



**DEPARTMENT OF TRANSPORTATION**

**National Highway Traffic Safety Administration**

**49 CFR Part 572**

**Docket No. NHTSA-2019-0023**

**RIN 2127-AM13**

**Anthropomorphic Test Devices,**

**IIII 5th Percentile Female Test Dummy;**

**Incorporation by Reference**

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

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** This document proposes to revise the chest jacket and spine box specifications for the Hybrid III 5th Percentile Female Test Dummy (IIII-5F) set forth in Part 572, *Anthropomorphic Test Devices*. The proposed jacket revisions would 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 would eliminate a source of signal noise caused by fasteners within the box that may become loose. This rulemaking responds to a petition for rulemaking from the Alliance of Automobile Manufacturers.

**DATES:** You should submit your comments early enough to be received not later than

**[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL**

**REGISTER].** Proposed effective date: 45 days following date of publication of a final rule.

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

- Federal eRulemaking Portal: Go to <http://www.regulations.gov>. Follow the online instructions for submitting comments.
- Mail: Docket Management Facility, M-30, U.S. Department of Transportation, West Building, Ground Floor, Rm. W12-140, 1200 New Jersey Avenue, S.E., Washington, D.C. 20590.
- Hand Delivery or Courier: West Building, Ground Floor, Room W12-140, 1200 New Jersey Avenue, S.E., between 9 a.m. and 5 p.m. Eastern Time, Monday through Friday, except Federal holidays.
- You may also call the Docket at 202-366-9826.

Regardless of how you submit your comments, please mention the docket number of this document.

Instructions: For detailed instructions on submitting comments and additional information on the rulemaking process, see the Public Participation heading of the Supplementary Information section of this document. Note: all comments received, including any personal information provided, will be posted without change to <http://www.regulations.gov>.

Privacy Act: Anyone is able to search the electronic form of all comments received in 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).

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

submit two copies, from which you have deleted the claimed confidential business information, to the Docket at the address given above. When you send a comment containing information claimed to be confidential business information, you should include a cover letter setting forth the information specified in our confidential business information regulation (49 CFR Part 512).

**FOR FURTHER INFORMATION, CONTACT:**

For technical issues, you may contact Mr. Peter G. Martin, Office of Crashworthiness Standards (telephone: 202-366-5668). For legal issues, you may contact Mr. John Piazza, Office of Chief Counsel (telephone: 202-366-2992) (fax: 202-366-3820). Address: National Highway Traffic Safety Administration, U.S. Department of Transportation, 1200 New Jersey Avenue, S.E., West Building, Washington, D.C. 20590.

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## **I. Executive Summary**

This document proposes changes to the Hybrid III 5th percentile adult female (HIII-5F) anthropomorphic test device (crash test 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 proposes 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. Neither change is intended to impose new requirements on vehicle manufacturers.

### **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<sup>1</sup> 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.

This NPRM proposes to adopt the jacket specifications described in J2921, as well as a few additional specifications. We believe that chest jackets that have been and are being manufactured to the SAE J2921 design would also conform to the proposed specifications but seek comment on whether this is accurate. NHTSA also believes that additional specifications are 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.

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 is commonplace when worn parts are replaced. NHTSA tentatively concludes that the proposed jacket specification would assure uniformity in the form, fit, and function of the HIII-5F. A benefit of this is 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 manufacturers, thereby providing more objective test results. We also tentatively conclude that dummies fitted with chest jackets that satisfy the proposed specifications would perform equivalently to dummies fitted with the FTSS or Denton jackets that were previously used. We seek comment on all of these tentative conclusions.

## **Spine Box**

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<sup>1</sup> The Society of Automotive Engineers (now SAE International). SAE is an organization that develops technical standards based on best practices.

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, *IIII5F Spine Box Update to Eliminate Noise*).

We propose to adopt the SAE modification, details of which are specified within engineering drawings provided in the J2915 information report. 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 does not affect or change the dummy's performance in any way (other than eliminate the potential for noise). The improved spine box addresses 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 increases the quality of data and reduces maintenance and testing time.

### **Lead Time**

NHTSA proposes a 45-day effective date following date of publication of a final rule to make available ATDs with the new chest jacket and spine box for use in agency testing. Manufacturers wishing to test with the proposed jacket and spine box should have no difficulty obtaining the necessary parts. We believe that the chest jackets that are currently being manufactured to meet the SAE J2921 specifications would also meet the proposed 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.

## **Petition for Rulemaking**

In 2014, the Alliance of Automobile Manufacturers (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.<sup>2</sup> 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.<sup>3</sup> The contents of this response are discussed in more detail in subsequent sections of this notice. NHTSA has granted this petition and today's NPRM commences rulemaking on the issues presented by the petition.

## **II. Chest Jacket**

### **a. Background**

Today's NPRM proposes changes to the Hybrid III 5th percentile small female (HIII-5F) test dummy. The HIII-5F was added to Part 572 in 2000.<sup>4</sup> 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 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). These documents can be found in Docket NHTSA-2000-6940 (available at [www.regulations.gov](http://www.regulations.gov)).

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<sup>2</sup> Letter from Scott Schmidt, Alliance, to NHTSA (Feb. 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.

<sup>3</sup> Letter from Scott Schmidt, Alliance, to NHTSA (May 11, 2015).

<sup>4</sup> 65 FR 10968 (Mar. 1, 2000).

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 dummy and covers the entire thorax, including the shoulder assembly. It is currently specified in the parts and drawings document in drawings 880105-355-E, 880105-356, 880105-423, and 880105-424, with a call-out to it in drawing 880105-300.

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

**b. 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.<sup>5</sup> At the time Subpart O was created in 2000, jackets were being produced by FTSS. Soon thereafter, Applied Safety Technologies Corporation, which later became Denton, began to manufacture HIII-5F dummies and jackets.

