

637969

FINAL REPORT NUMBER 225-MGA-05-009

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

HYUNDAI MOTOR COMPANY
2005 HYUNDAI TUCSON
NHTSA No. C50506

MGA RESEARCH CORPORATION
446 Executive Drive
Troy, Michigan 48083



Test Date: July 6, 2005
Report Date: July 13, 2005

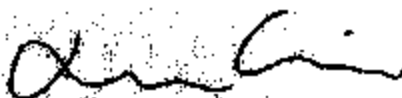
FINAL REPORT

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

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared By:



Melanie Schick, Project Engineer



Brad Reaume, Test Personnel



Helen A. Kaleto, Laboratory Manager

Approved By:



Approval Date:

07/13/2005

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By:

Amanda Prescott

Digitally signed by Amanda Prescott
DN: cn=Amanda Prescott, c=US, o=Office
of Vehicle Safety Compliance, ou=DOT-224
Reason: I am approving this document
Date: 2005.07.13 10:29:40-0500

Acceptance Date:

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 225-MGA-05-009	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Final Report of FMVSS 225 Compliance Testing of a 2005 Hyundai Tucson, NHTSA No. C50506		5. Report Date July 13, 2005	
		6. Performing Organization Code MGA	
7. Author(s) Helen A. Kalet, Laboratory Manager Melanie Schick, Project Engineer Brad Reaume, Test Personnel		8. Performing Organization Report No. 225-MGA-05-009	
9. Performing Organization Name and Address MGA Research Corporation 446 Executive Drive Troy, Michigan 48063		10. Work Unit No.	
		11. Contract or Grant No. DTNH22-02-D-11043	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Enforcement Office of Vehicle Safety Compliance (NVS-220) 400 Seventh Street, SW Room 6111 Washington, DC 20590		13. Type of Report and Period Covered Final Test Report	
		14. Sponsoring Agency Code NVS-220	
15. Supplementary Notes			
16. Abstract A compliance test was conducted on the subject 2005 Hyundai Tucson, NHTSA No. C50506, 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 July 6, 2005. Test failures identified were as follows: NONE The data recorded indicates that the 2005 Hyundai Tucson tested appears to comply with the requirements of FMVSS 225.			
17. Key Words Compliance Testing Safety Engineering FMVSS 225 2005 Hyundai Tucson		18. Distribution Statement Copies of this report are available From: NHTSA Technical Reference Division, Mail Code: NPO-230 400 Seventh Street, SW, Room PL-403 Washington, D.C. 20590 Telephone No. (202) 366-4946	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 74	22. Price

Form DOT F 1700.7 (8-70)

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1.0 PURPOSE AND PROCEDURE	5
2.0 COMPLIANCE TEST AND DATA SUMMARY	5
3.0 TEST VEHICLE INFORMATION	6
4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION	8
5.0 DATA	9
6.0 PHOTOGRAPHS	14
6.1 Front view	
6.2 Rear view	
6.3 ¼ Front left view	
6.4 ¼ Front right view	
6.5 Test vehicle's certification label	
6.5.1 Certification label photo #1	
6.5.2 Certification label photo #2	
6.5.3 Tire information label	
6.6 Vehicle tie down at each tie down location	
6.6.1 Front under vehicle	
6.6.2 Left front	
6.6.3 Left rear	
6.6.4 Right front	
6.6.5 Right rear	
6.7 2-dimensional template	
6.7.1 LH position photo #1	
6.7.2 LH position photo #2	
6.7.3 Center position photo #1	
6.7.4 Center position photo #2	
6.7.5 RH position photo #1	
6.7.6 RH position photo #2	
6.8 CRF verification	
6.8.1 LH position photo #1	
6.8.2 LH position photo #2	
6.8.3 LH position photo #3	
6.8.4 RH position photo #1	
6.8.5 RH position photo #2	
6.8.6 RH position photo #3	
6.9 ¼ Front view of test vehicle with test apparatus in place	
6.9.1 ¼ Front left view of SFADII	
6.9.2 ¼ Front right view of SFADII	
6.10 Pre-test views of each child restraint anchorage system installed in the vehicle	
6.10.1 Pre-test photo #1 of SFADII	
6.10.2 Pre-test photo #2 of SFADII	
6.10.3 Pre-test photo #3 of SFADII	

TABLE OF CONTENTS (continued)

<u>SECTION</u>	<u>PAGE</u>
6.11 Post-test views of each child restraint anchorage system installed in the vehicle	43
6.11.1 Post-test photo #1 of SFADII	
6.11.2 Post-test photo #2 of SFADII	
6.11.3 Post-test photo #3 of SFADII	
6.11.4 Post-test photo #4 of SFADII	
6.11.5 Post-test photo #5 of SFADII	
6.11.6 Post-test photo #6 of SFADII	
6.11.7 Post-test photo #7 of SFADII	
6.11.8 Post-test photo #8 of SFADII	
6.11.9 Post-test photo #9 of SFADII	
6.11.10 Post-test photo #10 of SFADII	
6.11.11 Post-test photo #11 of SFADII	
7.0 PLOTS	54
8.0 REPORT OF VEHICLE CONDITION	56
<u>SECTION</u>	
APPENDIX A OWNERS MANUAL CHILD RESTRAINT SYSTEMS	58
APPENDIX B MANUFACTURER'S DATA (OVSC Form 14)	62

LIST OF TABLES

<u>TABLE#</u>		
1.	Summary Data for Strength and Displacement	6
2.	General Test and Vehicle Parameter Data	6
3.	Child Restraint Tether Anchorage Configuration	9
4.	Child Restraint Lower Anchorage Configuration	10
5.	Tether Location and Dimensional Measurements	12
6.	Tether Anchorage Static Loading and Displacement	13

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. DTNH22-02-D-11043. The purpose of the testing was to determine if the subject vehicle, a 2005 Hyundai Tucson, NHTSA No. C50506 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 (2/24/05).

The front occupant compartment consisted of two (2) adjustable outboard bucket seats and the rear occupant compartment consisted of a 2nd row three-passenger 60/40 seat. Each 2nd row outboard seating position was equipped with a child restraint anchorage system (one tether and two lower anchors). The 2nd row center seating position was equipped with a tether anchorage. The center-to-center spacing between the 2nd row outboard lower anchorages was approximately 700 mm. Each 2nd row outboard seating position was tested with the SFADII fixture.

2.0 COMPLIANCE TEST AND DATA SUMMARY

TEST SUMMARY

The testing was conducted at MGA in Troy, Michigan on July 6, 2005.

Based on the test results, the 2005 Hyundai Tucson appears to comply with the performance requirements of FMVSS No. 225 for this test.

The SFADII at the 2nd row left seating position sustained a maximum force of 5,093 N and held the required load for 3 seconds. The total displacement from point "X" on the SFADII for the 2nd row left seating position was 61 mm. The SFADII at the 2nd row right seating position sustained a maximum force of 5,030 N and held the required load for 3 seconds. The total displacement from point "X" on the SFADII for the 2nd row right seating position was 49 mm.

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)
SB5262	SFAD II	Lateral Left	2 nd Row Left	5,093	61
			2 nd Row Right	5,030	49

3.0 TEST VEHICLE INFORMATION

Table 2. General Test and Vehicle Parameter Data

VEH. MOD YR/MAKE/MODEL/BODY	2005 Hyundai Tucson
VEH. NHTSA NO.	C50506
VIN	KM8JM12B45U064356
COLOR	White
VEH. BUILD DATE	10/12/04
TEST DATE	July 6, 2005
TEST LABORATORY	MGA Research Corporation
OBSERVERS	Melanie Schick, Brad Reaume, Kenney Godfrey

GENERAL INFORMATION:

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Hyundai Motor Company

Date of Manufacture: 10/12/04; VIN: KM8JM12B45U064356

GVWR: 4475 lbs; GAWR FRONT: 2535 lbs

GAWR REAR: 2425 lbs

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 30 psi REAR: 30 psi

Recommended Tire Size: P215/65R16

Recommended Cold Tire Pressure:

FRONT: 30 psi REAR: 30 psi

Size of Tire on Test Vehicle: P215/65R16

Type of Spare Tire: T155/90R16

VEHICLE CAPACITY DATA:

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

Number of Occupants: Front 2; Middle N/A; Rear 3; TOTAL 5.

4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

MGA Research Corporation 446 Executive Drive Troy, Michigan 48063	
Test Equipment Used for Testing	Calibration Due Date
MGA Hydraulic Test Frame	N/A
Two (2) Load Cell 10,000 lb Capability	S/N 607 (09/03/05), S/N 618 (09/03/05)
String Potentiometer	Calibrated at each use (S/N 20763, 20769)
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 TPM460 (03/07/06)
MGA Data Acquisition System	N/A
Digital Calipers	S/N MGA00305 (03/22/06)
Force Gauge	S/N MGA00015 (02/02/06)
Inclinometer (Digital)	S/N MGA00535 (06/28/06)

5.0 DATA

Table 3. Child Restraint Tether Anchorage Configuration

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-225-01.

REMARKS: NONE.

Table 4. Child Restraint Lower Anchorage Configuration

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 100 mm above the bar, and in the vertical longitudinal plane that passes through the center of the bar.	LH	N/A	50	50	N/A
	Cr		N/A		
	RH		50	50	
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	No		N/A
	Cr		N/A		
	RH		No		
Diameter of the bar (mm)	LH	N/A	6.00	5.99	N/A
	Cr		N/A		
	RH		5.99	5.98	
Inspect if the bars are straight, horizontal and transverse	LH	N/A	Yes		N/A
	Cr		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
	Cr				
	RH				
Optional Marking: If guidance fixtures are used, the fixture(s) must be installed.	LH	N/A	N/A		N/A
	Cr				
	RH				
Measure the distance between Point "Z" of the CRP and the center of the anchorage bar (mm)	LH	N/A	70		N/A
	Cr		N/A		
	RH		65		
Measure the distance between the SRP to the center of the anchorage bar (mm)	LH	N/A	175		N/A
	Cr		N/A		
	RH		175		

REMARKS: Measurements were obtained with the seat back adjusted to a seat back angle of 22 degrees, which is the second step from foremost in seat back reclining.

Table 4. Child Restraint Lower Anchorage Configuration (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 60 mm in length (mm).	LH	N/A	28	28	N/A
	Ctr		N/A		
	RH		28	28	
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 $\pm$ 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)
2 nd Row Left	17	No Data	0
2 nd Row Center	N/A	N/A	N/A
2 nd Row Right	17	No Data	0

N/A indicates that there were no lower anchors in the center seating position.

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

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
Second Row	LH	Yes
	Cr.	Yes
	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

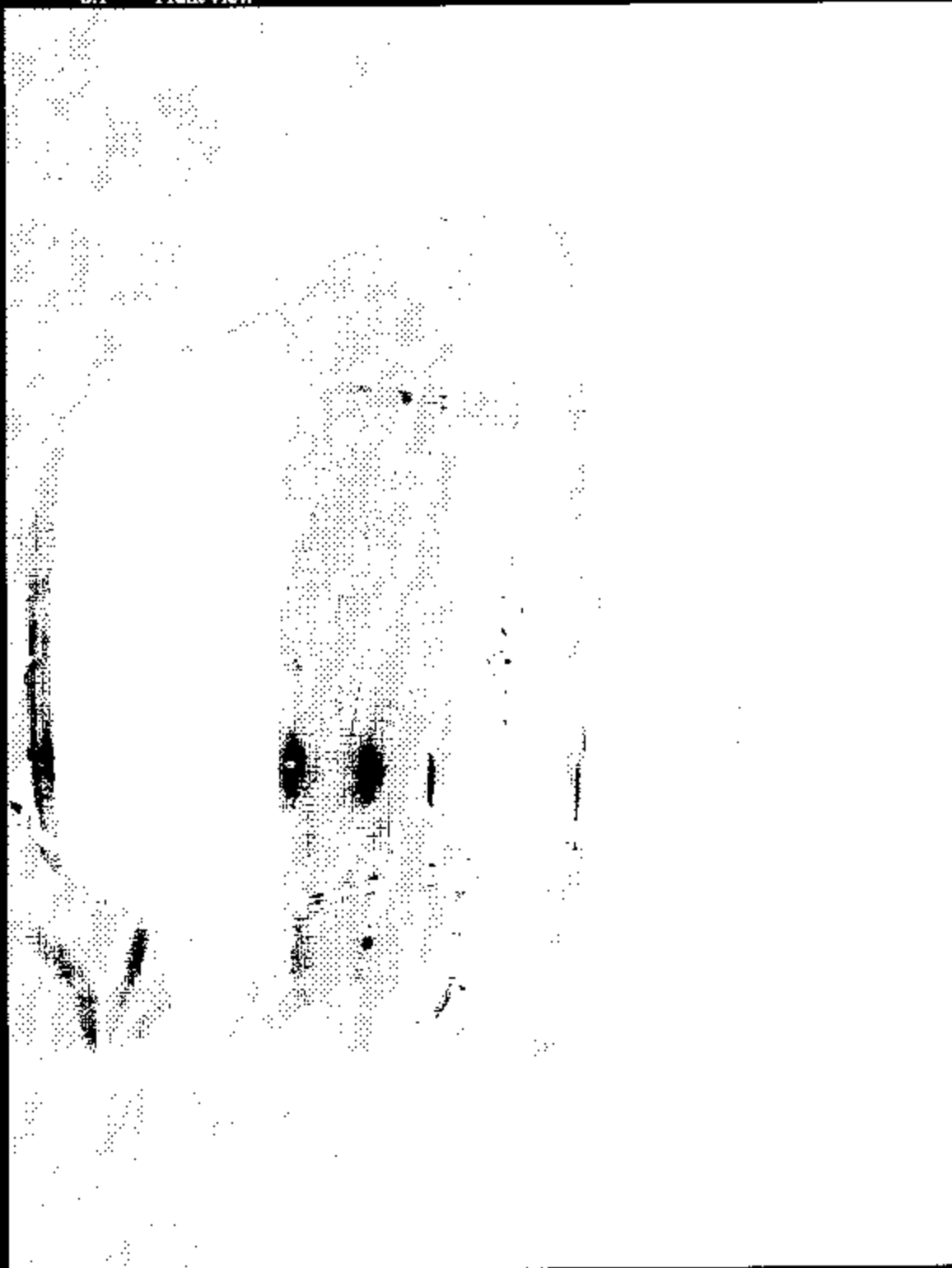
SEAT POSITION		Seat, Seat Back, & Head Restraint Positions			Type of SFAD Used	Angle (deg)	Initial Location (mm)	Onset Rate (N/sec.)	Force Applied (N)	Max. Load (N)	Final Location (mm)	Horiz. Displ. (mm)
		Seat	Seat Back	Is There a H/R?								
Front Row		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Second Row	LH	Fixed	Upright	Yes	II	0	12	167	5,000	5,093*	73	61
	Ctr.		Upright	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	RH			Yes	II	0	5	167	5,000	5,030*	54	49
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: (1) AS DETERMINED USING THE PROCEDURES SPECIFIED IN TP-225-01.

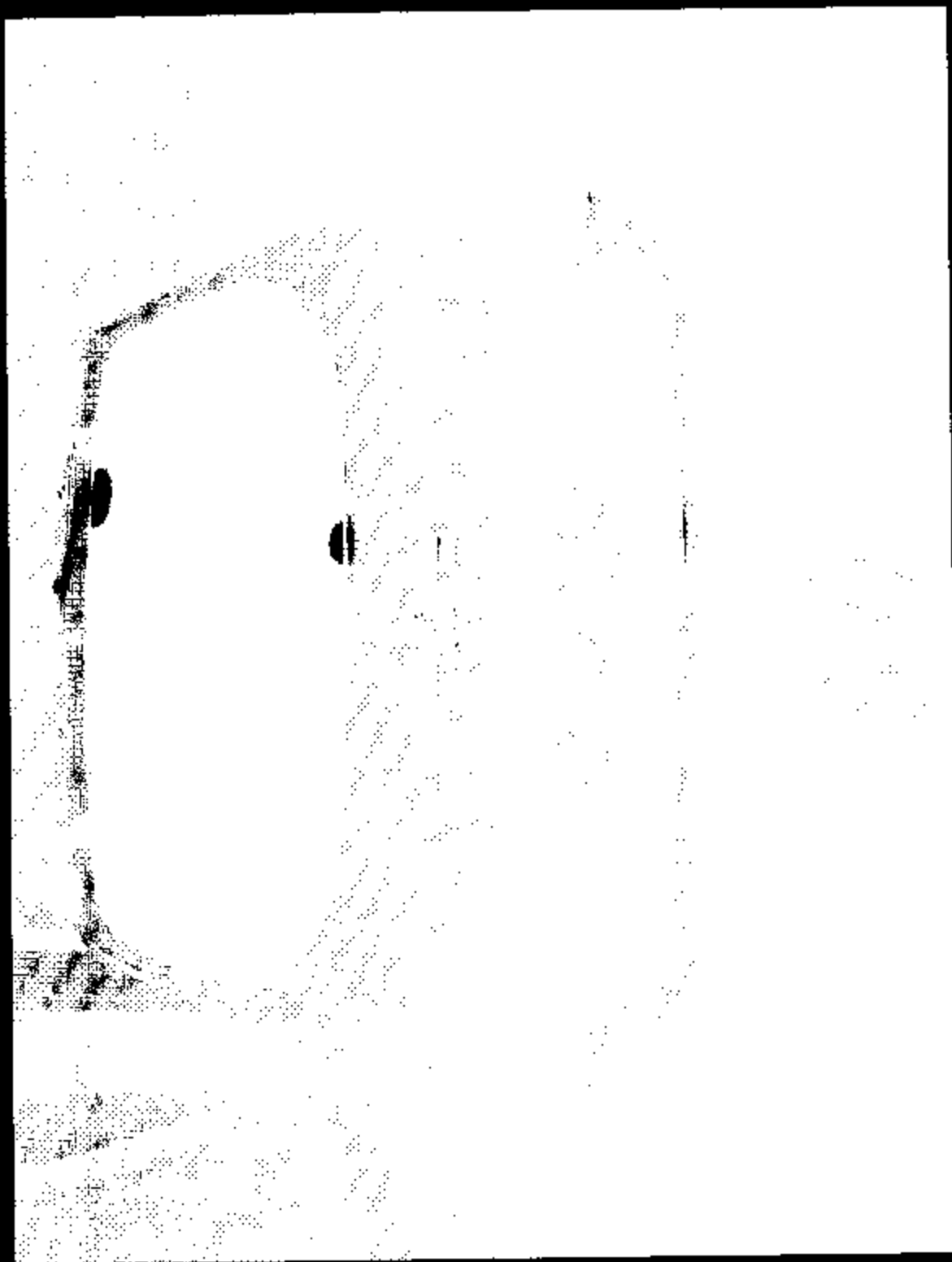
REMARKS: * Applied force exceeded the force specified in the test procedure.

