

# PEEK (POLYETHERETHERKETONE) PRODUCT CATALOGUE

Base resin: virgin PEEK (unfilled). Filled grades listed in Section 4. All data are typical values measured at 23 °C, 50 % RH unless stated otherwise. PEEK absorbs <0.5 % moisture at equilibrium; mechanical values are given for dry-as-machined condition.

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## VIRGIN PEEK — TYPICAL PROPERTIES (REFERENCE)

Density (ISO 1183): 1.31 g/cm<sup>3</sup>.

Tensile strength (ISO 527): 100 MPa.

Tensile modulus: 3.6 GPa.

Flexural strength: 165 MPa.

Flexural modulus: 4.1 GPa.

Compressive stress at 10 % strain: 120 MPa.

Charpy impact, unnotched: no break.

Notched Izod impact (ASTM D256): 5 kJ/m<sup>2</sup>.

Shore D hardness (ISO 868): 85.

Melting point (DSC): 343 °C.

Glass transition temperature (T<sub>g</sub>): 143 °C.

Heat deflection temperature HDT/A (1.8 MPa): 152 °C.

Continuous service temperature, mechanical: 260 °C. Short-term peak: 300 °C.

Thermal conductivity (ISO 22007): 0.25 W/(m·K).

Coefficient of linear thermal expansion (23–100 °C):  $5.0 \times 10^{-5}$  /K.

Flammability (UL94): V-0 at 0.8 mm. LOI: 35 %.

Dielectric strength (IEC 60243, 1 mm): 20 kV/mm.

Surface resistivity:  $> 10^{15} \Omega$ .

Water absorption, 24 h at 23 °C: 0.15 %. Saturation in water at 23 °C: 0.5 %.

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## 1. PEEK SHEETS

Extruded and compression-moulded stock. Unfilled and filled grades available.



Thickness range:

Extruded: 0.8, 1.0, 1.5, 2.0, 3.0, 4.0, 5.0, 6.0, 8.0, 10.0 mm.

Moulded: 8, 10, 12, 15, 20, 25, 30, 40, 50, 60, 80, 100 mm.

Standard sheet size: 500×1000 mm, 600×1200 mm, 1000×1000 mm. Larger formats up to 2000×1000 mm by arrangement.

Density (virgin): 1.31 g/cm<sup>3</sup>.

Tensile strength (virgin): 95 MPa (extruded), 100 MPa (moulded).

Flexural modulus (virgin): 4.0 GPa.

Continuous use temperature: 260 °C.

Surface finish: Ra 0.8–1.6 µm.

### **Applications:**

Electrical insulation plates in down-hole tools and connectors.

Machining stock for semiconductor wafer-handling components.

Slide pads and wear strips in food-processing conveyors.

Structural panels in aircraft interiors (FAR 25.853 compliance).

Fixtures for high-temperature soldering and welding processes.

### **Characteristics:**

No measurable outgassing in vacuum at 200 °C; total mass loss (TML) <0.03 % per ASTM E595.

Retains 80 % of flexural modulus after 1000 h thermal aging at 250 °C.

Resistance to gamma radiation: 1000 kGy without significant embrittlement.

Flame-smoke-toxicity profile meets EN 45545-2 R22/HL3 for rail interiors.

Available with one-side or two-side peel-ply surface for adhesive bonding.

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## **2. PEEK RODS**

Extruded and compression-moulded stock. Diameter range covers small-tolerance bushings to large valve seats.

Diameter:

Extruded: 5, 6, 8, 10, 12, 15, 16, 20, 25, 30, 35, 40, 50, 60, 70, 80, 100 mm.

Moulded: 120, 150, 180, 200, 250, 300 mm.

Standard length: 1000 mm, 2000 mm. Moulded rod: 1000 mm.

Density (virgin): 1.31 g/cm<sup>3</sup>.

Tensile strength (virgin, extruded): 100 MPa.

Flexural modulus: 4.0 GPa.

