

§ 572.40

the longitudinal centerline of the cylinder.

(c) Head accelerometers shall have dimensions and response characteristics specified in drawing 78051-136, revision A, or its equivalent, and the location of their seismic mass as mounted in the skull are shown in drawing C-1709, revision D.

(d) The six axis neck transducer shall have the dimensions, response characteristics, and sensitive axis locations specified in drawing C-1709, revision D and be mounted for testing as shown in Figures 20 and 21 of § 572.33, and in the assembly drawing 78051-218, revision T.

(e) The chest accelerometers shall have the dimensions, response characteristics, and sensitive mass locations specified in drawing 78051-136, revision A or its equivalent and be mounted as shown with adaptor assembly 78051-116, revision D for assembly into 78051-218, revision T.

(f) The chest deflection transducer shall have the dimensions and response characteristics specified in drawing 78051-342, revision A or its equivalent and be mounted in the chest deflection transducer assembly 78051-317, revision A for assembly into 78051-218, revision T.

(g) The thorax and knee impactor accelerometers shall have the dimensions and characteristics of Endevco Model 7231c or equivalent. Each accelerometer shall be mounted with its sensitive axis colinear with the pendulum's longitudinal centerline.

(h) The femur load cell shall have the dimensions, response characteristics, and sensitive axis locations specified in drawing 78051-265 or its equivalent and be mounted in assemblies 78051-46 and -47 for assembly into 78051-218, revision T.

(i) The outputs of acceleration and force-sensing devices installed in the dummy and in the test apparatus specified by this part are recorded in individual data channels that conform to requirements of Society of Automotive Engineers (SAE) Recommended Practice J211 Mar95, Instrumentation for Impact Tests, Parts 1 and 2. SAE J211 Mar95 sets forth the following channel classes:

- (1) Head acceleration—Class 1000
- (2) Neck forces—Class 1000

49 CFR Ch. V (10-1-11 Edition)

(3) Neck moments—Class 600

(4) Neck pendulum acceleration—Class 60

(5) Thorax and thorax pendulum acceleration—Class 180

(6) Thorax deflection—Class 180

(7) Knee pendulum acceleration—Class 600

(8) Femur force—Class 600

(j) Coordinate signs for instrumentation polarity conform to the sign convention shown in the document incorporated by § 572.31(a)(5).

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

(l) 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 shall not exceed 2g throughout the range of limb motion.

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

(n) Surfaces of dummy components are not painted except as specified in this part or in drawings subtended by this part.

[51 FR 26701, July 25, 1986, as amended at 53 FR 8765, Mar. 17, 1988; 62 FR 27518, May 20, 1997; 63 FR 45965, Aug. 28, 1998]

Subpart F—Side Impact Dummy 50th Percentile Male

SOURCE: 55 FR 45766, Oct. 30, 1990, unless otherwise noted.

§ 572.40 Incorporated materials.

(a) The drawings, specifications, manual, and computer program referred to in this regulation that are not set forth in full are hereby incorporated in this part by reference. These materials are thereby made part of this regulation. The Director of the Federal Register has approved the materials incorporated by reference. For materials subject to change, only the specific version approved by the Director of the Federal Register and specified in the regulation are incorporated. A notice of any change will be published in the FEDERAL REGISTER. As a convenience

to the reader, the materials incorporated by reference are listed in the Finding Aids Table found at the end of this volume of the Code of Federal Regulations.

(b) The materials incorporated in this part by reference are available for examination in the general reference section of Docket 79-04, Docket Section, National Highway Traffic Safety Administration, room 5109, 400 Seventh St., S.W., Washington, D.C., 20590, telephone (202) 366-4949. Copies may be obtained from Reprographic Technologies, 9000 Virginia Manor Rd., Suite 210, Beltsville, MD, 20705, Telephone (301) 419-5070, Fax (301) 419-5069.

[55 FR 45766, Oct. 30, 1990, as amended at 63 FR 16140, Apr. 2, 1998]

§ 572.41 General description.

