

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LABORATORY TEST PROCEDURE

FOR

FMVSS 207

Seating Systems



SAFETY ASSURANCE
Office of Vehicle Safety Compliance
Room 6115, NSA-30
400 Seventh Street, SW
Washington, DC 20590

OVSC LABORATORY TEST PROCEDURE NO. 207
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1. PURPOSE AND APPLICATION

The Office of Vehicle Safety Compliance (OVSC) provides contracted laboratories with Laboratory Test Procedures (TPs) which serve 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. Any contractor interpreting any part of an OVSC Laboratory Test Procedure to be in conflict with a Federal Motor Vehicle Safety Standard or observing any deficiencies in a Laboratory Test Procedure is required to advise the Contracting Officer's Technical Representative (COTR) and resolve the discrepancy prior to the start of compliance testing.

Contractors are required to submit a detailed test procedure to the COTR before initiating the compliance test program. The procedure must include a step-by-step description of the methodology to be used.

The OVSC Laboratory Test Procedures are not intended to limit or restrain a contractor from developing or utilizing any testing techniques or equipment which will assist in procuring the required compliance test data.

NOTE:

The OVSC Laboratory Test Procedures, prepared for use by independent laboratories under contract to conduct compliance tests for the OVSC, 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. Sometimes, recognizing applicable test tolerances, the Test Procedures specify test conditions which are less severe than the minimum requirements of the standards themselves. Therefore, compliance of a vehicle or item of motor vehicle equipment is not necessarily guaranteed if the manufacturer limits certification tests to those described in the OVSC Laboratory Test Procedures.

2. GENERAL REQUIREMENTS

Federal Motor Vehicle Safety Standard (FMVSS) No. 207, "Seating Systems," establishes requirements for seats, their attachment assemblies, and their installation, to minimize the possibility of failure as a result of forces on the seat in a vehicle impact. The standard applies to passenger cars, multipurpose passenger vehicles (MPVs), trucks and buses.

Each occupant seat, other than a side facing seat, or a passenger seat on a bus, shall withstand the following forces.

- A. In any position to which it can be adjusted - 20 times the weight of the seat applied in a forward longitudinal direction
- B. In any position to which it can be adjusted - 20 times the weight of the seat applied in a rearward longitudinal direction
- C. For a seat belt assembly attached to the seat the force specified in paragraph (a) above, if it is a forward facing seat, or paragraph (b), if it is a rearward facing seat, in each case applied simultaneously with the forces imposed on the seat by the seat belt assembly when it is loaded in accordance with S4.2 of S210
- D. In its rearmost position - a force that produces a 3,300 in-lb moment about the seating reference point for each designated seating position that the seat provides, applied to the upper crossmember of the seat back or the upper seat back in a rearward longitudinal direction for forward-facing seats and in a forward longitudinal direction for rearward-facing seats

Seats should remain in its adjusted position during the application of each force. Seats that fold should be equipped with a self locking device for restraining the seat or seat back. If there are any DSP's behind the seat which require the restraining device to be operated to exit from the vehicle, it should be easily accessible.

3. SECURITY

The contractor shall provide appropriate security measures to protect the OVSC test vehicles from unauthorized personnel during the entire compliance testing program. The contractor is financially responsible for any acts of theft and/or vandalism which occur during the storage of test vehicles. Any security problems which arise shall be reported by telephone to the Industrial Property Manager (IPM), Office of Contracts and Procurement, within two working days after the incident. A letter containing specific details of the security problem will be sent to the IPM (with copy to the COTR) within 48 hours. The contractor shall protect and segregate the data that evolves from compliance testing before and after each vehicle test. No information concerning the vehicle safety compliance testing program shall be released to anyone except the COTR, unless specifically authorized by the COTR or the COTR's Branch Chief or Division Chief.

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

4. GOOD HOUSEKEEPING

Contractors shall maintain the entire vehicle compliance testing area, 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 shall be adjusted to permit vehicles to be tested to other FMVSSs as may be required by the OVSC. All compliance testing shall be coordinated with the COTR in order to allow monitoring by the COTR or other OVSC personnel.

6. TEST DATA DISPOSITION

The contractor shall make all preliminary compliance test data available to OVSC within four hours after the test, if requested. 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. Calibration information shall not be destroyed.

7. GOVERNMENT FURNISHED PROPERTY (GFP)

ACCEPTANCE OF VEHICLE

The Contractor has the responsibility of accepting the test vehicle from either a new car dealer or a vehicle transporter. In both instances, the contractor acts in the OVSC's behalf when signing an acceptance of the test vehicle. If the vehicle is delivered by a dealer, the engineer must check to verify the following:

- A. All options listed on the "window sticker" are present on the test vehicle.
- B. Tires and wheel rims are new and the same as listed.
- C. There are no dents or other interior or exterior flaws.
- D. The vehicle has been properly prepared and is in running condition.
- E. The glove box contains an owner's manual, warranty document, consumer information, and extra set of keys.
- F. Proper fuel filler cap is supplied on the test vehicle.

If the test vehicle is delivered by a government contracted transporter, the contractor's test engineer shall check for damage which may have occurred during transit.

A "Report Of Vehicle Condition At The Completion Of Testing" form (Data Sheet No. 1) will be supplied to the contractor by the COTR when the test vehicle is transferred from the new car dealer or between test contracts. The upper half of the form describes the vehicle in detail, and the lower half provides space for a detailed description of the post test condition. This form must be returned to the COTR with the copies of the Final Test Report or the reports will NOT be accepted.

NOTIFICATION OF COTR

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

8. CALIBRATION OF TEST INSTRUMENTS

Before the contractor initiates the safety compliance test program, a test instrumentation calibration system shall be implemented and maintained in accordance with established calibration practices. Guidelines for setting up and maintaining such calibration systems are described in MIL-C-45662A, "Calibration System Requirements". The calibration system shall be set up and maintained as follows:

- A. Standards for calibrating the measuring and test equipment will be stored and used under appropriate environmental conditions to assure their accuracy and stability.

- B. All measuring instruments and standards shall be calibrated by the contractor, or a commercial facility, against a higher order standard at periodic intervals NOT TO EXCEED SIX (6) 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 will be labeled with the following information:
 - (1) Date of calibration
 - (2) Date of next scheduled calibration
 - (3) Name of company performing calibration service (if different than contractor)
 - (4) Name and employer 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--see next page
 - (3) Accuracy--see next page
 - (4) Calibration interval
 - (5) Type of standard used to calibrate the equipment (calibration traceability of the standard must 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 system shall need the acceptance of the COTR before the test program commences.

8. CALIBRATION OF TEST INSTRUMENTS....Continued

TEST EQUIPMENT ACCURACY

EQUIPMENT	RANGE	ACCURACY
Hydraulic Rams (5 Reqd)	0-120% of Specified Load	N/A
Load Cells (5 Reqd)	0-120% of Readout Capability	± 0.5%
Strip Chart Recorder	Readout Capability of 3% of Maximum Load	± 1.0%
Hydraulic Pump	Approx. 3.8 gpm	N/A
DC Power Supply	Adequate for Load Cells Used	Line Reg. of 0.05% (105 to 125 v) Load Reg. of 0.05% (0 to Full) Ripple: 5 mv P/P Stability: 0.1%
Digital Voltmeter or Equivalent Used to Monitor Load Cell Outputs	4 Digit Readout	± 0.1%
Signal Conditioning and Calibration Units	Adequate for Load Cells Used	± 0.5%
H-Point Machine	N/A	N/A
Steel Scale	36" Minimum	± 0.1"

F. Test equipment will receive a calibration check immediately prior to and after the test. This check will be recorded by the test technician(s) and included in the final report.

NOTE: In the event of a failure to the standard's minimum performance requirements, 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 will be at the COTR's discretion and will be performed without additional cost.

9. PHOTOGRAPHIC COVERAGE

Photographs, if required, shall be glossy black and white, 8 x 10 inches, and properly focused for clear images. A tag, label or placard identifying the test vehicle model, NHTSA number and date or item of equipment part number and date shall appear in each photograph and must be legible. Each photograph shall be labeled as to the subject matter.

As a minimum the following photographs shall be included in each vehicle final test report:

- A. Test vehicle certification label
- B. Test vehicle tire information label
- C. The label on any seat that is not designated for occupancy while the vehicle is in motion
- D. 3/4 frontal left side view of test vehicle
- E. 3/4 rear right side view of test vehicle
- F. Vehicle tie down at each tie down location.
- G. Pretest view of each seat.
- H. Pretest views of each seat anchorage in the vehicle.
- I. The control for the front seat back release (if applicable)
- J. Pretest equipment set up at each seat.
- K. Post test condition of each seat.
- L. Post test condition of seat anchorages.
- M. If S210 testing is required because the seat belt assembly is attached to the seat, include the photographs required in the 210 test procedure.
- N. Any test failure condition which requires special detail.

10. DEFINITIONS

H-POINT

The pivot center of a manikin torso and thigh as measured with a three dimensional H-point machine (Ref. SAE J826).

TORSO LINE

A line connecting the H-point and the Shoulder Reference Point (SRP) as defined in SAE Recommended Practice J383, "Motor Vehicle Seat Belt Anchorage".

SEATING REFERENCE POINT (SRP)

The manufacturer's design reference point which:

- A. Establishes the rearmost normal design driving or riding position of each designated seating position in a vehicle
- B. Has coordinates established relative to the designed vehicle structure
- C. Simulates the position of the center pivot of the human torso and thigh
- D. Is the reference point employed to position the two dimensional templates described in SAE Recommended Practice J826, "Manikins For Use In Defining Vehicle Seating Accommodation".

TEST SPECIMEN

A test specimen shall consist of each occupant seat installation contained in the NHTSA test vehicle. This is further defined as one complete seating system including front, rear, and intermediate seats. Seats that are adjustable shall include any track, link, or power actuating assemblies necessary to adjust the longitudinal or vertical position of the seat. In, addition, the test specimen shall include all necessary hardware for mounting to the vehicle floorpan and any seat trim that contributes to the structural strength of the seat and adjuster system.

TYPE 1 LAP (PELVIC) BELT RESTRAINT

A seat belt assembly or portion thereof intended to restrain movement of the pelvis.

TYPE 2 LAP & SHOULDER (PELVIC & UPPER TORSO) BELT RESTRAINT

A combination of lap and shoulder restraints intended to restrain movement of the pelvis, chest, and shoulder regions.

10. DEFINITIONS.....Continued

TYPE 2A SHOULDER BELT RESTRAINT

A seat belt intended to restrain the forward movement of the occupants upper torso. This belt can only be used in conjunction with a lap belt to form a Type 2 seat belt assembly.

VEHICLE CURB WEIGHT

The weight of a motor vehicle with standard equipment; maximum capacity of engine fuel, oil and coolant; and, if so equipped, air conditioning and additional weight optional engine.

DESIGNATED SEATING POSITION (DSP)

Any plan view lateral location intended by the manufacturer to provide seating accommodation for a person at least as large as a 5th percentile adult female, except auxiliary seating accommodations such as temporary or folding seats.

