

Determination 2016/059

Regarding the compliance of uPVC window and door joinery installed to a house at 9A Wellington Road, Feilding



Summary

This determination considers the compliance of joinery using a substituted uPVC product that is the subject of an application to amend a building consent. The determination discusses the evidence base and consequences of failure.

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, 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 to the determination are:

- the owners of the house, D and S Shaw, represented by one of the co-owners of the house (“the owner/supplier”). I note that one of the owners is a director of the window supplier.
- Manawatu District Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.

1.3 This determination arises from a decision by the authority to refuse to grant an amendment to a building consent for changes in window and door joinery to a partially constructed house, because it is not satisfied that the substituted uPVC joinery as installed or proposed will comply with certain clauses² of the Building Code (Schedule 1, Building Regulations 1992). The authority’s concerns relate to the strength, durability and weathertightness of the joinery components and installation.

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 the authority's exercise of its powers of decision in refusing to issue an amendment to the building consent for the uPVC joinery. In deciding this, I must consider whether the partially installed uPVC joinery complies with Clause B1 Structure, Clause B2 Durability and Clause E2 External Moisture of the Building Code. The uPVC joinery includes the windows and doors, the fixings and supports, the flashings and the junctions with adjacent walls and claddings, as well as the way components are intended to be installed and work together
- 1.5 The authority's submission limits its concerns to Building Code Clauses B1, B2 and E2 and this determination is therefore limited to those clauses with regard only to the subject uPVC joinery as outlined above.
- 1.6 In making my decision, I have considered the submissions of 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 General

- 2.1.1 The building work consists of a single-storey house situated on a level site in a medium wind zone for the purposes of NZS 3604⁴. The house has a simple rectangular plan with three projecting areas and accommodates an open living/dining/kitchen area, three bedrooms, two bathrooms and an internal garage. The house is simple in plan and form, with a low weathertightness risk.
- 2.1.2 Construction is generally conventional light timber frame with some specifically engineered elements, concrete floors and foundations. The 25° pitched hip and gable roof has roof overhangs of about 600mm at eaves and 400mm verges. The roof is clad with profiled metal.
- 2.1.3 The exterior wall cladding is part brick veneer and part proprietary horizontal fibre-cement weatherboards. The brick veneer is installed over a 50mm wide drained cavity. The fibre-cement weatherboards are fixed on battens forming a 20mm drained cavity.
- 2.1.4 At the time of the expert's inspection, the house structure, roof and walls were substantially complete, with building wrap and battens installed. Windows had been fixed, but reveals, sill supports, head flashings, brick veneer and weatherboards were yet to be completed pending resolution of the consent amendment.

