

# DuPont™ Zytel® 70G13HS1L 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® 70G13HS1L NC010 is a 13% glass fiber reinforced, heat stabilised polyamide 66 resin for injection moulding.**

General information	Value	Unit	Test Standard
Resin Identification	PA66-GF13	-	ISO 1043
Part Marking Code	PA66-GF13	-	ISO 11469
Rheological properties	dry / cond	Unit	Test Standard
Moulding shrinkage, parallel	0.7 / -	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.2 / -	%	ISO 294-4, 2577
Mechanical properties	dry / cond	Unit	Test Standard
Tensile Modulus	5500 / 3500	MPa	ISO 527-1/-2
Stress at break	120 / 75	MPa	ISO 527-1/-2
Strain at break	3 / 13	%	ISO 527-1/-2
Flexural Modulus	4900 / 2900	MPa	ISO 178
Flexural Strength	190 / 100	MPa	ISO 178
Poisson's ratio	0.35 / 0.37	-	ISO 527-1/-2
Tensile creep modulus			ISO 899-1
1h	* / 3300	MPa	
1000h	* / 2200	MPa	
Charpy impact strength			ISO 179/1eU
23°C	32 / 70	kJ/m <sup>2</sup>	
-30°C	30 / 30	kJ/m <sup>2</sup>	
Charpy notched impact strength			ISO 179/1eA
23°C	5 / 6	kJ/m <sup>2</sup>	
-30°C	- / 4	kJ/m <sup>2</sup>	
-40°C	4.5 / -	kJ/m <sup>2</sup>	
Izod notched impact strength			ISO 180/1A
23°C	4.5 / 4	kJ/m <sup>2</sup>	
-30°C	4.5 / 3	kJ/m <sup>2</sup>	
-40°C	4.5 / 3	kJ/m <sup>2</sup>	
Izod impact strength			ISO 180/1U
23°C	40 / 55	kJ/m <sup>2</sup>	
-30°C	35 / 28	kJ/m <sup>2</sup>	
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 / -	°C	ISO 11357-1/-2
Temp. of deflection under load			ISO 75-1/-2
1.8 MPa	238 / *	°C	
0.45 MPa	258 / *	°C	
Coeff. of linear therm. expansion, parallel	40 / *	E-6/K	ISO 11359-1/-2

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Coeff. of linear therm. expansion			ISO 11359-1/-2
normal	93 / *	E-6/K	
Normal, -40-23°C	77 / *	E-6/K	
Normal, 55-160°C	149 / *	E-6/K	
Parallel, -40-23°C	42 / *	E-6/K	
Parallel, 55-160°C	26 / *	E-6/K	
Thermal conductivity of melt	0.16	W/(m K)	-
Spec. heat capacity of melt	2370	J/(kg K)	-
Eff. thermal diffusivity	8.5E-8	m <sup>2</sup> /s	-
RTI, electrical			UL 746B
0.75mm	140 / *	°C	
1.5mm	140 / *	°C	
3mm	140	°C	
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	0.71 / *	mm	IEC 60695-11-10
UL recognition	yes / *	-	UL 94
FMVSS Class	B	-	ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	26	mm/min	ISO 3795 (FMVSS 302)
<b>Electrical properties</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>
Dissipation factor			IEC 60250
100Hz	70 / 2400	E-4	
1MHz	70 / 2400	E-4	
Volume resistivity	>1E13 / -	Ohm*m	IEC 60093
<b>Other properties</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>
Humidity absorption, 2mm	2.2 / *	%	Sim. to ISO 62
Water absorption, 2mm	7.6 / *	%	Sim. to ISO 62
Density	1230 / -	kg/m <sup>3</sup>	ISO 1183
Water Absorption, Immersion 24h	1.7 / *	%	Sim. to ISO 62
<b>VDA Properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Emission of organic compounds	6	µgC/g	VDA 277
<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	-

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Ejection temperature 210 °C -

