FINAL REPORT NUMBER 225-MGA-03-009

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

VOLKSWAGEN AG GERMANY
2003 VOLKSWAGEN PASSAT GLS SEDAN
NHTSA No. C35800

MGA RESEARCH CORPORATION
446 Executive Drive
Troy, Michigan 48083

Test Date: August 19 and 22, 2003
Report Date: October 10, 2003

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
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Approval Date: 3/15/04

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: _____

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7. Author(s) Helen A. Kaleto, Laboratory Manager Brad Reaume, Test Personnel		8. Performing Organization Report No. 225-MGA-03-009	
9. Performing Organization Name and Address MGA Research Corporation 446 Executive Drive Troy, Michigan 48083		10. Work Unit No.	
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12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Enforcement Office of Vehicle Safety Compliance (NVS-221) 400 Seventh Street, SW Room 5111 Washington, DC 20590		13. Type of Report and Period Covered Final Test Report	
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15. Supplementary Notes			
16. Abstract A compliance testing was conducted on the subject 2003 Volkswagen Passat GLS Sedan, NHTSA No. C35800, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-225T & 225L for the determination of FMVSS 225 compliance. The tests were conducted at MGA Research Corporation in Troy, Michigan on August 19 & 22, 2003. Test failures identified were as follows: NONE The data recorded indicates that the 2003 Volkswagen Passat GLS Sedan tested appears to comply with the requirements for FMVSS 225, set forth by the National Highway Traffic Safety Administration.			
17. Key Words Compliance Testing Safety Engineering FMVSS 225 2003 Volkswagen Passat GLS Sedan		18. Distribution Statement Copies of this report are available From: NHTSA Technical Reference Division, Mail Code: NAD-52 400 Seventh Street, SW, Room 5108 Washington, D.C. 20590 Telephone No. (202) 366-4946	
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1.0 PURPOSE AND PROCEDURE

PURPOSE

The child restraint anchorage test 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. DTNH22-02-D-11043. The purpose of the testing was to determine if the subject vehicle, a 2003 Volkswagen Passat GLS Sedan, NHTSA No. C35800 meets the performance requirements of FMVSS No. 225, "Child Restraint Anchorage Systems."

PROCEDURE

These tests were conducted in accordance with NHTSA's Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedures, TP-225T (5/3/01) and TP-225L (6/11/01), and MGA's Laboratory Test Procedure, MGATP225GOV (3/20/03).

The front occupant compartment consisted of two (2) adjustable outboard bucket seats and the rear occupant compartment consisted of a three-passenger full bench seat. Each rear outboard seating position was equipped with a child restraint anchorage system (one tether and two lower anchors). The rear center occupant position was equipped with a tether anchorage only. The center-to-center spacing between the rear outboard lower anchorage systems was approximately 700 mm. The lower anchorages for rear left outboard seating position was tested with SFAD 2 fixture and the tether anchorages all rear seating positions were tested with tether straps.

2.0 COMPLIANCE TEST AND DATA SUMMARY

TEST SUMMARY

The tests were conducted at MGA, Troy, Michigan on August 19 and 22, 2003.

Based on the test results, the 2003 Volkswagen Passat GLS Sedan, appeared to meet the performance requirements of FMVSS No. 225 for these tests.

The SFAD 2 at the rear left outboard seating position sustained a maximum force of 8,129 N and held the required load for 3 seconds with a total displacement of 53 mm, measured at Point "x". The tether anchorage on the rear left seating position sustained a maximum force of 5,452 N and held the required load for 3 seconds with a total displacement of 5 mm. The tether anchorage on the rear center seating position sustained a maximum force of 5,380 N and held the required load for 3 seconds with a total displacement of 6 mm. The tether anchorage on the rear right seating position sustained a maximum force of 5,389 N and held the required load for 3 seconds with a total displacement of 6 mm.

DATA SUMMARY

Strength and displacement summary data are provided below, and 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	Seating Position	Max. Load (N)	Displacement (mm)
SB3465	SFAD II	Rear Left	8,129	53
SB346a	Tether Only	Rear Left	5,452	5
		Rear Center	5,380	6
		Rear Right	5,389	6

3.0 TEST VEHICLE INFORMATION

Table 2. General Test and Vehicle Parameter Data

VEH. MOD YR/MAKE/MODEL/BODY	2003 Volkswagen Passat GLS Sedan
VEH. NHTSA NO.	C35800
VIN	WVWPD63B13P241080
COLOR	Silverstone Gray Met
VEH. BUILD DATE	09/02
TEST DATE	August 19 and 22, 2003
TEST LABORATORY	MGA Research Corporation
OBSERVERS	Brad Reaume

GENERAL INFORMATION:

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Volkswagen AG Germany

Date of Manufacture: 09/02; VIN: WVWPD63B1[redacted]

GVWR: 2071kg; GAWR FRONT: 1071kg

GAWR REAR: 1040kg

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 210 kpa REAR: 200 kpa

Recommended Tire Size: 205/65R15 Load Range: 385kg

Recommended Cold Tire Pressure:

FRONT: 210 kpa REAR: 200 kpa

Size of Tire on Test Vehicle: P205/65R15

Type of Spare Tire: Standard: T135/90D15

VEHICLE CAPACITY DATA:

Type of Front Seats:	Bench ___;	Bucket X;	Split Bench _____
Number of Occupants:	Front 2;	Rear 3;	TOTAL 5

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
Two (2) Load Cells 3,000 lb Capability	S/N 259 (11/23/03), SN 117 (11/23/03), S/N 222 11/02/03, & SN 151 (11/29/03)
Two (2) String Potentiometers (S/N 20420, 21811, & 20419)	Calibrated at each use
Hydraulic Pump	N/A
MGA CRF Fixture	N/A
MGA SFAD2	N/A
MGA H-point Machine	N/A
MGA 2-Dimensional Template	N/A
Linear Scale	10/4/03 (S/N 109154)
MGA Data Acquisition System	N/A
Three (3) Hydraulic Cylinders	N/A
Calipers	2/14/04 (S/N DCL002)
Force Gauge	10/11/03 (S/N FRG001)
Inclinometer (Digital)	7/03/04 (S/N DGP005)

5.0 DATA

Table 3. Child Restraint Tether Anchorage Configuration (Data Sheet 1)

Seating Position		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 Row		N/A	N/A	N/A	N/A
Second Row	LH	Yes	Yes	Yes	Yes
	Ctr.	Yes	Yes	Yes	Yes
	RH	Yes	Yes	Yes	Yes
Third Row		N/A	N/A	N/A	N/A

Note: AS DETERMINED USING THE PROCEDURES SPECIFIED IN TP-225L & 225T.

REMARKS: NONE

Table 4. Child Restraint Lower Anchorage Configuration (Data Sheet 2)

OBSERVED LOWER ANCHORAGE CONFIGURATION		SEAT POSITION			
		FRONT ROW	SECOND ROW		THIRD ROW
			I/B	O/B	
Above anchorage, permanently marked with a circle not less than 13 mm in Dia.; and whose color contrasts with its background; and its center is not less than 50 mm and not more than 75 mm above the bar, and in the vertical longitudinal plane that passes through the center of the bar.	LH	N/A	Yes		N/A
	Ctr		N/A		
	RH		Yes		
Each of the bars is visible, without the compression of the seat cushion or seat back, when the bar is viewed, in a vertical longitudinal plane passing through the center of the bar, along a line marking an upward 30 degree angle with a horizontal plane.	LH	N/A	N/A		N/A
	Ctr				
	RH				
Diameter of the bar (mm)	LH	N/A	5.9	6.0	N/A
	Ctr		N/A		
	RH		5.8	6.0	
Inspect if the bars are straight, horizontal and transverse	LH	N/A	Yes		N/A
	Ctr		N/A		
	RH		Yes		
Optional Marking: At least one anchorage bar (when deployed for use, if storable anchorages), one guidance fixture, or one seat marking is visible.	LH	N/A	N/A		N/A
	Ctr				
	RH				
Optional Marking: If guidance fixtures are used, the fixture(s) must be installed.	LH	N/A	N/A		N/A
	Ctr				
	RH				
Measure the distance between Point "Z" of the CRF and the center of the anchorage bar (mm)	LH	N/A	69	68	N/A
	Ctr		N/A		
	RH		66	65	
Measure the distance between the SRP to the center of the anchorage bar (mm)	LH	N/A	155		N/A
	Ctr		N/A		
	RH		155		

Table 4. Child Restraint Lower Anchorage Configuration (Data Sheet 2) (continued)

OBSERVED LOWER ANCHORAGE CONFIGURATION		SEAT POSITION			
		FRONT ROW	SECOND ROW		THIRD ROW
			I/B	O/B	
Inspect if the centroidal longitudinal axes are collinear within 5 degrees	LH	N/A	Yes		N/A
	Ctr		N/A		
	RH		Yes		
Inspect if the inside surface of the bar that is straight and horizontal section of the bars, and determine they are not less than 25 mm, but not more than 40 mm in length (mm).	LH	N/A	40	40	N/A
	Ctr		N/A		
	RH		40	40	
Inspect if the bars can be connected to, over their entire inside length by the connectors of child restraint system.	LH	N/A	Yes		N/A
	Ctr		N/A		
	RH		Yes		
Measure the distance between the center of the length of one bar to the center of the length of the other bar. The requirement is 280 mm ± 1 mm (mm).	LH	N/A	280		N/A
	Ctr		N/A		
	RH		280		
Inspect if the bars are an integral and permanent part of the vehicle.	LH	N/A	Yes		N/A
	Ctr		N/A		
	RH		Yes		
Inspect if the bars are rigidly attached to the vehicle. If feasible, hold the bar firmly with two fingers and gently pull.	LH	N/A	Yes		N/A
	Ctr		N/A		
	RH		Yes		

PITCH, YAW, & ROLL INFORMATION

SEAT POSITION	PITCH (deg)	YAW (deg)	ROLL (deg)
LH	18	No Data	0
Ctr.	N/A		N/A
RH	48		0

Note: AS DETERMINED USING THE PROCEDURES SPECIFIED IN TP-225L & 225T.

REMARKS: NONE

Table 5. Tether Location and Dimensional Measurements (Data Sheet 3)

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

Note: AS DETERMINED USING THE PROCEDURES SPECIFIED IN TP-225L & 225T.

REMARKS: NONE

Table 6. Tether Anchorage Static Loading and Displacement (Data Sheet 5) With Tether Strap

SEAT POSITION		Seat, Seat Back, & Head Restraint Positions			Angle (deg)	Initial Location (mm)	Onset Rate (N/sec.)	Force Applied (N)	Max. Load (N)	Final Location (mm)	Horizontal Displ. (mm)
		Seat	Seat Back	Is There a Head Restraint ?							
Front Row	LH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Ctr.										
	RH										
Second Row	LH	Fixed	Fixed	Yes	-5	2	177	5,300	5,452*	7	5
	Ctr.	Fixed	Fixed	Yes	-5	2	177	5,300	5,380*	8	6
	RH	Fixed	Fixed	Yes	-5	1	177	5,300	5,389*	7	6
Third Row	LH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Ctr.										
	RH										

Note: (1) AS DETERMINED USING THE PROCEDURES SPECIFIED IN TP-225L & 225T.

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

Table 7. Lower Anchorage Static Loading and Displacement (Data Sheet 6) With SFAD 2

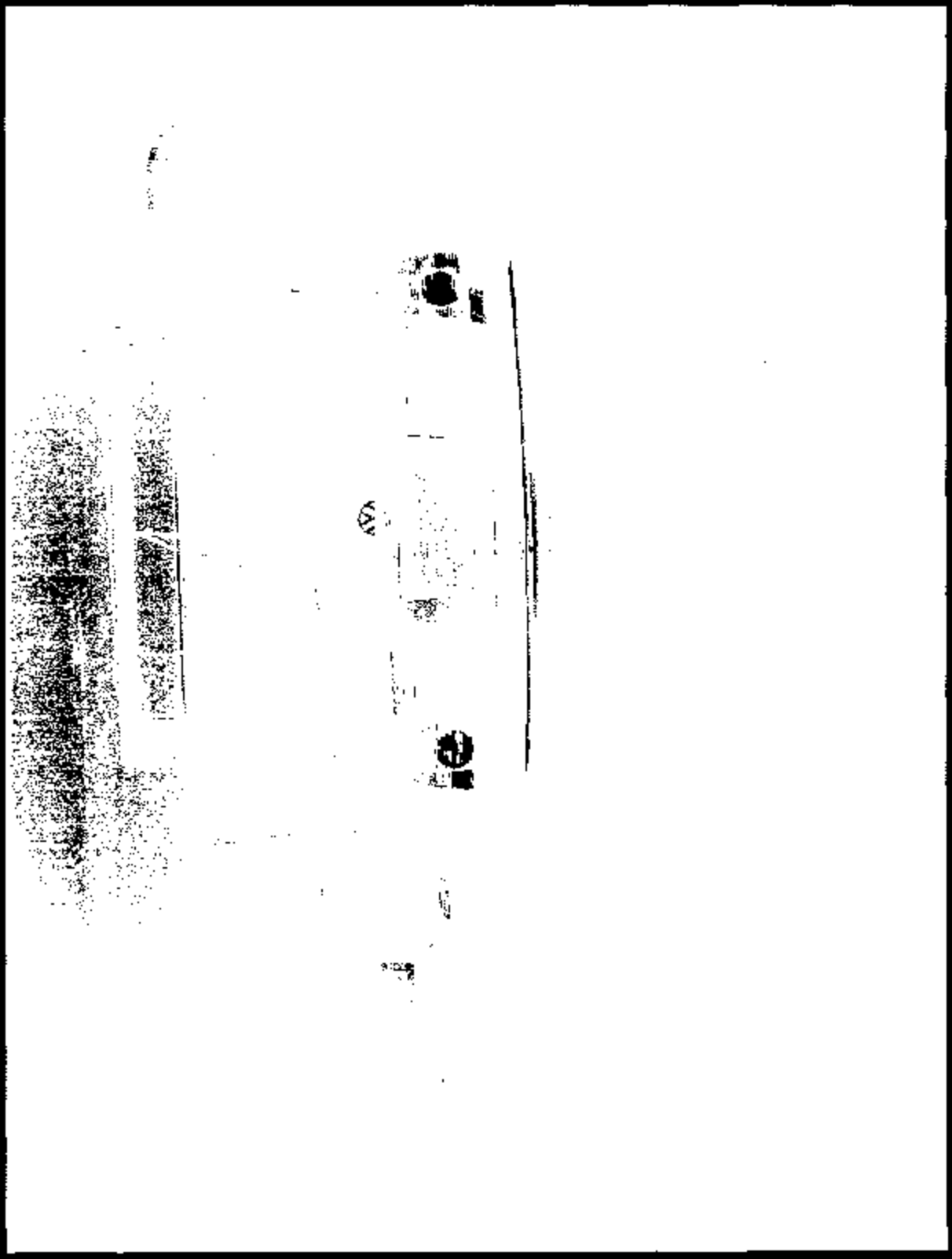
SEAT POSITION		Seat, Seat Back, & Head Restraint Positions			Measured Angles		Initial Location (mm)	Onset Rate (N/sec.)	Force Applied (N)	Max. Load (N)	Final Location (mm)	Displ. (mm)
		Seat	Seat Back	Is There a Head Restraint ?	Vertical (deg.)	Horizontal (deg.)						
Front Row	LH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Ctr.											
	RH											
Second Row	LH	Fixed	Fixed	Yes	N/A	10	29	3750	8,000	8,129*	82	53
	Ctr.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	RH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Third Row	LH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Ctr.											
	RH											

Note: (1) AS DETERMINED USING THE PROCEDURES SPECIFIED IN TP-225L.
(2) FORWARD FORCE APPLICATION

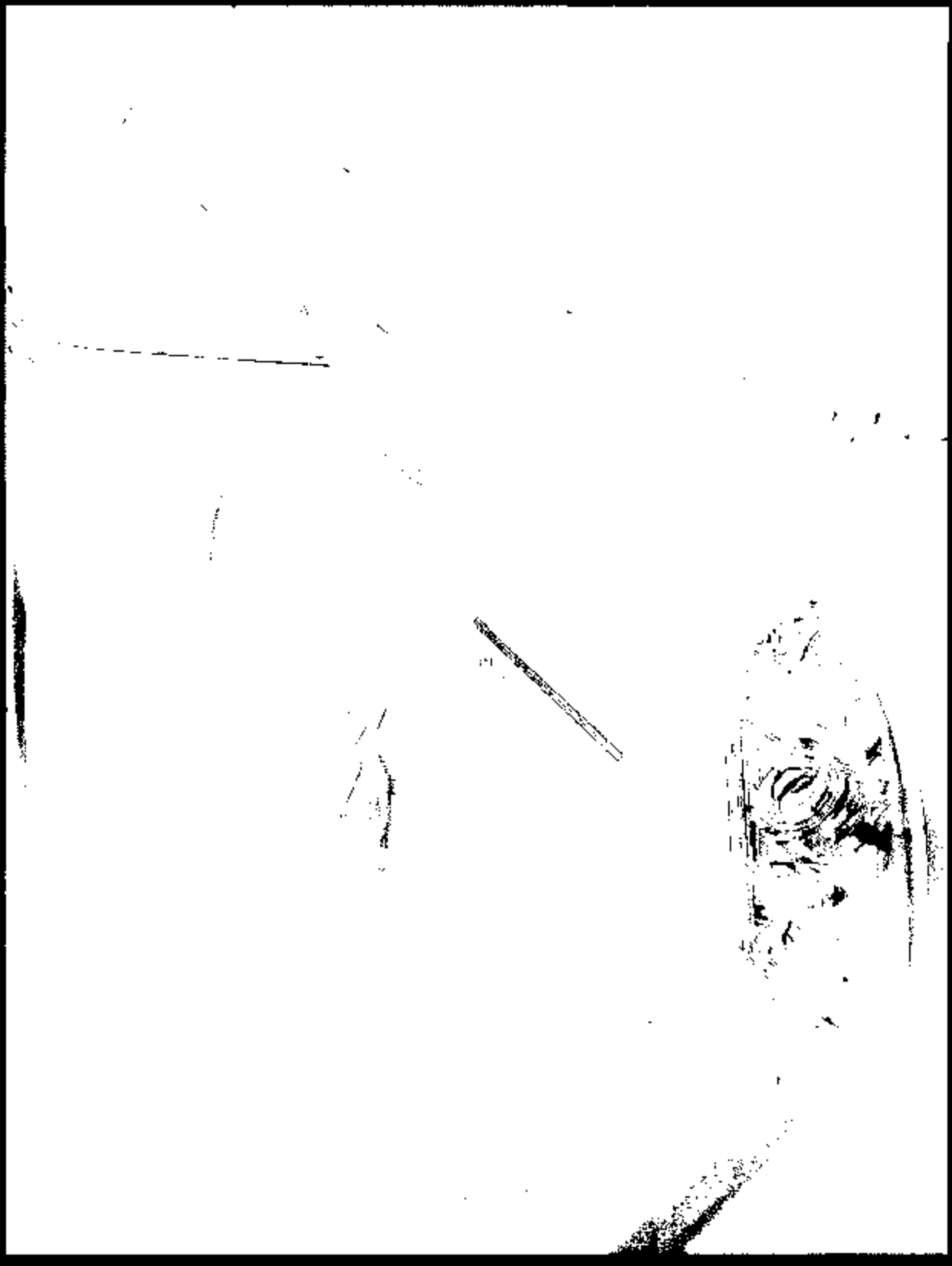
REMARKS: *Applied force exceeded force specified in the test procedure.

