



**DEPARTMENT OF TRANSPORTATION**

**National Highway Traffic Safety Administration**

**49 CFR Part 571**

**Docket No. NHTSA-2014-0026**

**RIN 2127-AL35**

**Child Restraint Systems**

**AGENCY:** National Highway Traffic Safety Administration (NHTSA), U.S. Department of Transportation (DOT).

**ACTION:** Final rule; response to petition for reconsideration.

**SUMMARY:** This final rule denies most aspects of a petition for reconsideration of a February 27, 2012, final rule that expanded the applicability of the Federal motor vehicle safety standard for child restraint systems to child restraints sold for children weighing up to 36 kilograms (kg) (80 pounds (lb)). The petition stated, among other things, that a label that was required by the 2012 rule for certain child restraints was unclear and could be misunderstood. In response, NHTSA is making minor adjustments to the labeling requirement to make it clearer and more reader-friendly. For a year, manufacturers have the option of meeting the requirements of the February 27, 2012 rule or the rule as modified today. All other requests for substantive changes to the 2012 rule are denied.

**DATES:** *Effective date:* The amendments made by this final rule are effective February 27, 2014.

*Compliance dates:* The compliance date of the amendments of this final rule is February 27, 2015. Optional early compliance is permitted. Accordingly, child restraints manufactured on or after February 27, 2014 until February 26, 2015, may comply by meeting either the requirements specified in the February 27, 2012, final rule (77 FR 11626) or those requirements as amended by today's final rule. Child restraints manufactured on or after February 27, 2015 must meet the requirements as amended by today's final rule.

If you wish to petition for reconsideration of this rule, your petition must be received by **[INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

**ADDRESSES:** If you wish to petition for reconsideration of this rule, refer in your petition to the docket number of this document and submit your petition to: Administrator, National Highway Traffic Safety Administration, 1200 New Jersey Avenue, S.E., West Building, Washington, D.C., 20590. For information on the Privacy Act, see Rulemaking Analyses and Notices section.

For access to the docket to read background documents or comments received, go to <http://www.regulations.gov> and follow the online instructions for accessing the docket. You may also visit DOT's Docket Management Facility, 1200 New Jersey Avenue S.E., West Building Ground Floor, Room W12-140, Washington, D.C. 20590-0001 for on-line access to the docket.

**FOR FURTHER INFORMATION CONTACT:** For technical issues, you may call Ms. Cristina Echemendia, Office of Rulemaking (Telephone: 202-366-6345) (Fax: 202-493-2990). For legal issues, you may call Ms. Deirdre Fujita, Office of Chief Counsel (Telephone: 202-366-

2992) (Fax: 202-366-3820). The mailing address of the National Highway Traffic Safety Administration is: 1200 New Jersey Avenue, S.E., West Building, Washington, D.C. 20590.

## **SUPPLEMENTARY INFORMATION:**

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### **I. Introduction**

This final rule denies most aspects of a petition for reconsideration of a February 27, 2012, final rule (77 FR 11626) that expanded the applicability of Federal Motor Vehicle Safety Standard (FMVSS) No. 213, “Child restraint systems,” from child restraint systems (CRSs) for children weighing up to 65 lb to CRSs for children weighing up to 80 lb. The final rule also adopted use of a 10-year-old child (10YO) test dummy (HIII-10C) to test CRSs manufactured for children weighing 65 to 80 lb. The test dummy weighs about 78 lb.

Generally speaking, in NHTSA’s compliance test for FMVSS No. 213, NHTSA has the choice of assessing the performance of a CRS when installed on a bench seat by way of the simulated lower anchorages of the “child restraint anchorage system”<sup>1</sup> of the standard seat

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<sup>1</sup> In 1999, NHTSA issued FMVSS No. 225, “Child restraint anchorage systems,” which requires vehicle manufacturers to equip vehicles with child restraint anchorage systems that are standardized and independent of the vehicle seat belts. The child restraint anchorage system required by FMVSS No. 225 is a 3-point system consisting of two lower anchorage points and an upper anchorage point. Each lower anchorage consists of a six millimeter (mm) diameter straight rod, or “bar,” onto which a CRS connector can be attached. The two lower anchorage bars are typically located at or near the seat bight. The upper anchorage (“tether anchorage”) is a part to which a tether hook of a CRS can be attached. The 1999 rule also amended FMVSS No. 213, “Child restraint systems,” to require CRSs to be equipped with connectors that enable the CRS to attach to the vehicle’s lower anchorages of the child restraint anchorage system. A new head excursion performance requirement was added for forward-facing child

assembly or by a seat belt. That is, child restraint manufacturers must ensure that their products meet the requirements of FMVSS No. 213 when NHTSA tests the CRS attached by the child restraint anchorage system connectors and when the agency tests the CRS attached by the seat belt. During the course of this particular rulemaking, the Alliance of Automobile Manufacturers (Alliance) submitted a comment<sup>2</sup> on an aspect of the rulemaking proposal relating to how NHTSA would use the 10YO dummy in compliance tests, particularly with respect to an issue concerning attaching CRSs by the child restraint anchorage system.<sup>3</sup> The Alliance pointed out that the child restraint anchorage system was developed by NHTSA to withstand crash forces in a crash generated by a mass on the system of 65 lb (mass of child plus that of CRS).<sup>4</sup> Given such a design parameter, the group stated that vehicle manufacturers would never recommend that a CRS be installed using the vehicle child restraint anchorage system when used to restrain children represented by the 10YO dummy (the dummy alone weighs about 78 lb). Subsequently, the Alliance and the Association of Global Automakers (Global Automakers) submitted a joint comment stating that “review of the actual supporting test data and load calculations reveals that the LATCH load requirements were developed using a combined maximum child+CRS weight of 65 pounds.”<sup>5,6</sup> The vehicle manufacturer groups also expressed concern about “a trend

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restraints (other than booster seats), and to meet it, child restraints universally use a top tether strap affixed to the top of the restraints.

<sup>2</sup> NHTSA-2007-0048-0008.

<sup>3</sup> These are CRSs equipped with an internal harness (webbing) to restrain the child (“harness-equipped CRSs”). Forces from the mass of the child+CRS are imposed on the child restraint anchorage system. These are not “belt-positioning seats” used with a vehicle’s Type II seat belt system.

<sup>4</sup> Assuming the mass of the CRS is about 17 lb, which is approximately the average mass of a CRS, the child restraint anchorage system is designed for children weighing up to about 48 lb (for a combined weight of 65 lb, from the weight of the CRS plus the weight of the child).

<sup>5</sup> NHTSA-2010-0158-0016.

<sup>6</sup> NHTSA notes: many in the child passenger safety community refer to the child restraint anchorage system as the “LATCH” system, an abbreviation of the phrase “Lower Anchors and Tethers for Children.” The term was developed by a group of manufacturers and retailers soon after the 1999 final rule establishing FMVSS No. 225 for use in educating consumers on the availability and use of the anchorage system and for marketing purposes.

toward increased weight of child restraints...[that] could call into question the validity of the 48 pound estimate for appropriate maximum child weight capacity.”<sup>7</sup>

The information from the vehicle manufacturers was important to NHTSA in determining how we should use the new 10YO test dummy in compliance testing. After assessing all available information, NHTSA decided that it would not subject child restraints with internal harnesses to compliance testing using the 10YO test dummy while the CRS is attached by the child restraint anchorage system anchorages, since that scenario would be contrary to vehicle manufacturers’ instructions for using child restraint anchorage systems and inconsistent with the design parameters of the anchorage system.

Furthermore, the agency determined that, given that NHTSA will not test a child restraint with the child restraint anchorage system on the standard seat assembly using the 10YO dummy for the above reasons, there is a need to inform consumers on the use of child restraint anchorage systems to reduce the likelihood that a CRS would be used in a manner that is inconsistent with the assessed performance of the harness-equipped CRS and the design limits of child restraint anchorage systems. Some new harness-equipped CRSs have been produced that are heavier than all CRSs made in the past, and some are recommended for children weighing more than 48 lb.

In the 2012 final rule, we adopted a labeling instruction informing consumers not to use the child restraint anchorage system when restraining a total weight of more than 65 lb.<sup>8</sup> NHTSA determined that a label is needed to reduce the likelihood that consumers will use the child restraint anchorage system lower anchorages with a child+CRS weight that is too heavy for the anchorages, which would pose an unreasonable risk of overloading the vehicle anchorage system in a crash. Overloading the vehicle lower anchorages could be catastrophic for the child

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<sup>7</sup> NHTSA-2010-0158-0016.

<sup>8</sup> The 3 points of child restraint anchorage systems are required to meet strength requirements designed around a “combined” weight of 65 lb (combined weight of the child plus the CRS’s weight) (“child+CRS weight”).

occupant, as the CRS could dislodge from the vehicle seat. The instruction provided a clear and consistent message regarding the use of the child restraint anchorage system and improved the current situation where consumers are provided inconsistent or no information about the child weight limit for the lower bars. The information helps to ensure that the child restraint anchorage systems (particularly the lower anchorages) are used in a manner that comports with the design parameters of the vehicle system.

## **II. Petition for Reconsideration**

NHTSA received a petition for reconsideration on the label from several consumer advocates.<sup>9</sup> The petitioners did not oppose informing consumers of the weight limits of the lower anchorages per se, but instead did not support a 65 lb limit. They requested that the 65 lb combined weight should be increased to 80 to 85 lb, believing this is needed to “preserve the extended use of lower anchors.”

Petitioners believe that when NHTSA developed FMVSS No. 225, the agency referred several times in the preamble to a child weight of 65 lb. Petitioners “surmise that FMVSS 213 [sic] rule was for anchors to be strong enough to accommodate [CRSs] that would in themselves weigh at least 15, possibly 20 pounds, which implies a combined weight of at least 80 to 85 lbs.” The petitioners state that “the decision to adopt 65 pounds as the combined maximum weight... will unnecessarily restrict the use of the LATCH system and force caregivers back to using seat belts for anchoring forward-facing [CRSs].” The petitioners also state that their intent in

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<sup>9</sup> D. Stewart and D. Donaldson (Safe Ride News), S. Tombrello (SafetyBeltSafe), J. Colella (Traffic Safety Projects) and B. Hoffman (Oregon Health Sciences University).

petitioning for reconsideration of the rule was to “minimize the likelihood that vehicle manufacturers will apply the same formula” to tether anchorages.<sup>10</sup>

### **III. Correspondence**

#### **a. The Label**

A number of persons sent letters or met with NHTSA in support of the petition for reconsideration or to ask questions about the labeling requirement.<sup>11</sup> Several suggest that NHTSA suspend the requirement for the label, increase the 65 lb combined weight limit on the label, or require vehicle manufacturers to increase the strength of child restraint anchorage systems to accommodate a higher combined weight. Several letter writers express the view that the final rule should have addressed tether weight limits.

Several of the letters and other submissions are summarized below.

Representatives from the Dorel Juvenile Group (Dorel) and others met with NHTSA to express their view that the new labeling requirement reduces use of child restraint anchorage systems. They believe that the current status quo (current recommendations and practice) is to use child restraint anchorage systems for installing child restraints with internal harnesses for a child weight up to 48 lb. They also add that child safety seats now weigh between 15 to 33 lb, so the new label would exclude the use of child restraint anchorage systems for a “large” number of children who are still in harnessed-CRSs. They state that because child restraint anchorage systems are easier to use and have a higher rate of correct installation than seat belts, a child restraint anchorage system installation is safer than a belt installation. They suggest that in the

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<sup>10</sup> The petitioners also suggested that NHTSA undertake a number of initiatives to upgrade various child restraint anchorage system requirements or improve CRS safety. Most of the suggestions were beyond the scope of this rulemaking and will not be discussed further in this document.

<sup>11</sup> Copies of letters are in the docket for the final rule: Docket No. NHTSA-2011-0176. NHTSA has also placed in the docket memoranda describing various meetings.

short term, NHTSA should suspend the new label requirement, and that in the long term, NHTSA should increase the strength of the child restraint anchorage system.

Safe Ride News (SRN) wrote in a letter that the agency should suspend the labeling requirement because the label will “cause a lot of confusion” and affect public perception of the safety of child restraint anchorage systems “without improving actual safety in any significant way.” The letter writer believes that public education messages will become “extremely muddled due to the variability from CR [child restraint] to CR.” SRN also states its concern that “lower-anchor weight limits will spill over to tether-anchor weight limits.” Further, in another letter, SRN suggests that NHTSA require a child-weight limit of 50 lb as a “compromise” that “eliminates the formula of child-weight plus CR-weight.” Under SRN’s suggestion, child restraint manufacturers may set their own weight limits for the use of child restraint anchorage systems up to that ceiling with a possible lower weight limit for extremely heavy child restraint models.

The Juvenile Products Manufacturers Association (JPMA) submitted a letter in support of Dorel’s submission and Safe Ride News’ letter, repeating many points of earlier correspondence.<sup>12</sup> Those points include that the extended use of lower anchorages should be preserved; that use of tethers should be increased; that efforts should be made to minimize the likelihood that vehicle manufacturers will similarly restrict tether anchor use; that parents might not remember or even initially know to switch to the seat belt during the several-year course of a CRS’s use; and, that innovation by CRS manufacturers to reduce loads on anchors through energy management features should be supported. JPMA also expressed the view that NHTSA should suspend the label and “consider strengthening the anchorage strength requirements of

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<sup>12</sup> NHTSA had discussed many of these points in the preamble to the February 27, 2012 final rule. For the most part, no new information bearing on the discussion was provided by JPMA’s post final rule submissions.



FMVSS 225 immediately.” In a later submission, JPMA states that the label will result in “lack of trust in LATCH” because it results in varying weight limits, and in some cases weight limits lower than the 40 or 48 lb currently used in the field. JPMA also believes that the label will lead to early graduation to boosters due to the wording on the label and because CRSs might not achieve a tight fit with a seat belt or may be too difficult to install with a seat belt.

An individual, Alisa Baer, wrote that introducing “strict lower anchor weight limits of CR + child = 65 pounds will further complicate” child restraint anchorage systems. The letter writer states that parents typically do not understand how fast a child grows and that a parent may opt not to use a CRS when their child is on the cusp of the weight limit out of fear that the child will soon outgrow the CRS, when in reality the child could have much more time before exceeding the weight limit. The writer states that “ugly numbers- like 37 or 41 [lb]--are scary to parents & technicians,” and “will likely erode confidence in the LATCH system” because people may “[think] ‘is the LATCH system so fragile that if the child was 38 pounds instead of 37 it might not hold in a crash?’”

Consumers Union sent a letter stating that it was “worried that the new rules may encourage parents to secure heavier child seats using standard safety belts instead of the LATCH system.” Consumers Union states that “each CRS will still feature a different maximum recommended child weight limit, based on the differences between the seat’s weight and the 65 lb limit of the lower LATCH anchors,” which, the letter writer believes, will confuse caregivers.

