

Interpon Redox

Powder Systems for
Corrosion Protection

Refresh training EMEA
June 2025

Agenda for today

Introduction

Substrate & Pretreatment

ISO 12944 standard

Our Interpon Redox offer

How to select the right system

Competitor market insights

Q&A

Introduction

Substrate selection

Steel



Mild Steel (Low Carbon Steel)

Steel in its most basic form is an alloy of iron and carbon in which the carbon content ranges up to 2% of the total alloy.

Properties:

- Composition: Approximately 0.05–0.25% carbon content.
- Characteristics: High ductility, weldability, and machinability.
- Magnetism: Highly magnetic due to its iron content.

Industrial Applications:

- Construction (frames, beams, columns)
- Automotive parts
- Pipelines and poles



Cold Rolled Steel (CRS)

Produced in cold-reduction mills where the material is cooled at near room temperature, followed by annealing and/or tempers rolling.

Properties:

- Processing: Rolled at room temperature for enhanced strength.
- Surface Finish: Smooth and bright, with tight tolerances.
- Strength: Higher tensile and yield strength compared to hot rolled steel.

Industrial Applications:

- Automotive body panels
- Home appliances
- Furniture



Hot Rolled Steel (HRS)

Rolled as very high temperatures to a particular shape before being cooled, and while less expensive, provide a less consistent finish.

Properties:

- Processing: Rolled at high temperatures, making it easier to shape.
- Surface Finish: Rougher surface with looser tolerances.
- Cost: Generally, more cost-effective than cold rolled steel.

Industrial Applications:

- Structural components in construction
- Automotive frames
- Rail tracks

Substrate selection

Steel



Cast Iron

Properties:

- Composition: Iron alloy with 2–4% carbon and 1–3% silicon.
- Strength: High compressive strength, excellent wear resistance.
- Machinability: Good, though more brittle than steel.
- Thermal Stability: Excellent at damping vibrations and withstanding thermal cycling.

Industrial Applications:

- Construction: Pipes, manhole covers, drainage systems
- Automotive: Engine blocks, brake drums, cylinder heads
- Machinery: Machine bases, gear housings, and industrial tools
- Mining & Energy: Pump casings, valves, and heavy-duty components

Variants:

- Gray Cast Iron: Excellent damping and machinability
- Ductile (Nodular) Cast Iron: Improved ductility and impact resistance
- White Cast Iron: Hard, abrasion-resistant but brittle

Substrate selection

Coated Steel



Hot-Dip Galvanized Steel (HDGS)

Created by dipping the substrate metal into a molten metal with a lower melting temperature (normally zinc) to provide an outer coating.

Properties:

- Corrosion Resistance: Zinc coating provides barrier and cathodic protection.
- Durability: Suitable for harsh environments.

Industrial Applications:

- Outdoor structures
- Automotive parts
- HVAC systems



Sendzimir (Continuous galvanizing)

Continuous galvanizing : the surface of a continuous ribbon of steel is coated on both sides with a thin layer of zinc to enhance its durability.

Properties:

- Processing: Continuous hot-dip galvanizing with aluminum in the zinc bath.
- Surface Finish: Smooth and uniform coating.

Industrial Applications:

- Automotive components
- Appliances
- Construction materials



Electro-Galvanized Steel (EG)

Electroplating is a process that uses electric current to reduce dissolved metal cations (Zinc), so that they form a coherent metal coating on an electrode.

Properties:

- Processing: Electroplating zinc onto steel for a uniform coating.
- Surface Finish: Smooth and suitable for painting.

Industrial Applications:

- Automotive body panels
- Appliances
- Electrical equipment

Substrate selection

Coated Steel



Thermal Sprayed Galvanized Steel

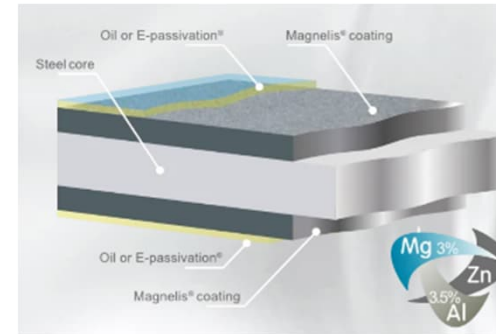
Thermal spraying is a group of coating processes in which finely divided metallic or non-metallic materials are deposited in a molten or semi-molten condition to form a coating. The coating material may be in the form of powder, ceramic rod, wire or molten materials.

Properties:

- Processing: Zinc or aluminum is sprayed onto steel surfaces.
- Advantages: Thicker coatings and suitability for large structures.

Industrial Applications:

- Bridges
- Offshore platforms
- Industrial machinery



Magnelis® Coated Steel

Magnelis® is a flat carbon steel coated on both sides with a zinc-aluminium-magnesium alloy*. Excellent corrosion resistance - at least 3 times better than galvanised steel in external applications. Complete edge protection thanks to the self-healing properties of Magnelis® on cut edges.

Properties:

- Composition: Zinc, aluminum, and magnesium alloy coating.
- Corrosion Resistance: Superior to traditional galvanized steel.

Industrial Applications:

- Solar panel structures
- Agricultural buildings
- Coastal constructions

Substrate selection – Non-Ferrous substrates

The principal non-Ferrous metal used is aluminium. Non-Ferrous metals have one valuable advantage over Ferrous metals, which is that they are highly resistant to corrosion and rust because they do not have any iron content in them. (Aluminium forms a thin layer of oxide on its surface, protecting it against corrosion.)

Extruded Aluminium

In very simple terms, extruded aluminium is made by forcing a heated aluminium billet through a die to achieve the desired cross section. The extrusion can then be cut to an appropriate length and subjected to further processing, like machining bolt holes or fitting together different parts for the final product.

Die cast aluminum

Die cast aluminium, on the other hand, is achieved by melting aluminium ingots, pouring or injecting the molten metal into a die Mold using a power cylinder or piston, and then letting the aluminium solidify into the die mold's shape as it cools. Extruded aluminium tends to be smoother and generally more expensive than die cast aluminum but can be limited in terms of the shapes and size of products they can create.

Substrate selection

The following table provides an overview of key performance attributes of the key substrate categories in relation to corrosion protection:

Substrate	Material Cost	Substrate Surface Smoothness	Corrosion Sensitivity
Steel	Low	High (Medium-High)	High
Galvanized Steel	Medium	Low (Low-Medium)	Low
Die Cast Aluminum	Medium	Medium (Medium-High)	Medium
Extruded Aluminum	High	High	Very Low-Low

This table is a simplified summary overview of substrate differences.

Surface Pretreatment

Prior to application of the coating the surface must be treated to:

- Eliminate dirt from the surface
- Remove any grease from the surface
- Physically or chemically change the metal surface

The main reasons for this are:

- Provide a good surface which the coating can adhere to
- Improve the corrosion resistance of the coating system
- Good surface preparation is the first step in preparation of a high-performance corrosion prevention coating system



Surface Pretreatment



Chemical
Pretreatment



Mechanical
Pretreatment

Chemical pretreatment

These operations can constitute a chemical pre-treatment:

Oil and grease removal

- Alkali cleaners
- Acid cleaning
- Solvent dip



Eliminate oils, greases and dust

Etching

- Acid etch



Create a naked and homogenous surface

Conversion

- Iron Phosphate
- Zinc Phosphate
- Thin layer of insoluble salts



Chemical reaction improving the corrosion resistance

Passivation

- Organic resins
- Chromic acid solutions



Eliminate the active salts deposits
Made with chromic acid solutions and now with organic resins.

Rinsing

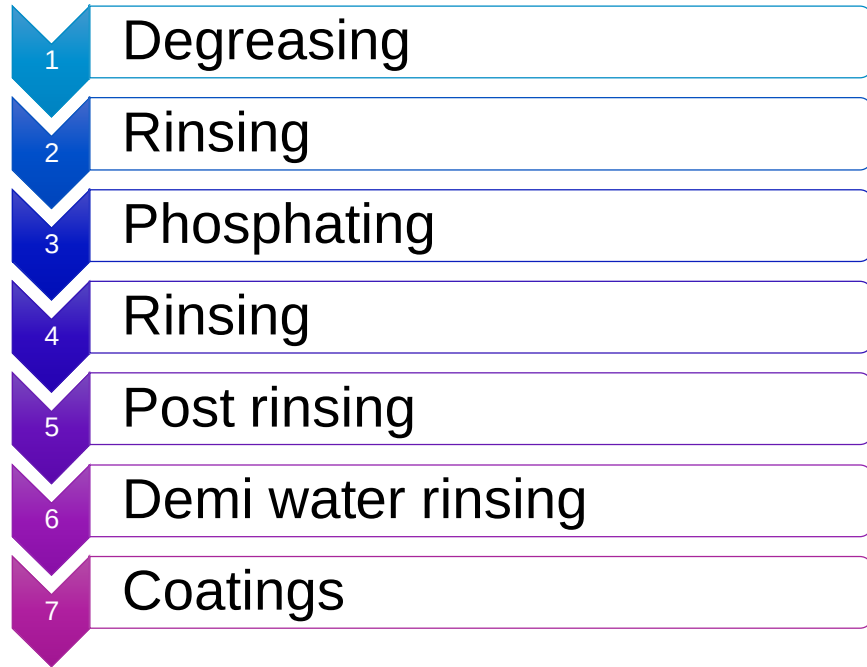
- After each bath in cascades
- DW



To remove excess chemical from previous bath.
To prevent carry over the next bath.

