PROTECH
GROUP

ANTICORROSION

Steel Surface Coatings

Steel Substrates.
Multi-Layer Defense.
Sustained Performance.
Anti-Corrosion Protection.

Technical Overview
2025 - 2026

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CORROSION PROTECTION
Two-Coat/Multi-Coat Coating System

INTRODUCTION

Corrosion is the electrochemical degradation of metals caused by environmental exposure to moisture, oxygen, salts, and other corrosive agents. The severity of corrosion depends on the environmental conditions, such as humidity, industrial pollutants, and proximity to marine or coastal regions. According to ISO 12944 and other international standards, corrosion environments are classified into categories from **C1** (very low) to **C5** (very high), with additional classes for immersion or offshore exposure.

To combat corrosion in moderate to highly corrosive settings (C3 to C5), a **2-coat or multi-coat powder coating system** is commonly employed. This system typically includes a **corrosion-resistant primer**—often formulated with zinc-rich epoxy or other chemically resistant compounds—followed by a durable topcoat, such as polyester or polyurethane powder. The primer forms a barrier and inhibits corrosion at the substrate level, while the topcoat offers UV resistance, mechanical durability, and aesthetic finish. Together, the two layers ensure enhanced adhesion, long-term performance, and extended service life for metal components in aggressive environments.

At Protech Group, we engineer high-performance powder coating primers specifically designed to deliver excellent adhesion, enhanced corrosion resistance, and compatibility with various topcoat systems to ensure long-lasting corrosion protection for steel and galvanized substrates.

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Protech Coating Compliant with ISO 12944

To assist corrosion experts, engineers and consultant in selecting the best corrosion protection option for every specific situation, guidelines are set in ISO 12944. This international standard describes different corrosion classes, and sets the benchmark on corrosion protection of steel structures by protective paint systems. Standard **ISO 12944** was introduced in 1998, revised in 2007 and updated in 2018 with some significant changes and additions. It now consists of nine sections referring to paints and coatings for steel structures that are exposed to the elements, submerged or buried.

Part 6 of the standard (ISO 12944-6) specifies methods for laboratory tests and conditions for evaluating paint systems for the protection of carbon steel structures against corrosion. Industry professionals (such as facility and plant owners, corrosion protection companies or construction companies) use the detailed, unambiguous and easily understood standards set forth in Part Two of ISO 12944 to ensure that the coatings they use and/or provide guarantee the expected level of protection against corrosion in the environment in which they will be located.

Corrosion Category	Corrosivity	Example of Environment Outdoor	Example of Environment Indoor
C1	Very Low		Heated buildings with dry air and insignificant amounts of pollutants, e.g. offices, shops, schools, hotels.
C2	Low	Environments with low levels of pollution. Mainly rural setting.	Unheated buildings with changing temperature and humidity. Low frequency off moisture condensation and low content air pollution, e.g. sports halls, warehouses.
C3	Moderate	Atmosphere with a certain amount of salt or moderate amounts of air pollution. Urban areas and slightly industrialized areas. Areas with moderate influence from the coast.	Buildings with moderate humidity and certain amount of air pollution from production processes, e.g. breweries, dairies, laundries,heated ice rinks.
C4	High	Atmospheres with moderate amount salt or palpable amounts air pollution. Industry and coastal areas.	Buildings with high humidity and large amount air pollution from production processes, e.g. chemical industries, swimming pools, shipyards, non-heated ice rinks.
C5	Very High	Industrial areas with high humidity and aggressive atmosphere and coastal areas with a large amount salt in the air.	Buildings with almost permanent moisture condensation and large amount air pollution.
C5M or CX	Very High Marine & Extreme	Industrial areas with extreme humidity and aggressive tropical or sub-tropical atmosphere. Offshore areas with a large amount salt in the air.	Industrial buildings with extreme humidity and aggressive atmosphere.

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Multi-Coats. One Powerful Anti-Corrosion Shield.

