

# Zytel® 70G30HSL 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® 70G30HSL NC010 is a 30% glass reinforced, heat stabilised nylon 66 resin for injection moulding.

### Product information

|                      |                                      |           |
|----------------------|--------------------------------------|-----------|
| Resin Identification | PA66-GF30                            | ISO 1043  |
| Part Marking Code    | >PA66-GF30<                          | ISO 11469 |
| ISO designation      | ISO 16396-PA66,GF30,M1GHNRT2,S14-100 |           |

### Rheological properties

|                              | dry/cond. |                    |                     |
|------------------------------|-----------|--------------------|---------------------|
| Viscosity number             | 153/*     | cm <sup>3</sup> /g | ISO 307, 1157, 1628 |
| Moulding shrinkage, parallel | 0.3/-     | %                  | ISO 294-4, 2577     |
| Moulding shrinkage, normal   | 1.1/-     | %                  | ISO 294-4, 2577     |

### Typical mechanical properties

|                                       | dry/cond.  |                   |              |
|---------------------------------------|------------|-------------------|--------------|
| Tensile Modulus                       | 10000/7000 | MPa               | ISO 527-1/-2 |
| Stress at break                       | 200/130    | MPa               | ISO 527-1/-2 |
| Strain at break                       | 3.4/5      | %                 | ISO 527-1/-2 |
| Flexural Modulus                      | 9000/6300  | MPa               | ISO 178      |
| Flexural Strength                     | 280/200    | MPa               | ISO 178      |
| Tensile creep modulus, 1h             | */6800     | MPa               | ISO 899-1    |
| Tensile creep modulus, 1000h          | */5100     | MPa               | ISO 899-1    |
| Charpy impact strength, 23°C          | 80/93      | kJ/m <sup>2</sup> | ISO 179/1eU  |
| Charpy impact strength, -30°C         | 70/73      | kJ/m <sup>2</sup> | ISO 179/1eU  |
| Charpy notched impact strength, 23°C  | 12/15      | kJ/m <sup>2</sup> | ISO 179/1eA  |
| Charpy notched impact strength, -30°C | 10/10      | kJ/m <sup>2</sup> | ISO 179/1eA  |
| Charpy notched impact strength, -40°C | 10/-       | kJ/m <sup>2</sup> | ISO 179/1eA  |
| Izod notched impact strength, 23°C    | 13/17      | kJ/m <sup>2</sup> | ISO 180/1A   |
| Izod notched impact strength, -30°C   | 12/10      | kJ/m <sup>2</sup> | ISO 180/1A   |
| Izod impact strength, 23°C            | 70/-       | kJ/m <sup>2</sup> | ISO 180/1U   |
| Izod impact strength, -30°C           | 60/-       | kJ/m <sup>2</sup> | ISO 180/1U   |

# Zytel® 70G30HSL NC010

## NYLON RESIN

|  |           |     |            |
|--|-----------|-----|------------|
| Hardness, Rockwell, M-scale                  | 104/88    |     | ISO 2039-2 |
| Hardness, Rockwell, R-scale                  | 124/117   |     | ISO 2039-2 |
| Ball indentation hardness, H 961/30          | 270/187   | MPa | ISO 2039-1 |
| Poisson's ratio                              | 0.34/0.35 |     |            |
| Multiaxial Impact, Total Energy, 4.5m/s, 2mm | 5/-       | J   | ISO 6603-2 |

## 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 |
| Temp. of deflection under load, 1.8 MPa     | 248/*     | °C    | ISO 75-1/-2    |
| Temp. of deflection under load, 0.45 MPa    | 261/*     | °C    | ISO 75-1/-2    |
| Coeff. of linear therm. expansion, parallel | 22/*      | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal   | 107/*     | 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, 3mm                        | 140       | °C    | UL 746B        |
| RTI, impact, 0.75mm                         | 125       | °C    | UL 746B        |
| RTI, impact, 1.5mm                          | 125       | °C    | UL 746B        |
| RTI, impact, 3mm                            | 125       | °C    | UL 746B        |
| RTI, strength, 0.75mm                       | 140       | °C    | UL 746B        |
| RTI, strength, 1.5mm                        | 140/*     | °C    | UL 746B        |
| RTI, strength, 3mm                          | 140       | °C    | UL 746B        |

