DEPARTM

National Highway Traffic Safety Administration

49 CFR Part 572

[Docket No. NHTSA-2024-0093]

RIN 2127-AM13

Anthropomorphic Test Devices, HIII 5TH Percentile Female Test Dummy; Incorporation by Reference

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

ACTION: Final rule.

SUMMARY: This document revises the chest jacket and spine box specifications for the Hybrid III 5th Percentile Female Test Dummy (HIII–5F). The jacket revisions resolve discrepancies between the jacket specifications in subpart O and jackets available in the field, and ensure a sufficiently low level of variation between jackets fabricated by different manufacturers. The spine box revisions eliminate a source of signal noise caused by fasteners within the box that may become loose during sled or vehicle crash tests. This rulemaking responds to a petition for rulemaking from the Alliance of Automobile Manufacturers.

DATES: *Effective date*: This rule is effective on [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

IBR date: The incorporation by reference of certain material listed in the rule is approved by the Director of the Federal Register as of [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

Petitions for reconsideration: Petitions for reconsideration for this final rule must be received no later than [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

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

- Petitions for reconsideration of this final rule must refer to the docket and notice number set forth above and be submitted to the Administrator, National Highway Traffic Safety Administration, 1200 New Jersey Avenue SE, Washington, DC 20590. Note that all petitions received will be posted without change to www.regulations.gov, including any personal information provided.
- *Confidential Business Information:* If you wish to submit any information under a claim of confidentiality, you should submit 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 a copy, from which you have deleted the claimed confidential business information, to Docket Management at the address given above. When you send a submission 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). Please see further information in the Regulatory Notices and Analyses section of this preamble.
- *Privacy Act:* The petition will be placed in the docket. Anyone is able to search the electronic form of all documents received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the *Federal Register* published on April 11, 2000 (65 FR 19476) or you may visit www.transportation.gov/individuals/privacy/privacy-act-system-records-notices. In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to better inform its decision-making process. DOT posts these comments, without edit, including any personal information the commenter provides, to *www.regulations.gov,* as described in the system of

records notice (DOT/ALL-14 FDMS), which can be reviewed at 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.

- *Docket:* For access to the docket to read background documents or comments received, go to www.regulations.gov at any time or the street address listed above. Follow the online instructions for accessing the dockets.

FOR FURTHER INFORMATION CONTACT: For technical issues, you may contact Mr. Garry Brock, Office of Crashworthiness Standards; phone: (202) 366-6198. For legal issues, you may contact Ms. K. Helena Sung, Office of Chief Counsel; phone: (202) 366-2992. The mailing address of these officials is: National Highway Traffic Safety Administration, 1200 New Jersey Avenue SE, Washington, D.C. 20590.

SUPPLEMENTARY INFORMATION:

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I. Executive Summary

This final rule finalizes changes to the Hybrid III 5th percentile adult female (HIII-5F) anthropomorphic test device (ATD or crash test dummy or dummy). The HIII-5F is used in frontal compliance crash tests and air bag static deployment tests, certification to which is required for certain vehicles by Federal Motor Vehicle Safety Standard (FMVSS) No. 208, *Occupant crash protection.* The dummy is described in 49 CFR part 572, subpart O.

Among other things, subpart O incorporates by reference several documents that specify the physical make-up of the dummy. This document finalizes changes to the chest jacket and spine box specifications to address issues with the fit and availability of the jacket and a noise

artifact from the spine box. Today's rulemaking responds to the Alliance of Automobile Manufacturer's (the Alliance) 2014 petition for rulemaking.[1]

Chest Jacket

The chest jacket is a sleeveless foam-filled vinyl zippered jacket that represents human flesh, including female breasts. The chest jacket may need to be replaced because it can shrink or otherwise fall out of specification or wear out with age. Since the introduction of the HIII-5F into part 572 in 2000, none of the jackets that were manufactured met the jacket specifications specified in part 572. Since around 2006, NHTSA, in its own compliance tests, has used the brand of dummy and jacket (either First Technology Safety Systems (FTSS) or Denton ATD (Denton)) used by the vehicle manufacturer to certify the vehicle. However, these FTSS and Denton jackets are no longer being manufactured; manufacturers (or test laboratories) and NHTSA have, or will soon, run out of these jackets. In 2013, SAE[2] published an information report for the HIII-5F chest jacket, SAE J2921 JAN2013, *H-III5F Chest Jacket Harmonization,* describing a new jacket compatible with FTSS and Denton dummies.

The NPRM proposed to adopt the jacket specifications described in SAE J2921, as well as a few additional specifications. We believed that chest jackets that have been and are being manufactured to the SAE J2921 design would also conform to the proposed specifications. NHTSA also believed that additional specifications were necessary to ensure a sufficient level of uniformity between jackets produced by different manufacturers when other manufacturers enter the market, and to prevent the variances in jacket designs that were problematic in the past from reoccurring. Based on NHTSA's testing, the agency concluded that dummies fitted with chest jackets that satisfy the proposed specifications would perform equivalently to dummies fitted

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[1] Letter from Scott Schmidt, Alliance, to NHTSA (February 21, 2014). The Alliance consisted of: BMW Group; Chrysler Group LLC; Ford Motor Company; General Motors Company; Jaguar Land Rover; Mazda; Mercedes-Benz USA; Mitsubishi Motors; Porsche; Toyota; Volkswagen Group of America; and Volvo Cars.

[2] The Society of Automotive Engineers (now SAE International). SAE is an organization that develops technical standards based on best practices.

with the FTSS or Denton jackets that were previously used. A benefit of standardized jacket specifications would be that the agency would no longer have to maintain chest jackets of different designs and take steps to match the compliance test jacket with that specified by the vehicle manufacturer, thereby providing more objective test results.

Spine Box

The spine box is the dummy's steel backbone. It is located in the dummy's thorax, which consists of six bands that simulate human ribs. Since the mid-2000s, industry and NHTSA have been aware of a signal noise artifact in the signals from the accelerometers in the thorax during sled and crash tests originating in the spine box. The source of the noise is fasteners that become loose during normal use. In 2011 SAE published an information report for a spine box modification (SAE J2915 AUG2011, *H-III5F Spine Box Update to Eliminate Noise*).

We proposed to adopt the SAE J2915 modification. The proposed revisions would add plates to the side of the spine box, with bolts countersunk into the plate to remove any play from the assembly. The modification would not affect or change the dummy's performance in any way (other than eliminate the potential for noise). The improved spine box would address a shortcoming in the ATD's design that had to be addressed by end users disassembling the dummy, re-torquing the relevant fasteners by hand before each test, and re-qualifying the dummy as needed. The improved spine box would increase the quality of data and reduce maintenance and testing time.

Summary of Final Rule

NHTSA received comments from Humanetics Innovative Solutions, Inc. (HIS), the Alliance for Automotive Innovation (the Alliance), and Ms. Sial (an individual commenter). All commenters were generally supportive of the NPRM, with a few measurement specification recommendations.

The final rule adopts most of the NPRM's proposed specifications, with minor changes to ensure a sufficiently low level of variation among jackets based on analysis of post-NPRM measurement data and commenters' data. For the jacket, the agency updates the values of some dimensions to reflect more closely the larger pool of measurement data acquired since the NPRM. We also increase the dimensional tolerances in several places because the proposed tolerances were unnecessarily small. Additionally, a limited number of dimensions are revised to become "reference only" dimensions (which are useful during inspections) because the larger pool of data revealed that there were not consistent reference measurement points associated with them. For the spine box, the final rule adjusts the mass specification slightly to reflect a small increase in mass due to the material that is added.

Furthermore, the rule's effective date is 45 days after the final rule's publication date. The final rule change is not intended to impose new requirements on vehicle manufacturers. We believe currently manufactured chest jackets meet the SAE J2921 specifications and meet the finalized specifications. We also believe that the parts to implement the spine box fix are available, as are newly manufactured replacement spine boxes that incorporate the fix. Manufacturers wishing to test with the finalized jacket and spine box should have no difficulty obtaining the necessary parts.

The costs associated with this rulemaking are limited to those associated with acquiring new dummy parts. We conclude that the finalized changes would not necessitate the purchasing of any parts that would not have been purchased in the normal course of business in the absence of the finalized changes. This final rule is not significant and was not reviewed by the Office of Management and Budget under E.O.12866.

II. Background

a. Rulemaking History

In 2014, the Alliance petitioned NHTSA to incorporate the new SAE jacket into part 572 per SAE Information Report J2921 and revise the spine box as described in SAE Information Report J2915.[3] NHTSA subsequently sent a letter to the Alliance asking for clarification on several points. The Alliance responded to NHTSA's request with a supplemental letter dated May 11, 2015.[4] NHTSA granted this petition.

On December 26, 2019, NHTSA published a NPRM (84 FR 70916) to revise the chest jacket and spine box specifications for the Hybrid III 5th Percentile Female Test Dummy (HIII–5F) set forth in Part 572--*Anthropomorphic Test Devices*. NHTSA proposed to adopt the jacket specifications described in SAE J2921, as well as several additional specifications for the jacket's contour that are not contained in SAE J2921.

The NPRM comment period closed on February 24, 2020. HIS requested a ninety-day extension to the NPRM comment period to collect data regarding the proposed additional chest jacket specifications while also ensuring a sufficient sample size.[5] On June 2, 2020, the agency extended the comment period until August 3, 2020 (85 FR 33617). NHTSA also published a set of instructions on how to record jacket measurements in the rulemaking docket.[6] The instructions were written for lab technicians to record the jacket measurements. They were the same jacket measurements as those proposed in the NPRM but conveyed in more comprehensible format than in the NPRM. After the extended comment period in August 2020, HIS and the Alliance submitted additional measurement data and recommendations to the NPRM.

After issuing the NPRM, NHTSA continued to collect measurement data on newly purchased jackets to check whether the dimensions and tolerances proposed were being met by

[3] Letter from Scott Schmidt, Alliance, to NHTSA (February 21, 2014).
[4] Letter from Scott Schmidt, Alliance, to NHTSA (May 11, 2015).
[5] NHTSA-2019-0023-004.
[6] NHTSA-2019-0023-007.

