Celanese
The chemistry inside innovation™

FORTRON® 1140L4 DW - PPS

Description

40% Glass reinforced, strong and tough, V-0
Fortron 1140L4 DW is a 40% glass-reinforced grade that is the strongest and toughest product available. It has been developed for use in drinking water applications. It exhibits excellent heat and chemical resistance, good electrical properties and is inherently flame-retardant. The high hardness and rigidity at elevated temperatures allows for good load bearing performance. This product has good weldability due to the modest filler level. Applications made of this grade are electronical components (i.e. bobbins, lamp housings, brush holders) and various other components requiring strength and resistance to aggressive chemicals (i.e. automotive heaters, pumps, valves, fuel rails, microwave oven rings and distillation column packings).

Physical properties	Value	Unit	Test Standard
Density	**103**	lb/ft³	ISO 1183
Molding shrinkage, parallel (flow)	**0.3**	%	ISO 294-4, 2577
Molding shrinkage, transverse normal	**0.6**	%	ISO 294-4, 2577
Water absorption, 23 °C-sat	**0.02**	%	Sim. to ISO 62
Bulk density	**0.721**	g/cm³	ISO 60

Mechanical properties	Value	Unit	Test Standard
Tensile modulus	**2.13E6**	psi	ISO 527-1, -2
Tensile stress at break, 5mm/min	**28300**	psi	ISO 527-1, -2
Tensile strain at break, 5mm/min	**1.8**	%	ISO 527-1, -2
Flexural modulus, 23 °C	**2.1E6**	psi	ISO 178
Flexural stress at break	**41300**	psi	ISO 178
Charpy impact strength, 23 °C	**25.2**	ft-lb/in²	ISO 179/1eU
Charpy impact strength, -30 °C	**25.2**	ft-lb/in²	ISO 179/1eU
Charpy notched impact strength, 23 °C	**4.76**	ft-lb/in²	ISO 179/1eA
Charpy notched impact strength, -30 °C	**4.76**	ft-lb/in²	ISO 179/1eA
Izod impact notched, 23 °C	**4.76**	ft-lb/in²	ISO 180/1A
Izod impact notched, -30 °C	**4.76**	ft-lb/in²	ISO 180/1A
Izod impact unnotched, 23 °C	**16.2**	ft-lb/in²	ISO 180/1U
Izod impact unnotched, -30 °C	**16.2**	ft-lb/in²	ISO 180/1U
Compressive modulus	**2.18E6**	psi	ISO 604
Rockwell hardness (M-Scale)	**100**	M-Scale	ISO 2039-2

Thermal properties	Value	Unit	Test Standard
Melting temperature, 10 °C/min	**536**	°F	ISO 11357-1/-3
Glass transition temperature, 10 °C/min	**194**	°F	ISO 11357-1,-2,-3
DTUL at 1.8 MPa	**518**	°F	ISO 75-1, -2
DTUL at 8.0 MPa	**419**	°F	ISO 75-1, -2
Coeff. of linear therm expansion, parallel	**0.144**	E-4/°F	ISO 11359-2
Coeff. of linear therm expansion, normal	**0.233**	E-4/°F	ISO 11359-2
Limiting oxygen index (LOI)	**47**	%	ISO 4589-1/-2
Flammability @1.6mm nom. thickn.	**V-0**	class	UL 94
thickness tested (1.6)	**0.1**	in	UL 94
Flammability at thickness h	**V-0**	class	UL 94
thickness tested (h)	**0.0150**	in	UL 94
Flammability 5V at thickness h	**5VA**	class	UL 94
thickness tested (5V)	**0.1**	in	UL 94
Glow wire ignition temperature, 0.8 mm	**1520**	°F	IEC 60695-2-13

Electrical properties	Value	Unit	Test Standard
Dielectric constant (Dk), 1MHz	**4.1**	-	IEC 60250
Dissipation factor, 1MHz	**20**	E-4	IEC 60250
Volume resistivity, 23 °C	**>1E13**	Ohm*m	IEC 62631-3-1
Surface resistivity, 23 °C	**6.6E11**	Ohm	IEC 62631-3-2
Comparative tracking index	**PLC 4**	-	UL 746

