



Elekem Ltd

High performance spin moulded PEEK tubes



Elekem specialises in the production of TECAPEEK SM spin moulded tubes, manufactured exclusively from Victrex® PEEK polymer.

Elekem developed the first advanced technology spin moulding machines for the manufacture of TECAPEEK SM tubes. Other processing techniques include compression moulding and isostatic moulding.

TECAPEEK SM tubes offer a variety of properties that benefit a wide range of applications, especially those within the oil and gas sector, where high temperature, high mechanical forces and resistance to aggressive chemicals is paramount.

As well as oil and gas, Elekem products are suitable for use in a variety of markets including, but not limited to, the seals industry, food industry, hydraulic/fluid handling, pump manufacturing, paper manufacturing, chemical, transportation, electronics, aerospace and medical.



Sealing applications in harsh environments

Sealing products, such as backup and split rings made from TECAPEEK SM tube offer significant advantages in extreme application environments, such as in the oil and gas industry.

High mechanical strength with double the pressure handling capability of PTFE.

High creep resistance more than 200 times that of PTFE.

10 times the compressive strength of PTFE at elevated temperatures.

Products manufactured from TECAPEEK SM tube can survive service temperatures in the range of -50 °C to +260 °C whilst maintaining high mechanical strength.

Pressure ratings of 30,000 psi are not uncommon.

High wear and abrasion resistance lead to suitability in sliding and rotating applications, which can lead to

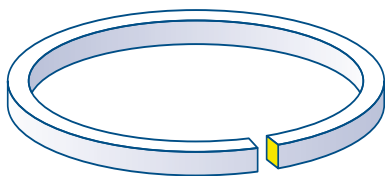
a reduction in friction, increased efficiency and reduced maintenance while improving productivity.

The chemical properties of TECAPEEK SM tube lend themselves to use in harsh environments with resistance to high-pressure steam, most oils, chemicals, and gases, and other fluids common in the oil and gas industry.

Through the use of fillers and additives, properties can be enhanced or modified to suit a particular application requirement.

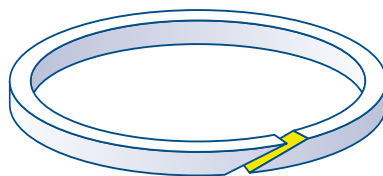
TECAPEEK SM tubes produced at Elekem have low stress and enhanced properties, when compared to tubes manufactured using other processing techniques.

The product is easy to machine without requiring specialised equipment, however our state of the art machining facilities have the capacity and capability to provide components, seal rings and split seal rings to the highest precision and tolerance.



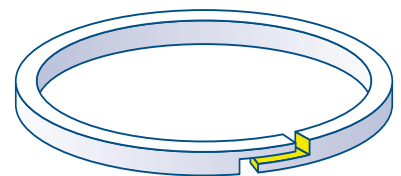
Butt Joint

- Low cost solution
- Constant low leakage rates
- Gap closes as temperatures increase
- Responds to pressure without permanent deformation



Scarf Joint

- Gap clearance effect far lower than for butt joints
- Scarf angles are variable but typically 20°
- Enhanced sealing at lower pressures
- Zero gap sizes possible



Stepped Joint

- No clear path for fluid escape
- Low pressure sealing at low temperatures
- Very low constant leakage rates

Elekem TECAPEEK SM tubes can be modified to suit particular application needs by the introduction of suitable fillers and additives

Our engineers can work with your design teams to recommend and develop tailored solutions to satisfy your demanding application requirements.

Available fillers

Glass fibres

Glass fibres are primarily used to increase strength values.

- Increased tensile strength, compressive strength and rigidity
- Improved creep strength
- Increased thermal dimensional stability
- Reduction of thermal expansion and shrinkage
- Reduction of toughness and consequently breaking strength and impact strength

Please note glass fibres have an abrasive effect. For this reason, glass fibre-reinforced materials are less suited for sliding friction applications and when processed, bring about increased levels of tool wear.

Carbon fibres

Carbon fibres have a similar effect to glass fibres, but

- Carbon fibres provide a better weight-to-strength ratio
- Carbon fibres are not as abrasive as glass fibres and are consequently suitable for sliding friction applications
- The influence of carbon fibres on electrical properties can be disregarded

PTFE

Under compressive stress, abraded material from PTFE-filled plastics forms a fine polymer film with sliding properties on the sliding surface.

