

*The Deputy Administrator of the National Highway Traffic Safety Administration, Steven S. Cliff, Ph.D., signed the following final rule on March 10, 2022, which the Agency is submitting for publication in the Federal Register. While NHTSA has taken steps to ensure the accuracy of this Internet version of the final rule, it is not the official version of the final rule. Please refer to the official version in a forthcoming Federal Register publication, which will appear on the Government Printing Office's FDSys website ([www.gpo.gov/fdsys/search/home.action](http://www.gpo.gov/fdsys/search/home.action)) and on Regulations.gov (<http://www.regulations.gov/>). Once the official version of this document is published in the Federal Register, this version will be removed from the Internet and replaced with a link to the official version.*

**DEPARTMENT OF TRANSPORTATION**  
**National Highway Traffic Safety Administration**  
**49 CFR Part 571**  
**Docket No. NHTSA-2021-0003**  
**RIN 2127-AM06**  
**Occupant Protection for Vehicles With**  
**Automated Driving Systems**

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

**ACTION:** Final rule.

**SUMMARY:** This final rule amends the occupant protection Federal motor vehicle safety standards (FMVSSs) to account for future vehicles that do not have the traditional manual controls associated with a human driver because they are equipped with Automated Driving Systems (ADS). This final rule makes clear that, despite their innovative designs, vehicles with ADS technology must continue to provide the same high levels of occupant protection that current passenger vehicles provide. The occupant protection standards are currently written for traditionally designed vehicles and use terms such as “driver’s seat” and “steering wheel,” that are not meaningful to vehicle designs that, for example, lack a steering wheel or other driver controls. This final rule updates the standards in a manner that clarifies existing terminology while avoiding unnecessary terminology, and, in doing so, resolves ambiguities in applying the standards to ADS-equipped vehicles without traditional manual controls. In addition, this final rule amends the standards in a manner that maintains the existing regulatory text whenever

possible, to make clear that this rule maintains the level of crash protection currently provided occupants in more traditionally designed vehicles. This final rule is limited to the crashworthiness standards to provide a unified set of regulatory text applicable to vehicles with and without ADS functionality.

**DATES:** Effective date: [**insert date 180 days following publication of this final rule in the FEDERAL REGISTER**]. Optional early compliance (i.e., prior to the effective date) is permitted. Petitions for reconsideration must be received on or before [**insert date 45 days after date of publication in the FEDERAL REGISTER**].

**ADDRESSES:** If you wish to petition for reconsideration of this rule, you should 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.

Privacy Act. The petition will be placed in the docket. Anyone is able to search the electronic form of all documents received into any of our dockets by the name of the individual submitting the document (or signing the document, 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 (Volume 65, Number 70; Pages 19477-78) or you may visit <http://dms.dot.gov>.

Confidential Business Information: If you wish to submit any information under a claim of confidentiality, you should submit three copies of your complete submission, including the information you claim to be confidential business information, to the Chief Counsel, NHTSA, at the address given under FOR FURTHER INFORMATION CONTACT. In addition, you should submit two copies, from which you have deleted the claimed confidential business information,

to Docket Management at the address given above. To facilitate social distancing due to COVID-19, NHTSA is treating electronic submission as an acceptable method for submitting confidential business information (CBI) to the Agency under 49 C.F.R. Part

512. <https://www.nhtsa.gov/coronavirus>

**FOR FURTHER INFORMATION CONTACT:** For non-legal issues, you may contact Mr. Louis Molino, Office of Crashworthiness Standards, Telephone: 202-366-1740, Facsimile: 202-493-2739. For legal issues, you may contact Ms. Sara R. Bennett, Telephone: 202-366-7304 or Mr. Daniel Koblenz, Telephone: 202-366-5329, Office of Chief Counsel. Address: National Highway Traffic Safety Administration, 1200 New Jersey Avenue S.E., Washington, D.C. 20590.

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### **I. Executive Summary**

NHTSA has been evaluating its Federal Motor Vehicle Safety Standards (FMVSSs) to identify where concepts or terminology used in the standards do not account for the designs that the agency expects, and industry confirms, could accompany certain vehicles equipped with Automated Driving Systems (ADSs).<sup>1</sup> NHTSA has detailed in previous rulemaking notices the activities it has undertaken in its evaluation. These activities include initial evaluation of the

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<sup>1</sup> An ADS is defined as the “hardware and software that are collectively capable of performing the entire [dynamic driving task] on a sustained basis, regardless of whether it is limited to a specific operational design domain (ODD); this term is used specifically to describe a Level 3, 4, or 5 driving automation system.” SAE International J3016\_201806 Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles. While this notice uses the term “ADS-equipped vehicle” it focuses on SAE Level 4 and Level 5 vehicles that lack traditional manual controls.

FMVSSs,<sup>2</sup> issuing Federal Register notices soliciting input from stakeholders,<sup>3</sup> research on possible options available to the agency to amend the FMVSSs,<sup>4</sup> and public discussions with stakeholders.<sup>5</sup>

This prior work resulted in the agency's March 30, 2020, notice of proposed rulemaking (NPRM) underlying this final rule.<sup>6</sup> The NPRM proposed to revise its current crashworthiness<sup>7</sup> (200-Series) FMVSSs to amend terms or other text to account for the unconventional interior designs that are expected to be present in certain ADS-equipped vehicles. An example of such an unconventional interior design would be those that lack driving controls.

In the proposal, NHTSA proposed to amend the existing FMVSSs in a way that maintains the occupant protection performance currently required by the 200-Series FMVSSs while amending the wording that has or will become obsolete as applied to new designs, and to clarify for manufacturers developing ADS-equipped vehicles the application of a particular FMVSS to their vehicle. The NPRM also ensured these revisions accounted for dual-mode ADS-equipped vehicles (ADS-equipped vehicles that also have a conventional driving mode), as defined by SAE International (SAE).<sup>8</sup> NHTSA also sought to remove requirements for which a safety need does not exist.

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<sup>2</sup> <https://rosap.nsl.bts.gov/view/dot/12260>.

<sup>3</sup> Removing Regulatory Barriers for Vehicles with Automated Driving Systems Request for Comment, 83 FR 6148 (Feb. 13, 2018); Removing Regulatory Barriers for Vehicles with Automated Driving Systems Advance Notice of Proposed Rulemaking, 84 FR 24433 (May 28, 2019).

<sup>4</sup> [https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/ads-dv\\_fmvs\\_voll-042320-v8-tag.pdf](https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/ads-dv_fmvs_voll-042320-v8-tag.pdf)

<sup>5</sup> FMVSS Considerations for Automated Driving Systems Stakeholder Meeting, information available at <https://www.vtti.vt.edu/fmvss/>.

<sup>6</sup> 85 FR 17624.

<sup>7</sup> Throughout this notice, NHTSA uses “crashworthiness” and “occupant protection” interchangeably because the agency considers the 200-Series FMVSSs to be focused on both.

<sup>8</sup> An [ADS-Equipped] Dual-Mode Vehicle is defined as “[a] type of ADS-equipped vehicle designed for both driverless operation and operation by a conventional driver for complete trips.” SAE J3016\_201806 Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles.

NHTSA received 45 comments on the NPRM.<sup>9</sup> The proposal garnered comments from vehicle and equipment manufacturers, ADS developers, industry associations, consumer advocates, advocates for persons with disabilities, States, insurance organizations, a university, an oil independence advocacy group, and members of the general public. Many commenters supported the proposal and the use of definitional and textual changes to achieve the goals of the NPRM, though numerous other commenters argued that the agency's focus on this issue was premature. Regardless of their general position on the rule, most commenters did support NHTSA's suggestion that, to the extent any changes were finalized, they should be done in way that minimized the complexity of the changes to the FMVSSs.

The agency acknowledges that uncertainty continues to exist around the development and potential deployment of ADS-equipped vehicles. Nevertheless, NHTSA believes it is appropriate to finalize this action at this time in anticipation of emerging ADS vehicle designs that NHTSA has seen in prototype form. The current designs generally involve forward-facing row seating<sup>10</sup> and vehicles without manual driving controls. NHTSA has designed this final rule to minimize the changes to the FMVSSs and to maintain the level of occupant protection currently provided in all FMVSS compliant vehicles. This final rule provides regulatory certainty that, despite their innovative designs, vehicles with ADS technology must continue to provide the same high levels of occupant protection that current passenger vehicles provide. This final rule adopts most of the provisions included in the NPRM, with some exceptions summarized in the next section.

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<sup>9</sup> Docket No. NHTSA-2020-0014. NHTSA received an additional 5 comments that were determined to be completely unrelated to this notice (#4, #5, #6, #18, #52), and 1 duplicate submission (#42).

<sup>10</sup> Applying the occupant protection standards to forward-facing seating is straightforward since the standards are generally designed with forward-facing seating in mind. In contrast, applying the standards to side-facing, campfire or other seating configurations is more complex and will involve more research, which is currently underway, and standard development.

## Differences Between the NPRM and Final Rule

The differences between the NPRM and the final rule are generally minor and are fully explained in the relevant sections in this document. Some of the more substantive changes in this final rule are as follows.

- NHTSA believes that children should not occupy the “driver’s” position when the vehicle is operating in ADS mode and steering controls are present, given that the driver’s seating position has not been designed to protect children in a crash. For example, the required limit on the rearward displacement of the steering column and forcefulness with which the air bag deploys have been optimized for adults and could pose a safety risk to children. The NPRM proposed that ADS vehicles must *suppress vehicle motion* when: (1) the vehicle contains a driver's seat (i.e., manually operated driving controls are available, but not necessarily functional during ADS operation); (2) the occupant of the driver’s seat is classified by the air bag system as a child; and (3) the vehicle is in an operational state that does not require a driver (i.e., where the ADS is in control of the driving task). After review of the comments, for now, NHTSA has decided against adopting a vehicle motion suppression requirement in these circumstances. The agency would like to know more about the relative risk of a child seated in the “driver’s” position as compared to the passenger position and whether there are other ways of addressing this safety concern than a requirement to suppress vehicle motion completely. The agency would also like to explore any necessary refinements to occupant detection and low risk deployment requirements and test procedures for the driver’s seat.



- Proposed regulatory text would have changed the front row seat compartmentalization occupant protection requirements for large school buses (gross vehicle weight rating over 4,536 kg (10,000 lb.)) in ways not intended by NHTSA. Such text is not adopted by this final rule.
- NHTSA has modified FMVSS No. 208, *Occupant crash protection*, to be clearer in the protections that are required for inboard seating positions in the front row of ADS-equipped vehicles.
- This final rule modifies the application section of FMVSS Nos. 212, *Windshield mounting*, and 219, *Windshield zone intrusion*, to make clear these standards exclude occupant-less vehicles, since these standards meet no safety need when there are no occupants to protect.
- NHTSA has decided not to move forward at this time with changing the FMVSS No. 226, *Ejection mitigation*, requirements for the ejection mitigation countermeasure readiness indicator. The agency will consider amendments to controls and displays in a separate rulemaking.

Minor differences between the NPRM and this final rule are discussed in the appropriate sections in this preamble. Some of these differences include:

- Moving the definition of “seat outline” from FMVSS No. 226 to § 571.3, *Definitions* (see Section IV.a.7 of this preamble);
- Slightly revising the term used to describe occupant-less vehicles, to refer to at least “one person” rather than referring to “a designated seating position,” (see Section V.a of this preamble); and

- In FMVSS No. 208, correcting a missed revision indicating there can be multiple front seat passengers (S19.2.2(e)) (see Section VI.f of this preamble), and adopting a wording change to clarify the air bag suppression test procedure (S20.2, S22.2, S24.2) (see Section VI.a of this preamble).

As was the case for the NPRM, to illustrate the precise changes that are being made within the context of the full regulatory text, we are providing in the docket for this rulemaking a document that contains the full regulatory text of each modified standard included in this final rule. The text is color coded in the following manner; blue bold underline (text added by the NPRM), red strikeout (text deleted by the NPRM), green bold underline (text added by the final rule), orange strikeout (text deleted by the final rule). (The information is provided for illustration purposes for the convenience of readers and does not change the amendments provided in the amendatory text of this final rule.)

### **Guiding Principles**

In the NPRM, NHTSA expressed certain “guiding principles” for this rulemaking, which continue to be relevant in this final rule. First, the amended FMVSS requirements in this final rule are intended to maintain the level of crashworthiness performance in vehicles with and without ADS functionality, including ADS-equipped vehicles that also have a conventional driving mode (dual-mode ADS vehicles). The level of performance required by the amended FMVSSs is just as appropriate for ADS-vehicles as it is for non-ADS vehicles in protecting the public against unreasonable risk of death or injury in a crash.<sup>11</sup> More specifically, NHTSA sought to maintain the level of safety currently provided to occupants by applying the crash test performance requirements for the right front outboard occupant to the left front outboard

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<sup>11</sup> 49 U.S.C. 30102(a)(10) (from definition of “motor vehicle safety”).

occupant of ADS-vehicles, wherever possible. Similarly, occupants seated behind driving controls in ADS-vehicles (dual-mode ADS vehicles) will be protected just as drivers are today. Second, NHTSA sought to amend its standards to account for new designs, and to clarify for manufacturers developing ADS-equipped vehicles, particularly those that lack manual controls, that the standards apply to their vehicles. In short, NHTSA sought to clarify that a manufacturer of ADS-equipped vehicles must continue to apply occupant protection standards to its vehicles even if manual steering controls are not installed in the vehicle. Finally, for the convenience of readers and those familiar with the standards, NHTSA sought to amend the requirements in a manner that minimized the changes to the regulatory text of the standards.

This final rule is purposefully limited in scope based on the bounds listed below.

1. This final rule only applies to ADS-equipped vehicles that have seating configurations similar to non-ADS vehicles, i.e., forward-facing front seating positions (conventional seating). Thus, NHTSA focused on conventional seating in this rulemaking, noting that additional research is necessary to understand and address different safety risks posed by vehicles with unconventional seating arrangements (e.g., rear-facing seats or campfire seating).

2. This final rule addresses ADS-equipped vehicles designed exclusively to carry property (“occupant-less vehicles”) by amending the application of existing crashworthiness requirements for these vehicles, as appropriate. This final rule does not address potential vehicle-to-vehicle compatibility issues related to occupant-less vehicles, as the existing standards do not test for this issue.<sup>12</sup>

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<sup>12</sup> Vehicle-to-vehicle compatibility refers to how well two vehicles match up in a two-vehicle crash. Vehicles that are heavier, with higher ground clearance, and with stiffer front ends can pose a higher injury risk to occupants in smaller cars. Currently NHTSA has no evidence of compatibility issues with occupant-less vehicles, but NHTSA is researching this area.

3. With one exception, this final rule refrains from amending requirements relating to telltales and warnings, as that area has implications beyond the 200-Series standards and is a subject of continuing NHTSA research. The exception to this is the air bag suppression telltale, which we believe is reasonable to address now. This is described further in section VI.b of this preamble.

### **Tables of Costs and Benefits**

This rule will eliminate the need for ADS-equipped -vehicle manufacturers to equip vehicles with redundant manual driving controls in vehicles that do not have manual driving capabilities, to comply with FMVSS. In turn, the cost impacts of this rule will be driven predominantly by the per-vehicle costs savings to each vehicle that would no longer need certain manual controls and the number of vehicles produced each year that will be produced without those controls. The Agency has reliable information on the former category, given that we generally know the current costs of this equipment, but can only estimate the broader effects. Thus, NHTSA calculated ranges of estimates of cost impacts using a variety of logical assumptions. NHTSA calculated the impact of the final rule on costs by analyzing production cost savings arising from forgoing the installation of manual steering controls. These cost savings are partially offset by incremental costs associated with augmenting safety equipment in the left front seating position to make that position equivalent to the right front seating position.

NHTSA estimates that this rule would save approximately \$995 per vehicle, as explained in greater detail in the RIA. NHTSA has conducted an analysis that shows how these cost savings would look if these types of vehicles entered the fleet to at least some degree. The results of this estimate show the present value of the final rule's estimated year-2050 savings to ADS-DV manufacturers and consumers, based on the assumption that there will be

approximately 5.8 million affected vehicles, at a three-percent discount rate equal to \$2.5 billion . At a seven-percent discount rate, the estimated year-2050 savings has a present value equal to approximately \$0.9 billion, as presented in Table 1:

**Table 1: Estimated Total Monetized Annual Cost Impacts  
(ADS-DV Cost Impacts in 2050, Billions of 2018 Dollars, 31% ADS-DV Sales Share)**

<b>Dual-Mode Sales Share Offset</b>	<b>Discount Rate</b>	<b>Mean Cost Impact</b>
0%	3% (Discounted back to 2022)	-\$2.5
0%	7% (Discounted back to 2022)	-\$0.9
30%	3% (Discounted back to 2022)	-\$1.7
30%	7% (Discounted back to 2022)	-\$0.6

These estimates represent an upper bound, in which ADS-DVs do not compete with dual-mode ADS-equipped vehicles (i.e., 5.8 million ADS-DVs are sold in 2050, with each including a measure of production cost savings associated with forgoing manual steering controls). Under the alternative EIA scenario in which one percent of new vehicle sales in 2050 are comprised of ADS-DVs, the corresponding estimates are: a present value in 2022 of approximately \$60 million at a three-percent discount rate; and approximately \$20 million at a seven-percent discount rate.

As a sensitivity analysis, NHTSA also considered an alternative case, in which ADS-DV sales in 2050 are reduced by 30 percent relative to the baseline, with the change in sales representing sales of dual-mode ADS-equipped vehicles. This represents a case in which: (1) ADS-DV sales are split between approximately one-sixth fleet sales and five-sixths private ownership, per the EIA scenario; (2) one-seventh of fleet ADS-DV purchases in the baseline analysis are allocated to dual-mode vehicle sales (i.e., approximately  $1/7 \times 1/6$  of all ADS-DV sales); and (3) one-third of private ADS-DV purchases in the baseline analysis are allocated to

dual-mode vehicle sales (i.e., approximately  $1/3 \times 5/6$  of all ADS-DV sales). Under this alternative scenario, savings to ADS-DV manufacturers and consumers under the final rule would be approximately \$1.7 billion at a three-percent discount rate, and approximately \$0.6 billion at a seven-percent discount rate.

There are no other quantified benefits associated with this final rule. NHTSA acknowledges that this final rule may impact safety and fuel consumption and would likely generate benefits associated with incremental producer and consumer surplus beyond the production cost savings quantified above. This final rule may also generate benefits that could lead to increased safety, reductions in administrative burden, and reductions in manufacturer uncertainty, though these benefits are also unquantified.

The final rule is assumed to have no effect on the per-mile risk of travel in ADS-DVs, as it does not revise, remove, or establish anything associated with their safety performance. That is, the removal of manual steering controls is not assumed to offer any direct safety benefit or detriment for travel in ADS-DVs. However, it is feasible that changes in ADS-DV demand associated with the final rule (e.g., due to changes in vehicle design or decreases in cost) could increase the use of ADS-DVs. In turn, safety outcomes associated with the final rule would be equal to the net effects of: (1) changes in per-mile fatality and injury risk for travel that is shifted from conventional vehicles to ADS-DVs; and (2) incremental fatalities and injuries for travel in ADS-DVs that would not have taken place in any vehicle otherwise. It is difficult to project net safety impacts associated with the final rule without information on: (1) per-mile fatality and injury risk for ADS-DVs and conventional vehicles over time; and (2) demand for travel in ADS-DVs and conventional vehicles as a function of ADS-DV price and design attributes. NHTSA continues to engage in various research, regulatory, and enforcement efforts associated

with the safety of the automated driving system itself, but those activities are outside the scope of this rulemaking.

The final rule could affect per-vehicle fuel consumption by changing the mass of ADS-DVs. NHTSA expects ADS-DV mass to either decrease (due to the removal of currently required equipment) slightly or remain essentially unchanged (due to the addition of automated steering components that offset the mass savings of the removed equipment) under the final rule. NHTSA acknowledges that, in principle, ADS-DV mass could increase (if vehicle seating configurations and amenities are changed sufficiently when exploiting the reduction in design constraints when removing manual steering controls) under the final rule. In any event, current corporate average fuel economy (CAFE) requirements are based on a vehicle's "footprint," and thus any change in a vehicle's mass will not affect a manufacturer's obligations under that program. Finally, as stated in the NPRM, NHTSA has not attempted to address the revisions that may be necessary to provide regulatory certainty for manufacturers that wish to self-certify ADS-equipped vehicles with unconventional seating arrangements.

The final rule would lead to a reduction in the number of standards from which manufacturers of ADS-DVs would have to seek exemptions. The reduction in exemption requests would be associated with a reduction in administrative costs for both manufacturers and NHTSA. NHTSA does not have sufficient information to establish a specific estimate of administrative cost savings. However, the cost savings would be expected to be small relative to the production cost savings associated with the rule.

A less tangible, but still important, expected impact of the final rule would be a reduction in uncertainty for manufacturers of ADS-equipped vehicles. The final rule provides clarity to manufacturers on constraints to developing FMVSS-compliant ADS-equipped vehicles. In turn,

developmental paths for ADS-equipped vehicles could be implemented with greater precision and efficiency. The reduction in uncertainty could reduce not only the costs associated with manufacturing ADS-equipped vehicles, but also the time it would take to bring these vehicles to the market. An accelerated development timeline would be a benefit both to manufacturers and consumers.

## **II. NPRM**

On March 30, 2020, NHTSA issued an NPRM that proposed modifications to certain terms and other regulatory text in the 200-Series FMVSSs to account for ADS-equipped vehicles and certain interior designs that are expected to be present in these vehicles, including the lack of driving controls.<sup>13</sup> The NPRM also included modifications to the regulatory text to take into account some dual-mode ADS-equipped vehicles.<sup>14</sup> The NPRM sought to resolve whether occupant protection requirements ought to apply to occupant-less vehicles.

NHTSA's proposal sought to account for certain vehicle designs expected to accompany ADS-equipped vehicles in a manner that minimized textual additions and modifications to the 200-Series FMVSSs. The proposal discussed existing terms used in the standards that, through their use, made uncertain how regulatory text applies to vehicle designs that did not incorporate such terms. The proposal discussed existing terms that, by virtue of new vehicle designs, could be misunderstood, and defined them to clarify their meaning for ADS-equipped vehicles. The NPRM proposed a few new terms and definitions and proposed relocating other terms and

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<sup>13</sup> 85 FR 17624. As discussed below, however, the NPRM assumed the vehicles will have conventional forward-facing seating.

<sup>14</sup> An [ADS-Equipped] Dual-Mode Vehicle is defined as “[a] type of ADS-equipped vehicle designed for both driverless operation and operation by a conventional driver for complete trips.” SAE J3016\_201806 Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles.



definitions. The NPRM proposed to modify regulatory text to address situations where there may be no driver seat, but multiple outboard passenger seats. The agency proposed to consider any left outboard seat that does not have immediate access to traditional manual controls (“manually operated driving controls”) as a “passenger seat” and mirror the test procedures and requirements from the right side.

FMVSS No. 208, *Occupant crash protection*, is a primary focus of this rulemaking, as it is one of NHTSA’s most complex standards, and many of this standard’s performance requirements and test procedures were written with references to the “driver’s” seating position. This emphasis on the driver’s position in the standard reflected the fact that, with conventional (i.e., non-ADS) vehicles, the driver’s seat should always be occupied by an individual of legal driving age during operation. For our discussions in this document we will typically refer to these individuals as adults, although they may in some cases be legally minors. The NPRM discussed the treatment of advanced air bags and advanced air bag suppression telltales<sup>15</sup> in ADS-equipped vehicles with two front outboard passenger seats. The NPRM proposed to require a separate telltale for each front outboard passenger seat, which must be visible from each front outboard seat. The NPRM addressed FMVSS No. 208’s seat belt requirements for “medium-sized” buses (with a gross vehicle weight rating (GVWR) between 4,536 kilograms (kg) (10,000 pounds (lb.)) and 11,793 kg (26,000 lb.)) and school buses (GVWR greater than 4,536 kg (10,000 lb.)). For such buses equipped with ADS without a driver’s seat, NHTSA proposed that all front seats meet the protection requirements that must currently be met by the driver’s seat.

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<sup>15</sup> The term “telltale” is defined in FMVSS No. 101; Controls and displays, as “an optical signal that, when illuminated, shows the actuation of a device, a correct or improper functioning or condition, or a vehicle system’s failure to function.” The term is used in many other FMVSSs and is used in FMVSS No. 208 for an indicator of air bag operational status as a function of the occupant detection system of the seat.

The NPRM proposed to streamline the 200-Series FMVSSs so that requirements would not apply when the ADS-configured vehicle posed no safety need for the requirement. For example, the proposal took the position that, when there is not a steering wheel or steering column in a motor vehicle, FMVSS Nos. 203, *Impact protection for the driver from the steering control system*, and 204, *Steering control rearward displacement*, would not apply. Similarly, the NPRM proposed not to apply occupant protection standards to vehicles designed solely to carry cargo, rather than occupants (“occupant-less” vehicles).<sup>16</sup> This was accomplished by proposing to alter the “application” section of various FMVSSs to indicate that the standards only applied to a “truck” with at least one designated seating position (DSP).<sup>17</sup> The NPRM analysis concluded that this change was only required for FMVSS Nos. 201, *Occupant protection in interior impact*, 205, *Glazing material*, 206, *Door locks and door retention components*, 207, *Seating systems*, 208, *Occupant crash protection*, 214, *Side Impact protection*, 216a, *Roof crush resistance; Upgraded standard*, and 226, *Ejection mitigation*.

### **High-Level Summary of Comments on Overall Approach and Need for Rulemaking**

In response to the NPRM, NHTSA received 45 comments from vehicle and equipment manufacturers and ADS developers, industry associations, consumer advocates, advocates for persons with disabilities, States, insurance organizations, a university, an oil independence advocacy group, and members of the general public. Generally, most commenters supported the proposal, the revision of terms and use of definitional and textual changes to achieve the goals of the NPRM, and the agency’s approach to minimize the complexity of the changes to the

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<sup>16</sup> We note that a vehicle designed to carry standee passengers (e.g., a transit shuttle) would fall under one of NHTSA’s other vehicle classifications.

<sup>17</sup> “Designated seating position” is defined in 49 CFR 571.3. Generally described, a DSP is a seat location that has a seating surface width of at least 330 millimeters (13 inches) as measured in the manner described in the definition.

FMVSSs.<sup>18</sup> However, various other commenters, particularly certain non-governmental organizations, raised concerns about the agency’s general approach to ADS regulation and the prioritization of this and similar rules, though many of these commenters had only minor comments concerning specific proposed technical changes.

Approximately 25 commenters across all commenter types agreed that there is a need for the proposal, and, of these, approximately 17 commenters stated they agreed with the general approach. For example, General Motors (GM) commented that it supports the approach used in the NPRM and that “when finalized into a final rule, [it] will provide needed regulatory certainty for certification, reduce certification costs and minimize (but not completely eliminate) the need for future NHTSA interpretation or exemption requests related to ADS-equipped vehicles.” Waymo stated that the proposal would not reduce any protections for automated vehicles without manual controls and strongly supported the limitations in scope of the NPRM “to crashworthiness standards to conventional occupant seating arrangements.” The Alliance for Automotive Innovation (Alliance) stated that the rulemaking will work towards “maintaining motor vehicle safety” and “reduce the need to rely on the administratively complex and time-consuming FMVSS exemption process.”

Several commenters, though, questioned the need for the rulemaking action. The Center for Auto Safety (CAS) argued that a better allocation of limited government resources would be to focus on the “nearer-term technology improvements with immediate impact on the safety of occupants of conventional vehicles, pedestrians, and other vulnerable road users.” CAS stated that such an approach was more appropriate because “fully autonomous driving system-equipped vehicles [...] do not exist at this time.” CAS also asserted that NHTSA should not permit

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<sup>18</sup> An additional 5 comments were received that were determined to be completely unrelated to this notice (#4, #5, #6, #18, #52), and 1 duplicate submission (#42).

traditional manual controls to be removed from vehicles “until at least equivalent safety [of ADS-equipped vehicles] is proven.” CAS stated that such controls “might be deployable only as needed but are an absolute necessity for the many conceivable foreseen and unforeseen safety-critical situations that ADS-equipped vehicles will encounter.” The National Safety Council (NSC) stated that “shifting focus from tried-and-true vehicle standards is the wrong approach and evaluating the removal of those standards is premature at this time. As most ADS vehicle designs that might benefit from a revision of FMVSS standards are still on the drawing boards and unforeseen issues are certain to arise, eliminating current standards at this point is hasty.” NSC argued that NHTSA should redirect resources and prioritize requiring advanced driver assistance systems (ADAS) and other technologies in vehicles. Consumer Reports (CR) also “question[ed] the present focus of the agency on ‘removal of regulatory barriers’ rather than on developing and implementing standards for proven safety technologies,” though CR also stated that it “appreciate[s] the Agency’s targeted approach on this topic” and that the narrow scope of the NPRM “is appropriate.” The Insurance Institute for Highway Safety (IIHS) expressed concern that “the current Notice of Proposed Rulemaking (NPRM) creates a path for deploying into the market ADS-controlled vehicles without regulations that establish the ground rules for the safe behavior of ADS,” Though it also stated that “modifications proposed by NHTSA likely will be helpful to the entities developing automated driving systems (ADS) and the vehicles that will be controlled by ADS” and that the “changes answer some questions about how the occupants of ADS-controlled vehicles should be protected in the event of a crash.”

