

FORTRON® 1140L4 | PPS | Glass Reinforced

Description

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	1650	kg/m ³	ISO 1183
Mold shrinkage - parallel	0.2 - 0.6	%	ISO 294-4
Mold shrinkage - normal	0.4 - 0.6	%	ISO 294-4
Water absorption (23°C-sat)	0.02	%	ISO 62

Mechanical properties	Value	Unit	Test Standard
Tensile modulus (1mm/min)	14700	MPa	ISO 527-2/1A
Tensile stress at break (5mm/min)	195	MPa	ISO 527-2/1A
Tensile strain at break (5mm/min)	1.9	%	ISO 527-2/1A
Flexural modulus (23°C)	14500	MPa	ISO 178
Flexural stress @ break	285	MPa	ISO 178
Charpy impact strength @ 23°C	53	kJ/m ²	ISO 179/1eU
Charpy impact strength @ -30°C	53	kJ/m ²	ISO 179/1eU
Charpy notched impact strength @ 23°C	10	kJ/m ²	ISO 179/1eA
Charpy notched impact strength @ -30°C	10	kJ/m ²	ISO 179/1eA
Unnotched impact str (Izod) @ 23°C	34	kJ/m ²	ISO 180/1U
Notched impact strength (Izod) @ 23°C	10	kJ/m ²	ISO 180/1A
Notched impact strength (Izod) @ -30°C	10	kJ/m ²	ISO 180/1A
Rockwell hardness	100	M-Scale	ISO 2039-2

Thermal properties	Value	Unit	Test Standard
Melting temperature (10°C/min)	280	°C	ISO 11357-1,-2,-3
Glass transition temperature (10°C/min)	90	°C	ISO 11357-1,-2,-3
DTUL @ 1.8 MPa	270	°C	ISO 75-1/-2
DTUL @ 8.0 MPa	215	°C	ISO 75-1/-2
Coeff.of linear therm. expansion (parallel)	0.26	E-4/°C	ISO 11359-2
Coeff.of linear therm. expansion (normal)	0.42	E-4/°C	ISO 11359-2
Limiting oxygen index (LOI)	47	%	ISO 4589
Flammability @ 1.6mm nom. thickn.	V-0	class	UL94
thickness tested (1.6)	1.5	mm	UL94
Flammability at thickness h	V-0	class	UL94
thickness tested (h)	0.38	mm	UL94
Flammability 5V at thickness h	5VA	class	UL94
thickness tested (5V)	3	mm	UL94

Electrical properties	Value	Unit	Test Standard
Relative permittivity - 1 MHz	4.6	-	IEC 60250
Dissipation factor - 1 MHz	62	E-4	IEC 60250
Volume resistivity	>1E13	Ohm*m	IEC 60093
Surface resistivity	>1E15	Ohm	IEC 60093

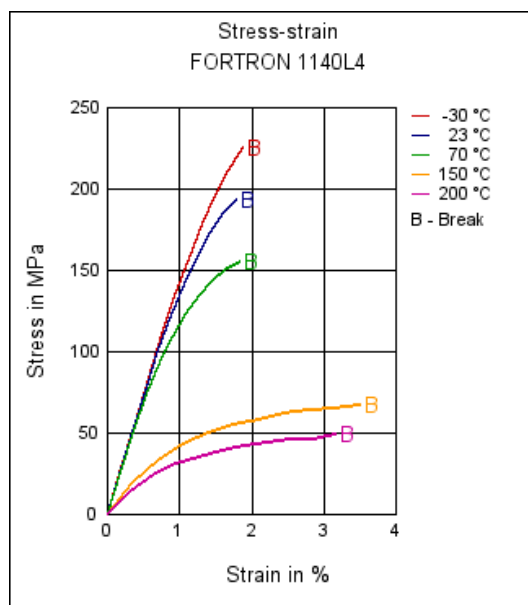
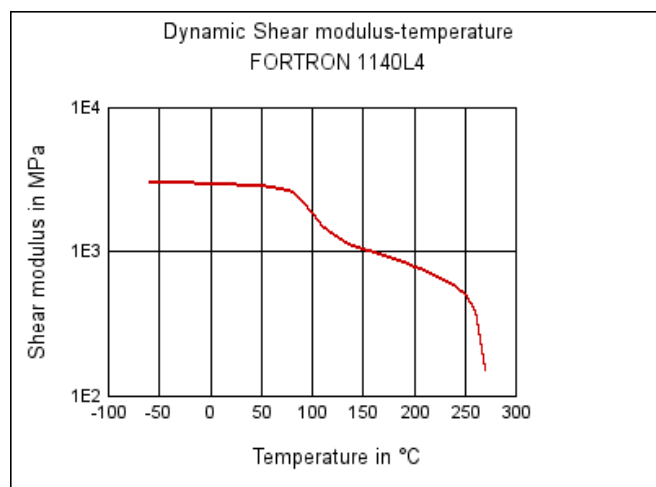
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Electrical properties	Value	Unit	Test Standard
Electric strength	28	kV/mm	IEC 60243-1
Comparative tracking index CTI	125	-	IEC 60112