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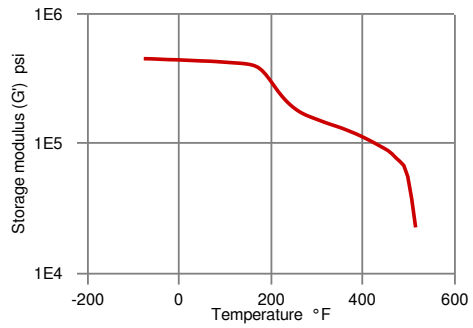
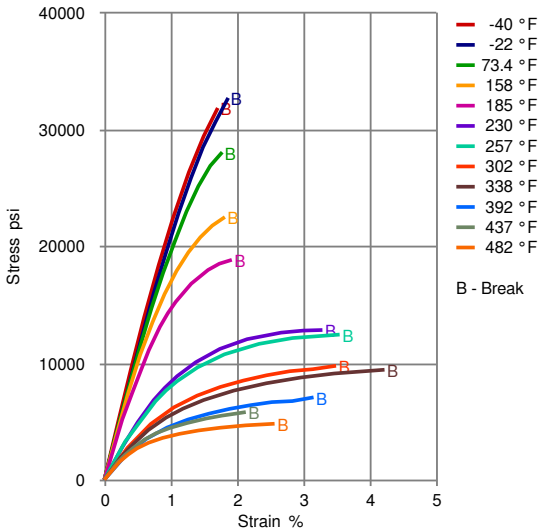
Rheological calculation properties	Value	Unit	Test Standard
Spec. heat capacity melt	**1500**	J/(kg K)	Internal

