

Zytel® 103HSL NC010

NYLON RESIN

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® 103HSL NC010 is a heat stabilised, lubricated polyamide 66 resin for injection moulding.

Product information

Resin Identification Part Marking Code ISO designation	PA66 >PA66< ISO 16396-PA66		ISO 1043 ISO 11469
Rheological properties	dry/cond.		
Viscosity number	150 ^[1] /*	cm ³ /g	ISO 307, 1628
Moulding shrinkage, parallel	1.3/-	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.3/-	%	ISO 294-4, 2577
[1]: Sulfuric acid 96%			,
Typical mechanical properties	dry/cond.		
Tensile modulus	3100/1400	MPa	ISO 527-1/-2
Tensile stress at yield, 50mm/min	85/55	MPa	ISO 527-1/-2
Tensile strain at yield, 50mm/min	4.3/25	%	ISO 527-1/-2
Nominal strain at break	20/>50	%	ISO 527-1/-2
Tensile strain at break, 50mm/min	40/-	%	ISO 527-1/-2
Flexural modulus	2800 / 1300 ^{[DS}	^{S]} MPa	ISO 178
Flexural stress at 3.5%	95/65	MPa	ISO 178
Tensile creep modulus, 1h	*/1200	MPa	ISO 899-1
Tensile creep modulus, 1000h	*/650	MPa	ISO 899-1
Charpy impact strength, 23°C	N/N	kJ/m²	ISO 179/1eU
Charpy impact strength, -30°C	400/N	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	5.5/12	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30°C	4.5/3.5	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -40°C	2.5/2.5	kJ/m²	ISO 179/1eA
Izod notched impact strength, 23°C	5/10	kJ/m²	ISO 180/1A
Izod notched impact strength, -30°C	4.0/4.0	kJ/m²	ISO 180/1A
Izod notched impact strength, -40°C	4.0/3.5 ^[DS]	kJ/m²	ISO 180/1A
Izod impact strength, 23°C	N/N	kJ/m²	ISO 180/1U
Izod impact strength, -30°C	300/N	kJ/m²	ISO 180/1U
Ball indentation hardness, H 358/30	-/85	MPa	ISO 2039-1
Ball indentation hardness, H 961/30	180/-	MPa	ISO 2039-1
Poisson's ratio	0.37/0.43		

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[DS]: Derived from similar grade

Tribological properties	dry/cond.		
Coefficient of sliding friction, 1h against steel	-/0.6		ASTM 1894
Thermal properties	dry/cond.		
Melting temperature, 10°C/min	262/*	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	60/40	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	70/*	°C	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	200/*	°C	ISO 75-1/-2
Vicat softening temperature, 50°C/h 50N	240/*	°C	ISO 306
Coefficient of linear thermal expansion	100/*	E-6/K	ISO 11359-1/-2
(CLTE), parallel			
Coefficient of linear thermal expansion (CLTE),	110/*	E-6/K	ISO 11359-1/-2
normal			
Thermal conductivity of melt	0.16	W/(m K)	ISO 22007-2
Effective thermal diffusivity, flow	5E-8	m²/s	ISO 22007-4
Specific heat capacity of melt	2790	J/(kg K)	ISO 22007-4
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	95	°C	UL 746B
RTI, impact, 1.5mm	110	°C	UL 746B
RTI, impact, 3.0mm	110	°C	UL 746B
RTI, strength, 0.75mm	115	°C	UL 746B
RTI, strength, 1.5mm	125/*	°C	UL 746B
RTI, strength, 3.0mm	125	°C	UL 746B
Temperature index, tensile strength, 20 000h	120/*	°C	IEC 60216-1
Temperature index, tensile strength, 5000h	145/*	°C	IEC 60216-1
Flammability	dry/cond.		
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	yes/*		UL 94
Burning Behav. at thickness h	V-2/*	class	IEC 60695-11-10
Thickness tested	0.71/*	mm	IEC 60695-11-10
UL recognition	yes/*		UL 94
Oxygen index	28/*	%	ISO 4589-1/-2
Glow Wire Flammability Index, 0.75mm	850/-	°C	IEC 60695-2-12
Glow Wire Flammability Index, 1.5mm	960/-	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3.0mm	960/-	°C	IEC 60695-2-12
Glow Wire Ignition Temperature, 0.75mm	725/-	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 1.5mm	725/-	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 3.0mm	725/-	°C	IEC 60695-2-13
Glow Wire Temperature, No Flame, 0.75mm	700/-	°C	IEC 60335-1
Glow Wire Temperature, No Flame, 1mm	700/-	°C	IEC 60335-1
Glow Wire Temperature, No Flame, 1.5mm	700/-	°C	IEC 60335-1
Glow Wire Temperature, No Flame, 2mm	700/-	°C	IEC 60335-1