### Characteristics

Processing	• Injection Moulding		
Delivery form	• Pellets		
Additives	• Lubricants	• Release agent	
Special characteristics	• Heat stabilised or stable to heat		
Regional Availability	• North America • Europe	• Asia Pacific • South and Central America	• Near East/Africa • Global

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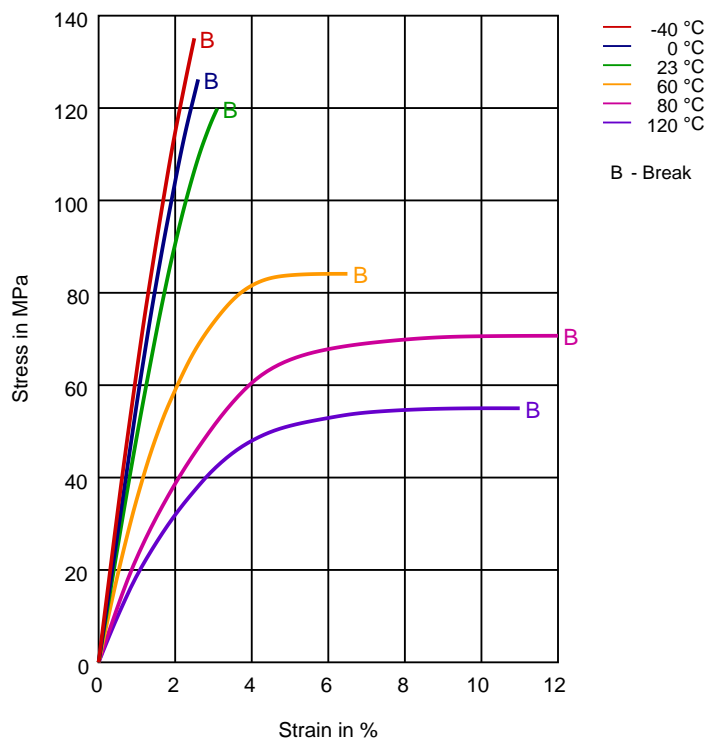


# DuPont™ Zytel® 70G13HS1L NC010

## NYLON RESIN

Diagrams

Stress-strain (dry)(measured on Zytel® 70G13L NC010)



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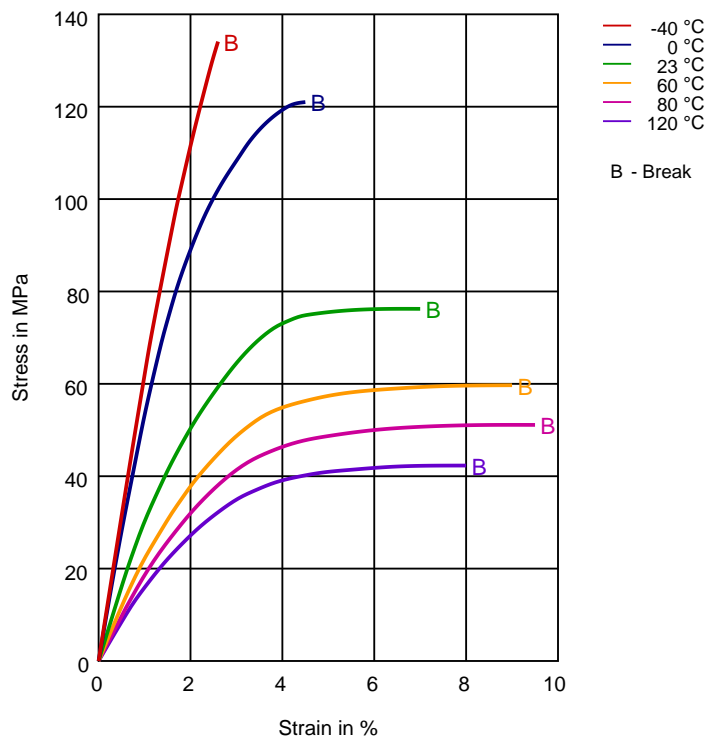
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# DuPont™ Zytel® 70G13HS1L NC010

