STEEL HOUSE FRAMES

TECHNICAL BULLETIN TB-34

Rev 1, April 2008
This issue supersedes all previous issues

INTRODUCTION

This bulletin has been written to assist designers, builders and homeowners to realise the benefits of frames made from TRUECORE® steel. The coating of TRUECORE® steel complies with the durability requirements of the Building Code of Australia (BCA) *3.4.2.2. Volume 2.*

Only general information is provided in this bulletin and this is not a substitute for professional advice. BlueScope Steel recommends that you seek specific advice regarding the needs of your project.

ENVIRONMENT

Residential framing made from TRUECORE® steel should be erected greater than 300 metres from "surf" and/or "exposed" salt marine influences or greater than 100 metres from the high water mark of "calm" salt marine or brackish influence. Refer *TB-35 'Australian Salt Marine Classifications'* for definitions and some examples.

HANDLING AND SITE STORAGE

As with all building materials, care should be exercised when handling and storing frames and trusses made from TRUECORE® steel.

Suitable gloves should always be worn when handling framing material. Framing material should be handled in a manner suitable to protect the coating and to avoid any adverse effects on product performance.

Minor scratches are unlikely to affect product performance, however if the coating is accidentally damaged and needs repair *(see Technical Bulletin TB-10 - Cut edge protection of zinc-coated and zinc/aluminium alloy-coated steel)*, the affected area can be treated by the application of a zinc rich paint designed for this purpose.

Whilst TRUECORE® steel is a durable framing material, frames and trusses made from TRUECORE® steel should be kept dry during storage and erection. Minor amounts of moisture such as overnight condensation should simply evaporate. Frames and trusses should be stored on a flat, even surface and other loads not placed on top. It is good practice to keep exposure to the weather during the building process to a minimum.

TERMITE CONSIDERATIONS

The BCA is the principal source document that governs how buildings can be built in Australia and Part 3.1.3 of Volume 2 clearly recognizes that if primary building elements are made from steel, no termite barrier is required. Termites and borers cannot eat steel. Knowing the structural integrity of the home cannot be compromised should give homeowners peace of mind.

Owners thinking of installing a termite barrier to protect secondary building components such as skirting boards, architraves and cupboards manufactured from cellulose material, may wish to contact the National Association of Steel-framed Housing (*NASH*). NASH commissioned a study on the risk of termite infestation in steel framed and timber framed houses. This data provides evidence of the peace of mind that can come from choosing a steel frame. It is then the owner's choice whether they believe it is necessary to pay the additional cost for a barrier system.

WALL FRAMES

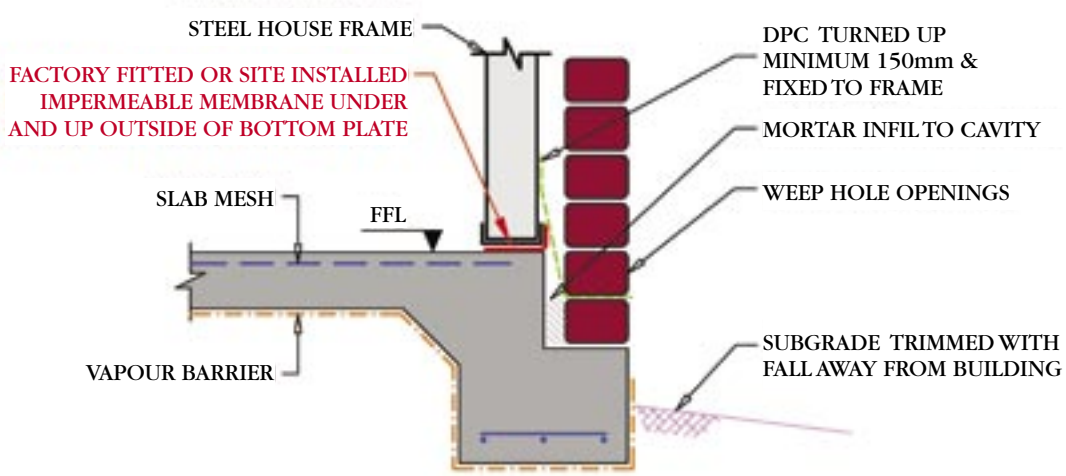
Use a Membrane

An impermeable membrane should be installed under all perimeter bottom plates fixed to concrete slabs on ground. The membrane should also extend up the weather side flange of the bottom plate *(see Figures 1 and 2)*. This is consistent with good building practice and is a condition of BlueScope Steel's warranty on house framing made from TRUECORE® steel.