6.0 PHOTOGRAPHS

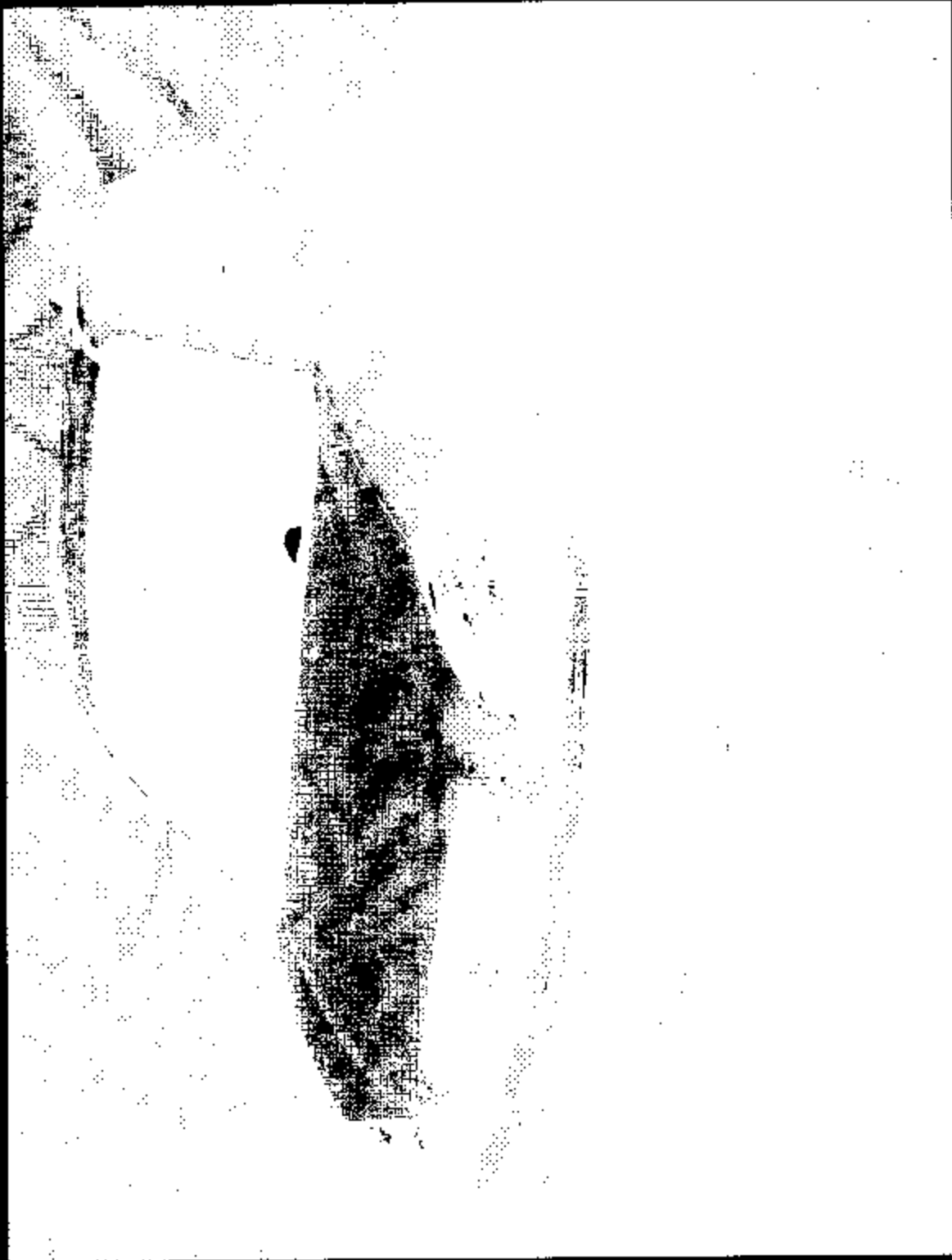
6.1 Front view



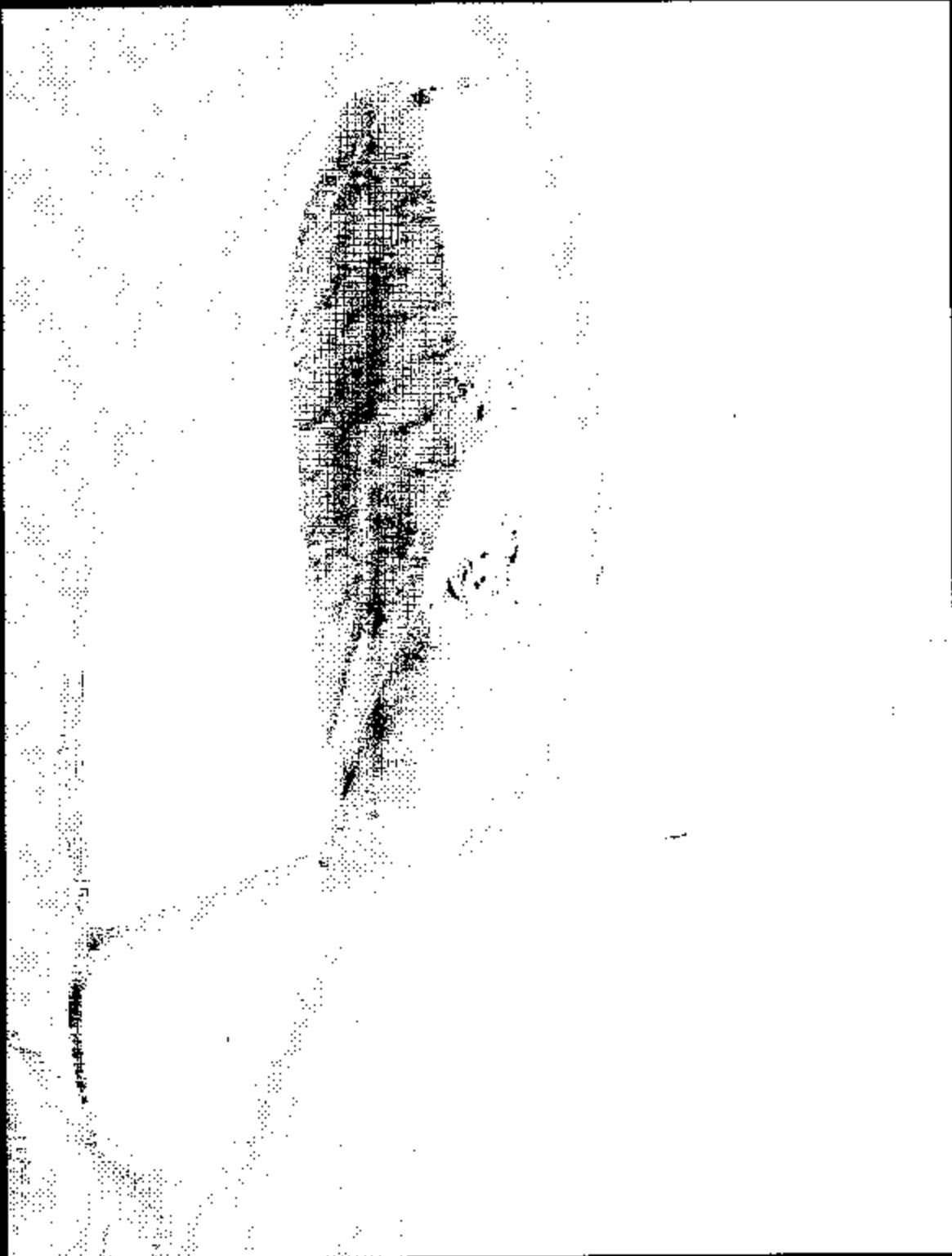
6.2 Rear view



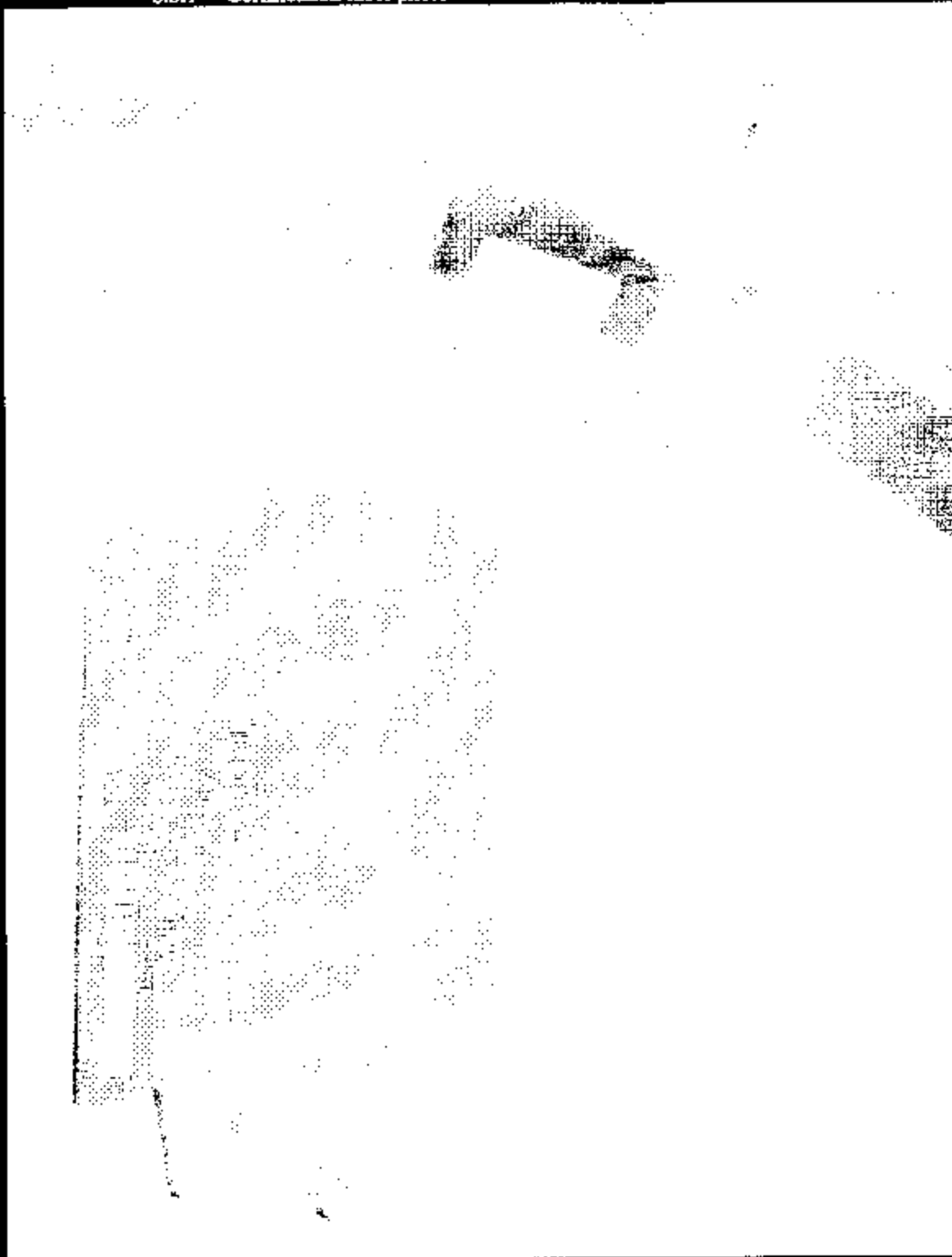
6.3 ¾ Front left view



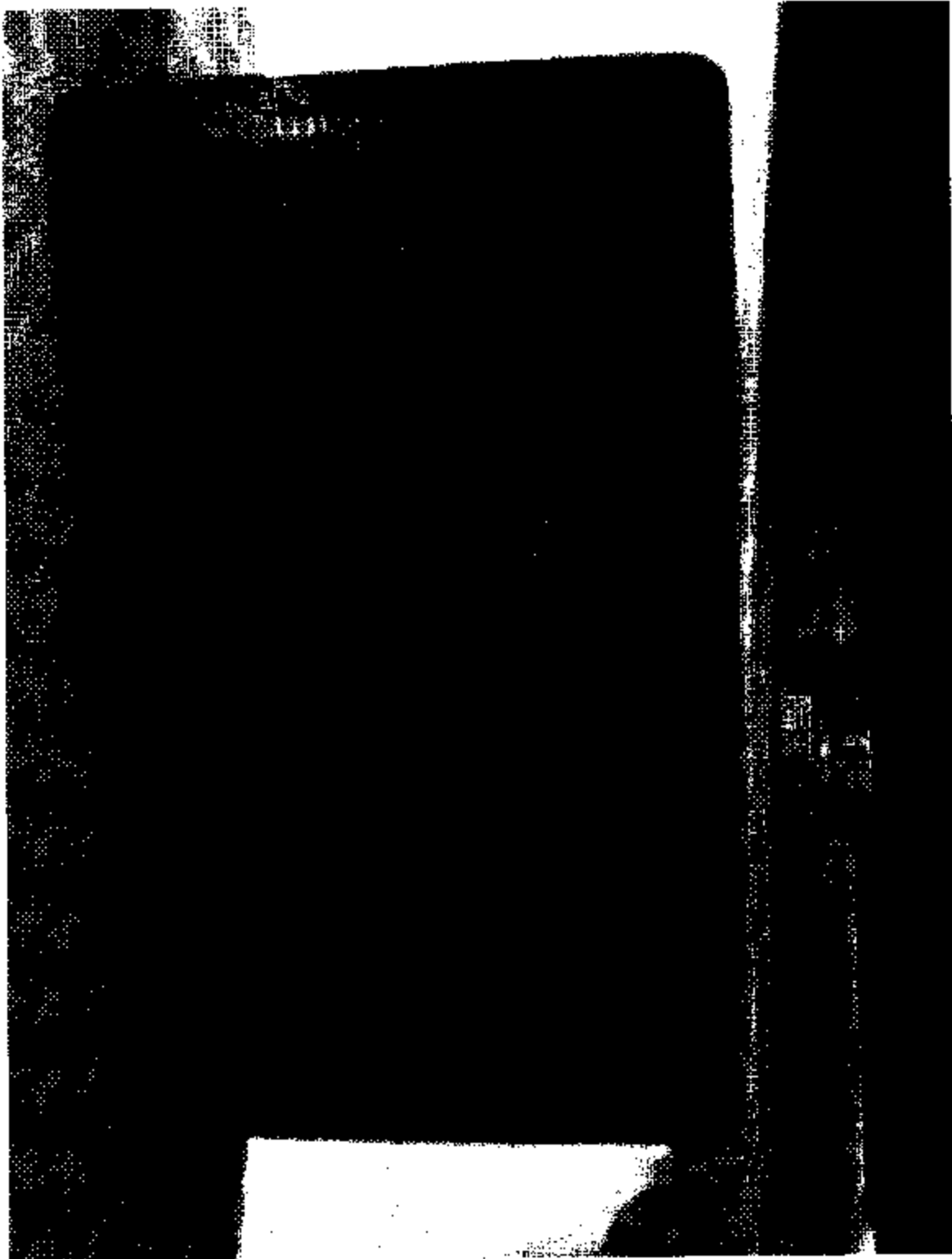
6.4 ¼ Front right view



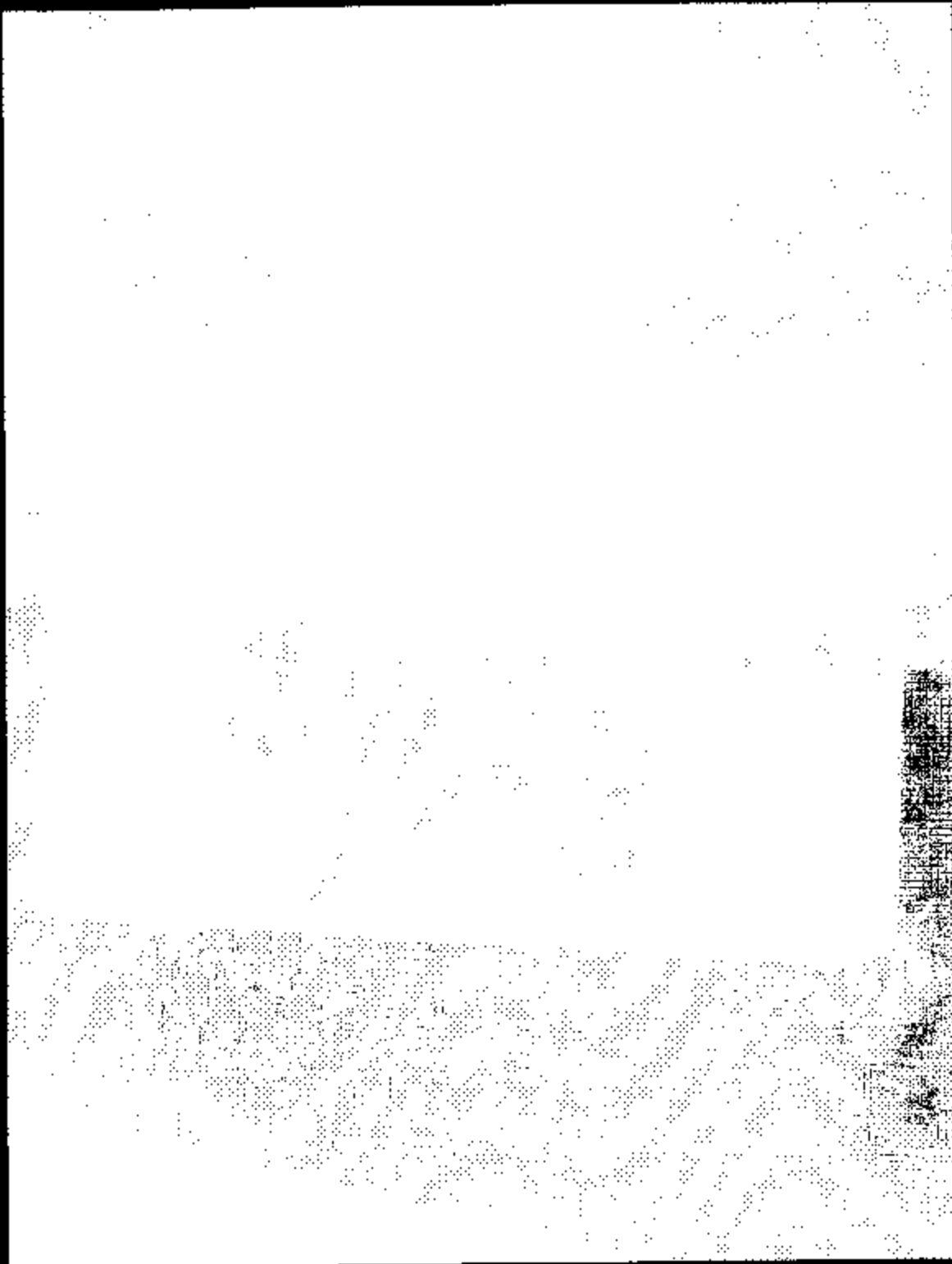
6.5 Test vehicle's certification label
6.5.1 Certification label photo #1



