



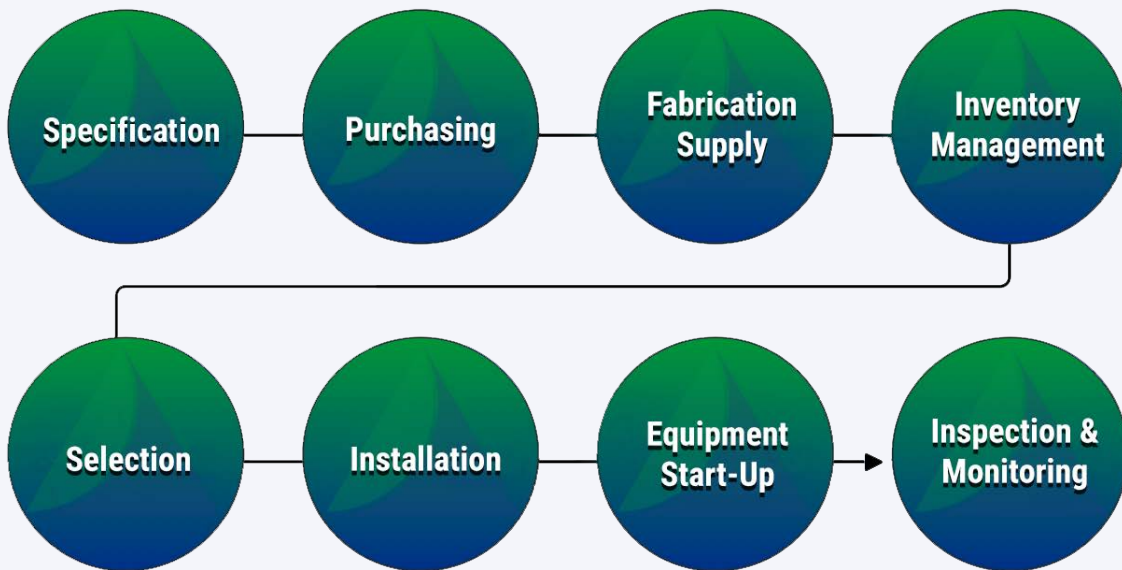
Ecomap™
Environmental Compliance
Maintenance Program

Ecomap

Helping companies develop environmentally sound practices to support sustainability efforts, consent order compliance and restricted emissions allowance, or otherwise achieve Best Available Control Technology (BACT) standards.



VSP Technologies, utilizing a Six Sigma approach, works with customers to develop comprehensive fluid sealing management protocols. Coupling its deep engineering resources, including a senior environmental engineer, with decades of fluid-sealing expertise, VSP can tailor an Ecomap program to fit the unique needs of a plant's operation. Controlling all elements in the process are critical for LDAR and enhanced LDAR programs.



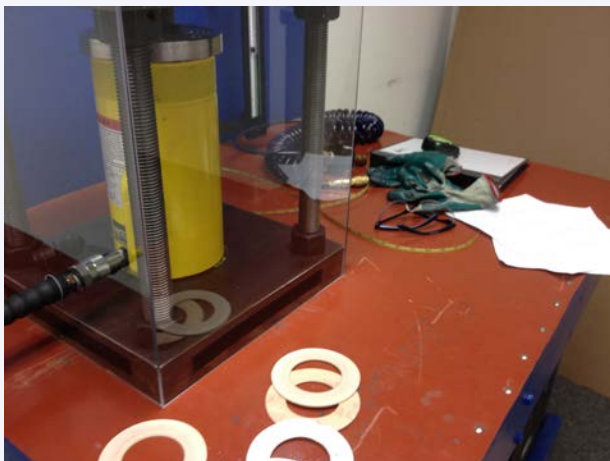
VSP Technologies deploys a team of Engineers and Fluid Sealing Specialists who provide engineered solutions for your unique sealing requirements.

8140 Quality Drive, Prince George, VA 23875
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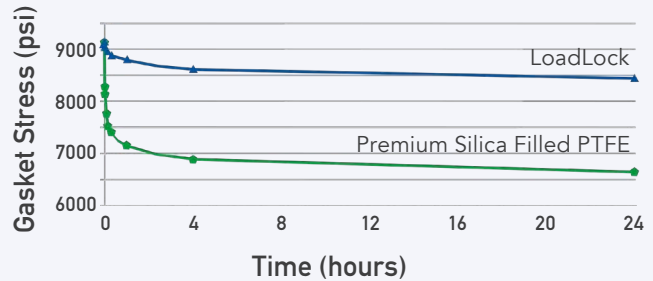
TESTING & EXPERTISE

VSP maintains an extensive database of gasket specifications and capabilities. Partnering world-class manufacturers, third party testing labs and our own in-house lab uniquely position VSP with the expertise, experience & tools to recommend the best sealing products and maintenance practices.

