TP-572-T-00
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U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

CALIBRATION TEST PROCEDURE
for
Part 572 Subpart T, HIII 10-Year-Old
Child Test Dummy

ENFORCEMENT
Office of Vehicle Safety Compliance
Mail Code: NVS-220, W43-481
1200 New Jersey Avenue, SE
Washington, DC 20590

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FIGURES

TABLES

1. PURPOSE AND APPLICATION

The purpose of this laboratory procedure is to provide dummy users (independent testing laboratories under contract with the Office of Vehicle Safety Compliance) with standard test procedures for performing receiving-inspection and performance calibration tests on the Part 572, Subpart T dummy so that repetitive and correlative test results can be achieved. The following tests have been developed to establish a uniform calibration procedure for all users as the means of verifying the performance of the dummy.

A. EXTERNAL DIMENSIONS (drawing 420-0000 & PADI)

B. HEAD DROP TEST (572.172)

C. NECK FLEXION TEST (572.173(b)(1))

D. NECK EXTENSION TEST (572.173(b)(2))

E. THORAX IMPACT TEST (572.174)

F. TORSO FLEXION (572.175)

G. KNEE IMPACT TESTS (572.176)

2. GENERAL REQUIREMENTS

Each Part 572, Subpart T dummy used in a compliance test must meet the specifications and performance criteria of Part 572. The Hybrid III 10-year-old Child Test Dummy (HIII-10C) is defined by drawings and specifications containing the following materials:

(1) The parts listed in "Parts/Drawing List, Part 572 Subpart T, Hybrid III 10-Year-Old Child Test Dummy (HIII-10C), August 2011" (incorporated by reference, see §572.170),

(2) The engineering drawings and specifications contained in "Parts List and Drawings, Part 572 Subpart T, Hybrid III 10-Year-Old Child Test Dummy (HIII-10C), August 2011," which includes the engineering drawings and specifications described in Drawing 420-0000, the titles of the assemblies of which are listed in Table 1, and,

(3) A manual entitled "Procedures for Assembly, Disassembly and Inspection (PADI) of the Hybrid III 10-Year-Old Child Test Dummy (HIII-10C), August 2011."

TABLE 1. DRAWING PACKAGE INDEX

Component assembly	Drawing No.
(i) Head Assembly	420-1000
(ii) Neck Assembly	420-2000
(iii) Upper Torso Assembly	420-3000

(iv) Lower Torso Assembly	420-4000
(v) Complete Leg Assembly—left	420-5000-1
(vi) Complete Leg Assembly—right	420-5000-2
(vii) Complete Arm Assembly—left	420-7000-1
(viii) Complete Arm Assembly—right	420-7000-2

The documents are available from www.regulations.gov under Docket No. NHTSA-2011-0175.

3. SECURITY

All NHTSA Part 572, Subpart T test dummies delivered to the contract laboratory as Government Furnished Property (GFP) will be stored in a safe and secure area such as the dummy calibration laboratory. The contractor is financially responsible for any acts of theft and/or vandalism which occur during the storage of GFP. Any security problems shall be reported by telephone to the Industrial Property Manager (IPM), Office of Contracts and Procurement, within two working days after the incident. A letter containing specific details of the security problem will be sent to the IPM (with copy to the COTR) within 48 hours.

The contractor is responsible for maintaining the NHTSA test dummies in good working order, and shall protect and segregate the data that evolves from conducting Part 572, Subpart T dummy calibration tests before and after each compliance test.

No information concerning the Part 572, Subpart T dummy calibration data shall be released to anyone except the COTR, unless specifically authorized by the COTR or the COTR's Division Chief.

NOTE: No individuals, other than contractor personnel directly involved in the dummy calibration test program, shall be allowed to witness dummy calibration tests unless specifically authorized by the COTR.

4. GOOD HOUSEKEEPING

Contractors shall maintain the entire dummy calibration laboratory, test fixtures, and instrumentation in a neat, clean, and painted condition with test instruments arranged in an orderly manner consistent with good test laboratory housekeeping practices.

5. TEST SCHEDULING AND MONITORING

The Part 572, Subpart T dummies are being calibrated as test tools to be used in determining compliance with the requirements of federal motor vehicle safety

standards. The schedule for these performance calibration tests must be correlated with that of the test schedule. All testing shall be coordinated to allow monitoring by the COTR.

6. TEST DATA DISPOSITION

The contractor shall make all dummy calibration data available to the COTR for review and analysis as required.

All backup data sheets, strip charts, recordings, plots, technician's notes, etc. shall be either sent to the COTR or destroyed at the conclusion of each delivery order, purchase order, etc.

7. GOVERNMENT FURNISHED PROPERTY (GFP)

Part 572, Subpart T test dummies will be furnished to the contract laboratory by the OVSC. The dummies shall be stored in an upright sitting position with the weight supported by the internal structure of the pelvis. The dummies head shall be held upright by using a strap around the chest or the base of the neck so that the neck is not supporting the weight of the dummy. Refer to Appendix A for an example storage device. These dummies shall be stored in a secured room that is kept between 55°F and 85°F. The contractor will check dummy components for damage after each compliance test and complete a dummy damage checklist that will be included with the posttest dummy calibration. The COTR will be kept informed of the dummies condition in order that replacement parts can be provided.

8. CALIBRATION AND TEST INSTRUMENTATION

Before the contractor initiates the dummy performance calibration test program, a test instrumentation calibration system must be implemented and maintained in accordance with established calibration practices. The calibration system shall be set up and maintained as follows:

A. Standards for calibrating the measuring and test equipment shall be stored and used under appropriate environmental conditions to assure their accuracy and stability.

B. All measuring instruments and standards shall be calibrated by the contractor, or a commercial facility, against a higher order standard at periodic intervals not exceeding 6 months for instruments and 12 months for calibration standards. Records, showing the calibration traceability to the National Institute of Standards and Technology (NIST), shall be maintained for all measuring and test equipment.

C. All measuring and test equipment and measuring standards shall be labeled with the following information:

(1) Date of calibration

(2) Date of next scheduled calibration

(3) Name of the technician who calibrated the equipment

D. The contractor shall provide a written calibration procedure that includes, as a minimum, the following information for all measurement and test equipment:

(1) Type of equipment, manufacturer, model number, etc.

(2) Measurement range

(3) Accuracy

(4) Calibration interval

(5) Type of standard used to calibrate the equipment (calibration traceability of the standard must be evident)

(6) The actual procedures and forms used to perform calibrations.

E. The contractor shall keep records of calibrations for all test instrumentation in a manner that assures the maintenance of established calibration schedules. All such records shall be readily available for inspection when requested by the COTR. The calibration system will need the written acceptance of the COTR before testing begins.

F. Test equipment shall receive a calibration check immediately prior to each test. This check shall be recorded by the test technician(s) and made available if requested by the COTR.

9. DEFINITIONS

PADI- Procedures for Assembly, Disassembly, and Inspection

10. INSTRUMENTATION, TEST CONDITIONS, AND PROCEDURES

10.1 INSTRUMENTATION

10.1.1 TRANSDUCERS REQUIRED FOR QUALIFICATION TESTS (572.177(a))

The contractor shall provide and install the instrumentation needed for qualification testing and if required, for compliance testing. The instrumentation used during the compliance tests shall be those installed during qualification testing.

A. HEAD – The head accelerometers shall have dimensions, response characteristics, and sensitive mass locations specified in drawing SA572-S4 and be mounted in the head as shown in drawing 420-0000, sheet 2 of 5. (572.177(a)(3))

Three accelerometers shall be mounted in the head cavity to measure orthogonal accelerations (Ax, Ay, Az) at the center of gravity (CG) of the head assembly.

B. NECK – The upper neck force and moment transducer shall have the dimensions, response characteristics, and sensitive axis locations specified in drawing SA572-S11 (included in drawing 420-0000) and be mounted in the head-neck assembly as shown in drawing 420-0000, sheet 2 of 5. (572.177(a)(4))

C. CHEST –The chest deflection transducer shall have the dimensions and response characteristics specified in drawing SA572-S50 and be mounted to the upper torso assembly as shown in drawing 420-0000, sheet 2 of 5. (572.177(a)(5))

10.1.2 OTHER TRANSDUCERS (572.177(b))

The following instrumentation may be required for installation in the dummy for compliance testing. If so, the contractor shall provide the instrumentation and it is installed during qualification procedures:

A. THORAX- The thorax CG accelerometers have the dimensions, response characteristics, and sensitive mass locations specified in drawing SA572-S4 (included in drawing 420-0000) (incorporated by reference, see § 572.170) and are mounted in the torso assembly in a triaxial configuration within the spine box instrumentation cavity.

B. NECK- The lower neck force and moment transducer has the dimensions, response characteristics, and sensitive axis locations specified in drawing SA572-S40 (included in drawing 420-0000) and is mounted to the neck assembly by replacing the lower neck mounting bracket 420-2070 as

shown in drawing 420-2000 (all incorporated by reference, see § 572.170).

C. CLAVICLE- The clavicle force transducers have the dimensions, response characteristics, and sensitive axis locations specified in drawing SA572-S41 (included in drawing 420-0000) and are mounted in the shoulder assembly as shown in drawing 420-3800 (both incorporated by reference, see § 572.170).

D. CHEST DEFLECTION- The IR-Tracc chest deflection transducers have the dimensions and response characteristics specified in drawing SA572-S43 (included in drawing 420-0000) and are mounted to the spine box assembly as shown in drawing 420-8000 (both incorporated by reference, see § 572.170).

E. SPINE AND STERNUM- The spine and sternum accelerometers have the dimensions, response characteristics, and sensitive mass locations specified in drawing SA572-S4 (included in drawing 420-0000) and are mounted in the torso assembly in uniaxial fore-and-aft oriented configuration arranged as corresponding pairs in two locations each on the sternum and at the spine box of the upper torso assembly as shown in drawing 420-0000 (both incorporated by reference, see § 572.170), sheet 2 of 5.

F. LUMBAR SPINE- The lumbar spine force-moment transducer has the dimensions, response characteristics, and sensitive axis locations specified in drawing SA572-S12 (included in drawing 420-0000) and is mounted in the lower torso assembly as shown in drawing 420-4000 (both incorporated by reference, see § 572.170).

G. ILIAC CREST- The iliac force transducers have the dimensions and response characteristics specified in drawing SA572-S13 L and R (included in drawing 420-0000) and are mounted in the lower torso assembly as shown in drawing 420-4000 (both incorporated by reference, see § 572.170).

H. PELVIS- The pelvis accelerometers have the dimensions, response characteristics, and sensitive mass locations specified in drawing SA572-S4 (included in drawing 420-0000) and are mounted in the torso assembly in triaxial configuration in the pelvis bone as shown in drawing 420-0000 (both incorporated by reference, see § 572.170), sheet 2 of 5.

I. FEMUR- The femur force and moment transducers (SA572-S10, included in drawing 420-0000) have the dimensions, response characteristics, and sensitive axis locations specified in the appropriate drawing and are mounted in the upper leg assembly, replacing the femur load cell simulator

(drawing 420-5121) as shown in drawing 420-5100 (all incorporated by reference, see § 572.170).

J. OTHER- The tilt sensors have the dimensions and response characteristics specified in drawing SA572-S42 (included in drawing 420-0000) and are mounted to the head, thorax, and pelvis assemblies as shown in drawing 420-0000 (both incorporated by reference, see § 572.170), sheet 2 of 5.

10.1.3 TRANSDUCER TEST CONDITIONS

A. TRANSDUCER MOUNTS – The mountings for sensing devices shall have no resonance frequency less than 3 times the frequency range of the applicable channel class. (572.177(e))

B. TRANSDUCER SIGN CONVENTION – Coordinate signs for instrumentation polarity shall conform to SAE J1733DEC94. Figure 1 and Table 2 describe some of the sign conventions for transducers mounted in the head, chest, and legs. (572.177(d))

C. TRANSDUCER OUTPUTS AND FILTERING – The outputs of transducers installed in the dummy and in the test equipment specified by this part are to be recorded in individual data channels that conform to SAE Recommended Practice J211 (incorporated by reference, see S572.170) except as noted, with channel frequency classes as follows: (572.177(c))

(1) Pendulum acceleration	CFC 180
(2) Pendulum D-plane rotation (if transducer is used)	CFC 60
(3) Torso flexion pulling force (if transducer is used)	CFC 60
(4) Head acceleration	CFC 1000
(5) Neck forces, upper and lower	CFC 1000
(6) Neck moments, upper and lower	CFC 600
(7) Thorax CG acceleration	CFC 180
(8) Sternum deflection	CFC 600
(9) Sternum and rib accelerations	CFC 1000
(10) Spine accelerations	CFC 180
(11) Lumbar forces	CFC 1000
(12) Lumbar moments	CFC 600
(13) Shoulder forces	CFC 180
(14) Pelvis accelerations	CFC 1000
(15) Iliac forces	CFC 180
(16) Femur and tibia forces	CFC 600
(17) Femur and tibia moments	CFC 600

All filter classes should be of the “phaseless” type to be compatible with the “time” dependent test parameters.

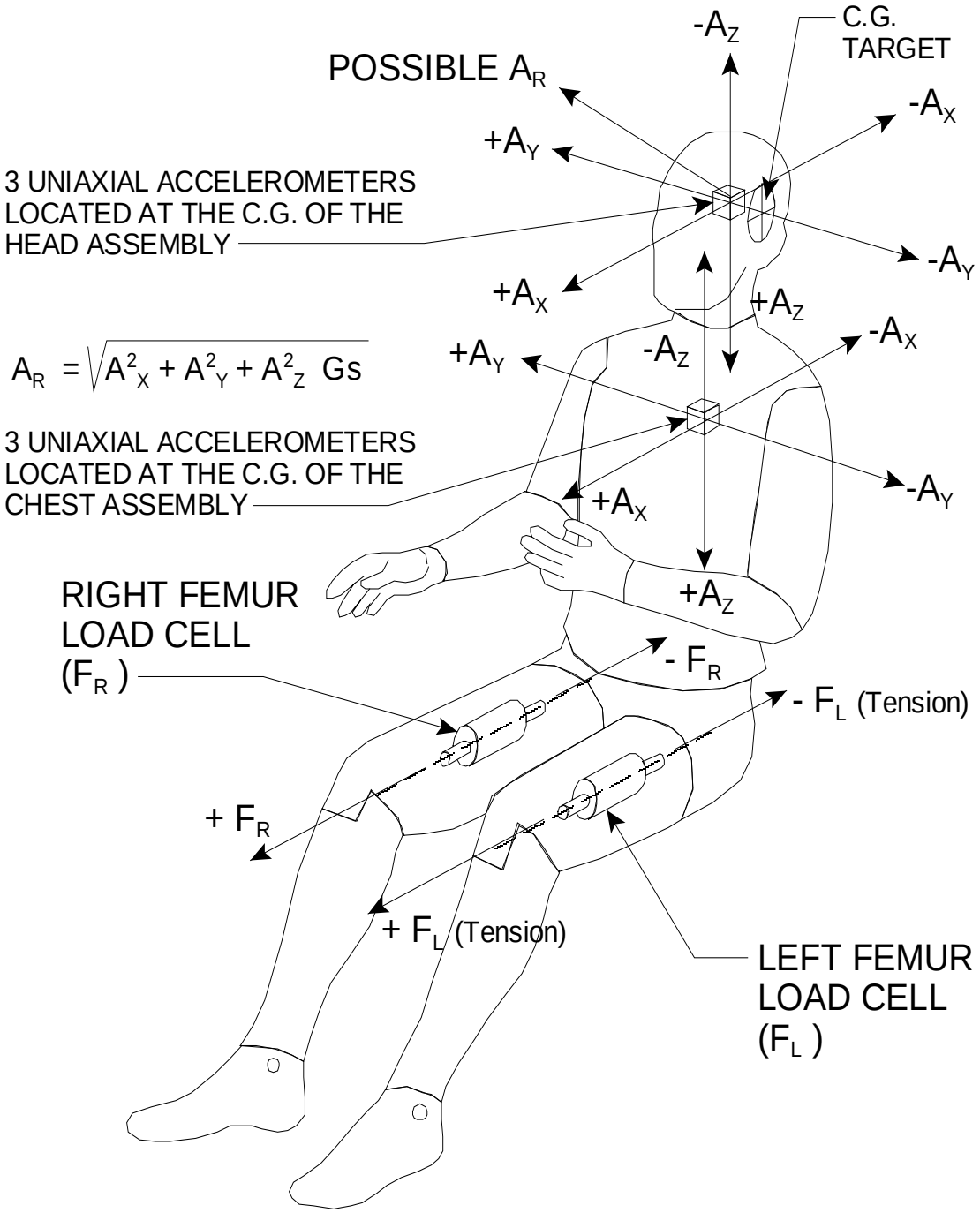


FIGURE 1. SIGN CONVENTION FOR PART 572 TEST DUMMIES

TABLE 2. SIGN CONVENTION FOR TRANSDUCER OUTPUTS

BODY SEGMENT — MEASURED FORCE	**POSITIVE OUTPUT DIRECTION**
NECK FX SHEAR FY SHEAR FZ AXIAL MX MOMENT (ROLL) MY MOMENT (PITCH) MZ MOMENT (YAW)	 HEAD REARWARD OR CHEST FORWARD HEAD LEFTWARD, CHEST RIGHTWARD HEAD UPWARD, CHEST DOWNWARD LEFT EAR TOWARD LEFT SHOULDER CHIN TOWARD STERNUM CHIN TOWARD LEFT SHOULDER
FEMUR FX SHEAR FY SHEAR FZ AXIAL MX MOMENT (ROLL) MY MOMENT (PITCH) MZ MOMENT (YAW)	 KNEE UPWARD, UPPER FEMUR DOWNWARD KNEE RIGHTWARD, UPPER FEMUR LEFTWARD KNEE FORWARD (TENSION), PELVIS REARWARD KNEE LEFTWARD, HOLD UPPER FEMUR IN PLACE KNEE UPWARD, HOLD UPPER FEMUR IN PLACE KNEE ROTATED CCW WHEN FACING FRONT OF DUMMY
KNEE CLEVIS - FZ AXIAL	TIBIA DOWNWARD (TENSION), FEMUR UPWARD
UPPER TIBIA MX MOMENT MY MOMENT	 ANKLE LEFTWARD, HOLD KNEE IN PLACE ANKLE FORWARD, BOTTOM OF KNEE CLEVIS REARWARD
LOWER TIBIA FX SHEAR FY SHEAR FZ AXIAL MX MOMENT MY MOMENT	 ANKLE FORWARD, KNEE REARWARD ANKLE RIGHTWARD, KNEE LEFTWARD ANKLE DOWNWARD (TENSION), KNEE UPWARD ANKLE LEFTWARD, HOLD KNEE IN PLACE ANKLE FORWARD, BOTTOM OF KNEE CLEVIS REARWARD
CHEST DISPLACEMENT	CHEST COMPRESSED - NEGATIVE
KNEE SHEAR DISPLACEMENT	PUSH ON FRONT OF TIBIA - NEGATIVE

NOTE: DIRECTIONS ARE DEFINED IN RELATION TO A SEATED DUMMY

10.2 GENERAL TEST CONDITIONS

A. Surfaces of dummy components are not painted unless otherwise specified. (572.177(h))

B. Dummy performance tests of the same component, segment, assembly, or fully assembled dummy are separated in time by a period of not less than 30 minutes unless otherwise specified. (572.177(g))

C. The dummy performance tests are conducted at any temperature between 20.6°C (69°F) and 22.2°C (72°F) and at any relative humidity from 10% to 70% after exposure of the dummy to these conditions for a period of not less than 4 hours.

