Metallic O-Rings

DMR™ Metallic O-Rings are designed to prevent leakage of gases or liquids under adverse sealing conditions. These static, metal-to-metal seals can withstand pressures from high vacuum to 100,000 psi (6,804 atm). They can endure continuous temperatures from -425°F to 1,800°F (-269°C to 982°C), or intermittent temperatures up to 3,000°F (1,650°C). They resist radiation, chlorides, corrosives, and other hostile environments. They will not deteriorate with age, either in use or in storage.

Design, Materials, Coatings, and Sizes

DMR™ Metallic O-Rings, designated MOR, are made of metal tubing (or solid rod) which is formed into circular or other shapes and the two ends welded together. The O-Ring metal is stainless steel or other alloys. The O-Ring can be electroplated with silver, copper, indium, nickel, gold, lead or other metals, or it can be coated with Teflon. The flow of the finish material improves the sealing, especially under high pressure and/or vacuum. Since tensile strength and resilience of the seal are determined in part by metal temper, DMR™ components offers a choice of heat treating to material specification or tempering to customer specifications.

Application Characteristics

The typical application places a Metallic O-Ring in axial compression between parallel faces, which are square to the fluid passage or vessel axis. The seal is usually located in an open or closed groove in one face. It can also be located in a retainer, which eliminates the need for machining a groove.

Upon compression to a predetermined fixed height, the seal tubing buckles slightly, resulting in two contact areas on the seal face and maximum contact stress between the seal and the mating faces. When the flange faces are closed, the O-Ring is under compression and tends to spring back against the flanges, thus exerting a positive sealing force. If the O-Ring is the self-energized type, the pressure of the gas or liquid on the vented side energizes the seal and further increases the sealing force by pushing the seal against the flange face.
Types of Metallic O-rings

Plain
(Not Self-Energized or Pressure Filled)
Made of metal tubing (or solid rod) in most metals. This type is the most economical O-Ring. It is designed for low to moderate pressure and vacuum conditions.

Self-Energized
The inner periphery of the O-Ring is vented by small holes or a slot. The pressure inside the ring becomes the same as the system. Increasing the internal pressure increases sealing effectiveness.

Pressure-Filled
Pressure-filled O-Rings are designed for a temperature range of 800° F to 2,000° F (425° C to 1093° C). They cannot tolerate pressures as high as the self-energized type. The ring is filled with an inert gas at about 600 psi (41 atm). At elevated temperatures, gas pressure increases, offsetting loss of strength in tubing and increasing sealing stress.