6.0 PHOTOGRAPHS

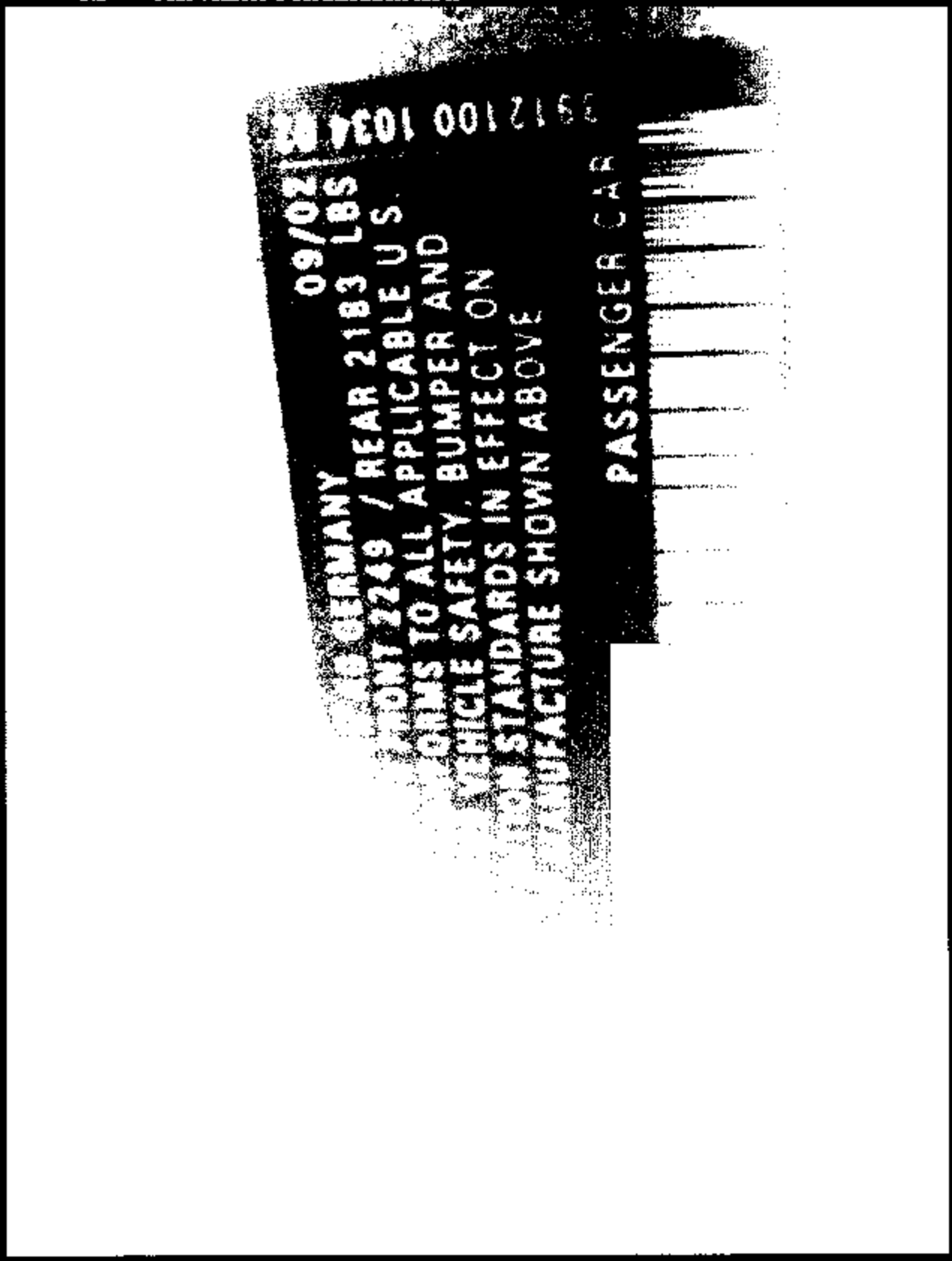
6.1 Full rear view



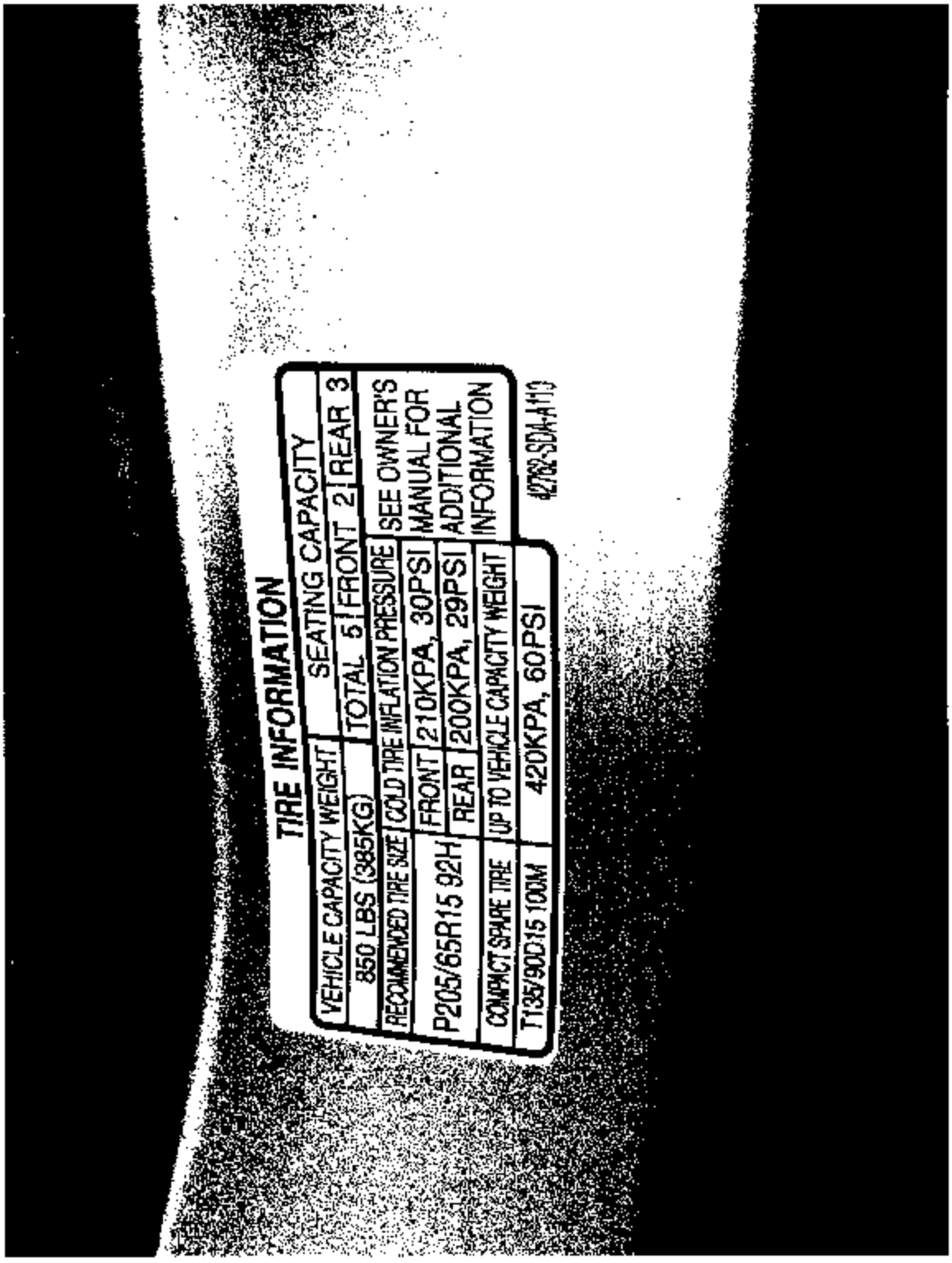
6.2 ¾ Front left view



6.3 Test vehicle's certification label

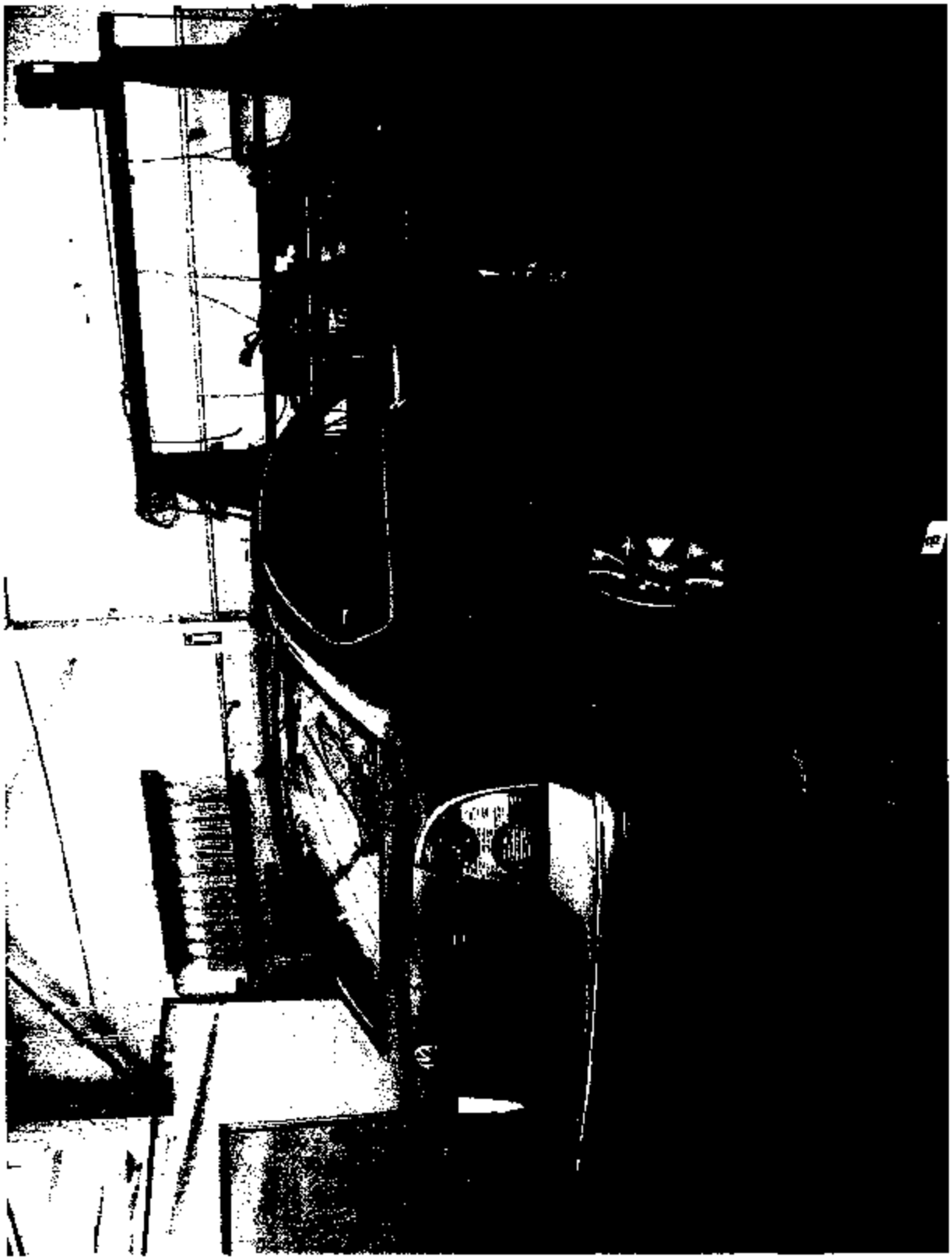


6.4 Test vehicle's tire information placard



6.5 ¾ Rear left side view of test vehicle

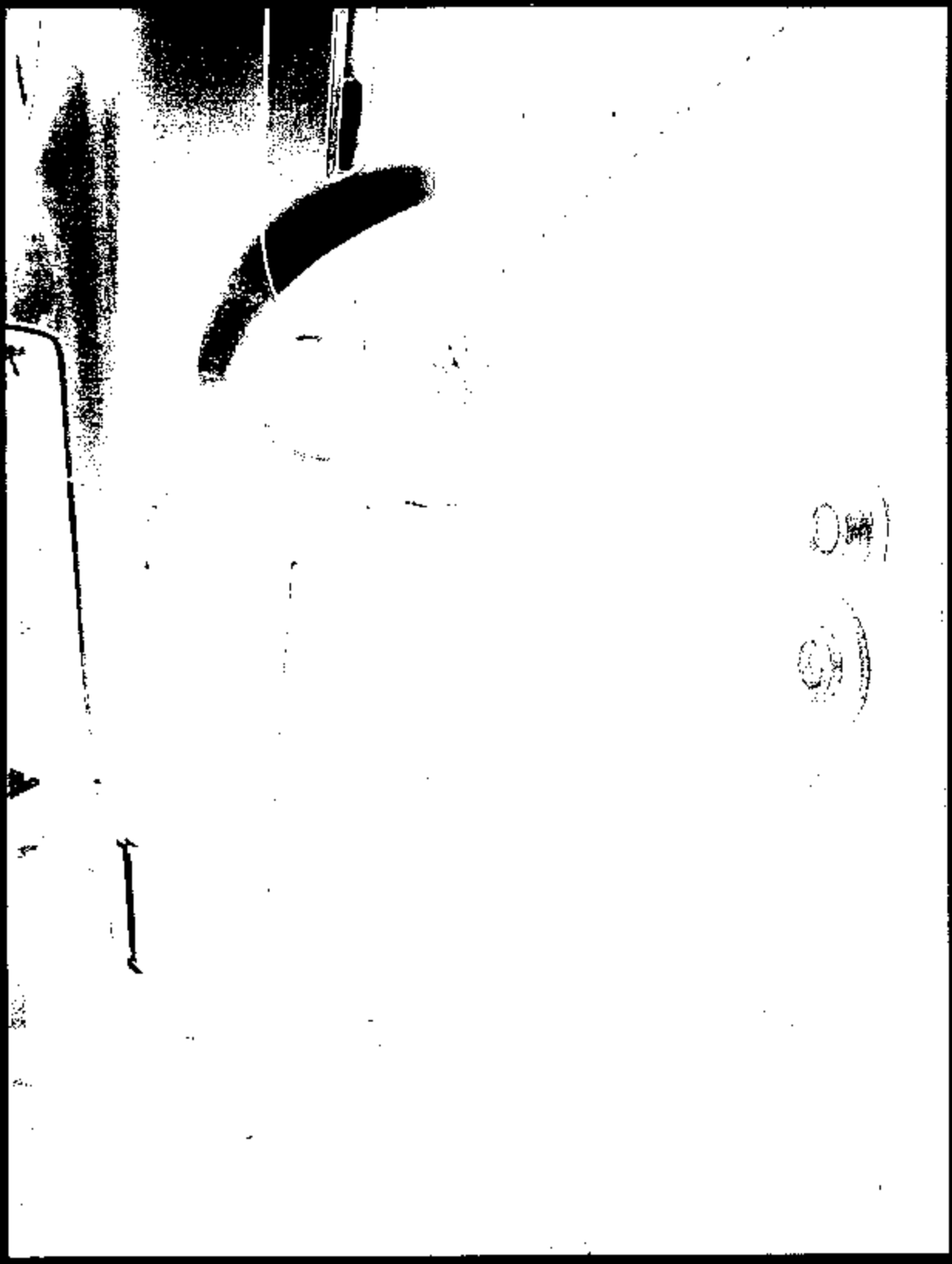
6.6 ¾ Rear right side view of test vehicle