D. Dummy limb joints are set at 1G, barely restraining the weight of the limb when it is extended horizontally. The force required to move a limb segment does not exceed 2G throughout the range of limb motion. (572.177(f)).

10.3 HEAD ASSEMBLY

10.3.1 TEST SET-UP (572.172(c))

A. The head assembly shall be suspended and oriented as show in Figure 2.

B. The impact surface shall be a rigidly supported flat horizontal steel plate which is 50.8 mm (2 in.) thick and 610 mm (24 in.) square with a clean, dry, and smooth surface having a micro finish of not less than 203.2×10^{-6} mm (8 micro inches) (RMS) and not more than 2032.0×10^{-6} mm (80 micro inches) (RMS).

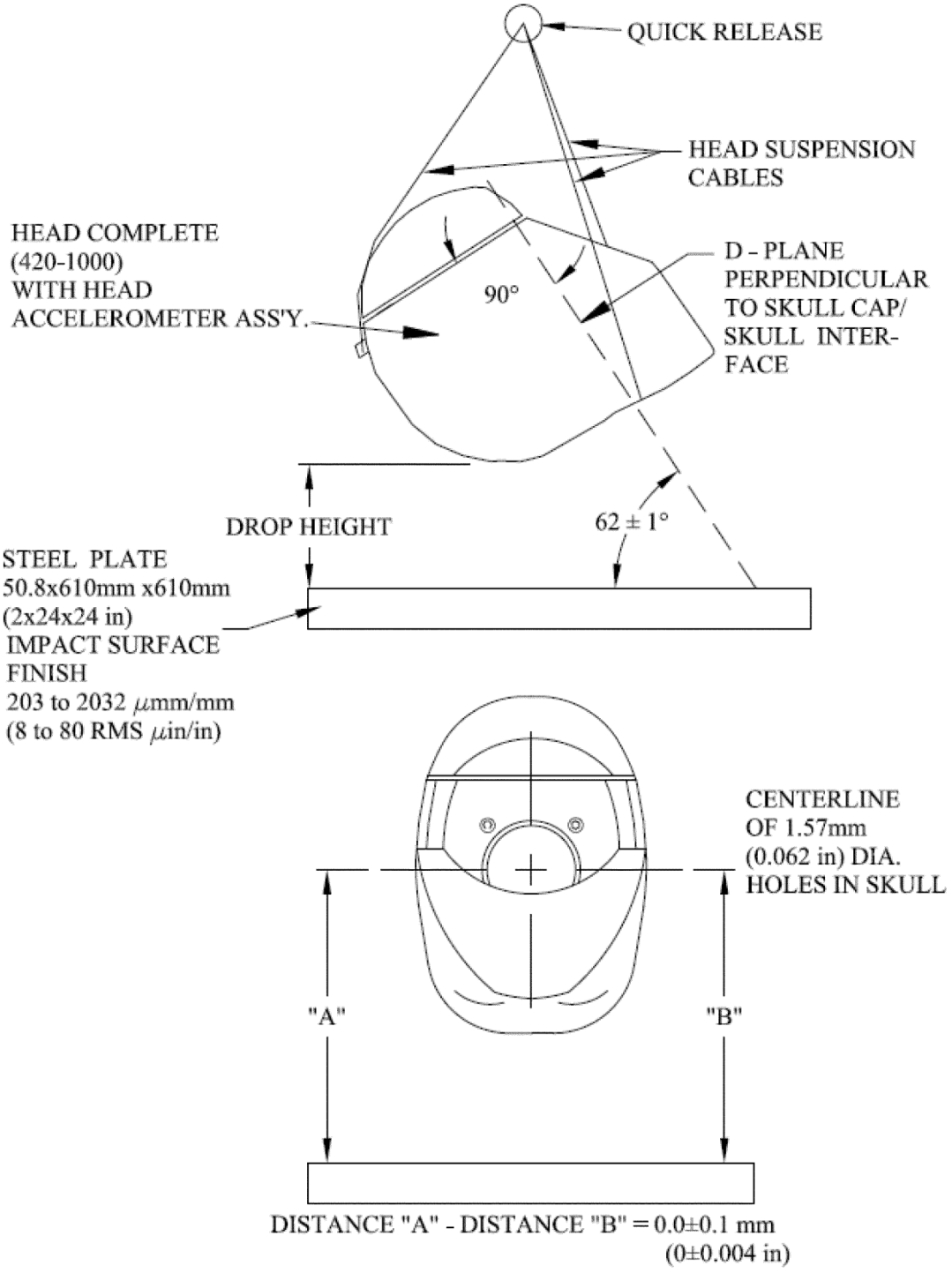


FIGURE 2. HEAD DROP TEST SET-UP SPECIFICATIONS

10.3.2 COMPONENTS FOR HEAD ASSEMBLY TEST (572.172(a))

The head assembly for this test consists of the complete head (drawing 420–1000), a six-axis neck transducer (drawing SA572–S11, included in drawing 420–0000), or its structural replacement (drawing 420–383X), and three accelerometers (drawing SA572–S4, included in drawing 420–0000). (572.172(a))

Refer to the PADI for assembly and disassembly instructions.

10.3.3 HEAD ASSEMBLY CALIBRATION REQUIREMENT (572.172(b))

When the head assembly is dropped from a height of 376.0 ± 1.0 mm (14.8 ± 0.04 in.) in accordance with these procedures, the peak resultant acceleration at the location of the accelerometers at the head CG may not be less than 250 G or more than 300 G. The resultant acceleration vs. time history curve shall be unimodal; oscillations occurring after the main pulse must be less than 10 percent of the peak resultant acceleration. The lateral acceleration shall not exceed 15 G (zero to peak).

10.3.4 HEAD ASSEMBLY TEST PROCEDURE (572.172(c))

A. Condition the head assembly at any temperature between 18.9 and 25.6 °C (66 and 78 °F) and a relative humidity from 10 to 70 percent for at least four hours.

B. Allow at least 2 hours between successive tests on the same head.

C. Clean the impact surface of the skin and the impact plate surface with isopropyl alcohol, trichloroethane, or equivalent. The skin of the head must be clean and dry for testing.

D. Suspend and orient the head assembly as shown in Figure 2. The lowest point on the forehead must be 376.0 ± 1.0 mm (14.8 ± 0.04 in) from the impact surface and the 1.57 mm (0.062 in) diameter holes located on either side of the dummy's head shall be used to ensure that the head is level with respect to the impact surface.

E. Drop the head assembly from the specified height by means that ensure a smooth, instant release onto the impact surface.

10.4 NECK

10.4.1 TEST SET-UP

The pendulum specified in Figure 3 is required for the neck assembly qualification test. (572.173(c)(3))

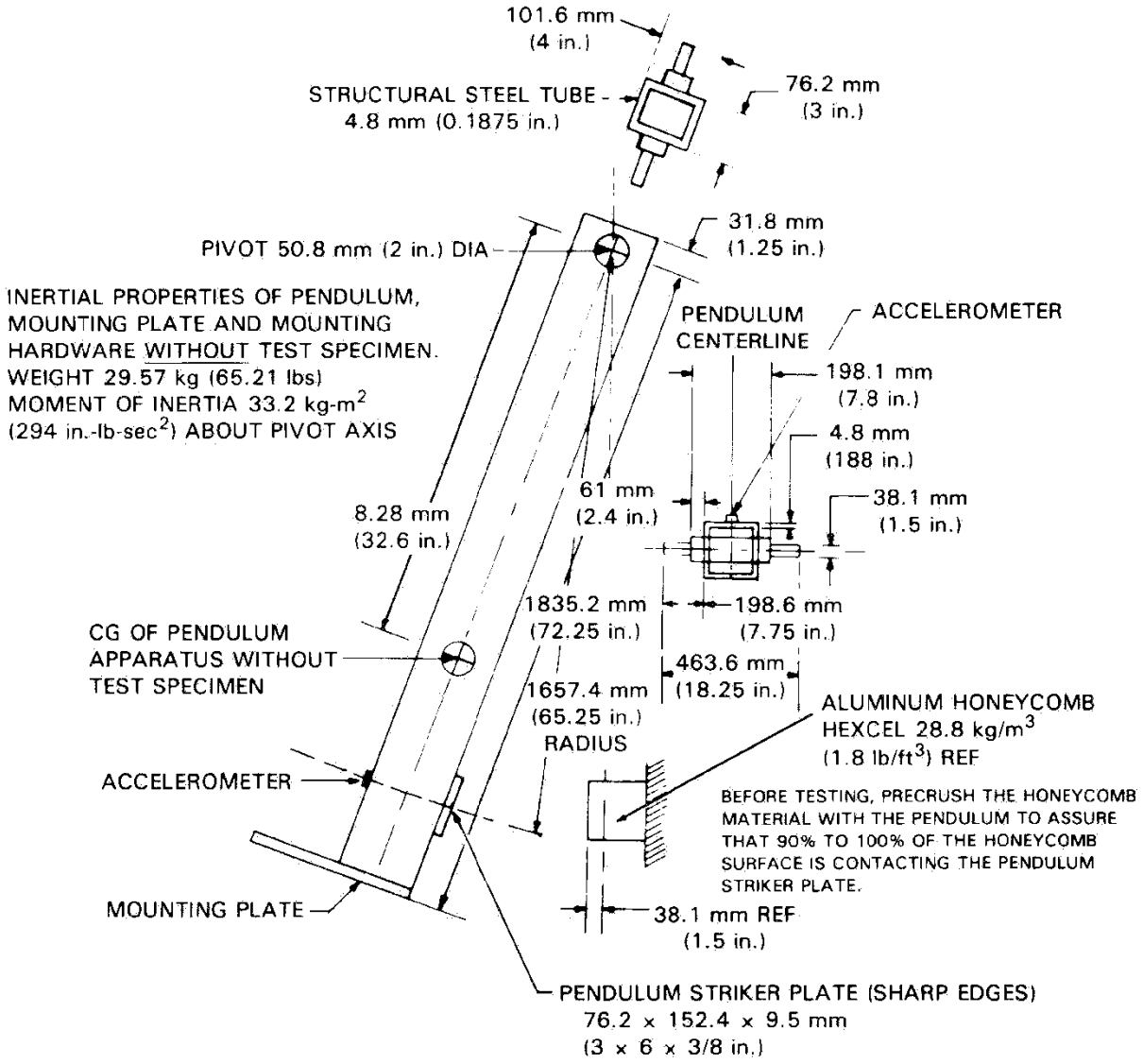


FIGURE 3. NECK PENDULUM SPECIFICATIONS

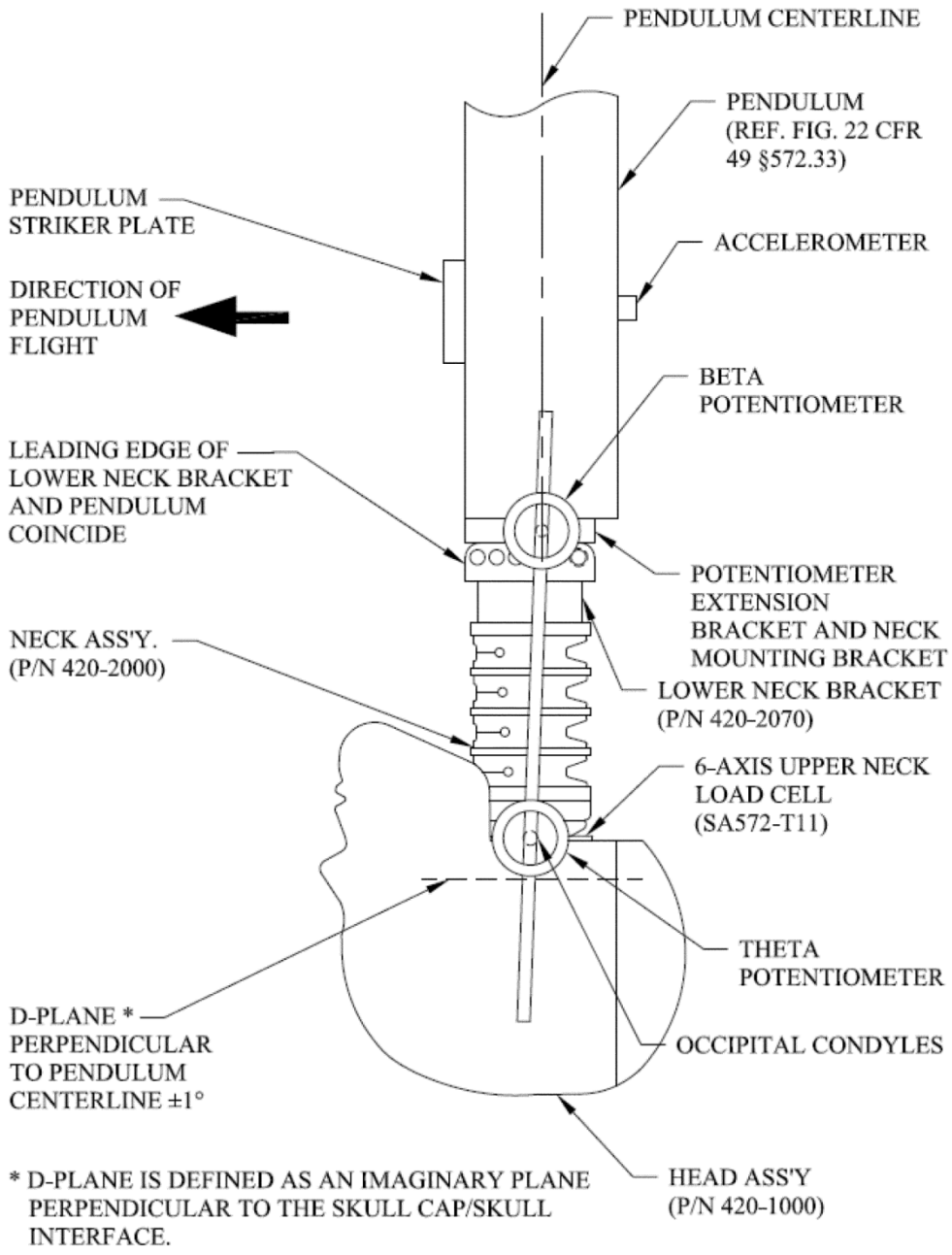


FIGURE 4. NECK FLEXION TEST SET-UP SPECIFICATIONS

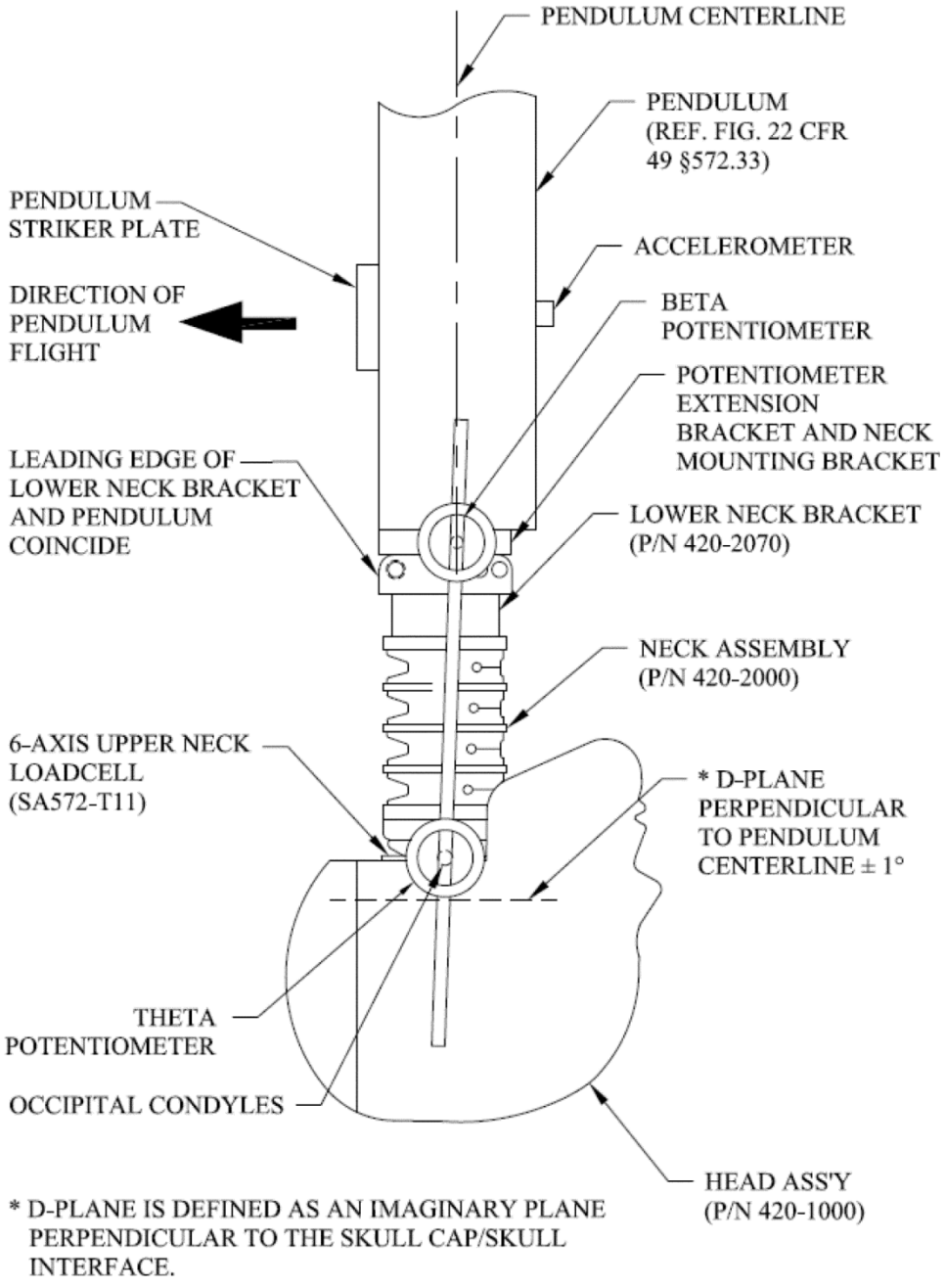


FIGURE 5. NECK EXTENSION TEST SET-UP SPECIFICATIONS

10.4.2 COMPONENTS FOR NECK ASSEMBLY TEST (572.173(a))

For the purposes of this test, the head-neck assembly consists of the assembly of components shown in drawing 420-2000 including the head (drawing 420-1000), neck (drawing 420-2000), six-channel neck transducer (SA572-S11,

included in drawing 420-0000), lower neck bracket assembly (drawing 420-2070), and either three uniaxial accelerometers (drawing SA572-S4, included in drawing 420-0000) or their mass equivalent installed in the head assembly as specified in drawing 420-1000.

