Zytel® 101L NC010

NYLON RESIN

DuPont Performance Polymers

PROSPECTOR®
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Technical Data

Product Description	
Unreinforced Polyamide 66	
General	
Material Status	• Commercial: Active
Literature [1]	• Processing - Injection Molding (English) • Typical Processing for DuPont Engineering Polymers (English)
UL Yellow Card [2]	• E41938-100726136 • E41938-234369
Search for UL Yellow Card	• DuPont Performance Polymers • Zytel®
Availability	• Africa & Middle East • Asia Pacific • Europe • Latin America • North America
Additive	• Mold Release
RoHS Compliance	• Contact Manufacturer
Automotive Specifications	• ASTM D4066 PA0111 • CHRYSLER MS-DB-41 CPN1938 • CHRYSLER MS-DB-41 CPN2012 Color: Color As Noted On Drawing • FORD WSK-M4D647-A • GM GMP.PA66.005 • GM QK 002911
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) • Shear Stress vs. Shear Rate (ISO 11403-1) • Tensile Modulus vs. Temperature (ISO 11403-1) • Viscosity vs. Shear Rate (ISO 11403-2)
Part Marking Code (ISO 11469)	• PA66
Resin ID (ISO 1043)	• PA66

Physical	Dry	Conditioned	Unit	Test Method
Density	1.14	--	g/cm³	ISO 1183
Molding Shrinkage				ISO 294-4
Across Flow	1.4	--	%	
Flow	1.4	--	%	
Water Absorption				ISO 62
73°F (23°C), 24 hr, 0.0394 in (1.00 mm)	4.2	--	%	
Saturation, 73°F (23°C), 0.0787 in (2.00 mm)	8.5	--	%	
Equilibrium, 73°F (23°C), 0.0787 in (2.00 mm), 50% RH	2.6	--	%	
Viscosity Number				ISO 307
96% H2SO4 (Sulphuric Acid)	150	--	cm³/g	

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Mechanical	Dry	Conditioned	Unit	Test Method
Tensile Modulus	450000 (3100)	203000 (1400)	psi (MPa)	ISO 527-2
Tensile Stress (Yield)	11900 (82.0)	7980 (55.0)	psi (MPa)	ISO 527-2
Tensile Strain (Yield)	4.5	25	%	ISO 527-2
Nominal Tensile Strain at Break	25	> 50	%	ISO 527-2
Tensile Creep Modulus				ISO 899-1
1 hr	--	203000 (1400)	psi (MPa)	
1000 hr	--	119000 (820)	psi (MPa)	
Flexural Modulus	406000 (2800)	174000 (1200)	psi (MPa)	ISO 178
Poisson's Ratio	0.37	0.43		ISO 527

Films	Dry	Conditioned	Unit	Test Method
Tensile Elongation - MD (Yield)	4.5	--	%	ISO 527-3

Impact	Dry	Conditioned	Unit	Test Method
Charpy Notched Impact Strength				ISO 179/1eA
-22°F (-30°C)	2.1 (4.5)	1.4 (3.0)	ft·lb/in² (kJ/m²)	
73°F (23°C)	2.6 (5.5)	7.1 (15)	ft·lb/in² (kJ/m²)	
Charpy Unnotched Impact Strength				ISO 179/1eU
-22°F (-30°C)	190 (400)	No Break	ft·lb/in² (kJ/m²)	
73°F (23°C)	No Break	No Break		
Notched Izod Impact Strength				ISO 180/1A
-40°F (-40°C)	2.6 (5.5)	1.4 (3.0)	ft·lb/in² (kJ/m²)	
-22°F (-30°C)	2.6 (5.5)	1.4 (3.0)	ft·lb/in² (kJ/m²)	
73°F (23°C)	2.6 (5.5)	5.7 (12)	ft·lb/in² (kJ/m²)	
Unnotched Izod Impact Strength				ISO 180/1U
-22°F (-30°C)	140 (300)	No Break	ft·lb/in² (kJ/m²)	
73°F (23°C)	No Break	No Break		

