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FORTRON® 1140L4 DW

Polyphenylene sulfide

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).

Product information

Resin Identification	PPS-GF40	ISO 1043
Part Marking Code	>PPS-GF40<	ISO 11469

Rheological properties

Moulding shrinkage, parallel	0.3	%	ISO 294-4, 2577
Moulding shrinkage, normal	0.6	%	ISO 294-4, 2577

Typical mechanical properties

Tensile modulus	14700	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	195	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	1.8	%	ISO 527-1/-2
Flexural modulus	14500	MPa	ISO 178
Flexural strength	280	MPa	ISO 178
Compressive modulus	15000	MPa	ISO 604
Compressive strength	265	MPa	ISO 604
Charpy impact strength, 23°C	53	kJ/m²	ISO 179/1eU
Charpy impact strength, -30°C	53	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	10	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30°C	10	kJ/m²	ISO 179/1eA
Izod notched impact strength, 23°C	10	kJ/m²	ISO 180/1A
Izod notched impact strength, -30°C	10.0	kJ/m²	ISO 180/1A
Izod impact strength, 23°C	34	kJ/m²	ISO 180/1U
Izod impact strength, -30°C	34	kJ/m²	ISO 180/1U
Hardness, Rockwell, M-scale	100		ISO 2039-2
Poisson's ratio	0.33[C]		

[C]: Calculated

Thermal properties

Melting temperature, 10°C/min	280	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	90	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	270	°C	ISO 75-1/-2
Temperature of deflection under load, 8 MPa	215	°C	ISO 75-1/-2
Ball pressure test	260	°C	IEC 60695-10-2
Coefficient of linear thermal expansion (CLTE), parallel	16	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	42	E-6/K	ISO 11359-1/-2
Thermal conductivity, flow	0.47	W/(m K)	ISO 22007-2
Thermal conductivity, crossflow	0.41	W/(m K)	ISO 22007-2

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Thermal conductivity, through plane	0.39	W/(m K)	ISO 22007-2
Effective thermal diffusivity, flow	2.7E-7	m²/s	ISO 22007-4
Effective thermal diffusivity, crossflow	2.4E-7	m²/s	ISO 22007-4
Effective thermal diffusivity, through plane	2.2E-7	m²/s	ISO 22007-4
Specific heat capacity of melt	1040	J/(kg K)	ISO 22007-4

Flammability

Burning Behav. at 1.5mm nom. thickn.	V-0	class	IEC 60695-11-10
Thickness tested	1.5	mm	IEC 60695-11-10
Burning Behav. at thickness h	V-0	class	IEC 60695-11-10
Thickness tested	0.38	mm	IEC 60695-11-10
Burning Behav. 5V at thickness h	5VA	class	IEC 60695-11-20
Thickness tested	3	mm	IEC 60695-11-20
Oxygen index	47	%	ISO 4589-1/-2
Glow Wire Flammability Index, 0.4mm	960	°C	IEC 60695-2-12
Glow Wire Ignition Temperature, 0.75mm	825	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 0.4mm	825	°C	IEC 60695-2-12

Electrical properties

Relative permittivity, 1MHz	4.1		IEC 62631-2-1
Dissipation factor, 1MHz	20	E-4	IEC 62631-2-1
Volume resistivity	>1E13	Ohm.m	IEC 62631-3-1
Surface resistivity	6.6E11	Ohm	IEC 62631-3-2
Electric strength	21[PV]	kV/mm	IEC 60243-1
Comparative tracking index	125		IEC 60112
Arc Resistance	134	s	UL 746B

[PV]: Preliminary Value

Physical/Other properties

Water absorption, 2mm	0.02	%	Sim. to ISO 62
Water absorption, Immersion 24h	0.02	%	Sim. to ISO 62
Density	1600	kg/m³	ISO 1183
Bulk density	720	kg/m³	ISO 60

Injection

Drying Recommended	yes	
Drying Temperature	130	°C
Drying Time, Dehumidified Dryer	2 - 4	h
Processing Moisture Content	≤0.02	%
Melt Temperature Optimum	330	°C
Min. melt temperature	310	°C
Max. melt temperature	340	°C
Screw tangential speed	0.2 - 0.3	m/s
Mold Temperature Optimum	150	°C
Min. mould temperature	140	°C
Max. mould temperature	160	°C
Hold pressure range	30 - 70	MPa
Back pressure	3	MPa

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Characteristics

Processing	Injection Moulding
Delivery form	Pellets
Additives	Release agent
Special characteristics	Flame retardant, Heat stabilised or stable to heat, Chemical resistant

Additional information

Injection molding

Preprocessing

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

Processing

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.

