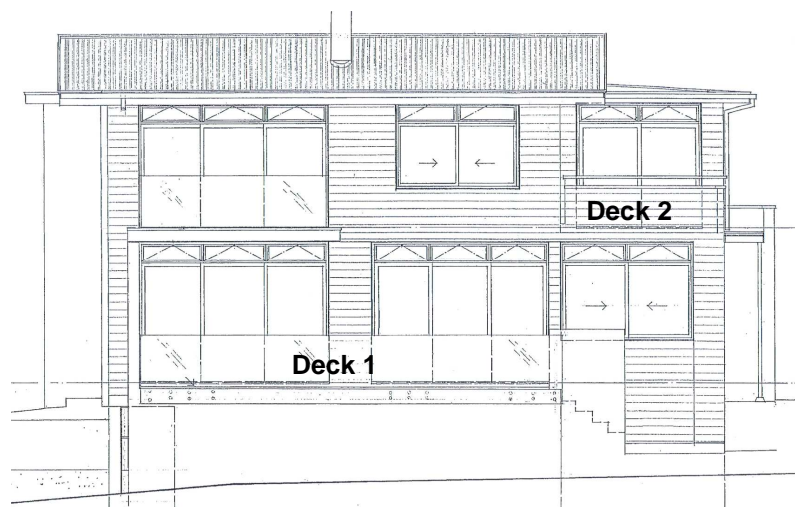




Determination 2010/78

Refusal to issue a code compliance certificate for a house with tiled decks at 42E Rarangi Road, St Heliers, Auckland



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 applicants are the owners, P O’Brien and M Valgre (“the applicants”) and the other party is the Auckland City Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.2 This determination arises from the decisions of the authority to refuse to issue a code compliance certificate and to issue a notice to fix for a 5-year-old house because it was not satisfied that elements of the building work complied with certain clauses² of the Building Code (First Schedule, Building Regulations 1992). The authority’s concerns about the compliance of the building work relate to the weathertightness of the tiled decks to the house (see paragraph 4.3).

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.

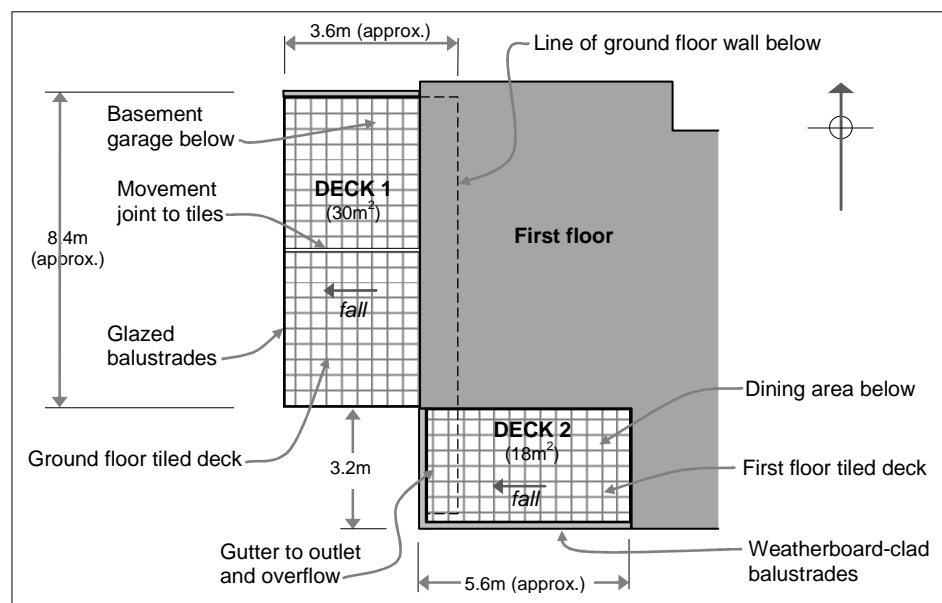
- 1.3 The matter to be determined³ is therefore whether the authority was correct in its decision to refuse to issue a code compliance certificate and to issue a notice to fix for the building work. In deciding this matter, I must consider whether the tiled deck membranes as installed on the building (“the deck floors”) comply with Clause E2 External Moisture and Clause B2 Durability of the Building Code. The deck floors include the components of the system (such as the membrane, the plywood substrate and the deck tiles) as well as the way the components have been installed and work together.
- 1.4 I have received no evidence relating to a dispute about any other matters related to this building, and this determination is therefore limited to the deck floors. 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 6.

