

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, 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® 70G33HS1L NC010 is a 33% glass fiber reinforced, heat stabilized polyamide 66 resin for injection moulding.

Product information

Resin Identification Part Marking Code ISO designation	PA66-GF33 >PA66-GF33< ISO 16396-PA66,0	5F33,M1GHNR,S14-110	ISO 1043 ISO 11469
Rheological properties	dry/cond.		
Viscosity number	153/*	cm³/g	ISO 307, 1157, 1628
Moulding shrinkage, parallel	0.3/-	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.1/-	%	ISO 294-4, 2577
Typical mechanical properties	dry/cond.		
Tensile Modulus	11000/8000	MPa	ISO 527-1/-2
Stress at break	200/140	MPa	ISO 527-1/-2
Strain at break	3.5/5	%	ISO 527-1/-2
Flexural Modulus	9500/6000	MPa	ISO 178
Flexural Strength	290/200	MPa	ISO 178
Tensile creep modulus, 1h	*/8000	MPa	ISO 899-1
Tensile creep modulus, 1000h	*/5500	MPa	ISO 899-1
Charpy impact strength, 23°C	85/100	kJ/m²	ISO 179/1eU
Charpy impact strength, -30°C	70/75	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	13/17	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30°C	10/10	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -40°C	10/10	kJ/m²	ISO 179/1eA
lzod notched impact strength, 23°C	12/15	kJ/m²	ISO 180/1A
lzod notched impact strength, -30°C	10/10	kJ/m²	ISO 180/1A
lzod notched impact strength, -40°C	10/10	kJ/m²	ISO 180/1A
Izod impact strength, 23°C	80/90	kJ/m²	ISO 180/1U



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Thermal properties dry/cond. Melting temperature, 10°C/min 262/* °C ISO 11357-1/-2 Glass transition temperature, 10°C/min 80/- °C ISO 11357-1/-2 Temp. of deflection under load, 1.8 MPa 252/* °C ISO 75-1/-2 Temp. of deflection under load, 0.45 MPa 261/* °C ISO 75-1/-2 CLTE, Parallel, -40-23°C 24/* E-6/K ISO 11359-1/-2 Coeff. of linear therm. expansion, parallel 18/* E-6/K ISO 11359-1/-2 CLTE, Parallel, 55-160°C 13/* E-6/K ISO 11359-1/-2	U 2 -1
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CLTE, Normal, -40-23°C 65/* E-6/K ISO 11359-1/-2	
Coeff. of linear therm. expansion, normal 83/* E-6/K ISO 11359-1/-2	
Coeff. of linear therm. expansion, Normal, 55-160°C 140/* E-6/K ISO 11359-1/-2	
Thermal conductivity of melt 0.22 W/(m K)	
Spec. heat capacity of melt 2210 J/(kg K)	
Spec. heat capacity solid 1330 J/(kg K)	
RTI, electrical, 0.75mm 140 °C UL 746E	В
RTI, electrical, 1.5mm 140 °C UL 746B	В
RTI, electrical, 3mm 140 °C UL 7468	В
RTI, impact, 0.75mm 125 °C UL 7468	В
RTI, impact, 1.5mm 125 °C UL 7468	В
RTI, impact, 3mm 125 °C UL 7468	В
RTI, strength, 0.75mm 140 °C UL 7468	В
RTI, strength, 1.5mm 140/* °C UL 7468	В
RTI, strength, 3mm 140 °C UL 746	В
Flammability dry/cond.	
Burning Behav. at 1.5mm nom. thickn. HB/* class IEC 60695-11-10	0
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	
Glow Wire Flammability Index, 0.75mm 725/- °C IEC 60695-2-12	
Glow Wire Flammability Index, 1.5mm 700/- °C IEC 60695-2-12	
Glow Wire Flammability Index, 3mm 800/- °C IEC 60695-2-12	2
Glow Wire Ignition Temperature, 0.75mm 750/- °C IEC 60695-2-1.	
Glow Wire Ignition Temperature, 1.5mm 725/- °C IEC 60695-2-1.	3
Glow Wire Ignition Temperature, 3mm 825/- °C IEC 60695-2-1	3
FMVSS ClassSE/B-ISO 3795 (FMVSS 302	



