

Determination 2007/37

A dispute in relation to the code compliance of a liquid-applied membrane at 22 Moana Crescent, Te Anau



1. The matter 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, Determinations Manager, Department of Building and Housing (“the Department”), for and on behalf of the Chief Executive of that Department. The applicants are Mr and Mrs McGregor, acting through the builder as agent (“the applicants”). The other party is the Southland District Council (“the territorial authority”).
- 1.2 This determination arises from the decision of the territorial authority not to issue a code compliance certificate for a 3-year old house.

¹ The Building Act 2004 is available from the Department’s website at www.dbh.govt.nz.

² The Building Code is available from the Department’s website at www.dbh.govt.nz.

- 1.3 The matter to be determined is whether the liquid-applied membrane applied to the deck of the balcony of the house complies with the provisions of the Building Code² (First Schedule, Building Regulations 1992).
- 1.4 In making my decision, I have considered the submissions of the parties, the report of the independent expert commissioned by the Department to advise on this dispute (“the expert”), and the other evidence in this matter. I have evaluated this information using a framework that I describe more fully in paragraph 6.1.
- 1.5 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.

2. The building work

- 2.1 The building work in question relates to a two-storey detached house situated on a level site, which is in a medium wind zone for the purposes of NZS 3604³. Construction is conventional light timber frame constructed on concrete and timber-framed floors and the outside cladding is 40mm polystyrene sheets fixed over a treated timber batten cavity system. The sheets are finished with a “Rockcote” modified plaster system.
- 2.2 A large timber-framed external balcony is situated at the upper level of the house, spanning across most of the north elevation, and is constructed over living spaces. With the exception of a central section with a metal balustrade, the lower external walls of the house are extended upwards to form the balustrades to three sides of the balcony. The tops of the monolithic-clad balustrades are finished with metal flashings. The balcony deck is finished with the proprietary fibreglass-reinforced vinyl membrane that is the matter central to this determination. The membrane has upstands under the main wall and balustrade cladding and discharges water into a metal gutter at the front of the balcony.
- 2.3 The membrane in question is “Chevaline Dexx (“the membrane”), which according to Equus Watertight Technology (“Equus”), has been applied to a plywood substrate in accordance with its “Standard Specification p3011rev” that was applicable at the time of installation. The membrane was installed by an Equus certified applicator.
- 2.4 Equus provided a producer statement for the installation of the membrane and a 15-year warranty for the membrane materials, both dated 11 April 2005. The producer statement noted that in order to maintain the integrity of the membrane, it was recommended that the exposed surfaces be cleaned and re-top coated between the 8th and 11th year of service.

3. Sequence of events

- 3.1 The territorial authority issued a building consent for the house on 29 June 2004.
- 3.2 The territorial authority carried out various inspections during the course of construction and carried out a “follow-up” inspection in early 2005. Following this inspection, the territorial authority wrote to the designers of the house on 18 February 2005. The territorial authority noted that certain work was required before it could issue a code compliance certificate. One of the matters raised was that:

³ New Zealand Standard NZS 3604:1999 Timber Framed Buildings

We have yet to receive satisfactory testing information from the supplier of the first floor deck areas moisture proofing system. This was a variation from the originally specified membrane type weatherproofing and has yet to be approved.

- 3.3 In a letter dated 2 May 2005, the territorial authority wrote to the builder noting that it had received a producer statement from the membrane applicator. The territorial authority stated that it had not received any suitable testing information about the project. In addition, it expressed concern about the need to recoat the membrane to maintain its required durability and the affect of this on subsequent owners.
- 3.4 In May 2005, Joyce Group Ltd produced a document entitled “Verification of Chevaline Dextx Waterproofing System for Equus Industries Ltd”. On 22 November 2005, Joyce Group also forwarded to Equus the curriculum vitae of the expert who had prepared this document. I believe that these documents were also passed on to the territorial authority.
- 3.5 Various correspondence in the form of letters, e-mails, and attached information passed between the territorial authority, the builder, and the supplier of the membrane materials from 10 July 2005 to 31 October 2005. In summary, the territorial authority was left with the following concerns:
- The Opus slip-resistance test reports on the product as supplied to the territorial authority were of little relevance, as the tested product was applied to a concrete substrate, and not the plywood one used on the applicants house.
 - The impartiality of the Equus in-house laboratory test information.
 - The specific expertise and impartiality of the expert used by Joyce Group to verify the system.
 - The lack of assessment of local buildings to which the membrane has been applied.
- 3.6 The application for a determination was received by the Department on 4 October 2006.

