604335

REPORT NUMBER 214-GTL-04-004

SAFETY COMPLIANCE TESTING FOR FMVSS NO. 214S SIDE IMPACT PROTECTION (STATIC)

TOYOTA MOTOR CORPORATION
2004 TOYOTA PRIUS, PASSENGER CAR
NHTSA NO. C45107

GENERAL TESTING LABORATORIES, INC.
1623 LEEDSTOWN ROAD
COLONIAL BEACH, VIRGINIA 22443

SEPTEMBER 14, 2004

FINAL REPORT

PREPARED FOR

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

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Prepared by: Debbie Musick

Approved by: [signature]

Approval Date: 9/14/04

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Accepted by: [signature]

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15. Supplementary Notes		
16. Abstract Compliance tests were conducted on the subject 2004 Toyota Prius Passenger Car in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-214S-05 for the determination of FMVSS 214 compliance. Test failures identified were as follows: NONE		
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INTRODUCTION

1.0 PURPOSE OF COMPLIANCE TEST

A 2004 Toyota Prius 4-door passenger car was subjected to Federal Motor Vehicle Safety Standard (FMVSS) No. 214 testing to determine if the vehicle was in compliance with the requirements of the standard. FMVSS No. 214 establishes requirements for the side doors of a Motor Vehicle to minimize the safety hazard caused by intrusion into the passenger compartment as a result of a side impact accident.

1.1 TEST VEHICLE

The test vehicle was a 2004 Toyota Prius 4-door passenger car. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: JTDKB20U040[redacted]

B. NHTSA No.: C45107

C. Manufacturer: TOYOTA MOTOR CORPORATION

D. Manufacture Date: 01/04

The vehicle's front and rear seating systems were removed for this test. All vehicle windows were closed and all doors were locked for this test.

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 214 testing on September 2, 2004.

SECTION 2
TEST PROCEDURE AND SUMMARY OF RESULTS

2.0 TEST PROCEDURE

All tests were conducted in accordance with NHTSA, Office of Vehicle Safety Compliance (OVSC) Laboratory Procedure, TP-214S-05 dated 14 September 1993 and General Testing Laboratories, Inc. (GTL) Test Procedure, TP-214S-05, "Static – Side Impact Protection".

Each vehicle shall be able to meet the requirements of either, at the manufacturer's option, 2.1 or 2.2 when any of its side doors that can be used for occupant egress are tested.

2.1 OPTION ONE

With any seats that may affect load upon or deflection of the side of the vehicle removed from the vehicle, each vehicle must be able to meet the requirements of 2.1.1 through 2.1.3.

2.1.1 INITIAL CRUSH RESISTANCE

The initial crush resistance shall not be less than 2,250 pounds.

2.1.2 INTERMEDIATE CRUSH RESISTANCE

The intermediate crush resistance shall not be less than 3,500 pounds.

2.1.3 PEAK CRUSH RESISTANCE

The peak crush resistance shall not be less than two times the curb weight of the vehicle or 7,000 pounds, whichever is less.

2.2 OPTION TWO

With seats installed in the vehicle, and located in any horizontal or vertical position to which they can be adjusted and at any seat back angle to which they can be adjusted, each vehicle must be able to meet the requirements of 2.2.1 through 2.2.3.

2.2.1 INITIAL CRUSH RESISTANCE

The initial crush resistance shall not be less than 2,250 pounds.

2.2.2 INTERMEDIATE CRUSH RESISTANCE

The intermediate crush resistance shall not be less than 4,375 pounds.

SECTION 2 CONTINUED

2.2.3 PEAK CRUSH RESISTANCE

The peak crush resistance shall not be less than three and one half times the curb weight of the vehicle or 12,000 pounds, whichever is less.

SECTION 3
COMPLIANCE TEST DATA

DATA SHEET 1
TEST VEHICLE RECEIVING-INSPECTION

VEH. MOD YR/MAKE/MODEL/BODY: 2004 TOYOTA PRIUS PASSENGER CAR
VEH. NHTSA NO.: C45107 ; VIN: JTDKB20U040[redacted]
VEH. BUILD DATE: 01/04 ; TEST DATE: SEPTEMBER 2, 2004
TEST LABORATORY: GENERAL TESTING LABS
OBSERVERS: G. FARRAND, J. LATANE

A. First compliance test by laboratory for this vehicle is the static FMVSS 214 test.

___ Yes X No (Go to item 2)

X (1) Label test vehicle with NHTSA Number

X (2) Verify all options on the "window sticker" are present on the vehicle

X (3) Verify tires and wheel rims are new and the same as listed

X (4) Verify there are no dents or other interior or exterior flaws

X (5) Verify the glove box contains an owner's manual, warranty document, consumer information, and extra keys

X (6) Verify the vehicle is equipped with the proper fuel filler cap

X (7) If the vehicle has been delivered from the dealer, verify the vehicle has been properly prepared and is in running condition

B. Verify seat adjusters are working
X Yes ___ No

C. Verify there is a seat belt at each seating position
X Yes ___ No

D. Without disturbing the integrity of each seat belt and anchorage, verify that each seat belt is attached to the anchorage. For seat belts that are attached to the seat, also verify the seats are attached to the seat anchors and the seat anchors are attached to the vehicle.
X Yes ___ No

E. Curb Weight of Vehicle: 2948 LBS.

F. COMMENTS: (Explain any problems here)

RECORDED BY: G. Farrand DATE: 09/02/04

APPROVED BY: D. Musick

DATA SHEET 2
PRETEST PREPARATION

VEH. MOD YR/MAKE/MODEL/BODY: 2004 TOYOTA PRIUS PASSENGER CAR
VEH. NHTSA NO.: C45107 ; VIN: JTDKB20U040[redacted]
VEH. BUILD DATE: 01/04 ; TEST DATE: SEPTEMBER 2, 2004
TEST LABORATORY: GENERAL TESTING LABS
OBSERVERS: G. FARRAND, J. LATANE

Prior to testing the following will be accomplished:

		TEST 1	TEST 2
A.	Check the manufacturers certification statement to determine if the vehicle should be tested with or without seats installed.	X	X
B.	Remove all seats unless the vehicle has been certified with the seats installed. If the seats remain in the vehicle, they are to be adjusted per the COTR's instructions.	X	X
C.	Close all windows	X	X
D.	Lock All doors	X	X
E.	State door tested	LF	RR
F.	State the length of a horizontal line drawn on door through a point 5 inches vertically above lowest point of test door	41.4	30.2
G.	State vertical distance from the lowest part of test door to bottom of loading device	5"	5"
H.	State position of vertical centerline of loading device on the midpoint of line determined step F	20.7	15.1
I.	Determine that the vertical axis of the loading device is perpendicular to the longitudinal and lateral axis of the test vehicle	X	X
J.	Determine that the top of the loading device is above the door window opening but not touching any structure above the window opening	X	X

RECORDED BY: G. Farrand DATE: 09/02/04

APPROVED BY: D. Mussil

DATA SHEET 3
STATIC LOAD TEST - BACK-UP SYSTEM DATA

VEH. MOD YR/MAKE/MODEL/BODY: 2004 TOYOTA PRIUS PASSENGER CAR
VEH. NHTSA NO.: C45107 ; VIN: JTDKB20U040[redacted]
VEH. BUILD DATE: 01/04 ; TEST DATE: SEPTEMBER 2, 2004
TEST LABORATORY: GENERAL TESTING LABS
OBSERVERS: G. FARRAND, J. LATANE

RESULTS: Plots of load versus displacement and time versus displacement obtained from the back-up data (attach plots to data sheet) showed that:

TEST #1 - GTL #5248 (LEFT FRONT DOOR)

A. The initial crush resistance was 2938 lbs.

B. The intermediate crush resistance was 4998 lbs.

C. The peak crush resistance was 11,751 lbs at 12.69 inches

D. The rate of loading was .2"/sec

The dial indicator and the inclinometer showed the following deflections.

LOADING DEVICE TRAVEL	DIAL INDICATOR	INCLINOMETER
0 inches	0.0000	0
2 inches	0.0075	0
4 inches	0.1178	0
6 inches	0.1682	0
12 inches	0.6875	0
12.69 Inches (full travel)	0.7280	0

TEST #2 - GTL #5249 (RIGHT REAR DOOR)

A. The initial crush resistance was 4393 lbs.

B. The intermediate crush resistance was 6091 lbs.

C. The peak crush resistance was 11,987 lbs at 12.589 inches

D. The rate of loading was .2"/sec

DATA SHEET 3 CONTINUED
STATIC LOAD TEST - BACK-UP SYSTEM DATA

The dial indicator and the inclinometer showed the following deflections.

LOADING DEVICE TRAVEL	DIAL INDICATOR	INCLINOMETER
0 inches	0.0000	0
2 inches	0.0223	0
4 inches	0.0756	0
6 inches	0.1349	0
12 inches	0.2235	0
12.589 inches (full travel)	0.2539	0

RECORDED BY: _____ DATE: 09/02/04

APPROVED BY: _____

DATA SHEET 4
DATA REDUCTION

VEH. MOD YR/MAKE/MODEL/BODY: 2004 TOYOTA PRIUS PASSENGER CAR
VEH. NHTSA NO.: C45107 ; VIN: JTDKB20U040[redacted]
VEH. BUILD DATE: 01/04 ; TEST DATE: SEPTEMBER 2, 2004
TEST LABORATORY: GENERAL TESTING LABS
OBSERVERS: G. FARRAND, J. LATANE

Data from the primary data systems will be analyzed and the plots attached to the data sheet.

RESULTS - The load versus displacement plot showed that - -

TEST #1 - GTL #5248 (LEFT FRONT DOOR)

A. The initial crush resistance was 2938 lbs.
B. The intermediate crush resistance was 4998 lbs.
C. The peak crush resistance was 11,751 lbs at 12.69 inches

The time versus displacement plot showed that - -

The rate of loading was .2"/sec

TEST #2 - GTL #5249 (RIGHT REAR DOOR)

A. The initial crush resistance was 4393 lbs.
B. The intermediate crush resistance was 6091 lbs.
C. The peak crush resistance was 11,987 lbs at 12.589 inches

The time versus displacement plot showed that - -

The rate of loading was .2"/sec

Comparison of the ABOVE DATA with the BACKUP DATA indicates the following - -

All data was the same.

RECORDED BY: L. Farrand DATE: 09/02/04

APPROVED BY: D. Messich

SECTION 4

TEST EQUIPMENT LIST

EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO.	CAL. DATE	NEXT CAL. DATE
COMPUTER	AT&T	486DX266	N/A	N/A
TEST FIXTURE	GTL 220	220	N/A	N/A
A/D INTERFACE	METRABYTE	DAS-16(F)	BEFORE USE	BEFORE USE
SCALES	FAIRBANKS	N/A	BEFORE USE	BEFORE USE
SIGNAL CONDITIONER	METRABYTE	EXP-RES	BEFORE USE	BEFORE USE
LOAD CELLS	REVERE REVERE	544351A 544551B	11/03 11/03	11/04 11/04
LINEAR POT.	WALDALE WALDALE	123456A 123456B	BEFORE USE	BEFORE USE
INCLINOMETER	STARRETT	360/002	02/04	02/05
DIAL INDICATOR	MIOTO	0001-2	BEFORE USE	BEFORE USE

SECTION 5

PHOTOGRAPHS

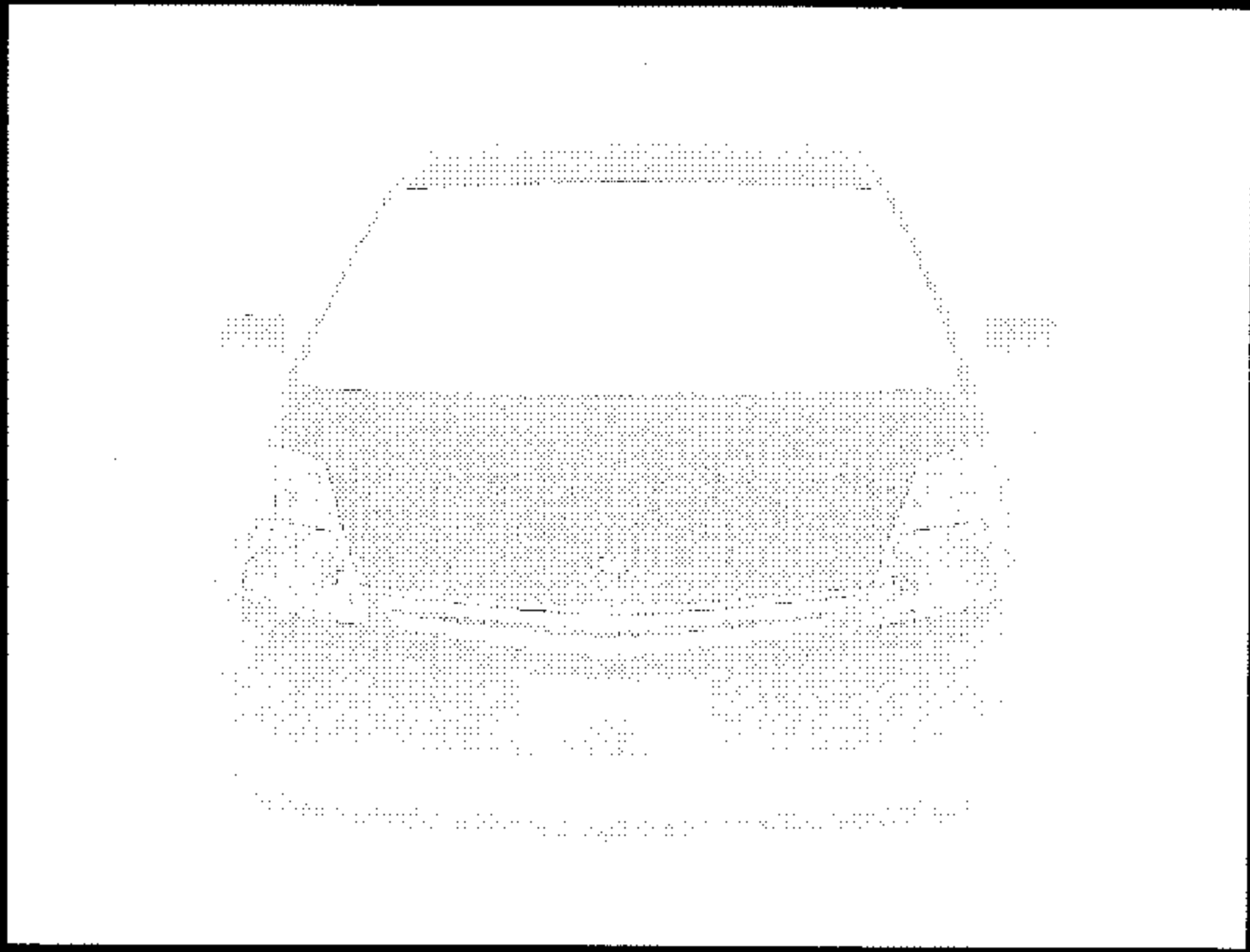

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FIGURE 5.1
FRONT VIEW OF VEHICLE PRE-TEST

