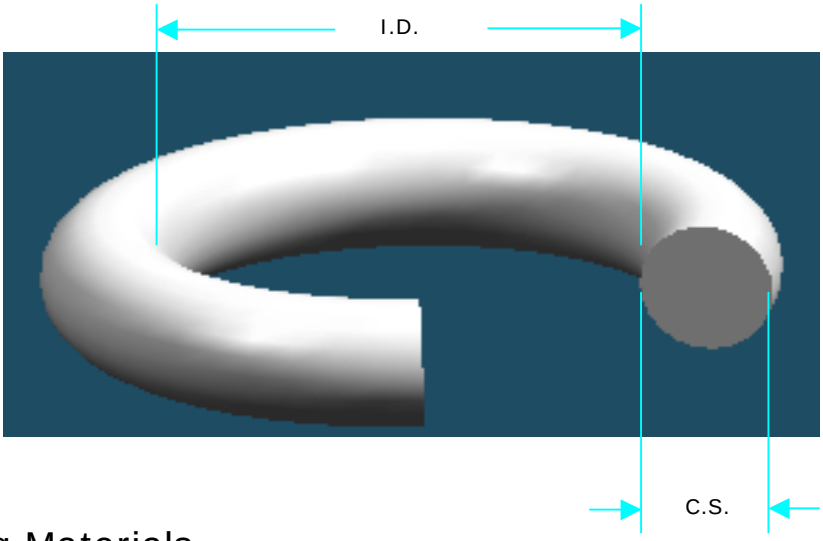
What is an O-Ring?

An o-ring has two characteristics, geometry (shape) and material. These two characteristics will dictate how an o-ring will perform in a given application.

The geometry of the o-ring is defined by two primary dimensions, the inner diameter (I.D.) and the cross section diameter (C.S.). The outer diameter (O.D.) is defined by the I.D. and C.S. dimensions.



O-Ring Materials

Elastomers are commonly used for o-ring materials. Elastomer materials are used due to their resiliency (memory to return to their original shape). Other materials may also be used to form and o-ring seal (PTFE, Nylon etc…). A key characteristic for elastomers is material hardness. Elastomer hardness is typically measured in Shore A points. The harder the material, the higher the Shore A reading will be.

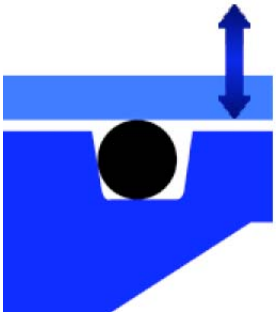
Common elastomers used for o-rings:

ASTM Designation	Elastomer	Common Trade Names	Low Temp	High Temp
NBR	Nitrile (Buna-N)	PARACRIL®, CHEMIGUM®	-40°F (-40°C)	248°F (120°C)
EPDM	Ethylene-Propylene Diene	VISTALON®, NORDEL®	-67°F (-55°C)	302ºF (150ºC)
VMQ	Silicone	SILASTIC®, SILPLUS®	-67°F (-55°C)	450°F (232°C)
FKM	Fluoroelastomer	VITON®, FLUOREL®	-13°F (-25°C)	392°F (200°C)

* Other elastomers are available as well - Please contact Anderson Seal for more information

Please reference the Elastomer Compatibility Guide for more information.

How Does and O-Ring Function?



An o-ring seal has two components:

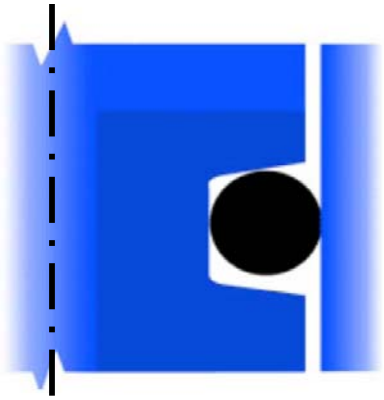
- The o-ring
- The o-ring gland (mating components)

The compression of the o-ring in the o-ring gland and the retention of the o-ring in the o-ring gland provide the sealing function.

Types of O-Ring Seal Applications

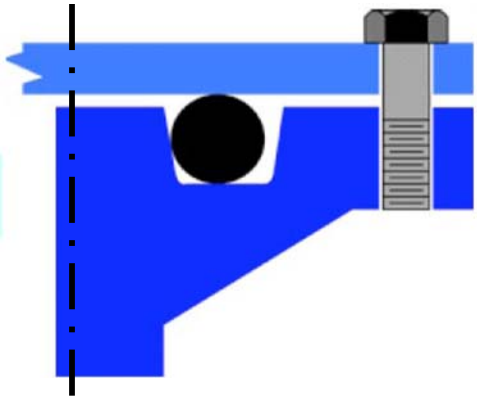
There are two main types of o-ring seal applications:

- Radial Seal
- Face Seal



Radial Seal

The radial seal o-ring seals mainly on the radial portion on the o-ring C.S.