Diono<sup>13</sup> sent a letter expressing its belief that the 65-lb combined weight threshold was “far too conservative a limitation given the dynamic capacity of the lower anchors in vehicles” and asks that NHTSA “allow a maximum weight of CRS plus occupant to be limited to 80 lbs with the use of lower anchors.” These are the same arguments that Diono made in response to

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<sup>13</sup> A child restraint manufacturer previously known as “Sunshine Kids.”

the NPRM when the company was named Sunshine Kids. Diono believes that there is “much data from testing analysis that has shown lower anchors support total masses larger than the proposed limit of 30.5 kg,” and states that it has data from its sled testing which “show that with a combined mass of 78 lbs to ~ 110 lbs the lower anchors see dynamic loads well within the dynamic capacity of the lower anchors.” Diono also states that “ECE-R44 has recommended the combined weight limit be 33 kgs (Combined mass of CRS plus occupant) or 72.6 lbs.”

The Alliance submitted correspondence focused on the need for the label to address rear-facing child restraints equipped with an internal harness that are sold for heavier children, which are used without a tether. The Alliance highlights that it reviewed “some of the heavier 3-in-1 child restraints currently on the market, especially those which have been certified for use up to 40/45 lbs rearward-facing,” and notes that “a potential weight combination of up [sic] 73.8 lbs becomes apparent—without use of a tether.” The Alliance seeks “to ensure that the label is also applied to rear-facing child restraints.”

#### **b. Other Issues**

NHTSA also received correspondence from Graco asking that harness-equipped CRSs recommended for children up to 70 lb in weight should be excluded from the head excursion requirements if the CRS height restrictions do not accommodate the HIII-10C dummy.

Graco also raises a question about S5(f) of the final rule, which applies to harness-equipped CRSs. S5(f) refers to the weight of the test dummy used to test the CRS. Graco suggests that NHTSA publish a list of the weights for each test dummy to make it “easy for manufacturers to determine which [anthropomorphic test device] and CRS combinations need to be tested with each type of belt and provide more standardized results for consumers.”

### **IV. Agency Response**

NHTSA has evaluated all relevant issues presented above and has made the following decisions in responding to those issues.

**a. The Label**

**A Label is Necessary to Address a Safety Need.**

NHTSA has determined that the information presented by the label in question is necessary to address a safety need. The information reduces the likelihood that consumers will use the child restraint anchorage system with a combined weight of child plus CRS weight too high for the anchorages in a crash. FMVSS No. 225 requires the anchorage system to withstand crash forces resulting from a combined (child+CRS) mass of 65 lb.<sup>14</sup> Not having information about the weight limits poses an unreasonable risk of overloading the child restraint anchorage system given that CRS weights are increasing (currently there is no limit on the size and mass of CRSs), harness-equipped CRSs are being produced that are marketed for children of heavier masses than 40 lb, and peak vehicle accelerations are much higher now (some exceed 60 g) than the 48 g the agency had assumed in 1999 when designing the strength requirements of FMVSS No. 225. We believe that information about child weight limits needs to be provided on the CRS, given the design limits of child restraint anchorage systems and the changing physical demands on the system from modern child restraint and vehicle designs.

In an April 11, 2011 letter to NHTSA, the Alliance and Global Automakers expressed support for a label such as that adopted by the 2012 rule. These vehicle manufacturer groups expressed concern “that there appears to be a trend toward increased weight of child restraints. This trend, if it continues, could call into question the validity of the 48 pound estimate for

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<sup>14</sup> At the time FMVSS No. 225 was established, forward-facing harness-equipped CRSs weighed about 15 lb on average.

appropriate maximum child weight capacity.” NHTSA agrees that this development is a cause for concern, and believes that the labeling requirement addresses this potential safety problem.

The market has not provided the information consumers need. Vehicle and CRS users’ manuals have conflicting or a lack of information on the maximum child weight limit for lower anchor use. Most vehicle manufacturers do not include a child weight limit for lower anchor use in their vehicle owner’s manual. A 2011 manual developed by SRN, “LATCH Manual,”<sup>15</sup> indicates that only about 54 percent of vehicle “makes” provides information on the weight limits of child restraint anchorage systems.<sup>16</sup>

Child restraint manufacturers’ recommendations for using the child restraint anchorage system are also varied and generally unhelpful. NHTSA reviewed approximately 40 CRS manuals from different CRS manufacturers to see the current recommendations of CRS manufacturers. In our sample, Dorel and Evenflo did not specify a maximum child weight for use with the child restraint anchorage system. Graco and Recaro specified using the vehicle manufacturer’s weight limits for use of the child restraint anchorage system and also specified a maximum child weight of 48 lb for use of the anchorages. Britax recommended that consumers follow vehicle manufacturers’ instructions and that, if a vehicle manufacturer does not provide a limit, consumers should assume a 40 lb maximum child weight limit for lower anchors. Diono recommended use of the child restraint anchorage system for children weighing up to 65 lb

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<sup>15</sup> The “LATCH Manual,” developed by SRN ([www.saferidenews.com](http://www.saferidenews.com)), compiles material such as the vehicle manufacturers’ recommendations for the maximum child weight limit for using the child restraint anchorage system. The manual is used by child passenger safety technicians participating in a child seat checkup program run by a nonprofit organization called SafeKids as a look-up tool for installing child restraints in vehicles.

<sup>16</sup> In the 2011 LATCH Manual, 12 percent of vehicle makes recommended 40 lb as the child weight limit for lower anchor use and 42 percent recommended 48 lb. In the 2013 LATCH Manual, 8 percent of vehicle manufacturers recommended a child weight limit of 48 lb while 64 percent recommended the combined CRS+child weight limit of 65 lb for lower anchor use.

(corresponding to the weight of a 50<sup>th</sup> percentile 9.5 year-old) and even, for some models, 80 lb (corresponding to the weight of a 50<sup>th</sup> percentile 11 year-old).

Since most vehicles do not specify a child weight limit for lower anchor use, and since CRS instruction manuals generally have no information (e.g., Dorel and Evenflo), refer to the vehicle owner's manual (Graco, Britax, Recaro), or have conflicting information on the child weight limit for using the lower anchorages (Graco, Recaro), many consumers are unaware or unsure as to the weight limits of child restraint anchorage systems. A consumer looking in the CRS manual might be referred to a non-existent vehicle owner's manual instruction on child weight limits for lower anchor use, or might be informed that the anchorage system may be used to a weight beyond the intended design limit of many if not most vehicles' anchorage systems.

This problematic situation can be fixed if the CRS has the required information about the weight limits. With the information, consumers will have convenient access to facts about the child weight limit for lower anchor use. A label with the information will provide clear and consistent information for determining the child weight limit for lower anchor use, which will be easily accessible to the caregiver at all times.<sup>17</sup> Consumers following this information will virtually eliminate the risk of anchorage failure in a crash.<sup>18</sup>

We do not believe that specifying a combined (child+CRS) weight limit in the vehicle owners' manual rather than on a CRS label would be as effective at communicating the information as placing a label on the CRS. First, the consumer will need to determine the weight

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<sup>17</sup> In addition, the agency has plans to promote the label and provide consumer education regarding the new label.

<sup>18</sup> We recognize that currently there are no reported anchorage failures in on the road vehicles. However, the risk of anchorage failure exists to such an extent today that NHTSA would like to be proactive in addressing this risk. In the past, there has been a low incidence of heavier children in CRSs with internal harnesses. This could very well change in the future as NHTSA and other groups are encouraging caregivers to keep children in harness-equipped CRSs for a longer time. Moreover, CRSs are being produced for children of increasingly heavier weights. Also, crash pulses of newer vehicles are higher and child restraints themselves are getting heavier. We believe that a problem of anchorage failures is in the making, so we are addressing the situation now before the problem comes to fruition.

of the CRS and then calculate the maximum child weight limit. We believe that these additional actions required by the consumer are unreasonable; the consumer is unlikely to take the step of assessing the CRS weight or may not bother to make the calculation. Second, a recent survey<sup>19</sup> conducted by the agency showed that only 14 percent of caregivers use the vehicle owners' manuals for information about installing CRSs. This indicates that most consumers will not learn of the instruction by way of the vehicle owner's manual.

We disagree with JPMA's and Diono's assertion that the label will result in lack of confidence in child restraint anchorage systems. We believe that the label will provide clear and consistent information on the use of child restraint anchorage systems and will thereby promote more trust in child restraint anchorage systems. More importantly, the information will virtually eliminate the risk of a failure of an anchorage system in attaching a CRS to the vehicle.<sup>20</sup> Such failures, not the label, would reduce consumer confidence in child restraint anchorage systems. We are taking action now to instruct consumers of the intended use of the anchorage system to avoid failures in the field.

### **The Strength Was Based on a 65-lb Combined Weight Limit**

The petitioners state that they wish to "preserve the extended use of lower anchors." They state that the preamble for the final rule establishing FMVSS No. 225 refers to a child weight of 65 lb, and that the intent of the agency in establishing the standard was "for anchors to be strong enough to accommodate CRs [sic] that would in themselves weigh at least 15, possibly 20 pounds, which implies a combined weight of at least 80 to 85 lbs."

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<sup>19</sup> National Child Restraint Use Special Study (NCRUSS), DOT HS 811 679, <http://www-nrd.nhtsa.dot.gov/Pubs/811679.pdf>

<sup>20</sup> As noted earlier, we recognize that there are no reported anchorage failures in on the road vehicles. However, the risk of anchorage failure exists. In the past, there has been a low incidence of heavier children in CRSs with internal harnesses. This could change in the future as NHTSA and other groups are encouraging caregivers to keep children in harness-equipped CRSs for longer time, and CRSs are being produced for heavier and heavier children. Also, crash pulses of newer vehicles are higher and child restraints themselves are getting heavier. We believe that a problem of anchorage failures is in the making, so we are addressing the situation now before the problem arises.

**Agency Response:** The petitioners' view is incorrect. The preambles<sup>21</sup> analyzing, explaining, and developing the rationale for FMVSS No. 225's strength requirement overwhelmingly refer to a combined weight (child+CRS) of 65 lb. The entire engineering analysis upon which the strength requirement was based uses a combined weight of 65 lb.

To illustrate, NHTSA explained the basis for FMVSS No. 225's 15 kN strength requirement in a 2003 document responding to petitions for reconsideration of various aspects of the 1999 final rule.

NHTSA stated that the agency based the strength requirement—

on an analysis of the forces that are likely to be imposed on a LATCH system in a crash. NHTSA agrees [with a petitioner] that the maximum expected force acting on the center of gravity of a child in a child restraint is calculated as the total mass of the child and the child restraint system ("the child/CRS system") multiplied by the acceleration of the system. ... Assuming a child and child restraint mass of 29.7 kg (65 lb), the dynamic force expected to act through the center of gravity of the child/CRS system in a 48.4 g crash is approximately 14,100 N. [Emphasis added.]  
68 FR 38208, 39218-38219, June 27, 2003.

References to a "child" weight of 65 lb rather than to a "combined" weight in the 2010 SNPRM were in error, as the Alliance, JPMA and others have pointed out. Such references were imprecise and limited in describing the assumptions underlying the strength requirement of child restraint anchorage systems. The Alliance explained that the load calculations for the 15 kN strength requirement were based on a combined maximum (child+CRS) weight of 65 lb.<sup>22</sup> The Alliance and others were concerned that the proposed wording that referred to a 65-lb child weight did not adequately account for the weight of the CRS and thus would be providing misinformation. NHTSA agreed with the commenters and made the correction in the final rule.

The present petitioners state that "What is proposed [sic] in the final rule, is, in effect, a major change of interpretation of anchor weight limits without any opportunity for assessment and comment that is usual in regulatory changes."

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<sup>21</sup> See, e.g., final rule, response to petitions for reconsideration, 68 FR 38208, June 27, 2003.

<sup>22</sup> In its comment JPMA also supported using the combined weight (child+CRS), rather than child weight alone, to avoid overloading the anchorages.

This assertion is without merit. As explained above, the agency did not make a “change of interpretation of anchor weight limits” by basing the final rule on a combined child+CRS weight of 65 lb. A 65 lb combined weight limit was the established engineering basis for the strength requirement of FMVSS No. 225 from the beginning of the standard. The 2010 SNPRM was in error in referring to a child weight alone of 65 lb. The 2012 final rule remedied the error by referencing combined weight (child+CRS).

Moreover, the weight to which the label refers was an issue well within the scope of the present rulemaking. The question of the weight limits of child restraint anchorage systems and the safe use of the anchorage system with heavier children were crucial aspects of the 2010 SNPRM (see section VII.a. of the SNPRM, 75 FR at 71659). Upon proposing a label to inform consumers of the limits of the child restraint anchorage system, the SNPRM specifically asked for comment on the child weight variable: “Comments are requested on the label’s reference to the 65 lb (29.5 kg) threshold.” 75 FR at 71659.

In addition, vehicle manufacturer groups (Alliance and Global Automakers) and JPMA commented on the SNPRM, informing NHTSA that the proposed wording that referred to a 65-lb child weight alone did not adequately account for the weight of the CRS and was thus providing incorrect information. NHTSA benefited from the comments and corrected the weight limit to reflect the weight of the child+CRS, as designed by FMVSS No. 225, in the final rule. The agency was not required to reissue another proposal for notice and comment to make this correction.

Diono believes that there is “much data from testing analysis that has shown lower anchors support total masses larger than the proposed limit of 30.5 kg” and states that it has data from its sled testing which “show that with a combined mass of 78 lbs to ~ 110 lbs the lower anchors see dynamic loads well within the dynamic capacity of the lower anchors.” Diono believes that its tests show that, with a combined child and child restraint weight of 80 lb, the dynamic loads on the anchors are in the range of 9 kN at each lower anchor. Diono also states that NHTSA has tested CRSs (some weighing 30 lb) for many years using the Hybrid III 6-year-old (HIII-6C) dummy weighing 48 lb (for a combined weight of 78 lb) as part of its compliance program with no anchorage failures. Based on this information,



Diono concludes that there is a very safe margin with the use of lower anchorages for a combined child and CRS weight of 80 lb.

The agency disagrees that Diono's test data indicate that NHTSA should amend the labeling requirement in such a way that condones the use of the lower anchorages with a combined child and CRS weight of 80 lb. Diono's testing consisted of sled tests using the FMVSS No. 213 test bench and a sled pulse (47 G pulse and a 35 mph velocity) representing the crash pulse of a 2001 Toyota Echo in an NCAP frontal crash test. The docket submissions from Diono show that for sled tests performed with the 47 G pulse and combined child and CRS weight of 82 lb (65 lb dummy + estimated 17 lb CRS) and 97 lb (80 lb dummy + estimated 17 lb CRS), the peak total load on the child restraint anchorages were 25.7 - 27.3 kN. Those loads clearly exceed the 15 kN quasi-static load minimum strength requirement of the anchorage system per FMVSS No. 225.

