

Polyetheretherketone (PEEK)

KEY FEATURES

- Excellent Flexural, Impact and Tensile Characteristics
- A Superior Dielectric at High Temperatures and Frequencies
- Very High Continuous Working Temperature
- Outstanding Wear and Abrasion Resistance
- Very High Heat Deflection Temperature
- Low Smoke and Toxic Gas Emissions
- Exceptional Chemical Resistance
- Excellent Hydrolysis Resistance
- Good Radiation Resistance

DESCRIPTION

Well known for its high temperature resistance, PEEK is a unique semicrystalline, engineering thermoplastic that also offers excellent chemical compatibility. Parts manufactured from PEEK can operate at temperatures up to 260°C (480°F) and has a melting point around 341°C (646°F). PEEK is often used in hot water or steam environments while maintaining physical properties such as flexural and tensile strength on a high level.

PEEK (Unfilled)

This general purpose grade is unreinforced and offers the highest elongation and toughness of all PEEK grades. Unfilled PEEK is available in sheet and rod forms in natural (a very light brown or tan) color and is also available in black. Black PEEK is ideal for instrument components where aesthetics are important, as well as for seal components where ductility and inertness are important. All unfilled PEEK grades comply with FDA regulation 21 CFR 177.2415 for repeated food contact.

PEEK (30% Glass Filled)

The addition of glass fibers significantly reduces the expansion rate and increases the flexural modulus of PEEK. This grade is ideal for structural applications that require improved strength, stiffness, or stability, especially at temperatures above 300°F (150°C). Glass-filled PEEK is light brown or tan in color.

PEEK (30% Carbon Filled)

The addition of carbon fibers enhances the compressive strength and stiffness of PEEK, and dramatically lowers its expansion rate. It offers designers optimum wear resistance and load carrying capability in a PEEK-based product. This grade provides 3½ times higher thermal conductivity than unreinforced PEEK -- dissipating heat from the bearing surface faster. Carbon-filled PEEK is black in color.

PEEK (Bearing Grade, Ketron HPV)

This grade of PEEK, containing carbon fiber reinforced with graphite and PTFE lubricants, offers the lowest coefficient of friction and the best machinability for all PEEK grades. Bearing grade PEEK has an excellent combination of low friction, low wear, high limiting PV, low mating part wear, and easy machining. Bearing grade PEEK is black or dark grey in color.

TYPICAL PROPERTY VALUES

	ASTM or UL Test	Properties	Unfilled	30% Glass Fibers	30% Carbon Fibers	Bearing Grade
Physical	D792	Density (lb/in ³) (g/cm ³)	0.047	0.056	0.051	0.052
			1.31	1.54	1.41	1.44
	D570	Water Absorption, 24 hrs (%)	0.10	0.10	0.06	0.05
	ASTM or UL Test	Properties	Unfilled	30% Glass Fibers	30% Carbon Fibers	Bearing Grade
Mechanical	D638	Tensile Strength (psi)	16,000	15,000	19,000	11,000
	D638	Tensile Modulus (psi)	500,000	900,000	1,100,000	850,000
	D638	Tensile Elongation at Break (%)	20	3	5	2
	D790	Flexural Strength (psi)	25,000	28,000	25,750	27,500
	D790	Flexural Modulus (psi)	600,000	1,000,000	1,250,000	1,100,000
	D695	Compressive Strength (psi)	20,000	26,000	29,000	26,700
	D695	Compressive Modulus (psi)	500,000	1,000,000		1,000,000
	D785	Hardness, Shore D	M100 (R126)	M103	M102	M85
	D256	IZOD Notched Impact (ft-lb/in)	1.0	1.4	1.0	0.7
	ASTM or UL Test	Properties	Unfilled	30% Glass Fibers	30% Carbon Fibers	Bearing Grade
Thermal	D696	Coefficient of Linear Thermal Expansion (x 10 ⁻⁵ in./in./°F)	2.6	1.2	1.0	1.7
	D648	Heat Deflection Temp (°F / °C) at 264 psi	320 / 160	600 / 315	550 / 288	383 / 195
	D3418	Melting Temp (°F / °C)	644 / 340	644 / 340	644 / 340	-
		Max Operating Temp (°F / °C)	480 / 249	480 / 249	500 / 260	482 / 250
	C177	Thermal Conductivity (BTU-in/ft ² -hr-°F) (x 10 ⁻⁴ cal/cm-sec-°C)	1.75	2.98	6.4	1.7
			6.03	10.3	22.0	5.9
UL94	Flammability Rating	V-0	V-0	V-0	V-0	
	ASTM or UL Test	Properties	Unfilled	30% Glass Fibers	30% Carbon Fibers	Bearing Grade
Electrical	D149	Dielectric Strength (V/mil) short time 1/8" thick	480	500	32	-
	D150	Dielectric Constant at 1 MHz	3.30	3.70	-	-
	D150	Dissipation Factor at 1 MHz	0.003	-	-	-
	D257	Volume Resistivity (ohm-cm)at 50% RH	4.9 x 10 ¹⁶	5 x 10 ¹⁶	105	10

• The data stated above are typical values intended for reference and comparison purposes only.
• The data should not be used as a basis for design specifications or quality control.

• The information is provided as a guide to the best of our knowledge and given without obligation or liability.
• Testing under individual application circumstances is recommended