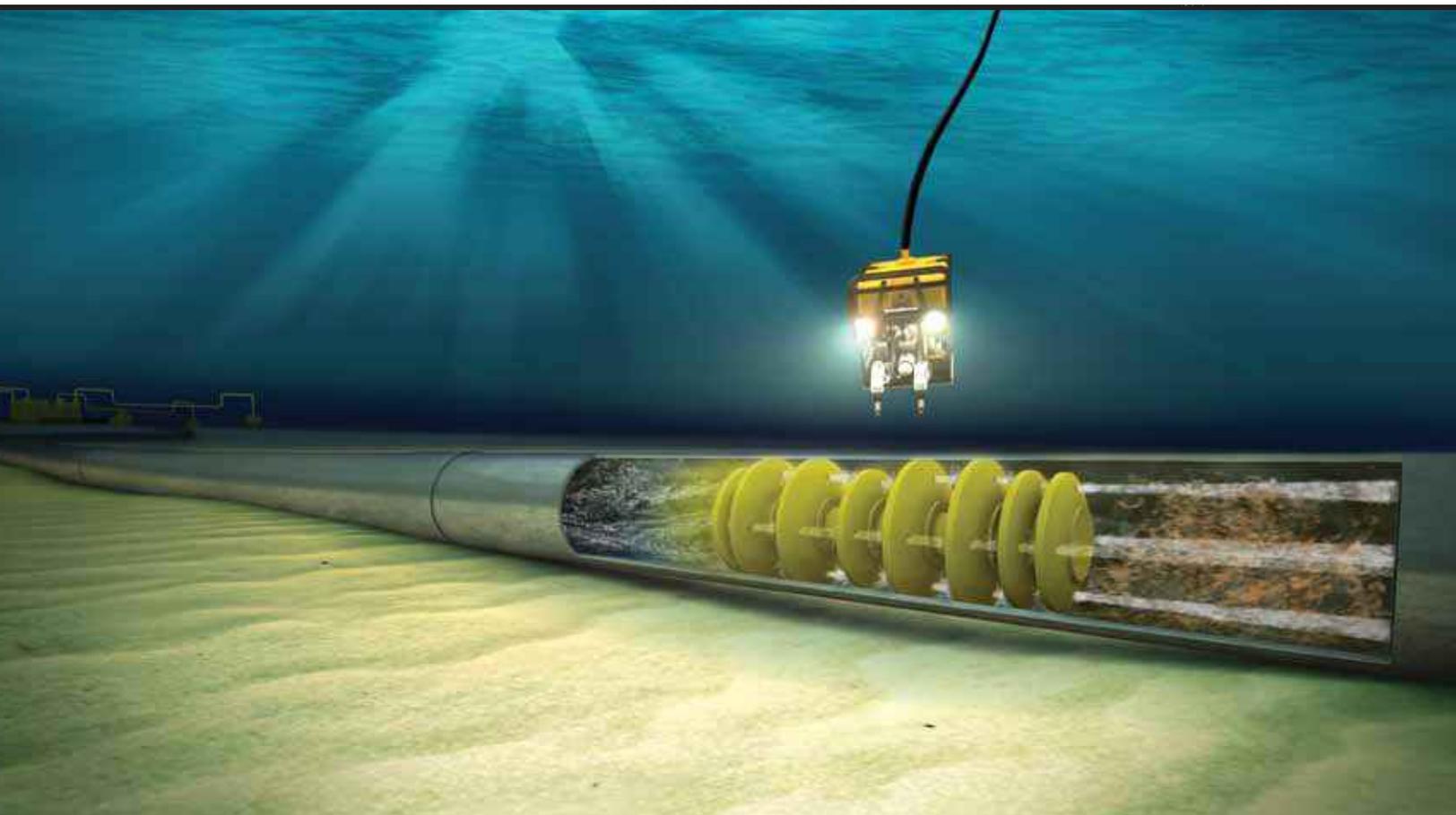


FOR CON  
DIMENSION  
CONTRACTOR

**DRINKWATER**

**PRODUCTS**

*Pipeline Integrity Solutions*



SUPPLIED BY

## ABOUT US

Drinkwater Products delivers best-in-class pipeline specialty products for the oil and gas industry, and has done so since it was established in Louisiana in 1987. As a market leader in the pipeline pigging industry, Drinkwater Products provides unmatched selection and everything you need for successful pipeline maintenance.

## SOLUTIONS

Drinkwater Products is the number one source for maintenance products of pipelines. We have earned that reputation because we fundamentally believe in helping our customers build a maintenance program, not just purchase maintenance products.

A strategic program is set in place to ensure the integrity of the pipeline protecting your operation from downtime and unexpected delays. Our independent, unbiased and experienced support will help deliver a successful solution for your team time and time again.

## CONTACT

Address: 10789 Hwy 182  
Franklin, LA 70538

Toll Free: +1 800-515-7078  
Main: +1 337-828-0177  
West Coast: +1 661-381-6761  
Fax: +1 337-828-5999  
Email: [Sales@DrinkwaterProducts.com](mailto:Sales@DrinkwaterProducts.com)  
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## CATALOG GUIDE

- **Pigs and Pigging Products**
  - **Flange Insulation Kits**
  - **Monolithic Isolation Joints**
  - **Link Seal®**
  - **Casing Insulators**
  - **End Seals**
  - **Trenton Wax Tape Systems**
  - **Liquid Measurement**
- 

## COMPLETE PRODUCT OFFERINGS

### PIPELINE PIGS

Types -- Foam, Cast-Urethane, Steel Body, Spheres, Gauge Pigs, Solubles  
Brands -- Enduro Pipeline Services, Girard Industries, Knapp Polly Pig, Maloney Technical Products, S.U.N. Engineering, T.D. Williamson

### PIG TRACKING EQUIPMENT

Transmitters  
Receiver Units  
Subsea Tracking Units  
Geophones

### PIG DETECTORS

TDW Pig Sig V®  
Enduro Pig Popper™  
CDI Bandit  
SUN Magna Sygg®

### FLANGE INSULATION KITS

Pikotek VCS  
Pikotek VCFS (FireSafe)  
ID Seal  
PGE  
Linebacker  
VCXT (Xtreme Temp)  
Phenolic

### MONOLITHIC ISOLATION JOINT

Electro-Stop®

### LINK-SEAL®

### CASING INSULATORS

Model PE  
Model PE High Temp  
Ranger II  
Metallic  
Metallic Ultra High Temp

### END SEALS

Model W  
Model C  
Model S

### TRENTON WAX PRODUCTS

#1 Wax Tape  
#2 Wax Tape  
TemCoat 3000 (Primer)  
Profiling Mastic (Birdseed)  
Innercoat Blocks  
Fill Coat (Casing Fill)  
MC Outerwrap  
Guard-Wrap  
Glas-Outerwrap  
EON 6 Fusion Coated Epoxy

### MEASUREMENT PRODUCTS

Prover Spheres  
Prover Switches  
Sphere Pickers  
Sphere Pumps  
Sizing Tools  
Sizing Rings

### ADDITIONAL PRODUCTS

Closures  
O-Rings  
Line Markers  
Chemical Sticks  
Holiday Detectors  
Night Caps

## FOAM



Foam pigs are a useful and economical solution to many pigging scenarios, such as batching, cleaning, dewatering, and drying. Drinkwater Products carries a full range of foam pigs and will help you decide which one is right for your job.

### OPTIONS and DATA

- Foam Density Options - 1-2 lb (soft), 5-7 lb (medium), 9-10 lb (hard)
- Coating Options - Bare, Spiral, Criss Cross, Totally Coated
- Nose Options - Bullet Nose, Double Dish, Double Nose, Flat on both ends
- Cleaning Options - Steel Brushes, Plastic Brushes, Urethane Blades, Metal Studs, Silicon Carbide
- Cavity options available for transmitters
- Magnets can be potted inside foam
- Handling Ropes or Straps

## CAST-URETHANE



Cast-Urethane pigs are rugged, versatile pigs that can be used for a number of applications including batching, cleaning and dewatering. Cast-Urethane pigs can be run multiple times and are generally more aggressive than foam pigs.

### OPTIONS and DATA

- Material Options - Urethane, Neoprene, Nitrile, EPDM\*, Viton\*
- Configurations - Cups, Discs, Dual-Diameter
- Bi-Directional or Uni-Directional
- Cleaning Options - Carbon Steel Brushes, Stainless Steel Brushes, Plastic Brushes, Pencil Brushes
- Cavity options available for transmitters or other tracking devices
- Magnets can be potted inside urethane
- Handling Ropes or Straps

*\*EPDM and Viton available in select pigs only. Call for more info.*

## STEEL-BODY



Steel-Body pigs, or Mandrel pigs, are heavy duty pigs which can be configured in a number of ways to provide maximum cleaning, sealing and sweeping power. These pigs can travel long distances and the urethane cups and discs are replaceable which makes them an economical option for many pipeline operators.

