



Determination 2015/034

Regarding the authority's exercise of its powers of decision in refusing to issue a code compliance certificate for a 1-year-old house with profiled metal roof cladding at 8 The Drive, Twizel



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 and Assurance, Ministry of Business, Innovation and Employment (“the Ministry”), for and on behalf of the Chief Executive of the Ministry.

1.2 The parties

1.2.1 The parties to the determination are:

- the owners of the house, J and M Linton (“the applicants”) acting through the builder
- Mackenzie District Council (“the authority”), carrying out its duties as a territorial authority or building consent authority
- the licensed building practitioner and builder of the house (“the builder”), who is also acting as agent for the owners.

1.3 This determination arises from the decision of the authority to refuse to issue a code compliance certificate for a 1-year-old house unless changes were made to roof flashings which did not comply with the building consent issued for the house. The authority was not satisfied that the roof complies with certain clauses² of the Building Code (First Schedule, Building Regulations 1992).

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

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

- 1.4 The matter to be determined³ is therefore whether the authority correctly exercised its powers in refusing to issue the code compliance certificate. In making this decision, I must consider whether the ridge flashings as installed to the roof of this house comply with Clause B2 Durability and Clause E2 External Moisture of the Building Code. The ridge flashings include the underlying roof cladding, the seals and the underlay, as well as the way the components are installed and work together.
- 1.5 The application for this determination is limited to the installed ridge flashings and I have taken the authority's refusal to accept those flashings to constitute a refusal to issue a code compliance certificate for the house (see paragraph 4.2). In regard to the authority's refusal, this determination is limited to the matter outlined in paragraph 0.
- 1.6 In making my decision, I have considered the submissions from the parties, the report of the expert commissioned by the Ministry to advise on this dispute ("the expert") and the other evidence in this matter.

2. The building work

- 2.1 The building work consists of a detached house situated on a level large rural site in an extra high wind zone as described in NZS 3604⁴. Construction is generally conventional light timber frame, with a concrete slab and foundations, plastered brick veneer cladding, profiled metal roofing and aluminium windows.

2.2 The roof

- 2.2.1 The 27° pitched hipped roof includes two projecting gables to the north and a gabled entry canopy to the south as shown in Figure 1.

