



Understanding UL 9540 and UL 9540A

For solar manufacturers, installers, end users and AHJs, understanding the safety standards that apply to energy storage systems (ESS) mustn't be overlooked. Two such standards—UL9540 and UL 9540A—can often be mistaken for one another due to the similarity in their names. However, they have distinct purposes and requirements. The goal of this paper is to help readers understand each and how they are distinct from one another, as well as why it may matter to you.

1. WHAT IS UL 9540?

UL 9540 is the comprehensive safety standard for energy storage systems and equipment, ensuring that an ESS meets essential safety benchmarks for installation and operation. It covers aspects like electrical safety, performance, and environmental considerations. For manufacturers like EG4, having UL 9540 certification means the system is approved for safe use, making it suitable for residential, commercial, and industrial applications.

2. WHAT IS UL 9540A?

UL 9540A is a separate testing method specifically for assessing the potential fire risks associated with thermal runaway in lithium-ion battery systems. It doesn't certify a product, instead, it provides crucial data on how a system behaves in the event of a fire. This helps inform safety codes and can influence fire mitigation strategies, installation guidelines, and zoning requirements. While a battery included in an ESS may have undergone UL 9540A testing, it may not necessarily be UL 9540 certified.

UL Aspect	UL 9540	UL 9540A
Purpose	Certifies the safety of an entire ESS.	Tests fire behavior and thermal runaway risk.
Application	Requested by manufacturers for system certification.	Requested by AHJs for fire safety data.
Scope	Focuses on overall safety and performance.	Provides specific data for developing safer practices.
Product Labelling	Provides manufacturers with an Authorization to Mark the product as UL9540 compliant	Does not result in a sticker or label on the product

3. WHY IT MATTERS FOR EG4 CUSTOMERS

As an installer, it's essential to understand how UL 9540 and UL 9540A impact compliance with local building codes and permitting processes. Many AHJs require UL 9540-certified energy storage systems to meet safety standards for electrical and fire safety. Additionally, they may request proof of UL 9540A data for installations including batteries to ensure that the ESS is installed in a safe location, with a safe distance between units.

At EG4, we prioritize safety and compliance with all relevant industry standards. Our hybrid inverters are designed to meet UL 9540 certification requirements when paired with our batteries, which not only validates our commitment to quality but also simplifies the process for installers. By using UL 9540-certified systems, our customers can be confident that their installations meet the highest safety standards.