### OPTIONS and DATA

- Material Options - Urethane\*, Neoprene, Nitrile, Viton
- Configurations - Cups, Discs, Dual-Diameter
- Bi-Directional or Uni-Directional
- Cleaning Options - Carbon Steel Brushes, Stainless Steel Brushes, Plastic Brushes, Pencil Brushes, Urethane Blades, Magnets
- Cavity options available for transmitters or other tracking devices
- Magnets can be mounted on body of pig for tripping magnetic pig detector, or for picking up debris

*\*Urethane available in all durometers.*

## SPHERES



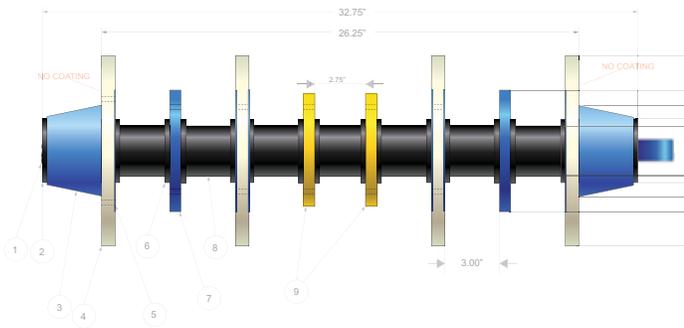
Sphere pigs are utilized on many systems that have automatic ball launchers or small pigging valves. They are capable of making sharp radius 90's and are effective at sweeping out liquids and soft debris. Call us to find out if sphere pigs are the right choice for your system.

### OPTIONS and DATA

- Material Options - Urethane\*, Neoprene, Nitrile, Foam
- Configurations - Inflatable Urethane, Solid Urethane, Solid Foam, Urethane with Foam Core
- Cleaning Options - Foam Spheres can have steel brushes for scraping
- We will fill and size inflatable spheres
- Sizing Rings available

*\*Urethane available in all durometers.*

## CUSTOM DESIGN



There are many factors to consider when pigging pipelines such as product type, volumes, bend radii and much more. These variables will dictate what type of pig is right for your job. Unfortunately, there isn't a "one-size fits all" option when it comes to pipeline pigs and a new design is required to accomplish the requested pigging goals.

Drinkwater Products has the knowledge and expertise to design custom made pigs for a wide range of irregular piping scenarios. Whether it is modifying an existing pig or designing something brand new, we believe that attention to detail can make all the difference in having an effective pig run.

### OPTIONS and DATA

- Material Selection - Foam, Urethane, Neoprene, Nitrile, Chemical Resistant Urethane
- Dual-Diameter and Multi-Diameter options available
- Nose Options - Bullet Nose, Double Dish, Double Nose, Flat on both ends
- Cleaning Options - Steel Brushes, Plastic Brushes, Urethane Blades, Metal Studs, Silicon Carbide
- Tracking Options - Electromagnetic Transmitters, Acoustic Pingers, Radioactive Isotopes, Magnets
- Magnets can be used for picking up debris
- Custom designed pigs take thought and planning. Having your pipeline specs available will give us the needed information to properly design pigs that will be effective and safe to run. Please call us to discuss your unique pigging needs.



## MAINTENANCE PIGGING STRATEGIES



### OPTIONS and DATA

- Free Consultation
- Will provide spreadsheet with pipeline data including pig to be used on each line.
- Pig Options - Foam, Cast-Urethane, Steel Mandrel, Spheres
- Cleaning Options - Steel Brushes, Pencil Brushes, Plastic Brushes, Urethane Blades, Metal Studs, Silicon Carbide
- The following information is helpful:
  - Is this a new or old line?
  - Length of line
  - Pipe ID (Internal Diameter or Wall Thickness)
  - Bend Radius
  - Wyes and Fittings
  - Type of Product
  - Flow Rates
  - Pressure during normal operations
  - Has any debris been recovered while pigging?

“What kind of pigs should I use?” “How often should I pig?” These are common questions related to maintaining a clean pipeline. Historically crude oil lines were often pigged more regularly than natural gas lines, but not anymore. With more and more wet gas systems in play, sweeping liquids has become as critical as cleaning paraffin out of oil lines. No matter what kind of lines you are maintaining, an effective maintenance program starts with knowing your line and selecting the proper pig. Drinkwater Products will help you in this process and can lay out a recommended strategy based on over 25 years of maintenance pigging experience.



## STEP-UP PIGGING PLANS



Paraffin has been a problem for crude oil pipelines for many years. As the oil cools down, wax (paraffin) begins to fall out (cloud point) of the oil and starts to build up in the pipeline. This wax build up, if not properly maintained, can lead to complete blockage of the pipeline. If recognized in time, the wax can be removed prior to complete blockage utilizing a series of pigs. Putting together a Step-Up Pigging Plan requires careful study and attention to detail to ensure the pigs don't push out too much paraffin at once creating a plug. When necessary, Drinkwater Products will recommend using some type of chemical solvent in conjunction with the pigging plan. This will help to soften hard paraffin, thus making it easier to remove. If you have a crude oil line that is experiencing high pressure and are afraid of it plugging, call us and we will lay out an effective, safe strategy for cleaning your pipeline one pig at a time.

### OPTIONS and DATA

- Free consultation before, during and after program implementation.
- Diagnostics report showing effective Pipe ID
- Pigging Proposal includes types of pigs, quantities, and order that they should be run



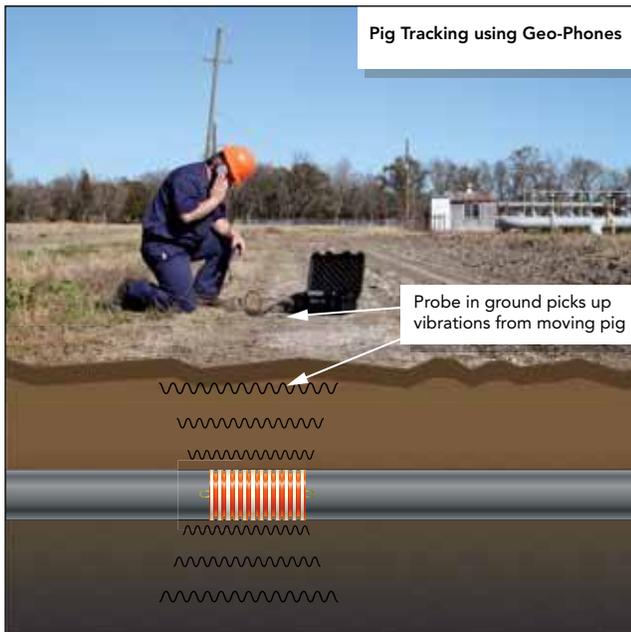
## PIG TRACKING EQUIPMENT



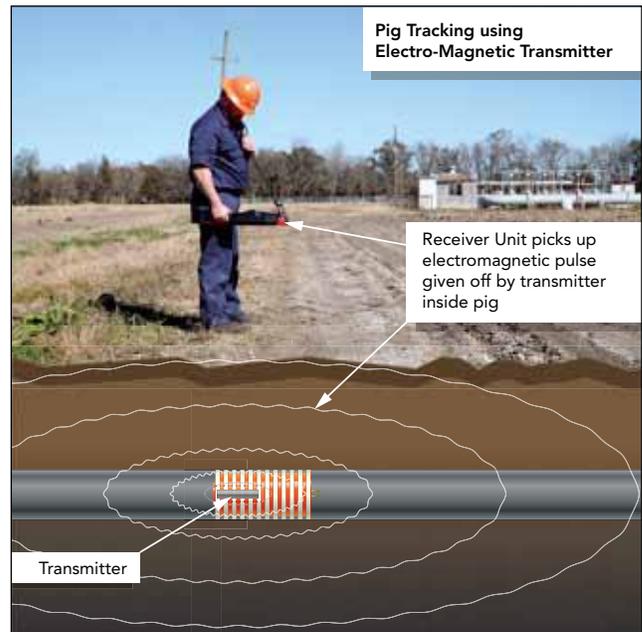
Pig Tracking Equipment plays an essential role in an operator's pigging activities. Knowing where the pig is and finding it if it gets stuck can save the user costly down time and frustration. Drinkwater Products keeps a wide range of tracking equipment for rental or purchase and has the hands-on experience to help you with product selection and tracking strategy.

