

NHTSA notes: The Acting Administrator, James Owens, signed the following document on March 16, 2020, and we are submitting it for publication in the Federal Register. While we have taken steps to ensure the accuracy of this version of the document, it is not the official version. Please refer to the official version in a forthcoming Federal Register publication or on GPO's Web Site. You can access the Federal Register at <http://www.archives.gov/federal-register/index.html>

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

Docket No. NHTSA-2020-0014

RIN 2127-AM06

Occupant Protection for Automated Driving Systems

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

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: This proposal is one of a series of regulatory actions that NHTSA is considering to address the near- and long-term challenges of testing and verifying compliance with the Federal motor vehicle safety standards (FMVSS) for vehicles equipped with Automated Driving Systems (ADS) that lack the traditional manual controls necessary for human drivers, but that are otherwise traditional vehicles with typical seating configurations. This notice seeks to clarify the ambiguities in applying current crashworthiness standards to ADS-equipped vehicles without traditional manual controls, while maintaining the regulatory text's application to more traditional vehicles and vehicles equipped with ADS that may have alternate modes. This proposal is limited to the crashworthiness standards and provides a unified set of proposed regulatory text applicable to vehicles with and without ADS functionality. This NPRM builds on

NHTSA's efforts to identify and address regulatory barriers to vehicles with unique designs that are equipped with ADS technologies, including the advance notice of proposed rulemaking on removing barriers in the crash avoidance (100 Series) FMVSS in May 2019, the request for comments on this topic in January 2018, and the research that NHTSA is currently conducting. NHTSA also intends to issue a separate notice regarding removal of barriers in the FMVSS that pertain to telltales, indicators, alerts, and warnings in ADS-equipped vehicles.

DATES: You should submit your comments early enough to be received not later than **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: You may submit comments to the docket number identified in the heading of this document by any of the following methods:

- Federal eRulemaking Portal: Go to <http://www.regulations.gov>. Follow the online instructions for submitting comments.
- Mail: Docket Management Facility: U.S. Department of Transportation, 1200 New Jersey Avenue S.E., West Building Ground Floor, Room W12-140, Washington, D.C. 20590-0001.
- Hand Delivery or Courier: 1200 New Jersey Avenue S.E., West Building Ground Floor, Room W12-140, between 9 a.m. and 5 p.m. ET, Monday through Friday, except Federal holidays.
- Fax: 202-493-2251.

You may call the Docket Management Facility at 202-366-9826.

Instructions: All submissions must include the agency name and docket number. Note that all comments received will be posted without change to <http://www.regulations.gov>,

including any personal information provided. Please see the Privacy Act discussion below. We will consider all comments received before the close of business on the comment closing date indicated above. To the extent possible, we will also consider comments filed after the closing date.

Privacy Act: In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to better inform its rulemaking process. DOT posts these comments, without edit, to www.regulations.gov, as described in the system of records notice, DOT/ALL-14 FDMS, accessible through www.transportation.gov/privacy. In order to facilitate comment tracking and response, we encourage commenters to provide their name, or the name of their organization; however, submission of names is completely optional. Whether or not commenters identify themselves, all timely comments will be fully considered.

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. When you send a comment containing information claimed to be confidential business information, you should include a cover letter setting forth the information specified in our confidential business information regulation (49 CFR Part 512).

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, Office of Chief Counsel,

Telephone: 202-366-2992. Facsimile: 202-366-3820. You may send mail to these officials at:
The National Highway Traffic Safety Administration, 1200 New Jersey Avenue S.E.,
Washington, D.C. 20590.

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I. Executive Summary

The National Highway Traffic Safety Administration (NHTSA) is proposing to modernize many of its current crashworthiness¹ (200 Series) Federal motor vehicle safety standards (FMVSSs) to remove unnecessary barriers to Automated Driving System-equipped vehicles (ADS-equipped vehicles) and the unconventional interior designs that are expected to accompany these vehicles, including the lack of driving controls.² This notice and the modifications to the regulatory text discussed within it also take into account some dual-mode ADS-equipped vehicles, as defined by SAE International (SAE).³

¹ Throughout this notice, NHTSA uses “crashworthiness” and “occupant protection” interchangeably because the agency considers the 200 Series FMVSSs to be focused on both.

² 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.

³ 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's safety mission requires the agency to prioritize actions that reduce traffic accidents and deaths and injuries resulting from motor vehicle crashes.⁴ Enabling innovation with lifesaving potential is also a priority for the agency, and the agency believes that ADS-equipped vehicles may have lifesaving potential. Even so, as much of this potential is currently unsubstantiated and the impacts unknown, the agency believes the most prudent path forward is to remove unnecessary barriers to innovation while ensuring that occupants continue to receive the same protections afforded by existing regulations. Specifically, this Notice of Proposed Rulemaking (NPRM) proposes to modernize portions of the FMVSSs listed below, by making definitional or textual changes. We have tentatively determined that changes are not required for the remainder of the 200 Series FMVSS to achieve the goal of this NPRM, but NHTSA seeks comment as to whether additional changes are necessary or appropriate and all other aspects of this proposal.

- FMVSS No. 201; Occupant protection in interior impact.
- FMVSS No. 203; Impact protection for the driver from the steering control system.
- FMVSS No. 204; Steering control rearward displacement.
- FMVSS No. 205, Glazing materials.
- FMVSS No. 206; Door locks and door retention components.
- FMVSS No. 207; Seating systems.
- FMVSS No. 208; Occupant crash protection.
- FMVSS No. 214; Side impact protection.
- FMVSS No. 216a; Roof crush resistance; Upgraded standard.
- FMVSS No. 225; Child restraint anchorage systems.

⁴ 49 U.S.C. § 30101.

- FMVSS No. 226; Ejection Mitigation.

The modifications proposed in this notice accomplish several high-level changes that span one or more of the standards listed above and are discussed in greater detail in Section VI.

The first high-level change is the modification, addition, or relocation of key definitions throughout 49 CFR Part 571. This proposal defines “driver air bag,” “driver dummy,” “driver’s designated seating position,” “passenger seating position,” and “steering control system.” These definitions become the supporting definitions that clarify application of the FMVSSs to ADS-equipped vehicles while maintaining their application to traditional vehicles and minimizing textual disruption. NHTSA also proposes to add a new term, “manually-operated driving controls” and move the definition of “row” from FMVSS No. 226 to Part 571.3. In addition, NHTSA proposes to move the definition of “steering control system” from FMVSS No. 203 to Part 571.3.

Second, this proposal clarifies the application of some occupant protection standards to vehicles designed to carry objects, not occupants,⁵ and clarifies the applicability of standards designed to protect drivers from injury from the steering control system. The rationale behind these changes is that a vehicle that will only carry things, not people, would not require the protections currently in place that are designed to protect occupants. Vehicles not designed to carry occupants may require different protections to be in place, which are not the subject of this notice.

Third, this proposal addresses the protections required when there is not a steering wheel or steering column in a motor vehicle. The rationale discussed in this notice is that an occupant should not need protection from a steering control system if none exists in that vehicle.

⁵ Dictionary.com defines an “occupant” as “a person, family, group, or organization that lives in, occupies, or has quarters or space in or on something.” Available at <https://www.dictionary.com/browse/occupant>

Fourth, this notice proposes to modify the regulatory text to address situations where there may be no driver's seat and multiple outboard passenger seats. This is accomplished primarily through the definitional modifications discussed in the first point, above.

Fifth, this proposal discusses the treatment of advanced air bags and advanced air bag suppression telltales⁶ given the likely eventuality that child occupants of an ADS-equipped vehicle could one day sit in what we now consider the driver's seat, even though NHTSA guidance is, and expected to continue, that children under the age of 13 should be properly restrained in rear seating rows.

Additionally, this notice discusses and proposes modifications to the regulatory text where it currently uses the driver's seat or the steering control as a spatial reference point for other locations in the vehicle. Buses, dummy placement for vehicles with bench seats, and characterizing the side of a vehicle based upon proximity and orientation to the driver's seat are all discussed in detail.

Finally, this proposal makes some minor editorial revisions and some clarifying modifications to ensure that industry and the public have a clear idea of how the occupant protection standards apply to ADS-equipped vehicles.

NHTSA developed this notice in consideration of comments the agency received in response to its January 18, 2018 Request for Comments notice (RFC), which sought to identify regulatory barriers in existing FMVSSs to the testing and compliance verification of ADS-equipped vehicles with unconventional interior designs.⁷ Comments received from the RFC indicate that there is a belief that many of the regulatory barriers to certification of ADS vehicles

⁶ Telltales are 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."

⁷ 83 FR 2607 (Jan. 18, 2018).

in crashworthiness standards do not require research because they are primarily related to a clarification of terminology, particularly for “driver” related terms. Commenters also seemed aligned with the concept that the crash protection afforded front seat occupants should be maintained for ADS vehicles. A more thorough discussion of the comments follows in later sections of this notice.

The primary goal of this NPRM is to modify the existing FMVSS in a way that both maintains the occupant protection performance currently required by the 200 Series FMVSS while also providing regulatory certainty for manufacturers developing ADS-equipped vehicles and reducing unnecessary barriers and costs. NHTSA proposes to achieve this goal by primarily making textual and definitional changes throughout the 200 Series FMVSS and in 49 CFR § 571.3. The proposed changes are based on the public feedback obtained through the RFC and information provided by stakeholders involved in ongoing NHTSA research.

In this NPRM, the agency explains (with examples) its reasoning behind the various modifications of the regulatory text being proposed and why the agency has opted not to propose other changes. NHTSA notes that, while the proposed regulatory text modifications are included in this notice, the agency will provide in the docket for this NPRM a supplemental document that contains the full regulatory text of each modified standard, illustrating the added and deleted regulatory text to ensure that the precise changes proposed are available to commenters with the full context of the unmodified regulatory text. This supplemental document is intended to aid the public by providing a side-by-side comparison of both the current and proposed regulatory text.

Although this proposal attempts to resolve most of the barriers present in the occupant protection FMVSS, it does 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 designated seating position (i.e., driver’s seat). This is a broad topic that will be discussed in a future notice focused solely on these issues, where the agency can engage the stakeholder community on those issues requiring additional policy and technical discussion.⁸ The one exception to this statement is the availability of the telltale related to the suppression of frontal passenger air bags, which will be discussed in this notice.

II. Background

The National Traffic and Motor Vehicle Safety Act (49 U.S.C. chapter 301) (“Safety Act”) prohibits regulated entities from manufacturing for sale, selling, offering for sale, introducing or delivering in interstate commerce, or importing into the United States any motor vehicle or equipment that does not comply with the FMVSSs.⁹ There are currently more than 60 FMVSSs that establish performance requirements to address a wide array of safety issues, such as occupant crash protection, fire protection, electrical protection, crash avoidance, and pedestrian safety. Almost all of these FMVSSs were promulgated long before vehicles equipped with ADS were contemplated, and thus, include a variety of assumptions surrounding who would be driving a vehicle, that the vehicle would have human occupants, and what protections drivers and occupants might need. Due to these assumptions, there are many actual and perceived barriers to the unique vehicle designs that are expected to accompany ADS-equipped vehicles that exist throughout the FMVSSs.

a. NHTSA’s Prior Research and Public Engagement Efforts

NHTSA has spent the last several years evaluating its regulations as they apply to vehicles equipped with ADS, with the primary focus on identifying potential barriers. The

⁸ Regulation Identifier Number 2127-AM07. More information available on the Unified Agenda: <https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201904&RIN=2127-AM07>.

⁹ 49 U.S.C. § 30112(a).

agency has also conducted research and engaged the public through a variety of means to further inform its evaluation of the FMVSSs. NHTSA, in collaboration with the Volpe National Transportation Systems Center, conducted a preliminary report identifying barriers to the compliance testing and self-certification of ADS-equipped vehicles without traditional manual controls. In March 2016, that report was published (the “Volpe Report”).¹⁰ The report focused on FMVSS requirements that present barriers due to references to humans throughout those standards.¹¹

Based on the Volpe Report findings, in 2017, NHTSA initiated work with the Virginia Tech Transportation Institute (VTTI) to expand upon the report by performing analysis and industry outreach to identify potential approaches for addressing certification and compliance verification barriers.¹² Through this contract with NHTSA, VTTI taking a broader look at possible modifications to the current FMVSS regulatory text and test procedures that would both maintain safety and ensure regulatory certainty for manufacturers of ADS-equipped vehicles without traditional manual controls.

The agency and the Department of Transportation (DOT) have also issued guidance focused on various aspects of ADS safety and safety of automation across the transportation sector. In September 2017, NHTSA and DOT released the guidance document *Automated Driving Systems 2.0: A Vision for Safety* to provide guidance to the public, particularly industry stakeholders and the States. *A Vision for Safety* discussed 12 priority safety design elements for

¹⁰ 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.nhtl.bts.gov/view/dot/12260>.

¹¹ The term ‘driver’ is defined in §571.3 as follows: “Driver means the occupant of the motor vehicle seated immediately behind the steering control system.”

¹² The task award document states “[t]he overall goal of this Task Order is to provide NHTSA findings and results needed to make informed decisions regarding the modification of FMVSS in relation to the certification and compliance verification of innovative new vehicle designs precipitated by automated driving systems.”

manufacturers and other innovators involved in ADS development, including vehicle cybersecurity, human machine interface, crashworthiness, consumer education and training, and post-crash ADS behavior. In October 2018, DOT released *Preparing for the Future of Transportation: Automated Vehicle 3.0*, a complementary document to the 2017 guidance that introduces guiding principles that will support Departmental programs and policies and describes the DOT's multi-modal strategy to address existing barriers to safety innovation and progress. It also communicates DOT's agenda to the public and stakeholders on important policy issues and identifies opportunities for cross-modal collaboration. DOT's automation principles are: (1) We will prioritize safety; (2) We will remain technology neutral; (3) We will modernize regulations; (4) We will encourage a consistent regulatory and operational environment; (5) We will prepare proactively for automation; and (6) We will protect and enhance the freedoms enjoyed by Americans.

