VpCl® Technology For Oil and Gas Industry
PROTECT OIL & GAS INDUSTRIES

The Oil & Gas Industry has presented difficult challenges to researchers in fighting the effects of corrosion — in economic loss and environmental safety. The total annual cost of corrosion in the oil and gas production industry is estimated to be $1.372 billion, more specifically $589 million in surface pipeline and facility costs, $463 million annually in downhole tubing expenses, and another $320 million in capital expenditures related to corrosion.¹ Cortec’s capability offers highly efficient and economical corrosion protection for Oil and Gas applications. Cortec® products have been developed using proprietary VpCI® Technology. Cortec® VpCl®s are a safe, cost-effective method for preventing and diminishing the severe damage caused by corrosive process streams. Utilizing Cortec’s corrosion inhibiting products will help companies within the oil and gas industries to comply with safety, health, and environmental policies as well as reduce unplanned maintenance and deferment costs.

PROTECT THE ENVIRONMENT

VpCl®s offer an environmentally safe method of treatment with low toxicity and low polluting effects. Unlike corrosion inhibiting systems of the past, many of Cortec® VpCl®s do not contain chromates or other heavy metals, nitrites, or chlorinated hydrocarbons. With Cortec® VpCl®s you can turn the tables on corrosion. With the support of our corrosion scientists, engineers, and testing facility, Cortec® can provide simple, environmentally friendly, cost-effective solutions to corrosion problems.

PROTECT CONTINUOUSLY

Unlike conventional methods, such as filming amine corrosion inhibitors, you can inject Cortec® VpCl®s into any part of your system. Cortec® VpCl®s go to work immediately and are self-replenishing. Continuous, uninterrupted protection in the liquid phase, inter-phase, and vapor phase can be added at multiple points. For example, the automatic injection of Cortec® VpCl®s into a system — with no attendance operator — provides protection immediately, even on pre-rusted or scaled surfaces.

Cortec® VpCI® Technology

VpCI® technology is an innovative, environmentally safe, cost-effective option for corrosion protection. Cortec® products protect with a thin, mono-molecular protective barrier. The barrier re-heals and self-replenishes, and can be combined with other functional properties for added protective capabilities. VpCI® forms a physical bond on the metal surface creating a barrier layer against aggressive ions.

Vapor phase Corrosion Inhibitors (VpCI®)

Industry Solutions

PROCESS SYSTEMS–HYDROCARBON SIDE

Crude oil processing equipment, pipes and pipelines, refinery equipment and systems, tankers, and engines need protection against pitting, corrosive gases, and water intrusions.

Cortec® VpCI® Treatments protect systems with a high ratio of residual water, and systems exposed to halogens, sulfide, and hydrogen. These products are especially effective in low areas in the system where water collects causing extreme corrosive attack. Put Cortec® VpCIs to work and let the Cortec® VpCI® alternative solve your corrosion problems.

Upstream: Exploration & Production

Cortec® provides superior corrosion protection for operational and capital spares, production equipment, infrastructure, key assets, pipeline, vessels, storage tanks, modules, and skids – including flow path, internal and external, operational, and idled assets. Useful during transport, construction, commissioning, operations and maintenance for onshore and offshore assets, Cortec® products and services are environmentally friendly, quarantine compliant, and EHS preferable. Cortec® VpCI® and MCI® solutions for oil/gas ensure readiness and effective maintenance at the lowest possible cost. Sub-sea pipelines, risers, and separators.

Midstream: Transportation & Storage

Cortec® patented VpCI® technology provides cost effective, easy-to-apply, leave-in suitable solutions for pipeline, storage vessels, transportation vehicles and vessel, and all related capital equipment. Select Cortec® products for flow path (gas, oil, alcohol, steam, fuel, brine, fresh water, salt water), external coatings, internal coatings, and void space including encased pipe, ASTs and as supplements to CP systems. Cortec® also has a range of MRO products that can be used safely in operating conditions.

