Innovative Applications of PEEK in E-Bike Motors

Quiet, Efficient, and Durable Motor Solutions

www.jundehpp.de

JUNDE PEEK, a subsidiary of Jiangsu Junhua HPP Co., Ltd., offers full-industry-chain PEEK application solutions: ☑Raw Material Production ☑Semi-Finished Product Preparation ☑Precision Injection Molding ☑CNC Machining

Leveraging 18 years of R&D and manufacturing experience in high-performance specialty engineering materials from Junhua Co., Ltd., our products are ISO 13485 and ISO 9001 certified, and widely applied in e-bikes, aerospace, medical, and new energy sectors.

Main PEEK Grades and Their Typical Performance Metrics

PEEK (Polyether ether ketone) is a high-performance specialty engineering thermoplastic. Its molecular structure, featuring aromatic rings and ether linkages, grants it outstanding heat resistance, mechanical strength, and chemical stability—making it the ideal choice for upgrading e-bike motors.

We offer a comprehensive range of professional grades to meet the demands of various components.

Performance Categories	PEEK5600G	PEEK5600CF30	PEEK5600GF30	PEEK5600CF30-GQ	PEEK5600SWR
Density (g/cm³)	1.30	1.40	1.50	1.40	1.42
Tensile Strength (MPa)	95	250	180	260	170
Tensile Modulus (GPa)	4.0	23	12.5	24	13
Elongation at Break (%)	25	4.5	4.5	5	4
Flexural Strength (MPa)	169	350	280	390	270
Flexural Modulus (GPa)	4.2	18	11.5	16	10
Charpy Impact Strength (Unnotched) KJ/m²	No break	45	50	45	30
Izod Impact Strength (Notched) KJ/m²	6	9	9	9	/
Water Absorption (24h, %)	0.05	0.05	0.3	0.05	0.3
Rockwell Hardness	50(HRE)	75(HRE)	70(HRE)	80(HRE)	69(HRE)
Coefficient of Friction	0.30-0.35	0.25-0.3	0.25-0.55	0.25-0.3	0.1~0.2
Wear Rate (mg/h)	0.4	0.35	0.23	0.25	0.13
Heat Deflection Temperature (℃)	155	330	330	335	330

PEEK Applications in Mid-Drive Motor Products

Mid-Drive Motor Gear
Grade: PEEK5600G

Mid-Drive Motor Gear
Grade: PEEK5600CF30

Mid-Drive Motor Gear
Grade: PEEK5600G

Torque Testing of PEEK Motor Gear

Evaluates the gear's mechanical strength, deformation resistance, and durability by applying rotational torque.

Module 1, 41 Teeth

Left-Hand Helical, 16mm Face Width

Single Tooth Load Capacity: **36.1 N·m**

PEEK Applications in Hub Motor Products

Hub Motor Gear
Grade: PEEK5600G

Hub Motor Gear
Grade: PEEK5600G

Hub Motor Gear
Grade: PEEK5600G

Planetary Gear Set of Hub Motor
Grade: PEEK5600G

Unlock Next-Gen E-Bike Motors: PEEK's High Performance Edge.

Core Challenges in E-Bike Motors

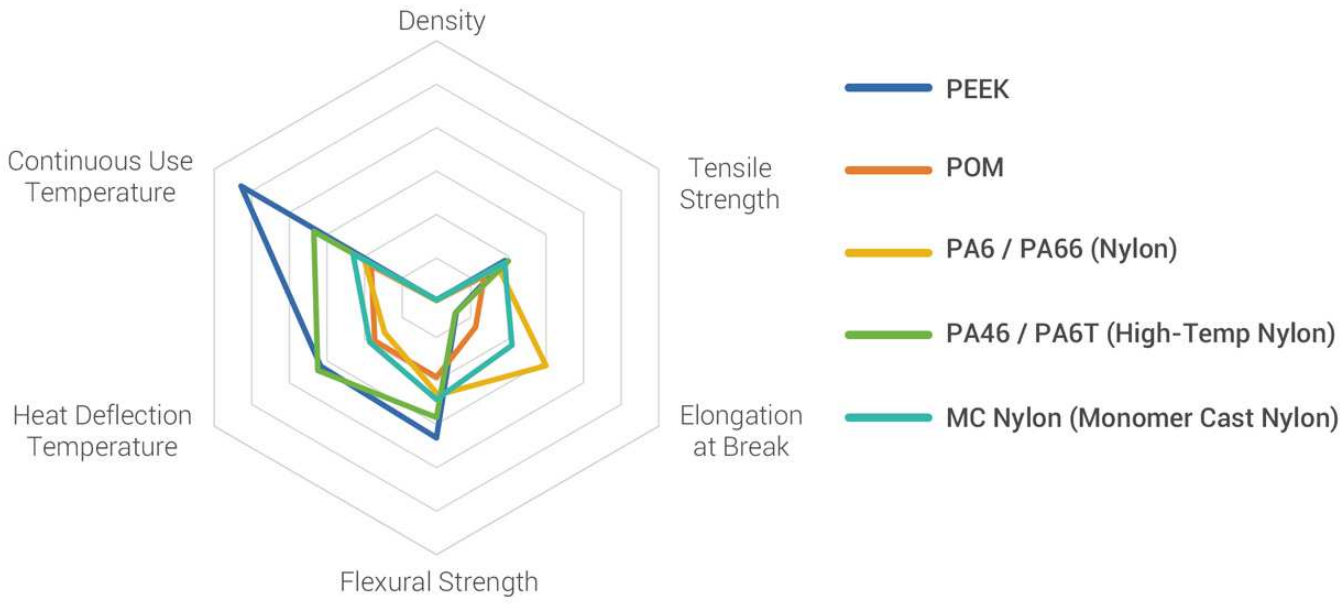
High-Temperature Stress
Continuous motor operation exceeds 150°C
Conventional plastics (e.g., POM/PA66) soften and deform under heat
Metal parts expand with heat, compromising precision

Weight Burden
Metal components increase overall bike weight
Reduced battery range
Lower handling flexibility

Limited Service Life
Traditional materials wear quickly under prolonged load
Humid environments accelerate material aging

Lubrication Issues
Grease evaporation causes increased wear
Regular maintenance raises operational costs
Grease contamination affects system cleanliness

Performance Comparison: PEEK vs. Traditional Materials



Performance Categories	PEEK	POM	PA6/PA66(Nylon)	PA46/PA6T(High-Temp Nylon)	MC Nylon(Monomer Cast Nylon)
Density	1.3	1.42	1.13	1.25	1.16
Tensile Strength	95	65	80	100	90
Elongation at Break	25	50	150	25	100
Flexural Strength	155	85	110	135	115
Heat Deflection Temperature	155	85	70	160	90
Continuous Use Temperature	260	90	100	165	110

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