

# DuPont™ Zytel® HTN51G35HSL NC010

## HIGH PERFORMANCE POLYAMIDE RESIN

### Product Information

Zytel® HTN51G35HSL NC010 is a 35% glass reinforced, heat stabilized, lubricated, hydrolysis resistant high performance polyamide resin. It is also a PPA resin.

General information	Value	Unit	Test Standard
Resin Identification	PA6T/XT-GF35	-	ISO 1043
Part Marking Code	PA6T/XT-GF35	-	ISO 11469
Part Marking Code	>PPA-GF35<	-	SAE J1344
Rheological properties	dry / cond	Unit	Test Standard
Molding shrinkage, parallel	0.2 / -	%	ISO 294-4, 2577
Molding shrinkage, normal	0.6 / -	%	ISO 294-4, 2577
Mechanical properties	dry / cond	Unit	Test Standard
Tensile Modulus	12000 / 12000	MPa	ISO 527-1/-2
Stress at break	210 / 210	MPa	ISO 527-1/-2
Strain at break	2.4 / 2.2	%	ISO 527-1/-2
Flexural Modulus	10300 / 10300	MPa	ISO 178
Flexural Strength	300 / 290	MPa	ISO 178
Tensile creep modulus			ISO 899-1
1h	* / 11000	MPa	
1000h	* / 9500	MPa	
Charpy impact strength			ISO 179/1eU
73°F	70 / 55	kJ/m <sup>2</sup>	
-22°F	60 / 50	kJ/m <sup>2</sup>	
Charpy notched impact strength			ISO 179/1eA
73°F	11 / 11	kJ/m <sup>2</sup>	
-22°F	10 / 10	kJ/m <sup>2</sup>	
-40°F	11 / -	kJ/m <sup>2</sup>	
Izod notched impact strength			ISO 180/1A
73°F	11 / 11	kJ/m <sup>2</sup>	
-22°F	10 / 10	kJ/m <sup>2</sup>	
Izod impact strength, -22°F	50 / 40	kJ/m <sup>2</sup>	ISO 180/1U
Hardness, Rockwell, M-scale	108 / -	-	ISO 2039-2
Hardness, Rockwell, R-scale	124 / -	-	ISO 2039-2
Coefficient of sliding friction, 1h against steel	- / 0.35	-	ASTM 1894
Thermal properties	dry / cond	Unit	Test Standard
Melting temperature, first heat	300 / *	°C	ISO 11357-1/-3
Temp. of deflection under load			ISO 75-1/-2
260 psi	264 / *	°C	
65 psi	284 / *	°C	
Vicat softening temperature, 90°F/h, 11 lbf	290 / *	°C	ISO 306
Coeff. of linear therm. expansion, parallel	18 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion			ISO 11359-1/-2
normal	55 / *	E-6/K	
Normal, -40-23°C	55 / *	E-6/K	
Parallel, -40-23°C	18 / *	E-6/K	
Thermal conductivity of melt	0.25	W/(m K)	-
Spec. heat capacity of melt	1860	J/(kg K)	-
RTI, electrical			UL 746B
30mil	150 / *	°C	
60mil	150 / *	°C	
120mil	150	°C	