SAE jackets already in the field. For the final rule, the agency also examined all measurement data provided by the commenters.

b. Chest Jacket

The HIII–5F chest jacket is a sleeveless foam-filled vinyl zippered jacket that represents human flesh, including female breasts. The chest jacket is zipped onto the underlying dummy and covers the entire thorax, including the shoulder assembly. The HIII–5F was added to part 572 in 2000.[7] The HIII–5F is used in frontal compliance crash tests and air bag static deployment tests, certification to which is required for certain vehicles by FMVSS No. 208, *Occupant crash protection.*

The HIII-5F dummy is described in 49 CFR part 572, subpart O. This subpart contains regulatory text describing the qualification procedures and requirements for the dummy. Subpart O also incorporates several other documents by reference. Those documents describe the physical make-up of the dummy, and include a parts list, a set of engineering drawings, and a document entitled, *Procedures for Assembly, Disassembly, and Inspection* (PADI).[8]

The NPRM proposed changes to the chest jacket specifications to address known issues with the shape and availability of the jacket.

Existing Jackets Do Not Meet the Current Part 572 Specifications

The chest jacket, along with the HIII-5F, was developed under the auspices of SAE. When subpart O was created in 2000, jackets for the HIII-5F were being produced solely by FTSS. Soon thereafter, Applied Safety Technologies Corporation, which later became Denton, began to manufacture HIII-5F dummies and jackets.

[7] 65 FR 10968 (March 1, 2000).
[8] These documents can be found in Docket NHTSA-2000-6940 (available at www.regulations.gov).

The jackets FTSS and Denton produced did not conform to all aspects of the part 572 specifications; in addition, jackets produced by each manufacturer differed from those produced by the other.[9] The differences between the FTSS and Denton jackets, and between those jackets and the part 572 specifications, are the result of a variety of factors. For one, the subpart O jacket drawing, which consists of two sheets, contains errors and ambiguities. The dimensions for the breast locations are not consistent between the two sheets, and the overall shape is not consistent, either. These inconsistences and ambiguities contributed to dimensional differences between the FTSS and Denton jackets.

In 2003, FTSS submitted a petition for rulemaking to revise the jacket dimensions to correspond to the dimensions of the jackets then being produced by FTSS.[10] NHTSA denied this petition.[11] The agency stated that while dummies with the FTSS and Denton jackets performed somewhat differently from dummies with jackets that conformed with the part 572 specifications, the dimensional differences did not have a significant effect on dummy performance as long as the seat belt was properly positioned.[12]

However, studies of the jacket by Transport Canada and the Alliance in the mid-2000s found that FTSS and Denton dummies performed differently in the types of testing specified in FMVSS No. 208.[13] FMVSS No. 208 specifies a variety of different dynamic (crash) and static (out-of-position) requirements using the HIII-5F.[14]

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[9] Both Transport Canada and the Alliance found dimensional differences between the two brands of jackets. The 2019 NPRM (84 FR 70916) provides more details on the specific differences and manufacturing design choices contributing to the discrepancies.

[10] Letter from FTSS to NHTSA (dated December 30, 2003).

[11] 71 FR 45427 (August 9, 2006).

[12] *Id. See* also letter from FTSS to NHTSA (August 28, 2006).

[13] Transport Canada's research found that the FTSS and Denton dummies performed differently with respect to chest deflection in both full-scale rigid barrier crash tests and in out-of-position testing. Suzanne Tylko et al., 2006, The Effect of Breast Anthropometry on the Hybrid III 5th Female Chest Response, Stapp Car Crash Journal, Vol. 50 (November 2006), p. 390. The Alliance similarly reported research by vehicle manufacturers. Letter from the Alliance (January 31, 2006), p. 1,8-9. In 2005 the Alliance presented these issues to NHTSA and documented them in a 2006 letter. *See also* Tylko et al., 2006, A Comparison of Hybrid III 5th Female Dummy Chest Responses in Controlled Sled Trials, SAE Technical Paper Series, 2006-01-0455.

[14] *See, e.g.,* FMVSS No. 208 S15 (rigid barrier test requirements); S25 (out-of-position requirements).

Development of the SAE J2921 Jacket Specifications (SAE Jacket)

These differences between the FTSS and Denton jackets led SAE, in 2006, to establish a task force to develop a harmonized jacket compatible with both companies' versions of the HIII-5F jacket (for ease of reference, referred to in this document as the "SAE jacket").

In 2010, FTSS and Denton merged to form HIS. The merger meant that HIS became the only significant dummy manufacturer and what had begun as an effort to specify the design of a "harmonized" jacket became an effort for HIS to simply design and produce a jacket that could fit existing Denton and FTSS dummies as well as newly manufactured HIS dummies.

SAE published an information report for the harmonized jacket in 2013 (SAE J2921 JAN2013 *supra*). An update to this information report was published in March 2023 (SAE J2921 MAR2023). This update does not alter any of the technical specifications. The J2921 jacket is currently offered for sale by HIS and JASTI-USA, Inc., the U.S. affiliate of JASTI Co., LLC, a manufacturer of dummies and test equipment headquartered in Japan.

NHTSA Enforcement Policy to Address Chest Jacket Issues

The discrepancies among the available jackets brands (principally from FTSS and Denton) can lead to different compliance test results with different jackets. In 2006, the Alliance requested that NHTSA, in its compliance testing program, use the same dummy brand (Denton or FTSS) the vehicle manufacturer used in its certification of a particular make/model. NHTSA adopted this requested practice.

Recent events render this approach of maintaining both FTSS and Denton jackets obsolete and necessitate further action by NHTSA. After the merger of FTSS and Denton, HIS indicated that it would maintain production of the FTSS and Denton brand versions of the jackets

so that they could be used as spare parts on the existing FTSS and Denton dummies.[15] However, in 2015 HIS discontinued production of the original FTSS and Denton chest jacket designs and now sells only the SAE jacket, identified as part number 880105-355-H.[16]

Over the past few years, NHTSA has received requests from several vehicle manufacturers for NHTSA to conduct its compliance tests using the SAE jacket. NHTSA has asked manufacturers to identify the jacket (Denton, FTSS or SAE) for NHTSA to use in its compliance testing. However, because chest jackets shrink or otherwise fall out of specification or wear out with age, NHTSA's stock of FTSS and Denton jackets is running out, and NHTSA has only a limited supply. The Alliance has informed NHTSA that its members are facing the same issue. Thus, the issues of jacket availability and which jacket designs are acceptable for use in compliance tests have become more urgent.

Testing of the SAE Jacket[17]

The development of the SAE jacket included was a preliminary jacket in 2011 and then a final version in 2013. NHTSA and others tested both versions of the SAE jackets to assess ATD performance with the new components.

The studies compared the dimensions of the jackets and evaluated the performance of dummies fitted with the jackets in different tests (sled tests, out-of-position tests, and some of the subpart O qualification tests). The studies found that dummies fitted with SAE-designed jackets (both the 2011 and 2013 versions) performed essentially the same as dummies fitted with pre-existing FTSS and Denton (non-SAE) jackets with respect to dummy injury metrics and other

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[15] The Brand Harmonization of the Hybrid III 5th Small Female Crash Test Dummy 880105-000, The ATD Harmonization Task Group, Humanetics Innovative Solutions, Inc., July 2012.
[16] Identified as part number 880105-355-H. This is the part number of the engineering drawing of the jacket that appears in SAE J2921. Hybrid-III 5th Small Female Dummy, 880105-000-H Brand Harmonized Parts Catalog, Humanetics Innovative Solutions, Inc., August 2018.
[17] See 2019 NPRM Section IV (84 FR 70921-70922) for a more detailed summary of NHTSA and industry evaluation of the chest jacket.

responses (with one exception). While some common refurbishment may be needed when fitting the jacket onto an older dummy, the tests demonstrated that once an older dummy was retrofitted with a new J2921 jacket, all parts on the dummy conformed dimensionally to the proposed subpart O engineering drawings.

Proposed Modifications

In the NPRM, NHTSA proposed to amend the chest jacket specifications in subpart O's regulatory text to incorporate by reference new versions of the drawing package, parts list and PADI. The proposed changes reflect the J2921 jacket design in which the breast contours are blended more gradually into the torso, compared to the current subpart O design where the breast contours are more sharply defined.

NHTSA proposed to adopt the specifications in SAE J2921 (Figures 4–6 in SAE J2921, which are engineering drawings of the SAE jacket design). However, we also proposed adding additional specifications for the jacket's contour that are not contained in SAE J2921. Our proposed additional specifications for the jacket's contour adds breadth, depth, and circumference dimensions at different section levels of the jacket on the main assembly drawing of the dummy (880105–000, Rev. N, Sheet 5). Dimensions are specified for a jacket fitted/worn on a dummy, *i.e.,* measurements would be recorded on the jacket as fitted/worn on a dummy positioned on the same flat-back bench as what is currently shown on 880105–000, Rev. N, Sheet 5. The additional dimensional specifications were intended to define the outer shape of the thorax and to preclude belt routing discrepancies. The information included additional views of the chest jacket at various cross sections.

In the NPRM, NHTSA tentatively concluded that the proposed jacket specification would ensure uniformity in the form, fit, and function of the HIII-5F. We also tentatively concluded that the proposed jacket specifications would encompass existing jackets that have been built to

the SAE J2921 specifications; the proposed specifications were developed in light of such existing jackets.

c. Spine Box

The spine box of the HIII-5F is the dummy's steel backbone. It is located in the dummy's thorax, which consists of six bands that simulate human ribs. The bands are made of spring steel, and a thick layer of graphite is bonded to each band to provide damping when the bands are deflected, thus giving them humanlike properties. On the posterior aspect of the thorax, the bands are affixed to the spine box. The spine box is currently specified in the parts and drawings document in drawings 880105-1000, and SA572-S28 with call-outs in 880105-300 and the PADI (p. 21).

In the mid-2000s, the SAE Task Force began an effort—in parallel with its efforts on the chest jacket—to find and eliminate a source of signal noise that sometimes emanated from the HIII–5F spine box. Alliance members determined that the noise was caused by loosening of six socket head cap screws attaching the spine box to the lower spine. Due to a design shortcoming, repeated crash testing loosened the screws so that they rattled against the inner walls of the through holes. This rattling led to artifacts in the signals of the accelerometers in the thorax during sled and crash tests. The problem affected FTSS and Denton units alike. Testing laboratories have been addressing this problem by disassembling the dummy and inspecting and tightening the screws routinely.

