FINAL REPORT NUMBER 225-MGA-07-002

SAFETY COMPLIANCE TESTING FOR FMVSS 225 "Child Restraint Anchorage Systems"

GENERAL MOTORS CORPORATION 2007 CHEVROLET TAHOE 4-DOOR NHTSA No. C70104

MGA RESEARCH CORPORATION 446 Executive Drive Troy, Michigan 48083



Test Date: October 11, 2007 Report Date: November 20, 2007

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW
ROOM 6111 (NVS-220)
WASHINGTON, D.C. 20590

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Prepared By:	Fern Gatilao, Project Engineer
	Brack Reaume
	Brad Reaume, Test Personnel
	theend Kalito
	Helen A. Kaleto, Laboratory Manager
Approved By:	Pamenonellate
Approval Date:	1/18/2008
FINAL REPORT AC	CEPTANCE BY OVSC:
	Edward E. Chan No. Con = Edward E. Chan, C = US, O = National Highway Traffic Safety Administration, OU_= Office of Vehicle Safety Compiliance
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15. Supplementary Notes

16. Abstract

A compliance test was conducted on the subject 2007 Chevrolet Tahoe, NHTSA No. C70104, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-225-01 for the determination of FMVSS 225 compliance. The tests were conducted at MGA Research Corporation in Troy, Michigan on October 11, 2007. Test failures identified were as follows:

NONE

The data recorded indicates that the 2007 Chevrolet Tahoe tested appears to meet the requirements of FMVSS 225.

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1.0 PURPOSE AND PROCEDURE

PURPOSE

The child restraint anchorage testing results presented in this report are part of the Federal Motor Vehicle Safety Standard (FMVSS) No. 225 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by MGA Research Corporation (MGA) under Contract No. DTNH22-06-C-00030/0003. The purpose of the testing was to determine if the subject vehicle, a 2007 Chevrolet Tahoe, NHTSA No. C70104 meets the performance requirements of FMVSS No. 225, "Child Restraint Anchorage Systems."

PROCEDURE

This testing was conducted in accordance with NHTSA's Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure TP-225-01 (4/11/05) and MGA's Laboratory Test Procedure, MGATP225GOV (6/23/06).

The rear occupant compartment consisted of a 2^{nd} row three-passenger 60/40 split-bench seat. The 2^{nd} row outboard RH and center seating positions were equipped with a child restraint anchorage system (one tether and two lower anchorages). The 2^{nd} row LH seating position was equipped with a tether anchorage. The center-to-center spacing between the 2^{nd} row outboard lower anchorages was approximately 800 mm. The 2^{nd} row LH outboard seating position was tested with the SFADI fixture and the 2^{nd} row center & RH seating position were tested with the SFADII fixture.

2.0 COMPLIANCE TEST AND DATA SUMMARY

TEST SUMMARY

The testing was conducted at MGA in Troy, Michigan on October 11, 2007.

Based on the test results, the 2007 Chevrolet Tahoe appears to meet the requirements of FMVSS No. 225 for this testing.

The SFADI at the 2^{nd} row left seating position sustained a maximum force of 15,456 N and held the required load for 3 seconds. The SFADII at the 2^{nd} row right seating position sustained a maximum force of 11,153 N and held the required load for 3 seconds. The total displacement was 99mm. The SFADII at the 2^{nd} row center seating position sustained a maximum force of 15,621 N and held the required load for 3 seconds.

DATA SUMMARY

Strength and displacement summary data are provided below. Data for the configuration and the location of each child restraint anchorage system are provided in Section 5.0. Photographs are found in Section 6.0 and test plots are found in Section 7.0.

Table 1. Summary Data for Strength and Displacement

MGA Test #	Fixture Type	Test Configuration	Seating Position	Max. Load (N)	Displacement (mm)	
	SFADII	Lower Only	2 nd Row Right	11,153	99	
SB7673	SFADII		2 nd Row Center	15,621	N/A	
	SFADI	SFADI Forward w/Tether		2 nd Row Left	15,456	N/A

N/A indicates that the displacement criteria does not apply to this test.

3.0 TEST VEHICLE INFORMATION

Table 2. General Test and Vehicle Parameter Data

VEH. MOD YR/MAKE/MODEL/BODY	2007 Chevrolet Tahoe
VEH. NHTSA NO.	C70104
VIN	1GNFC13J17R220854
COLOR	White
VEH. BUILD DATE	06/2006
TEST DATE	October 11, 2007
TEST LABORATORY	MGA Research Corporation
OBSERVERS	Fern Gatilao , Brad Reaume, Kenney Godfrey

GENERAL INFORMATION:

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: General Motor Corporation

Date of Manufacture: 06/06; VIN: 1GNFC13J17R220854

GVWR: <u>7100 lbs</u>; GAWR FRONT: <u>3200 lbs</u>

GAWR REAR: 4100 lbs

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: <u>32 psi</u> REAR: <u>32 psi</u>

Recommended Tire Size: P265/70R17

Recommended Cold Tire Pressure:

FRONT: 32 psi REAR: 32 psi

Size of Tire on Test Vehicle: P265/70R17

Size of Spare Tire: P265/70R17

VEHICLE CAPACITY DATA:

Type of Front Seats: Bench ____; Bucket ___; Split Bench X ___

Number of Occupants: Front <u>3</u>; Middle <u>0</u>; Rear; <u>3</u> TOTAL <u>6</u>.

4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

MGA Research Corporation 446 Executive Drive Troy, Michigan 48083				
Test Equipment Used for Testing	Calibration Due Date			
MGA Hydraulic Test Frame	N/A			
Three (3) Load Cell 10,000 lb Capability	S/N 607 (6/6/07), 618 (6/6/07), 609 (6/6/07)			
String Potentiometer	Calibrated at each use (S/N F1603966A)			
Hydraulic Pump	N/A			
MGA CRF Fixture	N/A			
MGA SFADI	N/A			
MGA SFADII	N/A			
MGA 2-Dimensional Template	N/A			
Linear Scale	S/N TPM722 (1/2/08)			
MGA Data Acquisition System	N/A			
Digital Calipers	S/N MGA00683 (1/4/08)			
Force Gauge	S/N MGA00015 (4/6/08)			
Inclinometer (Digital)	S/N MGA00727 (4/18/08)			

5.0 DATA

Table 3. Child Restraint Tether Anchorage Configuration

Seatii Positi	_	Permit the attachment of a tether hook	Accessible without the need for any tool other than a screwdriver or coin	Ready for use without the need for any tools	Sealed to prevent the entry of exhaust fumes
Front F	Row	N/A	N/A	N/A	N/A
LH		Yes	Yes	Yes	Yes
Second Row	Ctr.	Yes	Yes	Yes	Yes
Kow	RH	Yes	Yes	Yes	Yes
Third F	Row	N/A	N/A	N/A	N/A

Note: AS DETERMINED USING THE PROCEDURES SPECIFIED IN TP-225-01.

REMARKS: NONE.

Table 4. Child Restraint Lower Anchorage Configuration

OBSERVED LOWER ANCHORAGE CONFIGURATION	SEAT POSITION				
		FRONT	SECON	ID ROW	THIRD
		ROW	I/B	O/B	ROW
Above anchorage, permanently marked with a circle not less than 13 mm in Dia.; and whose color contrasts with its background; and its	LH	-	N/A	N/A	
center is not less than 50 mm and not more than 100 mm above the	Ctr	N/A	57	58	N/A
bar, and in the vertical longitudinal plane that passes through the center of the bar.	RH		58	58	
Each of the bars is visible, without the compression of the seat cushion or seat back, when the bar is viewed, in a vertical	LH		N	No	
longitudinal plane passing through the center of the bar, along a line	Ctr	N/A	Y	'es	N/A
marking an upward 30 degree angle with a horizontal plane.	RH		Y	'es	
Diameter of the bar (mm)	LH		N	//A	_
	Ctr	N/A	6	6	N/A
	RH		6	6	
Inspect if the bars are straight, horizontal and transverse	LH		N/A		N/A
	Ctr	N/A	Yes		
	RH		Yes		
Optional Marking: At least one anchorage bar (when deployed for use, if storable anchorages), one guidance fixture, or one seat	LH				
marking is visible.	Ctr	N/A	N	//A	N/A
	RH				
Optional Marking: If guidance fixtures are used, the fixture(s) must be installed.	LH				
be instance.	Ctr	N/A	N	//A	N/A
	RH				
Measure the distance between Point "Z" of the CRF and the front surface of the anchorage bar (mm)	LH		N/A		
surface of the anchorage par (min)		N/A	55		N/A
	RH		55		
Measure the distance between the SRP to the front of the anchorage bar (mm)	LH		N	N/A	
oai (iiiii)	Ctr	N/A	165	165	N/A
	RH		157	157	

Table 4. Child Restraint Lower Anchorage Configuration (continued)

