

Special Condition
plus Means of Compliance to SCRef.: M-TS-0000419
Past Ref.: SC-G25.1585-01
Issue : 2
Date : 26 April 2022
Proposed Final
Deadline for comments: 22 Jan 2022

SUBJECT: Mitigation of flight deck fires originating from lithium batteries that are not part of the aircraft design

REQUIREMENTS incl. Amdt.: CS 25.831, CS 25.851, 25.853, 25.855, 25.857, 25.863, 25.1309, 25.1360, 25.1453(a)(2), 25.1453(b)(1), 25.1501, 25.1541, 25.1581, 25.1585 at Amdt. 27

ASSOCIATED IM/MoC: Yes / No

ADVISORY MATERIAL: FAA report DOT/FAA/TC-16/37 "Summary of FAA Studies Related to the Hazards Produced by Lithium Cells in Thermal Runaway in Aircraft Cargo Compartments"

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M-TS Issue: 2**Special Condition**
Mitigation of flight deck fires originating from lithium batteries
that are not part of the aircraft design

- 1) The emergency procedures to be followed in case of lithium battery fire on the flight deck must be specified considering the different threats (i.e. heat, smoke, fire and explosion) associated to a potential lithium battery thermal runaway event.
- 2) Adequate training must be specified for the flight- and cabin crew addressing such emergency procedures.
- 3) The emergency equipment required to effectively follow the procedures established to meet above SC 1) must be suitable for lithium battery fires and must be located either in the flight deck or in its close proximity so that it can be timely retrieved by the flight crew or the cabin crew, as applicable.
- 4) The design of each stowage compartment and each mounting bracket on the flight deck, must be evaluated by means of a fire hazard assessment supported by test evidence to determine its suitability to place or stow PEDs, power banks and spare batteries.
- 5) Placards must be installed to allow the identification of stowage locations and mounting brackets inside the flight deck that are determined to be suitable for PED stowage according to above SC 4).

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The associated Means of Compliance is published for awareness only and is not subject to public consultation.

MOC to SC 1

The emergency procedures required to meet special condition 1) should be included in the AFM and should be developed considering the following guidance:

- a. Personal Electronic Devices (PEDs) powered by lithium batteries are commonly transported on the flight deck of Large Aeroplanes, e.g. electronic flight bags (EFB) or devices carried by the flight crew for personal convenience (mobile phones, tablets, laptop computers, e-cigarettes,etc.). In addition to PEDs, also power banks or spare batteries may be transported on the flight deck by flight crew members.
- b. A possible means of compliance with special condition 1) consists in prohibiting the carriage on the flight deck of lithium batteries that are not part of the aircraft type design and that have a capacity exceeding 2 Wh.
- c. The lithium battery may be in a PED on a mounting bracket or may be in the personal belongings of the flight crew - both cases need to be addressed.
- d. A lithium battery fire on the flight deck could be potentially catastrophic and therefore the emergency procedures should involve either the removal of the PED, power bank or spare battery from the flight deck or placing it in a safe stowage that is readily on the flight deck.
- e. The need to use liquids to cool the battery as part of the fire-fighting procedure.
- f. The likelihood that cabin crew members can actively participate to the fire-fighting procedure should be evaluated.
- g. The procedure should make clear whether it is required for the aircraft to land as soon as possible.

MOC to SC 3

The emergency procedures that address special condition 1) should foresee the use of emergency equipment (e.g. specific gloves) necessary to move an overheated PED to a defined location on the flight deck or in the passenger cabin. The designated stowage location of such equipment should be within easy reach of each flight crew member.

MOC to SC 4

The hazard assessment required by SC 4) should cover all the consequences of a thermal runaway event, such as for example:

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- a. Smoke and toxic gases released from the battery, taking into account the effects of the implementation of the applicable flight deck smoke evacuation procedure.
- b. The need to remove the battery from the flight deck, if applicable.
- c. The consequences of the use of liquids to cool the battery as part of the fire-fighting procedure.
- d. The impact of the battery fire on the physical integrity of stowage boxes or mounting brackets.
- e. The potential for corrosive leakage from the battery.

The hazard assessment should be performed considering a representative lithium battery fire in terms of heat, smoke and toxic gases generation. In absence of any other justification, it should be assumed that in a thermal runaway of a representative PED battery temperatures as high as 760° C could be reached and that the event could have a duration of at least 2 minutes. The setup and procedure of any test conducted to support the demonstration of compliance with SC 4 should be agreed with EASA. The proximity of critical systems (e.g. oxygen systems, wire bundles, other batteries, etc.) that could be affected by direct flame impingement or heat transfer should be taken into account. Mounting brackets should be shown to withstand the PED overheat/ fire until the PED can be safely removed from the mounting bracket.

A possible means of compliance with special condition 4) consists in prohibiting the carriage on the flight deck of lithium batteries that are not part of the aircraft type design and that have a capacity exceeding 2 Wh.

MOC to SC 5

Based on the outcome of the hazard assessment required by special condition 4), it should be determined whether to mark the stowage compartments that are not suitable for the storage of PED, power banks and spare batteries, or, alternatively, to identify the stowage compartments that have been established to be suitable to that purpose. Text such as *“Not suitable for equipment containing lithium battery”* or *“Suitable for equipment containing lithium battery”* should be used for the marking, or any other equivalent text found acceptable by EASA.