

**Dimensional Compatibility of Child Restraint Systems and
Passenger Seat Systems in Civil Transport Airplanes**

RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature.

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FOREWORD

Child restraint systems, designed primarily for use in automobiles, are also being used in civil airplanes. The performance of the child restraint systems is defined by Federal Motor Vehicle Safety Standards, the standards of the United Nations, or the individual standards of other countries. Their use in civil airplanes and the requirements for adult passenger seats in civil airplanes are governed by regulations of the Federal Aviation Administration. This Aerospace Recommended Practice provides guidance for dimensional compatibility between the child restraint systems and forward-facing transport airplane passenger seat systems, so that the child restraint system will fit in the passenger seat and can be snugly installed using the pelvic restraint provided with the passenger seat.

1. SCOPE:

This document provides guidance to promote dimensional compatibility between forward facing passenger seat systems in civil transport airplanes and child restraint systems developed primarily for use in automobiles.

2 REFERENCES:

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AS8049	Performance Standard for Seats in Civil Rotorcraft and Transport Airplanes
SAE J1819	Securing Child Restraint Systems in Motor Vehicles

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 1564 (Method A) Indention Load Deflection (ILD) Test (using 25% deflection)

2.3 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

Code of Federal Regulations, Title 14, Part 25	Airworthiness Standards: Transport Category Airplanes
Code of Federal Regulations, Title 14, Part 91	General Operating and Flight Rules
Code of Federal Regulations, Title 14, Part 121	Certification and Operations: Domestic, Flag and Supplemental Air Carriers and Commercial Operations of Large Aircraft
Code of Federal Regulations, Title 14, Part 125	Certification and Operations: Airplanes having a Seating Capacity of 20 or more Passengers or a Maximum Payload Capacity of 6,000 Pounds or more
Code of Federal Regulations, Title 14, Part 135	Air Taxi Operators and Commercial Operators
Code of Federal Regulations, Title 49, Part 571.213	Federal Motor Vehicle Safety Standards, Child Restraint Systems

2.4 ECE Publications:

Available from United Nations Economic Commission for Europe, Geneva, SUI

Economic Commission for Europe (ECE), Regulation No. 44 - Uniform Provisions Concerning the Approval of Restraining Devices for Child Occupants of Power Driven Vehicles (Child Restraint Devices)

3. DEFINITIONS (AS USED IN THIS DOCUMENT):

3.1 CHILD RESTRAINT SYSTEM:

A child restraint system is a portable system designed to help protect children from injury or death in automobile and/or aircraft accidents. For the purpose of this document, child restraint systems used in aircraft must be supported only by the passenger seat and be snugly installed in the passenger seat using only the pelvic restraint (with belt extender if required) provided with the passenger seat. Child restraint systems which require special fittings on the passenger seat, which require support from structure or furnishings external to the passenger seat, or which require special belts for attachment to the passenger seat are excluded from this document.

3.2 PASSENGER SEAT SYSTEM:

The passenger seat system consists of the passenger seat and pelvic restraint.

3.3 PASSENGER SEAT:

A passenger seat is a forward facing passenger seat used in a civil transport airplane. It includes cushions, arm rests, trim, and any component of the seat which limits or restricts seat space available to the adult passenger. The seat is considered to be in a position appropriate for airplane take-off or landing.

3.4 PELVIC RESTRAINT:

A pelvic restraint is the seat belt (safety belt) assembly installed in the passenger seat and intended to restrain movement of the lower torso by directing forces to the pelvic girdle of the adult passenger. A belt extender becomes part of the pelvic restraint when it is used to increase the length of the seat belt for larger passengers or for retaining a child restraint system.

3.5 BELT EXTENDER:

A belt extender is a length of seat belt webbing with matching latch plate and buckle with adjustment hardware intended to accommodate the girth of larger passengers.

3.6 TEST FIXTURE:

The passenger seat test fixture is defined by Figure 1 of this document.

