

## VECTRA® MT®4310 - LCP

### Description

30% glass fiber, excellent flow, high temperature capability  
 Vectra® MT4310 VF3001 (natural) is a 30% glass reinforced high flow, LCP grade for injection molding.

Vectra® MT4310 VF3001 (natural) is a special grade developed for medical industry applications and complies with:

- Food Contact Substance Notification (FCN) No. 742 of the Food and Drug Administration (FDA) and is listed in the Drug Master File (DMF 8464) and the Device Master File (MAF 315)
- the corresponding EU and national registry regulatory requirements
- biocompatibility in tests corresponding to USP 23 Class VI/ISO 10993
- low residual monomers
- no animal products

Highest temperature capability

Easiest flow

Suitable where very thin walls are required

Used for broad range of SMT applications, with minimal dimensional change

Chemical abbreviation according to ISO 1043-1 : LCP

Inherently flame retardant

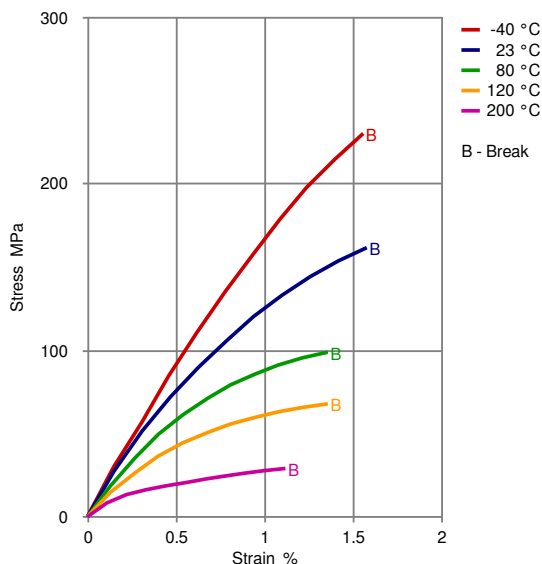
Physical properties	Value	Unit	Test Standard
Density	1610	kg/m <sup>3</sup>	ISO 1183
Molding shrinkage, parallel (flow)	0.1	%	ISO 294-4, 2577
Molding shrinkage, transverse normal	0.5	%	ISO 294-4, 2577
Mechanical properties	Value	Unit	Test Standard
Tensile modulus	16000	MPa	ISO 527-1, -2
Tensile stress at break, 5mm/min	160	MPa	ISO 527-1, -2
Tensile strain at break, 5mm/min	1.6	%	ISO 527-1, -2
Flexural modulus, 23 °C	16000	MPa	ISO 178
Flexural strength, 23 °C	225	MPa	ISO 178
Charpy notched impact strength, 23 °C	40	kJ/m <sup>2</sup>	ISO 179/1eA
Izod impact notched, 23 °C	30	kJ/m <sup>2</sup>	ISO 180/1A
Compressive modulus	14000	MPa	ISO 604
Compressive stress at 1% strain	93	MPa	ISO 604
Rockwell hardness (M-Scale)	71	M-Scale	ISO 2039-2
Thermal properties	Value	Unit	Test Standard
Melting temperature, 10 °C/min	335	°C	ISO 11357-1/-3
DTUL at 1.8 MPa	276	°C	ISO 75-1, -2
DTUL at 8.0 MPa	216	°C	ISO 75-1, -2
Vicat softening temperature, 50 °C/h 50N	195	°C	ISO 306
Coeff. of linear therm expansion, parallel	0.07	E-4/°C	ISO 11359-2
Coeff. of linear therm expansion, normal	0.2	E-4/°C	ISO 11359-2
Limiting oxygen index (LOI)	45	%	ISO 4589-1/-2
Flammability at thickness h	V-0	class	UL 94
Electrical properties	Value	Unit	Test Standard
Dielectric constant (Dk), 100Hz	4	-	IEC 60250
Dielectric constant (Dk), 1MHz	3.3	-	IEC 60250
Dissipation factor, 100Hz	100	E-4	IEC 60250
Dissipation factor, 1MHz	250	E-4	IEC 60250
Volume resistivity, 23 °C	1E13	Ohm*m	IEC 62631-3-1
Surface resistivity, 23 °C	1E14	Ohm	IEC 62631-3-2
Electric strength, 23 °C (AC)	32	kV/mm	IEC 60243-1
Comparative tracking index	PLC 3	-	UL 746



