

# Fire Test Standards – Airlines



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# Fire Test – Airlines

## Lithium Battery Fire Test Standard

Are we overlooking something??

### **Checked in Baggage**

- Mobile phones (new/used/ refurbished/ damaged)
  - PED (new/used/ refurbished/ damaged)
  - Toys
  - Musical devices
  - E-cigarettes / vapes
  - Powerbanks
- +++++++ Loaded in bags with other flammable materials

### **Unsuspecting Cargo Shipments**

- Toys
  - Personal effects
  - General Cargo
- +++++++ mis-declared intentionally or unintentionally

# Fire Test – Airlines

## Fire Test Involving Baggage

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### Requirement

In addition to specific risk mitigation measures in the ‘acceptance for carriage’ process (baggage and cargo), and the built-in fire suppression system in Class C cargo compartment, an additional layer of fire protection was identified in the lower deck of the passenger aircraft to further enhance the existing risk mitigations.

### Challenges

- Absence of industry-wide standards for assessing fire risks associated with undeclared goods in the lower deck (both cargo and baggage).
- Growing demand for transporting high-energy batteries, which increases the complexity of fire risk management.

### Current Solution

Individual airlines are left with no choice but to conduct their own fire risk tests, based on internally developed specifications, aiming to cover a wide range of potential fire scenarios.

# Fire Test – Airlines

## **Fire Test Involving Baggage**

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### **Emirates Baggage Fire Load Test**

#### **Testing conditions**

- Count and location of ignitor boxes in container
- Distribution of inflammable items in individual bags and their locations in the container
- Type of baggage material
- Ignition times and minimum duration of fire to be maintained
- Location of fire test to maintain same ambient environment for all tests
- Thermal imaging

#### **Success conditions**

- Fire containment duration (6 hrs)
- Smoke observation/detection within 10 mins of first ignition and continue throughout the 6 hrs
- No Flame penetration or projectiles
- Max temperature not to exceed 204 °C

Load Type	Quantity	Lithium Batteries (See Notes)	Toiletries	95% Ethyl Alcohol	Clothing
IATA Baggage Type 25 (Duffel Bag) 	19	16 batteries per bag	3 (inclusive of 1 aerosol)	10 bottles Maximum of 1 bottle per bag up to 10 bags	As Required
IATA Baggage ID 22R (upright bag) 	23	16 batteries per bag	2 (inclusive of 1 aerosol)	9 bottles Maximum of 1 bottle per bag up to 9 bags	As Required
IATA Baggage ID 28 (woven bag) 	15	16 batteries per bag	3 (inclusive of 1 aerosol)	6 bottles Maximum of 1 bottle per bag up to 6 bags	As Required
Ignitor Box	1	24 batteries	-	-	Not Applicable
IATA Baggage Type 25 (Duffel Bag) with Ignitor	1	48 batteries	3 (inclusive of 2 aerosol)	2 bottles	As Required
IATA Baggage ID 22R (upright bag) with Optional Ignitor	1	16 batteries	2 (inclusive of 1 aerosol)	1 bottle	As Required

## Load Specifications

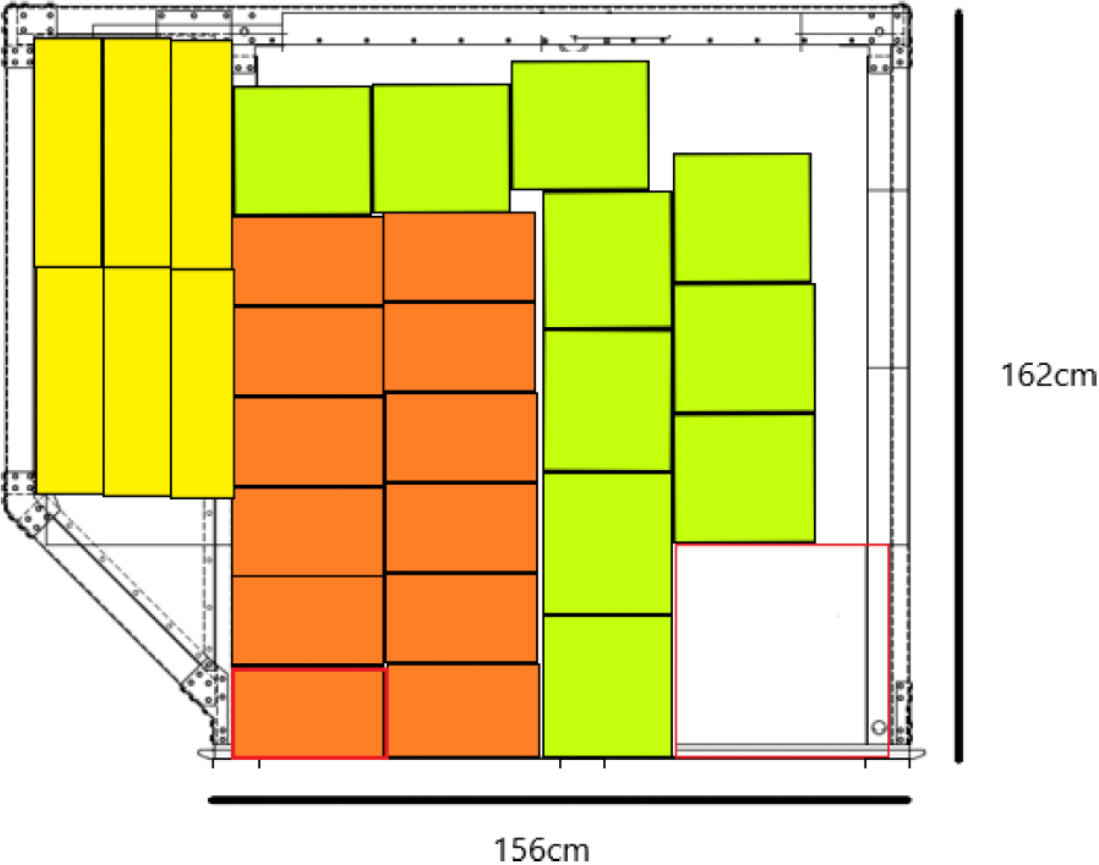
Lithium Batteries should be secured together in pack of 8, with a cage encompassing the battery pack to prevent uncontained projection of the batteries during thermal runaway.