OBSERVED LOWER ANCHORAGE CONFIGURATION	SEAT POSITION				
		FRONT ROW	SECON I/B	D ROW O/B	THIRD ROW
Inspect if the centroidal longitudinal axes are collinear within 5	LH		N/A		
degrees	Ctr	N/A	Yes		N/A
	RH	Yes			
Inspect if the inside surface of the bar that is straight and horizontal	LH		N	/A	
section of the bars, and determine they are not less than 25 mm, but not more than 60 mm in length (mm).	Ctr		29	31	-
2 \ /		N/A	34	34	N/A
	RH		29 31	31	-
Inspect if the bars can be connected to, over their entire inside length	LH		N/A		
by the connectors of child restraint system.	Ctr	N/A	Yes		N/A
	RH	=	Y	es	
Inspect if the bars are an integral and permanent part of the vehicle.	LH		N/A		
	Ctr	N/A	Y	es	N/A
	RH		Yes		
Inspect if the bars are rigidly attached to the vehicle. If feasible,	LH		N/A		
hold the bar firmly with two fingers and gently pull.		N/A	Yes		N/A
	RH		Y	es	

PITCH, YAW, & ROLL INFORMATION

SEAT POSITION	PITCH (deg)	YAW (deg)	ROLL (deg)
2 nd Row Left	N/A	N/A	N/A
2 nd Row Center	13.0	No Data	0.0
2 nd Row Right	7.0	No Data	0.0

N/A indicates that there were no lower anchorages in the 2nd row LH seating position.

Note: AS DETERMINED USING THE PROCEDURES SPECIFIED IN <u>TP-225-01</u>.

REMARKS: NONE

Table 5. Tether Location and Dimensional Measurements

SEAT POSITION FOR TETHER		TETHER ANCHORAGE LOCATION Located in the required zone?			
Front Row		N/A			
C 1	LH	Yes			
Second Row	Ctr.	Yes			
Row	RH	Yes			
Third Row		N/A			

Note: AS DETERMINED USING THE PROCEDURES SPECIFIED IN TP-225-01.

REMARKS: NONE

Table 6. Tether Anchorage Static Loading and Displacement

SEAT POSITION		Seat, Seat Back, & Head Restraint Positions		Type of Ang	Angle	. Initial	Onset	Force	Max.	Final	Horiz.	
		Seat	Seat Back	Is There a H/R?	SFAD Used	(deg)	Location (mm)	Rate (N/sec.)	Applied (N)	Load (N)	Location (mm)	Displ. (mm)
Front Row		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Second Row	LH		Most Upright	Yes	I	9	N/A	537	15,000	15,456*	N/A	N/A
	Ctr.	Fixed		N/A	II	9	N/A	537	15,000	15,621*	N/A	N/A
	RH			Yes	II	9	46	389	11,000	11,153*	145	99
Third Row		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: AS DETERMINED USING THE PROCEDURES SPECIFIED IN <u>TP-225-01</u>.

REMARKS: * Applied force exceeded the force specified in the test procedure.