NHTSA and DOT have engaged stakeholders by holding several public events on topics surrounding vehicles equipped with ADS. On December 7, 2017, DOT hosted a roundtable on voluntary data exchanges to accelerate the safe deployment of vehicles equipped with ADS. Later, on March 1, 2018, DOT held a public listening session on automated vehicle policy to seek input on the development of *Preparing for the Future of Transportation: Automated Vehicles 3.0*. On March 6, 2018, NHTSA held a public meeting on regulatory barriers in the existing FMVSSs to the vehicles equipped with ADS and that have certain unconventional interior designs. NHTSA, coordinating with VTTI, also held two multi-day public meetings on FMVSS considerations for ADS, to ensure that the agency was considering all viable options for the modernization of current FMVSS text and test procedures.

Additionally, NHTSA has issued several notices in the last two years on issues surrounding the development and deployment of ADSs. One of which was a RFC on how best the agency should approach updating its standards, which is described in more detail in sections below. The second notice was an advance notice of proposed rulemaking (ANPRM) soliciting information from the public about whether and how best to develop a national pilot program for testing ADS-equipped vehicles in a safe manner. Third, NHTSA issued an ANPRM requesting information from the public on modernizing NHTSA crash avoidance standards (100 Series FMVSS) by removing unnecessary and unintended barriers.¹³

While the agency works to identify unnecessary restrictions on nascent technologies with life-saving potential, it also recognizes that many of the protections that today's FMVSSs provide are broadly applicable to all vehicles, including ADS-equipped vehicles. The crashworthiness and occupant protection standards that NHTSA has put in place are examples of such standards. These standards and the associated technologies utilized in these standards have provided protections that have saved hundreds of thousands of lives over the last 50 plus years and the agency believes that the occupants of ADS-equipped vehicles also need such protections since even a perfectly designed ADS will not be able to avoid all crashes.¹⁴ Thus, the agency's approach for the 200 Series FMVSSs is to clarify the *unintentional* barriers to innovation, ensure current protections are enjoyed by occupants of ADS-equipped vehicles, and conduct additional research on the remaining FMVSSs and occupant protection issues the agency is not currently able to address with textual or definitional changes. For occupant protection, some of the issues that require further research include novel seating arrangements (e.g., campfire seating; carriage-

¹³ 84 FR 24433 (May 28, 2019).

¹⁴ DOT HS 812 069, "Lives Saved by Vehicle Safety Technologies and Associated Federal Motor Vehicle Safety Standards, 1960 to 2012," January 2015.

style seating), novel occupant seating postures (e.g., lay flat seating), rear seat protections, occupant seat use patterns, and transitions of traditional manual controls in dual-mode ADS-equipped vehicles (i.e., driving controls that can be stowed away while an ADS controls the vehicle).

b. Impact of this NPRM on Current and Future Petitions for Exemption

Until NHTSA comprehensively amends all the FMVSSs to not explicitly or implicitly require manual controls, NHTSA expects that manufacturers of ADS-equipped vehicles without traditional manual controls will seek exemptions from those FMVSS requirements that implicitly or explicitly require manual controls. In addition, we believe that uncertainty related to the certifications of ADS-equipped vehicles with driving controls will result in exemption requests. NHTSA has statutory authority under 49 U.S.C. § 30113 to grant manufacturers exemptions from FMVSS and Bumper Standard requirements for limited number of vehicles. NHTSA may only grant an exemption if a manufacturer demonstrates that an exemption would be in the public interest, would be consistent with the Safety Act, and would qualify under at least one of four enumerated statutory bases.¹⁵ NHTSA has promulgated regulations formalizing the procedures manufacturers must follow to seek an exemption at 49 CFR Part 555.

Manufacturers applying for an exemption under 49 U.S.C. § 30113 must make all the statutorily required showings for each FMVSS requirement with which an exempted vehicle would not comply. Given the number of FMVSS requirements that currently require or assume the presence of a driver or make reference to things such as the driver's seat, driver air bag or

¹⁵ Three of the four exemption bases require that the manufacturer make some sort of documentary showing regarding the level of safety of the exempted vehicle. The remaining basis requires that the manufacturer show that an exemption is needed to avoid substantial economic hardship.

driver dummy, NHTSA expects that manufacturers of ADS-equipped vehicles could potentially need to seek exemptions from dozens of FMVSS requirements.

The proposed changes in this notice will not eliminate the need for manufacturers of ADS-equipped vehicles to seek exemptions. However, the proposed changes could make the exemption process more efficient by reducing the number of standards from which manufacturers of ADS-equipped vehicles must seek exemption, while maintaining the existing level of occupant protection provided by the current FMVSSs. The recent exemption petition from General Motors (GM) for their Zero-Emission Autonomous Vehicle (ZEAV), 84 FR 10182, provides an illustrative example of how this proposal could impact the exemption process. In that petition, GM requested exemption from 16 FMVSSs, six of which are crashworthiness standards that would be affected by this proposal (FMVSS Nos. 203, 204, 207, 208, 214, and 226). If the changes proposed by this notice had been finalized at the time GM submitted its application, many of the requirements in these six standards either would not have applied to the ZEAV, or would have provided compliance options that would have allowed for certification.¹⁶

c. ADS Barriers Request for Comment

To begin the rulemaking process, NHTSA published a RFC on January 18, 2018.¹⁷ This RFC requested information from the public to assist the agency in identifying any potential barriers in the existing FMVSS to the testing and compliance verification of ADS-equipped vehicles and certain unconventional interior designs that could be addressed without adversely affecting safety. That document focused primarily on vehicles equipped with ADS that lack

¹⁶ We note that some of these standards include requirements for telltales or alerts, which would not be affected by the changes proposed in this notice, but are expected to be addressed in a future rulemaking. GM would still need to seek an exemption for these requirements even if the changes being proposed in this notice are adopted.

¹⁷ 83 FR 2607 (January 18, 2018).

certain controls that humans would use to control and navigate vehicles, such as brake pedals, steering wheels, and accelerator pedals. NHTSA solicited public input on how best the agency could approach the evaluation of current FMVSSs. The RFC asked a series of questions on identified and as of yet unidentified barriers in the FMVSSs, test procedure modifications, research issues, and how the agency should prioritize its research and rulemaking efforts. NHTSA's goal in publishing the RFC was to collect the information necessary to develop proposals to modernize its standards and launch research to support such proposals. Comments received in response to the RFC that are applicable to this proposal are summarized below.

d. Summary of Comments Received in Response to the ADS Barriers RFC That Apply to This Proposal

The majority of comments received supported the concept of updating the FMVSSs, though some expressed concern with the timing of doing so. The Advocates for Highway and Auto Safety ("Advocates") expressed concern with NHTSA working to remove barriers to ADS-equipped¹⁸ vehicles before evaluating the safety of vehicles equipped with ADSs and developing standards to govern the ADS's performance.¹⁹ The Center for Auto Safety agreed and commented that NHTSA and DOT should develop and put in place safeguards to protect the public from ADS-equipped vehicles before removing barriers.²⁰ The Center for Auto Safety commented that the American public have expressed discomfort and apprehension regarding

¹⁸ Advocates and other commenters used the term autonomous vehicle (AV) or highly automated vehicle (HAV) to refer to vehicles equipped with ADSs. For consistency in this notice we will use the terms ADS or ADS-DV, as appropriate.

¹⁹ Docket No. NHTSA-2018-0009-0086, available at <https://www.regulations.gov/document?D=NHTSA-2018-0009-0086>.

²⁰ Docket No. NHTSA-2018-0009-0083, available at <https://www.regulations.gov/document?D=NHTSA-2018-0009-0083>.

ADS-equipped vehicles, and that safety should be NHTSA’s primary focus, not “paving the way for the success of businesses” in the ADS market.²¹

Consumer Watchdog echoed these concerns and added that it believes NHTSA is violating its safety mission by removing barriers.²² Consumer Watchdog stated that NHTSA should remove the “right barriers” and conduct research to develop new regulations of vehicles equipped with ADSs.

The agency agrees that focusing on the removal of the “right” barriers is the first step, and the approach taken in this notice makes as minimal changes as possible, while also making sure the occupant protections currently in place remain in place to benefit occupants of ADS-equipped vehicles. NHTSA is also conducting research on how best to extend this approach to the rest of the FMVSSs not covered in this notice and is also conducting research on how the agency might test and evaluate the performance of ADSs. Additionally, NHTSA plans to issue a notice discussing potential safety principles that the agency could assess and validate the competence and safety of ADSs.²³

A wide array of stakeholders expressed support in their comments for treating FMVSS modification differently for ADS-equipped vehicles designed to carry human occupants and ADS-equipped vehicles not designed to carry human occupants. For example, the Advocates questioned the need for occupant protection requirements for vehicles that will never carry occupants, while stressing that it believes all other FMVSS requirements (e.g., crash avoidance and post-crash survivability, both of which are outside the scope of this NPRM) should be

²¹ *Id.*

²² Docket No. NHTSA-2018-0009-0085, available at <https://www.regulations.gov/document?D=NHTSA-2018-0009-0085>.

²³ RIN 2127-AM15. More information is available at: <https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201904&RIN=2127-AM15>.

retained to protect all road users.²⁴ The Alliance of Automobile Manufacturers (Alliance) stated there may be a need to evaluate provisions of the FMVSS that could have implications for occupant-less ADS-equipped vehicles.²⁵

There also seemed to be agreement among most stakeholders that maintaining the current level of protection and performance offered by the 200 Series FMVSSs is an important goal in order to ensure the safety of all occupants. Many manufacturers commented that ADS-equipped vehicles that have conventional front row seating configurations and lack manual controls should have the same requirements and protections in all front seating positions. General Motors suggested that NHTSA complete this in the agency's initial efforts to remove barriers,²⁶ and Waymo specifically recommended that NHTSA take the protections of the front right outboard passenger seat and apply those to front left outboard seating position (or what is considered a driver's seat in a vehicle with manual controls).²⁷

Some commenters commented extensively on the terms "driver" and "driver's seating position." Global Automakers stated that "these references, as well as other driver reference type categories identified in the Volpe report, should be considered on a case-by-case basis for their potential impact on the ability to certify a vehicle consistent with Federal Standards."²⁸ They also stated that it may be appropriate for some FMVSSs to require, for instance, that "driver's seat" requirements apply to any front seating position occupant. Even so, Global Automakers

²⁴ Docket No. NHTSA-2018-0009-0086, *available at* <https://www.regulations.gov/document?D=NHTSA-2018-0009-0086>.

²⁵ Docket No. NHTSA-2018-0009-0070, *available at* <https://www.regulations.gov/document?D=NHTSA-2018-0009-0070>.

²⁶ Docket No. NHTSA-2018-0009-0070, *available at* <https://www.regulations.gov/document?D=NHTSA-2018-0009-0079>.

²⁷ Docket No. NHTSA-2018-0009-0088, *available at* <https://www.regulations.gov/document?D=NHTSA-2018-0009-0088>.

²⁸ Docket No. NHTSA-2018-0009-0095, *available at* <https://www.regulations.gov/document?D=NHTSA-2018-0009-0095>.

commented that NHTSA should likely use a finite number of alternatives to address references to “driver” throughout the FMVSSs. Zoox Inc. (“Zoox”) also addressed the modification of the definition of “driver” and provided sample regulatory text in its comments.²⁹ The definition of “human driver” that Zoox suggested is the current definition of “driver” found in 49 CFR § 571.3. Zoox suggested defining “human driver” and suggested modifying the current definition of “driver” to clarify its applicability to both humans and ADS. Zoox opined that it may also:

[B]e appropriate to maintain a finite number of defined alternatives to addressing instances where the term ‘driver’s seat’ appears. For example, in some instances it may be appropriate to redefine the ‘driver’s seat’ as the ‘primary seating position as designated by the manufacturer.’ For other regulations, an alternative could be to define the driver’s seat as the ‘front left-most seat.’ One example of why this is important would be for standards concerning how a dummy may be positioned within the vehicle for the purposes of evaluating compliance with crashworthiness standards.³⁰

Some commenters provided detailed analysis of the particular barrier that they believe each standard poses, including the categorization and nature of the potential barrier. A summary of the discussion for particular standards is listed below by standard.

- ***FMVSS No. 201; Occupant protection in interior impact.***

²⁹ Docket No. NHTSA-2018-0009-0089, available at <https://www.regulations.gov/document?D=NHTSA-2018-0009-0089>.

³⁰ Docket No. NHTSA-2018-0009-0089, available at <https://www.regulations.gov/document?D=NHTSA-2018-0009-0089>.

Many commenters agreed that FMVSS No. 201 would need clarification in order to remove barriers to ADS vehicles. Both the Alliance³¹ and Ford³² separated each FMVSS and Part Regulation into categories that described the extent and effect of the barrier, as they perceived them. Alliance and Ford both stated that FMVSS No. 201 contained language that did not fully contemplate ADSs, but included barriers that could be resolved with near-term solutions, such as language modifications, interpretations, and exemptions. Motor & Equipment Manufacturers Association commented that FMVSS No. 201 either was not applicable to ADSs or posed a barrier to these vehicles.³³

After a detailed review of our current standards, and in consideration of additional input received through the VTTI research program, NHTSA tentatively agrees with the assessment that the barriers posed by FMVSS No. 201 can and should be relatively easily resolved through language and definitional modifications. Thus, NHTSA proposes to modify the regulatory text of FMVSS No. 201, described in greater detail in later sections of this notice.

