

Zytel® 7301 NC010

NYLON RESIN

Zytel® 7301 NC010 is an Unreinforced Polyamide 6

Product information

| | | |
|----------------------|------------------------------|-----------|
| Resin Identification | PA6 | ISO 1043 |
| Part Marking Code | >PA6< | ISO 11469 |
| ISO designation | ISO 16396-PA6,,M1G1N,S14-030 | |

Rheological properties

| | | | |
|------------------------|----------------------|--------------------|---------------|
| | dry/cond. | | |
| Viscosity number | 150 ^{[1]/*} | cm ³ /g | ISO 307, 1628 |
| [1]: Sulfuric acid 96% | | | |

Typical mechanical properties

| | | | |
|--------------------------------------|-------------|-------------------|--------------|
| | dry/cond. | | |
| Tensile modulus | 2900 / 1500 | MPa | ISO 527-1/-2 |
| Tensile stress at yield, 50mm/min | 80 / - | MPa | ISO 527-1/-2 |
| Tensile strain at yield, 50mm/min | 4.5 / - | % | ISO 527-1/-2 |
| Nominal strain at break | 25 / - | % | ISO 527-1/-2 |
| Tensile strain at break, 50mm/min | 50 / - | % | ISO 527-1/-2 |
| Flexural modulus | 2300 / - | MPa | ISO 178 |
| Charpy impact strength, 23°C | N / N | kJ/m ² | ISO 179/1eU |
| Charpy impact strength, -30°C | N / - | kJ/m ² | ISO 179/1eU |
| Charpy impact strength, -40°C | N / - | kJ/m ² | ISO 179/1eU |
| Charpy notched impact strength, 23°C | 6 / - | kJ/m ² | ISO 179/1eA |
| Izod notched impact strength, 23°C | 6 / - | kJ/m ² | ISO 180/1A |
| Izod notched impact strength, -40°C | 6.0 / - | kJ/m ² | ISO 180/1A |
| Izod impact strength, 23°C | - / N | kJ/m ² | ISO 180/1U |
| Hardness, Rockwell, R-scale | 119 / - | | ISO 2039-2 |
| Ball indentation hardness, H 961/30 | 170 / - | MPa | ISO 2039-1 |
| Poisson's ratio | 0.37 / 0.43 | | |
| Abrasion resistance | 4.5 / * | mm ³ | ISO 4649 |

Tribological properties

| | | | |
|---|-----------|--|-----------|
| | dry/cond. | | |
| Coefficient of static friction, against steel | - / 0.22 | | ISO 8295 |
| Coefficient of sliding friction, 1h against steel | - / 0.26 | | ASTM 1894 |

Thermal properties

| | | | |
|--|-----------|----------|----------------|
| | dry/cond. | | |
| Melting temperature, 10°C/min | 221 / * | °C | ISO 11357-1/-3 |
| Glass transition temperature, 10°C/min | 60 / 15 | °C | ISO 11357-1/-3 |
| Temperature of deflection under load, 1.8 MPa | 55 / * | °C | ISO 75-1/-2 |
| Temperature of deflection under load, 0.45 MPa | 160 / * | °C | ISO 75-1/-2 |
| Coefficient of linear thermal expansion (CLTE), parallel | 70 / * | E-6/K | ISO 11359-1/-2 |
| Coefficient of linear thermal expansion (CLTE), normal | 100 / * | E-6/K | ISO 11359-1/-2 |
| Thermal conductivity, flow | 0.24 | W/(m K) | ISO 22007-2 |
| Specific heat capacity solid | 1680 | J/(kg K) | ISO 22007-4 |