(a) The dummy consists of component parts and component assemblies (SA-SID-M001, revision C, dated September 12, 1996, and SA-SID-M001A, revision B, dated September 12, 1996), which are described in approximately 250 drawings and specifications that are set forth in § 572.5(a) of this chapter with the following changes and additions which are described in approximately 85 drawings and specifications (incorporated by reference; see § 572.40):

(1) The head assembly consists of the assembly specified in subpart B (§ 572.6(a)) and conforms to each of the drawings subtended under drawing SA 150 M010 and drawings specified in SA-SID-M010, dated August 13, 1987.

(2) The neck assembly consists of the assembly specified in subpart B (§ 572.7(a)) and conforms to each of the drawings subtended under drawing SA 150 M020 and drawings shown in SA-SID-M010, dated August 13, 1987.

(3) The thorax assembly consists of the assembly shown as number SID-053 and conforms to each applicable drawing subtended by number SA-SID-M030 revision A, dated May 18, 1994.

(4) The lumbar spine consists of the assembly specified in subpart B (§ 572.9(a)) and conforms to drawing SA 150 M050 and drawings subtended by SA-SID-M050 revision B, dated September 12, 1996, including the addition of Lumbar Spacers-Lower SID-SM-001 and Lumbar Spacers-Upper SID-SM-002

(both dated May 12, 1994), and Washer 78051-243.

(5) The abdomen and pelvis consist of the assembly specified in subpart B of this part (§ 572.9) and conform to the drawings subtended by SA 150 M060, the drawings subtended by SA-SID-M060 revision A, dated May 18, 1994, and the drawings subtended by SA-SID-087 sheet 1 revision H, dated May 18, 1994, and SA-SID-087 sheet 2 revision H.

(6) The lower limbs consist of the assemblies specified in subpart B (§ 572.10) shown as SA 150 M080 and SA 150 M081 in Figure 1 and SA-SID-M080 and SA-SID-M081, both dated August 13, 1987, and conform to the drawings subtended by those numbers.

(b) The structural properties of the dummy are such that the dummy conforms to the requirements of this subpart in every respect both before and after being used in vehicle tests specified in Standard No 214 § 571.214 of this chapter.

(c) Disassembly, inspection, and assembly procedures; external dimensions and weight; and a dummy drawing list are set forth in the Side Impact Dummy (SID) User's Manual, dated May 1994 except for pages 7, 20 and 23, and appendix A (consisting of replacement pages 7, 20 and 23) dated January 20, 1998 (incorporated by reference; see § 572.40).

[55 FR 45766, Oct. 30, 1990, as amended at 59 FR 52091, Oct. 14, 1994; 63 FR 16140, Apr. 2, 1998]

§ 572.42 Thorax.

(a) When the thorax of a completely assembled dummy (SA-SID-M001A revision A, dated May 18, 1994, incorporated by reference; see § 572.40), appropriately assembled for right or left side impact, is impacted by a test probe conforming to § 572.44(a) at 14 fps in accordance with paragraph (b) of this section, the peak accelerations at the location of the accelerometers mounted on the thorax in accordance with § 572.44(b) shall be:

(1) For the accelerometer at the top of the Rib Bar on the struck side (LUR or RUR) not less than 37 g's and not more than 46 g's.

(2) For the accelerometer at the bottom of the Rib Bar on the struck side

§ 572.43

(LLR or RLR) not less than 37 g's and not more than 46 g's.

(3) For the lower thoracic spine (T12) not less than 15 g's and not more than 22 g's.

(b) Test Procedure. (1) Adjust the dummy legs as specified in § 572.44(f). Seat the dummy on a seating surface as specified in § 572.44(h) with the limbs extended horizontally forward.

(2) Place the longitudinal centerline of the test probe at the lateral side of the chest at the intersection of the centerlines of the third rib and the Rib Bar on the desired side of impact. This is the left side if the dummy is to be used on the driver's side of the vehicle and the right side if the dummy is to be used on the passenger side of the vehicle. The probe's centerline is perpendicular to thorax's midsagittal plane.