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RTI, impact			UL 746B
30mil	125	°C	
60mil	125 / *	°C	
120mil	130	°C	
RTI, strength			UL 746B
30mil	130	°C	
60mil	140 / *	°C	
120mil	150	°C	
<b>Flammability</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>
Burning Behav. at 60mil 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	0.85 / *	mm	IEC 60695-11-10
UL recognition	yes / *	-	UL 94
Oxygen index	24 / *	%	ISO 4589-1/-2
Glow Wire Flammability Index			IEC 60695-2-12
30mil	750 / -	°C	
60mil	750 / -	°C	
120mil	960 / -	°C	
Glow Wire Ignition Temperature			IEC 60695-2-13
60mil	775 / -	°C	
120mil	800 / -	°C	
FMVSS Class	B	-	ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	23	mm/min	ISO 3795 (FMVSS 302)
<b>Electrical properties</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>
Relative permittivity			IEC 62631-2-1
100Hz	4 / -	-	
1MHz	4 / -	-	
Dissipation factor, 1MHz	120 / -	E-4	IEC 62631-2-1
Volume resistivity	>1E13 / 1E13	Ohm*m	IEC 62631-3-1
Surface resistivity	* / 1E14	Ohm	IEC 62631-3-2
Electric strength	36 / 36	kV/mm	IEC 60243-1
Comparative tracking index	600 / 600	-	IEC 60112
<b>Other properties</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>
Water absorption, 80mil	4.5 / *	%	Sim. to ISO 62
Density	1470 / -	kg/m <sup>3</sup>	ISO 1183
Density of melt	1230	kg/m <sup>3</sup>	-
<b>VDA Properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Odor test	4	class	VDA 270
<b>Injection</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Drying Recommended	yes	-	-
Drying Temperature	≥100	°C	-
Drying Time, Dehumidified Dryer	6 - 8	h	-
Processing Moisture Content	≤0.1	%	-
Melt Temperature Optimum	325	°C	-
Min. melt temperature	320	°C	-
Max. melt temperature	330	°C	-
Mold Temperature Optimum	150	°C	-
Min. mold temperature	140 <sup>[1]</sup>	°C	-
Max. mold temperature	180	°C	-

1: Higher temperature needed for thinner sections.

### Characteristics

Processing	• Injection Molding
Delivery form	• Pellets

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## HIGH PERFORMANCE POLYAMIDE RESIN

Additives	• Lubricants	• Release agent
Special characteristics	• Heat stabilized or stable to heat	
Regional Availability	• North America • Europe	• Asia Pacific • South and Central America • Near East/Africa • Global

### Processing Texts

#### Injection molding

During molding, use proper protective equipment and adequate ventilation. Avoid exposure to fumes and limit the hold up time and temperature of the resin in the machine. Purge degraded resin carefully with HDPE.

When lower mold temperatures are used, the initial warpage and shrinkage may be lower, but the surface appearance and chemical resistance may be reduced, and the dimensional change may be greater when parts are subsequently heated.

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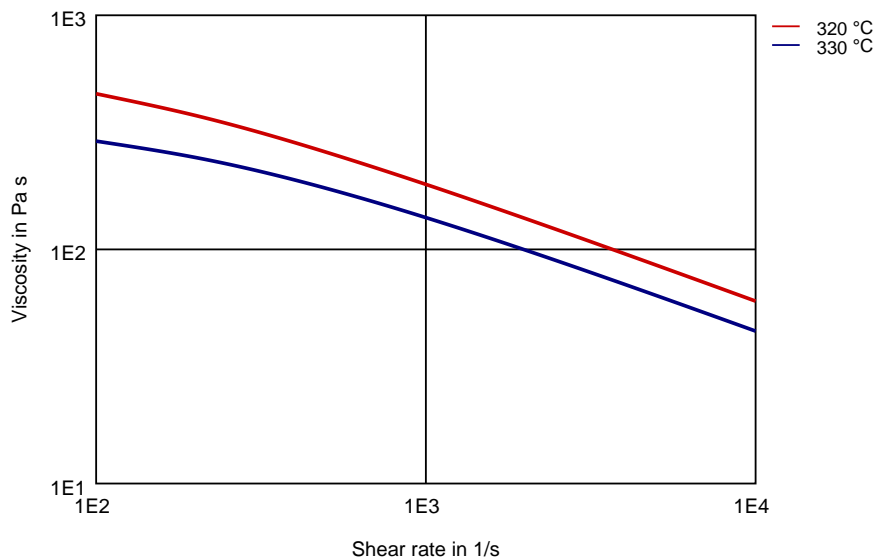


