



Corrosion Inhibitors for Industrial & Architectural Applications

As a leading global chemical manufacturer, ICL's R&D team is continuously developing innovative solutions which enable the manufacturing of sustainable, high-quality paints and coatings.



As a global leader in providing HALOX® corrosion inhibitors to the paint and coatings market, ICL is more than a pigment supplier. We are an innovative solutions provider for your ever-evolving needs.

MAKE THE RIGHT CHOICE!

Find the best HALOX® corrosion inhibitor to fit your formulation needs. For recommendations, ask the "Inhibitor" at halox.com



Our Products

Our HALOX® product line is formulated to offer safer, more durable and longer-lasting solutions to address a multitude of coatings markets such as:

- Aerospace
- Agricultural & Construction Equipment
- Architectural
- Automotive Refinish
- Coil Coatings
- Industrial Maintenance

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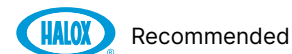
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HALOX® Recommendation Guide



By Resin (Solvent-Based Coatings)	Epoxies	Epoxy Esters	Polyurethanes	Moisture Cure Urethanes	Short & Medium Oil Alkyds	Long Oil Alkyds	Polyesters	Silicones
HALOX® CW-314								
HALOX® CW-2230								
HALOX® CW-22/221								
HALOX® CW-291								
HALOX® 430								
HALOX® 430 JM								
HALOX® CW-491								
HALOX® SW-111								
HALOX® Z-PLEX® 111								
HALOX® Z-PLEX® 250								
HALOX® Z-PLEX® 750								
HALOX® CZ-170								
HALOX® SZP-391								
HALOX® SZP-391 JM								
HALOX® SZP-395								
HALOX® 550 WF								
HALOX® 630								
HALOX® 650								
HALOX® 700								
HALOX® Zinc Phosphate								
HALOX® BW-111 & BW-191								



By Resin (Water-Based Coatings)	Epoxies	Polyurethanes	Polyurethane Dispersions	Water Reducible Alkyds	Alkyds Dispersions	Chlorinated Polymers	Acrylics
HALOX® 430							
HALOX® 430 JM							
HALOX® CW-314							
HALOX® CW-491							
HALOX® SW-111							
HALOX® Z-PLEX® 111							
HALOX® Z-PLEX® 250							
HALOX® Z-PLEX® 750							
HALOX® CZ-170							
HALOX® SZP-391							
HALOX® SZP-391 JM							
HALOX® 550 WF							
HALOX® 350							
HALOX® 515 & 515 LFG							
HALOX® 520							
HALOX® 570 & 570 LS							
HALOX® Zinc Phosphate							
HALOX® BW-111 & BW-191							

By Specialty Application	Clear Coats	Thin Films	Acid Catalyzed	Powder Coating	Wash & Etch Primers	Aerospace	Coil Coating	High Temperature	Rust Converter
HALOX® 430 JM									
HALOX® CZ-170									
HALOX® SZP-391 JM									
HALOX® 550 WF									
HALOX® 350									
HALOX® 570									
HALOX® 630									
HALOX® 650									
HALOX® RC-980									

Inorganic Corrosion Inhibitors with Zinc

For over 50 years, HALOX[®] corrosion inhibitive pigments have provided a high standard of protection without the use of lead or hexavalent chromium compounds.

Eliminate Hazardous Toxins Without Sacrificing Performance

ICL proudly offers a variety of Inorganic Corrosion Inhibitors based on the proven performance of zinc. Our Z-PLEX[®] products are designed to allow you to choose the right inhibitor for your performance and manufacturing needs.

HALOX[®] 700

Controlled Solubility

HALOX[®] 700 is a zinc and aluminum based inorganic corrosion inhibitor designed to provide early and long-term corrosion protection. It combats the onset of corrosion in industrial coatings, and its broad formulating latitude provides good compatibility with most paint systems. Recommended usages include water and solvent-based paints (alkyd, epoxy and polyurethane coatings).

