

saveBOARD NZBC E3 Design Guide Internal  
Moisture Control



**saveBOARD Internal Linings  
and External RABB**



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Version 1.0

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## 1. Purpose of Document

This document is intended to help Designers, Builders, D.I.Y. Homeowners, and Building Consent Authority (B.C.A.) Building Officials who want to ensure that saveBOARD meets the NZ Building Code requirements for E3 Internal Moisture.

Following the design instructions within this document are important to ensure correct product use and the ongoing support of the manufacturer's material warranty.

### Designer and Installer Qualification and Skill level

Where saveBOARD is specified as part of design or Installation, the designer/installers should have the appropriate skills and knowledge of the product and, where necessary, the qualification required for Licence Building Work in NZ.

#### **Please Note:**

*The design and Installation of saveBOARD can be used for building work that forms part of the primary structure and weathertight envelope of a building which is Restricted Building Work (RBW). RBW must be carried out or supervised by a Licensed Building Practitioner (LBP). It is also necessary to obtain building consent before the commencement of RBW. Failure to do so is an offence under the Building Act 2004.*

## 2. Technical Support

This document must be read in conjunction with the saveBOARD Product Technical Statements (P.T.S.).

Please refer to saveBOARD specifications and details for all materials. These are easily

downloaded from the saveBOARD website [www.saveBOARD.nz](http://www.saveBOARD.nz).

For product maintenance and warranty requirements, please refer to the guidance on the saveBOARD website: [www.saveBOARD.nz](http://www.saveBOARD.nz).

saveBOARD provides technical support for the full range of saveBOARD products. By visiting [www.saveBOARD.co.nz](http://www.saveBOARD.co.nz) you can access all the latest information regarding our products, including:

- Product Technical Statements (P.T.S.)
- Product Specification
- Installation Guides,
- Technical Notes,
- CAD Drawings, and
- other useful information.

## 3. saveBOARD NZBC E3 - Internal Moisture Control compliance

NZ Building Code Clause E3 (NZBC E3) has the primary objective to ensure that buildings have appropriate control of internal moisture to safeguard people against illness, injury, or loss of amenity that could result from an accumulation of internal moisture.

saveBOARD is aware that it is necessary to consider these requirements as an essential part of holistic building design, accounting for thermal resistance, ventilation, and space temperature control.

In researching NZ Building Code performance requirements, s has researched the most up-to-date NZ study on internal moisture control for buildings from BRANZ -*Vapour Control in New Zealand Walls Study Report (Overton, 2016)*. The BRANZ research findings suggest that currently, all generic<sup>1</sup> building designs in NZ are not adequately addressing NZBC E3.

saveBOARD can successfully contribute to buildings compliance with NZBC E3 and

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<sup>1</sup> Does not include buildings that include vapour control measures.



specifically the functional requirements of NZBC E3.2.

To demonstrate this saveBOARD has been tested for:

- Water vapour transmission and permeance to ASTM E96-16 [Intertek-US 30/05/2018].
- Water absorption - Water vapour transmission and permeance to ASTM E96-16 [Scion – NZ 03/2022].
- Resistance to growth of mould ASTM D2373-12 for [Intertek – US 29/07/2013].

Additionally, to testing, hygrothermal analysis has been undertaken to demonstrate that saveBOARD' has a vapour permeability/vapour resistance functional performance (as part building envelope system) that performs equal to, or marginally better than other NZ leading products accepted as compliant in NZBC E2/AS1 -Table 23.

saveBOARD have demonstrated compliance through this method because NZBC E2/AS1 - Table 23 is the only NZ Acceptable Solution that specifies a performance standard for product vapour transmission in buildings.

## 4. Building design with saveBOARD for Internal moisture control

To ensure saveBOARDS NZBC E3 building design performance, Kaizon Consultants NZ has conducted a hygrothermal engineering analysis that has quantified NZBC performance for saveBOARD in selected regions/climate zones of NZ. This analysis supports the design solutions product limitations within this document.

**In conclusion** – research, laboratory testing and engineering analysis all demonstrate that saveBOARD linings, as part of a complete building design/system, can be successfully used to demonstrate compliance with the functional requirements of NZBC E3.2 (explicitly performance requirement NZBC E.3.3.1).

## 5. saveBOARD - Use and Limitations

To ensure adequate NZBC E3 performance, saveBOARD provides the following guidelines and limitations for use:

- The building design must have an adequate combination of thermal resistance, ventilation and space temperature control.
- saveBOARD recommends the use of full building continuous Mechanical Ventilation and Temperature Control (MVTC) for all residential projects when using saveBOARD.
- The use of saveBOARD without full building MVTC is not recommended in specified climate zones unless supported by independent expert analysis.