DESIGNATED SEATING CAPACITY (DSC)

The number of DSPs provided in the vehicle and indicated on the vehicle's Tire Information Label.

NONADJUSTABLE SEAT

A passenger seat which does not have a seat adjuster. This also includes seats capable of movement for stowing the seat.

VEHICLE SEAT SYSTEM

A structure engineered to seat the driver and/or passengers including all cotton and foam rubber padding material, seat trim material, decorative metal trim parts, and seat adjusters and supporting components.

SEAT BACK RELEASE CONTROL

A mechanism designed to release the restraining device of hinged or folding seat.

SEAT ADJUSTERS

Devices anchored to the vehicle floorpan which support the seat frame and provides for seat assembly fore and aft adjustment. This includes any track, link, or power actuating assemblies necessary to adjust the position of the seat (longitudinal and vertical adjustment).

10. DEFINITIONS.....Continued**SEAT FRAME AND SEAT BACK RESTRAINING DEVICE**

A device designed to restrict the longitudinal movement of a hinged or folding seat frame or seat back.

SEAT BACK FRAME UPPER CROSSBAR

The uppermost horizontal structural member of a seat back frame.

SEAT BELT ATTACHMENT HARDWARE

Any or all hardware designed for securing the seat belt assembly to a seating system or a vehicle structure.

SEAT FRAME

The structural portion of a seat assembly. It may be of tubular, stamped steel, wood, fiber board, etc., construction.

SEATING SYSTEM ATTACHMENT HARDWARE

Any or all hardware designed for securing the seat assembly to the vehicle floorpan or vehicle structure.

11. PRETEST REQUIREMENTS

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

- A. A step-by-step description of the methodology to be used
- B. A written quality control (QC) procedure which shall include calibrations, the data review process, report review, and the people assigned to perform QC on each task
- C. A complete listing of test equipment which shall include instrument accuracy and calibration dates
- D. Detailed checkoff lists to be used during the test and during data review.

There shall be no contradiction between the OVSC Laboratory Test Procedure and the contractor's in-house test procedure. The procedures shall cover all aspects of testing from vehicle receipt to submission of the Final Report. Written approval must be obtained from the COTR before initiating the compliance test program so that all parties are in agreement.

A compliance test is not to be conducted unless all of the various test conditions specified in the applicable OVSC Laboratory Test Procedure have been met. Failure of a contractor to obtain the required test data and to maintain acceptable limits on test parameters in the manner outlined in the applicable OVSC Laboratory Test Procedure shall require a retest at the expense of the contractor. The retest costs will 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.

RECEIVING INSPECTION OF TEST VEHICLES

- A. A clean and secure test vehicle storage area shall be maintained by the contractor. The test vehicle shall be protected from theft of equipment.
- B. Upon receipt of the test vehicle, it shall be identified by the contractor with a NHTSA number previously furnished by the COTR.
- C. The test vehicle's seats and restraint systems shall be subjected to a visual inspection to ascertain that the seat belt assembly anchorage systems are complete and the seats and seat belt assemblies are functional. Any damage that could influence the test results shall be recorded on the Vehicle Condition sheet, and any unusual condition shall be reported to the COTR before initiation of testing. The COTR must approve the testing of any unusual test specimen.

11. PRETEST REQUIREMENTS.....Continued

- D. The operation of all adjustable seating systems will be checked to ascertain that the systems operate correctly. The results of this inspection shall be recorded on the Receiving-Inspection sheet.

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 have been met. Failure of a contractor to obtain the required test data and to maintain acceptable limits on test parameters in the manner outlined in the applicable OVSC Laboratory Test Procedure may require a retest at the expense of the contractor. The retest costs will include the cost of the replacement vehicle (with the same equipment as the original vehicle) and all costs associated with conducting the retest. The original test specimen (vehicle) used for the invalid test shall remain the property of OVSC, and the retest specimen shall remain the property of the contractor. If there is a test failure, the contractor shall retain the retest specimen for a period not exceeding 180 days. If there is no test failure, the Contractor may dispose of the test specimen upon notification from the COTR that the final test report has been accepted.

The Contracting Officer of NHTSA is the only NHTSA official authorized to notify the contractor that a retest is required. The retest shall be completed within two (2) weeks after receipt of notification by the Contracting Officer that a retest is required. If a retest is conducted, no test report is required for the original test.

12. COMPLIANCE TEST EXECUTION

GENERAL STATEMENT OF REQUIREMENTS

Standard 207 establishes requirements for seats, their attachment assemblies, and their installation. Those requirements, which are for each occupant seat as designated by the manufacturer, are listed below.

- A. Occupant seats without a seat belt assembly attached to the seat must with stand the following forces:
- (1) In any position to which the seat can be adjusted - 20 times the weight of the seat applied at the seat's center of gravity in a forward longitudinal direction. (S207, paragraph 4.2(a))
 - (2) In any position to which the seat can be adjusted - 20 times the weight of the seat applied at the seat's center of gravity (CG) in a rearward longitudinal direction. (S207, paragraph 4.2(b))
 - (3) In its rearmost position - a 3,300 inch-pound moment about the seating reference point for each designated seating position (DSP) that the seat provides. (S207, paragraph 4.2(d))
 - (4) During the application of forces in 1.a, 1.b, and 1.c the seat shall remain in its adjusted position. (S207, paragraph 4.2.1)
 - (5) For hinged or folding forward facing seats, the restraining device shall not fail or release with a forward longitudinal force equal to 20 times the weight of the hinged or folding portion of the seat applied at the CG of that portion of the seat. For hinged or folding rearward facing seats, the force is 8 times the weight of the hinged or folding portion of the seat applied in a rearward longitudinal direction at the center of gravity of that portion of the seat. In addition, the restraining device shall not fail when the seat is subjected to an acceleration of 20 g. in the longitudinal direction opposite to that in which the seat folds. (S207, paragraphs 4.3.2.1 and 4.3.2.2)
- B. Occupant seats with a seat belt assembly attached to the seat must with stand the following forces.
- (1) All the forces described above plus the forces described in S210, Seat Belt Assembly Anchorages. These additional forces are applied simultaneously with the force in 1.a if it is a forward facing seat or the forces of 1.b if it is a rearward facing seat. (S207, paragraph 4.2(c))

12. COMPLIANCE TEST EXECUTION.....Continued**TEST EQUIPMENT DESCRIPTION**

- A. A static loading apparatus capable of applying the required loads to a front bench seat with 3 designated seating positions (DSPs).
- B. Suitable load cells and instrumentation for measuring and permanently recording loads.
- C. Seat assembly pull test stand. The stand shall be sturdy enough to adequately withstand the loads applied.
- D. Restraining device or fixture to completely tie-down and immobilize the S207 test vehicle when applying the required loads.
- E. System to raise and hold the test vehicle at least 1 inch above the floor level.
- F. A camera to provide pertinent still photographs, which as a minimum, should include the photographs listed in this test procedure.
- G. A control panel containing pressure gauges, directional valves, pressure regulating valves, and isolation valves.
- H. A test loading monitoring and control system consisting of load cells and multi channel strip chart recorders with built in time base and event. Force control is derived from a full servo system directed by a closed loop programmable force generator. The loading system shall be capable of applying load at a constant rate. In addition, if any seat or cables used fail during the test, the rate of loading on the remaining seats shall not be affected. The system must also record the unloading of the seats at the end of the holding period. If all hydraulic actuators are not connected to the same pressure source, the application rate difference shall not exceed five percent. Likewise, the maximum force, maintained for the time interval specified, shall not exceed the standard's specified maximum value. Target values for application rate and maximum force shall be based on a worst case error analysis to be prepared and submitted by the contractor, including all potential measurement variables, and shall be approved by the COTR prior to commencing compliance testing.
- I. See OVSC Laboratory Test Procedure No. 210 for seat belt assembly anchorage test equipment needed for those seats with the seat belt assembly attached to the seat.

12. COMPLIANCE TEST EXECUTION.....Continued

SEQUENCE FOR SEAT BELT ASSEMBLY ANCHORAGE TESTS

The test vehicles shall be subjected to the tests in the following order:

- A. Receiving inspection of test vehicle
- B. Static load testing of seating systems

RECEIVING INSPECTION OF TEST VEHICLE

- A. A clean and secure test vehicle storage area shall be maintained by the contractor. The test vehicle shall be protected from theft of equipment.
- B. Upon receipt of the test vehicle, it shall be identified by the contractor with a NHTSA number previously furnished by the COTR. The "Report of Vehicle Condition at Completion of Testing" inspection sheet (data sheet 1) shall be completed by the contractor and added to the final test report.
- C. The test vehicle's seating systems restraint systems shall be subjected to a visual inspection to ascertain that the anchorage systems are complete and the seats are functional. Any damage that could influence the test results shall be recorded on the "Test Vehicle Receiving Inspection" sheet (Data Sheet No. 2), and any abnormal condition shall be reported to the COTR before initiation of testing. The COTR must approve the testing of any abnormal test specimen.
- D. The operation of all adjustable seating systems will be checked to ascertain that the systems operate correctly. The results of this inspection shall be recorded on the inspection sheet in Data Sheet No. 2.

STATIC LOAD TESTING OF SEATING SYSTEMS

The three groupings of seat configurations are shown in Figure 1. A description of the test requirements for different types of vehicle seating systems with forward facing seats is also shown in Figure 2. Further details for the five different tests are shown on Figure 3.

