Zytel® 70G30HSLR ECO-R 312 BK099

NYLON RESIN

Common features of Zytel® nylon resin include mechanical and physical properties such as high mechanical strength, excellent balance of stiffness and toughness, good high temperature performance, good electrical and flammability properties, good abrasion and chemical resistance. In addition, Zytel® nylon resins are available in different modified and reinforced grades to create a wide range of products with tailored properties for specific processes and end-uses. Zytel® nylon resin, including most flame retardant grades, offer the ability to be coloured.

The good melt stability of Zytel® nylon resin normally enables the recycling of properly handled production waste. If recycling is not possible, we recommend, as the preferred option, incineration with energy recovery (-31kJ/g of base polymer) in appropriately equipped installations. For disposal, local regulations have to be observed.

Zytel® nylon resin typically is used in demanding applications in the automotive, furniture, domestic appliances, sporting goods and construction industry.

Zytel® 70G30HSLR ECO-R 312 BK099 is a 30% glass fibre reinforced, heat stabilised, hydrolysis resistant polyamide 66 resin for injection molding. It has same performance and processing properties as Zytel® 70G30HSLR BK099.

Zytel® 70G30HSLR ECO-R 312 BK099 incorporates 30% post-industrial recycled content (PIR) by weight in the finished product through mass balance allocation. The product is a drop-in replacement to the standard grade with the same performance and processing properties and contributes to the displacement of virgin fossil resources. The recycled source and allocated content in the product are certified according to ISCC PLUS mass balance approach.

Rheological properties

	dry/cond.		
Viscosity number	4150[1]/*	in³/lb	ISO 307, 1628
Molding shrinkage, parallel	0.3 / -	%	ISO 294-4, 2577
Molding shrinkage, normal	1.0 / -	%	ISO 294-4, 2577
Melt viscosity , @ 1000 sec-1, 280 °C	1900 / *	P	ISO 11443

[1]: acid sulphuric 96%

Typical mechanical properties

	dry/cond.		
Tensile modulus	1.45E6 / 1.02E6	psi	ISO 527-1/-2
Tensile stress at break, 5mm/min	29000 / 18900	psi	ISO 527-1/-2
Tensile strain at break, 5mm/min	3 / 5	%	ISO 527-1/-2
Flexural modulus	1.31E6 /	psi	ISO 178
	[DS]		
Flexural strength	40600 / 2 9000[DS]	psi	ISO 178
Flexural stress at 3.5%	39200 / 24700	psi	ISO 178
Charpy impact strength, 23 °C	33.3 / 38.1	ftlb/in²	ISO 179/1eU
Charpy impact strength, -30 °C	33.3 / 33.3[DS]	ftlb/in²	ISO 179/1eU
Charpy impact strength, -40 °C	30.9 / -	ftlb/in²	ISO 179/1eU

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Charpy notched impact strength, 23°C	5.71 / 7.14	ftlb/in²	ISO 179/1eA
Charpy notched impact strength, -30°C	4.28 / 4.28[DS]	ftlb/in²	ISO 179/1eA
Charpy notched impact strength, -40°C	4.28 / 4.28	ftlb/in²	ISO 179/1eA
Izod notched impact strength, 23°C	4.76 / 5.71	ftlb/in²	ISO 180/1A
Izod notched impact strength, -30°C	4.76 / -	ftlb/in²	ISO 180/1A
Izod notched impact strength, -40°C	4.76 / -	ftlb/in²	ISO 180/1A
Hardness, Rockwell, M-scale	104 / 88		ISO 2039-2
Hardness, Rockwell, R-scale	124 / 117		ISO 2039-2
Ball indentation hardness, H 961/30	39200 / 26800	psi	ISO 2039-1
Multiaxial Impact, Total Energy, 4.5m/s, 2mm	5 / -	Btu	ISO 6603-2

[DS]: Derived from similar grade

Thermal properties

	dry/cond.		
Melting temperature, 10°C/min	504 / *	°F	ISO 11357-1/-3
Glass transition temperature, 10°C/min	167 / 68	°F	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	487 / *	°F	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	502 / *	°F	ISO 75-1/-2
Coefficient of linear thermal expansion (CLTE), parallel	0.12 / *	E-4/°F	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), parallel, -40-23°C	0.144 / *	E-4/°F	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), parallel, 55-160°C	0.0722 / *	E-4/°F	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	0.444 / *	E-4/°F	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal, -40-23°C	0.389 / *	E-4/°F	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal, 55-160°C	0.722 / *	E-4/°F	ISO 11359-1/-2
Thermal conductivity, flow	0.36	W/(m K)	ISO 22007-2
Thermal conductivity of melt	0.21	W/(m K)	ISO 22007-2
Specific heat capacity of melt	2290	J/(kg K)	ISO 22007-4

Flammability

	dry/cond.		
Burning Behav. at 1.5mm nom. thickn.	HB / *	class	IEC 60695-11-10
Thickness tested	0.0591 / *	in	IEC 60695-11-10
Burning Behav. at thickness h	HB / *	class	IEC 60695-11-10
Thickness tested	0.0295 / *	in	IEC 60695-11-10
Oxygen index	24 / *	%	ISO 4589-1/-2
Glow Wire Flammability Index, 1.0mm	1290 / -	°F	IEC 60695-2-12
Glow Wire Flammability Index, 2.0mm	1380 / -	°F	IEC 60695-2-12
Glow Wire Flammability Index, 3.0mm	1470 / -	°F	IEC 60695-2-12
Glow Wire Ignition Temperature, 1.0mm	1340 / -	°F	IEC 60695-2-13
Glow Wire Ignition Temperature, 2.0mm	1340 / -	°F	IEC 60695-2-13
Glow Wire Ignition Temperature, 3.0mm	1430 / -	°F	IEC 60695-2-13
Glow Wire Temperature, No Flame, 3mm	1380 / -	°F	IEC 60335-1
FMVSS Class	B		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	1.46[2]	in/min	ISO 3795 (FMVSS 302)