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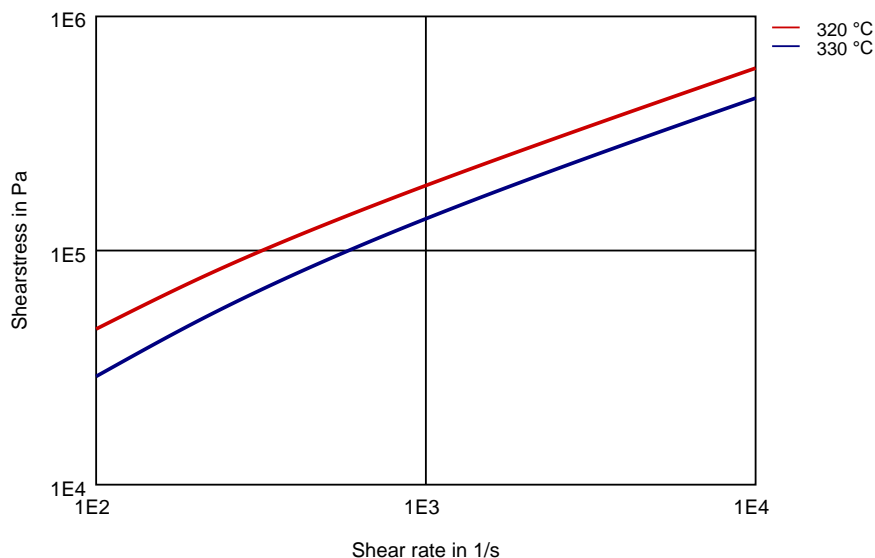
## HIGH PERFORMANCE POLYAMIDE RESIN

### Diagrams

#### Viscosity-shear rate



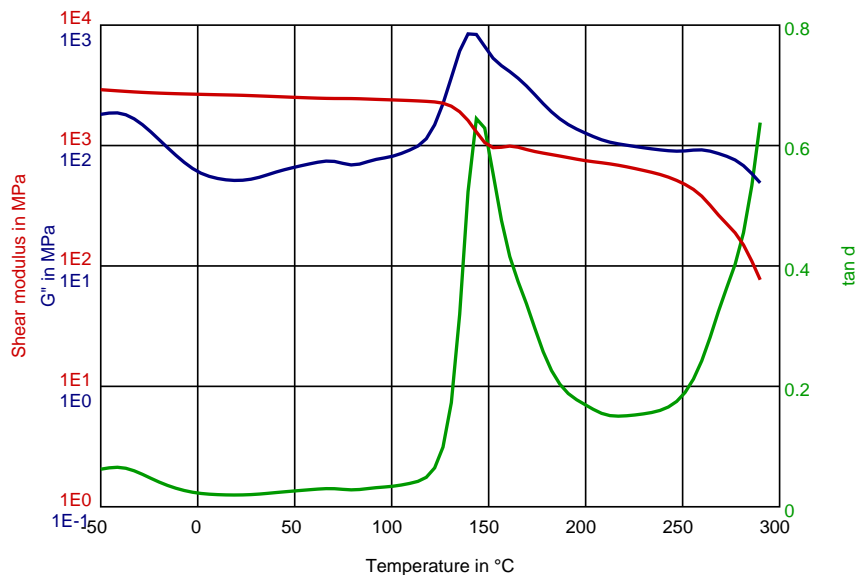
#### Shearstress-shear rate



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Dynamic Shear modulus-temperature (dry)



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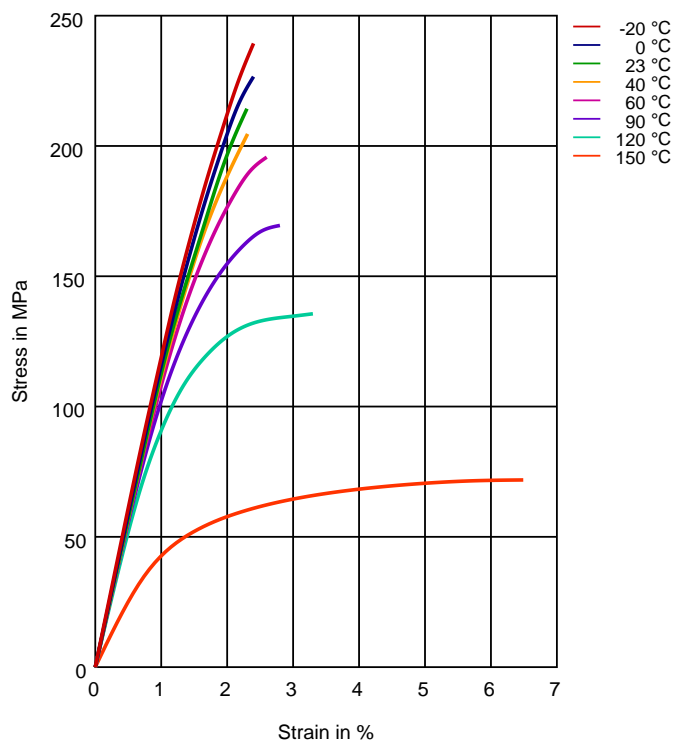
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## HIGH PERFORMANCE POLYAMIDE RESIN

