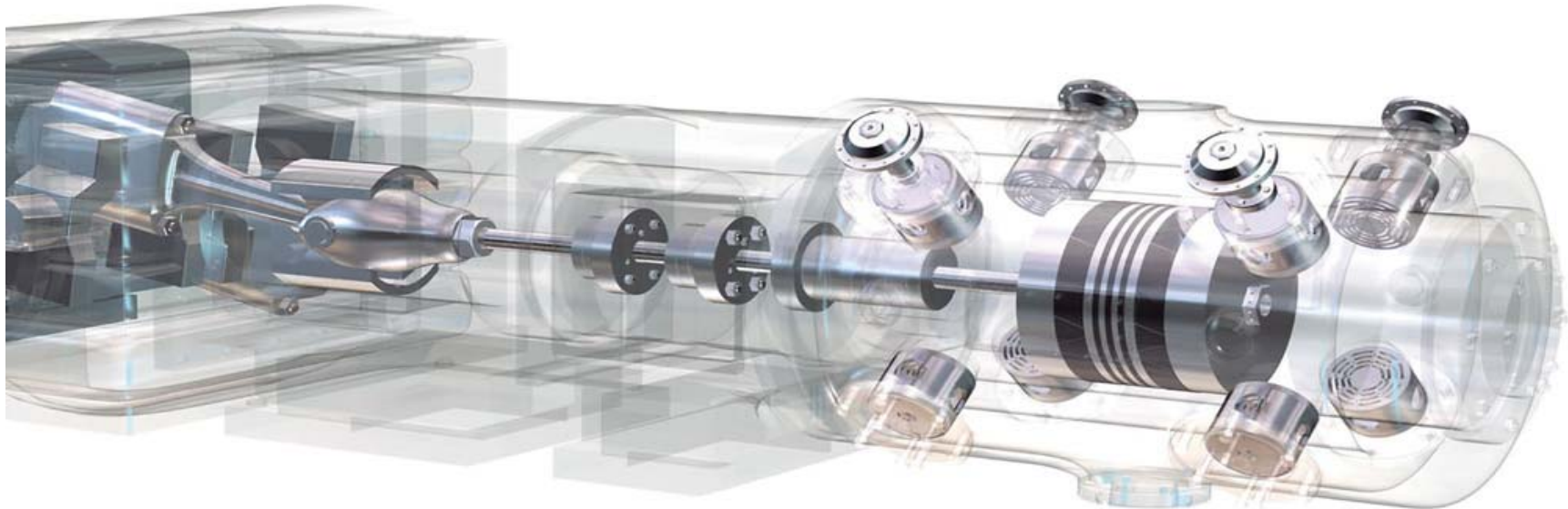


Field Validation of BCD Rod Packing System



Performance of the Hoerbiger BCD (Balance Cap Design) Rod Packing Rings in Reciprocating Compressors

Recent concerns of Fugitive Gas leakages from many Compressor sites have resulted in targeting of the Rod Packing seals as a major source of Hazardous, Volatile Organic Compounds & GHG(Greenhouse) Gases.

EPA Regulations CFR 40, Part 60-63 and CFR 40 part 98, Subpart W regulate reporting and monitoring with the intention of establishing emissions limits from reciprocating compressors



Performance of the Hoerbiger BCD Balance Cap Design Rod Packing Rings in Reciprocating Compressors

