

# DuPont™ Zytel® 70G30HSLR BK099

## NYLON RESIN

### Product Information

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, DuPont recommends, 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 BK099 is a 30% glass fibre reinforced, heat stabilised, hydrolysis resistant polyamide 66 resin for injection molding.**

General information	Value	Unit	Test Standard
Resin Identification	PA66-GF30	-	ISO 1043
Part Marking Code	PA66-GF30	-	ISO 11469
Rheological properties	dry / cond	Unit	Test Standard
Moulding shrinkage, parallel	0.3 / -	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.0 / -	%	ISO 294-4, 2577
Mechanical properties	dry / cond	Unit	Test Standard
Tensile Modulus	10000 / 7000	MPa	ISO 527-1/-2
Stress at break	200 / 130	MPa	ISO 527-1/-2
Strain at break	3 / 5	%	ISO 527-1/-2
Flexural Modulus	9000 / 6300	MPa	ISO 178 DS
Flexural Strength	280 / 200	MPa	ISO 178 DS
Charpy impact strength			ISO 179/1eU
23 °C	80 / 90	kJ/m <sup>2</sup>	
-30 °C	70 / 70	kJ/m <sup>2</sup>	DS
-40 °C	65 / -	kJ/m <sup>2</sup>	
Charpy notched impact strength			ISO 179/1eA
23 °C	12 / 14	kJ/m <sup>2</sup>	
-30 °C	9 / 9	kJ/m <sup>2</sup>	DS
-40 °C	9 / -	kJ/m <sup>2</sup>	
Izod notched impact strength, -40 °C	10 / -	kJ/m <sup>2</sup>	ISO 180/1A
Ball indentation hardness, H 961/30	270 / 185	MPa	ISO 2039-1
DS: Derived from similar grade			
Thermal properties	dry / cond	Unit	Test Standard
Melting temperature, 10 °C/min	262 / *	°C	ISO 11357-1/-3
Glass transition temperature, 10 °C/min	80 / 20	°C	ISO 11357-1/-2
Temp. of deflection under load			ISO 75-1/-2
1.8 MPa	253 / *	°C	
0.45 MPa	261 / *	°C	
Coeff. of linear therm. expansion, parallel	22 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion			ISO 11359-1/-2
normal	81 / *	E-6/K	
Normal, -40-23 °C	72 / *	E-6/K	
Normal, 55-160 °C	130 / *	E-6/K	
Parallel, -40-23 °C	29 / *	E-6/K	
Parallel, 55-160 °C	16 / *	E-6/K	
Spec. heat capacity of melt	2290	J/(kg K)	-
RTI, electrical			UL 746B
0.75mm	140 / *	°C	
1.5mm	140 / *	°C	
3mm	140	°C	

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RTI, impact				UL 746B
0.75mm	125	°C		
1.5mm	125 / *	°C		
3mm	125	°C		
RTI, strength				UL 746B
0.75mm	140	°C		
1.5mm	140 / *	°C		
3mm	140	°C		
<b>Flammability</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>	
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 / *	-	UL 94	
Burning Behav. at thickness h	HB / *	class	IEC 60695-11-10	
Thickness tested	0.75 / *	mm	IEC 60695-11-10	
UL recognition	yes / *	-	UL 94	
Oxygen index	24 / *	%	ISO 4589-1/-2	
FMVSS Class	SE/B	-	ISO 3795 (FMVSS 302)	
Burning rate, Thickness 1 mm	24	mm/min	ISO 3795 (FMVSS 302)	
<b>Electrical properties</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>	
Volume resistivity	>1E13 / 1E9	Ohm*m	IEC 62631-3-1	DS
Electric strength	38 / 32	kV/mm	IEC 60243-1	
Comparative tracking index				
Comparative tracking index	400 / -	-	IEC 60112	
CTI, 23°C	1 / -	PLC	UL 746A	
DS: Derived from similar grade				
<b>Other properties</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>	
Humidity absorption, 2mm	1.9 / *	%	Sim. to ISO 62	
Water absorption, 2mm	6 / *	%	Sim. to ISO 62	
Density	1370 / -	kg/m <sup>3</sup>	ISO 1183	
<b>VDA Properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>	
Odour	5	class	VDA 270	
<b>Injection</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>	
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		
Max. screw tangential speed	0.2 / *	m/s		
Mold Temperature Optimum	100	°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	210	°C		
<b>Characteristics</b>				
Processing	• Injection Moulding			
Delivery form	• Pellets			
Additives	• Lubricants	• Release agent		
Special characteristics	• Heat stabilised or stable to heat			
Regional Availability	• North America	• Asia Pacific	• Near East/Africa	
	• Europe	• South and Central America	• Global	

