



DURTEC[®]

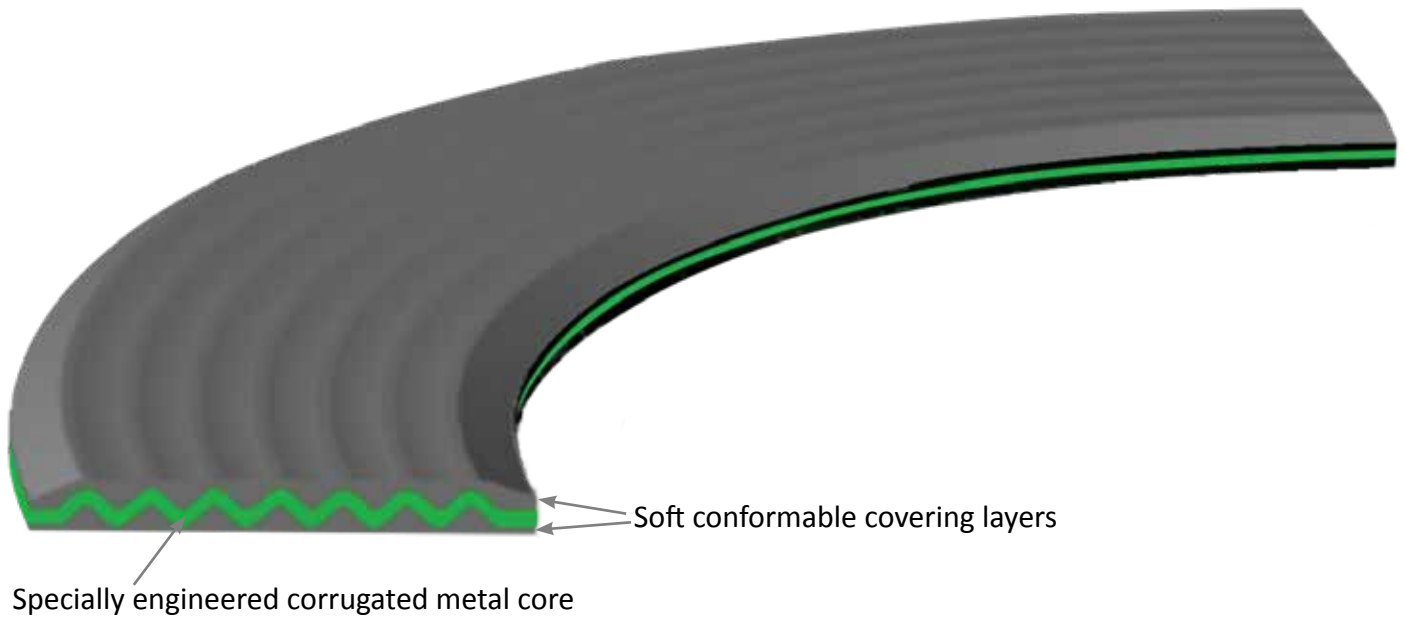
**SPECIALLY ENGINEERED
METAL CORE TECHNOLOGY**

DURLON[®]

Superior Performance - Superior Safety

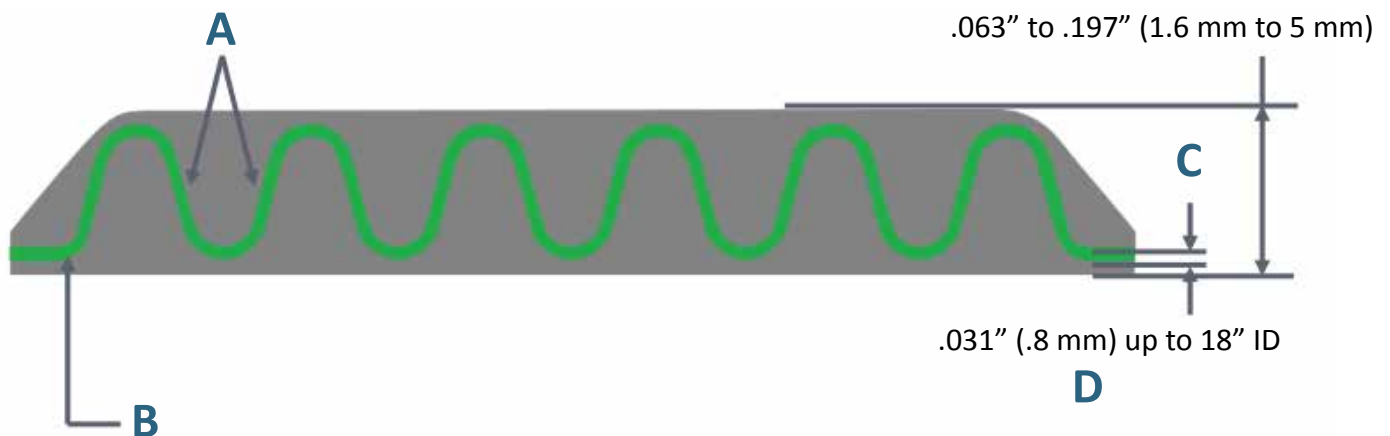
What is it?