Refer to the PADI (see Section 2 for information on locating the PADI) for assembly and disassembly instructions.

10.4.3 NECK ASSEMBLY CALIBRATION REQUIREMENT (572.173(b))

The head-neck assembly shall have the following characteristics:

A. Flexion.

1. Plane D, referenced in Figure 4, shall rotate in the direction of preimpact flight with respect to the pendulum's longitudinal centerline between 76 degrees and 90 degrees. During the time interval while the rotation is within the specified corridor, the peak moment, measured by the neck transducer (drawing SA572-S11, included in drawing 420-0000), about the occipital condyles may not be less than 50 N-m (36.9 ft-lbf) and not more than 62 N-m (45.7 ft-lbf). The positive moment shall decay for the first time to 10 N-m (7.4 ft-lbf) between 86 ms and 105 ms after time zero.

2. The moment shall be calculated by the following formula:
$$\text{Moment (N-m)} = M_y - (0.01778) \times (F_X).$$

3. M_y is the moment about the y-axis in Newton-meters, F_X is the shear force measured by the neck transducer (drawing SA572-S11) in Newtons, and 0.01778 is the distance in meters from the load center of the neck transducer to the occipital condyle.

B. Extension.

1. Plane D, referenced in Figure 4, shall rotate in the direction of preimpact flight with respect to the pendulum's longitudinal centerline between 96 degrees and 115 degrees. During the time interval while the rotation is within the specified corridor, the peak moment, measured by the neck transducer (drawing SA572-S11, included in drawing 420-0000), about the occipital condyles may not be more than −37 N-m (−27.3 ft-lbf) and not less than −46 N-m (−33.9 ft-lbf). The positive moment shall decay for the first time to −10 N-m (−7.4 ft-lbf) between 100 ms and 116 ms after time zero.

2. The moment shall be calculated by the following formula: Moment (N-m) = $M_y - (0.01778) \times (F_X)$.

3. M_y is the moment about the y-axis in Newton-meters, F_X is the shear force measured by the neck transducer (drawing SA572-S11, included in drawing 420-0000) in Newtons, and 0.01778 is the distance in meters from the load center of the neck transducer to the occipital condyle.

C. Time Zero

Time zero is defined as the time of initial contact between the pendulum striker plate and the honeycomb material. All data channels shall be at the zero level at this time.

10.4.4 NECK ASSEMBLY TEST PROCEDURE (572.173(c))

A. Condition the neck assembly at any temperature between 20.6 and 22.2 °C (69 and 72 °F) and a relative humidity from 10 to 70 percent for at least four hours.

B. Torque the hex nut (drawing 420-2000, part 9000130) on the neck cable (drawing 420-2060) to 0.9 ± 0.2 N-m (8 ± 2 in-lbf) before each test on the same neck.

C. Mount the head-neck assembly on the pendulum (see Figure 3) so that the leading edge of the lower neck bracket coincides with the leading edge of the pendulum as shown in Figure 4 for flexion tests and Figure 5 for extension tests.

D. Release the pendulum and allow it to fall freely from a height to achieve an impact velocity of 6.1 ± 0.12 m/s (20.0 ± 0.4 ft/s) for flexion tests and 5.03 ± 0.12 m/s (16.50 ± 0.40 ft/s) for extension tests, measured by an accelerometer mounted on the pendulum as shown in Figure 4 at the instant of contact with the honeycomb. Stop the pendulum from the initial velocity with an acceleration vs. time pulse that meets the velocity change as specified below. Integrate the pendulum acceleration data channel to obtain the velocity vs. time curve:

TABLE 3. PENDULUM PULSE

Time (ms)	Flexion		Extension	
	M/s	ft/s	m/s	ft/s
10	1.64-2.04	5.38-6.69	1.49-1.89	4.89-6.20
20	3.04-4.04	9.97-13.25	2.88-3.68	9.45-12.07
30	4.45-5.65	14.60-18.53	4.20-5.20	13.78-17.06

10.5 THORAX

10.5.1 TEST SET-UP

A. DUMMY CLOTHING

For the thorax calibration tests, clothe the dummy with a cotton stretch above-the-elbow sleeved shirt and above-the-knee pants. The weight of the shirt and pants shall not exceed 0.14 kg (0.30 lb) each. (572.174(c)(1))

B. TEST PROBE FOR THORACIC IMPACTS (572.177(a)(1))

1. The test probe for thoracic impacts shall be of rigid metallic construction, concentric about its longitudinal axis.

2. It shall have a mass of 6.89 ± 0.012 kg (15.2 ± 0.05 lb). One-third of the weight of the suspension cables and any attachments to the impact probe must be included in the calculation of mass, and such components may not exceed 5 percent of the total weight of the test probe.

3. It shall have a minimum mass moment of inertia of 2040 kg-cm^2 (1.81 lb-in-sec^2) in yaw and pitch about the center of gravity.

4. The impacting end of the probe is perpendicular to and concentric with the longitudinal axis and must be at least 25.4 mm (1.0 in) long. It must have a flat, continuous, and non-deformable face with diameter of 121 ± 0.25 mm (4.76 ± 0.01 in) and a maximum edge radius of 12.7 mm (0.5 in).

5. The probe's end opposite to the impact face must have provisions for mounting of an accelerometer with its sensitive axis collinear with the longitudinal axis of the probe.

6. The impact probe shall have a free air resonant frequency of not less than 1000 Hz, which may be determined using the procedure listed in the PADI.

C. THORACIC IMPACT SET-UP SPECIFICATIONS

Refer to Figure 6 for details about the set-up of the thoracic impact qualification test.

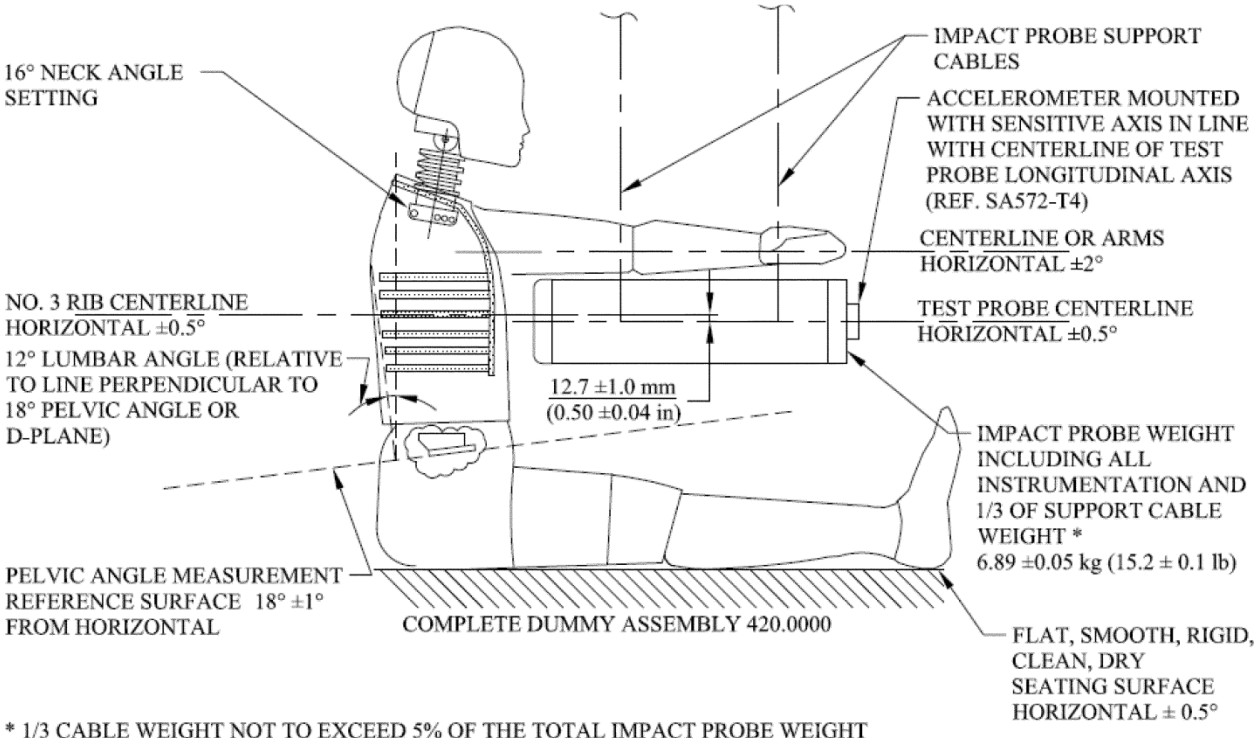


FIGURE 6. THORACIC IMPACT TEST SET-UP SPECIFICATIONS

10.5.2 COMPONENTS FOR THORAX ASSEMBLY TEST (572.174(a))

The thorax consists of the part of the torso assembly designated as the upper torso (drawing 420-3000). For the purpose of the qualification test, the dummy shall be completely assembled.

Refer to the PADI for assembly instructions.

10.5.3 THORAX ASSEMBLY CALIBRATION REQUIREMENT (572.174(b))

When the anterior surface of the thorax of a completely assembled dummy is impacted by the thoracic impact probe at 6.00 ± 0.12 m/s (22.0 ± 0.4 ft/s):

A. Maximum sternum displacement (compression) relative to the spine, must be 37 mm (1.46 in) - 46 mm (1.81 in). Within this compression corridor, the peak force measured by the impact probe shall be 2.0 kN (450 lbf) - 2.45 kN (551 lbf). The peak force between 20 mm (0.79 in.) and 37 mm (1.46 in.) of sternum displacement shall not exceed 2.52 kN (567 lbf).

B. The internal hysteresis of the ribcage in each impact shall be not less than 69 percent but not more than 85 percent. The hysteresis shall be calculated by determining the ratio of the area between the loading (from time zero to maximum deflection) and unloading portions (from maximum deflection to zero force) of the force deflection curve to the area under the loading portion of the curve.

C. The force shall be calculated by the product of the impactor mass and its measured deceleration.

10.5.4 THORAX ASSEMBLY TEST PROCEDURE (572.174(c))

A. Torque the lumbar cable to 0.9 ± 0.2 N-m (8 ± 2 in-lbf) and set the lumbar adjustment angle to 12 degrees. Set the neck angle to 16 degrees.

B. Condition the dummy at any temperature between 20.6 and 22.2 °C (69 and 72 °F) and a relative humidity from 10 to 70 percent for at least four hours.

C. Seat and orient the dummy on a seating surface without back support as shown in Figure 6. Extend the limbs horizontally and forward, within ± 1 degree parallel to the vertical midsagittal plane and to within ± 0.5 degrees of level ribs, measured in the anterior-posterior and lateral directions.

D. 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.

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

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

10.6 TORSO

10.6.1 TEST SET-UP

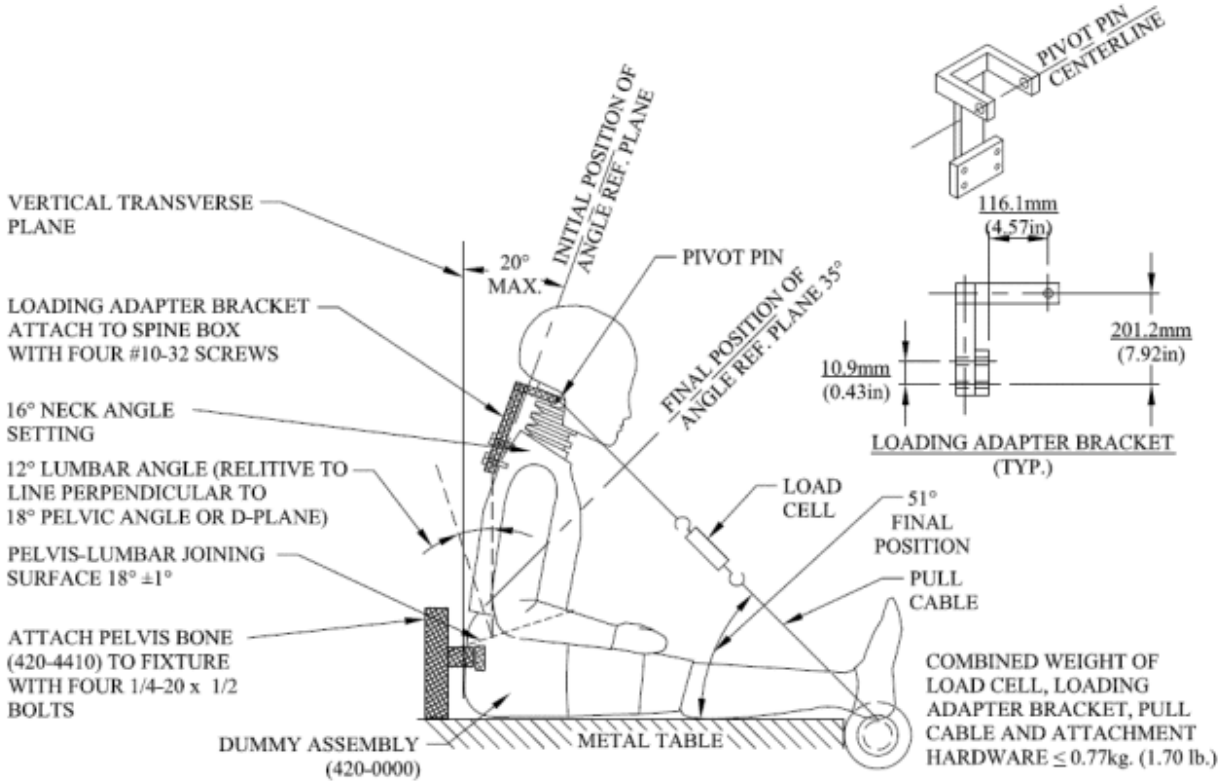


FIGURE 7. TORSO FLEXION TEST SET-UP SPECIFICATIONS

10.6.2 COMPONENTS FOR TORSO FLEXION TEST (572.175(a))

The test objective is to determine the stiffness of the molded lumbar assembly (drawing 420-4100), abdominal insert (drawing 420-4300), and chest flesh assembly (drawing 420-3560) on resistance to articulation between the upper torso assembly (drawing 420-3000) and lower torso assembly (drawing 420-4000).

For the purposes of this test, assemble the complete dummy. Refer to the PADI for installation instructions.

10.6.3 TORSO CALIBRATION REQUIREMENT (572.175(b))

When the upper torso assembly of a seated dummy is subjected to a force continuously applied at the head to neck pivot pin level through a rigidly attached adaptor bracket as shown in Figure 7:

A. The lumbar spine-abdomen-chest flesh assembly shall flex by an amount that permits the upper torso assembly to translate in angular motion relative to the vertical transverse plane 35 ± 0.5 degrees at which time the force applied must be not less than 180 N (40.5 lbf) and not more than 250 N (56.2 lbf).

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

10.6.4 TORSO FLEXION TEST PROCEDURE (572.175(c))

A. Torque the lumbar cable to 0.9 ± 0.2 N-m (8 ± 2 in-lbf) and set the lumbar adjustment angle to 12 degrees. Set the neck angle to 16 degrees.
B. Condition the dummy at any temperature between 20.6 and 22.2 °C (69 and 72 °F) and a relative humidity from 10 to 70 percent for at least four hours.
C. Assemble the complete dummy (with or without the legs below the femurs) and attach to the fixture in a seated posture as shown in Figure 7.
D. Secure the pelvis to the fixture at the pelvis instrument cavity rear face by threading four 1⁄4 -inch cap screws into the available threaded attachment holes. Tighten the mountings so that the test material is rigidly affixed to the test fixture and the pelvic-lumbar joining surface is 18 degrees from horizontal and the legs are parallel with the test fixture.
E. Attach the loading adaptor bracket to the spine of the dummy as shown in Figure 7.
F. Inspect and adjust, if necessary, the seating of the abdominal insert within the pelvis cavity and with respect to the chest flesh, assuring that the chest flesh provides uniform fit and overlap with respect to the outside surface of the pelvis flesh.
G. Flex the dummy's upper torso three times between the vertical and 30 degrees from the vertical transverse plane. Bring the torso to vertical orientation and wait for 30 minutes before conducting the test. During the 30-minute waiting period, the dummy's upper torso shall be externally supported at or near its vertical orientation to prevent it from drooping.
H. Remove all external support and wait two minutes. Measure the initial orientation angle of the torso reference plane of the seated, unsupported dummy as shown in Figure 7. The initial orientation angle may not exceed 20 degrees.
I. Attach the pull cable and the load cell so that the tension is applied along the midsagittal plane of the dummy.

J. Apply a tension to the pull cable so that the torso deflects at a rate between 0.5 and 1.5 degrees per second, until the angle reference plane is at 35 ± 0.5 degrees of flexion relative to the vertical transverse plane.
K. Continue to apply a force sufficient to maintain 35 ± 0.5 degrees of flexion for 10 seconds, and record the highest applied force during the 10-second period.
L. Release all force at the attachment bracket as rapidly as possible, and measure the return angle three minutes after the release.
M. Calculate the change in angle by subtracting the Initial Orientation Angle from the Return Angle.

10.7 KNEE

10.7.1 TEST SET-UP

A. TEST PROBE FOR KNEE IMPACTS (572.177(a)(2))

1. The test probe for knee impacts shall be of rigid metallic construction, concentric in shape, and symmetric about its longitudinal axis.
2. It shall have a mass of 1.91 ± 0.01 kg (4.21 ± 0.02 lb). One-third of the weight of the suspension cables and any attachments to the impact probe must be included in the calculation of mass, and such components may not exceed 5 percent of the total weight of the test probe.
3. It shall have a minimum mass moment of inertia of 140 kg-cm2 (0.124 lb-in-sec2) in yaw and pitch about the center of gravity.
4. The impacting end of the probe is perpendicular to and concentric with the longitudinal axis and must be at least 12.5 mm (0.5 in) long. It must have a flat, continuous, and non-deformable face with diameter of 76.2 ± 0.2 mm (3.00 ± 0.01 in) and a maximum edge radius of 12.7 mm (0.5 in).
5. The probe's end opposite to the impact face must have provisions for mounting of an accelerometer with its sensitive axis collinear with the longitudinal axis of the probe.
6. The impact probe shall have a free air resonant frequency of not less than 1000 Hz, which may be determined using the procedure listed in the PADI (incorporated by reference, see S572.170).