Our coating systems are engineered to deliver exceptional durability and protection in the most demanding environments. Designed and tested in accordance with ISO 12944-6 and ISO 20340, they offer proven, high-performance corrosion resistance for steel and other metal structures exposed to aggressive conditions.

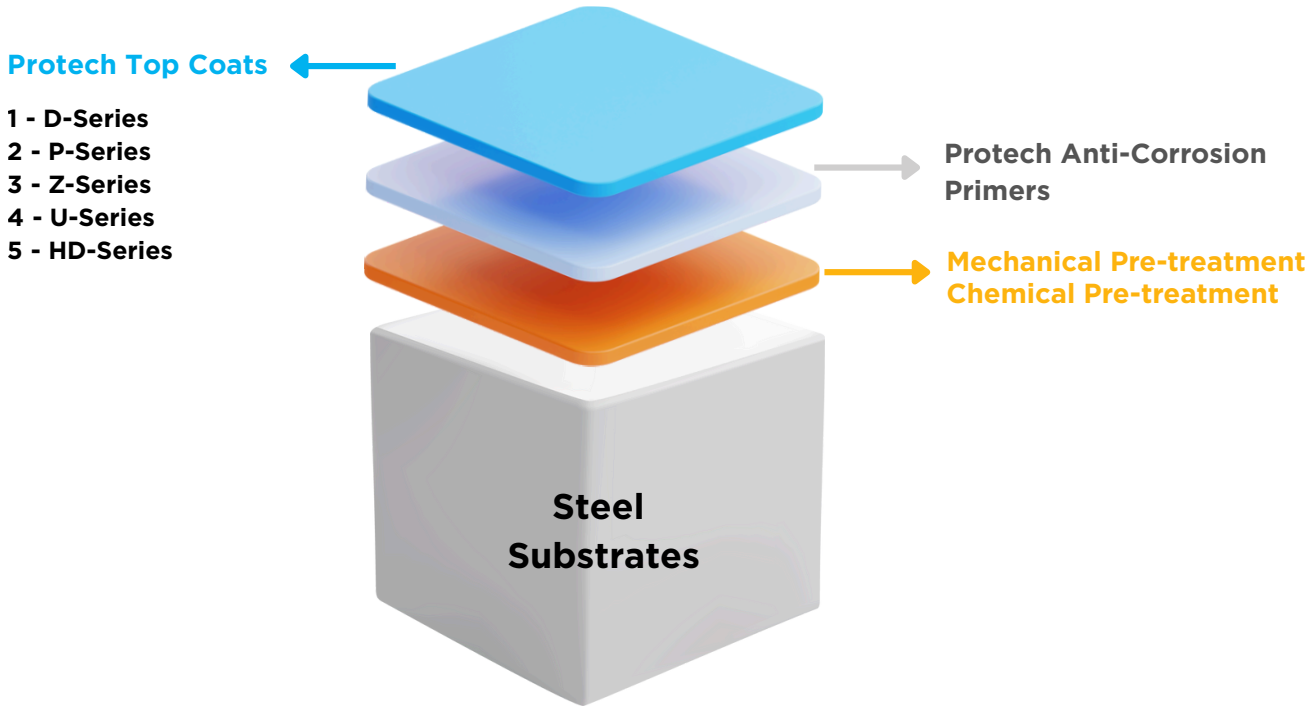
Dual-Layer Coating System

The dual-layer system combines a corrosion-inhibiting primer with a UV-resistant topcoat, providing long-term defense against moisture, salt spray, chemical exposure, and mechanical wear. This streamlined approach ensures extended service life, reduced maintenance costs, and reliable structural integrity in harsh marine, industrial, and offshore settings.

Multi-Layer Coating System

For even greater protection, our multi-coat application system incorporates a primer, one or two intermediate layers, and a topcoat. This advanced configuration enhances barrier properties and mechanical strength, making it ideal for environments with extreme exposure and performance demands. The multi-layer system is specifically engineered to meet rigorous standards and deliver superior resistance to corrosion, abrasion, and UV degradation.

