

FMVSS 213 Outline*

Safe Ride News Publications

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*Content and page numbers are from the 10-1-14 edition. Full text can be found at: <https://www.gpo.gov/fdsys/pkg/CFR-2014-title49-vol6/pdf/CFR-2014-title49-vol6-sec571-213.pdf>

834	S1	SCOPE—	CRS in motor vehicles and aircraft
834	S2	PURPOSE—	Reduce children killed or injured in crashes.
834	S3	APPLICATION—	Applies to passenger cars, multi-purpose passenger vehicles, trucks and buses, and to CRS for use in motor vehicles and aircraft
834	S4	DEFINITIONS—	Defines: Add-On CRS, Backless CRS, Belt-Positioning Seat, Booster Seat, Built-In CRS, Car Bed, CR Anchorage System (<i>Editor's note: The term LATCH is not used in FMVSS 213</i>), CRS, Contactable Surface, Factory-Installed Built-In CR, Harness, RF CRS, Representative Aircraft Passenger Seat, Seat Orientation Reference Line (SORL), Specific Vehicle Shell, Tether Anchorage, Tether Hook, Torso <i>Editor's Note: The term CRS, which is used throughout this document, stands for child restraint system. CRS is defined in this section of the standard as any device, other than a seat belt, that is used in a car or aircraft for children 36 kg (80 lbs.) or less.</i>
835	S5	REQUIREMENTS	(a-c) Says this section applies to built-in, add-on, and CRs for use in aircraft in each of the manufacturer's allowed positions. (d) EXCEPTION: when using Part 572 Subpart S dummy (Hybrid III 6-year old weighted), don't have to meet S5.1.2 or S5.1.3. (e) EXCEPTION: when using Part 572 Subpart T dummy (Hybrid III 10-year old), don't have to meet S5.1.2.1 (a) (HIC). (f) EXCEPTION: CRS with an internal harness need not meet the requirements of this standard when installed using the LA attachment if the weight of the child represented by the ATD plus the CRS weight exceeds 65 pounds. In these cases, required tests include only those in which a lap belt is used for lower anchorage.
836		5.1 Dynamic Performance	
		5.1.1 Child Restraint System Integrity	
		(a)	No complete separation of load-bearing element; no partial separation exposing openings/protrusions
		(b)	Must stay in same adjustment position if adjustable

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- (c) No opening greater than 1/4" will close up during a crash
- (d) For FF CRs, back and seating surface can be no less than 45 degrees after test
- 5.1.2 Injury Criteria** - CRs for use with children > 22 lbs made before 8/1/05
 - (a) HIC less than 1,000
 - (b) Chest Gs < 60
- 5.1.2.1 CRs for use with children > 22 lbs made on or after 8/1/05
 - (a) HIC less than 1,000 (time interval not greater than 36 milliseconds — HIC36)
 - (b) Chest Gs < 60
- 5.1.2.2 Option for dummy selection for pre-8-1-05 may be same as post-8-1-05, irrevocably

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- 5.1.3 Occupant Excursion**
 - 5.1.3.1 CRS other than RF and Car Beds -- Dummy's torso must be retained within the system
 - (a) Add-on CRS
 - (1) Head excursion limit described (813mm for harnesses, BPBs, CRS for special needs, and add-on CRS untethered; 720 mm for add-on CRS tethered)
 - (2) Knee excursion limit described (915 mm for all types of CRS and installation methods)
 - TABLE 5.1.3.1(a) -- lists these head and knee excursion limits by Add-on CRS type
 - (b) Built-In CRS -- Knee excursion: only 305 mm allowed. (No head excursion requirement for built-in CRS.)
 - 5.1.3.2 RF CRS — Torso must be contained by CR and target points on dummy head not above top of CR in test
 - 5.1.3.3 Car Bed — all parts of head and torso must stay retained within confines of car bed in test.
- 5.1.4 Back Support Angle:** RF-Angle between CR's back support for child and the vertical shall not exceed 70 degrees.

