

# European Aviation Safety Agency

## European Technical Standard Order (ETSO)

Subject: CHILD RESTRAINT SYSTEM (CRS)

### 1 - Applicability

This ETSO gives the requirements which Child Restraint System (CRS) that is manufactured on or after the date of this ETSO, must meet in order to be identified with the applicable ETSO marking.

### 2 - Procedures

#### 2.1 - General

Applicable procedures are detailed in CS-ETSO Subpart A.

#### 2.2 - Specific

None.

### 3 - Technical Conditions

#### 3.1 - Basic

##### 3.1.1 - Minimum Performance Standard

Standards set forth in applicable standard is SAE AS5276/1, "Child Restraint Systems in Transport Category Airplanes" dated October 2000, as modified, in attached **APPENDIX 1** "MINIMUM PERFORMANCE STANDARD FOR CRS" and **APPENDIX 2** "TEST CONDITIONS".

##### 3.1.2 - Environmental Standard

See CS-ETSO Subpart A paragraph 2.1

##### 3.1.3 - Computer Software

See CS-ETSO Subpart A paragraph 2.2

#### 3.2 - Specific

None.

### 4 - Marking

#### 4.1 - General

Marking is detailed in CS-ETSO Subpart A paragraph 1.2.

#### **4.2 - Specific**

None.

#### **5 - Availability of Referenced Document**

See CS-ETSO Subpart A paragraph 3.  
49CFR571 and 49CFR572 may be obtained from U.S. Government Printing Office  
(web-site: [www.gpoaccess.gov](http://www.gpoaccess.gov)).

## APPENDIX 1.

### MINIMUM PERFORMANCE STANDARD (MPS) FOR CHILD RESTRAINT SYSTEM (CRS)

This appendix prescribes the MPS for CRS, modified by the Agency in this ETSO. The applicable standard is SAE AS5276/1, "Performances Standard for Child Restraint Systems in Transport Category Airplanes" dated November 2000, and is modified with additions in ***bold italics***, as follows:

1. Page 1, paragraphs 1. (SCOPE), 1.1 (PURPOSE), and 1.2 (APPLICABILITY), page 2, paragraph 2. (REFERENCES), 2.1 and 2.1.1. Disregard these paragraphs as similar text appears in TSO.

2. Page 2, paragraph 2.1.2 reads as follows:

ETSO C22g, Safety Belts

DOT/FAA/AAM/-94/19, The Performance of Child Restraint Devices in:

Transportation Category Seats. Gowdy and DeWeese, FAA Office of Aviation Medicine Report, September 1994

3. Page 4, replace paragraph 3.2 as follows:

***To secure a CRS in an airplane passenger seat, the device shall rely upon the passenger seat lap belt (pelvic restraint) or possibly rigid bar lower anchorages if the airplane seat is so equipped, as prescribed by 49 CFR § 571.225 S9. The latter would require the CRS to be equipped with lower anchorage hardware per 49 CFR § 571.213 S5.9(a), that is, adjustable webbing attachments or retractable/stowable rigid prongs.***

4. Page 5, paragraph 3.2.5 reads as follows:

3.2.5 Where a CRS is equipped with prongs that attach the CRS to a rigid bar anchorage system in automobiles, ***as referenced in 49 CFR § 571.225*** 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.

5. Page 5, paragraph 3.3, Fire Protection, with modification reads as follows:

3.3 Cushions, upholstery, and all other exposed materials ***except small parts (knobs, triggers, fasteners, seals and electrical parts) that would not contribute significantly to the propagation of a fire*** shall meet the fire protection provisions of CS 25.853(a)

[Appendix F, Part I (a)(1)(ii)]. ***Seat belts and shoulder harnesses shall meet [Appendix F, Part I (a)(iv)]***

6. Page 5, replace paragraph 4, Performance Test Specifications, as follows:

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 prescribed in 4.1, are the issues evaluated. ***One dynamic impact test shall be performed, with the CRS secured using the passenger seat lap belt, for each category of child-occupant, as defined in paragraph 2.3 of this AS, for which the CRS is intended for use. In addition, CRS that are equipped with lower anchorage attachment hardware per 49 CFR § 571.213 S5.9(a) may be***

**tested with each category of child-occupant when secured using the rigid bar lower anchorages.**

7. Page 6, paragraph 4.2, Test Fixtures, reads as follows:

4.2 The fixture on which the CRS is installed for the dynamic test is based on the seat fixture defined in 49 CFR § 571.213. s61.1(a)(1), (FMVSS-213) **or a fixture that has been modified to accept the rigid bar lower anchorages per 49 CFR § 571.225 S9.** For the test specified by this AS, the back cushion, seat cushion, lap belts and belt anchor points are different from the standard FMVSS-213 seat configuration. Appendix A of this AS presents the locations, dimensions, and materials used to configure the FMVSS-213 fixture for the test specified by this AS.
8. Page 6, paragraph 4.2.1 reads as follows:

4.2.1 Passenger Seat Restraints: Airplane passenger seat lap belts shall be installed on the test fixture **as the primary means of attaching the CRS to the seat fixture depicted in Appendix A of this AS.** The buckle shall be a lift latch type release mechanism. The belts shall meet the requirements of ETSO-C22g and conform to the length dimensions shown in Appendix A, Figure A5 of this AS. The webbing shall be made of nylon or any suitable material that has been shown to be equivalent.
9. Page 6, new paragraph 4.2.2 reads as follows:

**4.2.2 Rigid Bar Lower Anchorages: Alternatively, CRS equipped with lower anchorage attachment hardware may be tested using the aforementioned modified test procedure.**
10. Page 7, the last sentence of paragraph 4.5, Photometric Instrumentation, reads as follows:

The resolution of the images shall be sufficient to enable accurate measurements of the maximum excursion of the head and knee of the ATD in Type **III** CRS tests, or the maximum rotation of the CRS in Type I and aft facing Type II CRS tests.
11. Page 7, new paragraph heading 5.1.1 reads as follows:

**5.1.1 Passenger Seat Restraint:** The CRS shall be installed in the test fixture and secured using the passenger seat lap belt in the manner specified by the manufacturer's instructions provided with the CRS. The maximum force applied to the free end of the lap belt webbing being pulled through the belt buckle tension retention mechanism shall not exceed 67 N (15lb) and the maximum force shall be applied for a period no longer than 3s. No other force may be applied to the CRS during the adjustment of the passenger seat lap belt. The CRS shall not be repositioned after the passenger seat lap belt has been tightened.
12. Page 7, new paragraph 5.1.2 reads as follows:

**5.1.2 Rigid Bar Lower Anchorages: The CRS may be installed in the modified test fixture and secured to the rigid bar lower anchorages as follows:**
13. Page 7, new paragraph 5.1.2.1 reads as follows:

**5.1.2.1 Flexible Lower Anchorage CRS Attachment: CRS equipped with adjustable webbing and latch plates may be secured to the rigid bar lower anchorages on the passenger seat. The maximum force applied to the free ends of the CRS's lower anchorage attachment webbing when**

*pulled through the tension retention mechanism shall be the same as paragraph 5.1 of this AS. These types of CRS may also be secured to the passenger seat by attaching them to the passenger seat lap belt anchorage in the manner specified by the manufacturer's instructions provided with the CRS.*

14. Page 7, new paragraph 5.1.2.2 reads as follows:

**5.1.2.2 Rigid Lower CRS Attachment: CRS equipped with rigid prongs may be secured to the rigid bar lower anchorages in the manner specified by the manufacturer's instructions provided with the CRS.**

15. Page 9, new second paragraph 6.1.2 reads as follows:

All portions of the Anthropomorphic Test Dummy (ATD) torso shall be retained within the CRS. The **centre point of the** target points on either side of the ATD head shall pass through the transverse orthogonal planes whose intersection contains the forward-most and top-most points on the CRS surfaces.

16. Page 10, new paragraph 6.5.1 reads as follows:

6.5.1 Post Test Release of Integral Restraints on the CRS: The force to release the buckle on the CRS integral restraints (**see 5.4**) shall not exceed **7,3 kg (16 pounds)**.

17. Page 10, disregard paragraphs 7.1a through e. Marking of the article shall be in accordance with paragraphs 7.1f through **7.1h**, and the paragraph 4 of this ETSO.

18. Page 11, disregard paragraphs 7.1h through m. New paragraph 7.1h reads as follows:

h. The following statement on yellow background with black text, regarding the installation and use of CRS:

"WARNING! DEATH OR SERIOUS INJURY CAN OCCUR. Follow all instructions on this child restraint and in the manufacturer's written instructions located \_\_\_\_\_."

- Do not place this device behind any wall or seat back in an airplane that has an airbag.
- Do not use in any passenger seat that has an inflatable seat belt.
- Use only in a forward facing seat. Do not use in a rear facing seat or a side facing seat.
- Attach this child restraint with the airplane passenger seat lap belt or rigid bar anchorage system if so equipped. This child restraint is not designed to be used with a shoulder strap or any other tether strap to the seat or airplane.
- Snugly adjust the belts provided with this child restraint around your child.

19. Page 12, paragraph 7.1i. Disregard this paragraph, as it has been included in the new paragraph 7.1h.

20. Page 16, Figure A6. Disregard this Figure, as it no longer applies. The substance of this warning is now in paragraph 7.1h.

## **APPENDIX 2.**

### **TEST CONDITIONS**

SAE AS 5276/1 incorporates, as references, the following test standards:

- SAE RP J211, Instrumentation for Impact Tests;
- SAE AS8049A, Performance Standard for Seats in Civil Rotorcraft, Transport Aircraft and General Aviation Aircraft;
- SAE ARP4466, Dimensional Compatibility of Child Restraint Systems and Passenger Seat Systems in Civil Transport Airplanes;
- 49 CFR Part 572, Anthropomorphic Test Dummies;
- CS 25.853(a) [Appendix F, Part I(a)(iv)].