## Flammability

|                                      |                       |        |                      |
|--------------------------------------|-----------------------|--------|----------------------|
|                                      | dry/cond.             |        |                      |
| Burning Behav. at 1.5mm nom. thickn. | HB/*                  | class  | IEC 60695-11-10      |
| Thickness tested                     | 1.5 <sup>[1]</sup> /* | mm     | IEC 60695-11-10      |
| UL recognition                       | yes/*                 |        | UL 94                |
| Burning Behav. at thickness h        | HB/*                  | class  | IEC 60695-11-10      |
| Thickness tested                     | 0.4/*                 | mm     | IEC 60695-11-10      |
| Oxygen index                         | 24/*                  | %      | ISO 4589-1/-2        |
| Glow Wire Flammability Index, 1mm    | 700/-                 | °C     | IEC 60695-2-12       |
| Glow Wire Flammability Index, 2mm    | 750/-                 | °C     | IEC 60695-2-12       |
| Glow Wire Flammability Index, 3mm    | 800/-                 | °C     | IEC 60695-2-12       |
| Glow Wire Ignition Temperature, 1mm  | 725/-                 | °C     | IEC 60695-2-13       |
| Glow Wire Ignition Temperature, 2mm  | 725/-                 | °C     | IEC 60695-2-13       |
| Glow Wire Ignition Temperature, 3mm  | 775/-                 | °C     | IEC 60695-2-13       |
| Glow Wire Temperature, No Flame, 3mm | 750/-                 | °C     | IEC 60335-1          |
| FMVSS Class                          | B                     |        | ISO 3795 (FMVSS 302) |
| Burning rate, Thickness 1 mm         | 20                    | mm/min | ISO 3795 (FMVSS 302) |

[1]: and also 0.75mm

# Zytel® 70G30HSL NC010

## NYLON RESIN

### Electrical properties

|                              | dry/cond. |       |               |
|------------------------------|-----------|-------|---------------|
| Relative permittivity, 100Hz | 4.4/10.8  |       | IEC 62631-2-1 |
| Relative permittivity, 1MHz  | 4.1/4.6   |       | IEC 62631-2-1 |
| Dissipation factor, 100Hz    | 70/4600   | E-4   | IEC 62631-2-1 |
| Dissipation factor, 1MHz     | 150/650   | E-4   | IEC 62631-2-1 |
| Volume resistivity           | >1E13/1E9 | Ohm.m | IEC 62631-3-1 |
| Surface resistivity          | */1E13    | Ohm   | IEC 62631-3-2 |
| Electric strength            | 38/32     | kV/mm | IEC 60243-1   |
| Comparative tracking index   | 400/-     |       | IEC 60112     |

### Other properties

|                                 | dry/cond. |                   |                |
|---------------------------------|-----------|-------------------|----------------|
| Humidity absorption, 2mm        | 1.9/*     | %                 | Sim. to ISO 62 |
| Water absorption, 2mm           | 6/*       | %                 | Sim. to ISO 62 |
| Water absorption, Immersion 24h | 1.3/*     | %                 | Sim. to ISO 62 |
| Density                         | 1370/-    | kg/m <sup>3</sup> | ISO 1183       |

### VDA Properties

|                               | dry/cond. |       |          |
|-------------------------------|-----------|-------|----------|
| Emission of organic compounds | 6         | µgC/g | VDA 277  |
| Odour                         | 4.5       | class | VDA 270  |
| Fogging, F-value (refraction) | 95/*      | %     | ISO 6452 |
| Fogging, G-value (condensate) | 0.3/*     | mg    | ISO 6452 |

