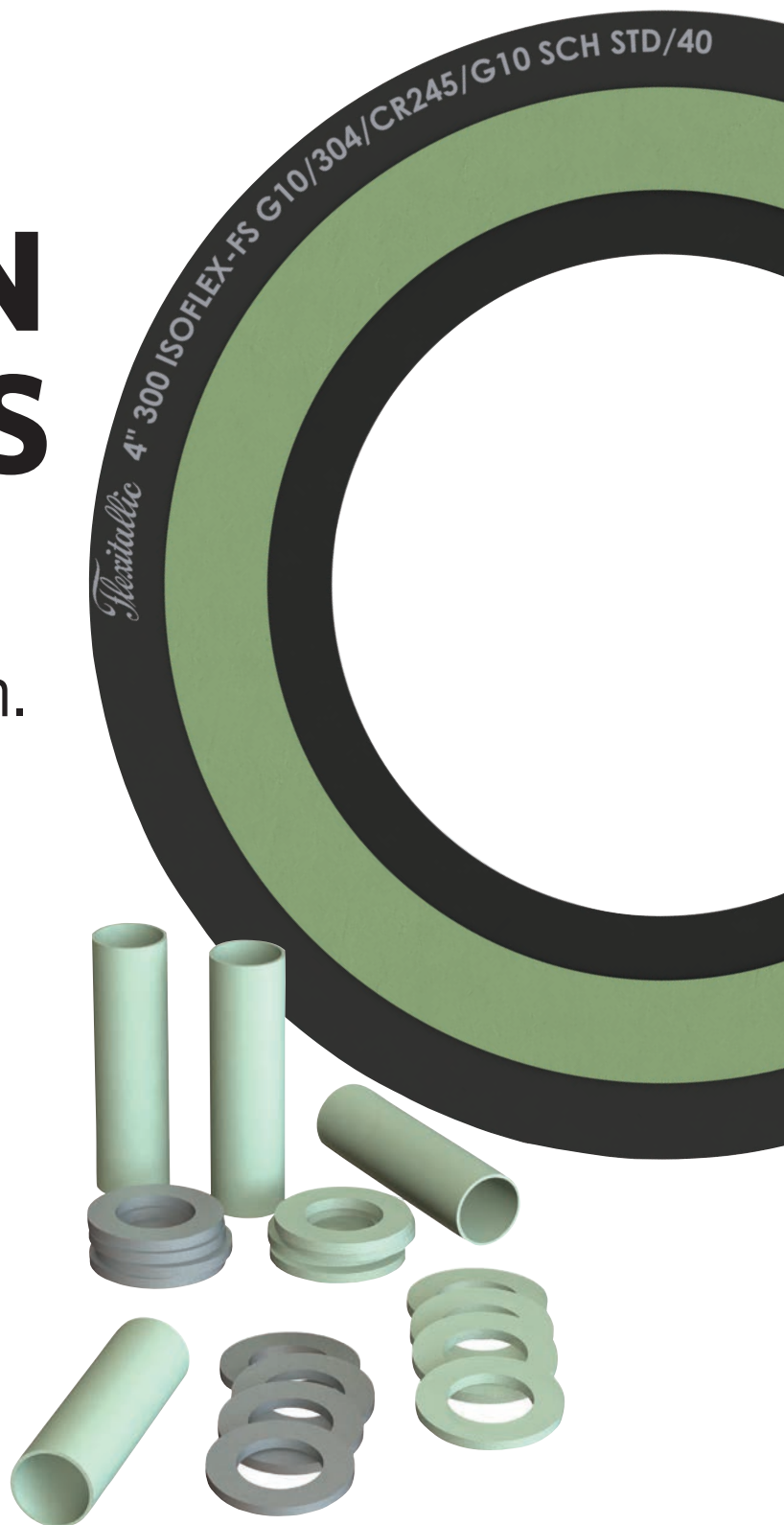


# FLANGE ISOLATION PRODUCTS

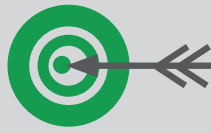
Bringing **innovation**  
to cathodic protection.



# INTRODUCING: ISOFLEX™ & ISOPRO



**Comprehensive product range** that addresses both industry and customer specific requirements.



From economical options to **best-in-class proprietary** offerings and everything in between.



A new isolation gasket that will exceed dielectric & sealing capabilities of all current market products.



Addressing age-old methods that focus on **“gasket-to-flange”** contact surfaces and asking, **“Why not in between?”**



**Boxed kit availability**, including: gasket, isolating sleeves and washers, metal backup washers.



**World-Class Application Engineering Support** Available via: phone, email & live chat.



**Professional Grade training, workshops and seminars**, which are centered on **“Best Practices”** approach to installation / bolt-up procedures. Sessions range from 2 - 6 hours, but are completely customisable to fit your specific needs.

