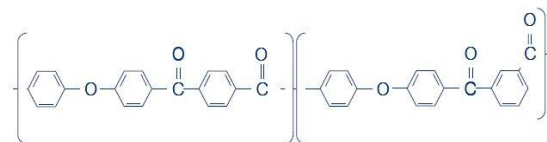


# KEPSTAN®



## Technical Data – KEPSTAN® 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 lower melting temperature and a Tg still above 160°C, the KEPSTAN® 7000 Series resins are very valued in all processes where a delayed or slower crystallization is key to ease thermoforming, to improve interlayer adhesion and to reduce internal stresses. They are for instance highly enabling in the field of continuous fiber composites for structural applications, and in filament additive manufacturing technologies with or without continuous fibers.

KEPSTAN® 7000 Series includes a very low flow grade, KEPSTAN® 7001, a medium flow grade, KEPSTAN® 7002, and a high flow grade, KEPSTAN® 7003, all unfilled PEKK resins designed to meet the requirements of a broad range of melt processing technologies, including among others extrusion, thermoforming, injection molding, fiber impregnation, composite consolidation and forming technologies, filament additive manufacturing.

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

### MATERIAL PROPERTIES

|                                      | Conditions                        | Test method  | Unit                   | Typical Value   |               |             |
|--------------------------------------|-----------------------------------|--------------|------------------------|-----------------|---------------|-------------|
|                                      |                                   |              |                        | 7001            | 7002          | 7003        |
| <b>Grades</b>                        |                                   |              |                        | <b>Very Low</b> | <b>Medium</b> | <b>High</b> |
| <b>Flow level</b>                    |                                   |              |                        |                 |               |             |
| <b>General</b>                       |                                   |              |                        |                 |               |             |
| Density                              | 23°C                              | ISO 1183     | g/cm <sup>3</sup>      | 1.29            | 1.29          | 1.29        |
| Color                                | -                                 | -            | -                      | Grey Beige      | Grey Beige    | Grey Beige  |
| Water absorption                     | 23°C, RH50%, equilibrium          | ISO 62       | %                      | 0.4             | 0.4           | 0.4         |
|                                      | 23°C, RH50%, 24 h, 2 mm           |              | %                      | 0.05            | 0.05          | 0.05        |
|                                      | 23°C, immersion, equilibrium      |              | %                      | 0.7             | 0.7           | 0.7         |
|                                      | 23°C, immersion, 24 h, 2 mm       |              | %                      | 0.11            | 0.11          | 0.11        |
| Melt volume flow rate                | 380°C / 5 kg                      | ISO 1133     | cm <sup>3</sup> /10min | 7               | -             | -           |
|                                      | 380°C / 1 kg                      |              | cm <sup>3</sup> /10min | -               | 6             | 12          |
| <b>Thermal</b>                       |                                   |              |                        |                 |               |             |
| Melting point                        | 20°C/min, 2 <sup>nd</sup> heating | DSC          | °C                     | 325             | 336           | 336         |
| Glass transition                     | 20°C/min                          |              | °C                     | 162             | 162           | 162         |
| Specific heat capacity               | 23°C                              |              | J/g/K                  | 1.02            | 1.02          | 1.02        |
| Heat deflection temperature          | 1.8 MPa                           | ISO 75f      | °C                     | 160             | 164           | 164         |
|                                      | 0.45 MPa                          |              | °C                     | Tbd             | Tbd           | Tbd         |
| Coefficient of thermal expansion     | Average, -100°C to Tg             | DMA, tension | µm/m/K                 | 24              | 24            | 24          |
|                                      | Average, Tg to 300°C              |              | µm/m/K                 | 230             | 230           | 230         |
| <b>Mechanical</b>                    |                                   |              |                        |                 |               |             |
| Tensile modulus                      | 23°C, 1 mm/min                    | ISO 527-1BA  | GPa                    | 3.7             | 3.9           | 4.0         |
| Tensile strength (yield point)       |                                   |              | MPa                    | 110             | 114           | 100 - 120   |
| Elongation at yield                  | 23°C, 25 mm/min                   | ISO 527-1BA  | %                      | 5.6             | 5.5           | n/a         |
| Elongation at break                  |                                   |              | %                      | >20             | >15           | 3 - 10      |
| Tensile strength (yield point) at HT | 125°C, 25 mm/min                  | ISO 527-1BA  | MPa                    | 61              | Tbd           | Tbd         |
| Elongation at break at HT            | 125°C and above, 25 mm/min        | ISO 527-1BA  | %                      | > 100           | Tbd           | Tbd         |
| Compression modulus                  | 23°C, 1 mm/min                    | ISO 604      | GPa                    | 3.7             | 3.8           | 3.8         |
| Compression strength                 | 23°C, 5 mm/min                    | ISO 604      | MPa                    | 145             | 149           | Tbd         |

|                                    |        |             |       |     |     |     |
|------------------------------------|--------|-------------|-------|-----|-----|-----|
| Flexural modulus                   | 23°C   | ISO 178-93  | GPa   | 3.8 | 3.9 | Tbd |
| Flexural strength (max)            | 23°C   |             | MPa   | 160 | 168 | Tbd |
| Charpy impact strength – Unnotched | 23°C   | ISO 179/1eU | kJ/m² | 62  | 62  | 22  |
|                                    | - 30°C |             |       | 41  | 41  | 18  |
| Charpy impact strength – Notched   | 23°C   | ISO 179/1eA | kJ/m² | 6   | 5   | 4.5 |
|                                    | - 30°C |             |       | 6   | 5.5 | 5   |

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

## Fire

|                       |        |            |     |             |              |              |
|-----------------------|--------|------------|-----|-------------|--------------|--------------|
| Flammability rating   | -      | UL 94      | -   | V-0 @ 0.8mm | V-0 @ 0.8 mm | V-0 @ 0.8 mm |
| Limiting Oxygen Index | 3.2 mm | ISO 4589-2 | %O2 | 38          | 38           | 38           |

## Electrical

|                       |                  |             |        |                  |                  |                  |
|-----------------------|------------------|-------------|--------|------------------|------------------|------------------|
| Dielectric strength   | 100 µm thickness | IEC 60243-1 | kV/mm  | 84               | 84               | 84               |
| Relative permittivity | 23°C – 1 MHz     | IEC 60250   | -      | 3.0              | 3.0              | 3.0              |
| Loss tangent          | 23°C – 1 kHz     | IEC 60250   | -      | 0.002            | 0.002            | 0.002            |
| Volume resistivity    | 23°C             | ASTM D257   | Ohm.cm | 10 <sup>16</sup> | 10 <sup>16</sup> | 10 <sup>16</sup> |
| Surface resistivity   | 23°C             | ASTM D257   | Ohm    | 10 <sup>16</sup> | 10 <sup>16</sup> | 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  |