

PEEK (PolyEtherEtherKetone) is a lightweight highly chemical resistant thermoplastic popular in the Aerospace & Defense and Medical Industries.



MATERIAL DETAILS

- High resistance to chemicals, moisture and steam.
- Withstands temperatures up to 480°F (250°C).
- Machined in a wide range of extruded and compression molded shapes and sizes.











PEEK APPLICATIONS

Due to its elasticity and resistance to chemicals, abrasion and hydrolysis, PEEK is a highly sought-after thermoplastic in the Aerospace & Defense and Medical industries.

Common uses include:

- Aerospace Weight Reduction Components
- Dental Implants
- Food and Beverage Automated Manufacturing Equipment
- Food and Beverage Filling
- Medical Implants
- Medical Instruments
- Metal Replacement
- Processing Equipment

• Semiconductor Manufacturing Equipment

Vacuum Chamber Applications



AEROSPACE & DEFENSE

In the Aerospace & Defense industry, it is applied to aircraft components for weight reduction, usually in place of metal parts.

With resistance to high temperatures and corrosive materials, PEEK provides a cost-effective alternative to the metal alloys traditionally used in aerospace, without sacrificing the ductile strength and mechanical qualities necessary for high-performance. Furthermore, in military aircraft, polymer components have the benefit of evading radar detection.

For over three decades, AIP has provided flight control, fuel system, interior, engine and aerodynamic-related PEEK components for various aircraft OEM and MRO providers worldwide.

Products Machined for Aerospace and Defense:



Aircraft Engines, Systems and Structural Components



Chemical Detection Devices



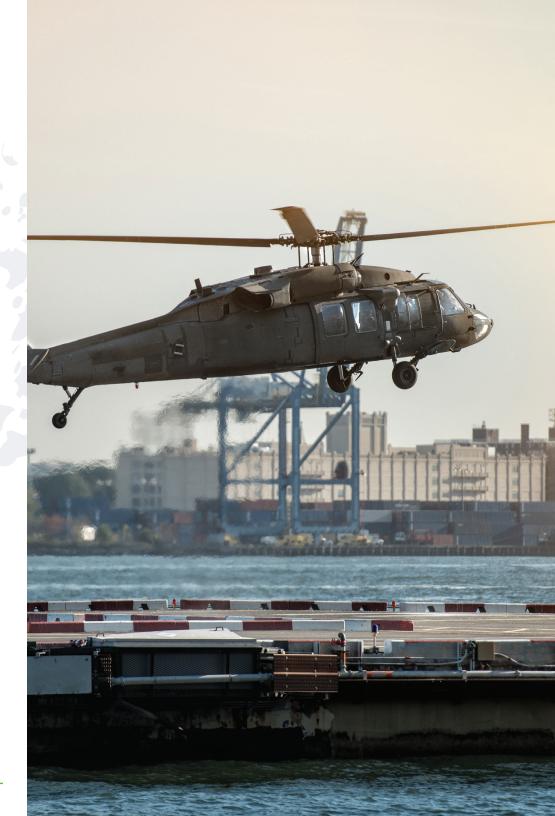
Landing Gear Components



Military Targeting and Defense Sensors



Space and Satellite Devices





MEDICAL & LIFE SCIENCES

In the Medical Industry, PEEK has a wide range of applications, such as medical instruments as well as dental and medical implants.

PEEK Neurosurgical Case Study

One such example of PEEK's versatility is in neurosurgery for stroke and traumatic brain injuries. Dr. Rohit Khanna wanted to develop a device that would relieve swelling in the skull for patients undergoing brain surgery, sometimes multiple surgeries, which can lead to complications or even death. Dr. Khanna partnered with AIP Precision Machining engineers to create a device that would expand without another operation, yet hold the "bone flap" and the rest of the skull together.

The polymer of choice? PEEK. AIP's engineers machined a medical component that





was flexible, strong and sensitive enough to fulfill the necessary requirements for this critical medical part. PEEK was also the best choice for this medical application because it was the most ductile and biocompatible. In preliminary tests with the PEEK surgical component, Dr. Khanna found the device was effective in reducing swelling in the brain and maintaining the structure of the skull. Currently, the FDA is processing the PEEK surgical piece for clearance to conduct clinical trials. If it is approved to move forward, it can make leaps and bounds in reducing the need for multiple brain surgeries, saving more lives.

