

Proposed Equivalent Safety Finding on “Improved Passenger Oxygen Mask Deployment System”

Applicable to Airbus A350-941

Introductory Note:

The hereby presented Equivalent Safety Finding has been classified as an important Equivalent Safety Finding and as such shall be subject to public consultation, in accordance with EASA Management Board decision 12/2007 dated 11 September 2007, Article 3 (2.) of which states:

"2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency."

Statement of Issue:

In case of cabin depressurization conventional oxygen mask deployment systems include an automatic presentation of all oxygen dispensing units simultaneously to the passengers.

In CS 25.1447 (c)(1) it is stated that:

“CS 25.1447 Equipment standards for oxygen dispensing units

If oxygen-dispensing units are installed, the following apply:

...

(c) If certification for operation above 7620 m (25 000 ft) is requested, there must be oxygen dispensing equipment meeting the following requirements (See AMC 25.1447(c)):

(1) There must be an oxygen-dispensing unit connected to oxygen supply terminals immediately available to each occupant, wherever seated. If certification for operation above 9144 m (30 000 ft) is requested, the dispensing units providing the required oxygen flow must be automatically presented to the occupants before the cabin pressure altitude exceeds 4572 m (15 000 ft) and ..."

Airbus A350-941 – Equivalent Safety Finding to CS 25.1447(c)(1)

– Improved Passenger Oxygen Mask Deployment System –

Design Proposal:

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 rest of the mask(s) is restrained behind a foil inside the container. By pulling either of the two masks, all remaining masks are presented and the oxygen flow starts.

Justification:

The new design proposal has been justified by addressing the following aspects:

- A. The safety benefits of the Improved Passenger Oxygen Mask Deployment System have been assessed by a detailed review of the Airbus in service events related to a failed deployment of the conventional system oxygen dispensing unit.
- B. Safety considerations have been made related to:
 - the potential of hidden failures of the elements stowed behind the foil (mask, hose, flow indicator...)
 - the justification of inspection intervals of the complete system,
 - the consequences of a non-deployment of the dispensing units with respect to a potential fire risk associated to oxygen being generated in the vicinity of a hot chemical oxygen generator.
- C. Operational Considerations and Cabin safety aspects have been agreed with EASA related to:
 - relevant information, in the customised Cabin Crew Operating Manual (CCOM), or as part of the Type Specific Data required to support establishment of customised Cabin Crew (CC) training,
 - the impact on the Safety Card and the Safety briefing.

Safety Equivalency Demonstration:

The design of the “State B-Light” passenger oxygen mask system used in the A350 aircraft is considered to ensure an equivalent level of safety to a literal compliance to CS 25.1447 (c)(1) if the following is demonstrated.

Upon “State-B light” system activation:

1. Each and every occupant wherever seated, has visibility to a dispensing unit the same or better than the conventional system and has access to a dispensing unit in the same or shorter time as a conventional system,
2. Each and every occupant wherever seated, is protected, oxygen mask in place and oxygen flow being delivered, in a same or shorter time than with a conventional system,
3. The usage of the oxygen dispensing unit by “naïve” cabin occupants is comparable or improved as compared to a conventional system.