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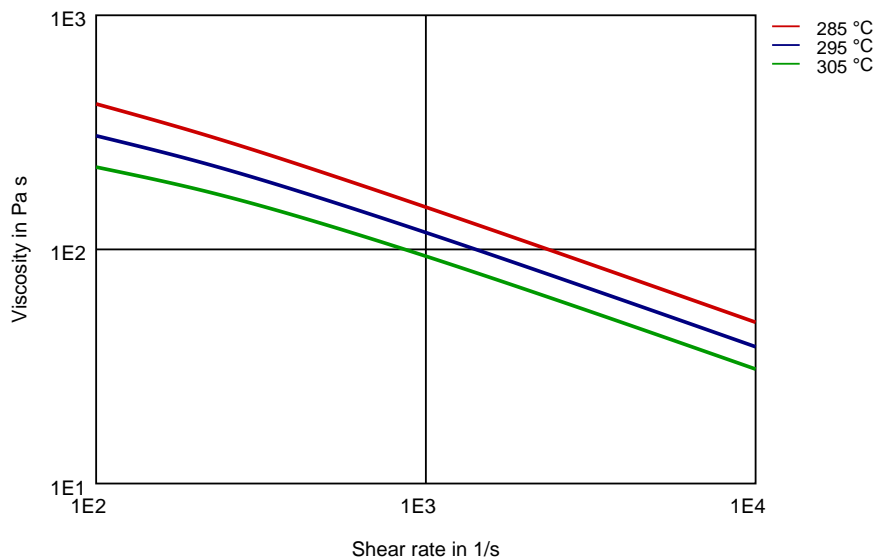
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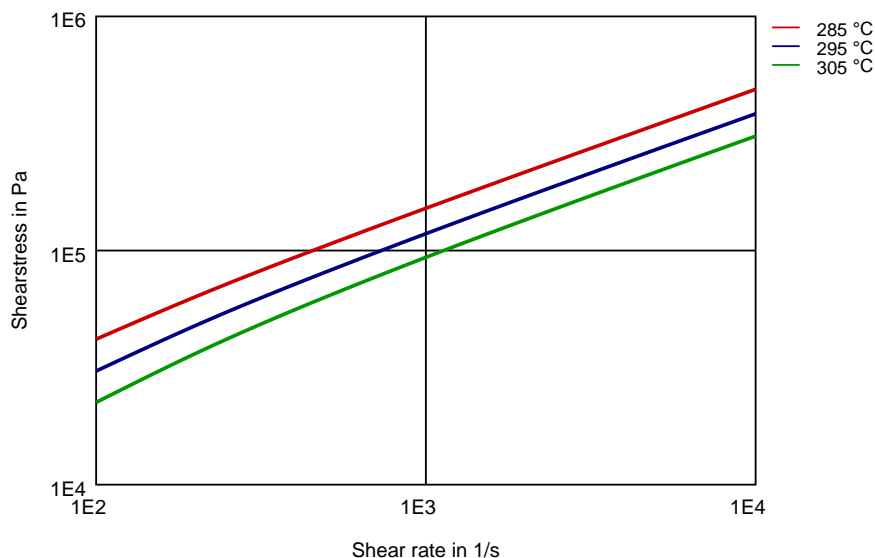
## NYLON RESIN