Diameter tolerance: ISO h9 (extruded). Moulded: +0.8/-0 mm.

Straightness deviation: ≤0.5 mm per 1000 mm.

Continuous service temperature: 260 °C.



### **Applications:**

Machined valve seats, poppets, and seals for high-temperature steam and chemical service.

Bearing bushes and thrust washers in aerospace actuators.

Insulating shafts and standoffs in MRI and X-ray equipment.

Guide pins and alignment dowels for PCB soldering pallets.

Probe bodies for down-hole logging tools.

### **Characteristics:**

Creep resistance: <1 % strain after 1000 h at 23 °C under 20 MPa compressive load.

Wear rate against S355 steel (dry, 1 MPa, 0.5 m/s): <math>1.5 \times 10^{-6}</math> mm<sup>3</sup>/N·m.

Notch-sensitive under high-speed loading; minimum notch radius  $\geq 0.5$  mm recommended for machined features.

Available in black (carbon-filled, anti-static) and natural (unfilled) colours.

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### 3. PEEK TUBES

Extruded tubes for thin-wall, moulded tubes for thick-wall applications. Both unfilled and glass-filled grades are offered.

Outer diameter (OD): 8, 10, 12, 15, 20, 25, 30, 40, 50, 60, 80, 100, 120, 150, 200 mm.

Wall thickness (WT):

Extruded: 1.0, 1.5, 2.0, 2.5, 3.0, 4.0 mm (OD  $\leq 100$  mm).

Moulded: 5, 6, 8, 10, 12, 15, 20, 25 mm.

Density:  $1.31 \text{ g/cm}^3$  (virgin).

Tensile hoop stress at yield (virgin): 95 MPa.

Continuous use temperature: 260 °C.

Burst pressure example: virgin PEEK, OD 25 mm  $\times$  WT 2 mm —  $> 15$  MPa at 23 °C.

Minimum bend radius without ovality  $> 3\%$ :  $5 \times$  OD for thin-wall (WT  $\leq 1.5$  mm).

#### **Applications:**

Cable insulation and protective sleeves in geothermal wells.

Insulating liners for coaxial connectors and high-voltage feedthroughs.



Bushings and bearing sleeves in chemical injection pumps.

Sensor housings in nuclear and subsea instrumentation.

### **Characteristics:**

Thin-wall extruded tube maintains >80 % burst pressure after 7 days in steam at 150 °C.

Gas permeability (helium) at 23 °C:  $<5 \times 10^{-13} \text{ cm}^3 \cdot \text{cm} / (\text{cm}^2 \cdot \text{s} \cdot \text{Pa})$ .

Adhesive bond strength after plasma treatment: lap shear >20 MPa (with epoxy).

OD tolerance extruded:  $\pm 0.15 \text{ mm}$  (OD  $\leq 30 \text{ mm}$ ). Moulded:  $+0.5/-0 \text{ mm}$ .

Outer surface Ra  $<0.8 \text{ }\mu\text{m}$  for sealing applications.

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## **4. FILLED PEEK GRADES**

Proprietary compounds based on virgin PEEK resin. Available as rod, plate, tube, and custom-moulded shapes. Data below for compression-moulded stock at 23 °C.

### **Grade PEEK-GF30 (30 % glass fibre)**

Density:  $1.49 \text{ g/cm}^3$ .

Tensile strength: 170 MPa.

Flexural modulus: 9.5 GPa.

HDT/A (1.8 MPa): 315 °C.

Continuous service temperature: 260 °C.

Coefficient of linear thermal expansion (23–100 °C):

$2.2 \times 10^{-5} / \text{K}$ .



Surface resistivity:  $>10^{15} \Omega$  (insulating).

**Grade PEEK-CF30 (30 % carbon fibre)**

Density: 1.41 g/cm<sup>3</sup>.

Tensile strength: 230 MPa.

Flexural modulus: 19.0 GPa.

