

# Zytel® ST801 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® ST801 NC010 is an Unreinforced, Super Toughened, Polyamide 66

### Product information

|                      |                                    |           |
|----------------------|------------------------------------|-----------|
| Resin Identification | PA66-HI                            | ISO 1043  |
| Part Marking Code    | >PA66-HI<                          | ISO 11469 |
| ISO designation      | ISO 16396-PA66-I,,M1G1L1NR,S14-020 |           |

### Rheological properties

|                              | dry/cond. |   |                 |
|------------------------------|-----------|---|-----------------|
| Moulding shrinkage, parallel | 1.8 / -   | % | ISO 294-4, 2577 |
| Moulding shrinkage, normal   | 1.4 / -   | % | ISO 294-4, 2577 |

### Typical mechanical properties

|                                       | dry/cond.   |                   |              |
|---------------------------------------|-------------|-------------------|--------------|
| Tensile modulus                       | 2000 / 900  | MPa               | ISO 527-1/-2 |
| Tensile stress at yield, 50mm/min     | 50 / 43     | MPa               | ISO 527-1/-2 |
| Tensile strain at yield, 50mm/min     | 5.7 / 37    | %                 | ISO 527-1/-2 |
| Nominal strain at break               | 40 / >50    | %                 | ISO 527-1/-2 |
| Flexural modulus                      | 1800 / 700  | MPa               | ISO 178      |
| Flexural strength                     | 68 / -      | MPa               | ISO 178      |
| Charpy impact strength, 23°C          | N / N       | kJ/m <sup>2</sup> | ISO 179/1eU  |
| Charpy impact strength, -30°C         | N / N       | kJ/m <sup>2</sup> | ISO 179/1eU  |
| Charpy notched impact strength, 23°C  | 80 / 115    | kJ/m <sup>2</sup> | ISO 179/1eA  |
| Charpy notched impact strength, -30°C | 18 / 17     | kJ/m <sup>2</sup> | ISO 179/1eA  |
| Izod notched impact strength, 23°C    | 80 / 90     | kJ/m <sup>2</sup> | ISO 180/1A   |
| Izod notched impact strength, -30°C   | 20.0 / 20.0 | kJ/m <sup>2</sup> | ISO 180/1A   |
| Hardness, Rockwell, R-scale           | 112 / 89    |                   | ISO 2039-2   |
| Poisson's ratio                       | 0.4 / 0.45  |                   |              |

### Thermal properties

|                                                         | dry/cond. |    |                |
|---------------------------------------------------------|-----------|----|----------------|
| Melting temperature, 10°C/min                           | 263 / *   | °C | ISO 11357-1/-3 |
| Glass transition temperature, 10°C/min                  | 75 / 20   | °C | ISO 11357-1/-3 |
| Temperature of deflection under load, 1.8 MPa           | 64 / *    | °C | ISO 75-1/-2    |
| Temperature of deflection under load, 1.8 MPa, annealed | 71 / *    | °C | ISO 75-1/-2    |
| Temperature of deflection under load, 0.45 MPa          | 132 / *   | °C | ISO 75-1/-2    |
| Ball pressure test                                      | 220 / -   | °C | IEC 60695-10-2 |

# Zytel® ST801 NC010

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|                                                              |       |       |                |
|--------------------------------------------------------------|-------|-------|----------------|
| Coeff. of linear therm. expansion, parallel, -40-23°C        | 94/*  | E-6/K | ISO 11359-1/-2 |
| Coefficient of linear thermal expansion (CLTE), parallel     | 120/* | E-6/K | ISO 11359-1/-2 |
| CLTE, Parallel, 23-55°C(73-130°F)                            | 120/- | E-6/K | ASTM E 831     |
| Coeff. of linear therm. expansion, normal, -40-23°C          | 92/*  | E-6/K | ISO 11359-1/-2 |
| Coefficient of linear thermal expansion (CLTE), normal       | 90/*  | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, Normal,23-55°C (73-130°F) | 90/-  | E-6/K | ASTM E 831     |
| RTI, electrical, 0.75mm                                      | 125   | °C    | UL 746B        |
| RTI, electrical, 1.5mm                                       | 125   | °C    | UL 746B        |
| RTI, electrical, 3.0mm                                       | 125   | °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, strength, 0.75mm                                        | 85    | °C    | UL 746B        |
| RTI, strength, 1.5mm                                         | 85/*  | °C    | UL 746B        |
| RTI, strength, 3.0mm                                         | 85    | °C    | UL 746B        |
| Hot mandrel                                                  | 0/-   |       | IEC 60695-10-2 |