### Diagrams

#### Viscosity-shear rate



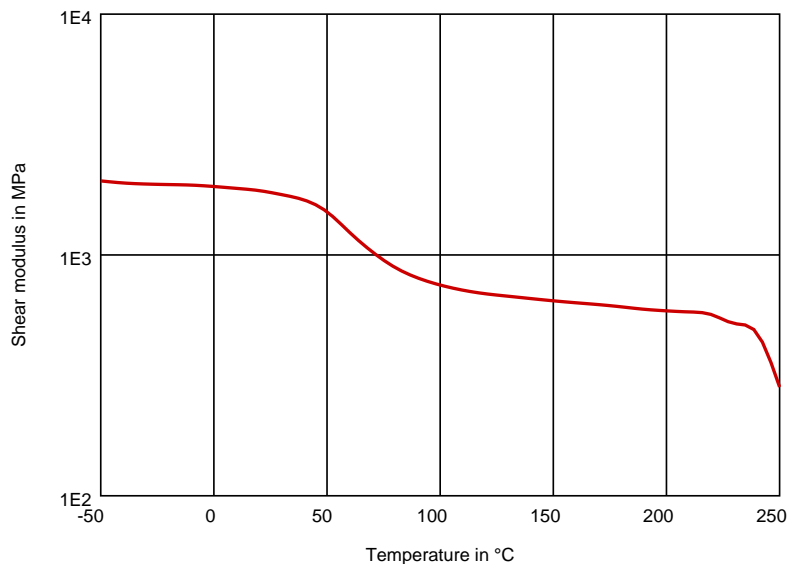
#### Shearstress-shear rate



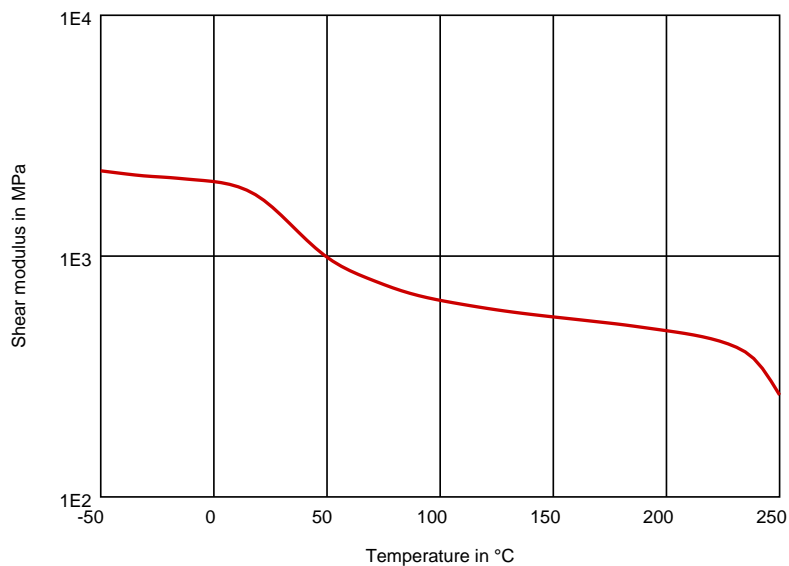
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Dynamic Shear modulus-temperature (dry)



Dynamic Shear modulus-temperature (cond.)