[2]: Based on Zytel® 70G30HSLR BK099

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Electrical properties

	dry/cond.		
Volume resistivity	>1E13 / 1E9[DS]	Ohm.m	IEC 62631-3-1
Surface resistivity	* / 1E12[DS]	Ohm	IEC 62631-3-2
Electric strength	965 / 813	kV/in	IEC 60243-1
Comparative tracking index	400 / -		IEC 60112

[DS]: Derived from similar grade

Physical/Other properties

	dry/cond.		
Humidity absorption, 2mm	1.9 / *	%	Sim. to ISO 62
Water absorption, 2mm	6 / *	%	Sim. to ISO 62
Water absorption, Immersion 24h	1.3 / *	%	Sim. to ISO 62
Density	0.0495 / -	lb/in³	ISO 1183

Emissions

Odor test	5[2]	class	VDA 270

[2]: Based on Zytel® 70G30HSLR BK099

Injection

Drying Recommended	yes	
Drying Temperature	176	°F
Drying Time, Dehumidified Dryer	2 - 4	h
Processing Moisture Content	≤0.2	%
Melt Temperature Optimum	563	°F
Min. melt temperature	545	°F
Max. melt temperature	581	°F
Max. screw tangential speed	≤0.2	m/s
Mold Temperature Optimum	212	°F
Min. mold temperature	158	°F
Max. mold temperature	248	°F
Hold pressure range	7250 - 14500	psi
Hold pressure time	0.0762	s/mil
Hold Pressure Time (h is the max. wall thickness of the part in mm)	h²+2	s
Ejection temperature	410	°F

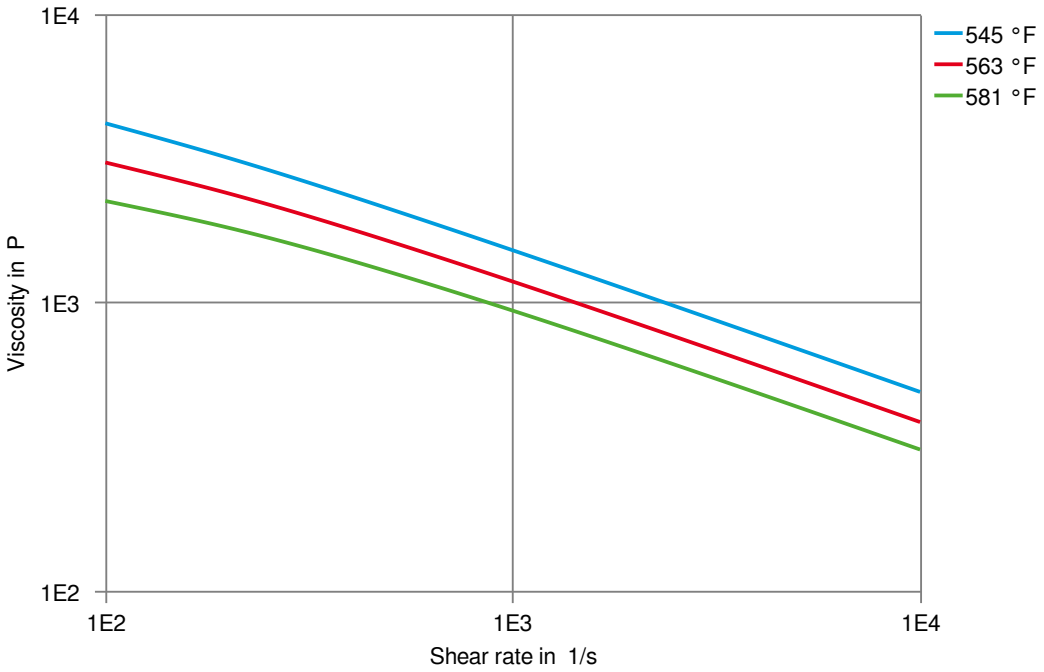
Characteristics

Processing	Injection Molding
Additives	Release agent
Special characteristics	Heat stabilized or stable to heat, Hydrolysis resistant
Sustainability	Recycled Content

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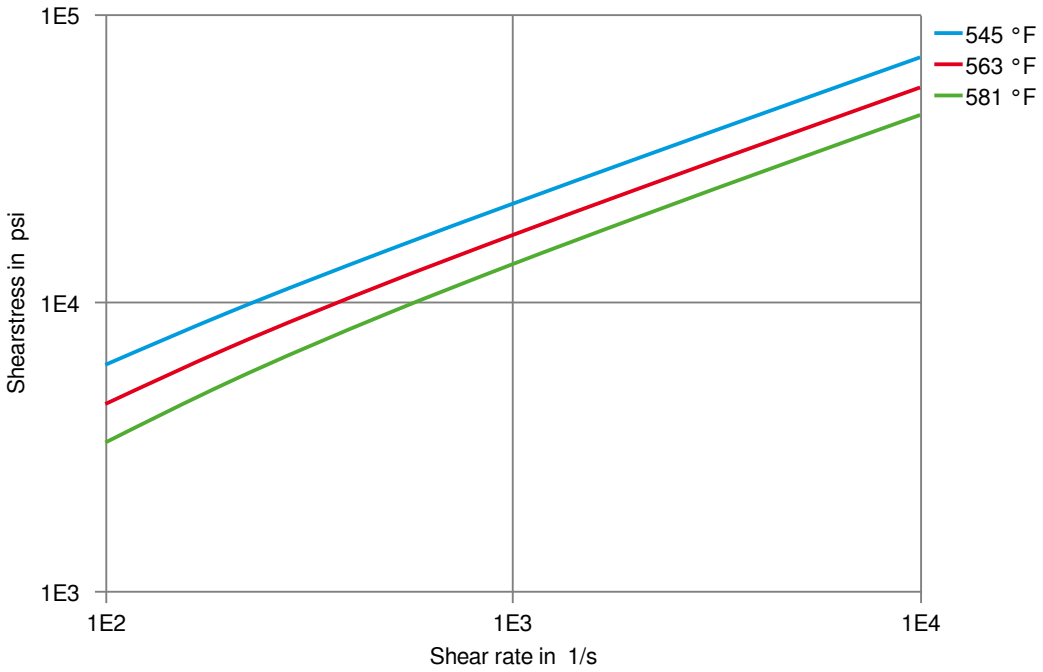
Viscosity-shear rate
(measured on Zytel® 70G30HSLR BK099)



