

CLEAN, PROTECT, AND PRESERVE

ENVIRONMENTALLY SAFE VpCI™ SuRFACE PREPARATION TECHNOLOGY



The Cortec® Mission

Cortec® Corporation is a company that has always believed it's not good enough to just meet customer needs. We must anticipate them. That is what it means to be an innovator. Currently, Cortec® supplies innovative corrosion protection solutions to the petrochemical, metalworking, telecommunications, electronics/electrical, utility, construction, military/government, marine, basic metals, automotive and equipment maintenance markets. We are expanding into new markets and creating new applications every day. For example, we have developed new technologies in the field of specialty chemical additives (i.e., paint, elastomers, plastics, etc.), new and exciting building blocks for water treatment and process industries emphasizing environmentally safe VpCI™ molecules, and new products for the preservation or restoration of concrete structures using MCI® Migrating Corrosion Inhibitor™ technology.

Leave your parts clean, dry and protected rather than exposed and vulnerable.

ENVIRONMENTAL, hEALTH AND SAFETY Compared with other products on the market, Cortec® can often reduce environmental, health and safety risks, while offering better cleaning protection.



Above: Aluminum trailer prior to treatment with VpCI 427 and VpCI 426



Above: Aluminum trailer after cleaning with VpCI 427 and VpCI 426.

Introduction

Cortec's unique range of Surface Preparation products are designed with the customer and the environment in mind. By consistently researching and developing new technologies, you can rest assured that our products are among the easiest and safest to use in the industry.

By incorporating Cortec's proprietary Vapor phase Corrosion Inhibitor (VpCI™) technology into your surface preparation processes, you can reduce or eliminate the need for more time consuming and costly processes down line.

Cortec's full line of degreasers, depainters, rust and oxide removers can eliminate more costly and dimension changing processes like sand blasting, bead blasting, and acid dipping. By incorporating VpCI™ products you can integrate this cleaning directly into existing manufacturing processes.

As the largest integrated manufacturer of Total Corrosion Control VpCI™ Systems, Cortec Corporation has the experience and technology you can rely on to solve your corrosion problems.



An area frequently overlooked related to corrosion control is that of surface preparation. By incorporating VpCI™ technology into the cleaning, degreasing, and rust removal processes, corrosion protection is offered while the parts are at their most vulnerable state.

Easy as 1 2 3; the 1 2 3 approach <<

1. Paint Removers

- Quickly and safely remove many types of paints without damaging the metal surfaces underneath
- Quickly and easily remove graffiti from concrete and other surfaces
- Safe to use
- Eliminates blasting, refinishing and painting typically required



2. Rust/Oxide Removers



- Tough on rust, easy on users and the environment
- Many formulations 100% biodegradable
- Effectively remove Rust / Oxide from many types of metals without affecting the base metal
- Available in a variety of forms for a wide range of applications

3. Soy-Based & Water-Based alkaline Cleaners/degreasers

Soy

- BioBased and completely biodegradable
- High performance for easy removal of oil and water-based fluids and coatings
- Includes proprietary VpCI™ technology to prevent flash rust after cleaning

Water

- Available in a wide range of forms:
 - High performance foaming
 - Non-Foaming
 - Powder & Liquid
- Cost effective and better performing
- Effective at lower temperatures
- Includes VpCI™ technology to protect against flash rust
- Zero V.O.C. , biodegradable



Preservatives

- Cortec® offers hundreds of products to protect your equipment after it has been cleaned and neutralized
- Water-, Soy- and Oil- Based protectants safely and conveniently preserve metal parts and equipment for extended time periods

Contact Cortec® for specific product recommendations: www.cortecvci.com

Case Histories/Applications

Corrosion: Corrosion and Rust Plague PaRts and equipment, Causing failuRes, RejeCts and Costly ReWoRk.



Solutions: CoRtec's® Range of SP PRoduCts Can eliminate Blasting, sanding and other laBoR-intensive, Costly PRoCesses.

