

Zytel® 77G33HS1L 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® 77G33HS1L NC010 is a 33% Glass Reinforced, Heat Stabilized, Polyamide 612 resin.

Product information

Resin Identification	PA612-GF33	ISO 1043
Part Marking Code	>PA612-GF33<	ISO 11469
ISO designation	ISO 16396-PA612,GF33,M1GHNR,S09-090	

Rheological properties

	dry/cond.		
Moulding shrinkage, parallel	0.3 / -	%	ISO 294-4, 2577
Moulding shrinkage, normal	0.9 / -	%	ISO 294-4, 2577

Typical mechanical properties

	dry/cond.		
Tensile modulus	9500 / 8000	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	170 / 140	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	3 / 3.2	%	ISO 527-1/-2
Flexural modulus	8500 / -	MPa	ISO 178
Flexural strength	250 / -	MPa	ISO 178
Charpy impact strength, 23°C	80 / 90	kJ/m ²	ISO 179/1eU
Charpy impact strength, -30°C	60 / 65	kJ/m ²	ISO 179/1eU
Charpy notched impact strength, 23°C	13 / 12	kJ/m ²	ISO 179/1eA
Charpy notched impact strength, -30°C	11 / 10	kJ/m ²	ISO 179/1eA
Izod notched impact strength, 23°C	13 / -	kJ/m ²	ISO 180/1A
Izod impact strength, 23°C	60 / -	kJ/m ²	ISO 180/1U
Poisson's ratio	0.34 / 0.34		

Thermal properties

	dry/cond.		
Melting temperature, 10°C/min	218 / *	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	65 / 55	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	200 / *	°C	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	216 / *	°C	ISO 75-1/-2
Coeff. of linear therm. expansion, parallel, -40-23°C	26 / *	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), parallel	20 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, parallel, 55-160°C	14 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, -40-23°C	83 / *	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	110 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, 55-160°C	160 / *	E-6/K	ISO 11359-1/-2
Thermal conductivity, flow	0.42	W/(m K)	ISO 22007-2
Thermal conductivity of melt	0.26	W/(m K)	ISO 22007-2
RTI, electrical, 0.75mm	65	°C	UL 746B
RTI, electrical, 1.5mm	65	°C	UL 746B

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RTI, electrical, 3.0mm	65	°C	UL 746B
RTI, impact, 0.75mm	65	°C	UL 746B
RTI, impact, 1.5mm	65	°C	UL 746B
RTI, impact, 3.0mm	65	°C	UL 746B
RTI, strength, 0.75mm	65	°C	UL 746B
RTI, strength, 1.5mm	65/*	°C	UL 746B
RTI, strength, 3.0mm	65	°C	UL 746B

Flammability

	dry/cond.		
Burning Behav. at 1.5mm nom. thickn.	HB/*	class	IEC 60695-11-10
Thickness tested	1.5/*	mm	IEC 60695-11-10
UL recognition	yes/*		UL 94
Burning Behav. at thickness h	HB/*	class	IEC 60695-11-10
Thickness tested	0.75/*	mm	IEC 60695-11-10
UL recognition	yes/*		UL 94
Glow Wire Flammability Index, 1.0mm	725/-	°C	IEC 60695-2-12
Glow Wire Flammability Index, 2.0mm	750/-	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3.0mm	750/-	°C	IEC 60695-2-12
Glow Wire Ignition Temperature, 1.0mm	725/-	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 2.0mm	750/-	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 3.0mm	750/-	°C	IEC 60695-2-13
FMVSS Class	B		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	<80	mm/min	ISO 3795 (FMVSS 302)

Electrical properties

	dry/cond.		
Volume resistivity	1E13/-	Ohm.m	IEC 62631-3-1
Comparative tracking index	600/-		IEC 60112

Physical/Other properties

	dry/cond.		
Humidity absorption, 2mm	0.7/*	%	Sim. to ISO 62
Water absorption, 2mm	1.8/*	%	Sim. to ISO 62
Water absorption, Immersion 24h	0.1/*	%	Sim. to ISO 62
Density	1320/-	kg/m ³	ISO 1183

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	≤0.2 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

