

Zytel® 103FHSA 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® 103FHSA NC010 is a heat stabilised, lubricated Polyamide 66 for injection moulding.

Product information

Resin Identification	PA66	ISO 1043
Part Marking Code	>PA66<	ISO 11469
ISO designation	ISO 16396-PA66,,M1G1HNR,S14-030	

Rheological properties

	dry/cond.		
Viscosity number	143/*	cm ³ /g	ISO 307, 1628
Moulding shrinkage, parallel	1.4/-	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.3/-	%	ISO 294-4, 2577

Typical mechanical properties

	dry/cond.		
Tensile modulus	3100/1400	MPa	ISO 527-1/-2
Tensile stress at yield, 50mm/min	85/55	MPa	ISO 527-1/-2
Tensile strain at yield, 50mm/min	4.5/23	%	ISO 527-1/-2
Nominal strain at break	16/>50	%	ISO 527-1/-2
Flexural modulus	2800/1200	MPa	ISO 178
Flexural stress at 3.5%	95/65	MPa	ISO 178
Tensile creep modulus, 1h	*/1300	MPa	ISO 899-1
Tensile creep modulus, 1000h	*/750	MPa	ISO 899-1
Charpy impact strength, 23°C	N/N	kJ/m ²	ISO 179/1eU
Charpy notched impact strength, 23°C	5/7	kJ/m ²	ISO 179/1eA
Izod notched impact strength, 23°C	6/10	kJ/m ²	ISO 180/1A
Izod notched impact strength, -40°C	5.0/-	kJ/m ²	ISO 180/1A
Hardness, Rockwell, R-scale	121/-		ISO 2039-2
Ball indentation hardness, H 358/30	-/85	MPa	ISO 2039-1
Ball indentation hardness, H 961/30	185/-	MPa	ISO 2039-1
Poisson's ratio	0.37/0.43		

Thermal properties

	dry/cond.		
Melting temperature, 10°C/min	263/*	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	60/40	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	70/*	°C	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	200/*	°C	ISO 75-1/-2

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Coefficient of linear thermal expansion (CLTE), parallel	100/* ^[DS]	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	110/* ^[DS]	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.16	W/(m K)	ISO 22007-2
Effective thermal diffusivity, flow	5E-8	m ² /s	ISO 22007-4
Specific heat capacity of melt	2790	J/(kg K)	ISO 22007-4

[DS]: Derived from similar grade

Flammability

	dry/cond.		
Burning Behav. at 1.5mm nom. thickn.	V-2/*	class	IEC 60695-11-10
Thickness tested	1.5/*	mm	IEC 60695-11-10
Burning Behav. at thickness h	V-2/*	class	IEC 60695-11-10
Thickness tested	0.4/*	mm	IEC 60695-11-10
Glow Wire Flammability Index, 0.4mm	850/-	°C	IEC 60695-2-12
Glow Wire Flammability Index, 0.75mm	850/-	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3.0mm	960/-	°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/-		IEC 62631-2-1
Dissipation factor, 1MHz	165/-	E-4	IEC 62631-2-1
Volume resistivity	1E12/1E9	Ohm.m	IEC 62631-3-1
Surface resistivity	*/1E10	Ohm	IEC 62631-3-2
Electric strength	31/-	kV/mm	IEC 60243-1

Physical/Other properties

	dry/cond.		
Humidity absorption, 2mm	2.6/*	%	Sim. to ISO 62
Water absorption, 2mm	8.5/*	%	Sim. to ISO 62
Water absorption, Immersion 24h	2.8 ^{[1]/*}	%	Sim. to ISO 62
Density	1140/-	kg/m ³	ISO 1183
Density of melt	1010	kg/m ³	

[1]: wall thickness 2mm

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VDA Properties

	dry/cond.		
Emission of organic compounds	1.2	µgC/g	VDA 277
Odour	2.5	class	VDA 270
Fogging, F-value (refraction)	70/*	%	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	290 °C
Min. melt temperature	280 °C
Max. melt temperature	300 °C
Screw tangential speed	≤0.4 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
Ejection temperature	200 °C

Characteristics

Processing	Injection Moulding
Delivery form	Pellets
Additives	Release agent
Special characteristics	Heat stabilised or stable to heat

Automotive

OEM	STANDARD
Mercedes-Benz	DBL5403.00 PA66
Mercedes-Benz	DBL5410.00 PA66
VW Group	VW 50127 PA66-1
VW Group	VW 50133 PA66-1

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

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- ✗ 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

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

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- ✘ 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).