



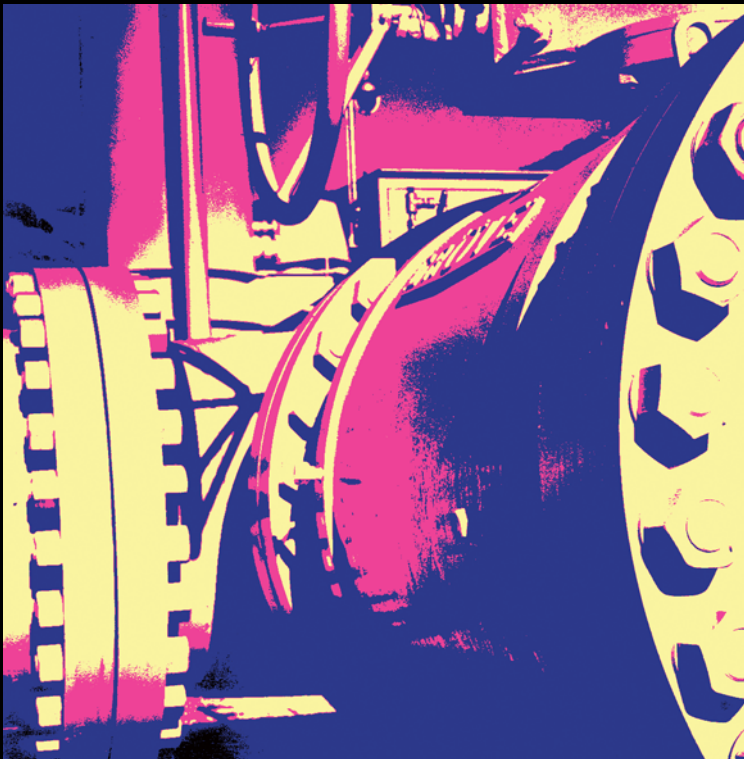
Flange Isolation Catalog

Sealing and Isolating Gaskets

Flange Isolation Kits

Isolation Sleeves and Washers

Specifications and Ordering Guide



PSI Isolating Gasket Types

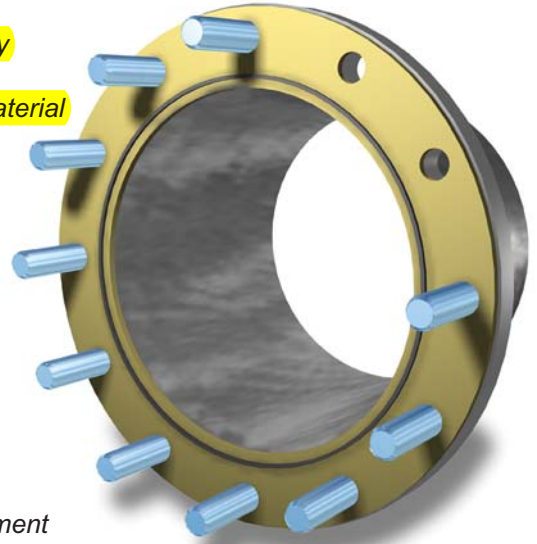
Type "E" Gaskets

Type "E" Gaskets extend to the outside diameter of the flange. They feature precision located bolt holes, to automatically center the gasket, and offer maximum protection against foreign material "shorting-out" the flange.

Type "E" gaskets may be ordered in any one of the following configurations:

- LineBacker® Sealing Gaskets
- GasketSeal® Sealing Gaskets
- Rubber Faced Phenolic Gaskets
- Plain Phenolic Gaskets
- Red Devil Gaskets
- Yellow Jacket Gaskets
- Garlock Gaskets
- Teflon® Gaskets

When configured as a LineBacker® Sealing Gasket, the sealing element may be positioned anywhere between the I.D. of the gasket and I.D. of the bolt circle.