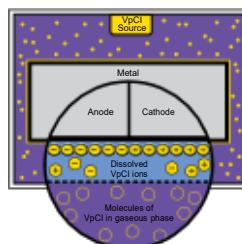


Ionic action of VpCI™

CReates a moleCulaR, inhiBiting layeR.

vPcI™:

- Conditions enClosed atmoSpheRe With a PRoteCtive vaPoR.
- vaPoR migRates to all ReCessed aReas and Cavities.
- vaPoR Condenses on all metal suRfaCes.
- ions dissolve in moistuRe layeR (WateR eleCtRoLyte).
- PRoteCtive ions aRe attRaCted to metal suRfaCes.
- ions foRm a thin, monomoleCulaR PRoteCtive layeR at the metal suRfaCe.
- PRoteCtive layeR Re-heals and self-RePlenishes thRough fuRtheR Condensation of the vaPoR.



the Eco family



Safe and Convenient: Cortec's Surface Preparation products are tough on oils, grease, rust and other soils, yet mild on workers and the environment.



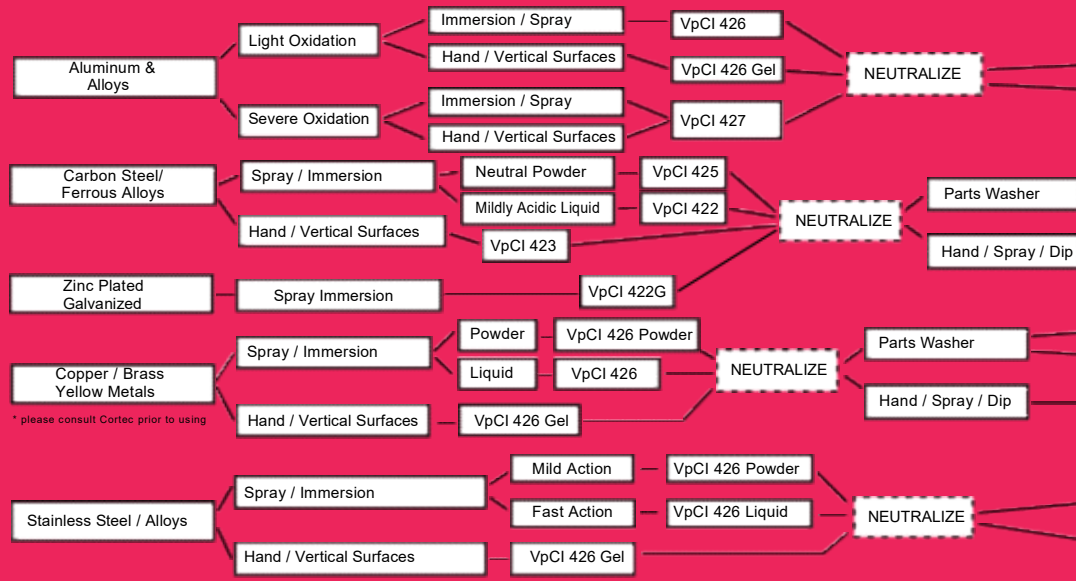
Effective: Cortec's Surface Preparation products are specifically formulated to exceed the expectations and demands of a wide range of users - from sensitive electronic components to heavy industrial equipment .

Corrosion Protection: By incorporating VpCI™ technology into the surface preparation products themselves, parts and equipment are left clean, dry and **protected**, rather than exposed and vulnerable.



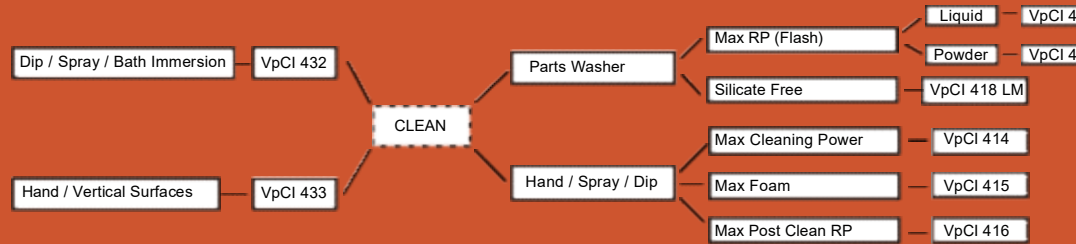
REMOVAL OF:

Oxide Rust

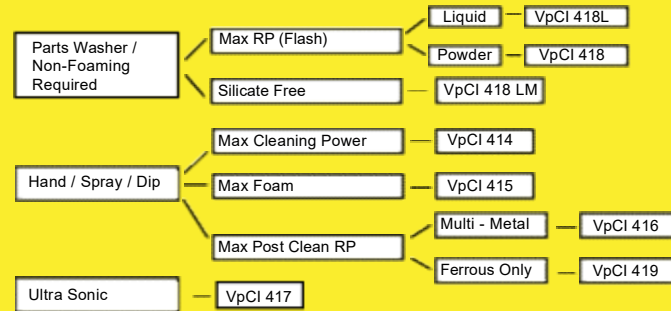


Note: In some cases it may be necessary to clear soils from parts prior to rust removal. Contact Cortec

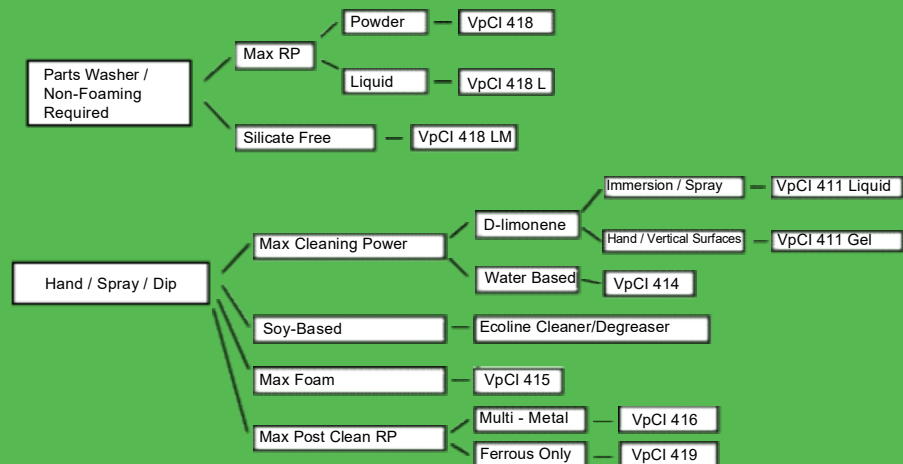
Paint

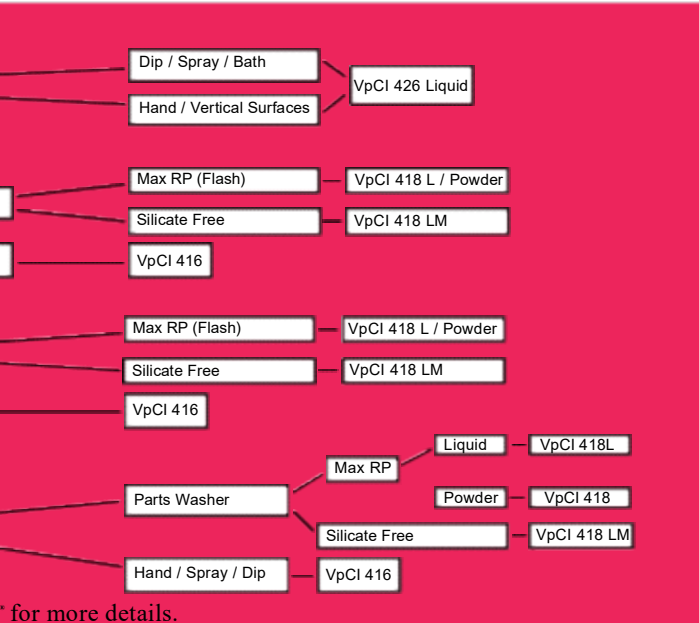


Water Based Fluid



Oil / Solvent Based





Explanation of Terminology & Abbreviations:

RP: Rust Preventative or Rust Prevention

Flash: Rust protection for the period immediately following cleaning (where “flash rust” occurs). Products that prevent flash rust are designed to protect a part for up to one week, allowing enough time for another form of RP to be applied.