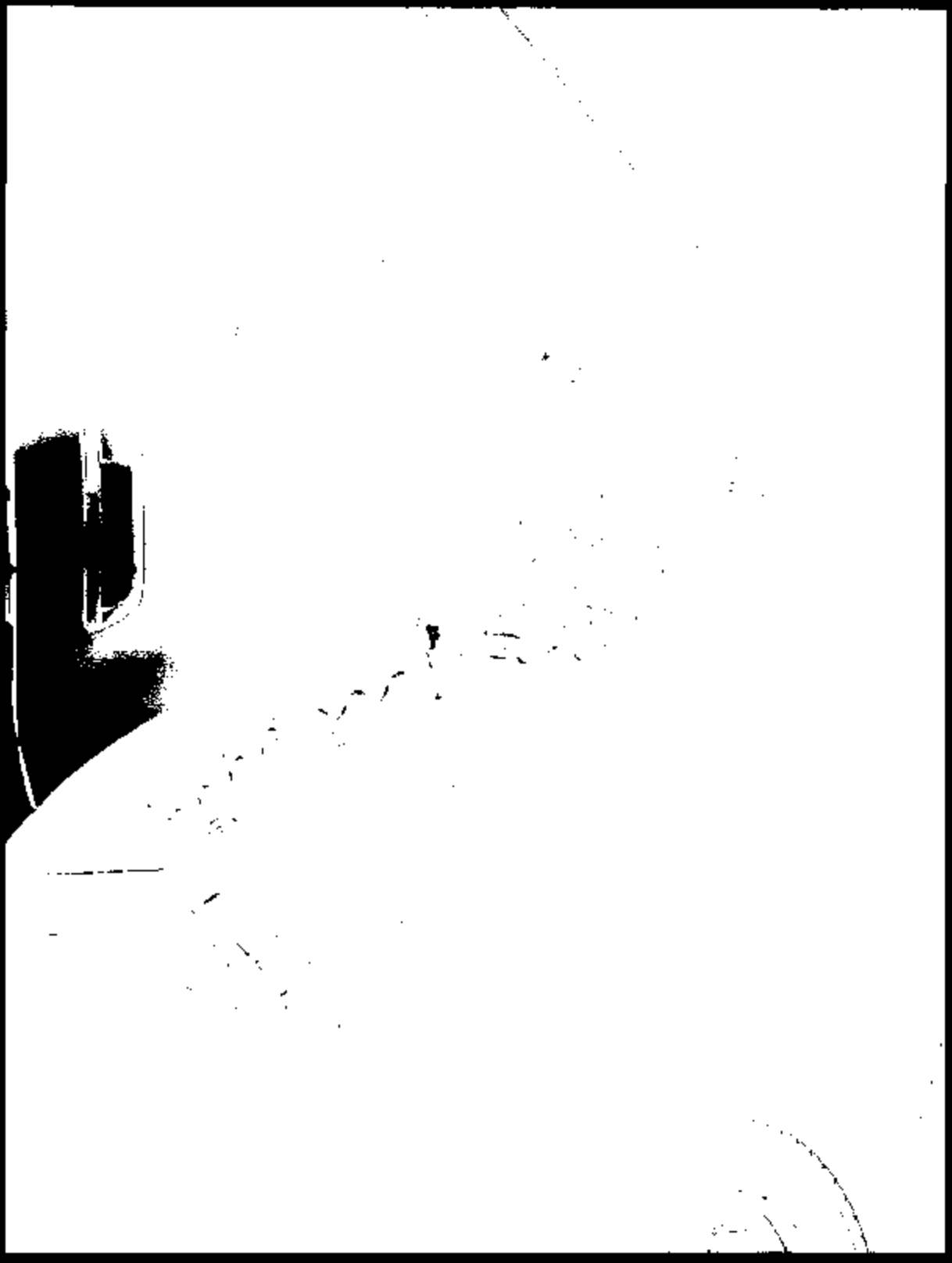
6.7 Vehicle tie down at each tie down location

