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U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LABORATORY TEST PROCEDURE

FOR

FMVSS 225

Child Restraint Anchorage Systems

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

REVISION CONTROL LOG
FOR OVSC LABORATORY TEST PROCEDURES
TP-225
Child Restraint Anchorage Systems

TEST PROCEDURE		FMVSS 225		DESCRIPTION
REV. No.	DATE	AMENDMENT	EFFECTIVE DATE	
00	3/05/99	64FR10823	09/1/99	Original release signed by O.D.
01	4/11/05	68FR38208	09/01/04	Include changes from petitions, including 69FR60563 and 69FR61154, and eliminating phase-in provisions.
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1. PURPOSE AND APPLICATION

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

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

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

2. GENERAL REQUIREMENTS

FMVSS No. 225, Child Restraint Anchorage Systems, establishes strength, location and accessibility requirements for lower anchor bars and top tether anchors used for securing a child restraint in a motor vehicle. The purpose of the standard is to reduce the likelihood of the anchorage systems' failure, and to increase the likelihood that child restraints are properly secured and thus more fully achieve their potential effectiveness in motor vehicles. The standard applies to passenger cars, multi-purposed passenger vehicles (MPV), and trucks with gross vehicle weight rating (GVWR) of 3,855 kg (8,500 lbs) or less and to buses (including school buses and multi-function school activity buses) with GVWR of 4,536 kg (10,000 lbs) or less. This standard does not apply to walk-in van-type vehicles, U. S. Postal Service vehicles, shuttle buses, and funeral coaches.

3. DEFINITIONS

CHILD RESTRAINT ANCHORAGE

Any vehicle component other than Type I or Type II seat belts, that is involved in transferring loads generated by a child restraint system to the vehicle structure.

CHILD RESTRAINT ANCHORAGE SYSTEM (CRAS)

A vehicle system that is designed for attaching a child restraint system to a vehicle at a particular designated seating position, consisting of two lower anchorages and a tether anchorage.

CHILD RESTRAINT FIXTURE (CRF)

The fixture that simulates the dimensions of a child restraint system, and that is used to determine the space required by the child restraint system and the location and accessibility of the lower anchorages. See Figure 9.

DESIGNATED SEATING POSITION (DSP)

Any plan view location capable of accommodating a person at least as large as a 5th percentile adult female, or if the overall seat configuration and vehicle design is such that the position is likely to be used as a seating position while the vehicle is in motion, with the exception of temporary or folding jump seats. (49 CFR § 571.3)

H POINT

The mechanically hinged hip point of a manikin, which simulates the actual pivot center of the human torso and thigh described in SAE Standard J826, November 1962.

OUTBOARD DESIGNATED SEATING POSITION

A designated seating position where a longitudinal vertical plane tangent to the outboard side of the seat cushion is less than 12 inches from the innermost point on the inside surface of the vehicle at a height between the design H-point and the shoulder reference point (as shown in fig. 1 of Federal Motor Vehicle Safety Standard No. 210) and longitudinally between the front and rear edges of the seat cushion. (49 CFR § 571.3)

REAR DESIGNATED SEATING POSITION

Any designated seating position that is rearward of the front seat(s).

SEAT BIGHT

The area close to and including the intersection of the surfaces of the vehicle seat cushion and the seat back.

SEATING REFERENCE POINT (SgRP)

The unique design H-point, as defined in SAE J1100 (June 1984), which establishes the rearmost normal design driving or riding position, which includes consideration of all modes of adjustment, horizontal, vertical, and tilt, in a vehicle. Simulates the position of the pivot center of the human torso and thigh and is the reference point employed to position the two-dimensional drafting template with the 95th percentile leg described in SAE J826 (May 1987), or, if the drafting template with the 95th percentile leg cannot be positioned in the seating position, is located with the seat in its most rearward adjustment position. (49 CFR §571.3)

SFAD1

The static force application device used to test tether anchorage strength when seat belts are used to secure a child restraint system in the vehicle. Figure 13.

SFAD2

The static force application device used to test lower anchorage and tether anchorage strength when seat belts are NOT used to secure a child restraint system in the vehicle. Figure 14.

TETHER ANCHORAGE

A user-ready, permanently installed vehicle system that transfers loads from a tether strap through the tether hook to the vehicle structure and that accepts a tether hook.

TETHER HOOK

A device used to attach a tether strap to a tether anchorage.

TETHER STRAP

A strap that is secured to the rigid structure of the seat back of a child restraint system, and is connected to a tether hook that transfers the load from that system to the tether anchorage.

4. COMPLIANCE TEST EXECUTION

TEST METHOD

All testing shall be performed with the child restraint anchorage systems in their installed for occupant-use configuration in the test vehicle furnished to the laboratory. The laboratory test procedure and associated equipment for testing are based on the requirements of the following documents to the extent referenced herein.

A. 49 CFR 571.225 Child restraint anchorage systems

B. SAE J1100 (June 1984)

C. SAE J826 (May 1987)

TEST EQUIPMENT

Test equipment items are listed below. The required range and accuracy of the equipment are included, where applicable.

DIMENSIONAL MEASUREMENT TESTS

A. Calipers with accuracy of ± 0.10 mm and sufficient range for measuring the length of the lower anchor bar

B. CRF meeting the dimensional requirements set forth in the standard

C. Inclinometer with accuracy of ± 0.2 degrees

D. Protractor with accuracy of ± 0.5 degrees

E. Steel tape with accuracy of ± 0.5 mm and sufficient range for measuring the distance between lower anchor bars

F. SAE J826 two-dimensional drafting template

G. 40 mm wide nylon tether strap with tether hook conforming to Figure 11 of FMVSS 213 (Figure 7)

H. SFAD2 meeting the dimensional requirements set forth in the standard

I. Hand-held force gauge with a minimum range of 200 N with accuracy of ± 0.5 N

STRENGTH TESTS

J. Test stand and fixture setup to retain test vehicle and other test equipment needed to conduct the strength test

K. SFAD1 meeting the dimensional requirements set forth in the standard (multiple SFADs may be required for simultaneous testing)

L. SFAD2 meeting the dimensional requirements set forth in the standard (multiple SFADs may be required for simultaneous testing)

M. Hand-held force gauge with a minimum range of 200 N with accuracy of ± 0.5 N

N. Load application device (at least 15 kN capacity) with a maximum application rate of 135 kN/second.

O. Steel cable for attaching and applying load to SFAD

P. Linear displacement transducer with accuracy of ± 0.25 mm

Q. Load cells with accuracy of ± 0.5 percent. Including seat belt load cells.

R. Tether strap with tether hook, consisting of webbing material with an elongation limit of 4 percent at a tensile load of 65,000 N

S. Data acquisition system

TEST SEQUENCE

The test vehicle shall be subject to the tests in the order shown below

A. Receiving-Inspection of Test Vehicle

B. Identify designated seating positions equipped with CRAS or tether anchorages

C. Dimensional Measurements

D. Strength Tests

RECEIVING INSPECTION OF TEST VEHICLE

Complete the "Vehicle Condition" form supplied by the COTR.

Upon receipt of the test vehicle, it shall be identified with a visible sign or placard showing the following information:

A. Vehicle Make/Model

B. Vehicle Identification Number (VIN)

C. Vehicle NHTSA number (provided by COTR)

D. Compliance Test for Child Restraint Anchorage Systems (S225).

IDENTIFY REQUIRED LOCATION OF CRAS AND TETHER ANCHORS

Vehicles with **3 or more** rear, forward-facing DSPs:

- Must have 2 Child Restraint Anchorage Systems (CRAS)
- Must have 1 additional tether anchorage (can be a CRAS)
- **Total = 2 CRAS + 1 Tether Anchorage or 3 CRAS**

- IF the vehicle has 3 or more rows of seating, then 1 CRAS must be in the second row.

- IF the vehicle has a rear, forward-facing, non-outboard DSP, then at least one tether anchorage or CRAS shall be at a non-outboard DSP.

- IF the vehicle has a seat that can be adjusted such that the DSP could be either an outboard or a non-outboard DSP, the DSP is considered a **non**-outboard DSP.

Vehicles with **2** rear, forward-facing DSPs:

- Must have 2 CRAS

Vehicles with **0** rear, forward-facing DSPs:

- Must have tether anchorages at **each** front forward-facing passenger DSPs.

Vehicles with **0** rear, forward-facing DSPs and an **air bag on-off switch** or without a front passenger air bag pursuant to a 49 CFR Part 555 exemption:

- Must have a CRAS in a front passenger DSP
- Must have tether anchorages at all other front passenger DSPs

Vehicles with rear, forward-facing **DSPs meeting the requirements of S4.5.4.1(b) of Standard No. 208** (small rear seat) and an **air bag on-off switch** or without a front passenger air bag pursuant to a 49 CFR Part 555 exemption:

- Must have a CRAS in a front passenger DSP.
- Must have tether anchorages at all other front passenger seating positions.

S4.5.4.1(b) of Standard No. 208 states,

"With the seats and seat backs adjusted as specified in S8.1.2 and S8.1.3, the distance, measured along a longitudinal horizontal line tangent to the highest point of the rear seat bottom in the longitudinal vertical plane described in either S4.5.4.1(b)(1) or S4.5.4.1(b)(2), between the rearward surface of the front seat back and the forward surface of the rear seat back is less than 720 millimeters.

(1) In a vehicle equipped with front bucket seats, the vertical plane at the centerline of the driver's seat cushion.
(2) In a vehicle equipped with front bench seating, the vertical plane which passes through the center of the steering wheel rim.