Furthermore, while the Toyota Echo pulse at 48 G in an NCAP test was considered a severe pulse in early 2000s, current NCAP data shows that many recent vehicle models have stiffer front ends than the Echo, with peak accelerations in excess of 50 G.

Additionally, Diono's data are inadequate because the data were obtained from sled tests conducted with an FMVSS No. 213 test bench seat. The child restraint anchorage system bars on the bench seat are designed and constructed to withstand repeated loading in 30-35 mph sled tests, i.e, they are reinforced over and above the anchorages of actual vehicles. Diono did not provide any actual vehicle test data (static or dynamic). The strength of child restraint anchorage systems in vehicles is evaluated according to specifications in FMVSS No. 225, which include a quasi-static load test of 15 kN applied to the lower anchors and tethers and a quasi-static load test of 11 kN applied only to the lower anchors. The lack of anchorage failures on NHTSA's test bench does not indicate that real-world vehicles' anchorages are strong enough to hold the force generated by higher weight children.

Diono referred to Economic Commission for Europe Regulation No. 44 (ECE R.44), "Restraining Devices for Child Occupants of Power-Driven Vehicles," and ECE R.14, "Safety Belt Anchorages, ISOFIX Anchorages, and Top Tether Anchorages," stating that these regulations limit to 72.6 lb the

combined weight of child and child restraint for ISOFIX use, even though ECE R.14 has slightly less stringent requirements on the ISOFIX anchors than FMVSS No. 225.

NHTSA does not find this view persuasive. For one thing, ECE R.44 limits the maximum child weight for CRSs with harnesses and CRSs equipped with ISOFIX to 40 lb, and specifies that the CRS weight be less than or equal to 33 lb. FMVSS No. 213 does not have such limitations on CRS design at this time. Thus, the overall risk of overloading the anchors in Europe is inherently lower than in the U.S. In this country, a label is needed to limit the weight on the anchorages to within design parameters.

Second, no showing has been made by Diono that the ECE requirements are sufficient to meet the safety need in the U.S. that is met by FMVSS No. 225. In a 2010 Transportation Research Laboratory (TRL) contract report, Hynd et al.<sup>23</sup> noted that there is evidence that the current ECE R.14 anchorage strength test requirements may be inadequate for some dummy and CRS combinations allowed in ECE R.44. We are not convinced that FMVSS No. 225's requirements should be made similar to those of ECE R.14.

Diono also states that the 2012 final rule's labeling requirement on lower anchor use contradicts Transport Canada's recent update of Canadian Motor Vehicle Safety Standard (CMVSS) No. 213, "Child restraint systems," which permits the use of lower anchors to install child restraints with harnesses for children weighing up to 65 lb.

We do not agree. Transport Canada has yet to consider the recent updates to FMVSS No. 213 incorporating the 10-year-old dummy for testing child restraints. We expect Canada to have similar issues as the U.S. regarding child restraint misuse, incorrect installations, and consumer confusion as to the child restraint anchorage systems. Transport Canada may be considering the merits of the label in the future.

## **Empirical Data**

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<sup>23</sup> Hynd, M., Pitcher, M., Hynd, D., Robinson, B., Carroll, J.A., "Analysis for the development of legislation on child occupant protection," Transportation Research Laboratory (TRL) Report, Prepared for the European Commission under the specific contract no. SI2:555655 and in the framework contract no. ENTR/05/17.01, July 2010. [http://ec.europa.eu/enterprise/sectors/automotive/files/projects/report-child-occupant-protection\\_en.pdf](http://ec.europa.eu/enterprise/sectors/automotive/files/projects/report-child-occupant-protection_en.pdf)

The petitioners request that NHTSA “provide any test or field data suggesting the need for a reinterpretation of the original statement that FMVSS 225 was devised for a child weighing 65 to 80 ...lbs.” As explained above, FMVSS No. 225 was developed to ensure that crash forces generated by a 65 lb combined weight will be withstood; it did not presume a child weight alone of 65 to 80 lb. The label is intended to inform consumers about the design limits of child restraint anchorage systems and to keep use of the lower anchorages to within the anchorage system’s design limits. The engineering analyses underlying the FMVSS No. 225 strength requirement have been fully discussed. The agency is not obligated to provide “test or field data” to justify why we disagree with the petitioners’ view that the weight limit should be based on a child weight alone of 65 to 80 lb.

Nonetheless, there are empirical data on this issue. There has been failure of a child restraint anchorage system in testing conducted by Transport Canada (30-35 mph) involving full frontal rigid barrier crash tests of model year (MY) 2009 and 2010 vehicles. Transport Canada placed child restraints in the outboard rear seating positions using the child restraint anchorage system (including the top tether).<sup>24</sup> The program involved 28 crash tests with the HIII-6C dummy and 4 crash tests with the HIII-10C dummy. The weight of the CRSs used in the tests ranged from 11.4 lb to 25.11 lb. The peak vehicle acceleration in these crash tests ranged from 30 g to 68 g. The total anchorage loads (sum of forces on the lower anchors and the tether anchor) ranged from 7.5 kN to 20.8 kN with the HIII-6C dummy, and from 13.3 kN to 20.4 kN with the HIII-10C dummy (see Tables A1(a) and A1(b) in the Appendix to this preamble).

The failure occurred in a 35 mph frontal crash test of a 2010 Kia Forte with the HIII-10C dummy restrained in Safety 1<sup>st</sup> Apex 65 child restraint. The CRS was installed in the right outboard rear seat with lower and top tether anchorages. The CRS weighed about 13 lb. The

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<sup>24</sup> Details of the Transport Canada tests are available in the docket for this document.

combined weight (child+CRS) in this test was 90 lb, the peak vehicle acceleration was 46 G. The total maximum anchorage loads measured in this test was 20,395 N. During the test, the inboard anchor, which was held in place by two bolts, pulled through the sheet metal resulting in a failure at the attachment point. The anchorage failure demonstrates a finite limit to the strength of the child restraint anchorages.

We are concerned that there are factors in play that have developed in recent years that raise the possibility that the limits of the child restraint anchorage system will be surpassed in more and more vehicles by the ordinary use of modern day CRSs in modern vehicles if measures are not in place to prevent this from happening. CRSs with internal harnesses are being produced that are recommended for children weighing 65 lb or more. The average weight of CRSs was 15 lb when FMVSS No. 225 was first issued; now CRSs are marketed that weigh more than 30 lb. Further, the strength requirements of the child restraint anchorage system were based on a 48 g vehicle acceleration, which is a level being surpassed among current vehicle models in a 35 mph frontal crash. In contrast, there are vehicle models in the current fleet that have peak vehicle acceleration in excess of 50 g in a 35 mph frontal crash.

Also presented in the Appendix in Tables A1(a) and A1(b) are the results of NHTSA's computed maximum total inertial loads on the child restraint anchorage system (F) using the combined weight of the child dummy and the CRS (m) and the peak vehicle acceleration (a),<sup>25</sup> using Newton's second law of motion ( $F=ma$ ).<sup>26</sup> A comparison of the measured and computed

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<sup>25</sup> The vehicle accelerations were filtered in accordance with Society of Automotive Engineers (SAE) J211, "Instrumentation for Impact Test – Part -1- Electronic Instrumentation," with SAE channel filter class (CFC) 60 (100 Hz).

<sup>26</sup> This is the same methodology used in the June 27, 2003 final rule (68 FR 38208) responding to petitions for reconsideration of the March 5, 1999, rule establishing FMVSS No. 225 (see 68 FR at 38218 for the rationale for this method of analysis). This analysis assumes that the child restraint is fully coupled to the vehicle and ignores friction between the CRS and the vehicle seat. It also assumes that the child dummy is coupled to the child restraint and ignores friction between the dummy and CRS surface. These are reasonable assumptions if the child restraint is securely attached to the lower anchors and tether anchor and the CRS internal harnesses are snugly attached.

total anchorage loads indicates that in 13 of 32 tests (41 percent), the computed anchorage loads were within 10 percent of the measured anchorage loads. In an additional 13 tests (40 percent), computed anchorage loads were within 20 percent of the measured loads. The general similarity between the measured and computed values provides a source of confidence in the anchorage strength requirements in FMVSS No. 225, which was based on a similar inertial load computation using a combined CRS+child weight of 65 lb and a peak acceleration of 48 G.

Almost all of the tests showed the integrity of present day child restraint anchorage systems in vehicles. The relatively low rate of anchorage failures in the Transport Canada vehicle crash tests may be because many vehicle manufacturers are designing the child restraint anchorage systems to be stronger than that required by FMVSS No. 225; the anchorage loads from the combined CRS+dummy weight and the peak vehicle acceleration were within the strength capabilities of vehicle anchorages.

Diono suggests a combined child+CRS weight limit of 80 lb. We believe that this suggestion raises an unreasonable risk that the lower anchorages would be overloaded, resulting in anchorage failure. The computed total child restraint anchorage load for a peak vehicle acceleration of 65 g and a combined child+CRS weight of 80 lb is 23,187 N, which is significantly higher than the measured total anchorage loads in the Transport Canada test series. Since there are vehicle models with peak vehicle accelerations of approximately 60-70 g,<sup>27</sup> having total anchorage loads exceeding 23,000 N is a distinct possibility if the combined weight limit is increased to 80 lb as suggested. Thus, we decline the request.

Another matter of concern to us is the low usage rate of the tether anchor and how nonuse of the tether, among other things, results in higher loads being imposed on the lower anchorages.

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<sup>27</sup> The peak vehicle acceleration of the 2012 Ford 500 is 73 g and that of the Toyota Scion IQ is 68 g in the NCAP 35 mph full frontal rigid barrier crash test.

Our survey data<sup>28</sup> indicates that approximately 30 percent of forward-facing child restraints that are installed using the lower anchorages do not have the tether attached. To study this and other issues, NHTSA performed sled tests at the agency's Vehicle Research and Test Center (VRTC) to measure the loads experienced by child restraint anchorages in a simulated crash. VRTC conducted 24 sled tests using the weighted 6-year-old Hybrid III dummy and three child seat models (Safety 1<sup>st</sup> Apex 65, Sunshine Kids Radian 65 and Britax Frontier 85) in two vehicle bucks (2010 Kia Forte and 2010 Ford Focus).<sup>29</sup> The child restraint models were selected because these models are marketed for heavier/older children, and because these CRSs were tested in the vehicle crash tests at Transport Canada. The two vehicle bucks were selected because both the Kia Forte and the Ford Focus had high measured anchorage loads in the Transport Canada frontal vehicle crash test program.

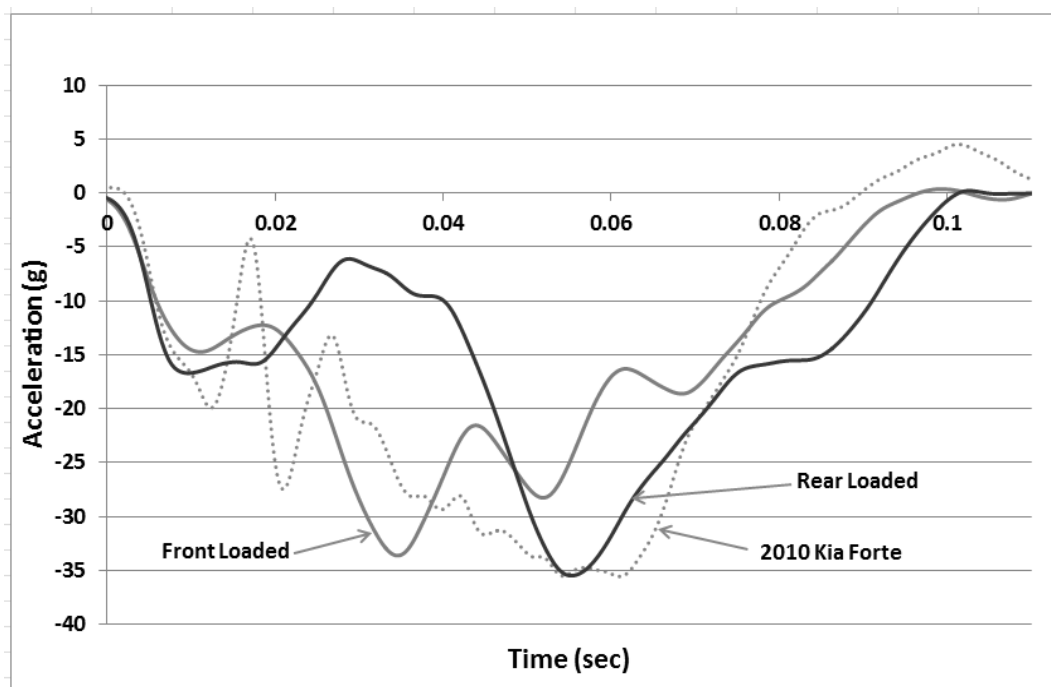
The agency selected two 35 mph, 35 g and 100 millisecond (ms) pulses to simulate a frontal crash. One of the pulses was front loaded while the second one was rear loaded (see Figure 1).<sup>30</sup> These two acceleration pulses were selected to cover the different vehicle acceleration pulse shapes observed in 35 mph full frontal rigid barrier crash tests.

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<sup>28</sup> National Child Restraint Use Special Study, DOT HS 811 679, <http://www-nrd.nhtsa.dot.gov/Pubs/811679.pdf>

<sup>29</sup> Amenson, T; Sullivan, L. "Frontal Sled Tests to Measure and Evaluate Loads on Child Restraint Anchorages," NHTSA Report, copy placed in the docket for this final rule.

<sup>30</sup> A front or rear loaded pulse is defined by the location of the peak acceleration relative to the midpoint of the pulse. If the peak is before the midpoint of the pulse, the pulse is front loaded and if it is after the midpoint, the pulse is rear loaded.



**Figure 1. NCAP Frontal Crash Test Vehicle Acceleration Pulse vs. Vehicle Buck Sled Acceleration Pulses. The Kia Forte acceleration in this figure was filtered to 30 Hz.**

The agency specifically selected the Kia Forte because of the lower anchorage failure observed in the vehicle crash test conducted by Transport Canada (discussed in the previous section). Transport Canada's tests used the Safety 1<sup>st</sup> Apex 65 CRS (approximately 13 lb) and the HIII-10C dummy (77 lb), for a combined weight of about 90 lb. VRTC's test used the same Safety 1<sup>st</sup> CRS model and a weighted HIII-6C dummy (66 lb), for a combined weight of approximately 79 lb.