Burning rate, Thickness 1 mm	28	mm/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	1E13/1E9	Ohm.m	IEC 62631-3-1	
Surface resistivity	*/1E15	Ohm	IEC 62631-3-2	
Electric strength	46/38	kV/mm	IEC 60243-1	
Comparative tracking index	400/-	-	IEC 60112	
Comparative tracking index, 3.0mm	1/-	PLC	UL 746A	
Electric Strength, Short Time, 2mm	27/-	kV/mm	IEC 60243-1	
Other properties	dry/cond.			
Humidity absorption, 2mm	1.8/*	%	Sim. to ISO 62	
Water absorption, 2mm	5.7/*	%	Sim. to ISO 62	
Density	1390/-	kg/m³	ISO 1183	
Water Absorption, Immersion 24h	1.2/*	%	Sim. to ISO 62	
VDA Properties	dry/cond.			
Emission of organic compounds	6	µgC/g	VDA 277	
Odour	4.5	class	VDA 270	
Fogging, F-value (refraction)	95/*	%	ISO 6452	
Fogging, G-value (condensate)	0.3/*	mg	ISO 6452	
Injection				
Drying Recommended	У€	es		
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 - 10	0 MPa		
Hold pressure time	24	3 s/mm		
Ejection temperature	2	10 °C		
Characteristics				

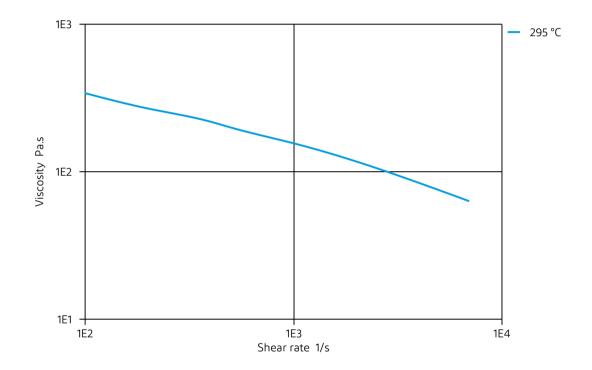
Additives

Release agent

Revised: 2019-12-12

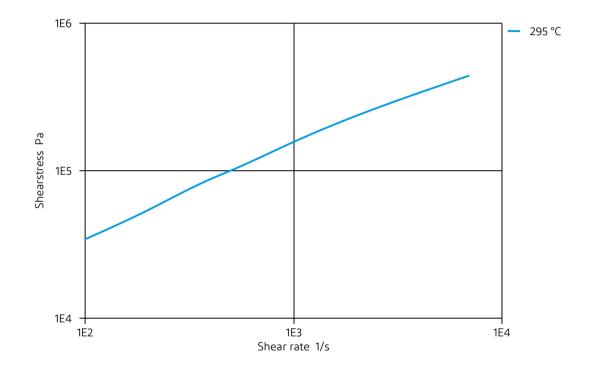
Zytel® 70G33HS1L NC010

Viscosity-shear rate



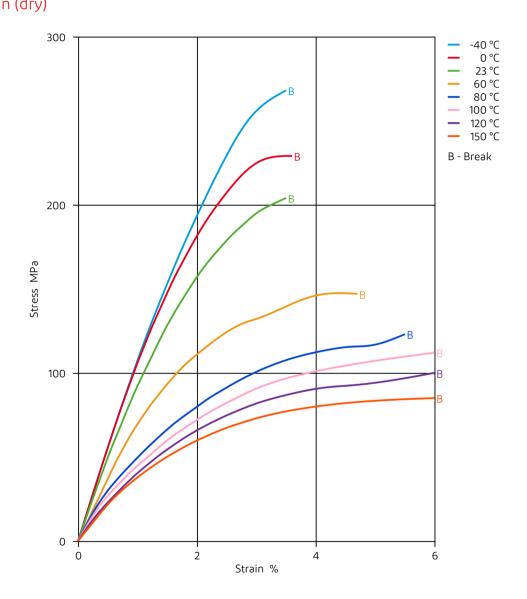
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Shearstress-shear rate

