

# Ketron<sup>®</sup> LSG CC PEEK

PRODUCT DATA SHEET

This specially developed grade is a unique engineering PEEK based material, which offers a high performance profile due to its woven carbon reinforced structure. This material is manufactured by means of compression moulding. Basically the composite contains 57% Carbon fibers and 43% Impregnated PEEK Polymer (PI preg) pressed into layers(laminates) of 0.325mm. Its key properties include superior mechanical strength and stiffness at elevated temperatures, outstanding friction and wear resistance, excellent performance in chemical and irradiated environments.

## Physical properties (indicative values <sup>■</sup>)

| MATERIALS  | Properties               | Units             | VALUES                 |
|--|--------------------------|-------------------|------------------------|
| Fabric   | Fiber (warp/Weft)        | -                 | 3K HS Carbon           |
|  | Fiber density            | g/cm <sup>3</sup> | 1.76                   |
|  | Weave                    | -                 | 5 H Satin              |
|  | Construction (warp/Weft) | yarn/cm           | 7.0 x 7.0              |
| PI Preg - Polymer  | Thermoplastic            | -                 | PEEK                   |
|  | Density                  | g/cm <sup>3</sup> | 1.30                   |
| Laminate   | Density                  | g/cm <sup>3</sup> | 1.53                   |
|  | Thickness                | mm/ply            | 0.325                  |
|  | Colour                   | -                 | black                  |
| PROPERTIES   | Test methods             | Units             | VALUES                 |
| Water absorption:  |                          |                   |                        |
| - after 24/96 h immersion in water of 23°C (1)                             | ISO 62                   | mg                |                        |
|  | ISO 62                   | %                 |                        |
| - at saturation in air of 23°C / 50% RH                                    | -                        | %                 |                        |
| - at saturation in water of 23°C   | -                        | %                 |                        |
| <b>Thermal Properties (2)</b>  |                          |                   |                        |
| Melting temperature (DSC, 10°C/min)  | ISO 11357-1/-3           | °C                | 343                    |
| Glass transition temperature (DSC, 20°C/min) - (3)                         | ISO 11357-2/-3           | °C                |                        |
| Thermal conductivity at 23°C in plane (X-direction):                       | ISO 22007-2              | W/(K.m)           | 2.7                    |
| Thermal conductivity at 23°C in thickness (Z-direction):                   | ISO 22007-2              | W/(K.m)           | 0.5                    |
| <b>Coefficient of linear thermal expansion in plane (X-direction):</b>     |                          |                   |                        |
| - average value between 23 and 100°C                                       | -                        | m/(m.K)           | 4 x 10 <sup>-6</sup>   |
| - average value between 23 and 250°C                                       | -                        | m/(m.K)           | 4.5 x 10 <sup>-6</sup> |
| <b>Coefficient of linear thermal expansion in thickness (Z-direction):</b> |                          |                   |                        |
| - average value between 23 and 100°C                                       | -                        | m/(m.K)           | 5 x 10 <sup>-5</sup>   |
| - average value between 23 and 250°C                                       | -                        | m/(m.K)           | 5 x 10 <sup>-5</sup>   |
| <b>Max. allowable service temperature in air:</b>                          |                          |                   |                        |
| - for short periods (4)  | -                        | °C                |                        |
| - continuously : for 5,000 / 20,000 h (5)                                  | -                        | °C                |                        |
| <b>Min. service temperature (6)</b>  |                          |                   |                        |
| <b>Flammability (7):</b>   |                          |                   |                        |
| - "Oxygen Index"   | ISO 4589                 | %                 |                        |
| - according to UL 94 (3 / 6 mm thickness)                                  | -                        |                   |                        |
| <b>Mechanical Properties at 23°C (8)</b>                                   |                          |                   |                        |
| <b>Tension test (9):</b>   |                          |                   |                        |
| - tensile stress at yield / tensile stress at break (10)                   | ISO 527                  | MPa               | NYP/375                |
| - tensile strength (10)  | ISO 527                  | MPa               | 560                    |
| - tensile strain at break (10)   | ISO 527                  | %                 | 1                      |
| - tensile modulus of elasticity (11)                                       | ISO 527                  | GPa               | 70                     |
| <b>Compression test (12):</b>  |                          |                   |                        |
| - compressive stress at 1 / 2 / 5 % nominal strain (11)                    | ISO 604                  | MPa               | 89 / 175 / 418         |
| - compressive strength   | ISO 14126                | MPa               | 716                    |
| <b>Charpy impact strength - Unnotched (13)</b>                             |                          |                   |                        |
|  | ISO 179-1/1eU            | kJ/m <sup>2</sup> | 65                     |
| <b>Charpy impact strength - Notched (14)</b>                               |                          |                   |                        |
|  | ISO 179-1/1eA            | kJ/m <sup>2</sup> | 35                     |
| <b>Flexural test (17):</b>   |                          |                   |                        |
| - flexural strength  | ASTM D790                | MPa               | 710                    |
| - flexural modulus   | ASTM D790                | GPa               | 51                     |
| <b>Ball indentation hardness (15)</b>                                      |                          |                   |                        |
|  | ISO 2039-1               | N/mm <sup>2</sup> | 560                    |
| <b>Rockwell hardness (15)</b>  |                          |                   |                        |
|  | ISO 2039-2               | -                 | M 114                  |
| <b>Electrical Properties at 23 °C</b>                                      |                          |                   |                        |
| Electric strength (16)   | IEC 60243                | kV/mm             |                        |
| Volume resistivity   | IEC 60093                | Ohm.cm            |                        |
| Surface resistivity  | IEC 60093                | Ohm               | ≤ 10 <sup>3</sup>      |
| Relative permittivity ε <sub>r</sub> : - at 100 Hz                         | IEC 60250                | -                 |                        |
| - at 1 MHz   | IEC 60250                | -                 |                        |
| Dielectric dissipation factor tan δ: - at 100 Hz                           | IEC 60250                | -                 |                        |
| - at 1 MHz   | IEC 60250                | -                 |                        |
| Comparative tracking index (CTI)   | IEC 60112                | -                 |                        |
|  | IEC 60112                | -                 |                        |

