Celanese
The chemistry inside innovation™

Zytel® 151 NC010

LONG CHAIN POLYAMIDE RESIN

Zytel® LCPA long chain polyamide resins provide an innovative and growing portfolio of flexible polymers with excellent thermal, chemical, and hydrolysis resistance. The diverse selection of Zytel® LCPA grades is targeted for a range of performance characteristics, balancing temperature resistance, flexibility and low permeation.

Zytel® 151 NC010 is a low viscosity polyamide 612 resin.

Product information

Resin Identification	PA612	ISO 1043
Part Marking Code	>PA612<	ISO 11469
ISO designation	ISO 16396-PA612,,M1G1N,S10-020	

Rheological properties

	dry/cond.		
Melt mass-flow rate	35 / *	g/10min	ISO 1133
Melt mass-flow rate, Temperature	230 / *	°C	
Melt mass-flow rate, Load	1 / *	kg	
Viscosity number	95 / *	cm^3/g	ISO 307, 1157, 1628
Intrinsic viscosity	0.98		ISO 307, 1157, 1628
Moulding shrinkage, parallel	1.3 / -	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.4 / -	%	ISO 294-4, 2577
Mold Shrinkage, Flow, 3.2mm (0.125in)	1.1 / *	%	
Mold Shrinkage, Transverse, 3.2mm (0.125in)	1.1 / *	%	

Typical mechanical properties

	dry/cond.		
Tensile Modulus	2400 / 1700	MPa	ISO 527-1/-2
Yield stress, 50mm/min	62 / 54	MPa	ISO 527-1/-2
Yield strain, 50mm/min	4.5 / 18	%	ISO 527-1/-2
Nominal strain at break	17 / >50	%	ISO 527-1/-2
Flexural Modulus	2100 / 1400	MPa	ISO 178
Charpy impact strength, 23°C	N / N	kJ/m^2	ISO 179/1eU
Charpy impact strength, -30°C	N / 40	kJ/m^2	ISO 179/1eU
Charpy notched impact strength, 23°C	3.5 / 4	kJ/m^2	ISO 179/1eA
Charpy notched impact strength, -30°C	3.5 / 3	kJ/m^2	ISO 179/1eA
Izod notched impact strength, 23°C	4 / 4.5	kJ/m^2	ISO 180/1A
Izod notched impact strength, -30°C	4.5 / 3	kJ/m^2	ISO 180/1A
Hardness, Rockwell, R-scale	114 / 108		ISO 2039-2
Poisson's ratio	0.38 / 0.42		

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Thermal properties

	dry/cond.		
Melting temperature, 10 °C/min	218 / *	°C	ISO 11357-1/-3
Glass transition temperature, 10 °C/min	65 / 50	°C	ISO 11357-1/-3
Temp. of deflection under load, 1.8 MPa	62 / *	°C	ISO 75-1/-2
Temp. of deflection under load, 0.45 MPa	140 / *	°C	ISO 75-1/-2
Vicat softening temperature, 50 °C/h, 50N	180 / *	°C	ISO 306
Coeff. of linear therm. expansion, parallel, -40-23 °C	90 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, parallel	110 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, parallel, 55-160 °C	160 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, -40-23 °C	90 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	120 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, 55-160 °C	180 / *	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.18	W/(m K)	Internal
Eff. thermal diffusivity	7.5E-8	m^2/s	Internal
Spec. heat capacity of melt	2750	J/(kg K)	Internal
RTI, electrical, 0.75mm	105	°C	UL 746B
RTI, electrical, 1.5mm	105	°C	UL 746B
RTI, electrical, 3mm	105	°C	UL 746B
RTI, impact, 0.75mm	65	°C	UL 746B
RTI, impact, 1.5mm	65	°C	UL 746B
RTI, impact, 3mm	65	°C	UL 746B
RTI, strength, 0.75mm	65	°C	UL 746B
RTI, strength, 1.5mm	65 / *	°C	UL 746B
RTI, strength, 3mm	65	°C	UL 746B