As a long-term solution, SAE developed an alteration to improve the spine box. Specifically, it recommended adding plates to the side of the spine box, with bolts countersunk into the plate to remove any play from the assembly. The alteration prevents the screws from loosening and eliminates the signal noise. NHTSA and others tested the new spine box fix as it was being developed. In 2011 SAE published an information report for the spine box modification (SAE J2915 AUG2011). This information report was revised in May 2022 (SAE

J2915 MAY2022). The updated information report does not contain any technical changes to the design and focuses on minor formatting and typographical changes.

Spine Box Testing

NHTSA's 2011 study and the SAE task force[18] showed that the spine modification had completely eliminated the noise emanating from the chest without affecting the response of the dummy in any other way. The study found that the spine boxes manufactured by different manufacturers were identical, suggesting that the spine box alterations are sufficiently specified. The study also concluded that the spine box was durable (did not loosen over repeated testing).

Proposed Modifications

In the NPRM, NHTSA proposed to change the spine box specifications to permanently fix the signal noise problem. The new versions of the drawing package, parts list, and PADI proposed for incorporation by reference include the SAE J2915 (Jan 2011)[19] specifications for the improved spine box. The proposed revisions would add plates to the side of the spine box, with bolts countersunk into the plate to remove any play from the assembly. The modification would increase the quality of data and reduce maintenance and testing time. The modification would not affect or change the dummy's performance in any way (other than eliminate the potential for noise).[20]

III. Summary of the Final Rule

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[18] Reported in SAE J2915.

[19] At the time of the NPRM, the most current SAE J2915 was the January 2011 version. Since the NPRM publication, this information report was revised in May 2022 (SAE J2915 May2022). The updated information report does not contain any technical changes to the design, and focuses on minor formatting and typographical changes.

[20] We note that the current subpart O ATD can be a valid test dummy without installing the new spine box, *i.e.,* users can address the signal noise problem by disassembling the dummy and inspecting and tightening the screws by hand on a routine basis. However, NHTSA believes that these efforts must be taken regularly to ensure that the ATD's thoracic data are not affected by the spine box signal noise, and that test evaluators should carefully review test data for signs of artifacts in the signals of the thorax accelerometers. As an alternative to checking bolt tightness on existing units or replacing the entire spine box, end-users, at their discretion, may opt to modify (rather than replace) their dummy's spine box as prescribed by SAE J2915. However, NHTSA's proposal does not include specifications for the modification.

After analysis of post-NPRM measurement data and commenters' data, this final rule adopts most of the NPRM's proposed specification with minor changes to ensure a sufficiently low level of variation between jackets fabricated by different manufacturers. The final rule revises the chest jacket and spine box specifications in subpart O that correct previous errors and ambiguities. A summary of the engineering changes is outlined in section VI and a full discussion of the engineering changes to the HIII–5F dummy, as discussed in this final rule, is found in a separate document docketed.[21]

For the jacket, the agency updates the values of some jacket dimensions to reflect more closely the larger pool of measurement data acquired since the NPRM. We also increase the dimensional tolerances in several places because the proposed tolerances were unnecessarily small. Additionally, a limited number of dimensions are revised to become "reference only" dimensions (which are useful during inspections) because the larger pool of data revealed that there were not consistent reference measurement points associated with them. Such "reference only" measurements are not required to be met by a compliant dummy. The additions and changes to the NPRM specifications will ensure uniformity in the form, fit, and function of the HIII–5F.[22]

For the spine box, NHTSA adjusts the mass specification slightly to reflect additional material that is added. No other changes are made for the spine box outside of the modification of the mass specification.[23]

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[21] Engineering Changes, Revision K, Hybrid III 5th Percentile Female Test Dummy, Part 572, Subpart O, Changes to: Parts List, Engineering Drawing Package, Procedure for the Assembly, Disassembly, and Inspection (PADI), Subpart O Regulatory Text, National Highway Traffic Safety Administration, January 2023.

[22] A full discussion of the data collected and updates made to the jacket dimensions and tolerances is described in a separate document docketed, Post-NPRM Analysis, HIII 5th Percentile Female Test Dummy Final Rule, Appendix B, Chest Jacket Analysis.

[23] A full discussion of the data collected, and updates made to the thorax weight, can be found in separate docketed document in Post-NPRM Analysis, HIII 5th Percentile Female Test Dummy Final Rule Appendix A, Spine Box Analysis.

Consistent with the NPRM, NHTSA has decided not to incorporate the mandrel[24] or the fit check procedure outlined in J2921. This final rule's updates to subpart O provide the necessary dimensions for the jacket. If there is a concern regarding shrinking of the jacket, measurements can be taken to confirm dimensionality. It would be up to the individual measurement taker whether to utilize the mandrel as part of the jacket fit check. In the Alliance's supplemental submission to NHTSA, the Alliance clarified that it was not requesting that the agency specify use of the mandrel. In the NPRM, the agency tentatively decided not to incorporate the mandrel or the fit check procedure outlined in J2921 and asked for comments on the mandrel. Commenters recommended using the mandrel when taking measurements of the jacket dimensions. NHTSA disagrees with the need to include a mandrel. Both the NPRM and post-NPRM analyses have been shown to meet the dimensional requirements by recording measurements on unworn jackets that were set up in the specified configuration without use of the mandrel. We recognize that when the proposed jacket is used on an existing dummy, the dummy may require some amount of re-tuning or refurbishment to pass the part 572 subpart O qualifications tests, but this need is common when worn parts are replaced. As SAE mentioned, the mandrel was intended to be used only to test the fit of the jacket as the jacket ages. As such, the mandrel can be used as an optional inspection device.

Overall measurement data confirms that the proposed and final rule jacket specifications encompass existing jackets that have been built to the SAE J2921 specifications. Therefore, the final rule effectively remains the same as the proposed rule.

IV. Post-NPRM Measurement and Analysis

After the NPRM publication, NHTSA continued to collect measurement data on newly purchased jackets to check whether the dimensions and tolerances proposed (including those

[24] SAE J2921 describes a mandrel to assess the fit of the jacket. Because jackets tend to shrink over time, the mandrel was developed to assess jacket fit as it ages.

derived from J2921 drawings and the new section dimensions added by NHTSA) were being met by SAE jackets already in the field. We also examined all measurement data provided by the commenters. Here, we provide a summary of the measurement and final rule changes. A full discussion of the process and the data collected can be found in a separate document being placed in the docket for this rulemaking.[25]

In defining the jacket in the NPRM, we proposed "unworn" dimensional requirements and "worn" dimensional requirements. The "unworn" dimensional measurements are taken on the jacket as a standalone component on the benchtop, while the "worn" measurements are taken on the underlying dummy. Additional measurements were included to our pool of "worn" and "unworn" data.[26] From this body of data, the final rule largely adopted the proposal with adjusted dimensions and tolerances to ensure that jackets in the field achieve an acceptable degree of conformity while still assuring a high level of uniformity.

For the "unworn" requirements, we are replacing the old, 2002 part 572 subpart O engineering drawings of the jacket with new drawings based on the drawings contained within SAE J2921. For the "worn" requirements, we specify additional dimensional requirements for the jacket's contours that are not contained in SAE J2921. They include dimensions for the jacket's breadth, depth, and circumference at different section levels. Detailed specification changes are described in the January 2023 Engineering Changes document.[27]

"Unworn" Measurements

The drawings containing the "unworn" measurements have several updates to account for a larger set of data.[28] Updates have also been made to create reference dimensions for some

[25] Post NPRM Analysis, HIII 5th Percentile Female Test Dummy Final Rule, Appendix B – Chest Jacket Analysis.
[26] *Id*. at 25.
[27] *Id*. at 21. Engineering Changes, Revision K, Hybrid III 5th Percentile Female Test Dummy, Part 572, Subpart O, Changes to: Parts List, Engineering Drawing Package, Procedure for the Assembly, Disassembly, and Inspection (PADI), National Highway Traffic Safety Administration, January 2023.
[28] *Id*. at 25.

measures. Review of the data provided in comments to the NPRM revealed that HIS had not reported all of the dimensional measurements of the jacket. Of the "unworn" dimensional data that HIS reported, HIS data were shown to be within the tolerances specified closely with the final rule.[29] In other words, the additional NHTSA measurements and the October HIS data, when viewed independently, both confirm each other.

The shape and configuration of the jacket defined in the final rule is identical to that of the engineering drawing contained within SAE J2921. As noted previously, NHTSA's engineering drawing incorporates several additional "unworn" dimensions that are needed to fully specify the jacket and preclude variations between future jackets fabricated by different manufacturers. NHTSA's additional dimensional requirements include arm hole specifications and reference (ref) dimensions for the breast location.

"Worn" Measurement

The "worn" dimensional requirements have four section levels specified for the jacket when fitted on the underlying HIII-5F dummy positioned on the same flat-back bench as what is currently shown on 880105-000, Rev. J, Sheet 5. The dimensional specifications define the outer shape of the thorax to preclude belt routing discrepancies that were the source of the thorax deflection differences described above. The requirements are also needed to ensure a sufficiently low level of variation between future jackets fabricated by different manufacturers.

The final rule updates the tolerances for the breadth and circumference measurements. With a few exceptions, all existing new SAE jackets were demonstrated to be within the dimensional requirements in the final rule. The final rule demonstrates that current SAE jackets now in the field conform to the new subpart O dimensional requirements. However, the final rule does not guarantee that all new jackets will fit properly on all underlying HIII-5F units. Similar to all other device measurements, diligence is needed to select a jacket for a particular

[29] *Id*. at 25.

dummy to ensure that all jacket-on-dummy requirements are met. NHTSA reviewed the provided data from HIS regarding the "worn" measurements and noted some recurring inconsistencies with NHTSA's own data.[30]

V. Response to Comments

In the NPRM, we sought comment on the proposed specifications, including the dimensions not specified in the SAE J291 report. We sought information and data on whether existing jackets built to SAE J2921 on existing dummies will meet the proposed specifications. NHTSA also sought comment on what (if any) additional information, such as tolerance specifications, is needed to fully specify the jacket to ensure that jackets produced by different manufacturers perform equivalently. We also sought comment on the proposed approach of specifying dimensions for the jacket as fitted on a dummy, including whether additional subpart O qualification tests are necessary.

