

Li-Ion Batteries, SMS and Safety

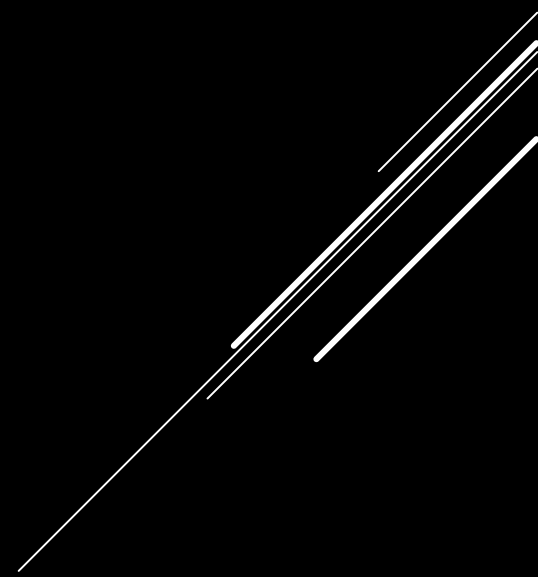


CAA Cabin Safety

Michael Burdick

June 2019

OVERVIEW

- ▶ Brief SMS
 - ▶ Lithium Battery Basics
 - ▶ Lithium Battery Incidents and Issues
 - ▶ Lithium Battery Challenges and Changes
 - ▶ Other incidents/concerns
- 

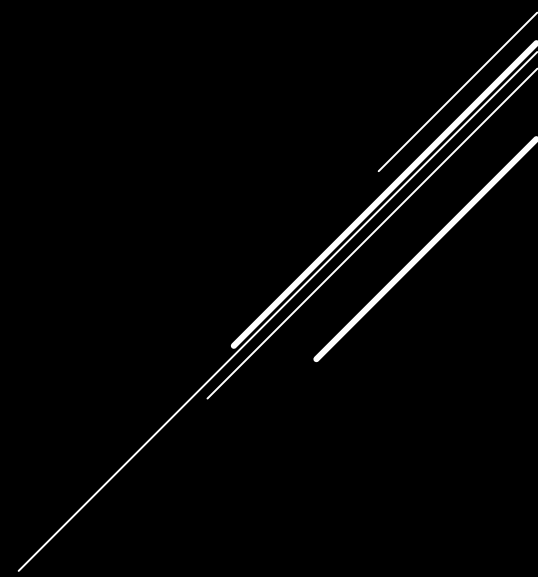
SMS

SAFETY POLICY: Commitment

SRM: Risk Identification

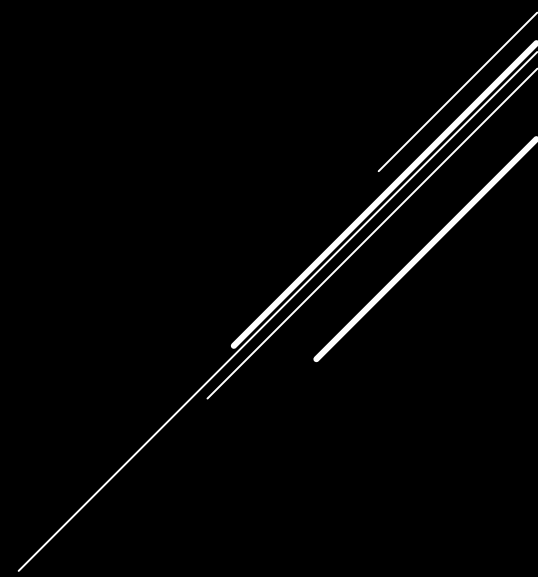
SAFETY ASSURANCE: Verify

SAFETY PROMOTION: Attitude



SMS & RISK INTERFACE

- ▶ DATA COLLECTION: REPORTING INCIDENTS
- ▶ DATA QUALITY
- ▶ DETERMINE RISK
- ▶ MITIGATE RISK
 - ▶ Challenging Budgetary Environment



- ▶ SAFO 10017, Risks in Transporting Lithium Batteries in Cargo by Aircraft.
- ▶ SAFO 16001, Risks of Fire or Explosion when Transporting Lithium Ion or Lithium Metal Batteries as Cargo on Passenger and Cargo Aircraft. SRA
- ▶ SAFO 16004- 06/05/2016: Contacting Shippers (ICAO)
- ▶ SAFO 16011- 16/09/2016: Recalled Batteries and Devices
- ▶ Emergency Order 20169288- 14/10/2016: Samsung

SAFO'S/ EO

► Boeing: July 17, 2015

“that the aircraft fire protection features are not able to adequately protect against.”

► Airbus: July 24, 2015

“render ineffective, the required Halon concentration for fire suppression and other control mechanism. There is the high likelihood of consequential significant structural damage to the aircraft.”

