

Equivalent Safety Finding on CS 25.783(c)(1) at Amdt 20
Pressurisation prevention means

Applicable to ATR 72-212A

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:

EASA received an application for the certification of an ATR 72-212A full cargo version. The modified aircraft is configured with a Large Cargo Door (LCD) including an Embedded/Crew Door located on the forward left side. The applicable Certification Specification is CS 25 at Amdt 20 (based on the date of application, the corresponding FAA applicable regulation is 14 CFR Part 25 of FAR as amended by amendments 25-1 through 25-144)

The Embedded/Crew door is hinged on the forward side (two hinges) and opens outwards and then forwards against the side of the fuselage. When fully opened, the door is held against the fuselage by a hook spring-loaded to engage the door external handle.

For reference, the text of CS 25.783(c) at Amendment 20 (the text of CS 25.783(c) is equivalent to the text of FAR 25.783(c) last amended at Amdt 114) is the following:

"(c) Pressurisation prevention means. There must be a provision to prevent pressurisation of the aeroplane to an unsafe level if any door subject to pressurisation is not fully closed, latched, and locked.

(1) The provision must be designed to function after any single failure, or after any combination of failures not shown to be extremely improbable.

(2) Doors that meet the conditions described in sub-paragraph (h) of this paragraph are not required to have a dedicated pressurisation prevention means if, from every possible position of the door, it will remain open to the extent that it prevents pressurisation or safely close and latch as pressurisation takes place. This must also be shown with any single failure and malfunction except that:

(i) with failures or malfunctions in the latching mechanism, it need not latch after closing, and

(ii) with jamming as a result of mechanical failure or blocking debris, the door need not close and latch if it can be shown that the pressurization loads on the jammed door or mechanism would not result in an unsafe condition. "

For further reference, following extract of the text of EASA AMC 25.783:

“If a vent panel is used, it should be designed so that, in normal operation or with a single failure in the operating linkage, the vent panel cannot be closed until the door is latched and locked. The vent panel linkage should monitor the locked condition of each door lock system.”

(The FAA AC 25.783-1A has the same wording of EASA AMC 25.783 except it does not include the last word ('system') of that paragraph)

CS 25.783 (c)(1) requires a provision to prevent pressurisation of the aeroplane to an unsafe level if any door subject to pressurisation is not fully closed, latched, and locked. The provision must be designed to function after any single failure, or after any combination of failures not shown to be extremely improbable.

The applicant cannot demonstrate full compliance with the CS: for a limited number of single failures, the vent panel can be closed whereas the locking system is not fully engaged.

The proposed design of the Embedded/Crew door together with the proposed operational procedures will provide a level of safety equivalent to a full compliance with CS 25.783(c)(1).

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– Applicable to ATR 72-212A –

Applicant Proposal

The applicant proposes to introduce provisions in the Aeroplane Flight Manual (AFM) limitation section requiring that prior to each flight:

- a. Only trained personnel are allowed to operate/close the Embedded/Crew door.
- b. Before take-off and when all doors are closed, the Flight Crew check the locking mechanism on the Embedded/Crew door from the inboard door's operator station as follows:
 - 1- Check that the Vent Panel is closed, and
 - 2- Check that the three flags (which provide visual indication of the locks status) indicate a lock status: each flag with an arrow-shaped sticker shall be located at level of "LOCK" indication on green background.

In addition to these limitations, placards are provided at door level (both inside and outside) to require that operation is only allowed by the trained personnel and to provide guidance to the Flight Crew for the two above check procedures (from inside) before take-off. This guidance will include instructions to use a flashlight or equivalent light source when necessary to ensure the flags described in more detail below are discernible.

The AFM checking procedure relies on the following indications:

DOOR LOCKING INDICATIONS

It is requested that Flight Crew check the status of the door locking indications prior to takeoff.

The visual inspection of the closed position of the door and the status of each of the latches and locks have a higher level of integrity than, and be independent of, the remote door lock indication in order that they may be used to allow dispatch in cases when remote indications of an unsafe door remain. (see AMC 25.783, paragraph 5, sub-paragraph 'CS 25.783(f) Visual inspection provision').

For each lock, the visual inspection indicators show the unlocked status (visual indication: "UNLK" position on red streaked background) as long as the door is not placed in closed, latched and locked position.

Once the door is placed in closed, latched and locked position, the flag driven by each lock's command rod is placed in front of the visual window and the visual indication shows "LOCK" position on green background, indicating the locked status.

Each flag is directly fixed and operated by the dedicated lock's command rod.

Each latch operating mechanism is secured by a dedicated lock and no single failure can lead to be in a locked position while the latching mechanism is in an unlatched position.

Safety Equivalency Demonstration

The Flight Crew check of the status of each lock as explained above is considered to provide adequate compensating features allowing to reach an equivalent level of safety to full compliance with CS 25.783(c)(1).

This will ensure reliable detection of single failure cases in the lock system, for which the vent panel can be closed when the locking system is not fully engaged.