Note: 1 g/cm<sup>3</sup> = 1,000 kg/m<sup>3</sup> ; 1 MPa = 1 N/mm<sup>2</sup> ; 1000MPa = 1 GPa ; 1 kV/mm = 1 MV/m.

## AVAILABILITY

**Sheets/Plates:** Thicknesses 2 - 63.5 mm (500 x 500 mm)

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### Legend:

- According to method 1 of ISO 62 and done on discs Ø 50 x 3 mm.
- The figures given for these properties are for the most part derived from raw material supplier data and other publications. Values for this property are only given here for amorphous materials and not for semi-crystalline ones.
- Only for short time exposure (a few hours) in applications where no or only a very low load is applied to the material.
- Temperature resistance over a period of 5,000/20,000 hours. After these periods of time, there is a decrease in tensile strength of about 50% as compared with the original value. The temperature values given here are thus based on the thermal-oxidative degradation which takes place and causes a reduction in properties. Note, however, that, as for all thermoplastics, the maximum allowable service temperature depends in many cases essentially on the duration and the magnitude of the mechanical stresses to which the material is subjected.
- Impact strength decreasing with decreasing temperature, the minimum allowable service temperature is practically mainly determined by the extent to which the material is subjected to impact. The values given here are based on unfavourable impact conditions and may consequently not be considered as being the absolute practical limits.
- These estimated ratings, derived from raw material supplier data and other publications, are not intended to reflect hazards presented by the materials under actual fire conditions. There are no UL-yellow cards available for these stock shapes.
- The figures given for the properties of dry material are for the most part average values of tests run on test specimens machined out of plates (31-64 mm).
- Test specimens: Type 1 B
- Test speed: 50 mm/min (chosen acc. to ISO 10350-1 as a function of the ductile behaviour of the material)
- Test speed: 1 mm/min
- Test specimens: cylinders Ø 8 x 16 mm
- Pendulum used: 15 J
- Pendulum used: 4 J
- 35 mm thick test specimens in plain
- Electrode configuration: Ø 25 / Ø 75 mm coaxial cylinders ; in transformer oil according to IEC 60296 ; 1 mm thick natural coloured test specimens.
- Test specimens: 127 x 12.7 x 3.2 mm. Modulus via 2 points (max. strength/10 and max strength/2). Procedure A: Strain rate Z = 0.01 mm/mm/min.

■ This table is a valuable help in the choice of a material. The data listed here fall within the normal range of product properties. **However, they are not guaranteed and they should not be used to establish material specification limits nor used alone as the basis of design.**