Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

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® 70G50HSLA BK039B is a 50% glass fiber reinforced, heat stabilised polyamide 66 resin for injection moulding. It has excellent flow characteristics.

Product information

Resin Identification	PA66-GF50	ISO 1043
Part Marking Code	>PA66-GF50<	ISO 11469
ISO designation	ISO 16396-PA66,GF50,M1CGHR,S10-160	

Rheological properties

	dry/cond.		
Viscosity number	105[1]/*	cm^3/g	ISO 307, 1628
Moulding shrinkage, parallel	0.3 / -	%	ISO 294-4, 2577
Moulding shrinkage, normal	0.8 / -	%	ISO 294-4, 2577

[1]: 96% sulfuric acid

Typical mechanical properties

	dry/cond.		
Tensile modulus	17000 / 13000	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	240 / 170	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	2.4 / 3.5	%	ISO 527-1/-2
Flexural modulus	16000 / 12000	MPa	ISO 178
Flexural strength	400 / 280	MPa	ISO 178
Flexural stress at 3.5%	- / 270	MPa	ISO 178
Compressive strength	215 / -	MPa	ISO 604
Tensile creep modulus, 1h	* / 10000	MPa	ISO 899-1
Tensile creep modulus, 1000h	* / 8000	MPa	ISO 899-1
Charpy impact strength, 23°C	90 / 95	kJ/m^2	ISO 179/1eU
Charpy impact strength, -30°C	90 / 90	kJ/m^2	ISO 179/1eU
Charpy notched impact strength, 23°C	15 / 20	kJ/m^2	ISO 179/1eA
Charpy notched impact strength, -30°C	15 / 14	kJ/m^2	ISO 179/1eA
Puncture energy, 23°C	10 / -	J	ISO 6603-2
Ball indentation hardness, H 961/30	300 / -	MPa	ISO 2039-1
Poisson's ratio	0.33 / 0.33		

Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

Thermal properties

	dry/cond.		
Melting temperature, 10 °C/min	262 / *	°C	ISO 11357-1/-3
Glass transition temperature, 10 °C/min	65 / 20	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	255 / *	°C	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	261 / *	°C	ISO 75-1/-2
Vicat softening temperature, 50 °C/h 50N	255 / *	°C	ISO 306
Coeff. of linear therm. expansion, parallel, -40-23 °C	13 / *	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), parallel	9 / *	E-6/K	ISO 11359-1/-2
CLTE, Parallel, 23-55 °C(73-130 °F)	19 / -	E-6/K	ASTM E 831
Coeff. of linear therm. expansion, parallel, 55-160 °C	19 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, -40-23 °C	42 / *	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	72 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, 55-160 °C	114 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, Normal,23-55 °C (73-130 °F)	61 / -	E-6/K	ASTM E 831
Thermal conductivity, flow	0.46	W/(m K)	ISO 22007-2
Thermal conductivity of melt	0.31	W/(m K)	ISO 22007-2
Specific heat capacity of melt	1870	J/(kg K)	ISO 22007-4
RTI, electrical, 0.75mm	120	°C	UL 746B
RTI, electrical, 1.5mm	120	°C	UL 746B
RTI, electrical, 3.0mm	120	°C	UL 746B
RTI, impact, 0.75mm	115	°C	UL 746B
RTI, impact, 1.5mm	125	°C	UL 746B
RTI, impact, 3.0mm	130	°C	UL 746B
RTI, strength, 0.75mm	115	°C	UL 746B
RTI, strength, 1.5mm	125 / *	°C	UL 746B
RTI, strength, 3.0mm	130	°C	UL 746B

Flammability

	dry/cond.		
Burning Behav. at 1.5mm nom. thickn.	HB / *	class	IEC 60695-11-10
Thickness tested	1.5 / *	mm	IEC 60695-11-10
UL recognition	yes[2] / *		UL 94
Burning Behav. at thickness h	HB / *	class	IEC 60695-11-10
Thickness tested	0.83 / *	mm	IEC 60695-11-10
UL recognition	yes / *		UL 94
Oxygen index	24 / *	%	ISO 4589-1/-2
FMVSS Class	SE		ISO 3795 (FMVSS 302)

[2]: UL yellow card (f1)

Electrical properties

	dry/cond.		
Volume resistivity	1E13 / -	Ohm.m	IEC 62631-3-1
Surface resistivity	* / 4E14	Ohm	IEC 62631-3-2
Electric strength	30 / -	kV/mm	IEC 60243-1
Comparative tracking index	500 / -		IEC 60112

Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

Physical/Other properties

	dry/cond.		
Humidity absorption, 2mm	1.2 / *	%	Sim. to ISO 62
Water absorption, 2mm	4.2 / *	%	Sim. to ISO 62
Water absorption, Immersion 24h	0.8[3] / *	%	Sim. to ISO 62
Density	1570 / -	kg/m³	ISO 1183
Density of melt	1400	kg/m³	

[3]: 2mm wall thickness

VDA Properties

	dry/cond.		
Emission of organic compounds	6.5	µgC/g	VDA 277
Odour	3	class	VDA 270
Fogging, G-value (condensate)	0.4 / *	mg	ISO 6452

Injection

Drying Recommended	yes	
Drying Temperature	80	°C
Drying Time, Dehumidified Dryer	2 - 4	h
Processing Moisture Content	≤0.2	%
Melt Temperature Optimum	295	°C
Min. melt temperature	285	°C
Max. melt temperature	305	°C
Screw tangential speed	≤0.2	m/s
Mold Temperature Optimum	95	°C
Min. mould temperature	70	°C
Max. mould temperature	120	°C
Hold pressure range	50 - 100	MPa
Hold pressure time	3	s/mm
Ejection temperature	220	°C

Characteristics

Processing	Injection Moulding
Delivery form	Pellets
Additives	Release agent
Special characteristics	Heat stabilised or stable to heat