6.7.1 left front

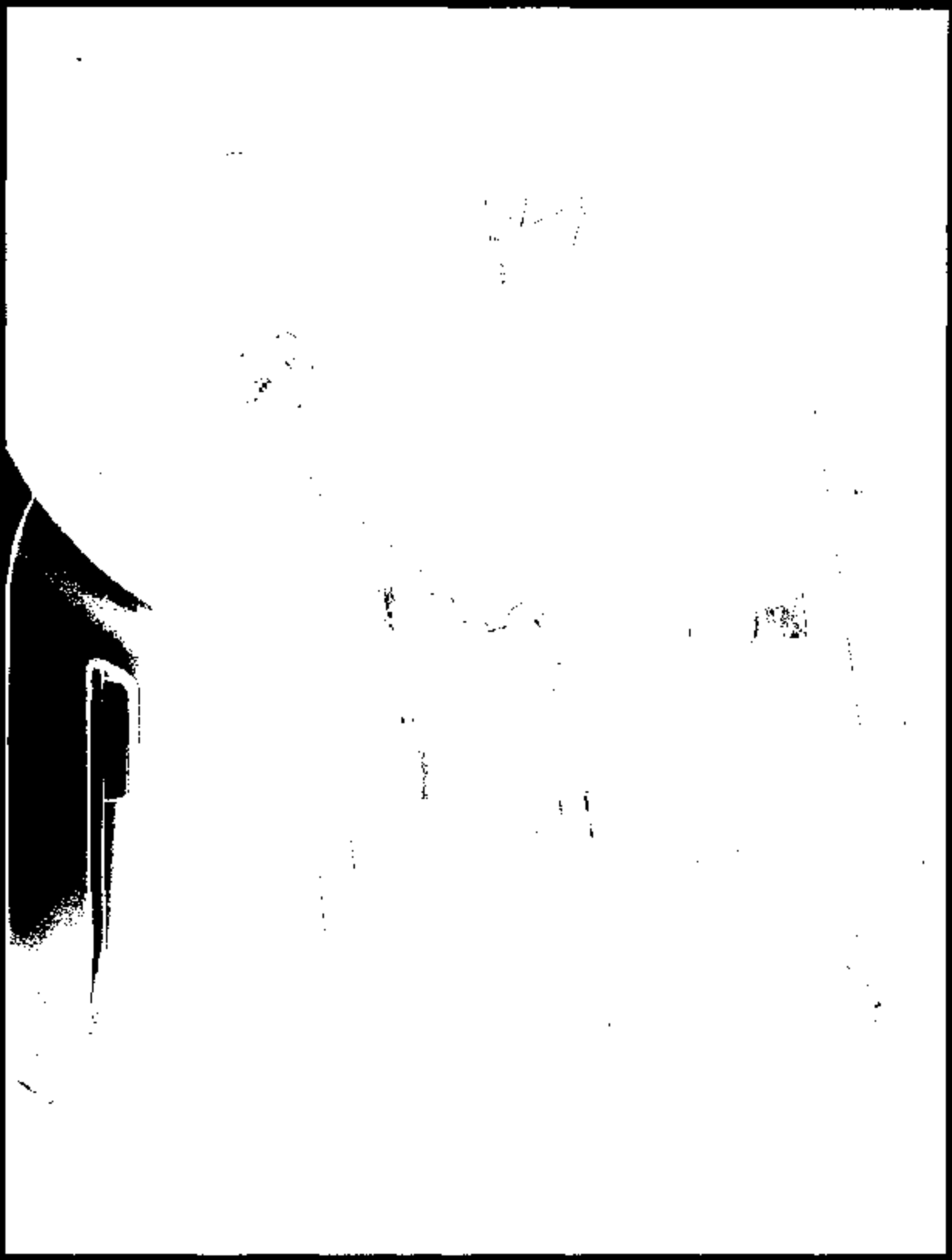
6.7.2 left rear



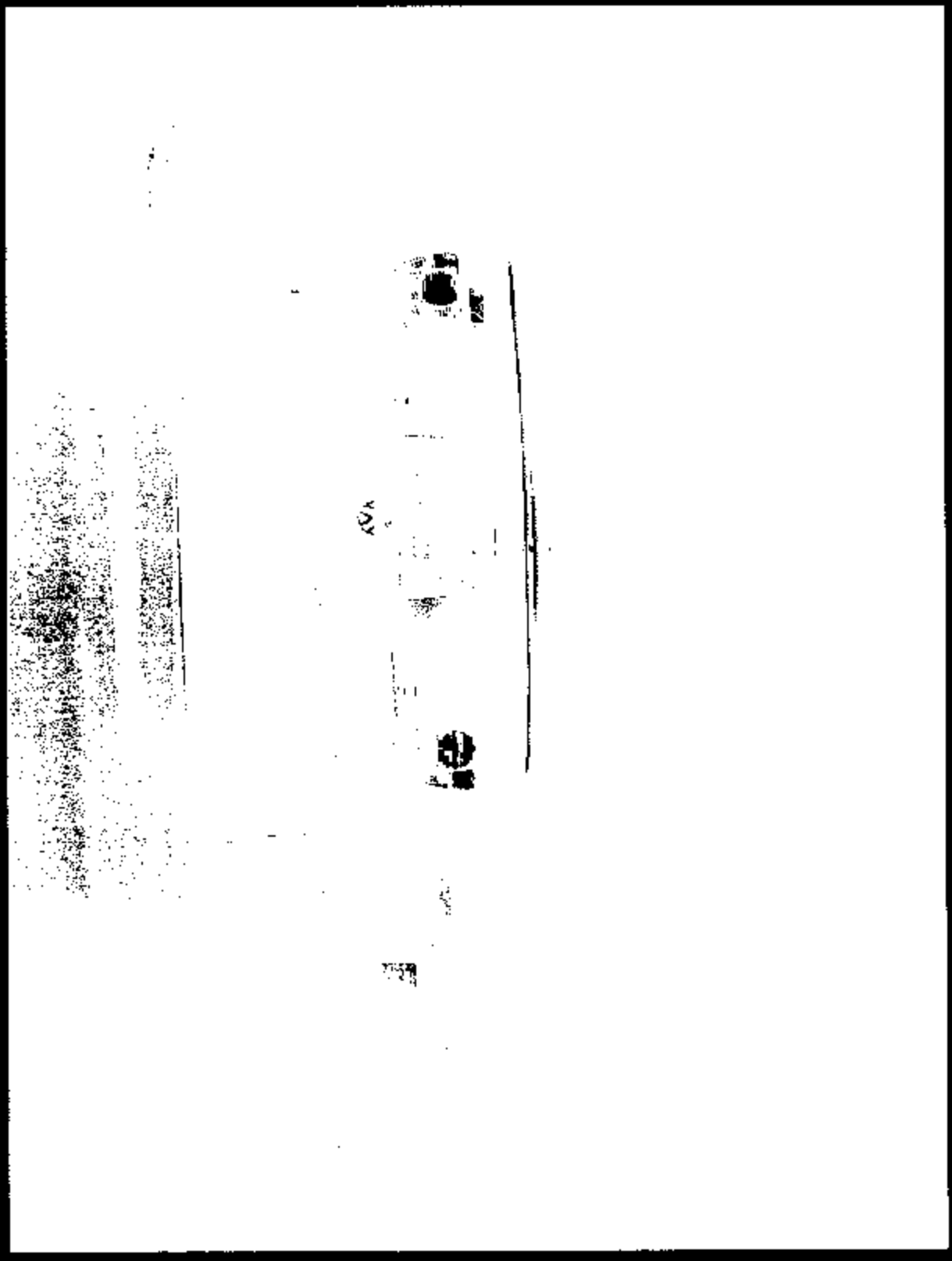
6.7.3 right front



6.7.4 right rear

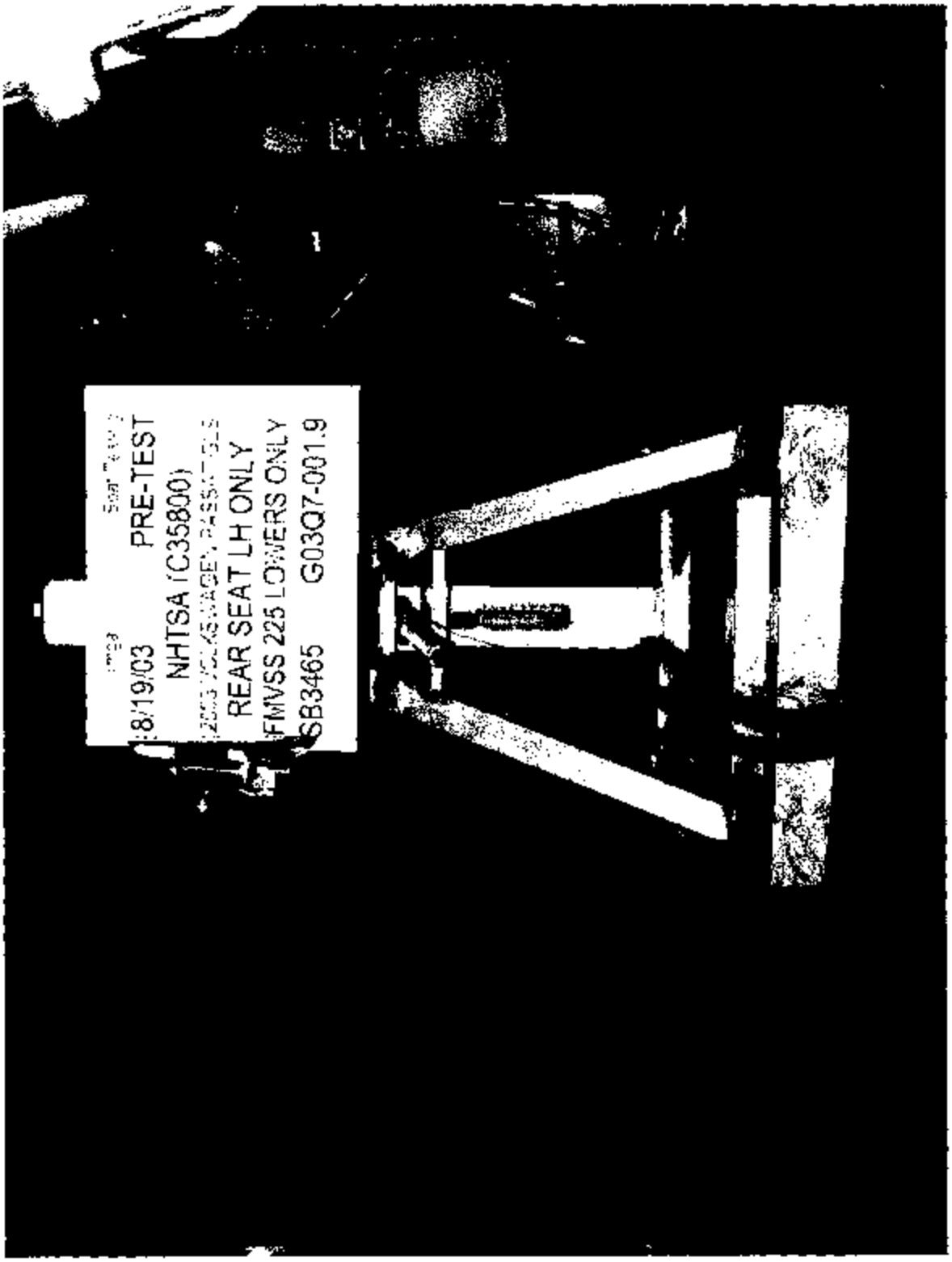


6.7.5 rear vehicle



6.8 Pre-test views of each child restraint anchorage system installed in the vehicle

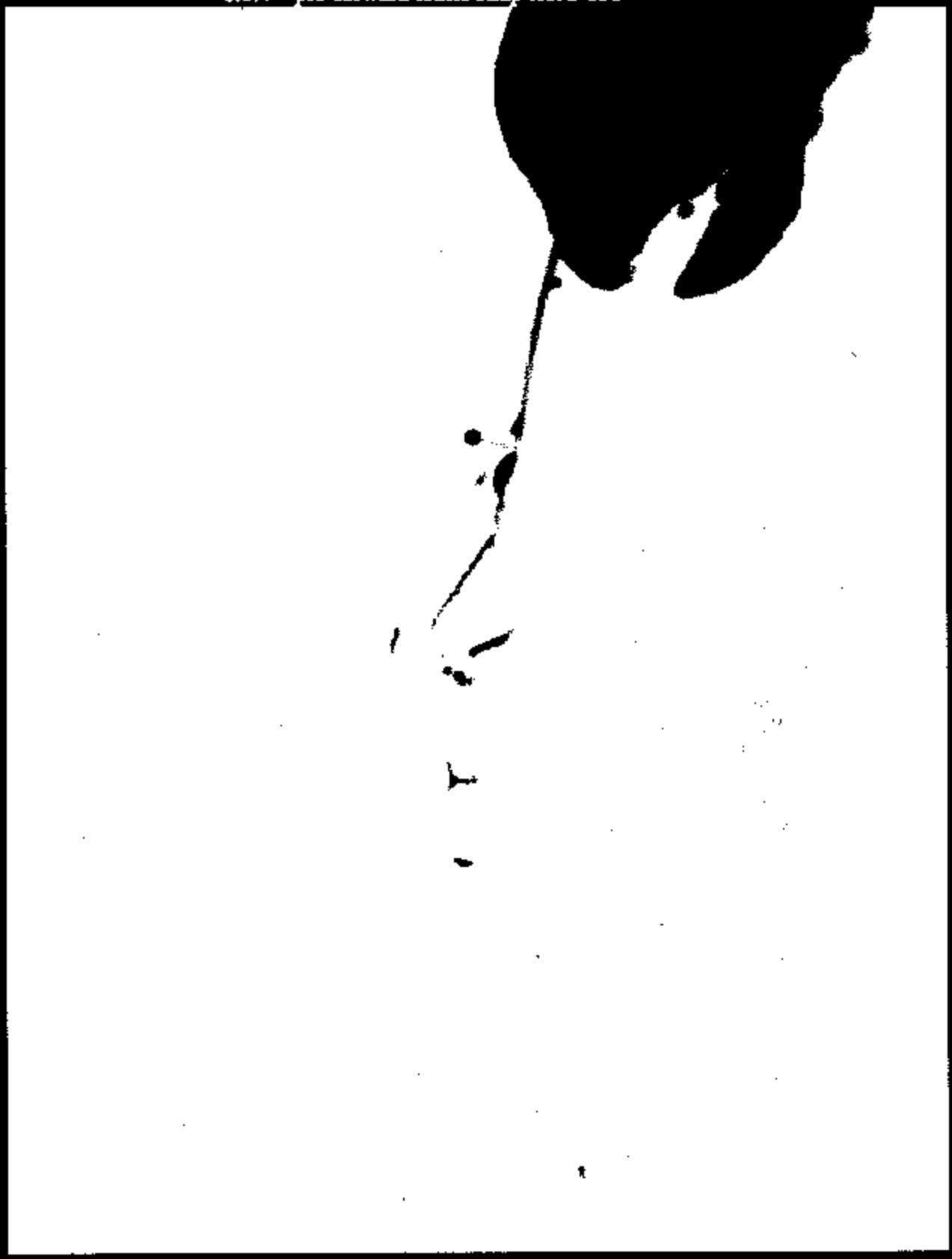
6.8.1 pre-forward SFAD II test 1 of 1



6.8.2 pre-forward tether strap test 1 of 3

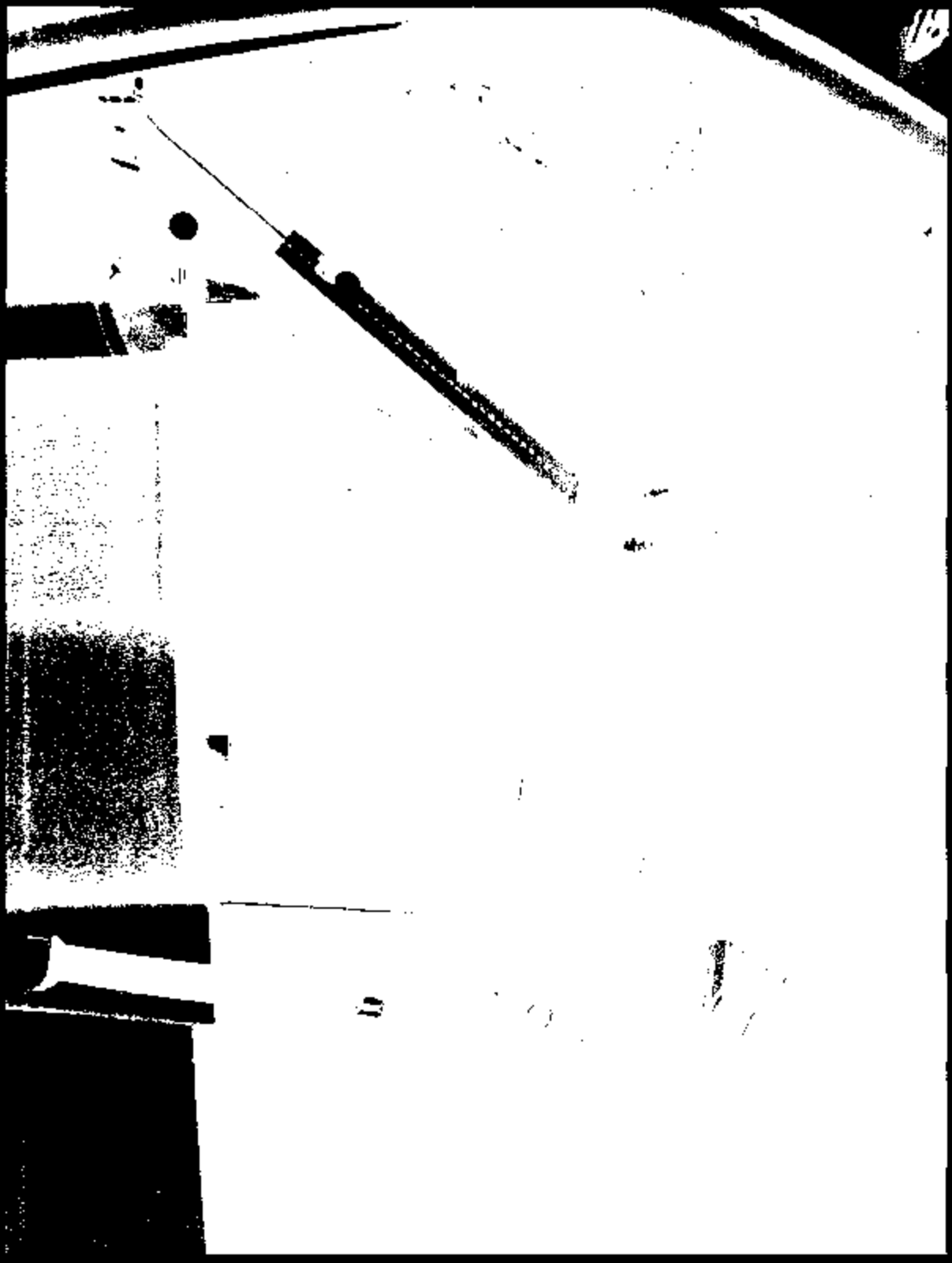
6.8.3 pre-forward tether strap test 2 of 3

