

HS No.
636823

REPORT NUMBER: 301F-MGA-03-004

**SAFETY COMPLIANCE TESTING FOR
FMVSS NO. 301F
FUEL SYSTEM INTEGRITY**

2003 Liberty Freedom
School Bus
NHTSA No.: C30901

PREPARED BY:
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BURLINGTON, WI 53105



Final Report Date: September 24, 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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WASHINGTON, D.C. 20590

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9/29/03
Date of Acceptance

Technical Report Documentation Page

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16. Abstract A compliance test was conducted on the subject 2003 Liberty Freedom School Bus, NHTSA No. C30901 in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-301-03 for the determination of FMVSS 301F compliance. TEST FAILURES: NONE			
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SECTION 1
PURPOSE OF COMPLIANCE TEST AND SUMMARY

A fuel system integrity test was performed on a MY2003 Liberty Freedom School Bus, NHTSA No. C30901, in accordance with the specifications of the Office of Vehicle Safety Compliance (OVSC) Test Procedures TP 301-03 to determine compliance to the requirements of Federal Motor Vehicle Safety Standards (FMVSS) 301, "Fuel System Integrity".

The vehicle was subjected to a 47.3 kph (29.4 mph) frontal impact.

Based on the test results, the MY2003 Liberty Freedom School Bus, NHTSA No. C30901 appears to meet the requirements of FMVSS 301 testing.

This program is sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-02-D-01057.

SECTION 2
COMPLIANCE TEST DATA

The following data sheets document the results of testing on the MY2003 Liberty Freedom School Bus, NHTSA No. C30901.

DATA SHEET 1
SCHOOL BUS DATA

Test Vehicle: **2003 Liberty Freedom School Bus**
Test Lab: **MGA Research-Wisconsin Operations**

NHTSA No.: **C30901**
Test Date: **8/25/03**

GENERAL VEHICLE IDENTIFICATION

School Bus Manufacturer:	Liberty	
School Bus Model:	Freedom	
Build Date:	10/02	
Incomplete Vehicle Manufactured By:	GMC	
Build Data for Bus Chassis:	10/02	
School Bus GVWR (kg):	4,354	
School Bus GAWR Front (kg):	1,950	
School Bus GAWR Rear (kg):	2,760	
School Bus VIN:	1GBHG39U831110237	
No. of Designated Seating Positions (DSP) including Driver:	17 (1 driver, 16 seat positions)	
School Bus NHTSA No.:	C30901	
Bus Body Color:	Yellow	
Engine Displacement	6.0 L	
No. of Cylinders:	8	
Fuel Pump Actuation:	Electric Pump "ON" with key	
Bus Unloaded Vehicle Weight (UVW) (kg):	3,058	
Bus Occupant Load:	864 kg – Passenger 68 kg – Driver 932 kg - Total	
Target Bus Test Weight (SBTW) (kg):	3,990	
Actual (SBTW) (kg):	3,985	
School Bus Tire Manufacturer:	Bridgestone	
	Front	Rear
Rec. Cold Tire Inflation Pressure (kpa):	345	552
Tire Size:	LT245/75R16	LT225/75R16
Load Range:	E	E

DATA SHEET 1 (CONTINUED)

SCHOOL BUS DATA

Test Vehicle: **2003 Liberty Freedom School Bus**
 Test Lab: **MGA Research-Wisconsin Operations**

NHTSA No.: **C30901**
 Test Date: **8/25/03**

GENERAL VEHICLE IDENTIFICATION

SCHOOL BUS ATTITUDE

	Units	LF	RF	LR	RR
As Received:	mm	NR	NR	NR	NR
Pre-Test:	mm	854	854	887	902
Post-Test:	mm	896	872	927	899

NR = Not Recorded

Weight of Fuel:	0.84 kg/liter (7.03 lbs./gallon)
Fuel Tank Capacity (liters/kg):	117 liters/99kg (31 gallons/218 lbs.)
Tank Test Volume (liters/kg):	111.3 liters/93.5 kg (29.4 gallons/207 lbs.)

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)*		
		Front	Rear	Total	Front	Rear	Total
Left	kg	826	724		903	1197	
Right	kg	780	728		872	1013	
Ratio	%	52.5	47.5		44.5	55.5	
Totals	kg	1606	1452	3058	1775	2210	3985

COMMENTS: The seats were removed during prior testing. Seat weight and occupant weight was ballast using salt bags to meet the calculated test weight.

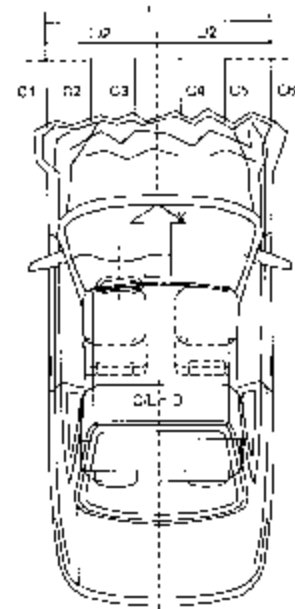
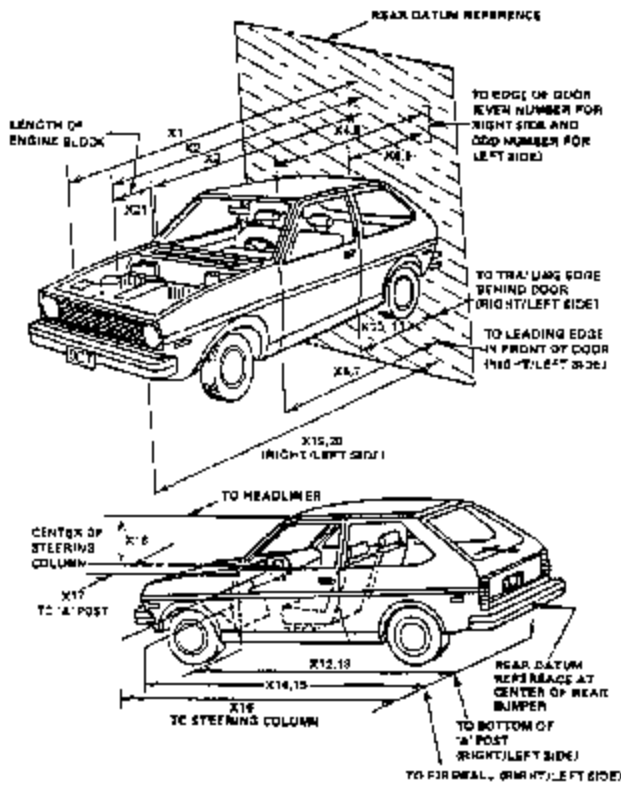
Recorded By: Chris Hand

Approved By: Michael J. [Signature]

Date: August 25, 2003

**DATA SHEET 2
SCHOOL BUS IMPACT DATA**

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
X1	Total length of vehicle at centerline	mm	6173	5616	557
C1	See Diagram	mm	5955	5321	634
C2	See Diagram	mm	6110	5611	499
C3	See Diagram	mm	6164	5625	540
C4	See Diagram	mm	6165	5630	535
C5	See Diagram	mm	6111	5620	491
C6	See Diagram	mm	5959	5456	503
L	See Diagram	mm	1800	1830	-30



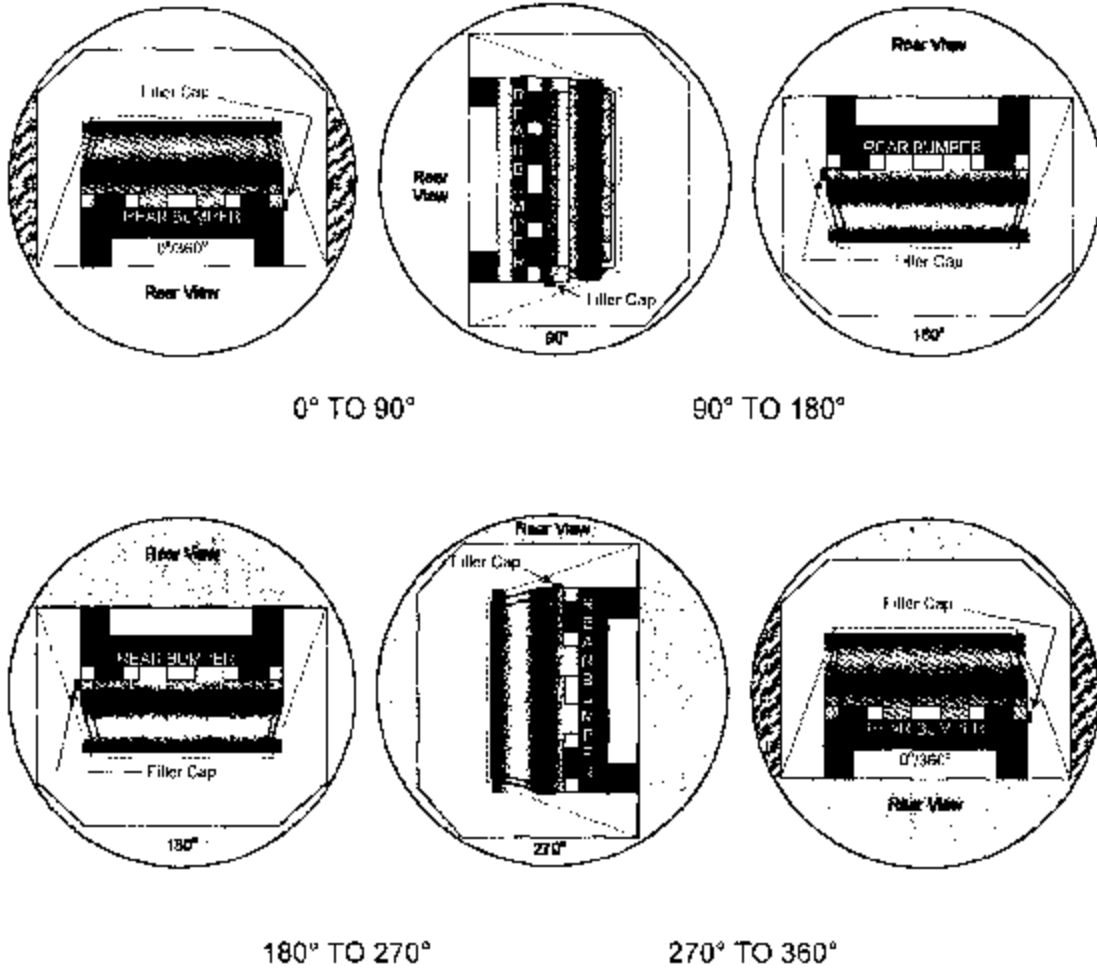
DATA SHEET 2 (CONTINUED)
SCHOOL BUS IMPACT DATA

Test Vehicle: **2003 Liberty Freedom School Bus**
Test Lab: **MGA Research-Wisconsin Operations**

NHTSA No.: **C30901**
Test Date: **8/25/03**

Time of Impact:	11:24 am
Ambient Temperature (°C):	22.4
Barrier Velocity – Speed Trap 1 (kph):	47.5
Barrier Velocity – Speed Trap 2 (kph):	47.3
Vehicle Rebound (mm):	0

**DATA SHEET 3
FMVSS 301 STATIC ROLLOVER DATA**



1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent spillage locations:

Test Phase	Rotation Time (sec)	Hold Time (sec)	Spillage (oz)
0° TO 90°	165	300	0
90° TO 180°	152	300	0
180° TO 270°	141	300	0
270° TO 360°	157	300	0