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Glow Wire Temperature, No Flame, 3mm FMVSS Class	700/- SE	°C	IEC 60335-1 ISO 3795 (FMVSS 302)
Electrical properties	dry/cond.		
Relative permittivity, 100Hz Relative permittivity, 1MHz Dissipation factor, 100Hz Dissipation factor, 1MHz Volume resistivity Electric strength Comparative tracking index Comparative tracking index, 3.0mm	3.8/12.8 3.5/4 75/5800 165/700 1E13/1E11 31/28 600/- 0/-	E-4 E-4 Ohm.m kV/mm	IEC 62631-2-1 IEC 62631-2-1 IEC 62631-2-1 IEC 62631-2-1 IEC 62631-3-1 IEC 60243-1 IEC 60112 UL 746A
Physical/Other properties	dry/cond.		
Humidity absorption, 2mm Water absorption, 2mm Water absorption, Immersion 24h Density Density of melt [2]: 3mm wall thickness	2.6/* 8.5/* 1.2 ^[2] /* 1140/- 980	% % % kg/m³ kg/m³	Sim. to ISO 62 Sim. to ISO 62 Sim. to ISO 62 ISO 1183
Film Properties	dry/cond.		
Strain at yield, parallel	4.5/*	%	ISO 527-3
VDA Properties			
Emission of organic compounds Odour		μgC/g class	VDA 277 VDA 270
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 Hold pressure range Hold pressure time Ejection temperature	2 - 4 ≤0.2 290 280 300 ≤0.4 70 40 95	% °C °C m/s °C °C C MPa s/mm	

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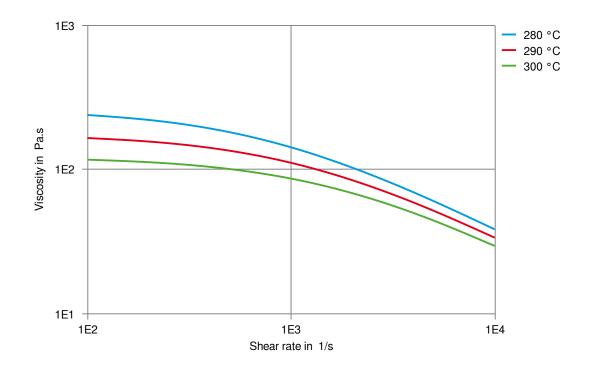


Characteristics

Additives

Release agent

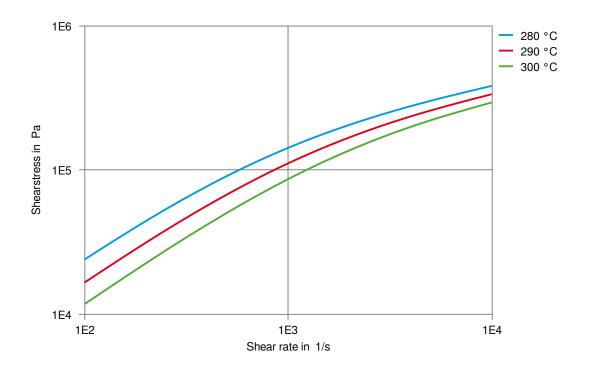
Viscosity-shear rate



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Shearstress-shear rate

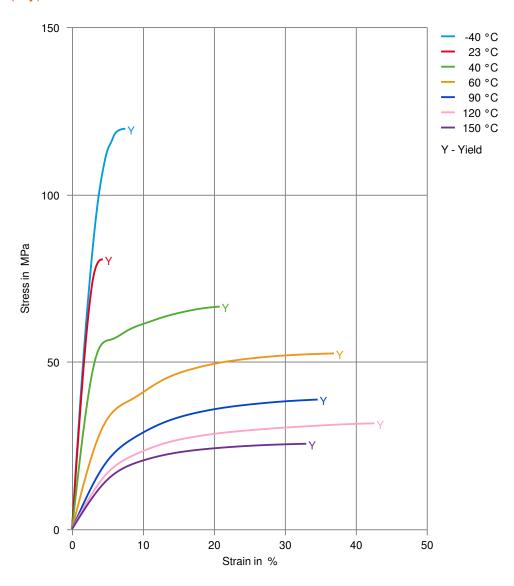


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Stress-strain (dry)