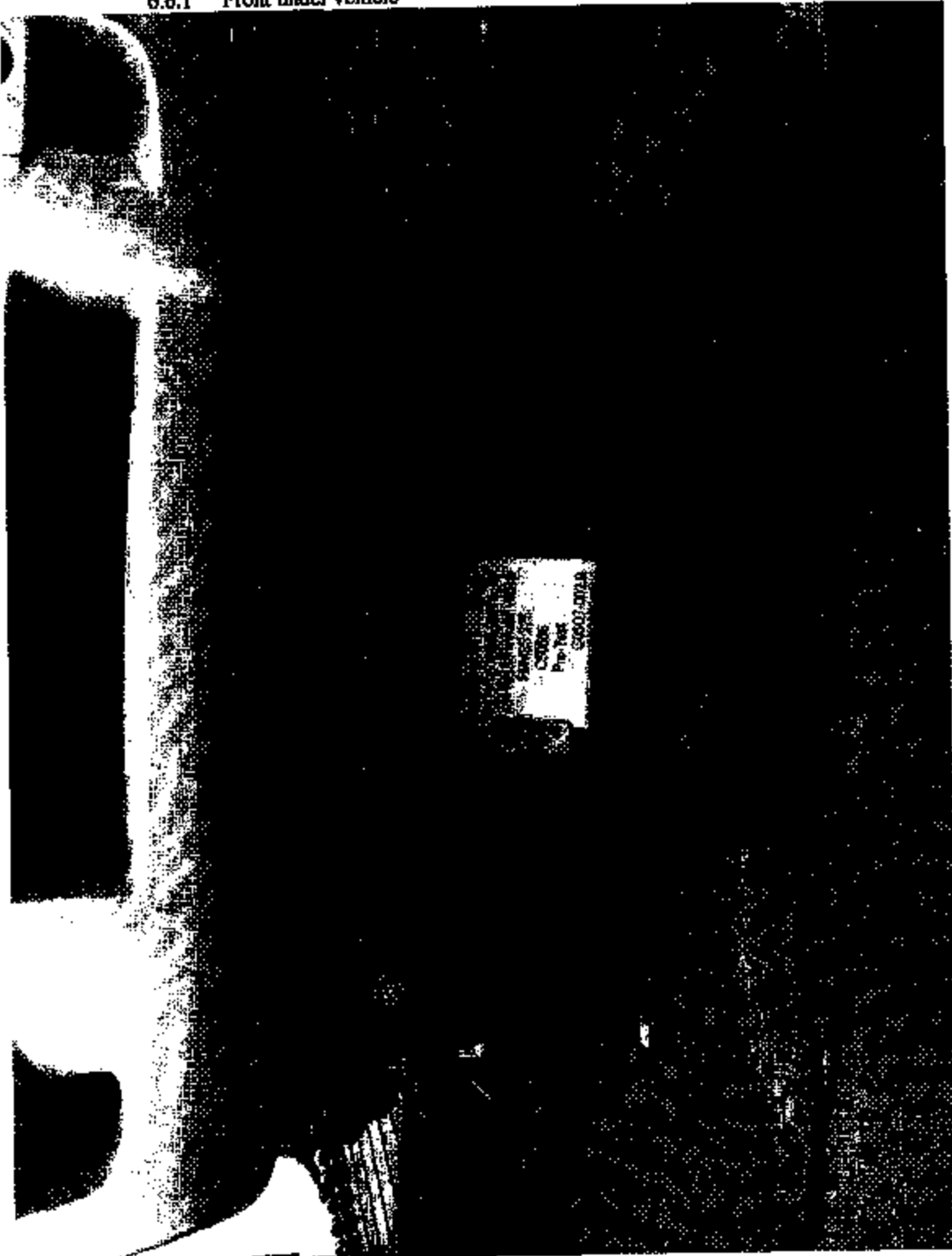
6.5.2 Certification label photo #2



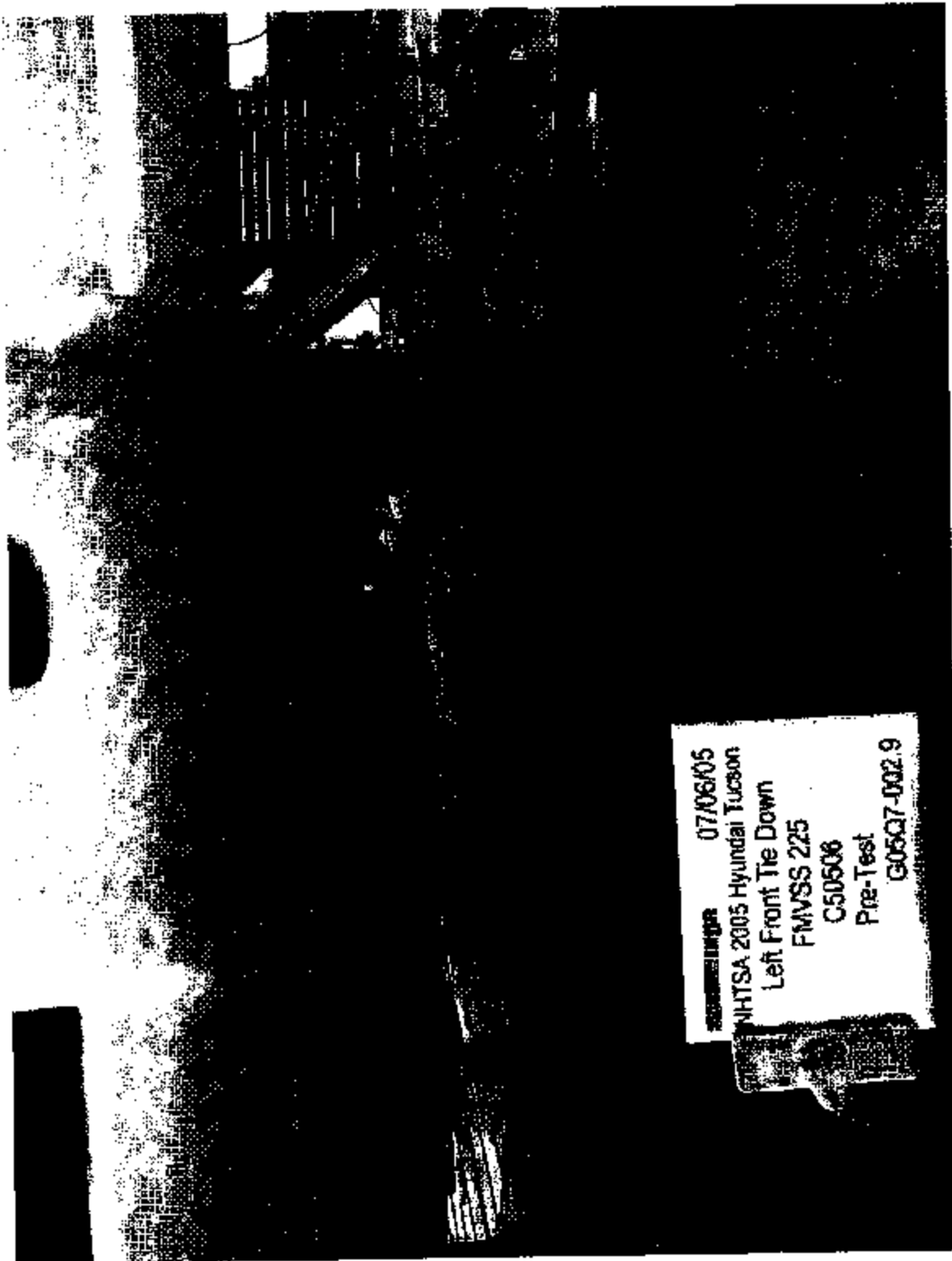
6.5.3 Tire information label



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

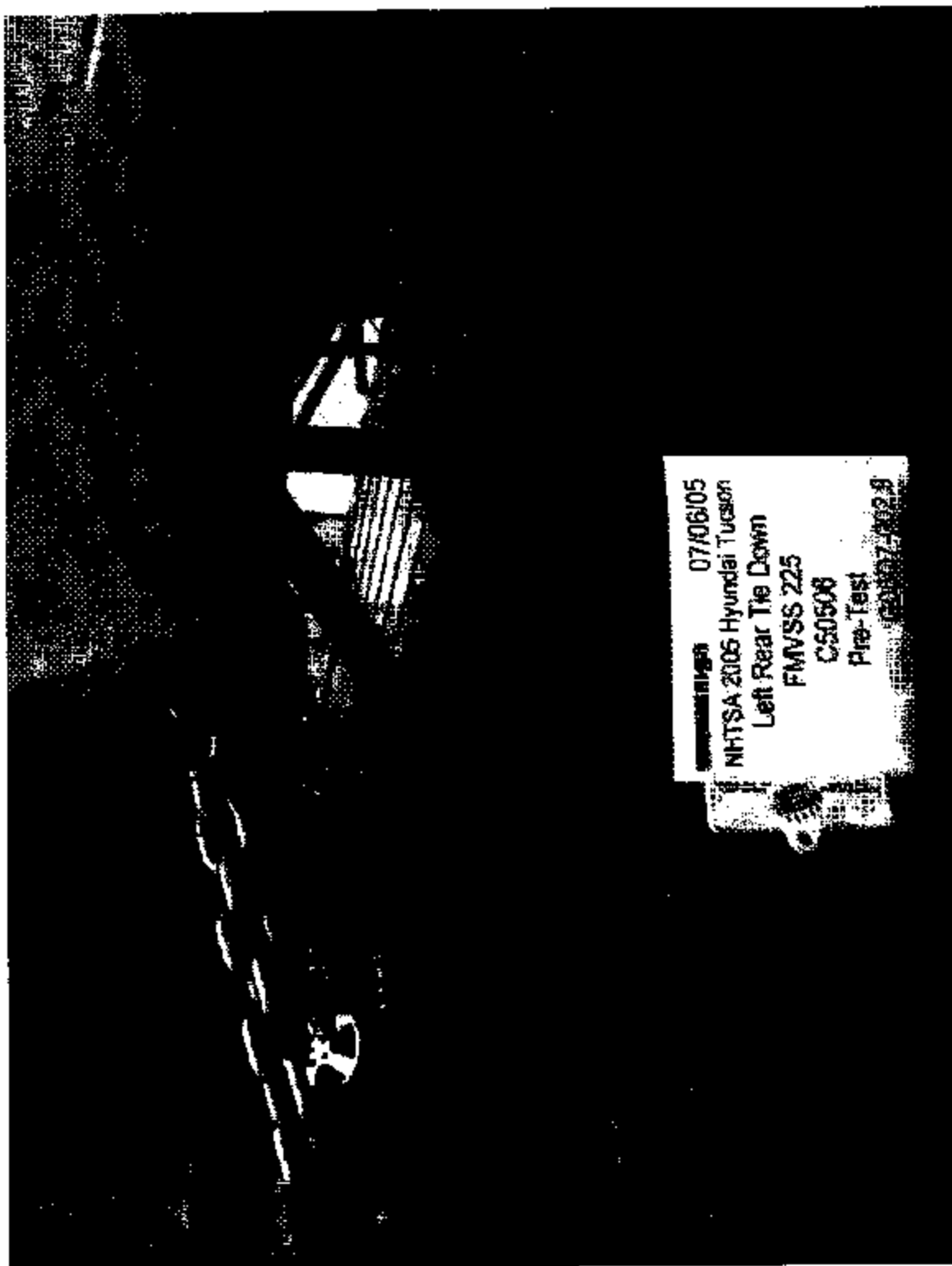


6.6.2 Left front



07/06/05
NHTSA 2005 Hyundai Tucson
Left Front Tie Down
FMVSS 225
C50506
Pre-Test
G05Q7-002.9

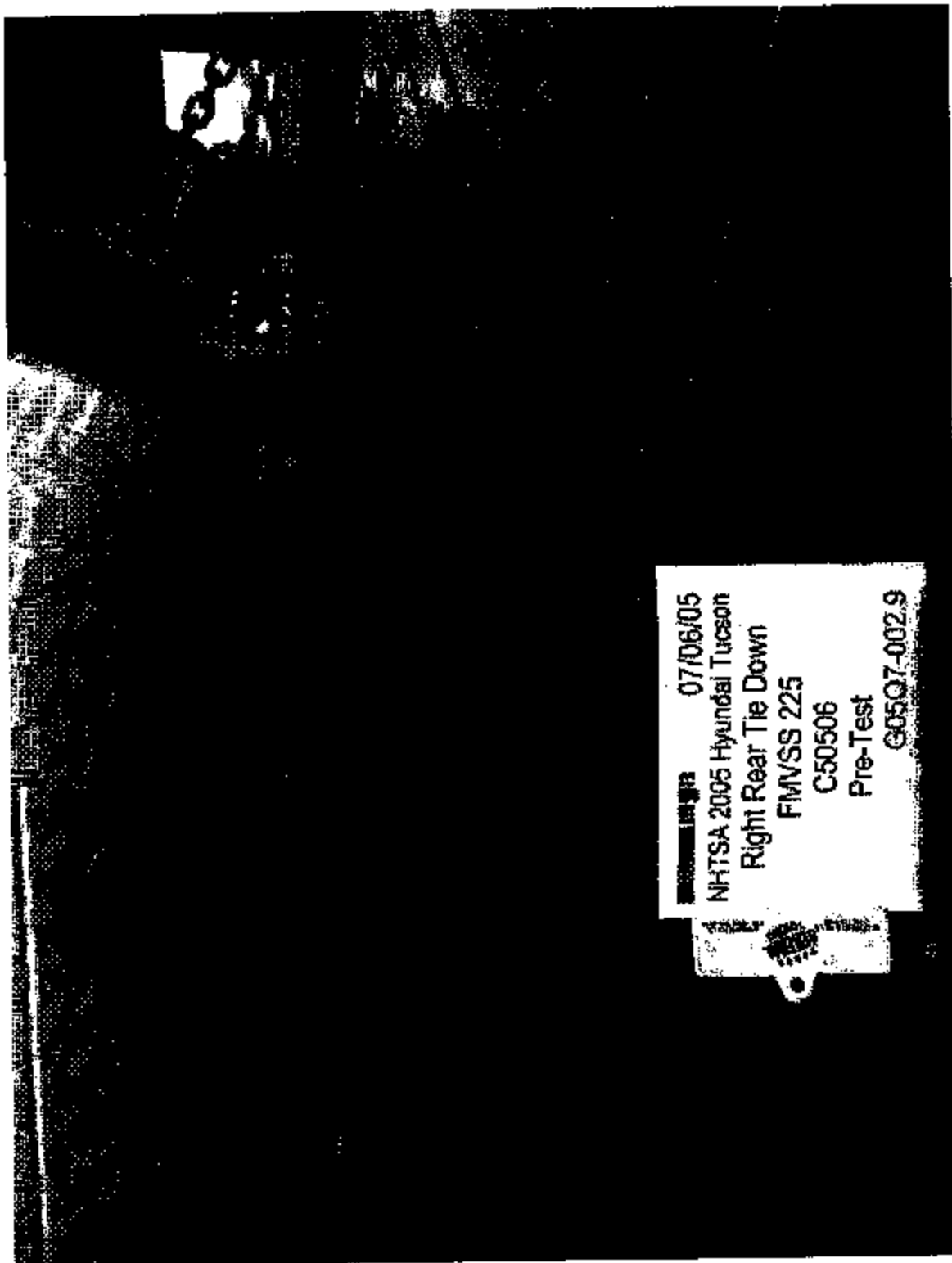
6.6.3 Left rear



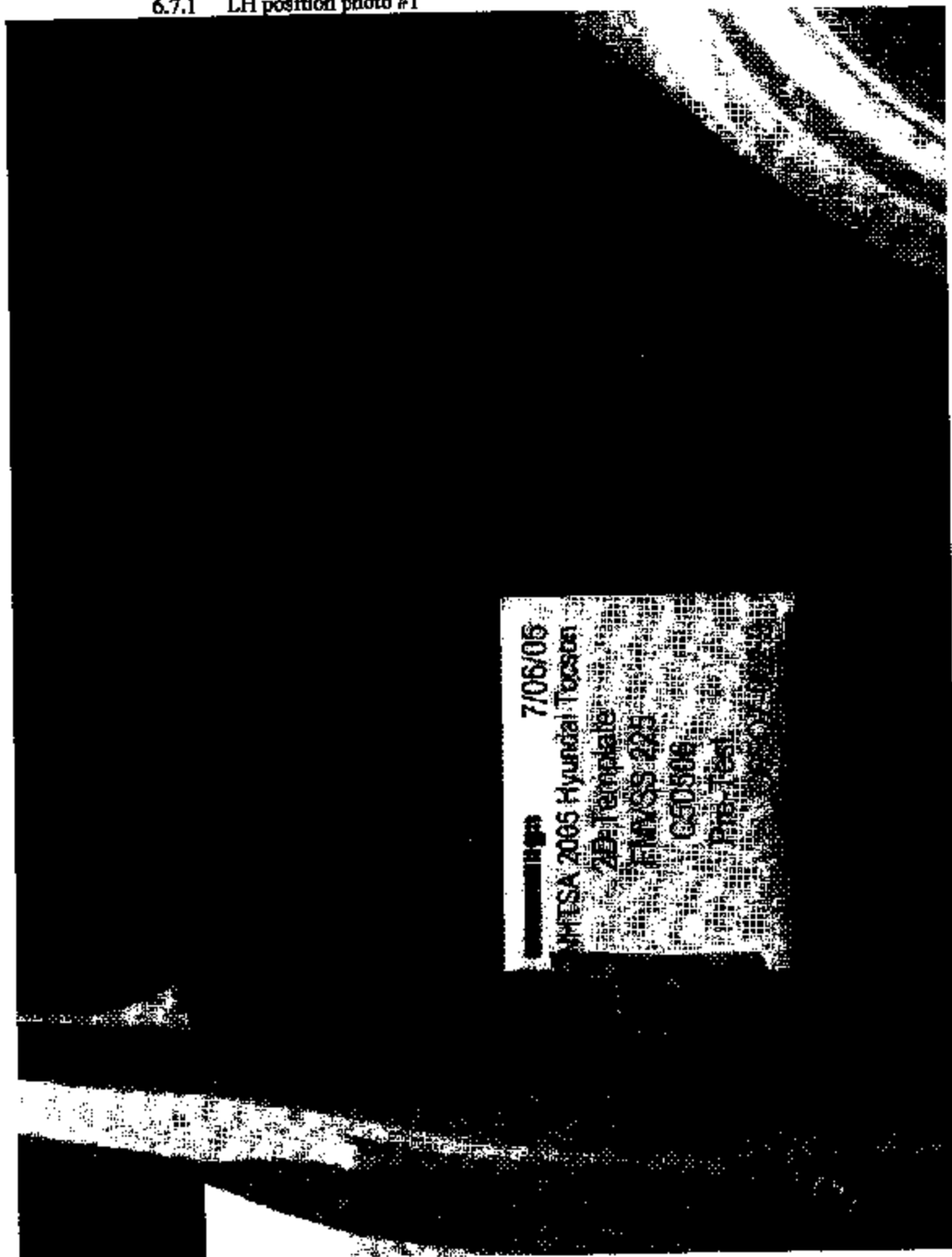
6.6.4 Right front



6.6.5 Right rear



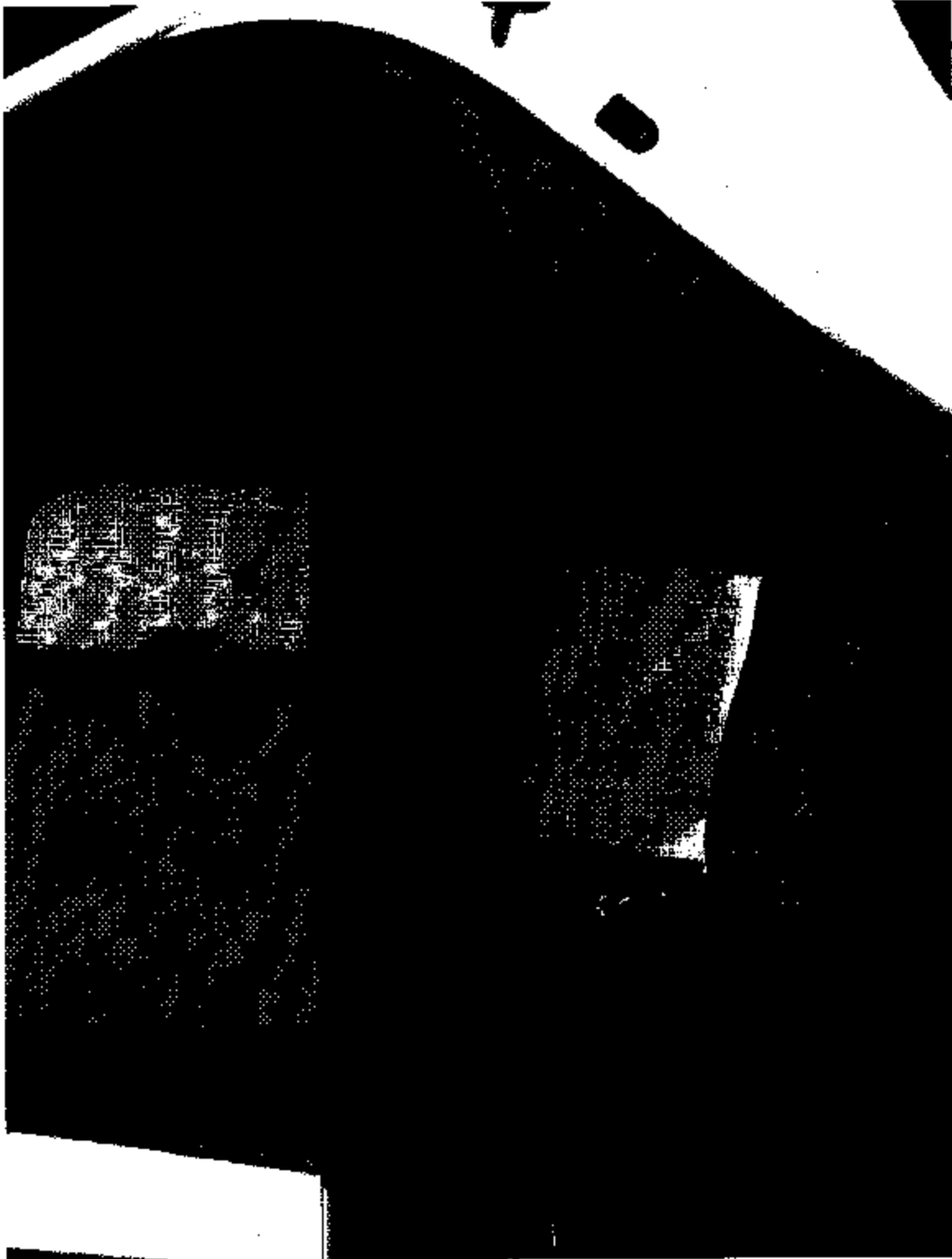
6.7 2-dimensional template
6.7.1 LH position photo #1