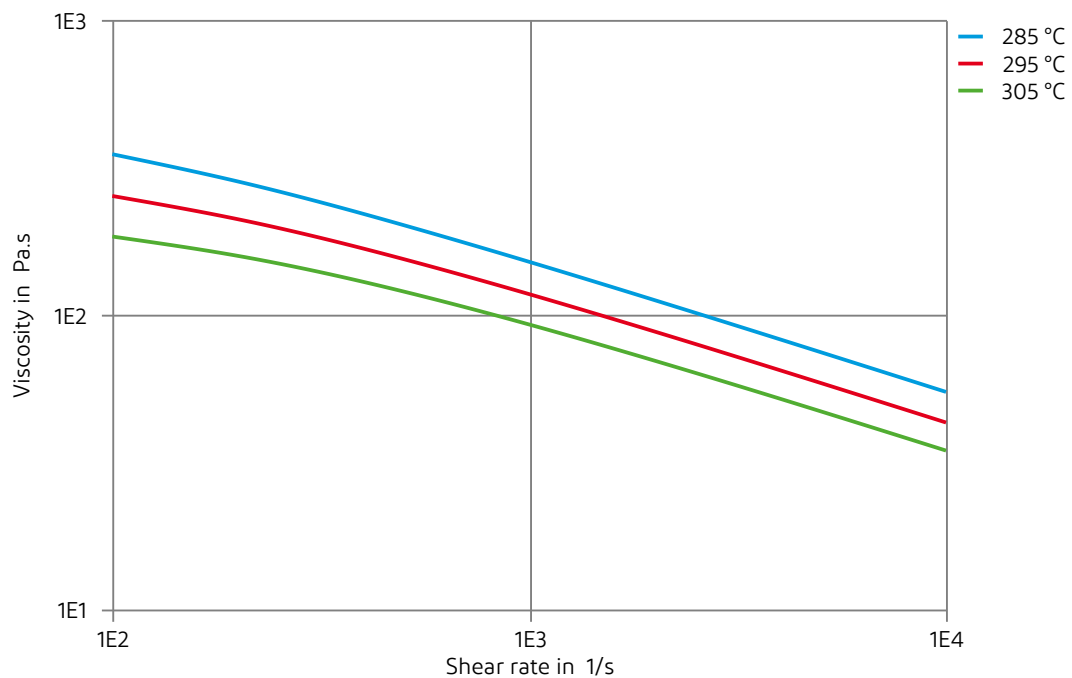
### Injection

|                                 |              |
|---------------------------------|--------------|
| 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           | 285 °C       |
| Max. melt temperature           | 305 °C       |
| Max. screw tangential speed     | 0.2 m/s      |
| Mold Temperature Optimum        | 100 °C       |
| Min. mould temperature          | 70 °C        |
| Max. mould temperature          | 120 °C       |
| Hold pressure range             | 50 - 100 MPa |
| Hold pressure time              | 3 s/mm       |
| Ejection temperature            | 210 °C       |

