



Determination 2010/047

Refusal to issue a code compliance certificate for a 1-year-old house at 20 Paton Place, Te Anau



1. The matters to be determined

- 1.1 This is a determination under Part 3 Subpart 1 of the Building Act 2004¹ (“the Act”) made under due authorisation by me, John Gardiner, Manager Determinations, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of that Department. The applicant is the owner B Anderson (“the applicant”), and the other party is the Southland District Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.2 This determination arises from the decision of the authority to refuse to issue a code compliance certificate for a 1-year-old house because it was not satisfied that it complied with certain clauses² of the Building Code (First Schedule, Building Regulations 1992). The refusal arose because it was not satisfied that the windows installed in the house complied with the weathertightness provisions of the code.

¹ The Building Act, Building Code, Compliance documents, past determinations and guidance documents issued by the Department are all available at www.dbh.govt.nz or by contacting the Department on 0800 242 243.

² In this determination, unless otherwise stated, references to sections are to sections of the Act and references to clauses are to clauses of the Building Code.

- 1.3 The matter to be determined³ is therefore whether the authority was correct to refuse to issue a code compliance certificate in regard to the windows. In deciding this, I must consider whether the window installation system (“the windows”) complies with Clause B2 Durability and Clause E2 External Moisture of the Building Code. The windows include the components of the system (such as the windows, the flashings and the junctions with the weatherboard cladding), as well as the way the components have been installed and work together.
- 1.4 During its final inspection on 9 April 2010, the authority identified various other outstanding items that required attention (see paragraph 3.4). However, the applicant has restricted his application to the lack of window sill flashings; and this determination is therefore limited to the window installation, with other outstanding issues left to the parties to resolve.
- 1.5 In making my decision, I have considered the submissions of the parties and the other evidence in this matter. I have evaluated this information using a framework that I describe more fully in paragraph 5.

2. The building work

- 2.1 The building work consists of a single-storey house situated on a flat site in a high wind zone for the purposes of NZS 3604⁴. Construction is conventional light steel frame, with concrete foundations and floor slab, fibre-cement weatherboard wall cladding, profiled metal roof cladding and aluminium windows. The house is assessed as having a low weathertightness risk (refer paragraph 6.2).
- 2.2 The house is a simple rectangular form with a 20° pitch profiled metal gable roof with eaves and verges of about 600mm. The roof extends at 10° pitch to form a 3m verandah to the north elevation. That verandah continues as a lean-to along the west elevation, with another lean-to verandah to part of the east elevation.
- 2.3 The walls are clad in 7.5mm fibre cement weatherboards, with a rusticated profile and a rough sawn finish, fixed through 5mm thick extruded polystyrene and the building paper to the steel framing. The steel wall framing and the rusticated profile of the weatherboards are beyond the scope of E2/AS1 (see paragraph 5.2).

2.4 The window installation

- 2.4.1 The aluminium windows are face-fixed over the cladding; with metal head flashings, no sill flashings and profiled timber scribes sealed against the weatherboards at the jambs. The aluminium sill flanges overlap the top of the cladding by 20mm, with an anti-capillary gap of about 5mm provided between the sill flange and the cladding.

³ Under sections 177(b)(i) of the Act

⁴ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

- 2.4.2 The rough openings in the steel frame are covered with the building wrap and then wrapped with a flexible flashing system. The proprietary system has been appraised⁵ as suitable for use in certain steel framed buildings. The flexible flashing system incorporates self-adhering conformable membrane tape applied at corners and overlaid with adhesive tape applied to the sill and part way up the jambs.
- 2.4.3 5mm thick extruded polystyrene packers surround the aluminium windows, with self-expanding polyurethane foam used as a flexible air seal between the rough opening and the treated timber liner.