Stress-strain (dry)



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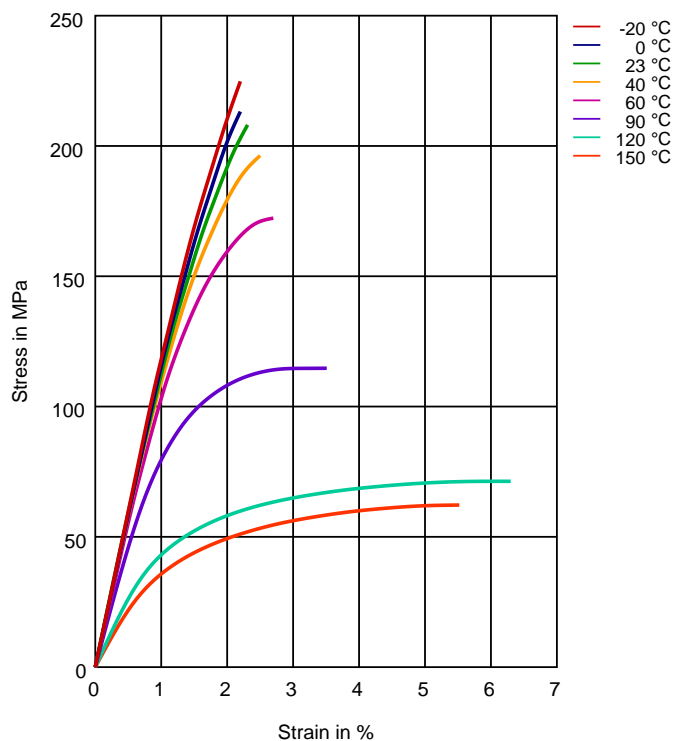
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## HIGH PERFORMANCE POLYAMIDE RESIN

Stress-strain (cond.)



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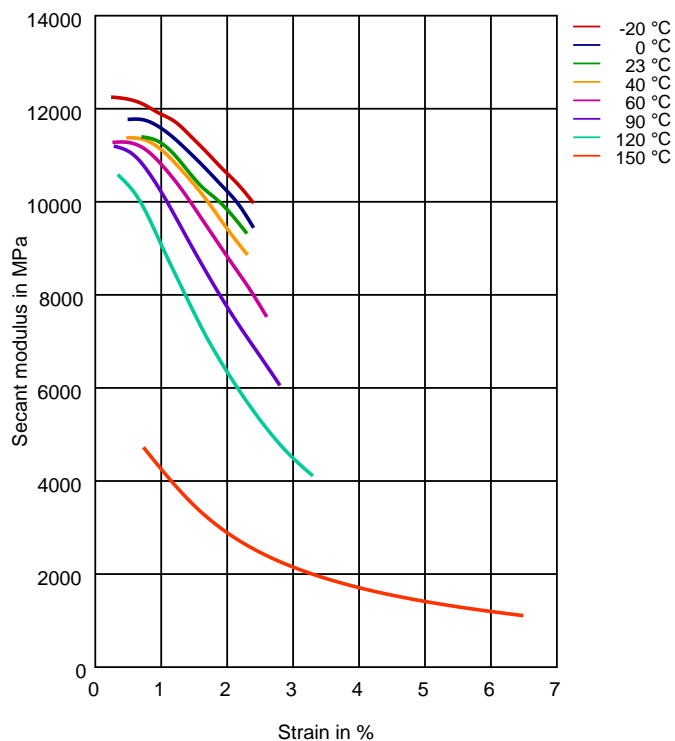
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## HIGH PERFORMANCE POLYAMIDE RESIN