6.7.2 LH position photo #2



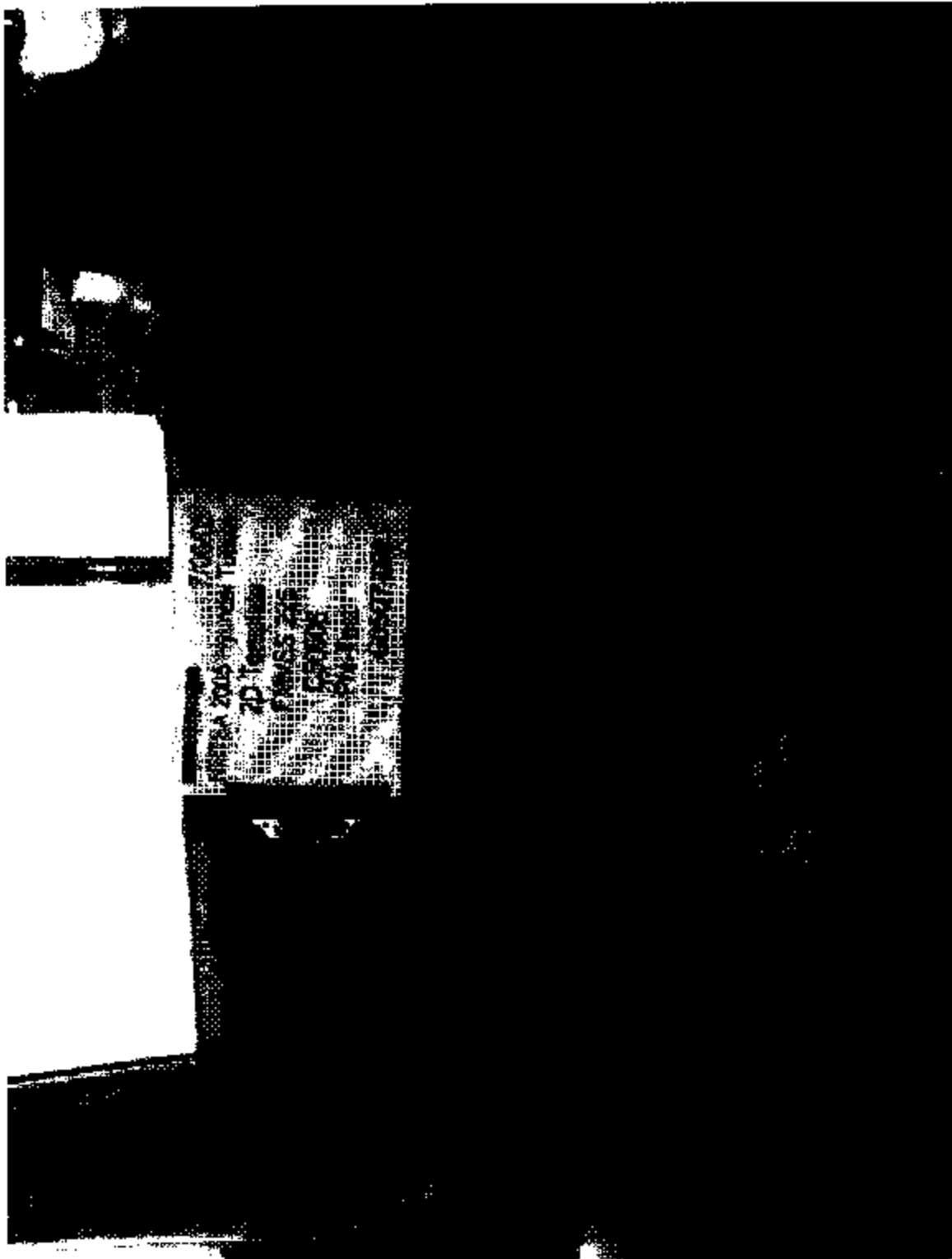
6.7.3 Center position photo #1



6.7.4 Center position photo #2



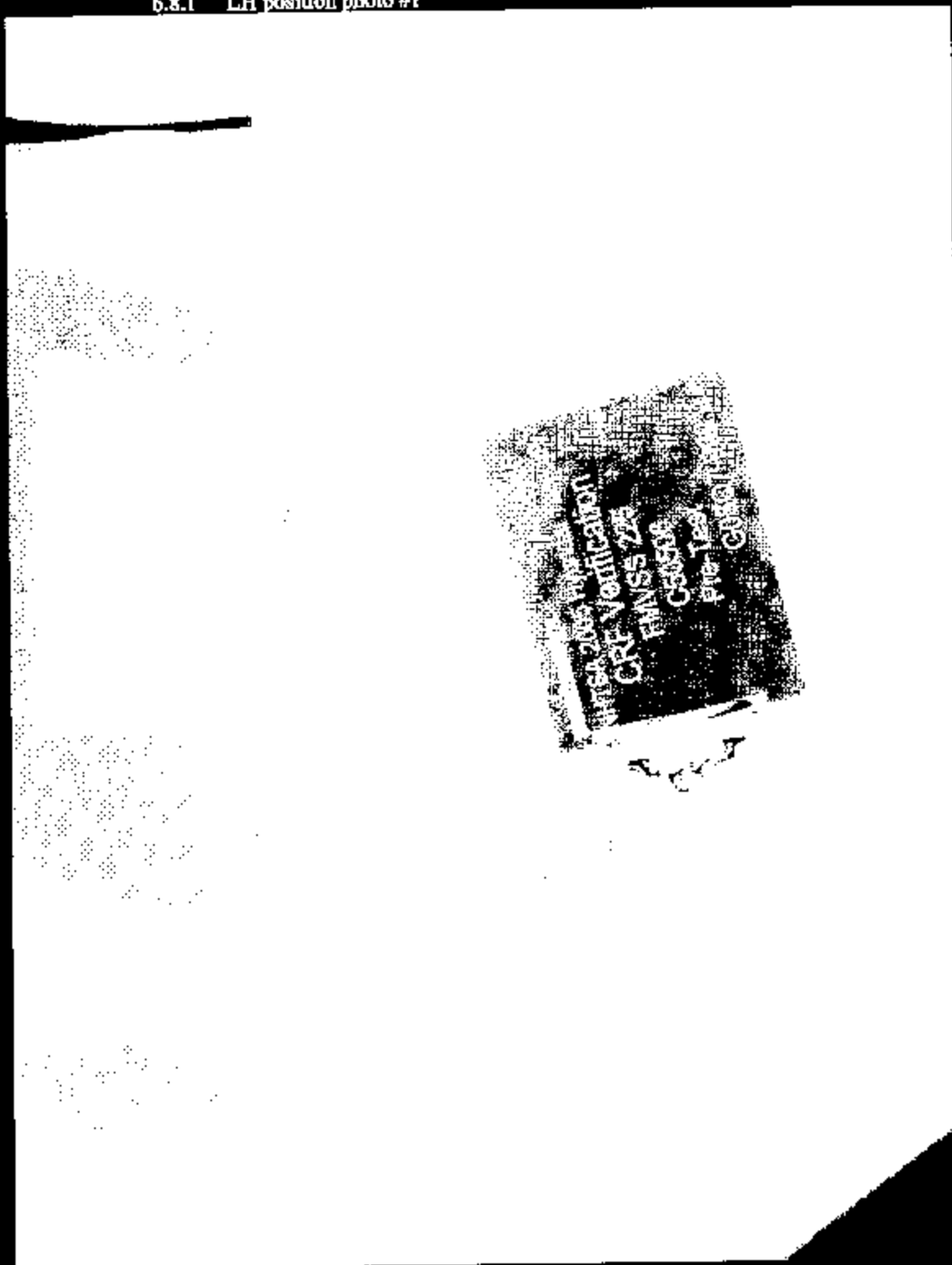
6.7.5 RH position photo #1



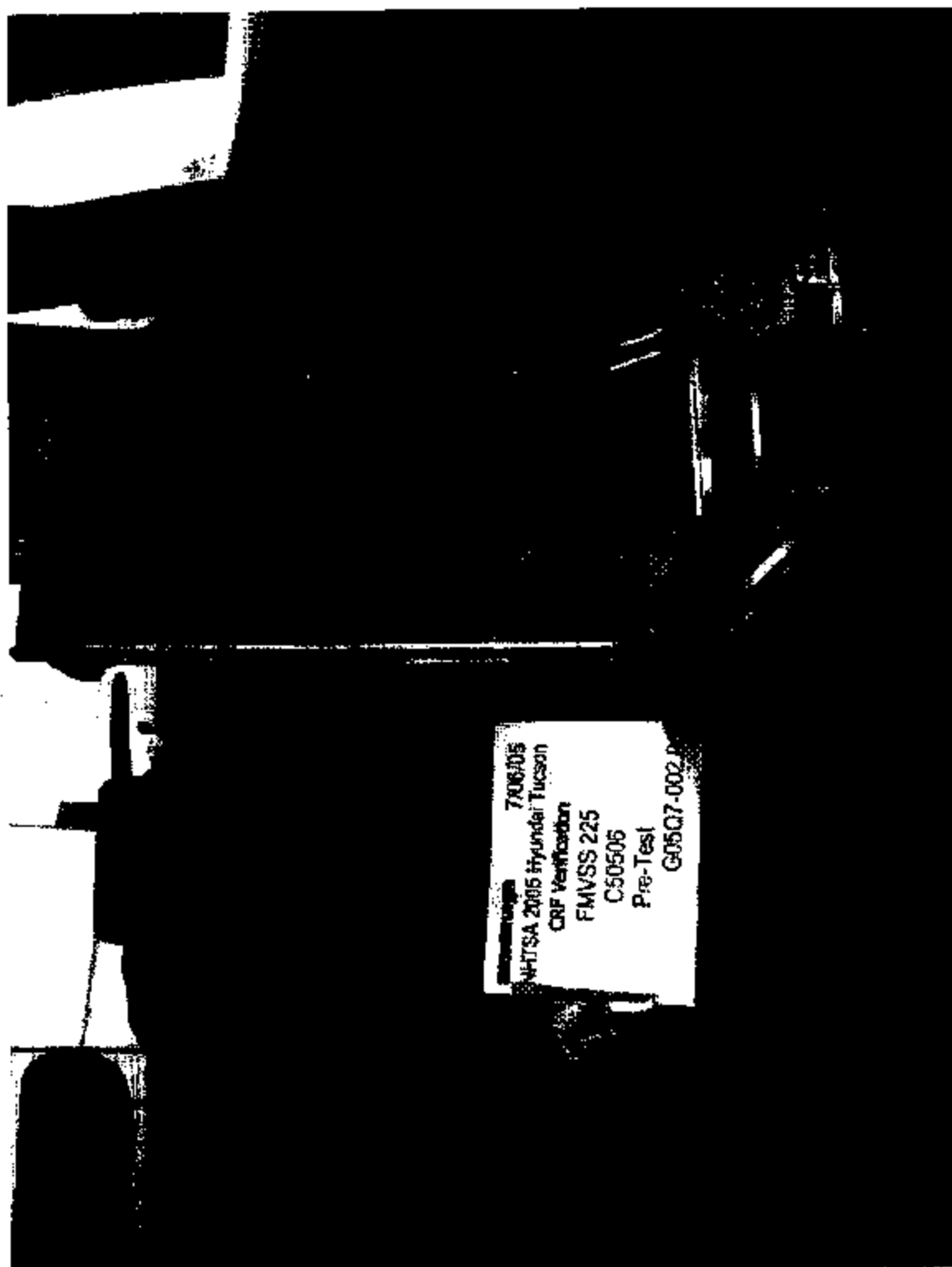
6.7.6 RH position photo #2



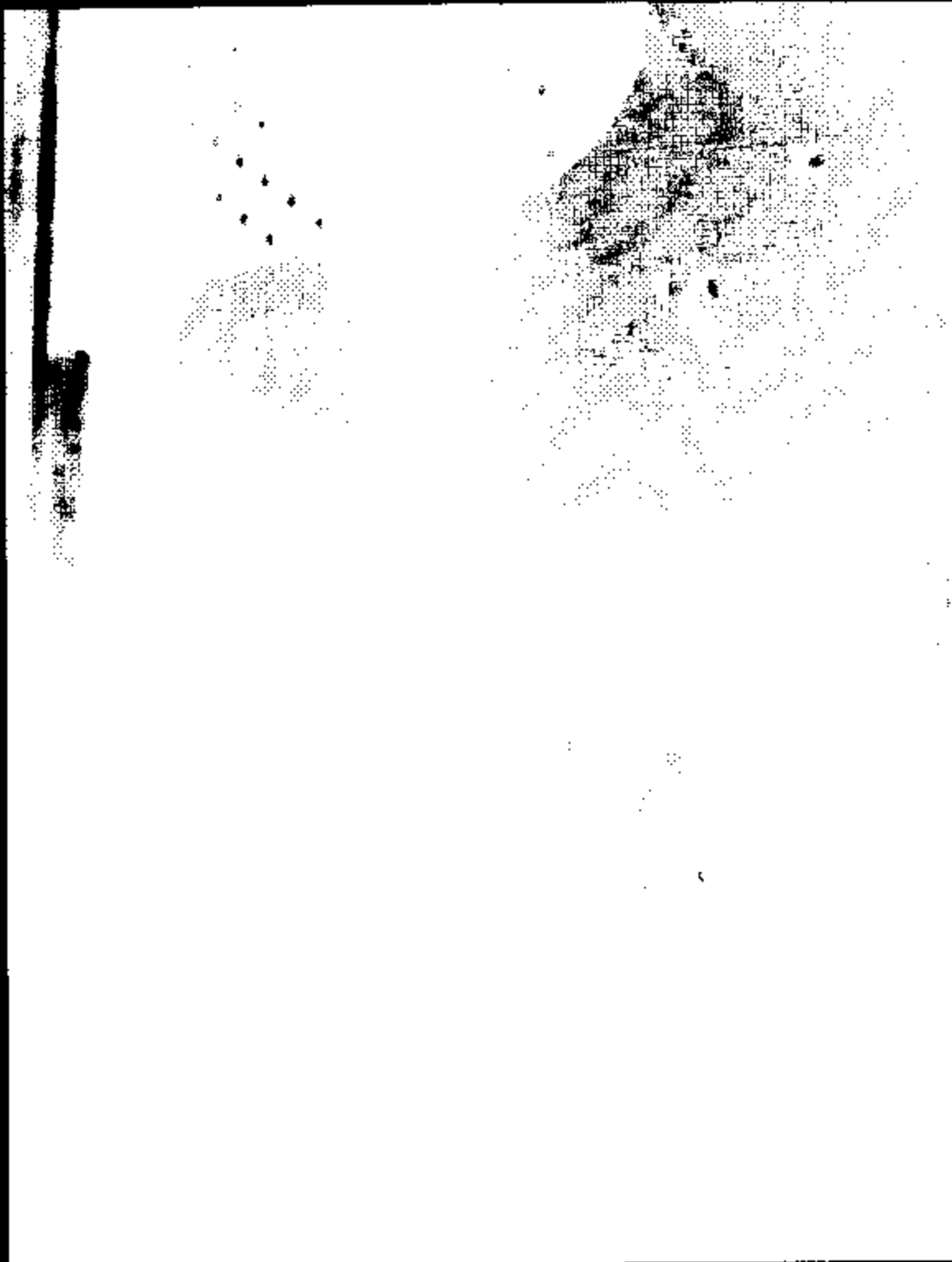
6.8 CRF verification
6.8.1 LH position photo #1