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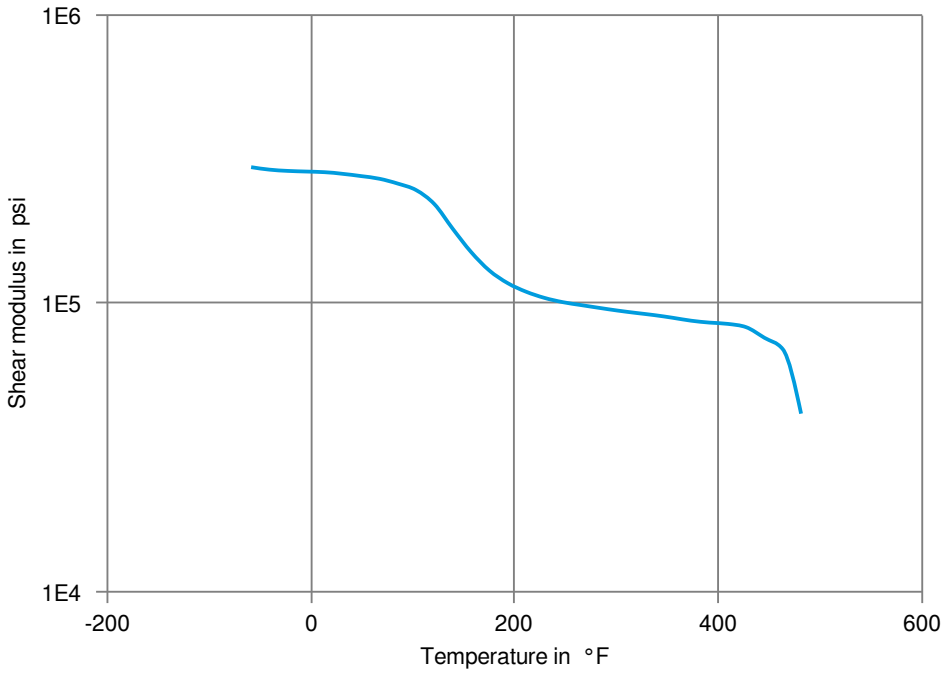
Shearstress-shear rate
(measured on Zytel® 70G30HSLR BK099)



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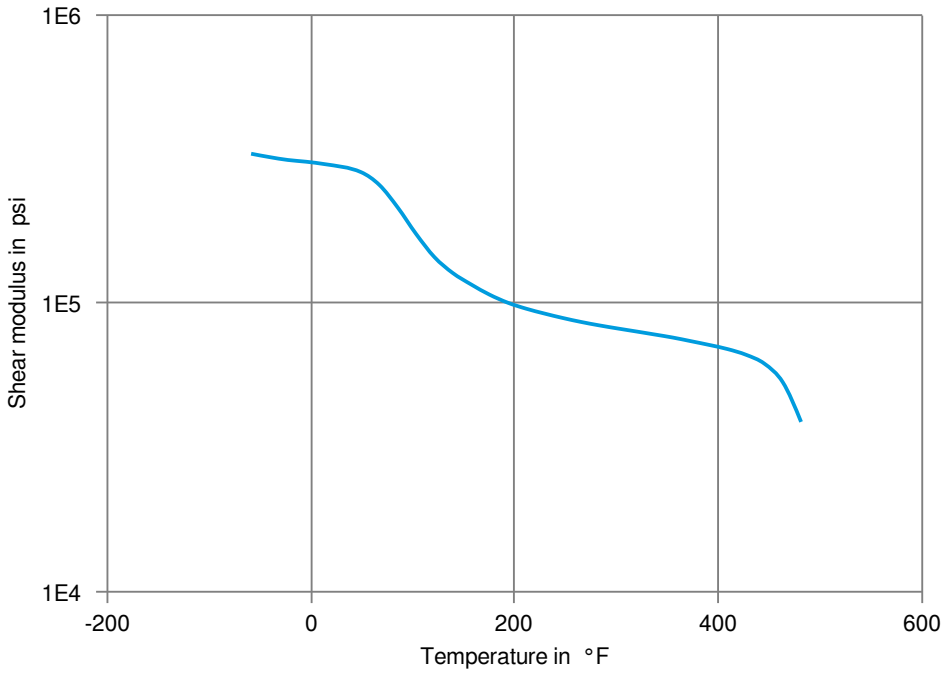
Dynamic Shear modulus-temperature (dry)
(measured on Zytel® 70G30HSLR BK099)