- ***FMVSS No. 203; Impact protection for the driver from the steering control system.***

The Alliance, Ford, and Mercedes Benz USA LLC³⁴ stated that FMVSS No. 203 is likely not relevant or applicable to ADS-equipped vehicles without conventional manual driver controls because the absence of the controls make the regulation unnecessary. Zoox requested regulatory text revisions that would clearly indicate that this standard does not apply to ADS-equipped vehicles without controls.

³¹ Docket No. NHTSA-2018-0009-0070, available at <https://www.regulations.gov/document?D=NHTSA-2018-0009-0070>.

³² Docket No. NHTSA-2018-0009-0099, available at <https://www.regulations.gov/document?D=NHTSA-2018-0009-0099>.

³³ Docket No. NHTSA-2018-0009-0080, available at <https://www.regulations.gov/document?D=NHTSA-2018-0009-0080>.

³⁴ Docket No. NHTSA-2018-0009-0077, available at <https://www.regulations.gov/document?D=NHTSA-2018-0009-0077>.

After a detailed review of our current standards, and in consideration of additional input received through the VTTI research program, NHTSA tentatively agrees with the assessment that the FMVSS No. 203 should not apply to vehicles without steering control systems. However, factors considered go beyond the mere absence of a steering control. The agency describes in greater detail in later sections of this notice the justification for this proposed decision. Thus, NHTSA proposes to modify the regulatory text of FMVSS No. 203 to clarify applicability to ADS-equipped vehicles, described in greater detail in later sections of this notice.

- ***FMVSS No. 204; Steering control rearward displacement.***

The Alliance, Ford, and Mercedes Benz stated that FMVSS No. 204 is likely not relevant or applicable to ADS-equipped vehicles without conventional manual driver controls because the absence of the controls make the regulation unnecessary. Zoox requested regulatory text revisions that would clearly indicate that this standard does not apply to ADS-equipped vehicles.

After a detailed review of our current standards, and in consideration of additional input received through the VTTI research program, NHTSA tentatively agrees with the assessment that the FMVSS No. 204 should not apply to vehicles without steering control systems. However, factors considered go beyond the mere absence of a steering control. We describe in greater detail in later sections of this notice the justification for this proposed decision. Thus, NHTSA proposes modifications to the regulatory text of FMVSS No. 204 to clarify applicability to ADS-equipped vehicles, described in greater detail in later sections of this notice.

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

The Alliance stated that the transparency related portions of FMVSS No. 205 are likely not relevant or applicable to ADS-equipped vehicles without conventional manual driver controls because the absence of the controls make the regulation unnecessary. Similarly, Ford's

commented that “this regulation is not applicable” to ADS-equipped vehicles with “sophisticated sensor systems allowing the ADS to see objects surrounding the vehicle.”³⁵ However, the Alliance stated the crashworthiness aspects should be preserved.

After a detailed review of our current standards, and in consideration of additional input received through the VTTI research program, NHTSA tentatively concludes that FMVSS No. 205 remains relevant for crashworthiness of ADS-equipped vehicles without driving controls vehicles. However, NHTSA proposes modifications to the regulatory text of FMVSS No. 205 to clarify applicability only to vehicles that carry occupants, described in greater detail in later sections of this notice.

- ***FMVSS No. 206; Door locks and door retention components.***

Alliance and Ford both stated that FMVSS No. 206 exhibited language that did not fully contemplate ADSs, but included barriers that could be resolved with near-term solutions, such as language modifications, interpretations, and exemptions. The Alliance also specifically mentions the visual or audible warnings that must be conveyed to the driver.

After a detailed review of our current standards, and in consideration of additional input received through the VTTI research program, NHTSA tentatively agrees with the assessment that the barriers posed by FMVSS No. 206 can and should be resolved through language and definitional modifications. Thus, NHTSA proposes modifications to the regulatory text of FMVSS No. 206 described in greater detail in later sections of this notice. However, as noted above, this notice does not address issues pertaining to warning systems.

- ***FMVSS No. 207; Seating systems.***

³⁵ Docket No. NHTSA-2018-0009-0099, available at <https://www.regulations.gov/document?D=NHTSA-2018-0009-0099>.

While the Alliance stated that it believes that FMVSS No. 207 exhibited language that did not fully contemplate ADSs, but that the issues could be resolved with minor modifications, Ford indicated that they believed an existing interpretation had resolved the barrier. Zoox requested a modification of the regulatory test to ensure the driver's seat requirement was clarified as applying to a human.

While an interpretation provides the public with some clarity or additional insight into NHTSA's interpretation of its standards as applied to a particular set of facts, modification of regulatory text through notice and comment rulemaking is the appropriate means of making policy changes. After a detailed review of our current standards, and in consideration of additional input received through the VTTI research program, NHTSA tentatively agrees with the assessment that the barriers posed by FMVSS No. 207 can and should be resolved through language and definitional modifications. The agency is using an approach in line with that suggested by the commenters to address the requirement for a driver's seat. Thus, this proposal provides modifications to the regulatory text of FMVSS No. 207 and its rationale for doing so, which are described in greater detail in later sections of this notice.

- ***FMVSS No. 208; Occupant crash protection.***

Alliance and Ford both stated that FMVSS No. 208 exhibited language that did not fully contemplate ADSs, but included barriers that could be resolved with near-term solutions, such as language modifications, interpretations, and exemptions.

Additionally, other commenters discussed the air bag readiness indicator and advanced air bag suppression status requirements in FMVSS No. 208. Zoox suggested the agency modify the text of FMVSS No. 208 requiring an air bag readiness indicator in S4.5.2 of FMVSS No. 208 to indicate that if there is no driver's designated seating position, the telltale must be visible to

“at least one designated seating position.”³⁶ Zoox also suggested modified regulatory text for S19.2.2 of FMVSS No. 208, which provides telltale requirements for the advanced air bag suppression status. Zoox suggested that any reference to the “right” front passenger be changed to the “outboard” front passenger and thus allowing for the possibility of there being a telltale for any front outboard location.³⁷

After a detailed review of our current standards, and in consideration of additional input received through the VTTI research program, NHTSA tentatively agrees in part with the assessment that many of the barriers posed by FMVSS No. 208 can and should be resolved through language and definitional modifications, and thus, has included this standard in this NPRM. The agency notes that other barriers, such as those involving indicator and warnings included in FMVSS No. 208 may be addressed in a future notice that includes a holistic discussion of the appropriate applicability of telltale requirements in ADS-equipped vehicles.

- ***FMVSS No. 214; Side impact protection.***

While the Alliance stated that it believes that FMVSS No. 214 exhibited language that did not fully contemplate ADSs, but that the issues could be resolved with minor modifications, Ford indicated that they believed an existing interpretation had resolved the barrier.

While an interpretation provides the public with some clarity or additional insight into NHTSA’s interpretation of its standards as applied to a particular set of facts, modification of regulatory text through notice and comment rulemaking is the appropriate means of making policy changes. After a detailed review of our current standards, and in consideration of additional input received through the VTTI research program, NHTSA proposes modifications to

³⁶ Docket No. NHTSA-2018-0009-0099, available at <https://www.regulations.gov/document?D=NHTSA-2018-0009-0099>.

³⁷

the regulatory text of FMVSS No. 214, which are described in greater detail in later sections of this notice.

- ***FMVSS No. 216a; Roof crush resistance; Upgraded standard.***

While the Alliance stated that it believes that FMVSS No. 216a exhibited language that did not fully contemplate ADSs, but that the issues could be resolved with minor modifications, Ford indicated that they believed an existing interpretation had resolved the barrier.

While an interpretation provides the public with some clarity or additional insight into NHTSA's interpretation of its standards, modification of regulatory text through notice and comment rulemaking is the appropriate means of making policy changes. After a detailed review of our current standards, and in consideration of additional input received through the VTTI research program, NHTSA tentatively agrees with the assessment that the barriers posed by FMVSS No. 216a can and should be resolved through language and definitional modifications. Thus, NHTSA proposes modifications to the regulatory text of FMVSS No. 216a, described in greater detail in later sections of this notice.

- ***FMVSS No. 225; Child restraint anchorage systems.***

While the Alliance stated that it believes that FMVSS No. 225 exhibited language that did not fully contemplate ADSs, but that the issues could be resolved with minor modifications, Ford indicated that they believed an existing interpretation had resolved the barrier.

After a detailed review of our current standards, and in consideration of additional input received through the VTTI research program, NHTSA tentatively agrees with the assessment that the barriers posed by FMVSS No. 225 can and should be resolved through language and definitional modifications, and thus, has included this standard in this NPRM. Thus, NHTSA

proposes modifications to the regulatory text of FMVSS No. 225, described in greater detail in later sections of this notice.

- ***FMVSS No. 226; Ejection Mitigation.***

Alliance and Ford both stated that FMVSS No. 226 exhibited language that did not fully contemplate ADSs, but included barriers that could be resolved with near-term solutions, such as language modifications, interpretations, and exemptions.

After a detailed review of our current standards, and in consideration of additional input received through the VTTI research program, NHTSA tentatively agrees in part with the assessment that many of the barriers posed by FMVSS No. 226 can and should be resolved through language and definitional modifications, and thus, proposes modifications to this standard in this NPRM. 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.

III. Limitations on Scope and Guiding Principles for Initial Identification and Removal of Regulatory Barriers

The changes proposed in this NPRM seek to remove unnecessary regulatory barriers to ADS-equipped vehicles in the crashworthiness FMVSSs, while maintaining the level of occupant protection that these standards currently provide. Additionally, the proposed changes would clarify the application of the crashworthiness standards to ADS-equipped vehicles without traditional manual controls, and would make changes facilitating certification and compliance verification of these vehicles to occupant protection requirements. NHTSA believes that, if adopted, the proposed changes would provide regulatory certainty for vehicle manufacturers as

to whether and how to certify the compliance of ADS-equipped vehicles without manual controls to the 200 Series FMVSSs, and would reduce the number of requirements from which manufacturers of these vehicles may need to seek a temporary exemption.^{38 39}

In developing this NPRM, the agency limited the scope of the barriers addressed by this proposed rule to exclude certain subject matters which the agency intends to address in other notices. NHTSA also followed certain guiding principles to ensure that the proposed changes properly balanced the interests of safety, feasibility and transparency with the public. We explain these scope limitations and guiding principles in greater detail below.

a. Limitations on Scope

Although this notice is the agency's first proposal containing modified regulatory text for the accommodation of ADS-equipped vehicles without traditional manual controls, NHTSA has other notices with similar goals planned.⁴⁰ As such, this proposal is limited in scope and rests on a number of assumptions, which are described in this section. First, we assume that the initial ADS-equipped vehicles will have seating configurations similar to non-ADS vehicles, i.e., forward facing front seating positions (conventional seating). This approach of addressing conventional seating first is consistent with many of the comments provided in response to the RFC.⁴¹ This limitation is primarily relevant to crashworthiness standards with dynamic crash

³⁸ The agency has also analyzed the 300 Series standards, but no changes are being proposed in this notice.

³⁹ The agency notes that vehicles equipped with an ADS that have traditional manual controls are currently covered by the occupant protection FMVSS and can typically be certified as such. However, NHTSA acknowledges that there may be some regulatory uncertainty on the part of manufacturers related to the 200 Series FMVSSs, even for ADSs with manual driving controls, which this NPRM seeks to address through proposed modifications of the existing regulatory requirements and definitions.

⁴⁰ "Removing Regulatory Barriers for Automated Driving Systems," RIN 2127-AM00, *available at* <https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201810&RIN=2127-AM00>; "Considerations for Telltales, Indicators and Warnings for Automated Driving Systems," RIN 2127-AM07, *available at* <https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201810&RIN=2127-AM07>.

⁴¹ Although conventional forward-facing seats are assumed, the proposal does not assume that every vehicle has front outboard seats as currently defined.

test performance requirements for occupants, i.e., FMVSS Nos. 201, “Occupant protection in interior impact,” 208, “Occupant crash protection,” and 214, “Side impact protection.” The narrow scope of this notice should in no way be interpreted that the agency believes that these standards are limited in applicability to ADS-equipped vehicles with conventional seating or that future updates will not be necessary to allow for ADS-equipped vehicles with unconventional seating arrangements. Nonetheless, we have not attempted to address in this document the revisions that may be necessary to provide regulatory certainty for manufacturers that wish to self-certify ADS-equipped vehicles with unconventional seating arrangements. Modifying current standards to account for and include non-traditional seating configurations requires significant additional research that the agency recently began. This research has been informed through input from the VTTI project⁴² and the RFC, as well as and continues to be informed through public outreach on the agency’s research portfolio.⁴³

Second, this NPRM addresses the topic of ADS vehicles designed exclusively to carry property (“occupant-less vehicles”) to the extent that the agency proposes that current crashworthiness requirements intended to protect human occupants should not apply to such vehicles. Our preliminary analysis leads us to conclude that occupant-less vehicles meet the Part 571.3 definition of a truck because occupant-less vehicles have no designated seating positions (DSPs), which necessarily means they are “designed primarily for the transportation of property.”⁴⁴ However, the agency solicits feedback on other perspectives from commenters. For occupant protection requirements tied to a particular DSP location, the absence of a DSP in a

⁴² See Contract No. DTNH2214D00328L/DTNH2217F00177, “Assessment, Evaluation, and Approaches to Modification of FMVSS that may Impact Compliance of Innovative New Vehicle Designs Associated with Automated Driving Systems.”