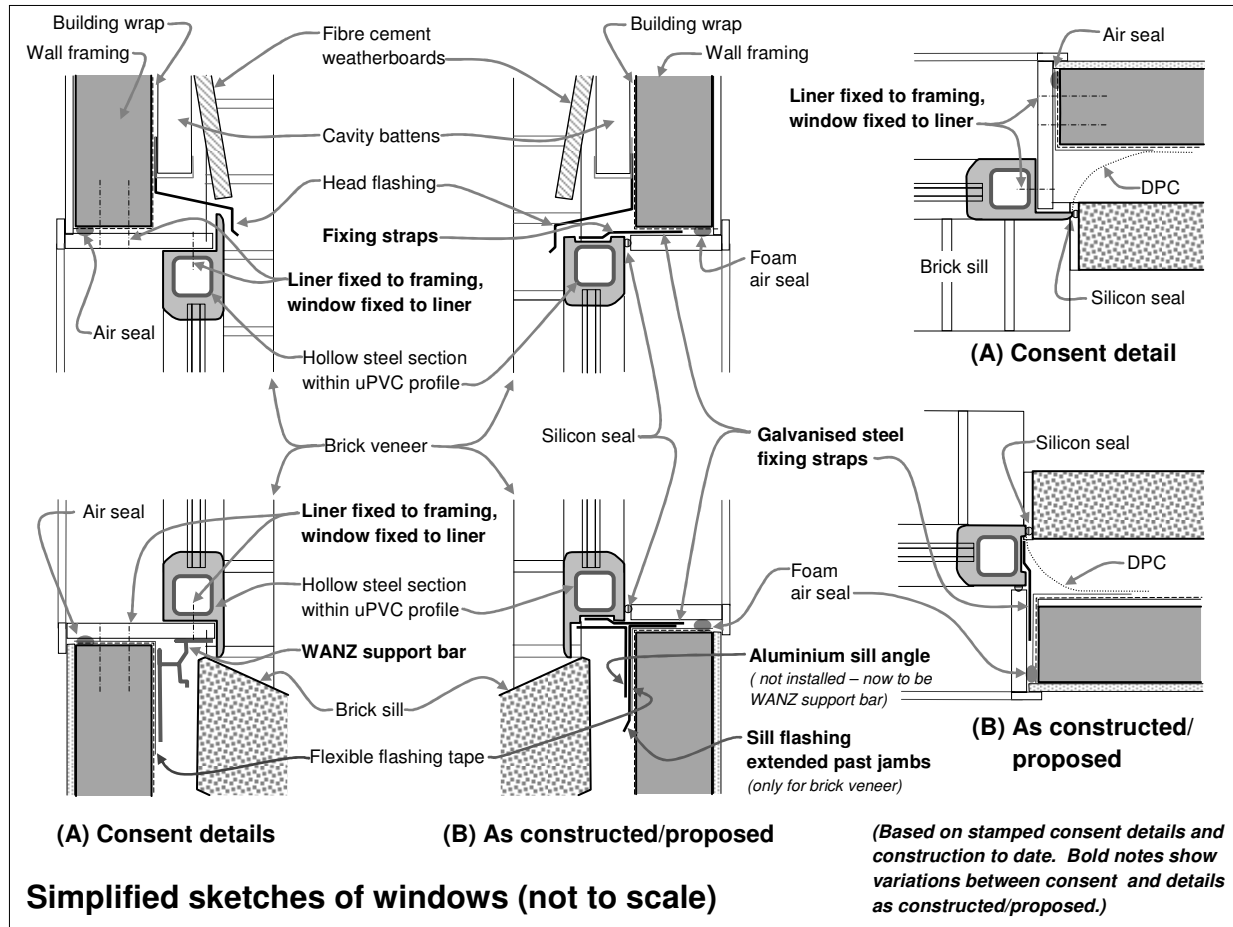
2.2 The uPVC joinery

- 2.2.1 The uPVC joinery to this house comprises top-hung awning sashes, plus one sliding and one hinged door. The consent drawings called for proprietary uPVC joinery to be supplied by the joinery supplier. This was substituted with alternative uPVC joinery using the same profiles but fabricated overseas and imported fully assembled, including glazing.
- 2.2.2 The substitute joinery resulted in changes to installation details as shown in the simplified sketch in Figure 1:

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

⁴ New Zealand Standard NZS 3604:2011 Timber Framed Buildings

Figure 1: Changes in window details



2.2.3 As shown in Figure 1, significant changes include the following:

Table 1: Significant changes in joinery

	(A) The consent joinery (consent drawing 21/03/16)	(B) The substitute joinery	
		Amendment details	As constructed/intended
Profile	uPVC extrusions with hollow steel sections within Full perimeter flange	uPVC extrusions with hollow steel sections within Flange at sill only	
Fixing	Timber reveal fixed to timber framing and into profile RHS	Galvanised fixing straps shown, with no size, spacing or fixings. Reveals cut to suit following window installation, with silicon bead at junction with profile	0.55 x 25mm standard galvanised steel strip brace at about 400mm centres, fixed to framing with single screws Reveals not yet installed
Support	WANZ ⁵ sill support bar shown	50mm aluminium support angles noted – but not shown or identified in sill detail. WANZ sill support bar not shown	Aluminium support angles not yet installed Owner/supplier now intends to use WANZ sill support
Flashing	No sill flashing shown	Sill flashing with kickout shown for brick veneer cavity only	