The NEXT GENERATION corrugated metal insert gasket.



Looking closer...

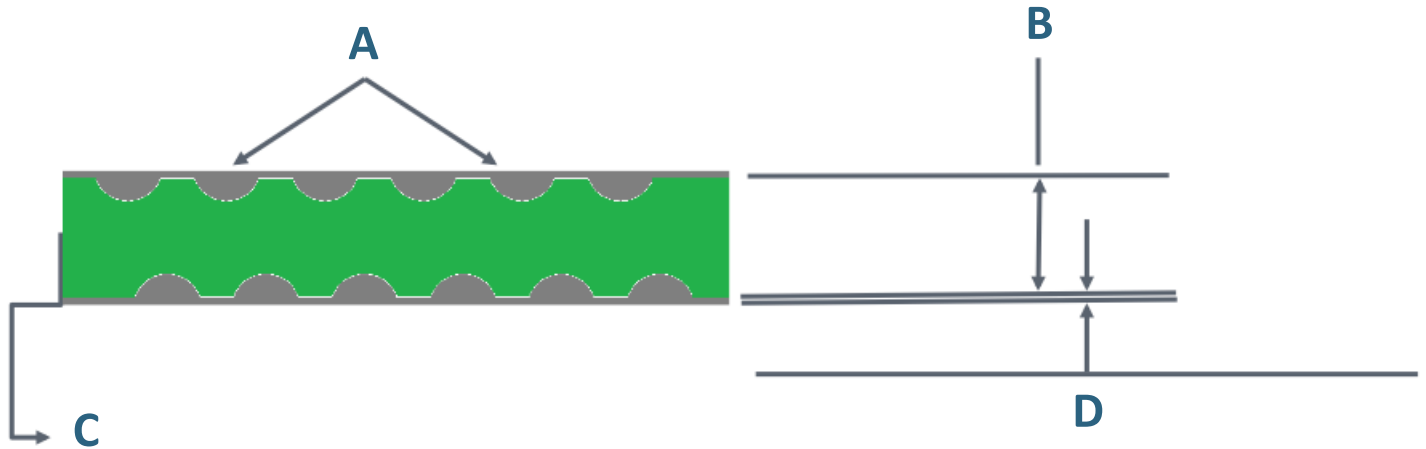
- A.** Proprietary corrugation forming process provides better spring back force without deformation to the corrugations (tighter seal at lower bolt loads with no retorquing)
- B.** Thickness of insert typically increases as pressure classes increase and service conditions become more severe
- C.** Thicker insert material than traditional corrugated metal core gaskets helps prevent crushing of corrugations
- D.** Thicker insert on gaskets allow for possibility of refacing depending on service conditions (lower life cycle costs)



- A.** Proprietary machined profile provides high levels concentrated seating stress without deformation to the grooves which results in tighter seal at lower bolt loads with no retorquing)
- B.** Standard core thickness is .118" (3mm) for 20" ID and up; however .078" to .315" (2mm to 8mm) are available upon request
- C.** Thicker core on large diameter gaskets allow

for possibility of refacing depending on service conditions (lower life cycle costs and quick turn around time on shutdowns)