### **Agency Response**

NHTSA is sensitive to concerns raised regarding prioritizing rulemakings and other activities that emphasize other technologies, such as advanced driver assistance systems

(ADAS), instead of focusing on vehicles that remain in development. However, in the case of this rulemaking, the agency focused appropriate resources to address a narrow question. Further, NHTSA has determined it is appropriate to proceed with this final rule at this time, as it will provide ADS manufacturers with certainty on how to comply with these FMVSSs and reaffirm the application of occupant protections standards to vehicles equipped with ADS. Thus, this final rule will have the limited effect of providing clarity on the specific issues addressed here, which will, at the very least, ensure that vehicles with ADS technology provide the same high levels of occupant protection that current passenger vehicles provide. Taking this action now will make clear that the crashworthiness standards apply to vehicles with ADS technologies.

We also note that, in addition to this action, we have commenced rulemaking and other action on ADAS technologies. In the Spring 2021 Unified Agenda of Regulatory and Deregulatory Actions, NHTSA announced two rulemakings to require emergency braking performance for heavy and light vehicles and to require pedestrian automatic emergency braking performance in light vehicles.<sup>19</sup> Furthermore, the agency is working on updates to its New Car Assessment Program (NCAP 5-star safety ratings program) to include additional modern vehicle safety technologies that can address crashes and promote safer behaviors. Thus, the agency is actively engaged in actions related to ADAS.

The purpose of the National Traffic and Motor Vehicle Safety Act (Safety Act), which NHTSA, by delegation, is tasked with administering, is to reduce traffic crashes and their resulting deaths and injuries, through carrying out research and establishing FMVSS.<sup>20</sup> In

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<sup>19</sup> Heavy Vehicle Automatic Emergency Braking, <http://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202104&RIN=2127-AM36> and Light Vehicle Automatic Emergency Braking (AEB) with Pedestrian AEB, <https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202104&RIN=2127-AM37>

<sup>20</sup> 49 USC 30101.

establishing FMVSSs, NHTSA sets minimum performance standards that are objective and practicable, and that protect the public against an unreasonable risk of crashes occurring, and death or injury in the event a crash does occur.<sup>21</sup> This final rule is consistent with the goals of the Safety Act by modifying the FMVSSs to account for vehicle designs that NHTSA anticipates will arise with deployment of ADS-equipped vehicles, in a manner that provides occupants with at least the same protections afforded by existing standards that the agency has already found meet the need for motor vehicle safety.

Although NHTSA understands concerns that this final rule is premature given the current state of ADS-equipped vehicle development, the agency has received many requests from industry for information to assist them in determining how existing FMVSSs apply to ADS-equipped vehicles developed without traditional manual controls (e.g., steering wheels) and other unconventional vehicle designs. In response to these requests, NHTSA conducted a preliminary analysis of the potential unintended barriers to these vehicle designs,<sup>22</sup> issued requests for comment, held public meetings, and initiated rulemaking proceedings on the topic—including this rulemaking—to gather as much information as possible on how best to approach modernizing the FMVSS to account for these vehicles.

There also continues to be progress toward development of ADS-equipped vehicles. NHTSA knows of dozens of testing and development activities taking place in more than 40 States and the District of Columbia, many of which involve ADS-equipped vehicles that lack manually operated driving controls.<sup>23</sup> In addition, one manufacturer of small, low speed,

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<sup>21</sup> 49 USC 30111.

<sup>22</sup> Kim, Perlman, Bogard, and Harrington (2016, March) Review of Federal Motor Vehicle Safety Standards (FMVSS) for Automated Vehicles, Preliminary Report. US DOT Volpe Center, Cambridge, MA. Available at: [https://rosap.ntl.bts.gov/view/dot/12260/dot\\_12260\\_DS1.pdf](https://rosap.ntl.bts.gov/view/dot/12260/dot_12260_DS1.pdf).

<sup>23</sup> <https://www.nhtsa.gov/automated-vehicles-safety/av-test-initiative-tracking-tool>.

occupant-less ADS delivery vehicles received a temporary exemption from NHTSA to deploy up to 2,500 vehicles per year for two years.<sup>24</sup> These activities, and the advancements toward development of ADS-equipped vehicles, have created an opportunity for new vehicle designs that warrants evaluation of current FMVSSs.

When NHTSA promulgated most of the current FMVSSs, the agency did not consider the sorts of vehicle designs that would be possible if a vehicle could operate without human intervention. Today, an increasing number of companies are developing technologies to make that idea a reality. NHTSA is issuing this final rule to amend terminology, definitions, and other nomenclature found in the relevant FMVSS that inadvertently and unnecessarily impede the unconventional vehicle designs described by manufacturers.

NHTSA identified the narrow scope of the NPRM clearly and has retained that scope for this final rule. Although the agency is sympathetic to many of the suggestions from CAS, CR, NSC and IIHS that NHTSA should focus on other vehicle safety issues and technologies, the agency believes it remains appropriate to finalize today's action on the narrow grounds identified in the NPRM, while continuing its other research and ongoing rulemaking actions on the issues identified by those commenters, including those related to ADS performance and ADAS technologies. Issues related to agency allocation of resources are also outside the scope of this final rule.

NHTSA also disagrees with the IIHS assertion that this final rule alone creates a path for ADS deployment. NHTSA's existing FMVSSs do not prevent the deployment of ADS in

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<sup>24</sup> 85 FR 7826 (Feb. 11, 2020). NHTSA has also received two other petitions for exemption for ADS-equipped vehicles that would lack manually operated driving controls. However, the agency has only requested comment on one of these petitions, which was later withdrawn. The agency is currently developing notices of receipt for the two other petitions it received, including GM's updated petition. See <https://www.reuters.com/article/us-autonomous-cruise-nhtsa-idUSKBN2762SP>.

vehicles configured like traditional vehicles (*i.e.*, equipped with manually operated driving controls), when the vehicles meet all applicable FMVSSs. If the vehicle can be certified as meeting the FMVSSs, it can be deployed with ADS regardless of issuance of this final rule. This final rule simply makes targeted changes to the FMVSSs to account for certain vehicle designs that NHTSA has seen from some manufacturers or has otherwise been made aware. In addition, this final rule only addresses the crashworthiness standards. As the agency continues to assess how and whether to change other relevant FMVSSs in response to these types of vehicles, at this stage, an ADS-equipped vehicle may still be required to petition for and receive an exemption from NHTSA to be manufactured for sale, sold, offered for sale, introduced or delivered for introduction in interstate commerce, or imported into the United States.<sup>25</sup>

This final rule is substantially similar to the NPRM, with some alterations resulting from consideration of the comments. A summary of the substantive differences between the NPRM and final rule was provided in Section I of this preamble.

### **III. Introduction to this Final Rule**

This final rule preamble is organized by critical subject matter. First, the rule addresses subjects that affect all 200-Series FMVSSs, such as changes to the terminology used in the standards. For example, the agency is defining some terms already used in many of the 200-Series FMVSSs to account for ADS-equipped vehicles (e.g., “driver’s designated seating position,” “passenger seating position”), or is adopting new definitions as appropriate (“manually operated driving controls,” “steering control”). These changes to nomenclature provide clarity about how the crashworthiness FMVSSs apply to ADS-equipped vehicles and seek to amend the FMVSSs to include these new vehicle designs. Another issue that affects all 200-Series

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<sup>25</sup> 49 USC 30112(a).



FMVSSs is the way in which the standards use features such as the “driver’s seat,” “passenger seat,” and “steering controls” as spatial references to describe where things are located within the vehicle. This final rule amends the terms so that the spatial references make sense as applied to the interior designs of ADS-equipped vehicles, which may, for example, lack a driver’s seat and have an additional passenger seat instead. Other issues of general significance include clarifications regarding how the 200-Series FMVSSs apply to vehicles that can be operated by both ADS and by a steering control (dual-mode vehicles), and how some test procedures pertain to vehicles that do not have components referenced therein (e.g., a manual parking brake mechanism).

Second, this final rule achieves an objective of the agency with regards to “occupant-less vehicles,” by tailoring the 200-Series FMVSSs to exclude vehicles that are intended not to have human occupants. Occupant-less vehicles are designed for the transportation of property, not people, and have no DSPs. The agency has determined that the original safety need of the 200-Series FMVSSs no longer exists when there are no occupants to protect. A more fulsome discussion of this topic is provided in section V of this preamble.

Third, this final rule preamble discusses amendments to terminology used in certain FMVSSs, and focuses on FMVSS No. 208 as a critical subject, as many of the performance requirements of this standard were written with reference to the driver’s and passenger’s seating positions. This final rule discusses changes to substantive requirements of the standard resulting from those revisions to terminology, such as the treatment of advanced air bags and advanced air bag suppression telltales in ADS-equipped vehicles, lockability requirements, and changes to FMVSS No. 208’s seat belt requirements for medium-sized buses and large school buses following the removal of the term “driver.”

Fourth, after the FMVSS No. 208 discussion, this final rule discusses amendments to other FMVSSs.

Lastly, the final rule discusses the effective date and cost impacts of the rule.

#### **IV. Implications**

##### **a. New and current terms and definitions**

##### **1. NPRM's approach to driver definition**

In the NPRM, NHTSA proposed to define, modify, or relocate existing terms and proposed new terms both to clarify application of the 200-Series FMVSSs to ADS-equipped vehicles and to facilitate the implementation of other proposed regulatory changes. However, NHTSA did not propose to amend the definition of “driver” in 49 CFR 571.3 to include ADS, and it did so intentionally. NHTSA cited four primary reasons for this decision. First, NHTSA believed it would not be appropriate to consider changes to such a fundamental and ubiquitous concept (“driver”) in a rulemaking that focused solely on the 200-Series without completing the additional research necessary to address implications for those other FMVSSs. Second, the regulatory changes NHTSA proposed in the NPRM did not necessitate examination of the issue of “what is a driver.” Third, NHTSA determined that revisiting the definition of driver would best be done in a different context, perhaps if the agency undertakes defining the ADS itself. Finally, keeping the current definition of driver was consistent with the input NHTSA received through the initial phase of a research project under which the FMVSSs were reviewed to identify potential approaches for addressing barriers.<sup>26</sup>

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<sup>26</sup> DOT HS 812 796, April 2020.

Notwithstanding NHTSA’s statements above, NHTSA received several comments suggesting amendments to the driver definition.<sup>27</sup> However, none of these comments addressed NHTSA’s four areas of concern. Accordingly, NHTSA does not amend the definition of driver in this final rule. However, the agency will consider the input received from comments on this rulemaking in proposing future regulatory actions.

**2. Newly defined, new, modified, and relocated terms**

The agency proposed several changes to terms and definitions to implement the goals of the rulemaking. These definitions were proposed to be located or were already located in part 571.3, “Definitions.” Table 2, below, summarizes the NPRM’s proposal for the reader.

**Table 2: Proposed changes to terms and definitions**

<b>Proposed term or definition</b>	<b>Type</b>	<b>Justification</b>
<i>Driver air bag</i> means the air bag installed for the protection of the occupant of the driver's designated seating position.	New definition of existing term	Clarify the application of occupant protection requirements
<i>Driver dummy</i> means the test dummy positioned in the driver's designated seating position.	New definition of existing term	Clarify the application of occupant protection requirements
<i>Driver's designated seating position</i> means a designated seating position providing immediate access to manually operated driving controls. As used in this part, the terms “driver's seating position” and “driver's seat” shall have the same meaning as “driver's designated seating position.”	New definition of existing term	Clarify the application of occupant protection requirements
<i>Manually operated driving controls</i> means a system of controls:  (1) That are used by an occupant for real-time, sustained, manual manipulation of the motor vehicle's heading (steering) and/or speed (accelerator and brake); and  (2) That are positioned such that they can be used by an occupant, regardless of whether the	New	Clarify the application of occupant protection requirements

<sup>27</sup> For example, some commenters suggested adding “human” or “conventional” in front of driver. As the agency noted in the preamble to the NPRM, since the “driver” definition clearly indicates an “occupant,” specifying “human” is superfluous.

occupant is actively using the system to manipulate the vehicle's motion.		
<i>Outboard designated seating position</i> means a designated seating position where a longitudinal vertical plane tangent to the outboard side of the seat cushion is less than 12 inches from the innermost point on the inside surface of the vehicle at a height between the design H-point and the shoulder reference point (as shown in fig. 1 of Federal Motor Vehicle Safety Standard No. 210) and longitudinally between the front and rear edges of the seat cushion. As used in this part, the terms “outboard seating position” and “outboard seat” shall have the same meaning as “outboard designated seating position.”	Modification	Clarify that the undefined terms “ <i>outboard seating position</i> ” and “ <i>outboard seat</i> ” have the same meaning as “ <i>outboard designated seating position.</i> ”
<i>Passenger seating position</i> means any designated seating position other than the driver’s designated seating position, except as noted below. As used in this part, the term “passenger seat” shall have the same meaning as “passenger seating position.” As used in this part, “passenger seating position” means a driver’s designated seating position with stowed manual controls.	New definition of existing term	Clarify the application of occupant protection requirements
<i>Row</i> means a set of one or more seats whose seat outlines do not overlap with the seat outline of any other seats, when all seats are adjusted to their rearmost normal riding or driving position, when viewed from the side.	Relocation	Eliminate the necessity to cross-reference FMVSS No. 226.
<i>Steering control system</i> means the manually operated driving control(s) used to control the vehicle heading and its associated trim hardware, including any portion of a steering column assembly that provides energy absorption upon impact. As used in this part, the term “steering wheel” and “steering control” shall have the same meaning as “steering control system.”	Relocation; Modification	To incorporate new definition for “manually operated driving controls,” and to clarify that the definition applies to the undefined terms “steering wheel” and “steering control.”

In proposing these definitions, NHTSA acknowledged that vehicle designs are changing in response to technological innovation. Given that the agency is already seeing ADS-equipped

vehicles being designed to operate in a “driverless” mode at all times,<sup>28</sup> and understanding that more vehicles may be designed as such in the future, the underlying assumption behind many of the current FMVSSs that manually operated driving controls will be present in all vehicles at all times is no longer controlling. For vehicles designed to be solely operated by an ADS, manually operated driving controls are logically unnecessary.<sup>29</sup> To account for this, the NPRM proposed a regulatory scheme in which the affected standards would not assume that a vehicle will always have a driver’s seat, a steering wheel and accompanying steering column, or just one front outboard passenger seating position. The definition modifications proposed allows the regulatory text, to be unambiguous related to, for example, which front seating positions are driver or passenger designated seating positions (DSPs). Taking the left front outboard seat as an example, this seating position may be a *passenger seating position* (modified definition) because it is not a *driver’s designation seating position* (modified definition). It is not a driver’s (DSP) because by virtue of the definition of *driver* (unmodified definition), it does not have access to a *steering control system* (modified definition), which is a type of *manually-operated driving control* (new definition).

The NPRM proposed to accomplish this regulatory scheme by modifying the text of the affected standards so that the front outboard passenger seat performance requirements and test procedures would apply to all front outboard seating positions for these vehicles. For most standards, the NPRM proposed to accomplish this by slight textual changes that would enable the performance requirements and test procedures that currently apply to the right front

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<sup>28</sup> See, e.g., Nuro R2X, discussed further below.

<sup>29</sup> Note that other regulatory changes to the FMVSS not impacted by this rulemaking (e.g., with regard to the 100-Series FMVSSs) would likely be necessary to permit such a vehicle to be manufactured for sale, even with the changes made by this rule (absent an exemption to the FMVSS under 49 CFR part 555). Note also that the Safety Act’s defect provisions apply to an ADS and ADS-equipped vehicle.

passenger seat to be “mirrored” for the left side of the vehicle. If the ADS-equipped vehicle retained a driver’s seat, the NPRM proposed keeping performance requirements and test procedures for the driver’s seat, when it exists, effectively unchanged. These proposed changes effectively turn occupant protection requirements for the driver’s seat into “if-equipped” requirement, meaning that when a vehicle does not have a driver’s seat, all front outboard seating positions must meet the current front outboard *passenger* seat requirements. The standards to which NHTSA proposed making this type of change were FMVSS Nos. 201, 208, 214, and 226.

Commenters generally supported NHTSA’s proposed changes to the terms and definitions. Some commenters provided suggestions and minor modifications to the proposals. This final rule maintains the proposed definitions and changes to terminology, except for “passenger seating position.” We address specific comments below.

### **3. Driver’s designated seating position, Manually operated driving controls**

The NPRM proposed to define *driver's designated seating position* as “a designated seating position providing immediate access to manually operated driving controls. As used in this part [571], the terms ‘driver's seating position’ and ‘driver's seat’ shall have the same meaning as ‘driver's designated seating position.’”

This definition incorporated another proposed term, *manually operated driving controls*, which was defined in the NPRM as “a system of controls: (1) That are used by an occupant for real-time, sustained, manual manipulation of the motor vehicle's heading (steering) and/or speed (accelerator and brake); and (2) That are positioned such that they can be used by an occupant, regardless of whether the occupant is actively using the system to manipulate the vehicle's motion. The definition of *steering control system* was clarified to state that it is a type of *manually operated driving control*.

## **Comments**

Many of the comments related to these definitions focused on “unconventional” driving controls. The Center for Auto Safety (CAS) argued that the definition of “driver’s designated seating position” should be written to exclude non-conventional controls such as joysticks, computers, tablet computers or wireless remote controls, and that reference should be made to controls that are “permanently attached to the vehicle in a fixed location.” In contrast, Tesla argued that the definition should consider situations where, for example, “the manual controls may be removable, or where they may still be present, but are ‘locked’ or rendered inoperative when the ADS is in control of the driving task, or where the vehicle may be operated remotely by portable steering controls within the vehicle (e.g., by cell phones or tablets).” Tesla stated that the definitions may not fully consider the “range of possibilities” of types of controls, such as “buttons, joysticks, screens” and “should not necessarily be determinative of whether the designated seating position should be considered a driver’s rather than a passenger’s seat for purposes of occupant protection.” The Alliance and Toyota commented that there may be a lack of clarity with respect to joystick type controls as to how they would fit into the proposed definitional structure.

## **Agency Response**

NHTSA has considered the comments but is not revising the two proposed definitions. The agency concludes that CAS’s suggested changes would add ambiguity to the definition of the driver designated seating position. The commenter’s suggestion to add “conventional” to the definition raises a question about the meaning of this term. Similarly, we believe that making the recommended change to refer to permanently attached controls in a fixed location may cause confusion with respect to stowable controls that may be installed in “dual-mode” vehicles.

NHTSA does not agree with Tesla that it is necessary at this time that the definition for manually operated driving controls account for the use of tablets or cell phones to control the vehicle. The new definition is meant to encompass traditional driving controls, not future controls that have not yet been developed. We also note that this rulemaking does not address joystick-type designs that are intended to be the only manual driving control or driving controls that have no fixed position at a particular seating location. Since this issue raises crash avoidance and crashworthiness safety concerns that are beyond the scope of this rulemaking action, we will not address the matter in this final rule.<sup>30</sup>

Tesla argued that only one of the terms “steering control system” and “manually operated driving controls” may be necessary, not both. NHTSA disagrees and believes having both terms allows for a more consistent regulatory text and less disruption from the existing text structure. Tesla claimed that the NPRM did not address the situation where the driving controls may still be present but are “locked” or “inoperative.” The NPRM explicitly considered inoperative controls that remain in position.<sup>31</sup> Tesla sought clarity on whether remote operation fell into the definition of “manually operated driving controls.” In response, under the definition of “manually operated driving controls,” it specifies that such controls are positioned such that they can be “used by an *occupant*” (emphasis added). Accordingly, the definition of “manually operated driving controls” excludes remote operation controls.

The Alliance stated there is a lack of clarity with respect to stowed manual controls. The commenter suggests the term “stowed” could mean a range of positions. The commenter points

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<sup>30</sup> GM focused on the plural nature of the proposed definition to suggest that an unconventional control, such as a joystick, could in fact be a single manually operated *control* (not a system of *controls*) for use by a technician or for fleet management to move the vehicle across a lot, for example. GM believed that this single control would not be intended for use by a motorist for real-time, sustained manual manipulation of steering or acceleration or braking. Instead, GM envisioned this single control to be used for the short-term, temporary activation of the vehicle for fleet management purposes.

<sup>31</sup> 85 FR at 17637, VI.a.vi.6.



to the preamble statement that research may be needed into the “transition of traditional manual controls in dual-mode ADS equipped vehicles.”

To be clear, issues arising from the physical act of stowing manual controls is beyond the scope of this rulemaking. We believe the existing standards clearly provide for occupant protection when the controls are stowed, creating a passenger DSP. As for the meaning of the term “stowed,” it is the past tense of “stow,” which has the plain language meaning of “pack or store away.” In the 200-Series standards, it is a term that is already used in relation to air bags, seat belts, and sun visors. We believe that a stowed manually operated driving control will be self-evident. Stowed controls could have multiple potential stowed positions and configurations, but not positioned such that they can be used by the driver.

#### **4. Passenger seating position**

The NPRM proposed to define “*passenger seating position*” as—

any designated seating position other than the driver’s designated seating position, except as noted below. As used in this part, the term “passenger seat” shall have the same meaning as “passenger seating position.” As used in this part, “passenger seating position” means a driver’s designated seating position with stowed manual controls.

GM suggested slightly revising the last sentence in a manner that clarifies the provision about stowed controls. NHTSA agrees in part with GM’s suggestion, and has decided in this final rule to change the last sentence to state:

As used in this part, “passenger seating position” includes what was a driver’s designated seating position prior to stowing of the manually operated driving controls.”

#### **5. Steering wheel to steering control**

The NPRM proposed to change the term “steering wheel” to “steering control” in consideration of steering controls that may not be circular, such as those shaped more like an airplane yoke control. At every occurrence of the term “steering wheel,” the NPRM substituted the term “steering control.” These terms were meant to be synonymous as is evident by the use of the terms in the proposed definition of “steering control system.”

## **Comments**

Comments were generally supportive, although some commenters raised concerns about issues tangential to the proposal. The California State Transportation Agency<sup>32</sup> (State of California, or CalSTA) and Securing American’s Future Energy (SAFE) expressed support for the proposal. Safe Ride News (SRN) expressed concerns related to potential dangers for non-circular steering controls. Tesla did not comment on the change from “wheel” to “control,” but rather was concerned that the term “steering control rim” in FMVSS No. 208 implied a circular control.

The final rule will adopt the proposed change. With respect to SRN’s concerns, the change in terminology does not newly enable manufacturers to equip vehicles with non-circular steering controls, since such controls were never prohibited. All of the standards that address the impact protection of steering controls remain in place. We also disagree with Tesla’s contention that the use of the term “rim” limits the shape of the steering control to a round object. We believe “rim” can reasonably be interpreted as “outer edge.” Thus, various shapes are possible. We decline to make any change to the term “steering control rim” in this final rule.

## **6. Outboard designated seating position**

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<sup>32</sup> Comments submitted in coordination with the California Highway Patrol and the California Department of Motor Vehicles.

NHTSA proposed to clarify that the terms “outboard seating position” and “outboard seat” have the same meaning as used in the existing definition of “outboard designated seating position.” Our analysis of the regulatory text of the crashworthiness FMVSSs, determined these three terms have the same meaning. Therefore, to clarify this point, we proposed added language specifying that “outboard seating position” and “outboard seat” have the same meaning as “outboard designated seating position.”

### **Comments**

There were no adverse comments made to this proposal and the final rule will adopt the proposed change.

### **7. Row and Seat outline**

The NPRM proposed to relocate the definition of “row,” which is currently located in FMVSS No. 226, to Part 571.3. The term was proposed to be used in multiple standards (FMVSS Nos. 201, 206 and 208). Moving it to part 571.3 would eliminate the need to insert a reference to its current location.

### **Comments**

There were no adverse comments related to moving the definition of “row.” However, Alliance, Zoox and GM recommended that the definition of “outline” similarly be moved to part 571.3 because the definition of “row” uses this term. The final rule will make this change.

### **8. Driver air bag and Driver Dummy**

The NPRM proposed to define “driver air bag,” “driver dummy.” These are new definitions, but the terms already appear many times in the FMVSSs. This is also the case for “passenger seating position” and “driver's designate seating position,” which we discussed extensively above. However, there was previously no strong need to define these terms.

NHTSA proposed to define them now because they help to clarify the application of the FMVSSs to ADS-equipped vehicles while maintaining their application to traditional vehicles and minimizing textual disruption.

## **Comments**

There were no adverse comments made to this proposal and the final rule will adopt the proposed change.

### **b. Modifying spatial references in test procedures and definitions that rely on the presence of a driver's seat and/or manual-operated driving controls**

FMVSS Nos. 201, 206, 208, 214, 216a, 225 and 226 contain terms or definitions that reference the driver's seat or steering controls to provide a spatial reference for where equipment in the vehicle must be installed, or test equipment (such as test dummies) placed in a compliance test. The NPRM proposed various changes addressing the situation where there is no driver's seat, a lone passenger seat, or no steering control to provide a spatial reference frame. In some instances, the agency proposed using the front row or the front outboard seating position as a reference rather than the driver's seat. In some cases, the "left" or "right" side of the vehicle was proposed to be used rather than "driver's side" or "passenger side."

#### **1. Driver's seat**

The NPRM proposed using the front row, or the seating reference point of a seat in the front row, as a spatial reference rather than the driver's seat. Such changes were proposed for FMVSS Nos. 201, 206, 208 and 225, for buses.<sup>33</sup> Most commenters were supportive of the proposed changes.

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<sup>33</sup> The Center for Auto Safety did not comment on the specifics of the change, but as with other bus-related issues, stated that "it is inappropriate to consider ADS for buses within the stated NPRM scope." NHTSA has responded to this issue earlier in this preamble.

FMVSS No. 225, “Child restraint anchorage systems,” currently defines “shuttle bus” as “a bus with only one row of forward-facing seating positions rearward of the *driver’s seat*” (emphasis added). The NPRM proposed modifying the definition to state that if the bus does not have a driver’s seat, it would meet the definition of a shuttle bus if it has only one row of forward-facing seating positions rearward of the front row. The NPRM made no alteration for non-ADS vehicles.

### **Comments**

The Alliance supported the change to the definition of “shuttle bus,” but requested that this change be made for all vehicles, not just vehicles without driving controls, using the same language. In contrast, the State of California (CalSTA) commented that the “proposed change may result in practical design and configuration changes to shuttle buses. Further research into how these changes will impact occupant safety on shuttle buses, if at all, is needed and suggests that it may be premature to address at this time.” The Alliance further addressed provisions for rear-facing front row seating.

NHTSA is not implementing the Alliance’s suggestion to apply the definitional change to non-ADS-equipped vehicles and is not accounting for rear-facing front row seating. This decision is in line with the agency’s intent to focus this rulemaking narrowly to address unique designs that might be implicated by ADSs. This rulemaking is NHTSA’s first step toward modernizing the FMVSSs to account for these new vehicle designs. No doubt there will be other steps, as the technologies mature, and suggestions for further amendments will be considered at those appropriate times.

NHTSA disagrees with CalSTA since the changes will have no effect on vehicles with driver's seats. Further, it is our expectation that using a front row seat as a reference rather than a driver's seat will have little to no effect on the reference point location.

For the reasons above and explained in the NPRM, this final rule adopts the changes that refer to the front row instead of to the driver's seat.

## **2. Dummy placement in bench seats**

Currently FMVSS Nos. 208 and 214 refer to the driver's DSP when specifying where to place and position test dummies in bench seats of vehicles in the respective compliance tests. The NPRM proposed to use the seating reference point of outboard seats as the spatial reference for the lateral placement of test dummies when there is no driver's DSP.

### **Comments**

All comments were generally in favor of using the seating reference point of outboard seats as the spatial reference for the lateral placement of test dummies when there is no driver's DSP.

The Center for Auto Safety (CAS) agreed with the proposed change to FMVSS No. 208 on the use of the seating reference point as the spatial reference for bench seats when there is no driver's seat. However, CAS stated: "[T]his proposal should not pertain to vehicles that include fixed or deployable human-accessible primary or backup (potentially deployable on demand or need) controls." NHTSA understands this comment as conveying CAS's belief there should not be any reduction in the safety of the driver as a result of this final rule—a belief with which the agency agrees. The agency notes that the proposed regulatory text was purposefully drafted in a manner that would not affect the protection currently provided by vehicles with manually operated driving controls, *i.e.*, those with a driver's seat.

