



ANSI B16.5 Bolt Torque (ft.-lbs) for 7500psi Gasket Seating Stress for Raised Face Flanges						
Nominal Pipe Size	Pressure Classes					
	150 Class	300 Class	600 Class	900 Class	1500 Class	2500 Class
1/2	21	21	21	30	30	30
3/4	30	37	37	43	43	43
1	40	49	49	66	66	66
1 1/4	60	73	73	100	100	113
1 1/2	78	113	113	148	148	165
2	150	75	75	102	102	116
2 1/2	184	109	109	142	142	159
3	262	155	155	178	225	248
3 1/2	149	175	202	N/A	N/A	N/A
4	186	219	253	320	352	417
5	277	277	363	446	528	610
6	352	234	307	342	411	878
8	490	377	476	573	670	815
10	475	404	496	542	967	1272
12	619	586	517	565	1004	1817
14	767	512	617	669	1228	N/A
16	713	700	829	894	1684	N/A
18	1038	763	1169	1338	2413	N/A
20	917	842	1076	1572	2899	N/A
22	1187	1172	1355	N/A	N/A	N/A
24	1289	1272	1570	2481	4293	N/A

ANSI B16.5 Bolt Torque (ft.-lbs) for 7500psi Gasket Seating Stress for RTJ Flanges						
Nominal Pipe Size	Pressure Classes					
	150 Class	300 Class	600 Class	900 Class	1500 Class	2500 Class
1/2	N/A	29	29	62	62	77
3/4	N/A	55	55	76	76	97
1	35	63	63	93	93	142
1 1/4	45	78	78	115	115	228
1 1/2	61	127	127	179	179	335
2	122	65	65	143	144	205
2 1/2	185	113	113	193	193	278
3	201	144	144	218	354	381
3 1/2	143	166	192	N/A	N/A	N/A
4	179	199	230	341	479	596
5	233	290	380	532	778	903
6	270	250	328	365	471	1390
8	382	439	555	738	879	1248
10	398	466	572	686	1247	2374
12	698	665	586	698	1230	3415
14	724	680	819	899	1732	N/A
16	675	847	1003	1178	2176	N/A
18	990	931	1427	1712	3111	N/A
20	877	1093	1396	2062	3859	N/A
22	1055	1374	1588	N/A	N/A	N/A
24	1321	1626	2007	3273	5935	N/A

Notes:
1) Recommended bolt torque is based on generating a minimum gasket seating stress of 7,500 PSI arrived at using API 6A Annex D recommended flange bolt torque.
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) The torque figures above are based on a flange surface finish between 125 -250 rms finish, surface flatness within 0.020" tolerance and no misaligned flanges.
5.) Deviation from these specific requirements may affect product performance or longevity.

VCS System Specifications

The Pikotek VCS seal is a high reliability system used for both isolating and general sealing purposes in Very Critical Services. The seal kit 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 10,000# classes. The VCS system is designed for service where the cost of failure cannot be tolerated. The VCS kit consists of a PTFE (Teflon) spring-energized seal, or an elastomeric o-ring, seated in an isolating laminate, which is permanently bonded to a high-strength metal gasket core. Sleeves and washers complete the isolating package. Due to its unique pressure activated sealing mechanism, the seal requires far less bolt stress to seal than any other industry gasket. The VCS 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 seal retainer.

Applications:

- Flange isolation in conjunction with cathodic protection.
- Isolation 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 damage on coated flange faces.
- To seal between flanges subjected to vibration/cavitation (i.e., compressor stations).

Ordering:

When ordering a complete VCS isolating 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) Isolating Sleeve Material and length if a custom size
- 6) Isolating Washer Material

Metallic Core

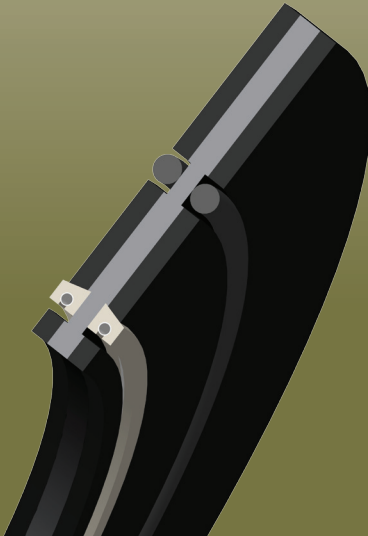
The core of each gasket is made of annealed 316 stainless steel. Other metals, including Duplex and Inconel are available upon special order.