Max: Maximum

hand: Applying products manually. This may involve spray bottles, brushes, or other methods.

Immersion: A process where parts are fully submerged in order to clean, or apply a rust preventative.

Neutralize: Process of creating a pH near 7 on the surface of the metal part. For acidic products, alkaline products are used to neutralize. For alkaline products, acidic products are used.

Max Cleaning: Products that have the greatest ability to remove the heaviest soils from the metal surface.

Max Post Clean RP: Products that have the greatest rust prevention ability after cleaning.

Indoor: Designates products offering protection when not exposed to running water, or other outdoor elements.

Outdoor: Designates products offering protection when exposed to outdoor conditions.

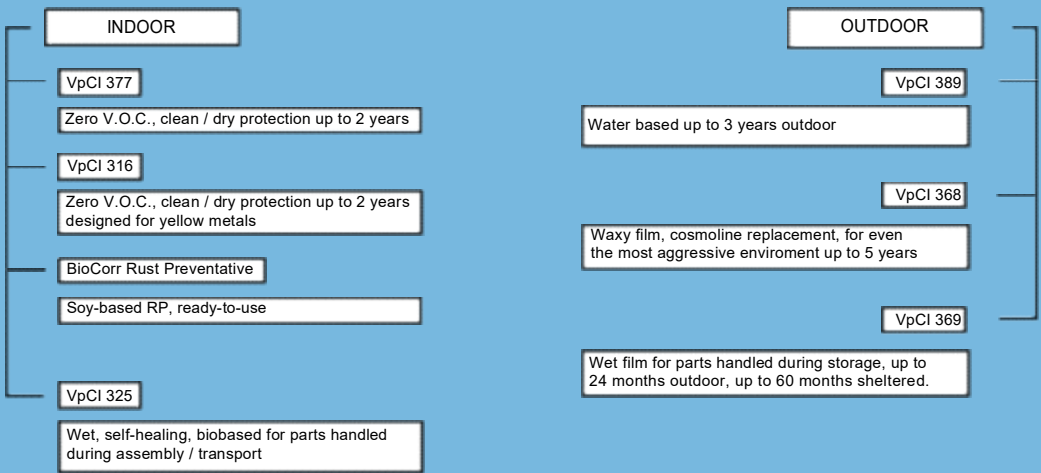
Blend: Combines cleaning power with post-clean rust prevention. Excellent default choice when both properties equally important.

Max Foam: Product that will cling to vertical and overhead surfaces for longer dwell time.

for more details.

Extended Protection After Cleaning

After you've achieved a clean, dry part, you can achieve longer corrosion protection periods using the products below.



Note: The above products are the most common temporary (easily removed) RP's available. Please contact Cortec for permanent coatings recommendations.

