

DuPont™ Zytel® 101F NC010

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® 101F NC010 is an internally lubricated polyamide 66 resin for injection moulding. It was developed for fast cycles and high productivity.

General information	Value	Unit	Test Standard
Resin Identification	PA66	-	ISO 1043
Part Marking Code	PA66	-	ISO 11469
Rheological properties	dry / cond	Unit	Test Standard
Viscosity number	150 / *	cm ³ /g	ISO 307, 1157, 1628
Moulding shrinkage, parallel	1.4 / -	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.4 / -	%	ISO 294-4, 2577
Postmoulding shrinkage, normal, 48h at 80°C	0.1 / *	%	ISO 294-4
Postmoulding shrinkage, parallel, 48h at 80°C	0.2 / *	%	ISO 294-4
Mechanical properties	dry / cond	Unit	Test Standard
Tensile Modulus	3100 / 1400	MPa	ISO 527-1/-2
Yield stress	82 / 55	MPa	ISO 527-1/-2
Yield strain	4.5 / 25	%	ISO 527-1/-2
Nominal strain at break	20 / >50	%	ISO 527-1/-2
Strain at Break, 23°C, 50mm/min	40 / -	%	ISO 527-1/-2
Flexural Modulus	2800 / 1200	MPa	ISO 178
Tensile creep modulus			ISO 899-1
1h	* / 1400	MPa	
1000h	* / 930	MPa	
Charpy impact strength			ISO 179/1eU
23°C	N / N	kJ/m ²	
-30°C	400 / N	kJ/m ²	
Charpy notched impact strength			ISO 179/1eA
23°C	6 / 13	kJ/m ²	
-30°C	4.5 / 3	kJ/m ²	
Izod notched impact strength			ISO 180/1A
23°C	5.5 / 11	kJ/m ²	
-30°C	6 / 4	kJ/m ²	
-40°C	5.5 / -	kJ/m ²	
Izod impact strength			ISO 180/1U
23°C	300 / N	kJ/m ²	
-30°C	300 / -	kJ/m ²	
Thermal properties	dry / cond	Unit	Test Standard
Melting temperature, 10°C/min	262 / *	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	60 / -	°C	ISO 11357-1/-2
Temp. of deflection under load			ISO 75-1/-2
1.8 MPa	70 / *	°C	
0.45 MPa	190 / *	°C	

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Vicat softening temperature, 50°C/h, 50N	240 / *	°C	ISO 306
Coeff. of linear therm. expansion, parallel	100 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	110 / *	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.16	W/(m K)	-
Spec. heat capacity of melt	2790	J/(kg K)	-
Eff. thermal diffusivity	5E-8	m ² /s	-
RTI, electrical			UL 746B
0.75mm	130 / *	°C	
1.5mm	130 / *	°C	
3mm	130	°C	
6mm	130	°C	
RTI, impact			UL 746B
0.75mm	75	°C	
1.5mm	75 / *	°C	
3mm	75	°C	
6mm	75	°C	
RTI, strength			UL 746B
0.75mm	85	°C	
1.5mm	85 / *	°C	
3mm	85	°C	
6mm	85	°C	
Flammability	dry / cond	Unit	Test Standard
Burning Behav. at 1.5mm nom. thickn.	V-2 / *	class	IEC 60695-11-10
Thickness tested	1.5 / *	mm	IEC 60695-11-10
UL recognition	yes / *	-	UL 94
Burning Behav. at thickness h	V-2 / *	class	IEC 60695-11-10
Thickness tested	0.71 / *	mm	IEC 60695-11-10
Oxygen index	28 / *	%	ISO 4589-1/-2
Glow Wire Flammability Index			IEC 60695-2-1/2
0.75mm	960 / -	°C	
1.5mm	960 / -	°C	
3mm	960 / -	°C	
Glow Wire Ignition Temperature			IEC 60695-2-1/3
0.75mm	725 / -	°C	
1.5mm	750 / -	°C	
3mm	800 / -	°C	
FMVSS Class	SE	-	ISO 3795 (FMVSS 302)
Electrical properties	dry / cond	Unit	Test Standard
Relative permittivity			IEC 60250
100Hz	3.8 / 8	-	
1MHz	3.6 / 4.6	-	
Dissipation factor			IEC 60250
100Hz	140 / -	E-4	
1MHz	180 / 1000	E-4	
Volume resistivity	1E13 / >1E13	Ohm*m	IEC 60093
Electric strength	31.5 / 26	kV/mm	IEC 60243-1
CTI, 23°C	0 / -	PLC	UL 746A
Other properties	dry / cond	Unit	Test Standard
Humidity absorption, 2mm	2.6 / *	%	Sim. to ISO 62
Water absorption, 2mm	8.5 / *	%	Sim. to ISO 62
Density	1140 / -	kg/m ³	ISO 1183
Density of melt	970	kg/m ³	-
Film Properties	dry / cond	Unit	Test Standard
Strain at yield, parallel	4.5 / *	%	ISO 527-3

