VICTORIAN BUILDING AUTHORITY

BUILDING PRACTICE NOTE

General GE 15 | Condensation Management

Audience

The audience/s for this Practice Note include/s:

☒ Architects/ Designers
☒ Builders
☒ Building Surveyors/ Inspectors
☒ Engineers
☒ Home Owners / Residential Tenants
☒ Owner Builders
☒ Plumbers
☒ Real estate management agents
☒ Trades and Maintenance (inc. Electricians)

Purpose

This Practice Note provides guidance on the Deemed to Satisfy provisions for Condensation Management under NCC 2022.

The content below provides guidance on:

- Introduction
- Pliable Building Membranes (Sarking)
- Exhaust Systems
- Ventilation of Roof Spaces

Abbreviations & Definitions

The abbreviations and definitions set out below are for guidance only. They are not intended to vary those established out in the Building Act 1993, the Building Regulations 2018 or the National Construction Code.

- **Act –** Building Act 1993
- **DtS** – Deemed to Satisfy
- **Eaves** – Lower edge of a pitched roof or edge of a flat roof (reference: Standards Australia HB-50)
- **HPS** – ABCB Housing Provisions Standard 2022
- **NCC** – National Construction Code 2022
- **Outdoor air** – Air outside the building
- **Pliable building membrane** – A water barrier as classified by AS 4200.1
- **Primary insulation layer** – The most interior insulation layer of a wall or roof construction
- **Regulations** – Building Regulations 2018
- **RBS** – Relevant building surveyor

- **Sarking type material** – A material such as a reflective insulation or other flexible membrane of a type normally used for a purpose such as waterproofing, vapour management or thermal reflectance.
- **SOU** – Sole Occupancy Unit – means a room or other part of a building for occupation by one or joint owner, lessee, tenant, or other occupier to the exclusion of any other owner, lessee, tenant, or other occupier such as a dwelling/apartment
- **Water control layer** – A pliable building membrane or the exterior cladding when no pliable building membrane is present
- **Water sensitive materials** – Materials that have an inherent capacity to absorb water vapour and include timber, plasterboard, plywood, oriented strand board and the like.

Introduction

To reduce the risks of condensation in buildings, the NCC introduces requirements for condensation management, which were adopted in Victoria on 1 May 2024. These requirements apply to wall sarking materials, defined under the NCC as pliable building membranes, and to the provision of exhaust and ventilation systems. The requirements are applicable to Class 1 buildings, SOUs in a Class 2 building, and a Class 4 part of a building.

The intent of the condensation management requirements in the NCC is to assist in reducing the likelihood of condensation occurring within a building, though they may not completely prevent its occurrence.

Pliable Building Membranes (Sarking)

