SAE INTERNATIONAL

STATUS OF SAE G-27 LITHIUM BATTERY PACKAGING PERFORMANCE COMMITTEE

Presented at International Aircraft Materials and Fire Protection Forum
June 13, 2023

Doug Ferguson, Co-Chair G-27 Committee

Standards Development Process

SAE G-27 Committee formed in March, 2016 at ICAO 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)

SAE G27 Committee Activity Update

~ 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 Webex teleconference calls
- Average of 3 in-person multi-day meetings per year
- Next in-person meeting will be in Washington, D.C. in July

SAE G27 Committee Activity Update

Documents in process:

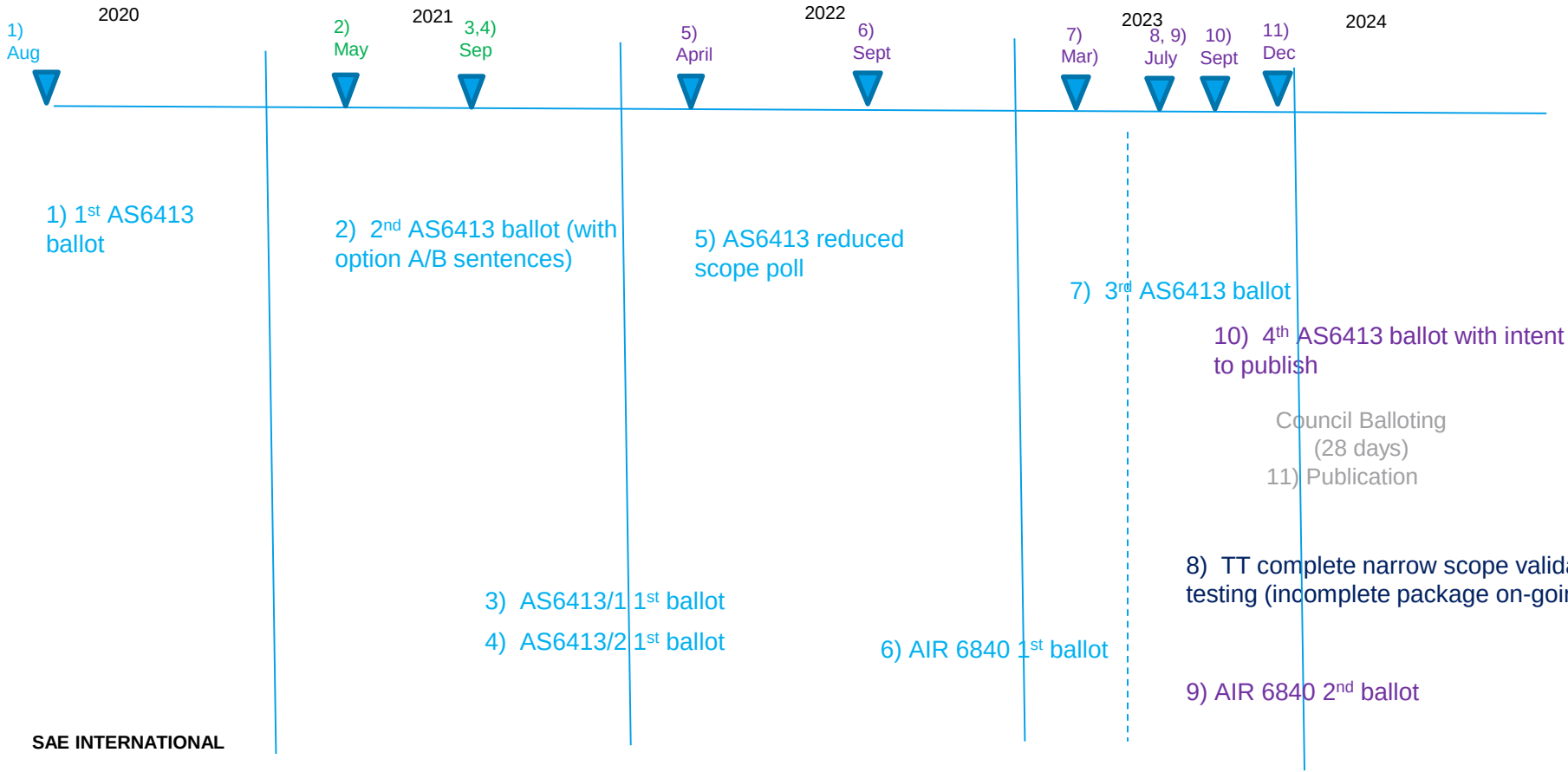
AS6413: Performance based package standard for lithium ion cylindrical cells as cargo on aircraft

AS6413/1: Performance based package standard for lithium batteries as cargo on aircraft – Package Testing with External Thermal Challenge

AS6413/2: Performance based package standard for lithium batteries as cargo on aircraft – Package Testing with Direct External Flame

AIR6840: Performance based package standard for Lithium batteries as cargo on aircraft – Background Information and Rationales

SAE G27 Document Progress Timeline (as of June 2023)



AS6413

- This standard provides a test method to demonstrate and document the control of the potential hazards from Lithium metal batteries (UN 3090) and Lithium ion batteries (UN 3480) when transported as cargo on aircraft.
- It addresses the need to control the hazards which might arise from a failure of an individual cell by containing the hazards within the package.
- Controlling the consequences of a failure within the package is intended to prevent uncontrolled fire and pressure pulses that may compromise current fire suppression systems within the cargo compartment.
- The intent of this test is to severely abuse a single cell such that it is most likely to enter thermal runaway with the presumption that a single cell may enter thermal runaway during transport.

AS6413 - Recent highlights

- **Gained verbal consensus during face to face meeting in March for method to address cells that do not go into thermal runaway at 200 C.**

SAE G27 Committee Activity Update

Baseline test method has been validated with cylindrical lithium ion cells.

Many additional "variations" or alternatives still require validation, including cells in batteries.

- Pouch and prismatic types (one lab's data provided in July)
- Reduced cell quantity in package (one lab's data provided in July)
- Lithium metal
- Benign @SOC
- Oversize package
- Generic package (Universal Packaging)

NEXT STEPS

- Finish validation testing of “baseline” test method to include all lithium ion cells and reduced cell configuration to have a “narrow scope” standard to be balloted before end of 2023.
  - Facilitate discussions outside the G27 committee between operators, shippers, test labs, and authorities
    - What requirements are expected to be contained within standard?
    - How is standard expected to be incorporated into regulations?
  - 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
- Publish AIR with appropriate intended use, rationales for various parameters
- Validate external fire test methods and publish those slash sheets
- Continue to validate test methods for lithium metal, Benign @SOC, Oversize, and Generic for expanded scope standard in the near future.

QUESTIONS?

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