

U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
LABORATORY TEST PROCEDURE

FOR

FMVSS 208, Occupant Crash Protection

FMVSS 212, Windshield Mounting

FMVSS 219, Windshield Zone Intrusion

FMVSS 301F, Fuel System Integrity – Frontal



ENFORCEMENT  
**Office of Vehicle Safety Compliance**  
**Room 6111, NVS-220**  
**400 Seventh Street, SW**  
Washington, DC 20590

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# REVISION CONTROL LOG FOR OVSC LABORATORY TEST PROCEDURES

## TP-208 Occupant Crash Protection

TEST PROCEDURE		FMVSS 208		DESCRIPTION
REV. No.	DATE	AMENDMENT	EFFECTIVE DATE	
00				
01				
02				
03				
04				
05	07/10/81			
06	05/15/87			
07	02/15/88			
08	09/08/89			
09	03/15/93			Major Revision
10	01/15/98			Minor changes to procedure. New data sheets, revised data sheets, hip flexion dummy calibration, and removal of Hybrid II dummy
11	08/22/02	CFR revised Fed. Reg. Notice	10/1/2000 12/18/2001	Major Revision – Advance air bag rules from May 2000 and December 2002
12	01/14/03	FR notices <sup>1</sup>		Major revisions to data sheets based on testing experience plus corrections to dummy calibration appendices

1. FR/Vol. 66, No. 169, 45777, 8/30/2001, FR/Vol. 66, No. 240, 64368, 12/13/2001, FR/Vol. 67, No. 135, 46400, 7/15/2002, FR/Vol. 67, No. 138, 47321, 7/18/2002, FR/Vol. 67, No. 182, 59020, 9/19/2002, FR/Vol. 68, No. 3, 504, 1/6/2003

TEST PROCEDURE		FMVSS 208		DESCRIPTION
REV. No.	DATE	AMENDMENT	EFFECTIVE DATE	
13	07/27/05	FR notices <sup>2</sup>		Major revisions to data sheets based on testing experience and reg. changes

2. FR/Vol. 68, No. 161, 50077, 8/20/2003; FR/Vol. 68, No. 223, 65179, 11/19/2003; FR/Vol. 69, No.106, 31034, 06.02.2004; FR/Vol. 69, No. 161, 51598, 8/20/2004.

## 1. PURPOSE AND APPLICATION

The Office of Vehicle Safety Compliance (OVSC) provides contractor laboratories with Laboratory Test Procedures as guidelines for obtaining compliance test data. The data are used to determine if a specific vehicle or item of motor vehicle equipment meets the minimum performance requirements of the subject Federal Motor Vehicle Safety Standard (FMVSS). The purpose of the OVSC Laboratory Test Procedures is to present a uniform testing and data recording format, and provide suggestions for the use of specific equipment and procedures. If any contractor views any part of an OVSC Laboratory Test Procedure to be in conflict with a Federal Motor Vehicle Safety Standard (FMVSS) or observes deficiencies in a Laboratory Test Procedure, the contractor is required to advise the Contracting Officer's Technical Representative (COTR) and resolve the discrepancy prior to the start of compliance testing.

Every contractor is required to submit a detailed test procedure to the COTR before initiating the compliance test program. The procedure must include a step-by-step description of the methodology to be used. The contractor's test procedure shall contain a complete listing of test equipment with make and model number and a detailed check-off sheet. The list of test equipment shall include instrument accuracy and calibration dates. All equipment shall be calibrated in accordance with the manufacturer's instructions. There shall be no contradictions between the Laboratory Test Procedure and the contractor's in-house test procedure. Written approval of the in-house test procedures shall be obtained from the COTR before initiating the compliance test program. The OVSC Laboratory Test Procedures are not intended to limit or restrain a contractor from developing or utilizing any testing techniques or equipment which will assist in procuring the required compliance test data. These Laboratory Test Procedures do not constitute an endorsement or recommendation for use of any product or method. However, the application of any such testing technique or equipment is subject to prior approval of the COTR.

**NOTE:** The OVSC Laboratory Test Procedures, prepared for the limited purpose of use by independent laboratories under contract to conduct compliance tests for the OVSC, are not rules, regulations or NHTSA interpretations regarding the meaning of a FMVSS. The Laboratory Test Procedures are not intended to limit the requirements of the applicable FMVSS(s). In some cases, the OVSC Laboratory Test Procedures do not include all of the various FMVSS minimum performance requirements. Recognizing applicable test tolerances, the Laboratory Test Procedures may specify test conditions that are less severe than the minimum requirements of the standard. In addition, the Laboratory Test Procedures may be modified by the OVSC at any time without notice, and the COTR may direct or authorize contractors to deviate from these procedures, as long as the tests are performed in a manner consistent with the standard itself and within the scope of the contract. Laboratory Test Procedures may not be relied upon to create any right or benefit in any person. Therefore, compliance of a vehicle or item of motor vehicle equipment is not necessarily guaranteed if the manufacturer limits its certification tests to those described in the OVSC Laboratory Test Procedures.

## 2. GENERAL REQUIREMENTS

### 2.1 FMVSS 208

This standard establishes performance requirements used to determine whether a vehicle meets the conditions, requirements, and injury criteria specified in S4, General requirements, S14, Advanced air bag requirements, and whether seat belt systems meet the applicable requirements of S7, Seat belt assembly requirements.

Passenger cars, trucks, and multipurpose passenger vehicles, with GVWR of 3,855 kilograms (8,500 lb) or less and an unloaded vehicle weight of 2,495 kilograms (5,500 lb) or less, must have frontal/angular protection in the front outboard seat positions with air bags and lap/shoulder belts. Lap/shoulder belts are required in each rear outboard seating position. Lap belts must meet the minimum requirement for the front and rear center-seating positions.

Occupant crash protection requirements are specified in terms of head and chest accelerations, chest displacement, neck forces and moments, and upper leg axial forces measured on laboratory calibrated Part 572 dummies in barrier impact collisions and applicable low risk deployment tests. When applicable, passenger air bag system suppression must be demonstrated for child dummies or human children and passenger air bag system reactivation must occur with 5<sup>th</sup> percentile female dummies or humans of a similar size.

2. GENERAL REQUIREMENTS....Continued

TABLE 1  
OCCUPANT CRASH PROTECTION INJURY CRITERIA

Injury Criteria	Dummies							
	50 <sup>th</sup> male certified to S5.1.1(a) 0-48 kmph belted, & S5.1.2(a)(1) 0-48 kmph unbelted <sup>1</sup>	50 <sup>th</sup> male certified to S13 (unbelted sled) <sup>1</sup>	50 <sup>th</sup> male certified to S5.1.1(b)(1) 0-48 kmph belted, & S5.1.1(b)(2)0-56 kmph belted, & S5.1.2(a)(2), S5.1.2(b) 32-40 kmph unbelted <sup>1</sup>	5 <sup>th</sup> female barrier S16.1(a) 0-48 kmph belted S16.1(b) 32-40 kmph unbelted, & S18.1 offset 0-40 kmph belted <sup>1</sup>	5 <sup>th</sup> female low risk deployment S25.3 <sup>2</sup>	12-month –old low risk deployment S20.4 <sup>3</sup>	3-year-old low risk deployment S22.4 <sup>4</sup>	6-year-old low risk deployment S24.4 <sup>4</sup>
HIC 36	1000 S6.2(a)(2)	1000 S6.2(a)(2)	N/A	N/A	N/A	N/A	N/A	N/A
HIC 15	N/A	N/A	700 S6.2(b)(2)	700 S15.3.2(b)	700 S15.3.2(b)	390 S19.4.2(a)	570 S21.5.2(b)	700 S23.5.2(b)
Nij	N/A	N/A	1.0 (Critical Values 6806 N tens. 6160 N comp. 310 Nm flex. 135 Nm ext.) S6.6(a)	1.0 (Critical Values 4287 N tens. 3880 N comp. 155 Nm flex. 67 Nm ext.) S15.3.6(a)	1.0 (Critical Values 3880 N tens. 3880 N comp. 155 Nm flex. 61 Nm ext.) S25.4(a)	1.0 (Critical Values 1460 N tens. 1460 N comp. 43 Nm flex. 17 Nm ext.) S19.4.4(a)	1.0 (Critical Values 2120 N tens. 2120 N comp. 68 Nm flex. 27 Nm ext.) S21.5.5	1.0 (Critical Values 2800 N tens. 2800 N comp. 93 Nm flex. 37 Nm ext.) S23.5.5(a)
Neck Extension	N/A	57 Nm S13.2(b)	N/A	N/A	N/A	N/A	N/A	N/A
Neck Flexion	N/A	190 Nm S13.2.(a)	N/A	N/A	N/A	N/A	N/A	N/A
Neck Tension	N/A	3300 N S13.2(c)	4170 N S6.6(b)	2620 N S15.3.6(b)	2070 S25.4(b)	780 N S19.4.4(b)	1130 N S21.5.5(b)	1490 N S23.5.5(b)
Neck Compress.	N/A	4000 N S13.2(d)	4000 N S6.6(c)	2520 N S15.3.6(c)	2520 S25.4(c)	960 N S19.4.4(c)	1380 N S21.5.5(c)	1820 N S23.5.5(c)
Neck Fore-Aft Shear	N/A	3100 N S13.2(e)	N/A	N/A	N/A	N/A	N/A	N/A
Chest g	60 g S6.3	60 g S6.3	60 g S6.3	60 g S15.3.3	60 g S15.3.3	50 g S19.4.3	55 g S21.5.3	60 g S23.5.3
Chest Compress.	76 mm S6.4(a)	76 mm S6.4(a)	63 mm S6.4(b)	52 mm S15.3.4	52 mm S15.3.4	N/A	34 mm S21.5.4	40 mm S23.5.4
Femur Load	10000N S6.5	10000 N S6.5	10000 N S6.5	6805 N S15.3.5	6805 N S15.3.5	N/A	N/A	N/A

1. Calculated on data recorded for 300 ms after the vehicle strikes the barrier or from time zero in the sled test. (S4.11(a))
2. Calculated on data recorded for 125 ms after the initiation of the final stage of air bag deployment designed to deploy in any full frontal rigid barrier crash up to 26 km/h. (S4.11(d))
3. Calculated on data recorded for 125 ms after the initiation of the final stage of air bag deployment designed to deploy in any full frontal rigid barrier crash up to 64 km/h. (S4.11(c))
4. Calculated on data recorded for 100 ms after the initial deployment of the air bag. (S4.11(b))



## 2. GENERAL REQUIREMENTS....Continued

**TABLE 2**  
**S7. SEAT BELT ASSEMBLY REQUIREMENTS**

	Passenger Cars			Trucks, MPVs, and Buses		
	Front Outboard	Rear Outboard	Non-Outboard	Front Outboard	Rear Outboard	Non-Outboard
Adjustment S7.1	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(2)	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(2)
Lockability S7.1.1.5	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(2)	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(2)
Movable Anchorage S7.1.2	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(2)	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(2)
Belt Intersection S7.1.3	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(2)	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(2)
Latch Mechanism S7.2	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(2)	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(3)	Yes S4.1.5.1(a)(2)
Seat Belt Warning S7.3	Yes S4.1.5.1(a)(3)	N/A S7.3	N/A S7.3	Yes S4.1.5.1(a)(3)	N/A S7.3	N/A S7.3
Belt Contact Force S7.4.3	<b>NO</b> S7.4 (b)(1)	YES S7.4 (b)(1)	YES S7.4 (b)(1)	YES S7.4 (b)(2)(ii)	YES S7.4 (b)(2)(ii)	YES S7.4 (b)(2)(ii)
Latch Plate Access S7.4.4	<b>NO</b> S7.4(b)(1)	YES S7.4 (b)(1)	YES S7.4 (b)(1)	YES S7.4 (b)(2)(ii)	YES S7.4 (b)(2)(ii)	YES S7.4 (b)(2)(ii)
Retraction S7.4.5	<b>NO</b> S7.4(b)(1)	YES S7.4 (b)(1)	YES S7.4 (b)(1)	YES S7.4 (b)(2)(ii)	YES S7.4 (b)(2)(ii)	YES S7.4 (b)(2)(ii)
Seat Belt Guides and Hardware S7.4.6	<b>NO</b> S7.4(b)(1)	YES S7.4 (b)(1)	YES S7.4 (b)(1)	YES S7.4 (b)(2)(ii)	YES S7.4 (b)(2)(ii)	YES S7.4 (b)(2)(ii)

## 2. GENERAL REQUIREMENTS....Continued

TABLE 3

## S7.1. - Adjustment as shown in Figure 1

LAP BELT FIT	RANGE OF DUMMIES	ADJUSTMENT
Left Front (Driver)	5% Female to 95% Male (S7.1.1.1)	Emergency Locking Retractor (S7.1.1.3)
Center Front	50% 6-Year-Old Child to 95% Male (S7.1.1)	Emergency or Automatic Locking Retractor or Manual Adjusting Device Lap belt shall be lockable for child safety seat (S7.1.1, S7.1.1.2(a) & S7.1.1.5)
Right Front (Passenger)	50% 6-Year-Old Child to 95% Male (S7.1.1)	Emergency Locking Retractor Lap belt shall be lockable for child safety seat(S7.1.1.3 & S7.1.1.5)
Left Rear	50% 6-Year-Old Child to 95% Male (S7.1.1)	Emergency Locking Retractor Lap belt shall be lockable for child safety seat (S7.1.1.3 & S7.1.1.5)
Center Rear	50% 6-Year-Old Child to 95% Male (S7.1.1)	Emergency or Automatic Locking Retractor or Manual Adjusting Device Lap belt shall be lockable for child safety seat (S7.1.1, S7.1.1.2(a) & S7.1.1.5)
Right Rear	50% 6-Year-Old Child to 95% Male (S7.1.1)	Emergency Locking Retractor Lap belt shall be lockable for child safety seat (S7.1.1.3 & S7.1.1.5)
SHOULDER BELT FIT	RANGE OF DUMMIES	ADJUSTMENT
Left Front (Driver)	5% Female to 95% Male (S7.1.1.1)	Emergency Locking Retractor or Manual Adjusting Device (S7.1.1) *
Center Front Type 2 Belt Optional	5% Female to 95% Male (S7.1.1.1)	Emergency Locking Retractor or Manual Adjusting Device (S7.1.1)
Right Front (Passenger)	5% Female to 95% Male (S7.1.1.1)	Emergency Locking Retractor or Manual Adjusting Device (S7.1.1) *
Left Rear	5% Female to 95% Male (S7.1.1.1)	Emergency Locking Retractor or Manual Adjusting Device (S7.1.1)
Center Rear Type 2 Belt Optional	5% Female to 95% Male (S7.1.1.1)	Emergency Locking Retractor or Manual Adjusting Device (S7.1.1)
Right Rear	5% Female to 95% Male (S7.1.1.1)	Emergency Locking Retractor or Manual Adjusting Device (S7.1.1)

**NOTE:** Front seat belt fit data will be obtained with the seat in both the forward most and rearward most positions and the seat back in the manufacturers nominal design riding position. \*Movable anchorages are required for outboard designated seating positions with Type 2 seat belts. (S7.1.2).

## 2. GENERAL REQUIREMENTS....Continued

**TABLE 4**  
**S7.3(a) Warning system for seat belt assembly provided at Driver's position, EITHER S7.3 (a)(1) or S7.3 (a)(2) —**

	S7.3(a)(1)	S7.3(a)(2)	
	Belt unlatched & Key on <sup>(1)</sup>	Belt latched & Key on	Belt unlatched & Key on <sup>(1)</sup>
Warning light <sup>(2)</sup>	60 sec. minimum	4 to 8 sec.	4 to 8 sec.
Audible signal <sup>(3)</sup>	4 to 8 sec.		4 to 8 sec.

(1) At the manufacturer's option, the driver's belt NOT IN USE (unbelted) is defined as either the belt latch mechanism is not fastened or the belt is not extended at least 4 inches from the stowed position.

