NEW ZEALAND STEEL

DURABILITY STATEMENT

For Galvsteel™ (galvanised steel) manufactured by New Zealand Steel Limited and used for structural building elements

Galvsteel™ material, when used for Purlins, Girts or Framing will have a durability of 50 years when used and maintained as defined below.

The above statements are subject to the following:

1. **Specifications**

Zinc coating weight;	275g/m² (Z275) or 450g/m² (Z450).
Complying with;	AS 1397:2001.
Steel Grade;	G250, G300, G450, G500 or G550.
Steel Thickness Range;	0.55-2.25 mm.
Bend diameter;	G250, G300; ≥ 2T.
	G450, G500, G550; ≥4T (where T = total coated thickness).

2. **Fixing, Handling and Maintenance according to the following publications:**

(a) New Zealand Steel Limited, *Specifiers and Builders Guide,* and *Installers Guide* (refer www.nzsteel.co.nz for most current version).
(b) *NZ Metal Roof & Wall Cladding, Code of Practice, Version 2* – Apr. 2008.
(c) AS/NZS 2312:2002 (Incorporating Amendment No. 1) *Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings.*
(d) Instructions and literature published by individual purlin and steel framing manufacturers.

3. **Environment.**

Initially the macroclimate in which the building is situated needs to be determined. Table 2 is broken down into broad geographical regions of New Zealand. Within the regions the corrosivity is further defined by the distance to the nearest coast, harbour or estuary.

For aggressive industrial environments either externally or internally, or buildings subject to heavy geothermal influence, expected corrosion rates and recommended coatings will need to be determined on a case by case basis using HERA Report R4-133:2005 [d].

4. Building Types

This statement classifies six different building situations where structural steel may be used (N.B. one building may contain more than one of these situations);

a) **Residential/Dry**

Steelwork located in a dry internal environment, with an effective thermal break between external cladding and the structure, such as a fully enclosed office, an apartment building or a domestic house. This includes structures that are lined with building paper and have internally controlled environments such as commercial shops and malls.

b) **Internal**

Steelwork located in a damp or humid environment, with no effective thermal break between the external cladding and structure. For structures such as storage sheds, garages and workshops which are typically closed when not in use. These structures are distinguished in the following two cases;

- **Damp**

  Steelwork located in a damp internal environment where condensation may occur, where the structure may be in an open sunny location (i.e. when the structure is exposed to the sun and not under any form of cover). This is for structures such as exhibition halls, vehicle depots and warehouses.

- **High Humidity**

  Steelwork located in an internal high humidity environment with some pollution, where the structure may be in a humid and shaded location (i.e. when the shed is under a tree shaded from the sun). This is for structures such as food processing plants, breweries and dairies.

c) **Open Front**

Steelwork located near permanent openings (such as near doors or windows that remain open under operating conditions), and may be exposed to the prevailing winds. For structures such as open front lean-to, gable structure closed in on three sides or warehouses with large openings. This building type has two cases, which are only applicable to the internal steelwork close to the openings as defined in Section 5.5 of reference [d].

- **Protected**

  Structures that are protected from the wind coming off the closest sea.

- **Open**

  Structures that are open and exposed to the prevailing wind coming off the closest sea.

d) **Awning**

Steelwork that is exposed to the wind but is protected from the rain located in an open sided structure such as carports or structures closed in on one side only. The equivalent reference [b] designation is "Sheltered". The corrosion rate of this building type and that of "Open Front; Exposed' are identical.

5. Paint Systems

The following paint systems are referenced in Table 2 of this document, alternative solutions are also available and may be identified by reference to HERA Report R4-133:2005 [d] or by discussions with paint suppliers or coatings specialists.

