



ISO 12944:2018

CORROSION PROTECTION OF STEEL
STRUCTURES BY PROTECTIVE
PAINT SYSTEMS

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ISO 12944 PAINTS AND VARNISHES

Corrosion Protection Steel Structure by Protective Paint Systems
(parts 1-9) 2017. The ISO 12944 standard is intended to assist engineers and corrosion experts in adopting best practice in the corrosion protection of structural steel at new construction locations.

ISO 12944 is progressively superseding regional standards to become a truly global benchmark in corrosion control.



CONTENTS

ISO 12944 describes the coatings cycles and the application systems most used in metal structures protection. Standard is correlated to the corrosion environment of the structure and expected durability.

ISO 12944 has nine sections:

1. General introduction
2. Classification of environments
3. Design considerations
4. Types of surfaces and surface preparation
5. Protective paint systems
6. Laboratory performance test methods
7. Execution and supervision of paint work
8. Development of specifications for new work and maintenance
9. Protective painting systems and laboratory test methods for offshore and related structures

DURABILITY (Design Life)

The durability of a protective coating system depends on several parameters:

- Coating technology
- Structure design
- Support
- Substrate preparation
- Application
- Application environment
- Exposure conditions

ISO 12944 defines four durability classes.

Low Durability	<7 years
Medium Durability	7-15 years
High Durability	15-25 years
Very High Durability	>25 years

The ISO 12944 standard characterizes corrosion performance into specific corrosion categories. These are defined by detailing the type of pretreatment, coating technology, coating thickness and number of layers applied to achieve a specific corrosion category.

CORROSIVITY CATEGORY	EXTERIOR	INTERIOR
C1		Heated buildings with clean atmospheres, e.g., offices, shops, schools, hotels
C2	Atmospheres with low level of pollution: mostly rural areas	Unheated buildings where condensation can occur, e.g., depots, sports halls
C3	Urban and industrial atmospheres, moderate sulfur dioxide pollution; coastal areas with low salinity	Production rooms with high humidity and some air pollution, e.g., food-processing plants, laundries, breweries, dairies
C4	Industrial areas and coastal areas with moderate salinity	Chemical plants, swimming pools, coastal ship and boatyards
C5	Industrial areas with high humidity and aggressive atmosphere and coastal areas with high salinity	Buildings or 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

The combination of the durability class and the corrosivity category determines the corrosion performance and the expected durability specified for the coating system.



LABORATORY TESTS (ISO 12944-6:2018)

Table 1 – Test procedures for coating systems applied to carbon steel or zinc coated steel with thermal-sprayed metallic coating for atmospheric corrosivity categories.

CORROSIVITY CATEGORY AS DEFINED IN ISO 12944 - 2	DURABILITY RANGES ACCORDING TO ISO 12944 - 1	TEST 1			TEST 2
		ISO 2812 - 2 <i>Water Immersion Hours</i>	ISO 6270 - 1 <i>Water Condensation Hours</i>	ISO 9227 <i>Neutral Salt Spray Hours</i>	ANNEX B <i>Cyclic Aging Test Hours</i>
C2	Low	-	48	-	-
	Medium	-	48	-	-
	High	-	120	-	-
	Very High	-	240	480	-
C3	Low	-	48	120	-
	Medium	-	120	240	-
	High	-	240	480	-
	Very High	-	480	720	-
C4	Low	-	120	240	-
	Medium	-	240	480	-
	High	-	480	720	-
	Very High	-	720	1440	1680
C5	Low	-	240	480	-
	Medium	-	480	720	-
	High	-	720	1440	1680
	Very High	-	-	-	2688

Table 2 – Test procedures for coating systems applied to carbon steel or zinc coated steel with thermal-sprayed metallic coating for immersion categories.