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- 5.2 Force Distribution**
 - 5.2.1 Minimum head support surface for all CRS other than car beds**
 - 5.2.1.1 EXCEPT as in 5.2.1.2, rearward movement will be prevented by means of a continuous back that is:
 - (a) Height — 500 mm for CR <40 lbs; 560 mm for CR > 40 lbs.
 - (b) Width — 8 inches wide, or 6 inches if there are 4 inch deep side wings
 - (c) Head angle — when tested, rearward rotation must not exceed 45 degrees greater than start point.
 - 5.2.1.2 Needn't follow 5.2.1.1 if using H2 or H3 6yo dummy or H3 10yo, or if in FF CRS dummy target points are below top of:
 - (a) Standard seat assembly for an Add-On CRS
 - (b) Vehicle seat for Built-In CRS
 - 5.2.2 Torso Impact Protection** (applies to all CRS other than car beds)
 - 5.2.2.1 (a) Back support must be flat or concave and have continuous surface area of at least 85 sq. inches
 - (b) Side support must be flat or concave and ≥ 48 sq. in. surface when CR for <20 lbs; 24 sq. in. for >20lbs
 - (c) Underlying surfaces must be flat or concave with curvature not < 2"
 - 5.2.2.2 FF CR shall have no fixed or moveable surface in front of dummy, except that restrain dummy (a1&2, b)
 - ~~5.2.3 Head Impact Protection~~ [Feb 2011, this section struck due to being obsolete. This section now reserved for insertion of future rules, if needed.]
 - ~~5.2.3.1 Applies to: All CRSs (except harness) for child under 10 kg, made before 8/1/05 and NOT tested with Sub-part R ATD (12 mo. old) (Editor's Note: After 8/1/05 this did not apply because instrumented 12 mo ATD then required.)~~
 - ~~5.2.3.2 Specifies padding compression/deflection, resistance and thickness for surfaces contactable by head in testing (a-b) (Editor's Note: A reason this no longer applies is that newer, superior EPP/EPS foams wouldn't meet this.)~~
 - 5.2.4 Protrusion Limitation** — applies to CRs in 5.2.3, limits how much sticks up or out when padding removed.
- 5.3 Installation**
 - 5.3.1 Add-on CRs shall meet a or b below, as appropriate:**
 - (a) No cam-wrap type attachment system may be used in passenger vehicles (Editor's note: "Cam-wrap" described,

not named, in standard)

(b) SCHOOL BUS: Cam-wraps okay on buses ONLY if labeled as in Fig 12 and if follows 1-3 label/pictogram given.

5.3.2 Installation for each add-on type must be accomplished solely as described in table

TABLE 5.3.2 lists installation method by CRS type

5.3.3 Car bed installation orientation relative to vehicle (perpendicular to vehicle's longitudinal plane)

5.4 Belts, Buckles, and Belt Webbing

5.4.1 Performance Requirements

5.4.1.1 Webbing for attachment or restraining child on CRSs made before 9/1/07:

- (a) Abraded breaking strength 75% of non-abraded breaking strength
- (b) Meet S4.2 (e-f) of FMVSS 209
- (c) If in contact with child, webbing width must be 1.5" or more

5.4.1.2 Webbing for attachment or restraining child on CRSs made on or after 9/1/07:

- (a) Strength req. when new (attachment webbing (15K Newtons) vs. restraining harness webbing (11K))
- (b) Abraded strength (1) 75% of non-abraded strength, (2) mass used for FMVSS 209 testing 2.35 kg
- (c) Breaking point after (1) light exposure (60% of new) and (2) exp. to microorganism (85% of new)
- (d) If contact with child, webbing width must be 1.5 inches or more

5.4.1.3 Width Test Procedure — Temperature and humidity range conditions when webbing measured

5.4.2 Belt Buckles and Belt Adjustment Hardware — These, on all CRS, shall comply to S4.3a-b of FMVSS 209

5.4.3 Belt Restraint

5.4.3.1 General — Harness shall be adjustable to snugly fit all children in the OK weight range for the CRS

5.4.3.2 Direct Restraint — Except for BPBs, belts and seat belts should impose no load on child that result from the mass of the system or (a) add-on seat back or (b) vehicle that built-in is part of

5.4.3.3 Seating Systems — Other than plain harnesses, those with a harness must provide:

- (a) Upper torso restraint from (i) belts over each shoulder or (ii) fixed or moveable surface (shield)
- (b) Lower torso restraint from (i) lap belt assembly w/ specified angle or (ii) fixed/moveable surf. (shield)
- (c) Crotch restraint via (i) crotch belt or (ii) fixed or moveable surface.
Applies only when CRS is for child 22 lbs or more.

5.4.3.4 Harnesses —(Editor's note: This section refers to harness-only CRSs.) Harnesses must provide:

- (a) Upper torso restraint from belts over each shoulder
- (b) Lower torso restraint from a lap and crotch belt
- (c) Prevent a child of any height allowed from being able to stand up on the vehicle seat

5.4.3.5 Buckle Release

- (a) Pre-test release force equal to or greater than 40 Newtons but not more than 62 Newtons
- (b) Post-test release force must be less than 71 Newtons
- (c) Must meet requirements found in FMVSS 209, except that button must be .65 sq. in. or larger
- (d) Must meet FMVSS 209 test requirements
- (e) The buckle must not release during the test

5.5 Labeling

Any additional labels included other than those required here may not obscure or confuse the meaning of the following required labels. Translations to other languages must be accurate.

5.5.1 Add-on CRs shall be permanently labeled as in 5.5.2 a-m

5.5.2 Labels that follow shall be in English, at least 10 pt. font, black on white (exceptions noted). Use all CAPS or sentence capitalization.