**DATA SHEET 3 (CONTINUED)
FMVSS STATIC ROLLOVER DATA**

Fuel Spillage Noted:	No
Failure, if applicable:	None

Stoddard Solvent Spillage Measurements

Timeframe	Description	Allowable Spillage	Measured Spilled	Results
T ₀ - T ₁	Time Zero to Cessation of Motion	31 grams (1 ounce)	0	PASS
T ₁ - T ₂	Cessation of Motion to 5 minutes after Cessation of Motion	156 grams (5 ounces)	0	PASS
T ₂ - T ₃	5 Minutes after Cessation of Motion to 30 minutes after Cessation of Motion	31 grams (1 ounce) per minute 933 grams (30 ounces) Total Allowed	0	PASS

ADDITIONAL FAILURE DETAILS: None

Recorded By:

Chris Hand

Approved By:

Michael J. [Signature]

Date: August 25, 2003

**SECTION 4
INSTRUMENTATION AND EQUIPMENT LIST**

Test Vehicle: **2003 Liberty Freedom School Bus**
 Test Lab: **MGA Research-Wisconsin Operations**

NHTSA No.: **C30901**
 Test Date: **8/25/03**

Equipment	Description	Serial No.	Cal. Date	Next Cal. Date
Counter/Timer	DCI	939095	10/25/02	10/25/03
Counter/Timer	DCI	939094	10/25/02	10/25/03
Stop Watch	Cole Parmer	9441010	3/28/03	3/28/04
Vehicle Scales	GSE	212091 & 212092	6/9/03	12/9/03
Tire Pressure Gauge	Dill	MGA06133	10/16/02	10/16/03
Tape Measure	Stanley Powerlock 5M	146	4/9/03	10/9/03
Temp. Indicator	Fluke Probe with Multimeter	944939	10/16/02	10/16/03
Fluke Meter	Fluke	76270715	10/8/02	10/8/03

**SECTION 5
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Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

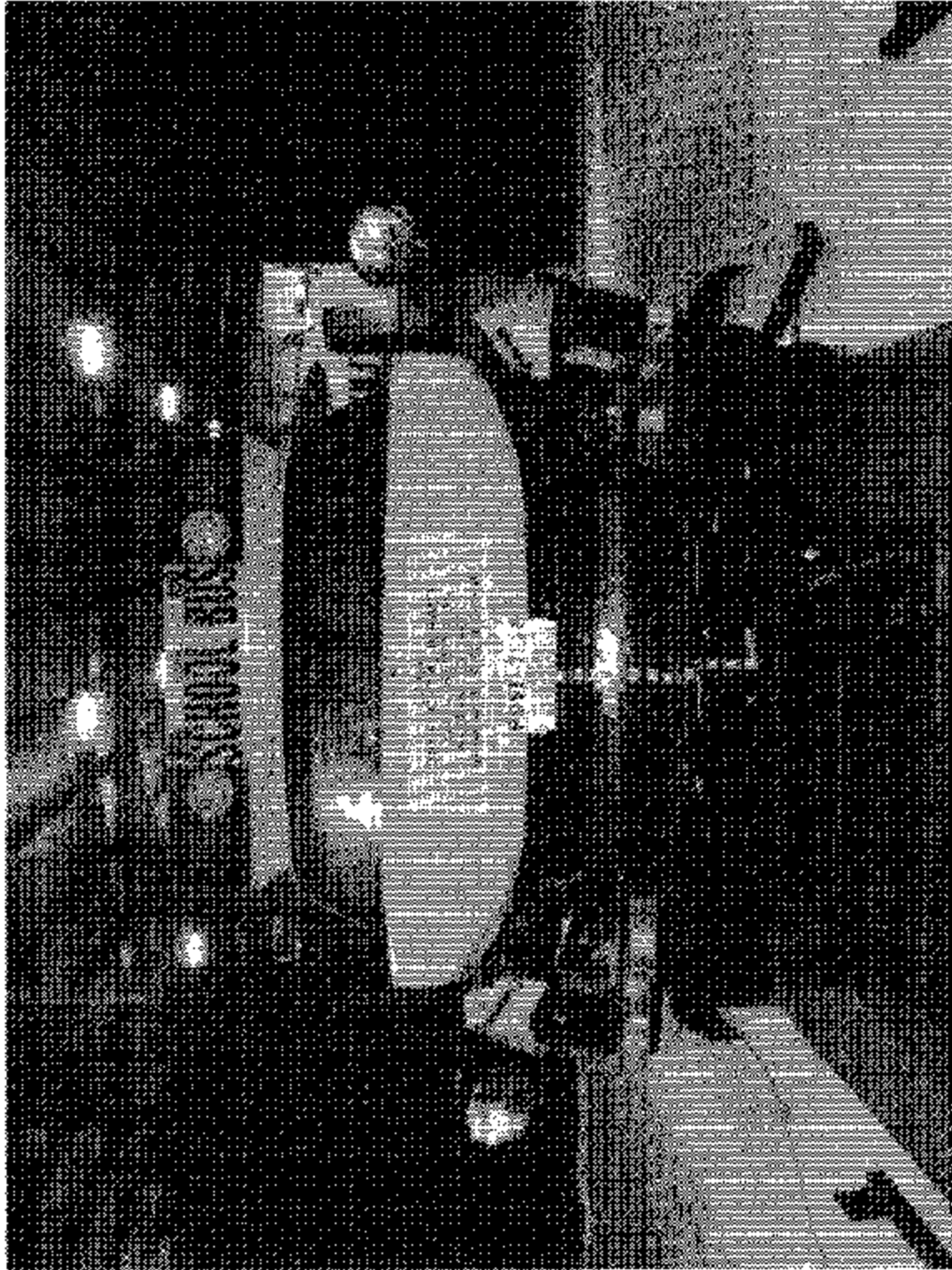
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Pre-Test Front View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

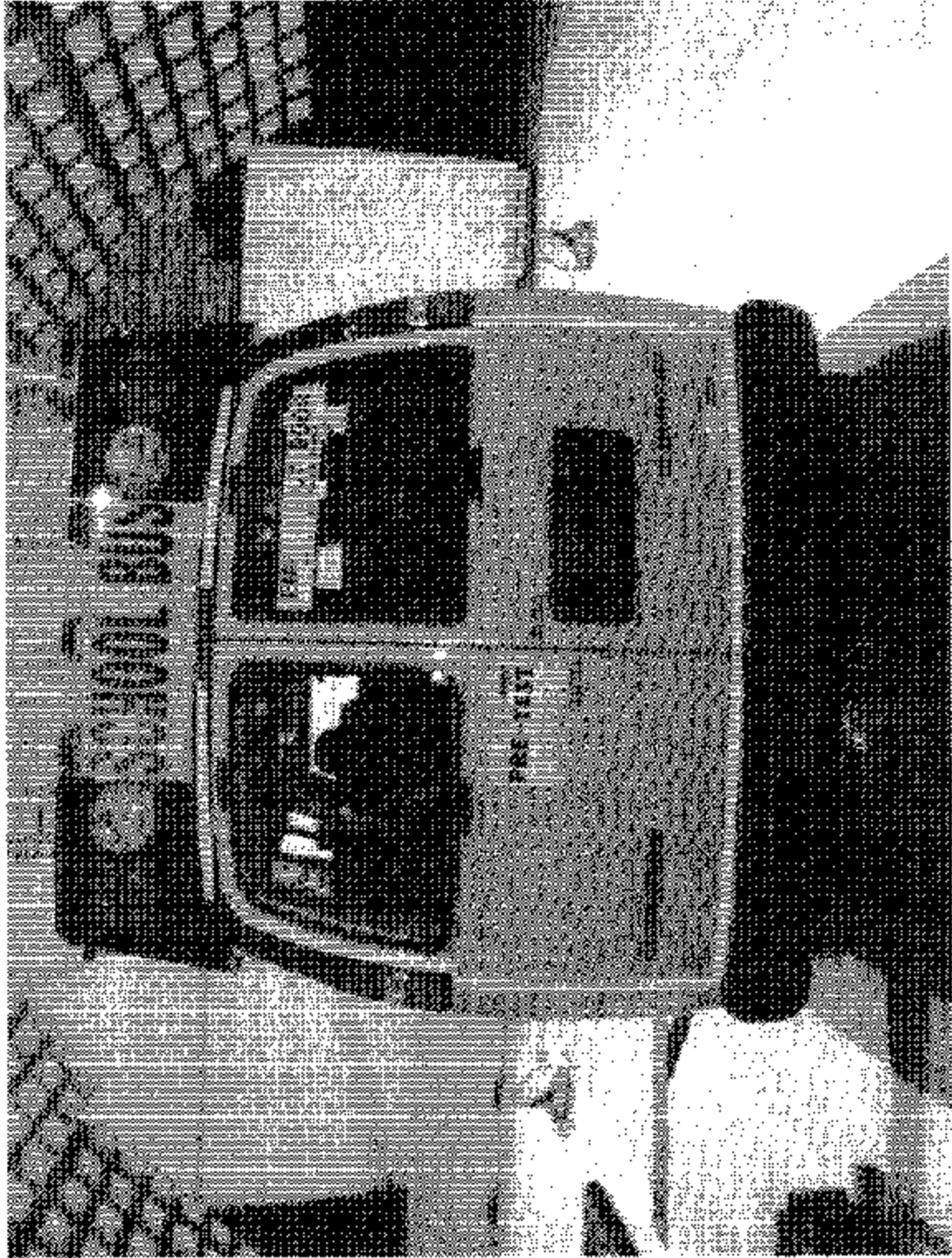
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Post-Test Front View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