## 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                       | 0.81/*    | mm     | IEC 60695-11-10      |
| UL recognition                         | yes/*     |        | UL 94                |
| Oxygen index                           | 20/*      | %      | ISO 4589-1/-2        |
| Glow Wire Flammability Index, 0.75mm   | 750/-     | °C     | IEC 60695-2-12       |
| Glow Wire Flammability Index, 1.5mm    | 750/-     | °C     | IEC 60695-2-12       |
| Glow Wire Flammability Index, 3.0mm    | 750/-     | °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       |
| FMVSS Class                            | B         |        | ISO 3795 (FMVSS 302) |
| Burning rate, Thickness 1 mm           | <80       | mm/min | ISO 3795 (FMVSS 302) |
| Hot Wire Ignition, 0.75mm              | 9/*       | s      | UL 746A              |
| Hot Wire Ignition, 1.5mm               | 15/*      | s      | UL 746A              |
| Hot Wire Ignition, 3mm                 | 20/*      | s      | UL 746A              |

## Electrical properties

|                              |           |       |               |
|------------------------------|-----------|-------|---------------|
|                              | dry/cond. |       |               |
| Relative permittivity, 100Hz | 3.2/5.5   |       | IEC 62631-2-1 |
| Relative permittivity, 1MHz  | 2.9/3.2   |       | IEC 62631-2-1 |
| Dissipation factor, 100Hz    | 80/1800   | E-4   | IEC 62631-2-1 |
| Dissipation factor, 1MHz     | 140/550   | E-4   | IEC 62631-2-1 |
| Volume resistivity           | 1E12/1E11 | Ohm.m | IEC 62631-3-1 |
| Surface resistivity          | */>1E15   | Ohm   | IEC 62631-3-2 |
| Electric strength            | 31/-      | kV/mm | IEC 60243-1   |
| Comparative tracking index   | 600/-     |       | IEC 60112     |

# Zytel® ST801 NC010

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|                                                |         |        |         |
|------------------------------------------------|---------|--------|---------|
| Arc Resistance                                 | 131 / * | s      | UL 746B |
| High Amperage Arc Ignition Resistance, 0.75 mm | 200 / * | arcs   | UL 746A |
| High Amperage Arc Ignition Resistance, 1.5 mm  | 200 / * | arcs   | UL 746A |
| High Amperage Arc Ignition Category, 1.5 mm    | 200 / * | class  | UL 746A |
| High Voltage Arc Tracking Rate                 | 7.6 / * | mm/min | UL 746A |

### Physical/Other properties

|                                 |                        |                   |                |
|---------------------------------|------------------------|-------------------|----------------|
|                                 | dry/cond.              |                   |                |
| Humidity absorption, 2mm        | 2 / *                  | %                 | Sim. to ISO 62 |
| Water absorption, 2mm           | 6.5 / *                | %                 | Sim. to ISO 62 |
| Water absorption, Immersion 24h | 1.2 <sup>[1]</sup> / * | %                 | Sim. to ISO 62 |
| Density                         | 1080 / -               | kg/m <sup>3</sup> | ISO 1183       |
| Density of melt                 | 920                    | kg/m <sup>3</sup> |                |

[1]: 3mm wall thickness

### Injection

|                                 |                        |
|---------------------------------|------------------------|
| Drying Recommended              | yes                    |
| Drying Temperature              | 80 °C                  |
| Drying Time, Dehumidified Dryer | 2 - 4 h                |
| Processing Moisture Content     | ≤0.2 %                 |
| Melt Temperature Optimum        | 290 °C                 |
| Min. melt temperature           | 280 °C                 |
| Max. melt temperature           | 300 °C                 |
| Screw tangential speed          | ≤0.3 m/s               |
| Mold Temperature Optimum        | 80 °C                  |
| Min. mould temperature          | 50 °C                  |
| Max. mould temperature          | 100 °C                 |
| Hold pressure range             | 50 - 100 MPa           |
| Hold pressure time              | 4 s/mm                 |
| Back pressure                   | As low as possible MPa |
| Ejection temperature            | 190 °C                 |

