

# Fire Safe Products

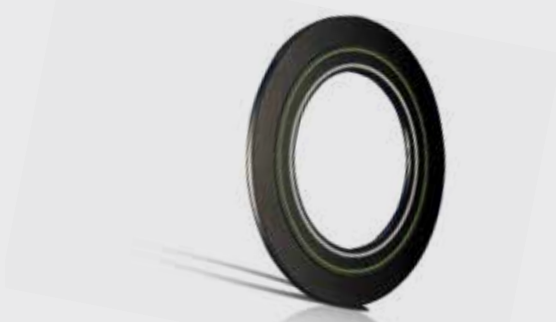
Garlock is the leader in high-performance fluid sealing products for the Oil and Gas Industry, committed to a culture of safety not only to our employees but for all of our customers as well. Garlock is at the forefront of this safety culture with our portfolio of Fire Safe Approved fluid sealing products.



Leaders in Sealing Integrity

**Garlock**  
an EnPro Industries family of companies

GPT is the world's leading manufacturer of critical service flange systems, spring-energized jacketed seals and electrical flange isolation kits for the oil and gas industry. As a result of their safety, reliability and availability, our products are used by major international oil and gas operators, pipeline transmission companies, and engineering and construction contractors. From innovative engineered solutions to industrial sealing applications that challenge conventional sealing products, our gaskets and seals comply with the most stringent international and fire safety standards.



## VCFS™ Isolating Seal Kit

The VCFS™ provides complete flange electrical isolation with tandem seal technology. PTFE sealing system has 20+ years successful track record. The VCFS™ offers e-ring sealing technology with a primary PTFE energized ring supported by the firesafe Inconel seal. It has passed API 6FB, 3rd Edition Fire Test. The VCFS™ mitigates potential flange rotation and provides a tighter seal under low bolt loads.

### Specifications

- > Based upon proven GPT VCS Platform
- > Provides complete flange electrical isolation
- > Tandem seal technology
- > PTFE sealing system has 20+ years successful track record
- > E-ring sealing system provides a high integrity firesafe seal
- > Use in conjunction with cathodic protection systems
- > Mitigates potential flange rotation
- > Provides a tighter seal under low bolt loads

### Test Results

- > Passed API 6FB, 3rd Edition Fire Test
- > EN 13555 Leakage Test
- > Shell Leakage Test

## VCXT™ Isolating Seal Kit

The Pikotek® VCXT™ flange isolating set is comprised of an isolating gasket, isolating sleeves, isolating washers and metal backing washers. The isolating system is constructed from a machined metal core utilizing a serration profile. The metal core is faced with a high performance sealing material incorporating Garlock's THERMa-PUR™ sealing technology. Correct gasket location is ensured by the inclusion of a high performance spacer ring, located around the periphery of the serrated metal core.

### Specifications

#### Insulating Gasket and Washers

- > Core Thickness .125" (316SS Core)
- > Facing Thickness .023" (x2)
- > Maintenance Factor (m) 4.00
- > ASME Minimum Seating Stress (Y) 3625 psi (25 MPa)
- > Dielectric Strength (ASTM D149a) 9.8 kV/mm

#### Mica Insulating Sleeves

- > Maximum Temperature +932°F (500°C)
- > Dielectric Strength 29.0 kV/mm

#### Metallic Backing Washers

- > Stainless Steel 0.125" thk
- > Other washer material can be provided to suit the application

### Test Results

- > Passed API 6FB, 3rd Edition Fire Test

# Compression Packing

The Garlock Compression Packing product line is committed to supplying the highest quality engineered products to the industry throughout the world. Garlock packing is designed to give the user the greatest return on initial investment in terms of leakage control, service life and dependable, cost-effective product.



## Style 1303-FEP

Fire safe valve packing of flexible graphite reinforced with INCONEL® complies with most stringent VOC and CHAP emissions regulations. Garlock Style 1303-FEP combines the emissions performance of engineered sets with the installation flexibility and speed that comes from braided packing. Style 1303-FEP offers the same fire safety and chemical resistance as EVSP.

