



Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

Zytel® HTN high performance polyamide resins feature high retention of properties upon exposure to elevated temperature, to high moisture, and to harsh chemical environments. Polymer families and grades of Zytel® HTN are tailored to optimize performance as well as processability.

Typical applications with Zytel® HTN include demanding applications in the automotive, electrical and electronics, domestic appliances, and construction industries.

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

Product information

Resin Identification	PA6T/XT-GF35	ISO 1043
Part Marking Code	>PA6T/XT-GF35<	ISO 11469
Part Marking Code	>PPA-GF35<	SAE J1344
ISO designation	ISO 16396-PA6T/XT,GF35,M1GHNR,S10-120	

Rheological properties

	dry/cond.		
Molding shrinkage, parallel	0.2/-	%	ISO 294-4, 2577
Molding shrinkage, normal	0.6/-	%	ISO 294-4, 2577

Typical mechanical properties

	dry/cond.		
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, 1h	*/11000	MPa	ISO 899-1
Tensile creep modulus, 1000h	*/9500	MPa	ISO 899-1
Charpy impact strength, 73°F	70/55	kJ/m ²	ISO 179/1eU
Charpy impact strength, -22°F	60/50	kJ/m ²	ISO 179/1eU
Charpy notched impact strength, 73°F	11/11	kJ/m ²	ISO 179/1eA
Charpy notched impact strength, -22°F	10/10	kJ/m ²	ISO 179/1eA
Charpy notched impact strength, -40°F	11/-	kJ/m ²	ISO 179/1eA
Izod notched impact strength, 73°F	11/11	kJ/m ²	ISO 180/1A
Izod notched impact strength, -22°F	10/10	kJ/m ²	ISO 180/1A
Izod impact strength, -22°F	50/40	kJ/m ²	ISO 180/1U
Hardness, Rockwell, M-scale	108/-	-	ISO 2039-2
Hardness, Rockwell, R-scale	124/-	-	ISO 2039-2
Poisson's ratio	0.33/0.33	-	



Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

Tribological properties

	dry/cond.	
Coefficient of sliding friction, 1h against steel	-/0.35	ASTM 1894

Thermal properties

Thermal properties		dry/cond.	
Melting temperature, 18°F/min	300/*	°C	ISO 11357-1/-3
Melting temperature, first heat	300/*	°C	ISO 11357-1/-3
Glass transition temperature, 18°F/min	135/95	°C	ISO 11357-1/-2
Temp. of deflection under load, 260 psi	264/*	°C	ISO 75-1/-2
Temp. of deflection under load, 65 psi	284/*	°C	ISO 75-1/-2
Vicat softening temperature, 90°F/h, 11 lbf	290/*	°C	ISO 306
CLTE, Parallel, -40-23°C	18/*	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, parallel	18/*	E-6/K	ISO 11359-1/-2
CLTE, Normal, -40-23°C	55/*	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	55/*	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.25	W/(m K)	
Spec. heat capacity of melt	1860	J/(kg K)	
RTI, electrical, 30mil	150	°C	UL 746B
RTI, electrical, 60mil	150	°C	UL 746B
RTI, electrical, 120mil	150	°C	UL 746B
RTI, impact, 30mil	125	°C	UL 746B
RTI, impact, 60mil	125	°C	UL 746B
RTI, impact, 120mil	130	°C	UL 746B
RTI, strength, 30mil	130	°C	UL 746B
RTI, strength, 60mil	140/*	°C	UL 746B
RTI, strength, 120mil	150	°C	UL 746B

Flammability

	dry/cond.		
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, 30mil	750/-	°C	IEC 60695-2-12
Glow Wire Flammability Index, 60mil	750/-	°C	IEC 60695-2-12
Glow Wire Flammability Index, 120mil	960/-	°C	IEC 60695-2-12
Glow Wire Ignition Temperature, 60mil	775/-	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 120mil	800/-	°C	IEC 60695-2-13
FMVSS Class	B	-	ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	23	mm/min	ISO 3795 (FMVSS 302)



Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

Electrical properties

	dry/cond.		
Relative permittivity, 100Hz	4/-	-	IEC 62631-2-1
Relative permittivity, 1MHz	4/-	-	IEC 62631-2-1
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
Dielectric Constant, 1 GHz	3.9/-	-	ASTM D 2520 B
Dissipation Factor, 1 GHz	120/-	E-4	ASTM D 2520 B

Other properties

	dry/cond.		
Humidity absorption, 80mil	1.4/*	%	Sim. to ISO 62
Water absorption, 80mil	4/*	%	Sim. to ISO 62
Density	1470/-	kg/m ³	ISO 1183
Density of melt	1230	kg/m ³	

VDA Properties

Odor test	4 class	VDA 270
-----------	---------	---------

Injection

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 ^[1] °C
Max. mold temperature	180 °C

[1]: Higher temperature needed for thinner sections.

