Zytel® 70G33L NC010

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® 70G33L NC010 is a 33% glass fiber reinforced polyamide 66 resin for injection molding.

Product information

Resin Identification	PA66-GF33	ISO 1043
Part Marking Code	>PA66-GF33<	ISO 11469
ISO designation	ISO 16396-PA66,GF33,M1GNR,S14-100	

Rheological properties

	dry/cond.		
Viscosity number	4350 / *	in³/lb	ISO 307, 1628
Molding shrinkage, parallel	0.3 / -	%	ISO 294-4, 2577
Molding shrinkage, normal	1.1 / -	%	ISO 294-4, 2577

Typical mechanical properties

	dry/cond.		
Tensile modulus	1.45E6 / 1.16E6	psi	ISO 527-1/-2
Tensile stress at break, 5mm/min	29000 / 20300	psi	ISO 527-1/-2
Tensile strain at break, 5mm/min	3.5 / 5	%	ISO 527-1/-2
Flexural modulus	1.31E6 / 870000	psi	ISO 178
Flexural strength	42100 / 29000	psi	ISO 178
Compressive strength	34800 / -	psi	ISO 604
Tensile creep modulus, 1h	* / 1.16E6	psi	ISO 899-1
Tensile creep modulus, 1000h	* / 798000	psi	ISO 899-1
Charpy impact strength, 23°C	40.4 / 47.6	ftlb/in²	ISO 179/1eU
Charpy impact strength, -30°C	33.3 / 35.7	ftlb/in²	ISO 179/1eU
Charpy notched impact strength, 23°C	6.18 / 8.09	ftlb/in²	ISO 179/1eA
Charpy notched impact strength, -30°C	4.76 / 4.76	ftlb/in²	ISO 179/1eA
Charpy notched impact strength, -40°C	4.76 / 4.76	ftlb/in²	ISO 179/1eA
Izod notched impact strength, 23°C	5.71 / 7.14	ftlb/in²	ISO 180/1A
Izod notched impact strength, -30°C	4.76 / 4.76	ftlb/in²	ISO 180/1A
Izod notched impact strength, -40°C	4.76 / 4.76	ftlb/in²	ISO 180/1A
Izod impact strength, 23°C	38.1 / 42.8	ftlb/in²	ISO 180/1U
Izod impact strength, -30°C	33.3 / 33.3	ftlb/in²	ISO 180/1U
Hardness, Rockwell, M-scale	101 / -		ISO 2039-2
Abrasion resistance	10 / *	mm³	ISO 4649

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Thermal properties

	dry/cond.		
Melting temperature, 10°C/min	504 / *	°F	ISO 11357-1/-3
Glass transition temperature, 10°C/min	176 / 68	°F	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	486 / *	°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	0.10 / *	E-4/°F	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), parallel, -40-23°C	0.133 / *	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	0.461 / *	E-4/°F	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal, -40-23°C	0.361 / *	E-4/°F	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal, 55-160°C	0.778 / *	E-4/°F	ISO 11359-1/-2
Thermal conductivity of melt	0.22	W/(m K)	ISO 22007-2
Specific heat capacity of melt	2210	J/(kg K)	ISO 22007-4
Specific heat capacity solid	1330[C]	J/(kg K)	ISO 22007-4
RTI, electrical, 0.75mm	266	°F	UL 746B
RTI, electrical, 1.5mm	266	°F	UL 746B
RTI, electrical, 3.0mm	266	°F	UL 746B
RTI, impact, 0.75mm	248	°F	UL 746B
RTI, impact, 1.5mm	248	°F	UL 746B
RTI, impact, 3.0mm	248	°F	UL 746B
RTI, strength, 0.75mm	266	°F	UL 746B
RTI, strength, 1.5mm	266 / *	°F	UL 746B
RTI, strength, 3.0mm	266	°F	UL 746B

[C]: Calculated

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
UL recognition	yes / *		UL 94
Burning Behav. at thickness h	HB / *	class	IEC 60695-11-10
Thickness tested	0.0280 / *	in	IEC 60695-11-10
UL recognition	yes / *		UL 94
Oxygen index	24 / *	%	ISO 4589-1/-2
FMVSS Class	B		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	1.18	in/min	ISO 3795 (FMVSS 302)