Section IV addresses the specific dimensional specifications based on post-NPRM measurement data analysis. This section will focus on the commenters' specific approach of specifying jacket dimensions. Further discussion of the comments can be found in a separately docketed document.[31]

a. Dimensional Targets and the Use of Mandrel

The mandrel was developed and described in the SAE information report (SAE J2921) describing the harmonized jacket. In the SAE report, it was noted that the jackets tend to shrink over time. The mandrel was developed to assess jacket fit as it ages. There are reference marks on the back, bottom, and top of the mandrel that serve as indicators that the jacket has shrunk to the point where a replacement is recommended.

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[30] A further discussion and analysis of the provided data is shown in Appendices B and C of the Post-NPRM Analysis, HIII 5th Percentile Female Test Dummy Final Rule, a separately docketed document.
[31] Post-NPRM Analysis, HIII 5th Percentile Female Test Dummy Final Rule, Appendix C – Response and Analysis of Comments Received.

In the NPRM, NHTSA considered the need for the mandrel and tentatively decided not to incorporate the mandrel in the fit check procedure outlined in SAE J2921, but did request comment.

Comment

In response to the NPRM, comments recommended a new use of the mandrel, outside of the initial design. Both HIS and the Alliance commented that the mandrel should be incorporated and used for taking dimensional measurements of the jacket. Concerns were raised regarding some of the measurements to be taken when the jacket is zipped onto the underlying dummy (worn) and difficulty in reliably obtaining those measurements. These concerns were based on the need to measure the jacket and obtain dimensional measurements within the tolerances. Commenters recommended the use of the mandrel as a tool to constrain the torso and take all measurements on/with the mandrel. The commenters noted that the mandrel would provide a repeatable means to set up the jacket for dimensional measurement. Commenters cited a need to have the mandrel to ensure jacket measurement consistency and cited poor Gage repeatability and reproducibility when the mandrel was not used.

Response

The use of the mandrel for taking dimensional measurements of the jacket represents a new use for the mandrel and was not part of the petition for rulemaking. The Alliance's supplemental submission to NHTSA clarified that it was not requesting that the agency specify the use of the mandrel.[32] The NPRM sought comments on the mandrel's use in SAE J2921. The SAE J2921 design used the mandrel for a fit check when the jacket has shrunk. The comments received proposed using the mandrel in a new way: to take dimensional measurements of the jacket in lieu of placing the jacket on the underlying dummy.

[32] *See* Letter from Scott Schmidt, Alliance, to NHTSA (Feb. 21, 2014); Letter from Scott Schmidt, Alliance, to NHTSA (May 11, 2015.

There are several technical reasons why the mandrel is not adopted in the final rule. Overall, NHTSA disagrees with the need for a mandrel to meet the final jacket measurement specifications but agrees it can be used as an optional inspection device. When the jacket is being prepared for testing, entities subject to FMVSS testing are free to use the mandrel as an inspection device for shrinking of the jacket or when configuring the unworn jacket before taking certain measurements. However, NHTSA will not include the mandrel in subpart O nor will it specify use of the mandrel.

Based on NHTSA's overall assessment of the data provided, the agency believes that the "worn" and "unworn" dimensions specified in the final rule remain sufficient for a determination of acceptable jacket size, without the need for a mandrel. NHTSA was able to record all the measurements in both a "worn" and "unworn" state for the dummy within tolerances, except for a few instances.

The purpose of an engineering drawing is to record and convey the dummy's requirements which is to be used in FMVSS testing. The drawings must include sufficient information to enable production planning, manufacture, assembly, testing, and inspection of individual parts and assemblies. The entire jacket-on-dummy assembly is specified by part 572, not just the individual parts. The jacket itself is made of a flexible material that is placed over the underlying dummy. The contour locations of the jacket relative to a vehicle shoulder belt are affected by the underlying structure of the dummy. Thus, those dimensions are specified on the assembly drawing of the dummy, known as "worn" dimensions when the jacket is fitted/zipped on the underlying dummy structure. It is important for the drawings to include the underlying dummy, to ensure that the external dimensions of the assembled dummy are consistent and within tolerance. Checking dimensional measures when the jacket is off the underlying dummy, even with the use of the mandrel, is not sufficient.

In addition to exterior dimensions of the full dummy assembly, individual parts are also specified on separate engineering drawings. The part drawings specify the construction and material of the jacket. They also specify jacket dimensions that do not depend on the underlying dummy. These dimensions are referred to as the "unworn" dimensions. For the jacket, the "unworn" dimensions, together with the "worn" assembly dimensions, are needed to ensure uniformity of the dummy as a whole. A separate jacket drawing is needed, just as separate drawings for other parts are needed. Thus, it is appropriate to have dimensions for the jacket on separate jacket-only drawings in the "unworn" condition.

NHTSA analyzed both our own data and the commenters' data. Both datasets have shown that the finalized specifications were achieved consistently within the tolerance ranges. Thus, the specifications ensure that current and future chest jackets will have sufficient uniformity. Notably, NHTSA's own measurements were recorded without the aid of a mandrel and still met the final rule specifications. This result confirms the validity of NHTSA's specifications without the use of mandrel. NHTSA's analysis of its post-NPRM data and commenters' measurement data is further detailed in section IV.

The use of the mandrel, if implemented in subpart O, would require new drawings with dimensions and tolerances to properly and repeatably specify the mandrel. This need would likely create new discrepancies. While J2921 depicts a drawing of the mandrel, it does not provide details or dimensions on the shape of the mandrel. Also, neither J2921 nor the commenters provided an objective fit criterion for a mandrel or mandrel-specific test procedure. Without the exact specification of the mandrel, contrary to the commenters' suggestion, the introduction of a new device here would create more variation for the jacket.

NHTSA also disagrees with the commenters' use of Gage repeatability and reproducibility (Gage R&R) analysis as further support that a mandrel is needed. A gage is a device used to obtain measurement. Here, a mandrel is described by SAE as a fit check device,

not a measurement device. The purpose of a Gage R&R analysis is to assess the quality of the measurement system if there is reason to believe the measurement discrepancy is due to the measurement device itself. Because NHTSA's proposed and final specification of dummy parts and assemblies does not introduce a new measurement device, NHTSA did not perform a Gage R&R. Analysis of Gage R&R is further discussed under the agency's response to comment section on the use of another measurement device.

It is important to note that just because a measurement is not within tolerances, it does not necessarily mean that the jacket is out of specification or cannot be used. For the "worn" dimensions in particular, the dimensions are affected by how the jacket is placed over the underlying dummy structure. If the specified dimensions are not met initially, the jacket can be adjusted and the measurements taken again. Note 7 on drawing 880105-000, Complete Assembly, confirms this possibility: "If the z-coordinates of the A-Pts are not within 5 mm of the target height of 10.23 in. (265 mm), re-seat the jacket be rolling it fore/aft against the shoulder to move the z-coordinate closer to the target height while maintaining the position of the H-point. The re-seated jacket shall rest in contact with the underlying shoulder pads with no gap between the pads and the jacket or between the pads and the clavicle castings."

b. Certification

The Alliance recommended the use of the mandrel as part of the jacket production process. Specifically, the Alliance noted that the jacket should be certified by its manufacturer on the mandrel and using a 3D measurement device such as a Faro arm.

Response

Dummy jacket certification requirement is not within NHTSA's authority and role. NHTSA does not certify the ATDs specified in part 572, nor does NHTSA certify any of the components used in the ATDs. NHTSA specifies the ATDs in part 572 used for FMVSS testing. Part 572 specifications lay out the technical aspects of the ATD. ATD manufacturers produce

the ATD and can choose to make a dummy meeting those specification. Then, under the self-certification process, motor vehicle original equipment manufacturers (OEMs) self-certify compliance with applicable FMVSS—in this case, FVMSS No. 208.[33] OEMs could choose to incorporate a mandrel as part of their certification process.

c. Annual Inspection Specification

HIS and the Alliance recommended an annual check of jackets by users with a measurement of eight critical dimensions on the mandrel. These eight critical measurements would check for shrinkage that could occur over time as a jacket ages.

Response

While the final rule is not including the mandrel as part of the fit check procedures to the HIII-5F jacket specification, OEMs and testing labs are not prohibited from using the mandrel as an optional device part of their routine inspection process.

Part 572 specifies the parts used on the dummy, but it does not specify any maintenance schedule or discuss any states of disrepair. Generally, other than the specifications in PADIs, there are no annual inspection criteria included. NHTSA will not be including additional inspection parameters as part of the PADI.

d. Other Measurement Device

HIS and the Alliance recommended that NHTSA stipulate that all measurements should be recorded using a digital Faro arm, or equivalent Coordinate Measuring Machine (CMM) system. HIS reasoned that measurements taken by standard gages are not sufficiently definitive, as evidenced by poor Gage repeatability and reproducibility results.

Response

[33] *See* 49 CFR part 567.

Specification of a specific measurement technique, such as the use of a CMM system, is not included in part 572. Part 572 defines the dimensions of the dummy and provides the PADI and qualification procedures to ensure it is responding as expected. Part 572 does not dictate the equipment used to take those measurements. Nonetheless, NHTSA carried out an assessment by comparing operator measurements of multiple jackets using basic levels and calipers vs. the more sophisticated Faro arm.[34] A Faro arm is a digital device that records precise three-dimensional coordinates. It is a brand name for a type of CMM.[35] The digital measurement device often provides a more precise means to record measurement but such a device may not always be available.

NHTSA's assessment had two objectives. The first was to determine whether both the digital device and the conventional device,[36] in this case a caliper here, could achieve the proposed jacket specification within the tolerance. The second objective was to determine whether there is a significant difference/deviation between the measurements taken by the two gages that the final rule requires gage-specific information.

NHTSA's gage device analysis showed that both types of measuring devices met the finalized nominal target value. In other words, both devices can properly measure the finalized jacket specifications. Although the Faro arm did have slightly more consistency than using the calipers, there is no significant difference in the use of Faro versus the conventional gage.

Instead, NHTSA found that the jacket setup, rather than the measuring device itself, had an impact on the measurements taken. To remedy this inconsistency, the final rule contains a new stipulation on the assembly drawing to reposition the jacket (880105-000, Complete Assembly, Hybrid HIII-5F).

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[34] Post-NPRM Analysis, HIII 5th Percentile Female Test Dummy Final Rule, Appendix C–Response and Analysis of Comments Received.
[35] Compared to conventional devices (measuring tables, calipers, dial gauges) a CMM device provides a convenient and oftentimes more precise means to record measurements.
[36] Examples of conventional devices include measuring tables, calipers, and dial gauges.