HALOX[®] SZP-391

Universal Workhorse

HALOX[®] SZP-391 is the standard for excellent corrosion protection in a myriad of coatings systems. The proprietary blend of strontium and zinc phosphosilicates offers protection in nearly all water and solvent-based applications. The versatility of HALOX[®] SZP-391 makes it the pigment of choice for formulators seeking long-term corrosion protection

HALOX[®] SZP-391 JM

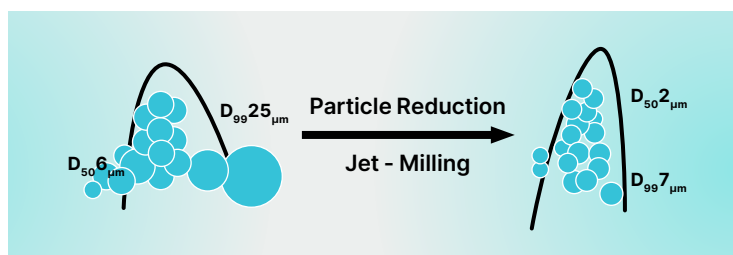
Jet-Milled

HALOX[®] SZP-391 JM contains the same proprietary blend of strontium and zinc phosphosilicates as HALOX[®] SZP-391 at a reduced particle size. Its jet-milled feature not only extends the range of applications to thin-film (<25 microns) and clear coats (<10 microns) with its reduced particle size range, but offers the opportunity for increased ease of incorporation. Emerging commercial coatings technologies, such as alkyd dispersions, benefit greatly from this feature.

HALOX[®] SZP-395

Cost & Performance Balance

HALOX[®] SZP-395 is a proprietary blend of strontium and zinc phosphosilicates used in protective coating systems. It's our most efficient and versatile corrosion inhibitive pigment recommended for use in a wide variety of resin systems. It is equally effective in such resins as: alkyds (both traditional and high solids), epoxies, latexes, water reducible alkyds, high acid value resins, catalyzed baking systems and vinylidene chloride latexes.



HALOX® CZ-170

Corrosion & Tannin Blocking

HALOX® CZ-170 is a zinc ortho-phosphate pigment with attributes beneficial to both corrosion inhibition and tannin-stain blocking. It is ideally suited for applications over multiple substrates where both types of protection are desired. The benefits can also be realized in thin-film and high-gloss applications due to the low particle size range.

HALOX® Z-PLEX 111

Low Cost Zinc Phosphate Offset

HALOX® Z-PLEX® 111 is specially engineered to contain 80% less zinc compounds while providing improved corrosion efficiency. This engineered zinc phosphate complex is designed to compete head-to-head with standard zinc phosphate pigments. For light industrial coatings, the reduced cost of HALOX® Z-PLEX® 111 compared to that of zinc phosphate brings realized savings to your formulation without sacrificing performance.

HALOX® Z-PLEX 750

2-in-1 Inorganic/Organic

HALOX® Z-PLEX® 750 is a hybrid corrosion inhibitor combining organic and inorganic inhibitor synergies. A cost-effective alternative to modified zinc phosphate, it improves humidity resistance and wet adhesion in both water and solvent-based coatings.

HALOX® Z-PLEX 250

Tried & Proven

HALOX® Z-PLEX® 250 is the universally accepted alternative to lead and chrome inorganic corrosion inhibitors for all applications. Its high degree of versatility is due to its narrow particle size distribution. It is a Type I, zinc phosphate dihydrate crystal form, which allows for use in both water and solvent-based coatings.

HALOX® Zinc Phosphate

Chrome-Free & Lead-Free Workhorse

HALOX® Zinc Phosphate is a universal lead-free and chromium-free inorganic corrosion inhibitor designed for water-based and solvent-based coatings. It exhibits a high degree of versatility because of its narrow particle size distribution: upper particle size limit of 20 microns, mean particle size of 5 microns.