Electrical properties

	dry/cond.		
Relative permittivity, 100Hz	4.2 / -		IEC 62631-2-1
Relative permittivity, 1MHz	4 / -		IEC 62631-2-1
Dissipation factor, 100Hz	100 / -	E-4	IEC 62631-2-1
Dissipation factor, 1MHz	150 / -	E-4	IEC 62631-2-1
Volume resistivity	1E13 / -	Ohm.m	IEC 62631-3-1

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Comparative tracking index	600 / -		IEC 60112
Electric Strength, Short Time, 1mm	940 / -	V/mil	IEC 60243-1

Physical/Other properties

	dry/cond.		
Humidity absorption, 2mm	1.8 / *	%	Sim. to ISO 62
Water absorption, 2mm	5.7 / *	%	Sim. to ISO 62
Water absorption, Immersion 24h	1.2[1] / *	%	Sim. to ISO 62
Density	0.0502 / -	lb/in³	ISO 1183

[1]: 2mm thickness

Emissions

	dry/cond.		
Emission of organic compounds	6	µgC/g	VDA 277
Odor test	4.5	class	VDA 270
Fogging, F-value (refraction)	95 / *	%	ISO 6452
Fogging, G-value (condensate)	0.3 / *	mg	ISO 6452

Injection

Drying Recommended	yes	
Drying Temperature	176	°F
Drying Time, Dehumidified Dryer	2 - 4	h
Processing Moisture Content	≤0.2	%
Melt Temperature Optimum	572	°F
Min. melt temperature	554	°F
Max. melt temperature	581	°F
Max. screw tangential speed	≤0.2	m/s
Mold Temperature Optimum	203	°F
Min. mold temperature	149	°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)	h^2+2	s
Ejection temperature	428	°F

Automotive

OEM	STANDARD	ADDITIONAL INFORMATION
Hyundai	MS211-37 Type E	
Stellantis - Chrysler	MS.50017 / CPN-1853	Natural
Stellantis - Chrysler	MS.50017 / CPN-3811	Natural

