DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 572

[Docket No. NHTSA–02–12541]

RIN 2127–AI00

Anthropomorphic Test Devices; Six-Year-Old Crash Test Dummy

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

ACTION: Final rule; response to petitions for reconsideration.

SUMMARY: This document responds to petitions for reconsideration of the final rule that adopted a new, more advanced 6-year-old child dummy (HIII–6C). That final rule was published January 13, 2000 (65 FR 2059, Docket No. NHTSA–99–6714). Adopting the dummy was the first step toward using the dummy to evaluate the safety of air bags for children. The petitions are granted in part and denied in part.

DATES: *Effective Date:* The amendments made in this rule are effective August 19, 2002.

Petitions: Petitions for reconsideration must be received by September 3, 2002.

ADDRESSES: Petitions for reconsideration should refer to the docket and notice number of this document and be submitted to: Administrator, National Highway Traffic Safety Administration, 400 Seventh Street, SW., Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: For non-legal issues, you may call Stan Backaitis, Office of Crashworthiness Standards, at 202–366–4912.

For legal issues, you may call Rebecca MacPherson, Office of the Chief Counsel, at 202–366–2992.

You may send mail to both of these officials at National Highway Traffic Safety Administration, 400 Seventh St., SW., Washington, DC 20590.

SUPPLEMENTARY INFORMATION:

I. Summary of Decision

Most of the issues raised in the petitions were minor and involved technical changes to either the dummy specifications or to the drawing package. In some cases, the petitioners requested the specifications be tightened to ensure more accurate measurements in the tests in which the dummy is used to measure injury criteria. More significant issues were raised regarding the thoracic peak force criteria, the need for a specified mass moment of inertia (MMI) and resonant frequency of the impactors, and the need for a post-test calibration.

Our review of the petitions also uncovered several minor errors in the drawings package that are resolved here. In addition, issues raised in the petitions for reconsideration of the final rule incorporating the Hybrid III 3-year-old child dummy into 49 CFR part 572 on the acceptable materials for load cells are addressed in this document since the same force and moment measuring load cells or load cells of similar construction are used in both dummies.

Further changes to the dummy will be designated as beta, gamma, etc., to assure that modifications can be easily tracked and identified. The new dummy is defined by a drawing and specification package, an updated procedures document for disassembly, assembly and inspection (PADI), and performance parameters including associated calibration procedures.

II. Summary of Petitions for Reconsideration

Petitions for reconsideration were received from the Alliance of Automobile Manufacturers (Alliance), Toyota, Denton (a manufacturer of load cells), and TRW (a manufacturer of air bags). One dummy manufacturer, FTSS also filed a petition which was dated February 28, 2000, the deadline for filing petitions. The petition was apparently never received by the agency. In a letter dated April 17, 2000, FTSS resubmitted its February 28 petition. This document was not placed into the docket until July 20, 2000. Because we cannot determine why FTSS' timely petition was not placed in the docket until well after the date for filing petitions had passed, this document addresses the concerns raised in the FTSS petition.

Significant issues were raised regarding the thoracic peak force criteria, the pendulum MMI and free air resonance frequency of the impactors, and the post-test calibration requirements. Additionally, petitioners raised issues related to the specifications for dummy clothing, the thoracic hysteresis corridor, the corridor for the knee impactor, the torso flexion test, and the instrumentation for measuring neck tension and extension. Finally, some petitioners pointed out apparent errors in the drawing package.

III. Thoracic Peak Force Criterion

The final rule provided a requirement for peak thoracic force in the compression transition zone (defined as sternum displacement relative to the spine between 12.5 mm and 38 mm) not to exceed 5% of the value of the peak force (1150–1380 N) measured in the specified maximum displacement zone. The Alliance and TRW both argued that this criterion was not proposed in the NPRM. Additionally, they argued that most of the dummy tests used to support the rulemaking measured peak forces in the transition zone that exceeded the new criterion. The Alliance stated that the new criterion does not improve the fit of the dummy response into the biomechanical corridor. Instead, it believed a peak force that did not exceed 1,560 N in the transitional zone between 12.5 mm and 38 mm of sternum displacement would better represent the demonstrated dummy responses. After discounting the outliers and dummy tests based on earlier versions of the dummy, the Alliance amended its position on the acceptable level of peak force and urged the agency to adopt a peak force of 1500 N. With this level, it determined that a much greater proportion of the data could stay within the biomechanical corridors.

While the Alliance and TRW are correct that a peak force specification was not explicitly proposed in the NPRM for the H–III6C, the issue of peak force specification in the transition zone was raised by TRC in its comments on the NPRM for the H–III6C dummy in general terms and in considerably more detail in its response to the NPRM for the 5th percentile adult female dummy (H–III5F), which did specify peak force in the transition zone. Peak acceleration response requirements for the dummy's thorax is a function of the impact force applied to the sternum as measured by the accelerometer mounted on the impactor. If the impactor force has a wide variation, the level of thoracic response variation would be expected to increase proportionally. The force levels within the maximum deflection zone, as specified in the final rule, allow thorax acceleration level variations of approximately ± 1 g, based on the mean weight of the upper torso of 26.5 lb. The specification in the final rule that the maximum force in the transition zone not exceed the force measured in the specified deflection corridor by more than 5% allows a maximum force in the transition zone of 1450 N. A thorax with this type of response could be responsible for adding one more g to thorax acceleration measurements. The Alliance's original request to increase the maximum allowable force in the transition zone to 1560 N would likely cause the dummy's upper thoracic response to increase by still another g. However, the revised suggestion that the

peak force be limited to 1500 N would reduce the latter increase to approximately 0.5 g. Thus, we agree with the Alliance that the additional 50 N may generate a slightly higher, but inconsequential, g level thorax response. While the small increase is not particularly desirable, it is a tolerable change with some positive safety aspects. Users who employ test dummies with elevated peak forces in compliance tests will run a greater risk of exceeding the acceleration tolerance levels specified for the thorax in those tests. We also note that the biomechanical impact response corridors for the human thorax allow a localized peak force to rise to 1500 N just before the sternum compression reaches the minimum required value of 38 mm. Accordingly, a limited increase in force levels is justified on a biomechanical response basis. For these reasons, we have decided to amend the regulatory text to allow a maximum peak force in the compression transition zone of 1500 N.

IV. Pendulum Mass Moment of Inertia and Free Air Resonance Frequency of Impactors

In its comments on the NPRM, TRC requested that the agency specify a generic impactor for use in the calibration tests. A generic impactor definition would allow users to construct various size impactors using the building block concept. This approach is consistent with the intent, expressed first in the NPRM and then in the final rule, that sensors be defined generically so as to avoid being unnecessarily design-restrictive. TRC stated, and we agreed, that the impactor should not be defined by a specific design, but rather by relevant engineering parameters. The relevant parameters are mass, stiffness, MMI, CG location, and minimum free air resonance frequency. The Alliance stated in its petition that the specifications for free air resonance frequency and MMI were not proposed in the NPRM. It did not challenge any of the other parameters that serve as the basis for a generic impactor. It also claimed that we had failed to provide data or a clear explanation demonstrating that these parameters were necessary. The Alliance further noted that when its members reviewed their own data they determined the parameters were irrelevant. It provided summaries of its members' data to support its position. The Alliance concluded that the two parameters (free air resonance and MMI) should be deleted until substantial data to justify their need had been generated. TRW stated that the final rule failed to specify a procedure for measuring free air resonance.

