



FLANGE INSULATION GASKETS



ISOMAX Flange Insulation Sets

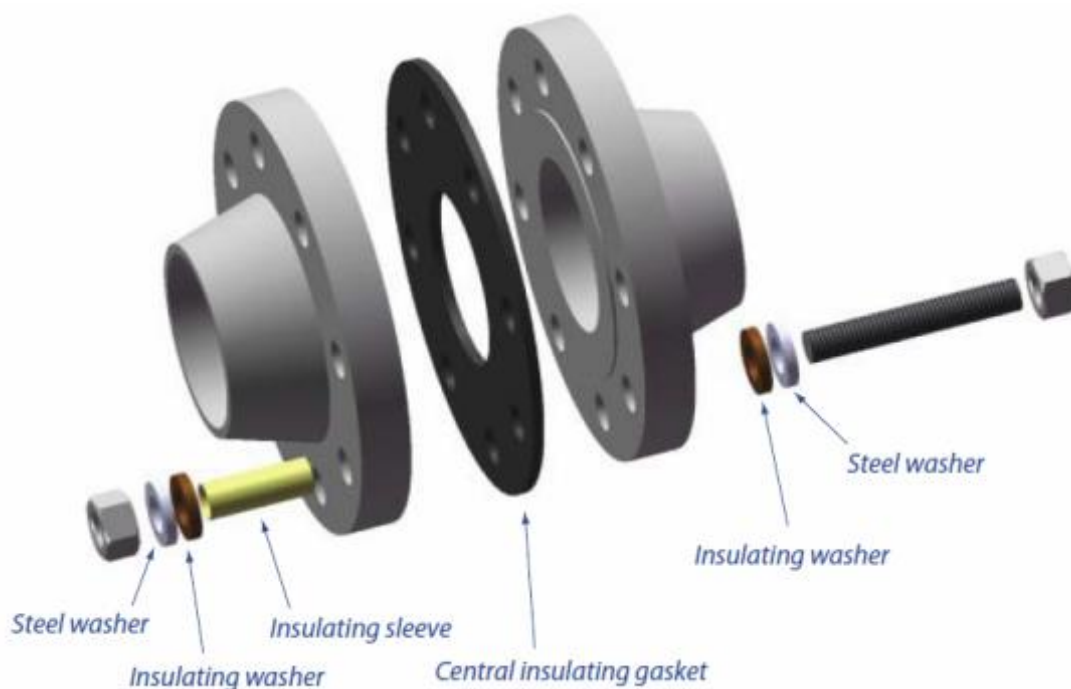
Klinger ISOMAX Insulation sets are used to limit corrosion in pipeline systems. Where dissimilar metals are present, the sets remove the possibility of the system acting as a galvanic cell and reduce the risk of galvanic corrosion of the pipe work. They are also used to isolate cathodically protected piping systems where they prevent the flow of electro-static charge.

Each flange insulation set comprises one central gasket, one insulation, sleeve, two insulating and two plated steel washers per bolt. The sets are individually packed and clearly labelled with the flange rating, size, type and material combination.

Key function of Insulating gaskets:

- Used to electrically isolate sections of pipe work
- Designed to minimise electro-chemical erosion
- Comprising materials with high dielectric strength
- Manufactured to suit flanged joints to ASME, BS, DIN and customer designs

Typical Flange Insulation Set components



Standard Sleeve & Washer Materials in the Set are:

- G10 Sleeves
- G10 Insulation Washers
- Zinc Plated Metal Washers or Polymer coated washers for Fire Safe Sets.
- Others on request

ISOMAX Flange Insulation Sets

Service Recommendations

The choice of insulation gasket for a given duty is dependent on the application conditions under which they will be operating. In addition to the temperature limitations, selection of the gasket must take into account the intended flange pressure class. The table below presents Klinger recommendations for safe sealing of ANSI flanges requiring insulating properties. The recommendations are based on both product knowledge and feedback from the field. For applications with specific service conditions please refer to Klinger for a recommendation.

ISOMAX Gasket recommendations for ANSI B16.5 Raised Face Flange Class

✓ - recommended ; ✗ - not recommended

Pressure Class Rating ANSI B16.5 Raised Face						
Gasket	150	300	600	900	1500	2500
Style LPS	✓	✓	✓	✓*	✓*	✗
HPS-High Pressure Spring Energised PTFE	✓	✓	✓	✓	✓	✓
HPFS-High Pressure Spring Energised PTFE + Fire Safe secondary seal	✓	✓	✓	✓	✓	✓

*subject to a technical evaluation-please contact Klinger

The above table is applicable to Raised Face Flanges. For ANSI B16.5 & API 6A Ring Joint Flanges(RTJ

Low Temperature Duty

Some applications require the use of insulating gaskets at low temperatures. In this case, care must be taken with materials that contain an elastomeric component since elastomers will harden as they pass through the glass transition temperature losing their resilience. The temperature at which this occurs is dependent on the elastomer.