Specific details for each test are shown as follows:

Figure 4 Forward Load on Folding Seat Back Restraining Device

Figure 5A Forward and Aft Loads on Seat Frame And Seat Adjusters where Seat Belts are Attached to Seat and Procedure in Figure 6A is Not Applicable

12. COMPLIANCE TEST EXECUTION.....Continued

- Figure 5B Forward and Aft Loads on Seat Frame and Seat Adjusters where Procedure in Figure 6B is Not Applicable
- Figure 6A Forward and Aft Loads on Seat Frame with Seat Belts Attached to Seat and C.G. of Seat in a Plane Horizontally Above, On, or Below the Seat Adjuster
- Figure 6B Forward and Aft Loads on Seat Frame for Seats with C.G. of Seat in a Plane Horizontally Above, On, or Below the Seat Adjuster
- Figure 7 Aft Moment Load On Seat Back Upper Frame

12. COMPLIANCE TEST EXECUTION.....Continued

SEAT CONFIGURATIONS

(Left Side Views Shown)

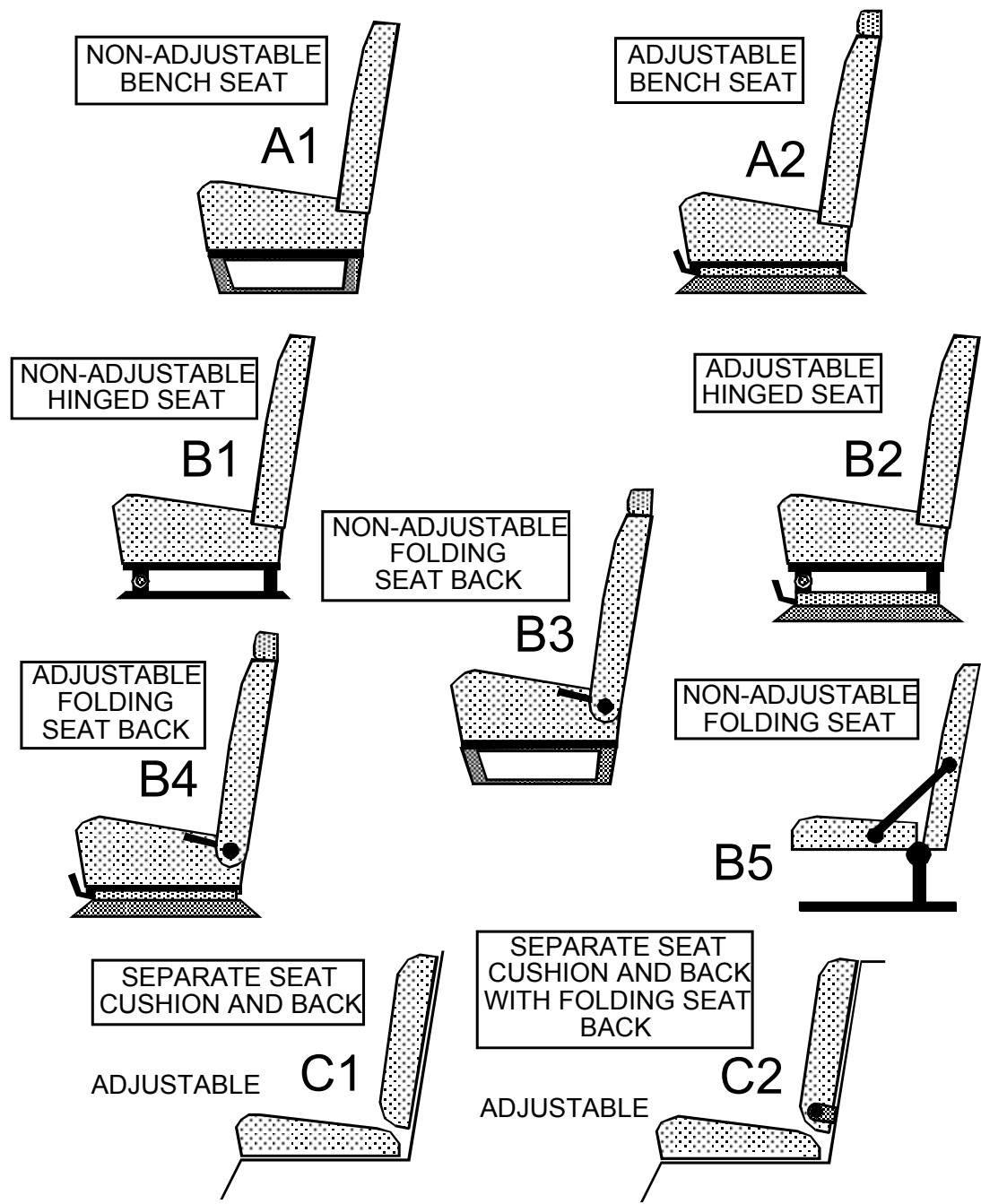


FIGURE 1

12. COMPLIANCE TEST EXECUTION....Continued
FIGURE 2 (GROUPS A & C)

TEST REQUIREMENTS	SEAT FORE/AFT POSIT.	GROUP `A'		GROUP `C'	
		BENCH SEAT		SEP. BACK/CUSHION FRAMES	
		Non-Adjust.	With Adjust.	Fixed Back	Folding Back
		A1	A2	C1	C2
#1. FOLDING BACK RESTRAINING DEVICE -- Fwd Load = 20 x Wb*	Fore				X
#2. SEAT FRAMES AND ADJUSTERS -- Fwd & Aft Loads = 20 x Wa*	Mid	X	X		
#3. SEAT FRAMES WITH BELT ANCHORAGES -- Fwd Load = 20 x Wa + 4950# (Lap)	Mid	X	X		
Aft Load = 20 x Wa	Mid	X	X		
#4. SEAT BACK UPPER FRAME MOMENT -- Aft Moment = 3275 in-lbs/occupant	Aft	X	X		X
#5. REAR SEAT BACK & CUSHION FRAMES --					
A. Fwd Back Load = 20 x Wb	N/A			X	X
A. Aft Back Load = 20 x Wb (if reqd)	N/A			X	X
#5. REAR SEAT BACK & CUSHION FRAMES --					
B. Fwd Cush Load = 20 x Wc*	N/A			X	X
B. Aft Cush Load = 20 x Wc (if reqd)	N/A			X	X

* Wa = Weight of the Seat ASSEMBLY
 Wb = Weight of the Seat BACK
 Wc = Weight of the Seat CUSHION

12. COMPLIANCE TEST EXECUTION....Continued

FIGURE 2 (GROUP B)

TEST REQUIREMENTS	SEAT FORE/AFT POSIT.	GROUP `B'				
		HINGED SEAT		FOLDING BACK		FOLDING SEAT/ NON-ADJUST.
		Non-Adjust.	With Adjust.	Non-Adjust.	With Adjust.	
		B1	B2	B3	B4	B5
#1. FOLDING BACK RESTRAINING DEVICE -- Fwd Load = 20 x Wb*	Fore			X	X	X
#2. SEAT FRAMES AND ADJUSTERS -- Fwd & Aft Loads = 20 x Wa*	Mid	X	X	X	X	X
#3. SEAT FRAMES WITH BELT ANCHORAGES -- Fwd Load = 20 x Wa + 4950# (Lap)	Mid	X	X	X	X	X
Aft Load = 20 x Wa	Mid	X	X	X	X	X
#4. SEAT BACK UPPER FRAME MOMENT -- Aft Moment = 3275 in-lbs/occupant	Aft	X	X	X	X	X
#5. REAR SEAT BACK & CUSHION FRAMES --						
A. Fwd Back Load = 20 x Wb	N/A					
A. Aft Back Load = 20 x Wb (if reqd)	N/A					
#5. REAR SEAT BACK & CUSHION FRAMES --						
B. Fwd Cush Load = 20 x Wc*	N/A					
B. Aft Cush Load = 20 x Wc (if reqd)	N/A					

* Wa = Weight of the Seat ASSEMBLY
 Wb = Weight of the Seat BACK
 Wc = Weight of the Seat CUSHION

12. COMPLIANCE TEST EXECUTION....Continued

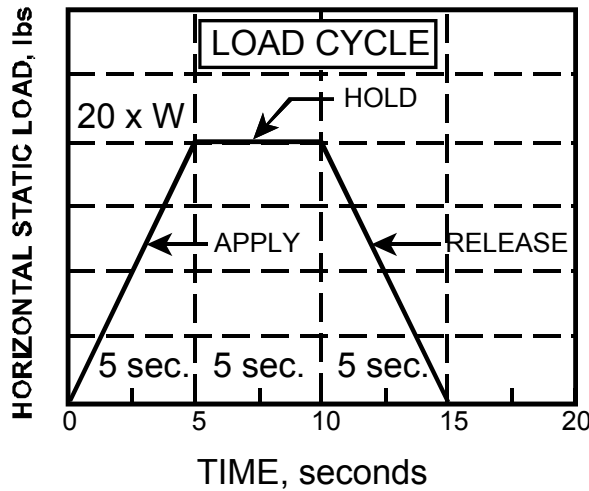
FORWARD LOAD ON FOLDING SEAT BACK RESTRAINING DEVICE

NOT on seats having adjustable backs for occupant comfort only.

FRONT SEAT(S) FULL FORWARD

Attach Load/Deflection Fixture to point through the c.g. of the seat back assembly using crossbar brace on seat back.

FORWARD HORIZONTAL STATIC LOAD = $20 \times W_b$



VALUES OF "W":
 W_a = Weight of seat assembly
 W_b = Weight of seat back
 W_c = Weight of seat cushion

W_b = Weight of Seat Back

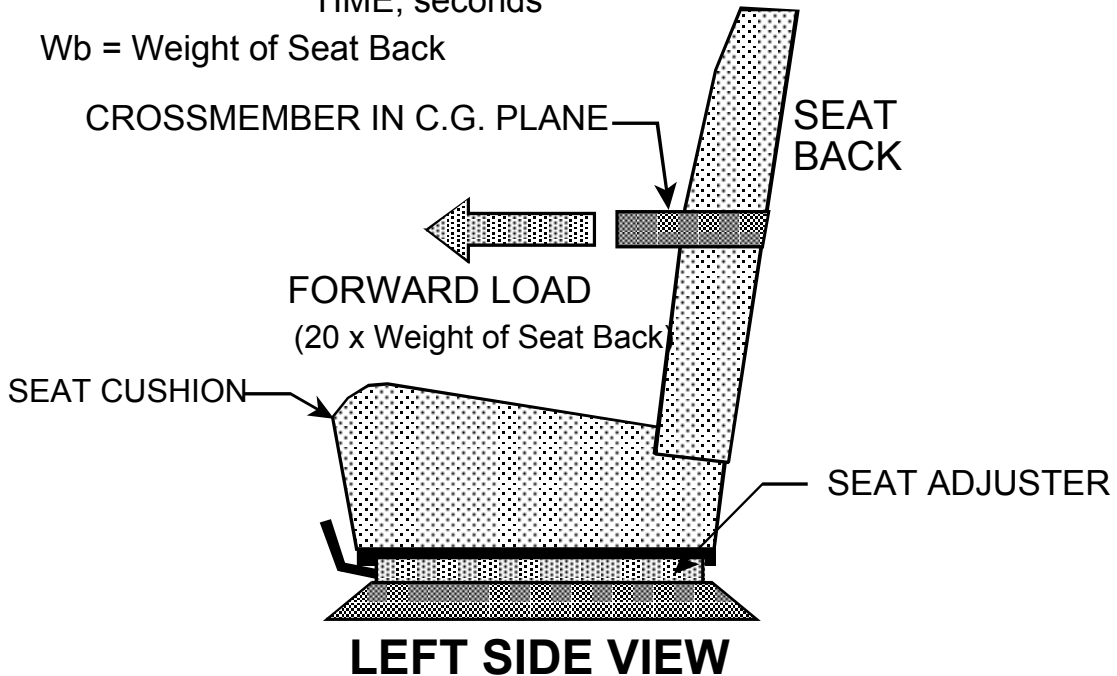


FIGURE 3A

12. COMPLIANCE TEST EXECUTION....Continued

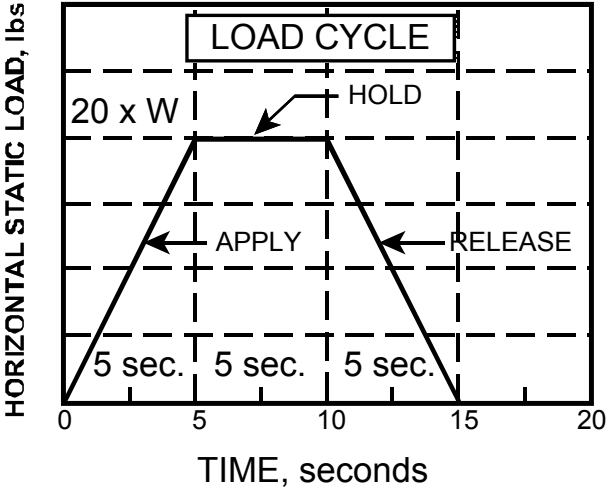
FORWARD AND AFT LOADS ON SEAT FRAME AND SEAT ADJUSTERS

FRONT SEAT(S) AT MID-POINT OF HORIZ. & VERTICAL TRAVEL

Attach diagonal struts at outboard edges of seat frame with rigid crossmember between them in plane of seat assembly c.g.

