

Stemapeek PEEK

Polyetheretherketone

PEEK

> rod - sheet



STEMPLAST HATZIAVGIOUSTIS
ENGINEERING PLASTICS

Product data sheet

Revision date: 1.7.2025 - Version: 1.0

Industries

Aerospace
Bakery & confectionery
Semiconductor industry
Beverage industry
Food industry
Electrical industry
Hydrogen energy
Semiconductor factory equipment
Electronics
Mechanical engineering industry
Oil & gas
Healthcare

Characteristics

High heat deflection temperature
Chemical resistant
High stiffness
High hardness
Good creep properties
Good dimensional stability
Low coefficient of thermal expansion
Flame retardant
Self-extinguishing after removal of flame
Low smoke density

Applications

Gears
Bushes
Piston rings
Valves
Medical articles

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General properties

| | | |
|---|---|------------------------------|
| Density ρ | DIN EN ISO 1183-1 - ASTM D792 sim. - DIN 53479 DIN IEC 60413 / 203 | 1,31 gr/cm ³ - |
| Moisture absorption | | |
| saturation in air, 23 °C, 50% RH | DIN EN ISO 62 - ASTM D570 - DIN 53495 sim. | 0,20 % |
| saturation in water 23 °C | DIN EN ISO 62 - ASTM D570 - DIN 53495 sim. | 0,45 % |
| immersion in water, 50x50x3 mm, 23 °C/24h | DIN EN ISO 62 - ASTM D570 - DIN 53495 sim. | - |
| Flammability (thickness 3 / 6 mm) | UL94 | V-0 / V-0 |
| Oxygen index | ISO 4589 -1,-2 - ASTM D2863 sim. | 35 % |
| Open porosity | DIN 66133 | - |

Mechanical properties

| | | |
|---|--|----------------------------|
| Tensile stress at yield σ^T | DIN EN ISO 527 - ASTM D638 - DIN 53455 sim. | 110 MPa |
| Tensile strength σ^T | DIN EN ISO 527 - ASTM D638 - DIN 53455 sim. | - |
| Elongation at break ϵ^{br} | DIN EN ISO 527 - ASTM D638 - DIN 53455 sim. | 20 % |
| Modulus of elasticity E^T | DIN EN ISO 527 - ASTM D638 - DIN 53455 sim. | 4000 MPa |
| Stress at 20% strain σ | ISO 37 - ASTM D412 - DIN 53504-S2 | - |
| Stress at 300% strain σ | ISO 37 - ASTM D412 - DIN 53504-S2 | - |
| Tensile strength σ^T | ISO 37 - ASTM D412 - DIN 53504-S2 | - |
| Elongation at break ϵ^{br} | ISO 37 - ASTM D412 - DIN 53504-S2 | - |
| Flexural stress at yield σ^{yB} | DIN EN ISO 178 - ASTM D790 - DIN 53452 sim. | 165 MPa |
| Flexural strength σ^B | DIN EN ISO 178 - ASTM D790 - DIN 53452 sim. | 172 MPa |
| Modulus of elasticity E^B | DIN EN ISO 178 - ASTM D790 - DIN 53452 sim. | 2140 MPa |
| Flexural strength σ^B | DIN IEC 60413 / 501 | - |
| Compressive stress at 1/2/5% nominal strain σ^{yC} | DIN EN ISO 604 - ASTM D695 - DIN 53454 | 23/43/- MPa |
| Compressive strength σ^C | | |
| - | DIN EN ISO 604 - ASTM D695 - DIN 53454 | 124 MPa |
| parallel to layers | DIN EN ISO 604 - ASTM D695 - DIN 53454 | - |
| perpendicular to layers | DIN EN ISO 604 - ASTM D695 - DIN 53454 | - |
| Compressive strength σ^C | DIN 51910 | - |
| Young's modulus E | DIN 51915 | - |
| Deformation | | |
| under load (13,7 N/mm ² , 24 h, 23 °C) | ASTM D621 | - |
| permanent (after 24 h relaxation, 23 °C) | ASTM D621 | - |
| compression set (72 h, 20 °C) | ISO 815-B - ASTM D395 sim. - DIN 53517 sim. | - |
| compression set (24 h, 70 °C) | ISO 815-B - ASTM D395 sim. - DIN 53517 sim. | - |
| Impact strength | | |
| Charpy unnotched α^{CU} | DIN EN ISO 179/1eU - DIN 53453 | no break kJ/m ² |
| Charpy notched α^{CN} | DIN EN ISO 179/1eA - ASTM D6110 sim. | 4 kJ/m ² |
| Charpy α^N 10 and α^N 15 | DIN EN ISO 179 - DIN 53453 | - |
| Charpy α^K 10 | DIN EN ISO 179 - DIN 53453 | - |
| Charpy notched α^K 15 | DIN EN ISO 179 - DIN 53453 | - |
| Izod notched α^{IN} | DIN EN ISO 180/1A - ASTM D256 sim. | - |
| Creep rate stress at 1% strain after 1000 h $\sigma^1 1000$ | DIN EN ISO 899-1 - ASTM D2990 sim. - DIN 53444 | > 30 MPa |

