

Innovative Tube to Tubesheet Sealing Mechanisms For Improved Reliability and Maintainability In Highly Corrosion Resistant Heat Exchangers

CGThermal
Process Technology Solutions
for Harsh and Corrosive Process Streams

In partnership with

TECHNOFORM

Sponsored by:



VAHTERUS



Presentation Outline

- Traditional Materials for Heat Exchangers for Highly Corrosive Process Streams (Graphite)
 - Traditional graphite tube to tubesheet joint
- Novel Graphite Composite Tube
- Advanced Sealing Methods
 - Threaded tube Nut
 - O-ring

Sponsored by:



Impervious Graphite Tube



Sponsored by:



Graphite Heat Exchanger

2022



Sponsored by:



VAHTERUS



Common Graphite Heat Exchanger Design



Cemented Tube-to-Tubesheet

Common Graphite Heat Exchanger Design Operation Cost Considerations

- Tubes can be plugged in the field
- Difficult to replace tube in field
- Care must be taken in chemical or mechanical cleaning
- Resistance to fouling diminishes with time
- Limited to graphite tubesheet MOC

Sponsored by:



Innovative Extruded Graphite Composite

Polyphenylene Sulfide + graphite powder

- Extruded to close tolerances
- Extended corrosion resistance
- Superior resistance to thermal shock
- Ductile material resistant to vibration stresses
- Higher pressure applications
- Resistant to fouling and easily cleaned

TECHNOFORM

Presentation Tomorrow

Design and Materials Workshop



Impervite.PPS-

Alpha Sintered Silicon Carbide



No Fillers
No Free Silicon
No trace Contaminations
Over 98% Theoretical Density
50% Harder than WC

HF, BR2, HNO3, Mixed acids, H2SO4 and High fouling applications

Sponsored by:



VAHTERUS

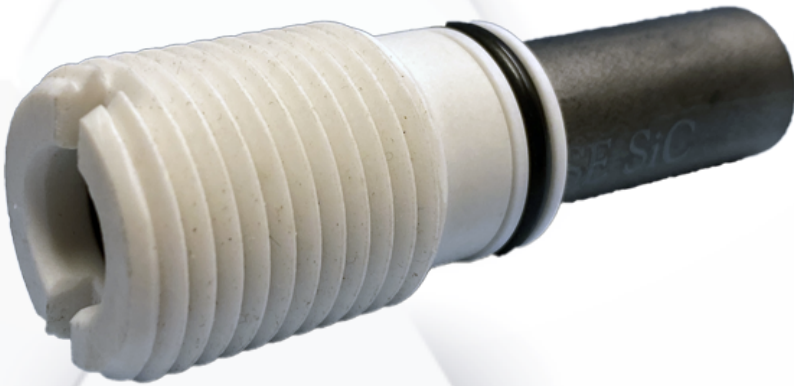


O-Ring Tube-to-Tubesheet Sealing

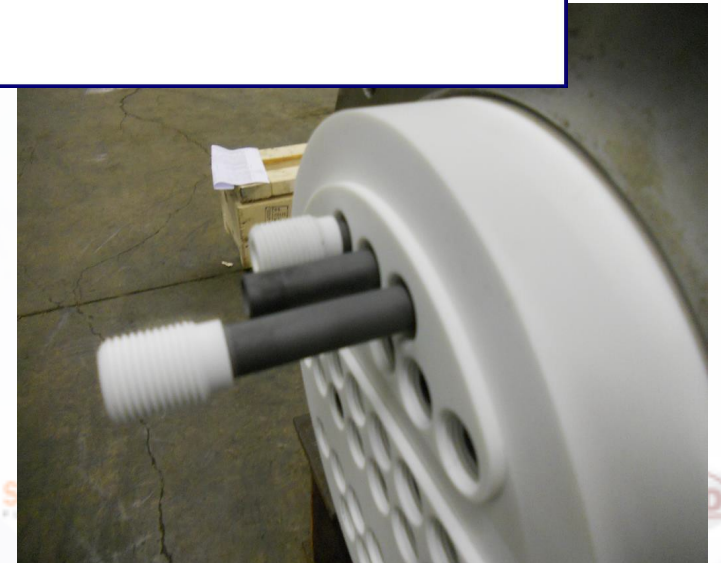
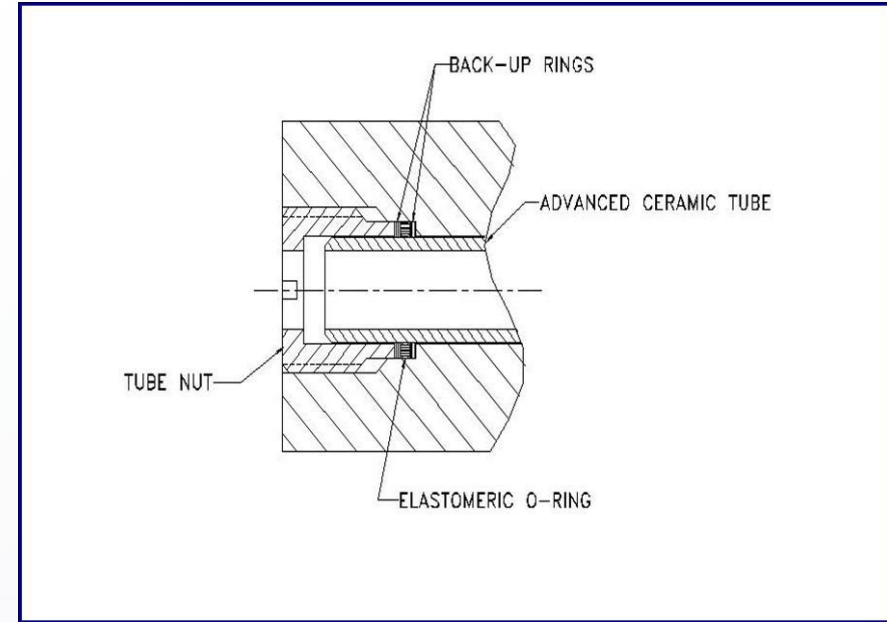
- The O-ring is one of the most common sealing technologies in all kinds of industries
- Long service-life with polymers for chemical and temperature resistance
- Safe and leakage-free operation with tailored sealing-designs
- Custom designed for pressure-requirements



O-Ring Tube-to-Tubesheet Sealing With Tubenut



- Tubes can expand independently of tubesheet.
- Easy tube replacement if required.
- Back-up rings create captured sealing mechanism and compensates for out of roundness



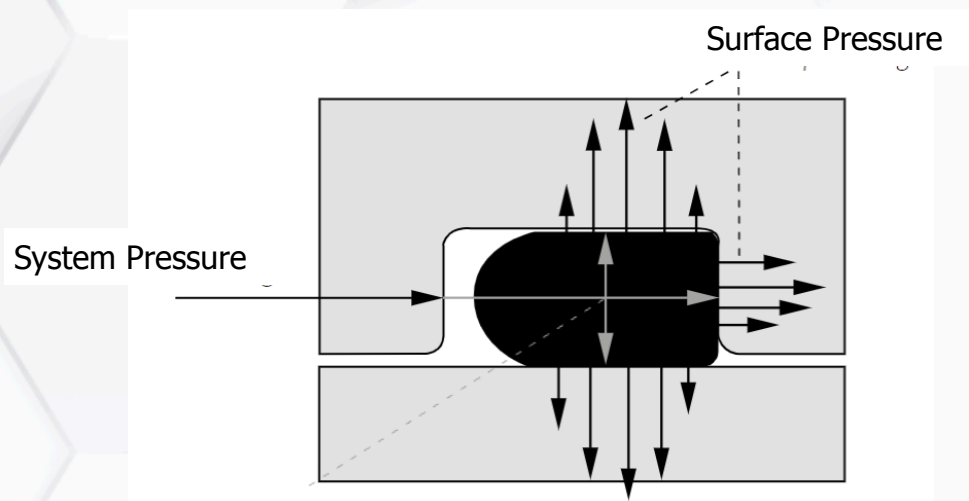
Sponsored by:



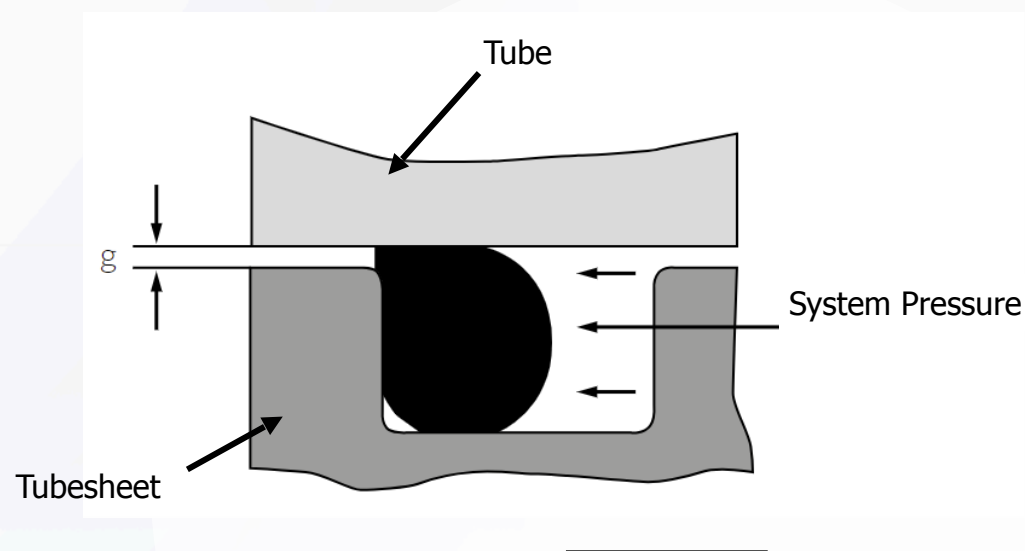
O-Ring Tube-to-Tubesheet Seal

Ideal for pressurized heat transfer processes

Compressed O-Ring Under Pressure



Non-compressed o-ring seal under pressure



Sponsored by:



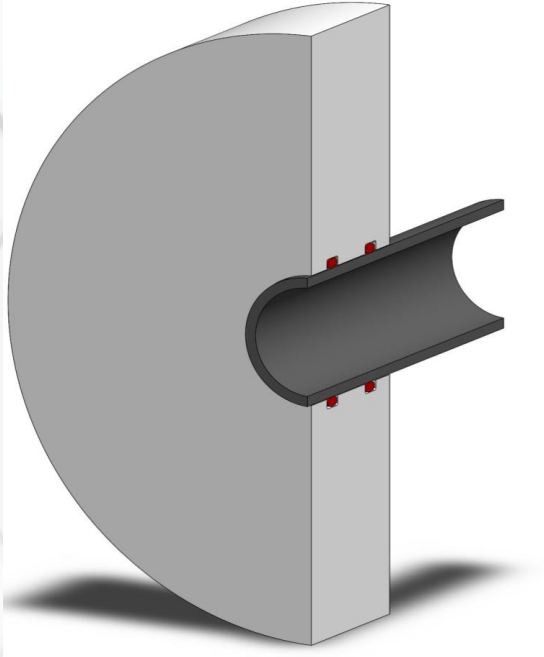
Brask, Inc.
The Heat Exchanger People



O-ring tube-to-tubesheet seal

ideal for pressurized heat transfer processes

- reduces the assembling-time
- less labor intensive design
- compensation of thermal expansion allows choice of tube and tube sheet material
- vibration dampening reduces mechanical stresses
- easy field repair
- eliminates the need for tube plugging



Sponsored by:



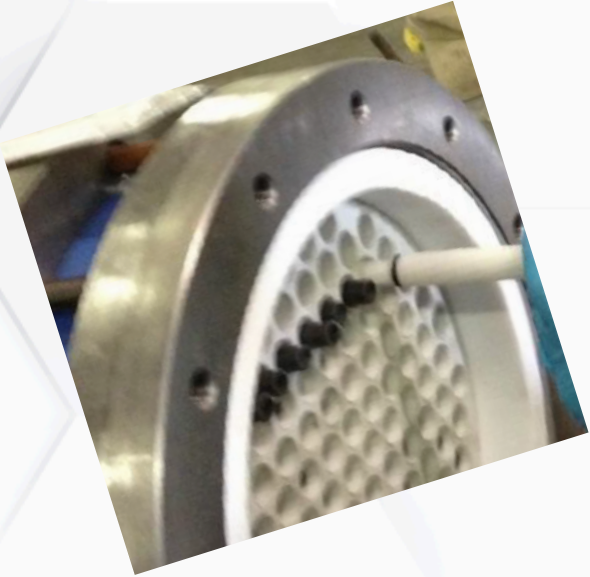
VAHTERUS



THE HEAT

O-ring tube-to-tubesheet seal

Ideal for pressurized heat transfer processes



Sponsored by:



?

SURVEY QUESTION:
Is this O-Ring design more desirable than
Bubba's O-Rings?

?



?



Sponsored by:



Brask, Inc.
The Heat Exchanger People



VAHTERUS