⁴³ <https://www.federalregister.gov/documents/2019/10/10/2019-22130/public-meeting-regarding-nhtsas-research-portfolio>

⁴⁴ 49 CFR § 571.3.

vehicle means that the associated performance test cannot be conducted. More detail is provided in the sections of this NPRM where we explain the changes made to each standard.

Notwithstanding this added clarification, NHTSA wishes to acknowledge that potential entrance of occupant-less vehicles into the market could theoretically have downstream effects on vehicle safety. The frontal crash protections provided for vehicle occupants by FMVSS No. 208 promotes vehicle structures that reduce the crash forces felt not only by occupants, but also by occupants of collision partners. These associated effects could be offset in whole or in part by the design and size of the vehicles. This is a complex issue and we are not prepared to address this topic further at this time. NHTSA plans to complete research and separately seek public comment on the creation of a new FMVSS category for occupant-less vehicles.

Further, another limitation on the scope of this notice relates to the barriers present in the standards within this notice related to telltales and warnings. The agency is not prepared at this time to provide a thorough analysis with respect to the topic of telltales and warnings as they related to ADS-equipped vehicles, including where there is no requirement for any occupant to be seated in what is currently considered the driver's designated seating position (driver's seat). This is a broad topic found throughout many of the FMVSS, not just the 200 Series standards. As mentioned above, research is continuing in this area, and the agency plans to publish a separate notice related to telltales. However, the availability of the telltale related to the suppression of frontal passenger air bags is the one excepted area that will be discussed in this notice (see section VI.a.5, below).

In analyzing the current 200 Series regulatory text and developing the necessary revisions, there were certain overarching principles NHTSA attempted to keep in the forefront

and guide the process. Below the agency describes the principles that guided our consideration of how best to apply the current FMVSSs to ADS-equipped vehicles.

b. Guiding Principles to NHTSA’s Approach in Updating the Crashworthiness FMVSS to Account for ADSs

1. Maintain Current Performance Requirements

NHTSA took every effort to maintain the level of crashworthiness performance in ADS-equipped vehicles without traditional manual controls currently required for vehicles without ADS functionality with the goal of maintaining occupant protection. In addition, the agency has attempted to craft the proposal such that it will have no effect on vehicles without ADS functionality. In doing so, NHTSA examined both the safety intent and specific performance requirements of the current standards as they apply to non-ADS vehicles. Although the safety intent may in certain cases appear to be somewhat abstract, they come more clearly into focus when specific requirements and regulatory text sections, such as purpose, scope, application, and definitions, are analyzed.

In consideration of the above, one of the complicating factors that became apparent was that a literal translation of the current regulatory text may in some cases be insufficient to maintain the safety intent or the existing level of performance. Nonetheless, the agency recognizes that there can be multiple valid approaches to achieving this goal of maintaining the performance requirements and that there can be reasonable disagreements about the safety intent and equivalence of safety when dealing with requirements that were, in some cases, promulgated many years ago.

2. Reduce Unnecessary Regulatory Barriers and Uncertainty for Manufacturers

We seek to modify the existing FMVSSs in a way that will help provide regulatory certainty for manufacturers developing ADS-equipped vehicles and reduce unnecessary certification barriers and cost in certain areas. If done correctly, this should help streamline manufacturers' certification processes, reduce certification costs and minimize the need for future NHTSA interpretation or exemption requests. Likewise, this approach will help the agency become more effective and efficient in the focused treatment of the fewer and more complex application of existing standards. NHTSA proposes to accomplish this in a way that maximizes stakeholder input and transparency and will garner public trust in the regulatory process for ADS vehicles.

3. Maintain the Current Regulatory Text Structure

The changes proposed in this document are intended to adapt existing FMVSS requirements for ADS vehicles in a way that does not change the existing requirements for non-ADS vehicles (i.e., vehicles with a driver's DSP). In some cases, this makes the new regulatory text more complex than it would otherwise need to be if this bifurcation were not made. In some instances, it may be possible to use the new translation specific to ADS vehicles and apply it to all vehicles, without any substantive change for non-ADS vehicles. We ask commenters to indicate where they believe this might be the case. We will attempt to highlight some of those situations, where appropriate in this notice.

4. Remain Technology Neutral

One of the core tenets of NHTSA's recent work to modernize the FMVSSs is to do so in a manner that becomes more inclusive of the unique interior designs that are expected to accompany ADS-equipped vehicles and to instill technology neutrality in the regulatory text of

the standards, to the extent practicable. This tenet is one of the DOT's Automation Principles, as described in *Preparing for the Future of Transportation: Automated Vehicles 3.0*, and is in line with previous DOT guidance that advised legislatures throughout the United States to also adopt this principle.⁴⁵ The agency believes that this proposal exemplifies this tenet, while balancing the needs for maintaining occupant protection standards. NHTSA requests comment on whether there are additional changes that the agency could make to be more inclusive of different technologies and improve technology neutrality in the FMVSS.

IV. Maintaining Original Safety Intent and Performance Requirements

a. Application to Crashworthiness Standards

Other than dual-mode vehicles,⁴⁶ a fundamental feature of many Level 4 and Level 5 ADS-equipped vehicles will likely be the absence of manual driving controls in left front outboard designated seating position, previously occupied by the driver in non-ADS vehicles. Thus, what was previously a driver's seating position, will effectively become a passenger seating position. We have attempted to maintain the safety intent and level of safety previously available to drivers by applying the same crash test performance requirements as the right front occupant to the left front outboard occupant. This concept was supported by several RFC commenters. This is neither surprising nor novel for crash protection required by the FMVSSs in that currently both front outboard seating positions are subjected to identical crash and impact tests, with the same adult sized test dummies and injury criteria. For example, the crash test requirements only deviate with respect to dummy positioning consistent with driving controls

⁴⁵ Automated Driving Systems 2.0: A Vision for Safety, *available at* https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/13069a-ads2.0_090617_v9a_tag.pdf.

⁴⁶ In this notice, this means a vehicle that has controls for human driving as well as a mode for ADS driving, whether or not the human driving controls are position for use.

being available in the left front seat. Regulatory text changes are proposed to clarify that the right front passenger protection will be mirrored on the left side.

However, there are some unique aspects of occupant protection related to advanced air bags that differ from passenger to driver seat. The right front outboard seating position (current passenger position) is subjected to a suite of tests designed to determine if the air bag will suppress or deploy in a low risk manner for out-of-position (OOP) occupants. The driver's seating position also has performance requirements for an OOP driver. As is the case for crash protection, if the left front outboard occupant becomes a passenger due to the elimination of driving controls, NHTSA believes that position would need to have the same OOP protection offered to the right front occupant. Regulatory text changes are proposed to clarify that the right front passenger OOP protection will be mirrored on the left side.

Finally, as the agency works toward providing regulatory certainty in the self-certification process while maintaining current safety levels, it has become clear that the current vehicle occupancy patterns may change for ADS vehicles. NHTSA is aware that existing occupant crash protection has been biased towards front outboard seat occupants, because traditionally, every vehicle has a driver and the right front passenger seat is the next most frequently occupied. This may not be the case for ADS vehicles, even with conventional forward-facing seats, thus likely changing the overall injury patterns seen in the vehicle fleet. As technology develops and ADS-equipped vehicles become more prevalent, this could necessitate a reassessment of the crash protection offered to occupants other than those in the front seats. This notice does not attempt such a task.

V. New and Current Definitions in Part 571.3

One of the primary challenges to the self-certification of ADS-equipped vehicles without traditional manual controls is the pervasive use of some form of the term “driver” throughout the FMVSSs. Although the terms “driver,” “driver’s” and “driving,” appear upwards of 200 times throughout the FMVSSs, each instance it is used falls roughly into one of four categories. Specifically, a driver is: 1) an entity that performs certain actions necessary for the determination of FMVSS compliance, e.g., brake pedal application in FMVSS No. 135, “Light vehicle brake system;” 2) a vehicle occupant who must be protected in a crash, e.g., frontal crash protection in FMVSS No. 208; 3) a spatial frame of reference for vehicle geometry, e.g., vehicle attitude in FMVSS No. 216a, and 4) an entity that receives messaging from the vehicle, e.g., door opening warning in FMVSS No. 206. All of these characteristics of a vehicle that relate to the driver terms must be considered when attempting to apply the current FMVSSs to vehicles equipped with ADS and when attempting to provide a holistic solution to the challenges in updating the FMVSSs to reflect the changed circumstances that ADS-equipped vehicles without manual controls will present.

By way of background, for more than 50 years the term “driver” has been defined in Part 571.3 as “the occupant of a motor vehicle seated immediately behind the steering control system.” The plain meaning of the term “occupant” is a human, since a human occupies space in the vehicle and would be seated in a designated seating position. Moreover, if the term “occupant” is understood to mean a human occupant, this definition is compatible with the four characteristics of a driver mentioned above.

While limiting the term “driver” to a human is consistent with the plain meaning of the “driver” definition, and is compatible with the current uses of the term “driver” in the FMVSS, it

also precludes use of an unmodified version of the term to describe the driving functionality of the ADS. In recognition of the potential regulatory challenges that NHTSA’s longstanding definition of the term “driver” could create for manufacturers of these ADS-equipped vehicles, NHTSA issued an interpretation letter to Google in 2016 (the “Google Interpretation”) in which the agency explained how it would adapt the definition of driver to the extent possible to account for ADS-equipped vehicles.⁴⁷ In this interpretation, the agency explained that it would interpret the definition of driver as follows:

“NHTSA will interpret ‘driver’ in the context of Google's described motor vehicle design as referring to the SDS [Self-Driving System],⁴⁸ and not to any of the vehicle occupants. . . . If no human occupant of the vehicle can actually drive the vehicle, it is more reasonable to identify the ‘driver’ as whatever (as opposed to whoever) is doing the driving.”

However, NHTSA also explained that the agency would consider initiating rulemaking to determine whether the definition of “driver” in Part 571.3 should be updated in response to changing circumstances.

We note that the current “driver” definition is inextricably linked to the “steering control system,” which is defined in FMVSS No. 203, “Impact protection for the driver from the steering control system,” as “the basic steering mechanism and its associated trim hardware, including any portion of a steering column assembly that provides energy absorption upon impact.”

Although this definition also presents regulatory challenges for ADS-equipped vehicles, the Google Interpretation did not address how NHTSA would interpret this term.

⁴⁷ Available at <http://isearch.nhtsa.gov/files/Google%20--%20compiled%20response%20to%2012%20Nov%20%2015%20interp%20request%20--%204%20Feb%2016%20final.htm>

⁴⁸ The terminology being used in this document is Autonomous Driving System (ADS).

a. Approach to Driver Definition for This NPRM

The agency has tentatively decided that it will not revise the regulatory definition of “driver” found in 49 CFR §571.3 at this time. Instead, NHTSA proposes to maintain the current definition without change, but to augment this definition with other supporting or clarifying definitions to indicate when the FMVSS is referring to a human driver or an ADS for the purposes of this notice and for clarifying the crashworthiness FMVSSs.

NHTSA has decided not to modify the regulatory definition of driver in this notice for these primary reasons:

- The agency should consider holistically whether to and how best to update the term “driver” in 571.3, and doing so in a notice focused solely on the crashworthiness FMVSSs could cause issues with future FMVSS updates that the agency has planned. Such future updates may necessitate revisiting the 200 Series standards.
- The agency believes that updating the term “driver” is not ripe at this time and unnecessary due to the limited types of usage throughout the crashworthiness FMVSS and the potential complications making changes could cause for the crash avoidance FMVSS and standards that refer to telltales, warnings, and alerts.
- The agency should consider, if updating the term “driver”, whether and how best to include a definition of the ADS in the regulatory text, which the agency expects would be a very complex process due to the types of references to “driver” in the FMVSS and the frequent terminology changes referencing ADS-equipped vehicles that the agency has witnessed over the past several years.

- This approach is consistent with input the agency received through the VTTI research program, which included feedback from expert researchers, industry stakeholders, and advocates.

While NHTSA has decided not to modify the definition of “driver” with this notice, it is considering doing so for future notices. Thus, the agency requests comment on various approaches that could be utilized in a holistic manner (i.e., are there definitions the agency should consider that would properly cover the four types of uses of “driver” and derivatives of “driver” throughout the FMVSS). As noted above, NHTSA acknowledges that it may in the future be necessary for the agency to create new defined terms within the FMVSS such as “ADS” to clarify when the regulatory text is referring to a non-human entity controlling the vehicle. However, as this is not needed in the context of the changes that NHTSA is proposing in this notice to make to the crashworthiness standards (which focus almost exclusively on the protection of humans), no such definition is proposed in this notice.

b. New, Modified and Relocated Definitions

While this NPRM does not propose changing the term “driver” itself or adding definitions of “ADS,” it does propose creating supplemental definitions of terms already used and amending driver-related definitions that exist in the current FMVSS. By defining or amending these terms, NHTSA hopes to clarify the application of crashworthiness FMVSS to ADS-equipped vehicles with minimal disruption to the existing regulatory text. The specific terms that exist in the FMVSS that the agency is proposing to define are “driver dummy,” “driver air bag,” “driver’s designated seating position,” and “passenger seating position.” Our proposed definitions of these terms are shown below.

Driver air bag means the air bag installed for the protection of the occupant of the driver's designated seating position.⁴⁹

Driver dummy means the test dummy positioned in the driver's designated seating position.⁵⁰

Driver's designated seating position means a designated seating position providing immediate access to manually-operated driving controls.⁵¹ 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."

Passenger seating position means any designated seating position other than the driver's designated seating position. 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.