Secant modulus-strain (dry)



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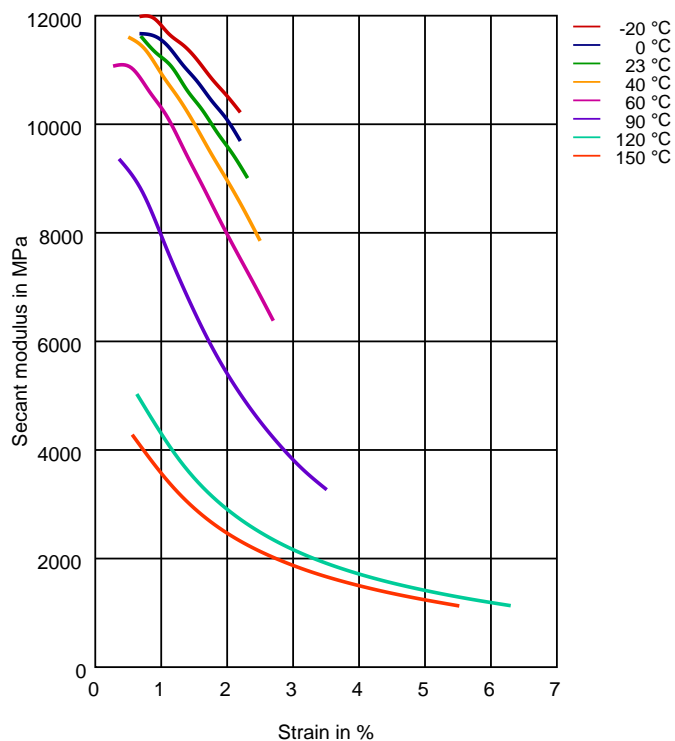




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## HIGH PERFORMANCE POLYAMIDE RESIN

Secant modulus-strain (cond.)



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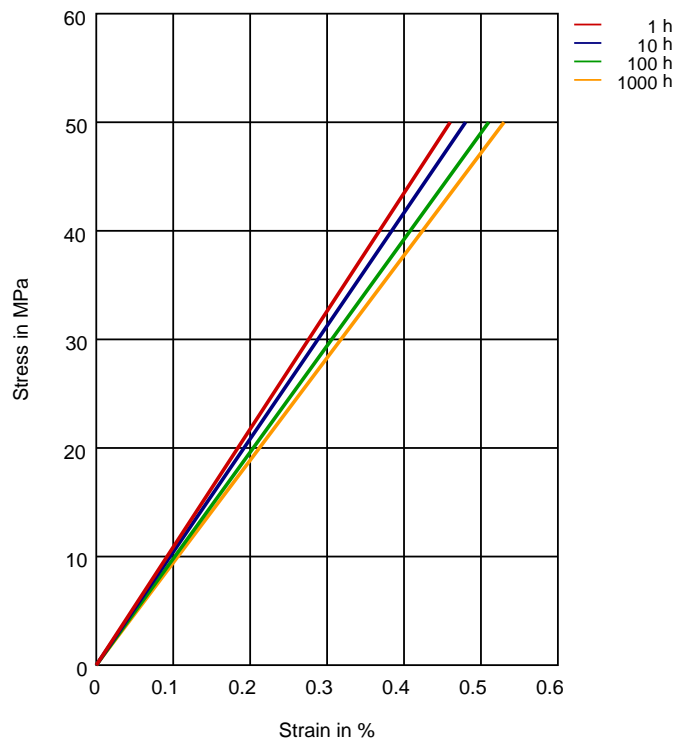
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## HIGH PERFORMANCE POLYAMIDE RESIN

