TP-301-04
January 17, 2007

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LABORATORY TEST PROCEDURE

FOR

FMVSS 212
Windshield Mounting

FMVSS 219
Windshield Zone Intrusion

FMVSS 301
Fuel System Integrity

(Passenger Cars, MPV's and Light Trucks with GVWR's under 4,536 kg)

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

OVSC LABORATORY TEST PROCEDURE NO. 301
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REVISION CONTROL LOG
FOR OVSC LABORATORY
TEST PROCEDURES

TP-301
(Fuel System Integrity)

TEST PROCEDURE		FMVSS 301		DESCRIPTION
REV. No.	DATE	AMENDMENT	EFFECTIVE DATE	
00	04/26/89	No Revision	04/26/89	Original release signed by O.D.
01	3/28/94		3/28/94	Add 2 appendices
02	11/8/94		11/8/94	Add lateral camera requirements
03	2/28/03	63FR28922	5/27/99	Conversion to metric and minor revisions
04	1/17/07		1/17/07	Reference 214 for lateral impact
05				
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1. PURPOSE AND APPLICATION

The purpose of the standard is to reduce deaths and injuries occurring from fires that result from fuel spillage during and after motor vehicle crashes. The standard applies to passenger cars, and to MPVs, trucks, and buses that have a GVWR of 4,536 kg or less. It also applies to school buses with a GVWR greater than 4,536 Kg. TP-301-SB covers these school buses.

The Office of Vehicle Safety Compliance (OVSC) provides contracted 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 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 shall submit a detailed test procedure to the COTR before initiating the compliance test program. The procedure shall 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 TPs 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 shall 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

FMVSS 212

When the vehicle traveling longitudinally forward at any speed up to and including 48.3 KM/H impacts a fixed collision barrier that is perpendicular to the line of travel of the vehicle, the windshield mounting of the vehicle shall retain not less than 50 percent of the portion of the windshield periphery on each side of the vehicle longitudinal centerline for vehicles equipped with front occupant automatic restraints, and 75 percent of the windshield periphery for vehicles not equipped with automatic restraints.

FMVSS 219

When the vehicle traveling longitudinally forward at any speed up to and including 48.3 KM/H impacts a fixed collision barrier that is perpendicular to the line of travel of the vehicle, no part of the vehicle outside the occupant compartment, except windshield molding and other components designed to be normally in contact with the windshield, shall penetrate the protected zone template to a depth of more than 6.4 mm, and no such part of a vehicle shall penetrate the inner surface of that portion of the windshield, within the daylight opening (DLO), below the protected zone.

FMVSS 301 — FUEL SPILLAGE — BARRIER CRASH

This standard applies to passenger cars, and to MPVs, trucks and buses that use fuel with a boiling point above 0°C. Fuel spillage in any fixed or moving barrier crash test shall not exceed 28 g from impact until motion of the vehicle has ceased, and shall not exceed a total of 142 g in the 5- minute period following cessation of motion. For the subsequent 25-minute period, fuel spillage during any 1 minute interval shall not exceed 28 g.

FMVSS 301 — FUEL SPILLAGE — ROLLOVER

This standard applies to passenger cars, and to MPVs, trucks and buses that use fuel with a boiling point above 0°C. Fuel spillage in any rollover test, from the onset of rotational motion, shall not exceed a total of 142 g for the first 5 minutes of testing at each successive 90° increment. For the remaining testing period, at each successive 90° increment, fuel spillage during any 1-minute interval shall not exceed 28 g.

3. SECURITY

The contractor shall provide appropriate security measures to protect the OVSC test vehicles and Government Furnished Property (GFP) such as test dummies from unauthorized personnel during the entire compliance testing program. The

3. SECURITY….continued

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 shall 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 Chief or Division Chief.

NOTE: NO INDIVIDUALS, OTHER THAN CONTRACTOR PERSONNEL DIRECTLY INVOLVED IN THE COMPLIANCE TESTING PROGRAM OR OVSC PERSONNEL, 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, test dummy storage area, 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 vehicle test schedule to the COTR prior to conducting the first compliance test. Tests shall be completed as required in the contract.

Scheduling of vehicle tests shall be adjusted to permit vehicles to be tested to other FMVSSs as may be required by the OVSC. All vehicle compliance testing shall be coordinated with the COTR in order to allow monitoring by the COTR and/or other OVSC personnel if desired.

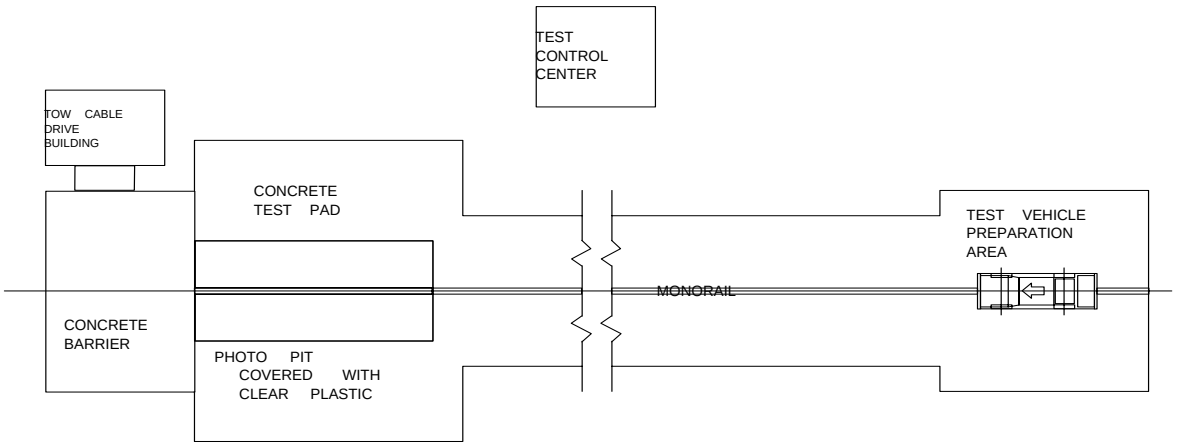
6. FACILITY AND EQUIPMENT

6.1 IMPACT TEST FACILITY

At a minimum, the impact test facility shall consist of a tow road, test pad area, fixed collision barrier (for frontal and oblique impact tests) and underground photographic pits. The facility shall be equipped with a tow and guidance system, test abort system, impact speed measurement and speed control systems and a static rollover device.

6. TEST DATA DISPOSITION ....continued

TYPICAL BARRIER IMPACT TEST FACILITY



6.2 IMPACT SPEED MEASUREMENT SYSTEM

Test vehicle or moving barrier impact speed or velocity shall be measured by 2 timing devices (photocells, break wires, laser beams, etc.) located within 1.5 meters of the impact plane. Both timing devices shall be accurate within plus or minus 0.08 km/h and shall be calibrated by an instrument traceable to the National Institute of Standards And Technology. The impact speed shall be permanently recorded (photograph of the digital readout from the timing device will suffice). A third timing device shall be placed at a sufficient distance from the impact plane for monitoring the speed of the test vehicle or moving barrier and permit a test abort if necessary.

6.3 MOVING BARRIER

The contractor shall have a moving barrier to conduct lateral and rear impact tests. The moving barrier shall consist of:

1. A common carriage constructed in accordance with Figure 1 of 571.301, which is symmetrical about a vertical plane containing its longitudinal axis.

2. A solid non-steerable front axle and fixed rear axle attached directly to the frame rails with no springs or other type suspension system on any wheel.

3. An impact surface that is a vertical, rigid, flat rectangle, 1981 mm (78 inches) wide and 1524 mm (60 inches) high, with its lower edge

6. TEST DATA DISPOSITION ....continued

horizontal and 127 mm (5 inches) above the ground surface. The impact surface shall be faced with a sheet of 19 mm (0.75 inch) thick exterior plywood, 1981 mm (78 inches) wide and 1524 mm (60 inches) high.

4. A braking device capable of stopping it.

5. Mounting brackets necessary to accommodate an overhead camera and abort brake system.

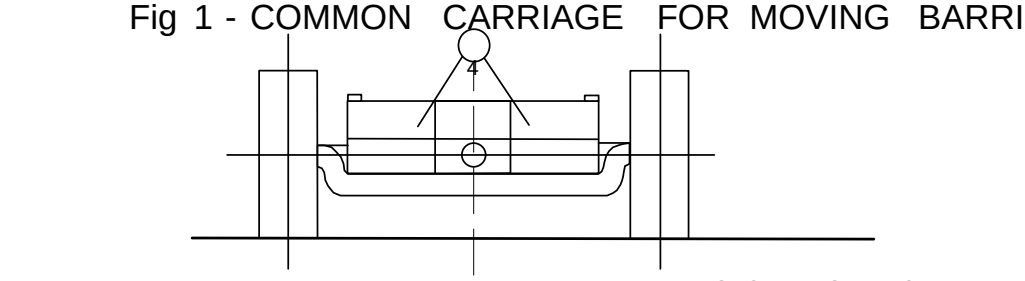
6. A weight distribution of 408.2 ± 11.3 kg at each rear wheel and 499 ± 11.3 kg at each front wheel when equipped with camera and abort system

7. Pneumatic tires on all wheels, P205/75R15, inflated to 200 +/- 21 kPa.

NOTE: The plywood shall be replaced as necessary during the compliance testing program.

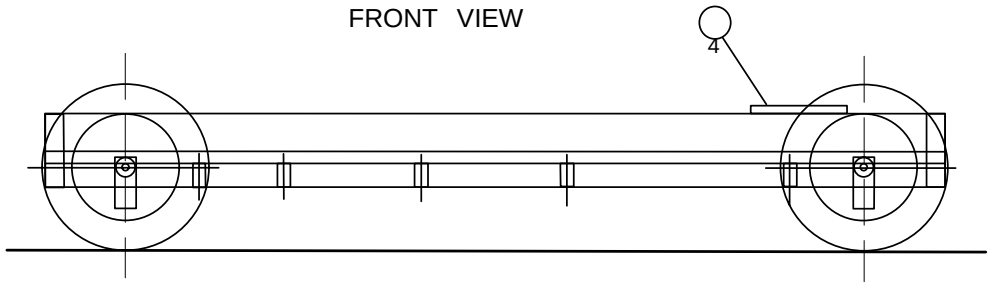
6. TEST DATA DISPOSITION ....continued

Fig 1 - COMMON CARRIAGE FOR MOVING BARRIERS

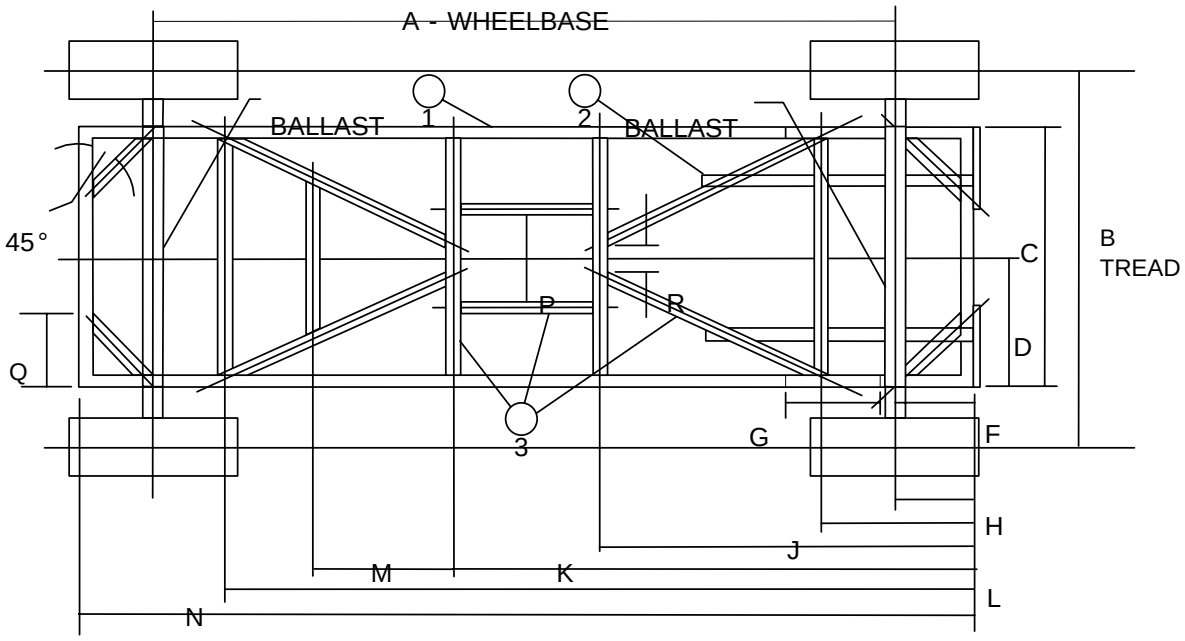


GROUND SURFACE

FRONT VIEW



SIDE VIEW GROUND SURFACE



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TOP VIEW

DIMENSIONS SHOWN IN TABLE ON NEXT PAGE

NOTES:

1. OUTER FRAME 6.0 x 2.0 x 0.19 in. (152 x 51 x 5 mm) STEEL TUBING, TWO PIECES WELDED TOGETHER FOR A 12.0 in. (305 mm) HEIGHT.
2. BALLAST TIE DOWNS.
3. ALL INNER REINFORCEMENTS AND FRAME GUSSETS OF 4.0 x 2.0 x 0.19 in. (102 x 51 x 5 mm) STEEL TUBING.
4. REINFORCE AREAS FOR BOLTING ON FACE PLATES.

6. TEST DATA DISPOSITION ....continued

DIMENSIONS FOR COMMON CARRIAGE FOR MOVING BARRIERS

LETTER	INCHES	MILLIMETERS
A	120.0	3048
B	60.0	1524
C	42.0	1067
D	21.0	533
E	144.0	3658
F	15.0	381
G	16.0	406
H	12.0	305
J	24.0	610
K	60.0	1524
L	84.0	2134
M	22.0	559
N	120.0	3048
P	16.0	406
Q	12.0	305
R	6.0	152

Note - Dimensions shall be within 5% of the specifications listed above

6.4 PHOTOGRAPHIC PIT

For FRONTAL and REAR impact tests, to permit underbody film coverage, the test pad area shall be equipped with a photographic pit. The pit shall be covered with plastic, Plexiglas, etc. strong enough to preclude any part of the vehicle from collapsing below ground level during the impact.

6.5 STATIC ROLLOVER DEVICE

The rollover device shall be capable of rotating the 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, with 90° of rotation taking place in any time interval from 1 to 3 minutes and holding in position up to 5 minutes.

6.6 WEIGHING SCALES

The scales used to weigh the test vehicle shall be accurate to within 0.1%.

6.7 TEST SURFACE AND TEST PAD AREA

The concrete surface upon which the vehicle is tested is level, rigid, and of uniform construction with a skid number of 75 when measured in accordance with American Society of Testing and Materials Method E: 274-65T at 64 km/h, omitting water delivery as specified in paragraph 7.1 of that method.

6. TEST DATA DISPOSITION ....continued

6.8 TOW ROAD

The tow road surface shall be straight, level, smooth and of uniform construction. The tow road shall be of sufficient length to allow stabilization of speed and attitude of the moving barrier (in lateral or rear impact tests) or the test vehicle (in frontal or oblique impact tests).

6.9 TOW AND GUIDANCE SYSTEM

The tow and guidance system shall be capable of ensuring that the moving barrier (in lateral or rear impact tests) or the test vehicle (in frontal or oblique impact tests) impact at the proper angle and within the speed tolerances specified for each type of test. The moving barrier or test vehicle shall be continuously towed up until it reaches 610 mm to 152 mm from impact. The tow cable attachment device shall release from the tow cable within the tolerance window. The velocity measurement shall be taken after cable release.

6.10 TEST ABORT SYSTEM

Test vehicles and the moving barrier shall be equipped with onboard brake abort systems. For rear impact compliance tests, the target vehicle and the moving barrier brake systems shall not be activated until after the final vehicle/barrier separation has occurred unless the vehicle rear wheels are jammed by deformed sheet metal and the vehicle remains against the moving barrier's face throughout the braking process. Moving barrier brakes shall be applied in advance of test vehicle brakes in order to preclude secondary impacts. The OVSC recommends the use of redundant brake abort systems.

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7. GOVERNMENT FURNISHED PROPERTY (GFP)

GFP shall consist of anthropomorphic test devices (test dummies) and test vehicles.

TEST DUMMIES

NHTSA’s Dummy Management will furnish an adequate number of Part 572 50th-percentile adult male test dummies to the contract laboratory. These dummies shall be stored in an upright seated position in a secured area which is temperature controlled between 10°C and 30°C. The contractor shall inspect the dummies for component damage after each crash test usage. The contractor shall keep the NHTSA Dummy Management informed of the need for dummy replacement components.

