

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, we recommend, 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® 70G33L NC010 is a 33% glass fiber reinforced polyamide 66 resin for injection moulding.

### Product information

Resin Identification Part Marking Code	PA66-GF33 >PA66-GF33<		ISO 1043 ISO 11469
ISO designation	ISO 16396-PA66		
Rheological properties	dry/cond.		
Viscosity number	157/*	cm <sup>3</sup> /g	ISO 307, 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	10000/8000	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	200/140	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	3.5/5	%	ISO 527-1/-2
Flexural modulus	9000/6000	MPa	ISO 178
Flexural strength	290/200	MPa	ISO 178
Compressive strength	240/-	MPa	ISO 604
Shear Strength	90/-	MPa	ASTM D 732
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
Izod notched impact strength, 23°C	12/15	kJ/m²	ISO 180/1A
Izod notched impact strength, -30°C	10.0/10.0	kJ/m²	ISO 180/1A
Izod notched impact strength, -40°C	10.0/10.0	kJ/m²	ISO 180/1A
Izod impact strength, 23°C	80/90	kJ/m²	ISO 180/1U
Izod impact strength, -30 °C	70/70	kJ/m²	ISO 180/1U
Hardness, Rockwell, M-scale	101/-		ISO 2039-2
Poisson's ratio	0.34/0.34		
Abrasion resistance	10/*	mm <sup>3</sup>	ISO 4649

Printed: 2024-04-11



NYLON RESIN

Thermal properties	dry/cond.		
Melting temperature, 10°C/min	262/*	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	80/20	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	252/*	°Č	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	261/*	°C	ISO 75-1/-2
Coeff. of linear therm. expansion, parallel, -40-23°C	24/*	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion	18/*	E-6/K	ISO 11359-1/-2
(CLTE), parallel	107		
Coeff. of linear therm. expansion, parallel, 55-160°C	13/*	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, -40-23°C	65/*	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE),	83/*	E-6/K	ISO 11359-1/-2
normal	007		
Coefficient of linear thermal expansion	140/*	E-6/K	ISO 11359-1/-2
(CLTE), normal, 55-160 °C	1407		100 11003 1/ 2
Thermal conductivity of melt	0.22	W/(mK)	ISO 22007-2
Specific heat capacity of melt	2210	J/(kg K)	ISO 22007-4
Specific heat capacity solid	1330 <sup>[C]</sup>	J/(kg K)	ISO 22007-4
RTI, electrical, 0.75mm	130	°C	UL 746B
RTI, electrical, 1.5mm	130	°C	UL 746B
RTI, electrical, 3.0mm	130	°C	UL 746B
RTI, impact, 0.75mm	120	°C	UL 746B
RTI, impact, 1.5mm	120	°C	UL 746B
RTI, impact, 3.0mm	120	°C	UL 746B
RTI, strength, 0.75mm	130	°C	UL 746B
RTI, strength, 1.5mm	130/*	°C	UL 746B
RTI, strength, 3.0mm	1307	°C	UL 746B
-	130		UL 746B
[C]: Calculated			
Flammability	dry/cond.		
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
Oxygen index	24/*	%	ISO 4589-1/-2
FMVSS Class	SE/B		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	28	mm/min	ISO 3795 (FMVSS 302)
Electrical properties	dir (a ciad		
	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/-	Ohm.m	IEC 62631-3-1
Comparative tracking index	600/-		IEC 60112
Electric Strength, Short Time, 1mm	37/-	kV/mm	IEC 60243-1