NHTSA is also proposing to add the new term "manually-operated driving controls" which is not a term currently used in the FMVSS. NHTSA's proposed definition is shown below.

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 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.

⁴⁹ Incorporates the definition of "driver's designated seating position."

⁵⁰ Incorporates the definition of "driver's designated seating position."

⁵¹ Incorporates the definition of "manually-operated driving controls."

In subpart (2) the definition states that the controls must be positioned for use by the occupant, whether or not the occupant is actively manipulating them. This means that, if manually operated driving controls are in place in front of a given seating position, the occupant of that seating position is considered a “driver” for purposes of the FMVSS—regardless of whether an ADS is controlling the vehicle. In such a case, the seat would be considered a “driver’s designated seating position” under the FMVSS.⁵² Conversely, if controls are not present in front of a seating position, either because they are stowed or because the vehicle is not equipped with manually-operated driving controls, the occupant in that seating position is not a “driver.” In this case, the seating position would be considered a “passenger seating position” under the FMVSS. If dual-mode vehicles have the capability of stowing driving controls, NHTSA expects that manufacturers will need to certify compliance in both states (e.g., manually-operated driving controls available and stowed).

Another proposed modified definition that would reference the new definition of “manually-operated driving controls” is the term “steering control system,” which is provided below.

Steering control system 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.”

The modification proposed here would modify the existing definition of “steering control system,” in FMVSS No. 203 to incorporate the proposed definition for “manually-operated

⁵² We note that this means, in ADS-DV that has non-stowable manually-operated controls at a given seating position, NHTSA would consider that seating position to be a “driver’s designated seating position” regardless of whether or not the ADS is driving the vehicle for the purposes of the crashworthiness standards.

driving controls.” We also propose relocating this definition to Part 571.3, and applying it to the terms “steering wheel” and “steering control,” which are not currently defined. However, we have tentatively determined these variations have the same meaning when used in the FMVSSs. Since these terms appear throughout the FMVSSs, specifying the definition for “steering control system” would clarify their meaning with respect to ADS and non-ADS vehicles with minimal disruption to the existing regulatory text.

NHTSA also proposes 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.” From our analysis of the regulatory text of the crashworthiness FMVSSs, we have tentatively determined these three terms have the same meaning. Therefore, to clarify this point, we have added language specifying that “*outboard seating position*” and “*outboard seat*” have the same meaning as “outboard designated seating position.”

Finally, we are proposing to relocate the definition of “row,” which is currently located in FMVSS No. 226, to Part 571.3. We have proposed the use of this term in multiple standards (FMVSS Nos. 201, 206 and 208). Moving it to Part 571.3 will eliminate the need to insert a reference to its current location.

We are proposing that each of these new and modified definitions be added or moved to Part 571.3, and that they be applicable to every FMVSS in the interest of efficiency and consistency. Another option that the agency recognizes as a potential solution is to place the relevant definitions within each standard that utilized the defined term in order to avoid creating additional confusion or conflict in other FMVSSs, such as the crash avoidance standards (100 Series FMVSS). While these changes may not resolve the barriers in the crash avoidance FMVSSs, the agency intends to address those issues and others in future notices. This would be

necessary if one or another of the definitions would create a conflict within some standard and the conflict could not be resolved in another way.

We seek comment on our proposals for new, modified, and relocated definitions, as well as the general approach and options described in this section. We also seek comment on whether the changes proposed in this section would create any definitional conflicts within the FMVSSs, such as causing additional, unintended confusion for manufacturers certifying to other FMVSSs not covered by this notice.

VI. Changes to the Regulatory Text of the Affected Standards

This section describes and explains the changes being proposed to the regulatory text of the affected standards. We have tentatively determined that no change is needed for FMVSS Nos. 202a, 209, 210, 212, 213, 217, 218, 219, 220, 221 and 222.⁵³ Rather than explaining each proposed change individually, which would be both cumbersome and repetitive, the agency has identified several categories of changes based on the substance of the change and its underlying justification. Because generic descriptions of the categories of changes may be difficult to grasp in the abstract, NHTSA explains each category of change using illustrative examples from the affected standards in the sections that follow.

Each subsection below covers the changes made to an individual crashworthiness standard affected by this proposal. In each subsection, we identify which category(ies) of changes we are proposing to the regulatory text of that standard, along with citations to the specific provisions that would be amended. The first time a category of change to the regulatory text is discussed, we provide a full and detailed description of what is being changed, and our reason for the change. When a category of change to the regulatory text appears again in

⁵³ In addition, we have determined that no change is need for FMVSS Nos. 301, 302, 303, and 304. Any changes to FMVSS No. 305 will be discussed in future notices.

subsequent standards, we cross reference back to the subsection in which the change category is described and explained. In addition, in certain instances where we have deemed appropriate, explanations are provided for why we do not believe a change to the regulatory text is needed.

The subsections are organized sequentially by standard number, except that the first standard addressed is FMVSS No. 208. We decided to analyze FMVSS No. 208 first for the sake of clarity, since it has the greatest number and greatest variety of proposed changes to its text. The explanations below include tables comparing the original regulatory text with the proposed regulatory text to provide illustrative examples of each change category. In addition, to illustrate the precise changes that are being proposed within the context of the full regulatory text, we are providing in the docket for this rulemaking an appendix document that contains the full proposed regulatory text of each modified standard, with added text in blue underlined font and the deleted text in red strikethrough font. The proposed regulatory text modifications are provided in the end of this NPRM.

a. FMVSS No. 208; “Occupant crash protection”

The purpose of FMVSS No. 208, Occupant crash protection, is to reduce the number of deaths and injuries to vehicle occupants in the event of a crash. To this end, FMVSS No. 208 specifies types and locations of seat belts and frontal air bags as well as crashworthiness requirements in terms of forces and accelerations on anthropomorphic dummies in test crashes. In specifying these crashworthiness requirements, FMVSS No. 208 assumes the presence of, and refers to, the driver’s seating position and steering control. These assumptions make certification and compliance verification of ADS-equipped vehicles without these components difficult or impossible.

Below we identify the specific provisions of FMVSS No. 208 that we believe are potential barriers to the certification and compliance verification of an ADS--equipped vehicle, and we explain how we propose to revise those provisions to maintain the same level of performance currently required by the standard.

1. Application to Vehicles without Designated Seating Positions

Currently, FMVSS No. 208 applies to all passenger cars, multipurpose passenger vehicles (MPVs), trucks, and buses. While most of these vehicle types carry “persons,” by definition, trucks do not. This means that because FMVSS No. 208 applies to all trucks, the standard would also apply to occupant-less trucks that have no designated seating positions (DSPs).⁵⁴ This creates a barrier to certification because the requirements of FMVSS No. 208 are linked to the existence of specified DSPs. For example, the advanced air bag crash test requirements are applied to the front outboard DSPs by virtue of S5.1.1 through S14.

Because occupant-less trucks would presumably have no DSPs, it is unclear how the test could be performed. NHTSA tentatively concludes 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. Accordingly, NHTSA is proposing to amend the application section of FMVSS No. 208 to apply only to trucks with DSPs.⁵⁵ Accordingly, we are proposing

⁵⁴ NHTSA acknowledges that the future implementation of occupant-less vehicles may be on vehicle platforms which do not appear to be what many would consider a “truck.” Nonetheless, the current definitions of “truck” in 571.3 is the only vehicle type definition, (i.e., bus, multipurpose passenger vehicle, passenger car, and truck), that specifically covers vehicles designed to carry property and not “persons.” In response to requests from stakeholders, the agency is evaluating whether a new vehicle class may be necessary for certain delivery vehicles, including occupant-less ones.

⁵⁵ We note that there are some standards that are applicable to trucks that we have chosen not to specify that they only apply if a DSP is present because the standard is clearly only applicable to DSP location. One such example is FMVSS No. 202a. This clarification with respect to trucks is consistent with past agency practice in that, except for trucks, the application sections of the crashworthiness standards specify vehicle types that carry people. In addition, we believe that all current crashworthiness standards are specifically intended for the protection of occupants within the vehicle to which they apply.

to modify S3. *Application* to specify that the standard applies to trucks only if they have at least one DSP, as shown below in Table VI-1. No other changes are proposed for the Application Section.

Table VI-1

Before Change
S3. <i>Application.</i> (a) This standard applies to passenger cars, multipurpose passenger vehicles, trucks, and buses.
After Change
S3. <i>Application.</i> (a) This standard applies to passenger cars, multipurpose passenger vehicles, trucks with at least one designated seating position, and buses.

We request comment on our proposed addition to the Application Section, changes not made and additional changes commenters believe to be necessary.

2. Textual Modifications Addressing That There May Be No Driver’s Seat and Multiple Outboard Passenger Seats

The agency proposes to treat any seat that does not have immediate access to traditional manual controls (what we have defined as “manually-operated driving controls”) as a passenger seat. This includes a seat located in the left front outboard position, where the driver’s seat is typically located. NHTSA has tentatively concluded that the most practicable way to maintain occupant protection in ADS-equipped vehicles with no manual controls (and thus, with no driver’s seat) is to require that all front outboard passenger seats meet the crash test performance requirements presently performed on the right front outboard passenger seat. For a passenger

seat located in the left front outboard position, this would be done by mirroring the test procedures and requirements from the right side.

NHTSA believes this approach will maintain the level of occupant protection currently offered by compliance with FMVSS No. 208 because it merely extends existing requirements for the front right passenger position to all outboard front passenger positions, regardless of vehicle side, and it would not affect the occupant protection requirements for conventional vehicles. Moreover, this approach would not significantly impact the testing burden on manufacturers, since it simply requires that test labs follow procedures for the passenger dummy on both sides of the vehicle rather than the procedures for the driver and outboard passenger test dummy that would be used for a crash test of a conventional vehicle.⁵⁶

To accomplish this change, we propose genericizing all references to “passenger” dummies by replacing the term with “front outboard passenger” dummy. An example of the type of change made is provided below in Table VI-2, from the general positioning of the arms of a crash test dummy. Previously, the passenger dummy was referred to in the singular. Now we are making clear that there may be more than one passenger dummy by the use of the phrase “any front outboard passenger.” The term “any” here is consistent with definition provide in Part 571.4.⁵⁷ Similar changes are made through the standard and are too many to mention.

Table VI-2

Before Change
S10.2.2 The passenger's upper arms shall be in contact with the seat back and the sides of the torso.

⁵⁶ An exception to this would be if an outboard seat is eliminated, as is discussed in section VI.a.3.

⁵⁷ Part 571.4 provides that “[t]he word *any*, used in connection with ... a set of items in a requirement ... means generally the totality of items ... any one of which may be selected by the Administration for testing.”

After Change

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.

3. The Treatment of Outboard Versus Center Seating Positions in the Front Row of Light Vehicles

For most light vehicles,⁵⁸ each outboard designated seating position, including the driver's seat, is required to have "Type 2" (lap and shoulder) seat belt assembly that conforms to FMVSS No. 209.⁵⁹ 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 to have frontal air bag protection at the driver's and right front DSPs.^{60,61} Any center seating positions in these light vehicles are allowed to be equipped with lap belts. ADS-equipped vehicles without driving controls may not have a front left outboard DSP or for that matter, any outboard DSP. Seating position could be moved toward the center of the vehicle. In this case, conceivably an ADS-equipped vehicle could be constructed with no air bag or lap and shoulder seat belts, although the agency believes this would be highly unlikely. In the regulatory text changes proposed in this notice, the agency has not attempted to address the reduction in frontal crash protection that would occur if previous outboard DSPs in non-ADS vehicles become inboard/center DSPs in ADS-equipped vehicles. We request comment on whether the final rule should require air bag (including OOP protection) and lap/shoulder seat belt protection to these inboard seating

⁵⁸ "Light vehicles" are vehicles with a gross vehicle weight rating (GVWR) less than 4,536 kilograms (kg) (10,000 pounds (lb)).

⁵⁹ Trucks and multipurpose passenger vehicles with a GVWR of more than 3,855 kg, but not greater than 4,536 kg, have compliance options involving crash tests, which relieve the requirement of providing Type 2 seat belts.

⁶⁰ Intermodal Surface Transportation Efficiency Act of 1991 on December 18, 1991 (Pub. L. 102-240).

⁶¹ 58 FR 46551 (September 2, 1993).

positions, if outboard positions are removed. We also seek comment on implications of such designs upon the statutory obligation for frontal air bags.

4. Treatment of Advanced Air Bags

Under the proposed rule, any front outboard seating position that does not have manual controls would be considered a passenger seat, and would need to meet passenger seat occupant protection requirements. Accordingly, in an ADS-DV without manual controls, the front left outboard seating position (i.e., the seating position that would typically be the driver's seat in a traditional vehicle), would need to meet passenger seat requirements. The regulatory requirements pertaining to frontal air bags for both the occupants of the driver's seat and passenger seat are commonly known as "advanced air bag" requirements. However, unlike a driver's seat, which must only meet adult occupant protection requirements, a passenger seat must meet both adult and child occupant protection requirements.

NHTSA seeks comment on whether it is necessary to apply passenger (child and adult) advanced air bag requirements to both front outboard seats in an ADS-equipped vehicle without manual controls because both of those seats would be available for child occupants.⁶² (In a traditional vehicle, the occupant in the driver's seat is all but guaranteed to be an adult, making child advanced air bag protections unnecessary). In practice, this would mean that the advanced air bag protections that traditional vehicles currently provide on the right front outboard seat would be mirrored in the left. NHTSA seeks comment on alternative techniques to ensure children receive existing protection.