Postprocessing

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

Processing Notes

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.

Storage

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

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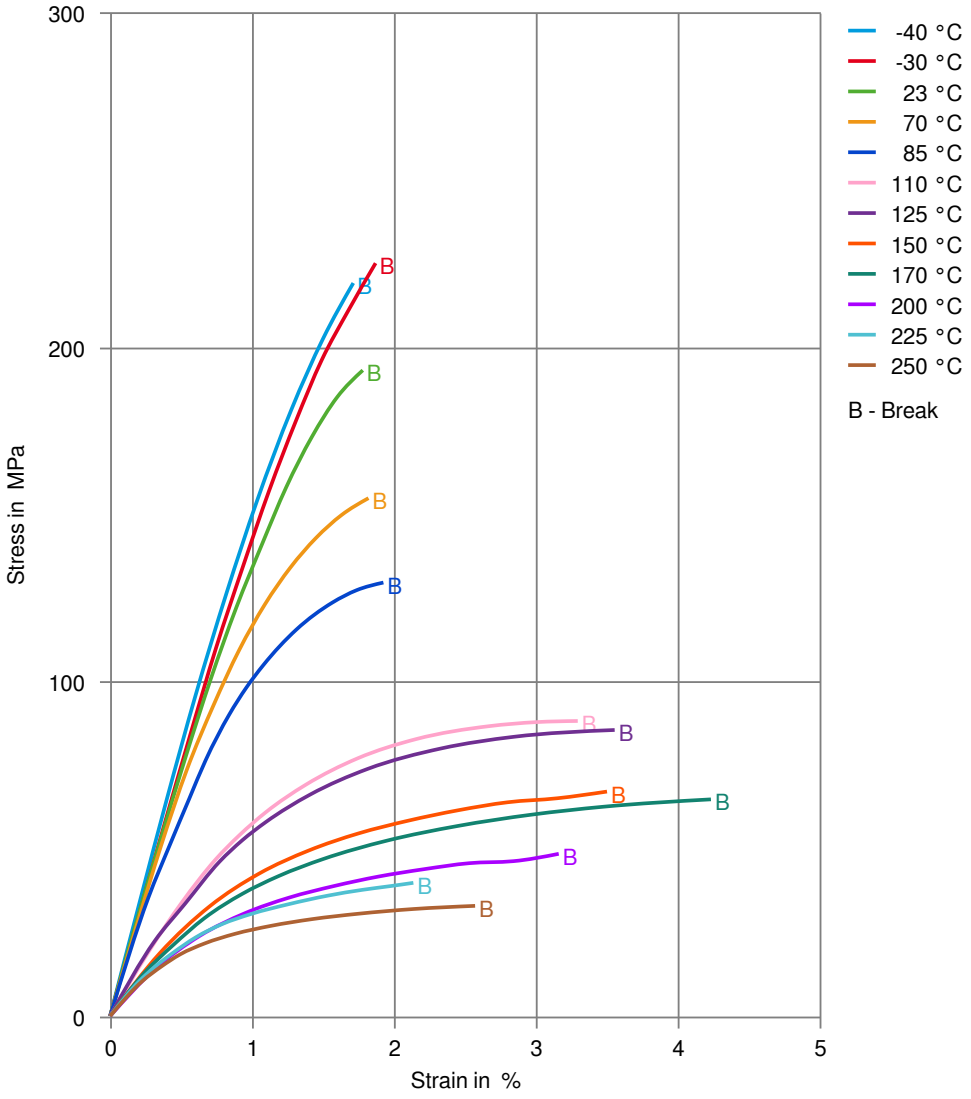
Stress-strain