### Extrusion

|                                 |              |
|---------------------------------|--------------|
| Drying Temperature              | 80 °C        |
| Drying Time, Dehumidified Dryer | 3 - 4 h      |
| Processing Moisture Content     | ≤0.06 %      |
| Melt Temperature Optimum        | 280 °C       |
| Melt Temperature Range          | 275 - 290 °C |

### Characteristics

|                         |                                |
|-------------------------|--------------------------------|
| Processing              | Injection Moulding             |
| Delivery form           | Pellets                        |
| Special characteristics | High impact or impact modified |

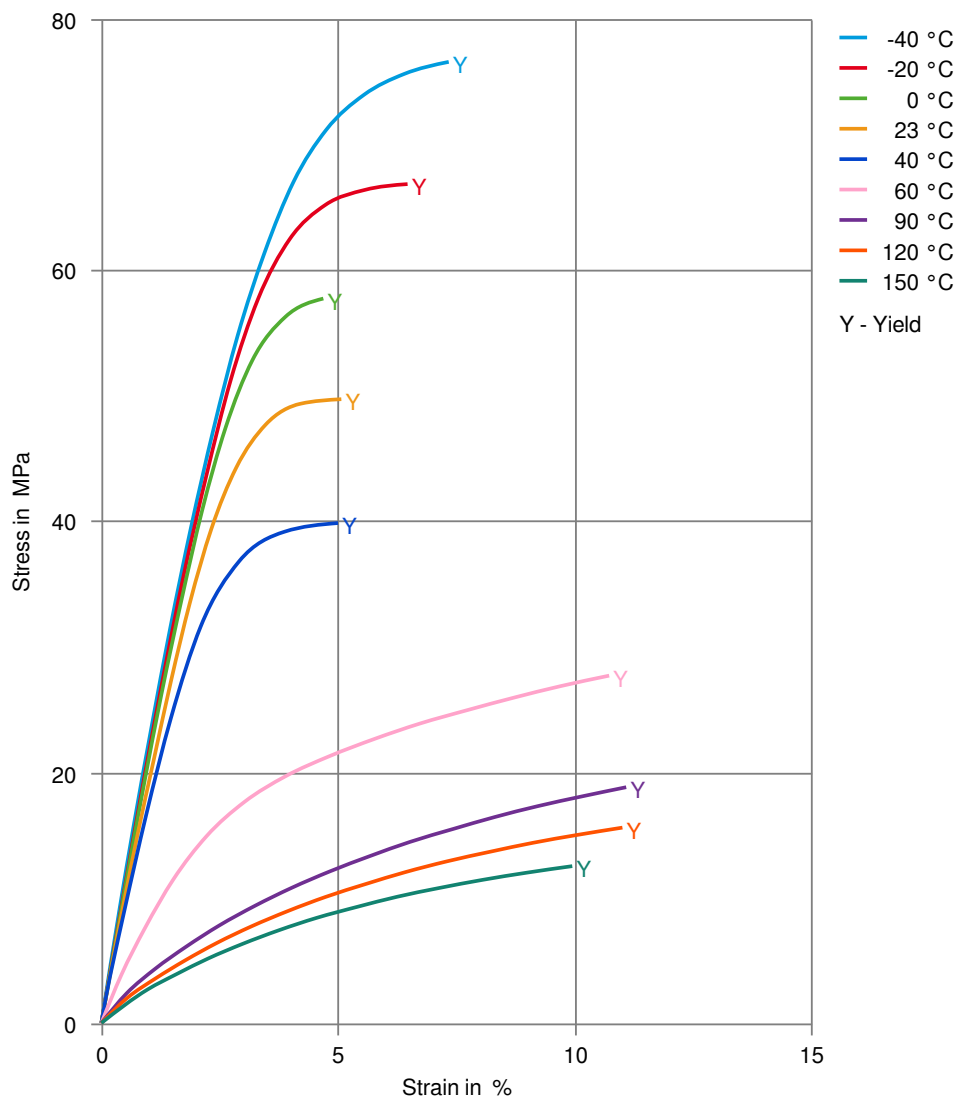
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## Automotive

