

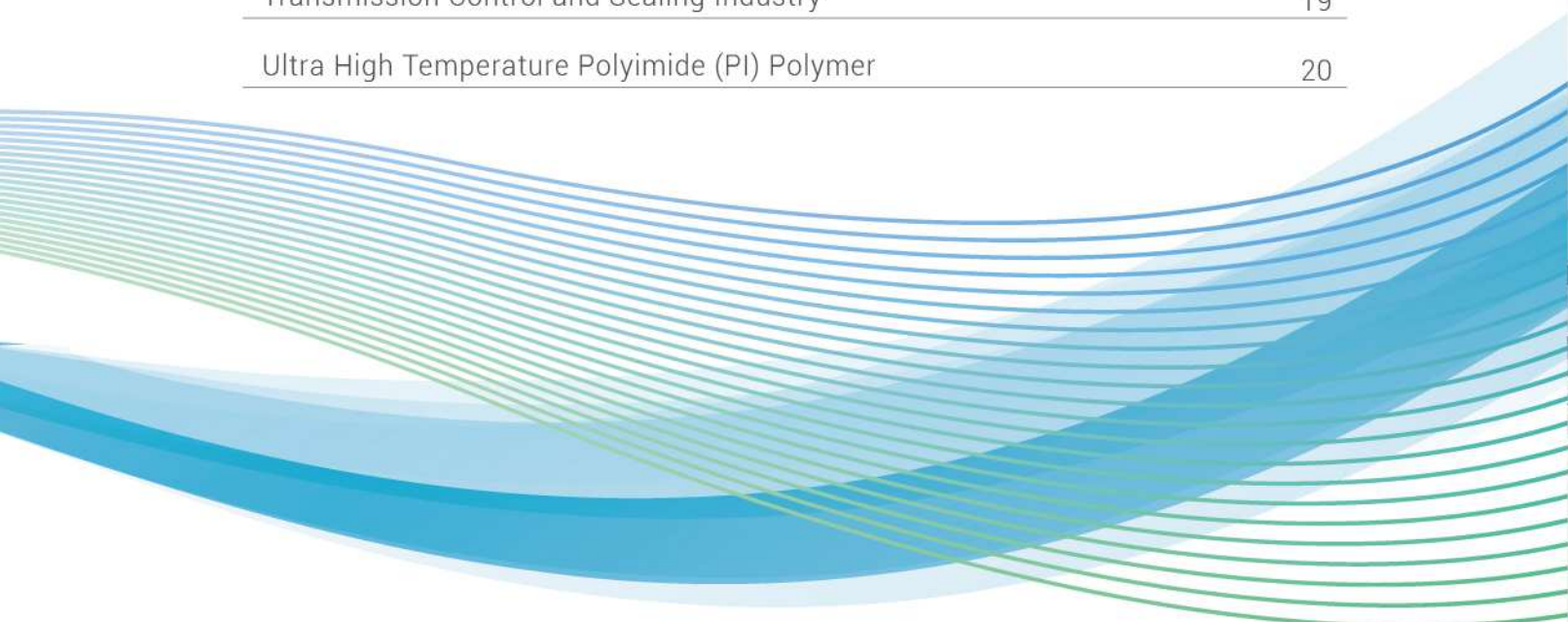


**PEEK and PI Materials  
Application Innovation  
Professional Production  
Service Provider**

**山东君昊高性能聚合物有限公司**  
SHANDONG JUNHAO HIGH PERFORMANCE POLYMERS CO., LTD.

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## Company Profile



Shandong Junhao High- Performance Polymer Co., Ltd. focuses on the research and development, production and sales of PEEK (polyetheretherketone), PI (polyimide) and other high-performance polymers. The company locates in Jining New Materials Industrial Park, Shandong Province. With advanced equipments and professional solutions to customers' requirements, we developed and produced PEEK and PI, and cooperated with companies in various industries.

We established long - term technical cooperation relationships with Jilin University and Donghua University, expanded the application of PEEK and PI in thermoplastic composite materials, 5G, medical equipment and aerospace and military industries. We provide a full range of technical support for PEEK, PI molding and innovative applications.

We are committed to building Shandong Junhao into an influential PEEK and PI professional company in China.



# Company Advantage

01

With an annual production capacity of 2500 tons of modified PEEK resin particles and 600 tons of PI resin, we develop specialized materials for various application industries.



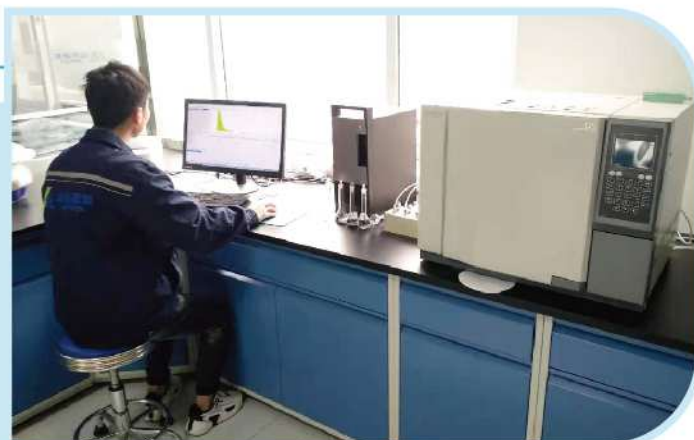
02

Advanced DCS system production control ensures stability between product batches.