IMMERSION CATEGORY AS DEFINED IN ISO 12944 - 2	DURABILITY RANGES ACCORDING TO ISO 12944 - 1	ISO 2812 - 2 <i>Water Immersion Hours</i>	ISO 6270 - 1a <i>Water Condensation Hours</i>	ISO 9227a <i>Neutral Salt Spray Hours</i>
Im1	High	3000	1440	-
	Very High	4000	2160	-
Im2	High	3000	-	1440
	Very High	4000	-	2160
Im3	High	3000	-	1440
	Very High	4000	-	2160

ONLY RELEVANT IF SYSTEMS ARE PARTIALLY OR TEMPORARILY IMMERSED/BURIED

SHERWIN-WILLIAMS PRODUCTS THAT MEET SPECIFICATIONS UN EN ISO 12944-2

REGION LEGEND	
North America	N
Europe	E
Asia	A
Latin America	L
Global	G

Substrate = Liquid Corrosion – Blasted Steel

					COATINGS SYSTEMS			
CORROSION CATEGORY	DURABILITY CLASS	TECHNOLOGY	SYSTEM N°	LAYER	PRODUCT NAME	DRY FILM µm	TOTAL DFT µm	REGION PRODUCT AVAILABLE IN
C2	High	SB	C2H/1	DTM	Polane D250	120	120	E
	Very High	SB	C2VH/1	DTM	Polane D250	180	180	E
C3	Medium	SB	C3M/1	DTM	Polane D250	120	120	E
	High	Hybrid	C3H/1	Primer	Duraspar Prime Epoxy High Build	140	180	E
				Topcoat	Kem Aqua 310	40		E
		SB	C3H/2	DTM	Polane D250	180	180	E
		SB	C3H/3	Primer	Duraspar Prime Epoxy High Build	140	180	E
				Topcoat	Kem Niso	40		E
		SB	C3H/4	Topcoat	Solvatic-PU-Monocoat ZE25	100	100	E
		SB	C3H/5	Topcoat	Solvatic-PU-Monocoat ZE25	160	160	E
		SB	C3H/6	Primer	Duraspar Prime Epoxy High Build	125	180	E
				Topcoat	Polane 3300	55		G
		SB	C3H/7	Primer	Duraspar Prime Epoxy 4000	125	180	G
				Topcoat	Polane 3300	55		G
		SB	C3H/8	Primer	Duraspar DTM Epoxy 6400	125	180	G
				Topcoat	Polane 3300	55		G
	Very High	SB	C3V/1	Primer	Duraspar Prime Epoxy 4000	140	240	G
				Topcoat	Polane D250	100		E
		SB	C3VH/2	Primer	Duraspar Prime Epoxy High Build	190	240	E
				Topcoat	Polane 3300	50		G
		SB	C3VH/3	Primer	Duraspar Prime Epoxy 4000	190	250	G
				Topcoat	Polane 3300	60		G
		SB	C3VH/4	Primer	Duraspar Prime Epoxy 6400	190	240	G
				Topcoat	Polane 3300	50		G

Substrate = Liquid Corrosion – Blasted Steel (continued)

					COATINGS SYSTEMS			
CORROSION CATEGORY	DURABILITY CLASS	TECHNOLOGY	SYSTEM N°	LAYER	PRODUCT NAME	DRY FILM µm	TOTAL DFT µm	REGION PRODUCT AVAILABLE IN
C4	Low	SB	C4L/1	DTM	Polane D250	120	120	E
	Medium	SB	C4M/1	DTM	Polane D250	180	180	E
	High	SB	C4H/1	Primer	Duraspar Prime Epoxy 4000	140	240	G
				Topcoat	Polane D250	100		E
		Hybrid	C4H/2	Primer	Duraspar Prime Epoxy High Build	120	240	E
				Midcoat	Duraspar Prime Epoxy High Build	80		E
				Topcoat	Kem Aqua 310	40		E
		SB	C4H/3	Primer	Duraspar Prime Epoxy High Build	120	240	E
				Midcoat	Duraspar Prime Epoxy High Build	80		E
				Topcoat	Kem Niso	40		E
		SB	C4H/4	Primer	Duraspar Prime Epoxy High Build	190	240	E
				Topcoat	Polane 3300	50		G
		SB	C4H/5	Primer	Duraspar Prime Epoxy 4000	190	250	G
				Topcoat	Polane 3300	50		G
		SB	C4H/6	Primer	Duraspar DTM Epoxy 6400	190	240	G
				Topcoat	Polane 3300	50		G
	Very High	SB	C4VH/1	Primer	Duraspar Prime Epoxy 4000	175	300	G
				Topcoat	Polane D250	125		E
		SB	C4VH/2	Primer	Duraspar Prime Epoxy High Build	125	300	E
				Topcoat	Polane D250	175		E
		SB	C4VH/3	Primer	Duraspar Prime Zinc Epoxy 82	60	260	E
				Topcoat	Polane D250	200		E
		SB	C4VH/4	Primer	Duraspar Prime Epoxy High Build	125	300	E
				Midcoat	Duraspar Prime Epoxy High Build	125		E
				Topcoat	Polane 3300	50		G
		SB	C4VH/5	Primer	Duraspar Prime Zinc Epoxy 82	60	260	G
				Midcoat	Duraspar Prime Epoxy 4000	150		G
		SB	C4VH/6	Topcoat	Polane 3300	50	300	G
				Primer	Duraspar DTM Epoxy 6400	60		G
		SB	C4VH/7	Primer	Duraspar Prime Zinc Epoxy 82	60	260	E
				Midcoat	Duraspar PrimeMIO Epoxy 2600	150		G
		SB	C4VH/8	Topcoat	Polane 3300	50	260	G
				Primer	Duraspar Prime Zinc Epoxy 82	60		E