HDT/A: 315 °C.

Thermal conductivity: 0.92 W/(m·K).

Surface resistivity:  $10^3$ – $10^6 \Omega$  (static-dissipative).

**Grade PEEK-Mod (bearing grade: carbon fibre + graphite + PTFE)**

Density: 1.48 g/cm<sup>3</sup>.

Tensile strength: 130 MPa.

Flexural modulus: 8.0 GPa.

Dynamic friction coefficient vs. steel: 0.12–0.18 (dry).

Wear factor K (ASTM D3702):  $<1.5 \times 10^{-6} \text{ mm}^3/\text{N}\cdot\text{m}$ .

Surface resistivity:  $10^6$ – $10^9 \Omega$ .

**Grade PEEK-GF30-HT (30 % glass fibre, high-temperature stabilised)**

Same mechanical range as GF30.

Retains 90 % tensile strength after 5000 h at 250 °C.

**Applications (by grade):**

GF30: pump housings, impellers, structural insulators.

CF30: semiconductor test sockets, wafer carriers, high-stiffness guide rails.

Bearing grade: bushings, thrust washers, sliding pads in unlubricated mechanisms.

GF30-HT: automotive under-hood sensors, aerospace bracket parts.

### **Characteristics:**

All filled grades pass UL94 V-0 at 1.5 mm.

Fibre orientation in extruded rod and plate causes anisotropic shrinkage; design allowance of +0.05 mm/10 mm in cross-direction.

CF30 shows <0.1 % moisture absorption at saturation; used in dimensionally stable optical benches.

Bearing grade self-lubricating, no stick-slip; tested to 1 million cycles at 1.5 MPa, 0.3 m/s without lubrication.

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## **5. PEEK MACHINED PARTS**

Fully finished components machined from virgin or filled PEEK stock. Geometry optimised



for high-temperature and chemical-resistant applications.

### **Machining capability**

Maximum part diameter: 600 mm (turning), 2000 mm (milling flat stock).

Maximum length: 2000 mm.

Minimum wall thickness after machining: 1.0 mm (virgin), 1.5 mm (filled).

Bore tolerance: H7 standard; H6 achievable.

Flatness on milled faces: 0.03 mm per 100 mm.

Surface finish Ra: 0.2–0.8 µm on sealing surfaces.

Threads: metric M2–M36, UN #0 to 1½", trapezoidal threads machined to 6H/6g fit.

### **Typical parts**

Valve seats, ball seats, and seal rings for high-pressure steam (virgin, GF30).

Compressor valve plates and poppets (CF30).

Bearing cages, bushings, and wear rings (bearing grade).

Wafer-handling end-effectors, guide combs, and insulating collars (virgin, CF30).

Test sockets and burn-in connectors for semiconductor testing (virgin, CF30).

Manifold blocks and instrument fittings for chemical analysis.

Medical instrument shafts and handles for repeated autoclave sterilisation.

### **Applications**

Oil & gas down-hole tooling: electrical isolation, seal elements rated to 200 °C and 140 MPa differential.

Aerospace: bushings and washers in landing gear and flap actuators; qualified to AMS PEEK specs.

Semiconductor: components with no ionic contamination; outgassing <0.01 % TML.

Medical: components for 1000+ steam autoclave cycles at 134 °C, no property degradation.

## **Characteristics**

Tolerance stability: <0.02 mm change on 50 mm dimension after 24-h water soak.

Machined virgin PEEK seal faces achieve Ra 0.2 µm; leak rate <1×10<sup>-9</sup> mbar·L/s on helium test.

No metal corrosion; compatible with salt spray per ISO 9227 for 1000 h without pitting.

FDA-compliant virgin PEEK for food contact (21 CFR 177.2415, EU 10/2011).

Virgin PEEK meets USP Class VI for biocompatibility.

Post-machining annealing at 200 °C for 4 h reduces residual stress by >70 %; recommended for thin-section parts.