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VDA Properties	dry / cond	Unit	Test Standard
Emission of organic compounds	6.5	µgC/g	VDA 277
Odour	3	class	VDA 270
Fogging, G-value (condensate)	0.1 / *	mg	ISO 6452
Injection	dry / cond	Unit	Test Standard
Drying Recommended	yes	-	-
Drying Temperature	80	°C	-
Drying Time, Dehumidified Dryer	2 - 4	h	-
Processing Moisture Content	≤0.2	%	-
Melt Temperature Optimum	290	°C	-
Min. melt temperature	280	°C	-
Max. melt temperature	300	°C	-
Max. screw tangential speed	0.4 / *	m/s	-
Mold Temperature Optimum	70	°C	-
Min. mould temperature	50	°C	-
Max. mould temperature	90	°C	-
Hold pressure range	50 - 100	MPa	-
Hold pressure time	4	s/mm	-
Ejection temperature	190	°C	-

Characteristics			
Processing	• Injection Moulding		
Delivery form	• Pellets		
Additives	• Release agent		
Regional Availability	• North America	• Asia Pacific	• Near East/Africa
	• Europe	• South and Central America	• Global

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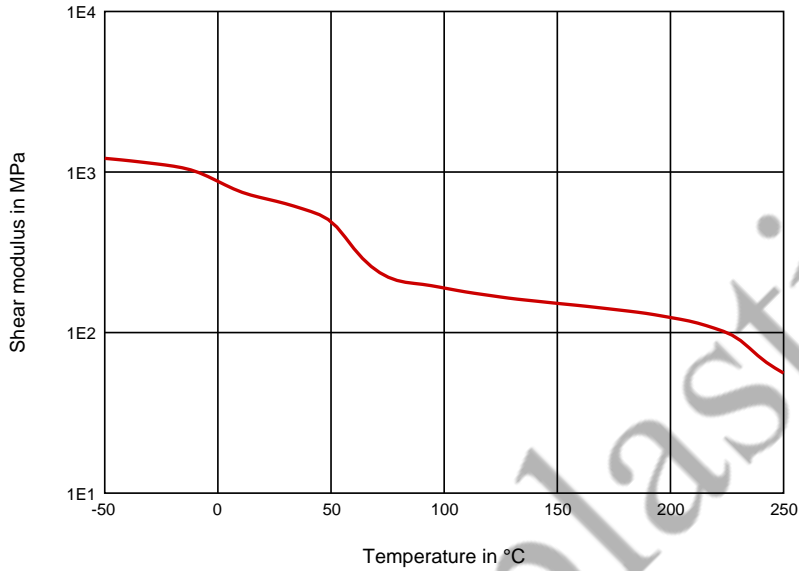


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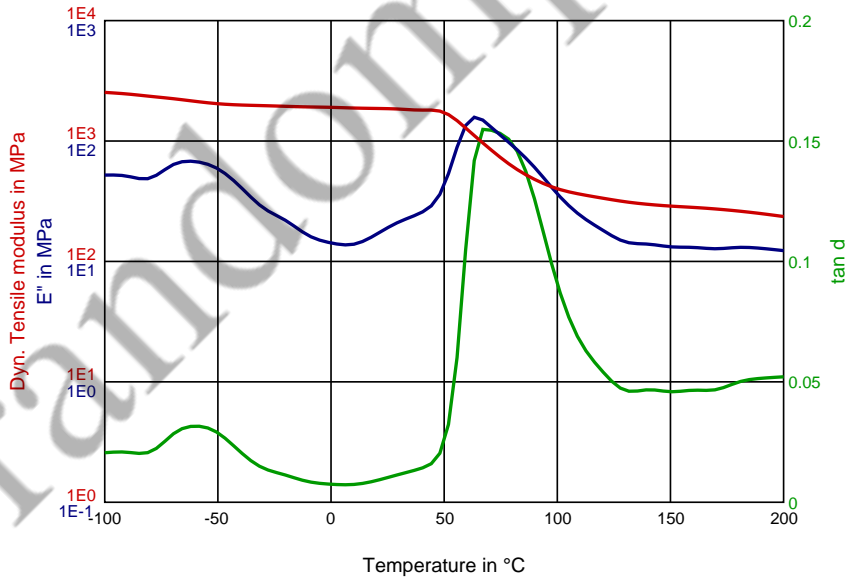
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Diagrams

Dynamic Shear modulus-temperature (cond.)