6.0 PHOTOGRAPHS

6.1 Front view

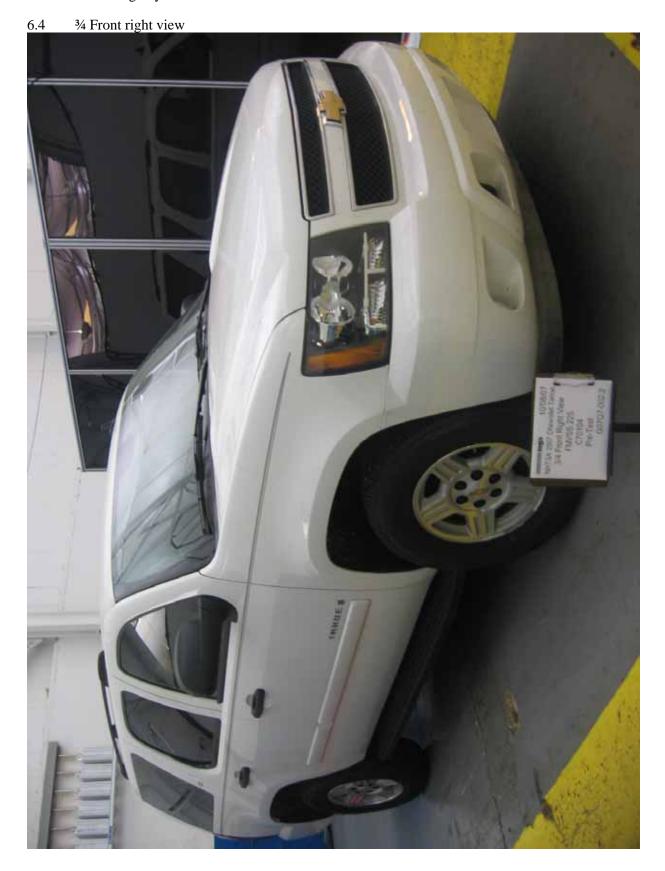


6.2 Rear view



6.3 3/4 Front left view





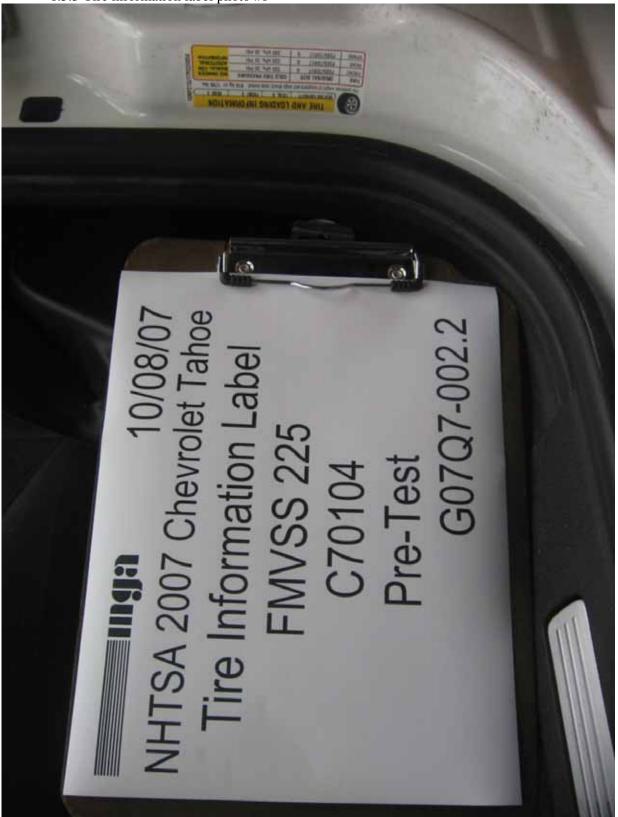
6.5 Test vehicle's certification label

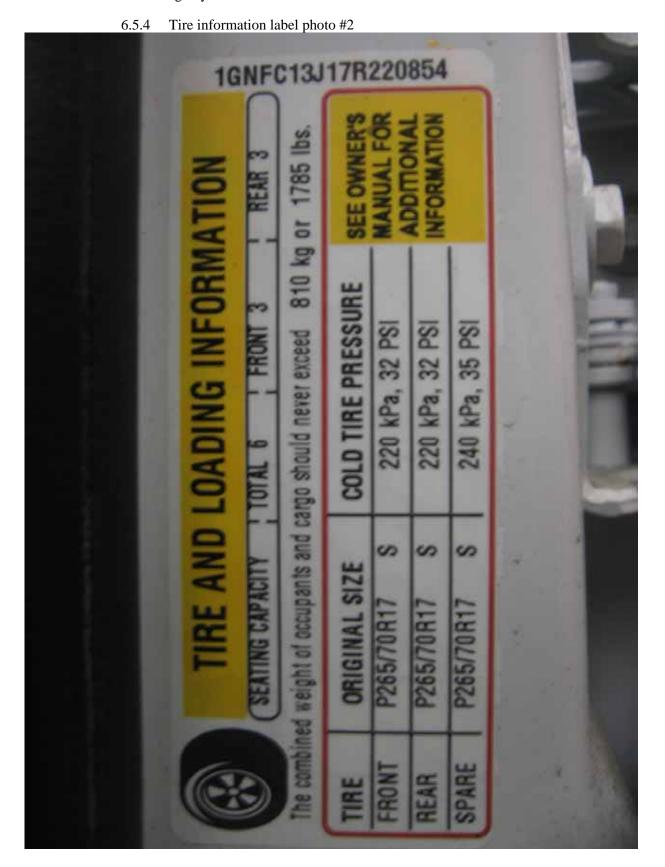


6.5.2 Certification label photo #2



6.5.3 Tire information label photo #1





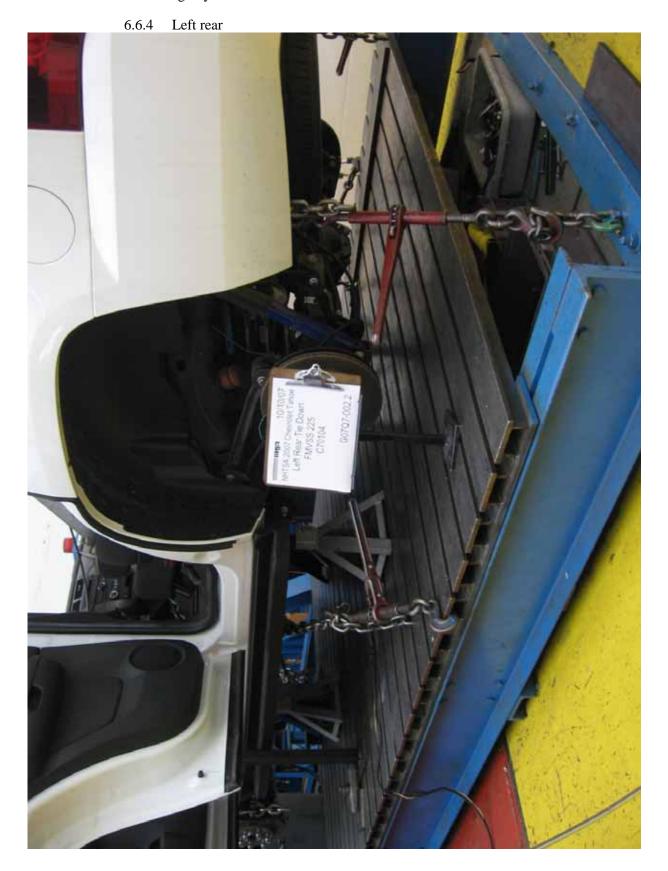
6.6 Vehicle tie down at each tie down location 6.6.1 Front under vehicle

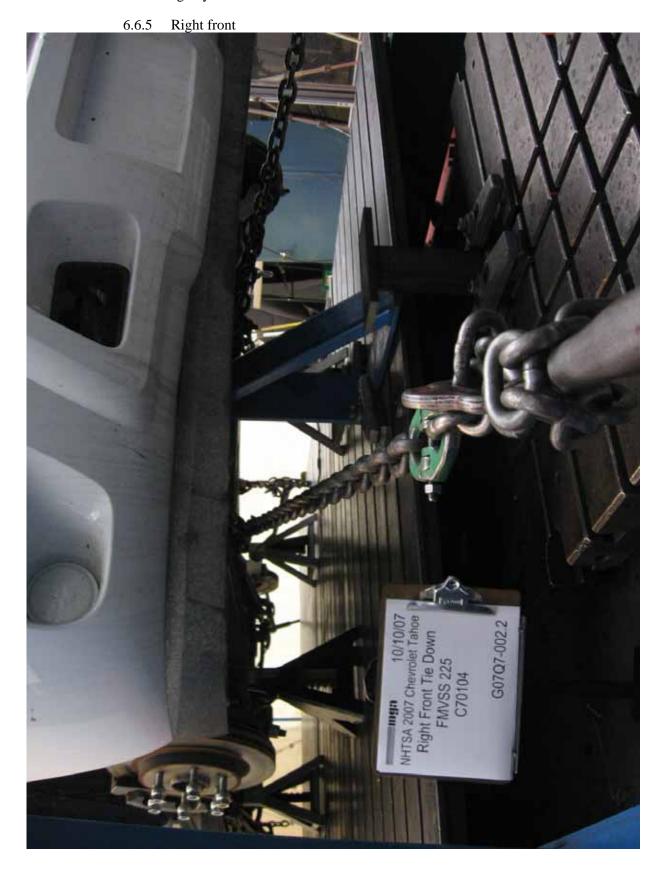




6.6.3 Left front





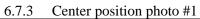




6.7 2-dimensional template 6.7.1 LH position photo #1















6.8 CRF verification 6.8.1 Center position photo





6.9 Front view of test vehicle with test apparatus in place 6.9.1 SFADI & II photo 1 of 2



6.9.2 SFADI & II photo 2 of 2



6.10 Pre-test views of each child restraint anchorage system installed in the vehicle 6.10.1 Pre-test photo #1 of SFADI & II