Hardness	Dry	Conditioned	Unit	Test Method
Rockwell Hardness				ISO 2039-2
M-Scale	79	59		
R-Scale	121	108		
Ball Indentation Hardness (H 358/30)	26100 (180)	12300 (85.0)	psi (MPa)	ISO 2039-1

Thermal	Dry	Conditioned	Unit	Test Method
Heat Deflection Temperature				
66 psi (0.45 MPa), Unannealed	374 (190)	--	°F (°C)	ISO 75-2/B
264 psi (1.8 MPa), Unannealed	158 (70.0)	--	°F (°C)	ISO 75-2/A
Glass Transition Temperature [4]	140 (60.0)	--	°F (°C)	ISO 11357-2
Vicat Softening Temperature	464 (240)	--	°F (°C)	ISO 306/B50
Ball Pressure Test (464°F (240°C))	Pass	--		IEC 60695-10-2
Melting Temperature [4]	504 (262)	--	°F (°C)	ISO 11357-3
CLTE				ISO 11359-2
Flow	5.6E-5 (1.0E-4)	--	in/in/°F (cm/cm/°C)	
Transverse	6.1E-5 (1.1E-4)	--	in/in/°F (cm/cm/°C)	
Effective Thermal Diffusivity	5.00E-8	--	m²/s	

Electrical	Dry	Conditioned	Unit	Test Method
Volume Resistivity	1.0E+14	1.0E+12	ohms·cm	IEC 62631-3-1
Electric Strength	810 (32)	710 (28)	V/mil (kV/mm)	IEC 60243-1
Relative Permittivity				IEC 62631-2-1
1 MHz	3.50	4.00		
100 Hz	3.80	11.0		
Dissipation Factor				IEC 62631-2-1
100 Hz	8.0E-3	0.21		
1 MHz	0.018	0.075		
Comparative Tracking Index (CTI)	PLC 0	--		UL 746
Comparative Tracking Index	600	--	V	IEC 60112

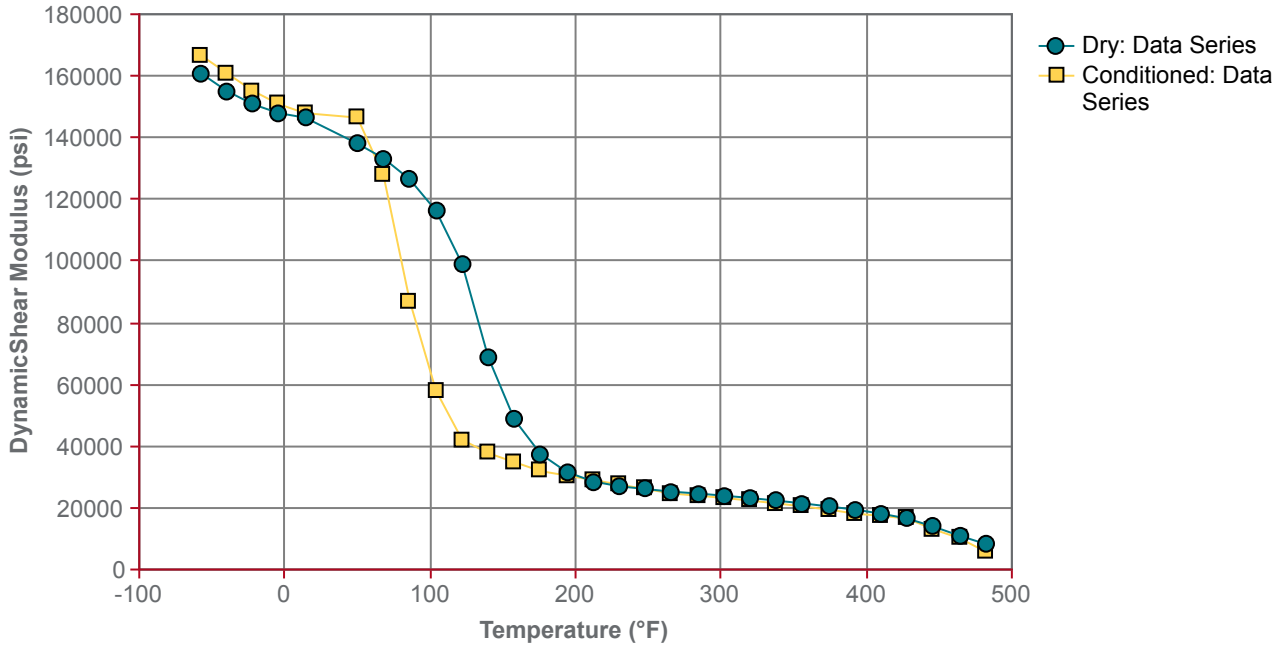
Flammability	Dry	Conditioned	Unit	Test Method
Flame Rating				UL 94 IEC 60695-11-10, -20
0.028 in (0.71 mm)	V-2	--		
0.06 in (1.5 mm)	V-2	--		
Oxygen Index	28	--	%	ISO 4589-2
FMVSS Flammability	DNI	--		FMVSS 302
Fogging - G-value (condensate)	4.0E-4	--	g	ISO 6452