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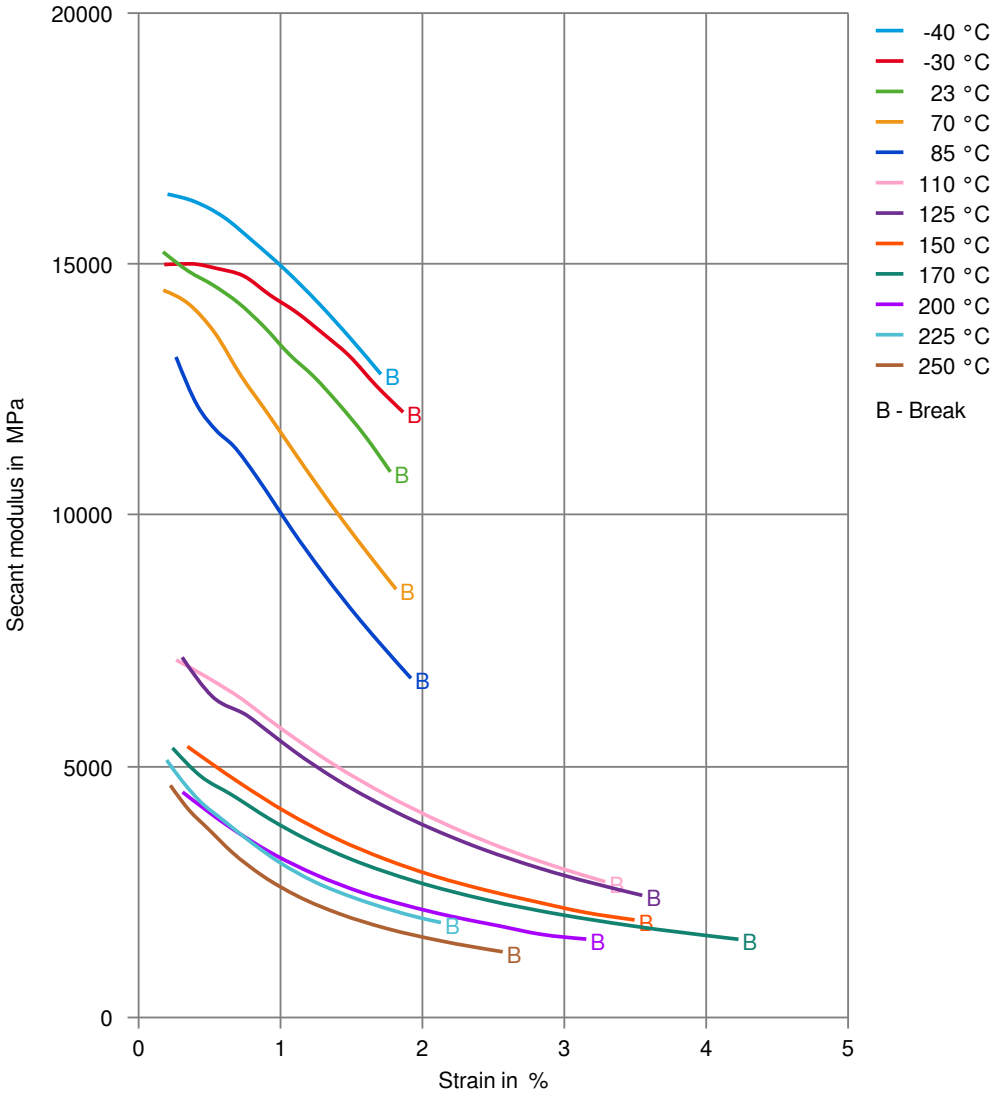
Secant modulus-strain



