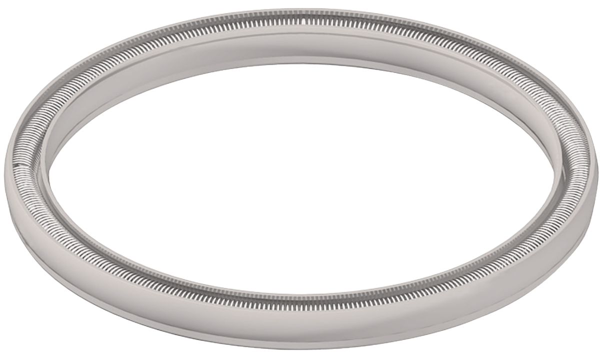
Engineered Thermoplastic Seals

Materials	Temp. Range		
PTFE	-268°C	to	232°C
Carbon/Graphite filled PTFE	-268°C	to	288°C
Glass/Moly filled PTFE	-268°C	to	288°C
Bronze filled PTFE	-268°C	to	288°C
Carbon filled PTFE	-268°C	to	288°C
PEEK	-70°C	to	260°C
Nylon	-30°C	to	93°C
UHMW-PE	-250°C	to	80°C



Product Description

Engineered thermoplastic seals (ETS) are a lip seal that incorporates a metal or composite spring into the seal design. The spring energizes the seal lip against the mating hardware, creating a seal capable of compensating for movement in a dynamic application. They are used in single acting dynamic applications and should be oriented with the spring towards the pressure side.

ETS are primarily used in extreme environments where a standard moulded elastomers or thermoplastics cannot meet the application requirements due to the material limitations. As ETS are designed to meet varying applications and high-performance requirements, Hi-Tech Seals mainly stocks custom design seals. For support designing an ETS to meet the needs of your applications, contact our engineering department.

Part Numbers:

SS ___ - ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

I.D. O.D. Height Material

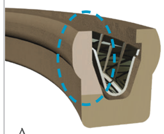
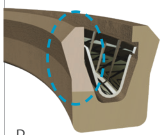
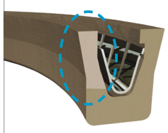
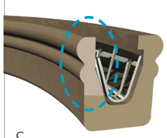
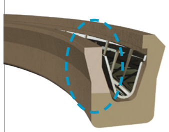
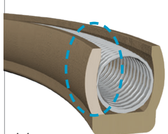
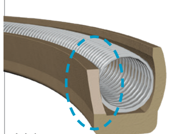
M - if Metric

Materials

Blank	Glass/Moly filled PTFE	TCF	Carbon Fiber filled PTFE
NYLON	Nylon	TCG	Carbon Graphite filled PTFE
UHMW	UHMW	TBF	Bronze filled PTFE
PEEK	PEEK		

Designing an Engineered Thermoplastic Seal

1. Select a dynamic lip configuration that suits application needs:

Seal Type	Advantages	Disadvantages
 A	• Low wear rate • Preferred design for oscillatory, slow rotary applications • Radius lip reduces probability of seal lip damage during installation	• Should not be used for dynamic sealing of abrasive media • May weep in high speed reciprocating applications due to seal lip hydroplaning
 B	• Improved sealability • Prefered design for dynamic sealing of gas and vapor • Beveled lip reduces probability of seal lip damage during installation	• Should not be used for dynamic sealing of abrasive media • May weep in high speed reciprocating applications due to seal lip hydroplaning
 D	• Locks seal into reduced glands • Reduced probability of seal lip hydroplaning • Low wear rate • Good excluder for debris and contaminants	• Requires good lead-in chamfer if hardware is installed lip first • Possible weepage of light fluids or gases
 S	• Low wear rate • Redundant seal lip design • Trapped fluid between contact points provides added lubrication to seal	• Should not be used for dynamic sealing of abrasive media • May weep in high speed reciprocating applications due to seal lip hydroplaning
 X	• Improved sealability over D style lip • Preferred lip design for dynamic sealing of abrasive media • Reduced probability of seal lip hydroplaning	• Requires good lead-in chamfer if hardware is installed lip first • Lip design must be used in combination with other lip style
 H	• High load of helical wound spring improves sealability • Suitable for sealing cryogenic gases and fluids • Radius lip reduces probability of seal lip damage during installation	• Should not be used for dynamic sealing of abrasive media • May weep in high speed reciprocating applications due to seal lip hydroplaning
 W	• High load of helical wound spring improves sealability • Preferred lip design for dynamic sealing of abrasive media • Reduced probability of seal lip hydroplaning	• Requires good lead-in chamfer if hardware is installed lip first • Lip design must be used in combination with radius lip style

Images are depicted with a bronze filled PTFE material.

2. Determine if the same sealing lip is appropriate for the static lip. Engineered Thermoplastic Seals do not have to be symmetrical.

Engineered Thermoplastic Seal

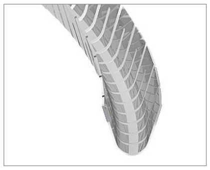
Jacket Materials	Temp. Range		
Virgin PTFE	-268°C	to	232°C
Carbon/Graphite filled PTFE	-268°C	to	288°C
Glass,/Moly filled PTFE	-268°C	to	288°C
Bronze filled PTFE	-268°C	to	288°C
PEEK	-70 °C	to	260°C
Nylon	-30°C	to	93°C
UHMWPE	-250°C	to	80°C

3. When determining which jacket material is required for your application, variables to consider include:

Variables to consider include:

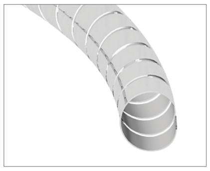
- Temperature
- Chemical
- Pressure
- Velocity
- Cost

4. When manufacturing ETS we typically use cantilever springs, though helical and slanted coil springs are available upon request.



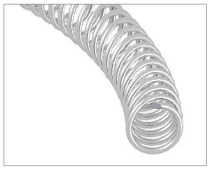
Cantilever Spring (V-Spring)

A cantilever spring is recommended for dynamic, medium load applications where low friction is desired. The V-shape spring provides constant compression load and is further energized by system pressure.



Helical Wound Spring

A helical wound spring is made from a metal ribbon, which is coiled into a helix. The spring compresses radially producing a very high load versus deflection. The helical wound spring is preferred for static applications or in applications where sealability is of a higher concern than friction.



Slanted Coil Spring

A slanted coil spring, also known as a canted coil spring, is manufactured from a round wire that is coiled and angled. The process creates a compression force in the radial direction. The canted coil design is suited for dynamic applications where low friction is critical.

5. The most common spring materials is stainless steel; however, Hastelloy®, Inconel, and Elgilogy are available for applications that require additional corrosion resistance.