

Lead-acid batteries

Due to the increase in demand for alternative back-up electricity supplies and stand-alone power systems (SAPS), energy storage batteries are becoming more frequently used as an alternative to mains power.

Lead-acid batteries can be found in SAPS due to their cost effectiveness and long-standing availability.

To form usable power, multiple batteries are connected in series, parallel, or a combination of both, to form Battery Energy Storage Systems (BESS). The BESS is connected to Power Conversion Equipment (PCE) to form usable electricity.

There is a high risk of serious injury or death if lead-acid batteries are not handled, installed, and stored correctly. Not only are lead-acid batteries a source of ignition, the acids used to produce the electrolyte are also very corrosive.

Consideration needs to be given to any hydrogen gas that a battery bank may emit, whether the cells are vented or sealed.

Ventilation (natural or forced), maintenance schedules, battery performance testing, the proximity and location of other electrical equipment or sources of ignition and access to water and eye irrigation stations need to be considered, before installation of a lead-acid BESS takes place.

AS/NZS3000:2018 (the Wiring Rules) clause 1.5.1(c) states: Equipment installed in areas where explosive gases or dust may be present shall provide protection against the ignition of such gases or dust.

AS/NZS 5139:2019 was published on the 11 October 2020 and sets out general installation and safety requirements for BESS.

This standard places restrictions on where a BESS can be located as well as restrictions on other equipment located near the BESS. The requirements within this standard ensure that the BESS is adequately protected from external influences that may cause damage to the BESS, ensures that external ignition sources do not pose a risk to the BESS and that the BESS does not provide an ignition source for explosive atmospheres such as gas or dust.

In addition to requiring that ignition sources are not located near explosive gas mixtures (such as hydrogen from batteries), manufacturer's instructions for the installation and operation of any BESS need to be followed. Following the manufacturer's instructions is essential to ensure that a BESS is installed in an environment or location it is designed for.

Network Operators may have requirements affecting selection and installation if the BESS is to be grid connected or form part of a stand-alone power supply provided or operated by a network operator. Electrical contractors need to check with the relevant network operator to ascertain all compliance requirements.

Building and Energy has published numerous documents outlining the dangers associated with electrical equipment that is installed in an explosive atmosphere. Please see the links below for more information.

- [Electrical Focus Issue 19](#)
- [Electrical Focus Issue 23](#)
- [Energy Bulletin 78 – Apr 2017](#)
- [Electrical Focus Issue 4 – Feb 2021](#)
- [Electrical Focus Issue 7 – Oct 2022](#)

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