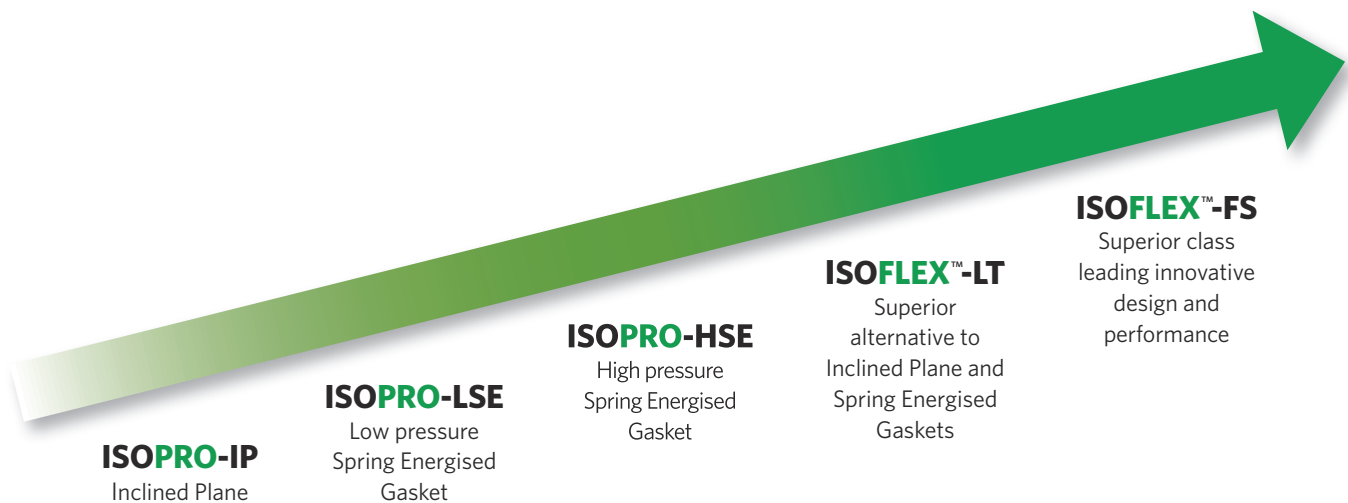
PRODUCT SELECTOR	ISOFLEX™-FS	ISOFLEX™-HP	ISOFLEX™-LT	ISOPRO-LSE	ISOPRO-HSE
Electrical Resistance	✓	✓	✓	✓	✓
Critical Service	✓	✓			
General Service	✓	✓	✓	✓	✓
Fire-Safe	✓				
Galvanic Corrosion Protection	✓	✓	✓	✓	✓
High Pressure Service	✓	✓			✓
Intermediate Pressure Service	✓	✓	✓	✓	✓
Low Pressure Service	✓	✓	✓	✓	✓
MESC SPE 85/300-2017	✓	✓			
Outperforms Spring Energised	✓	✓	✓		
Patent Design	✓	✓	✓		

# ISOFLEX™

- Exceeds the current market sealing performance
- Flexitallic's proprietary and patented designs that incorporate proven technology and proprietary materials
- A product platform consisting of two best-in-class designs and will grow over time.

# ISOPRO

- Matches capabilities of products that are currently available in the market
- Meets difficult-to-change and long-standing written specifications
- For use in non-critical service and low(er) temperature applications.



## COMMON INDUSTRY PITFALLS

- Sole emphasis on the isolating properties at the expense of overall sealability.
- Emphasis exclusively on dielectric strength rather than resistance under compression representative of bolted connection.
- Several high-end designs rely on narrow line seals which are more vulnerable to flange face imperfections.
- Positioning of the narrow line seal is towards the inner diameter of the flange.
- Consequences of metal protrusion on isolating properties, as seen in spring energised seals.
- Creep relaxation of soft sealing components like elastomers and PTFE.
- Reliance (upon compression) on the non-metallic GRE for mechanical strength is not ideal.
- Drawbacks of glass reinforced epoxy (GRE), such as permeation, chemical attack, strength and creep.
- Sleeve length not specific to washers, flanges and gasket thickness combination.

# ISO FLEX™-FS

## BEST FOR SEALING. BEST FOR ISOLATION.

THE ISO FLEX™-FS DESIGN IS AIMED AT ELIMINATING THE CONCERNS AND PITFALLS OF EXISTING MARKET OFFERINGS.

**ISO FLEX™-FS** is a fire safe isolation gasket that is ideal for high pressure & critical service applications utilizing:

- Two part serrated metallic core (Flexpro®)
- Faced with Corriculite, a fire safe non-conductive sealing material
- Polyimide isolating film. Dielectric Strength of 3000 V/mil
- Complete with NEMA grade glass reinforced epoxy (GRE) inner and outer rings
- ISO FLEX™-FS is API 6FB Fire Safe. One gasket satisfies both general & fire safe services.



### A CLOSER LOOK AT ISO FLEX™-FS

Seal location is engineered to ideally position the sealing area more closely to the fasteners.

#### INNER RING: NEMA GRADE GRE

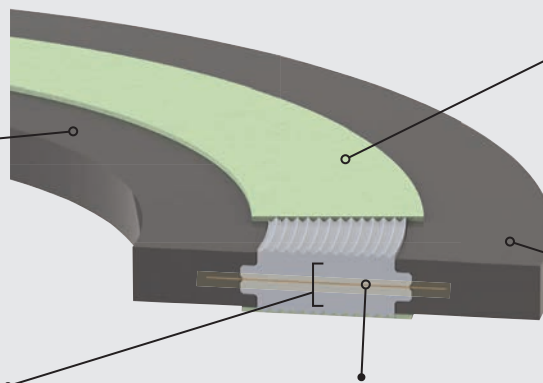
GRE components are auxiliary.