Chemical pretreatment

Usual chemical pretreatment process



Notes:

- Generally made up of 5 – 7 steps
- Some of these may be combined in one bath
- Rinsing normally takes place between each step to prevent carry over of chemicals from one bath to another
- Can be applied by dipping or spraying
- Dipping necessary if interior or hidden areas need protection

Chemical pretreatment

Chemical pretreatment Performance Comparison

Natural Salt Spray test 750 hours

Substrate : Mild steel

Coatings : Interpon 700

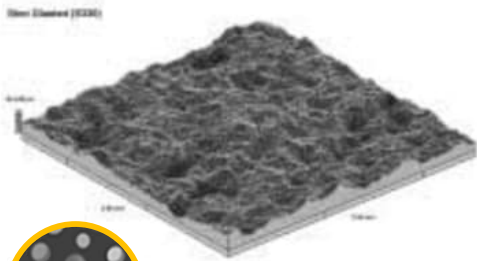
DFT : 60-80μ

Chemical pre-treatment type	Rust on the scribe in mm (average)
Fe Phosphating (without passivation)	7,7 mm
Nanoparticles with Zirconium (without post-treatment)	4,2 mm
Fe Phosphating + Passivation (Cr free)	4,2 mm
Zn Phosphating + Passivation (Cr free)	1,7 mm

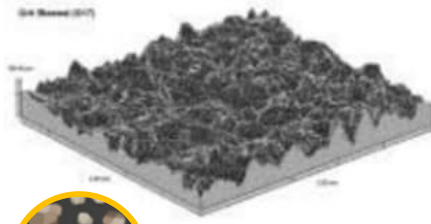
Mechanical pretreatment

How to choose blast cleaning type to use

Projection of abrasives on surface to be treated



Shot Blasting
With spherical grit
(S code)



Grit Blasting
With angular grit
(G code)



Choice of the right type

The choice of the grit type depends on:

- the type of projection, manual or automatic the expected roughness profile

Coatings adhesion

- Shot blasting < grit blasting
- Shot blasting: grease on the surface could be inserted into the metal by impact
- Grit blasting: steel or stainless steel recommended. Corundum accepted, rather for nonferrous metals.

Grit is preferred to shot because

It gives rougher surface profile which is better for coating adhesion

Any oil or grease on the substrate could be forced into the surface by the spherical shot

What is the goal?

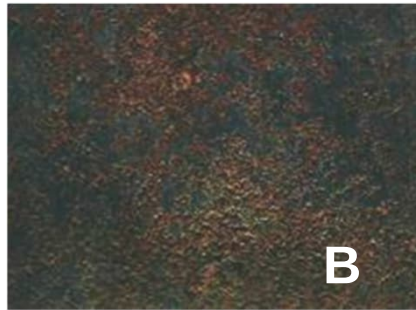
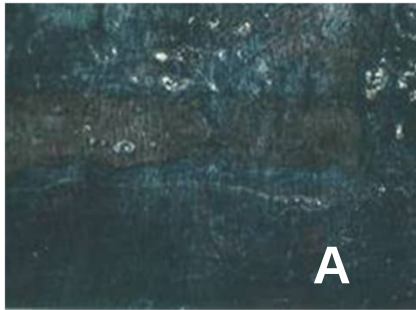
Give surface a defined nature and structure.

Mechanical pretreatment

Grit blasting key points

Degree of rust before preparation

Norm ISO 8501-1 or Swedish SIS 05.09.00 defines 4 initial rust degrees.
Degree C is generally the highest accepted degree before grit blasting)



Mechanical pretreatment

Grit blasting key points

Initial conditions of the parts

Cleanliness

- Free from dirt, contamination, impurities, oil or grease.
- degreased either by the alkaline or solvent.

Dry parts

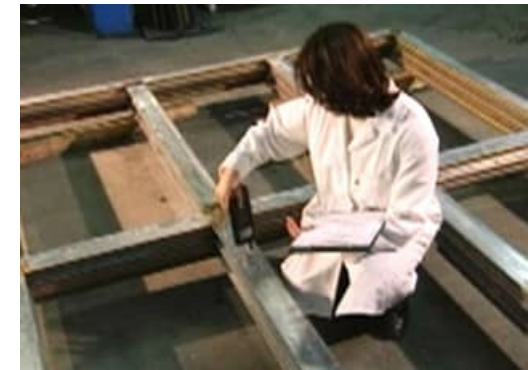
- must be perfectly dry before grit blasting
- into the workshop some hours before the blasting
- to blow them with compressed air
- stove them some minutes.



Application conditions

- Grits are clean from impurities
 - The compressed air equipment is dry and free from grease
 - Desoiling device = imperative
 - Air dewatering device = recommended
-
- Degree of air humidity < 85%
 - Substrate > 3°C above dew point.

If not, there's a risk of bad anti-corrosion protection



Surface pretreatment

Mechanical pre-treatment: **Grit blasting** key points

Application conditions

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Surface pretreatment

Mechanical pre-treatment: **Grit blasting** key points

What is dew point?

Temperature at which water condenses from air at atmospheric pressure occurs.

It is function of:

- Air temperature
- Air humidity
- Support temperature



Surface pretreatment

Mechanical pre-treatment: **Roughness profile**

One of two key indicators for grit blasting result

Roughness profile gives a measure of the depth of peaks and troughs.
3 parameters are used



Ra: Average peak size (excluding troughs)

Rt : Distance between the highest peak and the lowest trough

Rz: It is the average of the Rt measures on 5 lengths

Surface pretreatment

Mechanical pre-treatment: **Roughness profile**

One of two key indicators for grit blasting result

How to measure?

- Measured with a roughness measurement device
- Estimated with a roughness comparator



Surface pretreatment

Mechanical pre-treatment: **Roughness specification**

The roughness specification depends on the coating thickness

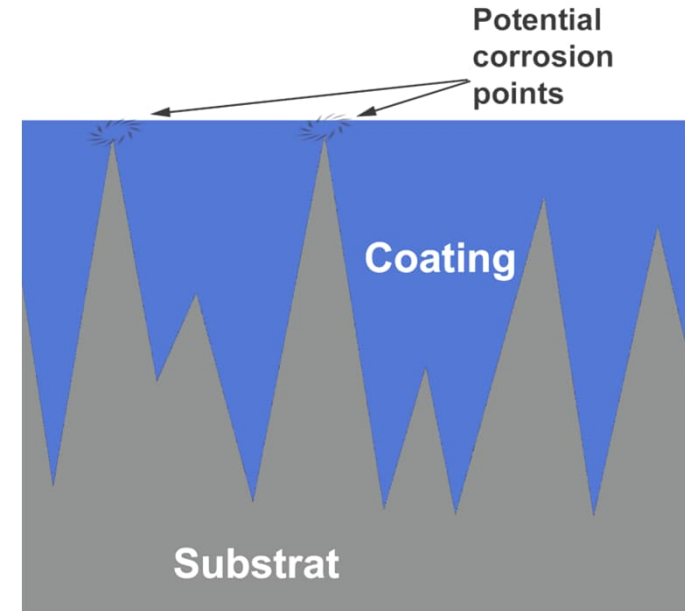
Film thickness $\geq R_t \times 2$

$R_t = R_a \times 7$.

Roughness specification to request:

$R_a < \text{film thickness} / 14$

Not too low for a good adhesion



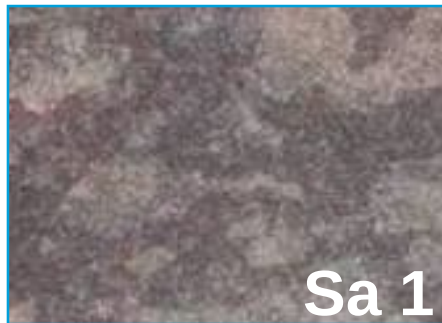
Surface pretreatment

Mechanical pre-treatment: **Cleanliness profile**

One of two key indicators for grit blasting result

4 Levels of cleanliness are used

Sa 1	Light blast cleaning
Sa 2	Thorough blast cleaning
Sa 2.5	Very thorough blast cleaning – Near White
Sa 3	Blast cleaning to visually clean steel – White metal



Surface pretreatment

The choice of preparation depends on several factors:

Factor	
Size & thickness of part	Thin parts difficult to prepare mechanically without distortion
Quality of part	Good quality could be prepared chemically
Required performance	Good quality mechanical preparation provides the best performance
Shape of part	Difficult to prepare mechanically inside box sections, sometimes necessary to use a chemical preparation before of after mechanical

Surface pretreatment

Mechanical pre-treatment: **The dust removal**

Remove steel dust by blowing.

