Probably the most common cause of O-ring failure is compression set. An effective O-ring seal requires a continuous “seal line” between the sealed surfaces. The establishment of this “seal line” is a function of gland design and seal cross section which determines the correct amount of squeeze (compression) on the O-ring to maintain seal integrity without excessive deformation of the seal element.

**Factors contributing to compression set failure of an O-ring seal:**
1. Selection of material with inherently poor compression set properties.
2. Improper gland design.
3. Excessive temperature developed causing the O-ring to harden and lose its elastic properties. (High temperatures may be caused by system fluids, external environmental factors, or frictional heat build-up.)
4. Volume swell of the O-ring due to system fluid.
5. Excessive squeeze due to over tightening of adjustable glands.
6. Incomplete curing (vulcanization) of material during production.
7. Introduction of fluid incompatible with material.

**Improving the rate of compression set:**
1. Use “Low Compression Set” material whenever possible.
2. Select material compatible for the intended service conditions (a material with higher temperature capability or greater chemical resistance).
3. Reduce system operating temperature.
4. Check frictional heat build-up at seal interface and reduce if excessive.
5. Verify groove dimensions are consistent with recommended Parker practices.

To read about other o-ring failure modes, and all things o-rings, visit [Parker’s O-Ring eHandbook](http://www.parker.com).