Celanese
The chemistry inside innovation™

FORTRON® 1140L4 - PPS

Description

40% Glass reinforced, strong and tough, V-0
Fortron 1140L4 is a 40% glass-reinforced grade that is the strongest and toughest product available. 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**	%	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

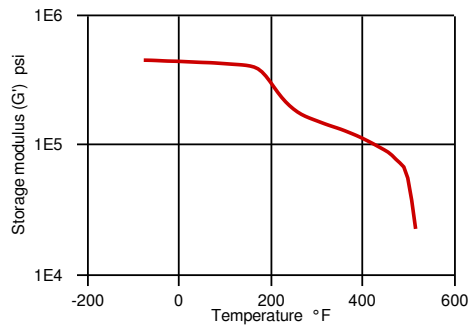
Electrical properties	Value	Unit	Test Standard
Dielectric constant (Dk), 1MHz	**4.1**	-	IEC 60250
Dissipation factor, 1MHz	**20**	E-4	IEC 60250
Volume resistivity, 23°C	**>1E15**	Ohm*m	IEC 62631-3-1
Volume resistivity at high temperature	**>1E13**	Ohm*m	IEC 62631-3-1
Temperature	**428**	°F	-
Surface resistivity, 23°C	**>1E17**	Ohm	IEC 62631-3-2
Surface resistivity at high temperature	**>1E12**	Ohm	IEC 62631-3-2

Temperature	**428**	°F	-
Electric strength, 23 °C (AC)	**787**	kV/in	IEC 60243-1
Electric strength at high temperature (AC)	**584**	kV/in	IEC 60243-1
Temperature	**428**	°F	-
Electric strength, 23 °C (DC)	**1020**	kV/in	IEC 60243-2
Electric strength at high temperature (DC)	**787**	kV/in	IEC 60243-2
Temperature	**428**	°F	-
Comparative tracking index	**PLC 4**	-	UL 746

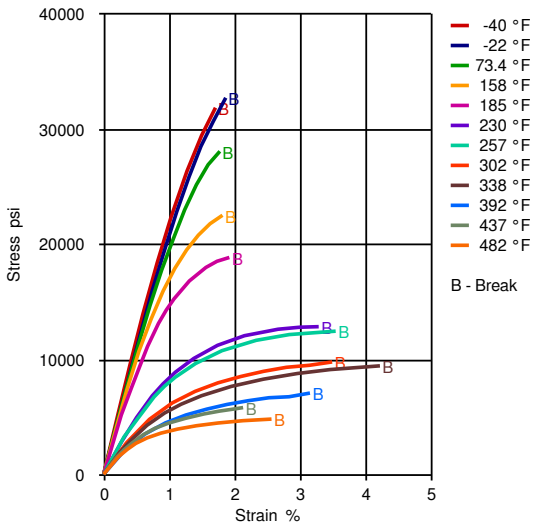
Rheological calculation properties	Value	Unit	Test Standard
Spec. heat capacity melt	**1500**	J/(kg K)	Internal