Zinc-Free Inorganic Corrosion Inhibitors

HALOX® SW-111

Superior Performance

HALOX® SW-111 is a strontium phosphosilicate pigment designed for high performance applications, such as water and solvent-based epoxy formulations. HALOX® SW-111 maintains a higher level of in-can stability compared to other zinc-based corrosion inhibitors. It performs well in the most demanding resins where the reactivity of zinc-containing anti-corrosive pigments can be problematic.

HALOX® 430

Zn-Free & Multi-Mechanism

HALOX® 430 is a patent protected pigment designed to provide both conventional passivation and ion-exchange technology in one product. The unique design enables formulation into nearly all water and solvent-based formulations. The ability to ion-exchange corrosion inducing species showcases the latest technology in heavy-metal replacements to ensure long-lasting performance.

HALOX® 430 JM

Jet-Milled

HALOX® 430 JM is a patent protected pigment designed to provide both conventional passivation and ion-exchange technology in one product. HALOX® 430 JM offers the same overall utility as HALOX® 430 with acceptance into thin-film and clear coat formulations. The ability to ion-exchange corrosion inducing species showcases the latest technology in heavy-metal replacements to ensure long-lasting performance.

HALOX® CW-314

FDA, Zn-Free, Multi-Functional

HALOX® CW-314 is especially suited for systems where 21 CFR 175.300 approval or conformance to ANSI/NSF standards are required. It is very effective in enhancing the infrared (IR) reflectance and thermal emissivity of elastomeric roof coatings. HALOX® CW-314 increases the total solar reflectance (TSR) while maintaining the dirt pick-up resistance (DPUR) and prevention of mildew growth. It can be used alone or in combination with other non-toxic corrosion inhibitors and mineral pigments in the formulation of environmentally friendly specialty paints.

HALOX® CW-2230

Anti-Corrosion & Flame Retardant

HALOX® CW-2230 is a calcium borosilicate pigment with unique manufacturing process results in a low moisture product, well-suited for polyurethane coatings, though not limited. HALOX® CW-2230 is an ideal choice for coatings applied over substrates such as galvanized steel and other treated substrates where saponification with surface zinc is undesirable.

HALOX® CW-22/221 & CW-291

Zn-Free, Phosphate-Free

HALOX® CW-22/221 is a calcium borosilicate pigment recommended for protective coatings formulated with alkyd technology. HALOX® CW-22/221 is an ideal choice for coatings applied over substrates such as galvanized steel and other treated substrates where saponification with surface zinc is undesirable. HALOX® CW-291 can be used as a stand-alone corrosion inhibitor or to enhance overall protection when used with traditional corrosion inhibitors over untreated substrates.

HALOX® CW-491

Legacy Zinc-Free

HALOX® CW-491 is a calcium phosphosilicate pigment recommended for zinc-free protective coatings. It offers a broad range of corrosion protection in both water and solvent-based systems.

