

UL 9540A Compliance and Installation Guidance for the Franklin Home Power System

The purpose of this documents is to demonstrate how the FranklinWH aPower X, the energy storage component of the Franklin Home Power system, fulfills the standardized testing approach and performance criteria specified in the 4th edition (2019) of UL 9540A and thereby allowed exceptions to otherwise restricted installation. The aPower X employs a Lithium Iron Phosphate-based cell chemistry, ensuring both safety and reliability. The system operates within a temperature range of -4°F to 122°F and incorporates cooling fans and thermal blankets for optimal system performance. Its design includes a low-voltage battery bus architecture, coupled with robust management systems for battery, energy conversion, safe energy, and cloud monitoring and control.

This tech brief is based on the reports from UL 9540A testing performed by Intertek (test report number: 210502554SHA-001) and Jensen Hughes Level Test Evaluation (1KRA22014.000.001). Below are key takeaways and installation guidance recommendations:

- FranklinWH has met the testing standards of UL 9540A (4th ed.) for residential use indoor and outdoor, wall- or ground-mounted ESS.
- Thermal runaway was not observed to propagate between units.
- The flammable gas concentration for a 95 m^3 room under UL test guidelines is expected to be within the test standard.
- The minimum required room size for three installed units (per the unit level UL 9540A test) is 100 m^3 .
- If a battery cell's temperature rises to 90°C , the battery management system disconnects the battery from the power electronics and commands it to shut off to prevent continued energy transfer to or from the battery.
- The internal wires are 24 AWG and Teflon coated to meet UL 1332 requirements. They have a 94V-0 flame retardant rating making them high-temperature, flame, corrosion, oil, strong acid and alkali, high pressure, and strong oxidizing agent resistant.
- Based on the test results, the FranklinWH installation guidance recommendations are:
 - aPower X qualifies for reduced unit clearances (the exception from code mentioned 36" spacing requirements) to at least 4" for three aPower X units. (Code reference: NFPA 2020 15.5)
 - Automatic sprinkler systems or other methods of automatic fire suppression are not mandatory for the installation of aPower X units per compliance with the UL 9540A unit-level performance criteria. (Code reference: NFPA 2020 4.4.4.3)
 - Ventilation requirements are not mandatory since the aPower X does not release any toxic gases during charging, discharging or normal use conditions (Code reference: NFPA 2020 15.11)
 - Use of fire cabinets can be excluded for indoor installations (Code reference: NFPA 2020 4.1.4.3)

Always consult with your local Authority Having Jurisdiction (AHJ) and ensure each FranklinWH ESS is installed in compliance with local regulations and fire codes. Our team is readily available to collaborate with local AHJs as safety and compliance remain our top priorities. For any further inquiries or UL 9540A test-related information, please do not hesitate to contact the FranklinWH Product team at engineering@franklinwh.com.

FranklinWH Engineering team