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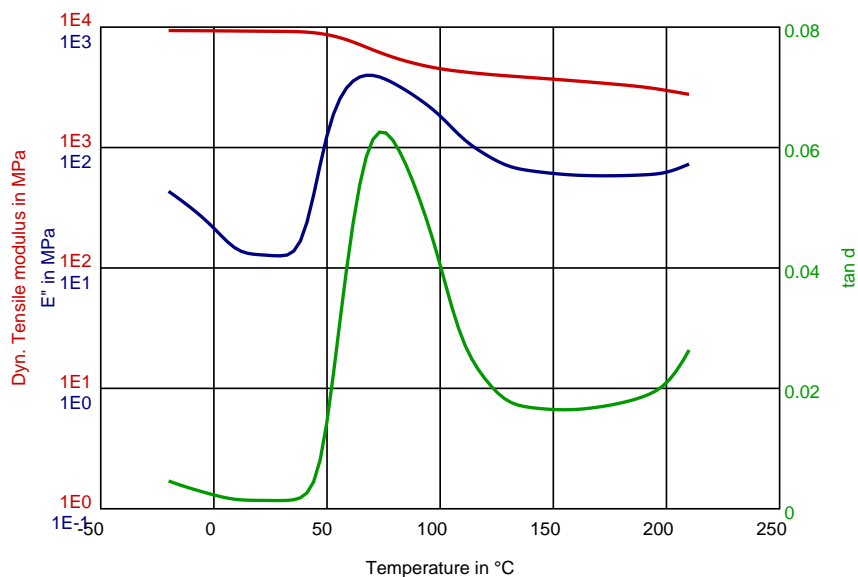
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## NYLON RESIN

Dynamic Tensile modulus-temperature (dry)



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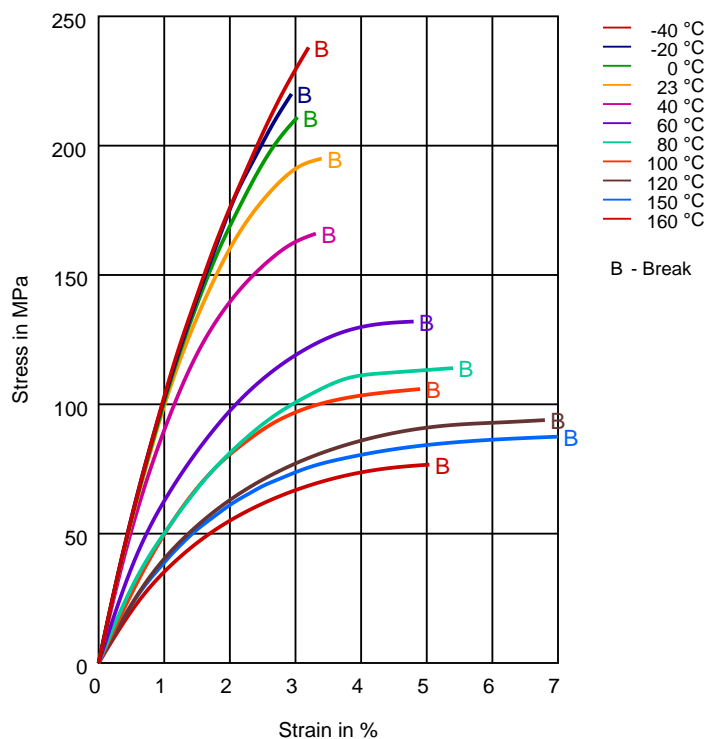
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## NYLON RESIN

Stress-strain (dry)



