



Overview of paint systems for exterior steel based on the AS/NZS2312 standards



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Yacht & Boat Paint

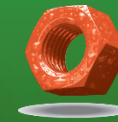

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Paint Systems for Mild Steel

Equivalents to AS/NZS 2312.1:2014



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Engineered Coating Systems

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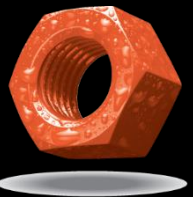

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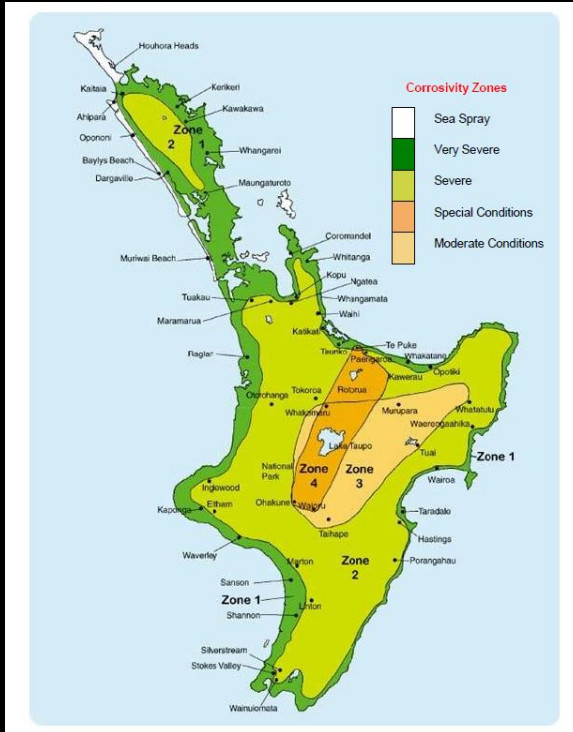
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Starting Point

- To select the correct coating system first you must know the type of steel you have, select the applicable environmental category and understand what length of durability period is required



Environmental Category maps



Description	ISO 9223	Old AS/NZS 2312	Govt Building Code Corrosion ZONES	Typical Exterior Environment
Very low	C1	A	Zone 3	Few alpine areas
Low	C2	B	Zone 3	Arid/rural/urban
Medium	C3	C	Zone 2	Costal
High	C4	D	Zone 1	Sea-shore (calm)
Very High - Industrial	C5-I	E-I	Zone 4	Chemical plants / volcanic
Very High - Marine	C5-M	E-M	Zone 1	Sea-shore (surf)
Sea Shore / Surf extreme	CX	-	Sea Spray	Sea-shore (severe surf)
Inland Tropical	T	F	n/a	Non-costal tropics

Classification of Environments

As per Section 2 - AS 2312.1 and based on ISO 9223 corrosivity categories

<p style="text-align: center;"><u>Micro-Environments</u></p> <p>In addition to climatic effects, the local environmental effects (microclimate) produced by the erection of a structure or installation of equipment needed to be taken into account. Such on-site factors require additional consideration because a mildly corrosive atmosphere can be converted into an aggressive environment by microclimatic effects. For example, a significant acceleration of corrosion rate can occur in the following circumstances:</p> <p>1/ At locations where the metal surface remains damp for an extended period, such as where surfaces are not freely drained or are sheltered from sunlight.</p> <p>2/ On unwashed surfaces, i.e. surfaces exposed to the atmospheric contaminants, notably coastal salts and pollution, but protected from cleansing rain.</p> <p>Other microclimatic effects which may accelerate the corrosion rate of the deterioration of its protective coating include acidic or alkaline fallout, industrial chemicals and solvents, airborne fertilizers and chemicals, prevailing winds which transport contamination, hot or cold surfaces and surfaces exposed to abrasion and/or impact etc. It is very difficult, if not impossible, to predict accurately the aggressiveness of a given environment and a certain amount of educated judgment is required to assess its influence on coating life.</p>	<p style="text-align: center;"><u>Category C1: Very Low</u></p> <p>Most commonly found inside heated or air conditioned buildings with clean atmospheres. They may also be found in semi-sheltered locations remote from marine or industrial influence and in unheated or non-air conditioned buildings. The only external environments in Australia or New Zealand are some alpine regions although generally these environments will extend into category C2.</p> <p style="text-align: center;"><u>Category C2: Low</u></p> <p>This category includes dry, rural areas as well as other regions remote from the coast or sources of pollution. Most (but not all) areas of Australia or New Zealand beyond 50km from the sea are in this category. Unheated buildings where some condensation may occur, such as warehouses and sports halls, can be in this category, however proximity to the coast is an important factor.</p> <p style="text-align: center;"><u>Category C3: Medium</u></p> <p>This category covers coastal areas with low salinity. The extent of the affected area varies with factors such as winds, topography and vegetation. Along ocean front areas with breaking surf and significant salt spray, it extends from about 1km inland to between 10 to 50 km inland, depending on the strength of prevailing winds and topography. Such regions are also found in urban and industrial areas with low pollution levels, however these areas are uncommon.</p>
<p style="text-align: center;"><u>Category C4: High</u></p> <p>This category occurs mainly on the coast. Around sheltered bays, Category C4 extends up to 50m inland from the shoreline. In areas of rough seas and surf, it extends from about 200-300m to 1km inland. As with other categories the extent depends on winds, wave action and topography. Industrial regions may also fit into this category and this category extends inside the plant where it is best considered as a microenvironment. Damp, contaminated interior environments such as occur with swimming pools, dye works, paper plants, foundry's, smelters and chemical plants may also extend into this category.</p>	<p style="text-align: center;"><u>Category C5: Very High</u></p> <p style="text-align: center;">(C5-I: Industrial C5-M: Marine) & CX-Extreme</p> <p>This category is common offshore and on the beachfront in regions of rough seas and surf beaches. The region can extend inland for several hundred metres and in some areas it can extend more than 1/2km from the coast. This category may also be found in aggressive industrial areas, where the environment may be acidic with pH of <5. For this reason, Category C5 is divided into Marine and Industrial for purposes of coating selection. Some of the damp and/or contaminated interior environments in category C4 may occasionally extend into this category. In addition there is an additional Category CX Extreme, for severe surf and off shore. If this is encountered the user should seek professional advice.</p>
<p><u>Category T: Inland Tropical</u> has been omitted in this list. Please refer to the Standard if required.</p>	<p style="text-align: center;">Important Note :</p> <p>If a site is considered to be in more than one category, then a selected coating should be capable of resisting the most severe of the environments involved.</p>
<p>Note: For a full, more detailed description please refer to the above mentioned Standard</p>	<p style="text-align: right;">October 2017</p>

