参考資料

JIS C4441
8.2.5 火災危険源（類焼）
分類C-A の電気化学的蓄電サブシステムは，JIS C 8715-2:2019 の
7.3.3 に従い試験及び検証する。

(JISC8715-2)
7.3.3 類焼試験（電池システム）
類焼試験は，次による。
a) 要求事項
電池システムの単電池の一つが熱暴走した場合でも，それによって，電池システムから発火してはならない。

b) 試験条件
電池システムを満充電し，周囲温度25±5 ℃で単電池の温度が安定するまで放置する。電池システムの単電池の一つを，例えば，抵抗加熱器又は外部熱源を使った熱伝導ヒーターによって，熱暴走の状態になるまで加熱する。熱暴走を起こす方法は，試験報告書に記載し，記録しなければならない。単電池が熱暴走した後，ヒーターを切り，電池システムを1時間観察する熱暴走させる方法は，上記以外も認める（附属書B参照）。

c) 判定基準
電池システムから外部への発火又は電池システム外装の開裂があってはならない。電池システムに外部カバーがない場合は，製造業者が指定する防火範囲から外部への発火があってはならない。

注記：最初の単電池の熱暴走は，試験の目的のために意図的に引き起こすものであるため，熱暴走させた単電池の発火は許される。

IEC 62933-5-2
8.2.5 Fire hazards (propagation)Category "C-A" electrochemical accumulation subsystems shall be tested and validated in accordance with the requirements of IEC 62619:2017, 7.3.3.

(IEC62619)
7.3.3 Propagation test (battery system)

a) Requirement
This test evaluates the ability of a battery system to withstand a single cell thermalrunaway event so that a thermal runaway event does not result in the battery system fire.

b) Test
The battery system is fully charged and then left until the cells stabilize in an ambienttemperature of 25°C ±5°C. One cell in the battery system is heated until the cell enters intothermal runaway, for example, using resistive heating or through thermal conductive heat transfer using an external heat source. The method used to create a thermal runaway in one cell is to be described and documented in the test report. After thermal runaway in the cell is initiated, the heater is turned off and battery system is observed for 1 h.
Other methods than the examples noted above to initiate thermal runaway in one cell are allowed. See Annex B.

c) Acceptance criteria
No external fire from the battery system or no battery case rupture.If the battery system has no outer covering, the manufacturer shall specify the area for fire protection.

NOTE Fire caused by the first cell is acceptable because the first thermal runaway is intentionally made for the test purpose as a trigger.

UL 1973
37 Internal Fire Exposure Test

37.1 The electric energy storage system shall be designed to prevent a single cell failure due to thermal runaway within the system from cascading. The DUT (i.e.battery or module) shall be designed to prevent cascading from propagating beyond the DUT enclosure.This test is applicable to secondary lithium and sodium sulfur technologies.

37.2 The fully charged electric energy storage system (MOSOC per 6.1) is to be subjected to the internal fire test which consists of heating one internal cell that is centrally located within the DUT until thermal runaway or otherwise forcing the failure of a cell through any means necessary and determining whether or notthat failure does not cause the failure of neighboring cells. If cascading occurs, the cascading shall not propagate beyond the DUT. Regardless of the method used to fail the cell, cell failure is to occur within at least 20 min. Once the thermal runaway is initiated, the mechanism used to create thermal runaway is shut off or stopped and the DUT is subjected to a 24-h observation period.

Exception No. 1: Testing on a cell that is other than centrally located within the DUT may additionally be conducted if it is not clear which is the worst casescenario. The location of the failed cell is to bedocumented for each test.Exception No. 2: Testing may be conducted on a representative subassembly consisting of one or more modules and surrounding representative environment, if it can be demonstrated that there is nopropagation beyond the subassembly. When testing at the module or subassembly level, consideration needs to be made of the vulnerability to combustion of those components surrounding the module in the final assembly.

37.3 As a result of the testing of 37.2, there shall be no fire propagating from the DUT or explosion of the DUT.
See Table 10.1 for additional details. If a thermal runaway condition cannot be initiated, asdemonstrated through testing, the DUT is considered to comply with the requirements of this test.