

TEFLON® ROTARY SEALS

PERFORMANCE MADE AFFORDABLE

We achieve state-of-the-art manufacturing techniques that allow us to produce the highest quality TFE lip seal available today, with cost efficiency. Our in-process controls and final inspection procedures allow us to meet your specifications and requirements on every custom designed seal, whether your needs are for 1 piece or 100,000 pieces.

1. Design versatility to meet your functional requirements.
2. Broad range of high-performance plastic and elastomeric element materials, and metal case materials.
3. Technical support, both "in-plant" and "in-the-field."
4. Immediate sales response to all inquiries.
5. Cost-effective manufacturing and ON-TIME delivery!
6. Quality control to meet your requirements.
7. Creative stocking and blanket order programs.
8. Equal consideration given to all OEM, Service/Maintenance, and Distributor Accounts.

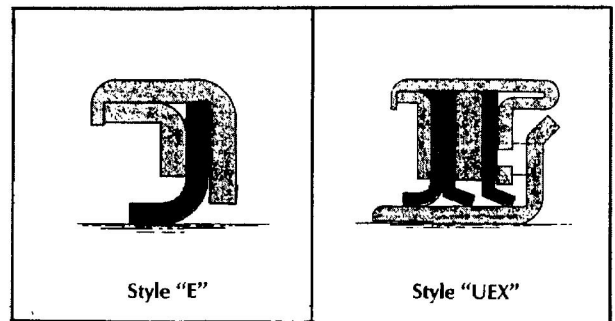


FIG. 1

PTFE LIP SEALS range from the conventional Style "E" to the special custom designed style "UEX."

The conventional seal styles offer high performance at competitive pricing, while our custom designs justify higher costs with extended warranty and reduced equipment "down-time."

Many multi-element seal types are available and can incorporate a variety of element designs. The multi-element seal is intended for usage in severe application areas, and/or where a single element seal might be marginal for zero leakage requirements.

Shown in Fig. 2 is Style "EP2." Ideally suited for hydraulic pumps, compressors, gearbox and applications where fluid pressure, or high-fluid turbulence is evident in the immediate seal area.

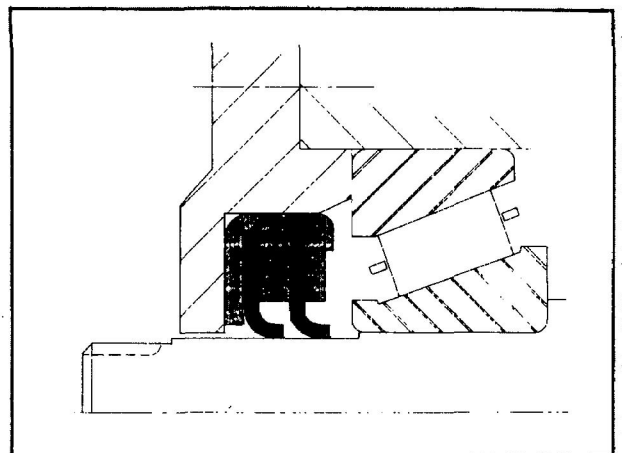


FIG. 2

ADVANTAGES AND CAPABILITIES OF TEFLON ROTARY LIPSEALS

With the availability of high performance thermoplastics, and ability to blend special filler combinations with PTFE resins, we can extend the application areas for rotary shaft lip-type seals.

Today you can consider using a PTFE rotary lip seal in areas where mechanical face seals were the only choice.

The following functional data is intended for reference only. Operational limits for a given seal type are controlled by a number of conditions. Usually, a significant increase in one factor will require a reduction in another factor.

TEMPERATURE: (-200°F to +575°F)

PTFE does not melt (gases off) and is processed at sintering temperatures of approximately 730°F; however, the material experiences a significant reduction in tensile strength and flexural modulus as temperature increases.

SURFACE SPEED: (12,000 fpm)

Limits on shaft speed are determined by the type and amount of media present in seal area, temperature, and hardware design. 12,000 fpm is attainable provided lubricating media is present and shaft hardness and dynamic runout are controlled.

COMPATIBILITY: (Excellent)

Due to the unique chain-bonding of PTFE, the resin has excellent resistance to the majority of chemicals and fluids. At elevated temperatures, PTFE's resistance to alkali metals, fluorine and fluorinating agents is limited.

When PTFE seals are required to seal non-lubricating medias, special consideration to materials and design are required.

TORQUE:

Extremely low torque requirements can be satisfied with PTFE seal designs. Special considerations must be given to element design as applied to application conditions.

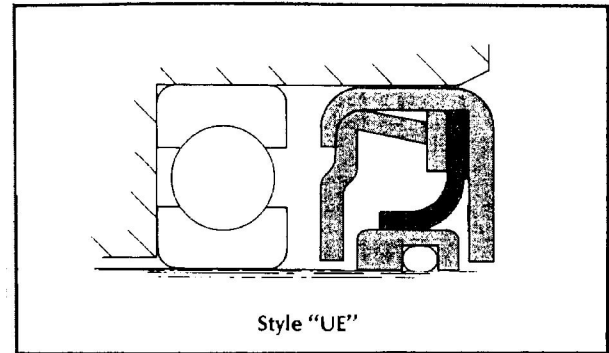


FIG. 3

Unitized Teflon seal and wear sleeve places responsibility for sealing surface on the seal supplier. Design also provides protection to element, and reduces customer heat treating and grinding costs.