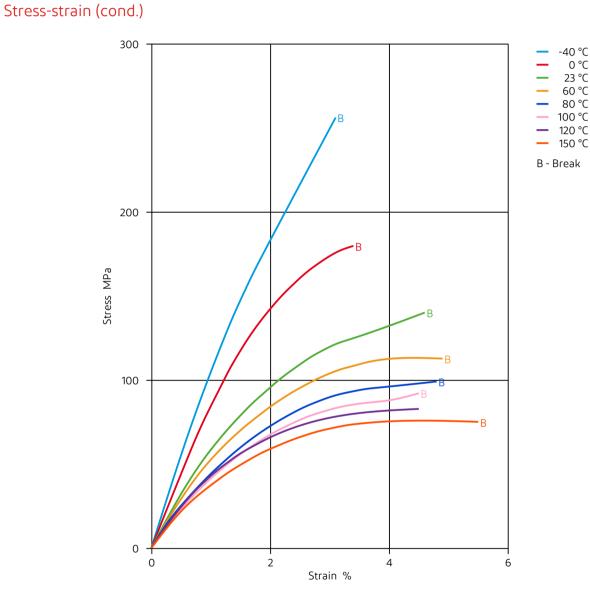




Stress-strain (dry)



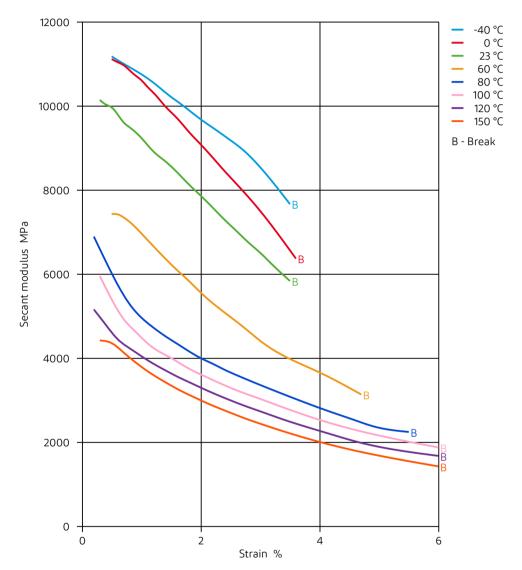






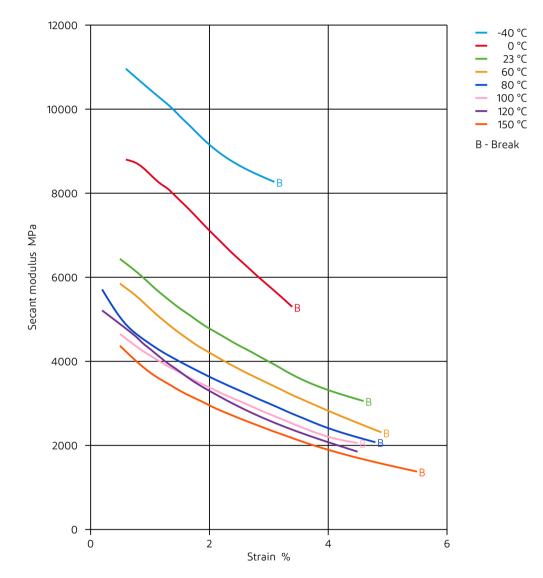
IN LON RESIN

Secant modulus-strain (dry)





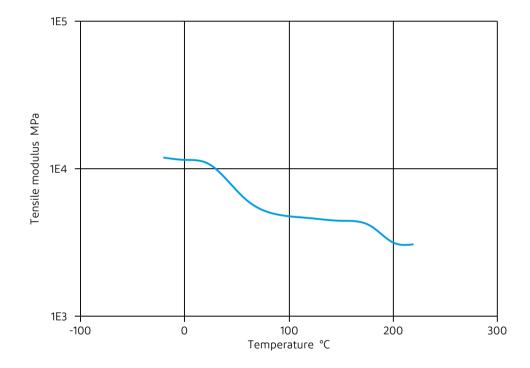
Secant modulus-strain (cond.)



