

VCS Technical Specifications

VCS Gasket Specifications

Description:

The Pikotek VCS gasket is a high reliability gasket used for both insulating and general sealing purposes in Very Critical Services. The gasket has a proven track record of integrity in aggressive sealing situations. The VCS is suitable in all services up to and including ANSI 2500# and API 15,000# classes. The VCS is designed for service where the cost of gasket failure cannot be tolerated.

The VCS gasket consists of a PTFE (Teflon) spring-energized face seal, or an elastomeric o-ring, seated in an insulating laminate, which is permanently bonded to a high-strength metal gasket core. Due to its unique pressure activated sealing mechanism, the gasket requires far less bolt stress to seal than any other gasket. The VCS gasket inner diameter is exactly matched to the flange bore to eliminate turbulent flow and flange face erosion/corrosion. The seal elements are replaceable in the reusable gasket retainer.

Applications:

- Flange insulation in conjunction with cathodic protection.
- Insulation between dissimilar metals to prevent galvanic corrosion.
- Wellhead isolation from inter-connected flowlines.
- Mating mismatched ring-joint to raised-face flanges (VCS will seal in ring-joint, raised-face and flat face/slip-on flanges).
- Eliminate fluid trap corrosion between ring-joint (RTJ) flanges where high concentrations of CO₂, H₂S and other aggressive hydrocarbon media are present.
- Eliminate turbulence and flow-induced erosion between ring-joint (RTJ) flanges.
- Protect against coating impingement on coated flange faces.
- To seal between flanges subjected to vibration/cavitation (i.e., compressor stations).

Ordering:

When ordering a complete VCS insulating kit, the following must be specified:

- 1) Flange Specification (ANSI/ASME, API, MSS, BSI or DIN standard)
- 2) Nominal Pipe Size, Pressure Rating and Bore Size
- 3) Operating Pressure, Temperature and Media
- 4) Required Seal Material
- 5) Insulating Sleeve Material
- 6) Insulating Washer Material
- 7) Metal Washer Material

Metallic Core

The core of each gasket is made of annealed 316 stainless steel. Other metals, including Duplex and Inconel are available upon special order.

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Gasket Insulating Material Options

- 1) **G-10** NEMA grade G-10 Glass-Reinforced Epoxy (GRE) laminate - **STANDARD**

Compressive Strength:	65,000 PSI
Dielectric Strength:	750-800 VPM
Max. Continuous Operating Temp:	302° F (150° C)
Water Absorption:	.05%
Flexural Strength:	65,000 PSI
Tensile Strength:	50,000 PSI
Bond Strength:	2,600 lb.
Shear Strength:	22,000 lb.

- 2) **G-11** NEMA grade G-11 Glass-Reinforced Epoxy (GRE) laminate material:

Compressive Strength:	50,000 PSI
Dielectric Strength:	500 VPM
Max. Continuous Operating Temp:	350° F (177° C)
Water Absorption:	.085%
Flexural Strength:	57,700 PSI
Tensile Strength:	41,000 PSI
Bond Strength:	2,200 lb.
Shear Strength:	21,200 lb.

Seal Material

The sealing elements are intended to provide an impervious barrier through which no contained media or other substance can penetrate. Consequently, the composite retainer backing material behind the seal remains uncontaminated and thus permanently holds the seal in place in a static, fully encapsulated manner.

Seal Material Options

- 1) **Teflon (Spring-Energized)**

STANDARD

Recommended for all environments. Helical wound spring provides radial load. Encapsulation in the seal groove eliminates creep or cold flow. This sealing system truly distinguishes Pikotek gaskets from all other flange sealing systems.

Temperature Range: -250° F to +350° F (note: gasket material is limiting factor)

- 2) **Viton**

General-purpose oilfield elastomer. Excellent resistance to aliphatic hydrocarbons, glycols and H₂S. Good resistance to aromatic hydrocarbons.

Not recommended for: Systems with amine inhibitors and in piping systems containing significant partial pressures of polar gases (i.e. CO₂) where radical pressure drops (i.e., 2000 PSI to 0 PSI) commonly occur.

Temperature Range: -15° F to +350° F

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Insulating Sleeve Options

- 1) **GRE** **STANDARD**
GRE (Glass-Reinforced Epoxy) tubing is suitable for continuous exposure to 350° F. This material is an epoxy laminate that offers **excellent** resistance to crushing, cracking, breaking and thread pinch.
- 2) **Mylar**
Spiral wound Mylar is a general-purpose material recommended for bolting applications with flange temperatures below 250° F. This material has generally **fair** resistance to crushing, cracking, breaking and thread pinch.

Insulating Washers

- 1) **GRE** **STANDARD**
1/8" (.125) thick washers cut to standard SAE washer dimensions

Steel Washer Options

- 1) **ZPS** **STANDARD**
Zinc-Plated Steel washers cut to standard SAE washer dimensions.
- 2) **SS**
Stainless Steel washers cut to standard SAE washer dimensions.

Three primary cross-sections of the Pikotek VCS

- 1) **1/2" thru 5" = .245" (.250" nominal) for all flange types including RTJ**

This cross-section is used for all small diameter flanges (less than 6" ID) in all pressure classes except API 10,000 PSI. This cross-section is thicker than conventional flange isolation for added flange separation. Further, the gasket thickness coincides closely to the flange separation (standoff) found with standard small diameter "R" and "RX" RTJ connections.

- 2) **6" thru 72" = .308" for all flange types including RTJ**

This cross-section is used for all large diameter flanges (equal to and greater than 6" ID) in all pressure classes except API 10,000 PSI. This thicker cross-section accommodates larger cross-section seals and further increases flange separation. Further, the gasket thickness coincides closely to the flange separation (standoff) found with standard large diameter "R" and "RX" RTJ connections.

- 3) **API 10,000 PSI = .250"**

This cross-section is designed for elevated pressures. The core is thicker with redundant seals seated deeper into the metal core for greater sealing integrity. This cross section is standard for all API 10,000 PSI flanges.

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Recommended Bolt Torque Values

(Bolt Stress = 30,000 PSI)

<u>Nominal Diameter of Bolts</u> (inches)	<u>Torque Value</u> (Ft. lbs.)
1/2	30
9/16	45
5/8	60
3/4	100
7/8	160
1	245
1 1/8	355
1-1/4	500
1-3/8	680
1-1/2	800
1-5/8	1100
1-3/4	1500
1-7/8	2000
2	2200
2-1/4	3180
2-1/2	4400
2-3/4	5920
3	7720
3-1/4	8400
3-1/2	9000
3-3/4	9600
4	10000

Notes:

- 1) Recommended bolt torque is based on generating a minimum gasket seating stress of 7,500 PSI.
- 2) Bolt torque values listed assume a lubricated stud bolt resulting in a .16 friction factor.
- 3) Recommended torque values are based on using weld-neck (integral) flanges.
- 4) Blind or other flanges may require different seating loads (please contact factory).
- 5) 30,000 PSI bolt stress may exceed the design allowable stress levels for certain stud bolt materials.