For the final rule, NHTSA is not requiring a specific gage to use for jacket measurements. It is not uncommon for different labs to use different techniques. Even with different measurement techniques, NHTSA's analysis has demonstrated it is possible to successfully measure the dimensions of the jackets. General care when placing the jacket onto the dummy can ensure it is consistently placed for measurement. Measurement with a CMM or calipers has been shown to yield consistent results that meet the final rule jacket specifications.

e. Spine Box

HIS supported NHTSA's proposed adoption of the SAE spine box to eliminate the mechanical noise from the chest accelerometers while preserving the dynamic response. However, based on HIS's review of fourteen ATDs, HIS requested NHTSA update the mass specification from one of the drawing documents (880105-000(-H) Sheet 6) to account for the additional mass from the bolt plates added to the spine box.

Response

NHTSA evaluated the ATDs that had the old spine box replaced (the original FTSS and Denton units) and newer HIII-5F units that incorporated the proposed SAE spine box design. After evaluation of weight measurements from existing and new ATDs,[37] NHTSA is adopting the mass specification change, specifically the upper torso assembly segment weight specification. It was noted that the plates added a small additional weight to the torso of the dummy and could cause the specifications to fall outside of the tolerance. While the final rule also adopts the SAE chest jacket design, the jacket's mass is not different from the prior FTSS and Denton versions. Consequently, the torso mass difference is due to the added bolt plates. The increase in torso mass specification is adopted in two places in the assembly engineering drawing in 880105-000(-H) Sheet 6.

[37] Post-NPRM Analysis, HIII 5th Percentile Female Test Dummy Final Rule, Appendix A–Spine Box Analysis.

f. Sample Size

Ms. Sial, an individual commenter, supported NHTSA's jacket specification update. However, to obtain a measurement that more accurately reflects the average U.S. women, Ms. Sial recommended basing the new proposed chest jacket dimension on a larger sample size, such as the mean body measurement data from the Centers for Disease Control and Prevention (CDC).

Response

When NHTSA develops a new crash test dummy, the agency updates the dummy anthropometry to consider human anthropometry measurements, such as those maintained by the CDC (among other factors). However, this rulemaking is not a revision to the anthropometry of the dummy for a new crash test dummy; therefore, a revision to the basic anthropometry of the dummy is outside of the scope of the final rule. Rather, the NPRM and now final rule resolves discrepancies between the jacket specifications in subpart O and jackets available in the field. The jacket specifications are developed from SAE J2921 to update the current crash test dummy's engineering components. These changes ensure a sufficiently low level of variation between jackets fabricated by different manufacturers.

Ideally, dummy jackets should have identical dimensions. However, there are measurement variabilities due to differences in manufacturing, set up, and measurement processes. Thus, jacket specifications include tolerances to account for measurement variability. For the NPRM, NHTSA conducted its own measurements and testing for the proposal. Following the NPRM and reviewing of comments received that included jacket measurement data, the agency continued to collect additional measurements to check whether the dimensions and tolerances proposed (including those derived from J2921 drawings and the new section dimensions added by NHTSA) were being met by SAE jackets already in the field for the final rule. Continuing to obtain jacket measurements allowed the agency to establish an average

measurement and tolerance of the dimensions for finalized drawings and ensure that the finalized tolerances and dimensions achieve an acceptable degree of consistency, conformity, and uniformity.

VI. Changes to the Drawing Package and PADI

NHTSA proposed to amend the subpart O regulatory text to incorporate by reference new versions of the drawing package, parts list and PADI. The final rulemaking closely reflects the revisions in the NPRM. Some new revisions have been added in the final rule. Below is a summary of the changes. All revisions are fully described in more detail in a separate document being placed into the docket for this rulemaking.[38]

Chest Jacket Drawing

For the final rule, NHTSA's new drawings, the Chest Flesh Assembly (880105–355–H, Sheets 1 and 2) and the Sternum Pad (880105–356–H), include some dimensional changes to reflect a larger pool of data. New reference dimensions are also added for the jacket. NHTSA also revises drawing 880105–000, Complete Assembly, 5th Female, Rev J, Sheet 5 to add jacket dimensions at various cross sections and revise the call-out to the jacket in drawing 880105–300 to reference the new drawing. We are also making some corresponding changes to the PADI.

To summarize the changes to the new drawing package, the drawings in which the chest jacket is currently specified (880105–355–E, 880105–356, 880105–423, and 880105–424) are replaced with:

- 880105–355–H, Rev B, Chest Flesh Assembly, Sheet 1
- 880105–355–H, Rev B, Chest Flesh Assembly, Sheet 2

[38] Engineering Changes, Revision K, Hybrid III 5th Percentile Female Test Dummy, Part 572, Subpart O, Changes to: Parts List, Engineering Drawing Package, Procedure for the Assembly, Disassembly, and Inspection (PADI), National Highway Traffic Safety Administration, January 2023.

- 880105–356–H, Rev C, Sternum Pad

880105-000, Complete assembly, Hybrid III 5th female

In the final rule, sheet 5 is redrawn to reflect the NPRM and final rule note changes. The dimensions remain the same as in the NPRM. Changes from the NPRM include that in note 5, the tolerances are updated on the section dimensions based on post-NPRM data to achieve an acceptable degree of conformity while still ensuring a high level of uniformity. For note 6, metric dimensions are given to aid in clarity. For note 7, a description is added for how to properly adjust the jacket fit on the dummy to aid in setup.

880105-000, Complete assembly, Hybrid III 5th female, Sheet 6, Assembly Weights table

Upper torso assembly with jacket (see Table 1 for parts included).

Was: 26.50 +/- 0.30 lbs (12.02 +/- 0.14 kg)

Now: 26.90 +/- 0.30 lbs (12.20 +/- 0.14 kg)

Total dummy weight.

Was: 108.03 +/- 2.00 lbs (49.05 kg +/- 0.91 kg)

Now: 108.43 +/- 2.00 lbs (49.18 kg +/- 0.91 kg)

Spine box torso mass specification is updated following further comment analysis. Specifically, the nominal value is shifted from to 26.90 +/- .30 lbs. from 26.50 +/- .30lbs. This change will allow the corridor to shift upwards of 0.40 lbs and the total dummy weight from 108.03 +/-2.50 lbs to 108.43 +/- 2.50 lbs. The final rule's weight specification would not affect or change the dummy's performance in any way (other than eliminate the potential for noise).

The final rule also corrects an old metric conversion error between pounds and kilograms. Specifically, the old metric conversion for 108.03 lbs. was incorrectly listed at 49.05 kg. It

should have been 49.00 kg. The changes to the affected drawings are described in more detail in a separate document being placed into the docket for this rulemaking.[39]

Jacket PADI

The PADI provides specifications on how to assemble the dummy above and beyond the engineering drawings. Given the dummy is frequently dissembled, the PADI includes a check on the exterior dimension to ensure that all assemblies and fitted parts are properly installed on the reassembled dummy. This exterior dimension corresponds to the specification changes to Drawing No. 880105-000, Complete assembly, 5th female, Rev. N, Sheet 5. In addition, the mass tables are removed from the PADI as they are already present within the drawing package. Detailed changes are further specified in the separate document being docketed.[40]

Spine Box

The new versions of the drawing package, parts list, and PADI incorporated by reference include the SAE J2915 specifications for the improved spine box. The final rule revisions add plates to the side of the spine box, with bolts countersunk into the plate to remove any play from the assembly. NHTSA's new engineering part and assembly drawings include the revised spine box to replace the current spine box drawings with the following:

- 880105–1045, Rev C, Hybrid III 5th Female Thoracic Spine Upgrade, Sheets 1–3
- 880105–1047, HIII–5F Plate, Thoracic Spine Upgrade
- SID–070–6, Rev B, DOT–SID, Modified 5/16–18x5/8" SHCS

VII. Housekeeping Amendments

[39] Engineering Changes, Revision K, Hybrid III 5th Percentile Female Test Dummy, Part 572, Subpart O, Changes to: Parts List, Engineering Drawing Package, Procedure for the Assembly, Disassembly, and Inspection (PADI), National Highway Traffic Safety Administration, January 2023.
[40] *Id*.

In the final rule, NHTSA adopts all of the proposed housekeeping and other amendments to subpart O below.

1. NHTSA amends the title of subpart O to add the word "adult" between "5th percentile" and "female" for clarity.

2. The agency removes the words "Alpha Version" from the title of subpart O. During adoption of some of the subparts of part 572 NHTSA had decided that referring to the alpha, beta, etc., "versions" of the test dummies would better distinguish a current version of an ATD from a previous version. The agency later decided this naming convention was not helpful and has not followed it. Accordingly, for the final rule, NHTSA removes "Alpha Version" from the title of subpart O since the naming convention is no longer used.

3. This final rule revises subpart O's references to SAE J211 parts 1 and 2 and to SAE J1733 to refer to updated versions of the standards. SAE J211 is revised with improved diagrams for defining the dummy coordinate system, and corrections to minor mistakes in print. New information and recommendations for data system grounding, sensor cable shielding, and minimizing the effects of transducer resonance are included. Clarifications on data processing are also included. J1733 is revised with improved diagrams for defining the dummy coordinate system (for the HIII-5F, the system itself is unchanged).

VIII. Lead Time

In the NPRM, NHTSA proposed to make subpart O – the specifications for the chest jacket and spine box – effective 45 days after the publication of the final rule.

The Alliance commented that the 45-day lead time is not sufficient time for the adoption of the new proposed chest jacket and spine box specification. The commenter noted that

NHTSA did not account for the time needed for compliance testing. Instead of a 45-day effective date, the Alliance suggested a lead time of five years,[41] and that until the effective date, the new specification be optional.

Response

After consideration of the comment and post-NPRM analysis of the proposed and final specification, NHTSA believes the 45-day lead time remains sufficient because the agency does not believe that testing under FMVSS No. 208 would be significantly affected by the final rule.

FMVSS No. 208 specifies that NHTSA is to use the subpart O dummy in its compliance tests. As discussed previously, if manufacturers are not using the final rule's jacket for certification, NHTSA will ask manufacturers to identify an FTSS or Denton jacket for NHTSA to use in its compliance testing. This rulemaking does not change any existing process for vehicle certification with the manufacturer-identified jackets. This rulemaking solely adds the new jacket specifications to part 572 and in turn for FMVSSS No. 208 testing. This final rule does not impose any new requirements on anyone.