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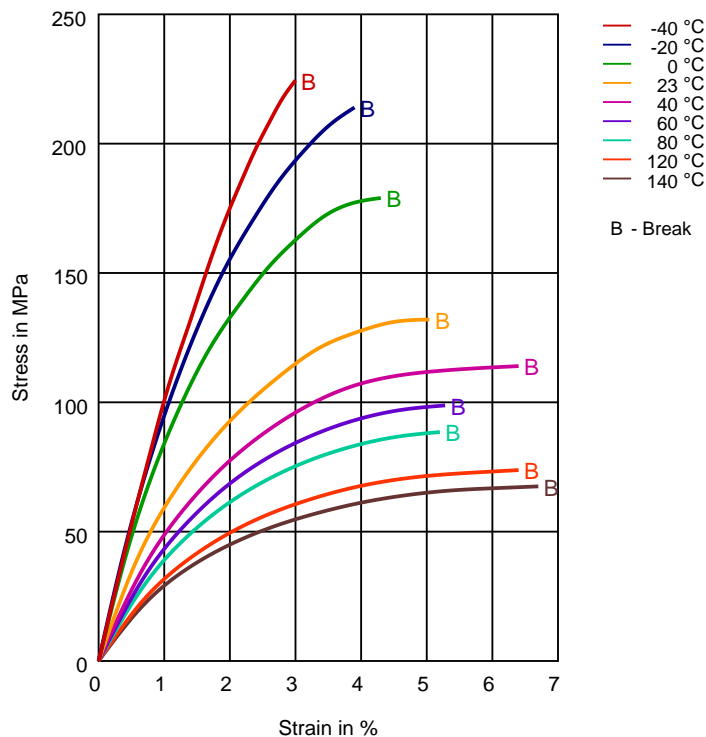
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# DuPont™ Zytel® 70G30HSLR BK099 NYLON RESIN

Stress-strain (cond.)



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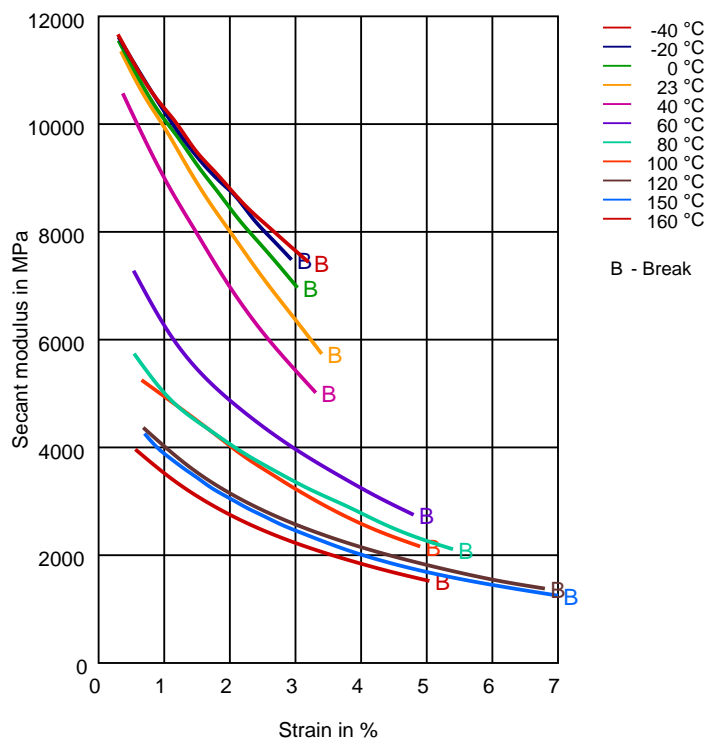
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## NYLON RESIN

Secant modulus-strain (dry)



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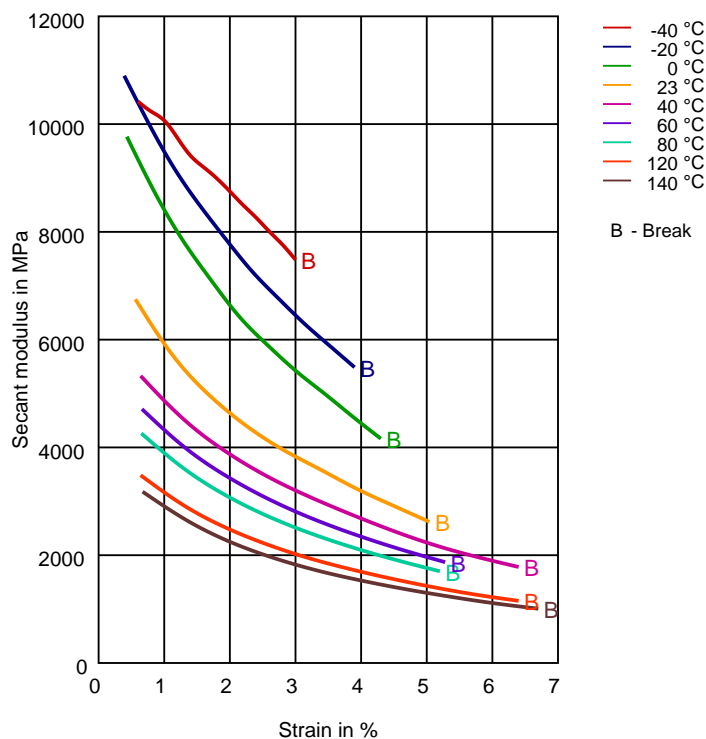