VRTC conducted a sled test with the Kia Forte buck and a front loaded sled pulse (shown in Figure 1), with the CRS installed in the right rear outboard seating position using the lower anchors and the top tether. Post-test evaluation showed some deformation of the sheet metal with some forward pull of the lower anchorages but not a complete failure of the anchorages. The total anchorage loads (lower anchors+tether) was measured to be 17,330 N and the total load on the lower anchors (inboard+outboard) was 11,666 N (See Table A2 in the Appendix). However, VRTC later conducted another test, identical to the first except the tether was not

attached. In that test, there was complete failure of the lower anchor hardware. The entire bolt and nut assembly pulled through the sheet metal. The total measured force on the lower anchors in this test was 14,922 N, which is 30 percent higher than the total lower anchor load in the earlier test with the tether attached.

NHTSA has reviewed all the sled tests conducted at VRTC (three child restraints in two vehicle bucks) and has determined that the ratio of lower anchor loads (when the tether is not attached) to lower anchor loads (when the tether is attached) ranges from 1.3 to 1.6. That is, these sled test results indicate that the loads on the lower anchorages are 30-60 percent higher when the tether is not used to install the CRS than when the full child restraint anchorage system (lower anchors+tether anchor) are used to install the CRS.

Thus, in further answer to Diono and others as to why we disagree with the suggested approach to increase weights to 80 lb, there is evidence of lower anchor failure when the tether was not attached at a combined weight of only 78 lb. Since we have evidence that 30 percent of forward-facing child restraints installed using the lower anchorages do not have the tether attached in the real world,<sup>31</sup> the labeling requirement reduces the possibility of field failure of lower anchorages, such as that observed in the sled test with the Kia Forte buck, when the combined (child and child restraint) weight approaches 80 lb.

### **Amendments to Revise the Labeling Requirement<sup>32</sup>**

The petitioners would like to “preserve the extended use of lower anchors.” Ms. Baer said in correspondence to NHTSA that “ugly numbers- like 37 or 41 [lb]--are scary to parents & technicians,” and “will likely erode confidence in the LATCH system.” Consumers Union stated

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<sup>31</sup> National Child Restraint Use Special Study, DOT HS 811 679, <http://www-nrd.nhtsa.dot.gov/Pubs/811679.pdf>

<sup>32</sup> The following discussion pertains to requirements that apply only to CRSs equipped with an internal harness to restrain the child and with components to attach to the lower anchorages of a child restraint anchorage system, and for which the combined weight of the CRS and the maximum recommended child weight for use with the internal harness exceeds 65 lb.



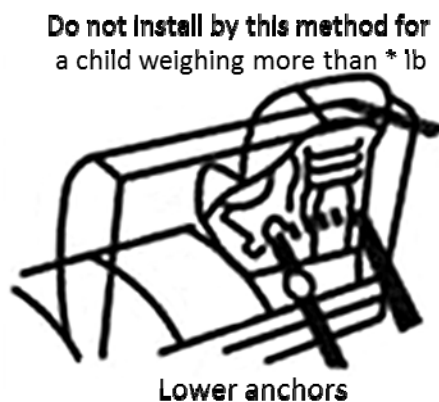
its belief that it will confuse caregivers when “each CRS will still feature a different maximum recommended child weight limit, based on the differences between the seat’s weight and the 65 lb limit of the lower LATCH anchors.”

**Agency Response:** NHTSA has evaluated the petition and the related correspondence and has decided to partially grant the petition. NHTSA is making two primary changes to the labeling requirement.

First, we agree with the view that the wording of the label specified in the 2012 final rule could lead consumers to misunderstand the instruction, remove the harness from the CRS before they should, or otherwise not follow the instruction. NHTSA is thus amending S5.5.2(g)(1)(ii) of the 2012 final rule to remove the instruction from that section. Instead, the instruction will be placed on a diagram that FMVSS No. 213 presently requires to be on CRSs under S5.5.2(l) of the standard. S5.5.2(l)(3) requires CRSs to be labeled with an installation diagram showing the CRS installed in a seating position equipped with a child restraint anchorage system (S5.5.2(l)(3)). We are adding a provision to S5.5.2(l)(3) to specify that a statement about child weight be included with the diagram.

The statement consists of a phrase, “Do not install by this method for a child weighing more than \* lb.” The “\*” value is the difference between 65 lb and the CRS weight, as discussed in the 2012 final rule. Alternatively, as discussed in the next section, the “\*” value may be rounded up, subject to certain conditions.

An example of the installation diagram with the information for the child weight limit for lower anchor use and for promoting tether use is shown below in Figure 2.



**Figure 2. Example of an Installation Diagram Using Child Restraint Anchorages for a Forward-Facing Child Restraint.**

The advantage of using the diagram is that it separates the child weight limit for lower anchor use from all the other information on the label in S5.5.2(g)(1)(ii) and puts it in a location where relevant installation information is provided. It is also advantageous to use diagrams over words to communicate information. The instruction on weight limits is concise and clear. This change will add more clarity regarding the child weight limits and will also be easily available to the caregiver installing the CRS.

Second, NHTSA concurs that the uniquely specific weight values provided on each CRS, based on the difference between 65 lb and the actual weight of the CRS, could be confusing to some consumers. For this reason, the agency is amending the final rule to add some flexibility in the maximum child weight calculation so that the label could be rounded up to display a child weight that is a multiple of five lb, which will be easier for consumers to remember, possibly less confusing to them, and appropriate from a safety point of view. This “rounding up” of the value is at the option of the manufacturer.

To provide this flexibility, the agency balanced the merits of allowing the child weight limit to be rounded up with the need to avoid an unreasonable risk of potentially overloading the

anchorages. We also recognized the need to give different accommodation for CRSs in the forward-facing and rearward-facing modes.

### **CRSs in the Forward-Facing Mode<sup>33</sup>**

NHTSA is amending the February 27, 2012 final rule to permit CRS manufacturers some flexibility in the calculated child weight limit for use with child restraint anchorage systems. We are retaining the requirement that the CRS must specify a maximum child weight for lower anchor use unique to each CRS model. Under the 2012 final rule, the maximum child weight that must be specified on the label is less than or equal to the difference between 65 lb and the weight of the CRS in pounds. Under today's final rule, that requirement is retained, but we are also providing manufacturers an option of rounding the value up to the next multiple of 5 lb. We are adding a provision in FMVSS No. 213 that specifies a lookup table for the maximum child weight limit in multiples of 5 lb for different weight ranges (65 – CRS weight (lb)) and are providing manufacturers the option of employing the table to round up the child weights. See Table 1, below.

**Table 1: For CRSs in Forward-Facing Mode**

<b>x = 65 minus CRS Weight (lb)</b>	<b>Child Weight Limit on Label (lb)</b>
$20 < x \leq 25$	25
$25 < x \leq 30$	30
$30 < x \leq 35$	35
$35 < x \leq 40$	40
$40 < x \leq 45$	45
$45 < x \leq 50$	50
$50 < x \leq 55$	55

<sup>33</sup> Again, this requirement applies only to forward-facing CRSs with internal harnesses for which the combined weight of the CRS and the maximum recommended child weight for use with internal harness exceeds 65 lb.

$55 < x \leq 60$	60
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We recognize that there is a possibility that this amendment will permit a manufacturer to indicate a child weight limit on the label that, when combined with the CRS weight, the combined (child+CRS weight limit) could marginally exceed 65 lb. For instance, if the CRS weighed 19 lb, then  $x = 65 \text{ lb} - 19 \text{ lb} = 46 \text{ lb}$ ; rounding up results in a child weight limit on the label) = 50 lb. This would lead to a combined (CRS + child) weight =  $50 \text{ lb} + 19 \text{ lb} = 69 \text{ lb}$ . Although this combined weight is greater to a slight degree than 65 lb, we believe this situation is acceptable for the following reasons.

First, data indicate that vehicles are equipped with child restraint anchorage systems (lower anchorages plus tether anchorage) that sufficiently surpass the minimum strength requirement of FMVSS No. 225 such that the anchorages will withstand crash forces generated by a combined (child+CRS) weight of 70 lb. NHTSA performed quasi-static tests on the child restraint anchorages in eleven MY 2006-2011<sup>34</sup> vehicle models and 18 MY 2013 vehicle models<sup>35</sup> to explore the strength of the anchorages in the current fleet. (These vehicles were previously crash-tested, but NHTSA examined the vehicles to assess the condition of the child restraint anchorage systems to determine the suitability of the vehicles for inclusion in the quasi-static test program.) The tests consisted of pulling the lower anchorages alone at the two outboard rear seating positions using the Static Force Application Device 2 (SFAD 2)<sup>36</sup> as specified in FMVSS No. 225, using the same loading rate but to higher loads or to anchorage failure. A static pull test was also conducted on the tether anchors alone in three rear seating

<sup>34</sup> Velentin-Ruiz, et al. "Quasi-static load tests to evaluate the strength of child restraint anchorage systems in MY 2006-2011 vehicles," NHTSA Report, December 2013. See docket for this final rule.

<sup>35</sup> "Quasi-static load tests to evaluate the strength of child restraint anchorage systems in MY 2013 vehicles," ALPHA Technology Associates, Inc., December 2013. See docket for this final rule.

<sup>36</sup> Shown in Figure 17 and 18 of FMVSS No. 225, "Child restraint anchorage systems."

positions using a cable at loading rates similar to that specified in FMVSS No 225, but again to higher loads or to anchorage failure.<sup>37</sup>

Among the 11 MY 2006-2011 vehicle models tested, 19 lower anchor sets (comprising two lower anchor bars) and 27 tether anchors were subjected to quasi-static loads. Of these, 14 lower anchor sets had strengths greater or equal to 20 kN, and all the tether anchors had strengths greater than 10 kN. Among the 18 MY 2013 vehicle models tested, 37 lower anchor sets and 46 tether anchors were subjected to quasi-static loads, among which 24 lower anchor sets had strengths greater than 20 kN and 25 tether anchors had strengths greater than 10 kN.<sup>38</sup>

The test results are set forth in a technical document placed in the docket. All in all, the results indicate that the quasi-static lower anchorage strength in current vehicles is significantly higher than required by FMVSS No. 225. The lowest force that produced lower anchor failure was 19.7 kN (2010 Kia Forte).<sup>39</sup> Our testing suggests that child restraint anchorage systems as currently manufactured are capable of withstanding the forces from a combined weight of 70 lb in a crash.

Second, although there is no consistent and direct correlation between dynamic to static strength of anchorage systems and the dynamic to static strength ratio is vehicle specific, data show that child restraint anchorage systems are able to withstand higher loads dynamically than

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<sup>37</sup> The agency had planned to test all the anchorages to failure. However, when the SFAD 2 broke in one of the tests before the vehicle anchorages failed, the agency decided to limit the quasi-static load to 20 kN for the lower anchors in the remaining tests to prevent continuously damaging and repairing the SFAD 2. In addition, the tether loads were limited to 10 kN to prevent damage to the equipment. Since the tether anchorage tests were performed after the lower anchorage tests, and because some of the vehicle seats experienced excessive seat damage and deformation during the lower anchorage tests, achieving target loads in the tether anchorage tests was not possible in some vehicles.

<sup>38</sup> In some tests, even though there was no anchorage failure, there was significant displacement and deformation of adjoining structures including the seat. In some cases, the target loads could not be achieved without failure of the anchorages because of significant deformation of the seat structure.

<sup>39</sup> However, some vehicles may sustain significant rear seat movement at higher loads (such as that of the Toyota Yaris), which may result in an increase in the forward excursion of the CRS in a frontal crash. This suggests that while current child restraint anchorage designs are more robust than the minimum required designs, they do have strength limits and so may not be adequate for installing heavy child restraint models with very heavy or older children.

statically. Our test data demonstrate that the dynamic strength of the child restraint anchorage systems (lower anchors+tether anchor) in our tests was greater than the 15 kN load required by FMVSS No. 225. In the Alliance's petition for reconsideration of the strength requirements of the 1999 final rule, the Alliance indicated that the quasi-static test load of FMVSS No. 225 simulating a high-speed impact should be approximately 50 percent of the expected dynamic load.<sup>40</sup> As discussed in the 2003 final rule responding to petitions for reconsiderations (68 FR 38218), Toyota determined that the tether anchorage was able to withstand about 30 percent greater loads dynamically than statically. NHTSA has considered these findings and believes that data indicate that the child restraint anchorage system will be able to withstand the crash forces generated by the combined child weight (rounded up)+CRS weight.

#### **CRSs in the Rear-Facing Mode<sup>41</sup>**

Rear-facing CRSs typically do not have a top tether attachment. When FMVSS No. 225 became effective in 1999, rear-facing child restraints were generally recommended for children weighing up to 20 lb. Currently in the market, there are "3-in-1" child restraints that alone weigh more than 20 lb that are recommended to use rear-facing with children weighing up to 45 lb. Thus, for these CRSs, the combined weight of CRS and the maximum weight of child recommended for the CRS exceeds 65 lb. Since these rear-facing child restraints are only attached using the lower anchorages without a tether, the lower anchorages are subjected to greater loads in a crash than if a similar weight child and CRS were in the forward-facing mode with the tether attached.

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<sup>40</sup> See 68 FR 38208, 38218; June 27, 2003.

<sup>41</sup> Again, this requirement applies only to rear-facing CRSs with internal harnesses for which the combined weight of the CRS and the maximum recommended child weight for use with internal harness exceeds 65 lb.

In its correspondence sent to the agency, the Alliance requested that NHTSA make clear that the label limiting the combined (child+CRS) weight to 65 lb for lower anchor use also must be placed on rear-facing child restraints.

In response, we agree to reiterate that the labeling requirement of the February 2012 final rule applies to those CRSs using lower anchorages in the rear-facing mode. There is good reason for the applicability to these CRSs, as the safety need addressed by the label is relevant to rear-facing CRSs as it is to forward-facing CRSs. However, we believe that the combined child+CRS weight should not exceed 65 lb for CRSs in the rear-facing mode under any circumstances, unlike the potential 70 lb limit for forward-facing restraints using the 3-point anchorage attachment (lower anchors plus tether anchor). This is because FMVSS No. 225 requires the minimum strength of lower anchorages alone to be only 11 kN (compared to the 15 kN strength of the full 3-point anchorage system).

Accordingly, manufacturers of covered rear-facing CRSs must specify a maximum child weight limit for lower anchor use. (Again, the covered CRSs are those that are recommended for use in the rear-facing mode, for which the combined weight of the CRS and the maximum recommended child weight for the rear-facing mode exceeds 65 lb.) We are retaining the provision that each covered CRS must be labeled with the maximum child weight for use with the lower anchors, which is less than or equal to the difference between 65 lb and the weight of the CRS in pounds. The CRS manufacturer is to provide the child weight on the installation diagram specified by S5.5.2(l).