Downstream: Refining & Petrochemical

By reducing downtime and extending equipment life, Cortec® products can improve downstream business operation effectiveness and efficiency. Equipment and pipeline failures in oil refining, gas processing, and production facilities create devastating delays. Cortec® products are useful as functional additives in finished petrochemical products, fuels, and byproducts – offering corrosion protection enhancement, especially in moisture and corrosion prone products. Additionally, Cortec products assist in the maintenance, repair, and operations of downstream assets.

RELATED PRODUCTS/SERVICES

- Permanent Paints
- Soft and Hard Coatings
- Thin Film Inhibitors
- Stabilizers
- CP Mitigation Engineering
- Idle Asset Preservation
- Packaging and Shrouds
- CUI and TOTL Inhibitors
- Additives
- Powders
- Float Coats
- Fogs & Void Space
- Packaging
- Absorption & Scavenging
- Hydrotesting
Turnkey Corrosion Control

FIELD SERVICES

In today’s diverse and challenging environment, the oil and gas industry increasingly faces reduced human capital availability, elusive efficiency improvements, and increasing reliance on analytic data which can be used to drive real-time decision making.

Cortec’s field services facilitates the emerging “digital oil field”, providing technology that oil and gas enterprises can rely on to ensure improved efficiency, real-time field communications and data collection, and intelligent, responsive decision making.

Equipment Preservation

Cortec® has provided turnkey support for many years for equipment preservation projects - now we can provide engineering needed through the final application of all preservation technology and products required to effectively mitigate corrosion during downtime.

- This includes preservation during shipment, storage, temporary shut-down, or long-term mothballing.
- Corrosion protection is provided to all surfaces, both internal and external through the multiple delivery systems available with Cortec® VpCI® technologies.
- VpCI® preservation applications include a variety of cleaning products, surface coatings, powders and liquids for fogging of large spaces, additives for lubricants and process liquids, as well as films for total encapsulation.
- With CEFS, real-time corrosion rate monitoring systems for critical assets are available.
- Assistance with removal of preservation products is also available during future equipment recommissioning.

Plant Layup and Mothballing

Cortec® specializes in turnkey corrosion control engineering and applications services for comprehensive lay-ups of individual units or entire plants. It is augmented with implementation of a comprehensive plant layup package that could include:

- A corrosion audit for identification of all facility corrosion control requirements.
- A comprehensive plan to mitigate internal and external corrosion on all plant assets - both above ground and underground.
- Turnkey application of all corrosion control systems.
- Monitoring and maintenance of corrosion control systems during the layup period.
- Future assistance with the transition from the layup phase to plant commissioning.
- All information can be found at www.CortecMothballing.com

Tank, Line & Process Vessel Corrosion Protection

A growing number of Oil & Gas companies are embracing the CorroLogic® System approach for their ASTs. Data from the real-time corrosion rate monitoring equipment that is installed in each tank along with the VpCI®, proves the long term effectiveness of this solution. Cortec® completed a pilot project for the Saudi Arabian Oil Company, Saudi Aramco, on an AST with an oil-sand tank pad at one of their critical Arabian Gulf oil export terminals. Product is used as a powder or string of Corrologic® Emitter powered with Nano VpCI®.


For high temperature applications for tanks holding liquids or solids above 200 deg C use Corrologic® Slurry HT VpCI® System.
Cortec® Global Services provides customers and clients with best-in-class technology, project management, engineering, design, application, and training services to ensure zero defect, low-cost preservation. For over 35 years, Cortec® has delivered high-performance turn-key solutions for manufacturers, engineering firms, and project owners from industries ranging from automotive, telecommunications, construction, aerospace, military, power generation, oil and gas, and mining.

By transferring knowledge of best practices between industries, Cortec® can ensure your preservation goals are attained at the lowest possible environmental impact and cost.