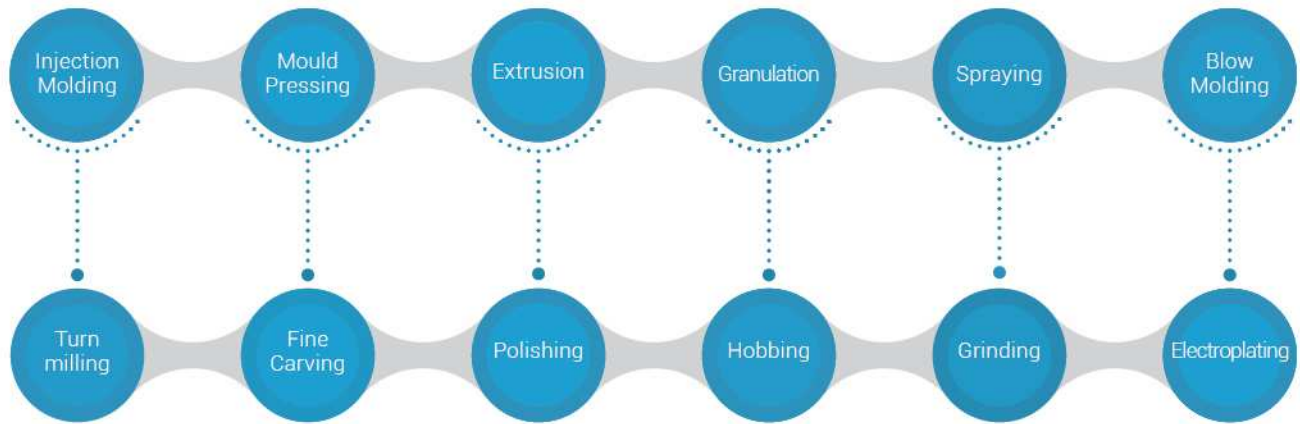


03

Comprehensive testing equipment,  
Advanced detection methods,  
Rigorous inspection specifications,  
High quality assurance.







Aerospace, Military and Nuclear Power



Petroleum and Petrochemical



Medical Devices



Textile Industry



5G Communication Industry



PV Industry, LCD and Semiconductor Industry



Analysis and Testing Equipment



Beverage Filling Industry



Automotive Industry



New Energy Industry



Electronic Cigarette Industry

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## R &amp; D Patents





- High Speed Intelligent Detector
- Intelligent Algorithm
- Intelligent Diagnostics and Instrument Status tracking
- Built-in Performance Tests
- Higher Analytical Performance, Lower Argon Costs
- Adaptable Vertical Torch Tube
- Dust and Corrosion Resistant
- Compact Size



## Agilent 5800 ICP-OES

Avoid Wasting Time, Get the Right Answer

Inorganic elemental impurities are becoming more and more important in implantable and electronic applications due to their toxicity and adverse effects on the stability of PEEK products.

Both the Chinese Pharmacopoeia and the U.S. Pharmacopoeia have included standards for inorganic element control, introduced instrumental detection methods, and increased the types of inorganic elements to be monitored.

In 2024 Shandong Junhao R&D department is equipped with an Agilent 5800 Inductively Coupled Plasma Emission Spectrometer (ICP-OES). This instrument is mainly used for the detection and control of heavy metals in implantable PEK series products and other non-implantable PEK series products for the detection and control of metallic and some non-metallic elements.