However, under today's final rule, we are also providing manufacturers an alternative of using a maximum child weight value that is a multiple of 5 lb by way of a lookup table. This alternative is adopted to enable manufacturers to avoid displaying an "ugly number" for the child

weight. We are adding a provision in FMVSS No. 213 that specifies the lookup table for the maximum child weight limit in multiples of 5 lb for different weight ranges ( $60 - \text{CRS weight (lb)}$ ) and are providing manufacturers the option of employing the table to obtain the maximum child weight limit. The maximum child weight limit is based on a calculation of 60 lb minus the weight of the CRS. We are using 60 lb rather than 65 lb as a starting point to ensure that the rounded value does not exceed 65 lb. This is important because for rear-facing restraints, the top tether will not be employed so the lower anchorages will be experiencing more crash forces than the full child restraint anchorage system. See Table 2, below.

**Table 2 – for CRSs in Rear-Facing Mode**

<b><math>x = 60 - \text{CRS Weight (lb)}</math></b>	<b>Child Weight Limit on Label (lb)</b>
$15 < x \leq 20$	20
$20 < x \leq 25$	25
$25 < x \leq 30$	30
$30 < x \leq 35$	35
$35 < x \leq 40$	40
$40 < x \leq 45$	45
$45 < x \leq 50$	50
$50 < x \leq 55$	55



Based on our testing experience, we believe that a set of minimally compliant lower anchorages (with a quasi-static strength of 11 kN) has sufficient dynamic strength to withstand inertial loads from a combined weight of 65 lb in a 35 mph frontal crash.<sup>42</sup>

### **CRSs Used Both Rear- and Forward-Facing**

For CRSs that have a rear-facing and forward-facing mode with internal harnesses, we prefer that the CRS provide installation diagrams in both modes along with a corresponding maximum child weight limit for lower anchor use, if such a limit is required. However, we are not requiring installation diagrams in both modes at this time. If a CRS manufacturer only provides one installation diagram and if a child weight limit is required in only one of the modes (rear-facing or forward-facing), then the diagram shall depict the installation in that particular mode along with the corresponding child weight limit. Alternatively, if a child weight limit is required in both modes and only one installation diagram is provided, then the child weight limit is either less than or equal to the difference between 65 and the CRS weight (lb) or the lesser of the child weight limits determined by way of Table 1 for the forward-facing mode and Table 2 for the rear-facing mode.

### **The Label's Effect on Current Weight Recommendations**

The petitioners express concern that the 65 lb combined maximum weight limit “will unnecessarily restrict the use of the LATCH system and force caregivers back to using seat belts for anchoring forward-facing” child restraints.

We do not agree that the new label will significantly reduce the number of CRSs that are installed with the lower anchorages of child restraint anchorage systems. Currently, technicians

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<sup>42</sup> Since the child restraint is not tightly coupled to the vehicle when the tether is not attached, we are unable to determine the combined child weight limit using Newtonian principles since the peak acceleration of the child restraint cannot be assumed to be that of the vehicle.

at child seat inspection stations recommend use of the child restraint anchorage system for children weighing between 40-48 lb, which corresponds to about a 6-year-old (see Table 3, below).<sup>43</sup> We reviewed the weights of harness-equipped CRSs in the market since 2008<sup>44</sup> to assess what the child weight limit for lower anchor use would be per the new labeling requirement. The detailed data are provided in Table A3 in the appendix to this preamble. Our review of 69 forward-facing harness-equipped CRSs showed that only 3 percent (2/69) of CRS models would have a child weight limit less than 40 lb. A child weight of 40 lb corresponds to a 50<sup>th</sup> percentile 5-year-old child by weight (see Table 3, below). Twenty-nine (29) percent (20/69) would have a child weight limit of 40 or 45 lb. Thirty-six (36) percent (25/69) would have a child weight limit greater or equal to 50 lb for lower anchor use per the new labeling requirement, which corresponds to approximately a 40<sup>th</sup> percentile 7-year-old child, by weight. Finally, 32 percent (22/69) would not require a label specifying maximum child weight for lower anchor use since the combined CRS and maximum recommended child weight in harness-equipped CRSs is less than 65 lb (17 of these CRSs have a recommended child weight of 40 lb and for the remaining 5 CRSs it is 50 lb). Thus, the label will expand lower anchor use past the 48 lb child weight limit for forty-four (44) percent of child restraints, and only restricts approximately 3 percent of CRS models to a child weight limit less than 40 lb for lower anchor use. Overall, the label will not reduce current lower anchor use but will provide clarity and

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<sup>43</sup> We understand that fitting station technicians currently use a child weight limit of 40 lb (corresponding to the weight of a 50<sup>th</sup> percentile 5-year-old child) if the child weight limit for lower anchor use is not provided by the vehicle manufacturer. Because most vehicle manufacturers and CRS manufacturers have not provided a maximum child weight limit for lower anchor use, technicians in the field have been applying a child weight limit of 40 lb. Thus, a 40 lb maximum child weight for lower anchor use represents one end of the range of current “industry” recommendations. Further, the manual used by technicians indicates that 42 percent of vehicle makes specifies a child weight limit of 48 lb for lower anchor use. (A child weight of 48 lb corresponds to an 85<sup>th</sup> percentile 5-year-old, 60<sup>th</sup> percentile 6-year-old, and 40<sup>th</sup> percentile 7-year-old child by weight, according to the 2000 CDC growth charts (see Table 3).) The 48 lb weight represents another part of the range of current industry recommendations for lower anchorage use.

<sup>44</sup> All CRSs evaluated under NHTSA’s CRS Ease-of-Use rating program for the years 2008-2012 were further evaluated to determine the maximum child weight for lower anchor use.

assurance that the anchors can be used as the child grows, which may in fact increase use of the anchors.

**Table 3. 5<sup>th</sup>, 50<sup>th</sup>, and 95<sup>th</sup> Percentile Weight and Height of Children by Age (CDC Growth Charts 2000)**

Age	Weight (lb)			Height (in)		
	5th percentile	50th percentile	95th percentile	5th percentile	50th percentile	95th percentile
1	19	22	28	28	30	32
2	23	28	34	32	35	37
3	28	31	39	35	38	40
4	30	36	45	38	40	43
5	33	41	51	40	43	46
6	37	45	60	43	46	49
7	41	51	68	45	48	52
8	45	58	77	47	51	55

The agency found no infant carriers for which the combined CRS+child weight (CRS weight + maximum child weight recommended for infant seat) exceeded 65 lb; therefore, no infant carrier will currently need the label.

Among 46 CRS convertible and 3-in-1 models which can be used in rear-facing mode, only 4 CRS models (8.7 percent) had a combined child+CRS weight (maximum child weight + CRS weight recommended for rear-facing mode) in excess of 65 lb, which requires a label specifying the maximum child weight for lower anchor use (See Table A3 in the Appendix to this preamble). Among these 4 CRSs, one CRS weighs 33.8 lb with a recommended child weight in rear-facing mode of 40 lb, and the remaining 3 CRSs weighed between 22.3-25.8 lb

with a recommended child weight in rear-facing mode of 45 lb.<sup>45</sup> It is unlikely that these CRSs will be used in rear-facing mode to the maximum recommended child weight of 40-45 lb since, as discussed in the next section, the child may get too tall to sit comfortably rear-facing or may exceed the height requirement before the weight limit is reached.

Permitting the calculated child weight limit to be a multiple of 5 lb will result in values that will be easier for the consumer to understand. The agency will incorporate this label in education material so that consumers are aware that there is a maximum child weight limit for lower anchor use and to look for this information on the CRS.

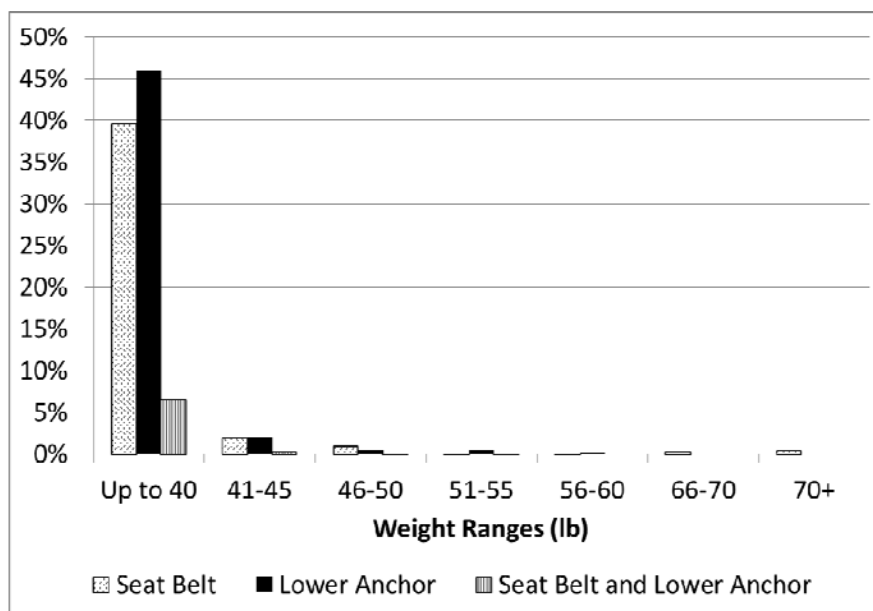
### **Practical Implications**

Field data show that harness-equipped CRSs are not now being widely used by consumers for children weighing more than 50 lb. The agency analyzed data from the National Child Restraint Use Special Study (NCRUSS)<sup>46</sup> to examine this issue. The survey data show that among children restrained in forward-facing harness-equipped CRSs (for both seat belt and lower anchor installation), 92.3 percent of the children weighed 40 lb or less, 5.9 percent weighed 41 to 50 lb, and only 1.5 percent weighed more than 50 lb (see Figure 3). Data suggest that children are outgrowing CRSs by height rather than by weight.

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<sup>45</sup> For reference, a 50<sup>th</sup> percentile 5 year-old weighs about 40 lb and a 50<sup>th</sup> percentile 6 year-old weighs 45 lb.

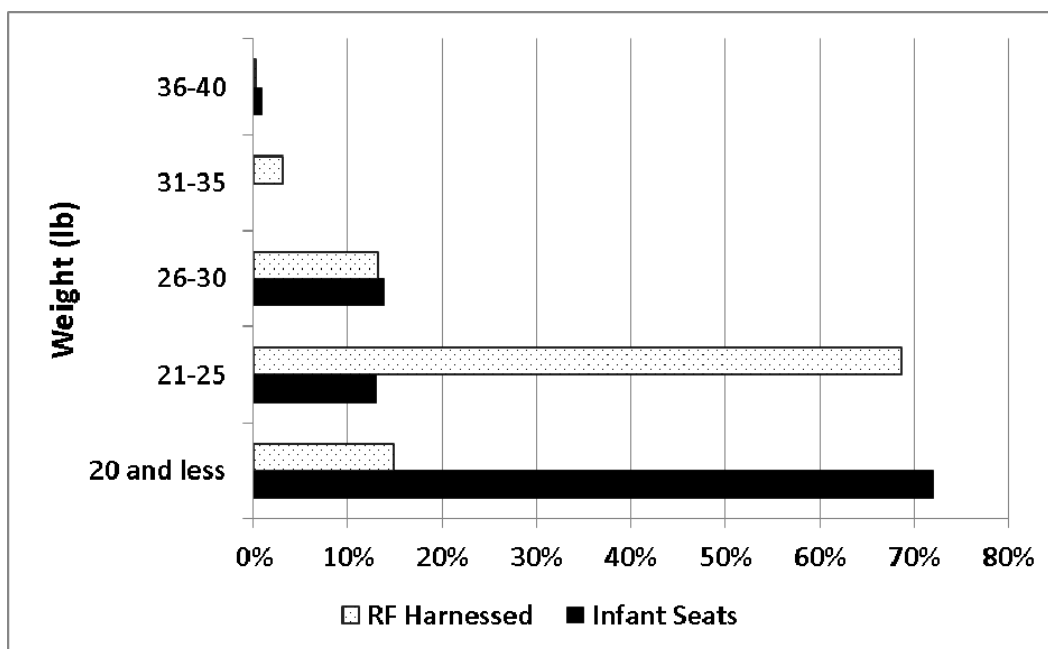
<sup>46</sup> NCRUSS is a large-scale nationally-representative survey that contains both an inspection of the child passenger's restraint system (or lack thereof) by a certified Child Passenger Safety Technician (CPST) and a detailed interview of the driver conducted by a highly trained investigation specialist.<sup>46</sup> The survey collected information on drivers and their child passengers 0-8 years old between June and August 2011. National Child Restraint Use Special study, DOT HS 811 679, <http://www-nrd.nhtsa.dot.gov/Pubs/811679.pdf>.



**Figure 3. NCRUSS Survey: Field Use of Forward-Facing CRS with Internal Harnesses by Method of Installation and by Child Weight Ranges.**

Since rear-facing harness-equipped CRSs are now designed for older/heavier children, the agency also used the NCRUSS survey to explore how these CRSs are used in the field. The NCRUSS survey show that 83.4 percent of children in rear-facing convertible or all-in-one seats (both of which are equipped with harnesses) weighed 25 lb or less, 13.2 percent weighed 26 to 30 lb, 3.2 percent weighed 30 to 35 lb (corresponding to a 50<sup>th</sup> percentile 4-year-old or 75<sup>th</sup> percentile 3-year-old), and 0.2 percent weighed more than 35 lb. The NCRUSS survey also show that 85.1 percent of children in rear-facing infant seats weighed 25 lb (corresponding to a 50<sup>th</sup> percentile 18 month old) or less, 13.9 percent weighed 26 to 30 lb<sup>47</sup>, and 1 percent weighed more than 30 lb (see Figure 4). The NCRUSS survey show that children weighing more than 35 lb are almost never restrained in rear-facing child restraints.

<sup>47</sup> A 30 lb child corresponds to a 50<sup>th</sup> percentile 3-year-old.



**Figure 4. NCRUSS Survey: Field Use of Rear-Facing CRSs by Type of CRS and by Child Weight Ranges.**

### Using Seat Belts

The petitioners state that “the decision to adopt 65 pounds as the combined maximum weight... will unnecessarily restrict the use of the LATCH system and force caregivers back to using seat belts for anchoring forward-facing [CRSs].” JPMA states that CRSs might not achieve a tight fit with a seat belt or may be too difficult to install with a seat belt and that parents might not know to switch to the seat belt during the several-year course of a CRS’s use. Dorel states that child restraint anchorage systems are easier to use and have a higher rate of correct installation than seat belts, so an installation by the former is safer than a belt installation.