The jackets FTSS and Denton produced did not conform to all aspects of the Part 572 specifications; in addition, jackets produced by each manufacturer also differed from each other. Both Transport Canada and the Alliance found dimensional differences between the two brands of jackets. In particular, the breast location differed, and the Denton jacket was longer.<sup>6</sup> Transport Canada's research also found that neither jacket matched the Part 572 specifications, though the Denton jacket dimensions were generally closer.<sup>7</sup> For example, the breasts on the FTSS jacket were lower than in the codified specifications.<sup>8</sup> Both Transport Canada and the Alliance concluded that the codified jacket specifications did not contain sufficient information

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<sup>5</sup> The Society of Automotive Engineers (now SAE International). SAE is an organization that develops technical standards based on best practices.

<sup>6</sup> Letter from the Alliance to NHTSA (Jan. 31, 2006) (Alliance letter), p. 8; Suzanne Tylko et al., 2006, The Effect of Breast Anthropometry on the Hybrid III 5th Female Chest Response, *Stapp Car Crash Journal*, Vol. 50 (Nov. 2006), p. 390.

<sup>7</sup> Tylko et al. 2006, *supra*, p. 392.

<sup>8</sup> *Id.* at p. 392.

about the shape and placement of the breasts to assure uniformity in the production of jackets between jacket manufacturers.<sup>9</sup>

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 inconsistencies and ambiguities contributed to dimensional differences between the FTSS and Denton jackets.

In addition, design choices by FTSS and Denton also contributed to the discrepancies. When NHTSA added the dummy and jacket to Part 572 in 2000, the engineering drawings for the jacket came from SAE. However, the jacket specifications did not match the actual jacket that FTSS was making. During the dummy development period, FTSS made a manufacturing decision to lower the breasts to change the lay of the shoulder belt.<sup>10</sup> FTSS later informed NHTSA that it had also increased the jacket depth by 1/2 inch to improve fit.<sup>11</sup> These changes were not reflected in the specifications that were ultimately incorporated by reference in Part 572 in 2000 (8801054-355-E, Rev. D). With respect to the Denton jacket, discrepancies between it and the Part 572 specifications arose after Subpart O was established, when Denton began producing dummies and jackets using their own molding processes. The Denton jacket more closely matched the Subpart O drawing than FTSS's, but did not conform wholly to it.

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<sup>9</sup> *Id.*, Alliance letter, p. 6.

<sup>10</sup> 71 FR 45427 (Aug. 9, 2006) (notice of denial of petition for rulemaking).

<sup>11</sup> Letter from FTSS to NHTSA (Aug. 28, 2006) (responding to NHTSA's notice of denial).

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.<sup>12</sup> NHTSA denied this petition.<sup>13</sup> The agency stated that while dummies with the FTSS and Denton jackets performed somewhat differently than 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.<sup>14</sup>

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.<sup>15</sup> FMVSS No. 208 specifies a variety of different dynamic (crash) and static (out-of-position) requirements using the HIII-5F.<sup>16</sup> 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. It concluded that the dimensional differences between the FTSS and Denton jackets "influences belt placement and affects contact with airbag modules during out-of-position testing . . . these differences confound the interpretation of chest response and adversely affect the validity of the test instrument."<sup>17</sup> The Alliance in a 2006 letter to NHTSA similarly reported research by vehicle manufacturers demonstrating that "significant variations in chest jacket dimensions between the Denton and

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<sup>12</sup> Letter from FTSS to NHTSA (dated December 30, 2003).

<sup>13</sup> 71 FR 45427 (Aug. 9, 2006).

<sup>14</sup> *Id.* See also letter from FTSS to NHTSA (Aug. 28, 2006).

<sup>15</sup> Tylko et al. (Nov. 2006), *supra*, p. 390; letter from the Alliance (Jan. 31, 2006), *supra*, p. 8. 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.

<sup>16</sup> See, e.g., S15 (rigid barrier test requirements); S25 (out-of-position requirements).

<sup>17</sup> Tylko et al. 2006, The Effect of Breast Anthropometry on the Hybrid III 5th Female Chest Response, *Stapp Car Crash Journal*, Vol. 50 (Nov. 2006), *supra*, p. 393.

FTSS ATD[s] . . . may produce different test results when evaluated in the NHTSA-1 & NHTSA-2 Out-of-Position Driver FMVSS 208 Tests.”<sup>18</sup>

**c. 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 (for ease of reference, referred to in this document as the “SAE jacket”). The main goal of the task force was to develop a jacket design such that both FTSS and Denton could produce a single, interchangeable jacket compatible with both companies’ versions of the HIII-5F. The task force also developed a device (referred to as a mandrel) to check jacket fit as the jacket ages (it is known that the jacket shrinks over time).

In 2010, FTSS and Denton merged to form Humanetics. Humanetics continued the jacket harmonization work of its predecessor companies. However, the merger meant that Humanetics was the only dummy manufacturer involved with drafting the SAE information report. Therefore, what began as an effort to specify the design of a “harmonized” jacket that could be produced by any manufacturer became an effort for Humanetics to simply design and produce a jacket that could fit existing Denton and FTSS dummies as well as newly manufactured Humanetics dummies.

During jacket development, Humanetics (under the auspices of SAE) refined the jacket design to account for various issues. NHTSA testing of early iterations of the jacket showed that an HIII-5F dummy fitted with it did not pass the Part 572 Subpart O torso flexion qualification test. (The results of this testing are discussed below in Section IV.) Humanetics addressed this issue by tapering the thickness of the jacket around the lower circumference where it interacts with the pelvis flesh.

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<sup>18</sup> Alliance letter to NHTSA (Jan. 31, 2006), *supra*, pp. 1, 9. In 2005 the Alliance presented these issues to NHTSA and documented them in a 2006 letter.