Automotive

OEM	STANDARD	ADDITIONAL INFORMATION
BMW	GS93016-PA66-GF50	(Heat Aging Resistant)
General Motors	GMW3038P-PA66-GF50H	Black
General Motors	GMW3038P-PA66-GF50J	Black
Mercedes-Benz	DBL5403.33 PA66 GF50	
Mercedes-Benz	DBL5409.35 PA66 GF50	
NIO	NIO-SM.51.003	

Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

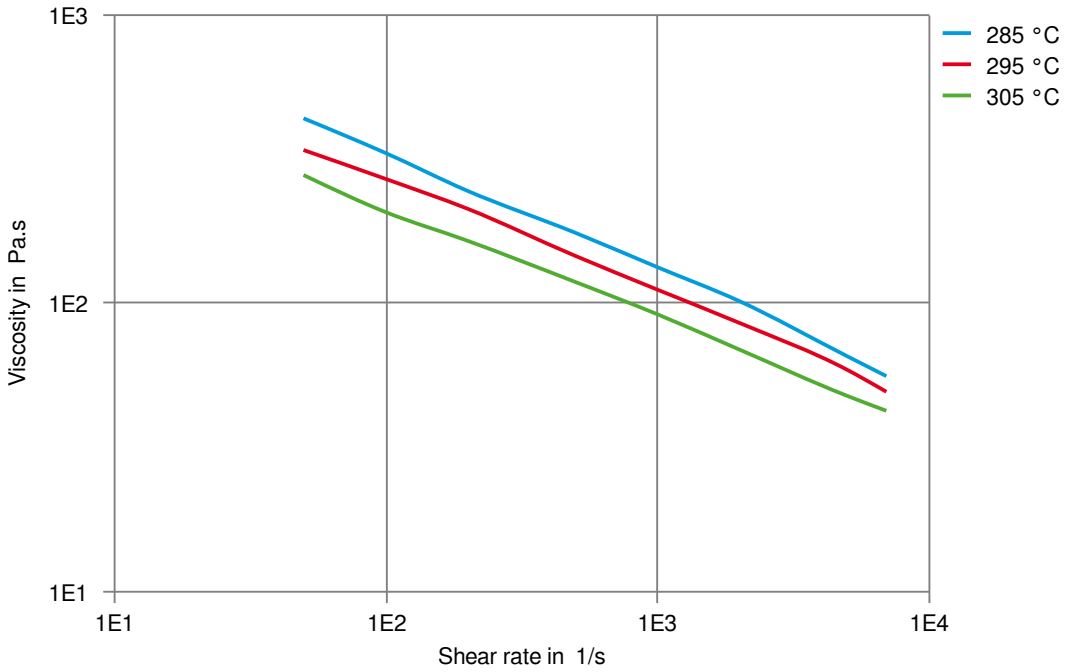
Renault-Nissan	AS25-a, No Spec, Special Part Approval, See Your CE Account Manager.	
Renault-Nissan	EP11b, No Spec, Special Part Approval, See Your CE Account Manager.	
Renault-Nissan	UB01b, No Spec, Special Part Approval, See Your CE Account Manager.	
Renault-Nissan	UB04b, No Spec, Special Part Approval, See Your CE Account Manager.	
Renault-Nissan	UB14, No Spec, Special Part Approval, See Your CE Account Manager.	
Renault-Nissan	UB20a, No Spec, Special Part Approval, See Your CE Account Manager.	
Renault-Nissan	UB20c, No Spec, Special Part Approval, See Your CE Account Manager.	
Renault-Nissan	UB20d, No Spec, Special Part Approval, See Your CE Account Manager.	
Stellantis	B62 0300 / 61/U4/AD1/W1/O1/AB1/E2/215M-218E/13/C1B	CPN4967, 01994_15_00032
Stellantis - Chrysler	MS.50017 / CPN-4967	Black
VW Group	VW 50127 PA66-10	
VW Group	VW 50133 PA66-8-A	

Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

Viscosity-shear rate

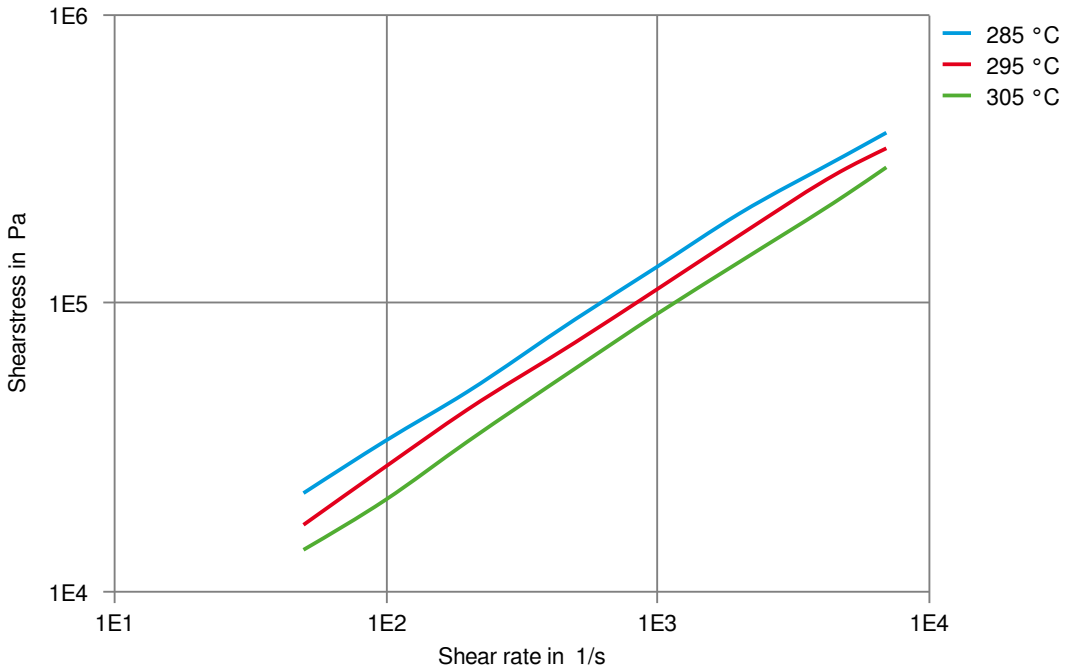


Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

Shearstress-shear rate

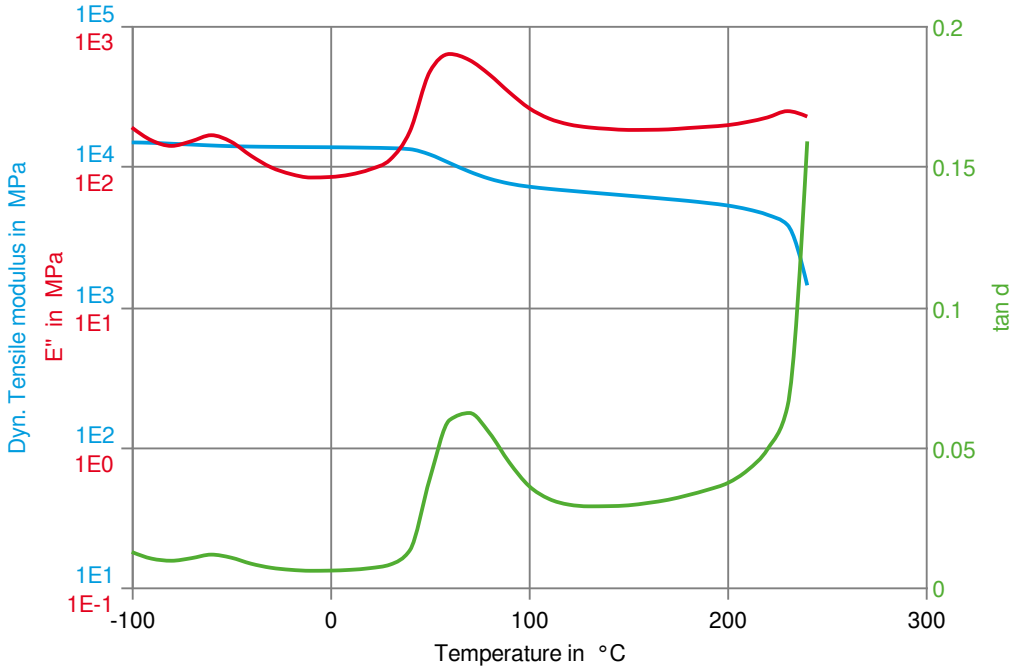


Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

Dynamic Tensile modulus-temperature (dry)

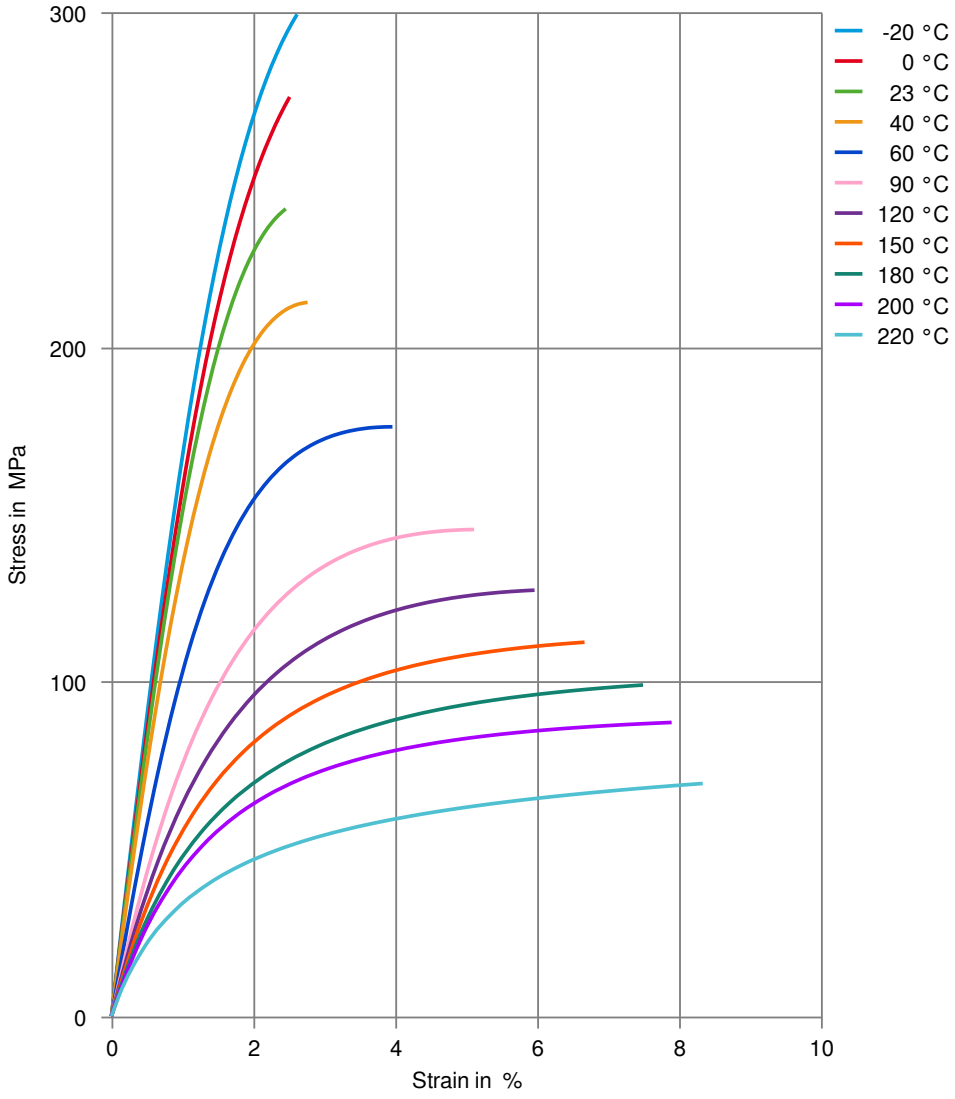


Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

Stress-strain (dry)