SHERWIN-WILLIAMS PRODUCTS THAT MEET SPECIFICATIONS UN EN ISO 12944-2

REGION LEGEND	
North America	N
Europe	E
Asia	A
Latin America	L
Global	G

Substrate = Liquid Corrosion – Blasted Steel (continued)

					COATINGS SYSTEMS			
CORROSION CATEGORY	DURABILITY CLASS	TECHNOLOGY	SYSTEM N°	LAYER	PRODUCT NAME	DRY FILM µm	TOTAL DFT µm	REGION PRODUCT AVAILABLE IN
C5	Low	SB	C5L/1	DTM	Polane D250	180	180	E
	High	SB	C5H/1	Primer	Duraspar Prime Zinc Epoxy 82	60	260	E
				Midcoat	Duraspar DTM Epoxy 6400	160		G
				Topcoat	Kem Niso	40		E
		SB	C5H/2	Primer	Duraspar Prime Zinc Epoxy 82	60	260	E
				Midcoat	Duraspar Prime Epoxy High Build	160		E
				Topcoat	Kem Niso	40		E
		SB	C5H/3	Primer	Duraspar Prime Zinc Epoxy 82	60	260	E
				Topcoat	Polane D250	200		E
		SB	C5H/4	Primer	Duraspar Prime Epoxy 4000	175	300	G
				Topcoat	Polane D250	125		
		SB	C5H/5	Primer	Duraspar Prime Epoxy High Build	125	300	E
				Topcoat	Polane D250	175		E
		SB	C5H/6	Primer	Duraspar Prime Epoxy High Build	125	300	E
				Midcoat	Duraspar Prime Epoxy High Build	125		E
				Topcoat	Polane 3300	50		G
		SB	C5H/7	Primer	Duraspar Prime Epoxy 4000	125	300	G
				Midcoat	Duraspar Prime Epoxy 4000	125		G
				Topcoat	Polane 3300	50		G
		SB	C5H/8	Primer	Duraspar DTM Epoxy 6400	125	300	G
				Midcoat	Duraspar DTM Epoxy 6400	125		G
				Topcoat	Polane 3300	50		G
		SB	C5H/9	Primer	Duraspar Prime Zinc Epoxy 82	60	260	E
				Midcoat	Duraspar PrimeMIO Epoxy 2600	150		G
				Topcoat	Polane 3300	50		G
		SB	C5H/10	Primer	Duraspar Prime Zinc Epoxy 82	60	260	E
				Midcoat	Duraspar Prime Epoxy 4000	150		G
				Topcoat	Polane 3300	50		G
		SB	C5H/11	Primer	Duraspar Prime Zinc Epoxy 82	60	260	E
				Midcoat	Duraspar DTM Epoxy 6400	150		G
				Topcoat	Polane 3300	50		G

Substrate = Liquid Corrosion – Blasted Steel (continued)