Our technical team can advise on system selection, substrate preparation, curing processes, and long-term maintenance strategies to ensure maximum performance in aggressive environments.



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Selecting a Corrosion Prevention Method for Steel Components

When selecting a corrosion prevention strategy for a steel component or structure, it is crucial to analyze and test various technical factors. Careful consideration must be given to the environment in which the steel will operate, as well as the stresses it may encounter during transportation, storage, installation, or erection.

Protech Group Anti-Corrosion Powder System are designed to meet specific protection requirements and project constraints. To identify the most suitable coating solution, follow these steps:

1. Identify the substrate type and determine the pretreatment process.
2. Classify the environment the object will be exposed to.
3. Establish additional performance criteria (UV resistance, chemical exposure, durability).
4. Assess the useful lifespan before significant maintenance is needed.
5. Choose the appropriate Protech primer and compatible topcoat for maximum protection.

Customers are responsible for substrate selection and pretreatment solutions. While tech support can provide guidance, it is important for customer engineering to choose the substrate material. We always recommend consulting with a chemical pretreatment supplier to identify the best options that meet their product demands.

Our range includes two-coat and multi-coat systems that offer improved barrier protection, durability, and adherence to international standards. You can select the ideal coating solutions for your application based on the information provided about our primers and topcoats.

Corrosion Category	Protech Group Coating Recommendation
C1	Single coat powder coating; interior or exterior grade.
C2	Single coat powder coating interior or exterior grade, optional primer coat, single-coat HD-Kote Polyester.
C3	2-coat system with primer and top coat, single coat high build HD-Kote polyester.
C4	2-coat system with high performance primer, intermediate layers and superior top coat to meet duty cycle
C5	2-coat system with zinc rich primer, intermediate layers and Super Durable top coat to meet duty cycle.
C5M or CX	Multi-coat system with primer, intermediate layers and top coat designed for extended duty cycle performance

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1 - Base Coat (Primer Selection)

Our corrosion protection primers are thermoset epoxy or hybrid-based powder coatings, formulated for both interior and exterior environments, offering optimal barrier properties and mechanical strength. They serve as an undercoat layer, significantly improving the durability of the entire coating system. We offer a broad portfolio of primers to address various application and performance requirements. A selection of representative primers is listed in the reference table below for your convenience.

Key Features

- Excellent corrosion resistance
- Superior adhesion to various substrates (steel, & galvanized steel)
- Smooth and uniform film build
- Compatibility with a wide range of topcoats
- Fast curing with high mechanical strength
- Free from heavy metals and environmentally compliant

Corrosion Category	Protech Powder Primer	Description	Capabilities	Features
C3 Medium	ES321A156 HS242A1989 PS241W1054	Epoxy Putty Grey Zinc Free Vulcan Gray HD-Kote Signal White	4000+hrs in 2 coat systems 4000+hrs in 2 coat systems 2500+hrs in 1 coat system	Fast cure, high build, good edge coverage Regular cure, good overbake inter-coat adhesion Exceeds AAMA2604 colour/gloss retention
C4 High	ES321A156 HS242A1989 ES312A67 PS311A1800	Epoxy Putty Grey Zinc Free Vulcan Gray Epoxy Zinc Rich Zinc Primer Gray	5000+hrs in 2 coat systems 5000+hrs in 2 coat systems 5000+hrs in 2 coat systems 5000+hrs in 2 coat systems	Fast cure, high build, good edge coverage Regular cure, good overbake inter-coat adhesion Sacrificial zinc content, heavy duty performance Sacrificial zinc content, good overbake inter-coat adhesion properties
C5-I Very High Industrial	ES312A67 PS311A1800	Epoxy Zinc Rich Zinc Primer Gray	Highest performance protection in 2 coat systems Highest performance protection in 2 coat systems	Sacrificial zinc content, heavy duty performance Sacrificial zinc content, good overbake inter-coat adhesion properties
C5-M Very High Marine & CX Extreme	Contact your Technical Representative to review C5M & C5X requirements.			