Product Description

Cleaners / Degreasers / Neutralizers

VpCI 405	Phosphorous-free, foaming, multi-purpose cleaner that provides multi-metal flash corrosion protection after application.	<ul style="list-style-type: none"> • Cleans Multiple Metals • Flash Protection • Phosphorus Free
VpCI 408	Mildly alkaline (neutral) blend of surfactants and multi-metal inhibitors designed for pressure cleaning systems at slightly elevated temperatures.	<ul style="list-style-type: none"> • Cleans Multiple Metals • Low Foaming • Flash Protection
VpCI-411	D-Limonene based cleaner degreaser for heavy-duty cleaning operations. Provides multi-metal flash corrosion protection. Water-reducible.	<ul style="list-style-type: none"> • Cleans Multiple Metals • Flash Protection • d-Limonene Based • Excellent degreaser
VpCI 411 gel	Gel version of VpCI 411 specifically for applications requiring longer dwell times and application to vertical surfaces.	<ul style="list-style-type: none"> • Ready to use • gel Version for Vertical Surfaces • Multi-Metal • d-Limonene Based
VpCI 414	Concentrated liquid multi-purpose, foaming alkaline, cleaner designed specifically to remove thick, waxy-type water-based coatings such as VpCI 389 and some solvent-based coatings. Provides light multi-metal corrosion protection. Designed specifically for cleaning ability.	<ul style="list-style-type: none"> • Cleans Multiple Metals • Flash Protection • Emulsifying degreaser • Best Water - based for rust prevention
VpCI 415	Concentrated liquid multi-purpose, foaming alkaline cleaner blending cleaning capability of VpCI 414 with flash corrosion protection of VpCI 416. Most often used at slightly higher concentrations than either VpCI 414 or VpCI 416.	<ul style="list-style-type: none"> • Flash Protection • Cleans Multiple Metals • Protects up to 6 months • Excellent blend of cleaning and rust prevention
VpCI 416	Concentrated liquid multi-purpose, foaming alkaline cleaner designed specifically for longest possible multi-metal corrosion protection while remaining highly effective at cleaning ability.	<ul style="list-style-type: none"> • Cleans Multiple Metals • Protects up to 60 days • Flash Protection • Best Water - based for rust prevention
VpCI 417	Concentrated powder multi-purpose, low-foaming alkaline cleaner designed specifically for applications where surfactants are required for cleaning ability, but less foam is desired. Provides multi-metal flash corrosion protection.	<ul style="list-style-type: none"> • Cleans Multiple Metals • Flash Protection • Low Foaming • ultrasonic Cleaner
VpCI 418	Concentrated powder multi-purpose, non-foaming alkaline cleaner/degreaser designed specifically for parts washers and applications where foaming is detrimental. In most applications will reduce or eliminate the need for defoamers. Available in bulk or as premeasured VpCI 418 Saf-T Charges (patented). Provides multi-metal flash corrosion protection to cleaned parts and parts washers.	<ul style="list-style-type: none"> • Cleans Multiple Metals • Flash Protection • Non- Foaming • Liquid or Powder Available
VpCI 418L	Concentrated liquid version of VpCI 418.	
VpCI 418LM	Concentrated liquid, silicate-free version of VpCI 418.	<ul style="list-style-type: none"> • Silicate Free (VpCI 418LM) • Sodium Free (VpCI 418LM)
VpCI 419	Concentrated liquid heavy-duty cleaner/degreaser designed for removal of heavy hydrocarbons, greases, oils and similar materials common to oil/gas industries and heavy industrial applications. Designed for ferrous-only flash corrosion protection and to chemically alter soil deposits allowing them to be removed with water.	<ul style="list-style-type: none"> • Protects Ferrous, Aluminum and galvanized • Flash Protection • Excellent degreaser

Product Description

EcoLine Cleaner/degreaser

Biobased (soya) and biodegradable liquid cleaner degreaser designed for removal of solvent and/or oily films and coatings.

- BioBased (Soya)
- Biodegradable
- Multi-Metal
- Flash Protection

Rust Oxide Removers

VpCI 422

Biobased (citrus) and biodegradable liquid rust remover ideally suited for removal of red and white rust (ferrous and alloy). Designed to be more forgiving to different application methods.

- BioBased (citrus)
- Ferrous
- Alloys Oxide Remover
- Will not attack base metal

VpCI 422g

Specific Version VpCI 422 designed to remove red rust (iron oxide) from exposed edges of Zn-plated/Galvanized metal, while not affecting the Zn-plating or galvanized layer. Non-acidic, near neutral pH (5.5-6.5), excellent chelating ability.

- Near neutral pH
- Non-Acidic, Chelating Action
- Rust removal from exposed (steel) edges of Zn-plated and galvanized

VpCI 423 gel

Gel version of VpCI 422 designed for vertical surfaces or longer dwell times when applied by brush or spray (non-dip tank).

- BioBased (citrus)
- Ferrous
- Alloys Oxide Remover
- Will not attack base metal

VpCI 425

Powder specifically designed to remove light oxides and staining from copper, steel and aluminum. Mix with water prior to application.

- Steel
- Aluminum
- Copper
- Oxide Remover

VpCI 426 Liquid

High performance, fast acting liquid rust remover designed specifically for stainless steel, copper and aluminum. May work too quickly for applications on carbon steel.

- Steel
- Aluminum
- Copper
- Stainless
- Follow with neutralizer

VpCI 426 gel

Gel version of VpCI 426 Liquid designed for similar applications on vertical surfaces or longer dwell times when applied by hand.