Diagrams

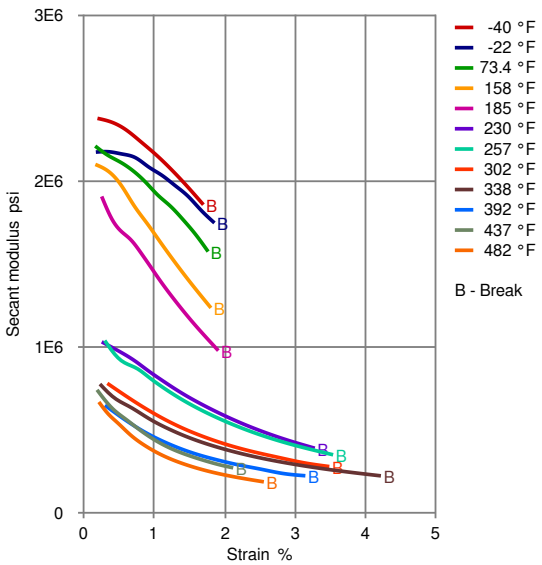
Dynamic Shear modulus-temperature



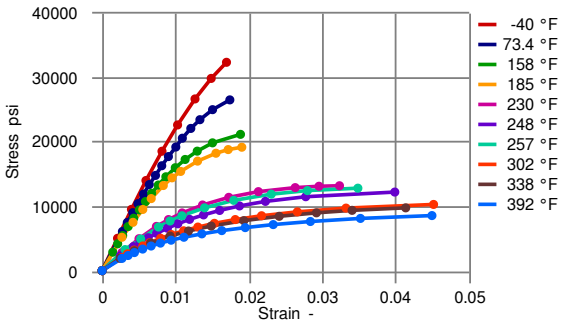
Stress-strain



Secant modulus-strain

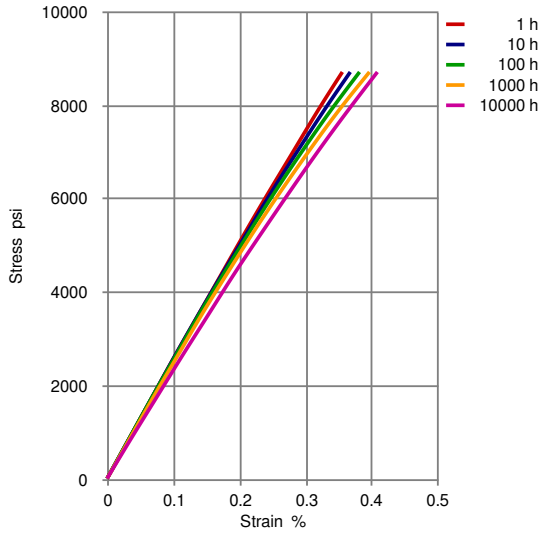


True Stress-strain

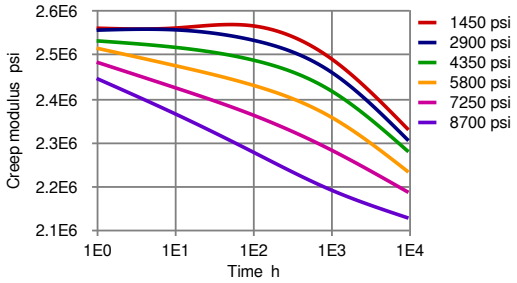


no yield at all temperatures
Poisson's value used is 0.39

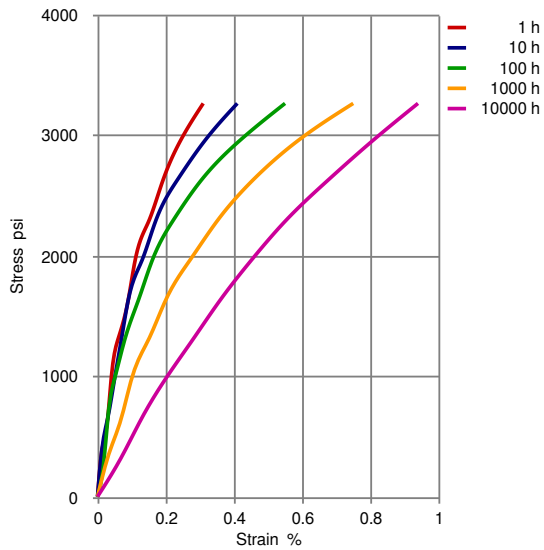
CAMPUS Stress-strain (isochronous) 73.4°F



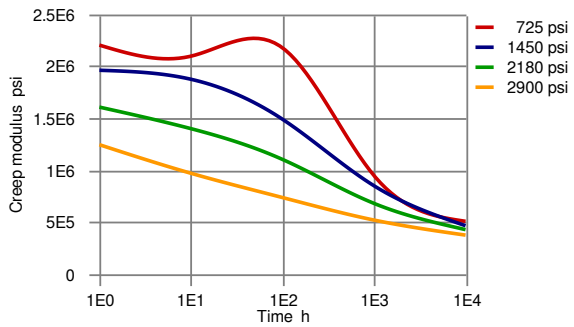
CAMPUS Creep modulus-time 73.4°F



CAMPUS Stress-strain (isochronous) 248°F



CAMPUS Creep modulus-time 248°F



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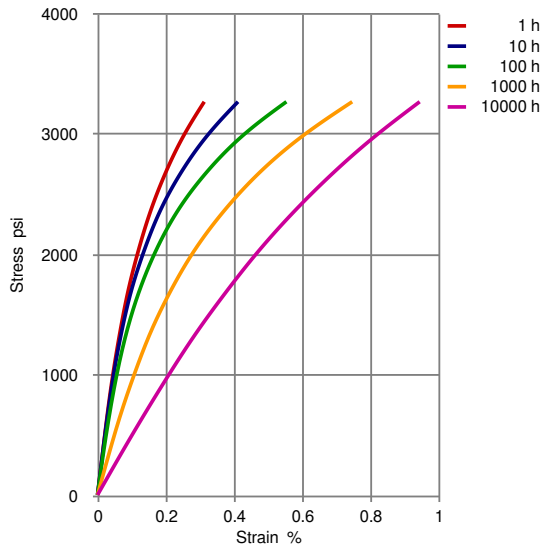
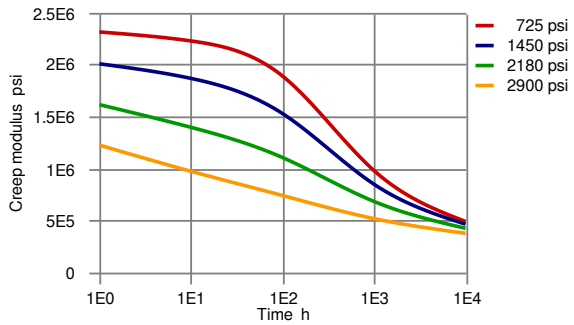
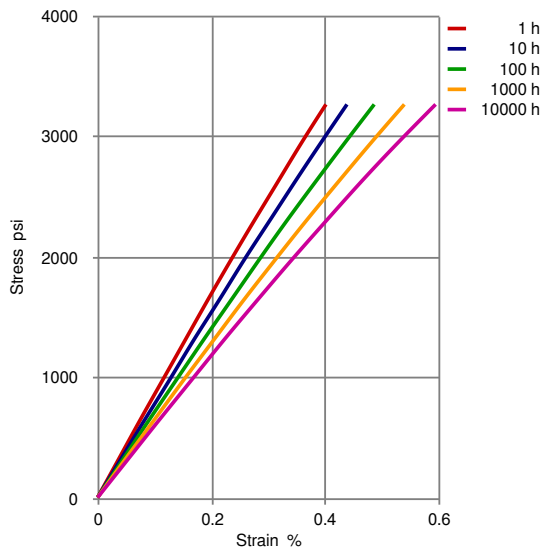
CAMPUS Stress-strain (isochronous) 302°F