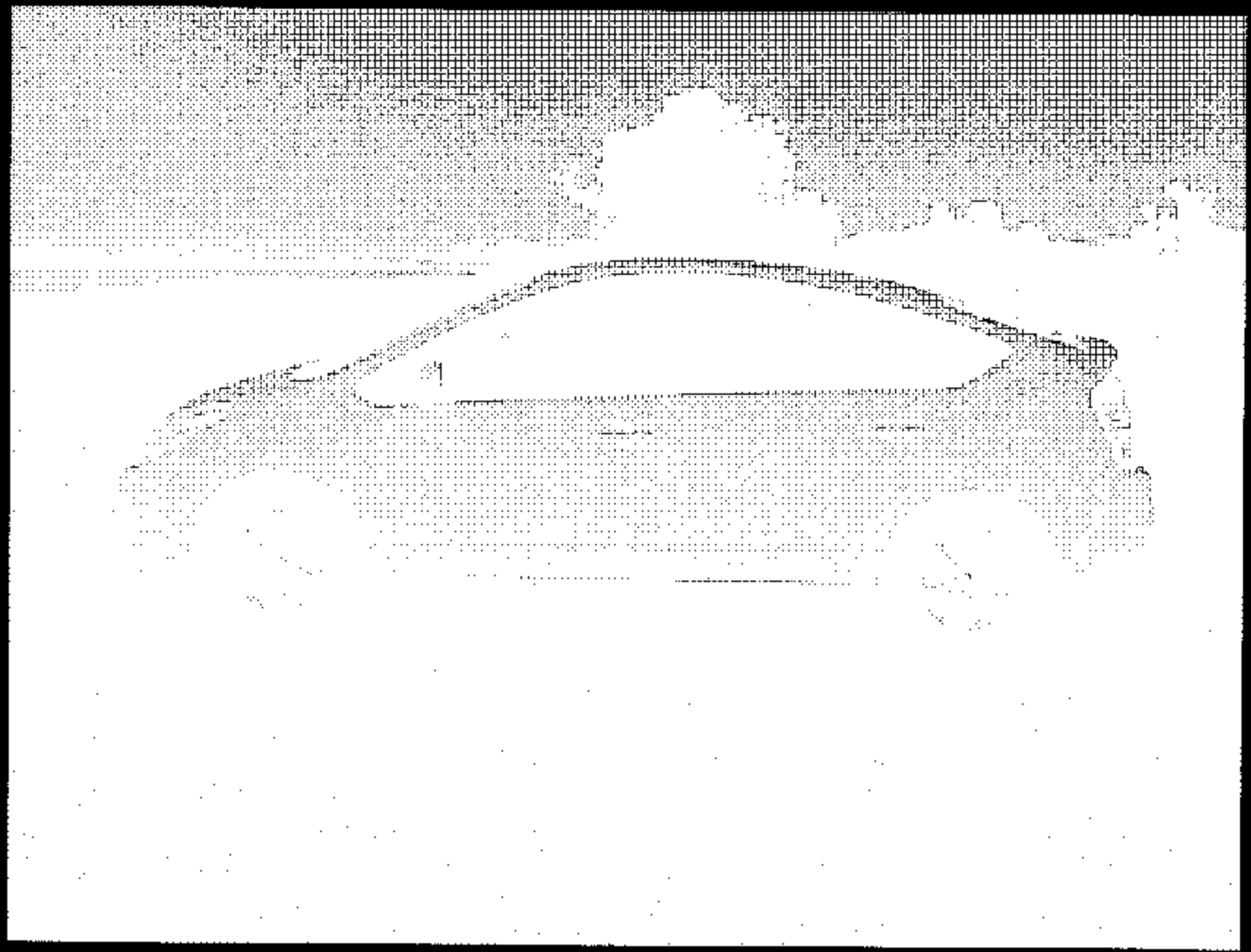

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FIGURE 5.2
LEFT SIDE VIEW OF VEHICLE PRE-TEST

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FIGURE 5.3
RIGHT SIDE VIEW OF VEHICLE PRE-TEST

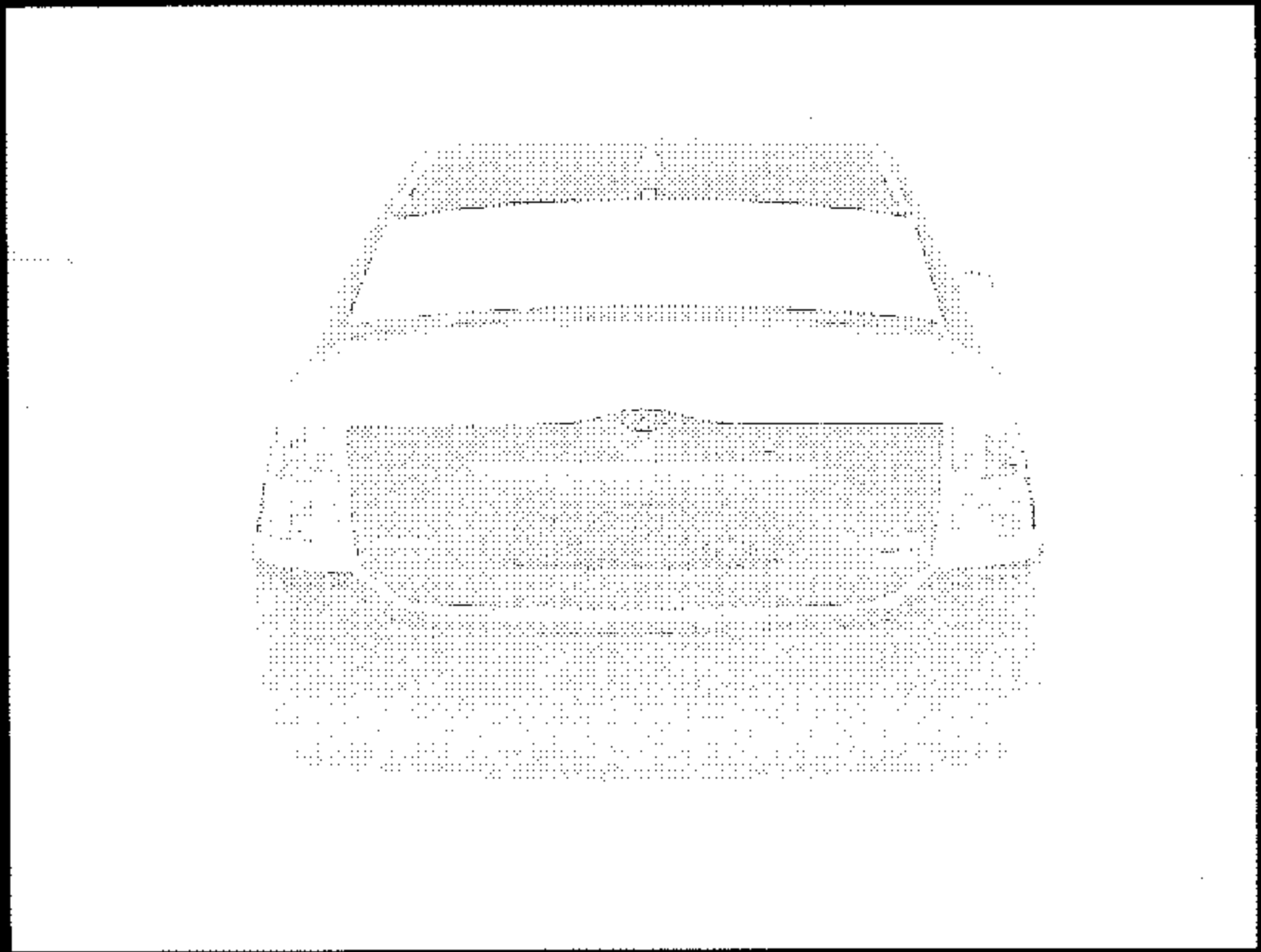

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FIGURE 5.4
REAR VIEW OF VEHICLE PRE-TEST

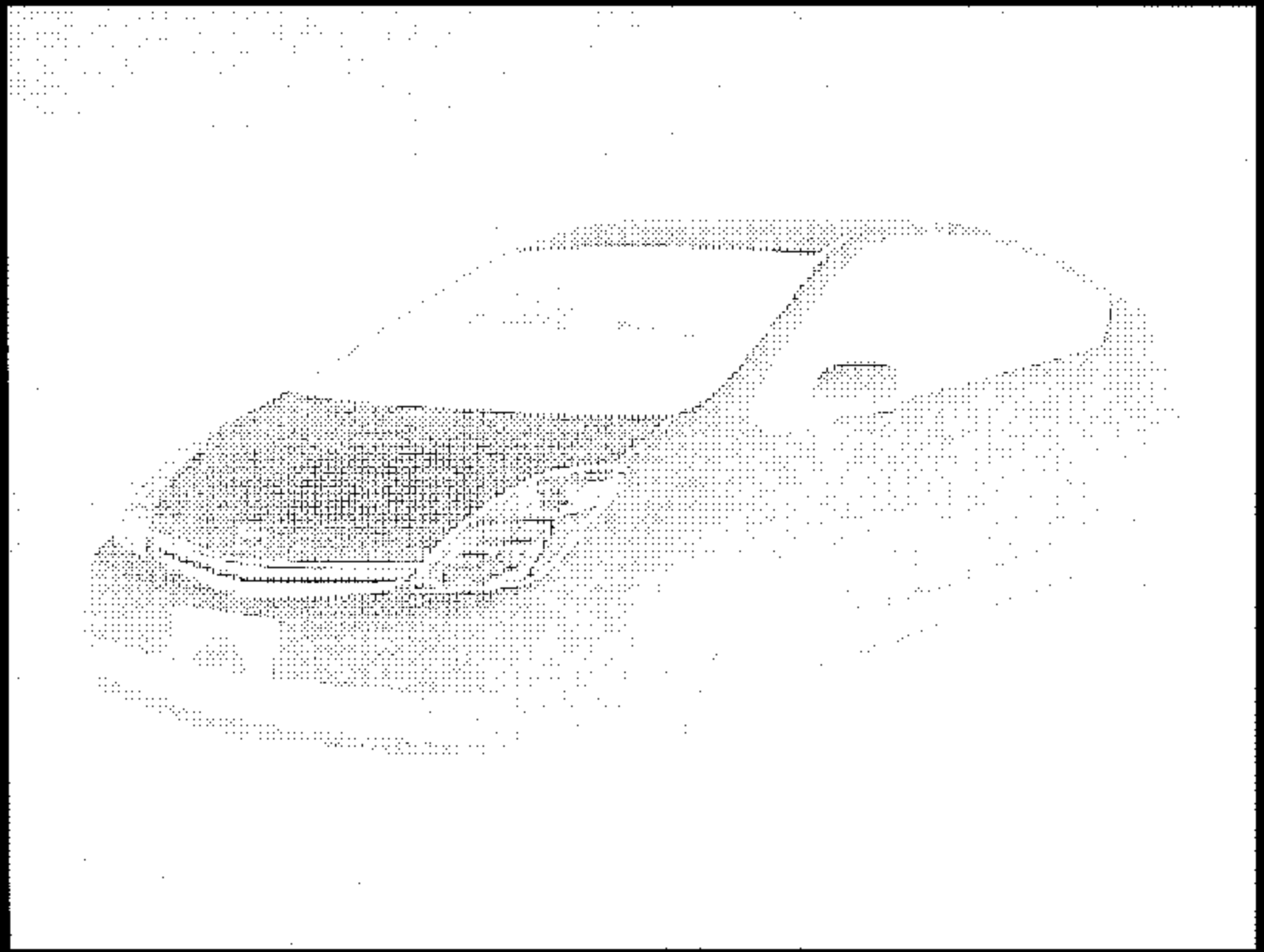

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FIGURE 5.5
¾ FRONTAL VIEW FROM LEFT SIDE OF VEHICLE PRE-TEST

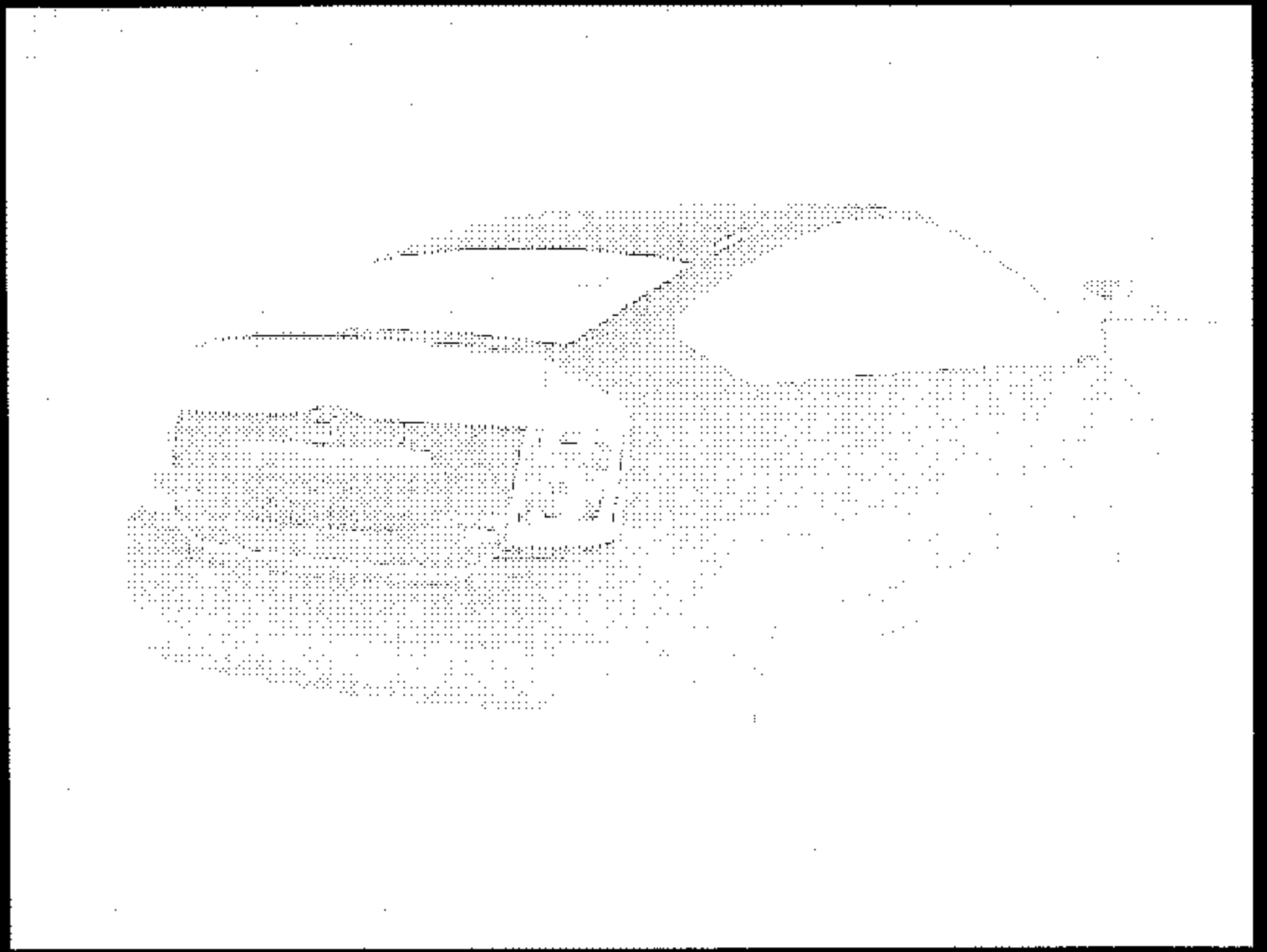

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FIGURE 5.8
¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE
PRE-TEST

