Celanese
The chemistry inside innovation™

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

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

Typical mechanical properties

Tensile modulus	13500	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	130	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	2.5	%	ISO 527-1/-2
Flexural modulus	13800	MPa	ISO 178
Flexural strength	200	MPa	ISO 178
Flexural strain at failure	2.5	%	ISO 178
Compressive modulus	11000	MPa	ISO 604
Compressive strength	120	MPa	ISO 604
Compressive stress at 1% strain	82	MPa	ISO 604
Charpy impact strength, 23°C	55	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	13	kJ/m²	ISO 179/1eA
Izod notched impact strength, 23°C	16	kJ/m²	ISO 180/1A
Izod impact strength, 23°C	60	kJ/m²	ISO 180/1U
Hardness, Rockwell, M-scale	55		ISO 2039-2
Poisson's ratio	0.33[C]		

[C]: Calculated

Thermal properties

Melting temperature, 10°C/min	335	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	265	°C	ISO 75-1/-2
Temperature of deflection under load, 8 MPa	220	°C	ISO 75-1/-2
Vicat softening temperature, 50°C/h 50N	200	°C	ISO 306
Ball pressure test	250	°C	IEC 60695-10-2
Coefficient of linear thermal expansion (CLTE), parallel	7[OT, 1]	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	62[OT, 1]	E-6/K	ISO 11359-1/-2

[OT]: One time tested

[1]: Temperature range: 23°C to 200°C

Celanese
The chemistry inside innovation™

VECTRA® E471I

Liquid Crystal Polymer

Flammability

Burning Behav. at thickness h	V-0	class	IEC 60695-11-10
Thickness tested	0.15	mm	IEC 60695-11-10
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, 1.0mm	800	°C	IEC 60695-2-12
Glow Wire Ignition Temperature, 0.75mm	875	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 0.4mm	900	°C	IEC 60695-2-12

Electrical properties

Relative permittivity, 1MHz	3.8		IEC 62631-2-1
Dissipation factor, 1MHz	310	E-4	IEC 62631-2-1
Volume resistivity	1E14	Ohm.m	IEC 62631-3-1
Surface resistivity	>1E15	Ohm	IEC 62631-3-2
Electric strength	53	kV/mm	IEC 60243-1
Comparative tracking index, 100 drops	200		IEC 60112
Relative permittivity, printed circuits and boards, 2.5 GHz	4[OT]		IEC 61189-2-721
Relative permittivity, printed circuits and boards, 10 GHz	4.04[OT]		IEC 61189-2-721
Dissipation factor, printed circuits and boards, 2.5 GHz	49[OT]	E-4	IEC 61189-2-721
Dissipation factor, printed circuits and boards, 10 GHz	45[OT]	E-4	IEC 61189-2-721

[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	1670	kg/m³	ISO 1183

Injection

Drying Recommended	yes	
Drying Temperature	150	°C
Drying Time, Dehumidified Dryer	4 - 6	h
Processing Moisture Content	≤0.01	%
Melt Temperature Optimum	355	°C
Min. melt temperature	335	°C
Max. melt temperature	370	°C
Screw tangential speed	0.2	m/s
Mold Temperature Optimum	100	°C
Min. mould temperature	80	°C
Max. mould temperature	120	°C
Back pressure	3	MPa
Ejection temperature	269	°C

Celanese
The chemistry inside innovation™

VECTRA® E471I

Liquid Crystal Polymer

Characteristics

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

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

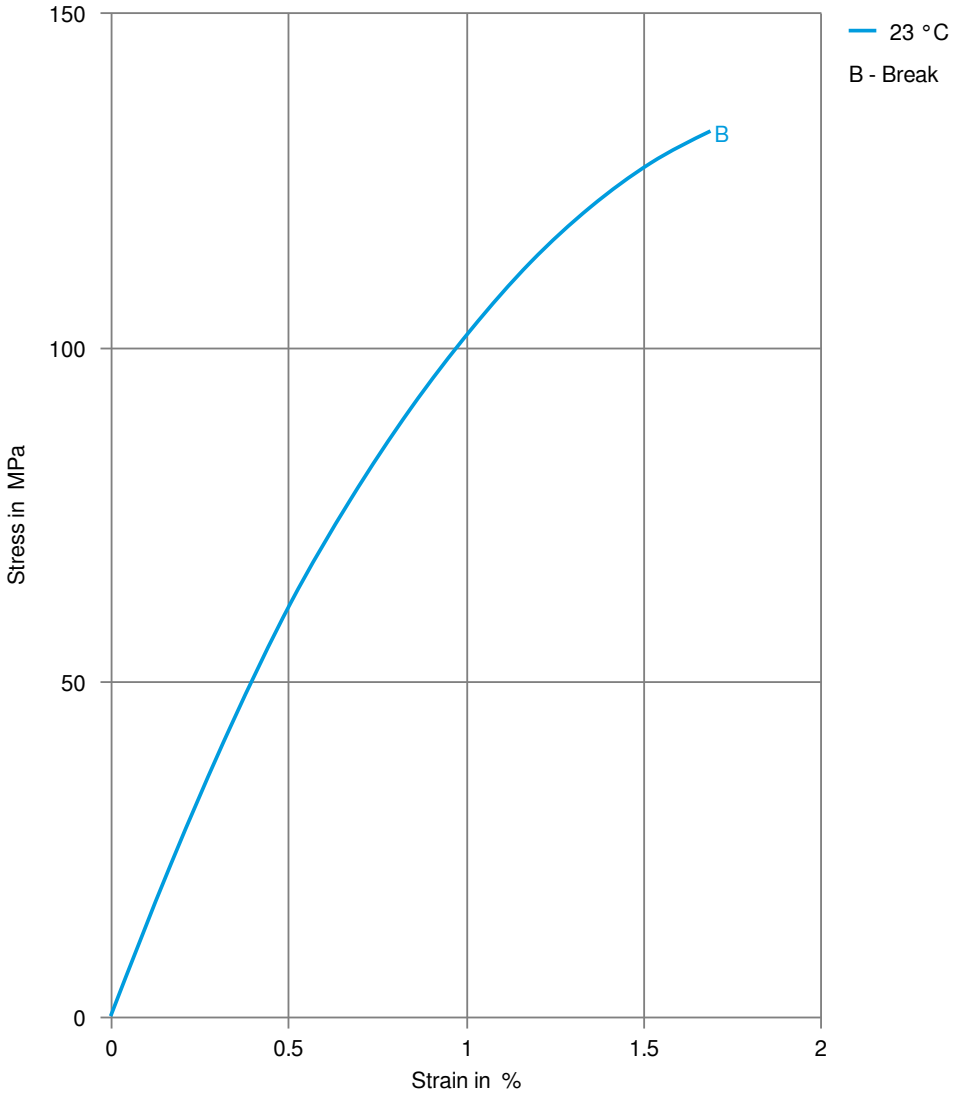
For subsequent storage of the material in the dryer until processed the temperature does not need to be lowered for grades A, B, C, D and V (<= 24 h).

Celanese
The chemistry inside innovation™

VECTRA® E471I

Liquid Crystal Polymer

Stress-strain



Celanese
The chemistry inside innovation™

VECTRA® E471I

Liquid Crystal Polymer

Secant modulus-strain