BOEING AND AIRBUS ADVISORY



Regulatory SRA

Safety SRA



Specifications

Dimensions

22" x 14" x 9" / 55,88 x 35,56 x 22,86 cm

Weight

9.4 lbs / 4.26 kg

Materials

Trilayer polycarbonate and nylon

Color

Black with blue accents

Storage

34L packing volume; 15" laptop compartment

Location Tracking

Equipped with 3G Cellular Data and GPS

App Communication

Bluetooth controls lock and functionality

Compatibility

iOS 8.0 or later and Android 4.4 and above

USB Ports

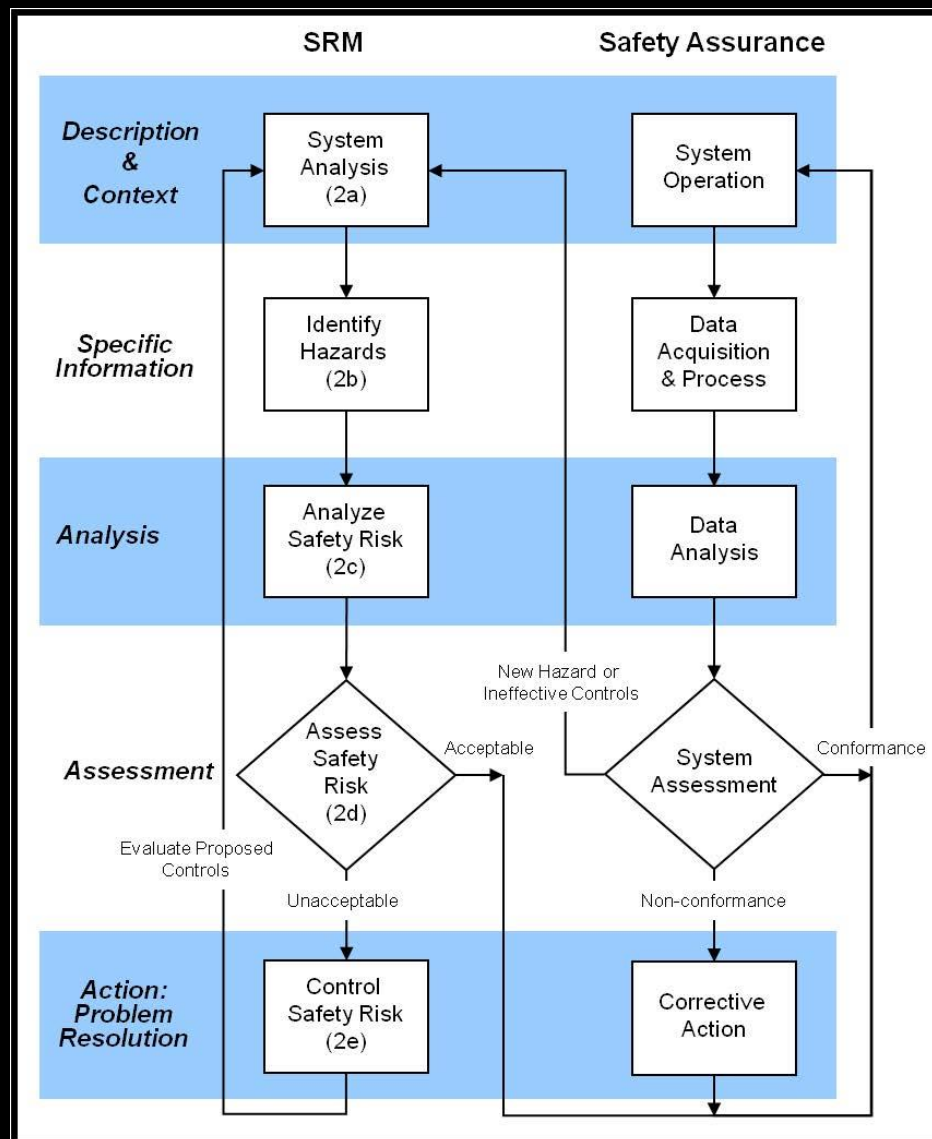
2 standard USB ports (one USB charging cable included)