Dynamic Tensile modulus-temperature (dry)



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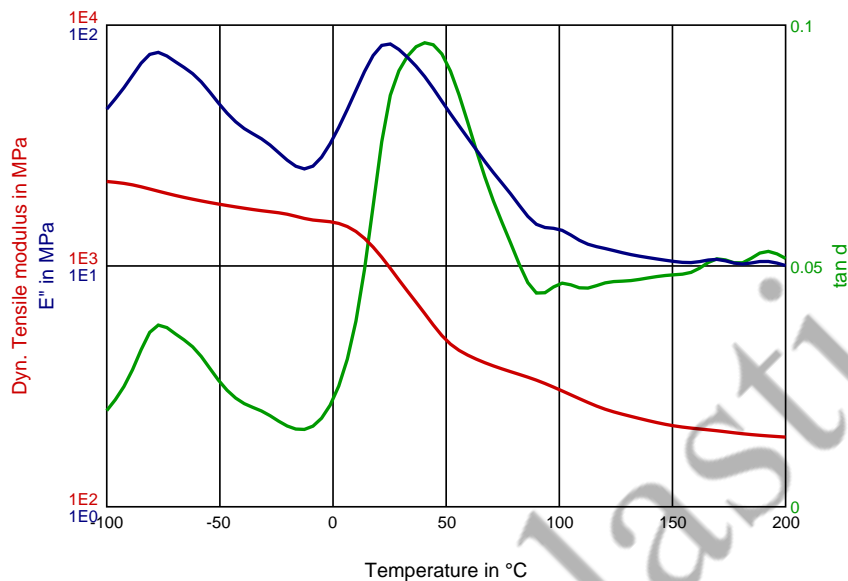
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Dynamic Tensile modulus-temperature (cond.)



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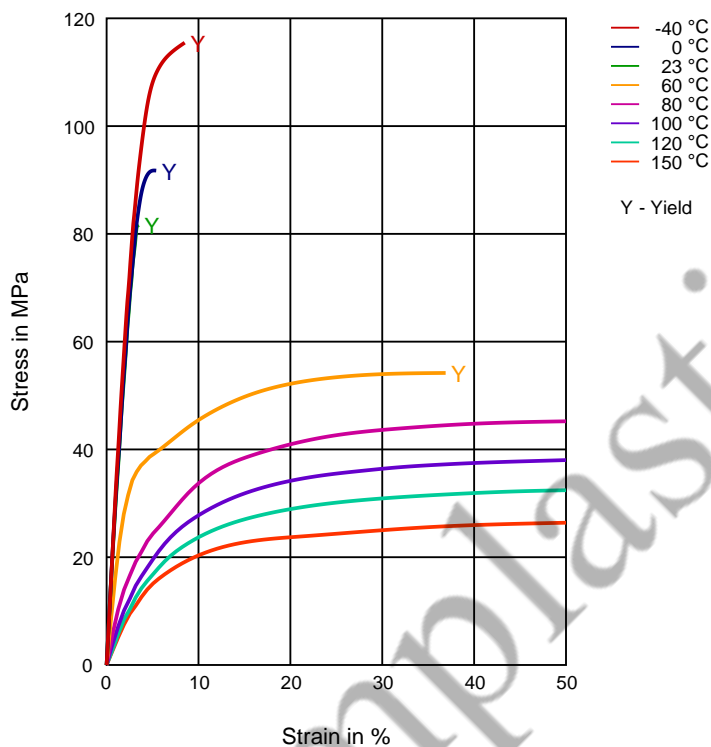


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Stress-strain (dry)



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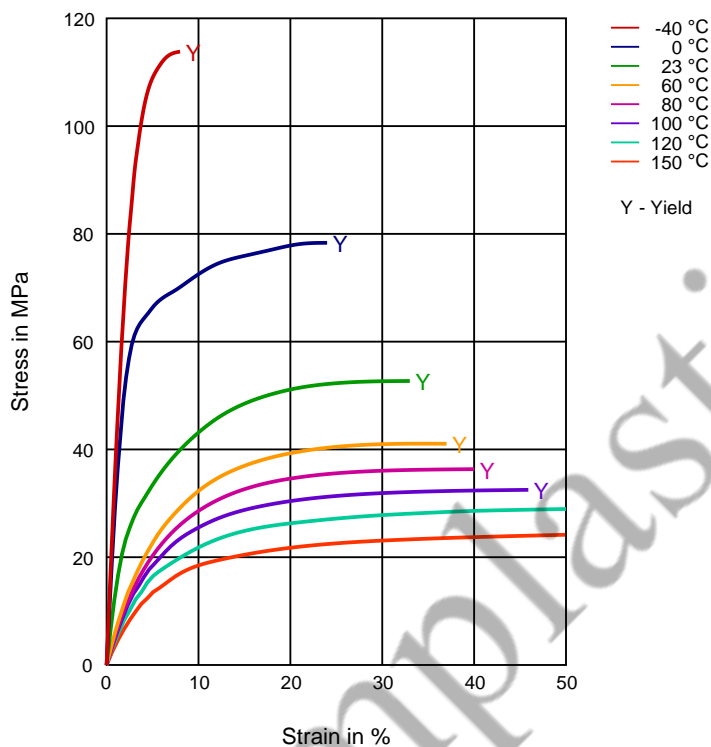