- (a) Model name or number
- (b) Manufacturer's name or name of distributor.

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- (c) Statement "Manufactured in _____" inserting month and year of manufacture.
- (d) Place of manufacture (city and state, foreign country), or distributor's city and state
- (e) "This child restraint system conforms to all applicable Federal motor vehicle safety standards."
- (f) Range of Use Statement (1-4 wording options give variation for how height is expressed); may optionally use the term "mass" instead of weight. Note: If only BPB, permission is given to include only min and max height and not include weight limit.
- (g) (1) Warning heading and comments with order of required warning labels (as below)
 - (i) Order of warnings is specified (as below)
 - (ii) How to secure the CR (belts or lower anchorage, if available in car) [For child restraints manufactured from February 27, 2014 to February 26, 2015: CRS with internal harnesses and LATCH systems for which the combined weight of the child restraint system and the maximum recommended child weight for use with internal harnesses exceeds 65 pounds, must be labeled with the following statement: "Do not use the lower anchors of the child restraint anchorage system (LATCH system) to attach this child restraint when re- straining a child weighing more than * [*insert a recommended weight value in English and metric units such that the sum of the recommended weight value and the weight of the child restraint system does not exceed 65 pounds (29.5 kg)] with the internal harnesses of the child restraint."]
 - (iii) Follow all instructions, and tell where manual stored on CRS
 - (iv) Register your child restraint with manufacturer
- (2) Warning heading can be on white or yellow background
- (3) Location and placement of statements on label or labels
- (h) CRs with harnesses that don't adjust automatically must say "Snugly adjust the belts provided with this child restraint around your child."
- (i) (1) Booster options for wording when used only with either lap-only or lap-shoulder belt
 - (i) "Use only the vehicle's lap and shoulder belt system when restraining the child in this booster seat" or
 - (ii) "Use only the vehicle's lap belt system, or the lap belt part of a lap/ shoulder belt system with the shoulder belt placed behind the child, when restraining the child with this seat."
- (2) (i) If either lap or lap-shoulder belt can be used with booster that has an optional upper torso restraint feature (*Editor Note: such as a shield*) wording specified to tell user to move shoulder belt behind child when restraint in use, and put in front of child when not.
- (ii) Shield BPBs that are installed so that the shoulder belt is not available for restraint (*Editor Note: such as now-discontinued Gerry Double Guard*) are exempt from previous section, but must warn to use the booster with vehicle lap-shoulder belt when shield is not in use.
- (j) If there is a top anchorage strap, state "Secure the top anchorage strap provided with this child restraint."
- (k) (1) RF only CRs say "Use only in a rear-facing position when using it in the vehicle."
- (2) Convertible CRs — (*Editor's Note: Minimum Turnaround Weight Label*)— "Use only in a rear-facing position when using it with an infant weighing less than (insert a recommended weight that is not less than 20 pounds.)"
- (3) Air bag warning statement specifications/location (i-heading, ii-colors, iii-pictogram)
- (4) May include "unless air bag is off" after "on front seat with air bags" on CRs that have deactivation feature
- (l) Installation diagram showing CR installed with
 - (1) Lap-shoulder belt
 - (2) lap-only belt

(3) LATCH. For CRS made on or after Feb. 27, 2015, (1)(3)(i) and (ii) apply:

(i) If the CRS is designed to meet the std. when installed with LATCH (per S5.3.2), and if the sum of the weight of the CRs and the max. harness use weight is greater than 65 lbs. (FF or RF), include the following with the LATCH installation diagram: Do not install by this method for a child weighing more than *. Manufacturer has three options for calculating *, and can include metric units if it wishes.

(A) For FF or RF CRs, * is less than or equal to 65 minus the CRS weight in pounds, OR

(B) For FF CRS, * can be rounded up to the next number ending in 0 or 5. See Table S5.5.2(L)(3)(I) (B)

(C) For RF CRS, * must be rounded down (or round up after starting with 60 rather than 65 pounds). See Table S5.5.2(L)(3)(I) (C)

(ii) If the CRS is designed to be used either RF or FF, the following applies

(A) If it has separate RF and FF LATCH diagrams, then the limit must appear on both diagrams.

(B) If it has only one diagram, and only one limit, then show the limit there.

(C) If it has only one diagram, but both RF and FF use is limited, then the limit stated must be either 65 pounds minus the CR weight or the lower of the rounded RF or FF weight limits.

(m) Statement that a recall could happen, so the consumer must register CR. Label must include manufacturer address and (i) US phone number or (ii) Website. Also Auto Safety Hotline phone and Web site.

(n) CRs, other than harnesses and boosters, may certify for use in aircraft. If they do, they must state "This restraint is Certified for Use in Motor Vehicles and Aircraft." Harnesses and BPBs must state "This restraint is NOT certified for Use in Aircraft." Either statement must be RED and appear after (e)

5.5.3 Labels f-l above must be visible when CRS is installed. If a base, (l, installation diagram) must be visible when only base installed.