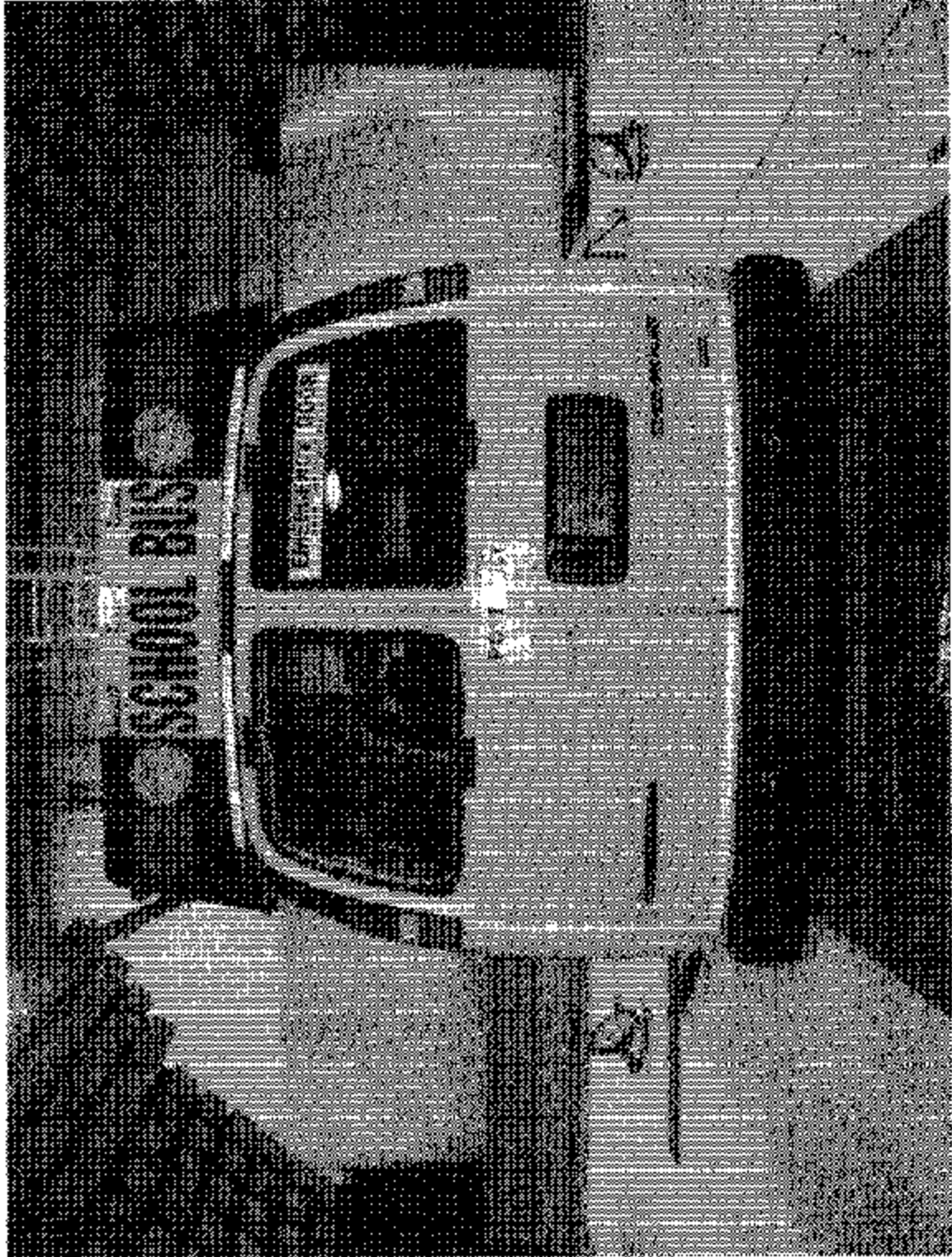
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Pre-Test Rear View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

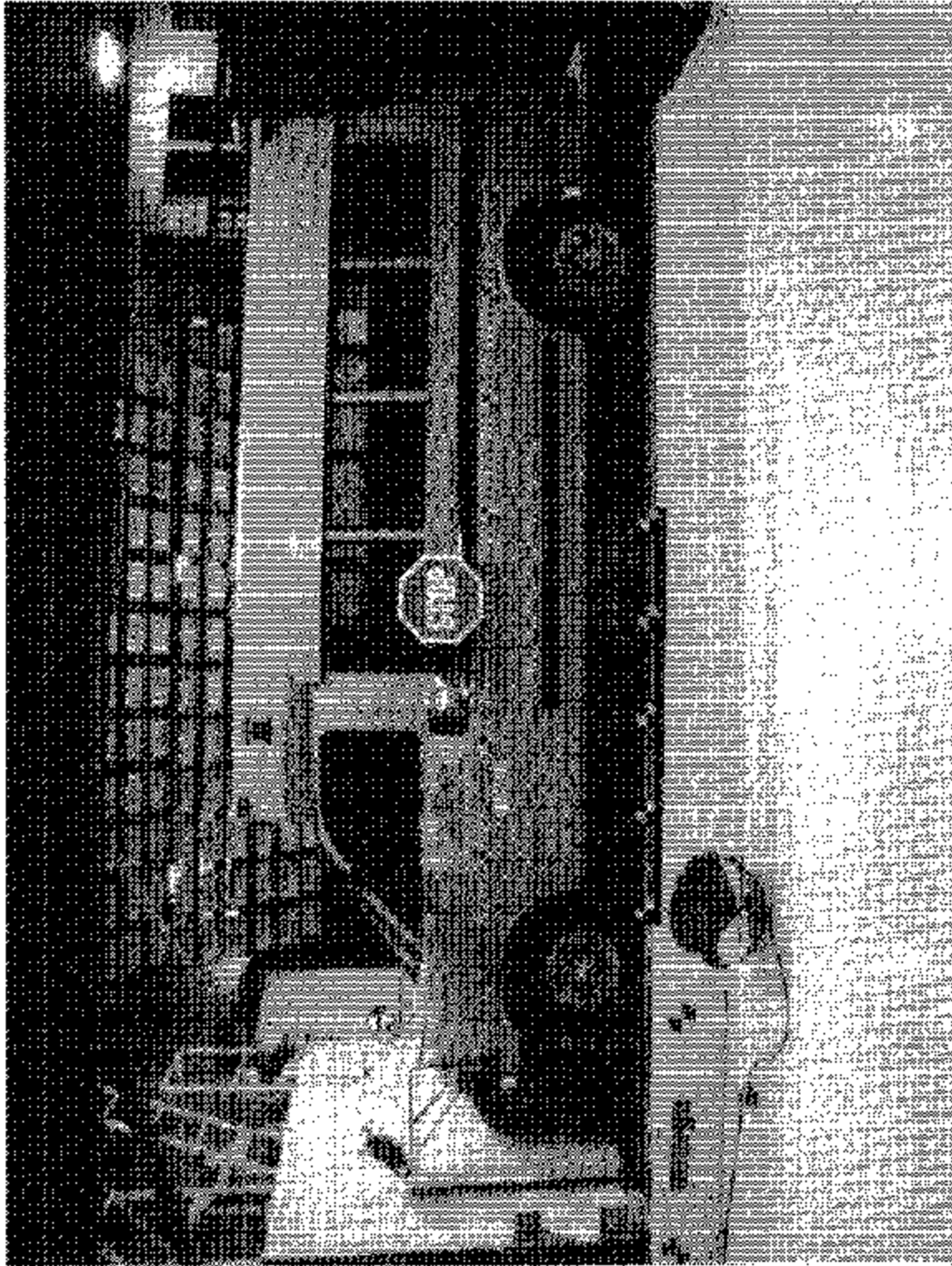
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Post-Rear Rear View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

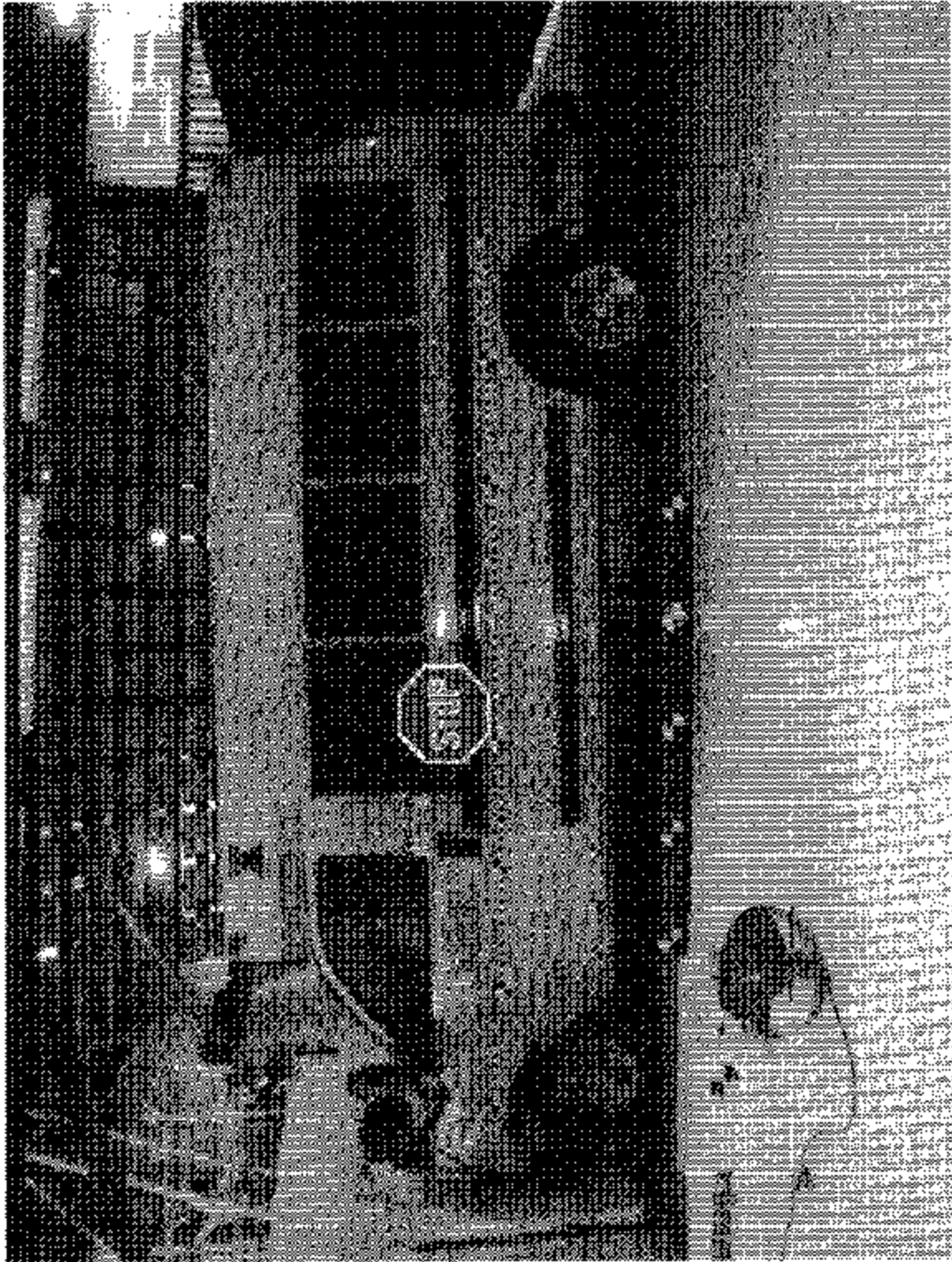
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Pre-Test Left Side of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