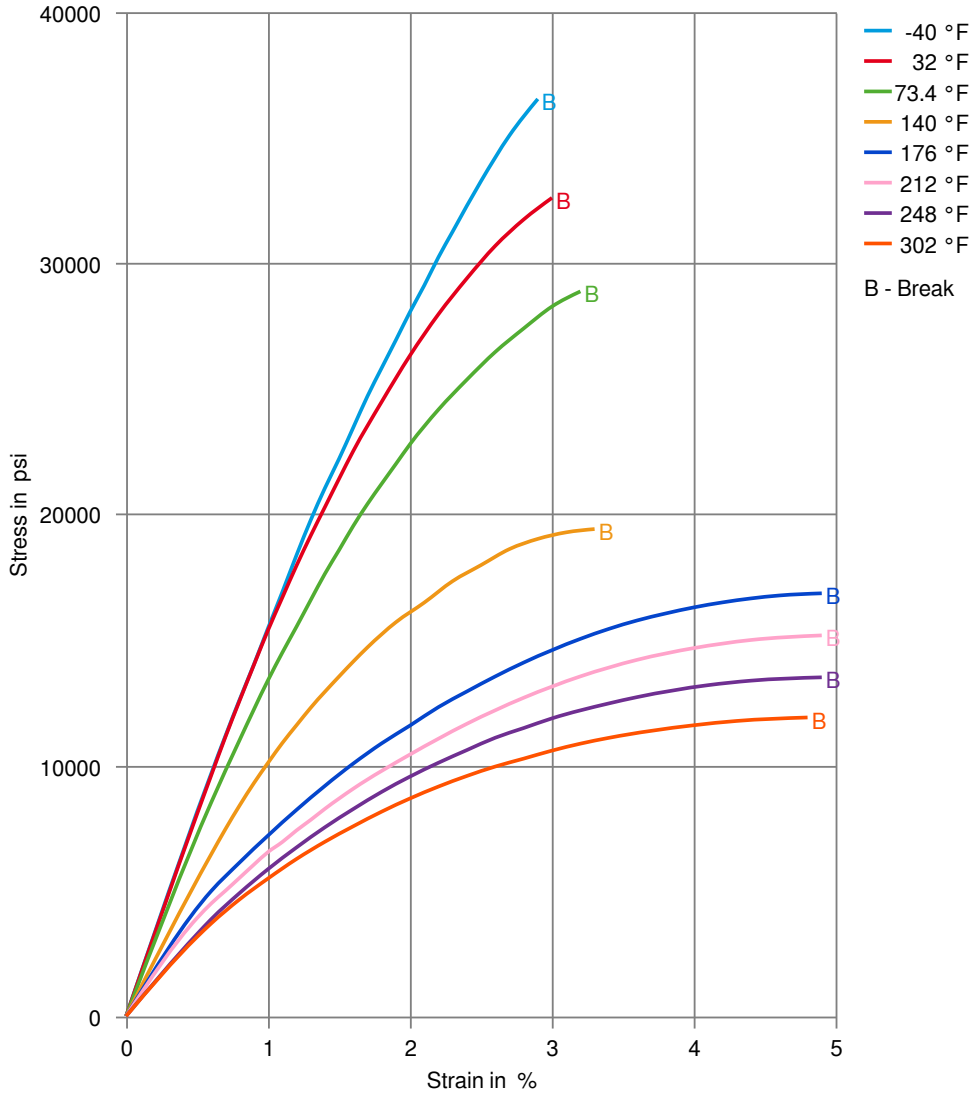
Characteristics

Processing	Injection Molding
Additives	Release agent

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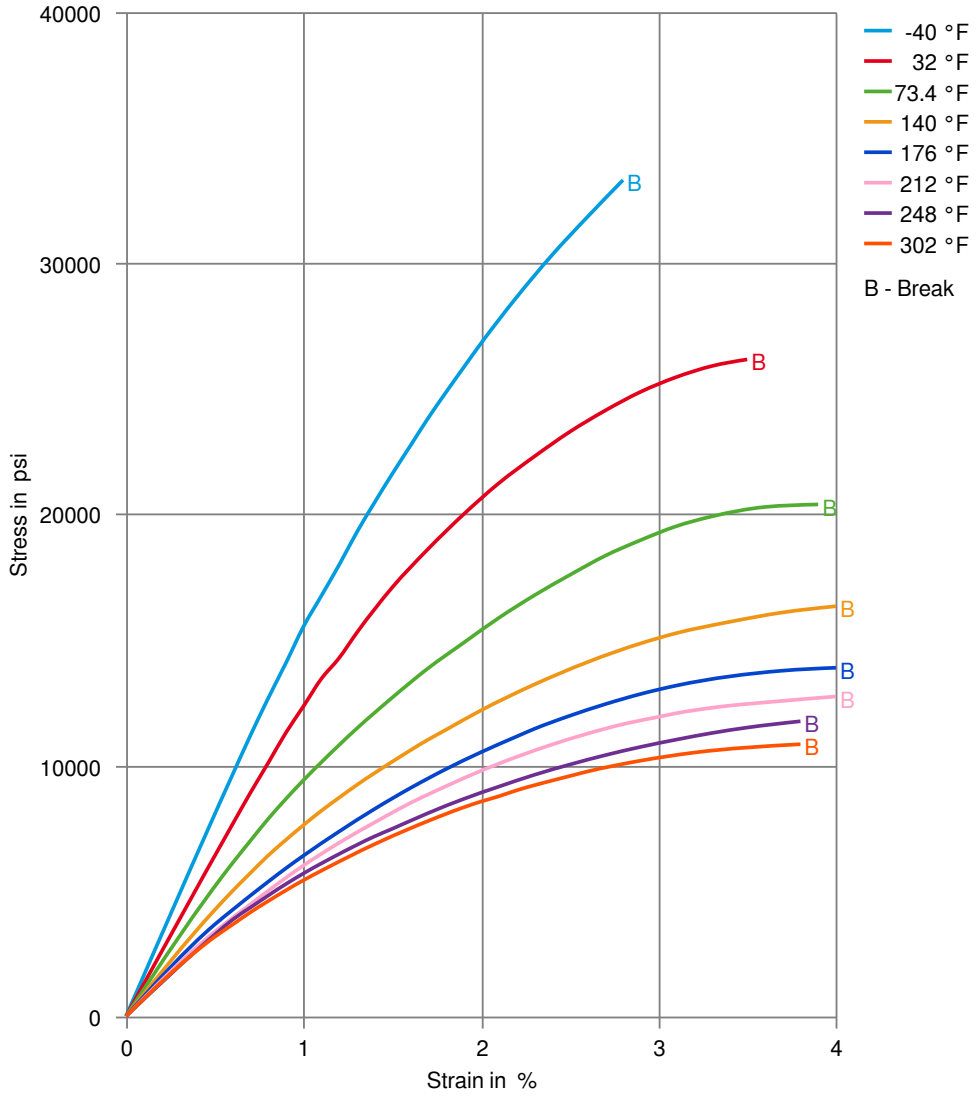
Stress-strain (dry)