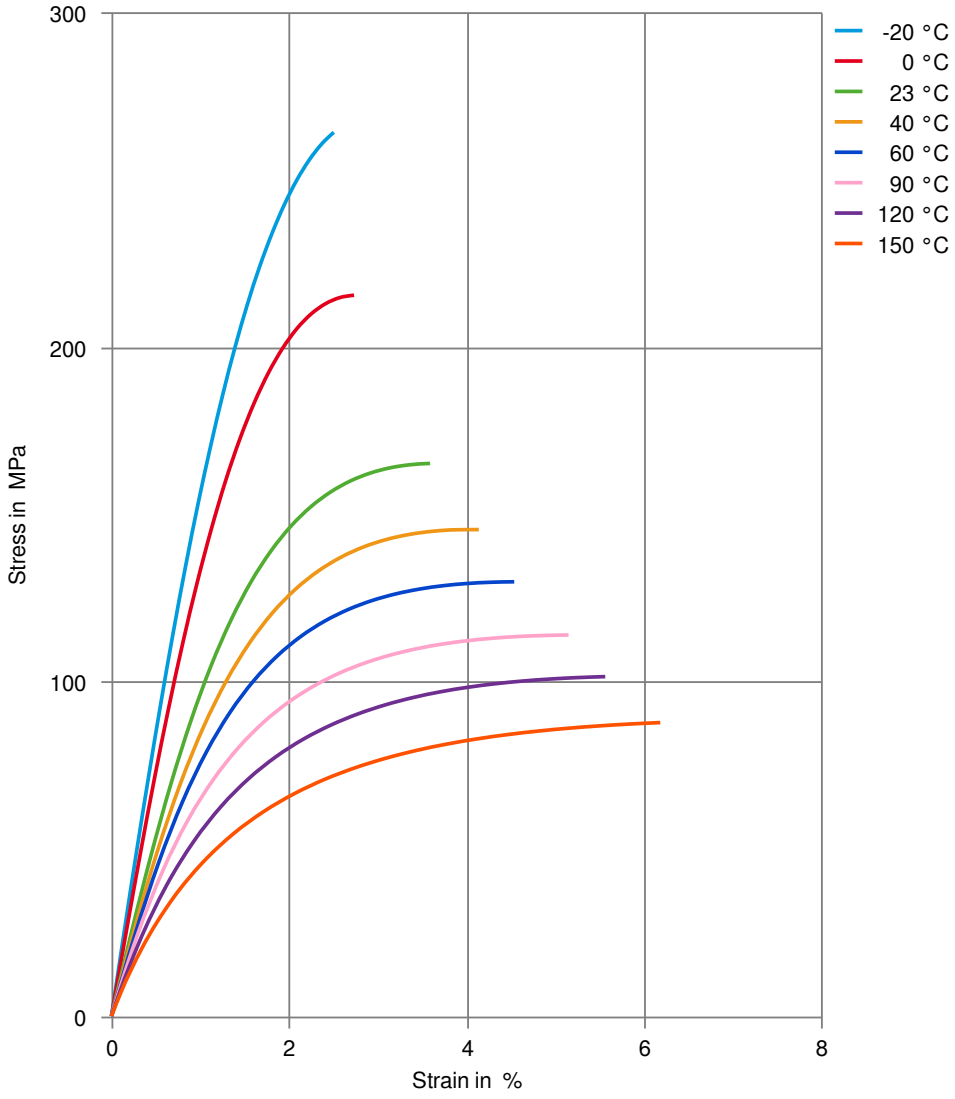


Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

Stress-strain (cond.)