Klinger would recommend a PTFE (Teflon) based seal.

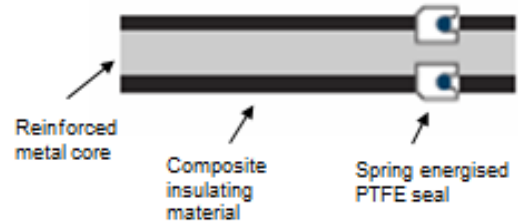
Assembly of Insulating Gaskets

Assembly of insulating gaskets requires the same good fitting practice used to assemble standard gaskets. When installing a gasket, the correct installation procedures should be followed and the flange surface finish (Ra) should be between 3.2 and 6.3 micro meters.

For other Klinger insulating gasket materials, please consult Klinger.

ISOMAX HPS Flange Insulation Sets

The HPS is a high strength and high reliability flange gasket designed for electrical insulation and sealing in very critical service applications. The gasket is manufactured using a composite seal retainer material bonded to a high integrity metal core, 316 Stainless Steel is standard. The spring energized PTFE seal offers excellent sealability even at low loads.



- The HPS gasket is a high reliability gasket used for both insulating and general sealing applications
- The HPS is suitable in all services up to and including ANSI 2500# and API 15,000# classes.
- Each HPS insulation set comprises one central insulating gasket, one insulation sleeve per bolt and two insulating and two plated steel washers per bolt.

Materials

- Metallic Core: 316 Stainless Steel
- (Duplex & Inconel available)
- Gasket Insulating Material: G-10 Glass Reinforced Epoxy (GRE) as standard (G-11 available)
- Seal Material: Spring-energized PTFE as standard
- (Viton available)
- Insulating Sleeve Material: GRE as standard
- (Mylar available)
- Insulating Washers Material GRE (standard)
- Steel Washer Material Zinc Plated Steel as standard (stainless steel available).

HPS Design

The design of the HPS gaskets incorporates a high-strength reinforced epoxy laminate bonded to a 316 stainless steel core as standard (other core materials available). This design results in the gasket having the strength of a traditional metallic gasket while at the same time allowing complete electrical insulation between the flange faces.

PTFE Spring-energised seals are installed into machined grooves to provide a pressure-activated sealing system that allows the HPS to be used as a high pressure insulating gasket.

(Viton o-rings also available if specified)

Electrical Insulation

The HPS distinguishes itself by providing electrical flange insulation in a high-strength gasket.

The HPS significantly reduces the potential for electrical conductivity between two flange faces by providing a non-conducting, non-metallic interface.

This eliminates potential corrosion resulting from dissimilar metals making contact or from ground induced current corrosion of metal components in pipeline systems.

The HPS is an effective sealing system used in breaking electrical conductivity in piping systems with cathodic protection.

The HPS's steel core and construction enables the gasket to withstand higher system pressure, pressure cycling, over torquing than conventional insulating gaskets.

General Characteristics

- Flange insulation as well as cathodic protection
- Reduces galvanic corrosion in dissimilar metal materials used in flange joints
- Allows mismatched ring-joint to raised-face flanges to be effectively sealed. HPS will seal in ring joint, raised-face and flat face/slip-on flange applications.
- Will withstand corrosive environments including high CO₂, H₂S and processed water
- The bore construction protects flange faces from media-induced corrosion and flow-induced erosion.
- The pressure energised seal allows for reduced flange assembly stress
- Easy to install and remove
- Reusable seal retainer and seals
- Suitable for all ANSI and API rated flanges
- High strength laminate material reduces failure due to over compression

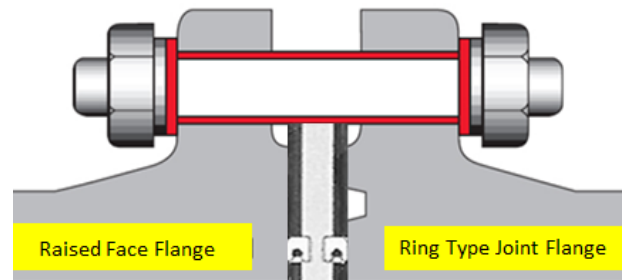
ISOMAX HPS Flange Insulation Sets

Sealing raised face to Ring Joint flanges

The positioning of the sealing elements of the HPS gasket are designed to fit Raised Face, Flat Face and Ring Type Joint flanges.