Our most common environmental categories are C3: Medium and C4: High

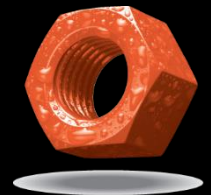
Category C3: Medium

This category covers coastal areas with low salinity. The extent of the affected area varies with factors such as winds, topography and vegetation. Along ocean front areas with breaking surf and significant salt spray, it extends from about 1km inland to between 10 to 50 km inland, depending on the strength of prevailing winds and topography. Such regions are also found in urban and industrial areas with low pollution levels, however these areas are uncommon.

Category C4: High

This category occurs mainly on the coast. Around sheltered bays, Category C4 extends up to 50m inland from the shoreline. In areas of rough seas and surf, it extends from about 200-300m to 1km inland. As with other categories the extent depends on winds, wave action and topography. Industrial regions may also fit into this category and this category extends inside the plant where it is best considered as a microenvironment. Damp, contaminated interior environments such as occur with swimming pools, dye works, paper plants, foundry's, smelters and chemical plants may also extend into this category.

Note: where a decision is being made between categories (eg is this C3 or C4?) the higher category should be chosen



Common Mild Steel Paint Systems & Durability periods

Resene Engineered Coating Systems

Equivalent to AS/NZS 2312.1

PAINTING SYSTEMS FOR STEEL

Coating System Details									Durability - Years to first maintenance						
System Designation	Surface Preparation	1st Coat		2nd Coat		3rd Coat		Total Nom DFT μm	Atmospheric corrosivity category						
		Product	Nom DFT μm	Product	Nom DFT μm	Product	Nom DFT μm		C1 Very Low	C2 Low	C3 Med.	C4 High	Very High		
														C5-I Ind	C5-M Mar
INORGANIC ZINC SILICATE															
IZS1	Sa 2½	Zincilate 11	75	-	-	-	-	75	25+	25+	15-25	10-15	2-5	5-10	
IZS4	Sa 2½	Zincilate 11	125	-	-	-	-	125	25+	25+	25+	15-25	5-10	10-15	
POLYURETHANE - Two Pack, Solvent Borne															
PUR1	St3	Armourcote 510	125	Uracryl 403	50	-	-	175	*	10-15	5-10	2-5	-	-	
PUR2	Sa 2½	Armourcote 220	75	Uracryl 403	50	-	-	125	25+	10-25	5-10	2-5	-	-	
PUR3	Sa 2½	Armourcote 220	75	Armourcote 510	125	Uracryl 403	50	250	*	25+	15-25	10-15	5-10	5-10	
PUR4	Sa 2½	Zincilate 11 or ArmourZinc 120	75	Armourcote 510 or Armourcote 515	125	Uracryl 403	50	250	*	25+	15-25	10-15	5-10	5-10	
PUR5	Sa 2½	Zincilate 11 or ArmourZinc 120	75	Armourcote 510	200	Uracryl 403	50	325	*	25+	25+	25+	15-25	15-25	

*While this system would have very high durability in this atmospheric category, it is unlikely that it would be economic.