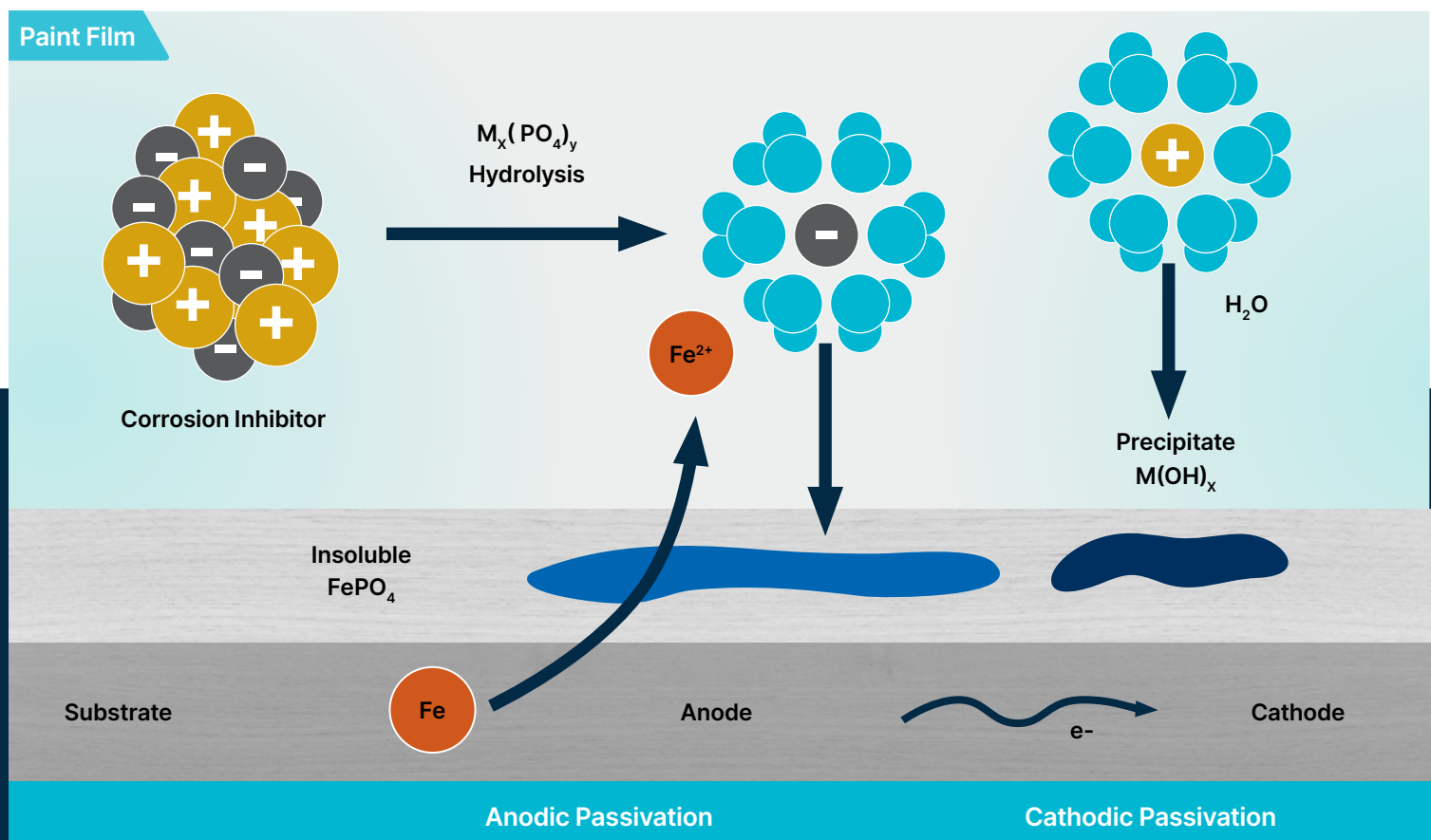
HALOX® BW-111 & BW-191

Synergistic

HALOX® BW-111 & BW-191 are barium phosphosilicate pigments ideally suited to provide a balanced corrosion inhibitive package when used with lower solubility corrosion inhibitors such as HALOX® SZP-391 or HALOX® Z-PLEX 250. The increased solubility of these products compared to traditional zinc phosphate offers increased protection during the beginning of a coating's service life. These products can be used as sole corrosion inhibitors or as an enhancement for overall protection when used with HALOX® SZP-391.

How Do Our Inorganic Corrosion Inhibitors Work?

Our Inorganic Corrosion Inhibitors work hard to give your coatings the best corrosion protection by delaying the onset of corrosion and providing long-term corrosion protection.





Specialty Inhibitors

HALOX® Specialty Inhibitors provide formulators with additional tools to increase hydrophobicity and adhesion in challenging environments.