Because of this design we are able to replace the old design of Phenolic RTJ gaskets commonly designated Type "D-Ring Joint Gasket" which were limited in their ability to take high stresses or excessive bolt loads which often resulted in gasket fracture, damage or failure in service.

Because the HPS uses pressure-activated sealing elements which are designed to sit inside the ring groove on RTJ flanges it has the additional advantage of allowing the HPS to seal mismatched RTJ to raised face or flat faced flanges. This can be of great benefit to the customer when replacing flanges or valves using current stock inventory that may have a different flange face than the mating flanges in situ.



HPS Flange Insulation Kit Components

The gasket set comprises the following as listed below:

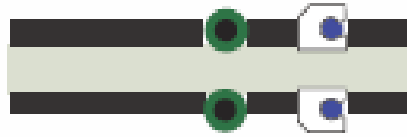
Insulation Kit Contents:

Insulating facing:	G-10 glass reinforced epoxy resin standard. G11 also available on request.	
Seal:	Spring energised PTFE (Viton also available)	
Core:	Stainless steel 316	
Standard	7.0 mm.	
Thickness:		
Insulating Washers:	G-10 glass reinforced epoxy resin (other materials are available) 3.2mm thickness 2 washers per bolt	
Steel Washers:	Zinc-plated steel, 3.2mm thickness (stainless steel washers also available) 2 washers per bolt	
Insulating Sleeves:	G-10 glass reinforced epoxy resin. (Mylar and Nomex also available) 1 insulating sleeve per bolt	

Insulation Kit Properties

Material type:	G-10 Glass-reinforced epoxy resin	G-11 High temperature resin
Compressive strength:	50,000psi - minimum	50,000psi - minimum
Dielectric strength:	24.1-31.5 kV/mm	24.0 kV/mm
Maximum temp:	150°C	200°C
Water absorption:	0.1% - maximum	0.1% - maximum
Flexural strength:	65,000psi	57,700psi
Tensile strength:	50,000psi	41,000psi
Temperature range:	- 130°C to 150°C (limited by gasket material)	- 46°C to 200°C (limited by gasket material)
Seal:	Spring-energised PTFE (Viton rubber also available)	

ISOMAX HPFS (Fire Safe Flange Insulation Sets)



Metallic Core – SS316L
Insulating Core Material – GRE Nema G-11
Primary Sealing Material – Spring Energized PTFE
Secondary Seal – Fire Safe Coated Metal O-Ring
Insulating Sleeves - G11
Insulating Washers – Polymer Coated Steel.

The HPFS insulation gasket is a development of the HPS design to make a fire-safe insulation set. The HPFS includes an additional coated metallic seal to retain the internal pressure along with the spring energized PTFE seal used in the HPS.

HPFS uses coated metallic insulating washers to maintain compressive strength after being exposed to a fire. The development of the high-strength coated steel washers removes the need for the use of an additional insulating washer.

*HPFS is fire safe tested to API 6FB. Certificate available upon request.



Test Setup Prior to Burn



Test Gasket During Burn

Applications:

HPFS gaskets are engineered for fire safe and extreme high reliability insulation and critical service applications.

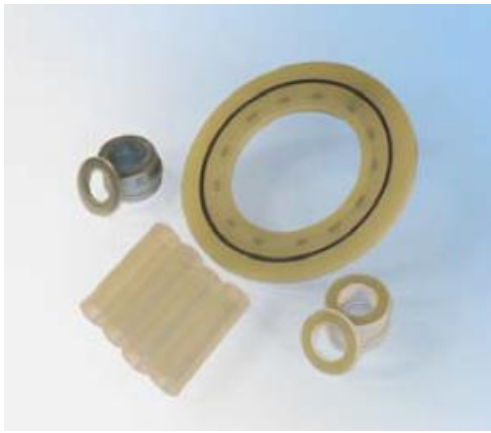
- High Pressure Flanges : 150 – 2500 class
- Critical, Extreme service
- High pH service
- H₂S , CO₂ service
- Locations where end users prefer an integral seal element and in applications where high volatile fluids are present

ISOMAX LPS Flange Insulation Sets

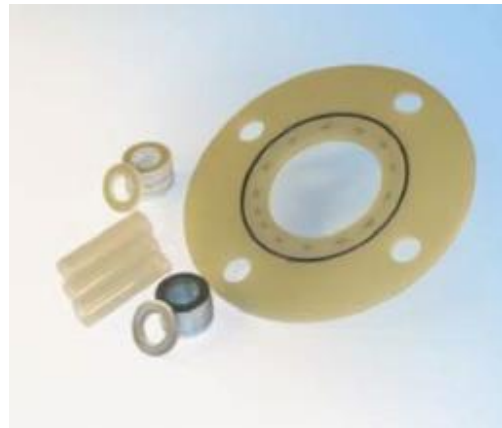
The LPS gasket is an economical seal for electrical flange isolation and general applications requiring higher performance capabilities than those offered by neoprene-faced phenolic gaskets.