# Laboratory



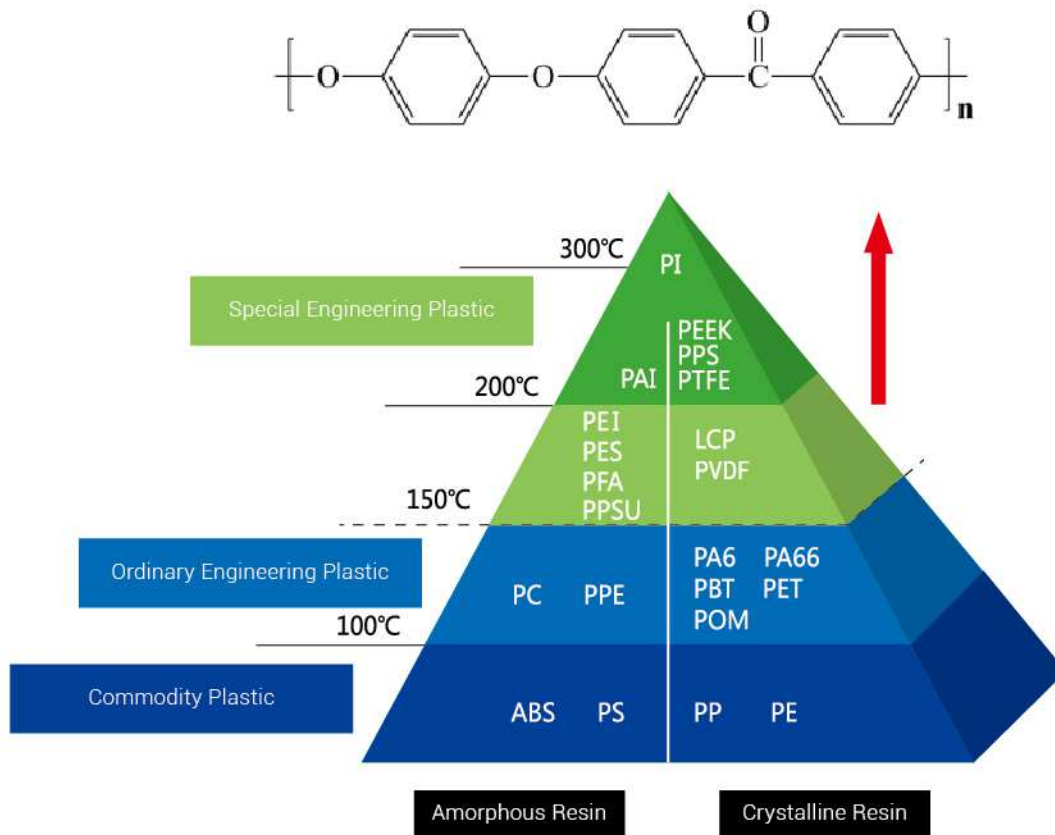


# Factory





# PEEK Polymer



PEEK(Polyetheretherketone), a semi - crystalline special engineering plastic with high temperature resistance, wear resistance, corrosion resistance, self-lubrication, and other properties, is widely used in analytical and testing instruments, electrical and electronic, textile printing and dyeing, photovoltaic liquid crystal glass and semiconductors, 5G communications, medical equipment, petroleum and petrochemicals, automobiles, aerospace and military nuclear power.