EXCEPTIONS and SPECIAL CASES:

Convertibles and school buses are excluded from having tether anchorages. DSPs required to have CRAS must have lower anchorages.

A built-in child restraint may be substituted for **one** required tether anchorage or CRAS. A vehicle may have additional built-in child restraints, but they do **not** count toward the additional required CRAS or tether anchorages.

A vehicle that does not have an air bag on-off switch shall **not** be equipped with a CRAS in a front DSP.

A vehicle with a rear DSP for which interference with transmission and/or suspension components prevents the location of the lower anchor bars of a CRAS within the required zone, are not required to provide a CRAS at that position. However, the vehicle must have a tether anchorage at a front passenger DSP.

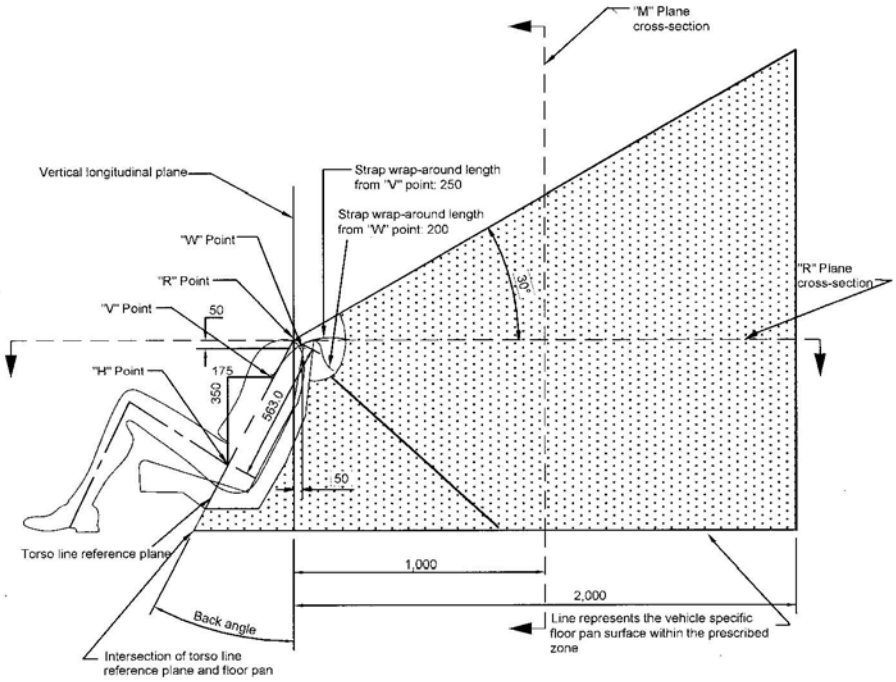
Inspect the vehicle for the presence of CRAS and tether anchorages. Record the number of rear DSPs, and the location and type(s) of anchorage(s) provided, on Data Sheet 2.

For vehicles with rear DSPs and no CRAS or tether anchorages in the rear DSPs, measure the distance specified in S4.5.4.1(b) of FMVSS 208. Record the distance on Data Sheet 2.

Data Sheet 2 provides a series of questions for determining if a vehicle is properly equipped.

DIMENSIONAL, LOCATION, AND MARKING REQUIREMENTS

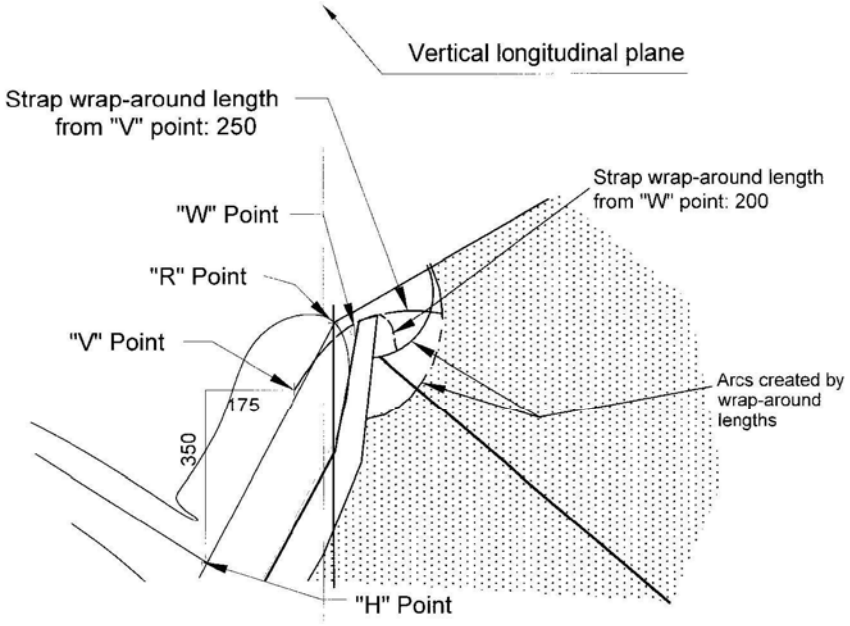
LOCATION OF TETHER ANCHORAGES



Notes

1. Dimensions in mm, except where otherwise indicated
2. Portion of user-ready tether anchorage that is designed to bind with the tether strap hook to be located within shaded zone
3. Drawing not to scale
4. "R" Point: Shoulder reference point
5. "V" Point: V-reference point, 350 mm vertically above and 175 mm horizontally back from H-point
6. "W" Point: W-reference point, 50 mm vertically below and 50 mm horizontally back from "R" Point
7. "M" Plane: M-reference plane, 1 000 mm horizontally back from "R" Point

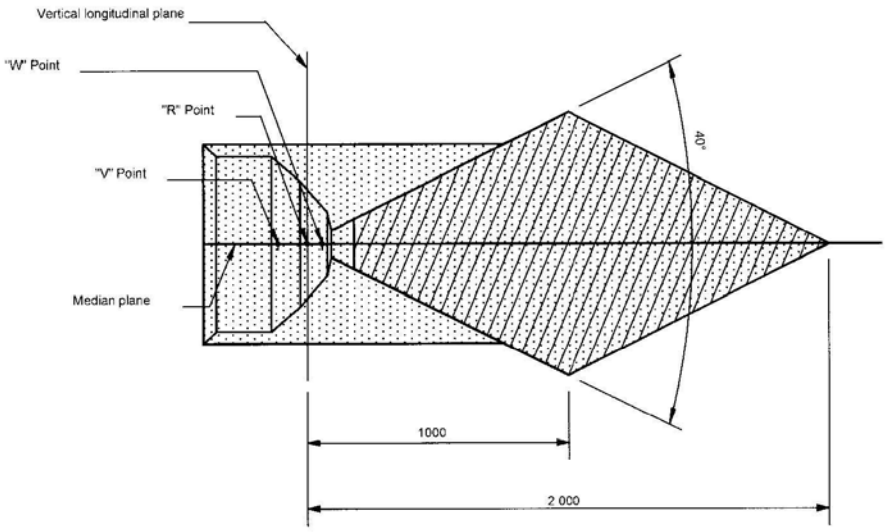
Figure 1 – Side View, Tether Anchorage Location



Notes

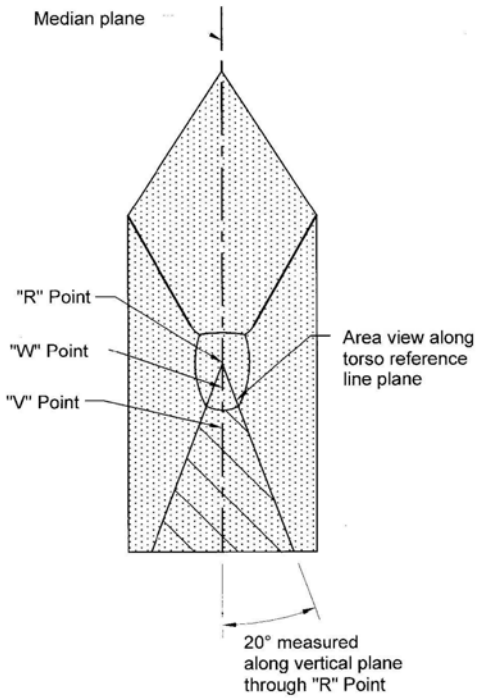
1. Dimensions in mm, except where otherwise indicated
2. Portion of user-ready tether anchorage that is designed to bind with the tether strap hook to be located within shaded zone

Figure 2 – Enlarged Side View, Tether Anchorage Location



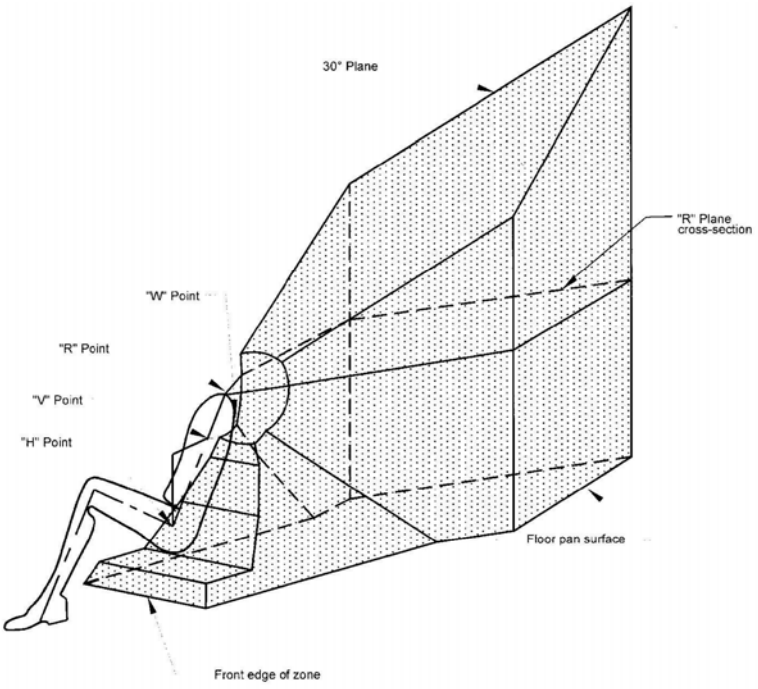
1. Dimensions in mm, except where otherwise indicated
2. Portion of user-ready tether anchorage that is designed to bind with the tether strap hook to be located within shaded zone

