Cloverdale Paint
INDUSTRIAL DIVISION

ISO 12944:2017 Systems Guide

For C4, C5 and CX Extreme

CATEGORIES OF ISO 12944 ATMOSPHERIC-CORROSIVITY ENVIRONMENTS

CORROSIVITY CATEGORY	ENVIRONMENT TYPES	
	EXTERIOR	INTERIOR
C1 very low		Heated buildings with clean atmospheres such as residential buildings
C2 low	Atmospheres with low pollution levels. Usually rural regions	Unheated building where condensation may occur, e.g. warehouses
C3 medium	Urban and industrial atmospheres with moderate sulfur dioxide levels. Coastal areas with low salinity	Production areas with high humidity and moderate air pollution, e.g. food processing plants, laundries
C4 high	Industrial areas and coastal areas with moderate salinity	Chemical plants, swimming pools, coastal ships and boatyards
C5 very high	Industrial areas with high humidity and aggressive atmosphere, and coastal areas with high salinity	Buildings or areas with almost permanent condensation and 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 atmospheres

Each corrosivity class is sub-divided into three durabilities:

Low (L): Up to 7 years
Medium (M): 7 – 15 years
High (H): 15 - 25 years
Very High (VH): > 25 years

The durabilities represent the approximate service time expectancy

LABORATORY TEST REQUIREMENTS

CORROSIVITY CATEGORY	Durability	ISO 6270-1 water condensation (hours)	ISO 9227 neutral salt spray (hours)	ISO 12944-6:2018 * Annex B cyclic ageing test (hours)
C4	Low	120	240	N/A
	Medium	240	480	N/A
	High	480	720	N/A
	Very High	720	1440	1680
C5	Low	240	480	N/A
	Medium	480	720	N/A
	High	720	1440	1680
	Very High	N/A	N/A	2688
CX	Low	N/A	N/A	N/A
	Medium	N/A	N/A	N/A
	High	N/A	N/A	N/A
	Extreme	N/A	N/A	4200

*Three chemicals for immersion test:

1) 10% NAOH aqueous solution
2) 10% H25SO4 aqueous solution
3) Mineral spirits, 18% aromatics

SURFACE PREPARATION STANDARDS

ISO 8501-1 Preparation Grade	Related SSPC Grade	ISO 8501-1 Surface Preparation Appearance
A Sa2½ B Sa2½ C Sa2½	SSPC-SP10	A near-white blast cleaned metal surface. All visible dirt, oil, rust, mill scales, old paint, and any other contaminates removed. Only slight stains as spots or stripes shall be seen.
A Sa3 B Sa3 C Sa3	SSPC-SP5	A white blast cleaned metal surface. All dirt, rust, mill scales, old paint, stains, and foreign material removed. A uniform metallic surface.

CATEGORIES OF ISO 12944 ATMOSPHERIC-CORROSIVITY ENVIRONMENTS

CORROSIVITY CATEGORY	ENVIRONMENT TYPES	
	EXTERIOR	INTERIOR
C4 high	Industrial areas and coastal areas with moderate salinity	Chemical plants, swimming pools, coastal ships and boatyards

Each corrosivity class is sub-divided into three durabilities:

Low (L): Up to 7 years
Medium (M): 7 – 15 years
High (H): 15 - 25 years
Very High (VH): > 25 years

The durabilities represent the approximate service time expectancy

LABORATORY TEST REQUIREMENTS

CORROSIVITY CATEGORY	Durability	ISO 6270-1 water condensation (hours)	ISO 9227 neutral salt spray (hours)	ISO 12944-6:2018 Annex B cyclic ageing test (hours)
C4.05	Low	120	240	N/A
	Medium	240	480	N/A
C4.06	Low	120	240	N/A
	Medium	240	480	N/A
	High	480	720	N/A
C4.09	Low	120	240	N/A
	Medium	240	480	N/A
C4.10	Low	120	240	N/A
	Medium	240	480	N/A
	High	480	720	N/A
C4.11	Low	120	240	N/A
	Medium	240	480	N/A
	High	480	720	N/A
	Very High	720	1440	1680

SURFACE PREPARATION STANDARDS

ISO 8501-1 Preparation Grade	Related SSPC Grade	ISO 8501-1 Surface Preparation Appearance
A Sa2½ B Sa2½ C Sa2½	SSPC-SP10	A near-white blast cleaned metal surface. All visible dirt, oil, rust, mill scales, old paint, and any other contaminates removed. Only slight stains as spots or stripes shall be seen.
A Sa3 B Sa3 C Sa3	SSPC-SP5	A white blast cleaned metal surface. All dirt, rust, mill scales, old paint, stains, and foreign material removed. A uniform metallic surface.

