Celanese
The chemistry inside innovation™

# VECTRA® MT®1310 - LCP

## Description

30% glass fiber, exc. bal. of properties
Vectra® MT1310 VF3001 (natural) is a 30% glass reinforced, easy flow LCP grade for injection molding.

Vectra® MT1310 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

The Standard for the Industry. Excellent balance of properties, including easy flow, easy processing, thermal stability, chemical resistance, mechanical and electrical properties. Suitable for vapor phase surface mount electrical and electronic devices.
Chemical abbreviation according to ISO 1043-1 : LCP
Inherently flame retardant

| Physical properties | Value | Unit | Test Standard |
|---|---|---|---|
| Density | **1620** | kg/m³ | ISO 1183 |
| Molding shrinkage, parallel (flow) | **0.2** | % | ISO 294-4, 2577 |
| Molding shrinkage, transverse normal | **0.4** | % | ISO 294-4, 2577 |
| Humidity absorption, 23°C/50%RH | **0.04** | % | ISO 62 |

| Mechanical properties | Value | Unit | Test Standard |
|---|---|---|---|
| Tensile modulus | **15000** | MPa | ISO 527-1, -2 |
| Tensile stress at break, 5mm/min | **190** | MPa | ISO 527-1, -2 |
| Tensile strain at break, 5mm/min | **2.1** | % | ISO 527-1, -2 |
| Tensile creep modulus, 1h | **12600** | MPa | ISO 899-1 |
| Tensile creep modulus, 1000h | **10900** | MPa | ISO 899-1 |
| Flexural modulus, 23°C | **15000** | MPa | ISO 178 |
| Flexural strength, 23°C | **260** | MPa | ISO 178 |
| Charpy notched impact strength, 23°C | **46** | kJ/m² | ISO 179/1eA |
| Izod impact notched, 23°C | **33** | kJ/m² | ISO 180/1A |
| Compressive modulus | **14500** | MPa | ISO 604 |
| Compressive stress at 1% strain | **100** | MPa | ISO 604 |
| Rockwell hardness (M-Scale) | **85** | M-Scale | ISO 2039-2 |

| Thermal properties | Value | Unit | Test Standard |
|---|---|---|---|
| Melting temperature, 10°C/min | **280** | °C | ISO 11357-1/-3 |
| DTUL at 1.8 MPa | **235** | °C | ISO 75-1, -2 |
| DTUL at 0.45 MPa | **250** | °C | ISO 75-1, -2 |
| DTUL at 8.0 MPa | **190** | °C | ISO 75-1, -2 |
| Vicat softening temperature, 50°C/h 50N | **160** | °C | ISO 306 |
| Coeff. of linear therm expansion, parallel | **0.06** | E-4/°C | ISO 11359-2 |
| Coeff. of linear therm expansion, normal | **0.23** | 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 | **4.2** | - | IEC 60250 |
| Dielectric constant (Dk), 1MHz | **3.7** | - | IEC 60250 |
| Dissipation factor, 100Hz | **160** | E-4 | IEC 60250 |
| Dissipation factor, 1MHz | **180** | E-4 | IEC 60250 |
| Volume resistivity, 23°C | **1E13** | Ohm*m | IEC 62631-3-1 |
| Surface resistivity, 23°C | **>1E15** | Ohm | IEC 62631-3-2 |

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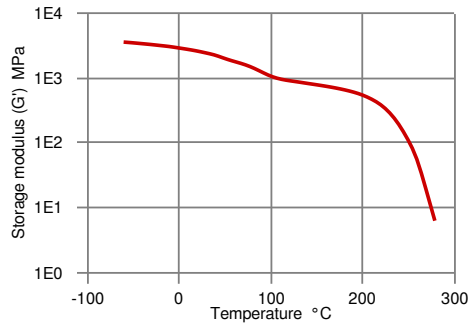
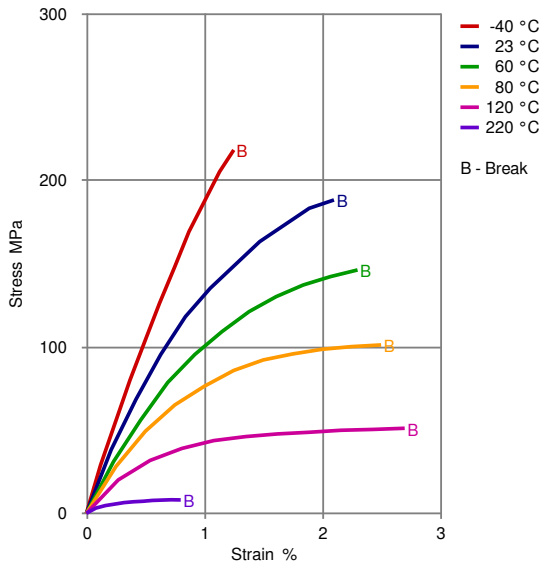
|---|---|---|---|
| Electric strength, 23 °C (AC) | **31** | kV/mm | IEC 60243-1 |
| Comparative tracking index | **PLC 3** | - | UL 746 |
| Arc resistance | **140** | s | Internal |

