SAE G27 Committee Update

Presented to International Aircraft Systems Fire Protection Forum September 25, 2024

> Doug Ferguson – Boeing (G27 Co-chair) Brian Johnson – Boeing (G27 Secretary)

SAE G27 Committee Update

- SAE G-27 Committee formed in March 2016 at International Civil Aviation Organization (ICAO) Air Navigation Commission (ANC) request to create a performance-based package standard (AS6413) for the safe transport of lithium batteries as cargo by air.
- Co-chaired by Doug Ferguson (Boeing) and Claude Chanson (Recharge)
 - ~ 200 individuals on G-27 Committee
 - Includes international organizations, airframe manufacturers, regulators, cell manufacturers, battery manufacturers, battery users, operators, package manufacturers, test facilities
 - ~ 40 voting members,
 - ~ 75 individuals consistently, actively engaged
 - Monthly teleconference calls
 - Average of 3 in-person multi-day meetings per year
 - Next in-person meeting will be in Fort Worth, TX in November 2024

SAE G27 Committee Update

4 documents currently in work

- AS6413 Standard for protecting against a lithium battery thermal runaway initiated inside the package
- AS6413/1 Standard for protecting against elevated temperatures occurring outside the package
- AS6413/2 Standard for protecting against direct flame occurring outside the package
- AIR 6840 Information Report providing background for assumptions and requirements inside the AS6413 documents. Also provides additional guidance.

SAE G27 Update

AS6413

- Intention is to address the safety of the cell/battery and packaging material (box, etc) together. Can allow for less protection from the package if the cell is inherently safer.
- Narrow scope (small, cylindrical, lithium-ion cells) standard has been approved by G27 committee and is being balloted by SAE Council, to be completed by Sept. 22.

AIR 6840

Information Report has been approved by G27 committee and is being balloted by SAE Council, to be completed by Sept. 22.

SAE G27 Update

AS6413

- 1. Initiate a thermal runaway (TR) in a cell within the package by heating at 5° to 20° C per minute (5° to 10° C for small cylindrical cells recommended).
- 2. Remove heater power when cell has entered TR or reached 375° C.
- 3. If no confirmation of initiation cell TR after cell reaches 375° C, then remove heater power and monitor pass/fail criteria for 5 hours.
- 4. If no TR, verify cell TR would have happened if at 100% State of Charge (SOC).
- 5. If still no TR, note in report and on test summary sheet.
- 6. Verify no "hazardous flame" or "hazardous particle" visually or with witness panels.
- 7. Verify package surface temperatures not sufficient to ignite adjacent materials
- 8. Verify no ignition of flammable vapors inside test chamber

SAE G27 Update - AS6413

G27 Background Test From FAA Systems Presentation "G27 Packaging Tests", Tom Maloney, May 2017



SAE G27 Update - Plans

- 1. AS6413 not expected to be incorporated into regulations until later revisions. May eventually be referenced in existing "approval process"
- 2. AS6413 contents will be discussed at next ICAO Dangerous Goods Panel meeting in November for feedback to G27 committee.
- 3. Use the released standard to conduct a true "round-robin" review of the ability of the test standard to provide consistent results from multiple labs unfamiliar with the standard
- 4. Establish priorities and timeline for expanding scope of AS6413, including slash sheets.
- 5. Next G27 meeting will be in Fort Worth, TX, USA, in November.