Battery

10,400 mAh capacity; charge phone 5-6x

Warranty

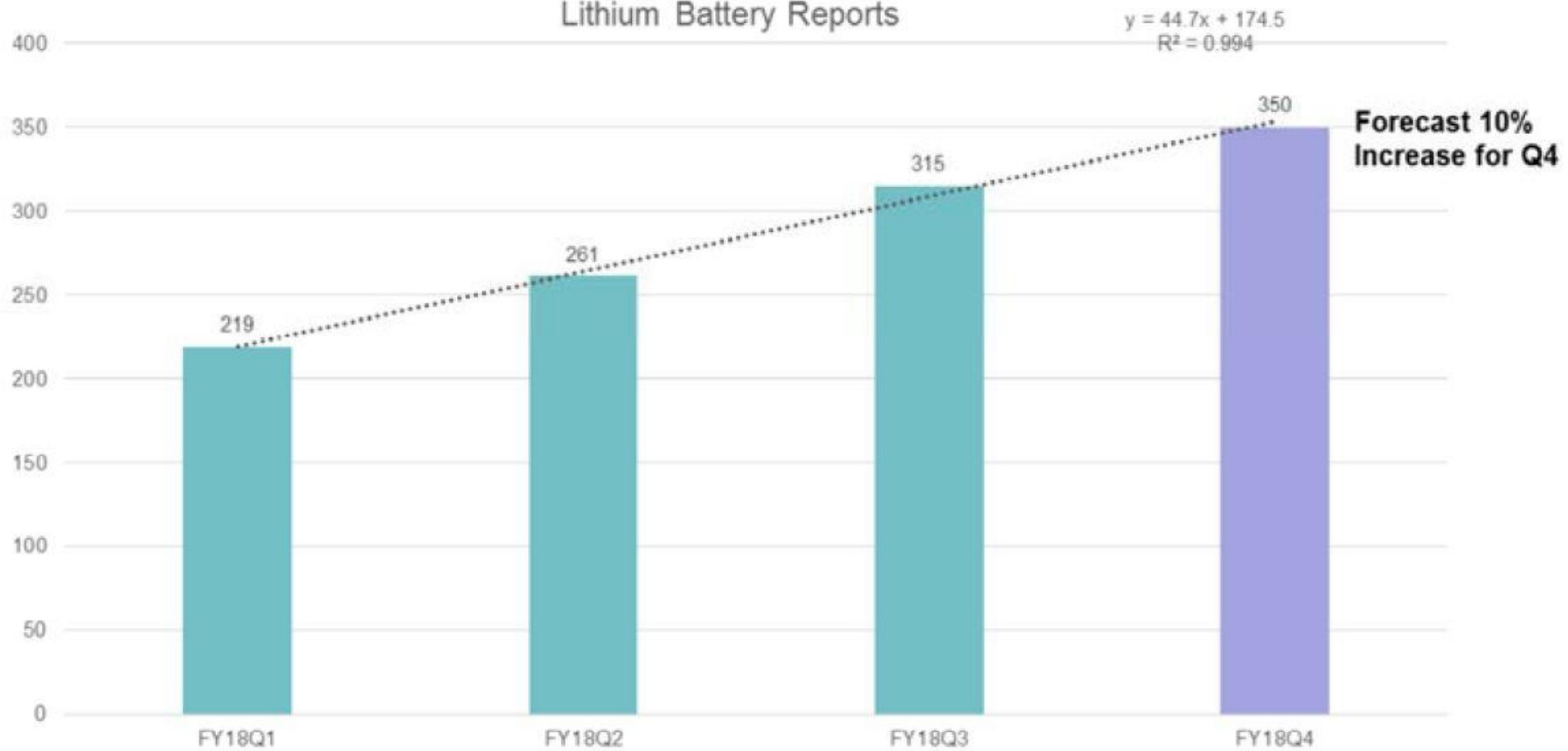
TSA-approved lock, FAA-compliant battery and 3G
2 years against defects in materials and electronic defects