| OEM                   | STANDARD            | ADDITIONAL INFORMATION    |
|-----------------------|---------------------|---------------------------|
| BMW                   | GS93016-PA66        | (Highly Impact Resistant) |
| Ford                  | WSK-M4D666-A        |                           |
| Hyundai               | MS211-46 Type C-2   |                           |
| Mercedes-Benz         | DBL5410.00 PA66-I   |                           |
| Stellantis - Chrysler | MS.50017 / CPN-2345 | Natural                   |
| Stellantis - Chrysler | MS.50017 / CPN-2424 | Natural                   |
| Stellantis - Chrysler | MS.50017 / CPN-2456 | Natural                   |

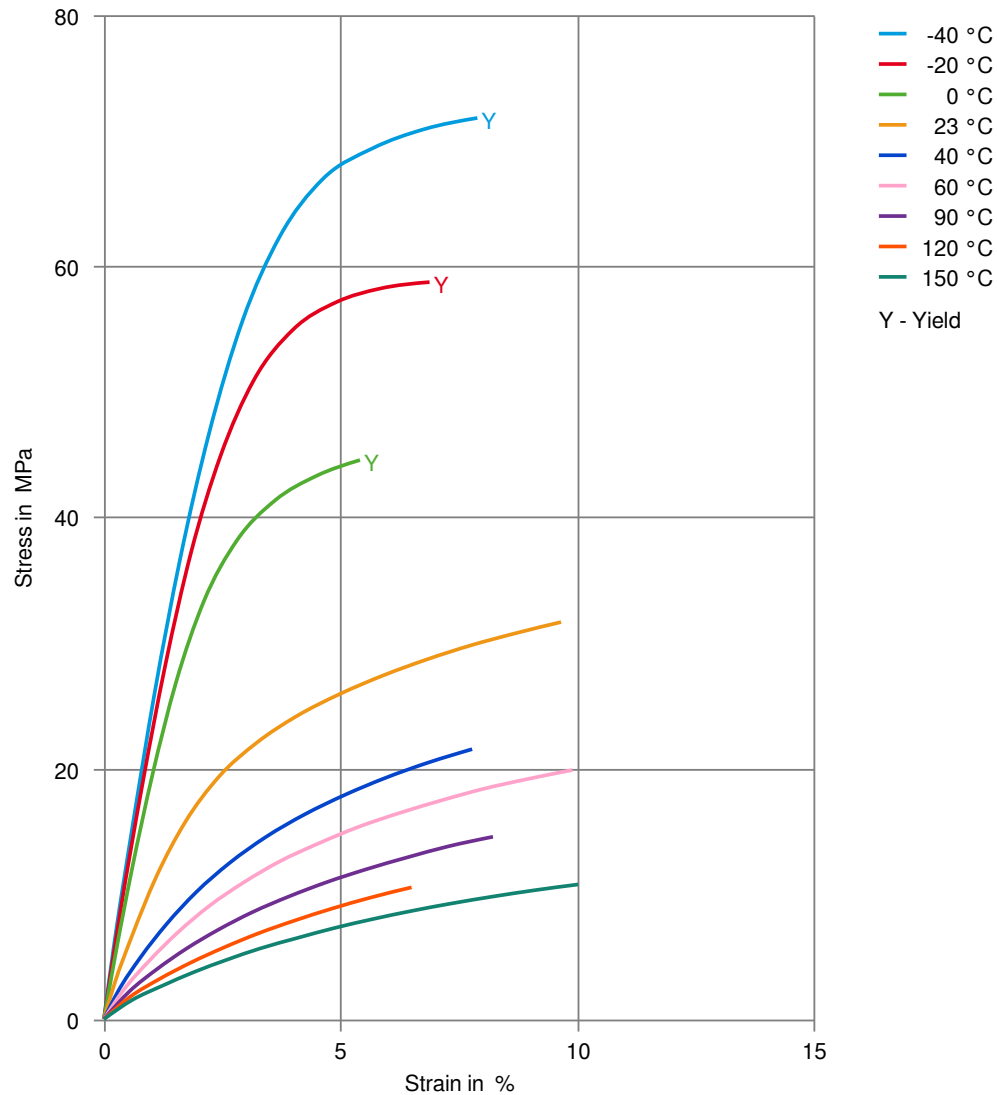
## Stress-strain (dry) (measured on Zytel® ST801 BK010A)