As noted above, parameters for minimum free air resonance frequency and MMI were specified in the final rule because we believed they were necessary parameters for defining a generic impactor. The NPRM had merely specified that the impactor be perfectly cylindrical in shape and of a certain diameter. This specification approach had been used in most SAE user's manuals. However, in practice, the probes are often not perfectly cylindrical and may be made up of multiple pieces, indicating that in the real world both SAE and existing agency specifications are insufficient for a generic impactor definition. We did not propose parameters for minimum free air resonance frequency and MMI in the NPRM because this generic impactor definition was developed partly in recognition of comments provided by TRC that the impactor specified in the NPRM was inconsistent with the probes regularly used by test laboratories. While we believe our explanation in the final rule as to why the parameters were necessary was sufficient, we are happy to further explain our rationale here. The definition uses three principles as guides:

- Because the overall shape and materials of the impactor may differ among users, its mass, size, MMI, natural resonance, and the shape of the impacting face are the only reliable indicators to assure that an impactor will be sufficiently rigid, capable of repeatable and non-distorted impact measurements;
- The minimum resonance requirement is needed to assure that a multiple-piece impactor does not produce separate interactions between its constituent parts that could distort the responses produced by the dummy; and
- The mounting structure for the accelerometer must be sufficiently rigid and not affect the pendulum-mounted accelerometer output (this requirement is also in SAE recommended practice J211).

We have examined the pendulum response data provided by the Alliance. Those data indicate that the pendulum has two resonant frequencies: One at 430 Hz and one at 6 kHz. The 430 Hz response is the result of beam bending(first mode) about the CG of the impactor, and the 6kHz response is the natural resonance of the impactor along its longitudinal axis (second mode). During beam bending, the ends of the beam experience maximum lateral translation with respect to the beam's undistorted longitudinal axis. Typically, longitudinally oriented accelerometers mounted at the end of the beam have less than three percent cross axis sensitivity. Accordingly, the effects on the signal of a longitudinally oriented accelerometer during the dummy impact would be nearly imperceptible. In contrast, resonance along the axis of the impactor is of primary interest for the thorax and knee tests, because vibrational characteristics of the impactor in the longitudinal direction could greatly affect the measured impact response. The 6 kHz response found in the data submitted by the Alliance demonstrates that our specified parameter for free air resonance is both practicable and relevant. Accordingly, we have decided to amend the regulatory text by specifying that the minimum free air resonance requirements for the thoracic and knee impactors be measured in line with the longitudinal axis of the impactor.

The data provided by the Alliance supporting their position that the MMI should not be specified at this time actually demonstrates the need for such a requirement. The data show a very wide spread of MMI values among various impactors. The moment of inertia of DaimlerChrysler's thoracic impactor is about six times lower than those of TRW, TRC, GM, and FTSS. Likewise, the moment of inertia of GM's knee impactor is approximately eight times that of FTSS. Other than the DaimlerChrysler thoracic impactor and the FTSS knee impactor, all the impactors in the data set were well above the minimum moment of inertia values specified in the final rule. Upon our request, DaimlerChrysler lent the agency the thoracic impactor for performance evaluation. We conducted an assessment of the probe at our Vehicle Research and Testing Center (VRTC) and found that the 164 kg cm^2 MMI presented in the Alliance petition was marginal in impact response. During its free flight, the probe had difficulty maintaining a stable trajectory and barely met the kinematic alignment specifications at impact with the dummy. While this may be largely a result of the probe's low moment of inertia, it is possible that an optimized probe's guidance and suspension system could resolve the problem. Thus, we concluded that a minimum moment of inertia of 160 kg cm^2 is barely sufficient as long as the probe's guidance and suspension systems can assure a stable free flight and impact alignment specifications at contact with the dummy. Accordingly, the regulatory

text has been changed to specify a minimum MMI of 160 kg cm^2.

As for TRW's request that the agency specify a procedure for measuring free air resonance, we have placed a test procedure in the Docket No. 6714–14 and in the PADI document that explains how NHTSA conducts impact tests to determine the resonance of the impactor. Other methods for making such a determination, both analytical and experimental, may be equally suitable for this purpose. Accordingly, we are not specifying a particular procedure in the regulatory text.

Although not addressed in its petition for reconsideration of the final rule adopting the H–III6C, the Alliance argued in the petitions for reconsideration of the final rules on the CRABI 12-month-old test dummy, the Hybrid III three-year-old child dummy and the H–III5F dummy that the provisions for concentricity and symmetry about the longitudinal axis are unrealistic since the pendulum is often fitted with velocity vanes or other hardware, causing asymmetry. The Alliance recommended revision of the probe specification to read, ''The primary test probe, less any additional hardware, for [body region] impacts shall be of rigid metallic construction.'' FTSS supported the Alliance petitions, stating that the addition of velocity vanes, cable attachment points, or other hardware will result in asymmetry and cause the center of gravity (CG) to be slightly offset from the geometrical center of the probe. FTSS recommended a limitation on the CG offset from the longitudinal axis.

NHTSA agrees with the Alliance and FTSS that the test probe specification should include provisions for mounting velocity vanes and suspension hardware if a cable system is used for impacts. However, the agency does not agree with FTSS that the possible CG offset from the longitudinal axis is needed and should be specified. NHTSA believes the specifications in the final rule for MMI in pitch and yaw provide sufficient controls to assure stable kinematics during the probe's free flight and impact with the dummy.

Accordingly, the agency is revising § 572.127 (a) and (b) to allow asymmetrical attachments needed for probe suspension and guidance as well as velocity vanes.

V. Post-test Calibration Requirements

The NPRM proposed that conformance of the dummy's structural properties would be checked before and after any compliance testing. When we published the NPRM for the Hybrid III 5th percentile adult small female dummy on September 3, 1998 (63 FR 46981, Docket No. NHTSA–98–4283) we decided to specify that the dummy conform to this part in every respect before its use in any test, but not after. We stated our intention to make the same change for the other dummies. The NPRMs for the Hybrid III 3-year-old child test dummy (64 FR 4385, January 28, 1999, Docket No. NHTSA–99–5032) and the 12-month-old infant dummy (CRABI) (64 FR 10965, March 8, 1999, Docket No. NHTSA–99–5156) proposed the same specification as the one proposed for the small adult female dummy. A full explanation of the agency's rationale can be found in the NPRM for the small adult female dummy. The agency rationale for the change in when to check for structural conformance is as applicable for the H–III6C as it is for the other dummies. Accordingly, in the Final Rule, section 572.121(c) was changed to adopt the language used in the NPRMs for the other pending dummy rulemakings.

All commenters on the NPRM for the H–III6C dummy, as well as all petitioners on the final rule, commented on this issue when it was first proposed as part of the NPRM for the 5th percentile adult female dummy. The comment period for that NPRM closed over a month before the final rule was issued on the H–III6C dummy and those comments were considered in determining whether to eliminate the post-test calibration requirements for the H–III6C dummy. The commenters' concerns with the proposed regulatory text were addressed in the final rule for the 5th percentile adult female dummy. No new issues or concerns have been raised in the context of the petitions for reconsideration of the final rule on the H–III6C dummy other than an allegation that the provision was outside of the scope of the NPRM. However, since the comments on the new language were received and considered before the final rule was issued, we do not believe that commenters were denied an opportunity to comment on the issue.