# Zytel® 70G30HSL NC010

NYLON RESIN

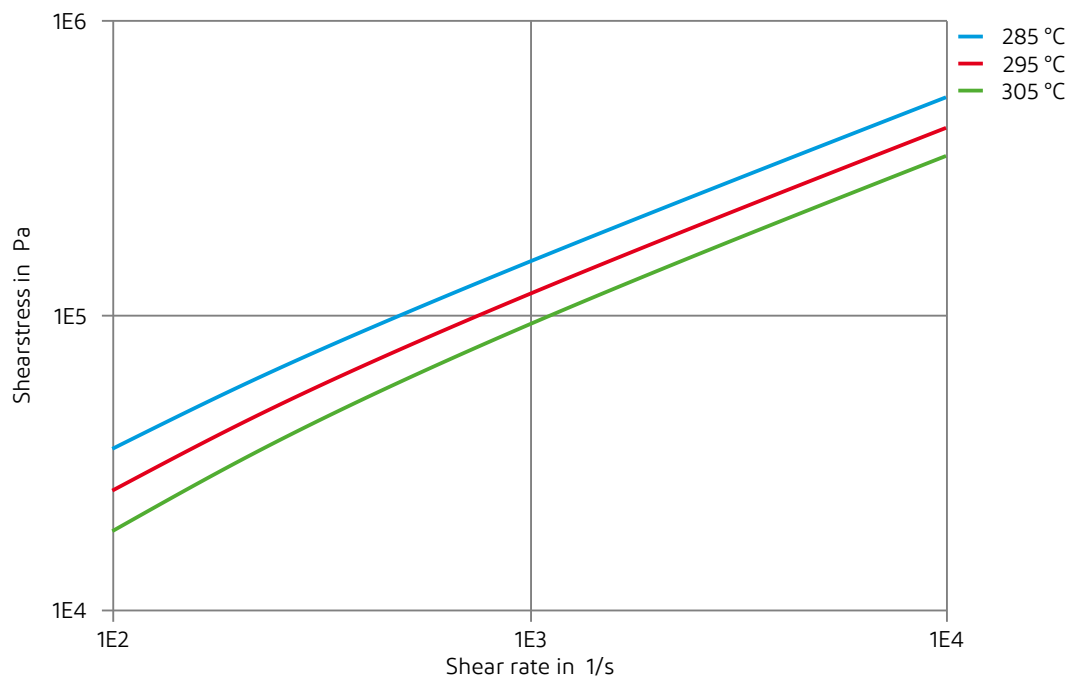
Viscosity-shear rate



# Zytel® 70G30HSL NC010

NYLON RESIN