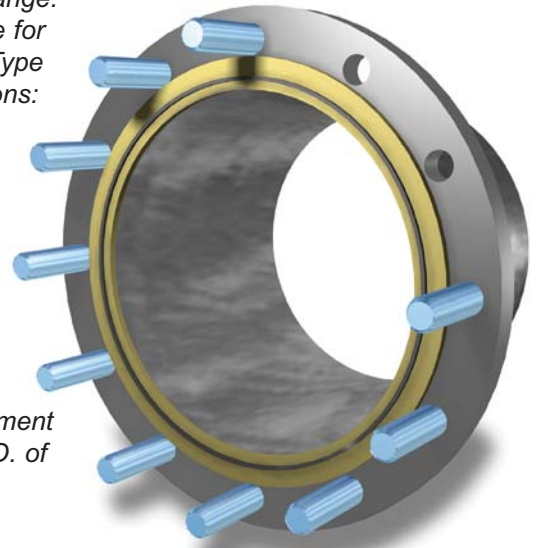


Type "F" Gaskets

Type "F" Gaskets are made to fit within the bolt hole circle of the flange. The O.D. of the gasket extends out to the I.D. of the bolt hole circle for good protection against foreign material "shorting-out" the flange. Type "F" gaskets may be ordered in any one of the following configurations:

- LineBacker® Sealing Gaskets
- GasketSeal® Sealing Gaskets
- Rubber Faced Phenolic Gaskets
- Plain Phenolic Gaskets
- Red Devil Gaskets
- Yellow Jacket Gaskets
- Garlock Gaskets
- Teflon® Gaskets

When configured as a LineBacker® Sealing Gasket, the sealing element may be positioned anywhere between the I.D. of the gasket and I.D. of the bolt circle.



Type "D" Gaskets

Type "D" Gaskets are available for RTJ flanges but the LineBacker® Sealing Gasket is an excellent alternative to "D" gaskets because the sealing element may be positioned anywhere between the I.D. of the gasket and I.D. of the ring groove. Inquire about the LineSeal™ sealing gasket for RTJ flange applications.

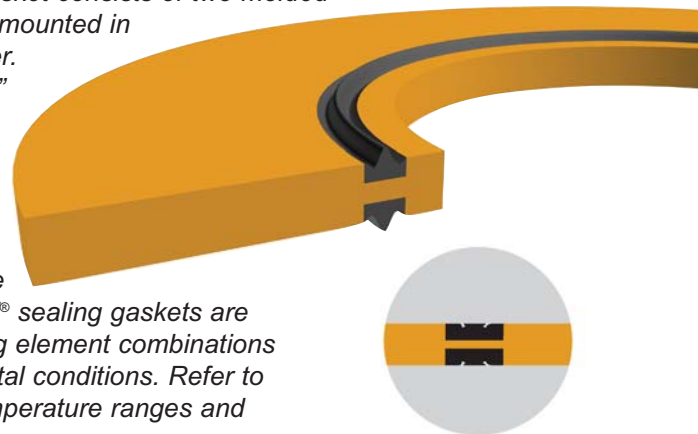
PSI Sealing & Isolating Gaskets - Standard 1/8" Thick*

GasketSeal® Sealing Gaskets



GasketSeal® sealing gaskets are considered one of the most effective methods for sealing and isolating flanges of all types. The gasket consists of two molded semi "O" rings (with precise crown to void ratio) mounted in grooves on opposite sides of an isolating retainer. While maintaining all the advantages of a full "O" ring seal, the semi "O" ring seal eliminates the need for a sealing groove in the flange face to reduce problems associated with alignment. GasketSeal® gaskets are self energizing with theoretical near zero "m" and "y" factors resulting in effecting a positive seal without excessive bolt loads required with flat gaskets. GasketSeal® sealing gaskets are available in a wide variety of retainer and sealing element combinations for matching gaskets to service and environmental conditions. Refer to the chart for the GasketSeal® sealing gasket temperature ranges and material compatibilities.

Note: Flange Faces, see page 11.