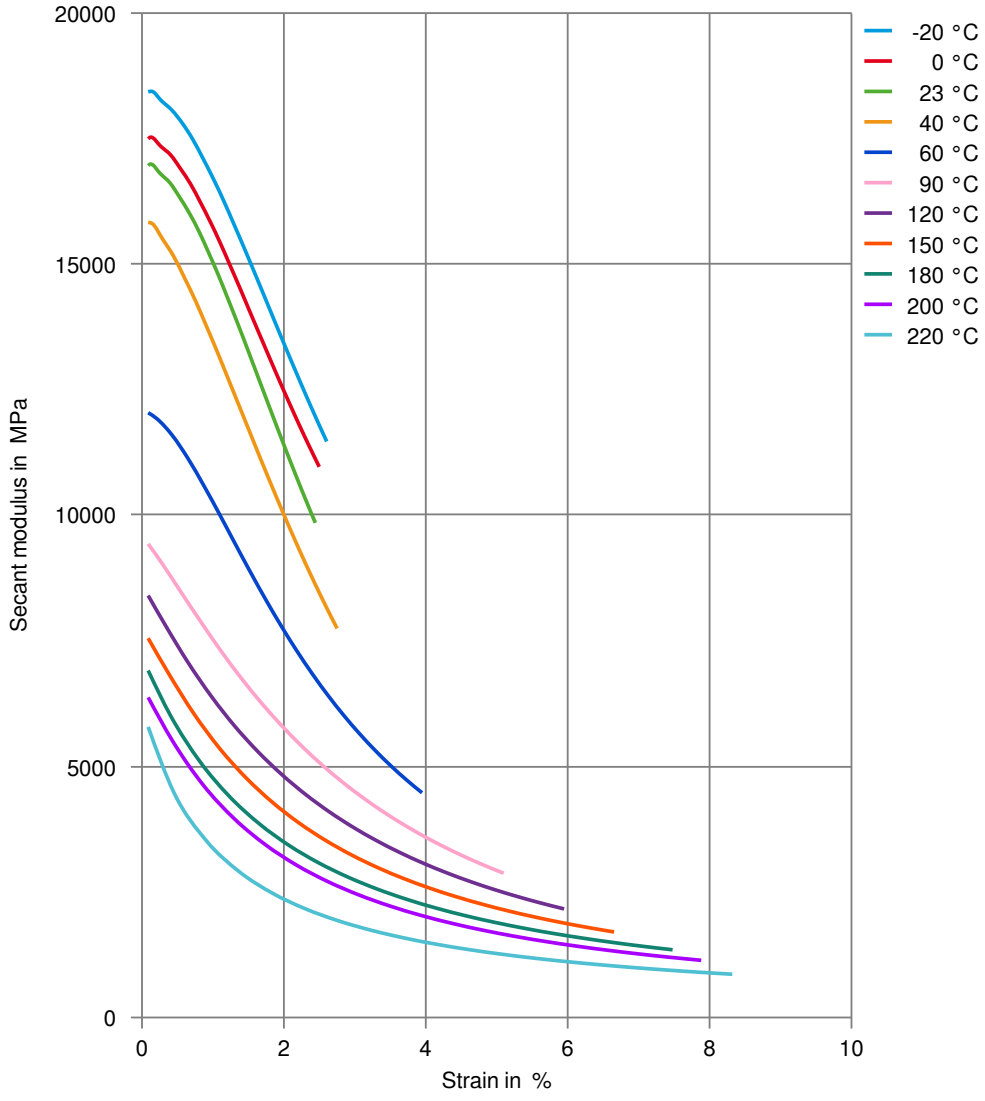


Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

Secant modulus-strain (dry)

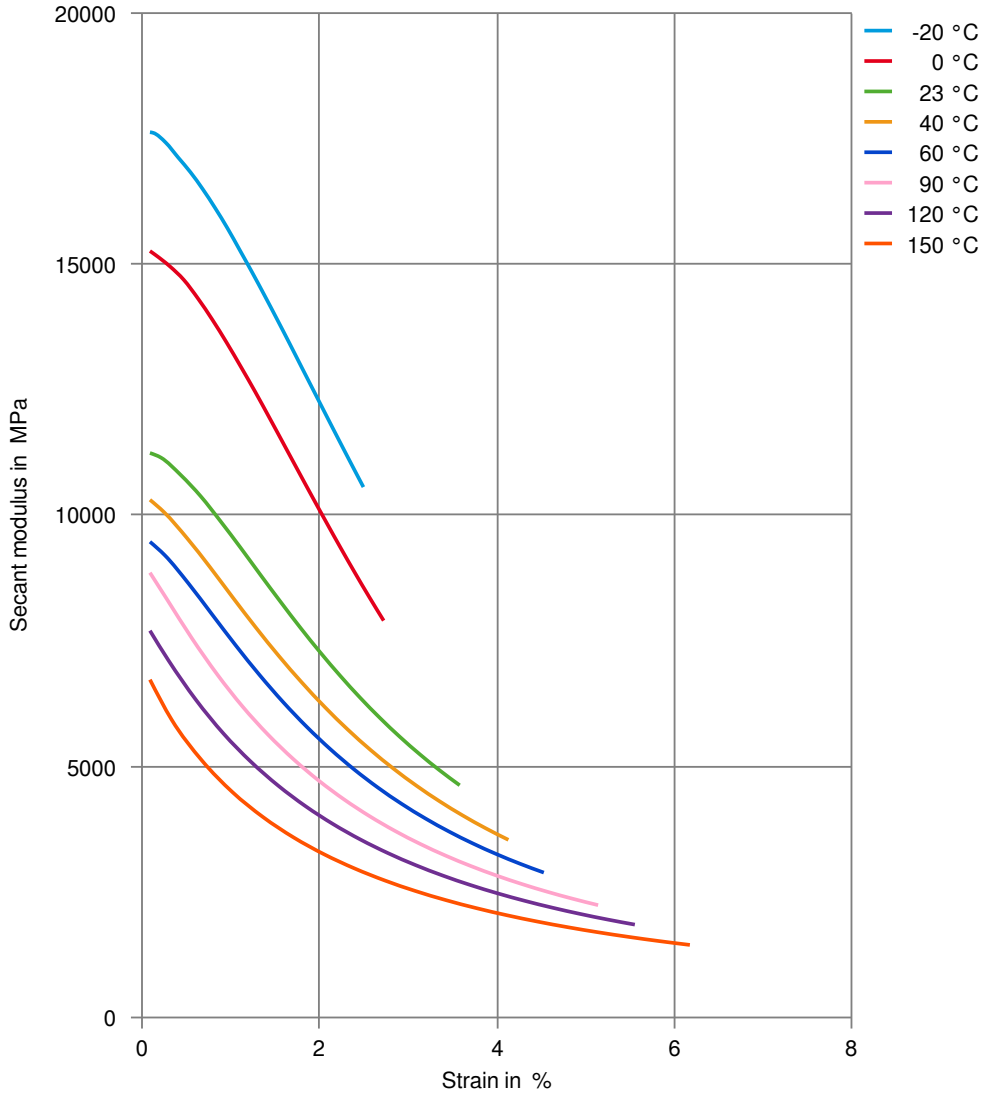


Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

Secant modulus-strain (cond.)