Characteristics

Additives	Release agent
-----------	---------------

Additional Information

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

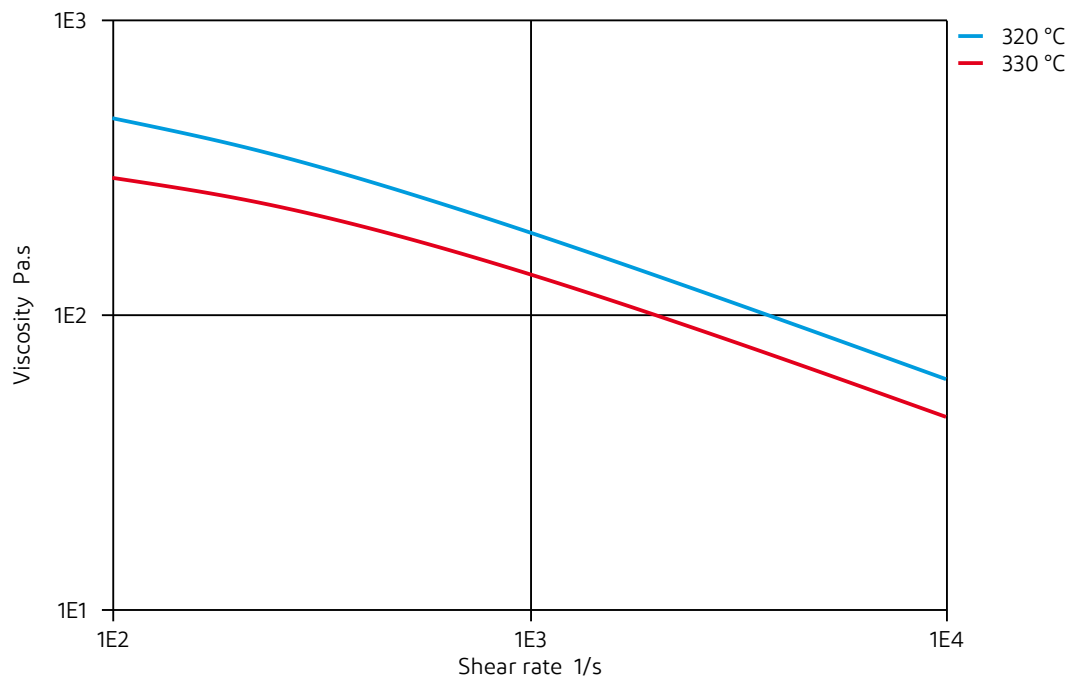


Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

reduced, and the dimensional change may be greater when parts are subsequently heated.