To apply passenger advanced air bag requirements to all front outboard seating positions, we have proposed to add the modifier "any front outboard" to the word "passenger" in the

⁶² Regardless of the presence of advanced air bags, NHTSA recommends that children not be placed in the front seat, if possible.

relevant sections of S19 through S24, S27 and S28. An example of this is provided below in Table VI-3.

Table VI-3

Before Change
S19.2.1 The vehicle shall be equipped with an automatic suppression feature for the passenger air bag which results in deactivation of the air bag during each of the static tests specified in S20.2
After Change
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

5. Advanced Air Bag Suppression Telltale for Passenger Air Bags

NHTSA seeks comment on amending the activation requirement for the advanced air bag suppression telltale required under FMVSS No. 208, S19.2.2 to eliminate references specifying a “passenger air bag system.” NHTSA has tentatively concluded that this change is necessary to permit the certification of ADS-equipped vehicles, which may have more than one passenger seat with an advanced air bag system. We wish to emphasize that, as noted earlier, this NPRM is not intended to address issues relating to telltales and warnings, and the change proposed here is not intended to indicate a policy position regarding the necessity or effectiveness of this or other telltales.

NHTSA seeks comment on requiring each front outboard passenger seat with a suppression-based advanced air bag system to have a unique telltale, so that occupants know

which air bag is suppressed. This would maintain the current level of safety provided by the standard because the telltale’s substantive performance criteria would remain the same, providing occupants with the same level of information about the status of each relevant air bag as the current standard. Table VI-4 shows the regulatory text changes related to the number of telltales. We note that S21.2.2 and S23.2.2 refer back to S19.2.2.

Table VI-4

Before Change
S19.2.2 The vehicle shall be equipped with at least one telltale which emits light whenever the passenger air bag system is deactivated and does not emit light whenever the passenger air bag system is activated, except that the telltale(s) need not illuminate when the passenger seat is unoccupied.
After Change
S19.2.2 The vehicle shall be equipped with telltales for each front outboard passenger seat which emits 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.

6. Treatment of ADS Vehicles with Driving Controls When Children are in the Driver’s Seat.

It is possible that some ADS-equipped vehicles will be equipped with manual driving controls and that the vehicle is designed for both driverless operation and operation by a conventional driver for complete trips (i.e., dual-mode). In such vehicles, the seat where the

manual controls are located would still be a driver's seat even when the ADS is engaged, and thus would be required to meet driver's seat occupant protection requirements. However, because such a vehicle could be capable of operation without a driver, it is possible that a child not old enough to drive could be placed in the driver's designated seating position. NHTSA believes this would be an inherently unsafe condition, particularly for smaller children, because the driver's seating position is not required to have crash protection for children or protection from the dangers of OOP air bag deployment.

To minimize the risk that a child could ride in a front DSP without the protections afforded by advanced air bags, NHTSA seeks comment on whether ADS-equipped vehicles that have manual controls should not be capable of motion if a child is detected in the driver's seat. This NPRM tentatively proposes that the following conditions would disallow vehicle motion: 1) the occupant of the seat is classified as a child, for which air bag suppression would be an option in a passenger seat, i.e., up to a 6-year-old as determined by the same test procedures used by air bag suppression (S20, S22 and S24); and 2) the vehicle is an operational state that does not require a driver, i.e., any situation where the ADS is under full control. An example of the new regulatory text to address this situation is provided in Table VI-5. Similar text has been added at S21.6 and S23.6.

In developing this proposal, NHTSA considered myriad situations that are not currently probable in traditional motor vehicles. The agency requests comment on whether disallowing vehicle motion in ADS-equipped dual-mode vehicles when a child is seated behind driving controls is the most appropriate option for handling what could be a potentially life-threatening situation to a child. NHTSA's core concern is the safety of all occupants, including children, and considers the potential risk to a child behind driving controls in a dual-mode ADS as both

foreseeable and unacceptable. NHTSA also requests comment and technical information from industry on how they plan to protect children who may be seated behind driving controls in dual-mode vehicles. Additionally, the agency requests comment on if and how best NHTSA could conduct research to further explore how best to protect children who may be seated behind driving controls in dual-mode ADS-equipped vehicles.

Table VI-5

Before Change
No current regulatory text.
After Change
<p><i>S19.5 Motion suppression for vehicles with manually-operated driving controls that do not require a driver.</i> Each vehicle that is certified as complying with S14 shall not be capable of motion when a 12-month-old CRABI dummy is placed at the driver's seating position and the vehicle is in an operational state that does not require a driver.</p> <p>S19.5.1 Motion suppression shall be assessed under the test procedures specified in S20.1 through S20.2, except that the 12-month-old CRABI dummy is placed in the driver's seating position and the result shall be an inability of engage vehicle motion.</p>

7. Driver's Seat Used as a Spatial Reference

i. Buses

FMVSS No. 208, S4.4, addresses the belt and crash test requirements and options for buses, including school buses, of every weight class. In S4.4.1 through S4.4.5, the driver's DSP is used as a frame of reference, primarily for the installation of seat belts. Depending on the bus type and GVWR, the driver's DSP is required to either be outfitted with a Type 1 or 2 seat belt

or meet a crash test option. As is the case with vehicles other than buses, the regulatory text must address when the driver’s DSP is not present in an ADS-equipped vehicle. However, buses are unique in that the protection required for other vehicle seats depends on the location of the seat when compared to the location of the driver’s DSP. For example, S4.4.3.2.1 specifies the belt requirements for “any outboard designated seating position not rearward of the driver’s.”

For ADS-equipped vehicles without driver’s seats, a direct translation could be achieved by simply substituting “left front outboard seat.” However, ADS-equipped vehicles may not have a left front outboard seat, so the agency sees no inherent reason to reference the left outboard seat over the right front outboard seat in these vehicles. Therefore, for vehicles without a driver’s seat, we propose to make references to both front row outboard seats, using the definition of “row” originally provided in FMVSS No. 226 and now being moved to Part 571.3. An example of this translation is provided below in Table VI-6, for school buses with a GVWR of 4,536 kg (10,000 lb) or less below. Similar changes can be found in S4.4.1 and S4.4.5.1.1.

An alternative to referencing the outboard seats in the front “row” would be to have more simply specified front outboard seats. One challenge to this would be that bus seating configuration can be somewhat unique, with offset seats in the same row. Thus, referencing the front “row” may in some cases provide additional clarity. In similar situations for other vehicle types, it may not be necessary to refer to “row,” but just front outboard seats.

We also seek comment on whether modifying the text below to reference only the front row, even in cases where a school bus has a driver’s DSP, is a viable option without any significant negative effect.

Table VI-6

Before Change

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.
After Change
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.

For all buses with a GVWR of more than 4,536 kg (10,000 lb), but not greater than 11,793 kg (26,000 lb) and school buses with a GVWR of greater than 11,793 kg (26,000 lb), only the driver's seating position is required to be outfitted with a Type 1 or 2 seat belt or meet a crash test option. Seat belts provide protection in most types of crashes by keeping occupants within the vehicle and close to their original seating position, provide "ride-down" by gradually decelerating the occupant as the vehicle deforms and absorbs energy, and, if possible, prevent occupants from contacting harmful interior surfaces or one another.⁶³ NHTSA is primarily concerned with ensuring safety, and requests comment on how best the agency can ensure that occupants receive the same protections they receive today. For ADS-equipped buses mentioned above, without a driver's seat, NHTSA believes there are several distinct approaches to apply the protection requirements currently in this standard. First, NHTSA seeks comment on requiring all front seats have seat belts. Second, NHTSA seeks comment on requiring the right front outboard

⁶³ DOT HS 812 069, January 2015.

seating position to have a seat belt. Third, NHTSA requests comment on requiring at least one front passenger seat meet the required protections. Finally, NHTSA seeks comment on compartmentalization as a barrier to ejection, such as is required for passengers of school buses with a GVWR of more than 4,536 kg (10,000 lb). NHTSA tentatively proposes that all front passenger seats meet the protection requirements that must currently be met by the driver's seat in order to maintain the safety need inherent within the current requirement for a seat belt. While NHTSA proposes this particular option, the agency notes that any or none of the abovementioned options could be selected depending on stakeholder feedback.

Larger buses may only have a single front DSP, i.e., the driver's seat, with the right front area being taken by access to the passenger rows. Thus, in these configurations there is no other front passenger to protect. As we stated above, an ADS-equipped bus may not have a left front outboard seat at all, but may have multiple front passenger seats. We cannot meaningfully predict where any front passenger seat might be in an ADS-equipped bus. Therefore, the proposal above aims to offer seat belt protection to all front passengers, in the interest of assuring that any front passenger in ADS vehicles, regardless of lateral seat location, would have an available seat belt. Our rationale is there is likely a similar safety risk in all front row seats and that the prediction of where an individual might sit in the front row is likely to change in ADS-equipped vehicles, rather than permitting manufacturers to arbitrarily choose which front row occupant receives the protection of a seat belt.

Even so, the agency initially considered requiring a seat belt for a single front passenger in these buses, because doing so maintains the level of performance and protection currently required for non-ADS vehicles. Our reasoning was that any single vehicle occupant could choose to sit in the single seat location equipped with a belt, even if only one belted position

were provided. We assume that if they chose to sit at a front seat location without a seat belt, they would either not be interested in wearing a seat belt, were not aware that a seat belt equipped DSP were present, or all other seats were taken. We think that lack of awareness of a seat belt is unlikely, due to the visibility of seat belts, although we have not studied this circumstance. We seek comment on whether it would be more appropriate to require seat belts at only one DSP, rather than at all front passenger seating position. Vehicles with a driver's seat would continue being treated as they always have. These proposed changes can be found in S4.4.4.1.2, S4.4.4.2 and S4.4.5.3. We note that S4.4.4.1.1, which refers to a regulatory option for complete passive protection that to the agency's knowledge has never been used, is not being modified in this proposal. We seek comment on the need to modify this seldom used regulatory option.

ii. Dummy Placement in Bench Seats

In light vehicles, the driver's seat and the dummy placed there also provides a spatial reference point for the lateral positioning of the dummy in the outboard passenger seat on the other side of the vehicle. Currently, the passenger dummy is placed at the same lateral distance as the driver dummy from the vehicle longitudinal centerline. The driver is positioned by centering on the center of rotation of the steering control. When the driver reference is absent, as will be the case in ADS vehicles without driving controls, an alternative must be found for positioning of the passenger dummies. There are multiple approaches to this issue. One method would be to use the centerline of the head restraint on the left side or both sides of the vehicle. If just done on the left side, the right outboard passenger positioning would again use the left seat as a frame of reference. We have tentatively decided against this option because head restraints can sometimes be asymmetric. Instead, we are proposing to position both outboard passenger

dummies by using the seating reference point of the DSP where they are located. We are no longer using the left outboard dummy position as a reference for the right outboard dummy, although, we would expect symmetry in most cases. This proposed approach ensures that there are available and easy-to-understand spatial references, regardless of front seat configuration in an ADS-DV. An example of this change is provided in Table VI-7, below. Other examples can be found in S10.4.1.1, S20.2.1.4, S20.2.2.3, S20.4.4, S22.2.1.3, S22.2.2.1, S22.2.2.3, S22.2.2.4, S22.2.2.5, S22.2.2.6, S22.2.2.7 and S24.2.3.

We ask for comment on whether the text associated with a driver’s DSP could be deleted without any significant effect.

Table VI-7

Before Change
S16.3.3.1.4 <i>Bench seats</i> . 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 ± 10 mm (± 0.4 in), as the midsagittal plane of the driver dummy.
After Change
S16.3.3.1.4 <i>Bench seats</i> . 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 ± 10 mm (± 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 ± 10 mm (± 0.4 in), through the seating reference point of the seat that it occupies.

iii. Left versus Right Vehicle Side

In the performance of certain tests, specific steps in the vehicle preparation reference the driver’s side of the vehicle. In S13.3, the sill of the vehicle on the driver’s side is leveled. In this case, NHTSA believes that with a simple direct translation of “left side” there is no loss in meaning and the test can be performed just as effectively and achieve the same safety goal. The agency requests comment on whether stakeholders agree that this option will result in the same performance outcome.

8. Direct Translations

In some situations, a simple direct change from “driver” to “front left outboard” in the regulatory text is appropriate since there is no loss in meaning and the requirement or test procedure being specified can be described or performed just as effectively and achieve the same safety outcome. Such a situation occurs in S16.2.10.3. In this example, the adjustment made to the driver’s seat also controls the passenger seat, such as is the case with a bench seat. NHTSA does not believe there will be any unwanted implications of the front left outboard seat adjustment of an ADS vehicle controlling the positioning of a bench seat, as opposed to the right front seat. We note that if the front left outboard seat does not exist, the regulatory text is still viable as it is currently written.

Table VI-8

Before Change
S16.2.10.3 <i>Seat position adjustment.</i> If the passenger seat does not adjust independently of the driver seat, the driver seat shall control the final position of the passenger seat.
After Change

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.

9. Minor Editorial Revisions

At every occurrence of the term “steering wheel,” we have substituted the term “steering control.” These terms are synonymous as can be seen by the definition of “steering control system.” Nonetheless, the agency believes there is some merit in changing “wheel” to “control” in consideration of steering controls that may not be circular, e.g., shaped more like an air plane yoke control. We note that such systems would have both a “hub” about which they turn and a rim, i.e., an outer edge. A similar change was made in every FMVSS that is the subject of this NPRM.