Fill Analysis	Dry	Conditioned	Unit
Melt Density	0.970	--	g/cm³
Ejection Temperature	374 (190)	--	°F (°C)
Specific Heat Capacity of Melt	0.667 (2790)	--	Btu/lb/°F (J/kg/°C)
Thermal Conductivity of Melt	1.1 (0.16)	--	Btu·in/hr/ft²/°F (W/m/K)

Additional Information	Dry	Conditioned	Unit	Test Method
Emission of Organic Compounds	10.0	--	µgC/g	VDA 277
Odor	3.50	--		VDA 270

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
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	122 to 194 °F	50 to 90 °C
Mold Temperature, Optimum	158 °F	70 °C
Holding Pressure	7250 to 14500 psi	50.0 to 100 MPa
Drying Recommended	yes	yes
Hold Pressure Time	4.00 s/mm	4.00 s/mm
Maximum Screw Tangential Speed	945 in/min	24 m/min

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



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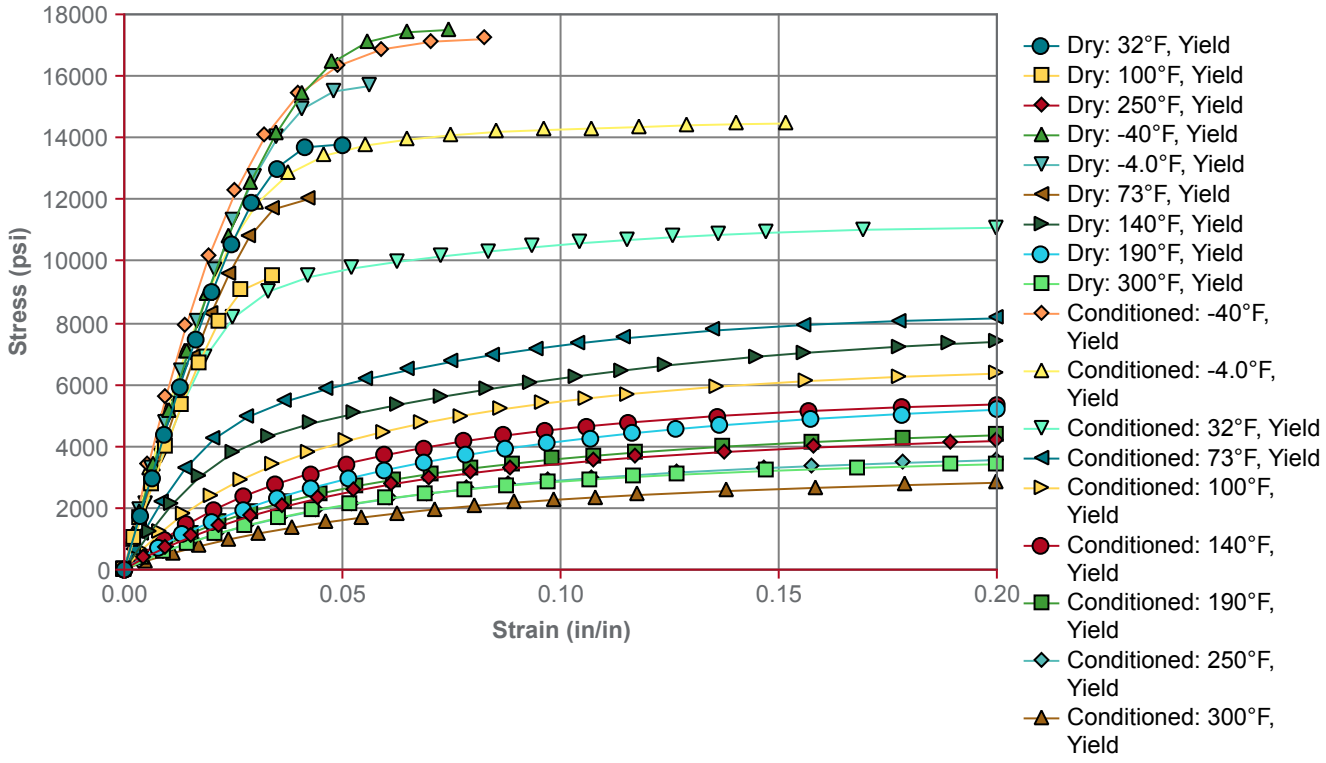
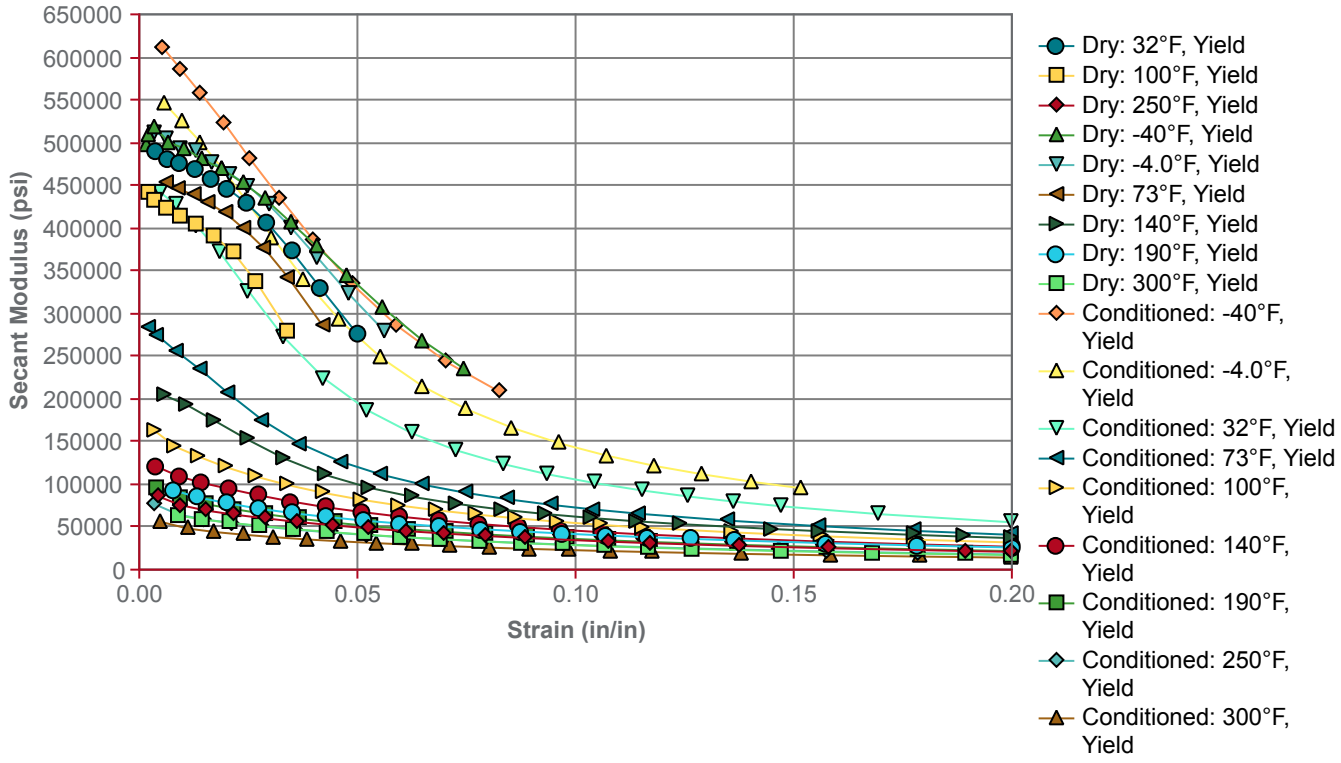
Isothermal Stress vs. Strain (ISO 11403-1)



