PRODUCT DATASHEET

# Ketron™ 1000 NU PEEK

## Poly-ether-ether-ketone

Ketron™ 1000 NU PEEK is an unfilled, polyetheretherketone grade that offers the highest elongation and toughness of all PEEK materials. Ketron™ 1000 NU PEEK is PMUC-certified and has passed stringent tests by an EDF-approved laboratory to meet PMUC requirements for use on nuclear sites. Each shipment is accompanied with a PMUC certificate including production batch number. MCG offers a range of engineering stock shape products that hold PMUC approval from third party certified laboratories in France. PMUC is the standard for products and materials used in electric, nuclear and thermal power plants.

| | | ISO* | | | ASTM* | | |
|---|---|---|---|---|---|---|---|
| | | Test methods | Units | Indicative values | Test methods | Units | Indicative values |
| Thermal properties (1) | Melting temperature (DSC, 10°C (50°F) / min) | ISO 11357-1/-3 | °C | 340 | ASTM D3418 | °F | 644 |
| | Glass transition temperature (DMA- Tan δ) (2) | | °C | | | °F | |
| | Thermal conductivity at 23°C (73°F) | | W/(K.m) | 0.25 | | BTU in./(hr.ft².°F) | 1.75 |
| | Coefficient of linear thermal expansion (-40 to 150 °C) (-40 to 300°F) | | | | ASTM E-831 (TMA) | µin./in./°F | 26 |
| | Coefficient of linear thermal expansion (23 to 100°C) (73°F to 210°F) | | µm/(m.K) | 50 | | | |
| | Coefficient of linear thermal expansion (23 to 150°C) (73°F to 300°F) | | µm/(m.K) | 55 | | | |
| | Coefficient of linear thermal expansion (>150°C) (> 300°F) | | µm/(m.K) | 130 | | | |
| | Heat Deflection Temperature: method A: 1.8 MPa (264 PSI) | ISO 75-1/-2 | °C | 160 | ASTM D648 | °F | 320 |
| | Continuous allowable service temperature in air (20.000 hrs) (3) | | °C | 250 | | °F | 480 |
| | Min. service temperature (4) | | °C | -50 | | °F | |
| | Flammability: UL 94 (3 mm (1/8 in.)) (5) | | | V-0 | | | V-0 |
| | Flammability: Oxygen Index | ISO 4589-1/-2 | % | 35 | | | |
| Mechanical Properties (6) | Tensile strength | ISO 527-1/-2 (7) | MPa | 115 | ASTM D638 (8) | PSI | 16,000 |
| | Tensile strain (elongation) at yield | ISO 527-1/-2 (7) | % | 5 | ASTM D638 (8) | % | 5 |
| | Tensile strain (elongation) at break | ISO 527-1/-2 (7) | % | 17 | ASTM D638 (8) | % | 40 |
| | Tensile modulus of elasticity | ISO 527-1/-2 (9) | MPa | 4,300 | ASTM D638 (8) | KSI | 630 |
| | Shear Strength | ASTM D732 | MPa | 55 | ASTM D732 | PSI | 8,000 |
| | Compressive stress at 1 / 2 / 5 % nominal strain | ISO 604 (10) | MPa | 38 / 75 / 140 | | | |
| | Compressive strength | | | | ASTM D695 (11) | PSI | 20,000 |
| | Charpy impact strength - unnotched | ISO 179-1/1eU | kJ/m² | no break | | | |
| | Charpy impact strength - notched | ISO 179-1/1eA | kJ/m² | 3.5 | | | |
| | Izod Impact notched | | | | ASTM D256 | ft.lb./in | 0.60 |
| | Flexural strength | ISO 178 (12) | MPa | 170 | ASTM D790 (13) | PSI | 25,000 |
| | Flexural modulus of elasticity | ISO 178 (12) | MPa | | ASTM D790 | KSI | 600 |
| | Rockwell M hardness (14) | ISO 2039-2 | | 105 | ASTM D785 | | 100 |
| | Rockwell R hardness (14) | ISO 2039-2 | | | ASTM D785 | | 126 |
| Electrical Properties | Electric strength | IEC 60243-1 (15) | kV/mm | 24 | ASTM D149 | Volts/mil | 480 |
| | Volume resistivity | IEC 62631-3-1 | Ohm.cm | 10^14 | ASTM D257 | Ohm.cm | |
| | Surface resistivity | ANSI/ESD STM 11.11 | Ohm | 10^13 | ANSI/ESD STM 11.11 | Ohm | 10^13 |
| | Dielectric constant at 1 MHz | IEC 62631-2-1 | | 3.2 | ASTM D150 | | 3.3 |
| | Dissipation factor at 1MHz | IEC 62631-2-1 | | 0.002 | ASTM D150 | | 0.003 |
| Miscellaneous | Color | | | Natural (beige) | | | Natural (beige) |
| | Density | ISO 1183-1 | g/cm³ | 1.31 | | | |
| | Specific Gravity | | | | ASTM D792 | | 1.31 |
| | Water absorption after 24h immersion in water of 23 °C (73°F) | ISO 62 (16) | % | 0.06 | ASTM D570 (17) | % | 0.10 |
| | Water absorption at saturation in water of 23 °C (73°F) | | % | 0.45 | ASTM D570 (17) | % | 0.5 |
| | Wear rate | ISO 7148-2 (18) | µm/km | 28 | QTM 55010 (19) | $in^3.min/ft.lbs.hrX10^{-10}$ | 375 |
| | Dynamic Coefficient of Friction (-) | ISO 7148-2 (18) | | 0.3-0.5 | QTM 55007 (20) | | 0.32 |
| | Limiting PV at 100 FPM (safety factor 4) | | | | QTM 55007 (21) | ft.lbs/in².min | 8,500 |
| | Limiting PV at 0.1 / 1 m/s cylindrical sleeve bearings | | MPa.m/s | 0.33 / 0.21 | | | |
| | Limiting PV at 0.5 m/s cylindrical sleeve bearings | QTM 55007 (21) | MPa.m/s | | | | |
| | Chemical Resistance | www.mcam.com/en/support/chemical-resistance-information | | | www.mcam.com/en/support/chemical-resistance-information | | |