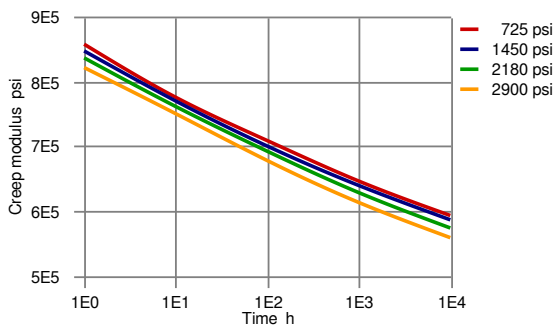
CAMPUS Creep modulus-time 302°F



CAMPUS Stress-strain (isochronous) 392°F



CAMPUS Creep modulus-time 392°F



Typical injection moulding processing conditions

Pre Drying	Value	Unit
Necessary low maximum residual moisture content	**0.02**	%
Drying time	**3 - 4**	h
Drying temperature	**266 - 284**	°F

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Temperature	Value	Unit
Hopper temperature	**68 - 86**	°F
Feeding zone temperature	**140 - 176**	°F
Zone1 temperature	**554 - 572**	°F
Zone2 temperature	**590 - 608**	°F
Zone3 temperature	**626 - 644**	°F
Zone4 temperature	**626 - 644**	°F
Nozzle temperature	**590 - 626**	°F
Melt temperature	**626**	°F
Mold temperature	**284 - 320**	°F
Hot runner temperature	**626 - 644**	°F

Pressure	Value	Unit
Back pressure max.	**30**	bar

Speed	Value
Injection speed	**fast**

Screw Speed	Value	Unit
Screw speed diameter, 25mm	**120**	RPM
Screw speed diameter, 40mm	**75**	RPM
Screw speed diameter, 55mm	**50**	RPM

Other	Value	Unit	Test Standard
Specimen thickness (shrinkage)	**0.125**	in	Internal

Other text information

Pre-drying

FORTRON 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 =< - 30° C. The time between drying and processing should be as short as possible.

Longer pre-drying times/storage

For subsequent storage the material should be stored dry in the dryer until processed (<= 60 h).

Injection molding

On injection molding machines with 15-25 D long three-section screws, as are usual in the trade, the FORTRON is processable. A shut-off nozzle is preferred to a free-flow nozzle.

Melt temperature 320-340 degC
Mold wall temperature at least 140 degC

A medium injection rate is normally preferred. All mold cavities must be effectively vented.

Injection Molding Preprocessing

Predrying in a dehumidified air dryer at 130 - 140 degC/3-4 hours is recommended.

Injection Molding Postprocessing

Tool temperature of at least 135 degC is recommended for parts to achieve maximum crystallizable potential.

Characteristics

Special Characteristics	Auto spec approved, Chemical resistant, Flame retardant, Heat resistant
Product Categories	Glass reinforced
Processing	Injection molding
Regulatory	Drinking water approved

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Delivery Form	Pellets
Additives	Release agent

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. The products mentioned herein are not intended for use in medical or dental implants.

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