TEST VEHICLES

The Contractor shall be responsible for accepting test vehicles from either new car dealers or vehicle transporters. In both instances, the contractor acts in the

7. GOVERNMENT FURNISHED PROPERTY (GFP) ....continued

OVSC's behalf when signing an acceptance of test vehicles. The contractor shall complete a thorough visual inspection of test vehicle prior to acceptance. The contractor shall complete a Vehicle Condition Report form and fax to the COTR within 24 hours after a vehicle has been delivered (see section 16, FORMS).

In addition to the above, the Contractor shall check for any damage, which may have occurred during transit. The Contractor shall document the inspection and report any problems to the COTR. This notification shall occur prior to preparation of the vehicle for testing.

8. CALIBRATION OF TEST INSTRUMENTS

Before the contractor initiates the safety compliance test program, the contractor shall implement and maintain a test instrumentation calibration system in accordance with ISO-10012-1, Calibration System Requirements. The calibration system shall be set up and maintained by the contractor as follows:

A. Standards for calibrating the measuring and test equipment shall 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 TO EXCEED 12 MONTHS! Records, showing the calibration traceability to the National Institute of Standards and Technology (NIST), shall be maintained for all measuring and test equipment.

C. All measuring and test equipment and measuring standards shall 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

8. CALIBRATION OF TEST INSTRUMENTS....continued

(5) Type of standard used to calibrate the equipment (calibration traceability of the standard shall be evident)

E. Records of calibration for all test instrumentation shall be kept by the contractor in a manner, which assures the maintenance of established calibration schedules. All such records shall be readily available for inspection when requested by the COTR. The calibration procedure shall be approved by the COTR before the test program commences.

9 PHOTOGRAPHIC DOCUMENTATION

9.1 COLOR PHOTOGRAPHS

The contractor shall take pretest and post test still color photographs. The photographs shall be 8 x 10 inches, and properly focused for clear images. A tag, label or placard identifying the test vehicle year, make and model, NHTSA number and date shall appear in each photograph and shall be legible. Each still photograph shall be labeled as to the subject matter.

As a minimum the following pretest and post test still photographs shall be included in each vehicle final test report, submitted by the contractor:

A. Front view of vehicle

B. Left side view of vehicle

C. Right side view of vehicle

D. Rear view of vehicle

E. 3/4 frontal view from left side of vehicle

F. 3/4 rear view from right side of vehicle

G. Underbody view of fuel tank area and fuel system components

H. Underbody view of engine area and fuel system components

I. Vehicle's certification label (pretest only)

J. Vehicle's tire information label (pretest only)

K. Full view of windshield with and without zone template (frontal test only)

L. Other photographs requested by COTR

9.2 CAMERA COVERAGE

High-speed photographic coverage:

The contractor shall document the crash event by a combination of high-speed color digital cameras and/or high-speed color 16 mm motion picture cameras or, if possible, all high-speed digital cameras. The specification for "high-speed digital cameras" and “high-speed motion picture cameras” are listed below.

Film and digital files shall be on a compact disc as AVI or MPEG files with standard or genrally 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 resolutions can be used if approved by the COTR.

Specifications:

1. High-speed motion picture cameras shall record on 16 mm color negative film and operate at 1000 frames per second for at least 10 ms before barrier contact and for at least 310 ms after barrier contact.

   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. 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 coordinates of the film recorded for each camera.

2. High-speed digital cameras shall record at 1000 frames per second for at least 10 ms before barrier contact and for at least 310 ms after barrier. 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 cameras views may not need to meet these specifications. Cameras that do not meet these specifications may be used if approved by the COTR**.** Digital files shall be on a compact disc saved as an AVI or MPEG file with standard or generally available "codec." Other types of files can be used if approved by the COTR

   A time zero light must be registered in a frame to indicate when contact with the barrier is made in a crash test or when the air bag is fired in a low risk deployment test in order to permit vehicle and dummy kinematics analysis on a film analyzer. The contractor shall report all camera locations along with camera speeds and lens focal lengths on the appropriate final repot data sheets. Camera locations will be referenced to the barrier face and monorail centerline with the X, Y, and Z coordinates of the film recorded for each camera.

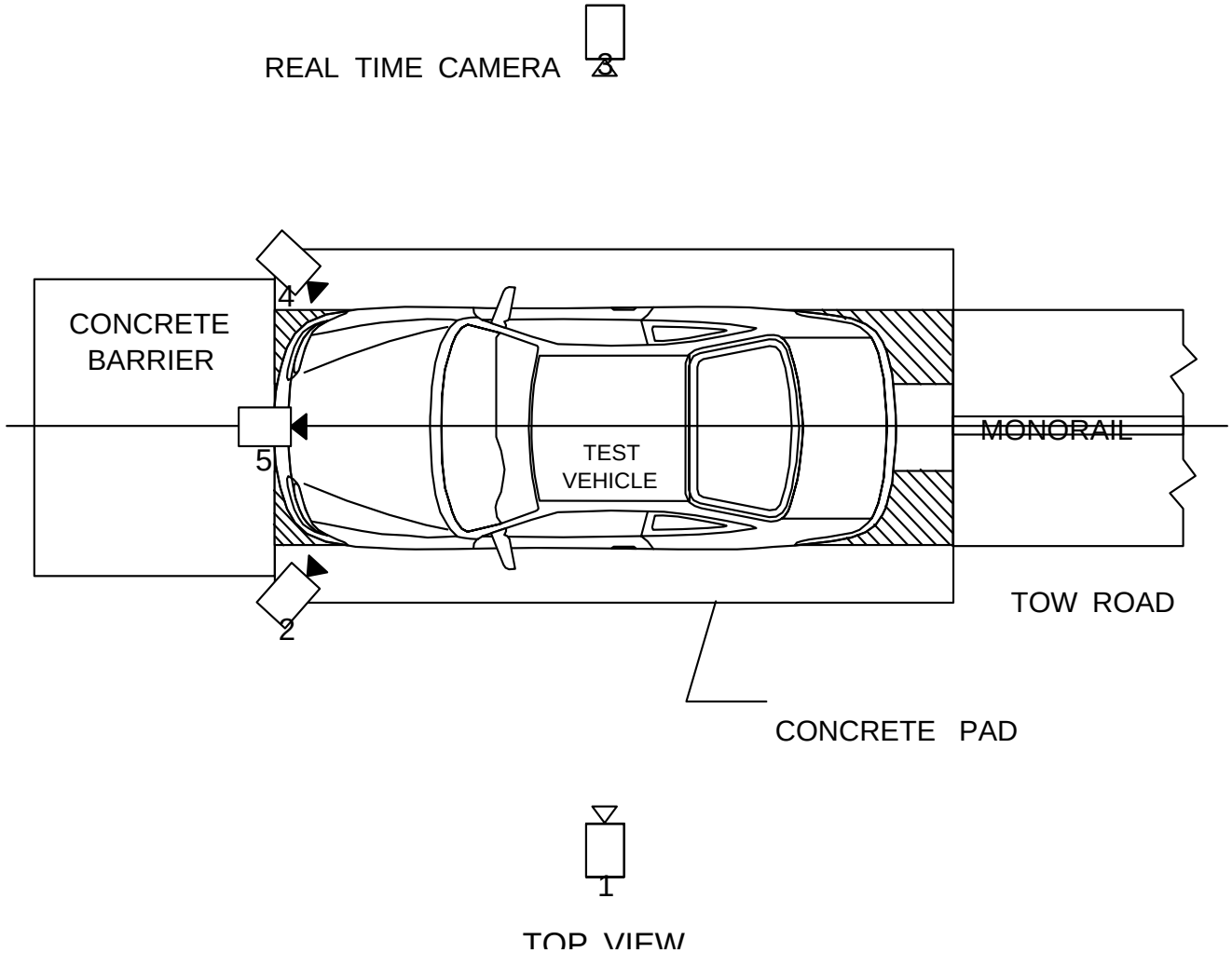
When a combination of film and digital cameras is used, the COTR will advise the contractor as to where the digital cameras will be utilized.

Real time photographic coverage

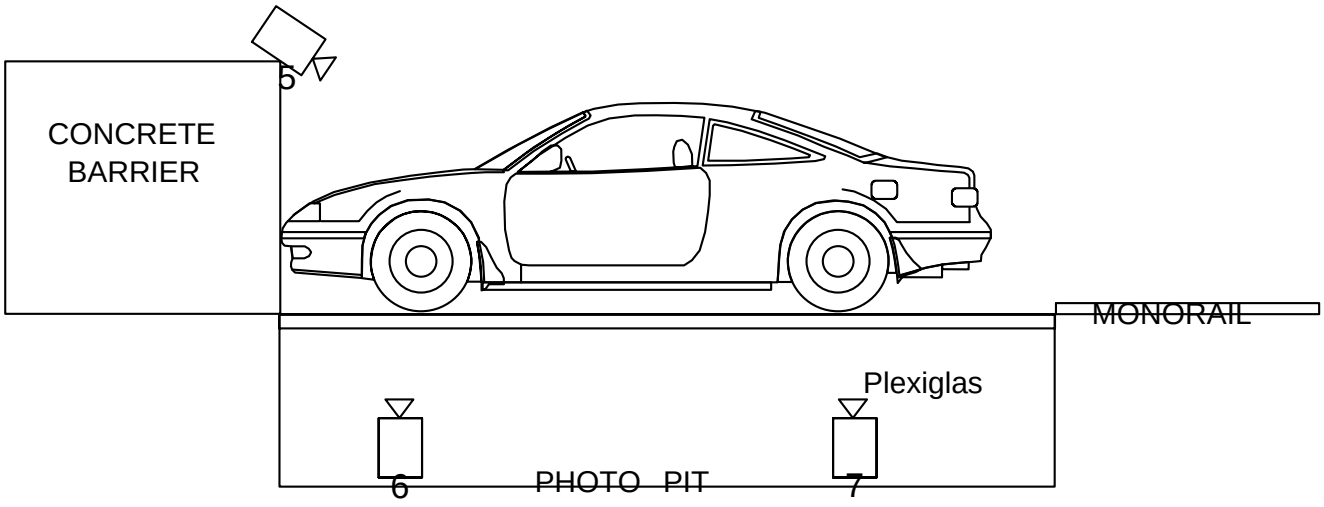
The contractor shall use a "real time" color digital and/or color motion picture camera with at least 24 fps to record the installation of the fuel filler cap onto the filler neck and the rotation of the cap to the installed position. The installation of the filler cap shall appear in the final version of the 16 mm motion picture or as a single motion picture file. The contractor shall also use this camera to record the right side of the vehicle or moving barrier as it travels down the tow road and through the impact event. The contractor shall use a hand held "real time" color digital or color camera with at least 24 fps to record any fluid spillage and its collection after the impact or during static rollover.

9.3 CAMERA LOCATIONS

A. Frontal Impact Test



9. PHOTOGRAPHIC DOCUMENTATION....continued



LEFT SIDE VIEW

CAMERA 1	A high-speed motion picture camera placed in an area to capture the left-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 2	A high-speed motion picture camera placed in an area to capture a close-up, three-quarter's front and left side view of the test vehicle.
CAMERA 3	A real time motion picture camera placed in an area to capture a right-side pan view of the impact event.
CAMERA 4	A high-speed motion picture camera placed in an area to capture a a close-up, three-quarter's front and right side view of the vehicle.
CAMERA 5	A high speed motion picture camera placed along the longitudinal centerline of the test vehicle to capture the front view of the test vehicle during impact.

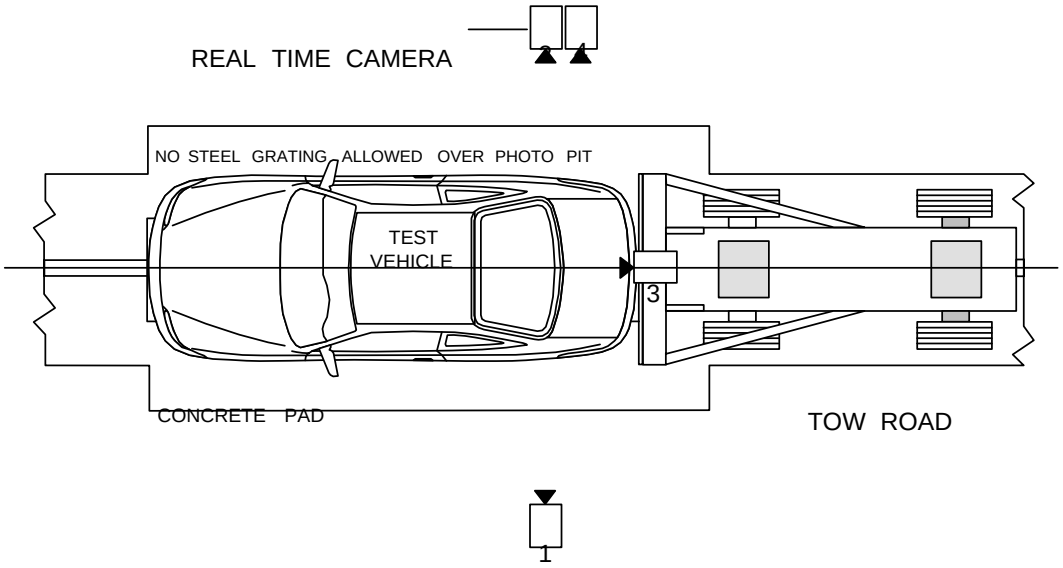
9. PHOTOGRAPHIC DOCUMENTATION....continued

CAMERA 6 — A high-speed motion picture camera positioned in the photographic pit beneath the front half of the vehicle's underbody to document any Stoddard solvent spillage.

CAMERA 7 — A high-speed motion picture camera positioned in the photographic pit beneath the rear half of the vehicle's underbody to document any Stoddard solvent spillage.

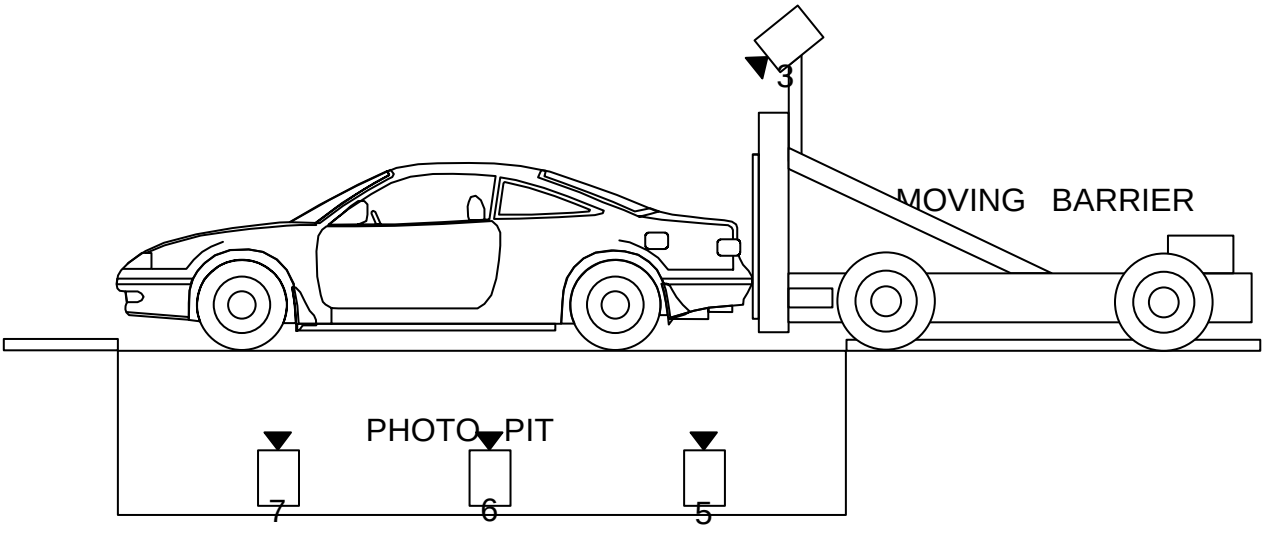
B. Rear Impact Tests

This test describes the 30 mph rear impact test. The new 50 mph rear impact test is currently being phased-in (complete phase-in by September 1, 2008). See TP-301R for the 50 mph rear impact test.



TOP VIEW

9. PHOTOGRAPHIC DOCUMENTATION....continued



LEFT SIDE VIEW

CAMERA 1	A high-speed motion picture camera placed in an area to capture the left rear-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 2	A real time motion picture camera placed in an area to capture a right-side pan view of the impact event.
CAMERA 3	A high-speed motion picture camera placed on the moving barrier along its longitudinal centerline to capture a close-up view of the impact event.
CAMERA 4	A high-speed motion picture camera placed in an area to capture the right rear-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 5	A high-speed motion picture camera positioned in the photographic pit beneath the rear half of the vehicle's underbody to document any Stoddard solvent spillage.

