Certification Memorandum

Evaluation of aisle width with respect to seat installations

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Regulatory requirement(s): CS 25.815

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Log of issues

Issue	Issue date	Change description
01	25.07.2018	First issue.

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1. Introduction

1.1. Purpose and scope

The purpose of this Certification Memorandum is to provide specific guidance about methods of compliance with the requirements of CS 25.815 at Amendment 21 and the equivalent requirements included in JAR/CS-25 at previous changes/amendments.

This Certification Memorandum is applicable to moveable items of passenger seats installed on large aeroplanes with 20 or more passengers that carry out commercial operations (ref. Deviation on JAR/CS 25.815 Width of Aisle, published on the EASA website on 13/04/2014).

The guidance given in this Certification Memorandum does not apply to the cross aisles required by JAR/CS 25.813, and it should be considered together with AMC 25.815, which refers to the relevant part of FAA Advisory Circular 25-17A (Transport Airplane Cabin Interiors Crashworthiness Handbook).

1.2. References

It is intended that the following reference materials should be used in conjunction with this Certification Memorandum:

Reference	Title	Code	Issue	Date
CS 25.815	CS-25 – Book 1 - Certification Specifications Large Aeroplanes – Subpart D Design and Construction - Width of Aisle	CS-25	21	27/03/2018
AMC 25.815	CS-25 – Book 2 – Acceptable Means of Compliance Large Aeroplanes – Subpart D Design and Construction - Width of Aisle	CS-25	21	27/03/2018
FAA AC 25-17	Transport Airplane Cabin Interiors Crashworthiness Handbook	N/A	A	18/05/2009
SAE ARP5576	Aircraft Seat Design Guidance and Clarifications	N/A	D	17/07/2015

1.3. Abbreviations

TT&L	Taxi, Take-Off and Landing

1.4. Definitions

Front row seat	A seat installed aft of an interior component other than a seat (e.g. a bulkhead, galley, lavatory, partition, class divider, etc.), a cross aisle, or a passageway leading to an exit.

2. Background

CS 25.815 at Amendment 21 prescribes the following:

"The passenger aisle width at any point between seats must equal or exceed the values in the following table:

Passenger seating capacity	Minimum passenger aisle width (cm (inches))	
	Less than 64 cm (25 inches) from floor	64 cm (25 inches) and more from floor
10 or less	30 (12)*	38 (15)
11 to 19	30 (12)	51 (20)
20 or more	38 (15)	51 (20)

** A narrower width not less than 23 cm (9 inches) may be approved when substantiated by tests found necessary by the Agency."*

FAA AC 25-17A provides the following guidelines on the determination of the width of the aisle between interior components other than seats:

"When the measurement is not between seats but between other aisle constraints such as galleys, coat closets, storage compartments, etc., the minimum widths at the specified vertical distance above the floor still prevails."

It must be noted that JAR/CS 25.815 does not explicitly mention any flight phase. Therefore, the specified aisle width is required to be maintained during all phases of flight, and not only during taxi, take-off, and landing.

Aisles are required to allow for rapid egress from the aeroplane in an emergency, but they also provide the means for crew members to access all parts of the cabin during aeroplane operations in order to address emergency conditions. Additionally, they allow passengers to return to their seats during turbulence. Not providing adequate aisles during flight may prevent the accomplishment of these needs.

Aisle widths should be determined with seats and their moveable features in the most critical positions allowed by the design. This practice is based on the assumption that the seats could be in this configuration during an emergency. For example, when the in-armrest video monitor of a seat is deployed, the minimum aisle width of 51 cm (20") might not be maintained above the height of 64 cm (25") from the floor.

As a result of repeated findings during cabin inspections conducted on several aeroplane models, EASA has concluded that seat design has developed in such a way that the cases of non-compliance with CS 25.815 during phases of flight other than Taxi, Take-Off and Landing (TT&L) are increasing. This trend is mainly due to the proliferation of seat places equipped with in-armrest tables and/or monitors.

3. EASA Certification Policy

3.1. EASA Policy

Seat-moveable items are not expected to encroach into the minimum aisle width specified in CS 25.815 during any phase of flight.