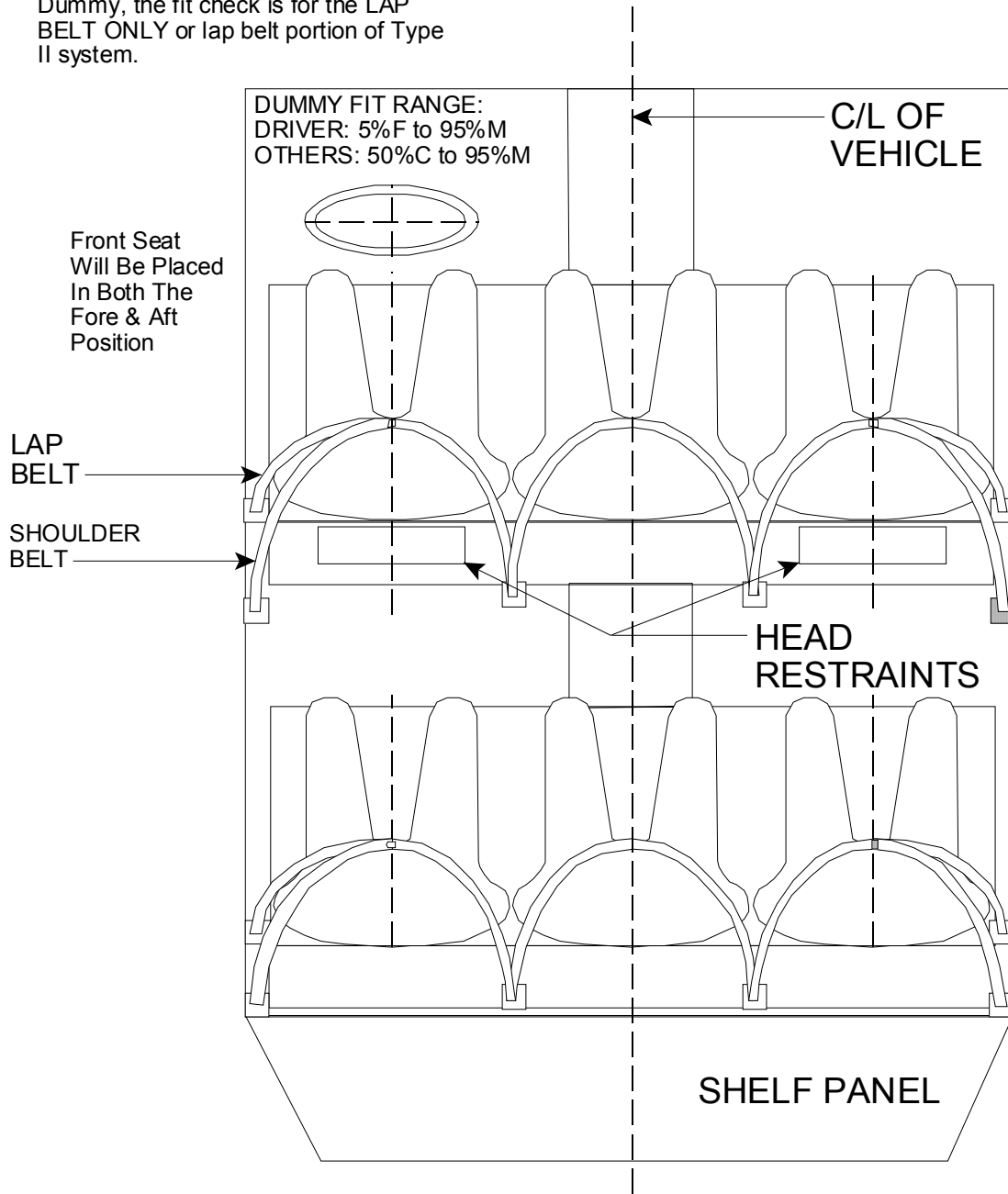
(2) Continuous or flashing warning light visible to the driver consisting of the symbol for the seat belt telltale. Instead of the continuous or flashing warning light, the manufacturer, if permitted by FMVSS 101, may display the words "FASTEN SEAT BELTS" or "FASTEN BELTS".

(3) Continuous or intermittent audible signal. \* 49 USCS @ 30124 does NOT allow an audible signal to operate for more than 8 seconds. A voluntary audible signal after the 4 to 8 second required signal may be provided. It must be differentiated from the required signal (5/25/2001 legal interpretation to Longacre and Associates).

2. GENERAL REQUIREMENTS....Continued

**TYPICAL ARRANGEMENT OF "ACTIVE" SEAT BELTS**

NOTE: For 50%C (6-year old child) Dummy, the fit check is for the LAP BELT ONLY or lap belt portion of Type II system.



TOP VIEW OF VEHICLE INTERIOR

FIGURE 1

## 2. GENERAL REQUIREMENTS....Continued

### 2.2 FMVSS 212, Windshield Mounting

This standard establishes windshield retention requirements for motor vehicles during crashes. After they are subjected to a full frontal (the line of travel of the vehicle is perpendicular to the barrier) barrier impact test at any speed up to and including 48 kmph, vehicles equipped with passive restraints must retain not less than 50 percent of the portion of the windshield periphery on each side of the vehicle longitudinal centerline.

### 2.3 FMVSS 219, Windshield Zone Intrusion -- Partial

This standard specifies limits for the displacement of vehicle components into the windshield area during a frontal barrier impact test at any speed up to and including 48 kmph.

**TABLE 5**

	In "Protected Zone"	Below "Protected Zone"
Vehicle Component Penetration	Maximum of 6 mm into template (571.219 S5)	Must not penetrate inner surface of windshield (571.219 S5)

### 2.4 FMVSS 301

This standard specifies requirements for the integrity of motor vehicle fuel systems in frontal crash tests at speeds up to and including 48 kmph.

#### A. Frontal, Oblique, Lateral, and Rear Impact —

**TABLE 6**

TIME	MAX. FLUID SPILLAGE
From impact until vehicle motion ceases	28 gm (571.301 S5.5)
For 5 minute period after vehicle motion ceases	142 gm (571.301 S5.5)
For the next 25 minutes	28 gm/minute (571.301 S5.5)

## 2. GENERAL REQUIREMENTS....Continued

### B. Static Rollover

**TABLE 7**

<b>TIME</b>	<b>MAX. FLUID SPILLAGE</b>
For 5 minute period from onset of rotation at each 90° position	142 gm (571.301 S5.6)
For 6th minute	28 gm (571.301 S5.6)
For 7th minute (if required)	28 gm (571.301 S5.6)
For 8th minute (if required)	28 gm (571.301 S5.6)

## 3. SECURITY

The Contractor shall provide appropriate security measures to protect the OVSC test vehicles and other Government Furnished Property (GFP) from unauthorized personnel during the entire compliance-testing program. The Contractor is financially responsible for any acts of theft and/or vandalism, which occur during the storage of test vehicles and GFP. Any security problems, which arise, shall be reported by telephone to the Industrial Property Manager (IPM), Office of Contracts and Procurement, within two working days after the incident. A letter containing specific details of the security problem will be sent to the IPM (with copy to the COTR) within 48 hours.

The Contractor shall protect and segregate the data that evolves from compliance testing before and after each vehicle test. No information concerning the vehicle safety compliance testing program shall be released to anyone except the COTR, unless specifically authorized by the COTR or the COTR's Branch or Division Chief.

**NOTE:** NO INDIVIDUALS, OTHER THAN CONTRACTOR PERSONNEL DIRECTLY INVOLVED IN THE COMPLIANCE TESTING PROGRAM, SHALL BE ALLOWED TO WITNESS ANY VEHICLE COMPLIANCE TEST UNLESS SPECIFICALLY AUTHORIZED BY THE COTR.

## 4. GOOD HOUSEKEEPING

Contractors shall maintain the entire vehicle compliance testing area, dummy calibration laboratory, test fixtures and instrumentation in a neat, clean and painted condition with test instruments arranged in an orderly manner consistent with good test laboratory housekeeping practices.

## 5. TEST SCHEDULING AND MONITORING

The Contractor shall submit a test schedule to the COTR prior to testing. Tests shall be completed as required in the contract. Scheduling shall be adjusted to permit sample motor vehicles to be tested to other FMVSS as may be required by the OVSC. All testing shall be coordinated to allow monitoring by the COTR.

## 6. TEST DATA DISPOSITION

The Contractor shall make all vehicle preliminary compliance test data available to the COTR on location within one hour after the test. Final test data, including digital printouts and computer generated plots shall be available to the COTR within two working days. Additionally, the Contractor shall analyze the preliminary test results as directed by the COTR.

All backup data sheets, strip charts, recordings, plots, technicians notes, etc., shall be either sent to the COTR or destroyed at the conclusion of each delivery order, purchase order, etc.

### TEST DATA LOSS

#### A. INVALID TEST DESCRIPTION

An invalid compliance test is one, which does not conform precisely to all requirements/specifications of the OVSC Laboratory Test Procedure and Statement of Work applicable to the test.

#### B. INVALID TEST NOTIFICATION

The Contractor shall notify NHTSA of any test not meeting all requirements/specifications of the OVSC Laboratory Test Procedure and Statement of Work applicable to the test, by telephone, within 24 hours of the test and send written notice to the COTR within 48 hours of the test completion.

#### C. RETEST NOTIFICATION

The contracting Officer of NHTSA is the only NHTSA official authorized to notify the Contractor that a retest is required. The retest shall be completed within 2 weeks after receipt of notification by the Contracting Officer that a retest is required.

#### D. WAIVER OF RETEST

NHTSA, in its sole discretion, reserves the right to waive the retest requirement. This provision shall not constitute a basis for dispute over the NHTSA's waiving or not waiving any requirement.

#### E. TEST VEHICLE

NHTSA shall furnish only one vehicle for each test ordered. The Contractor shall furnish the test vehicle required for the retest. The retest vehicle shall be equipped as the original vehicle. The original vehicle used in the invalid test shall remain the property of NHTSA, and the retest vehicle shall remain the property of the Contractor. The Contractor shall retain the retest vehicle for a period not exceeding 180 days if it fails the test. If the retest vehicle passes the test, the Contractor may dispose of it upon notification from the COTR that the test report has been accepted.

**6. TEST DATA DISPOSITION....Continued****F. TEST REPORT**

No test report is required for any test that is determined to be invalid unless NHTSA specifically decides, in writing, to require the Contractor to submit such report. The test data from the invalid test must be safeguarded until the data from the retest has been accepted by the COTR. The report and other required deliverables for the retest vehicle are required to be submitted to the COTR within 3 weeks after completion of the retest.

**G. DEFAULT**

The Contractor is subject to the default and subsequent reprocurement costs for nondelivery of valid or conforming test (pursuant to the Termination For Default clause in the contract).

**H. NHTSA'S RIGHTS**

None of the requirements herein stated shall diminish or modify the rights of NHTSA to determine that any test submitted by the Contractor does not conform precisely to all requirements/specifications of the OVSC Laboratory Test Procedure and Statement of Work applicable to the test.

**7. GOVERNMENT FURNISHED PROPERTY (GFP)****ACCEPTANCE OF TEST VEHICLES**

A "REPORT OF VEHICLE CONDITION" form shall be completed by the Contractor when the test vehicle is transferred from the new car dealer or between test contracts. "REPORT OF VEHICLE CONDITION" forms must be returned to the COTR with the copies of the Final Test Report or the reports will NOT be accepted.

**NOTIFICATION OF COTR**

The COTR must be notified within 24 hours after a vehicle has been delivered.

**TEST DUMMIES**

Part 572 test dummies will be furnished to the contract laboratory by the OVSC. The Subpart E (50<sup>th</sup> male), O (5<sup>th</sup> female), and N (6-year old) dummies shall be stored in an upright sitting position with the weight supported by the internal structure of the pelvis. The dummies shall be held upright by using a strap around the chest or the base of the neck so that the neck is not supporting the weight of the dummy. The Subpart P (3-year-old), and R (12-month-old) dummies shall be stored in a hanging position using the bracket and positioning shown in figures 1 and 2. The dummies shall be stored in a secured room, which is kept between 55°F and 85°F and 10-70% relative humidity. The Contractor shall check the dummy components for damage after each crash test or low risk deployment test and complete a Dummy Damage Checklist that will be included with the posttest dummy calibration. The COTR will be kept informed of the dummies



**7. GOVERNMENT FURNISHED PROPERTY (GFP)....Continued**

condition in order that replacement parts can be provided. The Contractor shall calibrate the test dummies before every dynamic test and check the calibration after every dynamic test.