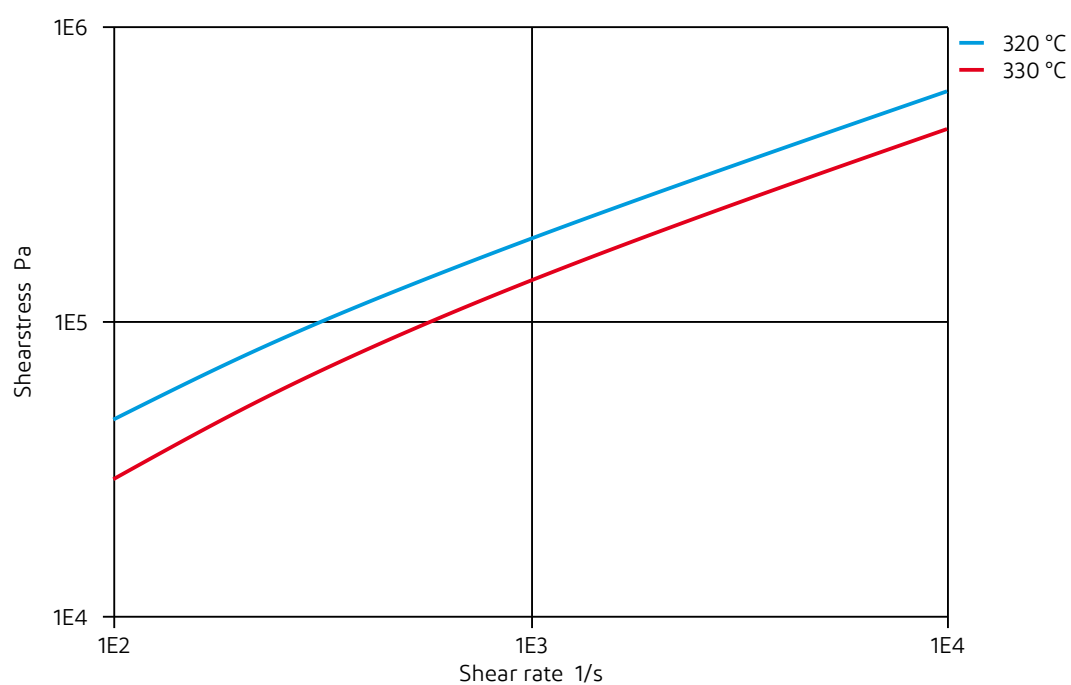
Viscosity-shear rate



Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

Shearstress-shear rate

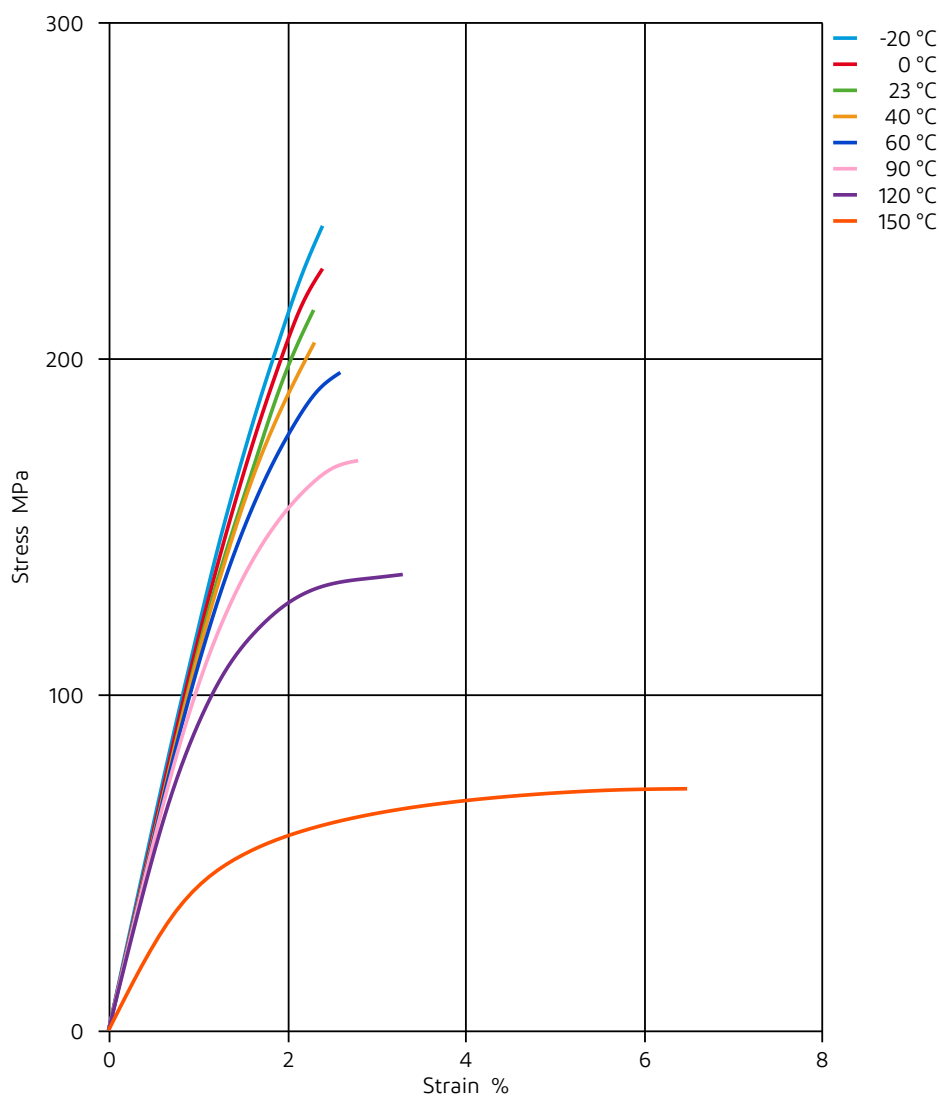




Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

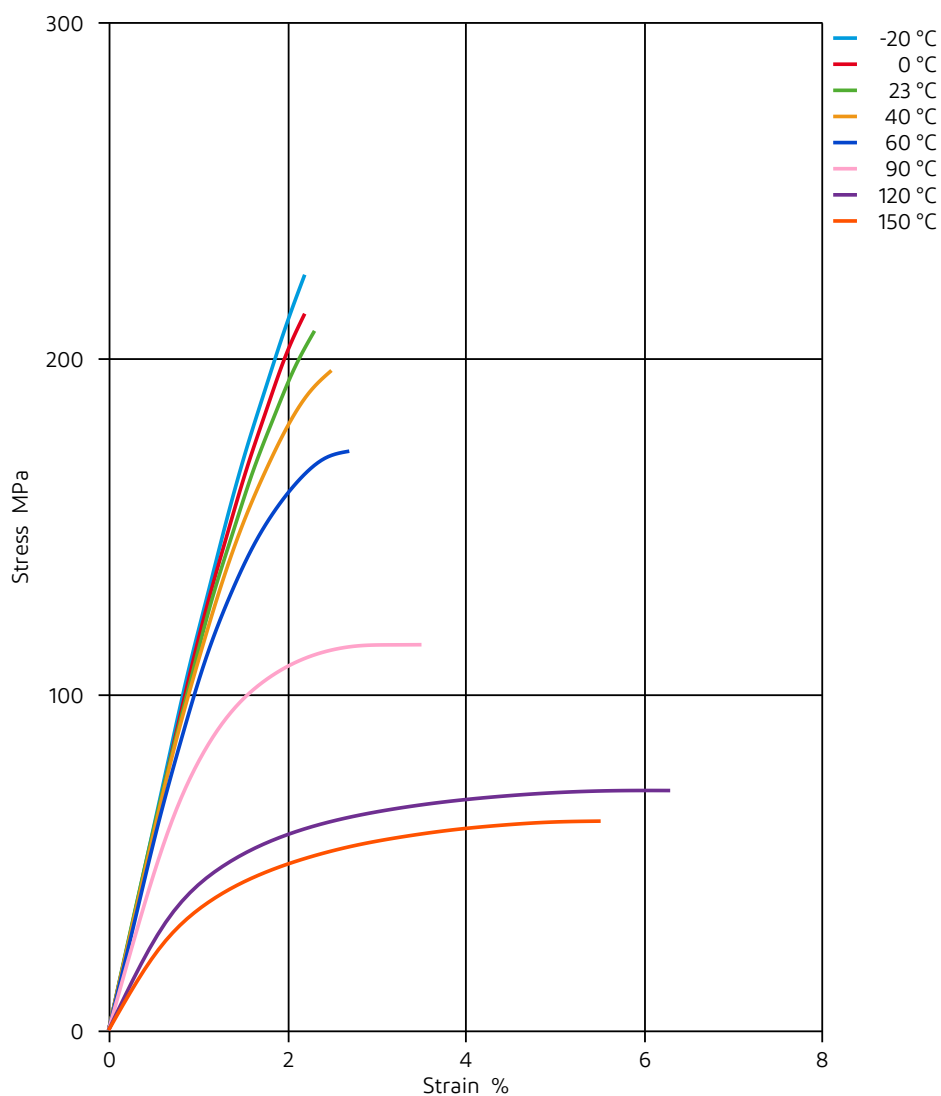
Stress-strain (dry)



Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

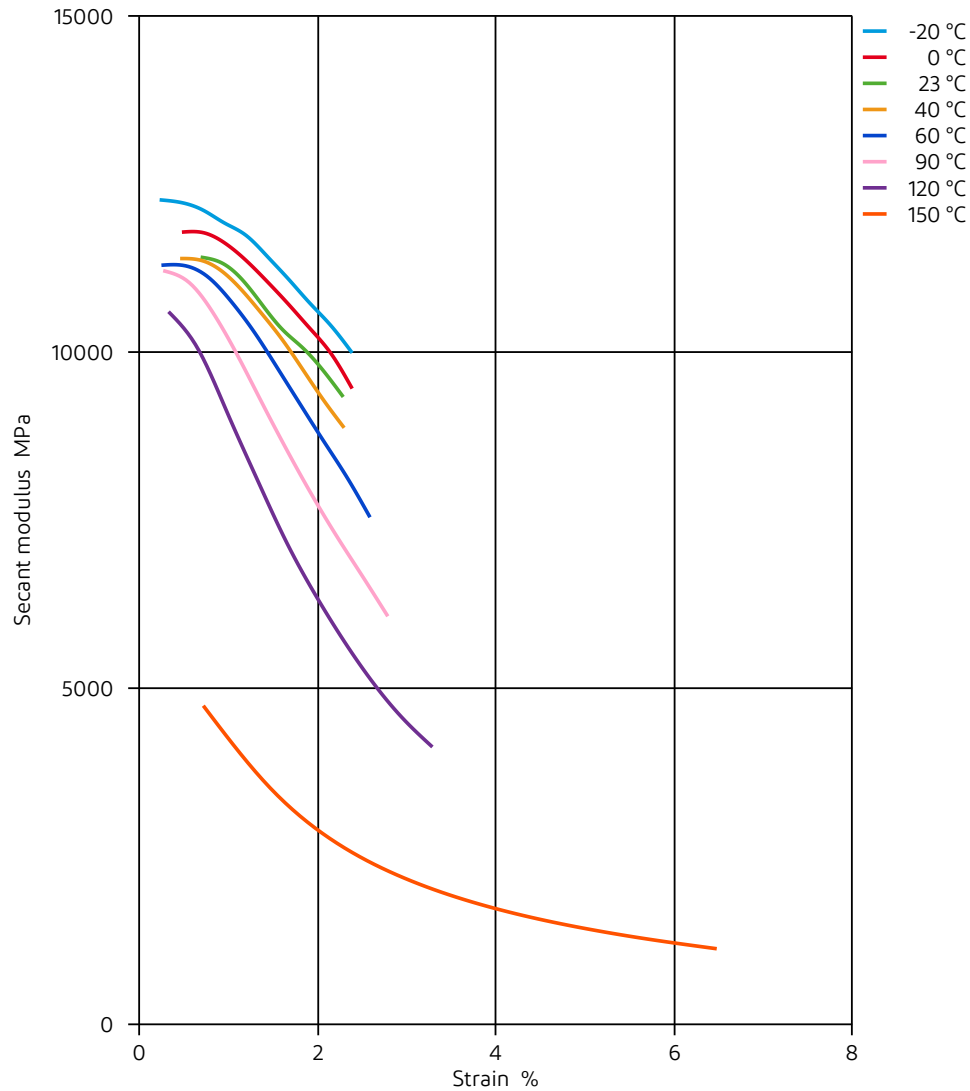
Stress-strain (cond.)



Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

Secant modulus-strain (dry)

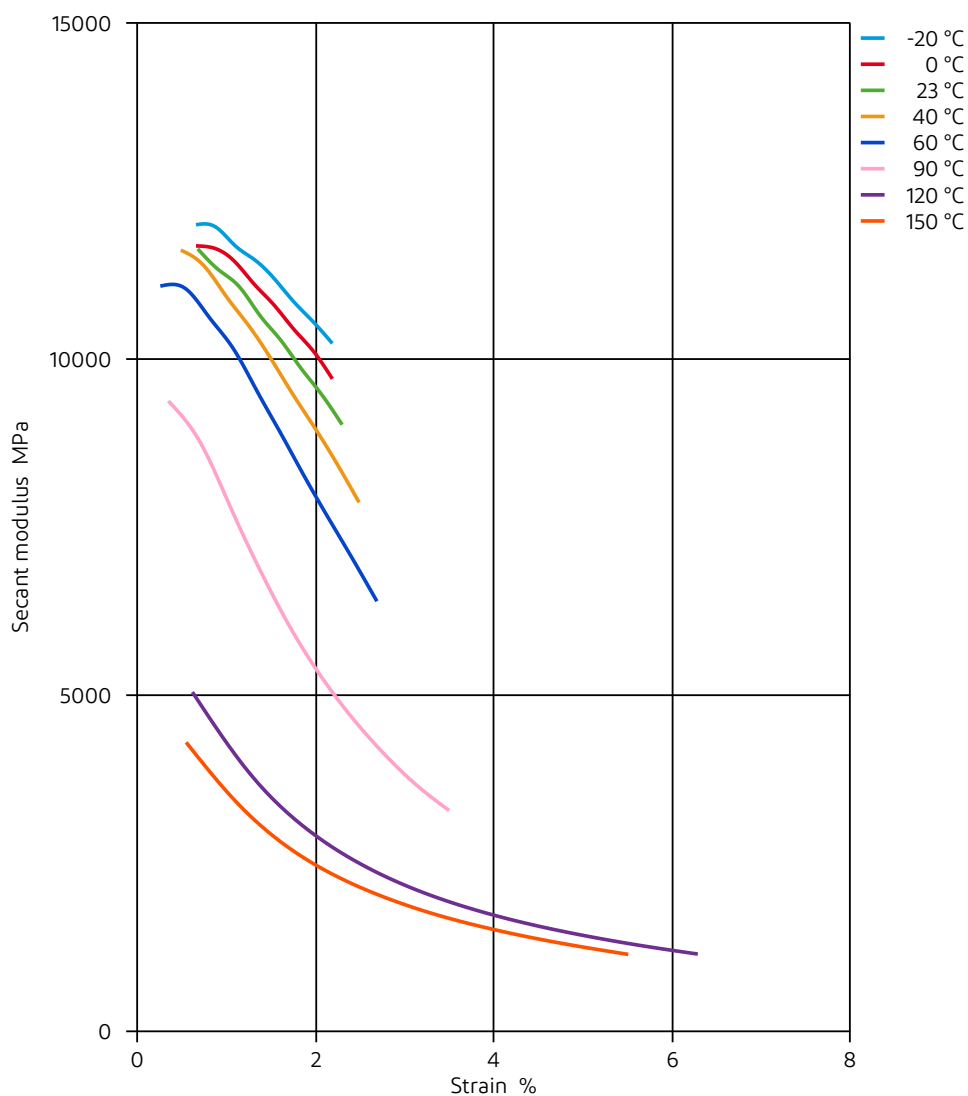




Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

Secant modulus-strain (cond.)