9. PHOTOGRAPHIC DOCUMENTATION....continued

CAMERA 6	A high-speed motion picture camera positioned in the photographic pit beneath the middle of the vehicle's underbody to document any Stoddard solvent spillage.
CAMERA 7	A high-speed motion picture camera positioned in the photographic pit beneath the front of the vehicle's underbody to document any Stoddard solvent spillage.
CAMERA 8	A high-speed motion picture camera suspended above the impact area to capture the entire impact event (not shown in Figure)

C. Lateral Impact Tests

The Lateral Impact Test is identical to the FMVSS No. 214 Test Procedure. See this test procedure for conducting this impact test.

D. UNDERBODY PAINT

The underbody of the test vehicle shall be painted flat white and the various fuel system components such as the fuel tank, filler pipe, supply line, return line, etc., painted in contrasting colors such as red, green, orange, etc., to aid photography and identification placards used as previously noted.

10. DEFINITIONS

DAYLIGHT OPENING (DLO)

Maximum unobstructed opening through the glazing surface (windshield), including reveal or garnish moldings adjoining the surface, as measured parallel to the outer surface of the glazing material.

DESIGNATED SEATING CAPACITY (DSC)

Number of designated seating positions (DSPs) provided.

DESIGNATED SEATING POSITION (DSP)

Any plan view location capable of accommodating a person at least as large as a 5th- 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 (MPV) with a GVWR less than 4,536 kg, having greater than 1270 mm of hip room (measured in accordance with SAE J1100a) shall have not less than 3 designated seating positions, unless the seat

10. DEFINITIONS....continued

design or vehicle design is such that the center position cannot be used for seating.

FIXED COLLISION BARRIER
(used for perpendicular Frontal and 1° to 30° Oblique impacts)

A flat, vertical, unyielding surface with the following characteristics:

A. At a minimum, the barrier shall consist of a reinforced concrete structure 1.8 meters high, 1.8 meters thick and 3.6 meters wide, weighing at least 45,360 kg. The barrier face shall be adjustable for conducting 30° oblique impact tests. The barrier face shall be faced with a sheet of 19 mm inch thick exterior plywood which is 1.2 meters high by 2.4 meter wide. The plywood shall be replaced as necessary during the compliance testing program.

B. The surface is sufficiently large that when struck by a test vehicle, no portion of the vehicle projects or passes beyond the surface.

C. When struck by a vehicle, the surface and its supporting structure absorb no significant portion of the vehicle's kinetic energy.

FORWARD CONTROL VEHICLE (FCV)

Configuration in which more than half of the engine length is rearward of the foremost point of the windshield base and the steering wheel hub is in the forward quarter of the vehicle length.

FUEL SPILLAGE

The fall, flow, or run of fuel from the vehicle but does not include wetness resulting from capillary action.

GROSS AXLE WEIGHT RATING (GAWR)

Value specified by the vehicle manufacturer as the load-carrying capacity of a single axle system, as measured at the tire-ground interfaces.

GROSS VEHICLE WEIGHT RATING (GVWR)

Value specified by the manufacturer as the loaded weight of a single vehicle.

LONGITUDINAL OR LONGITUDINALLY

Parallel to the longitudinal centerline of the vehicle.

10. DEFINITIONS....continued

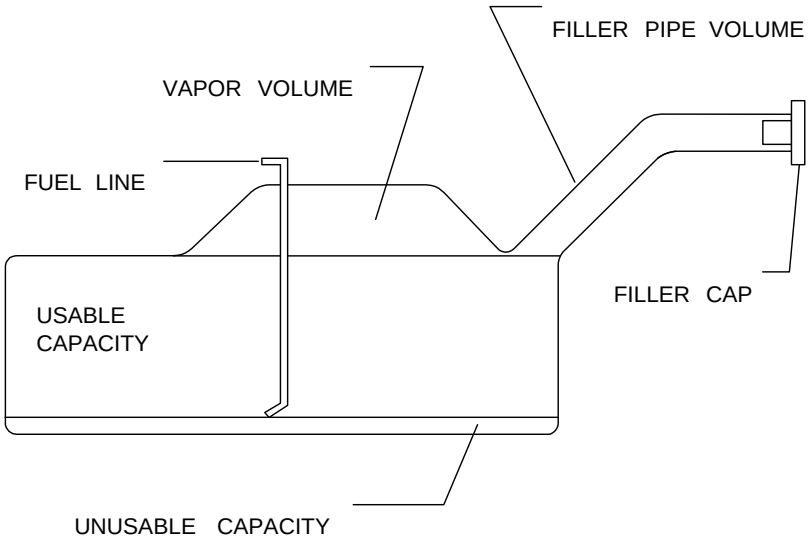
MULTIPURPOSE PASSENGER VEHICLE (MPV)

Motor vehicle with motive power, except a trailer, designed to carry 10 persons or less which is constructed either on a truck chassis or with special features for occasional off- road operation.

UNLOADED VEHICLE WEIGHT (UVW)

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 is use.

VEHICLE FUEL TANK ASSEMBLY



VEHICLE FUEL TANK CAPACITY

Fuel 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 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

10. DEFINITIONS....continued

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.

NOTE: The "usable capacity" and "unusable capacity" figures will be furnished by the COTR. This information is obtained from the vehicle manufacturers.

11. PRETEST REQUIREMENTS

Prior to conducting any compliance tests, contractors shall submit a detailed in-house compliance test procedure to the COTR, which includes a step-by-step description of the methodology to be used. The contractor shall obtain written approval from the COTR before initiating the compliance test program so that all parties are in agreement.

The contractor's test procedure shall contain a complete listing of test equipment and a detailed check-off list. There shall be no contradiction between the OVSC Laboratory Test Procedure (TP) and the contractor's in-house test procedure. The list of test equipment shall include instrument accuracy and calibration dates.

TEST DATA LOSS

A compliance test shall not to be conducted unless all of the various test conditions specified in the applicable OVSC Laboratory Test Procedure are met. Failure of a contractor to obtain the required test data and to maintain acceptable limits on test parameters (such as impact velocity) in the manner outlined in the applicable OVSC Laboratory Test Procedure shall require a retest at the expense of the contractor. The retest costs shall include the cost of the replacement vehicle or item of motor vehicle equipment and the service costs for conducting the retest.

PHOTOGRAPHIC PITS

Photographic pits shall be located in the tow road both at the fixed collision barrier face and at mid-range so that any possible Stoddard solvent spillage can be photographed during a frontal, oblique, rear or lateral impact event. Pit obstructions such as cross supports, excessive grating (applies to frontal and oblique impacts only), monorail, etc. shall be removed from the field of view of the 2 or 3 pit high speed motion picture cameras.

TEST VEHICLE AND MOVING BARRIER GUIDANCE

A guidance system is required to assure that the test vehicle or the moving barrier impacts the target at the proper angle. Normally the monorail, which extends along the center of the tow road, is used for lateral guidance with a small dolly or guide shoe "riding" on the monorail and engaging the drive cable through a set of jaws, which grip the cable. SOLID CONNECTIONS between the guide shoe and the test vehicle or moving barrier ARE **NOT** ALLOWED — cables with tensioning turnbuckles extending from the test vehicle's left and right side lower control arms to the guide shoe shall be used. The guide shoe is normally released from the monorail at the entrance to the

11. PRETEST REQUIREMENTS.....continued

photographic pit and the test vehicle or moving barrier free wheels into the barrier face or target vehicle. The monorail shall not extend over the photographic pit. The release of the barrier shall take place between 152 and 610 mm from the impacted side of the test vehicle. There shall be a minimum amount of steel grating over the fixed collision barrier photographic pit in order to allow for maximum photographic coverage of the test vehicle's underbody area.

NOTE: Per the requirements of FMVSS 301, steel grating is NOT allowed for rear impact tests. The test vehicle shall be placed on a concrete test surface.

12. TEST EXECUTION

12.1 TEST VEHICLE PREPARATION

A. VEHICLE TEST WEIGHT AS DELIVERED (UVW)

After the test vehicle is received, add fluids to levels specified in the owner's manual and then weigh the vehicle. Record on data sheet as "Unloaded Vehicle Weight" (UVW).

TARGET TEST WEIGHT (TTW)

Calculate the vehicle's Rated Cargo and Luggage Weight (RCLW). RCLW is determined by using the information contained on the vehicle's tire placard required by FMVSS 110, "Tire Selection and Rims," and usually affixed to the vehicle's left B post. Standard 110 requires that the Vehicle Capacity Weight (VCW) and Designated Seating Capacity (DSC) or number of occupants be recorded on the tire placard. Calculate and record RCLW as follows:

RCLW = VCW - (DSC X 68 kg. per occupant)

If Standard 110 information is not available for a MPV, light truck or bus, use the following calculation:

RCLW = GVWR - UVW - (68 kg x DSC), where DSC is obtained by counting the total number of seat belt locations throughout the vehicle

Calculate and record the Target Test Weight (TTW) as follows:

TTW = UVW + RCLW + (2 dummies x 74 kg. /dummy)

MPV's, light trucks and buses with a **MAXIMUM** GVWR 4,536 kg are loaded to UVW , plus 136 kg or its RCLW (furnished by the COTR), whichever is **LESS,** secured to the vehicle, plus a Part 572 dummy at each front outboard seating position.

12. TEST EXECUTION.....continued

AS TESTED (ACTUAL TEST WEIGHT)

Drain the fuel system and operate the engine until the fuel system is dry. Slowly refill the entire fuel system (rotate engine) with Stoddard solvent which has been dyed purple, having the physical and chemical properties of Type 1 solvent or cleaning fluid, Table 1, ASTM Standard D484-71, "Standard Specifications for Hydrocarbon Dry-cleaning Solvents" until, not less than 92 percent and not more than 94 percent, of the vehicle manufacturer's stated "usable capacity" is reached (use the useable capacity supplied by manufacturer, do not use values in the owners manual). This volume will be furnished by the COTR.

Stoddard solvent shall be filtered while being introduced into the fuel system. Drain all other fluids from the test vehicle with the exception of brake fluid if required for abort system, so that Stoddard solvent leakage from the fuel system shall be evident. Just prior to the test, operate the engine to assure that Stoddard solvent is present throughout the entire fuel system.

Load the vehicle with the required test dummies and necessary on-board test equipment (including all instrumentation, cameras, lighting, etc.) and then add ballast, if necessary, to achieve the Target Test Weight. The load is distributed so that the weight on each axle as measured at the tire-ground interfaces is in proportion to its GAWR.

The Actual Test Weight (ATW) shall have the following boundaries;

$(TTW - 9\ kg.) \leq ATW \leq TTW$

If the ATW exceeds TTW, the contractor shall notify the COTR to discuss the possible removal of vehicle components or instrumentation, which would decrease the weight.

UNDER NO CIRCUMSTANCES SHALL THE ACTUAL TEST WEIGHT (ATW) BE GREATER THAN THE TARGET TEST WEIGHT (TTW).

B. VEHICLE ATTITUDE MEASUREMENTS

If the test vehicle has an AUTO-LEVELING SYSTEM the system shall be powered (ignition "on") when attitude measurements are made.

12. TEST EXECUTION.....continued

AS DELIVERED ATTITUDE

With the test vehicle in the “As Delivered” (full fluids) condition, position the vehicle on a level surface and inflate all tires to the manufacturer's specifications as listed on the vehicle's tire information label or placard. Measure the distance between each of the four tire-to-ground interfaces and a pre-selected reference point on the test vehicle’s body, directly above each wheel opening. Record on data sheet as the “As Delivered” attitude.

AS TESTED ATTITUDE

With the test vehicle in the “As Tested” condition, position the vehicle on a level surface and inflate all tires to the manufacturer's specifications as listed on the vehicle's tire information label or placard. Measure the distance between each of the four tire-ground interfaces and the pre-selected reference point (same points used for “As Delivered”) on the test vehicle’s body directly above each wheel opening. Record on data sheet as the “As Tested” attitude.

C. FRONT SEAT CUSHION ADJUSTMENT

Adjustable front seats are in the adjustment position MIDWAY between the forwardmost and rearmost positions, and if separately adjustable in a vertical direction, are at the LOWEST position. If an adjustment position does not exist midway between the forwardmost and rearmost positions, the closest adjustment position to the REAR of the midpoint is used. Record the extremes of seat cushion adjuster fore and aft travel and the midpoint on the vehicle's rocker panel or side sill cover plate using a black marker after placing a vertical reference line on the outboard side of the front seat(s).

D. FRONT SEAT BACK ADJUSTMENT

Place adjustable front seat backs in the vehicle manufacturer's NOMINAL DESIGN RIDING POSITION in the manner specified by the manufacturer (information to be furnished by COTR). Place each adjustable head restraint in its highest adjustment position. Adjustable lumbar supports are positioned so that the lumbar support is in its LOWEST adjustment position.

E. STEERING COLUMN ADJUSTMENT

Adjustable steering controls are adjusted so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If there is no center position, use the next upper or lower position as supplied by the manufacturer.

12. TEST EXECUTION.....continued

F. PART 572B OR 572E TEST DUMMIES

50th-percentile adult male Part 572 test dummies are placed in each front outboard seating position. The following instructions apply:

(1). In vehicles equipped with bench seats, the upper torso of driver and passenger test dummies shall rest against the seat back. The midsagittal plane of the driver dummy shall be vertical and parallel to the vehicle's longitudinal centerline, and pass through the center of the steering wheel rim. The midsagittal plane of the passenger dummy shall be vertical and parallel to the vehicle's longitudinal centerline and the same distance from the vehicle's longitudinal centerline as the midsagittal plane of the driver dummy.

(2). In vehicles equipped with bucket seats, the upper torso of the driver and passenger test dummies shall rest against the seat back. The midsagittal plane of the driver and passenger dummy shall be vertical and shall coincide with the longitudinal centerline of the bucket seat.

(3). Dummies are restrained only by means that are installed in the test vehicle. Consult vehicle's owners manual for proper usage of occupant restraints.

G. SECURING BALLAST

Double canvas bags filled with sand, or lead shot shall be secured in the luggage or cargo area (at the centroid of luggage mass if possible) using seat belt webbing or steel straps attached to the vehicles rear floorpan. Steel plates may be secured to the cargo area as long as securement devices are not in the vicinity of any fuel system component.

H. MOVABLE WINDOW PLACEMENT

Movable vehicle windows and vents are placed in the fully open position.

I. CONVERTIBLE TOP PLACEMENT

Convertibles and open-body type vehicles have the top, if any, in place in the closed passenger compartment configuration.

J. DOOR LATCH PLACEMENT

Doors are fully closed and latched but not locked.

12. TEST EXECUTION.....continued

K. PARKING BRAKE AND TRANSMISSION PLACEMENT

The parking brake is disengaged and the transmission is in neutral.

TEST REQUIREMENTS FOR FMVSS 212, WINDSHIELD MOUNTING

When a passenger car, multipurpose passenger vehicle (MPV), light truck or bus (GVWR of 4,536 Kg or less and **MAXIMUM** unloaded vehicle weight or UVW of 2,495 Kg) traveling longitudinally forward at 47.3 km/h ± 0.8 km/h impacts a fixed collision barrier that is perpendicular to the line of travel of the vehicle (PERPENDICULAR FRONTAL IMPACT TEST), the windshield mounting of the vehicle shall retain NOT LESS than the minimum portion of the windshield periphery as follows:

A. Vehicles equipped with automatic occupant restraint systems shall retain not less than 50% of the portion of the windshield periphery on each side of the vehicle longitudinal centerline.

B. Vehicles NOT equipped with automatic occupant restraint systems shall retain not less than 75% of the windshield periphery.

NOTE: The standard does NOT apply to vehicles with a UVW greater than 2,495 Kg or to forward control vehicles, walk-in van-type vehicles, or to open-body-type vehicles with fold-down or removable windshields.

The following test condition shall apply: The windshield mounting material and all vehicle components in direct contact with the mounting material are at any temperature between –9.4 ºC and 43.3 ºC. Temperature measurement shall be made 15 minutes before the frontal impact test.

TEST REQUIREMENTS FOR FMVSS 219, WINDSHIELD ZONE INTRUSION

- **Compliance Test**

When a passenger car, multipurpose passenger vehicle (MPV), light truck or bus (GVWR of 4,536 kg or less) traveling longitudinally forward at 47.3 km/h plus or minus 0.8 km/h impacts a fixed collision barrier that is perpendicular to the line of travel of the

12. TEST EXECUTION.....continued

vehicle (PERPENDICULAR FRONTAL IMPACT TEST), no part of the vehicle outside the occupant compartment, except windshield molding and other components designed to be normally in contact with the windshield, shall penetrate the protected zone template, affixed to the windshield, to a depth of more than 6.4 mm, and no such part of the vehicle shall penetrate the inner surface of that portion of the windshield, within the daylight opening (DLO) below the protected zone.
NOTE: The standard does NOT apply to forward control vehicles, walk-in van-type vehicles, or to open-body-type vehicles with fold-down or removable windshields.

