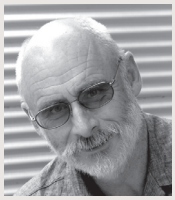

THERMAL BREAKS AND STEEL FRAMING

Steel framing is highly conductive to heat, so thermal breaks must be incorporated to prevent heat loss. But what is a thermal break, and where are they required when using steel framing?

By Trevor Pringle, ANZIA, BRANZ Principal Writer

Thermal breaks consist of an insulating material placed on the outdoor side of framing. They are needed to prevent the conduction of heat that can occur through steel framing sections that make up the thermal envelope of a building.

Thermal breaks to walls and roofs are required:

- on the outside face of all external steel wall framing (studs, plates and dwangs)
- between top plates and bottom truss chords or rafters
- on the outside edge of the purlins – fix a 40 × 12 mm thick strip of EPS
- behind steel members fixed to the outside of the wall frame such as soffit bearers.

Materials for thermal breaks

The R-value of the thermal break used must be not less than 0.25. Products such as the proprietary uPVC cavity batten systems do not meet the minimum R-value requirements for a thermal break.

Acceptable thermal break materials given in E3/AS1 are:

- 12 mm S grade expanded polystyrene
- 12 mm wood fibre insulating board – this is not typically recommended, as its durability will be affected by moisture.

Where a material other than those listed above is to be used, thermal performance data (from a reputable source) will need to be provided with the consent documents.

Other materials used as thermal breaks include:

- high-density polyethylene foam with a self-adhesive backing, which is easily adhered to steel frames before the installation of the wall underlay
- 40 mm thick timber battens.

Thermal break design options

Thermal breaks can be installed as:

- strips of thermal break material fixed to the outside of the framing – when installed over the wall underlay, strips should be 15 mm wider than the framing for an R-value of 0.25 and 30 mm wider for a higher R-value (see Figure 1)
- sheets of thermal break material fixed to the outside of the framing (gives better thermal performance than strips)
- specifically designed blocks such as those used between trusses and the top plate or channel.

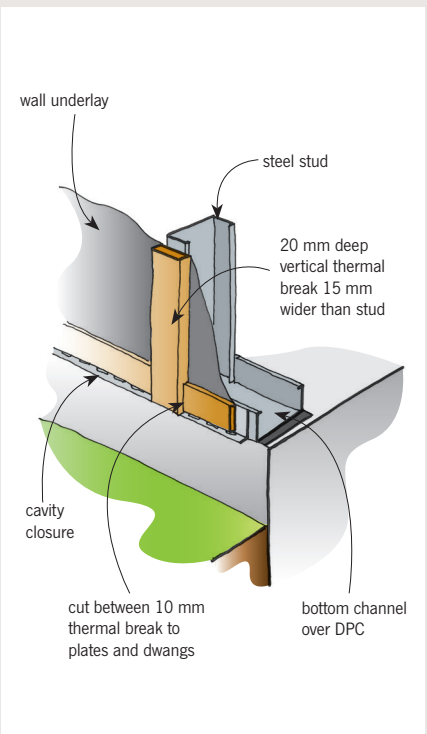

Figure 1: One option – base of drained cavity detail with thinner higher-performance thermal break fitted between verticals at bottom plate.

When installed, the junctions between vertical and horizontal thermal break strips must be tight butted so there are no gaps.

Thermal breaks and cavities

Where a cladding is to be installed over a drained and vented cavity, the design options include installing:

- 20 mm thick thermal break strips to the studs and top channel with 10 mm thick higher performance material fixed to the dwangs and the bottom plate – wall underlay is fixed to the framing first
- 20 mm thick thermal break strips to studs, plates and dwangs, installing the wall underlay then installing 20 mm nominal cavity battens – the cladding fixings will have to be specifically designed to allow for the thermal break and cavity batten thickness
- sheet thermal break material to the wall area and fixing nominal 20 mm cavity battens over it.

Better performance recommended

NASH (the National Association of Steel Framed Housing) recommends designers consider higher performance thermal breaks to further reduce heat loss through the framing and promotes a better performance thermal break R-value of:

- 0.35 strips in climate zones 1 and 2 and 0.4 in climate zone 3
- 0.4 sheathing in climate zones 1 and 2 and 0.5 in climate zone 3.

More detail on the thermal performance of steel-framed construction is contained in the BRANZ House insulation guide *and NASH N-11* House insulation guide*).*