

Chapter C10

High Film Kalsi Seals



Revision 1 November 4, 2013

Individual chapters of the Kalsi Seals Handbook are periodically updated. To determine if a newer revision of this chapter exists, please visit www.kalsi.com/seal-handbook.htm.

NOTICE: The information in this chapter is provided under the terms and conditions of the Offer of Sale, Disclaimer, and other notices provided in the front matter of this handbook.

1. High Film Seals incorporate an aggressive geometry

High Film Seals (Figure 1) incorporate an aggressive unidirectional hydrodynamic geometry which produces significantly increased film thickness, lower running torque, cooler operation, and increased contaminant flushing during rotation. In high speed, low differential pressure applications, they are self-lubricating even with ordinary tap water¹.



Figure 1
High Film Seals

High Film Kalsi Seals incorporate an aggressive unidirectional hydrodynamic geometry for cooler operation and improved high pressure extrusion resistance. In low pressure applications, the high hydrodynamic pumping related flow rate can be used to lubricate a stack of conventional lip seals.

2. High Film Seals can lubricate a series of lip seals

High Film Seals generate substantial flow and pressure, and can be used as miniature pumps to lubricate a series of lip seals. At the typical pump speed of 1,800 rpm on a 2.75" shaft, filled High Film Seals can produce flow rates in the range of 7.5 ml/minute with water, and 182 ml/minute with an ISO 320 viscosity grade lubricant. The flow rate is dependent on lubricant temperature and viscosity and shaft surface speed. The flow rate of solid cross-section High Film Seals is less than that of Filled High Film Seals.

One application for High Film seals is in centrifugal pumps that are used to pump harsh abrasive-laden fluids such as cement (Figure 2). The superior lubrication and controlled contaminant flushing rate of the High Film Seal allow extended operation with harsh environments that cause conventional rotary shaft seals to fail in a matter of days.

¹ Filled High Film Kalsi Seal configurations are recommended when water is used as the lubricant. The abrasive effect of evaporative deposits from leaked water significantly limits seal life when water is used as the lubricant.

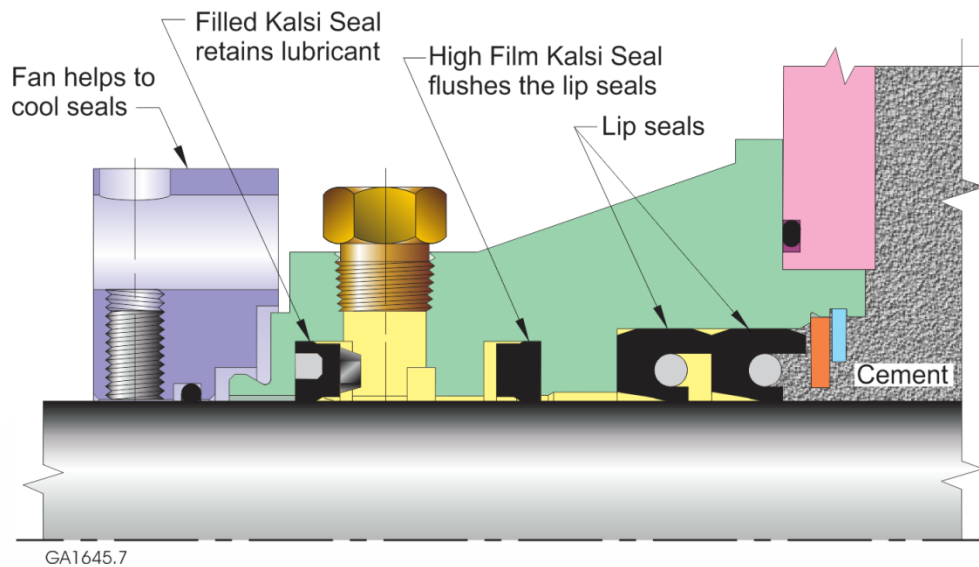


Figure 2

High Film Seals flush lip seals in cement pump cartridge

In cement pump cartridges, the aggressive hydrodynamic geometry of a High Film Seal is used to lubricate and flush a pair of lip seals which face the cement (U.S. Patents 7,798,496 & 8,505,924).

3. High Film Seals operate well in high differential pressure conditions

High film seals lubricate well in high differential pressure conditions. In 2,600 psi (17.93 MPa) laboratory testing across a range of shaft speeds, the torque of the High Film seal was substantially less than that of a basic Kalsi Seal, the condition after testing was typically better, and the seal was more tolerant of thinner viscosity lubricants.

High film seals are also suitable for ultra-slow speed, high differential pressure equipment where the aggressive geometry is exploited to provide the necessary lubrication. Testing indicates that High Film Seals require axial spring loading to effectively lubricate in zero differential pressure conditions.

4. Lip geometry is compatible with various seal configurations

High Film Seals can be molded in Single Durometer, Dual Durometer, or Filled configurations depending on customer needs. The high film geometry is capable of lubricating lip widths that are substantially wider than basic Kalsi Seals. The wider lip offers added sacrificial material to accommodate axially acting wear mechanisms such as extrusion damage and third body abrasion.

For available seal sizes, visit kalsiseals.com.

5. Special part numbers are required due to unidirectional design

High Film Seals are for unidirectional shaft rotation (Figure 3) In addition to the material dash number, the complete part number must include a CW (clockwise) or CCW (counter-clockwise) suffix to identify the direction of shaft rotation. For example, 432-8-11 CW is the part number for a clockwise High Film seal made with the -11 HNBR material. The direction of shaft rotation is oriented in reference to looking at the lubricant end of the seal.

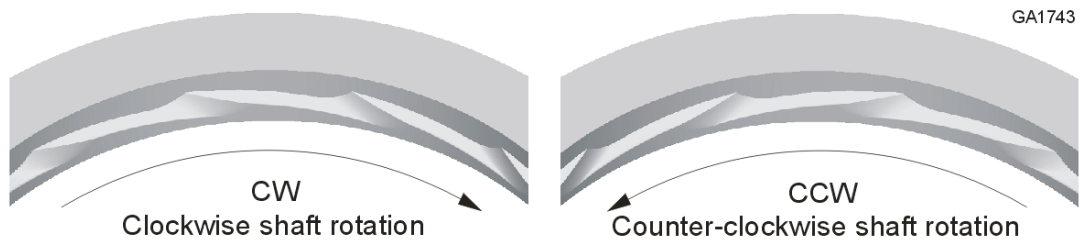


Figure 3

High Film Seals are for unidirectional rotation only

The arrows in this figure represent the direction of shaft rotation relative to stationary seals.