WHAT CAN AIP PRECISION MACHINING DO FOR YOU?

From concept to completion, our team of engineers will work with you to realize the final product. With some of the fastest lead times in the industry, our unrivaled technical experts can tackle your polymer challenges.

CUSTOMIZED FOR YOUR APPLICATION

We're proud to offer a complex quality assurance process that focuses on product quality, fast delivery and cost-effective options.















Design

Conceptualization





Precision

Machining + Quality Assurance





Finished Product

PEEK VARIANTS

MICAL	Strength to Weight Ratio Specific Gravity @ 73 F. Tensile Strength @ 73 F. (ult//yld) Tensile Elongation of Elasticity @ 73 F. Tensile Elongation at Break @ 73 F. Telsvural Strength @ 73 F. Flexural Modulus of Elasticity @ 73 F. Shear Strength @ 73 F.	Units Ksi Psi Psi Psi Psi Psi	ASTM Test Method 6	Ketron PEEK Compression Molded Poly- etheretherketone e	Victrex PEEK 4506 Injection Molded Poly-	Ketron PEEK Extruded Polyether-	30% Glass Filled Ketron PEEK Compression Motded 30%	30% Glass Filled Ketron PEEK Extruded	Victrex PEEK 4506L30 Injection Molded 30%	30% Carbon Filled Ketron PEEK Compression	30% Carbon Filled Ketron PEEK	Victrex PEEK 450CA30 Injection	Ketron PEEK HPV Bearing Grade	Victrex PEEK Optima LT	Tectron PPS Extruded
- 2 6 4 70 0 6 8	Strength to Weight Ratio Specific Gravity @ 73 F, (uit//y/d) Tensile Strength @ 73 F, (uit//y/d) Tensile Brongation at Break @ 73 F Flexural Strength @ 73 F Flexural Strength @ 73 F Shavara Strength @ 73 F Shavara Strength @ 73 F	Units ksi psi psi psi psi psi	ASTM Test Method 6 0792 0638 0638 0790 0790 0790	Compression Molded Poly- effections	Injection Molded Poly- stheretherketone	Extruded Polyether- etherketone	Compression Molded 30%	Extruded	Injection Molded 30%	Compression	Extridad	Injection	Rearing Grade	in land	Evtruded
- 2 6 4 5 9 7 8	Strength to Weight Ratio Specific Gravity @ 73 F Tensile Strength @ 73 F. (ult//y/d) Tensile Modulus of Eastfeity @ 73 F Tensile Elongation at Break @ 73 F Flexural Strength @ 73 F Flexural Modulus of Eastfeity @ 73 F Shear Strength @ 73 F	ksi psi psi psi psi	- D792 D638 D638 D790 D790 D790	1.32			GF PEEK	30% Glass Filled PEEK	GF PEEK	Molded 30% GF PEEK	30% Carbon Filled PEEK	Molded 30% GF PEEK	Polyether- etherketone	Injection Molded Poly- etheretherketone	_ ٽــ
2 6 4 6 9 7	Specific Gravity @ 73 F Tensile Strength @ 73 F. (util//yid) Tensile Modulus of Ensitity @ 73 F Tensile Enorgation at Break @ 73 F Flexural Strength @ 73 F Flexural Strength @ 73 F Shears Strength @ 73 F Shears Strength @ 73 F	psi psi psi psi	D792 D638 D638 D790 D790	1.32											
	Tensile Strength @ 73 F. (ult)/tyld) Tensile Modulus of Basticity @ 73 F Tensile Eurogation at Break @ 73 F Flexural Strength @ 73 F Flexural Strength @ 73 F Shears Modulus of Easticity @ 73 F Shear Strength @ 73 F	psi psi psi psi psi	D638 D638 D790 D790		1.30	1.31	1.45	1.54	1.50	1.42	1.41	1.41	1.44	1.30	1.35
