

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® 101F NC010 is an internally lubricated polyamide 66 resin for injection moulding. It was developed for fast cycles and high productivity.

Product information

Resin Identification Part Marking Code ISO designation	PA66 >PA66< ISO 16396-PA66,,M1G1NR,S14-030		ISO 1043 ISO 11469	
Rheological properties	dry/cond.			
Viscosity number	150/*	cm ³ /g	ISO 307, 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	
Typical mechanical properties	dry/cond.			
Tensile modulus	3100/1400	MPa	ISO 527-1/-2	
Tensile stress at yield, 50mm/min	82/55	MPa	ISO 527-1/-2	
Tensile strain at yield, 50mm/min	4.5/25	%	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	2800/1200	MPa	ISO 178	
Flexural strength	120/75	MPa	ISO 178	
Tensile creep modulus, 1h	*/1400	MPa	ISO 899-1	
Tensile creep modulus, 1000h	*/930	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	6/13	kJ/m ²	ISO 179/1eA	
Charpy notched impact strength, -30°C	4.5/3	kJ/m ²	ISO 179/1eA	
Izod notched impact strength, 23°C	5.5/11	kJ/m ²	ISO 180/1A	
Izod notched impact strength, -30°C	6.0/4.0	kJ/m ²	ISO 180/1A	
Izod notched impact strength, -40°C	5.5/3.0 ^[A]	kJ/m ²	ISO 180/1A	
Izod impact strength, 23°C	300/N	kJ/m ²	ISO 180/1U	
Izod impact strength, -30°C	$300/N^{[A]}$	kJ/m²	ISO 180/1U	

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Hardness, Rockwell, R-scale	121/108 0.37/0.43		ISO 2039-2	
Poisson's ratio	0.37 / 0.43			
[A]: Assessed				
Thermal properties	dry/cond.			
Melting temperature, 10°C/min	262/*	°C	ISO 11357-1/-3	
Glass transition temperature, 10°C/min	70/40	°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	190/*	°C	ISO 75-1/-2	
Vicat softening temperature, 50°C/h 50N	240/*	°C	ISO 306	
Ball pressure test	240/-	°C	IEC 60695-10-2	
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	130	°C	UL 746B	
RTI, electrical, 1.5mm	130	°C	UL 746B	
RTI, electrical, 3.0mm	130	°C	UL 746B	
RTI, electrical, 6mm	130	°C	UL 746B	
RTI, impact, 0.75mm	75	°C	UL 746B	
RTI, impact, 1.5mm	75	°C	UL 746B	
RTI, impact, 3.0mm	75	°C	UL 746B	
RTI, impact, 6mm	75	°C	UL 746B	
RTI, strength, 0.75mm	85	°C	UL 746B	
RTI, strength, 1.5mm	85/*	°C	UL 746B	
RTI, strength, 3.0mm	85	°C	UL 746B	
RTI, strength, 6mm	85	°C	UL 746B	
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	960/-	°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	750/-	°C	IEC 60695-2-13	
Glow Wire Ignition Temperature, 3.0mm	800/-	°C	IEC 60695-2-13	
Glow Wire Temperature, No Flame, 1mm	750/-	°C	IEC 60335-1	
Glow Wire Temperature, No Flame, 2mm	725/-	°C	IEC 60335-1	
FMVSS Class	SE		ISO 3795 (FMVSS 302)	

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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, 23°C	3.8/8 3.6/4.6 140/- 180/1000 1E13/1E10 31.5/26 600/- 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
•		. 20	3271071
Physical/Other properties	dry/cond.		
Humidity absorption, 2mm	2.6/*	%	Sim. to ISO 62
Water absorption, 2mm	8.5/*	%	Sim. to ISO 62
Density	1140/-	kg/m³	ISO 1183
Density of melt	970	kg/m³	
Film Properties	dry/cond.		
Strain at yield, parallel	4.5/*	%	ISO 527-3
VDA Properties	dry/cond.		
Emission of organic compounds	6.5	μgC/g	VDA 277
Odour	3	class	VDA 270
Fogging, G-value (condensate)	0.1/*	mg	ISO 6452
Injection		ŭ	

Injection

Drying Recommended	yes	
Drying Temperature	80	°C
Drying Time, Dehumidified Dryer	2 - 4	h
Processing Moisture Content	≤0.2	%
Melt Temperature Optimum	295	°C
Min. melt temperature	280	°C
Max. melt temperature	305	°C
Screw tangential speed	≤0.4	m/s
Mold Temperature Optimum	70	°C
Min. mould temperature	40	°C
Max. mould temperature	95	°C
Hold pressure range	50 - 100	MPa
Hold pressure time	4	s/mm
Ejection temperature	190	°C