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## NYLON RESIN

Secant modulus-strain (cond.)



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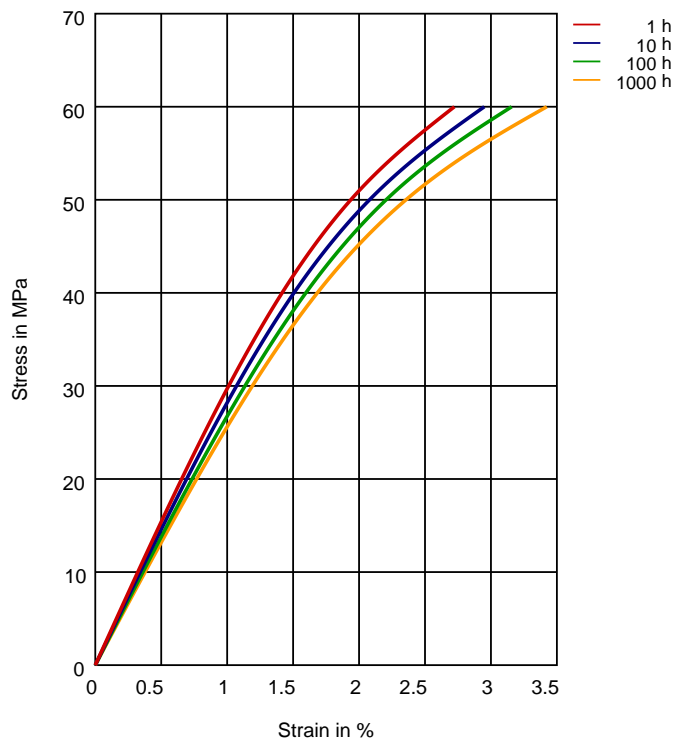
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# DuPont™ Zytel® 70G30HSLR BK099

## NYLON RESIN

Stress-strain (isochronous) 140°C (dry)



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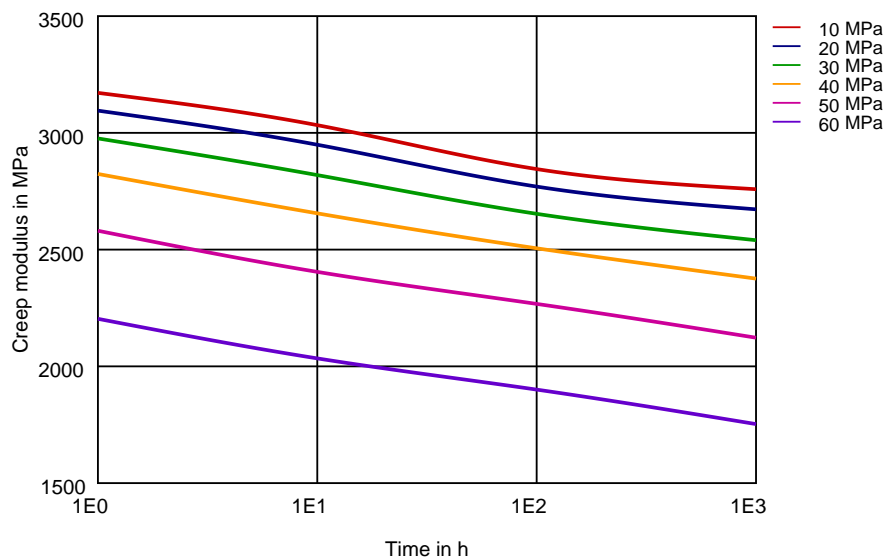
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## NYLON RESIN