## Diagrams

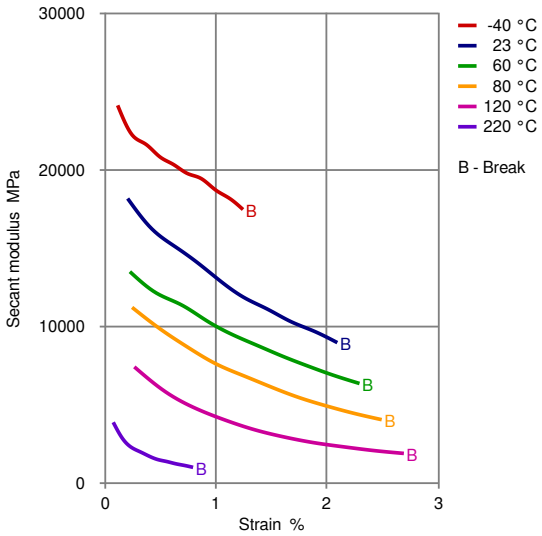
### Dynamic Shear modulus-temperature




### Stress-strain




### Secant modulus-strain




## Typical injection moulding processing conditions

| Pre Drying | Value | Unit |
|---|---|---|
| Necessary low maximum residual moisture content | **0.01** | % |
| Drying time | **4 - 6** | h |

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|---|---|---|
| Drying temperature | **150** | °C |

| Temperature | Value | Unit |
|---|---|---|
| Hopper temperature | **20 - 30** | °C |
| Feeding zone temperature | **60 - 80** | °C |
| Zone1 temperature | **270 - 280** | °C |
| Zone2 temperature | **275 - 285** | °C |
| Zone3 temperature | **280 - 290** | °C |
| Zone4 temperature | **285 - 295** | °C |
| Nozzle temperature | **290 - 300** | °C |
| Melt temperature | **285 - 295** | °C |
| Mold temperature | **80 - 120** | °C |
| Hot runner temperature | **285 - 295** | °C |

| Pressure | Value | Unit |
|---|---|---|
| Injection pressure | **500 - 1500** | bar |
| Hold pressure | **500 - 1500** | bar |
| Back pressure max. | **30** | bar |

| Speed | Value |
|---|---|
| Injection speed | **very fast** |

| Screw Speed | Value | Unit |
|---|---|---|
| Screw speed diameter, 16mm | **200** | RPM |
| Screw speed diameter, 25mm | **140** | RPM |
| Screw speed diameter, 40mm | **80** | RPM |

| 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 =< - 40° 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 (<= 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. The Vectra MT-grades MT1300, MT1305, MT1310, MT1335, MT1340 and MT1345 should be dried at 150°C for a minimum of 4 hours in a desiccant dryer.

### Characteristics

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|---|---|
| **Special Characteristics** | Flame retardant, Light stabilized |
| **Product Categories** | Medical technology |
| **Processing** | Injection molding |

## VECTRA® MT®1310 - LCP

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|---|---|
| **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 exist. We recommend that persons intending to rely on any recommendation or to use any equipment, processing technique or material mentioned in this publication should satisfy themselves that they can meet all applicable safety and health standards. We strongly recommend that users seek and adhere to the manufacturer's current instructions for handling each material they use, and entrust the handling of such material to adequately trained personnel only. Please call the telephone numbers listed for additional technical information. Call Customer Services for the appropriate Materials Safety Data Sheets (MSDS) before attempting to process our products.

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