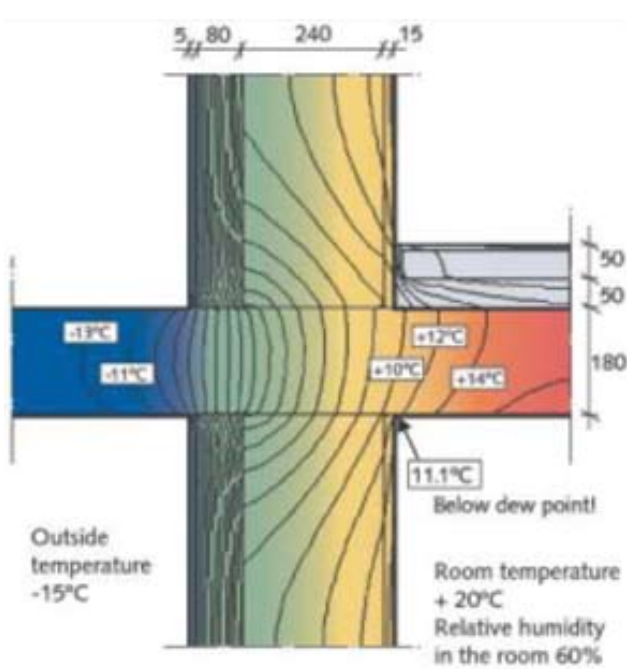


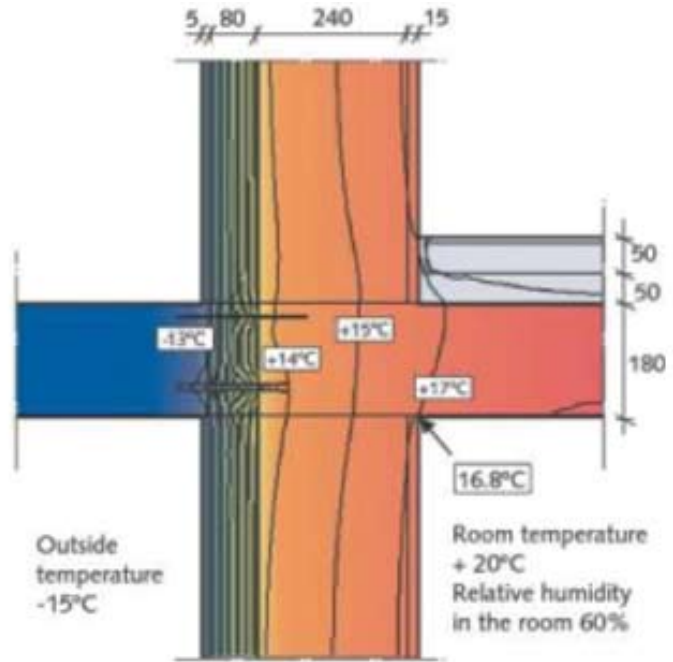
**Balconies**

Published Date: 29/05/2009

Balconies are frequently precast and then attached to a structure during construction. If measures are not taken to prevent it, there is a route for heat loss between the internal structure and the external balcony. This heat loss can lower internal temperatures such that the dew point temperature is reached and condensation occurs.



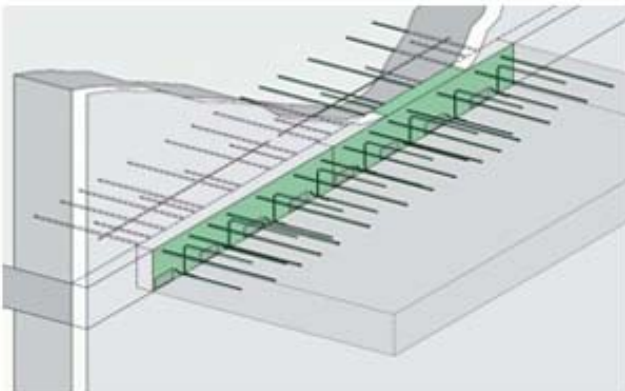
Temperature profile without thermal break



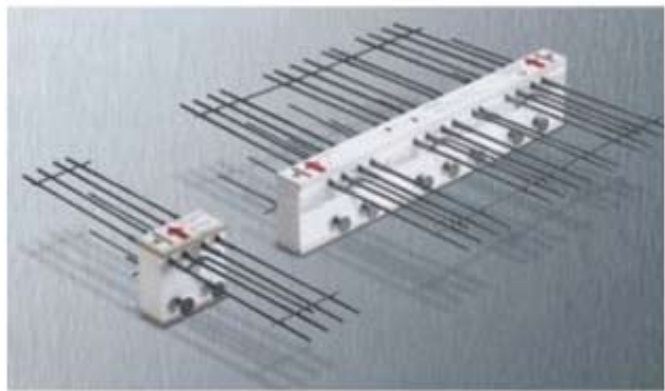
Temperature profile with thermal break

Traditionally the method used was to insulate the balcony (on both the top and bottom surfaces), and also to insulate areas of the slab within the structure. Current practice though is to incorporate a simple thermal break between the balcony and the supporting structure.

At the same time it is common to utilise a proprietary system to attach the balcony to the slab. There are several such systems available, two examples of which are below.



