Airplane Lithium-ion Battery Events
A Guide for Fire Fighters

The Response Hazard

Some Boeing airplanes are being equipped with lithium-ion batteries which are contained in a stainless steel enclosure with a vent tube leading overboard. These batteries store energy that can generate intense heat in the event of a short circuit or other failures. Lithium-ion batteries can short circuit if they are improperly packaged, dropped, damaged or have manufacturing defects.

Each lithium-ion cell contains a flammable electrolyte. If the cell has a short circuit or is exposed to high temperatures, it can swell and the electrolyte may begin to vaporize creating internal pressure which begins to vent overboard.

The box containing the lithium-ion battery cells is secured inside a reinforced stainless steel enclosure capable of containing a lithium-ion battery event. Venting of vapor during a battery failure event may be visible from an exterior vent on the bottom of the airplane under the forward or aft Electrical and Electronic (E&E) bay. During active venting, there is no reason to make access to the E&E bay.

Fire Fighting Tactics for E&E bay events containing Lithium-Ion Battery Packs

1. A battery failure reaction should be fully contained within the stainless steel enclosure with any gasses vented overboard.
2. Passengers and crew are safe inside the airplane. Passenger evacuation is not expected for a battery failure.
3. Evacuate area around exterior of the airplane upwind to at least 18m/ 60 ft. from airplane.
4. While venting, make no attempt to access E&E bay.
5. Confirm airplane power is shut down by communicating with the flight deck prior to making access.
6. Don all fire fighting Personal Protective Equipment including Self Contained Breathing Apparatus (SCBA) when entering the Hot Zone (9m/30 ft).

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7. If battery is not venting or venting is complete, access the E&E bay to ensure there is no other visible fire source.
    a. **In the event of visible flame** Halon (or Halon replacement) is the recommended agent to suppress a fire. If Halon, or Halon replacement is unavailable, then CO2 would be the recommended agent. Do not use dry chemical or powder of any kind.
    b. Flood the E&E bay with appropriate agent for approximately 20 to 30 seconds and then close the bay hatch for at least 60 seconds.
    c. Open E&E hatch to confirm fire is out. If flame is present, repeat step #7b.
8. Make no attempt to disconnect the battery pack from the airplane's electrical system using the quick disconnect or by cutting the battery cables.
9. Use heat detecting equipment to monitor temperature of reinforced box. Temperatures may reach as high as 338 degrees Celsius/640 degrees Fahrenheit.
10. Once the external temperature of the reinforced box is below 49 degrees Celsius/120 degrees Fahrenheit and atmosphere is clear of hazardous vapors, then the airplane can be turned over to maintenance.

Additional questions concerning this issue should be directed to Boeing Fire Department as follows:

Boeing Fire Department
Attn: J.R. Hudgins, Assistant Chief – Training & Safety
7755 East Marginal Way, MC 1X-151
Seattle, Washington USA 98108
Ph: 425-294-2552
john.r.hudgins@boeing.com