VI. Other Issues

1. Thoracic Hysteresis Corridor

The Alliance noted that the internal hysteresis corridor of the rib cage was specified in the NPRM at ''not less than 69 percent but not more than 85 percent.'' As pointed out by the Alliance, the final rule adopted a slightly broader corridor of not less than 65 percent and not more than 85 percent. Assuming the change was a typographical error, the Alliance requested the agency revise the specification to the narrower corridor proposed in the NPRM. The petitioner also asked for a justification for the broader corridor if the change was intentional.

The broader corridor is not the result of a typographical error. Instead, our review of the test data that had been used to establish the corridor specified in the NPRM led us to believe that the hysteresis corridor could be broadened slightly without degrading the dummy response. The change in specifications was intended to make it easier for dummy users to comply with the calibration specifications for the dummy. While we have no objection to narrowing the corridor to the parameters specified in the NPRM, we do not see a need to do so. Companies not represented by the Alliance will also need to comply with the calibration requirements of part 572. These companies may wish to take advantage of the broader corridor. Accordingly, no change is being made to the corridor specified in the final rule.

2. Knee Impact Corridor

The Alliance noted that the upper force limit of the knee impact test contains a conversion error and should be 3.0 kN (674 lbf) rather than 3.0 kN (625 lbf). The Alliance is correct. The regulatory test has been changed to specify the proper force in pounds-force.

3. Neck Flexion/Extension Test Instrumentation

NHTSA did not specify using a rotary potentiometer to measure head rotation for head/neck calibration testing because there are number of methods to measure rotation, all of which are acceptable. The Alliance petitioned the agency to specify a channel frequency class (CFC) of 60 that would apply if a rotary potentiometer is used to measure head rotation.

SAE J211, recommended practice for impact test instrumentation, does not designate a CFC for this application. However, the SAE user's manual for the H-III6 does specify a CFC 60 and NHTSA used a CFC 60 to filter the head rotation signal measured by potentiometers. Thus, it appears that both industry and NHTSA have reached a consensus that a channel frequency class of 60 is appropriate if a rotary potentiometer is used to generate data for this purpose. It should also be noted that our review of the raw data found no high frequency signals which would require a channel frequency class higher than 60. Accordingly, we believe it is appropriate to specify a CFC 60 filter if a potentiometer is used to measure head rotation. We reiterate our position that

head rotation may be measured using methods other than a potentiometer.

4. Torso Flexion Test

Section 572.135 specifies procedures for the torso flexion test. The temperature range for the test is specified at 66 to 78 degrees F. The Alliance and FTSS stated that this range is too wide and could result in test variability because of the sensitivity of the dummy materials to temperature. The Alliance noted, for example, that the dummy's lumbar spine should be maintained at 69 to 72 degrees F for proper behavior. The Alliance and FTSS recommended that the agency change the temperature range specification to 69 to 72 degrees F to be consistent with other dummy component tests.

To determine whether there is a need for a narrower temperature range in torso flexion tests, NHTSA's Vehicle Research and Test Center (VRTC) performed two series of temperature sensitivity tests on the HIII–3C dummy: One at a temperature range between 66 and 78 degrees F, and the other between 69 and 72 degrees F. In both series of tests, the average resistance force to flexion was slightly higher at the lower temperature.[1] However, the test results also indicated a resistance force difference of less than 2 pounds over the full temperature range for both series. In addition, plots of force vs. angle showed a very consistent and uniform slope with considerable overlap of measurements over the entire range of temperatures tested, indicating that temperature is not a significant factor. Based on these test data, VRTC concluded that variations in temperature have virtually no influence on the test results due to torso flexion in a crash test.

Although these tests were performed with the HIII–3C dummy and not the HIII–6C dummy, the agency believes that the similarities of design and test methods between the HIII–3C and HIII–6C dummies would lead to the same temperature sensitivity conclusions for the HIII–6C dummy.

To address the petitioners' concern with the ''consistency'' of temperature specifications, the agency has reviewed all temperature ranges for crash test dummies currently specified in 49 CFR part 572. Except for the Hybrid III neck and thorax, all specifications for Hybrid II, Hybrid III, and side impact (SID) dummies call for a test temperature range of 66 to 78 degrees F. The narrower temperature specification (69 to 72 degrees F) for the Hybrid III neck and thorax is due to a greater temperature sensitivity of these components, which highly influences the head kinematics and chest compression in crash tests. However, impact responses of the head, torso flexion, and femurs are not sensitive to temperature variations in the 66 to 78 degrees F range, and therefore allow a wider temperature spread. Thus, specifying a narrower temperature range exclusively for the torso flexion test for the HIII–6C dummy would create an inconsistency with respect to all other dummy torso flexion tests in part 572.

Moreover, to change the temperature specifications to a narrower range for dummies that already have a temperature specification of 66 to 78 degrees F, the agency would have to initiate rulemaking to determine the desirability of such a change. The agency notes that there are a number of dummy users, other than the petitioners, who may neither see a need for nor want to have a narrower temperature range specification. Some test facilities do not have the torso flexion test fixtures set up in a tight temperature control environment. These facilities would have to make capital expenditures to accommodate a narrower range specification.

In addition, the agency would have to provide a rationale for narrowing the temperature specification. Inasmuch as VRTC could not show a need for a narrower temperature range, and the petitioners have not provided data that would support the need for such a change, the agency would not be able to justify the requested revision.

In view of these considerations, the agency is denying this part of the Alliance and FTSS petitions.

5. Dummy Clothing

The final rule specifies that the dummy be clothed in ''a light-weight cotton stretch, short-sleeve shirt and above-the-knee pants.'' The Alliance maintained in its petition that this does not describe the clothing currently used by the automotive industry. Accordingly, it petitioned the agency to require that the dummy be clothed in ''a thermal knit, waffle-weave polyester and cotton underwear or equivalent, a size 5 long-sleeved shirt having a mass not exceeding 0.090 kg, and a size 4 pair of long pants having a mass not more than 0.090 kg, and cut off just far enough above the knee to allow the knee target to be visible.''

We do not believe we need to specify the weave or type of fabric of the dummy clothing, although we have no objection to designating sizes. We note, however, that size can vary based on clothing manufacturer and due to repeated washings. Generally, we do not believe there would be a problem with some amount of variation. We do believe it is appropriate, however, to specify a particular neck opening since shirts come with various neck styles (e.g., v-necked, round-necked) and because the different neck openings could have an effect on calibration. Accordingly, we are adding a requirement that the shirt have a neck opening that is large enough to fit over the dummy's head, but small enough to prevent contact between shoulder belts and the dummy's torso skin.

6. Changes in ''N'' Figures

The following changes are being made to the figures included as part of 49 CFR part 572, Subpart N to correct inaccuracies or ambiguities in those figures.

