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Battery Energy Storage System Installation requirements

AS/NZS 5139:2019 Electrical installations - Safety of battery systems for use with power conversion equipment

This document has been produced in consultation with, and is endorsed by, electrical safety regulators in all Australian States and Territories, and in New Zealand, via their representatives on the Electrical Regulatory Authorities Council (ERAC).

The purpose of this document is to provide a consistent approach across Australia and New Zealand to interpreting particular requirements within *AS/NZS 5139:2019 Electrical Installations – Safety of battery systems for use with power conversion equipment*.

Where *AS/NZS 5139:2019* applies to an electrical installation, the relevant regulator in Australia or New Zealand will have regard to the advice in this document when assessing the compliance of the installation.

For further enquiries or clarification relating to the contents of this document, please contact the relevant authority within your jurisdiction.

This document explains restrictions which apply to locations and proximity of equipment to Battery Energy Storage Systems. (BESS)

AS/NZS 5139:2019 was published on the 11 October 2019 and sets out general installation and safety requirements for battery energy storage systems.

This standard places restrictions on where a battery energy storage system (BESS) can be located and places restrictions on other equipment located in close proximity to the BESS. As the BESS is considered to be a source of ignition, the requirements within this standard ensure that the unit is adequately protected from external influences including damage and other heat sources.

Restricted locations of the BESS

Sections 4, 5 and 6 of *AS/NZS 5139:2019* place specific restrictions on where a BESS may not be installed and include the following:

1. External Damage

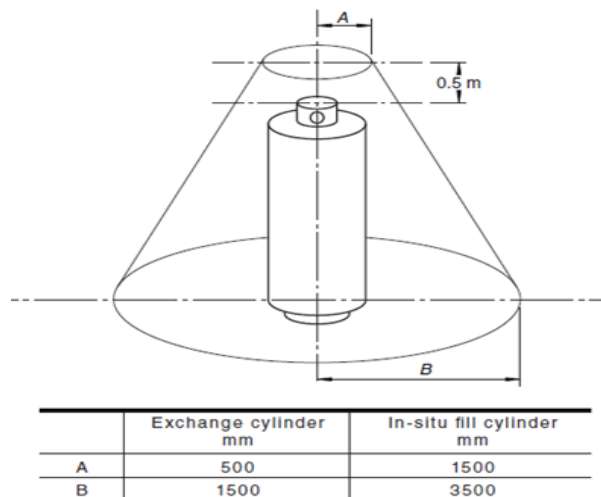
A BESS must not be installed,

- a. In a location where damage from external influences may be expected e.g. from damage by a vehicle.
 - i. Additional measures may be used to mitigate the risk, e.g. a bollard/s installed in such a manner that prevents a vehicle from making contact with the BESS, or
 - ii. The installation in a position or location that provides the protection necessary prevent a vehicle from making contact with the BESS.

2. Hazardous Locations

A BESS must not be installed,

- a. In a hazardous area as defined in AS/NZS 3000, refer
 - i. Fig 4.18 for distances from gas cylinders and,
 - ii. Fig 4.19 for distances from gas relief vent valves.



Note

Local Gas Network providers (GNP) may have additional requirements regarding exclusion zones around gas meters for switchboards and other sources of ignition such as Power Conversion Equipment (PCE) and batteries.

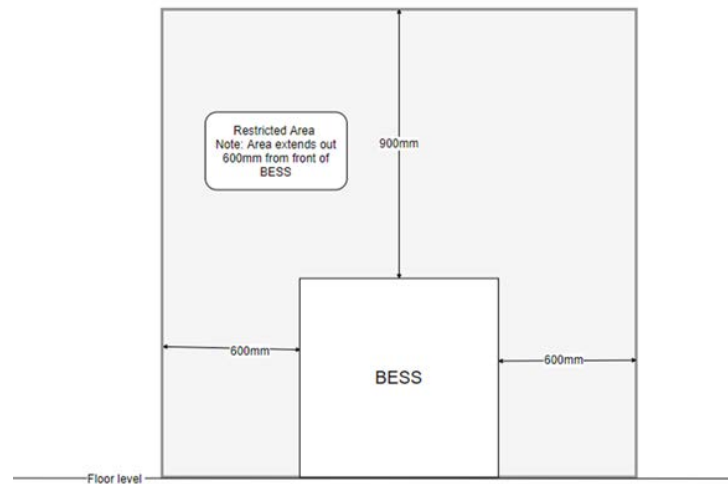
Please ensure you confirm with the relevant GNP within the area of the installation.

