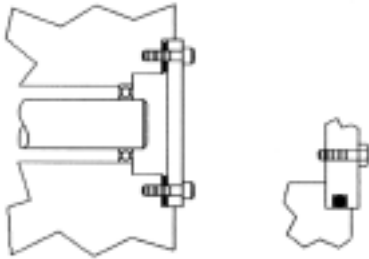


Whenever a shaft rotates, it needs a bearing arrangement for smooth, effective operation. Wherever there's a bearing, you'll find a seal helping it to reach its maximum service life and reliability. In simplest terms a shaft seal is a barrier with four functions: 1) Retaining lubricants or liquids 2) Excluding contaminants 3) Separating fluids and 4) Confining pressure.

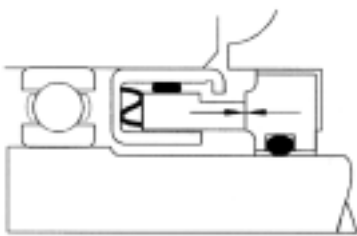
There are three basic types of seals:

**Static seals.** The function of a static seal is to create a barrier between non-moving surfaces. Typical examples would be a valve cover gasket or o-ring.

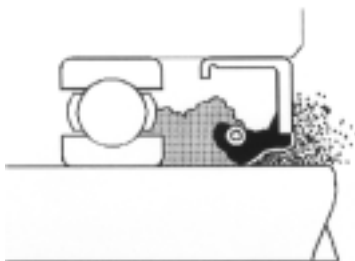
**Axial Mechanical Seals.** These are face type seals in which the sealing contact is between radially mounted components. One is usually stationary and seal contact pressure is applied by a spring mechanism.



*Typical static seals - gasket and o-ring.*



*Axial mechanical - seals between arrows.*



*Dynamic seal on rotating shaft with bearing.*

**Dynamic "Radial" Seals.** A dynamic radial seal creates a barrier between surfaces in relative motion. One is usually stationary while the other rotates. The cross-section shown below identifies the most common parts of a shaft seal. This is the primary type of seal described in the CR Handbook of Seals.

In many designs, the primary sealing lip is held in position by a garter spring. Generally, spring-loaded lips are for retaining oil and non-spring-loaded are used for low speed grease retention or excluding contaminants.

This seal has a simple L-shaped shell with the sealing material bonded to it. CR is not only a pioneer in developing new bonding techniques, but they also have developed and used an environmentally "friendly" water-based cement wherever possible.

Some seals have an inner shell to aid in protecting the lip from damage or distortion during installation. The sealing lip should always point toward the material to be contained.

The garter spring keeps the lip in position. In large diameter seals (over 8" or 200 mm) the spring is held by a Spring-Lock. To completely enclose the spring, Spring-Kover should be used as protection against contamination or where the spring tends to pop-out during installation.

Many CR seals have the patented Waveseal® lip design that pumps lubricant back to the oil cavity while holding out contaminants, regardless of the direction of shaft rotation. The smooth molded lip is formed in a wave-like pattern that describes a wider path on the shaft to dissipate heat and reduce wear.