- Effective avoidance of stick-slip effect
- Typically pronounced anti-adhesive behaviour

Other fillers are also available on request

The Elekem portfolio offers a number of modified materials from stock. Alongside these materials, individual customer requirements can be achieved by modification with fillers and additives, to further develop specific material characteristics and enhance performance.

It is important to bear in mind that the addition of any additive has multiple effects; alongside the positive effect on a key characteristic, other characteristics can be negatively influenced by an additive.



TECAPEEK SM Natural

Chemical designation

PEEK (polyetheretherketone)

Colour

Beige opaque

Density

1.31 g/cm³

Main features

- electrically insulating
- high thermal and mechanical capacity
- hydrolysis and superheated steam resistant
- good chemical resistance
- flame retardant according to UL94 V-0
- good machinability
- good slide and wear properties
- resistant to many solvents

Target Industries

- oil and gas industry
- chemical technology
- mechanical engineering
- electrical engineering
- aircraft and aerospace technology
- food engineering
- automotive industry
- semiconductor technology
- vacuum technology
- textile industry

Mechanical properties	parameter	value	unit	norm	comment
Modulus of elasticity (tensile test)		3520	MPa	BS EN ISO 527-2	
Tensile strength		102	MPa	BS EN ISO 527-2	
Tensile strength at yield		102	MPa	BS EN ISO 527-2	
Elongation at yield		3.6	%	BS EN ISO 527-2	
Elongation at break		19	%	BS EN ISO 527-2	
Flexural strength		164	MPa		
Modulus of elasticity (flexural test)		3670	MPa		
Shore D hardness		88		BS EN ISO 868	

Thermal properties	parameter	value	unit	norm	comment
Glass transition temperature		149	°C	ISO 11357-2:2013 1)	(1) Found in public sources.
Melting temperature		341	°C		(2) Found in public sources.
Service temperature	short term	300	°C	2)	Individual testing regarding application conditions is mandatory.
Service temperature	long term	260	°C		

TECAPEEK SM Glass Filled

Chemical designation

PEEK (polyetheretherketone)

Colour

Beige opaque

Density

1.53 g/cm³

Fillers

Glass fibres

Main features

- electrically insulating
- high thermal and mechanical capacity
- hydrolysis and superheated steam resistant
- good chemical resistance
- flame retardant according to UL94 V-0
- high dimensional stability
- good slide and wear properties
- very high stiffness
- very high creep resistance

Target Industries

- oil and gas industry
- chemical technology
- mechanical engineering
- electrical engineering
- aircraft and aerospace technology
- automotive industry
- conveyor technology
- vacuum technology
- textile industry

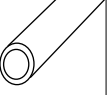
Mechanical properties	parameter	value	unit	norm	comment
Modulus of elasticity (tensile test)		7230	MPa	BS EN ISO 527-2	
Tensile strength		107	MPa	BS EN ISO 527-2	
Tensile strength at yield		107	MPa	BS EN ISO 527-2	
Elongation at yield		2.1	%	BS EN ISO 527-2	
Elongation at break		2.1	%	BS EN ISO 527-2	
Flexural strength		165	MPa		
Modulus of elasticity (flexural test)		6380	MPa		
Shore D hardness		89		BS EN ISO 868	

Thermal properties	parameter	value	unit	norm	comment
Glass transition temperature		147	°C	DIN 53765 1)	(1) Found in public sources.
Melting temperature		341	°C		(2) Found in public sources.
Service temperature	short term	300	°C	2)	Individual testing regarding application conditions is mandatory.
Service temperature	long term	260	°C		

PEEK Tube Sizes

Elekem's approach of customising TECAPEEK SM tube dimensions to suit the customer's machining requirements, has resulted in significant expansion of the product range and usage due primarily to:

- Minimising machining time
- Minimising material wastage
- Low inherent stress within tubes
- Increased dimensional stability for parts
- Enhanced material properties