5.5.4 (a) **Non-factory installed built-in** CRS must meet a-l of following labels; a-j and l must be visible when activated.

(b) **Factory-installed built-in** CRS must have f-j and l of following labels and be visible when activated. Info must also be found in the vehicle owner's manual.

5.5.5 (a) Model name or number

(b) Manufacturer's name

(c) Statement "Manufactured in _____" inserting month and year of manufacture.

(d) Place of manufacture (city and state, foreign country), or distributors city and state

(e) "This child restraint system conforms to all applicable Federal motor vehicle safety standards."

(f) Range of Use Statement (1-4 wording options for different types of CRS); *If only BPB, may include only min and max height and not include weight limit.*

(g) (1) Warning heading and comments with order of required warning labels (as below)

(i) Order of warnings (as below)

(ii) How to secure the CR (belts or LATCH, if available in car)

(iii) Follow all instructions, and where manual found

(iv) Register your child restraint with manufacturer

(2) Warning heading can be on white or yellow background

- (3) Location and placement of statements on label or labels
- (h) CRs with harnesses that don't adjust automatically must say "Snugly adjust the belts provided with this child restraint around your child."
- (i) RF only CRs say "Use only in a rear-facing position when using it in the vehicle."
- (j) Diagram of fully-activated system
- (k) Statement that a recall could happen, so the consumer must register CR. Label must include manufacturer address and (i) US phone number or (ii) Website. Also Auto Safety Hotline phone and Web site.
- (l) If booster, recommendation for the weight and height of occupants for system and how to use.

5.6 Printed Instructions for Proper Use

Any labels or written instructions included other than those required here may not obscure or confuse the meaning of the following required information. Translations to other languages must be accurate. Must use all CAPs or sentence capitalization.

5.6.1 Add-on CRS — Each must have English, step-by-step instructions with diagrams that cover installing system in vehicles, securing system in vehicles (*Editor's Note: NHTSA says "installing" is orientation and "securing" is tightening into vehicle*), positioning a child in the system, and adjusting the system to fit the child. Also, if there is a tether or child anchorage system (LATCH), must give step-by-step procedure, w/ diagrams, for proper use.

- 5.6.1.1 Must say that it is safer in the back seat according to accident statistics
- 5.6.1.2 Specify generally types of vehicles, seating positions, and seat belts that can and can't be used.
- 5.6.1.3 Must explain primary consequences of not following warning labels g-k in 5.5.2 above.
- 5.6.1.4 Car beds must say that child's head must be positioned toward center of vehicle
- 5.6.1.5 Must say that must be secured to vehicle, even when not in use, since unsecured CRS may injure others.
- 5.6.1.6 Each CRS must have a place on it to store the manufacturer's instructions
- 5.6.1.7 Recall statement with manuf. name and address, using wording (i) w/no website or (ii) w/ website
- 5.6.1.8 RF CRS must provide air bag warning and potential consequences. If FRONT passenger side air bags, must say to check vehicle owner's manual.
- 5.6.1.9 RF CRS that can pop into more upright position in testing must have warning against impeding function
- 5.6.1.10 (a) Booster options for wording when used only with either lap-only or lap-shoulder belt
 - (1) "Warning! Use only the vehicle's lap and shoulder belt system when restraining the child in this booster seat" or
 - (2) "Warning! Use only the vehicle's lap belt system, or the lap belt part of a lap/ shoulder belt system with the shoulder belt placed behind the child, when restraining the child with this seat."
- (b) (1) If either lap or lap-shoulder belt can be used with booster that has an optional upper torso restraint feature, wording specified to tell user to move shoulder belt behind child when restraint in use, and put in front of child when shield not in use. (*Editor's note: This describes a shield booster situation.*)
- (2) Shield BPBs that are installed so that the shoulder belt is not available for restraint are exempt from previous section, but must warn to use the booster with vehicle lap- shoulder belt when shield is not in use. (*Editor's note: like now-discontinued Gerry Double Guard.*)
- (c) BPBs shall include statement "This restraint is not certified for aircraft use."

- 5.6.1.11 SCHOOL BUS: Harnesses made just for school buses must include warning that it is for school bus only and that seat directly behind must be unoccupied or have restrained occupants.
- 5.6.1.12 (a) CRS with an internal harness and LATCH made Feb 27, 2014, to Feb 26, 2015, must state in the instructions "Do not use the lower anchors of the child restraint anchorage system (LATCH system) to attach this child restraint when restraining a child weighing more than *". Such that * is a number in pounds that does not exceed 65 pounds when added to the weight of the CRS.
- (b) CRS with an internal harness and LATCH made on or after February 27, 2015, must include instructions

presented in the same way that is described for appearance/calculation on labeling. See S5.5.2(1)(3).

