§ 572.127 Test conditions and instrumentation.

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

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

(c) 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 127–0000 sheet 3.

(d) *Neck force/moment transducer.* (1) The upper neck force/moment transducer shall have the dimensions, response characteristics, and sensitive axis locations specified in drawing SA572–S11 and be mounted in the head-neck assembly as shown in drawing 127–0000 sheet 3.

(2) The optional lower neck force/moment transducer shall have the dimensions, response characteristics, and sensitive axis locations specified in drawing SA572–S26 and be mounted as shown in drawing 127–0000 sheet 3.

(e) The thorax accelerometers shall have the dimensions, response characteristics, and sensitive mass locations specified in drawing SA572–S4 and be mounted in the torso assembly in triaxial configuration at T4, and as optional instrumentation in uniaxial for-and-aft oriented configuration on the most anterior ends of ribs #1 and #6 and at the spine box at the levels of #1 and #6 ribs as shown in 127–0000 sheet 3.

(f) The chest deflection transducer shall have the dimensions and response characteristics specified in drawing SA572–S50 and be mounted in the upper torso assembly as shown in 127–0000 sheet 3.

(g) The optional lumbar spine force-moment transducer shall have the dimensions, response characteristics, and sensitive axis locations specified in drawing SA572–S12 and be mounted in the lower torso assembly as shown in drawing 127–0000 sheet 3 as a replacement for lumbar adaptor 127–3005.

(h) The optional iliac spine force transducers shall have the dimensions and response characteristics specified in drawing SA572–S13 and be mounted in the torso assembly as shown in drawing 127–0000 sheet 3 as a replacement for ASIS load cell 127–3015–1 (left) and −2 (right).

(i) The optional pelvis accelerometers shall have the dimensions, response characteristics, and sensitive mass locations specified in drawing SA572–S4 and be mounted in the torso assembly in triaxial configuration in the pelvis bone as shown in drawing 127–0000 sheet 3.

(j) The femur force transducer shall have the dimensions and response characteristics specified in drawing SA72–S10 and be mounted in the leg assembly as shown in drawing 127–0000 sheet 3.

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

(1) Head acceleration—Class 1000.

(2) Neck:

(i) Forces—Class 1000;

(ii) Moments—Class 600;

(iii) Pendulum acceleration—Class 180;

(iv) Rotation—Class 60 (if used).

(3) Thorax:

(i) Rib acceleration—Class 1000;

(ii) Spine and pendulum accelerations—Class 180;

(iii) Sternum deflection—Class 600.

(4) Lumbar:

(i) Forces—Class 1000;

(ii) Moments—Class 600;

(iii) Flexion—Class 60 if data channel is used.

(5) Pelvis accelerations—Class 1000.

(6) Femur forces—Class 600.

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

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

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

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

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

[65 FR 2065, Jan. 13, 2000, as amended at 67 FR 47328, July 18, 2002]