### OPTIONS and DATA

- Electromagnetic Transmitters and Receivers
  - Track Multiple Pigs with Multiple Frequencies
  - Have a text message or email sent to you when pig passes
  - GPS Waypointing for hard to find areas
- Geophones
  - Leapfrogging packages available
  - Radio adapter to pick up signal through car stereo
  - Probe bars threaded for mounting geophone probe allowing for more clarity in areas where ground cover is deeper
- Acoustic Pingers and Hydrophones available
  - Smart Gauge Plate and GRID Systems available
- Subsea Tracking Units
  - ROV/ Diver Operated Receivers
  - Skid-Based Antennae with long cable available for water depths up to 500ft
- AGM's for picking up MFL or other Smart Pigs



Geophones greatly amplify the vibrations of the pig rubbing against the wall of the pipe allowing the user to hear the pig coming from sometimes miles away.



Electromagnetic Transmitters give off a pulse which is picked up by a receiver unit. This allows the operator to track a moving pig or locate a stuck pig.

## INTRUSIVE PIG DETECTORS

Intrusive Pig Detectors provide notification of a pig passage. They are permanently installed on the pipe usually near the pig launcher and receiver. They are activated when a pig passes through the pipe triggering an internal lever or piston, which then relays that passage with some type of visual indicator or an electrical signal.

### TDW Pig Sig® V



TDW's PIG-SIG® V Scraper Passage Indicator is a device installed at prescribed intervals on pipelines to detect the passage of a pig or sphere. Most common passage indicators function by extending a unidirectional or bidirectional trigger into pipelines through a welded fitting or nipple that has been tapped. When a pig passes an indicator, the trigger is tripped which immediately activates a signaling mechanism. The PIG-SIG V indicator comes with a standard omnidirectional trigger that is easier to install and all but eliminates trigger breakage. Signaling systems available with the PIG-SIG V include a flag indicator, an electrical indicator or a flag/electrical indicator. All are compatible with all standard THREAD-O-RING™ nipples previously made by TDW and are interchangeable.

This makes it possible to order the PIG-SIG V

unit as an upgrade conversion kit without nipple, or as a new installation kit complete with nipple.

Standard PIG-SIG V passage indicators are built to withstand the most brutal offshore/onshore environments. Each PIG-SIG V indicator is weatherproof and corrosion-resistant. All components exposed to pipeline products are completely sealed to prevent leakage and are NACE compatible. Components exposed to the atmosphere are all 316 stainless steel — except on electrical models, where the microswitch is aluminum with a protective powder coating unless stainless steel is specially requested. The microswitch flag indicator offers high visibility. Because the triggering toggle that extends into a pipe is omnidirectional, it does not require adjustments after it is set. This means the flag can be oriented to face any desired direction. The carbon steel nipple is manufactured from easily weldable material. PIG-SIG indicators can be installed on or removed from a pressured pipeline.

### OPTIONS and DATA

- Flag Indicator with Manual Reset
- Electrical Indicator with Auto Reset
- Flag/Electrical Indicator combined
- Extended models, for installation on buried pipelines are available
- Special materials and O-ring seals are available
- Nipple can be furnished with flanged or threaded mounting

### ENDURO® Pig Popper



The Pig Popper™ is an intrusive pig signal that is manually reset once it has been tripped by a pig.

Extensions are available in 6 inch increments for buried pipe locations. All units are also available in a lighted (beacon) version. The Pig Popper™ is designed to be fitted on most existing 2 inch fittings.

The Pig Popper™ Assembly may be installed in any location around the pipe – perpendicular to the center line of the pipe.

The Enduro Pig Popper is available in several different options.

- Manual Visual Alert
- Electrical Alert
- Combo – Electrical/Manual Visual Alert

### OPTIONS and DATA

- Bi-directional trigger
- Stainless steel inner construction
- Simple installation
- Universal fitting
- No-doubt observation of pig arrival
- Intuitive reset

## NON-INTRUSIVE PIG DETECTORS

Non-Intrusive Pig Detectors provide notification of a pig passage by detecting a magnet inserted into a pig. They can be permanently mounted on the pipe or moved from one location to another. Once a magnetic field is detected, these detectors provide a visual or electrical indicator.

### CDI CD52 Bandit



With over ten years of production and thousands of problem free units in the field, the CD52 Bandit has a proven track record of providing a simple, reliable, durable and non-intrusive means of detecting and recording pipeline pig passages in the world's most harsh environments. Once placed on the pipeline, CDI's patented noise cancelling antenna immediately begins scanning for

both transmitter and permanent magnet equipped pipeline pigs. When a pig passage is detected by the system, operators are notified simultaneously through the LCD display which shows dates and times, and relay outputs which can be interfaced to PLCs, SCADA, lights and horns. With marine-coated stainless steel as an option and an explosion-proof rating on every single system, the CD52 can be used throughout your pipeline system regardless of environment.

### OPTIONS and DATA

- Detection of both transmitter and permanent magnet equipped pigs
- Operational temperature range as wide as -45°C to +80°C with optional heater
- Designed for permanent or temporary use both on and offshore
- Powered for one full year on two off-the-shelf D-cell alkaline batteries, or can utilize client's +24VDC remote power
- Available in standard aluminum or optional 316L stainless steel
- Optional satellite radio can send pig passage time, date and GPS location via email or SMS message
- Available in a sub-sea version in water depths up to 14,000 ft

### S.U.N. Magna Sygg®



The MAGNA-SYGG from S.U.N. Engineering, Inc. is truly a non-intrusive pipeline pig detector. Simple and rugged, it can be strapped to the surface of a pipe or it can be used as a portable pig passage indicator. You do not have to shut down the pipeline and wait for an expensive crew to install special fittings – the MAGNA-SYGG pig detector is ready to go to work.

MAGNA-SYGG Series 100 pig detectors feature rugged weatherproof construction. The Series 200 pig detectors have explosion proof, UL listed housings. The detector can be powered by its self-contained battery or by on-site 24 VDC. The pig detectors can be used to actuate a range of devices from simple manual reset flags to Supervisor Control and Data Acquisition (SCADA) systems.

MAGNA-SYGG operates by reacting to changes in magnetic field strength (changes in magnetic flux density). A passing pig, which has been properly fitted with a suitable magnet, will induce a current within the detector's base. Upon detection of the magnetic field, the pig detector then activates a NO (Normally Open) or NC (Normally Closed) Relay, that has a 7 second reset delay. Contacts are rated 1/4 A at 24 VDC.

### OPTIONS and DATA

- NO / NC Relay
- Mechanical Flag
- Battery Pack
- 24 VDC Power (optional)
- Timer (optional)
- Satellite Base (optional)
- Test Light (optional)
- Reset Switch (optional)
- Explosion Proof (optional)

