

§572.174 Thorax assembly and test procedure.

(a) The thorax consists of the part of the torso assembly designated as the upper torso (drawing 420-3000) (incorporated by reference, see §572.170).

(b) When the anterior surface of the thorax of a completely assembled dummy (drawing 420-0000) (incorporated by reference, see §572.170) is impacted by a test probe conforming to section 572.177 at 6.00 ± 0.12 m/s (22.0 ± 0.4 ft/s) according to the test procedure in paragraph (c) of this section:

(1) Maximum sternum displacement (compression) relative to the spine, measured with chest deflection transducer (drawing SA572-T4, included in drawing 420-0000) (incorporated by reference, see §572.170), must be not less than 37 mm (1.46 in) and not more than 46 mm (1.81 in). Within this specified compression corridor, the peak force, measured by the impact probe as defined in section 572.177 and calculated in accordance with paragraph (b)(3) of this section, shall not be less than 2.0 kN (450 lbf) and not more than 2.45 kN (551 lbf). The peak force after 20 mm (0.79 in.) of sternum displacement but before reaching the minimum required 37 mm (1.46 in.) sternum displacement limit shall not exceed 2.52 kN (567 lbf).

(2) The internal hysteresis of the ribcage in each impact as determined by the plot of force vs. deflection in paragraph (a)(1) of this section 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.

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

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

(1) 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 shall not exceed 0.14 kg (0.30 lb) each.

(2) Torque the lumbar cable (drawing 420-4130) (incorporated by reference, see

§572.170) 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.

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

(4) Seat and orient the dummy on a seating surface without back support as shown in Figure T4, with the limbs extended horizontally and forward, parallel to the midsagittal plane, the midsagittal plane vertical within ± 1 degree and the ribs level in the anterior-posterior and lateral directions within ± 0.5 degrees.

(5) 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.

(6) 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.

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

(8) 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.

§572.175 Upper and lower torso assemblies and torso flexion test procedure.

(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) (all incorporated by reference, see §572.170).

(b) When the upper torso assembly of a seated dummy is subjected to a force continuously applied at the head to