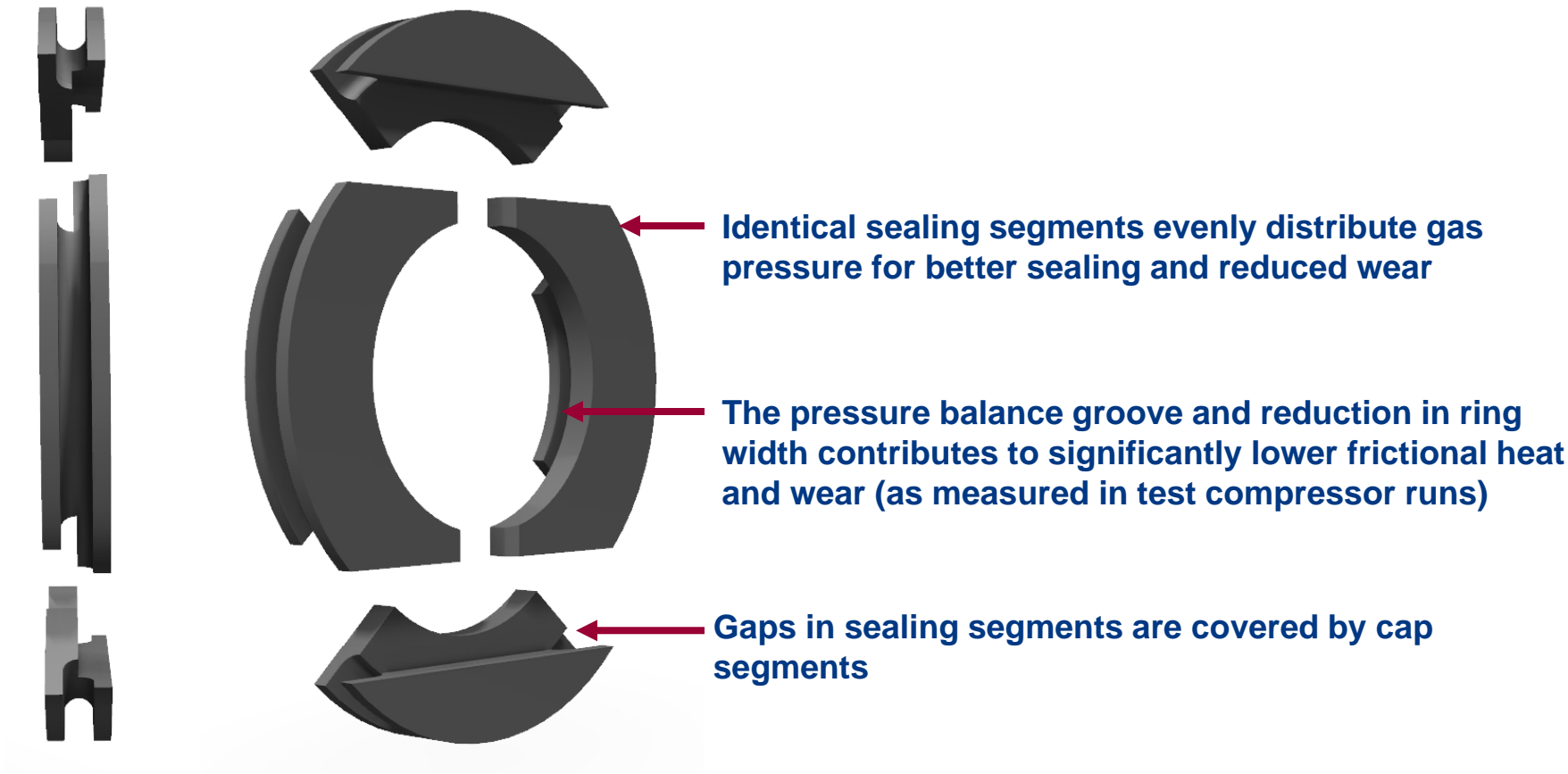
“BCD” Rod Seal Ring design has been shown to reduce leakage amounts when compared to traditional packing ring designs.

- **Will fit in most reciprocating compressors**
 - Ring ID's to fit rod sizes from 20mm (.787”) to 127mm (5.000”).
 - Capability to retrofit most standard groove dimensions and cup depths.
- **Design in its fourth year with over 1000 Cylinders currently running.**
- **Higher Performance = Positive Sealing + Uniform low wear**
 - Multiple field tests showing leakage rates below the EPA/CFR recommended leakage level of .1917 SCFM
 - Field tests showing equal or longer runs than conventional TR and RT style rod packing rings.
- **Continued test results to cover most all applications**
 - Monitored field tests are being run internationally
 - Includes API 618 buffer gas applications with lower purge gas usage

Note: Proper unit maintenance required before low leakage rate can be achieved regardless of ring design.



Balanced Cap Design (BCD) packing

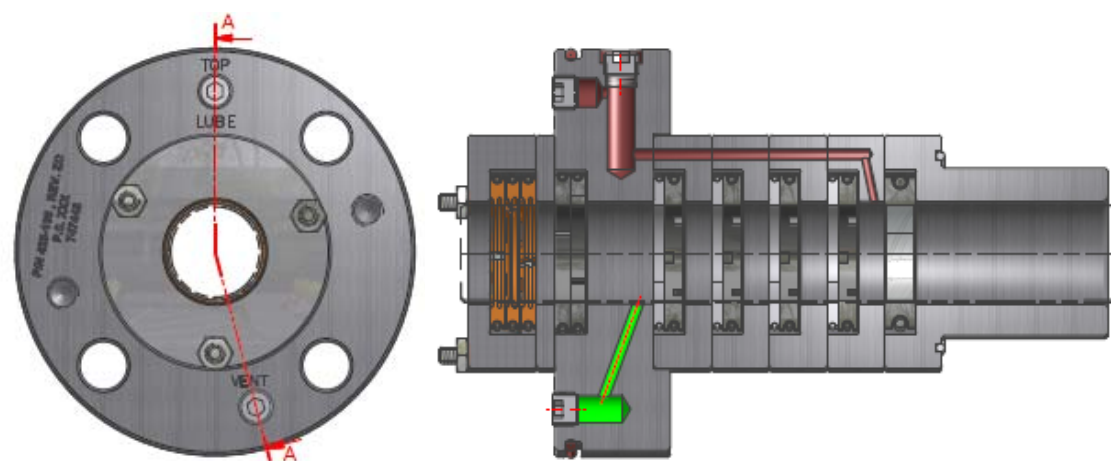


Materials: HY54 Low Wear Polymeric Compound



Balanced Cap Design (BCD) packing

A Case study on a Wellhead Compressor



Conditions:

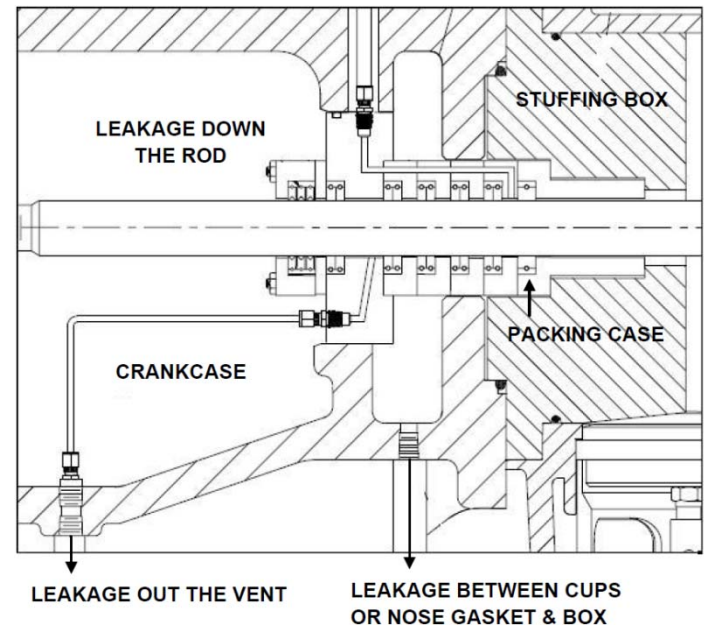
- Location: North Texas
- Lubricated Wet Natural Gas
- Third stage
 - Suction 400psi
 - Discharge 900psi
 - DischargeTemp <250 F
- Rod Dia. 1 1/8"
- Speed 1500 rpm
- Stroke 3"
- Continued operation 10,000+ hours



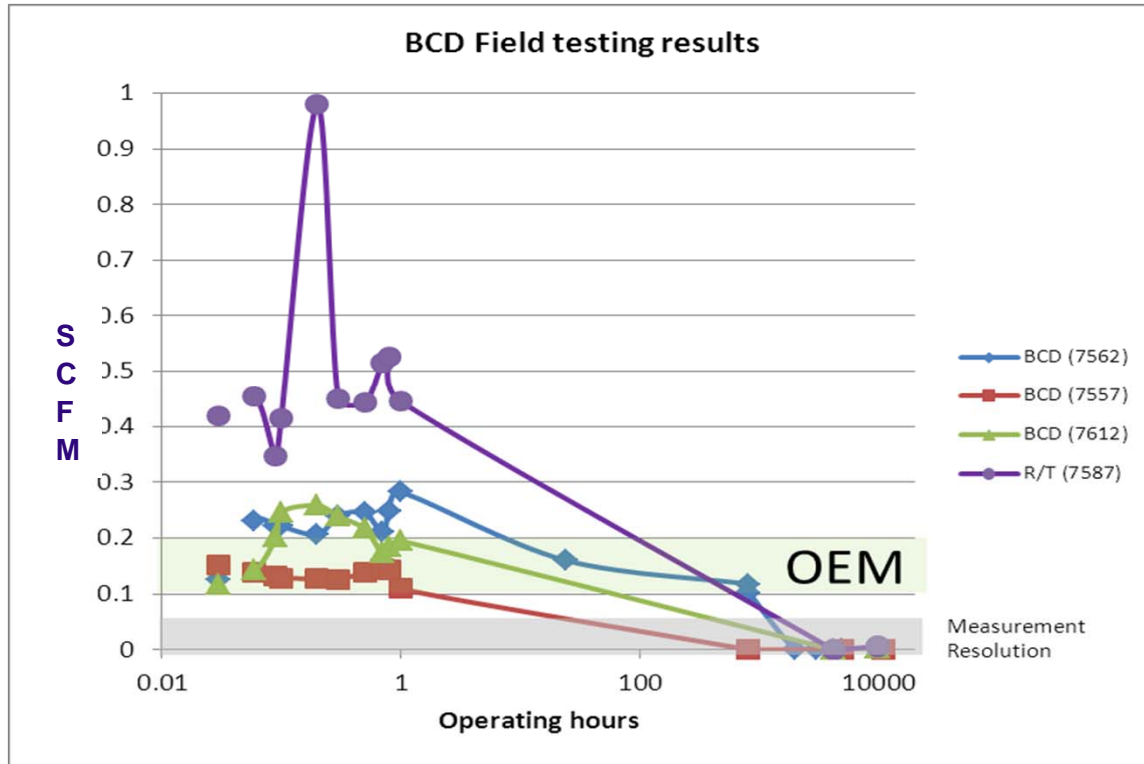
BCD emissions measurement



A portable digital mass flow meter is connected to both the vent and case cavity outlets to measure leakage



Emissions levels using the BCD



BCD Ring Sets leakage is averaging 0.1-0.2 SCFM after the first hour

The BCD out performed the standard OEM rings on wear-in and continues to be under the EPA/CFR recommended 11.5 SCFH (.19 SCFM) after 10,000+ hours in operation.



Information and Case Studies on many other applications are available.

See us at the Hoerbiger Booth

Thank you

Barton Scarbrough

OEM Key Account Manager

Hoerbiger OEM Group-Houston