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Stress-strain (cond.)



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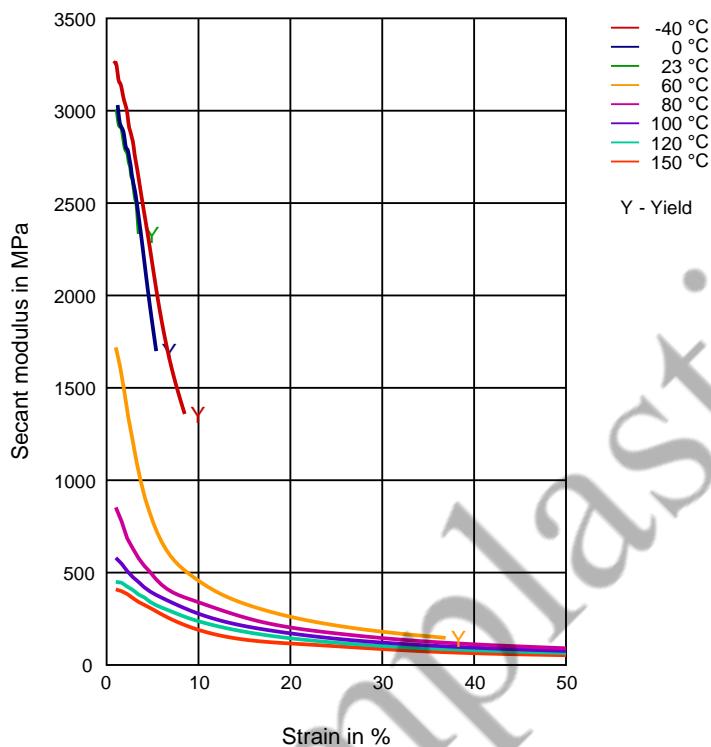


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Secant modulus-strain (dry)



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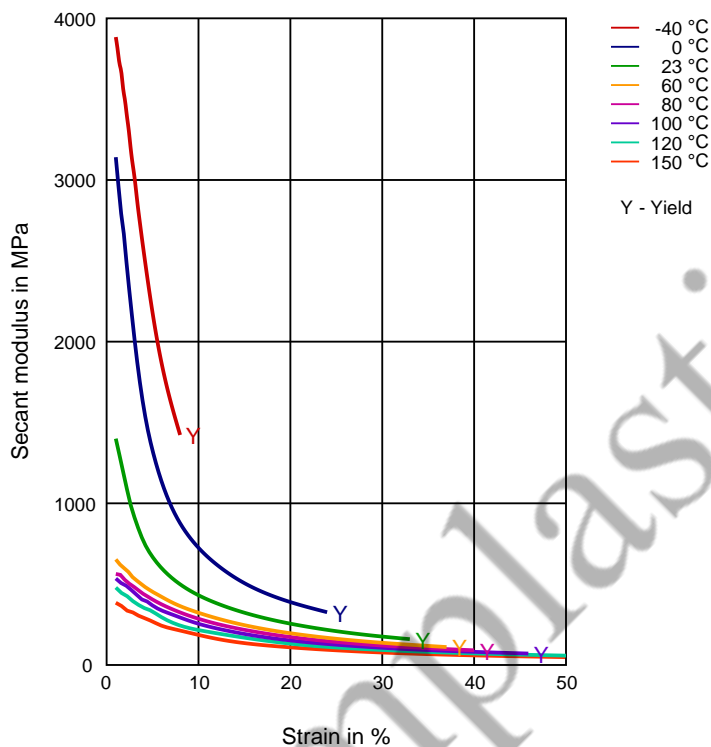
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Secant modulus-strain (cond.)



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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)
- ✗ 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)
- ✗ 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).

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 (Hytrell® 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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