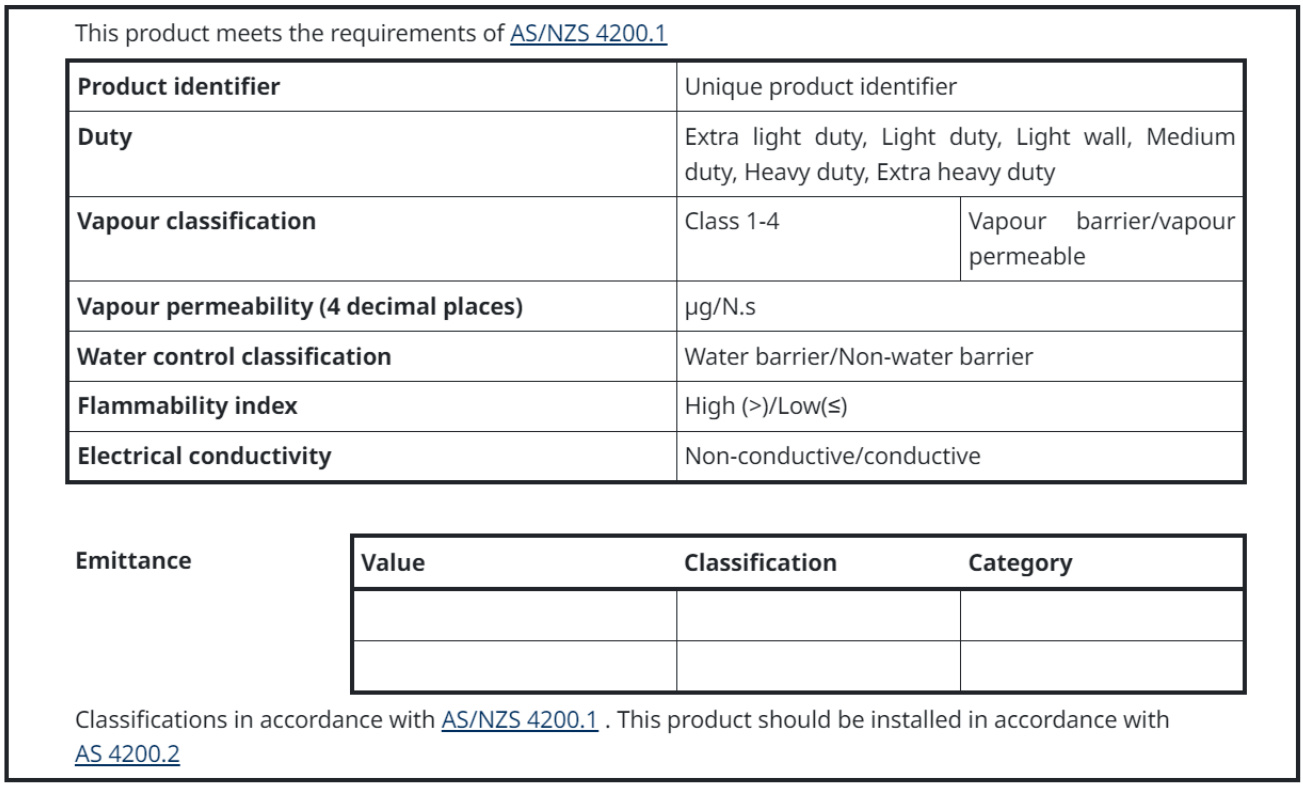
All sarking type materials used in the external walls of Class 1 buildings, Class 2 SOUs, and Class 4 parts of a building must comply with AS/NZS 4200.1 Pliable Building Membranes and Underlays—Materials and be installed in accordance with AS/NZS 4200.2 Pliable Building Membranes and Underlays—Installation Requirements.

Pliable building membranes must be positioned on the exterior side of the primary insulation layer in wall assemblies that form the external envelope of a building.

- In Climate Zones 4 and 5, the pliable building membrane must have a vapor permeance of no less than Class 3 (0.143 µg/N.s).
- In Climate Zones 6, 7, and 8, the pliable building membrane must have a vapor permeance of no less than Class 4 (1.14 µg/N.s).

A climate zone map for Victoria can be sourced from the **Australian Building Codes Board** website.

The figure below is an extract from Australian Standard AS 4200.1 – 2017, which shows an example of a product roll label that might be available on the market and provides the type of information that needs to be considered when selecting a compliant product.



This product meets the requirements of AS/NZS 4200.1

Product identifier	Unique product identifier	
Duty	Extra light duty, Light duty, Light wall, Medium duty, Heavy duty, Extra heavy duty	
Vapour classification	Class 1-4	Vapour barrier/vapour permeable
Vapour permeability (4 decimal places)	µg/N.s	
Water control classification	Water barrier/Non-water barrier	
Flammability index	High (>)/Low(≤)	
Electrical conductivity	Non-conductive/conductive	

Emittance

Value	Classification	Category

Classifications in accordance with AS/NZS 4200.1 . This product should be installed in accordance with AS 4200.2

Figure 1 - Example roll label for a pliable building membrane

Reproduced with permission of Standards Australia Limited. Copyright in AS/NZS 4200.1 – 2017 Pliable building membranes and underlays—Materials vests in Standards Australia Limited and Standards New Zealand.

These new NCC requirements are located within the DtS provisions of Clause F8D3 in Volume One and Clause 10.8.1 of the HPS as referenced in Volume Two of the NCC.

When a pliable building membrane is not installed in an external wall, the primary water control layer (e.g., external cladding) must be separated from water-sensitive materials by a drained cavity. This requirement does not apply to single-skin concrete and masonry walls.