Sealing is exclusively accomplished by faced serrations & polyimide isolation barrier.

#### DUAL Flexpro® SEAL DESIGN (Kammprofile)

4X Wider Seal with Flexpro® than Spring Energised Seals. Less susceptible to localized flange damage.

Compressive load rests on the Flexpro® (Kammprofile) to effect excellent tightness.



#### GASKET CORE: POLYIMIDE ISOLATION BARRIER

Excellent electrical resistance. Boasts a strong combination of thermal, chemical and mechanical properties.

Dielectric Strength (ASTM D149): 3000 V/mil.

Flexpro® facings and polyimide isolation barrier extend beyond the metallic core.

#### CORRICULITE® FACINGS

Prevents the onset of galvanic corrosion and provides gas tight sealing performance with wide range of fluid compatibility.

- API 6FB Fire Safe.
- Inherently non-conductive.

#### OUTER RING: NEMA GRADE GRE

GRE components are auxiliary.

Sealing is exclusively accomplished by faced serrations & polyimide isolation barrier.

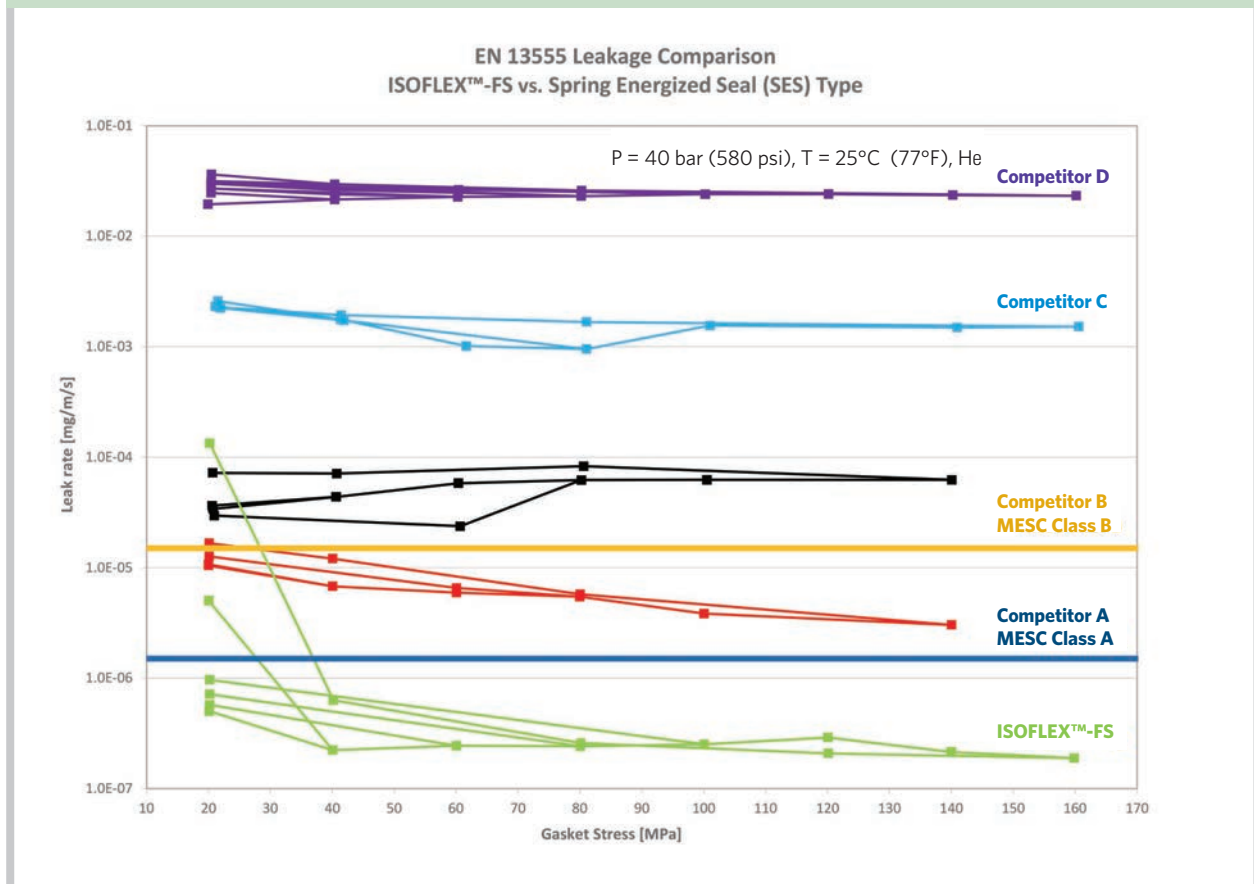
# ISOFLEX™-FS

## BEST FOR SEALING. BEST FOR ISOLATION.

### POLYIMIDE FILM TYPICAL PROPERTIES

Properties	Test Standard	Typical Value	Unit
Dielectric Strength	ASTM D149	3000	V/mil
Volume Resistivity	ASTM D257	1.0 x 10 <sup>15</sup>	Ohm cm
Tensile Strength	ASTM D882	24	ksi

### LEAKAGE COMPARISON: WW & SPRING ENERGISED SEAL TYPES



Spring Energised Seal (SES) type isolation gaskets are inconsistent in sealing performance.