Figure 3 – Plan View, Tether Anchorage Location



Notes
1. Portion of user-ready tether anchorage that is designed to bind with the tether strap hook to be located within shaded zone

Figure 4 – Front View, Tether Anchorage Location



Notes
1. Portion of user-ready tether anchorage that is designed to bind with the tether strap hook to be located within shaded zone

Figure 5 – Three-dimensional View, Tether Anchorage Location

Each tether anchorage must be located in the shaded region of Figures 1-5. A tether anchorage may be recessed, provided it is not located in the strap wraparound area at the top of the seat back. See Figure 2. For tether anchorages under the seat, the forwardmost edge of the shaded zone is bound by the torso line reference plane defined by the SAE J826 two-dimensional drafting template.

If the vehicle has a tether anchorage for which no part of the shaded region of Figures 1-5 is accessible without removing a seating component and the vehicle has either a flexible or rigid tether strap routing device then the tether anchorage may be located outside of the shaded zone.

DETERMINE IF THE TETHER ANCHORAGE IS WITHIN IN THE SHADED ZONE

Visually observe the location of the tether anchorage. If the tether anchorage is clearly within the shaded zone it is unnecessary to place the SAE J826 two-dimensional drafting template in the seat. Record observations on Data Sheet 3.

If the location of tether anchorage is not clearly within the zone, then:

Place the SAE J826 two-dimensional drafting template on the seat such that the H-point of the SAE J826 two-dimensional drafting template coincides with the SgRP of the DSP being checked. The SAE J826 two-dimensional drafting template shall be in the vertical longitudinal plane through the seating reference point.

The H-point of the SAE J826 two-dimensional template is the reference point for constructing the shaded zone. Using string, lasers, tapes, or other equipment, layout the shaded zone.

Determine if the tether anchorage is within the zone. Record observations on Data Sheet 3.

If the tether anchorage is outside the shaded zone, check for a tether strap routing device.

If a tether strap routing device is present, determine if the device is flexible or rigid. Record on Data Sheet 3.

Contact the COTR for further guidance on location and measurement of tether strap routing devices. The following is an outline of the steps necessary to determine the location of the tether anchorage and routing device.

If the tether strap routing device is flexible, mark the location of the torso reference plane as defined by the SAE J826 two-dimensional drafting template.

Remove the SAE J826 two-dimensional drafting template.

Attach the SFAD2 to the lower anchor bars.

If the DSP being checked does not have lower anchor bars, replace the adjustable anchor attaching bars of the SFAD2 with spacers that end flush with the back surface of the SFAD2. The SFAD2 is held with its central lateral plane in the vertical longitudinal plane of the seating position.

After securing or properly placing the SFAD2, a 40 mm wide nylon tether strap is routed through the routing device and attached to the tether anchorage as prescribed in the owner's manual for the vehicle.

Check that the tether strap is flat against the top surface of the SFAD2 and tension the tether strap to 60N ± 5N. A belt load cell shall be used to record the strap tension.

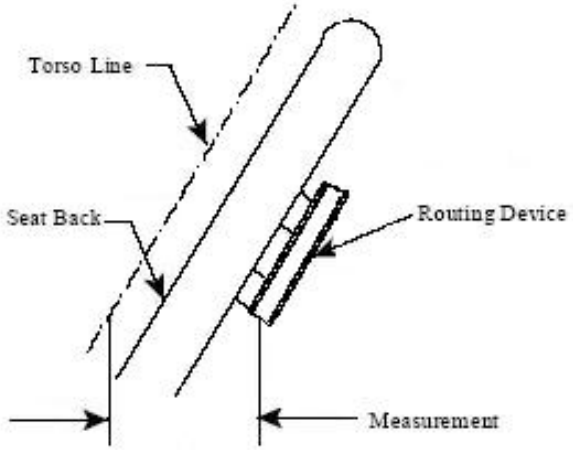


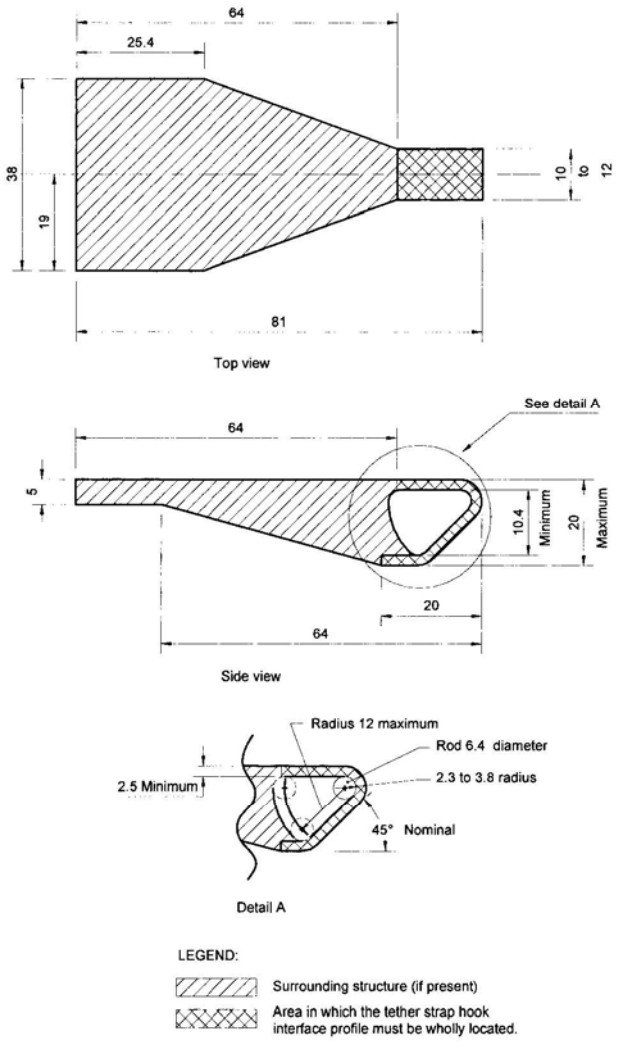
Figure 6 – Measurement of Tether Routing Device

Measure the horizontal distance between the torso reference plane (previously identified by the SAE J826 two-dimensional drafting template) and the forwardmost contact point between the strap and the routing device. This distance shall be at least 65 mm. Record on Data Sheet 3.

If the tether strap routing device is rigid, leave the SAE J826 two-dimensional drafting template in the DSP being checked.

Measure the horizontal distance in a vertical longitudinal plane from the torso reference plane to the routing device. This distance shall be at least 100 mm. Record on Data Sheet 3.

CONFIGURATION OF TETHER ANCHORAGES



Notes
1. Dimensions in mm, except where otherwise indicated
2. Drawing not to scale

Figure 7 – Tether Hook (FMVSS 213)

Each tether anchorage shall:

Permit attachment of a tether hook (FMVSS 213)

Be accessible without any tools other than a screwdriver or coin

After being accessed, be ready for use without the use of tools

Be sealed to prevent exhaust fumes from entering the passenger compartment

Record observations on Data Sheet 3.

DIMENSIONS OF LOWER ANCHORAGES

The lower anchorages consist of two bars that are 6 mm ± 0.1 mm in diameter, straight, horizontal, transverse, and not less than 25 mm and not more than 60 mm in length as shown in Figure 8. The lower anchorages can only be removed with a tool, such as a screwdriver or wrench and are rigidly attached such that a 100 N load will not cause the anchorages to deform more than 5 mm.

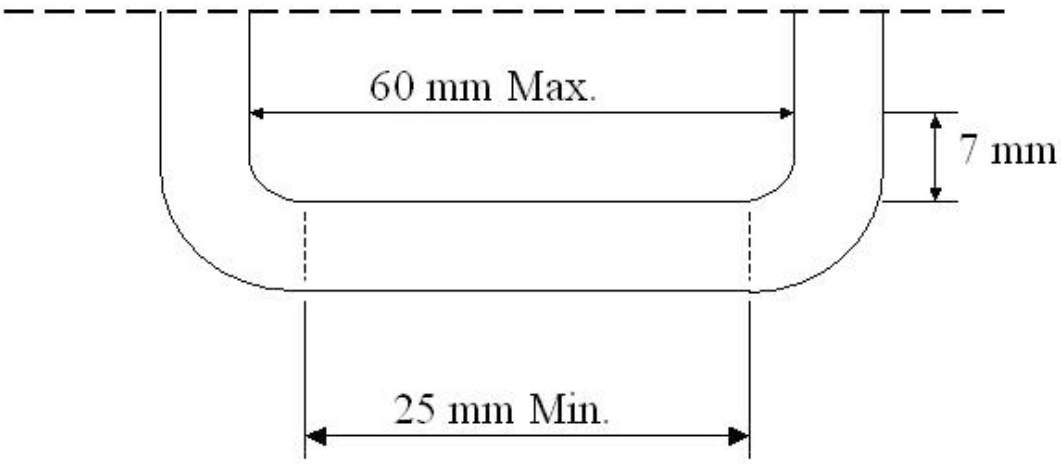


Figure 8 – Measurement of Lower Anchor Bar Length

Note: The maximum length of the lower anchorage bar is measured at a different location than the minimum length of the lower anchorage bar.