- Figure N2: (1) Relocate the 26.1 mm reference to the centerline of the posterior attachment bolt to reflect dimensional proportionality; (2) change reference from ''Neck Flexion Pendulum 46 CFR 572.33 FIG 22'' to ''Neck Flexion Pendulum 49 CFR 572.33 FIG 22''; and (3) add part number for bolt ''#9001265 Screw, SHCS #10–24 x 7/16''.
- Figure N3: (1) relocate the 26.1 mm reference to the centerline of the posterior attachment bolt to reflect dimensional proportionality; and (2) add part number for bolt ''#9001265 Screw, SHCS #10–24 x 7/16''.
- Figure N5: change bracket dimensions from ''89.9 mm (3.54 in) x 161.3 mm (6.35 in) x 31.8 mm (1.251 in)'' to ''90.4 mm (3.56 in) x 175.5 mm (6.91 in) x 31.8 mm (1.25 in)''.
- Figure N6: (1) remove note SA572-S4; and (2) change the weight tolerance on the knee probe from ''0.82 ± 0.01 kg (1.80 ± .02 lb)'' to ''0.82 ± 0.02 kg (1.80 ± .05 lb)''.

7. Errors and Corrections in Drawings

In its petition for reconsideration, Denton noted that drawings SA572–S12, SA572–S13–L&R, and SA572–S26,[2] which provide a generic description of the load cells used for the H–III6 dummy, contain specification problems. Denton maintains that the specifications provided in those drawings will render many acceptable load cells obsolete. The Alliance has supported Denton's petition to change those drawings.

The changes suggested by Denton reflect either errors in the drawing

[1] The test results can be found in Docket No. NHTSA–2000–7051.

[2] In this petition for reconsideration Denton noted a problem with drawing SA572–S25. That drawing depicts a shoulder load cell for the HIII–3C dummy. We contacted Deneton for clarification, and Denton agreed that its concern was with drawing SA572–S26.

package or changes that are so nominal as to have no detrimental effects on the dummy's impact response. Accordingly, the drawings have been changed, as reflected in Table 1.

In addition to the concerns raised by Denton, several minor inconsistencies and call-out errors were noted either by petitioners or by agency staff in the review process. Accordingly, the changes noted in Table 1 have been made to the drawing package. We are also issuing a new drawing series 127–DRL, which will summarize all of changes made to the drawing package for this dummy. We are providing this new drawing series to provide dummy users with a clear picture of corrections to the drawings. No changes have been made to the dummy. The first drawing is 127–DRL–1. Subsequent drawing changes will be summarized in a drawing bearing the number 127–DRL in dated sequence (*e.g.,* 127–DRL–2). This drawing series will be maintained and updated as long as 49 CFR part 572, subpart N remains in effect.

TABLE 1

Drawing/Part No.	Description	Revision description
127–SBL	6 year H3 standard build level	Deleted drawing.
SA572–127DRL–1	Drawing revision list	New drawing.
127–0000	Hybrid III 6 year old complete assembly.	Corrected location of ''I'' dimension (on sheet 5 of 6), all sheets revised to change letter ''K''
127–1009	Skin cap, skull	Added ''reference'' to item 1, corrected title.
127–2011	Sternum pad	Corrected angle dimensions.
127–2550	Chest—accelerometer assembly (SA572–S4).	Corrected accelerometer mount drawing number from 127–2110 to 127–2150.
127–4002	Upper leg flesh	Defined angular orientation of 0.5 dia. ''Posts''; Assigned missing hole diameters for load cell installation.
127–8210	6 yr old abdominal insert	Changed dimension 1.40 to 1.90 (notch depth), changed dimension 3.81 to 4.30 (overall height).
SA572–S4	Uniaxial piezorestive accelerometer.	Changed single decimal place tolerance from ± 0.1/2.54 to ± 0.1/2.5, corrected metric equivalents, and added dimensions.
SA572–S10	Femur load cell	Revised tolerance format, changed single decimal place tolerance from ± 0.1/2.54 to ± 0.1/2.5, changed reference note from ''Subpart E'' to ''Subpart N'', added material note, changed output at capacity from 1 mV/V min. to 0.75 mV/V min., added ''weight includes . . .'' note, and removed ''+'' from the Fz axis.
SA572–S11	Upper neck load cell	Revised tolerance format, changed single decimal place tolerance from ± 0.1/2.54 to ± 0.1/2.5, added material note, changed output at capacity from 1 mV/V min. to 0.75 mV/V min.
SA572–S12	Lumbar load cell	Changed hole dimension from 0.75/.1905 x .37/.89 to 0.63/16.0 x .35/8.9, changed weight from 1.3 lb/0.59 kg max to 1.35 lb/0.61 kg max, revised tolerance format, changed single decimal place tolerance from ± 0.1/2.54 to ± 0.1/2.5, changed reference note from ''Subpart E'' to ''Subpart N'', added material note, changed output at capacity from 1 mV/V min. to 0.75 mV/V min., added ''weight includes . . .'' note, and revised hole dimensions.
SA572–S13–L&R	Anterior-superior iliac spine load cell.	Changed output at capacity from 1 mV/V min. to 0.75 mV/V min., revised tolerance format, changed reference note from ''Subpart E'' to ''Subpart N'', added material note, changed single decimal place tolerance from ± 0.1/2.54 to ± 0.1/2.5, and added ''weight includes . . .'' note.
SA572–S26	Lower neck load cell	Revised tolerance format, changed single decimal place tolerance from ± 0.1/2.54 to ± 0.1/2.5, added material note, changed output at capacity from 1 mV/V min. to 0.75 mV/V min., added ''(does not include cables)'' to the weight note, added hole dimensions, and changed reference note from subpart E to subpart N.
SA572–S50	Chest potentiometer	Changed single decimal tolerance from ± 0.1/2.54 to ± 0.1/2.5, added/corrected metric equivalents, added ''Dia. Of hard shell housing'' and ''in rotary rigid shaft'' to notes, added ''signal connector pins'' note, and added ''locating'' and ''0'' to pin note.
SA572–S80	S4 triaxial accelerometer mounting block.	Changed single decimal place tolerance from ± 0.1/2.54 to ± 0.1/2.5, corrected metric equivalents, revised hole note, and relocated holes.
TE–2208–001	Neck adapter bracket—6 year old	Added part #9001265 and note #3, changed single decimal place tolerance from ± 0.1/2.54 to ± 0.1/2.5.
9001373	Bushing, shoulder	New drawing.
9000000 & 6000000	Hardware used on 3YR. 6YR. & 5th female.	Added part #9001265, removed part #9001373.

8. Availability of Drawings and Specifications Package and PADI

The drawings and specifications package and the PADI document referred to in this final rule are available for viewing and copying at the Department's public docket area, located at Plaza 401, 400 Seventh St., SW., Washington, DC. Additionally, these documents may be downloaded from the docket website, DMS.DOT.GOV. After accessing the website, click under the ''Search'' heading, and then under the ''search form'' to conduct a web search for the documents. When filling out the search form, enter NHTSA as the appropriate agency. Select ''rulemaking'' as the appropriate category, and ''Crashworthiness Drawings and Equipment'' as the appropriate subcategory. Enter the name of the test dummy under the ''subject'' category and then conduct your search by

clicking on the ''search'' heading. This will retrieve the entire PADI and drawings and specifications package for the H–III6C. The PADI and each drawing may be individually retrieved once you have accessed that docket. The drawings and specifications package and the PADI document are also available from Reprographic Technologies, 9107 Gaither Rd., Gaithersburg, MD 20877, (301)419–5070.