3.7 PITCH:

Pitch is the distance between corresponding points on identical seats placed in tandem (see Figure 2).

4. PASSENGER SEATS:

This section describes conditions for the passenger seats necessary to promote dimensional compatibility with child restraint systems.

4.1 Passenger Seat Cushions:

The passenger seat cushion should fully support the base of a child restraint system that is 380 mm (15 in) wide and 410 mm (16 in) deep.

BILL OF MATERIALS

ITEM	NAME	NO. REQ'D.	DIMENSIONS	MATERIAL
A	Back	1	1130x405x19 (44.62x16x0.75)	LAMINATED WOOD OR
B	Bottom	1	455x405x19 (17.87x16x0.75)	MEDIUM DENSITY
C	Side	2	625x425x19 (24.62x16.75x0.75)	FIBERBOARD (MDF)
D	Back Cushion	1	720x400x50 (28.37x15.75x2)	FLEXIBLE FOAM, 35-45 ILD,
E	Bottom Cushion	1	460x400x75 (18.12x15.75x3)	PER REFERENCE 2.2.1
F,G	Attachment Bolt	4	6 $\frac{1}{4}$ (0.25) bolt (see Detail B)	STEEL

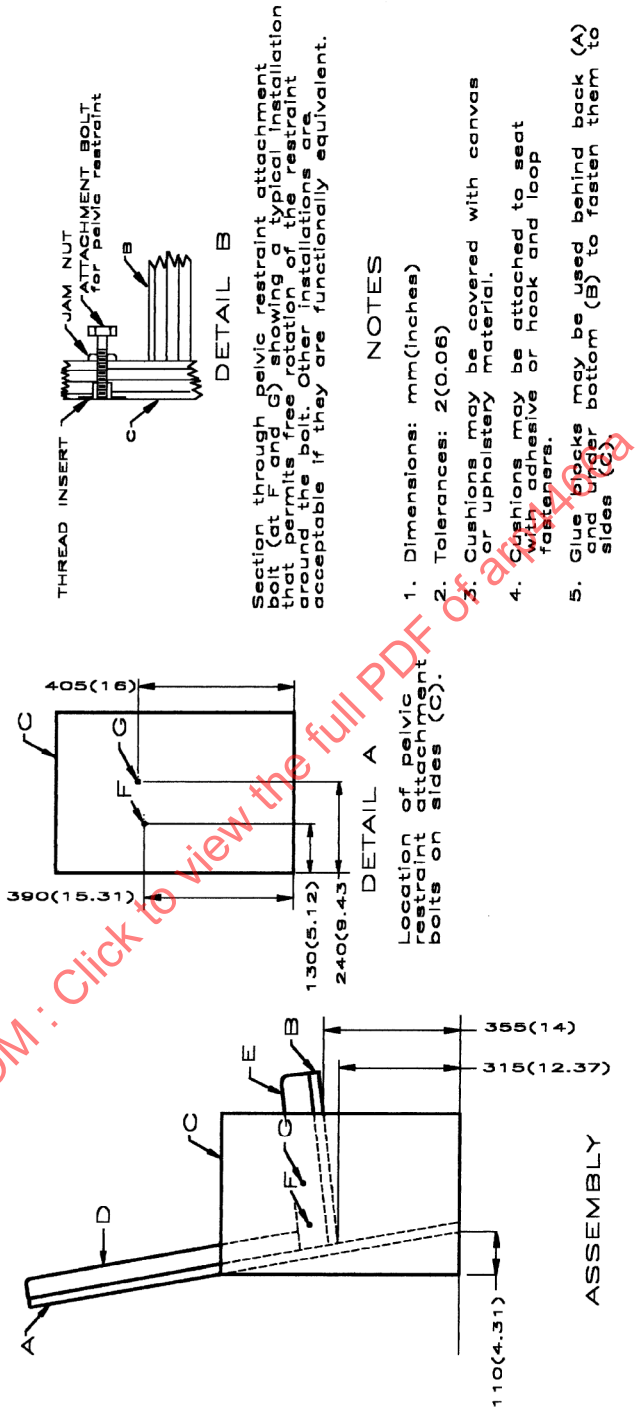


FIGURE 1

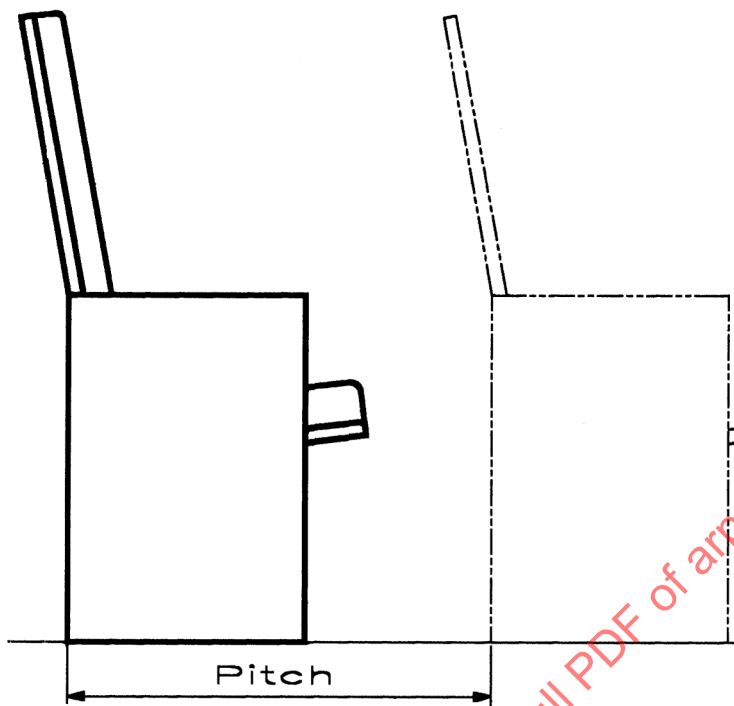


FIGURE 2

4.2 Clearance between Armrests of the Passenger Seat:

The distance between armrests, including recline buttons and any other accessories, should be at least 410 mm (16 in).

NOTE: The 16 inch clearance between armrests is consistent with advisory material issued by the Federal Aviation Administration, and was substantiated by measurements of actual passenger seats.

5. PELVIC RESTRAINT:

This section describes dimensions of the pelvic restraint appropriate for compatibility with child restraint system installation. In general, the pelvic restraint should be long enough to accommodate any child restraint installed in accordance with the manufacturers recommendations. The buckle and