SAE published an information report for the jacket in 2013 (SAE J2921 JAN2013 *supra*). The SAE jacket is intended to be compatible with all existing dummy brands (although, as explained later in this preamble, a dummy might need some tuning or refurbishing to meet Subpart O qualification requirements with the jacket). The J2921 jacket is currently offered for sale by Humanetics and JASTI-USA, Inc., the U.S. affiliate of JASTI Co., LLC, a manufacturer of dummies and test equipment headquartered in Japan.

**d. NHTSA enforcement policy to address chest jacket issues**

Since the introduction of the HIII-5F in 2000, the available jackets brands (principally from FTSS and Denton) did not match each other, and neither exactly matched the Part 572 specifications. Such differences 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 by maintaining qualified dummies (and jackets) from both FTSS and Denton and has tracked which brand was used in the certification of vehicles the agency tests.

Recent events render this approach obsolete and necessitate further action by NHTSA. After the merger of FTSS and Denton, Humanetics 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.<sup>19</sup> However, in 2015 Humanetics discontinued production of the original FTSS and Denton chest jacket designs. According to its product

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<sup>19</sup> 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.

catalog, Humanetics now sells only the SAE jacket, identified as part number 880105-355-H.<sup>20</sup> This is the part number of the engineering drawing of the jacket that appears in SAE J2921.

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 did not agree to these requests, and instead required manufacturers to identify an FTSS or Denton jacket 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.

Today's proposal is intended to resolve these issues by commencing amending the Part 572 specifications for the jacket to include the specifications set out in J2921. The proposal also includes a few specifications we developed that are intended to ensure that jackets produced by different manufacturers perform equivalently on all dummy brands. We believe that new jackets currently produced by Humanetics meet both the specifications in J2921 and the additional specifications.

**e. Proposed modifications to adopt the SAE jacket**

We propose to amend the chest jacket specifications in Subpart O. 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.

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<sup>20</sup> Hybrid-III 5th Small Female Dummy, 880105-000-H Brand Harmonized Parts Catalog, Humanetics Innovative Solutions, Inc., August 2018.

We propose to adopt the specifications in SAE J2921 (Figures 4-6, which are engineering drawings of the SAE jacket design). However, we also propose 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. J, Sheet 5). Dimensions are specified for a jacket worn on a dummy, i.e., measurements would be recorded on the jacket as worn on a dummy positioned on the same flat-back bench as what is currently shown on 800105-000, Rev. J, Sheet 5. The additional dimensional specifications are intended to define the outer shape of the thorax and to preclude belt routing discrepancies. The information includes additional views of the chest jacket at various cross sections.

We tentatively believe these additional specifications are necessary to ensure a sufficiently low level of variation between jackets produced by different manufacturers. We note that the jacket drawing contained within SAE J2921 JAN2013 has less specificity than the current Subpart O drawing, 880105-355-E, Rev. D. In the final J2921 report, there are no dimensions, reference or otherwise, defining the breast size or the arm hole size and location. Also, the taper shown in J2921 (added after the 2011 draft to mitigate binding in the torso flexion test) is pictorial only, with no dimensions. The SAE report also does not indicate whether the specifications are for the jacket on its own or as fitted on a dummy. The agency is concerned that this overall lack of specificity could result in the production of jackets of vastly different shapes, but still meeting the drawing specifications of J2921. As was the case with the old FTSS and Denton jackets and the current Part 572 specifications, this lack of specificity could lead to differences in performance between dummies, which this proposal intends to resolve.

We also tentatively conclude 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. However, we believe that the older FTSS or Denton jackets would not conform to the proposed specifications (for example, the circumference at the different section levels).

NHTSA proposes to amend the Subpart O regulatory text to incorporate by reference new versions of the drawing package, parts list and PADI. These changes are described in more detail in a separate document being placed in the docket for this rulemaking.<sup>21</sup> That document also includes the engineering drawings identified above.

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) would be replaced with:

- 880105-355-H, Rev B, Chest Flesh Assembly, Sheet 1
- 880105-355-H, Rev B, Chest Flesh Assembly, Sheet 2
- 880105-356-H, Rev C, Sternum Pad

The Chest Flesh Assembly (880105-355-H, Sheets 1 and 2) and the Sternum Pad (880105-356-H) are derived from the reprints of drawings contained in SAE J2921 (Jan 2013). We would also revise drawing 800105-000, 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 would also make some corresponding changes to the PADI.

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<sup>21</sup> Engineering Change Proposal, 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, November 2019.

NHTSA tentatively concludes that the proposed jacket specification will assure uniformity in the form, fit, and function of the HIII-5F. Based on testing the agency conducted with the SAE chest jacket (see section IV below, *Testing of the SAE jacket and spine box*), NHTSA tentatively concludes that dummies fitted with jackets built to the proposed specifications would pass the Subpart O qualification tests and would not result in different compliance test outcomes. This applies to both newly manufactured dummies as well as older, existing dummies fitted with the new jacket. When a new jacket is fitted to an existing (old) dummy (made by either FTSS and Denton), we believe there will be no significant change in performance in static out-of-position air bag deployment tests and in full scale vehicle crash tests, assuming the Subpart O qualification requirements are met. (Although, as discussed in the section below, when an existing FTSS or Denton dummy is fitted with a new jacket, the dummy may need to be re-tuned or refurbished in order to conform to all Subpart O qualification requirements. Such retuning or refurbishing is expected when fitting a new part to an existing dummy generally.)

We seek comment on the proposed specifications, including the proposed additional specifications. We seek information and data on whether existing jackets built to SAE J2921 on existing dummies will meet the proposed specifications. NHTSA also seeks comment on what (if any) additional information, such as tolerance specifications, is needed to fully specify the jacket in order to ensure that jackets produced by different manufacturers perform equivalently. We also seek 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.

We will continue to collect measurement data on newly purchased jackets to check whether the dimensions and tolerances specified herein (including those derived from J2921

drawings and the new section dimensions added by NHTSA) are being met by SAE jackets already in the field. We will also examine all measurement data provided to us. For the final rule, we may adjust the dimensions and tolerances to assure that jackets in the field achieve an acceptable degree of conformity while still assuring a high level of uniformity.