A brushing ensures also the removal of grit particles

The parts must not be soiled : handle with gloves.



Surface pretreatment

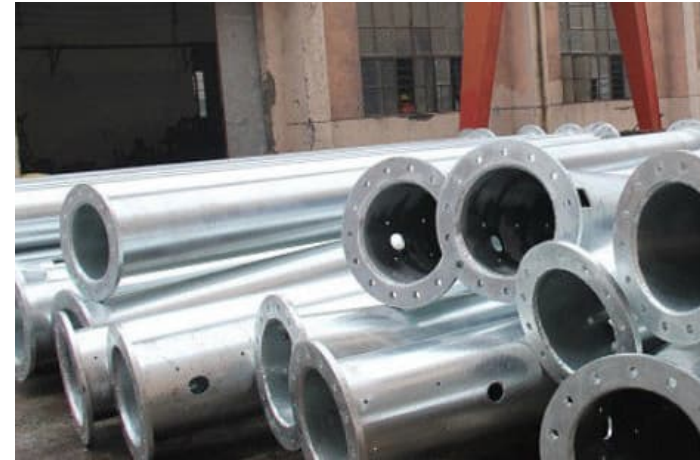
Pretreatment for coating over Galvanized Steel

It is necessary to **pre-treat** the galvanized surface because :

1. To remove the outer layer of grease and /or Zn- metal Oxides formed after galvanizing processs
2. increase the adhesion and coherence of the organic coating layer over the Zinc surface

Pre-treatments for galvanized surfaces:

1. Chemical : Phosphating (or equivalent)
2. Mechanical : grit-blasting To at least SA 2.5 in accordance with ISO 8501.1, 1998 (F) ; non-metallic grit (non Steel-based)
3. Mechanical : roughness equivalent to B9a, B10b, or B10a (Rz 35-65µm; Ra 6 – 10µm)



ISO 12944 standard

ISO 12944

"Corrosion Protection of Steel Structures by Protective by Paint Systems"



- ISO 12944 deals with protection of the steel structures with paint systems
- ISO 12944 covers, in the various parts, all the features that are important in achieving adequate corrosion protection
- ISO 12944 provide concisely, unambiguously and easily understandable state-of-the-art information on corrosion protection with paint to all the subjects involved in the project
- The ISO 12944 standard is intended to assist engineers and corrosion experts in adopting best practices in corrosion protection of steel for both new constructions and their maintenance

ISO 12944

"Corrosion Protection of Steel Structures by Protective Paint Systems"



- ISO 12944 was developed in the 1990's collecting all the previous experiences presence in local/regional standards and specifications
- It was published firstly in 1998 becoming a truly global benchmark in corrosion control superseding progressively the regional standards
- ISO 12944 has been revised only once in 2017/18
- Although **ISO 12944** (all parts) does not cover powder coatings, it can, by agreement, also be applied to do those cases which are not covered by ISO12944. Indeed, **Qualisteelcoat and GSB ST 663** take as references several parts of ISO 12944 (i.e. for specifications, requirements and assessment).
- In addition, several customers' specifications refer to ISO12944

ISO 12944 corrosivity categories

Category	Exterior	Interior
C1 very low		Heated buildings with clean atmospheres such as schools or offices
C2 Low	Atmospheres with low levels of pollution, mostly rural areas	Unheated buildings where condensation may occur such as depots or sports halls
C3 Medium	Urban and industrial atmospheres, moderate sulfur dioxide pollution, or coastal areas with low salinity	Production rooms with high humidity and some air pollution such as food processing plants, laundries, breweries, or dairies
C4 High	industrial areas and coastal areas with moderate salinity	Chemical plants, swimming pools, coastal ship and boat yards
C5 Very high	Industrial areas with high humidity and aggressive atmospheres	Buildings are areas with almost permanent condensation and with high pollution
CX Extreme	Offshore areas with high salinity and industrial areas with extreme humidity and aggressive atmosphere and subtropical and tropical atmospheres	Industrial areas with extreme humidity and aggressive atmosphere

ISO 12944 – Corrosion testing requirements

Applying liquid testing requirements to our powder offering

Category	Low ≤ years	Medium 7 – 15 years	High 15 – 25 years	Very High 25+ years
C2 Low	-	-	-	480 h
C3 Medium	120 h	240 h	480 h	720 h
C4 High	240 h	480 h	720 h	1440 h 1680 h (10 cycles)
C5 Very high	480 h	720 h	1440 h 1680 h (10 cycles)	2688 h (16 cycles)

Neutral Salt Spray (ISO 9227)

Cyclic Corrosion (ISO 20340)

ISO 12944 Corrosion Test

Introduction of Cyclic testing

- Technical community basically realized that Neutral salt spray testing isn't enough or reliable.
- Introduction of Cyclic Testing (ISO 20340) into ISO 12944 standard brings better reflect to “real world” corrosion conditions
- It aligns with our many years experience of developing coatings for exposure situations & in-service testing and track record
- The exposure cycle lasts a full week and includes 3 steps:

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
UV/condensation — ISO 16474-3			Neutral salt spray — ISO 9227			Low-temp. exposure at $(-20 \pm 2) ^\circ\text{C}$
						

Test requirements after corrosion tests

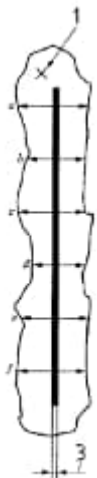
Criteria to pass the test

- Evaluation in terms of average corrosion value at scribe of only steel substrate
- (see annex A.2 of ISO12944-6; protective corrosion system is not considered)

What does “average corrosion at scribe” mean?

Calculate the corrosion at scribe M from the equation $M = (C-W)/2$, where C is average of the nine width measurements and W is the measured and recorded width of the scribe. The result of the calculation of the average corrosion at scribe should be give with a precision of 0,1 mm.

- Two of the three panels shall comply with requirements specified in ISO 12944-6;

	Neutral Salt Spray ISO 9227		Cyclic Corrosion Test ISO 20340
1998	≤1 mm		-
2018	≤1,5 mm		≤3 mm ≤8 mm*

* For coating systems for high impact areas CX applications (floors, splash zone, tidal zone, helideck, escape routes,..)

Insights on our NSS tests

Objectives of our customers asking for NSS test

- Regular product / process validation
- Evaluate a different substrate
- Evaluate a different pretreatment
- Changes in process parameters (Line speed / PT / heating media)
- Regular Product /process validation
- Simple documentation need and ask from our customers' upstream

Our Interpon Redox offer

Interpon Redox

The simplest route to maximum corrosion protection

Interpon Redox is your **total corrosivity solution**, enabling products to withstand whatever the world can throw at them, and remain fully operational long into the future.

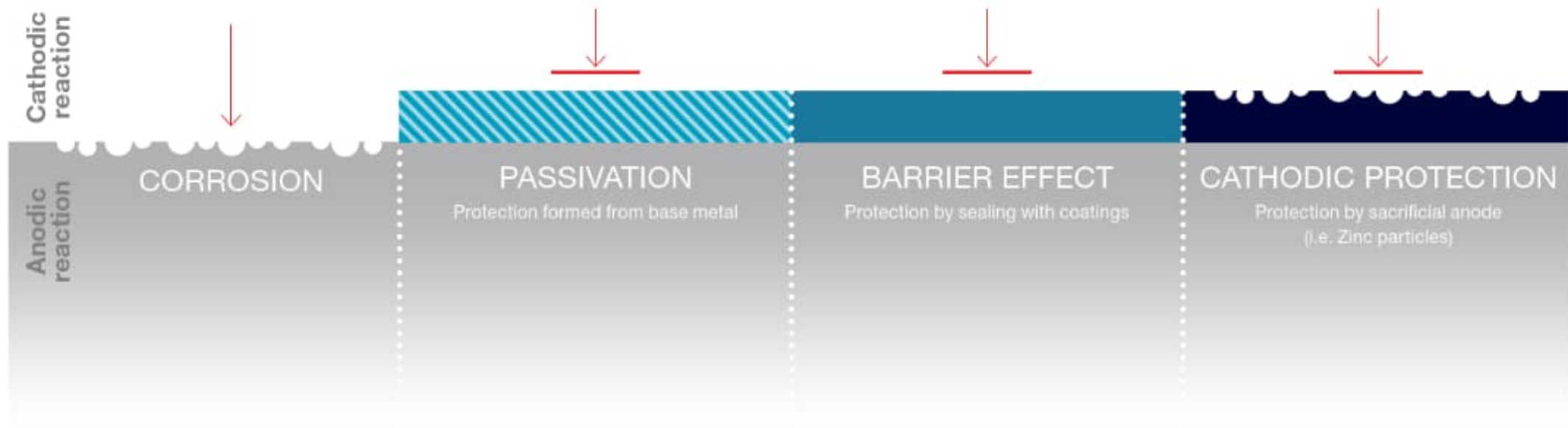
Because people like you need reliable products that set their own standards of excellence and provide a sustainable performance. And because people like you need Interpon.