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NYLON RESIN

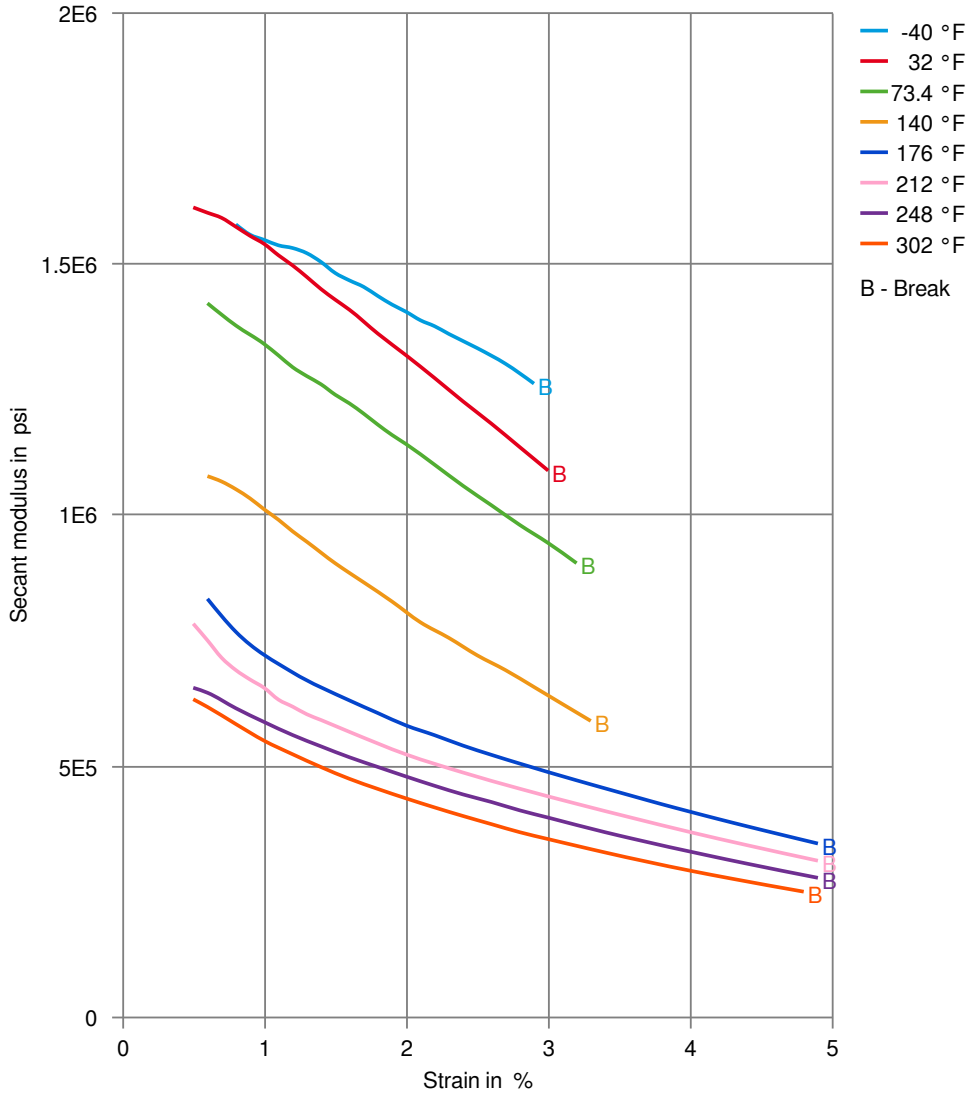
Stress-strain (cond.)