PRESSURE: (250,000 PV)

Pressure rating of a given seal design can be governed by so many variables that determining a maximum rating is difficult. If lubricating oil is present, a PV* factor of 250,000 can be used as a general guide.

**PV factor = shaft speed in SFM x pressure in PSI.*

DYNAMIC SHAFT RUNOUT: (*)

Dependent on shaft diameter and rpm. Seals will tolerate greater runout on larger shafts and/or lower rpm.

**Special designs can function with .150" TIR, with lower shaft speeds.*

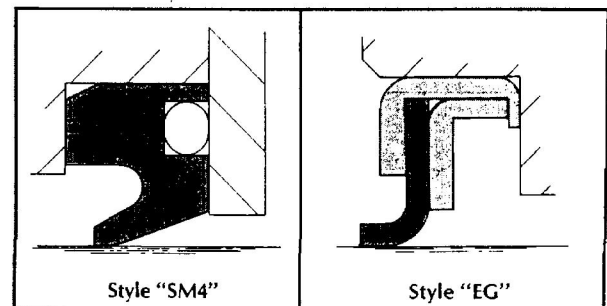


FIG. 4

Fig. 4 illustrates typical seals used in Food Process Equipment. Designs minimize media entrapment and allow for effective cleaning cycles.

HARDWARE RECOMMENDATIONS

Proper hardware control is as important as seal selection. Standard bore and shaft chamfers of 30° x .12" are adequate. The critical item is the shaft, and its surface area where the sealing element will make contact.

SHAFT MATERIAL

The type of material is normally predetermined by the equipment manufacturer. Heat treatable steels and cast iron are preferred.

In corrosive applications, stainless steel or hard nickel/chrome plating are recommended. When plating is required to increase surface hardness, and/or chemical resistance, it is important that quality of plating be controlled and plating thickness of .003" minimum after grind be maintained.

SHAFT HARDNESS

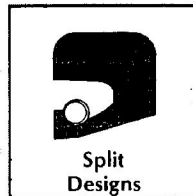
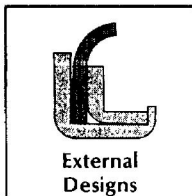
Dependent on media being sealed and/or amount of pressure that seal is exposed to.

0-25 psi	lubricated	28-32 RC
50-150 psi	lubricated	45-52 RC
200-500 psi	lubricated	55-65 RC
Abrasive/Corrosive media		55-65 RC

SHAFT FINISH

It is recommended that the shaft be plunge ground to eliminate any possible lead.

Lubricated	12-20 RMS
Vacuum Applications	6-10 RMS
Abrasive/Corrosive media	(Contact TRI-TEC)



MATERIALS

CASE AND SLEEVE MATERIAL

Due to the ability to spin form common as well as exotic metals efficiently, you are not limited by bore, shaft or media compability. Some typical case materials are:

Cold Rolled Steel	Aluminum	Titanium
Stainless Steel	Hastelloy	Inconels

ELEMENT MATERIAL

A wide range of PTFE blends, elastomers and synthetics are available to match your application requirements.

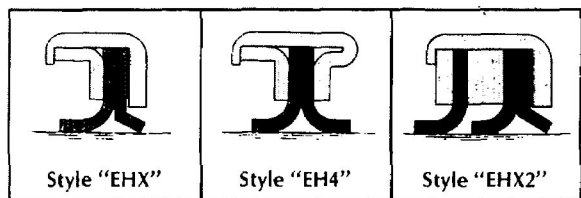
Fillers — Glass	Carbon	Graphite	Moly	Ekonol
Others — Silicone	Viton	UHMWPE	Nitrile	

First generation virgin PTFE is also used, typically in FDA applications.

GASKET MATERIAL

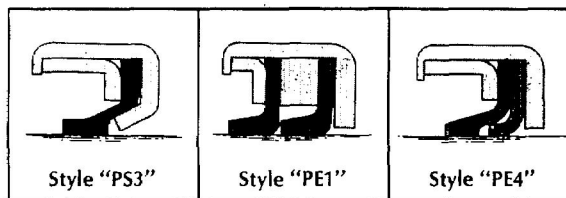
Armstrong high temperature compounds and all elastomer/fluoroelastomer materials.

DESIGNED AND DEVELOPED TO MEET YOUR APPLICATION REQUIREMENTS



HYDRODYNAMIC SEALS

Unidirectional shaft rotation.
High sealing efficiency.
High shaft speed and temperatures.
Offsets effects from damaged shaft or element.



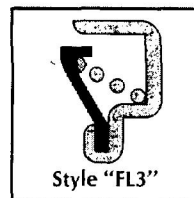
PRESSURE SEALS

Vacuum thru 750 psi.
250,000 PV in lubricants.
Lower cost, compared to Mechanical Face Type Seals.
Requires shaft hardness of 60 RC at higher pressure range.