5.6.2 Built-In CRS —

- (a) Each must have English, step-by-step instructions with diagrams that cover activating the CRS, positioning a child in the system, and adjusting the system to fit the child. In the case of a built-in car bed (!), must mention that head must be positioned toward the center of the vehicle.
- (b) These instructions must be in the vehicle owner's manual IF the system is factory installed.
- 5.6.2.1 Must explain primary consequences of not following warning labels f-i in 5.5.5 above.
- 5.6.2.2 If the built-in seat is not factory installed, there must be a label that mentions the potential for recalls and that tells the name, address, phone number and (optionally) website for the manufacturer.
- 5.6.2.3 If the built-in seat is not factory installed, there must be a place on the CRS to store instructions
- 5.6.2.4 Each built-in system, unless factory installed or installed in a specific vehicle (?), shall have info about what vehicles and seating positions are okay, and also that car beds must position the head to the center.
- 5.6.2.5 For built-in BPBs, instructions must include *min and max height and weight* info and consequences of not following directions. If intended for use only with lap part of l-s belt, specify to put shoulder belt behind child.

5.6.3 Add-on AND Built-in CRS with a non-self-adjusting harness must say: "A snug strap should not allow any slack. It lies in a relatively straight line without sagging. It does not press on the child's flesh or push the child's body into an unnatural position.

5.7 Flammability — all materials in a CRS must comply to S4 of FMVSS 302, including in the "in use" and "stowed" positions.

5.8 Required Info — attached registration form and electronic registration form

5.8.1 Attached registration form

- (a) Each CRS, except factory installed built-in, must have a registration form attached to a part that touches the ATD.
- (b) Each of these forms shall:
 - (1) Be a postcard attached by perforation to an info card.
 - (2) Follow the size, content and format in 9a and 9b of this section
 - (3) Be .0007 to .0095 inches thick
- (c) Each postcard shall have the model name or number and date of manufacture (month/year), have space for info, and be postage paid. No info other than the pertinent info described may appear.
- (d) Each card may have a web address, provided it goes directly to the registration page.

5.8.2 Electronic registration form

- (a) Each online form shall:
 - (1) Shall contain following info at top of the form
 - (i) "FOR YOUR CHILD'S CONTINUED SAFETY" in bold, caps, and at least 12 point
 - (ii) Language in 12+ pt bold caps/lower case that recalls can happen, despite testing, etc.
 - (iii) Language in 12+ pt bold caps/lower case that maker must have contact info to be able to alert owners.
 - (iv) Language in 12+ pt bold caps/lower case that model # and date must be given, found on registration card or on WHITE label located on the BACK of the CRS.
(Editor's note: This is the only reference in the standard of where label should be located and a NHTSA contact confirms that the label doesn't necessarily have to be on the back.)
 - (v) Language in 12 pt bold caps and lower case that CRS must be made in the USA
 - (2) Must have spaces to provide needed consumer info
- (b) No other non-pertinent info may appear. May contain link to manufacturer homepage. Accessing page may not

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cause additional screens or banners to appear.

(c) Direct Web address must be the one on the postcard and require no further clicks or keystrokes to access.

5.9 Attachment to CRS Anchorage System (*Editor's clarification: LATCH*)

- (a) All add-ons, other than car bed, harness or BPB, made on or after 9-1-02 shall have permanently attached components to secure the CRS to the lower anchorages specified in FMVSS 225. Drawings specified. Must be attached to CRS using a tool, like a screwdriver. Infant seats need only have it on base.
- (b) CRS made on or after 9-1-99 that have a tether must have a hook that conforms to the configuration and geometry in Fig. 11 of this standard.
- (c) CRS made on or after 9-1-99 that have a tether must have webbing that is adjustable so as to be made tight
- (d) Beginning 9-1-99, CRSs that enable the restraint to be securely fastened to the lower anchorages of a CR anchorage system, other than a system with hooks for attaching to the LAs, shall provide either an indication of when each attachment to the LAs become fully latched or attached, or a visual indication that all attachment to the LAs are fully latched or attached. Visual attachment must be detectable during normal daylight conditions.

S6 Test Conditions and Procedures

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6.1 Dynamic systems test for CRS — 6.1.1 describes conditions for tests; 6.1.2 describes the procedure; S7 describes the dummy that must be placed in the test specimen (CR); S9 describes dummy clothing; S10 dummy positioning.

6.1.1 Test conditions

(a) Test devices

(1) Add-on CRs

- (i) Test device for CRS made BEFORE 8-1-05 is a simulated bench seat with 3 seating positions, described in Drawing Package SAS-10-1000 with Addendum A (10-23-98). Mounting is specified as parallel to test platform and so that movement is prevented between device and platform.
- (ii) Test device for CRS made ON OR AFTER 8-1-05 is a simulated bench seat with 3 seating positions, described in NHTSA Standard Seat Assembly NHTSA-213-2003 (6-3-2003) Mounting is specified as parallel to test platform and so that movement is prevented between device and platform.