adjustment hardware should be located so that use of the child restraint system would not cause the pelvic restraint to become loose or prevent removal of the child restraint system when desired. The buckle and latch plate should be small so that they can pass through the child restraint belt path openings, if applicable. The buckle on the pelvic restraint uses a "lift lever" type of release mechanism.

5.1 Pelvic Restraint Length:

- 5.1.1 The length of webbing used in the pelvic restraint assembly should be such that only attachment hardware is permanently fixed to the webbing within 200 mm (8 in) of the attachment points of the pelvic restraint system to the passenger seat.
- 5.1.2 The length of a fully extended pelvic restraint assembly should be at least 1065 mm (42 in), as measured between the centers of the attachment points. A belt extender may be used to meet this requirement.
- 5.1.3 The length of a fully retracted pelvic restraint assembly should not be greater than 450 mm (18 in), as measured between the centers of the attachment points. A belt extender should not be used when making this measurement.
- 5.1.4 The length of the pelvic restraint adjustable sub-assembly (including the buckle with latch plate inserted), when adjusted to its minimum length, should not exceed 200 mm (8 in) as measured between the center of the attachment point and the far edge of the buckle and latch plate assembly.

5.2 Buckle and Latch Plate Size:

Buckles and latch plates used on the pelvic restraint should be capable of being passed through a rectangular opening measuring 40 mm by 80 mm in 25 mm thick (1.57 inch by 3.15 inch in 1 inch thick) rigid material.