# PEEK Main Material Grade and Typical Properties

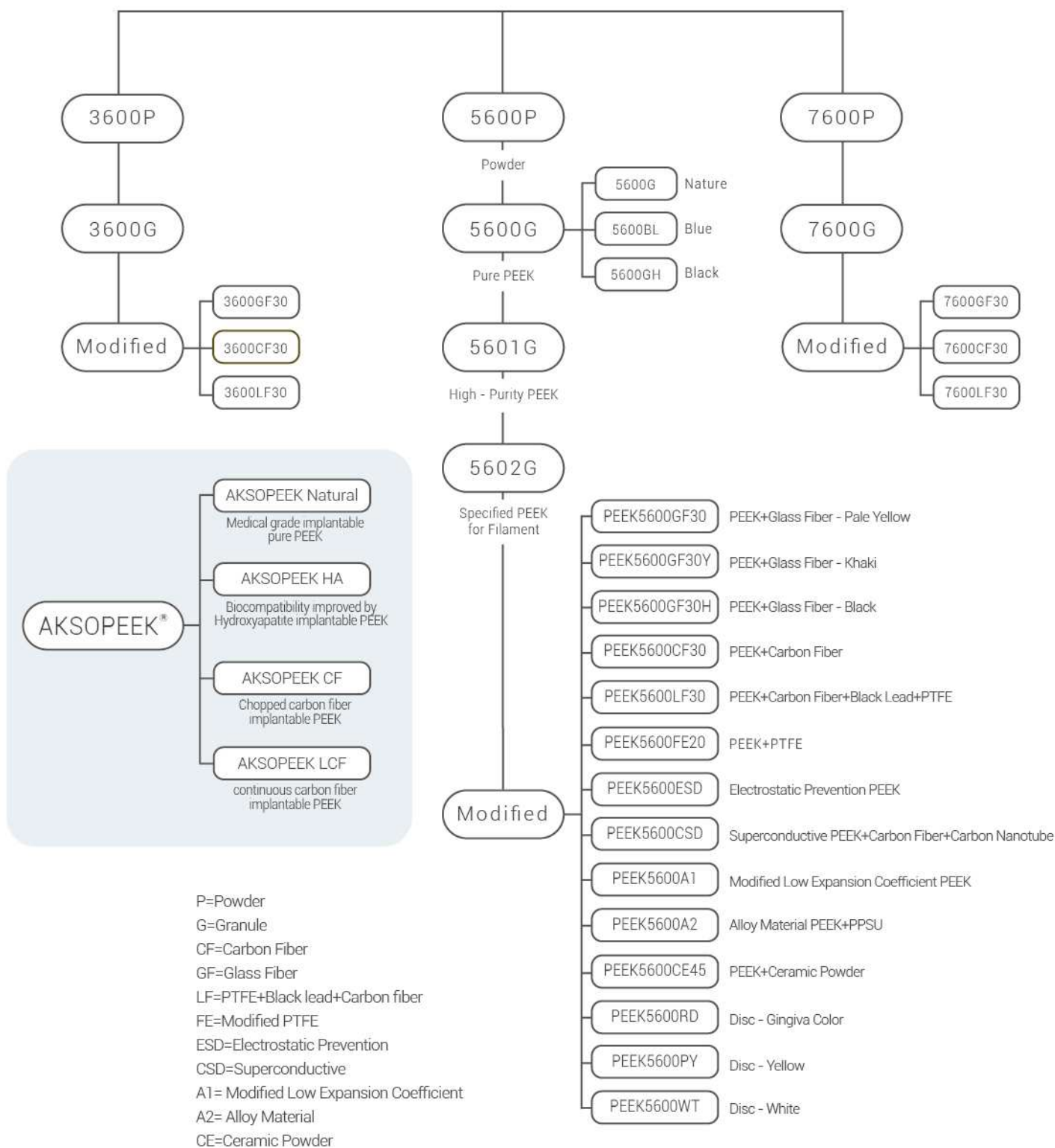
Item	Test standard or instrument	Unit	PEEK5600G	PEEK5600GF30	PEEK5600CF30	PEEK5600LF30	PEEK5600FE20
			(100%PEEK)	PEEK+30% glass fiber	PEEK+30% carbon fiber	PEEK+30% carbon fiber+graphite+PTFE	PEEK+20% PTFE
Mechanical Behavior							
Tensile Strength (23°C)	ISO 527	MPa	95	175	250	145	70
Tensile Modulus (23°C)	ISO 527	GPa	3.8	11	23	12.5	/
Elongation at Break (23°C)	ISO 527	%	35	2.0	1.5	2.2	/
Bending Strength (23°C)	ISO 178	MPa	155	235	350	220	118
Bending Modulus (23°C)	ISO 178	GPa	3.5	10	21	11	/
Charpy Impact Strength (unnotched)	ISO 179/1U	kJ/m²	No break	55	45	32	No break
IZOD Impact Strength (notched)	ISO 180/A	kJ/m²	4	6	6.5	4	6
Thermal Performance							
Melting Point	ISO11357	°C	343	343	343	343	343
Glass Transition Temperature	ISO11357	°C	143	143	143	143	143
Distortion Temperature	ISO 75A-f	1.8MPa, °C	152	315	315	293	150
Coefficient of Thermal Expansion	ASTM D696	ppm K-1	45	22	15	22	70
Thermal Conductivity	ISO /CD22007-4	W/ (m·K)	0.29	0.32	0.95	0.86	/
Electrical Performance							
Dielectric Strength (2mm)	IEC 60243-1	kV/mm	20	19	/	/	19
Dielectric Constant	IEC 62631	-	3.0	3.3	/	/	2.7
Surface Resistivity	GB/T31838.3	Ω	10 <sup>15</sup>	10 <sup>14</sup>	/	/	10 <sup>15</sup>
Volume Resistivity	IEC 62631	Ω·cm	10 <sup>15</sup>	10 <sup>15</sup>	10 <sup>5</sup>	10 <sup>6</sup>	/
Others							
Colour	-	-	Natural	Natural	Black	Black	Natural
Melt Flow Rate (400°C, 2.16kg)	ISO 1133	g/10min	6-10	2-5	1-3	2-5	/
Density	ISO 1183	g/cm³	1.30±0.02	1.50±0.02	1.40±0.02	1.44±0.02	1.41±0.02
Water Absorption (23°C, 24Hrs)	ISO 62-1	%	0.07	0.05	0.04	0.05	0.15
Molding Shrinkage	Parallel to Flow Direction	%	1.2	0.4	0.1	0.3	1.3
	Perpendicular to Flow Direction	%	1.5	0.8	0.5	0.6	1.8
Rockwell Hardness	GB/T 3398.2	HRR	118	119	121	108	113
Flammability Rating	UL 94	/	V-0	V-0	V-0	V-0	/
Friction Coefficient	ASTM D3702	100N-120rpm	0.30-0.38	0.38-0.46	0.15-0.25	0.18-0.30	0.1-0.2
*This parameter is a representative value, not a guaranteed value. If you need, please call our technical department for more detailed technical specifications!							

# PEEK Resin Product Number

High liquidity

Medium liquidity

Low liquidity





## Properties and Advantages



# Typical Application of PEEK Polymer

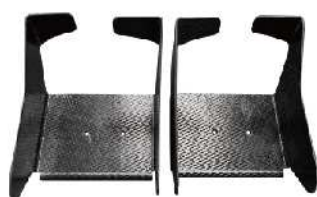
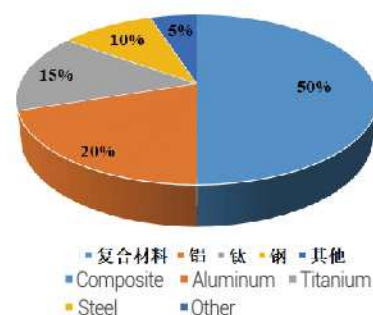
## Aerospace, Military and Nuclear Power



With the rapid development of science and technology, the quality requirements of the aerospace and military industry are getting higher and higher. Lightweight, high - modulus, and high - strength materials have become a research hotspot in this field. As a high- performance thermoplastic, PEEK was used in the military and aerospace industry at the beginning of the study. The PEEK composite material reinforced by carbon fiber is famous in the aerospace field.

A national aerospace research institute used PEEK5600G material to complete the aerospace mission.