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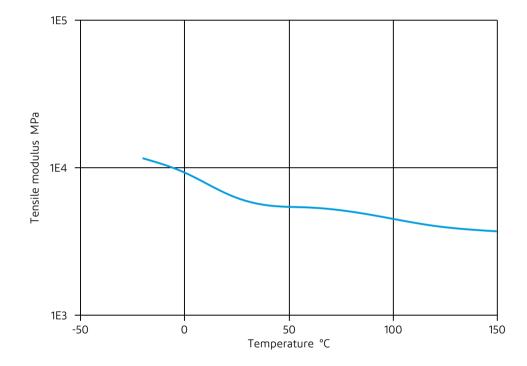
Tensile modulus-temperature (dry) (measured on Zytel® 70G33HS1L BK031)



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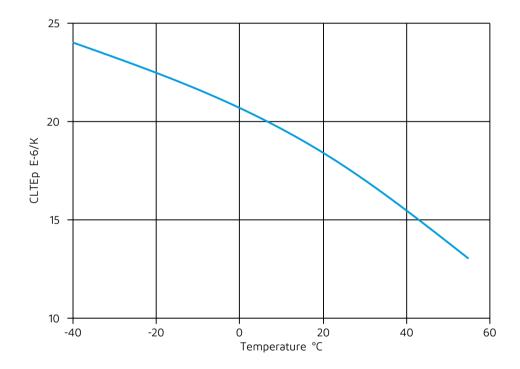
Tensile modulus-temperature (cond.) (measured on Zytel® 70G33HS1L BK031)



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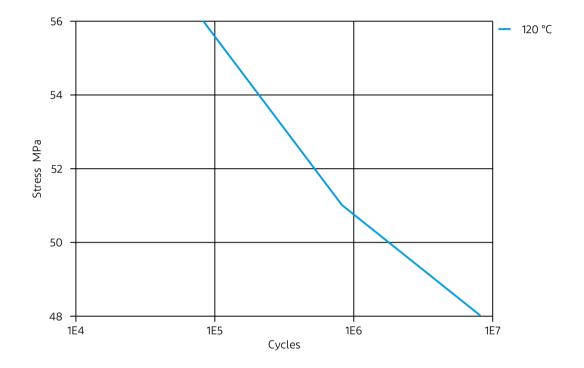
Coeff. of linear thermal expansion



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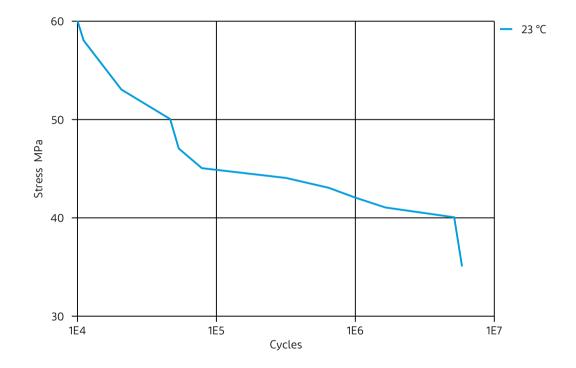
Tensile Fatigue, 10Hz, R=0.1 @ mm (dry)



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Tensile Fatigue, 10Hz, R=0.1 @ mm (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
- X Nitric Acid (40% by mass), 23℃
- X Sulfuric Acid (38% by mass), 23°C
- X Sulfuric Acid (5% by mass), 23℃
- X Chromic Acid solution (40% by mass), 23°C

Bases

- X 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
- ✓ 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

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- ✓ 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

Salt solutions

- ✓ Sodium Chloride solution (10% by mass), 23°C
- X Sodium Hypochlorite solution (10% by mass), 23°C
- ✓ Sodium Carbonate solution (20% by mass), 23°C
- ✓ Sodium Carbonate solution (2% by mass), 23°C
- X 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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