



**PRECISION
MACHINING**

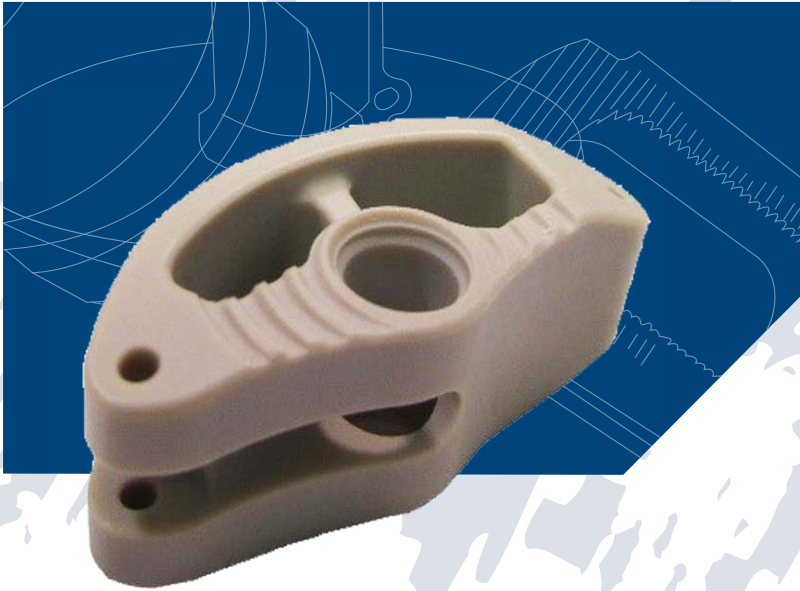
Unrivaled Expertise.
Unparalleled Results.

A detailed line art illustration of a precision machine tool, possibly a lathe or mill, is shown in the background. The tool has a complex structure with various components like a chuck, tool holder, and workpiece. The illustration is rendered in a light blue color, with some parts highlighted in a darker blue. The tool is positioned diagonally across the frame, with the handle on the left and the cutting head on the right. The background is a light gray with some faint, abstract shapes.

WHAT CAN THIS POLYMER DO?