Using appropriately sized calipers, measure the diameter of each lower anchorage bar. The calipers shall be held in a plane perpendicular to the centerline of the lower anchorage bar and approximately at the midpoint of the anchorage bar. Record the diameter on Data Sheet 4.

Locate the vertical plane tangent to the rearward portion of each anchorage bar. Locate a vertical plane 7mm rearward of the vertical plane for the anchorage bar and measure the length between the anchor bar supports, using appropriate calipers. It may be helpful to use a 7 mm spacer block to assist in accurate placement of the calipers for the length measurement. Record the maximum length on Data Sheet 4. The maximum length must be less than or equal to 60mm.

Locate the vertical plane tangent to the forward portion of the anchorage bar. Measure the straight portion of each anchorage bar. Record the minimum length on Data Sheet 4. The minimum length of the straight portion of the anchorage bar must be greater than or equal to 25 mm.

Additionally, mark the center of the straight portion of each anchorage bar for purposes of determining feasibility of simultaneous strength testing. This will be discussed later.

Perform a visual inspection of the attachment of the lower anchor bars and record on Data Sheet 4.

DEPTH OF LOWER ANCHORAGES

The lower anchorage bar must be at least 120 mm behind the SgRP.

Place the SAE J826 two-dimensional drafting template on the seat such that the H-point of the SAE J826 two-dimensional drafting template coincides with the SgRP of the DSP being checked. The SAE J826 two-dimensional drafting template shall be in the vertical longitudinal plane through the SgRP.

Project the vertical transverse plane containing the SgRP onto the seat cushion. After marking the seat cushion, remove the SAE J826 two-dimensional drafting template and measure the horizontal distance between the line representing the SgRP plane and the vertical transverse plane tangent to the front surface of the lower anchor bar. Record the distance on Data Sheet 4.

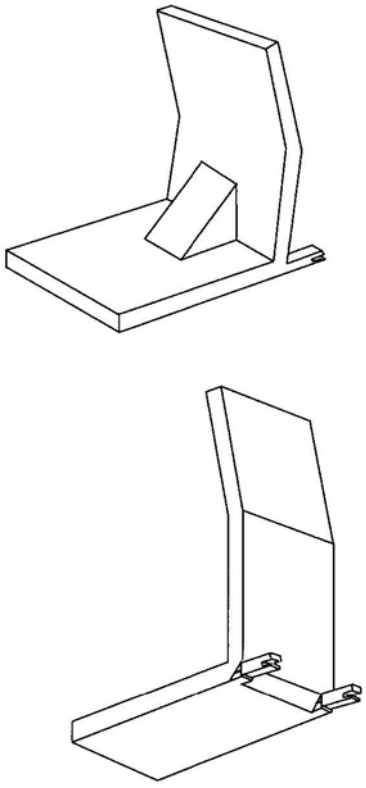


Figure 9 –CRF without side and top frames

The lower anchorage bar cannot be more than 70 mm behind point Z of the CRF. When the CRF is attached to the lower anchorages the pitch angle must be 15˚ ±10˚, the roll angle must be 0˚ ± 5˚, and the yaw angle must be 0˚ ±10˚.

Each vehicle and each CRAS in the vehicle shall permit installation of the CRF when adjustable seat backs are placed at the manufacturer's nominal design position with the seat positioned full rearward and fully downward. The seat setup information shall be provided by the COTR or standard engineer.

If the seat is adjustable, adjust the seat back to the manufacturer's nominal design position in the manner specified by the manufacturer. Then place the seat in the full rearward and full down position.

Place the CRF in the DSP containing lower anchor bars. With the CRF against or near the seat back, use the CRF rearward extensions to attach to the lower anchor bars. With the CRF resting on the seat and attached to the lower anchor bars, measure the pitch, roll, and yaw angles using an inclinometer. Record the angles on Data Sheet 4.

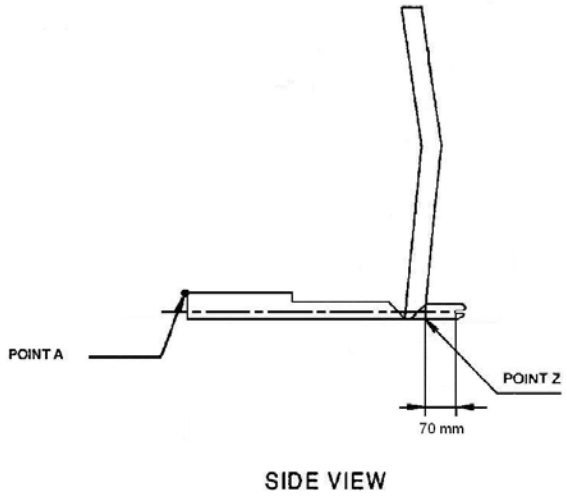


Figure 10 – Side View of CRF showing Point A and Point Z

Apply and maintain a 100 N load to the CRF through Point A of the CRF using a force gauge. Using either measuring scales incorporated into the CRF or appropriate measuring tapes, measure parallel to the bottom surface of the CRF, the distance between Point Z of the CRF and the vertical transverse plane tangent to the front surface of the anchor bar. Record the distance on Data Sheet 4.

MARKING AND CONSPICUITY OF LOWER ANCHORAGES

Above each anchor bar the vehicle shall be permanently marked by a circle, or the anchor bar shall be visible.

Figure 11 – Example of Lower Anchor Bar location marking

For each anchor bar marked by a circle, the circle must be:

- At least 13 mm in diameter
- Permanently affixed
- The circle may be solid or open, with or without words, symbols or pictograms. If words, symbols or pictograms are used their meaning is explained to the consumer in writing, such as in the vehicle owner's manual
- The circle may be on a tag
- The center of the circle must be within 25 mm of the vertical longitudinal plane that bisects the anchor bar.
- Located such that its center is on the seat back between 50 and 100 mm above the intersection of the vertical transverse and horizontal longitudinal planes intersecting at the horizontal centerline of each lower anchorage.

  OR

- Located such that its center is on the seat cushion between 75 and 125 mm forward of the intersection of the vertical transverse and horizontal longitudinal planes intersecting at the horizontal centerline of each lower anchorage.

Figure 12 – Example of Lower Anchor Bar Visibility

For each anchor bar or permanently attached guide (visibility provision):

- Must be visible without the compression of the seat back or seat cushion, when the bar or guide is viewed in a vertical longitudinal plane bisecting the anchor bar or guide at a 30˚ angle above the horizontal. Seat backs are in the nominal design riding position.
- The bars may be covered by a removable cap or cover, provided the cap or cover is permanently marked with words, symbols, or pictograms. The meaning of the words, symbols or pictograms must be explained to the consumer in writing, such as in the vehicle owner's manual.

CONDUCTING THE MEASUREMENTS FOR MARKING AND CONSPICUITY

Place any adjustable seat back in the manufacturer's nominal design riding position. Instructions will be provided by the responsible engineer or COTR.

If the seat has a circle to denote the lower anchor bar:

Using calipers, measure the diameter of the circle. Record on Data Sheet 5.

Mark the center of the circle and draw two lines through the center of the circle, one vertical and one horizontal.

Locate the center of the straight portion of the lower anchor bar that was marked during the dimensional measurements in the previous section.

Using calipers, measure the distance from the center of the circle to the center of the lower anchor bar. The distance is measured in a vertical longitudinal plane. Record this distance on Data Sheet 5.

Using calipers, measure the horizontal distance between the center of the circle and the center of the anchor bar. Record this distance on Data Sheet 5.

If words, symbols or pictograms are used, check the owner's manual for an explanation of their meaning. Include copies of the relevant pages of the owner's manual with the final test report.

If the seat does not have a circle to denote the lower anchor bar:

Remove any cap or covering, if necessary.

If there is a cap or covering over the lower anchor bar, check the owner's manual for an explanation of the words, symbols or pictograms on the cap or covering.

Locate the center of the straight portion of the lower anchor bar that was marked during the dimensional measurements in the previous section.

Attach a string, wire or other device, at the center of the lower anchor bar.

Using a protractor, find the line that is 30˚ above the horizontal in a vertical longitudinal plane. Use the string, wire or other device to denote the line.

Position the eyes such that they are looking down the 30˚ line. Do not compress the seat cushion or seat back. Determine if the lower anchor bar is visible. Record observations on Data Sheet 5.

If a laboratory has developed a different method of determination, the responsible engineer or COTR shall be consulted prior to initiation of the test.

STRENGTH REQUIREMENTS

REQUIREMENTS

A given tether anchorage or lower anchor bar shall only be strength tested once.

Consult with the COTR to determine which strength tests to conduct for a particular DSP.

The following are two charts that illustrate the performance requirements of the tether and lower anchorages.