IIHS stated that the proposed method to position passenger side dummies in the absence of a “driver’s” seat “seems sensible.” However, the commenter requested that the agency “ensure that this change will not result in unrealistic dummy positioning for all relevant dummy sizes before making its proposed change.” NHTSA has assessed how this final rule would impact dummy placement during compliance testing and concluded that the dummy positioning procedures are feasible for all the test dummies used in the standards, and dummy positioning would remain realistic for all tests. The Alliance supported the proposed language and suggested that such a method should be used with vehicles with unconventional steering controls. This suggestion is beyond the scope of this rulemaking but will be considered for future actions.

### **3. Driver’s side and passenger side**

FMVSS Nos. 206, 208, 216a and 226 refer to “driver’s side” and “passenger side” in describing substantive requirements and compliance test procedures. The NPRM proposed to substitute “left side” for driver’s side and “right side” for passenger side.

#### **Comments**

Some commenters were in favor of the approach NHTSA took in the NPRM. The Alliance supported the proposed language substituting “left side” for “driver’s side.” CAS indicated that this approach is sufficient to provide for testing under FMVSS No. 208. CalSTA supported the proposal, stating that this approach does not result in any “loss in meaning.” The commenter also agreed with similar proposed changes in FMVSS Nos. 206, 214 and 216a.

A few commenters did not support this change. In contrast to its comment about FMVSS No. 208, CAS stated that for FMVSS No. 214, optional manual controls normally associated with the driver’s position could be located on the right side of the vehicle. CAS also contended that, for FMVSS No. 226, the proposed changes to “left front door sill” from “driver’s door sill”

could have implications for vehicles that may only have doors or seating on the right side of the vehicle. ZF stated that the question of whether this option would result in the same performance outcome is one that needs additional study because it is unclear to them that “the occupant will be in the exact same position.”

The agency is adopting its proposal to change references to the driver’s and passenger side of the vehicle to the left and right side of the vehicle. With respect to CAS’s concern about FMVSS No. 214, whether manual controls associated with a defined driver position are on the left or right side of the vehicle has no bearing on the application of the standard’s requirements and test procedures to a vehicle. The standard’s side impact protection requirements currently and will continue to apply equally to the left and right sides of the vehicle. Further, the spatial reference changes proposed for FMVSS No. 214, S10.2 were nearly identical to the changes CAS supported in FMVSS No. 208. Regarding FMVSS No. 226, the agency is not aware of any vehicles under 10,000 lb. GVWR without a door on the left side of the vehicle. Regardless, placement of doors and seating on the right side of the vehicle does not affect the application of the requirements and test procedures of FMVSS No. 226. Finally, in response to ZF, we believe that it is reasonable to assume at this time that occupants would remain in the same position as currently contemplated by the standard, and thus, the same performance outcome could be expected by modifying the current language to “left side” and “right side.” NHTSA does not believe that additional research is necessary at this time since this rule only changes the term used to describe the seating position (“driver’s” seat) and not the performance requirements or placement of the seat itself. Finally, as mentioned previously, the scope of this rule includes conventional seating, not unconventional seating arrangements.

#### **4. Steering controls as a spatial reference**



FMVSS No. 201 S5.1.1(d) excludes from S5.1 “areas outboard of any point of tangency on the instrument panel of a 165 mm diameter head form tangent to and inboard of a vertical longitudinal plane tangent to the inboard edge of the steering wheel.” The NPRM proposed to amend S5.1.1(d) so that an area of the instrument panel excluded from S5.1 (the impact procedure) would no longer be excluded if the steering control were not present, i.e., the exclusion only applies to situations where the steering control is present.

CAS argued that the standard should apply to ADS-equipped vehicles that include optional manual controls that are either fixed or deployable if they are associated with a defined position. The Alliance believed additional clarity for S5.1.1(d) is needed for dual-mode vehicles with stowed controls, suggesting that NHTSA add the phrase “if the steering control is present or, in the case of dual-mode vehicles, fully deployed in manual driving mode” to the beginning of S5.1.1(d).

In response to CAS, the proposed amendment was intended to address vehicles without “steering wheels” and where the steering control is not present. The rule change was to ensure the protection provided by the current passenger side of the instrument panel (right side) is provided to the left side (former driver’s side). The revised standard will provide the same level of protection as the current standard when a steering control system is present.

Relatedly, NHTSA declines to make the Alliance’s suggested clarification because it is unnecessary. Steering controls are defined as a type of “manually operated driving control.” Manually operated driving controls are “positioned such that they can be used by an occupant.” Thus, by definition, these controls are not stowed controls. The suggestion also raises additional questions related to how “dual-mode vehicles,” “fully deployed,” and “manual driving mode” should be defined.

### **c. Dual-mode certification**

The NPRM stated that for dual-mode vehicles with the capability of stowing driving controls, NHTSA would require manufacturers to certify compliance with all applicable FMVSSs in both modes (*i.e.*, with the manually operated driving controls available and with the controls stowed).<sup>34</sup> When the manually operated driving controls are available, the vehicle would be subject to the FMVSS requirements at that DSP as applied to a driver's DSP. When they were stowed, the vehicle would be subject to the FMVSS requirements at the DSP as applied to a passenger seat.

#### **Comments**

Many commenters supported NHTSA's approach to dual-mode vehicles. IIHS noted that the agency's statement in the preamble<sup>35</sup> that "NHTSA *expects* that manufacturers will need to certify compliance in both states (*e.g.*, manually operated driving controls available and stowed)" [emphasis added] was unclear and urged NHTSA to modify the regulatory text to ensure its expectation is met. The Automotive Safety Council (ASC), Securing America's Future Energy (SAFE), and Uber agreed with NHTSA's proposal to require that manufacturers certify compliance to, and conduct validation testing in, both modes. Tesla suggested that NHTSA add "even more clarity regarding the applicability of the FMVSS to such [dual-mode] vehicles. Dual-mode vehicles are likely to be some of the first ADS-equipped vehicles on the road." In addition, Tesla believes it sees a conflict in the agency statements that a seating position is not a driver's DSP, *i.e.*, it is a passenger DSP, if that position is not equipped with a manually operated driving control and the statement that a DSP remains a driver's DSP when driving controls are in place and the ADS is engaged.

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<sup>34</sup> 85 FR at 17634.

<sup>35</sup> *Id.*

## Agency Response

Among commenters addressing the issue of certification of dual-mode vehicles, there was agreement on the need to certify in both modes. In response to IIHS, we have reviewed the regulatory text to assure the text is not worded in terms of “expectations” but is clear in terms of requirements.<sup>36</sup>

With respect to the Tesla comment about seeing a conflict in the agency statements that a seating position is not a driver’s DSP, NHTSA believes these statements are not in conflict and clearly proceed from the terms used in the regulatory text (driver, steering control system, manually operated driving controls, driver’s DSP, and passenger seating position). For example, the definition of “manually operated driving controls” makes no statement about the state of any ADS system. It simply states, among other things, that the controls are “positioned such that they can be used by an occupant.” While the steering controls might not be used, as would be the case of a dual-mode vehicle with the ADS engaged, the seating position where they are located and positioned for potential use, by definition, remains the driver’s DSP.

NHTSA believes that no additional regulatory text changes are needed beyond that proposed in the NPRM to assure clarity with respect to certification of dual-mode vehicles. NHTSA notes that if a left front seat has both a driver configuration and a passenger configuration, the agency may choose either configuration for compliance testing, or test both configurations.

### **d. Parking brake and transmission position**

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<sup>36</sup> Uber presented several hypothetical situations relating to the Safety Act’s “make inoperative” provision, 49 U.S.C. 30122, which were beyond the scope of the NPRM. The Agency recommends persons seeking a request for interpretation of NHTSA’s standards or regulations, or of the statutory provisions of the Safety Act, submit a request for interpretation to NHTSA’s Chief Counsel’s Office.

Many of the 200-Series FMVSSs incorporate a full vehicle crash test or other kind of dynamic vehicle test in the standard's compliance test. For some of these dynamic tests, a test condition applies such that the vehicle transmission is in neutral, and/or the parking brake applied. For vehicles without driver-accessible transmission shift selectors or parking brake mechanisms, NHTSA may not have readily available means to set the vehicle in neutral, activate a parking brake, or achieve other test conditions described in the compliance test.

NHTSA did not propose any regulatory text changes related to interfacing with ADS-equipped vehicles on pre-test transmission and brake status. The agency believed such changes were unnecessary for the purposes of this notice, as the important factor for the 200-Series FMVSSs was whether the transmission was in the proper gear and the pre-test brake activated; the way that pre-test state was achieved was of no consequence to performance of the crash test. It was envisioned that manufacturers would provide the know-how for the agency to achieve the necessary transmission and brake status when NHTSA conducts its compliance tests. However, comments were requested on this issue.

## **Comments**

Commenters were generally in agreement with the agency's approach. The Center for Auto Safety (CAS) supported the agency's views on this matter. The Alliance agreed that manufacturers could and would work with the agency to achieve the necessary transmission and parking brake status. Waymo stated that it "agree[s] with the line of thinking that the important element is whether the transmission is in the proper gear and whether the pre-test brake is activated--not the manner in which that state is achieved."<sup>37</sup> GM stated it would work with

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<sup>37</sup> Waymo stated the Agency should remain flexible in compliance testing in general: "[t]o implement this principle, NHTSA could adopt policies allowing manufacturers to provide the tools and information necessary for the agency to conduct compliance tests in a manner befitting each manufacturer's unique automated vehicle designs."

NHTSA and the agency's test labs should the need for such consultation arise. Alternatively, Tesla believed NHTSA should "consider updates to the parking brake status in compliance testing where it may not reflect real-world scenarios."

### **Agency Response**

NHTSA's view of how compliance tests would be conducted on vehicles without traditional transmission shift levers or parking brake mechanisms was supported by the commenters. The agency envisions compliance testing will be conducted with the above framework in mind. Tesla may be raising a point that certain test conditions may not be necessarily relevant or appropriate for some vehicles, if, for example, the vehicle parking brake status is not appropriate. While NHTSA agrees that FMVSS test conditions should be relevant and appropriate for the vehicle and for the safety need addressed by the standard at issue, the agency is not currently aware of a situation where the parking brake status is an inappropriate test condition or would be inappropriate for an ADS-equipped vehicle. Consistent with the NPRM, the final rule does not change any regulatory text related to interfacing with ADS-equipped vehicles on pre-test transmission and brake status.

### **V. Occupant-less Vehicles**

Currently, the 200-Series "vehicle" standards apply to passenger cars, multipurpose passenger vehicles (MPVs), trucks, buses, and school buses. These vehicle types, as they are defined in 49 CFR 571.3, are all, by definition, passenger-carrying vehicles, except for "trucks." (A driver of a truck is considered an occupant but is not considered a "passenger.") Occupant-less vehicles would not have designated seating positions or any other vehicle features that aid in the transportation of seated or standing occupants. These vehicles, which would not even have a driver's DSP, are expected to be more oriented to commercial movement of goods. Thus, by

definition, occupant-less vehicles cannot be categorized as a passenger car, MPV, or bus of any kind. The definition of “truck” in § 571.3 is the only vehicle type definition that specifically covers vehicles designed to carry property and not “persons.”

Because occupant-less vehicles qualify as trucks,<sup>38</sup> and since the 200-Series standards apply to trucks, occupant-less vehicles are currently subject to the 200-Series standards even though they do not carry occupants. In the NPRM, NHTSA tentatively determined that a safety need did not exist to apply the existing 200-Series standards to occupant-less vehicles. In addition, the analysis concluded that for some 200-Series standards, the application to occupant-less trucks could create uncertainty about certification because the requirements are seemingly linked to the existence of specified designated seating positions. Accordingly, with respect to trucks, NHTSA proposed to amend the application sections of FMVSS Nos. 201, 205, 206, 207, 208, 214, 216, and 226 to apply only to trucks with DSPs.

There are some standards that are applicable to trucks that the NPRM did not propose to amend because they only apply if a DSP were present. One such example is FMVSS No. 202a, *Head restraints*. Similarly, the agency did not propose amending the applicability of FMVSS No. 203, *Impact protection for the driver from the steering control system*, and 204, *Steering control rearward displacement*, to trucks. As discussed in the NPRM, this is because those standards only apply to vehicles with steering controls, which an occupant-less vehicle necessarily lacks. No change was proposed for FMVSS No. 209, *Seat belt assemblies*, because the standard is an equipment standard, and no change was proposed for FMVSS No. 210, *Seat belt assembly anchorages*, because that standard’s requirements only apply to DSPs. That said,

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<sup>38</sup> Under NHTSA’s self-certification framework, manufacturers must certify their vehicles as meeting all FMVSSs applicable to the vehicle type, and, to do so, must classify their vehicles for purposes of determining which FMVSSs apply. NHTSA may take issue with that classification if the agency believes the manufacturer has misclassified the vehicle and thus failed to certify the compliance of the vehicle appropriately with applicable FMVSSs.

NHTSA requested comment on whether any “additional changes are necessary or appropriate” to accomplish the goals of the NPRM.<sup>39</sup>

## Comments

Most commenters that addressed this issue were supportive of the proposal, but a few had reservations about how the approach could affect crash compatibility and other safety matters. A number of commenters focused on the applicability of FMVSS Nos. 203 and 204, FMVSS No. 205, *Glazing materials*, FMVSS Nos. 212, *Windshield mounting*, and 219, *Windshield zone intrusion*.

Most commenters believed that no safety need exists requiring occupant protection standards for occupant-less vehicles, and that the 200-series standards were not relevant for such vehicles. The American Trucking Associations (ATA) specifically supported changes to standards that apply to trucks with a GVWR greater than 4,536 kg (10,000 lb.). Uber argued that “equipment that is designed to protect occupants in traditional vehicles will do nothing but create unnecessary potential safety hazards in the event of a crash or if that equipment malfunctions.” Nuro stated that applying occupant protection standards to occupant-less vehicles could degrade safety by adding weight and rigidity, which may increase “the risk to occupants” of other vehicles. A number of other commenters suggested that NHTSA overlooked several other 200-Series FMVSSs that should also be amended to exclude occupant-less trucks from their applicability, namely FMVSS Nos. 212 and 219.

Commenters expressing concern about the proposal included the State of California (CalSTA) regarding possible degradation to the safety of vulnerable road users, such as pedestrians and bicyclists, if occupant-less vehicle were excluded from FMVSS No. 205. The

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<sup>39</sup> 85 FR at 17625.

Automotive Safety Council (ASC) raised the potential for crash compatibility concerns stemming from the potential loss of energy absorption in a crash involving an occupant-less vehicle.

### **Agency Response**

While NHTSA believes the non-applicability of certain standards was implicit in the proposal, the agency has considered the comments and is adopting amendments to provide clarity. Several commenters (including the Alliance, the Consumer Technology Association (CTA), Nuro, and, Zoox) suggested that additional clarity is needed with respect to the 200-Series FMVSSs sections the NPRM did not propose to modify. As discussed later below, NHTSA agrees to amend FMVSS Nos. 212 and 219 to clarify non-applicability to occupant-less vehicles.

#### **a. General observations**

The Center for Auto Safety argued that a truck with an optional or deployable control system should not be excluded from FMVSS Nos. 201, 205 and 206. NHTSA would like to be clear that this subject pertains to occupant-less vehicles that are specifically designed *not* to contain occupants. NHTSA's intent is to keep the safety of occupants, including drivers, at the forefront of this rule.

Nuro suggested three possible ways to limit the applicability of the FMVSSs to occupant-less vehicles: (1) a blanket exclusion in section 571.7; (2) a preamble statement; or (3) a change to all application sections. First, a blanket change to section 571.7 or to change "all" application sections would be overly broad and exceed the scope of this notice, which focuses exclusively on the 200-series standards. Second, a statement in the preamble would not provide appropriate transparency and clarity. In other words, the applicability of the standards to the vehicles in



question would not be apparent from the actual text of the standards. Thus, to assure a full and careful consideration of the applicability of the FMVSSs to subject vehicles and avoid unintended consequences, NHTSA has decided to evaluate each standard and determine applicability on a standard-by-standard basis. In some cases, no change was needed because the non-applicability of the standard to occupant-less vehicles is indirect (*e.g.*, by virtue of reference to a seating position, such as for FMVSS No. 202a).

In the NPRM, NHTSA proposed to exclude occupant-less trucks from the FMVSS occupant protection requirements, tentatively concluding that, “the safety need that supports the crashworthiness requirement of FMVSS No. 208 for the protection of vehicle occupants does not exist for occupant-less trucks.” While this final rule affirms this conclusion, the agency notes that the language proposed to accomplish this exclusion applies standards to “trucks with at least one designated seating position.” Commenters such as the National Disability Rights Network, in different contexts covered in Section VI.f of this preamble, raised the prospect of vehicles with ADS that do not include a DSP, but accommodate people with certain physical disabilities (*e.g.*, through wheelchair securement mechanisms). NHTSA notes that the definition of DSP only encompasses wheelchair securement devices for a “vehicle sold or introduced into interstate commerce for purposes that include carrying students to and from school or related events.” Accordingly, the proposed applicability language (referring to trucks with at least one designated seating position) may leave ambiguity as to whether an occupant-less truck could be permissibly outfitted with a wheelchair securement mechanism and avoid occupant protection requirements. While the NPRM’s preamble discussion tentatively concluded that occupant-less trucks do not present a safety need for occupant protection requirements, the language used to exclude such trucks was imprecise and conflicted with the tentative conclusion, which could lead to confusion.

Accordingly, the agency has decided that, rather than amending the application sections to include “trucks with at least one designated seating position,” the final rule will specify, “trucks designed to carry at least one person,” which would include occupants in wheelchair securements. We believe this will ameliorate the problems related to referencing the DSP definition, yet will achieve the same purpose. We note that this change should not result in any reduction in objectivity since the definitions of passenger car, MPV, and bus all refer to being designed to carry a certain number of persons.

**b. FMVSS No. 205, *Glazing materials***

CalSTA posited that vulnerable road users, such as pedestrians and bicyclists, might be placed at risk if occupant-less vehicles are excluded from meeting FMVSS No. 205. The State suggested that “[i]f the glazing materials standard is removed, a standard providing a commensurate level of safety for vulnerable road users should be implemented.”

Given that one of NHTSA’s guiding principles for this rulemaking was maintaining safety levels provided by existing FMVSS, the agency carefully considered this issue. The agency first analyzed the intended purpose of FMVSS No. 205. The focus of the Society of Automotive Engineers (SAE) standard, SAE J673-Automotive Safety Glasses—on which FMVSS No. 205 is based—was to benefit the occupants of motor vehicles. The purpose of Standard No. 205 as promulgated, and as specified today, references vehicle occupants and makes no mention to persons struck outside the vehicle. Nonetheless, the commenter raises the possibility that FMVSS No. 205 has had an unintended benefit for vulnerable road users, and the agency sought to understand any unintended consequences of this rulemaking. Accordingly, NHTSA undertook a thorough search, but found no crash data or research studies that could

verify unintended benefits for pedestrians, cyclists or other persons resulting from FMVSS No. 205 glazing.

The effect of glazing in pedestrian and other road users' collisions with motor vehicles is complex, as the crash may manifest potential tradeoffs between various design aspects of glazing and glazing retention. The center of the windshield, if it breaks on impact, can be a relatively forgiving area with respect to the impact forces/deceleration of the struck person. However, in contrast to the middle of the windshield, the area of windshield attachment, particularly at the A-pillars, may be relatively hazardous to a person striking it as the pillars are stiff structural elements. For a windshield to protect occupants, it must be adequately retained in a crash. FMVSS No. 212 specifies windshield mounting requirements that must be met, for the benefit of occupants, when subjected to a 48 km/h (30 mph) barrier crash test. In order to retain the windshield, the perimeter mounting must be sufficiently stiff. It is unclear whether or to what extent the crashworthiness test requirements of FMVSS No. 205 contribute to, or are offset by, these forgiving yet stiff aspects of a windshield. That is, even if the glazing is forgiving in the center once it breaks, the windshield mounting must be stiff enough to meet FMVSS No. 212. Any overall benefit to pedestrians and cyclists from compliance with FMVSS No. 205 is uncertain.

It bears noting that FMVSS No. 205 is an "if equipped" standard. Accordingly, the standard only requires FMVSS No. 205 glazing if vehicles have glazing. The extent to which occupant-less vehicles would have glazing is unknown at this time.

In its comment, Nuro argued that, if manufacturers of occupant-less vehicles were not required to meet occupant protection requirements, they could concentrate on protection of other road users.<sup>40</sup>

After consideration of the information above, NHTSA has decided that information is not available to substantiate the view that there would be lost safety benefits to pedestrians and other road users by excluding occupant-less vehicles from FMVSS No. 205. However, NHTSA will monitor this issue. In view of Nuro's statement above, NHTSA believes that the amendment adopted by this final rule may open up avenues for potential development of more pedestrian-friendly designs for occupant-less vehicles, though the agency is not relying on this belief in making the decision to exclude these vehicles, as these vehicles would not be required to make these changes.

As to more general matters, both NADA and Ford asserted that the change to FMVSS No. 205 would not address the standard in its entirety, and that transmissibility/visibility aspects of the standard would need to be revisited in the future. In response, NHTSA notes that the NPRM proposed, and this final rule adopts, revisions to FMVSS No. 205 that apply the standard only to vehicles with occupants.

In its comment to the NPRM, Nuro stated that, just as the NPRM proposed changes to FMVSS No. 205, conforming changes should be made to FMVSS No. 500, *Low speed vehicles*, and part 565, *Vehicle identification number (VIN) requirements*. Nuro sought a change to FMVSS No. 500 to make clear that a windshield is required only if the low speed vehicle had at least one DSP. In response, NHTSA has decided no change to the low speed vehicle standard is

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<sup>40</sup> Nuro made similar arguments specific to FMVSS No. 205 in its petition for a temporary exemption from aspects of FMVSS No. 500, which the Agency granted on February 11, 2020. Docket NHTSA-2019-0017-0002; 85 FR 7826. FMVSS No. 500 requires low speed vehicles to have a windshield that meets FMVSS No. 205.

necessary because FMVSS No. 500 incorporates by reference various aspects of other FMVSS. This means, in practice, that when NHTSA makes changes to FMVSS No. 205, those changes will automatically be incorporated into FMVSS No. 500. While the low speed vehicle standard refers to FMVSS No. 205, the change to the application section of FMVSS No. 205 makes clear that it does not apply to occupant-less vehicles. Also, other aspects of FMVSS No. 500 will still apply to occupant-less vehicles, so changing FMVSS No. 500 could be confusing.

Nuro noted that part 565 requires that the VIN be visible through “the vehicle glazing” by an observer “whose eye-point is located outside the vehicle adjacent to the left windshield pillar.” This final rule does not amend part 565, as the matter is beyond the scope of the NPRM. However, the agency understands the issue and will consider addressing it in a future action.

### **c. Vehicle crash compatibility**

The Automotive Safety Council (ASC) supported limiting the crash protection requirements of FMVSS No. 208 to vehicles with at least one designated seating position but argued that measures are still needed to ensure adequate crash compatibility with the fleet. ASC referenced ADS 2.0 statements that “unoccupied vehicles equipped with ADSs should provide geometric and energy absorption crash compatibility with existing vehicles on the road.” ASC stated that crash compatibility “is currently controlled to some degree by the crash requirements of FMVSS [No.] 208. Energy absorption in the crash by the unoccupied vehicle structure is a necessary factor in helping to protect the occupied vehicle passengers.”

In its comment, Nuro mentioned that the preamble of the NPRM indicated NHTSA is considering crash compatibility research and possible rulemaking for occupant-less vehicles. Nuro stated that crash compatibility should not be the agency’s initial foray into drafting standards for these vehicles. Nuro argued there is no reason to believe that occupant-less

vehicles should be less compatible than existing vehicles, but that “the opposite is true due to the lower mass and smaller size that can be achieved for vehicles that will not carry, and need not include protections for, humans.”

The NPRM did not include provisions related to potential vehicle-to-vehicle crash compatibility, and this final rule continues this approach. As stated in the NPRM, this is a complex issue that has not yet been adequately researched and we have no evidence that vehicle-to-vehicle crash compatibility might cause adverse safety consequences at this time, as occupant-less vehicles do not exist in the fleet in any significant number. However, NHTSA is engaged in research on this subject and will also monitor on-road deployments. In addition, NHTSA does not agree with Nuro’s assertion that all future occupant-less vehicles will necessarily be small and light and thereby a safer collision partner because NHTSA’s decision in this final rule is not limited by weight and thus will apply to any occupant-less vehicle. NHTSA notes that the American Trucking Associations’ comment on this subject, as previously mentioned in the Comments subsection of section V. of this preamble, was especially supportive of changes made to standards applying to occupant-less trucks with a GVWR greater than 4,536 kg (10,000 lb.), thus indicating that there may be occupant-less vehicles that are much larger and heavier than Nuro’s vehicles. Further, the fact that an occupant-less vehicle does not have to protect its own occupant does not mean that they will necessarily be designed to protect other road users more, as it is possible that manufacturers of occupant-less vehicles might tolerate increased risks to other road users in the interest of protecting their own cargo. Potential crash compatibility implications relating to occupant-less trucks is an area of interest for the agency and warrants further examination.

**d. FMVSS Nos. 212, *Windshield mounting* and 219, *Windshield zone intrusion***

The NPRM requested comment on whether the agency had included all relevant FMVSSs that might need changes similar to those identified in the proposal. Many commenters suggested there was no safety need to apply FMVSS Nos. 212 and 219 to occupant-less vehicles, as there would be no occupants in the vehicles to protect with the countermeasures installed to meet these *Windshield mounting* and *Windshield zone intrusion* standards, respectively.

### **Agency Response**

NHTSA agrees that FMVSS No. 212 and 219 should also be amended to exclude occupant-less vehicles. It was an oversight by NHTSA not to have included those standards in the NPRM. The NPRM for this rulemaking action was broad and intended to include all crashworthiness (200-Series FMVSSs) standards. In the NPRM, NHTSA discussed whether there was a need to apply FMVSSs that serve primarily to protect vehicle occupants to occupant-less vehicles, and whether those FMVSSs had a continuing safety purpose for occupant-less vehicles. NHTSA requested comment on “whether additional changes are necessary or appropriate” to accomplish the goals of the NPRM.<sup>41</sup> This request sought the very input that NHTSA received from commenters on FMVSS Nos. 212 and 219, and was included in the NPRM with the intent of soliciting input on whether the agency had included all relevant FMVSSs that might need changes.

As requested, commenters provided additional input, and the comments received on FMVSS Nos. 212 and 219, helped NHTSA assure the final rule would address a more complete set of relevant standards. Given that NHTSA proposed FMVSS No. 205, *Glazing materials* be amended so as not to require a windshield in an occupant-less vehicle to meet that standard due to an absence of a safety need for the glazing, failing to make conforming changes to FMVSS

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<sup>41</sup> 85 FR at 17625.

Nos. 212 and 219 would be inconsistent with both the Agency's intended outcome and with commenters' requests. The modifications to FMVSS Nos. 212 and 219 are the logical outgrowth of both the discussions related to occupant-less vehicles and the proposed regulatory text for FMVSS No. 205. Given the absence of a safety need to apply FMVSS No. 205 to occupant-less vehicles, there is also no safety need for occupant-less vehicles to retain a windshield to protect against injury from penetrating objects or ejection (FMVSS No. 212), or from windshield intrusion (FMVSS No. 219).

Accordingly, NHTSA is amending FMVSS Nos. 212 and 219 in this final rule to exclude trucks that are not designed to carry at least one person (occupant-less vehicles).

#### **VI. FMVSS No. 208, *Occupant crash protection***

Making appropriate amendments to FMVSS No. 208, *Occupant crash protection* is one of the most important aspects of this rulemaking. Not only is Standard No. 208 a significant 200-Series standard, but it includes several terms that differentiate a "driver's" position from a front "passenger's" seating position. Thus, translating the terms of FMVSS No. 208 to account for vehicles that do not have manually operated steering controls, or vehicles where the manually operated steering controls could be stowed, is central to this final rule.

The NPRM discussed proposals for: applying FMVSS No. 208's advanced air bag requirements to front outboard seats without manually operated driving controls (including to seats that had been considered a driver's seat); applying the standard's telltale requirements; applying requirements for front outboard seats to seats that are no longer "outboard"; and suppressing vehicle motion when a child restraint system is sensed in a seating position with manually operated steering controls. The NPRM also proposed amending FMVSS No. 208's



bus requirements to account for buses equipped with ADS and that lack manually operated steering controls.