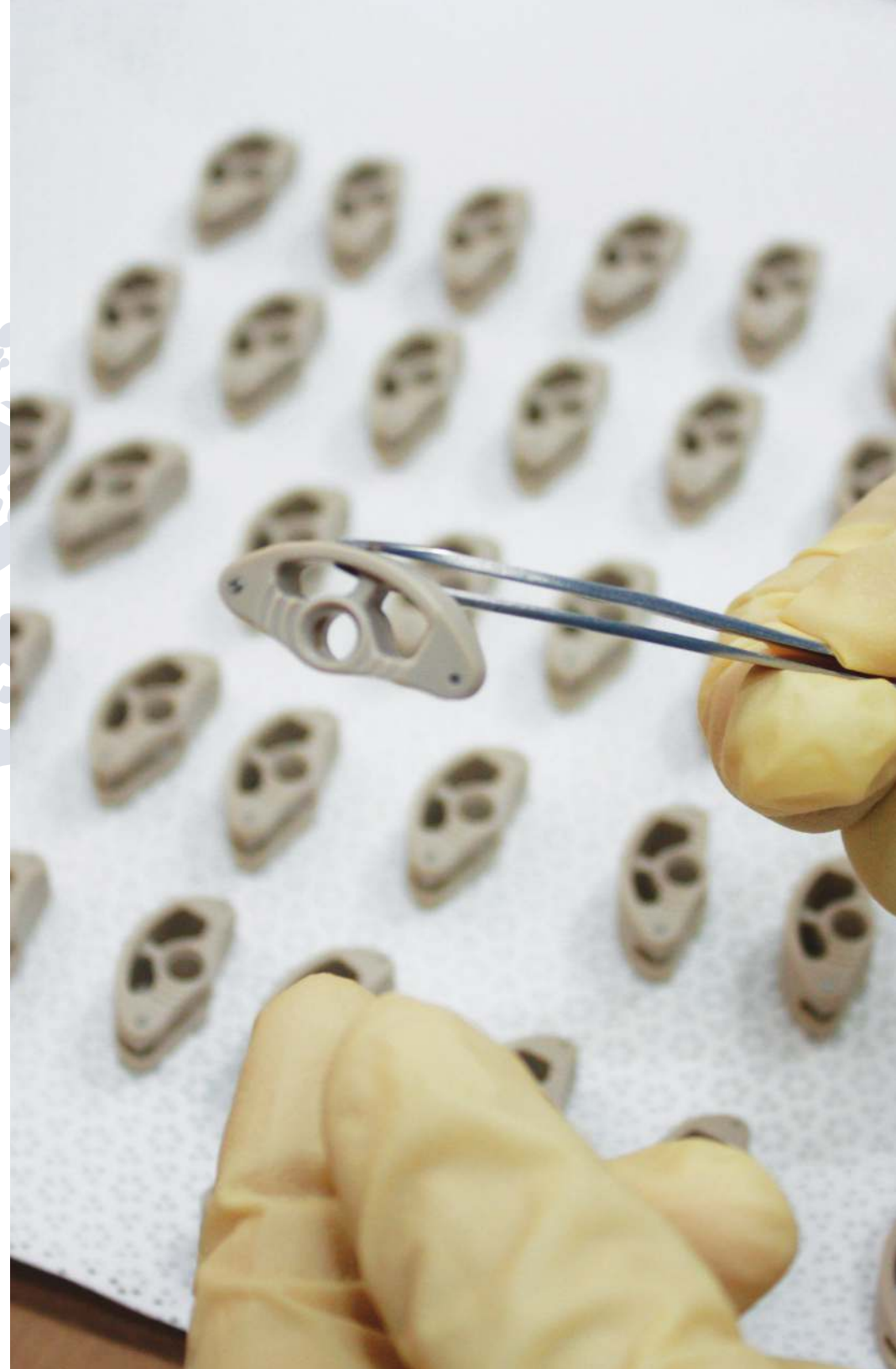
PEEK

(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.

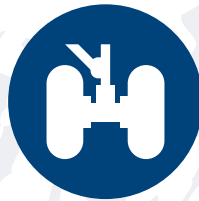
Products Machined for Aerospace and Defense:



Aircraft Engines,
Systems and
Structural
Components



Chemical
Detection Devices



Landing Gear
Components



Military Targeting
and Defense
Sensors



Space and
Satellite Devices

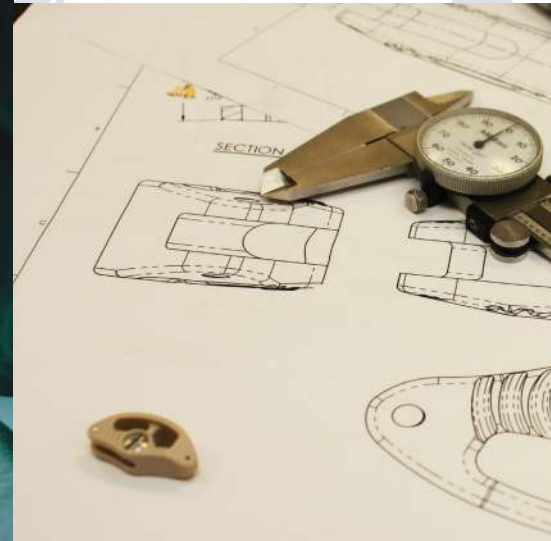


MEDICAL & LIFE SCIENCES

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



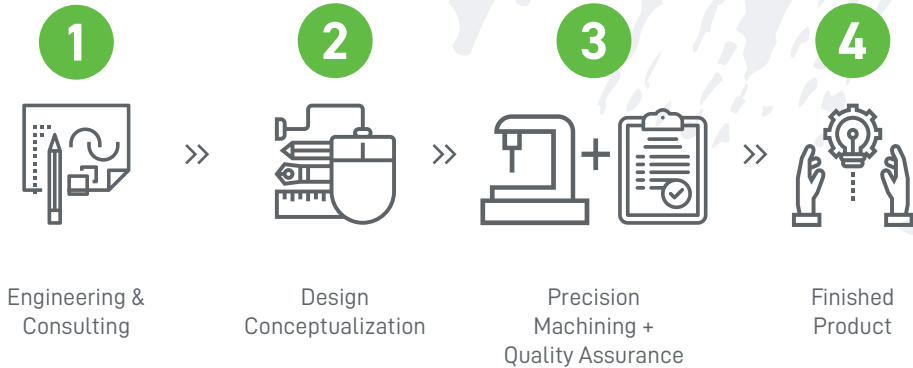
was flexible, strong and sensitive enough to fulfill the necessary requirements for this critical medical part. PEEK was also the best choice for this medical application because it was the most ductile and biocompatible. In preliminary tests with the PEEK surgical component, Dr. Khanna found the device 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.