Tether Anchorage Strength Requirements						
	Tether/Lap Belt Strap Tension	Preload	Force application angle measured at preload	Time to Reach Required Force	Required Force	Required Hold Time
SFAD1	53.5 N - 67 N	500 N	5-15 degrees	24-30 s	15,000 N	1 s
SFAD2	53.5 N - 67 N	500 N	5-15 degrees	24-30 s	15,000 N	1 s

Lower Anchorage Strength Requirements							
	Force Application Direction	Preload	Force application angle measured at preload	Time to Reach Required Force	Required Force	Maximum horizontal displacement	Required Hold Time
SFAD2	Forward	500 N	5-15 degrees	24-30 s	11,000 N	175 mm	1 s
SFAD2	Lateral (70-80 degrees)	500 N	-5-5 degrees	24-30 s	5,000 N	150 mm	1 s

Secure the vehicle off its suspension prior to conducting the strength tests. The vehicle may be secured using jackstands and chains attached to the vehicle at hard points or secured using Appendix A, “LP-Securement-00, December 22, 2004.” The method of securement will be the decision of the COTR.

TETHER ANCHORAGE STRENGTH TEST

The tether anchorage strength test can be conducted with either the SFAD1 or the SFAD2 for a given DSP. The procedure for testing the tether anchorage is the same for both the SFAD1 and the SFAD2 with the notable exception of the method of securing the SFAD in the DSP being tested. Therefore, this procedure provides instructions for installing both SFADs within the context of the overall test.

PROCEDURE

Adjust each seat being tested to the full rear position. Then place the seat in the full down position at the full rear position. Adjust the seat back to the most upright position of adjustment for passenger use. If the SFAD2 cannot be attached with the seat back in the full upright position, adjust the seat back as indicated in the owner’s manual. If the owner’s manual does not provide instructions for adjustment, adjust the seat back to the position closest to the upright position that permits attachment to the lower anchor bars.

Adjust the head restraints as indicated in the owner’s manual. If no instructions are provided in the owner’s manual place the head restraint in any position of adjustment.

Record seat back angle and head restraint position on Data Sheet 6.

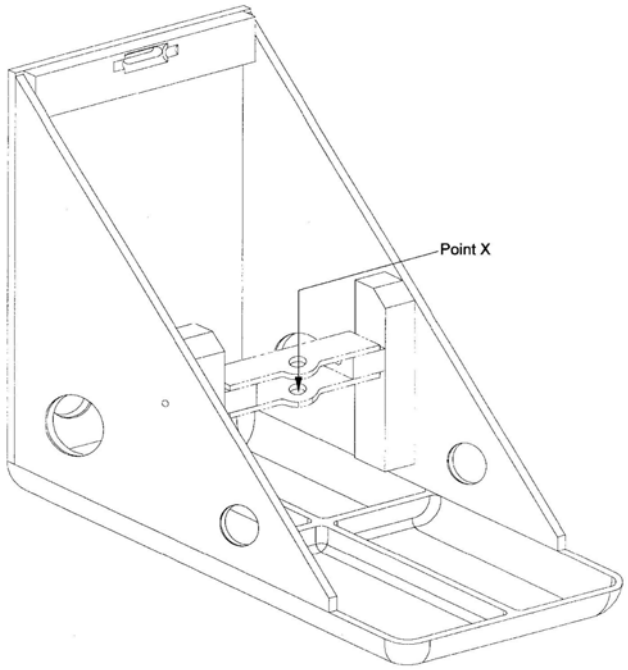


Figure 13 – SFAD1, Three-dimensional View

SFAD1 INSTALLATION

For seats without lower anchorages, install the SFAD1 using the vehicle seat belts. Place SFAD1 in the center of the seat to be tested.

If the seat being tested has a seat belt with a height-adjustable D-ring, place the D-ring at the mid-position of adjustment. If no mid-position exists, place the D-ring at the position immediately below the mid-position. Record D-ring position on Data Sheet 6.

Extend the seat belt a sufficient distance to permit the routing of the seat belt through the SFAD1 seat belt path holes and the securement of the seat belt latch plate in the seat belt buckle.

Attach the tether strap to the tether anchorage. If the vehicle is equipped with a tether routing device, route the tether strap along the routing device.

If the seat is equipped with seat belts having automatic locking retractors, extend the webbing to its fullest extent to engage the locking mode. If the seat belt does not have an automatic locking retractor, lock the seat belt as indicated in the owner's manual.

Apply a rearward horizontal force of a 135N ± 15N through Point X on SFAD1. Maintain this force while the seat belts and tether strap are tightened to a webbing tension of 53.5 N to 67 N. Record force on Data Sheet 6.

The seat belt webbing tension is measured on the lap belt portion of the seat belt webbing with a seat belt webbing load cell. The tether strap tension is measured with a belt webbing load cell. Record the tension on Data Sheet 5.

If SFAD1 cannot be attached because of the location of the seat belt buckle, SFAD1 shall be attached using webbing with breaking strength greater than or equal to the breaking strength of the vehicle seat belt. The geometry of the seat belt shall be duplicated.

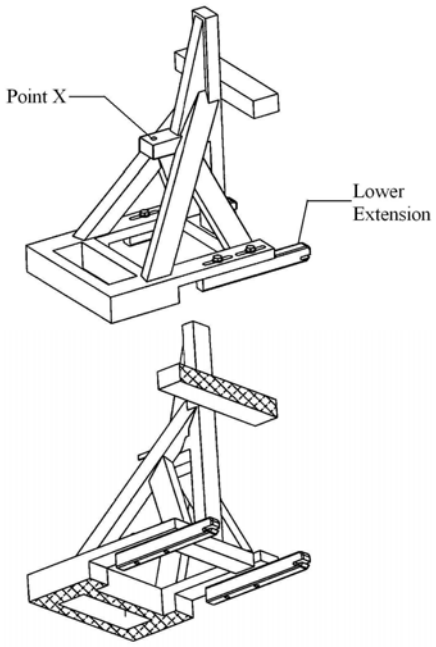


Figure 14 – SFAD2, Three-dimensional Views

SFAD2 INSTALLATION

For seats with lower anchorages, install the SFAD2 using the lower anchor bars. Attach the rearward extensions of the SFAD2 to the lower anchor bars. Do not tighten the bolts on the rearward extensions.

Attach the tether strap to the tether anchorage. If the vehicle is equipped with a tether routing device, route the tether strap along the routing device.

Apply a 135N ± 15 N rearward force on the center of the lower front crossmember of the SFAD2, maintain this force while tightening the tether strap to 53.5-67 N of webbing tension and adjusting and tightening the bolts on the rearward extensions of the SFAD2.

The tether webbing tension is measured with a seat belt webbing load cell. Record the tension on Data Sheet 6.

Attach the steel cable load application device to Point X on the SFAD. Attach the load cells and perform pretest calibration of the system.

Apply a 500 N force in a forward direction in a vertical longitudinal plane at an angle of 10° ± 5° above the horizontal, check for separation of the tether anchorage. Measure the angle at the 500 N force. Record the angle and the visual observation for tether anchorage separation on Data Sheet 6.

Increase the force as linearly as practicable to 14,950 N ± 50 N in 24-30 seconds.

Hold for 1 second.

Release the force.

A graph showing the force versus time for the test shall be included with the final test report. Record the peak force on Data Sheet 6.

Multiple DSPs may be tested simultaneously. See “Simultaneous Testing” for guidance.

LOWER ANCHORAGE STRENGTH TEST

PROCEDURE (FORWARD FORCE)

Adjust each seat being tested to the full rear position. Then place the seat in the full down position at the full rear position. Adjust the seat back to the most upright position of adjustment for passenger use. If the SFAD2 cannot be attached with the seat back in the full upright position, adjust the seat back as indicated in the owner’s manual. If the owner’s manual does not provide instructions for adjustment, adjust the seat back to the position closest to the upright position that permits attachment to the lower anchor bars.

Adjust the head restraints as indicated in the owner’s manual. If no instructions are provided in the owner’s manual place the head restraint in any position of adjustment.

Record seat back angle and head restraint position on Data Sheet 7.

For seats with lower anchorages, install the SFAD2 using the lower anchor bars. Attach the rearward extensions of the SFAD2 to the lower anchor bars. Do not tighten the bolts on the rearward extensions.

DO NOT ATTACH A TETHER STRAP

Apply and maintain a 135 N ± 15 N rearward force on the center of the lower front crossmember of the SFAD2 while adjusting and tightening the bolts on the rearward extensions of the SFAD2. Record force on Data Sheet 7.

Attach the steel cable load application device to Point X on the SFAD. Attach the load cells and string potentiometers and perform pretest calibration of the system.

Apply a 500 N force in a forward direction in a vertical longitudinal plane at an angle of 10° ± 5° above the horizontal. Measure and record the horizontal displacement of

Point X, H1 and the angle at the 500 N force. IF, the instrumentation permits, "zero" the string potentiometer to permit direct measurement of the displacement of Point X.

Increase the force as linearly as practicable to 10,950 N ± 50 N in 24-30 seconds. Measure and record the displacement of Point X, H2.

Hold for 1 second.

Release the force.

A graph showing the force versus time and force versus displacement for the test shall be included with the final test report. Record the overall peak force on Data Sheet 7.

Multiple DSPs can be tested simultaneously. See "Simultaneous Testing" for guidance.

PROCEDURE (LATERAL FORCE)

Adjust each seat being tested to the full rear position. Then place the seat in the full down position at the full rear position. Adjust the seat back to the most upright position of adjustment for passenger use. If the SFAD2 cannot be attached with the seat back in the full upright position, adjust the seat back as indicated in the owner's manual. If the owner's manual does not provide instructions for adjustment, adjust the seat back to the position closest to the upright position that permits attachment to the lower anchor bars.

Adjust the head restraints as indicated in the owner's manual. If no instructions are provided in the owner's manual place the head restraint in any position of adjustment.

Record seat back angle and head restraint position on Data Sheet 8.

For seats with lower anchorages, install the SFAD2 using the lower anchor bars. Attach the rearward extensions of the SFAD2 to the lower anchor bars. Do not tighten the bolts on the rearward extensions.