The intent of F8D3(3) and 10.8.1(3) is to ensure that when no wrap or sarking-type material is installed, a drained cavity is provided between the primary water control layer (e.g., external cladding) and any plasterboard, timber framing, plywood, or similar materials.

This provision is not intended to permit the use of untested vapor-permeable materials in place of pliable building membranes. Untested vapor-permeable materials should not be used, as they may cause damage to water-sensitive materials by promoting the accumulation of condensation

Exhaust Systems

The requirements for the installation of exhaust systems to assist with condensation management in Class 1 buildings fall under the DtS provisions of Clause 10.8.2 of the HPS. For Class 2 SOUs and Class 4 parts of a building, these requirements are covered under Clause F8D4.

These provisions address exhaust systems in kitchens (including rangehoods), bathrooms, sanitary compartments, and laundries. They also cover the required flow rates and discharge methods for these exhaust systems to ensure effective condensation management.

The table below outlines these requirements:

Exhaust Requirement	Bathrooms & Sanitary Compartments	Kitchens (Including Rangehoods) & Laundries
Flow rate	25 L/s	40 L/s
Discharge	Via shaft or duct to outdoor air	

Table 1 – Exhaust system requirements

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Clothes Dryers

To reduce the likelihood of excessive condensation caused by the operation of clothes dryers, the NCC includes requirements for the discharge of clothes dryer exhausts. These requirements differ between Volume One of the NCC and the HPS.

For Class 1 buildings, clause 10.8.2(3) of the HPS requires that, where a venting clothes dryer is installed, it must discharge directly to outdoor air or via a shaft or duct. This necessitates that an application for a building permit includes sufficient information on the drawings to demonstrate that a venting clothes dryer will be installed and how it will be discharged. If not shown on the application drawings, the RBS must question whether a venting clothes dryer will be installed in the building.

For Class 2 SOUs, clause F8D4(3) requires that, where a space for a clothes drying appliance is provided in accordance with clause F4D2(1)(b), a space must also be provided for ducting from the clothes drying appliance to outdoor air.

The key difference in this provision under Volume One of the NCC is that it is not based on having the appliance or ducting “installed”; rather, it requires a “space” to be provided for the clothes drying appliance to meet the requirements for laundry facilities.

The RBS must question whether a space for a clothes drying appliance is to be provided and/or whether a venting or condensing dryer will be installed if this has not been sufficiently documented on the application drawings.

This provision does not apply where a condensing dryer is installed, as these dryers collect water vapor for removal rather than discharging it via an exhaust.

Where the proposed building is to function as a rental property and it is unknown at the time whether future tenants will have a clothes drying appliance, it may be best to provide a space for the appliance along with a shaft or duct to outdoor air that includes a wall socket. This would allow for the future connection of an exhaust from a clothes drying appliance, should one be installed.

Make-up Air

Where an exhaust system is provided in a kitchen (including rangehood), bathroom, sanitary compartment, or laundry in a Class 1 building that is not naturally ventilated in accordance with clause 10.6.2(a) (an openable window) of the HPS, make-up air must be provided to the applicable rooms as follows:

1. Via openings to an adjacent room with a free area of 14,000 mm^2; or
2. In accordance with AS 1668.2:2012 *The use of ventilation and air conditioning in buildings*, Part 2: *Mechanical ventilation in buildings*.

The make-up air openings required by (1) above are based on the minimum flow rates specified in clause 10.8.2(1) of the HPS. An opening with a free area of 14,000 mm² can be achieved by providing a 20mm undercut to a minimum 700mm wide door.

Where a room in a Class 1 building has a venting clothes dryer installed, make-up air must be provided in accordance with AS 1668.2:2012, unless that room is naturally ventilated in accordance with clause 10.6.2(a) of the HPS.

Similarly, in a Class 2 SOU, where a room has space for a clothes drying appliance that discharges to outdoor air in accordance with clauses F4D2(1)(b) and F8D4(3) of Volume One of the NCC, make-up air must be provided in accordance with AS 1668.2:2012, unless that room is naturally ventilated in accordance with clause F6D7 of the NCC.