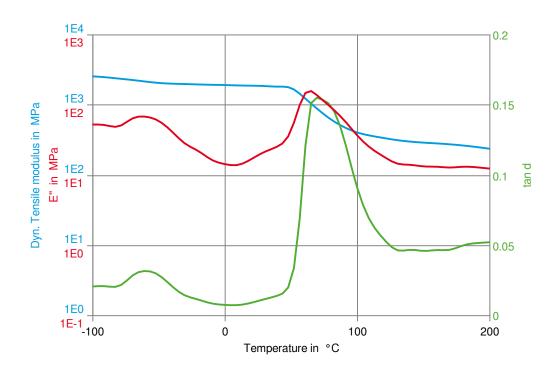
Characteristics

Additives Release agent

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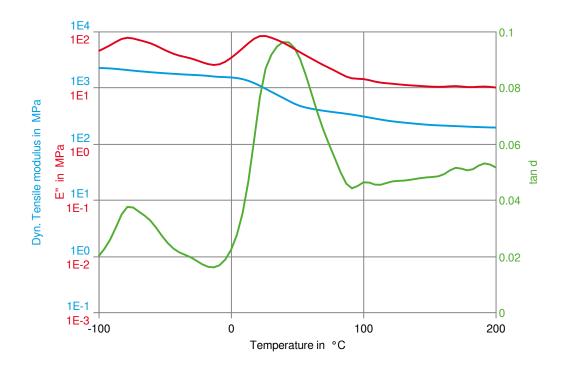
Dynamic Tensile modulus-temperature (dry)



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Dynamic Tensile modulus-temperature (cond.)

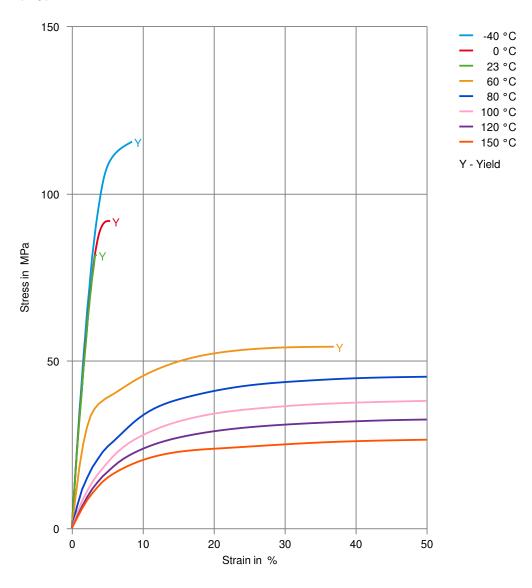


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Stress-strain (dry)

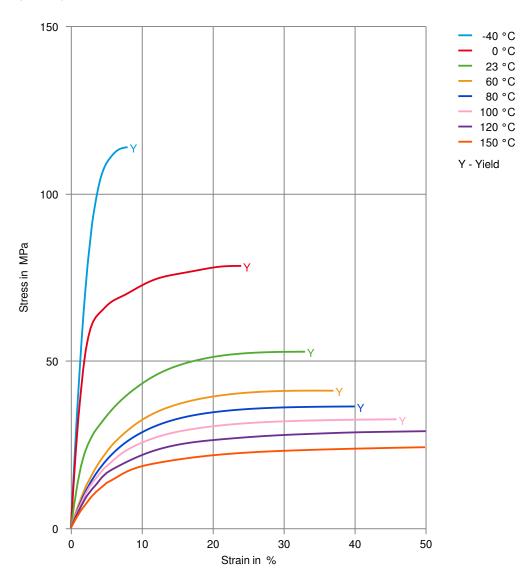


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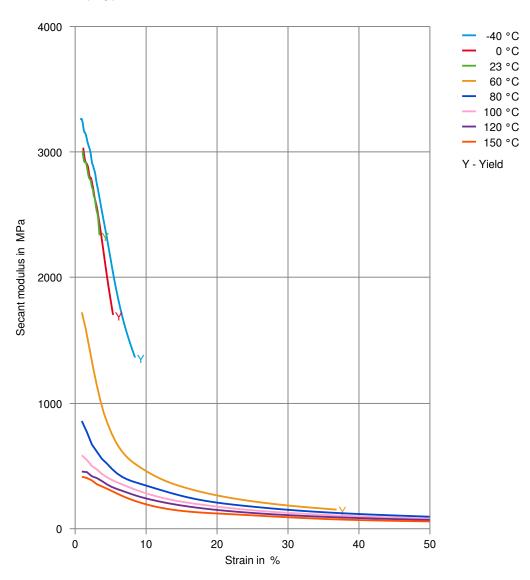
Stress-strain (cond.)



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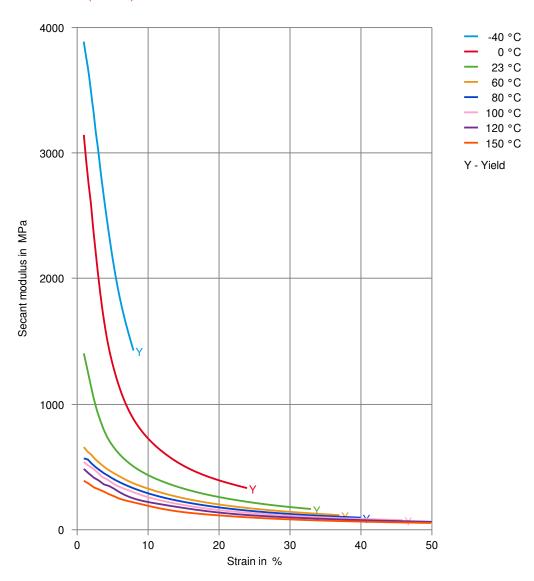
Secant modulus-strain (dry)



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Secant modulus-strain (cond.)



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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
- X Motor oil OS206 304 Ref.Eng.Oil, ISP, 135°C
- X Automatic hypoid-gear oil Shell Donax TX, 135°C
- X 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
- ✓ 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
- X 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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