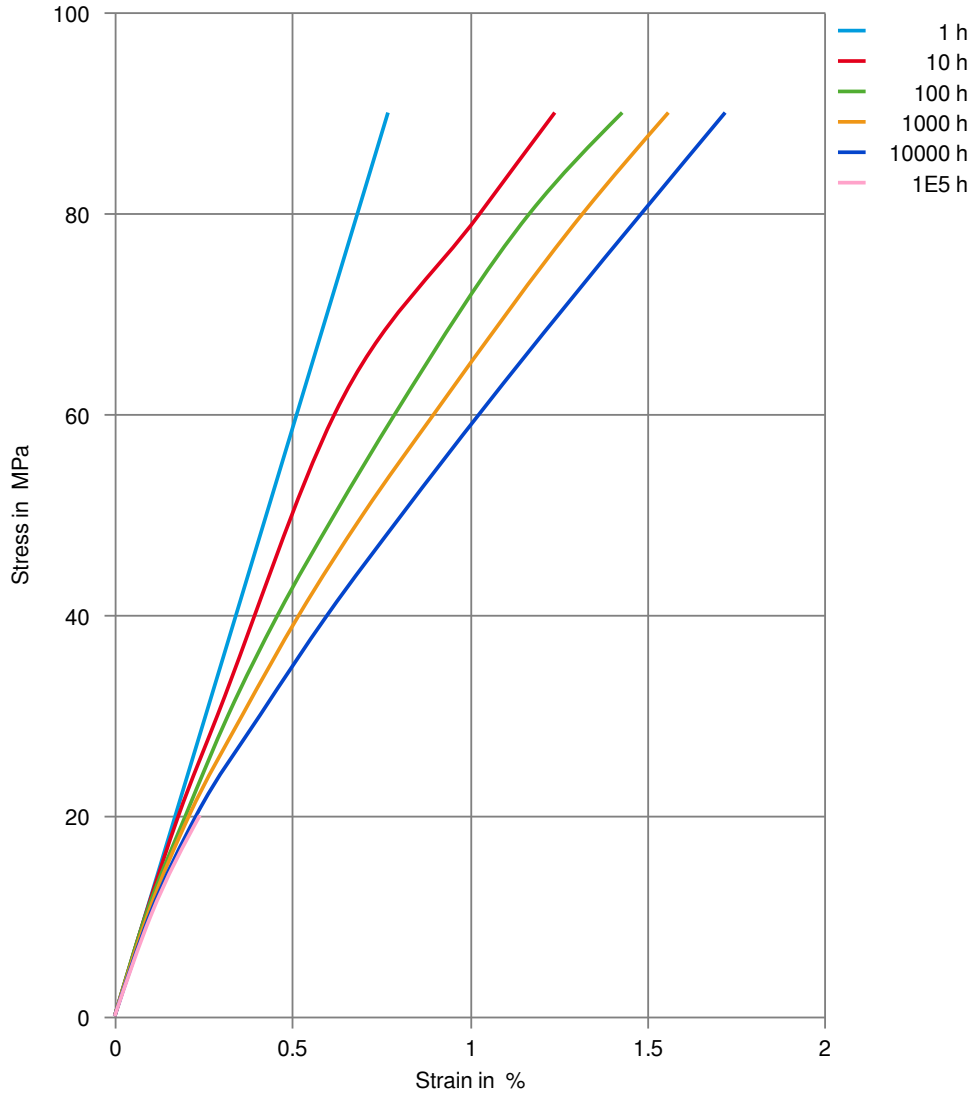


Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

Stress-strain (isochronous) 23 °C (cond.)

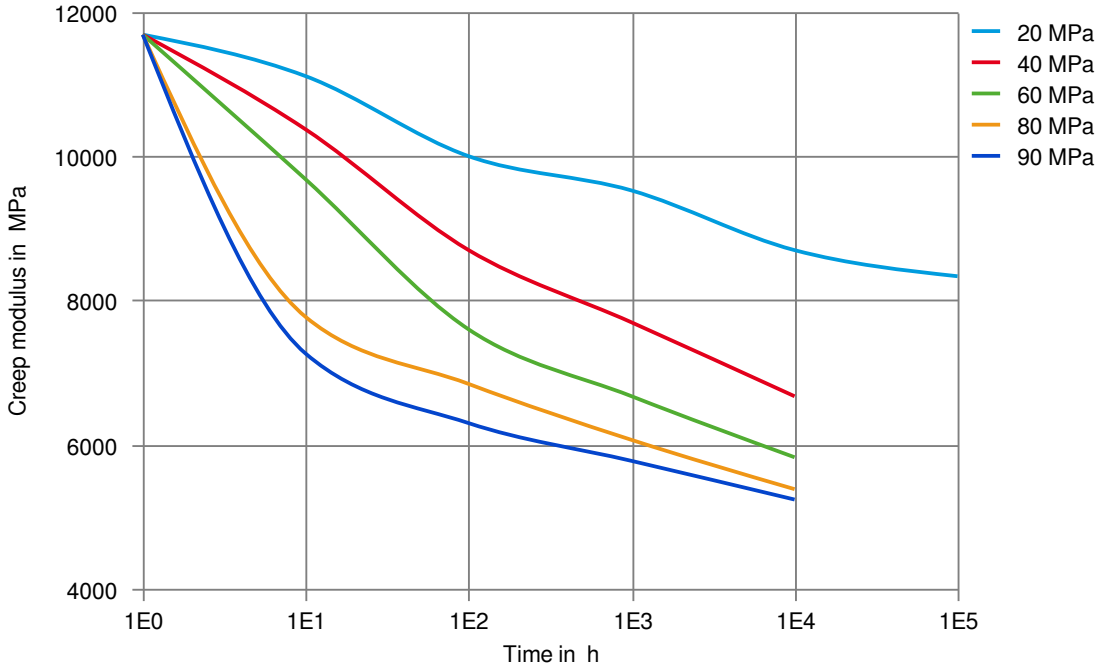


Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

Creep modulus-time 23 °C (cond.)