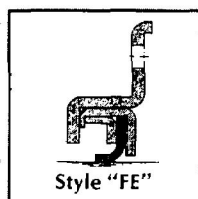
HIGH RUNOUT SEALS

Misalignment and/or shaft runout to .150" TIR.
For low to moderate rpm.
Unitized designs available.



FACE SEALS

Seals axially against the mating hardware.
Used where high rpm and runout are both present.
Effective excluder seal.



FLANGE RETAINER SEALS

Direct replacement for other Flange Type Seals.
To be considered when pressing seal into bore is not possible.



MULTI-ELEMENT SEALS

Severe sealing requirements.
Labyrinth designs available.
Design versatility.



RUBBER O.D. SEALS

Positive static seal for rough or damaged bores.
Accommodates greater variations in bore size.



SPRING-LOADED SEALS

Low temperature applications.
Applications where high element wear is expected.
High rpm and shaft runout are present.

The designs shown within this catalog illustrate several of the design variations available

Features such as Hydrodynamic Elements, Rubber O.D., Retention Flanges and Wear Sleeves are available on most seal types.

Many seal types are available in a wide variety of metal case materials, and size range up to 72" diameter.

Because PTFE materials have unique characteristics, and the design parameters are so variable, TRI-TEC engineering should determine proper seal design for a given application.

Customers are requested to provide details of operation conditions, and if possible, a print of seal hardware area. This will enable engineering to determine the best seal design with respect to function and installation.

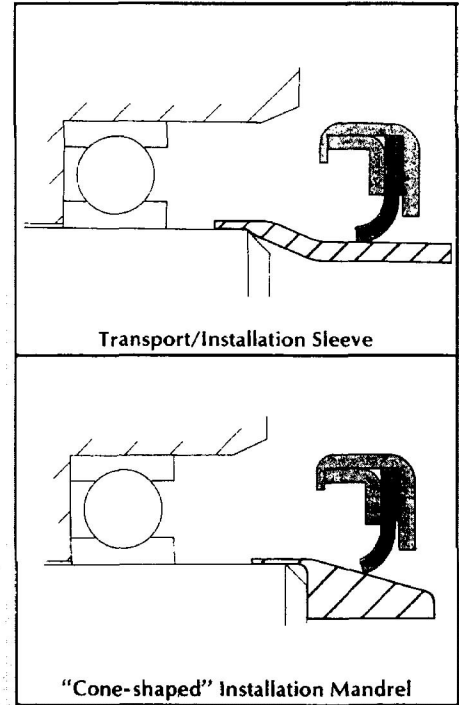
HANDLING AND INSTALLATION

SHAFT INSTALLATION

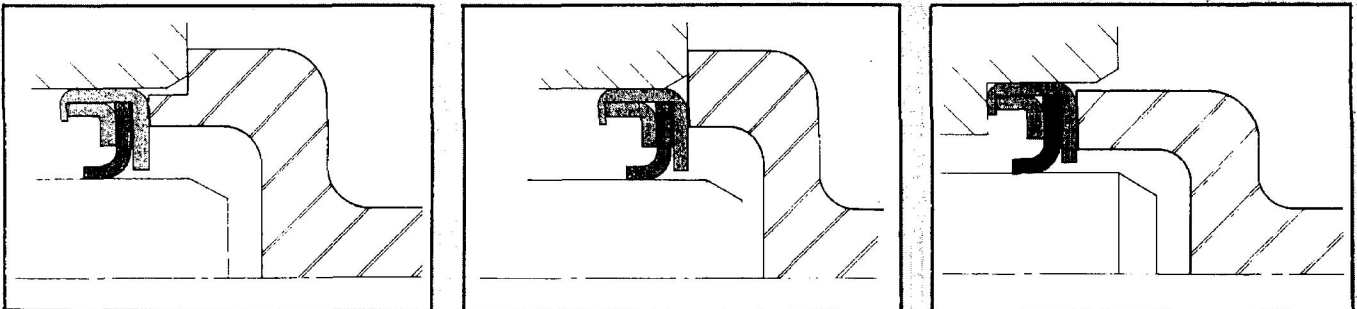
Since PTFE Lip Seals have a higher degree of shaft interference than elastomer seals, special care should be taken for installation.

Typically when shipped, PTFE Lip Seals are stacked on mandrels for ease of handling and storage. The mandrel also provides the sealing element with a "set" to aid in installation. However, when installing against the lip and/or where adequate lead-in chamfer is not available, a special installation tool is usually needed. Shown to the right are two installation methods which is recommended.

The "cone-shaped" installation mandrel is ideal for in-house OEM installations, where one mandrel can be used to install the seals. Whereas, the "transport/installation" sleeve is typically used for in-the-field or aftermarket applications where each individual seal is shipped on a protective applicator sleeve. Either of these tools can be supplied if needed.



BORE INSTALLATION



The above layouts illustrate typical fixtures used for press fitting seals into housing bore.