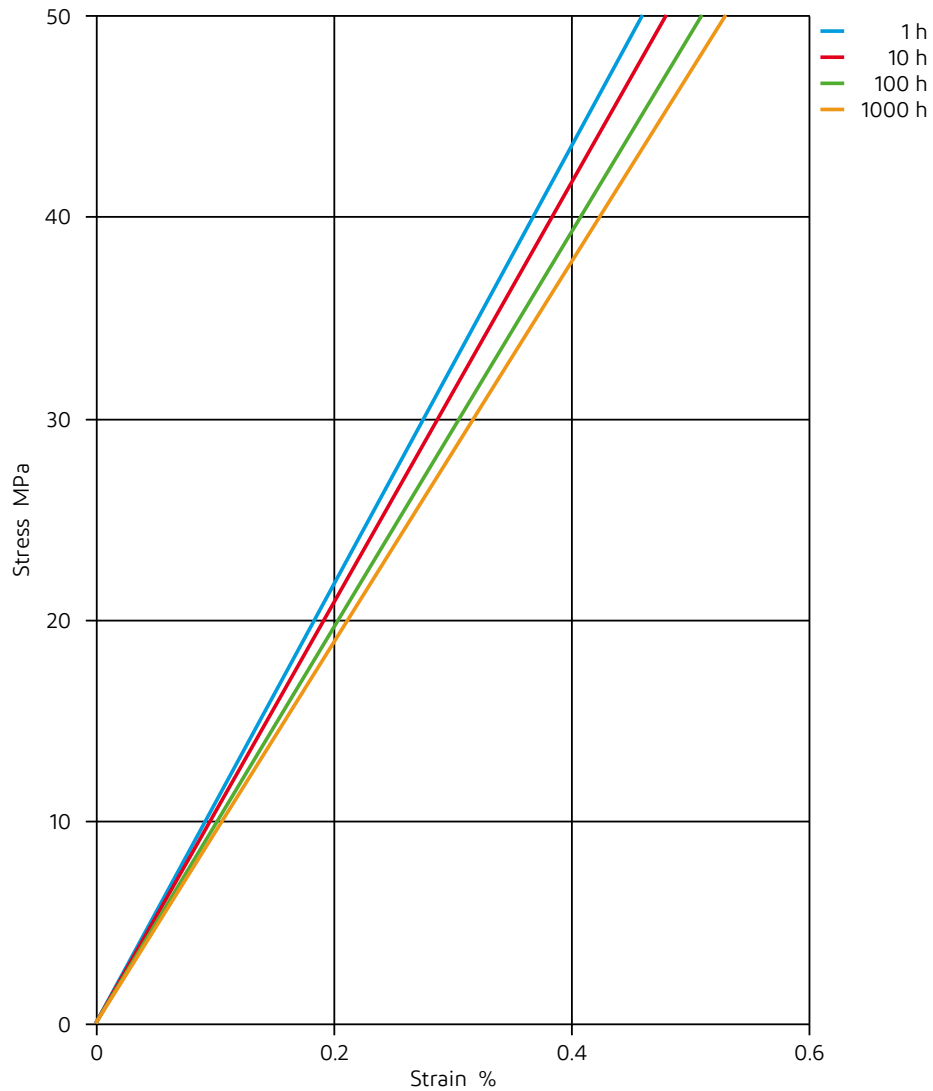




Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

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

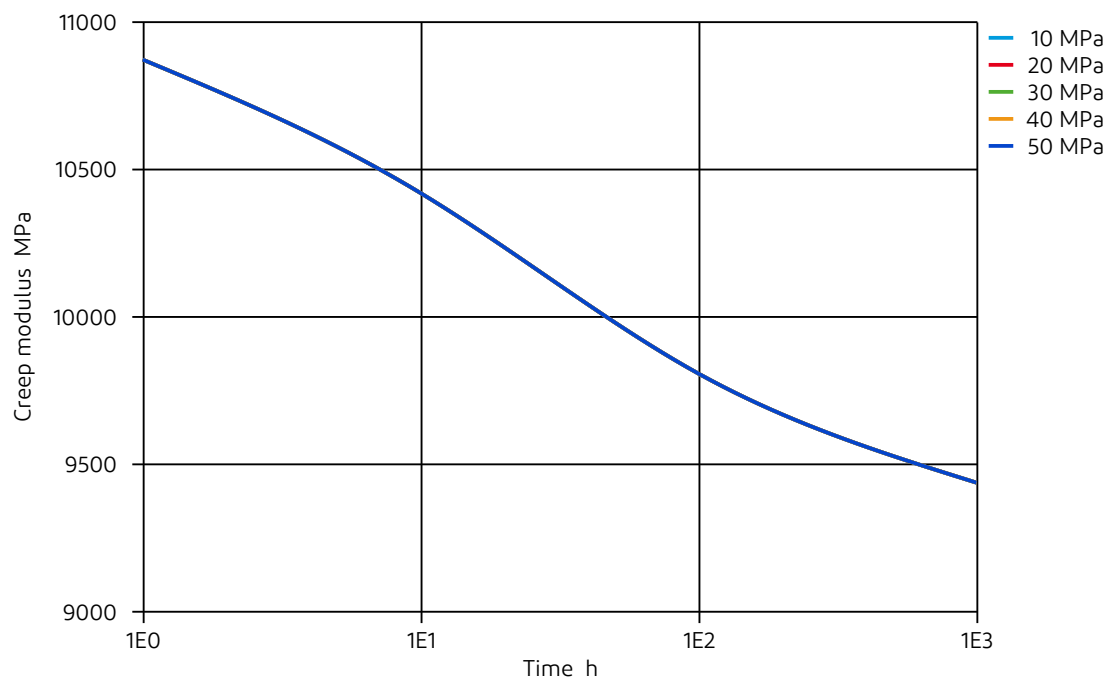




Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

Creep modulus-time 23°C (cond.)