The average state of charge amongst the batteries contained in the bundle shall be 50% ( $\pm 5\%$ ).

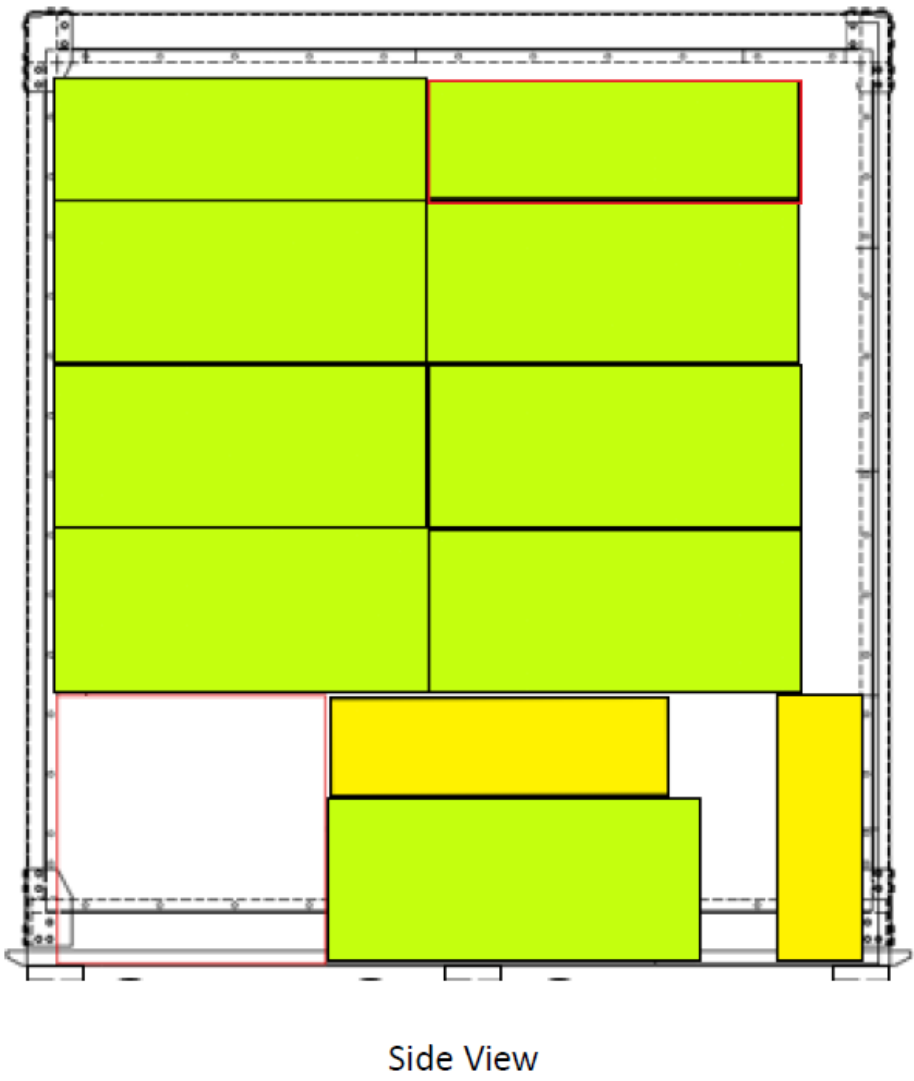
The build-up of the baggage inside the ULD does not need to be fully uniform, which would better reflect realistic loading condition in live operation.

# Fire Test – Airlines

## Fire Test Involving Baggage



## Load Distribution



# Fire Test – Airlines

## Fire Test Involving Baggage



Beginning of Test



End of Test



End of Test



# Fire Test – Airlines

## **Fire Test Involving Other Loads**

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- **Wheelchairs with unremovable Li batteries**
- **EV batteries**

***Loaded in Fire Resistant Container (FRC) and on aircraft pallets with Fire Containment Cover (FCC)***

# Fire Test – Airlines

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## Recommendations:

- The industry must urgently establish standardized fire testing protocols that incorporate more severe fire load scenarios – particularly for FRC/FCC.
- Airlines and FRC/FCC manufacturers are encouraged to share their fire tests data and results.
- IATA is encouraged to collaborate with industry experts, international standard-setting organizations, and regulators in the continued enhancement of fire testing standards for FRC/FCC, to promote standardization and facilitate safety compliance.

# Thank you!