Protected Zone Template — The lower edge of the protected zone is determined by the following:

A. Place a 16.5 cm diameter rigid sphere weighing 6.8 kg in a position such that it simultaneously contacts the inner surface of the windshield glazing and the surface of the instrument panel, including padding. If any accessories or equipment such as the steering control system obstruct positioning of the sphere, remove them, and then replace them prior to barrier impact testing.

B. Draw the locus of points on the inner surface of the windshield contactable by the sphere across the width of the instrument panel. From the outermost contactable points, extend the locus line horizontally to the edges of the glazing material. **NOTE**: Do not scratch glazing as a method of marking the contact between sphere and windshield.

C. Draw a line on the inner surface of the windshield below and 1.3 cm distant from the locus line.

D. The lower edge of the protected zone is the longitudinal projection onto the outer surface of the windshield on the line determined in item C.

The Protected Zone is the space enclosed by the following surfaces:

A. The outer surface of windshield in the pre-crash configuration.

B. The locus of points 7.6 cm outward along perpendiculars drawn to each point on the outer surface of the windshield.

C. The locus of lines forming a 45º angle with the outer surface of the windshield at each point along the top and side edges of the outer surface of the windshield and the lower edge of the protected zone previously determined, in the plane perpendicular to the edge at that point.

A Windshield Zone Template (WZT) is cut or formed from Styrofoam, type DB, cut cell, to the dimensions of the protected zone previously determined. The WZT is affixed to the windshield so that it delineates the protected zone and remains affixed throughout the frontal barrier impact compliance test. The following test conditions shall apply:

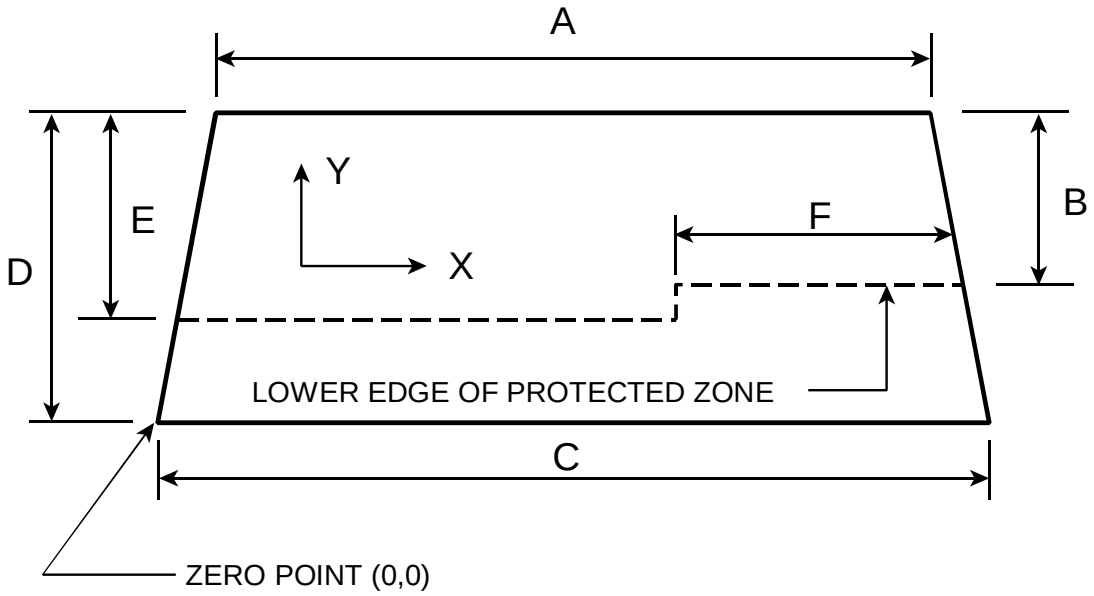
12. TEST EXECUTION.....continued

A. The protected zone template is affixed to the windshield in a manner previously described.

B. The hood, hood latches, and any other hood retention components are engaged prior to the frontal barrier impact test.

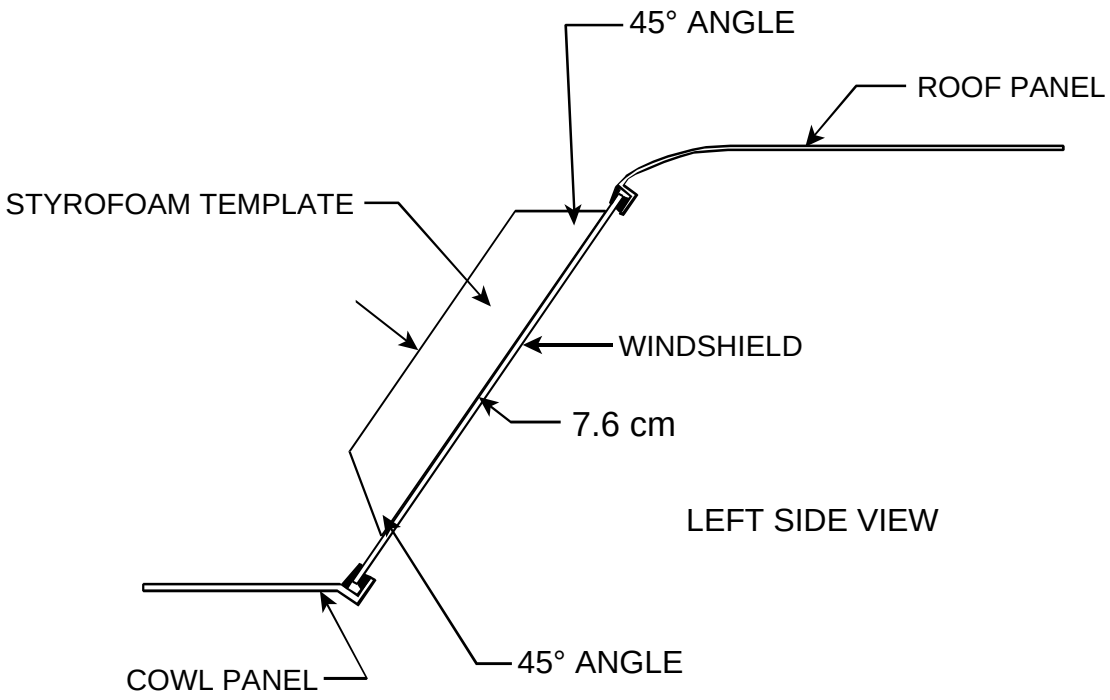
C. Adjustable cowl tops or other adjustable panels in front of the windshield are in the position used under normal operating conditions when windshield-wiping systems are not in use.

FRONT VIEW OF WINDSHIELD



12. TEST EXECUTION....Continued

CROSS-SECTIONAL VIEW OF PROTECTED ZONE TEMPLATE



NOTE: VERTICAL SLOTS CUT IN FOAM TEMPLATE
ON SIDE WHICH IS PLACED AGAINST WINDSHIELD

TEST REQUIREMENTS FOR FMVSS 219, WINDSHIELD ZONE INTRUSION - INDICANT TEST

To perform the FMVSS 219 Indicant Test, determine the Protective Zone as described above in the FMVSS Compliance Test Procedure. Draw a line defining the Protective Zone but **do not** use a Styrofoam Windshield Template. Penetration to the windshield shall be determined solely by any visible intrusion on the windshield after the Perpendicular Frontal Impact Test and review of the high-speed film.

12.2 FIXED BARRIER CRASH TEST

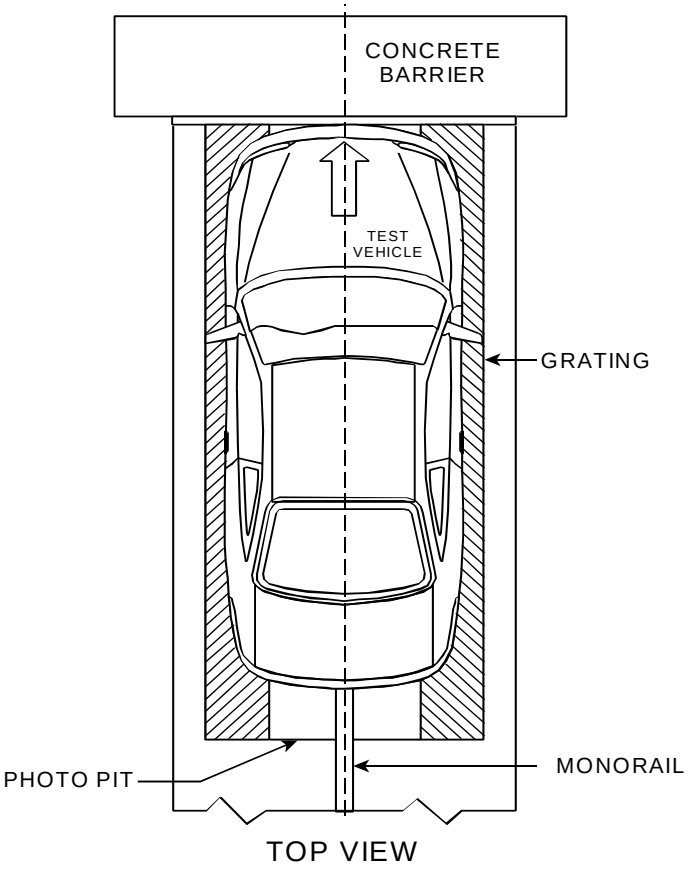
A. Impact Speed

The test vehicle is towed longitudinally forward at a speed of 47.3 km/h ± 0.8 km/h when it impacts a fixed collision barrier.

B. Impact Angle

Full Frontal - The line of travel is perpendicular (90°, +/- 5°) to the fixed collision barrier.

Oblique Angle - The line of travel is at any angle (5° to 25° +/- 5°) in either direction from the perpendicular (90°,+/- 5°) of the fixed collision barrier.



12. TEST EXECUTION.....continued

12.3 REAR MOVING BARRIER CRASH

The following test describes the 30 mph rear impact test. The new 50 mph rear impact test is currently being phased-in (complete phase-in by September 1, 2008). See TP-301R for the 50 mph rear impact test.

The test vehicle is positioned on the level, concrete test pad area as illustrated in the diagram. The test vehicle is aligned on the track to assure the moving barrier impacts at the angle as described below. Also, the test vehicle is placed in a position to assure that the cameras in the photo pit capture the entire impact event from the moment the moving barrier makes initial contact with the test vehicle until separation of the moving barrier and test vehicle.

A. Impact Speed

The moving barrier is guided so that it travels in a straight line, with no significant lateral, vertical or rotational movement. The moving barrier impacts the rear of the stationary test vehicle at a speed of 47.3 km/h ± 0.8 km/h

B. Impact Angle

The moving barrier impacts the stationary test vehicle such that a vertical plane through the geometric center of the barrier impact surface and perpendicular, (90°+/- 5°) to that surface coincides with the longitudinal centerline of the test vehicle.

12. TEST EXECUTION.....continued

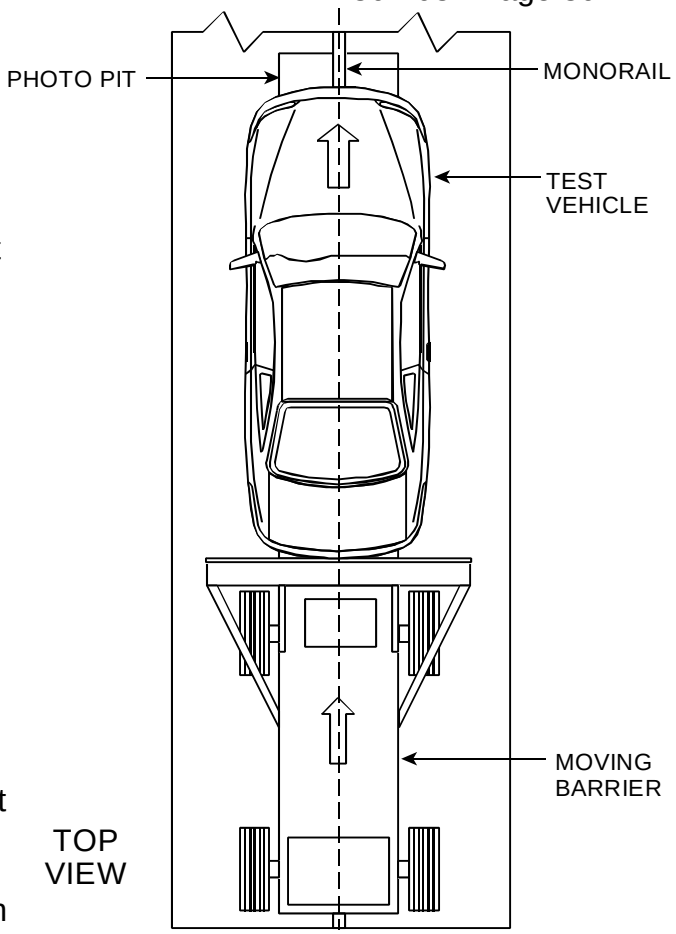
12.4 LATERAL MOVING BARRIER CRASH

The Lateral Impact Test is identical to the FMVSS No. 214 Test Procedure. See this test procedure for conducting this impact test.

12.5 COLLECTION OF STODDARD SPILLAGE

Collect Stoddard solvent spillage, if any, immediately after impact using the most efficient method available. Weigh the total amount of spillage. Stoddard solvent spillage, from the moment the vehicle ceases motion, shall not exceed a total of 142 g by weight for 5 minutes after the vehicle comes to rest.

12.6 STATIC ROLLOVER



TOP VIEW

Within 30 minutes after the impact test, the test vehicle is rotated on the Static Rollover Device to each successive increment of 90° through 360° at a uniform rate, with a full 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.

NOTE: If there is an indication of a test failure during or just after the impact test, DO NOT conduct the static rollover test.

(1) Remove test dummies and de-power systems.

(2) Carefully secure the test vehicle on the Static Rollover Device so as not to cause any damage to fuel system components or fuel lines.

(3) Begin rotating the vehicle for the first 90° increment. Record time rotation begins and ends. The vehicle shall be held in this position for 5 minutes after rotation ends.

(4) Collect Stoddard solvent spillage, if any, from the onset of rotation or the time rotation began up to 5 minutes thereafter.

Note: If there is an indication of a test failure during any 90° increment of the rollover test, STOP THE TEST. Do not continue to the next successive 90° increment.

(5) Change collection containers. Record any spillage that occurs during the 6th minute after the onset of rotation or when rotation began.

(6) If required, change collection containers. Record any spillage that occurs during the 7th minute after the onset of rotation or when rotation began.

(7) If required, change collection containers. Record any spillage that occurs during the 8th minute after the onset of rotation or when rotation began.

Repeat for 90° to 180°, 180° to 270° and 270° to 360° increments.

PASS OR FAIL CRITERIA - 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.

13. TEST DATA DISPOSITION

The contractor shall make all vehicle preliminary compliance test data available to the COTR at the test site within twenty-four hours after the test. Final test data, including digital printouts and computer generated plots (if applicable), shall be furnished to the COTR within 5 working days. Additionally, the contractor shall analyze the preliminary test results as directed by the COTR.

All backup data sheets, strip charts, recordings, plots, technician's 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 compliance test is not to be conducted unless all of the various test conditions specified in the applicable OVSC Laboratory Test Procedure are met. Failure of a contractor to obtain the required test data and to maintain acceptable limits on test parameters (such as impact velocity) in the manner outlined in the applicable OVSC Laboratory Test Procedure shall require a retest at the expense of the contractor. The retest costs shall include the cost of the replacement vehicle or item of motor vehicle equipment and the service costs for conducting the retest. The original GFP will become the property of the contractor after the retest has been successfully conducted.

14. REPORTS

14.1 MONTHLY STATUS REPORTS

The contractor shall submit a monthly Test Status Report and a Vehicle Status Report to the COTR. The Vehicle Status Report shall be submitted until all vehicles are disposed. Samples of the required Monthly Status Reports are contained in the report forms section.

14. REPORTS.....continued

14.2 APPARENT NONCOMPLIANCE

A test failure shall be communicated by the contractor to the COTR within 24 hours with written notification mailed within 48 hours (Saturdays and Sundays excluded). A Notice of Test Failure (see report forms section) with a copy of the particular compliance test data sheet(s) and preliminary data plot(s) shall be included. In the event of a test failure, a post test 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.

14.3 FINAL TEST REPORTS

14.3.1 COPIES

In the case of a test failure, the contractor shall submit **SEVEN** hard copies and one PDF formatted copy of the Final Test Report to the COTR for acceptance within three weeks of test completion. The Final Test Report format to be used by all contractors can be found in the Report Section.