Part F6 in Volume One of the NCC has requirements for make-up air to be provided to mechanically ventilated rooms in accordance with AS 1668.2.

Exhausts in Bathrooms & Sanitary Compartments

Where a bathroom or sanitary compartment is not naturally ventilated through openings in accordance with clause F6D7 of Volume One of the NCC or clause 10.6.2(a) of the HPS, any exhaust serving those rooms that is not run continuously, must:

1. Be interlocked with the room's light switch; and
2. Have a run-on timer so that the exhaust system continues to operate for 10 minutes after the light switch is turned off.

Ventilation of Roof Spaces

Where a Class 1, Class 2 SOU or Class 4 part of a building are in Climate Zones 6, 7 & 8, a roof must have a roof space that is a minimum of 20mm in height and that is ventilated through evenly distributed openings as set out in the Table below:

Roof Pitch	Minimum Openings
< 10°	25,000 mm2/m provided at each of two opposing ends
≥ 10° and < 15°	25,000 mm2/m provided at the eaves and 5,000 mm2/m at high level
≥ 15° and < 75°	7,000 mm2/m provided at the eaves and 5,000 mm2/m at high level, plus an additional 18,000 mm2/m at the eaves if the roof has a cathedral ceiling

Table 2 – Ventilation requirements

A performance solution is not required where a building has no overhanging eaves and another low-level ventilation solution "at the eaves" may be used, for example fascia vents or proprietary ventilation systems that meet the ventilation requirements of the NCC.

Where a building has multiple roof spaces, for example a two storey dwelling with a single storey part on the ground floor, each roof must be treated separately, meaning that each separate roof space must meet the relevant ventilation requirement in their own right and the ventilation requirement should be shared between the separate roof spaces.

The figures below illustrate how the dimensions specified in Table 2 are to be applied for a roof with a pitch ≥ 15° and < 75°, and this should be carried out using the following steps:

1. Determine the roof pitch of the building in degrees (i.e. 23°)
2. Select the applicable roof pitch from the left column in Table 2 (i.e. ≥ 15° and < 75°).
3. Determine the longest horizontal/plan dimension of the specific roof being considered.
4. Calculate the openings required for the specific roof, from the corresponding minimum openings specified in the right column of Table 2, based on the particular ventilation solution being used.