Regulatory Analyses and Notices

Executive Order 12866 and DOT

Regulatory Policies and Procedures

Executive Order 12866, ''Regulatory Planning and Review'' (58 FR 51735, October 4, 1993), provides for making determinations whether a regulatory action is ''significant'' and therefore subject to Office of Management and Budget (OMB) review and to the requirements of the Executive Order. The Order defines a ''significant regulatory action'' as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or Tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

We have considered the impact of this rulemaking action under Executive Order 12866 and the Department of Transportation's regulatory policies and procedures. This rule is not considered a significant regulatory action under section 3(f) of the Executive Order 12866. Consequently, it was not reviewed by the Office of Management and Budget under E.O. 12866, ''Regulatory Planning and Review.'' The rulemaking action is also not considered to be significant under the Department's Regulatory Policies and Procedures (44 FR 11034, February 26, 1979).

This document amends 49 CFR part 572, subpart N. This rule indirectly imposes requirements on only those businesses that choose to manufacture or test with the dummy, in that the agency will only use dummies for compliance testing that meet all of the criteria specified in this rule. It may indirectly affect vehicle and child seat manufacturers if it is incorporated by reference into the advanced air bag rulemaking or a future Child Seating Systems (FMVSS No. 213) rulemaking.

The total cost of an uninstrumented H–III6C dummy is approximately $30,000. Instrumentation will add approximately $25,000 to $41,000 to the cost, depending on the number of data channels the user chooses to collect. The amendments made in this document will not affect the cost of the dummy.

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

Executive Order 13132

Executive Order 13132 requires NHTSA 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.'' Under Executive Order 13132, the agency may not issue a regulation with Federalism implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by State and local governments, the agency consults with State and local governments, or the agency consults with State and local officials early in the process of developing the proposed regulation. NHTSA also may not issue a regulation with Federalism implications and that preempts State law unless the agency consults with State and local officials early in the process of developing the proposed regulation.

We have analyzed this rule in accordance with the principles and criteria set forth in Executive Order 13132. This rule will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. We have determined that this rule does not have sufficient federalism implications to warrant consultation and the preparation of a Federalism Assessment. The amendments made in this document will not affect the cost of the dummy.

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 rule is not subject to the Executive Order because it is not economically significant as defined in E.O. 12866. It does indirectly involve decisions based on health risks that disproportionately affect children, namely, the risk of deploying air bags to children. However, this rulemaking serves to help vehicle and air bag manufacturers to take steps to reduce that risk.

Executive Order 12778

Pursuant to Executive Order 12778, ''Civil Justice Reform,'' we have considered whether this rule will have any retroactive effect. This rule does not have any retroactive effect. A petition for reconsideration or other administrative proceeding will not be a prerequisite to an action seeking judicial review of this rule. This rule does not preempt the states from adopting laws or regulations on the same subject, except that it does preempt a state regulation that is in actual conflict with the federal regulation or makes compliance with the Federal regulation impossible or interferes with the implementation of the Federal statute.

Regulatory Flexibility Act

Pursuant to the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996) whenever an agency is required to publish a notice of rulemaking for any 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). However, no regulatory flexibility analysis is required if the head of an agency certifies the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the

Regulatory Flexibility Act to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have a significant economic impact on a substantial number of small entities.

I have considered the effects of this rulemaking action under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) and certify that this proposal will not have a significant economic impact on a substantial number of small entities. The amendments made in this document will not affect the cost of the dummy. The rule does not impose or rescind any requirements for anyone. The Regulatory Flexibility Act does not, therefore, require a regulatory flexibility analysis.

National Environmental Policy Act

We have analyzed this amendment 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.

Paperwork Reduction Act

Under the Paperwork Reduction Act of 1995, a person is not required to respond to a collection of information by a Federal agency unless the collection displays a valid OMB control number. This rule does not propose any new information collection requirements.

National Technology Transfer and Advancement Act

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

The H–III6C dummy that is the subject of this document was developed under the auspices of the SAE. All relevant SAE standards were reviewed as part of the development process. The following voluntary consensus standards have been used in developing the dummy:

- SAE Recommended Practice J211–1995, ''Instrumentation for Impact Tests—Parts 1 and 2'', dated March, 1995; and
- SAE J1733 Information Report, titled ''Sign Convention for Vehicle Crash Testing'', dated December 1994.

Unfunded Mandates Reform Act

Section 202 of the Unfunded Mandates Reform Act of 1995 (UMRA) requires Federal agencies to prepare a written assessment of the costs, benefits and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local or tribal governments, in the aggregate, or by the private sector, of more than $100 million in any one year (adjusted for inflation with base year of 1995). Before promulgating a NHTSA rule for which a written statement is needed, section 205 of the UMRA generally requires us to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows us to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if we publish with the final rule an explanation why that alternative was not adopted.

This rule does not impose any unfunded mandates under the Unfunded Mandates Reform Act of 1995. This rule does not meet the definition of a Federal mandate because it does not impose requirements on anyone. Further, it will not result in costs of $100 million or more to either State, local, or tribal governments, in the aggregate, or to the private sector. The amendments made in this document will not affect the cost of the dummy. Thus, this rule is not subject to the requirements of sections 202 and 205 of the UMRA.

Regulation Identifier Number (RIN)

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

List of Subjects in 49 CFR Part 572

Incorporation by reference. Motor vehicle safety.

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

PART 572—ANTHROPOMORPHIC TEST DUMMIES

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 1.50.

2. By revising the title of subpart N to read as follows:

Subpart N—Six-year-old Child Test Dummy, Beta Version

3. By revising § 572.120(a)(1), (a)(2), and (c)(1) to read as follows:

§ 572.120 Incorporation by reference.

(a) * * *

(1) A drawings and inspection package entitled ''Parts List and Drawings, Hybrid III Six-year-old Child Test Dummy (H-III6C, Beta Version) (June 2002)'', consisting of:

(i) Drawing No. 127–1000, 6-year H3 Head Complete,

(ii) Drawing No. 127–1015, Neck Assembly,

(iii) Drawing No. 127–2000, Upper Torso Assembly,

(iv) Drawing No. 127–3000, Lower Torso Assembly,

(v) Drawing No. 127–4000–1 and 4000–2, Leg Assembly,

(vi) Drawing No. 127–5000–1 and 5000–2, Arm Assembly, and

(vii) The Hybrid III Six-year-old Child Parts/Drawing List.

(2) A procedures manual entitled ''Procedures for Assembly, Disassembly, and Inspection (PADI) of the Hybrid III 6-year-old Child Crash Test Dummy (H-III6C), Beta Version, June 2002'';

* * * * *

(c) * * *

(1) The drawings and specifications package and the PADI document referred to in subparagraph (a) are accessible for viewing and copying at the Department of Transportation Docket's public area, Plaza 401, 400 Seventh St., SW, Washington, DC 20590, and may be downloaded from dms.dot.gov. They are also available from Reprographic Technologies, 9107 Gaither Rd, Gaithersburg, MD 200877, (301) 419–5070.