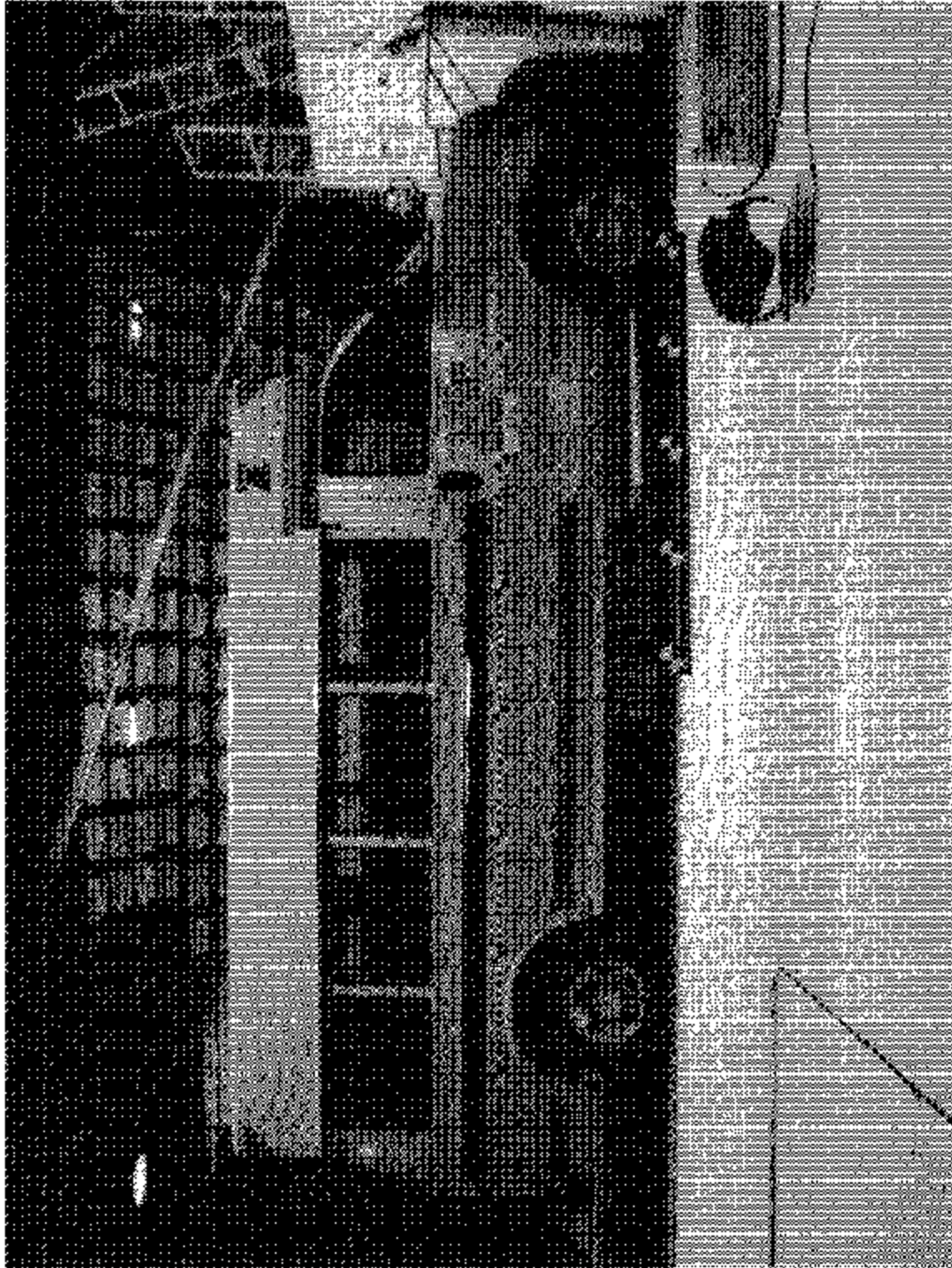
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Post-Test Left Side of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

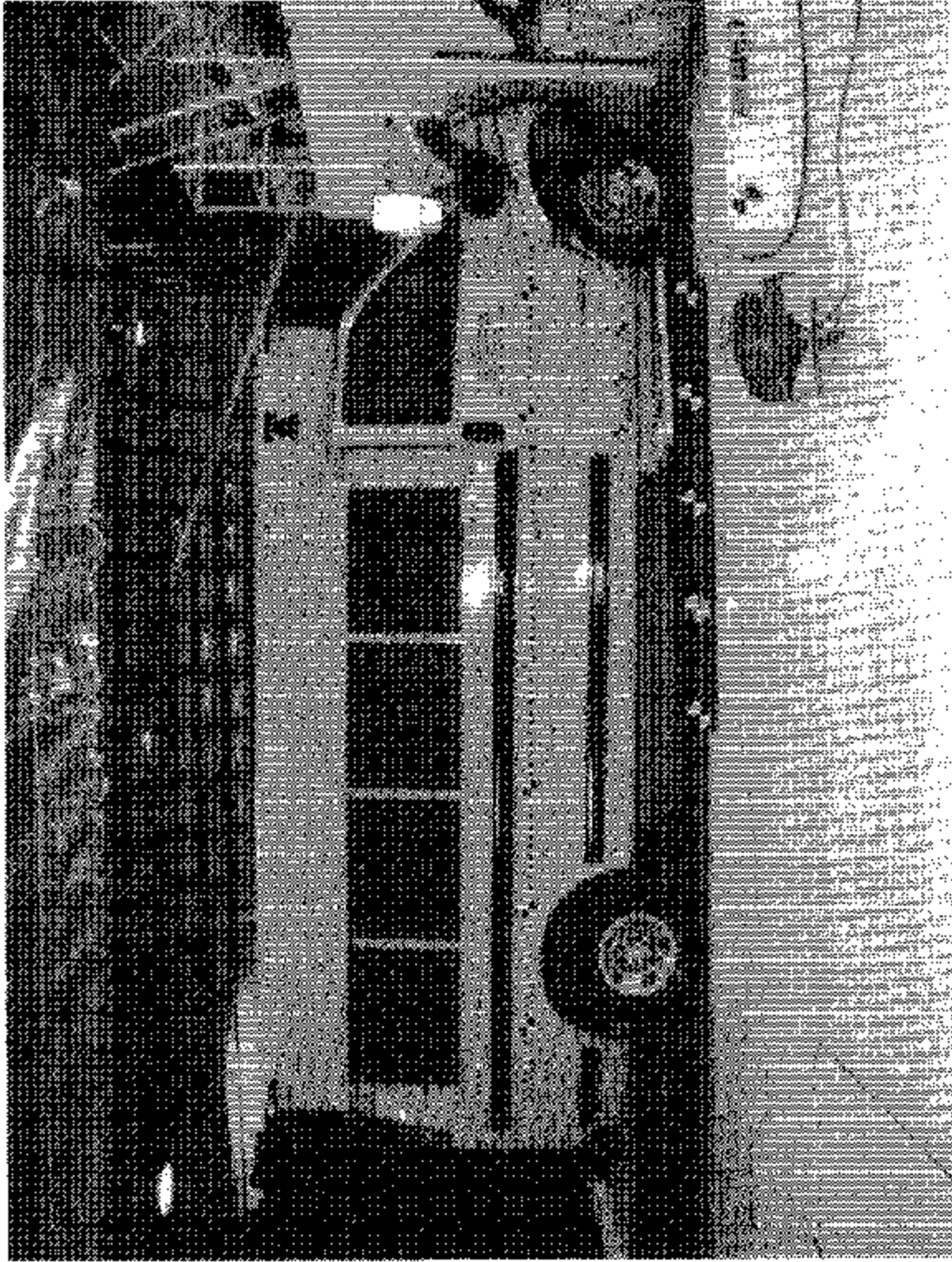
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Pre-Test Right Side of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

NHTSA No.: C30901



Post-Test Right Side of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

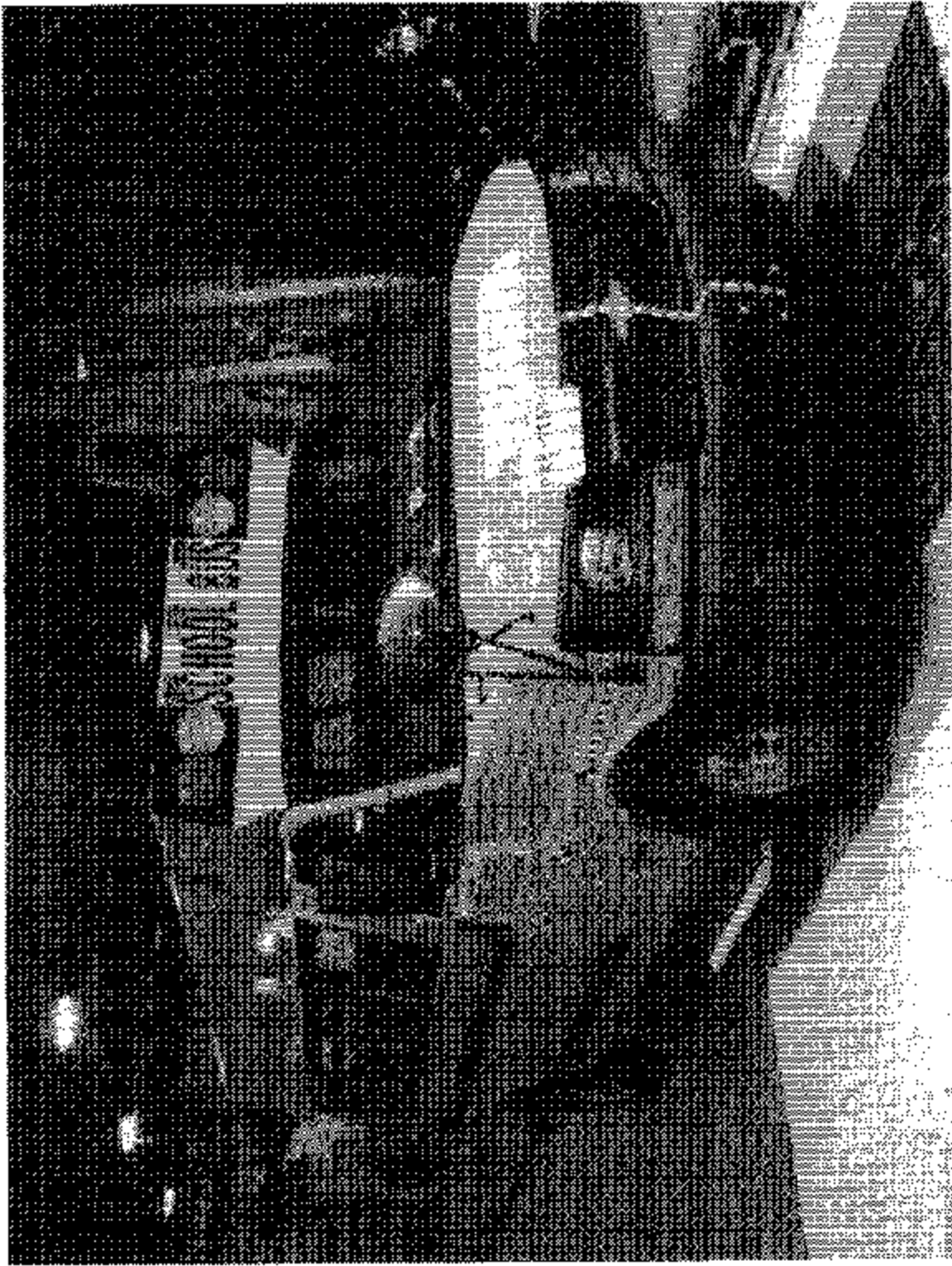
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Post-Test Left Front 3/4 View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

