> <td></td> <td></td> <td></td> <td>ISO 527-2</td>	Tensile Stress (Break)				ISO 527-2
Flexifiel Modulus (850) (7000) (MPa) ISO 178 Flexural Stress (260) - (MPa) ISO 178 Compressive Stress (260) - (MPa) ISO 604 Shear Strength (160) - (MPa) ISO 604 Shear Strength (160) - (MPa) ASTM 0732 Poisson's Ratio 0.34 0.34 0.34 ISO 527 mpact Dry Conditioned Unit Test Method Charpy Notched Impact Strength ISO 179/1eA ISO 179/1eA -40°F (40°C) (11) (10) (k/Im7) -22°F (-30°C) (21) (12) (k/Im7) 73°F (23°C) (23) 31 (ft/Inf) -22°F (-30°C) (60) (65) (k/Im7) -22°F (-30°C) (80) (90) (k/Im7) -22°F (-30°C) (11) (10) (k/Im7) -22°F (-30°C) (21) (12) (k/Im7) -22°F (-30°C) (21) (21)	Tensile Strain (Break)	3.2	3.2	%	ISO 527-2
Plexified Surges (260) (MPa) ISO 179 Compressive Stress 23200 (160) psi (MPa) ISO 604 Shear Strength 10900 (75.0) psi (MPa) ASTM D732 Poisson's Ratio 0.34 0.34 0.34 Unit Test Method Charpy Notched Impact Strength 5.7 4.8 ft:Iblin ² ISO 179/16A -40°F (-40°C) (12) (10) (KJ/m ²) ISO 179/16A -22°F (-30°C) (11) (10) (KJ/m ²) ISO 179/16A -22°F (-30°C) (13) (12) (KJ/m ²) ISO 179/16U -22°F (-30°C) (13) (12) (KJ/m ²) ISO 179/16U -22°F (-30°C) (60) (65) (KJ/m ²) ISO 179/16U -22°F (-30°C) (60) (65) (KJ/m ²) ISO 180/1A -40°F (-40°C) (11) (10) (KJ/m ²) ISO 180/1A -40°F (-40°C) (11) (10) (KJ/m ²) ISO 180/1A -40°F (-40°C) (11)	Flexural Modulus				ISO 178
Confignessive Sitess (fi6) (MPa) 180 004 Shear Strength (160) (MPa) ASTM D732 Poisson's Ratio 0.34 0.34 0.34 0.34 Charpy Notched Impact Strength Dry Conditioned Unit Test Method Charpy Notched Impact Strength 5.7 4.8 ft.ib/in² 150 179/16A -40°F (-40°C) (12) (10) (kJ/m²) 150 179/16A -22°F (-30°C) 6.2 5.7 ft.ib/in² - 73°F (23°C) 6.2 5.7 ft.ib/in² - -22°F (-30°C) (60) (65) (kJ/m²) - -22°F (-30°C) 8 4.3 ft.ib/in² - -40°F (-40°C) (11) (10) (kJ/m²) - -22°F (-30°C) (60) (65) (kJ/m²) - -40°F (-40°C) (11) (10) (kJ/m²) - -22°F (-30°C) 5.2 4.8 ft.ib/in² - -22°F (-30	Flexural Stress				ISO 178
Shear Strength (T5.0) (MPa) ASTM D/32 Poisson's Ratio 0.34 0.34 0.34 Unit Test Method Charpy Notched Impact Strength 5.7 4.8 ft:lb/in² (kJ/m²) -40°F (-40°C) (12) (10) (kJ/m²) (kJ/m²) -22°F (-30°C) 6.2 5.7 ft:lb/in² (kJ/m²) 73°F (23°C) 6.2 5.7 ft:lb/in² (kJ/m²) Charpy Unnotched Impact Strength 100 (kJ/m²) (kJ/m²) 100 -22°F (-30°C) 6.0 (65) (kJ/m²) 100 100 (kJ/m²) -22°F (-30°C) 73°B 23.1 ft:lb/in² 150 179/1eU -22°F (-30°C) 73°B 4.8 ft:lb/in² 150 180/1A -40°F (-40°C) (11) (10) (kJ/m²) 150 180/1A -40°F (-40°C) 5.2 4.8 ft:lb/in² 150 180/1A -40°F (-40°C) (11) (10) (kJ/m²) 150 180/1A -22°F (-30°C) 5.2 <t< td=""><td>Compressive Stress</td><td></td><td></td><td></td><td>ISO 604</td></t<>	Compressive Stress				ISO 604