**Agency Response:** These arguments are speculative and unsupported. Field data show a high percentage of children weighing over 40 lb restrained in forward-facing CRSs installed with seat belts, i.e., consumers are now attaching CRSs with seat belts at a high rate. The consumers

will not be “forced back” to doing something different.<sup>48</sup> Moreover, recent field data<sup>49</sup> shows that most children graduate to booster seats when they reach approximately 40 lb, which corresponds to a 95<sup>th</sup> percentile 3-year-old or a 50<sup>th</sup> percentile 5-year-old. Thus, it appears unlikely that the label will “force caregivers back to using seat belts for anchoring forward-facing” CRSs since many children do not now use harness-equipped CRSs when they reach 40 lb in weight.

The arguments that new seat belt designs are incompatible with CRS installation are speculative. Views are evolving regarding the compatibility of new belt designs, such as inflatable seat belts, with CRS installation. For instance, Britax initially recommended against CRS installation using inflatable belts, but has changed its mind and now permits CRS installations with the belts. We do not have reason to believe that seat belts with advanced technologies cannot be designed to install CRSs. We also note that SAE J1819 is undergoing revisions to improve compatibility of seat belts and child restraint anchorages with CRSs.<sup>50</sup> It would be premature for NHTSA to conclude that changes in seat belt design render installation of CRSs by seat belts unfeasible.

Regarding Dorel’s statement, NHTSA believes that the statement is not germane to the issue of the design limits of child restraint anchorage systems. If the anchorages are used in a manner that results in material failure because the design limits of the anchorage system were

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<sup>48</sup> It does not make sense to us that we should suspend the label because parents might not remember to switch to the seat belt during the course of a CRS’s use, as suggested by JPMA. It seems to us that it makes more sense to try to instruct consumers of the design limits of child restraint anchorage systems so that they may be informed to correctly use of the systems, than to forgo informing them about the 65 lb limit because it is presumed that the consumer is unlikely to switch to the seat belt at the appropriate time.

<sup>49</sup> NCRUSS, DOT HS 811 679, <http://www-nrd.nhtsa.dot.gov/Pubs/811679.pdf>.

<sup>50</sup> Society of Automotive Engineers (SAE) J1819, “Securing Child Restraint Systems in Motor Vehicles.” This SAE recommended practice is meant to promote compatibility between child restraint systems and vehicle seats and seat belts. The recommended practice provides design guidelines to vehicle manufacturers for certain characteristics of seats and seat belts, and to CRS manufacturers for corresponding CRS features so that each can be made more compatible with the other. <https://standards.sae.org/wip/j1819/>.

exceeded, the child passenger is at risk regardless of the relative ease of using child restraint anchorage systems or the tightness of the installation of CRSs on the anchorages.

### **Tether Anchorages**

The petitioners also state that their intent in petitioning for reconsideration of the rule was to “minimize the likelihood that vehicle manufacturers will apply the same formula” to tether anchorages. Issues relating to weight limits for the top tether anchorage are out of scope of this rulemaking.

### **Increasing the Strength of the Anchorage System**

The petitioners believe that NHTSA should require vehicle manufacturers to increase the strength of child restraint anchorage systems to accommodate a higher combined weight. This issue is out of scope of this rulemaking.

## **b. Other Issues**

### **Head Excursion**

Graco requests that the 10YO test dummy only be used to test CRSs when the dummy fits in the seat as per the manufacturer’s recommended usage. Graco states that it produces a harness-equipped CRS recommended for a 70 lb child, but limits the recommended seated height of the child occupant and limits the head height relative to the seat. Graco asks that the 10YO dummy not be used to evaluate performance of the CRS if the dummy exceeds the recommended limits on seating height. Graco believes that in the real world, the seat would not be used with a child of this stature, and as a result, the 10YO dummy may give inaccurate readings.

Alternatively, Graco suggests that the dummy be used to evaluate CRSs to assess structural integrity, chest resultant, and knee excursion limits but not the head excursion requirement.

Graco states that the head excursion measurement resulting from the use of the 10YO dummy



would not represent the real world due to the dummy being significantly taller than the recommended child occupant.

### **Agency Response**

The agency is denying Graco's request. It is not in the public interest to exclude testing those CRSs recommended for children of a weight range represented by the 10YO dummy but whose height may be lower than that of the dummy.

The agency indirectly addressed this issue in the rulemaking. In the 2008 SNPRM (73 FR 3908), we had considered whether FMVSS No. 213 should expressly require that each CRS be capable of fitting the test dummy that is specified in S7 of the standard to evaluate the CRS. The agency only received comments from JPMA, which stated that child restraints are designed to accommodate the dummies with which they will be tested and that an explicit "fit" requirement is not required. After reviewing the comment, the agency decided not to pursue a fit requirement, assuming it was not needed because manufacturers already ensure that CRSs accommodate/fit the appropriate child dummies.

Graco is now indicating that a CRS it has produced is recommended for children represented by the 10YO dummy weight-wise, but does not fit the dummy height-wise. We do not believe it would be in the interest of safety to exclude the CRS from testing with the 10YO dummy, or exclude the CRS from a performance requirement, because the CRS does not actually fit the dummy. We believe that a better approach would be to subject the CRS to testing with the dummy if the manufacturer recommends the CRS for use with children represented by the dummy, as designated by S7 of FMVSS No. 213.

We have not been provided with any compelling information to exclude Graco's CRS from testing with the dummy. Graco has the option to lower the child weight recommendation

of the CRS in question from 70 lb to 65 lb to avoid testing with the dummy, or it could continue to market the CRS for children over 65 lb and ensure that the CRS meets the FMVSS No. 213 requirements when tested with the 10YO (such as by redesigning the CRS to have a harness slot that can properly accommodate the 10YO dummy and/or making any structural changes needed to ensure integrity and performance using this dummy).

### **Weights of the Anthropomorphic Test Devices**

The February 2012 final rule adopted a provision (S5(f)) that basically excludes CRSs equipped with an internal harness from FMVSS No. 213 while attached to the lower anchors of the child restraint anchorage system under certain circumstances. The circumstances are: the test dummy used to test the CRS is of a weight such that the dummy's weight plus the CRS weight exceeds 65 lb. In a March 29, 2012 letter on this provision, Graco states that:

[T]esting will be required with LATCH if the combined ATD and CRS weight is under the 65 lb limit. Therefore, the weight of the ATD will be important in determining what testing is required for any CRS. Since ATD weights vary and the addition of clothing, shoes, and instrumentation can add significant weight to the ATD, ... [NHTSA should] publish a list of the useful weight for each ATD to be used for testing.

In response, NHTSA agrees that the provision in the 2012 final rule implies a need for information on the test dummy weights. However, as Graco notes, the test dummy weights vary, and the addition of clothing, shoes, and instrumentation (the weights for which are not specified in NHTSA's regulations) can affect the "weight" of the test dummy and add undue uncertainty to the test provisions of the standard. Uncertainty results from variability in the weight of the dummy due to variances in the clothing, shoes, and instrumentation used with a particular dummy. We conclude that, to avoid this uncertainty, S5(f) should be slightly revised to move from a reference of "a test dummy of a weight" to "the average weight of the child represented by the test dummy." The average weight of the child represented by the dummy can be specified

in FMVSS No. 213--which NHTSA is specifying in this final rule<sup>51</sup>--and is not subject to the same degree of variation as the “test dummy of a weight” provision. Thus, we will reword S5(f) to exclude from lower anchor testing CRSs tested with a dummy that results in the combined weight of the CRS and the average weight of child represented by the test dummy (shown in a table in the standard) to exceed 65 pounds in the forward-facing mode and 65 pounds in the rear-facing mode.<sup>52</sup>

Using the average child weight represented by the test dummy eliminates the variability of dummy weights due to differences in instrumentation and clothing. The average child weights are within the weight range for dummy selection specified in S7.1.2 and so would not change the method of testing CRSs. In addition, using the average child weight in the referenced table ensures that the child restraint system is tested using lower anchors with the test dummy closest to the maximum child weight limit on the label for lower anchor use.

An example illustrating this is as follows. If a CRS weighing 19 lb has a label specifying 50 lb as the maximum child weight for lower anchor use, this CRS will be tested using the lower anchors with the Hybrid III 6-year-old dummy. The average weight of the child represented by this test dummy is 45 lb.

## **V. Rulemaking Analyses and Notices**

### **Executive Order (E.O.) 12866, E.O. 13563 and DOT Regulatory Policies and Procedures**

The agency has considered the impact of this regulatory action under E.O. 12866 and E.O. 13563 and the Department of Transportation’s (DOT’s) regulatory policies and procedures.

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<sup>51</sup> The average weight of child represented by the various test dummies in the table is obtained from the Centers for Disease Control (CDC) 2000 Growth Charts.

<sup>52</sup> Such a child restraint must meet the standard when tested using its internal harnesses to restrain such a test dummy while attached to the standard seat assembly using the belt system.

This rulemaking action was not reviewed by the Office of Management and Budget under E.O. 12866. This rulemaking is also not significant under DOT's regulatory policies and procedures (44 FR 11034, February 26, 1979).

This response to a petition for reconsideration mostly denies the petition. The few changes that are being made are minor, mostly to clarify a labeling requirement and to provide flexibility to CRS manufacturers regarding the wording of the label. We estimate that today's final rule has no effect on the estimated costs and benefits and other economic impacts of the February 27, 2012 final rule.

### **Regulatory Flexibility Act**

The Regulatory Flexibility Act of 1980, as amended, requires agencies to evaluate the potential effects of their proposed and final rules on small businesses, small organizations and small governmental jurisdictions. I hereby certify that this final rule will not have a significant economic impact on a substantial number of small entities. Small organizations and small governmental units will not be significantly affected since the potential cost impacts associated with this final rule will not significantly affect the price of child restraints.

This final rule denies most of the petition for reconsideration of the February 2012 final rule. To the extent we are amending the original final rule, the amendments are minor, mostly to clarify a labeling requirement, and adequate lead time is provided. The cost of revising the label is minimal.

### **National Environmental Policy Act**

NHTSA has analyzed this rulemaking action for the purposes of the National Environmental Policy Act. The agency has determined that implementation of this action would not have any significant impact on the quality of the human environment.

**Executive Order 13132 (Federalism)**

NHTSA has examined this final rule pursuant to Executive Order 13132 (64 FR 43255, August 10, 1999) and concluded that no additional consultation with States, local governments or their representatives is mandated beyond the rulemaking process. The agency has concluded that the rulemaking would not have sufficient federalism implications to warrant consultation with State and local officials or the preparation of a federalism summary impact statement. The final rule would not have “substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.”

NHTSA rules can preempt in two ways. First, the National Traffic and Motor Vehicle Safety Act contains an express preemption provision: When a motor vehicle safety standard is in effect under this chapter, a State or a political subdivision of a State may prescribe or continue in effect a standard applicable to the same aspect of performance of a motor vehicle or motor vehicle equipment only if the standard is identical to the standard prescribed under this chapter. 49 U.S.C. 30103(b)(1). It is this statutory command by Congress that preempts any non-identical State legislative and administrative law addressing the same aspect of performance.

The express preemption provision described above is subject to a savings clause under which “[c]ompliance with a motor vehicle safety standard prescribed under this chapter does not exempt a person from liability at common law.” 49 U.S.C. 30103(e) Pursuant to this provision, State common law tort causes of action against motor vehicle or equipment manufacturers that might otherwise be preempted by the express preemption provision are generally preserved. However, the Supreme Court has recognized the possibility, in some instances, of implied preemption of such State common law tort causes of action by virtue of NHTSA’s rules, even if

not expressly preempted. This second way that NHTSA rules can preempt is dependent upon there being an actual conflict between an FMVSS and the higher standard that would effectively be imposed on motor vehicle or equipment manufacturers if someone obtained a State common law tort judgment against the manufacturer, notwithstanding the manufacturer's compliance with the NHTSA standard. Because most NHTSA standards established by an FMVSS are minimum standards, a State common law tort cause of action that seeks to impose a higher standard on motor vehicle or equipment manufacturers will generally not be preempted. However, if and when such a conflict does exist - for example, when the standard at issue is both a minimum and a maximum standard - the State common law tort cause of action is impliedly preempted. See Geier v. American Honda Motor Co., 529 U.S. 861 (2000).

Pursuant to Executive Order 13132 and 12988, NHTSA has considered whether this rule could or should preempt State common law causes of action. The agency's ability to announce its conclusion regarding the preemptive effect of one of its rules reduces the likelihood that preemption will be an issue in any subsequent tort litigation.

To this end, the agency has examined the nature (e.g., the language and structure of the regulatory text) and objectives of this rule and finds that this rule, like many NHTSA rules, prescribes only a minimum safety standard. As such, NHTSA does not intend that this rule preempt state tort law that would effectively impose a higher standard on motor vehicle or equipment manufacturers than that established by this rule. Establishment of a higher standard by means of State tort law would not conflict with the minimum standard announced here. Without any conflict, there could not be any implied preemption of a State common law tort cause of action.

**Executive Order 12988 (Civil Justice Reform)**

With respect to the review of the promulgation of a new regulation, section 3(b) of Executive Order 12988, “Civil Justice Reform” (61 FR 4729, February 7, 1996) requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) Clearly specifies the preemptive effect; (2) clearly specifies the effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct, while promoting simplification and burden reduction; (4) clearly specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. This document is consistent with that requirement.

Pursuant to this Order, NHTSA notes as follows. The preemptive effect of this rule is discussed above. NHTSA notes further that there is no requirement that individuals submit a petition for reconsideration or pursue other administrative proceeding before they may file suit in court.

### **Paperwork Reduction Act**

NHTSA has provided a 60-day comment period (77 FR at 11645) and a 30-day comment period (78 FR at 77554) on the collection of information requirement in the previous final rule.<sup>53</sup> The agency asked for public comments on a collection of information titled, “Consolidated Child Restraint System Registration, Labeling and Defect Notifications.” OMB Control Number: 2127–0576. The requested expiration date of approval is 3 years from the approval date. We requested approval of a revision to a currently approved collection, and for revising an existing label and adding a sentence to the printed instructions of certain child restraint systems (CRSs with internal harnesses for which the combined weight of the CRS and the maximum

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<sup>53</sup> Under the Paperwork Reduction Act of 1995, a person is not required to respond to a collection of information by a Federal agency unless the collection displays a valid OMB control number.

recommended child weight for use with internal harness exceeds 65 lb). The added sentences will inform the consumer that the lower anchors of a child restraint anchorage system may be used up to a combined weight of child and harnessed-child restraint of 65 lb. The purpose of this label is to reduce consumer confusion about using the lower anchors and to reduce the risk that the lower anchors will be used in a way that is beyond the design limitations of the anchorage system.

### **National Technology Transfer and Advancement Act**

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (NTTAA), Public Law 104-113, section 12(d) (15 U.S.C. 272) directs NHTSA to use voluntary consensus standards in its regulatory activities unless doing so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies, such as the Society of Automotive Engineers (SAE). The NTTAA directs the agency to provide Congress, through the OMB, explanations when we decide not to use available and applicable voluntary consensus standards.