⁵ WANZ – Window Association of New Zealand

2.3 The substituted joinery

- 2.3.1 The double-glazed windows and doors are fabricated in China (“the window fabricator”) using extrusions manufactured by another Chinese based manufacturer (“the profile manufacturer”) and glass manufactured by another (“the glass manufacturer”). Other joinery components are manufactured in China and Germany.
- 2.3.2 The profile manufacturer is a joint venture between the Chinese partner and the world’s largest extruder of uPVC profiles for doors and windows (“the extruder”) which was founded in 1967 and operates in more than 40 countries, with subsidiaries in Europe, North America, India and Asia.
- 2.3.3 Frame and casement profiles are reinforced with hollow steel sections within the uPVC extrusions. The profile manufacturer extrudes profiles for export using a ‘tropical mix’ based on a CAZN (calcium zinc) stabiliser and seven micro-ingredients, including Titanium dioxide (TiO₂). Manufacturers of uPVC profiles are instructed to use ‘tropical mix’ extrusions for windows to be exported outside China; identified on all frame extrusions by the number ‘9’ code-printed during production.
- 2.3.4 Joinery using profiles provided by the profile manufacturer was tested by Intertek in China in 2015. An earlier 2012 test report was also provided by a building and façade testing laboratory in Australia (“the testing laboratory”) that is accredited with NATA⁶ which identified the client; the owner/supplier explained the client name was that the window fabricator used previously. However, the Australian test report does not identify the particular extrusions from which the test sample was manufactured.
- 2.3.5 The owner/supplier provided certificates and test reports as evidence of compliance of the uPVC windows. For clarity, this determination uses the following titles:

Table 2: Relevant certificates and test reports

Date	For:	By:	Covers:	Title given
May 12	The window fabricator (under a former name)	The testing laboratory	Double awning window Profile not identified	“The Australian test report”
April 15	The window fabricator	Intertek ⁷	Awning window (RP0001) uPVC profile of the extruder	“Intertek report”
Oct 15	The window fabricator	SAI Global ⁸	STANDARDMARK licence Joinery product AS 2047-2014	“SMK40451 Licence”
Oct 15	The window fabricator	SAI Global	STANDARDMARK licence Safety glazing AS 2208-1996	“SMK40452 Licence”
Jan 15	The glass manufacturer	CSI ⁹	Safety glazing AS 2208-1996	“CSI certificate”
2016	The window fabricator	AWA ¹⁰	Certificate of membership	“AWA certificate”
	Director of the window fabricator	AGGA ¹¹	Competency certificate AS1288-2006	“AGGA certificate”

⁶NATA: The National Association of Testing Authorities, Australia

⁷ IAS accredited global testing company

⁸ SAI: Standards Australia International, formerly Standards Australia - publicly listed standards compliance and information business

⁹ Certification Solutions Internal is an Australian company (also registered in NZ) which certify that products conform with a particular National or International Standard, Specification or Industry Code

¹⁰ Australian Window Association

¹¹ Glass and Glazing Association Victoria

3. Background

3.1 General

3.1.1 The building consent for the house (BC125453) was issued on 23rd March 2016. The consent specification included the following requirements for selections:

Substitutions are not permitted to the following selections

4.1 NOMINATED FABRICATOR

The nominated fabricators for this section of work are;
Company: [the extruder]

4.2 SUPPLY AND INSTALLATION

Supply and installation of the specified PVC-U joinery system by the following:
Supply only: By fabricator
Installation only: [the window supplier]

3.1.2 The specified windows were changed to the substitute windows without specific approval of the substitution and construction proceeded on that basis. During a brick veneer inspection, the authority observed the window substitution and changes to the installation.

3.1.3 The owner/supplier met with the authority on 2 June 2016 to discuss the situation. In an email to the owner/supplier on the same day, the authority noted that the owner/supplier had agreed to provide confirmation of the joinery's compliance by confirmation from the Ministry or 'an appraisal of the window system from an approved authority in New Zealand'.

3.1.4 The authority subsequently issued a site note dated 16th June 2016 which stated:

Windows have not been installed in accordance with the consented plans and specifications:

1. No WANZ bars installed to openings at brick or [proprietary] claddings
2. Jamb flashing extensions not installed at brick cladding
- 3 Head flashings not in place.

