

the pendulum (see Figure V2-C in Appendix A to this subpart) occurring between 50 and 70 ms from time zero;

(3) Peak occipital condyle moment shall not be higher than -36 Nm and not lower than -44 Nm. The moment measured by the upper neck load cell (Mx) shall be adjusted by the following formula:  $Mx(oc)^1 = Mx + 0.01778Fy$ ;

(4) The decaying moment shall cross the 0 Nm line after peak moment between 102 ms-126 ms after time zero.

**§ 572.194 Shoulder.**

(a) The shoulder structure is part of the upper torso assembly shown in drawing 180-3000. For the shoulder impact test, the dummy is tested as a complete assembly (drawing 180-0000). The dummy is equipped with T1 laterally oriented accelerometer as specified in 49 CFR 572.200(d), and deflection potentiometer as specified in 180-3881 configured for shoulder and installed as shown in drawing 180-0000 sheet 2 of 5. When subjected to the test procedure as specified in paragraph (b) of this section, the shoulder shall meet the performance requirements of paragraph (c) of this section.

(b) *Test procedure.* (1) Soak the dummy assembly (180-0000) in a test environment as specified in 49 CFR 572.200(j).

(2) Seat the dummy, outfitted with the torso jacket (180-3450) and cotton underwear pants on a certification bench, specified in Figure V3 in Appendix A to this subpart, the seat pan and the seatback surfaces of which are covered with a 2 mm thick PTFE (Teflon) sheet;

(3) Align the outermost portion of the pelvis flesh of the impacted side of the seated dummy tangent to a vertical plane located within 10 mm of the side edge of the bench as shown in Figure V4-A in Appendix A to this subpart, while the midsagittal plane of the dummy is in vertical orientation.

(4) Push the dummy at the knees and at mid-sternum of the upper torso with just sufficient horizontally oriented force towards the seat back until the

back of the upper torso is in contact with the seat back.

(5) While maintaining the dummy's position as specified in paragraphs (b)(3) and (4) of this section, the top of the shoulder rib mount (drawing 180-3352) orientation in the fore-and-aft direction is  $24.6 \pm 2.0$  degrees relative to horizontal, as shown in Figure V4-B in Appendix A to this subpart.

(6) Adjust orientation of the legs such that they are symmetrical about the mid-sagittal plane, the thighs touch the seat pan, the inner part of the right and left legs at the knees are as close as possible to each other, the heels touch the designated foot support surface and the feet are vertical and as close together as possible.

(7) Orient the arm to point forward at 90 degrees relative to the interior-superior orientation of the upper torso spine box incline.

(8) The impactor is specified in 49 CFR 572.200(a).

(9) The impactor is guided, if needed, so that at contact with the dummy's arm rotation centerline (ref. item 23 in drawing 180-3000) the impactor's longitudinal axis is within  $\pm 1$  degree of a horizontal plane and perpendicular to the midsagittal plane of the dummy. The centerpoint of the impactor face at contact is within 2 mm of the shoulder yoke assembly rotation centerline (drawing 180-3327), as shown in Figure V4-A in Appendix A to this subpart.

(10) The dummy's arm-shoulder is impacted at  $4.4 \pm 0.1$  m/s with the impactor meeting the alignment and contact point requirements of paragraph (b)(9) of this section.

*(c) Performance criteria.*

(1) While the impactor is in contact with the dummy's arm, the shoulder shall compress not less than 30 mm and not more than 37 mm measured by the potentiometer specified in (a);

(2) Peak lateral acceleration of the upper spine (T1) shall not be less than 17 g and not more than 19 g;

(3) Peak impactor acceleration shall be not less than 14 g and not more than 18 g.

**§ 572.195 Thorax with arm.**

(a) The thorax is part of the upper torso assembly shown in drawing 180-3000. For the thorax with arm impact

<sup>1</sup>Mx(oc) is the moment at occipital condyle (Newton-meters) and Fy is the lateral shear force (Newtons) measured by the load cell.