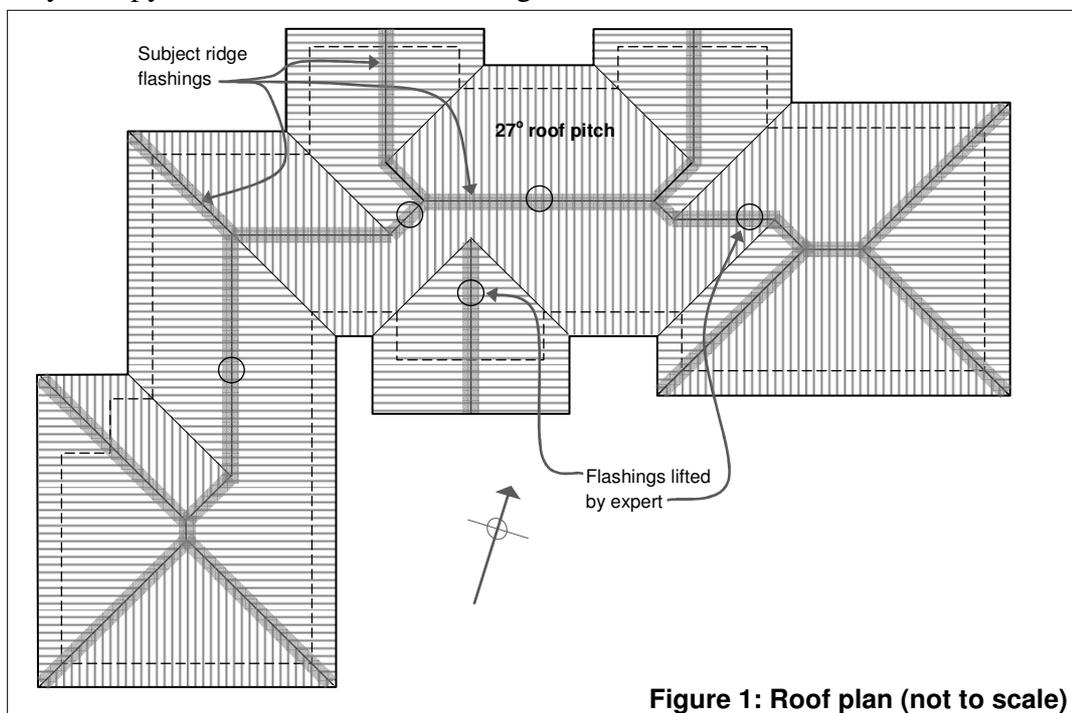


Figure 1: Roof plan (not to scale)

³ Under sections 177(1)(b) and 177(2)(d) of the Act

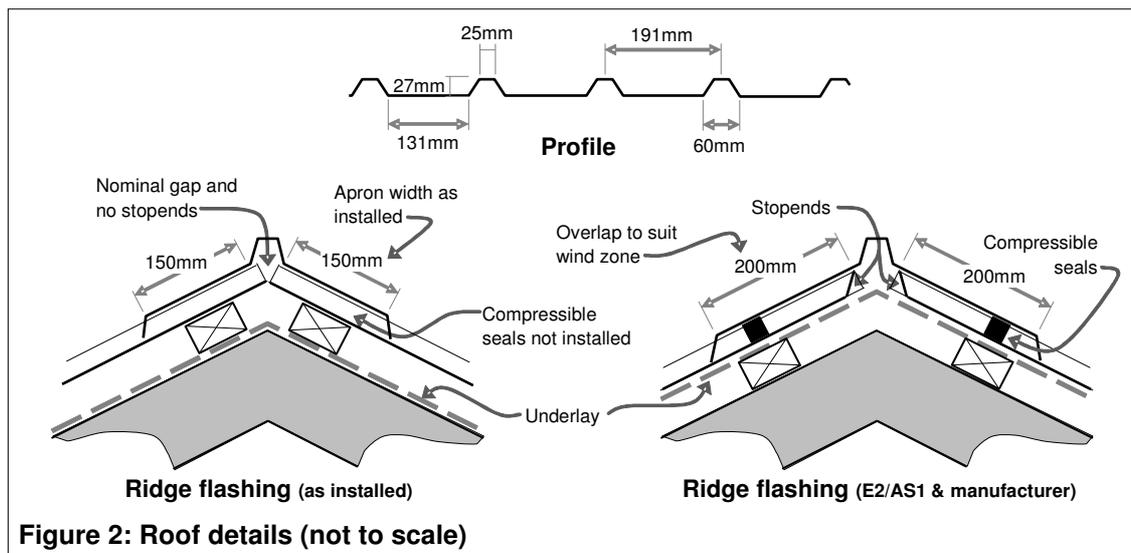
⁴ New Zealand Standard NZS 3604:2011 Timber Framed Buildings

2.2.2 The installed roof cladding is a proprietary colour-coated steel cladding system suitable for roof pitches down to 3° and includes purpose-made flashings to junctions and edges. The roofing has an asymmetrical trapezoidal profile with 27mm high crests and 131mm wide profiled trays as shown in Figure 2.

2.3 The roof ridge flashings

2.3.1 The building consent drawings showed colour-coated steel roofing with a conventional corrugated profile, with the ridge detail calling for an overlap of 200mm minimum in accordance with E2/AS1.

2.3.2 The manufacturer of the installed trapezoidal roofing provides details for common junctions, edges and intersections, including for ridge flashings as shown in Figure 2.



