



AEROSPACE STANDARD	AS5276™/1	REV. A
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Performance Standard for Child Restraint Systems in Transport Category Airplanes		

RATIONALE

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

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1. SCOPE:

This SAE Aerospace Standard (AS) defines minimum performance standards and related qualification criteria for add-on child restraint systems (CRS) which provide protection for small children in passenger seats of transport category airplanes. The AS is not intended to provide design criteria that could be met only by an aircraft-specific CRS. The goal of this standard is to achieve child-occupant protection by specifying a dynamic test method and evaluation criteria for the performance of CRS under emergency landing conditions.

1.1 Purpose:

The methods presented in this AS are designed to assure that CRS will provide adequate security and safety for their occupants. This will enable proper restraint of children in the aircraft environment. This AS defines a test procedure, interpretation of the results, and pass/fail criteria.

1.2 Applicability:

This AS addresses the performance criteria for add-on type CRS when used in transport category airplane passenger seats, certificated under 14 CFR Part 25, which have lap belts as the only means of occupant restraint. These criteria do not replace or supersede existing criteria for child restraint devices certified for compliance with Federal Motor Vehicle Safety Standard No. 213 (FMVSS-213), which is published in 49 CFR 571.213. This AS does not redefine or supersede applicable Federal Aviation Administration (FAA) regulations for CRS allowed for use on airplanes.

2. REFERENCES:

2.1 Applicable Documents:

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.

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

RP J211	Instrumentation for Impact Tests
AS8049	Performance Standard for Seats in Civil, Rotorcraft and Transport Aircraft and General Aviation Aircraft
ARP4466	Dimensional Compatibility of Child Restraint Systems and Passenger Seat Systems in Civil Transport Airplanes

2.1.2 Federal Aviation Administration (FAA) Regulations, Advisory Circulars, and Reports: Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325.

14 CFR 21	Certification Procedures for Products and Parts
14 CFR 25	Airworthiness Standards: Transport Category Airplanes
14 CFR 121	Operating Requirements: Domestic, Flag, and Supplemental Operations
AC 91-62B	FAA Advisory Circular: Use of Child Seats in Aircraft
TSO C22	Safety Belts
DOT/FAA/AAM/-94/19	The Performance of Child Restraint Devices in Transport Passenger Seats, Gowdy and DeWeese, FAA Office of Aviation Medicine Report, September, 1994

2.1.3 National Highway Traffic Safety Administration (NHTSA) Regulations: Available from NHTSA, 400 7th Street, SW, Washington, DC 20590.

49 CFR 571.213	Federal Motor Vehicle Safety Standard No. 213 Child Restraint Systems
49 CFR 572	Anthropomorphic Test Dummies

2.1.4 ANSI Publications: Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ANSI Z535.4 -1998 Product Safety Signs and Labels

2.2 Applicable References:

“Infant and Child Restraints: Selecting the Appropriate Type”, American Academy of Pediatrics, 1996

2.3 Classification of Children:

The physical characteristics of small children govern the proper CRS for use. Mass, standing height, and developmental maturity (i.e., age) are important for proper CRS configuration and orientation. As children develop at different rates, combined application of these characteristics in selecting a CRS may be difficult. To assist in this process, Table 1 defines three stages of child development that have been established by the American Academy of Pediatrics, each with a single dominant characteristic underlined. Where an occupant falls between categories, the dominant characteristic is used to determine the proper CRS configuration and orientation.

TABLE 1 - Definitions of Child Categories

Child Category	Mass, kg (lb)	Height, cm (in)	Age, mo
Newborn	<u>Birth to 5 (11)</u>	Birth to 65 (26)	N/A
Infant	5 - 10 (11 - 22)	65 - 85 (26 - 34)	<u>under 12</u>
Toddler	10 - 20 (22 - 44)	<u>85 - 100 (34 - 40)</u>	over 12

2.4 Classification of Child Restraints::

Restraint systems are classified by child category. Some CRS serve more than one child category. Table 2 defines the three classes of CRS for this AS.