Where there has been no indication of a test failure, the contractor shall submit **FOUR** hard copies and one PDF formatted copy of each Final Test Report to the COTR within three weeks of test completion. Payment of contractor's invoices for completed compliance tests may be withheld until the Final Test Report is accepted by the COTR. Contractors are requested to NOT submit invoices before the COTR is provided copies of the Final Test Report.

Contractors shall 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.

Contractors shall 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, associated documentation (including photographs) are 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 shall be a complete document capable of standing by itself. The contractor shall use **detailed** descriptions of all compliance test events. Any events that are not directly associated with the standard but are of technical interest shall also be included. The contractor shall include as much

14. REPORTS.....continued

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.

14.3.3 FIRST THREE PAGES

A. 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:

(1) Final Report Number such as 301-ABC-9X-001 where
301 is the FMVSS tested
ABC are the initials for the laboratory
0X is the Fiscal Year of the test program
001 is the Group Number (001 for the 1st test, 002 for the 2nd test, etc.)

(2) Final Report Title And Subtitle such as

SAFETY COMPLIANCE TESTING FOR FMVSS 301
Fuel System Integrity
* * * * * * * * * * * * * * * *
World Motors Corporation
2000 XYZ 4-door sedan
NHTSA No. CX0401

(3) 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 (3) AND (4)

(4) Date of Final Report completion

(5) The words "FINAL REPORT"

(6) 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
400 Seventh Street, SW
Room 6111 (NVS-220)
Washington, DC 20590

14. REPORTS.....continued

B. 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

C. 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

301-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 301 Compliance Testing of 2000 World XYZ 4- door sedan, NHTSA No. CY000

Block 5 — REPORT DATE

March 1, 2000

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

US Department of Transportation
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance (NVS-220)
400 Seventh Street, SW, Room 6111
Washington, DC 20590

Block 13 — TYPE OF REPORT AND PERIOD COVERED

Final Test Report
Feb. 15 to Mar. 15, 2000

Block 14 — SPONSORING AGENCY CODE

NVS-220

Block 15 — SUPPLEMENTARY NOTES

Leave blank

Block 16 — ABSTRACT

Compliance tests were conducted on the subject 2000 World XYZ 4-door sedan in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-301-0X to assure FMVSS 301 compliance. Test failures identified were as follows:

None

NOTE: Above wording shall be shown with appropriate changes made for a particular compliance test. Any questions should be resolved with the COTR.

14. REPORTS.....continued

Block 17 — KEY WORDS

Compliance Testing
Safety Engineering
FMVSS 301

Block 18 — DISTRIBUTION STATEMENT

Copies of this report are available from —
NHTSA Technical Information Services
Room 5111 (NPO-230)
400 Seventh St., SW
Washington, DC 20590
Telephone No.: 202-366-2588

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

Final test report Table of Contents shall include the following:

Section 1 — Purpose of Compliance Test

Section 2 — Compliance Test Results Summary

Section 3 — Compliance Test Data

Appendix A — Photographs

14. REPORTS.....continued

SECTION 1 - PURPOSE OF COMPLIANCE TEST

This section briefly outlines the purpose for conducting the compliance test and states the appropriate OVSC test procedure followed during the test. The following is provided as an example;

Section 1

Purpose of Compliance Test

This 30 mph rear moving barrier impact test is a part of the Federal Motor Vehicle Safety Standard (FMVSS) 301 Compliance Test Program conducted for the National Highway Traffic Safety Administration (NHTSA) by ABC Laboratories under Contract No. 123-456-789. The purpose of this test was to determine if the subject vehicle, a 200X World XYZ 4-door sedan, meets the performance requirements of FMVSS No. 301, "Fuel System Integrity." The test was conducted in accordance with the Office of Vehicle Safety Compliance Laboratory Test Procedure TP-301-03, dated September 30, 2002.

Note: The description shall be double-spaced on an entire separate page.

SECTION 2 - COMPLIANCE TEST RESULTS SUMMARY

This section gives a summary of the impact event. The following is provided as an example.

Section 2

Compliance Test Results Summary

A 1500 kg 2000 World XYZ 4-door sedan was impacted from the rear by a 1800 kg moving barrier at a velocity of 47.2 km/h. The test was performed by ABC Laboratories in Detroit, Michigan, on November 15, 200X.

The test vehicle was equipped with a 70 liter fuel tank which was filled to 93 percent capacity with stoddard fluid prior to impact. Part 572 B non-instrumented, 50^{th} percentile male Anthropomorphic Test Devices (ATD's) were place in the driver and right-front outboard designated seating positions respectively.

There was no fuel system fluid spillage following the impact event or during any portion of the static rollover test. The average longitudinal crush was 300 millimeters. The vehicle appeared to comply with all the requirements of FMVSS No. 301 "Fuel System Integrity."

The crash event was recorded by one real time camera and eight high-speed cameras. Pre- and post-test photographs of the test vehicle can be found in Appendix A.

Note: The summary shall be double-spaced on an entire separate page.

14. REPORTS.....continued

SECTION 3 - Compliance Test Data

This section contains all of the data recorded and collected during the test. At a minimum, this section shall include all of the information found in the following Data Sheets;

Data Sheet No. 1 - Test Vehicle Specifications

Data Sheet No. 2 - Pre-Test Data

Data Sheet No. 3 - Moving Barrier Data (For rear Impacts only)

Data Sheet No. 4 - Post Test Data

Data Sheet No. 5 - Static Rollover Test Data

Data Sheet No. 6 - Summary of FMVSS 212 Data (if applicable)

Data Sheet No. 7 – Summary of FMVSS 219 Data (if applicable)

APPENDIX A - Photographs

At a minimum, the following photographs shall be included in this section

1. Pre-test Front view of vehicle
2. Post-test Front view of vehicle
3. Pre-test Left side view of vehicle
4. Post-test Left side view of vehicle
5. Pre-test Right side view of vehicle
6. Post-test Right side view of vehicle
7. Pre-test Rear view of vehicle
8. Post-test Rear view of vehicle
9. Pre-test 3/4 frontal view from left side of vehicle
10. Post-test 3/4 frontal view left side of vehicle
11. Pre-test 3/4 rear view from right side of vehicle
12. Post-test 3/4 rear view from right side of vehicle

14. REPORTS.....continued

13. Pre-test underbody view of fuel tank area and fuel system components
14. Post-test underbody view of fuel tank area and fuel system components
15. Pre-test underbody view of engine area and fuel system components
16. Post-test underbody view of engine area and fuel system components
17. Vehicle's certification label (pretest only)
18. Vehicle's tire information label (pretest only)

15. DATA SHEETS

Data Sheet No. 1
Test Vehicle Specifications

TEST VEHICLE INFORMATION:

NHTSA No.: _____;
Year/Make/Model/Body Style:
Engine Data:
Transmission Data:
Final Drive Data:
Major Options:
Date Received: _____; Odometer Reading: _____ miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By:
Date of Manufacture:
VIN:
GVWR: _____ kg. ; GAWR — Front: _____ kg. ; GAWR — Rear: _____ kg.

DATA FROM VEHICLE'S TIRE PLACARD:

Location of Placard on Vehicle:
Tire Pressure With Maximum Capacity Vehicle Load: Front: _____ kPa; Rear: _____kPa
Recommended Tire Size:
Recommended Load Range:
Recommended Cold Tire Pressure: Front = _____ KPa; Rear = _____ kPa
Size of Tires on Test Vehicle:
Type of Spare Tire:

Vehicle Capacity Data
Type of Front Seat(s):
Number of Occupants: Front = ___ ; Rear = ___ ; Total =
A. VEHICLE CAPACITY WEIGHT (VCW) =_____ kg.
B. Number of Occupants x 68 kg. =_____ kg.
RATED CARGO AND LUGGAGE WEIGHT (RCLW) = (A - B) =_____ kg.

RECORDED BY: _____ ; DATE: _____

APPROVED BY: _____

15. DATA SHEETS....continued

Data Sheet No. 2
Pre-Test Data

WEIGHT OF TEST VEHICLE:

As Delivered At Laboratory (w/ maximum fluids)

Right Front = _____ kg. Right Rear = _____ kg.

Left Front = _____ kg. Left Rear = _____ kg.

TOTAL FRONT = _____ kg. TOTAL REAR = _____ kg.

% of TOTAL = _____ % % of TOTAL = _____ kg.

TOTAL DELIVERED WEIGHT = _____ kg.

Calculation of Target Test Weight (TTW)

1. Total Delivered Weight = _____ kg.

2. Rated Cargo & Lugg. Weight (RCLW) = _____ kg.

3. Weight of 2 Dummies (74 kg. each) = _____ kg.

TARGET TEST WEIGHT = 1 + 2 + 3 = _____ kg.

As Tested
Test Weight of Vehicle, Dummies and _____ kg of Cargo Weight

Right Front = _____ kg. Right Rear = _____ kg.

Left Front = _____ kg. Left Rear = _____ kg.

TOTAL FRONT = _____ kg. TOTAL REAR = _____ kg.

% of TOTAL = _____ % % of TOTAL = _____ %

TOTAL TEST WEIGHT = _____ kg.

Weight of Ballast secured in cargo area = _____ kg.

Type of Ballast:
Method of Securing Ballast:
Vehicle Components Removed for Weight Reduction_____

RECORDED BY: _____ ; DATE: _____

APPROVED BY: _____

15. DATA SHEETS....continued

Data Sheet No. 2
Pre-Test Data

VEHICLE ATTITUDE

As Delivered — Right Front: _____ mm
Left Front: _____ mm
Right Rear: _____ mm
Left Rear: _____ mm

As Tested — Right Front: _____ mm
Left Front: _____ mm
Right Rear: _____ mm
Left Rear: _____ mm

Vehicle's Wheelbase = _____ mm

FUEL SYSTEM DATA:

Fuel System Capacity Listed in Owner's Manual = _____ liters
Usable Capacity Figure Furnished By COTR = _____ liters
Test Volume Range (91 to 94% of Usable Capacity) —
_____ liters TO _____ liters

ACTUAL TEST VOLUME = _____ liters (with entire fuel system filled)
Test Fluid Type: Stoddard solvent
Test Fluid Specific Gravity:
Test Fluid Kinematic Viscosity: _____ centistokes
Test Fluid Color: _____ ("red" is preferred)
Type of Vehicle Fuel Pump:
Electric Fuel Pump Operation with Ignition Switch ON and Engine OFF —

Details of Fuel System:

Comments

RECORDED BY: _____ ; DATE: _____

APPROVED BY: _____

15. DATA SHEETS....continued

Data Sheet No. 3
Moving Barrier Data

Moving Barrier's Test Weight:

Right Front	_____kg	Right Rear	_____kg
Left Front	_____kg	Left Rear	_____kg
Total Front Weight:	_____kg	Total Rear Weight	_____kg
Total Test Weight	_____kg		

Tires (Mfr, line, size):_____

Recommended Maximum pressure:_____

Brake Abort system?(Yes/No):_____

RECORDED BY: _____ ; DATE: _____

APPROVED BY: _____

15. DATA SHEETS....continued

Data Sheet No. 4
Post Test Data

TYPE OF TEST:
TEST DATE: _____; TIME: _____; TEMP.: _____ °C
NHTSA NO.: _____; VIN:
REQUIRED IMPACT VELOCITY RANGE: _____ to _____ km/h
ACTUAL IMPACT VELOCITY: (speed traps located within 1.5 m of impact plane)
Trap No. 1 = _____ km/h Trap No. 2 = _____ km/h
Average Impact Speed = _____ km/h

STODDARD SOLVENT SPILLAGE MEASUREMENT:

A. From impact until vehicle motion ceases —

Actual = _____ g Maximum Allowable = 28 g

B. For 5 minute period after vehicle motion ceases —

Actual = _____ g Maximum Allowable = 28 g

C. For next 25 minutes —

Actual = _____ g Maximum Allowable = 28 g/minute

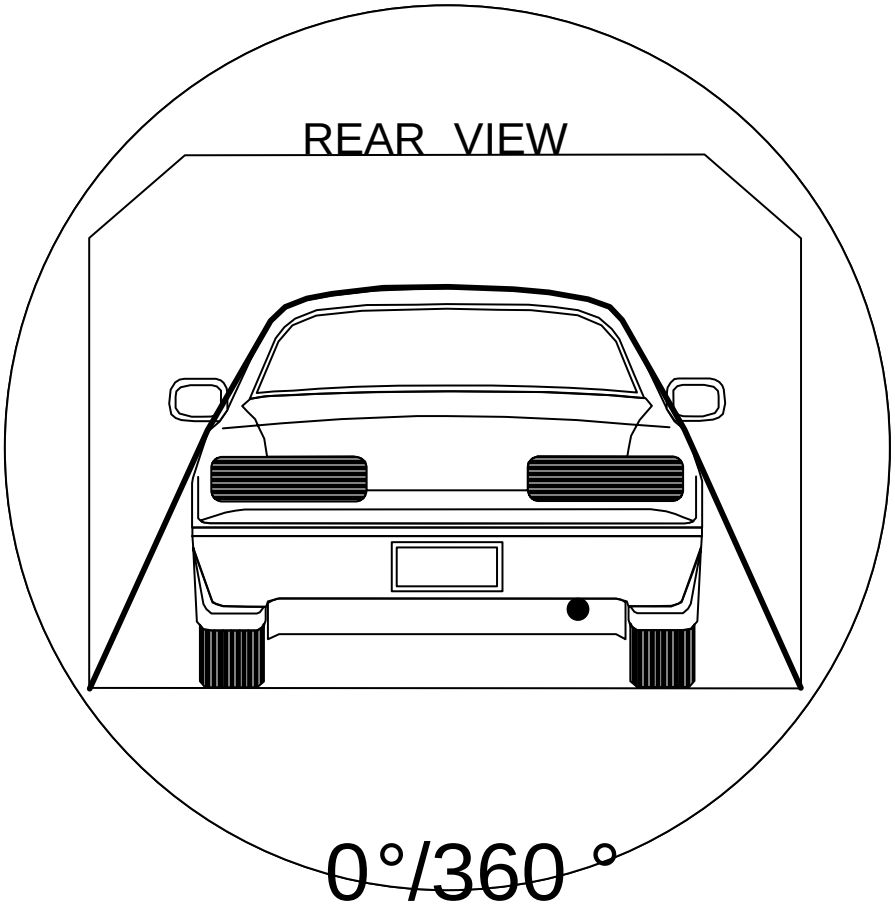
D. Provide Spillage Details:

RECORDED BY: _____ ; DATE: _____

APPROVED BY: _____

15. DATA SHEETS....continued

Data Sheet No. 5
STATIC ROLLOVER TEST DATA



A. Test Phase = 0° to 90°

Determination of Stoddard Solvent Collection Time Period:

1. Rollover Fixture 90° Rotation Time = ___ minutes, ___ seconds

(Specified Range is 1 to 3 minutes)

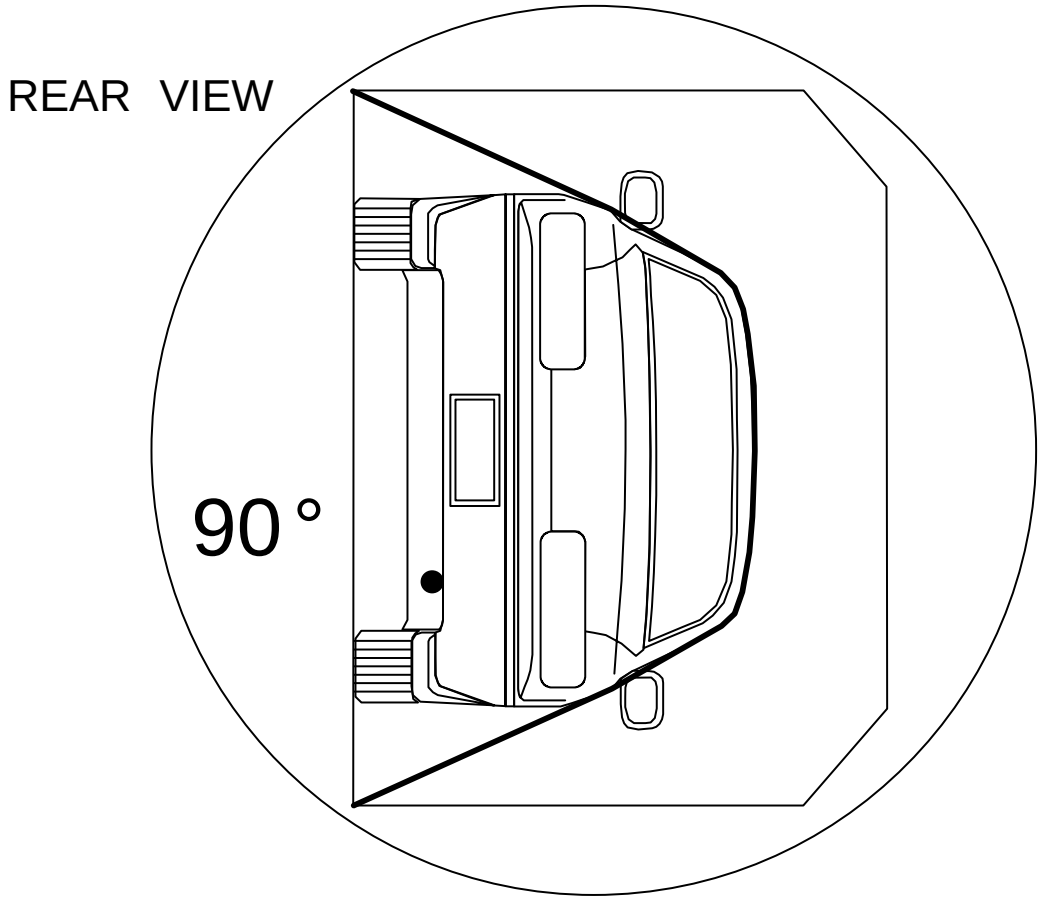
2. FMVSS 301 Position Hold Time = 5 minutes, 0 seconds