(3) Align the test probe so that its longitudinal centerline coincides with the line formed by the intersection of the transverse and frontal planes perpendicular to the chest's midsagittal plane passing through the designated impact point.

(4) Position the dummy as specified in § 572.44(h), so that the thorax's midsagittal plane and tangential plane to the Hinge Mounting Block (Drawing SID-034) are vertical.

(5) Impact the thorax with the test probe so that at the moment of impact at the designated impact point, the probe's longitudinal centerline falls within 2 degrees of a horizontal line perpendicular to the dummy's midsagittal plane and passing through the designated impact point.

(6) Guide the probe during impact so that it moves with no significant lateral, vertical or rotational movement.

(7) Allow a time period of at least 20 minutes between successive tests of the chest.

[59 FR 52091, Oct. 14, 1994, as amended at 59 FR 52091, Oct. 14, 1994]

§ 572.43 Lumbar spine and pelvis.

(a) When the pelvis of a fully assembled dummy (SA-SID-M001A revision B, dated September 12, 1996, (incorporated by reference; see § 572.40) is impacted laterally by a test probe conforming to § 572.44(a) at 14 fps in accordance with paragraph (b) of this section, the peak acceleration at the location of the ac-

49 CFR Ch. V (10-1-11 Edition)

celerometer mounted in the pelvis cavity in accordance with § 572.44(c) shall be not less than 40g and not more than 60g. The acceleration-time curve for the test shall be unimodal and shall lie at or above the +20g level for an interval not less than 3 milliseconds and not more than 7 milliseconds.

(b) Test Procedure. (1) Adjust the dummy legs as specified in § 572.44(f). Seat the dummy on a seating surface as specified in § 572.44(h) with the limbs extended horizontally forward.

(2) Place the longitudinal centerline of the test probe at the lateral side of the pelvis at a point 3.9 inches vertical from the seating surface and 4.8 inches ventral to a transverse vertical plane which is tangent to the back of the dummy's buttocks.

(3) Align the test probe so that at impact its longitudinal centerline coincides with the line formed by intersection of the horizontal and vertical planes perpendicular to the midsagittal plane passing through the designated impact point.

(4) Adjust the dummy so that its midsagittal plane is vertical and the rear surfaces of the thorax and buttocks are tangent to a transverse vertical plane.

(5) Impact the pelvis with the test probe so that at the moment of impact the probe's longitudinal centerline falls within 2 degrees of the line specified in paragraph (b)(3) of this section.

(6) Guide the test probe during impact so that it moves with no significant lateral, vertical or rotational movement.

(7) Allow a time period of at least 2 hours between successive tests of the pelvis.

[55 FR 45766, Oct. 30, 1990, as amended at 59 FR 52091, Oct. 14, 1994; 63 FR 16140, Apr. 2, 1998]

§ 572.44 Instrumentation and test conditions.

(a) The test probe used for lateral thoracic and pelvis impact tests is a 6 inch diameter cylinder that weighs 51.5 pounds including instrumentation. Its impacting end has a flat right angle face that is rigid and has an edge radius of 0.5 inches.

(b) Three accelerometers are mounted in the thorax for measurement of

lateral accelerations with each accelerometer's sensitive axis aligned to be closely perpendicular to the thorax's midsagittal plane. The accelerometers are mounted in the following locations:

(1) One accelerometer is mounted on the thorax to lumbar adaptor (SID-005 revision F, dated May 18, 1994, incorporated by reference; see §572.40) with seismic mass center located 0.5 inches toward the impact side, 0.1 inches upward and 1.86 inches rearward from the reference point shown in Figure 30 in appendix A to subpart F of part 572. Maximum permissible variation of the seismic location must not exceed 0.2 inches spherical radius.

(2) Two accelerometers are mounted, one on the top and the other at the bottom part of the Rib Bar (SID-024) on the struck side. Their seismic mass centers are at any distance up to .4 inches from a point on the Rib Bar surface located on its longitudinal center line .75 inches from the top for the top accelerometer and .75 inches from the bottom, for the bottom accelerometer.