3. Background

- 3.1 The authority issued a building consent (No. 31727/1) for the foundations and floor slab on 30 April 2007, followed by a building consent (No. 31727/2) on 25 May 2007 for the remainder of the house. Construction generally took place gradually over 2008 and 2009, with the authority carrying out various inspections.
- 3.2 The windows were apparently installed in December 2007, with scribes and painting completed by about July 2008. At a preline inspection on 4 November 2008 the authority verbally advised that sill flashings were required to be installed to the face-fixed windows. According to the applicant, this requirement was not put in writing.
- 3.3 The applicant discussed the need for sill flashings with the builder and ‘decided they were of little value’. The applicant also felt that ‘removing and reinstalling windows to allow sill flashings to be put in would inevitably damage the head flashings and scribes’.
- 3.4 I have not seen records of the authority’s inspections except for the record of the final inspection on 9 April 2010. This identified a list of outstanding items, which included ‘no sill flashing fitting – direct fixed cladding’.
- 3.5 The Department received an application for a determination on 19 April 2010.

4. The submissions

- 4.1 In his submission dated 13 April 2010, the applicant outlined the background to the current situation, noting that the builder ‘works to a very high standard’, the framing is galvanised steel and the house is at low risk of water penetration. The applicant described the system of window installation, with treated timber reveal liners, flashing tape used over the sills and expanding foam used as air seals. He also noted that all the strong winds and wind blown rain comes from the north and north west, which are sheltered by the three metre verandah.

⁵ BRANZ Appraisal Certificate No.444(2005)

- 4.2 The applicant forwarded copies of:
- the drawings and specification
 - the consent documentation
 - the authority's final inspection record dated 9 April 2010
 - photographs of the elevations, the windows and the window details
 - various other producer statements, appraisals and technical information.
- 4.3 The authority acknowledged the applicant's submission and attached an email dated 23 April 2010 from the building inspector involved with the construction of the house, which included the following points in regard to the windows:
- The applicant was informed at the preline inspection that sill flashings were required as the cladding was direct fixed.
 - The window reveals are LOSP-treated.
 - Rain from the east is normally driving rain.
 - The windows under verandahs are unlikely to be a problem.

4.4 The draft determination

- 4.4.1 Copies of a draft determination were forwarded to the parties on 20 May 2010.
- 4.4.2 The applicant accepted the draft determination and made several non-contentious comments that I have taken into account in this determination.
- 4.4.3 The authority did not accept the draft determination. This was on the grounds that, unless sill flashings were fitted, in the event of failure at the aluminium window junctions, the work would not satisfy the requirements of Clause E2.3.7.
- 4.4.4 The applicant commented on the authority's submission in an email to the Department dated 30 May 2010. He noted that the cladding does have a narrow 5mm wide cavity, and water getting past the window seals would be adequately disposed of. Any leak through the window mitres would be minimal and would drain through the holes along the sill flanges. In the unlikely event of a more major leak, the sill framing is protected and the flashing tape would direct moisture down the 5mm cavity.
- 4.4.5 I have carefully considered the comments of the parties regarding the draft determination. However, I have not been persuaded by these submissions to change the content of the determination.

5. Framework for evaluating the window system

- 5.1 The authority maintains that the window installation in this house does not comply with the building consent or with the weathertightness provisions of the Building Code, due to the lack of sill flashings.
- 5.2 There are no Acceptable Solutions that cover the steel framing and rusticated fibre cement weatherboards incorporated in this house. I am therefore of the opinion that the cladding system as installed, including the window installation must be considered to be an alternative solution.
- 5.3 In previous determinations, the Department has made the following general observations about Acceptable Solutions and alternative solutions:
- Some Acceptable Solutions cover the worst case, so they may be modified in less extreme cases and the resulting alternative solution will still comply with the Building Code.
 - Usually, when there is non-compliance with one provision of an Acceptable Solution, it will be necessary to add some other provision to compensate for that in order to comply with the Building Code.
- 5.4 In my view, the above observations remain valid and are significant in the evaluation of the code compliance of the window installation to this house.

6. Weathertightness of the window system

- 6.1 The risk factors considered in regards to weathertightness have been described in numerous previous determinations (for example, Determination 2004/1).

6.2 Weathertightness risk

- 6.2.1 This house has the following environmental and design features which influence its weathertightness risk profile, and consequently the risk profile for the windows:

Increasing risk

- the house is in a high wind zone in an inland area not subject to salt-laden air
- the walls have fibre cement weatherboard cladding fixed through 5mm thick strips that provide some limited drainage behind the cladding

Decreasing risk

- the house is one-storey high and simple in plan and form
- there are eaves and verge projections to shelter the walls and windows, and verandahs to three elevations of the house
- the external wall framing is galvanised steel.