Printed: 2024-04-11



## Zytel® 70G33L NC010

### NYLON RESIN

Physical/Other properties	dry/cond.		
Humidity absorption, 2mm Water absorption, 2mm Water absorption, Immersion 24h Density [1]: 2mm thickness	1.8/* 5.7/* 1.2 <sup>[1]</sup> /* 1390/-	% % kg/m <sup>3</sup>	Sim. to ISO 62 Sim. to ISO 62 Sim. to ISO 62 ISO 1183
VDA Properties	dry/cond.		
Emission of organic compounds Odour Fogging, F-value (refraction) Fogging, G-value (condensate)	6 4.5 95/* 0.3/*	μgC/g class % mg	VDA 277 VDA 270 ISO 6452 ISO 6452
Injection			
Drying Recommended Drying Temperature Drying Time, Dehumidified Dryer Processing Moisture Content Melt Temperature Optimum Min. melt temperature Max. melt temperature Screw tangential speed Mold Temperature Optimum Min. mould temperature Max. mould temperature Hold pressure range Hold pressure time Ejection temperature	2 - 4 ≤0.2 300 290 305 ≤0.2 95 65 120 50 - 100	% °C °C m/s °C °C °C MPa s/mm	

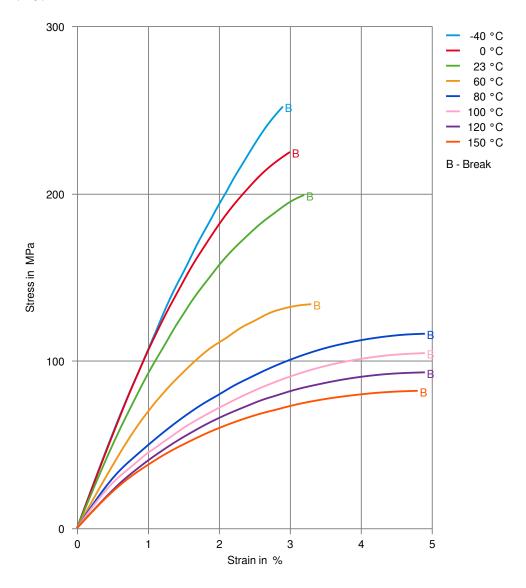
### Characteristics

Additives

Release agent

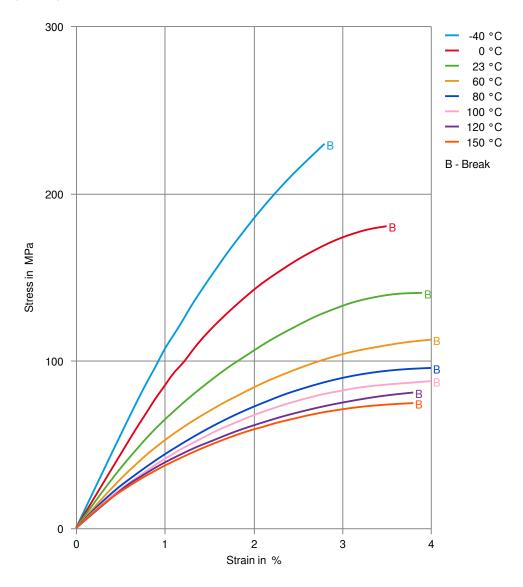


### Stress-strain (dry)



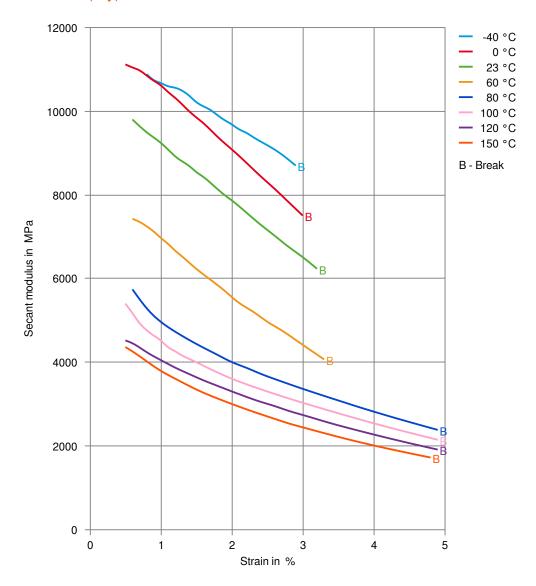


### Stress-strain (cond.)



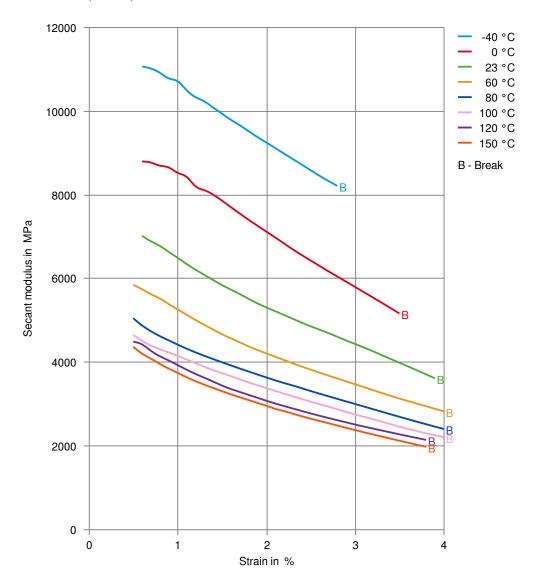


### Secant modulus-strain (dry)



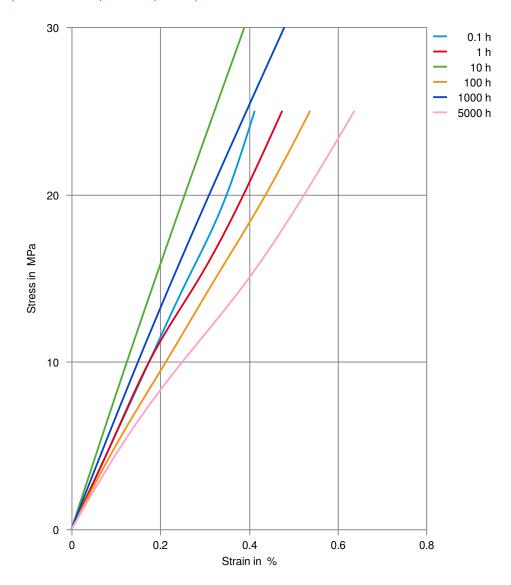


### Secant modulus-strain (cond.)



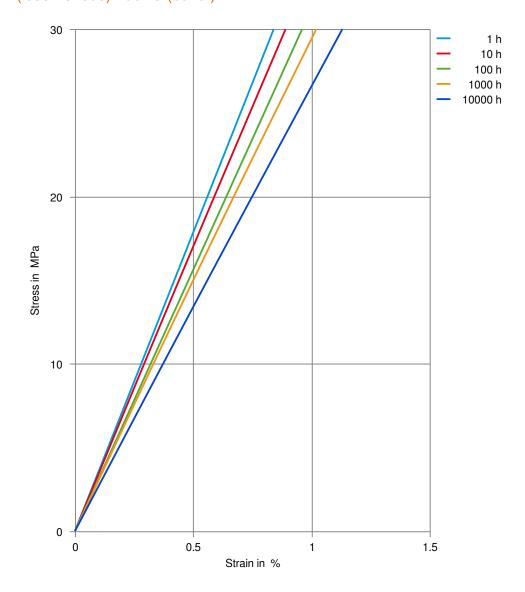


### Stress-strain (isochronous) 23°C (cond.)



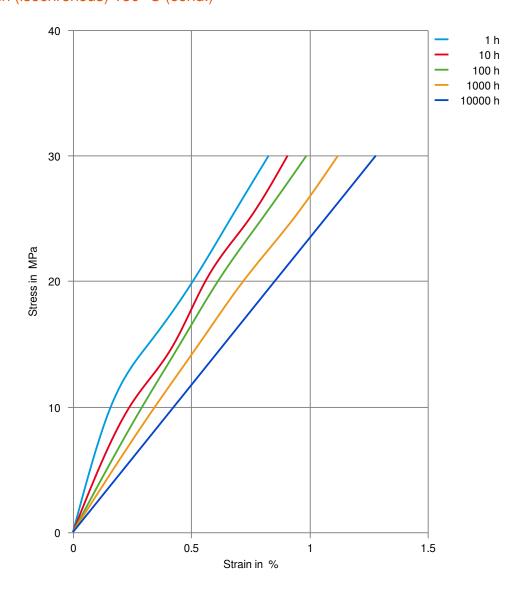


### Stress-strain (isochronous) 100°C (cond.)



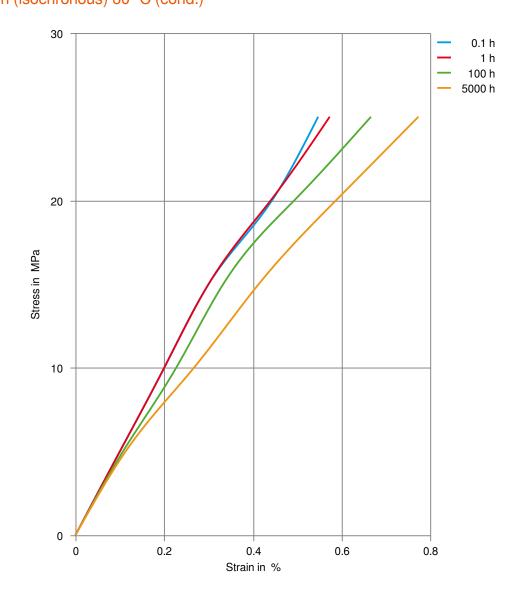