- Steel
- Aluminum
- Copper
- Concentration (100%)
- Follow with neutralizer

VpCI 426 Powder

Powder version of VpCI 426 designed to be mixed with water prior to application. Also available as VpCI 426 Saf-T-Charge minimizing chemical handling.

- Concentration (7% typical)
- Stainless Steel
- Aluminum
- Copper: Excellent for un-plated metals
- Follow with neutralizer

VpCI 427

Liquid, aluminum oxide remover and brightener that chemically dissolves and removes Al_2O_3 . Designed specifically for when a "new" surface is desired. Most of ten for subsequent operations or aesthetic purposes. Neutralize a surface with VpCI 426 after use.

- Aluminum oxide remover
- Neutralize with VpCI 426

Rust Converter/Primer

VpCI CorrVerteR

Thick, water-based liquid primer/converter that chemically reacts with iron oxide, then subsequently serves as a high performance self-priming coating. Can be topcoated for long-term protection. Designed specifically for applications where chemical rust removal or blasting is undesirable or impossible.

- Water Based Primer for Ferrous and Alloys
- Neutral Chemical Chelator
- Can be top coated

Paint Strippers / Graffiti

VpCI 432

Heavy-duty liquid paint stripper designed specifically for alkyds, acrylics and urethane coatings. Effective on variety of substrates such as wood, concrete and metal.

- Paint / graffiti Removal
- Variety of Substrates

VpCI 433

Gel version of VpCI 432 ideal for vertical surfaces or when longer dwell times are required in non-dip applications.

- gel version of 432 for vertical surfaces

Products	Foaming	Splitting	Emulsifying	Applications	Temperature Range	Availability	Base/carrier
VpCI 405	Moderate		X	power washer, immersion, or manual cleaning	40-140 F (5-60 C)	5 Gal(19 liter), 55 Gal(208 liter), Bulk	Water
VpCI 408	Low	X		high pressure automated wash system, recirculating systems	65-160 F (18-71 C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk	Water
VpCI 411	Moderate		X	power washer, immersion, or manual cleaning	40-100 F (5-40 C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk, Aerosol	D-Limonene
VpCI 411 Gel	NA		X	power washer, immersion, or manual cleaning	40-100 F (5-40 C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk	D-Limonene
VpCI 414	High		X	power washer, immersion, or manual cleaning	40-140 F (5-60 C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk, Ecoair	Water
VpCI 415	High		X	power washer, immersion, or manual cleaning	40-140 F (5-60 C)	5 Gal (19 liter), 55 Gal, (208 liter) Bulk, Aerosol	Water
VpCI 416	High		X	power washer, immersion, or manual cleaning	40-140 F (5-60 C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk, 16 Oz	Water
VpCI 417	Low	X		ultrasonic, recirculating systems, high pressure automated wash systems	65-160 F (18-71 C)	100 Pounds (45 Kg) or Drum	Water
VpCI 418	Non-Foaming	X		recirculating systems, high pressure automated wash systems	65-160 F (18-71 C)	100 Pounds (45 Kg) Drum	Water
VpCI 418L	Non-Foaming	X		recirculating systems, high pressure automated wash systems	65-160 F (18-71 C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk	Water
VpCI 418 LM	Non-Foaming	X		recirculating systems, high pressure automated wash systems	65-160 F (18-71 C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk	Water
VpCI 419	Moderate		X	power washer, immersion, or manual cleaning	40-140 F (5-60 C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk	Water
Ecoline Cleaner Degreaser	Moderate		X	power washer, immersion, or manual cleaning	40-100 F (5-40 C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk, 16 Oz	Soya Methyl ester
VpCI 422	Low	NA	NA	power washer, immersion, or hand spray	60-120 F (15-49 C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk, Ecoair	organic acid
VpCI 422G	Low	NA	NA	power washer, immersion, or hand spray	60-120 F (15-49 C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk	Water
VpCI 423	Low	NA	NA	brush, spray, or manual application	60-120 F (15-49 C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk	organic acid
VpCI 425	Low	NA	NA	immersion, ultrasonic baths	140-200 F (60-90 C)	100 Pounds (45 Kg)	inorganic acid
VpCI 426	Low	NA	NA	power washer, immersion, or hand spray	60-120 F (15-49 C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk	inorganic acid
VpCI 426 Gel	NA	NA	NA	brush, spray, or manual application	60-120 F (15-49 C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk	inorganic acid
VpCI 426 Powder	Low	NA	NA	immersion, ultrasonic baths	65-160 F (18-71 C)	100 Pounds (45 Kg)	inorganic acid
VpCI 427	Low	NA	NA	power washer, immersion, or hand spray	60-120 F (15-49C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk,	caustic
VpCI 432	Low	NA	NA	immersion, spray, or manual application	65-160 F (18-71 C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk, 16 Oz	solvent
VpCI 433	NA	NA	NA	brush, spray, or manual application	ambient to remain gel	5 Gal (19 liter), 55 Gal (208 liter), Bulk	solvent
VpCI CorrVerter	NA	NA	NA	brush, spray, roller, or immersion	60-120 F (15-49C)	5 Gal (19 liter), 55 Gal (208 liter), Bulk, 16 Oz	water-base acrylic