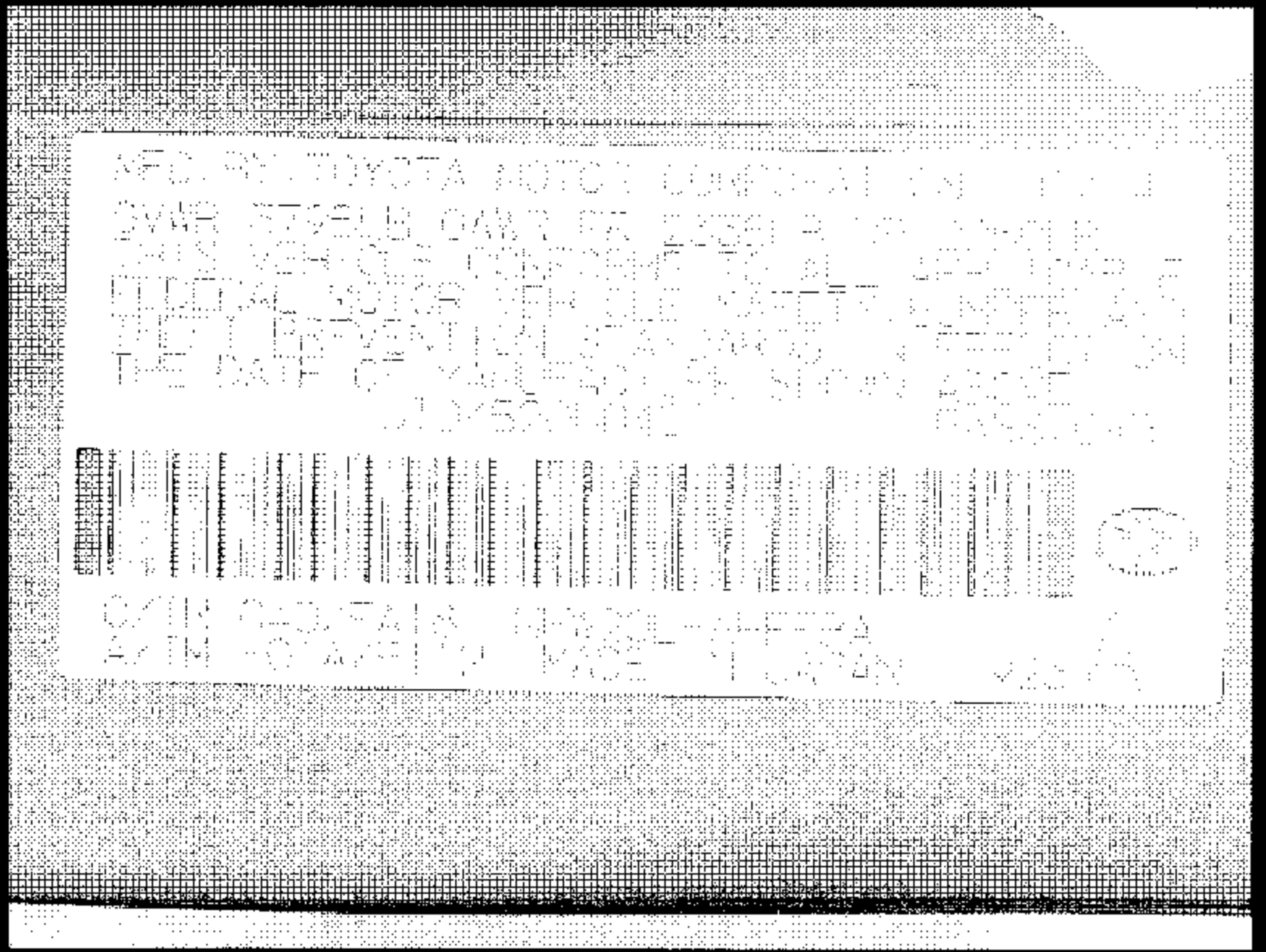

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FIGURE 5.7
VEHICLE CERTIFICATION LABEL

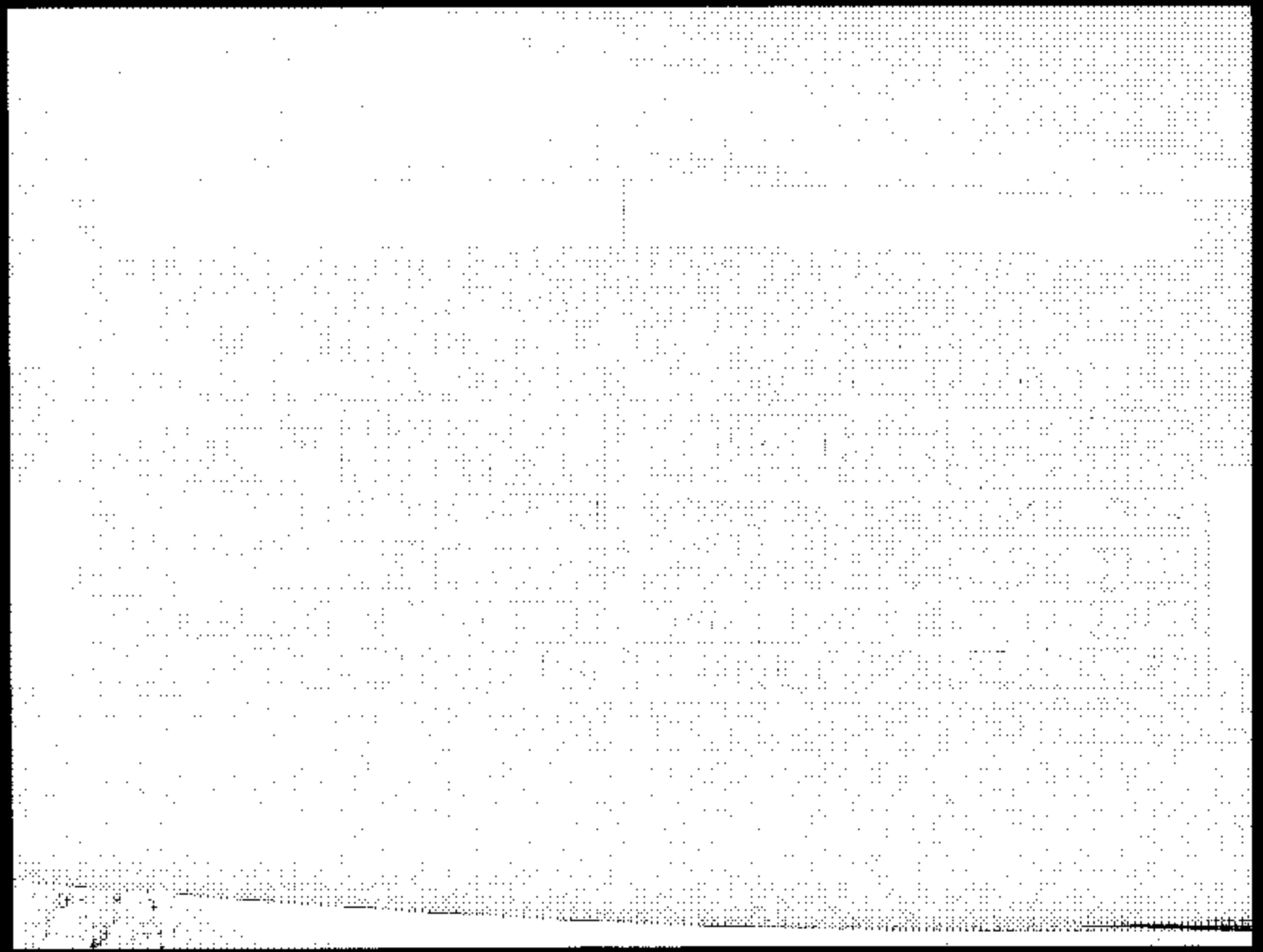

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FIGURE 5.8
VEHICLE TIRE INFORMATION LABEL

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FIGURE 5.9
VEHICLE VIN PLATE

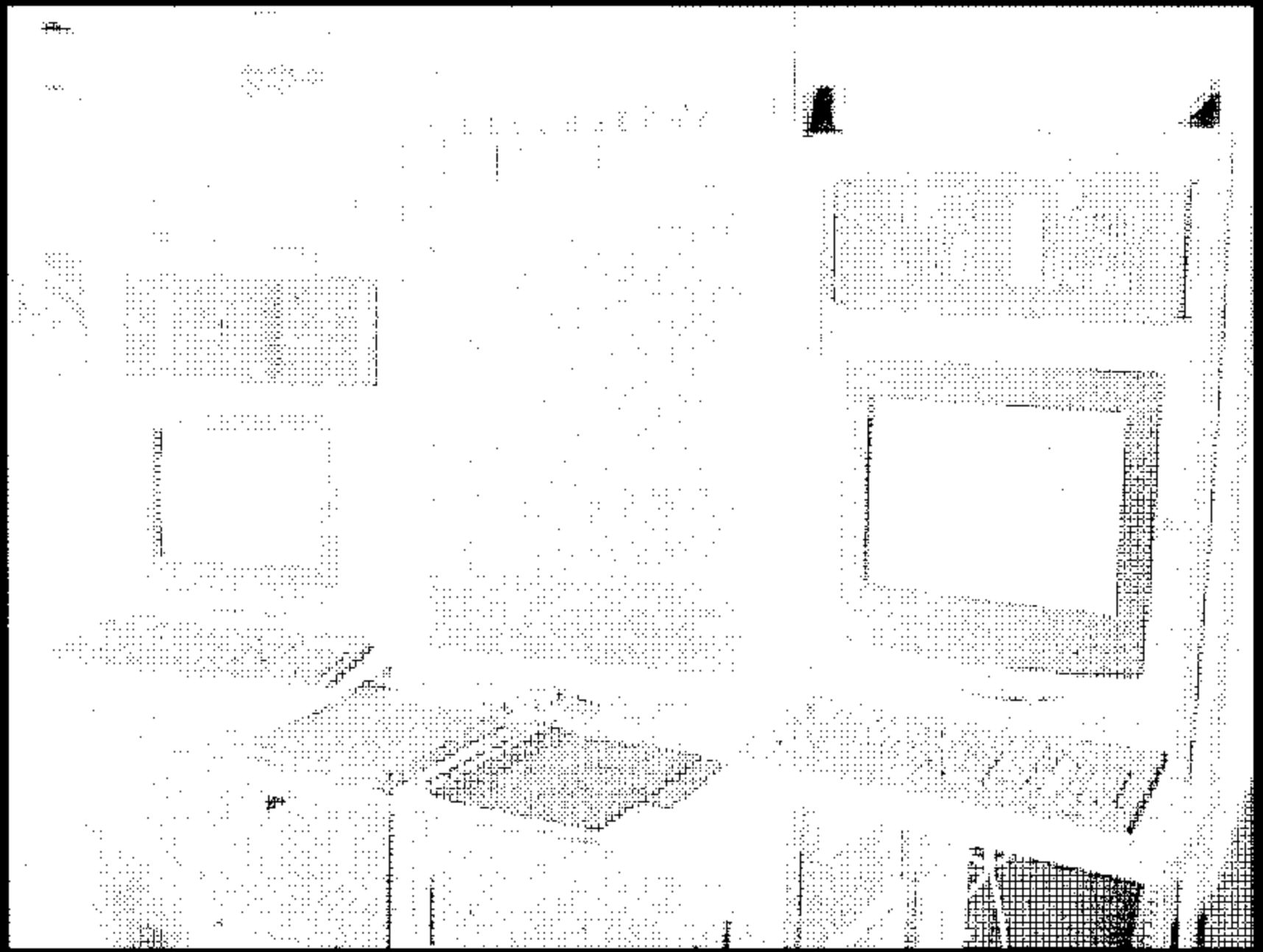

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FIGURE 5.10
INSTRUMENTATION SET-UP