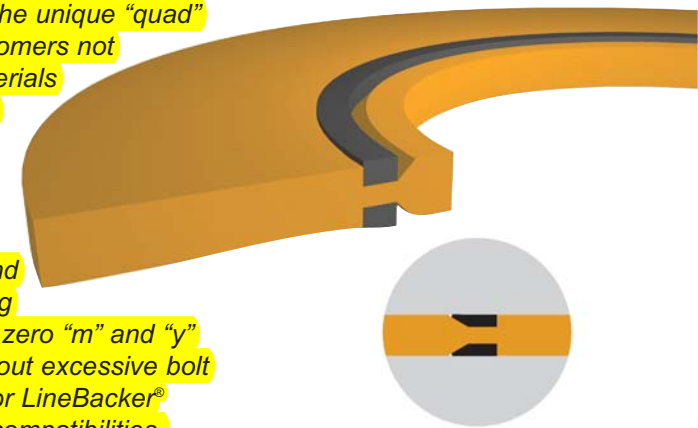
After Tightening

LineBacker® Sealing Gaskets



LineBacker® sealing gaskets utilize a patented rectangular sealing element, referred to as a "quad" ring, in combination with a unique groove design to effectively seal and isolate flanges of all types. With the unique "quad" ring design, elastic memory is provided for elastomers not normally associated with this characteristic. Materials such as AFLAS, TFE (Teflon) and KALREZ may therefore be used as sealing elements which dramatically increases the options available for matching gasket materials to service and environmental conditions. This greater variety of materials also provides excellent temperature and chemical range compatibility. LineBacker® sealing gaskets are self energizing with theoretical near zero "m" and "y" factors resulting in effecting a positive seal without excessive bolt loads required with flat gaskets. Refer to chart for LineBacker® sealing gasket temperature range and material compatibilities.

Note: Flange Faces, see page 11.



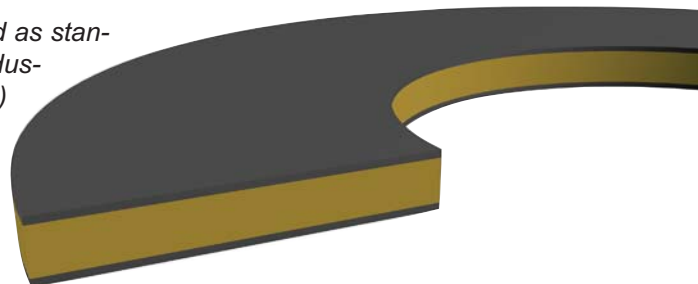
After Tightening

Rubber Faced Phenolic Gaskets



Rubber Faced Phenolic gaskets have been used as standard "flat" isolating gaskets in the oil and gas industries for many years. Neoprene (Nitrile or EPDM) rubber sheets are factory applied to both sides of a laminated phenolic retainer providing an effective sealing surface.

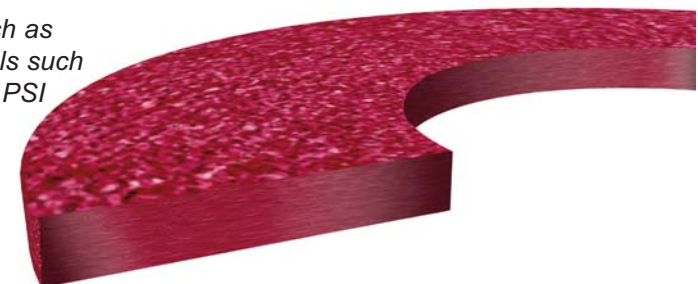
Note: Due to improved sealing characteristics and retainer/seal element options, LineBacker or GasketSeal sealing gaskets should be considered in lieu of rubber faced phenolic gaskets whenever possible.



Flat Gaskets



Flat gaskets are used in special applications such as elevated temperatures that often require materials such as Red Devil or Yellow Jacket. Please contact a PSI representative for additional information on available options.