NHTSA has reviewed available information and has determined that there are no voluntary consensus standards relevant to this rulemaking.

### **Unfunded Mandates Reform Act**

Section 202 of the Unfunded Mandates Reform Act of 1995 (UMRA) requires Federal agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local or tribal governments, in the aggregate, or by the private sector, of more than \$100 million in any



one year (adjusted for inflation with base year of 1995). This final rule would not result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector of more than \$100 million annually.

### **Executive Order 13045**

Executive Order 13045 (62 FR 19885, April 23, 1997) applies to any rule that: (1) is determined to be “economically significant” as defined under E.O. 12866, and (2) concerns an environmental, health, or safety risk that NHTSA has reason to believe may have a disproportionate effect on children. This rulemaking is not subject to the Executive Order because it is not economically significant as defined in E.O. 12866.

### **Executive Order 13211**

Executive Order 13211 (66 FR 28355, May 18, 2001) applies to any rulemaking that: (1) is determined to be economically significant as defined under E.O. 12866, and is likely to have a significantly adverse effect on the supply of, distribution of, or use of energy; or (2) that is designated by the Administrator of the Office of Information and Regulatory Affairs as a significant energy action. This rulemaking is not subject to E.O. 13211.

### **Plain Language**

The Plain Language Writing Act of 2010 (P. L. 111-274) and Executive Order 12866 require each agency to write all rules in plain language. Application of the principles of plain language includes consideration of the following questions:

- Have we organized the material to suit the public’s needs?
- Are the requirements in the rule clearly stated?
- Does the rule contain technical language or jargon that is not clear?

- Would a different format (grouping and order of sections, use of headings, paragraphing) make the rule easier to understand?
- Would more (but shorter) sections be better?
- Could we improve clarity by adding tables, lists, or diagrams?
- What else could we do to make this rulemaking easier to understand?

If you have any responses to these questions, please send them to NHTSA at the ADDRESSES section in the heading of this final rule.

### **Regulation Identifier Number (RIN)**

The Department of Transportation assigns a regulation identifier number (RIN) to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. You may use the RIN contained in the heading at the beginning of this document to find this action in the Unified Agenda.

### **Privacy Act**

Anyone is able to search the electronic form of all material received into any of our dockets, including petitions for reconsideration of this rule (a copy of which will be placed in the docket), by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the Federal Register published on April 11, 2000 (65 FR 19477 at 19478).

### **List of Subjects in 49 CFR Part 571**

Labeling, Motor vehicle safety, Reporting and recordkeeping requirements, Tires.

In consideration of the foregoing, NHTSA amends 49 CFR part 571 as follows:

## PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS

1. The authority citation for part 571 continues to read as follows:

Authority: 49 U.S.C. 322, 30111, 30115, 30117 and 30166; delegation of authority at 49 CFR 1.95.

2. Section 571.213 is amended by revising S5(f), S5.5.2(g)(1)(ii), S5.5.2(l)(3), and S5.6.1.12, to read as follows:

**§571.213 Standard No. 213: Child restraint systems.**

\* \* \* \* \*

S5 \* \* \*

(f) Each child restraint system that is equipped with an internal harness or other internal components to restrain the child need not meet this standard when attached to the lower anchors of the child restraint anchorage system on the standard seat assembly if the sum of the weight of the child restraint system (in pounds) and the average weight of child represented by the test dummy used to test the child restraint in accordance with S7 of this standard, shown in the table below, exceeds 65 pounds. Such a child restraint must meet this standard when tested using its internal harness or components to restrain such a test dummy while installed using the standard seat belt assembly specified in S5.3.2 of this standard.

**Table to S5(f) – Average weight of child represented by various test dummies.**

Test Dummy (specified in S7 of this standard)	Average weight of child represented by test dummy (pounds)
CRABI 12-month-old infant dummy (49 CFR Part 572, Subpart R)	22
Hybrid III 3-year-old dummy (49 CFR Part 572, Subpart P)	31

Hybrid III 6-year-old dummy 49 CFR Part 572, Subpart N)	45
Hybrid III 6-year-old weighted child test dummy (49 CFR Part 572 Subpart S)	62
Hybrid II 6-year-old dummy (49, CFR Part 572, Subpart I)	45

\* \* \* \* \*

S5.5.2 \* \* \*

(g) \* \* \*

(1) \* \* \*

(ii) Secure this child restraint with the vehicle's child restraint anchorage system, if available, or with a vehicle belt. [For car beds, harnesses, and belt positioning seats, the first part of the statement regarding attachment by the child restraint anchorage system is optional.] [For belt-positioning seats, the second part of the statement regarding attachment by the vehicle belt does not apply.] [For child restraints manufactured from February 27, 2014 to February 26, 2015, the following statement applies.] Child restraint systems equipped with internal harnesses to restrain the child and with components to attach to a child restraint anchorage system and 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 restraining 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.”

\* \* \* \* \*

(1) \* \* \*

(3) A seating position equipped with a child restraint anchorage system. For child restraint systems manufactured on or after February 27, 2015, the following paragraphs (1)(3)(i) and (ii) apply, as appropriate.

(i) If the child restraint is designed to meet the requirements of this standard when installed by the child restraint anchorage system according to S5.3.2, and if the sum of the weight of the child restraint and the maximum child weight recommended for the child restraint when used with the restraint’s internal harness or components is greater than 65 lb when used forward-facing or rear-facing, include the following statement on this installation diagram: “Do not install by this method for a child weighing more than \*.” At the manufacturer’s option, “\*” is the child weight limit in English units in accordance with S5.5.2(1)(3)(A)(i), (ii), or (iii). The corresponding child weight limit in metric units may also be included in the statement at the manufacturer’s option.

(A) For forward-facing and rear-facing child restraints, \* is less than or equal to 65 minus child restraint weight (pounds).

(B) For forward-facing child restraints, \* is the child weight limit specified in the following table corresponding to the value CW, calculated as 65 minus child restraint weight (pounds).

**Table to S5.5.2(1)(3)(i)(B) – Maximum Child Weight Limit for Lower Anchor Use for Forward-Facing Child Restraint System--Rounding**

CW = 65 – Child Restraint Weight (pounds)	Child Weight Limit “*” (pounds)

$20 < CW \leq 25$	25
$25 < CW \leq 30$	30
$30 < CW \leq 35$	35
$35 < CW \leq 40$	40
$40 < CW \leq 45$	45
$45 < CW \leq 50$	50
$50 < CW \leq 55$	55
$55 < CW \leq 60$	60

(C) For rear-facing child restraints, \* is the child weight limit specified in the following table corresponding to the value CW, calculated as 60 minus child restraint weight (pounds).

**Table to S5.5.2(1)(3)(i)(C) – Maximum Child Weight Limit for Lower Anchor Use for Rear-Facing Child Restraint System--Rounding**

<b>CW = 60 – Child Restraint Weight (pounds)</b>	<b>Child Weight Limit “*” (pounds)</b>
$15 < CW \leq 20$	20
$20 < CW \leq 25$	25
$25 < CW \leq 30$	30
$30 < CW \leq 35$	35

$35 < CW \leq 40$	40
$40 < CW \leq 45$	45
$45 < CW \leq 50$	50
$50 < CW \leq 55$	55

(ii) For child restraints designed to meet the requirements of this standard when installed forward-facing and rear-facing by the child restraint anchorage system according to S5.3.2, the following applies:

(A) If separate installation diagrams are provided for the child restraint installed forward-facing and rear-facing, S5.5.2(1)(3)(i) applies to each of the installation diagrams.

(B) If only one installation diagram is provided and if a statement specifying a child weight limit is required in only rear-facing or forward-facing mode pursuant to S5.5.2(1)(3)(i), then the diagram shall depict installation in that mode along with the corresponding child weight limit in accordance with S5.5.2(1)(3)(i).

(C) If a statement specifying a child weight limit is required for the child restraint installed forward-facing and rear-facing pursuant to S5.5.2(1)(3)(i) and only one installation diagram is provided, then the child weight limit shall be in accordance with S5.5.2(1)(3)(i)(A) or the lesser of the child weight limits described in S5.5.2(1)(3)(i)(B) and (C).

\* \* \* \* \*

S5.6.1.12(a) *Child restraint systems manufactured from February 27, 2014 to February 26, 2015.* The instructions for child restraint systems equipped with an internal harness to

restrain the child and with components to attach to a child restraint anchorage system, and for which the combined weight of the child restraint system and the maximum recommended child weight for use with the internal harness exceeds 65 pounds, must include the following statement: “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 “\*” [\*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 harness of the child restraint.”

(b) *Child restraint systems manufactured on or after February 27, 2015.* If the child restraint is designed to meet the requirements of this standard when installed by the child restraint anchorage system according to S5.3.2, the installation diagram showing the child restraint system installed using a child restraint anchorage system must meet the specifications in S5.5.2(1)(3).

\* \* \* \* \*



Issued on: February 14, 2014.

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David J. Friedman  
Acting Administrator

Billing Code 4910-59

**Note:** The following Appendix will not appear in the Code of Federal Regulations:

**APPENDIX TO THE FINAL RULE**

**Table A1(a). Peak Measured and Computed Lower Anchor and Tether Anchor Loads in  
30-35 mph Frontal Vehicle Crash Tests into a Fixed Rigid Barrier**

Tests with the HIII-6 Year Old Dummy (51 lb) <sup>1</sup>										
Test Number	MY	Make/Model	CRS Model	Combined Weight (with 51 lb 6YO)	Test Speed (km/h)	Vehicle Peak Accel. [G's] <sup>2</sup>	Tether Load [N]	Lower Anchor Average Load [N]	Total Anchor Loads (N)	Calculated Loads with Combined Weight Using 5 lb Dummy
TC09-215	2009	Pontiac/Vibe	Cosco Ventura	62.4	47.0	46.9	2,544	4,363	<b>11,270</b>	<b>13,020</b>
TC09-215	2009	Pontiac/Vibe	Evenflo Traditions	63.3	47.0	46.9	3,460	4,920	<b>13,301</b>	<b>13,208</b>
TC09-139	2009	Nissan/MURANO	Evenflo Traditions	63.3	47.0	57.7	1,773	4,845	<b>11,462</b>	<b>16,249</b>
TC09-247	2010	Pontiac/Montana	Safety 1st Apex65	63.8	47.0	29.6	1,093	3,232	<b>7,557</b>	<b>8,404</b>
TC10-201	2010	Kia/FORTE	Safety 1st Apex65	63.8	56.0	45.6	5,627	4,806	<b>15,240</b>	<b>12,947</b>
TC09-143	2009	Pontiac/Vibe	Safety 1st Alpha Omega	65.2	47.0	42.4	3,277	5,180	<b>13,637</b>	<b>12,304</b>
TC10-208	2010	Ford/FOCUS	Safety 1st Alpha Omega	65.2	55.5	62.1	5,546	4,237	<b>14,020</b>	<b>18,021</b>
TC09-236	2010	Suzuki/Swift	Safety 1xt Complete Air	65.3	54.5	48.4	4,220	3,759	<b>11,738</b>	<b>14,052</b>
TC09-229	2010	Ford/FOCUS	Safety 1st Complete Air	65.3	55.5	52.5	5,186	4,040	<b>13,266</b>	<b>15,242</b>
TC09-140	2009	Pontiac/G3Wave	Evenflo Titan Elite	66.0	47.0	40.6	3,905	3,137	<b>10,179</b>	<b>11,921</b>
TC09-242	2010	Hyundai/Entourage	Graco MyRide65	66.6	47.0	39.0	1,029	5,048	<b>11,124</b>	<b>11,562</b>
TC09-258	2010	Nissan/CUBE	Graco MyRide65	66.6	56.0	45.9	1,074	4,734	<b>10,542</b>	<b>13,608</b>
TC09-236	2010	Suzuki/Swift	Graco MyRide65	66.6	54.5	48.4	4,312	3,792	<b>11,895</b>	<b>14,349</b>
TC10-204	2010	Mazda/MAZDA 3	Graco MyRide65	66.6	56.0	67.5	6,258	3,833	<b>13,924</b>	<b>20,012</b>

Table A1(a) Continued.

Test Number	MY	Make/Model	CRS Model	Combined Weight (with 51 lb 6YO)	Test Speed (km/h)	Vehicle Peak Accel. [G's] <sup>2</sup>	Tether Load [N]	Lower Anchor Average Load [N]	Total Anchor Loads (N)	Calculated Loads with Combined Weight Using 5 lb Dummy
TC09-239	2010	Hyundai/ELANTRA	Britax Marathon	67.2	56.0	44.1	4,628	5,123	<b>14,875</b>	<b>13,190</b>
TC09-245	2010	Toyota/COROLLA	Britax Marathon	67.2	56.0	53.9	5,163	6,710	<b>18,582</b>	<b>16,121</b>
TC09-247	2010	Pontiac/Montana	Learning Curve True Fit	68.1	56.0	29.6	677	3,972	<b>8,621</b>	<b>8,961</b>
TC09-213	2009	Pontiac/G3Wave	Learning Curve True Fit	68.1	47.0	37.4	3,592	3,693	<b>10,978</b>	<b>11,323</b>
TC09-211	2009	Mazda/MAZDA6	Evenflo Triumph	69.7	47.0	36.4	6,006	3,291	<b>12,589</b>	<b>11,294</b>
TC09-136	2009	Mazda/MAZDA6	Evenflo Triumph	69.7	47.0	39.6	5,777	2,974	<b>11,725</b>	<b>12,286</b>
TC09-239	2010	Hyundai/ELANTRA	Evenflo Triumph	69.7	56.0	44.1		4,470	<b>8,940</b>	<b>13,683</b>
TC09-213	2009	Pontiac/G3Wave	Graco Nautilus	70.4	47.0	37.4	2,981	4,256	<b>11,492</b>	<b>11,710</b>
TC09-229	2010	Ford/FOCUS	Graco Nautilus	70.4	55.5	52.5	3,031	6,227	<b>15,485</b>	<b>16,438</b>
TC09-145	2009	Toyota/Matrix	Graco Nautilus	70.4	47.0	39.5	2,450	5,208	<b>12,865</b>	<b>12,370</b>
TC09-140	2009	Pontiac/G3Wave	Eddie Bauer Delux 3-in-1	70.8	47.0	40.6	3,892	3,470	<b>10,832</b>	<b>12,788</b>
TC09-143	2009	Pontiac/Vibe	Cosco Alpha Omega Elite	71.0	47.0	42.4	3,057	4,271	<b>11,599</b>	<b>13,393</b>
TC09-255	2010	Kia/SPORTAGE	Britax Frontier	73.1	56.0	44.4	1,598	6,677	<b>14,951</b>	<b>14,441</b>
TC10-204	2010	Mazda/MAZDA 3	Britax Frontier	73.1	56.0	67.5	5,861	7,479	<b>20,819</b>	<b>21,955</b>

<sup>1</sup> The weight of the instrumented HIII-6 year old dummy used in these vehicle crash tests was 51 lb.