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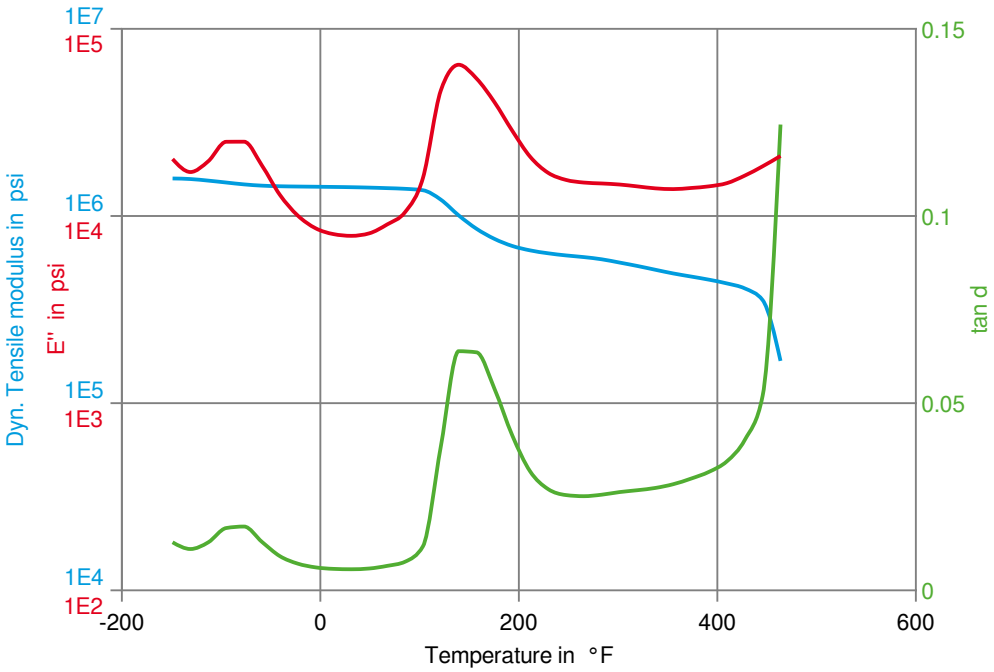
Dynamic Shear modulus-temperature (cond.) (measured on Zytel® 70G30HSLR BK099)



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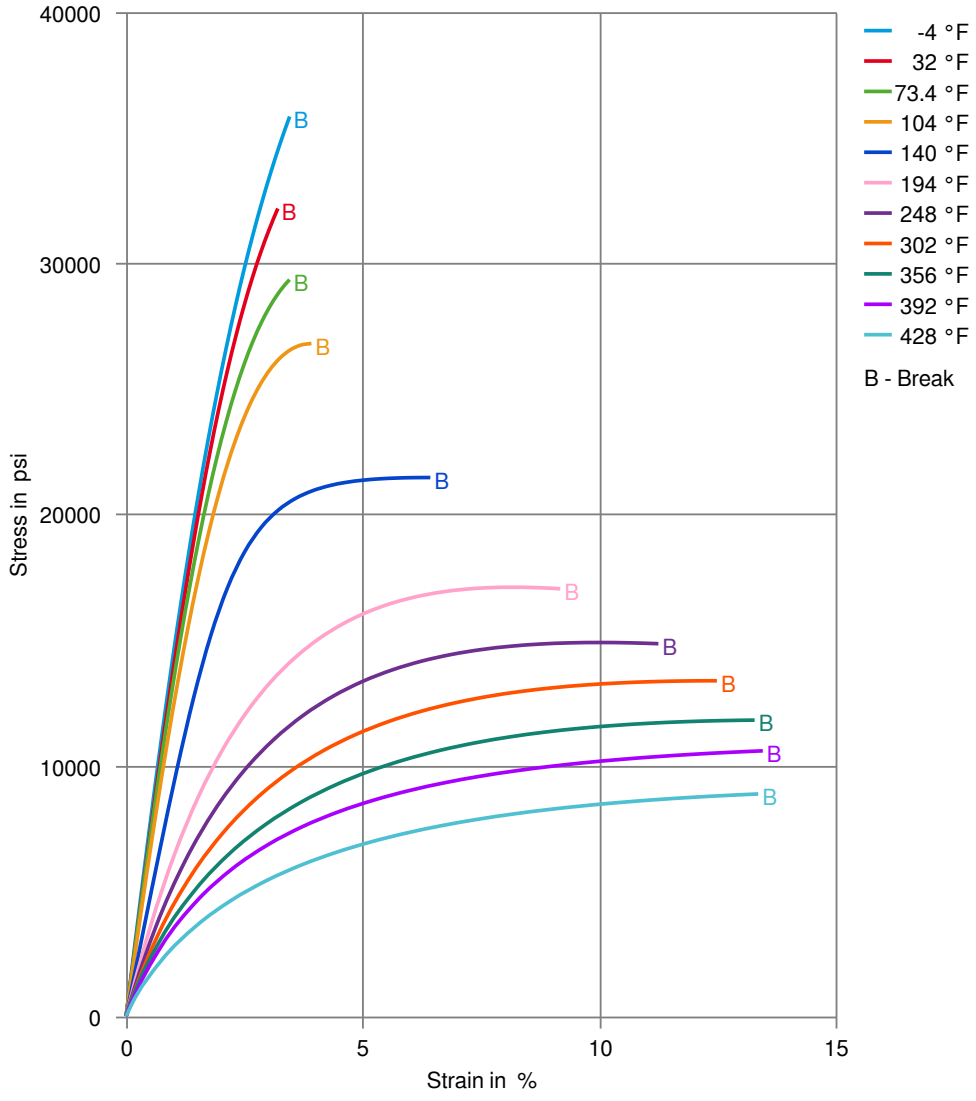
Dynamic Tensile modulus-temperature (dry) (measured on Zytel® 70G30HSLR BK099)