B. TEST SET-UP DIAGRAM FOR KNEE IMPACTS

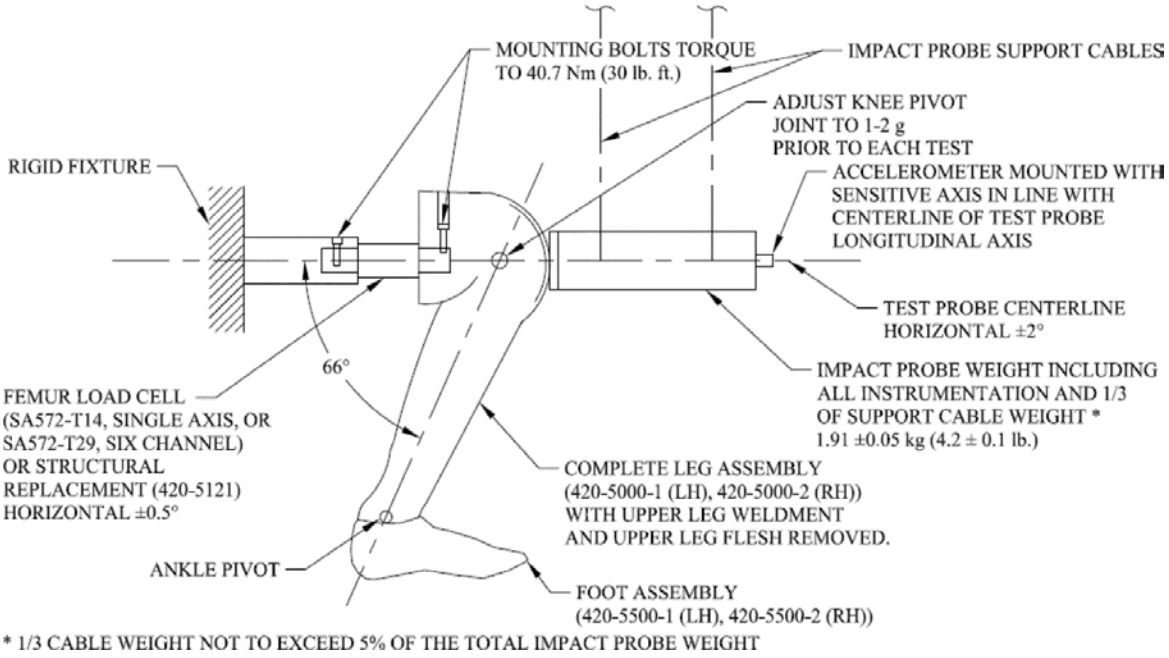


FIGURE 8. KNEE IMPACT TEST SET-UP SPECIFICATIONS

10.7.2 COMPONENTS FOR KNEE ASSEMBLY TEST (572.176(b))

For the purpose of this test, the knee assembly is the part of the leg assembly shown in drawing 420-5000 consisting of upper leg assembly (420-5200), femur load transducer (SA572-S10, included in drawing 420-0000) or its structural replacement (420-5121), lower leg assembly (420-5300), ankle assembly (420-5400), and foot molded assembly (420-5500). The upper leg flesh shall be removed.

10.7.3 KNEE ASSEMBLY CALIBRATION REQUIREMENT (572.176(b))

The peak resistance force must be 2.6 kN (585 lbf) - 3.2 kN (719 lbf). The force shall be calculated by the product of the impactor mass and its deceleration.

10.7.4 KNEE ASSEMBLY TEST PROCEDURE (572.176(c))

A. Condition the knee assembly at any temperature between 20.6 and 22.2 °C (69 and 72 °F) and a relative humidity from 10 to 70 percent for at least four hours.

B. Mount the test material and secure it to a rigid test fixture as shown in Figure 8. No part of the foot or tibia may contact any exterior surface.

C. Align the test probe so that throughout its stroke and at contact with the knee it is within 2 degrees of horizontal and collinear with the longitudinal centerline of the femur.

D. Guide the pendulum so that there is no significant lateral, vertical, or rotational movement at the time of initial contact between the impactor and the knee. 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.

E. The test probe velocity at the time of contact shall be 2.1 ± 0.03 m/s (6.9 ± 0.1 ft/s).

11. CALIBRATION TEST EXECUTION

When conducting calibration tests, complete the data sheets in section 14.

12. POST TEST REQUIREMENTS

The contractor shall verify all instrumentation operated properly to collect valid data and ensure the data sheets are complete and accurate.

13. REPORTS

13.1 APPARENT NONCONFORMANCE

During the posttest calibration verification, any indication of apparent nonconformance to the requirements of Regulation P572 shall be communicated by telephone to the COTR within 24 hours with written notification mailed within 48 hours (Saturdays and Sundays excluded). Written notification shall be submitted with a copy of the particular test data sheet(s) and preliminary data plot(s).

In the event of an apparent nonconformance, a post test calibration check of some critically sensitive test equipment and instrumentation may be required for verification of accuracy. The necessity for the calibration shall be at the COTR's discretion and shall be performed without additional costs to the OVSC.

13.2 FINAL PERFORMANCE CALIBRATION REPORTS

A report containing the pre-test calibration and posttest calibration verification data for each Part 572, Subpart T dummy used in a compliance test shall be submitted with the compliance final test report if requested by the COTR.

13.2.1 REQUIREMENTS

Performance calibration report Table of Contents shall include the following:

A. Section 1 — Purpose of Calibration Test

B. Section 2 — Calibration Data Summary

C. Section 3 — Test Data

D. Section 4 — Test Equipment List and Calibration Information

E. Section 5 — Photographs (if applicable)

The test data for each dummy will be presented in separate sections. Each section shall contain a title page, test results summary, and the test data. The title page shall include the dummy's serial number and the manufacturer's name. It will also indicate whether the calibration data is pre or posttest. The test results sheets will provide a summary of each test and describe any damage, failures and/or corrective action taken. The test data shall include the pass/fail data sheets, the time histories for each data channel used to determine the pass or fail status, and instrumentation calibration data sheets.

13.2.2 FIRST PAGE

FRONT COVER

A heavy paperback cover (or transparency) shall be provided for the protection of the final report. The information required on the cover is as follows:

A. Final Report Title And Subtitle such as

10-YEAR-OLD DUMMY CALIBRATION
IN SUPPORT OF
FMVSS 213 CHILD RESTRAINT SYSTEM DYNAMIC TESTS

B. DOT symbol, placed between items A and C

C. Contractor's Name and Address such as

ABC TESTING LABORATORIES, INC.
405 Main Street
Detroit, Michigan 48070

D. Date of Final Performance Calibration Report completion

E. The sponsoring agency's name and address as follows

U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
Mail Code: NVS-220, W43-481
1200 New Jersey Avenue, SE
Washington, DC 20590

14. DATA SHEETS

DATA SHEET 1- 10YO HIII
DUMMY DAMAGE CHECKLIST

Dummy Serial Number _____ Test Date _____

Technician _____

Complete this check sheet as part of the posttest calibration verification.

__ Perform general cleaning.

Dummy Item	Inspect for	Comments	Damaged	OK
Outer skin	Gashes, rips, cracks			
Head	Ballast secure			
	General appearance			
Neck	Broken or cracked rubber			
	Upper neck bracket firmly attached to the lower neck bracket			
	Looseness at the condyle joint			
	Nodding blocks cracked or out of position			
Spine	Broken or cracks in rubber.			
Ribs	Broken or bent ribs			
	Broken or bent rib supports			
	Damping material separated or cracked			
	Rubber bumpers in place			
Chest Displacement Assembly	Bent shaft			
	Slider arm riding in track			
Abdomen	Proper positioning			
Transducer leads	Torn cables			

Dummy Item	Inspect for	Comments	Damaged	OK
Accelerometer Mountings	Head mounting secure			
	Chest mounting secure			
Knees	Skin condition			
	Insert (do not remove)			
	Casting			
Limbs	Normal movement and adjustment			
Knee Sliders	Wires intact			
	Rubber returned to “at rest” position			
Pelvis	Broken			
Other				

If upon visual examination, damage is apparent in any of these areas, the appropriate engineer or engineering technician is to be consulted for a decision on repair or replacement of parts.

Repair or Replacement approved by:

_____ _____

Signature Date

Describe the repair or replacement of parts:

Checked by

_____ _____

Signature Date

DATA SHEET 2- 10YO HIII
EXTERNAL MEASUREMENTS

Dummy Serial Number _____ Test Date _____

Technician _____

__Pretest calibration
__Posttest calibration verification

__1. Remove the dummy's chest jacket and the abdominal insert.
__2. Seat the dummy on a flat, rigid, smooth, clean, dry, horizontal surface at least 406 mm (16 in.) wide and 221 mm ($8\ ^{11}/_{16}$ in.) deep having a back support at least 406 mm (16 in.) wide and 610 mm (24 in.) high. Center the dummy on this test surface and align its midsagittal plane vertically.
__3. Separate the upper and lower torsos by removing the four ¼-20 x 1/2 SHCS and four 9/32 ID x 1/2 OD x 1/16 flat washers. Remove the three 10-32 x 1/2" FHCS that attach the mounting plate adaptor assembly to the molded lumbar. Release the torque on the spine cable by easing the 5/16"-24 jam nut. Torque the spine cable to 0.68 – 1.13 Nm (6 – 10 in-lb).

NOTE: At this point, inspect the thorax for damage. The thorax displacement transducer may be removed for calibration if required (pretest calibration only). Use extreme caution to avoid damaging the instrumentation cables.

__4. Reassemble the mounting plate adaptor assembly to the molded lumbar. Reassemble the upper and lower torsos.
__5. Secure the dummy to the test fixture so that the rear surfaces of the upper thorax and the buttock are tangent to the vertical back support surface of the fixture (or as near tangent as possible). The dummy's midsagittal plane should be vertical.
__6. Position the dummy's H-point so that it is 58.3 mm (2.295 in) forward and 39.3 mm (1.546 in) downward from the square hole sleve. Position the dummy's hip pivot so that it is 84.0 ± 5.1 mm (3.31 ± 0.2 in) above the horizontal seating surface and 138.2 ± 5.1 mm (5.44 ± 0.2 in) forward of the rear vertical surface of the fixture.
__7. Extend the dummy's neck so that the plane perpendicular to the skull to skullcap interface is level both fore-and-aft and side-to-side, within 0.5 degrees. (The vertical mating surface between the skull and skull cap will be vertical.) The rear surface of the skullcap should be 48.3 ± 2.5 mm (1.9 ± 0.1 in) from the vertical surface of the test fixture. If needed, place a strap or bungee cord around the forehead of the dummy to stabilize the head in this position.
__8. Position the upper and lower legs parallel to the midsagittal plane and parallel to each other, and the angle between the tibia and femur forms a 90^{o} angle.
__9. Position the feet parallel to the dummy's midsagittal plane with the bottoms horizontal and parallel to the seating surface.

__10. Position the upper arms by the dummy's side so the centerlines of each arm are vertical and parallel to the back support surface and parallel to each other.
__11. Position the lower arms horizontally so that the centerline of the lower arm-hand is parallel to the seat surface.
__12. Measure and record the dimensions listed in following table, except for dimensions X, Y, and Z.
__13. Free the dummy from the seating fixture and record dimensions for X, Y, and Z.
__14. Install the abdominal insert and chest jacket. Reposition the dummy on the test fixture. The head need not be level as previously specified.
__15. Mark the locations AA and BB and record the measured dimensions Y and Z as specified in following table and Figure 9. Measure and record dimension X.

_____ _____
Signature Date

TABLE 4. EXTERNAL DIMENSIONS

HYBRID III, PART 572, SUBPART T EXTERNAL DIMENSIONS				
DIMENSION	**DESCRIPTION**	DETAILS	REQUIRED DIMENSION (mm)	ACTUAL MEASUREMENT
A	TOTAL SITTING HEIGHT	Seat surface to highest point on top of the head.	703.6 – 729.0	
B	SHOULDER PIVOT HEIGHT	Centerline of shoulder pivot bolt to the seat surface.	384.8 – 405.2	
C	H-POINT HEIGHT	Reference	79.0 – 89.2	
D	H-POINT LOCATION FROM BACKLINE	Reference	133.1 – 143.2	
E	SHOULDER PIVOT FROM BACKLINE	Center of the shoulder clevis to the rear vertical surface of the fixture.	85.1 – 95.3	
F	THIGH CLEARANCE	Measured at the highest point on the upper femur segment.	105.4 – 120.6	
G	BACK OF ELBOW TO WRIST PIVOT	back of the elbow flesh to the wrist pivot in line with the elbow and wrist pivots	227.4 – 242.6	
H	HEAD BACK TO BACKLINE	Back of Skull cap skin to seat rear vertical surface (Reference)	45.8 – 50.8	
I	SHOULDER TO- ELBOW LENGTH	Measure from the highest point on top of the broad upper surface of clavicle link below the collar ot the lowest part of the flesh of the elbow in line with the elbow pivot bolt.	269.3 – 284.5	
J	ELBOW REST HEIGHT	Measure from the flesh below the elbow pivot bolt to the seat surface.	137.1 – 157.5	
K	BUTTOCK TO KNEE LENGTH	The forward most part of the knee flesh to the rear vertical surface of the fixture.	463.5 – 483.9	
L	POPLITEAL HEIGHT	Seat surface to the horizontal plane at the bottom of the feet.	321.3 – 341.7	
M	KNEE PIVOT HEIGHT	Centerline of knee pivot bolt to the horizontal plane of the bottom of the feet.	373.4 – 388.6	
HYBRID III, SUBPART T EXTERNAL DIMENSIONS, continued				

DIMENSION	DESCRIPTION	DETAILS	REQUIRED DIMENSION (mm)	ACTUAL MEASUREMENT
N	BUTTOCK POPLITEAL LENGTH	The rearmost surface of the lower leg to the same point on the rear surface of the buttocks used for dim. “K”.	367.0 – 387.4	
O	CHEST DEPTH WITHOUT JACKET	Measured 330.2 ± 5.1 mm above seat surface	157.5 – 172.7	
P	FOOT LENGTH	Tip of toe to rear of heal	188.0 – 203.2	
Q	STATURE	(THEORETICAL) (Q = A - C - D + R + M)		N/A
R	BUTTOCK TO KNEE PIVOT LENGTH	The rear surface of the buttocks to the knee pivot bolt	414.0 – 434.4	
S	HEAD BREADTH	The widest part of the head	137.1 – 147.3	
T	HEAD DEPTH	Back of the head to the forehead	177.8 – 188.0	
U	HIP BREADTH	The widest part of the hips	256.6 – 271.8	
V	SHOULDER BREADTH	Outside shoulder edges, in line with the shoulder pivot bolts	307.4 – 322.6	
W	FOOT BREADTH	The widest part of the foot	68.6 – 83.8	
X	HEAD CIRCUMFERENCE	Measured at the point as in dim. “T”	528.3 – 548.7	
Y	CHEST CIRCUMFERENCE (WITH CHEST JACKET)	Measured 3330.2 ± 5.1 mm above seat surface	690.9 – 716.3	
Z	WAIST CIRCUMFERENCE (with chest jacket and abdominal insert)	Measured 158.8 ± 5.1 mm above seat surface	696.0 – 721.4	
AA	REFERENCE LOCATION FOR MEASUREMENT OF CHEST CIRCUMFERENCE	Reference	337.8 – 348.0	
BB	REFERENCE LOCATION FOR MEASUREMENT OF WAIST CIRCUMFERENCE	Reference		
CC	SHOULDER BELT INTERACTION	Reference		
DD	PELVIS BELT INTERACTION	Reference		

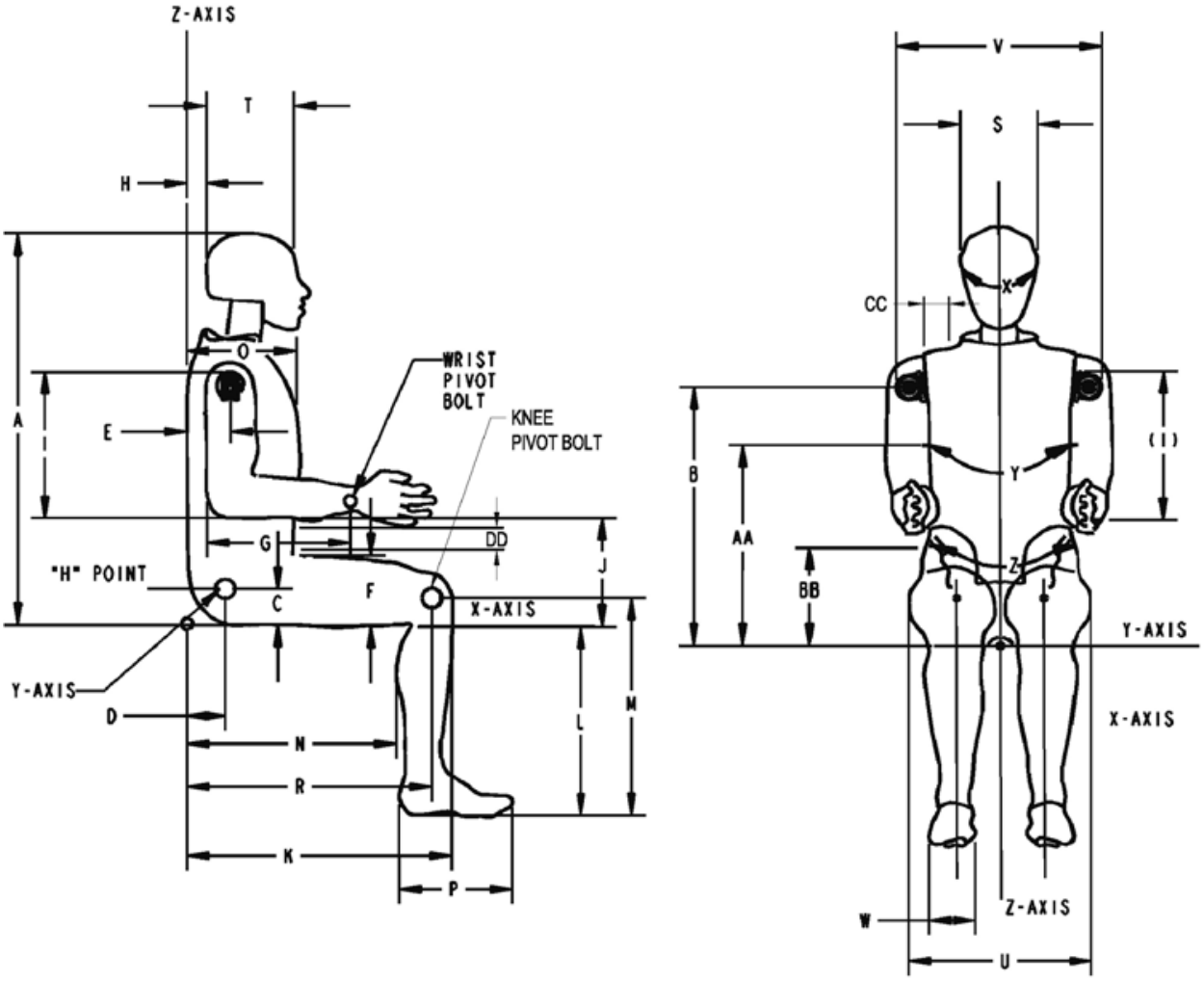


FIGURE 9. SPECIFICATIONS FOR EXTERNAL DIMENSIONS

DATA SHEET 3- 10YO HIII
HEAD DROP TEST (572.172)

