



### **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® ST811HS is a flexible, heat stabilized Super Tough polyamide 6 resin developed for extrusion and injection molding applications such as cable and rope jacketing, hose inner cores and fasteners and ski binding parts.

### Product information

Resin Identification Part Marking Code ISO designation	PA6-HI >PA6-HI< ISO 16396-PA6-I,,M1G1HNR,S14-010		ISO 1043 ISO 11469	
Rheological properties	dry/cond.			
Moulding shrinkage, parallel	0.9/-	%	ISO 294-4, 2577	
Moulding shrinkage, normal	1.4/-	%	ISO 294-4, 2577	
Typical mechanical properties	dry/cond.			
Tensile modulus	700/400	MPa	ISO 527-1/-2	
Tensile stress at break, 50mm/min	40/-	MPa	ISO 527-1/-2	
Nominal strain at break	>50/-	%	ISO 527-1/-2	
Tensile strain at break, 50mm/min	220/-	%	ISO 527-1/-2	
Flexural modulus	700/360	MPa	ISO 178	
Charpy impact strength, 23°C	N/N	kJ/m²	ISO 179/1eU	
Charpy impact strength, -30°C	N/N	kJ/m²	ISO 179/1eU	
Charpy notched impact strength, 23°C	71/129	kJ/m²	ISO 179/1eA	
Charpy notched impact strength, -30°C	14/13	kJ/m²	ISO 179/1eA	
Puncture energy, 23°C	16/-	J	ISO 6603-2	
Puncture energy, -30°C	25/-	J	ISO 6603-2	
Izod notched impact strength, -40°C	14.0/14.0	kJ/m²	ISO 180/1A	
Hardness, Rockwell, M-scale	60/-		ISO 2039-2	
Poisson's ratio	0.46/0.47			
Thermal properties	dry/cond.			
Melting temperature, 10 °C/min	218/*	°C	ISO 11357-1/-3	
Glass transition temperature, 10°C/min	50/0	°C	ISO 11357-1/-3	
Temperature of deflection under load, 1.8 MPa	42/*	°C	ISO 75-1/-2	
Vicat softening temperature, 50°C/h 50N	95/*	°C	ISO 306	
Coeff. of linear therm. expansion, parallel, -40-23°C	91/*	E-6/K	ISO 11359-1/-2	

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Coefficient of linear thermal expansion (CLTE), parallel	200/*	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, -40-23°C	106/*	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE),	180/*	E-6/K	ISO 11359-1/-2
normal	1007	2 0/11	100 11000 17 2
Thermal conductivity of melt	0.15	W/(m K)	ISO 22007-2
Specific heat capacity of melt	2600	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	65	°C	UL 746B
RTI, impact, 1.5mm	105	°C	UL 746B
RTI, impact, 3.0mm	105	°C	UL 746B
RTI, strength, 0.75mm	95	°C	UL 746B
RTI, strength, 1.5mm	100/*	°C	UL 746B
RTI, strength, 3.0mm	110	°C	UL 746B
, ,			
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	0.75/*	mm	IEC 60695-11-10
UL recognition	yes/*		UL 94
FMVSS Class	В		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	<80	mm/min	ISO 3795 (FMVSS 302)
Electrical properties	dry/cond.		
Dissipation factor, 100Hz	80/550	E-4	IEC 62631-2-1
Dissipation factor, 1MHz	140/1800	E-4	IEC 62631-2-1
Volume resistivity	1E13/1E11	Ohm.m	IEC 62631-3-1
Surface resistivity	*/1E15	Ohm	IEC 62631-3-2
Electric strength	31/-	kV/mm	IEC 60243-1
Physical/Other properties	dry/cond.		
Humidity absorption, 2mm	2.3/*	%	Sim. to ISO 62
Water absorption, 2mm	6.8/*	%	Sim. to ISO 62
Density	1040/-	kg/m³	ISO 1183
Density of melt	880	kg/m³	
Film Properties	dus //s sus d		
•	dry/cond.		
Strain at yield, parallel	4/*	%	ISO 527-3

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### **NYLON RESIN**

### Injection

yes	
60	°C
2 - 4	h
≤0.2	%
270	°C
260	°C
280	°C
≤0.3	m/s
70	°C
60	°C
80	°C
50 - 100	MPa
4	s/mm
146	°C
	60 2-4 ≤0.2 270 260 280 ≤0.3 70 60 80 50-100

