International

ISO 12944

Corrosion protection of steel structures by protective paint systems

AkzoNobel

What is ISO 12944?

ISO 12944 is the industry standard for corrosion protection of steel structures by protective paint systems. Originally released in 1998, the standard is put together by representatives from key countries and companies involved in the protection of steel structures to build a mutually beneficial standard. The standard is designed to provide guidance to architects, engineers, specifiers, applicators and other parties in the application of coatings to steel. The standard covers 9 parts with key components of the standard covering environment classification, protective paint systems, laboratory test methods and systems and test methods for offshore structures.

Select your ISO 12944 compliant system in 3 easy steps

Step 1 Select the corrosive environment

Use the following table to select the most appropriate classification for your project:

Category	Corrosivity	Typical Environment
C1	Very Low	Dry or cold with very low pollution
C2	Low	Temperate low pollution
C3	Medium	Temperate, medium pollution, tropical low pollution
C4	High	Temperate with high pollution, tropical with moderate pollution
C5	Very High	Temperate and subtropical with very high pollution and/or significant chloride effects
CX	Extreme	Extreme industrial areas, offshore areas, salt spray
IM1	Fresh water	River installations and hydro plants
IM2	Sea or brackish water	Immersed structures without cathodic protection
IM3	Soil	Buried structures
IM4	Sea or brackish water with cathodic protection	Immersed structures with cathodic protection

These environments are based on experiments that have measured the rate of metal loss for uncoated steel. The classification of environments applies to structural steel exposed to ambient (less than 120°C/248°F) conditions.


Gateshead Millennium Bridge
Location: UK
Products: Interthane, Interzone.

Step 2 How long until first major maintenance?

Use the following table to select how durable you want your coating system to be. The higher the durability, the longer the time to first major maintenance:

Durability Category	Duration to first major maintenance
Low (L)	Up to 7 years
Medium (M)	7-15 years
High (H)	15-25 years
Very High (VH)	More than 25 years

Remember, when selecting the most cost-effective system for your project, durability does not equate to a guaranteed time. Durability relates to the performance duration of the coating system before first major maintenance. Regular minor maintenance should always be anticipated in order to achieve the required life to first major maintenance.

Step 3 Select your ISO 12944 compliant system

In addition to our internal ISO 9001 certified laboratory testing and in-field performance assessments, AkzoNobel also commissions external testing programmes in line with the requirements of ISO 12944 in the most commonly specified environments.

Please see the indicative systems listed on the following pages (note products may not be available in all regions), a wide range of complementary testing of additional systems have also been commissioned. Please consult your local representative for more information in relation to your specification requirements.

C2 – High

Environment	Min. number of coats	Nominal DFT of system
C2 High	1	120µm

Typical System

Environment	Coat 1	If you want...
C2 High	Interseal 1052	High solids, low VOC and fast curing for increased productivity

Alternative Systems

Environment	Coat 1	If you want...
C2 High	Intergard 345	Low VOC, high solids
C2 High	Interthane 1070	Zinc phosphate PU and excellent durability
C2 High	Intercure Polyaspartic**	High productivity, rapid cure

C2 – Very High

Environment	Min. number of coats	Nominal DFT of system
C2 Very High	2	180µm

Typical System

Environment	Coat 1	Coat 2	If you want...
C2 Very High	Intergard 251HS	Interthane 990E*	High solids, low VOC and superior aesthetics

Alternative Systems

Environment	Coat 1	Coat 2	If you want...
C2 Very High	Interseal 1052	Interthane 990E*	High solids, low VOC and superior aesthetics
C2 Very High	Interthane 1070		Zinc Phosphate single coat solution for reduced complexity***
C2 Very High	Intergard 345		Epoxy, single coat solution for reduced complexity***

*Interthane 990E can be substituted with alternative gloss level versions, e.g. Interthane 990SG (semi gloss) or Interthane 990V (NAM). Please consult your local AkzoNobel representative.

**Intercure 99 produces a gloss finish and can be substituted with Intercure 4500 for a semi-gloss finish if required.

***Schemes which are designed to reduce complexity in specification which meet the performance testing criteria of the standard.