6.10.3 Pre-test photo #3 of SFADI & II



6.10.4 Pre-test photo #4 of SFADI & II



6.11 Post-test condition of each child restraint anchorage system 6.11.1 Post-test photo #1 of SFADI & II







6.11.4 Post-test photo #4 of SFADI & II

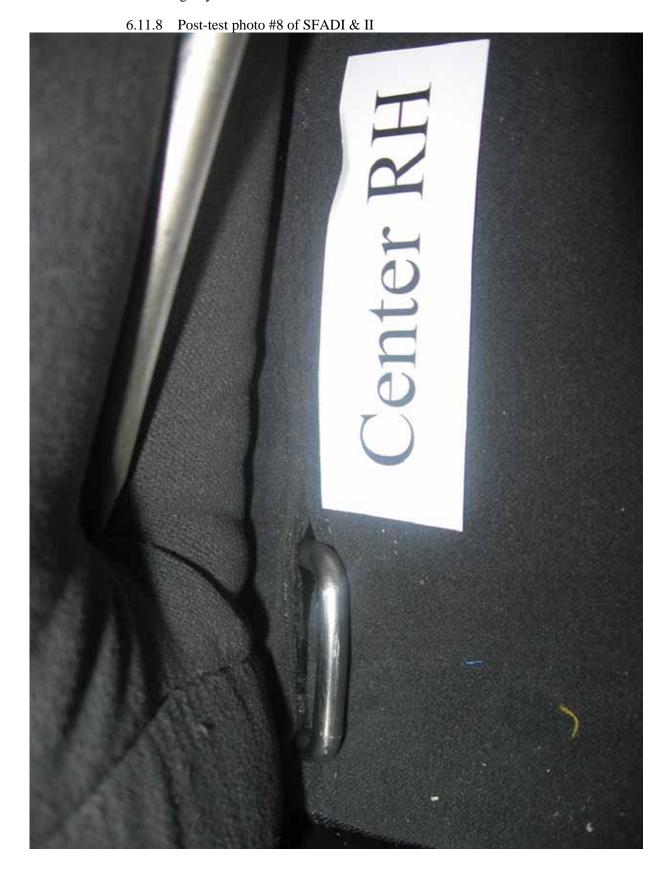


6.11.5 Post-test photo #5 of SFADI & II

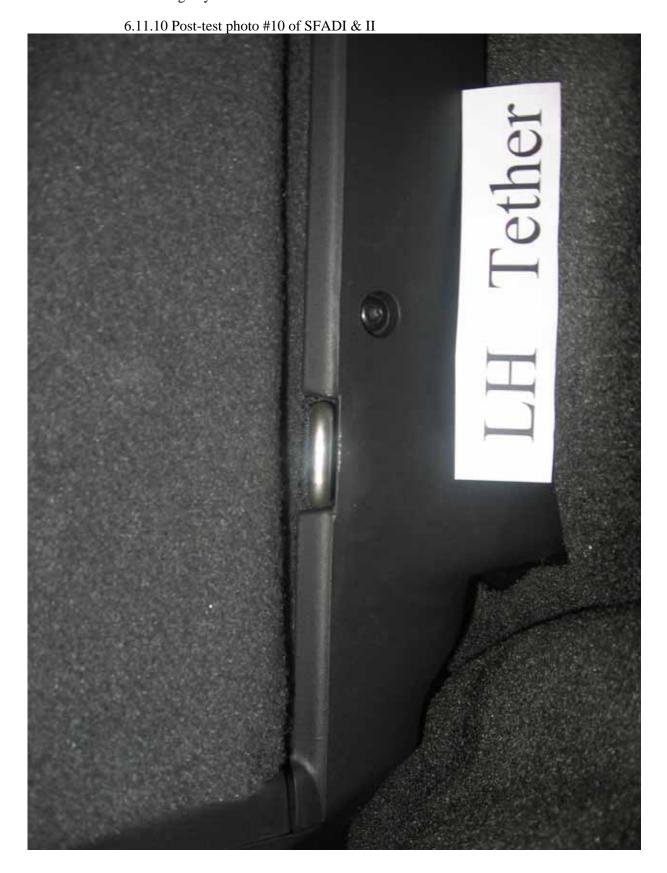






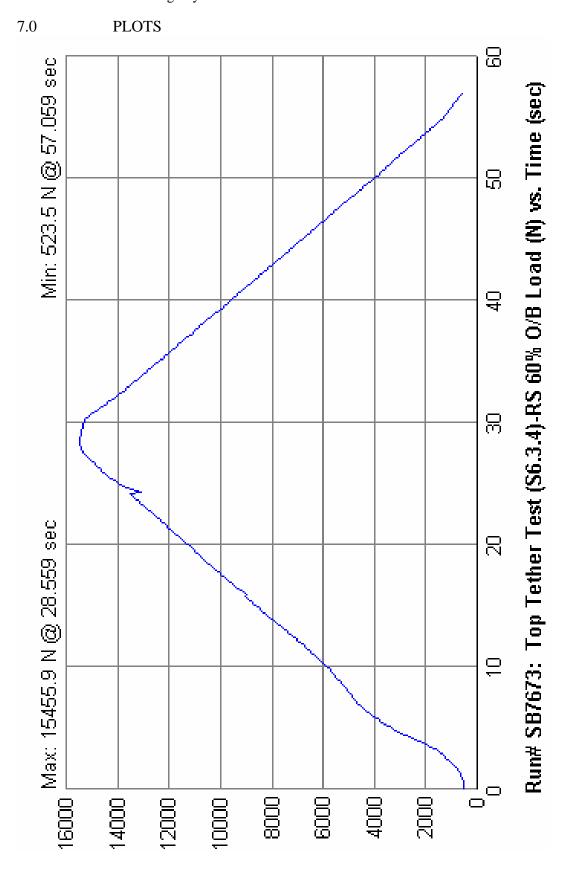


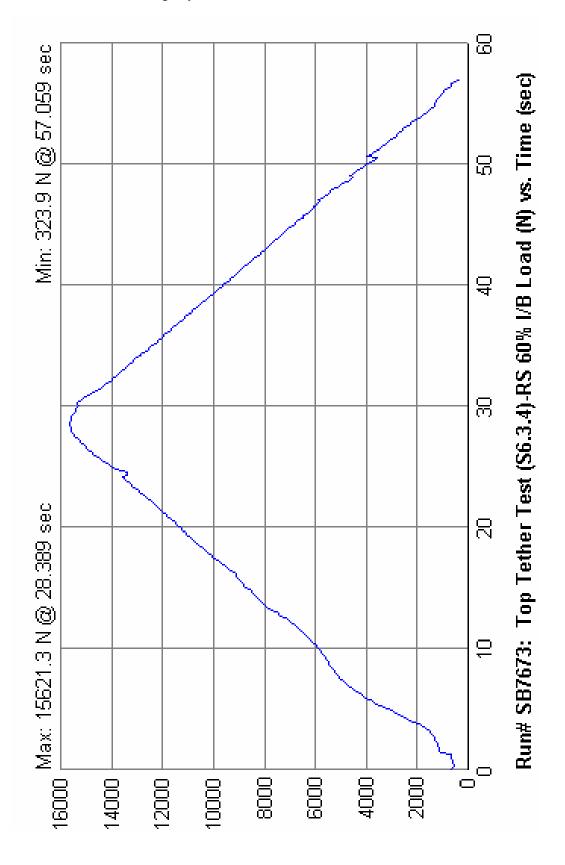


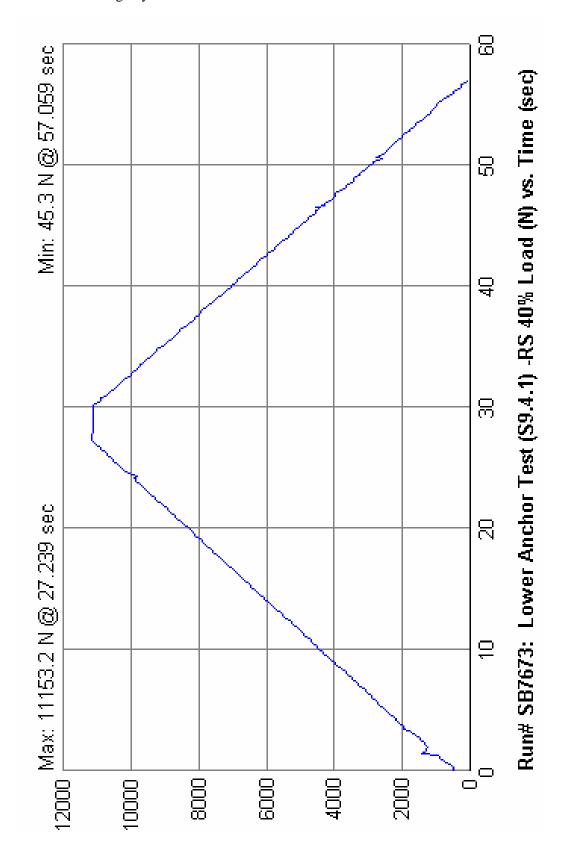


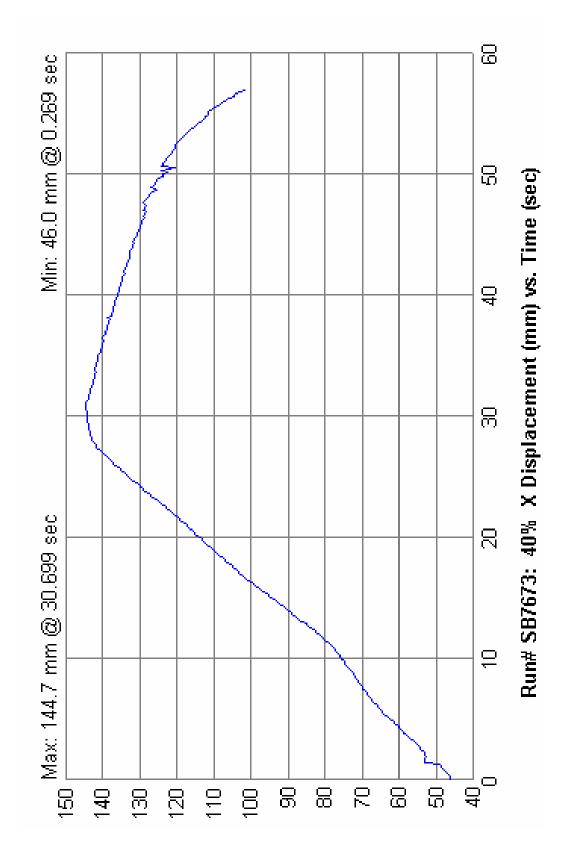












8.0 REPORT of VEHICLE CONDITION

REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING

CONTRACT No.: <u>DTNH22-06-C-00030/0003</u> DATE: <u>October 11, 2007</u>

From: MGA Research Corporation, 446 Executive Drive, Troy, MI 48083

To: NHTSA, OVSC, NVS-220

The following vehicle has been subjected to compliance testing for FMVSS No. 201U and 225

The vehicle was inspected upon arrival at the laboratory for the test and found to contain all of the equipment listed below. All variances have been reported within 2 working days of vehicle arrival, by letter, to the NHTSA Industrial Property Manager (NAD0-30), with a copy to the OVSC COTR. The vehicle is again inspected, after the above test has been conducted, and all changes are noted below. The final condition of the vehicle is also noted in detail.

VEH. MOD YR/MAKE/MODI	EL/BODY: 2007 Chev	vrolet Tahoe				
VEH. NHTSA NO.: <u>C70104</u>	VIN: <u>1GNFC13J17R220854</u>					
COLOR: White						
ODOMETER READINGS:	ARRIVAL	619 miles Date:	07/20/07			
	COMPLETION	619 miles Date:	10/11/07			
PURCHASE PRICE: \$34,684	DEALER'S NAME:	TRC				
ENGINE DATA:	8 Cylinders	<u>5.3</u> Liters	Cubic Inches			
TRANSMISSION DATA:	X Automatic	Manual	No. of Speeds $\underline{4}$			
FINAL DRIVE DATA:	X Rear Drive	Front Drive	4 Wheel Drive			

CHECK APPROPRIATE BOXES FOR VEHICLE EQUIPMENT:

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Melanie Schick, Brad Reaume, Kevin Schmitzer

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

Safety Compliance Testing For FMVSS	225
"Child Restraint Anchorage Systems"	

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REMARKS:

Salvage only.

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

All equipment inventoried and placed in vehicle.

Explanation for equipment removal:

Windshield and front seats were removed before conducting the testing.

Test Vehicle Condition:

Salvage only.

RECORDED BY: Fern Gatilao, Kenney Godfrey

DATE: October 11, 2007

APPROVED BY: Brad Reaume

APPENDIX A OWNERS MANUAL CHILD RESTRAINT SYSTEMS

Here are the most important things to know about the airbag system:

△ CAUTION:

You can be severely injured or killed in a crash if you are not wearing your safety belt — even if you have airbags. Wearing your safety belt during a crash helps reduce your chance of hitting things inside the vehicle or being ejected from it. Airbags are "supplemental restraints" to the safety belts. All airbags are designed to work with safety belts but do not replace them.

CAUTION: (Continued)

CAUTION: (Continued)

Frontal airbags for the driver and right front passenger are designed to deploy in moderate to severe frontal and near frontal crashes. They are not designed to inflate in rollover, rear crashes, or in many side crashes. And, for some unrestrained occupants, frontal airbags may provide less protection in frontal crashes than more forceful airbags have provided in the past.