J&P – Isopro system

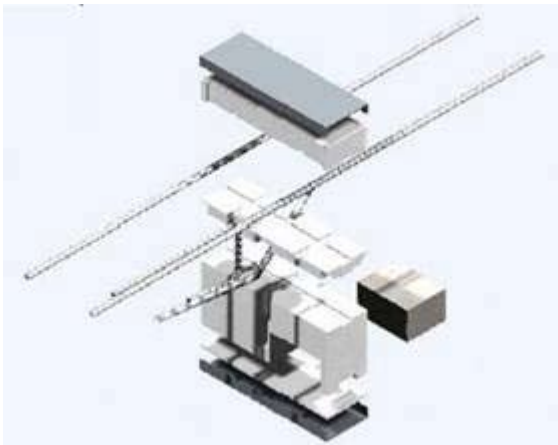


Halfen – HIT system

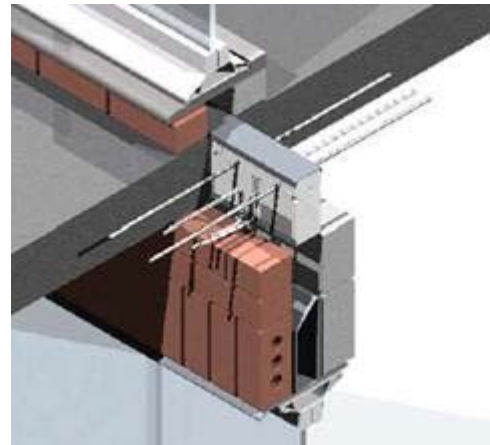
**Balconies**

Published Date: 29/05/2009

They all work in a similar fashion. There is an insulating layer, normally of polystyrene, typically 80mm wide. To take cantilever bending moments, there is tensile reinforcement in the top of the element, passing through the insulation. To prevent risk of corrosion, it is best practice for this tensile reinforcement to be stainless, although some systems use 'normal' reinforcement in a sleeve. To take compressive forces, a compression element is incorporated near the bottom of the element. These may be a low conductivity concrete block (as in Isopro) or a stainless steel pressure pad (as in Halfen).



Isopro in place



Isopro 'exploded'

Most systems have a nominal 30 minutes fire resistance, which can be increased to 90minutes by adding fire resistant board above and below.



When used with precast balconies, the assembly is cast into the balcony at the precast works. The assembly is supplied in lengths typically 1m long, with make-up pieces as required.

The balcony is then placed on staging at site, and the insitu slab cast against the projecting reinforcement. It is important to allow for initial settlement/deflection by setting the staging slightly higher than horizontal. Suppliers' designs will give the figure to allow for this.



**Balconies**

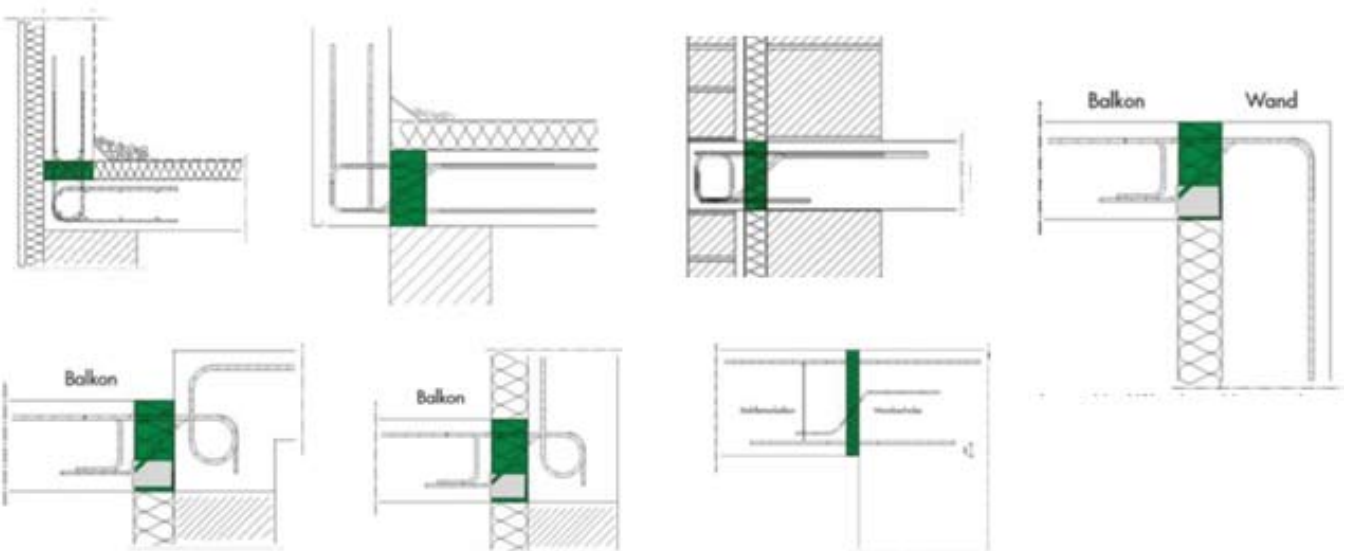
Published Date: 29/05/2009



The balcony systems can also be used for fully insitu balconies. In these cases the assembly is placed onto the formwork, and insitu concrete placed both sides of the insulation. It is vital to take note of markings that show which way around the assembly should be, and which way up it should be. Typically there will be an arrow pointing towards the balcony side.

Rainwater outlets may be positioned between the reinforcement. Whilst minor displacement is allowable, system suppliers should be consulted if it is anticipated that bars may need to be cut or significantly displaced at obstacles such as outlets or openings.

As well as supporting balconies, systems can be used for supporting insitu slabs at walls or beams where shear and moment need to be transferred whilst maintaining a thermal break. This is a specialised case and design can be complex.



The major manufacturers supply a very wide range of types catering for different cases such as normal cantilevers, propped cantilevers, offset levels, reverse moments, cantilevers onto walls and even wall-to-wall, etc. They will also supply full substantiating design calculations and drawings. For this reason the preferred course of action is to consult specialist suppliers at an early stage and develop a suitable profile.