2.3.3 The manufacturer's ridge detail shows:

- the flashing overlapping the roofing by a dimension to accord with Table 7 of E2/AS1⁵, which calls 200mm minimum overlaps in very high and extra high wind zones
- the ridge flashing turned down over the roofing profile
- compressible seals installed between the flashing and the roofing
- stop ends to the top of roof sheets
- roofing underlay wrapped over the ridge.

2.3.4 The expert investigated underlying construction at the roof ridges (see paragraph 5.3.1). As shown in Figure 2, the installed ridges include:

- installed flashings with aprons of about 150mm
- the tops of roofing sheets extended to almost meet at the apex
- no stop ends to the top of roof sheets
- no compressible seals installed between the flashing and the roofing
- roofing underlay wrapped over the ridge.

⁵ The Acceptable Solution to Clause E2

3. Background

- 3.1 The authority issued building consent No. 120252 to the applicants on 20 November 2012 and carried out various inspections during construction, including several in March and April 2013 when the roof installation would have been underway or completed.
- 3.2 The pre-line inspection record dated 5 April 2013 ticked 'check roof cladding' with no comments on the changed roofing or on the dimensions of the ridge flashing. The post-line inspection on 6 June 2013 suggests that the house was substantially completed by about September 2013 although there are no records of further inspections until the following year.
- 3.3 The authority carried out a final inspection on 24 July 2014 and the inspection record noted 'ridge/hip flashings to be 200mm'. In response to the draft determination, the authority noted that 'discussion was had around the issuing of a code compliance certificate' and no application was made. I note here that in correspondence to the applicants in December 2014 it was clear that the authority would not consider issuing a code compliance certificate based on the information before it at that time (refer paragraph 3.4.3).

3.4 Subsequent correspondence

- 3.4.1 The builder sought advice from the Ministry. The Ministry responded in an email dated 26 November 2014, outlining its understanding of the situation and noting that the roof had apparently been unaffected by the extreme winds and rain experienced in the September 2013 storm, and added that:
- ...E2/AS1 by its very nature is a conservative document that must allow for the worst case – it is simply one means of satisfying the Building Code and its requirements cannot be mandated.
- 3.4.2 The Ministry also noted some compensating factors such as the roof pitch and profile (see Figures 1 and 2), adding that 'turn-ups in this profile are more effective than in some others' and concluding:
- The Building Code is performance-based and proven performance in-use is a valid means of verifying compliance. If it can be shown that the roof has performed satisfactorily for the period since its completion particularly given the extremes of climate it has experienced, the requirement that the roof be altered to match the detail shown in the consent would not appear necessary.
- 3.4.3 The applicants forwarded the Ministry's email to the authority asking the authority to 'reconsider your decision regarding our Code of Compliance and accept a variation of our Building Plan'. The authority responded on 2 December 2014, stating that an amendment to the consent would need to be applied for, accompanied by 'all technical information, testing results, etc.', which would be assessed as an alternative solution. The authority suggested that a determination be sought on the matter.
- 3.5 The Ministry received an application for a determination on 15 January 2015 and sought further information from the parties, with the applicants providing plans and specifications on 2 March 2015. The authority explained its position in regard to the dispute and provided a copy of its property records on 6 March 2015.

4. The submissions

4.1 The applicants made no submission and provided copies of:

- the drawings
- email correspondence with the authority.

4.2 In response to enquiries, the authority outlined the background to the dispute, noting that the building consent had been issued 'showing the E2/AS1 compliant flashings and roofing material' but the roofing was subsequently changed to a different profile without approval and the change was not identified until the final inspection when the ridge flashing dimensions were also noted. The authority concluded:

The building consent was applied for and issued under compliance with E2/AS1, but was not built in accordance with the issued building consent, Therefore, if the owner were to apply for a Code Compliance Certificate, it would be refused as the building work is not consistent with the consented plans.

4.3 The authority provided a copy of its property records, which included documents relevant to this determination, including:

- the consent documentation
- the inspection records and photographs
- various other statements and other information.

