

## 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 electrical 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).

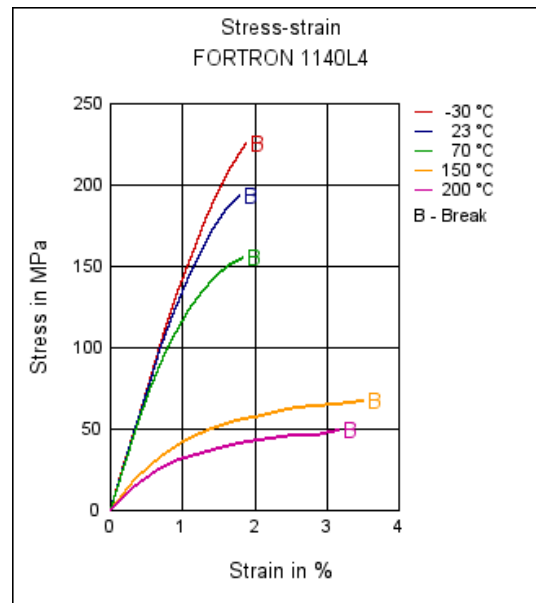
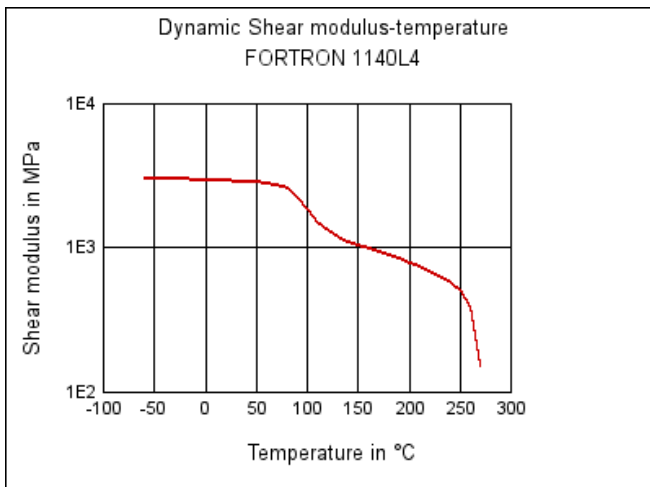
Physical properties	Value	Unit	Test Standard
Density	<b>1650</b>	kg/m <sup>3</sup>	ISO 1183
Mold shrinkage - parallel	<b>0.2 - 0.6</b>	%	ISO 294-4
Mold shrinkage - normal	<b>0.4 - 0.6</b>	%	ISO 294-4
Water absorption (23°C-sat)	<b>0.02</b>	%	ISO 62
Mechanical properties	Value	Unit	Test Standard
Tensile modulus (1mm/min)	<b>14700</b>	MPa	ISO 527-2/1A
Tensile stress at break (5mm/min)	<b>195</b>	MPa	ISO 527-2/1A
Tensile strain at break (5mm/min)	<b>1.9</b>	%	ISO 527-2/1A
Flexural modulus (23°C)	<b>14500</b>	MPa	ISO 178
Flexural stress @ break	<b>285</b>	MPa	ISO 178
Charpy impact strength @ 23°C	<b>53</b>	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy impact strength @ -30°C	<b>53</b>	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy notched impact strength @ 23°C	<b>10</b>	kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength @ -30°C	<b>10</b>	kJ/m <sup>2</sup>	ISO 179/1eA
Unnotched impact str (Izod) @ 23°C	<b>34</b>	kJ/m <sup>2</sup>	ISO 180/1U
Notched impact strength (Izod) @ 23°C	<b>10</b>	kJ/m <sup>2</sup>	ISO 180/1A
Notched impact strength (Izod) @ -30°C	<b>10</b>	kJ/m <sup>2</sup>	ISO 180/1A
Rockwell hardness	<b>100</b>	M-Scale	ISO 2039-2
Thermal properties	Value	Unit	Test Standard
Melting temperature (10°C/min)	<b>280</b>	°C	ISO 11357-1,-2,-3
Glass transition temperature (10°C/min)	<b>90</b>	°C	ISO 11357-1,-2,-3
DTUL @ 1.8 MPa	<b>270</b>	°C	ISO 75-1/-2
DTUL @ 8.0 MPa	<b>215</b>	°C	ISO 75-1/-2
Coeff.of linear therm. expansion (parallel)	<b>0.26</b>	E-4/°C	ISO 11359-2
Coeff.of linear therm. expansion (normal)	<b>0.42</b>	E-4/°C	ISO 11359-2
Limiting oxygen index (LOI)	<b>47</b>	%	ISO 4589
Flammability @1.6mm nom. thickn.	<b>V-0</b>	class	UL94
thickness tested (1.6)	<b>1.5</b>	mm	UL94
Flammability at thickness h	<b>V-0</b>	class	UL94
thickness tested (h)	<b>0.38</b>	mm	UL94
Flammability 5V at thickness h	<b>5VA</b>	class	UL94
thickness tested (5V)	<b>3</b>	mm	UL94
Electrical properties	Value	Unit	Test Standard
Relative permittivity - 1 MHz	<b>4.1</b>	-	IEC 60250
Dissipation factor - 1 MHz	<b>20</b>	E-4	IEC 60250
Volume resistivity	<b>&gt;1E13</b>	Ohm*m	IEC 60093
Surface resistivity	<b>&gt;1E15</b>	Ohm	IEC 60093

