VECTRA® E471I

Liquid Crystal Polymer

35% GF/Min modified/reinforced, low warp Vectra LCP grade with excellent properties
Chemical abbreviation according to ISO 1043-1 : LCP
Inherently flame retardant.
UL-Listing V-0 at all color at 0.15mm thickness per UL 94 flame testing.
Relative-Temperature-Index (RTI) according to UL 746B: electricals 130°C, mechanicals 130°C.
UL = Underwriters Laboratories

Product information

Resin Identification	LCP-(GF+MD)36	ISO 1043
Part Marking Code	>LCP-(GF+MD)36<	ISO 11469

Rheological properties

Molding shrinkage, parallel	0.1	%	ISO 294-4, 2577
Molding shrinkage, normal	0.5	%	ISO 294-4, 2577

Typical mechanical properties

Tensile modulus	1.96E6	psi	ISO 527-1/-2
Tensile stress at break, 5mm/min	18900	psi	ISO 527-1/-2
Tensile strain at break, 5mm/min	2.5	%	ISO 527-1/-2
Flexural modulus	2E6	psi	ISO 178
Flexural strength	29000	psi	ISO 178
Flexural strain at failure	2.5	%	ISO 178
Compressive modulus	1.6E6	psi	ISO 604
Compressive strength	17400	psi	ISO 604
Compressive stress at 1% strain	11900	psi	ISO 604
Charpy impact strength, 23°C	26.2	ftlb/in²	ISO 179/1eU
Charpy notched impact strength, 23°C	6.18	ftlb/in²	ISO 179/1eA
Izod notched impact strength, 23°C	7.61	ftlb/in²	ISO 180/1A
Izod impact strength, 23°C	28.5	ftlb/in²	ISO 180/1U
Hardness, Rockwell, M-scale	55		ISO 2039-2

Thermal properties

Melting temperature, 10°C/min	635	°F	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	509	°F	ISO 75-1/-2
Temperature of deflection under load, 8 MPa	428	°F	ISO 75-1/-2
Vicat softening temperature, 50°C/h 50N	392	°F	ISO 306
Ball pressure test	482	°F	IEC 60695-10-2
Coefficient of linear thermal expansion (CLTE), parallel	0.04[OT, 1]	E-4/°F	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	0.344[OT, 1]	E-4/°F	ISO 11359-1/-2

[OT]: One time tested

[1]: Temperature range: 23°C to 200°C

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Flammability

Burning Behav. at thickness h	V-0	class	IEC 60695-11-10
Thickness tested	0.0059	in	IEC 60695-11-10
Glow Wire Flammability Index, 0.4mm	1760	°F	IEC 60695-2-12
Glow Wire Flammability Index, 0.75mm	1760	°F	IEC 60695-2-12
Glow Wire Flammability Index, 1.0mm	1470	°F	IEC 60695-2-12
Glow Wire Ignition Temperature, 0.75mm	1610	°F	IEC 60695-2-13
Glow Wire Ignition Temperature, 0.4mm	1650	°F	IEC 60695-2-12

Electrical properties

Relative permittivity, 1MHz	3.8		IEC 62631-2-1
Relative permittivity, 2GHz	3.97[OT]		IEC 61189-2-721
Relative permittivity, 10GHz	4.04[OT]		IEC 61189-2-721
Dissipation factor, 1MHz	310	E-4	IEC 62631-2-1
Dissipation factor, 2GHz	49[OT]	E-4	IEC 61189-2-721
Dissipation factor, 10GHz	45[OT]	E-4	IEC 61189-2-721
Volume resistivity	1E14	Ohm.m	IEC 62631-3-1
Surface resistivity	>1E15	Ohm	IEC 62631-3-2
Electric strength	1350	kV/in	IEC 60243-1

[OT]: One time tested

Physical/Other properties

Humidity absorption, 2mm	0.002	%	Sim. to ISO 62
Water absorption, 2mm	0.015	%	Sim. to ISO 62
Density	0.0603	lb/in³	ISO 1183

Injection

Drying Recommended	yes	
Drying Temperature	302	°F
Drying Time, Dehumidified Dryer	4 - 6	h
Processing Moisture Content	≤0.01	%
Melt Temperature Optimum	671	°F
Min. melt temperature	635	°F
Max. melt temperature	698	°F
Max. screw tangential speed	0.2	m/s
Mold Temperature Optimum	212	°F
Min. mold temperature	176	°F
Max. mold temperature	248	°F
Back pressure	435	psi
Ejection temperature	516	°F

