



## INSTALLATION GUIDE

# Turcon® Variseal®

### Introduction

The Turcon® Variseal® is constructed much differently than O-Ring energized piston or rod seals. Therefore, the Variseal product line has a different set of requirements for installation.

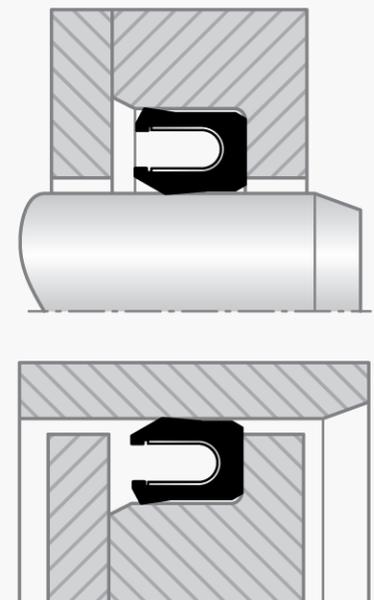
There are three basic gland styles to be considered: split, stepped, and solid glands. The gland required for a radial Variseal® is similar to an O-Ring gland with one major difference- an O-Ring gland has a typically solid (one piece) construction with a full gland wall on each side. Since the Variseal® is made from polymers, which do not stretch like elastomers, installation in such glands can be difficult or in many cases impossible. To install the Variseal® easily requires either the split gland or the stepped gland. The solid groove is sometimes used, but only when no other option exists and then only with certain diameter restrictions described later in the Groove Design section.

### Split Gland

The best way to obtain optimum Variseal® performance is to use a split gland. A split gland designates hardware that is separated or “split” into two pieces to allow assembly without deforming the seal. The split gland minimizes potential damage to the seal. Its advantages include:

- No stretching of the seal
- Repeated installation without damage
- No special installation tools

The disadvantage is that a second piece such as an end plate is required to retain the seal. This might also involve a third piece such as a bolt to secure the end plate.



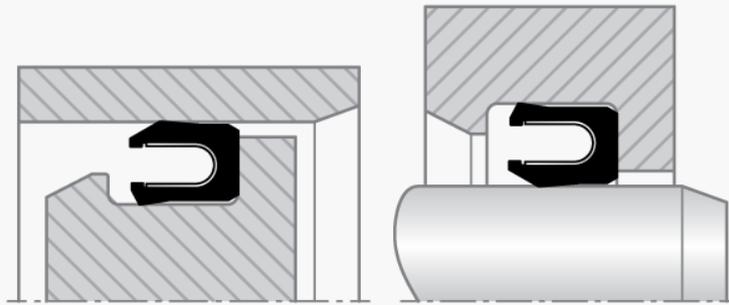


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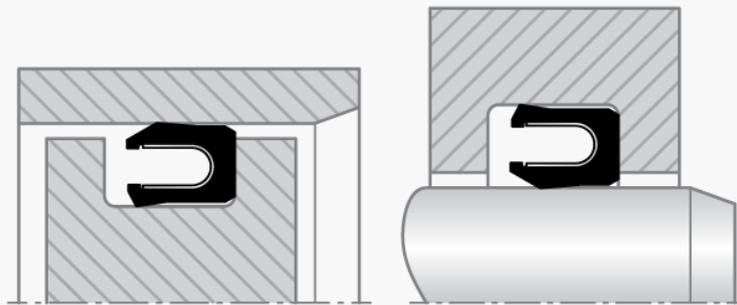
#### Stepped Glands

A stepped gland has a small “step” or ledge, which retains the seal. The step height is small, so that the seal can be pushed past it easily. See the Groove Design section for recommended step heights. In most cases, no special tooling or installation procedures are required. The stepped gland has the advantage of being a simpler configuration (with fewer pieces than the split gland) while maintaining relative ease of assembly. The stepped gland is an excellent configuration for piston seal applications.



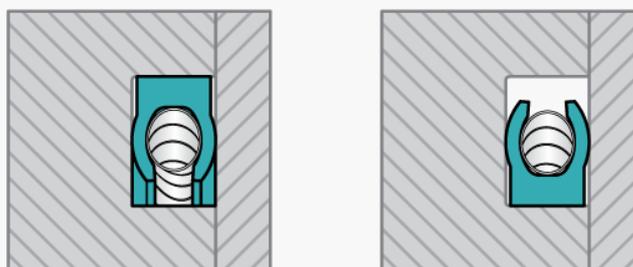
#### Solid Glands

Because the Variseal® does not stretch like an elastomeric O-ring, it is difficult to install in a solid radial groove. This gland is not recommended for new designs, but is often encountered when retrofitting existing glands. It can be used in those cases where the ratio of seal diameter to seal cross-section is large enough.



#### Face Seal Glands

Face seal glands for the Variseal® are typically the same as O-ring glands, with no problems installing the seal. One advantage of the Variseal® in face seal applications is that it does not require a full gland wall on the pressure side of the seal.