Further to this provide BRANZ certification for all exterior PVC-U joinery to show compliance with NZS 4211.

3.1.5 On 14 July 2015 the owner/supplier applied for an amendment to the building consent with revised drawings showing changed installation details. The authority responded with a request for further information to support the fixing detail and for the use of the window product itself, which the authority believed is not in accordance with the consent specification.

3.2 The WANZ comments on the substitute windows

3.2.1 The owner/supplier provided the authority with further technical, certificates and test information on the uPVC joinery and the manufacturer. The authority discussed the matter with the Window Association of New Zealand ("WANZ") and forwarded relevant information to WANZ for comment.

3.2.2 WANZ responded in an undated email to the authority that included the following comments (in summary):

- Although the Australian test report implies that the profile manufacturer operates in Australia, the profile manufacturer does not export into the Australian or NZ markets.

- Independent ‘ad-hoc’ window suppliers import the profile manufacturer’s products without the expected technical support.
- The Australian test report identifies the client as another large Chinese uPVC window manufacturer (see paragraph 2.3.4) and not the profile manufacturer.
- The Australian test report relates only to one small unspecified awning window. It dismisses water leakage ‘because it drained away’ and also does not ‘outline the testing protocol’ to the New Zealand standards.
- The ‘tropical mix’ was tested for only two years natural exposure, which is equivalent to about 2½ years solar radiation in New Zealand. Testing for accelerated weathering equivalent to 15 years exposure is needed.
- Testing does not meet AS/NZS 4284¹² for structure and weathertightness.

3.3 The Ministry received an application for a determination from the owner/supplier on 1 August 2016.

4. The submissions

4.1 The owner/supplier’s submission

4.1.1 The owner/supplier’s submission set out the background to the dispute, describing his attempts to show the windows’ compliance and noting that the same windows had been installed in another house within the past two years. The owner/supplier stated that the authority has refused to accept the certificates and reports provided and is insisting on local testing.

4.1.2 The owner/supplier provided copies of:

- the original drawings dated 22 February 2016
- relevant parts of the consent specifications and drawings dated 21 March 2016
- ‘StandardMark’ Licenses issued for the fabricator by Sai Global:
 - SMK40451 dated 10 October 2015 for uPVC joinery
 - SMK40452 dated 10 October 2015 for safety glass
- the Intertek report on uPVC window dated 24 April 2015
- the Australian test reports dated May and December 2012 for uPVC joinery
- the fabricator’s Certificate of Membership in Australian Window Association
- various other certificates, statements and information.

4.2 The authority’s submission

4.2.1 The authority made a submission on 16 August 2016, which explained that WANZ had provided advice on the information supplied by the owner/supplier (see paragraph 3.2). The authority set out reasons for its decision to refuse to accept the substitute joinery as follows (in summary):

- There are insufficient reasonable grounds to accept that the installed windows will comply with the Building Code, due to:

¹² AS/NZS 4284:2008 Testing of building facades

- insufficient evidence on compliance with Clause B1, with no engineering assessment provided for the joinery or its installation
 - insufficient evidence on compliance with Clause B2, with no reliable laboratory confirmation of UV protective additives
 - insufficient evidence on compliance with Clause E2, with no reliable assessment that the joinery conforms to NZS 4211¹³
 - the lack of marking or branding on the joinery stating that it has been ‘tested or comply with any standard or code’.
 - The joinery and installation do not comply with the building consent because:
 - the specification calls for the windows to comply with NZS 4211, but there is no evidence of compliance
 - the specification calls for a minimum ‘titanium dioxide’ content, but there is no evidence that this has been met
 - the installation is not in accordance with the consent drawings
 - WANZ support bars are called for in the consent documents but have not been installed. The aluminium angles used have no supporting information to confirm compliance.
- 4.2.2 The authority also forwarded a copy of an undated email from WANZ about the subject windows.
- 4.3 A draft determination was issued to the parties for comment on 23 October 2016.
- 4.4 By email on 28 November 2016, the owner/supplier accepted the draft and provided a copy of a Producer Statement PS1 – Design for the sizing of the window frames and design of window fixings.
- 4.5 In a response received on 1 December 2016, the authority accepted the draft without further comment.