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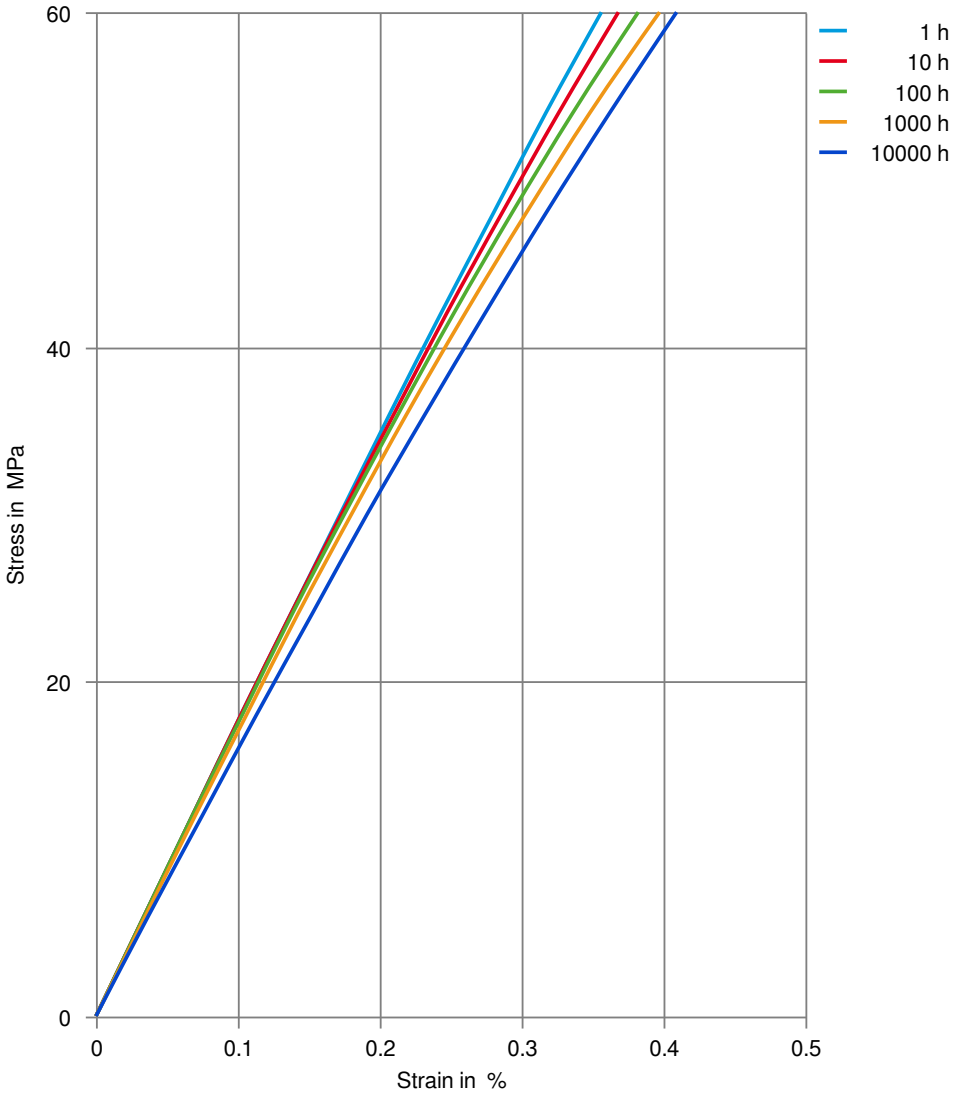
Polyphenylene sulfide

Stress-strain (isochronous) 23 °C



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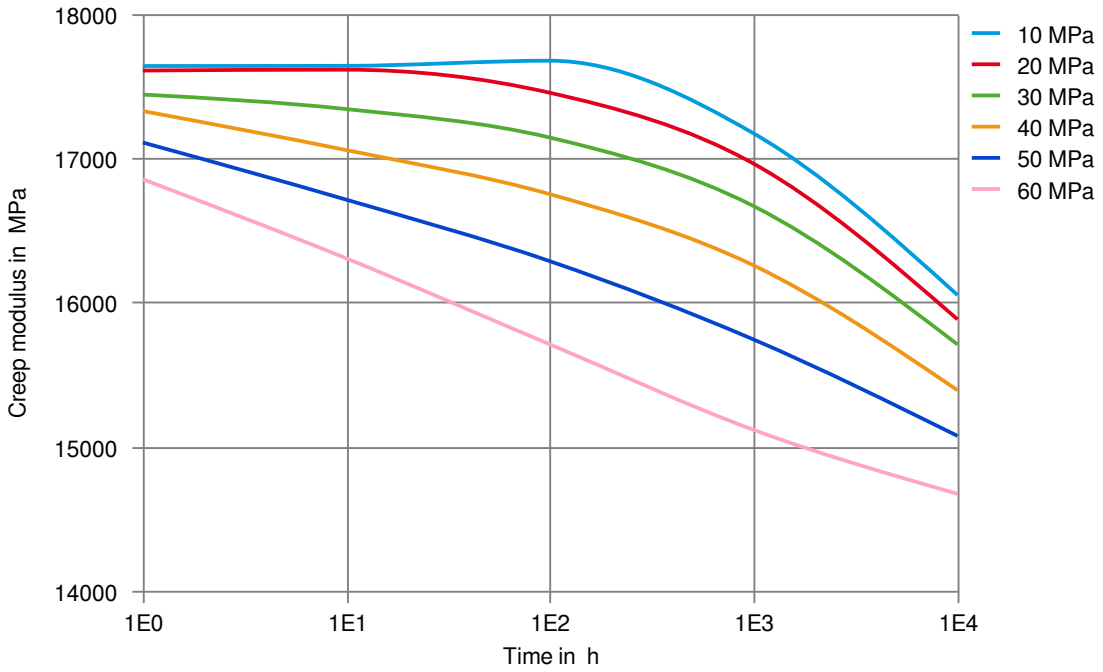
FORTRON® 1140L4 DW