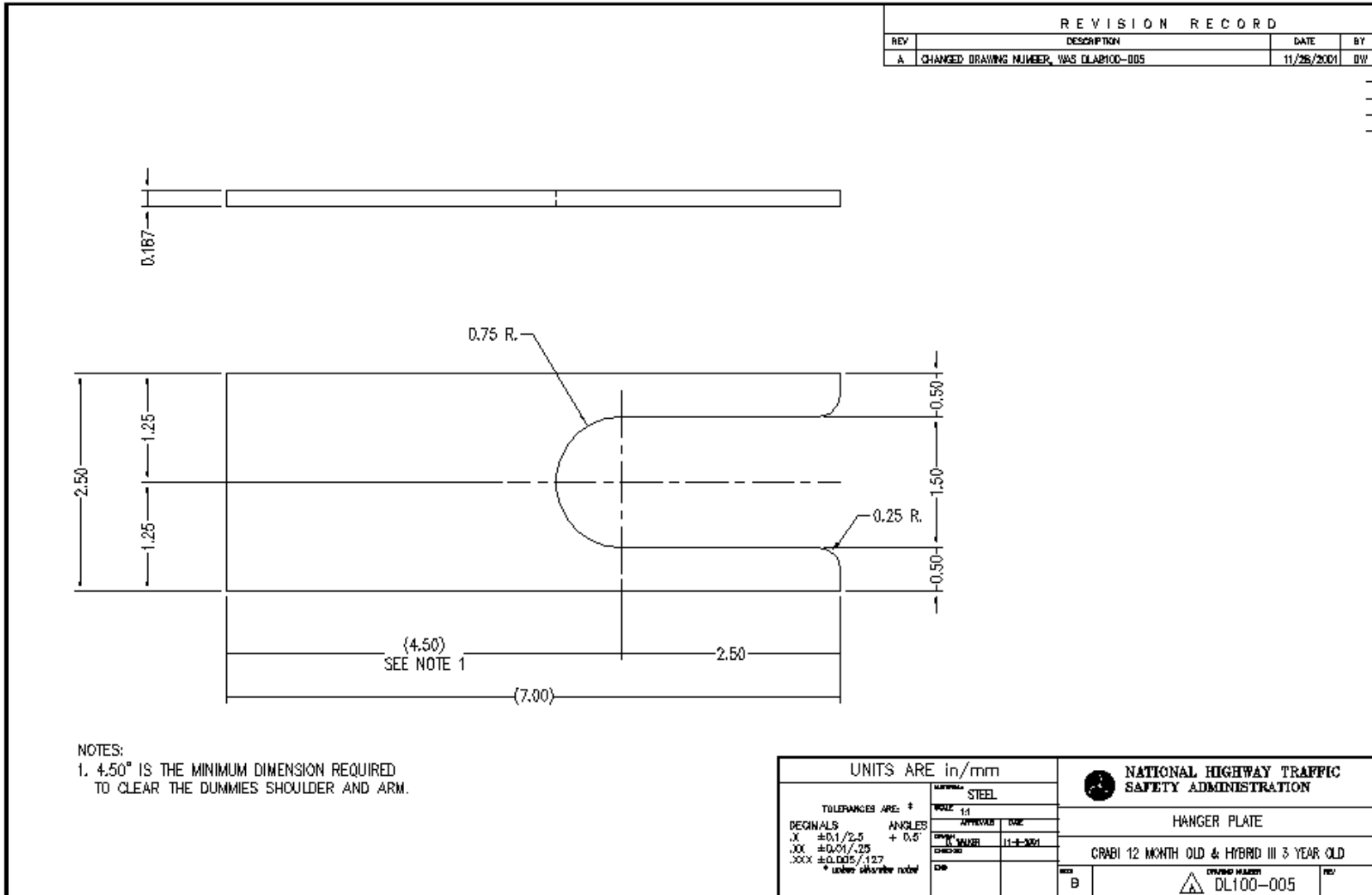


FIGURE 2

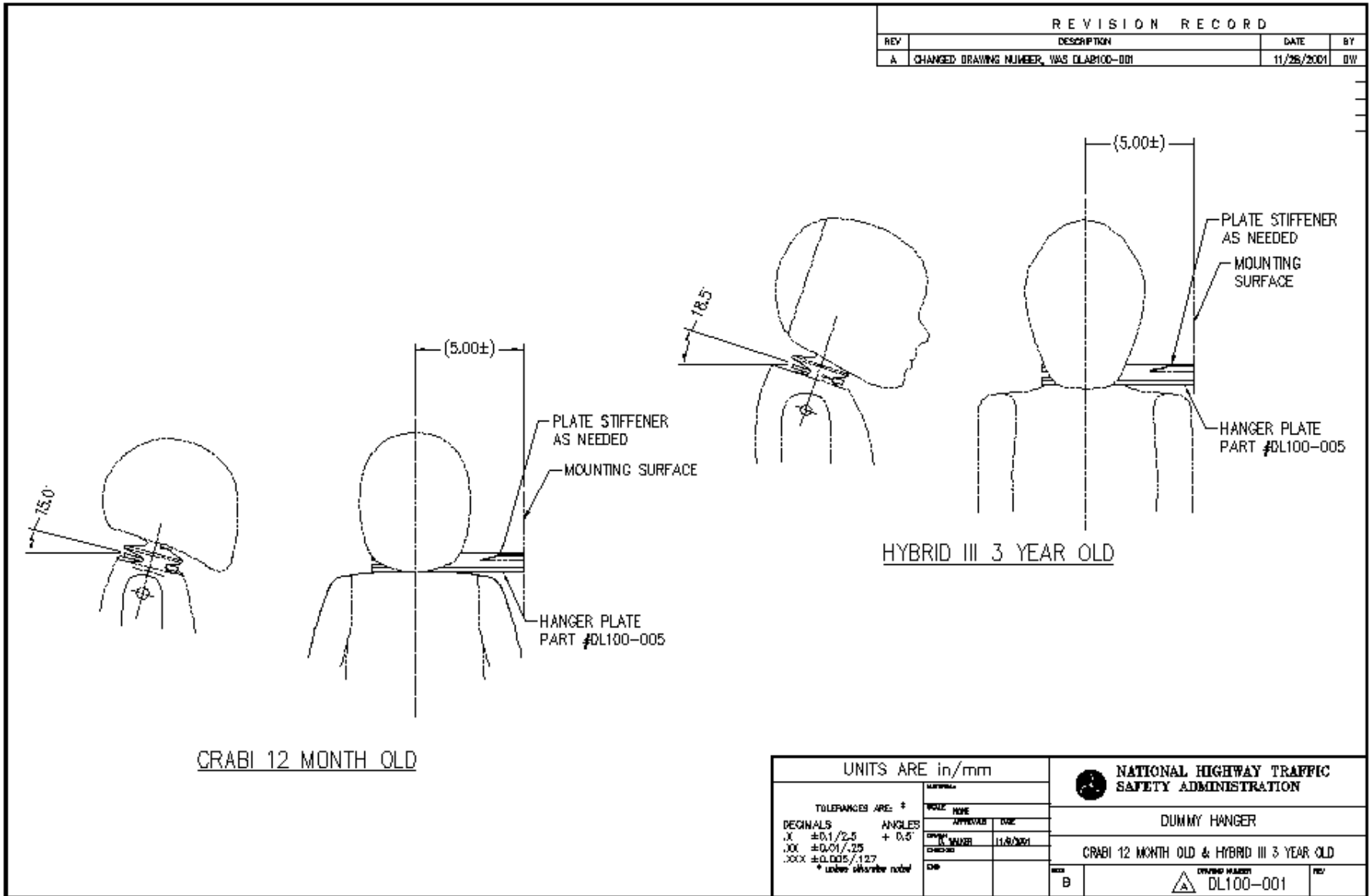


FIGURE 3

## 8. CALIBRATION AND TEST INSTRUMENTATION

Before the Contractor initiates the vehicle safety compliance test program, a test instrumentation calibration system must be implemented and maintained in accordance with established calibration practices. The calibration system shall include the following as a minimum:

- A. Standards for calibrating the measuring and test equipment will be stored and used under appropriate environmental conditions to assure their accuracy and stability.
- B. All measuring instruments and standards shall be calibrated by the Contractor, or a commercial facility, against a higher order standard at periodic intervals not exceeding **12 months for instruments and 12 months for the calibration standards**. Records, showing the calibration traceability to the National Institute of Standards and Technology (NIST), shall be maintained for all measuring and test equipment.

Accelerometers shall be calibrated every twelve months or after a vehicle fails to meet the FMVSS 208 performance requirements or after any indication from calibration checks that there may be a problem with the accelerometer whichever occurs sooner.

- C. All measuring and test equipment and measuring standards will be labeled with the following information:
  - (1) Date of calibration
  - (2) Date of next scheduled calibration
  - (3) Name of the technician who calibrated the equipment
- D. A written calibration procedure shall be provided by the Contractor, which includes as a minimum the following information for all measurement and test equipment:
  - (1) Type of equipment, manufacturer, model number, etc.
  - (2) Measurement range
  - (3) Accuracy
  - (4) Calibration interval
  - (5) Type of standard used to calibrate the equipment (calibration traceability of the standard must be evident)
  - (6) The actual procedures and forms used to perform the calibrations.
- E. Records of calibration for all test instrumentation shall be kept by the Contractor in a manner that assures the maintenance of established calibration schedules.

## 8. CALIBRATION AND TEST INSTRUMENTATION....Continued

- F. All such records shall be readily available for inspection when requested by the COTR. The calibration system will need the acceptance of the COTR before vehicle safety compliance testing commences.
- G. Test equipment shall receive a system functional check out using a known test input immediately before and after the test. This check shall be recorded by the test technician(s) and submitted with the final report.
- H. Anthropomorphic test devices shall be calibrated before and the calibration checked after each crash and low risk deployment test. The calibrations and calibration check shall be submitted with the final report.
- I. The Contractor may be directed by NHTSA to evaluate its data acquisition system. If so directed, the Contractor shall follow the procedures outlined in Appendix K.

Further guidance is provided in the International Standard ISO 10012-1, "Quality Assurance Requirements for Measuring Equipment" and American National Standard ANSI/NCSL Z540-1, "Calibration Laboratories and Measuring and Test Equipment General Requirements."

**NOTE:** In the event of a failure to meet the standard's minimum performance requirements additional calibration checks of some critically sensitive test equipment and instrumentation may be required for verification of accuracy. The necessity for the calibration will be at the COTR's discretion and will be performed without additional cost.

## 9. PHOTOGRAPHIC DOCUMENTATION

The contractor shall document the crash event or low risk deployment by a combination of high-speed color digital cameras and high-speed color 16 mm motion picture cameras or, all high-speed digital cameras. The specifications for "high-speed digital cameras" and "high-speed motion picture cameras" are listed below. At least 2 high-speed digital cameras must be used in the first year of the contract. A minimum of 2 high-speed digital cameras shall replace high-speed film cameras every year thereafter until all the cameras are high-speed digital cameras. When a combination of film and digital cameras are used, the COTR will advise the contractor as to where the digital cameras will be utilized.

High-speed motion picture cameras and high-speed digital cameras shall operate at 1000 frames per second for at least 10 ms before barrier contact or the air bag is fired for low risk deployment and for at least 310 ms after barrier contact or after the air bag is fired for low risk deployment.

Glare or lights showing on any glass area (closed windows or vents) must be minimized so that views of the dummies during the test are visible for film analysis.

Film and digital files shall be on a compact disc as AVI or MPEG files with standard or generally available "codec." Other types of files can be used if approved by the COTR. The film shall be scanned in at a resolution of 1920 x 1035 pixels. Other scanned film

## 9. PHOTOGRAPHIC DOCUMENTATION....Continued

resolutions can be used if approved by the COTR.

The contractor shall report all camera locations along with camera speeds and lens focal lengths on the appropriate final report data sheets. Camera locations will be referenced to the barrier face and monorail centerline with the X, Y, and Z coordinate of the film recorded for each camera.

### High-Speed Motion Pictures

High-speed motion picture cameras shall record on 16 mm color negative film. A timing mark must be registered on the film edge a minimum of every 10 ms and a time zero impact mark must be registered on the film to indicate when contact with the barrier is made in the crash test or when the air bag is fired in a low risk deployment test.

### High-Speed Digital Pictures

The minimum resolution for these cameras shall be 1536 CMOS sensors per every two rows of pixels, with 80% of the horizontal distance of the two rows covered by effective light sensors. There shall be a minimum of 1024 rows of sensors. Some camera views may not need to meet these specifications. Cameras that do not meet these specifications may be used if approved by the COTR.

A time zero impact mark must be registered in a frame to indicate when contact with the barrier is made in the crash test or when the air bag is fired in a low risk deployment test. Each frame shall contain the camera speed and the frame number beginning with the time zero frame labeled as "Frame 0." The frame numbers prior to time zero shall be negative numbers.

### Real Time Camera

The contractor shall use a "real time" color digital or color motion picture camera that operates at 24 frames per second. It shall be used to record pretest and posttest vehicle set-up, the installation of the fuel filler cap onto the filler neck and the rotation of the cap to the installed position, any fluid spillage and its collection after the impact or during static rollover, and to record a side view of the low risk deployment tests and right side of the vehicle or moving barrier as it travels down the tow road and through the impact event. The installation of the filler cap shall appear in the final version of the 16 mm motion picture or as a single motion picture file.

## 9.1 CAMERAS REQUIRED

### 9.1.1 OFFSET AND CRASH TESTS

CAMERA 1 Real-time (24 fps) left side view camera to follow the test vehicle down the tow road, across the photographic pit, and into the barrier face.

CAMERA 2 High-speed left side view camera to cover the vehicle's left side from the barrier face to a point rearward of the vehicle's front seat backs. The centerline of the camera shall be perpendicular to the longitudinal

## 9. PHOTOGRAPHIC DOCUMENTATION....Continued

centerline of the vehicle.

- CAMERA 3 High-speed left side view camera positioned adjacent to the vehicle's A-post to document the driver dummy's head movement during the impact event in the windshield area and windshield zone intrusion area. The centerline of the camera shall be perpendicular to the longitudinal centerline of the vehicle.
- CAMERA 4 High-speed left side view camera positioned adjacent to the vehicle's B-post or center post to document the movement of the driver dummy during the impact event.
- CAMERA 5 High-speed left side view camera positioned adjacent to the vehicle's B-post to document the movement of the vehicle's steering column/wheel assembly relative to the roof targets and the rear sill target during the impact event. (This camera is also used for steering column displacement analysis.) The centerline of the camera shall be perpendicular to the longitudinal centerline of the vehicle.
- CAMERA 6 High-speed left side view camera positioned adjacent to the vehicle's left front door and underneath CAMERA 5 to document the movement of the vehicle's steering column/wheel assembly relative to the roof target and the rear sill targets during the impact event. (This camera is also used for steering column displacement analysis.) The centerline of the camera shall be perpendicular to the longitudinal centerline of the vehicle.
- CAMERA 7 High-speed right side view camera to cover the entire right side of the test vehicle during the impact event. The centerline of the camera shall be perpendicular to the longitudinal centerline of the vehicle.
- CAMERA 8 High-speed right side view camera positioned adjacent to the vehicle's A-post to document the passenger dummy's head movement in the windshield area during the impact event and windshield zone intrusion. The centerline of the camera shall be perpendicular to the longitudinal centerline of the vehicle.
- CAMERA 9 High-speed right side view camera positioned adjacent to the vehicle's B-post (or center) to document the movement of the passenger dummy during the impact event.
- CAMERA 10 High-speed right side view camera positioned adjacent to the vehicle's right front door to document the movement of the passenger dummy during the impact event.
- CAMERA 11 High-speed overhead camera positioned directly above the vehicle's windshield centerline to cover the windshield area during the entire crash event. A polarizing filter may be used to eliminate windshield glare.

**9. PHOTOGRAPHIC DOCUMENTATION....Continued**

CAMERA 12 High-speed front view camera mounted above the barrier face to document the movement of the driver dummy during the impact event and windshield zone intrusion.

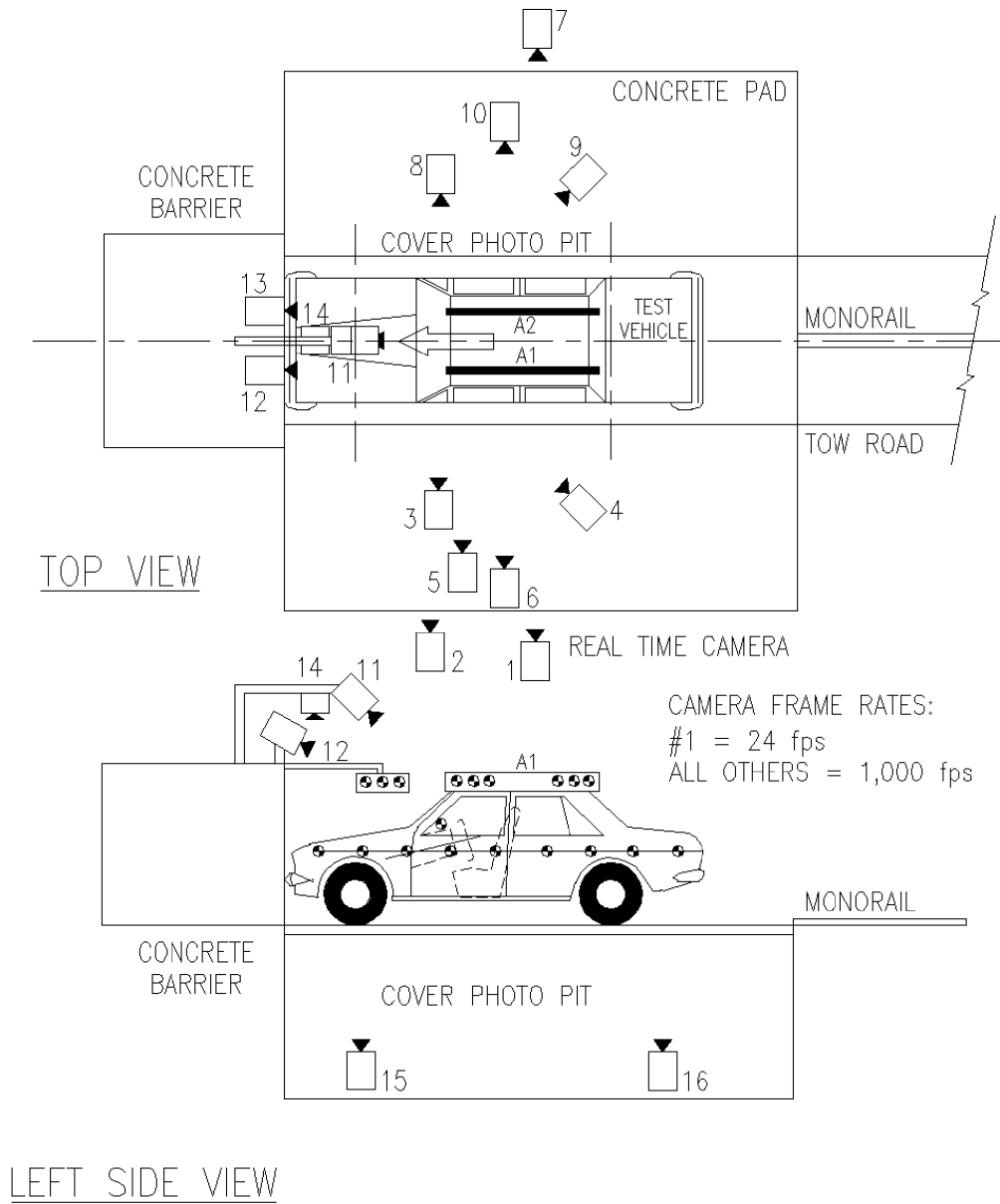
CAMERA 13 High-speed front view camera mounted above the barrier face to document the movement of the passenger dummy during the impact event and windshield zone intrusion.