TECAPEEK SM filled and unfilled (all sizes shown are mm)												
Tube OD	Length	Approximate wall thickness										
		3.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	22.5	25.0	
36	75 - 500	✓	✓	✓								
38	75 - 500	✓	✓	✓								
42	75 - 500	✓	✓	✓								
48	75 - 500	✓	✓	✓	✓							
52	75 - 500	✓	✓	✓	✓							
57	75 - 500	✓	✓	✓	✓	✓						
60	75 - 500	✓	✓	✓	✓	✓	✓					
62	75 - 500	✓	✓	✓	✓	✓	✓	✓	✓			
67	75 - 500	✓	✓	✓	✓	✓	✓	✓	✓	✓		
73	75 - 500	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
78	75 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
84	75 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
91	75 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
97	75 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
103	75 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
105	75 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
109	75 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
115	75 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
123	75 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
125	75 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
130	50 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
134	50 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
139	50 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
142	50 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
143	50 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
151	50 - 150		✓	✓	✓	✓	✓	✓	✓	✓	✓	
155	50 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
161	50 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
167	50 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
176	50 - 600		✓	✓	✓	✓	✓	✓	✓	✓	✓	
177	50 - 500		✓	✓	✓	✓	✓	✓	✓	✓	✓	
180	50 - 150			✓	✓	✓	✓	✓	✓	✓	✓	

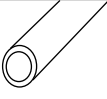
Key

✓ = Available as standard

For sizes or materials not listed
please contact us to discuss



TECAPEEKSM filled and unfilled (all sizes shown are mm)

Tube OD	Length	Approximate wall thickness										
		3.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	22.5	25.0	
192	50 - 150			✓	✓	✓	✓	✓				
199	50 - 130			✓	✓	✓	✓	✓	✓			
206	50 - 150			✓	✓	✓	✓	✓	✓			
215	50 - 150			✓	✓	✓	✓	✓	✓	✓		
223	50 - 150			✓	✓	✓	✓	✓	✓	✓		
225	50 - 150			✓	✓	✓	✓	✓	✓	✓		
233	50 - 150			✓	✓	✓	✓	✓	✓	✓		
235	50 - 150			✓	✓	✓	✓	✓	✓	✓		
242	50 - 125			✓	✓	✓	✓	✓	✓	✓		
247	50 - 150			✓	✓	✓	✓	✓	✓	✓	✓	
254	50 - 150			✓	✓	✓	✓	✓	✓	✓	✓	
262	50 - 130			✓	✓	✓	✓	✓	✓	✓	✓	
268	50 - 130			✓	✓	✓	✓	✓	✓	✓	✓	
279	50 - 135			✓	✓	✓	✓	✓	✓	✓	✓	
286	50 - 140			✓	✓	✓	✓	✓	✓	✓	✓	
293	50 - 130			✓	✓	✓	✓	✓	✓	✓	✓	
302	50 - 125			✓	✓	✓	✓	✓	✓	✓	✓	
311	50 - 125			✓	✓	✓	✓	✓	✓	✓	✓	
325	50 - 125			✓	✓	✓	✓	✓	✓	✓	✓	
335	50 - 125			✓	✓	✓	✓	✓	✓	✓	✓	
342	50 - 100			✓	✓	✓	✓	✓	✓	✓	✓	
348	50 - 125			✓	✓	✓	✓	✓	✓	✓	✓	
339	50 - 120			✓	✓	✓	✓	✓	✓	✓	✓	
360	50 - 100			✓	✓	✓	✓	✓	✓	✓	✓	
380	50 - 130			✓	✓	✓	✓	✓	✓	✓	✓	
400	50 - 110			✓	✓	✓	✓	✓	✓	✓	✓	
415	50 - 100			✓	✓	✓	✓	✓	✓	✓	✓	
425	50 - 100			✓	✓	✓	✓	✓	✓	✓	✓	
435	50 - 125			✓	✓	✓	✓	✓	✓	✓	✓	
465	50 - 100			✓	✓	✓	✓	✓	✓	✓	✓	
500	50 - 100			✓	✓	✓	✓	✓	✓	✓	✓	
515	50 - 100			✓	✓	✓	✓	✓	✓	✓	✓	
535	50 - 100			✓	✓	✓	✓	✓	✓	✓	✓	

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