6.2.2 When evaluated using the E2/AS1 risk matrix, these features show that all elevations of the house demonstrate a low weathertightness risk rating. I note that a drained cavity is not required by E2/AS1 for fibre-cement weatherboards at low risk levels.

6.3 Discussion

6.3.1 I have examined the evidence provided by the applicant, in particular the photographs and descriptions of the cladding and windows installation, and I make the following observations in regard to the windows:

- The site is inland and not subject to corrosive air. The windows are installed into galvanised steel framing, which has considerably more resistance to moisture than timber framing.
- Most windows are beneath deep verandahs, with no exposure to rain expected. On the south elevations the window heads are about 400mm below 600mm deep eaves, with very limited exposure to rain expected at the heads or jambs.
- On the east and west upper gable ends, the sloping window heads appear to be about 200mm beneath the 600mm verge projections, also with limited exposure to rain expected at the heads or jambs.
- The openings appear to have been satisfactorily protected with the building wrap and the flexible flashing system, with a cavity and air seals provided around the windows to minimise airflows carrying water into the building wall.
- The 5mm thermal break between the steel framing and the cladding provides some limited drainage behind the cladding, although this will be compromised between steel members by the 90mm insulation bulging against the cladding.
- The metal head flashings are satisfactory and the profiled jambs scribes appear well sealed against the fibre-cement weatherboards. It is therefore unlikely that any moisture will penetrate at the sheltered heads or the sealed jambs.
- At the sills, the sill flanges of the windows overlap the top of the cladding by 20mm, which is twice the 10mm minimum cover shown in E2/AS1. A gap of about 5mm provided between the sill flange and the cladding to protect against moisture ingress by means of capillary action.

6.4 Weathertightness performance of the windows

6.4.1 Based on the above features, I am of the opinion that any limited rain reaching the sills of these sheltered windows is unlikely to penetrate past the cover of the window flanges. In the unlikely event that rain is blown past the sill flange cover, the air seals and cavities around the window will moderate pressure differences to prevent moisture being drawn further into the wall structure, allowing it to dissipate via the building wrap and the weatherboard laps of this traditional rainscreen system.

6.4.2 Notwithstanding the fact that the windows are installed without sill flashings, I have noted certain compensating factors that assist the performance of the window installation in this particular case:

- The windows have generally been installed to good trade practice and have been in place for more than two years with no signs of moisture entry.
- The cladding system has some limited capacity for drainage.
- The roof projections provide good protection to the windows below them.
- The house has steel framing that provides good resistance to moisture.

I consider that these factors help compensate for the lack of sill flashings and can assist the window installation to comply with the weathertightness and durability provisions of the Building Code.

6.4.3 Due to the specific characteristics of this house, I am therefore of the opinion that the window system as installed is adequate, without retrofitting the omitted sill flashings. However I also consider that the applicant was remiss in not installing sill flashings and the authority was entitled to request their installation in accordance with the building consent. The lack of sill flashings to windows installed into direct fixed cladding systems is a serious omission that can in many circumstances prevent a building from complying with the weathertightness provisions of the Building Code.

6.5 Weathertightness conclusion

6.5.1 Taking into account the low weathertightness risk of the external envelope and the particular characteristics of this particular house, I am satisfied that the window installation complies with Clauses E2 and B2 of the Building Code.

6.6 Effective maintenance of claddings is important to ensure ongoing compliance with Clauses B2 and E2 of the Building Code and is the responsibility of the building owner. The Department has previously described these maintenance requirements (for example, Determination 2007/60). In the case of the window installation in this house, that will include monitoring and maintaining sealing of the jamb scribes.

7. The decision

7.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the window installation system complies with Clauses E2 and B2 of the Building Code, and accordingly, I reverse the authority's decision to refuse to issue a code compliance certificate in regard only to the windows.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 8 June 2010.

John Gardiner
Manager Determinations