C3 – Medium

Environment	Min. number of coats	Nominal DFT of system
C3 Medium	1	120µm

Typical System

Environment	Coat 1	If you want...
C3 Medium	Interseal 1052	High solids, low VOC and fast curing for increased productivity

Alternative Systems

Environment	Coat 1	If you want...
C3 Medium	Intergard 345	Low VOC, high solids
C3 Medium	Interthane 1070	Zinc phosphate PU and excellent durability
C3 Medium	Intercure Polyaspartic**	High productivity, rapid cure

C3 – High

Environment	Min. number of coats	Nominal DFT of system
C3 High	2	180µm

Typical System

Environment	Coat 1	Coat 2	If you want...
C3 High	Intergard 251HS	Interthane 990E*	High solids, low VOC and superior aesthetics

Alternative Systems

Environment	Coat 1	Coat 2	If you want...
C3 High	Interseal 1052	Interthane 990E*	High solids, low VOC and superior aesthetics
C3 High	Intergard 2509	Interthane 990E*	Fast cure, low VOC and superior aesthetics
C3 High	Intercure Polyaspartic**		High productivity, single coat, rapid cure***
C3 High	Intergard 345		Single coat, low VOC, high solids***

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***Schemes which are designed to reduce complexity in specification which meet the performance testing criteria of the standard.

C3 – Very High

Environment	Min. number of coats	Nominal DFT of system
C3 Very High	2	240µm

Typical System

Environment	Coat 1	Coat 2	If you want...
C3 Very High	Intergard 251HS	Interthane 990E*	High solids, low VOC and superior aesthetics

Alternative Systems

Environment	Coat 1	Coat 2	If you want...
C3 Very High	Interseal 1052	Interthane 990E*	High solids, low VOC and superior aesthetics
C3 Very High	Intercure Polyaspartic**		High productivity, single coat, rapid cure***

C4 - Medium

Environment	Min. number of coats	Nominal DFT of system
C4 Medium	2	180µm

Typical System

Environment	Coat 1	Coat 2	If you want...
C4 Medium	Intergard 251HS	Interthane 990E*	High solids, low VOC and superior aesthetics

Alternative Systems

Environment	Coat 1	Coat 2	If you want...
C4 Medium	Interseal 1052	Interthane 990E*	High solids, low VOC and superior aesthetics
C4 Medium	Intergard 345	Interthane 990E*	Fast cure, high solids and superior aesthetics
C4 Medium	Intercure Polyaspartic**		High productivity, single coat, rapid cure***

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**Intercure 99 produces a gloss finish and can be substituted with Intercure 4500 for a semi-gloss finish if required.

***Schemes which are designed to reduce complexity in specification which meet the performance testing criteria of the standard.

C4 - High

Environment	Min. number of coats	Nominal DFT of system
C4 High	2	200µm to 240µm

Typical System

Environment	Coat 1	Coat 2	If you want...
C4 High	Intergard 251HS	Interthane 990E*	High solids, low VOC and superior aesthetics

Alternative Systems

Environment	Coat 1	Coat 2	Coat 3	If you want...
C4 High	Interzinc 52E	Intergard 475HS	Interthane 990E*	Zinc rich, high solids, low VOC and superior aesthetics
C4 High	Interzinc 52E	Intergard 345	Interthane 3230G	Zinc rich, specifically designed for OEM use
C4 High	Interseal 1052	Intergard 475HS	Interthane 990E*	High solids, low VOC and superior aesthetics

C4 - Very High

Environment	Min. number of coats	Nominal DFT of system
C4 Very High	3	260µm

Typical System

Environment	Coat 1	Coat 2	Coat 3	If you want...
C4 Very High	Interzinc 52E	Intergard 475HS	Interthane 990E*	Zinc rich, high solids, low VOC and superior aesthetics

Alternative Systems

Environment	Coat 1	Coat 2	Coat 3	If you want...
C4 High	Interzinc 52E	Intercure Polyaspartic**		High productivity, rapid cure***

*Interthane 990E can be substituted with alternative gloss level versions, e.g. Interthane 990SG (semi gloss) or Interthane 990V (NAM). Please consult your local AkzoNobel representative.

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***Schemes which are designed to reduce complexity in specification which meet the performance testing criteria of the standard.