	Tensile Modulus of Elasticity @ 73 F Tensile Elongation at Break @ 73 F Flexural Strength @ 73 F Flexural Modulus of Elasticity @ 73 F Shear Strength @ 73 F	psi % psi psi psi	D638 D638 D790 D790	15000(ult)	14100(ult)	16000(uit)	17000(ult)	18000(ult)	22620(uit)	20000(ult)	23200(ult)	33785(ult)	17400	14100(ult)	13500(ult)
12 0 L 8	Tensile Elongation at Break @ 73 F Flexural Strength @ 73 F Flexural Modulus of Elasticity @ 73 F Shear Strength @ 73 F	% psi psi psi psi psi psi	D638 D790 D790 D732	450000	522000	200000	750000	1000000	1407000	800000	1400000	1885000	1100000	522000	200000
	Flexural Strength © 73 F Flexural Modulus of Elasticity © 73 F Shear Strength © 73 F	psi psi psi psi	D790 D790 D732	1.0	വ	20	က	ဗ	2.0	2.0	က	2	က	ιΩ	15
	Flexural Modulus of Elasticity @ 73 F Shear Strength @ 73 F	psi psi psi	D790 D732	25000	24650	25000	28000	28000	33785	30000		51475		24650	21000
8	Shear Strength @ 73 F	psi psi psi	D732	000009	594500	000009	1000000	1000000	1450000	1300000	٠	2929000		594500	575000
		psi			7685(ult)	8000		14000	14065(ult)	•		14065(ult)	٠	7685(ult)	0006
6	Compressive Strength, (% Deformation) @ 73 F	isd	D695	17000(10)	17255(10)	20000(10)	19000(10)	26000(10)	31175(10)	25000(10)	29000(10)	34800(10)	21800(10)	17255(10)	21500(10)
10	Compressive Modulus of Elasticity @ 73 F		269G	450000		200000	200000	1000000	٠	220000	٠				430000
1	Hardness, Rockwell, Scale as noted @ 73 F		D785	M99(R126)	M99(R126)	M100(R126)	M103(R124)	M103(R126)	M103(R126)M103(R124)	M97(R125)	M104	M107(R124)	M99	M99(R126)	M95(R125)
12	Hardness, Durometer, Shore D @ 73 F		D2240	D85		D85	98G	98G	٠	98Q	٠	٠	٠	٠	D85
13	Izod Impact, (Notched) @ 73 F	ft-lb/in of notch D256 TypeA	D256 TypeA	1.0	1.6	1.0	1.4	1.4	1.8	1.4	1.0	1.6	0.7	1.6	9:0
14	Coefficient of Friction, (Dry vs. Steel) Dynamic			0.40		0.40				0.19			0.24		07.0
15	Limiting PV, (with 4 to 1 factor of safety applied)	psi-ft/min		12500		2200	٠	•	٠	25000	25000	٠	13000	٠	
	Coefficient of Linear Thermal Expansion @ 73 F		E-831(TMA)	2.6E-05	2.6E-05	2.6E-05	1.4E-05	1.2E-05		1.7E-05	1.0E-05	8.0E-06	1.4E-05	2.6E-05	2.8E-05
17	Heat Deflection Temperature @ 264 psi		D648	320	306	320	009	009	009	009	518	009	977	306	250
	Tg-Glass Transition Temperature, (Amorphous)								289		289	289	289	289	
2 4EE	Melting Point, (VS = Vicat Softening Temp)		D3418	979	9779	979	979	979	979	979	9799	979	9779	979	240
20	Continuous Service Temperature in Air, ($M\alpha x$.)					480		480	780	480	482	780	787	780	
21	Thermal Conductivity	BTU-in/hr-ft2-F		1.75	1.75	1.75	2.98	2.98	2.98	6.37	6.40	6.37	1.70	1.75	2.00
22	Dielectric Strength, Short Term	Volts/mil	D149	780	480	780	200	200	200		32		٠	780	240
23	Volume Resistivity	ohm-cm	D257	4.9E+16	4.9E+16	4.9E+16	5.0E+16	5.0E+16	1.0E+16	٠	1.0E+16	1.4E+05	<1E8	4.9E+16	4.5E+16
54	Dielectric Constant @ 10E6 Hz	٠	D150	3.3	3.3	3.3	٠		3.7	٠	•			3.3	3.0
22 52	Dissipation Factor @ 10E6 Hz		D150	0.003	0.003	0.003			0.004	•				0.003	0.001
56	Flammability @ 3.1mm unless noted		DL94	0-/	0-/	0-/	0-/	0-/	0-/	۸-0	0-/	۸-0	۸-0	۸-0	۸-0
° 27	Water Absorbtion, Immersion, 24 Hrs	% by wt.				0.10		0.10		0.15					
28	Water Absorbtion, Saturation	% by wt.	D570(7)	0.50	0.50	0.50	0:20	0:30		0.50	0:30		0:30	0.50	0.03