FORWARD HORIZONTAL STATIC LOAD = $20 \times W_a$

AFT HORIZONTAL STATIC LOAD = $20 \times W_a$



VALUES OF "W":
 W_a = Weight of seat assembly
 W_b = Weight of seat back
 W_c = Weight of seat cushion

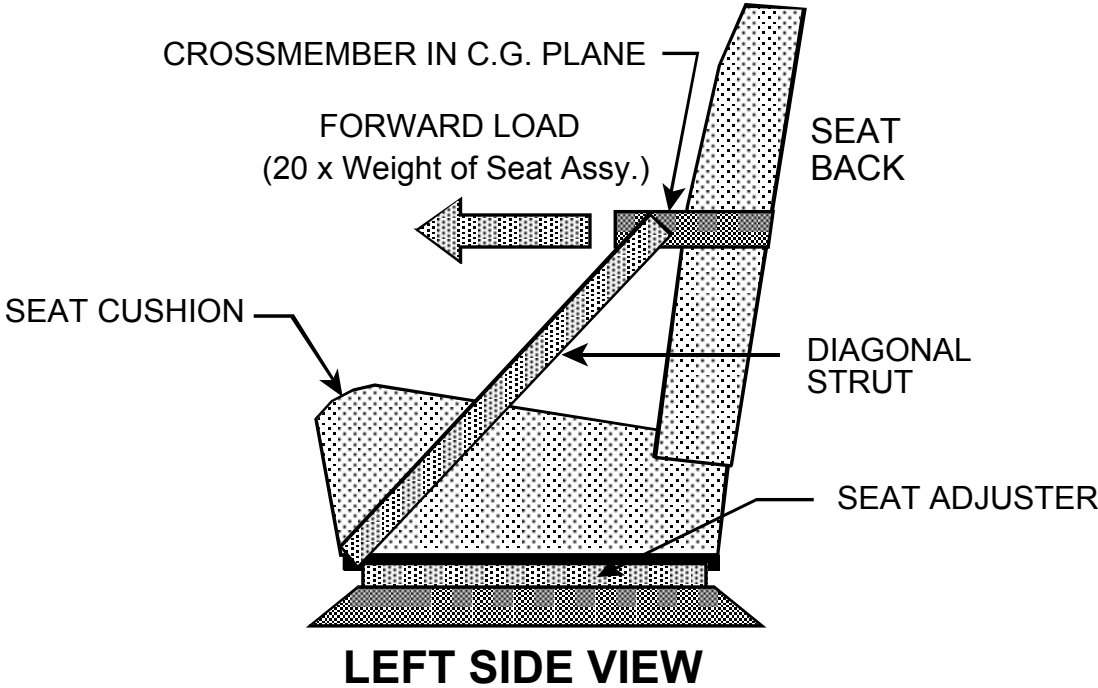


FIGURE 3B

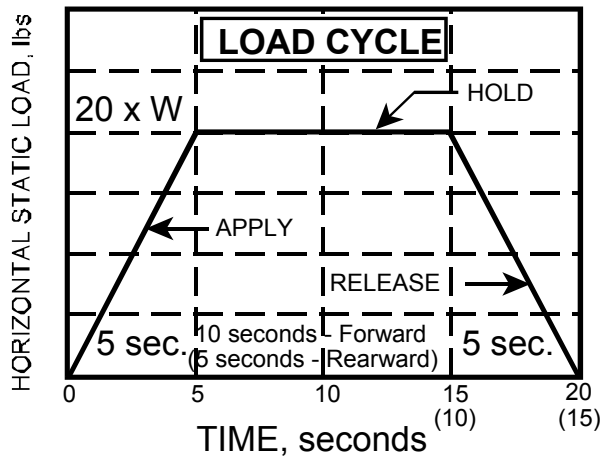
12. COMPLIANCE TEST EXECUTION....Continued
FORWARD AND AFT LOADS ON SEAT FRAME
WHEN BELTS ARE ATTACHED TO SEATING SYSTEM

FRONT SEAT(S) AT MOST **REARWARD** HORIZONTAL ADJUSTMENT POSITION AND **HIGHEST** VERTICAL ADJUSTMENT POSITION

Attach diagonal struts at outboard edges of seat frame with rigid crossmember between them in plane of seat assembly c.g.

TOTAL FWD. HORIZ. LOAD = Belt Load (2500#/anchor. point for lap belts = 5000# PLUS Fwd. Horiz. Static Load of $20 \times W_a$

AFT HORIZONTAL STATIC LOAD = $20 \times W_a$



VALUES OF "W":

W_a = Weight of seat assembly

W_b = Weight of seat back

W_c = Weight of seat cushion

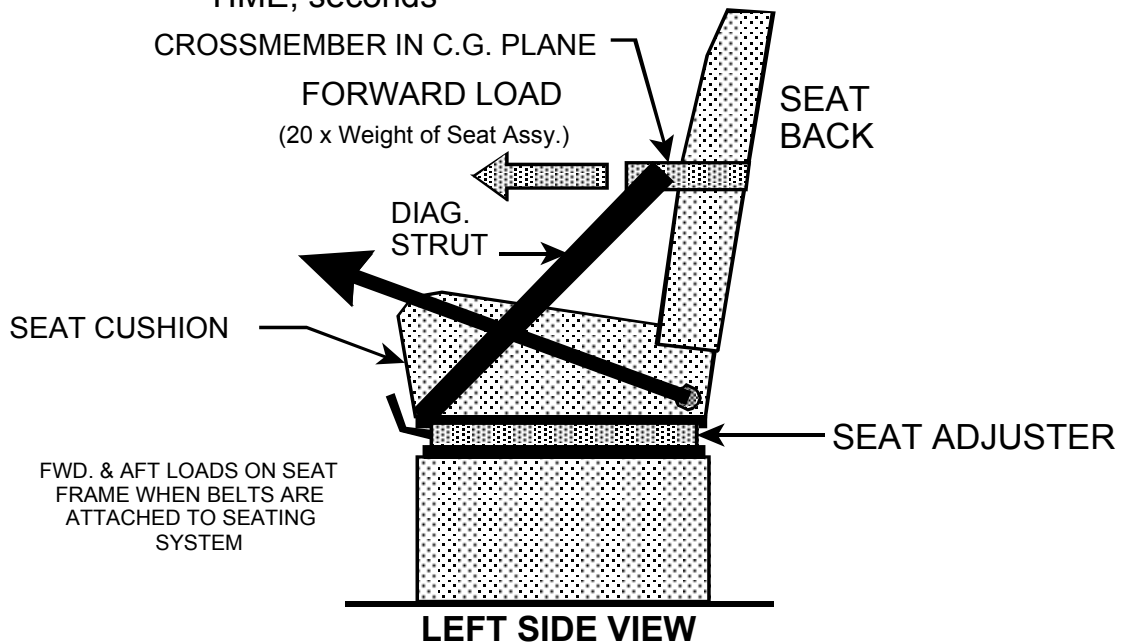


FIGURE 3C

12. COMPLIANCE TEST EXECUTION....Continued

AFT MOMENT LOAD ON SEAT BACK UPPER FRAME

FRONT SEAT(S) FULL AFT

Attach Load/Deflection Fixture to uppermost crossmember on seat back assembly.