CAMERA 14 High speed overhead camera positioned directly above the barrier to record the contact of the vehicle with the barrier.

CAMERA 15 High-speed photographic pit camera positioned beneath the vehicle's engine compartment to record the vehicle structural crush and document any Stoddard solvent spillage.

CAMERA 16 High-speed photographic pit camera positioned beneath the vehicle's fuel tank to document any Stoddard solvent spillage.





**CAMERA POSITIONS FOR FRONTAL IMPACTS**

**FIGURE 4**

## 9. PHOTOGRAPHIC DOCUMENTATION....Continued

### 9.1.2 LOW RISK DEPLOYMENT TESTS

- CAMERA 1 The real-time camera (24 fps) shall be used to document the pretest and posttest condition of the test vehicle in addition to the pretest and posttest positions of the test dummy.
- CAMERA 2 High-speed left side view camera positioned perpendicular to the longitudinal centerline of the vehicle in line with the transverse centerline of the seat cushion to capture the movement of the dummy.
- CAMERA 3 High-speed right side view camera positioned perpendicular to the longitudinal centerline of the vehicle in line with the transverse centerline of the seat cushion to capture the movement of the dummy.
- CAMERA 4 High-speed front view camera mounted in the midsagittal plane of the dummy to document the movement of the dummy.

9. PHOTOGRAPHIC DOCUMENTATION....Continued

CAMERA POSITIONS FOR LOW RISK DEPLOYMENTS

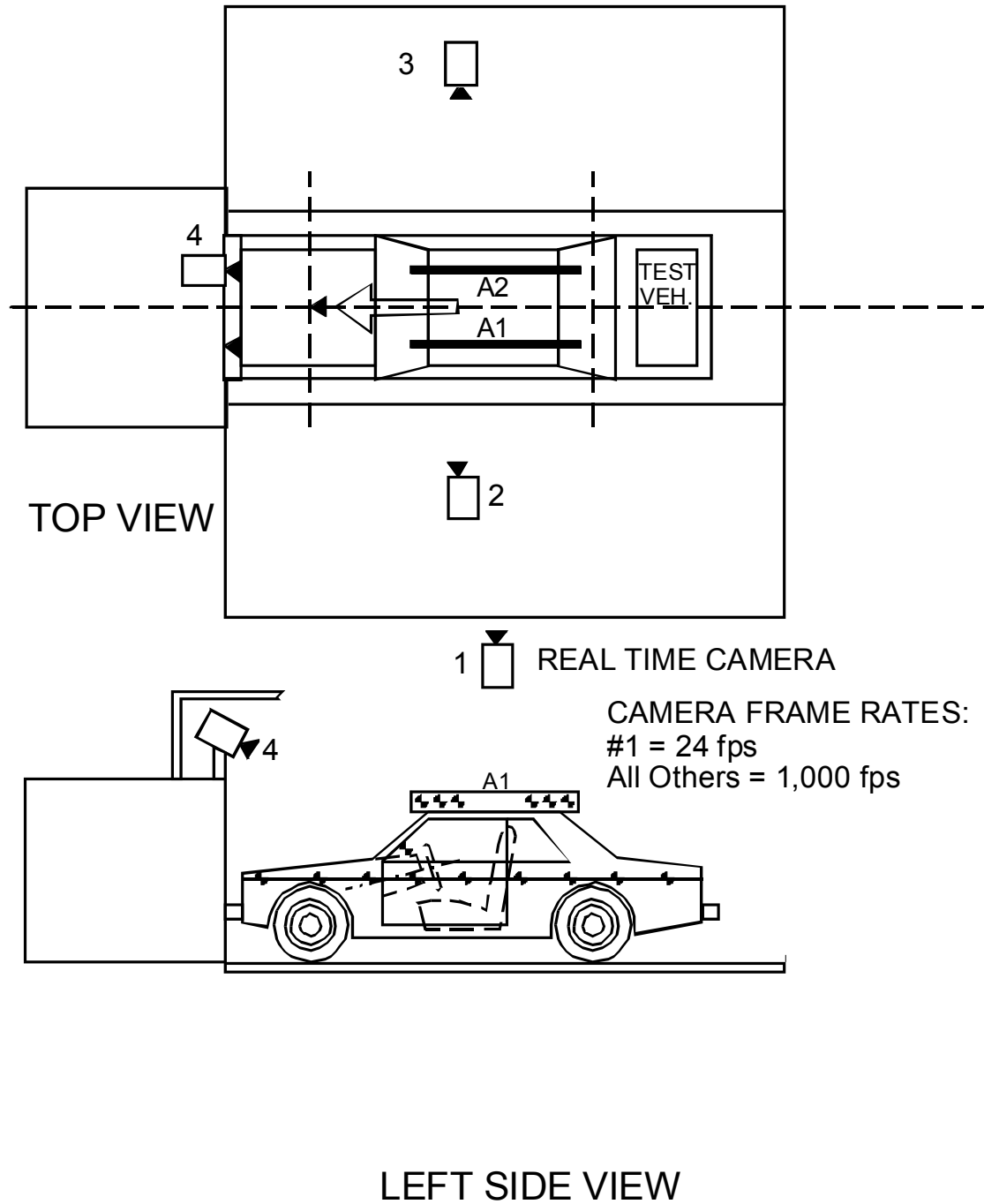


FIGURE 5

**9. PHOTOGRAPHIC DOCUMENTATION....Continued**

**9.2 COLORING REQUIREMENTS FOR TEST PHOTOGRAPHIC PURPOSES**

- A. Vehicle underbody components such as the floor pan, frame rail members, steering mechanism, suspension components, engine oil pan, and all fuel system components shall be painted with different colored paint (pink, green, blue, orange, etc.). (Crash tests ONLY.)
- B. Parts of the dummies shall be coated with colored chalk solutions to show contact points with the vehicle's interior, with their own components (such as head to knee contact), and with each other. The chalk solution shall be applied after final dummy positioning for crash tests. If necessary, the chalk solution may be applied prior to final dummy positioning for the low risk deployment tests.

**TABLE 8  
CHALK COLORS TO BE USED ON TEST DUMMIES**

DUMMY PART	DRIVER	PASSENGER
Nose	Red	Yellow
Lips	Red	Yellow
Face	Blue	Red
Top of Head	Yellow	Blue
Back of Head	Red	Yellow
Left Knee	Red	Yellow
Right Knee	Blue	Red
Lower Steering Wheel Rim	Red	

- C. In tests with a driver and passenger dummy, the clothes shall be contrasting colors so that the motion of each dummy can be identified during film analysis.

**9.3 PHOTOGRAPHIC COVERAGE OF FUEL FILLER CAP INSTALLATION**

The removal, installation and tightening of the vehicle's fuel filler cap and the cap's rotation to its locked position by Contractor's personnel will be documented. This color movie film or video footage shall appear in the final released movie or video print to show that the filler cap was properly installed and tightened prior to the crash test. (Crash test ONLY.)

**9.4 PHOTOGRAPHIC COVERAGE OF STODDARD SOLVENT SPILLAGE**

The real-time camera (24 fps) shall be used to record any Stoddard solvent spillage from the test vehicle after the impact event or during the static rollover test. (Crash test ONLY)

## 9. PHOTOGRAPHIC DOCUMENTATION....Continued

### 9.5 VEHICLE AND DUMMY PHOTOGRAPHIC COVERAGE

The real-time camera (24 fps) shall be used to document the pretest and post test condition of the test vehicle and the test dummies' pretest and post test positions (including marks showing the fore and aft seat position) and if applicable, placement of the lap and shoulder belts on these dummies.

### 9.6 IMPACT EVENT MARKER

Strobe lights or taped photoflash bulbs (cloth tape on bulb exterior to form small slit for light passage) will be placed in the field-of-view of all cameras to mark the beginning (time zero) of the crash or low risk deployment test. For the low risk deployment tests time zero is the when the signal is sent to fire the air bag. Light from the impact detectors SHOULD NOT COVER MORE THAN 3 FRAMES OF HIGH-SPEED FILM. Suggested locations for impact detectors or "time zero" markers are as follows:

- A. Vehicle's roof panel along longitudinal centerline above windshield header
- B. Top surface of vehicle's instrument panel along longitudinal centerline
- C. Adjacent to engine oil pan.
- D. Adjacent to vehicle's fuel tank.

### 9.7 REFERENCE TARGETS

Complete the "Photographic Targets" form for reference photographic targets to be used for crash testing. The setup rotation of the resection panel within the motion plane is unimportant.

### 9.8 INFORMATIONAL PLACARDS

Vehicle identification placards shall be positioned so that at least 1 placard will be visible in the field-of-view for each of the cameras. The following information will be shown:

- A. Vehicle's NHTSA Number
- B. Type of test, e.g., "48 KMPH FRONTAL," "40 KMPH FRONTAL," "40 KMPH OFFSET FRONTAL," etc.
- C. Date of test
- D. Name of contract laboratory
- E. Vehicle year, make and model

### 9.9 CRASH FILM TITLE AND EDITING

The 16 mm crash test movie film or video shall include the following title frames:

- A. "The following [***fill in the test type as stated in the informational placard above***] test was conducted under contract with the National Highway Traffic Safety Administration by [***name and location of test laboratory***]"

## 9. PHOTOGRAPHIC DOCUMENTATION....Continued

- B. TEST TYPE e.g., "48 KMPH FRONTAL," "40 KMPH FRONTAL," "40 KMPH OFFSET FRONTAL," etc.

TEST VEHICLE MODEL YEAR, MAKE AND MODEL

NHTSA No. CXXXXX

DATE OF TEST

CONTRACT NO.: DTNH22-XX-X-XXXXX

- C. The ending frame shall state "THE END"

### 9.10 FILM EDITING

The film shall be edited in the following sequence:

- A. Title
- B. Pretest Coverage
- C. Real Time Pan Coverage
- D. All high speed coverage in numerical order as shown in figures 4 and 5. When incorporating the procedures of appendix J the film shall be edited to include each steering column camera's (5 and 6) "pre-run" of the resection control points panel spliced together and directly preceding that camera's footage from the actual test.
- E. Posttest Coverage (All fuel system or windshield failures shall be completely documented.)
- F. If applicable, FMVSS 301 Rotating Fixture Coverage (a minimum 10 seconds "burst" during 0 to 90 degree roll)
- G. "The End"

### 9.11 STILL PHOTOGRAPHS

Provide still photographs (8 x 10 or 8½ x 11 inch color prints or digital photographs properly focused for clear images) of pretest and posttest condition of entire vehicle deformation and details that pertain to the tested standards. Photographs of all areas of the test vehicle that may be of importance to the frontal barrier impact test should be taken in excess and developed only if the need arises.

The following still photographs are required for the OVSC Standards Enforcement report for vehicles that exceed the FMVSS 208 performance requirements. Those marked with an asterisk are required in reports for vehicles that meet the FMVSS 208 performance requirements.

## 9. PHOTOGRAPHIC DOCUMENTATION....Continued

The underbody views will include the following vehicle components: fuel pump, fuel lines, sender unit, fuel tank filler pipe and any other visible fuel system components.

### 9.11.1 Frontal barrier crash tests

- \*A. Pretest and post test frontal view of test vehicle
- \*B. Pretest and post test left side view of test vehicle
- \*C. Pretest and post test right side view of test vehicle
- \*D. Pretest and post test left front three-quarter view of test vehicle
- E. Pretest and post test right rear three-quarter view of test vehicle
- F. Pretest and post test windshield view
- G. Pretest and post test engine compartment view
- H. Pretest and post test fuel filler cap view (Include for FMVSS 301 failures)
- \*I. Pretest and post test front underbody view
- J. Pretest and post test rear underbody view
- \*K. Pretest and post test driver dummy position with the camera perpendicular to the longitudinal centerline of the vehicle and in line with the markings showing the fore-aft position of the seat.
- \*L. Frontal pretest and post test driver dummy position with the camera in the same plane as the longitudinal centerline of the dummy.
- \*M. Pretest and post test passenger dummy position with the camera perpendicular to the longitudinal centerline of the vehicle and in line with the markings showing the fore-aft position of the seat.
- \*N. Frontal pretest and post test passenger dummy position view with the camera in the same plane as the longitudinal centerline of the dummy.
- \*O. Dummy contact point(s) vehicle and dummy
- \*P. Pretest and post test view of the knee bolsters.
- \*Q. Pretest and post test view of the steering column shear capsule if any part of it is visible. Do NOT disassemble any parts to take these photographs.
- \*R. Pretest and post test view of the under hood steering shaft and steering box. Take the best photograph possible without removing any parts.

## 9. PHOTOGRAPHIC DOCUMENTATION....Continued

- \*S. Pretest and post test view of the steering column intersecting the fire wall from the inside of the vehicle. Take the best photograph possible without removing any parts.
- \*T. Pretest and post test under hood view of the steering column intersecting the fire wall. Take the best photograph possible without removing any parts.
- U. Photograph of ballast installed in vehicle.
- V. Post test Stoddard solvent spillage location view, when leakage occurs.
- W. Post test windshield periphery retention loss.
- X. Post test windshield intrusion, when intrusion occurs.
- \*Y. Post test view of test vehicle while vehicle is on static rollover machine.
- \*Z. Photograph of certification label.
- \*AA. Photograph of tire placard.
- \*AB. Photograph of vehicle window sticker(s)
- AC. Photographs of fuel system failures

### 9.11.2 Offset Deformable Barrier – the above photographs plus the following

- \*A. Pretest and posttest of the front left side perpendicular to the centerline of the vehicle at the most forward point of the vehicle.
- \*B. Pretest and posttest of the front of the vehicle.
- \*C. Pretest and posttest of the vehicle interior to show any intrusion that may occur.

