

# PEEK PLASTIC (PolyEtherEtherKetone)

## PLASTICS FOR SEVERE ENGINEERING APPLICATIONS

### PRODUCT DESCRIPTION

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. Colours natural and black	Component identification
PEEK GL30	Reinforced with 30% glass fibre	Increased strength and 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 technology applications



### MACHINABILITY

The machinability of un-modified PEEK is very good. 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. Full machining instructions can be supplied 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, MEK at raised temperatures

### ATTRIBUTES

- Range of grades available
- Combination of stiffness tensile and impact strength
- Excellent chemical resistance
- Good electrical insulating resistance over 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
- Very good all-round product for a broad range of 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

### 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

\* Sizes not stocked are available on relatively short delivery time. 1, 2 or 3m lengths supplied or cut to customer requirements.

### TYPICAL APPLICATIONS

Mechanical engineering, automotive and general machinery construction - e.g. plain bearings, coil bodies, guide & clutch parts, gears, cams, rollers, slide bearings, seal rings and guide rails, pulleys, conveyor parts.

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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/cm <sup>3</sup>
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 <sup>2</sup>
Notched Impact Strength	-	3	5	3	3	kJ/m <sup>2</sup>
Ball indentation hardness / Rockwell	230	250	220	310	230	N/mm <sup>2</sup>
Hardness (Shore D)	88	91	85	91	88	-

ELECTRICAL PROPERTIES						
Volume resistivity	≥10 <sup>16</sup>	≥10 <sup>13</sup>	10 <sup>6</sup>	10 <sup>5</sup>	-	Ohm cm
Surface resistivity	≥10 <sup>15</sup>	≥10 <sup>13</sup>	-	-	-	Ohm
Dielectric constant @1 MHz	3.2	3.2	-	-	-	-
Dielectric loss factor @1 MHz	0.001	0.001	-	-	-	-
Comparative tracking index (CTI) Solution 'A'	-	175	-	-	-	-
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 <sup>-6</sup> .K <sup>-1</sup>
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	

OTHER PHYSICAL PROPERTIES						
Moisture absorption	0.20	0.14	0.15	0.14	0.20	%
Saturation in air @ 23°C and 50% RH						
Flammability according to UL94 (3mm/6mm thick)	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	-



### Thames Stockholders

Unit 5W, Woodall Road, Redburn Industrial Estate  
Ponders End, Enfield, Middlesex EN3 4LQ

 +44 (0)20 8805 3282

 +44 (0)20 8804 8164

 [www.thamesstock.com](http://www.thamesstock.com)

 [sales@thamesstock.com](mailto:sales@thamesstock.com)



[www.thamesstock.com](http://www.thamesstock.com)

[sales@thamesstock.com](mailto:sales@thamesstock.com)

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