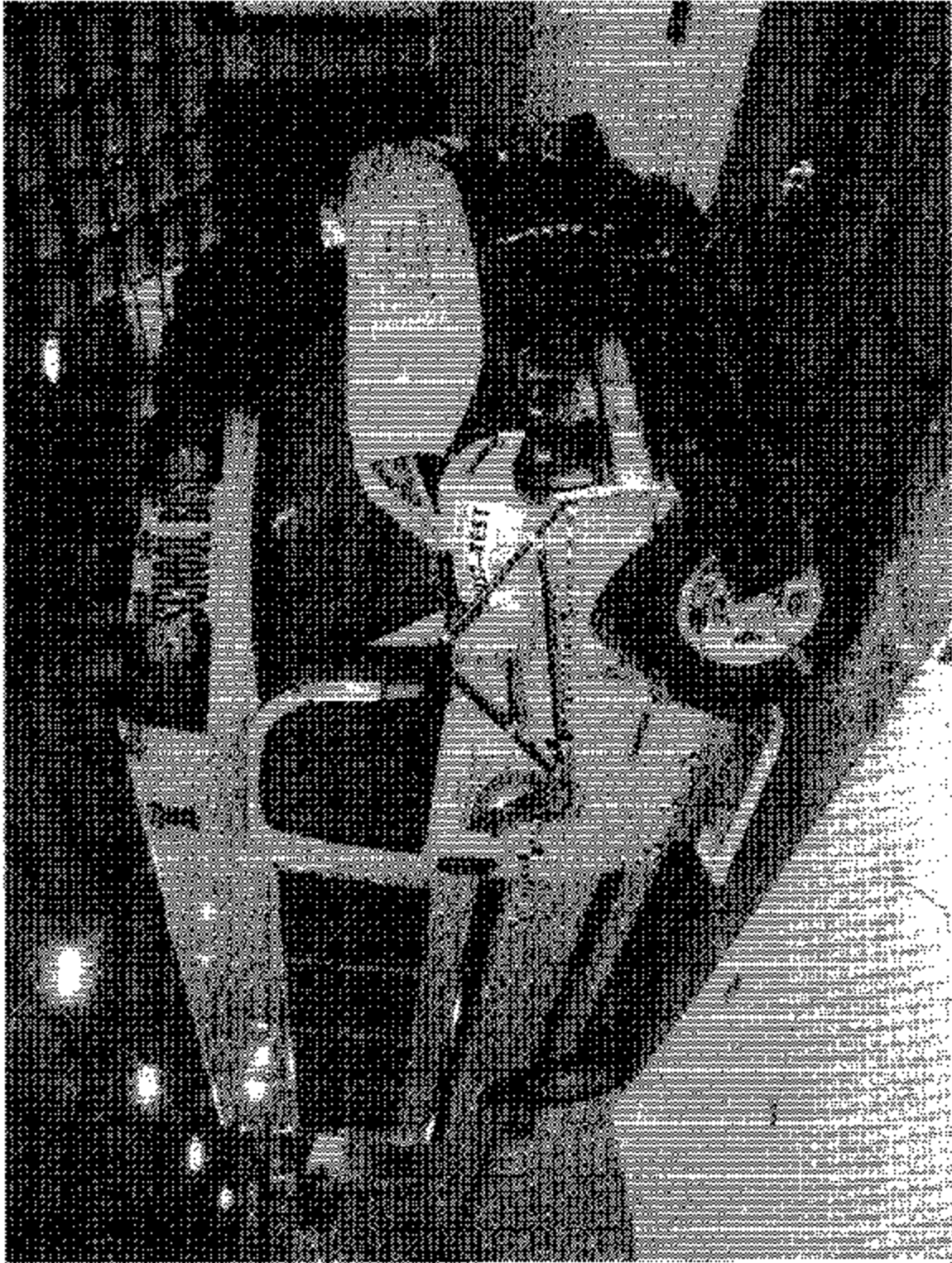
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Pre-Test Right Front 3/4 View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

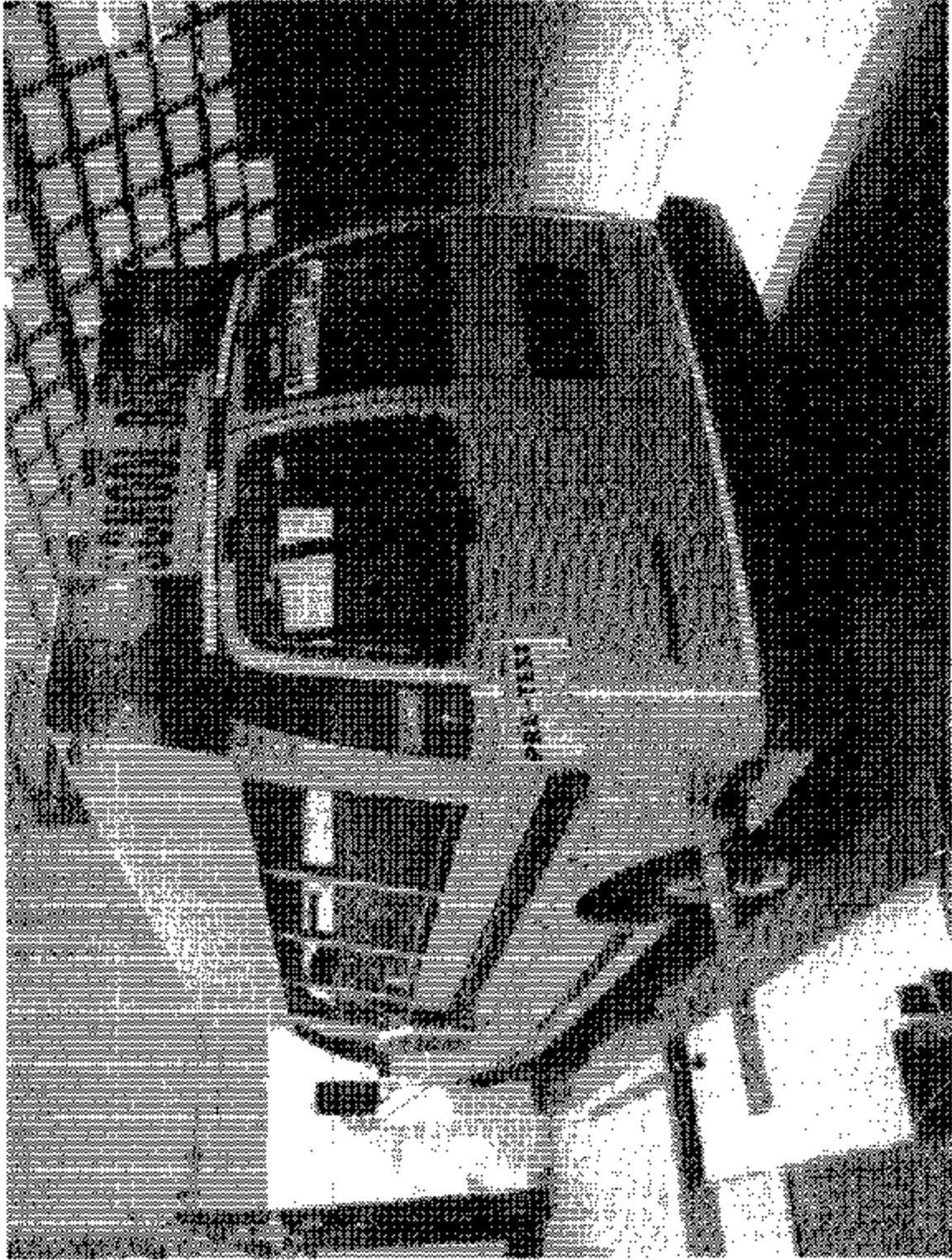
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Post-Test Right Front 3/4 View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

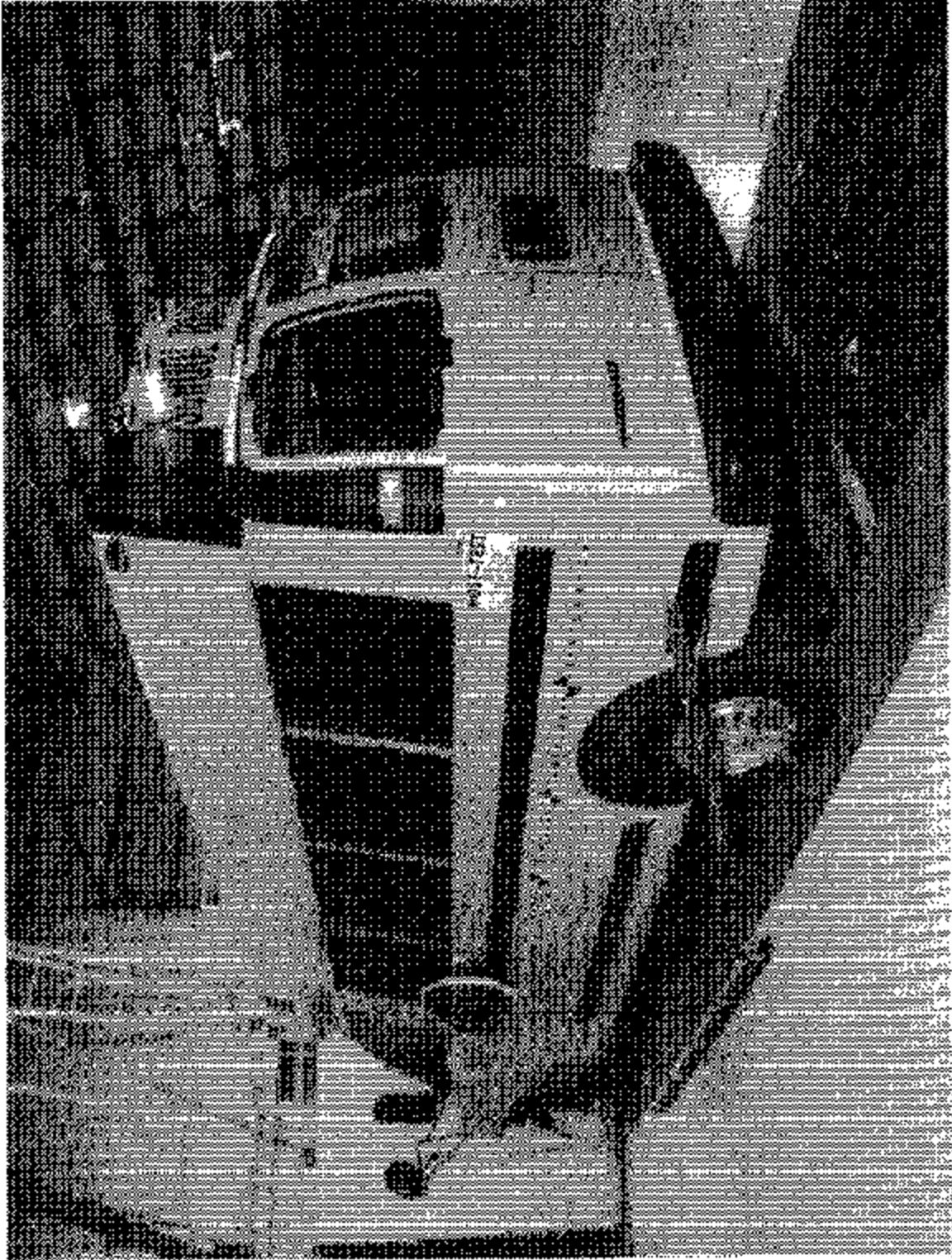
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Pre-Test Left Rear 3/4 View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