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NYLON RESIN

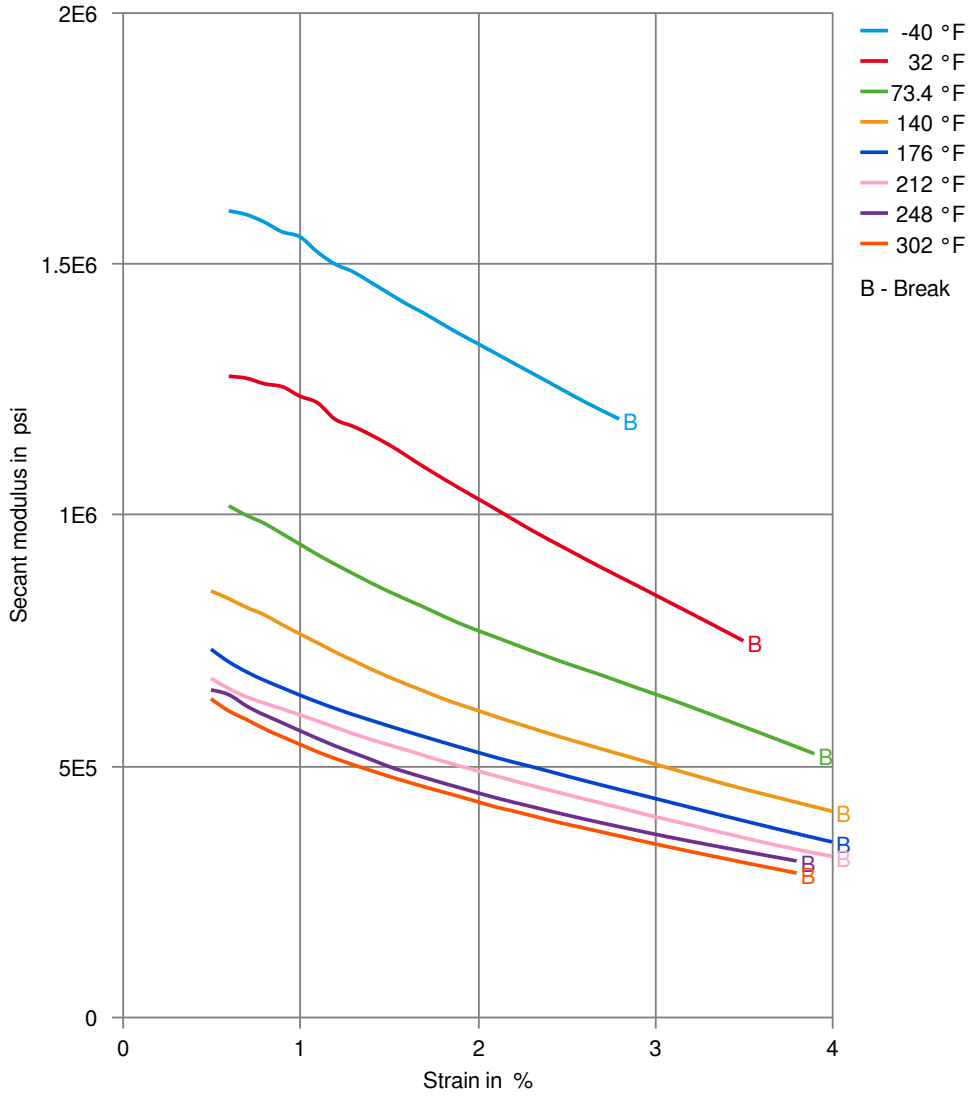
Secant modulus-strain (dry)



