

## § 572.20

the neck and install a cylindrical aluminum adapter 2.0 inches in diameter and 2.80 inches long in place of the neck.

(3) Flex the thorax forward 50 degrees and then rearward as necessary to return to its initial position in accordance with Figure 18 unsupported by external means.

(4) Apply a forward pull force in the midsagittal plane at the top of the neck adapter, so that at 40 degrees of the lumbar spine flexion the applied force is perpendicular to the thoracic spine box. Apply the force at any torso deflection rate between 0.5 and 1.5 degrees per second up to 40 degrees of flexion but no further; continue to apply for 10 seconds the force necessary to maintain 40 degrees of flexion, and record the highest applied force at that time. Release all force as rapidly as possible and measure the return angle 3 minutes after the release.

## § 572.20 Limbs.

The limbs consist of the assemblies shown on drawing SA 103C 001 as Nos. SA 103C 041, SA 103C 042, SA 103C 051, SA 103C 052, SA 103C 061, SA 103C 062, SA 103C 071, SA 103C 072, SA 103C 081, SA 103C 082, and conform to each of the applicable drawings listed under their respective numbers of the drawing SA 103C 002, sheets 12 through 21.

## § 572.21 Test conditions and instrumentation.

(a)(1) The test probe used for head and thoracic impact tests is a cylinder 3 inches in diameter, 13.8 inches long, and weighing 10 lbs., 6 ozs. Its impacting end has a flat right face that is rigid and that has an edge radius of 0.5 inches.

(2) The head and thorax assembly may be instrumented with a Type A or Type C accelerometer.

(i) Type A accelerometer is defined in drawing SA-572 S1.

(ii) Type C accelerometer is defined in drawing SA-572 S2.

(b) *Head accelerometers.* Install one of the triaxial accelerometers specified in § 572.21(a)(2) on a mounting block located on the horizontal transverse bulkhead as shown in the drawings sub-referenced under assembly SA 103C 010 so that the seismic mass centers of

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each sensing element are positioned as specified in this paragraph, relative to the head accelerometer reference point located at the intersection of a line connecting the longitudinal centerlines of the transfer pins in the side of the dummy head with the midsagittal plane of the dummy head.

(1) The sensing elements of the Type C triaxial accelerometer are aligned as follows:

(i) Align one sensitive axis parallel to the vertical bulkhead and coincident with the midsagittal plane, with the seismic mass center located 0.2 inches dorsal to, and 0.1 inches inferior to the head accelerometer reference point.

(ii) Align the second sensitive axis with the horizontal plane, perpendicular to the midsagittal plane, with the seismic mass center located 0.1 inches inferior, 0.4 inches to the right of, and 0.9 inches dorsal to the head accelerometer reference point.

(iii) Align the third sensitive axis so that it is parallel to the midsagittal and horizontal planes, with the seismic mass center located 0.1 inches inferior to, 0.6 inches dorsal to, and 0.4 inches to the right of the head accelerometer reference point.

(iv) All seismic mass centers are positioned with  $\pm 0.05$  inches of the specified locations.

(2) The sensing elements of the Type A triaxial accelerometer are aligned as follows:

(i) Align one sensitive axis parallel to the vertical bulkhead and coincident with midsagittal planes, with the seismic mass center located from 0.2 to 0.47 inches dorsal to, from 0.01 inches inferior to 0.21 inches superior, and from 0.0 to 0.17 inches left of the head accelerometer reference point.

(ii) Align the second sensitive axis with the horizontal plane, perpendicular to the midsagittal plane, with the seismic mass center located 0.1 to 0.13 inches inferior to, 0.17 to 0.4 inches to the right of, and 0.47 to 0.9 inches dorsal of the head accelerometer reference point.

(iii) Align the third sensitive axis so that it is parallel to the midsagittal and horizontal planes, with the seismic mass center located 0.1 to 0.13 inches inferior to, 0.6 to 0.81 inches dorsal to, and from 0.17 inches left to 0.4 inches

right of the head accelerometer reference point.

