Written by Howard W. Penrose, Ph.D., CMRP
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All pump seals leak. Mechanical seal leakage involves fluid becoming trapped between the rotary and stationary surfaces and vaporizing. The resulting vapor barrier—*also referred to as fluid film* —is what lubricates the seal surfaces. In a healthy seal, this leakage isn't noticeable (occurring at a rate of only about 0.030 drops per minute). Typical leakage paths are: between the faces; sleeve and shaft; rotary-face seal surfaces; stationary-face seal seat; and gland-to-pump face gasket or O-ring.

If leakage is visible, the seal has failed. If the unit has been in operation for more than a day, the failure could be associated with one of the following problems:

- *Seal Face* (45%): product vaporization issues, thermal or mechanical, deteri-oration, deposits, corrosion, abrasion, vibration or cavitation
- *Dynamic Component* (40%): fretting, hardening, chemical attack, deterioration, wear, compression issues and looseness
- *Static Seal Seat* (5%): deterioration, hardening, chemical attack, seal compression
- *Other* (10%)

Problems usually arise immediately if a seal is improperly installed. Common errors in the seal-replacement process include: not selecting the correct seal materials for the application; wear of seal-seat housing; incorrect spring/seal compression; improper seal-sleeve installation or surface under the seal sleeve; and damage to sealing components during installation. Misalignment of the seal—*or between the motor and pump*—can cause leakage, as can excessive vibration and pump soft-foot
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Lubrication of seal surfaces when sliding onto a shaft is a common installation issue. Water is the only suitable lubricant. Oil or soap will cause excessive surface wear or damage during operation. Never use oil on the rotary and stationary contact surfaces of the seal faces, as it will prevent formation of a vapor barrier and cause the surfaces to burn whether the pump is run dry or with fluid. All components must be clean and free from dirt, and the seal surfaces must be protected. If there's a seal or oil chamber—*as with a submersible pump*—be sure to select correct oil to ensure proper operation.
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References

PPC Mechanical Seals, *Mechanical Seal Basics for Maintenance,* 1990.

Fluid Sealing Association, *Mechanical Seal Handbook,* Philadelphia, PA, 1990.

Howard W Penrose is Vice President of Dreisilker Electric Motors, Inc., the Outreach Director of the Society for Maintenance and Reliability Professionals (SMRP) and the IEEE DEIS Webmaster. Email: hpenrose@dreisilker.com.