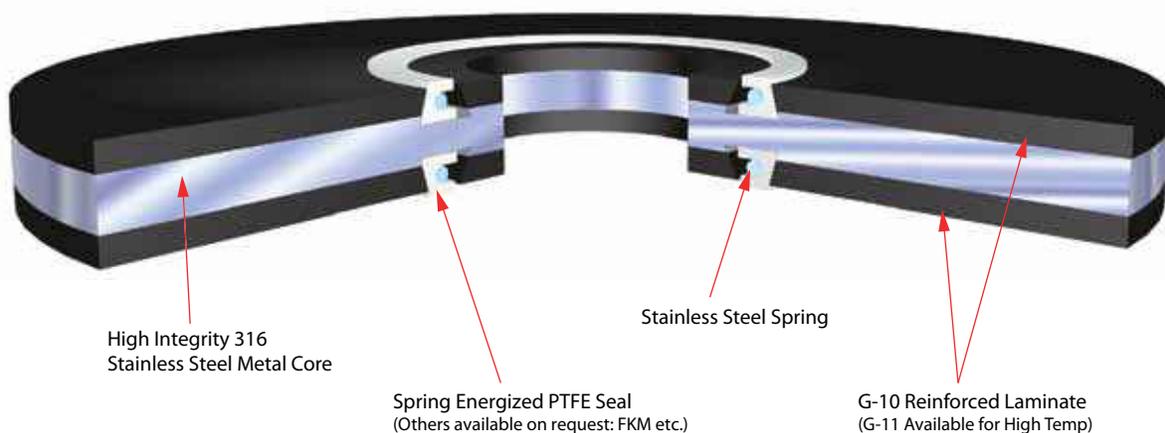
## PIKOTEK VCS



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

### OPTIONS and DATA

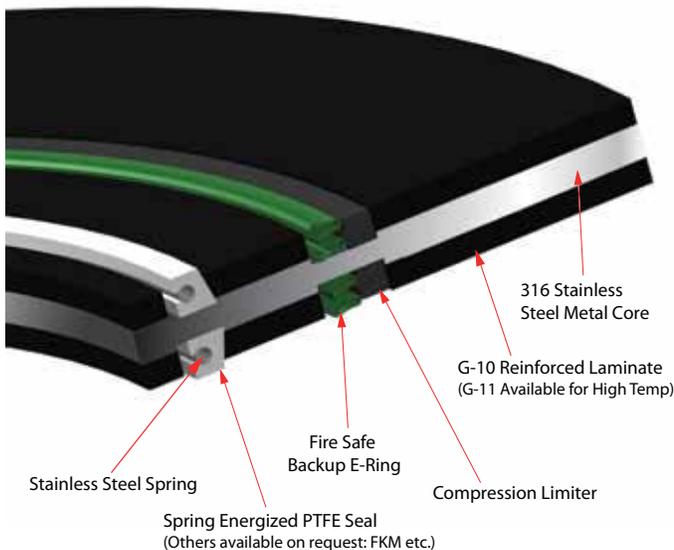
- Seals and isolates all pressure ratings through ANSI 2500# class and API 10,000# psi service
- Designed to withstand corrosive environments, including high concentrations of CO<sub>2</sub>, H<sub>2</sub>S, produced water and aggressive inhibitors
- Good electrical isolation properties for cathodic protection
- Pressure-activated seals provide high confidence sealing, eliminates costly leaks and provides a solution for fugitive emissions
- Mitigates galvanic corrosion in dissimilar metal flanges
- Can mate mismatched RTJ with raised-face flanges
- Works in Ring Joint Flanges, reducing fluid entrapment, flow induced erosion and media induced corrosion between flanges
- Gasket is self-aligning and centering; quick to install and no special tools are required
- Prevents turbulent flow at flanged connections
- High-strength laminate material resists failure due to excessive compression
- Available to match any flange specification (ANSI, ASME, API, MSS, BS, DIN, AS and others)



## PIKOTEK VCFS



The creation of the VCFS was driven by the demands of our customers who needed to electrically isolate their flanges but worried about the performance of non-metallic components in the event of a fire. This was especially a concern in the offshore market where the consequences of a fire on platforms are very hazardous and costly. Additionally, the needs of users in piping and LNG applications, where the risk of a fire would greatly threaten life and property, drove the need for an electrical isolation seal that is fire safe per API 6FB.



### OPTIONS and DATA

- Based upon proven VCS platform
- E-Ring sealing system is dual purpose providing fire safe as well as backup seal element
- Passed API 6FB 3rd Edition Fire Test
- Designed to withstand corrosive environments, including high concentrations of CO<sub>2</sub>, H<sub>2</sub>S, produced water and aggressive inhibitors
- Good electrical isolation properties for cathodic protection
- Pressure-activated seals provide high confidence sealing, eliminates costly leaks and provides a solution for fugitive emissions
- Mitigates galvanic corrosion in dissimilar metal flanges
- Can mate mismatched RTJ with raised-face flanges
- Works in Ring Joint Flanges, reducing fluid entrapment, flow induced erosion and media induced corrosion between flanges
- Gasket is self-aligning and centering; quick to install and no special tools are required
- Prevents turbulent flow at flanged connections

### HCS Washer System



As part of the development of the VCFS Firesafe gasket we had to overcome the potential of the loss of bolt load during the burn process of the API 6FB test. Therefore we developed the new X37 hardened coated steel washer system that withstood those demands.

- The coating is a proprietary formulation called X37
- The formulation consists of a corrosion resistant pre-treatment and multiple coats of a resin bonded modified PTFE coating with hardening agents.
- The formulation provides a high dielectric, lubrication, and an overall strong and durable coating.
- Dielectric of ~ 1000 Volts/mil

## PIKOTEK PGE



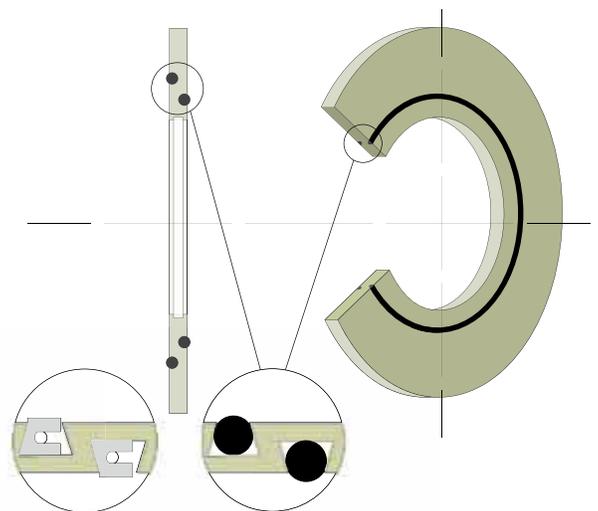
The PGE was designed to give operators an alternative to the failure prone phenolic-based isolating gaskets. Based on its construction, the PGE will provide a superior, long-lasting solution when compared to phenolic-based designs. The PGE is available in both full-face (Type E) and ring style (Type F) configurations. Depending upon the sealing element selected, the PGE is rated for most all hydrocarbon and water service applications.

The unique design of the GPT PGE system incorporates patented overlapping and offsetting seal grooves. The purpose of this design is to break each layer of laminate within the gasket itself thereby creating a barrier through which fluid and/or gas cannot migrate. The sealing element can be any elastomeric material as well as more sophisticated Spring-Energized Teflon lip seals. As a result of this advanced seal design, maintenance-free flange isolation and flange face corrosion mitigation are achieved economically.

COMMON MATERIALS PROPERTIES AND USES		
Retainer Material	G10 or G11	G10 comes standard but G11 can be used for temperatures that exceed 300°F up to 392°F
O-Ring Material	PTFE Viton Nitrile	PTFE (Teflon) comes spring-energized
Sleeve Options	G10 Nomex Mylar	G10 is the strongest material and Nomex is used for high temp situations
Washer Options	G10 G3	G10 comes standard but G3 can be used for temperatures that exceed 300°F up to 392°F

### OPTIONS and DATA

- High-reliability, low-pressure sealing system
- Overlapping seals eliminate potential leak/weep path in the laminate material
- Good electrical isolation properties for cathodic protection
- Choice of spring-energized teflon o-ring pressure activated seals
- Mitigates galvanic corrosion in dissimilar metal flanges
- Protects against flange face corrosion and flow-induced erosion
- Available in full-face (type E) or ring (type F) style
- High-strength G10 material resists failure due to excessive compression
- Isolating kits always include high-strength double washers and full-length sleeves for maximum assurance against shorting



## LINEBACKER®



LineBacker® sealing gaskets utilize a 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.

COMMON MATERIALS PROPERTIES AND USES		
Retainer Material	G10 or G11 Phenolic	G10 comes standard but G11 can be used for temperatures that exceed 300°F up to 392°F
O-Ring Material	PTFE Viton Nitrile	O-Rings come in special “Quad Ring” design
Sleeve Options	G10 Nomex Mylar	G10 is the strongest material and Nomex is used for high temp situations
Washer Options	G10 G3	G10 comes standard but G3 can be used for temperatures that exceed 300°F up to 392°F

### OPTIONS and DATA

- Eliminates Flange Leaks
- Guards against blowouts
- Protects against hostile environments
- Usable with any type of flange
- Matches gasket materials to service conditions
- All standard ANSI and API flange sizes from 1/2” and above
- Custom odd sizes and shapes
- All ANSI and API rated flanges

### TYPE “E” GASKET

The gasket retainer extends out to the O.D. of the flange. Holes are cut in a type “E” gasket at the bolt circle to accommodate threaded studs or bolts.

### TYPE “F” GASKET

The gasket retainer extends out to the I.D. of the bolt circle.

### 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

### ONE-PIECE SLEEVE AND WASHER SETS

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

- (2) 1/8” thick steel washers
- (1) One-piece isolating sleeve

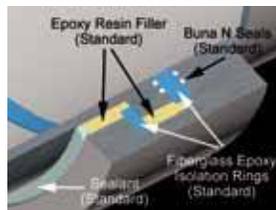
# MONOLITHIC ISOLATING JOINT

## ELECTRO-STOP™



The Electro-Stop® monolithic isolation fittings will serve as a positive leak-proof, long lasting block against the flow of electric current in all piping systems. When the Electro-Stop® isolation fitting is buried, you bury maintenance costs forever which is an especially important feature for system operators and engineers.

The ElectroStop® eliminates short circuits, field assembly and can be less expensive than a jointed flange with isolation gaskets. The Electro-Stop® is coated internally and externally to prevent corrosion and is 100% hydrostatically, electrically and weld tested. All ElectroStop® monolithic isolation joints are manufactured in accordance with ISO 9001-2008.



