

Lithium-ion batteries used in battery energy storage systems (BESS)

Lithium-ion batteries are the predominant technology being utilised within battery energy storage systems (BESS). These systems as defined in AS/NZS 5139 fall into three categories being:

1. Pre-assembled battery systems;
2. Pre-assembled integrated BESS; and
3. Battery systems that do not fall within the previous two identified categories.

AS/NZS 5139 sections 4, 5 and 6 contain specific installation, commissioning, and documentation requirements for each of these categories.

Risks and hazards

Lithium-ion batteries unlike traditional lead acid batteries pose additional risks to installers, users and, in the case of failure, first responders.

Types of potential hazards include:

- electrical;
- energy;
- mechanical;
- fire;
- explosive gasses; and
- toxic fume gasses.

These hazards are outlined in section 3.2 and table 3.1 of AS/NZS 5139. Sections 4, 5 and 6 of this standard contain the installation requirements that are necessary to eliminate health and safety risks, and if that is not possible, minimising the risk so far as is reasonably practicable to reduce these hazards.

Due to their construct, the majority of lithium-ion battery chemistries contain flammable electrolytes and for some chemistries highly reactive metals such as cobalt and manganese.

Under faults conditions these materials can adversely re-act internally and cause a release of flammable and toxic gases, fire and explosive atmospheres. To address these risks, electrical contractors must ensure the systems they install meet the relevant requirements of AS/NZS 5139. Some common AS/NZS 5139 requirements for all lithium-ion BESS include:

- Consideration of the arc flash level as specified in section 3.2.4 to determine the appropriate selection of personal protective equipment (PPE) when working on these systems.
- The location where the BESS is to be installed taking into account restricted locations and environmental conditions (such as temperature).
- Ensuring barriers to habitable rooms conform to the specified requirements in section 4, 5 or 6.
- Consideration of the requirement for ventilation.
- Overcurrent protection is installed and sized correctly for the battery system.
- All specified documentation is completed.
- Required signage is installed, ensuring signage is located as specified in the standard.
- Verification, testing and commissioning is performed as required, including by any other standard such as AS/NZS 3000.
- An induction is provided to the customer in accordance with sections 4, 5, or 6.

Installation – Notifiable work

The installation of a BESS system is notifiable work requiring notices to be submitted to the relevant network operator, or Building and Energy where there is no network operator. An electrical safety certificate is to be provided to the person for whom the work was carried out.

Disclaimer – The information contained in this fact sheet is provided as general information and a guide only. It should not be relied upon as legal advice or as an accurate statement of the relevant legislation provisions. If you are uncertain as to your legal obligations, you should obtain independent legal advice.

Building and Energy | Department of Energy, Mines, Industry Regulation and Safety

08 6251 1900

8.30am – 4.30pm

Level 1 Mason Bird Building

303 Sevenoaks Street (entrance Grose Avenue)

Cannington Western Australia 6107

M: **Locked Bag 100, East Perth WA 6892**

W: www.demirs.wa.gov.au/building-and-energy

E: be.energy@dmirs.wa.gov.au

Regional Offices

Goldfields/Esperance (08) 9021 9494

Great Southern (08) 9842 8366

Kimberley (08) 9191 8400

Mid-West (08) 9920 9800

North-West (08) 9185 0900

South-West (08) 9722 2888

National Relay Service: 13 36 77

Translating and Interpreting Service (TIS): 13 14 50

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