Diagrams

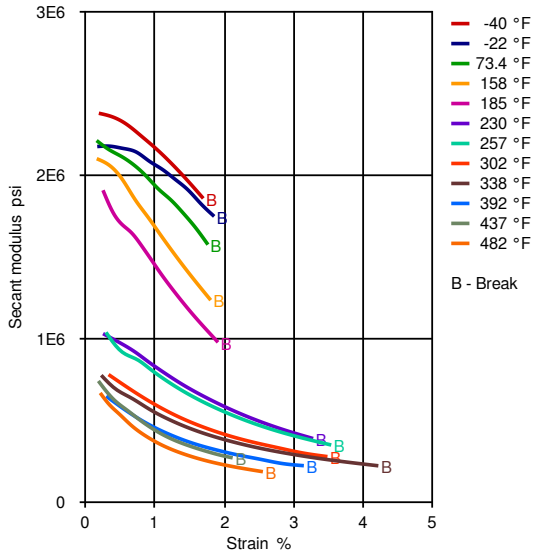
Dynamic Shear modulus-temperature



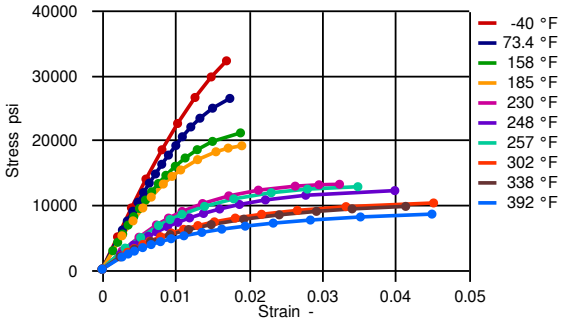
Stress-strain



Secant modulus-strain

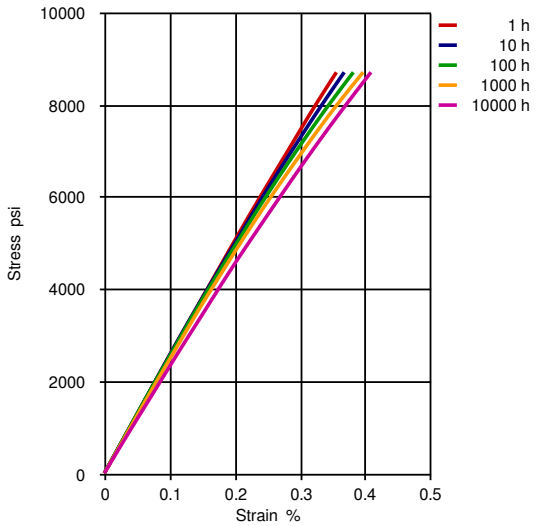


True Stress-strain

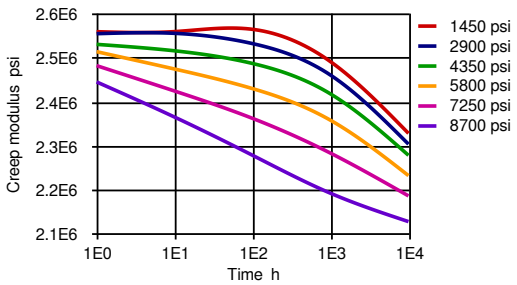


no yield at all temperatures
Poisson's value used is 0.39

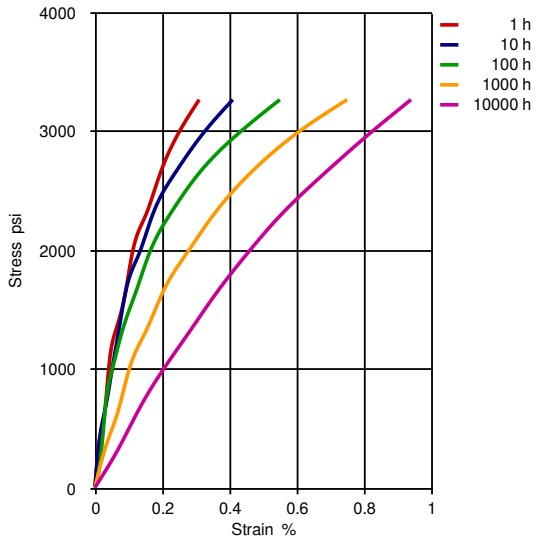
Stress-strain (isochronous) 73.4 °F



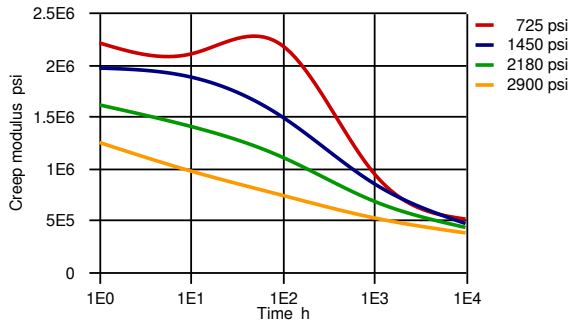
Creep modulus-time 73.4 °F



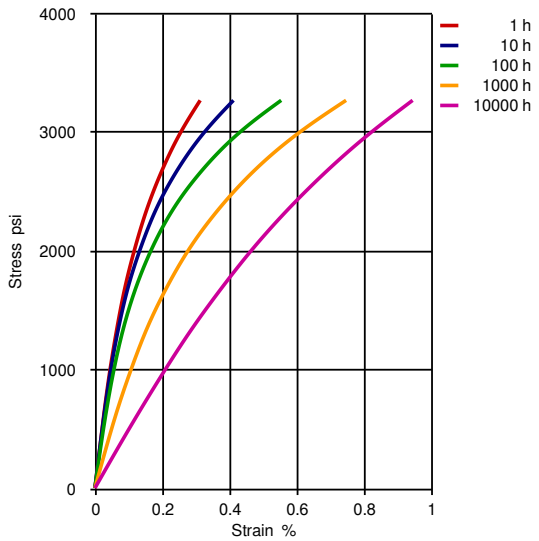
Stress-strain (isochronous) 248°F



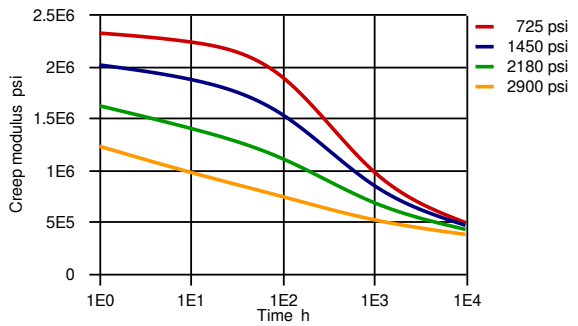
Creep modulus-time 248°F



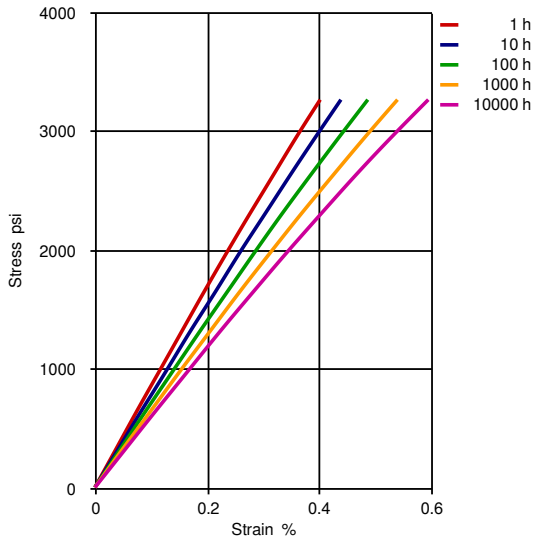
Stress-strain (isochronous) 302°F



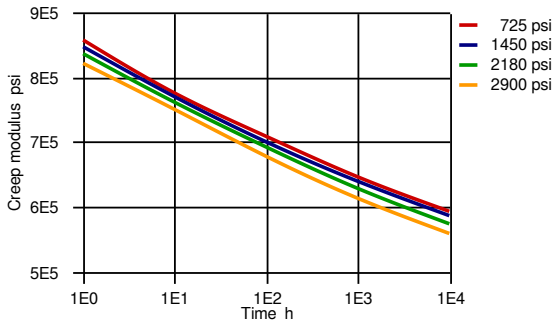
Creep modulus-time 302°F



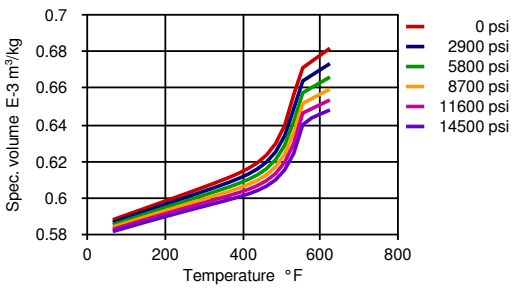
Stress-strain (isochronous) 392°F



Creep modulus-time 392°F



Moldflow Specific volume-temperature (pvT)



DSC Cooling Scan -20 C/min (ASTM E 1269)

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

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, Flame retardant
Product Categories	Glass reinforced
Processing	Injection molding
Regulatory	Drinking water approved
Delivery Form	Pellets
Additives	Release agent

Other Approvals

OEM	Specification
BMW	GS93016
Bosch	N28 BN14-GF010 (SF3001, SD3002 & SD3002(CN))
Chrysler (FCA)	CPN3502 BLK

Chrysler (FCA)	CPN4241 NAT
Daimler	(PPS - GF40) 5420.00
Dongfeng	SLCLBG2019011
FORD	WSL-M4D807-A NAL, BLK & BROWN
GM	GMW 17521 P-PPS-GF40-Type-2 NAT & BLK
Nissan	PPS(B60)-IPL-1
PSA	61/217M-219E/H115/H0412*/13
PSA	01994_15_00075 NAT & BLK
Renault	IP03a

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