(2) Built-in CRSs — The test device is either the specific vehicle or vehicle shell.

(i) Specific vehicle shell

(A) Describes how the shell must be mounted to the test platform, that vehicle seat must be adjusted to midway point (fore and aft) and in the lowest vertical position, and reclined so neck vertical, with HR at highest position.

(B) Specifies presence of accelerometer and data processing system, per SAE

(ii) Specific vehicle

(A) Specifies vehicle conditions, including adding luggage capacity weight, placement of adult 50th percentile male dummy driver, and fuel tank fill (to 90-95% full.)

(B) Specifies vehicle seat fore-aft position (midway) and at lowest vertical position

(C) Specifies vehicle recline so neck vertical and that head restraint is in highest position.

(D) Windows and vents may be in closed position

(E) Convertibles and open-bodied cars are in closed position.

(F) Doors are fully closed but NOT locked

(G) Instrumentation and data reduction must conform to SAE J211 June 80

(b) Tests are frontal barrier impact simulations (test platform) or frontal barrier crashes (specific vehicles) as specified in S5.1 of FMVSS 208 and for:

(1) Test Configuration I -- velocity change of 48 km/h (30 mph) with acceleration of platform entirely within curve in Fig 2 (made B4 8-1-05) or Fig 2A (made on or after 8-1-05).

(2) Test Configuration II -- velocity change 32 km/hr (20mph) with acceleration of platform within Fig. 3

- (c) Types of seat belts on test device includes Type 1 belt for non-BPBs and Type 2 for BPBs. Must be attached without any retractors. These and required CR anchorage system (*Editor's clarification: LAs*) are illustrated in Fig 1A and 1B. Webbing must not exceed 2 inches in width.
- (d)
 - (1) When using dummies in subparts I, or K, temperature from 19-26 degrees Celsius. (66-79 deg F)
 - (2) When using dummies in subparts N, P, R, or T, temp 20.6-22.2 C (69-72 F), and 10-70% humidity
- (e) Must pass all the requirements of S5 in all CR recline positions, belt paths, and orientations allowed in owner's manual.

6.1.2 Dynamic Test Procedure

- (a) Attach or activate CRS as described below
 - (1) Test Configuration I
 - (i) CRs other than BPBs, attach in any of A-D below
 - (A) Use center seat, lap belt, tether optionally attached if provided. Harness-type CR information.
 - (B) Same as A, except no tether (exceptions harness-only prod., special needs)
 - (C) Use the CR anchorage system with tether (if provided)
 - (D) Same as C, but with no tether attached.
 - (ii) Belt-positioning booster seats: attach to either outboard position with l-s belt, no tether or any other supplemental device; must apply 30 pounds of force onto the BPB toward the vehicle seat and release.
 - (iii) If built-in, activate the CRS according to manufacturer's instructions
 - (2) Test Configuration II
 - (i) Add-ons that are backless CRs with a tether or with a fixed or movable surface (in 5.2.2.2), install in the center with lap belt only.
 - (ii) Built-ins that are boosters with a top attachment strap or with a fixed or movable surface (in 5.2.2.2), activate the seat according to manufacturer's instructions.
- (b) Select a dummy as specified for this seat in S7 in accordance with S5.5
- (c) Place dummy in the CRS. Position it and use harness as specified in S10
- (d) Belt Adjustment
 - (1) Add-ons other than BPBs
 - (i) Specifications for snugness of harness in Newtons (9N at shoulder, etc.)
 - (ii) Specifications for tension on installation belts and straps (53.5 to 67 N)
 - (iii) Specifications for tension when using LATCH (53.5 to 67N)
 - (2) Add-on BPBs
 - (i) Specifications for tension on lap belt across dummy (9-18 N; 2-4 pounds)
 - (ii) Specifications for tension on shoulder belt across dummy (9-18 N; 2-4 pounds)
 - (3) - Built in CRS
 - (i) Specifications for tension on lap belt across dummy (53.5 to 67 N)
 - (ii) Specifications for tension on shoulder belt across dummy (9-18 N)
 - (iii) Harness adjustment snugness specified
- (e) Accelerate platform to simulate frontal impact in accordance with Configuration I or II
- (f) Determine conformance with S5.1

6.2 Buckle release test procedures

- 6.2.1 Detailed description of test procedure BEFORE conducting testing of 6.1
- 6.2.2 AFTER testing in 6.1, before buckle is "unlatched", tie a self adjusting sling to each wrist and ankle of the ATD (Fig4)
- 6.2.3 Next, pull the sling tied to the dummy with force specified for each dummy size

- (a) How to pull when it is an add-on CRS
- (b) How to pull when it is a built-in CRS

6.2.4 Directions for measuring the force required to release the buckle, while applying force described in 6.2.3

6.3 Head Impact protection—energy absorbing materials test procedure [This section struck in 2011 due to being obsolete.]