6.8.4 pre-forward tether strap test 3 of 3

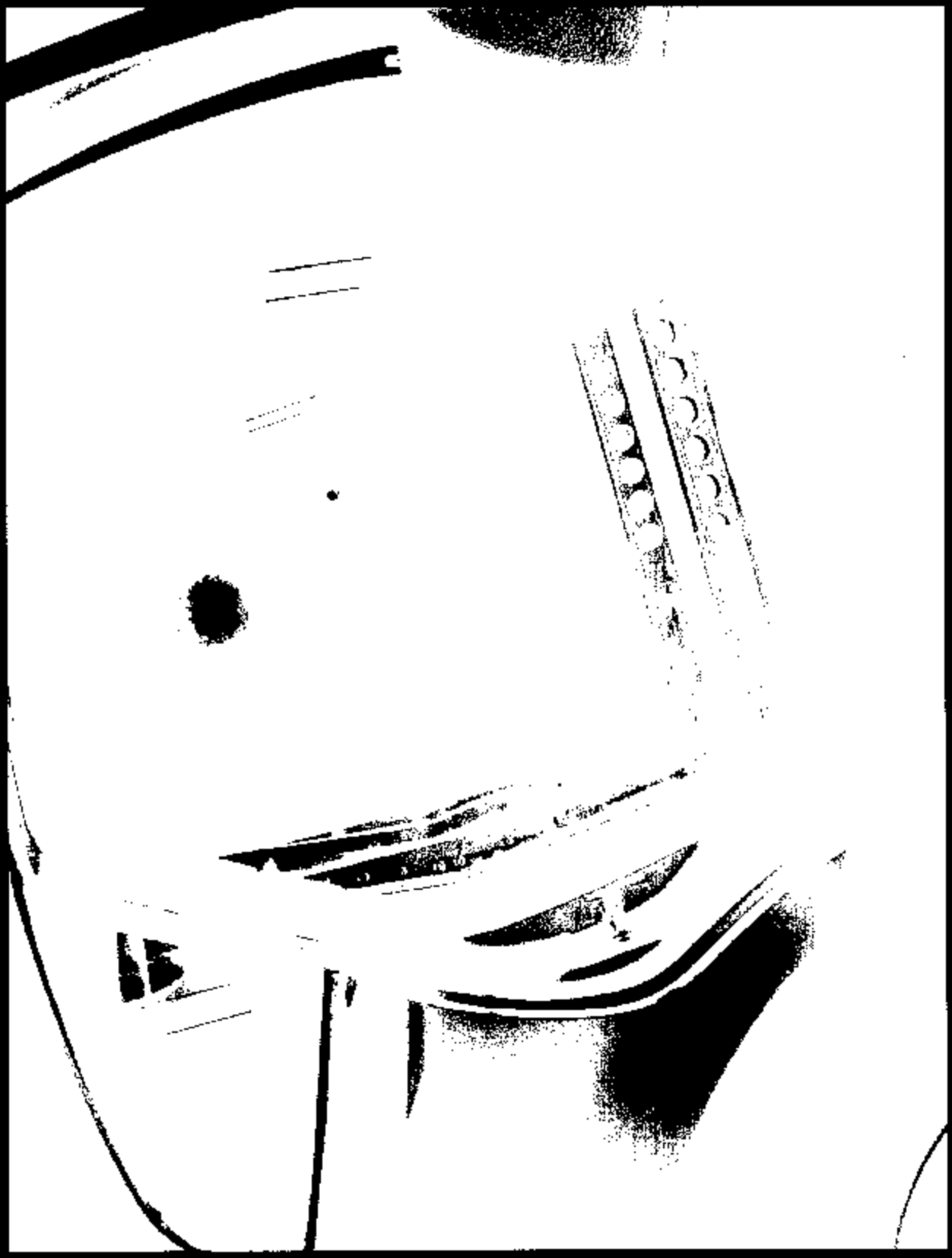


6.9 Pre-test equipment set up at each designated seating position

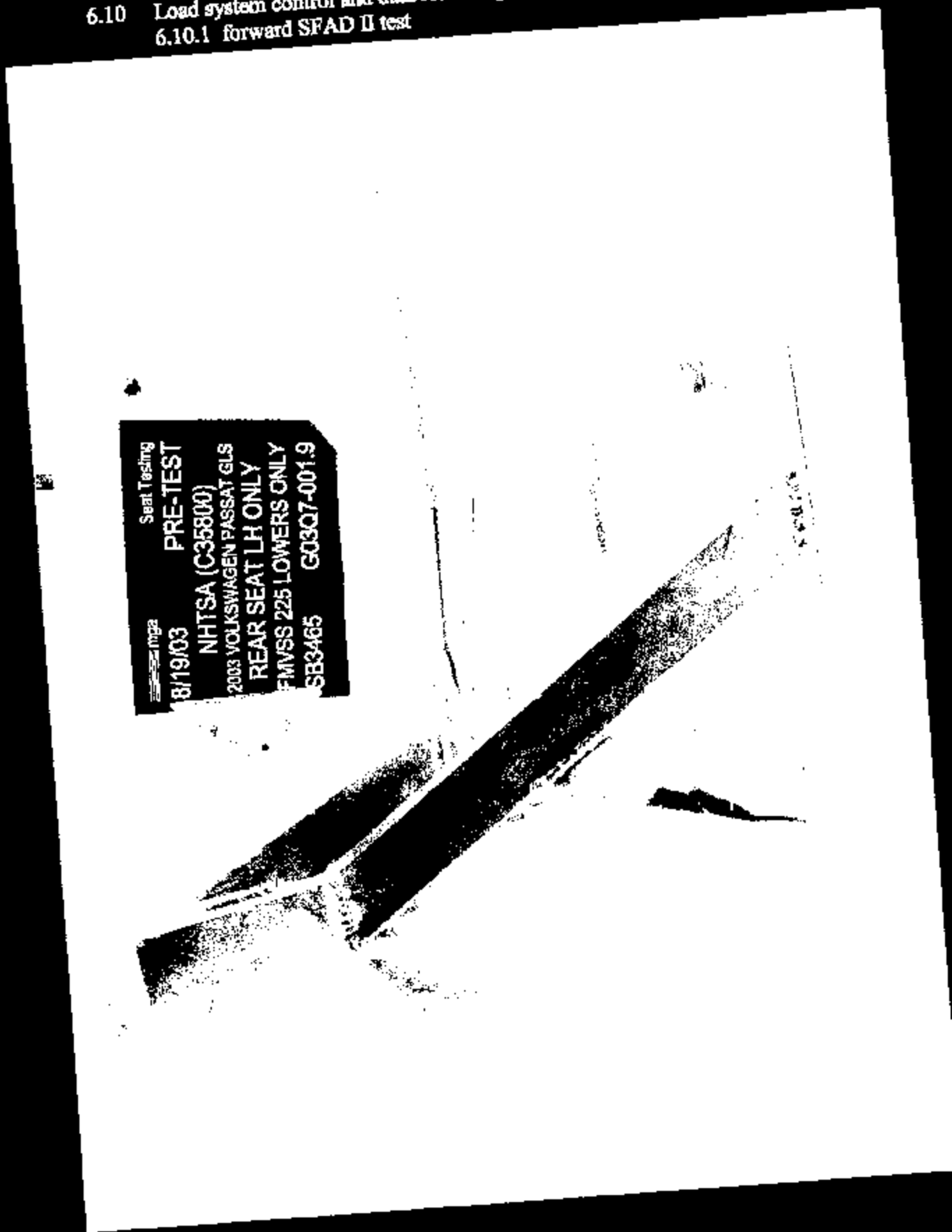
6.9.1 pre-test equipment 1 of 2



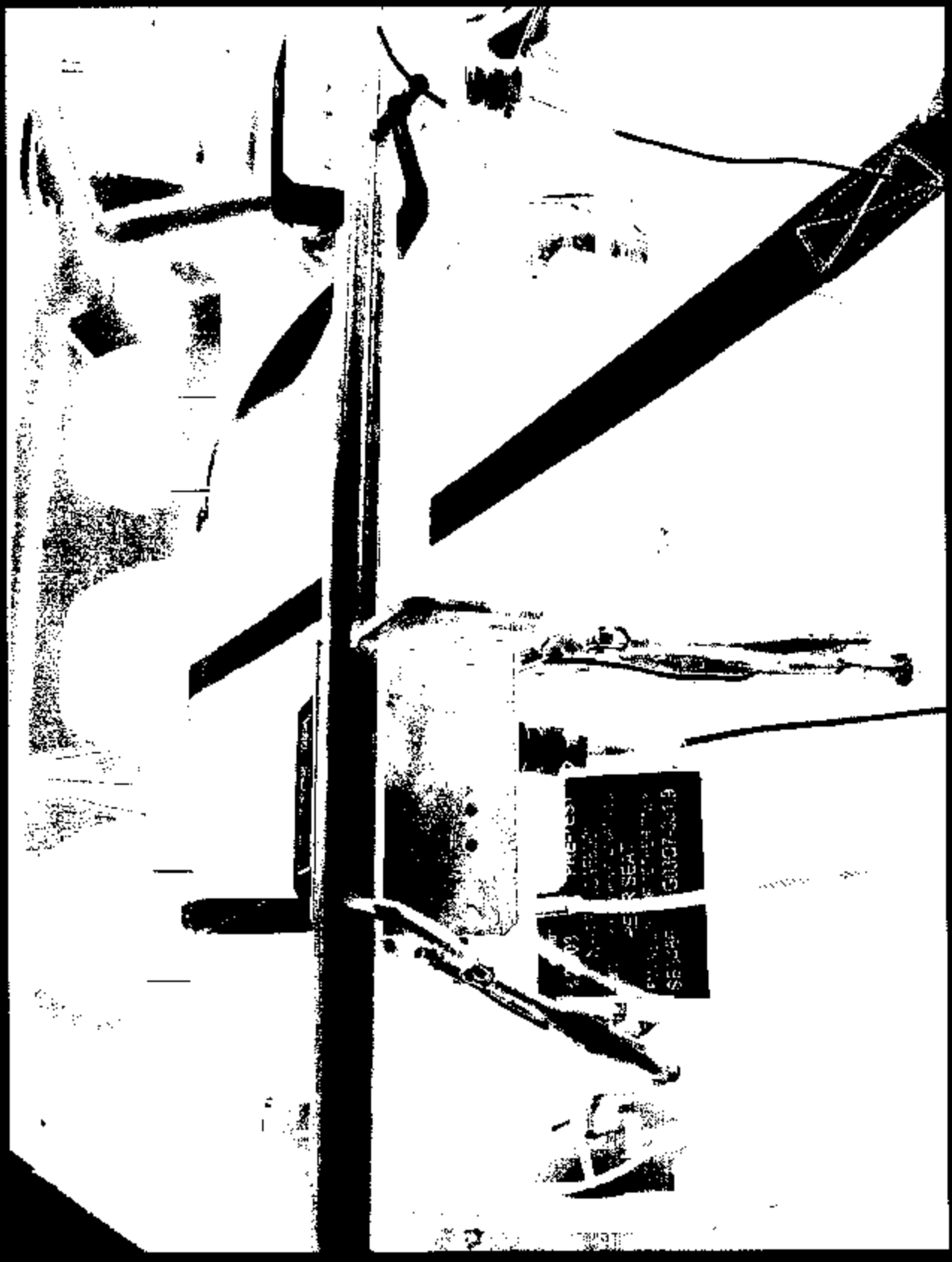
6.9.2 pre-test equipment 2 of 2



6.10 Load system control and data recording device in test position
6.10.1 forward SFAD II test



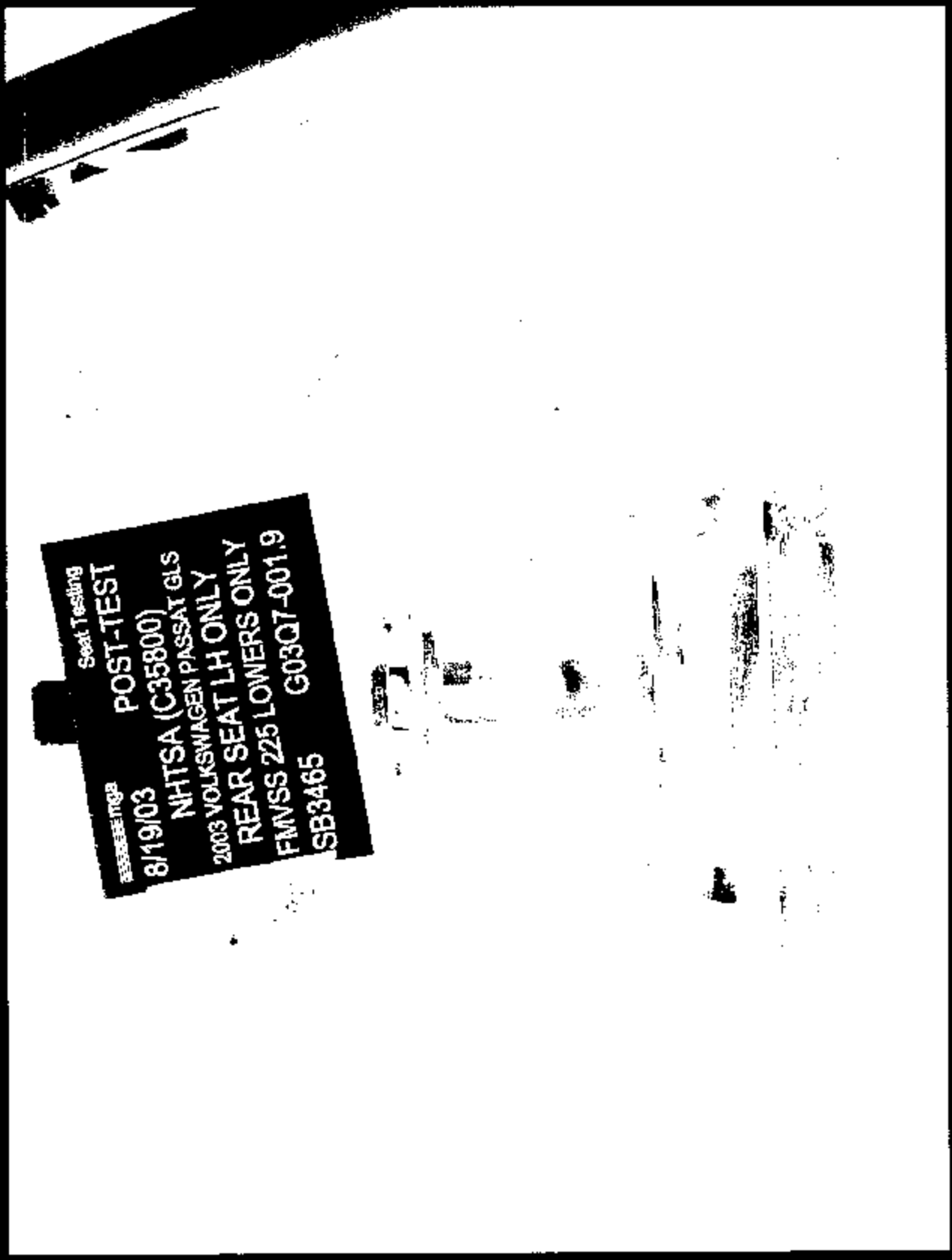
6.10.2 forward tether strap pre-test



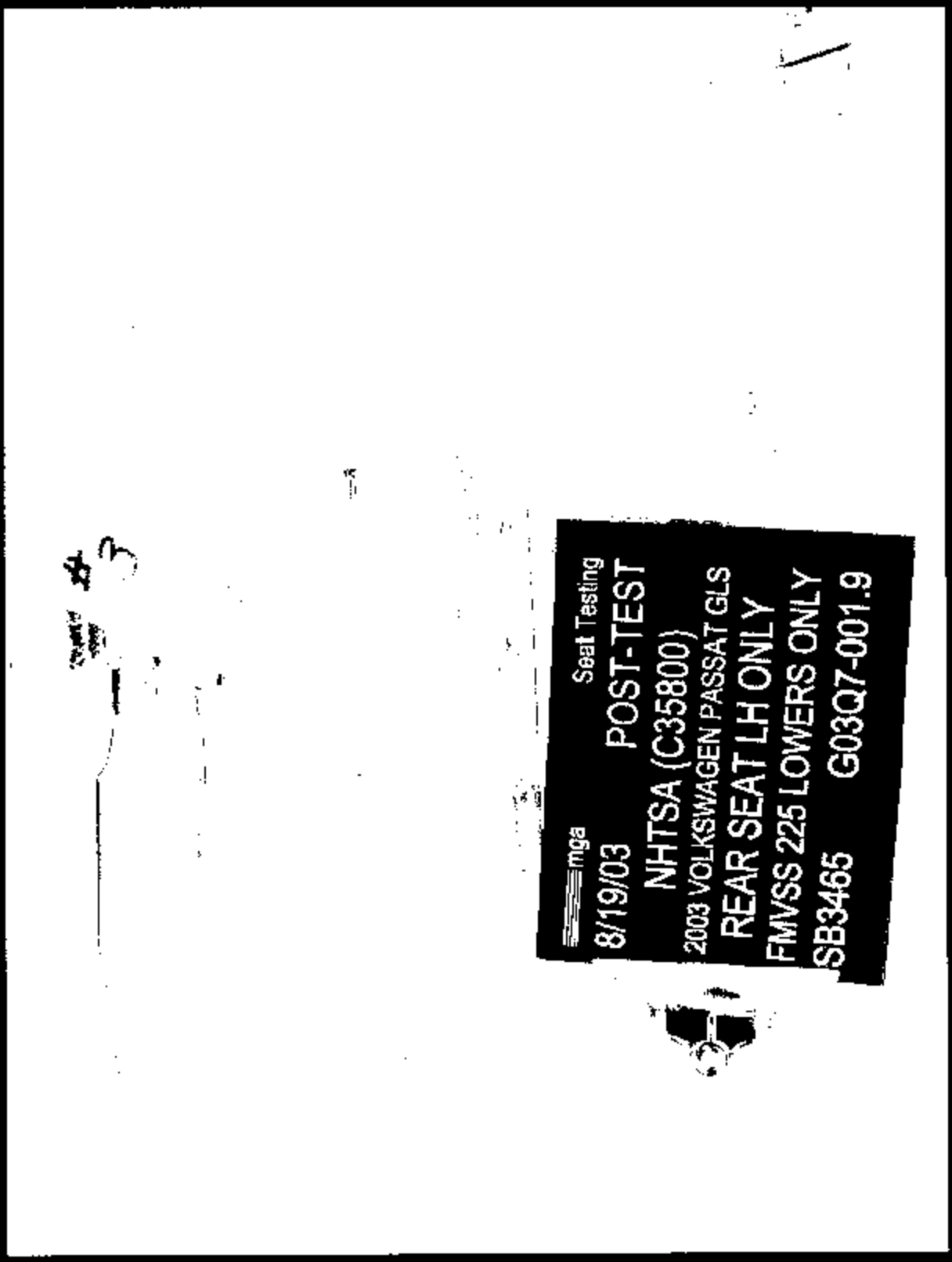
6.11 Post-test condition of each child restraint anchorage system