CORROSIVITY CATEGORY C4

ISO 12944 System No.	Generic Type Coating	Product Code	DFT (mils)	DFT (microns)	Expected Durability			
					Low	Medium	High	Very high
C4.05*	Epoxy	83021	3.1 to 6.3	80 to 160				
	Polyurethane	Armour Shield 839 series	0.8 to 4.0	20 to 100				
			7.1	180				
C4.06*	Epoxy	83110	3.1 to 9.4	80 to 160				
	Polyurethane	Armour Shield 839 series	1.6 to 3.1	40 to 80				
			9.4	240				
C4.09*	Zinc rich epoxy	83003/83005	2.4 to 3.1	60 to 80				
	Polyurethane	Armour Shield 839 series	3.1 to 3.9	80 to 100				
			6.3	160				
C4.10*	Zinc rich epoxy	83003/83005	2.4 to 3.1	60 to 80				
	Epoxy	83021	2.0 to 3.0	50 to 75				
	Polyurethane	Armour Shield 839 series	1.8 to 3.5	45 to 90				
			7.9	200				
C4.11*	Zinc rich epoxy	83003/83005	2.4 to 3.1	60 to 80				
	Epoxy	83021	2.0 to 3.0	50 to 75				
	Epoxy	83021	2.0 to 3.0	50 to 75				
	Polyurethane	Armour Shield 839 series	1.2 to 4.0	30 to 100				
			10.2	260				
Notes:								
Metal surface preparation requirement: Sa3 (SSPC-SP5)								
*Coating System is UV Durable								

CATEGORIES OF ISO 12944 ATMOSPHERIC-CORROSIVITY ENVIRONMENTS

CORROSIVITY CATEGORY	ENVIRONMENT TYPES	
	EXTERIOR	INTERIOR
C5 very high	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

Each corrosivity class is sub-divided into three durabilities:

Low (L): Up to 7 years
Medium (M): 7 – 15 years
High (H): 15 - 25 years
Very High (VH): > 25 years

The durabilities represent the approximate service time expectancy

LABORATORY TEST REQUIREMENTS

CORROSIVITY CATEGORY	Durability	ISO 6270-1 water condensation (hours)	ISO 9227 neutral salt spray (hours)	ISO 12944-6:2018 Annex B cyclic ageing test (hours)
C5.02	Low	240	480	N/A
	Medium	480	720	N/A
C5.03	Low	240	480	N/A
	Medium	480	720	N/A
	High	720	1440	1680
C5.07	Low	240	480	N/A
	Medium	480	720	N/A
	High	720	1440	1680
C5.08	Very High	N/A	N/A	2688
CX	Extreme	N/A	N/A	4200

SURFACE PREPARATION STANDARDS

ISO 8501-1 Preparation Grade	Related SSPC Grade	ISO 8501-1 Surface Preparation Appearance
A Sa2½ B Sa2½ C Sa2½	SSPC-SP10	A near-white blast cleaned metal surface. All visible dirt, oil, rust, mill scales, old paint, and any other contaminates removed. Only slight stains as spots or stripes shall be seen.
A Sa3 B Sa3 C Sa3	SSPC-SP5	A white blast cleaned metal surface. All dirt, rust, mill scales, old paint, stains, and foreign material removed. A uniform metallic surface.

CORROSIVITY CATEGORY C5

ISO 12944 System No.	Generic Type Coating	Product Code	DFT (mils)	DFT (microns)	Expected Durability			
					Low	Medium	High	Very high
C5.02*	Epoxy	83110	3.1 to 6.3	80 to 160				
	Polyurethane	Armour Shield 839 series	3.1 to 6.3	80 to 160				
			9.45	240				
C5.03*	Epoxy	83110	3.1 to 9.4	80 to 240				
	Polyurethane	Armour Shield 839 series	2.4 to 8.7	60 to 220				
			11.8	300				
C5.07*	Zinc rich epoxy	83003/83005	2.4 to 3.1	60 to 80				
	Epoxy	83150	3.9 to 5.9	100 to 150				
	Polyurethane	Armour Shield 839 series	1.2 to 3.9	30 to 100				
			10.2	260				
C5.08*	Zinc rich epoxy	83003 /83005	2.4 to 3.1	60 to 80				
	Epoxy	83150	3.9 to 5.9	100 to 150				
	Polyurethane	Armour Shield 839 series	3.5 to 6.3	90 to 160				
			12.6	320				
Notes:								
Metal surface preparation requirement: Sa3 (SSPC-SP5)								
*Coating System is UV Durable								

CORROSIVITY CATEGORY CX EXTREME

ISO 12944 System No.	Generic Type Coating	Product Code	DFT (mils)	DFT (microns)	Expected Durability
CX extreme	Zinc rich epoxy	83003/83005	2 to 3	50 to 75	CX extreme
	Epoxy	83110	5.9 to 9.8	150 to 250	
	Epoxy	83110	5.9 to 9.9	150 to 250	
			≥ 13.8	≥ 350	
Notes:					
Metal surface preparation requirement: Sa3 (SSPC-SP5)					
*Coating System is UV Durable					