## **f. Other Issues**

### **1. Mandrel**

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). 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.

Use of the mandrel, if implemented in Subpart O, would constitute a new qualification requirement with a new test procedure. However, J2921 does not provide a test protocol or an objective fit criterion. Also, while J2921 depicts a drawing of the mandrel, it does not provide details or dimensions on the shape of the mandrel.

In its supplemental submission to NHTSA, the Alliance clarified that it was not requesting that the agency specify use of the mandrel; instead, the mandrel is an optional inspection device for test labs and is not intended for inclusion in Subpart O. NHTSA has considered the need for the mandrel and has tentatively decided not to incorporate the mandrel or the fit check procedure outlined in J2921. We seek comment on this.

### **2. Dummy refurbishment and tuning of ribs**

When a new jacket is introduced, a dummy on which it is installed may need some amount of refurbishment or tuning in order to pass the Subpart O qualification tests.

The degree to which the dummy needs refurbishment may vary. Refurbishment refers to replacing damaged parts with new parts. Some individual dummies require more new parts than others to pass the qualification tests with the SAE jacket. In its testing, NHTSA replaced parts such as the upper leg flesh, the thorax bib, and the molded pelvis. NHTSA found that FTSS dummies required more frequent refurbishment than Denton dummies. In addition, Information Report SAE J2921 states that when a new jacket is fitted to an older dummy, the thickness of rib damping material may need to be re-tuned for the dummy to conform to the Part 572 thorax assembly qualification requirements. In its supplemental submission, the Alliance describes a procedure for tuning the ribs by shaving off damping material. The amount of tuning varies depending on the dummy brand and the specific jacket.

In its own testing, rather than shaving damping material, NHTSA simply replaced the ribs (along with other parts) when the agency retrofitted the J2921 jacket to one of its older dummies. Nonetheless, under certain conditions, shaving the damping material remains an option if end-users so desire. Shaving off damping material acts to lower the force generated in the torso impact qualification test. Because there is no easy way for end-users to add damping material, ribs must be replaced if the force is too low. A replacement rib must have an ample thickness of damping material in order to be shaved.

The need to refurbish or tune existing dummies to obtain passing qualification results is not out of the ordinary. To put this in perspective, whenever a dummy of any type is assembled (not just a HIII-5F) it must usually be adjusted to some degree in order to conform to all Part 572 qualification requirements. After repeated use in full scale vehicle tests, a part may need to be replaced if it has become worn or damaged. When a new part is introduced (such as the jacket of

the HIII-5F), replacement of other parts is sometimes needed so that the dummy can pass all qualification requirements.

### **III. Spine Box**

#### **a. Background**

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 (pg. 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 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. (This research is discussed below.) In 2011 SAE published an information report for the spine box modification (SAE J2915 AUG2011, *supra*).

#### **b. Proposed modifications**

We propose 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 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. We propose 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

All three drawings are derived from the reprints of drawings contained within SAE J2915 (Jan 2011). We discuss the changes in detail in the document docketed for this NPRM, *supra*.<sup>22</sup>

The modification would increase the quality of data and reduce maintenance and testing time. The modification does not affect or change the dummy's performance in any way (other than eliminate the potential for noise).<sup>23</sup>

#### **IV. Testing of the SAE Jacket and Spine Box**

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<sup>22</sup> Engineering Change Proposal, 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, November 2019.

<sup>23</sup> 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.

NHTSA and others tested the SAE jacket and spine box to assess ATD performance with the new components. NHTSA's evaluation of the jacket and spine box was presented at the 2011 ESV Conference and in a 2011 paper. The agency conducted several types of tests using HIII-5F dummies retrofitted with jackets built to the then-most current version of the SAE specifications being developed (SAE J2921 was still in draft status); one jacket was made by FTSS, and one was made by Denton). Industry also evaluated the jacket and spine box. The results of this research are briefly summarized below.

#### **a. Chest jacket**

##### **1. NHTSA evaluation**

In 2011 NHTSA published a study that evaluated preliminary versions of the SAE jacket produced by FTSS and Denton.<sup>24</sup> It compared the dimensions of the jackets and evaluated the performance of dummies fitted with the jackets in sled tests, out-of-position tests, and some of the Subpart O qualification tests. It found that dummies fitted with jackets built to the SAE design under development performed essentially the same as dummies fitted with pre-existing FTSS and Denton (non-SAE) jackets with respect to dummy injury metrics and other responses (with one exception).

The study found that the two brands of preliminary SAE jackets were identical in appearance (with some slight variations) and compared well to a draft version of the SAE drawings.

Qualification tests prescribed in Subpart O, including those most likely to be influenced by the jacket (the thorax impact test and the quasi-static torso flexion test) were also carried out. All of those Subpart O qualification requirements were met for all dummy configurations with

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<sup>24</sup> McFadden J. D., Striklin J.L. (2011), Evaluation of the Hybrid III 5th female modified chest jacket and spine box, Paper No. 11-0334, 2011 ESV Conference.

one exception: when either an FTSS dummy or a Denton dummy was fitted with the SAE jacket, the dummy did not meet the pull force requirement for the torso flexion test. During the flexion test, the jacket tended to bind at the waist when the dummies were pitched forward into the 45-degree test position. The added resistance due to the binding caused the pull force to exceed the specified limit of 390 N. The study concluded that further work on the jacket was needed to address the torso flexion test results. The SAE jacket was subsequently redesigned to address this.

NHTSA also conducted sled tests similar in severity to a frontal rigid barrier crash test (35 mph, peak acceleration of 28 Gs) and static, low-risk out-of-position air bag deployments. NHTSA found that dummies fitted with the jackets built to the SAE design under development performed essentially the same as dummies fitted with pre-existing FTSS and Denton jackets with respect to dummy injury metrics and other responses, including those most likely to be affected by the chest jacket (chest deflection and acceleration).