AFT HORIZONTAL MOMENT ABOUT SRP = 3275 in.-lbs/occupant

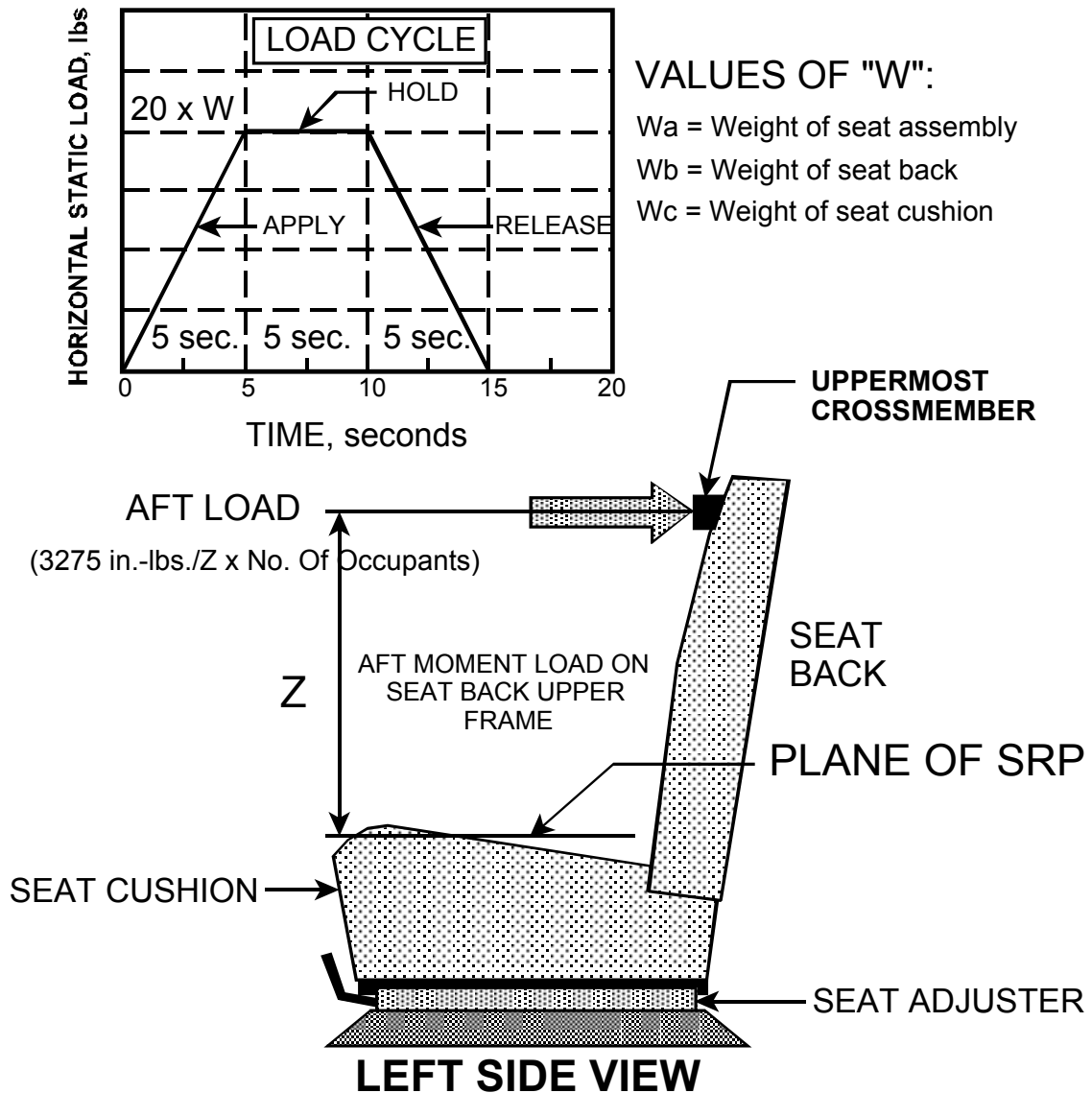


FIGURE 3D

12. COMPLIANCE TEST EXECUTION....Continued

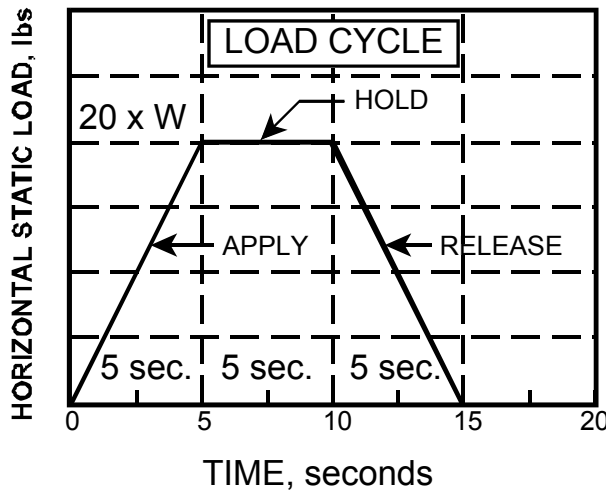
FORWARD LOADS ON REAR SEAT BACK AND CUSHION FRAMES

REAR SEAT BACK AND CUSHION POSITIONS FIXED

Attach fixture through point of c.g. on seat back or seat cushion

SEAT BACK ASSY - FWD. HORIZ. LOAD = $20 \times W_b$

**SEAT CUSHION ASSY. - FWD. HORIZ. LOAD = $20 \times W_c$ and
AFT HORIZ. LOAD = $20 \times W_c$**



VALUES OF "W":
 W_a = Weight of seat assembly
 W_b = Weight of seat back
 W_c = Weight of seat cushion

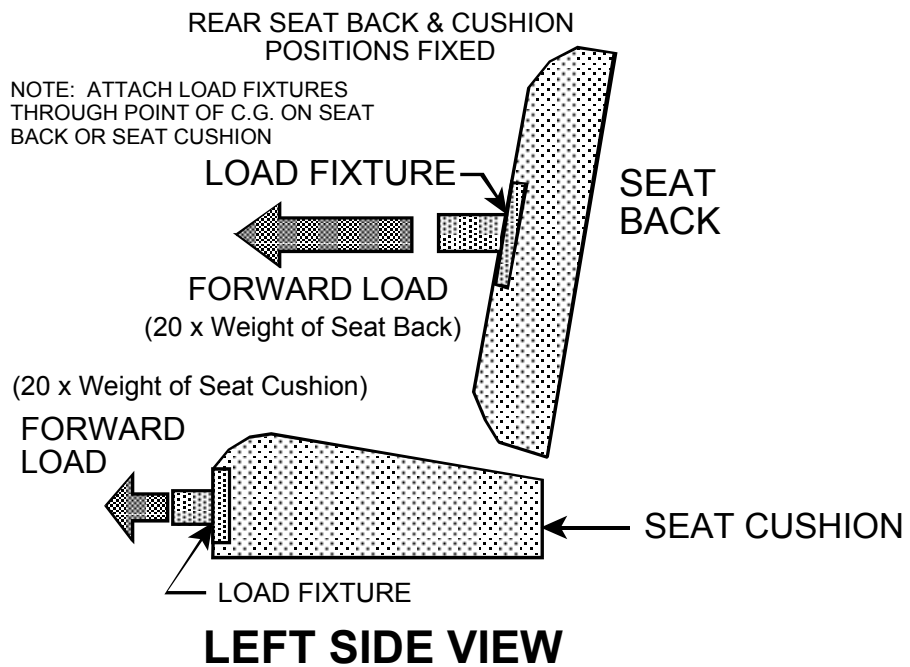


FIGURE 3E

12. COMPLIANCE TEST EXECUTION.....Continued

FORWARD LOAD ON FOLDING SEAT BACK RESTRAINING DEVICE

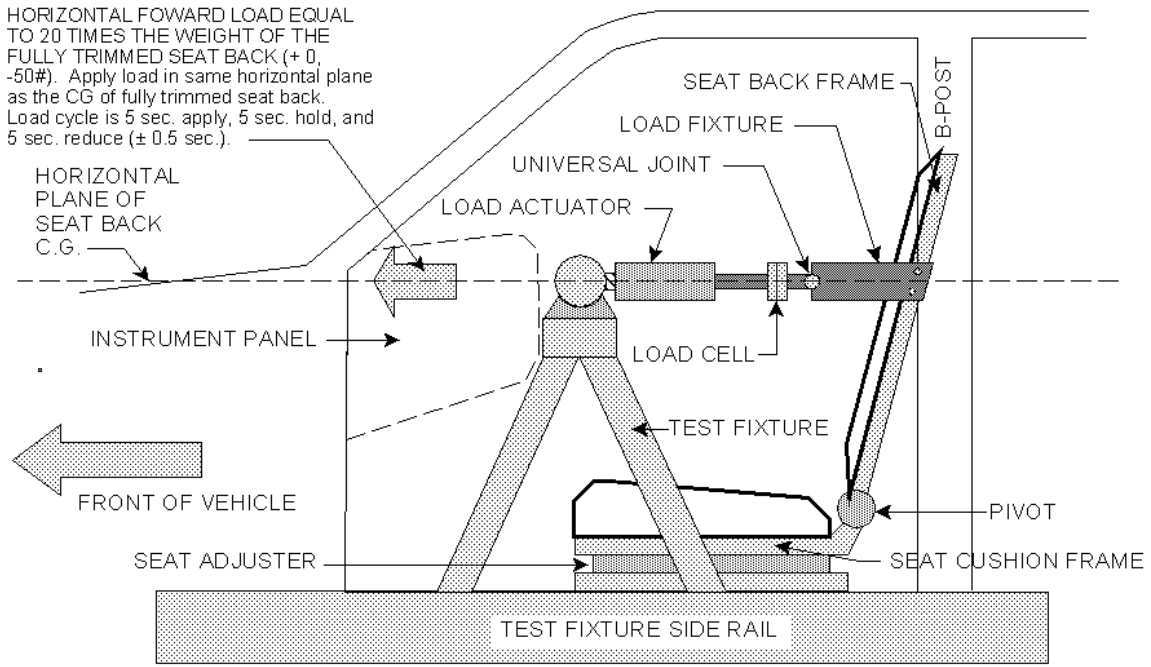
NOTE: Not Applicable to seats having a back that is adjustable for occupant comfort only!

SEAT LOCATION: Full forward if possible. Equipment limitations may necessitate the use of a mid-position due to the travel of the load application device.

Latching mechanism need not be operable after the application of static load.

HORIZONTAL FOWARD LOAD EQUAL TO 20 TIMES THE WEIGHT OF THE FULLY TRIMMED SEAT BACK (+ 0, -50#). Apply load in same horizontal plane as the CG of fully trimmed seat back. Load cycle is 5 sec. apply, 5 sec. hold, and 5 sec. reduce (± 0.5 sec.).

HORIZONTAL PLANE OF SEAT BACK C.G.



LEFT SIDE VIEW OF FRONT SEAT

FIGURE 4

12. COMPLIANCE TEST EXECUTION.....Continued
FORWARD AND AFT LOADS ON SEAT FRAME AND SEAT ADJUSTERS
WHERE PROCEDURE IN FIGURE 6 IS NOT APPLICABLE

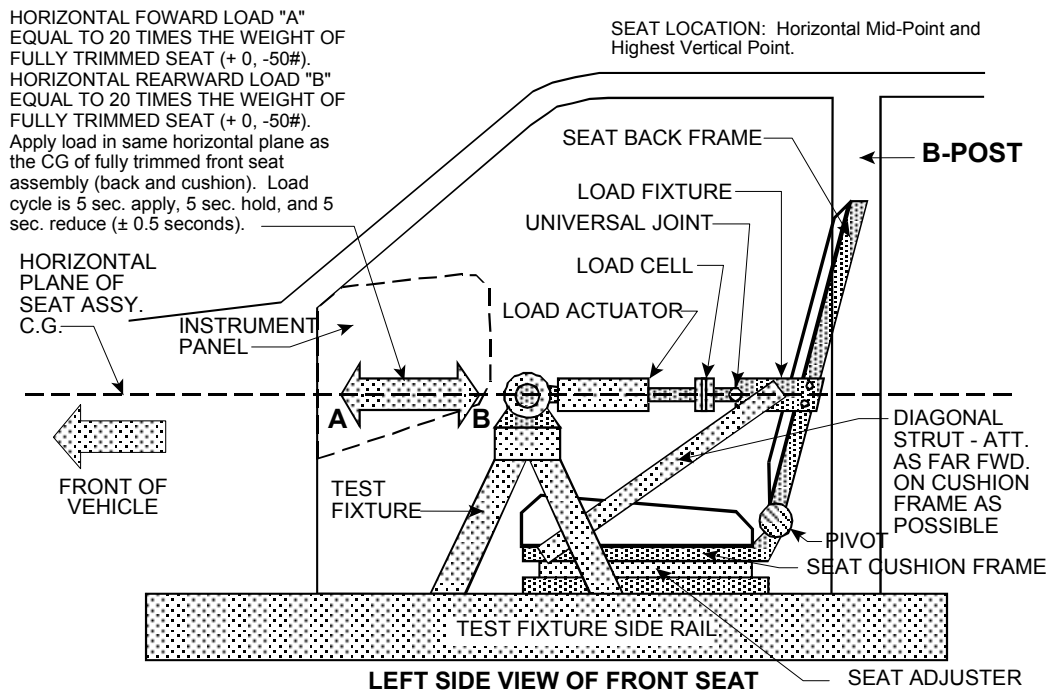


FIGURE 5A

FIGURE 5B

FORWARD AND AFT LOADS ON SEAT FRAME AND SEAT ADJUSTERS
WHERE SEAT BELTS ARE ATTACHED TO SEAT AND PROCEDURE IN
FIGURE 6 IS NOT APPLICABLE

HORIZONTAL FORWARD LOAD "A"
 EQUAL TO 20 TIMES THE WEIGHT OF
 FULLY TRIMMED SEAT (+ 0, -50#).
 HORIZONTAL REARWARD LOAD "B"
 EQUAL TO 20 TIMES THE WEIGHT OF
 FULLY TRIMMED SEAT (+ 0, -50#).
 Apply load in same horizontal plane as
 the CG of fully trimmed front seat
 assembly (back and cushion). Load
 cycle is 5 sec. apply, 5 sec. hold, and 5
 sec. reduce (± 0.5 seconds).