Polyphenylene sulfide

Creep modulus-time 23 °C



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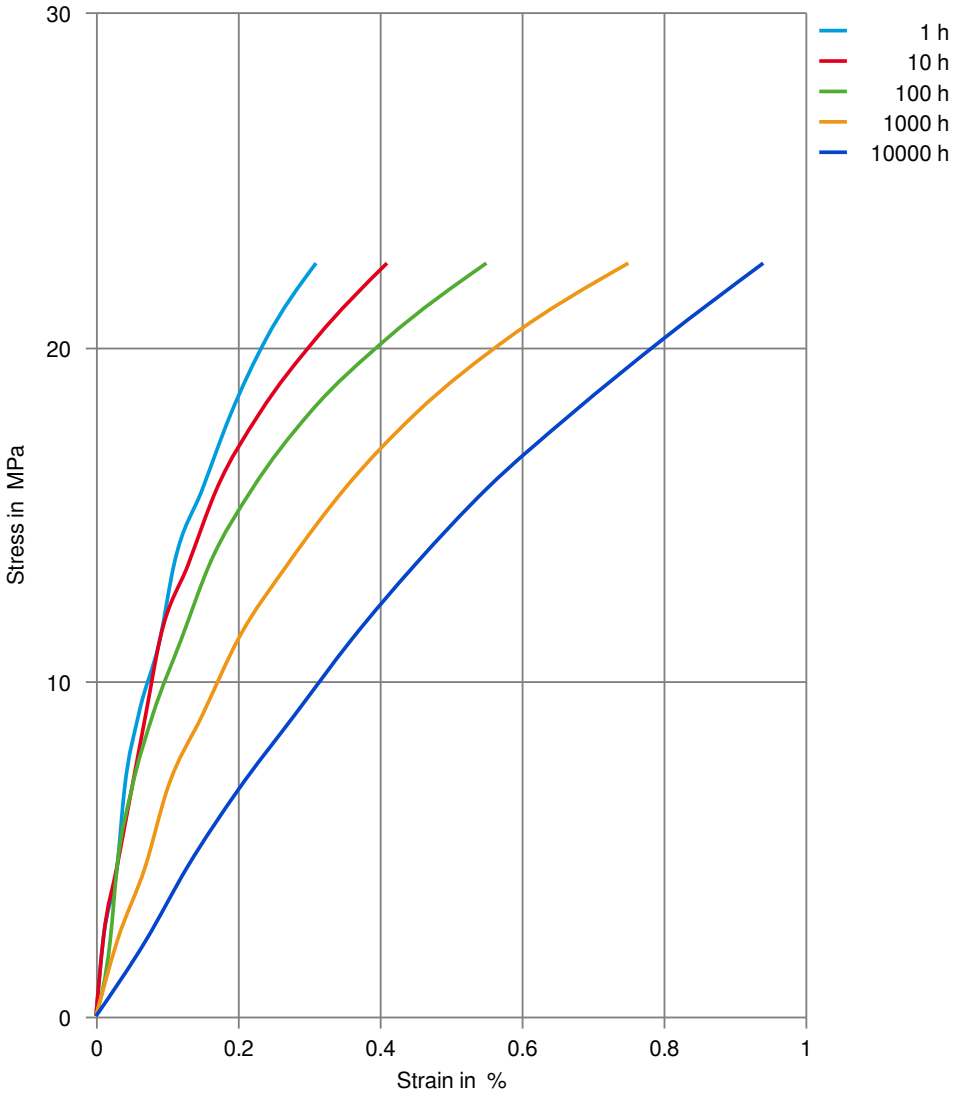
Polyphenylene sulfide