6.8.2 LH position photo #2



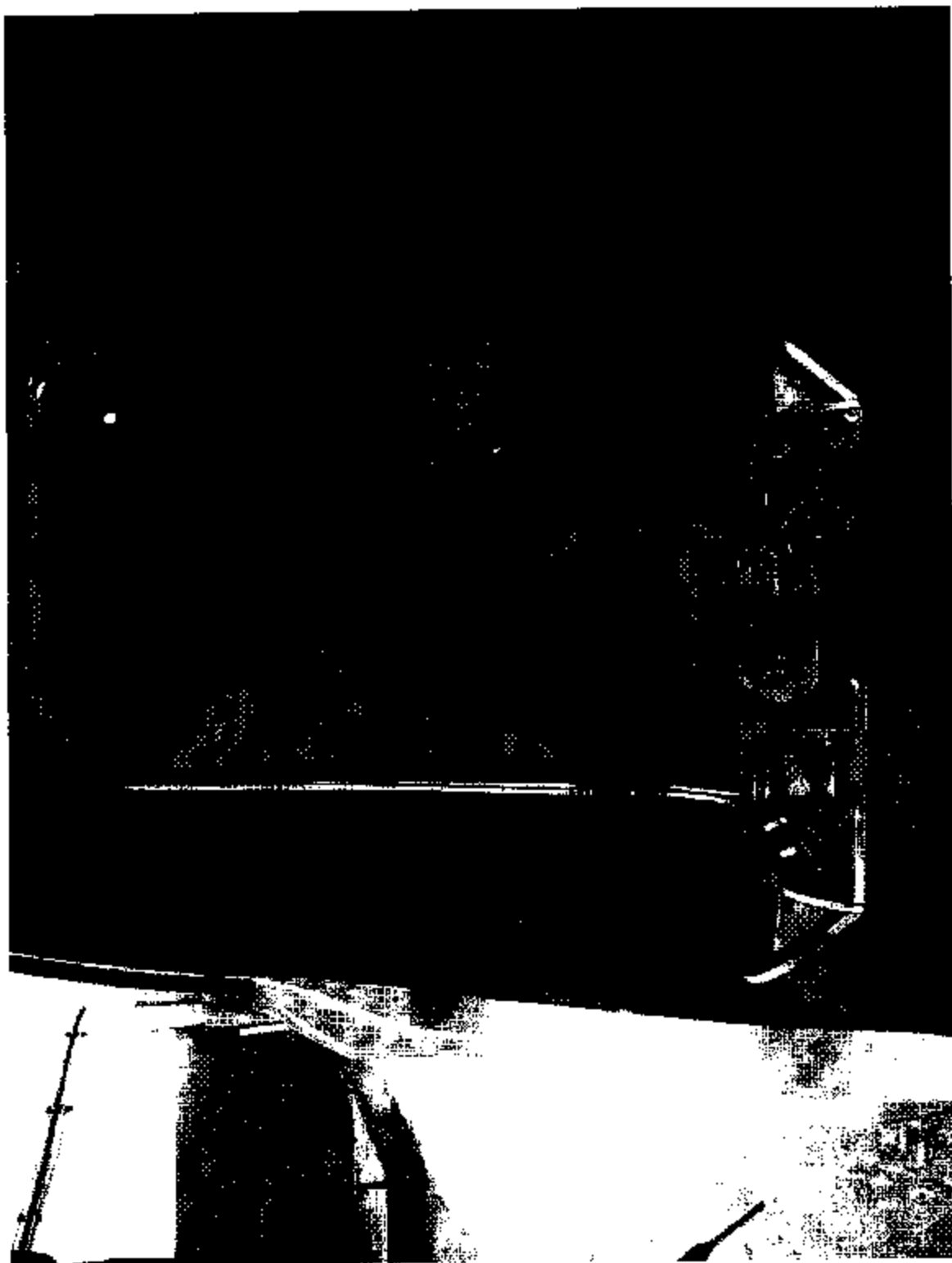
6.8.3 LH position photo #3



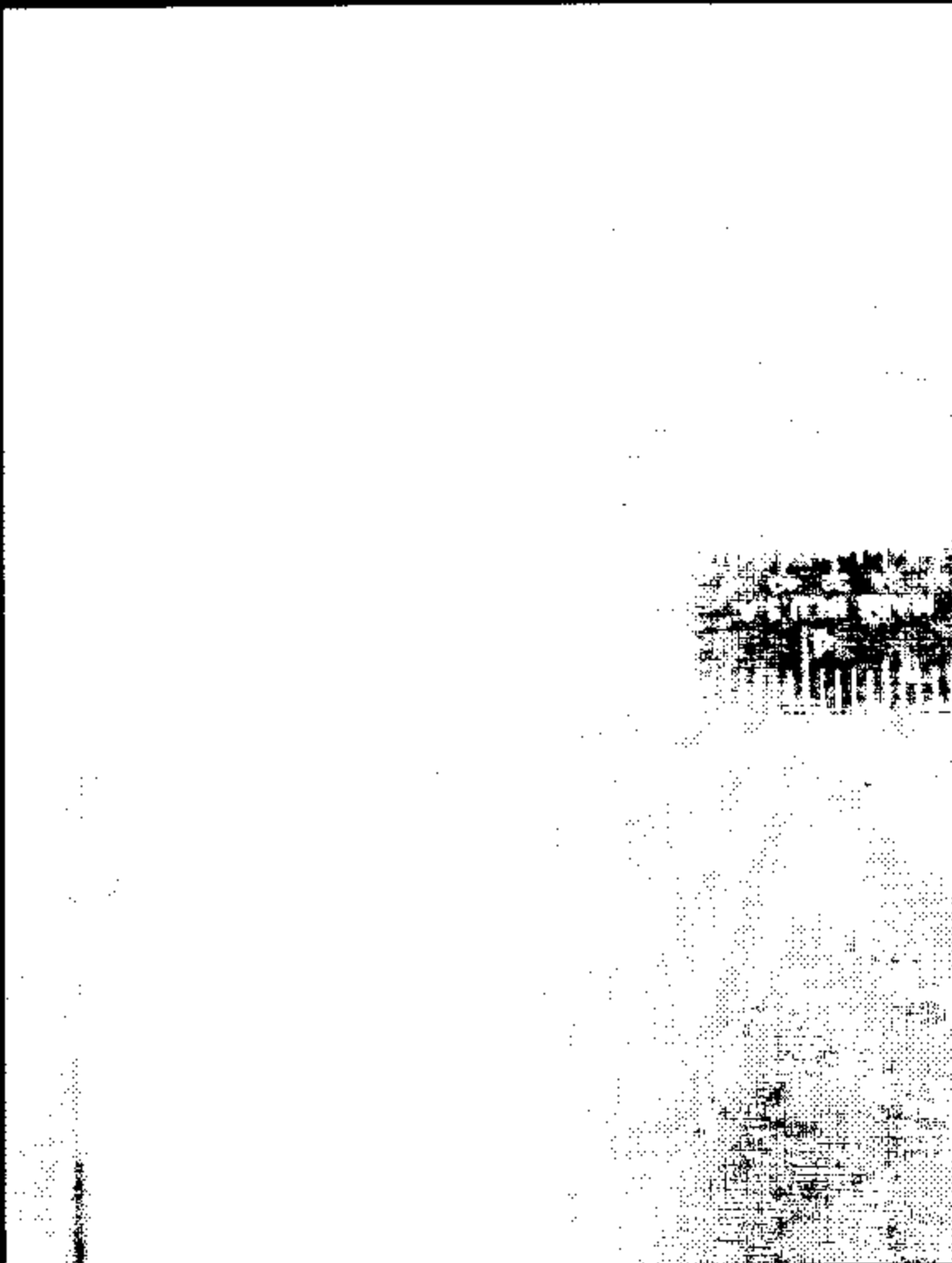
6.8.4 RH position photo #1



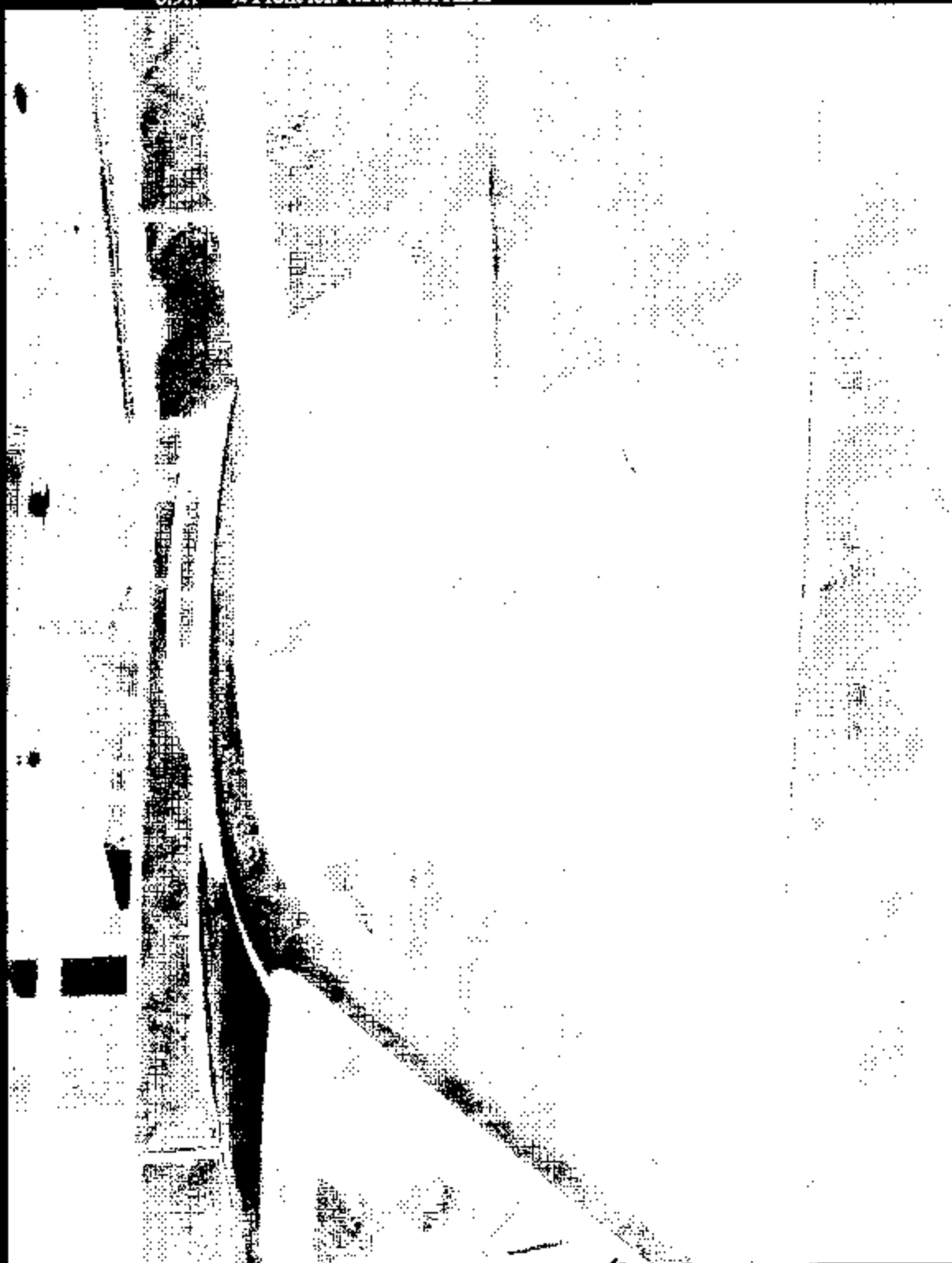
6.8.5 RH position photo #2



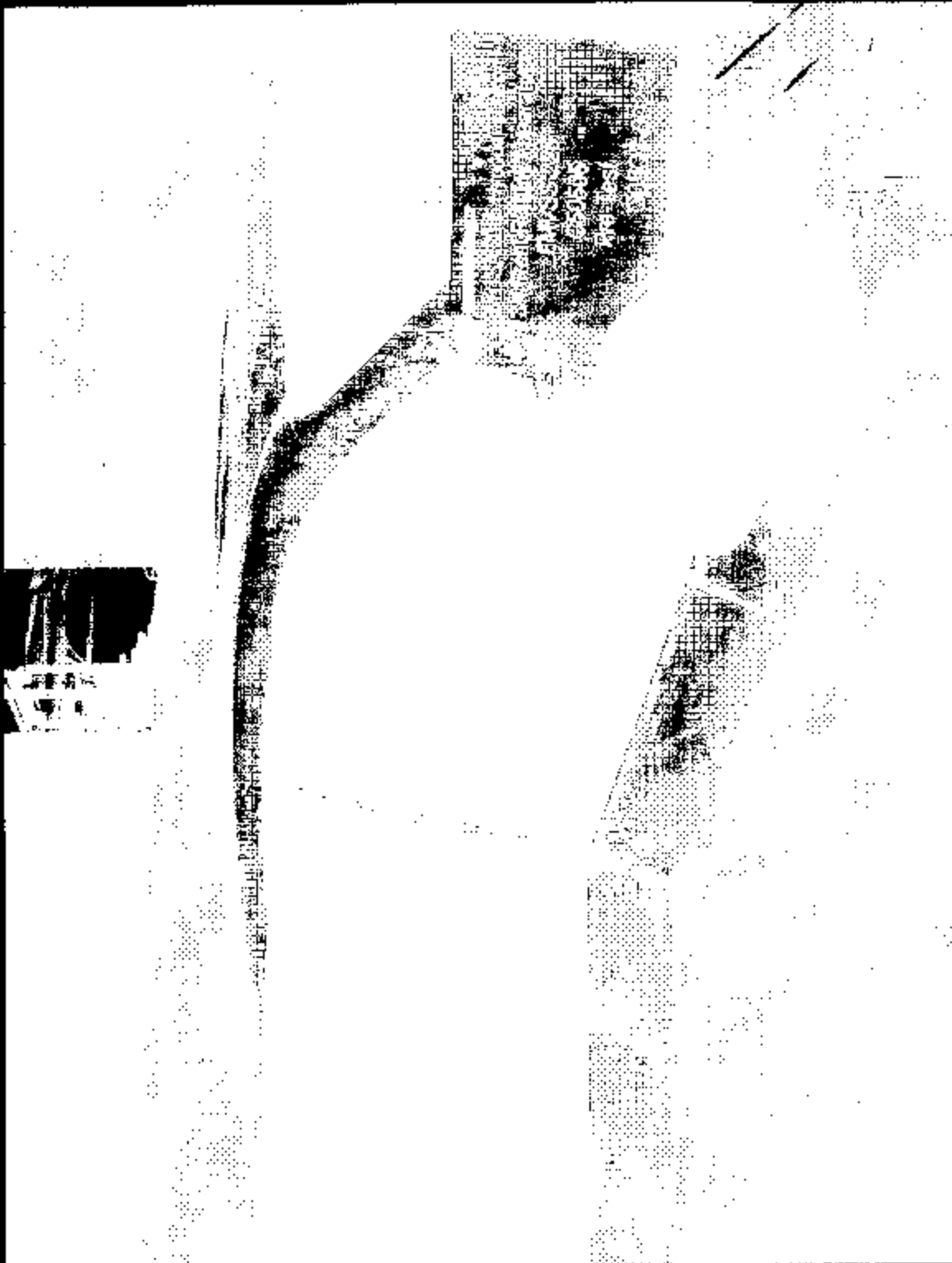
6.8.6 RH position photo #3



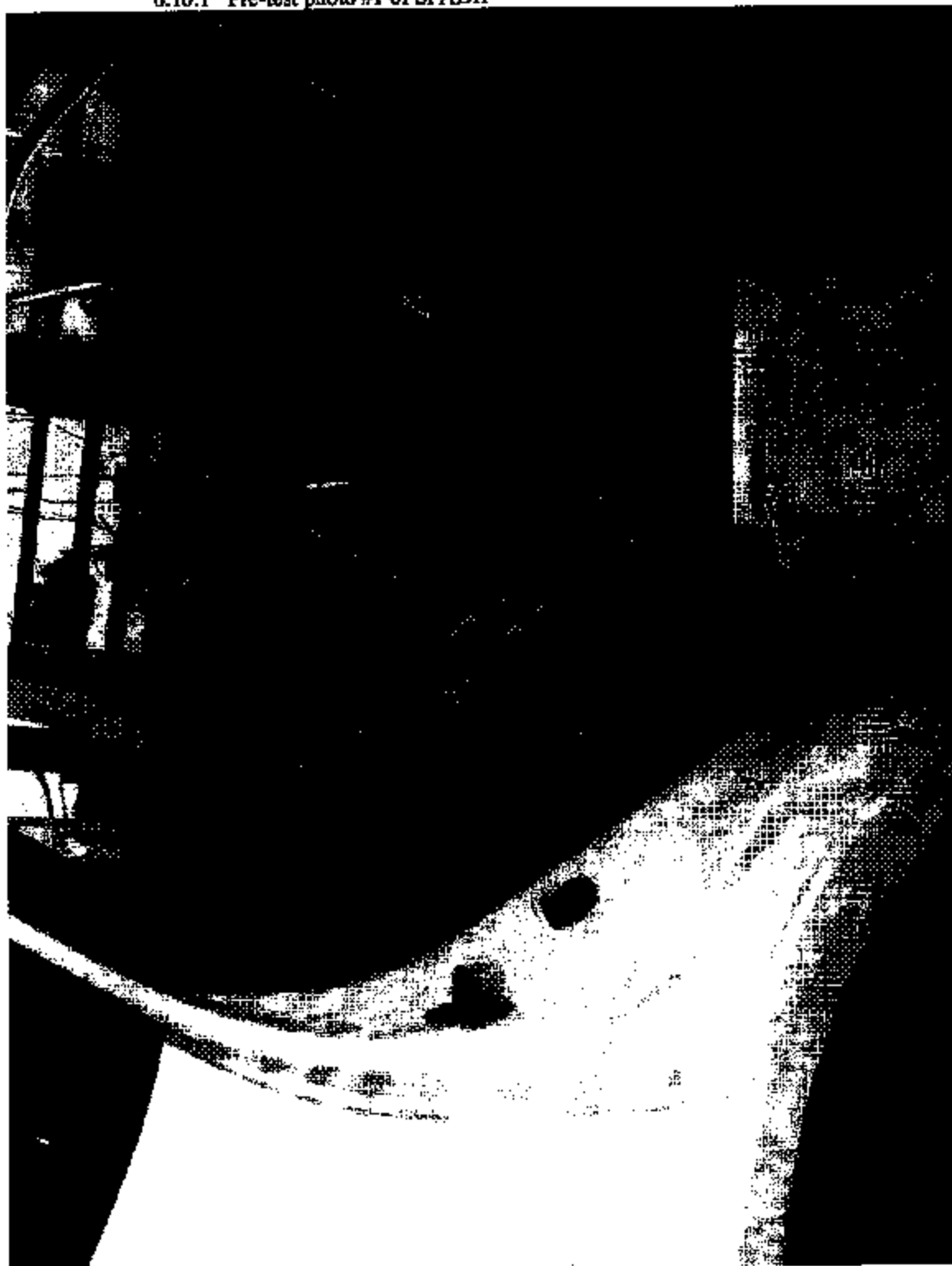
- 6.9 ¾ Front view of test vehicle with test apparatus in place
6.9.1 ¾ Front left view of SFADH



6.9.2 ¾ Front right view of SFADII



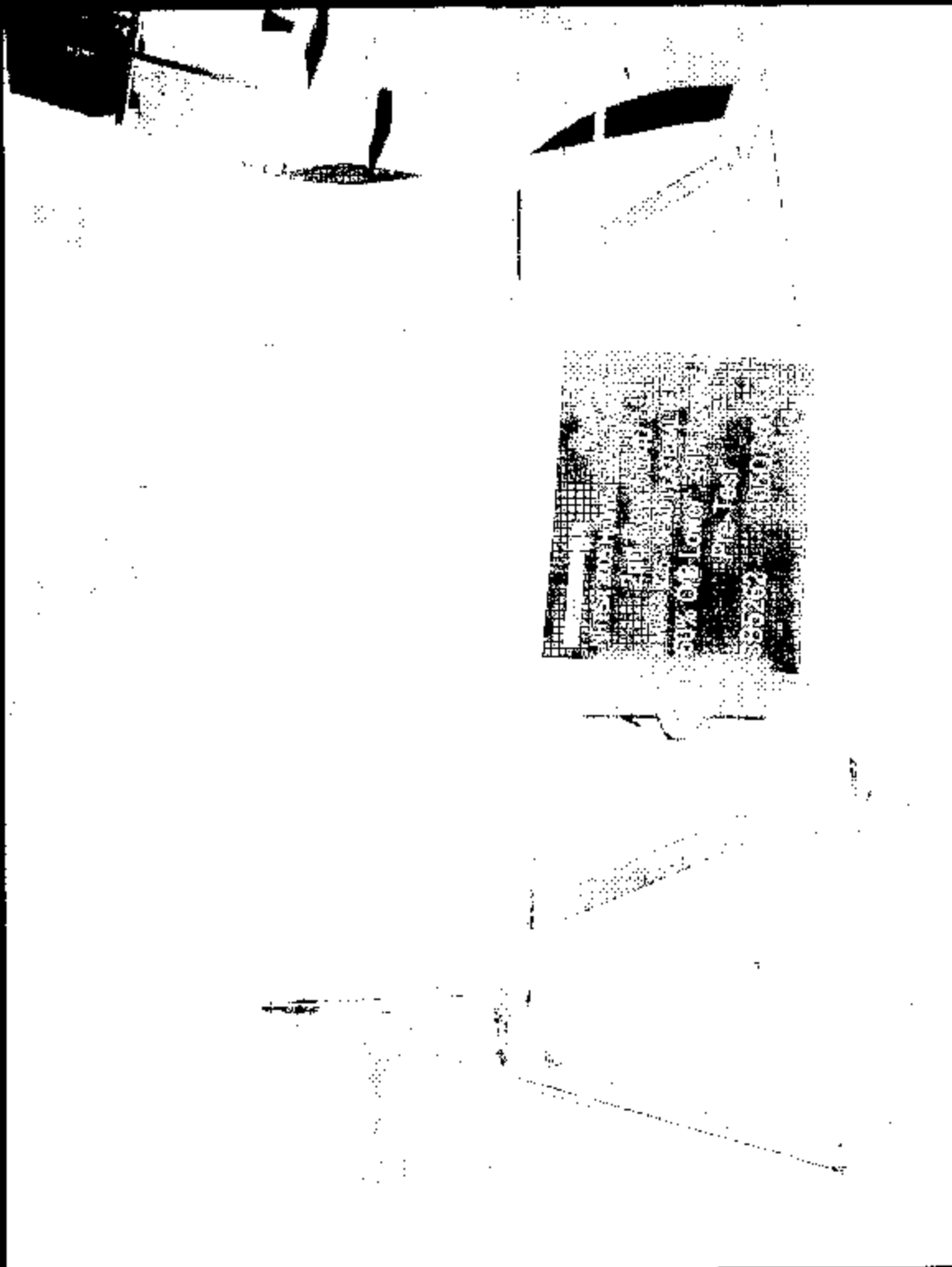
- 6.10 Pre-test views of each child restraint anchorage system installed in the vehicle
6.10.1 Pre-test photo #1 of SFADII



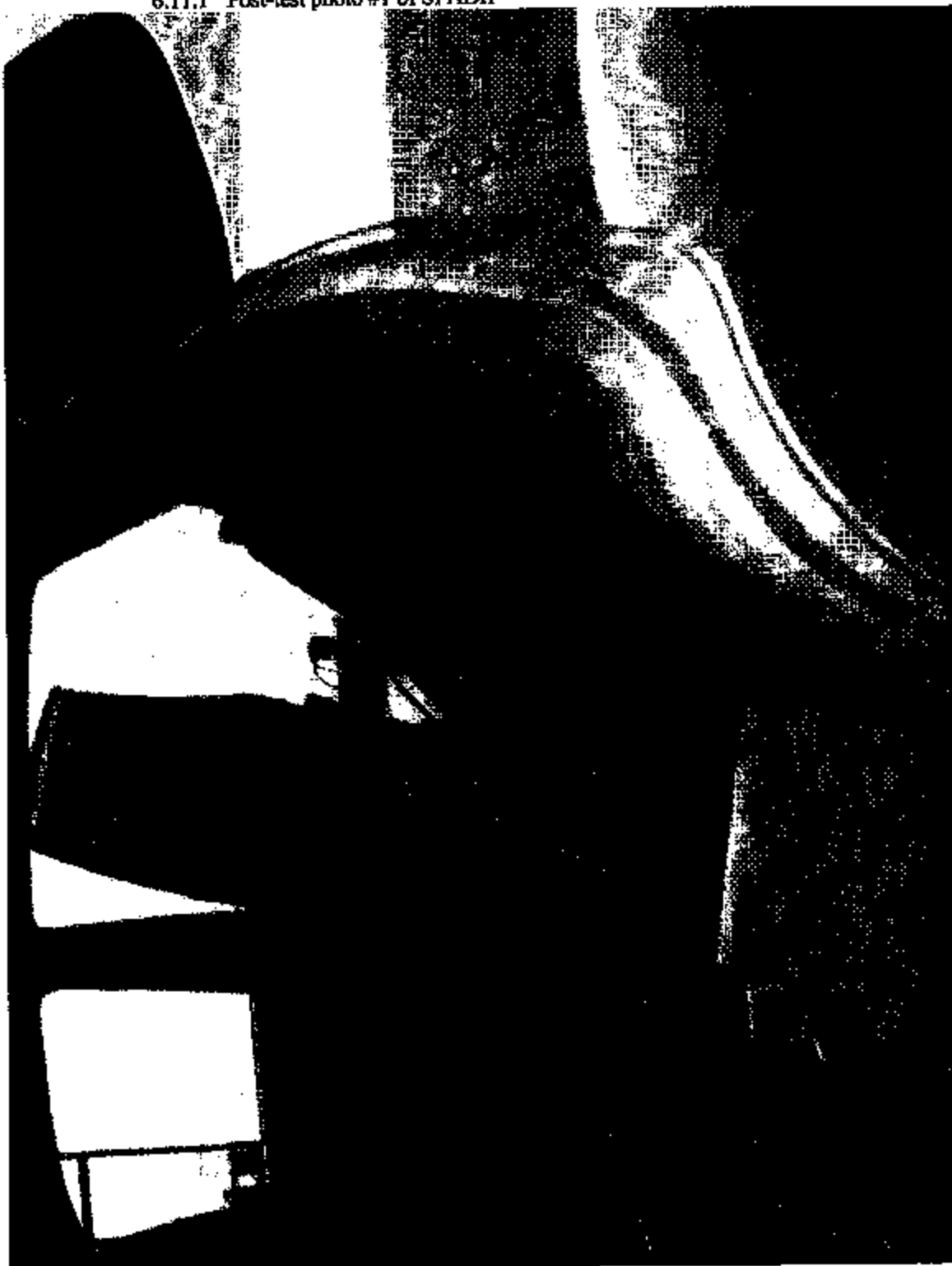
6.10.2 Pre-test photo #2 of SFADII



6.10.3 Pre-test photo #3 of SFADII



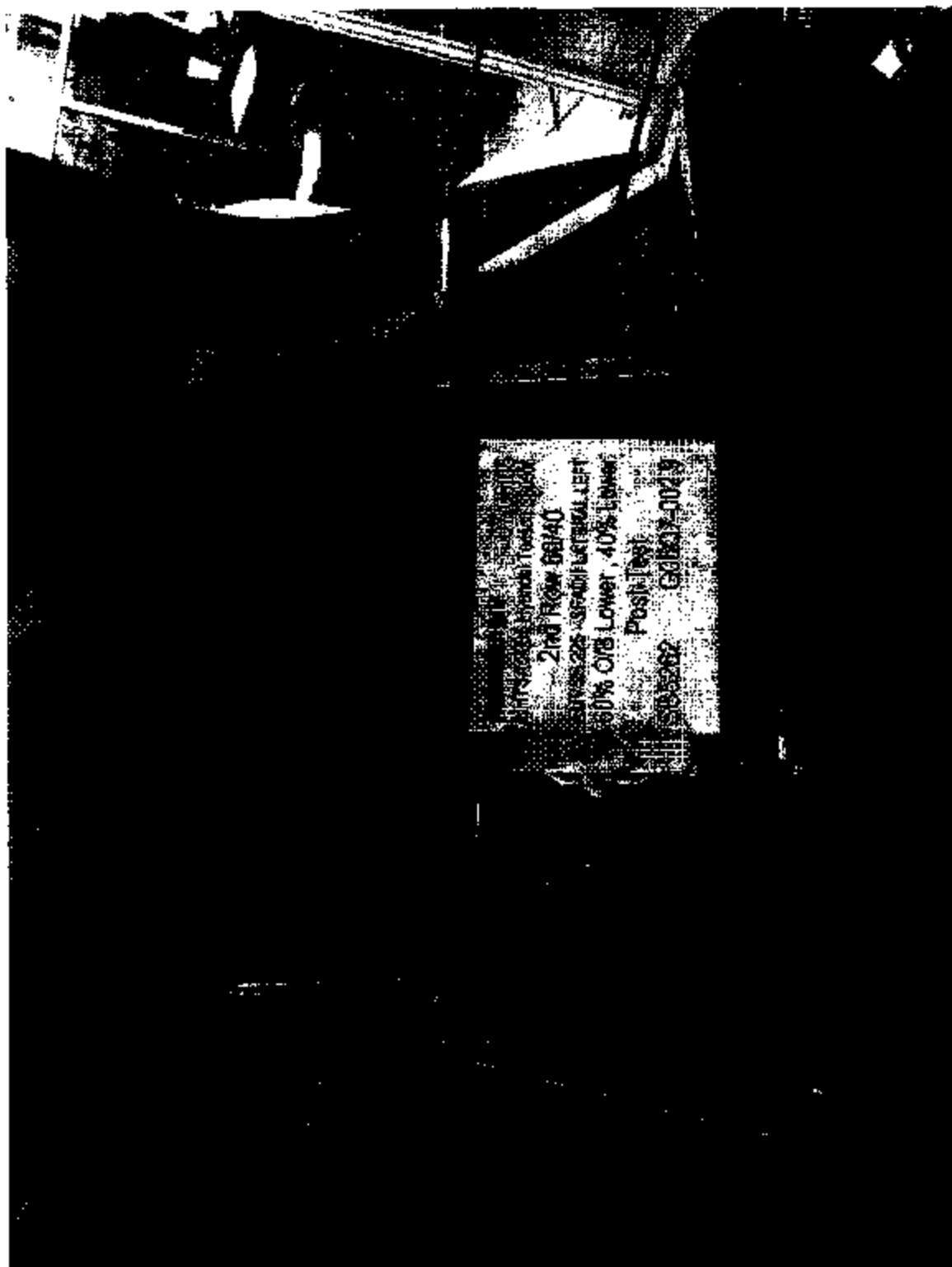
- 6.11 Post-test condition of each child restraint anchorage system
6.11.1 Post-test photo #1 of SFADII