Protecting high-performance assets in harsh environments

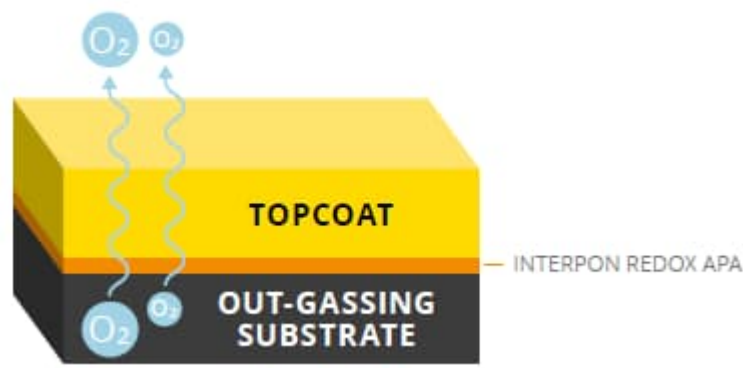
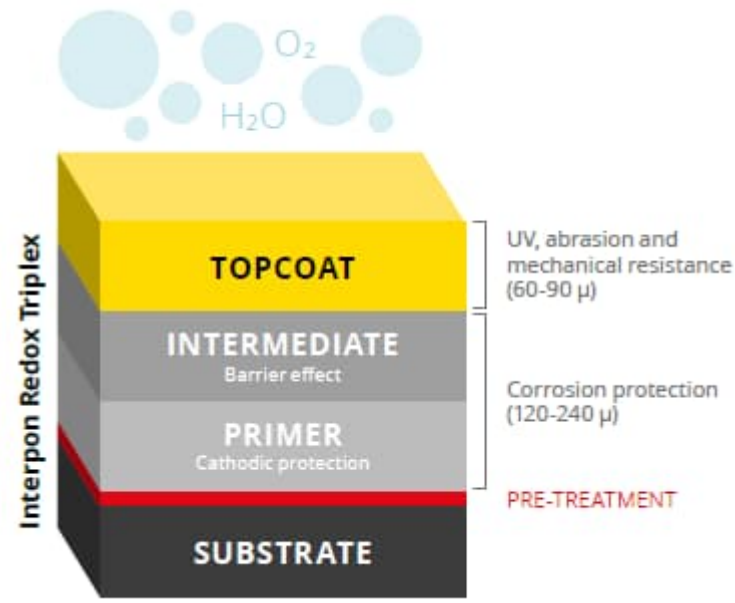
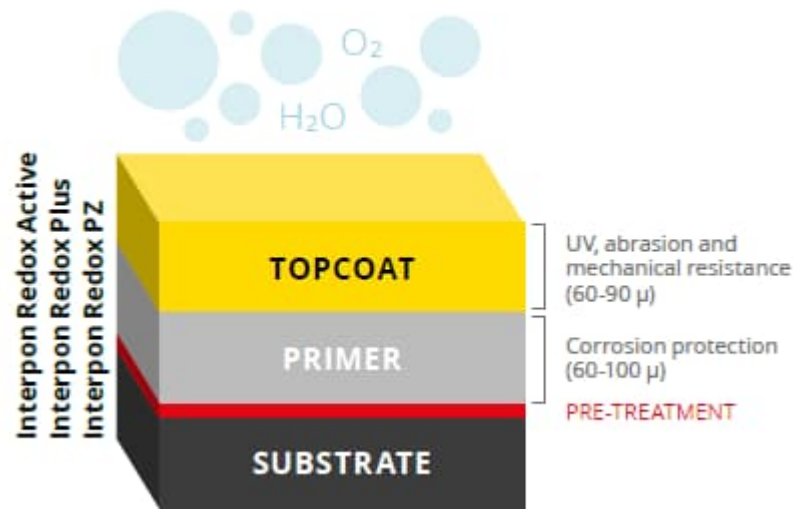
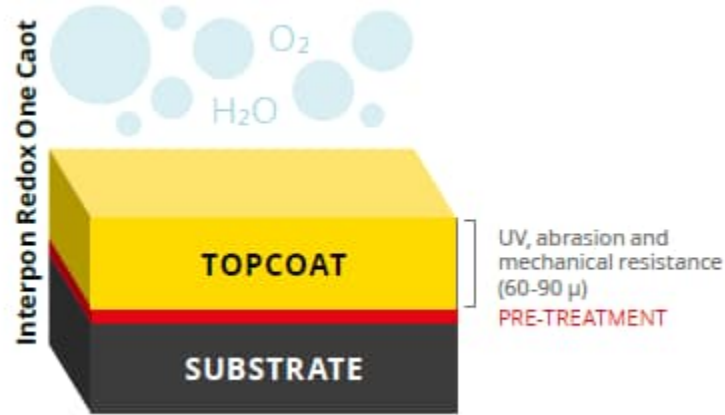
When products need to perform safely and reliably in corrosive environments, you need to protect both their function and their exterior. We are convinced that the best solution to do so is a powder system comprising of a primer plus topcoat.

There are three types of corrosion protection:



Multi-layered protection

Our powder systems are layered to offer the highest level of protection



The right powder solution for every project

Identify which Interpon Redox system meets your protection requirements **with Steel as base substrate**

Chemical pre-treatment

	C1	C2	C3	C4	C5
Interpon Redox One Coat			H	M	L
Interpon Redox Active			H	M	L
Interpon Redox Plus				H	M
Interpon Redox PZ	Not recommended				
Interpon Redox Triplex	Not recommended				

Mechanical pre-treatment

Interpon Redox One Coat			H	M	L
Interpon Redox Active			H	M	L
Interpon Redox Plus				H	M
Interpon Redox PZ				H	M
Interpon Redox Triplex					H

Durability ranges based on the ISO 12944:2018 standard

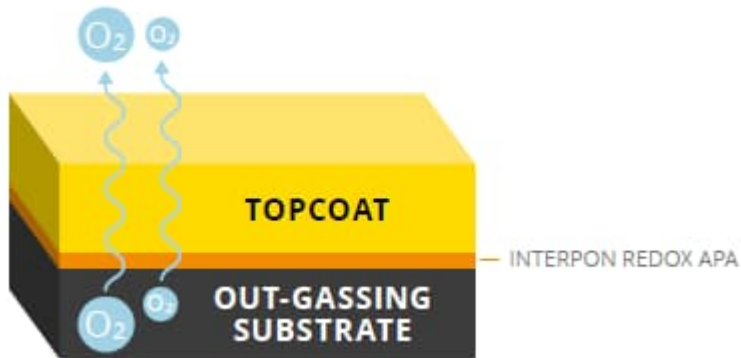
Low (L) Up to 7 years
 Medium (M) 7 to 15 years
 High (H) 15 to 25 years
 Very High (VH) More than 25 years

Interpon Redox APA

Characteristics and advantages

ROBUST

Designed for application on porous substrates that are susceptible to out-gassing as Interpon Redox APA significantly improves finishing by drastically reducing bubbling effect. Interpon Redox APA is ideal for application on hot dip galvanized steel, metal spray, zamak and aluminium brass.



- Outstanding outgassing properties
- Excellent edge coverage
- Very easy to apply
- Excellent adhesion with topcoat



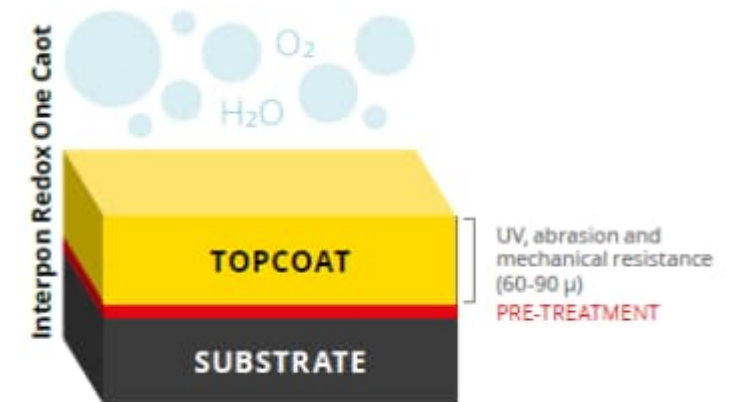
Interpon Redox One Coat

Characteristics and advantages

ROBUST

Interpon Redox One Coat enables you to deliver corrosion protection up to C4M in a single coat. Unlike traditional coatings, which require a primer for adhesion and corrosion protection, followed by a topcoat for UV protection and gloss, Interpon Redox One Coat delivers good levels of corrosion protection and UV durability from one application. Suitable for outdoor applications, the range is available in a comprehensive range of colours to make product selection as simple as the application.