6.11.1 post-forward SFAD II test 1 of 3

6.11.2 post-forward SFAD II test 2 of 3



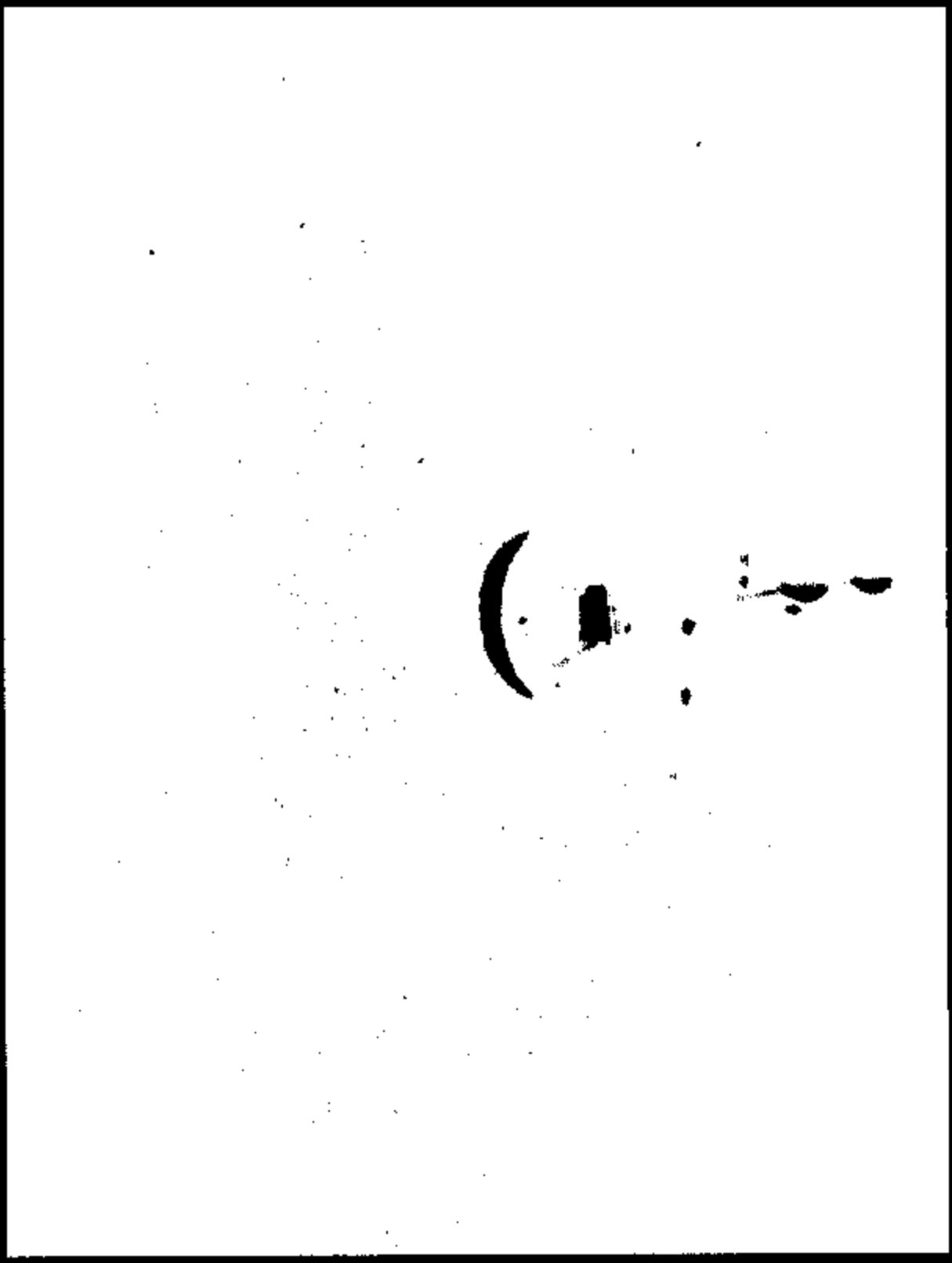
6.11.3 post-forward SFAD II test 3 of 3



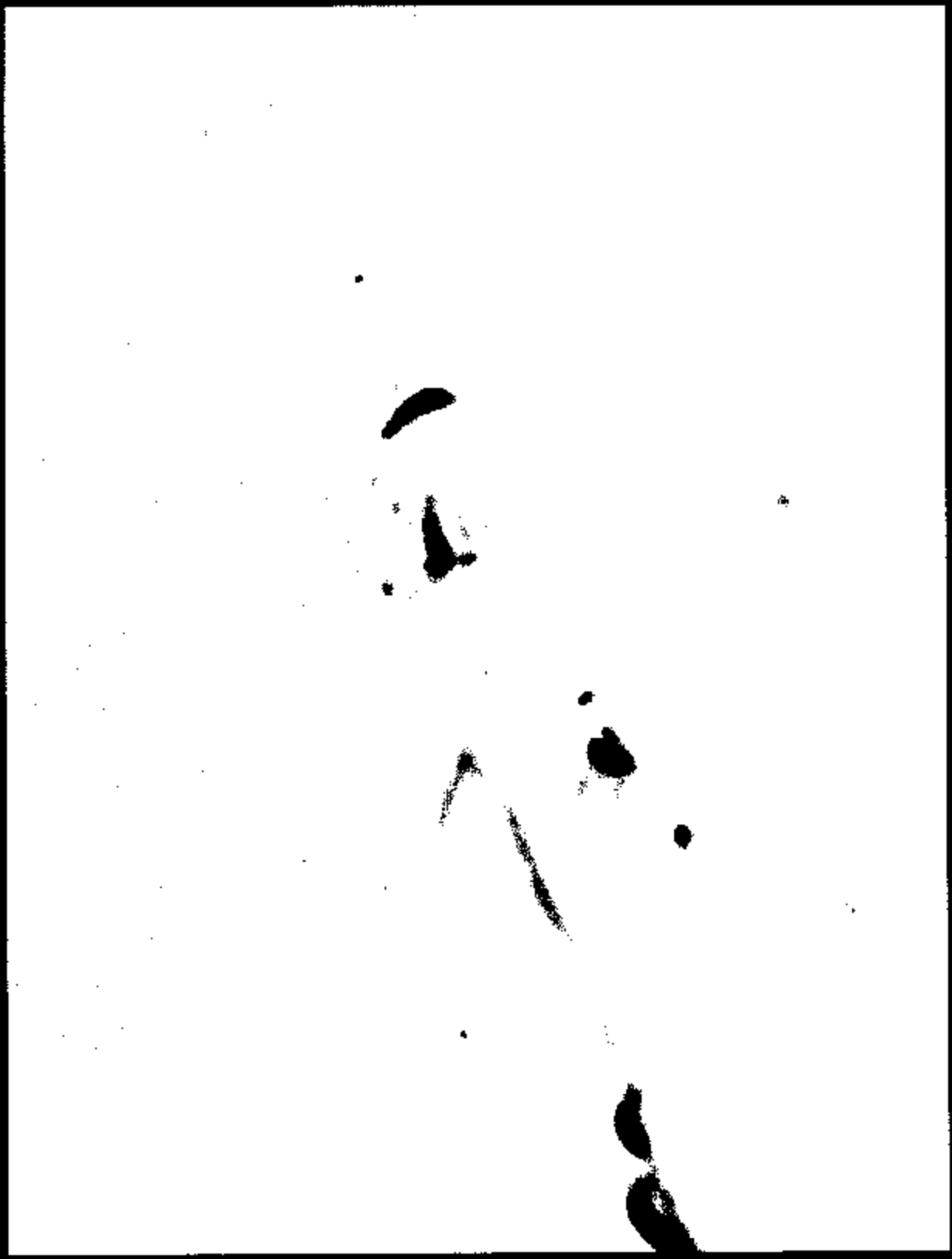
6.11.4 post-forward tether strap 1 of 4

Signboard should read "SB346a

6.11.5 post-forward tether strap 2 of 4

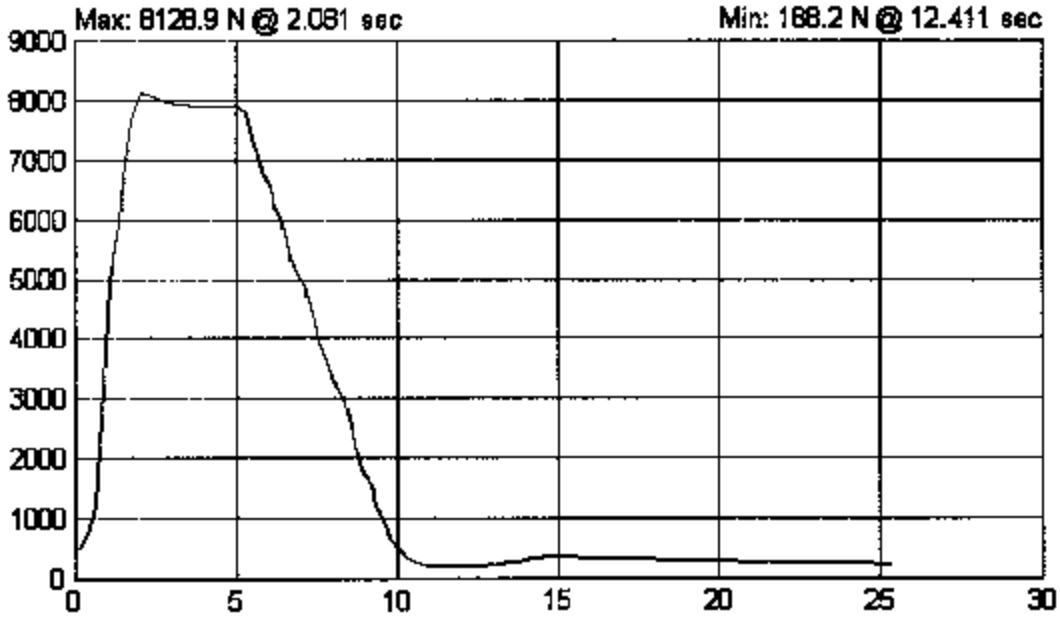


6.11.6 post-forward tether strap 3 of 4

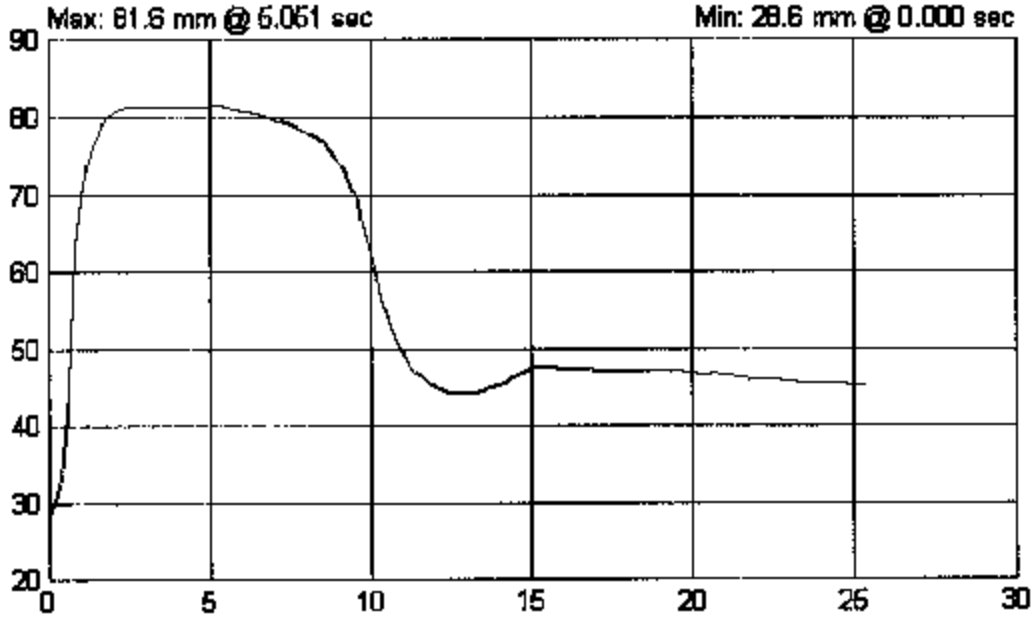


6.11.7 post-forward tether strap 4 of 4

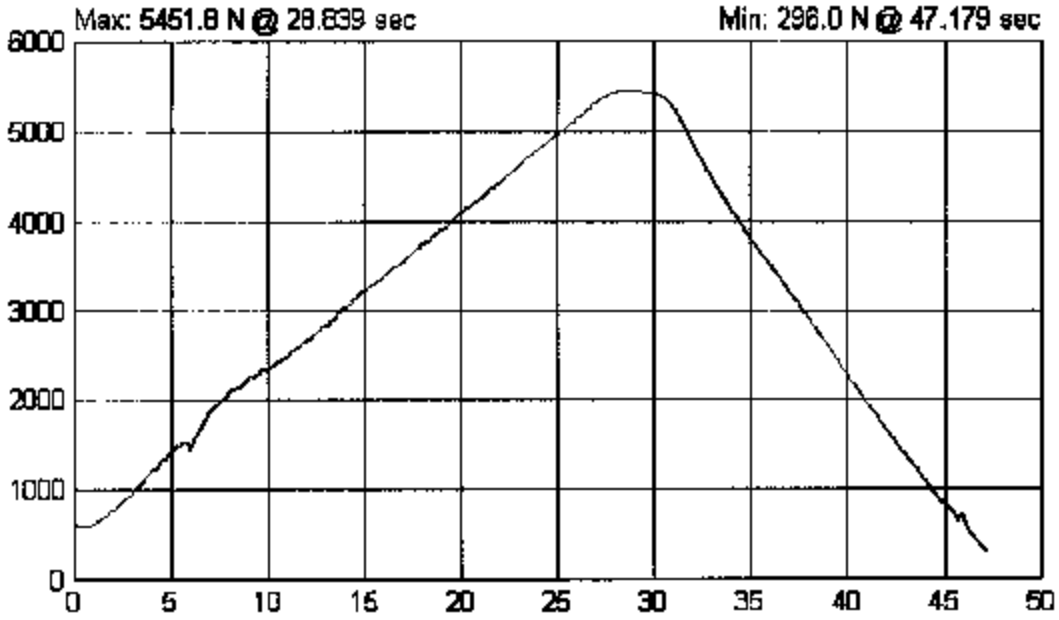
7.0 PLOTS



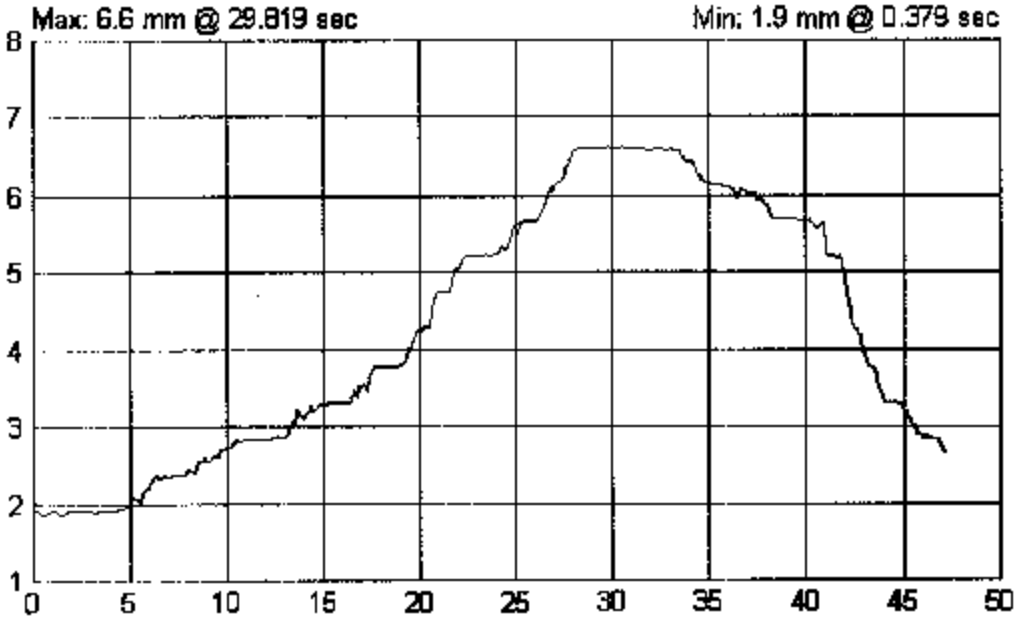
Run# SB3465: Lower Anchor Forward Test (S15) - Rear Left Load (N) vs. Time (sec)



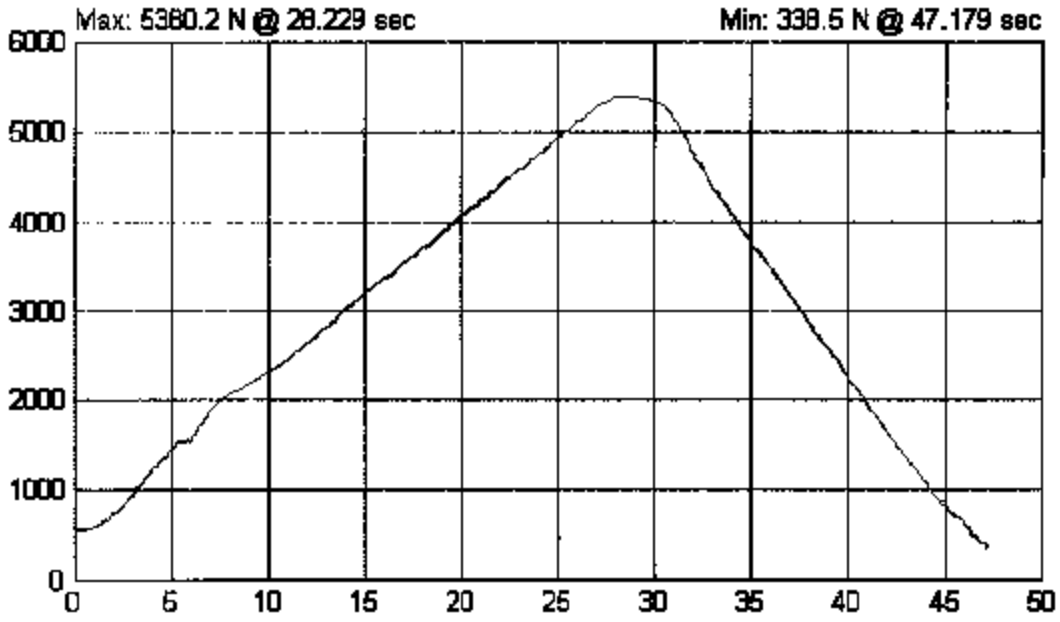
Run# SB3465: Lower Anchor Test (S15)-Rear Left SFAD2 X Displ. (mm) vs. Time (sec)



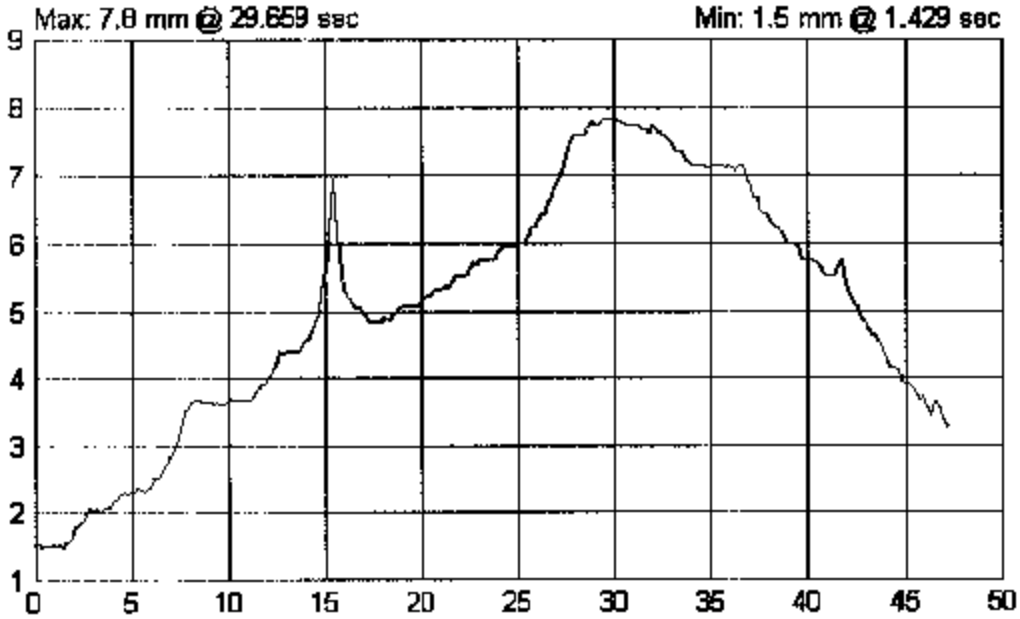
Run# SB346a: Tether Test (S6.3.4.1) - Rear Left Load (N) vs. Time (sec)



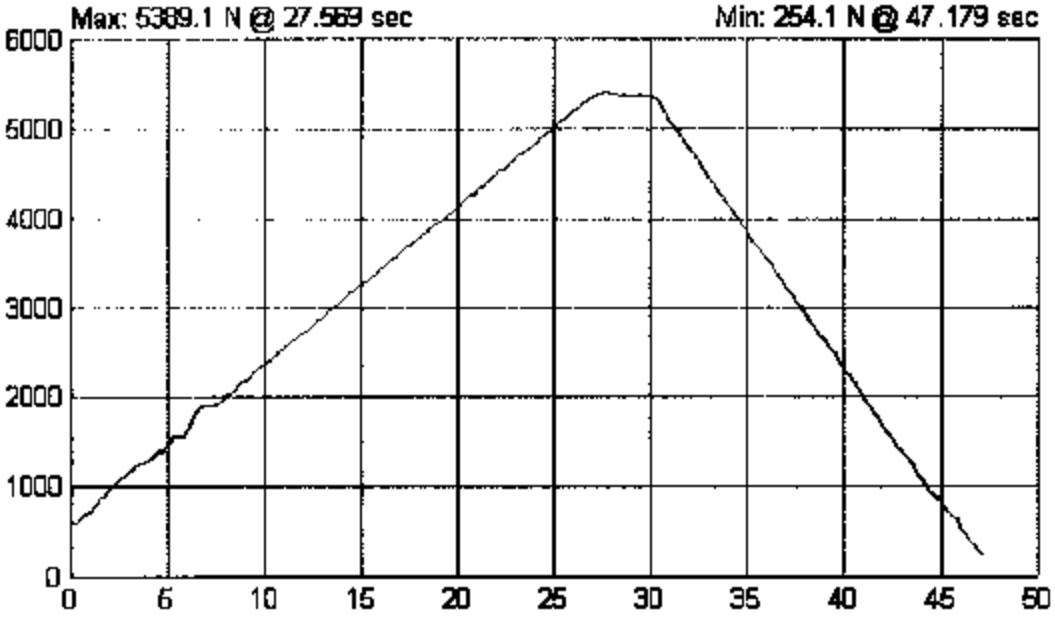
Run# SB346a: Tether Test (S6.3.4.1) - Rear Left Top Tether Displ. (mm) vs. Time (sec)



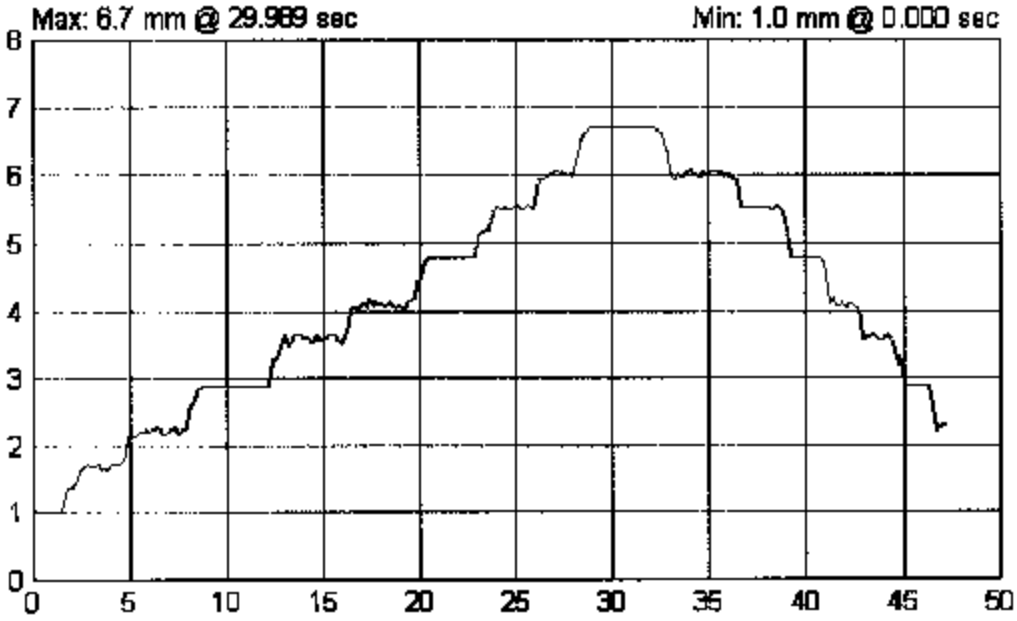
Run# SB346a: Tether Test (S6.3.4.1) - Rear Center Load (N) vs. Time (sec)



Run# SB346a: Tether Test (S6.3.4.1) - Rear Center Top Tether Displ. (mm) vs. Time (sec)



Run# SB346a: Tether Test (S6.3.4.1) - Rear Right Load (N) vs. Time (sec)



Run# SB346a: Tether Test (S6.3.4.1) - Rear Right Top Tether Displ. (mm) vs. Time (sec)

8.0 REPORT of VEHICLE CONDITION

REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING

CONTRACT No.: DTNH22-02-D-11043 DATE: August 22, 2003

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

To: NHTSA, OVSC, NVS-221

The following vehicle has been subjected to compliance testing for FMVSS No. 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/MODEL/BODY: 2003 Volkswagen Passat GLS Sedan

VEH. NHTSA NO.: C35800 VIN: WVWPD63B13[redacted]

COLOR: Silverstone Gray Met

ODOMETER READINGS: ARRIVAL 18 miles Date: 8/1/03

COMPLETION 18 miles Date: 8/22/03

PURCHASE PRICE: $23,460 (sticker price) DEALER'S NAME: Ernie Von Schledorn

ENGINE DATA: 4 cylinder, 1,781 cc

TRANSMISSION DATA: ___Automatic X Manual No. of Speeds 5

FINAL DRIVE DATA: ___Rear Drive __ Front Drive X 4 Wheel Drive

CHECK APPROPRIATE BOXES FOR VEHICLE EQUIPMENT:

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Brad Reaume

X	Air Conditioning		Traction Control	X	Clock
X	Tinted Glass	X	All Wheel Drive		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	X	Sun Roof or T-Top	X	Passenger Air Bag
	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/Cassette Radio		Other

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: Kenney Godfrey DATE: August 22, 2003

APPROVED BY: Brad Reaume

APPENDIX A
OWNERS MANUAL CHILD RESTRAINT SYSTEMS

Child safety

The physical principles of what happens when your car is in a crash, illustrated on pages 3 – 6, apply also to children. But unlike adults and teenagers, their muscles and bones are not fully developed. In many respects children are at greater risk of serious injury in crashes than are adults.

