

## PLIABLE BUILDING MEMBRANES IN EXTERNAL WALLS (BUILDING CLASSES 1, 2 & 4)

### Condensation management considerations for sarking-type materials in external walls (NCC 2022 Volume 1 & 2)

NCC Class 1 Building	NCC Class 2 Building	NCC Class 4 Building
<p>A stand-alone single dwelling or house where a single-family lives.</p> 	<p>An apartment building with two or more apartment units.</p> 	<p>A sole living dwelling part of any commercial building, such as a caretaker's residence in a factory, school or storage facility.</p> 

Working in partnership with customers to achieve National Construction Code (NCC) 2022 compliance, this Technical Bulletin explains key aspects of the expanded condensation management clauses in the NCC 2022 related to the use of sarking-type materials in external walls. Condensation management clauses were first introduced in the NCC 2019.

Pliable building membranes, also known as 'sarking-type' materials, are primarily used as a control layer for one or more controls such as water, thermal, vapour or air control, in residential or commercial buildings. Vapour control is an important part of condensation management. When referring to vapour control, standard AS/NZS 4200.1 uses the term vapour control membranes (VCM), which are classified as Class 1, 2, 3 or 4 according to their level of vapour permeance as per Table 1.

One objective of the condensation management clauses first introduced in the NCC 2019, was to reduce the risk of moisture inadvertently being trapped in the building envelope in certain climate zones. The NCC 2019 included a requirement for specific classes of vapour permeance in sarking-type materials for external walls and roofing, as vapour permeance can reduce instances and severity of condensation and improve drying potential when condensation occurs.

The NCC 2022 extends this with an expansion of Deemed to Satisfy (DTS) requirements for vapour permeance in sarking-type materials in external walls in Volumes 1 & 2. Following are the relevant clauses that apply to residential Building Class 1, sole-occupancy units of Class 2 buildings, and Class 4 parts of buildings:

- Building Classes 1, 2 & 4 in Climate Zone 4 & 5 now must include a vapour permeable membrane of Class 3 (>0.143 µg/N.s) or Class 4.
- Building Classes 1, 2 & 4 in Climate Zone 6, 7 & 8 now must include a vapour permeable membrane of Class 4 (>1.14 µg/N.s).

The NCC 2022 continues to allow for non-water barrier vapour permeable sarking type material in external walls where there is a drained cavity, such as brick veneer construction. Care should be taken in membrane/sarking-type material selection to ensure that internal linings are not damaged if installed prior to completion of external wall.

Development Applications and Building Permits approved using NCC 2019 will not be affected by these additional changes and can use the sarking-type material included in the original specification. Changes come into place from 1 May 2023, though this may vary by state and local governing body.

**Table 1: About Vapour Control Membranes (VCM)**

Vapour permeance is the degree that water vapour is able to diffuse through a material, measured in  $\mu\text{g}/\text{N}\cdot\text{s}$  (micrograms per newton-second) and tested in accordance with the ASTM-E96 Procedure B – Water Method at 23°C 50% relative humidity (RH). The vapour permeance of vapour control membranes (VCMs) are classified in reference documents AS 4200.1 and are broken up into four classifications.

This classification below should not be confused with Australian Building Code Board Building Classifications used in the NCC.

VCM Class	Category	Min. $\mu\text{g}/\text{N}\cdot\text{s}$	Max. $\mu\text{g}/\text{N}\cdot\text{s}$
Class 1	Vapour barrier	>0.0000	<0.0022
Class 2	Vapour barrier	>0.0022	<0.1429
Class 3	Vapour permeable	>0.1429	<1.1403
Class 4	Vapour permeable	>1.1403	No max.

## Key changes to pliable building membranes under Condensation Management in NCC 2022

For Building Class 1, sole-occupancy units of Class 2 buildings, and Class 4 parts of buildings where a pliable building membrane is installed in an external wall, it must comply as per the extract below.

### **Volume 1 F8D3 External Wall Construction (formerly NCC 2019 F6.2) and Volume 2 10.8.1 External Wall Construction (formally NCC 2019 3.8.7.2) extract**

- (1) Where a pliable building membrane is installed in an external wall, it must:
  - (a) Comply with AS 4200.1; and
  - (b) Be installed in accordance with AS 4200.2; and
  - (c) Be located on the exterior side of the primary insulation layer of wall assemblies that form the external envelope of a building.
- (2) Where a pliable building membrane, sarking-type material or insulation layer is installed on the exterior side of the primary insulation layer of an external wall, it must have a vapour permeance of not less than:
  - (a) 0.143  $\mu\text{g}/\text{N}\cdot\text{s}$  in climate zones 4 & 5; and
  - (b) 1.140  $\mu\text{g}/\text{N}\cdot\text{s}$  in climate zones 6, 7 & 8.

- (3) Except for single skin masonry and single skin concrete, where a pliable building membrane is not installed in an external wall, the primary water control layer must be separated from water sensitive materials by a drained cavity.

## Key takeaway

The NCC 2022 expands vapour permeable sarking-type material requirements for external wall construction in Building Classes 1, 2 & 4. External wall construction in Climate Zones 4–5 will now require a Class 3 Vapour Permeable Membrane as a minimum. Fletcher Insulation recommends the use of our Sisalation® Vapawrap® Residential Vapour Permeable Wall Wrap to meet and exceed these requirements.