**TOTAL SOLUTION PROVIDER**

Global Services is focused on providing our customers with optimum corrosion control solutions to meet their everyday needs. The scope for Cortec® Global Services includes a variety of corrosion control design, engineering, and field applications serving Cortec® customers worldwide. Our group is committed to providing a cost effective service designed to ensure our customers receive the correct products, technologies, and applications the first time, every time.

### Training and Supervision

<table>
<thead>
<tr>
<th>Cortec® Certified Applicator Training</th>
<th>Subject Matter Expert Liaison with Client Engineering</th>
<th>Full Service System Design</th>
<th>Single Purchase Order Full Service Preservation Execution</th>
<th>ISO/IEC 17025 Certified Independent Laboratory</th>
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</thead>
<tbody>
<tr>
<td>On-the-job-training (OJT) Modular Programs</td>
<td>Application Method and Specification</td>
<td>Corrosion Monitoring and Inspection</td>
<td>Value-Added, Turn-Key Solutions</td>
<td>Technical Specification</td>
</tr>
<tr>
<td>Supervision of Client Crews Including Short and Prolonged Deployment</td>
<td>Onsite Liaison: Including Short and Prolonged Deployment</td>
<td>Onsite or Offsite</td>
<td>Assistance Through Entire Project Life-Cycle</td>
<td>Product Design</td>
</tr>
</tbody>
</table>

**BUYER’S GUIDE**  
Visit our web site for more information on Cortec® Vapor phase Corrosion Inhibitors [CortecVCI.com](http://CortecVCI.com)

#### Certified Applicator Training

- **Applicator Training - Crew**: Cortec® supplied training to provide short-duration training on key asset/task
- **Applicator Training Individual Certification**: Cortec® supplies training services and individually certifies attendees on demonstrated competencies
- **Applicator Training – OJT Modular**: Cortec® provides supervisory training services onsite using OJT modules pertinent to job scope

#### Advisory Services

- **Specification Review**: Cortec® supplies SME (subject-matter-expert) remotely or onsite to review and assist in writing or reviewing preservation specifications
- **Onsite Liaison**: Cortec® supplies SME onsite or in back-to-back rotator format or similar in office setting to advise and consult on preservation issues and plan preservation resources
- **Project Manager**: Cortec® supplies PMs for duration of project to plan and execute preservation resources
- **Scoping Visit**: Cortec® supplies Preservation Advisor for initial scoping visits

#### Engineering, Design and Monitoring Services

- **Corrosion Monitoring**: Cortec® supplies SME onsite for comprehensive monitoring of all critical components of industrial objects, assets, facilities and plants for signs of corrosion based on project specifications
- **Corrosion Inspection**: Cortec® supplies SME to onsite for inspection of asset integrity and suitability of service. Can also evaluate, design, and implement robust corrosion inspection program
- **Engineering Design Services**: Cortec® supplies a corrosion engineer to build a product and/or process with a specified performance goal
- **Maintenance Services**: Cortec® supplies SME for maintenance of preservation application and projects

#### Full Service Preservation Services

- **Supervisory**: Cortec® supplies a Preservation Supervisor to oversee preservation application and/or training of Company crews
- **Full Crew**: Cortec® supplies trained crews to complete preservation projects
- **Skilled Labor**: Cortec® supplies labor to preservation projects to work with Company team