Maximize Corrosion Resistance While Promoting Adhesion

The performance attributes of HALOX® 550 and HALOX® 550 WF lead to overall improvements in barrier properties through both the formation of domains within the pores of a coating in addition to an affinity for bonding at the metal surface.

HALOX® 550 & 550 WF

Water-Based / Water & Solvent-Based

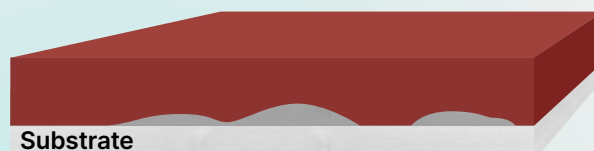
HALOX® 550/550 WF works directly with corrosion inhibitive pigments and organic additives. When used at a low loading level, they can boost the adhesion of the systems through the development of a sol-gel network and the formation of hydrophobic nanodomains within the coating. It's more than just an adhesion promoter – its fundamental chemistry is the ultimate synergist for improved coating performance. HALOX® 550 is designed for water-based systems. The versatility of HALOX® 550 WF enables it to be used in both water and solvent-based formulations.

HALOX® RC-980

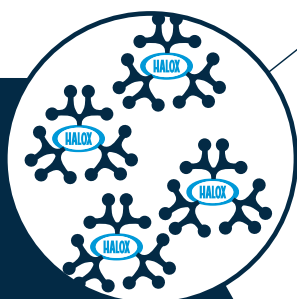
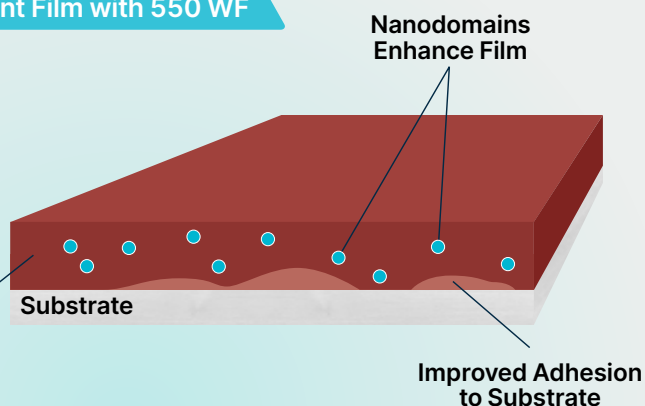
Rust Converter

HALOX® RC-980 is an organic additive designed to convert red rust to a black iron oxide. It can be used in slightly acidic waterborne vinyl or PVDC binders applied to rusted steel substrates. It converts the rust within minutes of the coating application and forms a black iron oxide barrier which can further be top-coated with water or solvent-based paints.

Paint Film without 550 WF



Paint Film with 550 WF



Organic Corrosion Inhibitors

HALOX® Organic Corrosion Inhibitors are effective against flash rusting and in-can corrosion prevention, though the benefits of using these products does not end there.

Improve Adhesion and Provide a High Gloss, Corrosion-Resistant Finish

Our HALOX® Organic Corrosion Inhibitors are ideally suited for high gloss, thin film, and clear coat applications. They also provide superior synergy when used in combination with inorganic corrosion inhibitors in traditional coatings. To achieve desired performance, proper selection of inhibitors is essential.

HALOX® 515 & 515 LFG

Liquid Dual Protection

HALOX® 515 is a liquid corrosion inhibitor designed for water-based formulations which is free from heavy-metals and nitrites. This low viscosity, liquid organic corrosion inhibitor meets all the needs of a traditional flash-rust inhibitor in addition to providing galvanic corrosion resistance and superior humidity resistance, all of which lead to better overall corrosion inhibition. A lower freeze point variant, HALOX® 515 LFG, is available for improved stability during cold weather transport and application.