(c) *Thorax accelerometers.* Install one of the triaxial accelerometers specified in § 572.21(a)(2) on a mounting plate attached to the vertical transverse bulkhead shown in the drawing subreferenced under assembly No. SA 103C 030 in drawing SA 103C 001, so that the seismic mass centers of each sensing element are positioned as specified in this paragraph, relative to the thorax accelerometer reference point located in the midsagittal plane 3 inches above the top surface of the lumbar spine, and 0.3 inches dorsal to the accelerometer mounting plate surface.

(1) The sensing elements of the Type C triaxial accelerometer are aligned as follows:

(i) Align one sensitive axis parallel to the vertical bulkhead and midsagittal planes, with the seismic mass center located 0.2 inches to the left of, 0.1 inches inferior to, and 0.2 inches ventral to the thorax accelerometer reference point.

(ii) Align the second sensitive axis so that it is in the horizontal transverse plane, and perpendicular to the midsagittal plane, with the seismic mass center located 0.2 inches to the right of, 0.1 inches inferior to, and 0.2 inches ventral to the thorax accelerometer reference point.

(iii) Align the third sensitive axis so that it is parallel to the midsagittal and horizontal planes, with the seismic mass center located 0.2 inches superior to, 0.5 inches to the right of, and 0.1 inches ventral to the thorax accelerometer reference points.

(iv) All seismic mass centers shall be positioned within  $\pm 0.05$  inches of the specified locations.

(2) The sensing elements of the Type A triaxial accelerometer are aligned as follows:

(i) Align one sensitive axis parallel to the vertical bulkhead and midsagittal planes, with the seismic mass center located from 0.2 inches left to 0.28 inches right, from 0.5 to 0.15 inches inferior to, and from 0.15 to 0.25 inches ventral of the thorax accelerometer reference point.

(ii) Align the second sensitive axis so that it is in the horizontal transverse plane and perpendicular to the

midsagittal plane, with the seismic mass center located from 0.06 inches left to 0.2 inches right of, from 0.1 inches inferior to 0.24 inches superior, and 0.15 to 0.25 inches ventral to the thorax accelerometer reference point.

(iii) Align the third sensitive axis so that it is parallel to the midsagittal and horizontal planes, with the seismic mass center located 0.15 to 0.25 inches superior to, 0.28 to 0.5 inches to the right of, and from 0.1 inches ventral to 0.19 inches dorsal to the thorax accelerometer reference point.

(d) The outputs of accelerometers installed in the dummy, and of test apparatus specified by this part, are recorded in individual data channels that conform to the requirements of SAE Recommended Practice J211a, December 1971, with channel classes as follows:

(1) Head acceleration—Class 1000.

(2) Pendulum acceleration—Class 60.

(3) Thorax acceleration—Class 180.

(e) The mountings for accelerometers have no resonance frequency less than cut-off 3 times the cut-off frequency of the applicable channel class.

(f) Limb joints are set at the force between 1-2g, which just supports the limbs' weight when the limbs are extended horizontally forward. The force required to move a limb segment does not exceed 2g 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 tests specified in §§ 572.16, 572.18, and 572.19, the dummy is positioned in accordance with Figures 16, 17, and 18 as follows:

(1) The dummy is placed on a flat, rigid, clean, dry, horizontal surface of teflon sheeting with a smoothness of 40 microinches and 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. For head tests, the seat has a vertical back support whose top is  $12.4 \pm 0.2$  inches above the seating surface. The rear surfaces of the dummy's shoulders and buttocks are touching the back support as

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shown in Figure 16. For thorax and lumbar spine tests, the seating surface is without the back support as shown in Figures 17 and 18, respectively.

(2) The shoulder yokes are adjusted so that they are at the midpoint of their anterior-posterior travel with their upper surfaces horizontal.