#### Laboratory and Corrosion Testing Services

- **Technical Liaison**: Cortec® supplies primary technical expert in the use and application of Cortec® products and preservation methods
- **Technical Service**: Cortec® supplies technical service contact to assist with product and application clarification
<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>DESCRIPTION</th>
<th>APPLICATIONS</th>
<th>DOSAGE</th>
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<tbody>
<tr>
<td>VpCI®-111 Emitter</td>
<td>VpCI®-111 emitters are unique devices designed to provide corrosion protection for metal components and parts enclosed in non-ventilated control boxes, cabinets or tool boxes up to 11 cubic feet (312 liters).</td>
<td>Operating, packaged and stored electrical equipment, marine navigation and communication equipment, aerospace electrical controls, electric motors, switching equipment, fuse boxes, medical equipment, electrical wiring, terminal boxes, scientific and measuring instruments, telecommunications equipment, control panels for manufacturing and processing equipment.</td>
<td>1 cup/11 ft³</td>
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<tr>
<td>BioCorr®</td>
<td>BioCorr® Rust Preventative is a waterbased, biobased, and biodegradable rust preventative that is intended for preservation of metals in storage and during transportation. BioCorr® Rust Preventative provides multi-metal protection and is an excellent environmentally sound alternative to petroleum derived products.</td>
<td>Apply to surface undiluted. This product has a low viscosity, so the coverage rate is very large.</td>
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<tr>
<td>VpCI®-329/ VpCI®-329D Pouch</td>
<td>Desicorr® VpCI® is a specially designed two sided pouch which contains a unique combination of desiccant and VpCI® (Vapor Phase Corrosion Inhibitor). Desicorr® VpCI® is designed to protect products, components or assemblies when packaged in corrugated boxes, plastic wrap or bags, and wood or metal containers. Desicorr® VpCI® emitters are unique devices designed to provide corrosion protection for metal components and parts enclosed in non-ventilated control boxes, cabinets or tool boxes up to 11 cubic feet (312 liters).</td>
<td>Each pouch protects up to 1 m³ (35 ft³).</td>
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<tr>
<td>ConPak® 1-MUL Pouch</td>
<td>Multifunctional inhibitor pouch with VpCI®/desiccant action 2.5&quot; L x 2.5&quot; W x 125&quot; H (6.4 cm x 6.4 cm x 0.3 cm).</td>
<td>Heavy-duty Cleaning and Corrosion Protection: 1 part VpCI®-416 to 5-10 parts water. Normal Cleaning (i.e. parts washing): 1 part VpCI®-416 to 10-40 parts water. Light Cleaning (i.e. rinsing): 1 part VpCI®-416 to 40-150 parts water.</td>
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<tr>
<td>VpCI®-416</td>
<td>Heavy-duty, water-based cleaner/degreaser formulation combined with unique corrosion protection action. Can be metered into power washers, steam cleaners, sprayers and dipping tanks. USDA approved.</td>
<td>VpCI®-416 can be applied with any conventional equipment including sprayers, dipping tanks, steam cleaners, and power washers.</td>
<td>Light cleaning: Use 0.1% (by weight) VpCI®-418 in water. Light cleaning: For drilling mud, grease, crude, bilges, concrete surfaces, and structures, use 5-8% (by weight) VpCI®-418 in water. Normal cleaning: For machinery, rail cars, offshore equipment, and tanks contaminated with medium deposits, use 3% (by weight) VpCI®-418 in water. Heavy-duty cleaning: For drilling mud, grease, crude, bilges, concrete surfaces, and structures, use 5-8% (by weight) VpCI®-418 in water. Steam cleaning: Use 2% by weight VpCI®-418 in water. Temperature range: VpCI®-418 is recommended for use in temperatures ranging from 96°-160°F (35°-71°C).</td>
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<tr>
<td>VpCI®-418 L</td>
<td>VpCI®-418 is a heavy-duty alkaline cleaner/degreaser for cleaning industrial, oil field, commercial and marine equipment.</td>
<td>VpCI®-418 is designed for use in power washing machinery, high agitation parts washers and high-pressure spray washers.</td>
<td>Light cleaning: Use 2% (by weight) VpCI®-418 in water. Normal cleaning: For machinery, rail cars, offshore equipment, and tanks contaminated with medium deposits, use 3% (by weight) VpCI®-418 in water. Heavy-duty cleaning: For drilling mud, grease, crude, bilges, concrete surfaces, and structures, use 5-8% (by weight) VpCI®-418 in water. Steam cleaning: Use 2% by weight VpCI®-418 in water. Temperature range: VpCI®-418 is recommended for use in temperatures ranging from 96°-160°F (35°-71°C).</td>
</tr>
<tr>
<td>VpCI®-329/ VpCI®-329D</td>
<td>VpCI®-329 is a vapor corrosion inhibiting concentrate for use with lubricating, hydraulic and preservation oils. Provides excellent protection in sheltered outdoor/indoor conditions.</td>
<td>VpCI®-329 protects in two unique ways by offering a tenacious film, which clings to metal surfaces, as well as vapor phase inhibitors into the air above the oil. The vapors condense and form a protective barrier on metal surfaces that are not in contact with the oil. Short-term protection: One part VpCI®-329 to 20 parts oil. Medium-term protection: One part VpCI®-329 to 10 parts oil. Long-term protection: One part VpCI®-329 to 5 parts oil. Storing metal parts: Spray, dip, or brush VpCI®-329 onto metal parts before storage.</td>