3. TOTAL = ___ minutes, ___ seconds

4. NEXT WHOLE MINUTE INTERVAL = ___ minutes

Actual Test Vehicle Stoddard Solvent Spillage:

15. DATA SHEETS....continued



1. First 5 minutes from onset of rotation = ___ g
(142 g allowed)

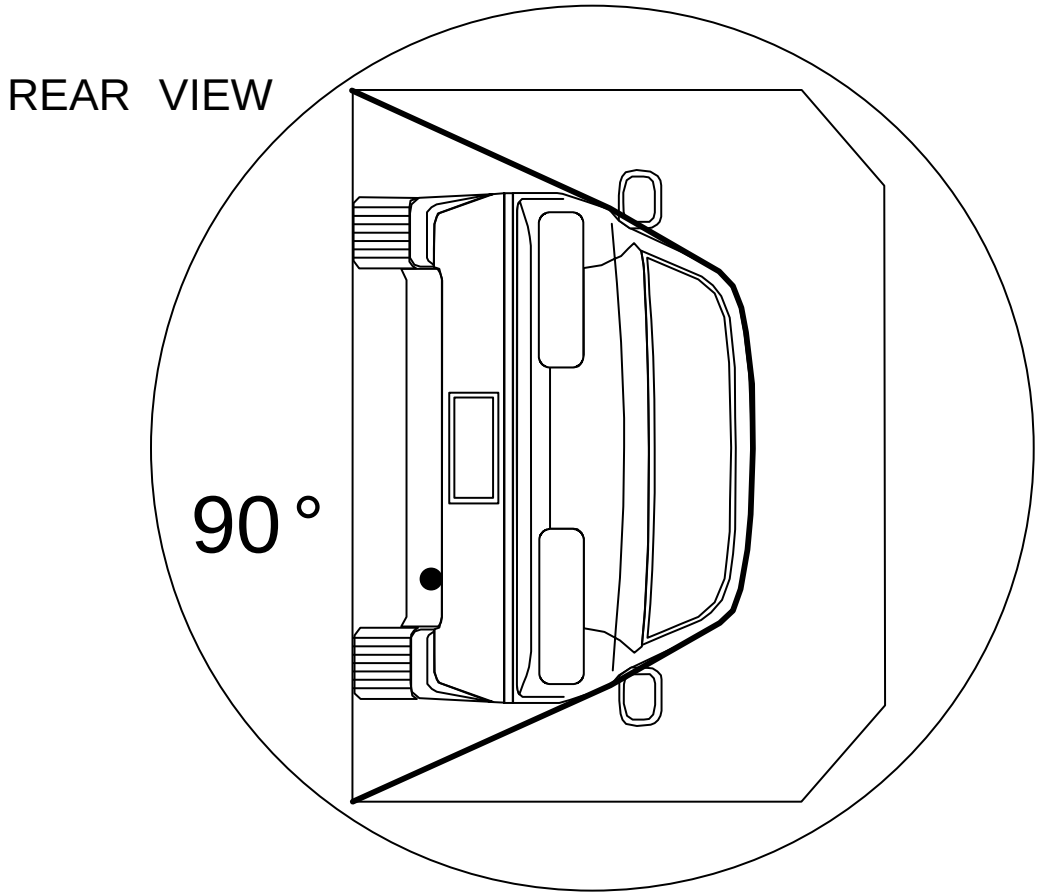
2. 6th minute = ___ g
(28 g allowed)

3. 7th minute = ___ g
(28 g allowed)

4. 8th minute = ___ g
(28 g allowed)

Provide Details of Stoddard Solvent Spillage Locations —

15. DATA SHEETS....continued



B. Test Phase = 90° to 180°

Determination of Stoddard
Solvent Collection Time Period:

1. Rollover Fixture 90°
Rotation Time = ___ minutes,
___ seconds

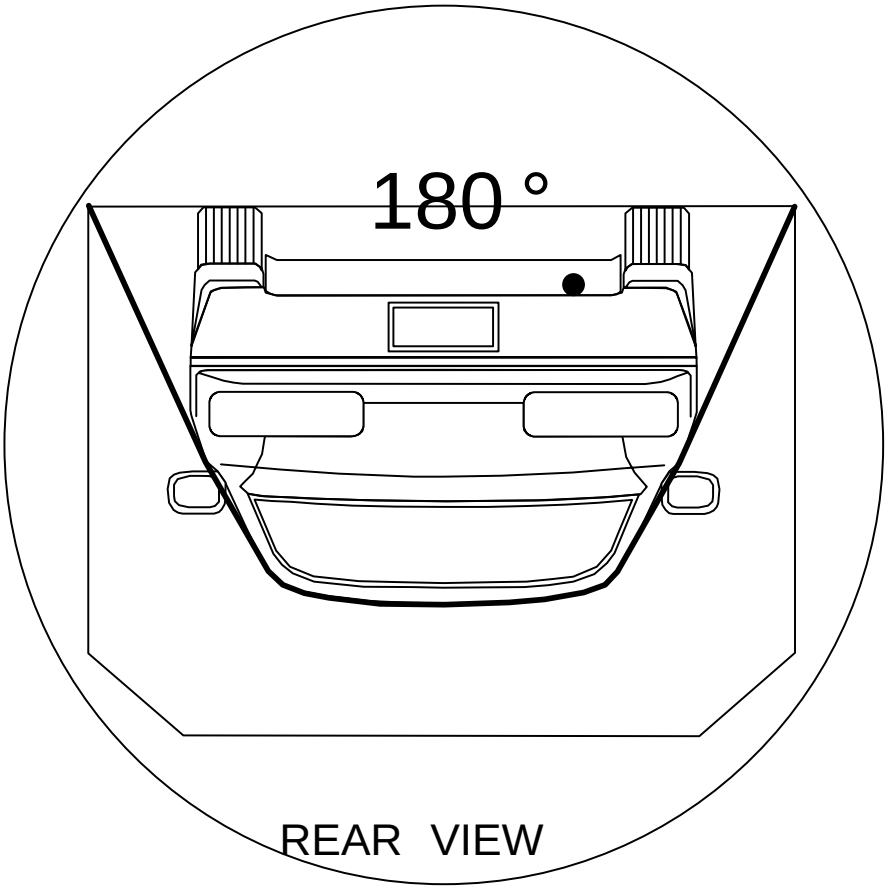
(Specified Range is 1 to 3
minutes)

2. FMVSS 301 Position Hold
Time = 5 minutes, 0 seconds

3. TOTAL = ___ minutes, ___ seconds

4. NEXT WHOLE MINUTE INTERVAL = ___ minutes

15. DATA SHEETS....continued



Actual Test Vehicle Stoddard
Solvent Spillage:

1. First 5 minutes from onset of rotation = ___ g
   (142 g allowed)

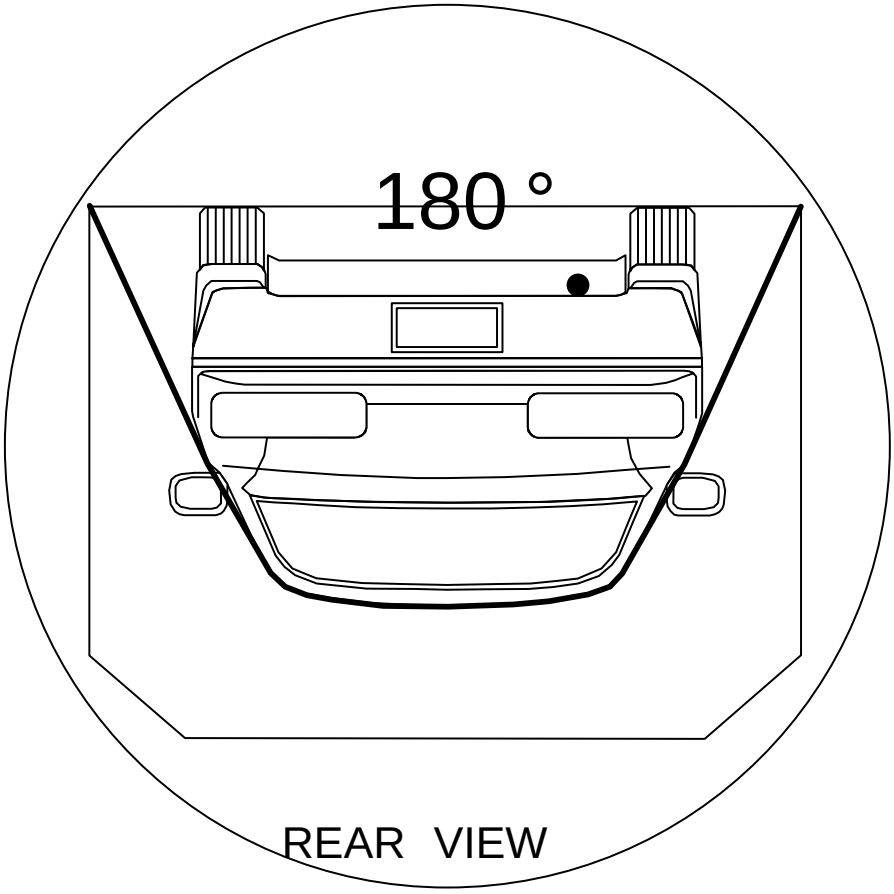
2. 6th minute = ___ g
   (28 g allowed)

3. 7th minute = ___ g
   (28 g allowed)

4. 8th minute = ___ g
   (28 g allowed)

Provide Details of Stoddard Solvent Spillage Locations —

15. DATA SHEETS....continued



C. Test Phase = 180° to 270°

Determination of Stoddard
Solvent Collection Time Period:

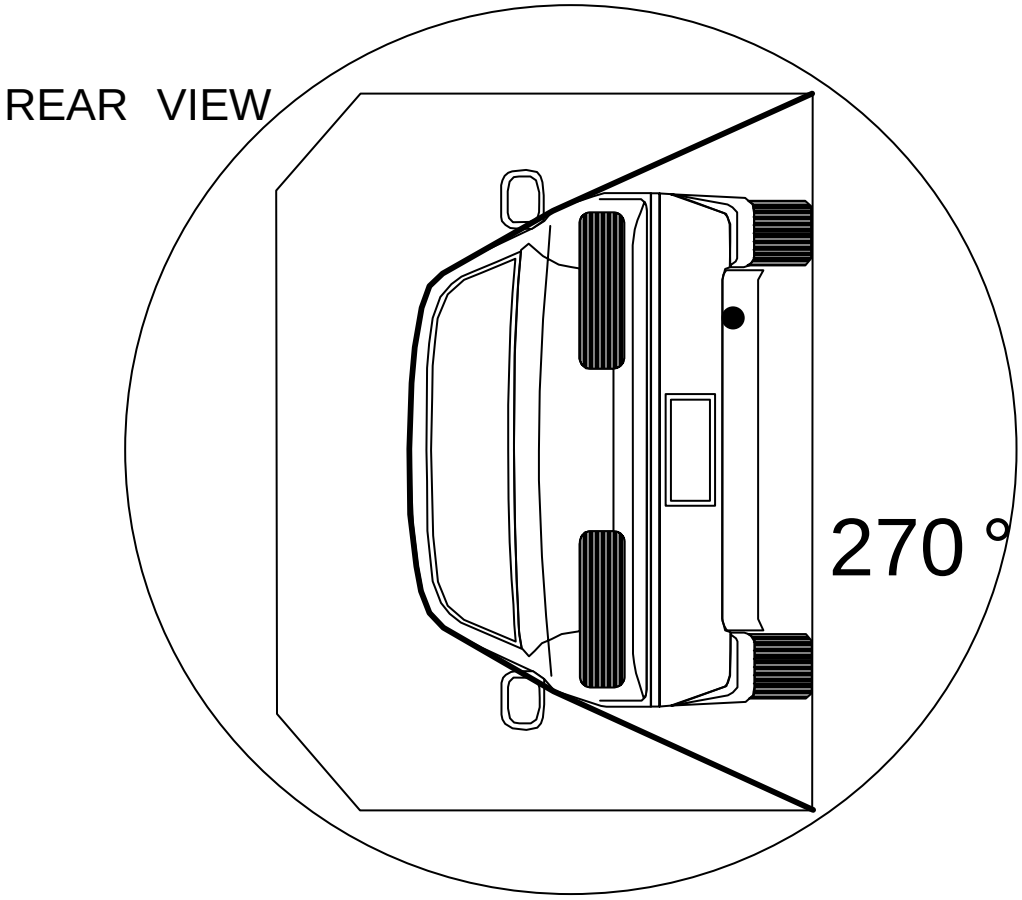
1. Rollover Fixture 90°
Rotation Time = ___ minutes,
___ seconds

(Specified Range is 1 to 3
minutes)

2. FMVSS 301 Position Hold
Time = 5 minutes, 0 seconds

3. TOTAL = ___ minutes, ___ seconds

15. DATA SHEETS....continued



4. NEXT WHOLE MINUTE
INTERVAL = ___ minutes

Actual Test Vehicle Stoddard
Solvent Spillage:

1. First 5 minutes from onset of rotation = ___ g
(142 g allowed)

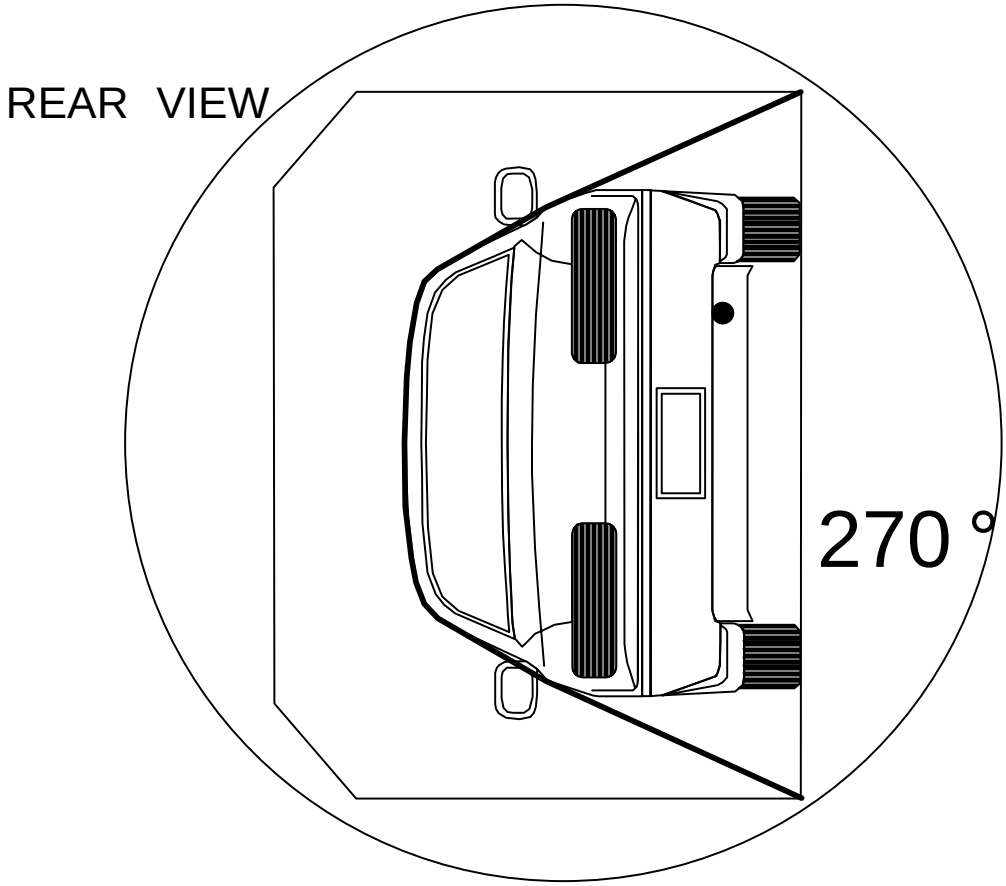
2. 6th minute = ___ g
(28 g allowed)