Stress-strain (isochronous) 120 °C



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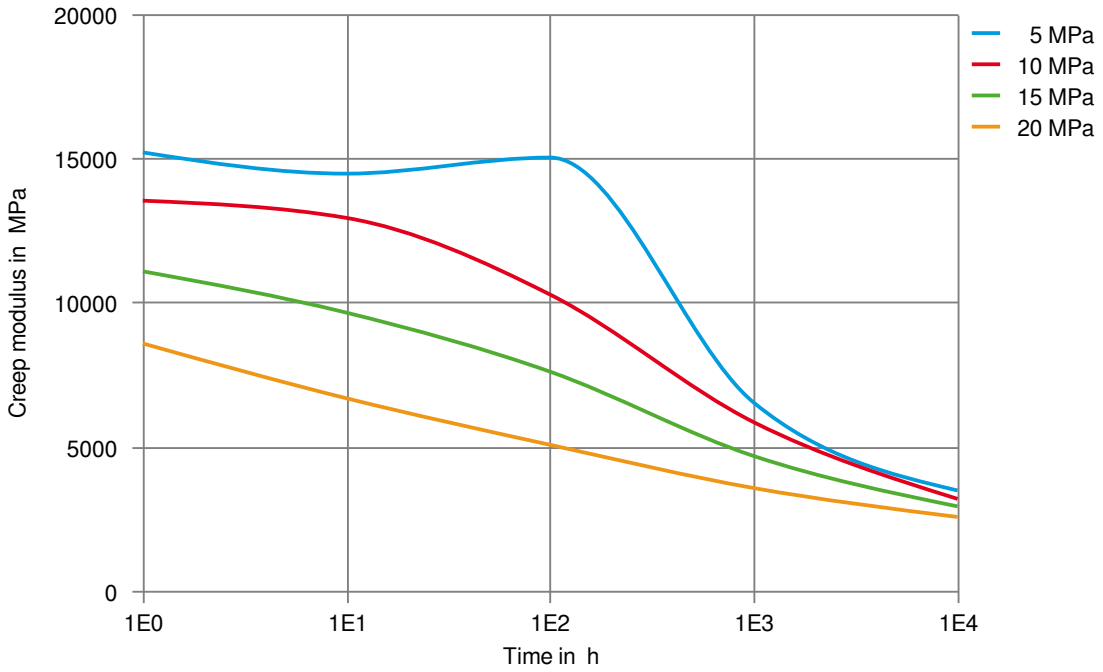
Polyphenylene sulfide

Creep modulus-time 120 °C



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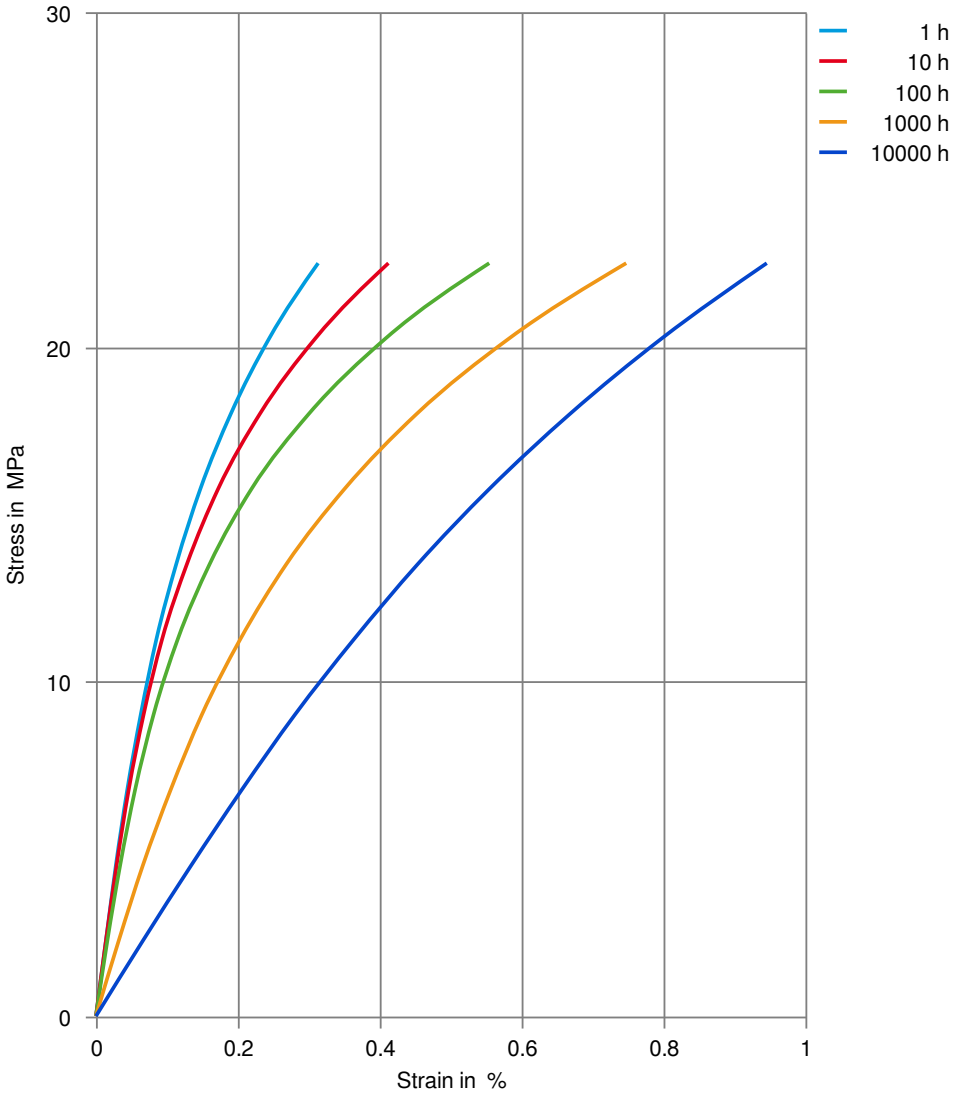
Polyphenylene sulfide