Face Seal

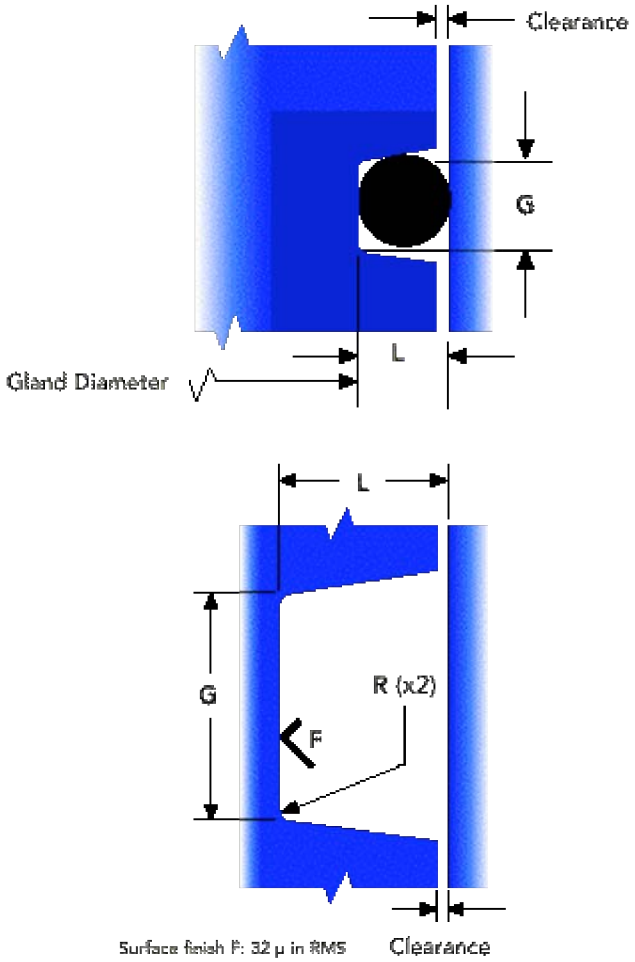
The face seal o-ring seals mainly on the axial portion on the o-ring C.S.

In addition there are triangular seals, dovetail seals and other special application arrangements.

O-Ring Gland Design

This o-ring gland design guide is applicable for static sealing applications with sealing pressures of 1,500 psi or less. For dynamic applications or applications above 1,500 psi, please contact Anderson Seal for assistance.

The purpose of the o-ring gland is to retain the o-ring in the proper sealing position, not allowing extrusion of the o-ring from the gland.



O-Ring Stretch
The gland diameter should provide for no greater than 5% stretch (based on **nominal** O-ring ID).

$$(ID_{Gland} - ID_{o\text{-}ring}) / ID_{o\text{-}ring} \times 100\% = \%\ Stretch$$

O-Ring Compression
The gland assembled depth (L) should provide between 10% and 30% o-ring compression.

$$(CS_{o\text{-}ring} - L) / CS_{o\text{-}ring} \times 100\% = \%\ Compression$$

O-Ring Gland Fill
The percentage of the gland that is filled by the o-ring should be between 65% and 85% and never exceed 90%

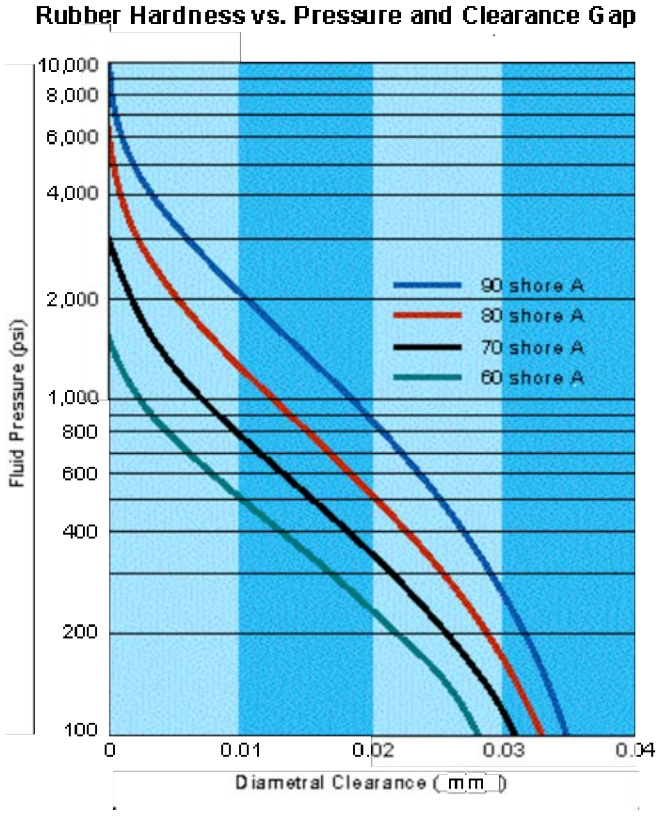
$$Cross\ Section\ Area_{o\text{-}ring} / Cross\ Section\ Area_{Gland} \times 100\% = \%\ Gland\ Fill$$

=

$$(((CS_{o\text{-}ring}/2)^2 \times m) / (G \times L)) \times 100\% = \%\ Gland\ Fill$$

Clearance

Clearance in the gland should be controlled to prevent o-ring extrusion. The chart below shows recommended clearance gap for a given application pressure and material hardness (Shore A Durometer)



Reference the Anderson Seal O-Ring design guide sheets for assistance with your o-ring application.