NOTE: Some colour finishes may need a thicker coat to achieve opacity.

LEGEND: St 3 = Power Tool cleaning (See AS1627.3)

Sa 2½ = Abrasive Blast Cleaning - Class 2½ (see AS1627.4)

DFT = Dry Film Thickness in Microns

Chart 4
December 2014

To show how a lesser system reduces durability period:
 Single pack decorative system (power tool prep)

Resene Engineered Coating Systems

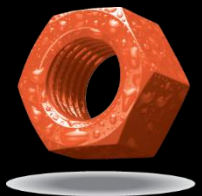
Equivalent to AS/NZS 2312.1

PAINTING SYSTEMS FOR STEEL

Coating System Details									Durability - Years to first maintenance					
System Designation	Surface Preparation	1st Coat		2nd Coat		3rd Coat		Total Nom DFT μm	Atmospheric corrosivity category					
		Product	Nom DFT μm	Product	Nom DFT μm	Product	Nom DFT μm		C1 Very Low	C2 Low	C3 Med.	C4 High	Very High	
													C5-I Ind	C5-M Mar
ACRYLIC - Latex, Single Pack														
ACL1	St3	Galvo One	40	Hi-Glo Sonyx 101 Lumbersider Enamacryl Lustacryl	40 40 40 40 40	Hi-Glo Sonyx 101 Lumbersider Enamacryl Lustacryl	40 40 40 40 40	120 120 120 120 120	15+	5-15	2-5	-	-	-
ACL3	Sa 2½	Zincilate 11 or ArmourZinc 120	75	Armourcote 510	125	Hi-Glo Sonyx 101 Lumbersider	40	240	*	25+	15-25	10-15	5-10	5-10
ACL4	Sa 2½	Armourcote 510	250	Hi-Glo Sonyx 101 Lumbersider	40	-	-	290	25+	15-25	10-15	5-10	2-5	2-5

Key Points

- All exterior paint systems with greater than 2-5 year durability periods typically require abrasive blast preparation of steel
- Durability periods are “time to first major maintenance” however regularly on-going maintenance should always be carried out.
- All paint coatings should be from the same supplier, not a combination of suppliers





Paint Systems for HDG Steel

Equivalents to AS/NZS 2312.2:2014



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Common HDG Steel Paint Systems & Durability periods

Resene Engineered Coating Systems Equivalent to AS/NZS 2312:2

PAINTING SYSTEMS FOR HOT DIP GALVANISED STEEL TO AS/NZS 4680

Coating System Details										Durability-Years to first maintenance of paint component of duplex system			
System No.	Service qualities	Surface Preparation	1st Coat		2nd Coat		3rd Coat		Total Nom DFT μm^*	Atmospheric corrosivity category			
			Product	Nom DFT μm	Product	Nom DFT μm	Product	Nom DFT μm		C2 Low	C3 Med.	C4 High	C5 Very High
HOT DIP GALVANIZING													
1D	Decorative †	Degrease, Wash and Dry	Galvo-Prime	35	HiGlo, Sonyx 101, Enamacryl, Lustacryl	50	-	-	85	5-10	5-10	NR	NR
2D	Decorative	Degrease, Wash and Dry, Sweep abrasive blast #	Armourcote 220	75	Uracryl 403 or Imperite IF 503	50	Uracryl 403 or Imperite IF 503	50	175	10-15	10-15	5-10	NR
3I	Wear and Tear Industrial	Degrease, Wash and Dry, Sweep abrasive blast #	Armourcote 220	75	Armourcote 510	150	-	-	225	>15	10-15	10-15	5-10
4D	Protective Long term Decorative	Degrease, Wash and Dry, Sweep abrasive blast #	Armourcote 510	250	Uracryl 403 or Imperite IF 503	50	Uracryl 403 or Imperite IF 503	50	350	>15	>15	10-15	5-10
5D	Protective Long term Industrial	Degrease, Wash and Dry, Sweep abrasive blast #	Armourcote 220	75	Armourcote 510	225	Uracryl 403 or Imperite IF 503	100 2 x 50 μm application	400	>15	>15	>15	10-15
5I	Protective Long term Industrial	Degrease, Wash and Dry, Sweep abrasive blast #	Armourcote 220	75	Armourcote 515 MIOX	150	Armourcote 515 MIOX	175	400	>15	>15	>15	10-15

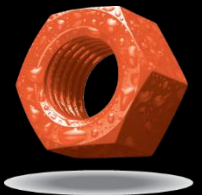
* Thickness of galvanising not included. † To increase decorative life use system 2D as a minimum.