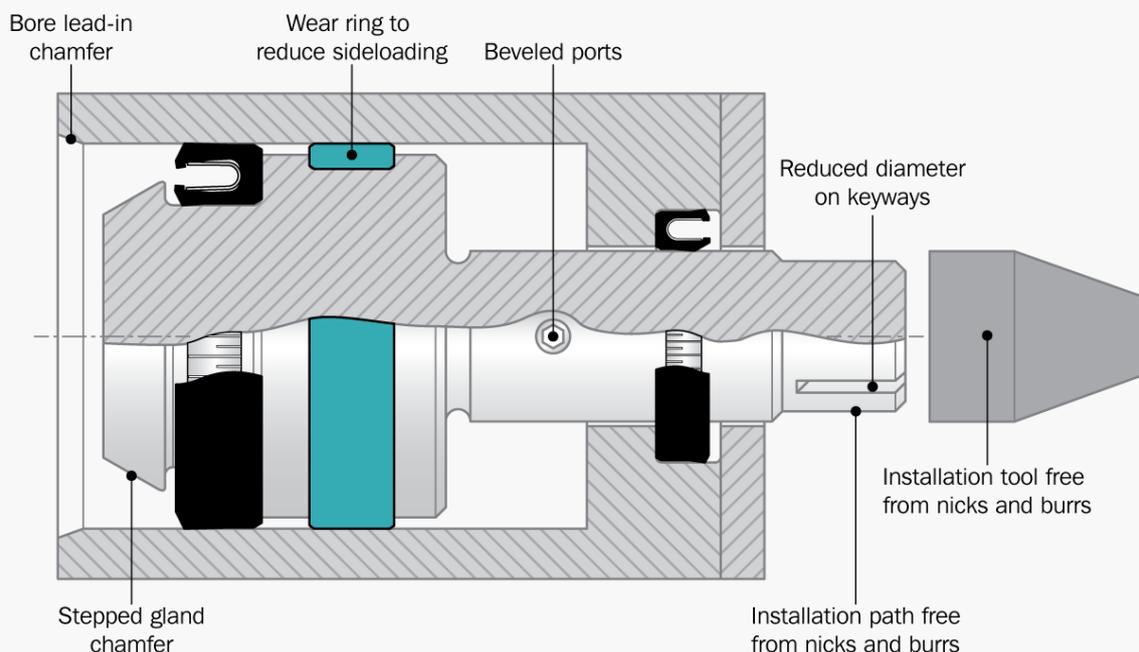
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#### Groove Design

Some basic tips for installation should be observed:

- The installation path should be kept free of nicks, burrs, scratches, or any sharp edge that could damage the seal.
- Any tool used to install seals should be free of sharp edges. Screw drivers are especially notorious for damaging seals and should not be used to handle the Variseal®.
- A lead-in chamfer on the end of the rod or bore helps during installation. The proper chamfer dimensions are given in the Groove design pages found later in this section. This is especially important where seals are to be installed face first (spring cavity side first) into the gland.
- When seals must be installed across ports, bevel and smooth the edges of the ports.
- Designate splines or keyways to fall on a smaller diameter than the sealing surface or use a protective sleeve to cover them during installation as illustrated in the figure below.
- The Variseal® is typically installed without the aid of heat or lubrication. In situations where heat is required to soften and expand the seal, submerge them for a few minutes in very hot oil or water.
- Application of a lubricant to surfaces of the seal and hardware reduces the force required to push the seal into a difficult gland such as a solid O-Ring groove.
- During handling, place the seals where they will not be crushed by tools or other items. It is advisable to leave the seals in their shipping containers until just before installation.
- Avoid glands which require bending the seals during installation. When seals must be stretched or compressed into a difficult gland, be sure to use the recommended tooling to resize the seals.
- Do not sideload the seals any more than is necessary. Avoid gland situations where a heavy rod or piston rests against one side of the seal.