### Specifications

- > Construction: High-purity GRAPH-LOCK® flexible graphite and 0.004" INCONEL® filament
- > Temperature -328°F (-200°C) to +850°F (455°C) atm; to +1,200°F (650°C) steam
- > pH Range: 0-14 (except strong oxidizers)
- > Pressure: To 4,500 psi (310 bar)

### Test Results

- > API 589 2nd Edition - this packing complies with the performance requirements of this standard
- > API 622 Rev 2



## Style 9000 EVSP

Garlock's Emissionless Valve Stem Packing (EVSP) is the ideal solution for applications where fugitive emissions have to be less than 100 PPM. This fire safe, chemically resistant packing preserves our environment while improving process yield. GRAPH-LOCK® rings in patented "cup and cone" design plus Style 1303-FEP end rings create a tight, effective seal for reduced VOC emissions.

### Specifications

- > Construction: GRAPH-LOCK® rings of high-purity diamond textured graphite tape, in cup and cone configuration; end rings made from Style 1303-FEP
- > Temperature -328°F (-200°C) to +850°F (455°C) atm; to +1,200°F (650°C) steam
- > pH Range: 0-14 (except strong oxidizers)
- > Pressure: To 10,000 psi + (690 bar)

### Test Results

- > API 589 2nd Edition - this packing complies with the performance requirements of this standard
- > API 622 Rev 2



## Style 212-ULE

Better performance than an engineered set in a convenient spool product. Style 212-ULE is easy to cut and install with color coded instructions. Cut inventory dollars and reduce outage schedules without sacrificing performance. Outage planning is easier than ever now that each 212-ULE box indicates how many typical valves can be repacked by one box.

### Specifications

- > Construction: High-purity GRAPH-LOCK® flexible graphite and 0.004" INCONEL® filament
- > Temperature -328°F (-200°C) to +850°F (455°C) atm; to +1,200°F (650°C) steam
- > pH Range: 0-14 (except strong oxidizers)
- > Pressure: To 4,500 psi (310 bar)

### Test Results

- > API 589 2nd Edition - this packing complies with the performance requirements of this standard
- > API 622 Rev 2

\*INCONEL is a registered trademark of Inco Alloys International, Inc.

# Metallic Gaskets

Garlock Metallic Gaskets have introduced some of the industry's most innovative production methods and products. The CONTROLLED DENSITY™ process for spiral wound gaskets ensures a high tightness level at a lower bolt stress. The TANDEM SEAL™ combines chemical resistance and fire safety in a single gasket. The Garlock EDGE® gasket seals at lower bolt stress while virtually eliminating inner buckling and is available in different models to fit application and installation needs. Garlock Metallic Gaskets is known for product quality and outstanding customer service while offering standard and exotic material options.



## FLEXSEAL®

Garlock's FLEXSEAL spiral wound gaskets with CONTROLLED DENSITY™ technology provide consistent compressibility. This process of precise winding density control provides a gasket designed to meet your specified sealing stress and assures consistent sealing of your most critical fluids.

### Specifications

- > Durable, easy to install and remove
- > Seals pressures to flange ratings, in accordance with ASME B 16.5
- > Guide ring simplifies centering of sealing element on the flange face
- > Designed solutions accommodate a variety of conditions by combining various metals and filler materials
- > Manufactured in accordance with ASME B16.20-2012
- > Temperature:
  - Minimum: -400°F (-240°C)
  - Max in atm: 850°F (454°C)
  - Max in steam: 1,200°F (650°C)
  - Max continuous: 850°F (454°C)

### Test Results

- > Passed API6FB 3rd Edition Fire Test



## THERMa-PUR™ Spiral Wound

The THERMa-PUR spiral wound gasket is designed for use in extreme temperature and aggressive chemical applications. It is manufactured using an environmentally friendly solvent-free process with Garlock's traditional quality. THERMa-PUR Spiral Wounds are yet another Garlock product born from customer driven innovation.