### 9.11.3 Suppression tests

- \*A. Left side view of final position
- \*B. Right side view of final position
- \*C. Windshield view of final position
- D. Photograph of the suppression telltale if it does not indicate the air bag is suppressed when the suppression test is performed

### 9.11.4 Low Risk Deployment

- \*A. Pretest and post test right side view



## 9. PHOTOGRAPHIC DOCUMENTATION....Continued

\*B. Pretest and posttest left side view

\*C. Dummy contact points

## 10. DEFINITIONS

- 10.1 Automatic-locking retractor: A retractor incorporating adjustment hardware by means of a positive self-locking mechanism which is capable when locked of withstanding restraint forces. (571.209, S3)
- 10.2 Backless child restraint system: A child restraint, other than a belt-positioning seat, that consists of a seating platform that does not extend up to provide a cushion for the child's back or head and has a structural element designed to restrain forward motion of the child's torso in a forward impact. (571.213, S3)
- 10.3 Belt-positioning seat: a child restraint system that positions a child on a vehicle seat to improve the fit of a vehicle Type II belt system on the child and that lacks any component, such as a belt system or a structural element, designed to restrain forward movement of the child's torso in a forward impact. (571.213, S3)
- 10.4 Booster seat: Either a backless child restraint system or a belt-positioning seat (571.213, S3)
- 10.5 Car bed: A child restraint system designed to restrain or position a child in the supine or prone position on a continuous flat surface. (571.213, S3)
- 10.5 Child restraint anchorage: Any vehicle component, other than Type I or Type II seat belts, that is involved in transferring loads generated by a child restraint system to the vehicle structure. (571.225, S3)
- 10.6 Child restraint anchorage system: A vehicle system that is designed for attaching a child restraint system to a vehicle at a particular designated seating position, consisting of:
- (a) Two lower anchorages meeting the requirements of S9; and
  - (b) A tether anchorage meeting the requirements of S6. (571.225, S3)
- 10.7 Child restraint system: Any device except Type I or Type II seat belts, designed for use in a motor vehicle or aircraft to restrain, seat, or position children who weight 50 pounds or less. (571.213, S3)
- 10.8 Daylight opening: The maximum unobstructed opening through the glazing surface including reveal, or garnish moldings adjoining the surface, as measured parallel to the outer surface of the glazing material. (571.219, S4)
- 10.9 Designated Seating Capacity: The number of designated seating positions provided. (571.3)
- 10.10 Designated Seating Positions: Any plan view location capable of accommodating a person at least as large as a 5<sup>th</sup> percentile adult female, if the overall seat configuration and design and vehicle design is such that the position is likely to be used as a seating position while the vehicle is in motion, except for auxiliary seating accommodations such as temporary or folding jump seats. Any bench or split-bench seat in a passenger car, truck or multipurpose passenger vehicle with a GVWR less than 4,586 kilograms (10,000 pounds), having greater than 127 centimeters (50 inches) of hip room (measured in accordance with SAE Standard J1100(a)) shall have not less than three seat designated seating positions, unless the set design or vehicle design is such that the center position cannot be used for seating. For the sole purpose of determining the classification of any vehicle sold or introduced into interstate commerce for purposes

**10. DEFINITIONS....Continued**

- that include carrying students to and from school or related events, any location in such vehicle intended for securement of an occupied wheelchair during vehicle operation shall be regarded as four designated seating positions. (571.3)
- 10.11 Emergency-locking retractor: A retractor incorporating adjustment hardware by means of a locking mechanism that is activated by vehicle acceleration, webbing movement relative to the vehicle, or other automatic action during an emergency and is capable when locked of withstanding restraint forces. (571.209, S3)
- 10.12 Fixed Collision Barrier: A flat, vertical, unyielding surface with the following characteristics:
- (1) The surface is sufficiently large that when struck by a tested vehicle, no portion of the vehicle projects or passes beyond the surface,
  - (2) The approach is horizontal surface that is large enough for the vehicle to attain a stable attitude during its approach to the barrier, and that does not restrict vehicle motion during impact,
  - (3) When struck by a vehicle, the surface and its supporting structure absorb no significant portion of the vehicle's kinetic energy, so that a performance requirement described in terms of impact with a fixed collision barrier must be met no matter how small an amount of energy is absorbed by the barrier. (571.3)
- 10.13 Fuel spillage: The fall, flow, or run of fuel from the vehicle but does not include wetness resulting from capillary action. (571.301, S3)
- 10.14 Gross axle weight rating or GAWR: The value specified by the vehicle manufacturer as the load-carrying capacity of a single axle system as measured at the tire-ground interfaces. (571.3)
- 10.15 Gross vehicle weight rating or GVWR: The value specified by the manufacturer as the loaded weight of a single vehicle. (571.3)
- 10.16 H point: The mechanically hinged hip point of a manikin which simulates the actual pivot center of the human torso and thigh, described in SAE Recommended Practice J826, "Manikins for Use in Defining Vehicle Seating Accommodations," November 1962. (571.3)
- 10.17 Longitudinal or longitudinally: Parallel to the longitudinal centerline of the vehicle. (571.3)
- 10.18 Outboard designated seating position: A designated seating position where a longitudinal vertical plane tangent to the outboard side of the seat cushion is less than 12 inches from the innermost point on the inside surface of the vehicle at a height between the design H-point and the shoulder reference point (as shown in fig. 1 of Federal Motor Vehicle Safety Standard No. 210) and longitudinally between the front and rear edges of the seat cushion. (571.3)
- 10.19 Overall vehicle width: The nominal design dimension of the widest part of the vehicle, exclusive of signal lamps, marker lamps, outside rearview mirrors, flexible fender extensions, and mud flaps, determined with doors and windows closed and the wheels in the straight-ahead position. (571.3)
- 10.20 Rated cargo and luggage capacity weight (RCLW):  
RCLW = vehicle capacity weight – (68 kg x designated seating capacity)  
Maximum RCLW used in testing a truck, MPV, or bus is 136 kg.
- 10.21 Rear-facing child restraint system: A child restraint system, except a car bed, that positions a child to face in the direction opposite to the normal direction of travel of the motor vehicle. (571.213, S3)

## 10. DEFINITIONS....Continued

- 10.22 Seating reference point (SgRP): The unique design H-point, as defined in SAE J1100 (June 1984), which:
- (a) Establishes the rearmost normal design driving or riding position of each designated seating position, which includes consideration of all modes of adjustment, horizontal, vertical, and tilt, in a vehicle;
  - (b) Has Z, Y, and Z coordinates, as defined in SAE J1100 (June 1984), established relative to the designed vehicle structure;
  - (c) Simulates the position of the pivot center of the human torso and thigh; and
  - (d) Is the reference point employed to position the two-dimensional drafting template with the 95<sup>th</sup> percentile leg described in SAE J826 (May 1987), or, if the drafting template with the 95<sup>th</sup> percentile leg cannot be positioned in the seating position, is located with the seat in its most rearward adjustment position. (571.3)
- 10.23 Telltale: A display that indicates the actuation of a device, a correct or defective functioning or condition, or a failure to function. (571.101, S4)
- 10.24 Tether anchorage: A user-ready permanently installed vehicle system that transfers loads from a tether strap through the tether hook to the vehicle structure and that accepts a tether hook. (571.225, S3)
- 10.25 Tether strap: A strap that is secured to the rigid structure of the seat back of a child restraint system, and is connected to a tether hook that transfers the load from that system to the tether anchorage. (571.225, S3)
- 10.26 Type 1 seat belt assembly: A lap belt for pelvic restraint
- 10.27 Type 2 seat belt assembly: A combination of pelvic and upper torso restraints
- 10.28 Unloaded vehicle weight: The weight of a vehicle with maximum capacity of all fluids necessary for operation of the vehicle, but without cargo, occupants, or accessories that are ordinarily removed from the vehicle when they are not in use. (571.3)
- 10.29 Vehicle capacity weight: The rated cargo and luggage load plus 68 kilograms times the vehicle's designated seating capacity. (571.110, S3)
- 10.30 Vehicle fuel tank capacity: The tank's unusable capacity (i.e., the volume of fuel left at the bottom of the tank when the vehicle's fuel pump can no longer draw fuel from the tank) plus its usable capacity (i.e., the volume of the fuel that can be pumped into the tank through the filler pipe with the vehicle on a level surface and with the unusable capacity already in the tank). The term does not include the vapor volume of the tank (i.e., the space above the fuel tank filler neck) nor the volume of the fuel tank filler neck. (571.3)
- 10.31 Windshield trim: Molding of any material between the windshield glazing and the exterior roof surface, including material that covers a part of either the windshield glazing or exterior roof surface. (571.216, S3)

## 11. PRETEST REQUIREMENTS

### 11.1 DETAILED TEST AND QUALITY CONTROL PROCEDURES REQUIRED

Prior to conducting any compliance test, Contractors are required to submit a detailed in-house compliance test procedure to the COTR which includes:

- A. A step-by-step description of the methodology to be used.
- B. A written Quality Control (QC) Procedure which shall include calibrations, the data review process, report review, and the people assigned to perform QC on

**11. PRETEST REQUIREMENTS....Continued**

each task.

- C. A complete listing of test equipment with instrument accuracy and calibration dates.
- D. Detailed checkoff lists to be used during the test and during data review. These lists shall include all test procedure requirements and FMVSS requirements pertaining to the safety standard for which testing is being performed. Each separate check off sheet shall identify the lab, test date, vehicle and test technicians. These check sheets shall be used to document that all requirements and procedures have been complied with. These sheets shall be submitted with the test report.

- D.1.1 The following heading information must be at the top of the first page of each check sheet and the NHTSA No. must be on each page.

NHTSA No. \_\_\_\_\_

Test Date: \_\_\_\_\_

Laboratory: \_\_\_\_\_

Test Technician(s): \_\_\_\_\_

Impact Angle: \_\_\_\_\_

Belted Dummies:  Yes  No

Test Speed:  32 to 40 kmph

0 to 48 kmph

0 to 56 kmph

Driver Dummy:  5<sup>th</sup> female  50<sup>th</sup> male

Passenger Dummy:  5<sup>th</sup> female  50<sup>th</sup> male

- D.1.2 The following information must be on the last page of each check sheet.

\_\_\_\_\_  
I certify that I have read and performed each instruction.

\_\_\_\_\_  
Date

- E. There shall be no contradiction between the OVSC Laboratory Test Procedure and the Contractor's in-house test procedure. The procedures shall cover all aspects of testing from vehicle receipt to submission of the final report. Written approval of the procedures must be obtained from the COTR before initiating the compliance test program.
- F. The sign convention shall be as shown in the following figure 6:

11. PRETEST REQUIREMENTS....Continued

## SIGN CONVENTIONS FOR PART 572 SUBPART E TEST DUMMIES

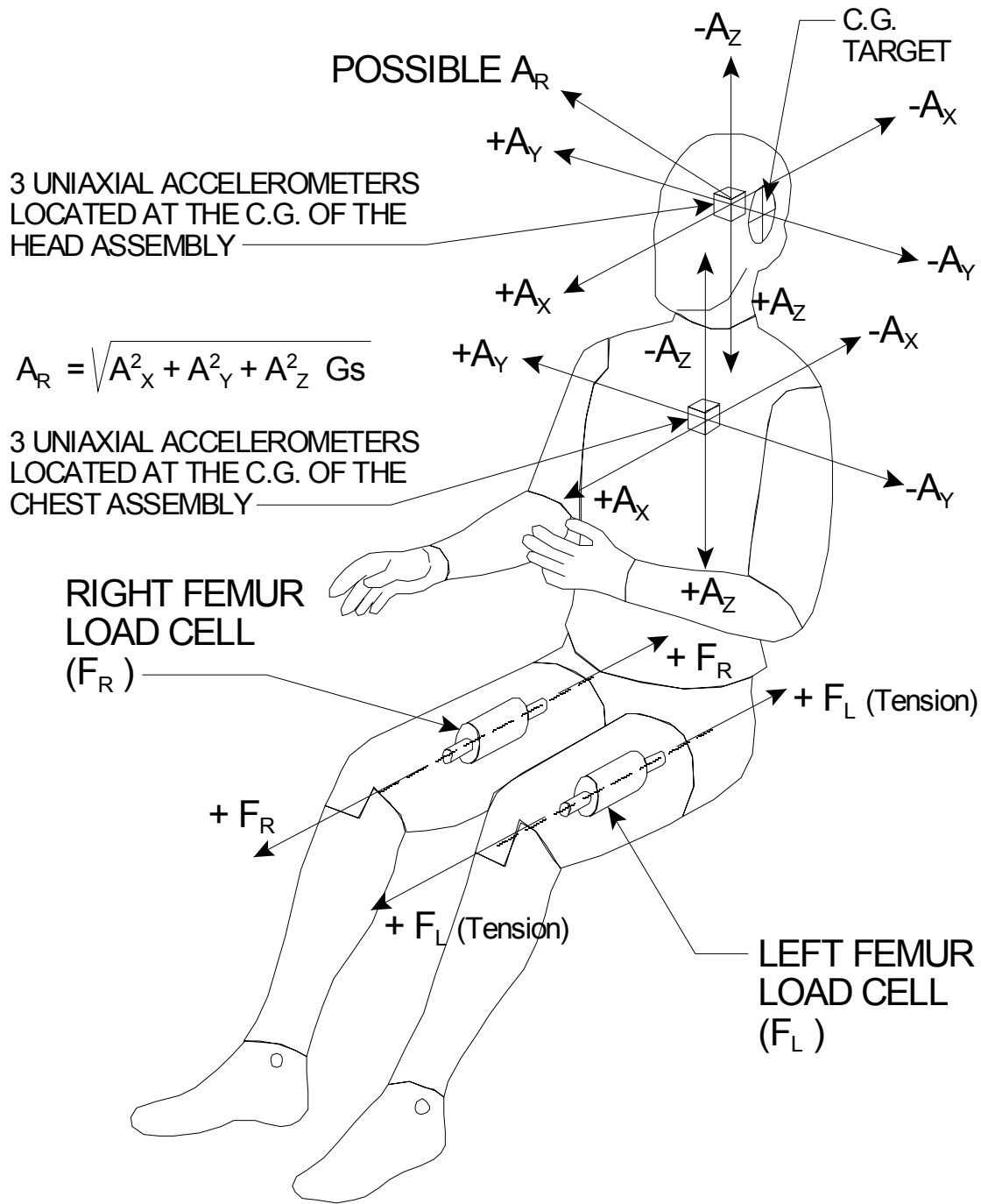


FIGURE 6

**11. PRETEST REQUIREMENTS....Continued****11.2 INSTRUMENTATION TO BE INSTALLED IN THE TEST DUMMIES**

- A. The Contractor shall provide and install the following instrumentation in the GFP dummies for all except the suppression tests. The instrumentation shall meet the specifications and be in the locations as required by the drawing packages referenced in Title 49, Code of Federal Regulations Part 572.

**TABLE 9**

Dummy	Head	Neck	Chest	Chest Compress.	Femur
50 <sup>th</sup> male	3 uniaxial accelerometers (Endevco 7231C-750 with 1% transverse sensitivity)	1 - 6-axis upper neck load cell (Denton drawing C-1709)	3 uniaxial accelerometers (Endevco 7231C-750 with 1% transverse sensitivity)	Potentiometer is included with the dummy	2 load cells (GSE Inc. Model 2430)
5 <sup>th</sup> female	3 uniaxial accelerometers (drawing SA572-S4)	1 - 6-axis upper neck load cell (drawing SA572-S11)	3 uniaxial accelerometers (drawing SA572-S4)	Potentiometer is included with the dummy	2 load cells (drawing SA572-S14)
6-yr-old	3 uniaxial accelerometers (drawing SA572-S4)	1 - 6-axis upper neck load cell (drawing SA572-S11)	3 uniaxial accelerometers (drawing SA572-S4)	Potentiometer is included with the dummy	N/A
3-yr.-old	3 uniaxial accelerometers (drawing SA572-S4)	1 - 6-axis upper neck load cell (drawing SA572-S19)	3 uniaxial accelerometers (drawing SA572-S4)	Potentiometer is included with the dummy	N/A
12-month-old	3 uniaxial accelerometers (drawing SA572-S4)	1 - 6-axis neck/lumbar spine load cell (drawing SA572-23)	3 uniaxial accelerometers (drawing SA572-S4)	N/A	N/A

- B. Temperature sensors to measure the stabilized temperature of the dummy (see Section 12.7).

The Contractor shall furnish data recording equipment having a sufficient number of channels available for recording the necessary time histories of the head and chest acceleration, chest displacement, neck forces and moments and the right and left femur axial loads applicable for calculating the injury values for each crash test or low risk deployment test for each test dummy used in the test. Each data channel will be comprised of a sensor, signal conditioner, data acquisition device, and all interconnecting cables, and must conform to the requirements of

## 11. PRETEST REQUIREMENTS....Continued

SAE Recommended Practice J211/1, MAR 95.

- C. An instrument calibration system capable of performing individual tests on all data channels used in acquiring the acceleration and force data shall conform to the appropriate section of SAE J211/1 MAR95. A schematic of the test setup is shown in Figure 8.
- D. A precision time system compatible with the test equipment shall be used to provide a time reference for all recorded data. A system that identifies the precise instant of barrier contact will be incorporated with the time reference signal.

### 11.3 OTHER INSTRUMENTATION

The Contractor shall provide and install the following accelerometers for all crash tests. The location of the accelerometers shall be recorded and included in the final test report.

The Contractor shall provide the necessary equipment to record and display the data. The data shall be included in the final test report and on the data tape/diskette.