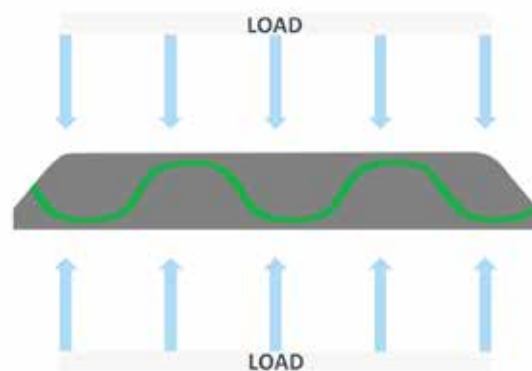
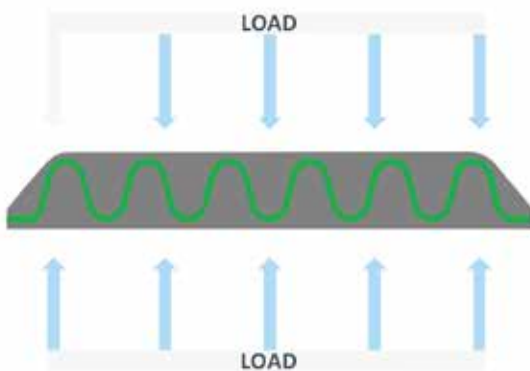
- D.** Standard facing material is .032" inhibited flexible graphite for elevated temperatures in oxidizing environments. Increases service life over industrial grade flexible graphite. Other materials and thicknesses available upon request.



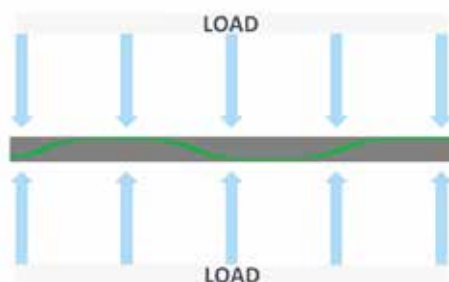
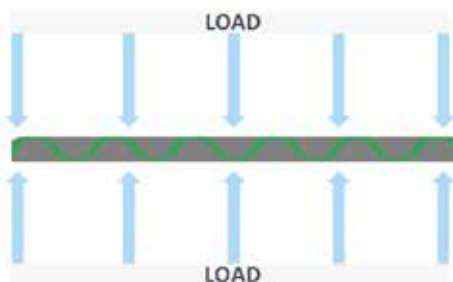
Comparison of cores

Durlon® Durtec®

Competitors Corrugated Metal Gasket



When compressed



Durtec® - Physical Properties

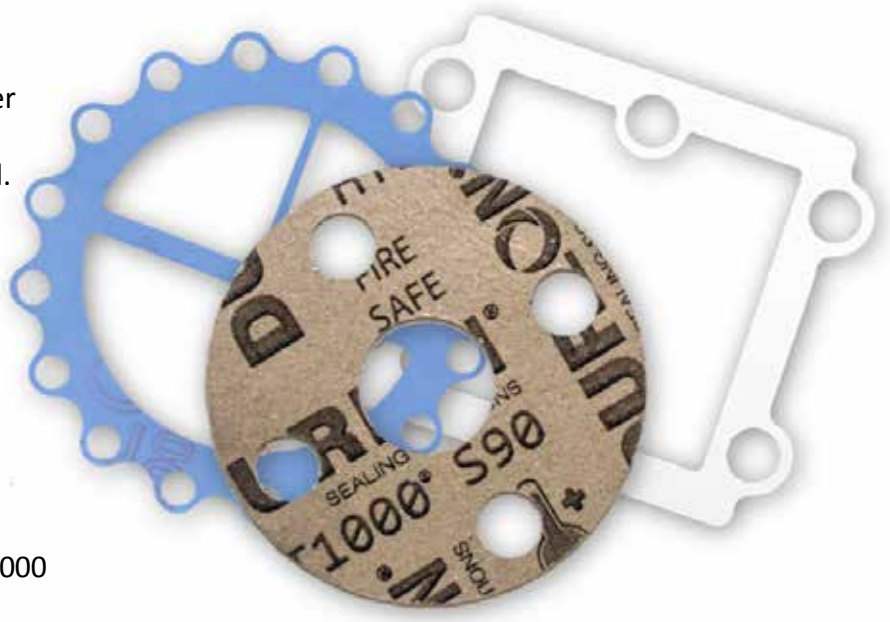
Temperature: -200oC to 1,000oC (-328°F to 1,832°F)*
Pressure: 320 bar (4,600 psi) max.
pH Range: 0-14
Gasket Factors: m= 1.5; Y= 833 psi

