

# ISO 12944:2018

Summary of main changes  
for Applicators and Specifiers



### **About this booklet**

This booklet summarises the main changes to ISO 12944 (revisions done in 2017 and 2018) relevant to paint applicators and specifiers. It is intended as a quick reference guide for people who already know and work with ISO 12944.

### **About the ISO 12944 standard**

The ISO 12944 standard is one of the main international standards for corrosion protection of steel by paint. It guides professionals when specifying and applying coating systems, and helps ensure adequate corrosion protection for steel structures and equipment across locations and industries.

The first edition of ISO 12944 was published in 1998. In the latest revisions, a number of changes have been made throughout the ISO 12944 standard. In addition, a new part (Part 9) has been added, which focuses specifically on coating systems for structures in offshore locations.

If you would like to know more about Hempel or our coating systems according to ISO 12944, please visit [hempel.fi](http://hempel.fi)

# ISO 12944

## ISO 12944 consists of 9 parts:

Part 1 - General introduction

Part 2 - Classification of environments

Part 3 - Design considerations

Part 4 - Types of surface and surface preparation

Part 5 - Protective paint systems

Part 6 - Laboratory performance test methods\*

Part 7 - Execution and supervision of paint work

Part 8 - Development of specifications of new work and maintenance\*

Part 9 - Painting of offshore constructions (ISO 20340 merged into ISO 12944) **NEW in 2018**

\*Changes made to Parts 6 & 8 during the latest revision are not considered relevant to specifiers and applicators and so are not listed in this booklet.

# Part 1 – General introduction

Part 1 provides the framework, terminology and definitions for the standard. It also contains the durability scheme, which suggests the length of time that a coating system is expected to last.

Durability scheme	Previous	<b>NEW</b>
Low durability (L)	2 to 5 years	up to 7 years
Medium durability (M)	5 to 15 years	7–15 years
High durability (H)	> 15 years	15–25 years
<b>NEW</b> Very high durability (VH)	–	> 25 years

# Part 2 – Classification of environments

Part 2 covers corrosive categories. There are two main categories: atmospheric conditions and submerged conditions.

## Corrosivity categories – Atmospheric conditions

Today

C1 – Very low



C2 – Low



C3 – Medium



C4 – High



C5-I – Very high  
Industrial

C5-M – Very high  
Marine

NEW

C5-M and C5-I merged. C5 is now for land-based structures.

C5 – Very high

NEW

CX – Extreme

The new CX Extreme category is for offshore structures (as outlined in Part 9).

# Part 2 – Classification of environments

## New and adjusted corrosivity categories – Atmospheric conditions

Mass loss per unit surface/thickness loss (after first year of exposure)				
Corrosivity category	Low-carbon steel		Zinc	
	Mass loss g/m <sup>2</sup>	Thickness loss mm	Mass loss g/m <sup>2</sup>	Thickness loss mm
C5 Very high	> 650 to 1,500	> 80 to 200	> 30 to 60	> 4.2 to 8.4
<b>NEW</b> CX Extreme	> 1,500 to 5,500	> 200 to 700	> 60 to 180	> 8.4 to 25



Significant difference between C5 and CX

# Part 2 – Classification of environments

## Corrosivity categories – Immersed conditions

Previous

Im 1 – Fresh water

Im 2 – Sea or brackish water

Defined in Part 2 and appears in Parts 5 & 6

Im 3 – Soil

NEW

Im 4 – Sea or brackish water

Defined in Part 2 and appears in Part 9 (Offshore)

# Part 3 – Design considerations

Part 3 considers how to create the best structural design for the correct use of the paint system.

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NEW

The preparation grade must be P3\* (EN ISO 8501-3) in case of high and very high durability for C4, C5 and CX, as well as Im1, Im2, Im3 and Im4.

*\*P3 = Very thorough preparation – surface is free of significant visible imperfections*



Responsibility of the steel builder





# Part 4 – Types of surface and surface preparation

Part 4 describes the surfaces and pre-treatment methods required to ensure the best performance of the paint system.

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NEW

Mainly editorial changes, text is shortened

Flame cleaning as surface preparation deleted

Chemical treatment as surface preparation added

High and ultra-high pressure water cleaning clarified

Reference is made to EN ISO 8501, Part 4



# Part 5 – Protective paint systems

Part 5 considers how to choose protective paint systems, and includes guidelines for different environments and for different durability requirements.