Flammability

	dry/cond.		
Burning Behav. at 1.5mm nom. thickn.	V-2 / *	class	UL 94
Thickness tested	1.5 / *	mm	UL 94
UL recognition	yes / *		UL 94
Burning Behav. at thickness h	V-2 / *	class	UL 94
Thickness tested	0.85 / *	mm	UL 94
UL recognition	yes / *		UL 94
Oxygen index	27 / *	%	ISO 4589-1/-2
Glow Wire Flammability Index, 0.4mm	960 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 0.75mm	960 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 1mm	960 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 1.5mm	960 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 2mm	960 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3mm	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, 1mm	725 / -	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 1.5mm	725 / -	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 2mm	725 / -	°C	IEC 60695-2-13

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Glow Wire Ignition Temperature, 3mm	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	DNI		ISO 3795 (FMVSS 302)

Electrical properties

	dry/cond.		
Volume resistivity	>1E13 / 1E11	Ohm.m	IEC 62631-3-1
Electric strength	30 / 30	kV/mm	IEC 60243-1
Comparative tracking index	600 / -		IEC 60112

Other properties

	dry/cond.		
Humidity absorption, 2mm	1.3 / *	%	Sim. to ISO 62
Water absorption, 2mm	3 / *	%	Sim. to ISO 62
Water absorption, Immersion 24h	0.4 / *	%	Sim. to ISO 62
Density	1060 / -	kg/m³	ISO 1183
Density of melt	900	kg/m³	Internal

VDA Properties

Emission of organic compounds	3.9	µgC/g	VDA 277

Injection

Drying Recommended	yes	
Drying Temperature	80	°C
Drying Time, Dehumidified Dryer	2 - 4	h
Processing Moisture Content	≤0.15	%
Min. melt temperature	230	°C
Max. melt temperature	290	°C
Min. mould temperature	50	°C
Max. mould temperature	90	°C

Extrusion

Drying Temperature	75 - 80	°C
Drying Time, Dehumidified Dryer	3 - 4	h
Processing Moisture Content	≤0.06	%
Melt Temperature Optimum	240	°C
Melt Temperature Range	235 - 250	°C