mpact Dry Conditioned Unit Test Method Charpy Notched Impact Strength ISO 179/1eA 4.8 ft-lb/in ² -40°F (40°C) 5.7 4.8 ft-lb/in ² -22°F (-30°C) 5.2 4.8 ft-lb/in ² 73°F (23°C) 6.2 5.7 ft-lb/in ² Charpy Unnotched Impact Strength ISO 179/1eU ISO 179/1eU -22°F (-30°C) (60) (65) (kJ/m ²) 73°F (23°C) 8 43 ft-lb/in ² 73°F (23°C) (80) (90) (kJ/m ²) Notched Izod Impact Strength ISO 179/1eU ISO 179/1eU -22°F (-30°C) (80) (90) (kJ/m ²) Notched Izod Impact Strength ISO 180/1A ISO 180/1A -40°F (-40°C) (11) (10) (kJ/m ²) -22°F (-30°C) 5.2 4.8 ft-lb/in ² -22°F (-30°C) (6.2 5.7 ft-lb/in ² -22°F (-30°C) (6.2 5.7 ft-lb/in ² -22°F (-30°C) (60)<	Shear Strength				ASTM D732
Charpy Notched Impact Strength ISO 179/1eA -40° F (-40° C) 5.7 4.8 ft : $bfin^2$ -22° F (-30° C) 5.2 4.8 ft : $bfin^2$ 73° F (23° C) 6.2 5.7 ft : $bfin^2$ 73° F (23° C) 6.2 5.7 ft : $bfin^2$ -22° F (-30° C) (13) (12) (kJ/m^3) Charpy Unnotched Impact Strength ISO 179/1eU -22° F (-30° C) (80) (90) (kJ/m^3) 73° F (23° C) (80) (90) (kJ/m^3) $rest (kJ/m^3)$ $rest (kJ/m^3)$ 73° F (23° C) (80) (90) (kJ/m^3) $rest (kJ/m^3)$ $rest (-40^{\circ}$ C) (11) (10) (kJ/m^3) $rest (kJ/m^3)$ -22° F (-30° C) 5.2 4.8 ft : $bfin^2$ $rest (kJ/m^3)$ -22° F (-30° C) 6.2 5.7 ft : $bfin^2$ $rest (kJ/m^3)$ -22° F (-30° C) 6.2 5.7 ft : $bfin^2$ $rest (kJ/m^3)$ -22° F (-30° C) $(6.2$ 5.7 ft : $bfin^$	Poisson's Ratio	0.34	0.34		ISO 527
Charpy Notched Impact Strength ISO 179/1eA -40°F (-40°C) 5.7 4.8 ft :bf/m² (12) (10) (kJ/m²) -22°F (-30°C) 5.2 4.8 ft :bf/m² (11) (10) (kJ/m²) 73°F (23°C) 6.2 5.7 ft :bf/m² Charpy Unnotched Impact Strength ISO 179/1eU	mpact	Dry	Conditioned	Unit	Test Method
$-40^{\circ}F(40^{\circ}C)$ 5.7 4.8 ft iblin² $-22^{\circ}F(-30^{\circ}C)$ (12) (10) (kJ/m^2) $73^{\circ}F(23^{\circ}C)$ 6.2 5.7 $ft.iblin^2$ Charpy Unnotched Impact Strength 5.7 $ft.iblin^2$ (kJ/m^2) $-22^{\circ}F(-30^{\circ}C)$ (29) 31 $(t1)$ (kJ/m^2) $-22^{\circ}F(-30^{\circ}C)$ (80) (65) $(t/M^2)^2$ $73^{\circ}F(23^{\circ}C)$ (38) 43 $tt.iblin^2$ $73^{\circ}F(23^{\circ}C)$ (38) 43 $tt.iblin^2$ $73^{\circ}F(23^{\circ}C)$ (38) 43 $tt.iblin^2$ $-40^{\circ}F(-40^{\circ}C)$ (11) (10) (kJ/m^2) $-40^{\circ}F(-40^{\circ}C)$ (11) (10) (kJ/m^2) $-22^{\circ}F(-30^{\circ}C)$ (11) (10) (kJ/m^2) $-22^{\circ}F(-30^{\circ}C)$ (29) (11) (10) (kJ/m^2) $73^{\circ}F(23^{\circ}C)$ (20) (21) (kJ/m^2) (kJ/m^2) $-22^{\circ}F(-30^{\circ}C)$ (70) (60) (kJ/m^2) (kJ/m^2) $73^{\circ}F(23^{\circ}C)$ (70) <	· · · · · · · · · · · · · · · · · · ·	,			
-22 F (-30°C) (11) (10) (kJ/m ²) 73°F (23°C) 6.2 5.7 ft-lb/in ² Charpy Unnotched Impact Strength ISO 179/1eU -22°F (-30°C) (60) (65) (kJ/m ²) 73°F (23°C) 29 31 ft-lb/in ² ISO 179/1eU -22°F (-30°C) (60) (65) (kJ/m ²) 73°F (23°C) (80) (90) (kJ/m ²) Notched Izod Impact Strength ISO 180/1A -40°F (-40°C) (11) (10) (kJ/m ²) -40°F (-40°C) (11) (10) (kJ/m ²) ISO 180/1A -40°F (-40°C) 5.2 4.8 ft-lb/in ² -22°F (-30°C) 5.2 4.8 ft-lb/in ² (11) (10) (kJ/m ²) ISO 180/1U -22°F (-30°C) 6.2 5.7 ft-lb/in ² Unnotched Izod Impact Strength ISO 180/1U ISO 180/1U -22°F (-30°C) (60) (45) (ft-lb/in ² $73°F (23°C) (29) 21 ft-lb/in2 -22°F (-30°C) (70) (60) (kJ/m2) $					