Stress-strain (isochronous) 150 °C



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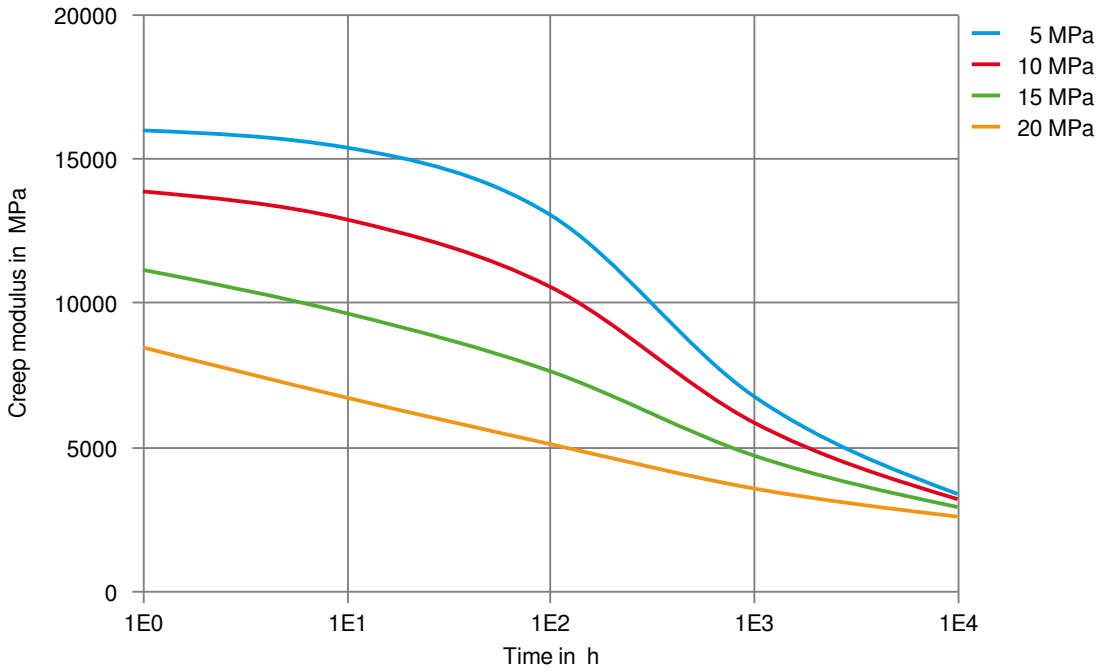
Polyphenylene sulfide

