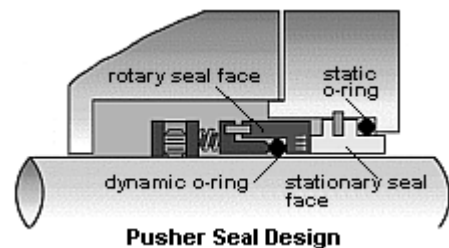


## Pusher & Non-Pusher Mechanical Seals

### An appreciation of the difference between pusher and non-pusher mechanical seals...

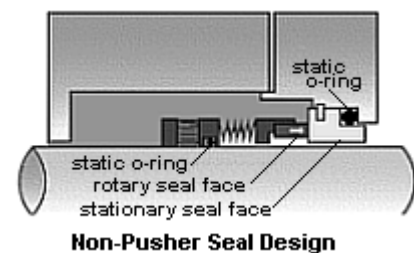
The majority of mechanical seals available today can be classified as either pusher or non-pusher seals. The advantages of one design versus the other will be dictated by the application. Understanding of these differences will result in the better selection of mechanical seals from conception while assisting in trouble shooting of mechanical seals which seem to fail prior to reaching their maximum intended service life.

A pusher mechanical seal incorporates a secondary o-ring; for example, that is responsible for sealing the fluid path between the pump shaft and the inside diameter of the rotating seal face. As the seal face wears and is hydraulically; by stuffing box pressure, and mechanically; by means of spring tension, compressed against the stationary face the o-ring moves along the pump shaft to accommodate this wear



and assist in the absorption of shaft misalignment. Realizing the secondary sealing o-ring is in a dynamic state during pump operation its ability to be somewhat resilient is critical. Being in this dynamic state the secondary seal material must be nearly 100 percent compatible with the fluid in the stuffing box, any swelling or hardening due to incompatibility or temperature can result in pump shaft or sleeve wear and a leak path between the secondary sealing member to atmosphere will develop.

In a non-pusher seal the secondary seal; o-ring for example, is in a static state at all times, even when the pump is in operation. The secondary sealing member is not required to make up the travel as the rotary and stationary seal faces wear. Primary seal face wear is typically accommodated by welded or elastomeric bellows which move; expand, to assist in the compression of the rotary to stationary seal face members. A non-pusher seal has no dynamic secondary sealing members in contact with the pump shaft virtually eliminating fretting and wear concerns.



When scrutinizing the performance differences between pusher and non-pusher seals for a given application one of the many factors to be considered would be the potential for shaft hang-up. Depending on the characteristics of the fluid in the stuffing box as it exits the rotary and stationary seal face inside diameters small deposits of solids form ahead of the secondary sealing member. These deposits can interfere with the travel of the dynamic sealing member as the seal faces wear and eventually pressure at the faces is reduced and excessive leakage; seal failure, occurs. On non-pusher seals with static secondary seals, should deposits form on the pump shaft or sleeve they will not affect the spring tension or hydraulic closing pressures as these debris cannot; within reason, interfere with the seal face travel.