



Federal Aviation Administration

Memorandum

Date: April 29, 2013

To: Manager, Transport Standards Staff, International Branch, ANM-116

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: Robert Hettman, ANM-112

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for improved passenger oxygen mask deployment system for the Airbus Model A350 airplane (FAA Project Number TC0544IB-T)

ELOS Memo #: TC0544IB-T-ES-3

Reg. Ref.: §§ 25.1301, 25.1309, 25.1447(c)

This memorandum informs the certificate management aircraft certification office of an evaluation made by the Transport Airplane Directorate (TAD) on the establishment of an equivalent level of safety (ELOS) finding for the Airbus Model A350 airplane.

Background

Title 14, Code of Federal Regulations (14 CFR) section 25.1447(c)(1) states the following in pertinent part: There must be an oxygen dispensing unit connected to oxygen supply terminals immediately available to each occupant wherever seated. In addition, if certification for operation 30,000 feet is requested, the dispensing units providing the required oxygen flow must be automatically presented to the occupants.

In case of cabin depressurization the conventional oxygen mask deployment system includes an automatic presentation of all oxygen dispensing units simultaneously to the passengers. Airbus developed for A350 a new passenger oxygen mask system to improve the stowage and deployment of the oxygen dispensing units. This system is called "State B-Light." If this system is activated (automatically or manually), two masks per container are presented. The remaining mask(s) is (are) restrained behind a foil inside the container. By pulling either of the initially presented masks, all remaining masks are presented and the oxygen flow starts. Because occupant action is required to present oxygen masks located behind the foil, the masks are not considered automatically presented.

Applicable regulations

§§ 25.1301, 25.1309, 25.1447(c)

Regulation requiring an ELOS finding

§ 25.1447(c)(1)

Description of compensating design features or alternative standards which allow the granting of the ELOS (including design changes, limitations or equipment need for equivalency)

The design of the “State B-Light” oxygen mask eliminates the possibility of oxygen masks becoming entangled with one another during deployment. Because masks cannot be tangled with one another, the overall system reliability is improved. When the system is activated either manually or automatically, at least one oxygen mask is visible and within easy reach of each passenger cabin occupant regardless of seat location. When one mask is pulled, oxygen flow is initiated to all masks in that seat group and the remaining masks deploy such that each cabin occupant has a supplemental oxygen mask.

To demonstrate the effectiveness of the improved system, a naïve subject test was conducted to compare the “State B-Light” system with a traditional oxygen system. During the comparative test, each occupant had an oxygen mask donned with oxygen flowing in the same or shorter time compared to a traditional system.

Explanation of how design features or alternative standards provide an ELOS to that intended by the regulation

The overall intent of § 25.1447(c)(1) is to provide in a timely manner accessible emergency oxygen protection to cabin occupants in case of cabin decompression. The applicant has successfully performed a naïve subject test to demonstrate that the new oxygen mask packaging provides an ELOS to that intended by the regulation.

FAA approval and documentation of the ELOS finding

The FAA has approved the aforementioned ELOS finding in the Model A350 airplane issue paper ES-3, titled “Improved Passenger Oxygen Mask Deployment System.” This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The TAD has assigned a unique ELOS memorandum number (see front page) to facilitate archiving and retrieval of this ELOS finding. This ELOS memorandum number should be listed in the type certificate data sheet under the Certification Basis section in accordance with the statement below:

ELOS Findings have been made for the following regulation:
§ 25.1447(c)(1), Equipment standards for oxygen dispensing units. (documented in TAD
ELOS Memo TC0544IB-T-ES-3)

Original signed by

Victor Wicklund

May 22, 2013

Transport Airplane Directorate
Aircraft Certification Service

Date

ELOS Originated by: Transport Standards Staff	Project Engineer Robert Hettman	Routing Symbol ANM-112
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