2. The building work

- 2.1 The building work consists of a three-storey detached house situated on an excavated sloping site in a high wind zone for the purposes of NZS 3604⁴. Construction is generally conventional light timber frame, with a concrete slab and foundations, concrete block basement walls, monolithic and fibre-cement weatherboard claddings, aluminium windows and profiled metal roofing.

2.2 The decks

- 2.2.1 The house has two enclosed decks as shown in the following sketch:



- 2.2.2 “Deck 1” is a 30m² ground floor deck situated above the western end of the basement garage. The deck includes an aluminium louver screen to the north and a louver canopy to the north end. The balustrades are glazed, with stainless steel posts side-fixed to the deck edge and a gap under the bottom rail. A movement joint is installed

³ Under sections 177(b)(i) and 177(b)(iii) of the Act

⁴ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

in approximately the middle, on an east-west line of tile joints within the longer dimension of the deck floor, which falls to the west and drains over the edge.

- 2.2.3 “Deck 2” is an 18m² deck on the southwest corner of the first floor; and is situated above the ground floor dining room. This deck has framed balustrades clad in fibre-cement weatherboards to both sides. The deck floor falls to the western end – into a tiled gutter draining to an outlet and overflow at the southeast corner.
- 2.2.4 Both decks have tiled floors, with the tiles adhered to a membrane applied over a plywood substrate. The specification calls for the deck framing to be ‘H3’ and the plywood substrate to be 18mm ‘H3 type treatment’.

2.3 The deck membrane systems

- 2.3.1 The membrane system is a two-part, flexible, cementitious, liquid-applied membrane applied in two coats to a minimum thickness of 2mm. The manufacturer provides fibreglass mesh, rubber-coated polyester tape and gaskets for use at various junctions and around drains and pipes.
- 2.3.2 The membrane system has been appraised by BRANZ⁵. The appraisal is current and states that the system will comply with Clauses E2 and B2 as an alternative solution, providing the system is ‘designed, used, installed and maintained’ according to the conditions described in the certificate. Conditions for the appraisal’s conclusions include:
- buildings to be within the scope of E2/AS1, with timber framed decks
 - decks to be a maximum area of 40m²
 - deck falls to be a minimum of 1:60 (1°)
 - membranes to be protected from exposure to UV light and physical damage by tiles adhered using tile adhesive compatible with the membrane
 - plywood substrates to be treated to H3.2 (CCA treated)
 - membrane to be installed by trained applicators, approved by the manufacturer.
- 2.3.3 Subject to the above conditions, the appraisal certificate concludes that the installed membrane system will:
- be impervious to water and will give a weathertight deck
 - will have a serviceable life of at least 15 years and be compatible with tile finishes with a design service life of 15-25 years
 - will not require maintenance provided significant substrate movement does not occur and the tile finish remains intact (refer to maintenance requirements discussed in paragraph 8.2).
- 2.3.4 The manufacturer has provided a ‘product performance warranty’ for the deck membranes to this house, which quotes the various standards that the product complies with and warrants the membrane performance for a period of 20 years. The membrane and tile applicator is ‘Approved Waterproofing Applicator 066’ for the

⁵ BRANZ Appraisal Certificate No. 485 (2005)

manufacturer's membrane system used in these decks, and has provided a producer statement dated 24 October 2007 for the decks and bathrooms to this house.

3. Background

3.1 The authority issued a building consent (No. B/2004/14550) on 9 September 2004 under the Building Act 1991, based on a building certificate issued by a building surveyor. The consent specification called for a 'torch-on' bituminous sheet membrane and the drawings showed a tile surface directly adhered to the membrane.

3.2 The inspections

3.2.1 The building certifier carried out inspections of the house during the first half of 2005, with the inspection summary showing the certifier's last inspection to be of the weatherboard cladding on 2 June 2005. On 30 June 2005, the building certifier advised the authority that it was unable to complete inspections and returned the project to the authority for completion of the inspections.