FMVSS No. 208 currently establishes crash protection requirements that are the same for the driver's designated seating position (DSP) as for the right front outboard seating position (commonly referred to as the front passenger seat). The vehicle's compliance with the requirements is assessed in a frontal crash test using adult-sized crash test dummies.

To minimize air bag risks to children and small-statured adults, however, FMVSS No. 208 also establishes "advanced air bag" requirements that, among other things, require the air bags at the right front DSP to either turn off automatically in the presence of detected young children, or deploy in a manner less likely to cause serious or fatal injury to child occupants. Manufacturers may also choose to combine these approaches. Vehicles that disable the passenger air bag utilize weight sensors and/or other means of detecting the presence of young children. To test detection capability, FMVSS No. 208 specifies that child dummies be placed in child restraint systems (child seats) that are, in turn, placed on the passenger seat. It also specifies "out-of-position" tests that are conducted with unrestrained child dummies sitting, kneeling, standing, or lying on the passenger seat. For manufacturers that design their passenger air bags to deploy in a low risk manner, the standard specifies that unbelted child dummies be placed against the instrument panel. The air bag is then deployed. The ability of driver air bags to deploy in a low risk manner is tested by placing the 5<sup>th</sup> percentile adult female dummy against the steering wheel and then deploying the air bag.

In the NPRM, NHTSA tentatively concluded that the most practical way to maintain occupant protection in ADS-equipped vehicles with no "manually operated driving controls" (and thus, with no driver's seat) would be to treat any seat that does not have immediate access

to such controls as a passenger seat under the standard. Thus, all front outboard seats in such vehicles are front outboard passenger seats and would be required to meet FMVSS No. 208's performance requirements that currently apply to the right front outboard passenger seat. For a seat located in the left front outboard position, this would be done by mirroring the test procedures and requirements from the right side. Among other things, to maintain the level of safety currently afforded to right front outboard passengers under FMVSS No. 208, NHTSA proposed requiring that all front outboard "passenger seats" meet advanced air bag requirements.

### **Comments**

Commenters were generally supportive of the proposed changes to FMVSS No. 208. Consumer Reports (CR) stated NHTSA should, "maintain the maximum protection under the standard in any modification. In the case of vehicles without manual controls, this means treating each front seat as a front outboard passenger seat and requiring all the protections required by that designation."

Ford supported the proposal, but with a caveat that occupant protection requirements should not apply to an "occasional use seat" which is clearly marked.

Safe Ride News (SRN) supported the proposed changes but raised the lockability requirements of S7.1.1.5a of FMVSS No. 208. These requirements require vehicles to have a seat belt assembly with a lockable lap belt at each seating position to facilitate the secure attachment of child restraint systems. The standard currently excludes the driver's seating position from lockability requirements, since, in traditional vehicles, a child restraint would not be installed at the driver's seat. SRN suggested NHTSA remove the exception from lockability for seats without manually operated driving controls or with stow-able controls in the left front seat.

## Agency Response

In response, NHTSA emphasizes that under this final rule, a left front DSP without manually operated driving controls is a passenger seat. Similarly, a left front DSP with stowable controls will have a mode that makes it a passenger seat. In either case, the DSP would be required to have a lockable seat belt. In response to Ford, we would make clear that the requirements would apply if the seat in question meets the definition of a DSP. Part of the DSP definition allows the labeling of certain seats as “not designated for occupancy while the vehicle is in motion.” We believe this addresses Ford’s concern, but the agency is not further expanding this provision. In the situation of a dual-mode vehicle whose controls are always in place, i.e., the controls cannot be stowed so the seat is always a driver’s seat, the lockability requirements would not apply, since a child restraint is unlikely to be used at this DSP.<sup>42</sup> Issues relating to children seated in a DSP with driving controls are discussed in more detail later in this document.

CalSTA requested that NHTSA ensure that any changes in nomenclature relative to the terms “passenger seat” or “driver’s seat” would not degrade occupant safety and requested research to confirm there is no unintended degradation of occupant safety.

In response, NHTSA emphasizes that the left front outboard passenger will be required to have the same protection as the right front outboard passenger DSP, which for adults are the same requirements that would apply to a driver’s seat. The current occupant protection requirements have been in place for almost 30 years. The immense technical data and information NHTSA and the occupant safety community have acquired over this period indicate there is no difference in the FMVSS No. 208 protection afforded adult occupants by the left or

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<sup>42</sup> Further, NHTSA discourages the use of child restraints in this driver’s designated seating position. A lockable belt at that position might imply that the DSP is appropriate for a child restraint, and it is not.

right front seating position. The data and other information on advanced air bag safety protections also indicate there are no technical reasons why the protections provided by a seat in the right front outboard seating position could not be mirrored by a passenger seat on the left side. Additional research is not necessary to verify that protections afforded to one seating position would be sufficient for the other seating position, as identical designs could be applied to the opposite sides of a vehicle.

This final rule adopts the proposal's provisions relating to the left front seat when that DSP meets the definition of a passenger seating position. The final rule makes minor clarifying changes to the regulatory text in response to comments, which are discussed below. This final rule adopts the provisions of the NPRM that relate to advanced air bag requirements, telltale requirements (indicating air bag suppression for the left front outboard seating position), and other requirements, except as discussed below.

**a. Advanced air bags**

As discussed in the proposal, applying advanced air bag requirements to all front outboard seating positions maintains the current levels of safety for ADS-equipped vehicles without manually operated driving controls. Applying the requirements meets the need for safety because an occupant will receive the same crash protection whether they choose to sit in the left or right front outboard seat. In addition, an important benefit of advanced air bags over conventional air bags is the protection of out-of-position occupants, particularly children. In a traditional vehicle, the occupant in the driver's seat is typically an adult. In contrast, occupants of the left front outboard passenger seats in an ADS-equipped vehicle without manually operated driving controls could possibly be children, as there would be no driving control mechanism at any position that may deter occupancy of the seating position by a child. NHTSA tentatively

concluded in the NPRM that the most straightforward way to protect children against air bag risks would be to require that any front outboard seat that could potentially be occupied by a child (i.e., a passenger seat) must meet the current advanced air bag requirements. This final rule adopts the provisions of the NPRM that relate to the protection of the left front seat occupant when that DSP meets this final rule's definition of a passenger seating position.

With regard to the static suppression requirement of FMVSS No. 208 S22.2 for the 3-year-old child dummy, GM and the Alliance asked that the regulatory text "clearly specify that suppression is tested only for the seating position where the child dummy is placed." NHTSA agrees the clarification is warranted and has added language to S22.1 to make clear that the relevant air bag that is to be suppressed is the air bag associated with the designated seating position being assessed. NHTSA has made similar clarifications to the text of FMVSS No. 208 regarding tests with the 12-month-old (S20.2) and 6-year-old (S24.2) child dummies.

NADA commented that air bag switch installation should apply, "to the extent applicable and appropriate." However, air bag on/off switch requirements comprise a topic beyond the scope of this rulemaking. Accordingly, NHTSA is not considering this suggestion in this rulemaking.

#### **b. Telltales**

FMVSS No. 208 currently requires that vehicles display a telltale, visible to the front row occupants, which indicates whether the front outboard passenger seat air bag is suppressed. Given that this rulemaking may result in multiple front outboard passenger seats, NHTSA proposed amending this requirement to specify that a separate telltale would be required for each outboard front passenger seat based upon the belief that doing so would maintain the current level of safety provided by the standard. The NPRM proposed that the current telltale's

substantive performance criteria would remain the same to provide occupants with the same level of information about the status of each pertinent air bag as provided by the current standard. Because the left front seat without manually operated controls would be a passenger seat, the NPRM proposed to require an additional telltale.

Commenters had differing views on this issue. The Alliance and GM requested that NHTSA consider a single telltale unit for both front outboard seating positions, so long as that telltale is visible from each seating position. The Center for Auto Safety (CAS) stated, “it is important for occupants to verify the operational capability of safety-critical equipment in vehicles they occupy, including telltales for suppression-based advanced air bag systems.” Safe Ride News (SRN) supported requiring seat-specific telltales. Various commenters had concerns or suggestions that are addressed below.

### **Agency Response**

The final rule adopts the provisions of the NPRM, with a few modifications in response to comments received. The Alliance and GM requested allowing a single telltale for both front outboard seating positions. It is NHTSA’s position that, while a single telltale unit that distinguishes both indicators would be acceptable, a single light indicating the suppression status of both air bag systems, but not distinguishing their individual state of suppression would not. Separate suppression telltales clarify which associated seating position is suppressed, allowing the corresponding passenger to respond to the information with appropriate action. Separate suppression telltales verify to the caregiver of children placed in seating positions that the corresponding air bag is suppressed and allow other users to determine whether the air bag corresponding to their seating position is properly functioning. Thus, this final rule requires the

telltale to be clearly recognizable to a driver and any front outboard passenger with which seat each telltale is associated.

IIHS argued that the proposal's use of "any" in reference to seating position requirements from which telltales required by FMVSS Nos. 226 (S4.2.2) and 208 (S19.2.2(d)) must be visible, is ambiguous, and suggested that the final rule use the term "all." The IIHS comment seems to interpret the proposal as seeking to require that the suppression telltale be visible from any DSP in the vehicle. This is incorrect. The proposal restricted visibility to the front outboard seats for the FMVSS No. 208 telltale. Accordingly, the final rule will retain the word "any" in FMVSS No. 208 S19.2.2(d). Comments specific to the FMVSS No. 226 telltale are addressed later in this document.

Safe Ride News commented that the location should be "on the dash in easy-to-see, logical juxtaposition to the seat for which it applies." On the other hand, the Automotive Safety Council (ASC) believed that the location of the telltale should be chosen to provide information regardless of where an adult may be seated in the vehicle. As noted above in our response to IIHS, we decline to implement the suggestion that the suppression telltales be visible from all seating positions. While expanding telltale visibility requirements generally is worthy of discussion, it is beyond the scope of this rulemaking. As stated elsewhere in the proposal and this document, NHTSA plans to issue a separate notice that will focus on telltales and warnings for ADS-equipped vehicles. In the interim, this final rule will establish requirements that will allow front seat occupants in vehicles without manual controls to determine whether either outboard front seating position has a suppressed air bag.

Disability rights advocacy groups (National Disability Rights Network (NDRN), Disability Rights Education Fund (DREDF), and the Consortium for Citizens with Disabilities

(CCD)) requested that NHTSA consider adding audible or haptic alerts to the visual alerts for suppression telltale information.<sup>43</sup> NHTSA is not aware of any previous implementation of haptic non-driving related warnings. More information and research may be necessary to implement types of layered alerts to ensure that vehicle occupants receive clear information that would not confuse or conflict with other information. NHTSA is aware that audible warnings have been implemented and there may be merit to such an implementation. However, as we reasoned above, we decline to implement audible warnings now because they require a larger discussion and more input on how best to achieve the goals of providing information, while also avoiding confusing vehicle occupants. That discussion is beyond the scope of this rulemaking but could be explored in the forthcoming notice on telltales. The agency notes, though, that nothing in this rule would prohibit audible or haptic alerts when used to complement the required visual alert.

IEE expressed concern that ADS-equipped vehicles might have no seat belt warning system as required by FMVSS No. 208, S7.3 because they may have no driver's DSP. IEE recommended that NHTSA require a seat belt reminder system in ADS vehicles that provides audio-visual warnings for unbelted occupants. The requested revisions are beyond the scope of the present rulemaking. NHTSA may consider this issue in future agency work related to telltales and indicators for ADS-equipped vehicles.

### **c. Front outboard versus center or inboard seating position**

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<sup>43</sup> These groups also suggested the Agency look to information presented at the November 2019 meeting, NHTSA Research Public Meeting, [www.regulations.com NHTSA-2019-0083-0007]. Among many topics, this meeting covered research on vulnerable and disabled road users. The Agency presented a brief summary of a research program entitled "Vulnerable and Disabled Road Users: Considerations Inside and Outside the Vehicle." The research program is ongoing and scheduled for completion in 2022.



An “outboard seating position” is defined in 49 CFR 571.3 as “a designated seating position where a longitudinal vertical plane tangent to the outboard side of the seat cushion is less than 12 inches from the innermost point on the inside surface of the vehicle at a height between the design H-point and the shoulder reference point (as shown in fig. 1 of Federal Motor Vehicle Safety Standard No. 210) and longitudinally between the front and rear edges of the seat cushion.” FMVSS No. 208 requires, for most light vehicles (GVWR less than 4,536 kg (10,000 lb.)), each “outboard designated seating position,” including the driver’s seat, to have a lap/shoulder (Type 2) seat belt assembly that conforms to FMVSS No. 209, *Seat belt assemblies*. Moreover, the subset of light vehicles that have a GVWR of less than 3,855 kg (8,500 lb.) and unloaded weight of 2,495 kg (5,500 lb.) are statutorily required<sup>44</sup> to have frontal air bag protection at the driver’s and right front DSPs, which are evaluated by FMVSS No. 208’s frontal barrier crash tests. Under FMVSS No. 208, any center seating positions in these light vehicles can be equipped with only a lap belt.

In the NPRM, NHTSA acknowledged that future vehicle designs might not have two front outboard seating positions. The agency sought to amend FMVSS No. 208 to be inclusive of and account for ADS-equipped vehicles (particularly those without driving controls) that might not have a front left outboard DSP or, for that matter, any outboard DSP, as those terms are defined in NHTSA’s regulations. NHTSA envisioned that one or both of the outboard seating positions on a current vehicle could be moved toward the center of the vehicle and thus fall outside of the outboard seating position definition. NHTSA sought to amend FMVSS No. 208 to provide occupants of an ADS-equipped vehicle with fewer than two front outboard seating positions no degradation in the crash protection now required by the standard for vehicles

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<sup>44</sup> Intermodal Surface Transportation Efficiency Act of 1991, Pub. L. No. 102-240, § 2508 (Dec. 18, 1991).

that are not ADS vehicles. The agency requested comment on including in the final rule air bag (including out-of-position occupant protection) and lap/shoulder (Type 2) seat belt protection to these inboard seating positions if outboard positions were removed. We also requested comment on the implications of such designs upon the statutory obligation for frontal air bags.

### **Comments**

Several entities, primarily consumer advocacy groups, commented in favor of providing Type 2 belts and air bags at all inboard seats. The Center for Auto Safety (CAS) stated that both lap/shoulder belts and air bags should be required for inboard seating positions in ADS-equipped vehicles. Safe Ride News (SRN) commented that the front center seating position in ADS and non-ADS vehicles “should no longer be allowed to be equipped with Type 1 (lap-only) belts, which are far less protective than Type 2 belts.” SRN noted that it believes this request is even more important since it expects it will be more likely that children would be seated in the front row in ADS-equipped vehicles, though did not provide any support for this expectation. IEE requested FMVSS No. 208 require advanced air bags at inboard seats. The Automotive Safety Council (ASC) stated that “automated vehicles may have increased usage/presence of a center seating position, possibly without accompanying outboard seating positions.” ASC argued that “it is reasonable” to apply the out-of-position advanced air bag requirements for all front designated seating positions. IIHS stated that all designated seating positions should receive “the same level of crash protection” in ADS-equipped vehicles, and that front row center positions should be required to have Type 2 belts and air bag protection.

Some commenters focused on the protection that should be afforded a single center seat. The Alliance commented that “[w]here there is only a single forward-facing front row center seat (and no other front row seating positions), current levels of FMVSS 208 crash performance,

including advanced air bag performance criteria, if applicable, should be required for that position.” However, the commenter also stated, “there should not be a specific air bag installment requirement to meet this crash performance.” Ford expressed support for the final rule “to apply the current performance requirements for the passenger seat called out in FMVSS [No.] 208, to both outboard positions when there are no controls, or to the center seat when the outboard seating positions are absent.”<sup>45</sup> GM also suggested that “where there is only a single forward-facing front row center seat, GM supports applying current right front outboard passenger side FMVSS [No.] 208 crash performance requirements.” ZF argued that if a single seat is installed in the front of the vehicle without driving controls, that occupant should be protected in the same manner as an outboard passenger occupant, including seat belts, and an air bag. The National Automobile Dealers Association (NADA) stated that “any vehicle (ADS-equipped or otherwise) with a single forward-facing front row center seat should be subject to FMVSS [No.] 208 crash performance requirements, including applicable advanced air bag performance criteria.”

Several commenters requested additional research on the issue. Waymo stated “considerable technical research and a new proposed rule” may be needed to address the protection that should be offered to inboard front seats when there are no outboard seats. Waymo also stated that “[i]f such seating arrangements are in fact likely,” Waymo prefers that NHTSA finalize this rule and deal with this “novel” issue in a separate rulemaking. Tesla urged NHTSA first to conduct research on the appropriateness and type of equipment (especially for out-of-position) that is needed to protect an occupant in the non-outboard seating position, including, e.g., where the center seat could serve as both an armrest for outboard occupants and a foldable

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<sup>45</sup> To clarify, Ford suggested these occupant protection requirements should not apply to an “occasional use seat” which is clearly marked. This comment was addressed previously in this preamble.

seat. CalSTA recommended further testing to ensure there is not an unintended compromise to occupant safety if implemented.

### **Agency Response**

In deciding how to respond in this final rule to the comments expressed on this topic, NHTSA considered its guiding principles for this rulemaking.<sup>46</sup> One principle is for NHTSA to take every effort to maintain the level of crashworthiness performance in ADS-equipped vehicles without traditional manual controls currently required for vehicles without ADS functionality. Another is for NHTSA to adapt existing FMVSS requirements to ADS-equipped vehicles in a way that does not change requirements for non-ADS vehicles. In addition, NHTSA seeks to modify the FMVSSs in a manner that is more attentive to the innovative interior designs that are expected to accompany ADS-equipped vehicles.

Applying these principles, NHTSA's decisions focus on protecting the public and minimizing any potential loss in crash protection provided by vehicles if outboard seats are removed in favor of inboard seats. Further, NHTSA primarily seeks to retain the protections from existing requirements in a manner that allows for innovators to develop certain alternative configurations that can accommodate vehicles with ADS. NHTSA has also made decisions considering the practicability of meeting requirements and the reasonableness of applying current FMVSS No. 208 requirements to inboard seat designs.

Taking these principles into account, NHTSA notes that passenger cars, multipurpose passenger vehicles, trucks and buses with a GVWR of less than 3,855 kg (8,500 lb.) and unloaded weight of 2,495 kg (5,500 lb.) are already required to have advanced air bag systems installed at the front outboard seating positions. Accordingly, the agency has decided to apply

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<sup>46</sup> These are set forth in the Executive Summary at the beginning of this preamble.

the FMVSS No. 208 protections now applying to the outboard seating positions to inboard seating positions, to the extent technically feasible. This final rule adopts a balanced path between the commenters that desire air bag and lap/shoulder belt protection at *all* inboard seats and those that believe such protection should be required only at a *single* inboard seat.

To accomplish this, this final rule will implement the following (see Figure 1). First, FMVSS No. 208 currently protects two designated seating positions in the front row of seats with a “full” suite of occupant protection countermeasures: Type 2 (lap/shoulder belt system), and an advanced air bag system. Those protected seats are currently the outboard seating positions. To maintain FMVSS No. 208’s protection of two seating positions in the front row--to the extent technically feasible--this final rule continues protecting two designated seating positions in the front row with the full suite of protective countermeasures (Type 2 belt and advanced air bag). Thus, where there is a single inboard seat and one or no outboard seats, the single inboard seat would be required to have lap/shoulder seat belts and advanced air bag protection in that single front row inboard seat, and any one remaining outboard seat will continue to offer the same protection as it does currently in vehicles with driving controls (the full suite of crash protection).

Second, NHTSA considered a front row with multiple inboard seats and one or no outboard seats. As discussed above, this final rule seeks to maintain protecting two designated seating positions in the front row with the full suite of protective countermeasures (Type 2 belt and advanced air bag). Thus, for this situation, the protection required by the vehicle depends on whether there is a remaining single outboard seat or not. If there is a remaining single outboard seat, that outboard DSP will be required to provide the full suite of protection (lap/shoulder seat belts and advanced air bag protection), and one of the inboard seats will be required to offer the

same full suite. The manufacturer will have the discretion to determine which of the inboard seats will offer this protection. The other inboard seat (if any) would only require a lap belt (a lap/shoulder belt may be provided at the manufacturers' choice), as this is the requirement now specified for an inboard first row seat under FMVSS No. 208. Thus, the protection offered by this configuration is essentially the same as vehicles with driving controls and three front seats (i.e., two DSPs with full suite of protection and one with lap belt protection).

In the second case, it is possible there is no outboard seat, but multiple inboard seats. For this situation, only a single inboard seat will be required to provide the full suite of protection (lap/shoulder seat belts and advanced air bag protection). The other inboard seat will only be required to offer a lap/shoulder belt. While the agency would like to require the full suite of protections for two DSPs in accordance with our principles above, we are not requiring a full suite of protection for the second DSP because of potential safety risks posed by air bags operating in close proximity to each other (*e.g.*, interaction between the two air bags or between occupants in close proximity when reacting to the air bags), as in the case of two inboard side-by-side seats. Commenters Waymo, Tesla and CalSTA suggested that additional research may be needed to discern if there are any unintended consequences related to more than one inboard seat with frontal air bag protection being in close proximity. NHTSA agrees with these commenters and plans to conduct research to determine the minimum lateral distance between the seats where air bag protection could be provided to both DSPs. The agency does not know how commonly such vehicle configurations will be produced and will seek additional information on this issue before pursuing a regulatory mandate.

To be clear, NHTSA does not believe any such research is needed for the situation where a single inboard passenger seat has frontal air bag protection, even with another non-air bag

protected seat in close proximity. Neither does NHTSA believe that a separate rulemaking is necessary to provide FMVSS No. 208 protections to a single inboard seating position. This is because the technology required in that situation is used by the millions in vehicles today, with decades of experience (currently there are front outboard seating positions with Type 2 belts and air bags right next to a center seating position with a lap belt or Type 2 belt). Vehicle manufacturers may need to address the specifics of the vehicle interior geometry and crash pulse to develop an appropriate design, but the agency has no reason to believe that providing a full suite of protection to a single inboard seat will be more challenging than for an outboard seat.

The above specified regulatory changes have been implemented in S4.1.5.6 and S4.5.6.4 of FMVSS No. 208. The regulatory approach taken in these sections was to point to the test procedures as specified for front outboard designated seating positions and apply them to the inboard seats, as appropriate. We believe that, except as noted below for bench seat positioning, the procedures as written can be performed on inboard seats, without adaptations. The agency has made minor edits to S16.2.10 and S16.2.10.3 to clarify positioning of inboard seats, in the case where seat positioning cannot be independently controlled.

Finally, NHTSA carefully considered the Alliance comment on inboard seat protection suggesting that current levels of crash performance be provided, including advanced air bag performance criteria, but without a specific air bag installation requirement. We interpreted this to mean that any stipulation for “inflatable restraint” should be removed from S4.1.5.6.3, with all other provisions remaining. The agency is declining to make this change at this time. The text is clearer with the reference to “inflatable restraint” than without it. Also, there are questions of scope related to this request and NHTSA would like to consider further comments on the suggestion.

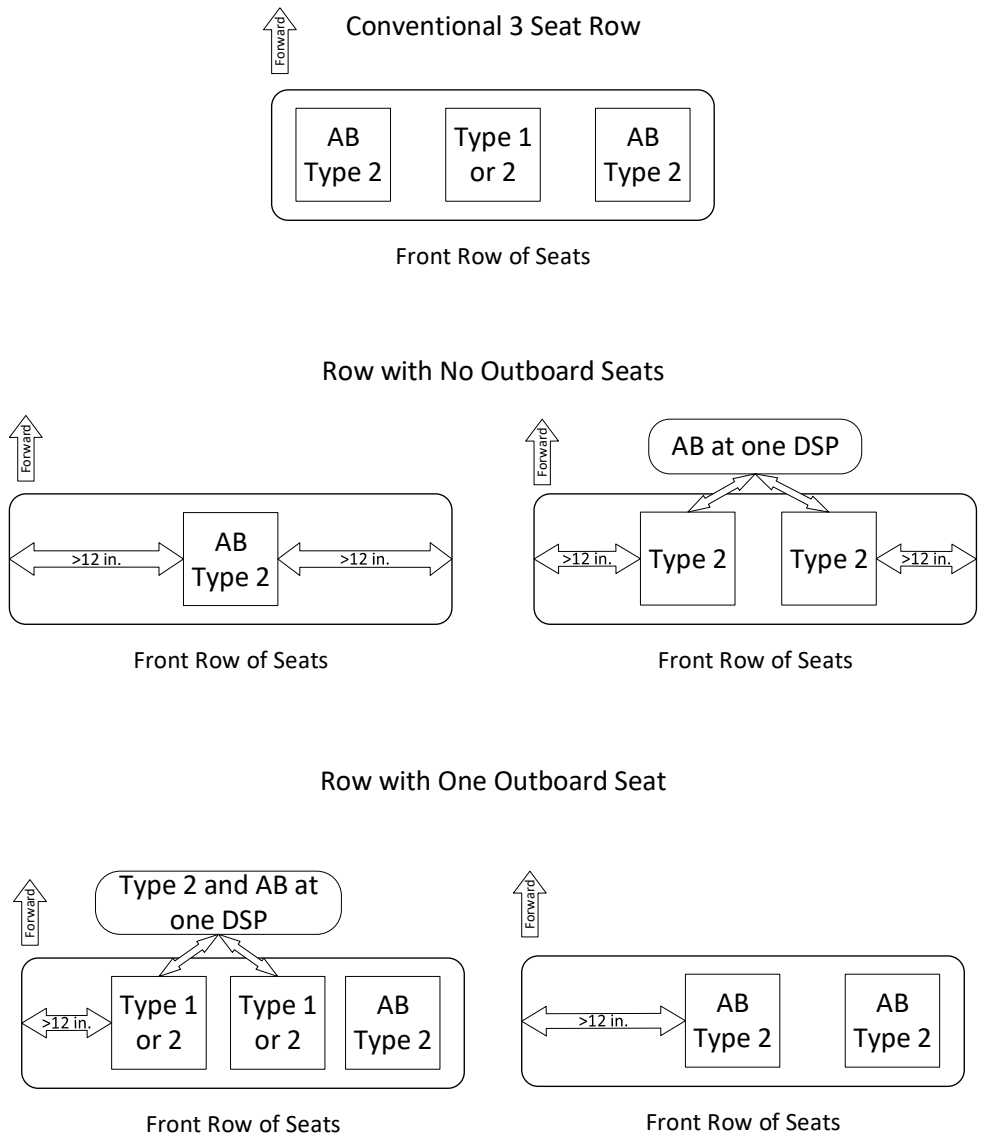


Figure 1- Schematic of air bag (AB) and seat belt protection for vehicles without driving controls and fewer than 2 outboard DSPs (provided for illustration purposes only).

**d. Suppression of vehicle motion when a child is detected in the driver’s seat**

Because some ADS-equipped vehicles may be designed with a driver’s seat (i.e., a seat with immediate access to manually operated driving controls), NHTSA explored the possibility that a child may be seated in a driver’s seat during ADS operation. As stated previously, NHTSA believes that children should not occupy the driver’s position when the vehicle is



operating in ADS mode and steering controls are present. Such a situation might occur when a caregiver places a child in this seat or when an older child places themselves in this position. This is a concern because a driver's seat is not a passenger seat, a driver's seat would not be subject to advanced air bag requirements protecting out-of-position children from air bag risks. In addition, the crash protection in the driver's seat is not tailored to a child. NHTSA was concerned about this possibility and proposed that ADS-equipped vehicles that have manually operated driving controls must render the vehicle incapable of motion if a child is detected in the driver's seat. The agency proposed that the ADS vehicle would be tested for compliance with this "motion suppression" requirement using the 12-month-old, 3-year-old and 6-year-old child test dummies currently used for out-of-position testing in the standard.

Many comments discussed this aspect of the proposal, with a variety of approaches. In general, commenters on this topic acknowledged that a potential problem exists that should be addressed but differed in their approach to a solution and beliefs about the readiness for a regulatory solution. Many non-industry commenters agreed with the proposal, as did some suppliers and an ADS developer. However, a couple commenters raised concerns about the proposal. Additional details on these comments are provided below.

Many commenters, including Consumer Reports, Safe Ride News (SRN), Johns Hopkins University, IIHS, IEE, the Automotive Safety Council (ASC), and the Center for Auto Safety (CAS) supported NHTSA's proposal to require motion suppression if a child were detected in the driver's seat of an ADS-equipped vehicle. CAS stated that the vehicle should be immovable if any child were detected in the driver's seat while the vehicle is stationary and should revert to a safe stop if a child is detected in the driver's seat while underway. CAS and SRN recommended that the suppression test be performed with a Hybrid III 10-year-old child test

dummy. Johns Hopkins University requested research on the behavior of occupants of various ages and sizes when seated as passengers in the driver position to ensure that they will receive the same protections.