Lithium Batteries

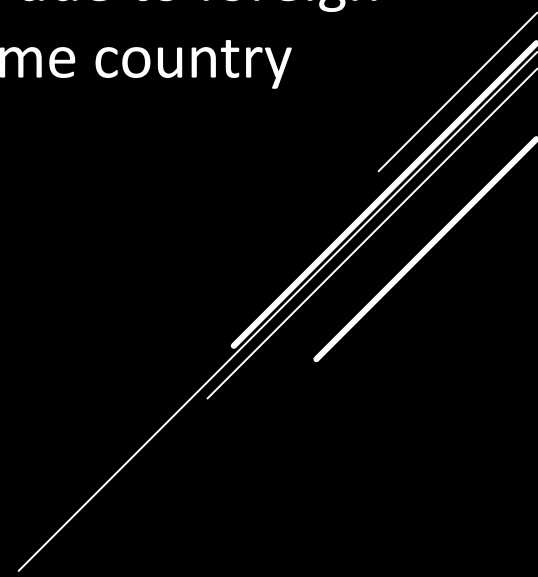


Lithium Battery Reports



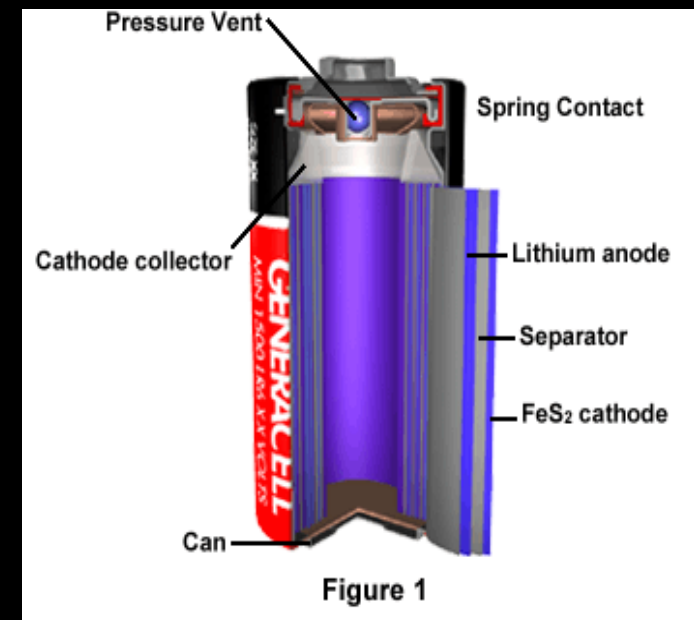
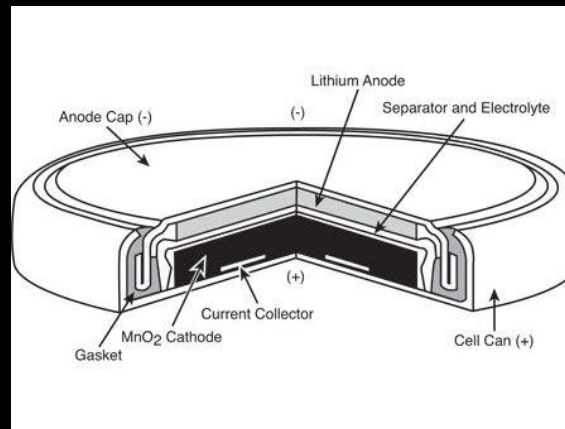
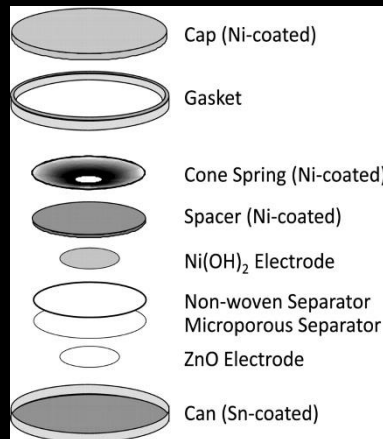
TRENDING UP

- In the past 12 months one carrier has seen a 15% increase in batteries being discovered