



## PEEK Polyetheretherketone, unfilled, extruded (ASTM Data)

**Categories:** Polymer; Thermoplastic; Polyketone; Polyetheretherketone (PEEK); Polyetheretherketone, PEEK, Unreinforced

**Material Notes:** PEEK grades offer chemical and hydrolysis resistance similar to PPS, but can operate at higher temperatures. Unreinforced, extruded PEEK offers good wear resistance and can be used continuously to 480°F (250°C). It can also be used in hot water or steam without permanent loss in physical properties. For hostile environments, PEEK is a high strength alternative to fluoropolymers. PEEK carries a V-O flammability rating and exhibits very low smoke and toxic gas emission when exposed to flame.

| Physical Properties            | Metric    | English   | Comments                      |
|--------------------------------|-----------|-----------|-------------------------------|
| Specific Gravity               | 1.31 g/cc | 1.31 g/cc | ASTM D792                     |
| Water Absorption               | 0.10 %    | 0.10 %    | Immersion, 24hr; ASTM D570(2) |
| Water Absorption at Saturation | 0.50 %    | 0.50 %    | Immersion; ASTM D570(2)       |

| Mechanical Properties      | Metric                                      | English   | Comments                     |
|----------------------------|---|---|------------------------------|
| Hardness, Rockwell M       | 100   | 100   | ASTM D785                    |
| Hardness, Rockwell R       | 126   | 126   | ASTM D785                    |
| Hardness, Shore D          | 85  | 85  | ASTM D2240                   |
| Tensile Strength           | 110 MPa                                     | 16000 psi   | ASTM D638                    |
| Elongation at Break        | 40 %  | 40 %  | ASTM D638                    |
| Tensile Modulus            | 4.34 GPa                                    | 630 ksi   | ASTM D638                    |
| Flexural Yield Strength    | 172 MPa                                     | 25000 psi   | ASTM D790                    |
| Flexural Modulus           | 4.14 GPa                                    | 600 ksi   | ASTM D790                    |
| Compressive Strength       | 138 MPa                                     | 20000 psi   | 10% Def.; ASTM D695          |
| Compressive Modulus        | 3.45 GPa                                    | 500 ksi   | ASTM D695                    |
| Shear Strength             | 55.2 MPa                                    | 8000 psi  | ASTM D732                    |
| Izod Impact, Notched       | 0.320 J/cm                                  | 0.600 ft-lb/in  | ASTM D256 Type A             |
| Coefficient of Friction    | 0.32  | 0.32  | Dry vs. Steel; QTM55007      |
| K (wear) Factor            | 755 x 10 <sup>-8</sup> mm <sup>3</sup> /N-M | 375 x 10 <sup>-10</sup> in <sup>3</sup> -min/ft-lb-hr | QTM 55010                    |
| Limiting Pressure Velocity | 0.298 MPa-m/sec                             | 8500 psi-ft/min                                       | 4:1 safety factor; QTM 55007 |

| Electrical Properties          | Metric                       | English                      | Comments              |
|--------------------------------|------------------------------|------------------------------|-----------------------|
| Surface Resistivity per Square | >= 1.00e+13 ohm              | >= 1.00e+13 ohm              | EOS/ESD S11.11        |
| Dielectric Constant            | 3.3<br>@Frequency 1e+6 Hz    | 3.3<br>@Frequency 1e+6 Hz    | ASTM D150             |
| Dielectric Strength            | 18.9 kV/mm                   | 480 kV/in                    | Short Term; ASTM D149 |
| Dissipation Factor             | 0.0030<br>@Frequency 1e+6 Hz | 0.0030<br>@Frequency 1e+6 Hz | ASTM D150             |

| Thermal Properties                          | Metric                                      | English                                       | Comments                      |
|---|---|---|-------------------------------|
| CTE, linear                                 | 46.8 µm/m-°C<br>@Temperature -40.0 - 400 °C | 26.0 µin/in-°F<br>@Temperature -40.0 - 750 °F | ASTM E831                     |
| Thermal Conductivity                        | 0.252 W/m-K                                 | 1.75 BTU-in/hr-ft <sup>2</sup> -°F            | ASTM F433                     |
| Melting Point                               | 340 °C                                      | 644 °F  | Crystalline, Peak; ASTM D3418 |
| Maximum Service Temperature, Air            | 249 °C                                      | 480 °F  | Long Term                     |
| Deflection Temperature at 1.8 MPa (264 psi) | 160 °C                                      | 320 °F  | ASTM D648                     |
| Flammability, UL94                          | V-0   | V-0   | 1/8 inch (Estimated Rating)   |

| Compliance Properties | Metric | English | Comments     |
|-----------------------|--------|---------|--------------|
| 3A-Dairy              | Yes    | Yes     |              |
| Canada AG             | No     | No      |              |
| FDA                   | Yes    | Yes     | Natural Only |
| NSF                   | No     | No      |              |
| USDA                  | Yes    | Yes     |              |
| USP Class VI          | No     | No      |              |

| Chemical Resistance Properties | Metric     | English    | Comments |
|--------------------------------|------------|------------|----------|
| Acids, Strong (pH 1-3)         | Limited    | Limited    |          |
| Acids, Weak                    | Acceptable | Acceptable |          |
| Alcohols                       | Acceptable | Acceptable |          |
| Alkalies, Strong (pH 11-14)    | Acceptable | Acceptable |          |