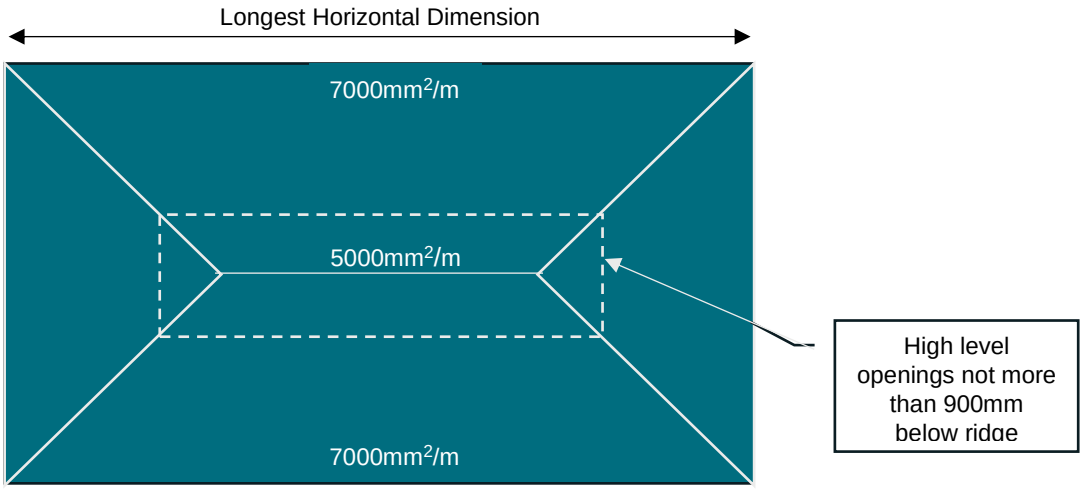

Figure 2 – Plan view of roof
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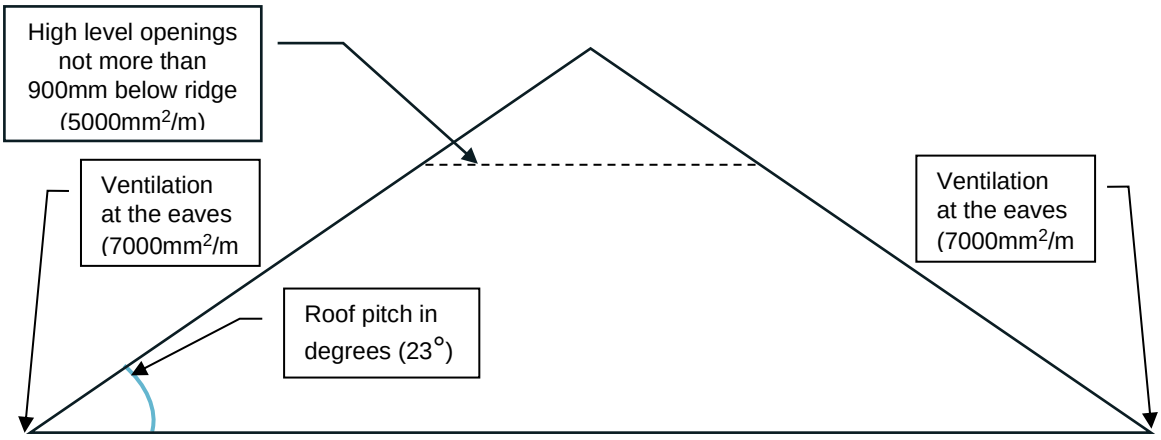

Figure 3 – Elevation view of roof
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In climate zones 6, 7 & 8, the required roof space must be immediately above:

- the primary insulation layer; or
- sarking with a vapour permeance of not less than 1.14 µg/N.s (i.e. Class 4 vapour control membrane), which is immediately above the primary insulation layer; or
- ceiling insulation that meets the energy efficiency requirements of clause 13.2.3(3) & (4) of the HPS and clause J3D7(3) & (4) of Volume One of the NCC.

EXAMPLES

The following figures are examples of using the ventilation requirements under the DtS provisions of the NCC only and should not be used for a particular building solution.

Example 1

- Located in climate zone 6, 7 or 8
- Roof pitch of 13°
- Longest horizonal/plan dimension of 18m
- Selected eave vent open area – 20,000mm²