#### A. X-DIRECTION ACCELEROMETERS

- #1. Rear seat cross-member on left side of vehicle
- #2. Rear seat cross-member on right side of vehicle
- #3. Top of engine block
- #4. Bottom of engine
- #5. Right front disc brake caliper
- #6. Left front disc brake caliper
- #7. Center of instrument panel top surface

#### B. Z-DIRECTION ACCELEROMETERS

Place a z-direction accelerometer along the vehicle longitudinal center line in the trunk, or as far back as possible in the rear passenger compartment.

### 11.4 FIXED COLLISION BARRIER

The basic fixed collision barrier must conform to the definition in Part 571.3--Definitions, 49 CFR Part 571.3, and at a minimum should consist of a reinforced concrete structure, 6 feet high, 6 feet thick, and 12 feet wide, weighing approximately 100,000 pounds.

Provision shall be made for 30° oblique crash tests. The fixed collision barrier may be

## 11. PRETEST REQUIREMENTS....Continued

adjustable or an extension may be added to the barrier to provide an angled barrier. If used, the extension shall be rigid such that it does not deflect or displace more than 10 mm (587.13).

The height of the barrier or, if used, the extension shall be at least as high as the highest point on the vehicle at the intersection of the vertical transverse plane tangent to the forward most point of both front tires, when the tires are parallel to the longitudinal centerline of the vehicle, and the vertical plane through the longitudinal centerline of the vehicle.

A sheet of 3/4-inch thick plywood will cover the barrier face and will be replaced as necessary during the testing period.

### 11.5 OFFSET DEFORMABLE BARRIER

The barrier is described in Title 49 of the Code of Federal Regulations, Part 587, Subpart C. It is included in this test procedure as Appendix I.

### 11.6 VEHICLE PREPARATION BUILDING

In order that the test vehicle can be prepared for crash testing at the head of the tow road during hot or cold weather, the Contractor shall have a temperature controlled building constructed which is large enough to house the test vehicle and allow for government, vehicle manufacturer, and laboratory personnel to move around the test vehicle. The building climate control must be capable of maintaining the ambient air temperature between 69° F and 72° F.

### 11.7 IMPACT SITE TOW ROAD

The tow road should be at least 500 feet in length and terminate at the face of the non-energy-absorbing barrier as shown in Figure 7. The first 100 feet from the head of the tow road will be used to accelerate the test vehicle up to the specified velocity without exceeding 0.5g, which might effect the positioning of the P572 test dummies in the test vehicle. The second 100 feet of tow road shall be used for dummy stabilization since the test vehicle should have approached the desired impact velocity with the acceleration now approaching zero. The remaining 300 feet of tow road will be used for test vehicle speed stabilization. The width of the tow road should be approximately 8 feet or greater and should be straight and level so that the test vehicle does not oscillate vertically in excess of 0.29 g's.

A photographic pit will be located in the tow road at the stationary barrier face so that leakage of Stoddard solvent can be photographed during the impact event. The pit shall be covered using the following guidelines:

- A. Use a transparent material that allows for use of pit cameras.
- B. The covering and its supports shall be of sufficient strength to support the vehicle structure should it come in contact with the cover during the FMVSS 208 test.
- C. The entire pit should be covered except for the area needed for the tow



## 11. PRETEST REQUIREMENTS....Continued

- system to operate.
- D. Precautions must be taken to ensure there is no electrostatic interference from the pit cover.

### TYPICAL FMVSS 208 BARRIER IMPACT TEST FACILITY

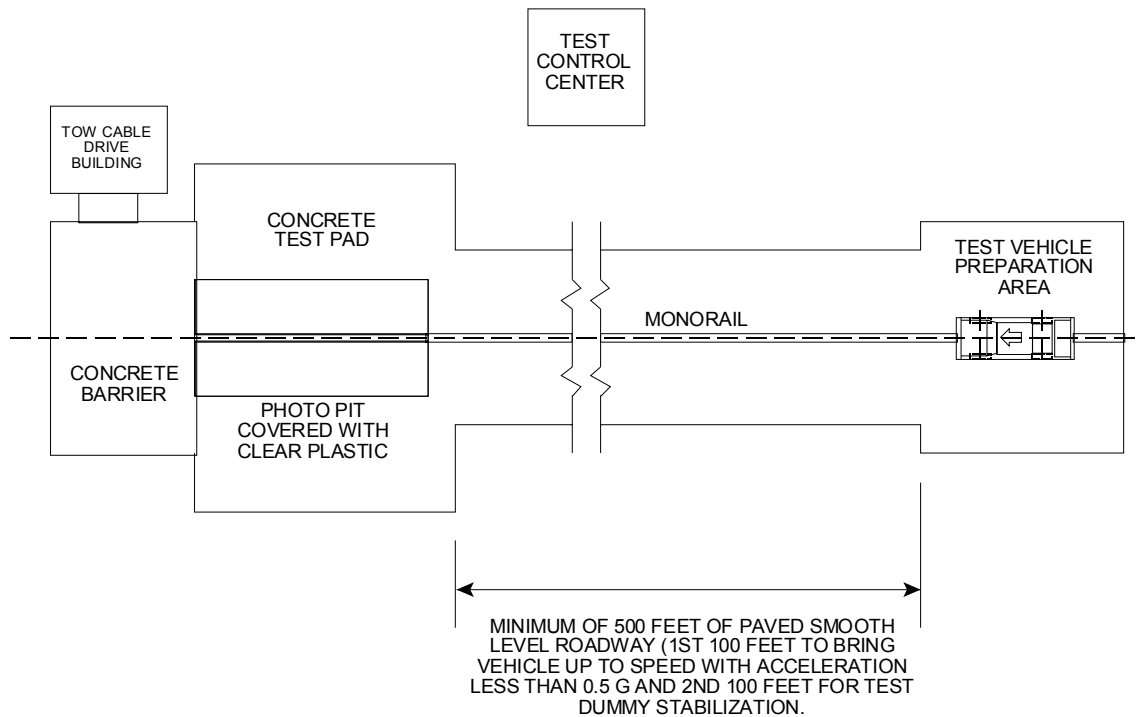


FIGURE 7

#### 11.8 TEST VEHICLE TOW SYSTEM

A guidance system is required to assure that the test vehicle impacts the barrier at the proper angle. At most laboratories, a monorail running down the center of the tow road is used to guide a dolly to which the vehicle is connected. **NOTE: NO HARD POINT CONNECTIONS BETWEEN THE MONORAIL AND TEST VEHICLE WILL BE ALLOWED.**

A "soft" lateral guidance system is required to assure that the test vehicle will impact the barrier face at the designated 90° angle (straight perpendicular impact). It is suggested that the Contractor's lateral guidance system include steel cables or chains extending from the vehicle lower 'A' arms or front frame rails to the monorail dolly or shoe. The dolly will ride on the monorail and engage the tow cable through a set of gripper jaws. The dolly will be stopped at the end of the tow road monorail or at the head of the photographic pit releasing the vehicle cables or chains at the same time allowing the vehicle to proceed to the barrier face for impact.

## 11. PRETEST REQUIREMENTS....Continued

A "soft" connection (seat belt webbing, steel cables, chains, etc.) between the tow cable attachment device and the test vehicle front frame assembly shall be provided by the Contractor. **NOTE:** NO HARD POINT CONNECTIONS BETWEEN THE TOW CABLE AND THE TEST VEHICLE SHALL BE ALLOWED. The tow cable attachment will release from the cable so that the vehicle will roll into the barrier at a constant velocity (no acceleration).

### 11.9 TEST VEHICLE IMPACT SPEED CONTROL

The speed of the test vehicle is dependent on the speed requested by the COTR and must be controlled to obtain and maintain the vehicle speed within  $\pm 0.8$  kmph.

### 11.10 TEST VEHICLE IMPACT SPEED MEASUREMENT

The vehicle speed shall be constant for the last 1.5 meters of travel. The speed shall be measured when the front of the vehicle is 1.5 meters and 30 cm from the barrier. There shall be a redundant system at both distances. For multi sensor measuring systems, the sensors for each system shall be no more than 100 mm apart. The accuracy of the system shall be 0.08 kmph.

The basis for the speed measurement (time and distance) shall be calibrated by an instrument(s) traceable to the National Institute of Standards and Technology (NIST). The impact velocity shall be permanently recorded.

A timing device shall monitor the velocity of the test vehicle to permit aborting the test if the vehicle's speed is outside of the specified velocity range.

Test vehicle impact speed measurement can also be calculated from the high speed photographic film. While the test vehicle is resting against the barrier face for pretest preparations, a stadia pole will be placed directly in line with one of the photographic targets on the side of the vehicle as viewed through the broadside camera bore sight.

### 11.11 ABORT SYSTEM

The laboratory shall provide an abort system capable of bringing the vehicle to a controlled stop.

### 11.12 STATIC ROLLOVER MACHINE

The rollover machine must be capable of rotating the barrier impacted test vehicle about its longitudinal axis with the axis kept horizontal, to each successive increment of  $90^\circ$ ,  $180^\circ$ , and  $270^\circ$  at a uniform rate, with  $90^\circ$  of rotation taking place in any time interval from 1 to 3 minutes. Leakage will be collected for the 5-minute period from the beginning of rotation plus any additional 1-minute collection periods that are required. Containers for the collection of possible Stoddard solvent spillage and a stop watch for timing the fluid collection intervals are required. Containers must be labeled before they are photographed.

## 11. PRETEST REQUIREMENTS....Continued

### 11.13 ELECTROMAGNETIC INTERFERENCE AND STATIC CHARGE CONTROL

The laboratory shall take all necessary precautions to avoid electromagnetic and/or static charge interference with the test data. The following procedures shall be included in those adopted by the laboratory:

- A. Ground the head, thorax, and both femurs of the anthropomorphic test devices. This is accomplished by connecting the four components with a wire. A single wire then exits the dummy and is attached to a grounding block on the vehicle. Connect the grounding block to earth ground. The actual wire size and connections are left to the laboratory based on the system it uses.
- B. Use a static electricity elimination spray on the dummies and the interior of the vehicle.
- C. Ground and use a static electricity elimination spray on pit covers.

### 11.14 TEST DATA ACQUISITION AND REDUCTION

The Contractor must meet all the requirements in the NHTSA Test Reference Guides which are available from the NHTSA web site [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov): If a Contractor is not presently certified as defined by the NHTSA Test Reference Guides, contact

Office of Crashworthiness Research  
Safety Systems Engineering and Analysis Division, NVS-321  
400 Seventh Street, SW  
Washington, DC 20590  
Telephone No.: 202-366-4850

A Contractor is not considered qualified for test work described herein without this certification.

Prior to the vehicle crash test, onboard instrumentation is installed, and a null reference and a shunt calibration adjustment is performed to set all data devices including FM magnetic tape recorders. Immediately following the crash test, a post impact null reference and shunt calibration check shall be performed. The pretest adjustment and posttest check will be recorded and the data submitted with the report.

Analog data is collected for at least 300 ms (longer if needed for the low risk deployment tests) after time zero, prefiltered (Class 1000) and digitized at a minimum rate of 10,000 samples per second. The data is then placed onto permanent storage media after the application of appropriate calibration scale factors.

As the data is recalled for integration or plotting, the appropriate phase-less digital filter, such as the Butterworth four-pole phase less digital filter is applied. These filters are in accordance with SAE Recommended Practice J211/1 MAR95, "Instrumentation for Impact Tests."

## 11. PRETEST REQUIREMENTS....Continued

**TABLE 10**  
**Filtering requirements from SAE J211/1 MAR95**

	Filter Class	Cut-off Frequency
Head acceleration	1000	1650
Neck forces	1000	1650
Chest compression	600	1000
Femur loads	600	1000
Neck moments	600	1000
Nij calculations	600	1000
Chest acceleration	180	300
Vehicle acceleration	60	100
Velocity	180	300
Displacement	180	300

Before plotting, the Contractor's program manager or engineer shall determine the "time zero", which is verified with the trigger signal. When a velocity or displacement trace is to be plotted, integration for the appropriate acceleration signal is performed digitally.

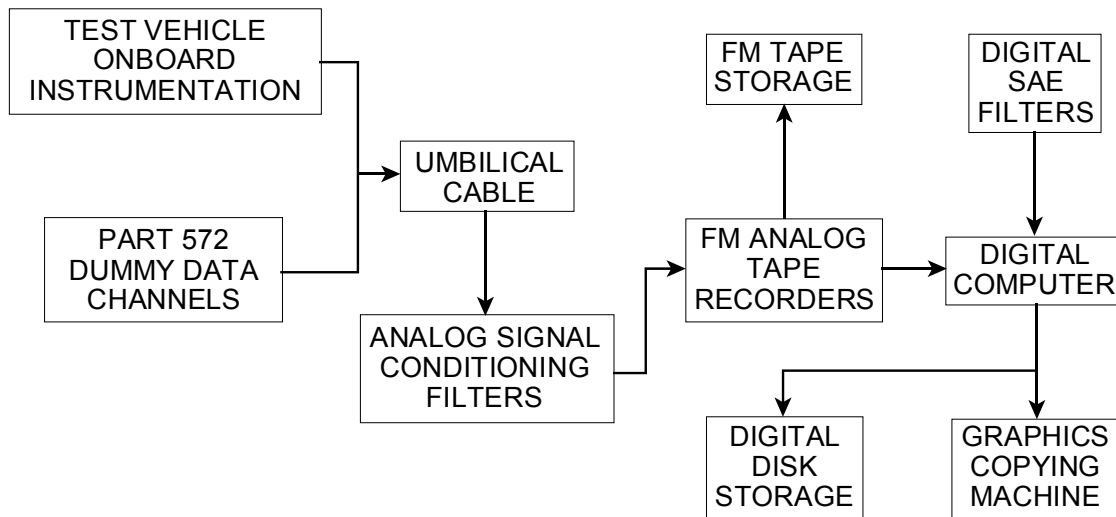
11.15 ALGORITHMS USED TO CALCULATE THE HEAD INJURY CRITERION (HIC),  $N_{ij}$ , THE THREE MILLISECOND CLIPS OF A WAVEFORM, AND TO DIGITALLY FILTER THE CLASS 1000 DATA

Algorithms that are used to calculate the HIC,  $N_{ij}$ , 3 millisecond clips of a waveform, and to digitally filter the Class 1000 data collected from the tests, are on the NHTSA web site ([www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)).

Any questions pertaining to the algorithms should be directed to the following organization:

National Highway Traffic Safety Administration  
 Office of Crashworthiness Research  
 Safety Systems Engineering and Analysis Division  
 400 Seventh Street, SW  
 Mail Code: NVS-321  
 Washington, DC 20590  
 Telephone No.: 202-366-4850

## TYPICAL VEHICLE AND OCCUPANT TEST DATA ACQUISITION SYSTEM



**Figure 8**

## 12. COMPLIANCE TEST EXECUTION

12.1 Review the COTR work order in the data sheet section and perform all the ordered items from 1 through 26 prior to any crash test. Use the appropriate data sheets from the data sheet section of this test procedure.

### 12.2 TEST TEMPERATURE CONDITIONS

The Contractor must verify that the dummy temperature for crash tests or low risk deployment tests is in the specified temperature range (69°F to 72°F) by either of the following two methods. The temperature sensors for both methods shall be accurate at least to within  $\pm 0.5^\circ\text{F}$ .

- A. The dummy must be soaked in an ambient air environment in the specified range as shown above for 16 hours prior to the test and any time after that until just before the movement of the vehicle towards the impact barrier. The ambient air temperature must be monitored and continuously recorded within 36 inches of the dummies. If at any time the ambient air temperature is not in the specified range, as shown above, the dummy part temperature measurement of Method B must be used prior to the impact test to verify a stabilized dummy temperature.
- B. The dummy must be soaked in an ambient air environment in the specified range (69°F to 72°F) for 16 hours prior to the test. The ambient temperature must be monitored and continuously recorded until just before impact. The temperature of the following dummy parts must be monitored and continuously recorded at least 30 minutes prior to the impact test.