CAUTION: (Continued)

Infants and Young Children

Everyone in a vehicle needs protection! This includes infants and all other children. Neither the distance traveled nor the age and size of the traveler changes the need, for everyone, to use safety restraints. In fact, the law in every state in the United States and in every Canadian province says children up to some age must be restrained while in a vehicle.

△ CAUTION:

Children can be seriously injured or strangled if a shoulder belt is wrapped around their neck and the safety belt continues to tighten. Never leave children unattended in a vehicle and never allow children to play with the safety belts.

Every time infants and young children ride in vehicles, they should have the protection provided by appropriate restraints. Young children should not use the vehicle's adult safety belts alone, unless there is no other choice. Instead, they need to use a child restraint.

△ CAUTION:

People should never hold a baby in their arms while riding in a vehicle. A baby does not weigh much — until a crash. During a crash a baby will become so heavy it is not possible to hold it. For example, in a crash at only 25 mph (40 km/h), a 12 lb (5.5 kg) baby will suddenly become a 240 lb (110 kg) force on a person's arms. A baby should be secured in an appropriate restraint.



. .

△ CAUTION:

Children who are up against, or very close to, any airbag when it inflates can be seriously injured or killed. Airbags plus lap-shoulder belts offer protection for adults and older children, but not for young children and infants. Neither the vehicle's safety belt system nor its airbag system is designed for them. Young children and infants need the protection that a child restraint system can provide.

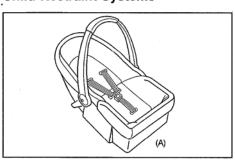


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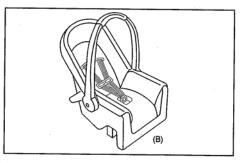
△ CAUTION:

The body structure of a young child is quite unlike that of an adult or older child, for whom the safety belts are designed. A young child's hip bones are still so small that the vehicle's regular safety belt may not remain low on the hip bones, as it should. Instead, it may settle up around the child's abdomen. In a crash, the belt would apply force on a body area that is unprotected by any bony structure. This alone could cause serious or fatal injuries. Young children always should be secured in appropriate child restraints.

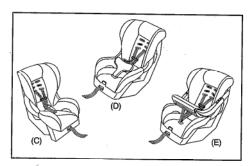
Child Restraint Systems



An infant car bed (A), a special bed made for use in a motor vehicle, is an infant restraint system designed to restrain or position a child on a continuous flat surface. Make sure that the infant's head rests toward the center of the vehicle.

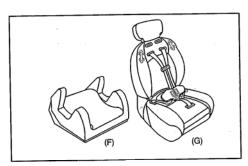


A rear-facing infant seat (B) provides restraint with the seating surface against the back of the infant. The harness system holds the infant in place and, in a crash, acts to keep the infant positioned in the restraint.



A forward-facing child seat (C-E) provides restraint for the child's body with the harness and also sometimes with surfaces such as T-shaped or shelf-like shields.

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A booster seat (F-G) is a child restraint designed to improve the fit of the vehicle's safety belt system. Some booster seats have a shoulder belt positioner, and some high-back booster seats have a five-point harness. A booster seat can also help a child to see out the window.

O: How Should I Use a Child Restraint?

A: A child restraint system is any device designed for use in a motor vehicle to restrain, seat, or position children. A built-in child restraint system is a permanent part of the motor vehicle. An add-on child restraint system is a portable one, which is purchased by the vehicle's owner. To help reduce injuries, an add-on child restraint must be secured in the vehicle. With built-in or add-on child restraints, the child has to be secured within the child restraint.

When choosing an add-on child restraint, be sure the child restraint is designed to be used in a vehicle. If it is, it will have a label saying that it meets federal motor vehicle safety standards. Then follow the instructions for the restraint. You may find these instructions on the restraint itself or in a booklet, or both.

Securing an Add-on Child Restraint in the Vehicle

A CAUTION:

A child can be seriously injured or killed in a crash if the child restraint is not properly secured in the vehicle. Make sure the child restraint is properly installed in the vehicle using the vehicle's safety belt or LATCH system, following the instructions that came with that restraint, and also the instructions in this manual.

To help reduce the chance of injury, the child restraint must be secured in the vehicle. Child restraint systems must be secured in vehicle seats by lap belts or the lap belt portion of a lap-shoulder belt, or by the LATCH system. See Lower Anchors and Tethers for Children (LATCH) on page 73 for more information. A child can be endangered in a crash if the child restraint is not properly secured in the vehicle.

When securing an add-on child restraint, refer to the instructions that come with the restraint which may be on the restraint itself or in a booklet, or both. and to this manual. The child restraint instructions are important, so if they are not available, obtain a replacement copy from the manufacturer.

Keep in mind that an unsecured child restraint can move around in a collision or sudden stop and injure people in the vehicle. Be sure to properly secure any child restraint in your vehicle — even when no child is in it.

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Securing the Child Within the Child Restraint

There are several systems for securing the child within the child restraint. One system, the three-point harness, has straps that come down over each of the infant's shoulders and buckle together at the crotch. The five-point harness system has two shoulder straps, two hip straps, and a crotch strap. A shield may take the place of hip straps. A T-shaped shield has shoulder straps that are attached to a flat pad which rests low against the child's body. A shelf- or armrest-type shield has straps that are attached to a wide, shelf-like shield that swings up or to the side.



△ CAUTION:

A child can be seriously injured or killed in a crash if the child is not properly secured in the child restraint. Make sure the child is properly secured, following the instructions that came with that restraint.

Because there are different systems, it is important to refer to the instructions that come with the restraint. A child can be endangered in a crash if the child is not properly secured in the child

Where to Put the Restraint

Accident statistics show that children are safer if they are restrained in the rear rather than the front seat. We recommend that child restraints be secured in a rear seat, including an infant riding in a rear-facing infant seat, a child riding in a forward-facing child seat, and an older child riding in a booster seat.

Your vehicle has a rear seat that will accommodate a rear-facing child restraint. A label on your sun visor says, "Never put a rear-facing child seat in the front." This is because the risk to the rear-facing child is so great, if the airbag deploys.

△ CAUTION:

A child in a rear-facing child restraint can be seriously injured or killed if the right front passenger's airbag inflates. This is because the back of the rear-facing child restraint would be very close to the inflating airbag. Be sure the airbag is off before using a rear-facing child restraint in the passenger's position.

Even though the passenger sensing system is designed to turn off the passenger's frontal airbag if the system detects a rear-facing child restraint,

CAUTION: (Continued)

CAUTION: (Continued)

no system is fail-safe, and no one can guarantee that an airbag will not deploy under some unusual circumstance, even though it is turned off. We recommend that rear-facing child restraints be secured in the rear seat, even if the airbag is off.

If you need to secure a forward-facing child restraint in the right front seat, always move the front passenger seat as far back as it will go. It is better to secure the child restraint in a rear seat.

Do not use child restraints in the center front seat position. The restraints will not work properly.

Wherever you install it, be sure to secure the child restraint properly.

Keep in mind that an unsecured child restraint can move around in a collision or sudden stop and injure people in the vehicle. Be sure to properly secure any child restraint in your vehicle —/even when no child is in it.

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Lower Anchors and Tethers for Children (LATCH)

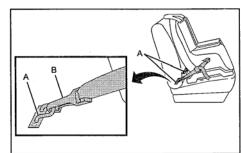
The LATCH system holds a child restraint during driving or in a crash. This system is designed to make installation of a child restraint easier. The LATCH system uses anchors in the vehicle and attachments on the child restraint that are made for use with the LATCH system.

Make sure that a LATCH-compatible child restraint is properly installed using the anchors, or use the vehicle's safety belts to secure the restraint, following the instructions that came with that restraint, and also the instructions in this manual. When installing a child restraint with a top tether, you must also use either the lower anchors or the safety belts to properly secure the child restraint. A child restraint must never be attached using only the top tether and anchor.

In order to use the LATCH system in your vehicle, you need a child restraint that has LATCH attachments. The child restraint manufacturer will provide you with instructions on how to use the child restraint and its attachments. The following explains how to attach a child restraint with these attachments in your vehicle.

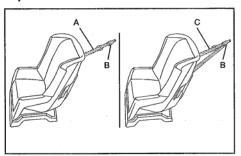
Not all vehicle seating positions or child restraints have lower anchors and attachments or top tether anchors and attachments.

Lower Anchors



Lower anchors (A) are metal bars built into the vehicle. There are two lower anchors for each LATCH seating position that will accommodate a child restraint with lower attachments (B).

Top Tether Anchor



A top tether (A, C) anchors the top of the child restraint to the vehicle. A top tether anchor is built into the vehicle. The top tether attachment (B) on the child restraint connects to the top tether anchor in the vehicle in order to reduce the forward movement and rotation of the child restraint during driving or in a crash.

