

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® 70G13HS1L BK031 is a 13% glass fiber reinforced, heat stabilised polyamide 66 resin for injection moulding.

#### **Product information**

Resin Identification Part Marking Code ISO designation	PA66-GF13 >PA66-GF13< ISO 16396-PA66,GF13,M1CGHR,S14-050		ISO 1043 ISO 11469
Rheological properties	dry/cond.	<b>0</b> .	
Viscosity number Moulding shrinkage, parallel Moulding shrinkage, normal [1]: formic acid	137 <sup>[1]/*</sup> 0.5/- 1.0/-	cm³/g % %	ISO 307, 1628 ISO 294-4, 2577 ISO 294-4, 2577
Typical mechanical properties	dry/cond.		
Tensile modulus Tensile stress at break, 5mm/min Tensile strain at break, 5mm/min Flexural modulus Flexural strength Flexural strength Flexural stress at 3.5% Charpy impact strength, 23°C Charpy notched impact strength, 23°C Charpy notched impact strength, -40°C Izod notched impact strength, -40°C Izod notched impact strength, -40°C	5500/3500 120/75 2.5/12 4900/2900 190/100 165/90 32/- 5/6 4.5/4 4.5/4 4.5/6 4.5/4.0 0.35/0.37	MPa MPa % MPa MPa kJ/m <sup>2</sup> kJ/m <sup>2</sup> kJ/m <sup>2</sup> kJ/m <sup>2</sup>	ISO 527-1/-2 ISO 527-1/-2 ISO 527-1/-2 ISO 178 ISO 178 ISO 179/1eU ISO 179/1eA ISO 179/1eA ISO 179/1eA ISO 180/1A
Thermal properties	dry/cond.		
Melting temperature, 10°C/min Glass transition temperature, 10°C/min Temperature of deflection under load, 1.8 MPa Temperature of deflection under load, 0.45 MPa Ball pressure test Coeff. of linear therm. expansion, parallel, -40-23°C	262/* 80/20 238/* 258/* 220/- 42/*	°C °C °C °C E-6/K	ISO 11357-1/-3 ISO 11357-1/-3 ISO 75-1/-2 ISO 75-1/-2 IEC 60695-10-2 ISO 11359-1/-2

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## Zytel® 70G13HS1L BK031

### NYLON RESIN

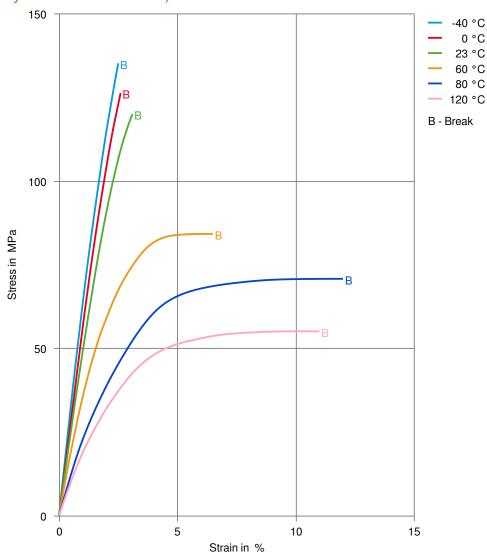
Coefficient of linear thermal expansion	40/*	E-6/K	ISO 11359-1/-2
(CLTE), parallel Coeff. of linear therm. expansion, parallel, 55-160°C	26/*	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, parallel, 55-160 C	20/ 77/*	E-6/K	ISO 11359-1/-2 ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE),	93/*	E-6/K	ISO 11359-1/-2 ISO 11359-1/-2
normal			
Coefficient of linear thermal expansion (CLTE), normal, 55-160°C	149/*	E-6/K	ISO 11359-1/-2
RTI, electrical, 0.75mm	140	°C	UL 746B
RTI, electrical, 1.5mm	140	°C	UL 746B
RTI, electrical, 3.0mm	140	°C	UL 746B
RTI, impact, 0.75mm	125	°C	UL 746B
RTI, impact, 1.5mm	125	°C	UL 746B
RTI, impact, 3.0mm	125	°C	UL 746B
RTI, strength, 0.75mm	140	°C	UL 746B
RTI, strength, 1.5mm	140/*	°Č	UL 746B
RTI, strength, 3.0mm	140	°C	UL 746B
Flammability	dry/cond.		
-	HB/*	class	IEC 60695-11-10
Burning Behav. at 1.5mm nom. thickn. Thickness tested			
	1.5/*	mm	IEC 60695-11-10
UL recognition	yes/*	ala a a	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	В	, .	ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	26	mm/min	ISO 3795 (FMVSS 302)
Physical/Other properties	dry/cond.		
Humidity absorption, 2mm	2.2/*	%	Sim. to ISO 62
Water absorption, 2mm	7.6/*	%	Sim. to ISO 62
Water absorption, Immersion 24h	1.7 <sup>[2]</sup> /*	%	Sim. to ISO 62
Density	1230/-	kg/m³	ISO 1183
[2]: 3.2mm wall thickness		C C	
VDA Properties			
Emission of organic compounds		6 μgC/g	VDA 277
Injection			
Drying Recommended	y	es	
Drying Temperature	Į	80 °C	
Drying Time, Dehumidified Dryer	2 -	-4 h	
Processing Moisture Content	≤0	0.2 %	
Melt Temperature Optimum	29	95 °C	
Min. melt temperature	28	85 °C	
Max. melt temperature		05 °C	
Screw tangential speed		).2 m/s	
Mold Temperature Optimum		0° 00	