## 12. COMPLIANCE TEST EXECUTION....Continued

- (1) The outside surface temperature of the forehead. (remove this sensor immediately prior to the test)
- (2) The surface temperature of the spine box. (this is in the internal portion of the dummy)
- (3) The outside surface temperature of the neck. (remove this sensor immediately prior to the test)
- (4) The outside surface temperature of one knee. (remove this sensor immediately prior to the test)

The chalk coating may be put on the face and knee around the sensor. The sensors shall be taped into place on the outer surfaces of the dummy and secured to the spine box for the internal sensor.

When the temperature of these four components has reached the applicable temperature range as listed above, and has remained in that range for 30 continuous minutes, the impact test may be performed.

It is not the intent of Method B to have the dummy outside the ambient air temperature range that corresponds to the specified dummy temperature range listed above. However, the purpose is to confirm that the dummy is still at the proper stabilized temperature even if there are short fluctuations of ambient air temperature outside the range specified for the dummy temperature. Therefore, if there is an ambient air temperature excursion outside the specified dummy temperature range, the Contractor must work quickly to bring the ambient air temperature back into that range.

The Contractor shall mark the ambient air temperature recording with the date, time and technician name at the beginning of the 16 hour soak and when the vehicle begins to move towards the barrier. The dummy part temperature recordings shall also be marked at the beginning and end with the date, time, and technician's name. Any excursions from the specified temperature must be noted on the recording along with the reason for the excursion. Temperature recordings shall be supplied to the COTR with final test reports. The windshield mounting material and all vehicle components in direct contact with the mounting material must be at a temperature between 15°F and 110°F. This temperature measurement must be made within 15 minutes of the impact test event.

### 12.3 TEST SUBJECTS

See the COTR work order to determine the type of dummies or human subjects to be used for a particular test. Tables 11 and 12 are the clothing requirements for dummies and humans.

The dummy calibration procedures are attached as Appendices. The calibration data for each dummy used in a crash or low risk deployment test shall be shown on the appropriate data sheets as provided in the calibration procedures.

Dummy positioning procedures for the Part 572, Subpart E dummy are detailed in Appendix F and dummy positioning procedures for the Part 572, Subpart O dummy are

## 12. COMPLIANCE TEST EXECUTION....Continued

detailed in Appendix G. Seating procedures for suppression and low risk deployment tests are part of Section 15, Data Sheets.

The COTR may require that positioning of the dummies for crash tests be performed in the presence of the NHTSA and vehicle manufacturer's representatives. The manufacturer's representatives will also be afforded the opportunity to take measurements of the dummies' positions after the dummy positioning procedures are complete and before the Contractor records dummy measurements.

The dummies used in the frontal crash tests shall be alternated in the driver's and passenger's seat. For example, if three dummies are prepared for each test, the driver dummy from the previous test will become the spare, the passenger dummy from the previous test will be the driver, and the spare from the previous test will be the passenger.

## 12. COMPLIANCE TEST EXECUTION....Continued

**TABLE 11**  
**Dummy Clothing Requirements**

	Shirt	Pants	Shoes
5 <sup>th</sup> female S16.2.5	Form fitting cotton stretch short sleeve	Form fitting cotton stretch above-the-knee	Size 7½W MIL-S-21711E, Amendment 2, 10/14/94
50 <sup>th</sup> male S8.1.8.2	Form fitting cotton stretch short sleeve No more than 0.25 lb	Form fitting cotton stretch above-the-knee No more than 0.25 lb	Size 11XW MIL-S 13192P Amendment 1, 10/14/94 1.05 to 1.45 lb each
12-month-old 572.154(c)(2) PADI, pg. 3	50% Cotton-50% polyester-based tight-fitting crew-neck long-sleeve shirt (total weight of shirt and pants no more than 0.25 kg (0.55 lb))	50% Cotton-50% polyester-based tight-fitting ankle-length pants (total weight of shirt and pants no more than 0.25 kg (0.55 lb))	No shoes
3-year-old 572.144(c)(1) PADI, pg. 4	Cotton-polyester-based tight-fitting long sleeve shirt (total weight of shirt and pants no more than 0.25 kg (0.55 lb))	Cotton-polyester-based tight-fitting ankle-length pants (total weight of shirt and pants no more than 0.25 kg (0.55 lb))	Children's size 8 Oxford style canvas sneaker (Drawing 210-5920) 0.16 to 0.26 kg each
6-year-old 572.124(c)(2) PADI, pg.11	Form fitting cotton stretch short sleeve Children's size XS (size 4-5), Thermal Knit, waffle weave, 50% Cotton-50% polyester. 0.09 kg max.	Form fitting cotton stretch above-the-knee. Children's size XS (size 4-5), Thermal Knit, waffle weave, 50% Cotton-50% polyester. 0.09 kg max	Children's size 13M Oxford style canvas sneakers 0.33 to 0.43 kg each

**TABLE 12**  
**Human Subject Clothing Requirements**

	Shirt	Pants	Shoes
5 <sup>th</sup> female S29.2	Cotton T-shirt	Full-length cotton pants	Sneakers
3-year-old S29.2	Cotton T-shirt	Full-length cotton pants	Sneakers
6-year-old S29.2	Cotton T-shirt	Full-length cotton pants	Sneakers



## 12. COMPLIANCE TEST EXECUTION....Continued

### 12.4 FUEL SYSTEM INTEGRITY

#### 12.4.1 Fluid Collection

After the vehicle impact, fuel system Stoddard solvent leakage will be collected by hand and documented with a real-time (24 fps) motion picture camera and stop watch. The "tea cup method" has been used in the past and involves simply placing a collection vessel beneath the leakage source and timing the intervals of several collected volumes. The collected Stoddard solvent samples can subsequently be measured and spillage rates calculated. Contractors are invited to suggest alternative methods for fluid collection. If the "tea cup method" is used, the test personnel must be in position to scramble to observation points around the test vehicle at the instant the vehicle comes to rest after the impact event.

#### 12.4.2 Static Rollover for FMVSS 301

The Contractor must conduct a static rollover test within 30 minutes after the vehicle impact only after the "quick look" data provides assurance that the vehicle is in compliance with FMVSS No. 208. The Contractor must keep the test vehicle under constant observation for Stoddard solvent leakage during the transition between impact and static rollover testing.

When the test vehicle is rotated in a fixture on its longitudinal axis to each successive increment of 90°, following an impact crash, Stoddard solvent spillage, from the onset of rotational motion, shall not exceed a total of 142 grams for the first 5 minutes of testing at each successive 90° increment. For the remaining testing period, at each increment of 90°, solvent spillage during any 1-minute interval shall not exceed 28 grams.

**NOTE:** If there is an indication of a noncompliance during an impact test, the static rollover test WILL NOT BE CONDUCTED!

## 12. COMPLIANCE TEST EXECUTION....Continued

Static rollover test conditions —

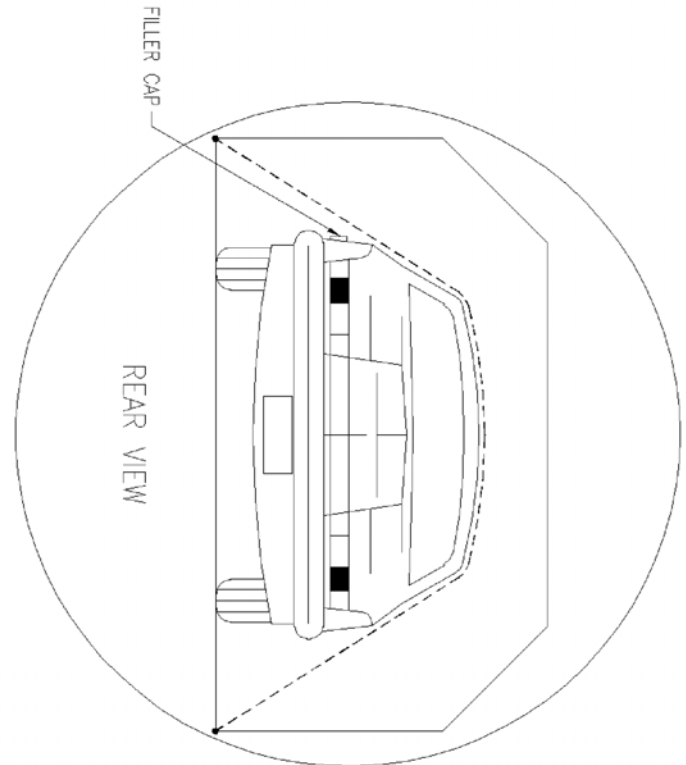
Within 30 minutes after a vehicle impact, the vehicle is rotated in a test fixture about its longitudinal axis, with the axis kept horizontal, to each successive increment of

- (1) 90°
- (2) 180°
- (3) 270°
- (4) 360°

at a uniform rate, with 90° of rotation taking place in any time interval from 1 to 3 minutes.

After reaching each 90° increment the vehicle is held in that position for 5 minutes.

The rollover machine must be capable of rotating the barrier impacted test vehicle about its longitudinal axis with the axis kept horizontal, to each successive increment of 90°, 180°, and 270° at a uniform rate. Leakage will be collected for the 5-minute period from the beginning of rotation plus up to three 1-minute collection periods. Containers for the collection of possible Stoddard solvent spillage and a stop watch for timing the fluid collection intervals are required. Containers must be labeled before they are photographed.



- 12.5 Review the “COTR Vehicle Work Order” form and complete the data sheets associated with each task. For crash tests, data sheets 32, 33, 34, 35, 36, 37, 38 (frontal) or 39 (offset), and 40 shall be completed along with the applicable dummy positioning data sheets that are in the appendices. Include the “COTR Vehicle Work Order” and all other data sheets in the test report.

### 12.6 PRE-CRASH TEST

- 12.6.1 Start the vehicle measurement data sheet
- 12.6.2 Start vehicle weight and attitude data sheet
- 12.6.3 Paint the underbody (see section 9.2)
- 12.6.4 Start windshield mounting data sheet (ONLY if included on COTR Work Order)
- 12.6.5 Start windshield zone intrusion data sheet (ONLY if included on COTR Work Order)
- 12.6.6 Complete vehicle targeting data sheet
- 12.6.7 Complete vehicle accelerometer placement data sheet
- 12.6.8 Complete high speed camera placement data sheet
- 12.6.9 Complete dummy positioning data sheets (data sheets in appendix)
- 12.6.10 Complete dummy measurement data sheets
- 12.6.11 Complete vehicle weight and attitude data sheet

## 12. COMPLIANCE TEST EXECUTION....Continued

- 12.6.12 Start photograph data sheet
- 12.6.13 Start crash test data sheet (Frontal or Offset)

### 12.7 POST-CRASH TEST

- 12.7.1 Start FMVSS 301 data sheet (ONLY if included on COTR Work Order)
- 12.7.2 Complete photograph data sheet
- 12.7.3 Complete crash test data sheet (*posttest calcs.*) (Frontal or Offset)
- 12.7.4 Complete windshield zone intrusion data sheet (ONLY if included on COTR Work Order)
- 12.7.5 Complete windshield retention data sheet (ONLY if included on COTR Work Order)
- 12.7.6 Complete FMVSS 301 data sheet
- 12.7.7 Complete the vehicle measurement data sheet
- 12.7.7 Complete the "Report of Vehicle Condition"

## 13. POST TEST REQUIREMENTS

The protected zone and windshield mounting must be checked directly after a frontal barrier impact. Loss of windshield protection can be determined when a piece of paper can pass between the windshield edge and the vehicle body. Photographs of the windshield periphery should be taken before the vehicle is placed in the FMVSS 301 static rollover machine.

Do not proceed to the FMVSS 301 static rollover if there are apparent test failures from the crash test.

## 14. REPORTS

### 14.1 MONTHLY STATUS REPORTS

The Contractor shall submit a monthly Test Status Report and a Vehicle or Equipment Status Report to the COTR (both reports shown in this section). The Vehicle Status Report shall be submitted until all vehicles or items of equipment are disposed of.

14. REPORTS....Continued

MONTHLY TEST STATUS REPORT  
 FMVSS 208  
 DATE OF REPORT:

NO.	VEHICLE NHTSA NO., MAKE & MODEL	TEST DATE	PASS/ FAIL	DATE REPORT SUBMITTED	DATE INVOICE SUBMITTED	INVOICE PAYMENT DATE
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

14. REPORTS....Continued

MONTHLY VEHICLE STATUS REPORT  
 FMVSS 208  
 DATE OF REPORT:

NO.	VEH. NHTSA NO., MAKE & MODEL	DATE OF DELIVERY	ODOMETER READING	TEST COMPLETE DATE	VEHICLE SHIPMENT DATE	ODOMETER READING
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

## 14. REPORTS....Continued

### 14.2 APPARENT TEST FAILURE

Any indication of an apparent test failure shall be communicated by telephone to the COTR within 24 hours with written notification mailed within 48 hours (Saturdays and Sundays excluded). A Notice of Apparent Test Failure, shown in this section, with a copy of the particular compliance test data sheet(s) and preliminary data plot(s) shall be included.

In the event of an apparent test failure, a posttest calibration check of some critically sensitive test equipment and instrumentation may be required for verification of accuracy. The necessity for the calibration shall be at the COTR's discretion and shall be performed without additional costs to the OVSC.

**14. REPORTS....Continued**

LABORATORY NOTICE OF APPARENT TEST FAILURE TO OVSC

FMVSS NO. 208 TEST DATE: \_\_\_\_\_

LABORATORY: \_\_\_\_\_

CONTRACT NO.: \_\_\_\_\_ DELV. ORDER NO.: \_\_\_\_\_

LABORATORY PROJECT ENGINEER'S NAME: \_\_\_\_\_

TEST SPECIMEN DESCRIPTION: \_\_\_\_\_

\_\_\_\_\_

VEHICLE NHTSA NO.: \_\_\_\_\_ VIN: \_\_\_\_\_

MFR: \_\_\_\_\_

APPARENT TEST FAILURE DESCRIPTION: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

FMVSS REQUIREMENT, PARAGRAPH S\_\_\_ :

\_\_\_\_\_

\_\_\_\_\_

NOTIFICATION TO NHTSA (COTR): \_\_\_\_\_

DATE: \_\_\_\_\_ BY: \_\_\_\_\_

REMARKS:

## 14. REPORTS....Continued

### 14.3 FINAL TEST REPORT

#### 14.3.1 COPIES

In the case of a test failure or retest (another test of a vehicle that exceeded the FMVSS 208 performance requirements), **SEVEN** copies of the Final Test Report, **FOUR** copies of the test film, **ONE** copy of the dummy calibrations, **TWO** copies of the electronic data media, and **ONE** copy of the test check sheets shall be submitted to the COTR within three weeks of test completion for acceptance. The Final Test Report format to be used by all Contractors can be found in this section.

Where there has been no indication of a test failure, **FIVE** copies of each Final Test Report, **THREE** copies of the test film, **ONE** copy of the dummy calibrations, **ONE** copy of the electronic data media and **ONE** copy of the test check sheets shall be submitted to the COTR within three weeks of test completion for acceptance.

Payment of Contractor's invoices for completed compliance tests may be withheld until the Final Test Report is accepted by the COTR. Do NOT submit invoices before the COTR is provided copies of all the report deliverables.

Contractors are required to submit the first Final Test Report in draft form within two weeks after the compliance test is conducted. The Contractor and the COTR will then be able to discuss the details of both test conduct and report content early in the compliance test program.

Film, electronic data, dummy calibrations and contractor test check sheets must be provided with the draft test report.

Contractors are required to PROOF READ all Final Test Reports before submittal to the COTR. The OVSC will not act as a report quality control office for Contractors. Reports containing a significant number of errors will be returned to the Contractor for correction, and a "hold" will be placed on invoice payment for the particular test.