### Specifications

- > Extreme Temperature - Able to withstand high temperature weather continuously or extreme thermal cycling in excess of 1,832°F (1,000°C)
- > Oxidation Resistance - Contains proprietary materials that provide improved weight loss characteristics over other high-temperature solutions
- > Chemical Resistance - Proprietary formulation is resistant to a broad range of chemicals: Titanium Tetrachloride, molten salts and other heavy oxidizers
- > Hydrophobic - Resists water contamination and degradation in service conditions
- > Easy Release from Flanges - Does not stick to flanges making removal of gaskets easy and faster without the need to chisel or scrape flanges
- > Temperature: Minimum: -400°F (-240°C)  
Max in atm/Steam/Contin: 1,832°F (1,000°C)

### Test Results

- > Passed API6FB 3rd Edition Fire Test



## Tandem Seal

The TANDEM Gasket is chemically-resistant and fire safe. It is available with a PTFE envelope or facing that withstands aggressive chemicals and corrosive media. The spiral wound and serrated inner ring is designed to seal to the ID of the flange bore to prevent erosion. The Tandem Seal is also available with graphite facing layers on the serrated inner ring.

### Specifications

#### Chemical-resistant

- > PTFE envelope/facing withstands aggressive chemicals and corrosive media
- > Fire-safe—passed independent fire tests
- > Two sealing elements significantly reduce corrosion and bacterial contamination of flanges
- > Seals to the ID of the pipe bore
- > Specify pipe schedule when ordering
- > Temperature:
  - Minimum: -400°F (-240°C)
  - Max. in atm: 500°F (260°C)
  - Max. in steam: 500°F (260°C)
  - Max. continuous: 500°F (260°C)

### Test Results

- > Passed API 6FB, 3rd Edition Fire Test

# Metallic Gaskets



## Kammprofile

The Kammprofile's serrated solid metal core concentrates the available bolt load for tight seals even at lower stresses. The core resists cold flow, over compression and blowout providing exceptional stability, even in large sizes. This stability facilitates ease of handling and installation. When faced with a soft, deformable sealing material, such as graphite, seating surface imperfections are filled under compression creating a tight seal. The Kammprofile's design makes it ideal for low-stress sealing situations, extreme temperature and pressure fluctuations.

## Specifications

### Chemical resistant

- > Accommodates standard ASME flanges as well as weaker and non-circular flanges
- > Replacement for jacketed heat exchanger gaskets
- > Seals less than perfect flanges
- > Handles pressures from vacuum to Class 2500
- > Temperature:
  - Minimum: -400°F (-240°C)
  - Max in atm: 850°F (454°C)
  - Max in steam: 1,200°F (650°C)
  - Max continuous: 850°F (454°C)

### Test Results

- > Passed API6FB 3rd Edition Fire Test



## THERMa-PUR™ Kammprofile

The THERMa-PUR Kammprofile gasket is designed for use in extreme temperature and aggressive chemical applications. It is manufactured using an environmentally friendly solvent-free process with Garlock's traditional quality. THERMa-PUR Kammprofiles are yet another Garlock product born from customer driven innovation.

## Specifications

- > Chemical resistant
- > Extreme Temperature - Able to withstand high temperature weather continuously or extreme thermal cycling in excess of 1,832°F (1,000°C)
- > Oxidation Resistance - Contains proprietary materials that provide improved weight loss characteristics over other high-temperature solutions
- > Chemical Resistance - Proprietary formulation is resistant to a broad range of chemicals: Titanium Tetrachloride, molten salts and other heavy oxidizers
- > Hydrophobic - Resists water contamination and degradation in service conditions
- > Easy Release from Flanges - Does not stick to flanges making removal of gaskets easy and faster without the need to chisel or scrape flanges
- > Temperature: Minimum: -400°F (-240°C)  
Max in atm/Steam/Contin: 1,832°F (1,000°C)

## Test Results

- > Passed API 607, 4th Edition Fire Test



## C.M.G. Family

The superior technology of the C.M.G. (Corrugated Metal Gasket) family of gaskets ensures excellent sealing performance and reliability, even in the most difficult applications. Each style combines a corrugated metal core with a compressible sealing element of various materials, for resistance to a wide range of harsh conditions, including extreme temperature, corrosive chemicals and thermal cycling.