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Additional information

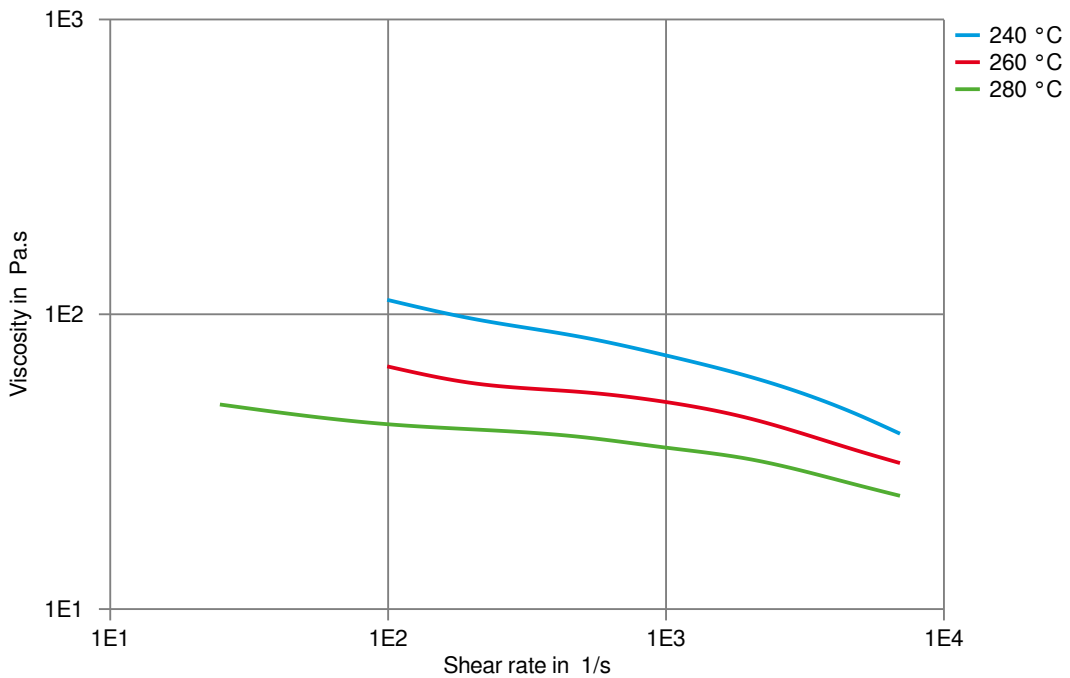
Other extrusion

Melt Viscosity
@235°C, 1000s-1 = 70 Pa.s

Profile extrusion

Melt Viscosity
@235°C, 1000s-1 = 70 Pa.s

Viscosity-shear rate



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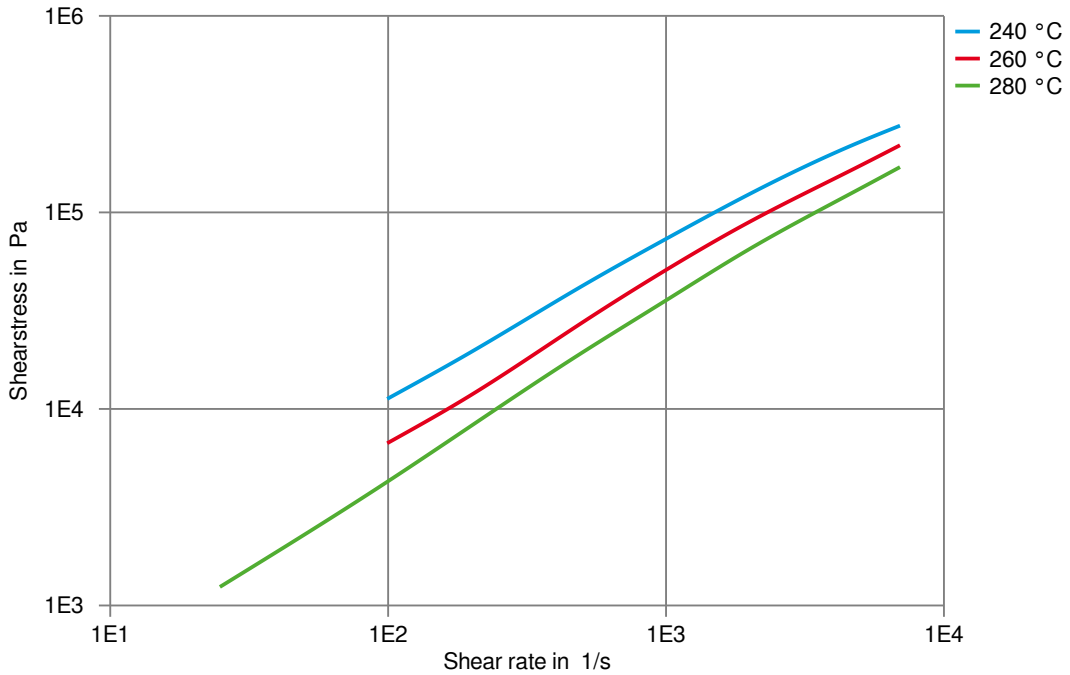
Shearstress-shear rate