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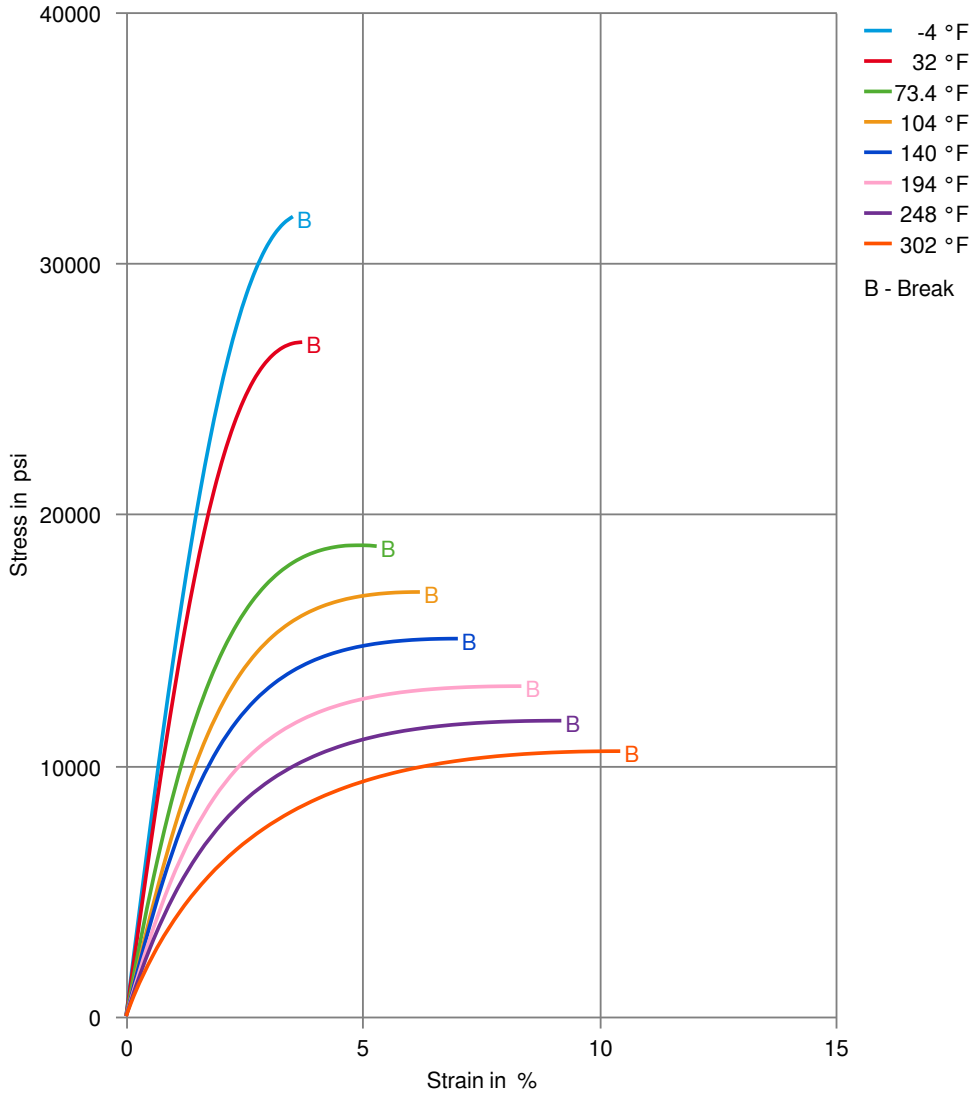
Stress-strain (dry)
(measured on Zytel® 70G30HSLR BK099)



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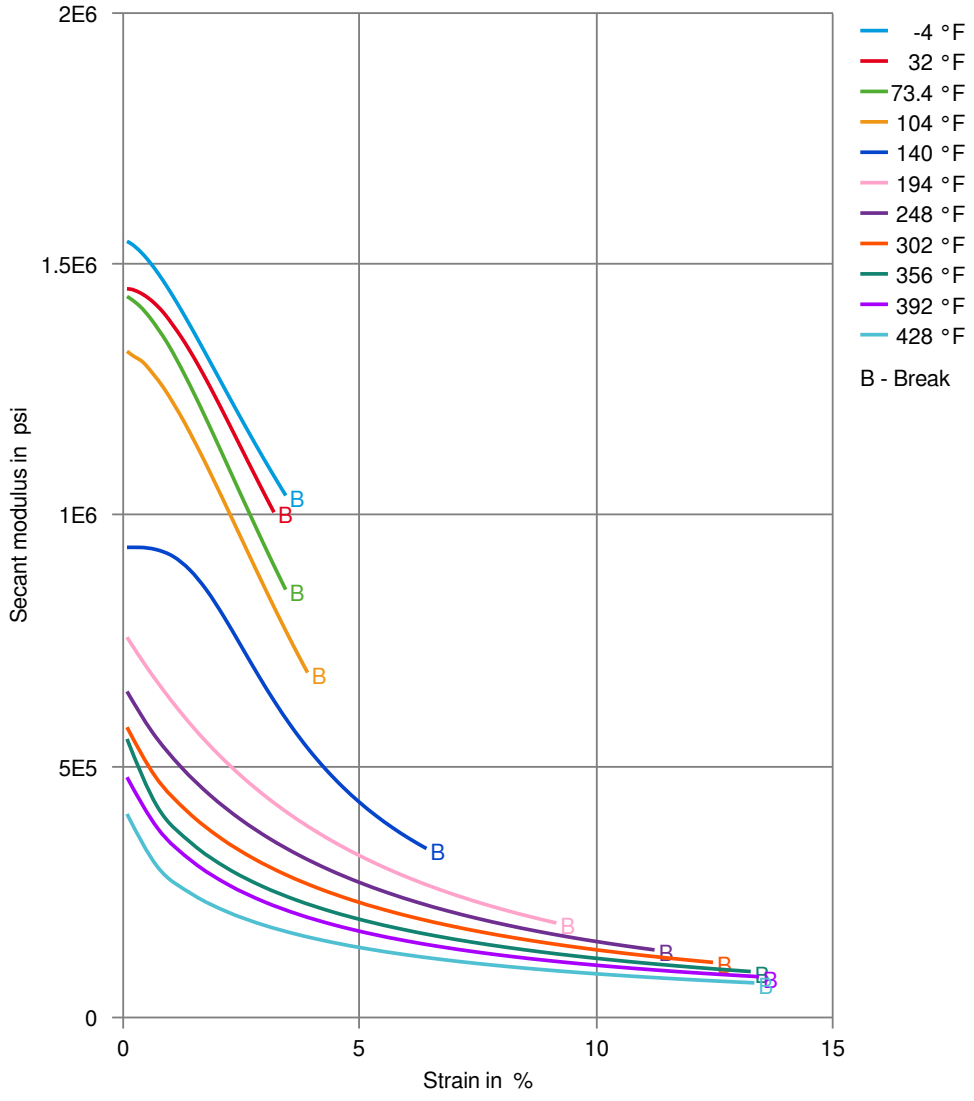
Stress-strain (cond.)
(measured on Zytel® 70G30HSLR BK099)