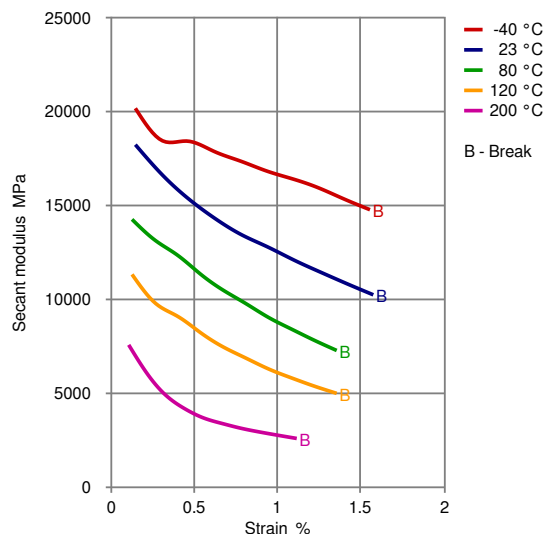
Arc resistance	<b>140</b>	s	Internal
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**Diagrams**

**Stress-strain**



**Secant modulus-strain**



**Typical injection moulding processing conditions**

**Pre Drying**

	Value	Unit
Necessary low maximum residual moisture content	<b>0.01</b>	%
Drying time	<b>4 - 6</b>	h
Drying temperature	<b>170</b>	°C

**Temperature**

	Value	Unit
Hopper temperature	<b>20 - 30</b>	°C
Feeding zone temperature	<b>60 - 80</b>	°C
Zone1 temperature	<b>315 - 325</b>	°C
Zone2 temperature	<b>320 - 330</b>	°C
Zone3 temperature	<b>325 - 335</b>	°C
Zone4 temperature	<b>330 - 340</b>	°C
Nozzle temperature	<b>335 - 345</b>	°C
Melt temperature	<b>335 - 345</b>	°C
Mold temperature	<b>80 - 120</b>	°C
Hot runner temperature	<b>335 - 345</b>	°C

**Pressure**

	Value	Unit
Injection pressure	<b>500 - 1500</b>	bar
Hold pressure	<b>500 - 1500</b>	bar
Back pressure max.	<b>30</b>	bar

**Speed**

	Value
Injection speed	<b>very fast</b>

**Screw Speed**

	Value	Unit
Screw speed diameter, 16mm	<b>200</b>	RPM
Screw speed diameter, 25mm	<b>140</b>	RPM
Screw speed diameter, 40mm	<b>80</b>	RPM



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Other	Value	Unit	Test Standard
Specimen thickness (shrinkage)	3.18	mm	Internal

### Other text information

#### 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  $\leq -40^{\circ}\text{C}$ . The time between drying and processing should be as short as possible.

#### Longer pre-drying times/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 ( $\leq 24$  h).

#### Injection molding

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.

#### 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 LCP MT4310 and MT4350 should be dried at  $150^{\circ}\text{C}$  for a minimum of 6 hours or at  $170^{\circ}\text{C}$  for a minimum of 4 hours in a desiccant dryer.

### Characteristics

Special Characteristics	Flame retardant, Light stabilized
Product Categories	Medical technology
Processing	Injection molding
Delivery Form	Pellets

### General Disclaimer

NOTICE TO USERS: Values shown are based on testing of laboratory test specimens and represent data that fall within the standard range of properties for natural material. These values alone do not represent a sufficient basis for any part design and are not intended for use in establishing maximum, minimum, or ranges of values for specification purposes. Colorants or other additives may cause significant variations in data values. Properties of molded parts can be influenced by a wide variety of factors including, but not limited to, material selection, additives, part design, processing conditions and environmental exposure. Any determination of the suitability of a particular material and part design for any use contemplated by the users and the manner of such use is the sole responsibility of the users, who must assure themselves that the material as subsequently processed meets the needs of their particular product or use. To the best of our knowledge, the information contained in this publication is accurate; however, we do not assume any liability whatsoever for the accuracy and completeness of such information. The information contained in this publication should not be construed as a promise or guarantee of specific properties of our products. It is the sole responsibility of the users to investigate whether any existing patents are infringed by the use of the materials mentioned in this publication. Moreover, there is a need to reduce human exposure to many materials to the lowest practical limits in view of possible adverse effects. To the extent that any hazards may have been mentioned in this publication, we neither suggest nor guarantee that such hazards are the only ones that



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