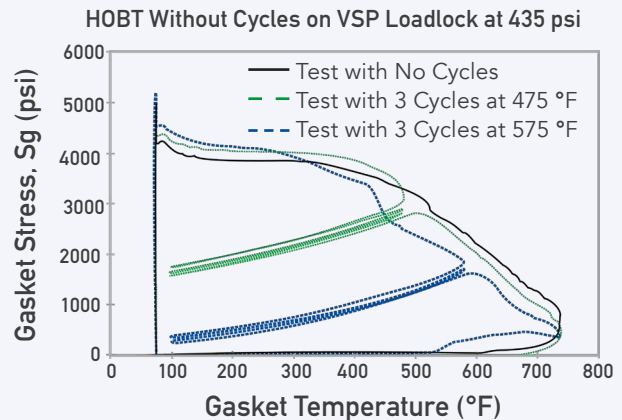
In-house Testing Lab



Gasket Creep/Relaxation Testing



3rd Party HOB2 Testing



We work with Leading Manufacturers to evaluate, support & recommend the best available control technology for your plant processes & practices

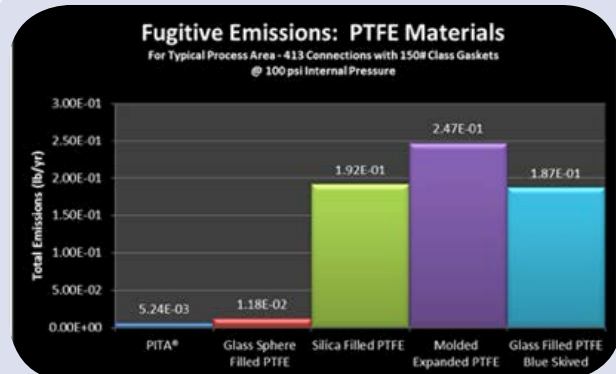


GASKET LEAKAGE CALCULATOR

VSP has developed a proprietary Gasket Leakage Calculator (GLC™) to help customers identify the lowest emission gaskets for their application. Using 3rd party gasket factor testing and an ASME peer-reviewed method, we demonstrate tightness characteristics across brands and material types. The GLC can also provide a more accurate alternative to published emission factors often used in fugitive emissions estimating/reporting (e.g. annual TRI reports).

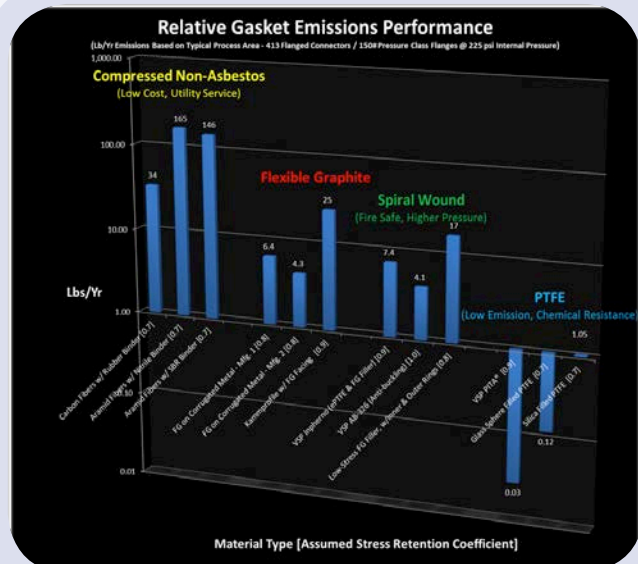
How it Works

- ▶ Applies only to circular gasket flanged connectors
- ▶ Accounts for number of connectors, NPS, operating pressure, torque and operational time for specific plant or process areas
- ▶ Uses ASME/Pressure Vessel Research Council empirical flange design equations with specific, leakage (tightness) based gasket coefficients determined through standardized procedures



What it Provides

- ▶ Relative gasket emissions performance
- ▶ Designed to work in conjunction with a defined Fluid-Sealing Process Management Program (Ecomap) at the site or process unit level, to manage all variables to ensure replication of input/design conditions



References:

1. Bausman, A.R., and Waterland, A.F., 2013 "Practical Sealing for Common Gasket Materials and Construction Types" ASME Pressure Vessels and Piping Conference, PVP2013-97432, Paris, France.
2. Rice, D.A., and Waterland, A.F., 2014 "Environmental Considerations for Gasket Selection and the Development of an Emissions Calculator for Gasket Materials" ASME & Piping Conference, PVP2014-28024, Anaheim, CA, USA.