10. Regulatory Text Not Modified Due to Non-Active Requirements

Various sections of the regulatory text of FMVSS No. 208 are no longer active because they have been superseded by revisions NHTSA has made over the years. NHTSA has tentatively decided to only provide translated regulatory text for active sections. However, even though a particular section may state its applicability is outdated for a particular vehicle type, this same section may be referenced for another vehicle type still in production. Therefore, care needs to be taken in determining which sections need not be translated. Table VI-9 lists the sections that make some reference to “driver” or “steering wheel/control,” but have not been updated through this notice since they are no longer active. The form of the translation that would have been required to these sections, if any, has not been determined. NHTSA seeks comment on whether this is the correct approach.

Table VI-9

Section for Which no Translation has been Provided
S4.1.3.4(a)(1) and (2), S4.1.4.1, S4.1.5.2.1, S4.1.5.3, S4.2.1.2(b), S4.2.5.4(c), S4.2.5.5(a)(1) and (2), S4.2.6.1.1, S4.2.6.2, S4.5.3.3(b)(B), S4.5.4.1(b)(2), S4.5.4.2

b. FMVSS No. 201; Occupant protection in interior impacts.

FMVSS No. 201 sets out performance requirements to protect occupants from injury due to impact with interior surfaces. Many of these requirements state that certain defined areas of the vehicle’s interior must provide a minimum level of protection when impacted by a test device. Currently, the standard describes many of these defined impact areas with references to the driver’s seating position and steering control.

We propose to amend FMVSS No. 201 to permit the certification of vehicles without a driver’s seat or steering controls. The proposed changes are described below.

1. Application Section

NHTSA proposes to modify the application section (S2) so that the standard would apply to trucks only if they have at least one DSP. As discussed in the portion of this notice focused on FMVSS No. 208, the rationale behind this modification rests primarily on lack of clarity on how to test and concerns about the necessity of testing occupant-less trucks to this standard, as they would have no occupants or DSPs. Additionally, NHTSA tentatively concludes that the safety need that supports the crashworthiness requirement of FMVSS No. 201 for the protection of vehicle occupants does not exist for occupant-less trucks. Accordingly, NHTSA has tentatively

decided to propose amending the application section of FMVSS No. 201 to apply only to trucks with DSPs.⁶⁴

2. Modifications to Address That There May Be No Driver’s Seat and Multiple Outboard Passenger Seats

Sections S5.1, S5.1.2, and S8.24 would be modified to allow multiple front outboard passengers. (See explanation in section VI.a.2.)

3. Driver’s Seat Used as Spatial Reference

NHTSA proposes to modify definitions for “A-pillar;” “B-pillar;” and “pillar” in S3, and the partial carve-out in S6.3(b) for altered vehicles and vehicles manufactured in multiple stages to use “the most rearward designated seating position in the forward row” as a reference point (instead of the “driver’s seat) to describe a spatial plane. (See explanation in section VI.a.7.i.) For the exclusion for multistage vehicles provided in S6.3(a), we note that specifying the rearmost seating reference point is consistent with the excluded area for non-multistage vehicles. However, the excluded area might be larger if the forward most seating reference point were used as a reference. Whether the excluded area would be larger or smaller than a vehicle with a driver’s seat would depend on the relative position of the driver’s seat. We seek comment on whether the excluded area should be more or less inclusive for multistage vehicles and the means to achieve any suggested recommendation.

Table VI-10

Before Change

⁶⁴ As noted above, there are some standards that are applicable to trucks that we have chosen not to specify that they only apply if a DSP is present because the standard is clearly only applicable to DSP location. One such example is FMVSS No. 202a, which specifies the requirements for head restraints depending on the seating position, e.g., front outboard. Thus, if there are no seating positions, such as could be the case for a occupant-less vehicle, the restraint requirements do not apply.

A-pillar means any pillar that is entirely forward of a transverse vertical plane passing through the seating reference point of the driver's seat.

After Change

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.

4. Steering control used as a spatial reference

NHTSA proposes to modify Section S5.1.1(d), which states that S5.1 does not apply to certain areas of the instrument panel that are bounded by the inboard edge of the steering control, so that it would apply only if a steering wheel is present. This change would clarify that S5.1.1(d) would not apply on a vehicle without a steering control.

c. FMVSS No. 203; Impact protection for the drivers from the steering control system, and FMVSS No. 204; Steering control rearward displacement

NHTSA proposes modifying the Application section (S2) of FMVSS No. 203 and the Application section (S2) of FMVSS No. 204 to state that the standards do not apply to vehicles without steering controls. The agency believes that these proposed changes would not reduce vehicle safety because, if there is no steering control 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. 201.⁶⁵

We note that this approach addresses multiple RFC comments. As discussed in the comment summary, some commenters seemed to believe that this standard simply would not apply to ADS-DVs without traditional manual controls, while others requested that NHTSA clearly indicate the applicability of this standard to these vehicles in the regulatory text. Some manufacturers have petitioned NHTSA for an exemption from FMVSS Nos. 203 and 204, which indicates that some companies may be unsure of whether these standards were if-equipped standards or included a requirement to equip vehicles with steering control systems. In developing a solution for resolving these ambiguities, NHTSA also assessed whether elimination of this standard for vehicles without steering controls, i.e. ADS-equipped vehicles without traditional manual controls, will maintain the level of crashworthiness protection among vehicles with or without ADS functionality. We have tentatively concluded that safety will be maintained due to the modifications that we have made to other standards to ensure the protection of that occupant (especially the changes proposed for FMVSS Nos. 201 and 208).

In addition to the change in applicability, we propose to move the definition of “steering control system” in FMVSS No. 203 to Part 571.3, as we discussed above in section V.b.

d. FMVSS No. 205; Glazing materials

NHTSA proposes modifying the Application Section (S3) so that the standard would apply to trucks only if they have at least one DSP for the reasons discussed in previous sections

⁶⁵ We note that, because most vehicles to which FMVSS No. 203 applies are not required to be equipped with air bags, NHTSA believes that a passenger seat that meets FMVSS No. 201 may provide equal or greater occupant protection than a driver's seat that is equipped with steering controls that meet FMVSS No. 203. In the absence of air bags, NHTSA believes that a passenger seat that has no steering controls would be safer than a driver's seat with a FMVSS No. 203-compliant steering column, because the presence of a steering column could itself increase risk of injury due to its proximity to the driver in a crash.

of this notice. In particular, see the discussions of this issue in the FMVSS No. 208 and FMVSS No. 201 sections. (See explanation in sections VI.a.1 and VI.b.1.) No other changes are proposed.

e. FMVSS No. 206; Door locks and door retention components

NHTSA proposes modifying the Application Section (S2) so that the standard would apply to trucks only if they have at least one DSP for the reasons discussed in previous sections of this notice. In particular, see the discussions of this issue in the FMVSS No. 208 and FMVSS No. 201 sections. (See explanation in sections VI.a.1 and VI.b.1.)

This NPRM also proposes to modify the definitions for “side front door” and “side rear door,” which use the “driver’s seat back” as a spatial frame of reference, so that they can also apply to vehicles without a driver’s seat. (See explanation in section VI.b.1.)

The test procedure step in S5.1.1.4, would be modified to replace a reference to the “driver’s side” of the vehicle with “left side.”⁶⁶ (See explanation in section VI.a.7.iii.) We note that, since both sides of the vehicle are tested, ADS and non-ADS vehicles would continue to be subject to identical testing requirements.

f. FMVSS No. 207; Seating systems

NHTSA proposes modifying the Application Section (S2) so that the standard would apply to trucks only if they have at least one DSP for the reasons discussed in previous sections of this notice. In particular, see the discussions of this issue in the FMVSS No. 208 and FMVSS No. 201 sections. (See explanation in sections VI.a.1 and VI.b.1.)

NHTSA proposes to modify the requirement that a vehicle have a driver’s seat (S4.1) to specify that a driver’s seat would be required only for vehicles with manually-operated driving

⁶⁶ We note that an identical test step is performed on the “opposite” side of the vehicle.

controls. This leaves unchanged the requirement of S4.1 for non-ADS vehicles. By virtue of the new definition of driver’s seat (driver’s designated seating position) and manually-operated driving controls, a driver’s seat must have 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. However, an ADS-equipped vehicle with driving controls would still need to have a driver’s seat.

g. FMVSS No. 214; Side impact protection

The proposed translations to FMVSS No. 214 match closely with the proposed changes to FMVSS No. 208. Like FMVSS No. 208, FMVSS No. 214 currently applies to all trucks, including occupant-less trucks that have no DSPs. Because occupant-less trucks would presumably have no DSPs, it is unclear how the dynamic side impact crash tests could be performed and whether the safety need of FMVSS No. 214 supports the requirements of the standard for the protection occupants in an occupant-less truck. Therefore, NHTSA proposes amending the application section of FMVSS No. 214 to apply only to trucks with DSPs. Additionally, as with FMVSS No. 208, NHTSA proposes clarifying that there may be multiple front outboard passengers by using the phrase "any front outboard passenger." NHTSA also proposes clarifying the test dummy positioning on bench seats by using the seating reference point of the DSP where they are located. Finally, NHTSA proposes clarifying that the "driver's side" now means the vehicle left side for spatial reference purposes. Table VI-11 below, provides the types of translations, the regulatory text section with examples of the change and the section number or this NPRM where a more detailed explanation of the change can be found.

Table VI-11 – Types of Translations Made in FMVSS No. 214

Type of Translation	Example Section	Explanation
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Clarification of Application Section.	S2	See sections VI.a.1VI.b.1
Clarification that there may be multiple front outboard passengers, by the use of “any.”	S12.3.1(d)	See section VI.a.2
Clarification of test dummy positioning on bench seats.	S12.1.2(1)	See section VI.a.7.ii
Translation of driver’s side to vehicle left side for spatial reference.	S10.2	See section VI.a.7.iii

h. FMVSS No. 216a; Roof crush resistance

NHTSA proposes to modify the Application Section (S3) so that the standard would apply to trucks only if they have at least one DSP for the reasons discussed in previous sections of this notice. In particular, see the discussions of this issue in the FMVSS No. 208 and FMVSS No. 201 sections. (See explanation in section VI.a.1 and VI.b.1.)

NHTSA proposes to modify the procedures for setting up the vehicle for testing in S7.1 to reference the left side and right side of the vehicle rather than the driver’s side and passenger’s side. (See explanation in VI.a.7.iii.)

i. FMVSS No. 225; Child restraint anchorage systems

NHTSA proposes to modify the definition of “shuttle bus” to clarify that if the bus does not have a driver’s seat, it meets the definition of a shuttle bus if it has only one row of forward-facing seating positions rearward of the front row, rather than only one row of forward-facing seating positions rearward of the driver’s seat. Thus, the front row is used as the frame of reference rather than the driver’s seat, when there is no driver’s seat. (See explanation in section VI.a.7.i.)

j. FMVSS No. 226; Ejection mitigation

NHTSA proposes to modify the Application Section (S2) so that the standard would apply to trucks only if they have at least one DSP for the reasons discussed in previous sections of this notice. In particular, see the discussions of this issue in the FMVSS No. 208 and FMVSS No. 201 sections. (See explanation in sections VI.a.1 and VI.b.1.)

The existing definition of “modified roof” (in S3) uses the term “driver’s compartment.” This is a definition that provides an exclusion from the standard for vehicles with “modified roofs.” NHTSA proposes to make a simple substitution of “occupant compartment.” We note that this change is not specific to vehicles without drivers, but will affect all vehicles to which this standard applies. However, we expect that it will not have any substantive effect on non-ADS vehicles, i.e., we expect that the driver’s compartment and the occupant compartment will be identical. Thus, NHTSA does not expect or intend additional vehicles to be excluded from the standard, but seeks comment on whether this is accurate.

S6.1(d) and (f) include test procedure requirements that reference “driver door sill” for vehicle setup. NHTSA proposes to simply change those references to “left front door sill,” similar to what was explained in VI.a.7.iii.

k. Regulatory Text Related to Parking Brake and Transmission Position

The crash tests required by the 200 Series standards, in general, do not require manually driving controls in order to conduct the tests. For example, in the full frontal test of FMVSS No. 208 the vehicle is towed down a test track and guided by a rail into a rigid barrier. There is no need to use the vehicle controls to steer the vehicle or control the impact speed. This does not require the vehicle to have the vehicle transmission in neutral and no brakes applied. In contrast, the moving deformable barrier side crash test in FMVSS No. 214 requires the vehicle to be

stationary, with the parking brake applied. In fact, multiple 200 (FMVSS Nos. 208, 214, and 212) and 300 (FMVSS Nos. 301, 303, and 305) Series standards include regulatory text that dictates the status of the vehicles parking brake and transmission. However, in some instances, this detail is left for the Compliance Test Procedure that accompanies the regulatory text. NHTSA realizes that for vehicles without driver-accessible parking brakes or transmission selectors, how to properly prepare the vehicle for testing may not be immediately obvious. However, this situation is not totally unique or novel even for conventional non-ADS vehicles. NHTSA has tested vehicles with automatic electronic parking brakes and electronic gear selectors, which may make it challenging to place the vehicle transmission and brake into the pre-test position. In these instances, NHTSA and its testing laboratories have worked with the vehicle manufacturers to achieve the necessary vehicle status. Thus, we are not currently proposing any regulatory text changes related to interfacing with ADS-equipped vehicles on pre-test brake and transmission status since 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 this state is achieved. NHTSA expects that manufacturers will provide the means for the agency to achieve the necessary brake and transmission status, if only for compliance testing purposes. We seek comment on the validity of our assumption and the proposed approach.

VII. Cost Impacts of This Modernization Effort

A Preliminary Regulatory Impact Analysis (PRIA) can be found in the docket for this NPRM. A summary of the PRIA findings are provided below. The agency solicits comment on the PRIA. NHTSA calculated the impact of the proposed 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.