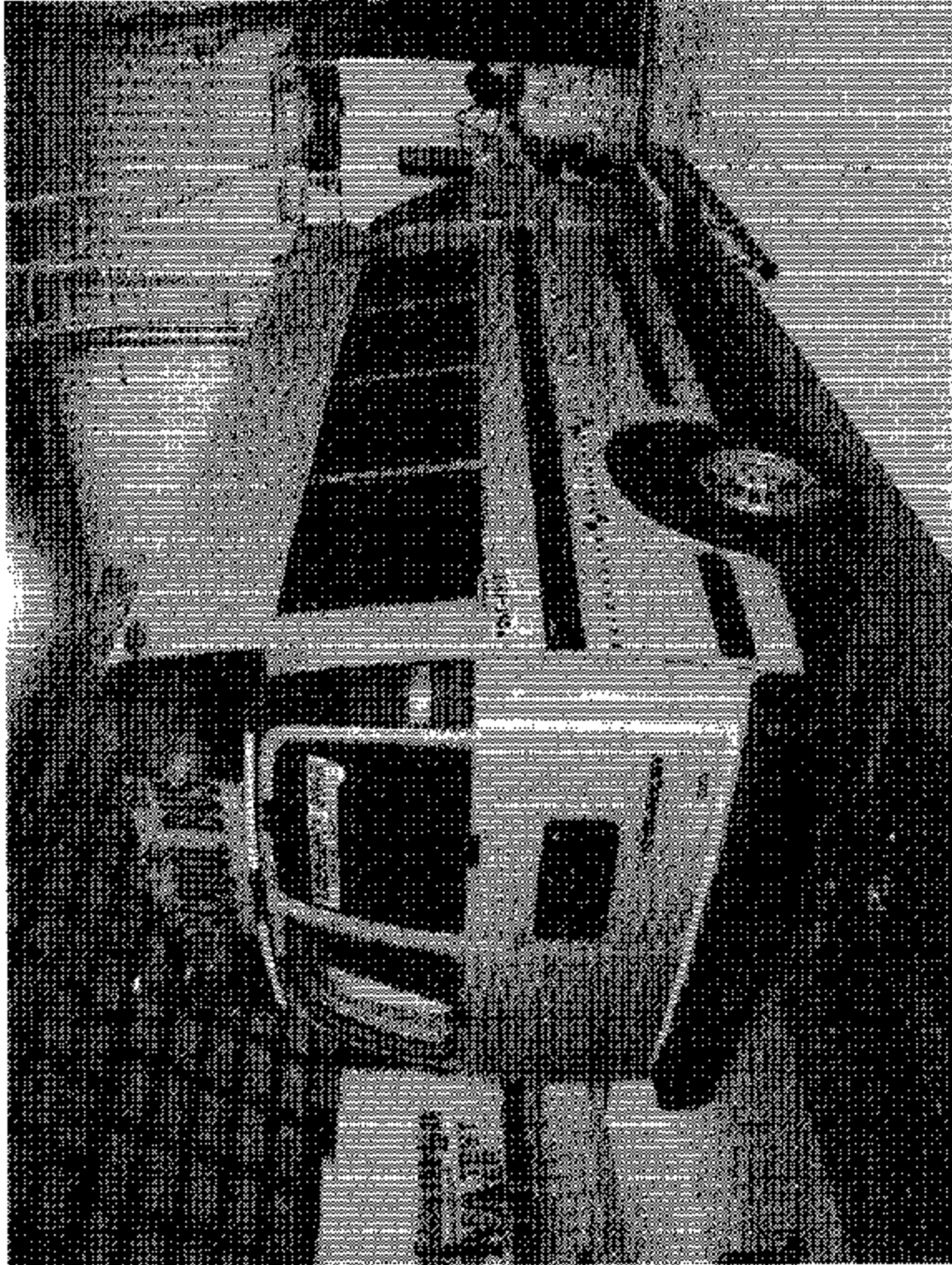
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Post-Test Left Rear ¼ View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

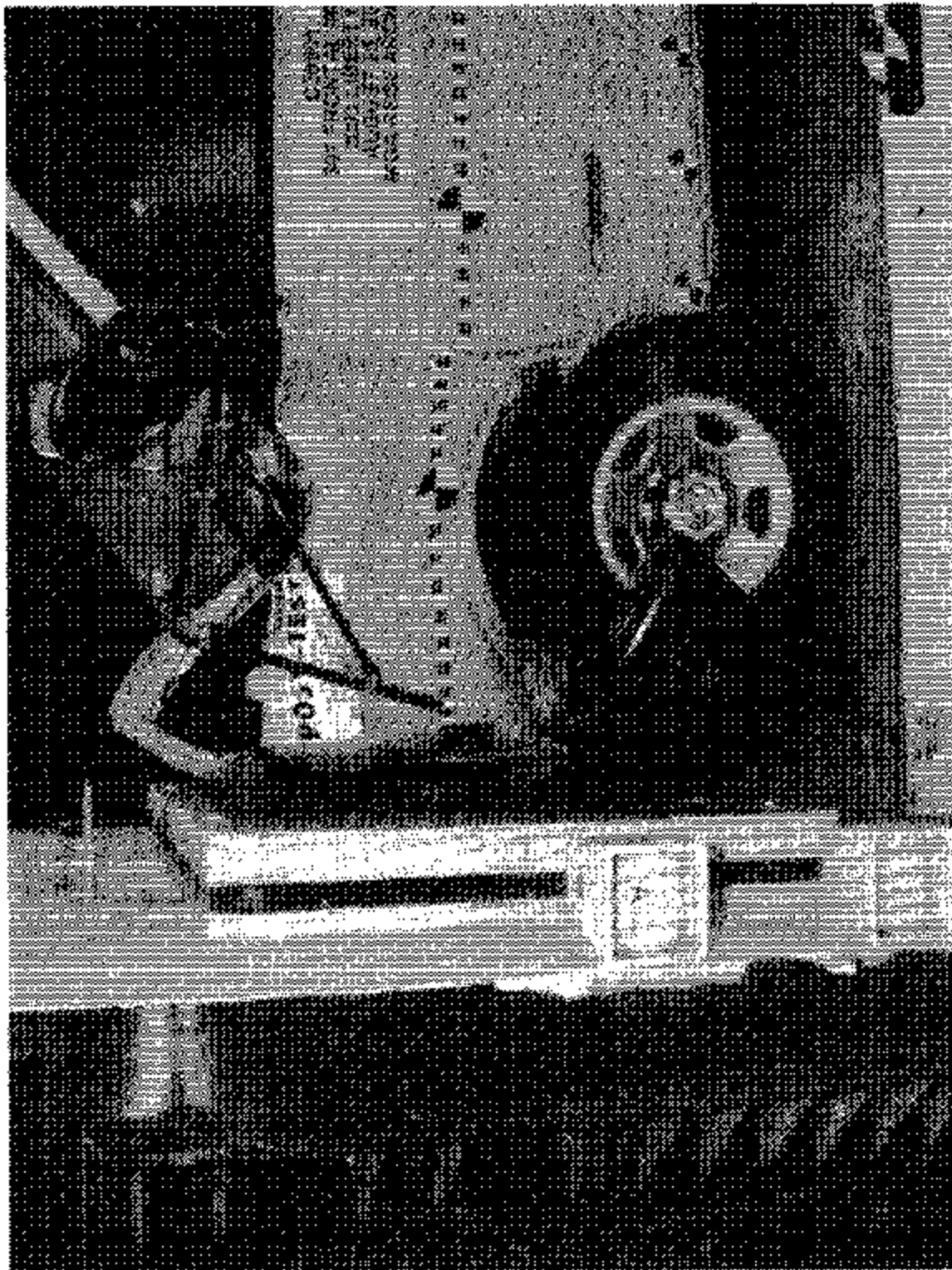
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Post-Test Right Rear 3/4 View of School Bus

Test Vehicle Procedure: 2003 Liberty Freedom School Bus
FMVSS 301F

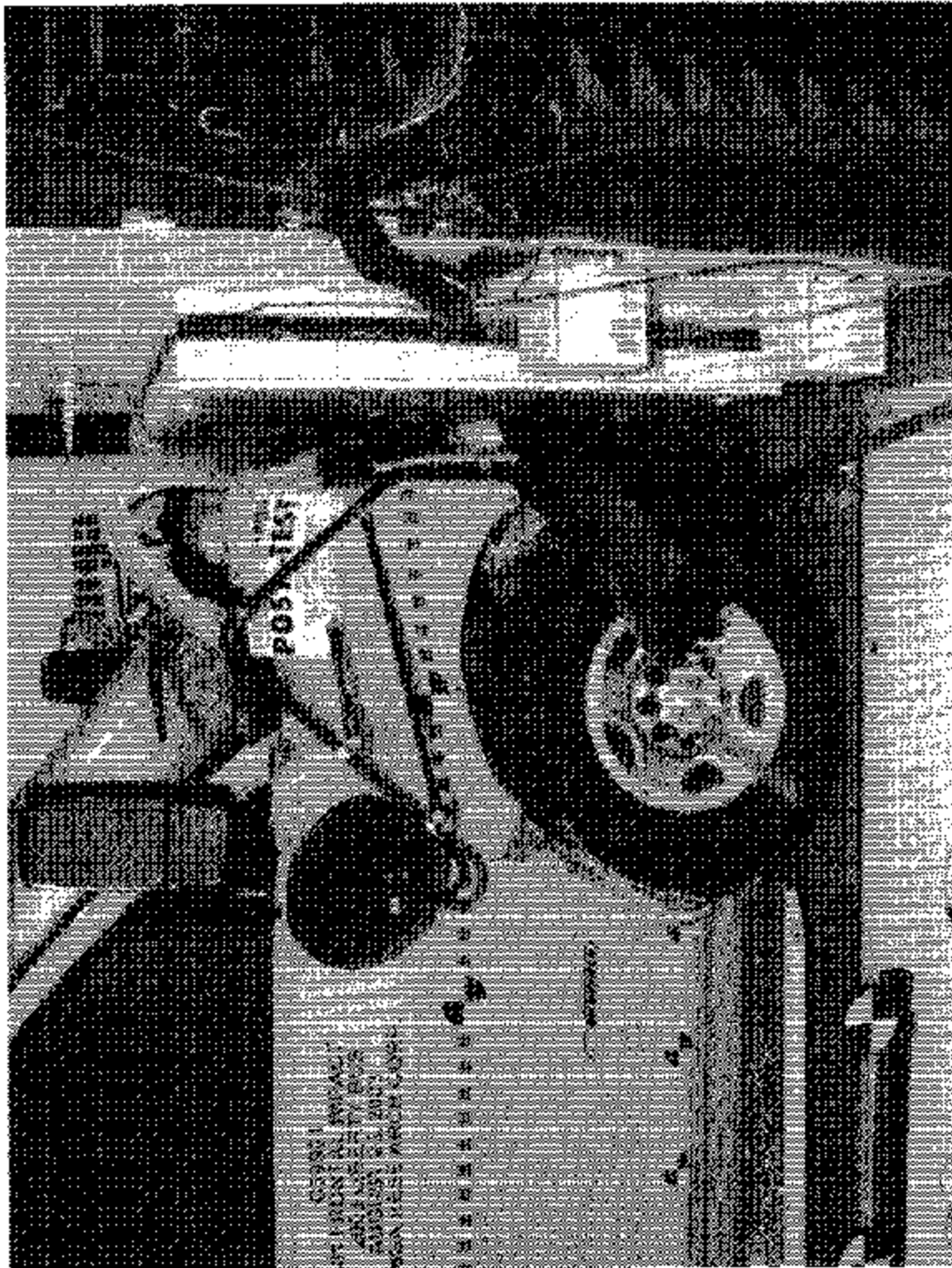
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Post-Test (Close-Up) Left Front Side of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

NHTSA No.: C30901



Post-Test (Close-Up) Right Front Side of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

NHTSA No.: C30901



Post-Test (Close-Up) Right Rear 1/4 View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