In contrast, a number of commenters expressed concerns about the proposal. The NDRN explained that “child protections that limit the vehicle’s motion would have the unintended consequence of prohibiting access and discriminating against adult drivers of short stature.” This concern was also expressed by DREDF and CCS. NDRN stated that a vehicle’s sensors would not know the difference between a child and an adult driver whose weight and height may be similar. The Alliance stated that “whenever a child can be placed in front of an air bag when the vehicle is in motion the appropriate advanced air bag requirements should apply at that seating position.” That said, the Alliance argued that “the issue of vehicle motion suppression does not fall within the category of a simple technical translation of current FMVSS [No.] 208 requirements,” but is an “operational topic” that NHTSA can and should address “on a separate track.” Waymo stated that it recognized the importance of protecting small children from air bag risks but had concerns about the proposed vehicle motion suppression approach. Waymo stated, “it may be technically feasible to address that risk by requiring the same advanced air bag protections in the driver’s seat of dual-mode vehicles as those that are currently required in the right front outboard passenger seat. In fact, there may be other technical solutions that would obviate the need for the NPRM’s proposal.... Waymo is confident that auto manufacturers can develop sound technical ways to address this issue.”

Ford stated that it “appreciates NHTSA’s safety concerns for child seats mounted in the driver seat of a ‘Dual mode’ AV when the ADS is active,” but sought an additional compliance option beyond motion suppression. Ford identified two risk categories for children in the

driver's seat: crash protections; and unintentional takeover of the driving task. Ford stated that the crash protection risk could be addressed by "[e]nsur[ing] the same level of crash protection for children of various ages in the driver seat position as provided today in the passenger outboard seating position," while the risk of unintentional take-over could be addressed "by suppressing manual requests to the steering control in ADS mode when a child is detected in the driver seat." GM asserted that motion suppression for dual-mode ADS-vehicles should not be the focus of the NPRM, but that it "is aligned with the need to address child occupant safety in dual-mode ADS-equipped vehicles and would support applying existing air bag suppression requirements (and/or low risk deployment) to accomplish this."

### **Agency Response**

NHTSA has decided not to adopt the proposal for motion suppression of the vehicle in this final rule. Additional information is needed to gain a fuller understanding of potential unintended consequences of the proposal, the potential safety problem related to interaction with driving controls, and available regulatory solutions before a final decision can be made. While the agency believes that FMVSS No. 208's air bag suppression test procedure could form the basis of a test procedure for a vehicle motion suppression regulatory option, such as that proposed in the NPRM,<sup>47</sup> additional work is necessary to address problems relating to a vehicle's sensors distinguishing between a child and an adult driver similar in size to a child.<sup>48</sup>

While several commenters suggested potential alternative regulatory solutions, they are outside of the scope of this rulemaking, require research to determine their technical feasibility,

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<sup>47</sup> Many commenters were under the mistaken impression that the NPRM only proposed that the 12-month-old CRABI dummy was to be used to assure vehicle motion suppression. To clarify, the NPRM proposed to use the 12-month-old, the 3-year-old, and the 6-year-old child dummies in the proposed procedure.

<sup>48</sup> At this time, NHTSA is not aware of any production-ready technical solution for occupant detection that would be able to discriminate between a 6-year-old or younger child and an adult of a similar or smaller size, and does not know of a test procedure that could be used to test a system's ability to do so.

or require further analysis to determine whether they would be consistent with the requirements of the Safety Act. Some suggested requiring the same advanced air bag protections in the driver's seat of dual-mode vehicles as those that are currently required in the right front outboard passenger seat. That approach does not address concerns with the effect the manually operated driving controls themselves could have on the children's crash protection. For instance, would an infant in a rear-facing child restraint in a seating position with a steering control system be adequately protected when the air bag is suppressed? Would a child in a forward-facing child restraint in a seating position with a steering control system be adequately protected when the air bag is suppressed or in a low risk deployment state? How should test procedures be developed to assess the crash protection provided to children in a driver's seating positions relative to the passenger position? While caregivers are taught to transport children in rear seating positions, to what extent would children be transported in ADS vehicles in seating positions that have manually operated driving controls? To finalize a rule in this area, the agency would like to answer these questions, and those answers require additional research.

NHTSA plans to initiate research into the possibility of alternative regulatory options that allow vehicle motion, but that also address the risk of children in a driver's seat. The agency is interested in the development of an analogous procedure to the child passenger low risk deployment tests, but for seats with manual controls. A test could be developed that assesses the injury risk from a deploying air bag on an out of position child. Another aspect of this research may attempt to discern whether the presence of the steering control (even with a suppressed or low risk deployment air bag) results in an unreasonable safety risk to an in-position child in the driver's seat compared to a child in a passenger seat.

While NHTSA has decided not to proceed with adopting the proposed requirement for vehicle motion suppression, we disagree with the assertion that this proposal was not appropriate for the rulemaking. While the rulemaking focused on translating the current FMVSS No. 208 requirements to account for ADS vehicles, the agency appropriately discerned what it believed to be a crash protection issue and a risk case that is a consequence of the vehicle design changes that may accompany vehicles equipped with ADS technology. After review of the comments, NHTSA has concluded that more information is needed to identify and understand the nature and extent of the potential safety problem and available regulatory alternatives.<sup>49</sup> The agency anticipates revisiting this issue as more is learned from research and as the technologies develop.

**e. Belts in buses**

FMVSS No. 208 establishes seat belt requirements for “medium-sized” buses (with a GVWR between 4,536 kg (10,000 lb) and 11,793 kg (26,000 lb)) and “large” buses (GVWR greater than 11,793 kg (26,000 lb)). For school buses, the driver’s seating position is required to have a Type 2 seat belt. For the other buses, the driver’s seating position is required to have a Type 1 or 2 seat belt (alternatively, a vehicle may meet a crash test option in FMVSS No. 208, depending on the vehicle). The NPRM sought comment on how the belt requirement should apply to an ADS bus that does not have a driver’s seat. Comments were requested on whether the standard should require a seat belt for all front seats, for just the left front outboard seating position, or for only at least one front passenger seat. NHTSA proposed that all front passenger seats should be protected with the same level of protection that would apply to the driver of a non-ADS vehicle. Our stated rationale was that there is likely a similar safety risk in all front row seats of these medium and large buses and that the prediction of where an individual might

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<sup>49</sup> This decision accords with E.O. 12866, *Regulatory Planning and Review*, Section 1.

sit in the front row is likely to change in ADS-equipped vehicles. The NPRM discussed concerns with arbitrarily determining which front row occupant receives the protection of a seat belt or allowing manufacturers to make that determination. (*See* proposed amendments to FMVSS No. 208 S4.4.4.1.2, S4.4.4.2 and S4.4.5.3.)

Many commenters (including the Alliance, Hyundai, Safe Kids, CAS, CalSTA, the Automotive Safety Council (ASC), Safe Ride News (SRN)) supported NHTSA's proposal. ASC also believed the proposed text should apply regardless of whether they are ADS or non-ADS vehicles and suggested there should be a seat belt warning for each position. SRN believed that the occupant protection formerly provided for an adult driver should be available for a supervisory adult or adults in school buses with ADS.

### **Agency Response**

The final rule adopts the proposed changes to the seat belts required for the front seats of medium sized buses (GVWR or more than 4,536 kg (10,000 lb), but not greater than 11,793 (26,000 lb)) without driver's DSPs, but will not proceed with the changes for large school buses (GVWR of more than 4,536 kg (10,000 lb)).<sup>50</sup> We will separate this discussion into large school buses and medium size non-school buses.

For large school buses described above, we have decided that more examination is necessary before finalizing a requirement. The FMVSS No. 222 compartmentalization requirements for passenger seats remain in place. We believe any changes to the compartmentalization requirement of FMVSS No. 222 for front row seats of novel ADS-equipped school buses require a more fulsome discussion before moving forward.

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<sup>50</sup> FMVSS No. 222, "School bus passenger seating and crash protection," considers buses with a GVWR greater than 4,536 kg (10,000 lb.) as large school buses (S5(a)).

NHTSA is finalizing its proposal for medium size buses, other than school buses, to require the same occupant protection at the front seat of an ADS as would currently be met by the driver's seat. However, modifying existing FMVSSs to require seat belt warnings for each bus seat would be outside the scope of this rulemaking.

CAS submitted that school buses should not be included in this rulemaking due to the unique role a human driver has in interacting with and overseeing the student occupants. The commenter is concerned about a rulemaking that has the effect of encouraging the development of school buses with ADS, because school buses rely on the human driver for more tasks such as "safety during ingress and egress, for discipline while underway, and for emergency evacuation in a variety of life- endangering situations." They argue that "any proposed rule on occupant protection for driverless school buses should be withdrawn unless and until all safety aspects of such operation are considered."

In response, NHTSA believes the CAS request that this rulemaking action exclude any changes that affect school buses is unwarranted. The final rule simply updates terms in the standards to make them technology-neutral to account for ADS-equipped vehicles, particularly those without manual controls, while providing the same amount of occupant protection. NHTSA notes that Federal law does not prohibit installation of an ADS on a school bus, currently. CAS did not provide any particularized safety issues within the scope of this rulemaking that would justify NHTSA's not proceeding with amending the school bus FMVSSs. NHTSA does not regulate the use or operation of school buses, so even with this final rule, States or local school districts can continue to purchase only non-ADS school buses if they wish to do so, and existing operational and supervisory requirements on a State, local or school district level could apply as well.

#### **f. Corrections to FMVSS No. 208 regulatory text**

NHTSA realized from some of the comments that editorial corrections should be made to some of the provisions of FMVSS No. 208.

Zoox believed that a change in S19.2.2(e) is needed for consistency throughout the regulatory text. NHTSA agrees with Zoox that S19.2.2(e) should be changed such that the reference to the “right front passenger” is changed to “any front outboard passenger.” The agency believes this is consistent with changes made throughout the FMVSSs to address the situation where there may be more than one front outboard passenger.

FMVSS No. 208, S4.2 defines, for use in that section, the term “vehicles manufactured for operation by persons with disabilities.” The purpose of this definition was to allow an exception to the type of seat belt required in the driver’s seating position in S4.2.1.2(b), which is a superseded section of FMVSS No. 208. The National Disability Rights Network (NDRN) commented that “[l]anguage needs to be added to these provisions that takes into consideration the potential for wheelchair accessible ADS-equipped vehicles without manual controls or a driver’s seat and reference to a front left outboard seat.”

In response, S4.2.1.2(b) has been superseded and the term “vehicles manufactured for operation by persons with disabilities” is no longer used anywhere in active portions of FMVSS No. 208, aside from the definition that is provided in S4.2. NHTSA interprets NDRN’s comment as requesting that “vehicles manufactured for operation by persons with disabilities” be added in active portions of FMVSS No. 208, as had been included in superseded portions of the standard. Though such a request is outside the scope of this final rule and requires additional analysis, NHTSA may consider similar language in future rulemakings.

#### **VII. Amendments to Various FMVSSs**



This section discusses comments received on proposed amendments to various FMVSSs. **FMVSS Nos. 203, *Impact protection for the driver from the steering control system* and 204, *Steering control rearward displacement***

NHTSA proposed modifying the application section (S2) of FMVSS Nos. 203 and 204 to state that the standards do not apply to vehicles without steering controls. The agency tentatively determined that the proposed changes would not reduce vehicle safety because, if no steering control is present at the seating position where the driver's seat would normally be located, that seating position would become a passenger seat that is still subject to the protection afforded by the requirements of FMVSS No. 201.

Several commenters supported the proposed wording change, and no commenter opposed. NHTSA is adopting the change. In their comments to the NPRM the American Trucking Association stated their belief that FMVSS No. 204 applied to heavy trucks. In response to this comment we would like to clarify that FMVSS No. 204 does not apply to trucks with a GVWR over 10,000 lb.

The Center for Auto Safety (CAS) discussed implications for vehicles with configurations that could change (*i.e.*, a vehicle could have configurations with steering controls and without), but such controls do not meet the definition of a manually operated driving control while stowed. The agency believes that no change is necessary to address the CAS concern, because it is already addressed by virtue of the fact that when the steering control is not stowed, both FMVSS Nos. 203 and 204 apply (unless otherwise excluded).

**FMVSS No. 207, *Seating systems – Driver's Seat Requirement***

NHTSA proposed to modify a requirement that a vehicle have a driver's seat (FMVSS No. 207, S4.1), to specify instead that a driver's seat would be required only for vehicles with

manually operated driving controls. By virtue of the new definition of driver's seat ("driver's designated seating position") and "manually operated driving controls," a driver's seat inherently has immediate access to such controls. Therefore, the proposed addition to S4.1 would clarify that a vehicle equipped with ADS, without traditional driving controls, need not have a driver's seat.

Most commenters responding to this issue (the California State Transportation Agency (CalSTA), GM, CAS) favored or were neutral on the proposal. GM noted that the NPRM's use of the term "manually operated driving control" as used in the requirement for a driver's seat in FMVSS No. 207 was incorrectly singular and instead should be plural. NHTSA agrees with this comment and has adopted the correction in the final rule.

Tesla asked NHTSA to reconsider this requirement, stating that, "in certain circumstances involving dual-mode vehicles, the driver's designated seating position may become a passenger's designated seating position (*e.g.*, when the manually operated driving controls are stowed)." Tesla stated that in such cases, there may be no driver's designated seating position, which could create uncertainty about compliance with FMVSS 207, S4.1 for dual-mode vehicles.

NHTSA does not understand how the situation Tesla describes creates uncertainty about S4.1 certification, since the driver's seat requirement is predicated on the presence of driving controls. If the vehicle were dual-mode with stowable controls, the manufacturer would need to provide a seat so that when the controls are in place, the seat would be available. Although such a system would be unnecessary, a manufacturer could provide a system that stows the driver's seat when the controls are stowed.

**FMVSS No. 214, *Side impact protection***

Zoox commented that the first sentence of FMVSS No. 214, S12.2.1(c) is unnecessary. This section of the standard refers to the positioning of the arms of the test dummy. The NPRM proposed adding a sentence to assure that the specification would apply if the vehicle had multiple front seat passenger dummies. However, since the specification would apply to any dummy, the additional sentence is redundant. NHTSA agrees with Zoox's assessment and is deleting the unnecessary text.

**FMVSS No. 220, *School bus rollover protection***

The Alliance suggested that in S5.2(b), the term "occupant compartment" should be substituted for "passenger and driver compartment." NHTSA did not propose changes to FMVSS No. 220 because the agency does not believe any are necessary.

We decline to make the requested change to FMVSS No. 220 because the agency continues to believe no changes are necessary. We note that a lack of a driver simply indicates that there is only a passenger compartment.

**FMVSS No. 226 – Ejection Countermeasure Readiness Telltales**

The agency stated in the preamble of the NPRM that it would not address telltales and warnings as they relate to ADS vehicles where there is no requirement for any occupant to be seated in what is currently considered the driver's DSP.<sup>51</sup> The NPRM stated that this is a broad topic that will be discussed in a future notice focused solely on these issues, where the agency can engage stakeholders on those issues requiring additional policy and technical discussion.

The proposed regulatory text from the NPRM (in S4.2.2 of FMVSS No. 226) included changes

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<sup>51</sup> The preamble stated (85 FR at 17630): "The Agency notes that other barriers, such as those involving the ejection mitigation countermeasure indicator included in FMVSS No. 226, would be more appropriately addressed in the Agency's planned future notice relating to the appropriate applicability of telltale requirements in ADS-equipped vehicles."

that inadvertently would have required the ejection mitigation countermeasure readiness indicator to be visible to the occupant of any DSP for vehicles without a driver's DSP.

This final rule does not proceed with this proposal. Changes to the ejection mitigation readiness indicator in FMVSS No. 226 were not intended to be included in the scope of this rulemaking. The agency will take the comments received on this issue into consideration when developing its next actions related to telltales and indicators for ADS-equipped vehicles.

#### **FMVSS No. 226, *Ejection mitigation* – Modified Roof Definition**

FMVSS No. 226 excludes “modified roof vehicles” from the standard (S2). The existing FMVSS No. 226 definition of “modified roof” (in S3) uses the term “driver's compartment.” NHTSA proposed to make a simple substitution of “occupant compartment” to replace “driver's compartment.” We noted that this change would affect the applicability of the standard to all vehicles. However, we expected that it would not have any substantive effect on non-ADS vehicles, *i.e.*, we expected that the driver's compartment and the occupant compartment would be identical and requested comment on our expectation.

This final rule adopts the proposed change. Only CalSTA commented on this aspect of the proposal, and they did so in agreement with the change. CalSTA asserted that this modification will increase occupant safety. NHTSA does not have information demonstrating that this change affects the level of protection provided by current requirements, since the modification does not expand applicability.

#### **VII. Effective Date**

This final rule is effective 180 days after date of publication in the Federal Register, with optional early compliance permitted. 49 U.S.C. 30111(d) states that a FMVSS may not become effective before the 180th day the standard is prescribed unless good cause is shown that a

different effective date is in the public interest. This final rule makes modifications to existing FMVSSs in a way that does not require manufacturers of traditional vehicles to modify their products. Moreover, providing for optional early compliance will allow manufacturers to benefit immediately from the flexibility afforded by the modifications to the FMVSSs included in this final rule, providing the same relief as if the effective date were earlier.

## **IX. Cost and Benefit Impacts of this Final Rule**

A Final Regulatory Impact Analysis (FRIA) can be found in the docket for this final rule. A summary of the FRIA findings is provided below. The cost impacts of this rule will depend on the per-vehicle costs savings to each vehicle that would no longer need certain manual controls, times the number of vehicles produced each year that will be produced without those controls. The Agency has reliable information on the former category, given that we generally know the current costs of this equipment, but can only estimate the broader effects. Thus, NHTSA calculated the impact of the final rule on costs by analyzing production cost savings arising from forgoing the installation of manual steering controls. These cost savings are partially offset by incremental costs associated with augmenting safety equipment in the left front seating position to make that position equivalent to the right front seating position, *i.e.*, when what would have previously been a driver's seating position would become a passenger seating position in an ADS-DV without manual controls.<sup>52</sup>

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<sup>52</sup> An ADS-DV is defined as “[a] vehicle designed to be operated exclusively by a level 4 or level 5 ADS for all trips within its given operational design domain (ODD) limitations (if any).” High driving automation (Level 4) is defined as “[t]he sustained and ODD-specific performance by an ADS of the entire dynamic driving task (DDT) and DDT fallback without any expectation that a user will respond to a request to intervene.” Full driving automation (Level 5) is defined as “[t]he sustained and unconditional (*i.e.*, not ODD-specific) performance by an ADS of the entire DDT and DDT fallback without any expectation that a user will respond to a request to intervene.” SAE J3016\_201806 Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles.

Monetized estimated per-vehicle cost impacts (2018 dollars) are presented by discount rate in Table IX-1 below based on a scenario presented by the Energy Information Administration (EIA),<sup>53</sup> in which ADS-DVs represent 31 percent of the share of new light-duty vehicle sales in the year 2050:

Table IX-1: Summary of Net Per-Vehicle Cost Impact Estimates (ADS-DV cost impacts in 2050, 2018 dollars)

<b>Discount Rate</b>	<b>Mean Net Cost Impact</b>	<b>5<sup>th</sup>- to 95<sup>th</sup>-Percentile Net Cost Impacts</b>
0% (Effects in 2050)	-\$995	-\$636 to -\$1,350
3% (Discounted back to 2022)	-\$435	-\$279 to -\$590
7% Discounted back to 2022)	-\$149	-\$96 to -\$203

The ranges of estimates were identified within an uncertainty analysis addressing uncertainty in the average level of cost savings that would be achieved by ADS-DV manufacturers. The uncertainty analysis centered on identifying plausible ranges of the per-vehicle cost savings, with corresponding assumptions regarding the distributions of values across each range (i.e., the likelihood of observing a particular value). The uncertainty analysis generated 50,000 simulated outcomes, across which the mean and percentile values reported in Table IX-2 were identified. In addition to the above ranges of estimates, the Agency performed a sensitivity analysis in which 30 percent of ADS-DV sales in 2050 are comprised of dual-mode vehicles. See the FRIA for the results of that analysis.

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<sup>53</sup> Chase, N., Maples, J., and Schipper, M. (2018). Autonomous Vehicles: Uncertainties and Energy Implications. Issue in Focus from the Annual Energy Outlook 2018. Washington, DC: U.S. Energy Information Administration. Available at <https://www.eia.gov/outlooks/aeo/av.php> (last accessed October 22, 2019).

Although attempting to project the number of vehicles that may benefit from these savings is, of course, highly uncertain, NHTSA has conducted an analysis that shows how these cost savings would look if these types of vehicles became more present in the fleet, as explained in greater detail in the FRIA. NHTSA assumed that light-duty vehicle sales would follow the identical baseline path projected in the Corporate Average Fuel Economy (CAFE) Model<sup>54</sup> through 2032 (the last year specified in the baseline), and then would continue to grow at the average annual growth rate in the baseline from 2027-2032 (approximately 0.2 percent per year; the projected baseline growth rate was also approximately 0.2 percent per year for 2027-2032 in the CAFE Model) for each year after 2032, growing to 18.7 million new light-duty vehicles sold in 2050. NHTSA assumed that the share of new light-duty vehicle sales comprised of ADS-DVs would reach 31 percent in the year 2050, based on the EIA scenario described above;<sup>55</sup> thus, new ADS-DV sales in 2050 are assumed to be equal to 31 percent of 18.7 million, or 5.8 million. Based on these assumptions, NHTSA estimates that the final rule would save ADS-DV manufacturers and consumers approximately \$2.5 billion in the year 2050 (\$2.7 billion in production cost savings, offset partially by \$0.2 billion in incremental costs) at a three-percent discount rate; and approximately \$0.7 billion in the year 2050 (\$0.9 billion in production cost savings, offset partially by approximately \$0.1 billion in incremental costs) at a seven-percent discount rate.

Table IX-2: Summary of Total Monetized Annual Benefit, Cost, and Net Cost Impact Estimates  
(ADS-DV cost impacts in 2050, billions of 2018 dollars)

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<sup>54</sup> Detailed information on the CAFE Model, including model files, is available at <https://www.nhtsa.gov/corporate-average-fuel-economy/compliance-and-effects-modeling-system>.

<sup>55</sup> Chase, N., Maples, J., and Schipper, M. (2018). *Autonomous Vehicles: Uncertainties and Energy Implications*. Issue in Focus from the Annual Energy Outlook 2018. Washington, DC: U.S. Energy Information Administration. Available at <https://www.eia.gov/outlooks/aeo/av.php> (last accessed October 22, 2019).

<b>Discount Rate</b>	<b>Benefits (Cost Savings)</b>	<b>Incremental Costs</b>	<b>Net Cost Impact</b>
3%	\$2.7	\$0.2	-\$2.5
7%	\$0.9	\$0.1	-\$0.9

The estimated cost impacts above represent the subset of potential impacts that are quantifiable (albeit with considerable uncertainty) under the available information. NHTSA identified five unquantified benefit impacts associated with the final rule: impacts on fuel consumption, impacts on safety, incremental producer and consumer surplus, changes in administrative burden, and changes in manufacturer uncertainty. The final rule could affect per-vehicle fuel consumption by changing the mass of ADS-DVs. NHTSA expects ADS-DV mass to either decrease (due to the removal of currently required equipment) slightly or remain essentially unchanged (due to the addition of automated steering components that offset the mass savings of the removed equipment) under the final rule. NHTSA acknowledges that, in principle, ADS-DV mass could increase (if vehicle seating configurations and amenities are changed sufficiently when exploiting the reduction in design constraints when removing manual steering controls) under the final rule. Conversely, ADS-DV net mass could decrease for cases where vehicles are used for travel without occupants (e.g., automated deliveries or empty running between trips with occupants). However, we do not have data to support any specific projections in changes in vehicle mass.

In any event, current corporate average fuel economy (CAFE) requirements are based on a vehicle's "footprint," and thus any change in a vehicles mass will not affect a manufacturer's obligations under that program. Finally, as stated in the NPRM, NHTSA has not



attempted to address the revisions that may be necessary to provide regulatory certainty for manufacturers that wish to self-certify ADS-equipped vehicles with unconventional seating arrangements. The final rule is assumed to have no effect on the per-mile risk of travel in ADS-DVs, as it does not revise, remove, or establish anything associated with their safety performance. That is, the removal of manual steering controls is not assumed to offer any direct safety benefit or detriment for travel in ADS-DVs. However, it is feasible that changes in ADS-DV demand associated with the final rule (e.g., due to changes in vehicle design or decreases in cost) could increase the use of ADS-DVs. In turn, safety outcomes associated with the final rule would be equal to the net effects of: (1) changes in per-mile fatality and injury risk for travel that is shifted from conventional vehicles to ADS-DVs; and (2) incremental fatalities and injuries for travel in ADS-DVs that would not have taken place in any vehicle otherwise. It is difficult to project net safety impacts associated with the final rule without information on: (1) per-mile fatality and injury risk for ADS-DVs and conventional vehicles over time; and (2) demand for travel in ADS-DVs and conventional vehicles as a function of ADS-DV price and design attributes.

NHTSA recognizes that incremental consumer and producer surplus under the final rule would accrue in addition to the production cost savings estimated in the preceding section. That is, by reconfiguring seating configurations and amenities to exploit the lack of manual steering controls, ADS-DV manufacturers would generate incremental consumer and producer surplus as consumers' willingness-to-pay increases. However, NHTSA does not have sufficient information available on the demand and supply of ADS-DVs and their substitutes to estimate the components of incremental consumer and producer surplus that are not captured within the estimates of production cost savings. Thus, the share of incremental consumer and producer

surplus not comprised of the cost savings identified in the preceding section is an unquantified benefit.

The final rule would lead to a reduction in the number of standards from which manufacturers of ADS-DVs would have to seek exemptions. The reduction in exemption requests would be associated with a reduction in administrative costs for both manufacturers and NHTSA. NHTSA does not have sufficient information to establish a specific estimate of administrative cost savings. However, the cost savings would be expected to be small relative to the production cost savings associated with the rule.

A less tangible, but still important, expected impact of the final rule would be a reduction in uncertainty for manufacturers of ADS-equipped vehicles. The final rule provides clarity to manufacturers on constraints to developing FMVSS-compliant ADS-equipped vehicles. In turn, developmental paths for ADS-equipped vehicles could be implemented with greater precision and efficiency. The reduction in uncertainty could reduce not only the costs associated with manufacturing ADS-equipped vehicles, but also the time it would take to bring these vehicles to the market. An accelerated development timeline would be a benefit both to manufacturers and consumers.

## **X. Regulatory Notices and Analyses**

### **Executive Order 12866, Executive Order 13563, and DOT Regulatory Policies and Procedures**

NHTSA has considered the impacts of this rulemaking action under E.O. 12866, “Regulatory Planning and Review” (58 FR 51735, October 4, 1993), E.O. 13563, “Improving Regulation and Regulatory Review,” and DOT regulatory requirements. This final rule is “significant” and was reviewed by OMB. This action is significant because it raises novel legal

and policy issues surrounding the regulation of vehicles equipped with ADS and is the subject of much public interest and has anticipated annual economic impacts greater than \$100 million. NHTSA has prepared a Final Regulatory Impact Analysis (FRIA) for this final rule, which can be found in the docket for this final rule. The cost savings of this final rule are described in the preamble and discussed in greater detail in the accompanying FRIA.

### **Regulatory Flexibility Act**

Pursuant to the Regulatory Flexibility Act (5 U.S.C. 601 et seq., as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency is required to publish a notice of proposed rulemaking or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small governmental jurisdictions). The Small Business Administration's regulations at 13 CFR part 121 define a small business, in part, as a business entity "which operates primarily within the United States." (13 CFR 121.105(a)(1)). No regulatory flexibility analysis is required if the head of an agency certifies the proposed or final rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the Regulatory Flexibility Act to require Federal agencies to provide a statement of the factual basis for certifying that a proposed or final rule will not have a significant economic impact on a substantial number of small entities.

I certify that this final rule will not have a significant economic impact on a substantial number of small entities. This final rule finalizes NHTSA's proposal of amendments to and clarifications of the application of existing occupant protection standards to vehicles equipped with ADS that also lack traditional manual controls. This final rule will apply to small motor vehicle manufacturers who wish to produce ADS without manual controls and with conventional

seating arrangements (i.e., forward-facing, front row seats). In the NPRM, NHTSA analyzed current small manufacturers and current small ADS developers in detail in the Preliminary Regulatory Impact Analysis (PRIA) for the NPRM, and found that none of the entities listed in the analysis would be impacted by this rulemaking. NHTSA received no comments on this analysis. For the reasons discussed in the PRIA and set forth in the FRIA, NHTSA concludes this rulemaking will not have a significant economic impact on a substantial number of small entities.

