TIMBER QUEENSLAND
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TECHNICAL DATA SHEET
ISSUED BY TIMBER QUEENSLAND

CORROSION RESISTANCE OF METAL CONNECTORS

35

RECOMMENDED PRACTICE // APRIL 2020

Metal connectors are used extensively in timber framed construction both internally within the building envelope as well as externally where they are exposed to the 'elements'. These metal connectors include items such as strapping/bracing, framing anchors, cyclone ties, joist hangers and truss plates. Just as it is with timber, it is equally important to ensure the durability of metal connectors is appropriate to the environment in which they are used. The majority of metal connectors used in construction would be expected to perform satisfactorily for the life of the building, which for normal buildings, is 50 years.

This Data Sheet provides recommendations to assist in achieving this expectation for metal connectors that are not in ground contact or embedded in concrete.

HOW TO USE THIS DATA SHEET

1. Determine Corrosion Zone
2. Determine Exposure Condition (Table 2)
3. By considering 1. and 2. Above, determine Minimum Corrosion Protection (Table 3).

CORROSION ZONE DEFINITIONS

(For use with this Data Sheet to determine levels of corrosion protection)

Sea Spray Zone - Less than 1km from surf coast or 100m from bayside areas.

Coastal Zone - 1km to 10km from surf coast or 100m to 1km from bayside areas.

Industrial Zone - Close proximity to industrial complexes where corrosive gases may be emitted. e.g. Port Pirie and Newcastle.

Special Hazard Zone - The environment within a building may also adversely affect the durability of connectors. For example enclosed swimming pools, fertiliser sheds, tanneries, chemical plants, piggeries, poultry sheds and similar may cause rapid corrosion of galvanised metal products and may also impact on stainless steel. Corrosion in these buildings will require special attention and is beyond the scope of this Data Sheet.

Low Hazard Zone - Generally locations not described by the above.

AS 4312 – 2019 - ATMOSPHERIC CORROSIVITY ZONES IN AUSTRALIA

This standard also provides guidance for atmospheric corrosion categories as shown in Table 1 below which is the extracted, Table 4.1, from AS 4312 - 2019.

TABLE 1 – AS 4312 – 2019 ATMOSPHERIC CORROSIVITY CATEGORIES (C1 – CX)

Location	Example	Distance from shoreline					
		0 m to 50 m	50 m to 100 m	100 m to 500 m	0.5 km to 1 km	1 km to 10 km	10 km to 100 km
Temperate surf	Sydney, Wollongong, Newcastle, Gold Coast	CX	CX/C5	C5	C4	C3	C3[a]
Temperate semi-sheltered	Adelaide, Brisbane, Perth	C5	C4	C4	C3	C3[a]	C2
Temperate quiet	Melbourne, Hobart	C4	C3	C3	C3	C2	C2
Tropic quiet	Cairns, Townsville	CX	CX	C5/C4	C3	C2	C2

[a] Reduce category to C2 if elevation exceeds 50 m when greater than 5 km from shoreline
NOTE - The shoreline is not accurately defined; in critical applications this should be taken as the high tide line.

TABLE 2 - EXPOSURE CONDITION

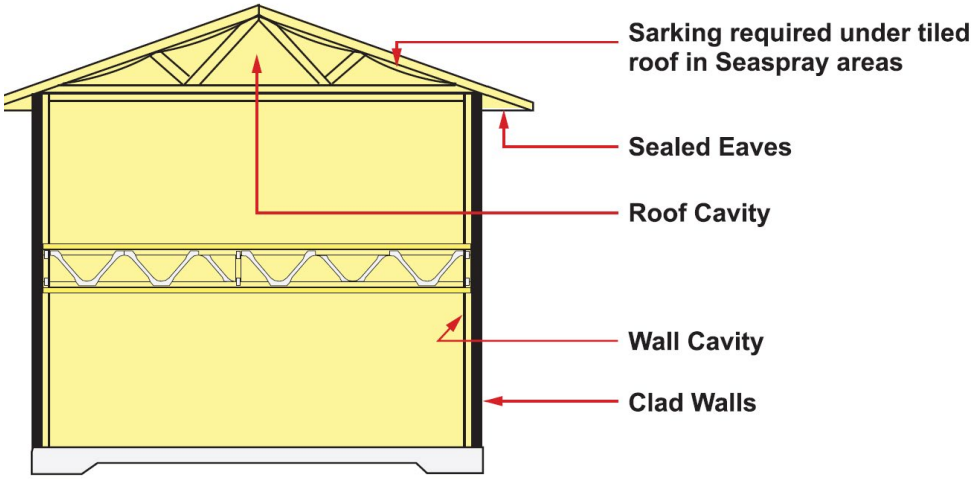
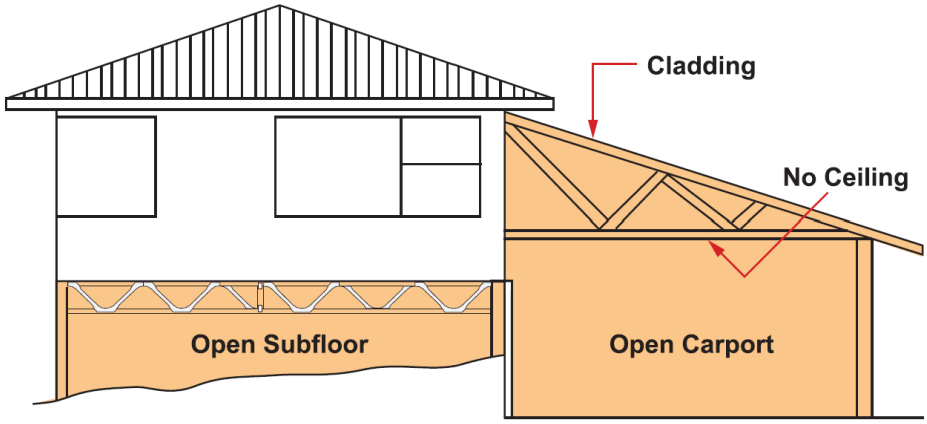
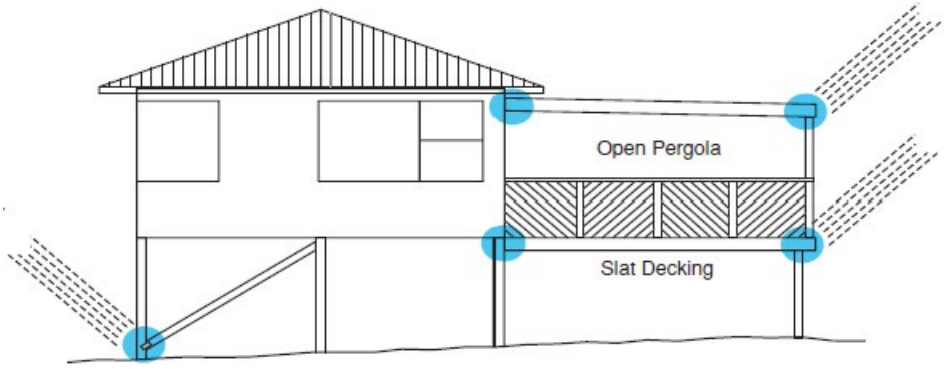
Definition	Exposure Condition
Enclosed Fully enclosed within the building envelope i.e. closed roof, floor and wall cavities.	
Sheltered Connectors not exposed to or washed by rain but may be subjected to wind-blown salts or other corrosive chemicals i.e. open garages, carports, shelters, open sub-floors and ventilated roof spaces.	
Exposed Connectors are exposed to weather and rain i.e. decks, pergolas and open sub-floor perimeters.	