*** The effectiveness of corrosion resistance directly depends on factors such as substrate selection, surface preparation, the thickness of the coating, and the curing process of the chosen coating system.***

**** Partial curing of the primer coat before applying the second coat is advisable. Following the application of the top coat, a full cure cycle should be implemented to achieve optimal inter-coat adhesion properties.****

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2 - Top Coat (U, Z, P, D and HD Series)

Our topcoat range is designed to provide superior durability and long-term protection when used over anti-corrosion primers in a two-coat powder coating system. The polyurethane series offers outstanding UV stability, color retention, and chemical resistance, making it ideal for high-exposure outdoor environments. The polyester series delivers excellent weatherability, mechanical strength, and resistance to chalking, ensuring performance in a wide range of industrial and architectural applications. Both series are engineered to work in synergy with corrosion-resistant primers, forming a robust barrier that meets or exceeds international standards for corrosion protection.

Protech Top Coats	Specifications
P-Series	Polyester TGIC, AAMA 2603 Compliant
D-Series	Polyester TGIC Free, AAMA 2603 & 2604 Compliant, Qualicoat Class I and II Compliant
Z-Series	Polyester TGIC, Super-Durable, AAMA 2604 & Qualicoat Class II & III Compliant; architectural grade
U-Series	Polyurethane-base; Outstanding Corrosion Resistance; Ultra-Smooth Finish (PCI flow chart rating 9/10) - AAMA 2603 & 2604 Compliant
HD-Kote	Polyester-based One-coat Powder System; Superior Corrosion and UV Resistance. It meets AAMA 2603 & 2604 specifications.

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PROTECH ANTI-CORROSION TOP COATINGS

P-SERIES

The P-series includes polyester/TGIC-based powders that meet AAMA 2603 standards. These powders are known for their flexibility, impact resistance, chemical resistance, and durability in outdoor settings. They offer an excellent mix of quality, performance, and affordability, making them suitable for indoor and outdoor applications. They cater to diverse needs and are available in a wide range of colors, gloss levels, and special effects.

TGIC Polyester

TGIC-Free Polyester

D-SERIES

The D-series features Protech's durable powder coatings for industrial and architectural use. These polyester powders, known as Primid or HAA-based, can be customized to meet AAMA 2603 or 2604 standards for outdoor applications. Key benefits include flexibility, impact resistance, Faraday cage penetration, and high transfer efficiency.

Z-SERIES

The Z-series™ by Protech provides durable coatings that meet AAMA 2604 and Qualicoat Class II standards. Ideal for exterior and architectural use, these weather-resistant powders come in various colors, glosses, and textures, offering superior performance over standard TGIC-free polyesters. Protech flexible, super-durable polyester powder coatings show significantly improved exterior performance compared to standard TGIC-free polyesters.

SD Polyester

Polyurethane

U-SERIES

U-Series polyurethane-based powder coatings offer excellent outdoor durability, corrosion resistance, and flexibility. With a smooth 9/10 PCI finish, they're ideal for high-end applications such as architectural components, appliances, and sublimation finishes. They are AAMA 2603 & 2604 compliant, and suitable for anti-graffiti, SEFA 8, and whiteboard uses.

HD-KOTE

HD Polyester

HD-KOTE is a polyester-based one-coat system engineered with superior corrosion resistance due to its ability to create a continuous, highly durable physical barrier between the metal substrate and the external environment. The heavy-duty nature of the coating ensures a thicker and more uniform protective film, effectively limiting the penetration of moisture, oxygen, and other corrosive agents—the primary drivers of metal degradation. By reducing the permeability of the coating and enhancing adhesion to the substrate, HD-KOTE minimizes pathways for water ingress and under film corrosion, thereby significantly increasing the long-term durability and resistance of the metal surface against harsh atmospheric conditions. This product is compliant with AAMA 2603 - 2604 standards.