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Flammability

| | dry/cond. | | |
|---|-----------|--------|----------------------|
| Glow Wire Flammability Index, 1.0mm | 800 / - | °C | IEC 60695-2-12 |
| Glow Wire Flammability Index, 3.0mm | 850 / - | °C | IEC 60695-2-12 |
| Glow Wire Ignition Temperature, 0.75mm | 725 / - | °C | IEC 60695-2-13 |
| Glow Wire Ignition Temperature, 0.4mm | 725 / - | °C | IEC 60695-2-12 |
| Glow Wire Ignition Temperature, 1.0mm | 725 / - | °C | IEC 60695-2-13 |
| Glow Wire Ignition Temperature, 1.5mm | 725 / - | °C | IEC 60695-2-13 |
| Glow Wire Ignition Temperature, 2.0mm | 725 / - | °C | IEC 60695-2-13 |
| Glow Wire Ignition Temperature, 3.0mm | 725 / - | °C | IEC 60695-2-13 |
| Glow Wire Temperature, No Flame, 0.75mm | 700 / - | °C | IEC 60335-1 |
| Glow Wire Temperature, No Flame, 1mm | 700 / - | °C | IEC 60335-1 |
| Glow Wire Temperature, No Flame, 1.5mm | 700 / - | °C | IEC 60335-1 |
| Glow Wire Temperature, No Flame, 2mm | 700 / - | °C | IEC 60335-1 |
| Glow Wire Temperature, No Flame, 3mm | 700 / - | °C | IEC 60335-1 |
| FMVSS Class | B | | ISO 3795 (FMVSS 302) |
| Burning rate, Thickness 1 mm | <80 | mm/min | ISO 3795 (FMVSS 302) |

Electrical properties

| | dry/cond. | | |
|-----------------------------|-------------|-------|---------------|
| Relative permittivity, 1MHz | 3.5 / 7 | | IEC 62631-2-1 |
| Volume resistivity | 1E13 / 1E10 | Ohm.m | IEC 62631-3-1 |
| Surface resistivity | */1E10 | Ohm | IEC 62631-3-2 |
| Comparative tracking index | 600 / 600 | | IEC 60112 |

Physical/Other properties

| | dry/cond. | | |
|--------------------------|-----------|-------------------|----------------|
| Humidity absorption, 2mm | 3 / * | % | Sim. to ISO 62 |
| Water absorption, 2mm | 9.5 / * | % | Sim. to ISO 62 |
| Density | 1130 / - | kg/m ³ | ISO 1183 |

Film Properties

| | dry/cond. | | |
|--|-----------|--|----------------|
| Stress at yield, parallel | 32 / * | MPa | ISO 527-3 |
| Stress at yield, normal | 31 / * | MPa | ISO 527-3 |
| Strain at yield, parallel | 18 / * | % | ISO 527-3 |
| Strain at yield, normal | 18 / * | % | ISO 527-3 |
| Maximum stress, parallel | 90 / * | MPa | ISO 527-3 |
| Maximum stress, normal | 80 / * | MPa | ISO 527-3 |
| Maximum strain, parallel | 350 / * | % | ISO 527-3 |
| Maximum strain, normal | 400 / * | % | ISO 527-3 |
| Gloss, 60° | 90 / * | | ISO 2813 |
| Haze | 0.02 / * | | ISO 14782 |
| WVTR, 23°C/85%r.h. | 15 / * | g/(m ² *d) | DIS 15106-1/-2 |
| Oxygen transmission rate, 23°C/0%r.h. | 12 / * | cm ³ /(m ² *d*bar) | DIS 15105-1/-2 |
| Carbon Dioxide transm. rate, 23°C/0%r.h. | 45 / * | cm ³ /(m ² *d*bar) | DIS 15105-1/-2 |
| Thickness of specimen | 0.1 / * | mm | |

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Injection

| | |
|---------------------------------|--------------|
| Drying Recommended | yes |
| Drying Temperature | 80 °C |
| Drying Time, Dehumidified Dryer | 2 - 4 h |
| Processing Moisture Content | ≤0.2 % |
| Melt Temperature Optimum | 270 °C |
| Min. melt temperature | 260 °C |
| Max. melt temperature | 280 °C |
| Screw tangential speed | ≤0.2 m/s |
| Mold Temperature Optimum | 70 °C |
| Min. mould temperature | 50 °C |
| Max. mould temperature | 90 °C |
| Hold pressure range | 50 - 100 MPa |
| Hold pressure time | 4 s/mm |

Extrusion

| | |
|---------------------------------|--------------|
| Drying Temperature | ≤80 °C |
| Drying Time, Dehumidified Dryer | 4 - 6 h |
| Processing Moisture Content | ≤0.05 % |
| Melt Temperature Optimum | 235 °C |
| Melt Temperature Range | 230 - 240 °C |

Characteristics

| | |
|---------------|---|
| Processing | Injection Moulding, Film Extrusion, Extrusion, Sheet Extrusion, Other Extrusion, Coatable |
| Delivery form | Pellets |

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

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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

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

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).

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Page: 5 of 5

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