Dummy Serial Number _____ Test Date _____

Technician _____

__Pretest calibration
__Posttest calibration verification

Test attempt no. ____ (when successive head drops are necessary)

__1. It has been at least 2 hours since the last head drop. (572.172(c)(5))
__ N/A, ONLY one head drop performed
__2. The head assembly for this test consists of the complete head (drawing 420–1000), a six-axis neck transducer (drawing SA572–S11, included in drawing 420–0000), or its structural replacement (drawing 420–383X), and 3 accelerometers (drawing SA572–S4, included in drawing 420–0000). (572.172(a))
__3. Torque the skull cap screws (10-24 x 1/2 SHCS) to 6.78 Nm.
__4. Accelerometers and their respective mounts are smooth and clean.
__5. The head accelerometer mounting plate screws (10-24 x 3/8 SHCS) are torqued to 6.78 Nm.
__6. The data acquisition system, including transducers, conforms to the requirements of SAE Recommended Practice J211/1 MAR95. (572.177(c))
__7. The head assembly has been soaked at a temperature between 18.9°C (66°F) and 25.6°C (78°F) and at a relative humidity from 10% to 70% for a period of at least four (4) hours prior to this test. (572.172(c)(1))
Record the maximum temperature _____
Record the minimum temperature _____
Record the maximum humidity _____
Record the minimum humidity _____
__8. Visually inspect the head skin for cracks, cuts, abrasions, etc. Repair or replace the head skin if the damaged area is more than superficial. Note: If the damage resulted from a compliance test, the damaged area is to be documented with photography and the posttest calibration verification testing completed before any replacement or repairs are made.
Record findings and actions: _____
_____
_____
_____
_____
__9. Clean the impact surface of the skin and the impact surface of the fixture with isopropyl alcohol, trichloroethane, or equivalent prior to the test. (572.172(c)(2))

__10. Suspend and orient the head assembly as shown in Figure 12. The lowest point on the forehead is 376.0 ± 1.0 mm (14.8 ± 0.04 inch) from the impact surface. (572.172(c)(3))
Record the actual distance _____

NOTE: The masses of the suspension device and the accelerometer cables are to be kept as lightweight as possible to minimize their effect on the test results.

__11. Level the head. Measure the 1.57 mm (0.062 inch) diameter holes located on either side of the dummy's head from the impact surface. A typical test setup is shown in Figure 12. The head is sufficiently level if the holes are equidistant (within 2 mm) from the impact surface (572.172(c)(3)).
Record the right side distance _____
Record the left side distance _____

__12. The impact surface is clean and dry and has a micro finish in the range of 203.2×10^{-6} mm (8 micro inches) to 2032.0×10^{-6} mm (80 micro inches) (RMS). (572.172(c)(4))
Record actual micro finish _____

__13. The impact surface is rigidly supported and the impact surface is a flat horizontal steel plate 50.8 mm (2 inches) thick and 610 mm (24 inches) square. (572.172(c)(4))
Record thickness _____
Record width _____
Record length _____

__14. Drop the head assembly from a height of 376.0 ± 1.0 mm (14.8 ± 0.04 inches) by a means that ensures a smooth, instant release onto the impact surface. (572.172(b) & 572.172(c)(4))

__15. Complete the following table using channel class 1000 data. (572.172(b)):

Parameter	Specification	Result
Peak resultant acceleration	250 g ≤ x ≤ 300 g	
Resultant versus time history curve	Unimodal	
Oscillations after the main pulse	Less than 10% of the peak resultant acceleration	
Lateral acceleration	y-axis acceleration ≤ 15 g	

__16. Insert plots of the x, y, z, and resultant acceleration data following this sheet.

_____ _____
Signature Date

DATA SHEET 4- 10YO HIII
NECK FLEXION TEST (572.173)

Dummy Serial Number _____ Test Date _____

Technician _____

__Pretest calibration
__Posttest calibration verification

Test attempt no. ____ (when successive flexion tests are necessary)

__1. It has been at least 30 minutes since the last neck test. (572.177(g))
__ N/A, ONLY one flexion test performed

__2. The components required for the neck tests include the head assembly (420-1000), neck (drawing 420–2000), six-channel neck transducer (SA572–S11, included in drawing 420–0000), lower neck bracket assembly (drawing 420–2070), and either three uniaxial accelerometers (drawing SA572–S4, included in drawing 420–0000) or their mass equivalent installed in the head assembly as specified in drawing 420–1000 (all incorporated by reference, see S572.170). (572.173(b))

__3. The assembly has been soaked at a temperature between 20.6°C (69°F) and 22.2°C (72°F) and at a relative humidity from 10% to 70% for a period of at least four (4) hours prior to this test. (572.173(c)(1))
Record the maximum temperature _____
Record the minimum temperature _____
Record the maximum humidity _____
Record the minimum humidity _____

__4. Visually inspect neck assembly for cracks, cuts, and separation of the rubber from the metal segments. Note: If the damage resulted from the vehicle crash test in which the dummy was an occupant, the damaged area is to be documented with photography and the posttest calibration verification testing completed before any replacement or repairs are made.
Record findings and actions: _____
_____
_____
_____
_____

__5. Inspect the nodding blocks (420-2023) for splits or deformation. Inspect the neck cable (420-2060) for deformation. Inspect the mounting plate insert (420-4507) and the nylon shoulder bushing (420-4509) and replace if they are torn or worn. When replacement is necessary, ONLY replace during pre-test calibration.
Record findings and actions: _____
_____
_____
_____

__6. Torque the hex nut (420-2000, part 9000130) on the neck cable (420-2060) to 0.9 ± 0.2 Nm (8 ± 2 in-lb). (572.173(c)(2))
__7. The data acquisition system, including transducers, conform to the requirements of SAE Recommended Practice J211/1 MAR95. (572.177(c))
__8. The test fixture pendulum conforms to the specifications in Figure 5. (572.173(c)(3))
__9. The head-neck assembly is mounted on the pendulum so the midsagittal plane of the head is vertical and coincides with the plane of motion of the pendulum longitudinal centerline as shown in Figure 6 for the flexion test. (572.173(c)(3))
__10. With the pendulum resting against the honeycomb material, adjust the neck bracket until the longitudinal centerline of the pendulum was perpendicular ± 1° to plane "D" on the dummy's head.
__11. Release the pendulum and allow it to fall freely from a height to achieve an impact speed of 5.98 m/s to 6.22 m/s as measured at the center of the pendulum accelerometer. (572.173(c)(4)(i))
__12. Complete the following table:

Neck Flexion Test Results (572.173(b)(1)(i)) & (572.173(c)(4)(i)(ii))

Parameter		Specification	Result
Pendulum impact speed		5.98 m/s ≤ speed ≤ 6.22 m/s	
Pendulum ΔV with respect to impact speed	@ 10ms	1.64 m/s ≤ ΔV ≤ 2.04 m/s	
	@ 20 ms	3.04 m/s ≤ ΔV ≤ 4.04 m/s	
	@30ms	4.45 m/s ≤ ΔV ≤ 5.65 m/s	
Plane D Rotation		Peak moment* 50 Nm ≤ moment ≤ 62 Nm during the following rotation range 76^o ≤ angle ≤ 90^o	____Nm @ ___degrees
Positive Moment Decay** (Flexion)		Time to decay to 10 Nm 86 ms ≤ time ≤ 105 ms	

*Moment about the occipital condyle = M_y – (0.01778 m x F_x) (572.173(b)(1)(ii)(iii))
M_y = Moment in Nm measured by the transducer
F_x = Force in N measured by the transducer
**Time zero is defined as the time of initial contact between the pendulum striker plate and the honeycomb material. (572.173(b)(3))

__13. Plots of acceleration, velocity, y-axis moment, and x-axis force and y-axis moment about the occipital condyle follow this sheet.

_____ _____
Signature Date

DATA SHEET 5- 10YO HIII
NECK EXTENSION TEST (572.173)

Dummy Serial Number _____ Test Date _____

Technician _____

__Pretest calibration
__Posttest calibration verification

Test attempt no. ____ (when successive extension tests are necessary)

__1. It has been at least 30 minutes since the last neck test. (572.177(g))
__ N/A, ONLY one flexion test performed

__2. The components required for the neck tests include the head assembly (420-1000), neck (drawing 420–2000), six-channel neck transducer (SA572–S11, included in drawing 420–0000), lower neck bracket assembly (drawing 420–2070), and either three uniaxial accelerometers (drawing SA572–S4, included in drawing 420–0000) or their mass equivalent installed in the head assembly as specified in drawing 420–1000 (all incorporated by reference, see S572.170). (572.173(b))

__3. The assembly has been soaked at a temperature between 20.6°C (69°F) and 22.2°C (72°F) and at a relative humidity from 10% to 70% for a period of at least four (4) hours prior to this test. (572.173(c)(1))
Record the maximum temperature _____
Record the minimum temperature _____
Record the maximum humidity _____
Record the minimum humidity _____

__4. Visually inspect neck assembly for cracks, cuts, and separation of the rubber from the metal segments. Note: If the damage resulted from the vehicle crash test in which the dummy was an occupant, the damaged area is to be documented with photography and the posttest calibration verification testing completed before any replacement or repairs are made.
Record findings and actions: _____
_____
_____
_____
_____

__5. Inspect the nodding blocks (420-2023) for splits or deformation. Inspect the neck cable (420-2060) for deformation. Inspect the mounting plate insert (420-4507) and the nylon shoulder bushing (420-4509) and replace if they are torn or worn. When replacement is necessary, ONLY replace during pre-test calibration.
Record findings and actions: _____
_____
_____
_____

__6. Torque the hex nut (420-2000, part 9000130) on the neck cable (420-2060) to 0.9 ± 0.2 Nm (8 ± 2 in-lb). (572.173(c)(2))
__7. The data acquisition system, including transducers, conforms to the requirements of SAE Recommended Practice J211/1 MAR95. (572.177(c))
__8. The test fixture pendulum conforms to the specifications in Figure 5. (572.173(c)(3))
__9. Mount the head-neck assembly on the pendulum so the midsagittal plane of the head is vertical and coincides with the plane of motion of the pendulum longitudinal centerline as shown in Figure 7 for the extension test. (572.173(c)(3))
__10. With the pendulum resting against the honeycomb material, adjust the neck bracket until the longitudinal centerline of the pendulum was perpendicular ± 1° to plane "D" on the dummy's head.
__11. Release the pendulum and allow it to fall freely from a height to achieve an impact speed of 4.91 m/s to 5.15 m/s as measured at the center of the pendulum accelerometer. (572.173(c)(4)(i))
__12. Complete the following table:

Neck Extension Test Results (572.173(b)(2)(i)) & (572.173(c)(4)(i)(ii))

Parameter		Specification	Result
Pendulum impact speed		4.91 m/s ≤ speed ≤ 5.15 m/s	
Pendulum ΔV with respect to impact speed	@ 10ms	1.49 m/s ≤ ΔV ≤ 1.89 m/s	
	@ 20 ms	2.88 m/s ≤ ΔV ≤ 3.68 m/s	
	@30ms	4.20 m/s ≤ ΔV ≤ 5.20 m/s	
Plane D Rotation		Peak moment* -46 Nm ≤ moment ≤ -37 Nm during the following rotation range 96^o ≤ angle ≤ 115^o	____Nm @ ___degrees
Positive Moment Decay** (Flexion)		Time to decay to -10 Nm 100 ms ≤ time ≤ 116 ms	

*Moment about the occipital condyle = M_y – (0.01778 m x F_x) (572.173(b)(2)(ii)(iii))
M_y = Moment in Nm measured by the transducer
F_x = Force in N measured by the transducer
**Time zero is defined as the time of initial contact between the pendulum striker plate and the honeycomb material. (572.173(b)(3))

__13. Plots of acceleration, velocity, y-axis moment, and x-axis force and y-axis moment about the occipital condyle follow this sheet.

_____ _____
Signature Date

DATA SHEET 6- 10YO HIII
THORAX IMPACT TEST (572.174)

Dummy Serial Number _____ Test Date _____

Technician _____

__Pretest calibration
__Posttest calibration verification

Test attempt no. ____ (when successive thorax impact tests are necessary)

__1. It has been > 30 minutes since the last thorax impact test. (572.177(g))
__ N/A, ONLY one thorax impact test performed
__2. The test fixture conforms to the specifications in Figure 6.
__3. The complete assembled dummy (420-0000) is used. (572.174(b))
__4. The dummy assembly has been soaked at a temperature between 20.6°C (69°F) and 22.2°C (72°F) and at a relative humidity from 10% to 70% for a period of at least four (4) hours prior to this test. (572.174(c)(3))
Record the maximum temperature _____
Record the minimum temperature _____
Record the maximum humidity _____
Record the minimum humidity _____
__5. Remove the chest skin and visually inspect the thorax assembly for cracks, cuts, abrasions, etc. Give particular attention to the rib damping material, chest displacement transducer assembly, and the rear rib supports. Inspect for rib deformation using the chest depth gage. If any damage is noted, repair and/or replace the damaged components unless the damage resulted from the vehicle crash test in which the dummy was an occupant. In this case, document the damage and complete the posttest calibration verification testing before any repairs or replacements are made.
__ - No damage
__ - Damage from crash test, no repairs or replacement because this is a post test calibration verification. Record damage _____
_____
__ - The following repairs or replacement was performed. Record _____
_____
_____
__6. The dummy is clothed in a form fitting cotton stretch above-the-elbow sleeved shirt and above-the-knees pants. The weight of the shirt and pants does not exceed 0.14 kg (0.30 lb) each. (572.174(c)(1))

__7. Seat the dummy, (chest skin still removed) without back support on the test fixture surface as shown in Figure 6. The surface must be long enough to support the pelvis and outstretched legs. (572.174(c)(4))
__8. Level the ribs both longitudinally and laterally ± 0.5° and adjust the pelvis angle to 18° ± 1°. The angle may be measured at the pelvis lumbar joining surface.
__9. The midsagittal plane of the dummy is vertical within ±1°. (572.174(c)(4))
__10. The longitudinal centerline of the test probe is centered within ±2.5 mm (0.1 in) of the midsagittal plane of the dummy 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° of a horizontal line in the dummy's midsagittal plane. (572.174(c)(5))
__11. Record locations such as the rear surfaces of the thoracic spine and the lower neck bracket reference with respect to locations such as the rear surfaces of the thoracic spine and the lower neck bracket. These reference measurements are necessary to ensure the dummy is in the same position after the chest skin is installed. The reference locations must be accessible after installation of the chest skin. It may be necessary to leave the chest skin zipper unfastened until the references are checked and fasten it just prior to the test.
__12. Install the chest skin and reposition the dummy as described in the preceding paragraph using the reference measurements recorded.
__13. Place the arm assemblies horizontal ± 2° and parallel to the midsagittal plane. The arms are held in place by tightening the adjustment nut which holds the arm yoke to the clavicle assembly.
__14. The data acquisition system, including transducers, must conform to the requirements of SAE Recommended Practice J211/1 MAR95. (572.177(c))
__15. Impact the anterior surface of the thorax with the test probe so the longitudinal centerline of the probe is within 2° of a horizontal line in the dummy's midsagittal plane at the moment of impact. (572.174(c)(6)) The velocity of the test probe at the time of impact is 6.00 ± 0.12 m/s. (572.174(b)) The probe is guided so there is no significant lateral, vertical, or rotational movement during the impact. (572.174(c)(7)) Neither the suspension hardware, suspension cables, nor other attachments to the probe, including the velocity vane, shall make contact with the dummy. (572.174(c)(8))

_16. Complete the following table:

Thorax Impact Results (572.174(b)) & (572.174(b)(1)(2))

Parameter*	Specification	Result
Test Probe Speed	5.88 m/s ≤ speed ≤ 6.12 m/s	
Chest Compression	37.0 mm ≤ compression ≤ 46.0 mm	
Peak force** between 38.0 and 46.0 mm chest compression	2000N ≤ peak force ≤ 2450N	
Peak force** between 20.0 and 37.0 mm chest compression	Max. force ≤ 2520N	
Internal Hysteresis***	69% ≤ hysteresis ≤ 85%	

*Time zero is defined as the time of initial contact between the test probe and the chest skin.
**Force = impactor mass x acceleration
***Area under loading curve minus the area under the unloading curve divided by the area under the loading curve. (Figure 10)

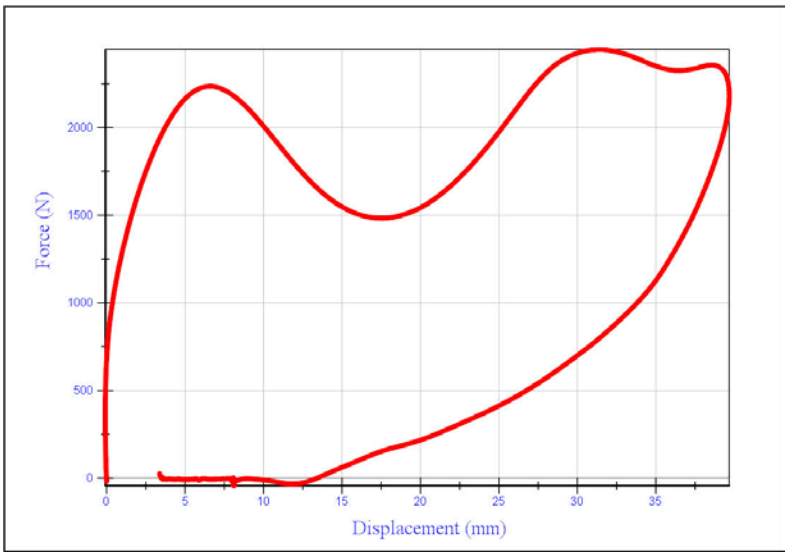


FIGURE 10. PART 572T HYBRID III-10C THORAX CALIBRATION – HYSTERESIS

__17. Plots of chest compression, acceleration, force, and force versus deflection follow this sheet.

_____ _____
Signature Date

DATA SHEET 7- 10YO HIII
TORSO FLEXION TEST (572.175)