Form	Neat pH	Dilute pH	Biodegradable	Length of Corrosion Protection	Metals Protected	Dilution Range (%)
Liquid Concentrate	12	10 - 12	YES	Up to 30 Days	Multi-Metal	10 - 50
Liquid Concentrate	N.E.	8.8 - 9.5	YES	Up to 1 Week	Multi-Metal	2 - 15
Liquid Concentrate	9.0 - 10.5	N.E.	YES	Up to 1 Week	Multi-Metal	25 - 100
Gel Ready-To-Use	9.0 - 10.5	N.A.	YES	Up to 1 Week	Multi-Metal	100
Liquid Concentrate	9.0 - 10.5	N.E.	YES	Up to 1 Week	Multi-Metal	5 - 66
Liquid Concentrate	10 - 12	N.E.	YES	Up to 30 Days	Multi-Metal	5 - 50
Liquid Concentrate	11.5 - 12.5	N.E.	YES	Up to 6 Months	Multi-Metal	5 - 50
Powder	N.A.	11.8 12.8	NE	Up to 3 Months	Multi-Metal	2 - 10
Powder	N.A.	11.8 12.8	NE	Up to 3 Months	Multi-Metal	2 - 10
Liquid Concentrate	N.E.	11 - 12	NE	Up to 3 Months	Multi-Metal	3 - 25
Liquid Concentrate	N.E.	10.1 10.6	YES	Up to 3 Months	Multi-Metal	3 - 25
Liquid Concentrate	12.5 - 13	11 - 12	YES	Up to 6 Months	Ferrous, Aluminum, Galvanized	5 - 66
Liquid Concentrate	N.E.	8 - 9	YES	Up to 1 Week	Multi-Metal	25 - 100
Liquid	1.7 - 2.5	N.E.	YES	Flash	Ferrous	100
Liquid	5.5-6.5	NA	YES	Flash	Multi-Metal, ZnPlated/Galvanized Specifically	100
Gel	NE	NE	YES	Flash	Ferrous	100
Powder	N.A.	7-8	YES	Flash	Multi-Metal	10-14 by weight
Liquid	1.5-2.5	N.E.	YES	Flash	Multi-Metal	25-100
Gel	NE	NE	YES	Flash	Multi-Metal	100
Powder	N.A.	2.5-3.5	YES	Flash	Multi-Metal	1-7 by weight
Liquid Concrete	>11	N.E.	NE	NA	Aluminium & Alloys	10-100
Liquid	N.E.	N.E.	NE	Flash	Multi-Metal	100
Gel	NE	NE	NE	Flash	Multi-Metal	100
Viscous Liquid	N.E.	N.E.	NE	Up to 5 Years	Ferrous	100



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Cortec Corporation warrants Cortec® products will be free from defects when shipped to customer. Cortec Corporation's obligation under this warranty shall be limited to replacement of product that proves to be defective. To obtain replacement product under this warranty, the customer must notify Cortec Corporation of the claimed defect within six months after shipment of product to customer. All freight charges for replacement product shall be paid by customer.

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