Monetized estimated per-vehicle cost impacts (2018 dollars) are presented by discount rate in Table VII-1 below based on a scenario presented by the Energy Information Administration⁶⁷ (EIA), in which ADS-DVs represent 31 percent of the share of new light-duty vehicle sales in the year 2050.

Table VII-1: Summary of Net Per-Vehicle Cost Impact Estimates (ADS-DV Cost Impacts in 2050, 2018 Dollars)

Discount Rate	Mean Cost Impact	5th- to 95th-Percentile Cost Impacts
3%	-\$398	-\$255 to -\$540
7%	-\$122	-\$78 to -\$166

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 VII-2 were identified. In addition to the above ranges of estimates, the agency performed

⁶⁷ 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).

a sensitivity analysis in which 30 percent of ADS-DV sales in 2050 are comprised of dual-mode vehicles. See the PRIA for the results of that analysis.

We request comment on this approach to representing the range of estimated impacts under uncertainty.

NHTSA assumed that light-duty vehicle sales would follow the identical baseline path specified in the Preliminary Regulatory Impact Analysis for the Safer Affordable Fuel-Efficient Vehicle rule⁶⁸ 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 2028-2032 (approximately 0.2 percent per year) 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 above⁶⁹; 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 proposed rule would save ADS-DV manufacturers and consumers approximately \$2.3 billion in the year 2050 (fifth-percentile estimate of \$1.5 billion and 95th-percentile estimate of \$3.1 billion) when discounting back to 2019 at a three-percent discount rate. At a seven-percent discount rate, the proposed rule is estimated to save ADS-DV manufacturers and consumers approximately \$0.7 billion in the year 2050 (fifth-percentile estimate of \$0.5 billion and 95th-percentile of \$1.0 billion).

⁶⁸ <https://www.nhtsa.gov/corporate-average-fuel-economy/safe> (last accessed October 22, 2019).

⁶⁹ 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).

Table VII-2: Summary of Total Monetized Annual Net Cost Impact Estimates
(ADS-DV Cost Impacts in 2050, Billions of 2018 Dollars)

Discount Rate	Mean Cost Impact	5th- to 95th-Percentile Cost Impacts
3%	-\$2.3	-\$1.5 to -\$3.1
7%	-\$0.7	-\$0.5 to -\$1.0

VIII. Regulatory Notices and Analyses

a. Executive Order 13771

This proposed rule is expected to be an Executive Order 13771 deregulatory action. Details on the estimated cost savings of this proposed rule can be found in the preamble’s discussion on cost impacts and in the accompanying supporting document providing further discussion in the docket for this NPRM.

b. Executive Order 12866, Executive Order 13563, and DOT Regulatory Policies and Procedures

Executive Order 12866, “Regulatory Planning and Review” (58 FR 51735, October 4, 1993), as amended by Executive Order 13563, “Improving Regulation and Regulatory Review” (76 FR 3821, January 21, 2011), provides for making determinations whether a regulatory action is “significant” and therefore subject to OMB review and to the requirements of the Executive Order. The Order defines a “significant regulatory action” as one that is likely to result in a rule that may:

- Have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the

environment, public health or safety, or State, local, or Tribal governments or communities;

- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

This action was reviewed by the Office of Management and Budget under E.O. 12866.

This action is a significant regulatory action within the meaning of E.O. 12866 and under the Department of Transportation's regulatory policies and procedures (44 FR 11034, February 26, 1979).

This action is significant because it raises the novel legal and policy issues surrounding the regulation of vehicles equipped with ADS and is the subject of much public interest. The cost savings of this deregulatory proposal are described in the preamble and discussed in greater detail in the accompanying cost savings document included in this docket.

c. 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 proposal 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 proposal will not have a significant economic impact on a substantial number of small entities.

This action proposes amendments to and clarifies the application of existing occupant protection standards to vehicles equipped with ADS that also lack traditional manual controls. This proposed rule would 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). NHTSA analyzed current small manufacturers and current small ADS developers in detail in the PRIA, and found that none of the entities listed in the analysis would be impacted by this proposal. Thus, I hereby certify that this proposed rule would not have a significant economic impact on a substantial number of small entities. Additional details related to the basis of this finding can be found in the PRIA for this rulemaking proposal.

d. Executive Order 13132 (Federalism)

NHTSA has examined today's proposal 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. The proposal 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 are generally preserved. However, the Supreme Court has recognized the possibility, in some instances, of implied preemption of such State common law tort causes of action by virtue of NHTSA's rules, even if not expressly preempted. This second way that NHTSA rules can preempt is dependent upon there being an actual conflict between an FMVSS and the higher standard that would effectively be imposed on motor vehicle manufacturers if someone obtained a State common law tort judgment against the manufacturer, notwithstanding the manufacturer's compliance with the NHTSA standard. Because most NHTSA standards established by an FMVSS are minimum standards, a State common law tort cause of action that seeks to impose a higher standard on motor vehicle manufacturers will generally not be preempted. However, if and when such a conflict does

exist—for example, when the standard at issue is both a minimum and a maximum standard—the State common law tort cause of action is impliedly preempted. See *Geier v. American Honda Motor Co.*, 529 U.S. 861 (2000).

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

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

e. 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 proposed rule is discussed above in connection with E.O. 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.

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

g. 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 proposed rule under the

policies and agency responsibilities of Executive Order 13609, and has determined this proposal would have no effect on international regulatory cooperation.

h. 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 proposed rule imposes no new reporting requirements on manufacturers.

i. 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 proposed rule. NHTSA searched for but did not find voluntary consensus standards directly applicable to the amendments proposed in this NPRM. Neither is NHTSA aware of any international regulations of Global Technical Regulation (GTR) activity addressing the subject of this proposal.

j. 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.

Although this proposed rule is a significant regulatory action, it does not contain a mandate that would impose costs on the private sector 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.

k. National Environmental Policy Act

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

l. Plain Language

Executive Order 12866 requires each agency to write all rules in plain language.

Application of the principles of plain language includes consideration of the following questions:

- Have we organized the material to suit the public's needs?
- Are the requirements in the rule clearly stated?
- Does the rule contain technical language or jargon that isn't clear?
- Would a different format (grouping and order of sections, use of headings, paragraphing) make the rule easier to understand?
- Would more (but shorter) sections be better?
- Could we improve clarity by adding tables, lists, or diagrams?
- What else could we do to make the rule easier to understand?

If you have any responses to these questions, please include them in your comments on this proposal.

m. 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.

IX. Regulatory Text

List of Subjects in 49 CFR Part 571

Motor vehicles, Motor vehicle safety

In consideration of the foregoing, we propose to amend 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. Amend § 571.3(b) as follows:

- a. Add the definitions of “Driver air bag”, “Driver dummy”, Driver’s designated seating position”, “Passenger seating position”, “Row”, and “Steering control system”; and
- b. 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 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.

* * * * *

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. 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.

* * * * *

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.

* * * * *

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, 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 with at least one designated seating position, 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 with at least one designated seating position, 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 and the definitions of “Side Front Door” and “Side Rear Door” in paragraph S3 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, and trucks with at least one designated seating position, 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 positions 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 passengers 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 positions 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 passengers seat back in the front row of seats, when the seat backs are adjusted to their most vertical and rearward position.

* * * * *

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 with at least one designated seating position, and buses.

* * * * *

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

* * * * *

9. Amend § 571.208 as follows:

- a. Revise paragraphs S3(a), S4.2, 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, S4.4.4.2, S4.4.5.1.1, S4.4.5.1.2, S4.4.5.1.2(e), S4.4.5.3, 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, 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(g), S19.2.2(h), S19.2.3, S19.3, S20.1.2, S20.2, S20.2.1.1, 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 S19.5, S19.5.1, S21.6, S21.6.1, S23.6, and S23.6.1 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 with at least one designated seating position, 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.

* * * * *

S4.2 *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 unloading 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.

* * * * *

S4.4.1 * * *

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 positions 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 $\frac{3}{4}$ 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 position 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:

* * * * *

S4.4.4.2 Each school bus with a GVWR of more than 4,536 kg (10,000 lb) but not greater than 11,793 kg (26,000 lb) shall be equipped with a Type 2 seat belt assembly 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. The seat belt assembly shall comply with Standard No. 209 (49 CFR 571.209) and with S7.1 and S7.2 of this standard. 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.

* * * * *

S4.4.5.1.1 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 positions 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.

* * * * *

S4.4.5.3 Each school bus with a GVWR of more than 11,793 kg (26,000 lb) shall be equipped with a Type 2 seat belt assembly 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. The seat belt assembly shall comply with Standard No. 209 (49 CFR 571.209) and with S7.1 and S7.2 of this standard. 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.

* * * * *

S4.5.1 * * *

(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.

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S10.4.2.1 *H-point.* The H-points of the driver and any front outboard passenger test dummies shall coincide within ½ inch in the vertical dimension and ½ inch in the horizontal dimension of a point ¼ 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.

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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.

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S10.6.1 *Driver dummy position.*

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S10.6.2 Front outboard *passenger dummy position*.

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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.

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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.

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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 outboard passenger seat set-up.*

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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.

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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 ± 10 mm (± 0.4 in) of the center of the steering control.

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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 ± 5 mm (± 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 ± 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.

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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*.

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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.

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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 ± 10 mm (± 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 ± 10 mm (± 0.4 in), through the seating reference point of the seat that it occupies.

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S16.3.3.2 Front outboard *passenger foot positioning*.

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

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

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

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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. Each telltale:

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(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.

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(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.

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S19.5 *Motion suppression for vehicles with manually-operated driving controls that do not require a driver.* Each vehicle that is certified as complying with S14 shall not be capable of motion when a 12-month-old CRABI dummy is placed at the driver's seating position and the vehicle is in an operational state that does not require a driver.

S19.5.1 Motion suppression shall be assessed under the test procedures specified in S20.1 through S20.2, except that the 12-month-old CRABI dummy is placed in the driver's seating position and the result shall be an inability of engage vehicle motion.

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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.

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

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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.

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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.

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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.

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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.

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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.

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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).

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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).

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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.

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S21.6 *Motion suppression for vehicles with manually-operated driving controls that do not require a driver.* Each vehicle that is certified as complying with S14 shall not be capable of motion when a 3-year-old dummy is placed at the driver's seating position and the vehicle is in an operational state that does not require a driver.

S21.6.1 Motion suppression shall be assessed under the test procedures specified in S22.1 through S22.2, except that the 3-year-old dummy is placed in the driver's seating position and the result shall be an inability of engage vehicle motion.

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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.

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

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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.

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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.

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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 ± 10 mm (± 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 ± 10 mm (± 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 ± 10 mm (± 0.4 in). Position the torso of the dummy against the seat back. Position the dummy's thighs against the seat cushion.

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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 ± 10 mm (± 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 ± 10 mm (± 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 ± 10 mm (± 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.

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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 ± 10 mm (± 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 ± 10 mm (± 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 ± 10 mm (± 0.4 in).

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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 ± 10 mm (± 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 ± 10 mm (± 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 ± 10 mm (± 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.

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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 ± 10 mm (± 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 ± 10 mm (± 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 ± 10 mm (± 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.

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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 ± 10 mm (± 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 ± 10 mm (± 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 ± 10 mm (± 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.

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S22.2.2.8 * * *

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

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

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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.

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

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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:

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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.

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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).

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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.

* * * * *

S23.6 *Motion suppression for vehicles with manually-operated driving controls that do not require a driver.* Each vehicle that is certified as complying with S14 shall not be capable of motion when a 6-year-old dummy is placed at the driver's seating position and the vehicle is in an operational state that does not require a driver.

S23.6.1 Motion suppression shall be assessed under the test procedures specified in S24.1 through S24.3, except that the 6-year-old dummy is placed in the driver's seating position and the result shall be an inability of engage vehicle motion.

* * * * *

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.* 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 ± 10 mm (± 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 ± 10 mm (± 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 ± 10 mm (± 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 ± 6 mm (± 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 ± 6 mm (± 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 § 571.214 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, S12.1.1, S12.1.1(a)(1), 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 with at least one designated seating position 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.* For the driver's seating position and for any front outboard passenger seating position, 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 ± 10 mm (± 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

± 5 mm (± 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 ± 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 ± 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 ± 0.5 degrees if possible. If it is still not possible to level the transverse instrumentation platform to within ± 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 ± 10 mm (± 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 ± 10 mm (± 0.4 in), through the seating reference point of the seating that it occupies.

* * * * *

11. Amend § 571.216a by revising paragraphs S3.1 and 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 with at least one designated seating position, 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 ± 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 ± 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).

* * * * *

12. 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.

* * * * *

1. Amend § 571.226 as follows:
 - a. Remove from paragraph S3 the definition of “Row”; and
 - b. Revise paragraphs S2, the definition of “Modified roof” in S3, S4.2.2, 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 with at least one designated seating position, and buses with a gross vehicle weight rating of 4,536 kg or less, except walk-in vans, modified roof vehicles and convertibles. 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.

* * * * *

S4.2.2 Vehicles that have an ejection mitigation countermeasure that deploys in the event of a rollover must have a monitoring system with a readiness indicator. The indicator shall monitor its own readiness and must be clearly visible from the driver's designated seating position and clearly visible from any designated seating position if no driver's seating position is occupied or present. The same readiness indicator required by S4.5.2 of FMVSS No. 208 may be used to meet the requirement. A list of the elements of the system being monitored by the indicator shall be included with the information furnished in accordance with S4.2.3.

* * * * *

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 ± 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 ± 5 mm of the vertical height difference determined in S6.1(e).

* * * * *

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James C. Owens

Acting Administrator

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