Some vehicle manufacturers already use the SAE jackets on the ATD. Moreover, because none of the dummy jackets that are currently in use correspond to the existing subpart O specifications, there should be no issue with taking an existing dummy out of conformity with the implementation of this rule. Post-NPRM measurement included new SAE jackets that are currently used in the field and conformed to the final rule specifications. The improved spine box is not expected to affect dummy performance because the revision only acts to remove the unwanted artifact of loose bolts rattling.

Manufacturers wishing to test with the final rule's jacket and spine box should have no difficulty obtaining the necessary parts. In the Alliance's supplemental petition letter, the

[41] In its February 21, 2014 petition, the Alliance recommended that compliance with the new specifications should be optional for a period of five years.

Alliance indicated that all parts associated with the proposed jacket and spine box changes are available, and there should not be any difficulties meeting anticipated demand. NHTSA believes that the introduction of the new parts is part of the normal maintenance of jackets as it ages and it would not create any significant increases in the workload necessary to maintain the dummies.

Lastly, a shortened lead time is desirable because the changes are beneficial for testing laboratories. We believe that the final rule's jacket and spine box changes will likely lead to diminished laboratory technician workload. A common jacket design will eliminate the need to deal with multiple jacket versions. The new spine box will also lighten laboratory workload by eliminating the need to re-torque the bolts between tests. With respect to levels of effort and technician training needed to modify and maintain the new jacket and spine box, the Alliance indicated in its supplemental letter that both modifications are well within the technical competency of existing laboratory technicians.

IX. Regulatory Analyses and Notices

Executive Order 12866, Executive Order 14904, Executive Order 13563, and DOT Regulatory Policies and Procedures

NHTSA has considered the potential impact of this final rule under Executive Order 12866, Executive Order 14094, Executive Order 13563, DOT Order 2100.6A, and the Department of Transportation's regulatory policies and procedures. This final rule is not considered to be significant under the Department of Transportation's regulatory policies and procedures (44 FR 11034, February 26, 1979).

As stated in 49 CFR 572.3, *Application,* part 572 does not in itself impose duties or liabilities on any person. It only serves to describe the test tools that measure the performance of occupant protection systems. Thus, this part 572 final rule itself does not impose any requirements on anyone. Businesses are affected only if they choose to manufacture or test with

the dummy. Because the economic impacts of this rule are minimal, no further regulatory evaluation is necessary.

This final rule finalizes changes to the specifications of the HIII-5F chest jacket and spine box. For entities testing with the dummy, the finalized revisions are intended to resolve issues with the fit and availability of the jacket and a noise artifact from the spine box. Neither change would impose new requirements on vehicle manufacturers.

With respect to benefits, the dummy would not change in any way other than to improve its usability and objectivity. This rulemaking benefits the public by specifying a more objective test tool, which lessens the burden of dummy end-users in performing tests and interpreting test results. It also benefits vehicle manufacturers by providing certainty about which test jacket and spine box NHTSA will use in compliance tests with the HIII 5th percentile adult female ATD, and assurance about the continued availability of the jacket. This rulemaking benefits NHTSA as the agency would no longer have to maintain test jackets of different designs and take steps to match the compliance test jacket with that specified by the vehicle manufacturers. Specifying the new test jacket and spine box ensures the long-term availability of a test jacket for compliance tests.

The costs associated with this rulemaking are limited to those associated with acquiring new dummy parts. We conclude that the finalized changes would not necessitate the purchasing of any parts that would not have been purchased in the normal course of business in the absence of the finalized changes.

We do not believe the finalized chest jacket changes will impose any additional costs compared to what would have been expended if we did not adopt the proposed changes. Because a chest jacket eventually wears out, it must be replaced. Dummy refurbishments and part replacements are a routine part of ATD testing. The agency understands that industry has essentially run out of its supply of the older FTSS and Denton jackets. We further understand

that industry has been replacing worn-out FTSS and Denton jackets with new jackets built to the SAE J2921 specifications. While the FTSS and Denton jackets are not consistent with the finalized specifications, we believe that chest jackets built to the SAE J2921 specifications would meet the finalized specifications. Because industry and testing labs need to replace the chest jacket in the regular course of business—regardless of whether the proposed changes are adopted—and the only available replacement chest jackets conform to the finalized specifications, we believe the finalized chest jacket specifications would not impose any additional costs on industry.[42]

The revised spine box, which is not typically replaced during routine maintenance, costs about $3,000.[43] End users do not have to purchase a revised spine box. They can compensate for the design shortcoming of the current spine box by disassembling the dummy and re-torquing the relevant fasteners by hand before each test.

Executive Order 13609: Promoting International Regulatory Cooperation

The policy statement in section 1 of Executive Order 13609 provides that the regulatory approaches taken by foreign governments may differ from those taken by the United States to address similar issues, and that in some cases the differences between them might not be necessary and might impair the ability of American businesses to export and compete internationally. It further recognizes that in meeting shared challenges involving health, safety, and other issues, international regulatory cooperation can identify approaches that are at least as

[42] For the HIII-5F, a new jacket costs about $1,300. This is an updated estimate from the NPRM's approximate cost of $850. If a new jacket is installed on an existing dummy, additional refurbishments or tuning of that dummy may be needed for it to pass the subpart O qualification tests. Depending on the condition and age of the dummy, several other parts may need to be replaced at a cost of up to $10,000. However, dummy refurbishments and part replacements are an inherent part of testing and many of the additional parts are often replaced on a regular schedule. In other words, some of the parts would eventually be replaced, and the costs of the replacement parts can be amortized over a number of tests.

[43] This cost was originally estimated to be approximately $600 during the NPRM stage. This estimation has been updated for the final rule.

protective as those that are or would be adopted in the absence of such cooperation and can reduce, eliminate, or prevent unnecessary differences in regulatory requirements.

The finalized revisions are intended to resolve issues with the fit and availability of the jacket and a noise artifact from the spine box. Neither change would impose new requirements on vehicle manufacturers. NHTSA does not believe the final rule would lead to any reduction in harmonization.

Executive Order 13045

Executive Order 13045 (62 FR 19885, April 23, 1997) applies to any rule that: (1) is determined to be "economically significant" as defined under E.O. 12866, and (2) concerns an environmental, health, or safety risk that NHTSA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, we must evaluate the environmental health or safety effects of the planned rule on children and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by us.

This final rule is not subject to the Executive order because it is not economically significant as defined in E.O. 12866.

Incorporation by Reference

Under regulations issued by the Office of the Federal Register (1 CFR part 51), an agency, as part of a proposed rule that includes material incorporated by reference, must summarize material that is proposed to be incorporated by reference and must discuss the ways the material proposed to be incorporated by reference is reasonably available to interested parties or how the agency worked to make materials available to interested parties. At the final rule stage, regulations require that the agency seek formal approval, summarize the material that it incorporates by reference in the preamble of the final rule, discuss the ways that the materials is

reasonably available to interested parties, and provide other specific information to the Office of the Federal Register.

In this rule, NHTSA incorporates by reference updated versions of a parts list, a set of drawings, and a manual into 49 CFR part 572, subpart O. After seeking comments and the agency's measurement analysis, we believe the updated versions contain additional specifications and illustrations that are helpful for end users who are attempting to qualify the ATD. This material is published by NHTSA. The contents of the documents are summarized in section VI above, and the documents incorporated by reference are placed in the docket for this rulemaking for interested parties to review. The following updated parts list, drawings, and a manual appear in the amendatory text of this document and earlier versions were previously approved for the locations in which these updated versions appear now: *Parts and Drawings List, Part 572 Subpart O, Hybrid III Fifth Percentile Small Adult Female Crash Test Dummy (HIII-5F)*, revised December 2022; *Engineering Drawings, Part 572 Subpart O, Hybrid III Fifth Percentile Small Adult Female Test Dummy (HIII-5F)*, revised December 2022; *Procedures for the Assembly, Disassembly, and Inspection (PADI), Hybrid III Fifth Percentile Adult Female Test Dummy (HIII-05F)*, revised June 2022.

This final rule also incorporates updated versions of SAE Recommended Practice J211/1 parts 1 and 2 and SAE J1733. Older versions of these documents were previously incorporated by reference into subpart O. The changes in the updated versions are summarized in section VII above and under the National Technology Transfer and Advancement Act rulemaking analysis below. The versions previously incorporated by reference are available in SAE International's online reading room.[44] The updated versions incorporated by reference in this final rule are available for review at NHTSA and are available for purchase from SAE International at https://www.sae.org.

[44]www.sae.org/standards/reading-room.

NHTSA has placed a copy of the parts list, set of drawings, and manual in the docket for this final rule. Interested persons can obtain a copy of the material or view the material online by accessing www.regulations.gov; phone: (877) 378-5457; or by contacting NHTSA's Chief Counsel's Office at the phone number and address in the **FOR FURTHER INFORMATION CONTACT** section of this document. The material is also available for inspection at the Department of Transportation, Docket Operations, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC; phone: (202) 366-9826.

Executive Order 13132 (Federalism)

NHTSA has examined this rule pursuant to Executive Order 13132 (64 FR 43255, August 10, 1999) and concluded that no additional consultation with States, local governments, or their representatives is mandated beyond the rulemaking process. The agency has concluded that this rule will not have sufficient federalism implications to warrant consultation with State and local officials or the preparation of a federalism summary impact statement. The rule does 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 compliance 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.

NHTSA rules can also preempt State law if complying with the FMVSS would render the motor vehicle manufacturers liable under State tort law. 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. 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 rule could or should preempt State common law causes of action. The agency's ability to announce its conclusion regarding the preemptive effect of one of its rules reduces the likelihood that preemption will be an issue in any subsequent tort litigation. To this end, the agency has examined the nature (i.e., the language and structure of the regulatory text) and objectives of this rule and finds that this rule, like many NHTSA rules, would prescribe only a minimum safety standard. As such, NHTSA does not intend this rule to preempt state tort law that would effectively impose a higher standard on motor vehicle manufacturers. Establishment of a higher standard by means of State tort law will not conflict with the minimum standard adopted here. Without any conflict, there could not be any implied preemption of a State common law tort cause of action.