SEAT LOCATION:
 Most Rearward Horizontal Adjustment and
 Highest Vertical Point.

12. COMPLIANCE TEST EXECUTION.....Continued
FORWARD AND AFT LOADS ON SEAT FRAME
WITH SEAT BELTS ATTACHED TO SEAT AND
C.G. OF SEAT IN A PLANE HORIZONTALLY ABOVE,
ON, OR BELOW THE SEAT ADJUSTER

Horizontal Forward Load "A" Equal to 20 Times the Weight of Fully Trimmed Seat (+ 0, -50#) for portion of seat weight above lowest surface of the seat adjuster.
 Horizontal Rearward Load "B" Equal to 20 Times the Weight of Fully Trimmed Seat (+ 0, -50#) for portion of seat weight above the lowest surface of the seat adjuster.
 Load cycle is 5 sec. apply, 10 seconds forward and/or 5 seconds rearward, and 5 sec. reduce (± 0.5 seconds).

Forward Seat Belt Anchorage Load "C"
 Pulled at an Angle of 5 E to 15E above the Vehicle Horizontal Reference Line (+ 0, -50#).
 Pulled simultaneously (LOADS A, C & E).
 LOAD = 5000# - lap belt anchorages on seat frame above seat adjuster. Use 3000# load for shoulder belt anchorages on frame.

Horizontal Forward Load "D" Equal to 20 Times the Weight of Fully Trimmed Seat (+ 0, -50#) for portion of seat weight below seat adjuster.
 Horizontal Rearward Load "E" Equal to 20 Times the Weight of Fully Trimmed Seat (+ 0, -50#) for portion of seat weight below the seat adjuster.
 Load cycle is 5 seconds apply, 10 seconds forward and/or 5 seconds rearward, and 5 sec. reduce (± 0.5 seconds).

CG1 = Center of Gravity of the portion of the seat above lowest surface of seat adjuster.

CG2 = Center of Gravity of the portion of the seat below the seat adjuster.

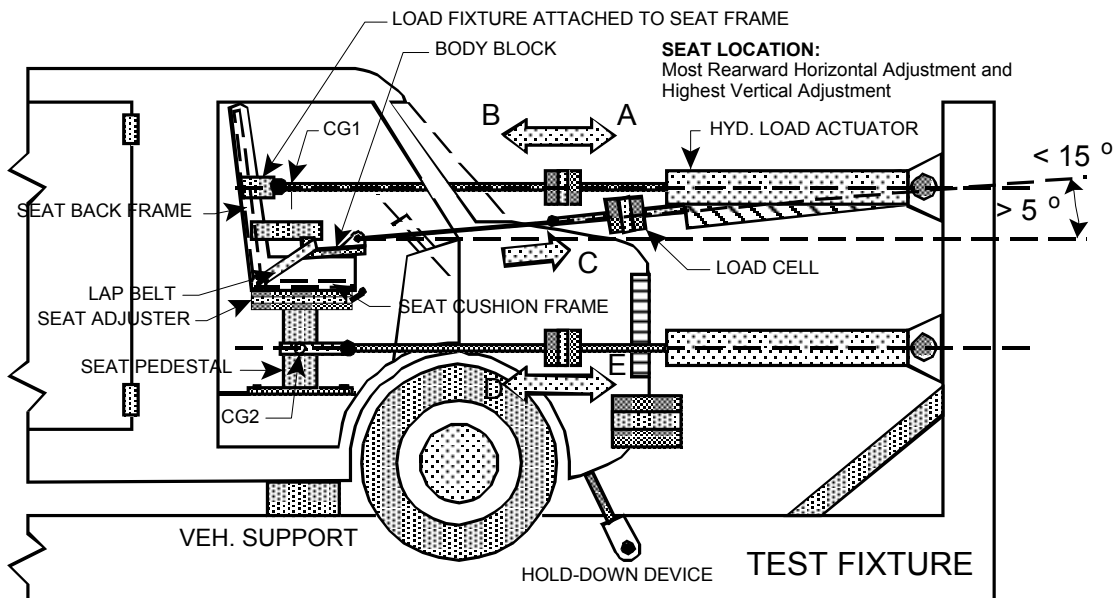


FIGURE 6A

12. COMPLIANCE TEST EXECUTION.....Continued
**FORWARD AND AFT LOADS ON SEAT FRAME
 FOR SEATS WITH C.G. OF SEAT IN A PLANE
 HORIZONTALLY ABOVE, ON, OR BELOW
 THE SEAT ADJUSTER**

Horizontal Forward Load "A" Equal to 20 Times the Weight of Fully Trimmed Seat (+ 0, -50#) for portion of seat weight above lowest surface of the seat adjuster.

Horizontal Rearward Load "B" Equal to 20 Times the Weight of Fully Trimmed Seat (+ 0, -50#) for portion of seat weight above the lowest surface of the seat adjuster.

Load cycle is 5 seconds apply, 5 seconds forward and/or 5 seconds rearward, and 5 seconds reduce (± 0.5 seconds).

Horizontal Forward Load "D" Equal to 20 Times the Weight of Fully Trimmed Seat (+ 0, -50#) for portion of seat weight below seat adjuster.

Horizontal Rearward Load "E" Equal to 20 Times the Weight of Fully Trimmed Seat (+ 0, -50#) for portion of seat weight below the seat adjuster.

Load cycle is 5 seconds apply, 5 seconds forward and/or rearward, hold, and 5 seconds reduce (± 0.5 seconds).

CG1 = Center of Gravity of the portion of the seat above lowest surface of seat adjuster.

CG2 = Center of Gravity of the portion of the seat below the seat adjuster.

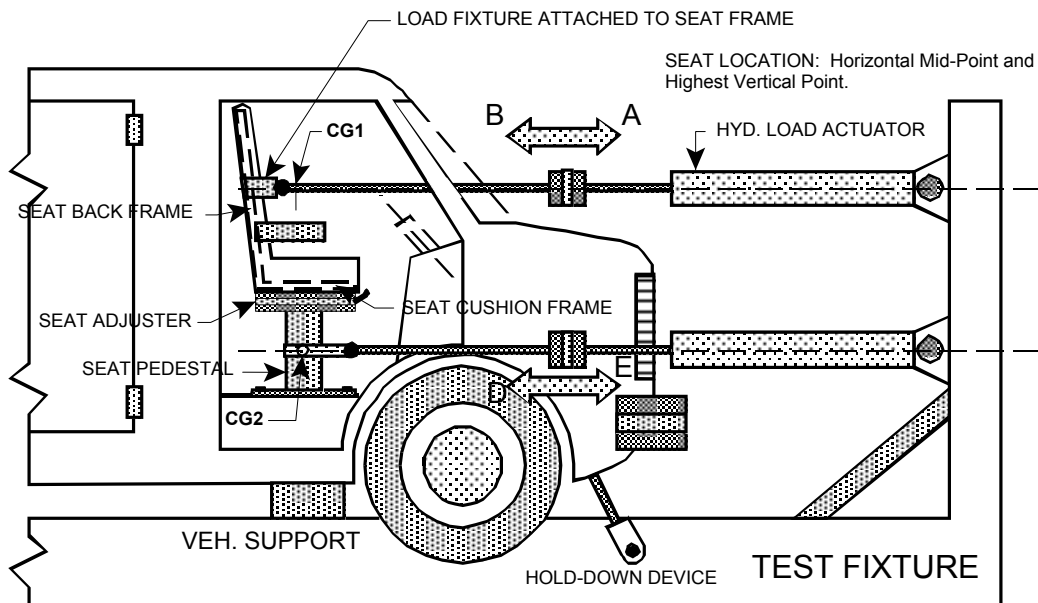


FIGURE 6B

12. COMPLIANCE TEST EXECUTION.....Continued
AFT MOMENT LOAD ON SEAT BACK UPPER FRAME

HORIZ. LOAD = $3275/Z''$ x No. of Occupants

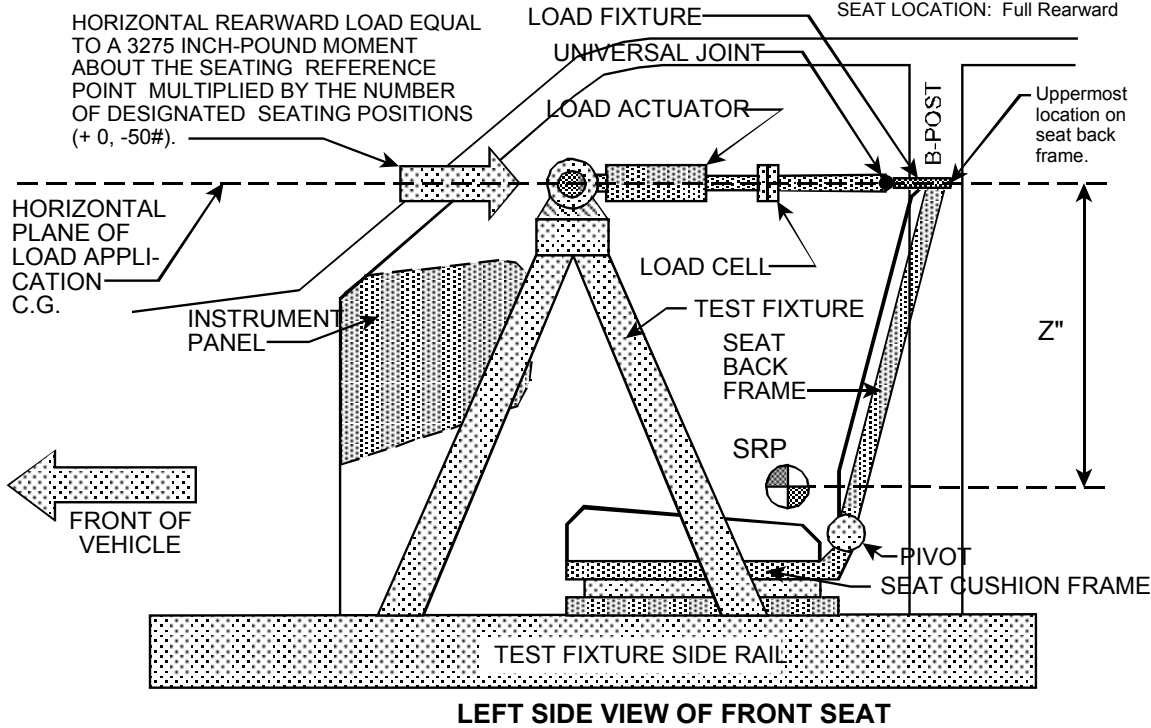


FIGURE 7

12. COMPLIANCE TEST EXECUTION.....Continued

Figure 8 Forward Load On Rear Seat Back Frame

Figure 9 Forward Load On Folding Seat Back Restraining Device

Figure 10 Forward Load On Rear Seat Cushion Frame

Figure 11 Alternate Loading Method For Rear Seat Cushion Frame

Methods for determining seating system center of gravity (CG) locations are shown on Figure 12.