(c) One accelerometer is mounted in the pelvis for measurement of the lateral acceleration with its sensitive axis perpendicular to the pelvic midsagittal plane. The accelerometer is mounted on the rear wall of the instrumentation cavity of the pelvis (SID-087 revision H, dated May 18, 1994, incorporated by reference; see §572.40). The accelerometer's seismic mass with respect to the mounting bolt center line is 0.9 inches up, 0.7 inches to the left for left side impact and 0.03 inches to the left for right side impact, and 0.5 inches rearward from the rear wall mounting surface as shown in Figure 31 in appendix A to subpart F of part 572. Maximum permissible variation of the seismic location must not exceed 0.2 inches spherical radius.

(d) Instrumentation and sensors used must conform to the SAE J-211 (1980) recommended practice requirements (incorporated by reference; see §572.40). The outputs of the accelerometers installed in the dummy are then processed with the software for the Finite Impulse Response (FIR) filter (FIR 100 software). The FORTRAN program for this FIR 100 software (FIR100 Filter Program, Version 1.0, July 16, 1990) is

incorporated by reference in this part (see §572.40). The data are processed in the following manner:

(1) Analog data recorded in accordance with SAE J-211 (1980) recommended practice channel class 1000 specification.

(2) Filter the data with a 300 Hz, SAE Class 180 filter;

(3) Subsample the data to a 1600 Hz sampling rate;

(4) Remove the bias from the subsampled data, and

(5) Filter the data with the FIR100 Filter Program (Version 1.0, July 16, 1990), which has the following characteristics—

(i) Passband frequency, 100 Hz.

(ii) Stopband frequency, 189 Hz.

(iii) Stopband gain, -50 db.

(iv) Passband ripple, 0.0225 db.

(e) The mountings for the spine, rib and pelvis accelerometers shall have no resonance frequency within a range of 3 times the frequency range of the applicable channel class.

(f) Limb joints of the test dummy are set at the force between 1-2 g's, which just supports the limbs' weight when the limbs are extended horizontally forward. The force required to move a limb segment does not exceed 2 g's throughout the range of limb motion.

(g) Performance tests are conducted at any temperature from 66 °F to 78 °F and at any relative humidity from 10 percent to 70 percent after exposure of the dummy to these conditions for a period of not less than 4 hours.

(h) For the performance of tests specified in §§572.42 and 572.43, the dummy is positioned as follows:

(1) The dummy is placed on a flat, rigid, clean, dry, horizontal smooth aluminum surface whose length and width dimensions are not less than 16 inches, so that the dummy's midsagittal plane is vertical and centered on the test surface. The dummy's torso is positioned to meet the requirements of §572.42 and §572.43. The seating surface is without the back support and the test dummy is positioned so that the dummy's midsagittal plane is vertical and centered on the seat surface.

(2) The legs are positioned so that their centerlines are in planes parallel to the midsagittal plane.

§ 572.44

(3) Performance pre-tests of the assembled dummy are separated in time by a period of not less than 20 minutes unless otherwise specified.