DO NOT ATTACH A TETHER STRAP

Apply and maintain a 135 N ± 15 N rearward force on the center of the lower front crossmember of the SFAD2 while adjusting and tightening the bolts on the rearward extensions of the SFAD2. Record force on Data Sheet 8.

Attach the steel cable load application device to Point X on the SFAD. Attach the load cells and string potentiometers and perform pretest calibration of the system.

Apply a 500 N force in a lateral direction in a vertical plane at an angle of 75° ± 5° from the vertical longitudinal plane bisecting the DSP. Within the vertical plane at an angle of 75° ± 5° the force shall be applied horizontally (0° ± 5°). Record the angles on Data Sheet 8.

Measure and record the horizontal displacement of Point X, H1 and the both angles at the 500 N force. IF, the instrumentation permits, “zero” the string potentiometer to permit direct measurement of the displacement of Point X.

Increase the force as linearly as practicable to 4,950 N ± 50 N in 24-30 seconds. Measure and record the displacement of Point X, H2.

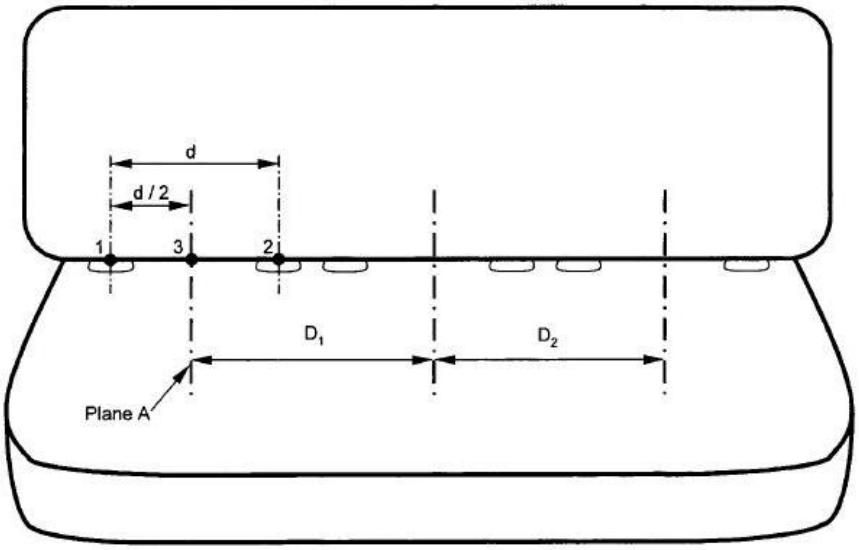
Hold for 1 second.

Release the force.

A graph showing the force versus time and force versus displacement for the test shall be included with the final test report. Record the overall peak force on Data Sheet 8.

Multiple DSPs may be tested simultaneously. See “Simultaneous Testing” for guidance.

SIMULTANEOUS TESTING



d = center to center distance between lower anchorages for a given seating position (nominally 280 mm).

D = distance between vertical longitudinal planes located midway between the anchorages for a given seating position.

Figure 15 – Illustration of measurement for determination of simultaneous testability

Multiple DSPs can be tested to the strength requirements for tether anchorages simultaneously. Multiple DSPs can be tested to the strength requirements for lower anchorages simultaneously. Simultaneously testing is only permissible when the distance between the midpoints of the two DSPs is greater than 400 mm apart (D1 > 400 mm).

OWNER'S MANUAL

The vehicle must provide written instructions for using the tether anchorages and the child restraint anchorage systems in the vehicle. The instructions must include:

- Seating positions equipped with tether anchorages and child restraint anchorage systems.
- Instructions that provide a step-by-step procedure, including diagrams, for properly attaching a child restraint system's tether strap to the tether anchorage.
- Information on how to appropriately use the tether anchorage and lower anchor bars.
- If the lower anchor bars are marked with a circle, a description of what the circle and any words or pictograms mean.

Record information on Data Sheet 9. Place a copy of all relevant portions of the owner's manual in the final report.

5. PHOTOGRAPHIC DOCUMENTATION

Photographs shall be color, 8" x 10" or 8.5" x 11" and legible. A tag, label, or placard identifying the test vehicle model and NHTSA number shall appear in each photograph and be legible. Each photograph shall be labeled as to the subject matter. The test setup and equipment used in all tests shall be photographed for the record before and at designated points during testing. Any failure must be photographed at various angles to assure complete coverage. As a minimum the following photographs shall be included:

A. Left side view of vehicle

B. Right side view of vehicle

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

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

E. Vehicle's certification label

F. Vehicle's tire and loading information label including inflation pressure label, if separate.

G. 3/4 left front view of the vehicle in test fixture

E. 3/4 right front view of the vehicle in test fixture

F. Pretest views of each DSP equipped with lower anchor bars and/or tether anchorages

G. Pretest views of each tether anchorage and lower anchor bar

H. CRF installed in each seat

I. Measurement of the distance between Point Z and the anchor bar

J. CRF installed in the seat, showing the angle measurement

K. Measurement of the circle identifying the lower anchor bar (if applicable)

L. View showing the lower anchor bar visibility (if applicable)

M. Cap or cover over the lower anchor bar (if applicable)

N. SAE J826 two-dimensional drafting template positioned in seat

O. Measurement of the distance between the SgRP and the lower anchor bar

P. Tether anchorage location relative to the SAE J826 two-dimensional drafting template

Q. Pretest side view of SFAD1 set-up for tether anchorage strength test

R. Posttest side view of SFAD1 set-up for tether anchorage strength test

S. Pretest side view of SFAD2 set-up for tether anchorage strength test

T. Posttest side view of SFAD2 set-up for tether anchorage strength test

U. Pretest side view of SFAD2 set-up for lower anchor bar strength test (forward force)

V. Posttest side view of SFAD2 set-up for lower anchor bar strength test (forward force)

W. Pretest side view of SFAD2 set-up for lower anchor bar strength test (lateral force)

X. Posttest side view of SFAD2 set-up for lower anchor bar strength test (lateral force)

6. POST TEST REQUIREMENTS

The contractor shall re-verify all instrumentation and check data sheets and photographs. Make sure data is recorded in all data blocks on every compliance test data sheet.

Consult the contract for test report and all other required deliverables and timelines.

7. DATA SHEETS

DATA SHEET 1

SUMMARY OF RESULTS

VEH. MOD YR/MAKE/MODEL/BODY STYLE: _____

VEH. NHTSA NO.: _____ ; VIN: _____

VEH. BUILD DATE: _____ ; TEST DATE: _____

TEST LABORATORY: _____

OBSERVERS:_____

_____

A. VISUAL INSPECTION OF TEST VEHICLE

Upon receipt for completeness, function, and discrepancies or damage which might influence the testing.

RESULTS:

B. REQUIREMENTS FOR CHILD RESTRAINT SYSTEMS AND TETHER ANCHORAGES

	PASS	**FAIL**
DSP a	____	____
DSP b	____	____
DSP c	____	____

C. LOCATION OF TETHER ANCHORAGES

	PASS	**FAIL**
DSP a	____	____
DSP b	____	____
DSP c	____	____

D. LOWER ANCHORAGE DIMENSIONS

	PASS	**FAIL**
DSP a	____	____
DSP b	____	____

	DSP c	____	____

E. CONSPICUITY AND MARKING OF LOWER ANCHORAGES

		PASS	FAIL
	DSP a	____	____
	DSP b	____	____
	DSP c	____	____

F.	**STRENGTH OF TETHER ANCHORAGES**	**PASS**	**FAIL**
	DSP a	____	____
	DSP b	____	____
	DSP c	____	____

G. STRENGTH OF LOWER ANCHORAGES (Forward Force)

		PASS	FAIL
	DSP a	____	____
	DSP b	____	____
	DSP c	____	____

H. STRENGTH OF LOWER ANCHORAGES (Lateral Force)

		PASS	FAIL
	DSP a	____	____
	DSP b	____	____
	DSP c	____	____

I.	**OWNER'S MANUAL**	**PASS**	**FAIL**

RECORDED BY: _____ DATE: _____

APPROVED BY: _____

DATA SHEET 2

REQUIREMENTS FOR CHILD RESTRAINT ANCHORAGE SYSTEMS AND TETHER ANCHORAGES

VEH. NHTSA NO.: TEST DATE:

Type of vehicle:

Number of rows of seats:

Number of rear, forward-facing designated seating positions:

Number of required CRAS (lower anchorages only, for convertibles/school buses):

Number of required tether anchorages (can be additional CRAS):

Is the vehicle a convertible?

Is the vehicle a school bus?

Does the vehicle have a CRAS (lower anchorages only, for convertibles/school buses) installed at a front passenger seating position?

If NO, skip to next question.

If YES, does the vehicle have rear designated seating positions?

If NO, does the vehicle have an air bag on-off switch or a special exemption for no passenger air bag?

If NO = FAIL If YES = PASS

If YES, does the vehicle meet the requirements of S4.5.4.1 (b) of S208 and have an air bag on-off switch or a special exemption for no passenger air bag?

Record the distance between the front and rear seat back:

If Distance <720 mm and vehicle has an air bag on-off switch or special exemption = PASS

If Distance ≥ 720 mm or no air bag on-off switch or no special exemption = FAIL

Does the vehicle have rear designated seating position(s) where the lower bars of a CRAS are prevented from being located because of transmission and/or suspension component interference?

If NO, skip to next question.

If YES, does the vehicle have a tether anchorage at a front passenger seating position?