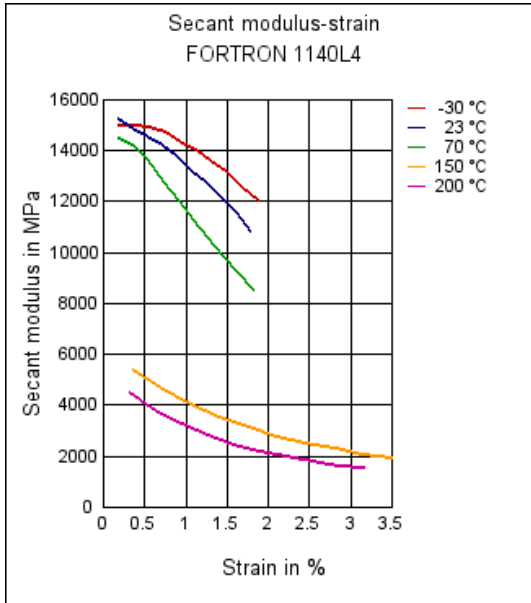
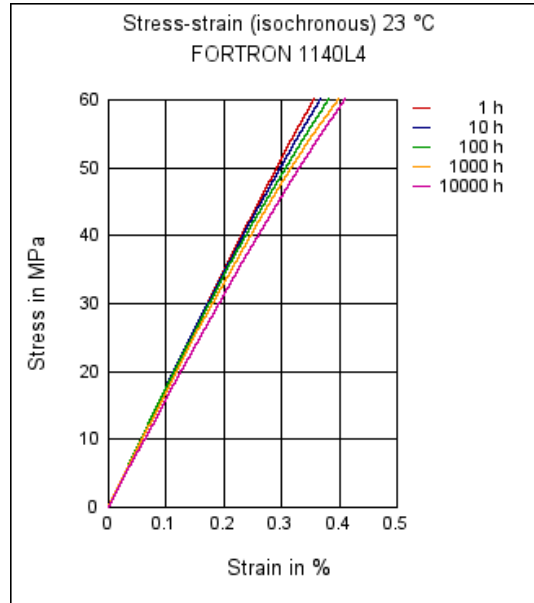
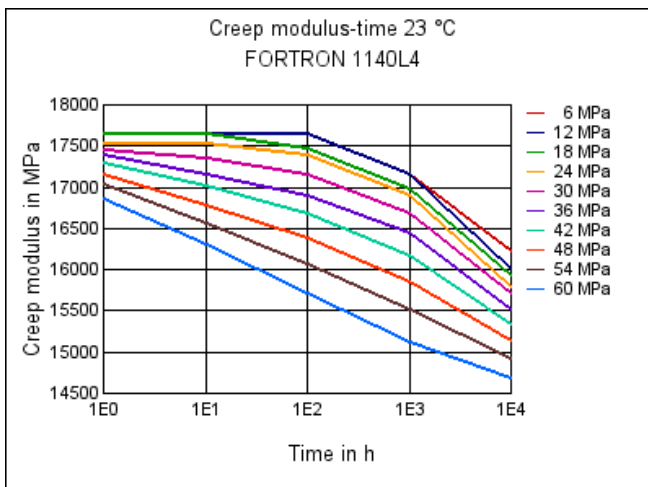
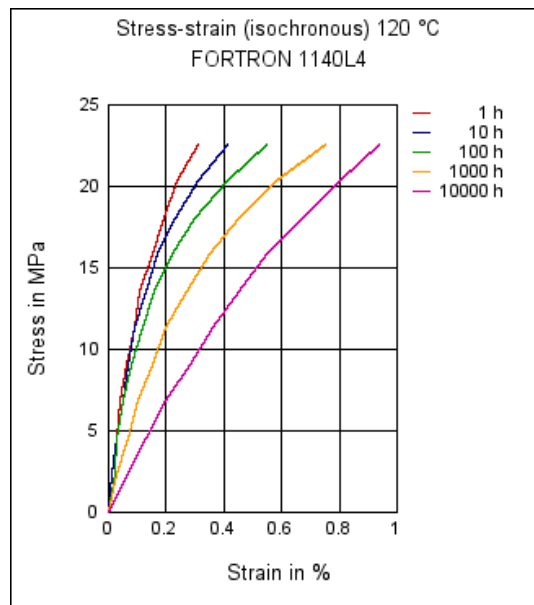
**FORTRON® 1140L4 | PPS | Glass Reinforced**

