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# Zytel® 70G30HSLR ECO-R BK099

## 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® 70G30HSLR ECO-R BK099 is a 30% glass fibre reinforced, heat stabilised, hydrolysis resistant polyamide 66 resin for injection molding. It has same performance and processing properties as Zytel® 70G30HSLR BK099.

Zytel® 70G30HSLR ECO-R BK099 belongs to the Zytel® ECO-R family. The products of this family contain polyamide derived from certified* post-industrial recyclate streams. This results in reduced lifecycle greenhouse gas emissions and lower fossil resource use.

*certified circular according to ISCC PLUS mass balance approach.

## Rheological properties

| | dry/cond. | | |
|---|---|---|---|
| Viscosity number | 150[1]/* | cm³/g | ISO 307, 1157, 1628 |
| Moulding shrinkage, parallel | 0.3 / - | % | ISO 294-4, 2577 |
| Moulding shrinkage, normal | 1.0 / - | % | ISO 294-4, 2577 |
| Melt viscosity , @ 1000 sec-1, 280 °C | 190 / * | Pa.s | ISO 11443 |

[1]: acid sulphuric 96%

## Typical mechanical properties

| | dry/cond. | | |
|---|---|---|---|
| Tensile Modulus | 10000 / 7000 | MPa | ISO 527-1/-2 |
| Stress at break, 5mm/min | 200 / 130 | MPa | ISO 527-1/-2 |
| Strain at break, 5mm/min | 3 / 5 | % | ISO 527-1/-2 |
| Flexural Modulus | 9000 / 6500[DS] | MPa | ISO 178 |
| Flexural Strength | 280 / 200[DS] | MPa | ISO 178 |
| Flexural Stress at 3.5% | 270 / 170 | MPa | ISO 178 |
| Charpy impact strength, 23 °C | 70 / 80 | kJ/m² | ISO 179/1eU |
| Charpy impact strength, -30 °C | 70 / 70[DS] | kJ/m² | ISO 179/1eU |

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| | | | |
|---|---|---|---|
| Charpy impact strength, -40 °C | 65 / - | kJ/m² | ISO 179/1eU |
| Charpy notched impact strength, 23 °C | 12 / 15 | kJ/m² | ISO 179/1eA |
| Charpy notched impact strength, -30 °C | 9 / 9[DS] | kJ/m² | ISO 179/1eA |
| Charpy notched impact strength, -40 °C | 9 / 9 | kJ/m² | ISO 179/1eA |
| Izod notched impact strength, 23 °C | 10 / 12 | kJ/m² | ISO 180/1A |
| Izod notched impact strength, -30 °C | 10 / - | kJ/m² | ISO 180/1A |
| Izod notched impact strength, -40 °C | 10 / - | kJ/m² | ISO 180/1A |
| 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 / 185 | MPa | ISO 2039-1 |
| Poisson's ratio | 0.34 / 0.35 | | |
| Multiaxial Impact, Total Energy, 4.5m/s, 2mm | 5 / - | J | ISO 6603-2 |

[DS]: Derived from similar grade

## Thermal properties

| | dry/cond. | | |
|---|---|---|---|
| Melting temperature, 10 °C/min | 262 / * | °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 | 250 / * | °C | ISO 75-1/-2 |
| Temp. of deflection under load, 0.45 MPa | 260 / * | °C | ISO 75-1/-2 |
| Coeff. of linear therm. expansion, parallel, -40-23 °C | 26 / * | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, parallel | 22 / * | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, parallel, 55-160 °C | 13 / * | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal, -40-23 °C | 70 / * | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal | 80 / * | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal, 55-160 °C | 130 / * | E-6/K | ISO 11359-1/-2 |
| Thermal conductivity | 0.36 | W/(m K) | ISO 22007-2 |
| Thermal conductivity of melt | 0.21 | W/(m K) | Internal |
| Spec. heat capacity of melt | 2290 | J/(kg K) | Internal |

## Flammability

| | dry/cond. | | |
|---|---|---|---|
| Burning Behav. at 1.5mm nom. thickn. | HB / * | class | UL 94 |
| Thickness tested | 1.5 / * | mm | UL 94 |
| Burning Behav. at thickness h | HB / * | class | UL 94 |
| Thickness tested | 0.75 / * | mm | UL 94 |
| 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 | 37[2] | mm/min | ISO 3795 (FMVSS 302) |

[2]: Based on Zytel® 70G30HSLR BK099

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## Electrical properties

| | dry/cond. | | |
|---|---|---|---|
| Volume resistivity | >1E13 / 1E9[DS] | Ohm.m | IEC 62631-3-1 |
| Surface resistivity | * / 1E12[DS] | Ohm | IEC 62631-3-2 |
| Electric strength | 38 / 32 | kV/mm | IEC 60243-1 |
| Comparative tracking index | 400 / - | | IEC 60112 |

[DS]: Derived from similar grade

## 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/m³ | ISO 1183 |

## VDA Properties

| | | | |
|---|---|---|---|
| Odour | 5[2] | class | VDA 270 |

[2]: Based on Zytel® 70G30HSLR BK099

## 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 | Internal |
| Min. melt temperature | 285 | °C | |
| Max. melt temperature | 305 | °C | |
| 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 | Internal |

## Characteristics

| | |
|---|---|
| Additives | Release agent |

## 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

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

### Salt solutions

- ✓ Sodium Chloride solution (10% by mass), 23°C
- ✗ Sodium Hypochlorite solution (10% by mass), 23°C

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- ✔ 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
- ✔ DOT No. 4 Brake fluid, 120°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

**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).