					COATINGS SYSTEMS			
CORROSION CATEGORY	DURABILITY CLASS	TECHNOLOGY	SYSTEM N°	LAYER	PRODUCT NAME	DRY FILM µm	TOTAL DFT µm	REGION PRODUCT AVAILABLE IN
CX		SB	CX/1	Primer	Duraspar Prime Zinc Epoxy 82	60	280	E
				Midcoat	Duraspar Prime MIO Epoxy 2600	170		G
				Topcoat	Polane 3300	50		G
		SB	CX/2	Primer	Duraspar Prime Zinc Epoxy 82	60	280	E
				Midcoat	Duraspar DTM Epoxy 6400	160		G
				Topcoat	Duarspar Ultra 1800 NISO	60		E
		SB	CX/3	Primer	Duraspar Prime Zinc Epoxy 82	60	280	E
				Midcoat	Duraspar DTM Epoxy 6400	170		G
				Topcoat	Polane 3300	50		G



THE SINGLE
SOURCE FOR
ALL YOUR
COATING NEEDS

SHERWIN-WILLIAMS PRODUCTS THAT MEET SPECIFICATIONS UN EN ISO 12944-2

REGION LEGEND	
North America	N
Europe	E
Asia	A
Latin America	L
Global	G

Substrate = Liquid Corrosion – Galvanized Steel					COATINGS SYSTEMS			
CORROSION CATEGORY	DURABILITY CLASS	TECHNOLOGY	SYSTEM N°	LAYER	PRODUCT NAME	DRY FILM µm	TOTAL DFT µm	REGION PRODUCT AVAILABLE IN
C3	High	SB	C3H/1	Primer	Duraspar Prime Epoxy High Build	125	180	E
				Topcoat	Polane 3300	55		G
		SB	C3H/2	Primer	Duraspar Prime Epoxy 4000	125	180	G
				Topcoat	Polane 3300	55		G
		SB	C3H/3	Primer	Duraspar DTM Epoxy 6400	125	180	G
				Topcoat	Polane 3300	55		G
	Very High	SB	C3VH/1	Primer	Duraspar Prime Epoxy High Build	190	240	E
				Topcoat	Polane 3300	50		G
		SB	C3VH/2	Primer	Duraspar Prime Epoxy 4000	190	250	G
				Topcoat	Polane 3300	60		G
		SB	C3VH/3	Primer	Duraspar DTM Epoxy 6400	190	240	G
				Topcoat	Polane 3300	50		G
		SB	C3VH/4	Primer	Duraspar Prime Epoxy 4000	110	160	G
				Topcoat	Polane 3300	50		G
		SB	C3VH/5	Primer	Duraspar DTM Epoxy 6400	110	160	G
				Topcoat	Polane 3300	50		G
C4	High	SB	C4H/1	Primer	Duraspar Prime Epoxy High Build	190	240	E
				Topcoat	Polane 3300	50		G
		SB	C4H/2	Primer	Duraspar Prime Epoxy 4000	190	250	G
				Topcoat	Polane 3300	60		G
		SB	C4H/3	Primer	Duraspar DTM Epoxy 6400	190	240	G
				Topcoat	Polane 3300	50		G
		SB	C4H/4	Primer	Duraspar Prime Epoxy 4000	110	160	G
				Topcoat	Polane 3300	50		G
		SB	C4H/5	Primer	Duraspar DTM Epoxy 6400	110	160	G
				Topcoat	Polane 3300	50		G
	Very High	SB	C4VH/1	Primer	Duraspar Prime Epoxy High Build	125	300	E
				Primer	Duraspar Prime Epoxy High Build	125		E
				Topcoat	Polane 3300	50		G
		SB	C4VH/2	Primer	Duraspar Prime Epoxy 4000	125	300	G
				Primer	Duraspar Prime Epoxy 4000	125		G
				Topcoat	Polane 3300	50		G
		SB	C4VH/3	Primer	Duraspar DTM Epoxy 6400	125	300	G
				Primer	Duraspar DTM Epoxy 6400	125		G
		Topcoat			Polane 3300	50		G