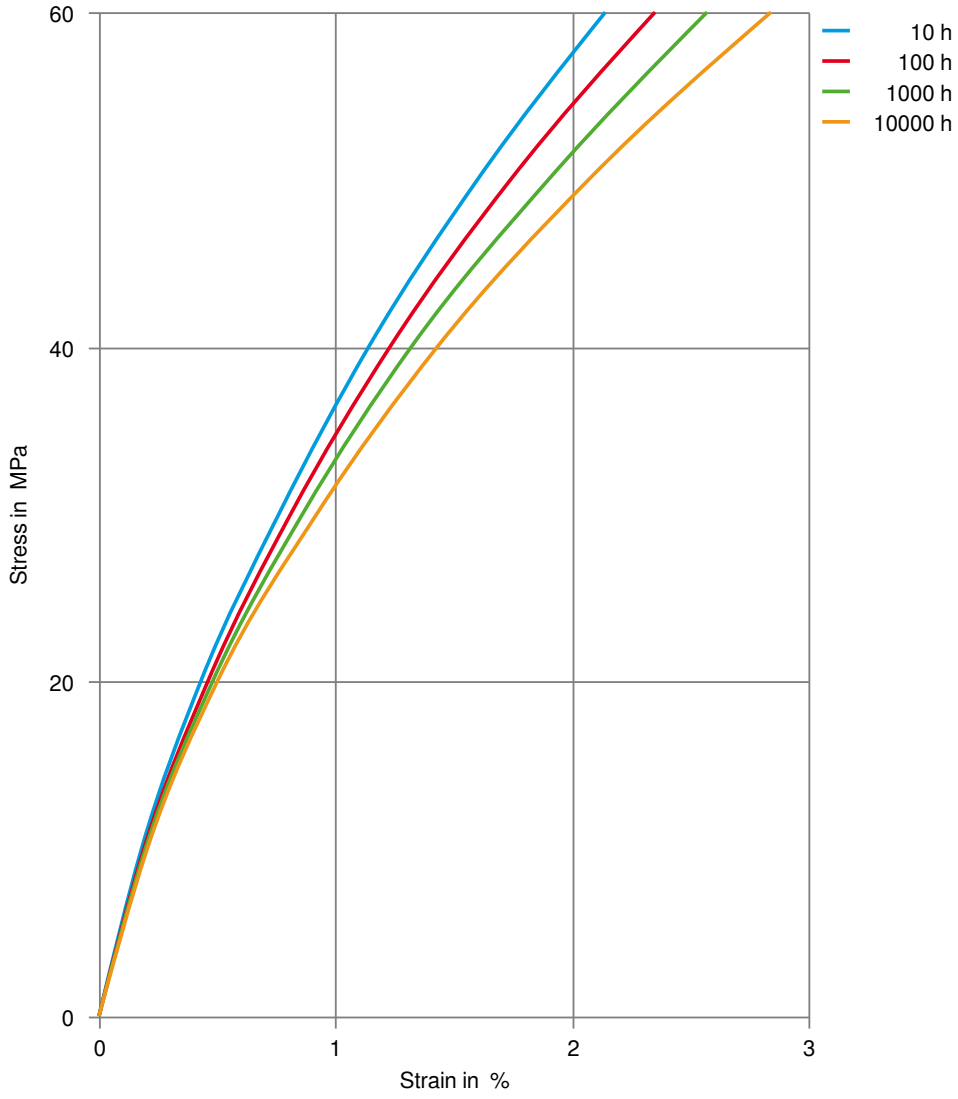


Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

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

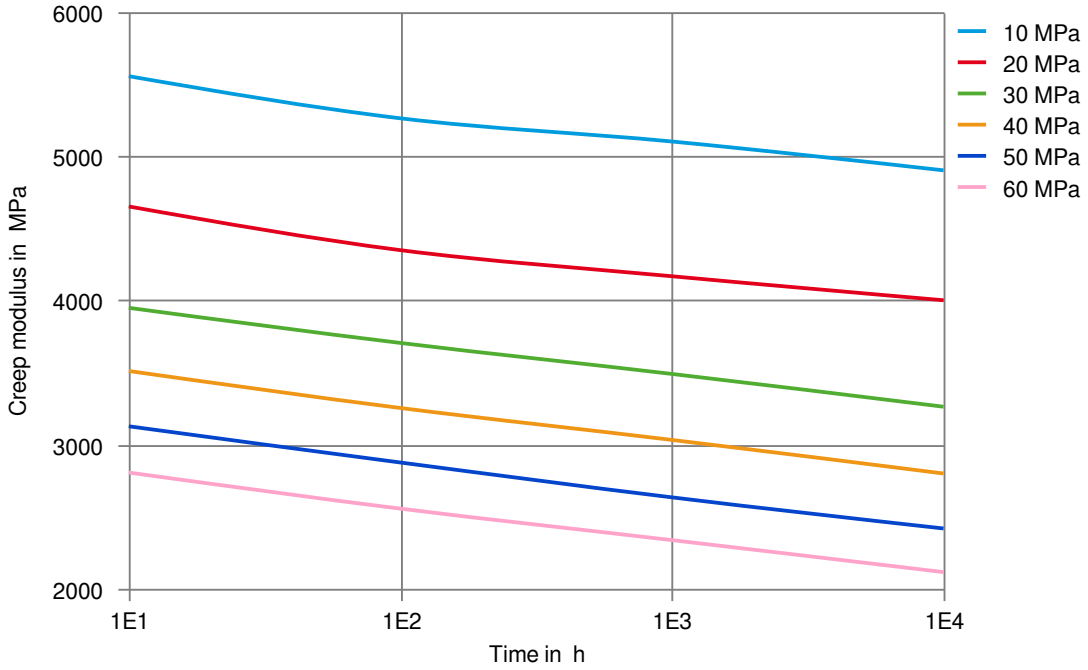


Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

Creep modulus-time 140 °C (cond.)