- Robust product to use regardless of pretreatment method saving costs since no additional investments in pre-treatment are required
- UV Durability making it suitable for outdoor use
- One coat application method saving process time and costs
- Corrosion protection up to C4M providing extended lifetime of the object due to corrosion protection
- VOC-free, solvent-free and zinc-free



Interpon Redox One Coat

Deciding Features & Benefits



Deciding features

Features	Benefits
Robust product to use regardless of pre-treatment method	No additional investments in pre-treatment required - saving you costs
Sustainability	Free from TGIC, Zinc and BPA
UV durability	Suitable for outdoor use
One coat application method	Saving process time and costs
Corrosion protection up to C4M	Extended lifetime of the object due to corrosion protection
Limitless color and finish options	A comprehensive portfolio of colors is available from stock, covering all of the most popular industrial RAL shades, gloss levels and finishes. Required color/finish can be matched upon request.

Interpon Redox One Coat

Natural testing



A natural outdoor anti-corrosion test applied on Interpon Redox One Coat in France under a tempered marine atmosphere that adheres to ISO 8565 and EN 13521-19 (ECCA T19) standards.

The corrosion test was conducted on a C5M corrosivity site in a 45° south exposure to represent one of the most severe corrosion environment for testing.

Substrate **Steel**

Pretreatment **Iron Phosphate + Passivation**

Topcoat **Standard polyester or Redox One Coat**

Interpon Redox One Coat

Natural testing – 12 Months

Interpon®

Substrate **Steel**

Pretreatment **Iron Phosphate + Passivation**

Topcoat **Standard polyester or Redox One Coat**

Test duration: 12 months



1



2



3

Standard polyester topcoat



1



2



3

Redox One Coat

Interpon Redox One Coat

Natural testing – 24 months

Interpon®

Substrate **Steel**

Pretreatment **Iron Phosphate + Passivation**

Topcoat **Standard polyester or Redox One Coat**

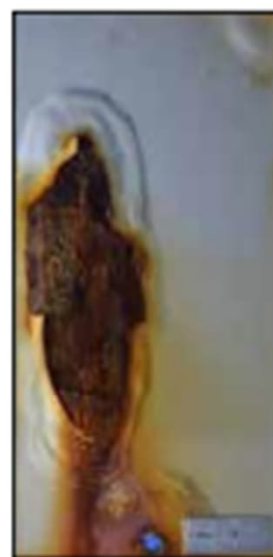
Test duration: 24 months



1



2



3

Standard polyester topcoat



1



2



3

Redox One Coat

Target Markets – Roller Shutters

Interpon®

There are over 1000 Roller Shutter Door manufacturers in the UK

The roller shutter door lathe is either manufactured from Galvanised Electro-Plate Steel or Aluminium. These lathes are pressed to create an inter-locking design.

It is extremely rare that roller shutter doors are chemically pre-treated and therefore can only be degreased with solvent. Many manufacturers are asking for a “Marine Grade” polyester powder coating but unable to offer something more durable.

*Pics show Shutter doors on Blackpool Shoreline



Target Markets – Steel Hinge Doors

Interpon®

The market for Steel hinge fire escape doors is extremely large.

Most Door manufacturers use Zintec, Alu-Zinc coated substrates during the manufacture.

When holes are cut out of the door to fit hardware, the Zintec is normally finished back to reveal the mild steel substrate.

Because fire doors are manufactured as hollow and contain a cardboard honeycomb insert, they cannot be chemically pre-treated. The gauge of the steel is also too thin to accept a mechanical abrasive blastclean so they have to use a solvent degreaser.

Due to cost, most manufacturers do not want to employ a Duplex coating system



Target Markets – Storage / IT Cabinets

Interpon®

The exterior storage cabinet market is growing at an enormous pace.

Companies like Amazon, Asda, Tesco, Sainsburys, Dulux and now many high end manufacturers are focusing on these collect out of hours storage cabinets.

The issues they are having is corrosion in the field as they tend to be manufactured from Mild Steel and are rarely pre-treated. Also, applying a duplex powder coating system causes issues with cool down rates and difficulty in seeing inside with top-coat.



Target Markets – Street Furniture

Interpon®

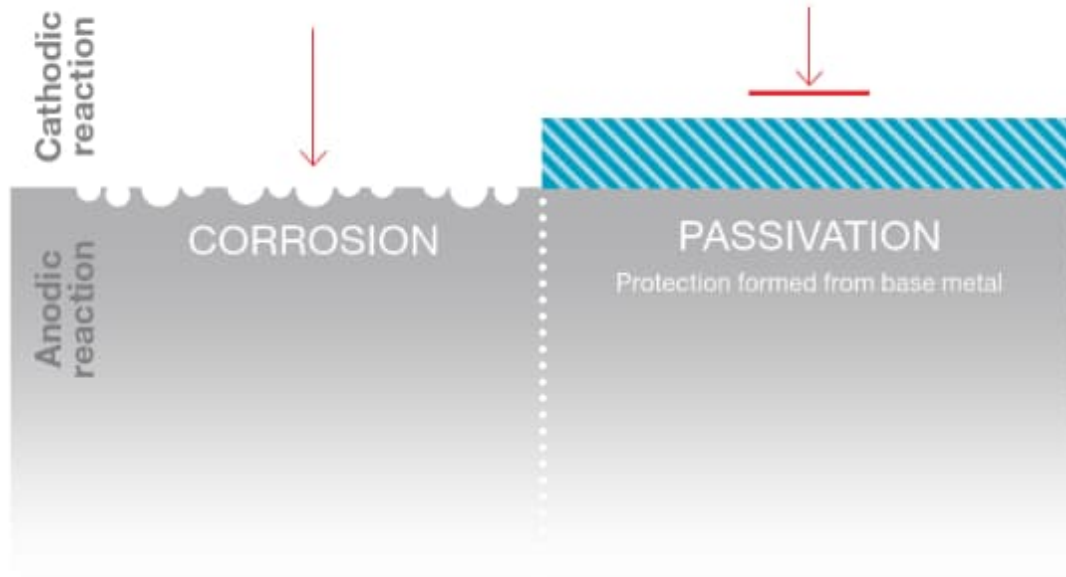
Glasdon UK are a large manufacturer of street furniture where corrosion performance is extremely important.

Glasdon have been experiencing corrosion issues with Bike Shelters and benches exposed to C4 environments and are looking to improve the coating system.

We are going to test a Duplex system of Redox PZ and Redox One-Coat



Passivation



Passivating steel with powder

Delaying a corrosive reaction or neutralizing acid ions with corrosion-inhibiting pigments that have the capacity to passivate a steel substrate.

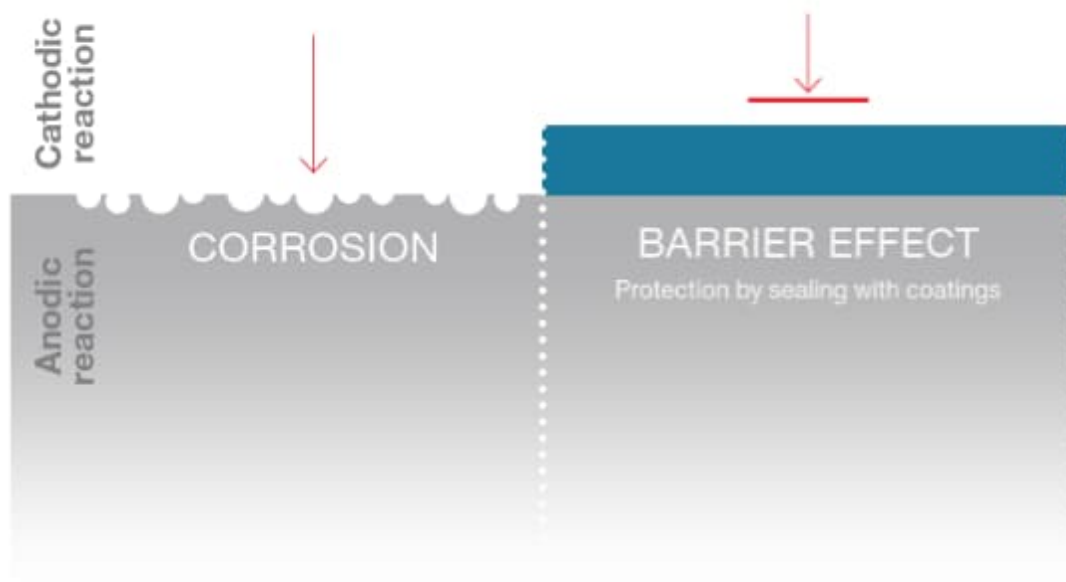
Interpon Redox Active

Characteristics and advantages

ROBUST Interpon Redox Active is a powder primer with active anticorrosive pigments that cause a passivation effect to protect the substrate. It has been formulated to offer the best adhesion for the topcoat – powder or liquid.

