

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

General information	Value	Unit	Test Standard
Resin Identification	PA66-GF33	-	-
Part Marking Code	>PA66-GF33<	-	ISO 11469
Rheological properties	dry / cond	Unit	Test Standard
Viscosity number	130 / *	cm ³ /g	ISO 307, 1157, 1628
Moulding shrinkage, parallel	0.3 / *	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.1 / *	%	ISO 294-4, 2577
Mechanical properties	dry / cond	Unit	Test Standard
Tensile Modulus	10500 / 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	9300 / 6210	MPa	ISO 178
Flexural Strength	290 / 200	MPa	ISO 178
Tensile creep modulus			ISO 899-1
1h	* / 8000	MPa	
1000h	* / 5500	MPa	
Charpy impact strength			ISO 179/1eU
23 °C	85 / 100	kJ/m ²	
-30 °C	70 / 75	kJ/m ²	
Charpy notched impact strength			ISO 179/1eA
23 °C	13 / 17	kJ/m ²	
-30 °C	10 / 10	kJ/m ²	
-40 °C	10 / 10	kJ/m ²	
Izod notched impact strength			ISO 180/1A
23 °C	12 / 15	kJ/m ²	
-30 °C	10 / 10	kJ/m ²	
-40 °C	10 / 10	kJ/m ²	
Izod impact strength			ISO 180/1U
23 °C	80 / 90	kJ/m ²	
-30 °C	70 / 70	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	80 / -	°C	ISO 11357-1/-2
Temp. of deflection under load			ISO 75-1/-2
1.8 MPa	252 / *	°C	
0.45 MPa	261 / *	°C	
Coeff. of linear therm. expansion, parallel	18 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	83 / *	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.22	W/(m K)	-
Spec. heat capacity solid	1330	J/(kg K)	-
Spec. heat capacity of melt	2210	J/(kg K)	-

Revised: 2014-06-11

Page: 1 of 11

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® 70G33HS1L NC010

NYLON RESIN

RTI, electrical				UL 746B
0.75 mm	140 / *	°C		
1.5mm	140 / *	°C		
RTI, impact				UL 746B
0.75 mm	125	°C		
1.5mm	125 / *	°C		
RTI, strength				UL 746B
0.75 mm	140	°C		
1.5mm	140 / *	°C		
Flammability	dry / cond	Unit	Test Standard	
Burning Behav. at 1.5mm nom. thickn.	HB / *	class	IEC 60695-11-10	
Thickness tested	1.5 / *	mm	IEC 60695-11-10	
UL recognition	UL / *	-	-	
Burning Behav. at thickness h	HB / *	class	IEC 60695-11-10	
Thickness tested	0.75 / *	mm	IEC 60695-11-10	
UL recognition	UL / *	-	-	
Oxygen index	24 / *	%	ISO 4589-1/-2	
Glow Wire Flammability Index			IEC 60695-2-1/2	
0.75mm	725 / -	°C		
1.5mm	700 / -	°C		
3mm	800 / -	°C		
Glow Wire Ignition Temperature			IEC 60695-2-1/3	
0.75mm	750 / -	°C		
1.5mm	725 / -	°C		
3mm	825 / -	°C		
Burning rate, Thickness 1 mm	28 ^[1]	mm/min	ISO 3795 (FMVSS 302)	
1: SE/B				
Electrical properties	dry / cond	Unit	Test Standard	
Relative permittivity			IEC 60250	
100Hz	4.2 / -	-		
1MHz	4 / -	-		
Dissipation factor			IEC 60250	
100Hz	100 / -	E-4		
1MHz	150 / -	E-4		
Volume resistivity	1E13 / 1E9	Ohm*m	IEC 60093	
Surface resistivity	* / 1E15	Ohm	IEC 60093	
Comparative tracking index				
Comparative tracking index	400 / -	-	IEC 60112	
3.0mm	1 / -	PLC	UL 746A	
Electric Strength, Short Time				
2mm	27 / -	kV/mm	IEC 60243-1	
3.2mm (0.126in)	20.9 / -	kV/mm	ASTM D 149	
Dielectric Constant			ASTM D 150	
1 MHz	3.7 / -	-		
1000 Hz	4.5 / -	-		
Dissipation Factor, 1 MHz	0.02 / -	E-4	ASTM D 150	
Other properties	dry / cond	Unit	Test Standard	
Humidity absorption, 2mm	1.8 / *	%	Sim. to ISO 62	
Water absorption, 2mm	5.7 / *	%	Sim. to ISO 62	
Density	1390 / -	kg/m ³	ISO 1183	
Water Absorption, Immersion 24h	1.2 / *	%	ASTM D 570	
VDA Properties	Value	Unit	Test Standard	
Emission of organic compounds	6	µgC/g	VDA 277	
Characteristics				
Processing	• Injection Moulding			