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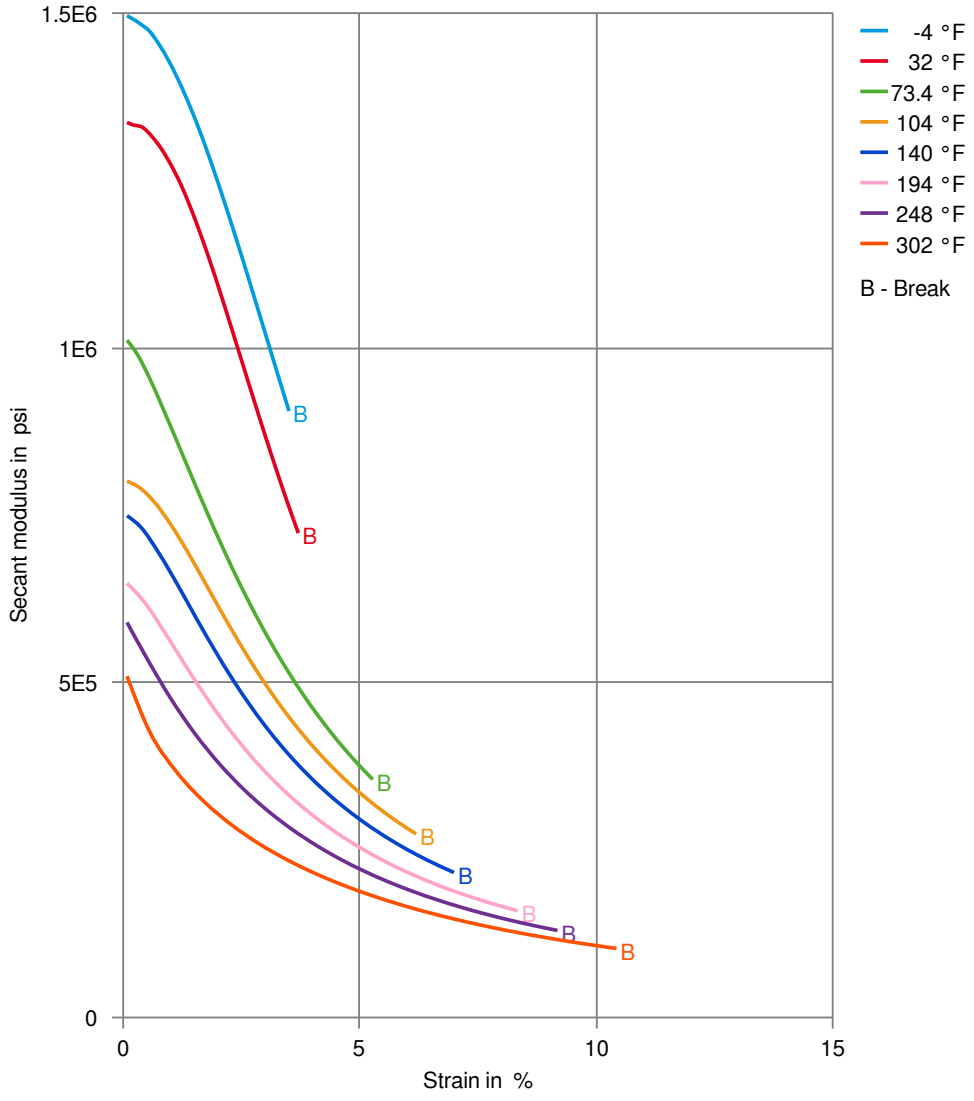
Secant modulus-strain (dry)
(measured on Zytel® 70G30HSLR BK099)



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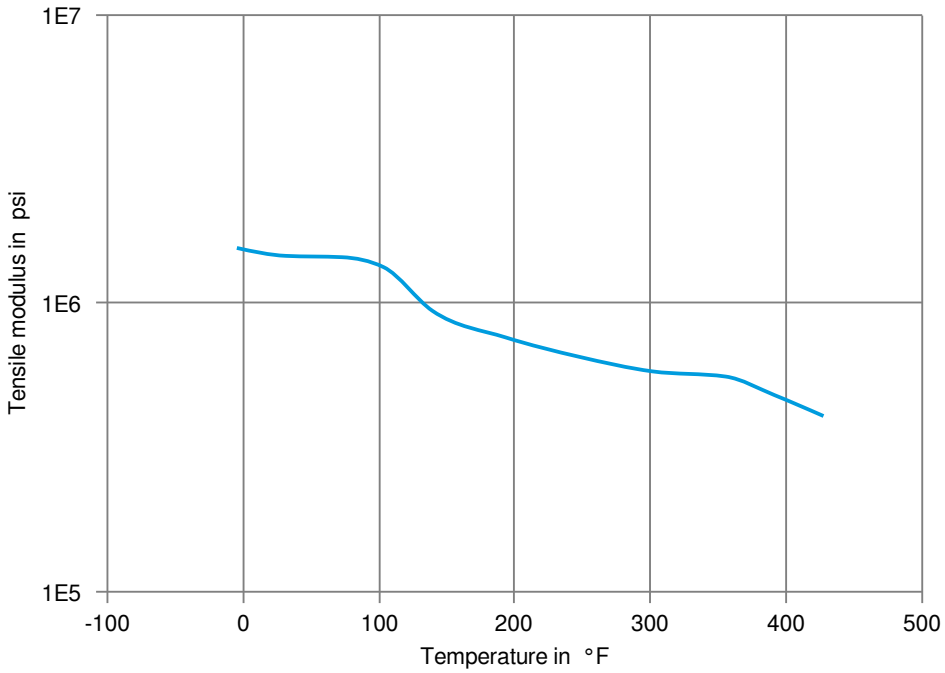
Secant modulus-strain (cond.)
(measured on Zytel® 70G30HSLR BK099)



