



## FR-PITA®

PITA® Technology for FRP Piping & Equipment Flanges  
Manufactured under U.S. Patents 6,682,081 & 7,455,301

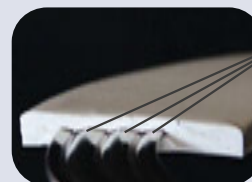
### FR-PITA

Combines VSP's patented PITA® gasket and OPRA™ reduced area technologies in an engineered design for low bolt load FRP flanges. The bolt load is concentrated on the insert corrugations leading to a higher tightness seal with concentric sealing rings while the reduced area allows for higher contact stress on the gasket.



### FR-PITA Addresses FRP Flange Assembly Problems that Lead to Poor Results with Conventional PTFE/ePTFE Technology

- ▶ Flanges
  - ▶ Brittle materials
  - ▶ Increased risk of flange breakage
- ▶ Gaskets
  - ▶ Full-face type gaskets required
  - ▶ Most PTFE materials are too hard
  - ▶ Molded ePTFE gaskets require higher load than is available
- ▶ Bolting
  - ▶ Low bolt torque required to prevent flange breakage
  - ▶ Most PTFE materials are too hard
- ▶ Corrugated peaks—defined contact points result in lower stress to seal than conventional virgin, filled PTFE or ePTFE gaskets



Point Contact Loading



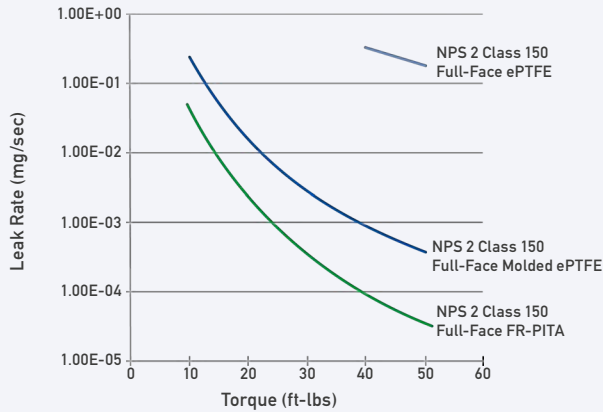
Pressure Film Highlights Gasket Stress

VSP Technologies deploys a team of Engineers and Fluid Sealing Specialists who provide engineered solutions for your unique sealing requirements.

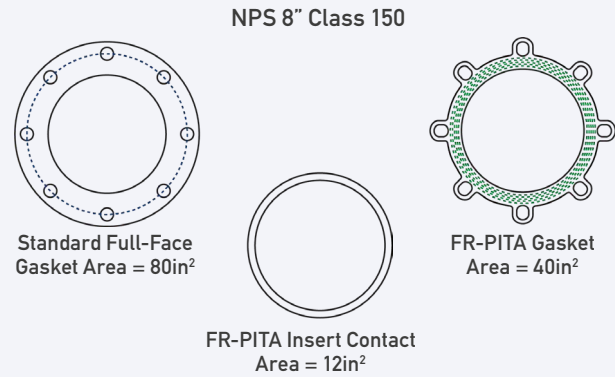
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**SPRING ENERGIZED CONSTRUCTION**

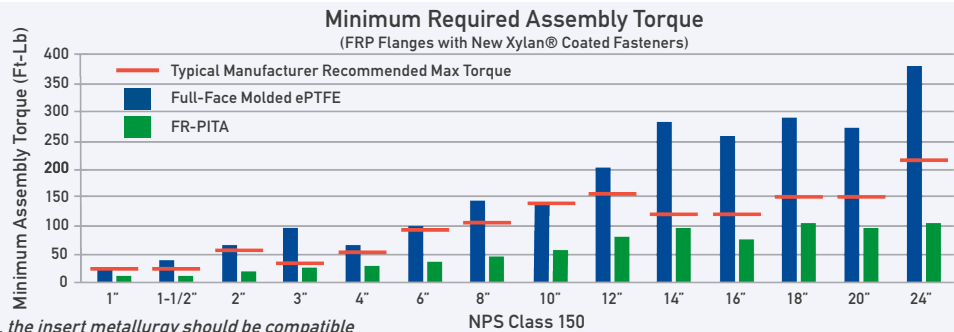
**FR-PITA maintains 10X lower leak rate than full-face molded ePTFE**



**FR-PITA combines patented OPRA and PITA technology to reduce gasket area/contact area**



**FR-PITA seals at a significantly lower minimum assembly torque than molded ePTFE and is within typical manufacturer max torque recommendations**



Note: When using minimum assembly torque, the insert metallurgy should be compatible with the process

**Product Specifications**

Temperature Range	Max= 600°F Min= -330°F
Pressure Resistance	Full vacuum to maximum flange rating
Chemical Resistance	All chemical services (pH 0-14) except molten alkali metals, elemental fluorine and aggressive tri-fluoride compounds
ASME Gasket Factors	m=2.5 y=1,200 psi
PVRC Gasket Factors (PVRC ROTT)	G <sub>B</sub> =263 psi a=0.299 G <sub>S</sub> =2.93E-10 psi
Tightness & Sealability (PVRC ROTT)	T <sub>p (max)</sub> =33,749 T <sub>p (min)</sub> =13,454
Stress Required to Achieve Helium Leak Rate of 1.02E-04 (mg/sec) @ 150 psig (NPS 4x150 Ring Gasket)	2,078 psi
Safe Reserve Operating Temperature (HOBT2 with Cycles)	500°F ASME Class 150 Service 450°F ASME Class 300 Service
Standard Insert Metallurgy	Hastelloy® C-276, 316 SS available

**FR-PITA Minimum Recommended Assembly Torque ASME Class 150**

NPS	TORQUE (Ft-Lb)
1	10
1.5	10
2	20
3	25
4	25
6	35
8	45
10	55
12	80
14	95
16	75
18	105
20	95
24	105

- ▶ ASME flange sizes NPS 1 - NPS 24
- ▶ FR-PITA technology available in custom designs for vessel manways and covers