* = Other thicknesses available through special order.

Sleeves and Washers

Isolating Sleeves

Isolating sleeves are available in the following materials:

- Mylar
- Polyethylene
- Phenolic
- Nomex®
- G-7 Silicon Glass
- G-10 Epoxy Glass
- G-11 Epoxy Glass

Designed to easily fit over standard size flange bolts/studs within standard size bolt holes, PSI isolating sleeves have a wall thickness of 1/32" (0.79mm) and are used with separate isolating and steel washers. They are available for standard American bolt sizes from 1/2" (12.7mm) to 3-1/2" (88.9mm) as well as metric bolt sizes from 12mm and larger.

Isolating Washers - Standard 1/8" Thick*

Isolating washers are available in the following materials:

- High Strength Glass Clad Phenolic
- G-3 High Temp. Phenolic
- G-7 Silicon Glass
- G-10 Epoxy Glass
- G-11 Epoxy Glass

Designed to provide tough, positive isolation. PSI isolating washers are available for bolt sizes from 1/2" (12.7mm) through 3-1/2" (88.9mm) and are made to fit over the isolating sleeves.

* = Other thicknesses available through special order.

Steel Washers

Steel washers are designed to fit over the isolating sleeve or the retainer ring on the one-piece sleeves and washers. The outside diameter is sized to fit within the bolt facing on ANSI standard flanges. They are made of 1/8" (3.2mm) thick plated hot-rolled steel. **Note:** 304 stainless steel available for special order.



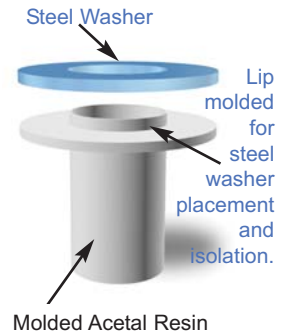
Note: Caution! Bolts with smooth shank portions may not fit within sleeves. Verify prior to ordering.

One-piece Sleeves and Washers

Molded Acetal 1 PC

Molded from acetal resin and available for bolt diameters from 1/2" to 1-1/2" (12.7 to 38.1mm), one-piece sleeves and washers are structurally tough but limited to applications where the flange temperature does not exceed +180°F (+80°C) and compressive loads do not exceed 18,000 psi.

They are generally used as single washer sets because they're molded to specific lengths and, in many instances, are longer than the thickness of a single flange. A washer centering ring positions the steel washer on the unit properly to avoid uneven pressures on the washers.



G-10 1 PC

Completely assembly custom made where ANSI rating exceeds 600#, operating temperatures up to 300°F (+149°C) and can handle compressive loads of 50,000 psi.

One - 1/8" thick steel washer

One - 1/8" thick G-10 washer

One - G-10 Isolating Sleeve



Custom Fabricated: G-10 One-Piece

Completely Assembled - No Loose Parts.

For pipe diameters over 24" or ANSI Class pressure ratings of 600# or greater, use **G-10 sleeves and G-10 washers** where temperatures and other conditions permit.

Sleeve Material Physical Properties

ASTM Test Method	Poly-ethylene	Mylar	Nomex	Phenolic	G-7* Silicone Glass	G-10 Epoxy Glass	G-11 Epoxy Glass	One-piece Molded Acetal
D149 Dielectric Strength Volts/Mil (Short Time)	400	4000	400	400	350	400	400	1,200
D695 Compressive Strength psi	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18,000
D229 Water Absorption %	0.01	0.8	N/A	1.6	0.10	0.10	0.10	0.22
Operating Temp. °F	-30 to +180	-75 to +300	-65 to +450	-20 to +225	Cryogenic to +450	Cryogenic to +280	Cryogenic to +320	-30 to +180
°C	-34 to +82	-59 to +149	-54 to +232	-29 to +107	Cryogenic to +232	Cryogenic to +138	Cryogenic to +160	-34 to +82
D790 Flexural Strength psi	7,000	13,000	20,000	16,000	20,000	55,000	55,000	1,400
Cut Through Resistance ft-lbs.	1,800	3,500	4,000	No Test	No Test	16,000	No Test	3,400