C5 - Medium

Environment	Min. number of coats	Nominal DFT of system
C5 Medium	2	240µm

Typical System

Environment	Coat 1	Coat 2	If you want...
C5 Medium	Intergard 251HS	Interthane 990E*	High solids, low VOC and superior aesthetics

C5 - High

Environment	Min. number of coats	Nominal DFT of system
C5 High	Zinc Primer - 3, Non-Zinc Primer - 2	260µm to 300µm

Typical System

Environment	Coat 1	Coat 2	Coat 3	If you want...
C5 High	Interzinc 52E	Intergard 475HS	Interthane 990E*	Zinc rich, high solids, low VOC and superior aesthetics

Alternative Systems

Environment	Coat 1	Coat 2	Coat 3	If you want...
C5 High	Interzinc 52E	Intergard 345	Interthane 990E*	Zinc rich, fast cure, low VOC and superior aesthetics
C5 High	Interzinc 52E	Intercure Polyaspartic**		High productivity, rapid cure, zinc rich***

C5 - Very High

Environment	Min. number of coats	Nominal DFT of system
C5 Very High	3	320µm to 360µm

Typical System

Environment	Coat 1	Coat 2	Coat 3	If you want...
C5 Very High	Interzinc 52E	Intergard 475HS	Interthane 990E*	Zinc rich, high solids, low VOC and superior aesthetics

*Interthane 990E can be substituted with alternative gloss level versions, e.g. Interthane 990SG (semi gloss) or Interthane 990V (NAM). Please consult your local AkzoNobel representative.

**Intercure 99 produces a gloss finish and can be substituted with Intercure 4500 for a semi-gloss finish if required.

***Schemes which are designed to reduce complexity in specification which meet the performance testing criteria of the standard.

Part 9 - CX / immersion / splash & tidal zones

The introduction of Part 9 to the ISO 12944 standard introduces the old ISO 20340 standard into ISO 12944. Part 9 mandates the use of cyclic testing for offshore structures. In previous editions of the standard offshore structures were referred to as C5-M however a new environmental category, CX, has now been introduced for all offshore structures.

All offshore systems must continue to go through 4,200 hours of cycling testing, which equates to 25 weeks.

Part 9 sets both the minimum number of coats and minimum film thickness per system, with some changes from the previous standard's requirements for C5-M. The table below outlines the requirements for steel substrates.

Category	CX		Splash & tidal zones			IM4	
Primer coat	Zinc (R)	Other primers	Zinc (R)	Other primers		Zinc (R)	Other primers
NDFT (µm)	≥40	≥60	≥40	≥60	≥200	-	≥150
MNOC	3	3	3	3	2	1	2
NDFT of system (µm)	≥280	≥350	≥450	≥450	≥600	≥800	≥350

NDFT – Nominal Dry Film Thickness / MNOC – Minimum Number of Coats.

One of the main changes in ISO 12944 Part 9 from ISO 20340 is in the performance criteria on corrosion creep – this now states that coating systems for high impact areas shall be less than or equal to 8.0mm and all other CX applications less than or equal to 3.0mm. Sea water immersion now states 6.0mm pass criteria.

Systems

Environment	Coat 1	Coat 2	Coat 3	If you want...
CX	Interzinc 52E	Intergard 475HS	Interthane 990E*	Zinc rich, high solids, low VOC and superior aesthetics
CX, Splash and Tidal Zone, IM4	Interzone 954	Interzone 954		High solids, low VOC and an extensive track record
CX, Splash and Tidal Zone, IM4	Interzone 9545	Interzone 9545		Ultra low VOC, rapid cure for use in a wide range of climates
CX, Splash and Tidal Zone, IM4	Interzone 1000	Interzone 1000		>20% glass flake content as per ISO 24656

*Interthane 990E can be substituted with alternative gloss level versions, e.g. Interthane 990SG (semi gloss) or Interthane 990V (NAM). Please consult your local AkzoNobel representative.


Chatreee Gold
Location: Thailand
Products: Interzinc, Intergard, Interthane.

Value added innovations

Interzinc 52E – Zinc rich epoxy primer

Interzinc 52E improves shop productivity by reducing overcoating times by up to 66%, offering customers the flexibility to produce more application metres per shift, while maintaining excellent anti-corrosive performance and airless spray properties.

Interthane 990E – Polyurethane topcoat

Interthane 990E is based on the trusted performance properties of Interthane 990 and delivers enhancements for customers who want a high gloss PU that reduces impact on the environment with lower volatile organic content (VOC) and less packaging waste.

Interthane 990E offers coating applicators the ability to increase productivity (up to 25%) with more square metres coated per 20L pack and to increase reputation with a greater distinction of image achieved compared to existing products.

Interzone 9545 – Heavy duty hybrid epoxy

Based on AkzoNobel patent protected technology, Interzone® 9545 is a novel HYBRID epoxy technology, combining two curing mechanisms to deliver enhanced production performance.

It builds upon the extensive track record of the Interzone® range which is the industry benchmark in the energy sector.

Offering exceptional durability, corrosion resistance and can increase productivity by up to 50%.

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