The results (purple, blue, black, red) are all different manufacturer's spring energised seal gaskets and have varying results (inconsistent sealing performance). Yellow and blue lines are Shell MESC Class A & B ("A" being more stringent). Sealing performance of all competitor's spring energised seal type gaskets were higher than the allowable leakage rate of MESC Class A. Whereas, ISOFLEX™-FS leakage rate (even at varying gasket stresses) was below the allowable leakage rate.

# CORRICULITE® - FACED FLEXPRO® OUTPERFORMS THE SPRING ENERGISED SEAL IN IN CYCLIC SERVICE.

## LONG TERM THERMAL CYCLE TEST: ISOFLEX™ -FS vs. SPRING ENERGISED SEAL

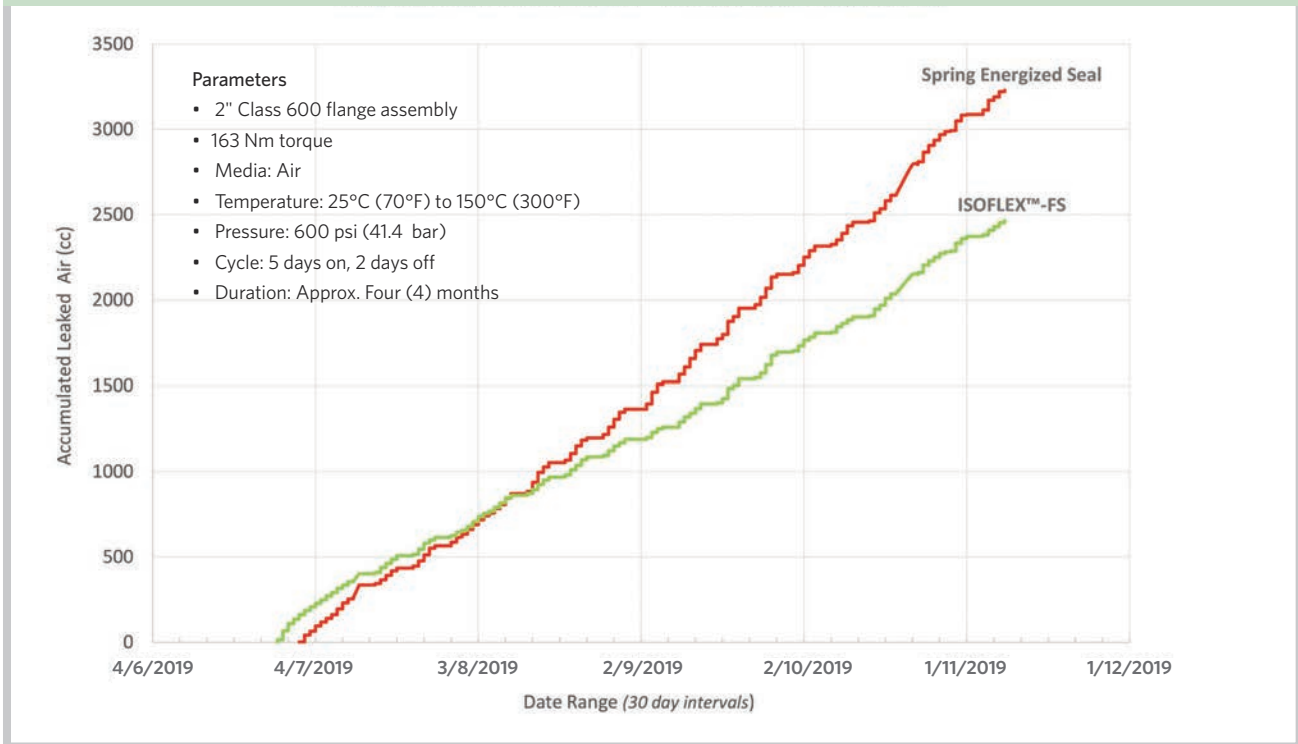


Chart shows leak rate of ISOFLEX™-FS vs Spring Energized Seal. The test was conducted as 5 days on, 2 days off, to induce thermal cycling. ISOFLEX™-FS sealed tighter, as shown by lower accumulative leaked gas.