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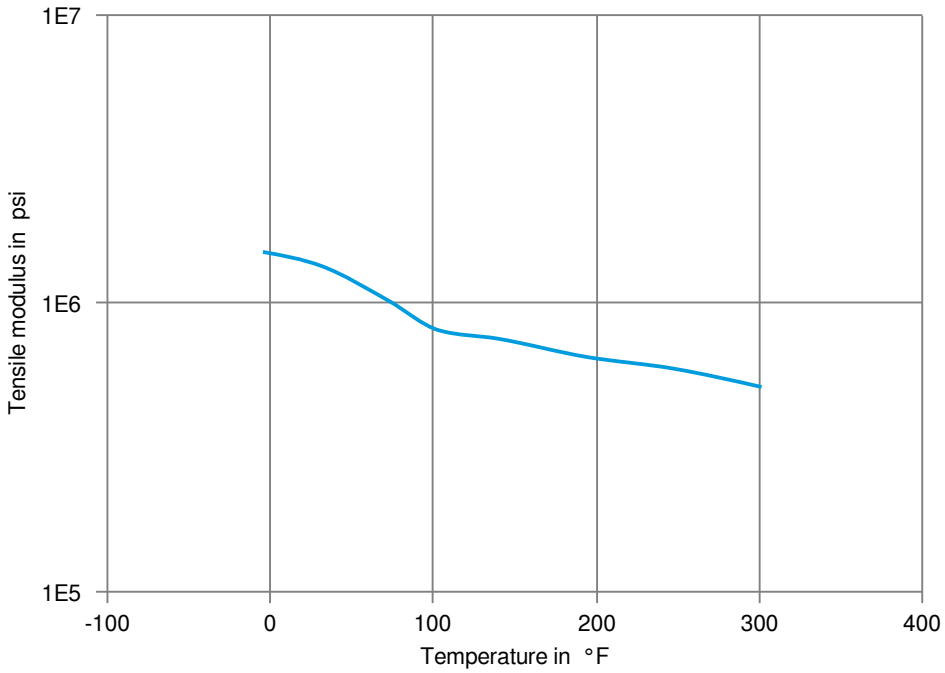
Tensile modulus-temperature (dry)
(measured on Zytel® 70G30HSLR BK099)



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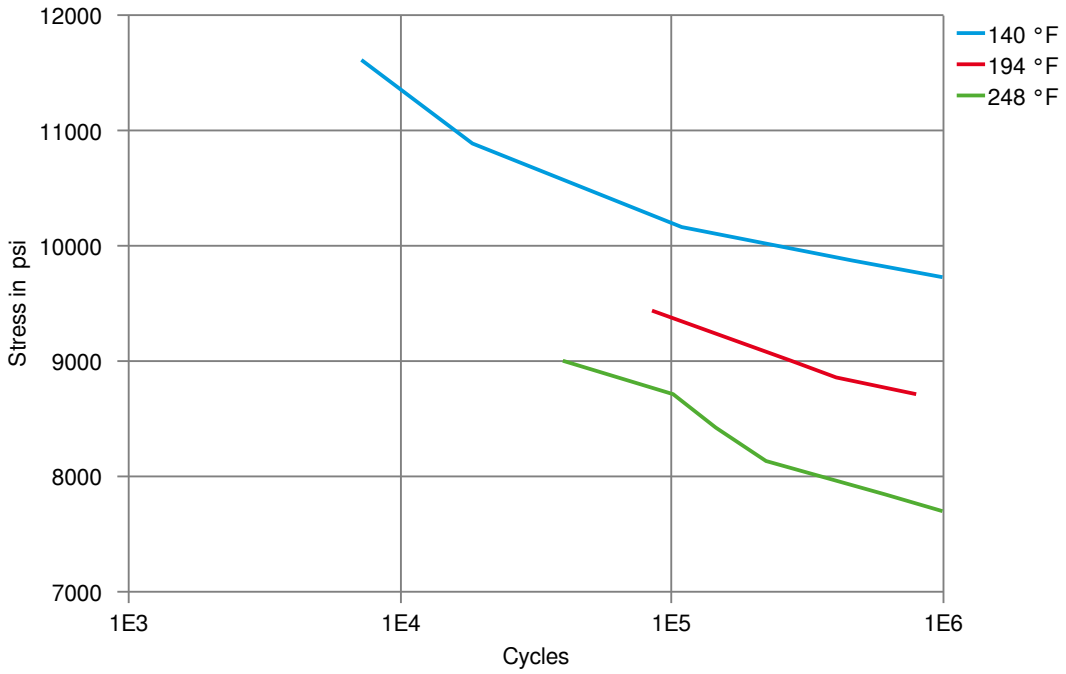
Tensile modulus-temperature (cond.)
(measured on Zytel® 70G30HSLR BK099)