Because children's bodies are not fully developed, they require restraint systems especially designed for their size, weight, and body structure. Many countries and all states of the United States and provinces of Canada have laws requiring the use of approved child restraint systems for infants and small children.

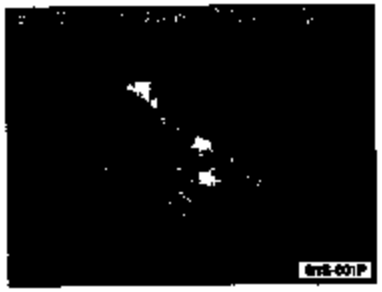
Child restraints, like adult safety belts, must be used properly to be effective. Used improperly, they can increase the risk of serious injury in a crash.

Please be sure to read and heed the important information and WARNINGS about child safety and the installation of child restraints in your Volkswagen.

• Accident statistics have shown that children are generally safer in the rear seat area than in the front seating position. Always restrain any child age 12 and under in the rear.

• All vehicle occupants and especially children must be restrained properly whenever riding in a vehicle. An unrestrained or improperly restrained child could be injured by striking the interior or by being ejected from the vehicle during a sudden maneuver or impact. An unrestrained or improperly restrained child is also at greater risk of injury or death through contact with an inflating airbag. A suitable child restraint properly installed and used at one of the rear seating positions provides the highest degree of protection for infants and small children in most crashes.

Consult the child seat manufacturer's instructions to be sure the seat is right for your child's size.



Infant seats

Infants up to about 9 months old (22 lbs. or 10 kg) receive the best protection in special infant carriers and child seats designed for their age group. Many experts believe that infants and small children should ride only in special restraints in which the child's back faces the driving direction. These child seats can be used safely only on the rear seat of your VOLKSWAGEN.

Using a rear-facing child seat on the front seat of a vehicle equipped with an airbag will seriously injure and can even kill a child when the airbag inflates in a crash.

• Never install rear-facing child seats or infant carriers on the front passenger seat. A child will be seriously injured and can be killed when the passenger airbag inflates.

• The inflating airbag will hit the child seat or infant carrier with great force and will smash the child seat and child against the backrest, center arm rest, or door.

• Always install rear-facing child seats or infant carriers on the rear seat.

• Never install a rear-facing child restraint in the forward-facing direction. Rear-facing restraints are designed for the special needs of infants and very small children and cannot protect them properly if turned forward-facing.

Child restraints on the front seat – important things to know

The airbag on the passenger side makes the front seat a potentially dangerous place for a child to ride. The front seat is not the safest place for a child in a forward-facing child seat. It is a very dangerous place for an infant or a larger child in a rearward-facing seat.

Babies and older children must never ride in a vehicle sitting on the lap of an adult. Holding a child in your arms is never a substitute for a child restraint system. The strongest adult could not hold onto the child under the forces exerted in a crash. The child would strike the interior of the vehicle and would also be struck by the adult's body moving forward. The child and the adult could injure each another.

In a frontal crash at a speed of 20–35 mph (30–55 km/h) the forces acting on a 13–pound (6 kg) infant would be more than 20 times the weight of the child. This means the weight of the child would suddenly be more than 260 pounds (120 kg). Under these conditions, only an appropriate child restraint properly used can reduce the risk of serious injury.

Convertible seats

A child too large for an infant restraint up to 4 years old (40 lbs. or 18 kg) should be restrained in a child seat certified for their weight.

The airbag on the passenger side makes the front seat a potentially dangerous place for a child to ride. The front seat is not the safest place for a child in a forward–facing child seat. It is a very dangerous place for an infant or a larger child in a rearward–facing seat.

Forward–facing child seats installed on the front passenger's seat may interfere with the deployment of the airbag and cause serious injury to the child. Install forward–facing child seats on the rear seat.

If exceptional circumstances require the use of a forward–facing child seat on the front seat, the child's safety and well–being require that the following special precautions be taken:

If, in exceptional circumstances, you must install a *forward–facing* child restraint on the front passenger's seat:

- **make sure the forward–facing seat has been designed and certified by its manufacturer for use on a front seat with a passenger front and side airbag.**
- **Always follow the manufacturer's instructions provided with the child seat or carrier.**
- **Always move the passenger seat into its rearmost position, as far away from the airbag as possible before installing the child restraint. The backrest must be adjusted to an upright position.**

Booster seats

Children up to 8 years old (80 lbs, or 36 kg) are best protected in child safety seats designed for their age and weight. Experts say that the skeletal structure, particularly the pelvis, of these children is not fully developed, and they should not use the vehicle safety belts.

Children of average size of about 4 years and older may use available three point combination lap and shoulder belts. It is usually best to put these children in appropriate booster seats. Be sure the booster seat meets all applicable safety standards.

Booster seats raise the seating position of the child and reposition both the lap and shoulder parts of the safety belt so that they pass across the child's body in the right places.

The routing of the belt over the child's body is very important for the child's protection, whether or not a booster seat is used.

Children age 12 and under should always ride in the rear seat.

Always position the shoulder portion of the three-point belt midway over the shoulder of the child. The shoulder portion must never rest against or across the neck. It should never contact or remain in front of the face, chin, or throat. The lap belt portion of the three point belt as well as any lap belt alone must always pass as low as possible across the pelvis, never over the abdomen. Failure to properly route safety belts over a child's body will cause severe injuries in a crash.

In a collision, airbags must inflate within a blink of an eye and with considerable force. In order to do its job, the airbag needs room to inflate so that it will be there to protect the occupant as the occupant moves forward into the airbag.

A vehicle occupant who is out of position and too close to the airbag gets in the way of an inflating airbag. When an occupant is too close, he or she will be struck violently and will receive serious or possibly even fatal injury.

In order for the airbag to offer protection, it is important that all vehicle occupants, especially any children, who must be in the front seat due to exceptional circumstance, be properly restrained and as far away from the airbag as possible. By keeping room between your body and the front of the passenger compartment, the airbag can inflate fully and completely and provide supplemental protection in certain frontal collisions.

Never let a child stand or kneel on any seat, particularly the front seat. Never let a child ride in the cargo area of your car. If a child is leaning forward, sitting sideways or out of position in any way, the child is more likely to be injured in a crash and will receive serious or fatal injuries if the child comes into contact with an airbag as it inflates.

Seatbelts and older children

Children of average size of about 7 years of age and older may use the lap belt in exceptional circumstances if the proper use of three point belts is not possible. Always remember that children do not have the pronounced pelvic structure required for the proper function of lap belts. The child's safety absolutely requires that a lap belt be fastened snugly and as low as possible around the pelvis. Never let a lap belt pass over the child's stomach or abdomen.

Failure to properly route safety belts over a childs body will cause severe injuries in a crash.
The lap belt portion of the three point belt as well as any lap belt alone must always pass as low as possible across the pelvis, never over the stomach or abdomen.

Younger children should use a lap belt only in very exceptional situations and only if no child restraint system for the child's size and weight or safer alternative means of transportation of the child is available. In these exceptional situations, the use of a lap belt is better than permitting the child to remain totally unrestrained. But remember: a lap belt cannot provide the same level of protection as a proper child restraint. Also, using a lap belt for younger children, who should be using a child restraint, may violate laws in your state or province.

- **As improperly worn safety belt will not provide the best protection in a crash and may cause serious personal injury. Always make sure that children and other vehicle occupants properly wear available restraint systems. Carefully follow the instructions provided by the manufacturers of child restraints.**
- **Commercially available child seats are required to comply with U. S. Federal Motor Vehicle Safety Standard (FMVSS) 213 (in Canada CMVSS 213).**
- **These standards include installation requirements for using a lap belt or the lap portion of a combination lap-shoulder belt such as those installed in your vehicle.**

• When buying a child restraint, select one that fits your child and vehicle.

• Only use child restraint systems that fully contact the flat portion of the seat cushion. The child seat must not tip or lean to either side. VOLKSWAGEN does not recommend using child seats that rest on legs or tube-like frames. They do not provide adequate contact with the seat.

• Improperly or inadequately installed child restraint systems can increase the risk of injury to children in crashes. Therefore, always carefully read and follow all instructions on installation and use that come with the system.

• Never install rear-facing child seats or infant carriers on the front passenger seat. A child will be seriously injured and can be killed when the passenger airbag inflates.

• The inflating airbag will hit the child seat or infant carrier with great force and will smash the child seat and child against the backrest, center arm rest, or door.

• Always install rear-facing child seats or infant carriers on the rear seat.

• Forward-facing child seats or infant carriers installed on the front passenger's seat may interfere with the deployment of the airbag and cause serious injury to the child. Allow a child to travel on the front passenger's seat only in a forward-facing child restraint system specifically designed and approved by the child restraint manufacturer for use in the front with airbags. Make sure the passenger seat is in the rearmost position. It is always safer to install a child seat in the rear.

Securing a child seat in the rear seats

Convertible Locking Retractor

The retractors for the rear seat three-point safety belts and the front passenger three-point safety belt have a convertible locking feature in addition to the emergency locking feature.

If you need to install a child seat at an outer seating position, you must first activate the convertible locking feature. Then secure the child seat by using the seat belt.

Activating the convertible locking retractor

• Slowly pull the belt all the way out and route it around or through the child restraint belt path.

• Insert the belt tongue into the buckle for that seating position. Make sure that the orange release button is facing away so that the child safety belt can be unbuckled quickly if necessary.

• Pull on the belt to make sure the safety belt is properly fastened.

• Guide the remaining portion of the belt back in place with your hand. While doing so, you should hear a continuous clicking noise from the retractor. That means that the convertible locking feature has been activated.

• Push and pull the child seat back and forth at the belt path to make sure that it is correctly and securely installed and does not move more than one inch side to side.

Always buckle the child seat firmly in place even if your child is not sitting in it. A loose child seat can fly around during a sudden stop or in a collision.

Deactivating the convertible locking retractor

The convertible locking retractor is deactivated by unfastening the safety belt (see page 13). Allow the safety belt to retract completely to its stowed position. The safety belt can now be used as an ordinary three-point safety belt without the additional locking feature.

If the convertible locking feature should be activated inadvertently, the safety belt must be unfastened to deactivate this feature. If the convertible locking feature is not deactivated, the safety belt will gradually become tighter and uncomfortable to wear. The convertible locking feature must be deactivated to restore normal belt operation and greater occupant comfort

Never unfasten the safety belt to deactivate the convertible locking retractor while the vehicle is in motion. You would not be protected at all and could suffer serious injury in a collision.

Securing a child seat with the center rear seat

Securing a child seat with the rear center safety belt

- First make sure the seat backrest of the rear seat bench is in upright position and securely latched in place, ***Booklet 3.1, chapter "Rear seat"***.
- Then secure the child seat as described in this chapter "*Child safety*".

Be sure to follow the instructions provided by the manufacturer of the child restraint you are using.

When transporting children on the rear seat bench, or if you are going to install a child restraint system on the rear seat bench, please remember:

- **The rear center three point safety belt cannot help to protect an infant or a child in a child restraint if the seat backrest to which it is attached is not securely latched. The child restraint would not be securely held in place and would move forward during sudden braking, in a sudden manoeuvre and especially in a collision. An infant or a child would be thrown forward together with the seat and would strike parts of the car's interior and could be seriously injured. See page 30.**
- **Always make sure that the rear seat backrest to which the rear center safety belt is attached is in upright position and securely latched into place so that it cannot fold forward whenever a child restraint is installed and especially when it is being used, *Booklet 3.1, chapter "Rear seat"*.**

What Types of CR Anchors are Available and How are They Related to Child Safety?

For years, CRs have been installed using the safety belts already present in every vehicle.

Since September 1, 1999, CR manufacturers have been providing tether straps that attach the top of the CR to the vehicles structure, on most of their forward-facing systems in order to comply with U.S. Federal regulations for CR performance in a crash. Vehicle manufacturers were required to phase-in tether anchorages for attachment of the tether strap in their U.S. vehicles beginning September 1, 1999.

The combination of the tether anchorages and the lower anchorages is now generally called the **LATCH** system for "**L**ower **A**nchor and **T**ether for **CH**ildren".

(The term "ISOFIX" regarding lower anchorages had been used by Volkswagen and other manufacturers in the past, but LATCH is now the standard name for the new child restraint anchorage system.)

Some CR manufacturers have been providing tether straps on certain models of their CRs, either as standard equipment or as a retrofit, for several years. Check with the manufacturer of the CR for tether strap availability.

To provide a simpler and more practicable way to attach the CR on the vehicle seat, U.S. Federal regulations require the phase-in of lower anchorages in vehicles and devices on new CRs to attach to the vehicle anchorages.

CR manufacturers will probably offer two kinds of lower anchorages on their child seats:

They could come with...

- ...hooks or other latches attached to adjustable straps

or

- ...rigid latches on bars that extend out the back of the CR and are released with release buttons at the bottom of the CR.

Where Can I Get Additional Information About CR Application and Usage?

There are a number of sources of additional information about CR selection, installation and usage:

NHTSA advises that the best child safety seat is the one that fits your child and fits in your vehicle, and that you will use correctly and consistently.

Try before you buy!

National Highway Traffic Safety Administration
(888) DASH-2-DOT
www.nhtsa.dot.gov

Center for Injury Prevention
(800) 344-7560
www.cipsafe.org
www.childsafety.org

National SAFE KIDS Campaign
(202) 662-0600
www.safekids.org

Safety BeltSafe U.S.A
(800) 745-SAFE (English)
(800) 747-SANO (Spanish)
www.carseat.org

Volkswagen Customer Relations
(800) 822-8987

Tether Anchors

Improper installation of child restraints will increase the risk of injury in a crash.

- **Improper use of child restraint anchors (tether anchors) could lead to injury in a collision. The anchors are designed to withstand only those loads imposed by correctly fitted child restraints.**
- **Never mount two child restraint seats on one anchor point.**
- **Always follow the instructions provided by the manufacturer of the child restraint that you intend to install in your VOLKSWAGEN.**
- **Never use child restraint tether anchorages to secure safety belts or other kinds of occupant restraints.**
- **Never attach a tether strap to a tie-down hook in the luggage compartment**
- **Never secure or attach any luggage or other items to the LATCH lower anchorages or to the tether anchors.**

Beginning with model year 2000, Volkswagen vehicles have tether anchors as standard equipment in the following locations:

Passat Sedan

Passat Wagon

The illustrations show the tether anchors for the rear seating positions:

- *Sedan:*
  Tether anchors for the three rear seating positions are located on the rear hat shelf (arrows).
- *Wagon:*
  Tether anchors for the three rear seating positions are located on the rear side of the rear seat back rest (arrows).

Tether Strap

A tether is a straight or V-shaped strap that attaches the top part of a CR to special anchorage points in the vehicle – see illustration on next page.

The purpose of the tether is to reduce the forward movement of the CR in a crash, in order to help reduce the risk of head injury that could be caused by striking the vehicle interior.

Forward facing CRs manufactured after September 1, 1999, are required by U.S. federal regulations to comply with new head movement performance requirements.

These new performance requirements make a tether necessary on most new child seats.

Improper installation of child restraints will increase the risk of injury in a crash.

- **Never attach a tether strap to a tie-down hook in the luggage compartment**
- **Never secure or attach any luggage or other items to the LATCH lower anchorages or to the tether anchors.**

Using Tethers on Rear Facing CRs

Currently, very few rear-facing CRs come with a tether. Please read and heed the CR manufacturer's instructions carefully to determine how to properly install the tether.