PEEK VARIANTS

	Units	ASTM Test Method	Competition Method	Ketron PEEK	Ketron PEEK 450G	Ketron PEEK 4500L30	30% Glass Filled Ketron PEEK	30% Glass Filled Ketron PEEK	30% Carbon Filled Ketron PEEK	30% Carbon Filled Ketron PEEK	30% Carbon Filled Ketron PEEK	30% Carbon Filled Ketron PEEK	Ketron PEEK 4500L30	Ketron PEEK 4500L30	Ketron PEEK 4500L30	Ketron PEEK Original L	Techem PPS
1	Strength to Weight Ratio	-	-	1.32	1.30	1.31	1.45	1.54	1.50	1.42	1.41	1.41	1.41	1.44	1.44	1.30	1.35
2	Specific Gravity @ 73 F	-	D792	15000 (ul)	14100 (ul)	16000 (ul)	17000 (ul)	18000 (ul)	22420 (ul)	20000 (ul)	22200 (ul)	22200 (ul)	33785 (ul)	17400	17400	14100 (ul)	13500 (ul)
3	Tensile Strength @ 73 F, (ul)/ (yld)	psi	D638	45000	52200	50000	75000	100000	1407000	80000	1400000	1400000	1885000	1100000	1100000	522000	500000
4	Tensile Modulus of Elasticity @ 73 F	psi	D638	1.0	5	20	3	3	2.0	2.0	3	3	2	3	5	15	15
5	Tensile Elongation at Break @ 73 F	%	D638	1.0	5	20	3	3	2.0	2.0	3	3	2	3	5	15	15
6	Flexural Strength @ 73 F	psi	D790	25000	24650	25000	28000	28000	33785	30000	-	-	51475	-	24650	21000	21000
7	Flexural Modulus of Elasticity @ 73 F	psi	D790	600000	594500	600000	1000000	1000000	1450000	1300000	-	-	2929000	-	594500	575000	575000
8	Shear Strength @ 73 F	psi	D732	-	7685 (ul)	8000	-	14000	14665 (ul)	-	-	-	14665 (ul)	-	7685 (ul)	9000	9000
9	Compressive Strength, (% Deformation) @ 73 F	psi	D695	17000 (ul)	17255 (ul)	20000 (ul)	19000 (ul)	26000 (ul)	31175 (ul)	25000 (ul)	29000 (ul)	29000 (ul)	34800 (ul)	21800 (ul)	17255 (ul)	21500 (ul)	21500 (ul)
10	Compressive Modulus of Elasticity @ 73 F	psi	D695	450000	-	500000	500000	1000000	1000000	500000	500000	500000	-	-	-	430000	430000
11	Hardness, Rockwell, Scale as noted @ 73 F	-	D785	M99 (R126)	M99 (R126)	M100 (R126)	M103 (R124)	M103 (R124)	M103 (R124)	M97 (R125)	M104	M107 (R124)	M99	M99	M99 (R126)	M95 (R125)	M95 (R125)
12	Hardness, Durometer, Shore D @ 73 F	-	D2240	085	1.0	1.6	1.4	1.4	1.8	1.4	1.4	1.4	1.8	1.4	1.6	1.6	0.85
13	Izod Impact, (Notched) @ 73 F	ft-lb/inch	D256 Type A	0.40	-	0.40	-	-	-	0.19	-	-	-	0.24	-	0.40	0.40
14	Coefficient of Friction, (Dry vs. Steel Dynamic)	-	-	12500	-	5500	-	-	-	25000	25000	25000	-	13000	-	-	-
15	Limiting PV, (with 4 to 1 factor of safety applied)	psi-ft/min	-	E-83 (TMA)	2.6E-05	2.6E-05	1.4E-05	1.2E-05	1.2E-05	1.7E-05	1.0E-05	1.0E-05	8.0E-06	1.4E-05	2.4E-05	2.8E-05	2.8E-05
16	Coefficient of Linear Thermal Expansion @ 73 F	in/in/F	-	D668	320	320	600	600	600	600	600	600	289	289	446	306	250
17	Heat Deflection Temperature @ 264 psi	F	D3418	-	289	-	-	-	289	289	289	289	289	289	289	289	289
18	Tg-Glass Transition Temperature, (Amorphous)	F	D3418	644	644	644	644	644	644	644	644	644	644	644	644	644	644
19	Melting Point, (VS → Viscal Softening Temp)	F	-	480	480	480	480	480	480	480	480	480	480	480	480	480	480
20	Continuous Service Temperature in Air, (Max.)	F	-	175	175	175	298	298	298	298	298	298	298	298	298	298	298
21	Thermal Conductivity	BTU-in/hr-ft ² -F	-	D149	480	480	480	500	500	500	500	500	500	500	500	500	500
22	Dielectric Strength, Short Term	Volts/mil	-	D257	4.9E+16	4.9E+16	5.0E+16	5.0E+16	5.0E+16	5.0E+16	5.0E+16	5.0E+16	5.0E+16	5.0E+16	5.0E+16	5.0E+16	5.0E+16
23	Volume Resistivity	ohm-cm	-	D150	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.001	0.001
24	Dielectric Constant @ 10E6 Hz	-	-	UL94	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0
25	Dissipation Factor @ 10E6 Hz	-	-	D570 (7)	0.15	0.50	0.15	0.10	0.11	0.15	0.06	0.06	0.06	0.05	0.50	0.01	0.01
26	Flammability @ 3.1mm unless noted	-	-	D570 (7)	0.15	0.50	0.15	0.10	0.11	0.15	0.06	0.06	0.06	0.05	0.50	0.01	0.01
27	Water Absorption, Immersion, 24 Hrs	% by wt.	-	D570 (7)	0.50	0.50	0.50	0.30	0.30	0.50	0.30	0.30	0.30	0.30	0.50	0.03	0.03
28	Water Absorption, Saturation	% by wt.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Precision Machined Plastic Components