4.4 A draft determination was issued to the parties for comment on 5 May 2015. Responses to the draft from both the applicant and the authority were received on 20 May 2015.

4.5 The applicant accepted the draft subject to the decision noting that providing the 'rectifications are made, this will result in the roof being compliant.'

4.6 I note here that the matter for determination is the authority's decision to refuse to issue the code compliance certificate, while I have commented on the compliance of proposed remedial works (refer paragraph 6.3.2) it does not form part of the decision.

4.7 The authority accepted the draft in principle, commenting as follows:

- The testing and/or in-service history is irrelevant to the determination (refer paragraphs 3.4.2 and 6.3.1).
- The consent application was made based on accordance with the Acceptable Solution E2/AS1.
- Other recently constructed houses referred to by the expert are not relevant.
- The expert's report is an assessment on compliance as an alternative solution, rather than whether or not the work complies with the Building Code and referenced E2/AS1.

4.8 In response to the authority's comments above, I note:

- The Building Code sets out performance based requirements, and while section 19 of the Act sets out the means of the compliance that an authority must accept, it does not preclude compliance being achieved by other means, being an alternative solution. In-service history can inform a view on compliance; however in this case there is a short period of in-service history, as noted in paragraph 6.3.1, and conclusions that can be drawn from that are in my view limited.

- In previous determinations I have discussed the issue of code compliance certificates where the as-built work differs from that consented, and I maintain the view that it is important to consider whether the completed building work complies with the Building Code⁶.
- The expert carried out an assessment of the ridge flashings as built and provided an opinion on compliance with the Building Code. The expert also discussed the non-compliances with E2/AS1 and went on to set out his view on one means that could be used to achieve compliance.
- I consider the information provided in the expert's assessment was sufficient for me to form a view on compliance with the Building Code.

5. The expert's report

5.1 As mentioned in paragraph 1.6, I engaged an independent expert to assist me. The expert is a member of the New Zealand Institute of Building Surveyors and inspected the house on 24 March 2015, providing a report completed on 31 March 2015. The parties were provided with a copy of the report on 31 March 2015.

5.2 General

5.2.1 The expert noted that he had observed a number of recently constructed houses in the same subdivision which had ridge and barge flashings with 150mm aprons, including several monopitched roofs with slopes as low as about 5°.

5.2.2 The expert discussed the situation with the owner who understood that the reduced width of the ridge flashing had resulted from the positioning of the top purlins (see Figure 2). The owner had been assured that the roofer 'had taken the roofing sheets right up to the apex line with only a nominal gap and that stop end turn-ups had been formed along with the building paper being carried over the ridge line'.

5.2.3 The expert visually assessed the roof to confirm the roofing profile and roof slope; noting that he considered the roof to be 'complex, with many sections of hip and gable'. Flashings had been in place for some two years, which included 'a quite extreme weather event some 18 months ago' and the expert observed no evidence of moisture from roof junctions damaging interior plasterboard linings.

5.2.4 The expert was also able to observe the underside of the roof via the garage area, and confirmed that there was a full overlap of the building paper at the apex of the roof ridge which would provide some protection against moisture penetration.

5.3 The ridge flashings

5.3.1 In order to investigate the underlying construction, the expert raised the ridge flashing at five locations (see Figure 1), and noted that in each location:

- no stop ends are installed to the top of the sheets
- no compressible seals are installed under the flashing
- the sheets carry up to the apex, with only a nominal gap, therefore increasing the effective cover of the ridge flashing

⁶ For example, Determination 2013/075 Regarding the compliance of roof flashings and the issuing of a notice to fix for a 7-year-old educational complex at 136 Landlyst Road, Waihi (*Ministry of Business, Innovation and Employment*) 9 December 2013.

- there was no visual evidence of moisture tracks under the flashing, with a layer of fine dust apparent on the roofing surface.