The gasket comprises grooves that are machined into high strength G10 laminate and in to which are inserted either spring energized PTFE or Viton o-ring seals which offer excellent sealability at low loads. The LPS gasket is highly suited for use in classes up to and including class 600 lb gasket.

The LPS gasket is available in full face (Type E) and ring style (Type F) configuration.



Ring Face



Full Face

General Properties

- Gives a high sealing reliability in low pressure system.
- Excellent electrical insulation when used on cathodic protection systems.
- Is suitable for most hydrocarbons services subject to seal ring material selection.
- Reduces galvanic corrosion in dissimilar metal flanges.
- Design eliminates media-induced corrosion and flow-induced erosion from flange faces.
- Design requires reduced flange/bolt assembly stress.
- Easy installation and removal.
- Suitable for all ANSI rated flanges up to class 600 lb.

Materials

Gasket Insulating Material & Washers: G-10 Glass Reinforced Epoxy (GRE) as standard (G-11 high-temperature grade also available).

Spring energized PTFE or O-Ring pressure activated seal: PTFE (spring energized) as standard (Viton and Neoprene also available).

Insulation sleeves: GRE (standard) or Nomex for high temperature service.

ISOMAX Flange Insulation Sets

LPS Flange Gasket Advantages & Benefits

- Low pressure sealing (ANSI class 150, 300 and 600) service.
- Seals are pressure activated.
- High strength laminate material reduces failure due to excess compression.
- Excellent electrical insulation when used on cathodic protection systems
- Design eliminates media-induced corrosion and flow-induced erosion from flange faces
- Reduces galvanic corrosion in dissimilar metal flanges.
- Also available with a variety of elastomeric seals.
- Easy installation, assembly and removal as design requires reduced flange/bolt assembly stress.
- Flanges do not have to be spread as would be the case with RTJ gaskets. The LPS easily slips in place.
- Gasket is self-aligning and centering, quick to install, no special tools are required.
- Maintenance-free, corrosion resistant design.

Insulation Kit Contents:

Insulating facing:	G-10 glass reinforced epoxy resin
Seal:	Spring energised Viton (PTFE also available)
Thickness:	3.2mm.
Insulating Washers:	G-10 glass reinforced epoxy resin (other materials are available) 3.2mm thickness 2 washers per bolt
Steel Washers:	Zinc-plated steel, 3.2mm thickness (stainless steel washers also available) 2 washers per bolt
Insulating Sleeves:	G-10 glass reinforced epoxy resin. (Mylar and Nomex also available) 1 insulating sleeve per bolt

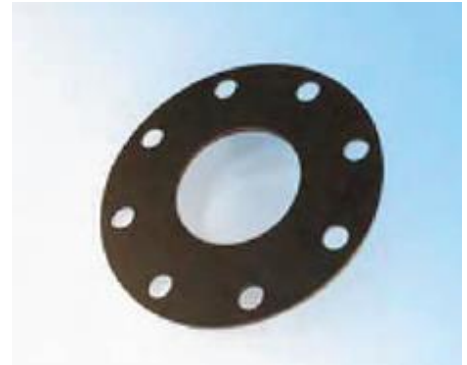
Core Materials:

Material type:	G-10 Glass-reinforced epoxy resin	G-11 High temperature resin
Compressive strength:	50,000psi - minimum	50,000psi - minimum
Dielectric strength:	24.1-31.5 kV/mm	24.0 kV/mm
Maximum Temp:	150°C	200°C
Water absorption:	0.1% - maximum	0.1% - maximum
Flexural strength:	65,000psi	57,700psi
Tensile strength:	50,000psi	41,000psi
Temperature range:	- 130°C to 150°C (limited by gasket material)	- 46°C to 200°C (limited by gasket material)
Seal:	Spring-energised PTFE (Viton or Nitrile rubber also available)	

Flange Insulation Sets

Type E – Full Face Gasket

Suitable for flat and raised face flanges. This style minimises the ingress of conductive foreign matter and reduces the risk of bridging. Typically used on oil and hydrocarbons where flange insulation is a requirement. Manufactured from materials with high dielectric strength to ensure minimum electrical contact between flanges.