in checked baggage or in quantities exceeding the regulatory limit
- Increase in foreign travel has increased the volume of batteries and other DG (pesticides, drugs, etc.) due to foreign travelers buying items not available in their home country



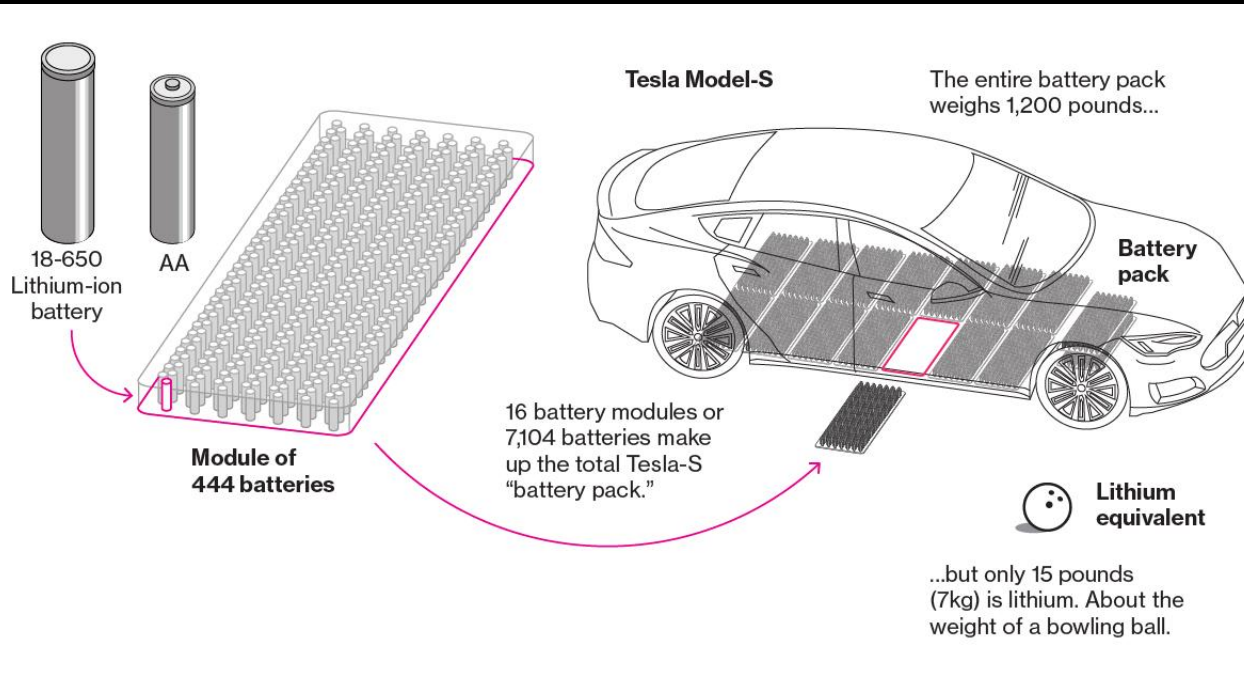
What is a Lithium Cell ?

