

specified for the H-III6C dummy. Since these results were based upon only one dummy, the agency has tentatively concluded that it should retain the 38–46 mm chest deflection specification.

The peak pendulum force responses in the weighted dummy's thoracic deflection range of 38–46 mm met the specifications for the H-III6C dummy in all tests. However, the average response was close to the upper limit of the specified corridor. Accordingly, the data suggest that, to assure better centering of the response specification, the H-III6C dummy corridor be changed from 1150–1380 N to 1225–1455 N for the weighted dummy.

The H-III6C specifications also require that the peak pendulum force during the thoracic deflection range of 12.5–38 mm not exceed by more than 5 percent the value of the peak force during the deflection range of 38–46 mm. The weighted dummy did not consistently meet this specification during NHTSA's testing. Accordingly, the data suggest that the H-III6C dummy limit be changed from 5 percent to 10 percent for the weighted dummy.

The internal hysteresis responses of the weighted dummy met the specifications for the H-III6C dummy in all tests. Accordingly, the data suggest that the H-III6C dummy specification for internal hysteresis of 65–85 percent be retained for the weighted dummy.

2. Torso Flexion Tests

The agency performed six torso flexion tests with the weighted dummy, two tests prior to and four following a series of six Standard No. 213 sled tests. The test results are detailed in the October 2001 Technical Report noted above. The results indicate that the durability and structural integrity of the

weighted dummy were not compromised by the added weight during the test series. However, the test data indicate that the weighted dummy did not meet the established flexion force corridors for the H-III6C dummy. The agency's torso flexion test responses with the weighted dummy also indicate the following.

The initial average torso setup angle for the weighted dummy in the absence of external support was 31.2 degrees. This is higher than the maximum value of 22 degrees specified for the H-III6C dummy. The additional mass located on the spine box of the weighted dummy is responsible for the increase in the initial torso setup angle. Accordingly, the data suggest that the following specification be added for the weighted dummy torso flexion test:

Remove the external support and wait two minutes. Measure the initial orientation of the Torso reference plane of the seated dummy as shown in Figure S2. This initial torso orientation angle may not exceed 32 degrees.

The agency also notes that the initial torso angle exhibited very good repeatability, with a coefficient of variation (CV) of 4.1 percent.

The weighted dummy torso in 45-degree flexion tests yielded an average resistance force of 103 N (23.2 lbf) with a standard deviation of 4 N (0.9 lbf). This is significantly lower than the resistance force of 173.5 ± 26.5 N (39 ± 6 lbf) specified for the H-III6C dummy. Accordingly, the data suggest that the H-III6C dummy resistance force specification be changed from 173.5 ± 26.5 N (39 ± 6 lbf) to 105 ± 20 N (23 ± 4.5 lbf) for the weighted dummy.⁷ The agency also notes that the weighted dummy exhibited very good repeatability of resistance force in the

flexion tests, yielding a CV of 3.8 percent.

The H-III6C dummy specifications require the torso to return within 8 degrees of the initial torso position upon removal of the flexion force. The weighted dummy met this specification in all tests. Accordingly, the data suggest that this specification be retained for the weighted dummy.

3. Sled Tests

The agency conducted HYGE sled tests using the Standard No. 213 pulse (24 G, 30 mph). The sled buck was equipped with a Standard No. 213 bench seat. The H-III6C and weighted dummies were seated side by side in Century Breverra Metro booster seats and restrained with 1999 Pontiac Grand Am rear seat lap/shoulder belts for all the sled tests. No shoulder belt routing clips or top tethers were used with any of the booster seats. To determine possible variability that may occur with shoulder belt retractors, the agency performed three tests with each dummy in the Century Breverra Metro restraint system both with and without the shoulder belt retractors.

The response data of the H-III6C and weighted dummies are summarized in the table below. The CV for most of the measurements listed indicates relatively comparable responses for the two dummies. Differences, such as higher chest deflection and higher belt loading for the weighted dummy, can be explained by the weighted dummy's increased mass. The shapes of the response curves, found in the October 2001 Technical Report, reflect reasonably comparable tracking of the loading responses vs. time for the same dummy seating and restraint configuration.

H-III6C AND WEIGHTED DUMMIES' RESPONSES IN BOOSTER SEATS

	Century Breverra Metro without shoulder belt retractor		Century Breverra Metro with shoulder belt retractor	
	H-III6C dummy	Weighted dummy	H-III6C dummy	Weighted dummy
HIC 15:				
Average	241	177	303	261
Percent CV	5.2	9.5	4.9	4.6
HIC Unlimited:				
Average	657	554	733	695
Percent CV	7.6	4.5	4.4	7.3
Nij:				
Average	1.01	0.83	0.93	0.93
Percent CV	10.9	8.6	7.5	5.9
Neck Peak Tension (N):				
Average	2,455	1,858	2,281	2,276
Percent CV	22.4	13.0	7.9	15.9

⁷ Since NHTSA had to base this proposed performance range specification on data from only a single dummy, the agency used 5 standard

deviations to calculate the upper and lower limits. The agency believes that this range is comparable to that for the H-III6C and will be sufficient to

accommodate the flexion responses from other dummy tests in the future.