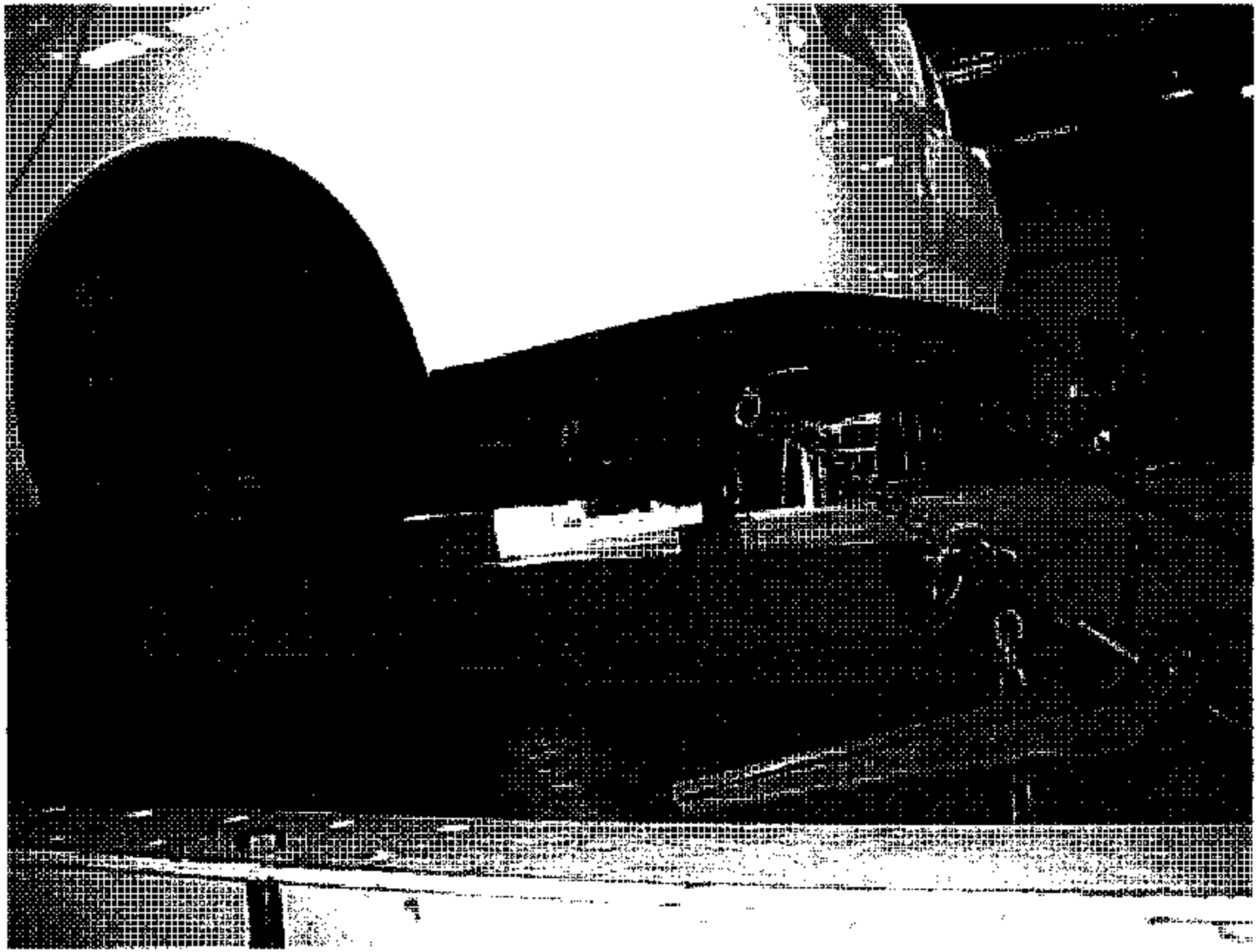

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FIGURE 5.11
REAR VEHICLE TIE DOWN – TEST 1

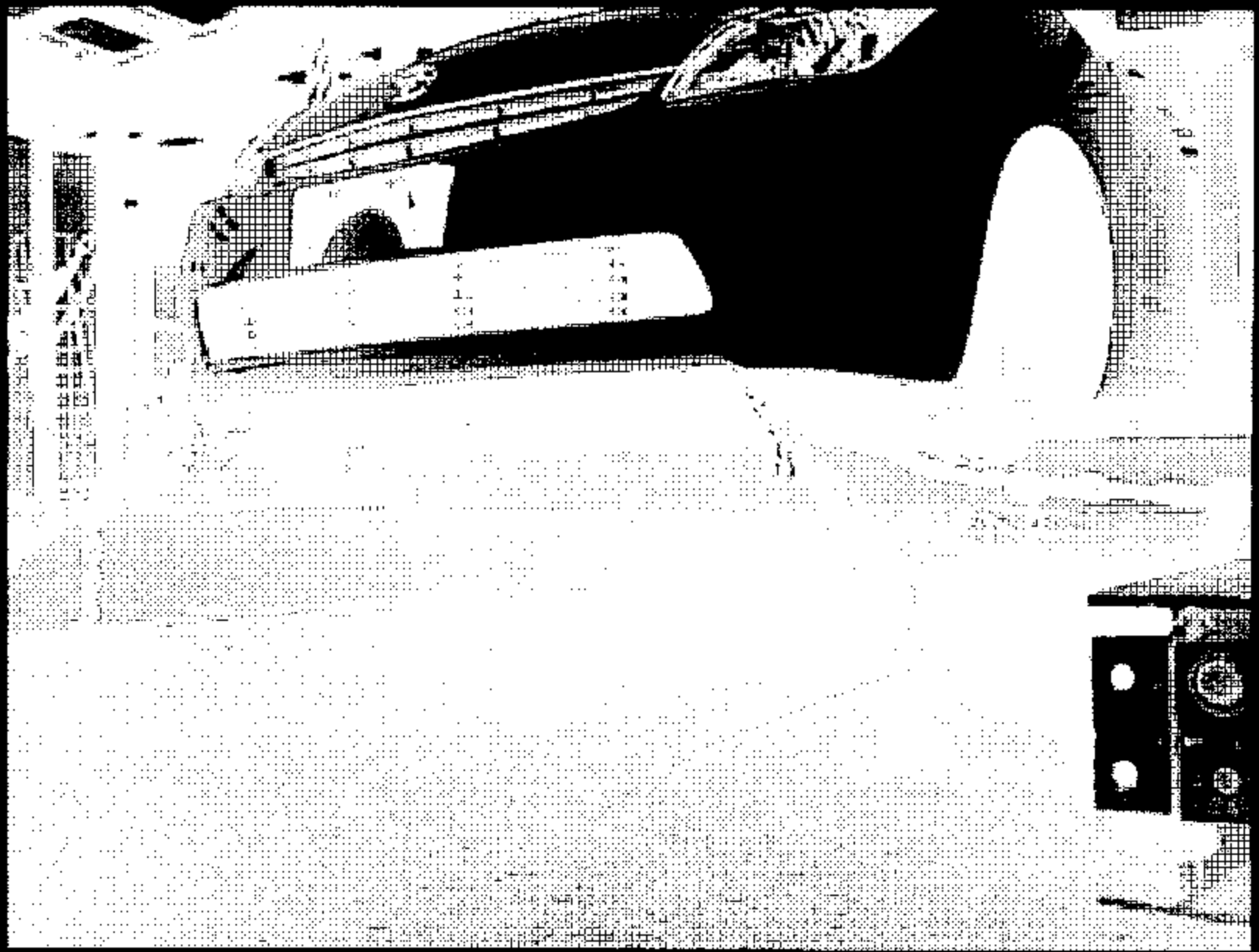

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FIGURE 5.12
FRONT VEHICLE TIE DOWN – TEST 1

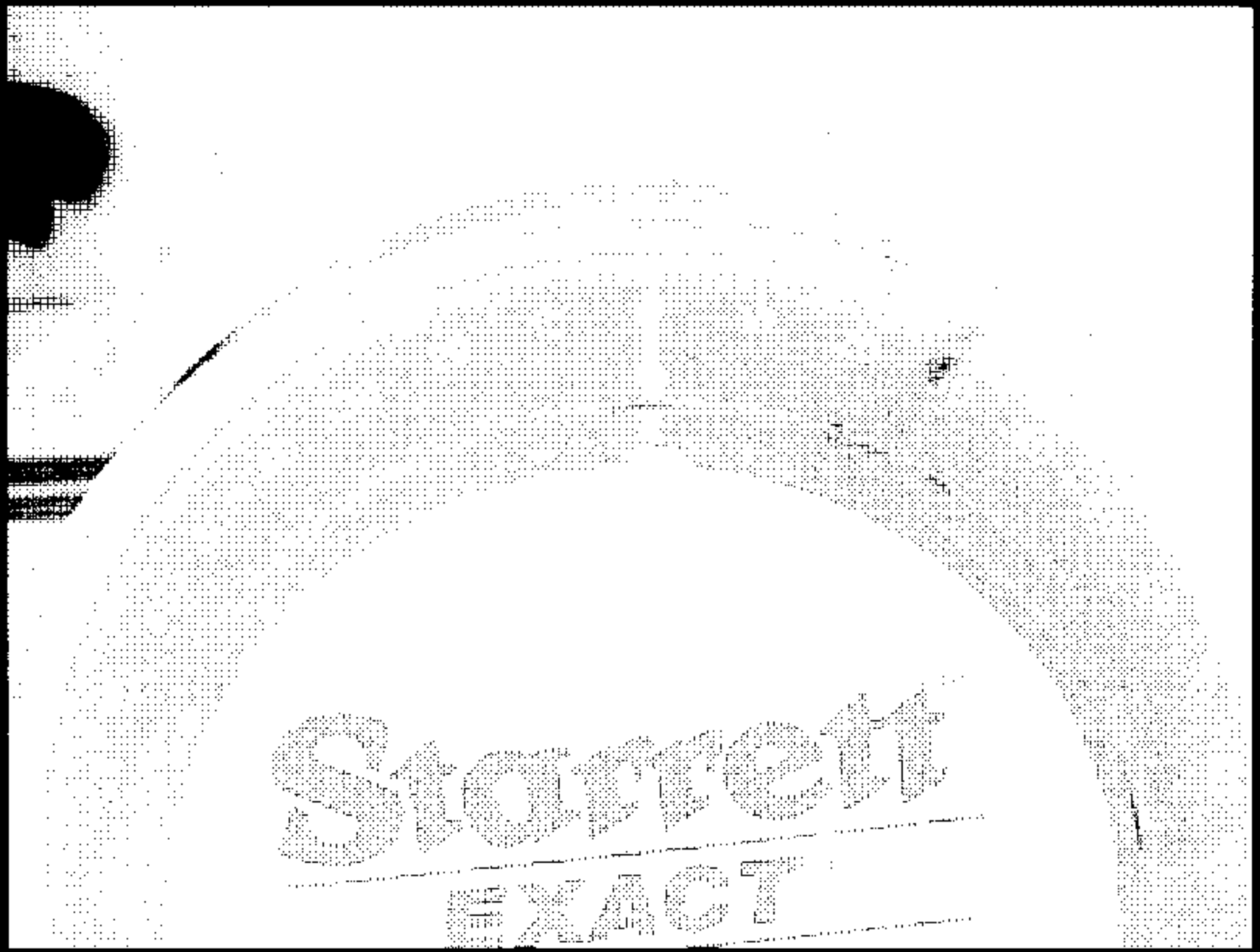

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FIGURE 5.13
INCLINOMETER PRE-TEST 1

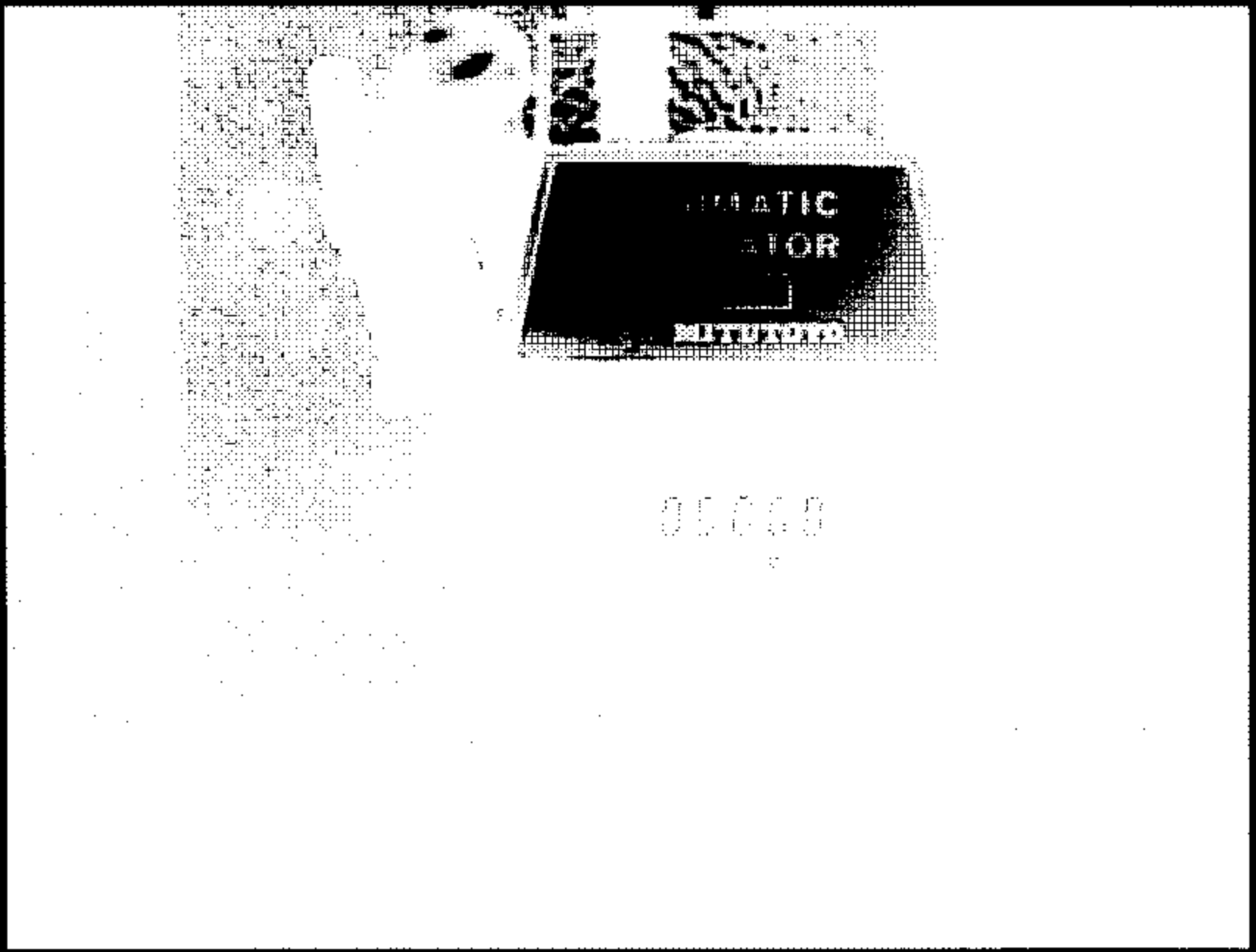

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FIGURE 5.14
DIAL INDICATOR PRE-TEST 1

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FIGURE 5.15
LOAD DEVICE AGAINST DOOR – PRE-TEST 1