I/3 F (23 C) (13) (12) (kJ/m²) Charpy Unnotched Impact Strength ISO 179/1eU ISO 179/1eU -22°F (-30°C) (60) (65) (kJ/m²) 73°F (23°C) 38 43 ft ·Ib/in² 73°F (23°C) 38 43 ft ·Ib/in² Notched Izod Impact Strength ISO 180/1A -40°F (-40°C) (11) (10) (kJ/m²) -40°F (-40°C) (11) (10) (kJ/m²) - - -40°F (-40°C) (11) (10) (kJ/m²) - - -22°F (-30°C) 5.2 4.8 ft ·Ib/in² - - 73°F (23°C) 6.2 5.7 ft ·Ib/in² - <t< td=""><td>-22°F (-30°C)</td><td></td><td></td><td></td><td></td></t<>	-22°F (-30°C)				
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) -22° F (-30° C) 6.2 (11) 5.7 (13) ft·lb/in² (12) Unnotched Izod Impact Strength ISO 180/1U -22° F (-30° C) 6.2 (13) 5.7 (12) ft·lb/in² (kJ/m²) Unnotched Izod Impact Strength ISO 180/1U -22° F (-30° C) ISO 180/1U -22° F (-30° C) 60) (45) (kJ/m²) 73° F (23° C) 29 (60) 21 (ft·lb/in² ft·lb/in² 73° F (23° C) 29 (70) 60) (kJ/m²) 73° F (23° C) 33 (70) 29 (60) 150 180/1U -22° F (-30° C) 66) (kJ/m²) ISO 180/1U -22° F (-30° C) 29 (60) 150 180 150 180 73° F (23° C) 29 (70) 150 180 150 180 264 psi (1.8 MPa), Unannealed 216 - °F (°	73°F (23°C)				
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Charpy Unnotched Impact Strength				ISO 179/1eU
Notched Izod Impact Strength ISO 180/1A -40°F (-40°C) 5.2 4.8 ft-lb/ln² -22°F (-30°C) (11) (10) (kJ/m²) -22°F (-30°C) 6.2 5.7 ft-lb/ln² (11) (10) (kJ/m²)	-22°F (-30°C)	(60)			
$-40^{\circ}F(-40^{\circ}C)$ 5.2 4.8 $ft \cdot lb/in^2$ $-20^{\circ}F(-40^{\circ}C)$ 5.2 4.8 $ft \cdot lb/in^2$ $-22^{\circ}F(-30^{\circ}C)$ 5.2 4.8 $ft \cdot lb/in^2$ $73^{\circ}F(23^{\circ}C)$ 6.2 5.7 $ft \cdot lb/in^2$ Unnotched Izod Impact Strength ISO 180/1U ISO 180/1U $-22^{\circ}F(-30^{\circ}C)$ (60) (45) (kJ/m^2) $73^{\circ}F(23^{\circ}C)$ (60) (45) (kJ/m^2) $73^{\circ}F(23^{\circ}C)$ (70) (60) (kJ/m^2) $73^{\circ}F(23^{\circ}C)$ (29) 21 $ft \cdot lb/in^2$ $73^{\circ}F(23^{\circ}C)$ (23) (24) (kJ/m^2) $73^{\circ}F(23^{\circ}C)$ 33 29 $ft \cdot lb/in^2$ $73^{\circ}F(23^{\circ}C)$ 33 29 $ft \cdot lb/in^2$ $73^{\circ}F(23^{\circ}C)$ 33 29 $ft \cdot lb/in^2$ $Ft = 150^{\circ}(30^{\circ}C)$ $70^{\circ}(60)$ (kJ/m^2) (kJ/m^2) $73^{\circ}F(23^{\circ}C)$ $70^{\circ}(60)$ $r^{\circ}F$ $(50^{\circ}75-2/B)$ 46° psi (0.45 MPa), Unannealed (216) $$ $r^{\circ}F$ $(80^{\circ}75$	73°F (23°C)				
-40 F (40 C) (11) (10) (kJ/m²) -22°F (-30°C) 5.2 4.8 ft·lb/in² (11) (10) (kJ/m²) 73°F (23°C) 6.2 5.7 ft·lb/in² Unnotched Izod Impact Strength (12) (kJ/m²) -22°F (-30°C) 29 21 ft·lb/in² (13) (12) (kJ/m²) (kJ/m²) Unnotched Izod Impact Strength 29 21 ft·lb/in² -22°F (-30°C) (80) (45) (kJ/m²) 73°F (23°C) 33 29 ft·lb/in² 73°F (23°C) 33 29 ft·lb/in² 73°F (23°C) 33 29 ft·lb/in² 73°F (23°C) 70 (60) (kJ/m²) 'hermal Dry Conditioned Unit Test Method Heat Deflection Temperature 421 °F ISO 75-2/B 264 psi (1.8 MPa), Unannealed 392 °F ISO 11357-2 264 psi (1.8 MPa), Unannealed 392 °F ISO 11357-2 Glass Transition Temperature 4 <td< td=""><td>Notched Izod Impact Strength</td><td></td><td></td><td></td><td>ISO 180/1A</td></td<>	Notched Izod Impact Strength				ISO 180/1A