The vehicle test fixture is shown on Figure 13.

Eight possible noncompliances are shown on Figure 14.

12. COMPLIANCE TEST EXECUTION.....Continued
FORWARD LOAD ON REAR SEAT BACK FRAME

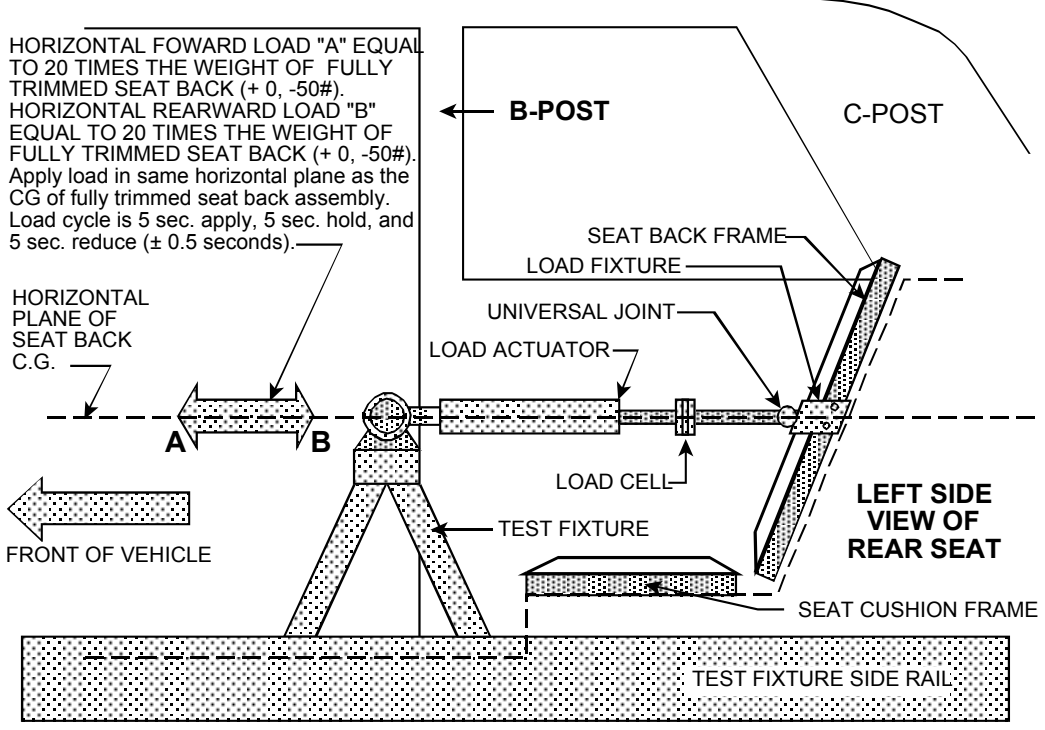
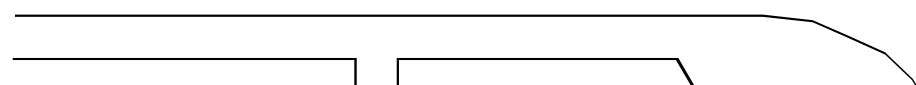