5.3.2 The expert noted that the owner had been advised that stop ends had been installed at the ridges. In regard to the lack of stop ends and compressible seals, the expert noted that these are called for:

- in the consent drawings and in E2/AS1
- in the roofing manufacturer's specification details
- in all good trade practice guides.

5.3.3 The expert considered other compliance aspects of the roof cladding system and made the following comments:

- Although the roofing profile has changed from a corrugated profile shown in the consent drawings to a trapezoidal profile, the latter is a well-recognised standard domestic profile and the change should not affect compliance.
- Notwithstanding the reduced cover of the ridge flashings, there is no evidence of a failure of weathertightness over the past two years.

5.4 Summary

5.4.1 The expert considered that the dimensions of the installed ridge flashings would comply with the weathertightness and durability provisions of the Building Code if:

- stop ends were formed to provide an upstand height of 10mm minimum
- compressible seals were installed in accordance with manufacturer's details.

6. Compliance of the ridge flashings

6.1 The authority maintains that the installed ridge flashings do not accord with the consent drawings and with E2/AS1, and must therefore be assessed as an alternative solution. I accept that view, although I note that the authority appears to have no objections to the use of the particular profiled metal roofing installed to this house, but only to the dimensions of the ridge flashings.

6.2 Performance of the installed flashings

6.2.1 In evaluating the installation of these ridge flashings for compliance with the Building Code, it is useful to make some comparisons with the relevant Acceptable Solution E2/AS1 and also with the manufacturer's details. I make the following observations on the installed ridge flashings:

According to E2/AS1 and manufacturer (see Figure 2)	The installed ridge flashing system (see Figure 2)
Recommended ridge flashing details for the trapezoidal roof profile are appropriate for slopes down to 3°	The 27° pitch installed roof is well above the minimum, improving the shedding of water and the effectiveness of overlaps.
The aprons to ridge flashings should provide 200mm minimum overlap in very high wind zones	The installed ridge flashings are intended for lower wind zones, where a minimum overlap of 150mm is required.

According to E2/AS1 and manufacturer (see Figure 2)	The installed ridge flashing system (see Figure 2)
The manufacturer's ridge flashings allow for about 50mm gap between the top roof sheets at the apex	The roof sheets are installed with a nominal gap at the apex, so increasing the effective cover to about 175mm.
Compressible seals restrict any water that is driven under the ridge flashing	No compressible seals have been installed.
Sheet ends are turned up to restrict any water that may reach the tops of roofing from penetrating at the apex.	No stop ends have been installed to the tops of roofing sheets.
The roofing underlay is wrapped over the apex to allow any water that penetrates past the flashing to drain to the outside.	The underlay is wrapped over the apex to overlap beyond the ridge line

6.2.2 Taking into account the expert's report and the above observations, I consider that the dimensions of the ridge flashings installed to this house are likely to perform at least as well as a 200mm overlap used on this particular roof profile installed on a minimum roof pitch of 3°.

6.2.3 However the expert's investigations also identified significant omissions and I therefore consider the remedial work is necessary to the roof ridges in respect of:

- the lack of stop ends to the tops of the roofing sheets
- the lack of compressible seals between the ridge flashing and the roofing.

6.3 Conclusion

6.3.1 I consider the expert's report establishes that the current performance of the ridge flashings to date has been adequate because there is no evidence of past or current moisture penetration into the roof ridges. However, the period of in-service performance is limited and I consider that the omissions at the roof ridges are likely to allow the ingress of moisture.

6.3.2 Because the identified omissions occur in discrete areas, I am able to conclude that satisfactory rectification of the items outlined in paragraph 6.2.3, either singularly or in combination, will result in the ridge flashings being brought into compliance with Clauses E2 and B2 of the Building Code.

7. The decision

7.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the ridge flashings to the roof of this house do not comply with Clause E2 of the Building Code, and accordingly I confirm the authority's decision to refuse to issue a code compliance certificate.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 12 June 2015.

John Gardiner
Manager Determinations and Assurance