Severability

The issue of severability of FMVSSs is addressed in 49 CFR 571.9. It provides that if any FMVSS or its application to any person or circumstance is held invalid, the remainder of the part and the application of that standard to other persons or circumstances is unaffected.

Regulatory Flexibility Act

The Regulatory Flexibility Act of 1980 (5 U.S.C. 601 *et seq.*) requires agencies to evaluate the potential effects of their proposed and final rules on small businesses, small organizations, and small Government 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)).

The Act requires agencies to prepare and make available an initial and final regulatory flexibility analysis (RFA) describing the impact of proposed and final rules on small entities. An RFA is not required if the head of the agency certifies that the proposed or final rule will not have a significant impact on a substantial number of small entities. The head of the agency has made such a certification with regard to this final rule.

The factual basis for the certification (5 U.S.C. 605(b)) is set forth below. Although the agency is not required to issue an initial regulatory flexibility analysis, this section discusses many of the issues that an initial regulatory flexibility analysis would address.

Section 603(b) of the Act specifies the content of an RFA. Each RFA must contain:

1. A description of the reasons why action by the agency is being considered;

2. A succinct statement of the objectives of, and legal basis for a final rule;

3. A description of and, where feasible, an estimate of the number of small entities to which the final rule will apply;

4. A description of the projected reporting, recording keeping and other compliance requirements of a final rule including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;

5. An identification, to the extent practicable, of all relevant Federal rules which may duplicate, overlap or conflict with the final rule;

6. Each final regulatory flexibility analysis shall also contain a description of any significant alternatives to the final rule which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the final rule on small entities.

A description of the reason why action by the agency is being considered and the objectives of, and legal basis for, the final rule are discussed at length earlier in this document.

NHTSA has considered the effects of this rulemaking under the Regulatory Flexibility Act. I hereby certify that this rulemaking action will not have a significant economic impact on a substantial number of small entities. This action will not have a significant economic impact on a substantial number of small entities because the revisions to the test dummy will not impose any requirements on anyone. NHTSA will use the revised ATD in agency testing but will not require anyone to manufacture the dummy or to test motor vehicles or motor vehicle equipment with it. Further, small vehicle manufacturers that choose to test with the 5th percentile adult female dummy will not be significantly impacted by this rulemaking. The final rule will simply replace the chest jacket and spine box now used with the test dummy with more up-to-date equipment. Since chest jackets must periodically be replaced on the test dummy because they wear out, this amendment will not significantly affect end users of the ATD (they will continue to do what they already do). Similarly, the change to the new spine box will not significantly affect small vehicle manufacturers. It entails a simple one-time replacement where the old part would be switched out with the new.

National Environmental Policy Act

NHTSA has analyzed this rule for the purposes of the National Environmental Policy Act. In accordance with 49 CFR 1.81, 42 U.S.C. sec. 4336, and DOT NEPA Order 5610.1C,

NHTSA has determined that this rule is categorically excluded pursuant to 23 CFR 771.118(c)(4) (planning and administrative activities, such as promulgation of rules, that do not involve or lead directly to construction). This rulemaking, which finalizes changes to the Hybrid III 5th percentile adult female (HIII-5F) anthropomorphic test device (ATD or crash test dummy), is not anticipated to result in any environmental impacts, and there are no extraordinary circumstances present in connection with this rulemaking.

Civil Justice Reform

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

Pursuant to this order, NHTSA notes as follows: The issue of preemption 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.

Paperwork Reduction Act

Under the procedures established by the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501, et. seq.), Federal agencies must obtain approval from the OMB for each collection of information they conduct, sponsor, or require through regulations. This rulemaking does not establish any information collection requirements as defined by the OMB in 5 CFR part 1320.

National Technology Transfer and Advancement Act

Under the National Technology Transfer and Advancement Act of 1995 (NTTAA), "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."[45] However, if the use of such technical standards would be "inconsistent with applicable law or otherwise impractical, a Federal agency or department may elect to use technical standards that are not developed or adopted by voluntary consensus standards bodies."[46] 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 the agency to provide Congress, through OMB, explanations when the agency decides not to use available and applicable voluntary consensus standards. Circular A-119 directs that evaluating whether to use a voluntary consensus standard should be done on a case-by-case basis.[47] An agency should consider, where applicable, factors such as the nature of the agency's statutory mandate and the consistency of the standard with that mandate.[48]

SAE has published information reports on the HIII 5th percentile adult female's chest jacket and spine box which today's rule incorporates by reference in full. The foregoing sections of this document discuss in detail SAE's work in these areas: SAE J2921 (Chest Jacket) and SAE J2915 (Spine Box). This rule includes a few specifications beyond SAE J2921; the preamble explains NHTSA's belief that they are necessary to ensure a sufficient level of uniformity

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[45] National Technology Transfer and Advancement Act of 1995, Pub. L. 104-113, 110 Stat. 775 (1996), .*a*t section 12(d)(1).
[46] *Id.* at section 12(d)(3).
[47] Office of Management and Budget, Circular No. A-119, ¶ 5(a)(i), Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities (Jan. 26, 2016).
[48] *Id*.

between jackets produced by different manufacturers going forward, and to prevent discrepancies in jacket designs from reoccurring in the future.

In addition, the following voluntary consensus standards have been used in developing this final rule:

- SAE Recommended Practice J211/1_202208 (August 2022), *Electronic Instrumentation*;
- SAE Recommended Practice J211/2_202204 (April 2022), *Photographic Instrumentation*; and
- SAE J1733_201811 (November 2018), *Sign Convention for Vehicle Crash Testing*.

Unfunded Mandates Reform Act

The Unfunded Mandates Reform Act of 1995 (Pub. L. 104-4) (UMRA) requires 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 expenditures by States, local, or tribal governments, in the aggregate, or by the private sector, of $100 million or more (adjusted annually for inflation with base year of 1995) in any one year. Adjusting this amount by the implicit gross domestic product price deflator for 2022 results in $177 million (111.416/75.324 = 1.48). The assessment may be included in conjunction with other assessments, as it is here.

This rule will not impose any unfunded mandates under the UMRA. This rule does not meet the definition of a Federal mandate because it does not impose requirements on anyone. It amends 49 CFR part 572 by adding specifications for a new test jacket and spine box for the 5th percentile adult female dummy that NHTSA uses in agency compliance tests. This rule will affect only those businesses that choose to manufacture or test with the dummy. This rule would not result in expenditures by State, local, or tribal governments of more than $177 million annually.

UMRA requires the agency to select the "least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule." As discussed above, the agency considered alternatives to the final rule and has concluded that the requirements are the most cost-effective alternatives that achieve the objectives of the rule.

Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 et seq., as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. NHTSA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the Federal Register. This rule does not meet the criteria in 5 U.S.C. 804(2) to be considered a major rule. The rule will be effective forty-five days after the date of publication in the Federal Register.

Regulation Identifier Number

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.

Rulemaking Summary, 5 U.S.C. 553(b)(4)

As required by 5 U.S.C. 553(b)(4), a summary of this rule can be found in the Abstract section of the Department's Unified Agenda entry for this rulemaking at https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202404&RIN=2127-AM13.

Privacy Act

Anyone can search the electronic form of all documents received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the Federal Register published on April 11, 2000 (65 FR 19477-78), or you may visit www.dot.gov/privacy.html.

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 write to us with your views.

NHTSA has considered these questions and attempted to use plain language in promulgating this final rule. Please inform the agency if you can suggest how NHTSA can improve its use of plain language.

Submission of Confidential Information

You should submit a redacted "public version" of your comment (including redacted versions of any additional documents or attachments). This "public version" of your comment should contain only the portions for which no claim of confidential treatment is made and from which those portions for which confidential treatment is claimed has been redacted. See below for further instructions on how to do this.

You also need to submit a request for confidential treatment directly to the Office of Chief Counsel. Requests for confidential treatment are governed by 49 CFR part 512. Your request must set forth the information specified in part 512. This information includes the materials for which confidentiality is being requested (as explained in more detail below); supporting information, pursuant to § 512.8; and a certificate, pursuant to § 512.4(b) and part 512, appendix A.

You are required to submit to the Office of Chief Counsel one unredacted "confidential version" of the information for which you are seeking confidential treatment. Pursuant to § 512.6, the words "ENTIRE PAGE CONFIDENTIAL BUSINESS INFORMATION" or "CONFIDENTIAL BUSINESS INFORMATION CONTAINED WITHIN BRACKETS" (as applicable) must appear at the top of each page containing information claimed to be confidential. In the latter situation, where not all information on the page is claimed to be confidential, identify each item of information for which confidentiality is requested within brackets: "[ ]."

You are also required to submit to the Office of Chief Counsel one redacted "public version" of the information for which you are seeking confidential treatment. Pursuant to § 512.5(a)(2), the redacted "public version" should include redactions of any information for which you are seeking confidential treatment (*i.e.,* the only information that should be unredacted is information for which you are not seeking confidential treatment).

NHTSA is currently treating electronic submission as an acceptable method for submitting confidential business information to the agency under part 512. Please do not send a hardcopy of a request for confidential treatment to NHTSA's headquarters. The request should be sent to Dan Rabinovitz in the Office of the Chief Counsel at Daniel.Rabinovitz@dot.gov. You may either submit your request via email or request a secure file transfer link. If you are submitting the request via email, please also email a courtesy copy of the request to Helena Sung at Helena.Sung@dot.gov.

List of Subjects in 49 CFR Part 572

Motor vehicle safety, Incorporation by reference.

In consideration of the foregoing, NHTSA amends 49 CFR part 572 as follows:

PART 572—ANTHROPOMORPHIC TEST DEVICES

1. The authority citation for part 572 continues to read as follows:

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

Subpart O–Hybrid III 5th Percentile Adult Female Test Dummy

2. Revise the heading of subpart O to read as set forth above.

3. Revise § 572.130 to read as follows:

§ 572.130 Incorporation by reference.

Certain material is incorporated by reference (IBR) into this subpart with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, the National Highway Traffic Safety Administration (NHTSA) must publish a document in the *Federal Register* and the material must be available to the public. All approved material is available for inspection at NHTSA and at the

National Archives and Records Administration (NARA). Contact NHTSA at: 1200 New Jersey Avenue SE, Washington DC 20590; phone: (202) 366-2588; website: www.nhtsa.gov/about-nhtsa/electronic-reading-room. For information on the availability of this material at NARA, visit www.archives.gov/federal-register/cfr/ibr-locations or email fr.inspection@nara.gov. The material may be obtained from the following sources:

(a) NHTSA Technical Information Services, 1200 New Jersey Ave. SE, Washington, DC 20590; phone: 202-366-2588; website: https://www.nhtsa.gov.