Cell: means a single encased electrochemical unit (one positive and one negative electrode) which exhibits a voltage differential across its two terminals.



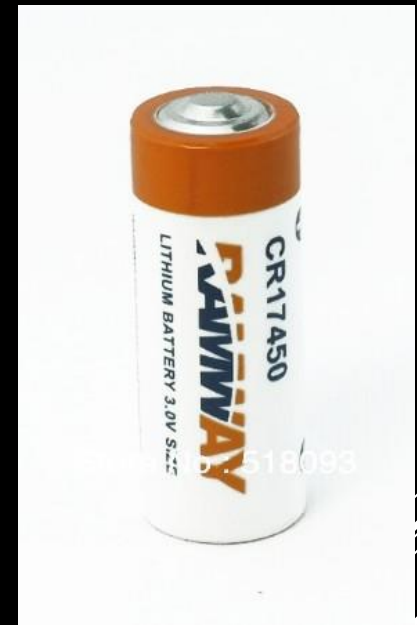
What is a Lithium Battery ?

Battery: means two or more cells which are electrically connected together and fitted with devices necessary for use, for example, case, terminals, marking and protective devices.

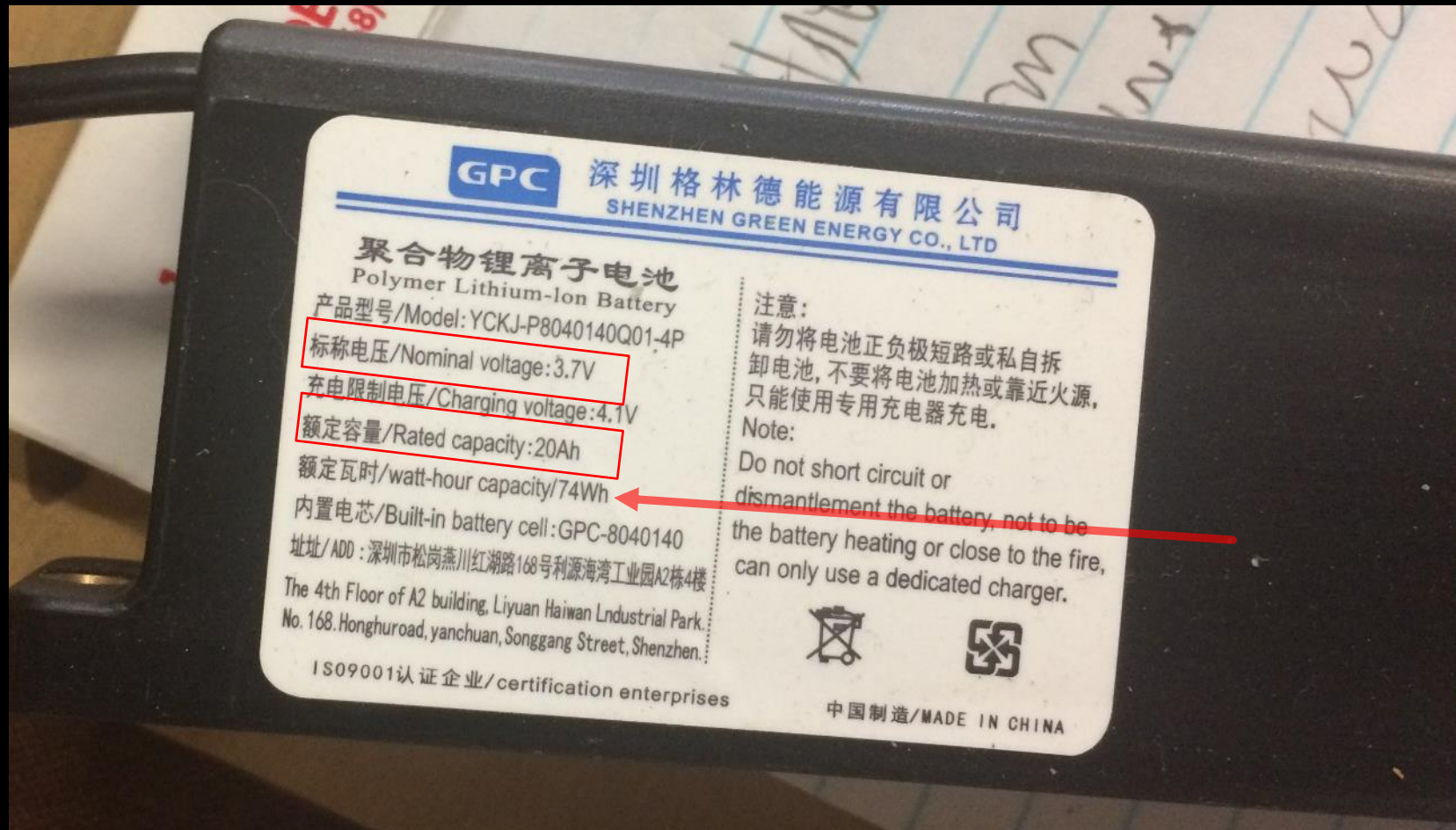


Units that are commonly referred to as "battery packs", "modules" or "battery assemblies" having the primary function of providing a source of power to another piece of equipment.

Lithium metal cell or battery: means an electrochemical cell or battery utilizing lithium metal or lithium alloys as the anode. The lithium content of a lithium metal or lithium alloy cell or battery is measured when the cell or battery is in an undischarged state. The lithium content of a lithium metal or lithium alloy battery is the sum of the grams of lithium content contained in the component cells of the battery.

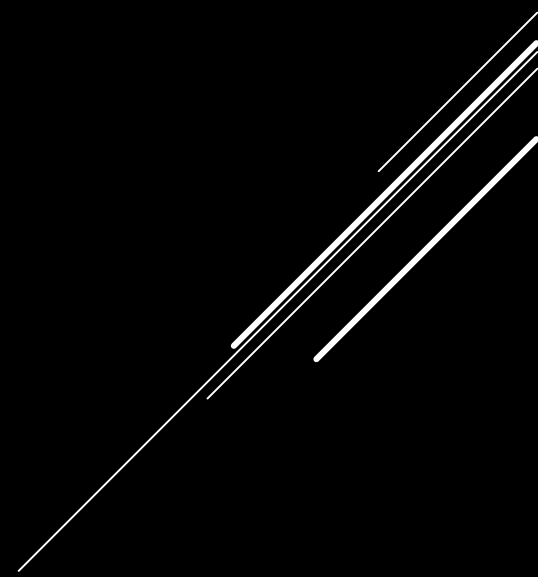






The calculation: Volts (V) x Ampere-hour (Ah) = Watt hours (Wh).
 $3.7 \times 20 = 74\text{Wh}$

INCIDENTS AND ISSUES

- Over 150 incidents by air mode
 - Training Requirements
 - Packaging
 - Counterfeit Batteries
 - New Products Introduced
- 

UPS B744 at Dubai on September 3rd 2010, crash result of cargo fire



Asiana Cargo B744, West of Jeju International Airport on
July 28, 2011, crashed result of a cargo fire