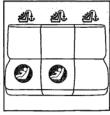
Your child restraint may have a single tether (A) or a dual tether (C). Either will have a single attachment (B) to secure the top tether to the anchor.

Some child restraints with top tethers are designed for use with or without the top tether being attached. Others require the top tether always to be attached. In Canada, the law requires that forward-facing child restraints have a top tether, and that the tether be attached. In the United States, some child restraints also have a top tether. Be sure to read and follow the instructions for your child restraint.

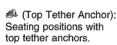
If the child restraint does not have a top tether, one can be obtained, in kit form, for many child restraints. Ask the child restraint manufacturer whether or not a kit is available.

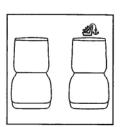
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Lower Anchor and Top Tether Anchor Locations



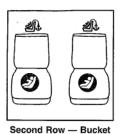
(Lower Anchor): Seating positions with two lower anchors.





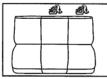
Third Row — Two Passenger (Top Tether Anchor): Seating positions with top tether anchors.





(Lower Anchor): Seating positions with two lower anchors.





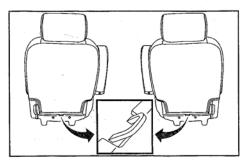
Third Row — Three Passenger

(Top Tether Anchor): Seating positions with top tether anchors.

For models with a three passenger third row seat, see the information following for installing a child restraint with a top tether in the third row, if your vehicle has one. Never install two top tethers using the same top tether anchor.

For models with 60/40 second row seating, the rear right side passenger and center seating positions have exposed metal anchors located in the crease between the seatback and the seat cushion.

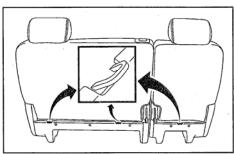
For models with second row bucket seats, both rear seating positions have exposed metal anchors located in the crease between the seatback and the seat cushion.



Second Row Seat - Bucket

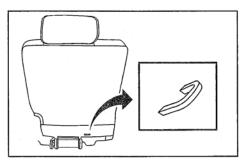
For models with bucket second row seating, the top tether anchors are located at the bottom rear of the seat cushion for each seating position in the second row. Be sure to use an anchor located on the same side of the vehicle as the seating position where the child restraint will be placed.

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Second Row Seat -- 60/40

For models with 60/40 second row seating, the top tether anchors are located at the bottom rear of the seat cushion for each seating position in the second row. Be sure to use an anchor located on the same side of the vehicle as the seating position where the child restraint will be placed.



Third Row Seat — Two or Three Passenger

For vehicles with a two passenger third row seat, there is one top tether anchor located at the bottom rear of the seat cushion that can be used for the rear driver side seating position in the third row. Never install two top tethers using the same top tether anchor.

For vehicles with a three passenger third row seat, there is one top tether anchor located at the bottom rear of the seat cushion that can be used for either the third row center or driver side seating position. Never install two top tethers using the same top tether anchor.

Do not secure a child restraint in the right front passenger position or the third row passenger side seating position if your vehicle has a third row seat, if a national or local law requires that the top tether be attached, or if the instructions that come with the child restraint say that the top tether must be attached. There is no place to attach the top tether in these positions.

Accident statistics show that children are safer if they are restrained in the rear rather than the front seat. See *Where to Put the Restraint on page 71* for additional information.

Securing a Child Restraint Designed for the LATCH System

△ CAUTION:

If a LATCH-type child restraint is not attached to anchors, the restraint will not be able to protect the child correctly. In a crash, the child could be seriously injured or killed. Make sure that a LATCH-type child restraint is properly installed using the anchors, or use the vehicle's safety belts to secure the restraint, following the instructions that came with that restraint, and also the instructions in this manual.

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△ CAUTION:

Each top tether anchor and lower anchor in the vehicle is designed to hold only one child restraint. Attaching more than one child restraint to a single anchor could cause the anchor or attachment to come loose or even break during a crash. A child or others could be injured if this happens. To help prevent injury to people and damage to your vehicle, attach only one child restraint per anchor.

△ CAUTION:

Children can be seriously injured or strangled if a shoulder belt is wrapped around their neck and the safety belt continues to tighten. Secure any unused safety belts behind the child restraint so children cannot reach them. Pull the shoulder belt all the way out of the retractor to set the lock, if your vehicle has one, after the child restraint has been installed. Be sure to follow the instructions of the child restraint manufacturer.

Notice: Contact between the child restraint or the LATCH attachment parts and the vehicle's safety belt assembly may cause damage to these parts. Make sure when securing unused safety belts behind the child restraint that there is no contact between the child restraint or the LATCH attachment parts and the vehicle's safety belt assembly.

Folding an empty rear seat with the safety belts secured, may cause damage to the safety belt or the seat. When removing the child restraint, always remember to return the safety belts to their normal, stowed position before folding the rear seat.

 Attach and tighten the lower attachments to the lower anchors. If the child restraint does not have lower attachments or the desired seating position does not have lower anchors, secure the child restraint with the top tether and the safety belts. Refer to your child restraint manufacturer instructions and the instructions in this manual.

- 1.1. Find the lower anchors for the desired seating position.
- 1.2. Put the child restraint on the seat.
- 1.3. Attach and tighten the lower attachments on the child restraint to the lower anchors.
- If the child restraint manufacturer recommends that the top tether be attached, attach and tighten the top tether to the top tether anchor, if the vehicle has one. Refer to the child restraint instructions and the following steps:
 - 2.1. Find the top tether anchor.

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2.2. Route, attach and tighten the top tether according to your child restraint instructions and the following instructions:



If the position you are using does not have a head rest/restraint and you are using a single tether, route the tether over the seatback.



If the position you are using does not have a head rest/restraint and you are using a dual tether, route the tether over the seathack



If the position you are using has an adjustable head rest/restraint and you are using a dual tether, route the tether around the head rest/restraint.



If the position you are using has an adjustable head rest/restraint and you are using a single tether, raise the head rest/restraint and route the tether under the head rest/restraint and in between the head rest/restraint posts.

3. Push and pull the child restraint in different directions to be sure it is secure.

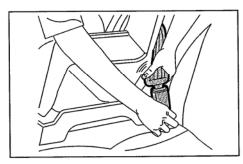
Securing a Child Restraint in a Rear Seat Position

If your child restraint has the LATCH system, see Lower Anchors and Tethers for Children (LATCH) on page 73.

If your vehicle has a third row, there is no top tether anchor in the passenger-side seating position. Do not secure a child restraint in this position if a national or local law requires that the top tether be anchored or if the instructions that come with the child restraint say that the top tether must be anchored.

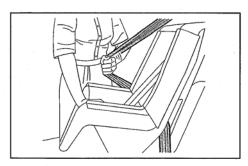
If your child restraint does not have the LATCH system, you will be using the lap-shoulder belt to secure the child restraint in this position. Be sure to follow the instructions that came with the child restraint. Secure the child in the child restraint when and as the instructions say.

- 1. Put the child restraint on the seat.
- Pick up the latch plate, and run the lap and shoulder portions of the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.

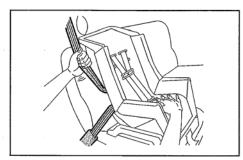


Buckle the belt. Make sure the release button is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.

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Pull the rest of the shoulder belt all the way out of the retractor to set the lock.



5. To tighten the belt, push down on the child restraint, pull the shoulder portion of the belt to tighten the lap portion of the belt and feed the shoulder belt back into the retractor. If you are using a forward-facing child restraint, you may find it helpful to use your knee to push down on the child restraint as you tighten the belt.

- If your child restraint manufacturer recommends using a top tether, and the position that you are using has a top tether anchor, attach and tighten the top tether to the top tether anchor. Refer to the instructions that came with the child restraint and to Lower Anchors and Tethers for Children (LATCH) on page 73.
- Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, if the top tether is attached to the top tether anchor, disconnect it. Unbuckle the vehicle's safety belt and let it go back all the way. The safety belt will move freely again and be ready to work for an adult or larger child passenger.

Securing a Child Restraint in the Center Front Seat Position

△ CAUTION:

A child in a child restraint in the center front seat can be badly injured or killed by the right front passenger's airbag if it inflates. Never secure a child restraint in the center front seat. It is always better to secure a child restraint in the rear seat.

Do not use child restraints in this position. The restraints will not work properly.

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Securing a Child Restraint in the Right Front Seat Position

Your vehicle has a right front passenger airbag. A rear seat is a safer place to secure a forward-facing child restraint. See *Where to Put the Restraint on page* 71

In addition, your vehicle has a passenger sensing system. The passenger sensing system is designed to turn off the right front passenger's frontal airbag when an infant in a rear-facing infant seat or a small child in a forward-facing child restraint or booster seat is detected. See Passenger Sensing System on page 101 and Passenger Airbag Status Indicator on page 240 for more information on this including important safety information.