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**NEW** New durability category (Very high)

New dry film thickness (DFT) values

DFT not informative but normative

All tables updated

# Part 5 – Protective paint systems

**NEW** New durability category; new DFT values

Durability		Low (l)			Medium (m)			High (h)			NEW Very high (vh)		
		Zn (R)	Misc.		Zn (R)	Misc.		Zn (R)	Misc.		Zn (R)	Misc.	
Binder base of primer		ESI EP PUR	EP PUR ESI	AK AY	ESI EP PUR	EP PUR ESI	AK AY	ESI EP PUR	EP PUR ESI	AK AY	ESI EP PUR	EP PUR ESI	AK AY
Binder base of subsequent coats		EP PUR AY	EP PUR AY	AK AY	EP PUR AY	EP PUR AY	AK AY	EP PUR AY	EP PUR AY	AK AY	EP PUR AY	EP PUR AY	AK AY
C2	MNOC	*			–	–	1	1	1	1	2	2	2
	NDFT				–	–	100	60	120	160	160	180	200
C3	MNOC	–	–	1	1	1	1	2	2	2	2	2	2
	NDFT	–	–	100	60	120	160	160	180	200	200	240	260
C4	MNOC	1	1	1	2	2	2	2	2	2	3	2	–
	NDFT	60	120	160	160	180	200	200	240	260	260	300	–
C5	MNOC	2	2	–	2	2	–	3	2	–	3	3	–
	NDFT	160	180	–	200	240	–	260	300	–	320	360	–

Summary of the minimum number of coats and NDFT of the paint system depending on durability and corrosivity

# Part 5 – Protective paint systems

**NEW** DFT not informative but **normative**

- New annexes added and defined:
  - A and B** are **normative** = must be followed
  - C to G** are **informative** = for orientation only
- No tables for paint systems onto galvanised and metallised surfaces for **immersion service**. Only some recommendations for their possible use are given.

## Part 5 – Protective paint systems

A new section has been added for use of new and innovative paint systems that deviate from the ISO 12944 requirements.



# Part 7 – Execution and supervision of paint work

Part 7 describes how to carry out and supervise coating application.

## Use of ISO 19840 for taking thickness measurements Number of reference areas reduced

Size of structure (painted area) m <sup>2</sup>	Recommended maximum number of reference areas	Recommended maximum percentage of reference area relative to total %
≤ 5,000	1	0.3
> 5,000 ≤ 10,000	2	0.3
> 10,000 ≤ 25,000	3	0.2
> 25,000 ≤ 50,000	4	0.15
> 50,000	5	0.1

# Part 9 – Painting of offshore constructions

Part 9 addresses protective paint systems and laboratory performance test methods for offshore constructions and related structures. It is a new section in ISO 12944, which incorporates elements of and replaces ISO 20340.

## Former ISO 20340

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**NEW** ISO 20340 becomes a part of ISO 12944 as a new Part 9



# Part 9 – Painting of offshore constructions

**NEW** New corrosivity categories for atmospheric (CX) and immersed conditions (Im4)

	Blast-clean carbon steel Sa 2½ ; Surface profile: medium {G}					Hot-dip galvanized steel or steel with Zn-based metalizing		
Corrosivity category of environment	CX (offshore)		Splash and tidal zones CX (offshore) and Im4			Im4		CX (offshore)
First coat	Zn (R)	Other primers	Zn (R)	Other primers		Other primers		
NDFT (µm)	≥ 40	≥ 60	≥ 40	≥ 60	≥ 200	–	≥ 150	
Minimum number of coats	3	3	3	3	2	1	2	2
NDFT of paint system (µm)	≥ 280	≥ 350	≥ 450	≥ 450	≥ 600	≥ 800	≥ 350	≥ 200
Minimum pull-off test value (before ageing) determined in accordance with ISO 4624, Method X (MPa)	5	5	5	5	5	8	5	5

*Minimum requirements for protective paint systems and their initial performance*



# Part 9 – Painting of offshore constructions

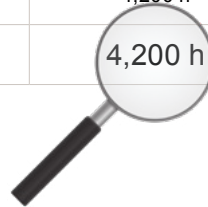
**NEW**

New **corrosivity categories** for atmospheric (CX) and immersed conditions (Im4) – requirements on lab testing

Test	Environment of corrosivity category CX (offshore)	Environment of combined corrosivity category CX (offshore) and Im4 (splash and tidal zones)	Environment of corrosivity category Im4
Ageing resistance (Cycling testing)	4,200 h	4,200 h	-
Cathodic disbonding	-	4,200 h	4,200 h
Seawater immersion	-	4,200 h	4,200 h

CX: 4,200 hours = 175 days = 25 weeks\*

\*C5 very high – 2688 hours = 112 days = 16 weeks



## Find out more

You can find out more about Hempel at [hempel.fi](https://hempel.fi), where you can also download our ISO brochure, read our ISO FAQs or watch our webinar on changes to the ISO 12944 standard.



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Hempel is proudly owned by the Hempel Foundation, which supports cultural, humanitarian and scientific causes across the world.

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