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FIGURE 5.16
LOAD DEVICE AGAINST DOOR @ MAX LOAD - TEST 1

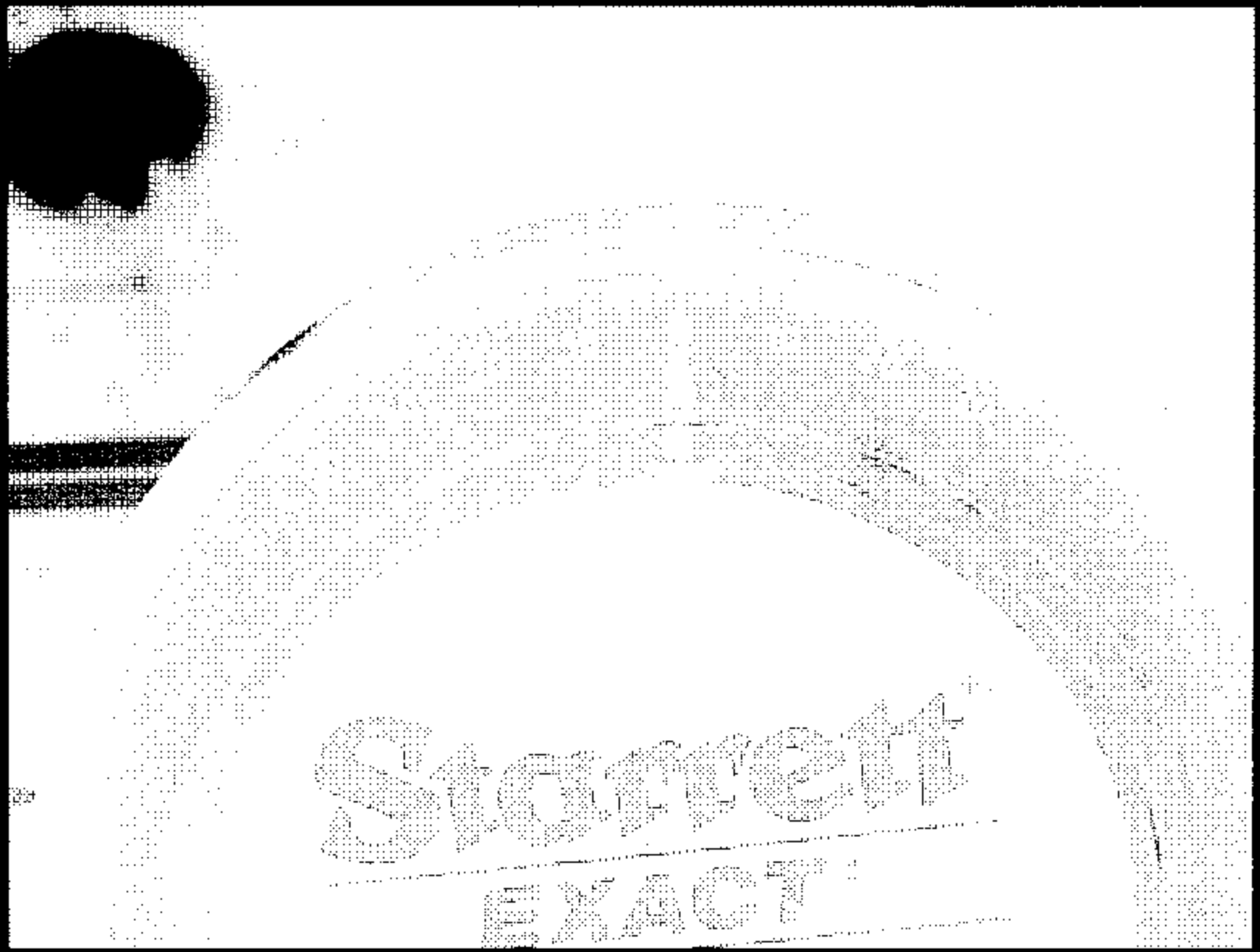

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FIGURE 5.17
INCLINOMETER AT MAX LOAD – TEST 1

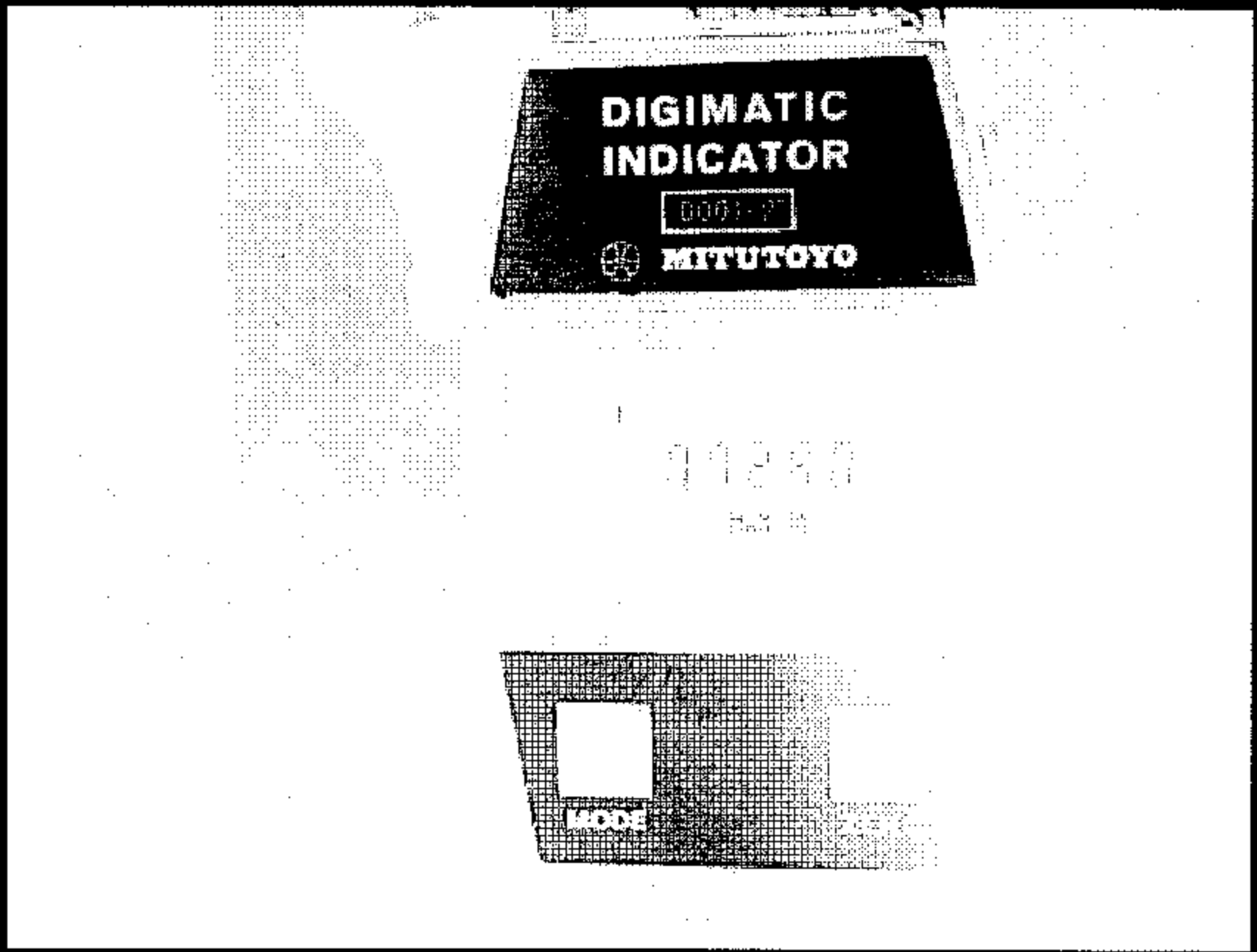

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FIGURE 5.18
DIAL INDICATOR AT MAX LOAD – TEST 1

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FIGURE 5.19
POST TEST DOOR OUTSIDE – TEST 1

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FIGURE 5.20
POST TEST DOOR INSIDE – TEST 1

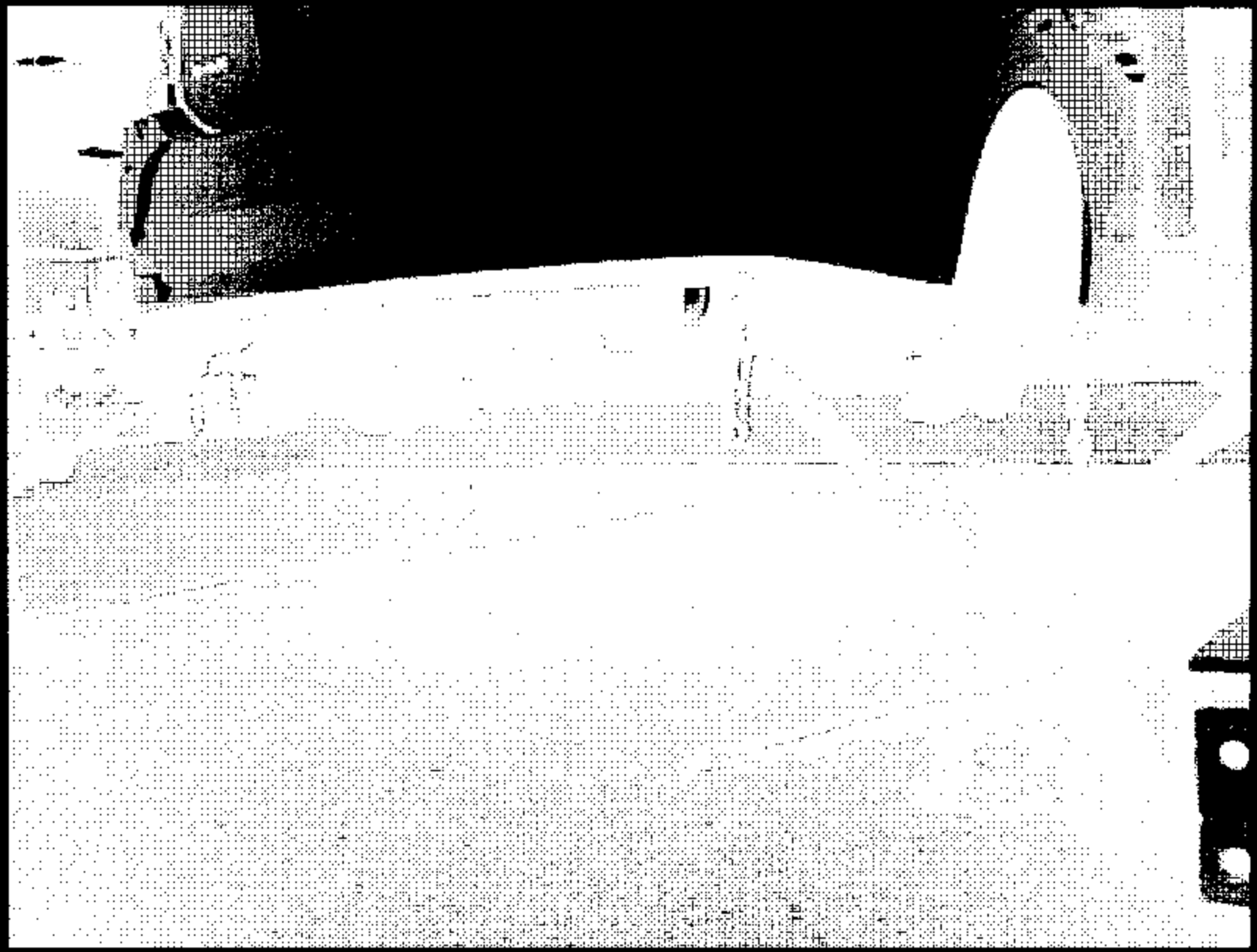

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FIGURE 5.21
REAR VEHICLE TIE DOWN – TEST 2

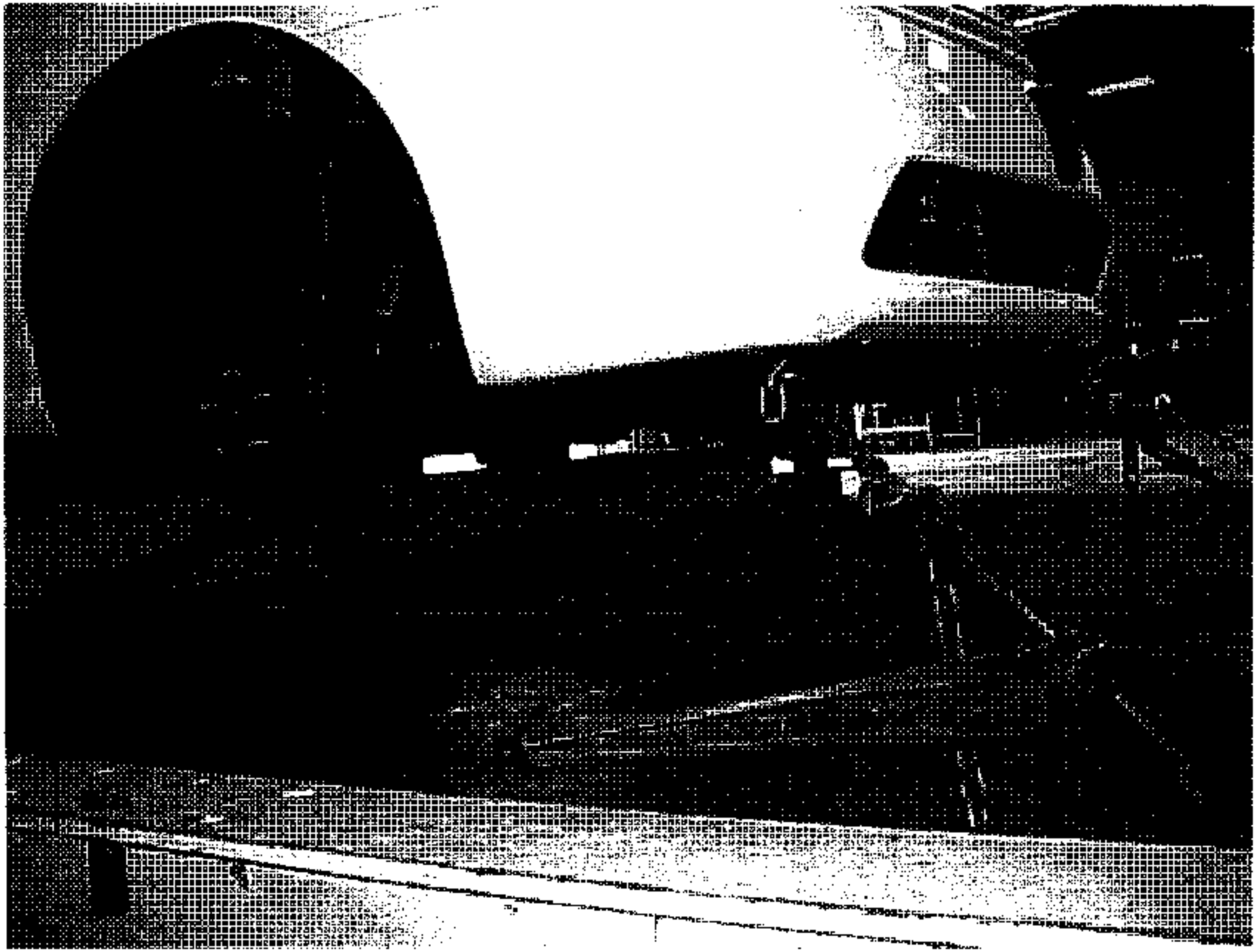

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FIGURE 5.22
FRONT VEHICLE TIE DOWN – TEST 2