5. The expert’s report

5.1 General

- 5.1.1 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 Architects and inspected the partially installed uPVC joinery on 20 September 2016; providing a report dated 12 October 2016 which was forwarded to the parties on 14 October 2016.
- 5.1.2 When the expert visited the building, the house structure, roof and walls were substantially complete, with building wrap and battens installed and cladding installed up to about 1m high. Windows had been fixed but head flashings, brick veneer and weatherboards were yet to be completed pending resolution of the consent amendment.

5.2 The documentation review

- 5.2.1 The expert noted the following changes in window installation between the details supplied for the proposed consent amendment and the consent details (see Figure 1):
- the weatherproofing of the installation details are not significantly different
 - the size, spacing and fixings of the fixing straps are not provided

¹³ NZS 4122:2008 Specification for performance of windows

- the size, thickness and fixings of the aluminium support angle are not provided.

5.2.2 The expert reviewed the test and accreditation documentation provided; translating Intertek tests to equivalent results for NZS 4211¹⁴ as shown in Table 3:

Table 3: Review of documentation

	Subject	Tests	Outcome	Comments
Intertek report	1.6 x 1.8m sample Testing AS 2047-1999 (Standard tests to AS4420.2-1996)	Deflection Operating force Air infiltration Water penetration Ultimate strength Casement torsion	As per NZS 4211: Pass Pass Different limit Pass Pass Not carried out	Require evidence of compliance with air infiltration and casement torsion. No testing of doors.
Australian test report	Tests to AS 2047-1999		Different client No profiles etc identified	Test results not considered
SMK40451 Licence	Joinery manufacture		Window fabricator certified as competent to manufacture uPVC windows to AS2047:2014	
SMK40452 Licence	Joinery fabrication		Window fabricator certified as competent to install safety glass	

5.2.3 The expert noted that statements from the profile manufacturer claimed that exposure testing in Australia was carried out by an exposure laboratory for the ‘tropical mix’ profile in accordance with ASTM 4726. However, without a copy of the test report this could not be verified.

5.3 Compliance of the substitute joinery

5.3.1 In regard to Clause B1 Structure, the expert noted that there is:

- no evidence in the Intertek report of what fixings were used for the tested joinery unit which satisfied the requirement ultimate failure
- no recommendations or details from window fabricator or profile manufacturer for fixing the units into place
- insufficient information to assess adequacy of fixing straps, centres and fixings.

5.3.2 In regard to Clause E2 External moisture, the expert noted that:

- the Intertek tests passed four of the six tests required for awning windows to establish compliance with NZS 4211
- further testing is needed for air infiltration and torsion requirements
- given the construction and small sizes of units, the subject windows are likely to perform adequately in the tests
- there is no testing carried out for doors
- NZS 4211 requires joinery units to be labelled as compliant.

¹⁴ NZS 4211:2008 Specification for performance of windows

5.3.3 In regard to Clause B2 Durability, the expert noted that:

- there is no copy of the exposure test report referred to by the profile manufacturer
- ASTM 4726 testing involves external exposure at 45° for a period of two years followed by testing for discolouration and brittleness but does not advise what life expectancy may be extrapolated from tests
- there is no history of use for the windows in New Zealand
- the profile manufacturer is one of the largest providers of uPVC extrusions and have been producing them since 1971, with a Singapore office opened in 1995
- there is likely to be a history of use of the profiles in regions where UV exposure is high.

5.4 Observations of the installed uPVC joinery

5.4.1 In regard to the installed uPVC window units, the expert noted that:

- the profile manufacturer's label was visible on several frames, including the extrusion reference that corresponds with the Intertek test report and the number '9' that refers to the 'tropical mix' used in the uPVC
- all glass is etched with 'Certified Product: AS/NZS 2208 SAI Global', but lacks the NZS 4223¹⁵ requirement to identify whether toughened or laminated
- the window supplier advised that all glass was toughened to avoid varying requirements in different regulatory export markets.