Characteristics

Processing	Injection Molding
Special characteristics	Flame retardant, Heat stabilized or stable to heat, High Flow, Low Warpage, Lead-free soldering resistant

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Additional information

Injection molding

Preprocessing

Vectra resins are well known for their excellent thermal and hydrolytic stability. In order to ensure these properties are optimum, the resin should be dried correctly prior to processing. Vectra Ei-grades and Vectra V143XL should be dried at 150°C for a minimum of 6 hours or at 170°C for a minimum of 4 hours in a desiccant dryer.

Processing

A three-zone screw evenly divided into feed, compression, and metering zones is preferred. A higher percentage of feed flights may be needed for smaller machines: 1/2 feed, 1/4 compression, 1/4 metering.

Vectra LCPs are shear thinning, their melt viscosity decreases quickly as shear rate increases. For parts that are difficult to fill, the molder can increase the injection velocity to improve melt flow.

Processing Notes

Pre-Drying

VECTRA should in principle be predried. Because of the necessary low maximum residual moisture content the use of dry air dryers is recommended. The dew point should be =< - 40° C. The time between drying and processing should be as short as possible.

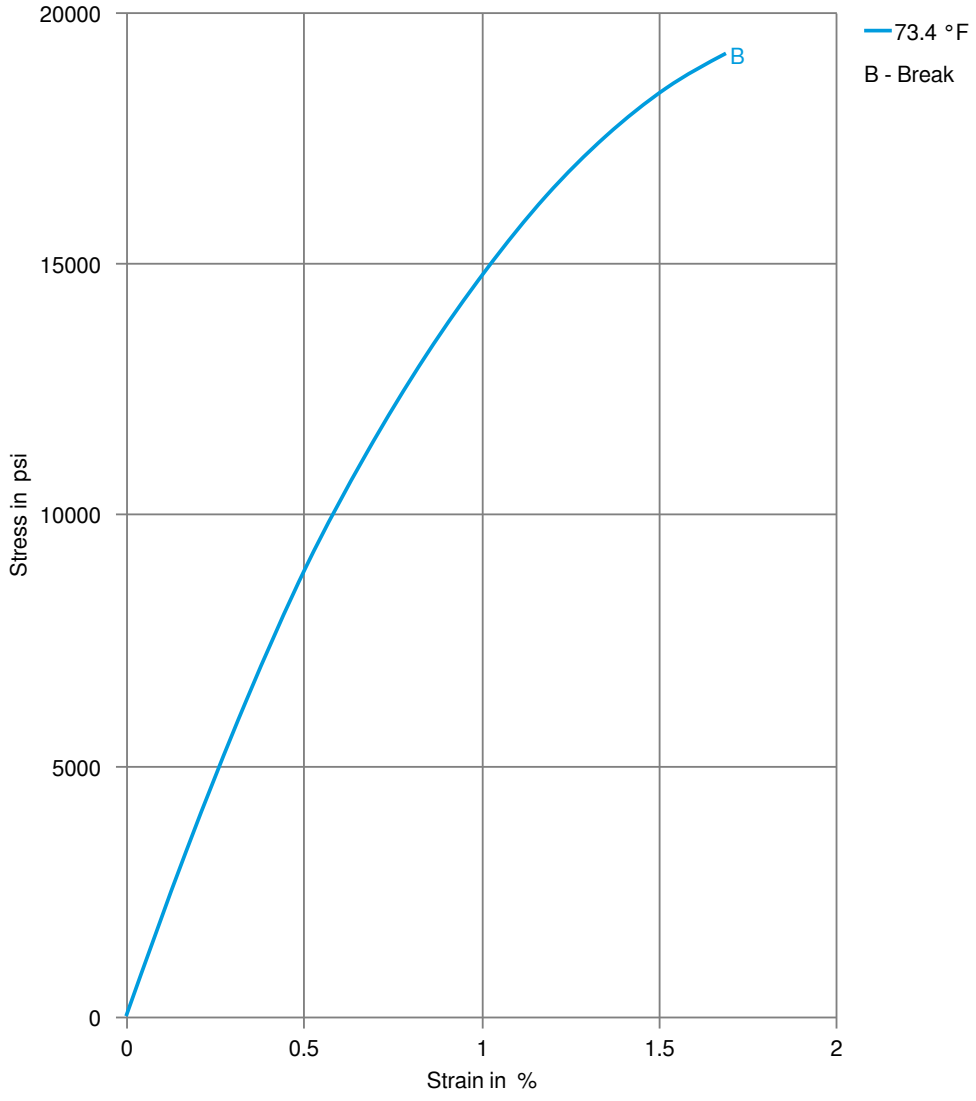
Storage

For subsequent storage of the material in the dryer until processed the temperature does not need to be lowered for grades A, B, C, D and V (<= 24 h).

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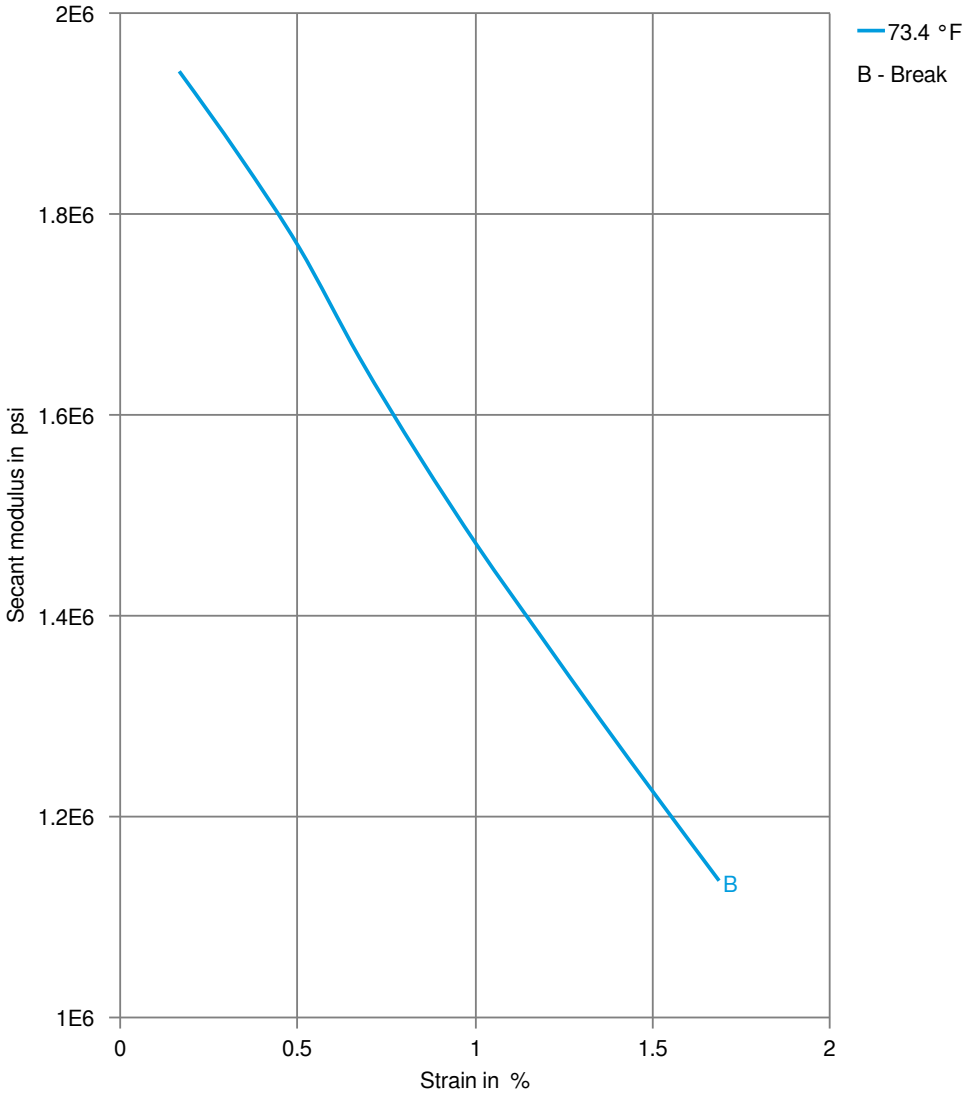
Stress-strain



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Secant modulus-strain



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