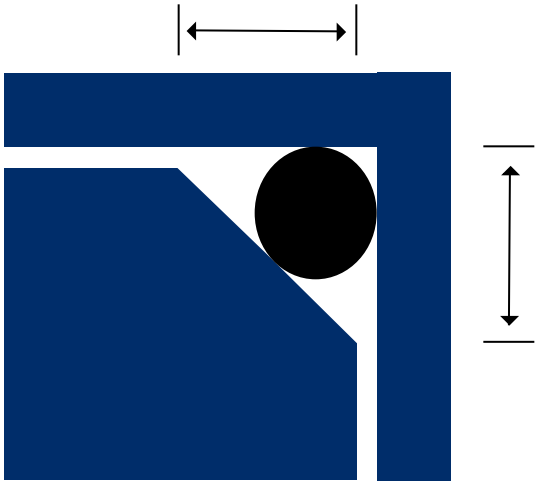
ORD Problem Solved!



- Machining is easily achieved by using a 45° chamfer tool and sinking the tool to the specified "L" value for your cross-section.
- For further information, see page 4-21 in the Parker O-Ring Handbook (ORD 5700).
- These design recommendations are based on using a 45° chamfer angle. All other angles are custom and require application testing/verification.

Success Story

Application:
Tube heat exchanger

Problem:
The customer was designing a heat exchanger that utilized a bundle of more than 100 thin-wall tubes inside a hollow shell. A heated process fluid was to be pumped through the tubes, where it was cooled by water flowing around the outside of the tubes. At each end of the bundle, the OD of each tube had to be sealed to the endplate of the shell to prevent loss of cooling water. Because of thermal expansion, welding each tube was not possible, nor was a male groove design due to the thin tube walls. The customer had tried traditional female O-ring grooves, but installation was troublesome.

Parker Solution:
Parker recommended crush seal O-ring grooves for the endplates. Countersunk holes were machined into the endplate to provide the triangular groove for each O-ring. The tubes and O-rings were then loosely installed and a second flat plate was bolted to the endplate to compress the O-rings into their grooves.

Outcome:
The customer reduced their machining time by more than 75% and was able to assemble all 200+ joints with no pinched O-rings and no leaks.

Crush Seal Gland Designs

O-rings are asked to perform in an unbelievably wide range of applications. For this reason, it is not always possible to fit a traditional rectangular O-ring groove into existing space limitations. In some cases, an O-ring may even be asked to seal two leak paths between mating parts. For these applications, a triangular-shaped O-ring groove may be the solution to the customer's design dilemma. Commonly called a "crush seal" design, triangular groove designs have established a proven track record of success in numerous industries.

Traditionally, an effective seal is created when a rubber seal element is pressed tightly between two mating components. In a triangular groove, the O-ring is pressed equally against three mating surfaces. This is the most reliable method of sealing a bidirectional leak path.

These glands are designed using a 45° chamfer with the short "legs" of the groove being equal to 1.321 times the cross-section of the O-ring. This provides for acceptable gland fill and generates sufficient contact pressure to make an air-tight seal. O-rings removed from these glands must be replaced if the gland is disassembled. The O-ring is under considerable stress in these applications and almost always takes a severe enough compression set to require replacement. These designs have also been used as an easier-to-maufacture alternative to traditional static female O-ring glands.

For more information on this or any of Parker's O-Ring Division compounds, contact Parker's Applications Engineers.