Pie chart of proportion of aircraft materials



## Performance of Continuous CF/PEEK TPC

Item	Unit	UD Tapy 0°	UD Tapy 0°/90°	Two Way Prepreg Cloth	Test Standard
Carbon Fiber Mass Content	%	66	66	60	ASTM D3529
Density	g/cm <sup>3</sup>	1.58	1.58	1.55	ASTM D792
Hardness	HRE	105	104	102	ASTM D785
Tensile Strength	MPa	2200	880	700	ASTM D3039
Tensile Modulus	GPa	130	73	70	ASTM D3039
Flexural Strength	MPa	2000	1400	900	ASTM D7264
Flexural Modulus	GPa	116	65	73	ASTM D7264
Compressive Strength	MPa	1200	670	630	ASTMD 6641
Compressive Modulus	GPa	120	60	56	ASTMD 6641
Distortion Temperature	°C	332	332	332	ASTM D648
Compression Strength After Impact	MPa	220	225	230	ASTM D7137
Type 1 Interbedded Fracture Toughness	J/m <sup>2</sup>	1400	1410	1430	ASTM D5528
Short Beam Intensity	MPa	110	100	80	ASTM D2344
- 0.5%In- Plane Shear Strength- 0.5%	MPa	140		145	ASTM D3518
- In- Plane Shera Modulus	GPa	4.5		4.5	ASTM D3518



# AKSOPEEK



With many advantages, such as high-heat resistance, corrosion resistance, high strength, X-ray transmission, and biocompatibility, AKSOPEEK® has become the most promising medical polymer material. The material has passed various tests of implanted PEEK material YY/T0660-2008, which can meet the requirements of clinical implantation.



## Test of Biocompatibility

Material	Standard	Experiment Name	Result
AKSOPEEK® Implantable Material	ISO 10993 - 3	Genotoxicity Test	PASSED
		Ames Test	PASSED
		Chromosomal Aberration Assay in Mammalian Cells in Vitro	PASSED
	ISO 10993- 4	Blood Compatibility	PASSED
	ISO 10993- 5	Cytotoxicity Test	PASSED
	ISO 10993- 6	Bone Implant Trial (26 Weeks)	PASSED
	ISO 10993- 10	Skin Sensitization Test	PASSED
		Intradermal Reaction Test	PASSED
	ISO 10993- 11	Pyrogen Test	PASSED
		Acute Systemic Toxicity Test	PASSED
		Subchronic Systemic Toxicity Test	PASSED
	ISO 10993- 17	Toxicology	PASSED
	ISO 10993- 18	Chemical Characterization	PASSED

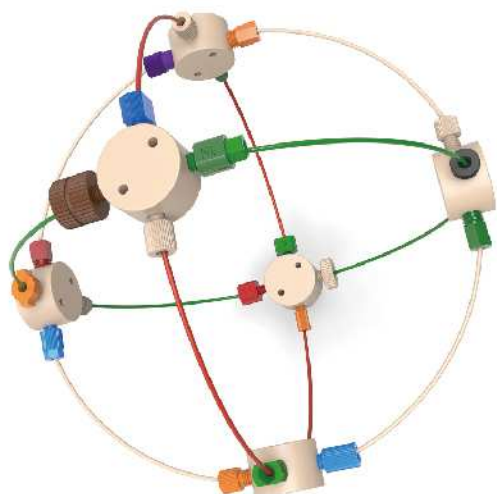
## Analysis and Testing Equipment



PEEK material has the characteristics of high strength, high purity, low release, and corrosion resistance, which does not interfere with separation and purification processes. Therefore, it is widely used in analytical instruments such as liquid chromatographs, ion chromatographs, protein purification instruments, microwave digesters, glycosylated hemoglobin detectors, and sample pretreatment equipment. In particular, PEEK is the most suitable material for ion chromatography fluid transmission because of its high acid-base resistance and low metal ion content.

PEEK Chemical Resistance Sheet

Acids	23°C	100°C	200°C
10% Acetic Acid	A	A	
Concentrated Acetic Acid	A	A	A
Acrylic Acid	A	A	
Aqua Regia	C	C	C
Benzenesulfonic Acid	C		
Benzoic Acid	A	A	
Boric Acid	A	A	
Carbolic Acid	A		
Carbonic Acid	A	A	
Chloroacetic Acid	A	A	
Chlorosulfonic Acid	C	C	C
40% Chromic Acid	A		



A - No Reaction. PEEK can contact these reagents directly. Verifying the actual application is recommended.

B - Slight Effect. PEEK can contact these reagents directly. Verifying the actual application is recommended.

C - Serious Effect. PEEK is only allowed to come into contact with the above reagents under certain circumstances.





# PEEK is used in the Petrochemical Industry

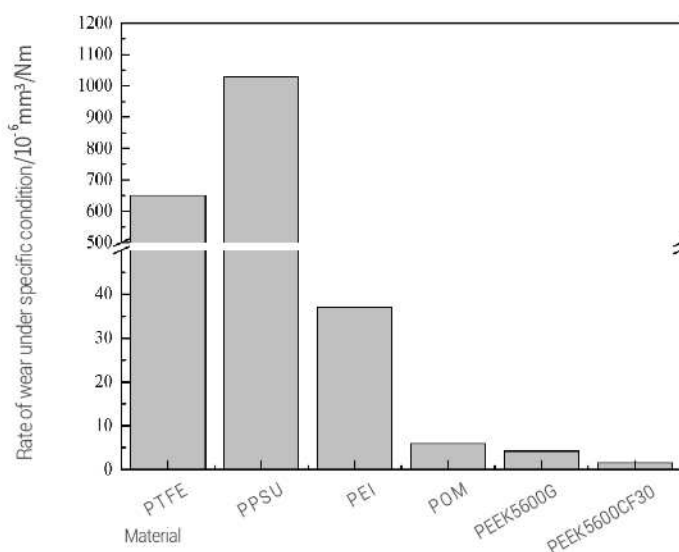
- Wear-Resistant
- High Temperature Resistance
- High Strength
- Self-Lubricating
- Acid-Base Corrosion
- High Reliability