Other Gasket Factors
Kammprofile: m= 4.0; Y =1,000 psi

Durtec® - Options

Sizes, Types, and Materials:

- Standard ASME, DIN, JIS, and BS EN sizes
- Non-Standard MSS SP-44, API 605, and other sizes up to 157" (4m) in diameter
- Standard core material - 316L stainless steel. Other core materials such as SS304, SS321, SS316Ti, Monel®, Titanium, Hastelloy®, and Alloy 20 can be manufactured to your specifications upon request
- Standard facing material - Super inhibited graphite. This meets or exceeds Shell Specification MESC SPE 85/203 & PVRC SCR Flexible Graphite Spec for FG 600 material
- Alternate facing materials are available upon request. Popular materials include Durlon® 9000 & 9600, HT1000® and our ETG series.



Durtec® - Applications

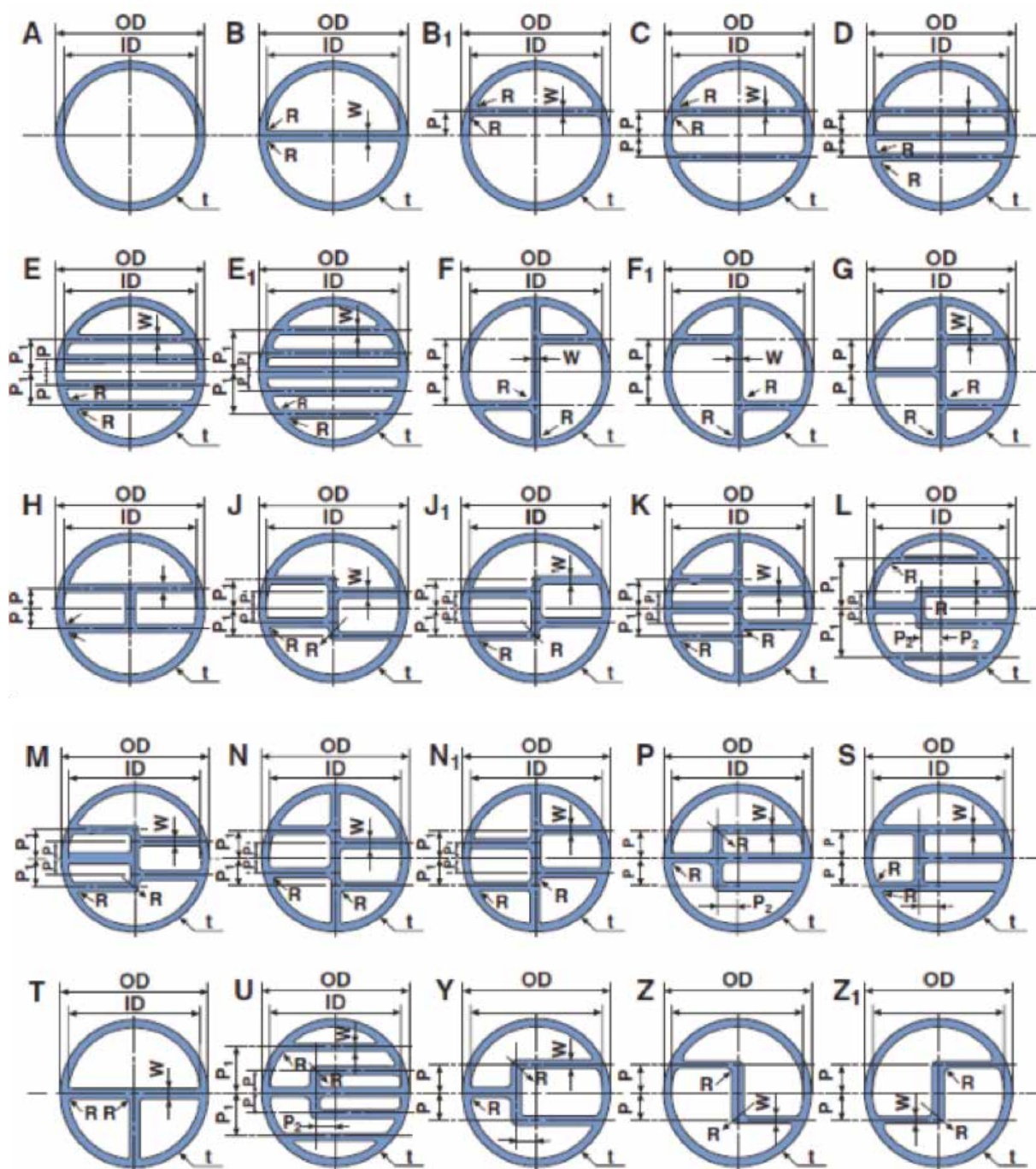
Use where excellent sealing characteristics are required