4. The submissions

- 4.1 Under the “Matter for Determination”, the applicants noted that the territorial authority had refused to issue a code compliance certificate as it did not accept the membrane as an alternative solution. The consent for the building work was issued in November 2004, prior to the current Building Act coming into force. The applicants also set out the verification, service history, direct comparisons, testing, and product certification of the membrane.
- 4.2 The applicant supplied copies of the:
- plans and specifications
 - the building consent
 - correspondence with the territorial authority and other interested parties
 - Joyce Group report of May 2005
 - producer statement and materials warranty
 - membrane applicator’s certificate.

- 4.3 The territorial authority did not make a formal submission to the Department. However, it did express concern that a favourable decision regarding the membrane could be interpreted as universal acceptance of the product.
- 4.4 The territorial authority supplied copies of:
- its alternative solution assessment
 - some correspondence with the interested parties.
- 4.5 The draft determination was sent to the parties for comment on 1 March 2007. The applicant accepted the draft.
- 4.6 In a letter to the Department dated 12 March 2007, the territorial authority said it:
- . . . accepts the outcome of the determination . . . but is concerned that the only thing required is recoating to make the system satisfy the provisions of the Building Code.
- In addition the territorial authority said:
- Council knows this outcome is relevant to this particular case only, but in reality the supplier and the industry will see this as an endorsement of the product . . . The product may well be compliant. Council is not making any judgment on the quality of the product, simply saying that it does not believe the supplier has adequately supported the alternative solution application . . .
- My response to the letter is set out in paragraph 7.2.

5. The expert's report

- 5.1 As mentioned in paragraph 1.4, I engaged an expert to provide me with an individual assessment of the code-compliance of the decking system. This expert is a member of the New Zealand Institute of Building Surveyors.
- 5.2 The expert inspected the deck membrane on 19 January 2007, and furnished a report that was completed on 2 February 2007. The expert verified the construction details, and noted that the balcony deck grade and shaping is in accordance with the plans and that the deck cross-falls are to the specified 1.5 degree slope. The expert was also able to confirm that the membrane applicator is a well-established tradesperson who undertakes such work. The expert was impressed by the high standard of all the construction elements and details of the house.
- 5.3 The expert carried out a series of non-invasive moisture readings to the exterior of the building adjoining the balcony and also at the ceilings of the living spaces located under the balcony deck. No elevated readings were recorded, nor did the expert observe any evidence of moisture ingress into the interior of the building.
- 5.4 The expert made the following comments regarding the balcony construction:
- The total construction had been carried out with appropriate regard to best trade practice.
 - All the detailing provided a complete stormwater discharge without ponding, together with high upstands, full corner filleting, and fully sloped capping details.
 - The entire balcony construction, including the membrane, showed no evidence of any weathertightness failure, separation cracking, water staining, or general failure.

- The membrane had been applied in accordance with the Equus data sheets and specification details, and the construction system and the membrane followed the BRANZ “Good Membrane Roofing Practice”, and in particular, sections 3 and 8.
- Compliance with the relevant sections of E2/AS1 had been met.
- There is some minor pin holing in the membrane surface, which suggested that the coating fixed to the reinforcing was not a full 100% complete.

5.5 While noting the territorial authority’s concerns as to the verification of the product, the expert also made the following specific comments regarding the Chevaline Dextr system:

- The system has been in use in New Zealand for over 20 years.
- The expert had viewed the system at other locations over that period of time and attributed any failures to poor workmanship rather than to product failure.
- The expert was of the opinion that, with the exception of the Southland District Council, all territorial authorities accepted that this membrane system complied with the requirements of B2 and E2.

6. Evaluation for code compliance

6.1 Evaluation framework

6.1.1 In evaluating the design of a building and its construction, it is useful to make some comparisons with the relevant Acceptable Solution⁴, in this case E2/AS1, which will assist in determining whether the features of this house are code compliant. However, in making this comparison, the following general observations are valid:

- Some Acceptable Solutions cover the worst case, so that 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.

6.1.2 The approach in determining whether building work is weathertight and durable and is likely to remain so, is to apply the principles of weathertightness. This involves the examination of the design of the building, the surrounding environment, the design features that are intended to prevent the penetration of water, the cladding system and its associated features. The Department and its antecedent, the Building Industry Authority, have also described weathertightness risk factors in previous determinations⁵ (for example, Determination 2004/1). While in general these determinations relate basically to cladding, these factors are also relevant when applied to the membrane in question.

