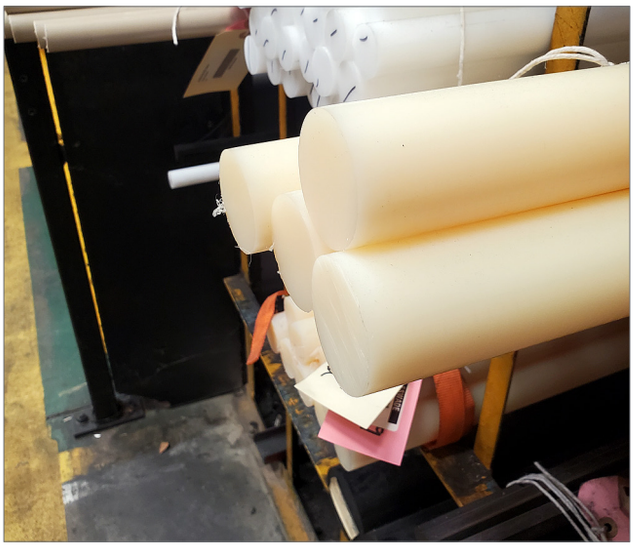
THAMES STOCKHOLDERS
A Division of SMITHS

PEEK (PolyEtherEtherKetone)

HIGH PERFORMANCE PLASTIC



Known under the chemical name polyetheretherketone, **PEEK** is a quality, high-performing engineering plastic suitable for a broad range of engineering applications.

Technical Description

Thames offers the following PEEK grade options:

Grade	Modification	Purpose
PEEK	None	Component Indentification.
PEEK GL30	Reinforced with 30% glass fibre	Increased strength & stiffness.
PEEK FC30	Self-lubricating additives	To provide increased bearing performance and life.
PEEK CA30	Reinforced with 30% carbon fibre	Increased strength, stiffness & stability. Static dissipative.
PEEK MG	Biocompatibility tested grade, (USP Class VI & DIN EN ISO 10993-5	Facilitates approval for use in medical applications.

ATTRIBUTES:

- A broad range offering excellent corrosion resistance
- Combination of stiffness tensile and impact strength
- Good electrical insulating resistance over a broad temperature range
- Very high resistance to high-energy radiation
- Excellent dimensional stability under heat
- Low coefficient of thermal expansion
- Good creep resistance & low moisture absorption
- Outstanding sliding properties
- High wear resistance & excellent abrasion resistance

BENEFITS:

- Optimised for application suitability
- Superior all-round product for various applications
- Ability to operate in the most demanding applications and performance conditions
- Perfect for components requiring tight manufacturing tolerances
- Suitable for use in gear and industrial bearing applications

Machinability

The machinability of un-modified PEEK is excellent. The glass or carbon fibre reinforced grades will require tipped tooling. As with all plastic materials, experience has shown that extra care must be taken with larger diameters, especially in the colder months when plastic materials lose some of their toughness, and so have less resistance to machining stresses. We supply full machining instructions on request.

Chemical Resistance

PEEK has good resistance to water and water vapour (un-filled material has excellent hydrolysis resistance), alcohols, esters, alkaline solutions, oils, fats and fuels. It is not resistant to sulphuric acid, nitric acid, halogens, or MEK at raised temperatures.

*Product Availability

Extruded round bar	Natural colour made from 6mm to 150mm dia, black to 100mm. Modified grades – please call for quotation.
Extruded sheet/plate	Natural colour made from 6mm to 60mm thk. Modified grades – please call for quotation.
Tubular bar	Natural from 30 x 15mm dia to 95 x 50mm dia

Typical Applications

PEEK finds use in mechanical engineering, automotive and general machinery construction. Examples include plain bearings, coil bodies, guide & clutch parts, gears, cams, rollers, slide bearings, seal rings and guide rails, pulleys & conveyors.

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Mechanical Properties

	450G Natural or Black, unmodified	GL30 (30% Glass)	FC30 (bearing grade)	CA30 (30% carbon fibre)	MG (medical grade)	
Density at 20°C	1.31	1.51	1.46	1.40	1.31	g/cm3
Tensile strength @ yield	110	80	75	120	110	MPa
Elongation @ break	20	5	4	7	20	%
Tensile modulus of elasticity	4000	6550	4900	6500	4000	MPa
Flexural Strength	170	250	210	-	-	MPa
Impact Strength	No brk	40	27.5	-	-	kj/m^2
Notched Impact Strength	-	3	5	3	3	kj/m^2
Ball indentation hardness / Rockwell	230	250	220	310	230	N/mm^2
Hardness (Shore D)	88	91	85	91	88	-

Electrical Properties

Volume resistivity	≥10^{16}	≥10^{13}	10^6	10^5	-	Ohm cm
Surface resistivity	≥10^{15}	≥10^{13}	-	-	-	Ohm
Dielectric constant @1 MHz	3.2	3.2	-	-	-	-
Dielectric loss factor @1 MHz	0.001	0.001	-	-	-	-
Comparative tracking index (CTI)	–	175	-	-	-	-
Solution 'A'. Dielectric strength	20	20	-	-	-	Kv/mm

Thermal Properties

Melting temperature	343	343	343	343	343	°C
Specific thermal capacity at 100°C	1.34	-	-	-	1.34	kJ/(kg · K)
Coefficient of thermal expansion (Ave. between 20 - 60 °C)	50	30	30	25	50	10^{-6} .K^{-1}
Thermal conductivity at 20°C	0.25	0.43	0.24	-	0.25	W/(m · K)
Heat deflection temperature (method A, 1.8 MPa)	152	315	293	315	152	°C
Service Temperature - long term	-60 to +250	-20 to +250	-30 to +250	-20 to +250	-60 to +250	°C
- short term	+310	+310	+310	+310	+310	

Electrical Properties

Moisture absorption Saturation in air @ 23°C and 50% RH	0.20	0.14	0.15	0.14	0.20	%
Flammability according to UL94 (3mm/6mm)	V0/V0	V0/V0	V0/V0	V0/V0	V0/V0	-
Suitability to bonding	+	+	-	+	-	-
Physiological indifference according to FDA or EEC 90/128 - natural colour	=	-	-	+		
Friction Co-efficient	0.34	0.42	0.11	-	-	DIN 53375
UV Stability	0	0	+	+	0	-

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