6.3.1 Prepare and test specimens of the energy absorbing material used to comply with S5.2.3 in accordance with the 25% compression-deflection test described for the specific material category in the American Society of Testing and Materials (ASTM). (For example: Sponge, expanded rubber, slab urethane foam, open-cell foam, etc.)
(Subparts mentioned in this section are found in part 572 of this chapter.)

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S7 Test Dummies

7.1 **Dummy Selection** — Select any dummy specified in 7.1.1, 7.1.2 or 7.1.3, based on height and mass recommendation for CRS in accordance with S5.5. If CRS is used in multiple categories, any dummy from each category may be tested.

7.1.1 ~~CRS before 8-1-05~~ [This section struck in 2011 due to it being obsolete. This section is now reserved.]

- (a) ~~If the CRS can be used by children under 5 kg (11 lbs) or 25.6", test with newborn (Part 572, subpart K)~~
- (b) ~~If the CRS can be used by children between 5 kg (11 lbs) and 10 kg (22 lbs) or 25.6"-33.5" (650-850 mm), test with newborn (Chapter 572, subpart K) and a 9-mo-old (Part 572, subpart J)~~
- (c) ~~If the CRS can be used by children between 10 kg (22 lbs) and 18 kg (40 lbs) or 33.5"-43.3" (860-1100 mm), test with 9-mo-old (Ch. 572, subpart J) and 3-year-old (572 Subpart C and S7.2), but no 9-mo-old in BPB~~
- (d) ~~If the CRS can be used by children over 18 kg (40 lbs) or 43.3" (1100mm), test with 6-yr-old dummy conforming to 572, subpart I (the Hybrid II 6-y-o)~~

7.1.2 CRS after 8-1-05

- (a) If the CRS can be used by children under 5 kg (11 lbs) or 25.6", test with newborn (572, subpart K)
- (b) If the CRS can be used by children between 5 kg (11 lbs) and 10 kg (22 lbs) or 25.6"-33.5", test with newborn (572, subpart K) and a 12-mo-old (572, subpart R)
- (c) If the CRS can be used between 10 kg (22 lbs) and 18 kg (40 lbs) or 33.5"-43.3", test with 12-mo-old (572, subpart R) and 3-year-old (572, Subpart P) (*Editor's Note: Ignore S7.2; NHTSA says that was left here in error*), but no 12-mo in BPB
- (d) If the CRS can be used by children 40–50 pounds or by children 1100–1250 mm tall (43.3 to 49.2 inches), test with 6-yr-old dummy conforming to 572, subpart N (the Hybrid III 6-yo)
- (e) If CRS can be used by children 50–65 pounds or by children 1100–1250 mm tall (43.3 to 49.2 inches), test with a 572 Subpart S dummy (weighted Hybrid III 6-yo.)
- (f) If CRS can be used by children who weigh more than 65 pounds or by children taller than 1250 mm (49.2 inches), test with a 572 Subpart T dummy (Hybrid III 10-yo.)

7.1.3 Voluntary Use of Alternative Dummies —

Makers can opt to test CRS ~~made before 8-1-10~~ with Hybrid II 6-y-o (Subpart I) rather than the Hybrid III 6-y-o (Subpart N). Choice, once made, is irrevocable. (*Editor's Note: The rule used to include an "if made-by date, but no longer does, as of 2011."*)

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S8 Requirements, test conditions, and procedures for CRS for use in aircraft.

8.1 **Installation Instructions**—all CRS made for use in aircraft must have instructions in the manual for installing and securing child in an aircraft seat.

8.2 **Inversion Test**— Must meet the following requirements in all angles and all belt paths. Unless otherwise stated, use orientation that would be used in a motor vehicle.

8.2.1 Figure 6 shows proper positioning in a "representative aircraft seat"

8.2.2 Install with aircraft seat belt and no other strap (other than FAA approved seat belt extender).

8.2.3 Position appropriate dummy as described in S10

8.2.4 Secure harness as described in dynamic test procedure (S6.1.2)

- 8.2.5 Rotate test scenario forward around a horizontal axis at a speed of 35 to 45 degrees per second to an angle of 180 degrees. Hold there for 3 seconds. Specified rate of rotation must be attained in not less than a half second and not more than one second. The CRS must not detach from seat and the child must not come out of CRS.
- 8.2.6 Repeat steps in 8.2.1 through 8.2.4. Rotate sideways around a horizontal axis contained in the median longitudinal plane of the seating surface portion of the aircraft seat. Rate is 35-45 degrees per second to an angle of 180 deg. Hold there for 3 seconds. Specified rate of rotation must be attained in not less than a half second and not more than one second. The CRS must not detach from seat and the child must not come out of CRS.