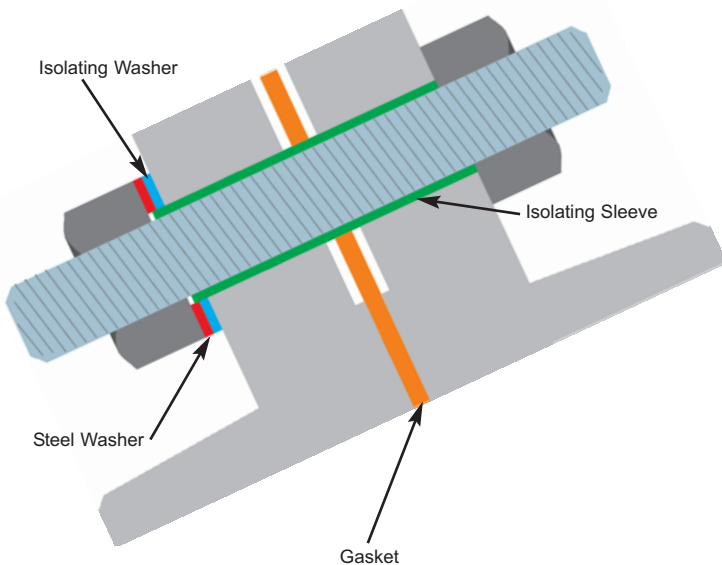
* = G-7 material should not be used with hydrocarbons, not even trace amounts.

1/8" Washer Material Physical Properties

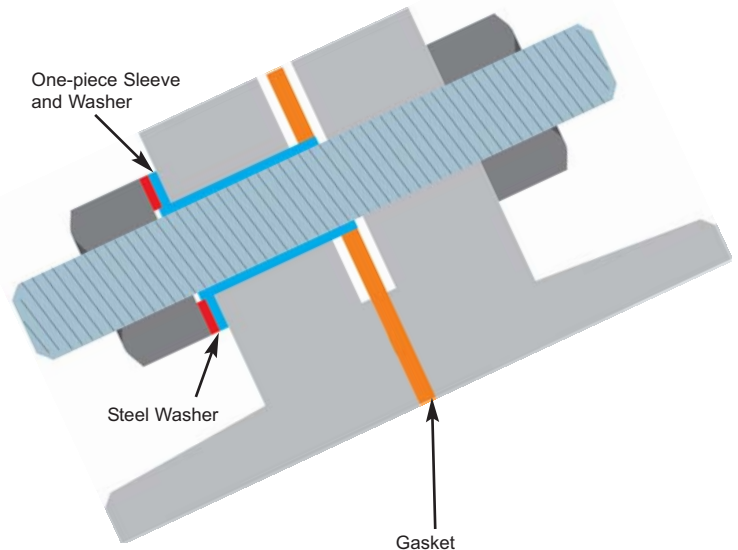
ASTM Test Method	Glass Clad Phenolic	G-3 Hi-Temp Phenolic Glass	G-7* Silicone Glass	G-10 Epoxy Glass	G-11 Epoxy Glass	One-piece Molded Acetal
D149 Dielectric Strength Volts/Mil (Short Time)	500	550	350-400	550	550	1,200
D695 Compressive Strength psi	33,000	50,000	40,000	50,000	50 - 80,000	18,000
D229 Water Absorption %	1.6	0.7	0.07	0.10	0.10	0.22
Operating Temp. °F	-65 to +300	-65 to +392	Cryogenic to +450	Cryogenic to +280	Cryogenic to +350	-30 to +180
°C	-54 to +149	-54 to +200	Cryogenic to +232	Cryogenic to +138	Cryogenic to +177	-34 to +82

* = G-7 material should not be used with hydrocarbons, not even trace amounts.

