



Determination 2015/009

Regarding the code-compliance of a window in a proposed shower enclosure of a new house at 591 Paerata Ridge Road, Opotiki

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 architect, D Page, (“the architect”), who is who is a licensed building practitioner under the Building Act and who is the applicant in this case
 - the owners of the house, M & S Butcher (“the owners”)
 - Opotiki District Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.3 I consider Western Bay of Plenty District Council (“the contractor”), a building consent authority who was contracted to the authority to assess the building consent application for compliance, is a person with an interest in this determination.
- 1.4 This determination arises from an application for a building consent for the construction of a new dwelling. The authority is of the view that, with regards to a window to a shower, the proposed details do not comply with clauses E3.3.4 and E3.3.5 of the Building Code (Schedule 1, Building Regulations 1992)².
- 1.5 The matter to be determined³ is whether the proposed shower enclosure, in particular the detailing to the window, complies with Clause E3.
- 1.6 In making my decision, I have considered the submissions of the parties and the other evidence in this matter. The clauses of the Building Code and the Acceptable Solution discussed in this determination are set out in Appendix A.

¹ The Building Act, Building Code, compliance documents, past determinations and guidance documents issued by the Ministry are all available at www.dbh.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 references to clauses are to clauses of the Building Code.

³ Under section 177(1)(a) of the Act

2. The proposed shower detail and the background

2.1 Figure 1 below shows the shower sill detail that is in dispute.

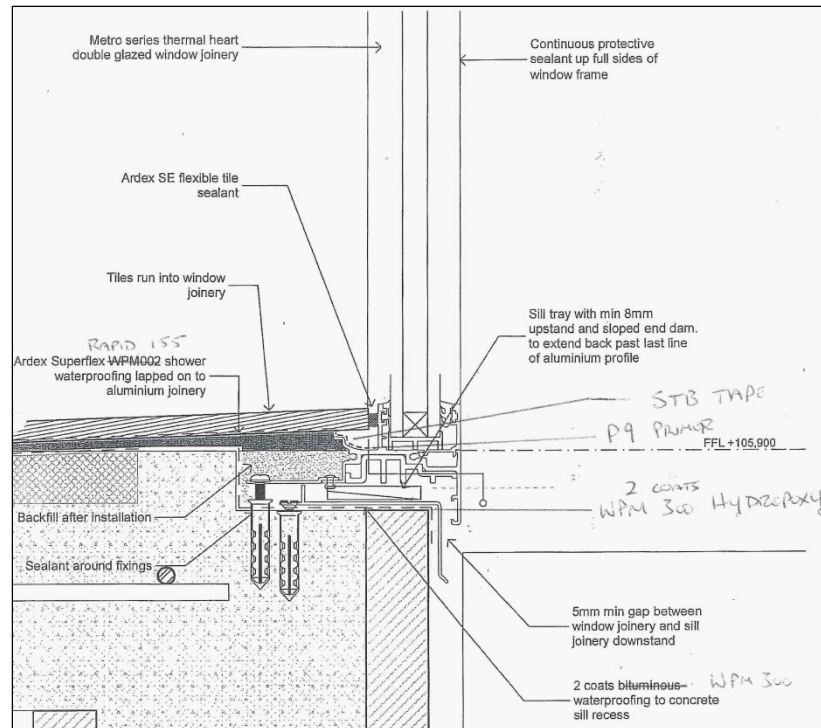


Figure 1: Shower sill detail (not to scale)

2.2 On 6 November 2014 the contractor sent a request for further information, noting that the contractor did not consider the proposed details would comply, and there was 'no evidence/information to qualify or substantiate how the window/door and associated construction details will be made impervious and easily [c]leaned'.

2.3 The architect responded on 11 November 2014, providing a window sill detail drawing and noting that:

The silicone seal is the same seal relied on for the junctions at tile corner joints. The water proofing to the floor and walls will be sealed on to the aluminium joiner. If the seal were to fail the moisture would be taken out via the [sill] tray to the exterior – as shown in [the attached drawing].

2.4 The contractor responded on 12 November 2014, noting that it did not consider the proposed details would comply with clause E3.3.4 or E3.3.5 and requesting a statement from the manufacturer or supplier of the window confirming that the window is designed for the intended use and will comply. The contractor also requested further information and clarification in reference to the performance requirements of clauses E3.3.4 and E3.3.5 as follows:

- How allowing water to drain through the window/door system will meet the requirement for impervious and easily cleaned; taking into account:
 - By being impervious, no passage of moisture/water is allowed.
 - Possibility of the water is trapped (sic) within the floor rebate and cannot be drained. What is the likelihood?
 - How the drainage system will [work] with [a] build-up of soap/[grit] from normal use?
- How the system can comply with 'easily cleaned' provision of the code when allowing water to pass through gap and space that are not accessible

during normal maintenance. What is the impact of soap or chemical in the water on the drainage system so that the whole system can continue to perform its function for at least 15 years?