Petrochemical



The characteristics of chemical corrosion resistance and wear resistance can ensure the continuous and stable operation of the equipment, avoid equipment shutdown, and ensure the safe operation of the device.

A domestic chemical company used PTFE - modified PEEK material produced by us instead of the original pure PEEK material. The result is that the service life of the wear - parts has been extended by 1.3 - 3 times.



Rate of wear under specific condition of different materials

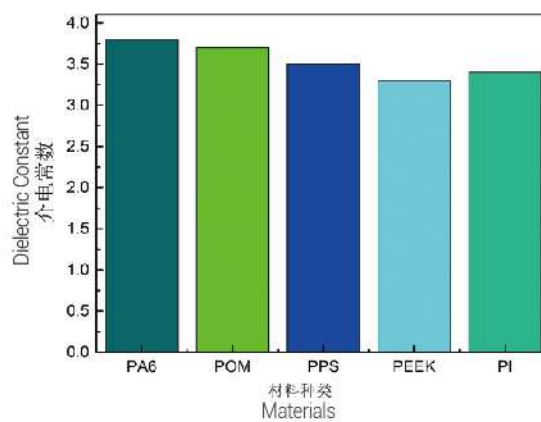


## PV Industry, LCD and Semiconductor Industry

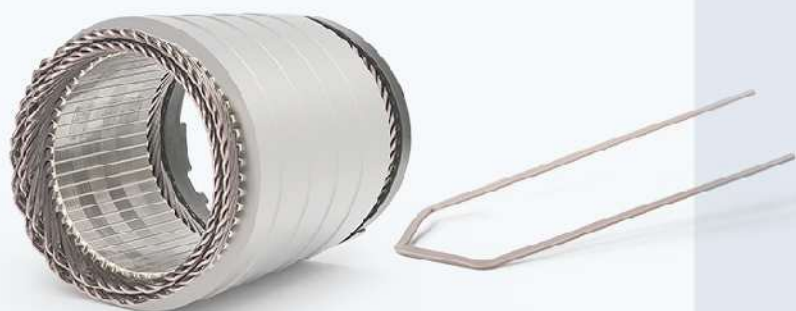
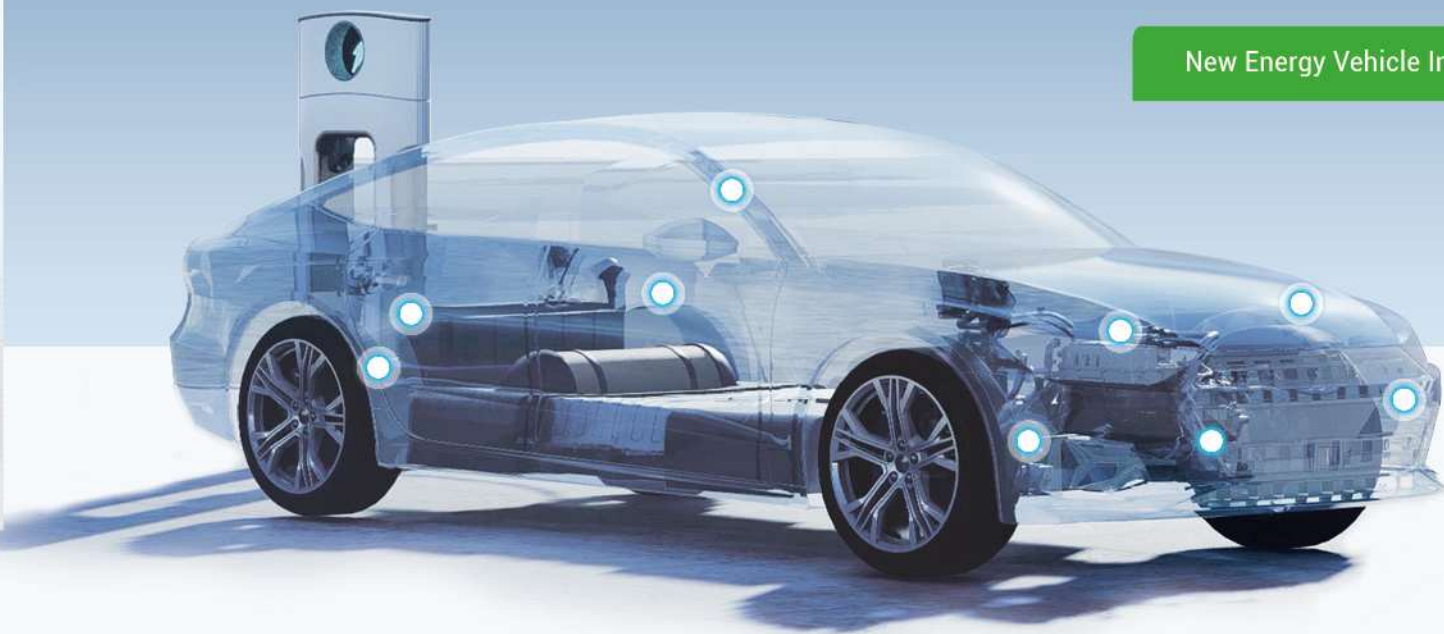


