

Durability – Steel House Frames

Steel House Frames have In-built Durability. Corrosion Protection is Built In.

Protective coatings of either TrueCore® 45% zinc/55% aluminium alloy, or zinc, defend the steel against corrosion. (Note: TrueCore® is produced in Australia by BlueScope Steel. 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 provides a 50 – year warranty for its TrueCore® 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.

Some steel framing systems are partially or completely joined by welding. The high temperatures reached in localised areas during the welding process remove a small amount of the metallic coating. The fabricator restores the corrosion-resistance of the affected areas by applying a suitable zinc-rich paint (commonly called “cold galvanizing”) as required by AS 4600 Cold-formed sections code.

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 TrueCore® 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 TrueCore®, 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.

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.
NASH Standard for Residential and Low-Rise Steel Framing, Part 1: Design Criteria.
AS 4600 Cold-formed sections code.
AS 3700 Masonry Code (brick ties).
BlueScope Steel Technical Bulletin No. TB 10, “Cut Edge Protection of Zinc-coated and Zinc/Aluminium Alloy-Coated Steel Sheet.”

For more information about galvanizing [click here](#).

Note: Ownership of the TrueCore® trademark resides within BlueScope Steel