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Ejection temperature

210 °C

Characteristics

Processing

Injection Moulding

Delivery form

Pellets

Special characteristics

Heat stabilised or stable to heat

Automotive

OEM

General Motors

STANDARD

GMW17599P-PA612-GF35

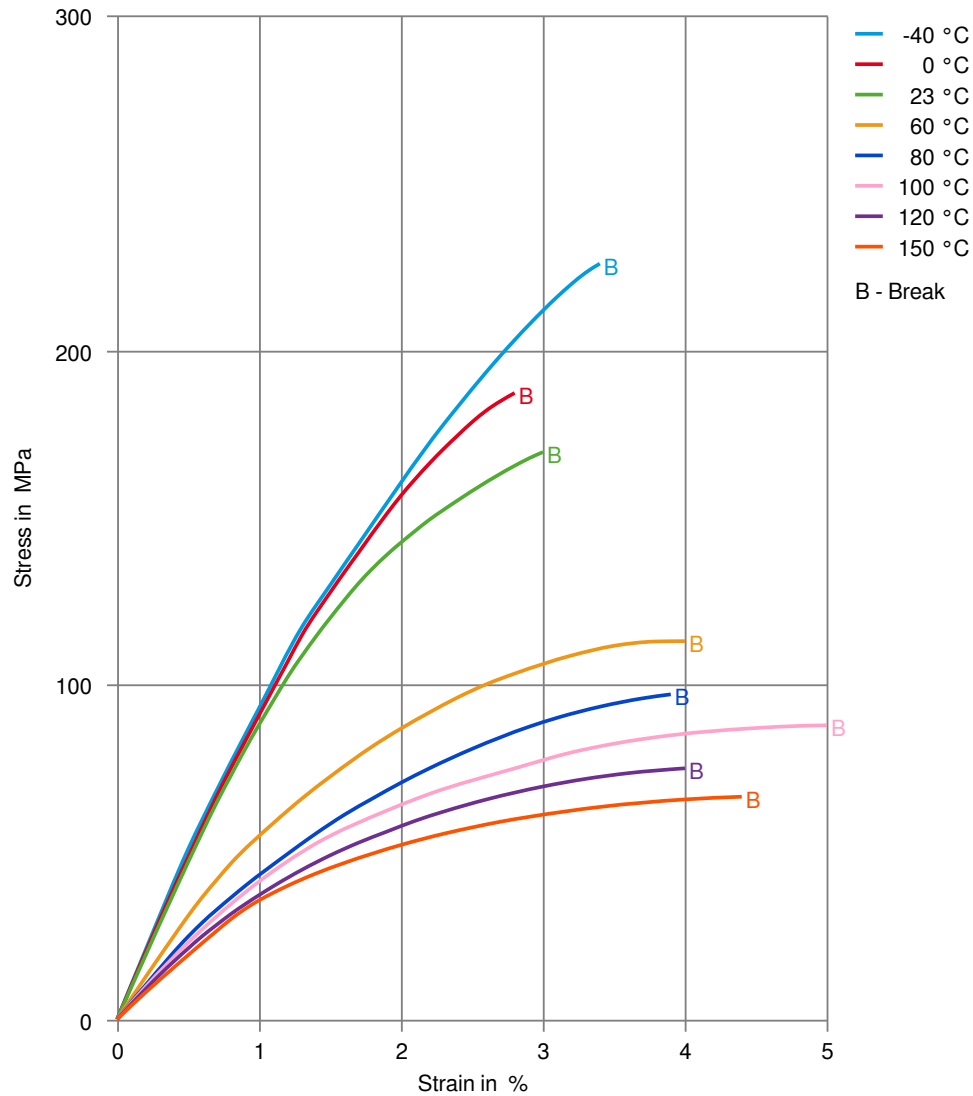
ADDITIONAL INFORMATION

Natural

Stress-strain (dry)