-22 F (-30 C) (11) (10) (kJ/m²) $73^{\circ}F(23^{\circ}C)$ 6.2 5.7 $ft \cdot lb/in^2$ Unnotched Izod Impact Strength ISO 180/1U $-22^{\circ}F(-30^{\circ}C)$ 29 21 $ft \cdot lb/in^2$ $r = 22^{\circ}F(-30^{\circ}C)$ (60) (45) (kJ/m^2) $73^{\circ}F(23^{\circ}C)$ 33 29 $ft \cdot lb/in^2$ $73^{\circ}F(23^{\circ}C)$ 33 29 $ft \cdot lb/in^2$ $73^{\circ}F(23^{\circ}C)$ 70° (60) (kJ/m^2) $73^{\circ}F(23^{\circ}C)$ 33 29 $ft \cdot lb/in^2$ $73^{\circ}F(23^{\circ}C)$ 70° (60) (kJ/m^2) $73^{\circ}F(23^{\circ}C)$ 70° (60) (kJ/m^2) $73^{\circ}F(23^{\circ}C)$ 70° (50°) (kJ/m^2) $73^{\circ}F(23^{\circ}C)$ 70° (60) (kJ/m^2) $73^{\circ}F(23^{\circ}C)$ 70° (60) (kJ/m^2) $73^{\circ}F(23^{\circ}C)$ 70° 70° 70° Heat Deflection Temperature 421° $-r$ $\binom{\circ}{(°C)}$ $150^{\circ}75^{\circ}/F$ 264 psi (1.8 MPa),	-40°F (-40°C)				
1/3 F (23 C) (13) (12) (kJ/m²) Unnotched Izod Impact Strength ISO 180/1U -22°F (-30°C) 29 21 ft·lb/in² (60) (45) (kJ/m²) 73°F (23°C) 33 29 ft·lb/in² 73°F (23°C) (70) (60) (kJ/m²) Premal Dry Conditioned Unit Test Method Heat Deflection Temperature 421 °F ISO 75-2/B 264 psi (1.8 MPa), Unannealed 392 °F ISO 75-2/A Glass Transition Temperature 4 149 131 °F ISO 11357-2 Malting Temperature 4 424 °F ISO 11357-2	-22°F (-30°C)	(11)	(10)		
-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 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 Malting Temperature 4 424 °F ISO 11357-2	73°F (23°C)				
-22 °F (-30°C) (60) (45) (kJ/m²) 73 °F (23°C) 33 29 ft·lb/in² 73 °F (23°C) (70) (60) (kJ/m²) Thermal Dry Conditioned Unit Test Method Heat Deflection Temperature 421 °F ISO 75-2/B 264 psi (1.8 MPa), Unannealed 392 °F ISO 75-2/A Glass Transition Temperature 4 149 131 °F ISO 11357-2 Malting Temperature 4 424 °F ISO 11357-2	Unnotched Izod Impact Strength				ISO 180/1U
(70) (60) (kJ/m²) Chermal Dry Conditioned Unit Test Method Heat Deflection Temperature 421 °F ISO 75-2/B 264 psi (1.8 MPa), Unannealed 392 °F ISO 75-2/A Glass Transition Temperature 4 149 131 °F ISO 11357-2 Malting Temperature 4 424 °F ISO 11357-2	-22°F (-30°C)	(60)	(45)	(kJ/m²)	
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		(70)	(60)	(kJ/m²)	
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 Malting Temperature 4 424 °F ISO 11357-3		Dry	Conditioned	Unit	Test Method
66 psi (0.45 MPa), Unannealed (216) (°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 Molting Temperature 4 424 °F ISO 11357-2	Heat Deflection Temperature				
264 psi (1.6 MPa), Onameand (200) (°C) ISO 75-2/A Glass Transition Temperature 4 149 (65.0) 131 (55.0) °F (°C) ISO 11357-2 Molting Temperature 4 424 °F ISO 11357-3	66 psi (0.45 MPa), Unannealed	(216)		(°C)	ISO 75-2/B
Glass Transition Temperature 4 (65.0) (55.0) (°C) ISO 11357-2 Malting Temperature 4 424 °F ISO 11357-3	264 psi (1.8 MPa), Unannealed	(200)		(°C)	ISO 75-2/A
	Glass Transition Temperature ⁴	(65.0)		(°C)	ISO 11357-2
	Melting Temperature ⁴				ISO 11357-3