### ISOFLEX™ -FS

### SPRING ENERGISED



### Post Test Observations

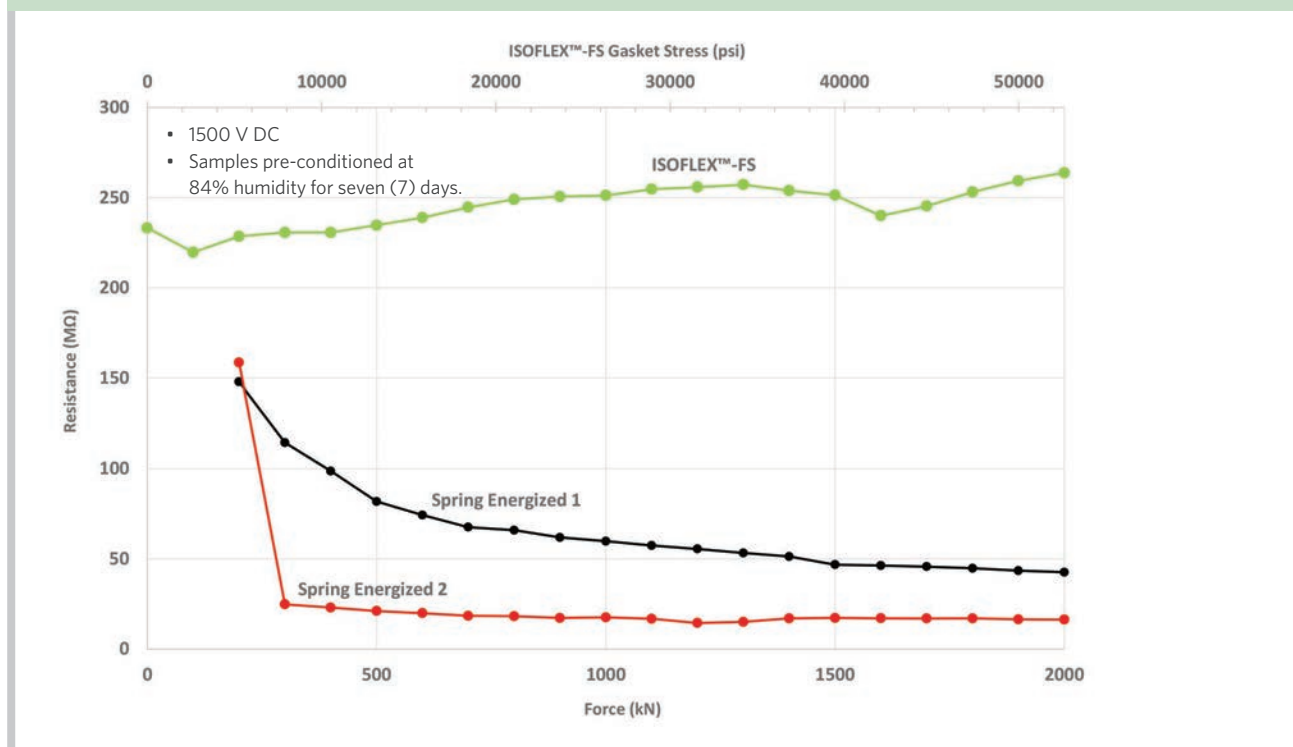
- Both load & heat cause the GRE to creep into the flange bore
- ISOFLEX™ -FS has no issues as zero load rests on GRE

# ISOFLEX™-FS

## BEST FOR SEALING.

## BEST FOR ISOLATION.

### ELECTRICAL RESISTANCE TESTING - UNDER COMPRESSIVE LOAD



Under compressive load (and elevated humidity level), the shortcomings of the SES type design are apparent as it pertains to diminishing electrical resistance and a rapid drop in resistivity. Achieving a high level of electrical resistance with high humidity is important, due to potentially high humid climate that the isolation gasket may be installed in. Electrical resistance measured under compressive load shows the actual resistance the gasket can offer once installed.



Testing performed at the elevated humidity level of 84%.



Increased levels of moisture are directly related to humidity intensity. Moisture reduces electrical resistance & isolation properties.



Achieving a high level of electrical resistance with high humidity is a significant result, even more so while under increasing compressive load.

#### SPRING ENERGISED 1



Diminishing electrical resistance is seen as a result of the spring moving closer towards the flange under compressive load.

#### SPRING ENERGISED 2



A rapid drop in resistivity is experienced as a result of the spring cutting through the PTFE.

#### ISOFLX™ - FS



Electrical resistance of the ISOFLX™-FS remains constant at the extreme gasket stress of 363 MPa.

# ISOFLEX™-LT

## THE ISOFLEX™-LT DESIGN IS LESS SUSCEPTIBLE TO LOCALIZED FLANGE DAMAGE.

- Base ring is made with NEMA Grade glass reinforced epoxy (GRE).
- Seal design based on trusted Flexpro® (*Kammprofile*) style serrations in the GRE base ring.
- Faced with Corriculite®, to provide a reliable seal.
- The combination of the seal design and Corriculite® creates a ring of highly compressed facing material resulting in an impermeable barrier.



### A CLOSER LOOK AT ISOFLEX™-LT

Seal location is engineered to ideally position the sealing area more closely to the fasteners.

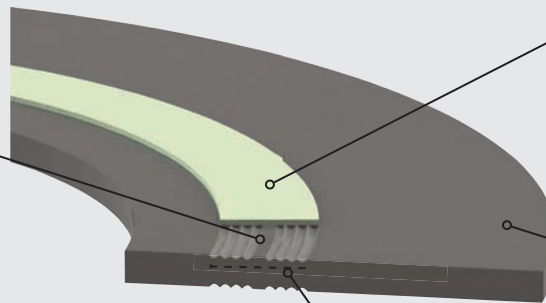
The blank space creates a ring of highly compressed facing material resulting in an impermeable barrier.

#### **INCLINED PLANE DESIGN**

Seal is made from soft material like: Nitrile, Viton or PTFE.

Reliance on narrow seal (2.5mm) is not ideal.

Susceptible to localized flange damage.



#### **CORRICULITE® FACINGS**

Prevents the onset of galvanic corrosion and provides gas tight sealing performance with wide range of fluid compatibility.

Corriculite® facing is inert and inherently non-conductive.

#### **BASE RING: NEMA GRADE GRE**

(Glass reinforced epoxy).



#### **DUAL FLEXPRO® STYLE SEAL DESIGN**

Seal is a combination of Flexpro® Style serrated G10 or G11 and faced with Corriculite® material.