HALOX® 520

Dual Functionality

HALOX® 520 contains dual functionality as a corrosion inhibitor and an adhesion promoter. It may be used in water-based formulations such as: 2 pack epoxy systems, 1 and 2 pack polyurethanes, acrylics (especially epoxy/amine functionalized), and hybrid systems. HALOX® 520 can also be used as a metal pretreatment additive.

HALOX® 350

Organic Anodic Passivator

HALOX® 350 is a highly effective corrosion inhibitor designed for water-based formulations in order to provide flash-rust inhibition, in-can rust prevention and improved adhesion performance. This product may be used as a powder (formulation pH dependent) or as an easily prepared liquid additive to a wide array of coatings systems. HALOX® 350 is a nitrite-free corrosion inhibitor.

HALOX® 630

Hydrophobic Adhesion Promoter

HALOX® 630 is a high performance liquid corrosion inhibiting additive for solvent-based formulations. Its ability to improve adhesion to poorly prepared substrates is unsurpassed. HALOX® 630 may be used alongside traditional corrosion inhibiting pigments or as the stand-alone inhibitor for DTM applications including clear coats with proven performance on brass and aluminum alloy.



HALOX® 570 & 570 LS

Flash & Weld Seam Passivator

HALOX® 570 is a highly effective long-term corrosion inhibitor designed for water-based formulations in order to provide flash-rust inhibition, galvanic corrosion resistance, and improved adhesion performance. This product may be used as a powder (formulation pH dependent) or as an easily prepared liquid additive to a wide array of coatings systems including UV applications.

30% HALOX® 350 SOLUTION	WEIGHT	30% HALOX® 570 SOLUTION	WEIGHT
De-ionized Water	57.3	De-ionized Water	62.8
28% Ammonium Hydroxide*	15.0	28% Ammonium Hydroxide*	7.2
HALOX® 350	27.7	HALOX® 570	30.0
TOTAL	100.00	TOTAL	100.00

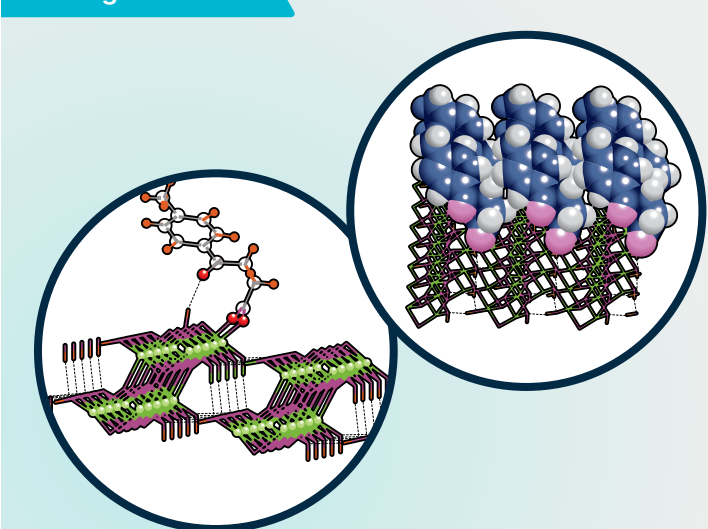
Stir slowly, adjust pH to 8-9 *AMP-95 is suitable

HALOX® 650

Zero VOC Synergist

HALOX® 650 is an electron rich di-acid acid based organic corrosion inhibitor designed for solvents, high-solids and powder coatings. Its heterocyclic (C, N, S) composition makes it heat stable (<170 °C), an effective anodic inhibitor, reduces cut-edge corrosion and is a powerful synergist for other anticorrosive pigments such as HALOX® SZP-391, HALOX® Z-PLEX® 250, and HALOX® 430. It is used in chromate-free coatings such as coil coatings and wash/etch primers. It also allows formulators to pass the T-bend test for force cured coatings.

How Organics Work



Molecular modeling of repeating dinuclear fragment.