3.2.2 The authority carried out the remaining inspections of the house, which included:

- cladding on 23 July 2005, which noted 'provide adequate overflows to decks'
- pre-line on 29 July 2005, which ticked 'membrane' and 'deck overflows'
- post-line on 15 August 2005, which passed
- cladding on 25 August 2005, which passed.

The house appears to have been substantially completed by the end of 2005, although a final inspection was not called for until the end of 2008.

3.2.3 The authority carried out a 'final residential inspection' on 5 December 2008 and the inspection record passed all building work and identified no defects. Outstanding documentation was listed, including a producer statement for 'external deck waterproofing'. The applicants supplied the documentation and applied for a code compliance certificate on 24 April 2009.

3.3 The authority's refusal to issue a code compliance certificate

3.3.1 The authority re-visited the site on 30 June 2009 and, in a letter to the applicants dated 26 August 2009, noted that each building consent was assessed on a 'case-by-case basis'. That involved reviewing documentation, visiting the site, photographing the work and undertaking a 'peer review if the building is considered at risk'.

3.3.2 The authority's 'peer review' had identified that tiles were installed directly over a liquid-applied membrane, which is therefore 'not accessible for adequate maintenance or repair' or for monitoring its performance.

3.3.3 The authority therefore concluded that it:

...cannot be 'satisfied on reasonable grounds' that the external decks comply with the building code and therefore are unable to issue a Code Compliance Certificate for the building consent.

3.4 The subsequent correspondence

3.4.1 The applicants sought advice from the membrane manufacturer and the installer and, in an email dated 25 January 2010, the manufacturer noted that it had:

...struggled with E2/AS1, as we believe the requirement to be able to maintain the membrane is not necessary. Once the membrane has been covered with tile, it needs no further maintenance.

3.4.2 The applicants wrote to the authority on 25 September 2009 to request a review of the decision; noting the membrane manufacturer's comments on access for maintenance, the BRANZ appraisal of the membrane (see paragraph 2.3.2) and attaching the warranty from the manufacturer (see paragraph 2.3.4).

3.4.3 The authority responded on 16 October 2009, stating that the deck membrane system must be considered as an alternative solution and making the following points:

- [Although there is] no issue with the product when installed correctly and by a registered/approved installer', the standards listed in the manufacturer's warranty 'would be achievable under normal maintenance, [but if the membrane] cannot be maintained (as is the case) then the product would most certainly come into question as to its durability.
- [The membrane product] simply cannot be maintained, monitored, repaired etc because it is now beneath a layer of tiles. The risk is too high regarding the tiled decks and the membranes.

3.4.4 The applicants responded to the above on 12 November 2009 questioning the basis of the authority's refusal to issue a code compliance certificate when the decks were:

... specifically what was approved by council on the building plans and specifications, and secondly, the point raised regarding maintenance being required, when there is no specific reference to this in the warranty...

3.5 The notice to fix

3.5.1 In a letter to the applicants dated 21 December 2009, the authority confirmed its position and advised that a notice to fix would be issued. The authority wrote to the applicants on 1 March 2010, stating that it was not satisfied that the building work complied with the Building Code in 'a number of respects'.

3.5.2 The authority attached a 'photo file' of the decks and a notice to rectify, which stated that the building work did not comply with Clauses B2 and E2 of the Building Code. Although the notice did not identify any defects, the 'details of the contraventions' were that (in summary):

- the deck membranes are not accessible for maintenance
- the deck membrane used differs from the product in the consent specification.

3.6 The Department received an application for a determination on 29 March 2010.

4. The submissions

4.1 The applicants made a submission in the form of a letter to the Department dated 25 March 2010, which set out the background to the dispute and described attempts to resolve the situation with the authority.

4.2 The applicants forwarded copies of:

- the authority's final inspection record
- the correspondence with the authority
- email correspondence with the membrane manufacturer
- the notice to fix dated 1 March 2010
- various producer statements and other information.

4.3 In a letter to the Department dated 30 March 2010, the authority stated that it assumed the matter in dispute was the 'refusal to issue a code compliance certificate, based on the notice to fix'. The authority also noted that the building consent was issued based on a building certificate, so it was the building certifier not the authority that was 'satisfied that the direct fixing of the tiles complied with the building code at the time the consent was issued'. The authority did not consider a manufacturer's warranty sufficient to provide 'reasonable grounds' for compliance, stating:

Upon receiving a request for a code compliance certificate Council must consider the most up to date information available. Membranes with tiles attached are an alternative solution. This type of construction has become problematic, and there is no way of inspecting or maintaining the membrane with tiles fixed to it.