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PROTECH MULTI-COAT SYSTEM APPLICATION

Corrosion Category	Typical Environment	Pre-Treatment		Protech Primer Coat 1	Curing*	Min. Film Tickness	Protech Topcoat Coat 2	Curing	Min Total Tickness
		Steel	Galvanized Steel						
C3 (Medium/ High)	Urban and industrial atmospheres with moderate sulfur dioxide pollution; coastal areas with low salinity.	Chemical or Mechanical	Chemical or Mechanical	ES321A156	Partial Gel	2-3mils or cover blast profile by 1mil min	Polyester	5-10 mins @400F Metal	5-7 mils
		Chemical or Mechanical	Chemical or Mechanical	HS242A1989	Partial or Full	2-3mils or cover blast profile by 1mil min	Polyester	5-10 mins @400F Metal	5-7 mils
		Chemical or Mechanical	Chemical or Mechanical	NONE	NONE	4-8mils	HD-Kote Polyester	7 mins @400F	4-8 mils
C4 (High)	Industrial areas with high humidity and aggressive atmosphere; coastal areas with moderate salinity.	Chemical or Mechanical	Mechanical	ES321A156	Partial Gel	3-4mils or cover blast profile by 1mil min	SD Polyester/ Polyurethane	7-10 mins @400F	6-9 mils
		Chemical or Mechanical	Mechanical	HS242A1989	Partial or Full	3-4mils or cover blast profile by 1mil min	SD Polyester/ Polyurethane	7-10 mins @400F	6-9 mils
		Chemical or Mechanical	Mechanical	ES312A67	Partial Gel	3-4mils or cover blast profile by 1mil min	SD Polyester/ Polyurethane	7-10 mins @400F	6-9 mils
		Chemical or Mechanical	Mechanical	PS311A1800	Partial or Full	3-4mils or cover blast profile by 1mil min	SD Polyester/ Polyurethane	7-10 mins @400F	6-9 mils
C5 (Very High) Industrial	Industrial areas with very high humidity and aggressive atmospheres; coastal and offshore areas with high salinity.	Chemical And Mechanical	Mechanical	ES312A67	Partial Gel	3-4mils or cover blast profile by 1mil min	SD Polyester/ Polyurethane	7-10 mins @400F	6-9 mils
		Chemical And Mechanical	Mechanical	PS311A1800	Partial or Full	3-4mils or cover blast profile by 1mil min	SD Polyester/ Polyurethane	7-10 mins @400F	6-9 mils
C5-M Very High Marine & CX Extreme	Offshore Plants, Splash Zones, Heavy Chemical Industries.	**Contact your Technical Representative to review C5M & C5X requirements.**							

CURING*: IT IS ESSENTIAL TO ALWAYS VERIFY CURING SCHEDULES ON THE TECHNICAL DATA SHEET.

Importance of Substrate and Surface Preparation for C5 Applications:

- Substrate and surface preparation are essential for C5 applications.
- You may need an extra e-coat primer or a blend of chemical and mechanical pretreatment.
- Be sure to discuss the complete duty cycle with your Technical Representative.

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ABOUT PROTECH GROUP

FORMULATING THE RIGHT MIX.

Since 1976, the Protech Group has established itself as a global leader in surface coating technology, providing a wide range of products, including powder coatings, liquid coatings, architectural paints, and polymer-based specialty materials for various industries around the world. With **15** production facilities located in the U.S., Canada, and Europe, our team comprises over **1,500** employees, including our licensees, representing more than **50** nationalities. Supported by the expertise of over **50** chemists, we offer high-performance, innovative, and sustainable solutions designed to protect and enhance surfaces in automotive, architecture, furniture, appliances, and industrial sectors.

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