Table 1

System	Surface Preparation	1st Coat			2nd Coat			3rd Coat			Total nominal DFT [3] (µm)
		Type	PRN [1]	Nominal DFT [2] (µm)	Type	PRN [1]	Nominal DFT [2] (µm)	Type	PRN [1]	Nominal DFT [2] (µm)	
P1	Degrease, wash and dry	Acrylic dispersion paint		40	Acrylic dispersion paint[4]		40				80
P2		Galvanised iron acrylic primer		40	Acrylic dispersion paint[4]		40				80
P3[5]		Etch primer		12	Acrylic elastomeric		350				362
P4[5]	Sweep abrasive blast	Polyamido cured epoxy primer	C10	75	High build epoxy	13	200	Acrylic 2-pack	C33	50	325
P5[5]								Polyurethane gloss	C26	50	325

Notes on Table 1

[1]PRN: Paint reference number as given in appendix C of reference [c].
[2]DFT; coating dry film thickness.
[3]The total nominal DFT does not include the galvanised coating thickness.
[4]Contact the coating supplier for feedback on the appropriate acrylic paint for its intended use. For example, for internal high humidity locations it is recommended to use acrylic enamel at the specified nominal DFT.
[5]P3, P4 and P5 coatings must be applied by a professional coating applicator to achieve the required durability performance.

6. Maintenance

Maintenance is necessary when the galvanised coating ceases to provide sacrificial protection to the steel base, or where the appearance is no longer aesthetically acceptable.

Rust staining or the growth of rust spots usually indicates the breakdown of galvanised coating. At the first sign of breakdown, the surface should be treated with an appropriate maintenance coating system. All maintenance should be carried out in accordance with AS/NZS 2312:2002 (Incorporating Amendment No. 1) [c] and *New Zealand Steelwork Corrosion Coatings Guide* (HERA Report R4-133) [d].

Regular inspections of the steel work and maintenance at the first signs of a problem will extend the durability of the sections.

7. Recommended coating systems to achieve 50 year durability.

Table 2 shows the recommended coating system to achieve 50 year durability for the different building conditions in the various marine environments throughout New Zealand.

8. References

a) El Sarraf, R. and Hicks, S. – *Extending the Durability Performance of Galvsteel™ using a Protective Coating System*, (HERA) Structural Systems Technical Report SSTR-001 2008.
b) NZS 3404 Part 1, *Steel Structures Standard 2009;* Standards New Zealand.
c) AS/NZS 2312:2002 (Inc Incorporating Amendment No. 1), *Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings.*
d) Clifton, G.C. and El Sarraf, R. *New Zealand Steelwork Corrosion Coatings Guide* (HERA Report R4-133) 2005.

August 2010

Table 2

	Location	Characterised by	Residential /Dry	Internal		Open front		Awning
				Damp	High humidity	Protected	Open	
Within 200m of breaking surf	West coast, South Island	Heavy salt deposits, almost constant smell of salt spray in the air.	1	3	4	4	4	4
Within 100m of breaking surf	West coast, North Island		1	3	4	4	4	4
Within 50m of breaking surf	Other coasts		1	3	4	4	4	4
200m up to 500m or more inland from breaking surf. In the immediate vicinity of calm salt water such as harbour foreshores.	West coast, South Island	Medium salt deposits, Frequent smell of salt in the air.	1	3	4	4	4	4
50m up to 500m or more inland from breaking surf. In the immediate vicinity of calm salt water such as harbour foreshores.	All other coasts		1	1	3	4	4	4
500m to 1km from breaking surf. In the immediate vicinity of calm salt water such as estuaries.	West coast of both islands and South coast of South Island.	Little salt deposits, occasional smell of salt in the air.	1	1	3	4	4	4
500m to 1km from breaking surf. In the immediate vicinity of calm salt water such as estuaries.	East coast of both islands, South coast of North Island and all harbours.		1	1	3	3	4	4
1km to 20 km from salt water	West coast of both islands and South coast of South Island	Minor salt deposits, no smell of salt in the air.	1	1	3	4	4	4
1km to 5km from salt water	East coast of both islands, South coast of North Island and all harbours.		1	1	2	3	4	4
20km to 50km from salt water.	West coast of both islands and South coast of South Island	No marine influence.	1	1	1	2	2	2
5km to 50km from salt water	East coast of both islands, South coast of North Island and all harbours.		1	1	1	2	2	2
Inland more than 50km from salt water.	Both Islands		1	1	1	1	1	1

Note; all environments may be extended inland by prevailing winds and local conditions.

Key

1	Z275
2	Z450 or Z275 and one of the paint systems P1 – P5 applied when new.
3	Z275 and one of (P3, P4 or P5) applied when new, <u>or</u> P1 or P2 applied when new and recoated every 15 years.
4	Z275 and one of (P3, P4 or P5) applied when new and then recoated every 15 years <u>or</u> (P1 or P2) applied when new and recoated every 8 years.