

# FORTRON® 4184L4

## Polyphenylene sulfide

Fortron 4184L4 is the strongest and toughest glass/mineral reinforced product available. It offers excellent heat resistance at high loads and good chemical resistance. The electrical properties are excellent and the product is inherently flame-retardant. This product also offers low creep resistance and good rigidity due to the mineral content. Applications made of this grade include electronic components (i.e. bobbins, connectors and solenoid valves).

### Product information

Resin Identification	PPS-(GF+MD)5 3	ISO 1043
Part Marking Code	>PPS-(GF+MD)53<	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	16600 MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	165 MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	1.4 %	ISO 527-1/-2
Flexural modulus	16200 MPa	ISO 178
Flexural strength	250 MPa	ISO 178
Compressive modulus	16200 MPa	ISO 604
Compressive strength	245 MPa	ISO 604
Compressive stress at 1% strain	207 MPa	ISO 604
Charpy impact strength, 23°C	29 kJ/m <sup>2</sup>	ISO 179/1eU
Charpy impact strength, -30°C	29 kJ/m <sup>2</sup>	ISO 179/1eU
Charpy notched impact strength, 23°C	7 kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength, -30°C	7 kJ/m <sup>2</sup>	ISO 179/1eA
Izod notched impact strength, 23°C	7 kJ/m <sup>2</sup>	ISO 180/1A
Izod notched impact strength, -30°C	7.0 kJ/m <sup>2</sup>	ISO 180/1A
Izod impact strength, 23°C	27 kJ/m <sup>2</sup>	ISO 180/1U
Izod impact strength, -30°C	27 kJ/m <sup>2</sup>	ISO 180/1U
Hardness, Rockwell, M-scale	100	ISO 2039-2
Poisson's ratio	0.33 <sup>[C]</sup>	

[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
Coefficient of linear thermal expansion (CLTE), parallel	24 E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	32 E-6/K	ISO 11359-1/-2
Specific heat capacity of melt	1600 J/(kg K)	ISO 22007-4

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### 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	0.75 mm	IEC 60695-11-10

### Electrical properties

Relative permittivity, 1MHz	4.7	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	>1E15 Ohm	IEC 62631-3-2
Electric strength	27 kV/mm	IEC 60243-1
Comparative tracking index	150	IEC 60112
Arc Resistance	156 s	UL 746B

### Physical/Other properties

Water absorption, 2mm	0.02 %	Sim. to ISO 62
Water absorption, Immersion 24h	0.03 %	Sim. to ISO 62
Density	1800 kg/m <sup>3</sup>	ISO 1183

### 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
Ejection temperature	217 °C

### Characteristics

Processing	Injection Moulding
Delivery form	Pellets
Additives	Release agent
Special characteristics	Flame retardant, Platable, Light stabilised or stable to light, Heat stabilised or stable to heat, Improved creep

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## 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  $\leq -30^{\circ}\text{C}$ . The time between drying and processing should be as short as possible.

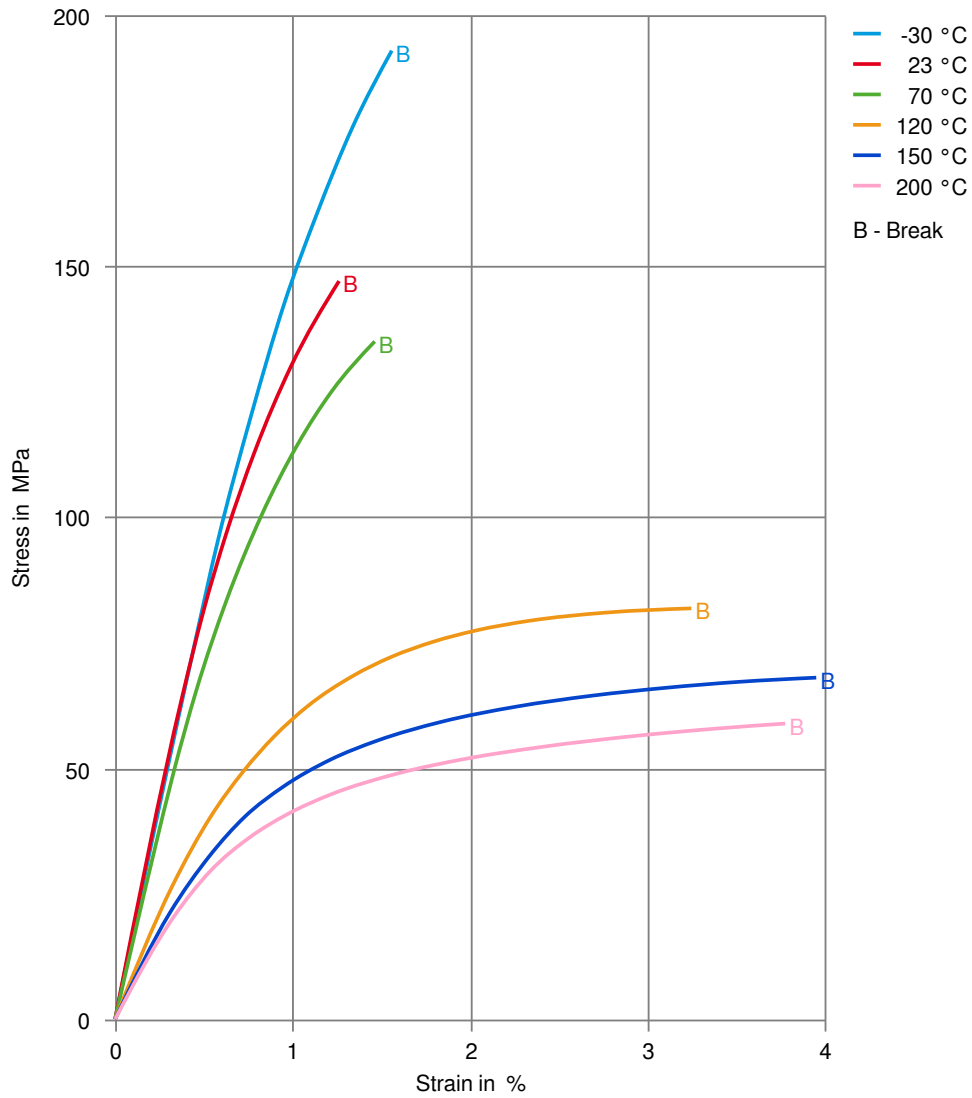
### Storage

For subsequent storage the material should be stored dry in the dryer until processed ( $\leq 60\text{ h}$ ).

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## Stress-strain



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## Secant modulus-strain