Substrate = Liquid Corrosion – Galvanized Steel (continued)					COATINGS SYSTEMS					
CORROSION CATEGORY	DURABILITY CLASS	TECHNOLOGY	SYSTEM N°	LAYER	PRODUCT NAME	DRY FILM µm	TOTAL DFT µm	REGION PRODUCT AVAILABLE IN		
		SB	C4VH/4	Primer	Duraspar Prime Epoxy 4000	150	200	G		
				Topcoat	Polane 3300	50		G		
		SB	C4VH/5	Primer	Duraspar DTM Epoxy 6400	150	200	G		
				Topcoat	Polane 3300	50		G		
C5	High	SB	C5H/1	Primer	Duraspar Prime Epoxy High Build	125	300	E		
				Primer	Duraspar Prime Epoxy High Build	125		E		
				Topcoat	Polane 3300	50		G		
		SB	C5H/2	Primer	Duraspar Prime Epoxy 4000	125	300	G		
				Primer	Duraspar Prime Epoxy 4000	125		G		
				Topcoat	Polane 3300	50		G		
		SB	C5H/3	Primer	Duraspar DTM Epoxy 6400	125	300	G		
				Primer	Duraspar DTM Epoxy 6400	125		G		
				Topcoat	Polane 3300	50		G		
		SB	C5H/4	Primer	Duraspar Prime Epoxy 4000	150	200	G		
				Topcoat	Polane 3300	50		G		
		SB	C5H/5	Primer	Duraspar DTM Epoxy 6400	150	200	G		
				Topcoat	Polane 3300	50		G		
			Very High	SB	C5VH/1	Primer	Duraspar Prime Epoxy 4000	190	240	G
						Topcoat	Polane 3300	50		G
				SB	C5VH/2	Primer	Duraspar DTM Epoxy 6400	190	240	G
						Topcoat	Polane 3300	50		G

					POWDER COATINGS SYSTEMS					
CORROSION CATEGORY	DURABILITY CLASS	SUBSTRATE	PRE-TREATMENT SYSTEM	LAYER	PRODUCT NAME	DRY FILM µm	TOTAL DFT µm	CERTIFICATE	REGION PRODUCT AVAILABLE IN	
C4	High	Steel	Chemical	Primer	VALDE PRIME - (Group 944)	50-80	110-160	PE-0069	E	
				Topcoat	PE/P/Q - (Group 11)	60-80				
		Cont. Galv. Steel	Chemical	Primer	VALDE PRIME - (Group 944)	50-80	110-160	PE-0105	E	
				Topcoat	PE/P/Q - (Group 11)	60-80				
		Cont. Galv. Steel	Mechanical & Chemical	Primer	E-coat	20	60-80	PE-0093	E	
				Topcoat	PE/P/Q - (Group 11)	60-80				
C5	High	Hot Dip Galv. Steel	Mechanical	Primer	VALDE PRIME - (Group 944)	50-80	110-160	PE-0070	E	
				Topcoat	PE/P/Q - (Group 11)	60-80				
			Chemical	Primer	VALDE PRIME - (Group 944)	50-80	110-160	PE-0071	E	
				Topcoat	PE/P/Q - (Group 11)	60-80				
		Steel Thermal Spraying	-	Primer	VALDE PRIME - (Group 944)	50-80	110-160	PE-0188		
				Topcoat	PE/P/Q - (Group 11)	60-80				
				Primer	VALDE PRIME - (Group 944)	50-80	110-160	PE-0189	E	
				Topcoat	PE/P/Q - (Group 11)	60-80				
		Steel	Chemical	Primer	E-coat	20	120-160	PE-0094	E	
				Topcoat	PE/P/Q - (Group 11)	60-80				

ENERGY INDUSTRIAL COATING SYSTEMS

ISO 12944:2018

SHERWIN-WILLIAMS®

At Sherwin-Williams, we think about coatings differently, continuously seeking the perfect solution to help your products win over your customers. Whether you need the most rugged and protective coating, a technical expert to provide answers and hands-on support, consistently perfect color at just the right gloss, or a custom solution created just for you - we are here to help. We are Sherwin-Williams General Industrial Coatings, and we are obsessed with giving you the competitive edge.

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