- Pipeline flanges, pressure vessels, heat exchangers, towers, tanks, OEM
- Anywhere fire safety is a concern
- High temperature
- Cycling - extreme pressure and or temperature fluctuations
- Heavy vibration
- Remote field applications
- Large diameter asbestos gasket replacement
- Double jacketed gasket replacement and heat exchangers
- Easy replacement for poor-performing spiral wound gaskets
- Low available bolt loads (ie 3", 8" & 12" 150# Flanges)

Durtec® - Heat Exchanger Options

There are many styles of heat exchanger gaskets and most have complicated rib designs or partitions.



Durtec® - Advantages



Durlon® Durtec® gaskets are made with a specially engineered corrugated metal core that is bonded on both sides with soft covering layers, typically flexible graphite. The core is produced by patented technology that allows the finished gasket to have the best possible mechanical support function. Corrugations in the Durtec® core are virtually uncrushable unlike conventional corrugated metal core gaskets. The precision construction guarantees that Durlon® Durtec® gaskets will have excellent sealing characteristics even under low bolt loads.

The Durtec® gasket is designed to withstand high temperatures and pressures, to be blowout resistant, to be fire safe, and to resist toxic and or corrosive chemicals for such applications as: pipeline flanges, valves, small & large pressure vessels, heat exchangers, towers and tanks.

Durtec® Fire Safety test results - Passed modified API 607 fire test and meets the requirements of Shell Specification MESC SPE 85/203 & PVRC SCR Flexible Graphite Spec for FG 600 material.

Fire Safe

SS316L/Graphite has passed the modified API 607, 4th Edition with Exxon modifications

Blow-out resistance

Metal core provides excellent resistance to internal pressure spikes

Reusable

On larger sizes and special configurations, the core may be refaced with new sealing material and reused, thus providing lower cost of ownership and quicker turn around times.

Superior Core Technology

Durtec® design can allow for complete replacement of spiral wound and Kammprofile gaskets with improved performance and lower life cycle

Sealability

Seals tightly with lower bolt loads vs. spiral wound gaskets and Kammprofiles which is ideal for fugitive emissions control

Stock consolidation

Reduction of inventory by eliminating the need to stock numerous styles of gaskets