## Choosing the right Sisalation® wall wraps and sarkings for your projects

Fletcher Insulation provides a comprehensive range of Sisalation® wall wraps and sarkings to suit different applications and climate zones.




Sisalation® Vapawrap® Residential Vapour Permeable Wall Wrap is a vapour permeable wrap best suited for cold and temperate climates and can be used in all climate zones, except in Climate Zone 1. For hot and tropical climate zones, a vapour barrier completely taped and sealed should be used.









The recommended vapour permeance requirement in this Technical Bulletin refers to the NCC 2022 Building Class 1, sole-occupancy units of Class 2 buildings, and Class 4 parts of buildings. However, vapour permeance can be applied in other building classes for best practice in condensation management.

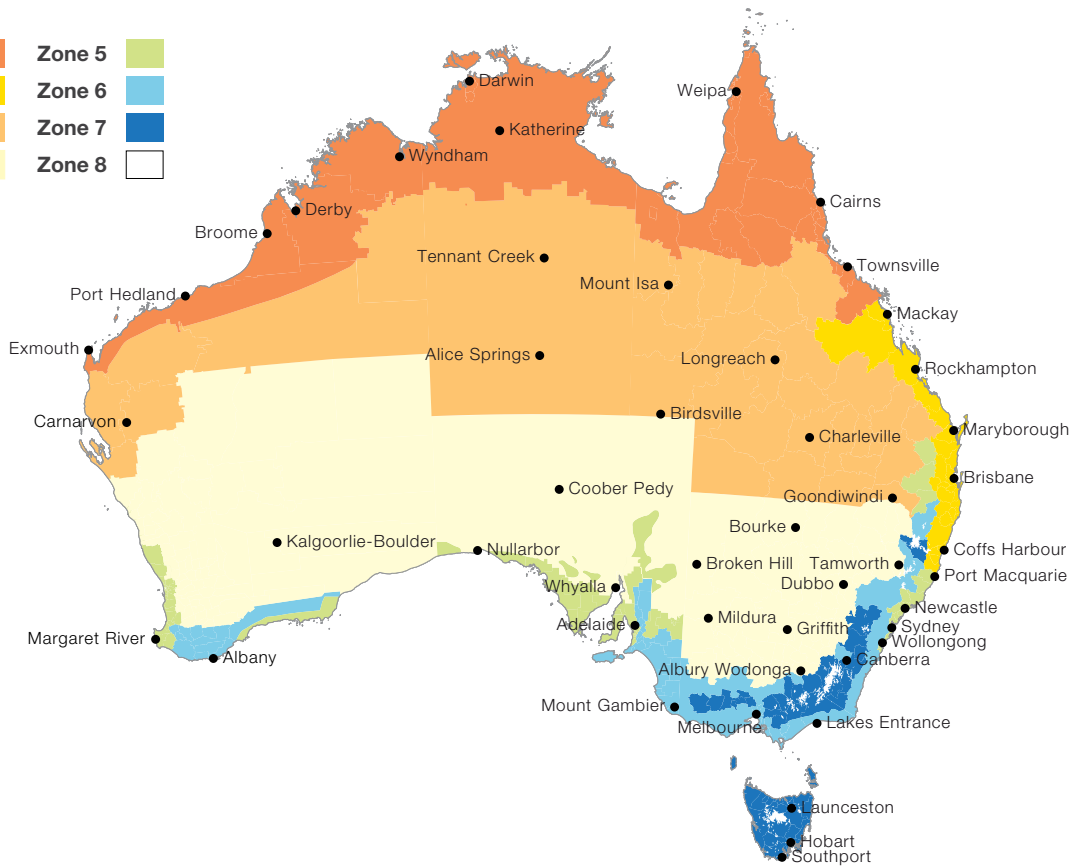
See Table 2 on next page for selection of right Sisalation® wall wraps and sarkings by Climate Zone.



**Table 2: Sisalation® Wall Wraps and Sarkings by Climate Zone**

Climate Zone	Sisalation® product
<b>Climate Zones 1–3*</b> 	Sisalation® Vapawrap® Residential Vapour Permeable Wall Wrap (not suitable for Climate Zone 1)*
	Sisalation® Multipurpose EHD (456)
	Sisalation® Tuff Wrap™ Wall Wrap Standard (497)
<b>Climate Zones 4–8</b> 	Sisalation® Vapawrap® Residential Vapour Permeable Wall Wrap
<b>Brick veneer construction in Climate Zones 2–5</b> 	Sisalation® Tuff Wrap™ Wall Wrap Breather (497)

- Zone 1 
- Zone 2 
- Zone 3 
- Zone 4 
- Zone 5 
- Zone 6 
- Zone 7 
- Zone 8 



**References**

- 1 NCC 2022 Volume 1 F8D3 External Wall Construction and Volume 2 10.8.1 External Wall Construction.
- 2 The Condensation in Buildings Handbook provided by the Australian Building Codes Board under the CC BY 4.0 licence.

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