

Exemption No. 7512A

**UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98057-3356**

In the matter of the petition of

Raytheon Aircraft Company

for an exemption from §§ 25.785(b),
25.562(c)(3), (c)(5) and (c)(6) of
Title 14, Code of Federal Regulations

**Regulatory Docket No. FAA-2006-26293
(formerly Docket No. 30173)**

GRANT OF EXEMPTION

By letter dated July 7, 2003, Mr. John Tighe, Director, Airworthiness and Certification, Raytheon Aircraft Company, 9709 E. Central, P.O. Box 85, Wichita, Kansas 67201-0085, petitioned for an amendment to Exemption No. 7512, issued on April 23, 2001. That exemption granted Raytheon Aircraft Company relief from the general occupant protection requirements of Title 14 Code of Federal Regulations (14 CFR) 25.785(b), 25.562(c)(3), (c)(5), and (c)(6) for persons occupying multiple-place side-facing seats during takeoff and landing on Raytheon Model 4000 airplanes manufactured prior to January 1, 2004. The petitioner now requests an amendment to Exemption No. 7512 to remove the limitation that restricts its applicability to airplanes manufactured prior to January 1, 2004.

The petitioner requests relief from the following regulation:

Section 25.785(b) requires general occupant protection for occupants of multiple-place side-facing seats that are occupied during takeoff and landing.

Section 25.562(c)(3), (c)(5) and (c)(6) requires the upper torso restraint retention on the shoulder, serious head injury protection and injury to the femur from compressive loading of the femur for occupants of multiple place side-facing seats that are occupied during takeoff and landing.

Section 25.562(c)(5), as amended by Amendment 25-64, requires that each occupant must be protected from serious head injury under the conditions prescribed in

§ 25.562(b). Where head contact with seats or other structure can occur, protection must be provided so that the head impact does not exceed a HIC of 1,000 units. The level of HIC is defined by the equation:

$$HIC = \left\{ (t_2 - t_1) \left[\frac{1}{(t_2 - t_1)} \int_{t_1}^{t_2} a(t) dt \right]^{2.5} \right\}_{\max}$$

Where:

t1 is the initial integration time,

t2 is the final integration time, and

a(t) is the total acceleration vs. time curve for the head strike, and where

(t) is in seconds, and (a) is in units of gravity (g).

The petitioner's supportive information is as follows:

Raytheon Aircraft Company has been granted an exemption (Exemption No. 7512) for Raytheon Model 4000 airplanes manufactured prior to January 2004. Raytheon Aircraft Company requests an amendment to this exemption to remove the limitation restricting applicability to airplanes manufactured prior to January 2004. Raytheon believes that the grant should not contain any time limitation, and that any side-facing seats manufactured for the Horizon Model 4000 aircraft and certified in compliance to the exemption be considered certified for the life of the model line with the same certification basis.

Raytheon Aircraft Company hereby petitions for an amended exemption from the requirements of §§ 25.785(b), 25.562(c)(3), (c)(5), and (c)(6) to enable installation of one or more side-facing sofas in Raytheon 4000 airplanes manufactured prior to January 2004.

Public Interest

The lack of definitive regulatory injury criteria for side-facing seats prohibits the installation of certain floor plans and amenities. It also inhibits the flexibility to offer a seating type that has long been in use in business aircraft. Raytheon does not know of any real or perceived safety problem with those aircraft. Moreover, Raytheon does not believe that any data exist that would lead one to reason that side-facing seats are a cause of more injuries or are more unsafe than their forward- or aft-facing counterparts.

Raytheon Aircraft Company's complete petition for exemption is available on the Department of Transportation's docket website. Go to <http://dms.dot.gov>. The docket number is FAA-2006-26293 (formerly Docket Number 30173). The petitioner's complete supportive information is contained in its petition.

Notice and public procedure

A summary of this petition was not published in the Federal Register for public comment, because Exemption No. 7512 received no comments, and because this amended exemption is only removing the limitation that restricts its applicability to airplanes manufactured prior to January 1, 2004.

The Federal Aviation Administration's analysis/summary is as follows:

Exemption No. 7512 was granted to Raytheon Aircraft Co. with a limitation that restricted its applicability to airplanes manufactured before January 1, 2004. The petitioner has requested that this exemption be amended and the limitation be removed.