FIGURE 8

FIGURE 9

FORWARD LOAD ON REAR FOLDING SEAT BACK RESTRAINING DEVICE



12. COMPLIANCE TEST EXECUTION.....Continued
FORWARD LOAD ON REAR SEAT CUSHION FRAME

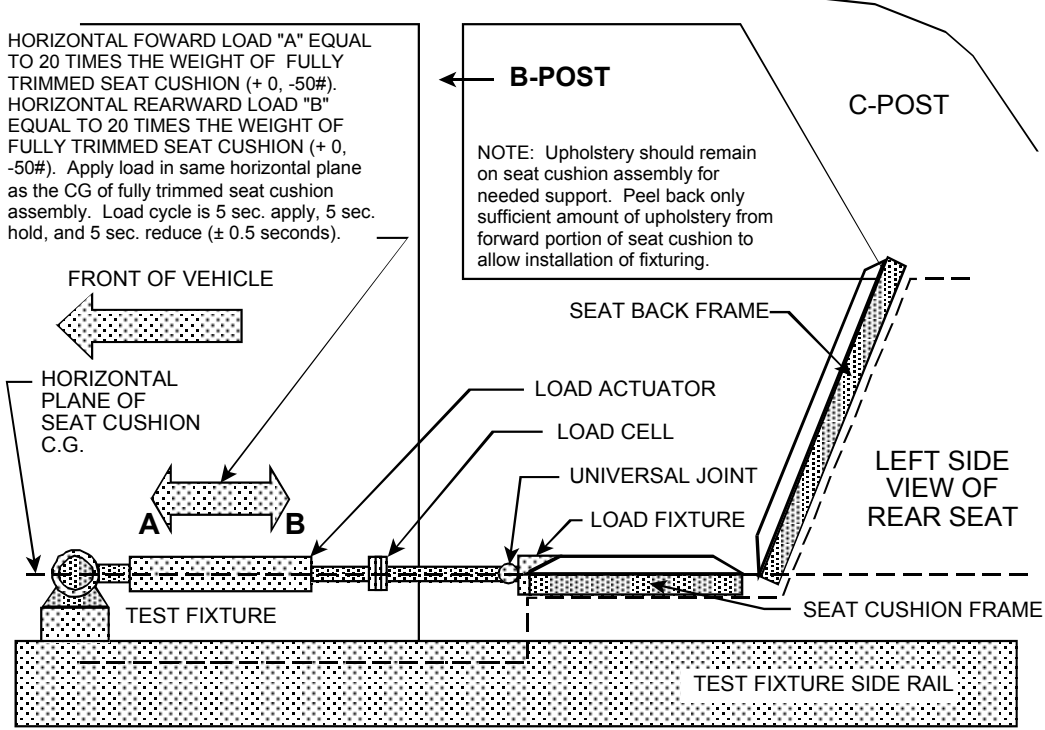


FIGURE 10

ALTERNATE SETUP - FORWARD LOAD ON REAR SEAT CUSHION FRAME

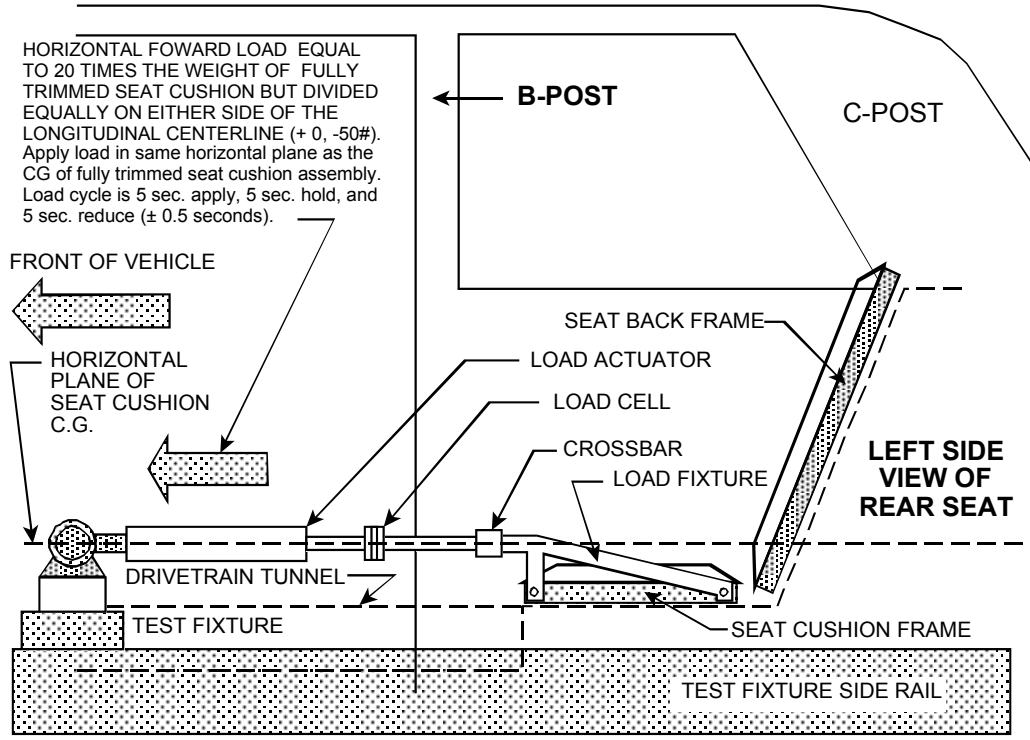


FIGURE 11

12. COMPLIANCE TEST EXECUTION.....Continued

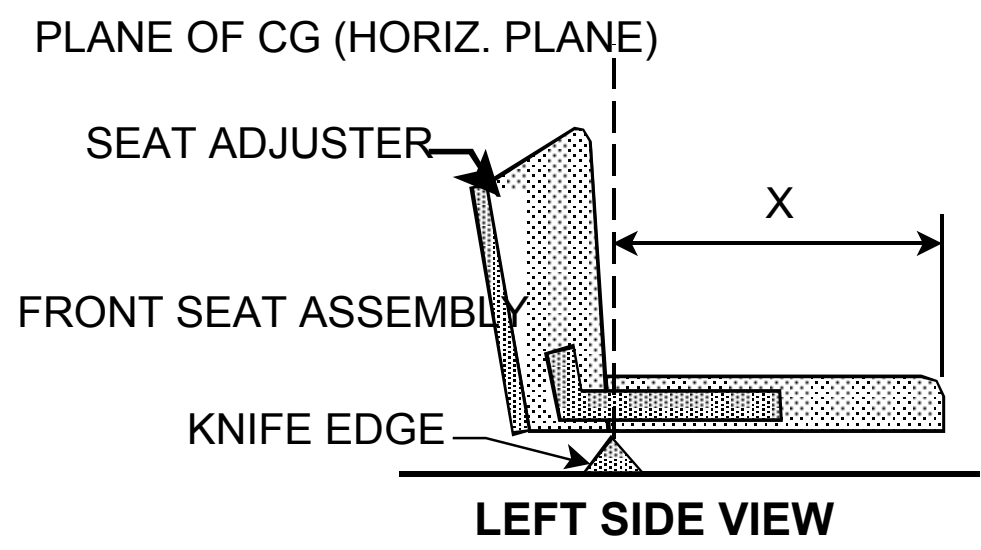
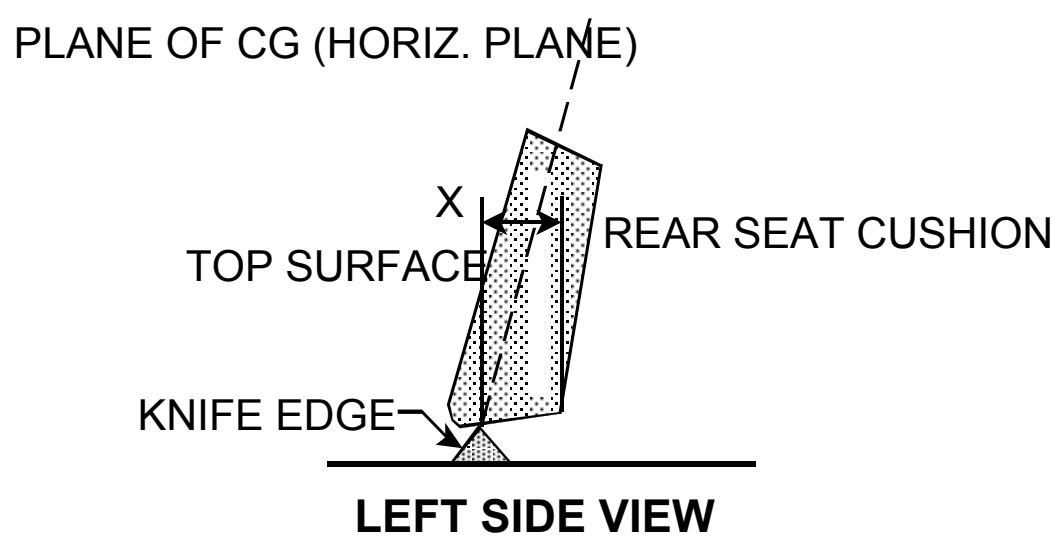
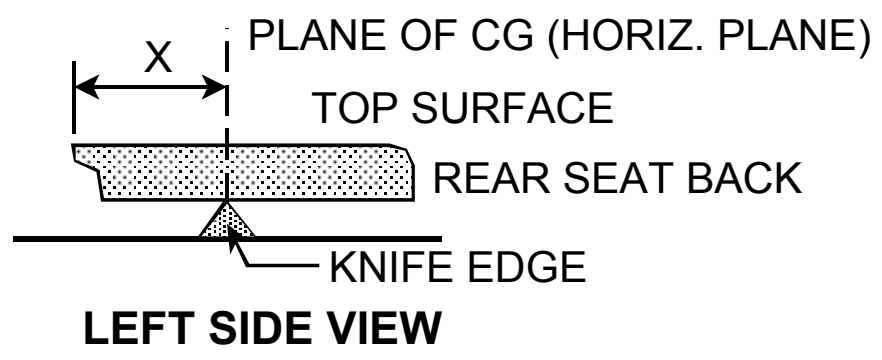


FIGURE 12

12. COMPLIANCE TEST EXECUTION.....Continued

S207 VEHICLE TEST SETUP

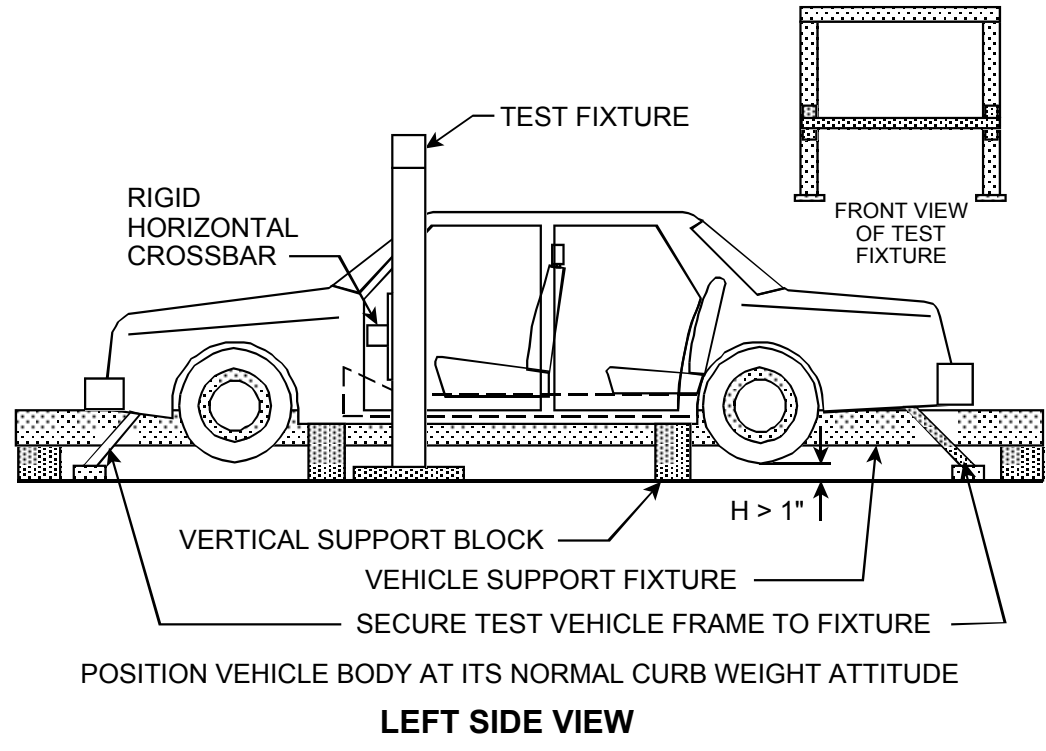
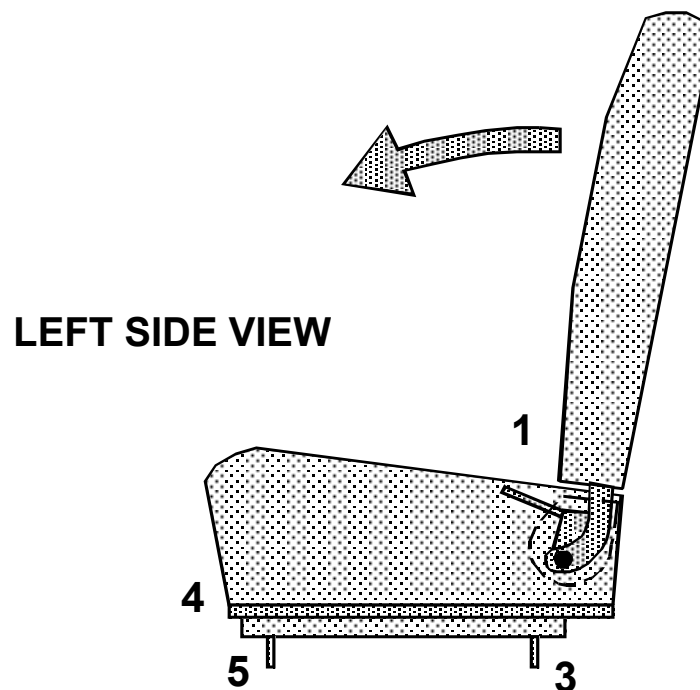


FIGURE 13

COMPLIANCE TEST EXECUTION.....Continued

S207, SEATING SYSTEMS, POSSIBLE NONCOMPLIANCES

1. Folding Seat Back Restraining Device releases from its preset position during application of forward load.
2. Seat Frame releases from its adjusted position during the application of a forward or rearward load.
3. Seat Frame or Seat Adjusters detach from the test vehicle floorpan during the application of a forward or rearward load.
4. Seat Frame detaches from the Seat Adjuster mechanism during the application of a forward or rearward load.
5. Seat Adjuster mechanism separates during the application of a forward or rearward load.
6. Hinged Seat Restraining Device detaches from the Seat Frame during the application of a forward or rearward load.
7. Hinged Seat Restraining Device disengages during the application of a forward or rearward load.
8. Rear Seat Back or Cushion Frame detaches from the test vehicle structure during the application of the specified load.

**13. POST TEST REQUIREMENTS**

Contractor shall re-verify all instrumentation and check data sheets.

14. REPORTS

14.1. Monthly Status Reports

The contractor shall submit a monthly Test Status Report and a Vehicle or Equipment Status Report to the COTR. The Vehicle or Equipment Status Report shall be submitted until all vehicles or items of equipment are disposed of. See Section 16 "Forms" for samples of the required Monthly Status Reports.

14.2 Apparent Test Failure

Any indication of a test failure shall be communicated by telephone to the COTR within 24 hours with written notification mailed within 48 hours (Saturday and Sunday hours excluded). A Notice of Test Failure (see Section 16) 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, **seven** copies of the Final Test Report shall be submitted 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 this section.

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

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

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

14. REPORTS...Continued

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 must be a complete document capable of standing by itself and containing all data sheets.

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

Instructions for the preparation of the first three pages of the final test report are provided for 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:

- Final Report Number such as 207-ABC-9X-001 where - -
 - 207 is the FMVSS tested
 - ABC are the initials for the laboratory
 - 9X is the Fiscal Year of the test program
 - 001 is the Group Number (001 for the 1st test, 002 for the 2nd test, etc.)

Final Report Title And Subtitle such as

SAFETY COMPLIANCE TESTING FOR FMVSS 207
Seating Systems

Name of Vehicle Manufacturer
Model Year, Make/Model, Body Style
NHTSA Number Test Vehicle

Contractor's Name and Address such as

COMPLIANCE TESTING LABORATORIES, INC.
4335 West Dearborn Street
Detroit, Michigan 48090

14. REPORTS....Continued

NOTE: DOT SYMBOL WILL BE PLACED BETWEEN ITEMS (3) AND (4)

Date of Final Report Completion such as "March 15, 199X"

The words "FINAL REPORT"

The sponsoring agency's name and address as follows - -

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Safety Assurance
Office of Vehicle Safety Compliance
400 Seventh Street, SW
Room 6115 (NSA-30)
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

207-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 207 Compliance Testing of 199X Ace Super
2-door Coupe, NHTSA No. CX0401

Block 5 — REPORT DATE

March 15, 199X

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
Office of Vehicle Safety Compliance
Mail Code: NEF-30
400 7th St, SW, Room 6115
Washington, DC 20590

Block 13 — TYPE OF REPORT AND PERIOD COVERED

Final Test Report
Feb. 15 to Mar. 15, 199X

Block 14 — SPONSORING AGENCY CODE

NEF-30

Block 15 — SUPPLEMENTARY NOTES

Leave blank

Block 16 — ABSTRACT

Compliance tests were conducted on the subject 199X Ace Super 2-door coupe in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-207-0X for the determination of FMVSS 207 compliance. Test failures identified were as follows:

None

Note: Above wording must 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 207

Block 18 — DISTRIBUTION STATEMENT

Copies of this report are available from - -

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14. REPORTS....Continued

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 Data Summary

Section 3 — Compliance Test Data

Section 4 — Noncompliance Data (if applicable)

Section 5 — Photographs