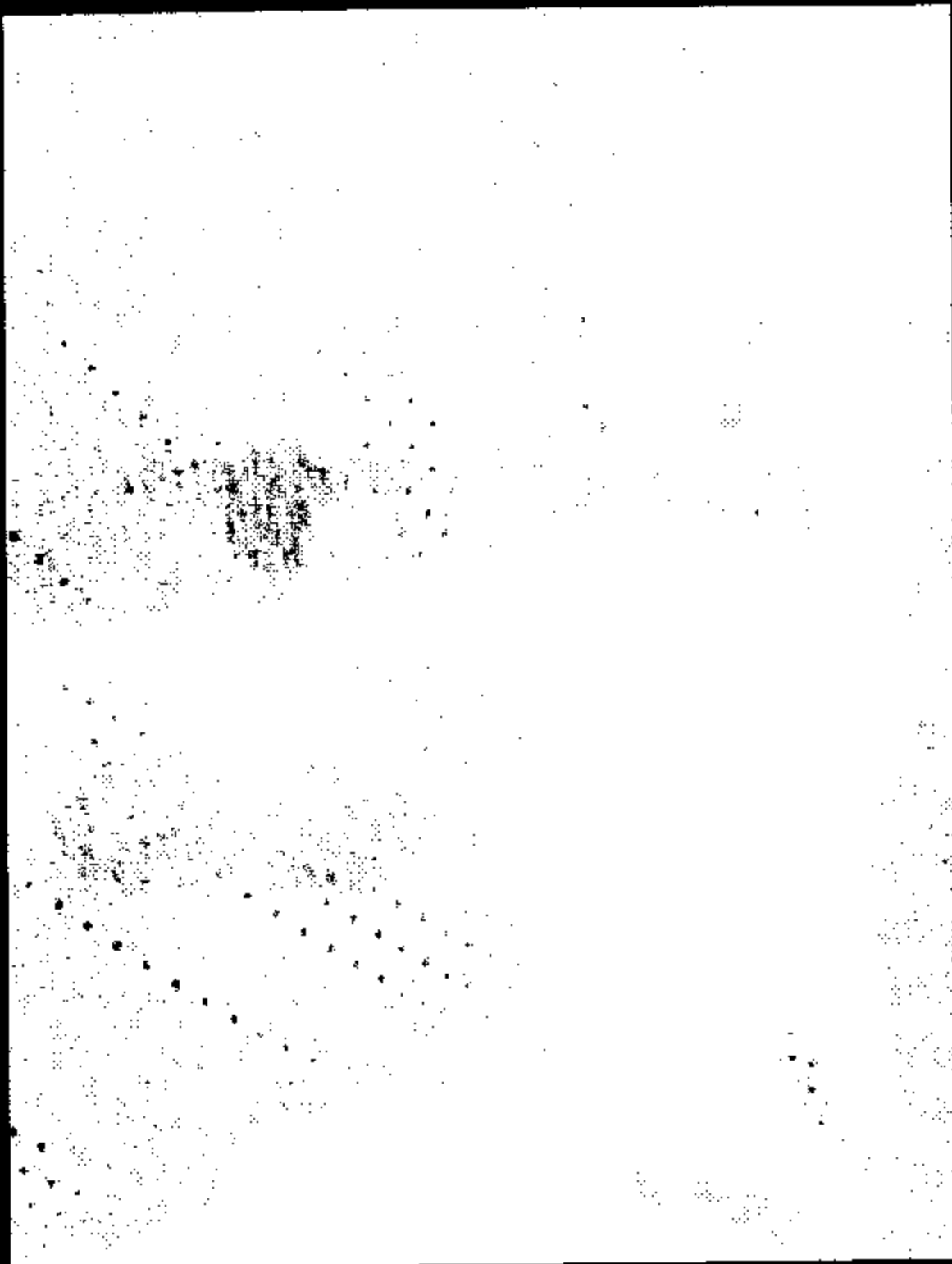
6.11.2 Post-test photo #2 of SFADII



6.11.3 Post-test photo #3 of SPADII



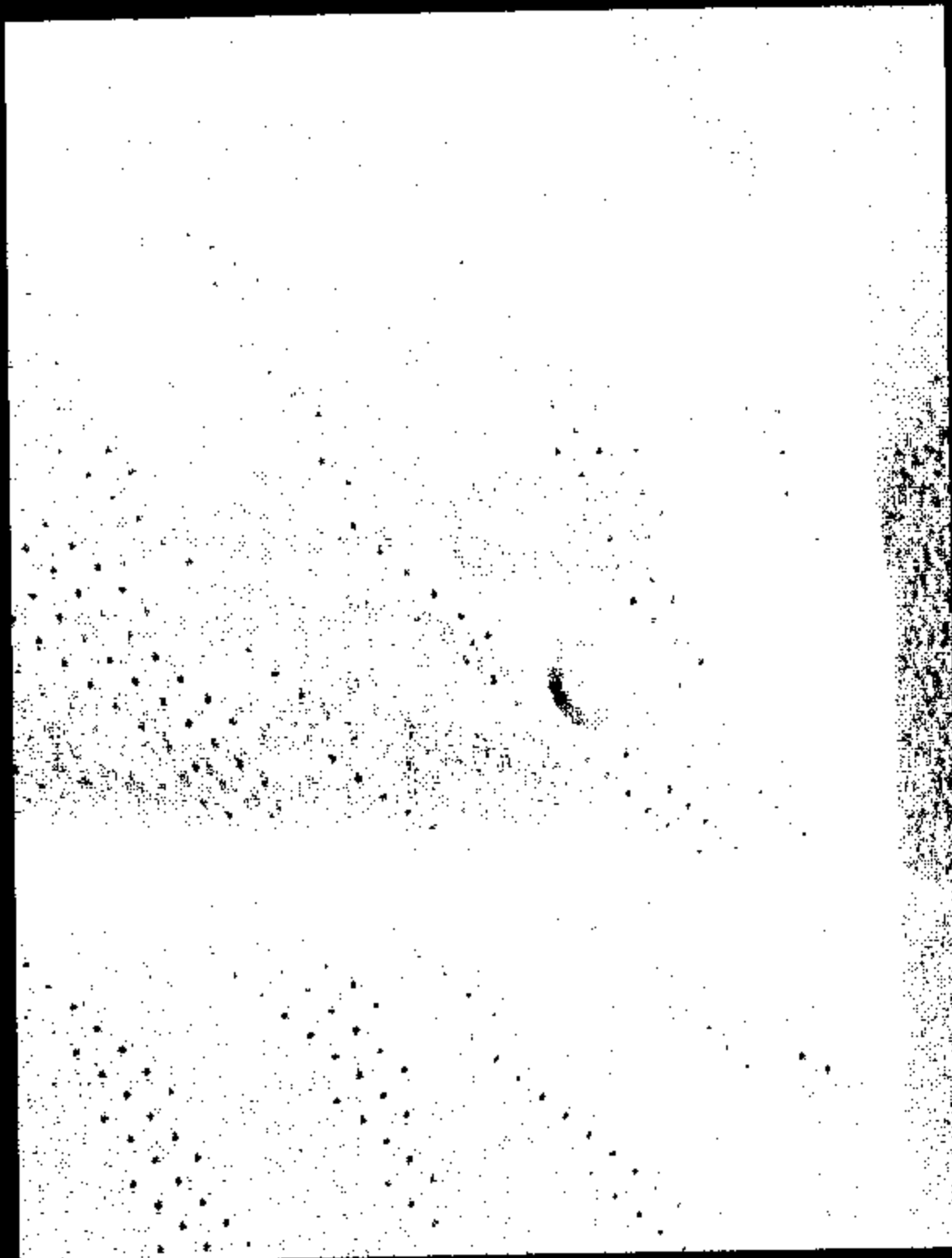
6.11.4 Post-test photo #4 of SFADII



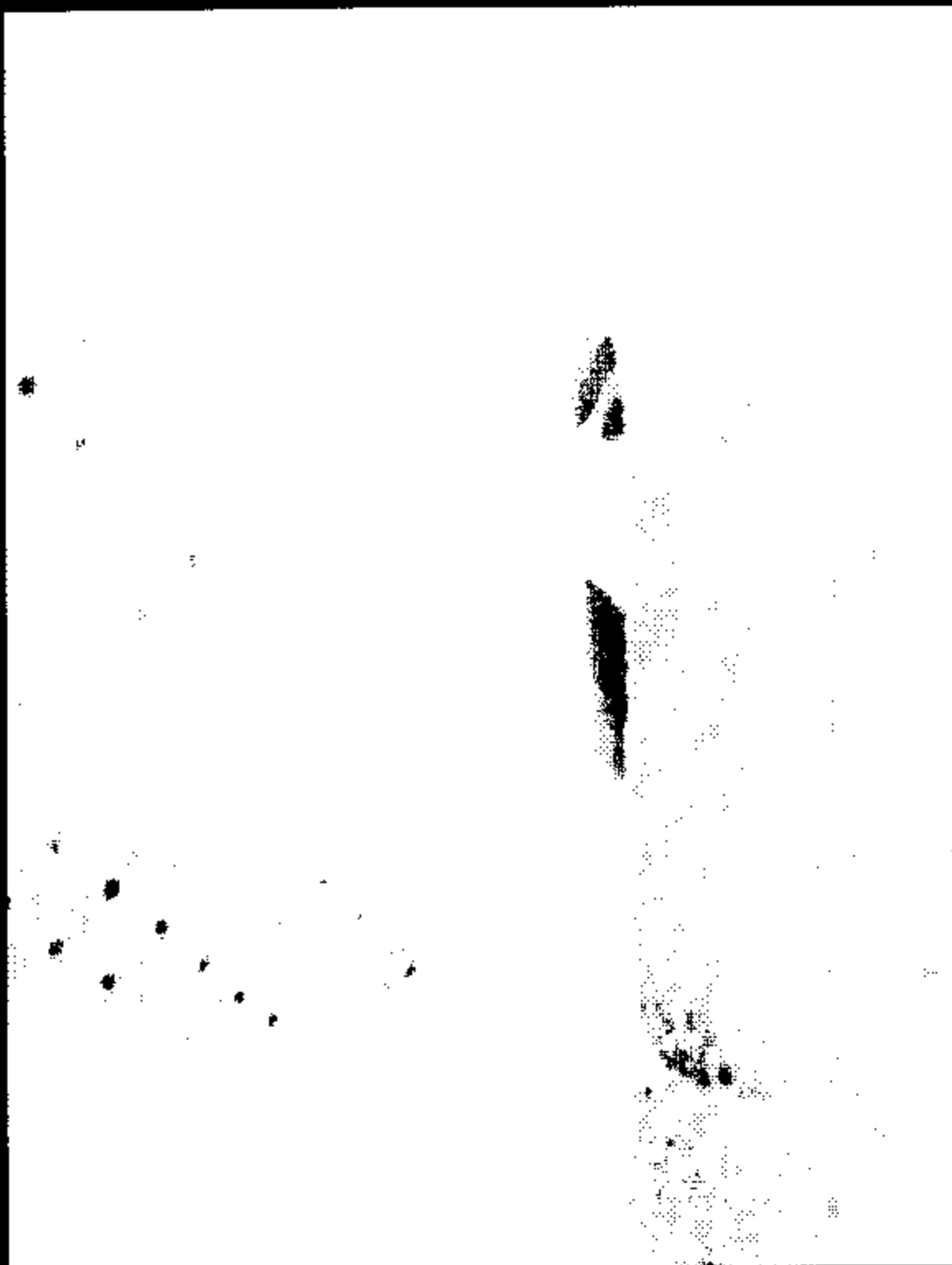
6.11.5 Post-test photo #5 of SFADII



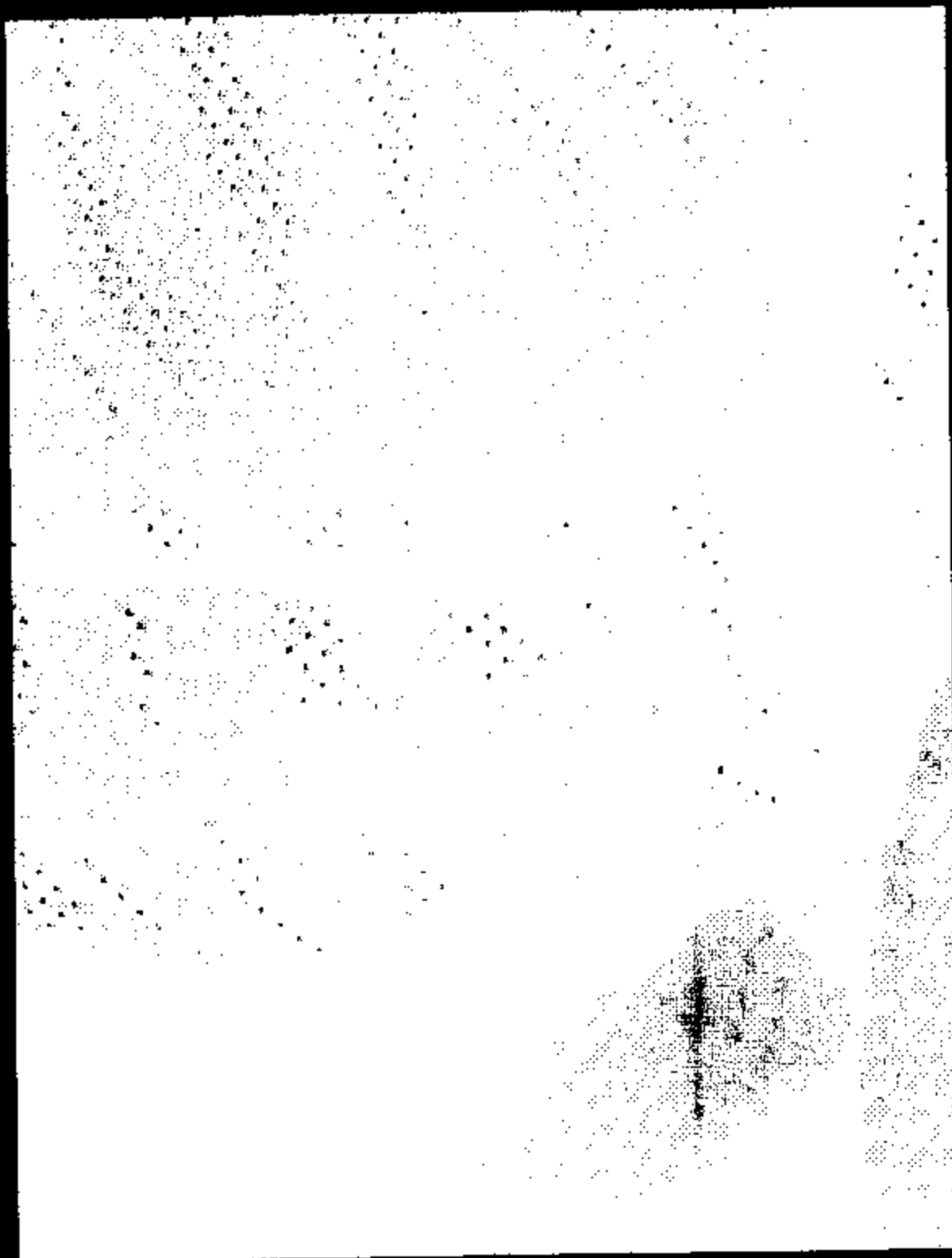
6.11.6 Post-test photo #6 of SPADII



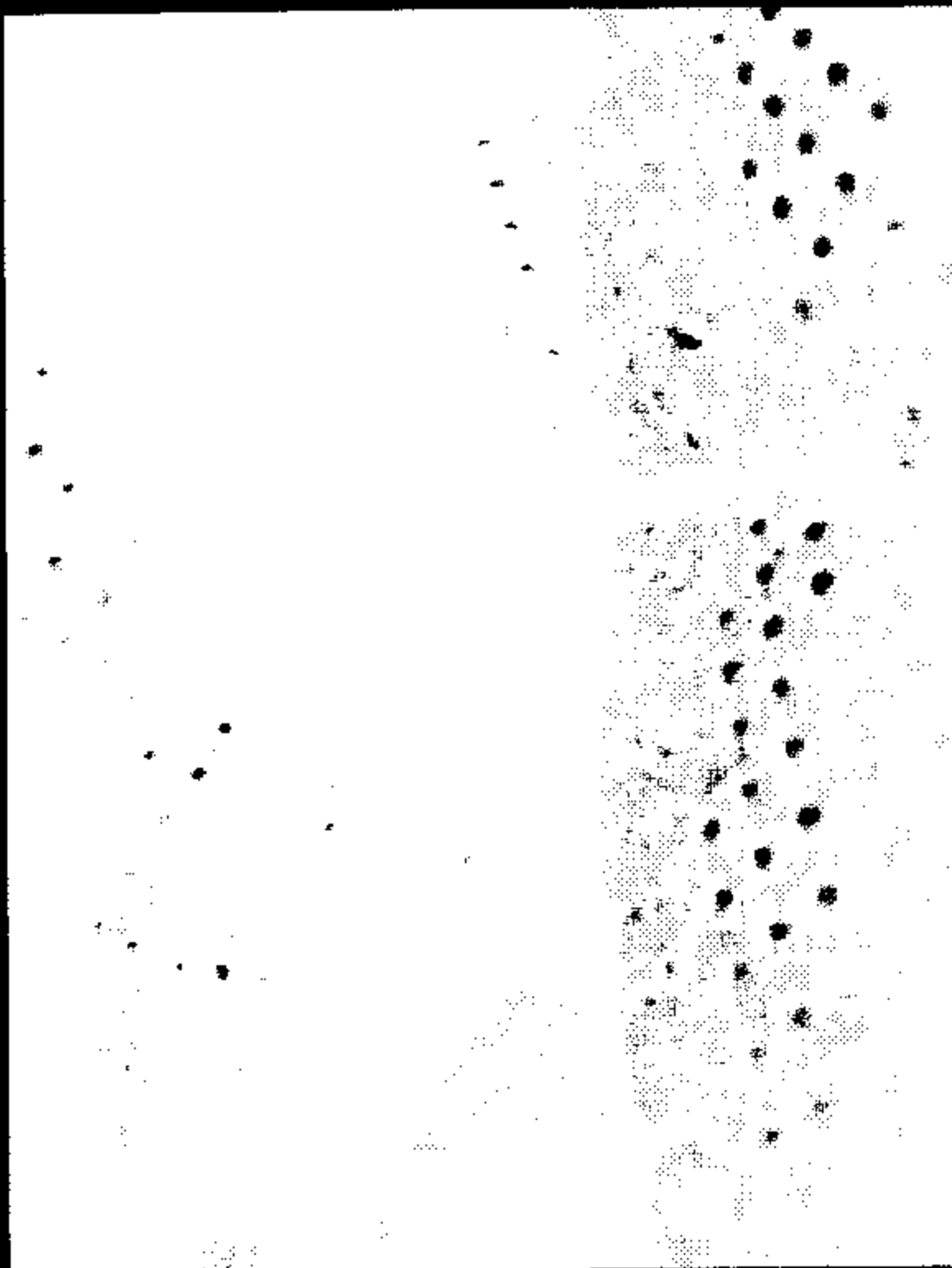
6.11.7 Post-test photo #7 of SFADII



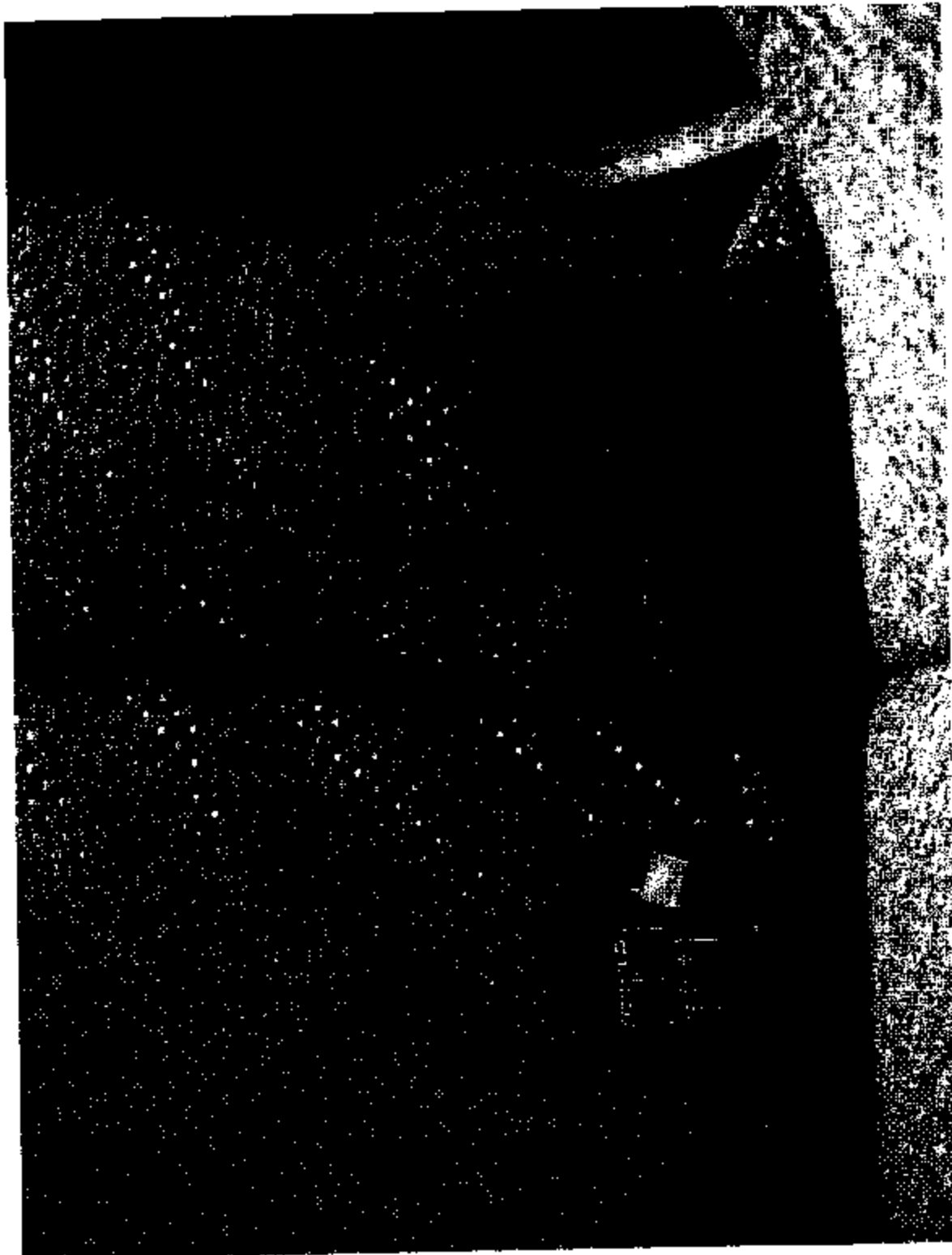
6.11.8 Post-test photo #8 of SFADII



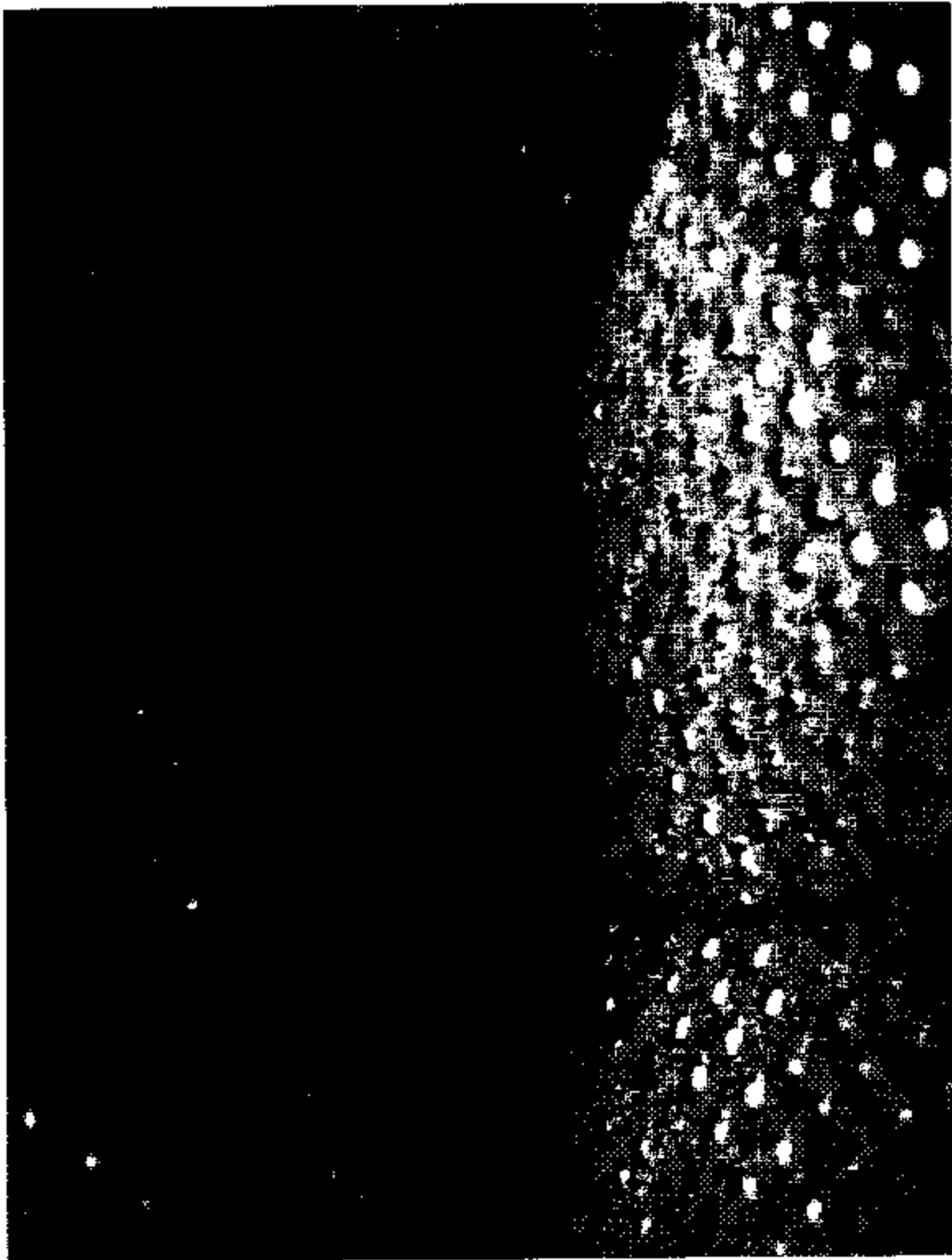
6.11.9 Post-test photo #9 of SFADII



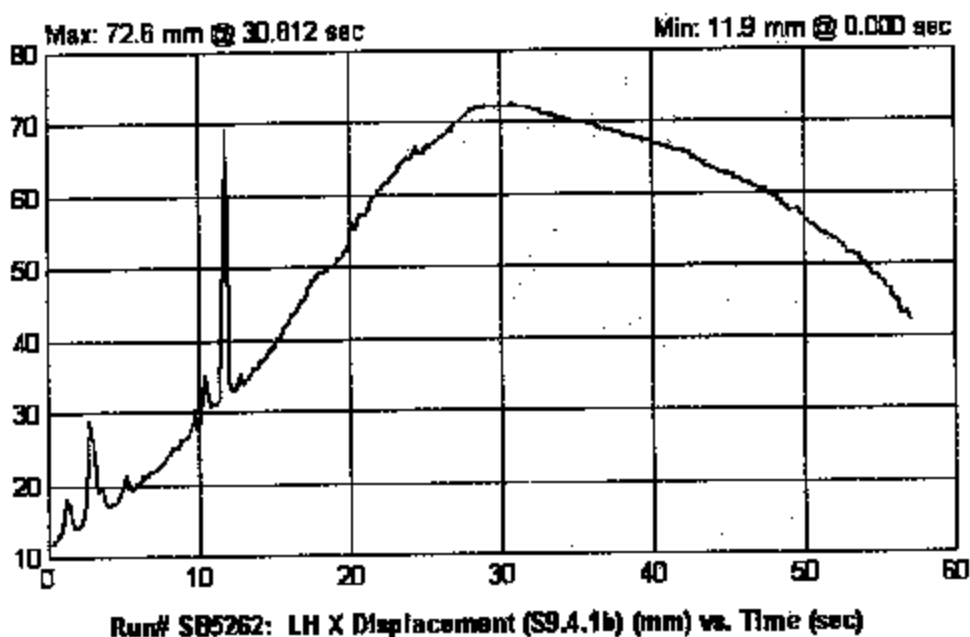
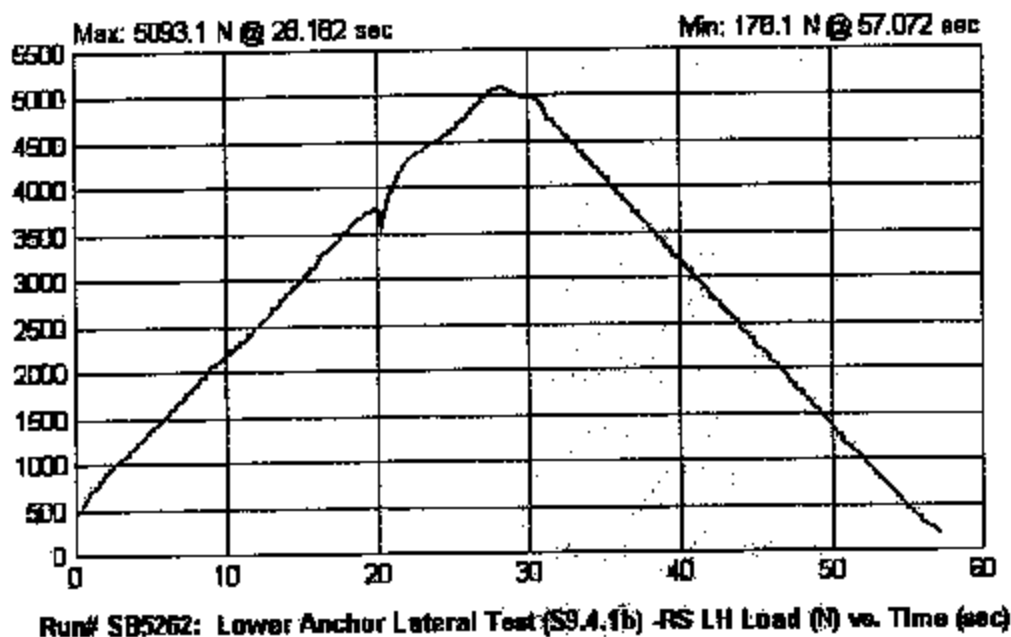
6.11.10 Post-test photo #10 of SFADII

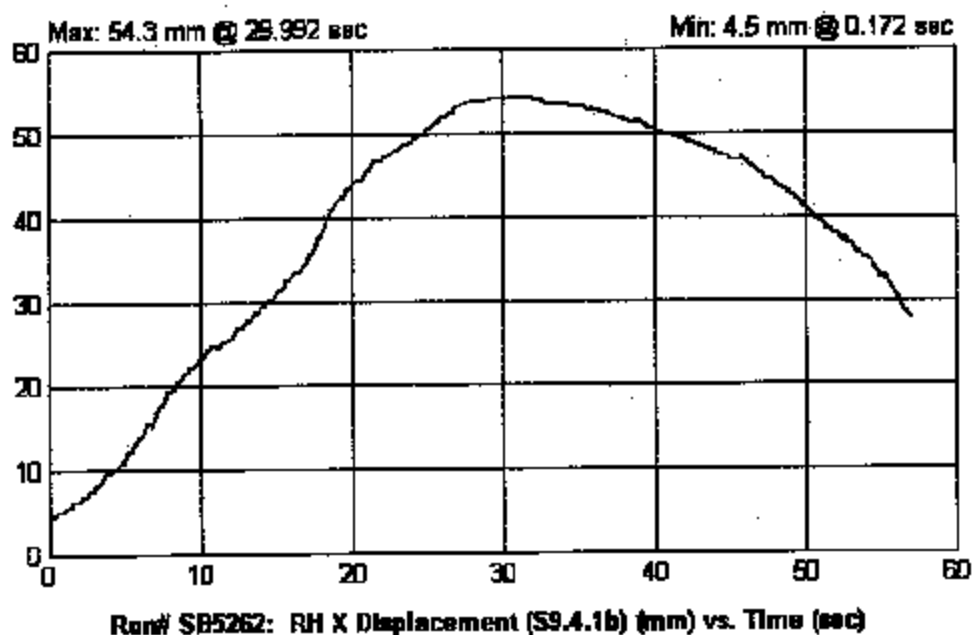
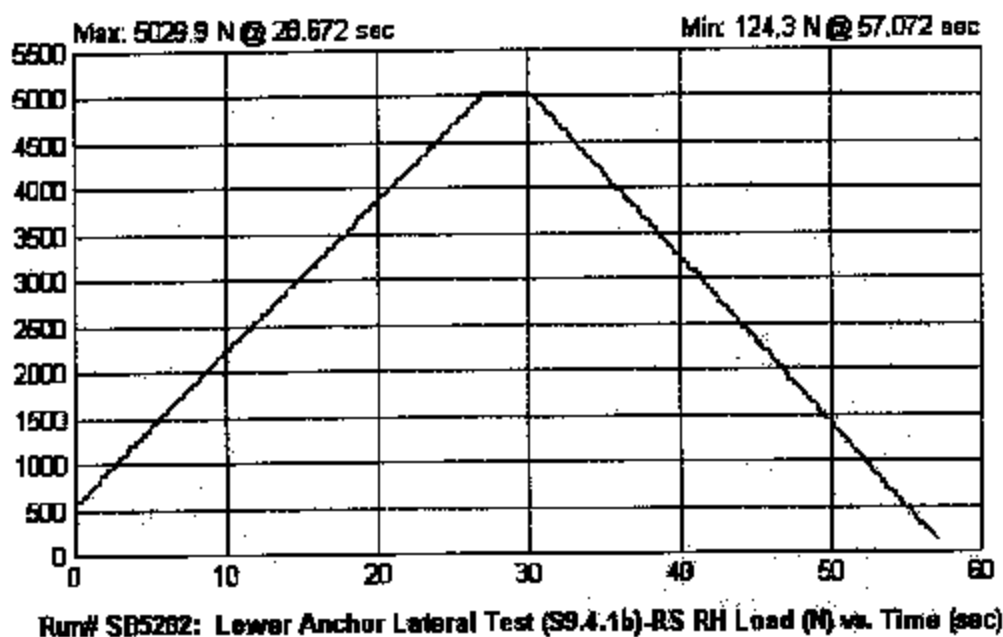


6.11.11 Post-test photo #11 of SFADII



7.0 PLOTS





8.0 REPORT of VEHICLE CONDITION

REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING

CONTRACT No.: DTNH22-02-D-11043

DATE: July 6, 2005

From: MGA Research Corporation, 446 Executive Drive, Troy, MI 48063

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/MODEL/BODY: 2005 Hyundai Tucson

VEH. NHTSA NO.: C50506

VIN: KM8JM12B45U064356

COLOR: White

ODOMETER READINGS: ARRIVAL 89 miles Date: 03/17/05

COMPLETION 90 miles Date: 07/06/05

PURCHASE PRICE: N/A

DEALER'S NAME: LaFontaine Motors, Inc.

ENGINE DATA: 4 Cylinders 2.0 Liters Cubic Inches

TRANSMISSION DATA: X Automatic Manual No. of Speeds 4

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

CHECK APPROPRIATE BOXES FOR VEHICLE EQUIPMENT:

TEST LABORATORY: MGA Research Corporation

OBSERVERS: Melanie Schick, Brad Reaume, Kenney Godfrey

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

Front seats and left rear door were removed before conducting the test.

Test Vehicle Condition:

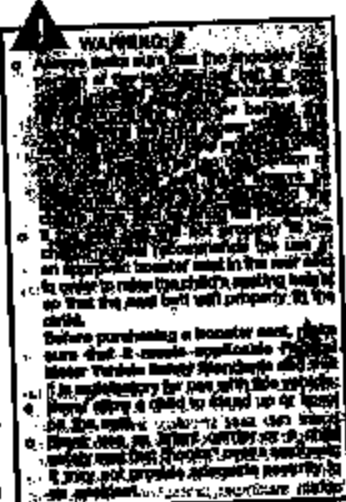
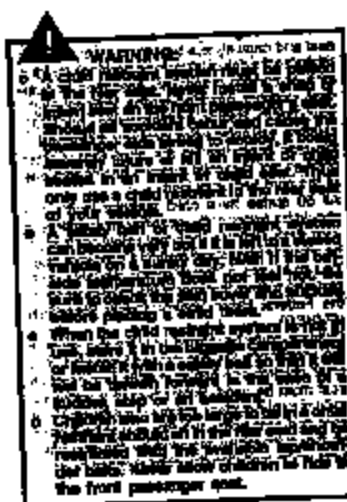
Salvage only.