<td>Apply at a rate of 218-545 fl/gal (5.4-13.6 m²/L) for a 1.3-mil spread. Ensure that the metal part is completely wrapped and sealed to provide adequate protection. Large void spaces should additionally be protected with an emitter.</td>
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<tr>
<td>VpCI®-391</td>
<td>VpCI®-391 is a water-born, temporary coating that is intended for medium to long-term indoor and outdoor protection.</td>
<td>VpCI®-391 is recommended for metal surfaces as a protective coating when a non-tacky surface is required and when optimal removability is beneficial.</td>
<td>Apply at a rate of 218-545 fl/gal (5.4-13.6 m²/L) for a 1.3-mil spread. Ensure that the metal part is completely wrapped and sealed to provide adequate protection. Large void spaces should additionally be protected with an emitter.</td>
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<tr>
<td>M-529</td>
<td>M-529 is an oil-based package of corrosion inhibitors for lubricating, hydraulic oils or engine oils.</td>
<td>Corrosion protection for ferrous and non-ferrous metals M-529 can be dosed at 2-5% for operational protection or preservation.</td>
<td>M-529 can be dosed at 2-5% for operational protection or preservation.</td>
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<tr>
<td>VpCI®-327</td>
<td>VpCI®-327 is a ready-to-use waterborne corrosion inhibitor for temporary protection.</td>
<td>In-process protection; Edge spray of coils and sheet stock; Void spaces; Double wall void spaces; Foggings. VpCI®-327 can be fogged into a void space at a rate of 1 oz./ft³ (1L/m³).</td>
<td>VpCI®-327 can be fogged into a void space at a rate of 1 oz./ft³ (1L/m³).</td>
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<tr>
<td>VpCI®-705 Bio</td>
<td>VpCI®-705 Bio is specially formulated for use as a multifunctional fuel additive to biodiesel and other biofuels.</td>
<td>It serves as a corrosion inhibitor, fuel stabilizer, and water emulsifier for biodiesel, diesel, and gasoline.</td>
<td>0.1-0.15% concentration.</td>
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<tr>
<td>PRODUCT</td>
<td>DESCRIPTION</td>
<td>APPLICATIONS</td>
<td>DOSAGE</td>
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<tr>
<td>MCI®-2018</td>
<td>Time-proven Corrosion Inhibiting Technology that will extend the life of the</td>
<td>Wire rope, electrical connections/wiring, sheltered</td>
<td>1-3 mil spread</td>
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<td>all reinforced concrete structures such as commercial buildings, parking</td>
<td>gear, equipment, and vehicles for up to three years,</td>
<td>rate.</td>
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<td>decks, garages, and bridge structures</td>
<td>even in aggressive outdoor conditions.</td>
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<tr>
<td>MCI®-2020</td>
<td>Clear MCI® surface treatment for existing concrete. Designed to penetrate and</td>
<td>Provides MCI® corrosion protection for rebar in</td>
<td>Coverage: One</td>
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<td>migrate throughout the concrete structure. Patented.</td>
<td>existing structures such as bridges, buildings,</td>
<td>coat at 150 ft²/</td>
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<td>garages, decks, and bridge structures.</td>
<td>gal. Or two coats</td>
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<tr>
<td>MCI®-2018</td>
<td>One coat at 150 ft²/ gal. Or two coats at 150 ft²/half gallon.</td>
<td>Ensure that the metal part is completely wrapped and</td>
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<tr>
<td>VpCI®-368</td>
<td>VpCI®-368 is our best inhibitor for use as an oil additive and/or temporary</td>
<td>VpCI®-368 is a time-proven coating that provides</td>
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<td>coating.</td>
<td>excellent protection to metal substrates exposed to</td>
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<td>harsh outdoor conditions.</td>
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<td>VpCI®-322</td>
<td>Provides corrosion protection to lubricating or hydraulic oils in indoor or</td>
<td>VpCI®-322 is a broad range corrosion inhibitor not</td>
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<td>open air conditions. Conforms to MIL-P-46001B, MIL-I-85062, MIL-C-16173D</td>
<td>only effective on ferrous metals, but also effective</td>
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<td>(Grade 3), and MIL-I-85062.</td>
<td>on zinc, aluminum, galvanized steel, copper,</td>
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<tr>
<td>VpCI®-326</td>
<td>Corrosion inhibitor oil additive for hydraulic oil and gearbox assemblies.</td>
<td>Provides corrosion protection for rebar in existing</td>
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<td>structures such as bridges, buildings, garages,</td>
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<td>decks, and bridge structures.</td>
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<tr>
<td>MCI®-369 L</td>
<td>Cortec® VpCI®-126 EM UV Film combines high strength resins with ultraviolet</td>