# Zytel® ST801 NC010

NYLON RESIN

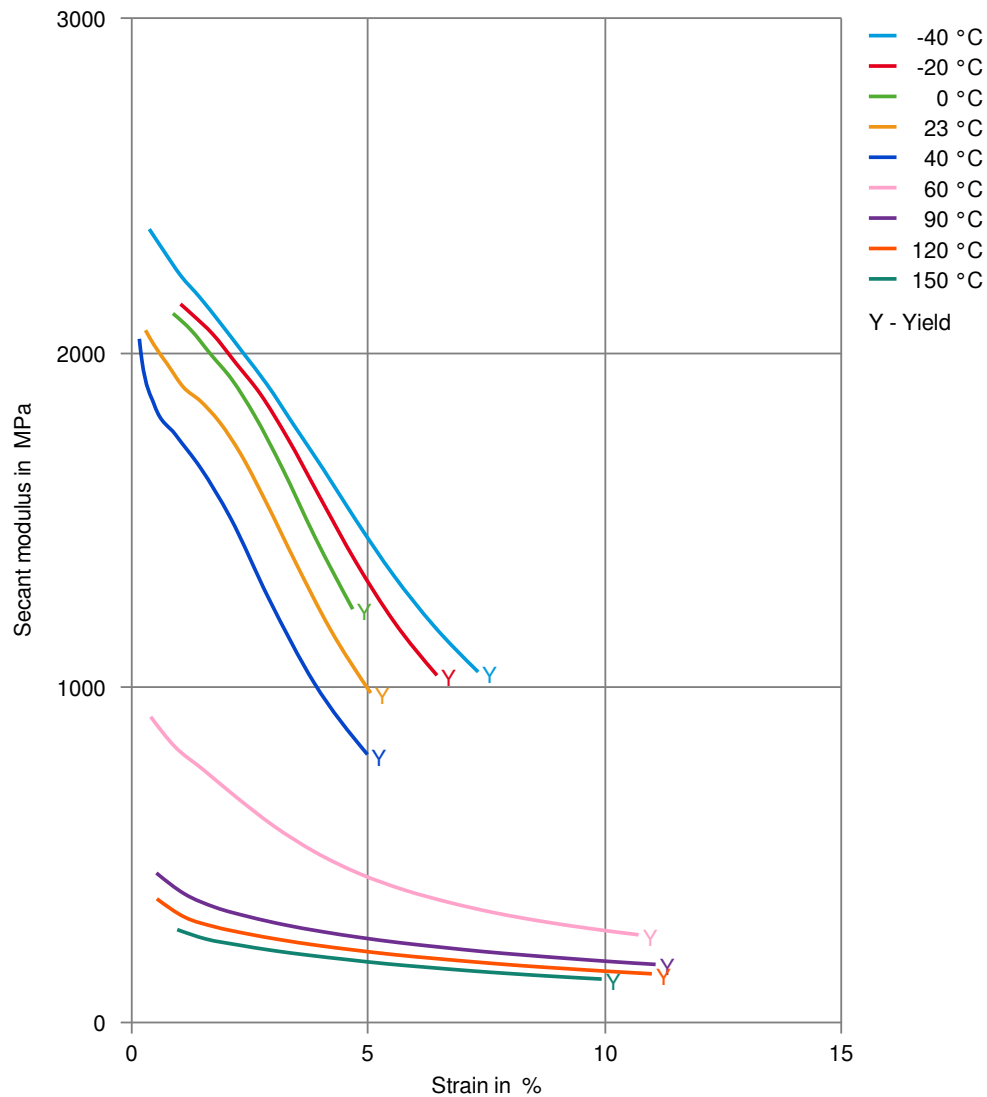
Stress-strain (cond.)  
(measured on Zytel® ST801 BK010A)