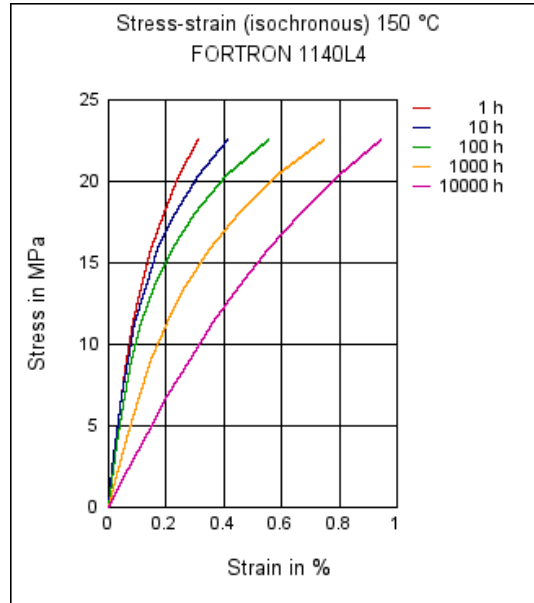
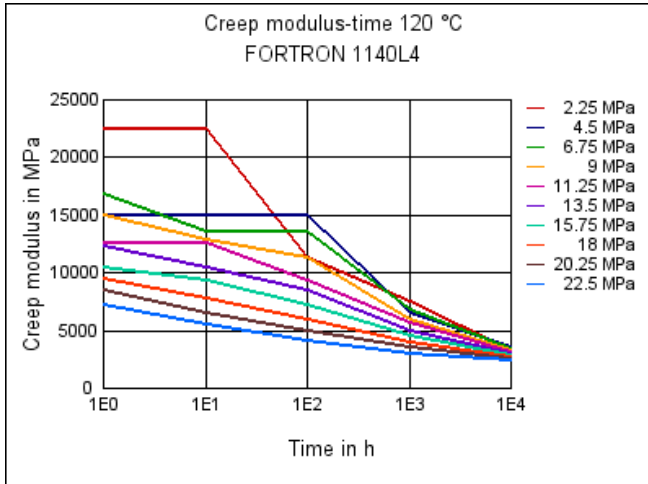
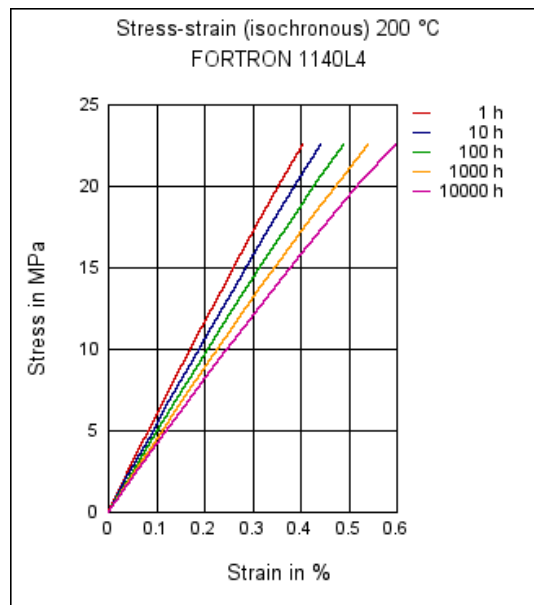
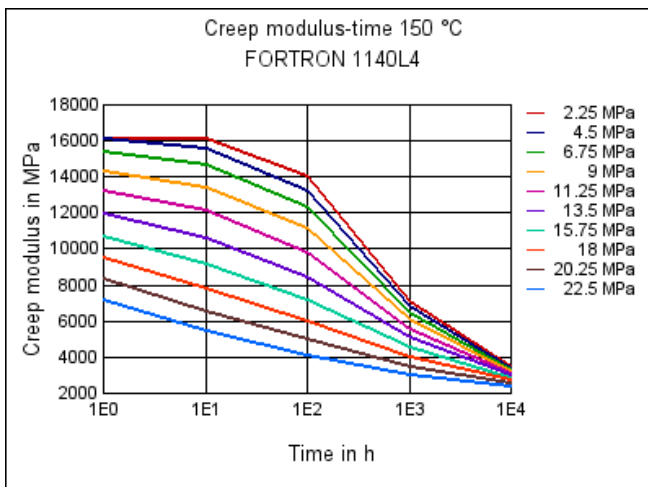
Electrical properties	Value	Unit	Test Standard
Electric strength	<b>28</b>	kV/mm	IEC 60243-1
Comparative tracking index CTI	<b>125</b>	-	IEC 60112