### **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 will not have sufficient federalism implications to warrant consultation with State and local officials or the preparation of a federalism summary impact statement. This final rule will 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 manufacturers that might otherwise be preempted by the express preemption provision may be preserved. However, the Supreme Court has recognized the possibility 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 the higher standard effectively imposed through a State common law tort judgment against the manufacturer, notwithstanding the manufacturer's compliance with the NHTSA standard, creating an obstacle to the accomplishment and execution of that standard. 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 E.O. 13132, NHTSA has considered whether this final 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. Under the principles enunciated in *Geier* it is possible that a rule of State tort law could conflict with a NHTSA safety standard if it created an obstacle to the accomplishment and execution of that standard. Since this final rule translates existing occupant protection standards to vehicles equipped with alternative cabin configurations that lack manual driving controls, NHTSA does not currently foresee the likelihood of any such tort requirements and does not have a basis for concluding that such a conflict exists.

NHTSA solicited comments from the States and other interested parties on this assessment of issues relevant to E.O. 13132 in the NPRM. While one commenter touched on the organization's general support for the concept of federalism, it did not assert that the rulemaking was anything but an appropriate balance between State and Federal regulation.

### **Congressional Review Act**

The Congressional Review Act, 5 U.S.C. 801 et. seq., as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States.

NHTSA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the Federal Register. A major rule cannot take effect until 60 days after it is published in the Federal Register. This action is a "major rule" as defined by 5 U.S.C. 804(2). This rule will be effective sixty days after the date of publication in the Federal Register.

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

When promulgating a regulation, Executive Order 12988 specifically requires that the agency must make every reasonable effort to ensure that the regulation, as appropriate: (1) Specifies in clear language the preemptive effect; (2) specifies in clear language the effect on existing Federal law or regulation, including all provisions repealed, circumscribed, displaced, impaired, or modified; (3) provides a clear legal standard for affected conduct rather than a general standard, while promoting simplification and burden reduction; (4) specifies in clear language the retroactive effect; (5) specifies whether administrative proceedings are to be

required before parties may file suit in court; (6) explicitly or implicitly defines key terms; and (7) addresses other important issues affecting clarity and general draftsmanship of regulations.

Pursuant to this Order, NHTSA notes as follows. The preemptive effect of this final rule is discussed above in connection with Executive Order 13132. 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.

### **Executive Order 13045 (Protection of Children From Environmental Health and Safety Risks)**

Executive Order 13045, “Protection of Children from Environmental Health and Safety Risks,” (62 FR 19885; April 23, 1997) applies to any proposed or final rule that: (1) Is determined to be “economically significant,” as defined in 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. If a rule meets both criteria, the Agency must evaluate the environmental health or safety effects of the rule on children, and explain why the rule is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

This final rule is not expected to have a disproportionate health or safety impact on children. Consequently, no further analysis is required under Executive Order 13045.

### **Executive Order 13609, Promoting International Regulatory Cooperation**

Executive Order 13609, “Promoting International Regulatory Cooperation,” promotes international regulatory cooperation to meet shared challenges involving health, safety, labor, security, environmental, and other issues and to reduce, eliminate, or prevent unnecessary differences in regulatory requirements. NHTSA has analyzed this final rule under the policies

and Agency responsibilities of Executive Order 13609, and has determined this rule would have no effect on international regulatory cooperation.

### **Paperwork Reduction Act**

Under the Paperwork Reduction Act of 1995 (PRA), 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. This final rule imposes no new reporting requirements on any person.

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

Under the National Technology Transfer and Advancement Act of 1995 (NTTAA) (Pub. L. 104-113), “all Federal agencies and departments shall use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as a means to carry out policy objectives or activities determined by the agencies and departments.” 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 SAE. The NTTAA directs us to provide Congress, through OMB, explanations when we decide not to use available and applicable voluntary consensus standards.

Pursuant to the above requirements, the agency conducted a review of voluntary consensus standards to determine if any were applicable to this final rule. NHTSA searched for, but did not find, voluntary consensus standards directly applicable to the amendments adopted in this final rule. Neither is NHTSA aware of any international regulations or Global Technical Regulation (GTR) activity addressing the subject of this final rule.

### **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 annually (adjusted for inflation with base year of 1995). Before promulgating a rule for which a written statement is needed, section 205 of the UMRA generally requires the agency to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows the agency to adopt an alternative other than the least costly, most cost-effective, or least burdensome alternative if the agency publishes with the final rule an explanation of why that alternative was not adopted.

This final rule does not contain a mandate that would impose costs on any of the entities listed above of more than \$100 million annually (adjusted for inflation with base year of 1995). As a result, the requirements of Section 202 of the Act do not apply.

### **National Environmental Policy Act**

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

### **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.

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

Motor vehicles, Motor vehicle safety.

### **Regulatory Text**

In consideration of the foregoing, NHTSA amends 49 CFR part 571 to read 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 571.3(b) is amended by adding, in alphabetical order, the definitions of “Driver air bag,” “Driver dummy,” “Driver’s designated seating position,” “Manually operated driving controls,” “Passenger seating position,” “Row,” “Seat outline,” and “Steering control system”; and revising the definition of “Outboard designated seating position,” to read as follows:

#### **§ 571.3 Definitions**

\* \* \* \* \*

(b) \* \* \*

*Driver air bag* means the air bag installed for the protection of the occupant of the driver’s designated seating position.

*Driver dummy* means the test dummy positioned in the driver’s designated seating position.

*Driver's designated seating position* means a designated seating position providing immediate access to manually operated driving controls. As used in this part, the terms "driver's seating position" and "driver's seat" shall have the same meaning as "driver's designated seating position."

\* \* \* \* \*

*Manually operated driving controls* means a system of controls:

(1) That are used by an occupant for real-time, sustained, manual manipulation of the motor vehicle's heading (steering) and/or speed (accelerator and brake); and

(2) That is positioned such that they can be used by an occupant, regardless of whether the occupant is actively using the system to manipulate the vehicle's motion.

\* \* \* \* \*

*Outboard designated seating position* means a designated seating position where a longitudinal vertical plane tangent to the outboard side of the seat cushion is less than 12 inches from the innermost point on the inside surface of the vehicle at a height between the design H-point and the shoulder reference point (as shown in fig. 1 of Federal Motor Vehicle Safety Standard No. 210) and longitudinally between the front and rear edges of the seat cushion. As used in this part, the terms "outboard seating position" and "outboard seat" shall have the same meaning as "outboard designated seating position."

\* \* \* \* \*

*Passenger seating position* means any designated seating position other than the driver's designated seating position, except as noted below. As used in this part, the term "passenger seat" shall have the same meaning as "passenger seating position." As used in this part,

“passenger seating position” includes what was a “driver’s designated seating position” prior to stowing of the present manually operated driving controls.

\* \* \* \* \*

*Row* means a set of one or more seats whose seat outlines do not overlap with the seat outline of any other seats, when all seats are adjusted to their rearmost normal riding or driving position, when viewed from the side.

\* \* \* \* \*

*Seat outline* means the outer limits of a seat projected laterally onto a vertical longitudinal vehicle plane.

\* \* \* \* \*

*Steering control system* means the manually operated driving control used to control the vehicle heading and its associated trim hardware, including any portion of a steering column assembly that provides energy absorption upon impact. As used in this part, the term “steering wheel” and “steering control” shall have the same meaning as “steering control system.”

\* \* \* \* \*

3. Amend § 571.201 by revising paragraphs S2, the definition of the terms “A-pillar,” “B-pillar,” and “Pillar” in S3, revising S5.1(b), S5.1.1(d), S5.1.2(a), S6.3(b), S8.6, S8.20, and S8.24 to read as follows:

**§ 571.201 Standard No. 201; Occupant protection in interior impact**

\* \* \* \* \*

S2. *Application.* This standard applies to passenger cars and to multipurpose passenger vehicles, trucks designed to carry at least one person, and buses with a GVWR of 4,536

kilograms or less, except that the requirements of S6 do not apply to buses with a GVWR of more than 3,860 kilograms.

S3. \* \* \*

*A-pillar* means any pillar that is entirely forward of a transverse vertical plane passing through the seating reference point of the driver's designated seating position or, if there is no driver's designated seating position, any pillar that is entirely forward of a transverse vertical plane passing through the seating reference point of the rearmost designated seating position in the front row of seats.

\* \* \* \* \*

*B-pillar* means the forwardmost pillar on each side of the vehicle that is, in whole or in part, rearward of a transverse vertical plane passing through the seating reference point of the driver's designated seating position or, if there is no driver's designated seating position, the forwardmost pillar on each side of the vehicle that is, in whole or in part, rearward of a transverse vertical plane passing through the seating reference point of the rearmost designated seating position in the front row of seats, unless:

- (1) There is only one pillar rearward of that plane and it is also a rearmost pillar; or
- (2) There is a door frame rearward of the A-pillar and forward of any other pillar or rearmost pillar.

\* \* \* \* \*

*Pillar* means any structure, excluding glazing and the vertical portion of door window frames, but including accompanying moldings, attached components such as safety belt anchorages and coat hooks, which:

(1) If there is a driver's designated seating position, supports either a roof or any other structure (such as a roll-bar) that is above the driver's head, or if there is no driver's designated seating position, supports either a roof or any other structure (such as a roll-bar) that is above the occupant in the rearmost designated seating position in the front row of seats, or

(2) Is located along the side edge of a window.

\* \* \* \* \*

S5.1 \* \* \*

(b) A relative velocity of 19 kilometers per hour for vehicles that meet the occupant crash protection requirements of S5.1 of 49 CFR 571.208 by means of inflatable restraint systems and meet the requirements of S4.1.5.1(a)(3) by means of a Type 2 seat belt assembly at any front passenger designated seating position, the deceleration of the head form shall not exceed 80 g continuously for more than 3 milliseconds

S5.1.1 \* \* \*

(d) If the steering control is present, areas outboard of any point of tangency on the instrument panel of a 165 mm diameter head form tangent to and inboard of a vertical longitudinal plane tangent to the inboard edge of the steering control; or

\* \* \* \* \*

S5.1.2 \* \* \*

(a) The origin of the line tangent to the instrument panel surface shall be a point on a transverse horizontal line through a point 125 mm horizontally forward of the seating reference point of any front outboard passenger designated seating position, displaced vertically an amount equal to the rise which results from a 125 mm forward adjustment of the seat or 19 mm; and

\* \* \* \* \*

S6.3 \* \* \*

(b) Any target located rearward of a vertical plane 600 mm behind the seating reference point of the rearmost designated seating position. For altered vehicles and vehicles built in two or more stages, including ambulances and motor homes, any target located rearward of a vertical plane 300 mm behind the seating reference point of the driver's designated seating position or the rearmost designated seating position in the front row of seats, if there is no driver's designated seating position (tests for altered vehicles and vehicles built in two or more stages do not include, within the time period for measuring HIC(d), any free motion headform contact with components rearward of this plane). If an altered vehicle or vehicle built in two or more stages is equipped with a transverse vertical partition positioned between the seating reference point of the driver's designated seating position and a vertical plane 300 mm behind the seating reference point of the driver's designated seating position, any target located rearward of the vertical partition is excluded.

\* \* \* \* \*

S8.6 *Steering control and seats.*

(a) During targeting, the steering control and seats may be placed in any position intended for use while the vehicle is in motion.

(b) During testing, the steering control and seats may be removed from the vehicle.

\* \* \* \* \*

S8.20 *Adjustable steering controls—vehicle to pole test.* Adjustable steering controls shall be adjusted so that the steering control hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions.

\* \* \* \* \*

S8.24 *Impact reference line—vehicle to pole test.* On the striking side of the vehicle, place an impact reference line at the intersection of the vehicle exterior and a transverse vertical plane passing through the center of gravity of the head of the dummy seated in accordance with S8.28, in any front outboard designated seating position.

\* \* \* \* \*

4. Amend § 571.203 by revising paragraph S2 and removing and reserving S3 to read as follows:

**§ 571.203 Standard No. 203; Impact protection for the driver from the steering control system.**

\* \* \* \* \*

S2. *Application.* This standard applies to passenger cars and to multipurpose passenger vehicles, trucks and buses with a gross vehicle weight rating of 4,536 kg or less. However, it does not apply to vehicles that conform to the frontal barrier crash requirements (S5.1) of Standard No. 208 (49 CFR 571.208) by means of other than seat belt assemblies. It also does not apply to walk-in vans or vehicles without a steering control.

S3. [Reserved]

\* \* \* \* \*

5. Amend § 571.204 by revising paragraph S2 to read as follows:

**§ 571.204 Standard No. 204; Steering control rearward displacement**

\* \* \* \* \*

S2. *Application.* This standard applies to passenger cars and to multipurpose passenger vehicles, trucks, and buses. However, it does not apply to walk-in vans or vehicles without steering controls.



\* \* \* \* \*

6. Amend § 571.205 by revising paragraph S3(a) to read as follows:

**§ 571.205 Standard No. 205, Glazing materials.**

\* \* \* \* \*

S3. \* \* \*

(a) This standard applies to passenger cars, multipurpose passenger vehicles, trucks designed to carry at least one person, buses, motorcycles, slide-in campers, pickup covers designed to carry persons while in motion and low speed vehicles, and to glazing materials for use in those vehicles.

\* \* \* \* \*

7. Amend § 571.206 by revising paragraph S2, the definitions of “Side Front Door” and “Side Rear Door” in paragraph S3, and S5.1.1.4(b)(1)(ii)(C) to read as follows:

**§571.206 Standard No. 206; Door locks and door retention components**

\* \* \* \* \*

S2. *Application.* This standard applies to passenger cars, multipurpose passenger vehicles, trucks designed to carry at least one person, and buses with a gross vehicle weight rating (GVWR) of 4,536 kg or less.

S3. \* \* \*

*Side Front Door* is a door that, in a side view, has 50 percent or more of its opening area forward of the rearmost point on the driver's seat back, when the seat back is adjusted to its most vertical and rearward position. For vehicles without a driver’s designated seating position it is a door that in a side view, has 50 percent or more of its opening area forward of the rearmost point

on the most rearward passenger's seat back in the front row of seats, when the seat backs are adjusted to their most vertical and rearward position.

*Side Rear Door* is a door that, in a side view, has 50 percent or more of its opening area to the rear of the rearmost point on the driver's seat back, when the driver's seat is adjusted to its most vertical and rearward position. For vehicles without a driver's designated seating position it is a door that in a side view, has 50 percent or more of its opening area rear of the rearmost point on the most rearward passenger's seat back in the front row of seats, when the seat backs are adjusted to their most vertical and rearward position.

\* \* \* \* \*

S5.1.1.4 \*\*\*

(C) Transverse Setup 1. Orient the vehicle so that its transverse axis is aligned with the axis of the acceleration device, simulating a left-side impact.

\*\*\*\*\*

8. Amend § 571.207 by revising paragraphs S2 and S4.1 to read as follows:

**§571.207 Standard No. 207; Seating systems.**

\* \* \* \* \*

S2. *Application.* This standard applies to passenger cars, multipurpose passenger vehicles, trucks designed to carry at least one person, and buses.

\* \* \* \* \*

S4.1 *Driver's seat.* Each vehicle with manually operated driving controls shall have a driver's designated seating position.

\* \* \* \* \*

9. Amend § 571.208 as follows:

a. Revise paragraphs S3(a), S4.2 (introductory text), S4.2.5.4(c), S4.2.5.5(a)(2), S4.2.6.1.1, the definition of “Perimeter-seating bus” in S4.4.1, S4.4.3.2.1, S4.4.3.2.2, S4.4.4.1.1, S4.4.4.1.2, S4.4.5.1.1, S4.4.5.1.2, S4.4.5.1.2(e), S4.5.1(c)(3), S4.5.1(e)(1), S4.5.1(e)(2), S4.5.1(e)(3), S4.5.1(f)(1), S4.11(d), S7.1.1.5(a), S7.1.6, S8.1.4, S8.2.7(c), S10.2.1, S10.2.2, S10.3.1, S10.3.2, S10.4.1.1, S10.4.1.2, S10.4.2.1, S10.5, S10.6.1, S10.6.2, S10.7, S13.3, S16.2.9, S16.2.9.1, S16.2.9.2, S16.2.9.3, the heading of S16.2.10, S16.2.10.3, S16.3.2.1.4, S16.3.2.1.8, S16.3.2.1.9, S16.3.2.3.2, S16.3.2.3.3, S16.3.2.3.4, S16.3.3, S16.3.3.1, S16.3.3.1.2, S16.3.3.1.4, S16.3.3.2, S16.3.3.3, S16.3.4, S16.3.5, S19.2.1, S19.2.2, S19.2.2(d), S19.2.2(e), S19.2.2(g), S19.2.2(h), S19.2.3, S19.3, S20.1.2, S20.2, S20.2.1.4, S20.2.2.3, S20.3, S20.3.1, S20.3.2, S20.4.1, S20.4.4, S20.4.9, S21.2.1, S21.2.3, S21.3, S21.4, S22.1.2, S22.1.3, S22.2, S22.2.1.1, S22.2.1.3, S22.2.2, S22.2.2.1(a), S22.2.2.1(b), S22.2.2.3(a), S22.2.2.3(b), S22.2.2.4(a), S22.2.2.5(a), S22.2.2.6(a), S22.2.2.6(b), S22.2.2.7(a), S22.2.2.7(b), S22.2.2.8(a), S22.2.2.8(a)(6), S22.3, S22.3.1, S22.3.2, S22.4.2.2, S22.4.3.1, S22.4.3.2, S22.4.4, S22.5.1, S23.2.1, S23.2.3, S23.3, S23.4, S24.1.2, S24.1.3, S24.2, S24.2.3, S24.3, S24.3.1, S24.3.2, S24.4.2.3, S24.4.3.1, S24.4.3.2, S24.4.4, S26.2.1, S26.2.2, S26.2.4.3, S26.2.4.4, S26.2.5, S26.3.2, S26.3.3, S26.3.4.3, S26.3.5, S26.3.6, S26.3.7, S27.5.2, S27.6.2, S28.2, and S28.4;

b. Redesignate paragraph S7.1.6 as paragraph S7.1.1.6; and

c. Add new paragraphs S4.1.5.6, S4.1.5.6.1, S4.1.5.6.2, S4.1.5.6.3, S4.1.5.6.4, S4.1.5.6.5, S4.1.5.6.6, and S4.2.6.4, to read as follows:

**§571.208 Standard No. 208; Occupant crash protection**

\* \* \* \* \*

S3. *Application.* (a) This standard applies to passenger cars, multipurpose passenger vehicles, trucks designed to carry at least one person, and buses. In addition, S9, *Pressure vessels*

*and explosive devices, applies to vessels designed to contain a pressurized fluid or gas, and to explosive devices, for use in the above types of motor vehicles as part of a system designed to provide protection to occupants in the event of a crash.*

\* \* \* \* \*

*S4.1.5.6 Inboard designated seating positions in passenger cars without manually operated driving controls.*

*S4.1.5.6.1 For vehicles specified in S4.1.5.6 with no outboard designated seating positions and with a single front inboard designated seating position, the vehicle shall at that position meet the requirements of S4.1.5.6.3 and S4.1.5.6.4. The above specified vehicles with multiple front inboard designated seating position shall at one inboard position meet the requirements S4.1.5.6.3 and S4.1.5.6.4 and at all other inboard positions meet the requirements of S4.1.5.6.6.*

*S4.1.5.6.2 For vehicles specified in S4.1.5.6 with only one outboard designated seating position and a single front inboard designated seating position, the vehicle shall at that position meet the requirements of S4.1.5.6.3 and S4.1.5.6.4. The above specified vehicles with multiple front inboard designated seating position shall at one inboard position meet the requirements of S4.1.5.6.3 and S4.1.5.6.4 and at all other inboard positions meet the requirements of S4.1.5.6.5.*

*S4.1.5.6.3 As specified in S4.1.5.6.1 and S4.1.5.6.2, the vehicles shall meet the frontal crash protection requirements of S5.1.2(b) as specified for front outboard passenger designated seating positions by means of an inflatable restraint system that requires no action by vehicle occupants and the requirements of S14, as specified for front outboard passenger designated seating positions.*

S4.1.5.6.4 As specified in S4.1.5.6.1 and S4.1.5.6.2, the designated seating positions have a Type 2 seat belt assembly that conforms to Standard No. 209 and S7.1 through S7.3 of this standard, as specified for front outboard passenger designated seating positions.

S4.1.5.6.5 As specified in S4.1.5.6.1 and S4.1.5.6.2, as appropriate, have a Type 1 or Type 2 seat belt assembly that conforms to Standard No. 209 and S7.1 through S7.3 of this standard.

S4.1.5.6.6 As specified in S4.1.5.6.1 and S4.1.5.6.2, as appropriate, have a Type 2 seat belt assembly that conforms to Standard No. 209 and S7.1 through S7.3 of this standard, as specified for front outboard passenger designated seating positions.

\* \* \* \* \*

S4.2 *Trucks and multipurpose passenger vehicles with a GVWR of 10,000 pounds or less.* As used in this section, *vehicles manufactured for operation by persons with disabilities* means vehicles that incorporate a level change device (e.g., a wheelchair lift or a ramp) for onloading or offloading an occupant in a wheelchair, an interior element of design intended to provide the vertical clearance necessary to permit a person in a wheelchair to move between the lift or ramp and the driver's position or to occupy that position, and either an adaptive control or special driver's seating accommodation to enable persons who have limited use of their arms or legs to operate a vehicle. For purposes of this definition, special driver's seating accommodations include a driver's seat easily removable with means installed for that purpose or with simple tools, or a driver's seat with extended adjustment capability to allow a person to easily transfer from a wheelchair to the driver's seat.

\* \* \* \* \*

S4.2.5.4 \* \* \*

(c) Each truck, bus, and multipurpose passenger vehicle with a GVWR of 8,500 pounds or less and an unloaded vehicle weight of 5,500 pounds or less manufactured on or after September 1, 1995, but before September 1, 1998, whose driver's seating position complies with the requirements of S4.1.2.1(a) of this standard by means not including any type of seat belt and whose right front passenger seating position is equipped with a manual Type 2 seat belt that complies with S5.1 of this standard, with the seat belt assembly adjusted in accordance with S7.4.2, shall be counted as a vehicle complying with S4.1.2.1.

S4.2.5.5 \* \* \*

(a) \* \* \*

(2) Each truck, bus, and multipurpose passenger vehicle with a GVWR of 8,500 pounds or less and an unloaded vehicle weight of 5,500 pounds or less whose driver's seating position complies with the requirements of S4.1.2.1(a) by means not including any type of seat belt and whose right front passenger seating position is equipped with a manual Type 2 seat belt that complies with S5.1 of this standard, with the seat belt assembly adjusted in accordance with S7.4.2, is counted as one vehicle.

\* \* \* \* \*

S4.2.6.1.1 The amount of trucks, buses, and multipurpose passenger vehicles complying with the requirements of S4.1.5.1(a)(1) of this standard by means of an inflatable restraint system shall be not less than 80 percent of the manufacturer's total combined production of subject vehicles manufactured on or after September 1, 1997 and before September 1, 1998. Each truck, bus, or multipurpose passenger vehicle with a GVWR of 8,500 pounds or less and an unloaded vehicle weight of 5,500 pounds or less manufactured on or after September 1, 1997 and before September 1, 1998, whose driver's seating position complies with S4.1.5.1(a)(1) by means of an

inflatable restraint system and whose right front passenger seating position is equipped with a manual Type 2 seat belt assembly that complies with S5.1 of this standard, with the seat belt assembly adjusted in accordance with S7.4.2 of this standard, shall be counted as a vehicle complying with S4.1.5.1(a)(1) by means of an inflatable restraint system. A vehicle shall not be deemed to be in noncompliance with this standard if its manufacturer establishes that it did not have reason to know in the exercise of due care that such vehicle is not in conformity with the requirement of this standard.

\* \* \* \* \*

S4.2.6.4 *Inboard designated seating positions in trucks, buses, and multipurpose passenger vehicles without manually operated driving controls and with a single or multiple front inboard designated seating position and no outboard seating positions and with a GVWR of 3,855 kg (8,500 lb) or less and an unloaded vehicle weight of 2,495 kg (5,500 lb) or less.* The above specified vehicles shall meet the requirements of S4.1.5.6 as specified for passenger cars.

\* \* \* \* \*

#### S4.4.1 \* \* \*

*Perimeter-seating bus* means a bus, which is not an over-the-road bus, that has 7 or fewer designated seating positions that are forward-facing or can convert to forward-facing without the use of tools, and are rearward of the driver's designated seating position or rearward of the outboard designated seating position(s) in the front row of seats, if there is no driver's designated seating position.

\* \* \* \* \*

S4.4.3.2.1 The driver's designated seating position and any outboard designated seating position not rearward of the driver's seating position shall be equipped with a Type 2 seat belt

assembly. For a school bus without a driver's designated seating position, the outboard designated seating positions in the front row of seats shall be equipped with Type 2 seat belt assemblies. The seat belt assembly shall comply with Standard No. 209 (49 CFR 571.209) and with S7.1 and S7.2 of this standard. The lap belt portion of the seat belt assembly shall include either an emergency locking retractor or an automatic locking retractor. An automatic locking retractor shall not retract webbing to the next locking position until at least 3/4 inch of webbing has moved into the retractor. In determining whether an automatic locking retractor complies with this requirement, the webbing is extended to 75 percent of its length and the retractor is locked after the initial adjustment. If the seat belt assembly installed in compliance with this requirement incorporates any webbing tension-relieving device, the vehicle owner's manual shall include the information specified in S7.4.2(b) of this standard for the tension-relieving device, and the vehicle shall comply with S7.4.2(c) of this standard.

S4.4.3.2.2 Passenger seating positions, other than those specified in S4.4.3.2.1, shall be equipped with Type 2 seat belt assemblies that comply with the requirements of S7.1.1.5, S7.1.5 and S7.2 of this standard.

\* \* \* \* \*

S4.4.4.1.1 *First option—complete passenger protection system—driver only.* The vehicle shall meet the crash protection requirements of S5, with respect to an anthropomorphic test dummy in the driver's designated seating position, by means that require no action by vehicle occupants.

S4.4.4.1.2 *Second option—belt system.* The vehicle shall, at the driver's designated seating position and all designated seating positions in the front row of seats, if there is no driver's designated seating position, be equipped with either a Type 1 or a Type 2 seat belt



assembly that conforms to §571.209 of this part and S7.2 of this Standard. A Type 1 belt assembly or the pelvic portion of a dual retractor Type 2 belt assembly installed at these seating positions shall include either an emergency locking retractor or an automatic locking retractor. If a seat belt assembly includes an automatic locking retractor for the lap belt or the lap belt portion, that seat belt assembly shall comply with the following:

\* \* \* \* \*

S4.4.5.1.1 The driver's designated seating position and any outboard designated seating position not rearward of the driver's seating position shall be equipped with a Type 2 seat belt assembly. The seat belt assembly shall comply with Standard No. 209 (49 CFR 571.209) and with S7.1 and S7.2 of this standard. For a bus without a driver's designated seating position, any outboard designated seating position in the front row of seats, shall be equipped with Type 2 seat belt assemblies. If a seat belt assembly installed in compliance with this requirement includes an automatic locking retractor for the lap belt portion, that seat belt assembly shall comply with paragraphs (a) through (c) of S4.4.4.1.2 of this standard. If a seat belt assembly installed in compliance with this requirement incorporates any webbing tension-relieving device, the vehicle owner's manual shall include the information specified in S7.4.2(b) of this standard for the tension-relieving device, and the vehicle shall comply with S7.4.2(c) of this standard.

S4.4.5.1.2 Passenger seating positions, other than those specified in S4.4.5.1.1 and seating positions on prison buses rearward of the driver's seating position, shall:

\* \* \* \* \*

(e) Comply with the requirements of S7.1.1.5, S7.1.1.6, S7.1.3, and S7.2 of this standard.

\* \* \* \* \*

S4.5.1 \* \* \*

(c) \* \* \*

(3) If a vehicle does not have an inflatable restraint at any front seating position other than that for the driver's designated seating position, the pictogram may be omitted from the label shown in Figure 6c.

\* \* \* \* \*

(e) \* \* \*

(1) Except as provided in S4.5.1(e)(2) or S4.5.1(e)(3), each vehicle that is equipped with an inflatable restraint for the passenger position shall have a label attached to a location on the dashboard or the steering control hub that is clearly visible from all front seating positions. The label need not be permanently affixed to the vehicle. This label shall conform in content to the label shown in Figure 7 of this standard, and shall comply with the requirements of S4.5.1(e)(1)(i) through S4.5.1(e)(1)(iii).