<sup>2</sup> The vehicle accelerations were filtered with SAE CFC60<sup>54</sup>

<sup>54</sup> The vehicle accelerations were filtered in accordance with the Society of Automotive Engineers (SAE) J211, "Instrumentation for Impact Test-Part-1-Electronic Instrumentation," with SAE Channel Filter Class (CFC) 60 (100 Hz).

**Table A1(b). Peak Measured and Computed Lower Anchor and Tether Anchor Loads in 30-35 mph Frontal Vehicle Crash Tests into a Fixed Rigid Barrier**

<b>Tests with the HIII-10 Year Old Dummy (77 lbs)</b>										
Test Number	MY	Make/Model	CRS Model	Combined Weight (with 77 lb 10 YO)	Test Speed (km/h)	Test Peak Acceleration [G's] <sup>1</sup>	Tether Load [N]	Lower Anchor Average Load [N]	Total Anchor Loads (N)	Calculated Loads with Combined Weight Using 77 lb Dummy
TC09-145	2009	Toyota/Matrix	Britax Regent	102.1	47.0	39.5	1,760	7,338	<b>16,436</b>	<b>17,944</b>
TC10-201	2010	Kia/FORTE	Safety 1st Apex65	89.8	56.0	45.6	7,759	6,318	<b>20,395</b>	<b>18,222</b>
TC10-208	2010	Ford/FOCUS	Safety 1st Alpha Omega	91.2	55.5	62.1	5,995	6,194	<b>18,383</b>	<b>25,204</b>
TC09-258	2010	Nissan/CUBE	Graco MyRide65	92.6	56.0	45.9	1,081	6,140	<b>13,361</b>	<b>18,917</b>

1 The vehicle accelerations were filtered with SAE CFC60

**Table A2. Measures Anchorage Loads in Sled Tests Using the 2010 Kia Forte and Ford Focus Vehicle Bucks with Front and Rear Loaded Sled Pulses and the Weighted HIII-6C Dummy**

Buck Type	CRS Model <sup>1</sup>	Peak Loads With Tether (N)					Peak Loads without Tether (N)			Ratio of Lower Anchor Load with and without Tether
		Inboard Lower Anchor	Outboard Lower anchor	Total Lower Anchor	Tether Anchor	Total tether + Lower Anchor	Inboard Lower Anchor	Outboard Lower Anchor	Total Lower Anchor	
Front Loaded Sled Pulse										
2010 Kia Forte	Apex 65	5833	5833	11666	5664	17330	7418	7504	14922	1.3
	Radian 65	6343	6088	12431	8698	21129	9629	8866	18495	1.5
	Frontier 85	5767	5194	10961	4473	15434	8245	7613	15858	1.4
2010 Ford Focus	Apex 65	4657	4276	8933	NA <sup>2</sup>	NA	7036	7328	14364	1.6
	Radian 65	6542	5966	12508	NA	NA	8538	10137	18675	1.5
	Frontier 85	5539	5424	10963	NA	NA	7490	9060	16550	1.5
Rear Loaded Sled Pulse										
2010 Kia Forte	Apex 65	5202	5919	11121	6468	17589	7333	7157	14490	1.3
	Radian 65	6818	6015	12833	8088	20921	7789	9108	16897	1.3
	Frontier 85	6294	5366	11660	4537	16197	7863	8969	16832	1.4
2010 Ford Focus	Apex 65	5185	4748	9933	NA	NA	7045	7125	14170	1.4
	Radian 65	6461	5433	11894	NA	NA	9862	8224	18086	1.5
	Frontier 85	6033	4918	10951	NA	NA	7628	8828	16456	1.5

1 Apex 65: Safety 1st Apex 65; Radian 65: Sunshine Kids Radian 65; Frontier 85: Britax Frontier 85

2 NA implies tether loads not measured because of insufficient space to attach load cell to the tether.

**Table A3. Child Weight Limit for Lower Anchor Use for Child Restraint Models  
Evaluated in NHTSA's 2008-2012 CRS Ease-of-Use Program**

Make/Model	Seat Type	EOU Year	CRS Weight (lb)	Max. Child Wt. for CRS (lb)		CRS Wt. + Max. Child Wt. (lb)		Max. Child Wt. for Lower Anchor Use			
				RF Mode	FF Mode	RF Mode	FF Mode	RF Mode 65-CRS wt. (lb)	FF Mode 65-CRS wt. (lb)	RF Mode in multiple of 5 lb	FF Mode in Multiple of 5 lb
Graco/CozyCline	Forward-Facing	2009	21	NA	40	NA	61	NA	NR	NA	NR
TrendZ/FastBack	Combination	2012	28.3	NA	70	NA	98.3	NA	36.7	NA	40
Britax/Frontier 85 SICT	Combination	2012	22.5	NA	85	NA	107.5	NA	42.5	NA	45
Britax/Frontier	Combination	2008	22.3	NA	80	NA	102.3	NA	42.7	NA	45
Graco/Nautilus Elite	Combination	2010	21.5	NA	65	NA	86.5	NA	43.5	NA	45
Graco/Nautilus	Combination	2008	20.8	NA	65	NA	85.8	NA	44.2	NA	45
Graco/Argos 70	Combination	2012	20.4	NA	70	NA	90.4	NA	44.6	NA	45
Safety 1st/Essential Air	Combination	2011	19.6	NA	65	NA	84.6	NA	45.4	NA	50
Britax/Frontier 85	Combination	2010	19.6	NA	85	NA	104.6	NA	45.4	NA	50
Safety 1st/Summit Deluxe	Combination	2008	14.9	NA	40	NA	54.9	NA	NR	NA	NR
Dorel/Eddie Bauer Deluxe High Back	Combination	2009	14.7	NA	40	NA	54.7	NA	NR	NA	NR
Dorel/Safety 1st Apex 65	Combination	2009	13.8	NA	65	NA	78.8	NA	51.2	NA	55
Safety 1st/Apex 65	Combination	2008	13.8	NA	65	NA	78.8	NA	51.2	NA	55
Evenflo/SecureKid E3	Combination	2012	13.2	NA	65	NA	78.2	NA	51.8	NA	55
TrendZ/EuroSport	Combination	2012	12.7	NA	50	n/a	62.7	NA	NR	NA	NR
Evenflo/Generations 65	Combination	2010	12.3	NA	65	NA	77.3	NA	52.7	NA	55
Evenflo/SecureKid 300	Combination	2012	12.3	NA	65	NA	77.3	NA	52.7	NA	55
Evenflo/Maestro	Combination	2010	10.7	NA	50	NA	60.7	NA	NR	NA	NR
Graco/Cargo	Combination	2009	10.6	NA	40	NA	50.6	NA	NR	NA	NR
Eddie Bauer/Comfort High Back Booster	Combination	2008	9.9	NA	40	NA	49.9	NA	NR	NA	NR
Evenflo/Chase Comfort Touch	Combination	2008	8.3	NA	40	NA	48.3	NA	NR	NA	NR
Evenflo/Chase	Combination	2009	8.3	NA	40	NA	48.3	NA	NR	NA	NR
Safeguard/ Go	Combination	2008	8.2	NA	60	NA	68.2	NA	56.8	NA	60

RF – rear-facing; FF – forward-facing; EOU – CRS Ease-of-Use Program; NR – label not required; NA – not applicable

Table A3. Continued

Make/Model	Seat Type	EOU Year	CRS Weight (lb)	Max. Child Wt. for CRS (lb)		CRS Wt. + Max. Child Wt. (lb)		Max. Child Wt. for Lower Anchor Use			
				RF Mode	FF Mode	RF Mode	FF Mode	RF Mode 65-CRS wt. (lb)	FF Mode 65-CRS wt. (lb)	RF Mode in multiple of 5 lb	FF Mode in Multiple of 5 lb
<b>Combi/Zeus 360</b>	Convertible	2010	30.6	33	40	63.6	70.6	NR	34.4	NR	35
<b>Orbit Baby/G2</b>	Convertible	2012	24.5	35	65	59.5	89.5	NR	40.5	NR	45
<b>Sunshine Kids/Radian XT</b>	Convertible	2009	23.8	35	80	58.8	103.8	NR	41.2	NR	45
<b>Peg Perego /Primo Viaggio 5-70</b>	Convertible	2012	22.3	45	70	67.3	92.3	42.7	42.7	40	45
<b>Britax/Advocate CS</b>	Convertible	2009	22.1	35	65	57.1	87.1	NR	42.9	NR	45
<b>Sunshine Kids/Radian 65</b>	Convertible	2009	21.2	35	65	56.2	86.2	NR	43.8	NR	45
<b>Sunshine Kids/Radian 80</b>	Convertible	2009	21.2	35	80	56.2	101.2	NR	43.8	NR	45
<b>Maxi-Cosi /Pria 70</b>	Convertible	2012	20.3	40	70	60.3	90.3	NR	44.7	NR	45
<b>Britax/Boulevard</b>	Convertible	2009	20.2	35	65	55.2	85.2	NR	44.8	NR	45
<b>Britax/Boulevard CS</b>	Convertible	2009	20.2	35	65	55.2	85.2	NR	44.8	NR	45
<b>Compass/TrueFit</b>	Convertible	2008	18.3	35	65	53.3	83.3	NR	46.7	NR	50
<b>Learning Curve/First Years True Fit Premier</b>	Convertible	2009	18.3	35	65	53.3	83.3	NR	46.7	NR	50
<b>Recaro/Euro</b>	Convertible	2012	18.1	35	70	53.1	88.1	NR	46.9	NR	50
<b>Graco/MyRide65 (1757133)</b>	Convertible	2012	16.2	40	65	56.2	81.2	NR	48.8	NR	50
<b>Safety 1st/Chart 65 Air</b>	Convertible	2012	16	40	65	56	81	NR	49	NR	50
<b>Graco/MyRide 65 (1756291)</b>	Convertible	2010	15.4	40	65	55.4	80.4	NR	49.6	NR	50
<b>Britax/Roundabout 50</b>	Convertible	2009	14.4	40	50	54.4	64.4	NR	NR	NR	NR
<b>Graco/Classic Ride 50</b>	Convertible	2012	12.4	40	50	52.4	62.4	NR	NR	NR	NR
<b>Eddie Bauer/XRS 65</b>	Convertible	2012	12.1	40	65	52.1	77.1	NR	52.9	NR	55
<b>Combi/Coccoro</b>	Convertible	2009	12	33	40	45	52	NR	NR	NR	NR
<b>Cosco/Scenera</b>	Convertible	2008	10.5	40	40	50.5	50.5	NR	NR	NR	NR
<b>Graco/ComfortSport</b>	Convertible	2010	10.4	30	40	40.4	50.4	NR	NR	NR	NR
<b>Safety 1st/Uptown</b>	Convertible	2008	10.4	35	40	45.4	50.4	NR	NR	NR	NR

RF – rear-facing; FF – forward-facing; EOU – NCAP CRS Ease-of-Use Program; NR – label not required; NA – not applicable  
 Table A3. Continued

Make/Model	Seat Type	EOU Year	CRS Weight (lb)	Max. Child Wt. for CRS (lb)		CRS Wt. + Max. Child Wt. (lb)		Max. Child Wt. for Lower Anchor Use			
				RF Mode	FF Mode	RF Mode	FF Mode	RF Mode 65-CRS wt. (lb)	FF Mode 65-CRS wt. (lb)	RF Mode in multiple of 5 lb	FF Mode in Multiple of 5 lb
Evenflo/Tribute 5	Convertible	2008	9.7	35	40	44.7	49.7	NR	NR	NR	NR
Cosco /Apt 40RF	Convertible	2012	8	40	40	48	48	NR	NR	NR	NR
Orbitbaby /Toddler	Convertible	2011	23.9	35	50	58.9	73.9	NR	41.1	NR	45
Britax/Boulevard 70 CS	Convertible	2011	19.1	40	70	59.1	89.1	NR	45.9	NR	50
Safety 1st /Complete Air	Convertible	2011	14.8	40	50	54.8	64.8	NR	NR	NR	NR
Safety 1st/onSide Air	Convertible	2011	9.3	40	40	49.3	49.3	NR	NR	NR	NR
Cosco/Scenera 40RF	Convertible	2011	8.6	40	40	48.6	48.6	NR	NR	NR	NR
Safety 1st/Guide 65	Convertible	2012	12.1	40	65	52.1	77.1	NR	52.9	NR	55
Graco/Smart Seat	3-in-1	2011	33.8	40	65	73.8	98.8	31.2	31.2	30	35
Diono/RadianRXT	3-in-1	2012	25.8	45	80	70.8	105.8	39.2	39.2	35	40
Diono/RadianR100	3-in-1	2012	24.2	40	65	64.2	89.2	NR	40.8	NR	45
Diono/Radian120	3-in-1	2012	24.2	45	80	69.2	104.2	40.8	40.8	40	45
Evenflo/Symphony	3-in-1	2009	21.7	35	40	56.7	61.7	NR	NR	NR	NR
Evenflo/Symphony 65 E3	3-in-1	2012	20.8	40	65	60.8	85.8	NR	44.2	NR	45
Evenflo/Symphony 65	3-in-1	2012	19.4	40	65	59.4	84.4	NR	45.6	NR	50
Dorel/Eddie Bauer Deluxe 3-in-1	3-in-1	2009	16.8	35	50	51.8	66.8	NR	48.2	NR	50
Eddie Bauer/Deluxe 3-in-1	3-in-1	2008	16.8	35	50	51.8	66.8	NR	48.2	NR	50
Dorel/Alpha Omega Elite	3-in-1	2009	16.6	35	50	51.6	66.6	NR	48.4	NR	50
Dorel/Safety 1st Alpha Omega Elite	3-in-1	2009	16.6	35	50	51.6	66.6	NR	48.4	NR	50
Safety 1st/Alpha Omega Elite	3-in-1	2008	16.6	35	50	51.6	66.6	NR	48.4	NR	50
Dorel/Alpha Omega*	3-in-1	2009	15.3	35	50	50.3	65.3	NR	49.7	NR	50
Safety 1st/All-in-One	3-in-1	2008	14.4	35	50	49.4	64.4	NR	NR	NR	NR
Eddie Bauer/Deluxe Convertible Car Seat	3-in-1	2008	10.9	35	40	45.9	50.9	NR	NR	NR	NR

RF – rear-facing; FF – forward-facing; EOU – NCAP CRS Ease-of-Use Program; NR – label not required; NA – not applicable



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