FIGURES TO SUBPART N OF PART 572

Figure N 1

HEAD DROP TEST SET-UP SPECIFICATIONS

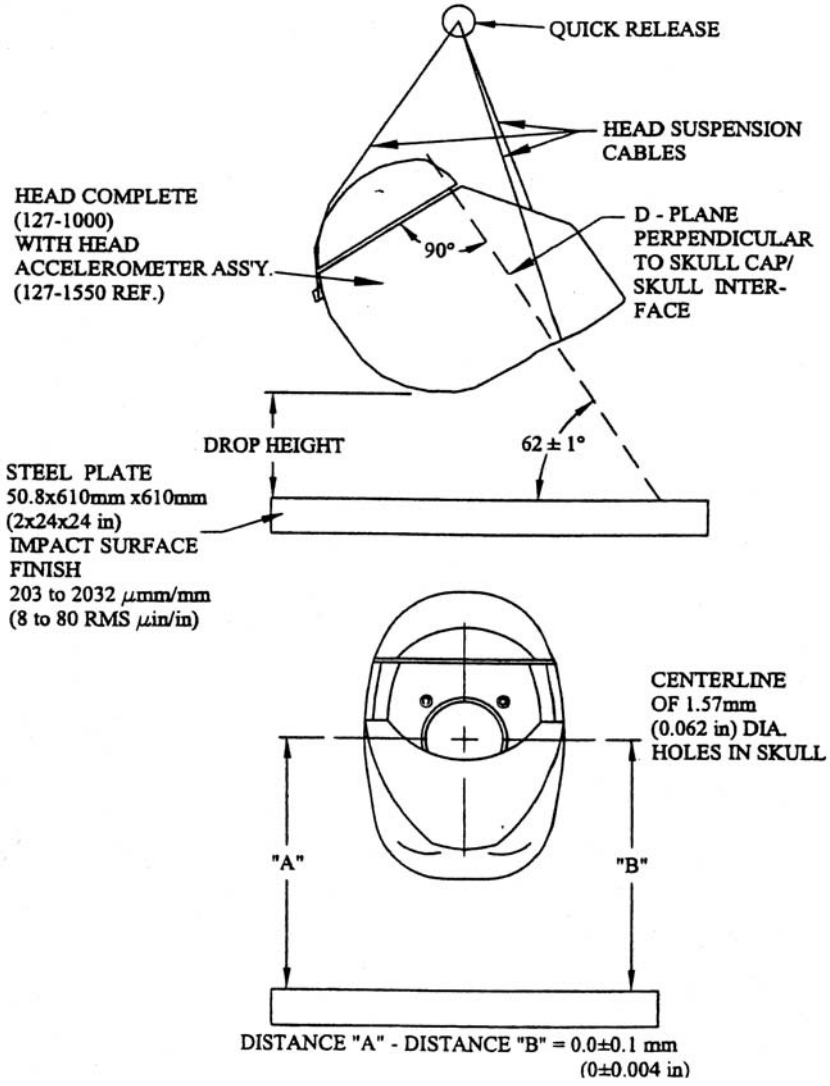
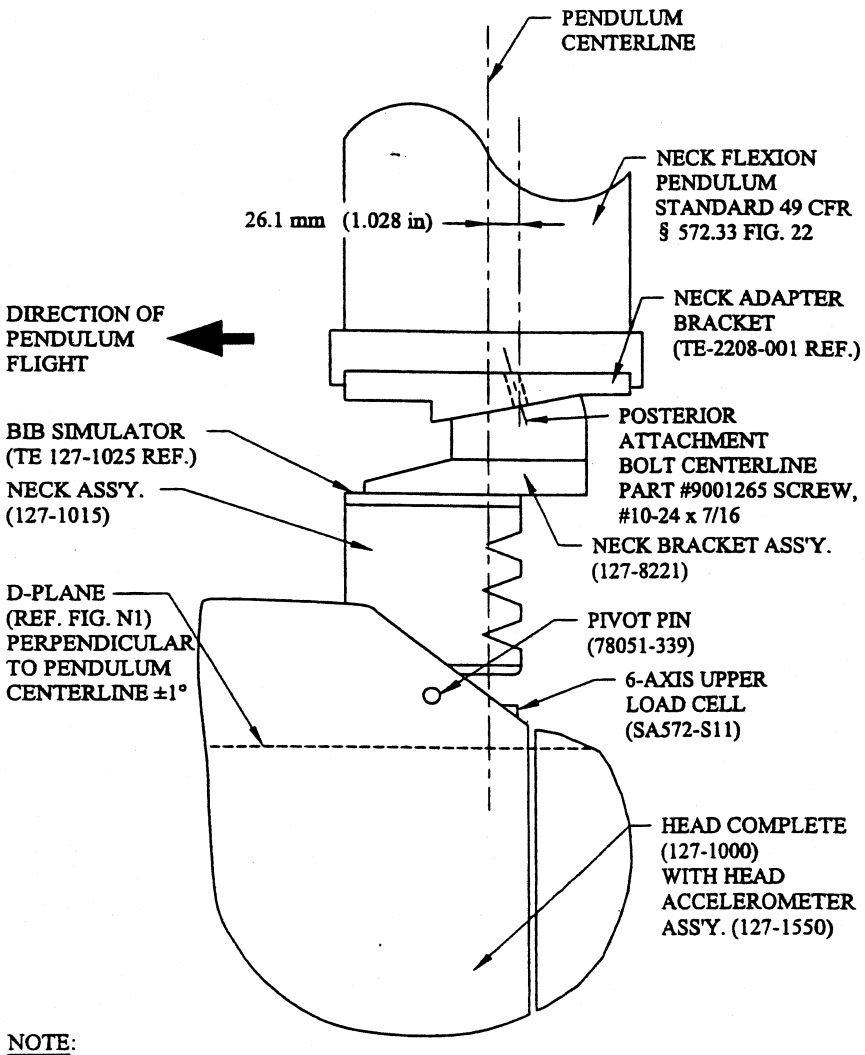