### HOW TO ORDER

To order ElectroStop™ Monolithic Isolating Fittings please indicate the following:

- Quantity
- Nominal Pipe Size
- ANSI, DIN, API Pressure Class or Actual Working Pressure
- Pipe Grade
- Wall Thickness
- Temperature Limits
- Product Conveyed

### OPTIONS and DATA

- Eliminates short circuits
- Eliminated field assembly
- Eliminates maintenance
- Special dual O-Ring seal
- Coated both internally and externally
- 100% electrically tested
- Is completely weld inspected
- Is manufactured in accordance with ISO9001:2000 specifications
- 100% butt weld construction
- A low uniform profile enhances ease of handling and field coating or tape wrapping
- Fittings can be welded into the pipeline above grade, utilizing standard pipeline welding procedures, then lowered into the trench by a sling
- There is a natural heat sink to dissipate circumferential weld heat during installation
- They are tamper proof and maintenance free after installation



Standard Tests Include:

- 100% Hydrostatic Pressure & Electrical Tests
- 100% Ultrasonic of Welds
- 100% Magnetic Particle of Welds
- 100% Dye Penetrant of Welds

## LINK-SEAL®



Link-Seal® modular seals are considered to be the premier method for permanently sealing pipes of any size passing through casings, walls, floors and ceilings. In fact, any cylindrical object may be quickly, easily and permanently sealed as they pass through barriers by the patented Link-Seal® modular seal design.

Ductile iron, concrete, metal and plastic pipes may be hydrostatically sealed within walls to hold up to 20 psig (40 feet of static head). Electrical or telecommunications cable may be sealed within conduit as they enter vaults or manholes. The annular space between carrier pipes passing through casings may be sealed against the entry of water, soil or backfill material.

With a wide variety of hardware/elastomer combinations, Link-Seal® modular seals are easily configured to achieve the best possible match for service conditions encountered. High temperature seals, fire seals (Factory Mutual Approved) and oil resistant seals may be ordered to meet special or unique service applications. For the system approach, metal or non-conductive Century-Line® sleeves with water stops may be ordered with Link-Seal® modular seals to ensure correct positioning and a water tight seal of the installation within poured concrete walls.

Link-Seal® modular seals are also available for a wide variety of special applications, temperature extremes, exotic chemical combinations and for “out of round” or non-centered applications.

### OPTIONS and DATA

- **Saves Time and Money**

Link-Seal® modular seals install in up to 75% less time compared to lead-oakum joints, hand-fitted flashings, mastics, or casing boots.

- **Positive Hydrostatic Seal**

Link-Seal® modular seals are rated at 20 psig (40ft of head), which exceeds the performance requirements of most applications.

- **Long Seal Life**

Link-Seal® modular seals are designed for use as a permanent seal. Seal elements are specially compounded to resist aging and attack from ozone, sunlight, water, and a wide range of chemicals.

- **Maximum Protection Against Corrosion**

Standard fasteners have a two-part zinc dichromate and proprietary corrosion inhibiting coating. Corrosion resistant 316 stainless steel available for maximum corrosion protection.

- **Certifications/Approvals**

Factory Mutual Fire Approved. Also a wide variety of approvals from various Federal agencies, associations, code groups, laboratories, and organizations.

- **ISO Quality Assurance**

Link-Seal® modular seals are manufactured in an ISO 9001:2000 certified facility.

- **Configure a Link-Seal® Modular Seal to Match Your Application**

16 sizes, color-coded EPDM, Nitrile, and Silicone elastomers may be used with various hardware options to match performance characteristics with service conditions.



## MODEL PE



High density (linear), injection molded virgin polyethylene casing isolators/spacers provide positive insulation, high abrasion resistance and low coefficient of friction for a wide variety of double containment carrier/casing pipe applications. They are extremely light in weight and easy to handle during installation. A ribbed inner surface prevents slippage and guards against carrier pipe coating damage while the outer surface may include any one of several molded runners to accommodate 2" (50.8mm) x 4" (101.6mm) or larger carrier/casing differentials.

One piece solid molded segments provide for maximum load bearing. Hardware includes cadmium plated steel studs, nuts and washers. A screwdriver is the only tool needed for installation.

### OPTIONS and DATA

- 5" (127mm) wide band for maximum hoop strength around carrier pipe.
- Ribbed inner surface prevents slippage and guards against coating damage.
- Molded from virgin polyethylene material.
- Lightweight for ease of handling and installation.
- Screwdriver is only tool needed for installation.
- High-temp model available (up to 12" x 16" [305mm]) for service temperatures to 280°F. (138°C.).
- Eliminates the need for blown sand or pea gravel



## RANGER II®



The Ranger II® is a completely non-metallic casing isolator/spacer system that uses molded segments to encircle the carrier pipe. Each segment includes at least one molded-in runner and one slide lock. Customers may choose from any one of five different size bands to allow correct sizing for carrier pipe O.D. ranges from 0.83" up to 37.60" in diameter.

Once sized, the segments are placed around the carrier pipe and cinched together via non-metallic slide locks. Installation is quick and easy while only a small inventory of segments may be used to accommodate a large variety of pipe styles, types and diameters.

### OPTIONS and DATA

- All non-metallic - no nuts, bolts, washers or any other metal parts to corrode or degrade over time.
- Designed for carrier pipe diameters from 0.83" (21mm) to 37.60" (955mm) in diameter.
- Segmented pieces - small inventory may be used to accommodate a large variety of pipe styles, types and diameters.
- Easy assembly - simply slide the segments together and ratchet tight with patented Slide-Lock connecting system.
- Wide variety of runner heights to allow numerous options for pipe positioning within the casing and may be used to adjust for grade.
- Manufactured from UV resistant polypropylene.
- High impact strength, (1.5 ft. lbs./inch). Excellent compressive strength, 3,000 psi (211 kg/square cm.) and great dielectric strength (800 volts/mil.).



## METALLIC



An extremely tough and durable heat fused fluid bed thermo set cross-linked polymer coating is offered on steel casing spacers/isolators 4" and larger, with 8" and 12" band widths. The cold formed steel casing spacer/isolator band (risers where applicable) and studs for runner mounting are grit blasted, heated and fusion coated with a cross-linked epoxy polymer formulation, providing a minimum 0.010 (0.254mm) thick coating over the entire metallic surface. A post cured cycle strengthens the bond and provides an even more uniform coating.

Other heat fused formulations are also available for custom orders and applications.

### OPTIONS and DATA

- Low labor costs - may be installed by one person
- Riser height may be specified for specific positioning of carrier pipe within casing
- Heavy duty PVC inner liner provides protection for pipe and/or coating as well as back-up isolation
- May be used for long pulls and/or heavy pipe installations
- Designed to last for the life of the piping system
- Offers excellent corrosion resistance
- Deeply embossed flanges offer added strength during tightening of flange bolts
- Glass reinforced nylon or polyester runners offer low coefficient of friction = 0.1 To 0.6 And 18,000 psi compressive strength
- Available with 8" or 12" bands.



## ULTRA HI-TEMP



These ultra-high temp Casing Spacers are made out of 304 Stainless Steel and come with a high quality Durlon liner. These rugged skids have no runners and are designed to withstand temperatures up to 550°F !

### OPTIONS and DATA

- Designed for a maximum continuous operating temperature of 550°F
- Made out of 304 Stainless Steel
- Utilizes a Durlon 8500 Liner
- Great for use in steam lines and other lines where high temperatures are expected
- Available in sizes starting from 2" x 4" and up

## MODEL S



Model "S" standard pull-on end seals are flexible and easily installed on customer specified casing/carrier pipe combinations. Manufactured from 1/8" thick synthetic rubber, Model "S" end seals are extremely robust, resistant to wide variations in environmental conditions while eliminating the possibility of foreign material entering the opening between carrier and casing

pipes. Included with Model "S" end seals are two appropriately sized hose clamps which are used to secure the rubber material around both carrier and casing pipes. Installation is quick and easy with only a screwdriver needed for tightening the hose clamps.



### OPTIONS and DATA

- Quick and easy installation
- Carrier pipe does not need to be perfectly centered within casing
- Screwdriver is only tool required for installation
- Designed to last for the life of the piping system
- Heavy duty hose clamps supplied



## MODEL C



Model "C" custom pull-on end seals are designed to accommodate custom carrier/casing diameter combinations. They are ordered to customer supplied specifications so they may be used for any size casing/carrier differential. Manufactured

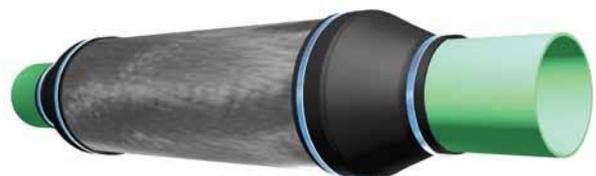
from 1/8" thick specially compounded synthetic rubber, Model "C" end seals are extremely robust, resistant to wide variations in environmental conditions while eliminating the possibility of foreign material entering the opening between carrier and casing pipes.

Included with Model "C" end seals are two appropriately sized hose clamps which are used to secure the rubber material around both carrier and casing pipes. Installation is quick and easy with only a screwdriver needed for tightening the hose clamps.



### OPTIONS and DATA

- Custom made to order
- Quick and easy installation
- Carrier pipe does not need to be perfectly centered within casing
- Screwdriver is only tool required for installation
- Designed to last for the life of the piping system
- Heavy duty hose clamps supplied.