A label on your sun visor says, "Never put a rear-facing child seat in the front." This is because the risk to the rear-facing child is so great, if the airbag deploys.

A CAUTION:

A child in a rear-facing child restraint can be seriously injured or killed if the right front passenger's airbag inflates. This is because the back of the rear-facing child restraint would be very close to the inflating airbag. Be sure the airbag is off before using a rear-facing child restraint in the passenger's position.

Even though the passenger sensing system is designed to turn off the passenger's frontal airbag if the system detects a rear-facing child restraint, no system is fail-safe, and no one can guarantee that an airbag will not deploy under some unusual circumstance, even though it is turned off. We recommend that rear-facing child restraints be secured in the rear seat, even if the airbag is off.

If you need to secure a forward-facing child restraint in the right front seat position, move the seat as far back as it will go before securing the forward-facing child restraint. See *Manual Seats on page 9* or *Power Seats on page 10*.

If your child restraint has the LATCH system, see Lower Anchors and Tethers for Children (LATCH) on page 73.

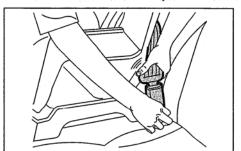
There is no top tether anchor at the right front seating position. Do not secure a child seat in this position if a national or local law requires that the top tether be anchored or if the instructions that come with the child restraint say that the top tether must be anchored. See Lower Anchors and Tethers for Children (LATCH) on page 73 if the child restraint has a top tether.

You will be using the lap-shoulder belt to secure the child restraint in this position. Be sure to follow the instructions that came with the child restraint. Secure the child in the child restraint when and as the instructions say.

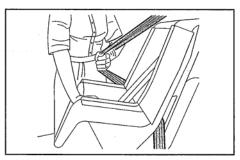
- Your vehicle has a right front passenger's frontal airbag. See Passenger Sensing System on page 101. We recommend that rear-facing child restraints be secured in a rear seat, even if the airbag is off. If your child restraint is forward-facing, move the seat as far back as it will go before securing the child restraint in this seat. See Manual Seats on page 9 or Power Seats on page 10.
 - When the passenger sensing system has turned off the right front passenger's frontal airbag, the off indicator in the passenger airbag status indicator should light and stay lit when you turn the ignition to RUN or START. See Passenger Airbag Status Indicator on page 240.
- 2. Put the child restraint on the seat.

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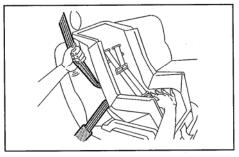
Pick up the latch plate, and run the lap and shoulder portions of the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.



Buckle the belt. Make sure the release button is positioned so you would be able to unbuckle the safety belt quickly if you ever had to.



Pull the rest of the shoulder belt all the way out of the retractor to set the lock.



To tighten the belt, push down on the child restraint, pull the shoulder portion of the belt to tighten the lap portion of the belt and feed the shoulder belt back into the retractor. If you are using a forward-facing child restraint, you may find it helpful to use your knee to push down on the child restraint as you tighten the belt. You should not be able to pull more of the belt from the retractor once the lock has been set.

- 7. Push and pull the child restraint in different directions to be sure it is secure.
- If the airbag is off, the off indicator will be lit and stay lit when the key is turned to RUN or START.

If a child restraint has been installed and the on indicator is lit, turn the vehicle off. Remove the child restraint from the vehicle and reinstall the child restraint.

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If, after reinstalling the child restraint and restarting the vehicle, the on indicator is still lit, check to make sure that the vehicle's seatback is not pressing the child restraint into the seat cushion. If this happens, slightly recline the vehicle's seatback and adjust the seat cushion if possible. Also make sure the child restraint is not trapped under the vehicle head restraint. If this happens, adjust the head restraint.

If the on indicator is still lit, secure the child in the child restraint in a rear seat position in the vehicle and check with your dealer.

To remove the child restraint, just unbuckle the vehicle's safety belt and let it go back all the way. The safety belt will move freely again and be ready to work for an adult or larger child passenger.

Airbag System

Your vehicle has a frontal airbag for the driver and a frontal airbag for the right front passenger. Your vehicle may also have roof-mounted rollover airbags designed for either side impact or rollover deployment. Roof-mounted rollover airbags are available for the driver and the passenger seated directly behind the driver and for the right front passenger and the passenger seated directly behind that passenger.

If your vehicle has roof-mounted rollover airbags, the word AIRBAG will appear on the airbag covering on the ceiling above the sidewall trim near the driver's and right front passenger's window and the second row outside seating positions

Also, if your vehicle has a third row passenger seat, you may have third row roof-mounted rollover airbags.

Frontal airbags are designed to help reduce the risk of injury from the force of an inflating frontal airbag. But these airbags must inflate very quickly to do their job and comply with federal regulations.

Q: What are the different types of add-on child restraints?

A: Add-on child restraints, which are purchased by the vehicle's owner, are available in four basic types. Selection of a particular restraint should take into consideration not only the child's weight, height, and age but also whether or not the restraint will be compatible with the motor vehicle in which it will be used.

For most basic types of child restraints, there are many different models available. When purchasing a child restraint, be sure it is designed to be used in a motor vehicle. If it is, the restraint will have a label saying that it meets federal motor vehicle safety standards.

The restraint manufacturer's instructions that come with the restraint state the weight and height limitations for a particular child restraint. In addition, there are many kinds of restraints available for children with special needs.

△ CAUTION:

Newborn infants need complete support, including support for the head and neck. This is necessary because a newborn infant's neck is weak and its head weighs so much compared with the rest of its body. In a crash, an infant in a rear-facing seat settles into the restraint, so the crash forces can be distributed across the strongest part of an infant's body, the back and shoulders. Infants always should be secured in appropriate infant restraints.

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APPENDIX B MANUFACTURER'S DATA (OVSC FORM 14)

Attachment F Chevrolet Tahoe, 4-Dr SUV FMVSS 225 Form 225

FORM – 225 Rev. 03/20/07

SEAT REFERENCE POINT (SRP) AND TORSO ANGLE DATA

FMVSS No. 225

(All dimensions in mm¹)

/ BODY STYLE: 4 - Door / MODEL: Tahoe / MAKE: Chevrolet MODEL YEAR: 2007 SEAT STYLE: FRONT ROW: AN3 Buckets (uplevel); A95 Buckets (base); AE7 Buckets with center seat SECOND ROW: AM8 - 60/40 Split Bench; AL4 - Bucket seats THIRD ROW: AS3 - 50/50 Split Bench for 3 passengers; AW2 - 50/50 Split Bench for 2 passengers

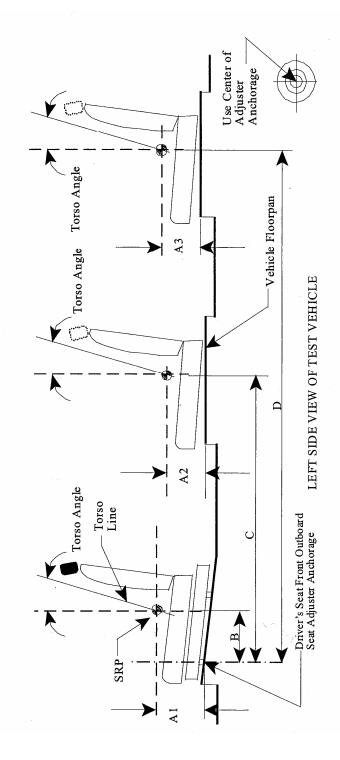


Table 1. Seating Positions¹ and Torso Angles

		Left (Driver Side)	Center (if any)	Right
			(14) 000	206 (AN3 A95 AF7)
A1		296 (AN3, A95, AE7)	296 (AE7)	(11) (20) (20) (20)
		296 (AM8. AL4)	296 (AM8)	296 (AM8, AL4)
AZ		(0)(0)	200 (AS3)	209 (AS3. AW2)
A3		209 (AS3, AWZ)	(203 (A33)	
		292 (AN3, A95, AE7)	292 (AE7)	292 (AN3, A95, AE7)
Δ		1400 (ANO ALA)	1196 (AM8)	1196 (AM8, AL4)
S		1190 (AIMO, AL+)	(cum) 0011	CONTA CONTECCO
		2037 (AS3, AW2)	2037 (AS3)	2037 (ASS, AWZ)
ם ן		CA (ANIO AGE AEZ)	21 (AE7)	21 (AN3. A95, AE7)
		21 (AN3, A95, AE7)	(174) 17	
Torso Angle (degree)	Front Row			
			(01.4) = 0	OF (AMS ALA)
	Second Row	25 (AM8, AL4)	25 (AM8)	23 (AIMIG, ALT)
		CONTRACTOR OF THE PROPERTY OF	04 (AS3)	24 (AS3, AW2)
	Third Row	24 (AS3, AW2)	(24 (200)	

Note: All dimensions are in mm. If not, provide the unit used.