2.5 The architect emailed the contractor on 12 November 2014, noting that the waterproofing under the bathroom tiles will extend onto the sill joinery. This was similar to 'standard' waterproofing details used at floor/wall junctions in tiled shower cubicles where a waterproofing membrane is used to prevent the passage of water. The architect also noted:

- Should both the flexible sealant between the tiles and the joinery and the waterproofing layer to the joinery fail, a small amount of moisture would reach the sill tray which itself drains to the exterior.
- If the moisture failed to track onto the sill tray, it would reach the bituminous waterproofing layer applied to the rebate in the concrete slab, which would also drain to the exterior.
- Should moisture penetrate at the sill fixings, there may possibly be a slight dampening of the concrete block/slab, but this will always be less than dampening caused by water running down the block after rain. The durability of the building (concrete block/slab) was not adversely affected by moisture penetrate.
- It was unlikely that moisture penetrating the joint would be soap or chemical-laden. If it was, the seal between the tiling and the window frame and the waterproofing membrane were designed to withstand their effects.

2.6 It appears the matter remained unresolved between the parties, and the Ministry received an application for a determination on 20 November 2014.

3. The submissions

3.1 The architect set out the following points in a submission with the application:

- Though in this instance the window joinery will be at floor level, the same arguments should be considered whatever height the window sill is above floor level.
- The materials used are all impervious materials and also easily cleaned.
- There are four different measures at sill level to prevent moisture ingress to the framing:
 - 1) Flexible sealant between the tiling and the window joinery
 - 2) Waterproof shower membrane
 - 3) Aluminium Sill tray
 - 4) Waterproof membrane to rebate in concrete floor slab
- Any water that might penetrate the mitres in the aluminium joinery would be drained to the exterior by the sill tray.
- Without the wind pressure, moisture is no more likely to ingress on the internal face than on the external face or when there is extensive condensation in the building; if necessary a similar neoprene glazing strip can be used internally as is used externally.

- Soap and other shower chemicals are unlikely to have any greater adverse effect, if any, on the glazing strip than other proprietary window cleaning products that would be used externally.
 - If moisture does penetrate the seal between the tile and the joinery, it will be prevented from access to the structure by the membrane that is extended on to the joinery and will exit through the standard condensation holes to the sill tray and the exterior.
 - If moisture does seep passed the seal it will be ‘virtually free’ of soap and/or grit and have less debris than normal condensation on other windows that run into dust and debris in condensation channels and then exits in the same manner.
- 3.2 The applicant provided the following in support of the application:
- The covering letter to the application
 - Drawings of the shower jamb detail and shower sill detail
 - Floor plan showing the location of shower enclosure
 - Correspondence between the parties.
- 3.3 On 4 December 2014 the architect provided technical information and advice received from the manufacturer of the waterproofing membrane to the shower confirming its ability to adhere to the aluminium joinery and recommending specific products from the manufacturer’s range including compatible sealants, etc.
- 3.4 The authority made no submission in response to the application for determination, but provided copies of the relevant drawings and correspondence.
- 3.5 A draft determination was issued to the parties for comment on 15 January 2015. The draft considered compliance with E3 Internal moisture in terms of clauses E3.3.6 but not clauses E3.3.4 and E3.3.5.
- 3.6 In separate responses received on 19 January 2015, the owners and the architect accepted the draft without further comment.
- 3.7 The authority provided a submission dated 29 January 2015 in response to the draft. The authority submitted the following (in summary):
- ‘There is no dispute with regards to requirements of building code clause E3.3.6. What is in dispute is compliance with E3.3.4 and E3.3.5 and how compliance can be demonstrated ...’
 - It was accepted that in this case the consequences of failure and damage are ‘low/unlikely’. The determination should consider whether the same arrangement but with a timber floor or timber frame construction would comply, as the architect has submitted that the argument should be considered whatever height the window sill is above floor level.
 - The window is not as easy to access and repair as most shower screens. There is no evidence as to how the window is fit for the purpose in terms of being impervious and easily cleaned.
- 3.8 The authority sought further ‘guidance and instruction as to how requirements of ‘impervious and easily cleaned ... can be interpreted in such a design; and then how compliance can be demonstrated and established’