Creep modulus-time 140°C (dry)



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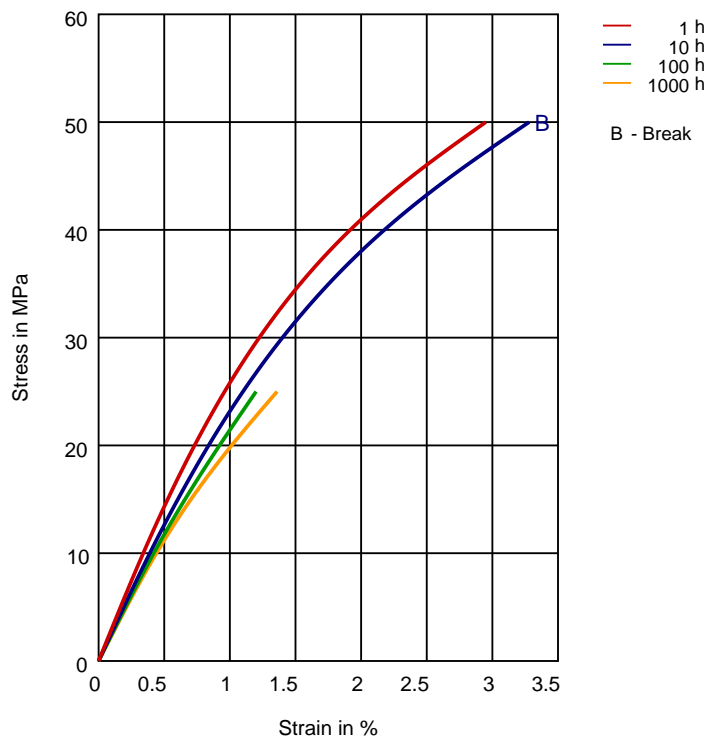
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# DuPont™ Zytel® 70G30HSLR BK099

## NYLON RESIN

Stress-strain (isochronous) 180°C (dry)



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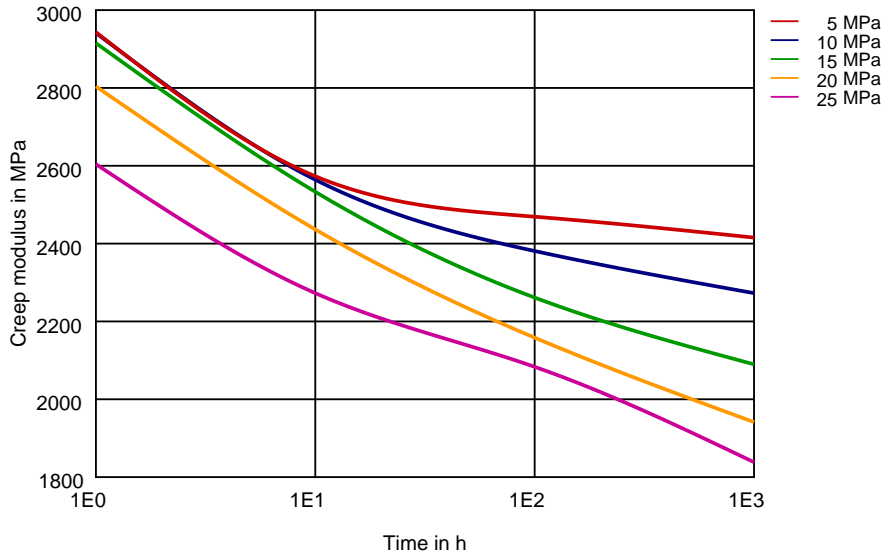
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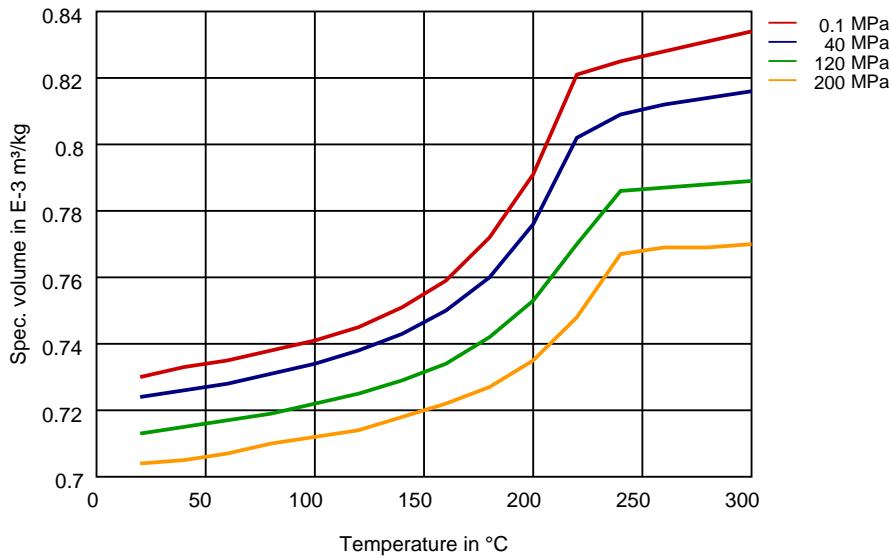
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## NYLON RESIN

