

FORTRON® LM1140L4 - PPS

Description

Fortron LM1140L4 is a 40% glass-reinforced grade that is the strongest and toughest product available. It is laser markable. 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 electronic 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/ft ³	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/cm ³	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	1.9	%	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/in ²	ISO 179/1eU
Charpy impact strength, -30°C	25.2	ft-lb/in ²	ISO 179/1eU
Charpy notched impact strength, 23°C	4.76	ft-lb/in ²	ISO 179/1eA
Charpy notched impact strength, -30°C	4.76	ft-lb/in ²	ISO 179/1eA
Izod impact notched, 23°C	4.76	ft-lb/in ²	ISO 180/1A
Izod impact notched, -30°C	4.76	ft-lb/in ²	ISO 180/1A
Izod impact unnotched, 23°C	16.2	ft-lb/in ²	ISO 180/1U
Izod impact unnotched, -30°C	16.2	ft-lb/in ²	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
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
Electric strength, 23°C (AC)	711	kV/in	IEC 60243-1
Comparative tracking index	PLC 4	-	UL 746

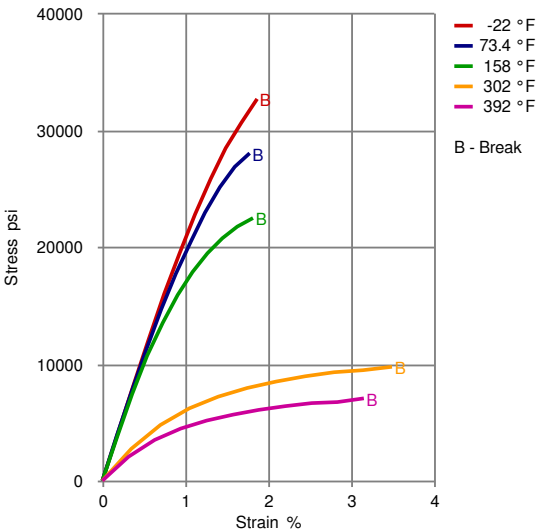
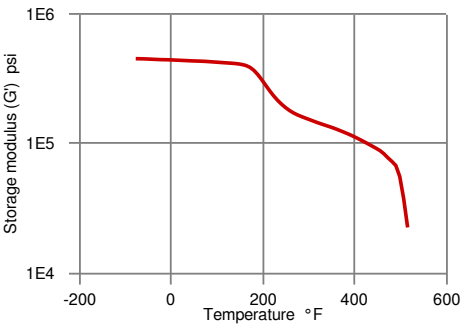


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Rheological calculation properties	Value	Unit	Test Standard
Spec. heat capacity melt	1500	J/(kg K)	Internal

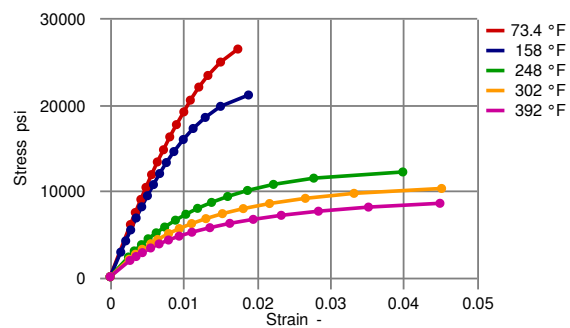
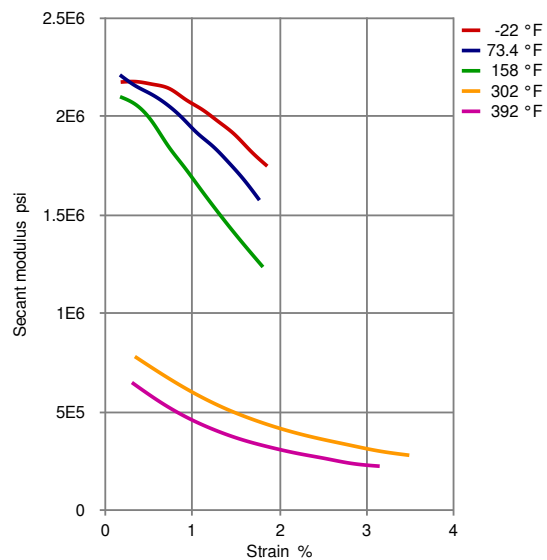
Diagrams