### **Extrusion**

Drying Temperature	60 <sup>[1]</sup>	°C
Drying Time, Dehumidified Dryer	4 - 6	h
Processing Moisture Content	≤0.06	%
Melt Temperature Optimum	240	°C
Melt Temperature Range	235 - 250	°C

[1]: dehumidified dryer, dew point -40°C

### Characteristics

Processing Injection Moulding, Other Extrusion

Delivery form Pellets

Additives Release agent

Special characteristics High impact or impact modified, Heat stabilised or stable to heat

### **Automotive**

OEM STANDARD ADDITIONAL INFORMATION

General Motors GMW17577P-PA6-T2 Natural Stellantis - Chrysler MS.50017 / CPN-3492 Natural

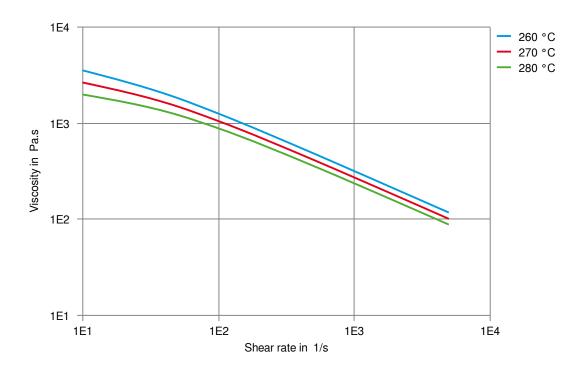
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Viscosity-shear rate

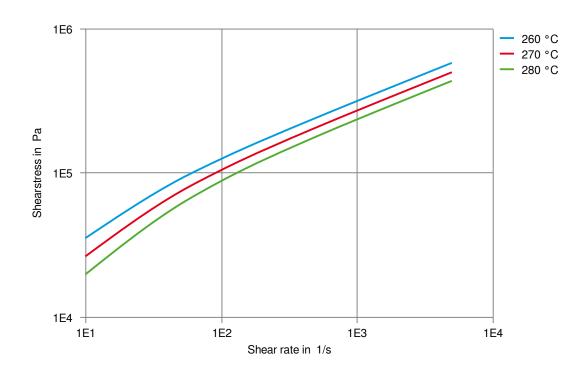


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Shearstress-shear rate

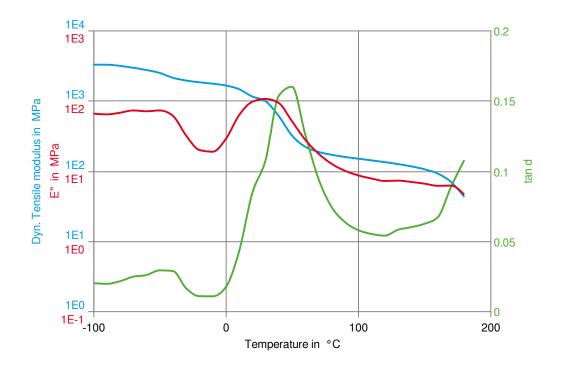


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Dynamic Tensile modulus-temperature (dry)

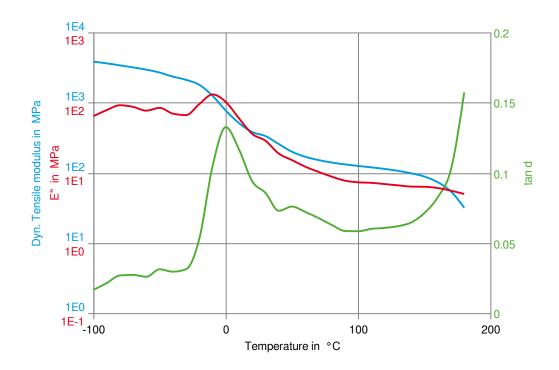


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Dynamic Tensile modulus-temperature (cond.)