4. Discussion

4.1 The legislation

4.1.1 The functional and performance requirements of Clause E3 discussed in this determination:

- E3.2 Buildings must be constructed to avoid the likelihood of –
 - (a) fungal growth or the accumulation of contaminants on linings and other building elements; and ...
 - (c) damage to building elements caused by the presence of moisture.
- E3.3.4 Wall surfaces adjacent to sanitary fixtures or sanitary appliances must be impervious and easily cleaned.
- E3.3.5 Surfaces of building elements likely to be splashed or become contaminated in the course of the intended use of the building, must be impervious and easily cleaned
- E3.3.6 Surfaces of building elements likely to be splashed must be constructed in a way that prevents water splash penetrating behind linings or into concealed spaces.

4.1.2 The question is whether the proposed details at the junction between the tiled floor and the window will comply with the relevant performance requirements.

4.2 Clauses E3.3.4 and E3.3.5 – surfaces being ‘Impervious and easily cleaned’

4.2.1 The authority considers that compliance Clauses E3.3.4 and E3.3.5 will not be achieved.

4.2.2 Clauses E3.3.4 and E3.3.5 are concerned with the required attributes and performance of surfaces that will be splashed with water as a normal and expected occurrence. In this instance the surfaces will be the tiles, window, and the sealant at the junction (“the primary seal”).

4.2.3 The architect has specified the junction between the tiled shower floor and the upstand on the condensation channel is to be sealed with a proprietary flexible tile sealant. The sealant acts as the primary barrier to water ingress at this junction. The sealant proposed by the membrane manufacturer is suitable for use in wet areas such as showers; it is flexible with up to 25% of movement, is UV resistant and contains mould inhibitors⁴.

4.2.4 E3/AS1 (refer Appendix A) lists materials and surface finishes that are ‘impervious and easily cleaned’ and are deemed to satisfy the requirements of Clause E3. Paragraph 3.3.1 of E3/AS1 lists materials and surface finishes that may be used in showers – several of these materials use mechanical and sealed joints that continue to the base of a shower lining. These joints are similar in nature to the sealed joint between the floor and the window proposed in this case, but do not have the benefit of a means to drain away any water that may penetrate the lining.

4.2.5 I am of the view that the relevant surfaces in this case satisfy the requirements of Clauses E3.3.4 and E3.3.5.

4.2.6 The requirements of clauses E3.3.4 and E3.3.5 do not apply to situations where water splash is not a normal and expected occurrence – such as where water may penetrate the primary seal. In my view the building elements beyond the primary seal are not

⁴ Taken from technical specification for the proposed sealant as recommended by the manufacturer at paragraph 3.3.

required to be impervious and easily cleaned; these elements are only required to satisfy the requirements of clause E3.3.6. If compliance with E3.3.6 is achieved, in that water splash is being prevented from ‘penetrating behind linings or into concealed spaces’, there is no need for those elements to also be impervious and easily cleaned.

4.3 Clause E3.3.6

- 4.3.1 The performance requirement of Clause E3.3.6 is to avoid the likelihood of internal moisture being able to penetrate behind linings or into concealed spaces. This is to prevent fungal growth or the accumulation of contaminants on building elements, and to prevent damage to building elements. I consider the floor/window junction works as a system and that Clause E3.3.6 applies to the system as a whole.
- 4.3.2 The shower tiling includes a waterproofing membrane that will direct any moisture to the condensation channel in the window. Any moisture breaching the sealant at the tile to window junction would also fall into this channel. The channel is designed to typically collect any condensation that runs down the inside of the glass and frame, with holes in the channel that direct the water to the outside; as such it provides an adequate outlet for water that may penetrate the sealed junction or the tiles.
- 4.3.3 Should the primary seal fail there are three mechanisms that will direct any internal moisture to the exterior:
- the purpose-made condensation channel to the window sill
 - the sill tray under the window
 - the waterproofed rebate in the concrete slab.
- Any other failure of the window’s waterproofing performance (i.e. failure of mitre junctions in the aluminium or the glazing gaskets) would lead to the same drainage mechanisms being brought into play.
- 4.3.4 There are no building elements likely to be at risk of damage if the primary seal fails. The building elements concerned are durable and would not be adversely affected by the levels of moisture likely to arise from the expected use of the shower.
- 4.3.5 It will be important to ensure the manufacturer’s instructions are followed in relation to the correct installation of the shower membrane and the primary seal, etc. It is also important to ensure that neither the shower membrane nor the primary seal will adversely affect the drainage from the condensation channel, i.e. that neither element restricts or reduces the proper drainage from the channel.
- 4.3.6 Notwithstanding these considerations, in terms of the plans provided with the consent application and additional information received from the applicant as part of this determination, I consider there is sufficient evidence to establish on reasonable grounds that the proposed building work will comply with Clause E3 of the Building Code.
- 4.3.7 Maintenance of the sealant will be an important factor in ensuring ongoing performance of the system as a whole and this is the responsibility of the owners. The primary seal is readily observable and any excess quantities of water exiting the window sill to the outside will also alert the owners to there being a problem requiring attention.