Flash Rust Corrosion Inhibitors

Flash Rust Corrosion Inhibitors are added to water-based coatings in order to stop corrosion formation that occurs during the drying process.

Put an End to the Appearance of Rust Spotting and In-Can Corrosion

Without the use of Flash Rust Inhibitors, water soluble corrosion products migrate to the surface of the coating appearing as rust stains or spots. In addition to the flash rust protection provided by the entire line of HALOX® Organic Corrosion Inhibitors, we are proud to offer FLASH-X® products specifically designed to prevent unsightly staining which can ruin an otherwise perfect finish.

HALOX® FLASH-X® 150

Tried & Trusted

HALOX® FLASH-X® 150 combines dual mechanisms to combat flash rusting and in-can rusting. The low viscosity liquid is ideal for increasing production output and may be post-added to meet the challenges of customer specific modifications.

HALOX® FLASH-X® 330

Nitrite-Free

HALOX® FLASH-X® 330 is a low-odor, low-foam additive which has no effect on gloss and provides excellent package stability. It contains no nitrite or nitrate compounds, is effective at low loading levels and may be incorporated at any stage of the paint manufacturing process. The product is also suitable for use in water jet-blasting and metal working applications.



Our HALOX® Corrosion Inhibitors are available for purchase through our global distribution network. To contact a distributor in your area for pricing and availability, visit: halox.com/distributors



REACH



ICL is one of the world's leading fertilizer and specialty chemicals producers committed to fulfilling humanity's ever-evolving needs. Our major production activities are located in Israel, Europe, the US, South America and China, and are supported by major global marketing and logistics networks.

Our Commitment: Successful relationships begin at the product development planning stage and extend through plant trials and product launch. Customers come to us with challenges, and we are dedicated to providing them with solutions. For manufacturers who rely on quality coatings, ICL offers proven performance, long-term corrosion and tannin stain protection, and protection of the world around us.

Technical Service: Our technical support capabilities allow us to help customers achieve better products. We are committed to building our product portfolio and continually exploring and expanding the frontiers of today's coatings technologies. This includes delivering timely assistance on coating formulation questions, aiding formulators in achieving total system compatibility and identifying an optimum inhibitor package to address individual cost and performance targets. We take the problem, analyze the parameters, work jointly with company product experts and create solutions that exceed customer expectations.

Quality / REACH Statement / Responsible Care: As a responsible international supplier of specialty chemicals, ICL is committed to advancing the principles of sustainability in the industries in which we operate. We incorporate quality, health, safety and environment management systems into all phases of the chemical life cycle. We pledge continuous improvement to provide the highest quality of products while protecting the safety of our people, our business partners, and the environment.

ICL is ISO 9001, ISO 14001:2004 and RC 14001:2014 certified. We are committed to our Responsible Care® initiatives and are consistent with the Responsible Care® code of Product Stewardship. We remain fully engaged in the implementation of the European Union's Registration, Evaluation, Authorization and Restriction of Chemicals legislation (REACH). The impact it will have on the future availability of chemicals is of vital importance for ICL, our customers and the entire global chemical industry.

**To learn more, visit: www.halox.com
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This information is based on our present state of knowledge and is intended to provide general notes on our products and their uses. It should not therefore be construed as guaranteeing specific properties of the products described or their suitability for a particular application. No legal liability shall be derived from it. Any existing industrial property rights must be observed. The quality of our products is guaranteed under our terms and conditions. © 2023 ICL Specialty Products Inc. All rights reserved. All information is protected under international copyright conventions. BK Giulini is a wholly owned subsidiary of ICL Group. **ICL HALOX 0324**

Additional Product Lines

HALOX®: An extensive portfolio of organic and inorganic corrosion and flash rust inhibitors, supplemented by tannin stain inhibitors.

LOPON® & POLYRON®: Dispersing agents and stabilizers specially formulated for silicate and biocide-free paints.

TARGON®: Versatile additives for the construction industry.