#### 14.3.2 REQUIREMENTS

The Final Test Report with the associated documentation (including photographs) is relied upon as the chronicle of the compliance test. The Final Test Report will be released to the public domain after review and acceptance by the COTR. For these reasons, each final report must be a complete document capable of standing by itself.

The Contractor should use **detailed** descriptions of all compliance test events. Any events that are not directly associated with the standard but are of technical interest should also be included. The Contractor should include as much detail as possible in the report.

Instructions for the preparation of the first three pages of the final test report are provided below for the purpose of standardization.



**14. REPORTS....Continued****14.3.3 FIRST THREE PAGES****FRONT COVER**

A heavy paperback cover (or transparency) shall be provided for the protection of the final report. The information required on the cover is as follows:

(A) Final Report Number such as 208-ABC-9X-001, where —

208 is the FMVSS tested

ABC are the initials for the laboratory

9X is the Fiscal Year of the test program (or 0X after year 1999)

001 is the Group Number (001 for the 1st test, 002 for the 2nd test, 003 for the 3rd test, etc.)

(B) Final Report Title And Subtitle such as

SAFETY COMPLIANCE TESTING FOR FMVSS 208

Occupant Crash Protection

\*\*\*\*\*

World Motors Corporation

199X XYZ 4-door sedan

NHTSA No. CX0401

(C) Contractor's Name and Address such as

COMPLIANCE TESTING LABORATORIES, INC.

4335 West Dearborn Street

Detroit, Michigan 48090

**NOTE:** DOT SYMBOL WILL BE PLACED BETWEEN ITEMS (C) AND (D)

(D) Date of Final Report completion

(E) The words "FINAL REPORT"

(F) The sponsoring agency's name and address as follows

U. S. DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

Enforcement

Office of Vehicle Safety Compliance

Mail Code: NVS-220

400 Seventh Street, SW, Room 6115

Washington, DC 20590

**14. REPORTS....Continued**

## FIRST PAGE AFTER FRONT COVER

A disclaimer statement and an acceptance signature block for the COTR shall be provided as follows:

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared By: \_\_\_\_\_

Approved By: \_\_\_\_\_

Approval Date: \_\_\_\_\_

## FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: \_\_\_\_\_

Acceptance Date: \_\_\_\_\_

**14. REPORTS....Continued**

## SECOND PAGE AFTER FRONT COVER

A completed Technical Report Documentation Page (Form DOT F1700.7) shall be completed for those items that are applicable with the other spaces left blank. Sample data for the applicable block numbers of the title page follows.

## Block 1 — REPORT NUMBER

208-ABC-9X-001

## Block 2 — GOVERNMENT ACCESSION NUMBER

Leave blank

## Block 3 — RECIPIENT'S CATALOG NUMBER

Leave blank

## Block 4 — TITLE AND SUBTITLE

Final Report of FMVSS 208 Compliance Testing  
of a 200X World XYZ Deluxe 4-door sedan  
NHTSA No. CX0401

## Block 5 — REPORT DATE

March 1, 199X (or 200X)

## Block 6 — PERFORMING ORGANIZATION CODE

ABC

## Block 7 — AUTHOR(S)

John Smith, Project Manager  
Bill Doe, Project Engineer

## Block 8 — PERFORMING ORGANIZATION REPORT NUMBER

ABC-DOT-XXX-001

## Block 9 — PERFORMING ORGANIZATION NAME AND ADDRESS

ABC Laboratories  
405 Main Street  
Detroit, MI 48070

**14. REPORTS....Continued**

Block 10 — WORK UNIT NUMBER

Leave blank

Block 11 — CONTRACT OR GRANT NUMBER

DTNH22-9X-D-12345

Block 12 — SPONSORING AGENCY NAME AND ADDRESS

U.S. Department of Transportation  
National Highway Traffic Safety Administration  
Enforcement  
Office of Vehicle Safety Compliance  
Mail Code: NVS-220  
400 Seventh Street, SW, Room 6115  
Washington, DC 20590

Block 13 — TYPE OF REPORT AND PERIOD COVERED

Final Test Report  
Feb. 15 to Mar. 15, 199X (or 200X)

Block 14 — SPONSORING AGENCY CODE

NVS-220

Block 15 — SUPPLEMENTARY NOTES

Leave blank

Block 16 — ABSTRACT

Compliance tests were conducted on the subject 199X World XYZ 4-door sedan in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP208-XX for the determination of FMVSS 208 compliance. Test failures identified were as follows:

None

## 14. REPORTS....Continued

### Block 17 — KEY WORDS

Compliance Testing  
Safety Engineering  
FMVSS 208

### Block 18 — DISTRIBUTION STATEMENT

Copies of this report are available from the following:

National Highway Traffic Safety Administration  
Technical Information Services (NPO-405)  
400 Seventh St., SW, Room 5108  
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### Block 19 — SECURITY CLASSIFICATION OF REPORT

Unclassified

### Block 20 — SECURITY CLASSIFICATION OF PAGE

Unclassified

### Block 21 — NUMBER OF PAGES

Add appropriate number

### Block 22 — PRICE

Leave blank

## 14.3.4 TABLE OF CONTENTS

### Sample Test Report **Table of Contents:**

Section 1 — Purpose of Compliance Test

Section 2 — Tests Performed

Section 3 — Injury Result Summary

Section 4 — Discussion of Test (if applicable)

Section 5 — Test Data Sheets (list each sheet in order)

Section 6 — Test Data (including acceleration and load plots)

Section 7 — Photographs (Photographs of suppression tests and low risk deployment tests shall be included with the data sheets to which they apply.)

Section 8 — Notice of Test Failure (if applicable)

## 14. REPORTS....Continued

### 14.3.5 NON-DATA SHEET SECTION PAGES AND INSTRUCTIONS FOR THE REST OF THE TEST REPORT

#### PURPOSE

This Federal Motor Vehicle Safety Standard 208 compliance test is part of a program conducted for the National Highway Traffic Safety Administration by [**insert company name**] under contract [**insert contract number**]. The purpose of the test was to determine whether the subject vehicle, [**insert model year, make, model and NHTSA no.**], meets certain performance requirements of FMVSS 208, "Occupant Crash Protection"; [**include these if applicable, FMVSS 212, "Windshield Mounting"; FMVSS 219, "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity"**]. The compliance test was conducted in accordance with OVSC Laboratory Test Procedure No. TP208-XX dated \_\_\_\_\_, 200X.

**14. REPORTS....Continued**TESTS PERFORMED

The following checked items indicate the tests that were performed:

- 1. Rear outboard seating position seat belts (S4.1.4.2(b) & (S4.2.4))
- 2. Air bag labels (S4.5.1)
- 3. Readiness indicator (S4.5.2)
- 4. Passenger Air Bag Manual Cut-Off Device (S4.5.4)
- 5. Lap belt lockability (S7.1.1.5)
- 6. Seat belt warning system (S7.3)
- 7. Seat belt contact force (S7.4.3)
- 8. Seat belt latch plate access (S7.4.4)
- 9. Seat belt retraction (S7.4.5)
- 10. Seat belt guides and hardware (S7.4.6)
- 11. Air bag suppression telltale (S19.2.2)
- 12. Suppression tests with 12-month-old CRABI dummy (Part 572, Subpart N)
- 13. Suppression tests with Newborn infant (Part 572, Subpart K)
- 14. Suppression tests with 3-year-old dummy (Part 572, Subpart P)
- 15. Suppression tests with 6-year-old dummy (Part 572, Subpart R)
- 16. Test of Reactivation of the passenger Air Bag system with an Unbelted 5<sup>th</sup> Percentile female dummy
- 17. Low risk deployment test with 12-month-old dummy (Part 572, Subpart N)
- 18. Low risk deployment test with 3-year-old dummy (Part 572, Subpart P)
- 19. Low risk deployment test with 6-year-old dummy (Part 572, Subpart R)
- 20. Low risk deployment test with 5<sup>th</sup> female dummy (Part 572, Subpart O)
- 21. Impact tests
  - Frontal Oblique
    - Belted 50<sup>th</sup> male dummy driver and passenger (0 to 48 kmph) (S5.1.1.(a))
    - Unbelted 50<sup>th</sup> male dummy driver and passenger (0 to 48 kmph) (S5.1.2(a)(1))
    - Unbelted 50<sup>th</sup> male dummy driver and passenger (32 to 40 kmph) (S5.1.2(a)(1) or S5.1.2(b))
  - Frontal 0°
    - Belted 50<sup>th</sup> male dummy driver (0 to 48 kmph) (S5.1.1(b)(1) or S5.1.1(a))
    - Belted 50<sup>th</sup> male dummy passenger (0 to 48 kmph) (S5.1.1(b)(1) or S5.1.1(a))
    - Belted 5<sup>th</sup> female dummy driver (0 to 48 kmph) (S16.1(a))
    - Belted 5<sup>th</sup> female dummy passenger (0 to 48 kmph) (S16.1(a))
    - Belted 50<sup>th</sup> male dummy driver and passenger (0 to 56 kmph) ) (S5.1.1(b)(2))
    - Unbelted 50<sup>th</sup> male dummy driver and passenger (0 to 48 kmph) (S5.1.2(a)(1))
    - Unbelted 50<sup>th</sup> male dummy driver (32 to 40 kmph) (S5.1.2(a)(2) or S5.1.2(b))
    - Unbelted 50<sup>th</sup> male dummy passenger (32 to 40 kmph) (S5.1.2(a)(2) or S5.1.2(b))
    - Unbelted 5<sup>th</sup> female dummy driver (32 to 40 kmph) (S16.1(b))
    - Unbelted 5<sup>th</sup> female dummy passenger (32 to 40 kmph) (S16.1(b))
  - 40% Offset 0° Belted 5<sup>th</sup> female dummy driver and passenger (0 to 40 kmph) (S18.1)
- 22. Sled test: Unbelted 50<sup>th</sup> male dummy driver and passenger (S13)
- 23. FMVSS 204 indicant test
- 24. FMVSS 212 test
- 25. FMVSS 219 indicant test
- 26. FMVSS 301 frontal test

**14. REPORTS....Continued**

For the crash tests, the vehicle was instrumented with 8 accelerometers. The accelerometer data from the vehicle and dummies were sampled at [*insert sample rate*] and processed as specified in SAE J211/1 MAR95 and FMVSS 208, S4.13.

The dynamic tests were recorded using high speed [*choose the appropriate media: film or video*].

[*Choose the appropriate sentence: The vehicle appears to meet the performance requirements to which it was tested. or The vehicle appears to fail the following performance criterion(a): \_\_\_\_\_.*]



**14. REPORTS....Continued**

**INJURY RESULT SUMMARY FOR CRASH TESTS AND/OR  
LOW RISK DEPLOYMENT TESTS**

NHTSA No. \_\_\_\_\_

Test Date: \_\_\_\_\_

VIN \_\_\_\_\_

Frontal Crash  Offset Crash  Low Risk Deployment

Impact Angle: \_\_\_\_\_

Belted Dummies:  Yes  No

Speed Range:  0 to 40 kmph  32 to 40 kmph  0 to 48 kmph  0 to 56 kmph

Test Speed \_\_\_\_\_

Driver Dummy:  5<sup>th</sup> female  50<sup>th</sup> male

Passenger Dummy:  5<sup>th</sup> female  50<sup>th</sup> male

Test weight \_\_\_\_\_

**[Include any of the following result tables that are appropriate for the tests that were performed.]**

50<sup>th</sup> Percentile Male Frontal Crash Test  
Vehicles certified to S5.1.1(a) or S5.1.2(a)(1)

Injury Criteria	Max. Allowable Injury Assessment Values	Driver	Passenger
HIC36	1000		
Chest g	60 g		
Chest displacement	76 mm		
Left femur	10,000 N		
Right femur	10,000 N		

Injury measures calculated for data collected from 0 ms to \_\_\_\_\_ ms

## 14. REPORTS....Continued

50<sup>th</sup> Percentile Male Frontal Crash Test  
 Vehicles certified to S5.1.1(b)(1), S5.1.1(b)(2), S5.1.2(a)(2), or S5.1.2(b)

Injury Criteria	Max. Allowable Injury Assessment Values	Driver	Passenger
HIC15	700		
N <sub>te</sub>	1.0		
N <sub>tf</sub>	1.0		
N <sub>ce</sub>	1.0		
N <sub>cf</sub>	1.0		
Neck tension	4170 N		
Neck compression	4000 N		
Chest g	60 g		
Chest displacement	63 mm		
Left femur	10,000 N		
Right femur	10,000 N		

Injury measures calculated for data collected from 0 ms to \_\_\_ ms

5<sup>th</sup> Percentile Female [**choose one: Frontal or Offset**] Crash Test  
 Vehicles certified to S16.1(a), S16.1(b), or S18.1

Injury Criteria	Max. Allowable Injury Assessment Values	Driver	Passenger
HIC15	700		
N <sub>te</sub>	1.0		
N <sub>tf</sub>	1.0		
N <sub>ce</sub>	1.0		
N <sub>cf</sub>	1.0		
Neck tension	2620 N		
Neck compression	2520 N		
Chest g	60 g		
Chest displacement	52 mm		
Left femur	6805 N		
Right femur	6805 N		

Injury measures calculated for data collected from 0 ms to \_\_\_ ms

## 14. REPORTS....Continued

5<sup>th</sup> Percentile Female Low Risk Deployment Test  
Vehicles certified to S25.3

Injury Criteria	Max. Allowable Injury Assessment Values	Position 1	Position 2r
HIC15	700		
N <sub>te</sub>	1.0		
N <sub>tf</sub>	1.0		
N <sub>ce</sub>	1.0		
N <sub>cf</sub>	1.0		
Neck tension	2070 N		
Neck compression	2520 N		
Chest g	60 g		
Chest displacement	52 mm		
Left femur	6805 N		
Right femur	6805 N		

Injury measures calculated for data collected from 0 ms to \_\_\_ ms

6-Year Old Low Risk Deployment Test  
Vehicles certified to S24.4

Injury Criteria	Max. Allowable Injury Assessment Values	Position 1	Position 2r
HIC15	700		
N <sub>te</sub>	1.0		
N <sub>tf</sub>	1.0		
N <sub>ce</sub>	1.0		
N <sub>cf</sub>	1.0		
Neck tension	1490 N		
Neck compression	1820 N		
Chest g	60 g		
Chest displacement	40 mm		

Injury measures calculated for data collected from 0 ms to \_\_\_ ms

14. REPORTS....Continued

3-Year Old Low Risk Deployment Test  
Vehicles certified to S22.4

Injury Criteria	Max. Allowable Injury Assessment Values	Position 1	Position 2r
HIC15	570		
N <sub>te</sub>	1.0		
N <sub>tf</sub>	1.0		
N <sub>ce</sub>	1.0		
N <sub>cf</sub>	1.0		
Neck tension	1130 N		
Neck compression	1380 N		
Chest g	55 g		
Chest displacement	34 mm		

Injury measures calculated for data collected from 0 ms to \_\_\_ ms

12-Month Old Low Risk Deployment Test  
Vehicles certified to S20.4

	HIC15	N <sub>te</sub>	N <sub>tf</sub>	N <sub>ce</sub>	N <sub>cf</sub>	Neck tension	Neck compression	Chest g
Max. Allowable Injury Assessment Values	390	1.0	1.0	1.0	1.0	780 N	960 N	50 g
Child Restraint								

Injury measures calculated for data collected from 0 ms to \_\_\_ ms

**[Add as many rows as necessary for the child restraints tested.]**

**14. REPORTS....Continued**

Discussion of Test

***[Discuss any unexpected events or items that may be of interest. If there were no events or items to discuss, state that there were none.]***

**14. REPORTS....Continued**

After the "Discussion of Test" page, put in the completed applicable data sheets of Section 15 in order by data sheet number. Photographs, when taken for a specific test data sheet (e.g. suppression test or low risk deployment), shall be included directly after that data sheet. Next put in the plots of the electronic data that were collected during the test. Then put in the rest of the photographs after the data plots. Finally, put in the ambient temperature recording.