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NYLON RESIN

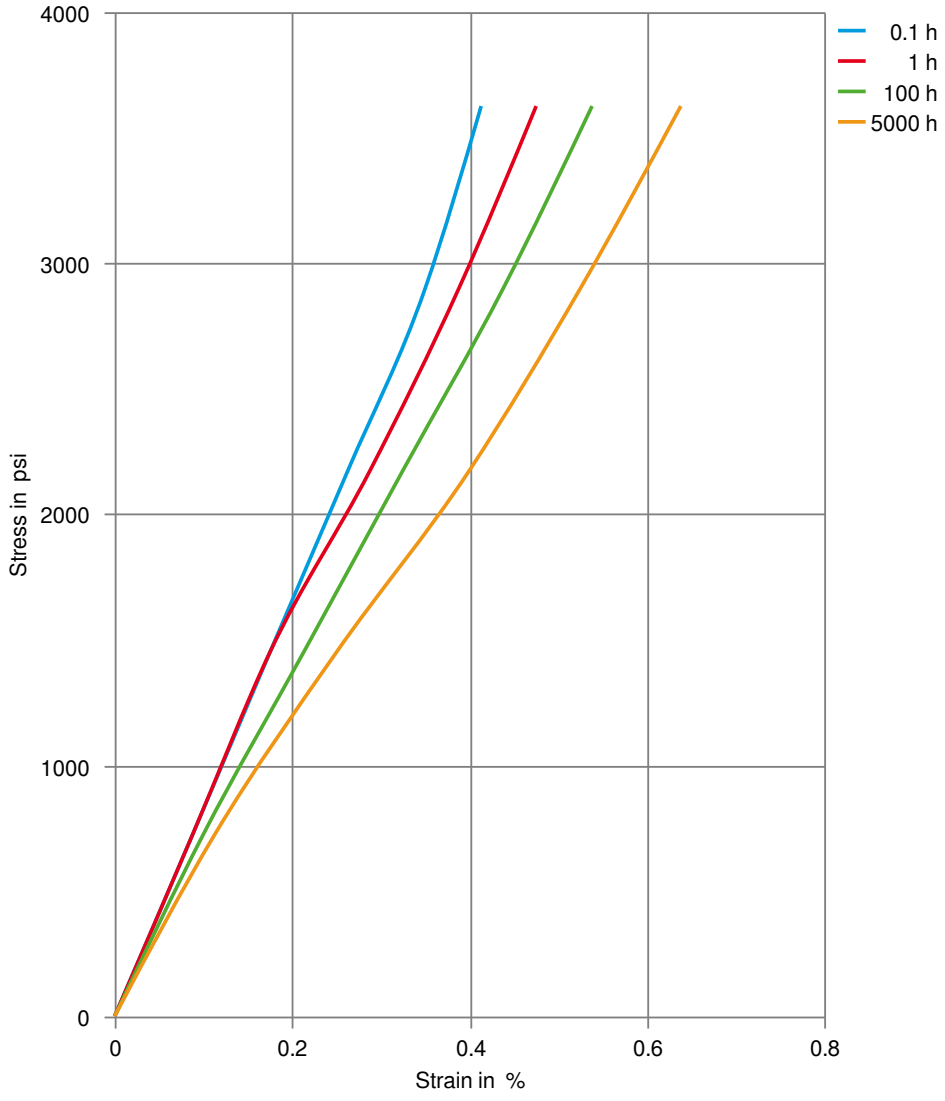
Secant modulus-strain (cond.)



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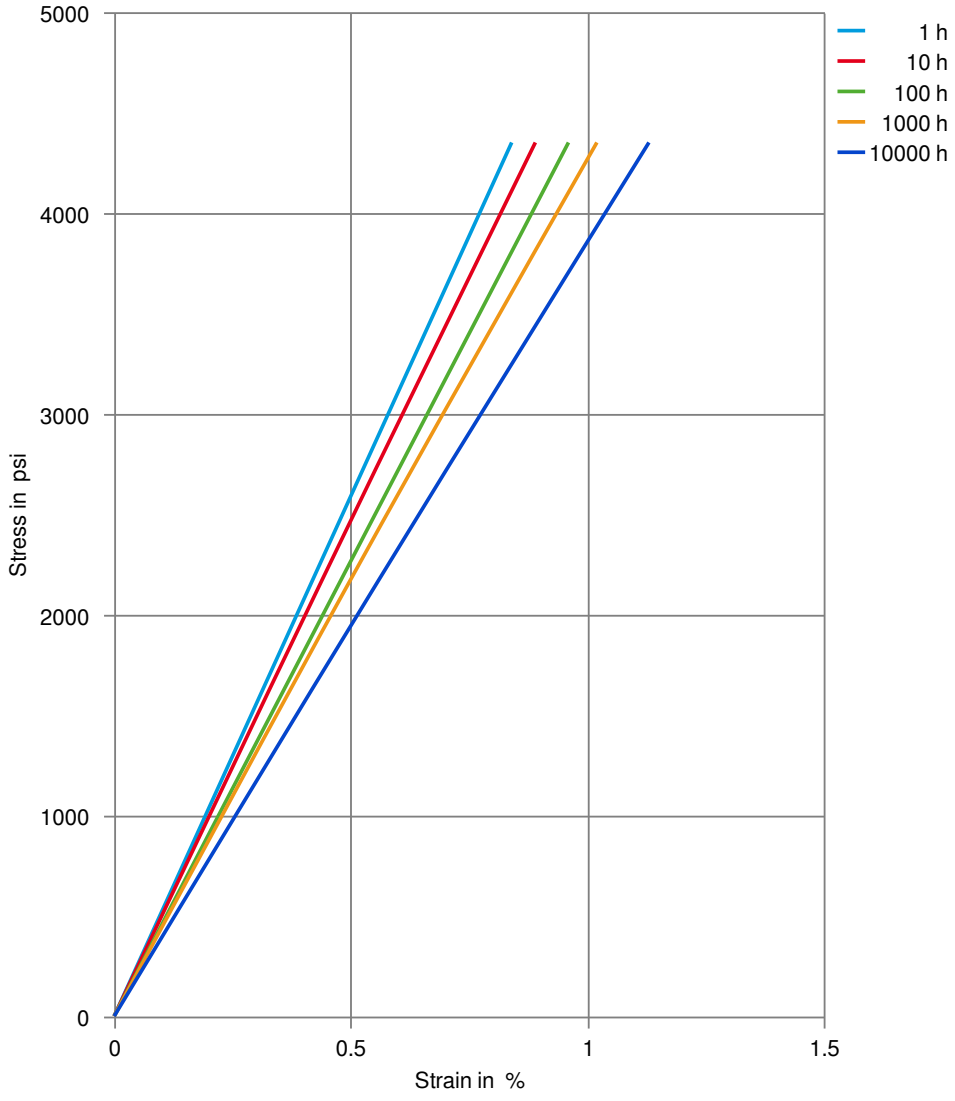
Stress-strain (isochronous) 73.4 °F (cond.)