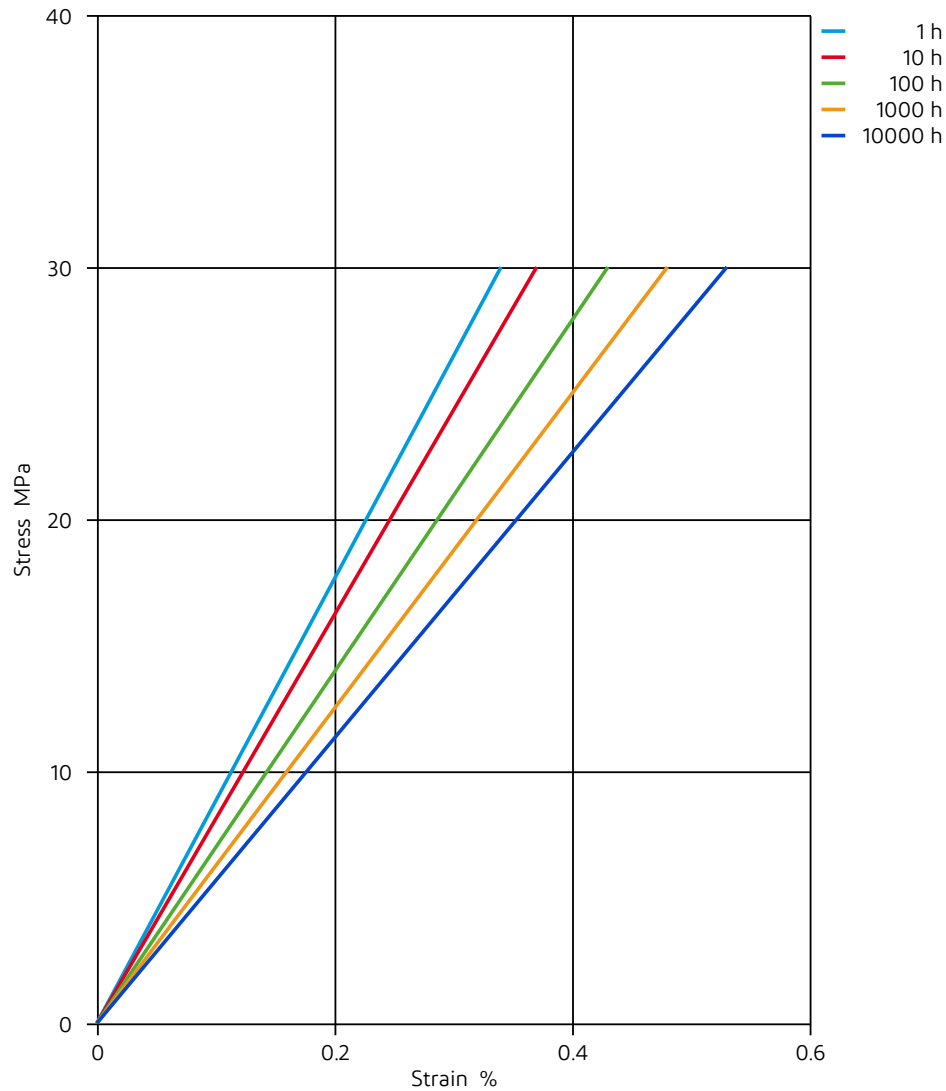




Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

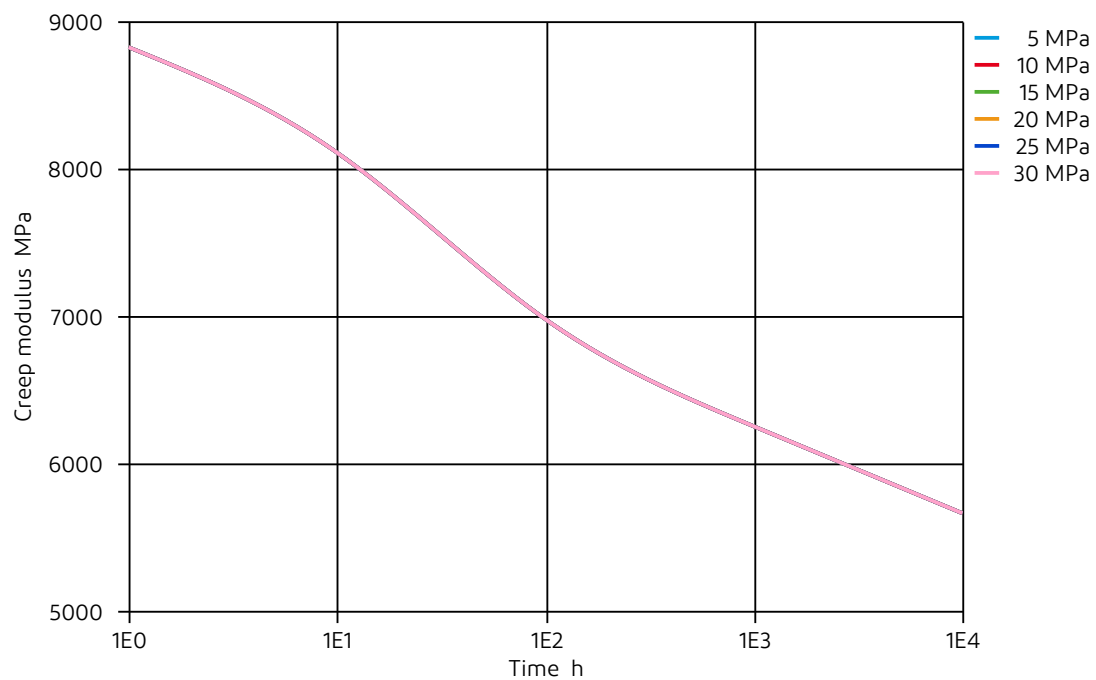
Stress-strain (isochronous) 100°C (dry)



Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

Creep modulus-time 100°C (dry)