Dummy Serial Number _____ Test Date _____

Technician _____

__Pretest calibration
__Posttest calibration verification

Test attempt no. ____ (when successive torso flexion tests are necessary)

__1. It has been at least 30 minutes since the last torso flexion test. (572.177(g))
__ N/A, ONLY one torso flexion test performed
__2. The test fixture conforms to the specifications in Figure 7.
__3. The complete assembled dummy (420-0000) is used. (572.175(c)(3))
__ with legs below the femurs.
__ without legs below the femurs.
__4. The dummy assembly soaked at a temperature between 20.6°C (69°F) and 22.2°C (72°F) and at a relative humidity from 10% to 70% for a period of at least four (4) hours prior to this test. (572.175(c)(2))
Record the maximum temperature _____
Record the minimum temperature _____
Record the maximum humidity _____
Record the minimum humidity _____
__5. Secure the pelvis to the fixture at the pelvis instrument cavity rear face by threading four ¼ x 20 x ½ inch cap screws into the available threaded attachment holes. Tighten the mountings so that the test material is rigidly affixed to the test fixture and the pelvic-lumbar joining surface is 18 degrees from horizontal and the legs are parallel with the test fixture. (572.175(c)(4))
__6. Attach the loading adapter bracket to the spine of the dummy as shown in Figure 7. (572.175(c)(5))
__7. Flex the dummy forward and back 3 times such that the angle reference plane moves between 0° and 30° with respect to the vertical transverse plane. (572.175(c)(7))
__8. Support the dummy such that the angle reference plane is at or near 0° (vertical with respect to the vertical transverse plane). Wait at least 30 minutes before continuing. (572.175(c)(7))
__9. Remove all external support that was implemented above. (572.175(c)(8))
__10. Measure the initial orientation angle of the torso reference plane of the seated, unsupported dummy. (572.175(c)(8)
Record reference plane angle (max. allowed 20°) _____
__11. Attach the pull cable and the load cell. (572.175(c)(9))
__12. Apply a tension force in the midsagittal plane to the pull cable at any upper torso deflection rate between 0.5° and 1.5° per second, until the angle reference plane is at 35° ± 0.5° of flexion relative to the vertical transverse plane. (572.175(c)(10))

__13. Maintain angle reference plane at 35° ± 0.5° of flexion for 10 seconds. (572.175(c)(11))
__14. As quickly as possible release the force applied to the attachment bracket. (572.175(c)(12))
__15. 3 minutes after the release of the force, measure the reference plane angle. (572.175(c)(12))
__16. Complete the following table:

Torso Flexion Results (572.175(b)) & (572.175(c)(8)(10))

Parameter	Specification	Result
Initial ref. plane angle	Angle $\leq 20^o$	
Torso rotation rate	$0.5^o/s \leq$ rate $\leq 1.5^o/s$	
Force at $35^o \pm 0.5^o$	180 N $\leq$ force $\leq$ 250 N	
Final ref. plane angle	Initial ref. plane angle $\pm 8^o$	

_____ _____
Signature Date

DATA SHEET 8- 10YO HIII
LEFT KNEE IMPACT TEST (572.176)

Dummy Serial Number _____ Test Date _____

Technician _____

__Pretest calibration
__Posttest calibration verification

Test attempt no. ____ (when successive knee impact tests are necessary)

__1. It has been at least 30 minutes since the last knee impact test. (572.177(g))
__2. The test fixture conforms to the specifications in Figure 8.
__3. The knee assembly consisting of lower upper leg assembly (420-5200), femur load transducer (SA572-S10) or its structural replacement (420-5121), lower leg assembly (420-5300), ankle assembly (420-5400), and foot molded assembly (420-5500-1) were used. (572.176(b))
__4. The knee assembly has been soaked at a temperature between 20.6°C (69°F) and 22.2°C (72°F) and at a relative humidity from 10% to 70% for a period of at least four (4) hours prior to this test. (572.176(c)(1))
Record the maximum temperature _____
Record the minimum temperature _____
Record the maximum humidity _____
Record the minimum humidity _____
__5. Mount the test specimen and secure it to the rigid test fixture. (572.176(c)(2))
__6. No parts of the foot or tibia contact any exterior surface. (572.176(c)(2))
__7. Align the test probe so that throughout its stroke and at contact with the knee it is within 2 degrees of horizontal and collinear with the longitudinal centerline of the femur. (572.176(c)(3))
__8. The probe is guided so there is no significant lateral, vertical, or rotational movement during impact with the knee. (572.176(c)(4))
__9. The data acquisition system, including transducers, must conform to the requirements of SAE Recommended Practice J211/1, MAR95. (572.177(c))
__10. Contact the knee with the test probe at a speed between 2.07 m/s and 2.13 m/s. (572.176(c)(5)) Neither the suspension hardware, suspension cables, nor other attachments to the probe, including the velocity vane, make contact with the dummy. (572.176(c)(6))
__11. Complete the following table:

Knee Impact Results (572.176(b)(1)) & (572.176(c)(5))

Parameter	Specification	Result
Probe speed	2.07 m/s ≤ speed ≤ 2.13 m/s	
Peak resistance force*	2600 N ≤ force ≤ 3200 N	

*Force = impactor mass x deceleration

__12. Plots of acceleration versus time and force versus time follow this sheet.

_____ _____

Signature Date

DATA SHEET 9- 10YO HIII
RIGHT KNEE IMPACT TEST (572.176)

Dummy Serial Number _____ Test Date _____

Technician _____

__Pretest calibration
__Posttest calibration verification

Test attempt no. ____ (when successive knee impact tests are necessary)

__1. It has been at least 30 minutes since the last knee impact test. (572.177(g))
__2. The test fixture conforms to the specifications in Figure 8.
__3. The knee assembly consisting of lower upper leg assembly (420-5200), femur load transducer (SA572-S10) or its structural replacement (420-5121), lower leg assembly (420-5300), ankle assembly (420-5400), and foot molded assembly (420-5500-2) were used. (572.176(b))
__4. The knee assembly has been soaked at a temperature between 20.6°C (69°F) and 22.2°C (72°F) and at a relative humidity from 10% to 70% for a period of at least four (4) hours prior to this test. (572.176(c)(1))
Record the maximum temperature _____
Record the minimum temperature _____
Record the maximum humidity _____
Record the minimum humidity _____
__5. Mount the test specimen and secure it to the rigid test fixture. (572.176(c)(2))
__6. No parts of the foot or tibia contact any exterior surface. (572.176(c)(2))
__7. Align the test probe so that throughout its stroke and at contact with the knee it is within 2 degrees of horizontal and collinear with the longitudinal centerline of the femur. (572.176(c)(3))
__8. The probe is guided so there is no significant lateral, vertical, or rotational movement during the impact with the knee. (572.176(c)(4))
__9. The data acquisition system, including transducers, must conform to the requirements of SAE Recommended Practice J211/1, MAR95. (572.177(c))
__10. Contact the knee with the test probe at a speed between 2.07 m/s and 2.13 m/s. (572.176(c)(5)) Neither the suspension hardware, suspension cables, nor other attachments to the probe, including the velocity vane, make contact with the dummy. (572.176(c)(6))
__11. Complete the following table:

Knee Impact Results (572.176(b)(1)) & (572.176(c)(5))

Parameter	Specification	Result
Probe speed	2.07 m/s ≤ speed ≤ 2.13 m/s	
Peak resistance force*	2600 N ≤ force ≤ 3200 N	

*Force = impactor mass x deceleration

__12. Plots of acceleration versus time and force versus time follow this sheet.

_____ _____

Signature Date

DATA SHEET 10- 10YO HIII
PART 572 INSTRUMENTATION CALIBRATION INFORMATION

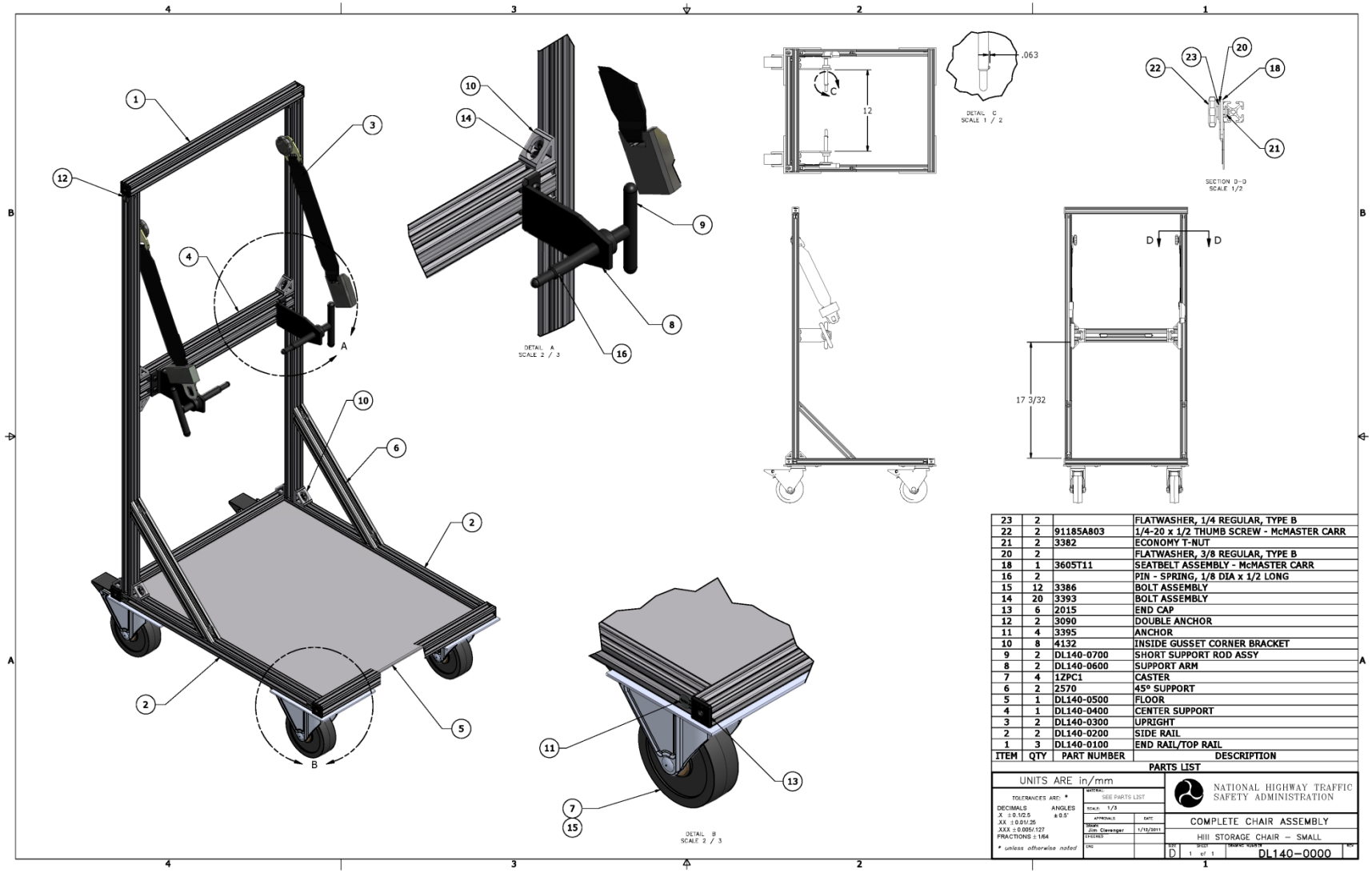
I.D. NO.	MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF LAST CALIBRATION	DATE OF NEXT CALIBRATION
DUMMY INSTRUMENTATION					
HEAD ACCELEROMETERS					
(1) LONGITUDINAL					
(2) LATERAL					
(3) VERTICAL					
NECK TRANSDUCER					
CHEST ACCELEROMETERS					
(1) LONGITUDINAL					
(2) LATERAL					
(3) VERTICAL					
CHEST POTENTIOMETER					
FEMUR LOAD CELLS					
(1) RIGHT FEMUR					
(2) LEFT FEMUR					
LABORATORY INSTRUMENTATION					
NECK PENDULUM ACCELEROMETER					
THORAX PENDULUM ACCELEROMETER					
KNEE PENDULUM ACCELEROMETER					
NECK ROTATION TRANSDUCER 1 (OPTIONAL)					
NECK ROTATION TRANSDUCER 2 (OPTIONAL)					

LABORATORY TECHNICIAN: _____

Appendix A : 10 Year Old HIII Storage Chair Drawing Package

HIII STORAGE CHAIR - SMALL

March 2011



ITEM	QTY	PART NUMBER	DESCRIPTION
23	2		FLATWASHER, 1/4 REGULAR, TYPE B
22	2	91185A803	1/4-20 x 1/2 THUMB SCREW - McMASTER CARR
21	2	3382	ECONOMY T-NUT
20	2		FLATWASHER, 3/8 REGULAR, TYPE B
18	1	3605T11	SEATBELT ASSEMBLY - McMASTER CARR
16	2		PIN - SPRING, 1/8 DIA x 1/2 LONG
15	12	3386	BOLT ASSEMBLY
14	20	3393	BOLT ASSEMBLY
13	6	2015	END CAP
12	2	3090	DOUBLE ANCHOR
11	4	3395	ANCHOR
10	8	4132	INSIDE GUSSET CORNER BRACKET
9	2	DL140-0700	SHORT SUPPORT ROD ASSY
8	2	DL140-0600	SUPPORT ARM
7	4	1ZPC1	CASTER
6	2	2570	45° SUPPORT
5	1	DL140-0500	FLOOR
4	1	DL140-0400	CENTER SUPPORT
3	2	DL140-0300	UPRIGHT
2	2	DL140-0200	SIDE RAIL
1	3	DL140-0100	END RAIL/TOP RAIL

