Conventional Dry Gas Seals (DGS) have a flow across their face, from the high pressure to the low pressure side. Moisture or oils from the process are naturally carried into the seal gap by the flow from this pressure differential, where they carbonize or boil from the sear and cause reliability issues. Trying to stop this with buffer gas is like trying to stop water from flowing downhill. Although this leakage is small, it is coming under closer scrutiny from the EPA and other regulatory bodies.

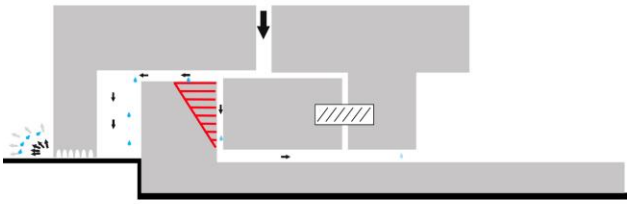

Figure 1: Conventional Dry Gas Seal

Our "New Way Seal" uses Externally Pressurized Gas Bearing Technology (EPGB) through a porous seal face to create a pressure in the seal gap that is higher than the process pressure. The flow to vent is the same, but about the same amount that is vented flows back into the process. The advantage is that moisture will not enter the gap because the gap is at a higher pressure. It would be like water running up hill; it is just not natural for a lower pressure to flow into a higher pressure. So, there is no flow across the seal face from the process, increasing reliability. The process gas required for the externally pressurized bearing is 1/100 of the buffer gas used with Conventional DGS, and the higher pressure differential makes it easier to condition the bearing gas reliably.

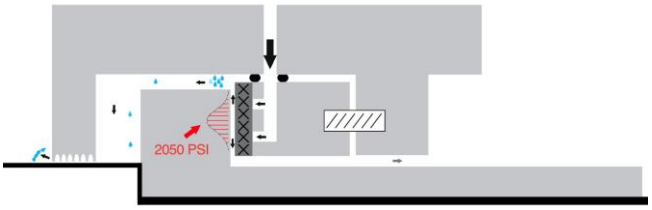

Figure 2: New Way Seal

With our "Ventless Seal" we have all the advantages of the New Way Seal, but additionally we can segregate gases in a single seal face. This enables a Zero Emissions Seal (ZES). This is where all the process gas stays in the compressor and all the barrier gas exits the compressor. By using two externally pressurized bearing gases, (process gas is used on the process side of the seal face and a barrier gas on the vent side) their relative pressure may be adjusted to steer the highest pressure point in the gap to be between the gases. At this point, all process gas flows back to process and all the barrier gas exits the compressor, eliminating Fugitive Emissions and flaring. The balance point is determined by a gas detector in the vent that looks for any process gas molecules (say 10 to 100 parts per million as a threshold) with a control to slightly increase the barrier gas pressure and so maintaining the balance at the separation between the gases.

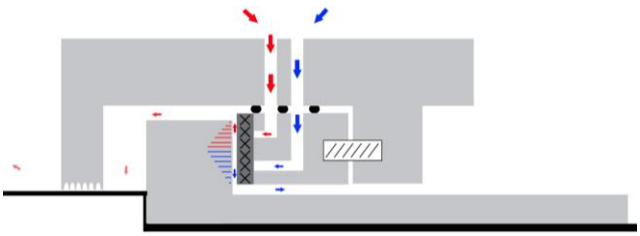

Figure 3: Ventless Seal

Videos That May Be of Interest

One-Minute New Way Seal Animation

https://www.youtube.com/watch?v=I5X9Y2hQroE

Three-Minute New Way Seal Animation

https://www.youtube.com/watch?v=VFp7SPe5Tuk

Ventless Seal Hardware

https://www.youtube.com/watch?v=IF872nQdAq8

Water Tolerant Seal

https://www.youtube.com/watch?v=gB6vcudLUcU&feature=youtu.be

Spraying Water Between Bearings At 7500rpm

https://www.youtube.com/watch?v=0SPwPxYHeRs

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