6.1.3 The consequences of a building demonstrating a high weathertightness risk is that building solutions that comply with the Building Code will need to be more robust. Conversely, where there is a low weathertightness risk, the solutions may be less

⁴ An Acceptable Solution is a prescriptive design solution approved by the Department that provides one way, but not the only way, of complying with the Building Code. The Acceptable Solutions are available from the Department’s website at www.dbh.govt.nz.

⁵ Copies of all determinations issued by the Department can be obtained from the Department’s website.

robust. In any event, there is a need for both the design of elements that contribute to weathertightness, and their installation, to be carefully carried out.

6.2 Weathertightness risk

6.2.1 In relation to these characteristics I find that the house:

- is situated in a medium wind zone
- is extremely well constructed
- has 400mm wide eaves projections that afford protection to cladding elements
- has cladding fixed over a timber batten cavity system.

7 Discussion

7.1 I note the territorial authority's concerns regarding the lack of independent product testing or verification of the membrane system installed on the balcony deck. Also, its concern that a favourable decision in this case could be interpreted as a general approval of the product. I have taken these concerns into account in making my final decision.

7.2 In this case the use of the membrane is considered to be an alternative solution for compliance with the building code. There are several criteria which can be used to assess a building product in a particular application for code compliance. In this case I have applied two criteria, the first being proven in-service performance and the second being the quality of the finished application.

7.3 With regard to the first criterion, the membrane system is provided by an established manufacturer and has been in use for 23 years. The expert also noted that:

I have viewed many examples of Chevaline Dexx as an applied membrane product over the past 20 years and all of the failures I have viewed has related directly to associated poor construction detailing and workmanship and not an actual product failure.

7.4 In this instance, there is the benefit of in-service performance of this application. After three years of service, there is no evidence of moisture entering the building.

7.5 With regard to the second criterion, the most common problem with liquid applied membranes is the inadequate quality control at time of application. I have therefore looked for assurance that the installation is applied in accordance with good trade practice, and to the manufacturer's requirements.

7.6 In this case it has been installed to a level of trade practice which the expert regarded as being "of a high standard", in addition to being in accordance with the manufacturer's recommendations and industry guidance documents.

7.7 I am therefore of the opinion, that, when considered together, these two criteria provide sufficient grounds for me to conclude that the membrane system, in this particular application, is able to achieve compliance with the code and that the system, as installed, complies with clause E2.

7.8 However, I accept that remedial work is necessary in respect of the pin holes that occur in the surface of the membrane. Accordingly, I do not accept that the membrane complies with clause B2 at this time. Clause B2 requires that a building continues to satisfy all the objectives of the Building Code throughout its effective life, and that includes the requirement for the membrane to remain weathertight.

Because the pin holes in the membrane surface are likely to allow the ingress of moisture in the future, the house does not comply with the durability requirements of clause B2.

- 7.9 Because the fault identified with the membrane system is minor, I am able to conclude that its satisfactory rectification will result in the membrane remaining weathertight and in compliance with clause B2.
- 7.10 I emphasise that each determination is conducted on a case-by-case basis. Accordingly, the fact that a particular membrane system has been established as being code compliant on a specific building does not necessarily mean that the same system will be code compliant in other situations. This determination should on no account be taken as any form of product endorsement, appraisal or certification.
- 7.11 I acknowledge and support the territorial authority's submissions with respect to the need to properly assess alternative solutions, and how these should be adequately documented when seeking consent for their use.
- 7.12 Effective maintenance of the membrane is important to ensure ongoing compliance with clauses B2 and E2 of the Building Code and is the responsibility of the building owner. Clause B2.3.1 of the Building Code requires that the membrane be subject to "normal maintenance", however that term is not defined in the Act.
- 7.13 I take the view that normal maintenance is that work generally recognised as necessary to achieve the expected durability for a given building element. Following regular inspection, normal maintenance tasks should include but not be limited to:
- where applicable, following manufacturers' maintenance recommendations
 - washing down surfaces, particularly those subject to wind-driven salt spray
 - re-coating protective finishes.

8 The Decision

- 8.1 In accordance with section 188 of the Building Act 2004, I determine that the membrane does not comply with clause B2 of the Building Code, and accordingly confirm the territorial authority's decision to refuse to issue a code compliance certificate.
- 8.2 I also determine that once the pin hole defects are rectified, the membrane applied to the deck of the balcony of the house will comply with the provisions of the Building Code.

Signed for and on behalf of the Chief Executive of the Department of Building and Housing on 11 April 2007.

John Gardiner
Determinations Manager