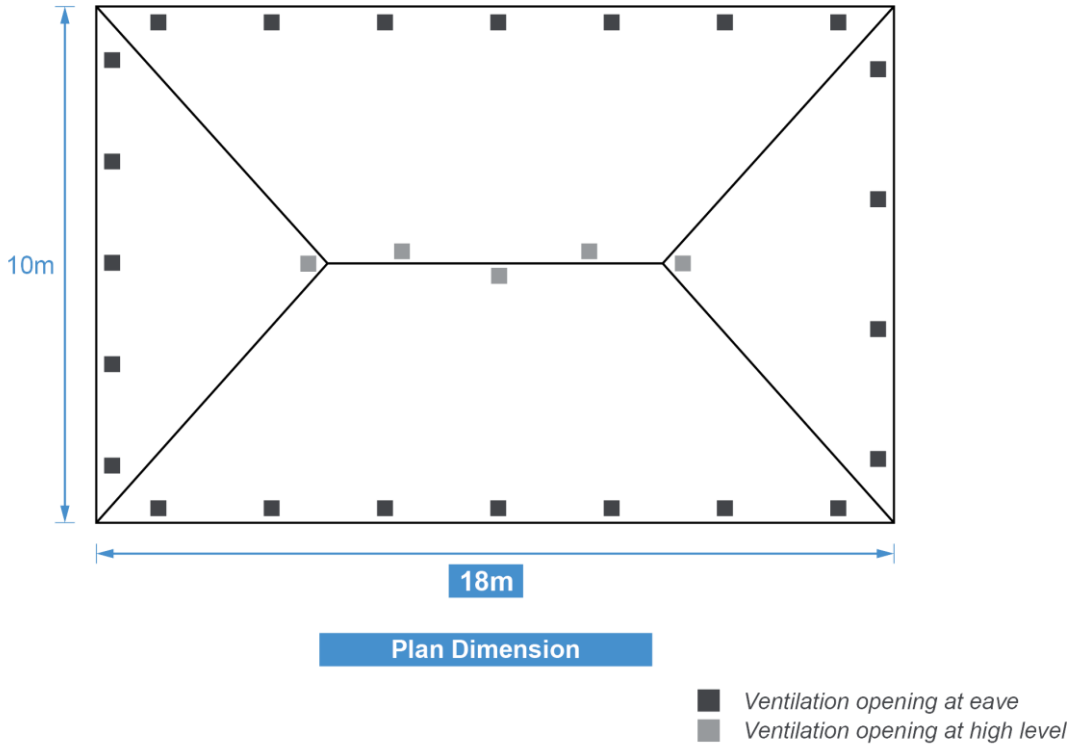

Figure 4 – Example roof 1
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As the building is in climate zone 6, 7, or 8, roof spaces must be ventilated. With a roof pitch of 13°, refer to Table 2 of this practice note, which specifies 25,000mm²/m of ventilation at the eaves and 5,000mm²/m at high level (within 900mm of the ridge).

To calculate the low-level ventilation requirement, multiply the longest horizontal/plan dimension (18m) by 25,000mm², resulting in 450,000mm². Using eave vents with an open area of 20,000mm², divide the total requirement (450,000mm²) by 20,000mm², yielding 22.5 vents (rounded up to 23). These vents must be evenly distributed along the eaves.

To calculate the high-level ventilation requirement, multiply the longest horizontal/plan dimension (18m) by 5,000mm², resulting in 90,000mm². Using vents with an open area of 20,000mm², divide the total requirement (90,000mm²) by 20,000mm², yielding 4.5 vents (rounded up to 5). These vents must be evenly distributed within 900mm of the ridge.

Example 2

- Located in climate zone 6, 7 or 8
- Roof pitch of 24°

- Longest horizonal/plan dimension of 20m
- Selected eave vent open area – 10,000mm²