## Specifications

### GRAPHONIC®

- > Temperature: Minimum: -400°F (-240°C)
  - Max in atm: 850°F (454°C)
  - Max in steam: 1,200°F (650°C)
  - Max continuous: 850°F (454°C)
- > Pressure: max: 1,000 psig (70 bar)
- > PxT Max: 1/16" thk: 700,000 (25,000)
- > PxT Max: 1/8" thk: 400,000 (13,500)

### G.E.T.™

- > Temperature: Minimum: -400°F (-240°C)
  - Max in atm: 500°F (260°C)
  - Max in steam: 500°F (260°C)
  - Max continuous: 500°F (260°C)
- > Pressure: max: 1,000 psig (70 bar)
- > PxT Max: 1/8" thk: 250,000 (8,500)

## Test Results

- > Passed API6FB 3rd Edition Fire Test

# Gasket Products

Garlock's Extreme Grade gasketing materials are made of graphite, carbon or inorganic fibers with a choice of NBR or SBR binders. Extreme Grade gaskets have world-class sealability helping to improve operational performance and comply with stringent environmental requirements. All Garlock Extreme Grade products are available with a revolutionary Flange-Free™ anti-stick that helps cut maintenance costs and reduce downtime.



## Style 5500

### Tighter seal

- > Inorganic fiber gasketing offers excellent thermal stability with minimal weight loss
- > Reduced creep relaxation and improved torque retention provide optimal sealability

### Temperature Resistant

- > Non-oxidizing fibers withstand a continuous operating temperature up to 550°F (290°C) and maximum spike of 800°F (425°C)
- > Style 5500 has passed the Garlock Fire Test and is ABS Fire Safe Type Approved

## Specifications

- > Color: Grey
- > Composition: Inorganic fiber with nitrile
- > Temperature: Minimum: -100°F (-75°C)  
Max: 800°F (425°C)  
Max continuous: 550°F (454°C)
- > Pressure: 1,200 psig (83 bar)
- > Sealability (ASTM F37B)  
ASTM Fuel A 0.2ml/hr  
Nitrogen 1.0ml/hr
- > Creep Relaxation (ASTM F38) 15%
- > Compressibility Range (ASTM F36) 7-17%
- > Recovery (ASTM F36) >50%
- > Gas Permeability (DIN 3535 Part 4)  
0.05cc/min

## Test Results

- > Passed API 589 3rd Edition Fire Test



## Style 9850

### Heat and Pressure Resistant

- > Carbon fiber gasketing excels in harshest conditions - intense heat, high pressure, saturated steam and hot oils

### Tighter seal

- > Maintains effective seal during pressure and temperature fluctuations
- > Superior torque retention lowers leakage rates and reduces maintenance time

### Convenient

- > Flexible material is easy to handle and cut
- > Sheet sizes to 150"x150" (3.8 m x 3.8 m) minimize waste and inventory costs

## Specifications

- > Color: Black
- > Composition: Carbon with nitrile
- > Temperature: Minimum: -100°F (-75°C)  
Max: 900°F (480°C)  
Max continuous: 650°F (340°C)
- > Pressure: 2,000 psig (138 bar)
- > Sealability (ASTM F37B)  
ASTM Fuel A 0.1 ml/hr  
Nitrogen 0.1 ml/hr
- > Creep Relaxation (ASTM F38) 15%
- > Compressibility Range (ASTM F36) 7-17%
- > Recovery (ASTM F36) >56%
- > Gas Permeability (DIN 3535 Part 4)  
0.015cc/min