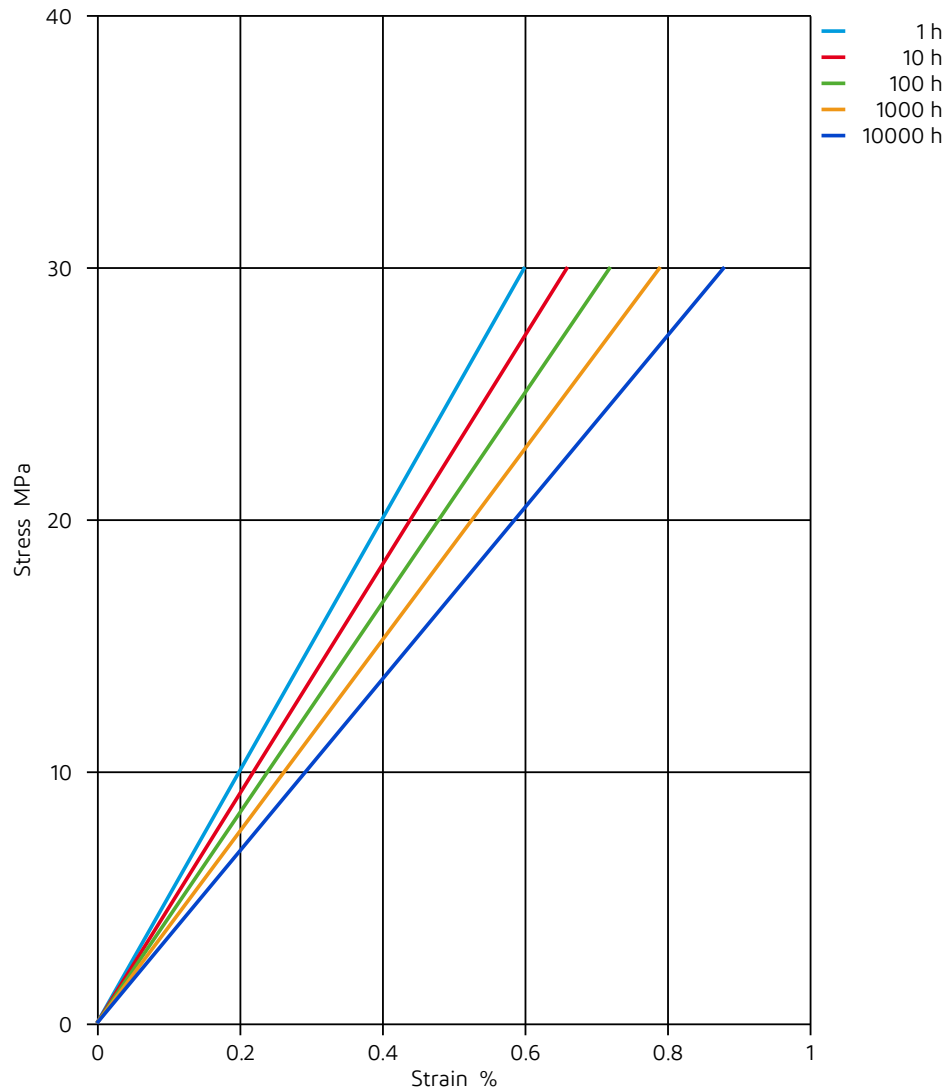




Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

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

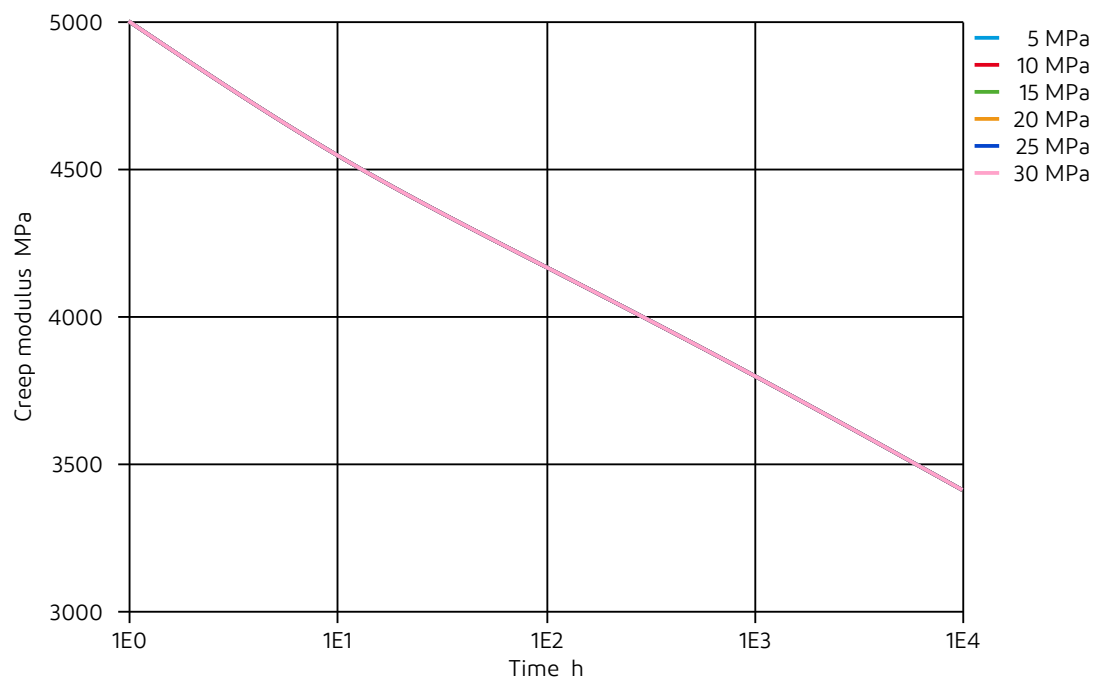




Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

Creep modulus-time 150°C (dry)