Full length sleeve, single washer set configuration



One-piece sleeve & washer configuration



Flange Isolation Kits

Flange Isolation Kits

Flange isolation kits are available for all flange sizes, types, pressure ratings and materials. Each kit is individually and securely packed in a reinforced corrugated cardboard box, which is clearly labeled as to its contents for convenience in warehousing and field use. Very large diameter gaskets are packaged separately from the sleeves and washers for convenience in storing and handling.

Each gasket is labeled with:

- Materials (Retainer Material or Retainer/Seal Element Combination)
- Pipe Size
- ANSI Class
- Date of Manufacture
- Type Flange (Weld Neck or Slip-on)
- Installation Procedure
- Torque Values

Sleeves and Washers

Sleeves and washers are enclosed in a strong polyethylene bag to eliminate any possibility of loss. A chart showing the recommended sequence for tightening flange bolts is also included with each kit, as well as with each individual gasket.



Common LineBacker® & GasketSeal® Sealing Gasket Physical Properties

ASTM	Test Method	Plain Phenolic	Rubber Faced Phenolic	G-3 Hi-Temp Phenolic Glass	G-7* Silicone Glass	G-10 Epoxy Glass	G-11 Epoxy Glass
D149	Dielectric Strength Volts/Mil (Short Time)	500	500	550	350-400	550	550
D695	Compressive Strength (psi)	25,000	25,000	50,000	40,000	50,000	50,000+
D229	Water Absorption (%)	1.6	1.6	0.7	0.07	0.10	0.10
D257	Insulation Resistance Meg Ohms	40,000	40,000	46,000	2,500	200,000	200,000
D790	Flexural Strength (psi)	22,500	22,500	60,000	27,000	60,000	75,000+
D785	Hardness Rockwell "M"	85	85	115	105	115	115
D256	IZOD Impact Strength (Ft-Lbs/Inch)	1.2	1.2	12.0	8.0	14.0	12.0
D638	Tensile Strength (psi)	20,000	20,000	42,000	25,000	45,000	43,000
D732	Shear Strength (psi)	10,000	10,000	18,000	20,000	22,000	22,000
	Temperature Range (Degrees F)	-65 to +220	-65 to +175	-65 to +392	Cryogenic to +450	Cryogenic to +280	Cryogenic to +349
	Temperature Range (Degrees C)	-54 to +104	-54 to +79	-54 to +200	Cryogenic to +232	Cryogenic to 138	Cryogenic to +176

* = G-7 Material should not be used with hydrocarbons, not even trace amounts.

Seal Element Temperature Limits

	Nitrile	Viton	Teflon	Neoprene	EPDM
Degrees Fahrenheit	-40 to +250	-20 to +350	Cryogenic to +450	-40 to +175	-65 to +300
Degrees Celsius	-40 to +121	-29 to +177	Cryogenic to +232	-40 to +79	-54 to +149

Consider **both** retainer and seal element temperature limits together for GasketSeal® and LineBacker® Sealing Gaskets.

Flange Isolation Kits

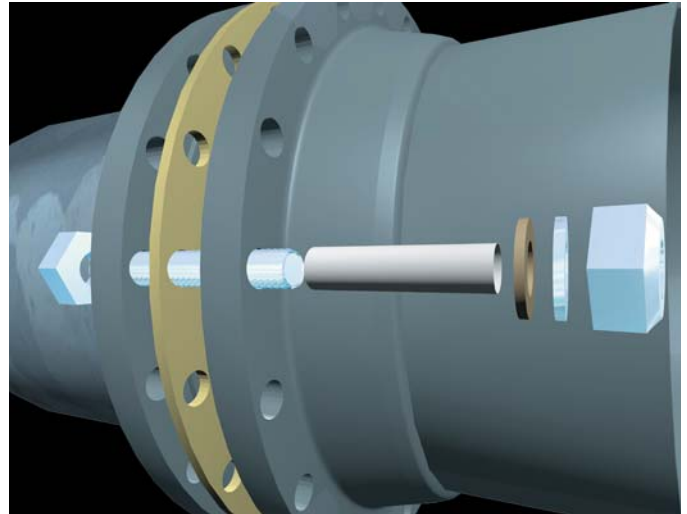
Single Washer Set

Single washer set flange isolation kits include the following items for each bolt:

- One - 1/8" thick steel washer
- One - Isolating washer
- One - Isolating sleeve

Application Considerations

In buried applications, single washer configurations may be used to allow the Cathodic Protection (CP) current to reach the nuts and bolts. If desired, nuts on the opposite side of the cathodically protected flange may be included as part of the CP system.



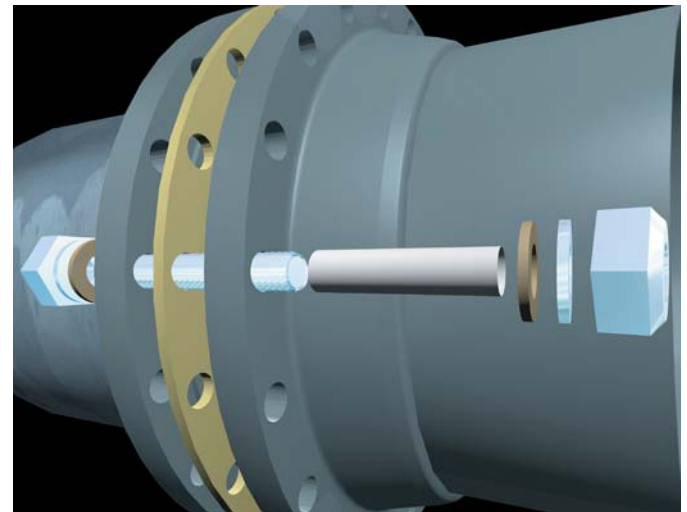
Double Washer Set

Double washer set flange isolation kits include the following components for each bolt:

- Two - 1/8" thick steel washers
- Two - Isolating washers
- One - Full length isolating sleeve

Application Considerations

Double washer configurations may be used for added protection against the possibility of "shorting out" the nuts and bolts. In addition, double washer sets electrically isolate the nuts and bolts from both flanges.



One-Piece Sleeve and Washer Sets

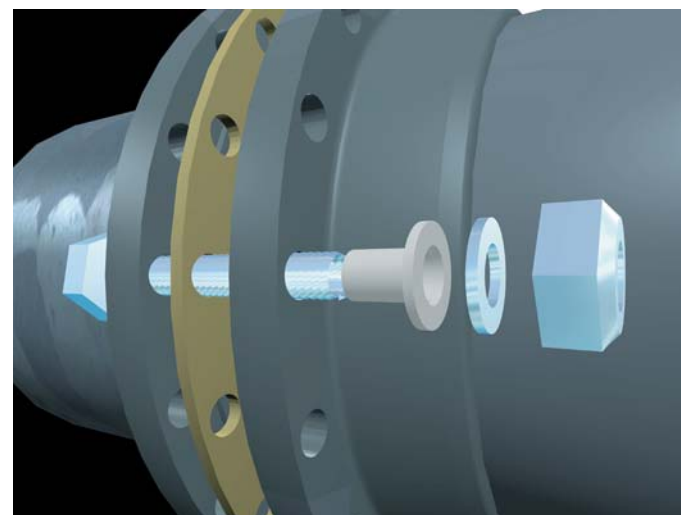
One-piece sleeve and washer set flange isolation kits include the following items for each bolt:

- Two - 1/8" thick steel washers
- One - One-piece Isolating sleeve

Application Considerations

Easier to install, one-piece sleeves also allow the inspector a visual indication of sleeve usage. Due to the relatively low compressive strength of this material, its use is not recommended for high pressure or large diameter flanges that require high torque loads.