PARTS LIST

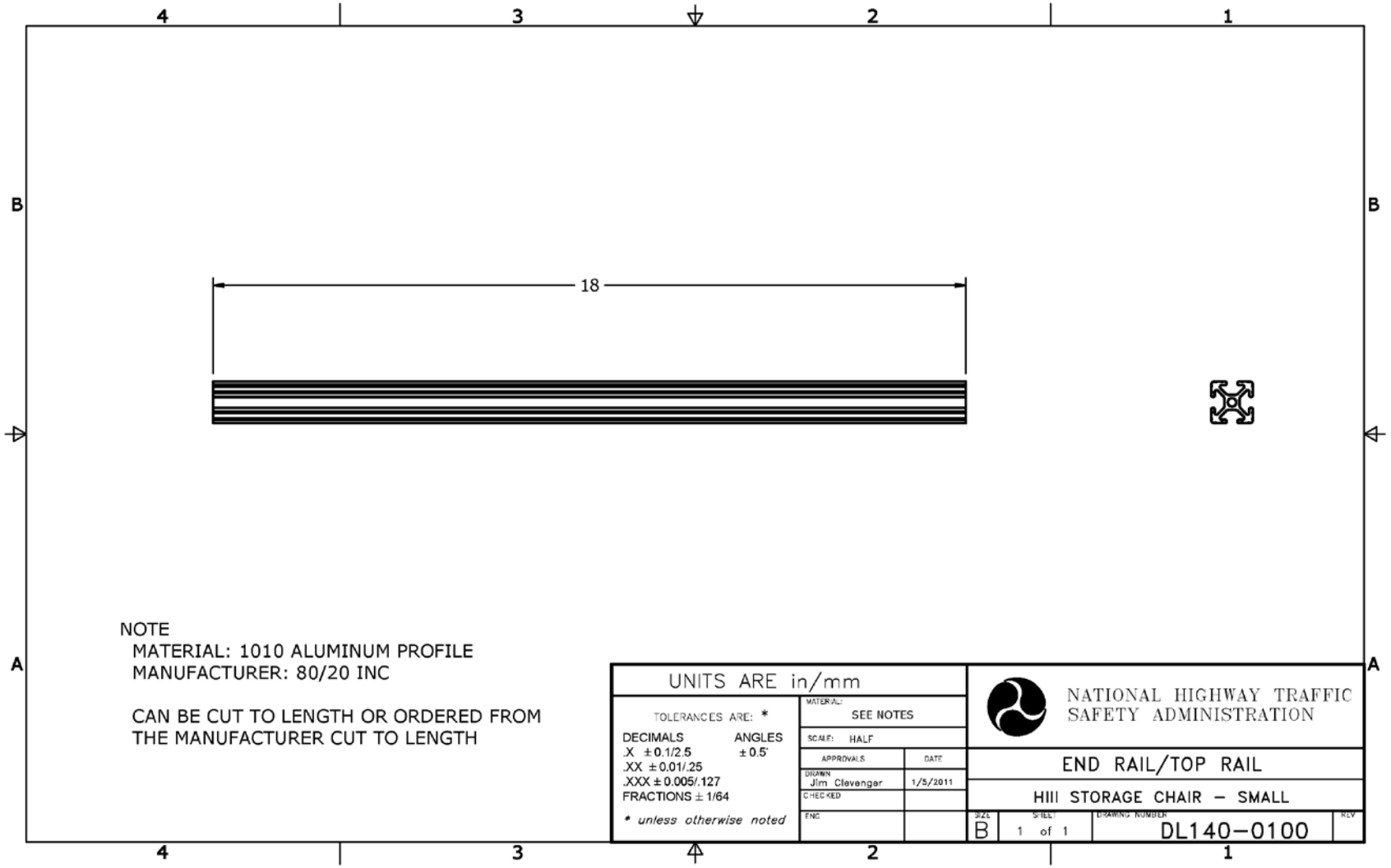
UNITS ARE in/mm

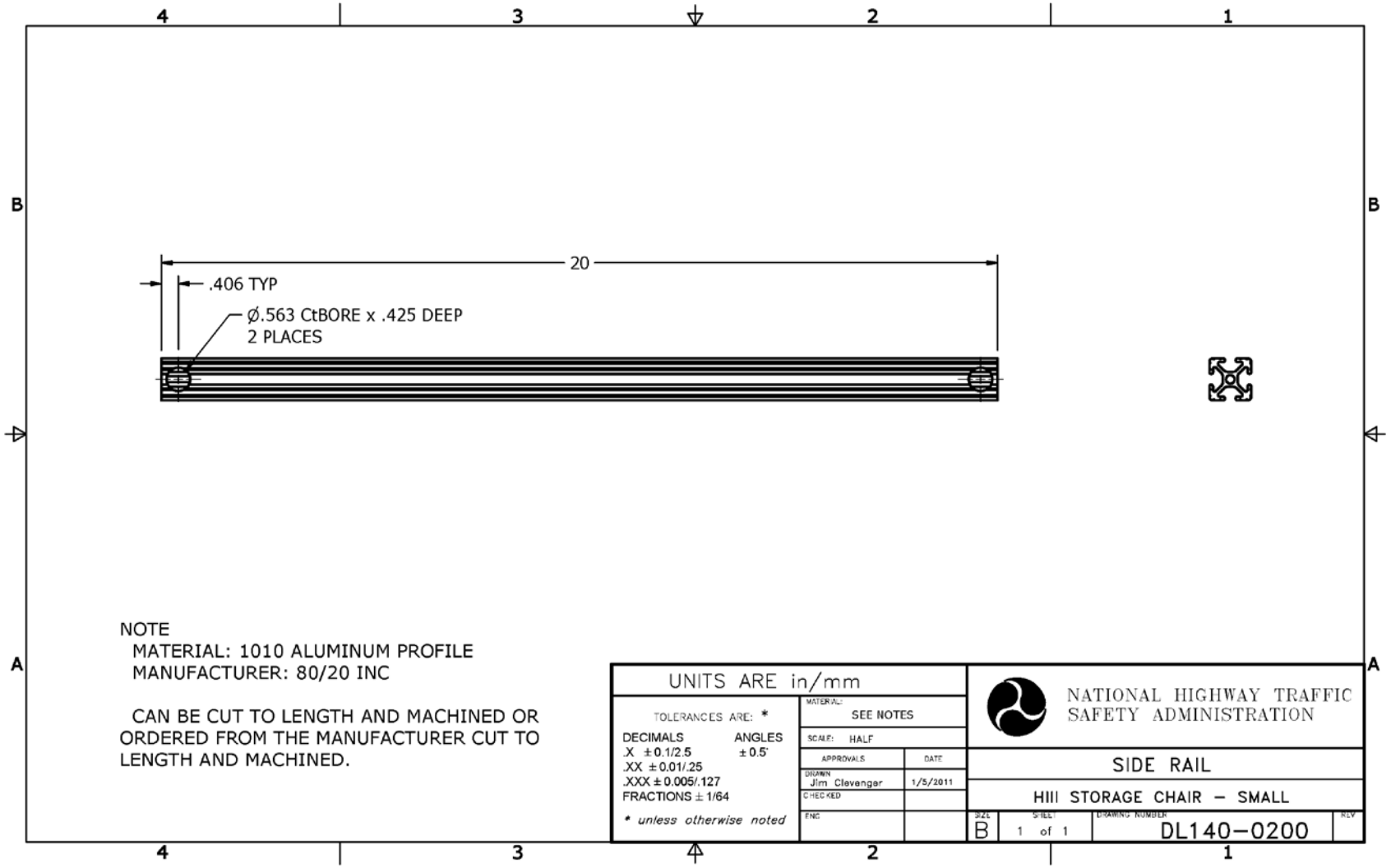
TOLERANCES ARE: *
DECIMALS
.X ±0.1/2.5
.XX ±0.01/.25
.XXX ±0.005/.127
FRACTIONS ±1/64
ANGLES ±0.5°
* unless otherwise noted

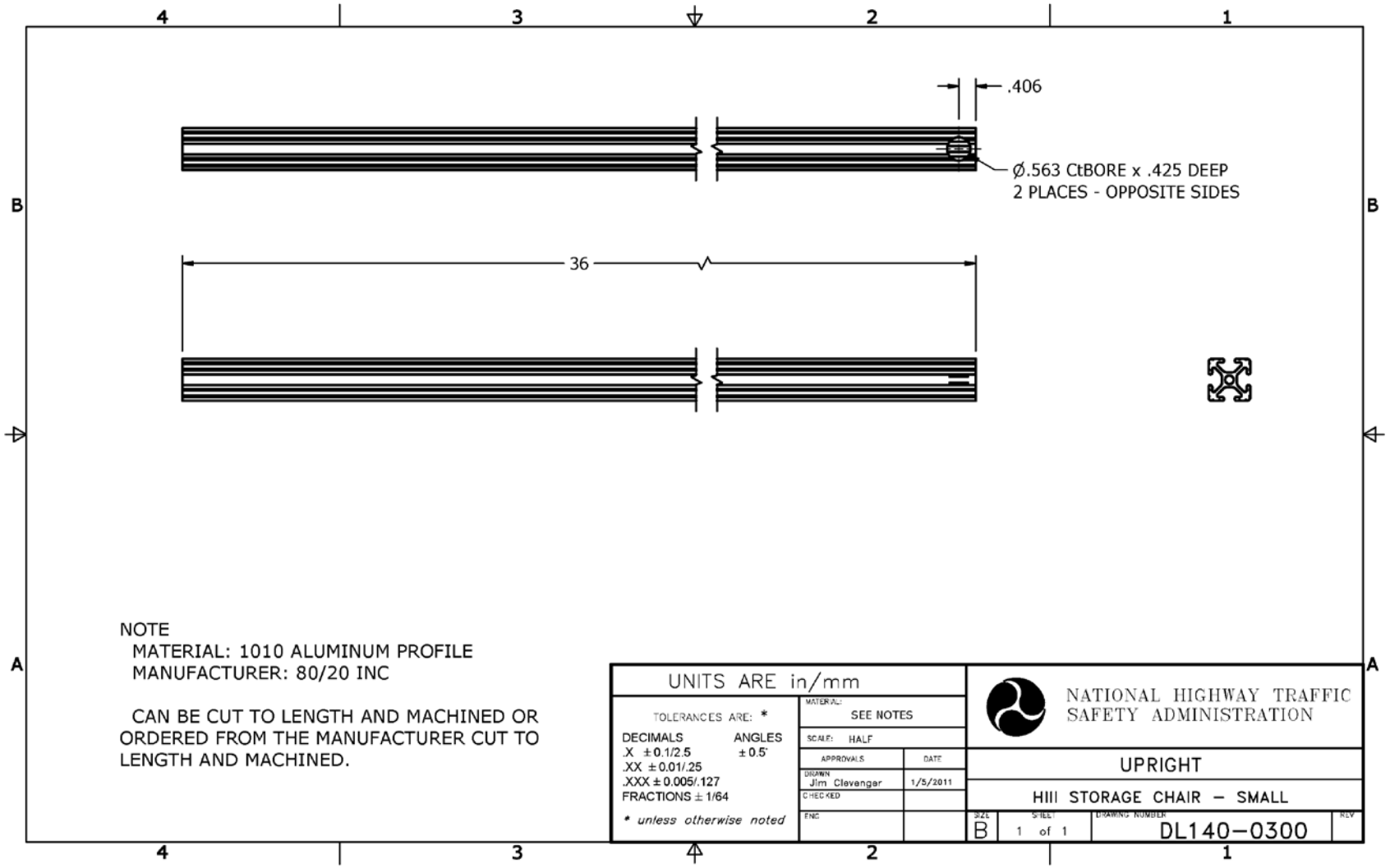
MATERIAL: SEE PARTS LIST
SCALE: 1/3
APPROVALS | DATE
DRAWN: Jim Clevenger | 1/12/2011
CHECKED
DNC

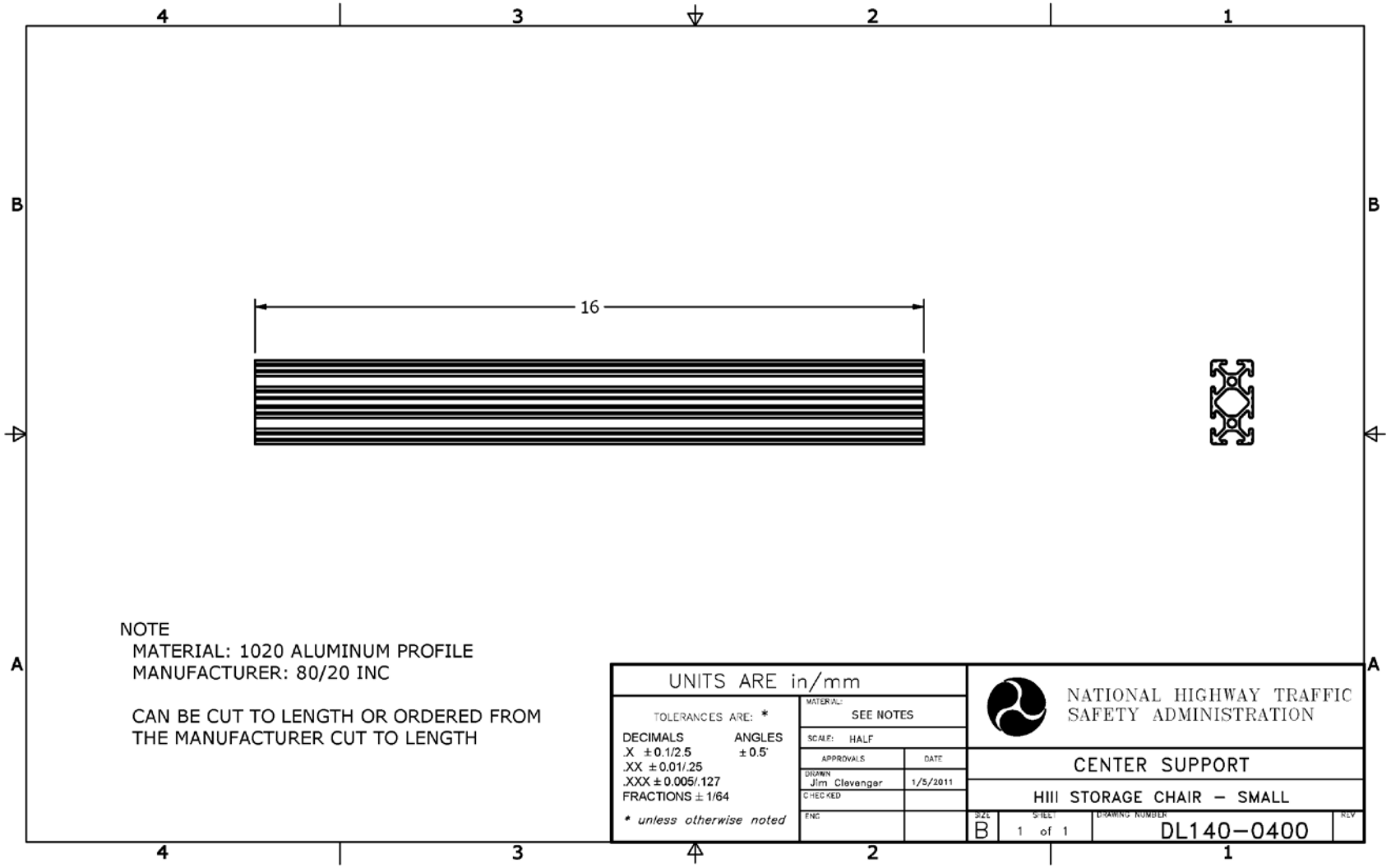
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

COMPLETE CHAIR ASSEMBLY
HIII STORAGE CHAIR – SMALL
SIZE: D | SHEET: 1 of 1 | DRAWING NUMBER: DL140-0000 | REV


4
3
2
1
B
A
18
NOTE
MATERIAL: 1010 ALUMINUM PROFILE
MANUFACTURER: 80/20 INC
CAN BE CUT TO LENGTH OR ORDERED FROM THE MANUFACTURER CUT TO LENGTH
UNITS ARE in/mm
TOLERANCES ARE: *
DECIMALS
.X ±0.1/2.5
.XX ±0.01/.25
.XXX ±0.005/.127
FRACTIONS ±1/64
ANGLES
±0.5°
* unless otherwise noted
MATERIAL: SEE NOTES
SCALE: HALF
APPROVALS
DATE
DRAWN Jim Clevenger 1/5/2011
CHECKED
ENG
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
END RAIL/TOP RAIL
HIII STORAGE CHAIR – SMALL
SIZE B
SHEET 1 of 1
DRAWING NUMBER DL140-0100
REV


4
3
2
1
B
A
20
.406 TYP
Ø.563 CtBORE x .425 DEEP
2 PLACES
NOTE
MATERIAL: 1010 ALUMINUM PROFILE
MANUFACTURER: 80/20 INC
CAN BE CUT TO LENGTH AND MACHINED OR ORDERED FROM THE MANUFACTURER CUT TO LENGTH AND MACHINED.
UNITS ARE in/mm
TOLERANCES ARE: *
DECIMALS
.X ±0.1/2.5
.XX ±0.01/.25
.XXX ± 0.005/.127
FRACTIONS ± 1/64
ANGLES
±0.5°
* unless otherwise noted
MATERIAL: SEE NOTES
SCALE: HALF
APPROVALS
DATE
DRAWN Jim Clevenger 1/5/2011
CHECKED
ENG
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SIDE RAIL
HIII STORAGE CHAIR – SMALL
SIZE B
SHEET 1 of 1
DRAWING NUMBER DL140–0200
REV


4
3
2
1
B
A
.406
Ø.563 CtBORE x .425 DEEP
2 PLACES - OPPOSITE SIDES
36
NOTE
MATERIAL: 1010 ALUMINUM PROFILE
MANUFACTURER: 80/20 INC
CAN BE CUT TO LENGTH AND MACHINED OR ORDERED FROM THE MANUFACTURER CUT TO LENGTH AND MACHINED.
UNITS ARE in/mm
TOLERANCES ARE: *
DECIMALS
.X ±0.1/2.5
.XX ±0.01/.25
.XXX ± 0.005/.127
FRACTIONS ± 1/64
ANGLES
±0.5°
* unless otherwise noted
MATERIAL: SEE NOTES
SCALE: HALF
APPROVALS
DATE
DRAWN Jim Clevenger 1/5/2011
CHECKED
ENG
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
UPRIGHT
HIII STORAGE CHAIR – SMALL
SIZE B
SHEET 1 of 1
DRAWING NUMBER DL140-0300
REV


4
3
2
1
B
A
16
NOTE
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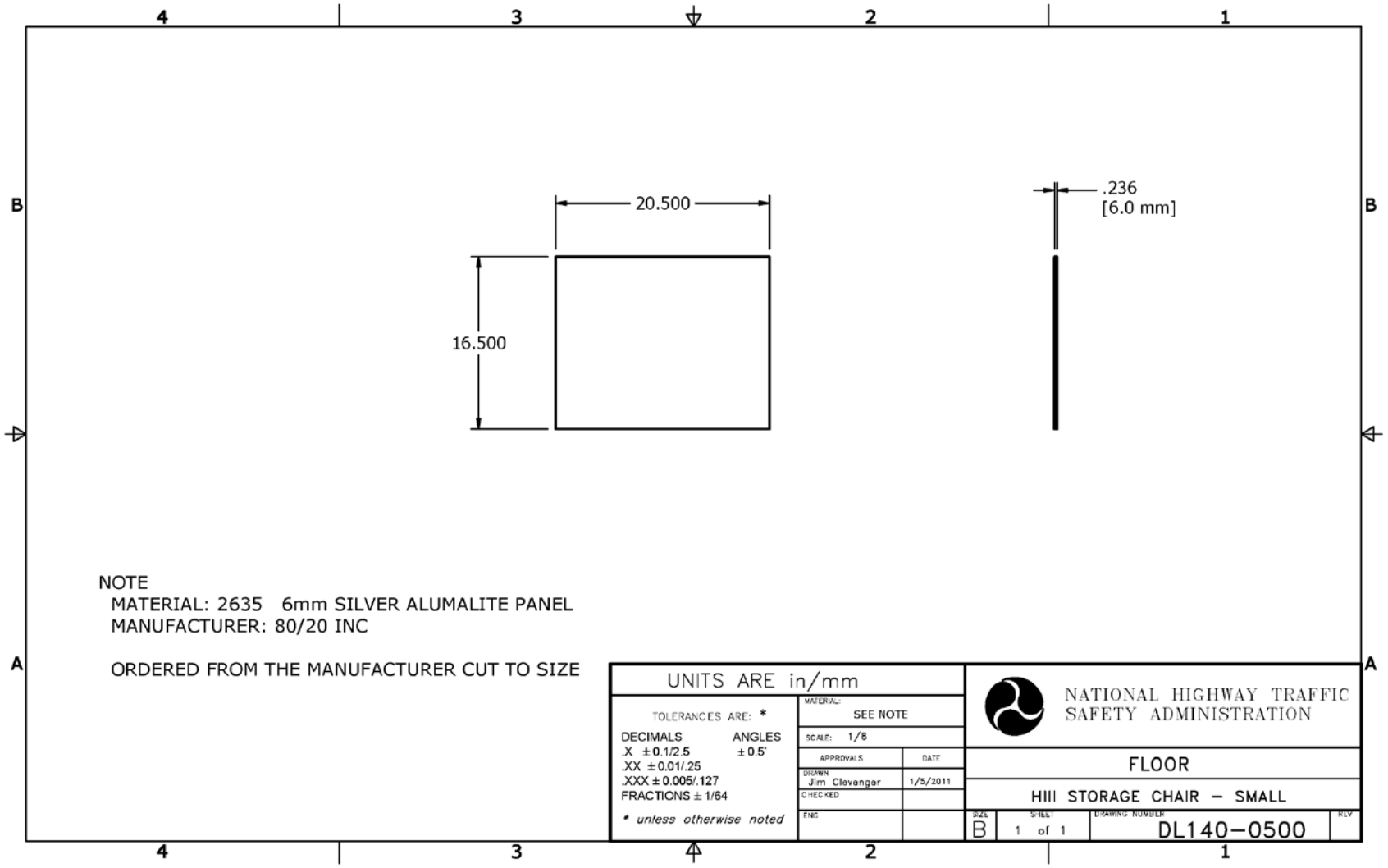
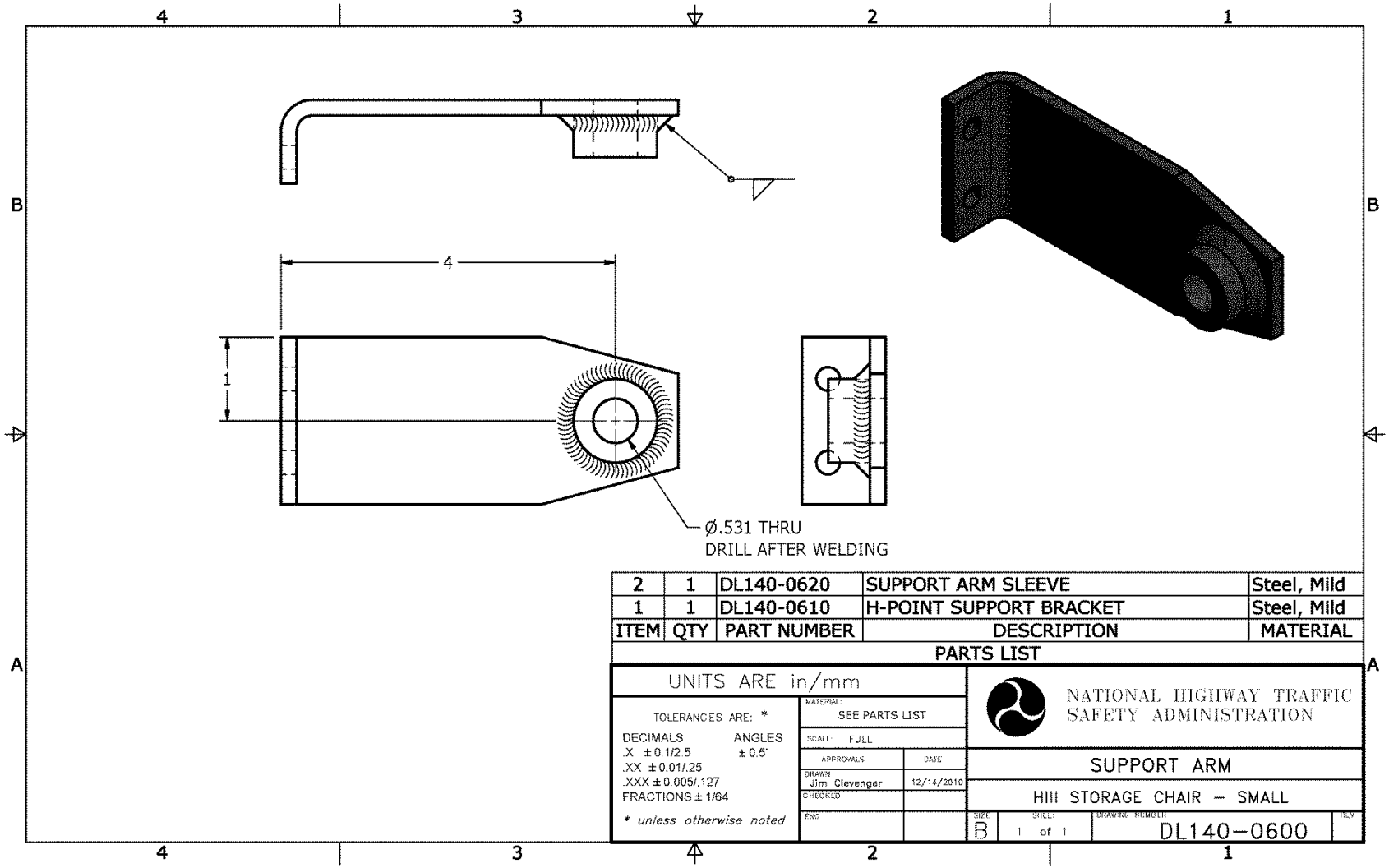
MANUFACTURER: 80/20 INC
CAN BE CUT TO LENGTH OR ORDERED FROM THE MANUFACTURER CUT TO LENGTH
UNITS ARE in/mm
TOLERANCES ARE: *
DECIMALS
.X ±0.1/2.5
.XX ±0.01/.25
.XXX ±0.005/.127
FRACTIONS ±1/64
ANGLES ±0.5°
* unless otherwise noted
MATERIAL: SEE NOTES
SCALE: HALF
APPROVALS
DATE
DRAWN Jim Clevenger 1/5/2011
CHECKED
ENG
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
CENTER SUPPORT
HIII STORAGE CHAIR – SMALL
SIZE B
SHEET 1 of 1
DRAWING NUMBER DL140-0400
REV