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



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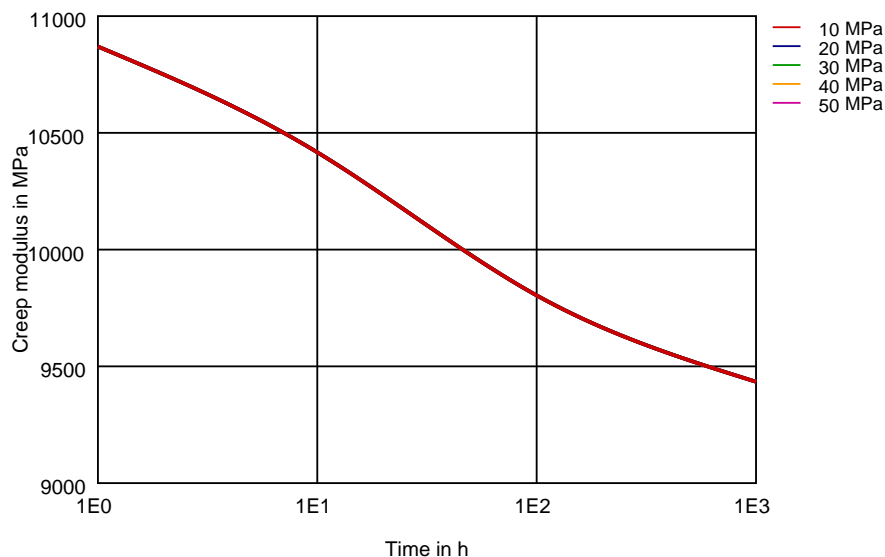
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## HIGH PERFORMANCE POLYAMIDE RESIN

Creep modulus-time 23 °C (cond.)



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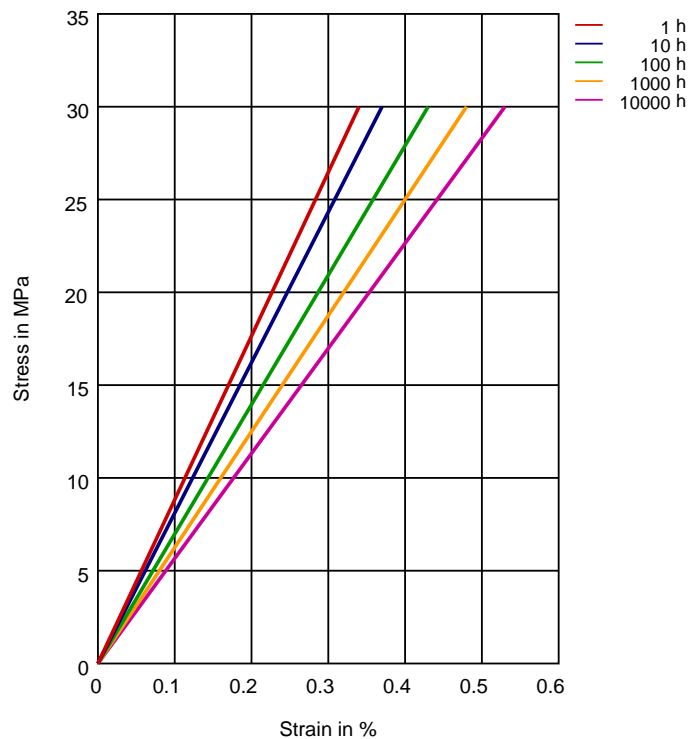
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## HIGH PERFORMANCE POLYAMIDE RESIN

Stress-strain (isochronous) 100°C (dry)