### 5.01 saveBOARD recommendation

saveBOARD recommends the use of MVTC in all residential projects to create superior building performance and an interior environment that is in line with the World Health Organisation standards (WHO, 2022) for occupant health and comfort.

### 5.02 Performance definition for Mechanical Ventilation and Temperature Control -MVTC

Heating Min 18 °C ±  
Cooling: 24 °C

RH Control: Max. 60% RH, which would require dehumidification.

## 6. saveBOARD Design process

### 6.01 Approved saveBOARD design methods

Design using saveBOARD must be based on direct reference to approved saveBOARD Design Methods (SDM).

<b>SDM 1:</b>	Approved Climates Zones confirmed through hygrothermal analysis
<b>SDM 2:</b>	Full building design inputs based on the saveBOARD E3 Risk Matrix assessment;
<b>SDM 3:</b>	Project-specific hygrothermal analysis or suitable expert opinion

Table 1: Approved saveBOARD Design Methods

### 6.02 Designer and User Responsibilities-

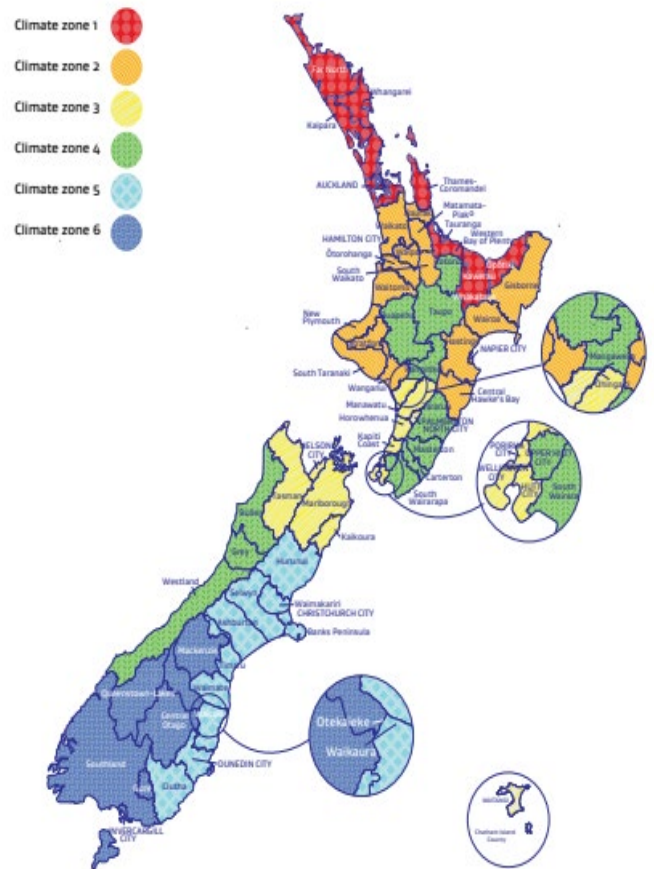
Please note that saveBOARD is a single material forming only one part of the complete building design. Design for NZBC E3 must be considered holistically, and it remains the designer's responsibility to ensure all NZBC requirements are met.

## 7. SDM1 - SaveBOARD use without – MVTC

Notwithstanding saveBOARD recommendation for MVTC in all residential projects, saveBOARD can be successfully used as part of an NZBC E3.2 compliant design in many NZ locations without MVTC, based on hygrothermal analysis evidence.

Analysis has been completed with reference to the Climate Zones provided in NZBC H1/AS1 5th Edition Climate Zone Map.

The saveBOARD approved use Climates Zones for SDM1 are identified in Table 2a & 2b below and must be used as design guidance for designers.



Climate Zone	saveBOARD use without MVTC:	Geographical locations:
<b>ZONE 1:</b>	Approved	Far North - Auckland – Bay of Plenty
<b>ZONE 2:</b>	Approved	Waikato – Taranaki – East Coast (North Island)
<b>ZONE 3:</b>	Approved	Wellington – Horewhenua – Manawatu – Marlborough – Tasman - Kaikoura

Table 2a: SDM1 **approved** saveBOARD Design climate zones.



Climate Zone	saveBOARD use without MVTC:	Geographical locations:
<b>ZONE 4</b>	Use SDM 2, or SDM 3	Central plateau and Wairapa (North Island) Buller to Westland (South Island West Coast)
<b>ZONE 5</b>	Use SDM 2, or SDM 3	Hauranui to Clutha (South Island East Coast)
<b>ZONE 6</b>	Use SDM 2, or SDM 3	Southland, Gore, Queenstown Lakes, Central Otago, MacKenzie

Table 2b: SDM1 **Not approved** saveBOARD Design climate zones.

## 8. SDM2 - saveBOARD use with MVTC

### 8.01 saveBOARD recommendation

saveBOARD recommends the use of MVTC in all residential projects because it creates superior building performance and an interior environment that is in line with the World Health Organisation standards (WHO, 2022) for occupant health and comfort.