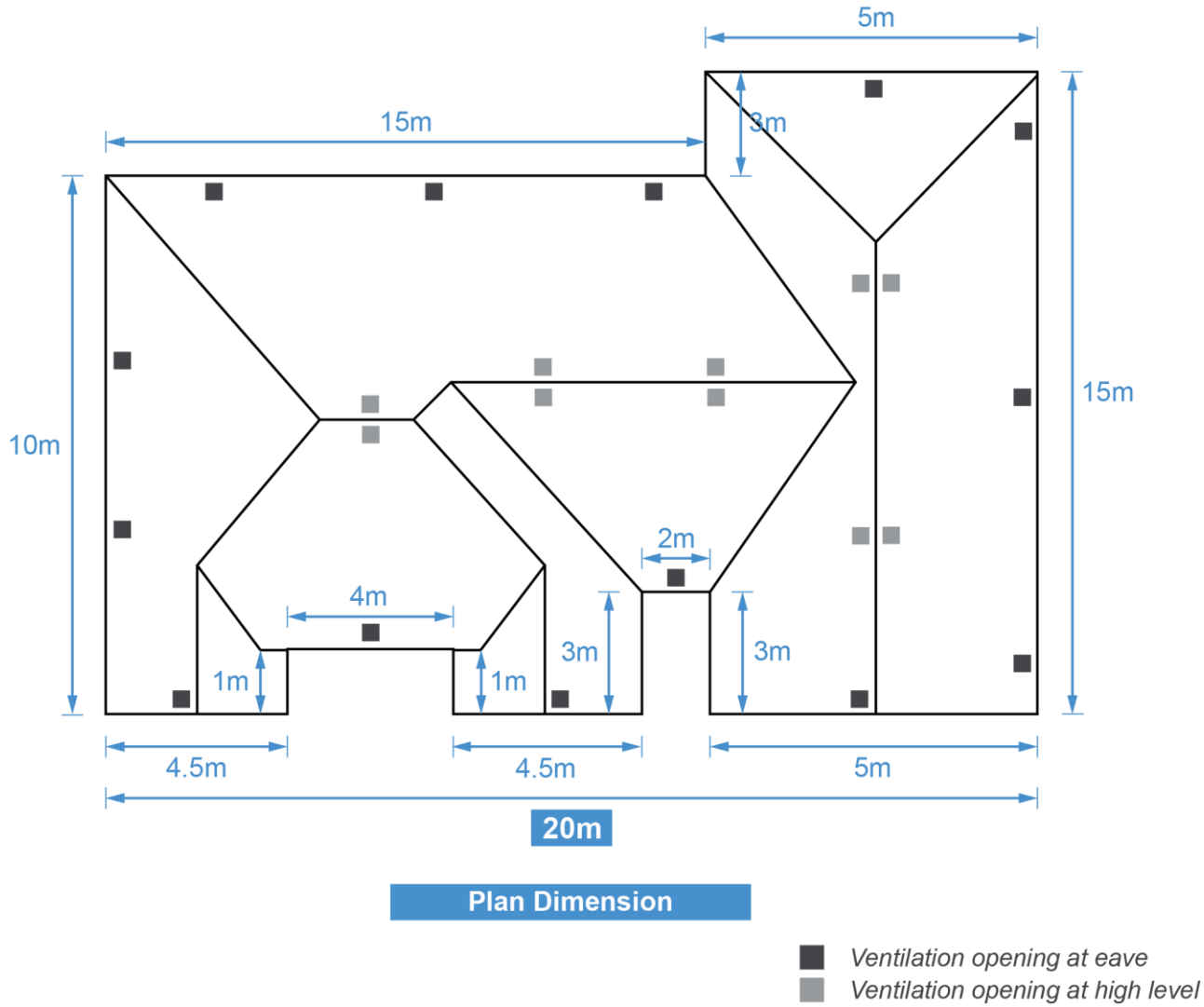

Figure 5 – Example roof 2
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As the building is in climate zone 6, 7, or 8, roof spaces must be ventilated. With a roof pitch of 24°, refer to Table 2 of this practice note, which specifies 7,000mm²/m of ventilation at the eaves and 5,000mm²/m at high level (within 900mm of the ridge).

To calculate the low-level ventilation requirement, multiply the longest horizontal/plan dimension (20m) by 7,000mm², resulting in 140,000mm². Using eave vents with an open area of 10,000mm², divide the total requirement (140,000mm²) by 10,000mm², yielding 14 vents. These vents must be evenly distributed along the eaves.

To calculate the high-level ventilation requirement, multiply the longest horizontal dimension (20m) by 5,000mm², resulting in 100,000mm². Using vents with an open area of 10,000mm², divide the total requirement (100,000mm²) by 10,000mm², yielding 10 vents. These vents must be evenly distributed within 900mm of the ridge.

Roof fasteners that slightly intrude into ventilation areas will not significantly impede airflow. Meshes that block vermin, embers, or corrosive aerosols can be used if they allow drainage and ventilation as required.

ROOF SPACE VENTILATION EXEMPTIONS

The roof space ventilation requirements above do not apply to:

- concrete roofs
- structural insulated roof panels for example reinforced Autoclaved Aerated Concrete (AAC)
- roofs required to meet Bushfire Attack Level FZ in accordance with AS 3959
- a roof space directly beneath roof tiles with no sarking installed.

Roof space ventilation requirements do not apply in Climate Zones 1 to 5.

The roof space of a Class 10a building such as a private garage, is not subject to the roof ventilation requirements, unless that same roof space is also serving a Class 1, Class 2 SOU and or Class 4 part of a building, in which case, the roof ventilation requirements will apply.

To determine whether a particular building is subject to the ventilation requirements, refer to the climate zone map on the **Australian Building Codes Board** website.

Related Documentation

- Building Act 1993
- Building Regulations 2018
- National Construction Code 2022
- AS 1668.2 – 2012 The use of ventilation and air conditioning in buildings, Part 2: Mechanical ventilation in buildings
- AS 3959 – 2018 Construction of buildings in bushfire-prone areas
- AS/NZS 4200.1 – 2017 Pliable building membranes and underlays - Materials
- AS/NZS 4200.2 – 2017 Pliable building membranes and underlays - Installation requirements

List of Amendments

- N/A

Document history

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