RECORDED BY: Melanie Schick, Kenney Godfrey

DATE: July 6, 2005

APPROVED BY: Brad Reaume

APPENDIX A
OWNERS MANUAL CHILD RESTRAINT SYSTEMS



For small children and babies, the use of a child seat or infant seat is required. This child seat or infant seat should be of appropriate size for the child and should be installed in accordance with the manufacturer's instructions. It is further required that the seat be placed in the vehicle rear seat since this can make an important contribution to safety. Your vehicle is provided with three child restraint back holders for installing the child seat or infant seat.

Three child restraint hook holders are located in the rear luggage compartment floor.



²This symbol indicates the location of each use within a letter combination.

1. Open the tailer anchor cover on the rear
hanger compartment foot.

2. Route the child restraint seat tether strap over the headboard.

1

28

- For vehicles with adjustable headrests, route the tether strap under the headrest and between the headrest posts, otherwise route the tether strap over the top of the seatback.
- Connect the tether strap hook to the child restraint hook holder and tighten to secure the seat.



NECESSARY Securing the Child Restraint Seat with the "ISOFIX" system



Some child seat manufacturers make safety seats that are labeled as ISOFIX or ISOFIX-compatible child seats. These seats include two rigid or weighting-mounted attachments that connect to two ISOFIX anchors at specific seating positions in your vehicle. This type of child seat eliminates the need to use seat belts to attach the child seat for forward-facing child seats.

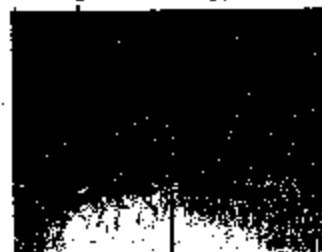
ISOFIX anchors have been provided in your vehicle. The ISOFIX anchors are located in the left and right outboard rear seating positions. Their locations are shown in the illustration. There is no ISOFIX anchor provided for the center rear seating position.

