

Samsung UL 9540A Lithium-ion Energy Storage System

Vertiv is pleased to announce the availability of the UL 9540A version of the 128S and 136S battery systems from Samsung. Designed and optimized for datacenter applications, they are the first lithium-ion battery cabinets to fulfill the UL 9540A fire test safety standards for Energy Storage Systems (ESS) referenced in the newer fire codes and standards.

This document is meant to address some common questions regarding some of the new fire codes and standards as well as to answer questions about the differences between the original (pre-UL 9540A) systems from Samsung and the new UL 9540A version of the 128S and 136S battery systems

General Questions

Is UL 9540A a UL certification?

No. UL 9540A is a fire test. It does not have pass/fail criteria like a UL certification. It is a test method for evaluating thermal runaway fire propagation in battery energy storage systems.

When is a UL 9540A fire test deemed successful if it is not pass/fail?

A UL 9540A fire test report is, at a high level, deemed successful if flames do not propagate from one cabinet to another during the test.

Who is responsible for obtaining a UL 9540A fire test report?

The battery vendor is responsible for submitting the battery system for the UL 9540A test. In this case, Samsung has submitted their battery system for completion of the UL 9540A fire test.

Who is responsible for detailing the specifications of the battery system setup that will undergo a UL 9540A fire test?

The battery vendor is responsible for specifying the setup and provides that to the testing agency such as UL or CSA.

Is the Energy Storage System's Battery Monitoring System (BMS) active during the fire test?

No. The system's BMS is not active. The purpose of the test is to monitor the system during a forced thermal runaway event and therefore the safety features of the system under test are not active.

What will the UL 9540A report include?

The UL 9540A report will detail what occurs during the test (gases emitted during cell venting, temperatures monitored on cabinet exterior surfaces, etc.) and if any mitigation techniques were used during the test. It will identify if flames propagated from one cabinet to an adjacent cabinet.

Will the UL 9540A report include fire suppression requirements?

No. Every site will be different. (Different batteries; capacity of stored energy; material in ceilings, walls and floors; installed ventilation and fire suppression systems; alarm systems; time for first responders to arrive on site, etc.) For that reason, a testing agency cannot state specific fire suppression requirements.

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How can fire suppression recommendations be obtained?

UL states that a professional Fire Protection Consultant Engineer be engaged by an end customer to review the site's specific parameters and to make recommendations for the site.

Who has access to the UL 9540A report?

The UL 9540A report is the property of the battery manufacturer that obtained the report. It will not be found on the testing agency's web site. The battery manufacture can make it available for use.

Does Vertiv have a copy of the Samsung battery system UL 9540A report?

Yes. Contact Product Marketing team for a copy.

How can the UL 9540A fire test report be used?

The data in the Samsung UL 9540A fire test report can be reviewed by the Authority Having Jurisdiction (AHJ) or the fire marshals permitting a site to determine if a waiver can be made to the 3 foot spacing requirements specified in the newer fire codes. The AHJ may permit larger energy capacities or smaller group spacing based on the data in the report.

What is UL 9540?

UL 9540 is a UL safety certification for Energy Storage Systems and Equipment. It has pass/fail criteria as established by UL.

What does UL 9540 certify?

It certifies that a UL 1973 certified battery system operates safely as specified with the charger in a UL 1778 certified UPS.

Who specifies the setup for a UL 9540 certification?

UL or the UL testing agency (such as CSA, Intertek or ETL) specifies the setup.

Who has responsibility for obtaining UL 9540 certification?

The UPS manufacturer because the charger is part of the UPS, not the battery system.

What does UL 9540 cover?

It covers the gaps between UL 1973 certified battery system and a UL 1778 certified UPS.

Is UL 9540 a requirement in the newer fire codes?

UL 9540 is referenced in the newer fire codes but based on the data in a UL 9540A fire test report it can be waived by an AHJ.

When will Vertiv complete UL 9540 certifications?

UL 9540 certifications are planned for the first half of 2021. It will be completed with EXL S1 first.

If a UL 9540A battery system is deployed before UL 9540 certification is received will certification be retroactive for that Samsung + EXL S1 site?

No. If we deploy a UL 9540A compliant cabinet, and then we get UL 9540, the deployed cabinet(s) would not automatically be retroactively UL 9540 certified. But for a fee from UL, the site can be inspected by UL, and a certification made to those cabinets. This is something we've apparently done in the past with some UPS systems that received UL 1778.

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What is NFPA 855?

NFPA 855 is one of the latest standards to be released. It is the Standard for the Installation of Stationary Energy Storage Systems and was released on August 25, 2019.

Free access to NFPA 855 is available at www.nfpa.org/855. The document provides the most recent requirements for mitigating the hazards associated with an ESS. It stipulates specifications for

maximum stored energy and spacing guidelines for systems.

Can components of a Samsung 9540A version system be mixed and matched with a pre-9540A (legacy) Samsung system?

No. The racks and modules of a new 9540A version Samsung system cannot be mixed and matched with a pre-9540A (legacy) system.

What are the major differences between a pre-9540A (legacy) system and a 9540A version system from Samsung?

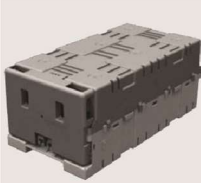







The key differences are shown in the below diagram.

Samsung UL 9540A Lithium-ion Energy Storage System

Main purpose of the change is to meet the testing criteria of UL9540A

Current Design (2016 ~ 2019 2Q)

New Design (2019 3Q ~)

Battery Module		Dimension (W x H x D): 216 x 163 x 414 Weight: About 17 kg		Dimension (W x H x D): 214 x 163 x 404 Weight: About 16.5 kg Designed for UL9540A testing New Module BMS <ul style="list-style-type: none"> • Not interchangeable with current module BMS • BMS size is unchanged
Rack Frame		Dimension (W x H x D): 650 x 2055 x 600 Design: Front Door		Dimension (W x H x D): 650 x 2055 x 530 Design <ul style="list-style-type: none"> • Designed for UL9540A testing • Reduced footprint • Front bolted panel for modules, door for BCU and SMPS
BCU		Dimension (W x H x D): 583 x 235 x 411 Key components: MCB (600A) Fuse (500A) Rack BMS		Dimension: no change No change in key components Rack BMS F/W change <ul style="list-style-type: none"> • Communication with new Module BMS • Added protective functions
SMPS Assembly		Dimension (W x H x D): 397 x 86 x 338 Key components: MCB (600A) Fuse (500A) Rack BMS		Dimension: no change Systems BMS F/W change <ul style="list-style-type: none"> • To match with Rack BMS F/W change (added protective functions)

Have the specifications changed for the Samsung battery system?

No. The cells used in the 9540A System modules are the same exact cells that were used in the pre-9540A (legacy) system. The specifications and run time characteristics are the same.

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What do the new cabinets and modules look like?

The new cabinet is now available in black. Below are examples of the Samsung 9540A battery cabinet and the modules used in the cabinet.



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