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Min. mould temperature Max. mould temperature Hold pressure range Hold pressure time Ejection temperature

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



70 °C

3 s/mm

120 °C

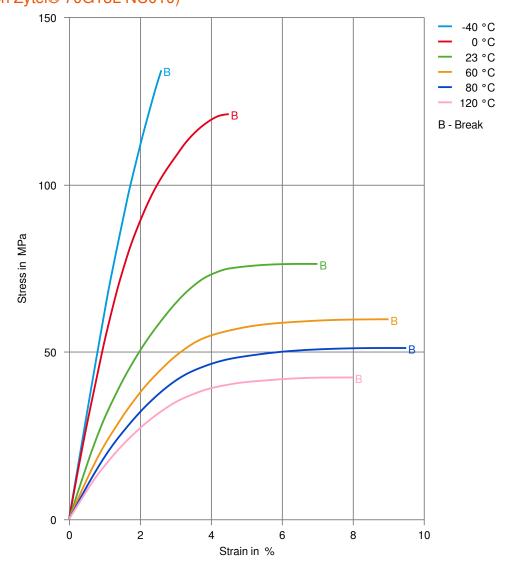
210 °C

50 - 100 MPa



## NYLON RESIN

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

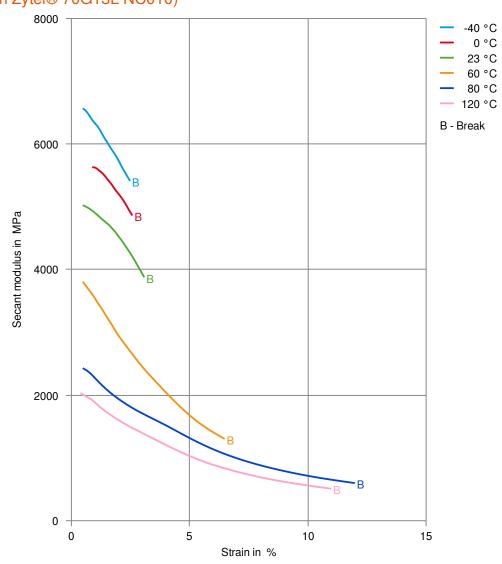




## Zytel® 70G13HS1L BK031

### NYLON RESIN

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

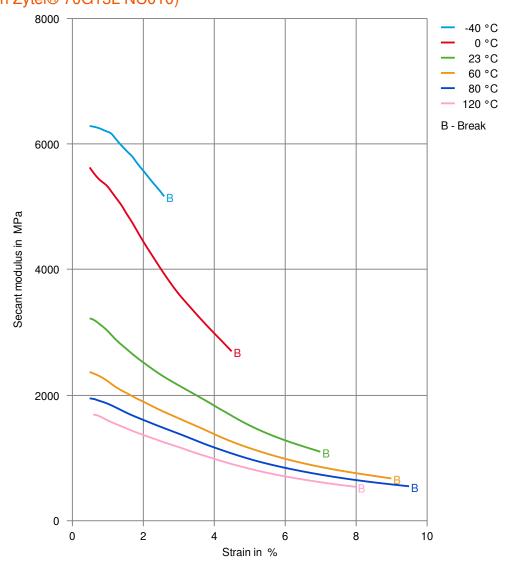




## Zytel® 70G13HS1L BK031

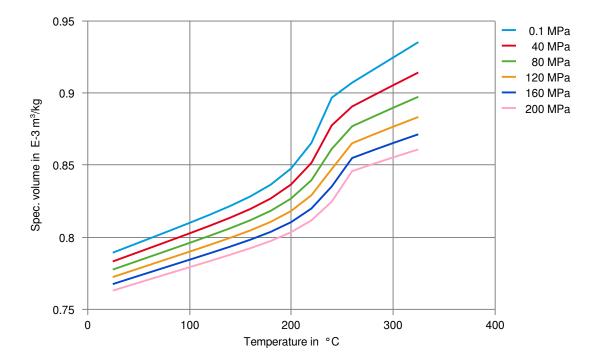
### NYLON RESIN

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





Specific volume-temperature (pvT)





#### **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
- ★ 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

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### 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
- ★ 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).

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#### Revised: 2022-12-02 Source: Celanese Materials Database

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