### 8.02 saveBOARD Simple NZBC E3 Design Guidance

To assist designers in achieving NZBC E3.3.1 functional requirements, saveBOARD provide design guidance with the use of the E3 Design Calculation Risk Matrix. (Please refer to the appendix below for a worked example).

### 8.03 Using the saveBOARD E3 Design Calculation Risk Matrix (E3 DCRM):

This is a simple design assessment process for designers. When using the des assessment process, the input criteria must be incorporated into the building design/specification.

#### Calculation use:

Designers must apply each assessment criteria and calculate a total score.

To use SDM 2, a project must achieve a total score  $\leq 8$  (Equal to or less than 8).

Projects that achieve a score of  $> 8$ ; and are not supported by SDM 1 must use SDM 3 and obtain independent expert advice before specifying or using saveBOARD.

### E3 Design Calculation Risk Matrix (E3 DCRM)

sample table

<b>Design Criteria 1-</b> <i>Thermal Insulation Location</i>		
<b>Type</b>	<b>Score</b>	<b>Definition</b>
External <sup>2</sup> (Warmwall)	1	-
Internal <sup>3</sup>	3	-
Within structure <sup>4</sup>	5	.
<b>Design Criteria 2-</b> <i>Ventilation</i>		
<b>Type</b>	<b>Score</b>	<b>Definition</b>
Full House	1	
Partial Isolated <sup>5</sup>	3	-
No ventilation	5	-
<b>Design Criteria 3-</b> <i>Space Temperature and Humidity Control</i>		
<b>Type</b>	<b>Score</b>	<b>Definition</b>
Full House	1	
Partial/Isolated <sup>6</sup>	3	
None	5	
<b>TOTAL SCORE</b>	-	Score < 8 - OK Score > 8 Must obtain expert confirmation

## 9.0 SDM3 - saveBOARD use Specific Engineering Design

### 9.01 saveBOARD limitations

Hygrothermal analysis or suitable expert opinion is required for saveBOARD use in the following conditions:

- Projects that do not meet the requirements of SDM1 or SDM2/
- For buildings/rooms enclosing very warm or wet areas such as spa pools, saunas, and swimming pools,
- For buildings in a very cold environment, such as ski lodges and mountain huts. Both of which are colder than the coldest climate explored in winter months.

<sup>2</sup> Insulation located on exterior side of the Rigid Air Barrier.

<sup>3</sup> Insulation located on the interior side of the external wall structure.

<sup>4</sup> Insulation located within the exterior structural frame.

<sup>5</sup> Kitchen – Bathroom mechanical extract

<sup>6</sup> Heat or Humidity device in single location(s) only. Risk could be higher than 5 in certain circumstances.

## Appendix 1

### SDM 2 Worked Example:

Project: Simple residential house.

Location: North Island Zone 2

Thermal Envelope:

- Construction -NZS 3604 timber frame – (M Content <18%)
- External moisture control/Thermal envelope design NZBC E2/AS1 (Cavity with - WeatherB-, Brick, etc.) with 12mm sSaveBOARD Rigid Air Barrier – Insulation within the 90mm frame with R2.5 Quilt Insulation.
- The internal lining is 12mm sSaveBOARD Paperface – full plaster finish.

Heat Source: Ducted throughout all habitable rooms

Ventilation: Positive pressure system to all habitable rooms

<b>Design Criteria 2- Ventilation</b>		
Type	Score	Definition
Full House	1	Positive pressure – ducted type system
Partial Isolated*	3	-
No ventilation	5	-
<b>Design Criteria 3- Space Temperature and Humidity Control</b>		
Type	Score	Definition
Full House	1	A system that maintains a suitable Temperature/Humidity for all habitable areas***
Partial/Isolated**	3	
None	5	
<b>TOTAL SCORE</b>	<b>7</b>	<b>Score &lt; 8 - OK</b> Score > 8 Must obtain expert analysis

\*Single isolated ventilation source – Kitchen/Bathroom mechanical extract.

\*\*Single/Isolated Heat -Humidity control source(s).

\*\*\* The World Health Organisation's Housing and Health Guidelines, published in 2018 (with direct New Zealand input), proposes 18°C as a safe indoor temperature to protect the health of general populations.

### Worked Example:

<b>Design Criteria 1- Thermal Insulation Location</b>		
External - Insulation is located on the exterior side of the Rigid Air Barrier.		
Internal - Insulation is located on the interior side of the external wall structure.		
Within Structure - Insulation located within the exterior structural frame.		
Type	Score	Definition
External (Warmwall)	1	-
Internal	3	-
Within structure	5	External walls insulated within timber frame R2.5 Quilt Insulation.

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