- Robust corrosion protection performance up to 7 years in corrosivity level C5 for steel
 - Ease of application on complex objects
 - Suitable for objects with varying levels of substrate thickness
 - Performs well across a variety of curing schedules
 - Provides excellent edge coverage
 - Designed for use with chemical and mechanical pre-treatment
 - Can be used as holding primer for up to 6 weeks
- 
- Available in a broad variety of colors
 - Compatible with a wide range of topcoats
 - VOC-free, solvent-free and zinc-free

Barrier Effect



Protection by barrier effect

Isolating steel from its environment with a water and airtight barrier to block direct contact with oxygen and other corrosive agents and prevent corrosion.

Interpon Redox Plus

Characteristics and advantages

STRONG

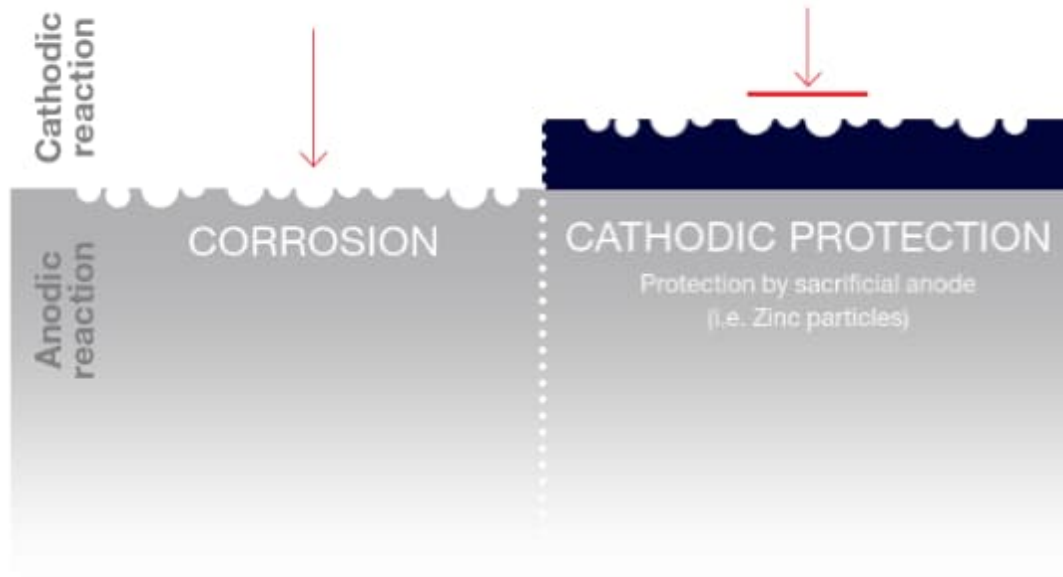
This barrier-effect powder coating can be used on multiple substrates, and on surfaces with chemical or mechanical pre-treatment. The two-layer system comprises a pure epoxy primer and a topcoat (powder or liquid) to deliver greater protection against corrosion and rust (up to level C5).

- Strong protection against corrosion and rust, up to C5 level
- Extra tough and durable – high resistance to damage
- Ease of application; spray as conventional powder coatings
- System available for both porous and non-porous metal surfaces
- Designed for use with chemical and mechanical pre-treatment
- Can be used as a holding primer



- Compatible with a wide range of topcoats
- Offers a smooth finish to different substrates
- VOC-free, solvent-free and zinc-free

Cathodic Protection



Cathodic protection

Connecting metal to a more reactive “sacrificial metal”, that will corrode instead of the protected substrate.

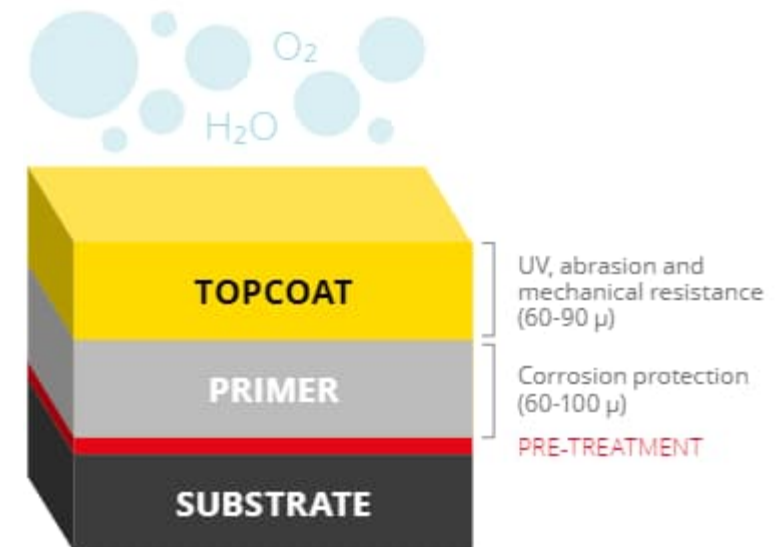
Interpon Redox PZ

Characteristics and advantages

EXCELLENT

The best performing powder coating for corrosion protection over blasted steel. It combines a barrier effect primer with long lasting cathodic protection. A cost-effective combination for products that are either submerged or above ground and uses a unique blend of zincs ensures the highest level of conductivity to create cathodic cells that protect the metal substrate.

- Excellent performance and corrosion prevention up to C5 environments
- Best performing powder primer for corrosion protection over blasted steel
- Aesthetic, defect-free finish, particularly in comparison to other metal zinc protection such as galvanizing or zinc metal spraying
- Designed for use with mechanical pre-treatment
- Compatible with a wide range of topcoats
- VOC-free, solvent-free



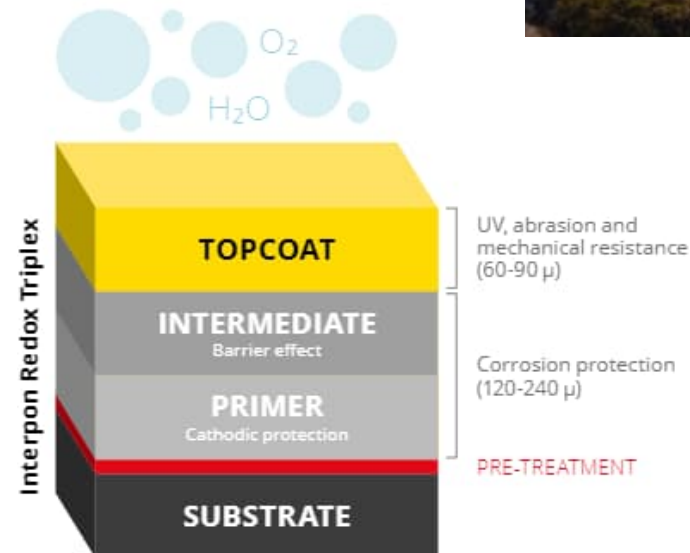
Interpon Redox Triplex / Three Layer

Characteristics and advantages

EXCELLENT

Offers the benefits of both cathodic and enhanced barrier protection. This three-layer system combines the zinc-rich primer Interpon Redox PZ with the barrier-protective primer Interpon Redox Plus – finished with your choice of Interpon topcoat. It is designed primarily to protect steel objects that are pre-treated through grit or shot blasting and is ideal for environments with high humidity or salinity.

- Ultra-strong corrosion protection performance up to C5 environments
- Combination of barrier and cathodic protection
- Ideal for high-humidity environments
- Provides excellent edge coverage
- Designed for use with mechanical pre-treatment
- Compatible with a wide range of topcoats
- VOC-free and solvent-free



Global Interpon Redox Offering



GLOBAL INTERPON REDOX PRODUCT OFFER

Redox Core Offer	NAM	EMEA	China / Taiwan	Korea	Thailand	ANZ	Vietnam	India
Redox APA		FL151F			EL286A	EL286A	EL286A	EL286A
Redox Active	EE006QF	EL140G	EL190Z	EL555K	EL193V	EL193V	EL193V	EL140N
Redox Plus	BL115QF	AL285F	AL180CS	AL101K	AL117N	AL117N	AL117N	AL117N
Redox PZ	AL101QF	ALZ90F	ALZ66CS	ALZ66K	ALZ90F ALZ44TH	ALZ90F BL103A*	ALZ90F ALZ55V	ALZ90F ALZ55N
Redox Triplex / Three layer		ALZ90F + AL285F			ALZ90F + AL117N	ALZ90F + AL286A	ALZ90F + AL117N	ALZ90F + AL117N
Redox One Coat		Multiple						

* BL103A is localized ANZ version of previous imported KR BL103K

Qualisteelcoat approvals in place

Work in progress: link to Qualisteelcoat certificates soon available on Interpon.com **Interpon®**

APPROVED COATING SYSTEMS

You are here: [Home](#) » [APPROVALS](#) » [COATING SYSTEMS](#)

The coating systems are grouped per type of base material.
Click on the type of base material to expand the table of the corresponding approvals.