Side-facing seats are considered a novel design for transport category airplanes that include Amendment 25-64 in their certification bases, and were not considered when those airworthiness standards were promulgated. Hence, the existing regulations do not provide adequate or appropriate safety standards for occupants of multiple-place side-facing seats. The FAA has been conducting research to develop an acceptable method of compliance with §§ 25.785(b), 25.562(c)(3), (c)(5), and (c)(6) for multiple-place side-facing seat installations. When the research will be completed is undefined.

Additionally, what compliance standards may be developed as a result of the research is indeterminate. Therefore, the FAA does not currently have an acceptable method of compliance and without such, the FAA finds that it is in the public interest to grant an exemption to the petitioner for Raytheon Model 4000 airplanes. This public interest argument does not justify granting exemptions once an acceptable method of compliance with §§ 25.785(b), 25.562(c)(3), (c)(5), and (c)(6) is developed. As a result, the FAA does not intend to grant similar exemptions once an acceptable method of compliance is developed.

In consideration of the foregoing, I find that an amendment to Exemption No. 7512 is in the public interest and will not affect the level of safety provided by the regulations. Therefore, pursuant to the authority contained in 49 U.S.C. 40113 and 44701, delegated to me by the Administrator, Raytheon Aircraft Company is granted an amendment to Exemption No. 7512 to remove the limitation that restricts its applicability to airplanes manufactured prior to January 1, 2004. This amendment is applicable to Raytheon Model 4000 airplanes. All other limitations of Exemption No. 7512 apply to this amendment, and are provided below.

The following limitations apply to this amended exemption:

1. The airplane must not be operated for hire, or offered for common carriage. This provision does not preclude the operator from receiving remuneration to the extent consistent with 14 CFR part 125, 14 CFR part 91, and subpart F, as applicable.
2. Existing Criteria: All injury protection criteria of § 25.562(c)(1) through (c)(6) apply to the occupants of side-facing seating. The HIC assessments are only required for head contact with the seat and/or adjacent structures.

3. **Body-to-Body Contact:** Contact between the head, pelvis, or shoulder area of one Anthropomorphic Test Dummy (ATD) on the adjacent seated ATDs is not allowed during the test conducted in accordance with § 25.562(b)(1) and (b)(2). Incidental contact of the legs, feet, arms and hands that will not result in incapacitation of the occupants is acceptable. Any contact between adjacent ATDs is acceptable during rebound.
4. **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, then a conservative representation of the structure and its stiffness must be included in the tests. In most cases, the representation of the structure would be more rigid and have less deflection under load than the actual installation on the airplanes. The contact surface of this structure must be covered with at least two inches of energy absorbing protective foam, such as ensolite.
5. **Thoracic Trauma:** Thoracic Trauma Index (TTI) injury criteria must be less than 85, as defined in 49 CFR part 572, subpart F. Thoracic trauma index data must be processed as defined in Federal Motor Vehicle Safety Standard (FMVSS) part 571.214, section S6.13.5.
6. **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.
7. **Shoulder Strap Loads:** Where upper torso straps (shoulder straps) are used for sofa occupants, tension loads 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.
8. **Seat Positions:** All seat positions need to be occupied by ATDs for the longitudinal tests.
9. **End Closures:** All side-facing seats require end closures or other means to prevent the occupant from translating off of the seat.
10. **Longitudinal Tests:** For the longitudinal tests conducted in accordance with the conditions specified in § 25.562(b)(2), a minimum number of tests will be required as follows:
 - a. One test will be required with ATDs in all positions, with undeformed floor, 10 degrees yaw, and with all lateral supports (armrests/walls). For configurations with a wall or bulkhead immediately forward of the forward seat position on the sofa, an SID or equivalent ATD will be used in the forward seat position and a Hybrid II ATD(s) or equivalent will be used for all other seat locations. For configurations without a wall or bulkhead immediately forward of the forward seat, Hybrid II ATDs or equivalent will be used in all seat locations.

b. One test will be required with Hybrid II ATDs or equivalent in all positions, with deformed floor, 10 degrees yaw, and with all lateral supports (armrests/walls). This could be considered the structural test as well.

11. Vertical Test: For the vertical test, conducted in accordance with the conditions specified in § 25.562(b)(1), Hybrid II ATDs or equivalent will be used in all seat positions.

Issued in Renton Washington, on April 16, 2007.

/s/

Ali Bahrami

Manager

Transport Airplane Directorate

Aircraft Certification Service