Note: 1 g/cm³ = 1,000 kg/m³ ; 1 MPa = 1 N/mm² ; 1 kV/mm = 1 MV/m

NYP: there is no yield point

This table, mainly to be used for comparison purposes, is a valuable help in the choice of a material. The data listed here fall within the normal range of product properties of dry material. However, they are not guaranteed and they should not be used to establish material specification limits nor used alone as the basis of design. See the remaining notes on the next page.

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# Notes, see datasheet on page 1

1. The figures given for these properties are for the most part derived from raw material supplier data and other publications.
2. Values for this property are only given here for amorphous materials and for materials that do not show a melting temperature (PBI & PI).
3. Temperature resistance over a period of min. 20,000 hours. After this period of time, there is a decrease in tensile strength – measured at 23 °C – of about 50 % as compared with the original value. The temperature value given here is thus based on the thermal-oxidative degradation which takes place and causes a reduction in properties. Note, however, that 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.
4. 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 value given here is based on unfavourable impact conditions and may consequently not be considered as being the absolute practical limit.
5. These estimated ratings, derived from raw material supplier data and other publications, are not intended to reflect hazards presented by the material under actual fire conditions. There is no ‘UL File Number’ available for these stock shapes.
6. Most of the figures given for the mechanical properties are average values of tests run on dry test specimens machined out of rods 40-60 mm when available, else out of plate 10-20mm. All tests are done at room temperature (23° / 73°F)
7. Test speed: either 5 mm/min or 50 mm/min [chosen acc. to ISO 10350-1 as a function of the ductile behaviour of the material (tough or brittle)] using type 1B tensile bars. Tensile strength may refer to either tensile strength at yield (with elongation at yield reported) or to tensile strength at break.
8. Test speed: either 0.2"/min or 2"/min or [chosen as a function of the ductile behaviour of the material (brittle or tough)] using Type 1 tensile bars. Tensile strength may refer to either tensile strength at yield (with elongation at yield reported) or to tensile strength at break.
9. Test speed: 1 mm/min, using type 1B tensile bars
10. Test specimens: cylinders Ø 8 mm x 16 mm, test speed 1 mm/min
11. Test specimens: cylinders Ø 0.5" x 1", or square 0.5" x 1", test speed 0.05"/min
12. Test specimens: bars 4 mm (thickness) x 10 mm x 80 mm ; test speed: 2 mm/min ; span: 64 mm.
13. Test specimens: bars 0.25" (thickness) x 0.5" x 5" ; test speed: 0.11"/min ; span: 4"
14. Measured on 10 mm, 0.4" thick test specimens.
15. Electrode configuration: Φ 25 / Φ 75 mm coaxial cylinders ; in transformer oil according to IEC 60296 ; 1 mm thick test specimens.
16. Measured on discs Ø 50 mm x 3 mm.
17. Measured on 1/8" thick x 2" diameter or square
18. Test procedure similar to Test Method A: “Pin-on-disk” as described in ISO 7148-2, Load 3MPa, sliding velocity= 0,33 m/s, mating plate steel Ra= 0.7-0.9 µm, tested at 23°C, 50%RH.
19. Test using journal bearing system, 200 hrs, 118 ft/min, 42 PSI, steel shaft roughness 16±2 RMS micro inches with Hardness Brinell of 180-200
20. Test using Plastic Thrust Washer rotating against steel, 20 ft/min and 250 PSI, Stationary steel washer roughness 16±2 RMS micro inches with Rockwell C 20-24
21. Test using Plastic Thrust Washer rotating against steel, Step by step increase pressure, test ends when plastic begins to deform or if temperature increases, depending on the material, to a maximum which lays between 212°F (100°C) and 482°F (250°C), a 4:1 safety factor has been applied to the posted value.

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