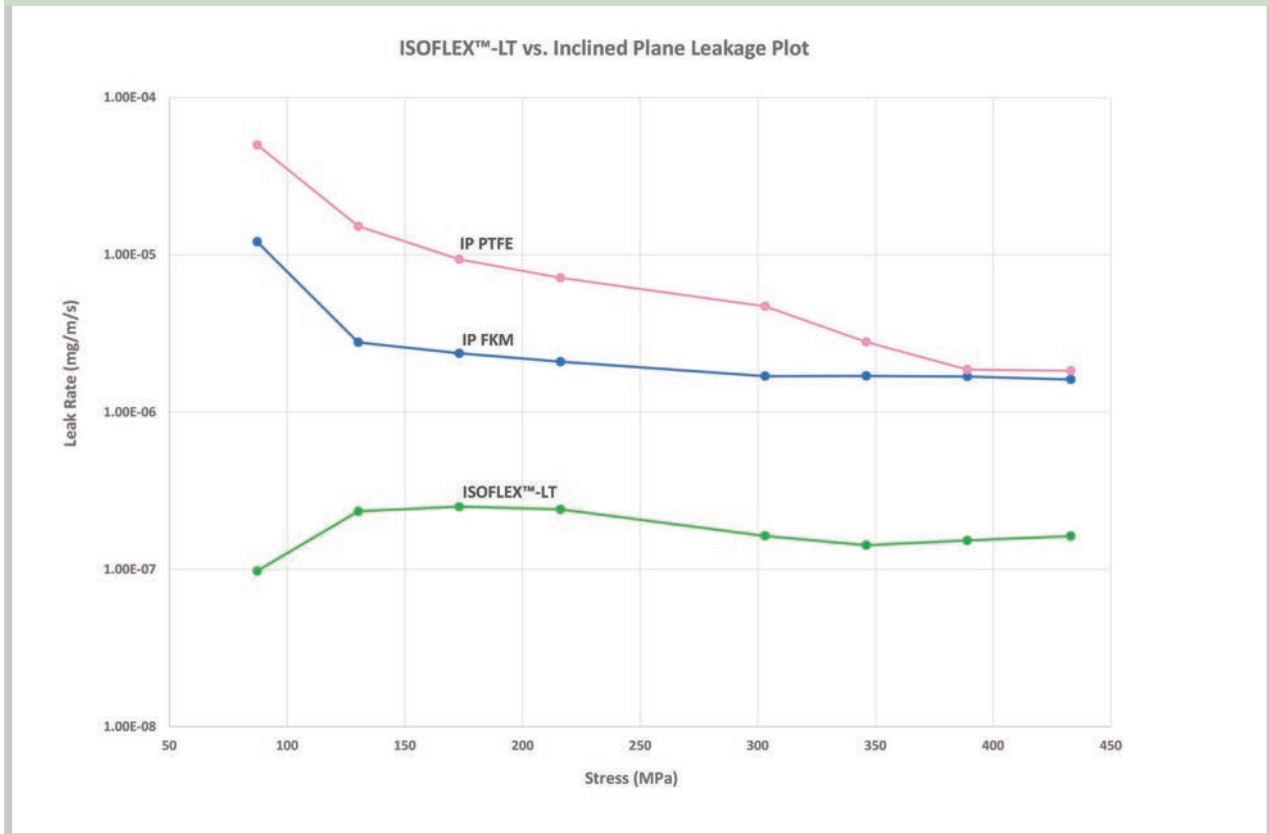
3X wider seal with Flexpro® (8.89mm) than the Inclined Plane design.



# ISOFLEX™-LT

**ISOFLEX™-LT SEALS BETTER THAN THE INCLINED PLANE STYLE GASKETS OFFERED BY COMPETITORS.**

## PROVEN TECHNOLOGY. RESULTS DRIVEN.



Above test results show that ISOFLEX™-LT seals better than the inclined plane style gaskets offered by competitors.

# ISOPRO-LSE

**ISOPRO-LSE IS A FLANGE ISOLATION GASKET COMPRISING OF TWO SPRING ENERGISED PTFE SEALS LOCATED IN PRECISION MACHINED OFFSET GROOVES IN A GLASS REINFORCED EPOXY (GRE) CARRIER.**



- Designed to effect a high integrity seal while proving effective electrical isolation across bolted flange connections.
- The epoxy outer provides electrical isolation, the PTFE spring energised seal forms an impermeable, gas tight barrier.
- Gaskets can be sized to the bore of the pipe or vessel mitigating turbulent flow, fluid dead spots and erosion.
- Suitable in applications requiring basic dissimilar metal to metal isolation or as part of a more complex passive and/or active isolation system.
- A high integrity seal over a wide range of applied stress and suitable for use across all flange pressure classes.
- The relatively narrow width of the spring energised seal ensures a tight seal even at very low applied loads. Unique seal geometry provides additional seal energisation when the system is pressurised.
- Compatible with all commonly encountered up and down steam hydrocarbon media, from sweet and sour crude to refined product
- Insulating washers and sleeves are fabricated from high performance glass epoxy laminate (typically G10 or G11) offering both high compressive strength and pinch resistance. Backing washers are zinc plated carbon steel. Other materials for sleeves, insulating and backing washers are available on request.