## NYLON RESIN

Stress-strain (cond.)(measured on Zytel® 70G13L NC010)



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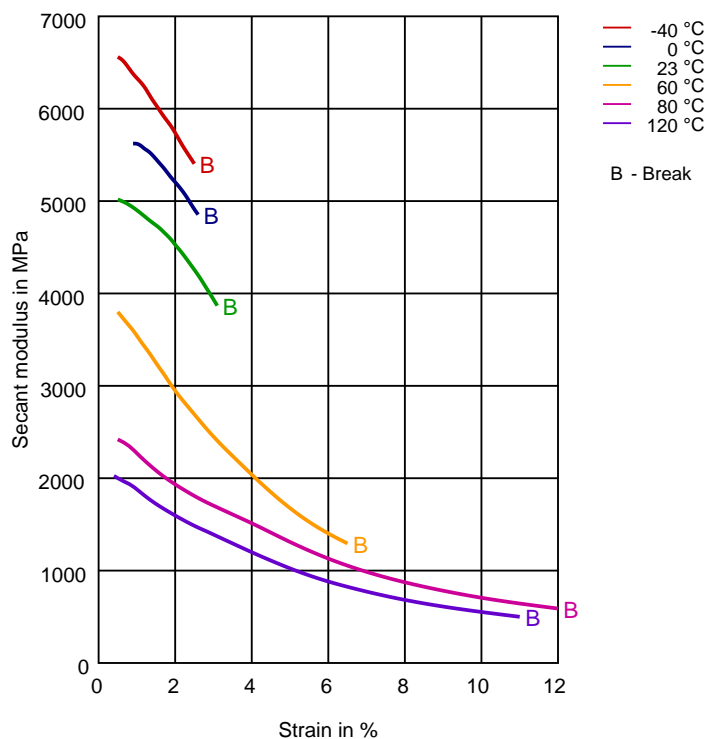
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# DuPont™ Zytel® 70G13HS1L NC010

## NYLON RESIN

Secant modulus-strain (dry)(measured on Zytel® 70G13L NC010)



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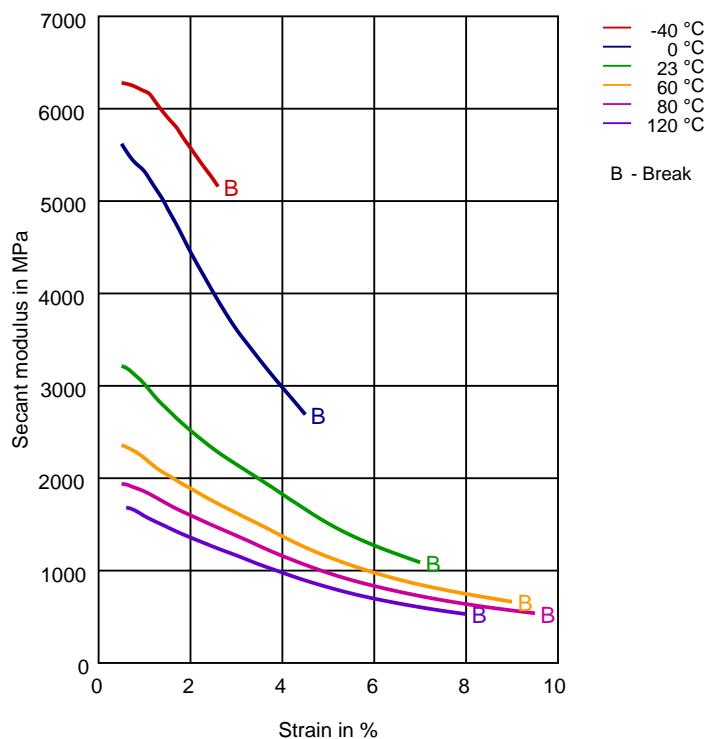
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# DuPont™ Zytel® 70G13HS1L NC010

## NYLON RESIN

Secant modulus-strain (cond.)(measured on Zytel® 70G13L NC010)



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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)

#### 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)

### 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 (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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