Residential LFP Battery Fire Safety

This document explains the fire safety characteristics of our 52V 15 kWh Lithium Iron Phosphate (LFP) residential battery system, the quality of the cells used, and the standards-based installation practices that ensure safe operation in New Zealand homes.

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Battery Chemistry & Fire Risk

What type of battery is used?

Our system uses **Lithium Iron Phosphate (LFP or $LiFePO_4$)** chemistry.

LFP chemistry is widely recognised as the safest lithium-ion battery type for residential energy storage because:

- Very high thermal stability – resists overheating
- No oxygen release during failure, which greatly reduces fire propagation
- Much higher ignition temperature than lithium nickel or cobalt-based batteries
- Extremely low risk of thermal runaway

LFP batteries are commonly used in safety-critical environments such as hospitals, data centres, public transport, and grid-scale energy storage.

Cell Quality, Manufacturing & Compliance (Tier-1 Cell Supplier)

Our battery systems are built using **Lithium Iron Phosphate (LFP) cells** manufactured by one of the largest and most reputable LFP cell manufacturers in the world, supplying cells for:

- Residential and utility-scale energy storage
- Electric vehicles and commercial transport
- Industrial and critical infrastructure applications

They are widely regarded as a Tier-1 manufacturer, operating at scale with stringent quality control, full cell traceability, and extensive long-term field data.

Cell-Level Safety & Compliance

The cells used in our batteries:

- Are independently tested and compliant with IEC 62619 at the cell level
- Are designed specifically for stationary energy storage applications
- Undergo extensive electrical, thermal, mechanical, and abuse testing. One of the most important safety tests passed by these cells is the nail penetration test.

What is a Nail Penetration Test?

A nail penetration test simulates a severe internal short circuit by driving a metal nail through the cell.

The test checks that:

- The cell **does not explode**
- The cell **does not sustain fire**
- Heat is **localised and self-limiting**

Passing this test demonstrates the cell's ability to fail safely even under extreme physical damage.

System-Level Certification & Compliance

IEC 62619 Battery System Certification

Our complete battery system is also certified to **IEC 62619**, an international safety standard for industrial and stationary lithium batteries.

This certification includes testing for:

- Overcharge and over-discharge protection
- Short-circuit protection
- Thermal stability and abuse conditions
- Mechanical shock and vibration
- Internal cell failure scenarios

IEC 62619 certification confirms the system has been independently verified to **fail safely under extreme fault conditions**.

IEC

Installation Standards & Electrical Safety

AS/NZS 5139—Battery System Safety

All installations are completed in accordance with **AS/NZS 5139 – Electrical installations – Safety of battery systems for use with power conversion equipment**.

This standard governs:

- Approved installation locations
- Minimum clearances from habitable rooms and exits
- Fire separation requirements
- Ventilation and environmental protection
- Labelling and emergency shutdown access

Compliance with AS/NZS 5139 ensures the battery is installed to **minimise fire risk and maximise emergency response safety**.

AS/NZS 3000 – Wiring Rules & Electrical Compliance

In addition to AS/NZS 5139, all electrical work is carried out in accordance with **AS/NZS 3000 – Electrical Installations (Wiring Rules)**.

This means:

- All work is performed by a licensed / registered electrician
- Wiring, protection devices, earthing, and isolation meet national electrical safety requirements
- The installation is independently inspected and tested
- A Certificate of Compliance (COC) is issued and signed off where required

Compliance with AS/NZS 3000 ensures the battery system meets the **same electrical safety standards as all permanent household wiring**.

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Built in Battery Safety Systems

Each battery system includes multiple, independent layers of protection:

Battery Management System (BMS)

- Continuous monitoring of voltage, current, and temperature
- Automatic shutdown if safe limits are exceeded
- Cell balancing to prevent uneven charge build up

Electrical Protection

- Short-circuit and overload protection
- Controlled charge and discharge rates
- Automatic isolation from the home if abnormal conditions are detected

Mechanical & Enclosure Safety

- Robust, noncombustible enclosure
- Internal cell separation to prevent fault propagation
- Designed specifically for stationary residential use

Collectively, these safeguards are designed to minimise risk, contain faults, and maintain safe operation in a residential environment.

Fire Safety in Real-World Use

How likely is a battery fire?

For **properly installed LFP systems**, the risk of fire is **extremely low**. Real-world data shows LFP batteries have **orders of magnitude lower fire incidence** than other lithium chemistries.

Most reported battery fires globally involve:

- Non-LFP chemistries
- Poor quality or counterfeit products
- Improper or non-compliant installations

What happens if something goes wrong?

In the unlikely event of a fault:

- The BMS shuts the system down automatically
- Energy flow stops immediately
- LFP cells resist ignition and do not sustain combustion

The system is designed to **fail safe**, **not fail violently**.

Frequently Asked Questions (Q&A)

Q: Can the battery catch fire like a phone or laptop battery?

A: No. Phones and laptops typically use lithium cobalt or nickel-based chemistries. LFP batteries are significantly more stable and far less prone to ignition.

Q: Is it safe to have a battery installed at my home?

A: Yes. When installed using IEC 62619 certified LFP batteries, in compliance with AS/NZS 5139 and AS/NZS 3000, residential energy storage is considered very safe and is widely used across Australia and New Zealand.

Q: What about fires reported in the media?

A: Media reports usually involve older technologies, non-compliant installations, or non-LFP batteries. Our system uses the safest lithium chemistry available and follows modern electrical and fire safety standards.

Q: Can firefighters safely respond if there is an emergency?

A: Yes. AS/NZS 5139 includes labelling, isolation points, and placement rules specifically designed to support emergency services. LFP batteries also present a much lower risk during fire response.

Q: Does the battery require ventilation or cooling?

A: The system is designed for normal residential environments and does not require active cooling. Install locations are selected to ensure appropriate clearances and environmental protection.

Q: What maintenance is required for safety?

A: YThe battery is maintenancefree. Safety monitoring is continuous and automatic through the internal BMS. We recommend periodic visual checks and standard electrical inspections as part of normal home maintenance.

Key Takeaway for Home owners

Here's what makes these residential battery systems safe and reliable:

- LFP is the safest lithium battery chemistry available
- Tier1 cells are tested and compliant at cell level
- IEC 62619 confirms independent battery safety testing
- AS/NZS 5139 and AS/NZS 3000 compliant installation minimises risk
- All work is performed by licensed electricians and signed off
- Multiple redundant safety systems are built in

When combined, these measures make residential LFP battery storage a **very low fire risk technology**, comparable to or safer than many common household electrical appliances.