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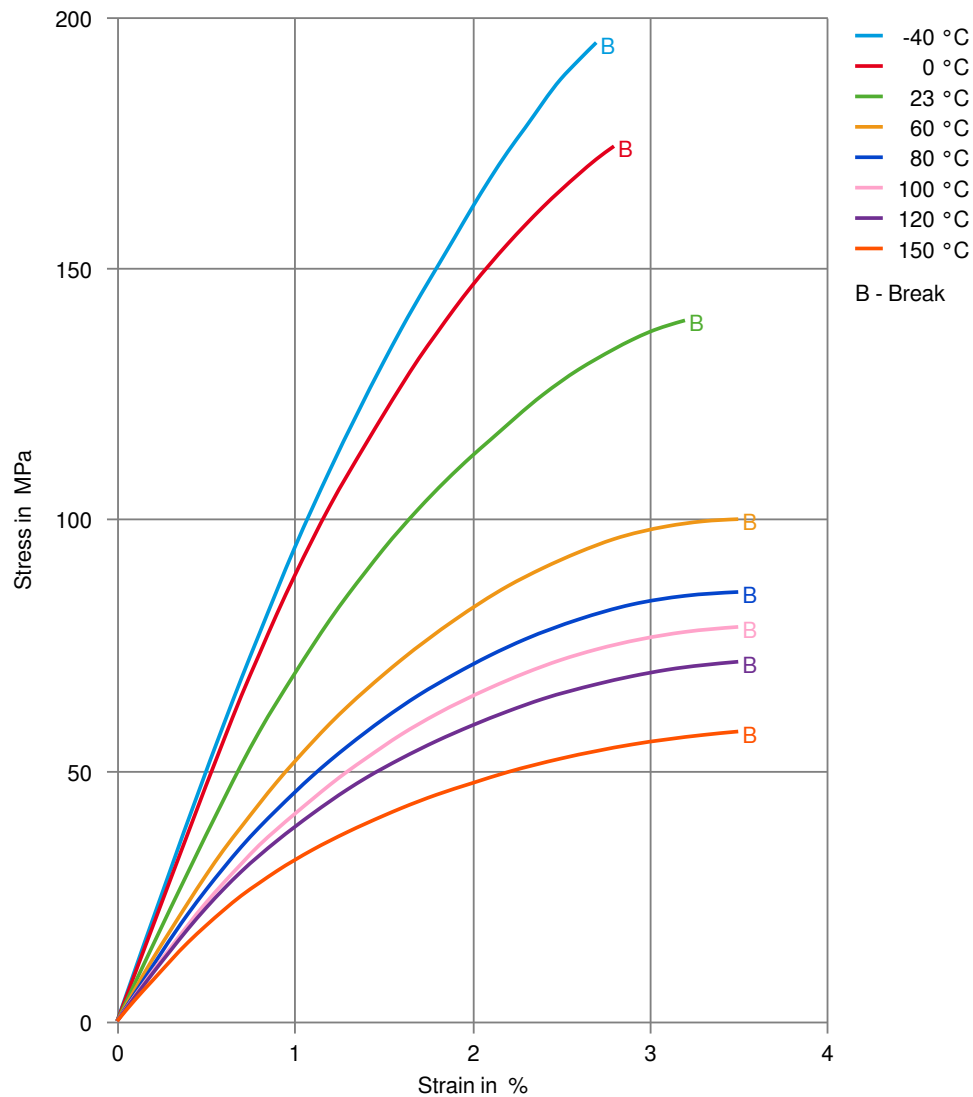
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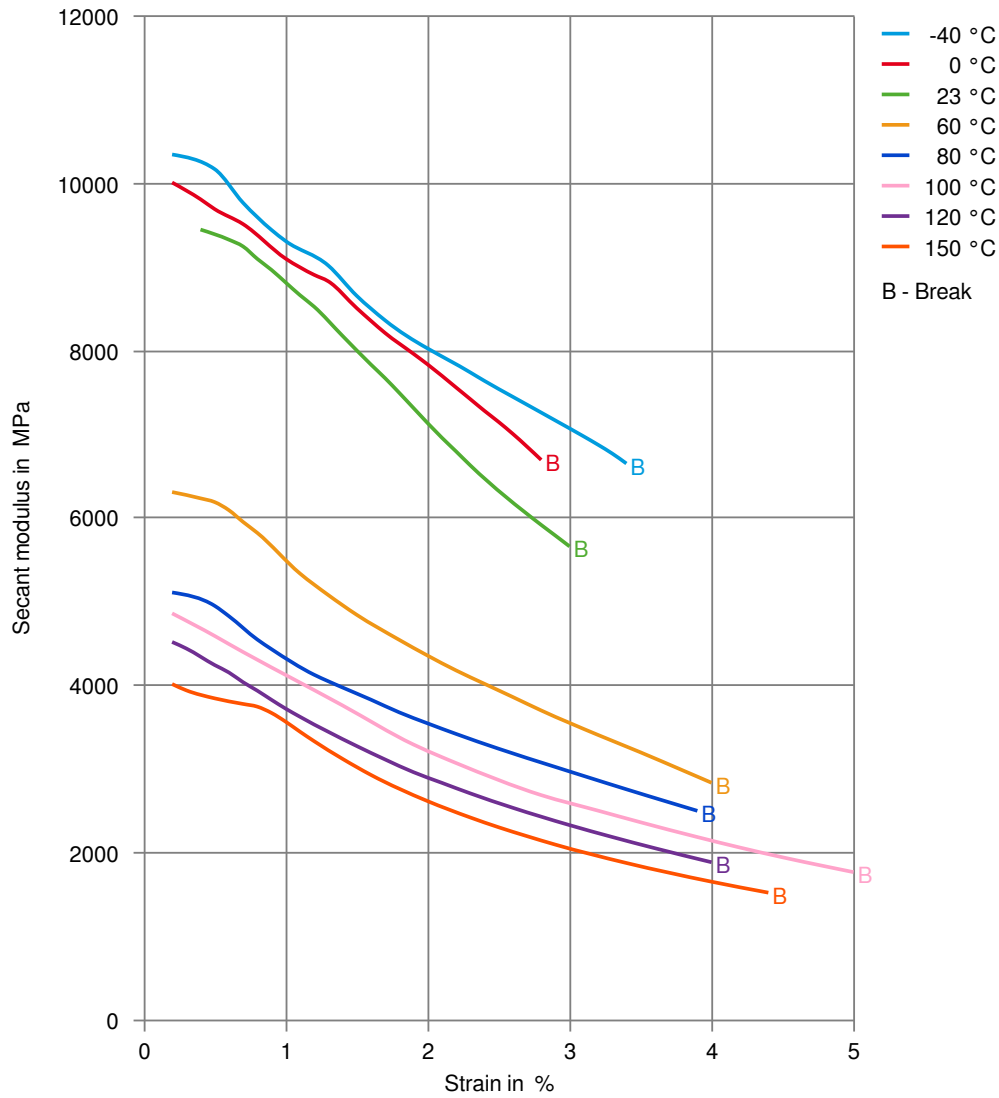
Stress-strain (cond.)