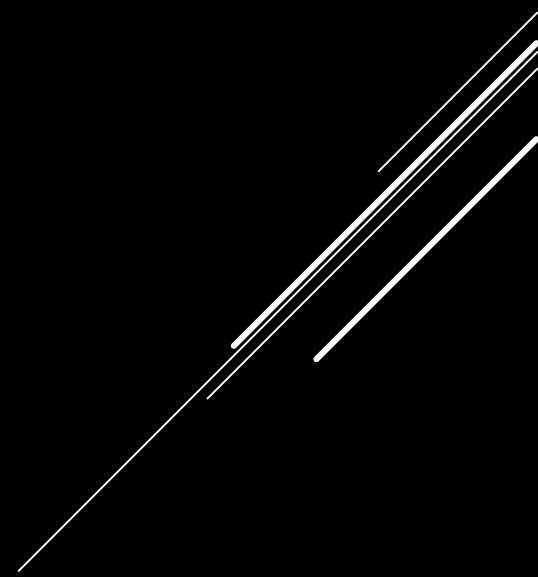
Picture by AviationNewsToday.com

2.1 Aerosols

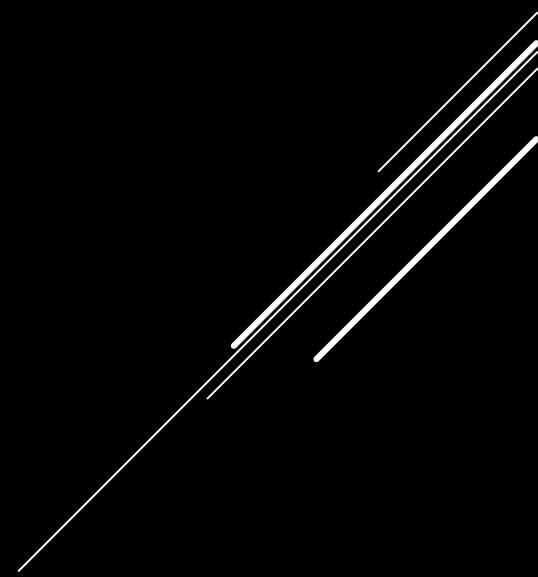




ADDITIONAL SAFTEY ISSUES

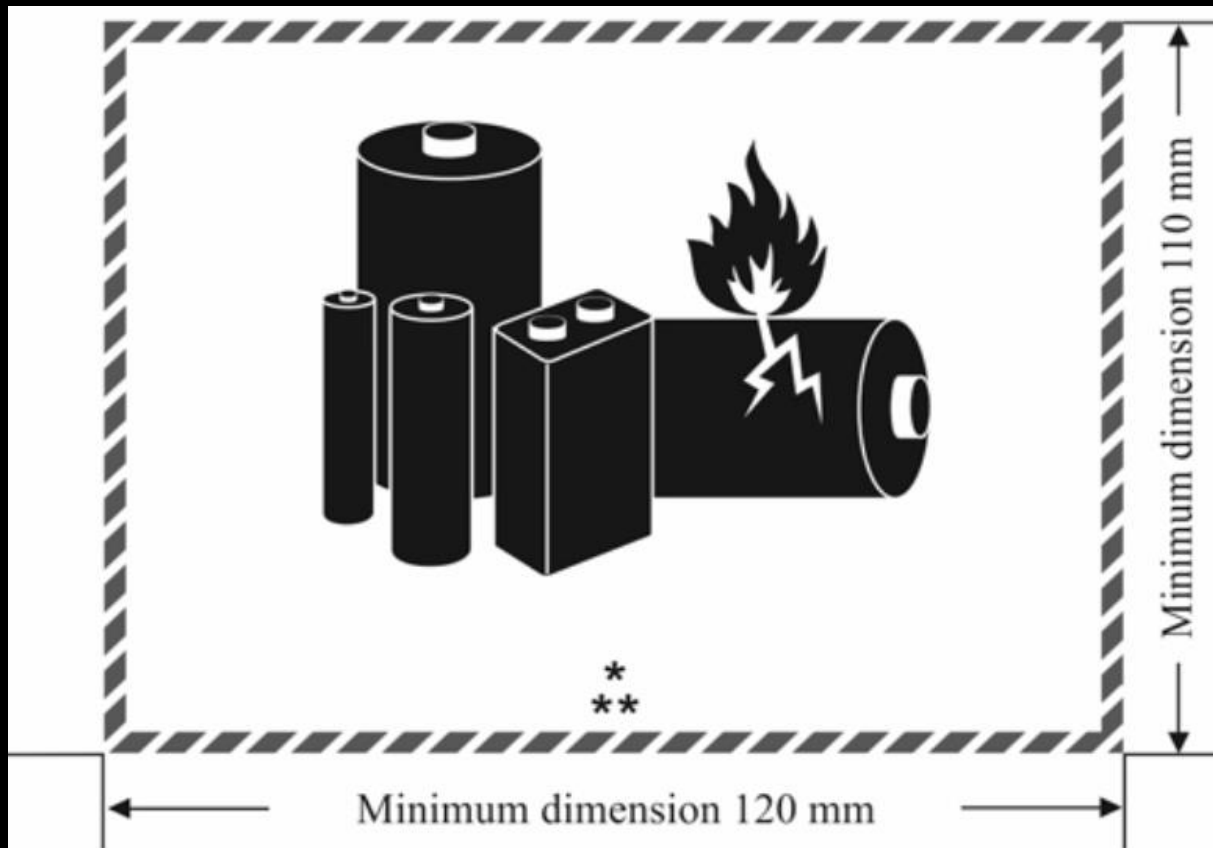
- Fire Fighting
 - Off Gassing
 - Handling the battery
 - Area of least risk
- 

CHANGES & ADDITIONAL HAZMAT ISSUES



COMMUNICATION!

A series of several parallel white lines of varying lengths, slanted upwards from left to right, located in the bottom right corner of the image.