## MODEL W



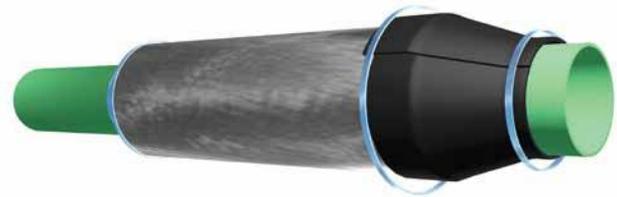
Model "W" wrap around end seals are designed to accommodate customer supplied specifications so they may be used for any size casing/carrier differential. Manufactured from 1/8" thick specially compounded synthetic rubber, Model "W" end seals are

extremely robust, resistant to wide variations in environmental conditions while eliminating the possibility of foreign material entering the opening between carrier and casing pipes. Included with Model "W" end seals are two appropriately sized hose clamps which are used to secure the rubber material around both carrier and casing pipes. Installation is quick and easy with only a screwdriver needed for tightening the hose clamps.



### OPTIONS and DATA

- Custom made to order
- Quick and easy installation
- Carrier pipe does not need to be perfectly centered within casing
- Screwdriver is only tool required for installation
- Designed to last for the life of the piping system
- Heavy duty hose clamps supplied.
- Self-curing seam - simply remove plastic backing and press together.



## MODEL FW



Model "FW" fire resistant end seals have been developed for applications specified as fire prone areas such as tank farms or pipes passing through fire walls. They are ordered to customer supplied specifications so they may be used for any size casing/carrier differential.

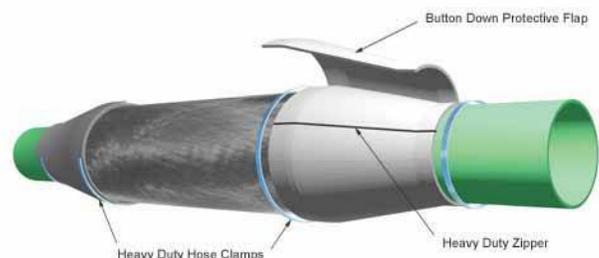
These seals are excellent for eliminating the possibility of foreign material entering the opening between carrier and casing pipes.

Included with Model "FW" End Seals are two appropriately sized hose clamps which are used to secure the material around both carrier and casing pipes. Installation is quick and easy with only a screw driver needed for tightening the hose clamps.



### OPTIONS and DATA

- Custom made to order
- Quick and easy installation
- Carrier pipe does not need to be perfectly centered within casing
- Screwdriver is only tool required for installation
- Designed to last for the life of the piping system
- Heavy duty hose clamps supplied.



# TRENTON WAX TAPE SYSTEMS

## #1 WAX-TAPE®



Trenton's #1 Wax-Tape® for below ground use, provides long-lasting protection and is compatible with many types of materials such as steel, ductile iron and PVC.

Customers have been impressed when removing a small patch of Trenton Wax-Tape for inspection purposes. They consistently find the surface in the same condition as when the tape was first applied. After inspection, the small patch can then be reapplied for continued protection.

It remains pliable and supports cathodic protection. Trenton's #1 Wax-Tape® is a widely used product in a variety of settings in the oil, gas, water and chemical industries.

### APPLICATION PROCEDURES

Wire brush and scrape the surface clean of dirt, loose coating and loose rust. Apply a thin film of Wax-Tape Primer. If the surface is wet, cold or rusty, rub and press on primer to displace moisture and ensure adhesion. Then wrap #1 Wax-Tape using a 1" overlap. On straight pipe apply slight tension to ensure contact with surface. On irregular surfaces allow slack so the tape can be molded into conformity. In either case, press and form the tape so there are no air pockets or voids under the tape. Also, press and smooth out the lap seams to ensure they are sealed. The tape does not require curing or drying time so it can be backfilled immediately. For belowground pipes that are 10" or larger, apply a Trenton outerwrap. For aggressive soil conditions a Trenton outerwrap, a rock shield or select backfill should be considered.

### OPTIONS and DATA

- Composed of a blend of microcrystalline waxes, plasticizers and corrosion inhibitors saturated into a non-woven, non-stitch bonded synthetic fabric, forming a tape wrapper
- Contains no siliceous mineral fillers
- Minimal surface preparation required; just clean off dirt, loose coating or rust; No sandblasting required
- Conforms to irregular shapes such as flanges, valves, couplings and fittings
- Completely compatible with cathodic protection
- Contains no VOC's; non-toxic, non-hazardous, non-carcinogenic, and non-flammable
- Does not require curing or drying time and can be backfilled immediately. \* For below ground pipes that are 10" or larger we recommend using an outerwrap such as the MC Outerwrap for added protection against rocks and aggressive soil
- Only requires a 1" over Lap
- Thickness (70-90 mils)
- Dielectric strength (170 volts/mil)
- Application temperature (0-110°F)
- Operating temperature (-50°F-120°F)

### PACKAGING

- 2" x 9' rolls (48 rolls/case)
  - 4" x 9' rolls (24 rolls/case)
  - 6" x 9' rolls (16 rolls/case)
  - 6" x 18' rolls (8 rolls/case)
  - 9" x 18' rolls (6 rolls/case)
  - 12" x 18' rolls (4 rolls/case)
- Special widths and lengths available

# TRENTON WAX TAPE SYSTEMS

## #2 WAX-TAPE®



Used above and below ground, Trenton's #2 Wax-Tape® slowly firms up and protects against the elements. It is easy to apply, requires no special equipment, is compatible with most other coatings and requires only minimal surface preparation. Trenton's #2 Wax-Tape® completely conforms to irregular surfaces, such as flanges and wellheads, and is unaffected by the elements.

Trenton's #2 Wax-Tape® resists weathering and UV without the need for an additional outercoat or outerwrap and is excellent for use when abrasive blasting or painting is impractical.

### APPLICATION PROCEDURES

Wire brush and scrape the surface clean of loose mill scale, rust, paint and other foreign matter. Apply a thin film of Wax-Tape Primer. If the surface is wet, cold or rusty, then rub and press on primer firmly to displace the moisture and ensure adhesion. Then wrap #2 Wax-Tape using a 1" overlap. While wrapping, press and mold the tape into conformity, ensuring that there are no air pockets or voids, so that the tape is in intimate contact with the surface. Also, press and smooth out lap seams to ensure that they are sealed. If the tape is going to be painted, allow a few days for it to firm up.

### OPTIONS and DATA

- #2 Wax-Tape® is a nonwoven, nonstitch bonded synthetic fabric, saturated with a blend of microcrystalline wax, solvents and corrosion inhibitors (no clay fillers), forming a tape wrapper that firms up and is suitable for painting
- Contains no siliceous mineral fillers
- Minimal surface preparation required; just clean off dirt, loose coating or rust; No sandblasting required
- Conforms to irregular shapes such as flanges, valves, couplings and fittings
- Completely compatible with cathodic protection
- Non-toxic, non-carcinogenic, contains low VOC's
- Can be painted after firming up
- Colors: brown, aluminum, white (also available upon request in yellow, red, blue and green)
- Only requires a 1" Over Lap
- Thickness (70-90 mils)
- Dielectric Strength (170 volts/mil)
- Operating temperature (-50°F-140°F)

### HT-3000 WAX-TAPE (High Temp)

Trenton HT-3000 Wax-Tape® is a specially formulated wax-based tape used for corrosion protection of metal pipe and fixtures experiencing higher than normal temperatures. HT-3000 Wax-Tape can be applied and will perform effectively at continuous operating temperatures of up to **230°F (110°C)** and is designed for use in aboveground and belowground applications.

### PACKAGING

- 2" x 9' rolls (48 rolls/case)
- 4" x 9' rolls (24 rolls/case)
- 6" x 9' rolls (16 rolls/case)
- 6" x 18' rolls (8 rolls/case)
- 9" x 18' rolls (6 rolls/case)
- 12" x 18' rolls (4 rolls/case)
- Special widths and lengths available

# TRENTON WAX TAPE SYSTEMS

## WAX-TAPE PRIMERS



### WAX-TAPE® PRIMER

Available in brown or white, Trenton's Wax-Tape Primer® is a blend of microcrystalline waxes, plasticizers, and corrosion inhibitors (no clay fillers). It has a paste-like consistency and is designed to displace moisture and wet the surface, ensuring adhesion of the tape. This primer is typically used below ground as a surface conditioner on metal surfaces prior to using Trenton Wax Tape.

### TEMCOAT™ / TEMCOAT™ 3000

Temcoat™/Temcoat™ 3000 is a high-temperature microcrystalline wax-based coating compound that will not melt and can be applied at ambient temperatures up to 230°F. Temcoat 3000 is designed to maintain spreadability at lower temperatures and are easily applied by hand.