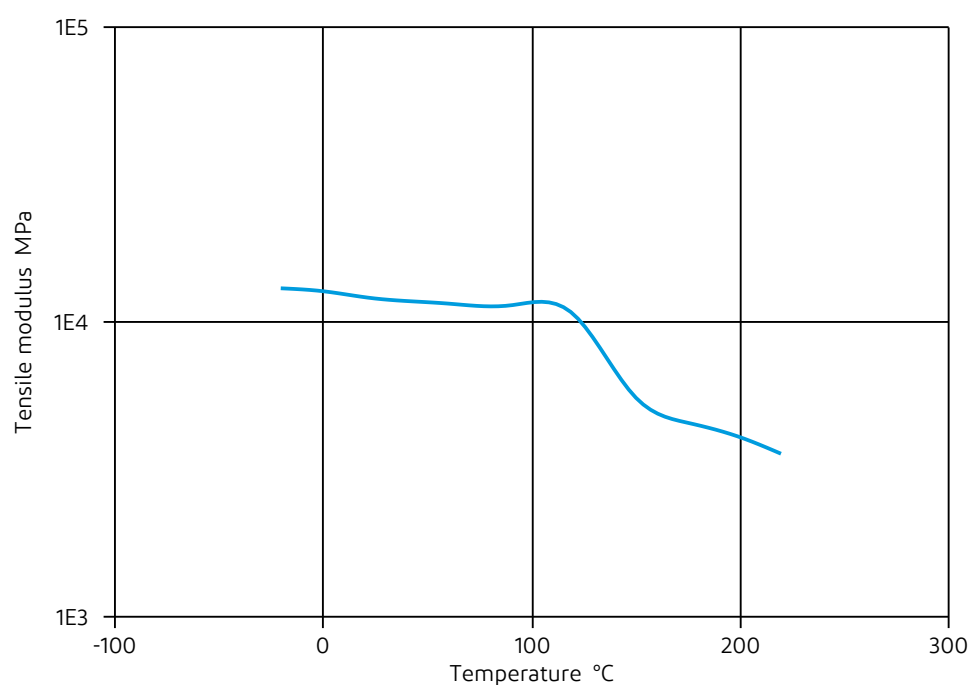




Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

Tensile modulus-temperature (dry)

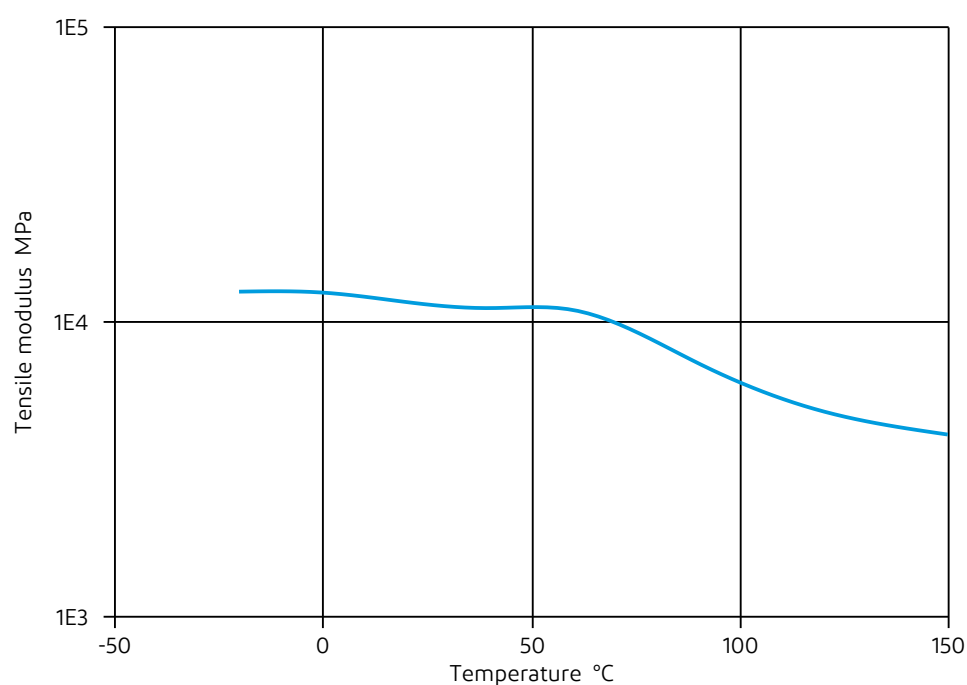




Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

Tensile modulus-temperature (cond.)



Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE 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

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
- ✓ Diesel EN 590, 100°C

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).
- ✗ 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).



Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

Revised: 2021-04-06

Page: 19 of 19

dupont.com

The information set forth herein is furnished free of charge, is based on technical data that DuPont believes to be reliable, and represents typical values that fall within the normal range of properties. This information relates only to the specific material designated and may not be valid for such material used in combination with other materials or in other processes. It is intended for use by persons having technical skill, at their own discretion and risk. This information should not be used to establish specification limits nor used alone as the basis of design. Handling precaution information is given with the understanding that those using it will satisfy themselves that their particular conditions of use present no health or safety hazards and comply with applicable law. Since conditions of product use and disposal are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information. As with any product, evaluation under end-use conditions prior to specification is essential. Nothing herein is to be taken as a license to operate or a recommendation to infringe on patents.

CAUTION: Do not use DuPont materials in medical applications involving implantation in the human body or contact with internal body fluids or tissues unless the material has been provided from DuPont under a written contract or other acknowledgement that is consistent with the DuPont policy regarding medical applications and expressly acknowledges the contemplated use. For further information, please contact your DuPont representative.

DuPont's sole warranty is that our products will meet our standard sales specifications in effect at the time of shipment. Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted. TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, DUPONT SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR NON-INFRINGEMENT. DUPONT DISCLAIMS LIABILITY FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

DuPont™, the DuPont Oval Logo, and all trademarks and service marks denoted with ™, SM or ® are owned by affiliates of DuPont de Nemours, Inc. unless otherwise noted.

© 2021 DuPont. All rights reserved.