4.4 The authority's remaining concerns

- 4.4.1 In regards to the authority's concerns about soap or grit accumulating in concealed elements: I am of the view that matter from the shower, such as cleaning products, soap and grit, is unlikely to collect or penetrate the floor/window junction to the extent that it would cause the system to fail in terms of compliance with Clause E3.
- 4.4.2 The authority has also sought guidance about the use of a similar floor/window junction with a timber substrate instead of concrete, or with the window sill at some point above the floor (i.e. becoming a lining/window junction). In my view the compliance of either case will rest on suitable detailing and the use of sufficiently durable materials.

5. The decision

- 5.1 In accordance with section 188 of the Building Act 2004, I hereby determine that the detailing to the window of the proposed shower enclosure will comply with Clause E3 of the Building Code.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 2 March 2015.

John Gardiner
Manager Determinations and Assurance

Appendix A: The relevant legislation

A.1 The relevant clause of the Building Code

Clause E3 – Internal Moisture

Objective

E3.1 The object of this provision is to –

- (a) safe safeguard people against illness, injury, or loss of amenity that could result from accumulation of internal moisture; ...

Functional requirement

E3.2 Buildings must be constructed to avoid the likelihood of –

- (a) fungal growth or the accumulation of contaminants on linings and other building elements; and
- (b) ...
- (c) damage to building elements caused by the presence of moisture.

Performance

E3.3.4 Wall surfaces adjacent to sanitary fixtures or sanitary appliances must be impervious and easily cleaned.

E3.3.5 Surfaces of building elements likely to be splashed or become contaminated in the course of the intended use of the building, must be impervious and easily cleaned.

E3.3.6 Surfaces of building elements likely to be splashed must be constructed in a way that prevents watersplash penetrating behind linings or into concealed spaces.

A1.2 Definitions used in E3/VM1 & AS1 include:

Impervious That which does not allow the passage of moisture.

A1.3 The Acceptable Solution E3/AS1 includes:

3.0 Watersplash

3.1 Lining materials

3.1.1 Floors The following linings and finishes to floors satisfy the performance for *impervious* and easily cleaned surfaces in areas exposed to watersplash:

- a) Integrally waterproof sheet material (e.g. polyvinylchloride) with sealed joints.
- b) Ceramic or stone tiles ...
- c) Cement based solid plaster or concrete ...
- d) Cork tile or sheet sealed with waterproof applied coatings and with sealed joints.
- e) Monolithic applied coatings having a polished non-absorbent finish ...
- f) A timber or timber based product such as particleboard sealed with waterproof applied coatings.

3.1.2 Walls

The following linings and finishes to walls satisfy the performance for *impervious* and easily cleaned surfaces in areas exposed to watersplash:

- a) Integrally waterproof sheet material (e.g. polyvinylchloride) with sealed joints.

- b) Ceramic or stone tiles ...
- c) Cement based solid plaster or concrete...
- d) Cork tile or sheet sealed with waterproof applied coatings.
- e) Monolithic applied coatings having a polished non-absorbent finish ...
- f) Sheet linings finished with vinyl coated wallpaper, or semi-gloss or gloss coating.
- g) Water resistant sheet linings finished with decorative high pressure laminate ...
- h) Modular or multiple lining units which are themselves impervious and easily cleaned, and are installed with impervious joints.
- i) Timber or timber based products such as particleboard sealed with waterproof applied coatings.

3.3.1 Showers

All shower spaces shall have *impervious* floor and wall finishes. Lining materials and finishes listed in Paragraphs 3.1.1 and 3.1.2 satisfy this requirement ...

- a) The following materials shall not be used:
 - i) Cork tile or sheet sealed with waterproof applied coatings,
 - ii) Sheet linings finished with vinyl coated wallpaper, or semi-gloss or gloss coating.
- b) Ceramic or stone tile finishes shall be laid on a continuous impervious substrate or membrane. ...