PEEK has the characteristics of high purity, dimensional stability, and low dielectric constant. High pure PEEK can protect the parts like chips and wafers from pollution. PEEK with stable size can ensure the safety of the chip during the transfer process. PEEK with low dielectric constant can ensure that electronic parts are not damaged by voltage.

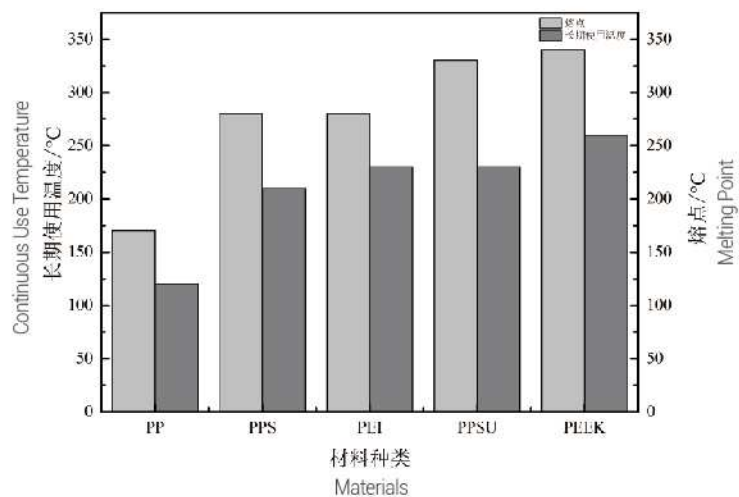
Features of low transmission loss, low transmission delay, and high characteristic impedance can meet the requirements of high frequency and high speed for 5G.







PEEK material replaces some metal materials of new energy vehicle batteries, which reduces the overall weight of cars and reduce their energy consumption by 5% to 10%.





## Textile Printing and Dyeing Industry



PEEK has excellent high temperature resistance, wear resistance and self-lubricating properties, which perfectly replaces the copper sliders, bushings and other metal parts on textile printing and dyeing equipment, and solves the technical problems existing during production.

## Food Processing and Beverage Filling Industry

The key parts of food processing, packaging and beverage filling equipment require higher reliability and longer service life. PEEK material not only has the advantages of high temperature resistance, wear resistance and corrosion resistance, but also has the advantages of fatigue resistance, which reduces the update frequency of equipment parts and greatly improves the production requirements of continuous operation.

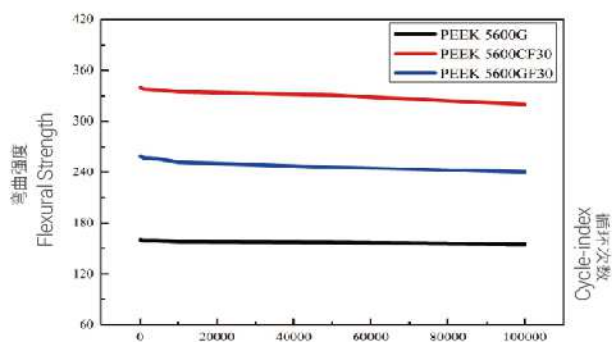
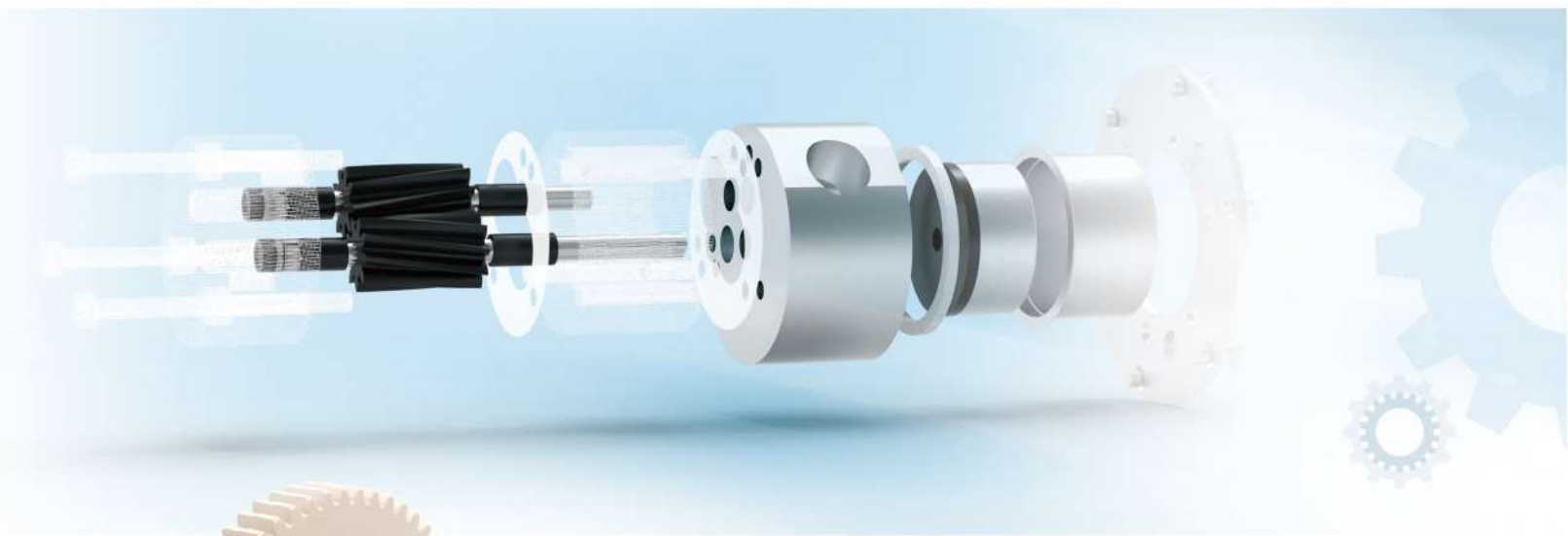


