

ESSENTIUM PEKK

Essentium polyetherketoneketone (PEKK) filament made with Arkema 6002 Kepstan™ resin is an ultra-polymer for the most demanding aerospace and industrial applications. PEKK shares most of the performance attributes of PEEK but is substantially easier to print due to lower viscosity, lower degree of crystallinity, and substantially lower warping. PEKK maintains the flame smoke toxicity ratings for FAR compliance while offering greatly improved resistance to chemical attack in comparison to PEI.



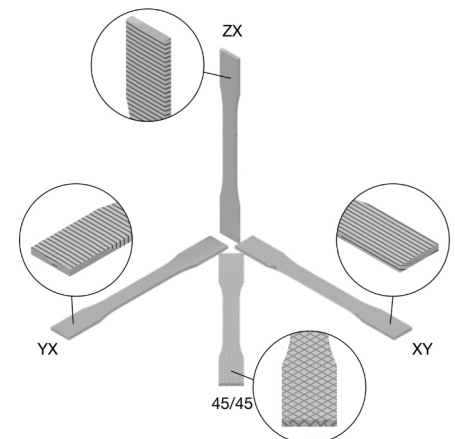
MECHANICAL PROPERTIES

Metric	Test Method	Print Orientation		
		XY	45/45	ZX
Ultimate Tensile Strength, MPa	ISO 527-2	82.9 (1.0)	48.4 (1.5)	63.7 (2.3)
Tensile Modulus, GPa	ISO 527-2	3.04 (0.38)	2.25 (0.31)	1.95 (0.13)
Strain at Break, %	ISO 527-2	75.8 (12.0)	4.9 (0.7)	4.4 (0.5)
Flexural Strength, MPa	ISO 178	114.3 (1.7)	91.6 (2.8)	106.5 (1.8)
Flexural Modulus, GPa	ISO 178	2.37 (0.10)	2.08 (0.10)	2.43 (0.10)
Izod Impact Strength, Notched kJ/m ²	ISO 180	5.5 (1.3)	3.6 (0.7)	3.4 (0.8)

Standard deviations listed in parentheses

MATERIAL PROPERTIES

Property	Method	Value
Density ¹ , g/cm ³	ISO 1183	1.27
HDT @ 0.45 MPa ¹ , °C	ISO 75	-
HDT @ 1.8 MPa ¹ , °C	ISO 75	139
Melting Point ¹ , °C	ISO 11357	300
Glass Transition Temp ¹ , °C	ISO 11357	160
Flammability Rating @ 0.8mm ¹	UL94	V0
Limiting Oxygen Index @ 1.6mm ¹ , %O ₂	ISO 4589-2	38
Equilibrium Water Absorption ¹ , 23°C, 50% RH, %	ISO 62	0.16



¹ Values taken from raw material TDS

MATERIAL HANDLING AND DRYING

Essentium PEKK is a hygroscopic thermoplastic and will absorb moisture from humid air. Keep the material in the vacuum sealed packaging until you are ready to print with it. PEKK filament should always be fed to the printer in a dry container and stored in a dry cabinet to minimize absorbed moisture. If the material does absorb more than 200 ppm moisture, it should be dried in a low dew point oven or vacuum oven at 120°C for 3 – 8 hours or overnight in the Essentium DryBox™ with SmartBAKE™. Essentium recommends printing PEKK on a G14 phenolic build sheet with a thin layer of Magigoo® HT applied to the surface to facilitate the removal of parts.

RECOMMENDED HSE PRINT SETTINGS

Contact Essentium for HSE Print Profiles or find our [Print Profiles online](#).

RECOMMENDED FFF PRINT SETTINGS

Nozzle Temperature, °C	350 – 400	Fan Speed, %	0 – 20
Bed Temperature, °C	100 – 150	Bed Material	G14
Print Speed, mm/s	20 – 50	Bed Adhesion Method	Magigoo® HT or VM Nano
First Layer Speed, mm/s	20	Infill Density, %	10 – 90

KEY FEATURES:

- High temperature resistance
- Excellent chemical and solvent resistance
- Easier to print compared to PEEK
- Inherently flame retardant
- Rated for FAR 25.853 requirements

APPLICATIONS INCLUDE:

- Aerospace parts
- Railway parts
- Oil and gas
- Semiconductor manufacturing

ADVANCED MATERIAL PROPERTIES

Property	Method	Value
Dielectric Strength @ 100 um thickness ¹ , kV/mm	IEC 60243-1	84
Relative Permittivity ¹ , 23°C, 1 MHz	IEC 60250	2.5
Loss Tangent ¹ , 23°C, 1 kHz	IEC 60250	0.007
Volume Resistivity ¹ , 23°C, Ohm.cm	IEC 60093	1.0 E+16
Surface Resistivity ¹ , 23°C, Ohm	IEC 60093	1.0 E+16
Total Mass Loss (TML), %	ASTM E595	0.27
Collected Volatile Condensable Material (CVCM), %	ASTM E595	<0.01
Water Vapor Recovered (WVR), %	ASTM E595	0.29

¹ Values taken from raw material TDS