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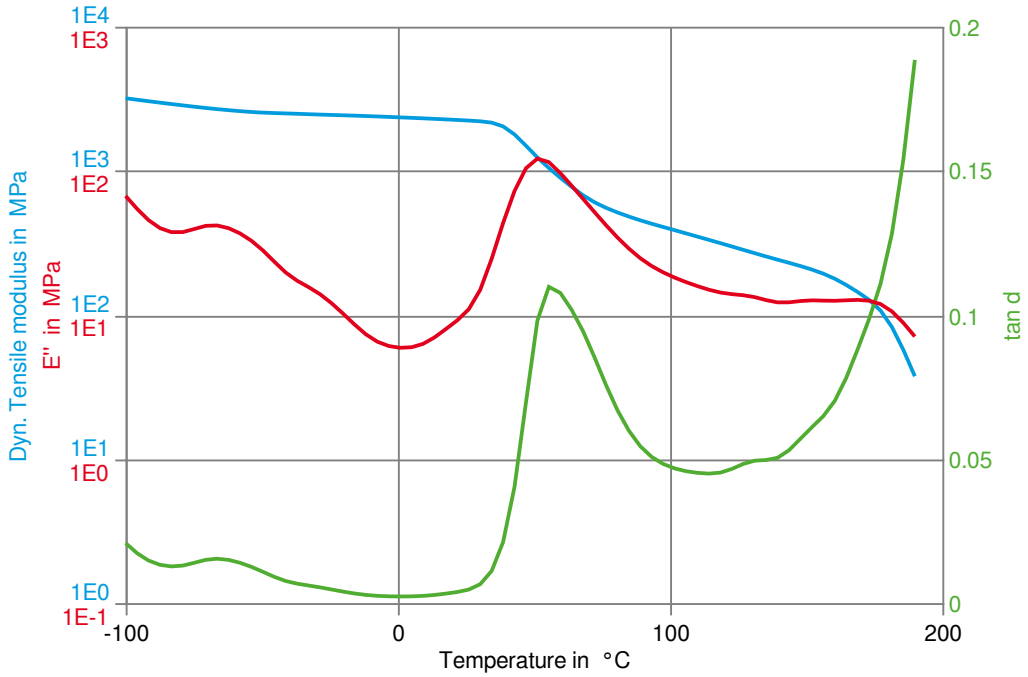
Dynamic Tensile modulus-temperature (dry)



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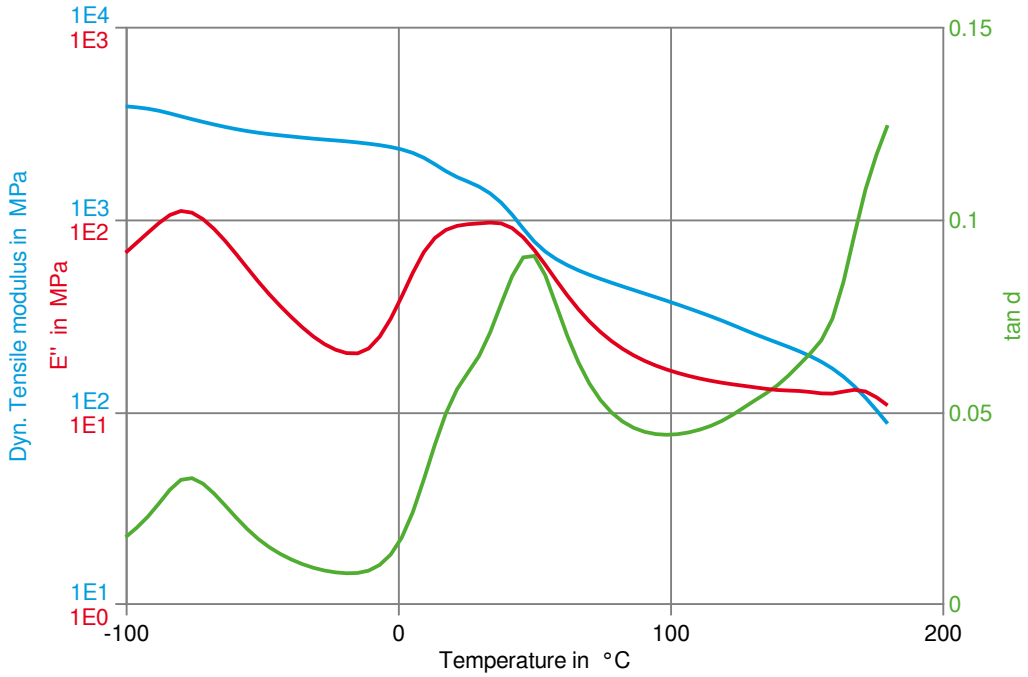
LONG CHAIN POLYAMIDE RESIN

Dynamic Tensile modulus-temperature (cond.)



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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

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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).