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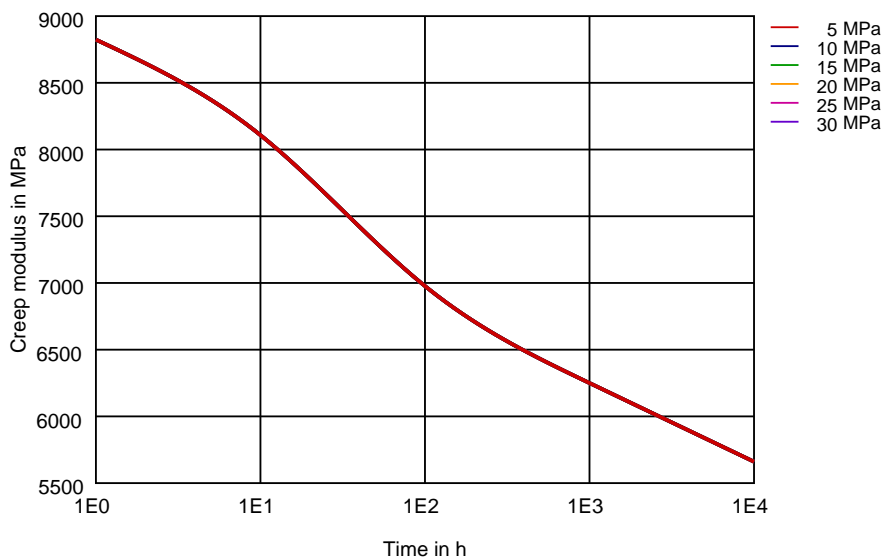
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## HIGH PERFORMANCE POLYAMIDE RESIN

Creep modulus-time 100°C (dry)



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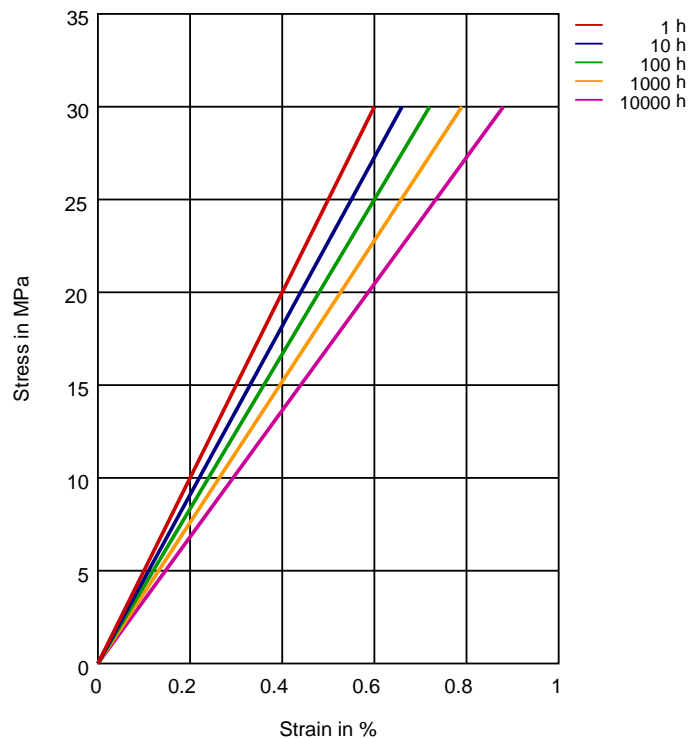
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## HIGH PERFORMANCE POLYAMIDE RESIN

Stress-strain (isochronous) 150°C (dry)



