



UL9540a Large Scale Fire Testing

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Fortress eVault MAX and eFlex batteries have been evaluated by an National Recognized Test Lab TUV Rheinland for UL9540a large scale fire unit testing. During the test, the battery is heated to induce thermal runaway. No external flaming was observed for either battery unit. **Based on the temperature data gathered, Fortress Power allows a 1" gap between the batteries and any wall surface. This is a narrowing of the 2" gap requirement mentioned in current product manuals. Additionally, Fortress Power does not require type X drywall to be utilized during installation. Any material with combustion temperatures above 332F, accounting for a >3X safety factor in actually measured wall temperatures utilizing a 1" air gap during thermal runaway.**

During the test, internal battery cells are heated to above 630C / 1166F to induce thermal runaway temperature. This is significantly hotter than the temperature required to induce thermal runaway in lithium iron phosphate batteries, replicating both a thermal runaway fire or an external building fire. Temperatures of nearby batteries (adjacent and above) as well as nearby walls are measured to analyze the environmental risk during a thermal runaway event.

During the thermal runaway event, the surface temperature of the battery remained below 218C/424F at the hottest part of the battery (the underside), below the temperature at which standard drywall burns as well as below the temperature that thermal runaway in lithium iron phosphate batteries. Battery sidewall temperature remained below 167C/332F and adjacent sidewall temperature remained below 40C/104F.

Because the temperatures are below the combustion temperature of standard drywall, Fortress Power does not require Type X gypsum board to be installed in finished or unfinished rooms with either eVault MAX or eFlex battery models. While the product manuals have called for a 2" gap between the batteries and the wall, Fortress Power does allow a 1" gap consistent with the most recent UL9540a tests.

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