Figure N 2

NECK FLEXION TEST SET-UP SPECIFICATIONS



NOTE:
PENDULUM SHOWN IN VERTICAL ORIENTATION

Figure N 3

NECK EXTENSION TEST SET-UP SPECIFICATIONS

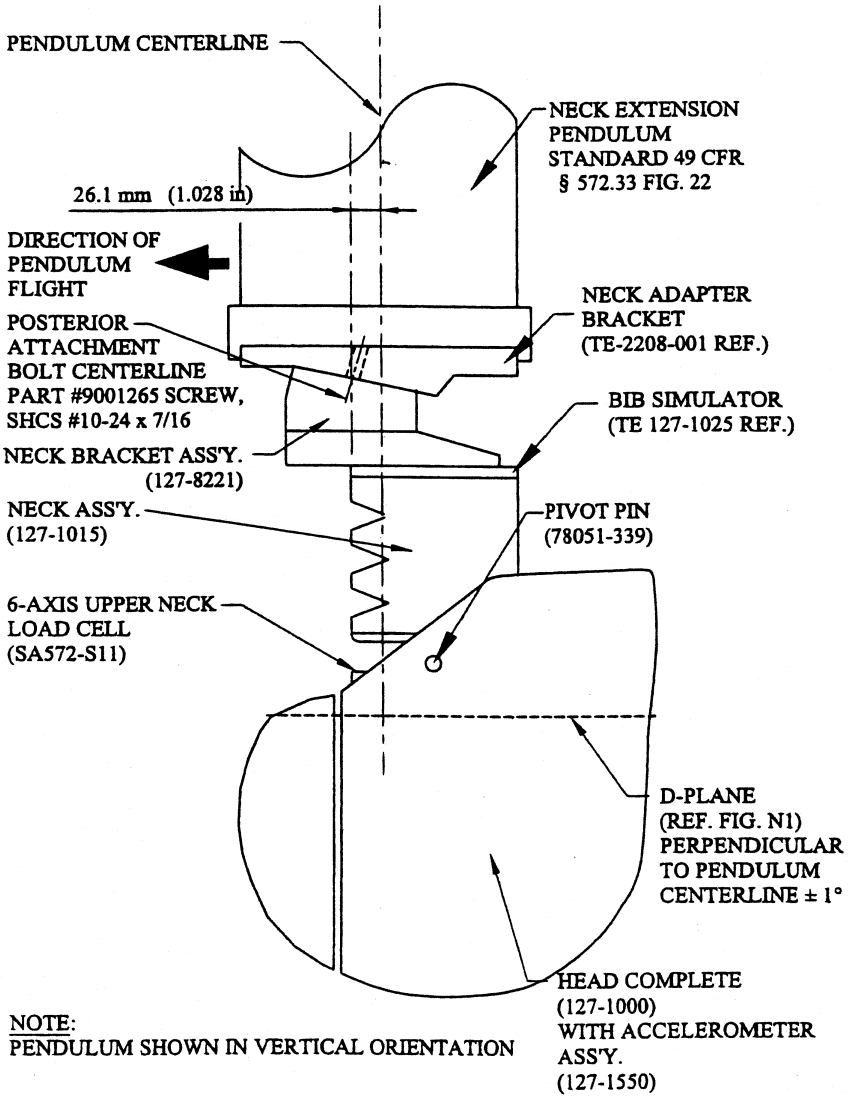
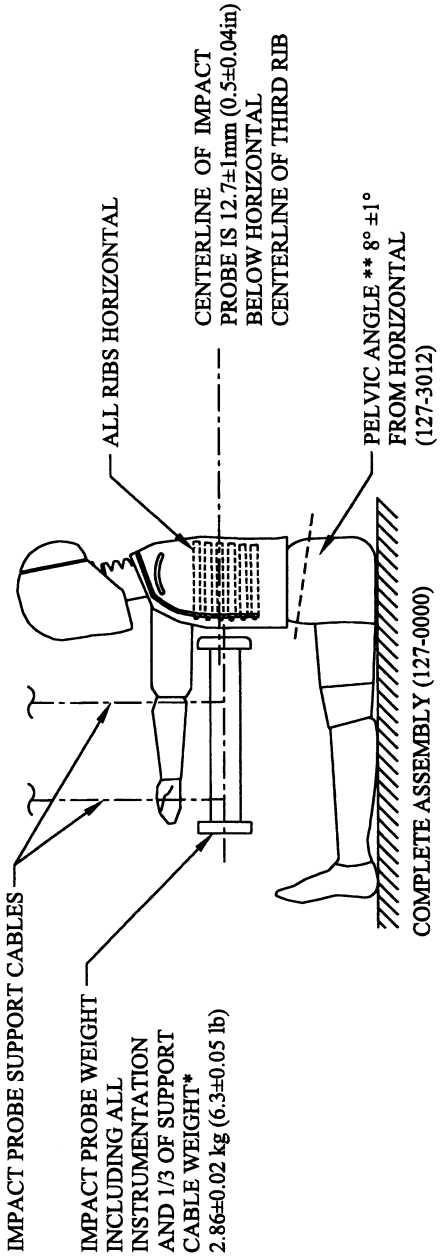


