Ketron® 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 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 ▪)

MATERIALS	Properties	Units	VALUES
Laminate	Density	g/cm³	1.53
PROPERTIES	**Test methods**	**Units**	**VALUES**
Colour	-	-	black
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	-	%	
Thermal Properties (2)			
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
Coefficient of linear thermal expansion in plane (X-direction):			
- average value between 23 and 100°C	-	m/(m.K)	4×10^{-6}
- average value between 23 and 250°C	-	m/(m.K)	4.5×10^{-6}
Coefficient of linear thermal expansion in thickness (Z-direction):			
- average value between 23 and 100°C	-	m/(m.K)	5×10^{-5}
- average value between 23 and 250°C	-	m/(m.K)	10×10^{-5}
Max. allowable service temperature in air:			
- for short periods (4)	-	°C	
- continuously : for min. 20,000 h (5)	-	°C	
Min. service temperature (6)	-	°C	
Flammability (7):			
- "Oxygen Index"	ISO 4589	%	
- according to UL 94 (3 / 6 mm thickness)	-	-	
Mechanical Properties at 23°C (8)			
Tension test (9):			
- tensile stress at yield (10)	ISO 527	MPa	NYP
- tensile strength (10)	ISO 527	MPa	680
- tensile strain at break (10)	ISO 527	%	1
- tensile modulus of elasticity (11)	ISO 527	GPa	55
Compression test (12):			
- compressive stress at 1 / 2 / 5 % nominal strain (11)	ISO 604	MPa	89 / 175 / 418
- compressive strength	ISO 14126	MPa	716
Charpy impact strength - Unnotched (13)	ISO 179-1/1eU	kJ/m²	65
Charpy impact strength - Notched (14)	ISO 179-1/1eA	kJ/m²	35
Flexural test (17):			
- flexural strength	ASTM D790	MPa	710
- flexural modulus	ASTM D790	GPa	51
Ball indentation hardness (15)	ISO 2039-1	N/mm²	560
Rockwell hardness (15)	ISO 2039-2	-	M 114
Electrical Properties at 23 °C			
Electric strength (16)	IEC 60243	kV/mm	
Volume resistivity	IEC 60093	Ohm.cm	
Surface resistivity	ANSI/ESD STM11.11	Ohm	$\leq 10^3$
Relative permittivity ε_r : - 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	-	

Legend:

1) According to method 1 of ISO 62 and done on discs Ø 50 mm x 3 mm.
2) The figures given for these properties are for the most part derived from raw material supplier data and other publications.
3) Values for this property are only given here for amorphous materials and for materials that do not show a melting temperature (PBI, PAI, PI).
4) Only for short time exposure (a few hours) in applications where no or only a very low load is applied to the material.
5) 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.
6) 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.
7) 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.
8) Most of the figures given for these mechanical properties of the materials are average values of tests run on dry test specimens machined out of plate 15-20 mm thickness.
9) Test specimens: Type 1 B
10) Test speed: either 5 or 50 mm/min [chosen acc. to ISO 10350-1 as a function of the ductile behaviour of the material (tough or brittle)]
11) Test speed: 1 mm/min.
12) Test specimens: cylinders Ø 8 mm x 16 mm
13) Pendulum used: 15J
14) Pendulum used: 4J
15) 10 mm thick test specimens in plain
16) Electrode configuration: ∅ 25 mm / ∅ 75 mm coaxial cylinders ; in transformer oil according to IEC 60296 ; 1 mm thick test specimens.
17) Test specimens: bars 4,8 mm (thickness) x 13 mm x 130 mm ; test speed: 2,5 mm/min ; span: 100 mm.

this table 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.**

It has to be noted that reinforced and filled material shows an anisotropic behaviour (properties differ when measured parallel and perpendicular to the manufacturing direction).

Note: 1 g/cm³ = 1,000 kg/m³ ; 1 MPa = 1 N/mm² ; 1000MPa = 1 GPa ;1 kV/mm = 1 MV/m.