- ▶ **Base Material: Steel (ST)**
- ▶ **Base Material: Continuous galvanized steel (SZ)**
- ▶ **Base Material: Hot Dip Galvanized Steel (HD)**
- ▶ **Base Material: Steel coated by thermal spraying (MS)**
- ▶ **Base Material: Steel + Electrophoretic Primer (STEC)**
- ▶ **Base Material: Continuous Galvanized Steel + Electrophoretic Primer (SZEC)**
- ▶ **Base Material: Hot Dip Galvanized Steel + Electrophoretic Primer (HDEC)**

C5-High					
Overview of Qualisteelcoat certificates - Akzo Nobel Powder Coatings					
System	Base Material				
	SZ3 Chemical	HD2 Chemical	HD2 Mechanical	MS2 None	STEC3 Chemical
Interpon Redox Plus Interpon Redox Plus Interpon D	PE-0138				
Interpon Redox Plus Interpon D		PE-0123	PE-0031	PE-0033	PE-0139
Interpon Redox APA Interpon D			PE-0032	PE-0034	

C4-High			
Overview of Qualisteelcoat certificates - Akzo Nobel Powder Coatings			
System	Base Material		
	SZ2 Chemical	ST2 Chemical	ST2 Mechanical
Interpon Redox Plus Interpon D	PE-0121	PE-0020	PE-0021
		PE-0184	PE-0185
Interpon Redox PZ Interpon D			PE-0097

Qualisteelcoat

Caution : All Qualisteelcoat approved products including competition is listed at this site.

[Qualisteelcoat approvals 2025.pdf](#)

Interpon Redox

Areas of use – Market testimonials



Shutters



Fencing



Machinery



Power transformers



Gas Cylinders



Outdoor furniture – playgrounds



LPG Tanks



Bus shelters



Street furniture



Battery generators



Fire equipment



Sweepers



Security elements



Elevators



Steel gates



Outdoor furniture



Electrical Cabinets



Fencing



Steel doors



Sliding gates



Galvanized substrates



Gas Stations



Agriculture



Lifts

How to select the right system

Interpon Redox: The one-stop shop for powder systems



Select the solution that suits your project Interpon Redox powder systems enable you to perfectly meet specific protection requirements

and application limitations for your project. After you have identified the corrosivity of the environment and the desired longevity of protection, selecting the right system takes three steps:

1. Identify the substrate and pre-treatment of your assets
2. Determine which other criteria the system must account for
3. Select your topcoat

Key questions to ask your customer?

- What is substrate in use?
 - Detail out as specific as possible
- What is pre-treatment in use?
 - Chemical
 - Only cleaning or real chemical pretreatment incl additional corrosion protection
 - Degreasing / phosphor degreasing (low amount of phosphates – mainly cleaning, not considered as chemical conversion)
 - Phosphating (typically iron or zinc)
 - Nano technology (e.g. silane, titanates, zirconium based)
 - Mechanical
 - Shot blast
 - Grit blasting (more expensive but better performance)
- What is corrosion requirement? C5 or...?
 - Corrosion protection lifetime (L, M, H and VH) → Lifetime defined in years
 - Durability protection lifetime (topcoat performance – Industrial - Arch Class 1 -3 → Durability performance defined in accelerated testing, not in number of years)

First line support

Redox System Finder

Go to the [Interpon Redox System Finder](#) and be guided to the best powder coating depending on project and parameters



Via our [Interpon.com website](#)



Via our [Desktop Connect App](#)



Via Connect App on iPad device

Environment

Required

Interior

Exterior

Required

C1

C2

C3

C4

C5

Design Life of Coatings System (Years)
Corrosion protection & weather resistance

Required

Up to 7

7 - 15

15 - 25

> 25

System

Substrate

Pre-Treatment

Primer

Intermediate

Topcoat Finish

Customer specific

Recommended product offer based on requirements and customer specific situation

Finding the solution to meet your needs

Redox System Finder

●●●Excellent ●●Strong ●Robust

1. Substrate and pre-treatment

The performance of the system is closely dependent on its substrate and surface preparation.

		Interpon Redox APA	Interpon Redox One Coat	Interpon Redox Active	Interpon Redox Plus	Interpon Redox PZ	Interpon Redox Triplex
Features	Pre-Treatment						
Steel	Chemical		✓	✓	✓		
	Mechanical		✓	✓	✓	✓	✓
HDG Steel	Chemical	✓			✓		
	Mechanical	✓			✓		
Zintec	Chemical	✓			✓		
	Mechanical	✓			✓		
Stainless steel	Mechanical	✓			✓		
Aluminium	Chemical	✓	✓	✓	✓		

Finding the solution to meet your needs

Redox System Finder

2. Protection criteria

These selection criteria help you find the system that keeps your assets protected from corrosion:

	Interpon Redox APA	Interpon Redox One Coat	Interpon Redox Active	Interpon Redox Plus	Interpon Redox PZ	Interpon Redox Triplex
Edge protection (sharp edges)	•		• • •	• •	•	• • •
Multiple color options		• • •	• • •			
Re-coating time		• • •	• • •	• •	•	•
Easy to apply (application point of view)	• • •	• • •	• • •	• •	•	•
Suitable for complex objects	•		• • •	• • •	•	•
Different metal thickness on same object or oven			• • •	• •	•	•
Curing range	• •	• •	• •	• • •	• •	• •
Suitable for sea environment	•				• •	• • •
Surface smoothness	• • •	• •	• • •	• • •	•	• •
Zinc-free system	✓	✓	✓	✓		
Cathodic protection					✓	✓
Compatibility with liquid topcoat	✓	✓	✓	✓	✓	✓
CMR-free label	✓	✓	✓	✓		

Finding the solution to meet your needs

Redox System Finder

3. Topcoat selection

Find the Interpon topcoat to finish your design

Range	Interpon 700	Interpon 600/610	Interpon EC	Interpon 800/810	Interpon D1000	Interpon D2000
Indoor use	• • •	• • •	• • •	• • •	• • •	• • •
Outdoor use (UV durability)		•	•	• •	• •	• • •
Chemical resistance	• •	•	• • •	•	•	• •
Resistance to overbaking	•	• •	• • •	• •	• •	• •
Paint flexibility	• • •	• •		• •	• •	•
Paint hardness	• •	• •	• • •	• •	• •	• •
Protection against graffiti			• • •			
Curing window	• • •	• •	•	• •	• •	• •
Gloss range	• • •	• •	•	• •	• •	• •

Second line of support

Your regional Interpon Redox Champions

For consultation on corrosion protection systems please contact the country Redox Champions.



“Redox go to” persons

Champions participated
on technical training



Germany

Andreas Groch

Michael Wehnhardt

R&D

Tullio Rossini

Gianfranco D'Ambrossio

I&C Segment

Tuna Elmastaş

Marketing

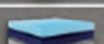
Aurélie Godan

Competitor Market Insights

Jotun

Primax offering

Steel performance matrix

Level of durability				low	medium	high	low	medium	high	low	medium	high
Condensation test, hrs ISO 6270				48	120	240	120	240	480	240	480	720
Salt spray test, hrs ISO 9227*				120	240	480	240	480	720	480	720	1440
Approximate time to first major repair				<5 years	5-15 years	>15 years	<5 years	5-15 years	>15 years	<5 years	5-15 years	>15 years
Grit Blasting Sa 2.5**	Pretreatment	System		C3			C4			C5-M&I***		
✓	None	Topcoat		•	•	•						
✓		Topcoat + Primax Xtend		•	•	•	•	•	•			
✓		Topcoat + Primax Protect		•	•	•	•	•	•			
✓	Iron Phosphate	Topcoat + Primax Xtend		•	•	•	•	•	•	•	•	
✓		Topcoat + Primax Protect		•	•	•	•	•	•	•	•	
✓	Zinc Phosphate	Topcoat + Primax Xtend		•	•	•	•	•	•	•	•	•
✓		Topcoat + Primax Protect		•	•	•	•	•	•	•	•	•
	Hot-Dipped Galvanized Steel + Sweeping****	Topcoat + Primax Xtend		•	•	•	•	•	•	•	•	•
		Topcoat + Primax Protect		•	•	•	•	•	•	•	•	•
	Hot-Dipped Galvanized Steel + Chromating****	Topcoat		•	•	•	•	•	•			
		Topcoat + Primax Xtend		•	•	•	•	•	•	•	•	•
		Topcoat + Primax Protect		•	•	•	•	•	•	•	•	•

- C5H/C5VH performance only claimed i.c.w. **hot dip galvanized steel + mechanical pre treatment** (also mentioned in TDS)

Jotun TDS 2 layer C5VH



Primax Protect

Primax Xtend

Resistance to neutral salt spray	ISO 9227 ISO 4628-2 ISO 4628-3 ISO 4628-4 ISO 4628-5	Passes or exceeds C4H requirements of ISO 12944-6 ** Passes or exceeds C5VH requirement of ISO 12944-6*** ***
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* Typical for this product when applied on zinc-phosphated steel panels (0.8 mm) with coating film thickness 60-80 µm using full cure schedule.