PROVEN RESULTS

Our time proven process, in conjunction with a commitment by all stake holders, will result in unmatched success. VSP works with you to ensure that the right sealing element is specified & correctly installed every time. We take the lead in providing unsurpassed training to site personnel from LDAR compliance and reliability engineers to flange assembler and Low-E packing installers.

We supply shop selection tools to ensure that the right sealing element is chosen and installed correctly.

On Site Multi-Discipline Training



Installer/Shop Guides

Gasket Type	Material	Temp. Range	Pressure Range	Notes
Graphite	Graphite	300-500 °F	15-20 PSI	High temperature, low pressure
PTFE	PTFE	300-500 °F	15-20 PSI	High temperature, low pressure
Nonmetallic	Various	300-500 °F	15-20 PSI	High temperature, low pressure
Composites	Various	300-500 °F	15-20 PSI	High temperature, low pressure
Metals	Various	300-500 °F	15-20 PSI	High temperature, low pressure

Flange Assembly Procedure

- Lubricate both threads and nut faces and tighten all nuts finger tight
- Select the Target Assembly Torque for the flange type/metalurgy and operating temperature
- Torque/tighten in a star pattern sequence as indicated below in (5) successive (increasing) increments to the Target Assembly Torque
- After the 5th pass, continue tightening the bolts in a circular pattern at the Target Assembly Torque until no further nut movement occurs

Fastener Markings

High Strength: H7, H7.5, H8, H9, H10, H11, H12, H13, H14, H15, H16, H17, H18, H19, H20, H21, H22, H23, H24, H25, H26, H27, H28, H29, H30, H31, H32, H33, H34, H35, H36, H37, H38, H39, H40, H41, H42, H43, H44, H45, H46, H47, H48, H49, H50, H51, H52, H53, H54, H55, H56, H57, H58, H59, H60, H61, H62, H63, H64, H65, H66, H67, H68, H69, H70, H71, H72, H73, H74, H75, H76, H77, H78, H79, H80, H81, H82, H83, H84, H85, H86, H87, H88, H89, H90, H91, H92, H93, H94, H95, H96, H97, H98, H99, H100

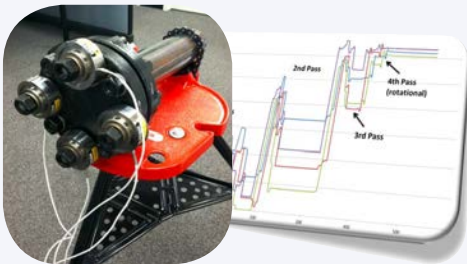
Intermediate Strength: I1, I2, I3, I4, I5, I6, I7, I8, I9, I10, I11, I12, I13, I14, I15, I16, I17, I18, I19, I20, I21, I22, I23, I24, I25, I26, I27, I28, I29, I30, I31, I32, I33, I34, I35, I36, I37, I38, I39, I40, I41, I42, I43, I44, I45, I46, I47, I48, I49, I50, I51, I52, I53, I54, I55, I56, I57, I58, I59, I60, I61, I62, I63, I64, I65, I66, I67, I68, I69, I70, I71, I72, I73, I74, I75, I76, I77, I78, I79, I80, I81, I82, I83, I84, I85, I86, I87, I88, I89, I90, I91, I92, I93, I94, I95, I96, I97, I98, I99, I100

Low Strength: L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L22, L23, L24, L25, L26, L27, L28, L29, L30, L31, L32, L33, L34, L35, L36, L37, L38, L39, L40, L41, L42, L43, L44, L45, L46, L47, L48, L49, L50, L51, L52, L53, L54, L55, L56, L57, L58, L59, L60, L61, L62, L63, L64, L65, L66, L67, L68, L69, L70, L71, L72, L73, L74, L75, L76, L77, L78, L79, L80, L81, L82, L83, L84, L85, L86, L87, L88, L89, L90, L91, L92, L93, L94, L95, L96, L97, L98, L99, L100

Gasket Selection Guides Specific to Your Site

4" x 6" Pocket Assembly Guides

Latest Training Tools & Techniques



Dale Rice, P.E., has a Bachelor's Degree in Chemistry from Hope College and Master's Degree in Environmental Engineering from Syracuse University. Dale is licensed in three states and works as an in-house environmental consultant, providing solutions and technical support to VSP's customers.

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