

Passive House and Plumbing

Common Pitfalls and How to Avoid Them

A presentation for the South Pacific Passive House Conference 2019

Summary

A Passive House requires accurate and competent input from a large number of professional stakeholders.

In addition, a Passive House may have very little 'head-room' in terms of compliance and there is no margin for error, omission or alteration onsite from the Passive House compliant design.

Experience has shown us that the plumber is the single subcontractor onsite who is most likely to make unapproved changes onsite to the plumbing system which has the potential to introduce significant thermal bridges to the completed building, particularly through vented soil stacks or externally vented fixtures.

Careful design of the plumbing system is crucial to avoid these thermal bridges and there are some key methods to achieve this.

Significance of Thermal Bridges of External Vents

An externally vented waste in the plumbing system can be the building's largest thermal bridge, with a Psi-value potentially as high as 0.3 W/(mK), making the elimination of these thermal bridges often critical to achieving compliance with the Passive House Standard.

Compliance Method Options

In Australia there is a single compliance method for the plumbing system; AS/NZS 3500 Part 2.

In New Zealand the same standard can be used, but clause G13/AS1 of the NZ Building Code can also be used.

This presentation will explore the relative benefits of both methods of compliance and the ease with which vented waste and vented stack thermal bridges can be eliminated via each method of compliance.

G13/AS1

G13/AS1 has some restrictions that make it very challenging, if not impossible, to eliminate externally vented stacks, particularly in multi-level buildings.

In addition, G13/AS1 requires fixture wastes to penetrate the side of a concrete floor foundation, making any externally insulated foundation system more challenging to build and introducing an additional thermal bridge through the external insulation.

AS/NZS 3500 Part 2

AS/NZS 3500 Part 2 allows a fundamentally different design of the plumbing system that makes it far easier to eliminate externally vented stacks, but this is contingent upon one significant design element; the length of the drains between fixtures and the outside drain. At design stage this may need to be considered to allow the elimination of externally vented stacks.

Ensuring Onsite Compliance

Experience has shown us, and other Passive House designers in New Zealand, that even a carefully designed and thermal bridge free plumbing design will only work if the onsite contractor follows the approved drawings.

Because externally vented stacks are cheaper to install than the alternatives, plumbers may opt for the easier and cheaper option onsite and ignore the drawings provided.

This risk is accentuated when the designer is not engaged to undertake onsite supervision work.

Adding key notations to the drawings and specification to make it both obvious to the plumbing subcontractor, and contractually obligated, that the plumbing system is installed as per the design drawings can help to avoid issues onsite.