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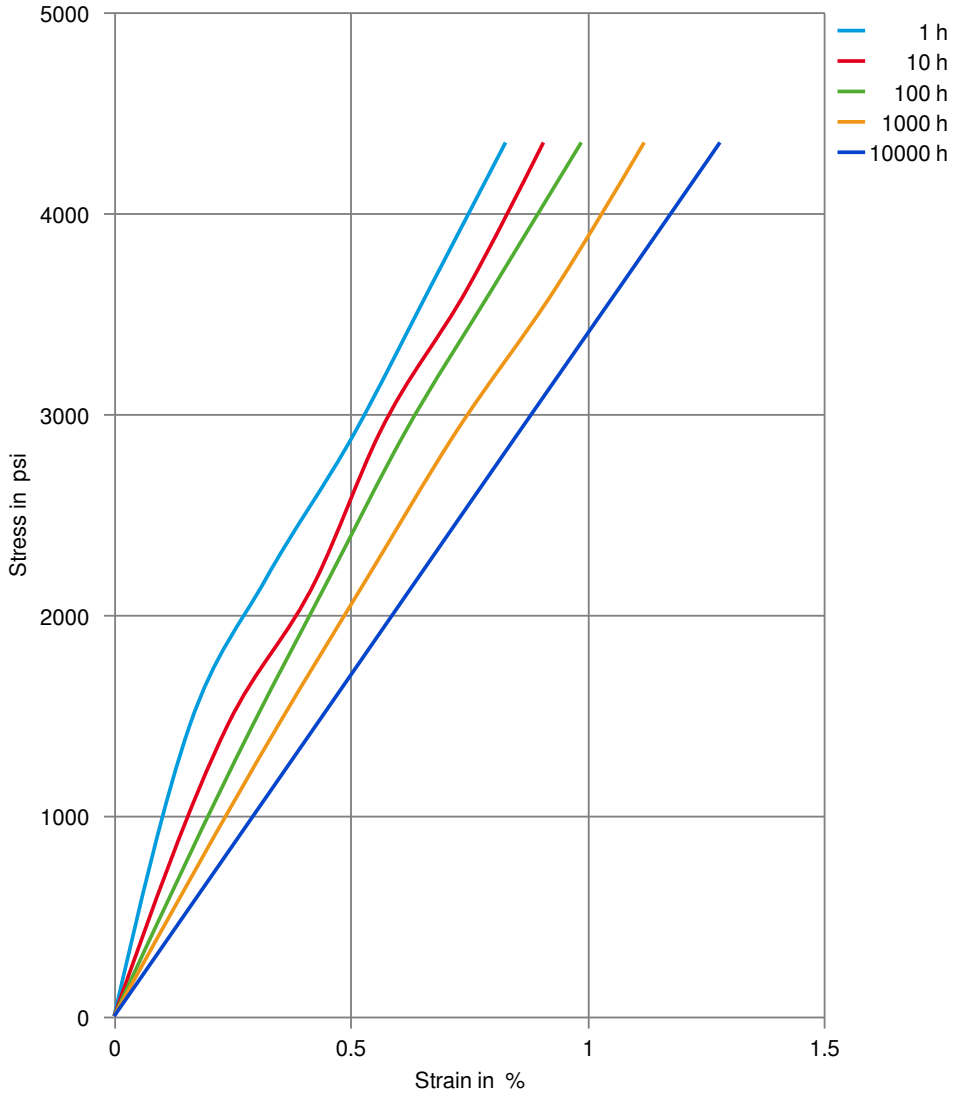
Stress-strain (isochronous) 212°F (cond.)