# ISOPRO-HSE

**ISOPRO-HSE IS A FLANGE ISOLATION GASKET COMPRISING OF TWO SPRING ENERGISED PTFE SEALS, LOCATED IN PRECISION MACHINED GROOVES IN A RIGID 3 PLY LAMINATE; A CENTRAL METALLIC CORE FACED WITH G10 GLASS/EPOXY COMPOSITE.**



- Designed to effect a high integrity seal while proving effective electrical isolation across bolted flange connections.
- Suitable in applications requiring basic dissimilar metal to metal isolation or as part of a more complex passive and/or active isolation system.
- The epoxy composite outer layers provide electrical isolation while the metallic core affords high structural integrity that in conjunction with the PTFE spring energised seal forms an impermeable, gas tight barrier.
- Unique manufacturing process results in a high strength mechanical bond between the individual lamina.
- Gaskets can be sized to the bore of the pipe or vessel mitigating turbulent flow, fluid dead spots and erosion.
- Capable of effecting a high integrity seal over a wide range of applied stress and is suitable for use across all flange pressure classes.
- The relatively narrow width of the spring energised seal ensures a tight seal even at very low applied loads. Unique seal geometry provides additional seal energization when the system is pressurized.
- Compatible with all commonly encountered up and down stream hydrocarbon media, from sweet and sour crude to refined product.
- NACE compliance certification for the laminate core is available on request.
- Insulating washers and sleeves are fabricated from high performance glass epoxy laminate (typically G10 or G11) offering both high compressive strength and pinch resistance. Backing washers are zinc plated carbon steel. Other materials for sleeves, insulating and backing washers are available on request.

# KIT COMPONENTS

ISOLATING SLEEVES & WASHERS.  
METALLIC BACK-UP WASHERS.  
NON-CONDUCTIVE ANTI-SEIZE.



## ISOLATING SLEEVES AND WASHERS

### Isolating Sleeves - Typical Temperature Limits

	Mylar	G10	G11
Max Temp °C	150 (302)	150 (302)	200 (392)
Min Temp °C	-70 (-94)	-129 (-200)	-129 (-200)

**Note:** Sleeves are cut to length accounting for double washer (DW) or single washer (SW) use, flange thickness including raised face height, and gasket thickness.

### Isolating Washers - Typical Temperature Limits

	G10	G11	Mica Faced Flexpro™ **
Max Temp °C	150 (302)	200 (392)	538 (1000)
Min Temp °C	-129 (-200)	-129 (-200)	-50 (-58)

**Note:** Standard metallic washer offering is Stainless Steel. Zinc plated Carbon steel available upon request.

# WHAT IS CORRICULITE®?

## THE NEW STANDARD FOR SEALING SOLUTIONS IN CORROSIVE ENVIRONMENTS



### THE BENEFITS OF CORRICULITE® ARE CLEAR

<b>FIRE SAFE - PASSES API 6FB FIRE TEST</b>	<b>PROVIDES GAS TIGHT SEALING PERFORMANCE</b>	<b>WIDE RANGE OF CHEMICAL COMPATIBILITY</b>
<b>MATERIAL IS INERT AND INHERENTLY NON CONDUCTIVE</b>	<b>PREVENTS THE ONSET OF GALVANIC CORROSION</b>	<b>NOT SUSCEPTIBLE TO COLD FLOW LIKE PTFE OR ELASTOMERS</b>
<b>TEMPERATURE RANGE -45°C (-49°F) TO 225°C (+440°F)</b>	<b>SEALS TIGHTER THAN GRAPHITE</b>	<b>COST EFFECTIVE, FLANGE CORROSION PROTECTION</b>

Responding to customer demands for an improved material with strong anti-corrosion characteristics.

Flexitallic created Corriculite® - a filler material for spiral wounds and facing for Isolation gaskets.

Corriculite® was specifically designed for use in corrosion-sensitive environments, such as seawater and hydrocarbon services.

Our proprietary material is widely utilized across a number of industries, including oil and gas, power and marine.



# A WINNING COMBINATION OF OPTIMUM SEALING AND ANTI-CORROSION PROPERTIES.

## A PROVEN SOLUTION

A number of benchmark tests have been carried out to validate the performance of Corriculite® as sealing material in corrosion sensitive conditions.

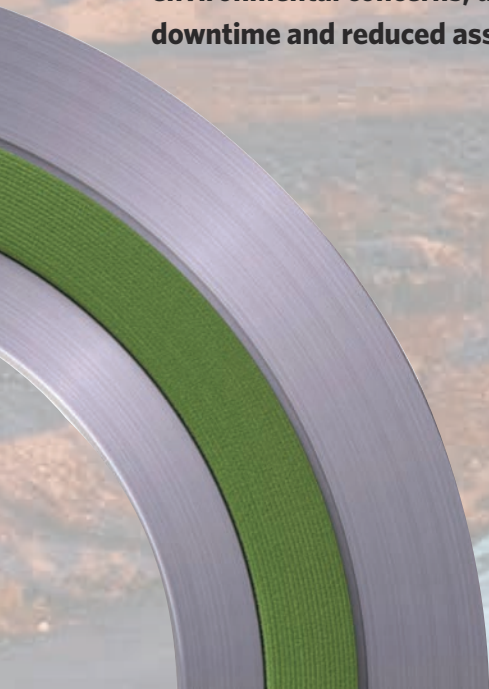
**For more information visit:**  
[Corriculite.com](http://Corriculite.com)



An example of corrosion caused by use of conventional graphite gaskets.