<td>Ensures that the metal part is completely wrapped and</td>
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<td>light stabilizers (UV) and Vapor phase Corrosion Inhibitor (VpCI®) Technology</td>
<td>sealed to provide adequate protection. Large void</td>
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<td>This state-of-the-art film construction provides multi-metal protection for</td>
<td>spaces should additionally be protected with an</td>
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<td>parts, equipment, and vehicles for up to three years, even in aggressive</td>
<td>emitter.</td>
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<td>Conditions.</td>
<td>Ensure that the metal part is completely wrapped and</td>
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<tr>
<td>VpCI®-306 EMUV</td>
<td>VpCI®-309 is a Vapor phase Corrosion Inhibitor powder for corrosion protection</td>
<td>VpCI®-309 is a Vapor phase Corrosion Inhibitor for</td>
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<td>Bag</td>
<td>of ferrous and non-ferrous metals.</td>
<td>pipe coating, parts storage, underwater coating,</td>
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<td>wire rope, steel plate, machined parts.</td>
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<tr>
<td>VpCI®-422</td>
<td>VpCI®-422 effectively removes rust and tarnish from steel, iron, copper,</td>
<td>Apply to concrete surfaces to remove rust stains.</td>
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<td>brass and chrome.</td>
<td>Use undiluted. Corrosion removal time varies</td>
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<tr>
<td>VpCI®-423</td>
<td>Effectively removes rust and tarnish from steel, iron, copper, brass and</td>
<td>Apply to concrete surfaces to remove rust stains.</td>
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<tr>
<td>BioPad®</td>
<td>BioPad® is a unique flexible corrosion inhibiting device constructed from</td>
<td>Apply to concrete surfaces to remove rust stains.</td>
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<td>100% bio-based non-woven material, resulting in a finished good containing</td>
<td>Ensure that the metal part is completely wrapped and</td>
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<td></td>
<td>75% bio-based content.</td>
<td>sealed to provide adequate protection. Large void</td>
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<tr>
<td>VpCI®-308 Powder</td>
<td>VpCI®-308 is a Vapor Phase Corrosion Inhibitor in powder form for corrosion</td>
<td>Tubular structures, pipes and vessels; internal</td>
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<td>protection of ferrous and non-ferrous metals in recessed areas, interior</td>
<td>surfaces of compressors, turbines, engines, tanks,</td>
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<td>cavities and voids.</td>
<td>boilers, heat exchangers; Steam condensate lines,</td>
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<tr>
<td>VpCI®-308 Powder</td>
<td>VpCI®-308 is a Vapor phase Corrosion Inhibitor powder for corrosion protection</td>
<td>Tubular structures, pipes and vessels; internal</td>
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<td>of ferrous and non-ferrous metals in recessed areas, interior cavities and</td>
<td>surfaces of compressors, turbines, engines, tanks,</td>
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<td>voids.</td>
<td>boilers, heat exchangers; Dry lay-up of closed</td>
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<tr>
<td>VpCI®-377</td>
<td>VpCI®-377 is a water-based concentrate designed as a complete replacement for</td>
<td>Tubular structures, pipes, vessels, and turbines;</td>
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<td>oil-based preventives for indoor protection of equipment and components.</td>
<td>internal surfaces of compressors, turbines, engines,</td>
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<td>Thin film coating for dry storage of: Castings, tubular parts, finished parts,</td>
<td>engines, tanks, boilers and heat exchangers; Dry</td>
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<td>above.</td>
<td>lay-up of closed circuit cooling systems; Equipment</td>
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<td></td>
<td>Apply to surface.</td>
<td>protection after hydrostatic testing; Parts,</td>
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<td>component and completed assemblies during shipping and storage. Additive to</td>
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<td>apply to shot blasting media, wet blasting; Additive to standing water; Voids,</td>
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<td>cavities and tanks.</td>
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<td>Bottom plate protection of petroleum storage tanks, tubular structures, pipes</td>
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<td>and vessels.</td>
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<td>300-500 g/m².</td>
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<td>300-500 g/m³.</td>
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<td>300-500 g/m².</td>
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</table>
### Blend of solvents, dispersants, surfactants and emulsifiers for treatment