- WARNING:**
- Do not install a child restraint seat at the center of the rear seat using the vehicle's ISOFIX anchors. The ISOFIX anchors are only provided for the left and right outboard rear seating positions. Do not use the ISOFIX anchors to secure a child seat to the center of the rear seat position. In a crash, the child seat ISOFIX attachments may not be secure enough to holding the child restrained and properly in the center of the rear seat and may break, causing serious injury or death.
 - Do not mount more than one child seat to a single vehicle or to a vehicle's restraint lower anchorage point. The improper increased load may cause the anchorage points or tether anchor to break, causing serious injury or death.
 - Attach the ISOFIX or ISOFIX-compatible child seat only to the appropriate location shown.
 - Always follow the installation and use instructions provided by the manufacturer of the child restraint.

27



The ISOFIX anchors are located between the seatback and the seat cushion of the rear seat left and right outboard seating positions.



Follow the child seat manufacturer's instructions to properly install safety seats with ISOFIX or ISOFIX-compatible child seats.

Once you have installed the ISOFIX child restraint seat, ensure that the seat is properly attached to the ISOFIX and tether anchors. Also, test the safety seat before you place the child in it. Tilt the seat from side to side. Also try to tug the seat forward. Check to see if the anchors hold the seat in place.

- WARNING:** Do not use any of the child seat's seat belt attachments. The child's head may be seriously injured or killed in a collision if the seat is used.

NECESSARY Installation on Rear Seat Center Position



Use the center seat belt for the rear seat to secure the child restraint system as illustrated. After installation of the child restraint system, rock the child seat back and forth, and side to side to ensure that it is properly secured by the seat belt.

If the child seat moves, readjust the length of the seat belt. Then, if equipped, insert the child restraint tether strap hook into the child restraint hook holder and tighten to secure the seat. Always refer to the child restraint system manufacturer's recommendation before installing the child restraint system in your vehicle.

28

Installation on Outboard Rear Seats



To install a child restraint system in the outboard rear seats, extend the shoulderlap belt entirely from the retractor until a "click" is felt. This will engage the seat belt retractor automatic locking feature, which allows the seat belt to retract but not extend. Install the child restraint system, buckle the seat belt and allow the seat belt to take up any slack. Make sure that the top portion of the belt is tight around the child restraint system and the shoulder portion of the belt is positioned so that it can not interfere with the child's head or neck. Also, double check to be sure that the retractor has engaged the Automatic Locking feature by trying to extend webbing out of the retractor. If the retractor is in the Automatic Locking mode, the belt will be locked.

After installation of the child restraint system, try to move it in all directions to be sure the child restraint system is securely fastened. If you need to tighten the belt, pull down webbing toward the retractor. When you unbuckle the seat belt and allow it to retract, the retractor will automatically revert back to its normal seated passenger Emergency Locking usage condition.

NOTE:

- Before installing the child restraint system in any seating position, read the instructions supplied by the child restraint system manufacturer.
- If the seat belt does not operate as described, have the system checked immediately by your authorized Hyundai dealer.

WARNING:

- If the retractor is set in the Automatic Locking mode, the child restraint system can rotate when your vehicle turns or stops abruptly.
- Do not install any child restraint system in the front passenger seat. Should an accident occur and cause the passenger side airbag to deploy, it could seriously injure or kill an infant or child seated in an infant or child seat. Therefore, only use a child restraint system in the rear seat of your vehicle.

Important Pre-tensioner Seat Belt

Your Hyundai vehicle is equipped with driver's and front passenger's pre-tensioner seat belts. The purpose of the pre-tensioner is to make sure that the seat belts fit tightly against the occupants body in certain frontal collisions. The pre-tensioner seat belts may be activated with or without airbag activation, depending on the circumstances of a collision.



In certain frontal collisions, the pre-tensioner will activate and pull the seat belt into tighter contact against the occupants body.

APPENDIX B
MANUFACTURER'S DATA (OVSC FORM 14)

FORM 14
 Page 1 of 11

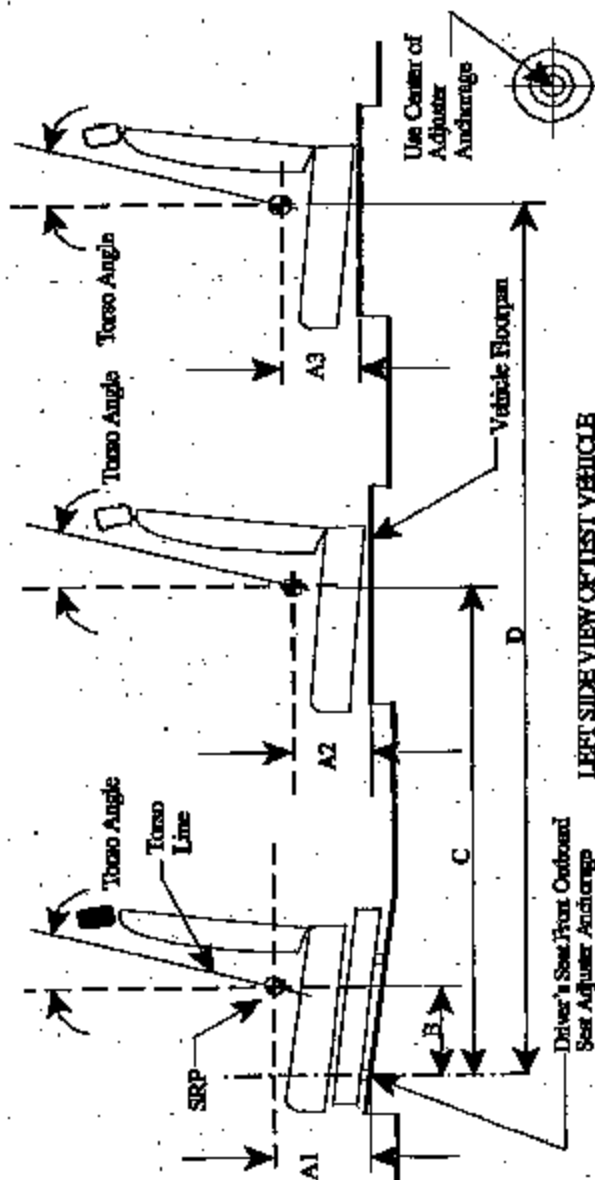
C50506

SEAT REFERENCE POINT (SRP) AND TORSO ANGLE DATA

FOR FMVSS 225

(All dimensions in mm)

Model Year: 2005; Make: HMC; Model: TUCSON; Body Style: SUV
 Seat Style: Front row: 2 SEATS (BUCKET); Second row: 3 SEATS (64 SEAT); Third row: NONE



2005 Hyundai
 Tucson

FORM 14
 Page 2 of 11

Table 1. Seating Positions¹ and Torso Angles

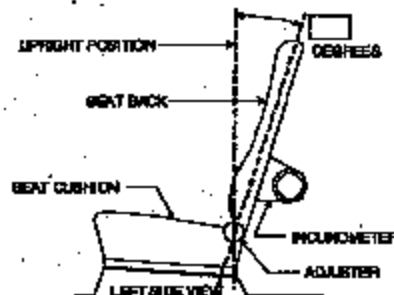
	Left (Driver Side)	Center (If any)	Right
A1	(Driver) 264.1		(Front Passenger) 264.1
A2	252.9	244.3	252.9
A3	-	-	-
B	342.5		342.5
C	1172.5	1157.5	1172.5
D	-	-	-
Torso Angle (degree)	Front Row		21
	Second Row	20	25
	Third Row		-

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

FORM 14
Page 3 of 11

NOMINAL DESIGN RIDING POSITION -

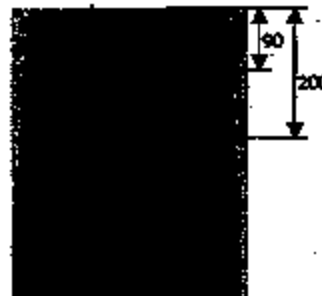
For adjustable driver, passenger, 2nd row and 3rd row seat backs, describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch/detent if applicable. Indicate if applicable, how the detents are numbered (Is the first detent "0" or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



Seat back angle for driver's seat = 21 degrees
(TORSO ANGLE : 21 degree)

Measurement Instructions:

The seat back angle can be measured if the inclinometer is attached to seat back plastic cover at the area of 90-200mm from the top of the seat back plastic cover. (see below)



Seat back angle for passenger's seat = 21_ degrees (TORSO ANGLE : 21 degree)

Measurement Instructions:

Same as the driver's seat

Seat back angle for 2nd row seat = 22_ degrees (TORSO ANGLE : 25 degree)

Measurement Instructions:

Seat back angle which is 22 degrees is second step from foremost in seat back reclining. (Total step of seat back reclining is four.) The seat back angle can be measured if the inclinometer is attached to any position of seat back plastic cover.

Seat back angle for 3rd row seat = _ _ degrees

Measurement Instructions:

note _____

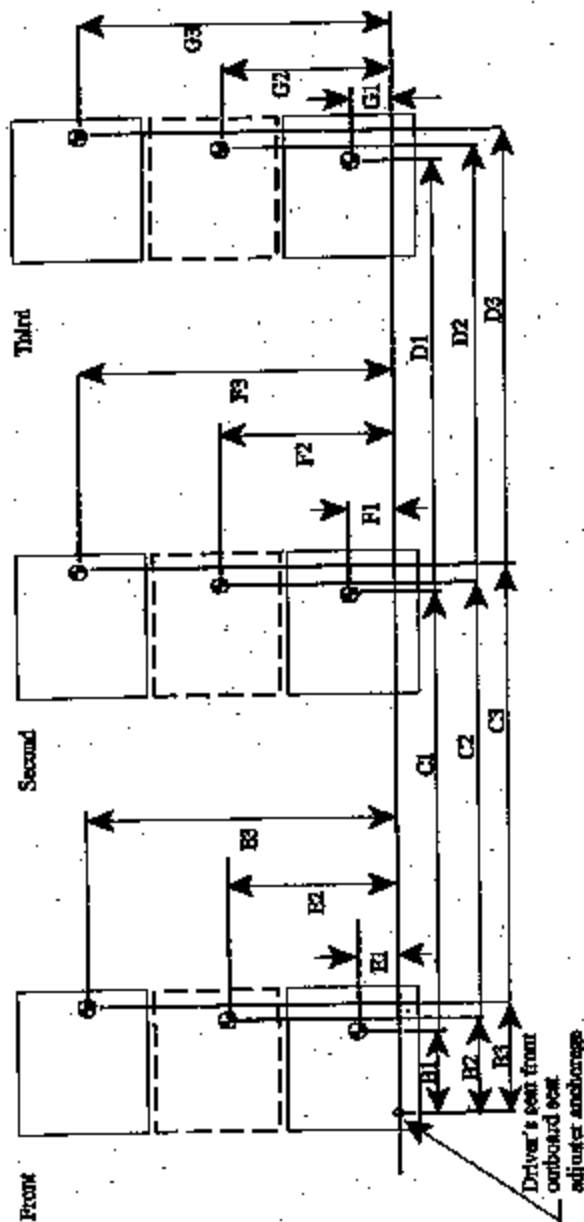
FORM 14
 Page 4 of 11

SEATING REFERENCE POINT
 FOR FMVSS 225

(All dimensions in mm)

(Note: The Child Restraint Anchorage Location determines the 225 SRP locations)

Model Year: 2014; Make: HMC; Model: TUCSON; Body Style: SUV
 Seat Style: Front row: 2 SEATS (BUCKET); Second row: 3 SEATS (6/4 SPLIT); Third row: NONE



FORM 14
 Page 5 of 11

Table 2. Seating Reference Point and Tether Anchorage Locations

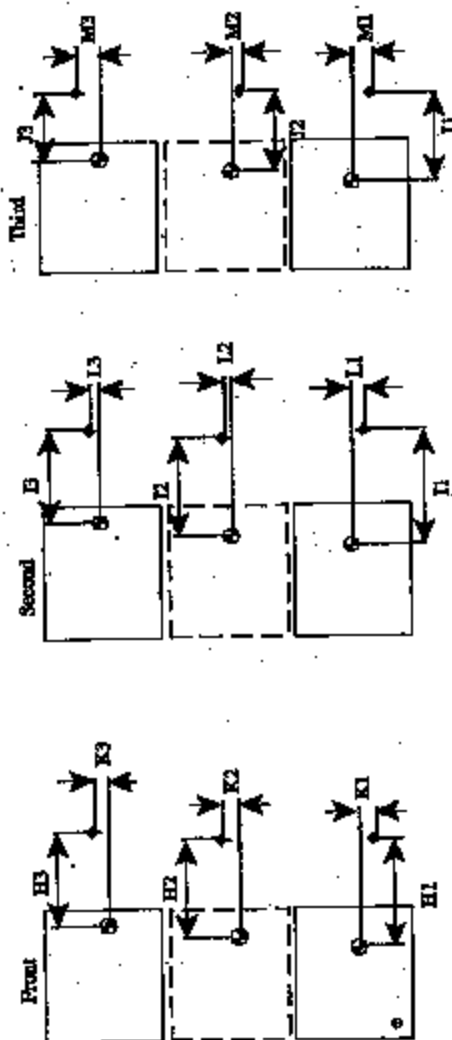
Seating Reference Point (SRP)		Distance from Driver's front outboard seat adjuster anchorage ¹
Front Row	B1	342.5
	E1	228
	B2	-
	E2	-
	B3	342.5
	E3	938
Second Row	C1	830
	F1	243
	C2	815 (reference to driver's seat)
	F2	583
	C3	830
	F3	923
Third Row	D1	-
	G1	-
	D2	-
	G2	-
	D3	-
	G3	-

Note: 1. Use the center of anchorage.

FORM 14
 Page 6 of 11

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

Model Year: 2007; Make: HMC; Model: ILUSION; Body Style: SUV
 Seat Style: Front row: 2 SEATS CHUCKER; Second row: 3 SEATS (6:4 SPLIT); Third row: NONE



○: SEAT

●: Tether anchorage

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

FORM 14
 Page 7 of 11

Table 3. Seating Reference Point and Tether Anchorage Locations

Seating Reference Point (SRP)	Distance from SRP	
Front Row	H1	-
	K1	-
	H2	-
	K2	-
	H3	-
	K3	-
Second Row	I1	266.5
	L1	-5
	I2	267
	L2	0
	I3	266.5
	L3	-5
Third Row	J1	-
	M1	-
	J2	-
	M2	-
	J3	-
	M3	-

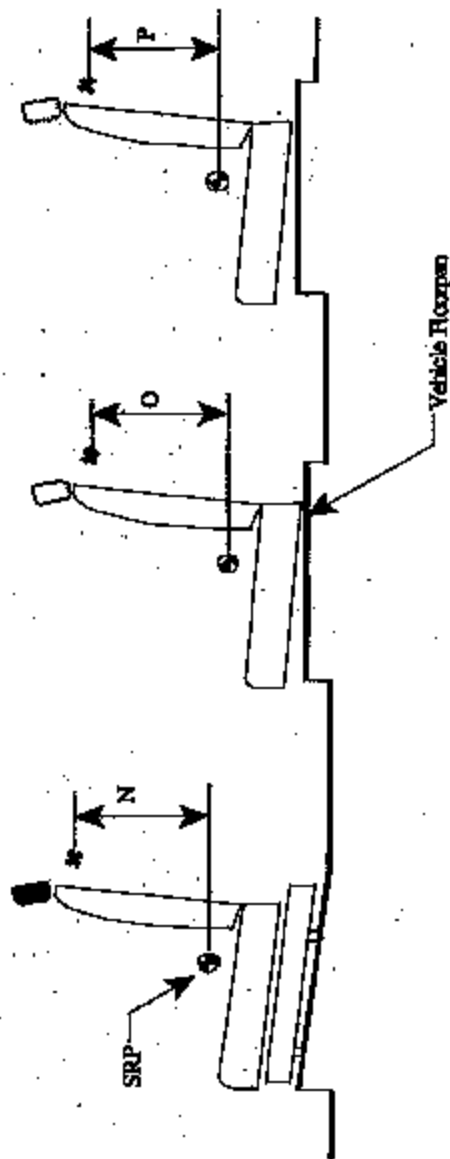
Note: 1. Use the center of anchorage.

FORM 14
 Page 8 of 11

TETHER ANCHORAGE LOCATIONS - VERTICAL
 FOR FMVSS 225

(All dimensions in mm)

Model Year: _____; Make: _____; Model: _____; Body Style: _____
 Seat Style: _____; Front row: _____; Second row: _____; Third row: _____



LEFT SIDE VIEW OF TEST VEHICLE

FORM 14
 Page 9 of 11

Table 4. Vertical Dimension For The Tether Anchorage

Seating Row	Vertical Distance from Seating Reference Point	
	N1 (Driver)	N/A
Front Row	N2 (Center)	-
	N3 (Right)	-
	O1 (Left)	-159
Second Row	O2 (Center)	-179
	O3 (Right)	-159
Third Row	P1 (Left)	-
	P2 (Center)	-
	P3 (Right)	-

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

FORM 14
Page 10 of 11

Test Procedures Used for Compliance Tests

Lower Anchorages

For each seating location in each row record applicable FMVSS Section		FMVSS 225 Section(s)			
Block 1		Lower anchorage location certification method used (Enter applicable section used in block 1 of each position by circling A or B) A) 9.2.1 or B) 15.1.2.2			
Block 2		Lower anchorage dimension (Enter applicable section used in block 2 by circling A or B) A) 9.1.1 or B) 15.1.2.3 (also provide roll and yaw angles) pitch _____° roll _____° yaw _____°			
Block 3		Lower anchorage marking (Enter applicable section used in block 3 by circling A or B) A) 9.5 or B) 15.4			
Block 4		Strength requirement (Enter applicable section used in block 4 by circling A or B) A) Section 9 or B) Section 15			
Front	Driver	N/A			
	Center (if any)	Block 1 A B	Block 2 Pitch Roll Yaw A B	Block 3 A B	Block 4 A B
	Right (if any)	Block 1 A B	Block 2 Pitch Roll Yaw A B	Block 3 A B	Block 4 A B
Second	Left	Block 1 A B	Block 2 Pitch 16° Roll 0° Yaw 0° A B	Block 3 A B	Block 4 A B
	Center N/A	Block 1 A B	Block 2 Pitch Roll Yaw A B	Block 3 A B	Block 4 A B
	Right (if any)	Block 1 A B	Block 2 Pitch 16° Roll 0° Yaw 0° A B	Block 3 A B	Block 4 A B
Third	Left	Block 1 A B	Block 2 Pitch Roll Yaw A B	Block 3 A B	Block 4 A B
	Center	Block 1 A B	Block 2 Pitch Roll Yaw A B	Block 3 A B	Block 4 A B
	Right	Block 1 A B	Block 2 Pitch Roll Yaw A B	Block 3 A B	Block 4 A B
Fourth	Left	Block 1 A B	Block 2 Pitch Roll Yaw A B	Block 3 A B	Block 4 A B
	Center	Block 1 A B	Block 2 Pitch Roll Yaw A B	Block 3 A B	Block 4 A B
	Right	Block 1 A B	Block 2 Pitch Roll Yaw A B	Block 3 A B	Block 4 A B

FORM 14
Page 11 of 11

Test Procedures Used for Compliance Tests

Tether Anchorage

For each seating location in each row record applicable FMVSS Section		FMVSS Section(s) - Req.		
Block 1		Tether anchorage location certification method used (Enter applicable section used in block 1 by circling A, B, C, D, E or F) A) 6.2.1 B) 6.2.1.1 C) 6.2.1.2 D) 6.2.2 E) 6.2.2.1 F) 6.2.2.2		
Block 2		Number of tether anchorages based upon the applicable section (Enter applicable section used in block 2 by circling A or B) A) 4.4 B) 4.5		
Block 3		Tether anchorage strength requirement (Enter applicable section used in block 3 by circling A, B, or C) A) 6.3.1 B) 6.3.2 C) 6.3.4		
Front	Driver	N/A		
	Center (if any)	Block 1: A B C D E F	Block 2: A B	Block 3: A B C
	Right (if any)	Block 1: A B C D E F	Block 2: A B	Block 3: A B C
Second	Left	Block 1: <u>A</u> B C D E F	Block 2: A B	Block 3: A B C
	Center	Block 1: <u>A</u> B C D E F	Block 2: <u>A</u> B	Block 3: <u>A</u> B C
	Right	Block 1: <u>A</u> B C D E F	Block 2: <u>A</u> B	Block 3: <u>A</u> B C
Third	Left	Block 1: A B C D E F	Block 2: <u>A</u> B	Block 3: <u>A</u> B C
	Center	Block 1: A B C D E F	Block 2: A B	Block 3: A B C
	Right	Block 1: A B C D E F	Block 2: A B	Block 3: A B C
Fourth	Left	Block 1: A B C D E F	Block 2: A B	Block 3: A B C
	Center	Block 1: A B C D E F	Block 2: A B	Block 3: A B C
	Right	Block 1: A B C D E F	Block 2: A B	Block 3: A B C