5.4.2 The expert inspected window installation completed to date, noting that:

- openings in timber framed walls were fully wrapped, with flexible flashing tape to corners and sills of the rough opening
- fixing straps were cut from 0.55 x 25mm standard galvanised steel strip brace and were fixed at about 400mm centres with single screws into framing
- in brick veneer walls, DPC jamb flashings were installed generally in accordance with E2/AS1 Figure 73C(g)
- as installation was incomplete, head flashings, WANZ sill supports, interior reveals and air seals had not yet been fitted.

5.4.3 In order to assess a completed joinery installation, the expert inspected a house in the vicinity where the same joinery had been installed about three years ago, noting that:

- no head flashings had been installed as window heads were directly beneath soffits, but other details appeared similar to those used in the subject house
- non-invasive moisture readings in linings around joinery units were 'consistent and low', with 'no visual evidence of moisture ingress'
- the external colour of the uPVC was 'free from signs of discolouration or other deterioration'

¹⁵ NZS 4223.3:1999 - Glazing in buildings - Part 3: Human impact safety requirements

- there was no sign of movement between the window and linings, which indicated that the window fixing system was adequate for the loads imposed on that particular house to date.

5.5 The expert's conclusions

- 5.5.1 In regard to compliance with Clause B1, the expert noted that engineering calculations or a producer statement is required to demonstrate the adequacy of the fixing design.
- 5.5.2 In regard to compliance with Clause B2, the expert noted that evidence of a history of satisfactory use of the profile manufacturer's windows could be provided by:
- reliable examples of 'tropical mix' uPVC used in an equatorial region with higher sunlight UV intensity than in NZ, or by
 - undertaking a test of, or otherwise verifying, the titanium dioxide content of the uPVC used in the joinery profile – and confirming that the content complied with the WANZ specification.
- 5.5.3 In regard to compliance with Clause E2, the expert noted that:
- test data is needed to confirm that the joinery product complies with the air infiltration limits and casement torsion loads comply with NZS 4211
 - the detailing shown in the consent application and the weathertightness of joinery installation completed to date appeared to be adequate.
- 5.5.4 Taking account of the verifiable testing carried out and certification obtained to date, the expert also noted that other paths might be taken to demonstrate compliance, including (in summary):
- seeking a CodeMark certificate for the joinery
 - verifying that BRANZ Appraisal 543 applies to the same RB001 profile used in the window fabrication (as the owner/supplier contends)
 - seeking a BRANZ Appraisal for the subject joinery.

6. Code compliance of the uPVC joinery

6.1 Compliance generally

- 6.1.1 In order for me to form a view as to code compliance of the uPVC joinery system, it is important to look for evidence that establishes whether the substitute joinery when installed will meet the performance requirements of the Building Code. I therefore need to consider the installation of the substitute joinery into the walls of this house and that evidence consists of the anticipated completed installation as shown in Figure 1 and the expert's report as described above.
- 6.1.2 In the case of this house, I consider that the evidence consists of:
- the expert's report on the partially installed joinery and a similar installation completed some three years ago (refer paragraph 5)
 - available test and technical information (see Tables 2 and 3)
 - the history of use of the uPVC joinery (see paragraph 6.2)
 - other information on uPVC joinery systems.

6.2 The history of use

- 6.2.1 The profile manufacturer is the world's largest extruder of uPVC profiles used for windows and doors. The company started its operations in 1969 in Germany and now has extrusion facilities in 12 countries (the United States, Russia, Poland, France, Spain, the United Kingdom, China, India, Canada, Mexico, Brazil and Chile), with offices in more than 40 countries across the world, including the United Arab Emirates, India, and Singapore.
- 6.2.2 The subject uPVC window systems have been used internationally for many years. Although introduced to the local market within the past five years, other types of uPVC window systems have been used in New Zealand for more than 20 years. The expert has also reported that the subject joinery was accepted by the authority in 2011 for another similar house in the same town as the subject house.

