

Draft ISSUE PAPER

PROJECT: Generic

ITEM: CI-1

STAGE: 2

REG. REF.: §§ 11.25, 25.562, 25.785

DATE: Nov. 12, 1997

**NATIONAL
POLICY REF.:**

ISSUE STATUS: OPEN

SUBJECT: Dynamic Test Requirements for Side-Facing
Divans (Sofas)

BRANCH ACTION: ANM-112,
AAM-630, ANM-102N

COMPLIANCE

TARGET: Pre-TC

Petition for Exemption

STATEMENT OF ISSUE: Side Facing seats are considered a novel design for Transport Category Airplanes that include amendment 25-64 in the certification basis, and were not considered when those airworthiness standards were promulgated. The FAA has determined that the existing regulations do not provide adequate or appropriate safety standards for occupants of side-facing multiple occupant seats (divans). Additionally, the best criteria currently available for evaluation of this type of seating do not ensure a level of safety that is equivalent to that afforded to occupants of forward and aft facing seating. Therefore, the only certification method available for this type of seating, for aircraft that include Amendment 25-64 in their certification basis, is through an exemption from the general injury requirement of 25.785(b).

This issue paper will be used to establish the minimum acceptable testing and human injury criteria that will be applied to side-facing divan certifications. This information will complement the exemption process as defined in 14 CFR Part 11.25 and in no way is intended to circumvent the need to provide an acceptable public interest argument as required per §11.25(b)(5).

BACKGROUND: Part 25 of the Federal Aviation Regulations (FAR) was amended June 16, 1988, by Amendment 25-64, to revise the emergency landing conditions that must be considered in the design of the airplane. Amendment 25-64 revised the static load conditions in § 25.561, and added a new § 25.562 that required dynamic testing for all seats approved for occupancy during takeoff and landing. The intent of Amendment 25-64 is to provide an improved level of safety for occupants on transport category airplanes. Because most seating is forward-facing on transport category airplanes, the pass/fail criteria developed in Amendment 25-64 focused

primarily on these seats. Since Amendment 25-64, several airplanes with both forward-facing and aft-facing seats have been certificated using the criteria in Amendment 25-64, and one airplane with single-place side-facing seats has been certificated using equivalent criteria defined in an issue paper.

For multiple occupancy seating, the best criteria currently available cannot be said to provide an equivalent level of safety for those occupants. Therefore, the only vehicle available for accepting these installations will be through an exemption from the general injury requirements of § 25.785(b). The criteria contained in this issue paper may be included in a petition for exemption from the noted requirement if an applicant so chooses. Any petition for exemption must also address why a grant of the petition would be in the public interest, in accordance with § 11.25(b)(5), and it should be emphasized that this public interest requirement must be satisfied regardless of the criteria that the divan is tested to.

FAA POSITION: The following proposed injury criteria and installation/testing guidelines represent the minimum acceptable standard for incorporation in a petition for exemption from the general occupant injury criteria of § 25.785(b).

1. The Proposed Injury Criteria

- (a) Existing Criteria: All injury protection criteria of § 25.562(c)(1) through (c)(6) apply to the occupants of side facing seating. HIC assessments are only required for head contact with the seat and/or adjacent structures.
- (b) Body-to-body contact: Contact between the head, pelvis, or shoulder area of one Anthropomorphic Test Dummy (ATD) on the adjacent seated ATD's is not allowed during the tests conducted in accordance with § 25.562(b)(1) and (b)(2). Incidental contact of the leg, feet, arms and hand that will not result in incapacitation of the occupants is acceptable. Contact during rebound is allowed.
- (c) Body-to-wall/furnishing contact: If the sofa is installed aft of a structure such as an interior wall or furnishing that may contact the pelvis, upper arm, chest or head of an occupant seated next to the structure, a conservative representation of the structure and its stiffness must be included in the tests. The contact surface of this structure must be covered with at least two inches of energy absorbing protective foam, such as ensolite.
- (d) Thoracic Trauma: Testing with a Side Impact Dummy (SID), as defined by 49 CFR Part 572, Subpart F, or its equivalent, must be conducted and Thoracic Trauma Index (TTI) injury criteria acquired with the SID must be less than 85, as defined in 49 CFR Part 572, Subpart F. SID TTI data must be processed as defined in Federal Motor Vehicle Safety Standard (FMVSS) Part 571.214, section S6.13.5.
- (e) Pelvis: Pelvic lateral acceleration must not exceed 130g. Pelvic acceleration data must be processed as defined in FMVSS Part 571.214, section S6.13.5.

- (f) Shoulder Strap Loads: Where upper torso straps (shoulder straps) are used for sofa occupants, tension load in individual straps must not exceed 1,750 pounds. If dual straps are used for restraining the upper torso, the total strap tension loads must not exceed 2,000 pounds.

2. General Guidelines

- (a) All side facing seats require end closures.
- (b) All seat positions need to be occupied for the longitudinal tests.
- (c) For the longitudinal tests, conducted in accordance with the conditions specified in § 25.562(b)(2), a minimum of two tests will be required, as follows:
- (1) One test will be required with one SID ATD in the forward most position and Hybrid II ATD(s) in all other positions, with undeformed floor, no yaw and with all lateral supports (armrests/walls).
 - (2) One test will be required with one SID ATD in the center seat and Hybrid II ATD(s) in all other positions, with deformed floor, 10 degrees yaw, and with all lateral supports (armrests/walls). This could be considered the structural test as well.
- (d) For the vertical test, conducted in accordance with the conditions specified in § 25.562(b)(1), Hybrid II ATD's will be used in all seat positions.

FCAA POSITION:

Open.

APPLICANT'S POSITION:

Open.

CONCLUSION:

Open.

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