**APPLICATIONS**

**DOSAGE**
- For dry fogging, applications apply 0.4 oz. per cubic foot (17 grams per 30 liters). For wet applications apply 0.5% by weight to the water.

### Wetting agent for aqueous and non-aqueous systems.

**APPLICATIONS**
- For water-blending or wet abrasive blending. Also for wet lay-up and hydro-testing.

**DOSAGE**
- Diluted with water at 1:1 to 1:2 ratio.

### Ambiodic water treatment system effective against corrosion and scale.

**APPLICATIONS**
- Large industrial cooling systems (open and closed), power plants, refineries, process plants.

**DOSAGE**
- 300ml/1,000,000 ft³. 17 liters/million cubic meters.

### Protection of partially filled spaces in both vapor and contact inhibitors.

**APPLICATIONS**
- 0.05% to 0.1% by v/v

### Oil-based liquid concentrates that boost corrosion protection of oils.

**APPLICATIONS**
- Thinner made of water/solvent blend. Used to quickly reduce viscosity

**DOSAGE**
- DESCRIPTION

### Water-based boiler water treatment prevents corrosive attack and harmful insulating deposits.

**APPLICATIONS**
- Very effective against scale formation on surfaces in contact with water.

**DOSAGE**
- DESCRIPTION

### Corrosion inhibitor for steam condensate lines in boiler systems.

**APPLICATIONS**
- Additive for injection into thermal insulation. Formulated for rapid transport of VpCI® through the insulating jacket to provide metal pipe protection.

**DOSAGE**
- DESCRIPTION

### Additive to provide corrosion protection for all common engineering metals used in automotive and industrial fuel systems. Approved by General Motors Corporation. #1060518 (GM) Division.

**APPLICATIONS**
- Recommended for use in diesel, gasoline, gauze sands and alcohol fuels as a corrosion inhibitor, fuel stabilizer and water emulsifier.