Isolating Material Options

1) G-10

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

Compressive Strength:	65,000 PSI
Dielectric Strength:	750-800 VPM
Max. Continuous Operating Temp:	302° F (150° C)
Minimum Continuous Operating Temp:	(minus) – 200° F
Water Absorption:	.05%
Flexural Strength:	65,000 PSI
Tensile Strength:	50,000 PSI
Bond Strength:	2,600 lb.
Shear Strength:	22,000 lb.



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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:	392° F (202 °C)
Minimum Continuous Operating Temp:	(minus) -50 °F
Water Absorption:	.085%
Flexural Strength:	57,700 PSI
Tensile Strength:	41,000 PSI
Bond Strength:	2,200 lb.
Shear Strength:	21,200 lb.

3) G-10CR (Cryogenic)

NEMA grade G-10 Glass-Reinforced Epoxy (GRE) laminate material:

Produced to NIST G10CR process specification for materials used in cryogenic applications.

Compressive Strenght:	65,000 PSI
Dielectric Strength:	800 VPM
Max. Continuous Operating Temp:	266°F (130 °C)
Minimum Continuous Operating Temp:	(minus) -273 °C -459 °F
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)

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 +250° F (note: gasket material is limiting factor)

Spring Material Options

Standard spring material is 302L Stainless Steel.

Hastelloy C276 is also available for aggressive medias.

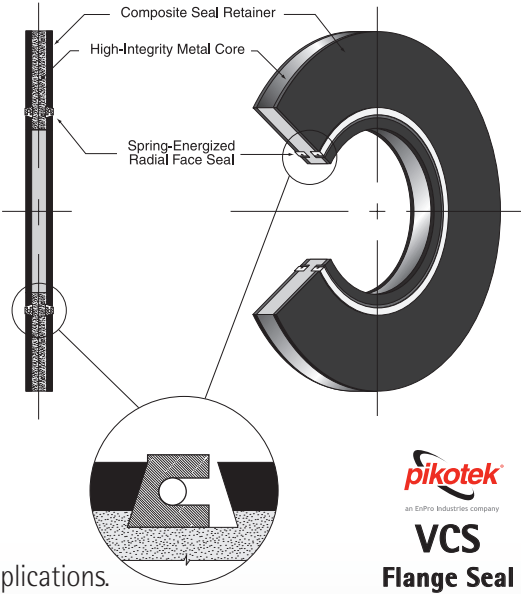
Note. At this time all other materials have too high a level of hardness to enable spring to be wound to the desired specification.

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 +392° F



3) Buna-Nitrile

General purpose elastomer only suitable for mild chemical resistance.

Temperature range -200°F to 240°F

4) Silicon

Suitable for use in potable water applications. Approved by WRAS.

Temperature range -55C to 300C

Special seal ring materials are available on request and subject to technical acceptability.

Isolating Sleeve Options

1) GRE

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) NOMEX

Nomex is a high temperature sleeve material manufactured from solid organic polymer and is suitable for temperatures up to 425 degree F.

3) 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.

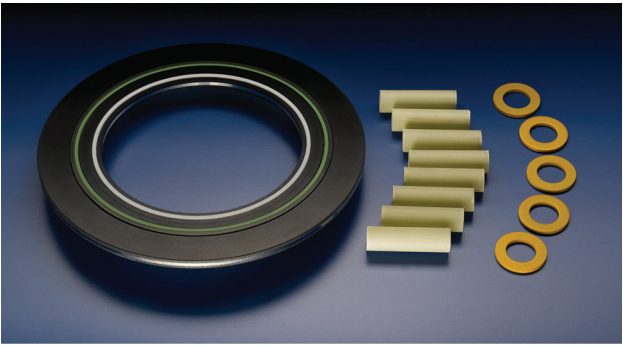
Isolating Washers Options

1) HCS WASHERS

Hardened Coated Steel Isolating Washers

2) GRE WASHERS

1/8" (.125) thick washers



Steel Washer Options

1) ZPS

Zinc-Plated Steel Washers

2) SS

Stainless Steel Washers

Three primary cross-sections of the Pikotek VCS

1) ½" 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.