3. 7th minute = ___ g
(28 g allowed)

4. 8th minute = ___ g
(28 g allowed)

Provide Details of Stoddard Solvent Spillage Locations —

15. DATA SHEETS....continued



D. Test Phase = 270° to 360°

Determination of Stoddard
Solvent Collection Time Period:

1. Rollover Fixture 90°
Rotation Time = ___ minutes,
___ seconds

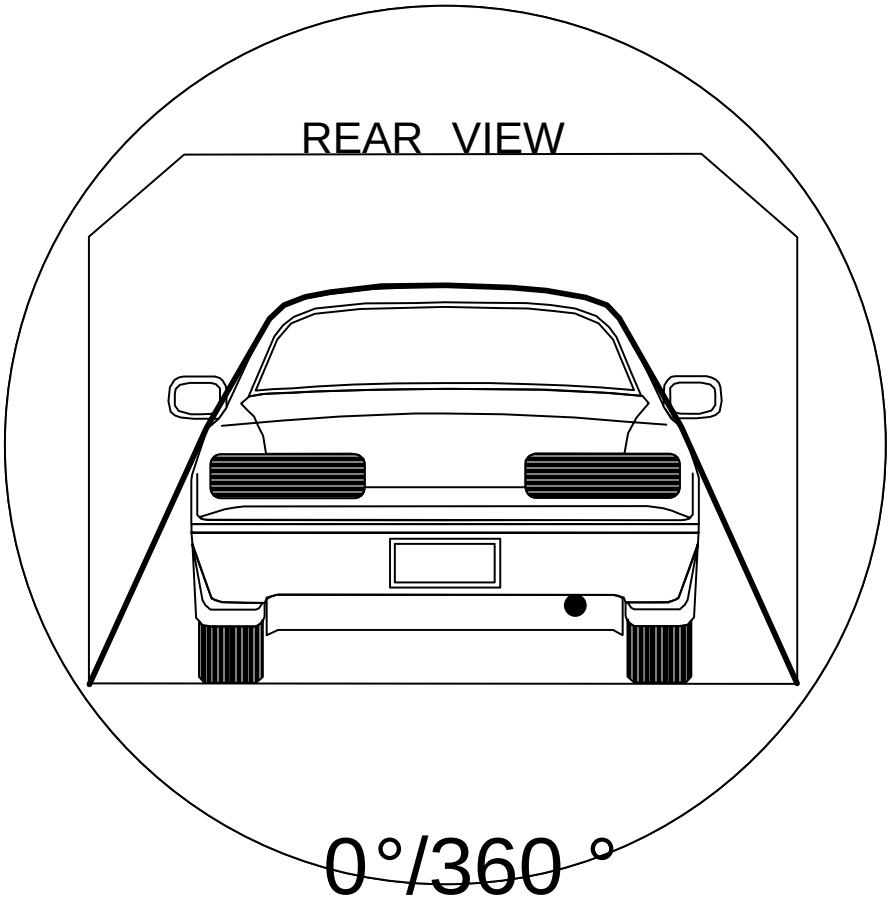
(Specified Range is 1 to 3
minutes)

2. FMVSS 301 Position Hold
Time = 5 minutes, 0 seconds

3. TOTAL = ___ minutes, ___ seconds

4. NEXT WHOLE MINUTE INTERVAL = ___ minutes

15. DATA SHEETS....continued



Actual Test Vehicle Stoddard Solvent Spillage:

1. First 5 minutes from onset of rotation = ___ g
   (142g allowed)

2. 6th minute = ___ g
   (28 g allowed)

3. 7th minute = ___ g
   (28 g allowed)

4. 8th minute (if required) = ___ g
   (28 g allowed)

Provide Details of Stoddard Solvent Spillage Locations —

RECORDED BY: _____ ; DATE: _____

APPROVED BY: _____

15. DATA SHEETS....Continued

Data Sheet No. 6
SUMMARY OF FMVSS 212 DATA

DETAILS OF WINDSHIELD MOUNTING (method of retention, type of trim, etc.)

_____

_____

WINDSHIELD PERIPHERY:

Pretest Measurement —	Right Side =	_____ inches
	Left Side =	_____ inches
	TOTAL =	_____ inches
Post Test Measurement —	Right Side =	_____ inches
	Left Side =	_____ inches
	TOTAL =	_____ inches

NOTE: Post Test Measurement shall be minimum of 75% of Pretest Measurement for vehicle NOT equipped with automatic front occupant restraints. Post Test Measurement shall be a minimum of 50% for each side of the windshield for vehicles equipped with automatic front occupant restraints.

TEMPERATURE OF WINDSHIELD MOLDING DURING TEST = _____ ºF

AREA OF RETENTION FAILURES:

Indicate area of retention loss and width of molding on sketch shown on next page.

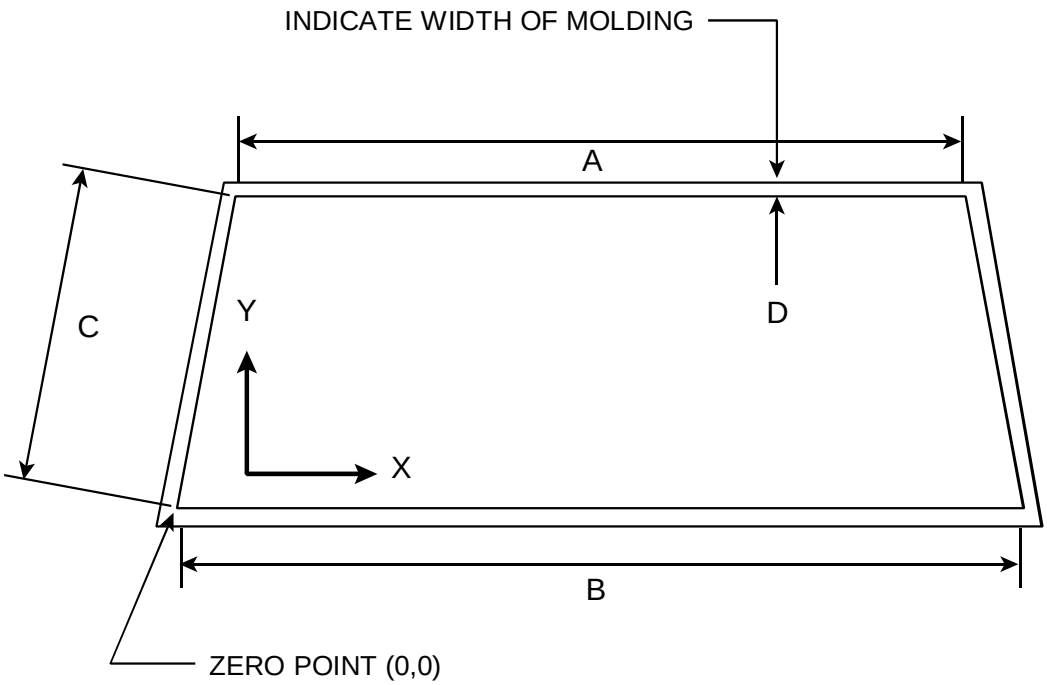
REMARKS:

RECORDED BY: _____ ; DATE: _____

APPROVED BY: _____

15. DATA SHEETS....Continued

FRONT VIEW OF WINDSHIELD



REMARKS:

RECORDED BY: _____ ; DATE: _____

APPROVED BY: _____

15. DATA SHEETS....Continued

Data Sheet No. 7
SUMMARY OF FMVSS 219 DATA

METHOD OF ADHERING STYROFOAM TEMPLATE TO WINDSHIELD:

_____

_____

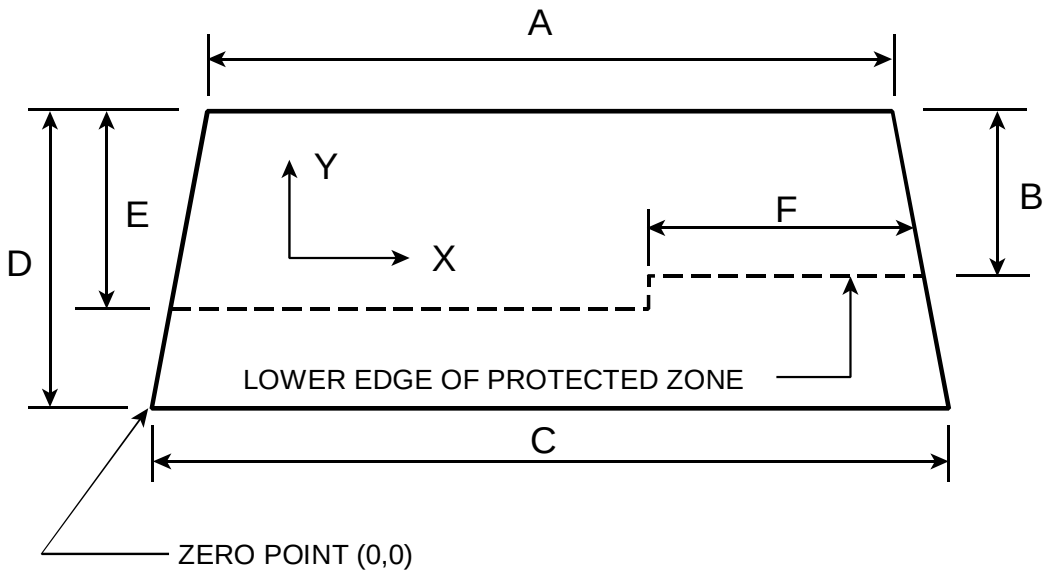
_____

_____

SKETCH OF FRONT VIEW OF WINDSHIELD:

Provide all dimensions necessary to reproduce the protected area

FRONT VIEW OF WINDSHIELD



AREA OF PROTECTED ZONE FAILURES:

A. Provide coordinates of the area that the protected zone template was penetrated more than 0.25 inches by a vehicle component other than one, which is normally in contact with the windshield

_____

15. DATA SHEETS....Continued

B. Provide coordinates of the area beneath the protected zone template that the inner surface of the windshield was penetrated by a vehicle component

_____

_____

REMARKS:

RECORDED BY: _____ ; DATE: _____

APPROVED BY: _____

16. FORMS

Forms, like Data Sheets, are provided as TOOLS to use in the exchange of data between the COTR and the contractor. Forms, unlike Data Sheets, are not PART of the Final Test Report. The contractor is not restricted from using other tools or expanding the forms outlined in this section.

A. Form 1 - Vehicle Condition Report

A "Vehicle Condition Report" form shall be submitted to the COTR with the copies of the Final Test Report (see example form). The first page of the form shall be completed when the test vehicle arrives at the testing laboratory. The second page of the form is completed after the test. The forms shall be LEGIBLE (hand written forms are unacceptable) and COMPLETE (all information requested is filled out).

B. Form 2 - Test Vehicle Information

A "Test Vehicle Information" form will be supplied by the COTR to the contractor before testing preparation (see example form). Information on this form is supplied by the automobile manufacturer to aid in the initial test set-up and shall be considered as REFERENCE MATERIAL. After vehicle preparation is complete, the Test Vehicle Information form shall be discarded.

C. Form 3 - Laboratory Notice of Test Failure to OVSC

A Laboratory Notice of Test Failure form shall be submitted to the COTR within 48 hours of an apparent test failure (see example form). The completed form may be transmitted by fax, electronic mail or overnight delivery.

16. FORMS....continued

FORM 1
Report of Vehicle Condition

CONTRACT NO. DTNH22-_____ DATE:
FROM:
TO:
PURPOSE: ( ) Initial Receipt ( ) Received via Transfer ( ) Present vehicle condition

MODEL YEAR/MAKE/MODEL/BODY STYLE:
MANUFACTURE DATE:_____ NHTSA NO.: _____ BODY COLOR:

VIN: _____ GVWR_____ GAWR (Fr) _____ GAWR (Rr)

ODOMETER READINGS: ARRIVAL _____ miles DATE:

COMPLETION _____ miles DATE:
PURCHASE PRICE: $ _____ DEALER'S NAME:

II ALL OPTIONS LISTED ON “WINDOW STICKER” ARE PRESENT ON THE TEST VEHICLE

II TIRES AND WHEEL RIMS ARE NEW AND THE SAME AS LISTED

II THERE ARE NO DENTS OR OTHER INTERIOR OR EXTERIOR FLAWS

II THE VEHICLE HAS BEEN PROPERLY PREPARED AND IS IN RUNNING CONDITION

II KEYLESS REMOTE IS AVAILABLE AND WORKING

II THE GLOVE BOX CONTAINS AN OWNER’S MANUAL, WARRANTY DOCUMENT, CONSUMER INFORMATION, AND EXTRA SET OF KEYS

II PROPER FUEL FILLER CAP IS SUPPLIED ON THE TEST VEHICLE

II USING PERMANENT MARKER, IDENTIFY VEHICLE WITH NHTSA NUMBER AND FMVSS TEST TYPE(S) ON ROOF LINE ABOVE DRIVER DOOR OR FOR SCHOOL BUSES, PLACE A PLACARD WITH NHTSA NUMBER INSIDE THE WINDSHIELD AND TO THE EXTERIOR FRONT AND REAR SIDE OF BUS

II PLACE VEHICLE IN STORAGE AREA

II INSPECT THE VEHICLE’S INTERIOR AND EXTERIOR, INCLUDING ALL WINDOWS, SEATS, DOORS, ETC., TO CONFIRM THAT EACH SYSTEM IS COMPLETE AND FUNCTIONAL PER THE MANUFACTURER’S SPECIFICATIONS. ANY DAMAGE, MISADJUSTMENT, OR OTHER UNUSUAL CONDITION THAT COULD INFLUENCE THE TEST PROGRAM OR TEST RESULTS SHALL BE RECORDED. REPORT ANY ABNORMAL CONDITION TO THE NHTSA COTR BEFORE BEGINNING ANY TEST

16. FORMS....continued

REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING

LIST OF FMVSS TESTS PERFORMED BY THIS LAB:

VEHICLE _____ NHTSA NO.

REMARKS:

Equipment that is no longer on the test vehicle as noted on previous page:

Explanation for equipment removal:

Test Vehicle Condition:

RECORDED BY: _____ DATE:

APPROVED BY: _____ DATE:

##########

RELEASE OF TEST VEHICLE

The vehicle described above is released from _____to be delivered to

Date: _____ Time: _____ Odometer:

Lab Representative:

Signature Title

Carrier/Customer Representative:

Signature Date

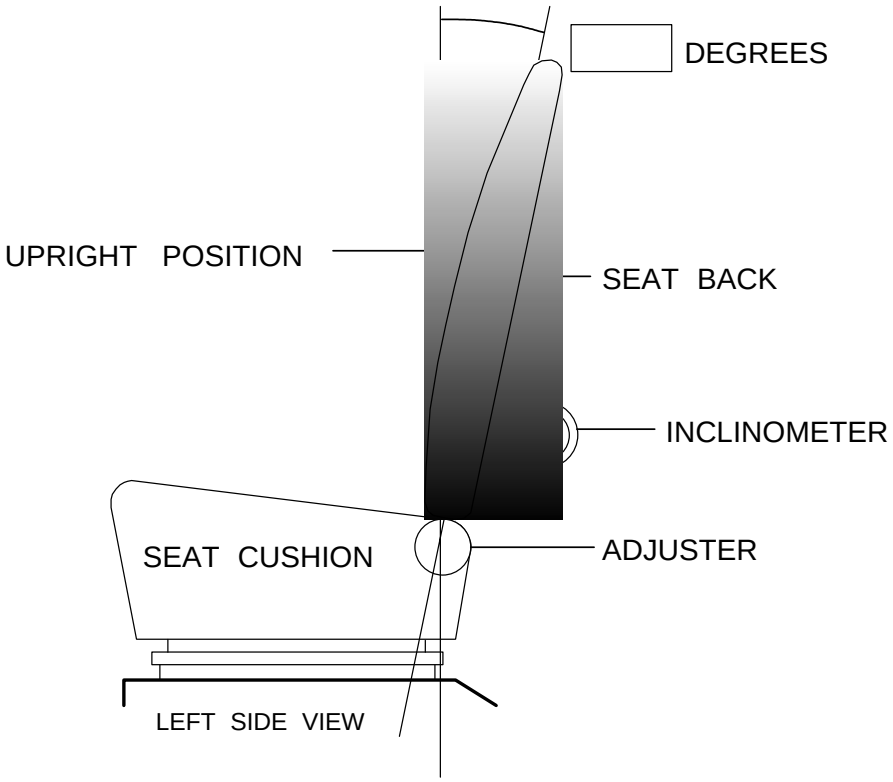
16. FORMS....continued

FORM 2
TEST VEHICLE INFORMATION

VEHICLE MODEL YEAR/MAKE:

MODEL/BODY STYLE:

1. NOMINAL DESIGN RIDING POSITION –



FRONT SEAT ASSEMBLY

For adjustable driver and passenger seat backs.
Please describe how to position the inclinometer to measure the seat back angle.
Include description of the location of the adjustment latch detent if applicable.
Indicate, if applicable, how the detents are numbered
(Is the first detent "0" or "1"?).