When a frame is fixed to a suspended floor, an impermeable membrane below the wall frame is not required to protect the wall from ground moisture if adequate sub-floor ventilation is supplied and a minimum distance

BLUESCOPE STEEL

Figure 1: Deep Edge Rebates



PROPOSED REBATE SYSTEM

Note: Beam reinforcement shall be designed to suit soil classification.
Note: Termite management treatments have been omitted for clarity.

of 400mm is allowed between the underside of the floor framing and existing ground level. (The protection of internal bottom plates is not considered necessary. For "wet areas" refer to Australian Standard AS 3470). The type of membrane used should be "impermeable to moisture".

Suitable impervious membranes include:

- Bitustik / Bituthene® 2000 by Grace Construction Products,
- Polyethylene and other products specified in BCA section Volume 2, 3.3.4.4
- Brushable Hydroseal from Tremco
- Kordon Termite Barrier (see manufacturer's specification for detail).

The protection of the weather side flange *(see Figure 1)* is necessary because this part of the frame is subject to moist air movement from the lower parts of the cavity as it tries to evaporate and move past the masonry damp-proof course.

Earth the Frame

For safety reasons, your house frame made from TRUECORE® steel should be temporarily earthed during erection. At the first opportunity your electrician should follow local electricity supply authority regulations and effectively earth the completed building frame via a connection to the main earth bar of the house switchboard.

Incompatible Materials

Materials considered incompatible with framing components made from TRUECORE® steel include:

- copper *
- lead *
- brass *
- stainless steel
- treated timber, green timber and other timber capable of retaining moisture. **NOTE** - frames made from TRUECORE® steel should be isolated from contact with treated, green or moist timber unless specific written advice has been obtained from BlueScope Steel.
- washers containing significant amounts of carbon black eg. neoprene.

The use of incompatible materials will void your warranty. *See Corrosion Technical Bulletin CTB-12 - Dissimilar Metals and Corrosion Technical Bulletin CTB-13 - Contact with Timber*

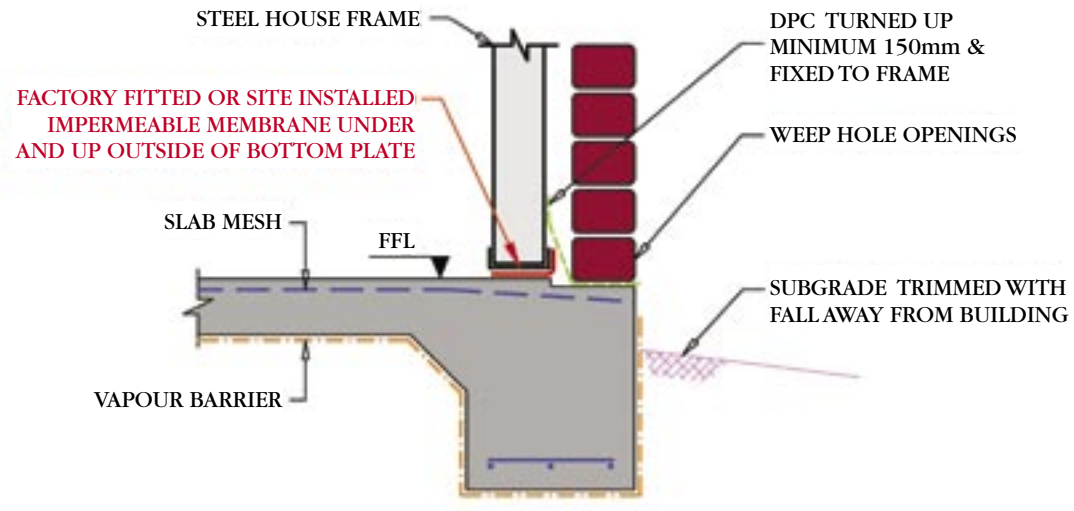
* - plumbing components should be isolated from frames or trusses using plastic or polymer grommets placed in pre-cut service holes in your wall frames.

ROOF TRUSSES

It is a condition of BlueScope Steel's warranty that roof trusses are completely enclosed within the building envelope, as described in the warranty terms and conditions. Building design should aim to minimise the ingress of any salt-laden, moist air. Avoid exposed eaves, creating an area of exposed but unwashed framing material *(see Corrosion Technical Bulletin CTB-8 - Building Applications).*

BLUESCOPE STEEL

Figure 2: Shallow Edge Rebates



PROPOSED REBATE SYSTEM

Note: Beam reinforcement shall be designed to suit soil classification.
Note: Termite management treatments have been omitted for clarity.

