

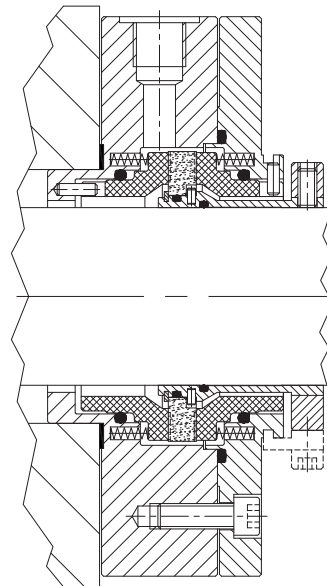
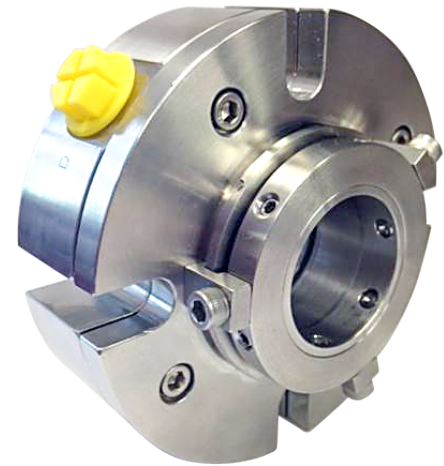


GAS LUBRICATED, NON-CONTACTING DUAL CARTRIDGE SEAL

Features and Benefits:

Advantages of non-contacting dual gas seal vs. a liquid lubricated dual seal for API plans 53 and 54:

- Extended seal life due to non-contacting seal faces, which eliminate friction and wear
- Non-contacting faces significantly reduce the amount of heat buildup at the faces, eliminating the need for external cooling
- Designed to run dry; excellent for batch run operations like tank unloading when operators neglect to shut pump down
- No pumping ring is necessary to circulate barrier fluid
- Simple support system – utilizes API Plan 74 instead of more complex Plans 53 or 54, lowering the cost of operation and maintenance of the seal support system
- Zero emissions just like seals using a pressurized liquid barrier fluid system
- 100% product purity: Nitrogen is clean and inert, eliminating product/barrier fluid compatibility issues
- Reduced power consumption



Materials of Construction:

- Faces:** Premium grade resin impregnated carbon, sintered silicon carbide
- Elastomers:** Viton®, Aflas®, nitrile, ethylene propylene, neoprene, and perfluoroelastomers
- Metallurgy:** 316 SS (standard construction). Also available in Hastelloy® C276
- Springs:** 316 SS

Operating Parameters:

- Size:** 1³/₈", 1³/₄", 1⁷/₈", 2¹/₈", 2¹/₂", 2⁵/₈"
Standard and Big Bore Options
- Temperature:** Up to 390°F (200°C)
- Speeds:** 1450-3600 RPM
- GFR:** Clockwise Rotation
(suitable for all ANSI B73 pumps)
- GFL:** Counter-Clockwise Rotation
- Pressures:** Min. Barrier Gas Pressure: 87 PSI (6 bar)
Max. Barrier Gas Pressure: 180 PSI (12.5 bar)
Barrier Gas Pressure must be maintained 45 PSI (3 bar) above seal chamber pressure

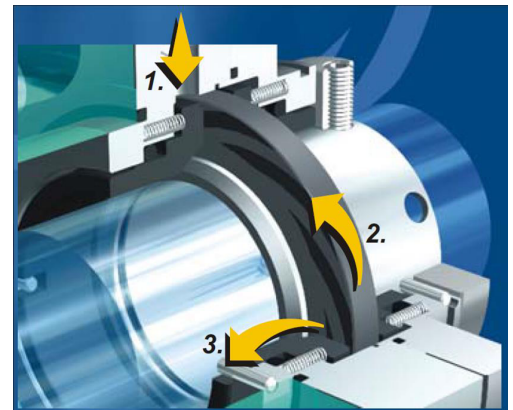


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	Liquid Lubricated Dual Seal	Flex-A-Seal's GFR/GFL Gas Seal
EPA Emissions requirements	Meets	Meets
Pumping ring	Required for API plan 53 Not required for API plan 54	Not needed
Seal reservoir	Required for API plan 53	Not needed
Cooling water	Required to remove heat generated at the seal faces, increasing energy costs	Not needed
Seal support system maintenance	Required, including refilling the reservoir	Not needed
Efficiency and Energy Consumption	Barrier fluid causes friction and drag at contacting seal faces, increasing power consumption	No frictional loss due to non-contacting seal faces - no increase in power consumption
Piping system	Complex API Plan 53 or 54 (using liquid barrier fluid)	Simple API Plan 74 (using nitrogen gas)
Process fluid contamination	Barrier fluid must be compatible due to leakage into product	None
Cost of operation	High: Regular fixed maintenance of seal support system including monitoring and refilling of barrier fluid	Low: Lower maintenance costs for seal and support system since there is no barrier fluid to fill

How Flex-A-Seal GFR and GFL Operate

- 1 Inert gas enters in the wide, deeper grooves on the OD of the rotating seal ring face.
- 2 As the shaft rotates, the gas compresses as it passes through the narrowing of the seal ring's spiral grooves.
- 3 The resultant gas film pressure provides an opening force slightly greater than the net closing forces, which cause the faces to separate and not contact.



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