* * * * *

4. By revising § 572.124(b) and (c) to read as follows:

§ 572.124 Thorax assembly and test procedure

* * * * *

(b) When the anterior surface of the thorax of a completely assembled dummy (drawing 127–0000) is impacted by a test probe conforming to section 572.127(a) at 6.71 ± 0.12 m/s (22.0 ± 0.4 ft/s) according to the test procedure in paragraph (c) of this section:

(1) The maximum sternum displacement (compression) relative to the spine, measured with chest deflection transducer (drawing SA572-S50), must be not less than 38.0 mm (1.50 in) and not more than 46.0 mm (1.80 in). Within this specified compression corridor, the peak force, measured by the probe in accordance with section 572.127, shall not be less than 1150 N (259 lbf) and not more than 1380 N (310 lbf). The peak force after 12.5 mm (0.5 in) of sternum displacement but before reaching the minimum required 38.0 mm (1.5 in) sternum displacement limit shall not exceed 1500 N (337.2 lbf).

(2) The internal hysteresis of the ribcage in each impact as determined by the plot of force vs. deflection in paragraph (b)(1) of this section shall be not less than 65 percent but not more than 85 percent.

(c) *Test procedure.* The test procedure for the thorax assembly is as follows:

(1) Soak the dummy in a controlled environment at any temperature between 20.6° and 22.2°C (69° and 72°F) and a relative humidity between 10 and 70 percent for at least four hours prior to a test.

(2) Seat and orient the dummy, wearing tight-fitting underwear or equivalent consisting of a size 5 short-sleeved shirt having a weight less than 0.090 kg (0.2 lb) and an opening at the top just large enough to permit the passage of the head with a tight fit, and a size 4 pair of long pants having a weight of less than 0.090 kg (0.2 lb) with the legs cut off sufficiently above the knee to allow the knee target to be visible, on a seating surface without back support as shown in Figure N4, 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.

(3) Establish the impact point at the chest midsagittal plane so that the impact point of the longitudinal centerline of the probe coincides with the midsagittal plane of the dummy within ± 2.5 mm (0.1 in) and is 12.7 ± 1.1 mm (0.5 ± 0.04 in) below the horizontal-peripheral centerline of the No. 3 rib and is within 0.5 degrees of a horizontal line in the dummy's midsagittal plane.

(4) Impact the thorax with the test probe so that at the moment of contact the probe's longitudinal center line falls within 2 degrees of a horizontal line in the dummy's midsagittal plane.

(5) Guide the test probe during impact so that there is no significant lateral, vertical or rotational movement.

(6) No suspension hardware, suspension cables, or any other attachments to the probe, including the velocity vane, shall make contact with the dummy during the test.

* * * * *

5. By amending § 572.126 and by revising paragraph (b) and adding paragraph (c)(6) to read as follows:

§ 572.126 Knees and knee impact test procedure.

* * * * *

(b) When the knee assembly, consisting of knee machined (drawing 127–4013), knee flesh (drawing 127–4011), lower leg (drawing 127–4014), the foot assembly (drawing 127–4030–1(left) and -2 (right)) and femur load transducer (drawing SA572-S10) or its structural replacement (drawing 127–4007) is tested according to the test procedure in section 572.127(c), the peak resistance force as measured with the test probe mounted accelerometer must be not less than 2.0 kN (450 lbf) and not more than 3.0 kN (674 lbf).

(c) *Test procedure.* * * *

(6) No suspension hardware, suspension cables, or any other attachments to the probe, including the velocity vane, shall make contact with the dummy during testing.

6. By revising § 572.127(a), (b), (k), (l), (m), (n), (o), and (p) to read as follows:

§ 572.127 Test conditions and instrumentation

(a) The test probe for thoracic impacts, except for attachments, shall be of rigid metal or metal alloy construction and concentric about its longitudinal axis. Any attachments to the impactor, such as suspension hardware, velocity vanes, etc., must meet the requirements of § 572.124(c)(6). The impactor shall have a mass of 2.86 ± 0.02 kg (6.3 ± 0.05 lb) and a minimum mass moment of inertia of 160 kg-c^2 (0.141 lb-in-sec^2) in yaw and pitch about the CG of the probe. One third of the weight of suspension cables and any attachments to the impact probe must be included in the calculation of mass, and such components may not exceed five percent of the total weight of the probe. The impacting end of the probe, has a flat, continuous, and non-deformable 101.6 ± 0.25 mm (4.00 ± 0.01 in) diameter face with an edge radius of 7.6/12.7 mm (0.3/0.5 in). The impactor shall have a 101–103 mm (4.0–4.1 in) diameter cylindrical surface extending for a minimum of 12.5 mm (0.5 in) to the rear from the impact face. The probe's end opposite to the impact face has provisions for mounting an accelerometer with its sensitive axis collinear with the longitudinal axis of the probe. The impact probe shall have a free air resonant frequency of not less than 1000 Hz limited to the direction of the longitudinal axis of the impactor.

(b) The test probe for knee impacts, except for attachments, shall be of rigid metal or alloy construction and concentric about its longitudinal axis. Any attachments to the impactor, such as suspension hardware, velocity vanes, etc., must meet the requirements of § 572.126(c)(6). The impactor shall have a mass of 0.82 ± 0.02 kg (1.8 ± 0.05 lb) and a minimum mass moment of inertia of 34 kg-cm2 (0.03 lb-in-sec2) in yaw and pitch about the CG of the probe. One third of the weight of suspension cables and any attachments to the impact probe must be included in the calculation of mass, and such components may not exceed five percent of the total weight of the probe. The impacting end of the probe, has a flat, continuous, and non-deformable 76.2 ± 0.2 mm (3.00 ± 0.01 in) diameter face with an edge radius of 7.6/12.7 mm (0.3/0.5 in). The impactor shall have a 76–77 mm (3.0–3.1 in) diameter cylindrical surface extending for a minimum of 12.5 mm (0.5 in) to the rear from the impact face. The probe's end opposite to the impact face has provisions for mounting an accelerometer with its sensitive axis collinear with the longitudinal axis of the probe. The impact probe shall have a free air resonant frequency of not less than 1000 Hz limited to the direction of the longitudinal axis of the impactor.

* * * * *

(k) The outputs of acceleration and force-sensing devices installed in the dummy and in the test apparatus specified by this part must be recorded in individual data channels that conform to SAE Recommended Practice J211, Rev. Mar95 ''Instrumentation for lmpact Tests,'' except that the lumbar measurements are based on CFC 600, with channel classes as follows:

(1) Head acceleration—Class 1000.

(2) Neck:

(i) Forces—Class 1000;

(ii) Moments—Class 600;

(iii) Pendulum acceleration—Class 180;

(iv) Rotation—Class 60 (if used).

(3) Thorax:
(i) Rib acceleration—Class 1000;
(ii) Spine and pendulum accelerations—Class 180;
(iii) Sternum deflection —Class 600.
(4) Lumbar:
(i) Forces—Class 1000;
(ii) Moments —Class 600;
(iii) Flexion —Class 60 if data channel is used.
(5) Pelvis accelerations —Class 1000.
(6) Femur forces—Class 600.

(l) Coordinate signs for instrumentation polarity shall conform to the Sign Convention For Vehicle Crash Testing, Surface Vehicle Information Report, SAE J1733, 1994–12.