For the measurement of the aisle width, all the possible stable positions of moveable items (e.g. armrests, armcaps, deployable video monitors, tray tables, etc.) should be evaluated. Any non-self-supporting positions do not need to be considered. For example, armrest covers that only need to be lifted during the deployment/stowage of in-armrest tables, and which are then closed by spring loading, do not need to be considered.

In general, for the dimensional checks of aisles, cylinders of 51 cm (20”) and 38 cm (15”) diameters can be used. An aisle width that is fully compliant with CS 25.815 will allow a 51 cm (20 ”) diameter cylinder, placed above a 38 cm (15”) diameter cylinder with a height equal to 64 cm (25 ”), to slide along the aisle. In doing so, the lower cylinder may move relative to the upper one, but it should always remain entirely within the vertical projection of the upper cylinder.

EASA considers that the necessity to provide the occupants of seats with tables and monitors may result in minor encroachments into the minimum required aisle width. Such minor encroachments can be considered to be negligible during phases of flight other than Taxi, Take-Off and Landing (TT&L), and thus they should not be considered to be non-compliances with CS 25.815, provided that the criteria specified in the present Certification Memorandum are met.

EASA would like to highlight that it should always be a design objective to minimize the encroachment into the aisle of such moveable items.

The criteria for the identification of acceptable encroachments of seat-moveable items into the aisle width envelope required by CS 25.815 are the following:

1) Encroachment into the dimensional aisle width limits of CS 25.815 is allowed:
    a. Only in phases of flight other than TT&L.
    b. Only for deployable video monitors, tables and armrests for disabled passengers that are not electrically operated, under the limitations specified below, in points 2, 3 and 4 respectively. However, if deemed necessary, additional guidance that specifically addresses deployable video monitors, tables and armrests for disabled passengers that are electrically operated may be released by EASA in the future.
2) Video monitors
    a. Encroachment into the minimum aisle width envelope defined by CS 25.815 is allowed for deployable video monitors mounted on front row seats. In addition, encroachment is allowed when a change in the number of seats abreast (e.g. a central triple seat installed behind a central quadruple seat) results in the need to provide seats with deployable video monitors.
    b. If a deployable video monitor encroaches into the minimum aisle width envelope required by CS 25.815, all the following conditions should be met:
        i) The minimum aisle width in the worst-case stable position of the deployable video monitor should be at least 23 cm (9 inches).
        ii) In the event of any encroachment allowed by i) above, it should be possible to restore the minimum aisle width envelope required by CS 25.815 through the application of a force on the video monitor that is not greater than 45 N (10 lbf) with a single sweeping motion using one hand. The sweeping motion may not necessarily be in the direction of travel along the aisle, and it may include changes in direction, but no changes to the grip. For example, opening an armrest cover to stow the video monitor is not allowed.
        iii) In any positions after deployment, regardless of whether they are stable or not, monitors installed on different seats should not come in contact with each other in such a manner that they could become impediments to egress from the aircraft.

3) Tables

   a. Encroachment into the minimum aisle width envelope defined by CS 25.815 is considered to be acceptable on all seat rows. If a table encroaches into the minimum aisle width envelope required by 25.815, all the following conditions should be met:

      i) The hinge mechanism of a deployed in-armrest table may have a length of up to 102 mm (4 ”) and a height of up to 51 mm (2 ”), measured from the top of the seat armrest, but it should not protrude into the aisle beyond the outside of the armrest.

      ii) A table leaf with a thickness of maximum 25 mm (1 ”) may rest on an armrest, but it should not protrude into the aisle beyond the outside of the armrest.

4) Armrests for disabled passengers

   a. Encroachment into the minimum aisle width envelope defined by CS 25.815 is allowed when following Aerospace Recommended Practice ARP5526, revision D, section 3.6.

3.2. Whom this Certification Memorandum affects

This Certification Memorandum affects all organisations that design cabin interiors for which the certification basis includes CS 25.815 at Amendment 21, or the equivalent requirements included in JAR/CS-25 at previous changes/amendments.

4. Remarks

1. Suggestions for amendment(s) to this EASA Certification Memorandum should be referred to the Certification Policy and Safety Information Department, Certification Directorate, EASA. E-mail CM@easa.europa.eu.

2. For any questions concerning the technical content of this EASA Certification Memorandum, please contact:

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