\* \* \* \* \*

(2) Vehicles certified to meet the requirements specified in S19, S21, and S23 before December 1, 2003, that are equipped with an inflatable restraint for the passenger position shall have a label attached to a location on the dashboard or the steering control hub that is clearly visible from all front seating positions. The label need not be permanently affixed to the vehicle. This label shall conform in content to the label shown in either Figure 9 or Figure 12 of this standard, at manufacturer's option, and shall comply with the requirements of S4.5.1(e)(2)(i) through S4.5.1(e)(2)(iv).

\* \* \* \* \*

(3) Vehicles certified to meet the requirements specified in S19, S21, and S23 on or after December 1, 2003, that are equipped with an inflatable restraint for the passenger position shall

have a label attached to a location on the dashboard or the steering control hub that is clearly visible from all front seating positions. The label need not be permanently affixed to the vehicle. This label shall conform in content to the label shown in Figure 12 of this standard and shall comply with the requirements of S4.5.1(e)(3)(i) through S4.5.1(e)(3)(iv).

\* \* \* \* \*

(f) *Information to appear in owner's manual.* (1) The owner's manual for any vehicle equipped with an inflatable restraint system shall include an accurate description of the vehicle's air bag system in an easily understandable format. The owner's manual shall include a statement to the effect that the vehicle is equipped with an air bag and lap/shoulder belt at both front outboard seating positions, and that the air bag is a supplemental restraint at those seating positions. The information shall emphasize that all occupants should always wear their seat belts whether or not an air bag is also provided at their seating position to minimize the risk of severe injury or death in the event of a crash. The owner's manual shall also provide any necessary precautions regarding the proper positioning of occupants, including children, at seating positions equipped with air bags to ensure maximum safety protection for those occupants. The owner's manual shall also explain that no objects should be placed over or near the air bag on the instrument panel, because any such objects could cause harm if the vehicle is in a crash severe enough to cause the air bag to inflate.

\* \* \* \* \*

#### S4.11 \* \* \*

(d) For driver dummy low risk deployment tests, the injury criteria shall be met when calculated based on data recorded for 125 milliseconds after the initiation of the final stage of air bag deployment designed to deploy in any full frontal rigid barrier crash up to 26 km/h (16 mph).

\* \* \* \* \*

S7.1.1.5 \* \* \*

(a) Each designated seating position, except the driver's designated seating position, and except any right front seating position that is equipped with an automatic belt, that is in any motor vehicle, except walk-in van-type vehicles and vehicles manufactured to be sold exclusively to the U.S. Postal Service, and that is forward-facing or can be adjusted to be forward-facing, shall have a seat belt assembly whose lap belt portion is lockable so that the seat belt assembly can be used to tightly secure a child restraint system. The means provided to lock the lap belt or lap belt portion of the seat belt assembly shall not consist of any device that must be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. Additionally, the means provided to lock the lap belt or lap belt portion of the seat belt assembly shall not require any inverting, twisting or otherwise deforming of the belt webbing.

\* \* \* \* \*

S7.1.1.6 [Redesignated]

\* \* \* \* \*

S8.1.4 Adjustable steering controls are adjusted so that the steering control hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions.

\* \* \* \* \*

S8.2.7 \* \* \*

(c) A vertical plane through the geometric center of the barrier impact surface and perpendicular to that surface passes through the driver's seating position seating reference point in the tested vehicle.

\* \* \* \* \*

S10.2.1 The driver dummy's upper arms shall be adjacent to the torso with the centerlines as close to a vertical plane as possible.

S10.2.2 Any front outboard passenger dummy's upper arms shall be in contact with the seat back and the sides of the torso.

\* \* \* \* \*

S10.3.1 The palms of the driver dummy shall be in contact with the outer part of the steering control rim at the rim's horizontal centerline. The thumbs shall be over the steering control rim and shall be lightly taped to the steering control rim so that if the hand of the test dummy is pushed upward by a force of not less than 2 pounds and not more than 5 pounds, the tape shall release the hand from the steering control rim.

S10.3.2 The palms of any passenger test dummy shall be in contact with the outside of the thigh. The little finger shall be in contact with the seat cushion.

\* \* \* \* \*

S10.4.1.1 In vehicles equipped with bench seats, the upper torso of the driver and front outboard passenger dummies shall rest against the seat back. The midsagittal plane of the driver dummy shall be vertical and parallel to the vehicle's longitudinal centerline, and pass through the center of rotation of the steering control. The midsagittal plane of any passenger dummy shall be vertical and parallel to the vehicle's longitudinal centerline and the same distance from the vehicle's longitudinal centerline as the midsagittal plane of the driver dummy, if there is a driver's seating position. If there is no driver's seating position, the midsagittal plane of any front outboard passenger dummy shall be vertical and parallel to the vehicle's longitudinal centerline, and pass through the seating reference point of the seat that it occupies.

S10.4.1.2 In vehicles equipped with bucket seats, the upper torso of the driver and passenger dummies shall rest against the seat back. The midsagittal plane of the driver and any front outboard passenger dummy shall be vertical and shall coincide with the longitudinal centerline of the bucket seat.

\* \* \* \* \*

S10.4.2.1 *H-point*. The H-points of the driver and any front outboard passenger test dummies shall coincide within  $\frac{1}{2}$  inch in the vertical dimension and  $\frac{1}{2}$  inch in the horizontal dimension of a point  $\frac{1}{4}$  inch below the position of the H-point determined by using the equipment and procedures specified in SAE Standard J826-1980 (incorporated by reference, see §571.5), except that the length of the lower leg and thigh segments of the H-point machine shall be adjusted to 16.3 and 15.8 inches, respectively, instead of the 50th percentile values specified in Table 1 of SAE Standard J826-1980.

\* \* \* \* \*

S10.5 *Legs*. The upper legs of the driver and any front outboard passenger test dummies shall rest against the seat cushion to the extent permitted by placement of the feet. The initial distance between the outboard knee clevis flange surfaces shall be 10.6 inches. To the extent practicable, the left leg of the driver dummy and both legs of any front outboard passenger dummy shall be in vertical longitudinal planes. To the extent practicable, the right leg of the driver dummy shall be in a vertical plane. Final adjustment to accommodate the placement of feet in accordance with S10.6 for various passenger compartment configurations is permitted.

\* \* \* \* \*

S10.6.1 *Driver dummy position*.

\* \* \* \* \*

S10.6.2 Front outboard *passenger dummy position*.

\* \* \* \* \*

S10.7 *Test dummy positioning for latchplate access*. The reach envelopes specified in S7.4.4 of this standard are obtained by positioning a test dummy in the driver's or front outboard passenger seating position and adjusting that seating position to its forwardmost adjustment position. Attach the lines for the inboard and outboard arms to the test dummy as described in Figure 3 of this standard. Extend each line backward and outboard to generate the compliance arcs of the outboard reach envelope of the test dummy's arms.

\* \* \* \* \*

S13.3 *Vehicle test attitude*. When the vehicle is in its “as delivered” condition, measure the angle between the left side door sill and the horizontal. Mark where the angle is taken on the door sill. The “as delivered” condition is the vehicle as received at the test site, with 100 percent of all fluid capacities and all tires inflated to the manufacturer's specifications as listed on the vehicle's tire placard. When the vehicle is in its “fully loaded” condition, measure the angle between the left side door sill and the horizontal, at the same place the “as delivered” angle was measured. The “fully loaded” condition is the test vehicle loaded in accordance with S8.1.1(a) or (b) of Standard No. 208, as applicable. The load placed in the cargo area shall be centered over the longitudinal centerline of the vehicle. The pretest door sill angle, when the vehicle is on the sled, (measured at the same location as the as delivered and fully loaded condition) shall be equal to or between the as delivered and fully loaded door sill angle measurements.

\* \* \* \* \*

S16.2.9 *Steering control adjustment*.

S16.2.9.1 Adjust a tiltable steering control, if possible, so that the steering control hub is at the geometric center of its full range of driving positions.

S16.2.9.2 If there is no setting detent at the mid-position, lower the steering control to the detent just below the mid-position.

S16.2.9.3 If the steering column is telescoping, place the steering column in the mid-position. If there is no mid-position, move the steering control rearward one position from the mid-position.

S16.2.10 *Front seat set-up.*

\* \* \* \* \*

S16.2.10.3 *Seat position adjustment.* If the front right outboard passenger seat does not adjust independently of the front left outboard seat, the front left outboard seat shall control the final position of the front right outboard passenger seat. If an inboard passenger seat does not adjust independently of an outboard seat, the outboard seat shall control the final position of the inboard passenger seat.

\* \* \* \* \*

S16.3.2.1.4 *Bench seats.* Position the midsagittal plane of the dummy vertical and parallel to the vehicle's longitudinal centerline and aligned within  $\pm 10$  mm ( $\pm 0.4$  in) of the center of the steering control.

\* \* \* \* \*

S16.3.2.1.8 If needed, extend the legs slightly so that the feet are not in contact with the floor pan. Let the thighs rest on the seat cushion to the extent permitted by the foot movement. Keeping the leg and the thigh in a vertical plane, place the foot in the vertical longitudinal plane that passes through the centerline of the accelerator pedal. Rotate the left thigh outboard about



the hip until the center of the knee is the same distance from the midsagittal plane of the dummy as the right knee  $\pm 5$  mm ( $\pm 0.2$  in). Using only the control that primarily moves the seat fore and aft, attempt to return the seat to the full forward position. If either of the dummy's legs first contacts the steering control, then adjust the steering control, if adjustable, upward until contact with the steering control is avoided. If the steering control is not adjustable, separate the knees enough to avoid steering control contact. Proceed with moving the seat forward until either the leg contacts the vehicle interior or the seat reaches the full forward position. (The right foot may contact and depress the accelerator and/or change the angle of the foot with respect to the leg during seat movement.) If necessary to avoid contact with the vehicles brake or clutch pedal, rotate the test dummy's left foot about the leg. If there is still interference, rotate the left thigh outboard about the hip the minimum distance necessary to avoid pedal interference. If a dummy leg contacts the vehicle interior before the full forward position is attained, position the seat at the next detent where there is no contact. If the seat is a power seat, move the seat fore and aft to avoid contact while assuring that there is a maximum of 5 mm (0.2 in) distance between the vehicle interior and the point on the dummy that would first contact the vehicle interior. If the steering control was moved, return it to the position described in S16.2.9. If the steering control contacts the dummy's leg(s) prior to attaining this position, adjust it to the next higher detent, or if infinitely adjustable, until there is 5 mm (0.2 in) clearance between the control and the dummy's leg(s).

S16.3.2.1.9 For vehicles without adjustable seat backs, adjust the lower neck bracket to level the head as much as possible. For vehicles with adjustable seat backs, while holding the thighs in place, rotate the seat back forward until the transverse instrumentation platform of the head is level to within  $\pm 0.5$  degree, making sure that the pelvis does not interfere with the seat

bight. Inspect the abdomen to ensure that it is properly installed. If the torso contacts the steering control, adjust the steering control in the following order until there is no contact: telescoping adjustment, lowering adjustment, raising adjustment. If the vehicle has no adjustments, or contact with the steering control cannot be eliminated by adjustment, position the seat at the next detent where there is no contact with the steering control as adjusted in S16.2.9. If the seat is a power seat, position the seat to avoid contact while assuring that there is a maximum of 5 mm (0.2 in) distance between the steering control as adjusted in S16.2.9 and the point of contact on the dummy.

\* \* \* \* \*

S16.3.2.3.2 Place the palms of the dummy in contact with the outer part of the steering control rim at its horizontal centerline with the thumbs over the steering control rim.

S16.3.2.3.3 If it is not possible to position the thumbs inside the steering control rim at its horizontal centerline, then position them above and as close to the horizontal centerline of the steering control rim as possible.

S16.3.2.3.4 Lightly tape the hands to the steering control rim so that if the hand of the test dummy is pushed upward by a force of not less than 9 N (2 lb) and not more than 22 N (5 lb), the tape releases the hand from the steering control rim.

S16.3.3 Front outboard *passenger dummy positioning*.

S16.3.3.1 Front outboard *passenger torso/head/seat back angle positioning*.

\* \* \* \* \*

S16.3.3.1.2 Fully recline the seat back, if adjustable. Install the dummy into any front outboard passenger seat, such that when the legs are 120 degrees to the thighs, the calves of the legs are not touching the seat cushion.

\* \* \* \* \*

S16.3.3.1.4 *Bench seats*. Position the midsagittal plane of the dummy vertical and parallel to the vehicle's longitudinal centerline and the same distance from the vehicle's longitudinal centerline, within  $\pm 10$  mm ( $\pm 0.4$  in), as the midsagittal plane of the driver dummy, if there is a driver's seating position. Otherwise, the midsagittal plane of any front outboard passenger dummy shall be vertical, parallel to the vehicle's longitudinal centerline, and pass, within  $\pm 10$  mm ( $\pm 0.4$  in), through the seating reference point of the seat that it occupies.

\* \* \* \* \*

S16.3.3.2 Front outboard *passenger foot positioning*.

\* \* \* \* \*

S16.3.3.3 Front outboard *passenger arm/hand positioning*.

\* \* \* \* \*

S16.3.4 *Driver and front outboard passenger adjustable head restraints*.

\* \* \* \* \*

S16.3.5 *Driver and front outboard passenger manual belt adjustment (for tests conducted with a belted dummy)*

\* \* \* \* \*

S19.2.1 The vehicle shall be equipped with an automatic suppression feature for any front outboard passenger air bag which results in deactivation of the air bag during each of the static tests specified in S20.2 (using the 49 CFR part 572 Subpart R 12-month-old CRABI child dummy in any of the child restraints identified in sections B and C of appendix A or A-1 of this standard, as appropriate and the 49 CFR part 572 subpart K Newborn Infant dummy in any of the car beds identified in section A of appendix A or A-1, as appropriate), and activation of the air

bag system during each of the static tests specified in S20.3 (using the 49 CFR part 572 Subpart O 5th percentile adult female dummy).

S19.2.2 The vehicle shall be equipped with telltales for each front outboard passenger seat which emit light whenever the associated front outboard passenger air bag system is deactivated and does not emit light whenever the associated front outboard passenger air bag system is activated, except that the telltale(s) need not illuminate when the associated front outboard passenger seat is unoccupied. For telltales associated with multiple front outboard passenger seats, it shall be clearly recognizable to a driver and any front outboard passenger the seat with which seat each telltale is associated. Each telltale:

\* \* \* \* \*

(d) Shall be located within the interior of the vehicle and forward of and above the design H-point of both the driver's and any front outboard passenger's seat in their forwardmost seating positions and shall not be located on or adjacent to a surface that can be used for temporary or permanent storage of objects that could obscure the telltale from either the driver's or any-front outboard passenger's view, or located where the telltale would be obscured from the driver's view or the adjacent front outboard passenger's view if a rear-facing child restraint listed in appendix A or A-1, as appropriate, is installed in any-front outboard passenger's seat.

(e) Shall be visible and recognizable to a driver and any front outboard passenger during night and day when the occupants have adapted to the ambient light roadway conditions.

\* \* \* \* \*

(g) Means shall be provided for making telltales visible and recognizable to the driver and any front outboard passenger under all driving conditions. The means for providing the required visibility may be adjustable manually or automatically, except that the telltales may not

be adjustable under any driving conditions to a level that they become invisible or not recognizable to the driver and any front outboard passenger.

(h) The telltale must not emit light except when any passenger air bag is turned off or during a bulb check upon vehicle starting.

S19.2.3 The vehicle shall be equipped with a mechanism that indicates whether the air bag system is suppressed, regardless of whether any front outboard passenger seat is occupied. The mechanism need not be located in the occupant compartment unless it is the telltale described in S19.2.2.

S19.3 *Option 2—Low risk deployment.* Each vehicle shall meet the injury criteria specified in S19.4 of this standard when any front outboard passenger air bag is deployed in accordance with the procedures specified in S20.4.

\* \* \* \* \*

S20.1.2 Unless otherwise specified, each vehicle certified to this option shall comply in tests conducted with any front outboard passenger seating position, if adjustable fore and aft, at full rearward, middle, and full forward positions. If the child restraint or dummy contacts the vehicle interior, move the seat rearward to the next detent that provides clearance, or if the seat is a power seat, using only the control that primarily moves the seat fore and aft, move the seat rearward while assuring that there is a maximum of 5 mm (0.2 in) clearance between the dummy or child restraint and the vehicle interior.

\* \* \* \* \*

S20.2 *Static tests of automatic suppression feature which shall result in deactivation of any front outboard passenger air bag, associated with that designated seating position.* Each vehicle that is certified as complying with S19.2 shall meet the following test requirements.

\* \* \* \* \*

S20.2.1.4 For bucket seats, “Plane B” refers to a vertical plane parallel to the vehicle longitudinal centerline through the longitudinal centerline of any front outboard passenger vehicle seat cushion. For bench seats in vehicles with manually operated driving controls, “Plane B” refers to a vertical plane through any front outboard passenger vehicle seat parallel to the vehicle longitudinal centerline the same distance from the longitudinal centerline of the vehicle as the center of the steering control. For bench seats in vehicles without manually operated driving controls, “Plane B” refers to the vertical plane parallel to the vehicle longitudinal centerline, through any front outboard passenger seat’s SgRP.

\* \* \* \* \*

S20.2.2.3 For bucket seats, “Plane B” refers to a vertical plane parallel to the vehicle longitudinal centerline through the longitudinal centerline of any front outboard passenger vehicle seat cushion. For bench seats in vehicles with manually operated driving controls, “Plane B” refers to a vertical plane through any front outboard passenger seat parallel to the vehicle longitudinal centerline the same distance from the longitudinal centerline of the vehicle as the center of the steering control. For bench seats in vehicles without manually operated driving controls, “Plane B” refers to the vertical plane parallel to the vehicle longitudinal centerline, through any front outboard passenger seat’s SgRP.

\* \* \* \* \*

*S20.3 Static tests of automatic suppression feature which shall result in activation of any front outboard passenger air bag system.*

S20.3.1 Each vehicle certified to this option shall comply in tests conducted with any front outboard passenger seating position, if adjustable fore and aft, at the mid-height, in the full

rearward and middle positions determined in S20.1.9.4, and the forward position determined in S16.3.3.1.8.

S20.3.2 Place a 49 CFR part 572 subpart O 5th percentile adult female test dummy at any front outboard passenger seating position of the vehicle, in accordance with procedures specified in S16.3.3 of this standard, except as specified in S20.3.1, subject to the fore-aft seat positions in S20.3.1. Do not fasten the seat belt.

\* \* \* \* \*

S20.4.1 Position any front outboard passenger vehicle seat at the mid-height in the full forward position determined in S20.1.9.4, and adjust the seat back (if adjustable independent of the seat) to the nominal design position for a 50th percentile adult male as specified in S8.1.3. Position adjustable lumbar supports so that the lumbar support is in its lowest, retracted or deflated adjustment position. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. If adjustable, set the head restraint at the full down and most forward position. If the child restraint or dummy contacts the vehicle interior, do the following: using only the control that primarily moves the seat in the fore and aft direction, move the seat rearward to the next detent that provides clearance; or if the seat is a power seat, move the seat rearward while assuring that there is a maximum of 5 mm (0.2 in) clearance.

\* \* \* \* \*

S20.4.4 For bucket seats, “Plane B” refers to a vertical plane parallel to the vehicle longitudinal centerline through the longitudinal centerline of any front outboard passenger seat cushion. For bench seats in vehicles with manually operated driving controls, “Plane B” refers to a vertical plane through any front outboard passenger seat parallel to the vehicle longitudinal

centerline that is the same distance from the longitudinal centerline of the vehicle as the center of the steering control. For bench seats in vehicles without manually operated driving controls, “Plane B” refers to the vertical plane parallel to the vehicle longitudinal centerline, through any front outboard passenger seat’s SgRP.

\* \* \* \* \*

S20.4.9 Deploy any front outboard passenger frontal air bag system. If the air bag system contains a multistage inflator, the vehicle shall be able to comply at any stage or combination of stages or time delay between successive stages that could occur in the presence of an infant in a rear facing child restraint and a 49 CFR part 572, subpart R 12-month-old CRABI dummy positioned according to S20.4, and also with the seat at the mid-height, in the middle and full rearward positions determined in S20.1.9.4, in a rigid barrier crash test at speeds up to 64 km/h (40 mph).

\* \* \* \* \*

S21.2.1 The vehicle shall be equipped with an automatic suppression feature for any front outboard passenger air bag which results in deactivation of the air bag during each of the static tests specified in S22.2 (using the 49 CFR part 572 subpart P 3-year-old child dummy and, as applicable, any child restraint specified in section C and section D of appendix A or A-1 of this standard, as appropriate), and activation of the air bag system during each of the static tests specified in S22.3 (using the 49 CFR part 572 subpart O 5th percentile adult female dummy).

\* \* \* \* \*

S21.2.3 The vehicle shall be equipped with a mechanism that indicates whether the air bag is suppressed, regardless of whether any front outboard passenger seat is occupied. The



mechanism need not be located in the occupant compartment unless it is the telltale described in S21.2.2.

S21.3 *Option 2—Dynamic automatic suppression system that suppresses the air bag when an occupant is out of position.* (This option is available under the conditions set forth in S27.1.) The vehicle shall be equipped with a dynamic automatic suppression system for any front outboard passenger air bag system which meets the requirements specified in S27.

S21.4 *Option 3—Low risk deployment.* Each vehicle shall meet the injury criteria specified in S21.5 of this standard when any front outboard passenger air bag is deployed in accordance with both of the low risk deployment test procedures specified in S22.4.

\* \* \* \* \*

S22.1.2 Unless otherwise specified, each vehicle certified to this option shall comply in tests conducted with any front outboard passenger seating position at the mid-height, in the full rearward, middle, and the full forward positions determined in S22.1.7.4. If the dummy contacts the vehicle interior, using only the control that primarily moves the seat fore and aft, move the seat rearward to the next detent that provides clearance. If the seat is a power seat, move the seat rearward while assuring that there is a maximum of 5 mm (0.2 in) clearance.

S22.1.3 Except as otherwise specified, if the child restraint has an anchorage system as specified in S5.9 of FMVSS No. 213 and is tested in a vehicle with any front outboard passenger vehicle seat that has an anchorage system as specified in FMVSS No. 225, the vehicle shall comply with the belted test conditions with the restraint anchorage system attached to the vehicle seat anchorage system and the vehicle seat belt unattached. It shall also comply with the belted test conditions with the restraint anchorage system unattached to the vehicle seat anchorage system and the vehicle seat belt attached.

\* \* \* \* \*

S22.2 *Static tests of automatic suppression feature which shall result in deactivation of any front outboard passenger air bag, associated with that designated seating position.* Each vehicle that is certified as complying with S21.2 shall meet the following test requirements:

\* \* \* \* \*

S22.2.1.1 Install the restraint in any front outboard passenger vehicle seat in accordance, to the extent possible, with the child restraint manufacturer's instructions provided with the seat for use by children with the same height and weight as the 3-year-old child dummy.

\* \* \* \* \*

S22.2.1.3 For bucket seats, “Plane B” refers to a vertical longitudinal plane through the longitudinal centerline of the seat cushion of any front outboard passenger vehicle seat. For bench seats in vehicles with manually operated driving controls, “Plane B” refers to a vertical plane through any front outboard passenger vehicle seat parallel to the vehicle longitudinal centerline the same distance from the longitudinal centerline of the vehicle as the center of the steering control. For bench seats in vehicles without manually operated driving controls, “Plane B” refers to the vertical plane parallel to the vehicle longitudinal centerline, through any front outboard passenger seat’s SgRP.

\* \* \* \* \*

S22.2.2 *Unbelted tests with dummies.* Place the 49 CFR part 572 subpart P 3-year-old child dummy on any front outboard passenger vehicle seat in any of the following positions (without using a child restraint or booster seat or the vehicle's seat belts):

S22.2.2.1 \* \* \*

(a) Place the dummy on any front outboard passenger seat.

(b) In the case of vehicles equipped with bench seats and with manually operated driving controls, position the midsagittal plane of the dummy vertically and parallel to the vehicle's longitudinal centerline and the same distance from the vehicle's longitudinal centerline, within  $\pm 10$  mm ( $\pm 0.4$  in), as the center of the steering control. For bench seats in vehicles without manually operated driving controls, position the midsagittal plane of any front outboard dummy vertically and parallel to the vehicle's longitudinal centerline, within  $\pm 10$  mm ( $\pm 0.4$  in) of the seating reference point of the seat that it occupies. In the case of vehicles equipped with bucket seats, position the midsagittal plane of any front outboard dummy vertically such that it coincides with the longitudinal centerline of the seat cushion, within  $\pm 10$  mm ( $\pm 0.4$  in). Position the torso of the dummy against the seat back. Position the dummy's thighs against the seat cushion.

\* \* \* \* \*

#### S22.2.2.3 \* \* \*

(a) Place the dummy on any front outboard passenger seat.

(b) In the case of vehicles equipped with bench seats and with manually operated driving controls, position the midsagittal plane of the dummy vertically and parallel to the vehicle's longitudinal centerline and the same distance from the vehicle's longitudinal centerline, within  $\pm 10$  mm ( $\pm 0.4$  in), as the center of the steering control. For bench seats in vehicles without manually operated driving controls, position the midsagittal plane of any front outboard dummy vertically and parallel to the vehicle's longitudinal centerline, within  $\pm 10$  mm ( $\pm 0.4$  in) of the seating reference point of the seat that it occupies. In the case of vehicles equipped with bucket seats, position the midsagittal plane of any front outboard dummy vertically such that it coincides with the longitudinal centerline of the seat cushion, within  $\pm 10$  mm ( $\pm 0.4$  in). Position

the dummy with the spine vertical so that the horizontal distance from the dummy's back to the seat back is no less than 25 mm (1.0 in) and no more than 150 mm (6.0 in), as measured along the dummy's midsagittal plane at the mid-sternum level. To keep the dummy in position, a material with a maximum breaking strength of 311 N (70 lb) may be used to hold the dummy.

\* \* \* \* \*

#### S22.2.2.4 \* \* \*

(a) In the case of vehicles equipped with bench seats and with manually operated driving controls, position the midsagittal plane of the dummy vertically and parallel to the vehicle's longitudinal centerline and the same distance from the vehicle's longitudinal centerline, within  $\pm 10$  mm ( $\pm 0.4$  in), as the center of the steering control. For bench seats in vehicles without manually operated driving controls, position the midsagittal plane of any front outboard dummy vertically and parallel to the vehicle's longitudinal centerline, within  $\pm 10$  mm ( $\pm 0.4$  in) of the seating reference point of the seat that it occupies. In the case of vehicles equipped with bucket seats, position the midsagittal plane of any front outboard dummy vertically such that it coincides with the longitudinal centerline of the seat cushion, within  $\pm 10$  mm ( $\pm 0.4$  in).

\* \* \* \* \*

#### S22.2.2.5 \* \* \*

(a) In the case of vehicles equipped with bench seats and with manually operated driving controls, position the midsagittal plane of the dummy vertically and parallel to the vehicle's longitudinal centerline and the same distance from the vehicle's longitudinal centerline, within  $\pm 10$  mm ( $\pm 0.4$  in), as the center of the steering control rim. For bench seats in vehicles without manually operated driving controls, position the midsagittal plane of any front outboard dummy vertically and parallel to the vehicle's longitudinal centerline, within  $\pm 10$  mm ( $\pm 0.4$  in) of the

seating reference point of the seat that it occupies. In the case of vehicles equipped with bucket seats, position the midsagittal plane of any front outboard dummy vertically such that it coincides with the longitudinal centerline of the seat cushion, within  $\pm 10$  mm ( $\pm 0.4$  in). Position the dummy in a standing position on any front outboard passenger seat cushion facing the front of the vehicle while placing the heels of the dummy's feet in contact with the seat back.

\* \* \* \* \*

S22.2.2.6 \* \* \*

(a) In the case of vehicles equipped with bench seats and manually operated driving controls, position the midsagittal plane of the dummy vertically and parallel to the vehicle's longitudinal centerline and the same distance from the vehicle's longitudinal centerline, within  $\pm 10$  mm ( $\pm 0.4$  in), as the center of the steering control. For bench seats in vehicles without manually operated driving controls, position the midsagittal plane of any front outboard dummy vertically and parallel to the vehicle's longitudinal centerline, within  $\pm 10$  mm ( $\pm 0.4$  in) of the seating reference point of the seat that it occupies. In the case of vehicles equipped with bucket seats, position the midsagittal plane of any front outboard dummy vertically such that it coincides with the longitudinal centerline of the seat cushion, within  $\pm 10$  mm ( $\pm 0.4$  in).

(b) Position the dummy in a kneeling position in any front outboard passenger vehicle seat with the dummy facing the front of the vehicle with its toes at the intersection of the seat back and seat cushion. Position the dummy so that the spine is vertical. Push down on the legs so that they contact the seat as much as possible and then release. Place the arms parallel to the spine.