Secant Modulus vs. Strain (ISO 11403-1)



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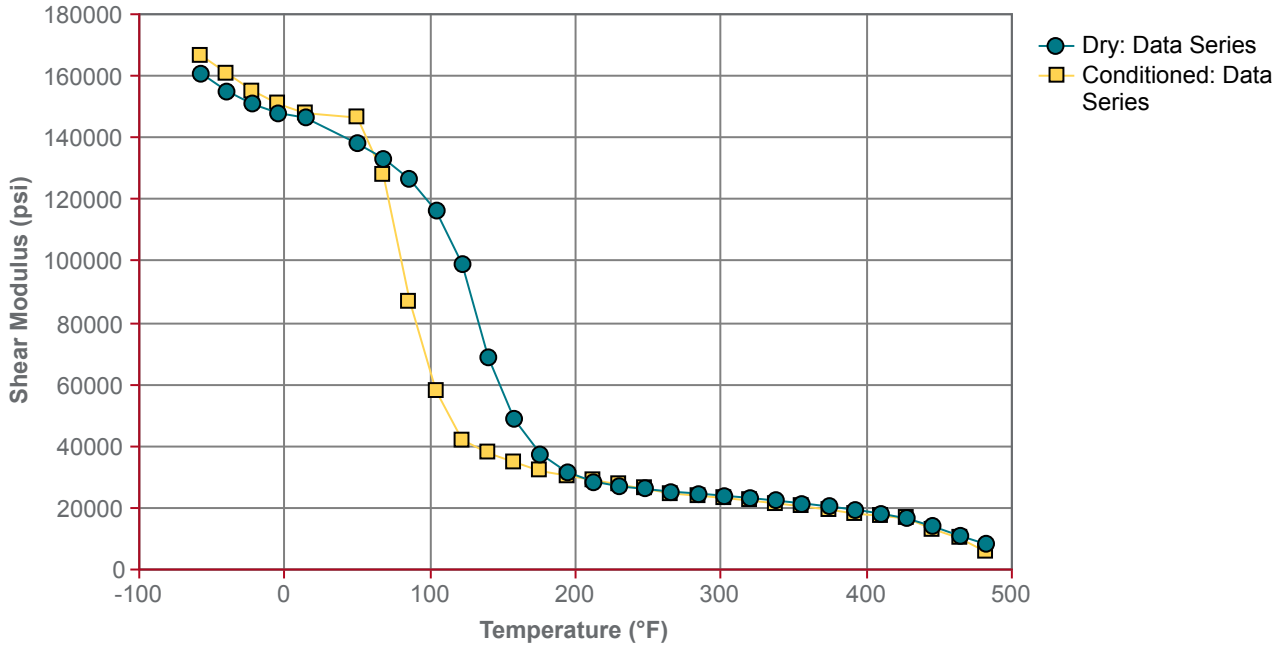
Shear Modulus vs. Temperature (ISO 11403-1)