FIGURE N 4

THORAX IMPACT TEST SET-UP SPECIFICATIONS



* 1/3 CABLE WEIGHT NOT TO EXCEED 5% OF THE TOTAL IMPACT PROBE WEIGHT
** PELVIS LUMBAR JOINING SURFACE

FIGURE N 5
TORSO FLEXION TEST SET-UP SPECIFICATIONS

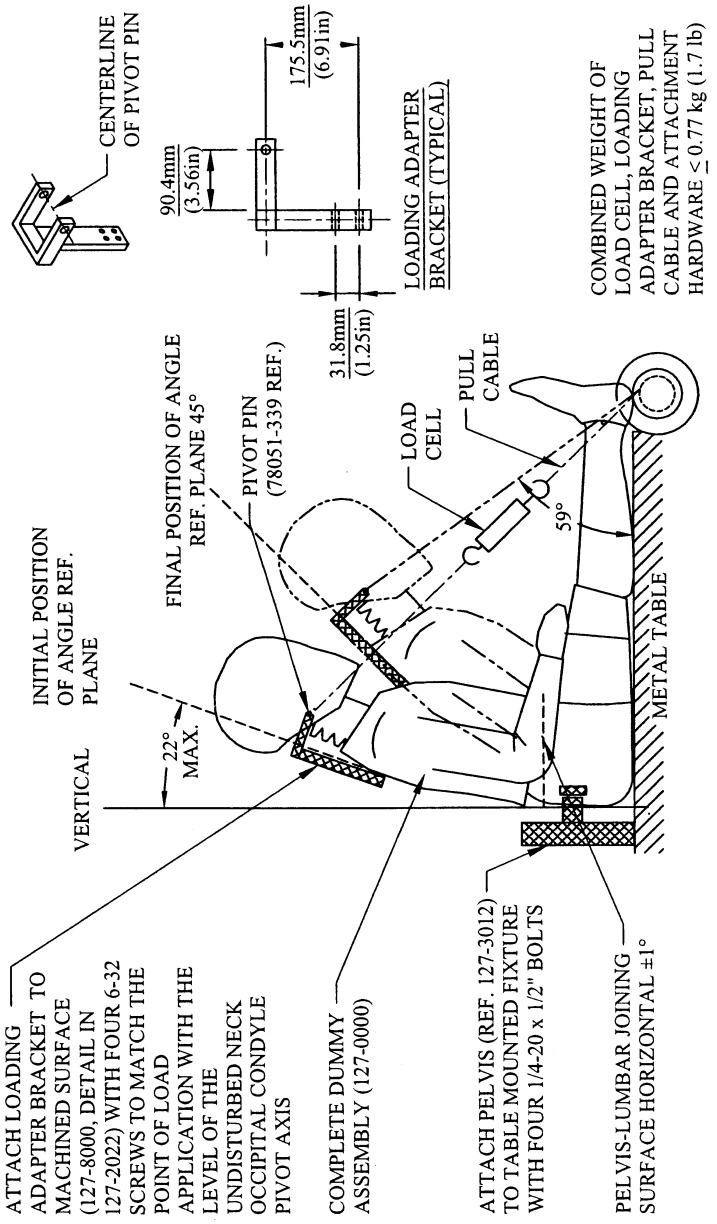
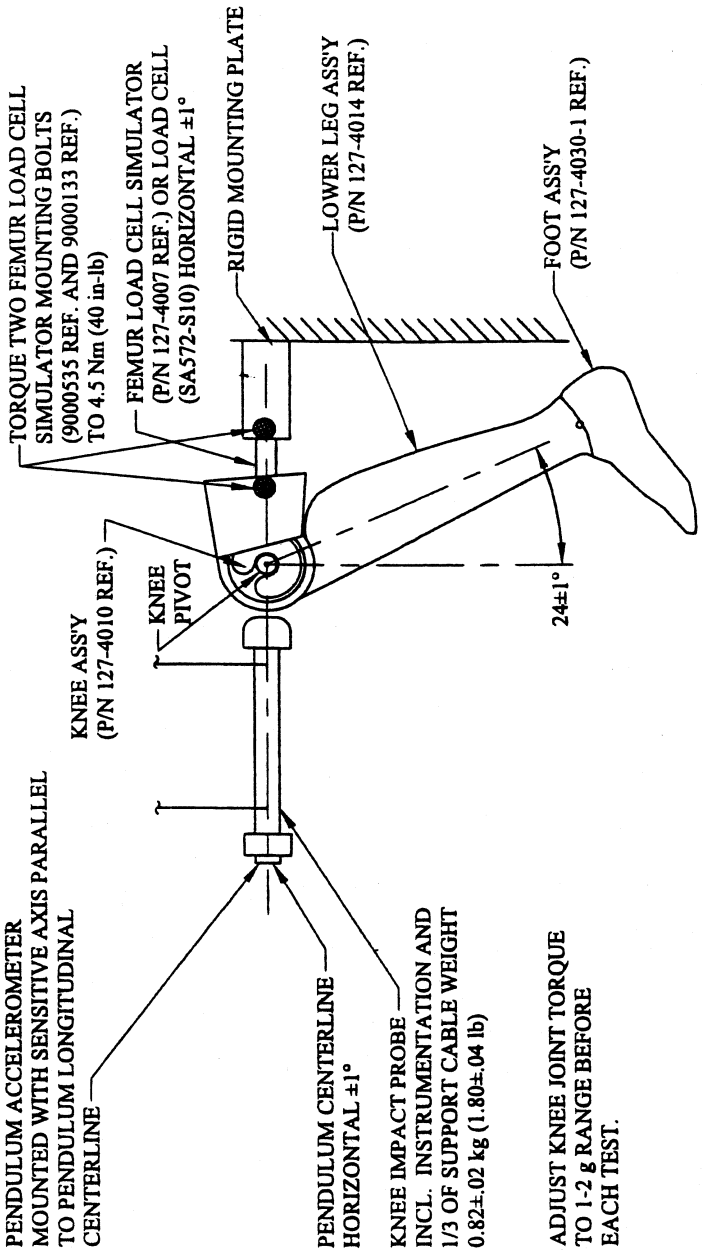


FIGURE N 6
KNEE IMPACT TEST SET-UP SPECIFICATIONS



[65 FR 2065, Jan. 13, 2000, as amended at 67 FR 47329, July 18, 2002; 67 FR 59023, Sept. 19, 2002]