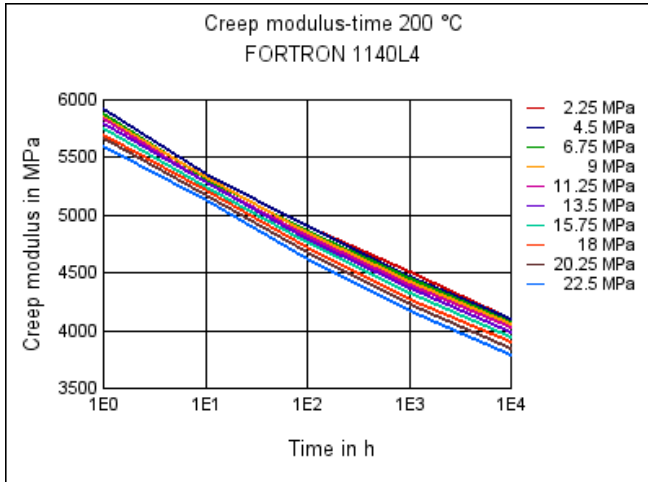
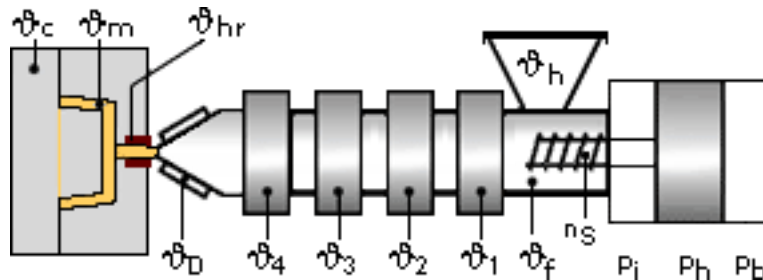
Test specimen production	Value	Unit	Test Standard
Injection molding melt temperature	<b>310 - 340</b>	°C	ISO 294
Injection molding mold temperature	<b>135 - 160</b>	°C	ISO 294

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

**Dynamic Shear modulus-temperature**
**Stress-strain**


**FORTRON® 1140L4 | PPS | Glass Reinforced**
**Secant modulus-strain**

**Stress-strain (isochronous)**

**Creep modulus-time**

**Stress-strain (isochronous)**


**FORTRON® 1140L4 | PPS | Glass Reinforced**
**Creep modulus-time**
**Stress-strain (isochronous)**

**Creep modulus-time**
**Stress-strain (isochronous)**


**FORTRON® 1140L4 | PPS | Glass Reinforced**
**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 ( $\leq 60\text{ h}$ ).

**Drying time: 3 - 4 h**
**Drying temperature: 130 - 140 °C**
**Temperature:**

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

---

**FORTRON® 1140L4 | PPS | Glass Reinforced**


---

**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

---

**General Disclaimer**


---

This publication was printed based on Celanese's present state of knowledge, and Celanese undertakes no obligation to update it. Because conditions of product use are outside Celanese's control, Celanese makes no warranties, express or implied, and assumes no liability in connection with any use of this information. Nothing herein is intended as a license to operate under or a recommendation to infringe any patents.

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.

---

**FORTRON® 1140L4 | PPS | Glass Reinforced**

---

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 (+49 (0) 69 30516299 for Europe, +1 859-372-3244 for the Americas and +86 21 3861 9266 for Asia) for additional technical information. Visit our web site for the appropriate Safety Data Sheets (SDS) before attempting to process our products. Feel free to call Customer Services for additional assistance.

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

© 2014 Celanese or its affiliates. All rights reserved. (Published 2.December.2016)

Celanese®, registered C-ball design and all other trademarks identified herein with ®, TM, SM, unless otherwise noted, are trademarks of Celanese or its affiliates. Fortron is a registered trademark of Fortron Industries LLC.