

# 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	-	-
Part Marking Code	>PA66<	-	ISO 11469
Rheological properties	dry / cond	Unit	Test Standard
Viscosity number	140 / *	cm <sup>3</sup> /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 <sup>2</sup>	
-30°C	400 / N	kJ/m <sup>2</sup>	
Charpy notched impact strength			ISO 179/1eA
23°C	6 / 13	kJ/m <sup>2</sup>	
-30°C	4.5 / 3	kJ/m <sup>2</sup>	
Izod notched impact strength			ISO 180/1A
23°C	5.5 / 11	kJ/m <sup>2</sup>	
-30°C	6 / 4	kJ/m <sup>2</sup>	
-40°C	5.5 / -	kJ/m <sup>2</sup>	
Izod impact strength			ISO 180/1U
23°C	300 / N	kJ/m <sup>2</sup>	
-30°C	300 / -	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	60 / -	°C	ISO 11357-1/-2
Temp. of deflection under load			ISO 75-1/-2
1.8 MPa	70 / *	°C	
0.45 MPa	200 / *	°C	

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

#### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

#### Asia Pacific

Tel: +81 3 5521 8600

#### Europe/Middle East/Africa

Tel: +41 22 717 51 11



# DuPont™ Zytel® 101F NC010

## NYLON RESIN

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 <sup>2</sup> /s	-
RTI, electrical			UL 746B
0.75 mm	130 / *	°C	
1.5mm	130 / *	°C	
RTI, impact			UL 746B
0.75 mm	75	°C	
1.5mm	75 / *	°C	
RTI, strength			UL 746B
0.75 mm	85	°C	
1.5mm	85 / *	°C	
<b>Flammability</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>
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	UL / *	-	-
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	
<b>Electrical properties</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>
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
Dielectric Strength, Short Time, 3.2mm (0.126in)	16.5 / -	kV/mm	ASTM D 149
Dielectric Constant, 1000 Hz	3.9 / 7	-	ASTM D 150
Dissipation Factor, 1000 Hz	200 / 200	E-4	ASTM D 150
Surface Resistivity	1E12 / -	Ohm	ASTM D 257
<b>Other properties</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>
Humidity absorption, 2mm	2.6 / *	%	Sim. to ISO 62
Water absorption, 2mm	8.5 / *	%	Sim. to ISO 62
Density	1140 / -	kg/m <sup>3</sup>	ISO 1183
Density of melt	970	kg/m <sup>3</sup>	-
<b>Film Properties</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>
Strain at yield, parallel	4.5 / *	%	ISO 527-3
<b>VDA Properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Emission of organic compounds	6.5	µgC/g	VDA 277
Odour	3	class	VDA 270