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FIGURE 5.23
INCLINOMETER PRE-TEST 2

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FIGURE 5.24
DIAL INDICATOR PRE-TEST 2

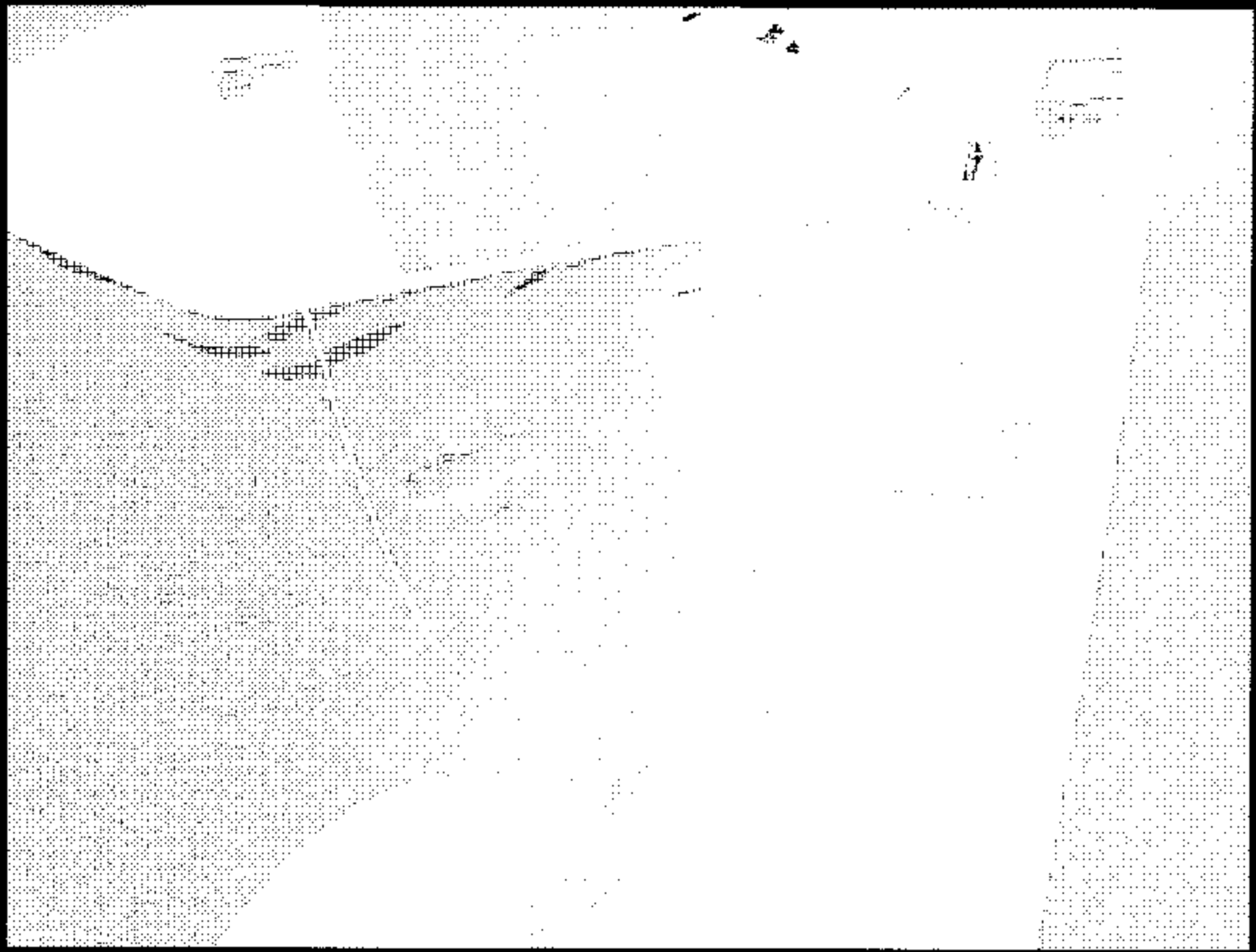

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FIGURE 5.25
LOAD DEVICE AGAINST DOOR – PRE-TEST 2

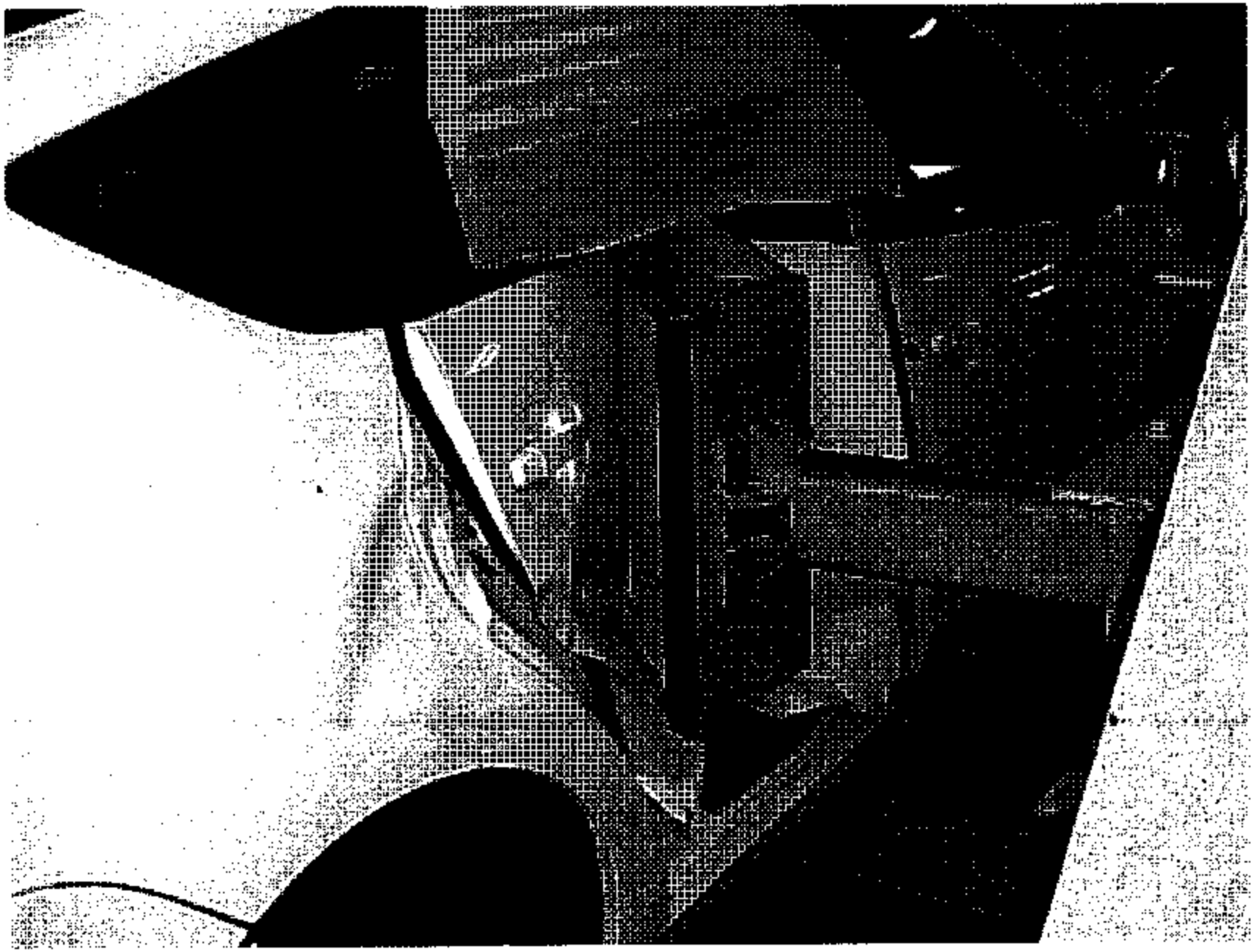

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FIGURE 5.26
LOAD DEVICE AGAINST DOOR @ MAX LOAD – TEST 2

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FIGURE 5.27
INCLINOMETER AT MAX LOAD – TEST 2

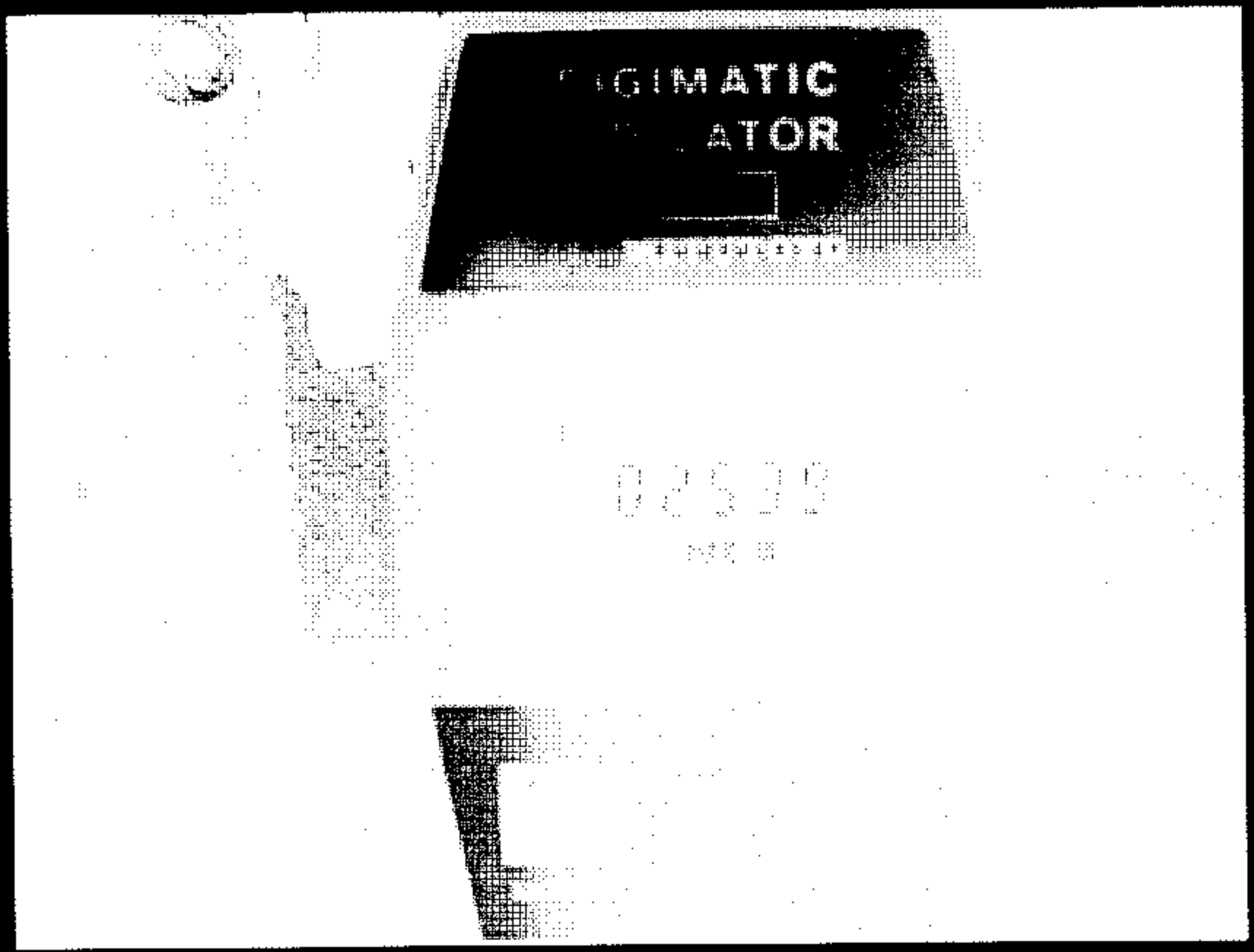

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FIGURE 5.28
DIAL INDICATOR AT MAX LOAD – TEST 2

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FIGURE 5.29
POST TEST DOOR OUTSIDE – TEST 2

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FIGURE 5.30
POST TEST DOOR INSIDE – TEST 2

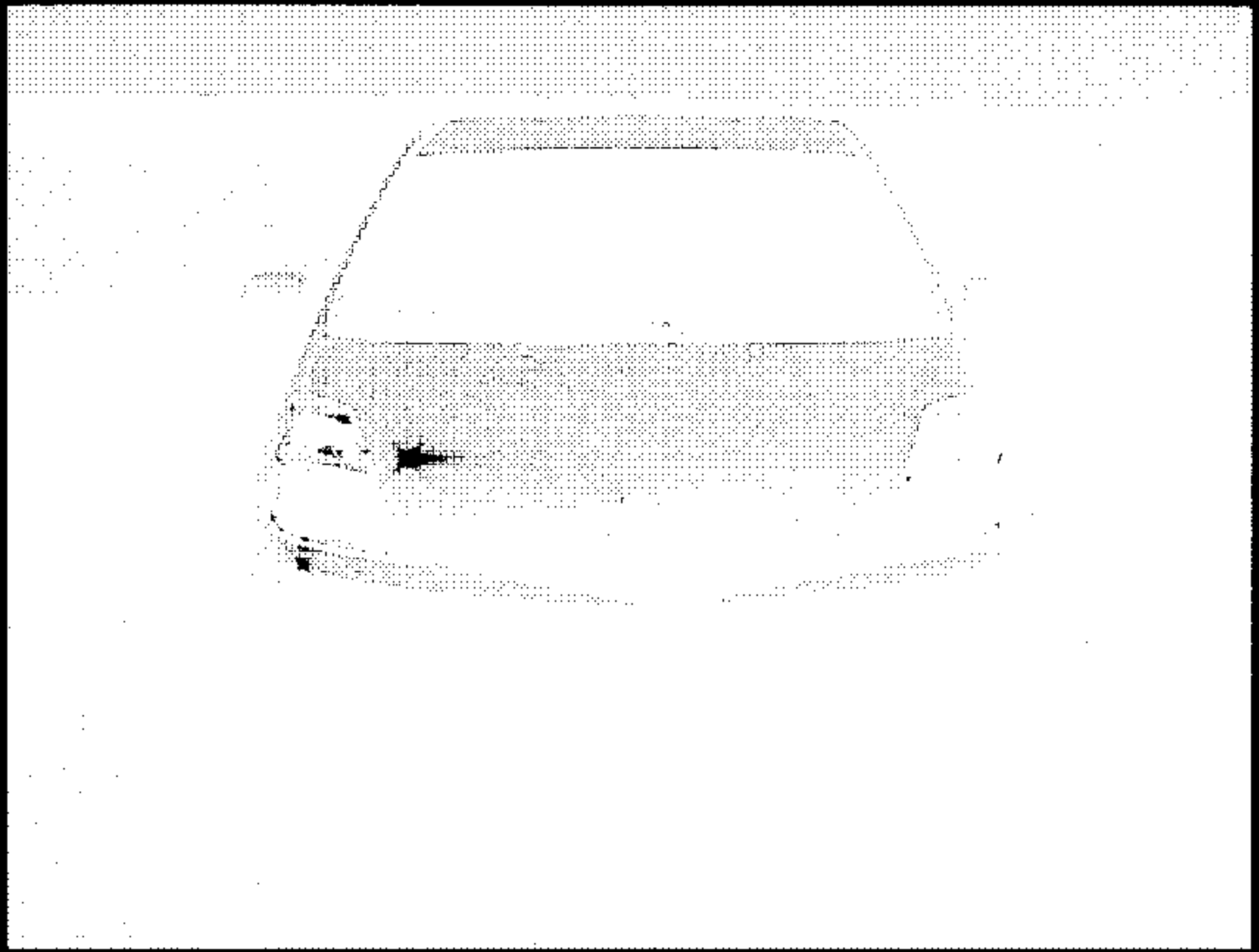

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FIGURE 5.31
FRONT VIEW OF VEHICLE POST TEST