#### End Use

Temcoat and Temcoat 3000 are used as an anti-corrosion compound for aboveground and below ground surfaces. They can be used as a cold-applied coating with a wrapper or as a priming paste with Wax-Tapes®. Because of their paste-like consistency over a wide temperature range, they are an excellent material for filling voids. They can be used for straight pipe, irregular fittings and flat surfaces.

### OPTIONS and DATA

- Goes on easily by hand
- Displaces moisture
- Penetrates surface rust
- Only a thin coat is required
- Non-toxic, non-flammable, non-carcinogenic and no VOC's.
- No waiting for drying or curing
- Can be applied to wet pipe
- Compatible with other coatings
- Pour Point - 100-115°F (Brown Primer only. Temcoat is non-melting)
- Flash Point - 350°F minimum
- Application temperature - 0-230°F (Temcoat 3000 only)

### PACKAGING

Brown Primer - One gallon cans (4 gallons per case)

Temcoat - 3 gallon pails  
1 gallon cans (4 gallons per case)

Temcoat 3000 - 3 gallon pails  
1 gallon cans (4 gallons per case)

# TRENTON WAX TAPE SYSTEMS

## OUTERWRAPS



### PVC OUTERWRAP

Economical mechanical protection for pipeline corrosion coatings, Trenton's PVC Outerwrap requires no specific surface preparation and can be applied in a wide variety of environmental conditions. It is simply spiral-wrapped, with an overlap, over the existing corrosion coating. No special tools are required.

#### Application:

Pipeline coating applications that might be subjected to severe soil stress or mechanical impingement can benefit from the protection of an additional outerwrap. Trenton PVC Outerwrap is a cost-effective solution that delivers additional mechanical protection for Trenton Wax-Tape® wraps.

### MC OUTERWRAP™

MC Outerwrap™ is a specialized blend of quick curing resins impregnated into a fiberglass fabric. It provides soil stress and backfill protection to coatings that need additional mechanical strength. MC Outerwrap is specifically designed as a "hard shell" outerwrap over the Wax-Tapes. It can also be used over other coatings. It is sold complete with gloves and Trenton End Adhesive. MC Outerwrap is hand applied, with no other application materials needed.

#### End Use

MC Outerwrap is used aboveground or belowground as a mechanical protective wrapper over Trenton's Wax-Tapes.



### POLY-PLY™ OUTERWRAP

Poly-Ply™ plastic wrapper consists of three membranes of .5-mil, 50 gauge, polyvinylidene chloride plastic, high-cling membranes, wound together as a single sheet. It provides a mechanical and electrical barrier over Temcoat™ or #1 Wax-Tape® while remaining flexible enough to conform to irregular shaped surfaces. It is inert, will not deteriorate, and is resistant to chemicals / bacteria commonly found in soil.

#### End Use

Poly-Ply™ is used as a wrapper over cold-applied Temcoat coating on straight pipe and irregular metal surfaces, such as T's and Couplings.

# TRENTON WAX TAPE SYSTEMS

## INNERCOAT® and GUARD WRAP



The combination of Innercoat® hot-applied wax and Guard-Wrap™ is used to prevent corrosion of belowground metal structures.

**Innercoat®** is a microcrystalline wax blend that has been successfully used as a pipe coating for over 50 years. Innercoat® hot wax coating is ideally suited for the job of protecting against corrosion. It has first-rate waterproofing characteristics because of its low moisture absorption and low rate of moisture transmission. Also, it is an exceptional dielectric barrier with high electrical resistance. When heated to a liquid for application to the pipe surface, Innercoat® has an oil-like consistency that penetrates the pores of the metal, thoroughly wetting the surface. Even after hardening, it continues to be pliable or “live,” allowing the wax coating to “flex” with the pipe as it moves due to underground stress and temperature variations. It is inert and will not change in character or composition over time, as well as being resistant to chemicals and bacteria commonly found in soils. Innercoat® is applied hot, but quickly cools and hardens and can be backfilled immediately after application of Guard-Wrap™.

**Guard-Wrap™** is composed of a plastic mat and film, saturated with microcrystalline wax that is used to provide additional mechanical protection against backfill stress and impact, while also providing an additional dielectric barrier. Because of its conformability to irregular shapes, it is an excellent wrapper for fittings as well as straight pipe. Guard-Wrap™ is composed of inert materials that will not deteriorate underground, and is resistant to chemicals and bacteria commonly found in soils. Innercoat and Guard-Wrap™ in combination are outstanding anti-corrosion materials for new service installations, field patching, weld seam cutbacks and pipeline reconditioning.

### OPTIONS and DATA

- An effective pipe coating proven by over 50 years of field use
- Can be used for new services, field patching, weld cutbacks and pipeline reconditioning
- Excellent for filling void between flanges
- Excellent corrosion barrier
- Low moisture absorption and transmission
- Excellent dielectric barrier
- Excellent wetting and adhesion properties
- Excellent ductility
- Permanently inert
- Compatible with other coatings
- Resistant to chemicals and bacteria commonly found in soils
- No primers required
- No waiting before backfilling
- Nontoxic, noncarcinogenic

### APPLICATION PROCEDURES

Clean pipe surface free of loose rust and scale, loose coating, dirt, grease, moisture and other foreign matter. Heat Innercoat to between 250° and 350°F in summer and between 350° and 500°F in winter to ensure proper adhesion. Then pour or brush Innercoat directly onto the clean and dry surface. For straight pipe use the “granny rag” method. Once Innercoat is applied, wrap with Guard-Wrap™. A thin coating of Innercoat can then be applied over the Guard-Wrap for additional protection.

### SPECIFICATIONS

Color .....	Brown
Specific gravity at 77°F.....	.88-.94
Flash point, min .....	500°F
Melting point .....	160-175°
Penetration at 77°F° .....	26-50
Dielectric strength.....	100 volts/mil

## CASING FILLING



Water or water vapor is present in most pipeline casings making possible galvanic corrosion of the carrier pipe. Also, a “water short” can occur through the water in the casing, allowing cathodic current to flow through the water and on to the pipe in the casing. Under these circumstances, cathodic current is increased and the casing is sacrificed as well. Casing filler prevents this from occurring. Further, in some instances, the pipe may be shorted to the casing through a direct metal-to-metal contact and filling the casing might correct this condition. In any case, it is difficult to cathodically protect pipe in casing, so filling of the casing will protect the pipe from corrosion regardless of the circumstances.

### FILL-COAT #1

Fill-Coat #1® is a low melt point, hot-installed petrolatum compound that sets up relatively firm at ground temperatures commonly found in normal pipeline operations. It has good “wetting” and adhesion characteristics and prevents possible corrosion of pipe in casings. Fill-Coat #1 meets the Department of Transportation requirements for shorted casings, and is expertly installed from readily available inventories by Trenton personnel.

#### End Use

Fill-coat #1 is used to displace water that may other-wise be present in the annular space between a casing and internal carrier pipe.

### FILL-COAT #2

Fill-Coat #2® is designed to be installed cold out of a 55 gallon drum for small quantity requirements. It remains in a firm gel consistency at ground temperatures commonly found in normal pipeline operations.

#### End Use

Fill-Coat #2 is used to fill the annular space between the pipeline casing and the carrier pipe. It displaces water that may be present and it prevents water from re-entering thereby mitigating any further corrosion.

### FILL-COAT #6

Fill-Coat #6® is a cold-installed/high temperature petroleum based casing filler compound that can be installed at ambient temperature as low as 50°F (10°C) with portable pumps. The product is used in bridge abutment casings, and it can be used in casings with elevated temperatures.

#### End Use

Fill-Coat #6 is used to fill the annulus of gas distribution bridge abutment casings. It prevents corrosion by filling the void in the casing annulus. In addition, new water is prevented from entering the gas-filled casing. Applications include aboveground cased pipe (like bridge abutment casings).



## PROVER SPHERES



Maloney Spheres are specially designed and compounded for optimum resiliency, wear-resistance and long life, evidenced by our thick wall construction. Maloney Spheres are compression molded at cavity pressure exceeding 2000 PSI. We do not pour-cast nor rotational-mold any of our spheres. The compression molding process is critical to ensuring a uniform density of the compounded material and to yield a wear-life that is unmatched in the industry.

During sphere production, each molded hemisphere is subjected to an intensive physical inspection. Following assembly and post-curing, every sphere is inflated to a specified increased diameter for 24 hours. This critical step is taken to assure that every Maloney Sphere that leaves our factory will fulfill the exacting demands of the task for which it was designed. Inflatable spheres are available in 4" sizes and larger. Solid spheres are available from 1-1/2" through 4" diameters in all materials. Limited larger solid spheres are available in polyurethane materials only.