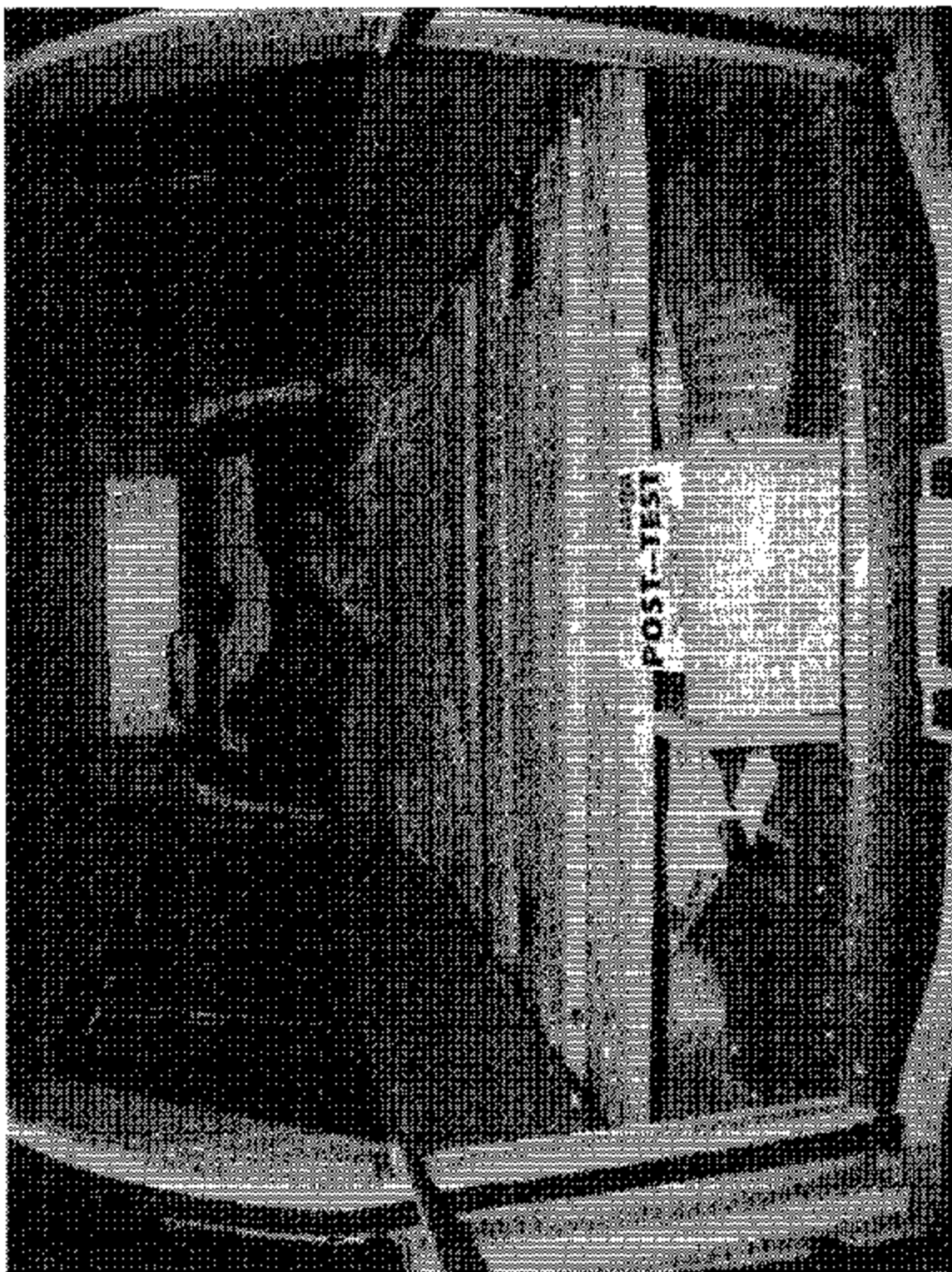
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Pre-Test Ballast

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

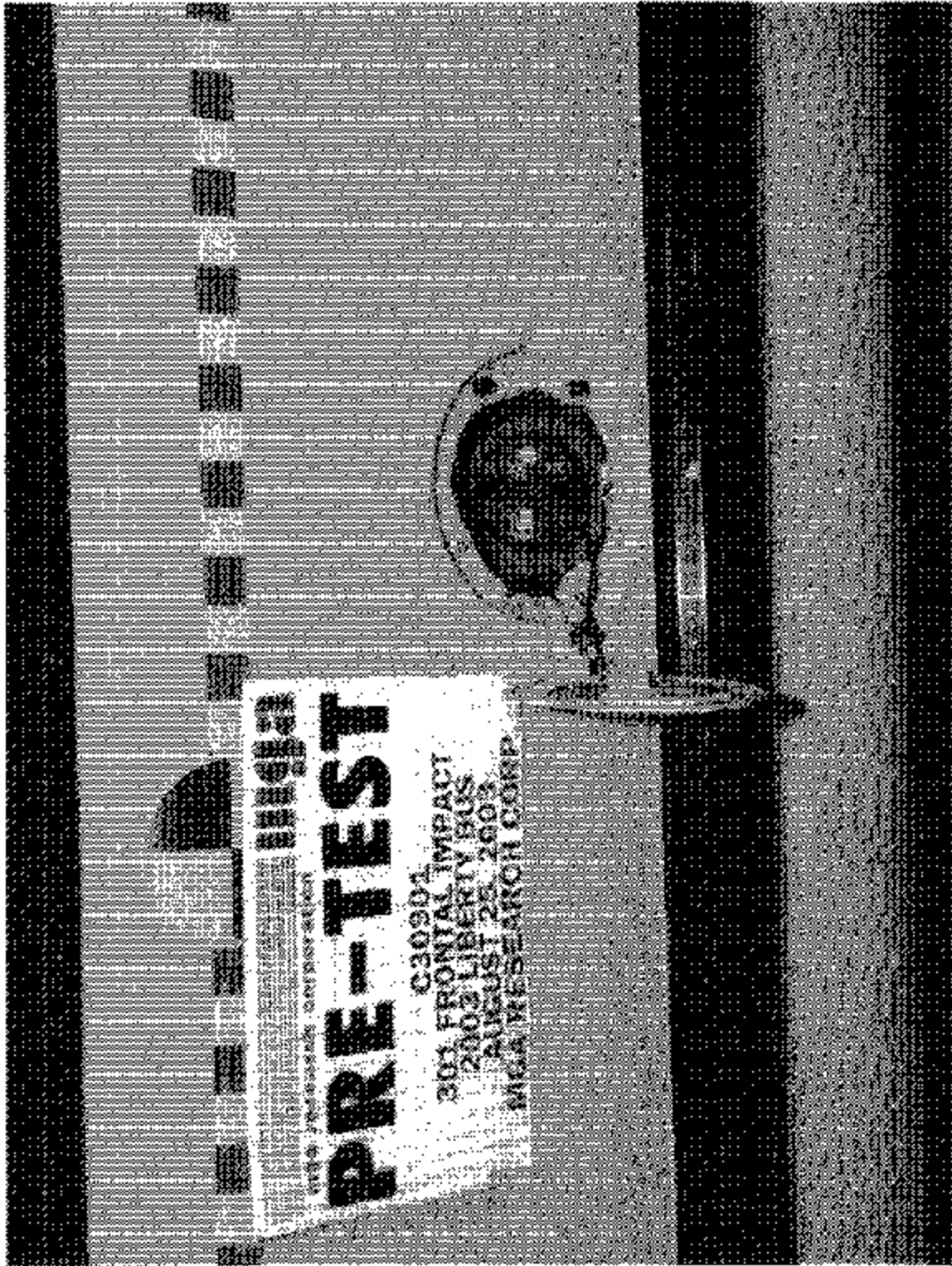
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Post-Test Ballast

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

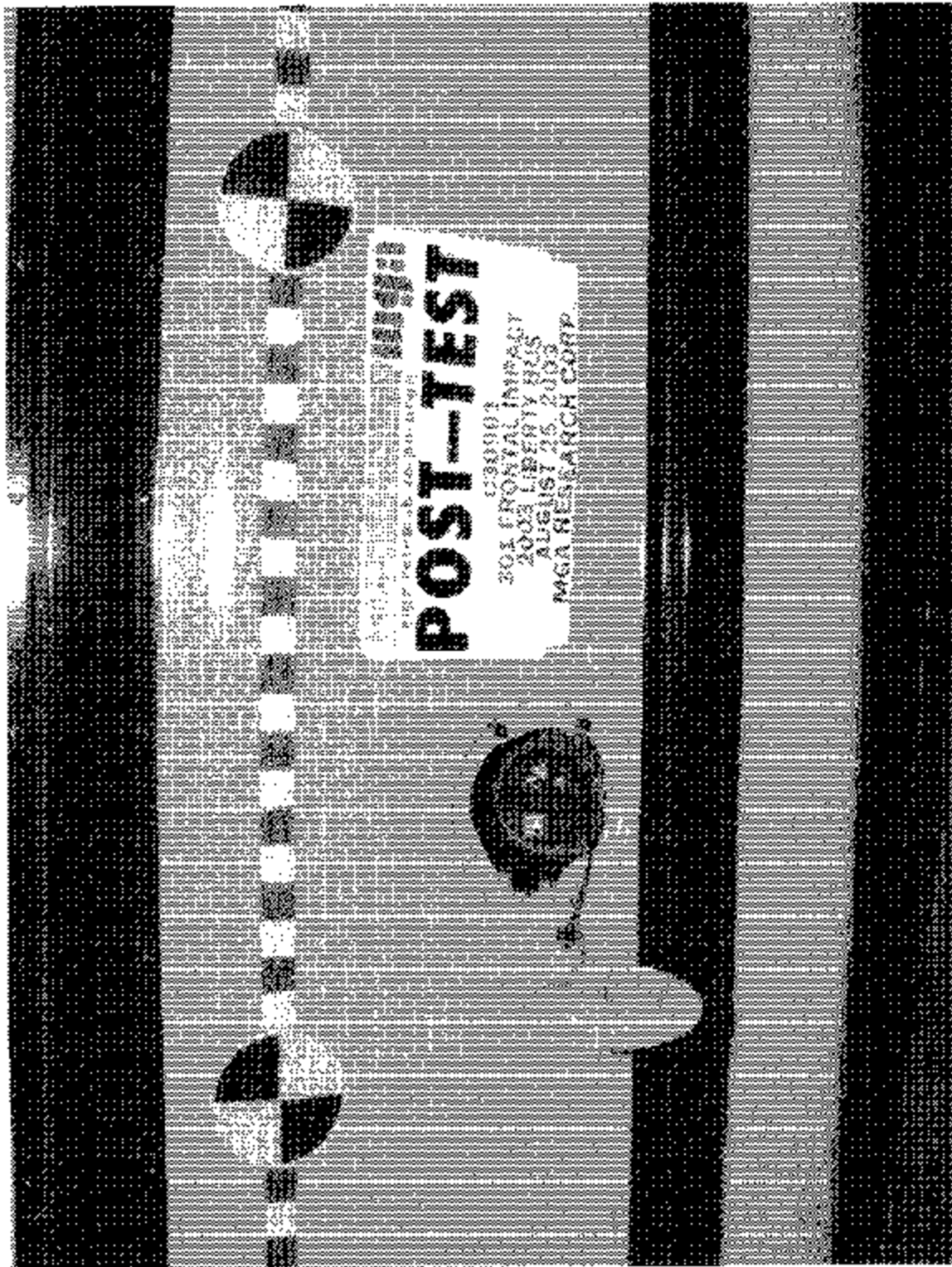
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Pre-Test of Fuel Cap