**CORRICULITE®**  
Protection / Sealed in

**Joints in hydrocarbon and seawater services are vulnerable to gasket degradation and flange face corrosion, which results in increased costs, lost production as well as safety and environmental concerns, unscheduled downtime and reduced asset availability.**



# ISOLATION PRODUCT OVERVIEW



	ISOPRO-LSE	ISOPRO-HSE
<b>GASKET OVERVIEW</b>	Glass Reinforced Epoxy (GRE) with Spring Energised PTFE seal	Glass Reinforced Epoxy (GRE) with Metal Core and Spring Energised PTFE seal
<b>PRIMARY ISOLATION</b>	Glass Reinforced Epoxy (GRE) and Spring Energised PTFE seal	Glass Reinforced Epoxy (GRE) and Spring Energised PTFE seal
<b>PRIMARY SEALING</b>	Spring Energised PTFE seal	Spring Energised PTFE seal
<b>FACING MATERIAL(S)</b>	No additional facing	No additional facing
<b>THICKNESS (mm)</b>	3.2mm (1/8")	6.6mm
<b>TEMPERATURE RANGE</b>	Refer to datasheet	Refer to datasheet
<b>PRESSURE RANGE</b>	ASME CLASS 150-600. EN1092-1 PN10-100	ASME CLASS 150-2,500. EN1092-1 PN10-400. API 6A CLASS 3,000-10,000
<b>COLOUR</b>	Light Green	Black
<b>CERTIFICATIONS &amp; APPROVALS</b>	NEMA - available on request	NEMA/NACE - available on request
<b>KIT OVERVIEW</b>		
<b>ISOLATION SLEEVE MATERIALS</b>	G10*	G10*
<b>ISOLATION WASHER MATERIALS</b>	G10*	G10*
<b>METALLIC WASHER MATERIAL</b>	Stainless Steel 316*	Stainless Steel 316*
<b>REQUIRED FOR ORDERING</b>		
<b>STYLE TYPE</b>	Style "F" (Ring) or Style "E" (Full Face)	
<b>SIZE / PRESSURE</b>	Flange standard size and pressure rating	
<b>WASHER CONFIGURATION</b>	Double Washer (DW) or Single Washer (SW)	
<b>FLANGE FACE TYPE</b>	Raised Face (RF), Flat Face (FF), Ring Type Joints (RTJ)	

\*Other materials available on request. \*\*Flanges below 2" may need modifications for smaller bores.



<b>ISO FLEX™-LT</b>	<b>ISO FLEX™-HP</b>	<b>ISO FLEX™-FS</b>
Glass Reinforced Epoxy (GRE) with Flexpro® (kammprofile) serrations and Corriculite® facing	Dual Flexpro™ with Corriculite® facing separated by polyimide film. GRE inner and outer rings	Dual Flexpro® with Corriculite® facing separated by polyimide film. GRE inner and outer rings. Fire Safe design.
NEMA Grade GRE (glass-reinforced epoxy) G10 or G11	Polyimide film	Polyimide film
Corriculite® faced serrations precision-machined for concentrated load	Dual Flexpro™ with Corriculite® facing	Dual Flexpro® with Corriculite® facing
Corriculite®	Corriculite®	Corriculite®
3.2mm (1/8")	6.35mm (1/4")	6.35mm (1/4")
Refer to datasheet	Refer to datasheet	Refer to datasheet
ASME B16.5 CLASS 150-900. EN1092/1 PN10-100	ASME CLASS 150-2,500, EN1092, PN10-400. API 6A CLASS 3,000 and 5,000	ASME CLASS 150-2,500. EN1092-1. PN10-400. API 6A CLASS 3,000 & 5,000
Black & Green	Black & Green	Black & Green
NEMA - available on request	NEMA/NACE - available on request	Fire Safety API 6FB • Exceeds MESC SPE 85/300-2017 Fugitive Emissions. Class A Requirements. NEMA/NACE - available on request
<b>KIT OVERVIEW</b>		
G10*	G10*	G10*
G10*	G10*	Mica faced Flexpro™***
Stainless Steel 316*	Stainless Steel 316*	Stainless Steel 316*
<b>REQUIRED FOR ORDERING</b>		
Style "F" (Ring) or Style "E" (Full Face)		
Flange standard size and pressure rating		
Double Washer (DW) or Single Washer (SW)		
Raised Face (RF), Flat Face (FF)	Raised Face (RF), Flat Face (FF), Ring Type Joints (RTJ)**	Raised Face (RF), Flat Face (FF), Ring Type Joints (RTJ)**

\*Other materials available on request. \*\*Flanges below 2" may need modifications for smaller bores. \*\*\*Alternative materials available for non fire safe applications.

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### About The Flexitallic Group

The Flexitallic Group is a global leader in specialised sealing solutions and products serving the oil and gas, power generation, chemical and petrochemical industries in emerging and developed markets. Focused on the upstream, downstream and power generation sectors, it has operations in France, the United States, Canada, Mexico, the United Kingdom, Germany, Italy, Belgium, the United Arab Emirates, Thailand, Australia and China plus a network of worldwide licensing partners and distributors.