Revised: 2014-06-11

Page: 2 of 11

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® 70G33HS1L NC010

NYLON RESIN

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

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 = 295°C

Melt temperature range = 285-305°C

Mould temperature optimum = 100°C

Mould temperature range = 70-120°C

Maximum Screw tangential Speed : 0.15 m/s

Flow front speed : 150 mm/s

Hold pressure optimum : 85 MPa

Hold pressure range : 50-100 MPa

Back pressure : low

Hold pressure time : 2.5 s/mm

Maximum hold-up time : 15 min

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

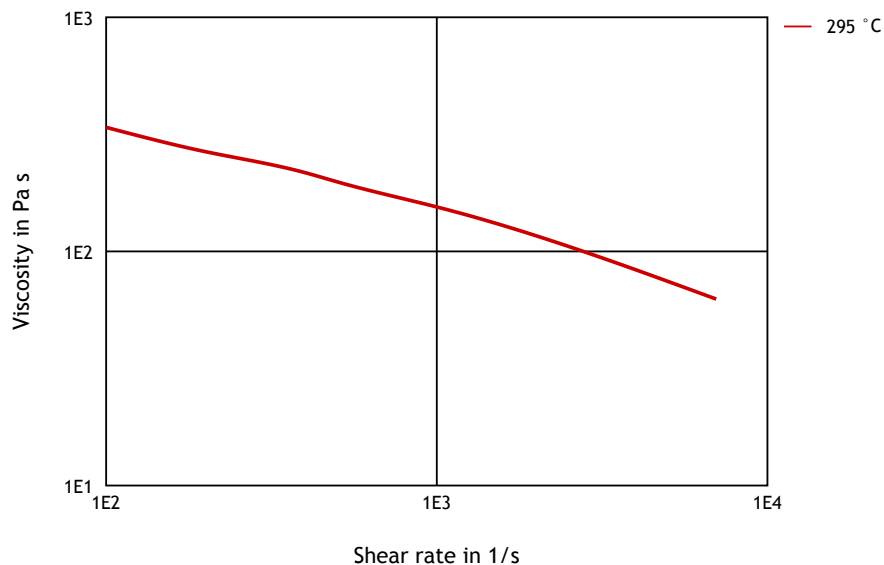


DuPont™ Zytel® 70G33HS1L NC010

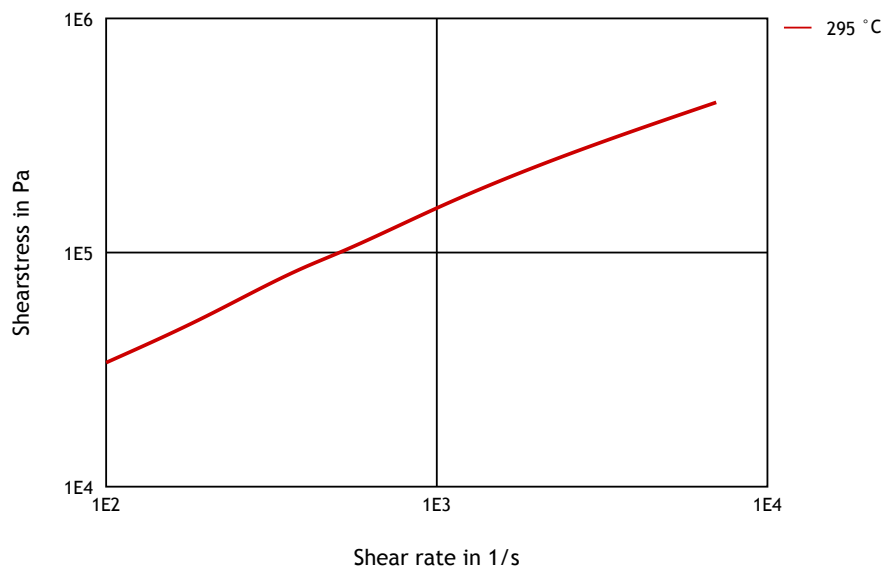
NYLON RESIN

Diagrams

Viscosity-shear rate



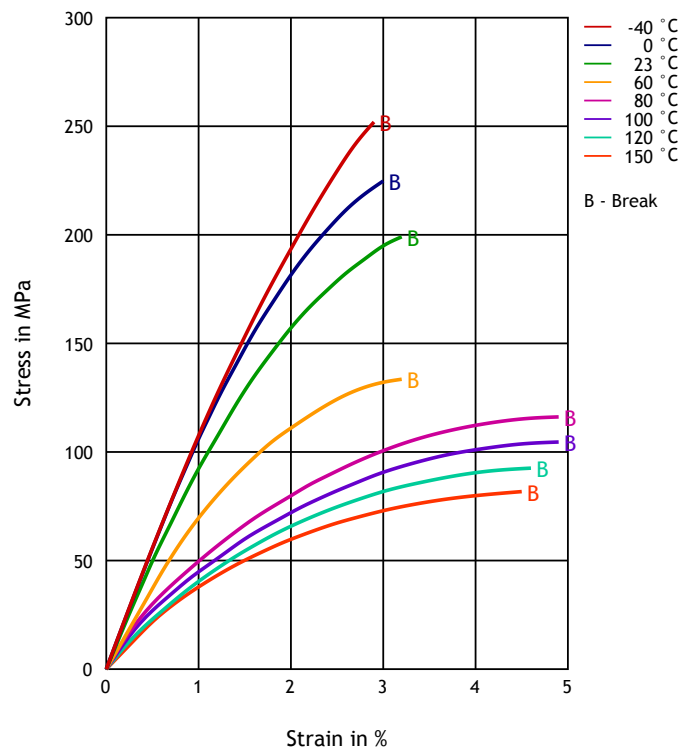
Shearstress-shear rate



DuPont™ Zytel® 70G33HS1L NC010

NYLON RESIN

Stress-strain (dry)



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

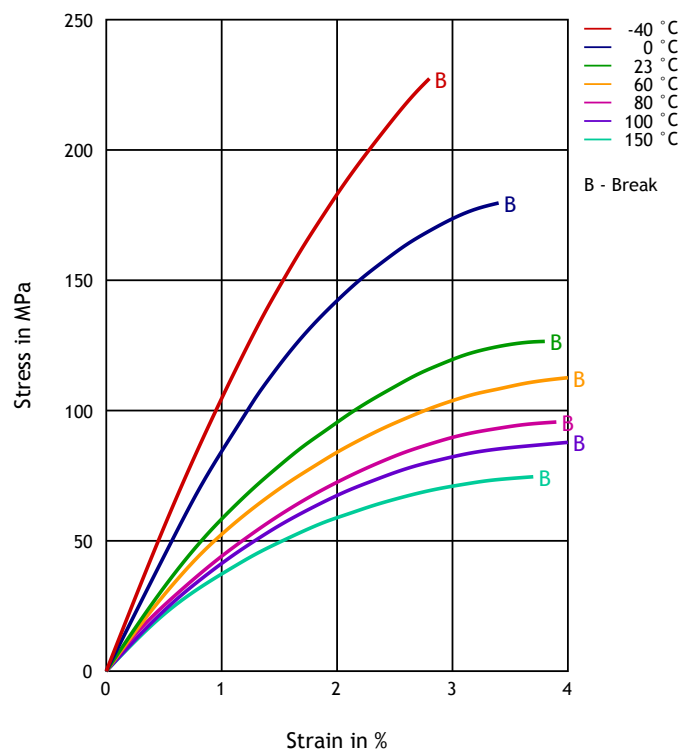
Tel: +41 22 717 51 11



DuPont™ Zytel® 70G33HS1L NC010

NYLON RESIN

Stress-strain (cond.)