YES = PASS NO = FAIL (S5(e))

Number of provided CRAS (lower anchorages only, for convertibles/school buses), indicate if a built-in child restraint is counted as a CRAS:

Is the number of provided CRAS (lower anchorages only, for convertibles/school buses) greater than or equal to the number of required CRAS (lower anchorages only, for convertibles/school buses)?

YES = PASS NO = FAIL (S4.4 (a) or (b) or (c))

If the vehicle has 3 or more rows of seats is a CRAS (lower anchorages only for convertibles/school buses) provided in the second row:

YES = PASS NO = FAIL (S4.4(a)(1))

Number of provided tether anchorages (can be additional CRAS) indicate if a built-in child restraint is counted as a tether anchorage (NOTE: a built-in child restraint can only be counted toward either the required number of CRAS or tether anchorages, not both):

Is the number of provided tether anchorages greater than or equal to the number of required tether anchorages?

YES = PASS NO = FAIL (S4.4 (a) or (b) or (c))

If the vehicle has 3 or more rear dsps and a non-outboard dsp, is a tether anchorage or CRAS provided at a non-outboard dsp?

YES = PASS NO = FAIL (S4.4(a)(2))

Are all tether and lower anchorages available for use at all times when the seat is configured for passenger use?

YES = PASS NO = FAIL (S4.6(b))

Provide a diagram showing the location of lower anchorages and/or tether anchorages.

COMMENTS:

RECORDED BY: _____ DATE: _____

APPROVED BY: _____

DATA SHEET 3

LOCATION OF TETHER ANCHORAGES

VEH. NHTSA NO.: TEST DATE:

Designated Seating Position: _____

Detailed description of the location of the tether anchorage:

Based on visual inspection, is the tether anchorage within the shaded zone?
- If YES, = PASS, skip to next section
- If NO, After constructing the shaded zone, is the tether anchorage within the shaded zone?
  - If YES, = PASS, skip to next section
  - If NO, Is it possible to locate a tether anchorage within the shaded zone without removing a seating component?
    - If YES, = FAIL (S6.2.1)
    - If NO, Is a tether routing device provided?
      - If YES, = PASS
      - If NO, = FAIL (S6.2.1.2)

Is the tether anchorage recessed?
- If NO, skip to next question
- If YES, Is it outside of the tether strap wraparound area?
  - YES = PASS NO = FAIL (S6.2.1)

Does the tether anchorage permit attachment of a tether hook?
- YES = PASS NO = FAIL (S6.1(a))

Is the tether anchorage accessible without the need for any tools other than a screwdriver or coin?
- YES = PASS NO = FAIL (S6.1(b))

After the tether anchorage is accessed, is it ready for use without the need for tools?
- YES = PASS NO = FAIL (S6.1(c))

Is the tether anchorage sealed to prevent the entry of exhaust fumes into the passenger compartment?
- YES = PASS NO = FAIL (S6.1(d))

If the DSP has a tether routing device, is it flexible or rigid?

If the DSP has a flexible tether routing device, after installing SFAD2 record the tether strap tension: _____
- (Must be 60 N ± 5 N)

If the DSP has a flexible tether routing device, record the horizontal distance between the torso reference plane and the routing device: _____

Greater than or equal to 65 mm = PASS Less than 65 mm = FAIL

If the DSP has a rigid tether routing device, record the horizontal distance between the torso reference plane and the routing device: _____

Greater than or equal to 100 mm = PASS Less than 100 mm = FAIL

COMMENTS:

RECORDED BY: _____ DATE: _____

APPROVED BY: _____

DATA SHEET 4

LOWER ANCHORAGE DIMENSIONS

VEH. NHTSA NO.: TEST DATE:

Designated seating position: _____

Outboard Lower anchorage bar diameter: _____
6 mm ± 0.1 mm = PASS Other size = FAIL (S9.1.1(a))

Inboard Lower anchorage bar diameter: _____
6 mm ± 0.1 mm = PASS Other size = FAIL (S9.1.1(a))

Are the bars straight, horizontal and transverse?
YES = PASS NO = FAIL (S9.1.1(b))

Length of the straight portion of the bar (outboard lower anchorage): _____
Length ≥ 25 mm = PASS Length < 25 mm = FAIL (S9.1.1(c)(i))

Length of the straight portion of the bar (inboard lower anchorage): _____
Length ≥ 25 mm = PASS Length < 25 mm = FAIL (S9.1.1(c)(i))

Length between the anchor bar supports (outboard lower anchorage): _____
Length ≤ 60 mm = PASS Length > 60 mm = FAIL (S9.1.1(c)(ii))

Length between the anchor bar supports (inboard lower anchorage): _____
Length ≤ 60 mm = PASS Length > 60 mm = FAIL (S9.1.1(c)(ii))

CRF Pitch angle: _____
Angle = 15˚ ±10˚ = PASS Angle ≠ 15˚ ±10˚ = FAIL (S9.2.1)

CRF Roll angle: _____
Angle = 0˚ ± 5˚ = PASS Angle ≠ 0˚ ± 5˚ = FAIL (S9.2.1)

CRF Yaw angle: _____
Angle = 0˚ ±10˚ = PASS Angle ≠ 0˚ ± 10˚ = FAIL (S9.2.1)

Distance between point Z on the CRF and the front surface of outboard anchor bar: _____
Distance ≤ 70 mm = PASS Distance > 70 mm = FAIL

Distance between point Z on the CRF and the front surface of inboard anchor bar: _____
Distance ≤ 70 mm = PASS Distance > 70 mm = FAIL

Distance between SgRP and the front surface of outboard anchor bar: _____
Distance ≥ 120 mm = PASS Distance < 120 mm = FAIL

Distance between SgRP and the front surface of inboard anchor bar: _____
Distance ≥ 120 mm = PASS Distance < 120 mm = FAIL

Based on visual observation, would a 100 N load cause the anchor bar to deform more than 5 mm?

If NO = PASS
If YES = FAIL (S9.1.1(g)), Provide further description of the attachment of the anchor bar:

COMMENTS:

RECORDED BY: _____ DATE: _____

APPROVED BY: _____

DATA SHEET 5

CONSPICUITY AND MARKING OF LOWER ANCHORAGES

VEH. NHTSA NO.: TEST DATE:
Designated seating position: _____

MARKING (Circles)

Diameter of the circle: _____
Diameter ≥ 13 mm = PASS Diameter < 13 mm = FAIL (S9.5(a)(1))

Does the circle have words, symbols or pictograms?
NO, skip to next question
YES, are the meaning of the words, symbols or pictograms explained in the owner's manual?
YES = PASS NO = FAIL (S9.5(a)(2))

Where is the circle located? Seat back or seat cushion

For circles on seat backs, vertical distance from the center of the circle to the center of the anchor bar: _____
Distance between 50 and 100 mm = PASS Other Distance = FAIL (S9.5(a)(3))

For circles on seat cushions, horizontal distance from the center of the circle to the center of the bar: _____
Distance between 75 and 125 mm = PASS Other Distance = FAIL (S9.5(a)(3))

Lateral distance from the center of the circle to the center of the anchor bar: _____
Distance ≤ 25 mm = PASS Distance > 25 mm = FAIL (S9.5(a)(3))

CONSPICUITY (No Circles)

Is the anchor bar or guide visible when viewed from a point 30˚ above the horizontal in a vertical longitudinal plane bisecting the anchor bar or guide?
YES = PASS NO = FAIL (S9.5(b))

If there is a guide, is it permanently attached?
YES = PASS NO = FAIL (S9.5(b))

Is there a cap or cover over the anchor bar?
If YES, Is the cap or cover marked with words, symbols or pictograms?
If NO = FAIL (S9.5(b))
If YES, is the meaning of the words, symbols or pictograms explained in the owner's manual?
YES = PASS NO = FAIL (S9.5(b))
If NO, there are no requirements for having a cover

RECORDED BY: _____ DATE: _____

APPROVED BY: _____

DATA SHEET 6

STRENGTH OF TETHER ANCHORAGES

VEH. NHTSA NO.: TEST DATE:

Designated seating position: _____

SFAD: _____

Seat back angle: _____

Location of seat back angle measurement: _____

Head restraint position: _____

D-ring position: _____ (SFAD1 only)

Force at Point X (lower front crossmember for SFAD2) while securing belts and tether: _____

Lap belt tension: _____ (SFAD1 only)

Tether strap tension: _____

Angle (measured above the horizontal at 500 N): _____

Separation of tether anchorage at 500 N: NO = PASS YES = FAIL (S6.3.1)

Force application rate: _____

Time to reach maximum force (24-30 s): _____

Maximum force (14,950 N ± 50 N): _____

Tested simultaneously with another DSP? YES or NO

COMMENTS:

RECORDED BY: _____ DATE: _____

APPROVED BY: _____

DATA SHEET 7

STRENGTH OF LOWER ANCHORAGES (Forward Force)

VEH. NHTSA NO.: TEST DATE:

Designated seating position: _____

Seat back angle: _____

Location of seat back angle measurement: _____

Head restraint position: _____

Force at lower front crossmember for SFAD2 while tightening rearward extensions:
_____

Angle (measured above the horizontal at 500 N): _____

Force application rate: _____

Time to reach maximum force (24-30 s): _____

Maximum force (10,950 N ± 50 N): _____

Displacement, H1 (at 500N): _____

Displacement, H2 (at maximum load): _____

Displacement of Point X: _____ (H2-H1)
Displacement > 175 mm = FAIL (S9.4.1(a))

Tested simultaneously with another DSP? YES or NO

Distance between adjacent DSPs: _____

COMMENTS:

RECORDED BY: _____ DATE: _____

APPROVED BY: _____

DATA SHEET 8

STRENGTH OF LOWER ANCHORAGES (Lateral Force)

VEH. NHTSA NO.: TEST DATE:

Designated seating position: _____

Seat back angle: _____

Location of seat back angle measurement: _____

Head restraint position: _____

Force at lower front crossmember for SFAD2 while tightening rearward extensions:
_____

Angle (measured above the horizontal at 500 N): _____

Angle (horizontally from the vertical longitudinal plane at 500 N): _____

Force application rate: _____

Time to reach maximum force (24-30 s): _____

Maximum force (4,950 N ± 50 N): _____

Displacement, H1 (at 500N): _____

Displacement, H2 (at maximum load): _____

Displacement of Point X: _____ (H2-H1)
Displacement > 150 mm = FAIL (S9.4.1(b))

Tested simultaneously with another DSP? YES or NO

Distance between adjacent DSPs: _____

COMMENTS:

RECORDED BY: _____ DATE: _____

APPROVED BY: _____

DATA SHEET 9

OWNER'S MANUAL

VEH. NHTSA NO.: TEST DATE:

Description of which DSPs are equipped with tether anchorages and child restraint anchorage systems.