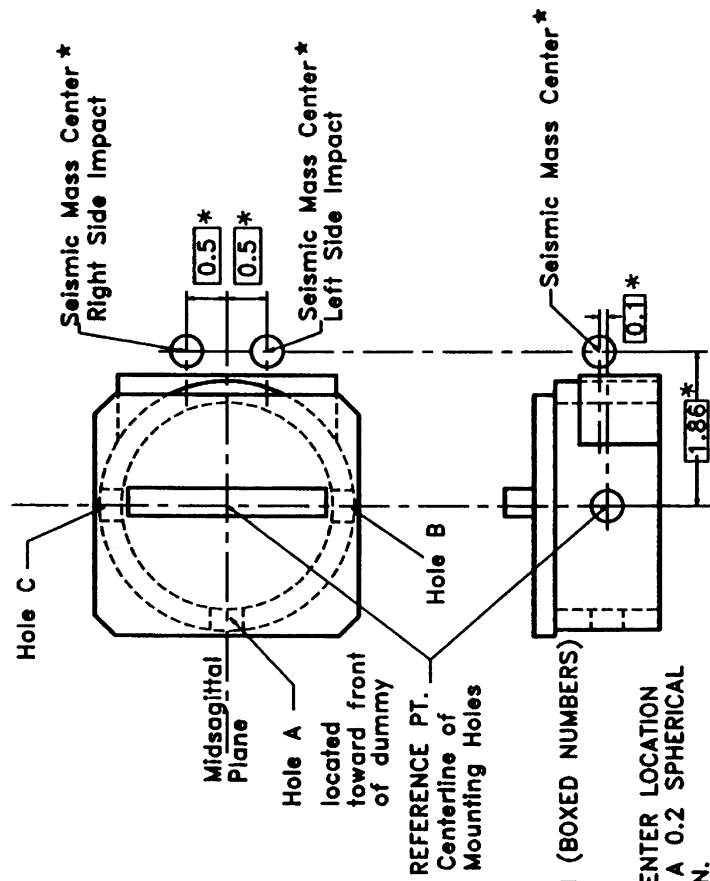
(4) Surfaces of the dummy components are not painted except as speci-

49 CFR Ch. V (10–1–11 Edition)

fied in this part or in drawings subtended by this part.

[55 FR 45766, Oct. 30, 1990, as amended at 56 FR 47011, Sept. 17, 1991; 59 FR 52091, Oct. 14, 1994]

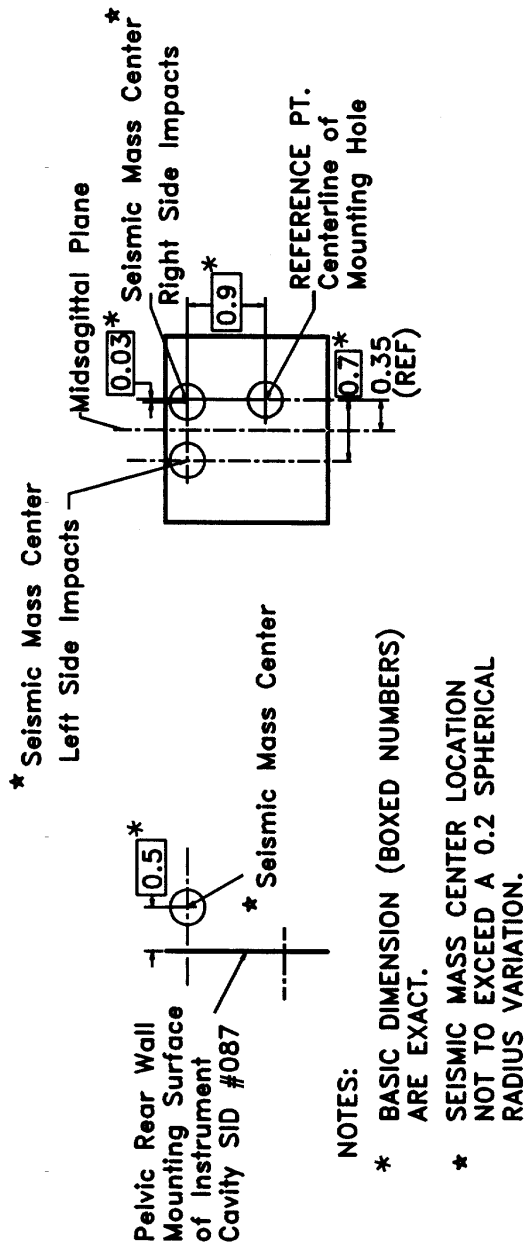
APPENDIX A TO SUBPART F OF PART 572—FIGURES



NOTES:

- * BASIC DIMENSION (BOXED NUMBERS) ARE EXACT.
- * SEISMIC MASS CENTER LOCATION NOT TO EXCEED A 0.2 SPHERICAL RADIUS VARIATION.

Accelerometer Seismic Mass Location on Assembly SID #005
 FIGURE 30



Pelvis Accelerometer Seismic Mass Location

FIGURE 31