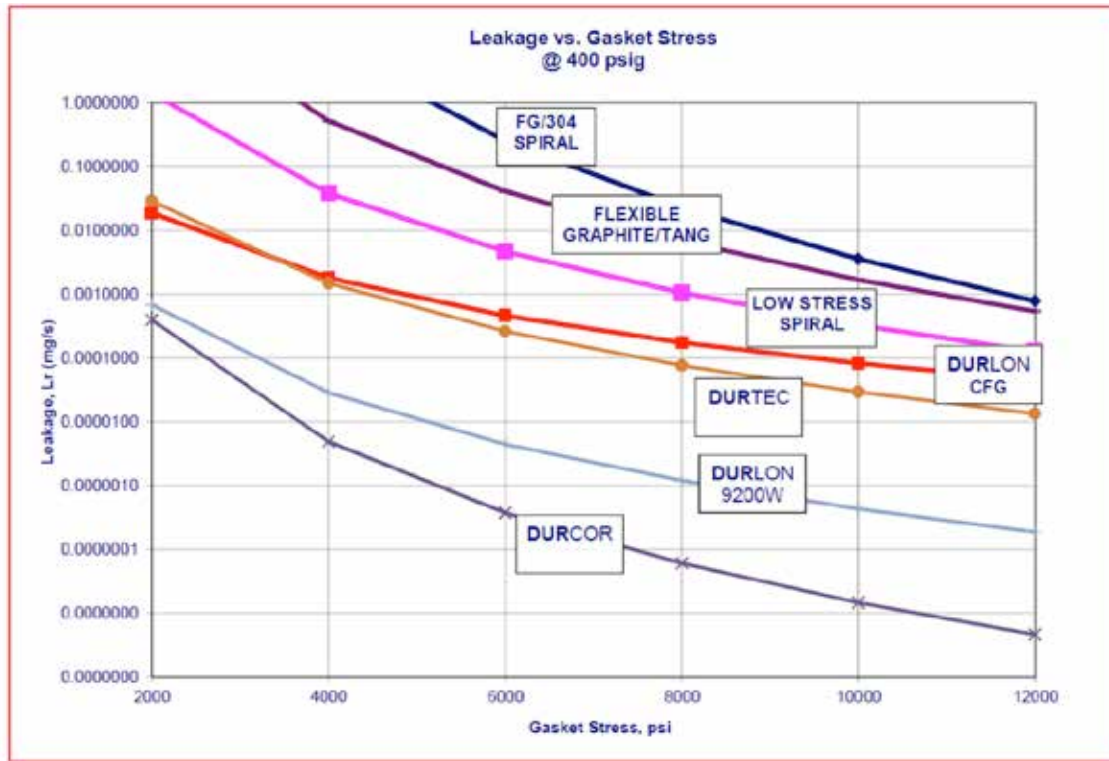
SIZE, TYPES & MATERIALS:

- Standard ASME, DIN, JIS and BS EN sizes
- Non-standard MSS SP-44, API 605 and other sizes up to 157" (4m) in diameter
- Standard core material is 316L stainless steel. Other core materials: SS304, SS321, SS316Ti, Monel® Titanium, Hastelloy® & Alloy 20 can be manufactured to your specifications on request
- Alternate facing material is available upon request. Popular materials include Durlon® 9600 expanded PTFE (ePTFE), mica & ceramic

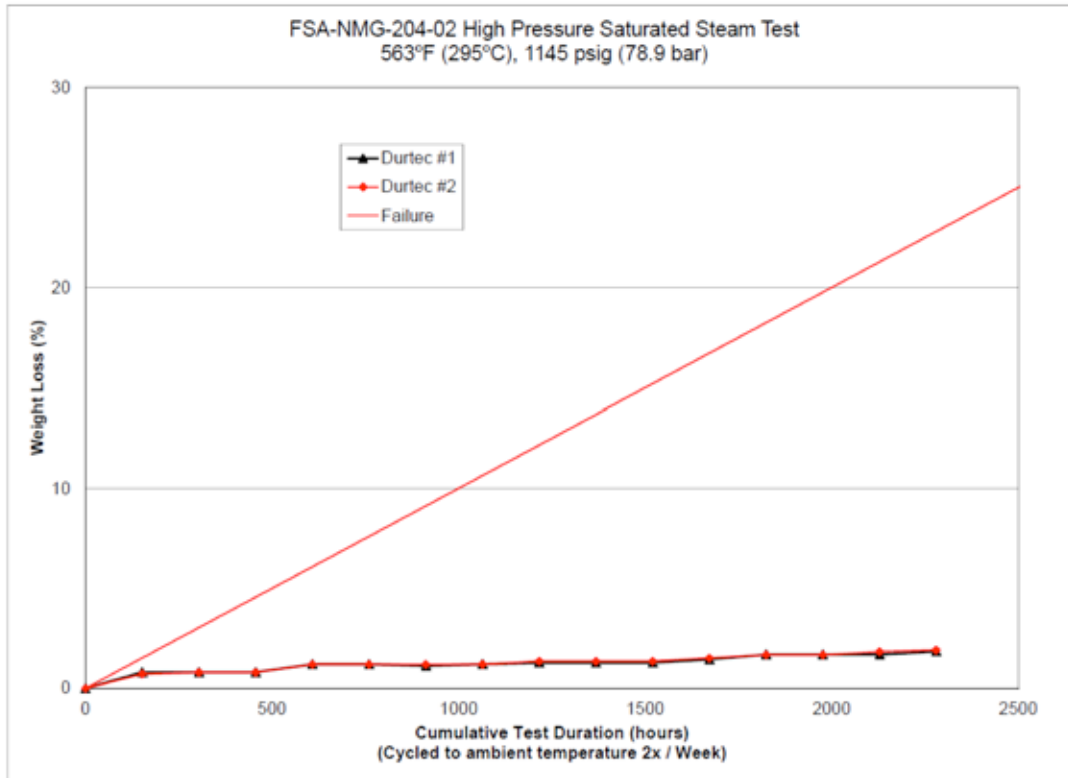
API 607 FIRE TEST:

- Average bolt torque loss (with no adjustments): Upstream 45%; Downstream 33%
- Fire, Cool Down & Post Burn: Combined Leak Rate (2 gaskets) 0 mL/min at 30 psig avg.
- Exxon requirements post burn: Combined Leak Rate (2 gaskets) with no flange bolt re-torques at any test pressure 0 mL/min at 30 psig, 0 mL/min at 50 psig, 0 mL/min at 100psig, 0 mL/min at 200 psig

Durtec® - Leakage vs. Gasket Stress



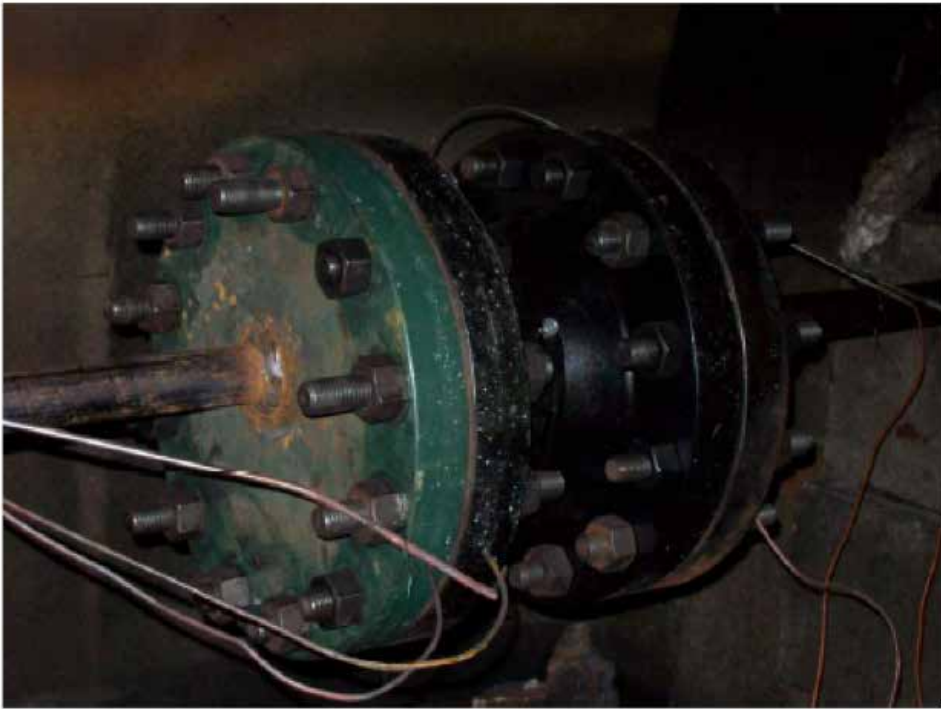
Durtec® - FSA Steam Test



Durtec® - API 607 Fire Test Summary



Sample of Gasket Before Test - 6 inch Class 300
Durlon® Durtec® Gasket



Test Setup

Durtec® - API 607 Fire Test Summary



Assembly During Burn



Gasket After Test - End of 30 minute Burn and 10 minute Cooldown

Durtec® - Superior Fire Safety

Results: API Standard 607, 4th Ed. with Exxon Modifications

- Average bolt torque loss (no adjustments) Upstream 45%, Downstream 33%
- Fire & Cool Down: Combined leak rate (2 gaskets) 1 mL/min at 30 psig avg.
- Post Burn: Combined leak rate (2 gaskets) 0 mL/min at 30 psig avg.
- Exxon Requirements Post Burn: Combined leak rate (2 gaskets) with no flange bolt retorques
 - 0 mL/min at 30 psig 0 mL/min at 200 psig
 - 0 mL/min at 50 psig 0 mL/min at 300 psig
 - 0 mL/min at 100 psig 0 mL/min at 700 psig