TABLE 3 – MINIMUM CORROSION PROTECTION

Corrosion Zone	Approximate AS 4312 Corrosivity Category (Refer to table 1)	Exposure Condition	Minimum Corrosion Protection
Seaspray Zone – High and Very High	C4/C5/CX	Enclosed	Galvanised Z275 Class
		Sheltered	Stainless Steel 304 or equivalent
		Exposed	Stainless Steel 304 or equivalent
Coastal Zone - Medium	C3/C4	Enclosed	Galvanised Z275 Class
		Sheltered	Galvanised Z275 Class with Soft Seal (or equivalent) Coating or Stainless Steel 304 or equivalent
		Exposed	Stainless Steel 304 or equivalent or 600+ gsm Hot Dipped Galvanising
Industrial Zone - High	C5/CX	Enclosed	Galvanised Z275 Class
		Sheltered	Galvanised Z275 Class with 'Soft Seal' (or equivalent) Coating or Stainless Steel 304 or equivalent
		Exposed	Stainless Steel 304 or equivalent or 600+ gsm Hot Dipped Galvanising
Swimming Pool Splash Zone (typically within 2 m of pool edgei.e. timber decks) - High	C5	All	Stainless steel 304 or equivalent
Special Hazard Zone – High and Very High	NA	Enclosed	Special requirements depending on hazard. Refer to corrosion specialist.
		Sheltered	
		Exposed	
Very Low and Low Hazard Zones	C1/C2	Enclosed	Galvanised Z275 Class
		Sheltered	Galvanised Z275 Class
		Exposed	Stainless Steel 304 or equivalent or 300+ gsm Hot Dipped Galvanising

Notes:
1. The majority of light gauge metal connectors are manufactured from Z275 galvanised steel.
2. The recommendations in Table 2 are only applicable to timber that has not been treated with timber preservatives that can cause accelerated corrosion. Refer to additional advice that follows.
3. Toothed metal plate connectors (truss plates), should not be used in any exposed applications as cyclic wetting and drying (expansion/shrinkage) will cause the plates to disengage from the timber

TREATED TIMBER

Some timber preservatives such as CCA, ACQ and Copper Azole can cause accelerated corrosion of metal connectors, particularly where moisture is present as can occur in Exposed Conditions. For these situations, galvanised metal connectors will require additional coatings such as epoxy paint or fusion coated to isolate the zinc in the galvanising from the copper in the timber treatment. Alternatively, stainless steel should be used.

LOSP timber preservatives have negligible effect on rates of corrosion and no special additional corrosion considerations are required for these.

Photograph 1 - ACCEPTABLE – Z275 bracing, multigrips and truss plates in a Low Hazard (>10km from surf) Sheltered Condition. Note: Connectors have been installed for 35 years.

Photograph 2 - ACCEPTABLE – As above, but caution recommended.

Photograph 3 - NOT ACCEPTABLE – Z275 connectors in deck joists 1 km from surf. 6 years old, Sunshine Coast.

Photograph 4 - NOT ACCEPTABLE – Uncoated Z275 nail plates and framing anchors in Low Hazard Zone but Exposed Condition under a deck.

SAFE WORKING

Working with timber produces dust particles. Protection of the eyes, nose and mouth when sanding, sawing and planing is highly recommended. Refer to tool manufacturers for safe working recommendations for particular items of equipment.

DISPOSAL OF OFFCUTS AND WASTE

For any treated timber, do not burn offcuts or sawdust.

Preservative treated offcuts and sawdust should be disposed of by approved local authority methods.

FURTHER INFORMATION

Timber Service Life Design Guide #5 published by FWPA and available at www.woodsolutions.com.au

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