Test specimen production	Value	Unit	Test Standard
Injection molding melt temperature	310 - 340	°C	ISO 294
Injection molding mold temperature	135 - 160	°C	ISO 294

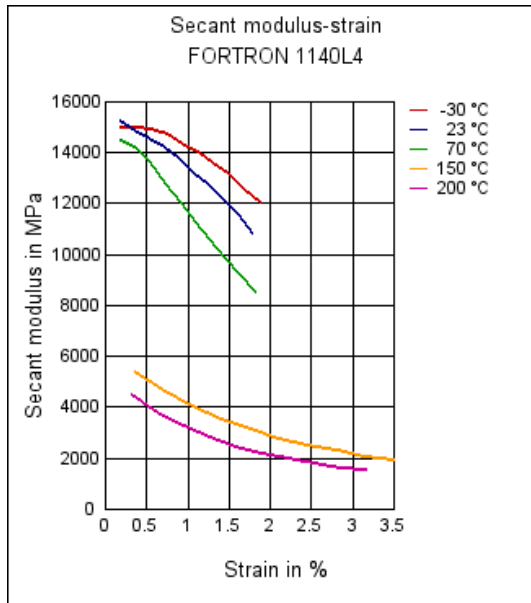
Rheological Calculation properties	Value	Unit	Test Standard
Specific heat capacity of melt	1500	J/(kg K)	Internal

Dynamic Shear modulus-temperature Stress-strain

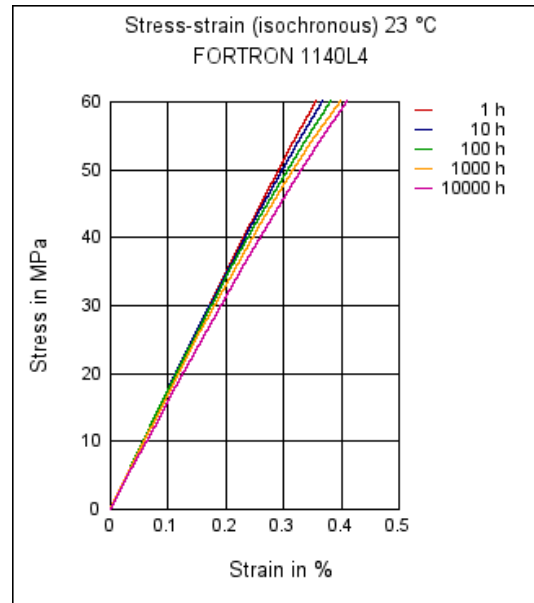


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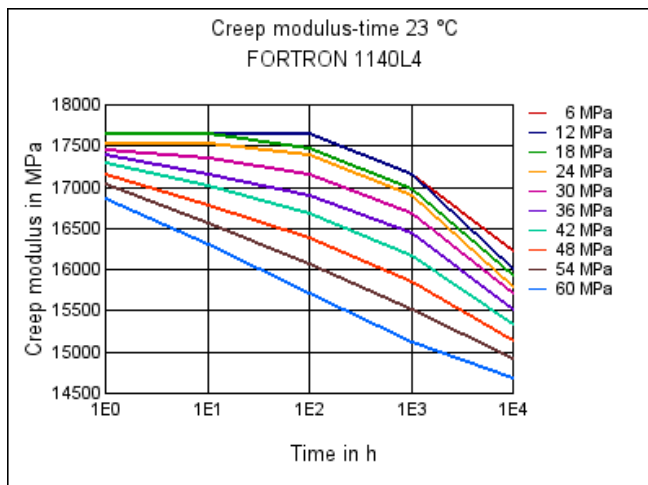
Secant modulus-strain