When SAE finalized the jacket design and issued SAE J2921 in 2013, NHTSA purchased new jackets (from Humanetics and JASTI-USA) to ensure they would fit properly on the agency’s existing FTSS and Denton HIII-5F dummies, and that “passing” results could be obtained in the torso flexion and thorax impact qualification tests. In all instances, the agency was able to demonstrate passing results for both these qualification tests (some dummy refurbishment was needed to pass the test, but as noted above, refurbishment of an ATD when a new part is fitted is a common operating procedure). See Table 2.

**Table 2. NHTSA Torso Flexion Tests, 2013-14.**

Dummy Mfg	Dummy Serial No.	Jacket	Trial	Test site	Initial angle (deg)	Return angle difference, Final – Init. (deg)	Max Force @ 45 deg during 10 sec (N)	Rotation Rate (deg/sec)	Test Date
					[1 to 20]	[-8 to +8]	[320 to 390]	[0.5 to 1.5]	
FTSS	F416	HIS	1	VRTC	15.4	3.6	331	1.03	5/28/2013

refurb.	DM9396		2	VRTC	15.3	3.8	325	0.98	5/28/2013
			3	VRTC	16.4	2.7	352	0.96	5/28/2013
FTSS refurb.	F416	HIS DM9432	1	VRTC	15.3	3.8	324	0.97	5/28/2013
			2	VRTC	16.1	3.1	345	0.95	5/28/2013
			3	VRTC	15.8	3.4	346	0.98	5/28/2013
FTSS refurb.	F416	JASTI 129	1	VRTC	14.7	4.5	363	0.97	5/28/2013
			2	VRTC	15.2	4.2	355	0.94	5/28/2013
			3	VRTC	15.5	4.1	355	0.99	5/29/2013
FTSS refurb.	F515	JASTI 129	1	TRC	16.3	2.8	326	0.94	5/6/2014
			2	TRC	16.4	3.0	324	0.96	5/6/2014
			3	TRC	16.4	3.6	343	0.91	5/6/2014
FTSS refurb.	F515	HIS DM9369	1	TRC	15.6	4.1	389	0.91	5/6/2014
			2	TRC	15.8	4.1	352	0.92	5/7/2014
			3	TRC	15.9	3.9	337	0.88	5/7/2014
Denton refurb.	D137	HIS DM9432	1	TRC	13.7	3.5	374	1.04	7/15/2014
			2	TRC	14.1	3.5	377	1.02	7/15/2014
			3	TRC	14.0	3.6	367	1.01	7/15/2014
Denton refurb.	D137	JASTI 129	1	TRC	12.7	5.1	360	0.87	7/16/2014
			2	TRC	13.3	4.5	359	0.94	7/17/2014
			3	TRC	14.2	3.9	353	0.96	7/18/2014

Note: Jackets reflect the design described in the final version of SAE J2921 (2013).

In summary, these tests demonstrated that old dummies (FTSS and Denton versions) that were fitted with the SAE jacket would pass the Subpart O qualification requirements. 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.

NHTSA did not perform re-tests of the sled and out-of-position test series performed for the 2011 study with the final version of the SAE jacket. The final revision only reduced the length of the sternal pad and tapered the lower portion of the jacket. These changes affect the dummy response in extreme thorax flexion as seen in the torso flexion qualification test. Because this condition was not manifested in either the sled or out-of-position test series, NHTSA believes the effects of the taper and shorter sternal pad would have been negligible. Nonetheless, NHTSA believes that the revisions to the jacket design were necessary; when extreme flexion does occur, the torso response must be preserved.

## 2. Industry evaluation

The Alliance's supplement to its rulemaking petition and SAE J2921 also indicate that the SAE jacket performs equivalently to the Denton and FTSS jackets.

The SAE report shows that the SAE jacket has not affected thorax biofidelity. It shows that the force vs. deflection plots for the 6.7 m/s thorax impact tests with the SAE jackets were within the biofidelity corridors that served as design targets for the original dummy design. The plots demonstrate that the SAE jacket has not affected dummy response.

The Alliance submitted information in its supplemental letter demonstrating that the SAE jacket can pass the Subpart O thorax impact tests. However, we note that both the Alliance and SAE J2921 indicate that the thickness of rib damping material may need to be adjusted for the dummy to conform to the Part 572 qualification requirement for the thorax assembly when a new SAE jacket is placed on an old dummy. The Alliance, in its supplemental submission, clarified how and why this adjustment is made. Due to high batch-to-batch variability of the rib damping material, the dynamic performance of the rib is specified and not the thickness. New ribs are shipped with the expectation that some tuning (shaving down some rib damping material) is required to bring the dummy into acceptable performance corridors depending upon the chest jacket used. The interchangeability varies with the brand and dummy condition, so adjustments may be necessary when switching jackets.

The testing also indicated that the final version of the SAE jacket could pass the Subpart O torso flexion test. Testing by both SAE and Alliance members found, as did NHTSA, that the first iteration of the SAE jacket (made in 2011) registered high pull forces in the torso flexion test. Testing of the final version of the jacket showed, however, that it was able to pass the torso flexion test. Both SAE J2921 and the Alliance's supplemental submission indicate that when a

new SAE jacket is fitted to an older dummy, some refurbishment of the dummy may be needed in order for it and the new jacket to perform properly.

#### **b. Spine box**

NHTSA's 2011 study 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.

Testing undertaken for the SAE task force and reported in SAE J2915 also showed that the new spine box had equivalent performance to the existing spine box and did not loosen over repeated testing.