TABLE 2 - Definitions of CRS Types

Type	Restraint Class	Restraint Configuration
I	Newborn	Aft facing, reclined
II	Infant	Aft facing, reclined
III	Toddler	Forward facing, upright

2.5 Compatibility of a CRS to Size of Child Occupant:

The CRS and its integral restraints shall be designed to be compatible with accepted classification standards, as indicated in 2.3 and 2.4, for the protection of children under high dynamic loads.

- a. Any child with a mass of less than 5 kg (11 lb) is considered a “newborn” and should be restrained in an aft facing orientation by a CRS providing both upper and lower torso restraint. (Type I)
- b. Any child that has not attained his or her first birthday is considered an “infant” and should be restrained in an aft facing orientation by a CRS providing both upper and lower torso restraint. (Type II)
- c. Any child that has a mass of greater than 5 kg (11 lb) and less than 10 kg (22 lb) is considered an “infant” and should be restrained in an aft facing orientation by a CRS providing both upper and lower torso restraint. (Type II)
- d. Any child that has attained his or her first birthday, with a mass greater than 10 kg (22 lb) and having a standing stature of less than 100 cm (40 in) in height is considered a “toddler” and should be seated in a forward facing CRS with both upper and lower torso restraint. (Type III)

3. GENERAL REQUIREMENTS:

All the paragraphs in this section are intended to ensure proper CRS performance within the aircraft environment. Test methods and pass/fail criteria are provided where appropriate.

3.1 CRS Interface with Airplane Passenger Seat:

The CRS shall comply with the recommendations of ARP4466.

- 3.2 A CRS installed in an airplane passenger seat shall rely only upon passenger seat lap belts (pelvic restraints) to secure the device to the seat. No passenger seat lap belt may contact the child-occupant of the CRS.
 - 3.2.1 The function of quick-release fittings, adjustment handles, and buttons shall be verified after the CRS is installed in the airplane passenger seat. Incorrect installation or inadvertent activation of quick-release fittings, adjustment handles and buttons shall be made improbable.
 - 3.2.2 Release of the child-occupant from the CRS shall be performed at a single point (excluding shoulder strap positioning buckles) and shall be accomplished without release of the airplane passenger seat lap belt.

- 3.2.3 Adjustable features of the CRS, such as swiveling bases, armrests, reclinable seat backs, and items that may be removed and stowed, etc., shall be designed so that they can be returned by the parent/companion to the positions required for takeoff and landing without release of the lap belt securing the CRS to the passenger seat. The actions necessary to return these features to the positions required for takeoff and landing shall be possible by the parent/companion without the release of the parent/companion restraints.
- 3.2.4 A stowable CRS, having means to collapse or fold to a stowable configuration, shall have a visible means by which to verify that, when installed on an airplane passenger seat, the CRS is positively locked in the correct position for occupancy.
- 3.2.5 Where a CRS is equipped with prongs that attach the CRS to a rigid bar anchorage system in automobiles, those prongs shall be retractable, in order to ensure proper positioning of the CRS in the airplane passenger seat and to avoid damage to the airplane seat.

3.3 Fire Protection:

Cushions, upholstery, and all other exposed materials used in the CRS shall meet the fire protection provisions of 14 CFR 25.853(c).

3.4 Dynamic Strength/Occupant Protection:

The CRS shall be designed, and demonstrated by test, to meet the performance criteria and occupant protection criteria defined in Sections 4, 5, and 6 of this AS.

3.5 Turbulence Protection:

The CRS shall be designed to retain the occupant during turbulence; this capability shall be demonstrated by means of the inversion test specified in 49 CFR 571.213 S8.2.

4. PERFORMANCE TEST SPECIFICATIONS:

The dynamic test described in this section is used to evaluate the performance of the CRS in a horizontal impact where the force is applied against the longitudinal axis of a forward facing airplane passenger seat that holds the CRS. The structural adequacy of the CRS, the effectiveness of the CRS attachments, and the adequacy of restraint of the child occupant, as described in 4.1, are the issues evaluated. One dynamic impact test shall be performed for each category of child-occupant for which the CRS is intended for use.