“*” must be replaced by the appropriate UN number(s) and the
“**” must be replaced by a telephone number for additional information

NEW LITHIUM BATTERY HANDLING



NEW LITHIUM BATTERY CLASS 9 LABEL

§171.15 Immediate notice of certain hazardous materials incidents.

(a) *General.* As soon as practical but no later than 12 hours after the occurrence of any incident described in paragraph (b) of this section, each person in physical possession of the hazardous material must provide notice by telephone to the National Response Center (NRC) on 800-424-8802

NOTIFICATION OF INCIDENTS



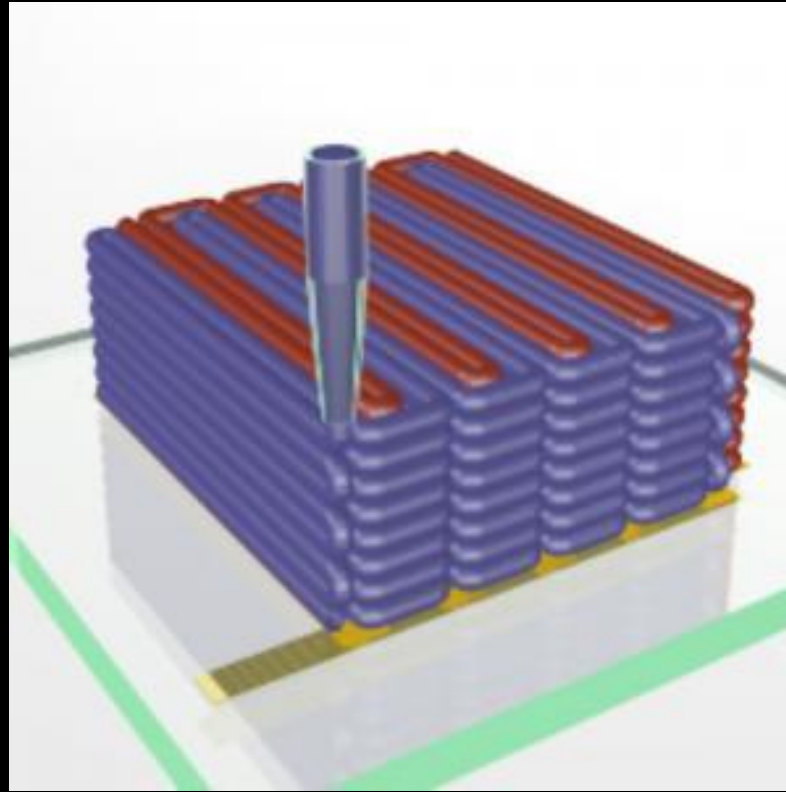
- ▶ (6) During transportation by aircraft, a fire, violent rupture, explosion or dangerous evolution of heat (*i.e.*, an amount of heat sufficient to be dangerous to packaging or personal safety to include charring of packaging, melting of packaging, scorching of packaging, or other evidence) occurs as a direct result of a battery or battery-powered device.

NOTIFICATION OF INCIDENTS





PERSONAL ELECTRONIC DEVICES (PED'S)



3D PRINTING THE NEXT GENERATION OF
BATTERIES

Paste

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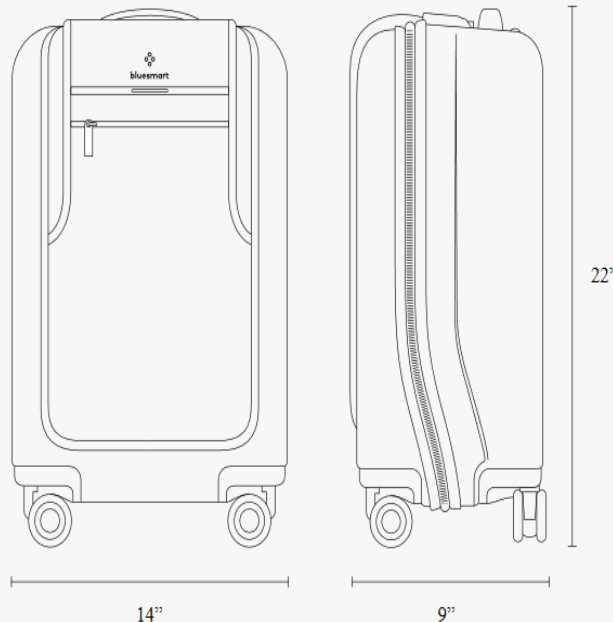
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Lithium Batteries built into suitcases: SMART BAGS?



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2 years against defects in materials and electronic defects





Self-Propelled Stroller Leads the Way to Hands-Free Parenting



Surfboards



LITHIUM BATTERY AIRCRAFT



QUESTIONS?