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Tensile Fatigue, 10Hz, R=0.1 @ in (dry)
(measured on Zytel® 70G30HSLR BK099)



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Chemical Media Resistance

Acids
- ✔ Acetic Acid (5% by mass), 23°C
- ✔ Citric Acid solution (10% by mass), 23°C
- ✔ Lactic Acid (10% by mass), 23°C
- ✘ Hydrochloric Acid (36% by mass), 23°C
- ✘ Nitric Acid (40% by mass), 23°C
- ✘ Sulfuric Acid (38% by mass), 23°C
- ✘ Sulfuric Acid (5% by mass), 23°C
- ✘ Chromic Acid solution (40% by mass), 23°C

Bases
- ✘ Sodium Hydroxide solution (35% by mass), 23°C
- ✔ Sodium Hydroxide solution (1% by mass), 23°C
- ✔ Ammonium Hydroxide solution (10% by mass), 23°C

Alcohols
- ✔ Isopropyl alcohol, 23°C
- ✔ Methanol, 23°C
- ✔ Ethanol, 23°C

Hydrocarbons
- ✔ n-Hexane, 23°C
- ✔ Toluene, 23°C
- ✔ iso-Octane, 23°C

Ketones
- ✔ Acetone, 23°C

Ethers
- ✔ Diethyl ether, 23°C

Mineral oils
- ✔ SAE 10W40 multigrade motor oil, 23°C
- ✔ SAE 10W40 multigrade motor oil, 130°C
- ✔ SAE 80/90 hypoid-gear oil, 130°C
- ✔ Insulating Oil, 23°C
- ✔ Motor oil OS206 304 Ref.Eng.Oil, ISP, 135°C
- ✔ Automatic hypoid-gear oil Shell Donax TX, 135°C
- ✔ Hydraulic oil Pentosin CHF 202, 125°C

Standard Fuels
- ✔ ISO 1817 Liquid 1 - E5, 60°C
- ✔ ISO 1817 Liquid 2 - M15E4, 60°C
- ✔ ISO 1817 Liquid 3 - M3E7, 60°C
- ✔ ISO 1817 Liquid 4 - M15, 60°C
- ✔ Standard fuel without alcohol (pref. ISO 1817 Liquid C), 23°C
- ✔ Standard fuel with alcohol (pref. ISO 1817 Liquid 4), 23°C
- ✔ Diesel fuel (pref. ISO 1817 Liquid F), 23°C
- ✔ Diesel fuel (pref. ISO 1817 Liquid F), 90°C
- ✔ Diesel fuel (pref. ISO 1817 Liquid F), >90°C

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Salt solutions
- ✔ Sodium Chloride solution (10% by mass), 23°C
- ✘ Sodium Hypochlorite solution (10% by mass), 23°C
- ✔ Sodium Carbonate solution (20% by mass), 23°C
- ✔ Sodium Carbonate solution (2% by mass), 23°C
- ✘ Zinc Chloride solution (50% by mass), 23°C

Other
- ✔ Ethyl Acetate, 23°C
- ✘ Hydrogen peroxide, 23°C
- ✔ DOT No. 4 Brake fluid, 130°C
- ✔ DOT No. 4 Brake fluid, 120°C
- ✔ Ethylene Glycol (50% by mass) in water, 108°C
- ✔ 1% nonylphenoxy-polyethyleneoxy ethanol in water, 23°C
- ✔ 50% Oleic acid + 50% Olive Oil, 23°C
- ✔ Water, 23°C
- ✔ Water, 90°C
- ✘ Phenol solution (5% by mass), 23°C
- ✔ Coolant Glysantin G48, 1:1 in water, 125°C

Symbols used:

✔ possibly resistant
Defined as: Supplier has sufficient indication that contact with chemical can be potentially accepted under the intended use conditions and expected service life. Criteria for assessment have to be indicated (e.g. surface aspect, volume change, property change).

✘ not recommended - see explanation
Defined as: Not recommended for general use. However, short-term exposure under certain restricted conditions could be acceptable (e.g. fast cleaning with thorough rinsing, spills, wiping, vapor exposure).

NOTICE TO USERS: Values shown are based on testing of laboratory test specimens and represent data that fall within the standard range of properties for natural material. These values alone do not represent a sufficient basis for any part design and are not intended for use in establishing maximum, minimum, or ranges of values for specification purposes. Colorants or other additives may cause significant variations in data values. Properties of molded parts can be influenced by a wide variety of factors including, but not limited to, material selection, additives, part design, processing conditions and environmental exposure. Other than those products expressly identified as medical grade (including by MT® product designation or otherwise), Celanese's products are not intended for use in medical or dental implants. Regardless of any such product designation, any determination of the suitability of a particular material and part design for any use contemplated by the users and the manner of such use is the sole responsibility of the users, who must assure themselves that the material as subsequently processed meets the needs of their particular product or use. To the best of our knowledge, the information contained in this publication is accurate; however, we do not assume any liability whatsoever for the accuracy and completeness of such information. The information contained in this publication should not be construed as a promise or guarantee of specific properties of our products. It is the sole responsibility of the users to investigate whether any existing patents are infringed by the use of the materials mentioned in this publication. Moreover, there is a need to reduce human exposure to many materials to the lowest practical limits in view of possible adverse effects. To the extent that any hazards may have been mentioned in this publication, we neither suggest nor guarantee that such hazards are the only ones that exist. We recommend that persons intending to rely on any recommendation or to use any equipment, processing technique or material mentioned in this publication should satisfy themselves that they can meet all applicable safety and health standards. We strongly recommend that users seek and adhere to the manufacturer's current instructions for handling each material they use, and entrust the handling of such material to adequately trained personnel only. Please call the telephone numbers listed for additional technical information. Call Customer Services for the appropriate Materials Safety Data Sheets (MSDS) before attempting to process our products.
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