图3 在23°C条件下一组PEEK材料的弯曲疲劳情况  
Bending fatigue data for different kinds of PEEK under 23°C







PEEK is corrosion - resistant and suitable for more severe applications, such as the transmission of organic solvents or acidic liquids. At the same time, the noise of PEEK is only 40% - 70% of that of metal material.



# Ultra High Temperature Polyimide (PI) Polymer

## Feature Advantages



High Temperature Resistance



Anti-Deformation



Corrosion Resistance



Ultra Low Deflation in Vacuum



Wear Resistance



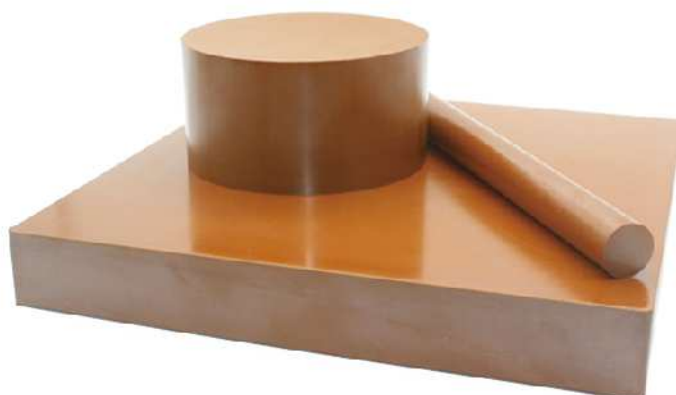
Electrical Insulation



Radiation Resistance

## Application field

Now widely used in automotive, semiconductor, office equipment, electrical and electronic equipment, scientific instruments, hot runners, petrochemical equipment, general machinery, textile machinery, laser printing, medical equipment and other fields.



- Mould hot runner insulation board, insulation ring
- Chip test box
- Laser embossing roller
- Semiconductor industry fixture
- Rolling, sliding, thrust washer
- Gear
- Glass industry bracket
- Piston ring
- copier separation claw
- Semiconductor chip nozzle
- Gas Chromatography Seal
- Valve
- Plasma torch vortex ring
- Car engine gasket
- Microwave parts





# PI Main Material Grade and Typical Properties

Item	Test standard or instrument	Unit	JHPI-10	JHPI-10-21 PEEK+15%Graphite	JHPI-10-22 PEEK+40%Graphite	JHPI-HT	JHPI-YS	JSJHTPI-01	JSJHTPI-02
Density	ISO 1183	g/cm³	1.4	1.43	1.7	1.4	1.36	1.32	1.36
Tensile Strength	ISO 527	MPa	96	90	60	92	121	90	97
Elongation at Break	ISO 527	%	10	5	2.5	8	13	8	8
Bending Strength	ISO 178	MPa	148	126	90	140	171	130	138
Charpy Impact Strength	ISO 179	MPa	90	55	13	88	NB	100	NB
Heat Distortion Temperature	ISO 75-1/-2	°C	>300	>300	>300	>320	255	230	250
Continuous Using Temperature	UL746B	°C	350	350	350	380	250	250	250

\*This parameter is a representative value, not a guaranteed value. If you need, please call our technical department for more detailed technical specifications!

## JHPI-10



With high temperature resistance level, the long-term use temperature is up to 350°C, and the instantaneous temperature reaches 400°C. Because of good processing characteristics, it can be processed into bars or other special-shaped parts.

## JHPI-10-21



The long-term use temperature is 350°C, and the instantaneous temperature is above 400°C, added 15% of the Graphite, leading to a low coefficient of friction and better wear resistance.

## JHPI-YS



A semi-thermoplastic polyimide material can be used up to 250°C for a long time, and it has high dimensional stability and transparency.

## JSJHTPI-01



Except Long-term use temperature of 250°C and excellent processing performance, it can be processed by injection molding or extrusion Production of various parts or profiles.



All About PEEK All About FUTURE



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