4.4 The authority forwarded a CD-Rom, entitled 'Property File', which contained documents pertinent to this determination including:

- the consent documentation
- the building certifier's inspection summary
- the authority's inspection records.

5. The draft determinations and the hearing

5.1 The first draft determination

5.1.1 The first draft determination was issued to the parties for comment on 1 June 2010. The applicant accepted the draft without comment.

5.1.2 The authority did not accept the draft, and in a submission dated 21 June 2010 the authority contended that:

- '...direct fixing of tiles onto membranes is contrary to the requirements of the building code, unless such membranes have a durability of no less than 50 years.'
- observations were made against the performance requirements of Clause B2 in relation to compliance with Clause E2. The failure of the membrane would go undetected during use and it would be difficult to access and replace. The membrane must be as durable as the tiles themselves.
- observations were made on the provisions of E2/AS1 and NZS 3604 with respect to the expected durability of materials and access to deck surfaces.

The submission included photographs illustrating the points raised.

5.2 The hearing

- 5.2.1 The authority requested a hearing, which was held on 28 July 2010. I was accompanied by a Referee engaged by the Chief Executive under section 187(2) of the Building Act 2004. The owners attended and the authority was represented by two of its officers. A staff member of the Department also attended.
- 5.2.2 The authority's verbal submission was predominantly based on describing its experience of problems relating to tiles adhered directly onto membrane decks and generally expanding the matters raised in its original submission.
- 5.2.3 Following the hearing, the attendees visited the house to view the decks. It was observed that Deck 1 (the larger deck) incorporated a movement joint within the tiled surface. There had been rain prior to the visit and I was able to observe the effect of rainwater falling onto the deck tiles and also to note a loose tile on Deck 2, where no movement joint had been incorporated into the tiled surface.
- 5.2.4 I amended the draft determination taking into account the authority's submission at the hearing and my observations made during the site visit.

5.3 The second draft determination

- 5.3.1 A second draft determination was issued to the parties for comment on 16 August 2010. Both parties accepted the draft without comment, apart from noting one typographical error.

6. The grounds for establishing code compliance

- 6.1 In order for me to form a view as to the code compliance of the membranes as installed, I need to establish what evidence is available. In the case of the deck membrane system, the evidence consists of:
- the membrane manufacturer's 'product performance warranty', stating the various standards that the membrane complies with.
 - the BRANZ Appraisal Certificate No. 485 (2005) for the membrane system
 - the membrane/tile applicator's producer statement for the system used.
- 6.2 I accept that the BRANZ appraisal and the other standards provide independent expert opinion on the qualities and expected performance of the membrane system, with the remaining information confirming the particular membrane used and the installation by an approved applicator of the membrane and tiles. The deck structure as specified is in accord with NZS 3602⁶ and shows no signs of deflection. Taking into account this evidence, and in the absence of evidence to the contrary, I am satisfied that the deck membrane products are adequate for the purposes used in this building.
- 6.3 In the case of the membrane installation, the evidence consists of:
- the applicator's approval from the manufacturer to apply the membrane system

⁶ NZS 3602: 2003 Timber and wood-based products for use in building

- the certifier's and authority's satisfactory inspections of the deck framing, the plywood substrate, the membrane and the completed tiles
- the authority's satisfactory final inspection which included the tiled decks (more than three years after the membrane installation)
- the absence of defects identified during the authority's visit and in the notice to fix (almost four years after the membrane installation)
- the authority's photographs of the deck attached to the notice to fix.

6.4 Following the hearing and site visit, where the loose tile was observed on Deck 2 (see paragraph 5.2.3), I sought further information from the tile installers regarding the adhesive used. This confirmed the following:

- The adhesive products used were compatible with the membrane and the degree of deformity that might be expected with tiles of the dimensions used.
- The adhesive suppliers recommend the installation of movement joints at 3 metre centres for larger tiles, in order to accommodate increased stress to the decreased number of joints.