Creep modulus-time 150 °C



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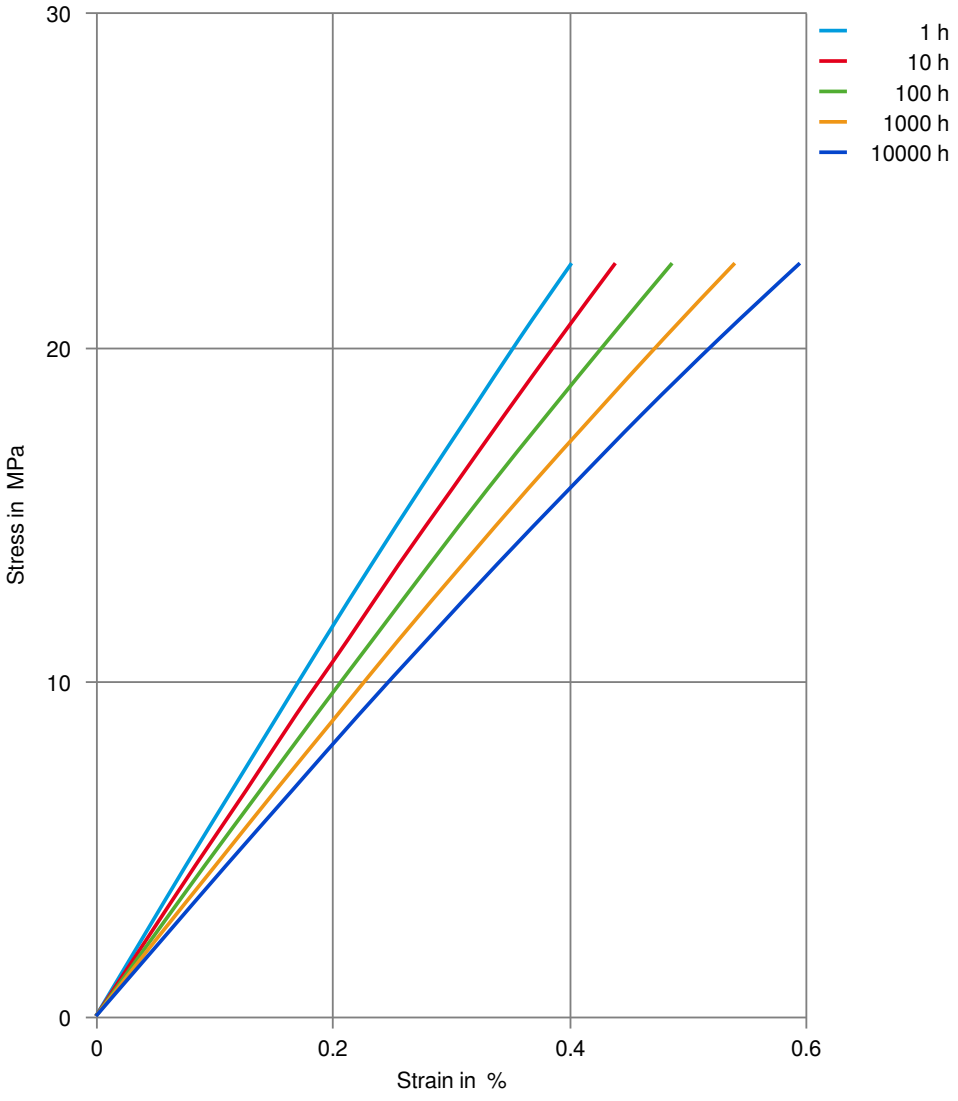
Polyphenylene sulfide

Stress-strain (isochronous) 200 °C



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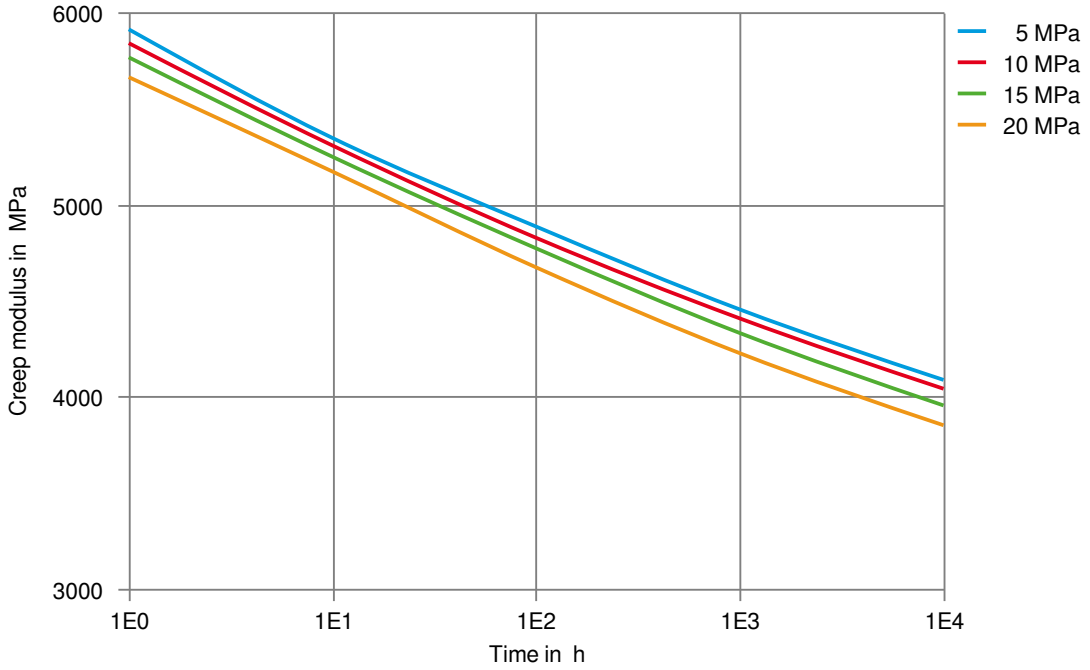
Polyphenylene sulfide

Creep modulus-time 200 °C



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