PASS **FAIL**

Step-by-step instructions for properly attaching a child restraint system's tether strap to the tether anchorage. Diagrams are required.

PASS **FAIL**

Description of how to properly use the tether anchorage and lower anchor bars.

PASS **FAIL**

If the lower anchor bars are marked with a circle, an explanation of what the circle indicates as well as any words or pictograms.

PASS **FAIL**

Include copies of relevant pages from the owner's manual in the final report.

COMMENTS:

RECORDED BY: _____ DATE: _____

APPROVED BY: _____

8. FORMS

FORM 1

TEST EQUIPMENT LIST

VEH. NHTSA NO.: TEST DATE:

SAMPLE TABLE

ITEM	MFR	MODEL	S/N	CALIBR. PERIOD	DATE OF LAST CALIBRATION	ACCURACY	REMARKS

REMARKS:

RECORDED BY: _____ DATE: _____

APPROVED BY: _____

APPENDIX A – VEHICLE SECUREMENT

PURPOSE AND APPLICATION

The Office of Vehicle Safety Compliance (OVSC) provides contracted laboratories with Laboratory Procedures (LPs) which serve as guidelines for common requirements among various standards. The requirements are incorporated into Laboratory Test Procedures (TPs) by reference and 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 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 Procedure to be in conflict with a Federal Motor Vehicle Safety Standard or observing any deficiencies in a Laboratory Procedure is required to advise the Contracting Officer's Technical Representative (COTR) and resolve the discrepancy prior to the start of compliance testing.

The OVSC Laboratory 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.

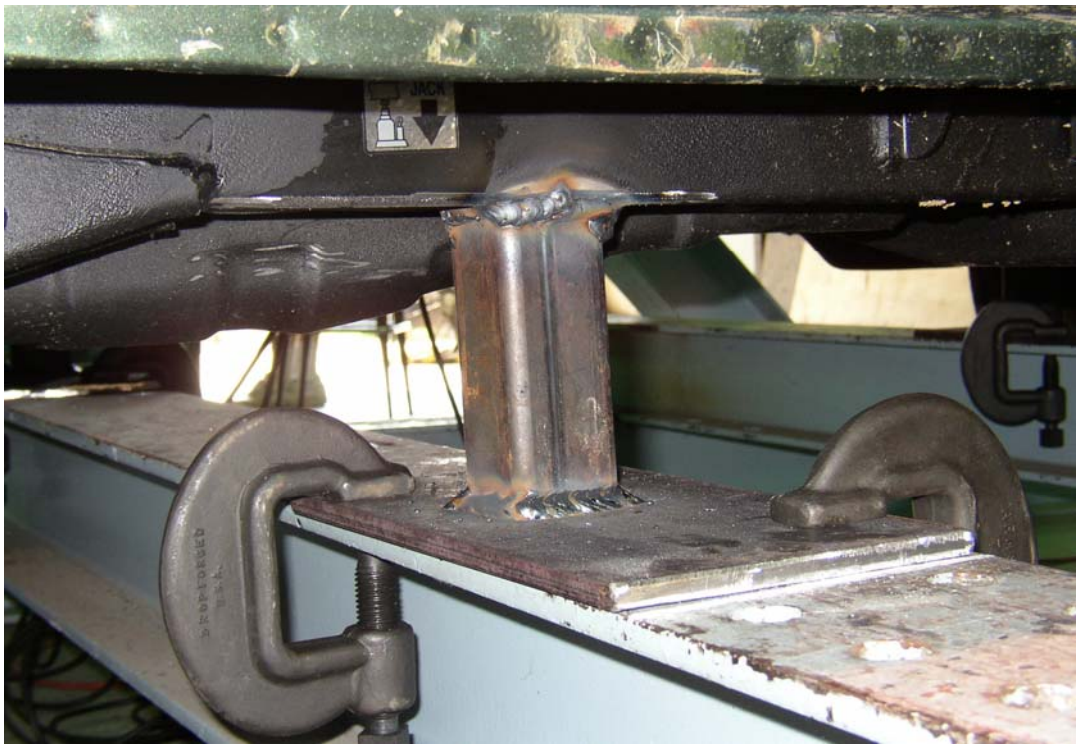
NOTE:

The OVSC Laboratory 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 Procedures do not include all of the various FMVSS minimum performance requirements. Sometimes, recognizing applicable test tolerances, the 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.

GENERAL REQUIREMENTS

FMVSS 202, 216, and 225 all require a vehicle to be secured off its suspension for testing. This procedure specifies a uniform method for securing vehicles for testing to FMVSS 202, 216, and 225. The vehicle shall be supported by four vertical stands that are welded to the jacking points of the vehicle. The stands shall be attached to a flat, level surface using C-clamps or other method deemed sufficient by the Contracting Officer's Technical Representative (COTR).

PROCEDURE



Photograph of a single vertical support in the "as tested" condition

Record the vehicle attitude with the vehicle resting on its suspension in the "as delivered" condition. The "as delivered" condition is the vehicle as received at the test site, with 100 percent of all fluid capacities, as listed in vehicle owner's manual, and all tires inflated to the manufacturer's specifications as listed on the vehicle's tire placard.

Measure the longitudinal vehicle attitude along both the driver and passenger sill.

Measure the lateral vehicle attitude along the front and rear bumpers at the vehicle centerline.

Locate the vehicle jack points. Refer to the vehicle owner's manual for identifying the jack points.

If the jack points are not defined or are generally defined, engineering judgment will be used to locate the vertical supports such that the distance between the fore and aft locations are maximized but lie in the region between the front and rear axles.

If the jack points are not located on the vehicle body or the vehicle frame, such as axles or suspension members, the vertical stands will be located in the same manner as vehicles with generally defined jack points.

Make all necessary measurements for fabricating the vertical support stands. A stand is typically comprised of a 3-4" piece of steel tubing that has 6" x 3", ¼" thick plate welded on end being attached to the bedplate. One piece of 3" x 3", ¼" thick plate is welded to the jack point.

NOTE: The dimensions provided are simply a guide; depending on vehicle specific parameters the size of the tubing and plates may vary. Variation in stand design may be required based on vehicle geometry or attachment location.

When making measurements, account for the current vehicle attitude and required vehicle attitude when tested. The "as tested" attitude shall be 0º ± 0.5º for both lateral and longitudinal attitude.

Weld a plate to the jack point. Repeat for the three other jack points.

Weld the tubing to the other plate to form a T-shaped stand.

Weld the T-shaped stand to the plate at the jack point. Repeat for the three other jack points.

NOTE: If the vehicle jack points are non-metallic a suitable epoxy or adhesive shall be used to attach the stands.

Fix all non-rigid body mounts to prevent motion of the vehicle body relative to the vehicle frame. This may be achieved by welding or blocking compressible body mounts.

Place the vehicle on the test stand and secure the base of the stands with C-clamps or other suitable method that restraints vehicle motion.

Chains and wire rope shall not be used to secure the vehicle.

The vehicle overhangs shall not be supported.

Measure the longitudinal vehicle attitude along both the driver and passenger sill.

Measure the lateral vehicle attitude along the front and rear bumpers at the vehicle centerline.

The lateral and longitudinal attitudes shall be 0º ± 0.5º.

PHOTOGRAPHIC DOCUMENTATION

Photographs shall be color, 8” x 10” or 8.5” x 11” and legible. A tag, label, or placard identifying the test vehicle model and NHTSA number shall appear in each photograph and be legible. Each photograph shall be labeled as to the subject matter. The photographs shall be incorporated into the applicable FMVSS test report. As a minimum the following photographs shall be included:

A. Each stand attached to the vehicle and mounted to the bedplate.

B. Overall left side view of vehicle mounted for testing

C. Overall right side view of vehicle mounted for testing

VEHICLE SECUREMENT DATA SHEET

DATE:

STANDARD TEST(S) BEING PERFORMED:

VEH. NHTSA NO.:

VIN:

Description of the location of the vehicle jack points:

Are any of the specified vehicle jack points on the axles or suspension members?

If YES, where are the jack points located?

Where are the vehicle stands located?

Are any of the specified vehicle jack points generally defined?

If YES, where are the jack points located?

Where are the vehicle stands located?

Vehicle attitude “as delivered”: Lat: Long:

Vehicle attitude “as tested”; Lat: Long:

REMARKS:

RECORDED BY: _____ DATE: _____

APPROVED BY: _____