(3) The dummy is adjusted for head impact and lumbar flexion tests so that the rear surfaces of the shoulders and buttocks are tangent to a transverse vertical plane.

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

(i) The dummy's dimensions are specified in drawings No. SA 103C 002, sheets 22 through 26.

(j) Performance tests of the same component, segment, assembly or fully assembled dummy are separated in time by a period of not less than 20 minutes unless otherwise specified.

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

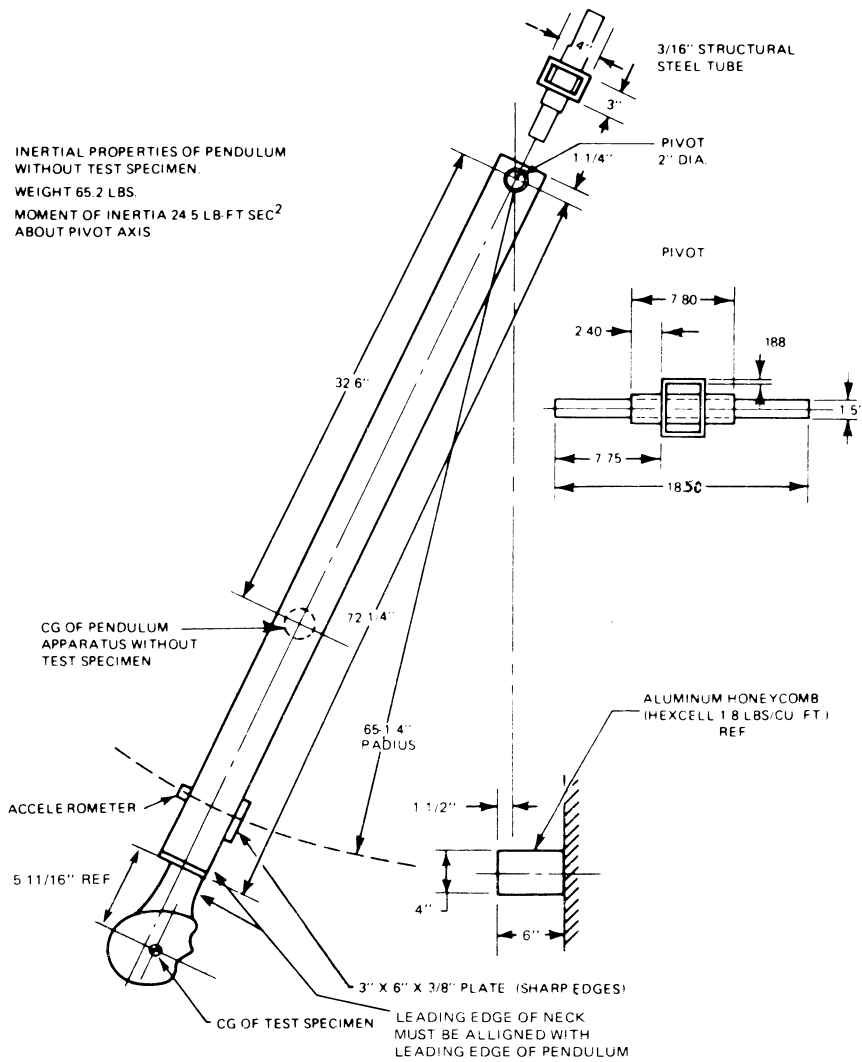


FIGURE NO. 15  
 NECK COMPONENT TEST

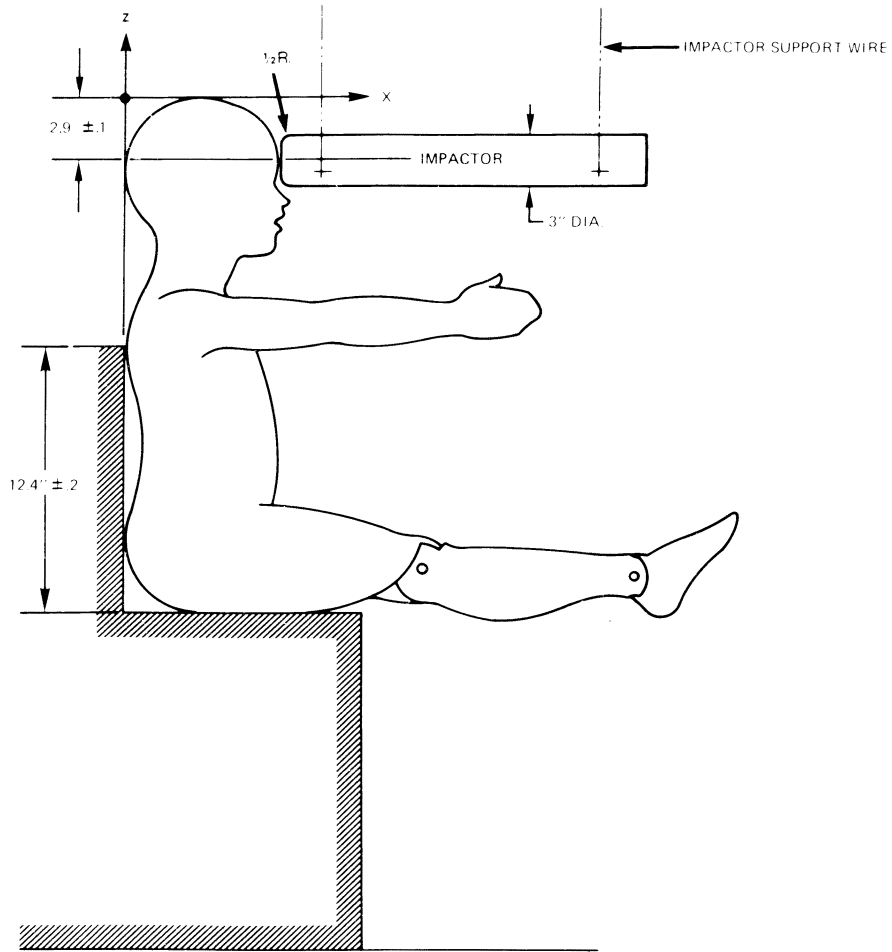


FIGURE NO. 16  
HEAD IMPACT TEST

IMPACTOR FACE TO BE VERTICAL  $\pm 2^\circ$   
AT CONTACT OF CHEST

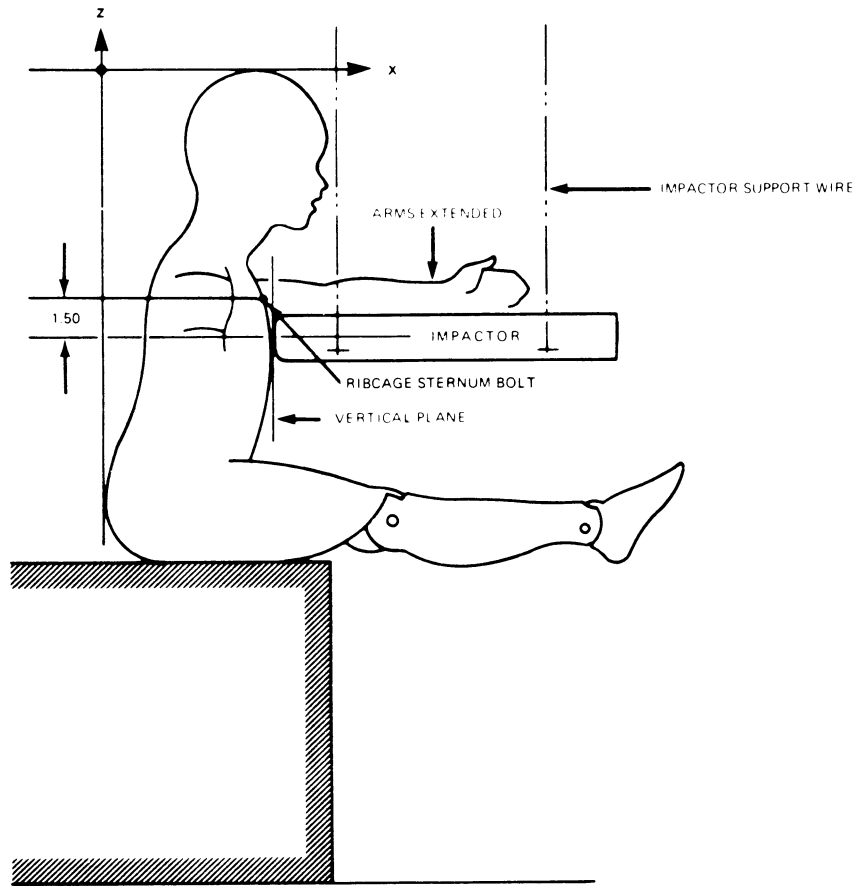


FIGURE NO. 17  
CHEST IMPACT TEST

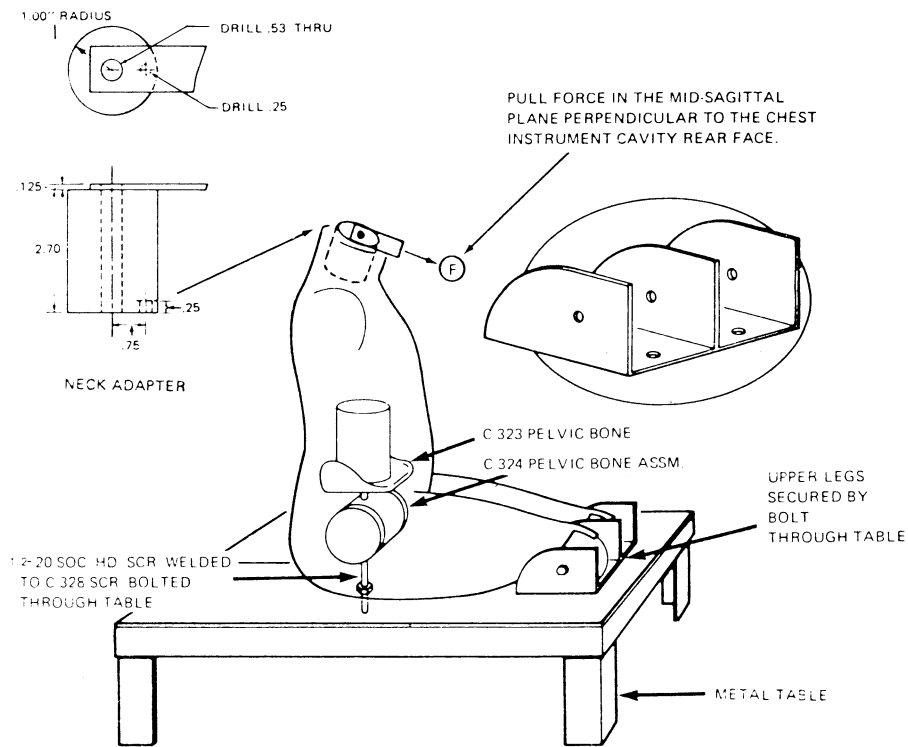


FIGURE NO. 18  
LUMBAR SPINE FLEXION TEST

[44 FR 76530, Dec. 27, 1979, as amended at 45 FR 82267, Dec. 15, 1980; 55 FR 30468, July 26, 1990]

**Subpart D—6-Month-Old Infant**

**§ 572.25 General description.**

(a) The infant dummy is specified in its entirety by means of 5 drawings (No. SA 1001) and a construction manual, dated July 2, 1974, which describe in detail the materials and the proce-

dures involved in the manufacturing of this dummy.

(b) The drawings, specifications, and construction manual referred to in this regulation that are not set forth in full are hereby incorporated in this part by reference. These materials are thereby