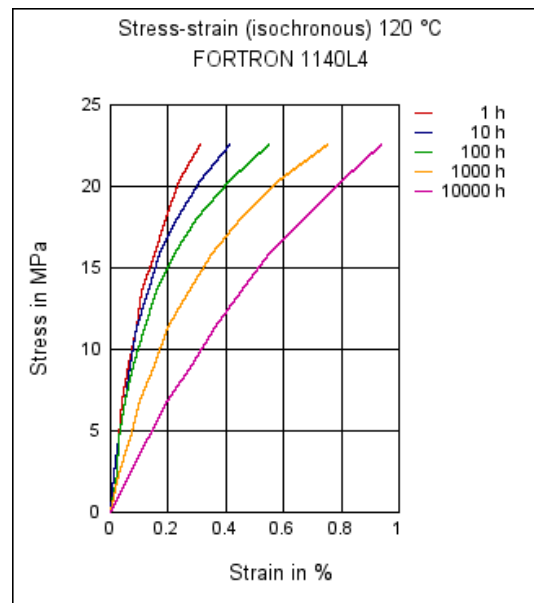
Stress-strain (isochronous)



Creep modulus-time



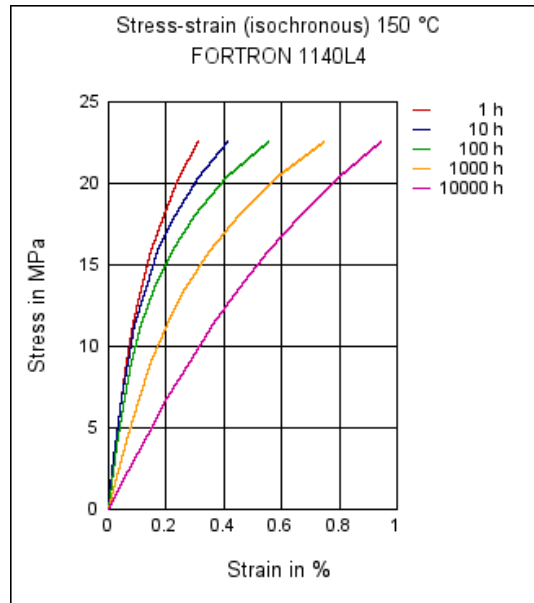
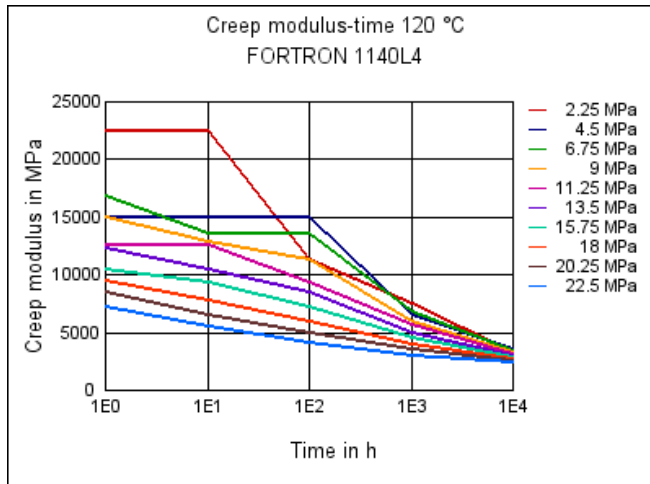
Stress-strain (isochronous)



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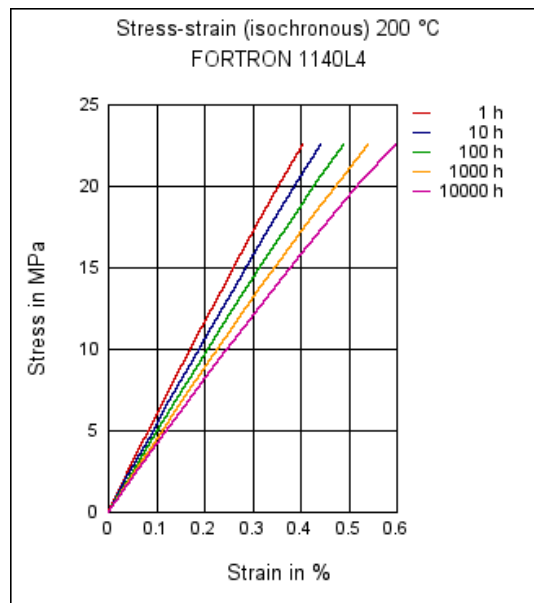
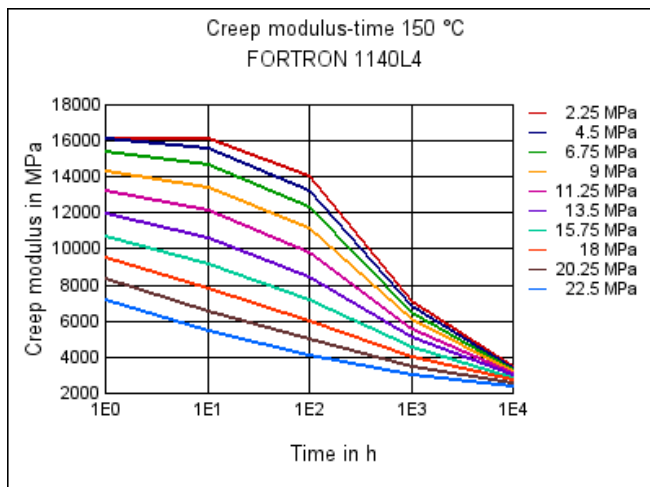
Creep modulus-time