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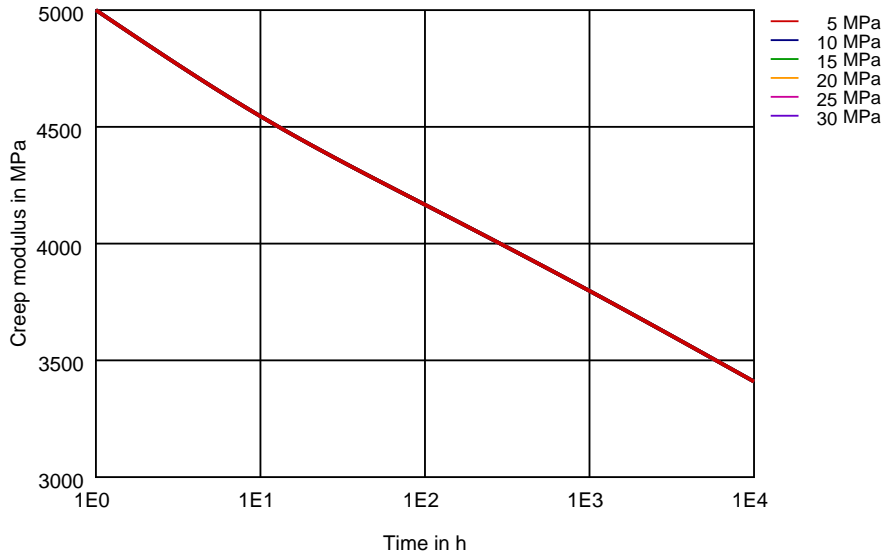
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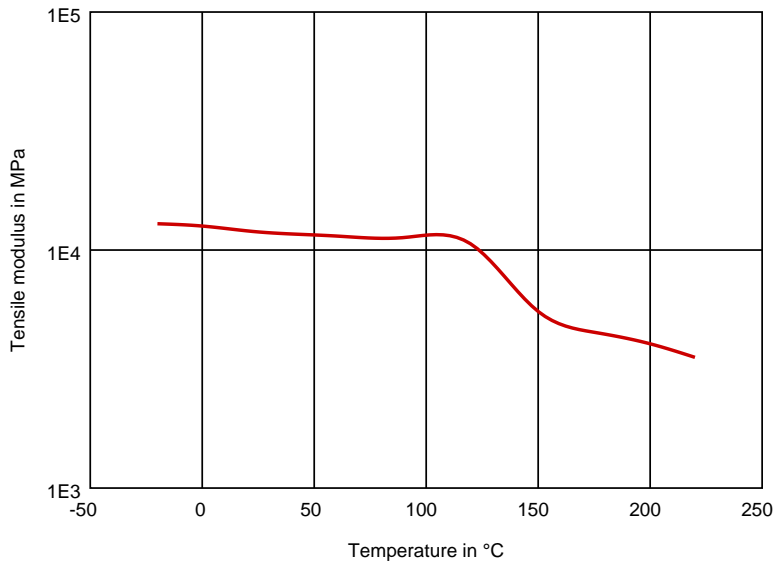
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## HIGH PERFORMANCE POLYAMIDE RESIN

Creep modulus-time 150°C (dry)



Tensile modulus-temperature (dry)



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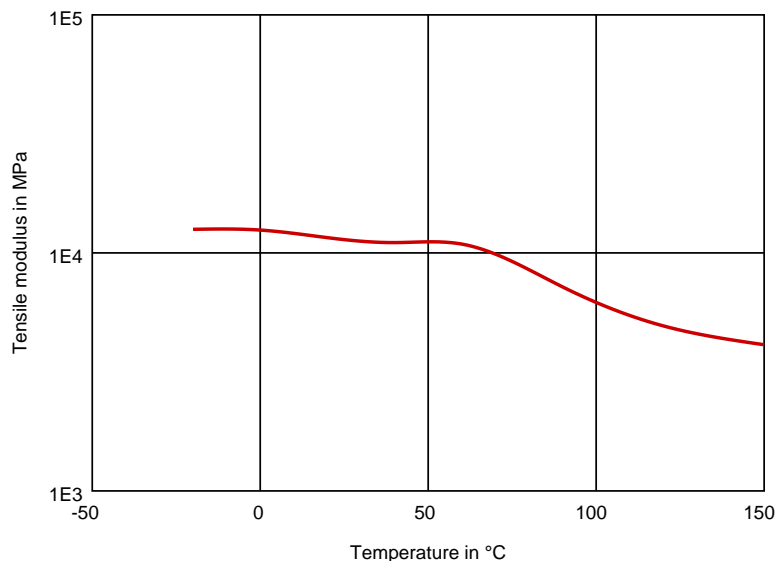
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## HIGH PERFORMANCE POLYAMIDE RESIN

Tensile modulus-temperature (cond.)



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### Chemical Media Resistance

#### Other

- ✓ Ethylene Glycol (50% by mass) in water (108°C)
- ✓ Water (23°C)
- ✓ Water (90°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).

- X 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 160 mil (Hytrel® measured at 80 mil), IEC Electrical properties measured at 80 mil, all ASTM properties measured at 120 mil, and test temperatures are 73°F unless otherwise stated.

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