## Stress-strain (isochronous) 150°C (cond.)





## Stress-strain (isochronous) 60 °C (cond.)





### **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°C
- X Sulfuric Acid (38% by mass), 23 °C
- X Sulfuric Acid (5% by mass), 23°C
- X 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
- ✓ 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

Printed: 2024-04-11



### NYLON RESIN

- 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
- X 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).

X 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).

Printed: 2024-04-11

Page: 13 of 13

#### Revised: 2022-03-09 Source: Celanese Materials Database

NOTICE TO USERS: Values shown are based on testing of laboratory test specimens and represent data that fall within the standard range of properties for natural material. These values alone do not represent a sufficient basis for any part design and are not intended for use in establishing maximum, minimum, or ranges of values for specification purposes. Colourants or other additives may cause significant variations in data values. Properties of moulded parts can be influenced by a wide variety of factors including, but not limited to, material selection, additives, part design, processing conditions and environmental exposure. Other than those product expressly identified as medical grade (including by MT® product designation or otherwise), Celanese's products are not intended for use in medical or dental implants. Regardless of any such product designation, any determination of the suitability of a particular material and part design for any use contemplated by the users and the manner of such use is the sole responsibility of the users, who must assure themselves that the material as subsequently processed meets the needs of their particular product or use. To the best of our knowledge, the information contained in this publication is accurate; however, we do not assume any liability whatsoever for the accuracy and completeness of such investigate whether any existing patents are infringed by the use of the materials mentioned in this publication. Moreover, there is a need to reduce human exposure to many materials to the lowest practical limits in view of possible adverse effects. To the extent that any hazards may have been mentioned in this publication, we neither suggest nor guarantee that such hazards are the only ones that exist. We recommend that persons intending to rely on any recommendation or to use any equipment, processing technique or material mentioned in this publication should satisfy themselves that they can meet all applicable safety and health standards. We strongly recommend that users s

© 2024 Celanese or its affiliates. All rights reserved. Celanese®, registered C-ball design and all other trademarks identified herein with ®, TM, SM, unless otherwise noted, are trademarks of Celanese or its affiliates. Fortron is a registered trademark of Fortron Industries LLC. KEPITAL is a registered trademark of Korea Engineering Plastics Company, Ltd.