4
3
2
1
B
A
20.500
16.500
.236
[6.0 mm]
NOTE
MATERIAL: 2635 6mm SILVER ALUMALITE PANEL
MANUFACTURER: 80/20 INC
ORDERED FROM THE MANUFACTURER CUT TO SIZE
UNITS ARE in/mm
TOLERANCES ARE: *
DECIMALS
.X ±0.1/2.5
.XX ±0.01/.25
.XXX ±0.005/.127
FRACTIONS ±1/64
ANGLES
±0.5°
* unless otherwise noted
MATERIAL: SEE NOTE
SCALE: 1/8
APPROVALS
DATE
DRAWN Jim Clevenger 1/5/2011
CHECKED
ENG
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
FLOOR
HIII STORAGE CHAIR – SMALL
SIZE B
SHEET 1 of 1
DRAWING NUMBER DL140-0500
REV



ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL
2	1	DL140-0620	SUPPORT ARM SLEEVE	Steel, Mild
1	1	DL140-0610	H-POINT SUPPORT BRACKET	Steel, Mild

PARTS LIST

UNITS ARE in/mm

TOLERANCES ARE: *

DECIMALS ANGLES
.X ±0.1/2.5 ±0.5°
.XX ±0.01/.25
.XXX ±0.005/.127
FRACTIONS ±1/64

* unless otherwise noted

MATERIAL: SEE PARTS LIST
SCALE: FULL

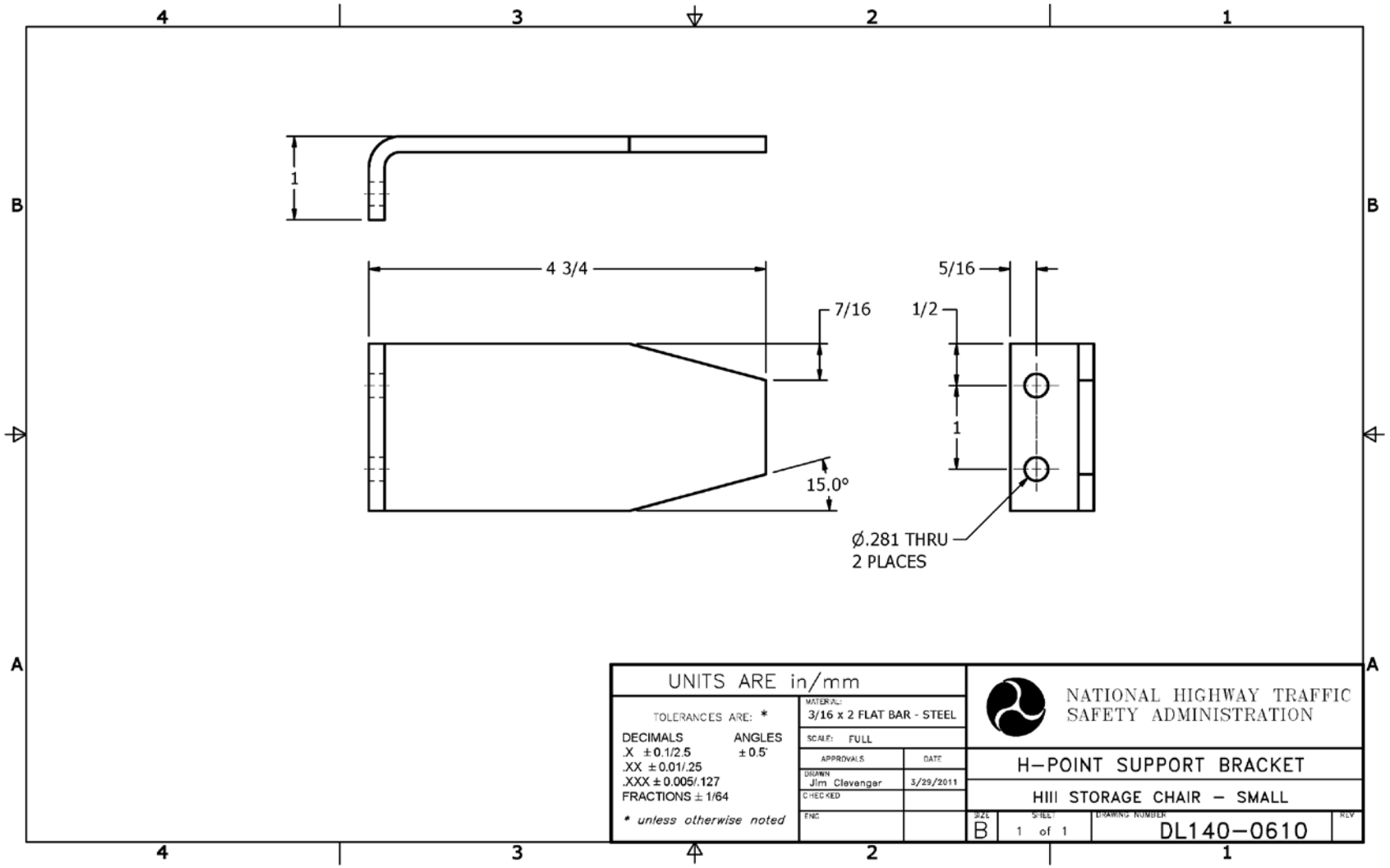
APPROVALS	DATE
DRAWN Jim Clevenger	12/14/2010
CHECKED	
ENG	

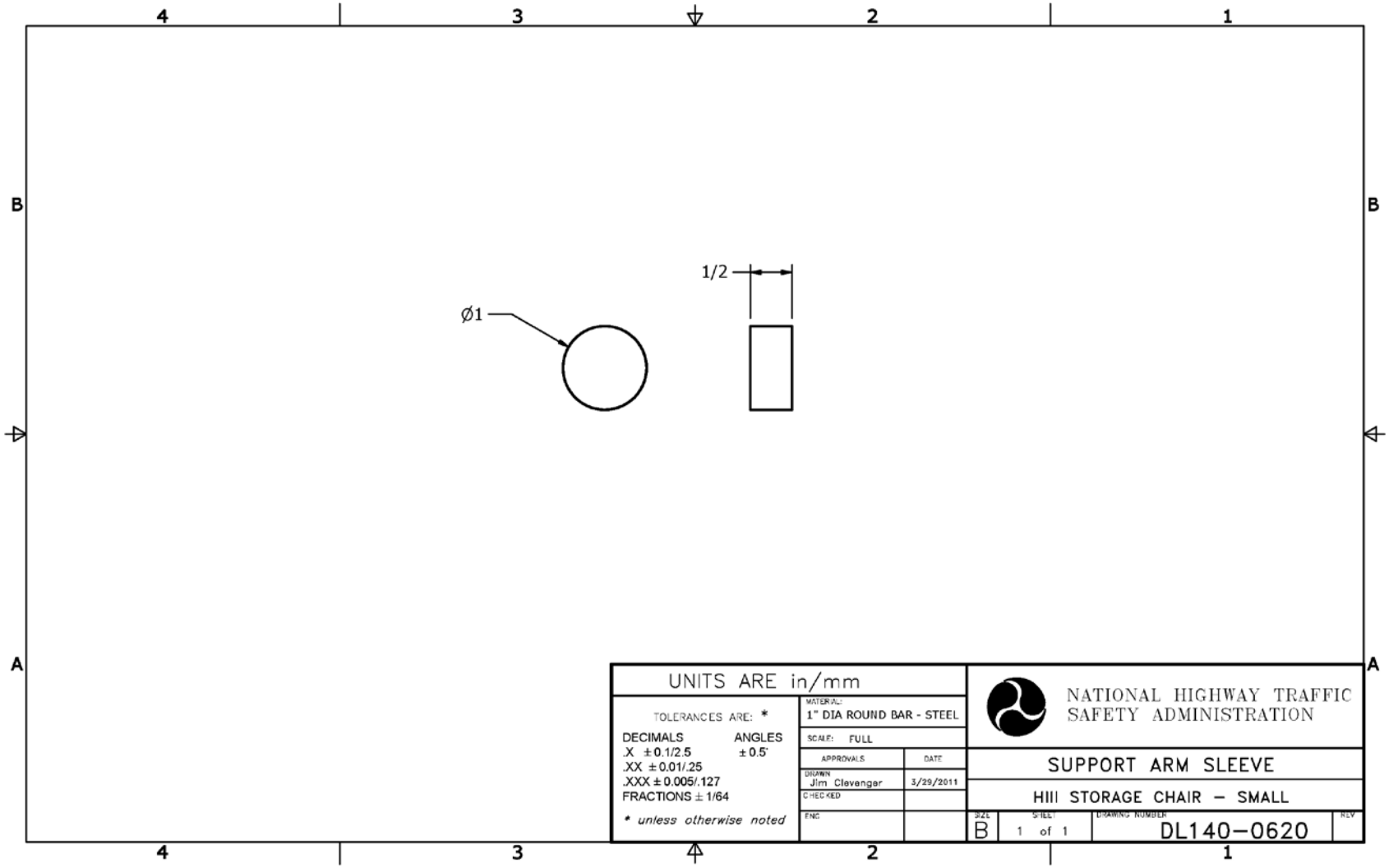
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

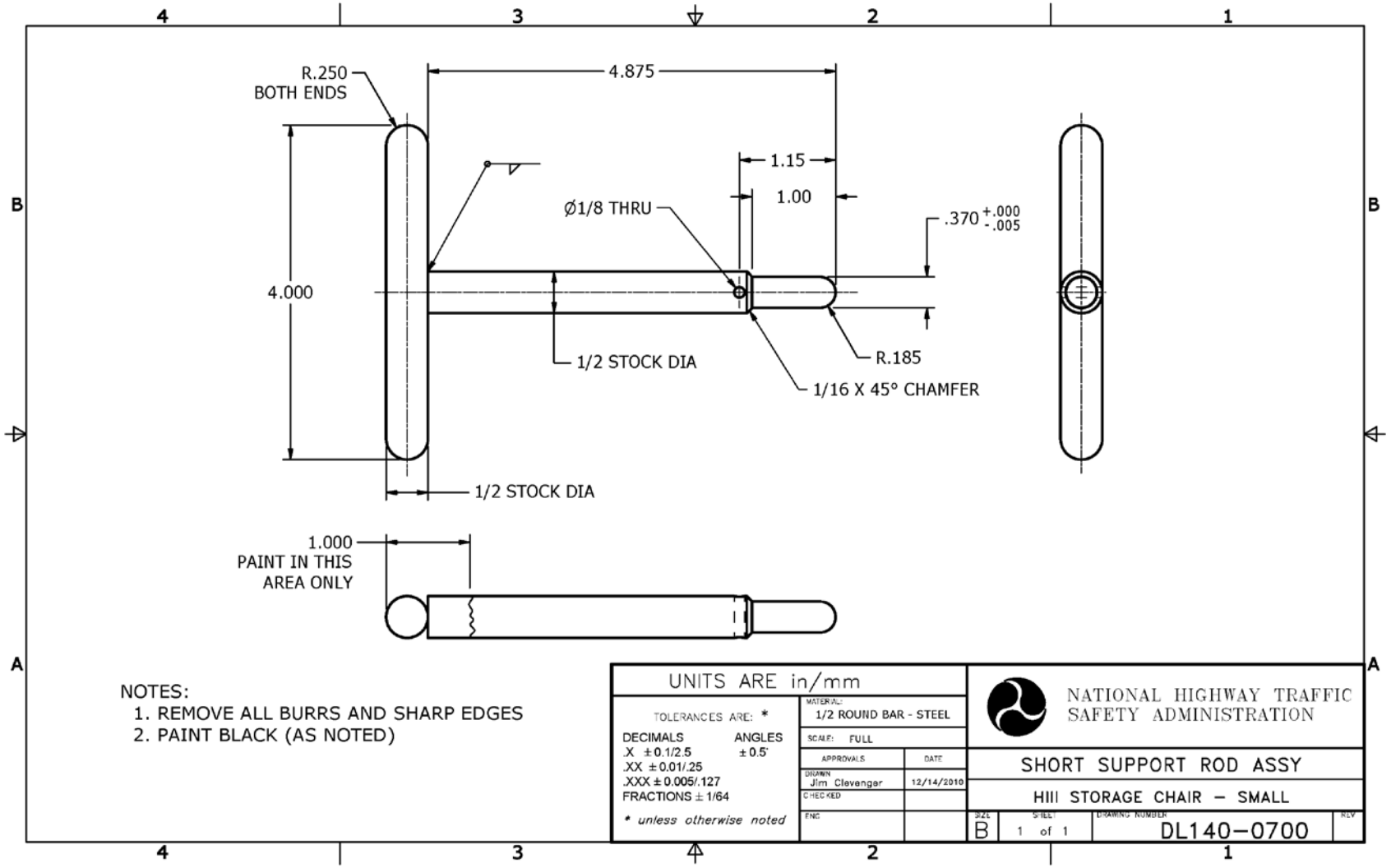
SUPPORT ARM

HIII STORAGE CHAIR – SMALL

SIZE B | SHEET 1 of 1 | DRAWING NUMBER DL140-0600 | REV


4
3
2
1
B
A
1
4 3/4
7/16
15.0°
5/16
1/2
1
Ø.281 THRU
2 PLACES
UNITS ARE in/mm
TOLERANCES ARE: *
DECIMALS
.X ±0.1/2.5
.XX ±0.01/.25
.XXX ±0.005/.127
FRACTIONS ±1/64
ANGLES
±0.5°
* unless otherwise noted
MATERIAL: 3/16 x 2 FLAT BAR - STEEL
SCALE: FULL
APPROVALS
DATE
DRAWN Jim Clevenger 3/29/2011
CHECKED
ENG
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
H-POINT SUPPORT BRACKET
HIII STORAGE CHAIR - SMALL
SIZE B
SHEET 1 of 1
DRAWING NUMBER DL140-0610
REV


4
3
2
1
B
A
1/2
Ø1
UNITS ARE in/mm
TOLERANCES ARE: *
DECIMALS
.X ±0.1/2.5
.XX ±0.01/.25
.XXX ± 0.005/.127
FRACTIONS ± 1/64
ANGLES
± 0.5°
* unless otherwise noted
MATERIAL:
1" DIA ROUND BAR - STEEL
SCALE: FULL
APPROVALS
DATE
DRAWN
Jim Clevenger
3/29/2011
CHECKED
ENG
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SUPPORT ARM SLEEVE
HIII STORAGE CHAIR – SMALL
SIZE
B
SHEET
1 of 1
DRAWING NUMBER
DL140–0620
REV


R.250
BOTH ENDS
4.875
1.15
1.00
Ø1/8 THRU
.370 +.000 -.005
4.000
1/2 STOCK DIA
R.185
1/16 X 45° CHAMFER
1/2 STOCK DIA
1.000
PAINT IN THIS
AREA ONLY
NOTES:
1. REMOVE ALL BURRS AND SHARP EDGES
2. PAINT BLACK (AS NOTED)
UNITS ARE in/mm
TOLERANCES ARE: *
DECIMALS
.X ±0.1/2.5
.XX ±0.01/.25
.XXX ±0.005/.127
ANGLES
±0.5°
FRACTIONS ±1/64
* unless otherwise noted
MATERIAL: 1/2 ROUND BAR - STEEL
SCALE: FULL
APPROVALS
DATE
DRAWN Jim Clevenger 12/14/2010
CHECKED
ENG
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SHORT SUPPORT ROD ASSY
HIII STORAGE CHAIR – SMALL
SIZE B
SHEET 1 of 1
DRAWING NUMBER DL140–0700
REV