# Zytel® ST801 NC010

NYLON RESIN

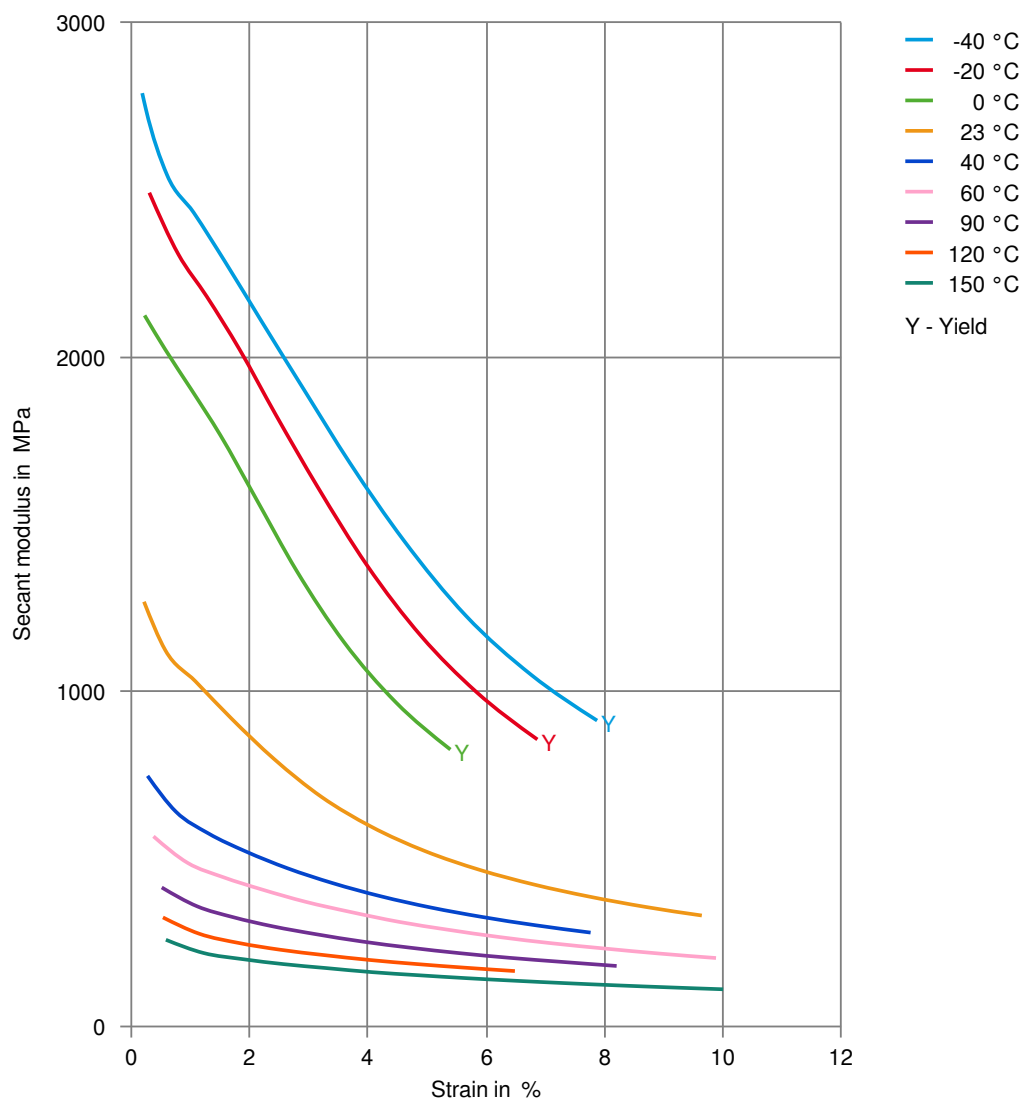
Secant modulus-strain (dry)  
(measured on Zytel® ST801 BK010A)



# Zytel® ST801 NC010

NYLON RESIN

Secant modulus-strain (cond.)  
(measured on Zytel® ST801 BK010A)



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### Chemical Media Resistance

#### Alcohols

- ✓ Isopropyl alcohol, 23°C
- ✓ Methanol, 23°C
- ✓ Ethanol, 23°C

#### Standard Fuels

- ✓ Standard fuel without alcohol (pref. ISO 1817 Liquid C), 23°C

#### Other

- ✓ Water, 23°C
- ✓ Water, 90°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).
- ✗ 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).