7. Discussion

7.1 In the case of the code compliance of the deck and roof membrane systems as installed to this building, I consider it important to look for evidence that establishes whether the systems are adequate to meet the performance requirements of the building code when installed in accordance with the supplier's instructions.

7.2 In the case of the decks to this house, I make the following observations:

BRANZ Appraisal Certificate No. 485 (2005) (Conditions as outlined in paragraph 2.3.2)	The decks in this house
Buildings to be within the scope of E2/AS1, with timber framed decks	The house is within the scope of E2/AS1, and the decks are timber framed with some steel UB's.
Decks to be a maximum area of 40m ²	Both decks are well under the limit as Deck 1 is 30m ² and Deck 2 is 18m ²
Deck falls to be a minimum of 1:60 (1°)	The drawings specify a minimum of 1° and the framing and substrates were inspected. The photographs indicate no signs of ponding after almost 4 years.
Membrane protected from UV exposure and damage with compatible adhesive-fixed tiles	The membrane applicator also laid the tiles, and is approved by the membrane manufacturer.
Membrane to be over treated plywood substrates	The plywood substrate is specified as 'H3'. The substrate was approved by the membrane applicator as suitable for the product and was inspected during construction.
Membrane to be installed by trained approved applicators	The applicator is approved by the membrane manufacturer.
When completed, the tiled membrane will be impervious to water and give a weathertight deck	The deck construction was inspected and 'passed' during construction and three years later at the final inspection. The deck also showed no apparent defects almost four years after the membrane installation.

BRANZ Appraisal Certificate No. 485 (2005) (Conditions as outlined in paragraph 2.3.2)	The decks in this house
When completed, the tiled membrane will have a serviceable life of at least 15 years	The manufacturer warrants the membrane for a period of 20 years.
The membrane will not require maintenance provided significant substrate movement does not occur and the tile finish remains intact.	<p>The manufacturer confirms that the membrane will not require maintenance.</p> <p>The tile finish appears to be well maintained.</p> <p>Likely movement of the tiles</p> <p>The tiles are large, at 600mm x 600mm, with fewer joints to accommodate stress from movement.</p> <p>The adhesive supplier recommends movement joints be installed at suitable (3m) centres for large tiles.</p> <p>Deck 1 includes a central movement joint to accommodate movement in the substrate.</p> <p>Deck 2 does not include a movement joint, and the loose tile indicates that lack of provision for movement has resulted in an isolated loss of tile adhesion.</p>

7.3 Taking into account the above, I am satisfied that the roof and deck membranes have been installed to the membrane manufacturer's instructions in accordance with good trade practice and with the conditions in the appraisal.

7.4 However, taking account of the authority's submission at the hearing, observations of the deck tiles following the hearing and further information from the adhesive supplier, I conclude that the following areas require attention:

- The lack of a central movement joint to the tiles of Deck 2.
- The loose tile to Deck 2. A check to be made of the adhesion of that tile and any damage that may have occurred to the membrane underneath it
- Investigation of the tiles to both decks, to confirm that tiles are fully adhered.

8. Conclusion

8.1 Providing the above areas are satisfactorily attended to, the BRANZ appraisal and the other available evidence provide me with reasonable grounds to conclude that the membrane systems as installed in this building will comply with Clauses E2 and B2 of the Building Code.

8.2 As part of the discussion I should draw the applicant's attention to the requirement of ongoing maintenance of the deck. While the membrane may not require maintenance, the BRANZ Good Practice Tiling Guide recommends regular maintenance of tiled floors as the substrate cannot be maintained. This to include:

- regular checks to see if there are any areas of subsidence
- regular checks of grouted or control joints
- immediate remedy of any faults such as crumbling grout or cracked tiles.

- 8.3 It is emphasised that each determination is conducted on a case-by-case basis. Accordingly, the fact that particular membrane systems have been established as being code compliant in relation to a particular building does not necessarily mean that the same systems will be code compliant in another situation.

9. The decision

- 9.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the deck membrane systems installed on the building do not comply with Clause B2 of the Building Code, and accordingly
- I confirm the authority's decision to refuse to issue a code compliance certificate, and
 - the authority is to modify the notice to fix, dated 1 March 2010, to take account of the findings of this determination.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 30 August 2010.

John Gardiner
Manager Determinations