

# FORTRON® ICE 504L HR

## Polyphenylene sulfide

FORTRON ICE 504L HR is a 40% glass fiber reinforced polyphenylene sulfide, that belongs to our new generation of Fortron® PPS.

This new technology combines improved hydrolysis resistance with optimization of molding conditions with faster cycle times. Due to the faster crystallization of the material at a higher temperature, the option of mold wall temperature reduction can be subject of advanced process optimization. The potential for optimization of Fortron® ICE by cycle time reduction is possible by standard cavity surface temperatures of 140 °C. The potential for lowering the mold temperature must be checked individually and it depends on process and part design.

### 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                       | 16000 MPa              | ISO 527-1/-2 |
| Tensile stress at break, 5mm/min      | 200 MPa                | ISO 527-1/-2 |
| Tensile strain at break, 5mm/min      | 1.8 %                  | ISO 527-1/-2 |
| Flexural modulus                      | 15000 MPa              | ISO 178      |
| Flexural strength                     | 290 MPa                | ISO 178      |
| Charpy notched impact strength, 23 °C | 9 kJ/m <sup>2</sup>    | ISO 179/1eA  |
| Izod notched impact strength, 23 °C   | 8.5 kJ/m <sup>2</sup>  | ISO 180/1A   |
| Izod impact strength, 23 °C           | 58.7 kJ/m <sup>2</sup> | ISO 180/1U   |
| 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    |
| Thermal conductivity, flow                    | 0.47 W/(m K)             | ISO 22007-2    |
| Thermal conductivity, crossflow               | 0.41 W/(m K)             | ISO 22007-2    |
| Thermal conductivity, through plane           | 0.39 W/(m K)             | ISO 22007-2    |
| Effective thermal diffusivity, flow           | 2.7E-7 m <sup>2</sup> /s | ISO 22007-4    |
| Effective thermal diffusivity, crossflow      | 2.4E-7 m <sup>2</sup> /s | ISO 22007-4    |
| Effective thermal diffusivity, through plane  | 2.2E-7 m <sup>2</sup> /s | ISO 22007-4    |
| Specific heat capacity of melt                | 1040 J/(kg K)            | ISO 22007-4    |

### Flammability

|                               |           |                 |
|-------------------------------|-----------|-----------------|
| Burning Behav. at thickness h | V-0 class | IEC 60695-11-10 |
| Thickness tested              | 0.38 mm   | IEC 60695-11-10 |
| Oxygen index                  | 47 %      | ISO 4589-1/-2   |

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## Electrical properties

|                    |            |               |
|--------------------|------------|---------------|
| Volume resistivity | 1E15 Ohm.m | IEC 62631-3-1 |
| Arc Resistance     | 134 s      | UL 746B       |

## 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/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        | 140 °C        |
| Min. mould temperature          | 125 °C        |
| Max. mould temperature          | 160 °C        |
| Hold pressure range             | 30 - 70 MPa   |
| Back pressure                   | 3 MPa         |

## Characteristics

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

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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 ( $\leq 60\text{ h}$ ).