In addition, Please refer to the known jurisdictional requirements at the end of this document.

3. Airflow and Vents

A BESS must not be installed,

- a. Within 600mm horizontally and 900mm below;
 - i. an opening window to a habitable room, or
 - ii. vents including mechanical, electrical or other ventilation openings to habitable rooms.



4. Passageways, Walkways, Exits and Escape Routes A BESS must not be installed,

- a. Within a passageway, walkway exits and escape or evacuation routes, or
- b. Underneath or below entrance and exit walkways, staircases, evacuation and escape routes and passageways external and internal to the building.

Notes to both 4(a) and 4(b) above.

- i. These requirements include all structures irrelevant of the construction method or materials.
 - ii. Smoke generated from a BESS that has ignited may be noxious and therefore impede a person from utilising an escape route directly above the BESS.
 - iii. In timber framed structures, structural damage will occur initially above a fire and may impact the structural integrity of the escape route above.
- c. Within 600mm from an exit that has an opening 900mm or less
 - i. Openings that are wider than 900mm, e.g. a garage opening, must allow a person to pass more than 1000mm from the nearest side of the BESS.

Note NSW variation below

5. Accessibility A BESS must not be installed,

- a. On roofs, or
 - i. Excluding roofs that are accessible via a permanently installed or fixed staircase or access ladder.
- b. Within ceiling spaces, or
- c. Set into wall cavities.
 - i. A recess that is entirely sealed to the cavity with non-combustible material is not considered a wall cavity, and

- ii. A BESS that is installed within a separate non-combustible enclosure or housing that is recessed into and entirely sealed to the wall cavity, is not considered recessed into the wall cavity.

6. Other

A BESS must not be installed,

- a. In any location where the installation of a switchboard is prohibited,
 - i. Refer Clause 2.10.2.5 of AS/NZS3000:2018.
- b. In any location where the installation of a generation system is prohibited,
 - i. Refer clause 6.2.4.7, 6.3.4.7 and 6.4.4.7 of AS/NZS 3000:2018.
- c. Other locations specifically prohibited by the manufacture,
 - i. Refer to the specific manufacturers installation instructions for your product

Restricted area surrounding the BESS

Electrical appliances (as defined by AS/NZS3000) that are not associated with the BESS may not be located closer than 600mm horizontally nor 900mm above the BESS.

These include but are not limited to

- Heat pumps, air-conditioning equipment and associated control gear,
- Hot water cylinders (gas and electric),
- Motors and control gear,
- Stoves and hotplates,
- Gas cooktops,
- Stationary appliances (as defined by AS/NZS3000).

Solar Power Conversion Equipment (PCE) including inverters that supply a charge to the BESS are excluded from the restriction.

The following items of equipment are not considered to be electrical appliances as per the definition.

- Switches and isolators and
- Socket outlets.

Barriers behind the BESS

When a BESS is installed on a wall or placed on the ground within 300mm of a wall that has a *habitable room* on the other side of the wall, there is an additional requirement to install a *non-combustible barrier* on the wall behind the BESS to delay the spread of fire.

A *habitable room* is defined in clause 1.3.42 of AS/NZS 5139:2019 and includes but not limited to the following;

- Bedrooms, study rooms and rooms used as home offices,
- Living, family or lounge rooms,

- Kitchen and dining rooms,
- Playrooms and sewing rooms,
- TV, music and entertainment rooms, and
- Sunrooms

A surface is deemed to be a *non-combustible barrier* after being tested in accordance with AS 1530.1 (Methods for fire tests on building materials, components and structures - Part 1: Combustibility test for materials)

Materials exempt from the need to be tested to this standard include:

- brick or masonry blocks,
- concrete,
- compressed cement sheeting, and,
- ceramic or clay based tiles (also known as terracotta).

Note:

Although not a mandatory requirement, cement sheeting with a thickness of 6mm is considered industry best practice.

Walls that are constructed of one of these materials do not require further barriers.