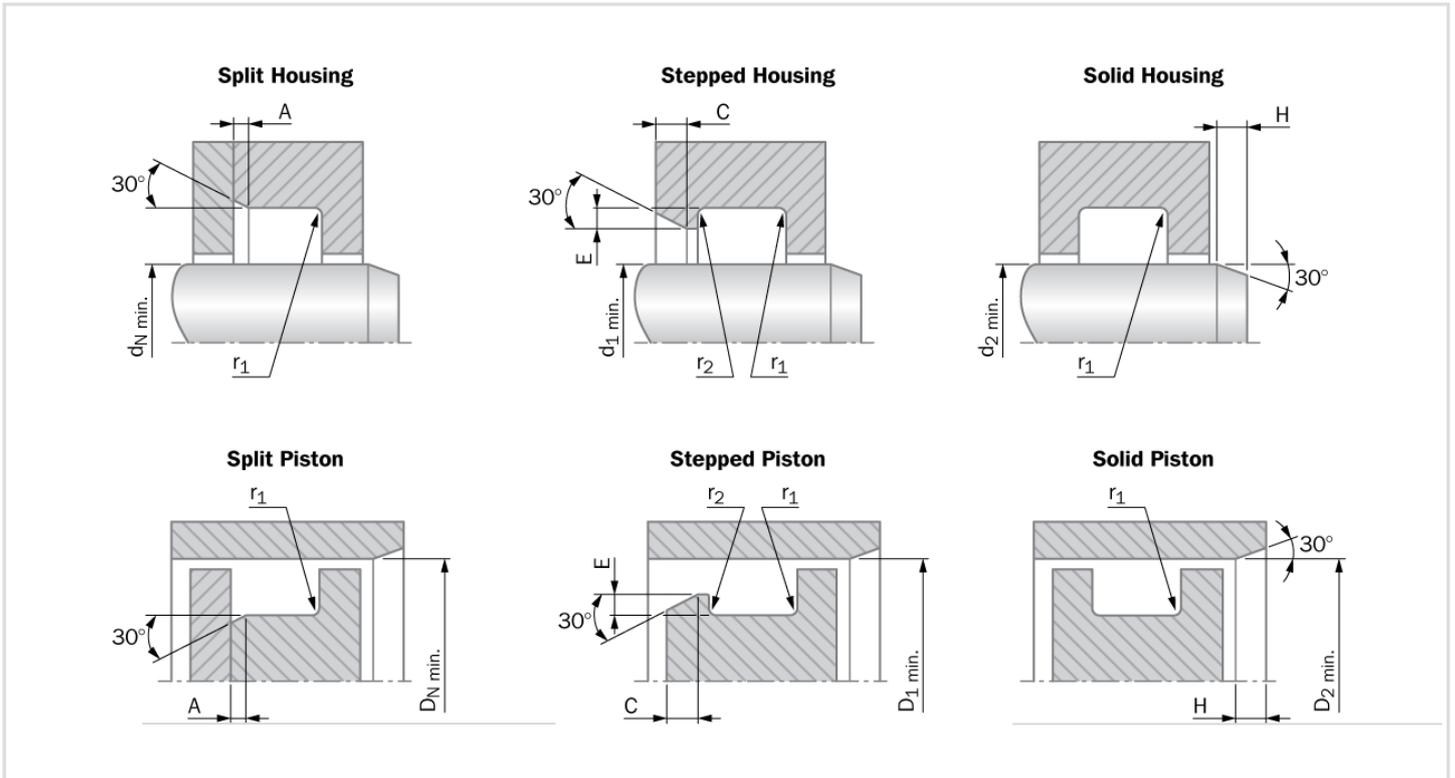




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### Variseal Groove Configurations



Installation lead-in chamfers and steps to include blend radii and are to be polished.

### Dimensions for Groove Designs - Metric

Series	Rod / Piston Groove Dimensions					
	A Chamfer	r <sub>1</sub> Maximum Radius	C Minimum Chamfer	r <sub>2</sub> Maximum Radius	E Minimum Step Height	H Minimum Chamfer
000	0.25 / 0.38	0.25	0.70	0.13	0.40	1.20
100	0.38 / 0.51	0.38	1.10	0.13	0.60	1.50
200	0.38 / 0.51	0.38	1.25	0.18	0.70	2.50
300	0.51 / 0.69	0.38	1.40	0.25	0.80	4.50
400	0.51 / 0.69	0.51	1.60	0.25	0.90	6.00
500	0.76 / 1.02	0.51	2.60	0.38	1.50	11.00



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### Groove Design for Rod - Metric

Series	Rod Diameter Recommendations				
	Split Groove	Stepped Groove	Solid Groove		
	Ø d <sub>N</sub> Minimum	Ø d <sub>1</sub> Minimum	Ø d <sub>2</sub> Minimum		
	Type M2S, W2, H	Type M2S, W2, H	Type M2S	Type W2	Type H
000	3.00	20.00	31.75	25.40	25.40
100	6.00	30.00	69.85	63.50	63.50
200	10.00	35.00	111.13	107.95	107.95
300	20.00	40.00	298.45	228.60	228.60
400	35.00	45.00	495.30	400.05	400.05
500	80.00	80.00	762.00	635.00	635.00

### Groove Design for Piston - Metric

Series	Piston Diameter Recommendations				
	Split Groove	Stepped Groove	Solid Groove		
	Ø D <sub>N</sub> Minimum	Ø D <sub>1</sub> Minimum	Ø D <sub>2</sub> Minimum		
	Type M2S, W2, H	Type M2S, W2, H	Type M2S	Type W2	Type H
000	6.00	11.50	34.93	19.05	19.05
100	10.00	17.50	50.80	28.58	28.58
200	16.00	20.00	69.85	44.45	44.45
300	28.00	28.00	104.78	60.33	60.33
400	45.00	45.00	139.70	95.25	95.25
500	100.00	100.00	254.00	203.20	203.20

### Important Note

Installation suggestions, material recommendations, parameters and further data provided are always subject to the particular field of use and the application in which the seal is intended to be used, in particular the interaction of the seal with other components of the application. Therefore they neither constitute an agreement on the legal and factual nature nor a guarantee of quality. Technical changes and errors remain reserved.