Note: G-10 One-Piece sleeve/washer assembly available for additional strength and convenience. See page 6 photo.



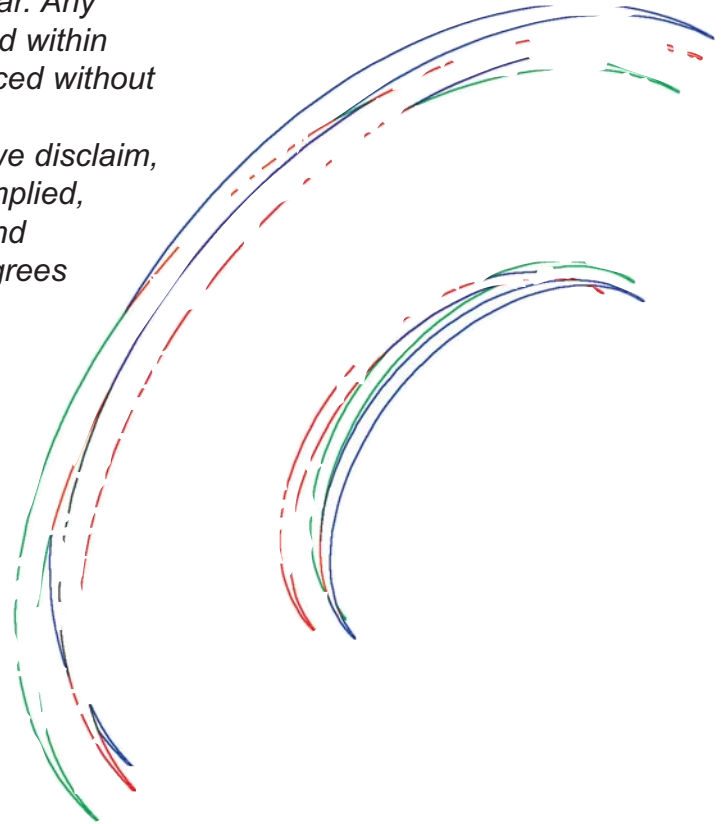
Buried Application Note: Consider using the ElectroStop™ monolithic isolation fitting.

Warranty

All products are warranted against failure caused by manufacturing defects for a period of one year. Any product found to be so defective and returned within one year from date of shipment will be replaced without charge.

The above warranty is made in lieu of, and we disclaim, any and all other warranties, expressed or implied, including the warranties of merchantability and fitness for a particular purpose, and buyer agrees to accept the products without any such warranties.

We hereby disclaim any obligation or liability for consequential damages, labor costs or any other claims or liabilities of any kind whatsoever.



ElectroStop Monolithic Isolation Fittings...Alternative to Flange Isolation Kits.

The ElectroStop™ monolithic isolation fitting will serve as a positive leak proof, long lasting block against the flow of electric current in all piping systems.

When you bury the ElectroStop isolation fitting you bury maintenance costs forever - an especially important feature for system operators and engineers.



The Industry's "Dual 'O' Ring Seal"

Standard Test Include:

100% Hydrostatic Pressure & Electrical tests

100% Ultrasonic of Welds

100% Magnetic Particle of Welds

100% Dye Penetrant of Welds



Pipeline Seal and Insulator, Inc.

6525 Goforth Street, Houston, TX 77021 U.S.A.

Telephone: 713-747-6948 • Toll Free: 800-423-2410 • Facsimile: 713-747-6029

www.pipelineseal.com • e-mail: info@psipsi.com



Certificate No. 10125

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PSI-FIC-3/09

The foregoing performance data are intended as guidelines only. Performance suitability for any specific applications should be determined by the user. Variation in temperature, pressure, concentration or mixtures acting synergistically may preclude suggested service use. Material selection is at the sole risk of the user. Consult with a specialist or PSI factory for specific applications. PSI's responsibilities will be limited to those listed in the PSI standard warranties. Note: Graphics not to scale, for illustration use only.