

## FACT FILE 2: Durability

Protective coatings of either TrueCore® - a zinc/aluminium alloy, or zinc, defend the steel against corrosion. (Note: TrueCore® steel is produced in Australia by BlueScope Steel Limited. Zinc coated steel is commonly known as "galvanized iron")

A natural phenomenon known as sacrificial protection prevents corrosion of any steel exposed at cut edges and penetrations.

**The protective coatings.** The coatings are tough, continuous, of uniform thickness, tightly adherent, and strongly resistant to corrosion. They are applied to both sides of the steel by the hot-dip process. In this process the steel strip is passed through a bath of molten metal, the amount of coating applied being closely controlled. The coating mass must meet the requirements of the relevant Australian Standard (AS 1397), or its equivalent.

BlueScope Steel Limited provides a 50 -year warranty\* for its TrueCore® Steel used correctly in steel house frames. Steel framing is the only framing material for which any kind of structural durability warranty is offered. The more traditional galvanized steel also gives satisfactory performance within the building envelope.

**Forming and fabrication does not impair the coatings.** Because the protective coatings are tough, and their bending properties understood, the forming processes involved in shaping the building frame components do not impair the effectiveness of the protective coatings. The coatings are also tough and resist damage during fabrication and handling on site.

**Sacrificial Protection.** Frame sections are usually produced from narrow coils of steel strip slit from wider coils. Service holes are punched into the studs during manufacture to enable plumbers and electricians to install piping and wiring. During fabrication of the frame a variety of joining methods are used that usually penetrate the steel. At the slit edges of the plates and studs, at fixing points where the steel is penetrated and where components have been punched or cut, the steel base is exposed, but will not rust. It is protected against corrosion by sacrificial protection.

Sacrificial protection refers to the process initiated when dissimilar metals are in contact in the presence of moisture. The more active metal, in this case the zinc or zinc/ aluminium coating, will sacrifice itself in preference to the steel, thus protecting the steel base and its structural properties.

The effect is well known. It is evident at the ends of sheets of corrugated steel roofing where they have been cut to length, or at the cut edges of steel rainwater guttering.

These articles do not corrode away from cut edges even though they are exposed to more severe conditions than house frames. It is worth noting also that galvanized steel strips with cut edges are commonly used as bracing on timber frames.

**Good Building Practice.** In certain conditions zinc or Zinalume® steel coatings can be corroded by galvanic action through contact with dissimilar metals. In particular, contact with copper or brass in the presence of moisture will lead to the rapid removal of the coating from galvanized or Zinalume® steel, followed in due course by corrosion of the underlying steel. Plumbers must therefore take care to isolate copper piping from steel framing by inserting specialized plastic plumbing grommets into the pre-punched service holes in the studs.

For the same reasons CCA treated timbers (which contain soluble copper-based chemicals) used in some external claddings must not come into contact with steel frames. They must be isolated by an approved building membrane.

Masonry wall ties must be installed in a way that prevents moisture travelling along the tie to the inner surface of masonry or frame.

When installing elevated steel sub-floor systems, it is important to follow the manufacturers' instructions. The thickness of the galvanizing depends on the coating process, and for certain exposure conditions some manufacturers may recommend additional protective measures.

It should be noted that for all steel framing there can be some unusually corrosive conditions where heavier coatings than normal may be required. NASH or a steel supplier is able to provide advice on this.

\*Terms and conditions apply.

### References:

AS 1397 *Steel sheet and strip Hot-dipped zinc-coated or aluminium/zinc coated.*

AS 2312 *Guide to the protection of iron and steel against exterior atmospheric corrosion.*

AS 3623 *Domestic metal framing.*

AS 4600 *Cold-formed sections code.*

AS 3700 *Masonry Code (brick ties).*

Building Code of Australia 1996 *volume Two, Part 3.4.2 Steel Framing.*

Building Code of Australia 1996 *volume Two, Part 3.3.3.2 Masonry Construction*

BlueScope Steel Limited Technical Bulletin No. TB 10, *"Cut Edge Protection of Zinc-coated and Zinc/Aluminium Alloy-Coated Steel Sheet."*

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