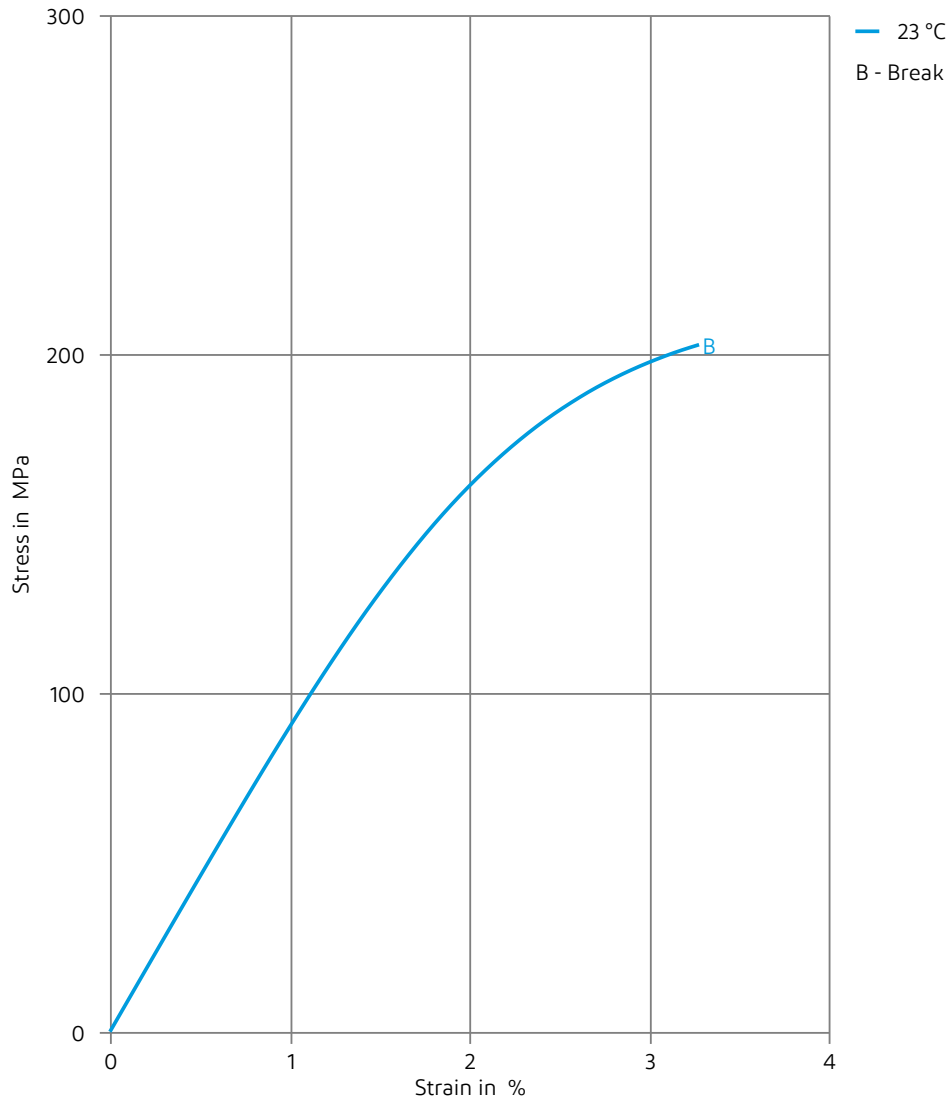
Shearstress-shear rate



# Zytel® 70G30HSL NC010

NYLON RESIN

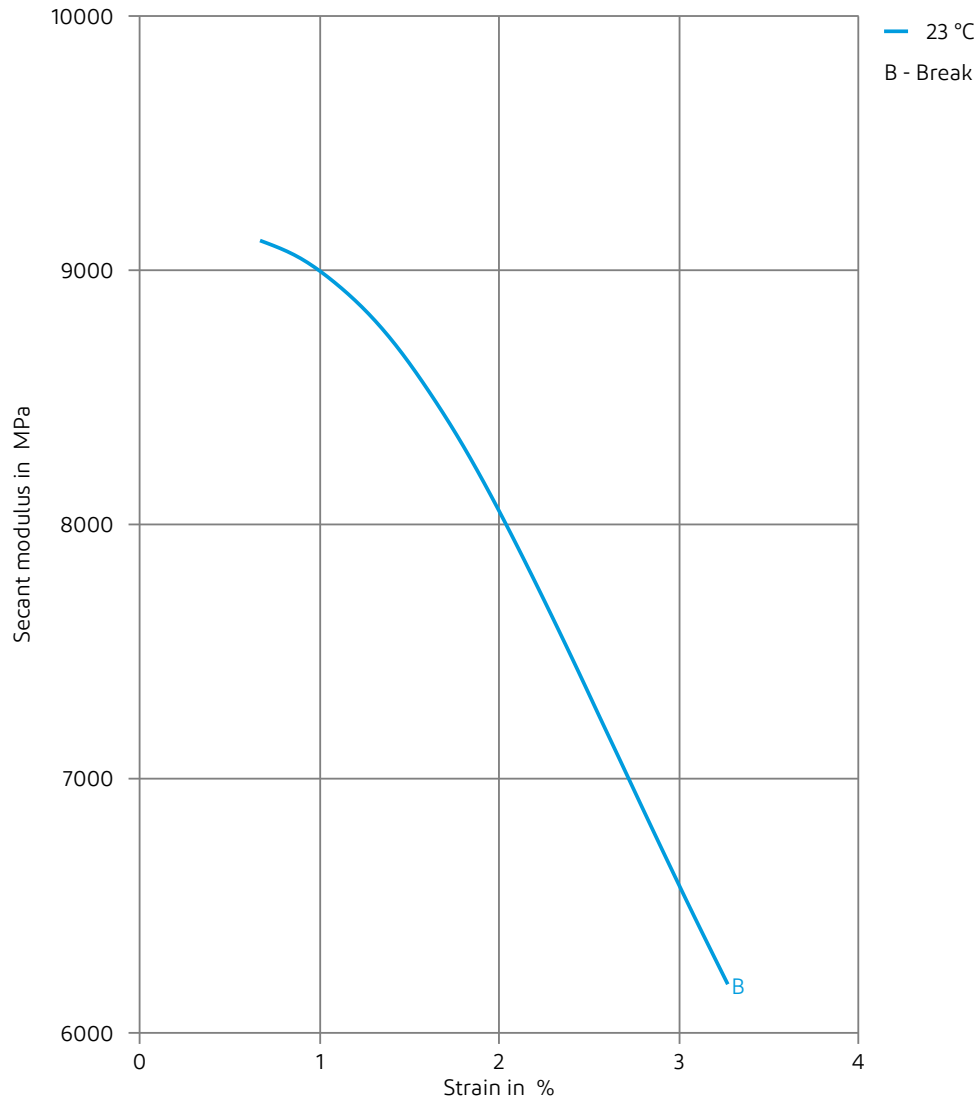
Stress-strain (dry)