ORM: 225

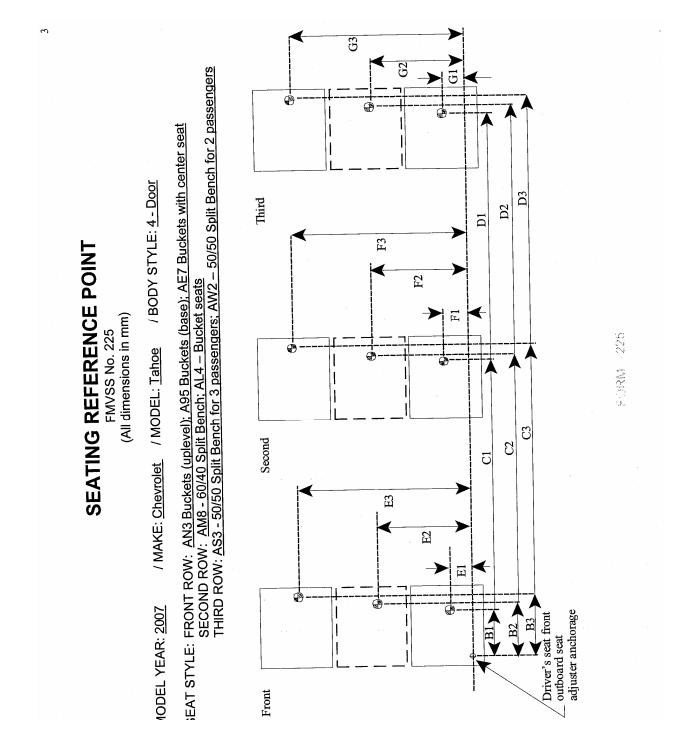


Table 2. Seating Reference Point and Tether Anchorage Locations

Seating Refere Point (SRP)	1	Distance from Driver's front outboard seat				
1 01111 (01111)		adjuster anchorage ¹				
Front Row	B1	292 (AN3, A95, AE7)				
	E1	225 (AN3, A95, AE7)				
	B2	292 (AE7)				
	E2	680 (AE7)				
	В3	292 (AN3, A95, AE7)				
	E3	1135 (AN3, A95, AE7)				
Second Row	C1	1196 (AL4, AM8)				
	F1	225 (AL4, AM8)				
	C2	1196 (AM8)				
	F2	680 (AM8)				
	C3	1196 (AL4, AM8)				
	F3	1135 (AL4, AM8)				
Third Row	D1	2037 (AS3, AW2)				
	G1	319 (AS3, AW2)				
	D2	2037(AS3)				
	G2	680 (AS3)				
	D3	2037 (AS3, AW2)				
	G3	1041 (AS3, AW2)				

Note: Use the center of anchorage.

FORM-225

TETHER ANCHORAGE LOCATIONS

FMVSS No. 225

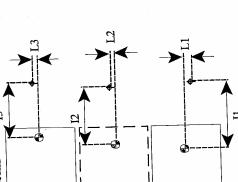
(All dimensions in mm)

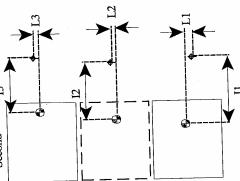
/ BODY STYLE: 4 - Door / MODEL: Tahoe

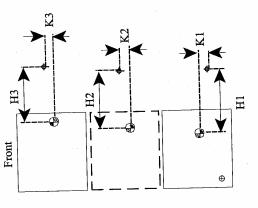
/ MAKE: Chevrolet

EAT STYLE: FRONT ROW: AN3 Buckets (uplevel); A95 Buckets (base); AE7 Buckets with center seat SECOND ROW: AM8 - 60/40 Split Bench; AL4 - Bucket seats THIRD ROW: AS3 - 50/50 Split Bench for 3 passengers; AW2 - 50/50 Split Bench for 2 passengers ODEL YEAR: 2007

Second







₱: Tether anchorage

Note: The location shall be measured at the center of anchorage.

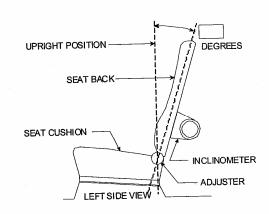
Table 3. Seating Reference Point and Tether Anchorage Locations

Seating Reference Point		Distance from SRP				
(SRP) Front Row	H1	N/A				
1 John Kow	K1	N/A				
	H2	N/A				
	K2	N/A				
	H3	N/A				
Second Row	K3	N/A				
	11	293.3 (AM8, AL4)				
	L1	76.0 (AM8, AL4)				
	12	293.3 (AM8)				
	L2	8.0 (AM8)				
	13	293.3 (AM8, AL4)				
	L3	0.0 (AM8, AL4)				
Third Row	J1	273.3 (AS3, AW2)				
	M1	146.4 (AW2); 156.9 (AS3)				
	J2	273.3 (AS3)				
	M2	204.1 (AS3)				
	J3	N/A				
	M3	N/A				

Note: Use the center of anchorage.

NOMINAL DESIGN RIDING POSITION

For adjustable driver, passenger, 2nd row and 3rd row seat backs, describe how to position the inclinometer to measure the seat back angle. Include a description of the location of the seat back adjustment latch detent if applicable. Indicate if applicable, how the detents are numbered (Is the first detent "0" or "1"?). Indicate if the seat back angle is measured with the dummy in the seat.



Seat back angle for driver's seat = 19.3 degrees

Measurement Instructions:

With the dummy in the seat, position the inclinometer at the top end of the vertical portion of the metal frame (need to cut seat back material to access frame)

Seat back angle for passenger's seat = 19.3 degrees (For AN3, A95 and AE7 seat types)

Measurement Instructions:

With the dummy in the seat, position the inclinometer at the top end of the vertical portion of the metal frame (need to cut seat back material to access frame)

Seat back angle for 2^{nd} row seat = 19.5 degrees. (For AM8 and AL4 seat types)

Measurement Instructions:

With the dummy in the seat, position the inclinometer at the top end of the vertical portion of the metal frame (need to cut seat back material to access frame)

Seat back angle for 3^{rd} row seat = $\underline{19 \text{ degrees}}$. (For AS3 and AW2 seat types)

Measurement Instructions:

With the dummy in the seat, position the inclinometer at the top end of the vertical portion of the metal frame (need to cut seat back material to access frame)

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TETHER ANCHORAGE LOCATIONS - VERTICAL

(All dimensions in mm)

/ BODY STYLE: 4 - Door / MAKE: Chevrolet / MODEL: Tahoe

DDEL YEAR: 2007

EAT STYLE: FRONT ROW: AN3 Buckets (uplevel); A95 Buckets (base); AE7 Buckets with center seat SECOND ROW: AM8 - 60/40 Split Bench; AL4 - Bucket seats THIRD ROW: AS3 - 50/50 Split Bench for 3 passengers; AW2 - 50/50 Split Bench for 2 passengers

Vehicle Floorpan

LEFT SIDE VIEW OF TEST VEHICLE

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Table 4. Vertical Dimension For The Tether Anchorage

Seating Reference Point			N/A	N/A	-101.8 (AL4, AM8)	-101.8 (AM8)	-101.8 (AL4, AM8)	-109.7 (AS3, AW2)	-109.7 (AS3)	N/A	
CiO Took and the	Vertical Dist	N1 (Driver)	N2 (Center)	N3 (Right)	O1 (Left)	O2 (Center)	O3 (Right)	P1 (Left)	P2 (Center)	P3 (Right)	
	Seating Row	Front Row			Second Row			Third Row	3		

Note: All dimensions are in mm. If not, provide the unit anchorage.

For each vehicle, provide the following information:

- 1. How many designated seating positions exist in the vehicle? 9 passenger maximum
- 2. How many designated seating positions are equipped with lower anchorages and tether anchorages? Specify which position(s). 2nd Row Seat (AM8 60/40 seat) lower anchorages and top tethers are available in the Driver side and center seating positions; 2nd Row Seat (AL4 Bucket seats) lower anchorages and tether anchorages are available in both bucket seats.

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- Row Seat (AS3 50/50 3 passenger seat) One tether anchorage available between the driver and center seats for use by one seating position; 3rd Row Seat (AW2 50/50 2 passenger seat) tether anchorage available in the driver side seat. seating positions; 2nd Row Seat (AL4 – Bucket seats) – tether anchorages are available in both bucket seats. 3RD 3. How many designated seating positions are equipped with tether anchorages? Specify which positions(s). 2^{nd} Row Seat (AMB - 60/40 seat) - top tethers are available in the Driver side, center and Passenger side
- Lower Anchorages Marking and Conspicuity: Whether the anchorages are certified to \$9.5(a) or \$9.5(b) of The Lower anchorages are visible, they meet section S9.5(b). FMVSS No. 225. 4.

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