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Stress-strain (isochronous) 302°F (cond.)

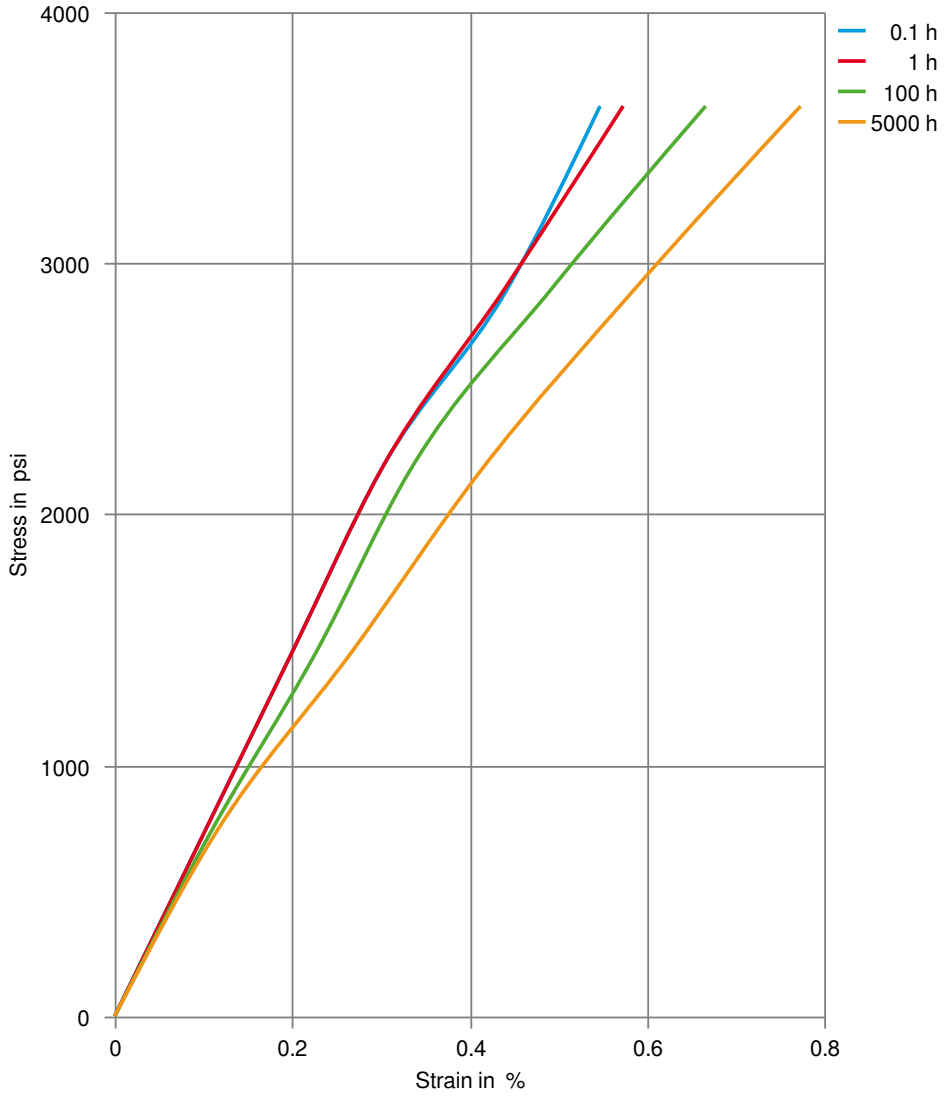


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Stress-strain (isochronous) 140 °F (cond.)



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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

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

Salt solutions

- ✔ Sodium Chloride solution (10% by mass), 23°C
- ✘ Sodium Hypochlorite solution (10% by mass), 23°C

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- ✔ 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
- ✔ 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

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).

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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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