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Civil Aviation Authority of Singapore

INFORMATION CIRCULAR

POTENTIAL FIRE HAZARD FROM BULK STORAGE OF ELECTRONIC TABETS (E-TABLETS) IN AIRCRAFT GALLEY CARTS

Purpose

1 This information circular is to raise awareness on the potential fire hazard associated with the storage of multiple e-tablets in aircraft galley carts.

Background

2 The usage of e-tablets as a replacement for the conventional in-flight entertainment has increased in popularity in airlines globally, while the effects of electromagnetic interference/compatibility of e-tablets with aircraft avionics system has been well studied and documented.

3 On the potential of fire hazard caused by the lithium batteries in e-tablets stored in galley carts, a series of tests were carried out by CAAS and the Federal Aviation Administration (FAA) William J. Hughes Technical Center. The objectives of these tests were to determine:

(a) The required configuration to store the multiple e-tablets to prevent the propagation of fire caused by thermal-runaway from a single lithium-ion battery in an e-tablet to adjacent e-tablets.

(b) The ability of the galley cart to contain a lithium-ion battery fire and to prevent fire and smoke from spreading outside the galley cart.

4 It should be noted that the e-tablets selected for the tests were based on the watt-hour rating of the batteries installed within the e-tablets and the test results would not be representative for e-tablets that have batteries with different watt-hour rating installed.

Tests outcome

5 The results of these tests established the potential fire hazards associated with bulk storage of e-tablets in a galley cart. The findings derived from these tests include the following:

(a) The risk of lithium battery thermal-runaway propagation from one e-tablet to another was small when the e-tablets were arranged in a vertical orientation with sufficient spacing between them (1 inch was sufficient in this study).

(b) Thermal runaway may cause the accumulation of flammable gases in the galley cart and increase the risk of an explosion. The force of an explosion can force open a latched galley cart door.

(c) The fire or explosion created within the galley cart has the potential to ignite adjacent aircraft cabin materials.

(d) The heavy accumulation of smoke in the cabin may interfere with firefighting efforts and can be hazardous to airplane occupants.

6 Details of the tests conducted are documented in the joint FAA-CAAS technical report, entitled “Fire Behavior of E-Tablets Stored in Aircraft Galley Carts”. A copy of the report is available at (https://www.fire.tc.faa.gov/reports/reports.asp).

Conclusion

7 The results of the tests confirmed the potential fire hazards associated with bulk storage of e-tablets in a galley cart and concluded that storage of e-tablets in a horizontal-stacked orientation without separation is not recommended. Although the tests confirmed that the risk of lithium battery thermal-runaway propagation from one e-tablet to another was small when the e-tablets were arranged in a vertical orientation with 1 inch spacing between them, this is true only for e-tablets with the associated battery watt-hour rating. Operators intending to store e-tablets in the vertical orientation will need to conduct additional assessments or tests to determine that the appropriate separation distance needed for the respective e-tablets.

8 Additional work is required to determine the desirable features of galley carts to contain a lithium battery fire and to prevent the danger associated with fire, smoke intensity and explosion.

9 For further enquiries, please contact Mr Jonathan Tan, Senior Manager (Airworthiness Engineering, Standards) at caas_afo_infocenter@caas.gov.sg .

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