### OPTIONS and DATA

- Compression molded at cavity pressures exceeding 2000 psi
- Specially compounded for optimum resiliency, wear-resistance and long life
- Each sphere is inflated and tested for a 24 hr period before leaving factory
- Has the thickest urethane wall of any sphere on the market
- Available in sizes 4" to 42"
- Excellent for displacing liquid in meter prover loops
- Can be used for product separation and batching
- Great for liquid removal in gas lines
- Can negotiate tight radius bends

Sphere Type	Min. Temp	Max Temp	Durometer	Recommended Use
Neoprene	-20°F	280°F	60 Shore A	General purpose, pipeline, hydrocarbon & chemical service
Nitrile	-15°F	212°F	60 Shore A	Exposure to n-octane, hydrocarbons & petroleum gas, water, gasoline and diesel oil
Hi-Temp Nitrile	-15°F	325°F	70 Shore A	For use in geothermal application, hot asphalt pipelines and general pipeline service in elevated conditions.
Polyurethane U53 (Yellow)	-20°F	170°F (oil) 140°F (water)	53 Shore A	Meter prover service, low temperature distillate removal service
Polyurethane U58 (Green)	0°F	170°F (oil) 140°F (water)	58 Shore A	Meter prover service. Gas distillate removal at greater than 600psi.
Polyurethane U66 (Red)	0°F	170°F (oil) 140°F (water)	66 Shore A	Gas distillate removal at greater than 600psi. General pipeline usage for situations requiring long runs or when pipeline is especially rough

## PROVER SWITCHES



Mag-Tek features a pressure balanced, piston actuated, proximity switch with no dynamic seals. The switch is factory sealed, with no field adjustment, eliminating the chance of slipping from the original setting. The hemispherical shape of the piston allows either uni-directional or bi-directional operation. The detector switch is manufactured from stainless steel and designed for either above ground or below ground applications. Once installed the Mag-Tek has only one moving part, the pressure balanced piston, thus allowing continuous maintenance free, and accurate

operation. Mag-Tek switches are also interchangeable with most other brands of switch mountings.

Once installed the hemispherical portion of the probe extends into the I.D. of the pipe approximately 3/8". When the sphere passes the switch, it forces the probe upward. This upward movement causes the ferrous body of the piston to enter the magnetic field of the proximity switch sensor. The result of the attracting forces causes the magnet in the sealed switch to move toward the ferrous piston causing the normally open contacts to close and complete the electrical circuit.

### OPTIONS and DATA

- Contact: Model M-5, M-5T, M-6, M-6T SPDT Environmentally Sealed  
Model M-5, M-5T M-6D, M-6TD DPDT Environmentally Sealed
- Classification: CSA NRTL/C Class I, Division 1, Groups C and D Hazardous Locations
- Rating: 2 Amps @ 240 V.A.C  
50 Milliamps @ 24 V.D.C.
- Repeatability: 0.002" units (Under identical operating conditions.)
- Response Time: 0.008 Seconds
- Temperature: -40°F to +221°F
- Pressure: 2220 PSI Max. Rating
- Weld on Base: Carbon Steel
- Spring: 302 Stainless Steel
- Piston: 416 Stainless Steel
- Body: 303 Stainless Steel
- O-Ring: Viton
- Conduit Opening: 1/2" FNPT for SPDT  
3/4" FNPT for DPDT

### TROUBLE SHOOTING

Due to the limited number of moving parts, problems with the Mag-Tek detector switch are few. The most common problems can be attributed to one of the following:

1. Switch damage - the switch may have been damaged by excessive electrical currents, or by dropping the switch. To check, remove the switch from the base, connect it to a volt/ohm meter and slide the piston into the lower portion of the switch. The switch should close and open as the piston is moved into and out of the switch. If it does not function properly, a replacement element is required.
2. No indication - The sphere is not contacting the piston properly. Measure the O.D. of the scraper cup or sphere to be certain they are the proper diameter.
3. No indication - Foreign material has accumulated above the piston in the sensing chamber preventing the piston from traveling upward. Remove the switch and clean the base of the switch and the spring. Check the bleed grooves in the piston to be sure they are clear.
4. Switch is clean and checks out OK, the switch is sized properly, but the switch is intermittent or still does not function properly - misalignment of the base and hole causing the piston to bind or preventing it from extending into the pipe ID. Recheck the base fit and probe insertion depth.

## FORMULAS

<b>Pi</b>	= 3.1416	<b>Circumference</b>	= Diameter X Pi
<b>Diameter</b>	= Circumference / Pi or Diameter <sup>2</sup> X Pi	<b>Surface of Sphere</b>	= Circumference X Diameter or Circumference X .3183
<b>Area of a Circle</b>	= Pi (R <sup>2</sup> ) where R = Radius or ½ of Diameter	<b>Volume of Sphere</b>	= Diameter <sup>3</sup> x .5236
<b>Weight of Water</b>	= 8.34 lbs per gallon	<b>Cubic ft of Water</b>	= 7.48 Gallons = 62 Lbs
<b>Water Pressure</b>	= 1 ft. head water = .4335 Psi		

**Line Fill In Bbls Per Mile** = Pipe I.D.<sup>2</sup> X 5.13 = bbl/mile (eg. 6.06 X 6.06 X 5.13 = 188 bbl/mile In 6" Line)

**Gallons Per Foot** = Pipe I.D.<sup>2</sup> x .0408 (eg. 6.06 X 6.06 X .0408 = 1.49 gals/ft In 6" Pipe)

**Bbls Per 1000 Ft.** = Diameter<sup>2</sup> (eg. 6 X 6 = 36 bbls/1000 ft)

**How Much Gas in 1000 Ft @ Standard Condition**

Pipe I.D.<sup>2</sup> x Line Pressure x .372 (eg. 6.06 X 6.06 X 600 psi X .372 = 8196 cft)

**1 Mph** = 88 ft per minute = 1.48 ft per second

**Velocity of Liquid in Mph (approx)**

BPD X .008 / Pipe I.D.<sup>2</sup>

**Velocity of Gas in Ft / Second**

$$V = \frac{0.75 \times Q}{D^2 \times P}$$

Q = Gas Volume Cf / Hr  
D = Inside Diameter  
P = Line Pressure

## PRESSURE AND FLOWS

PRESSURES & FLOWS FOR PIGGING (approx.)			
PIPE	PRESSURE (△)	GPM	CFM
2"	150	150	25
3"	125	250	100
4"	100	350	150
6"	75	550	250
8"	50	750	350
10"	40	850	400
12"	25	1000	500
14"	15	1200	600
16"	10	1400	700
18"	10	1700	800
20"	10	1800	900
24"	5	2200	1150
30"	5	2700	1400
36"	5	3300	2000

**NOTE:**

The recommended pressures and flow rates on this chart are provided as benchmarks only and can vary greatly based on a number of conditions. The CFM (cubic feet per minute) column varies, depending on the pressure on the line.

# MAINTENANCE GUIDELINES

## What is an effective pigging speed?

Many factors go into determining effective pigging speeds such as, the pigging objective (cleaning, batching, sweeping liquids etc.), what product you are running in and if you are running on-stream, etc.

Cleaning or utility pigs when run on-stream will have the speed dictated by the flow rates. We have seen that range from .07 mph to 20 mph. These are extremes and tend to be less effective. However, some good guidelines are as follows: Liquid lines 1-4 mph and gas lines 5-10 mph seem to be most effective.

## How often should maintenance pigging be done?

We work with lines that are pigged every day, both liquid and gas, and those pigged once a year. Frequency should be based on the particular need of the line.

As a rule of thumb, the closer to production the line is, the more need there is for pigging. For example, crude oil lines that have potential for wax build up or known build up are often pigged weekly.

### Some general guidelines are as follows:

- Crude oil lines near production -- weekly or bi-monthly
- Crude oil lines away from production -- monthly or quarterly
- Wet gas -- bi-monthly or monthly
- Dry gas -- quarterly or semi-annually
- Product lines -- quarterly or semi-annually

## Which is better, cups or discs?

Discs, when sized properly, do a very good job of displacement, cleaning and sealing. However, on longer runs discs may wear out sooner than cups and potentially lose their sealing capabilities. Unlike cups, discs are bi-directional and can be used when the pig will be reversed during operations such as hydro-testing or when potential problems could require reversal.

Although cups are less aggressive than discs when it comes to cleaning, there are several advantages cups have over discs. Cups get longer wear or more mileage than discs and are capable of negotiating greater reductions in pipe ID which allows them to maintain a seal in “out of round” pipe. Also, cups often make launching a pig easier, because of the cups ability to feed into the reducer and maintain a seal. This is especially true if low flow rates are present.

*NOTE: Recent years have seen the development of cups/discs combined in a cup configuration to try and achieve both benefits.*

AFTER SHOP

406.4 OD  
352.5 ID  
23.6 THK

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