Type F – Ring Gasket

Utilises a RF gasket which centrally locates within the bolts. Typically used on oil and hydrocarbons where flange insulation is a requirement. Manufactured from materials with high dielectric strength to ensure minimum electrical contact between flanges.



Type D – Ring Joint Gasket

Type D insulation gaskets use the same basic materials as the standard insulation sets but are designed for RTJ flanges. The gasket is manufactured from reinforced phenolic resin. Type D gaskets have an oval cross-section and are suitable for low pressure up to class 600# rating applications.

Care must be taken during installation of this gasket so that it is not overstressed during bolt up.



Flange Insulation Sets

Gasket recommendations for ANSI B16.5 Raised Face Flange Class

✓ - recommended ; ✗ - not recommended

Pressure Class Rating ANSI B16.5 Raised Face

Gasket	150	300	600	900	1500	2500
Neophenolic	✓	✓*	✗	✗	✗	✗
Topchem 2003	✓	✓	✗	✗	✗	✗
C-4430	✓	✓	✓*	✗	✗	✗
Topchem 2000	✓	✓	✓*	✗	✗	✗

Properties:

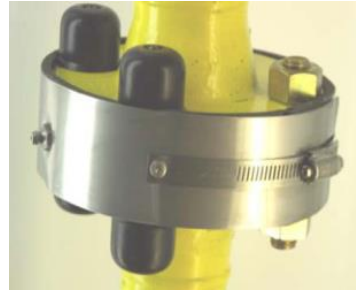
	Component	Dielectric Strength (Kv/mm)	Water Absorption (%)	Maximum Temperature (°C)
Neoprene faced Phenolic	Gasket	19.8	1.6	107
Klingersil C-4430	Gasket	21.3	10.6	400
Klinger Topchem 2000	Gasket	3.6	0.5	260
Klinger Topchem 2003	Gasket	16.7	0.5	260
G10	Gasket, Sleeve, Washer	24.1-31.5	0.1-max.	150
G11	Gasket, Sleeve, Washer	24.0	0.1 -max.	200
Mylar	Sleeve	157.5	0.8	145
Phenolic	Sleeve	5.5	1.0	107
Reinforced Phenolic	Washer	7.8	1.0	107

Note: The above values are based upon limited test data. Whilst every effort is made to ensure the information in this data sheet is accurate, it must be stressed that it is the users responsibility to ensure suitability for the intended end use. The values quoted above may be subject to modification at a later date.

Flange Insulation Sets

Flange Protection

It is recommended that a Klinger Flange Band Protector is also used to cover the outside of the flange to prevent the ingress of conductive matter.



Designed to cover flanges to protect flange faces, stud bolts, and gaskets from corrosion.

- Keeps out moisture, chemicals, saltwater, acid rain, etc.
- Keeps out foreign matter, which is critical on systems that are cathodically protected.
- Available in 316 stainless steel and Kydex plastic.
- 316 stainless steel worm gear clamp and injection fitting
- 316 stainless steel injection fitting.
- Standard gasket liner of closed cell neoprene, maximum operating temperature of 82°C.
- Optional EPDM rubber gasket liner, maximum operating temperature of 132°C.
- Optional liner of Teflon® or silicone for chemical and high temperature
- Safety relief valve optional, bleeds at 5 psi.
- Available for all size flanges.
- Standard liner Neoprene. Optional liner of Teflon® or silicone for chemical and high temperature applications.
- Custom engineered designs available per application.

Klinger Limited guarantees the quality, materials and workmanship of all its products either manufactured or distributed, but cannot be held responsible for the manner in which they are used, fitted or stored

For sales and technical advice, please contact:

Tel: +61 08 9251 1600 or Toll Free No.1300 79 82 79 (in Australia), Fax:+61 08 93509286
Email: sales@klinger.com.au or technical_service@klinger.com.au
Website: www.klinger.com.au

Western Australia: Head Office
1300 798 279
+61(8) 9251 1600
Fax: +61 (08) 9350 9286
email enquiries: sales@klinger.com.au

Victoria: 1300 798 279
Fax: +61 (03) 8795 9516

South Australia: 1300 798 279
Mobile: +61 0412 626 022
Fax: +61 (08) 8354 0400

New South Wales: 1300 798 279
Mobile: +61412626016

Queensland: 1300 798 279
Fax: +61 (07) 3268 2130

Northern Territory: 0412626004
Fax: +61 (08) 9350 9286

New Zealand: +64 (09) 269 1980
Fax: +64 (09) 269 1981

PNG/Fiji Sales: +61 (07) 3634 4700
+61 412 626 016

Export sales: +61 (08) 9251 1688
Email enquiries: export@klinger.com.au