

§ 572.121 General description.

(a) The Hybrid III type 6-year-old dummy is defined by drawings and specifications containing the following materials:

(1) Technical drawings and specifications package P/N 127-0000, the titles of which are listed in Table A;

(2) Procedures for Assembly, Disassembly, and Inspection (PADI) of the Hybrid III 6-year-old test dummy, Alpha version (August 1999).

TABLE A

Component assembly	Drawing number
Head assembly	127-1000
Neck assembly	127-1015
Upper torso assembly	127-2000
Lower torso assembly	127-3000
Leg assembly	127-4000
Arm assembly	127-5000

(b) Adjacent segments are joined in a manner such that except for contacts existing under static conditions, there is no contact between metallic elements throughout the range of motion or under simulated crash impact conditions.

(c) The structural properties of the dummy are such that the dummy must conform to this Subpart in every respect before use in any test similar to those specified in Standard 208, "Occupant Crash Protection", and Standard 213, "Child Restraint Systems".

§ 572.122 Head assembly and test procedure.

(a) The head assembly for this test consists of the complete head (drawing 127-1000), a six-axis neck transducer (drawing SA572-S11) or its structural replacement (drawing 78051-383X), a head to neck-to-pivot pin (drawing 78051-339), and 3 accelerometers (drawing SA572-S4).

(b) When the head assembly in paragraph (a) of this section is dropped from a height of 376.0 ± 1.0 mm (14.8 ± 0.04 in) in accordance with paragraph (c) of this section, the peak resultant acceleration at the location of the accelerometers at the head CG may not be less than 245 G or more than 300 G. The resultant acceleration vs. time history curve shall be unimodal; oscillations occurring after the main pulse

must be less than 10 percent of the peak resultant acceleration. The lateral acceleration shall not exceed 15 g's (zero to peak).

(c) *Head test procedure.* The test procedure for the head is as follows:

(1) Soak the head assembly in a controlled environment at any temperature between 18.9 and 25.6 °C (66 and 78 °F) and a relative humidity from 10 to 70 percent for at least four hours prior to a test.

(2) Prior to the test, clean the impact surface of the skin and the impact plate surface with isopropyl alcohol, trichloroethane, or an equivalent. The skin of the head must be clean and dry for testing.

(3) Suspend the head assembly as shown in Figure N1. The lowest point on the forehead must be 376.0 ± 1.0 mm (14.8 ± 0.04 in) from the impact surface and the head must be oriented to an incline of 62 ± 1 deg. between the "D" plane as shown in Figure N1 and the plane of the impact surface. The 1.57 mm (0.062 in) diameter holes located on either side of the dummy's head shall be used to ensure that the head is level with respect to the impact surface.

(4) Drop the head assembly from the specified height by means that ensure a smooth, instant release onto a rigidly supported flat horizontal steel plate which is 50.8 mm (2 in) thick and 610 mm (24 in) square. The impact surface shall be clean, dry and have a micro finish of not less than 203.2×10^{-6} mm (8 micro inches) (RMS) and not more than 2032.0×10^{-6} mm (80 micro inches) (RMS).

(5) Allow at least 2 hours between successive tests on the same head.

§ 572.123 Neck assembly and test procedure.

(a) The neck assembly for the purposes of this test consists of the assembly of components shown in drawing 127-1015.

(b) When the head-neck assembly consisting of the head (drawing 127-1000), neck (drawing 127-1015), pivot pin (drawing 78051-339), bib simulator (drawing TE127-1025), neck bracket assembly (drawing 127-8221), six-axis neck transducer (drawing SA572-S11), neck mounting adaptor (drawing TE-2208-001), and three accelerometers (drawing

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SA572–S4) installed in the head assembly as specified in §572.122, is tested according to the test procedure in paragraph (c) of this section, it shall have the following characteristics:

(1) *Flexion.* (i) Plane D, referenced in Figure N2, shall rotate in the direction of preimpact flight with respect to the pendulum’s longitudinal centerline between 74 degrees and 92 degrees. Within this specified rotation corridor, the peak moment about the occipital condyles shall be not less than 27 N-m (19.9 ft-lbf) and not more than 33 N-m (24.3 ft-lbf).

(ii) The positive moment shall decay for the first time to 5 N-m (3.7 ft-lbf) between 103 ms and 123 ms.

(iii) The moment shall be calculated by the following formula: Moment (N-m) = $M_y - (0.01778m) \times (F_x)$.

(iv) M_y is the moment about the y-axis and F_x is the shear force measured by the neck transducer (drawing SA572–S11) and 0.01778m is the distance from force to occipital condyle.

(2) *Extension.* (i) Plane D, referenced in Figure N3, shall rotate in the direction of preimpact flight with respect to the pendulum’s longitudinal centerline between 85 degrees and 103 degrees. Within this specified rotation corridor, the peak moment about the occipital condyles shall be not more than –19 N-m (–14 ft-lbf) and not less than –24 N-m (–17.7ft-lbf).

(ii) The negative moment shall decay for the first time to –5 N-m (–3.7 ft-lbf) between 123 ms and 147 ms.

(iii) The moment shall be calculated by the following formula: Moment (N-m) = $M_y - (0.01778m) \times (F_x)$.

(iv) M_y is the moment about the y-axis and F_x is the shear force measured by the neck transducer (drawing

SA572–S11) and 0.017778m is the distance from force to occipital condyle.

(3) Time-zero is defined as the time of initial contact between the pendulum striker plate and the honeycomb material.

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

(1) Soak the neck assembly 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.

(2) Torque the jam nut (drawing 9000341) on the neck cable (drawing 127–1016) to 0.23 ± 0.02 N-m (2.0 ± 0.2 in-lbs).

(3) Mount the head-neck assembly, defined in paragraph (b) of this section, on the pendulum so the midsagittal plane of the head is vertical and coincides with the plane of motion of the pendulum as shown in Figure N2 for flexion tests and Figure N3 for extension tests.

(4) Release the pendulum and allow it to fall freely from a height to achieve an impact velocity of 4.95 ± 0.12 m/s (16.2 ± 0.4 ft/s) for flexion tests and 4.3 ± 0.12 m/s (14.10 ± 0.40 ft/s) for extension tests, measured by an accelerometer mounted on the pendulum as shown in Figure 22 of 49 CFR 572 at the instant of contact with the honey comb.

(i) Time-zero is defined as the time of initial contact between the pendulum striker plate and the honeycomb material. All data channels should be at the zero level at this time.

(ii) Stop the pendulum from the initial velocity with an acceleration vs. time pulse which meets the velocity change as specified below. Integrate the pendulum acceleration data channel to obtain the velocity vs. time curve:

TABLE B

Time ms	Pendulum pulse			
	Flexion		Extension	
	m/s	ft/s	m/s	ft/s
10	1.2–1.6	3.9–5.3	1.0–1.4	3.3–4.6
20	2.4–3.4	7.9–11.2	2.2–3.0	7.2–9.8
30	3.8–5.0	12.5–16.4	3.2–4.2	10.5–13.8