

Application Success Stories

Application:

Rectangular flange

Problem:

Customer was attempting to use a standard 2-041 O-ring in a rectangular racetrack groove. Due to installation difficulties, they were experiencing manufacturing delays and high reject rates due to pinched O-rings.

Parker Solution:

In reviewing the O-ring groove, Parker's Applications Engineers noticed the corner radii in the groove were only 5.20 mm, below Parker's recommended low limit of three times the cross-sectional thickness, and well below the ideal design of six times the cross-section.

In addition, Parker recommended using a small amount of O-Lube in the bottom of the groove to hold the seal in place during installation.

Outcome:

By increasing the corner radius and using a small amount of O-Lube, the customer was able to eliminate assembly delays and seal installation damage without paying for custom seal tooling.

Three years of production with the new flange design have resulted in no significant installation problems.

A Closer Look: Racetrack Grooves

In the real world, standard round O-ring face seal grooves aren't always feasible. When a rectangular or oval "racetrack groove" is mandated by physical space limitations, there are two options for obtaining a reliable seal design.

One solution is use a custom-designed engineered seal from Parker's Engineered Seals Division that fits the groove perfectly. Further upgrading to a Press-in-Place seal that retains itself in the groove provides an additional benefit. These options are generally used for high volume applications.

When a custom seal is not practical, the next best option is to use a standard round O-ring in a racetrack groove. This design method can achieve an acceptable service life if certain Rules of Thumb are followed.

To minimize installation difficulties arising from stretch or OD compression of the seal, the centerline perimeter of the groove should match the centerline circumference of the O-ring (π times the sum of the inside diameter and the cross-section.)

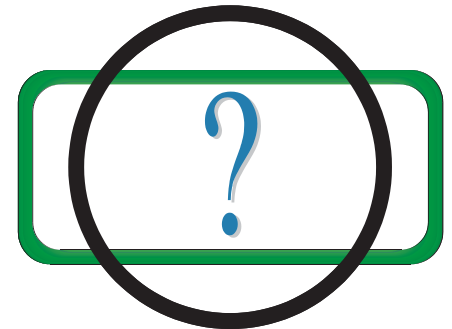
To minimize bending stress at the corners, the inside edge of the O-ring groove should have a radius equal to six times the cross-section of the O-ring. This can be reduced to three times the cross-section of the O-ring if space is at a premium. However, this additional bending stress can expose the O-ring to more rapid degradation in aggressive media and result in reduced service life.

For more information on gland designs or any of Parker's 200+ rubber compounds, contact an Applications Engineer.

Copyright © 2003, Parker Hannifin Corporation, Cleveland, OH. All Rights Reserved.

Parker Hannifin Corp. • O-Ring Division • 2360 Palumbo Drive • Lexington, KY 40509

Phone: (859) 269-2351 • Fax: (859) 335-5128 • www.parkerorings.com



In a racetrack groove, be sure the centerline circumference of the O-ring matches the centerline perimeter of the groove.