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Zytel® 77G33L NC010 NYLON RESIN DuPont Performance Polymers

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Fhermal	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 0.028 in (0.70 mm)	HB			UL 94 IEC 60695-11-10, -20
0.06 in (1.5 mm)	НВ			
Oxygen Index	23		%	ISO 4589-2
FMVSS Flammability	В			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	

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Form No. TDS-37102-en Document Created: Thursday, May 3, 2018

Zytel® 77G33L NC010 NYLON RESIN DuPont Performance Polymers



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	

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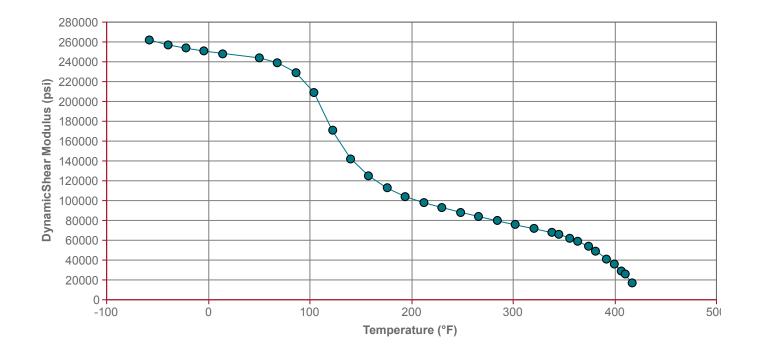