(m) The mountings for sensing devices shall have no resonance frequency less than 3 times the frequency range of the applicable channel class.

(n) Limb joints must be set at one G, barely restraining the weight of the limb when it is extended horizontally. The force needed to move a limb segment shall not exceed 2G throughout the range of limb motion.

(o) Performance tests of the same component, segment, assembly, or fully assembled dummy shall be separated in time by period of not less than 30 minutes unless otherwise noted.

(p) Surfaces of dummy components may not be painted except as specified in this subpart or in drawings subtended by this subpart.

7. By revising Figures N1, N2, N3, and N6 to read as follows:

Figures to Subpart N

* * * * *

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Figure N 1

HEAD DROP TEST SET-UP SPECIFICATIONS

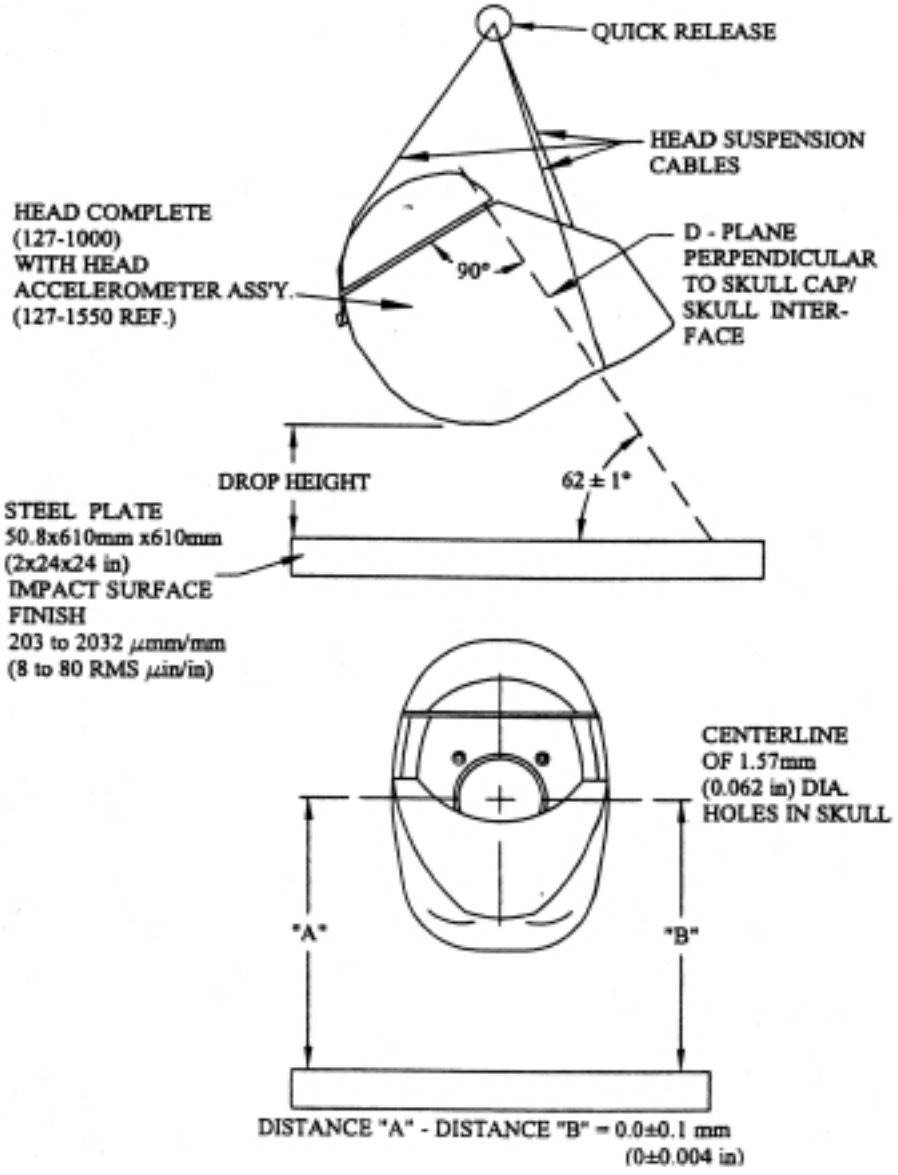
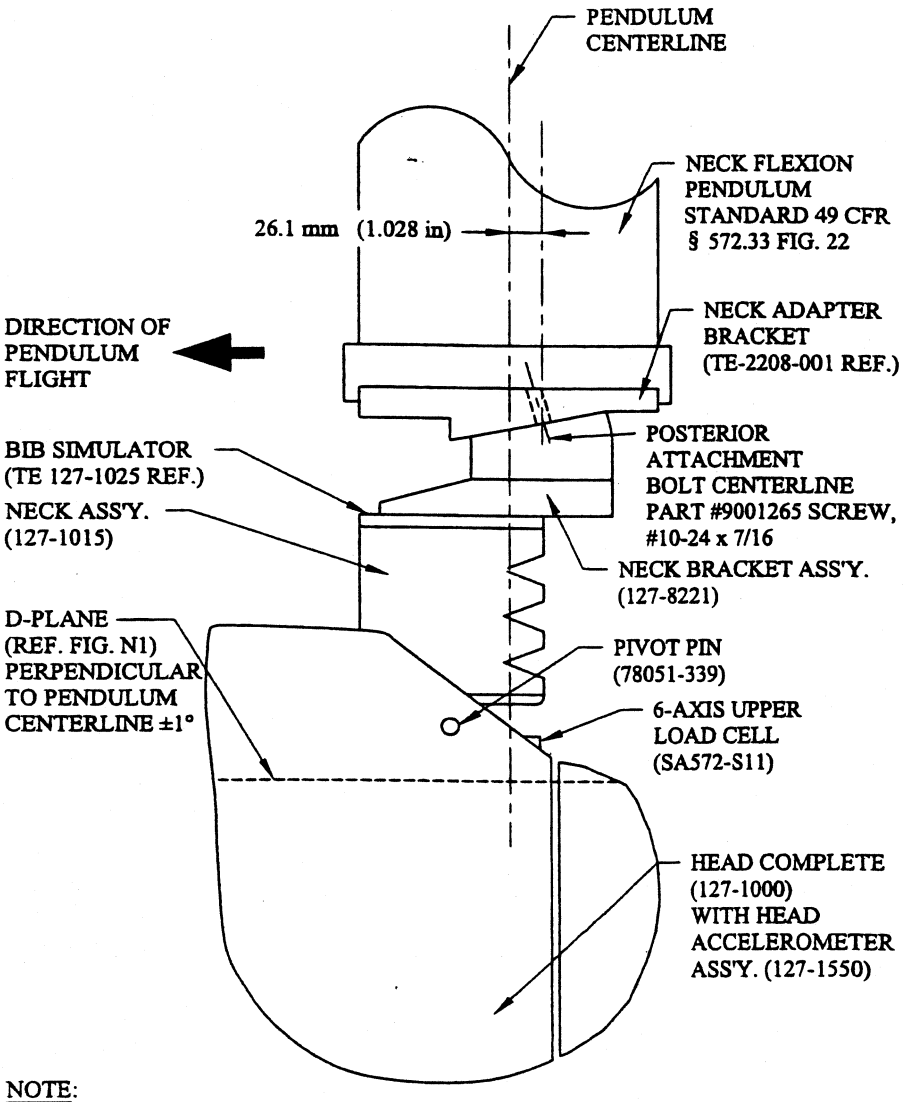