Seat back angle for driver's seat = _____°

Measurement Instructions:

_____

Seat back angle for passenger's seat = _____°
Measurement Instructions:

16. FORMS....continued

2. SEAT FORE & AFT POSITIONS –
Provide instructions for positioning the driver and front outboard passenger seat(s) in the center of fore and aft travel. For example, provide information to locate the detent in which the seat track is to be locked.

Positioning of the driver's seat:

Positioning of the passenger's seat (if applicable):

3. FUEL TANK CAPACITY DATA –

3.1 A. "Usable Capacity" of standard equipment fuel tank = _____ gallons.

B. "Usable Capacity" of optional equipment fuel tank = _____ gallons.

C. "Usable Capacity" of vehicle(s) used for certification testing to requirements of FMVSS 301 = _____ gallons.

Operational Instructions:

3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = _____ gallons

3.3 Is vehicle equipped with electric fuel pump? Yes-_____; No-

If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.

4. STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions:

16. FORMS....continued

FORM 3
LABORATORY NOTICE OF TEST FAILURE TO OVSC

TEST DATE:

LABORATORY:

CONTRACT NO.: _____; DELV. ORDER NO.:

LAB PROJECT ENGINEER'S NAME:

TEST VEHICLE YEAR/MAKE/MODEL/BODY STYLE:

VEH. NHTSA NO.: _____; VIN:

MFR:

TEST FAILURE DESCRIPTION:

FMVSS REQUIREMENT, PARAGRAPH S ___ :

NOTIFICATION TO NHTSA (COTR):

DATE: _____ ; BY:

REMARKS:

APPENDIX 1

ANTI-SIPHONING DEVICE FOR ALCOHOL FUEL VEHICLES

APPLICABLE ONLY TO THOSE VEHICLES TYPES THAT ARE CURRENTLY SUBJECT TO FMVSS 301 AND THAT ARE DESIGNED TO OPERATE WITH AT LEAST 20 PERCENT ALCOHOL FUEL CONTENT.

A1.1 TEST EQUIPMENT DESCRIPTION

The following is a list of the minimum suggested test equipment needed to perform the anti-siphoning test for alcohol fuel vehicles (S6.6).

A straight vinyl plastic or rubber hose of 120 centimeters (cm), +0.00, -0.60 (47.20 inches, +0.00, -0.25) length. The hose will have an outside diameter of 5.20 millimeters (mm), +0.00, -0.26 (0.20 inches, +0, -0.01).

A1.2 DEFINITIONS

ALCOHOL FUEL VEHICLES

Each vehicle manufactured to operate on an alcohol fuel (e.g., methanol, ethanol) or a fuel blend containing at least 20 percent alcohol fuel.

A1.3 COMPLIANCE TEST EXECUTION

Position the test vehicle on a level surface, fill the fuel tank with Stoddard solvent to between 90 to 95 percent of its useable capacity. Insert one end of the test hose into the fuel filler neck and determine whether the hose will pass through the anti-siphoning device and reach the solvent. Insert the test hose as far into the fuel filler neck as possible or until it is completely within the fuel filler neck or blocked by the anti- siphoning device. During insertion, keep the test hose concentric with the opening of the anti-siphoning device, if possible.

Measure the length of any remaining portion of the test hose outside of the fuel filler neck.

Record the measurement in Data Sheet 1.

Pull the test hose out of the fuel filler neck carefully for examination. If there is evidence that the hose had contacted the surface of the Stoddard solvent in the tank, then measure the length of the hose that was submerged in the solvent.

The vehicle fails the test if there is evidence that the hose end contacted the surface of the solvent in the tank.

APPENDIX 1....continued

DATA SHEET A1.1
ANTI-SIPHONING DEVICE FOR ALCOHOL FUEL VEHICLES

VEH. MOD YR/MAKE/MODEL/BODY:

VEH. NHTSA NO.: _____; VIN:

VEH. BUILD DATE: _____; TEST DATE:

TEST LABORATORY:

OBSERVERS:

1. Provide a description of the anti-siphoning device if possible.

2. Did the test hose pass through the anti-siphoning device opening?

   Yes- _____ No-

3. The test hose length outside of the fuel filler neck at maximum insertion:

   Length = _____ cm

4. The maximum inserted test hose length is (120.00 cm - measurement from item 3):

   Length = _____ cm

5. Was there evidence that the test hose contacted the surface of the Stoddard fluid in the fuel tank of the test vehicle?

   Yes- _____ (Fail) No- _____ (Pass)

6. Measure the length of the portion of the hose that was submerged in the Stoddard solvent:

   Length = _____ cm

APPENDIX 2

MODIFIED FMVSS 301 TEST, REAR IMPACT ONLY

FOR THE PURPOSE OF ACQUIRING INFORMATION FOR APPLIED RESEARCH, FMVSS 301, FUEL SYSTEM INTEGRITY TEST - REAR IMPACT, IS MODIFIED FOR EACH INSTRUMENTED DUMMY WITH THE FOLLOWING ADDITIONAL TEST AND DATA ACQUISITION REQUIREMENTS:

A2.1 TEST EQUIPMENT DESCRIPTION

The following is a list of the minimum additional test equipment needed to perform the modified FMVSS 301 test.

A. A anthropomorphic test dummy, Part 572E (Hybrid III), Part 572O (Hybrid III), Thor, or BioRid etc.
B. Sensor to measure head rotation directly or calculated from angular velocity for the test dummy specified above.
C. Sensor to measure chest rotation directly or calculated from angular velocity for the test dummy specified above.
D. Load cell to measure lower neck loads.
E. Lower neck accelerometer for the test dummy specified above.
F. Sensor to measure vehicle rotation directly or calculated from angular velocity.
G. SAE J826 manikin.
H. Head Restraint Measuring Device (Insurance Corporation of British Colombia (ICBC) machine).
I. Sensors to measure rotation for both the left and right side seat back directly or calculated from angular velocity.
J. Head Center of Gravity (C.G.) Triaxial Accelerometers for the test dummy specified above.
K. Chest C.G. Triaxial Accelerometers for the test dummy specified above.
L. Pelvis C.G. Triaxial Accelerometers for the test dummy specified above.
M. Load cell to measure upper neck loads.
N. Load cells to measure femur loads.
O. Sensors to measure vehicle acceleration, passenger seat belt motion (playout), and passenger seat belt load.
P. Data recording equipment having sufficient channels to record the necessary time history. Each data channel shall consist of a sensor, signal conditioner, data acquisition device, and all interconnecting cables and shall conform to the requirements of SAE Recommended Practice J211.

APPENDIX 2....continued

The following is a list of the minimum additional test equipment needed to perform the optional seat translation device for the modified FMVSS 301 test.

A. 2 String potentiometers
B. 2 Rotary potentiometers

A2.2 ADDITIONAL INSTRUMENTATION

Instrument the anthropomorphic test dummy as follows (Actual dummy and type of sensors used will be chosen in coordination with OVSC and OCR):

A. Head rotation about the y-axis (GFE*).
B. Chest rotation about the y-axis (GFE*).
C. Head C.G. Triaxial Accelerometers
D. Chest C.G. Triaxial Accelerometers
E. Pelvis C.G. Triaxial Accelerometers
F. Lower neck accelerometer.
G. Left femur load cell, single axis
H. Right femur load cell, single axis
I. Upper Neck
    1. 3-axis Neck Force Transducers (GFE*)
    2 3-axis Neck Moment Transducers (GFE*)
J. Lower Neck
    1. 3-axis Neck Force Transducers (GFE*)
    2 3-axis Neck Moment Transducers (GFE*)

* Government Furnished Equipment

Dummy calibration, according to the appropriate Dummy Performance Calibration Procedure, shall be performed prior to the start of testing, after every fifth test, and at the completion of testing.

Instrument the test vehicle to record the following:

A. Passenger left seat back rotation about the y-axis (GFE*)
B. Passenger right seat back rotation about the y-axis (GFE*)
C. Passenger door sill rotation about the y-axis (GFE*)
D. Primary and redundant accelerometers to record occupant compartment acceleration
E. Driver seat belt motion (playout)
F. Driver seat belt load

NOTE: Location of transducers will be determined in coordination with the Office of Vehicle Safety Compliance (OVSC) and the Office of Crashworthiness Research (OCR).

APPENDIX 2....continued

A.2.3 ONBOARD CAMERA REQUIREMENT

One high speed digital camera (1,000 frames/second) placed on/in the vehicle to acquire improved film coverage of seat/dummy/belt
dynamics in a rear crash. The resolution of the high speed digital camera shall meet the specifications from section 9.2 Camera Coverage of this test procedure. Time zero impact mark must be registered on the high speed video to indicate when contact with the barrier is made in a crash test. Actual camera location will be chosen in coordination with OVSC and OCR.

A.2.4 REPORTS AND ELECTRONIC TEST DATA

A. Plots to be included in test report —
Lower neck acceleration vs. time
Lower neck X,Y,Z force vs. time
Lower neck X,Y,Z moment vs. time
Vehicle angular velocity vs. time (if applicable)
Vehicle rotation vs. time
Left side seat back angular velocity vs. time (if applicable)
Left side seat back rotation vs. time
Head angular velocity vs. time (if applicable)
Head rotation vs. time
Chest angular velocity vs. time (if applicable)
Chest rotation vs. time

B. Measurements of the head restraint height and backset and note if the restraint locks in the adjusted position.

C. Note any deformation of the seat and attachment points to the floor

D. Note the type of recliner mechanism and any deformation of the recliner mechanism. Also note if there is a recliner mechanism on each side.

E. One set of still photos in digital format (JPEG). The JPEG files shall have the same naming convention as used on the photos in the final report.

F. One final report in PDF format.

Additional information included in reports and electronic test data for the optional seat translation measurement device.

A. Plots to be included in test report –
String displacement vs. time for the left side of the seat from the string potentiometer
Rotation vs. time for the for the left side of the seat from the rotary potentiometer
String displacement vs. time for the right side of the seat from the string potentiometer
Rotation vs. time for the for the right side of the seat from the rotary potentiometer
Displacement in the x-direction vs. time for the point of interest on the seat

B. Provide data sheet of the test setup of the optional seat translation measurement device.

APPENDIX 2....continued

A2.5 FRONT SEAT CUSHION ADJUSTEMENT

Adjustable front seat are adjusted according to the test dummy used. For the Part 572 tests dummies shall be positioned according the procedure in Procedure TP208-12 dated January 14, 2003. The final position of the seat cushion will be determined in coordination with the Office of Vehicle Safety Compliance (OVSC) and the Office of Crashworthiness Research (OCR).

A2.6 FRONT SEAT BACK ADJUSTEMENT

Place the front seat back to give a torso angle of 25 degrees ± 1 degrees as measured by the SAE J826 manikin (not furnished by the government). The final seat back torso angle will be determined in coordination with the Office of Vehicle Safety
Compliance (OVSC) and the Office of Crashworthiness Research (OCR).

A2.7 HEAD RESTRAINT POSITIONING AND MEASUREMENTS

The head restraint position will be determined in coordination with the Office of Vehicle Safety Compliance (OVSC) and the Office of Crashworthiness Research (OCR). The head restraint height and backset shall be measured according to the NPRM for FMVSS No. 202 (66 FR 968 – January 4, 2001). The ICBC machine will be government furnished equipment (GFE).

A2.8 DUMMY POSITIONING AND MEASUREMENTS

Anthropomorphic Test Dummy shall be placed in the passenger location and positioned with the appropriately procedure defined in TP208-12 dated January 14, 2003. The test lab shall provide measurements of the dummy in accordance with Data Sheet 35 of TP208-12 dated January 14, 2003. The final position procedure of the dummy will be determined in coordination with the Office of Vehicle Safety Compliance (OVSC) and the Office of Crashworthiness Research (OCR).

A2.9 ADDITIONAL TARGETS

Location of additional targets will be determined in coordination with the Office of Vehicle Safety Compliance (OVSC) and the Office of Crashworthiness Research (OCR).

A2.10 ELECTRONIC DATA SUBMISSION FOR ALL STANDARDS

An electronic data submission (CDs/diskettes), formatted in accordance with the NHSTA EV5 data format as specified in the Version 5 Test Reference Guide, Volume 1: Vehicle Tests (VTRG), shall be required for each test conducted for OVSC. Copies of the guide may be downloaded from the web site, http://www-nrd.nhtsa.dot.gov/software/entree/index.htm

APPENDIX 2....continued

The initial electronic data submission post-test will contain specification and measurement data in this EV5 format. Subsequent submission of the digital photos (JPEG), AVI, and the PDF copy of the final report shall also be prepared in accordance with the specifications for submission of these deliverables as defined in the Guide (VTRG).

Each submission shall include the raw sensor outputs measured to determine compliance to the standard, such as acceleration, force, displacement, etc.

Any questions concerning preparation of the electronic data submission shall be directed to:

Barbara Hennessey
US/DOT
NHTSA/NVS-321
400 Seventh Street, SW
Washington, DC 20590
PH: 202-366-4714
Fax: 202-366-3505

e-mail: barbara.hennessey@nhtsa.dot.gov

A2.11 OPITIONAL SEAT TRANSLATION MEASUREMENT DEVICE

The seat translation measurement device (STMD) consists of a cross bar that attaches to the roof of the vehicle and extension bars mounted to the sides of the seat. For each side of the seat a string pot is attached to the cross bar and the string is attached to the extension bar from the seat. At the location of the string and the extension from the seat is a rotary pot. Details on the mounting and use of the STMD will be determined in coordination with the Office of Vehicle Safety Compliance (OVSC) and the Office of Crashworthiness Research (OCR). After positioning the dummy measure the position of string at the cross bar attached to the roof, the position of the rotary potentiometer and point of interest on the seat.

A2.12 OPITIONAL ADDITIONAL DUMMY AND VEHICLE CHANNELS

Location of additional channels will be determined in coordination with the Office of Vehicle Safety Compliance (OVSC) and the Office of Crashworthiness Research (OCR).

A2.13 GOVERNMENT TEST INFORMATION SHEET

The Government will furnish an information sheet when this option is exercised for each individual test or series of tests. At a minimum the information sheet will include the following:

APPENDIX 2....continued

A. Selection dummy and types of sensors
B. Location of transducers
C. Position of seat cushion
D. Final seat back torso angle
E. Head restraint position
F. Final position procedure for the dummy
G. Camera location(s)
H. Additional targets
I. Details on mounting the STMD
J. Location of additional channels
K. Pre and Post seat back angle

REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING

CONTRACT NO.: DTNH22-_____ DATE: _____

FROM:

TO:

The following vehicle has been subjected to compliance testing for FMVSS No. _____

The vehicle was inspected upon arrival at the laboratory for the test and found to contain all of the equipment listed below. All variances have been reported within 2 working days of vehicle arrival, by letter, to the NHTSA Industrial Property Manager (NAD-30), with a copy to the OVSC COTR. The vehicle is again inspected, after the above test has been conducted, and all changes are noted below. The final condition of the vehicle is also noted in detail.

MODEL YEAR/MAKE/MODEL/BODY STYLE: _____

NHTSA NO.: _____ BODY COLOR: _____ VIN: _____

ODOMETER READINGS: ARRIVAL - _____ miles DATE - _____

COMPLETION - _____ miles DATE - _____

PURCHASE PRICE: $_____ DEALER'S NAME: _____

ENGINE DATA: ____ Cylinders ____ Liters ____ Cubic Inches

TRANSMISSION DATA: ____ Automatic ____ Manual ____ No. of Speeds

FINAL DRIVE DATA: ____ Rear Drive ____ Front Drive ____ 4 Wheel Drive

TIRE DATA: Size - _____ Mfr. - _____

CHECK APPROPRIATE BOXES FOR VEHICLE EQUIPMENT:

	Air Conditioning		Traction Control		Clock
	Tinted Glass		All Wheel Drive		Roof Rack
	Power Steering		Speed Control		Console
	Power Windows		Rear Window Defroster		Driver Air Bag
	Power Door Locks		Sun Roof or T-Top		Passenger Air Bag
	Power Seat(s)		Tachometer		Front Disc Brakes
	Power Brakes		Tilt Steering Wheel		Rear Disc Brakes
	Antilock Brake System		AM/FM/Cassette Radio		Other-

LIST OTHER PERTINENT OPTIONAL EQUIPMENT ON NEXT PAGE (REMARKS SECTION)