#### **V. Lead Time**

NHTSA proposes to make the changes effective 45 days after publication of a final rule. This means that Subpart O – the specifications for the chest jacket and spine box – will be changed on that date. FMVSS No. 208 specifies that NHTSA is to use the Subpart O dummy in its compliance tests. Thus, starting on the effective date of the final rule, under FMVSS No. 208 the HIII 5<sup>th</sup> percentile adult female dummy would be used with the new SAE jacket and spine box in NHTSA's tests.<sup>25</sup>

NHTSA believes the 45-day lead time would be sufficient because we do not believe that testing under FMVSS No. 208 would be significantly affected by the final rule. Vehicle manufacturers already use the SAE jacket on the ATD. Moreover, because none of the dummy

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<sup>25</sup> In its February 21, 2014 petition, the Alliance recommended that compliance with the new specifications should be optional for a period of five years. NHTSA seeks comment on whether this is still necessary or appropriate.

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. We also believe that jackets built to SAE J2921 that are currently used in the field would conform to the proposed 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 proposed jacket and spine box should have no difficulty obtaining the necessary parts. NHTSA asked the Alliance to assess the cost and availability of obtaining the parts associated with the proposed changes. In its supplemental letter, the 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.

We also tentatively conclude that a shortened lead time is desirable because the proposed changes are beneficial for testing laboratories. We believe that the proposed jacket and spine box changes would likely lead to diminished laboratory technician workload. A common jacket design would eliminate the need to deal with multiple jacket versions. The new spine box would 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. It also stated that the introduction of the new parts will not create any significant increases in the workload necessary to maintain the dummies.

## **VI. Housekeeping Amendments**

The agency proposes the following housekeeping and other amendments to Subpart O.

1. NHTSA proposes to amend the title of Subpart O to add the word “adult” between “5<sup>th</sup> percentile” and “female” for clarity.

2. The agency proposes to remove 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, we would like to remove “Alpha Version” from the title of Subpart O since the naming convention is no longer used.

3. This NPRM proposes to revise Subpart O’s references to SAE J211 parts 1 and 2 and to SAE J1733 to refer to the most up-to-date 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).

## **VII. Regulatory Analyses and Notices**

### Executive Order 12866, Executive Order 13563, and DOT Order 2100.6

We have considered the potential impact of this proposed rule under Executive Orders 12866 and 13563, and DOT Order 2100.6, and have determined that it is nonsignificant. This rulemaking document was not reviewed by the Office of Management and Budget (OMB) under E.O. 12866. We have considered the qualitative costs and benefits of this NPRM under the principles of E.O. 12866.

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 proposed 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 NPRM proposes changes to the specifications of the HIII-5F chest jacket and spine box. For entities testing with the dummy, the proposed 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 5<sup>th</sup> 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 tentatively conclude that the proposed 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 proposed changes.

We do not believe the proposed chest jacket changes would 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 proposed specifications, we believe that chest jackets built to the SAE J2921 specifications would meet the proposed 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 proposed specifications, we believe the proposed chest jacket specifications would not impose any additional costs on industry.<sup>26</sup>

The revised spine box, which is not typically replaced during routine maintenance, costs about \$600. 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 13771

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<sup>26</sup> For the case of the HIII-5F, a new jacket costs about \$850. If a new jacket is installed on an existing dummy, additional refurbishments or tuning of that dummy may be needed in order 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.

Executive Order 13771, titled “Reducing Regulation and Controlling Regulatory Costs,” directs that, unless prohibited by law, whenever an executive department or Agency publicly proposes for notice and comment or otherwise promulgates a new regulation, it shall identify at least two existing regulations to be repealed. In addition, any new incremental costs associated with new regulations shall, to the extent permitted by law, be offset by the elimination of existing costs. Only those rules deemed significant under section 3(f) of Executive Order 12866, “Regulatory Planning and Review,” are subject to these requirements. As discussed above, this rule is not a significant rule under Executive Order 12866 and, accordingly, is not subject to the offset requirements of 13771.

#### Executive Order 13609: Promoting International Regulatory Cooperation

The policy statement in section 1 of Executive Order 13609 provides, in part:

The regulatory approaches taken by foreign governments may differ from those taken by U.S. regulatory agencies to address similar issues. In some cases, the differences between the regulatory approaches of U.S. agencies and those of their foreign counterparts might not be necessary and might impair the ability of American businesses to export and compete internationally. In meeting shared challenges involving health, safety, labor, security, environmental, and other issues, international regulatory cooperation can identify approaches that are at least as protective as those that are or would be adopted in the absence of such cooperation. International regulatory cooperation can also reduce, eliminate, or prevent unnecessary differences in regulatory requirements.

The proposed 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 proposal would lead to any reduction in harmonization.

#### Executive Order 13132 (Federalism)

Executive Order 13132 requires agencies to develop an accountable process to ensure “meaningful and timely input by State and local officials in the development of regulatory

policies that have federalism implications.” “Policies that have federalism implications” is defined in the Executive Order to include regulations that 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 has analyzed this proposed amendment in accordance with the principles and criteria set forth in E.O. 13132. The agency has determined that this proposal does not have sufficient federalism implications to warrant consultation and the preparation of a federalism assessment.

#### National Environmental Policy Act

NHTSA has analyzed this proposal for the purposes of the National Environmental Policy Act and determined that it will not have any significant impact on the quality of the human environment.

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

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

Pursuant to this Order, NHTSA notes as follows. The 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.

#### Regulatory Flexibility Act

Pursuant to the Regulatory Flexibility Act (5 U.S.C. 601 et seq., as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency is required to publish a proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small governmental jurisdictions), unless the head of the agency certifies the rule will not have a significant economic impact on a substantial number of small entities. 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)).

NHTSA has considered the effects of this rulemaking under the Regulatory Flexibility Act. I hereby certify that this rulemaking action would not have a significant economic impact on a substantial number of small entities. This action would not have a significant economic impact on a substantial number of small entities because the revisions to the test dummy would not impose any requirements on anyone. NHTSA would use the revised ATD in agency testing but would 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 5<sup>th</sup> percentile adult female dummy would not be significantly impacted by this rulemaking. The proposal would 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 would 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 would not significantly affect small vehicle manufacturers. It entails a simple one-time replacement where the old part would be switched out with the new.