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| | | |
|--|---|------|
| Tear strength (propagation resistance) | ISO 34-1B - ASTM D624 | - |
| Hardness | | |
| ball indentation H ^{358 30} | DIN EN ISO 2039-1 - DIN 53456 | 230 |
| Rockwell | DIN EN ISO 2039-2 - ASTM D785 | M105 |
| Rockwell HR ^{5 100} | DIN IEC 60413 / 303 | - |
| Shore | DIN EN ISO 868 - ASTM D2240 sim. - DIN 53505 | D88 |
| Shore | DIN ISO 48-4 - ASTM D2240 sim. - DIN 53505 | - |
| Coefficient of sliding friction μ | DIN EN ISO 8295 - ASTM D1894 sim. | 0,34 |
| Wear rate S (dry running against steel, P=0.05 MPa, V=0.6 m/s, t=60 °C, near running surface, Pin on disc apparatus) | DIN ISO 7148-2 sim. | - |
| Abrasion resistance | DIN EN ISO 4649-A - ASTM D5963 sim. - DIN 53516 | - |

Electrical properties

| | | |
|--|---------------------------------------|----------------------------------|
| Dielectric constant (relative permittivity) ϵ^R | | |
| 100 Hz | IEC 60250 - ASTM D150 - VDE 0303-4 | 3,2 |
| 1 MHz | IEC 60250 - ASTM D150 - VDE 0303-4 | 3,2 |
| Dielectric dissipation factor $\tan\delta$ | | |
| 100 Hz | IEC 60250 - ASTM D150 - VDE 0303-4 | 0,001 |
| 1 MHz | IEC 60250 - ASTM D150 - VDE 0303-4 | 0,002 |
| Volume resistivity ρ | IEC 60093 - ASTM D257 - VDE 0303-30 | $10^{16} \Omega \cdot \text{cm}$ |
| Surface resistivity σ | IEC 60093 - ASTM D257 - VDE 0303-30 | $10^{18} \Omega$ |
| Surface resistivity σ (immersion in water 24h) | IEC 60093 - ASTM D257 - VDE 0303-30 | - |
| Dielectric strength E ^P | IEC 60243-1 - ASTM D149 - VDE 0303-21 | 20 kV/mm |
| Dielectric strength E ^P (in oil at 90 °C) | | |
| parallel to layers | IEC 60243-1 - ASTM D149 - VDE 0303-21 | - |
| perpendicular to layers | IEC 60243-1 - ASTM D149 - VDE 0303-21 | - |
| Tracking resistance V | IEC 60112 - ASTM D3638 - VDE 0303-11 | 150 CTI |

Thermal properties

| | | |
|---|--|--|
| Melting temperature T ^M (DSC, 10 °C/min) | ISO 11357-1,-3 - ASTM D3418 sim. | 343 °C |
| Specific heat (thermal capacity) c | ISO 11357-4 - ASTM E1269 | 1,3 J/(g·K) |
| Thermal conductivity λ (23 °C) | DIN 51908 | - |
| | ISO 22007-2 - ASTM C177 sim. - DIN 52612-2 | 0,25 W/(m·K) |
| Coefficient of linear thermal expansion α | | |
| average value 23-60 °C | ISO 11359-2 - ASTM E831 sim. - DIN 53752 | $50 \cdot 10^{-6} \cdot \text{K}^{-1}$ |
| average value 20-200 °C | DIN 51909 | - |
| Service temperature | | |
| long term (min / max - 5000 h) | | -60 / +250 °C |
| short term (not under stress - few hours) | | 310 °C |
| max service | | - |

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| | | |
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| Vicat softening point | | |
| Vicat VST A50 - 10N | ISO 306 - ASTM D1525 - DIN 53460 sim. | - |
| Vicat VST B50 - 50N | ISO 306 - ASTM D1525 - DIN 53460 sim. | - |
| Heat deflection temperature | | |
| HDT A - 1.80 MPa | DIN EN ISO 75-1,-2 - ASTM D648 - DIN 53461 sim. | 152 °C |
| HDT B - 0.45 Mpa | DIN EN ISO 75-1,-2 - ASTM D648 - DIN 53461 sim. | - |

The mechanical properties change due to the influence of moisture absorption. The modulus of elasticity declines and the material becomes tougher and more resistant to impact.

The above mentioned electrical properties result from measurements on natural and dry material.

The indicated values result from numerous individual measurements for an approximation of the values and correspond to our today's knowledge.

They serve as information about our products and are presented as a guide to choose from our range of materials. This, however, does not include an assurance of specific properties or the suitability for particular application purposes that are legally binding. Since the properties also depend on the dimension of the semi-finished products and the degree of crystallisation (e.g. nucleating by pigments), the actual values of the properties of a particular product may differ from the indicated values.