\* \* \* \* \*

S22.2.2.7 \* \* \*

(a) In the case of vehicles equipped with bench seats and manually operated driving controls, position the midsagittal plane of the dummy vertically and parallel to the vehicle's longitudinal centerline and the same distance from the vehicle's longitudinal centerline, within  $\pm 10$  mm ( $\pm 0.4$  in), as the center of the steering control. For bench seats in vehicles without manually operated driving controls, position the midsagittal plane of any front outboard dummy vertically and parallel to the vehicle's longitudinal centerline, within  $\pm 10$  mm ( $\pm 0.4$  in) of the seating reference point of the seat that it occupies. In the case of vehicles equipped with bucket seats, position the midsagittal plane of any front outboard dummy vertically such that it coincides with the longitudinal centerline of the seat cushion, within  $\pm 10$  mm ( $\pm 0.4$  in).

(b) Position the dummy in a kneeling position in any front outboard passenger vehicle seat with the dummy facing the rear of the vehicle. Position the dummy such that the dummy's head and torso are in contact with the seat back. Push down on the legs so that they contact the seat as much as possible and then release. Place the arms parallel to the spine.

\* \* \* \* \*

#### S22.2.2.8 \* \* \*

(a) Lay the dummy on any front outboard passenger vehicle seat such that the following criteria are met:

\* \* \* \* \*

(6) The head of the dummy is positioned towards the nearest passenger door, and

\* \* \* \* \*

*S22.3 Static tests of automatic suppression feature which shall result in activation of any front outboard passenger air bag system.*

S22.3.1 Each vehicle certified to this option shall comply in tests conducted with any front outboard passenger seating position at the mid-height, in the full rearward, and middle positions determined in S22.1.7.4, and the forward position determined in S16.3.3.1.8.

S22.3.2 Place a 49 CFR part 572 subpart O 5th percentile adult female test dummy at any front outboard passenger seating position of the vehicle, in accordance with procedures specified in S16.3.3 of this standard, except as specified in S22.3.1. Do not fasten the seat belt.

\* \* \* \* \*

S22.4.2.2 Place the dummy in any front outboard passenger seat such that:

\* \* \* \* \*

S22.4.3.1 Place any front outboard passenger seat at the mid-height, in full rearward seating position determined in S22.1.7.4. Place the seat back, if adjustable independent of the seat, at the manufacturer's nominal design seat back angle for a 50th percentile adult male as specified in S8.1.3. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. If adjustable, set the head restraint in the lowest and most forward position.

S22.4.3.2 Place the dummy in any front outboard passenger seat such that:

\* \* \* \* \*

S22.4.4 Deploy any front outboard passenger frontal air bag system. If the frontal air bag system contains a multistage inflator, the vehicle shall be able to comply with the injury criteria at any stage or combination of stages or time delay between successive stages that could occur in a rigid barrier crash test at or below 26 km/h (16 mph), under the test procedure specified in

S22.5.

\* \* \* \* \*

S22.5.1 The test described in S22.5.2 shall be conducted with an unbelted 50th percentile adult male test dummy in the driver's seating position according to S8 as it applies to that seating position and an unbelted 5th percentile adult female test dummy either in any front outboard passenger vehicle seating position according to S16 as it applies to that seating position or at any fore-aft seat position on any passenger side.

\* \* \* \* \*

S23.2.1 The vehicle shall be equipped with an automatic suppression feature for any front outboard passenger frontal air bag system which results in deactivation of the air bag during each of the static tests specified in S24.2 (using the 49 CFR part 572 subpart N 6-year-old child dummy in any of the child restraints specified in section D of appendix A or A-1 of this standard, as appropriate), and activation of the air bag system during each of the static tests specified in S24.3 (using the 49 CFR part 572 subpart O 5th percentile adult female dummy).

\* \* \* \* \*

S23.2.3 The vehicle shall be equipped with a mechanism that indicates whether the air bag is suppressed, regardless of whether any front outboard passenger seat is occupied. The mechanism need not be located in the occupant compartment unless it is the telltale described in S23.2.2.

S23.3 *Option 2—Dynamic automatic suppression system that suppresses the air bag when an occupant is out of position.* (This option is available under the conditions set forth in S27.1.) The vehicle shall be equipped with a dynamic automatic suppression system for any front outboard passenger frontal air bag system which meets the requirements specified in S27.



S23.4 *Option 3—Low risk deployment.* Each vehicle shall meet the injury criteria specified in S23.5 of this standard when any front outboard passenger air bag is statically deployed in accordance with both of the low risk deployment test procedures specified in S24.4.

\* \* \* \* \*

S24.1.2 Unless otherwise specified, each vehicle certified to this option shall comply in tests conducted with any front outboard passenger seating position at the mid-height, in the full rearward seat track position, the middle seat track position, and the full forward seat track position as determined in this section. Using only the control that primarily moves the seat in the fore and aft direction, determine the full rearward, middle, and full forward positions of the SCRP. Using any seat or seat cushion adjustments other than that which primarily moves the seat fore-aft, determine the SCRP mid-point height for each of the three fore-aft test positions, while maintaining as closely as possible, the seat cushion angle determined in S16.2.10.3.1. Set the seat back angle, if adjustable independent of the seat, at the manufacturer's nominal design seat back angle for a 50th percentile adult male as specified in S8.1.3. If the dummy contacts the vehicle interior, move the seat rearward to the next detent that provides clearance. If the seat is a power seat, move the seat rearward while assuring that there is a maximum of 5 mm (0.2 in) distance between the vehicle interior and the point on the dummy that would first contact the vehicle interior.

S24.1.3 Except as otherwise specified, if the booster seat has an anchorage system as specified in S5.9 of FMVSS No. 213 and is used under this standard in testing a vehicle with any front outboard passenger vehicle seat that has an anchorage system as specified in FMVSS No. 225, the vehicle shall comply with the belted test conditions with the restraint anchorage system attached to the FMVSS No. 225 vehicle seat anchorage system and the vehicle seat belt

unattached. It shall also comply with the belted test conditions with the restraint anchorage system unattached to the FMVSS No. 225 vehicle seat anchorage system and the vehicle seat belt attached. The vehicle shall comply with the unbelted test conditions with the restraint anchorage system unattached to the FMVSS No. 225 vehicle seat anchorage system.

\* \* \* \* \*

S24.2 *Static tests of automatic suppression feature which shall result in deactivation of any passenger air bag, associated with that designated seating position.* Each vehicle that is certified as complying with S23.2 of FMVSS No. 208 shall meet the following test requirements with the child restraint in any front outboard passenger vehicle seat under the following conditions:

\* \* \* \* \*

S24.2.3 *Sitting back in the seat and leaning on any front outboard passenger door.*

(a) Place the dummy in the seated position in any front outboard passenger vehicle seat. For bucket seats, position the midsagittal plane of the dummy vertically such that it coincides with the longitudinal centerline of the seat cushion, within  $\pm 10$  mm ( $\pm 0.4$  in). For bench seats in vehicles with manually operated driving controls, position the midsagittal plane of the dummy vertically and parallel to the vehicle's longitudinal centerline and the same distance from the longitudinal centerline of the vehicle, within  $\pm 10$  mm ( $\pm 0.4$  in), as the center of rotation of the steering control. For bench seats in vehicles without manually operated driving controls, position the midsagittal plane of any front outboard dummy vertically and parallel to the vehicle's longitudinal centerline, within  $\pm 10$  mm ( $\pm 0.4$  in) of the seating reference point of the seat that it occupies.

\* \* \* \* \*

S24.3 *Static tests of automatic suppression feature which shall result in activation of any front outboard passenger air bag system.*

S24.3.1 Each vehicle certified to this option shall comply in tests conducted with any front outboard passenger seating position at the mid-height, in the full rearward and middle positions determined in S24.1.2, and the forward position determined in S16.3.3.1.8.

S24.3.2 Place a 49 CFR part 572 subpart O 5th percentile adult female test dummy at any front outboard passenger seating position of the vehicle, in accordance with procedures specified in S16.3.3 of this standard, except as specified in S24.3.1. Do not fasten the seat belt.

\* \* \* \* \*

S24.4.2.3 Place the dummy in any front outboard passenger seat such that:

\* \* \* \* \*

S24.4.3.1 Place any front outboard passenger seat at the mid-height full rearward seating position determined in S24.1.2. Place the seat back, if adjustable independent of the seat, at the manufacturer's nominal design seat back angle for a 50th percentile adult male as specified in S8.1.3. Position any adjustable parts of the seat that provide additional support so that they are in the lowest or most open adjustment position. Position an adjustable head restraint in the lowest and most forward position.

S24.4.3.2 Place the dummy in any front outboard passenger seat such that:

\* \* \* \* \*

S24.4.4 Deploy any front outboard passenger frontal air bag system. If the frontal air bag system contains a multistage inflator, the vehicle shall be able to comply with the injury criteria at any stage or combination of stages or time delay between successive stages that could occur in

a rigid barrier crash test at or below 26 km/h (16 mph), under the test procedure specified in S22.5.

\* \* \* \* \*

S26.2.1 Adjust the steering controls so that the steering control hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If there is no setting at the geometric center, position it one setting lower than the geometric center. Set the rotation of the steering control so that the vehicle wheels are pointed straight ahead.

S26.2.2 Mark a point on the steering control cover that is longitudinally and transversely, as measured along the surface of the steering control cover, within  $\pm 6$  mm ( $\pm 0.2$  in) of the point that is defined by the intersection of the steering control cover and a line between the volumetric center of the smallest volume that can encompass the folded undeployed air bag and the volumetric center of the static fully inflated air bag. Locate the vertical plane parallel to the vehicle longitudinal centerline through the point located on the steering control cover. This is referred to as "Plane E."

\* \* \* \* \*

S26.2.4.3 The dummy's thorax instrument cavity rear face is 6 degrees forward (toward the front of the vehicle) of the steering control angle (i.e., if the steering control angle is 25 degrees from vertical, the thorax instrument cavity rear face angle is 31 degrees).

S26.2.4.4 The initial transverse distance between the longitudinal centerlines at the front of the dummy's knees is 160 to 170 mm (6.3 to 6.7 in), with the thighs and legs of the dummy in vertical planes.

\* \* \* \* \*

S26.2.5 Maintaining the spine angle, slide the dummy forward until the head/torso contacts the steering control.

\* \* \* \* \*

S26.3.2 Adjust the steering controls so that the steering control hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If there is no setting at the geometric center, position it one setting lower than the geometric center. Set the rotation of the steering control so that the vehicle wheels are pointed straight ahead.

S26.3.3 Mark a point on the steering control cover that is longitudinally and transversely, as measured along the surface of the steering control cover, within  $\pm 6$  mm ( $\pm 0.2$  in) of the point that is defined by the intersection of the steering control cover and a line between the volumetric center of the smallest volume that can encompass the folded undeployed air bag and the volumetric center of the static fully inflated air bag. Locate the vertical plane parallel to the vehicle longitudinal centerline through the point located on the steering control cover. This is referred to as "Plane E."

\* \* \* \* \*

S26.3.4.3 The dummy's thorax instrument cavity rear face is 6 degrees forward (toward the front of the vehicle) of the steering control angle (i.e., if the steering control angle is 25 degrees from vertical, the thorax instrument cavity rear face angle is 31 degrees).

\* \* \* \* \*

S26.3.5 Maintaining the spine angle, slide the dummy forward until the head/torso contacts the steering control.

S26.3.6 While maintaining the spine angle, position the dummy so that a point on the chin 40 mm (1.6 in)  $\pm 3$  mm ( $\pm 0.1$  in) below the center of the mouth (chin point) is, within  $\pm 10$

mm ( $\pm 0.4$  in), in contact with a point on the steering control rim surface closest to the dummy that is 10 mm (0.4 in) vertically below the highest point on the rim in Plane E. If the dummy's head contacts the vehicle windshield or upper interior before the prescribed position can be obtained, lower the dummy until there is no more than 5 mm (0.2 in) clearance between the vehicle's windshield or upper interior, as applicable.

S26.3.7 If the steering control can be adjusted so that the chin point can be in contact with the rim of the uppermost portion of the steering control, adjust the steering control to that position. If the steering control contacts the dummy's leg(s) prior to attaining this position, adjust it to the next highest detent, or if infinitely adjustable, until there is a maximum of 5 mm (0.2 in) clearance between the control and the dummy's leg(s). Readjust the dummy's torso such that the thorax instrument cavity rear face is 6 degrees forward of the steering control angle. Position the dummy so that the chin point is in contact, or if contact is not achieved, as close as possible to contact with the rim of the uppermost portion of the steering control.

\* \* \* \* \*

S27.5.2 Front outboard *passenger* (49 CFR part 572 subpart P 3-year-old child dummy and 49 CFR part 572 subpart N 6-year-old child dummy). Each vehicle shall meet the injury criteria specified in S21.5 and S23.5, as appropriate, when any front outboard passenger air bag is deployed in accordance with the procedures specified in S28.2.

\* \* \* \* \*

S27.6.2 Front outboard *passenger*. The DASS shall suppress any front outboard passenger air bag before head, neck, or torso of the specified test device enters the ASZ when the vehicle is tested under the procedures specified in S28.4.

\* \* \* \* \*

S28.2 Front outboard *passenger suppression zone verification test (49 CFR part 572 subpart P 3-year-old child dummy and 49 CFR part 572 subpart N 6-year-old child dummies).*

[Reserved]

\* \* \* \* \*

S28.4 Front outboard *passenger dynamic test procedure for DASS requirements.*

[Reserved]

\* \* \* \* \*

10. Amend § 571.212 by revising paragraphs S3 to read as follows:

**§571.212 Standard No. 212; Windshield mounting.**

\* \* \* \* \*

S3. *Application.* This standard applies to passenger cars, and to multipurpose passenger vehicles, trucks designed to carry at least one person, and buses having a gross vehicle weight rating of 4,536 kilograms or less. However, it does not apply to forward control vehicles, walk-in van-type vehicles, or to open-body type vehicles with fold-down or removable windshields.

\* \* \* \* \*

11. Amend § 571.214 by revising paragraphs S2, S5(c)(4), S8.3.1.3, S8.4, S10.2, S10.3.1, S10.3.2, S10.3.2.3, S10.5, the introductory text of S12.1.1, S12.1.1(a)(1), the introductory text of S12.1.2, S12.1.2(a)(1), S12.1.3(a)(1), S12.2.1(c), S12.3.1(d), S12.3.2(a)(4), S12.3.2(a)(8), S12.3.2(a)(9)(ii), S12.3.2(10), S12.3.3(a)(2), and S12.3.3(a)(4) to read as follows:

**§571.214 Standard No. 214; Side impact protection**

\* \* \* \* \*

S2 *Applicability.* This standard applies to passenger cars, and to multipurpose passenger vehicles, trucks designed to carry at least one person and buses with a gross vehicle weight rating

(GVWR) of 4,536 kilograms (kg) (10,000 pounds (lb)) or less, except for walk-in vans, or otherwise specified.

\* \* \* \* \*

S5 \* \* \*

(c) \* \* \*

(4) Vehicles in which the seat for the driver or any front outboard passenger has been removed and wheelchair restraints installed in place of the seat are excluded from meeting the vehicle-to-pole test at that position; and

\* \* \* \* \*

S8.3.1.3 *Seat position adjustment.* If the driver and any front outboard passenger seats do not adjust independently of each other, the struck side seat shall control the final position of the non-struck side seat. If the driver and any front outboard passenger seats adjust independently of each other, adjust both the struck and non-struck side seats in the manner specified in S8.3.1.

\* \* \* \* \*

S8.4 *Adjustable steering controls.* Adjustable steering controls are adjusted so that the steering control hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If there is no setting detent in the mid-position, lower the steering control to the detent just below the mid-position. If the steering column is telescoping, place the steering column in the mid-position. If there is no mid-position, move the steering control rearward one position from the mid-position.

\* \* \* \* \*

S10.2 *Vehicle test attitude.* When the vehicle is in its “as delivered,” “fully loaded” and “as tested” condition, locate the vehicle on a flat, horizontal surface to determine the vehicle



attitude. Use the same level surface or reference plane and the same standard points on the test vehicle when determining the “as delivered,” “fully loaded” and “as tested” conditions. Measure the angles relative to a horizontal plane, front-to-rear and from left-to-right for the “as delivered,” “fully loaded,” and “as tested” conditions. The front-to-rear angle (pitch) is measured along a fixed reference on the left and right front occupant’s door sills. Mark where the angles are taken on the door sills. The left to right angle (roll) is measured along a fixed reference point at the front and rear of the vehicle at the vehicle longitudinal center plane. Mark where the angles are measured. The “as delivered” condition is the vehicle as received at the test site, with 100 percent of all fluid capacities and all tires inflated to the manufacturer's specifications listed on the vehicle's tire placard. When the vehicle is in its “fully loaded” condition, measure the angle between the left front occupant’s door sill and the horizontal, at the same place the “as delivered” angle was measured. The “fully loaded condition” is the test vehicle loaded in accordance with S8.1 of this standard (49 CFR 571.214). The load placed in the cargo area is centered over the longitudinal centerline of the vehicle. The vehicle “as tested” pitch and roll angles are between the “as delivered” and “fully loaded” condition, inclusive.

\* \* \* \* \*

S10.3.1 *Driver and front outboard passenger seat set-up for 50th percentile male dummy.* The driver and front outboard passenger seats are set up as specified in S8.3.1 of this standard, 49 CFR 571.214.

S10.3.2. *Driver and front outboard passenger seat set-up for 49 CFR Part 572 Subpart V 5th percentile female dummy.*

\* \* \* \* \*

S10.3.2.3 *Seat position adjustment.* If the driver and any front outboard passenger seats do not adjust independently of each other, the struck side seat shall control the final position of the non-struck side seat. If the driver and any front outboard passenger seats adjust independently of each other, adjust both the struck and non-struck side seats in the manner specified in S10.3.2.

\* \* \* \* \*

S10.5 *Adjustable steering controls.* Adjustable steering controls are adjusted so that the steering control hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If there is no setting detent in the mid-position, lower the steering control to the detent just below the mid-position. If the steering column is telescoping, place the steering column in the mid-position. If there is no mid-position, move the steering control rearward one position from the mid-position.

\* \* \* \* \*

S12.1.1 *Positioning a Part 572 Subpart F (SID) dummy in the driver's seating position.*

(a) \* \* \*

(1) For a bench seat. The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and passes through the center of the steering control.

\* \* \* \* \*

S12.1.2 *Positioning a Part 572 Subpart F (SID) dummy in any front outboard passenger seating position.*

(a) \* \* \*

(1) For a bench seat. The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline. For vehicles with manually operated driving controls the midsagittal plane of the test dummy is the same distance from the vehicle's longitudinal centerline as would be the midsagittal plane of a test dummy positioned in the driver's seating position under S12.1.1(a)(1). For vehicles without manually operated driving controls the midsagittal plane of the test dummy shall be vertical and parallel to the vehicle's longitudinal centerline, and passes through any front outboard passenger seat's SgRP.

\* \* \* \* \*

S12.1.3 \* \* \*

(a) \* \* \*

(1) For a bench seat. The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and, if possible, the same distance from the vehicle's longitudinal centerline as the midsagittal plane of a test dummy positioned in the driver's seating position under S12.1.1(a)(1) or left front passenger seating positioned under S12.1.2(a)(1) in vehicles without manually operated driving controls. If it is not possible to position the test dummy so that its midsagittal plane is parallel to the vehicle longitudinal centerline and is at this distance from the vehicle's longitudinal centerline, the test dummy is positioned so that some portion of the test dummy just touches, at or above the seat level, the side surface of the vehicle, such as the upper quarter panel, an armrest, or any interior trim (i.e., either the broad trim panel surface or a smaller, localized trim feature).

\* \* \* \* \*

S12.2.1 \* \* \*

(c) *Arms.* Place the dummy's upper arms such that the angle between the projection of the arm centerline on the mid-sagittal plane of the dummy and the torso reference line is  $40^\circ \pm 5^\circ$ . The torso reference line is defined as the thoracic spine centerline. The shoulder-arm joint allows for discrete arm positions at 0, 40, and 90 degree settings forward of the spine.

\* \* \* \* \*

S12.3.1 \* \* \*

(d) *Driver and any front outboard passenger dummy manual belt adjustment.* Use all available belt systems. Place adjustable belt anchorages at the nominal position for a 5th percentile adult female suggested by the vehicle manufacturer.

\* \* \* \* \*

S12.3.2 \* \* \*

(a) \* \* \*

(4) *Bench seats.* Position the midsagittal plane of the dummy vertical and parallel to the vehicle's longitudinal centerline and aligned within  $\pm 10$  mm ( $\pm 0.4$  in) of the center of the steering control rim.

\* \* \* \* \*

(8) If needed, extend the legs slightly so that the feet are not in contact with the floor pan. Let the thighs rest on the seat cushion to the extent permitted by the foot movement. Keeping the leg and the thigh in a vertical plane, place the foot in the vertical longitudinal plane that passes through the centerline of the accelerator pedal. Rotate the left thigh outboard about the hip until the center of the knee is the same distance from the midsagittal plane of the dummy as the right knee  $\pm 5$  mm ( $\pm 0.2$  in). Using only the control that moves the seat fore and aft, attempt to return

the seat to the full forward position. If either of the dummy's legs first contacts the steering control, then adjust the steering control, if adjustable, upward until contact with the steering control is avoided. If the steering control is not adjustable, separate the knees enough to avoid steering control contact. Proceed with moving the seat forward until either the leg contacts the vehicle interior or the seat reaches the full forward position. (The right foot may contact and depress the accelerator and/or change the angle of the foot with respect to the leg during seat movement.) If necessary to avoid contact with the vehicle's brake or clutch pedal, rotate the test dummy's left foot about the leg. If there is still interference, rotate the left thigh outboard about the hip the minimum distance necessary to avoid pedal interference. If a dummy leg contacts the vehicle interior before the full forward position is attained, position the seat at the next detent where there is no contact. If the seat is a power seat, move the seat fore and aft to avoid contact while assuring that there is a maximum of 5 mm (0.2 in) distance between the vehicle interior and the point on the dummy that would first contact the vehicle interior. If the steering control was moved, return it to the position described in S10.5. If the steering control contacts the dummy's leg(s) prior to attaining this position, adjust it to the next higher detent, or if infinitely adjustable, until there is 5 mm (0.2 in) clearance between the control and the dummy's leg(s).

(9) \* \* \*

(ii) *Vehicles with adjustable seat backs.* While holding the thighs in place, rotate the seat back forward until the transverse instrumentation platform angle of the head is level to within  $\pm 0.5$  degrees, making sure that the pelvis does not interfere with the seat bight. (If the torso contacts the steering control, use S12.3.2(a)(10) before proceeding with the remaining portion of this paragraph.) If it is not possible to level the transverse instrumentation platform to within  $\pm 0.5$  degrees, select the seat back adjustment position that minimizes the difference between the

transverse instrumentation platform angle and level, then adjust the neck bracket to level the transverse instrumentation platform angle to within  $\pm 0.5$  degrees if possible. If it is still not possible to level the transverse instrumentation platform to within  $\pm 0.5$  degrees, select the neck bracket angle position that minimizes the difference between the transverse instrumentation platform angle and level.

(10) If the torso contacts the steering control, adjust the steering control in the following order until there is no contact: telescoping adjustment, lowering adjustment, raising adjustment. If the vehicle has no adjustments or contact with the steering control cannot be eliminated by adjustment, position the seat at the next detent where there is no contact with the steering control as adjusted in S10.5. If the seat is a power seat, position the seat to avoid contact while assuring that there is a maximum of 5 mm (0.2 in) distance between the steering control as adjusted in S10.5 and the point of contact on the dummy.

\* \* \* \* \*

S12.3.3 \* \* \*

(a) \* \* \*

(2) Fully recline the seat back, if adjustable. Place the dummy into any passenger seat, such that when the legs are positioned 120 degrees to the thighs, the calves of the legs are not touching the seat cushion.

\* \* \* \* \*

(4) Bench seats. Position the midsagittal plane of the dummy vertical and parallel to the vehicle's longitudinal centerline and the same distance from the vehicle's longitudinal centerline, within  $\pm 10$  mm ( $\pm 0.4$  in), as the midsagittal plane of the driver dummy, if there is a driver's seating position. Otherwise, the midsagittal plane of any front outboard passenger dummy shall

be vertical, parallel to the vehicle's longitudinal centerline, and pass, within  $\pm 10$  mm ( $\pm 0.4$  in), through the seating reference point of the seating that it occupies.

\* \* \* \* \*

12. Amend § 571.216a by revising the introductory text of paragraph S3.1(a), and by revising S7.1 to read as follows:

**§571.216a Standard No. 216a; Roof crush resistance; Upgraded standard**

\* \* \* \* \*

S3.1 \* \* \*

(a) This standard applies to passenger cars, and to multipurpose passenger vehicles, trucks designed to carry at least one person, and buses with a GVWR of 4,536 kilograms (10,000 pounds) or less, according to the implementation schedule specified in S8 and S9 of this section. However, it does not apply to—

\* \* \* \* \*

S7.1 Support the vehicle off its suspension and rigidly secure the sills and the chassis frame (when applicable) of the vehicle on a rigid horizontal surface(s) at a longitudinal attitude of 0 degrees  $\pm 0.5$  degrees. Measure the longitudinal vehicle attitude along both the left and right front sill. Determine the lateral vehicle attitude by measuring the vertical distance between a level surface and a standard reference point on the bottom of the left and right front side sills. The difference between the vertical distance measured on the left front side and the right front side sills is not more than  $\pm 10$  mm. Close all windows, close and lock all doors, and close and secure any moveable roof panel, moveable shade, or removable roof structure in place over the occupant compartment. Remove roof racks or other non-structural components. For a vehicle built on a chassis-cab incomplete vehicle that has some portion of the added body structure

above the height of the incomplete vehicle, remove the entire added body structure prior to testing (the vehicle's unloaded vehicle weight as specified in S5 includes the weight of the added body structure).

\* \* \* \* \*

13. Amend § 571.219 by revising paragraph S3 to read as follows:

**§571.219 Standard No. 219; Windshield zone intrusion**

\* \* \* \* \*

S3. *Application.* This standard applies to passenger cars and to multipurpose passenger vehicles, trucks designed to carry at least one person, and buses of 4,536 kilograms or less gross vehicle weight rating. However, it does not apply to forward control vehicles, walk-in van-type vehicles, or to open-body-type vehicles with fold-down or removable windshields.

\* \* \* \* \*

14. Amend § 571.225 by revising the definition of “Shuttle bus” in paragraph S3 to read as follows:

**§571.225 Standard No. 225; Child restraint anchorage systems**

\* \* \* \* \*

S3. \* \* \*

*Shuttle bus* means a bus with only one row of forward-facing seating positions rearward of the driver's seat or, for a vehicle without manually operated controls, means a bus with only one row of forward-facing seating positions rearward of all front row passenger seats.

\* \* \* \* \*



15. Amend § 571.226 as follows: Remove from paragraph S3 the definitions of “Row” and “Seat outline”; and revise paragraphs S2, the definition of “Modified roof” in S3, S6.1(d), and S6.1(f) to read as follows:

**§571.226 Standard No. 226; Ejection mitigation**

\* \* \* \* \*

S2. *Application.* This standard applies to passenger cars, and to multipurpose passenger vehicles, trucks designed to carry at least one person, and buses with a gross vehicle weight rating of 4,536 kg or less, except walk-in vans, modified roof vehicles, convertibles, and vehicles with no doors or with doors that are designed to be easily attached or removed so the vehicle can be operated without doors. Also excluded from this standard are law enforcement vehicles, correctional institution vehicles, taxis and limousines, if they have a fixed security partition separating the 1st and 2nd or 2nd and 3rd rows and if they are produced by more than one manufacturer or are altered (within the meaning of 49 CFR 567.7).

S3. \* \* \*

*Modified roof* means the replacement roof on a motor vehicle whose original roof has been removed, in part or in total, or a roof that has to be built over the occupant compartment in vehicles that did not have an original roof over the occupant compartment.

\* \* \* \* \*

S6.1 \* \* \*

(d) Pitch: Measure the sill angle of the left front door sill and mark where the angle is measured.

\* \* \* \* \*

(f) Support the vehicle off its suspension such that the left front door sill angle is within  $\pm 1$  degree of that measured at the marked area in S6.1(d) and the vertical height difference of the two points marked in S6.1(e) is within  $\pm 5$  mm of the vertical height difference determined in S6.1(e).

\* \* \* \* \*

Issued on \_\_\_\_\_ in Washington, D.C., under authority delegated in 49 CFR 1.95 and 501.5.

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Steven S. Cliff,  
Deputy Administrator

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