#### Incorporation by Reference

Under regulations issued by the Office of the Federal Register (1 CFR 51.5(a)), 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.

This proposed rule would incorporate by reference updated versions of a parts list, drawings, and a manual into 49 CFR Part 572, Subpart O. This material is published by NHTSA (with permission from SAE International). The contents of the documents are summarized in Sections II.e and III.b, above, and a draft of the documents that would be incorporated by reference has been placed in the docket for this rulemaking for interested parties to review.

This proposed rule would also incorporate updated versions of SAE Recommended Practice J211/1 parts 1 and 2 and SAE J1733. Older versions of these documents are already incorporated by reference into Subpart O. The changes in the updated versions are summarized in Section VI, above. The version currently incorporated by reference is available in SAE International's online reading room.<sup>27</sup> The updated version is available for review at NHTSA and is available for purchase from SAE International.

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<sup>27</sup> <https://www.sae.org/standards/reading-room>

## National Technology Transfer and Advancement Act

Under the National Technology Transfer and Advancement Act of 1995 (NTTAA) (Public Law 104-113), “all Federal agencies and departments shall use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as a means to carry out policy objectives or activities determined by the agencies and departments.” Voluntary consensus standards are technical standards (*e.g.*, materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies, such as SAE. The NTTAA directs this Agency to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

SAE has published information reports on the HIII 5<sup>th</sup> percentile adult female’s chest jacket and spine box which today’s proposal incorporates 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). To the extent the NPRM has a few specifications beyond SAE J2921, we explain our belief that they are necessary to ensure a sufficient level of uniformity 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 NPRM:

- SAE Recommended Practice J211/1\_201403 (March 2014), “Electronic Instrumentation”;
- SAE Recommended Practice J211/2\_201406 (June 2014), “Photographic Instrumentation”; and

- SAE J1733\_201811 (November 2018), “Sign Convention for Vehicle Crash Testing.”

#### Paperwork Reduction Act

Under the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501, *et seq.*), Federal agencies must obtain approval from the Office of Management and Budget (OMB) for each collection of information they conduct, sponsor, or require through regulations. This rulemaking would not establish any new information collection requirements.

#### Unfunded Mandates Reform Act

The Unfunded Mandates Reform Act of 1995 (Public Law 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 more than \$100 million annually (adjusted annually for inflation with base year of 1995). Adjusting this amount by the implicit gross domestic product price deflator for 2013 results in \$142 million ( $109.929/75.324 = 1.42$ ). The assessment may be included in conjunction with other assessments, as it is here.

This proposed rule would not impose any unfunded mandates under the UMRA. This proposed 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 5<sup>th</sup> percentile adult female dummy that NHTSA uses in agency compliance tests. This NPRM would affect only those businesses that choose to manufacture or test with the dummy. This proposed rule is not likely to result in expenditures by State, local or tribal governments of more than \$100 million annually.

#### Plain Language

Executive Order 12866 and E.O. 13563 require each agency to write all rules in plain language. Application of the principles of plain language includes consideration of the following questions:

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

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

#### Regulation Identifier Number (RIN)

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

#### Privacy Act

Anyone is able to search the electronic form of all comments 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).

## **VIII. Public Participation**

### **How do I prepare and submit comments?**

- To ensure that your comments are correctly filed in the Docket, please include the Docket Number found in the heading of this document in your comments.
- Your comments must not be more than 15 pages long.<sup>28</sup> NHTSA established this limit to encourage you to write your primary comments in a concise fashion. However, you may attach necessary additional documents to your comments, and there is no limit on the length of the attachments.
- If you are submitting comments electronically as a PDF (Adobe) file, NHTSA asks that the documents be submitted using the Optical Character Recognition (OCR) process, thus allowing NHTSA to search and copy certain portions of your submissions.
- Please note that pursuant to the Data Quality Act, in order for substantive data to be relied on and used by NHTSA, it must meet the information quality standards set forth in the OMB and DOT Data Quality Act guidelines. Accordingly, NHTSA encourages you to consult the guidelines in preparing your comments. DOT's guidelines may be accessed at <https://www.transportation.gov/regulations/dot-information-dissemination-quality-guidelines>.

### **Tips for Preparing Your Comments:**

When submitting comments, please remember to:

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<sup>28</sup> 49 CFR 553.21

- Identify the rulemaking by docket number and other identifying information (subject heading, Federal Register date and page number).
- Explain why you agree or disagree, suggest alternatives, and substitute language for your requested changes.
- Describe any assumptions you make and provide any technical information and/or data that you used.
- If you estimate potential costs or burdens, explain how you arrived at your estimate in sufficient detail to allow for it to be reproduced.
- Provide specific examples to illustrate your concerns, and suggest alternatives.
- Explain your views as clearly as possible, avoiding the use of profanity or personal threats.
- To ensure that your comments are considered by the agency, make sure to submit them by the comment period deadline identified in the DATES section above.

For additional guidance on submitting effective comments, visit:

[https://www.regulations.gov/docs/Tips\\_For\\_Submitting\\_Effective\\_Comments.pdf](https://www.regulations.gov/docs/Tips_For_Submitting_Effective_Comments.pdf).

**How can I be sure that my comments were received?**

If you wish Docket Management to notify you upon its receipt of your comments, enclose a self-addressed, stamped postcard in the envelope containing your comments. Upon receiving your comments, Docket Management will return the postcard by mail.