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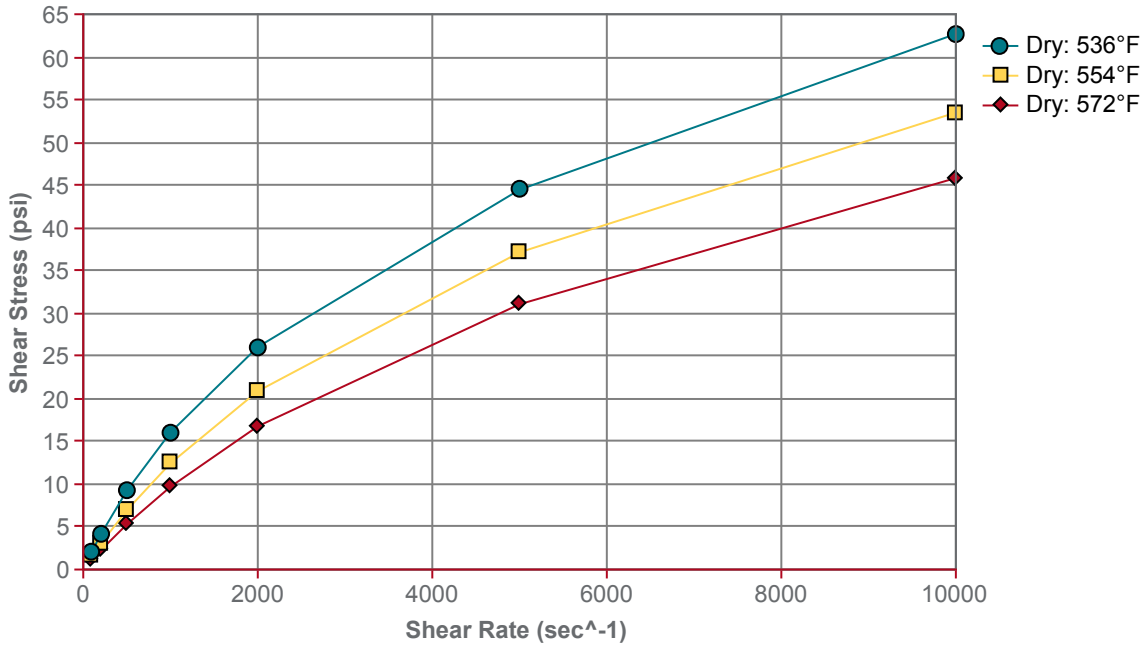
Shear Stress vs. Shear Rate (ISO 11403-1)