**DOSAGE**
- 0.99 - 1.5% by v/v.

### Ambient water treatment system effective against corrosion and scale.

**APPLICATIONS**
- Large industrial cooling systems (open and closed), power plants, refineries, process plants.

**DOSAGE**
- Less than 250 ppm.

### Concentrated additive protects multilayers from corrosion cooling systems.

**APPLICATIONS**
- Deep and hot wells, closed-loop cooling systems and casings.

**DOSAGE**
- 0.5% to 1% by v/v

### Additive for injection into thermal insulation. Formulated for rapid transport of VpCI® throughout the insulating jacket to provide metal pipe protection.

**APPLICATIONS**
- Injected at 3-6 month intervals at distances between injection points of 2-20 feet (0.6-6 m).

**DOSAGE**
- DESCRIPTION

### Fuel additive to provide corrosion protection for all common engineering metals used in automotive and industrial fuel systems. Approved by General Motors Corporation. #1060518 (GM) Division.

**APPLICATIONS**
- DESCRIPTION

### Wetting agent for aqueous and non-aqueous systems.

**APPLICATIONS**
- Easily added into aqueous and non-aqueous systems in conjunction with Cortec water-soluble and oil-soluble inhibitors.

**DOSAGE**
- Between 10 to 1000 ppm.

### Oxygen scavenger designed to protect boiler systems against oxygen corrosion (hydrazine-free).

**APPLICATIONS**
- Applied into boiler systems to stop the corrosive effects of oxygen present in feedwaters.

**DOSAGE**
- 10 ppm for every 1ppm O2.

### Corrosion inhibitor for steam condensate lines in boiler systems.

**APPLICATIONS**
- Injection into steam condensate lines where dissolved carbon dioxide in water forms corrosive carbonic acid.

**DOSAGE**
- Less than 100 ppm.

### Additive for acid systems such as industrial oil field and acid cleaning solutions and hot picking balls.

**APPLICATIONS**
- Added to low pH systems to prevent localized corrosion, especially pitting and hydrogen embrittlement.

**DOSAGE**
- 0.3% to 1% by v/v.

### General purpose water treatment antiscalant. Non-flammable and non-toxic.

**APPLICATIONS**
- Suitable for use in natural gas pipelines, and petroleum recovery processes, most effective for gas transmission lines including the difficult Top-of-Line (TOL) corrosion problems.

**DOSAGE**
- DESCRIPTION

### General purpose water treatment antiscalant. Non-flammable and non-toxic.

**APPLICATIONS**
- S-11/S11Org/S-11p is added when the pH of the VpCI® has reached 5.0. It will bring the pH down to reactivate the rust remover.

**DOSAGE**
- DESCRIPTION

### General purpose water treatment antiscalant. Non-flammable and non-toxic.

**APPLICATIONS**
- S-14Bio is biodedradable version.

**DOSAGE**
- DESCRIPTION

### Additive to activate or accelerate a rust removal solution. Formulated to extend the life of a VpCI®-422 solutions.

**APPLICATIONS**
- Designed for use in new solutions of VpCI®-422 to reactivate and accelerate their performance. For used solutions of VpCI®-422 2-42 is added when the pH of the VpCI®-422 solution has reached 5.0. It will bring the pH down to reactivate the rust remover.

**DOSAGE**
- DESCRIPTION

### Blend of solvents, dispersants, surfactants and emulsifiers for treatment of fuel oil grades #2, #4, #5 and #6.

**APPLICATIONS**
- Fuel oil dispersant/muculus that keeps insoluble particles dispersed thus reducing carbon deposits, clog formations, smoke and particle emission.

**DOSAGE**
- DESCRIPTION

### All organic water treatment building block (liquid or powder form available).

**APPLICATIONS**
- For low level concentrations which contain a unique combination of contact and vapor phase inhibitors.

**DOSAGE**
- 1 gal. - 1 gal./1000 gal. 0.95 - 3,785 liters/3785 liters1% to 10% by v/v.

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**LIMITED WARRANTY**

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