Durtec® - Yarmouth Test Details

API 607 4th Edition Fire Test Data

| | |
|---|------------------------|
| Customer: Triangle Fluid Controls Ltd. | Date: 7/14/2009 |
| Project Number: PN20978 | |
| Specification: API 607 4th Edition | |
| Product Code: Durlon® Durtec™ Gaskets | |
| Flange Mfgr: Weldbend | |
| Nut +Bolt Mfgr: Alloy & Stainless Fasteners/Shih Hsang | |
| Comments: New bolts, nuts and flanges | |
| YRT Technician: Matthew J. Wasielewski, P.E. | |

Bolt Torques (ft-lbs)

| Bolt Location | At Start of Test | At End of Test |
|---------------|------------------|----------------|
| Upstream #1 | 200 | 100 |
| Upstream #2 | 200 | 120 |
| Upstream #3 | 200 | 120 |
| Upstream #4 | 200 | 100 |
| Downstream #1 | 200 | 100 |
| Downstream #2 | 200 | 120 |
| Downstream #3 | 200 | 120 |
| Downstream #4 | 200 | 140 |

Fire and Cooldown Data:

| | | |
|-------------------------------------|------------|--------|
| Start Time: | 3:40 PM | (EST) |
| Average Test Pressure: | 30 | psig |
| Combined Leak Rate of Both Gaskets: | 1 | ml/min |
| Allowable Leakage: | 150 | ml/min |
| Is Leakage Below Allowable?: | YES | |

Post Burn Leakage Test

| | | |
|-------------------------------------|------------|--------|
| Start Time: | 4:20 PM | (EST) |
| Average Test Pressure: | 30 | psig |
| Leak Rate Side A: | 0 | ml/min |
| Leak Rate Side B: | 0 | ml/min |
| Combined Leak Rate of Both Gaskets: | 0 | ml/min |
| Allowable Leakage: | 150 | ml/min |
| Is Leakage Below Allowable?: | YES | |

| | |
|---|------------|
| Does Gasket Pass API 607 Leakage Requirements?: | YES |
|---|------------|

Witnesses



Durtec® - Yarmouth Test Details

Exxon Additional Requirements to API 607 4th Edition Fire Test

| | |
|--|------------------------|
| Customer: Triangle Fluid Controls Ltd. | Date: 7/14/2009 |
| Project Number: PN20978 | |
| Specification: Exxon additional requirements to API 607 4th Edition | |
| Product Code: Durlon® Durtec™ Gaskets | |
| Flange Mfgr: Weldbend | |
| Nut +Bolt Mfgr: Alloy & Stainless Fasteners/Shih Hsang | |
| Comments: | |
| YRT Technician: Matthew J. Wasielewski, P.E. | |

Bolt Torques (ft-lbs)

| Bolt Location | At Start of Test | Before Adjustments | At Test Completion |
|---------------|------------------|--------------------|--------------------|
| Upstream #1 | 200 | | 100 |
| Upstream #2 | 200 | | 120 |
| Upstream #3 | 200 | | 120 |
| Upstream #4 | 200 | | 100 |
| Downstream #1 | 200 | | 100 |
| Downstream #2 | 200 | | 120 |
| Downstream #3 | 200 | | 120 |
| Downstream #4 | 200 | | 140 |

| Test Pressure (psig) | Side A Leak Rate (ml/min) | Side B Leak Rate (ml/min) | Total Leak Rate (ml/min) | Flange Bolt Retorques |
|-------------------------|------------------------------|------------------------------|-----------------------------|--------------------------|
| 30 | 0 | 0 | 0 | |
| 50 | 0 | 0 | 0 | |
| 100 | 0 | 0 | 0 | |
| 200 | 0 | 0 | 0 | |
| 300 | 0 | 0 | 0 | |
| 700 | 0 | 0 | 0 | |

Combined leakage was less than 150 ml/min at all pressures.

Witnesses