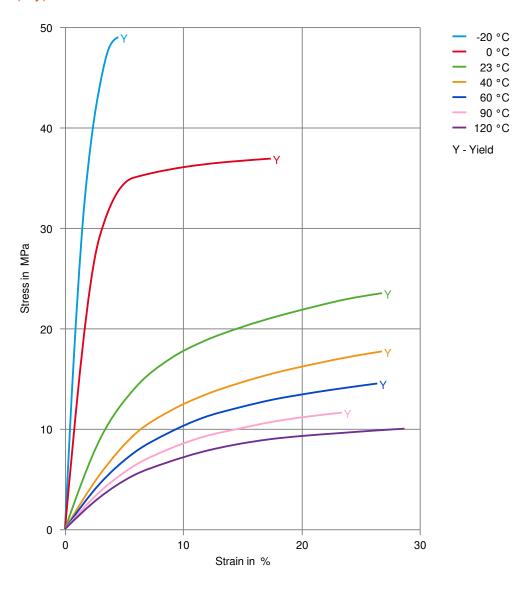
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Stress-strain (dry)



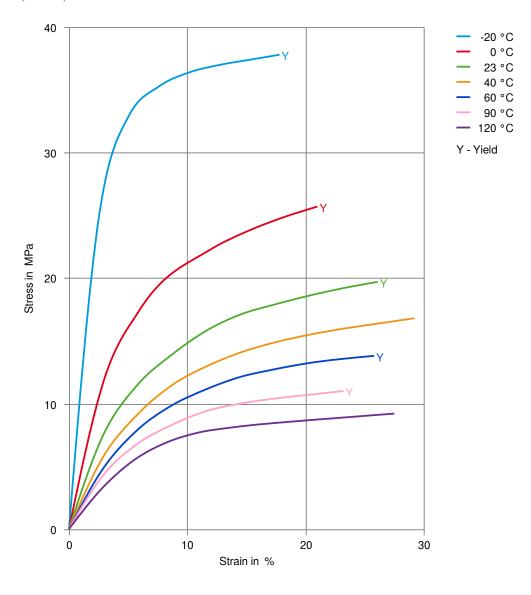
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**NYLON RESIN** 

Stress-strain (cond.)



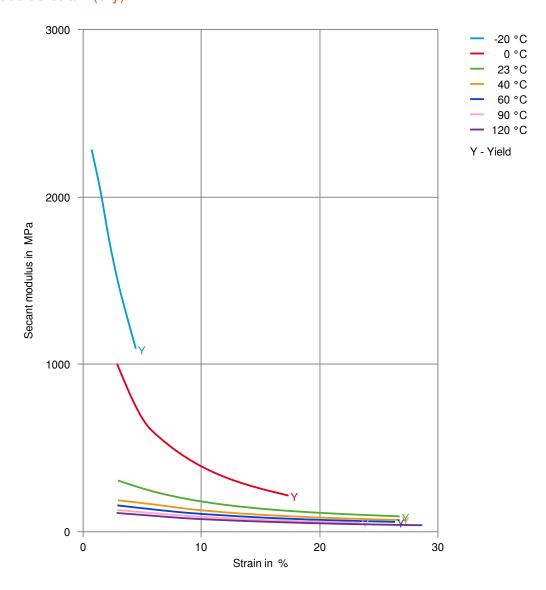
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Secant modulus-strain (dry)



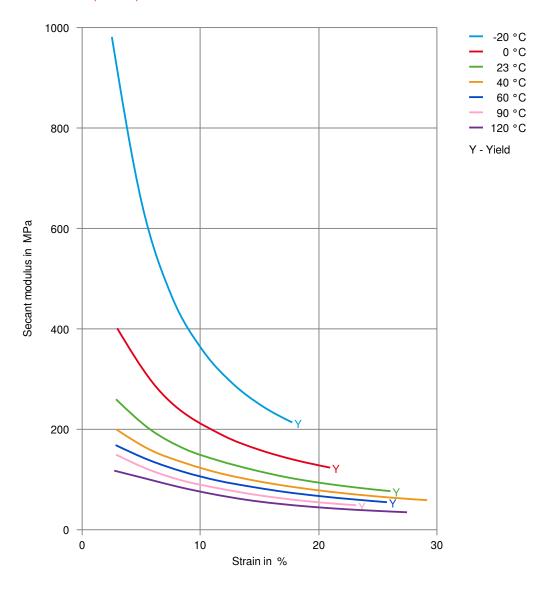
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Secant modulus-strain (cond.)



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### Zytel® ST811HS 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
- 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
- X 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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### Zytel® ST811HS NC010

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- ✓ 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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