Revised: 2014-06-11

Page: 6 of 11

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

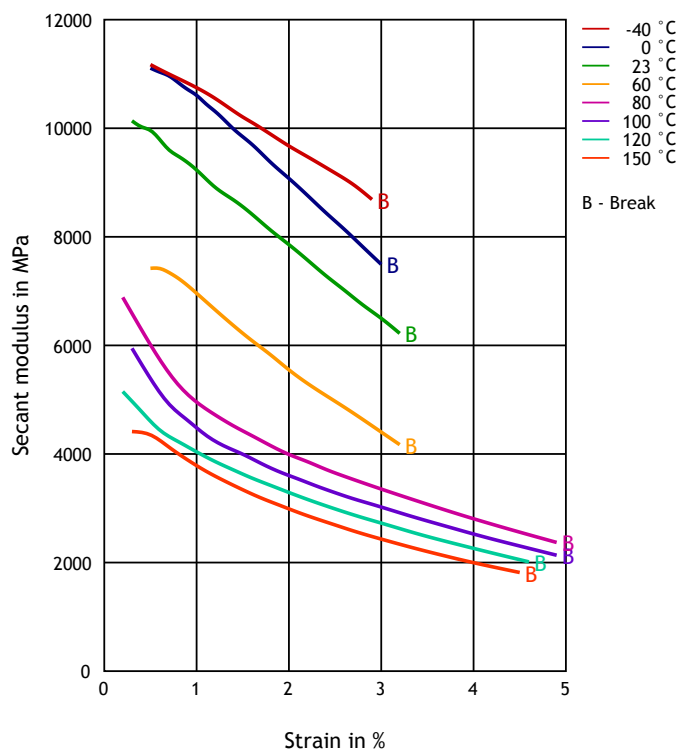


Copyright 2014 DuPont. The DuPont Oval Logo is a trademark or registered trademark of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.

DuPont™ Zytel® 70G33HS1L NC010

NYLON RESIN

Secant modulus-strain (dry)



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

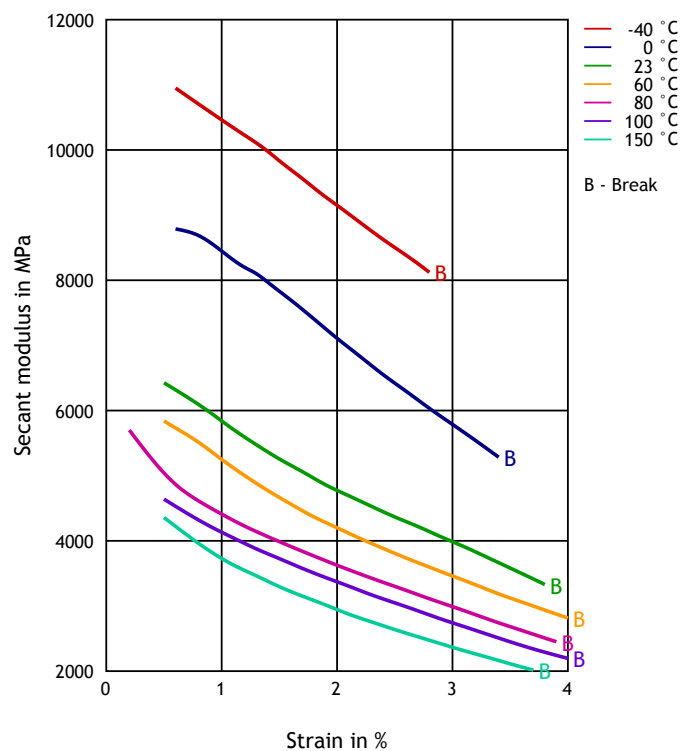
Tel: +41 22 717 51 11



DuPont™ Zytel® 70G33HS1L NC010

NYLON RESIN

Secant modulus-strain (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® 70G33HS1L 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: 2014-06-11

Page: 9 of 11

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® 70G33HS1L 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: 2014-06-11

Page: 10 of 11

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® 70G33HS1L 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

