

SUBJECT : **Installation of single glass pane observation windows in the pressurized cabin of a Large Aeroplane**

REQUIREMENTS incl. Amdt. : **JAR 25.775(d) Change 9**

ASSOCIATED IM/MoC¹ : Yes / No

ADVISORY MATERIAL : **AMC 25.775(d) of CS-25 Amendment 1**

INTRODUCTORY NOTE:

The following Deviation (Dev) shall be subject to public consultation in accordance with EASA Management Board decision 12/2007 dated 11 September 2007, Article 3 (2.) 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."

IDENTIFICATION OF ISSUE:

EASA has received an STC application for a large aeroplane. The design changes include the installation of two observation windows in the aft upper part of the fuselage, within the pressurized cabin. For optical quality reasons each of these two windows consists of a single glass pane.

The applicable EASA certification basis consists basically of JAR-25 Change 9. The installation of these single pane windows does not meet the following applicable requirement (*text marked in italics to highlight the non-compliance*):

JAR 25.775 Windshields and windows

(d) The design of windshields and windows in pressurised aeroplanes must be based on factors peculiar to high altitude operation, including the effects of continuous and cyclic pressurisation loadings, the inherent characteristics of the material used, and the effects of temperatures and temperature differentials. *The windshield and window panels must be capable of withstanding the maximum cabin pressure differential loads combined with critical aerodynamic pressure and temperature effects after any single failure in the installation or associated systems.* It may be assumed that, after a single failure that is obvious to the flight crew (established under JAR 25.1523), the cabin pressure differential is reduced from the maximum, in accordance with appropriate operating limitations, to allow continued safe flight of the aeroplane with a cabin pressure altitude of not more than 15,000 ft (see ACJ 25.775(d)).

¹ In case of SC, the associated Interpretative Material and/or Means of Compliance may be published for awareness only and they are not subject to public consultation.

Consultation Paper
Deviation

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The intent of this Deviation is to define the necessary mitigating factors/ features to ensure compliance with the applicable Essential Requirements of Annex II of Regulation (EU) 2018/1139.

Considering all the above, the following Deviation is proposed.

Deviation to JAR 25.775(d) Change 9²**Installation of single glass pane observation windows in the pressurized cabin of a Large Aeroplane**

With the installation of single pane glass windows, compliance with the “single failure” requirement of JAR 25.775(d) can not be shown. The following mitigating factors/features are defined to ensure compliance with the applicable Essential Requirements of Annex II of Regulation (EU) 2018/1139, aiming at safe flight and operation of the aircraft with the subject design change installed and at limiting the risks and effects of failure of the single pane windows which would result in sudden decompression of the aircraft.

- 1) This Deviation shall apply to a limited number of aeroplanes (MSN) that shall be operated for research purposes only (no commercial operation);
- 2) The aeroplane(s) modified by this installation shall be operated with only dedicated (flight and cabin) crew that is appropriately qualified, instructed and trained;
- 3) After installation of the window adapter structural modification the modified aeroplane(s) shall have an operating limit in flight cycles determined in agreement with the TC Holder;
- 4) The usage of the glass windows in flight cycles shall be limited to 10% of the aeroplane operating limit. For the remaining flights the windows shall be removed and metallic blind panels shall be installed;
- 5) The area of any single pane glass window shall be less than the area (hole size) required to be considered by the applicable decompression requirements;
- 6) The risk of failure of the glass windows shall be minimised by careful consideration of the installation details, **appropriate inspection and maintenance instructions**, further supported by an appropriate static strength and fatigue & damage tolerance substantiation of the affected aircraft structure performed by the TC Holder, as well as by compliance with the considerations contained in AMC 25.775(d)³ of CS-25 amendment 1, or a later amendment, for the “window intact” condition;
- 7) **Appropriate manufacturing process specifications, including the necessary inspection requirements, shall be established to address any manufacturing defects that can result in spontaneous fracture or otherwise reduce the intended strength capability of the glass panes;**
- 8) **Each finished glass pane shall be proof-pressure tested to the limit pressure load;**
- 9) In some of the STC configurations with the single pane glass windows installed, a pressure-tight box will be installed underneath one of the windows, capable of maintaining the full cabin pressure differential loads should the subject window fail;
- 10) In addition to the oxygen masks already installed above each seat, there shall be enough readily accessible oxygen dispensing units distributed in the cabin, automatically presented to the occupants before the cabin pressure altitude exceeds 4572 m (15.000 ft).

² Based on the EASA TC Basis applicable to the project that triggered this public consultation. Note that the text of JAR 25.775(d) Change 9 is identical to CS 25.775(d) at the latest Amdt. 26.

³ It has been agreed between the applicant and EASA to use AMC 25.775(d) at Amendment 1.