# Zytel® 70G30HSL NC010

NYLON RESIN

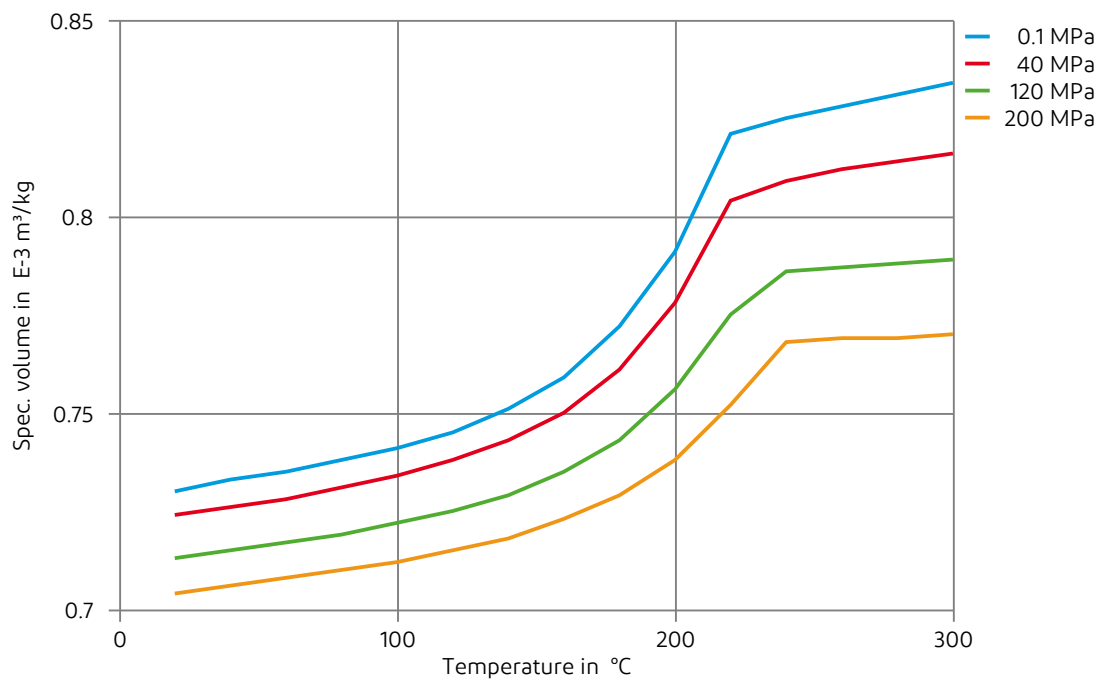
Secant modulus-strain (dry)



# Zytel® 70G30HSL NC010

NYLON RESIN

Specific volume-temperature (pvT)





# Zytel® 70G30HSL 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
- ✗ Hydrochloric Acid (36% by mass), 23°C
- ✗ Nitric Acid (40% by mass), 23°C
- ✗ Sulfuric Acid (38% by mass), 23°C
- ✗ 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

# Zytel® 70G30HSL NC010

## NYLON RESIN

### 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
- ✗ 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
- ✗ Coolant Glysantin G48, 1:1 in water, 125°C
- ✓ Urea solution (32.5% 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).
- ✗ 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).

## Mobility & Materials

The information set forth herein is furnished free of charge, is based on technical data that Celanese believes to be reliable, and represents typical values that fall within the normal range of properties. This information relates only to the specific material designated and may not be valid for such material used in combination with other materials or in other processes. It is intended for use by persons having technical skill, at their own discretion and risk. This information should not be used to establish specification limits nor used alone as the basis of design. Handling precaution information is given with the understanding that those using it will satisfy themselves that their particular conditions of use present no health or safety hazards and comply with applicable law. Since conditions of product use and disposal are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information. As with any product, evaluation under end-use conditions prior to specification is essential. Nothing herein is to be taken as a license to operate or a recommendation to infringe on patents.

CAUTION: Do not use Celanese materials in medical applications involving implantation in the human body or contact with internal body fluids or tissues unless the material has been provided from Celanese under a written contract or other acknowledgement that is consistent with the Celanese policy regarding medical applications and expressly acknowledges the contemplated use. For further information, please contact your Celanese representative.

Celanese's sole warranty is that our products will meet our standard sales specifications in effect at the time of shipment. Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted. TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, CELANESE SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR NON-INFRINGEMENT. CELANESE DISCLAIMS LIABILITY FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.