WALL INSULATION

House framing made from TRUECORE® steel offers many advantages, including tight dimensional tolerances, which can assist in achieving good insulation. One example of how tight tolerances can help is by reducing air leakage between the frame and insulating materials when heating a home in a cool climate.

Bulk insulation materials are commonly used with wall frames made from TRUECORE® steel. When insulating steel wall frames in cold climates or when building with cladding materials with low thermal resistance, such as metal, plastic or fibre-cement sheeting, rigid board or sheathing-type insulation products are recommended. These do not lose any of their insulating properties by being compressed into the cavity. If using bulk insulation with steel framing and lightweight cladding, batten the cladding out from the framing or use thin expanded polystyrene strips between the stud and the cladding. This will ensure good thermal performance and condensation control around the framing.

WALL TIES

Sometimes a forgotten structural component, the choice of wall ties can be important to the structural performance of a building frame. Galvanized wall ties complying with AS 2699 are suitable for use with steel framing in most situations, although more durable ties may be needed within 1km from breaking surf and heavy industrial areas, refer BCA Volume 2, Table 3.3.3.1.

Polymer wall ties are now available and should provide good performance with a steel building frame in all environments.

Stainless steel wall ties, if used, must be insulated from the framing material to avoid the possibility of corrosion resulting from the use of incompatible dissimilar metals.

PHONE / RADIO RECEPTION

A steel frame should not affect your telephone, wireless computer network, radio or mobile phone or television reception.

NOISE

A study published by CSIRO has concluded that steel framed houses are no “noisier” than houses with other types of frames. Whether a steel frame is mechanically jointed or welded, movement caused by changes in temperature should not cause significant noise in a properly constructed and insulated home (Source: *NASH*).

NOTE - *welded areas must be treated by the application of a zinc rich paint to ensure weld affected area has equivalent performance to remainder of TRUECORE® steel frame.*

FASTENERS

The correct choice of fastener is critical to long-term performance when fixing premium steel products. Fasteners used to fix your steel framing should conform to AS3566 Class 3 or Class 4 when at less than 400m from “surf “ or “exposed” salt marine influences.. Do not use stainless steel fasteners with steel framing made from TRUECORE® steel.

Rivets and bolts used to secure framing made from TRUECORE® steel should conform with relevant standards, be compatible with and have equivalent durability to TRUECORE® steel.

BLUESCOPE STEEL

LIGHTNING

As mentioned previously, steel frames are earthed and therefore this provides a direct path for the energy in the unlikely event of a lightning strike.

WARRANTY

A 50-year warranty is available on application for residential framing made from TRUECORE® steel. Warranties must be applied for prior to cladding of TRUECORE® steel framing (subject to terms and conditions). If you have any questions regarding this bulletin and for a copy of the full Warranty terms and conditions please contact your local BlueScope Steel office or BlueScope Steel Direct on 1800 800 789 or visit:

www.truecore.com.au

RELATED BLUESCOPE STEEL TECHNICAL BULLETINS:

Technical Bulletin TB-10 - Cut edge protection of zinc-coated and zinc/aluminium alloy coated steel

Technical Bulletin TB-16 - Fasteners For Roofing and Walling Product – Selection Guide

Technical Bulletin TB-35 - Australian Salt Marine Classifications

Corrosion Technical Bulletin CTB-8 - Building Applications

Corrosion Technical Bulletin CTB-12 - Dissimilar Metals

Corrosion Technical Bulletin CTB-13 - Contact with Timber

Please ensure you have the current Technical Bulletin as displayed at www.bluescopesteel.com.au

BlueScope Steel

BlueScope Steel Limited ABN 16 000 011 058
BlueScope Steel (AIS) Pty Ltd ABN 19 000 019 625

9 320075 054410

AUSTRALIA

SYDNEY	Telephone: (02) 9795 6700
MELBOURNE	Telephone: (03) 9586 2222
BRISBANE	Telephone: (07) 3845 9300
ADELAIDE	Telephone: (08) 8243 7333
PERTH	Telephone: (08) 9365 6666

OVERSEAS

BlueScope Steel (Malaysia) Sdn Bhd	Telephone: (603) 3250 8333
BlueScope Steel (Thailand) Limited	Telephone: (66 38) 685 710
PT BlueScope Steel Indonesia	Telephone: (62 21) 570 7564
BlueScope Steel Southern Africa (Pty) Limited	Telephone: (27 21) 555 4265

BLUESCOPE STEEL

Produced by Artimprint (02) 9984 8586