(1) Engineering Drawings, Part 572 Subpart O Hybrid III 5th Percentile Small Adult Female Test Dummy, December 2022 (the Engineering Drawings); IBR approved for §§ 572.131, 572.132, 572.133, 572.134, 572.135, 572.136, and 572.137.

(2) Parts/Drawing List, Part 572 Subpart O, Hybrid III 5th Percentile Small Adult Female Crash Test Dummy, December 2022 (the Parts/Drawings List); IBR approved for §572.131.

(3) Procedures for the Assembly, Disassembly, and Inspection (PADI) of the Hybrid III 5th Percentile Adult Female Crash Test Dummy (HIII-05F), June 2022 (the PADI); IBR approved for §572.131.

(b) SAE International, 400 Commonwealth Drive, Warrendale, PA 15096; phone: 1-877-606-7323; website: https://www.sae.org.

(1) SAE Recommended Practice J211-1, Instrumentation for Impact Test; Part 1 - Electronic Instrumentation, August 2022 (SAE J211-1); IBR approved for § 572.137.

(2) SAE Recommended Practice J211-2, Instrumentation for Impact Tests—Part 2: Photographic Instrumentation, April 2022 (SAE J211-2); IBR approved for § 572.137.

(3) SAE J1733, Sign Convention for Vehicle Crash Testing, November 2018; IBR approved for § 572.137.

4. Amend § 572.131 by:

a. Revising paragraphs (a)(1) and (2);

b. Adding paragraph (a)(3); and

c. Redesignating table A as "Table 1 to § 572.131(a)—Drawings List for Engineering Drawings, Part 572 Subpart O Hybrid III 5th Percentile Small Adult Female Test Dummy".

The revisions and addition read as follows:

§ 572.131 General description.

(a) * * *

(1) The Engineering Drawings (incorporated by reference, see § 572.130), including the drawings listed in table 1 to § 572.131(a);

(2) The Parts/Drawings List (incorporated by reference, see § 572.130); and

(3) The PADI (incorporated by reference, see § 572.130).

* * * * *

5. Amend § 572.132 by adding introductory text, revising paragraph (a), and removing the heading to paragraph (c). The addition and revision read as follows:

§ 572.132 Head assembly and test procedure.

All assemblies and drawings referenced in this section are contained in the Engineering Drawings (incorporated by reference, see § 572.130).

(a) The head assembly for this test consists of the complete head (drawing 880105-100X), a six-axis neck transducer (drawing SA572-S11) or its structural replacement (drawing 78051-383X), and 3 accelerometers (drawing SA572-S4).

* * * * *

6. Amend § 572.133 by:

a. Adding introductory text;

b. Revising paragraph (a), the first sentence of paragraph (b)(1)(i), and the first sentence of paragraph (b)(2)(i);

c. Removing the heading to paragraph (c);

d. Revising paragraphs (c)(3) and (c)(4)(ii); and

e. Redesignating Table B–Pendulum Pulse as "Table 2 to § 572.133–Pendulum Pulse".

The revisions and addition read as follows:

§ 572.133 Neck assembly and test procedure.

All assemblies and drawings referenced in this section are contained in the Engineering Drawings (incorporated by reference, see § 572.130).

(a) The neck assembly for the purposes of this test consists of the assembly of components shown in drawing 880105-250.

* * * * *

(b) * * *

(1) * * *

(i) Plane D, referenced in figure O1 to this subpart O, shall rotate in the direction of preimpact flight with respect to the pendulum’s longitudinal centerline between 77 degrees and 91 degrees. * * *

* * * * *

(2) * * *

(i) Plane D, referenced in figure O2 to this subpart O, shall rotate in the direction of preimpact flight with respect to the pendulum’s longitudinal centerline between 99 degrees and 114 degrees. * * *

* * * * *

(c) * * *

(3) Mount the head-neck assembly, defined in paragraph (b) of this section, on the pendulum described in figure 22 in 49 CFR part 572 so that the midsagittal plane of the head is

vertical and coincides with the plane of motion of the pendulum as shown in figure O1 to this subpart O for flexion tests and figure O2 to this subpart O for extension tests.

(4) * * *

(ii) Stop the pendulum from the initial velocity with an acceleration vs. time pulse which meets the velocity change as specified in table 2 to § 572.133. Integrate the pendulum acceleration data channel to obtain the velocity vs. time curve.

* * * * *

7. Amend § 572.134 by adding introductory text, revising paragraph (a), removing the heading to paragraph (c), and revising paragraph (c)(3). The addition and revisions read as follows:

§ 572.134 Thorax assembly and test procedure.

All assemblies and drawings referenced in this section are contained in the Engineering Drawings (incorporated by reference, see § 572.130).

(a) The thorax (upper torso) assembly consists of the part of the torso assembly shown in drawing 880105-300.

* * * * *

(c) * * *

(3) Seat and orient the dummy on a seating surface without back support as shown in figure O3 of this subpart O, with the limbs extended horizontally and forward, parallel to the midsagittal plane, the midsagittal plane vertical within ±1 degree and the ribs level in the anterior-posterior and lateral directions within ±0.5 degrees.

* * * * *

8. Revise and republish § 572.135 to read as follows:

§ 572.135 Upper and lower torso assemblies and torso flexion test procedure.

All assemblies and drawings referenced in this section are contained in the Engineering Drawings (incorporated by reference, see § 572.130).

(a) The test objective is to determine the stiffness effects of the lumbar spine (drawing 880105-1096), and abdominal insert (drawing 880105-434), on resistance to articulation between the upper torso assembly (drawing 880105-300) and the lower torso assembly (drawing 880105-450).

(b)(1) When the upper torso assembly of a seated dummy is subjected to a force continuously applied at the head to neck pivot pin level through a rigidly attached adaptor bracket as shown in figure O4 of this subpart O according to the test procedure set out in paragraph (c) of this section, the lumbar spine-abdomen assembly shall flex by an amount that permits the upper torso assembly to translate in angular motion relative to the vertical transverse plane 45 ±0.5 degrees at which time the force applied must be not less than 320 N (71.5 lbf) and not more than 390 N (87.4 lbf), and

(2) Upon removal of the force, the torso assembly must return to within 8 degrees of its initial position.

(c) The test procedure for the upper/lower torso assembly is as follows:

(1) Soak the dummy in a controlled environment at any temperature between 18.9 and 25.6 °C (66 and 78 °F) and a relative humidity between 10 and 70 percent for at least four hours prior to a test.

(2) Assemble the complete dummy (with or without the legs below the femurs) and attach to the fixture in a seated posture as shown in figure O4 of this subpart O.

(3) Secure the pelvis to the fixture at the pelvis instrument cavity rear face by threading four ¼ inch cap screws into the available threaded attachment holes. Tighten the mountings so that the test material is rigidly affixed to the test fixture and the pelvic-lumbar joining surface is horizontal.

(4) Attach the loading adapter bracket to the spine of the dummy as shown in figure O4 of this subpart O.

(5) Inspect and adjust, if necessary, the seating of the abdominal insert within the pelvis cavity and with respect to the torso flesh, assuring that the torso flesh provides uniform fit and overlap with respect to the outside surface of the pelvis flesh.

(6) Flex the dummy's upper torso three times between the vertical and until the torso reference plane, as shown in figure O4 of this subpart O, reaches 30 degrees from the vertical transverse plane. Bring the torso to vertical orientation and wait for 30 minutes before conducting the test. During the 30-minute waiting period, the dummy's upper torso shall be externally supported at or near its vertical orientation to prevent it from drooping.

(7) Remove all external support and wait two minutes. Measure the initial orientation angle of the torso reference plane of the seated, unsupported dummy as shown in figure O4 of this subpart O. The initial orientation angle may not exceed 20 degrees.

(8) Attach the pull cable and the load cell as shown in figure O4 of this subpart O.

(9) Apply a tension force in the midsagittal plane to the pull cable as shown in figure O4 of this subpart O at any upper torso deflection rate between 0.5 and 1.5 degrees per second, until the angle reference plane is at 45 ±0.5 degrees of flexion relative to the vertical transverse plane.

(10) Continue to apply a force sufficient to maintain 45 ±0.5 degrees of flexion for 10 seconds, and record the highest applied force during the 10-second period.

(11) Release all force at the attachment bracket as rapidly as possible, and measure the return angle with respect to the initial angle reference plane as defined in paragraph (c)(6) of this section 3 minutes after the release.

9. Amend § 572.136 by adding introductory text, revising paragraph (a), removing the heading to paragraph (c), and revising paragraph (c)(2). The addition and revisions read as follows:

§ 572.136 Knees and knee impact test procedure.

All assemblies and drawings referenced in this section are contained in the Engineering Drawings (incorporated by reference, see § 572.130).

(a) The knee assembly for the purpose of this test is the part of the leg assembly shown in drawing 880105-560.

* * * * *

(c) * * *

(2) Mount the test material and secure it to a rigid test fixture as shown in figure O5 of this subpart O. No part of the foot or tibia may contact any exterior surface.

* * * * *

10. Amend § 572.137 by adding introductory text and revising the paragraph (m) introductory text and paragraph (n) to read as follows:

§ 572.137 Test conditions and instrumentation.

All assemblies and drawings referenced in this section are contained in the Engineering Drawings (incorporated by reference, see § 572.130).

* * * * *

(m) The outputs of acceleration and force-sensing devices installed in the dummy and in the test apparatus specified by this part shall be recorded in individual data channels that conform to SAE J211-1 and SAE J211-2 (both incorporated by reference, see § 572.130), except as noted, with channel classes as follows:

* * * * *

(n) Coordinate signs for instrumentation polarity shall conform to SAE J1733 (incorporated by reference, see § 572.130).

* * * * *

Issued in Washington, D.C., under authority delegated in 49 CFR 1.95 and 501.

Adam Raviv

Chief Counsel

Billing Code 4910-59-P

[FR Doc. 2024-30985 Filed: 1/2/2025 8:45 am; Publication Date: 1/3/2025]