Barriers installed behind the BESS need to extend to at least the following dimensions:

- 600mm beyond the vertical side of the BESS,
- 900mm above the BESS,
- If the BESS is within 900mm of the ceiling surface, the ceiling must be protected with a barrier that extends 600mm past the outer extremity of the BESS, and level to the lowest portion of the BESS.

The following are not considered suitable barriers, whether coated by a covering or not:

- Timber panels
- Plasterboard
- Particle board

Barriers may not have perforations or other openings within the required dimensions and any opening greater than 5mm shall be sealed with a fire retardant sealant.

Jurisdictional Specific Variations and Requirements

The following requirements are specific to the particular jurisdiction:

Victoria

In Victoria the gas distribution requirements are 1000mm diameter from the gas meter vent to a distance of 1500mm in the direction of discharge.

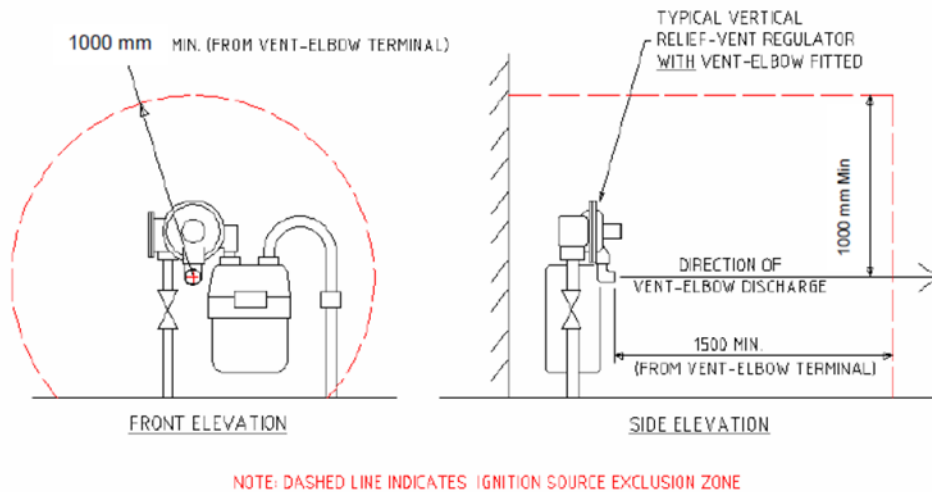


Image source: <https://www.multinetgas.com.au/wp-content/uploads/2019/03/Builder-info-for-Gas-Connections-Oct-2018.pdf>

Originally published by Multinet Gas Networks

New South Wales

In NSW, all openings regardless of size, which can be utilised as an exit, e.g. garage door openings, double door openings, etc. are classified as an exit and a BESS system shall not be installed within 600mm of the exit.

New Zealand

In New Zealand, there are exclusion zones associated with the gas supply, refer fig 4.20 of AS/NZS 3000:2018 for distances from gas supply regulators.

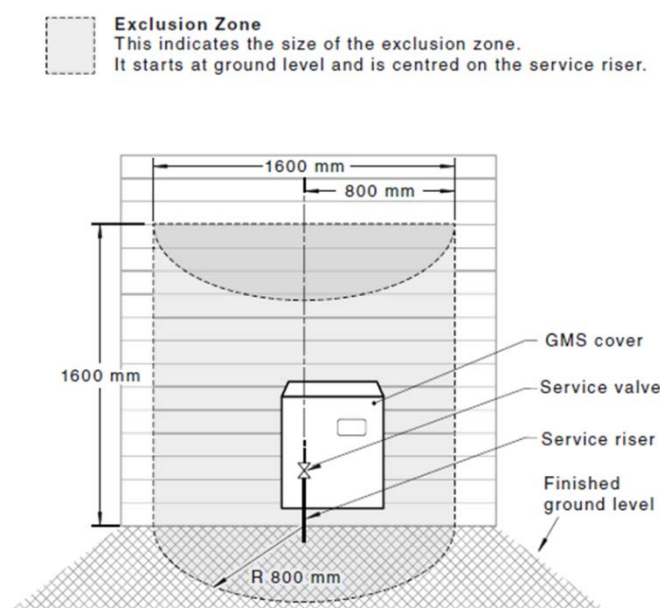


FIGURE 4.20 HAZARDOUS AREA FOR RETICULATED GAS SUPPLY REGULATORS

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