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FIGURE 5.32
LEFT SIDE VIEW OF VEHICLE POST TEST

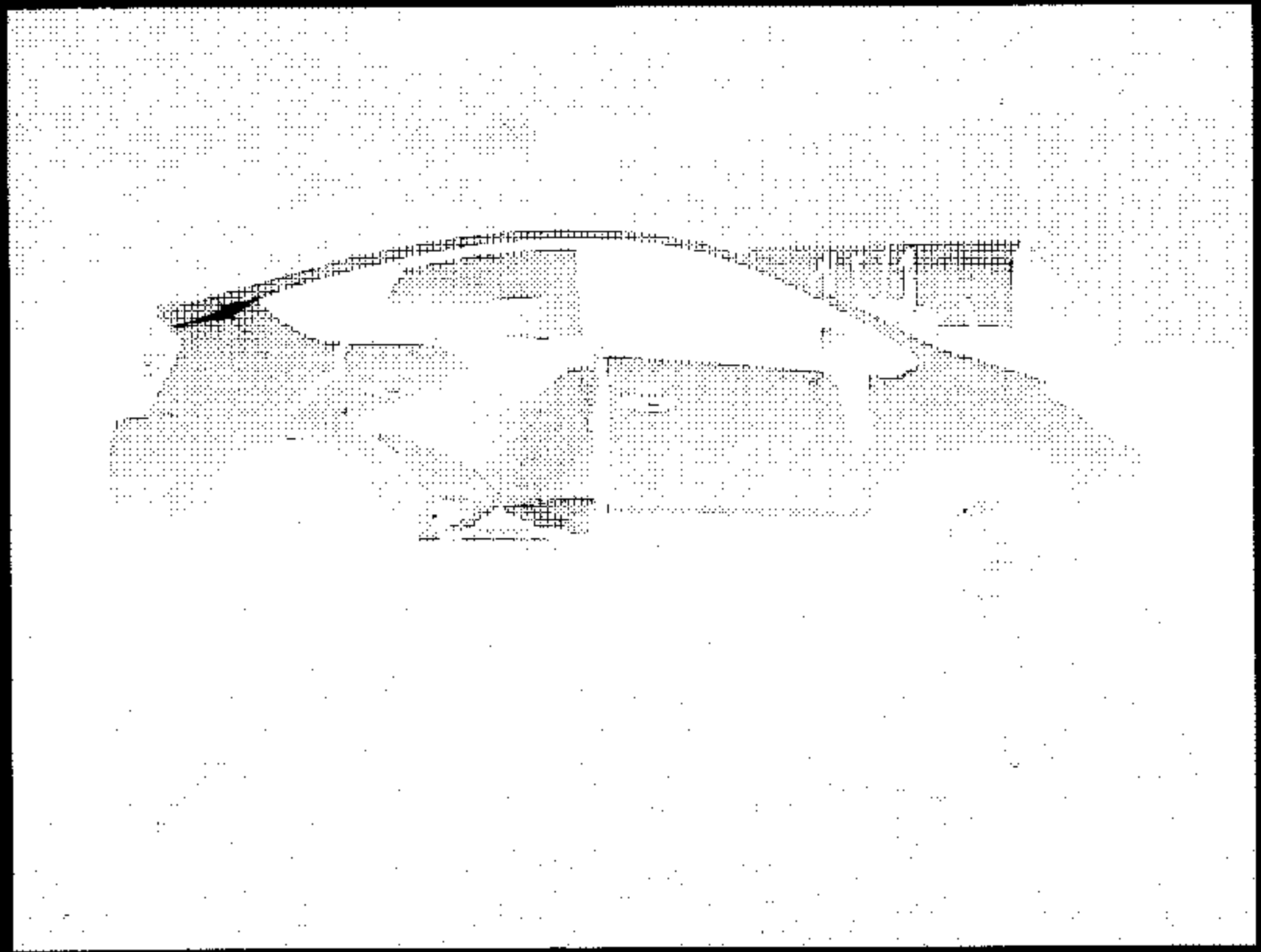

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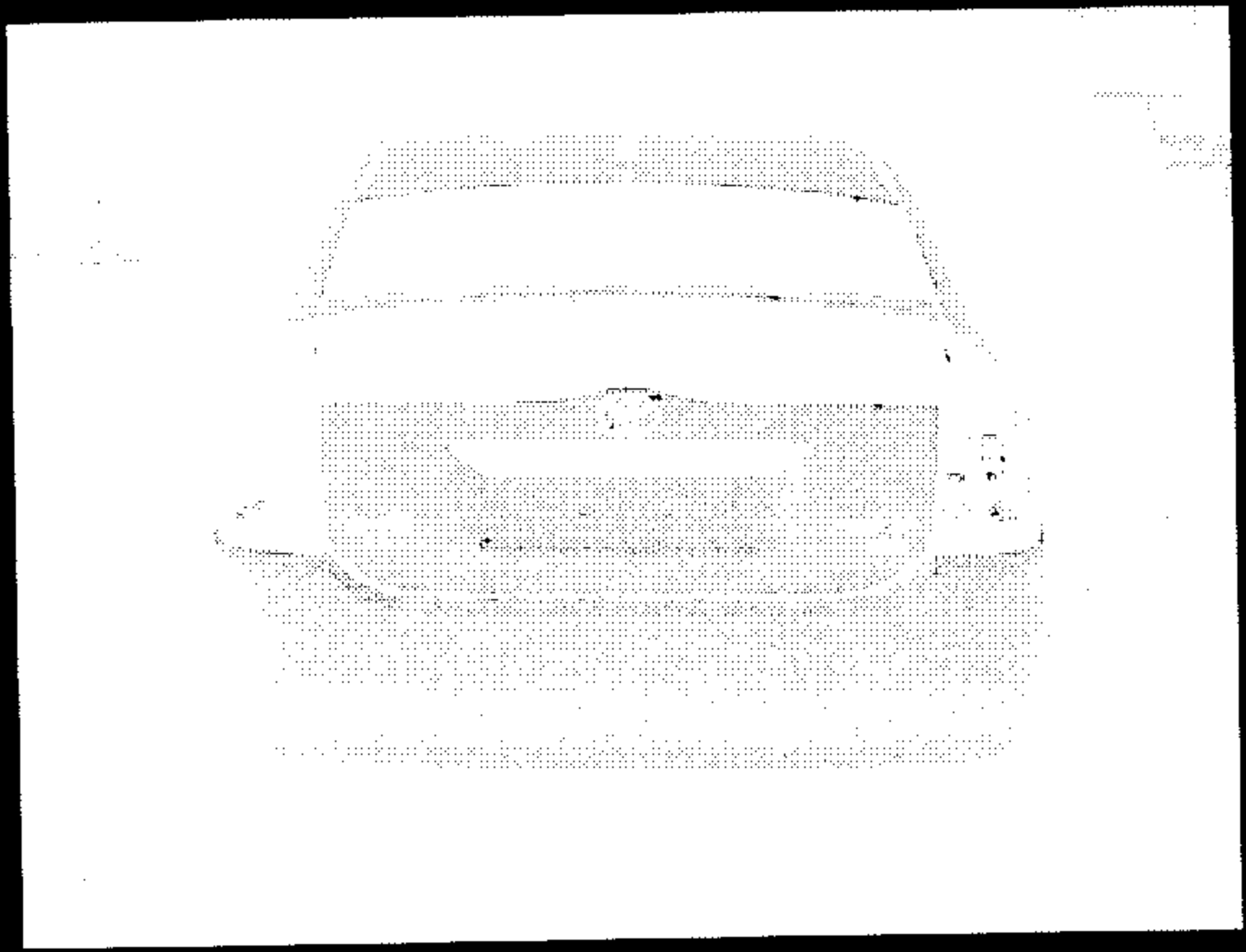
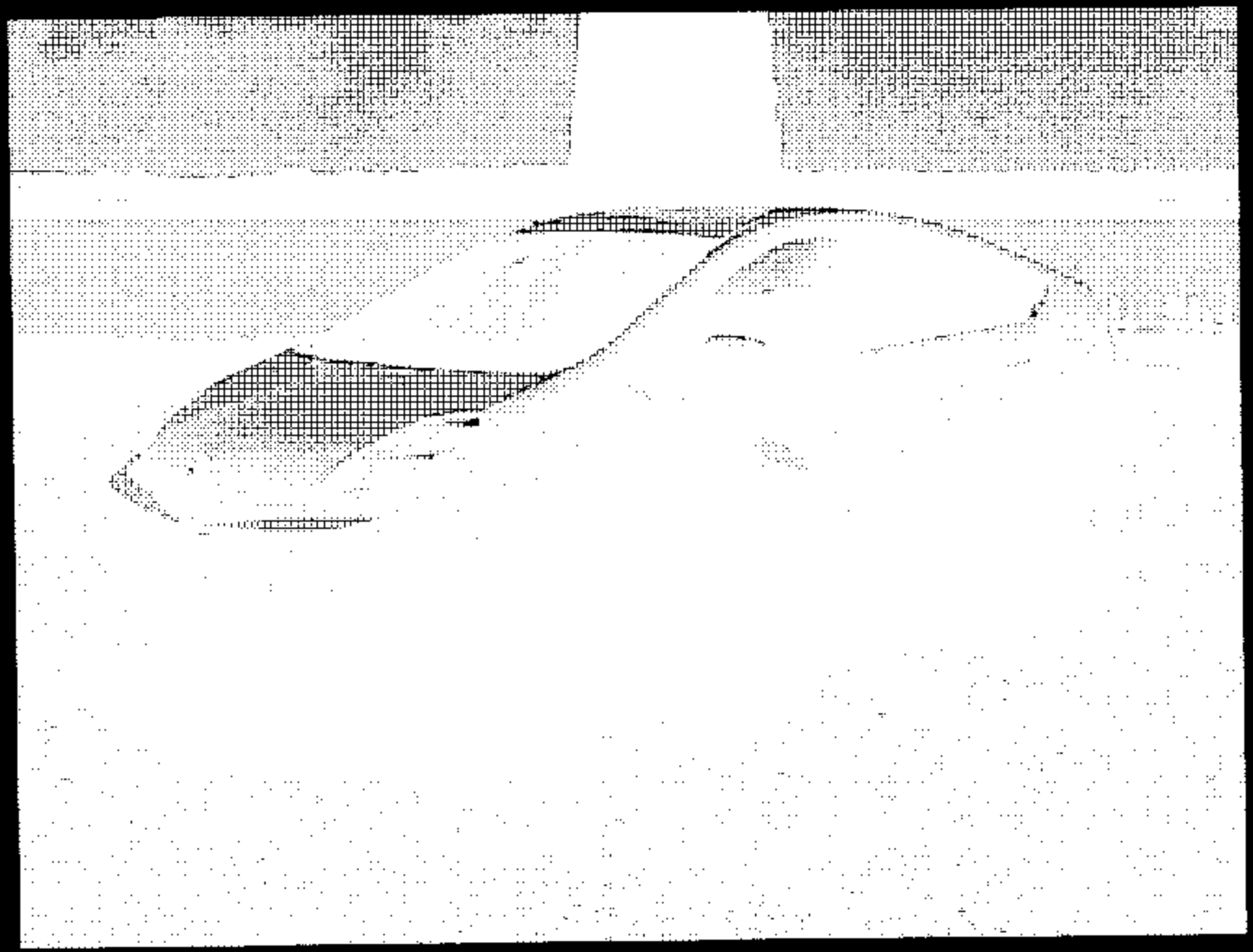
FIGURE 5.33
RIGHT SIDE VIEW OF VEHICLE POST TEST



2004 TOYOTA PRIUS
NHTSA NO. C45107
FMVSS NO. 214

FIGURE 5.34
REAR VIEW OF VEHICLE POST TEST



2004 TOYOTA PRIUS
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FIGURE 5.35
¾ FRONTAL VIEW FROM LEFT SIDE OF VEHICLE POST TEST