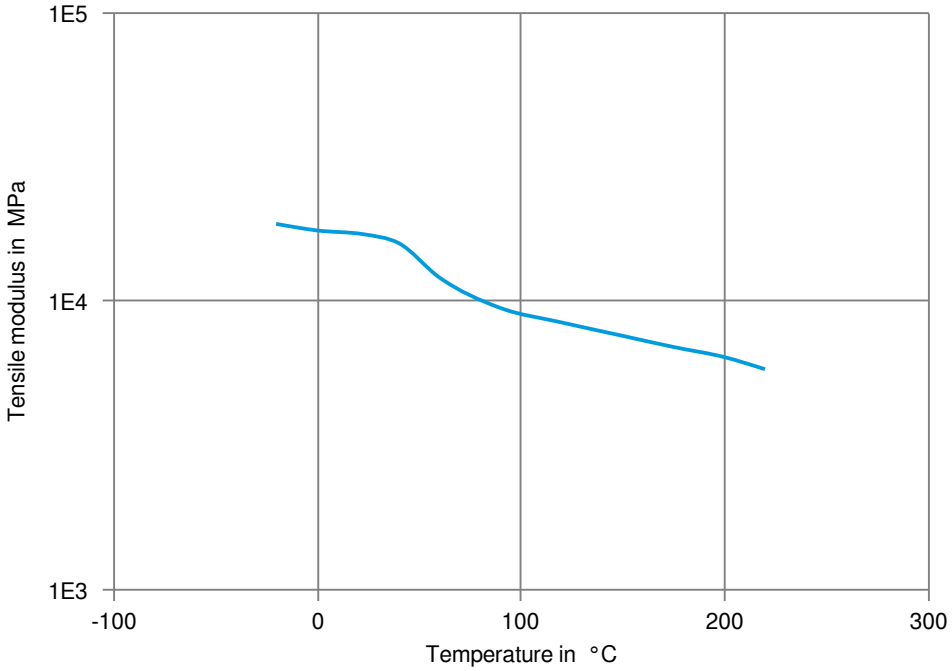


Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

Tensile modulus-temperature (dry)

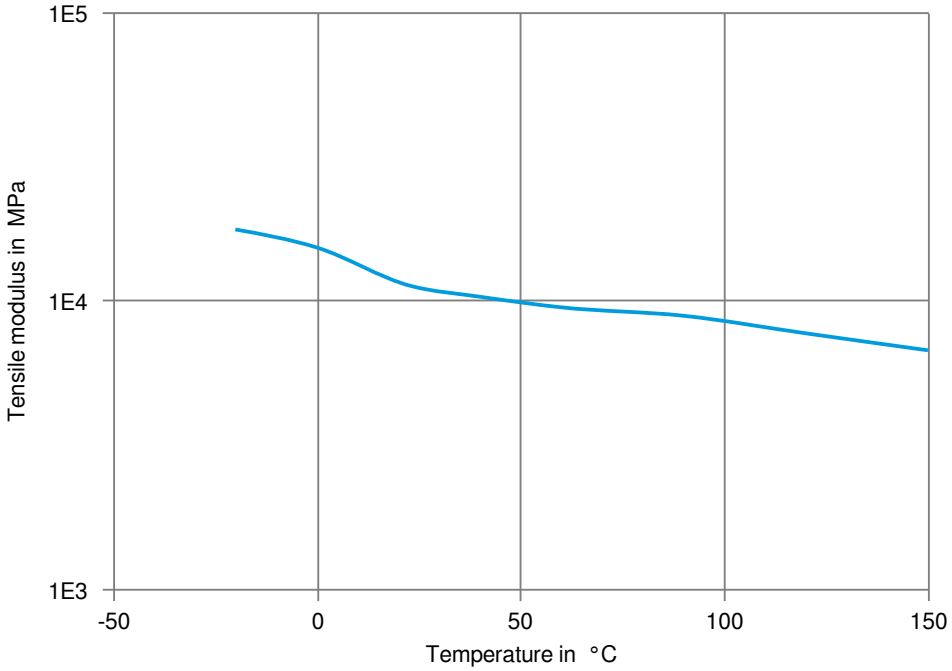


Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

Tensile modulus-temperature (cond.)

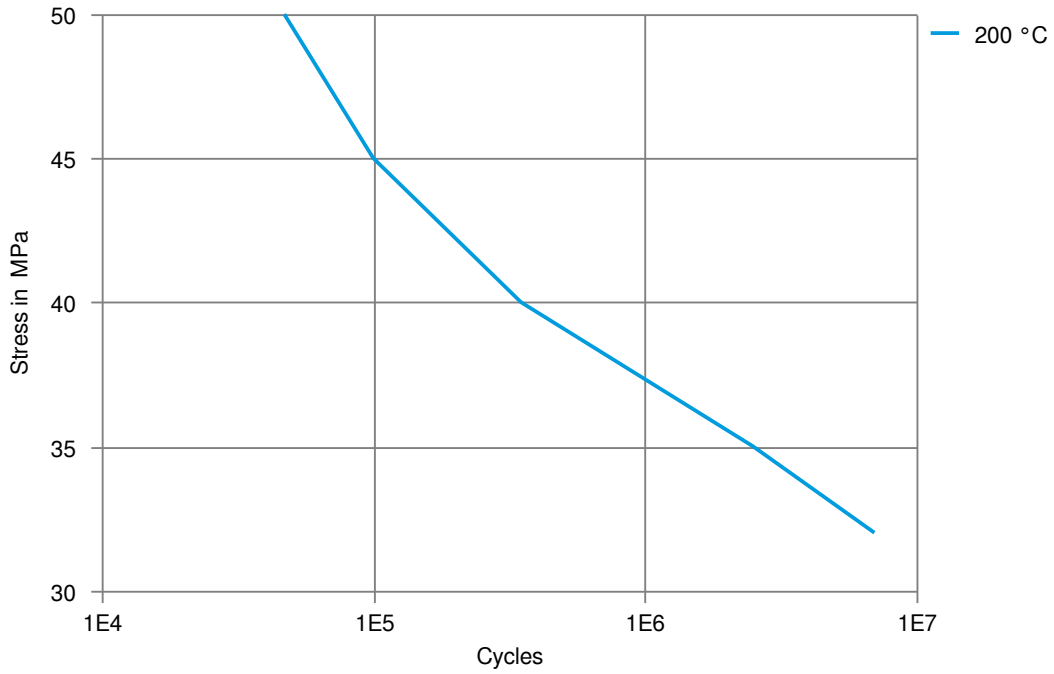


Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

Tensile Fatigue, 10Hz, R=0.1 @ 2mm (dry)



Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

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
- ✔ 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
- ✔ Diesel EN 590, 100°C

Celanese
The chemistry inside innovation™

Zytel® 70G50HSLA BK039B

NYLON RESIN

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).