Stress-strain (isochronous)



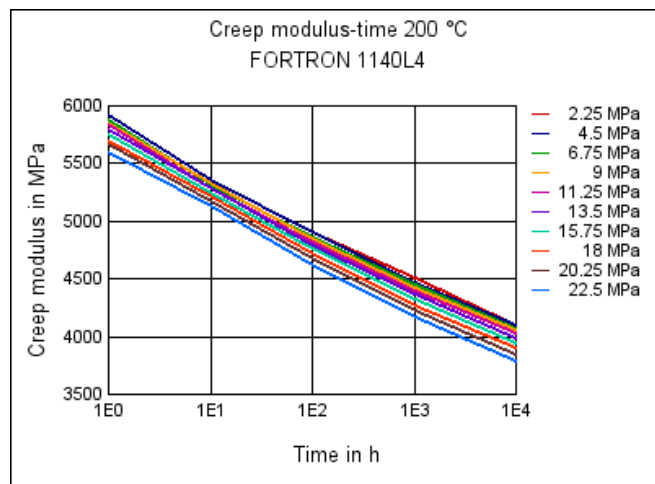
Creep modulus-time

Stress-strain (isochronous)

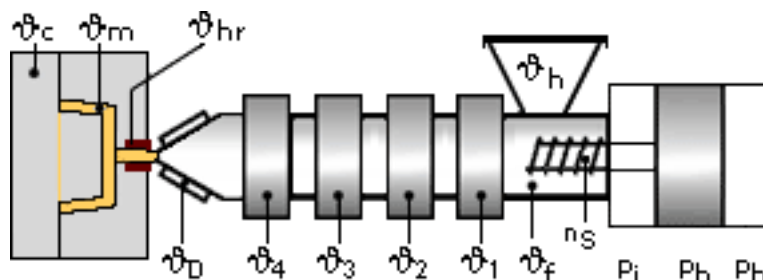


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Creep modulus-time



Typical injection moulding processing conditions



Pre Drying:

Necessary low maximum residual moisture content: 0.02%

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.

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

Drying time: 3 - 4 h

Drying temperature: 130 - 140 °C

Temperature:

	$\vartheta_{\text{Manifold}}$	ϑ_{Mold}	ϑ_{Melt}	$\vartheta_{\text{Nozzle}}$	ϑ_{Zone4}	ϑ_{Zone3}	ϑ_{Zone2}	ϑ_{Zone1}	ϑ_{Feed}	$\vartheta_{\text{Hopper}}$
min (°C)	330	140	330	310	330	330	310	290	60	20
max (°C)	340	160	340	330	340	340	320	300	80	30

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Pressure:

	Inj press	Hold press	Back pressure
min (bar)	500	300	0
max (bar)	1000	700	30

Speed:**Injection speed: fast****Screw speed**

Screw diameter (mm)	16	25	40	55	75
Screw speed (RPM)	-	120	75	50	-

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.

Contact Information

Americas

8040 Dixie Highway, Florence, KY 41042 USA

Product Information Service

t: +1-800-833-4882 t: +1-859-372-3244

Customer Service

t: +1-800-526-4960 t: +1-859-372-3214

e: info-engineeredmaterials-am@celanese.com

Asia

4560 Jinke Road, Zhang Jiang Hi Tech Park

Shanghai 201203 PRC

Customer Service

t: +86 21 3861 9266 f: +86 21 3861 9599

e: info-engineeredmaterials-asia@celanese.com

Europa

Am Unisys-Park 1, 65843 Sulzbach, Germany

Product Information Service

t: +(00)-800-86427-531 t: +49-(0)-69-45009-1011

e: info-engineeredmaterials-eu@celanese.co

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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.

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