** System 1: Grit blasted (Sa 2½) steel panels, Primax Protect +Jotun Facade. Total film thickness ~160 µm (primer 80 µm and 60-80 µm topcoat).

*** System 2: Grit blasted (Sa 2½) zinc phosphated steel panels, Primax Protect +Jotun Facade. Total film thickness ~160 µm (primer 80 µm and 60-80 µm topcoat).

*** System 3: Hot dipped galvanized (ISO 1461) steel with sweep blasting, Primax Protect + Jotun Facade. Total film thickness ~160 µm (primer 80 µm and 60-80 µm topcoat).

For more information on performance using Primax primers and Jotun's various exterior durable topcoats in combination with various methods of surface preparation and various types of substrates can be found on Jotun Primax Performance Matrix brochure.

Additional information:

This product when used in combination of Jotun Facade or Jotun Super Durable, maybe backed by a Product Performance Guarantee when applied to a grit blasted carbon steel substrate. For further advice, please contact your local Jotun office.

* Typical for this product when applied on zinc-phosphated steel panels (0.8 mm) with coating film thickness 70-90 µm using full cure schedule.

** System 1: Grit blasted (Sa 2½) steel panels, Primax Xtend +Jotun Facade. Total film thickness ~160 µm (primer 80 µm and 60-80 µm topcoat).

***System 2: Grit blasted (Sa 2½) zinc phosphated steel panels, Primax Xtend +Jotun Facade 2487. Total film thickness ~160 µm (primer 80 µm and 60-80 µm topcoat).

*** System 3: Hot dipped galvanized (ISO 1461) steel with sweep blasting, Primax Xtend+Jotun Facade. Total film thickness ~160 µm (primer 80 µm and 60-80 µm topcoat).

- TDS – public available information – shows C5VH performance:
 - Steel + grit blasted + zinc phosphate + Epoxy (zinc rich) primer + topcoat
 - HDG + sweep blast + epoxy (zinc rich) primer + topcoat
- Both systems are extremely rare systems to be applied at a coater.
 - Very expensive system

Akzo response:

3rd party lab testing with similar systems in progress to proof C5VH 2 layer performance as well.

Note: systems are very rare and expensive and substrate and pre treatment contribute already significant to corrosion protection. Therefore in future always check what performance we can claim in combination with substrate and pre treatment of customer!

Jotun CX claim

Jotun claim

- **Primer that meets with Qualisteelcoat and ISO 12944 standards;** [\[Source: Article CoatingsWorld\]](#)
 - "Jotun introduced Jotun Primax Coating Solutions, a powder coatings system that is Qualisteel compliant and has been independently tested to meet ISO 12944 CX requirements.
 - "...Primax Coating Solutions was engineered to protect steel used in critical machinery, such as generators, transformers, electrical cabinets, cranes, and other equipment operating in aggressive environments".
 - "...The solution is a two-layer anticorrosive steel protection system Involving primers and a premium topcoat, Jotun Super Durable"
- They assert to be the only company providing product warranties and having an Approved Applicators network

AkzoNobel view

- First of all it is good to remind ourselves that the ISO 12944 standard is a liquid coatings standard. Many powder producers including AkzoNobel use this standard as reference for powder corrosion protection requirements.
- Jotun's CX certification claims are questioned based on ISO 12944 standards, which **require 4,200 hrs cyclic corrosion tests and a minimum of three organic layers for CX certification**, making a two-layer system ineligible. Note: remember: the standard is defined for liquid coatings!
- If we zoom in to Qualisteelcoat approvals we see:
 - In Qualisteelcoat Jotun have only has a C5H license and no CX.
 - Also note that base material is steel coated by thermal spraying (MS) and **not steel**

Commercial guidance in response to CX claim

- Understand clear customer requirements regarding corrosion protection: what is the performance they need to meet? (E.g. C5H etc)
- What is the substrate they use and what pretreatment they use?
- Did customer receive a test report from Jotun that shows C5VH or CX performance in line with ISO 12944 testing guidance and tested on their used substrate and pre treatment? Also, so far we have only seen by customer shared test reports from Jotun themselves not from 3rd party labs.
- Use our Interpon Redox System to consult which system we can offer for which substrate and pre treatment to meeting corrosion requirements. Our Redox offering can meet up to C5VH (currently in 3 layer solution)
- In case of doubt or questions reach out to your local Interpon Redox champion for support
- So far we have seen no to very little commercial success stories by Jotun regarding their (improved) corrosion protection offering in the market. No news of wins in America or EMEA. Only in Asia and particular China Jotun is more active in promoting this offering especially to the new energy market.

PPG

Primeron

High-performance powder coatings for corrosion protection.

PPG's PRIMERON™ primer product portfolio is designed to provide high corrosion resistance for substrates including steel, hot-dip-galvanized steel, metalized steel and aluminum substrates. This full primer range offers special product features to meet the various requirements depending on typical end use, environments and substrate.

Do PPG powder primers meet industry specifications?

PPG powder primers meet ISO12944, the industry benchmark for safeguarding steel structures against corrosion through protective paint systems.

Specific to EMEA, all primers show very good corrosion resistance and have been tested according to the corrosivity categories. The systems performances have been approved by Qualisteelcoat.

Our newest innovation: PPG's high-performance zinc epoxy powder primer

- A patent-pending breakthrough in powder primer technology with enhanced performance over traditional zinc primers
- Formulated with an optimal amount of zinc, PPG PRIMERON™ high-performance zinc epoxy powder primer offers a better balance of properties than standard zinc primers, including improved transfer efficiency, corrosion performance, application ease and lower applied costs
- The breakthrough primer can be used in a two-coat, one-bake process on steel, hot-dip-galvanized steel, metalized steel and aluminum

PPG

Primeron

EMEA Primers and Benefits

PRIMERON ZINC:

A zinc-rich epoxy powder primer designed to provide enhanced corrosion protection for mild steel, hot-dip galvanized steel and aluminum substrates

- P512G000R: Offers very good flow and appearance and low bake capabilities

PRIMERON PRO: A primer that shows strong corrosion protection regardless of the pretreatment and very good results, especially on mechanically pretreated steel

- P511G508R: Offers balanced features, low consumption, good mechanical properties and high chemical resistance

PRIMERON EDGE: Engineered to optimize the edge coverage of sharp edges, significantly increasing the lifecycle of the coated parts

- P513G091R: Provides excellent edge protection, very good edge coverage, hides casting defects and is suitable for degassing substrates

PRIMERON FLEX: A specially developed hybrid powder coating optimally suited for various substrates.

- P852G001R: Offers good inter-coat adhesion that is compatible with a wider range of topcoat systems, good application stability and low consumption

	Primeron Zinc	A zinc-rich primer offering corrosion protection
	Primeron Pro	Primer that delivers exceptional corrosion protection and a balanced offering of other properties
	Primeron Edge	High-edge, outgas-friendly primer technology offering best-in-class corrosion protection for substrates with sharp and laser-cut edges
	Primeron Flex	Primer that provides excellent corrosion protection for multiple substrates including aluminum

Axalta

Alesta AP Qualisteel – Alesta Zero Zinc



Alesta® AP QualiSteel

In a more and more demanding market, there is an increasing need for a better protection of galvanized and zinc thermal sprayed steel. By using Alesta® AP QualiSteel, you increase not only the durability and protection of most steel structures, you also coat it in a wide range of colours.

When it comes to sustainability, Alesta® AP QualiSteel is an excellent choice. It enables you not only to save energy or material, it is also label free, and offers any steel structure a much longer life span thanks to the coating excellent UV stability. Alesta® AP QualiSteel is part of QUALISTEELCOAT coating system.



Alesta® ZeroZinc

Corrosion of steel leads to high repair and maintenance costs. Surface pre-treatment and use of the most appropriate anti-corrosion system will extend the life of the painted structure. After more than 10 years of research and development, the Alesta® ZeroZinc range of products is expanding to provide the best solution for every substrate. There is a ZeroZinc primer for each substrate to be coated: steel, parts with sharp edges, degassing substrates (galvanised steel and metallisation)

No Public information

Kansai Helios – Sherwin Williams



Q&A

AkzoNobel

THANK YOU