Figure N 2

NECK FLEXION TEST SET-UP SPECIFICATIONS



NOTE:
PENDULUM SHOWN IN VERTICAL ORIENTATION

Figure N 3

NECK EXTENSION TEST SET-UP SPECIFICATIONS

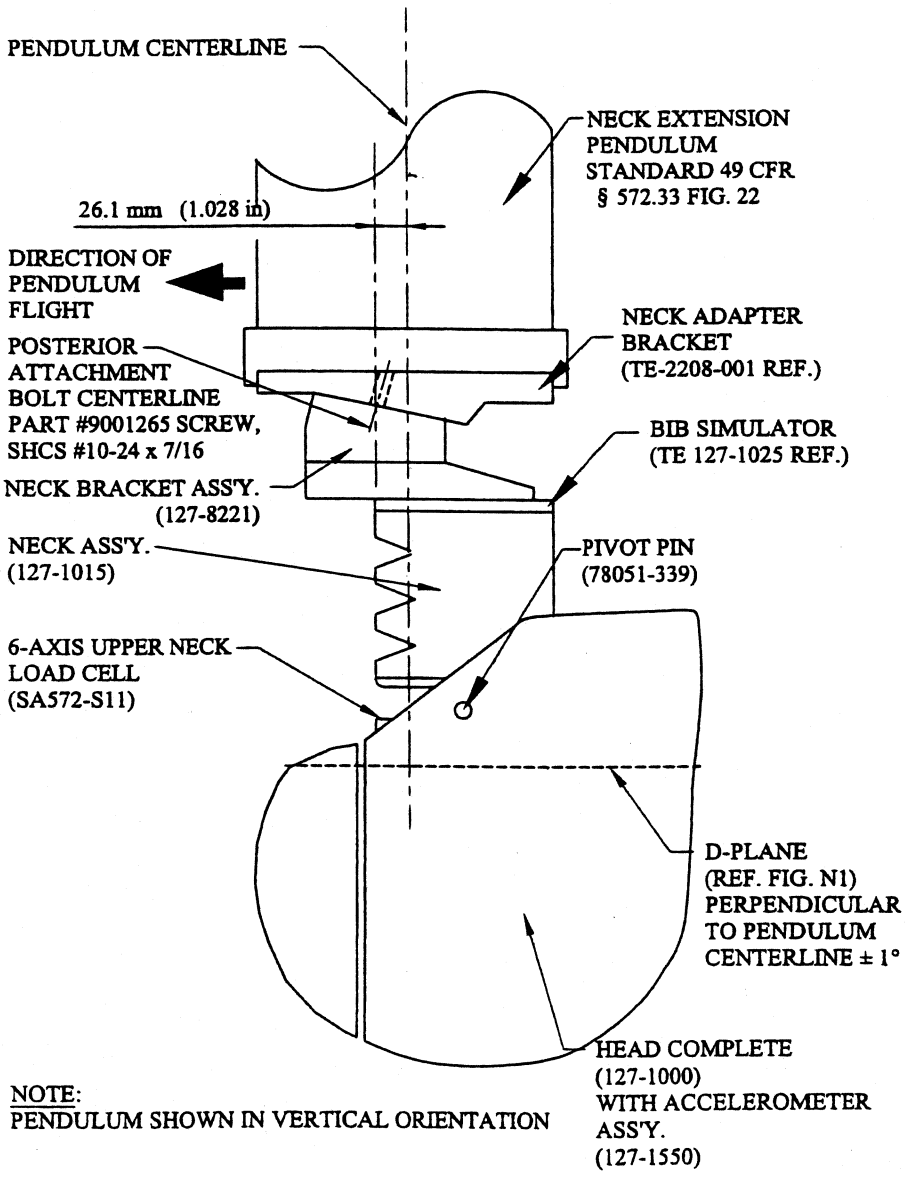
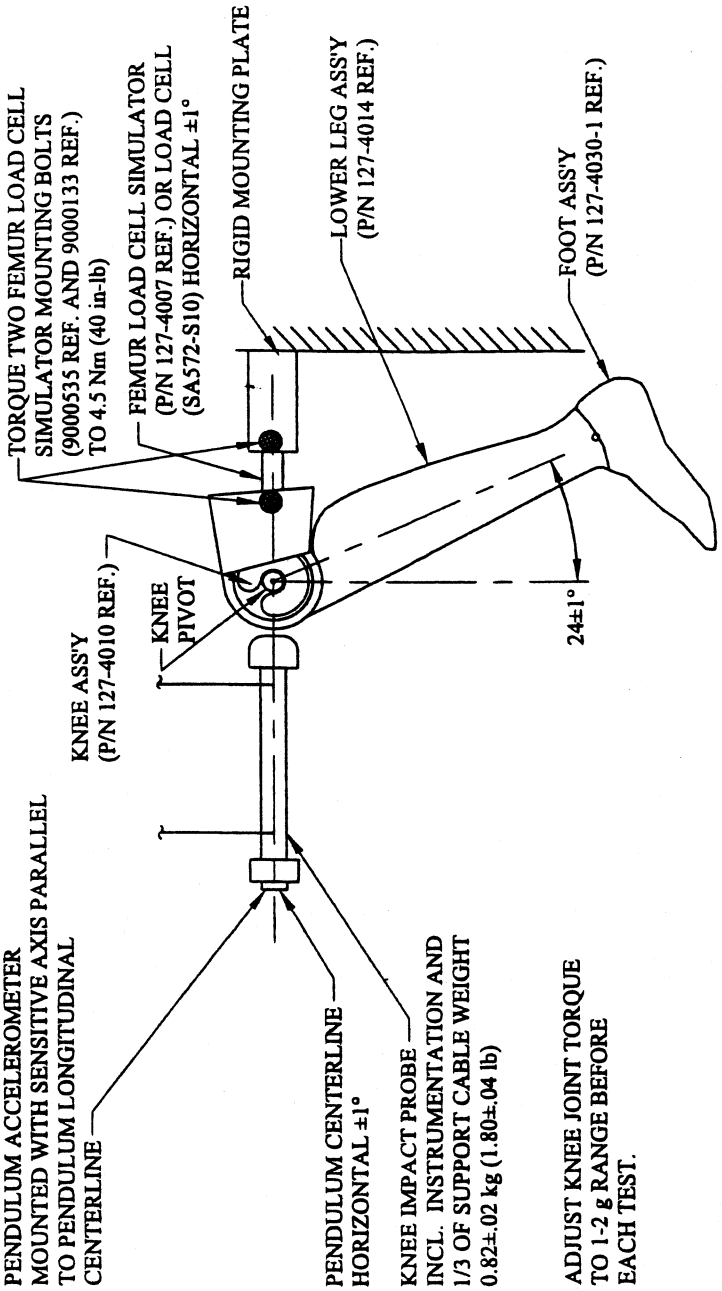


FIGURE N 6
KNEE IMPACT TEST SET-UP SPECIFICATIONS



Issued: June 19, 2002.

Jeffrey W. Runge,

Administrator.

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