## Test Results

- > Passed API6FB 3rd Edition Fire Test



## Style 9900

### Tough and Reliable

- > Graphite fiber gasketing withstands extreme temperatures and pressures, as well as many chemicals
- > Passed Garlock Fire Test, and is ABS Fire Safe Type Approved
- > Meets Navy Spec STR 5082
- > Maintains superior seal during thermal cycling, even in saturated steam and hot oils
- > Significantly reduces emissions to meet stringent Clean Air Act requirements
- > Graphite fiber sheet is easier to handle and cut than exfoliated graphite sheets or metal-inserted gasket material





## Specifications

- > Color: Mahogany
- > Composition: Graphite with nitrile
- > Temperature: Minimum: -100°F (-75°C)  
Max: 1,000°F (540°C)  
Max continuous: 650°F (340°C)
- > Pressure: 2,000 psig (138 bar)
- > Sealability (ASTM F37B)  
ASTM Fuel A 0.1 ml/hr  
Nitrogen 0.1 ml/hr
- > Creep Relaxation (ASTM F38) 9%
- > Compressibility Range (ASTM F36) 7-17%
- > Recovery (ASTM F36) >65%
- > Gas Permeability (DIN 3535 Part 4)  
0.015cc/min

## Test Results

- > Passed API607 4th Edition

# Fire Safe Product Selector

Equipment	Application	Compression Packing 	Cathodic Protection 	Metallic Gaskets 	Sheet Gasketing 
Boilers	Handholes and Manways			FLEXSEAL®, GRAPHONIC®, Kammprofile	
Columns, Towers, Vessels, Reactors & Utilities	Coke Drums			GRAPHONIC®, Kammprofile	
	Cooling Tower Fin-Fans			Kammprofile for site holes	
	Furnaces			FLEXSEAL®, GRAPHONIC®, Kammprofile	
Heat Exchangers	Shell & Tube			GRAPHONIC®, Kammprofile	9900, 9850, 5500
Mixers, Agitators, Autoclaves	Corrosive, Abrasive Service		VCFS, VCXT	FLEXSEAL®, GRAPHONIC®, Kammprofile	
	Handholes and Manways			FLEXSEAL®, GRAPHONIC®, Kammprofile	
Piping	Hydrocarbons, Corrosives		VCFS, VCXT	FLEXSEAL®, GRAPHONIC®, Kammprofile, Tandem Seal, G.E.T.	9900, 9850, 5500
	Steam, Boiler Feed, Condensate		VCFS, VCXT	FLEXSEAL®, GRAPHONIC®, Kammprofile	9900, 9850, 5500
	Flue Duct Hot Gases		VCFS, VCXT	THERMa-PUR™ Spiral, THERMa-PUR™ Kammprofile	
Pumps - Centrifugal/ Reciprocating	Acids, Caustics, Solvents		VCFS, VCXT	FLEXSEAL®, GRAPHONIC®, Kammprofile, Tandem Seal	
	Asphalt, Cat Cracker Slurry		VCFS, VCXT	FLEXSEAL®, GRAPHONIC®, Kammprofile, Tandem Seal	
	Boiler Feed, Condensate		VCFS, VCXT	FLEXSEAL®, GRAPHONIC®, Kammprofile, Tandem Seal	9900, 9850, 5500
	Crude Oil		VCFS, VCXT	FLEXSEAL®, GRAPHONIC®, Kammprofile, Tandem Seal	9900, 9850, 5500
Railroad Tank Cars	Chemical Tanks, Dome Lids			GRAPHONIC®, G.E.T.	
Valves (ball, gate, globe, slide)	Hydrocarbons, Hydrogen, Solvents	1303-FEP, EVSP, 212-ULE	VCFS, VCXT	FLEXSEAL®, GRAPHONIC®, Kammprofile	9900, 9850, 5500
	Saturated Steam	1303-FEP, EVSP, 212-ULE	VCFS, VCXT	FLEXSEAL®, GRAPHONIC®, Kammprofile	9900, 9850, 5500



Leaders in Sealing Integrity

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### Garlock Family of Companies

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