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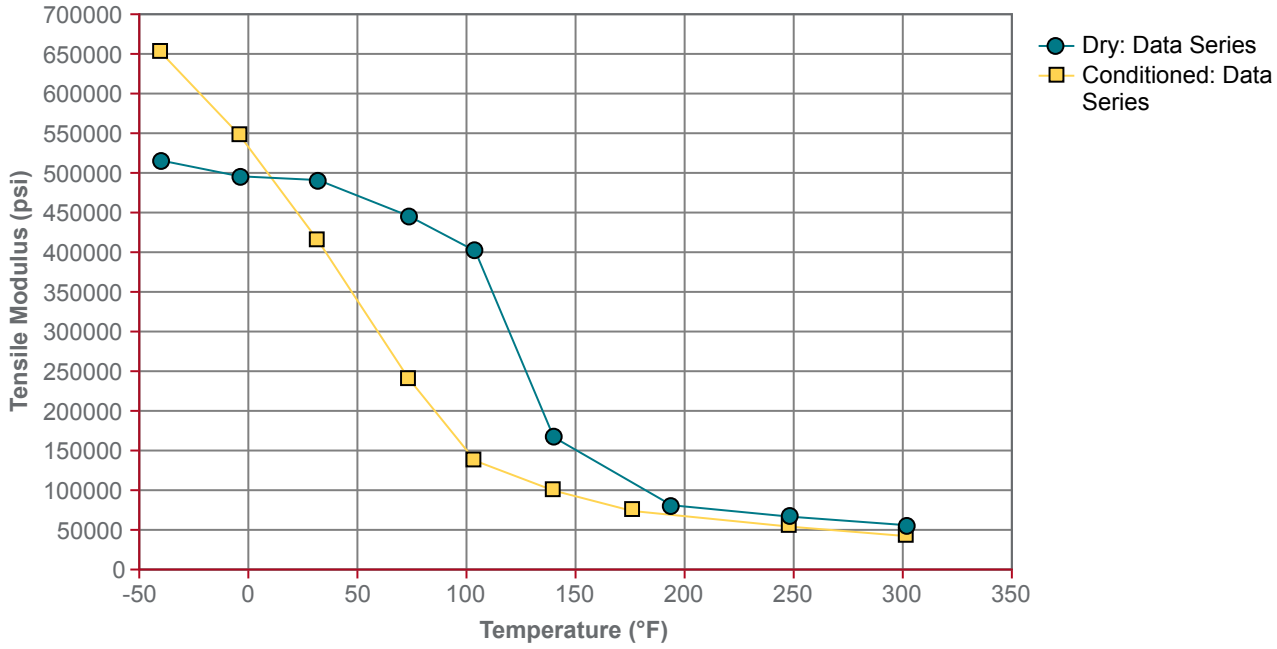
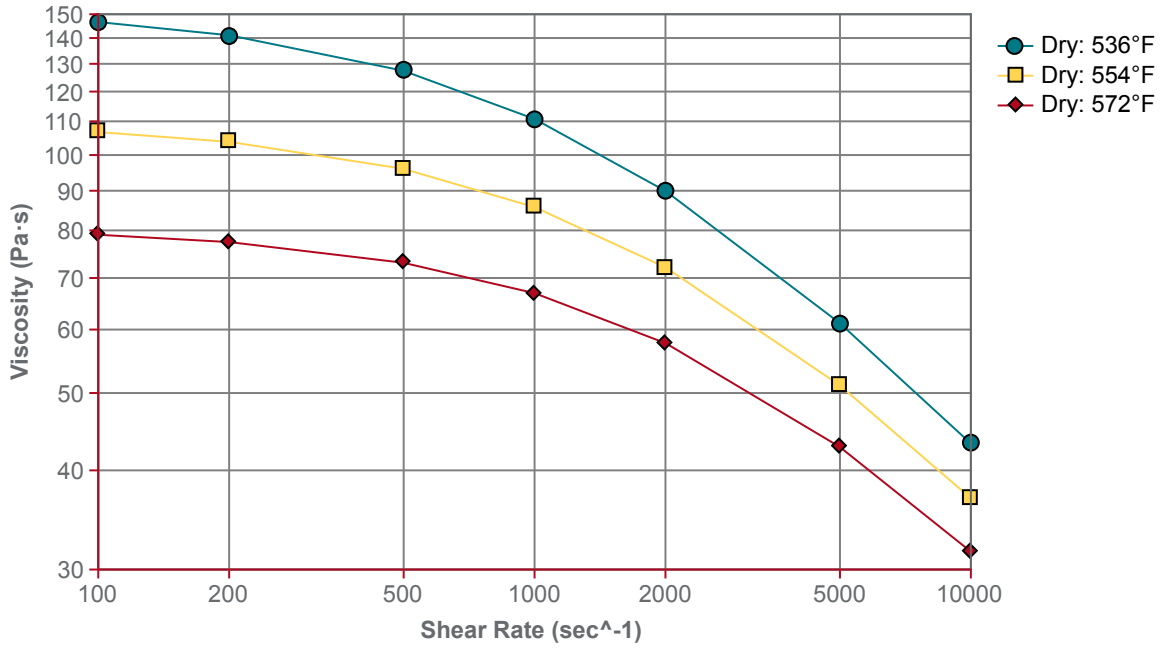
Tensile Modulus vs. Temperature (ISO 11403-1)



Viscosity vs. Shear Rate (ISO 11403-2)



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