Controlled sweep abrasive blasting with clean non-metallic abrasive to impart a surface roughness and remove chromate quenched surface adhesion of the applied system

Chart 1
December 2014

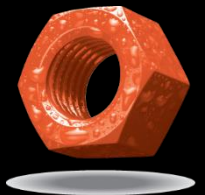
Key Point

- AS/NZS2312.2 HDG Steel equivalent Paint systems do not take into account the HDG itself which alone generally has a 20-30year durability period depending on environmental category, location and exposure etc.



Key Points

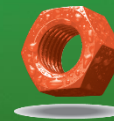
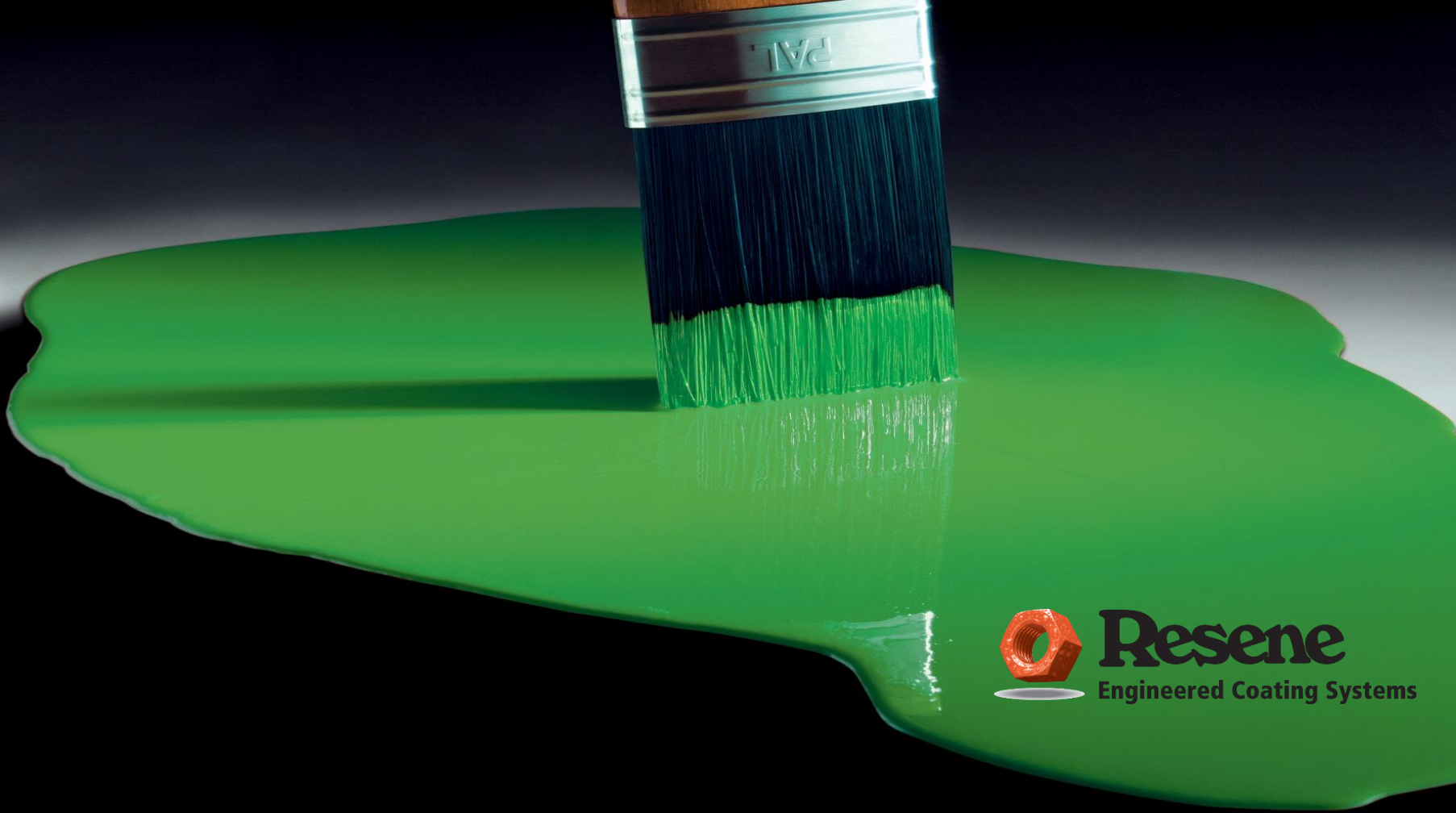
- The coating type is only one factor in determining the durability of a protective coating system. Surface preparation, application, procedures, design, local variations in environment and other factors will all influence the durability of coatings.
- AS/NZS2312 states that the maximum expected product warranty should be about one-quarter to one-third of the estimated durability period



Canopy Situation

- Exterior non-rained washed steel is considered to be in the highest corrosion zone and therefore requires an extremely durable coating system





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