S9 Dummy clothing and preparation

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9.1 Type of clothing

- (a) Newborn (unclothed)
- (b) ~~9-month-old (Size 1 poly/cotton long-sleeved shirt and pants; 0.136 kg)~~ **[Removed/Reserved, as of 2011]**
- (c) 12-month old (Snug-fitting cotton/poly long-sleeved sweatshirt and ankle length pants; ≤0.25kg)
- (d) Hybrid II 3-year-old and 6-year-old (detailed description of clothes and shoes)
- (e) Hybrid III 3-year old (clothed as described in subpart, except size 8 sneakers <0.26kg each)
- (f) Hybrid III 6-year old (clothed as described in subpart, except size 13 sneakers <0.43kg each)

9.2 Clothing preparation (temp range acceptable for washing clothing; 71-82 deg C for washer; 49-60 deg C for dryer, 30 min.)

9.3 Preparing dummies

- 9.3.1 Dummies under Subpart C, I, or J, spend at least 4 hours at 19-25.5 deg C and between 10 and 70% rel humidity
- 9.3.2 Dummies under Subpart N, P, R, S, or T spend at least 4 hours at 20.6-22.2 deg C and between 10 and 70% rel humidity

S10 Positioning the dummy and attaching belt systems

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10.1 Car beds—Place dummy in bed in supine position, perpendicular to longitudinal axis of vehicle or standard seat assembly in position according to manufacturer instructions with head to center

10.2 Restraints other than car beds

10.2.1 Newborn dummy and 12-month-old dummy: Position according to manufacturer instructions and the following:

- (a) ~~Before putting dummy in restraint, place on a horizontal surface on back. Put hand on center of torso and rotate dummy legs upward by lifting feet 90 degrees; slowly release legs, but do not return them to the flat surface~~
- (b) (1) ~~When testing FF child restraint, hold 9-month-old dummy torso upright until it contacts the system's seating surface, and place in seated position with the mid-sagittal plane of the dummy head~~ **[Removed/Reserved, as of 2011]**
 - (i) ~~aligned with center of CRS if add-on child restraint~~
 - (ii) ~~or, if built-in CRS, vertical and parallel to longitudinal center line of the vehicle shell or vehicle~~
- (2) When testing rear-facing CRS, place newborn, 12-month-old dummy in CRS so that the back of the head contacts back support of CRS. Follow the manufacturer instructions for attaching the harness and vehicle belts and tighten as specified. If the dummy's head does not stay in position, tape it against the front of the seatback with 6mm wide paper masking tape across the center of the dummy's face.
- (c) (1) (i) With forward-facing CRS, extend the arms of the 12 month old dummy as far as possible in upward vertical direction. Extend the legs of the 12-month-old dummy as far as possible in forward horizontal direction with dummy feet perpendicular to the centerline of lower legs. A force of 178 N is applied perpendicular to:
 - (A) plane of back of standard seat in add-on system
 - (B) back of vehicle seat in case of built-in system, first at dummy's crotch and then at dummy's thorax in center of dummy. Attach all CR harness and vehicle belts as directed by manufacturer.
- (ii) After doing (C)(1)(i), rotate each dummy limb downwards until limb contacts surface of CRS or standard seat assembly (for add-on systems) or specific vehicle shell/vehicle if built-in system.

Position the limbs if needed so that they do not inhibit head or torso movement in tests in S6.

- (2) When testing rear-facing CRS, extend dummy arms vertically upwards and then rotate down towards lower body until arm contacts a surface of the CR or seat. Make sure that no arm is restrained from movement in other than downward direction by any part of the CRS or belts used to anchor the seat.

10.2.2 Three-year-old, Hybrid II six-year-old, or Hybrid III weighted 6-year-old test dummy: Position the dummy according to the manufacturer's instructions while conforming to:

- (a) Hold dummy upright until it contacts CR seating surface and place dummy head:
 - (1) in center of seat for add-ons
 - (2) vertical and parallel to center line of vehicle for built-in CRS
- (b) Extend arms of dummy as far as possible in upward vertical direction and legs as far as possible in forward horizontal direction with feet perpendicular to center line of the lower legs
- (c) describes the force to use and size of surface used when applying force:
 - (1) on plane of back of seat for add-on systems
 - (2) on back of vehicle seat in built-in system, first against dummy crotch and then at dummy thorax.
Specifications regarding CRS belt (harness) use and non-use are described.
- (d) After the steps described in (c) are done, rotate each dummy limb downwards in a plane parallel to dummy's mid-sagittal plane until limb contacts the surface of the CRS or standard seating assembly for add-on system or specific vehicle if built-in system. Make sure limb placement does not inhibit torso or head movement in tests.