**How do I submit confidential business information?**

If you wish to submit any information under a claim of confidentiality, you should submit three copies of your complete submission, including the information you claim to be confidential business information, to the Chief Counsel, NHTSA, at the address given above under FOR FURTHER INFORMATION CONTACT. In addition, you should submit a copy, from which

you have deleted the claimed confidential business information, to the docket at the address given above under ADDRESSES. When you send a comment containing information claimed to be confidential business information, you should include a cover letter setting forth the information specified in our confidential business information regulation. (49 CFR part 512)

**Will the agency consider late comments?**

We will consider all comments received before the close of business on the comment closing date indicated above under DATES. To the extent possible, we will also consider comments that the docket receives after that date. If the docket receives a comment too late for us to consider in developing a final rule (assuming that one is issued), we will consider that comment as an informal suggestion for future rulemaking action.

**How can I read the comments submitted by other people?**

You may read the comments received by the docket at the address given above under ADDRESSES. The hours of the docket are indicated above in the same location. You may also see the comments on the Internet. To read the comments on the Internet, go to <http://www.regulations.gov>. Follow the online instructions for accessing the dockets.

Please note that even after the comment closing date, we will continue to file relevant information in the docket as it becomes available. Further, some people may submit late comments. Accordingly, we recommend that you periodically check the Docket for new material. You can arrange with the docket to be notified when others file comments in the docket. See [www.regulations.gov](http://www.regulations.gov) for more information.

**List of Subjects in 49 CFR Part 572**

Motor vehicle safety, Incorporation by reference.

In consideration of the foregoing, NHTSA proposes to amend 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.

2. Revise the heading of Subpart O to read as follows:

**Subpart O—Hybrid III 5<sup>th</sup> Percentile Adult Female Test Dummy**

3. Revise § 572.130 to read as follows:

**§ 572.130 Incorporation by reference.**

(a) Certain material is incorporated by reference (IBR) into this part 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, 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 the Department of Transportation, Docket Operations, Room W12-140, 1200 New Jersey Avenue, SE, Washington DC 20590, telephone 202-366-9826, and is available from the sources listed in the following paragraphs. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email [fedreg.legal@nara.gov](mailto:fedreg.legal@nara.gov) or go to <http://www.archives.gov/federal-register/cfr/ibr-locations.html>.

(b) NHTSA Technical Information Services, 1200 New Jersey Ave., SE, Washington, DC 20590, telephone 202-366-5965.

(1) A parts/drawing list entitled: “Hybrid III 5<sup>th</sup> Percentile Adult Female Crash Test Dummy Parts List, ([*date to be determined*]),” IBR approved for § 572.131.

(2) A drawings and specification package entitled “Parts List and Drawings, Part 572 Subpart O Hybrid III Fifth Percentile Adult Female Crash Test Dummy (HIII-5F) Revision K ([*date to be determined*]),” IBR approved for § 572.131, and consisting of:

(i) Drawing No. 880105-100X, Head Assembly, IBR approved for §§ 572.131, 572.132, 572.133, 572.134, 572.135, and 572.137;

(ii) Drawing No. 880105-250, Neck Assembly, IBR approved for §§ 572.131, 572.133, 572.134, 572.135, and 572.137;

(iii) Drawing No. 880105-300, Upper Torso Assembly, IBR approved for §§ 572.131, 572.134, 572.135, and 572.137;

(iv) Drawing No. 880105-450, Lower Torso Assembly, IBR approved for §§ 572.131, 572.134, 572.135, and 572.137;

(v) Drawing No. 880105-560-1, Complete Leg Assembly - left, IBR approved for §§ 572.131, 572.135, 572.136, and 572.137;

(vi) Drawing No. 880105-560-2, Complete Leg Assembly- right, IBR approved for §§ 572.131, 572.135, 572.136, and 572.137;

(vii) Drawing No. 880105-728-1, Complete Arm Assembly - left, IBR approved for §§ 572.131, 572.134, and 572.135 as part of the complete dummy assembly;

(viii) Drawing No. 880105-728-2, Complete Arm Assembly - right, IBR approved for §§ 572.131, 572.134, and 572.135 as part of the complete dummy assembly.

(3) A procedures manual entitled “Procedures for Assembly, Disassembly, and Inspection (PADI) Subpart O Hybrid III Fifth Percentile Adult Female Crash Test Dummy (HIII-5F) Revision K (*[date to be determined]*),” IBR approved for § 572.132.

(c) SAE International, 400 Commonwealth Drive, Warrendale, PA 15096, call 1-877-606-7323.

(1) SAE Recommended Practice J211/1\_201403, “Instrumentation for Impact Test - Part 1, Electronic Instrumentation,” (March 2014), IBR approved for § 572.137;

(2) SAE Recommended Practice J211/2\_201406, “Instrumentation for Impact Tests - Part 2, Photographic Instrumentation,” (June 2014), IBR approved for § 572.137; and

(3) SAE J1733\_201811, “Sign Convention for Vehicle Crash Testing,” (November 2018), IBR approved for § 572.137.

3. Amend § 572.131 by revising paragraph (a) (2) introductory text to read as follows:

**§ 572.131 General description.**

(a) \* \* \*

(2) Parts List and Drawings, Part 572 Subpart O Hybrid III Fifth Percentile Adult Female Crash Test Dummy (HIII 5F), Revision K (*[date to be determined]*) (all incorporated by reference, see § 572.130).

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4. Amend § 572.137 by revsing paragraph (m) introductory text, and paragraph (n) to read as follows:

**§ 572.137 Test conditions and instrumentation.**

\* \* \* \* \*

(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 Recommended Practice J211/1\_201403, “Instrumentation for Impact Test - Part 1, Electronic Instrumentation,” and SAE Recommended Practice J211/2\_201406, “Instrumentation for Impact Tests - Part 2, Photographic Instrumentation” (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\_201811, “Sign Convention for Vehicle Crash Testing,” (incorporated by reference, see § 572.130).

\* \* \* \* \*

Issued in Washington, D.C., under authority delegated in 49 CFR 1.95 and 501.4.

James Clayton Owens  
Acting Administrator

Billing Code: 4910-59-P

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