The illustration shows a tether strap mounted in a Passat Sedan model

The illustration shows a tether strap mounted in a Passat Wagon model

How to install the upper tether strap to the anchorage point Sedan only

Sedan only

- Release or deploy the tether strap on the child restraint according to the child restraint manufacturer's usage instructions.
- Guide the upper tether strap **under** the rear head restraint (raise the head restraint if necessary).
- Attach the tether strap anchorage hook into the opening of the tether anchorage.
- Tighten the tether strap firmly following the child restraint manufacturer's instructions.
- To release the tether strap, loosen the tension following the child restraint manufacturer's instructions. Depress the spring catch on the hook and release it from the anchorage.

How to install the upper tether strap to the anchorage point Wagon only

Wagon only

- Release or deploy the tether strap on the child restraint according to the child restraint manufacturer's usage instructions.
- Guide the upper tether strap **under** the rear head restraint (raise the head restraint if necessary).
- Guide the tether strap between the rear seat back and the luggage compartment cover (remove the luggage compartment cover if necessary, see *"Luggage compartment cover"*, **Booklet 3.1**).
- Attach the tether strap anchorage hook into the opening of the tether anchorage.
- Tighten the tether strap firmly following the child restraint manufacturer's instructions.
- To release the tether strap, loosen the tension following the child restraint manufacturer's instructions. Depress the spring catch on the hook and release it from the anchorage.

Lower Anchorages

The lower anchorage attachment points are located between the rear seatback and rear seat cushion – see illustration.

The lower anchorages for the rear outboard seating positions can be installed by your VOLKSWAGEN dealer.

Lower anchorages secure the CR in the seat without using the vehicle's safety belts. Anchorages provide a secure and easy-to-use attachment and minimize the possibility of improper CR installation.

All CRs manufactured after September 1, 2002, must have lower anchorage attachments for the LATCH system.
However, CR manufacturers have begun to provide such lower anchorages for the latch system in 2000 even before the required date.

Improper installation of child restraints will increase the risk of injury in a crash.

- **Never attach a tether strap to a tie-down hook in the luggage compartment.**
- **Never secure or attach any luggage or other items to the LATCH lower anchorages or to the tether anchors.**

Please remember that the lower anchorage points are only intended for installation and attachment of CRs specifically certified for use with LATCH lower anchorages.
CRs that are not equipped with the lower anchorage attachments can still be installed according to the CR manufacturer's instructions using vehicle safety belts.

Mounting the anchorage hook

- Install the guidance fixtures as explained on page 48.
- Guide the anchorage hook into the guide fixture.
- Press the anchorage hook with the spring catch release onto the lower anchorage so that the anchorage hook locks into place.

Pull on the anchorage hook to make sure that it is properly attached to the lower anchorage – see illustration.

- Tighten the strap following the CR manufacturer's instructions.

Release the anchorage hook

- Loosen the tension on the strap following the CR manufacturer's instructions.
- Depress the spring catch on the hook.
- Hold the spring catch in depressed position and move the hook in direction of the vehicle floor so that there is enough space to release the anchorage hook from the lower anchorage.

Using Lower Anchorages or Safety Belts

• Improper installation of child restraints will increase the risk of injuries in a crash.

• Always refer to the CRs manufacturer's instructions for proper installation of the CR and correct use of tether straps as well as the lower anchorages or safety belts in your vehicle.

Seat Markings for Lower Anchorages

Fig.1 The illustration above shows the location of the circular seat markings for the lower anchorages for the outboard rear seating positions.

The circular markings on the seat help you to locate the lower anchorages for the two rear outboard seating positions, see illustration.

For installation of a child restraint in your Volkswagen, always refer to the instructions provided by the manufacturer of your child restraint.

Fig.2 The illustration above shows the location of lower anchorages.

The lower anchorages are located between the rear seatback and the rear seat cushion – see Fig. 2.

Improper installation of child restraints will increase the risk of injury in a crash.

• Always follow the CRs manufacturer's instructions for proper installation of the CR and correct use of tether straps as well as the lower anchorages or safety belts in your vehicle.

• Please be sure to read and heed the important information and WARNINGS about child safety and the installation of CRs in this Booklet.

Guidance Fixtures for Lower Anchorages

Special guidance fixtures increase the convenience of the lower anchorages and help protect the seat material from possible damage when installing child restraints that have rigid lower anchorages and not straps with hooks. These guidance fixtures are either supplied with your Volkswagen as standard equipment, or your authorized Volkswagen dealer can supply them.

Attach the guidance fixtures to the lower anchorages as shown in illustrations on pages 44 and 46.

Note

You may find it easier to install CRs equipped with hooks attached to straps without the guidance fixtures in place. If this is the case, remove the guidance fixtures by pulling them off the anchorages. However, the guidance fixtures help you to locate the anchorages positions.

Installing the guidance fixtures

First push the seat cushion down so that the lower anchorages are visible.

Hold the guide fixture with the part number facing downward and push it in direction of arrow onto the anchorage – see upper illustration.

The groove in the guidance fixtures must snap into place over the lower anchorages installed in your Volkswagen.

Removing the guidance fixtures

- Remove the CR according the CR manufacturer's instructions.
- Push the seat cushion down so that the lower anchorages are visible.
- Pull the guidance fixtures off of the lower anchorages and keep the guidance fixtures in a safe place.

Notes

- **On vehicles with folding rear backrests, the guidance fixtures must be removed before folding the backrests to prevent damaging the seat cushion.**
- **Please keep the guidance fixtures in a safe place with the vehicle when not in use.**
- **If you leave the guidance fixtures installed for several days, this could leave a mark on the upholstery on the seat cushion and backrest in the area that the guidance fixtures were installed. The upholstery would also be permanently stretched around the guidance fixtures.**
  This applies especially to leather seats.
- **Always remove the guidance fixtures when not in use.**

Improper use of tether anchorages or lower anchorages can cause serious personal injury in a crash.

- **Always follow the CR manufacturer's instructions for proper installation and use of child restraint systems.**
- **Never use the LATCH or tether anchorages to attach safety belts or other kinds of occupant restraints.**
- **CR tether anchorages and the lower anchorages are only designed to secure a CR that has been equipped to use these anchorages.**
- **Tether anchorages and the lower anchorages are designed to withstand only those loads imposed by correctly fitted child restraints. Under no circumstances can they be used safely for adult or child seat belts or harnesses.**
- **Never mount more than one CR to a single tether or to a lower anchorage point. Attaching two child restraints to a single anchorage point can cause the anchorage to fail and cause serious personal injury in a crash.**
- **Never use the tether anchorages and lower anchorages to install three child restraints in your Volkswagen. If you must install three child restraints on the rear seat of a Volkswagen with three seating positions in the rear, you must use the vehicle safety belt to install the child restraint in the center seating position.**

Installing a Child restraint using the LATCH system

Make sure the seat back of the rear seat bench is in the upright position and securely latched in place.

There are two possibilities to attach a LATCH-CR to the the lower anchorages for the outboard seating position:

Rigid latches on bars that extend on the back of the CR:

- Install the guidance fixtures, see pages 46 and 47.
- Insert the latches into the lower anchorages. Make sure you hear the CR click securely into place.

Pull on the CR once you've mounted it to make sure it's secure!

Connecting the attachments to adjustable straps:

- Both attaching straps with anchorage hooks on the CR must be securely attached to the lower anchorages and then pulled tight according to the CR manufacturer's instructions, – see also page 44.
- Release or deploy the tether strap and the child restraint according the CR manufacturer's instructions.
- Guide the upper tether strap under the rear head restraint (raise the head restraint if necessary) and attach the tether strap anchorage hook into the opening of the tether anchorage.

To locate the tether anchorages on your vehicle, see page 40.

- Pull on the anchorage hooks to make sure that they are firmly attached to the anchorage by the spring catch of the hook.
- Tighten the tether strap firmly following the CR manufacturer's instructions.

Pull on the CR once you've mounted it to make sure it's secure!

Improper installation of child restraints will increase the risk of injury in a crash.

- **Always follow the CRs manufacturer's instructions for proper installation of the CR and correct use of tether straps as well as the lower anchorages or safety belts in your vehicle.**
- **Please be sure to read and heed the important information and WARNINGS about child safety and the installation of CRs in this booklet.**

APPENDIX B
MANUFACTURER'S DATA (OVSC FORM 14)

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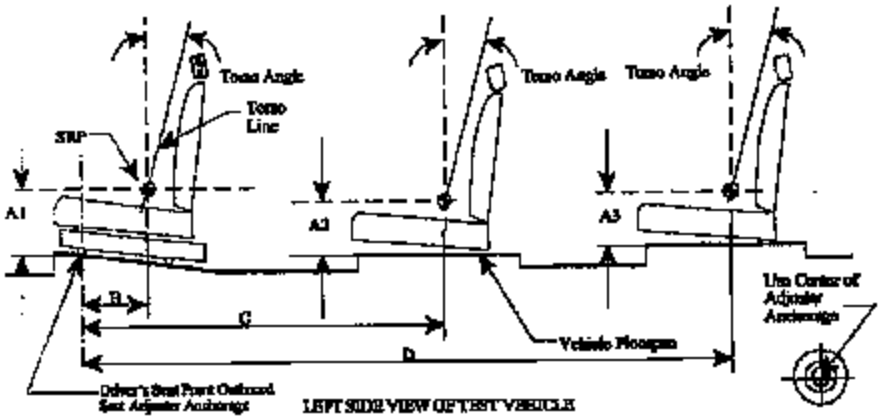
SEAT REFERENCE POINT (SRP) AND TORSO ANGLE DATA
FOR FMVSS 225
(All dimensions in mm)

Model Year: 2003 ; Make: Volkswagen ; Model: Passat GLS ; Body Style: Sedan
Seat Style: Front row: ; Second row: ; Third row:



LEFT SIDE VIEW OF TEST VEHICLE

C35800

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Table 1. Seating Positions and Torso Angles

		Left (Driver Side)	Center (If any)	Right
A1		(Driver)* 297	N/A	(Front Passenger) 239
A2		251	278	291
A3		N/A	N/A	N/A
B		301	N/A	320
C		1133	1104	1133
D		N/A	N/A	N/A
Torso Angle (degree)	Front Row	25°	N/A	25°
	Second Row	25°	N/A	25°
	Third Row	N/A	N/A	N/A

Note: 1. All dimensions are in mm. If not, provide the unit used.

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SEATING REFERENCE POINT
FOR FMVSS 225
(All dimensions in mm)

Model Year: 2003 ; Make: Volkswagen ; Model: Passat GLS ; Body Style: Sedan
Seat Style: Front row: ; Second row: ; Third row: N/A

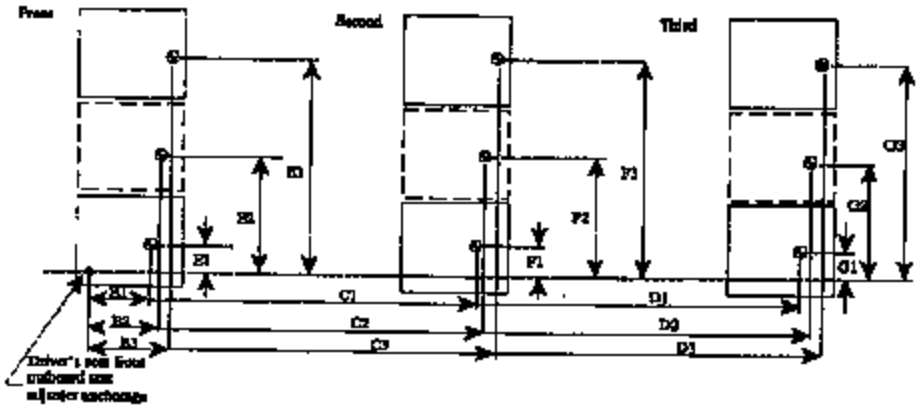

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Table 2. Seating Reference Point and Tether Anchorage Locations

Seating Reference Point (SRP)		Distance from Driver's front outboard seat adjuster anchorage[1]
Front Row	B1	301
	E1	0
	B2	N/A
	E2	N/A
	B3	320
	E3	700
Second Row	C1	1133
	F1	5
	C2	1104
	F2	350
	C3	1133
	F3	705
Third Row	D1	N/A
	G1	N/A
	D2	N/A
	G2	N/A
	D3	N/A
	G3	N/A

Note: 1. Use the center of anchorage.

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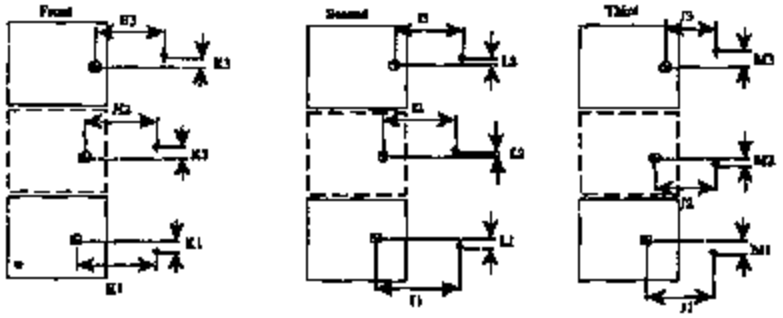
TETHER ANCHORAGE LOCATIONS
FOR FMVSS 225
(All dimensions in mm)

Model Year: _2003_____; Make: _Volkswagen___; Model: _Passat GLS _____; Body Style: __Sedan ___
Seat Style: Front row: _____; Second row: _____; Third row: _N/A_____



S: SRP
T: Tether anchorage

Note: 1. The location shall be measured at the center of the bar.

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Table 3. Seating Reference Point and Tether Anchorage Locations

Seating Reference Point (SRP)	Distance from SRP	
Front Row	H1	N/A
	K1	N/A
	H2	N/A
	K2	N/A
	H3	N/A
	K3	N/A
Second Row	J1	743
	L1	40
	J2	772
	L2	0
	J3	743
	L3	-40
Third Row	J1	N/A
	M1	N/A
	J2	N/A
	M2	N/A
	J3	N/A
	M3	N/A

Note: 1. Use the center of anchorage.

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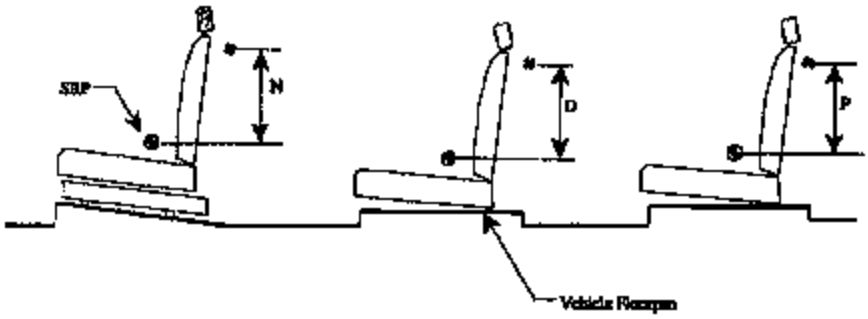
TETHER ANCHORAGE LOCATIONS - VERTICAL
FOR FMVSS 225
(All dimensions in mm)

Model Year: _2003_____; Make: _Volkswagen___; Model: _Passat GLS_____; Body Style: _Sedan_____
Seat Style: Front row: _____; Second row: _____; Third row: _N/A_____



LEFT SIDE VIEW OF TEST VEHICLE

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Table 4. Vertical Dimension For The Tether Anchorage

Seating Row	Vertical Distance from Seating Reference Point	
Front Row	N1 (Driver)	N/A
	N2 (Center)	N/A
	N3 (Right)	N/A
Second Row	O1 (Left)	526
	O2 (Center)	499
	O3 (Right)	526
Third Row	P1 (Left)	N/A
	P2 (Center)	N/A
	P3 (Right)	N/A

Note: 1. All dimensions are in mm. If not, provide the unit used.

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Test Procedures Used for Compliance Tests

Tether Anchorages

Seating Location		FMVSS Section(s) - Req.
Front	Driver	N/A
	Center (if any)	N/A
	Right (if any)	N/A
Second	Left	S6
	Center	S6
	Right (if any)	S6
Third	Left	N/A
	Center	N/A
	Right	N/A
Fourth	Left	N/A
	Center	N/A
	Right	N/A

Lower Anchorages

Seating Location	FMVSS Section(s) - Req.

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For each anchorage system, provide the following information:

1. **Lower Anchorage Dimensions:** Whether the anchorages are certified with S15.1.2.1 of FMVSS No. 225.

   Yes, the anchorages are certified with S15.1.2.1.

2. **Lower Anchorage Location:** Whether the anchorages are certified with S15.1.2.2 of FMVSS No. 225. If the anchorages are certified with S15.1.2.2, provide the pitch, roll and yaw angles.

   Yes, the anchorages are certified with S15.1.2.2.
   Pitch angles 15°
   Roll angles 0°
   Yaw angles 0°

3. **Lower Anchorage Marking and Conspicuity:** Whether the anchorages are certified with S15.4 of FMVSS No. 225. If guidance fixtures are used, provide the location of the seating systems that are equipped with the guidance fixture.

   Yes the anchorages are certified with S15.4. Guidance fixtures are not used.

4. **Location of Tether Anchorage:** Applicable section of FMVSS No. 225 for the option used for its certification.

   The tether anchorages location is specified according to S6.2.2(a)(1)

5. **Number of Tether Anchorage:** Applicable section of FMVSS No. 225 for the option used for its certification

   Section S 4.5.(b) was used for certification.