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

### Asia Pacific

Tel: +81 3 5521 8600

### Europe/Middle East/Africa

Tel: +41 22 717 51 11



# DuPont™ Zytel® 101F NC010

## NYLON RESIN

### 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

### Processing Texts

#### Injection molding

##### PREPROCESSING

Drying recommended = Yes, if moisture content of resin exceeds recommended level

Drying temperature = 80 °C

Drying time, dehumidified dryer = 2-4 h

Processing moisture content = <0.2 %

##### PROCESSING

Melt temperature optimum = 290 °C

Melt temperature range = 280-300 °C

Mould temperature optimum = 70 °C

Mould temperature range = 50-90 °C

Maximum Screw tangential Speed : 0.4 m/s

Flow front speed : 300 mm/s

Hold pressure optimum : 85 MPa

Hold pressure range : 50-100 MPa

Back pressure : low

Hold pressure time : 4 s/mm

Maximum hold-up time : 15 min

#### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

#### Asia Pacific

Tel: +81 3 5521 8600

#### Europe/Middle East/Africa

Tel: +41 22 717 51 11

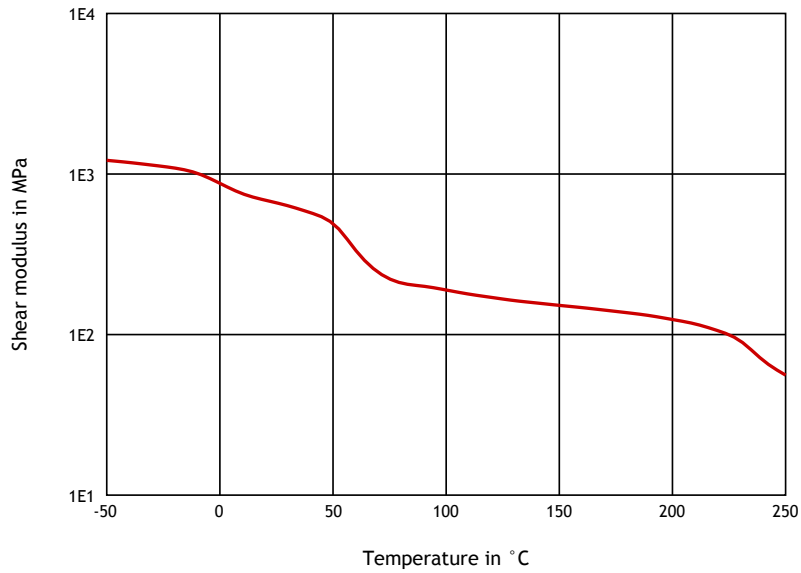


# DuPont™ Zytel® 101F NC010

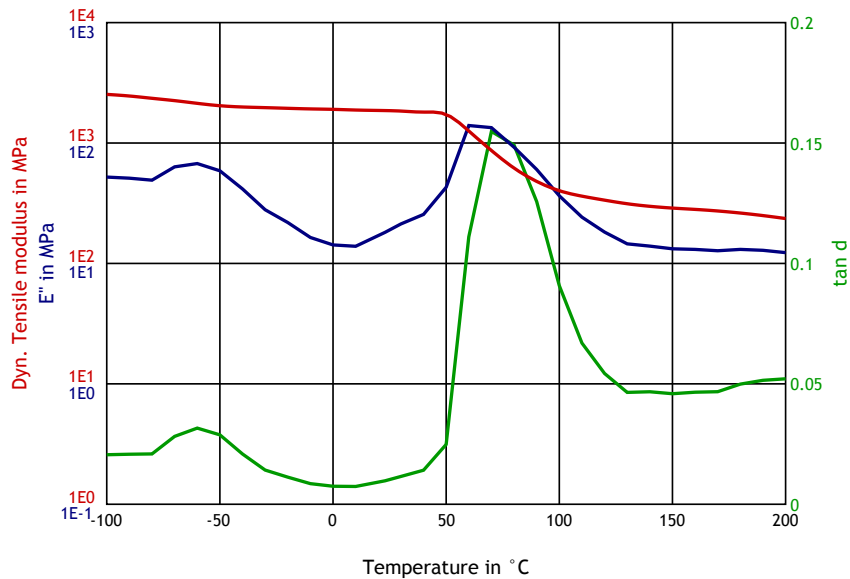
## NYLON RESIN

### Diagrams

#### Dynamic Shear modulus-temperature (cond.)



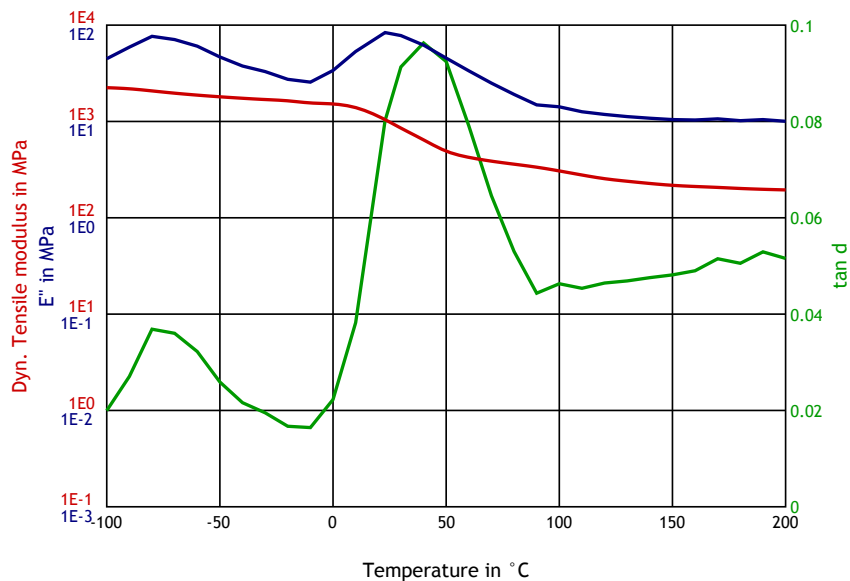
#### Dynamic Tensile modulus-temperature (dry)



# DuPont™ Zytel® 101F NC010

## NYLON RESIN

Dynamic Tensile modulus-temperature (cond.)



To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

### Asia Pacific

Tel: +81 3 5521 8600

### Europe/Middle East/Africa

Tel: +41 22 717 51 11



# DuPont™ Zytel® 101F NC010

## NYLON 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)
- ✗ 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)

Revised: 2014-05-21

Page: 6 of 8

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

#### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

#### Asia Pacific

Tel: +81 3 5521 8600

#### Europe/Middle East/Africa

Tel: +41 22 717 51 11



Copyright 2014 DuPont. The DuPont Oval Logo is a trademark or registered trademark of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.

# DuPont™ Zytel® 101F NC010

## NYLON RESIN

- ✓ 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 4.0mm (Hytrel® measured at 2 mm), IEC Electrical properties measured at 2.0mm, all ASTM properties measured at 3.2mm, and test temperatures are 23°C unless otherwise stated.

The information set forth herein is furnished free of charge and is based on technical data that DuPont believes to be reliable and falls within the normal range of properties. It is intended for use by persons having technical skill, at their own discretion and risk. This data 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. 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 in medical applications involving permanent implantation in the human body. For other medical applications, discuss with your DuPont customer representative and read Medical Caution H-50103-4.

Revised: 2014-05-21

Page: 7 of 8

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

#### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

#### Asia Pacific

Tel: +81 3 5521 8600

#### Europe/Middle East/Africa

Tel: +41 22 717 51 11



Copyright 2014 DuPont. The DuPont Oval Logo is a trademark or registered trademark of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.

# DuPont™ Zytel® 101F NC010

## NYLON RESIN

Copyright © 2014 DuPont or its affiliates. All Rights Reserved. The DuPont Oval Logo, DuPont™, The miracles of science™ and all products denoted with ® or ™ are registered trademarks or trademarks of E.I. du Pont de Nemours and Company or its affiliates.

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

**North America**

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

**Asia Pacific**

Tel: +81 3 5521 8600

**Europe/Middle East/Africa**

Tel: +41 22 717 51 11