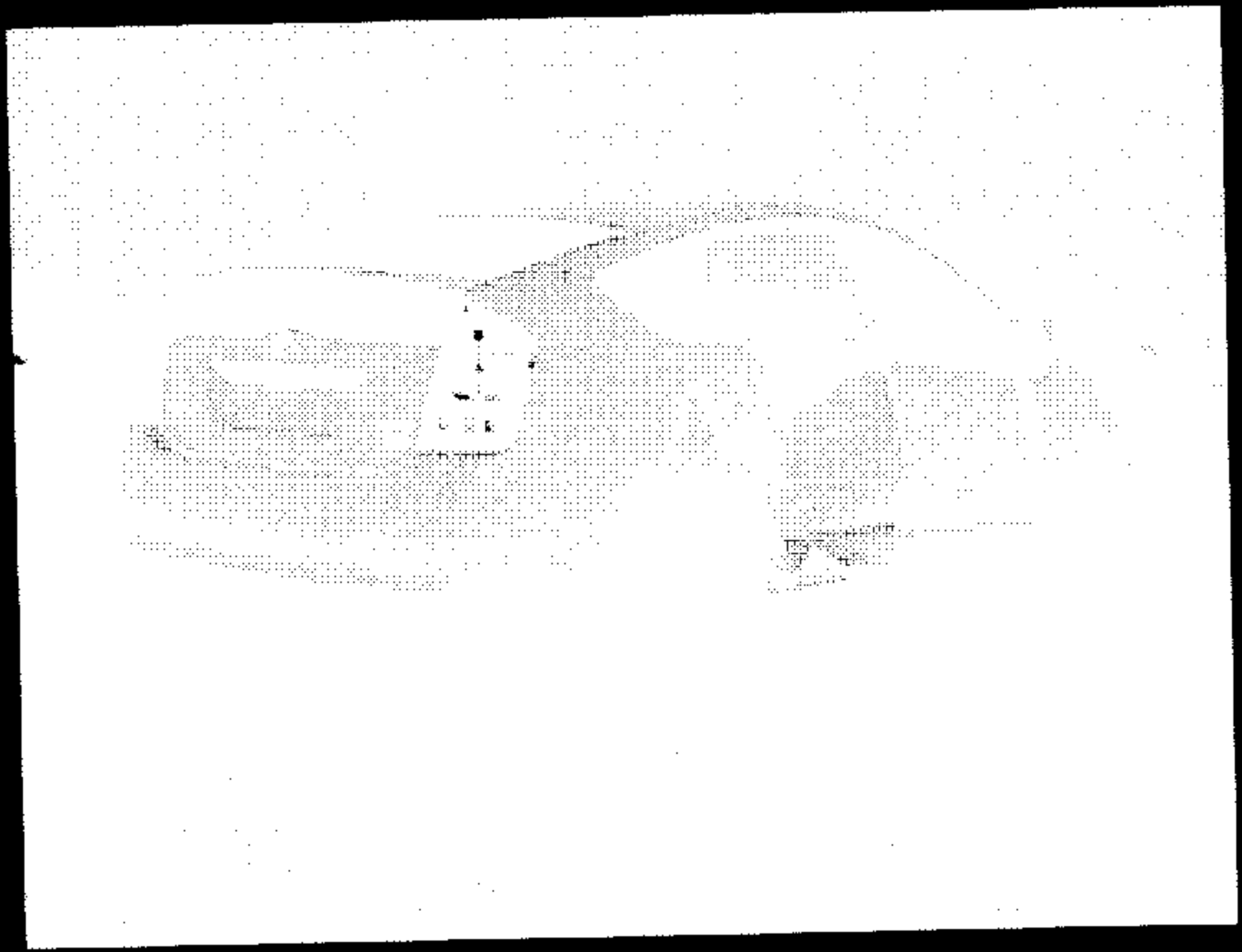

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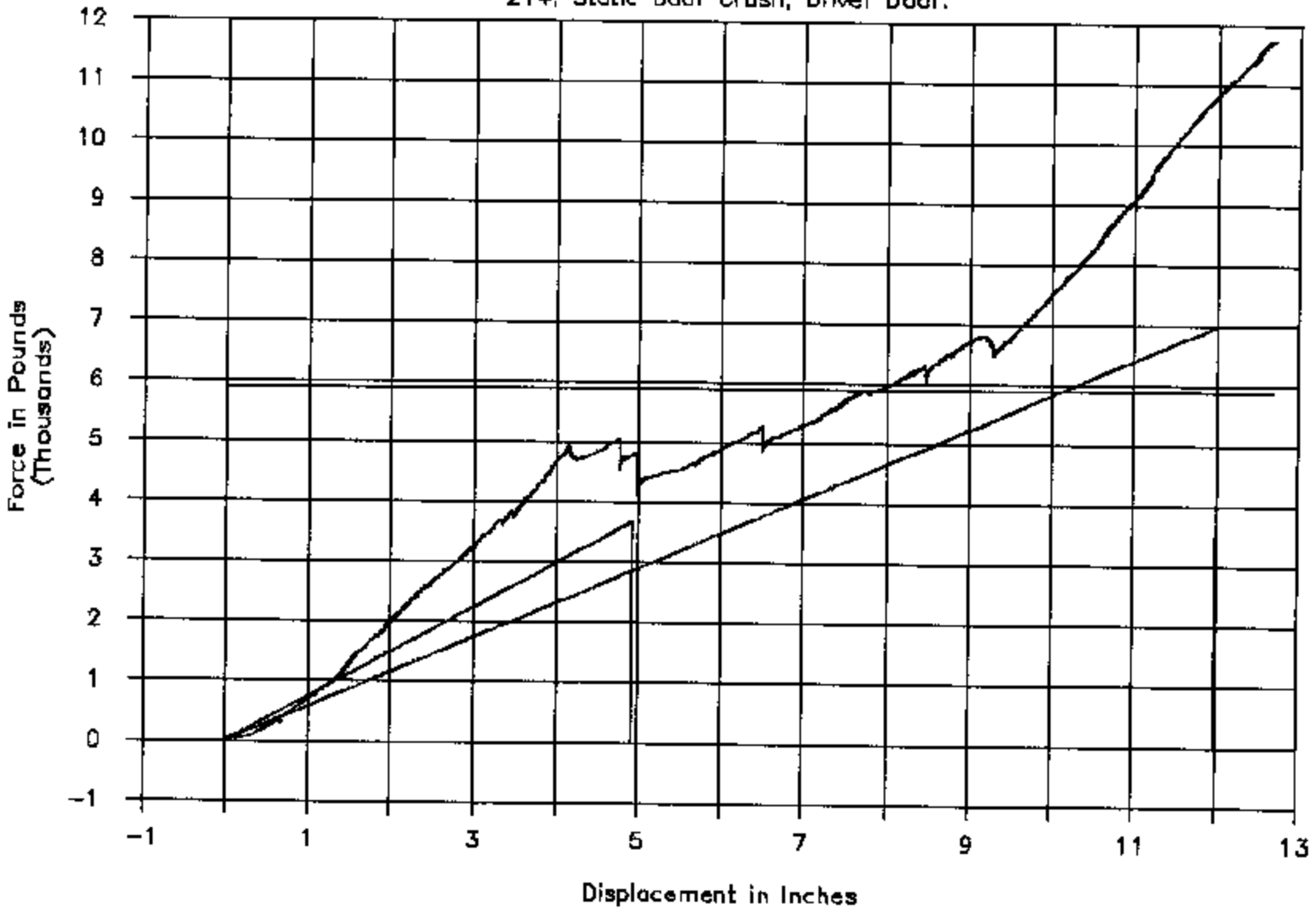
FIGURE 5.36
¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE
POST TEST

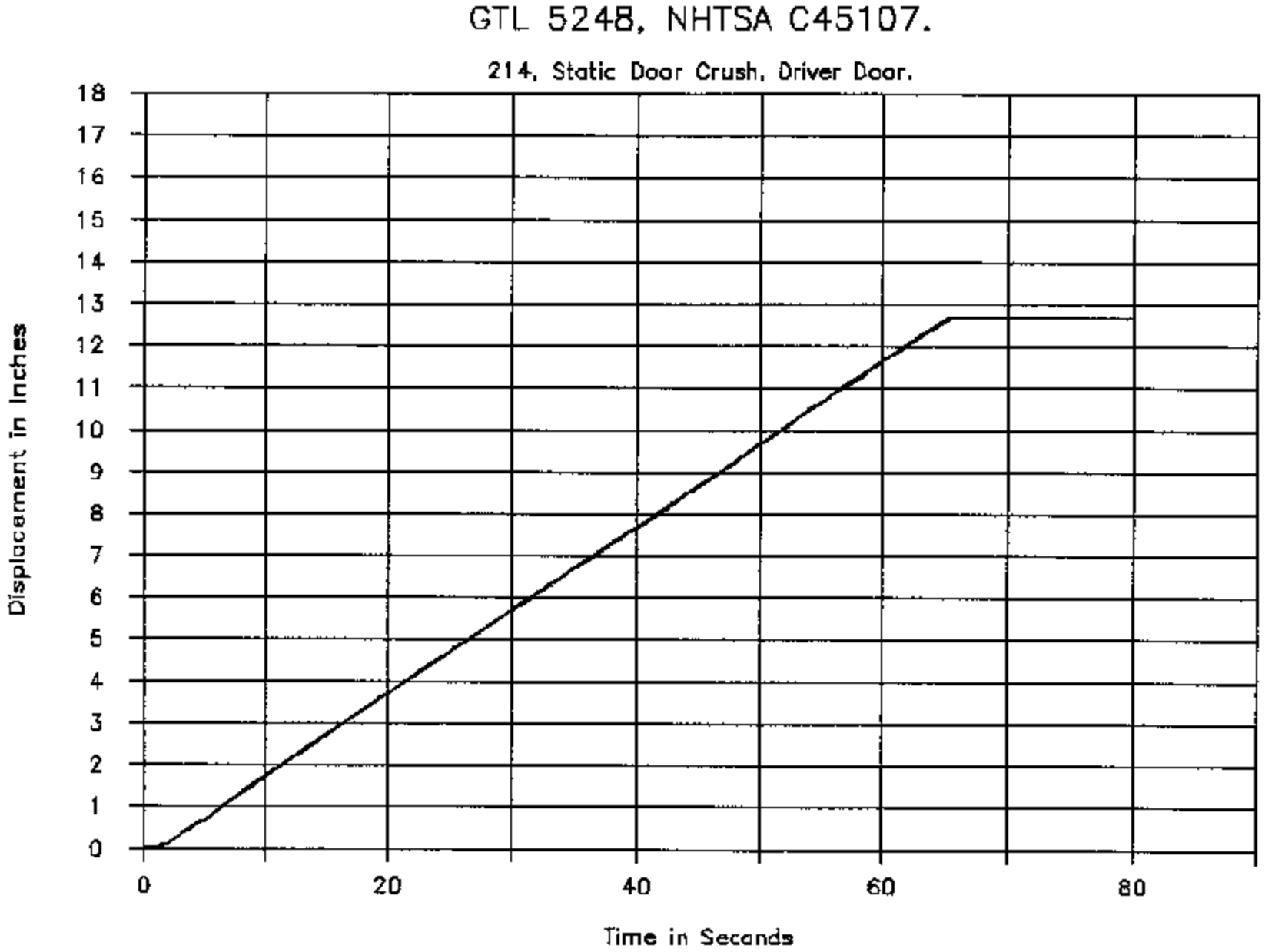
SECTION 6

TEST DATA PLOTS

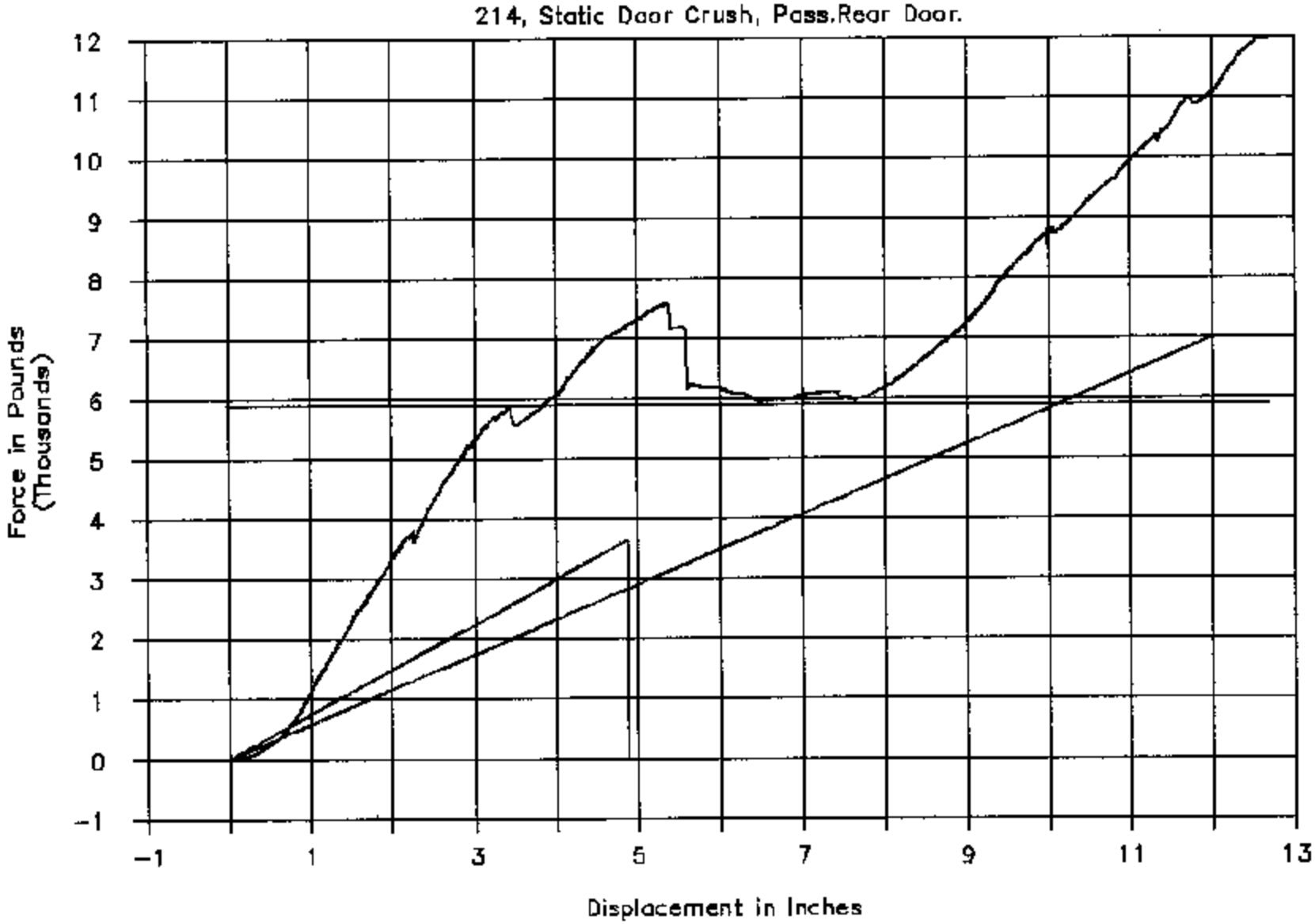
GTL 5248, NHTSA C45107.

214. Static Door Crush, Driver Door.




GTL 5248, NHTSA C45107.
214, Static Door Crush, Driver Door.
Displacement in Inches
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
0
20
40
60
80
Time in Seconds

GTL 5249, NHTSA C45107.



GTL 5249, NHTSA C45107.

214, Static Door Crush, Pass.Rear Door.