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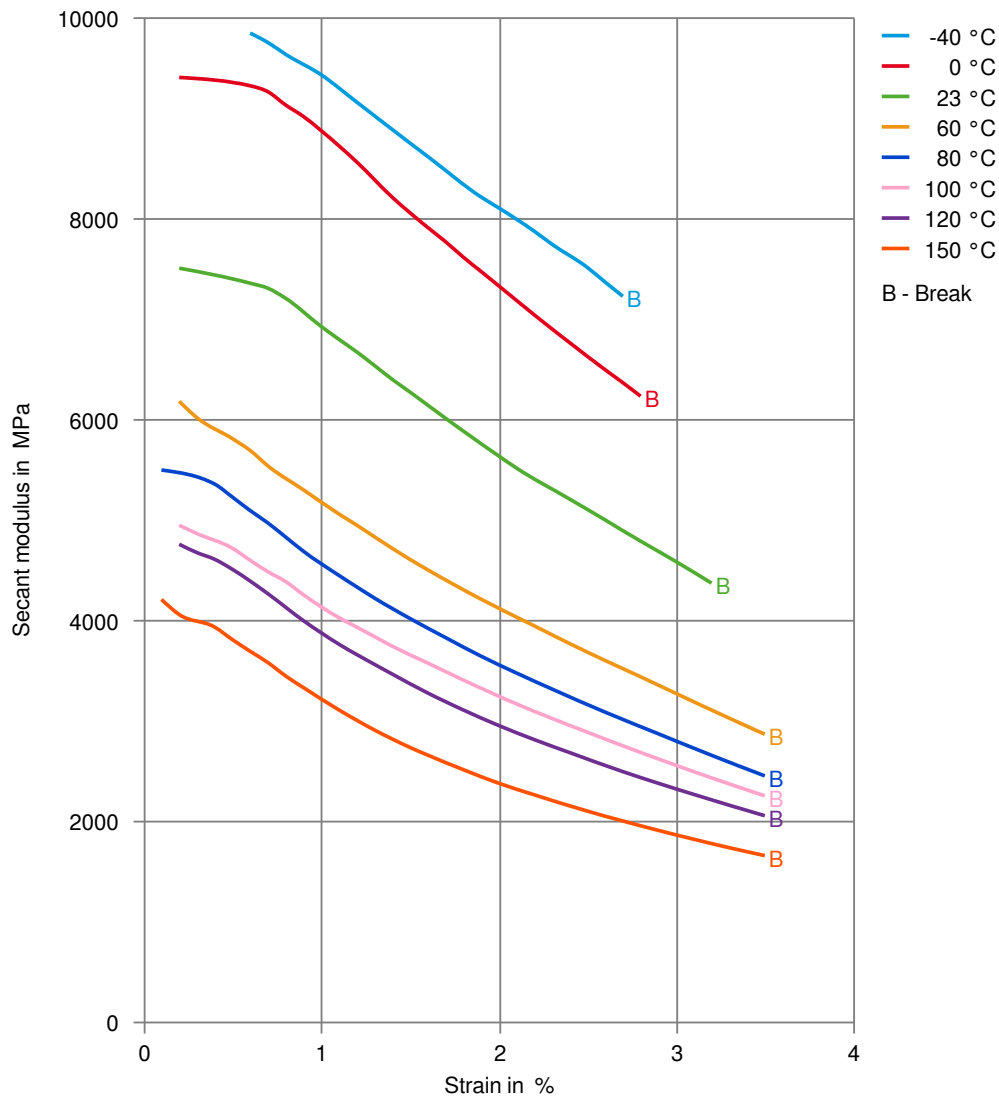
Secant modulus-strain (dry)



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Secant modulus-strain (cond.)



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Chemical Media Resistance

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
- ✓ Diesel EN 590, 100°C

Other

- ✓ Water, 23°C
- ✓ Water, 90°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).