

Mastering Lithium-Ion Battery Safety

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HIGH-LEVEL SUMMARY

In a world powered by lithium-ion batteries—smartphones, EVs, data centers, and renewable storage—safety is essential. Rapid advances bring rising risks: thermal runaway, recalls, and regulatory challenges that can disrupt operations, harm reputations, and endanger lives.

Mastering Lithium-Ion Battery Safety is the definitive guide from the Americase International team (Americase, HazMat Safety Consulting, and Fulcrum Testing) - leaders in engineered hazardous materials packaging, regulatory expertise, and testing and validation, with decades of expertise.

This book demystifies lithium-ion battery safety through real-world case studies, regulatory insights, and innovative strategies. It equips manufacturers, shippers, regulators, data center operators, and logistics professionals with practical tools. Drawing on Americase International's track record—including support for the largest U.S. lithium-ion recall and contributions to SAE G-27 and UN standards—you'll discover:

- **Evolution of Risks:** Historical breakthroughs to modern challenges like the Samsung Galaxy Note 7 recall, plus triggers and prevention.
- **Lab Testing & Validation:** Fulcrum Testing labs for thermal runaway simulations, real-life performance validation, and designs exceeding UN 38.3 and DOT standards.
- **Global Regulations:** DOT, ICAO, IATA, IMDG, SAE rules, special permits (e.g., DOT-SP 16011) for DDR batteries, and Americase International's role in future classifications.
- **Custom Packaging:** The Battery Bag, The Battery Super Box, ThermalVault™, packaging solutions for EV batteries, hyperscale data centers, aerospace and defense applications, and more.
- **Fire Containment & HazMat:** Passive containment strategies for thermal runaways without suppression systems.
- **Sustainability:** Reusable, recyclable packaging that cuts waste and Scope 3 emissions.

Filled with actionable insights, white papers, case studies, guidelines, and a glossary, the book turns compliance into a competitive edge.

Ideal for battery manufacturers, data center operators, EV OEMs, logistics professionals, compliance experts, safety engineers, fire protection managers, risk underwriters, recyclers, policymakers, startups, 3PLs, aerospace suppliers, and ESG officers, ***Mastering Lithium-Ion Battery Safety*** delivers tested strategies to protect people, infrastructure, and operations while building a safer, sustainable lithium-powered future.

WHAT THE BOOK COVERS (CHAPTER-LEVEL OVERVIEW)

Ch. 1	What is a lithium-ion recall—and what must companies prepare for?	A practical recall readiness framework covering volume scaling, regulatory compliance, thermal containment packaging, end-user logistics, and production planning—with lessons from the largest recall in U.S. history.
Ch. 2	The role of laboratory testing in preventing accidents.	Testing as a primary design methodology. How to bypass Battery Management Systems, force worst-case thermal runaway, interpret cell-specific failure modes across cylindrical, pouch, and prismatic formats, and use data to engineer containment that holds.
Ch. 3	Regulations and compliance—why it matters and who makes the rules.	How global battery safety regulations are actually built—from incident data and stakeholder consultation through committee drafting, public comment, and implementation across DOT, UN, ICAO, IATA, IMDG, and ADR.
Ch. 4	Custom packaging certification for lithium-ion batteries.	Embedding certification from concept through delivery—risk mapping, material selection, multi-modal compliance strategies, and the development of ThermalVault™ for next-generation fireproof storage cabinets.
Ch. 5	Understanding DOT special permits for lithium-ion battery transport.	What special permits are and how they work in practice—DOT-SP 16011, 20798, and 16532; state-of-charge requirements; modal restrictions; permit ownership; and how to navigate emergency applications efficiently.
Ch. 6	Insights from key committees on lithium battery regulations.	An inside view of SAE G-27 (air transport packaging, first standard published July 2024), SAE J3303 (storage containment, published 2025), and the UN IWG developing hazard-based classification to replace the outdated binary system.
Ch. 7	HazMat packaging requirements for dangerous goods.	Translating test results into certified designs—structured test plans, data packet documentation, vulnerability identification, and building packaging that meets UN performance standards across drop, stacking, vibration, thermal, and pressure regimes.
Ch. 8	Fire containment systems and packaging solutions.	The engineering behind passive thermal containment—insulation materials, phase-change layers, gas-tight sealing, pressure-relief venting, and structural integrity under fragmentation—applied across aviation, EVs, data centers, and energy storage.
Ch. 9	The importance of sustainability and commitment to innovation.	Circular packaging design, 10+ year reusable field assets, HPC rack packaging systems that eliminate single-use crates, Scope 3 emissions reduction, lifecycle assessments, and a documented 40% packaging cost reduction case study.

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