Creep modulus-time 180°C (dry)



Specific volume-temperature (pvT)



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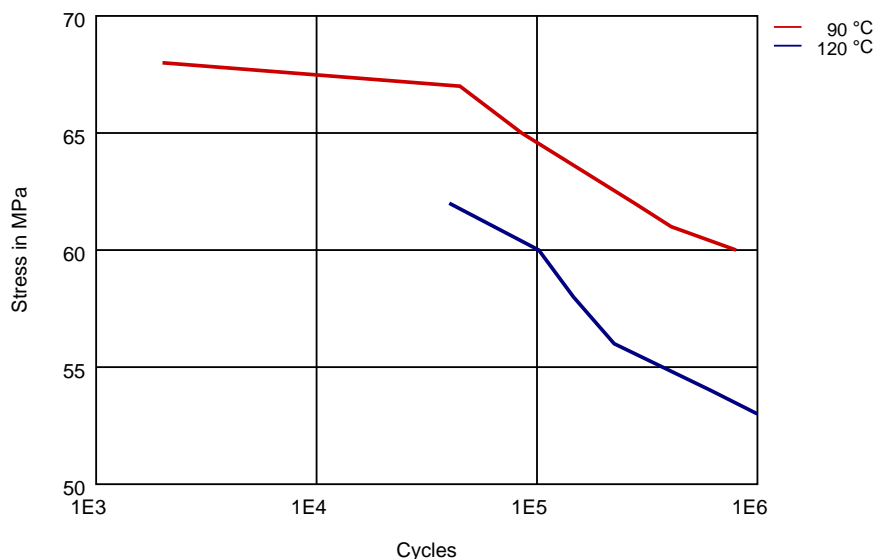
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# DuPont™ Zytel® 70G30HSLR BK099

## NYLON RESIN

Tensile Fatigue, 10Hz, R=0.1 0mm(dry)



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# DuPont™ Zytel® 70G30HSLR BK099

## 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)
- ✓ 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)

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- ✓ 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)
- ✓ 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).

Contact DuPont for Material Safety Data Sheet, general guides and/or additional information about ventilation, handling, purging, drying, etc. ISO Mechanical properties measured at 4mm (Hytrel® measured at 2 mm), IEC Electrical properties measured at 2mm, all ASTM properties measured at 3.2mm, and test temperatures are 23°C unless otherwise stated.

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