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Shear Modulus vs. Temperature, Dynamic (ISO 11403-1)





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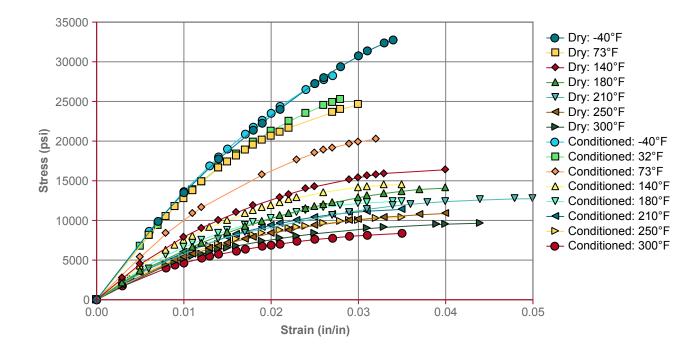
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Isothermal Stress vs. Strain (ISO 11403-1)





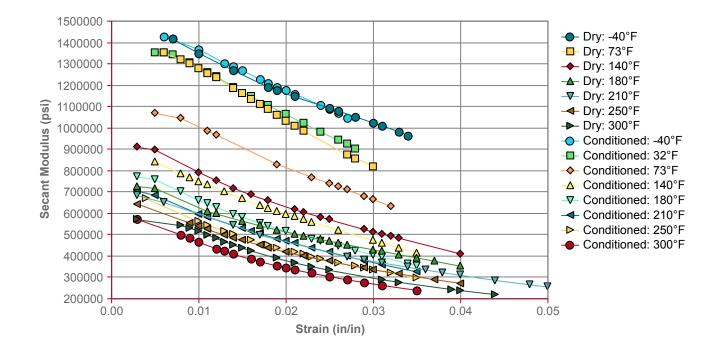
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Secant Modulus vs. Strain (ISO 11403-1)





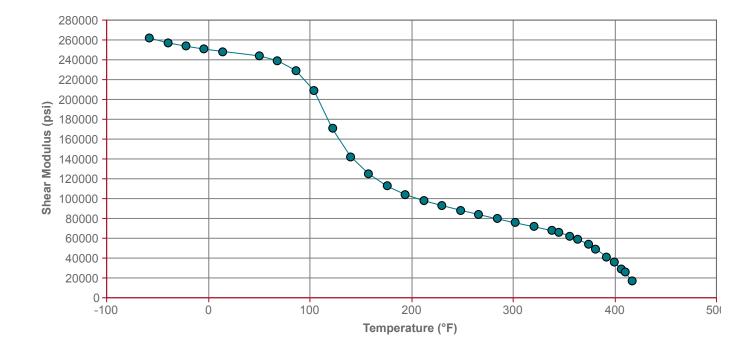
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Shear Modulus vs. Temperature (ISO 11403-1)





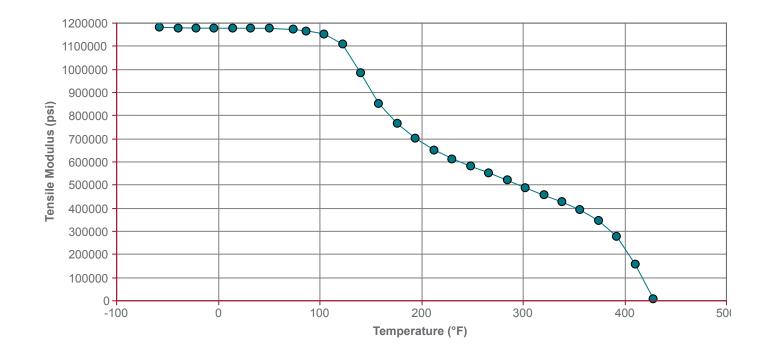
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Tensile Modulus vs. Temperature, Dynamic (ISO 11403-1)





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

⁴ 10°C/min

⁵ FMVSS 302

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