6.3 The available technical and test information

- 6.3.1 In the case of the subject uPVC joinery, the technical information includes:
- the designer's original consent details and specification
 - the designer's amended joinery details for the amendment application
 - technical and test information for the substitute joinery
 - the anticipated window installation completed as sketched in Figure 1.
- 6.3.2 The test information on the uPVC joinery system consists of the documents summarised in Table 2 (see paragraph 2.3.5). That documentation was reviewed by the expert (see Table 3) and certain deficiencies were identified as outlined in paragraph 5.5.
- 6.3.3 Taking account of the expert's report, I am therefore unable to be satisfied that the provided test reports, certification and other statements include sufficient reliable confirmation on the uPVC joinery and its qualities, including its durability and weathertightness when installed within New Zealand climatic and seismic conditions.
- 6.3.4 Notwithstanding the above, my conclusion for this particular house also needs to take into account other factors that apply to the specific situation, which may serve to balance the lack of reliable test evidence for the joinery.

6.4 The consequences of future failure for this house

- 6.4.1 Clause E2.3.2 of the Building Code requires that 'exterior walls must prevent the penetration of water that could cause undue dampness, damage to building elements, or both'. In addition to factors outlined above; I therefore need to assess risks applying to the particular circumstances of this building, which means considering the consequences of any possible future moisture penetration.
- 6.4.2 In regard to the risks and consequences of any future failure of the joinery system proposed for this particular house, I make the following observations:
- The single-storey house has a low weathertightness risk, with generous eaves to limit the impact of rain and also sunshine on most windows and doors.
 - The fibre-cement weatherboards are installed over a 20mm drained cavity and the brick veneer cladding incorporates a 50mm deep ventilated cavity, with the window units installed above those cavities.

- The framing openings are wrapped and taped, details call for flashings and air seals, and WANZ support bars are apparently intended to be installed. The installation is therefore anticipated to generally accord with E2/AS1.
- Although all required tests have not been completed, the uPVC profiles are steel reinforced and I concur with the expert's opinion that the small windows would likely perform adequately in the outstanding tests.
- Joinery units are fixed to framing with steel fixing straps; in response to the draft of this determination the owner/supplier provided a PS1 to verify the adequacy of the fixing system as installed.

6.4.3 Taking into account the above observations, I consider that the particular windows of this particular house are likely to comply with Clause B1 of the Building Code.

6.4.4 I also have reasonable grounds to conclude that, when completed, the partially installed joinery system will meet the performance requirements of Clause E2 for a minimum of 15 years as required by Clause B2 of the Building Code.

6.5 Conclusion

6.5.1 I acknowledge and support the authority with respect to the need to properly assess applications for consent amendments and to carefully review documentation submitted in support of substituted products. It is also clear that the owner/supplier ordered and installed the windows without seeking approval for the substitution.

6.5.2 I have considered the expert's report and the other available evidence, together with the consequences described in paragraph 6.4.2. As the engineering review of the fixing system has been satisfactorily resolved, I am of the opinion that there are sufficient grounds for me to conclude that the particular uPVC units partially installed into this particular house will comply with Clauses B1, B2 and E2 of the Building Code.

6.5.3 Notwithstanding my conclusion on the compliance of the particular joinery for this particular house, I accept that the authority has questioned the reliability and sufficiency of the documentation submitted for the consent amendment application. In order to avoid similar situations arising in the future, I strongly suggest that an appropriate appraisal be completed to cover a general use of the joinery product.

6.5.4 I emphasise that each determination is conducted on a case-by-case basis. Accordingly, the fact that particular joinery units have been established as being code-compliant in relation to a particular building does not necessarily mean that the same system will be code-compliant in another situation.

7. The decision

7.1 In accordance with section 188 of the Building Act 2004, I hereby determine that:

- the authority correctly exercised its powers of decision in refusing to amend the building consent in respect of the joinery installation, based on the information before it at that time
- as I have concluded the uPVC joinery system complies with the relevant clauses of the Building Code in this particular case, I reverse the authority's decision to refuse to amend the building consent, in respect of the above matter only.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 2 December 2016.

John Gardiner
Manager Determinations and Assurance