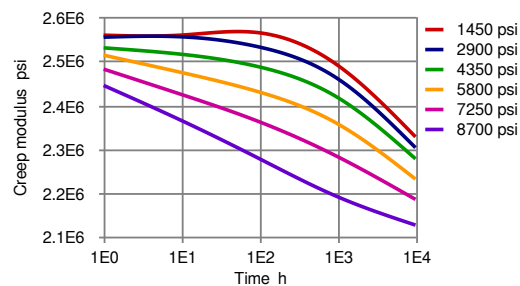
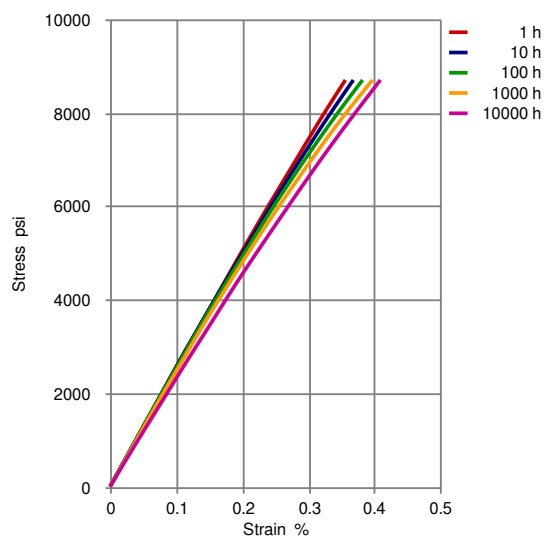
Dynamic Shear modulus-temperature	Stress-strain
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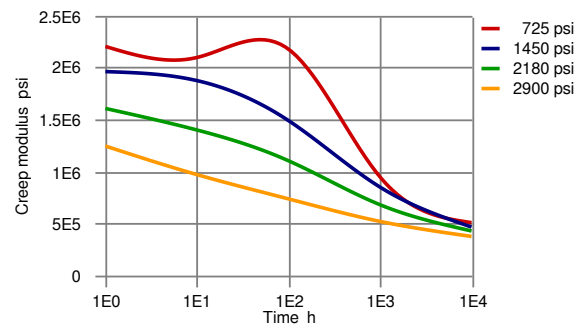
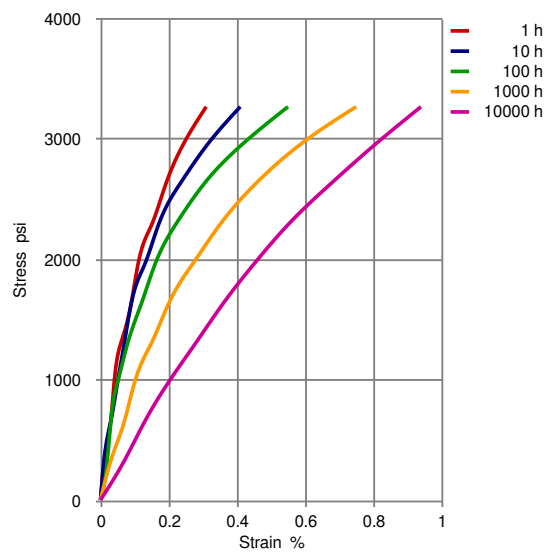






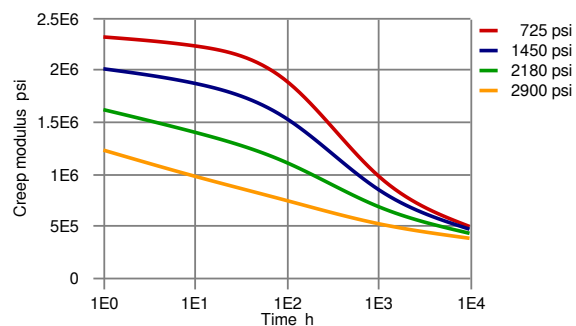
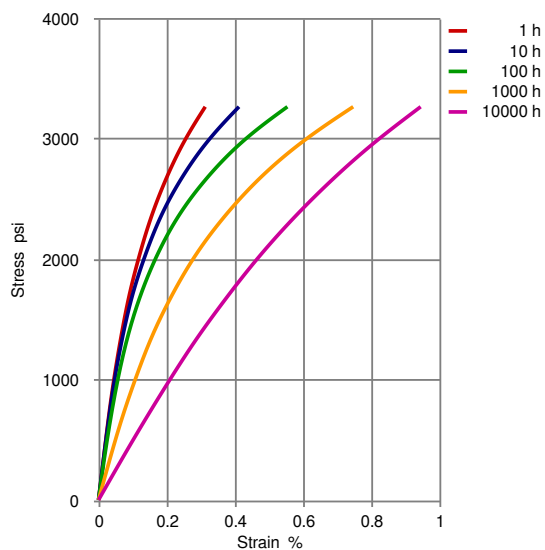
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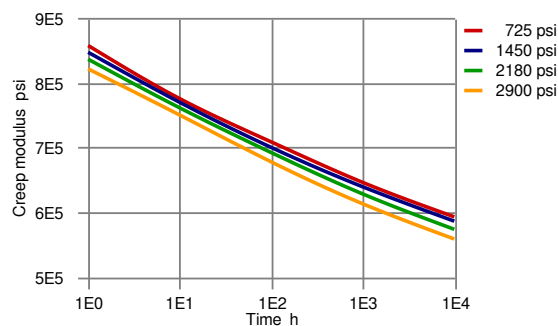
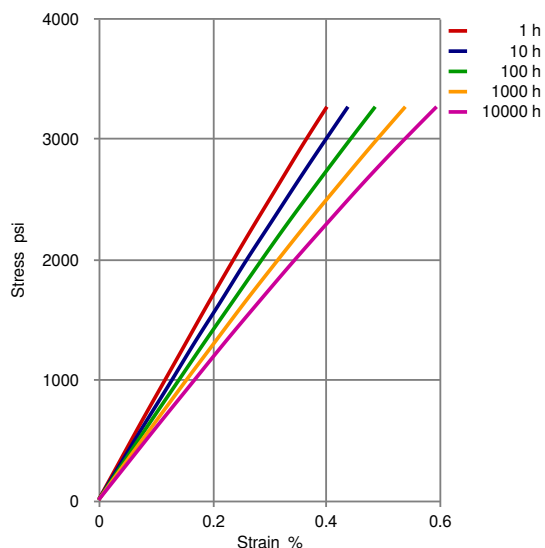
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Typical injection moulding processing conditions

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



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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 $\leq -30^{\circ}\text{C}$. 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 ($\leq 60\text{ h}$).

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	Chemical resistant, Flame retardant, Heat resistant, Laser markable
Product Categories	Glass reinforced
Processing	Injection molding
Delivery Form	Pellets
Additives	Release agent