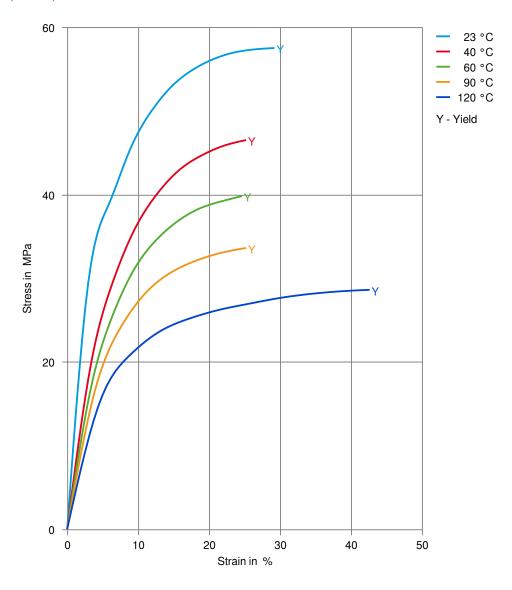


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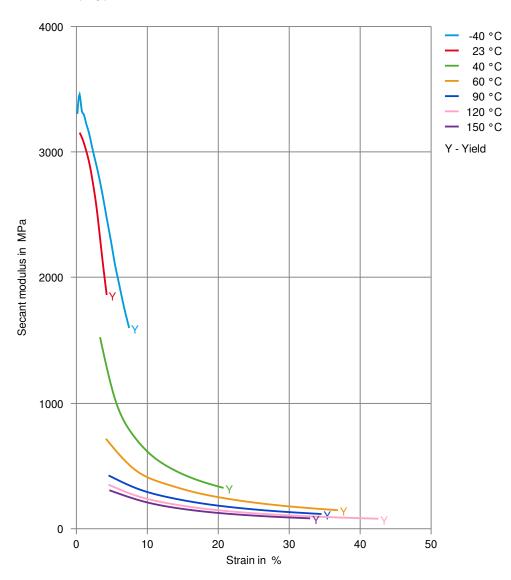
Stress-strain (cond.)



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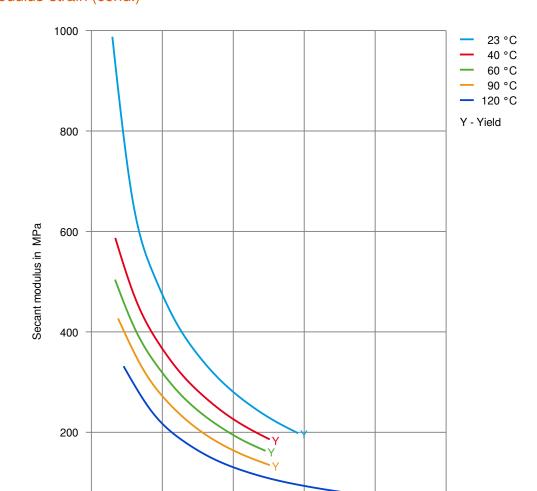
Secant modulus-strain (dry)



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Secant modulus-strain (cond.)



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10

20

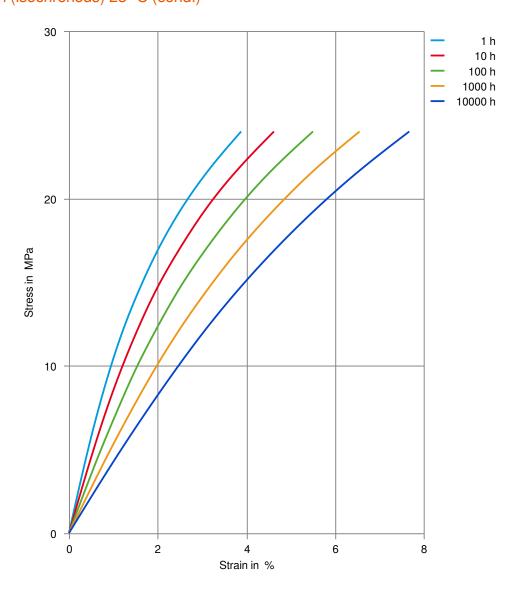
Strain in %

40

50



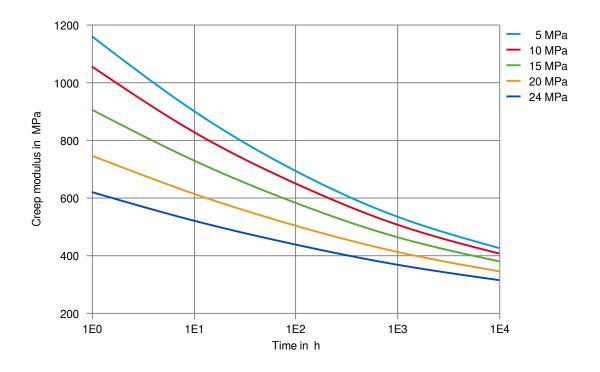
Stress-strain (isochronous) 23°C (cond.)



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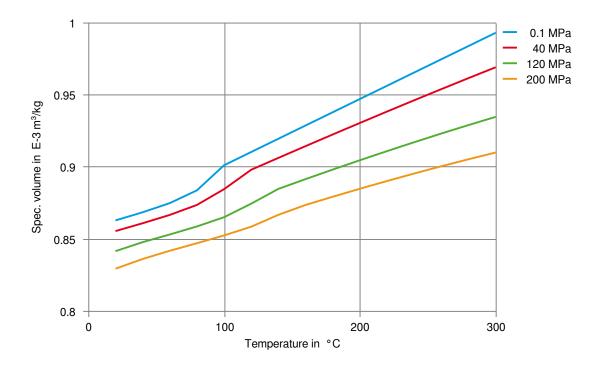
Creep modulus-time 23°C (cond.)



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Specific volume-temperature (pvT)



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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
- X 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

- X 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
- X Automatic hypoid-gear oil Shell Donax TX, 135°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

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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
- X Zinc Chloride solution (50% by mass), 23°C

Other

- ✓ Ethyl Acetate, 23°C
- X Hydrogen peroxide, 23°C
- X 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
- X 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: 2023-02-23 Source: Celanese Materials Database

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