



## Technical Data – 7000 Series

### Product description

KEPSTAN™ is a high performance thermoplastic material, based on *PolyEtherKetoneKetone* (PEKK) highly stable chemical backbone. Its semi crystalline structure in solid state offers an outstanding combination of mechanical and thermal strength together with chemical and fire resistance.

Among the KEPSTAN™ family, the 7000 Series benefits uniquely from PEKK crystalline capabilities while reducing significantly processing temperatures compared to the more crystalline 8000 Series. With a reduced melting temperature ( $T_m$  decreased by 25°C) and a  $T_g$  above 160°C, the KEPSTAN™ 7000 Series resins are highly enabling in the field of continuous fiber composites for structural applications.

KEPSTAN™ 7000 Series includes a medium flow grade, KEPSTAN™ 7002, and a high flow grade, KEPSTAN™ 7003, both unfilled PEKK resins designed to meet the requirements of a broad range of melt processing technologies, including among others extrusion, injection molding, fiber impregnation, consolidation and composite forming technologies.

KEPSTAN™ is available in pellet form and in powder form with different particle sizes. Standard packaging includes 20 kg boxes for pellets and 10 kg boxes for powders.

### Material properties

|                                      | Condition                         | Test method  | Unit                   | Typical Value |             |
|--------------------------------------|-----------------------------------|--------------|------------------------|---------------|-------------|
| Grades                               |                                   |              |                        | 7002          | 7003        |
| Flow level                           |                                   |              |                        | Medium        | High        |
| General                              |                                   |              |                        |               |             |
| Density                              | 23°C                              | ISO 1183     | g/cm <sup>3</sup>      | 1.29          |             |
| Color                                | -                                 | -            | -                      | Grey Beige    |             |
| Water absorption                     | 23°C, RH50%, equilibrium          | ISO 62       | %                      | 0.1           |             |
|                                      | 23°C, RH50%, 24 h, 2 mm           |              | %                      | 0.01          |             |
|                                      | 23°C, immersion, equilibrium      |              | %                      | 0.5           |             |
|                                      | 23°C, immersion, 24 h, 2 mm       |              | %                      | 0.2           |             |
| Melt volume flow rate                | 380°C / 5 kg                      | ISO 1133     | cm <sup>3</sup> /10min | 35            | (70)        |
|                                      | 380°C / 1 kg                      |              | cm <sup>3</sup> /10min | (6)           | 12          |
| Thermal                              |                                   |              |                        |               |             |
| Melting point                        | 20°C/min, 2 <sup>nd</sup> heating | DSC          | °C                     | 331           | 334         |
| Glass transition                     | 20°C/min                          |              | °C                     | 162           |             |
| Specific heat capacity               | 23°C                              |              | J/g/K                  | 1.02          |             |
| Heat deflection temperature          | 1.8 MPa                           | ISO 75f      | °C                     | 172           |             |
|                                      | 0.45 MPa                          |              | °C                     | tbd           |             |
| Coefficient of thermal expansion     | Average, -100°C to T <sub>g</sub> | DMA, tension | µm/m/K                 | 24            |             |
|                                      | Average, T <sub>g</sub> to 300°C  |              | µm/m/K                 | 230           |             |
| Mechanical                           |                                   |              |                        |               |             |
| Tensile modulus                      | 23°C, 1 mm/min                    | ISO 527-1BA  | GPa                    | 3.8           |             |
| Tensile strength (yield point)       |                                   |              | MPa                    | 110           | 70* to 105* |
| Elongation at yield                  | 23°C, 25 mm/min                   | ISO 527-1BA  | %                      | 5.2           | n/a         |
| Elongation at break                  |                                   |              | %                      | 20            | 2 to 4      |
| Tensile strength (yield point) at HT | 125°C, 25 mm/m in                 | ISO 527-1BA  | MPa                    | 61            | tbd         |
| Elongation at break at HT            | 125°C and above, 25 mm/mi n       | ISO 527-1BA  | %                      | > 100         | tbd         |
| Compression modulus                  | 23°C, 1 mm/min                    | ISO 604      | GPa                    | 3.8           |             |
| Compression strength                 | 23°C, 5 mm/min                    | ISO 604      | MPa                    |               | tbd         |
| Flexural modulus                     | 23°C                              | ISO 178-93   | GPa                    | 3.9           | tbd         |
| Flexural strength (max)              | 23°C                              |              | MPa                    | 168           | tbd         |
| Charpy impact strength – Unnotched   | 23°C                              | ISO 179/1eU  | kJ/m <sup>2</sup>      | 62            | 22          |
|                                      | - 30°C                            |              | kJ/m <sup>2</sup>      | 41            | 18          |
| Charpy impact strength – Notched     | 23°C                              | ISO 179/1eA  | k J/m <sup>2</sup>     | 4.5           |             |
|                                      | - 30°C                            |              | kJ/m <sup>2</sup>      |               | 4.5         |

\* Stress at break

All data measured on injection molded specimens, without further annealing or tempering.

## Fire

|                       |        |            |                 |              |
|-----------------------|--------|------------|-----------------|--------------|
| Flammability rating   | -      | UL 94      | -               | V-0 @ 0.8 mm |
| Limiting Oxygen Index | 1.6 mm | ISO 4589-2 | %O <sub>2</sub> | 35           |

## Electrical

|                       |                  |             |        |                  |
|-----------------------|------------------|-------------|--------|------------------|
| Dielectric strength   | 100 µm thickness | IEC 60243-1 | kV/mm  | 84               |
| Relative permittivity | 23°C – 1 MHz     | IEC 60250   | -      | 2.6              |
| Loss tangent          | 23°C – 1 kHz     | IEC 60250   | -      | 0.007            |
| Volume resistivity    | 23°C             | ASTM D257   | Ohm.cm | 10 <sup>16</sup> |
| Surface resistivity   | 23°C             | ASTM D257   | Ohm    | 10 <sup>16</sup> |

## Recommended processing conditions

|                                  |                                                           |
|----------------------------------|-----------------------------------------------------------|
| Drying temperature and time      | 150°C during 3 to 4 hours, or 120°C during 6 to 8 hours   |
| Processing temperature           | 340 – 360°C                                               |
| Temperature settings - Injection | Rear 320°C / Centre 340°C / Front 350°C / Nozzle 360°C    |
| Mold temperature                 | 230 to 250°C, to facilitate skin and core crystallization |
| Temperature settings - Extrusion | Zones 1/2/3/4 : 290°C/ 320°C/ 350°C / 340°C/ Die : 340°C  |

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