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

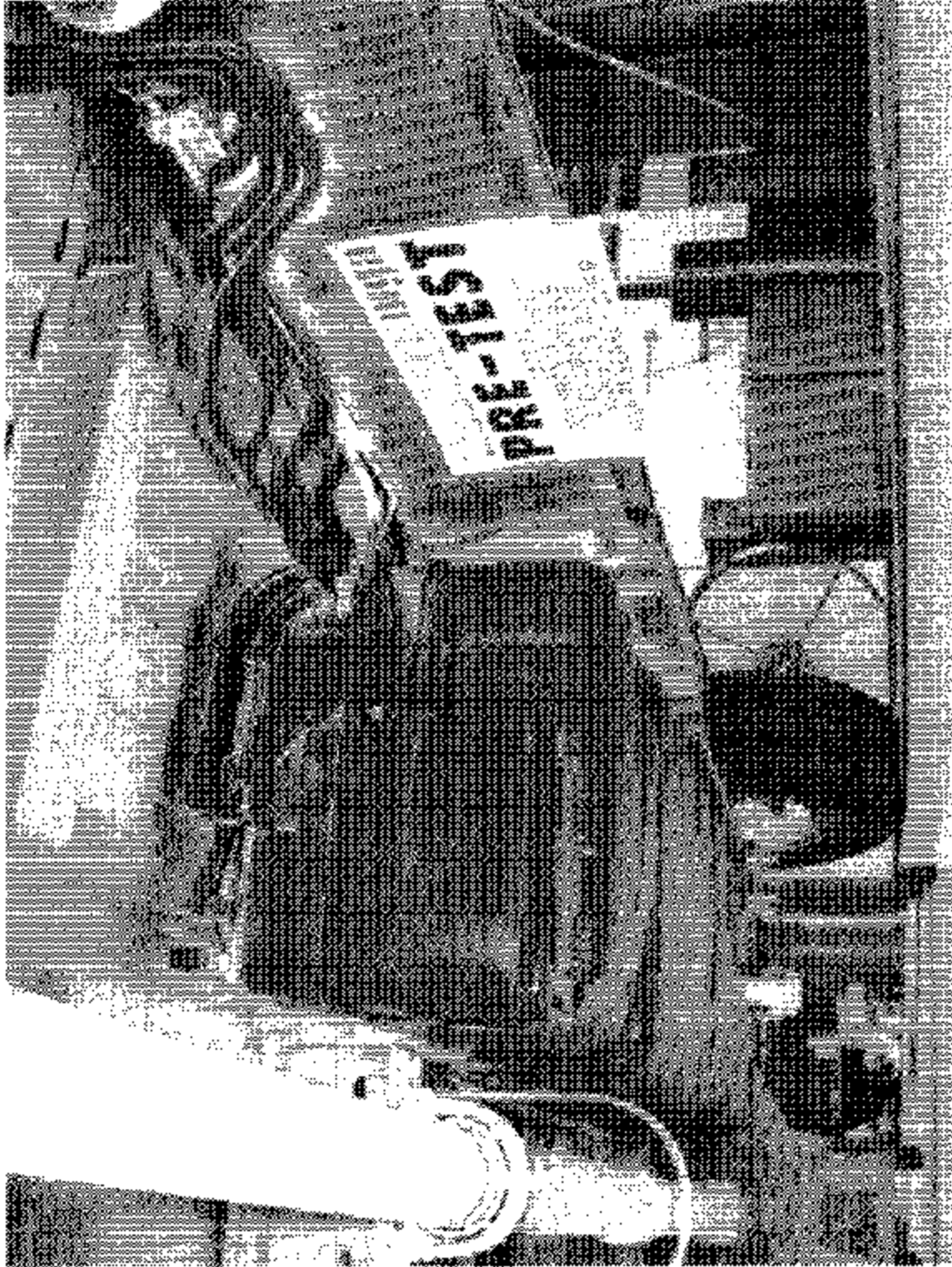
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Post-Test of Fuel Cap

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

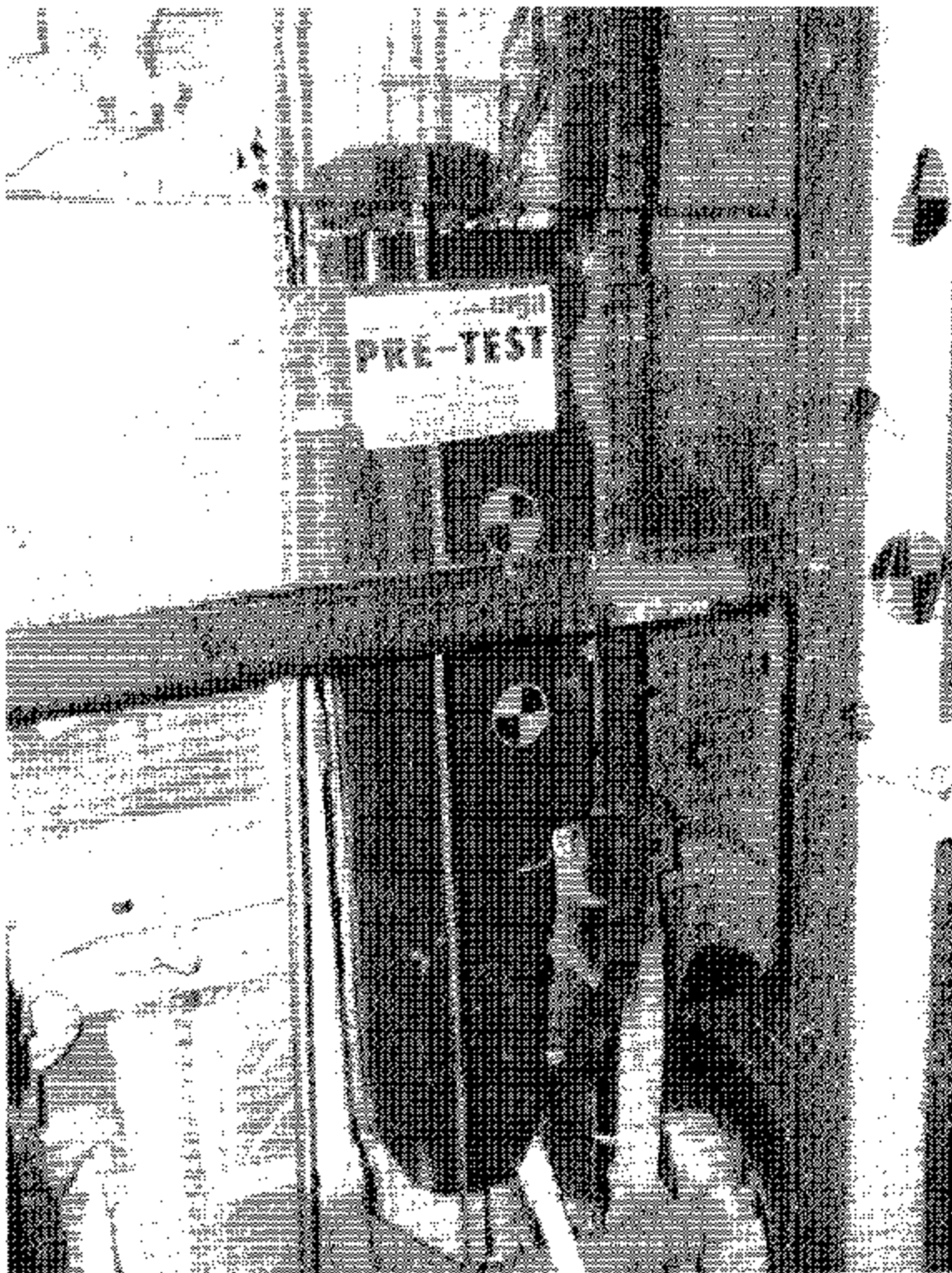
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Pre-Test of Fuel Tank (Close-Up)

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

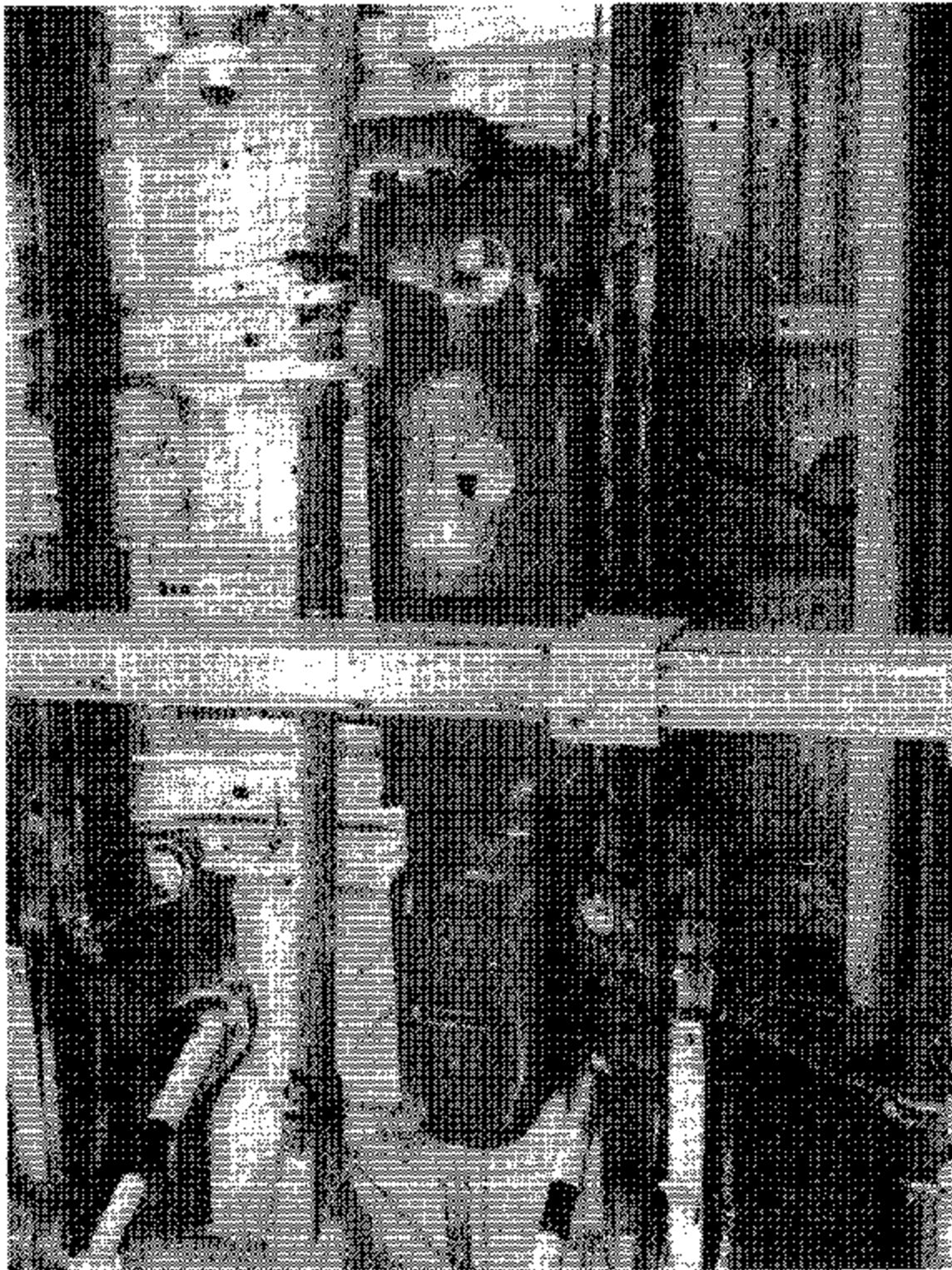
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Pre-Test of Fuel Tank

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

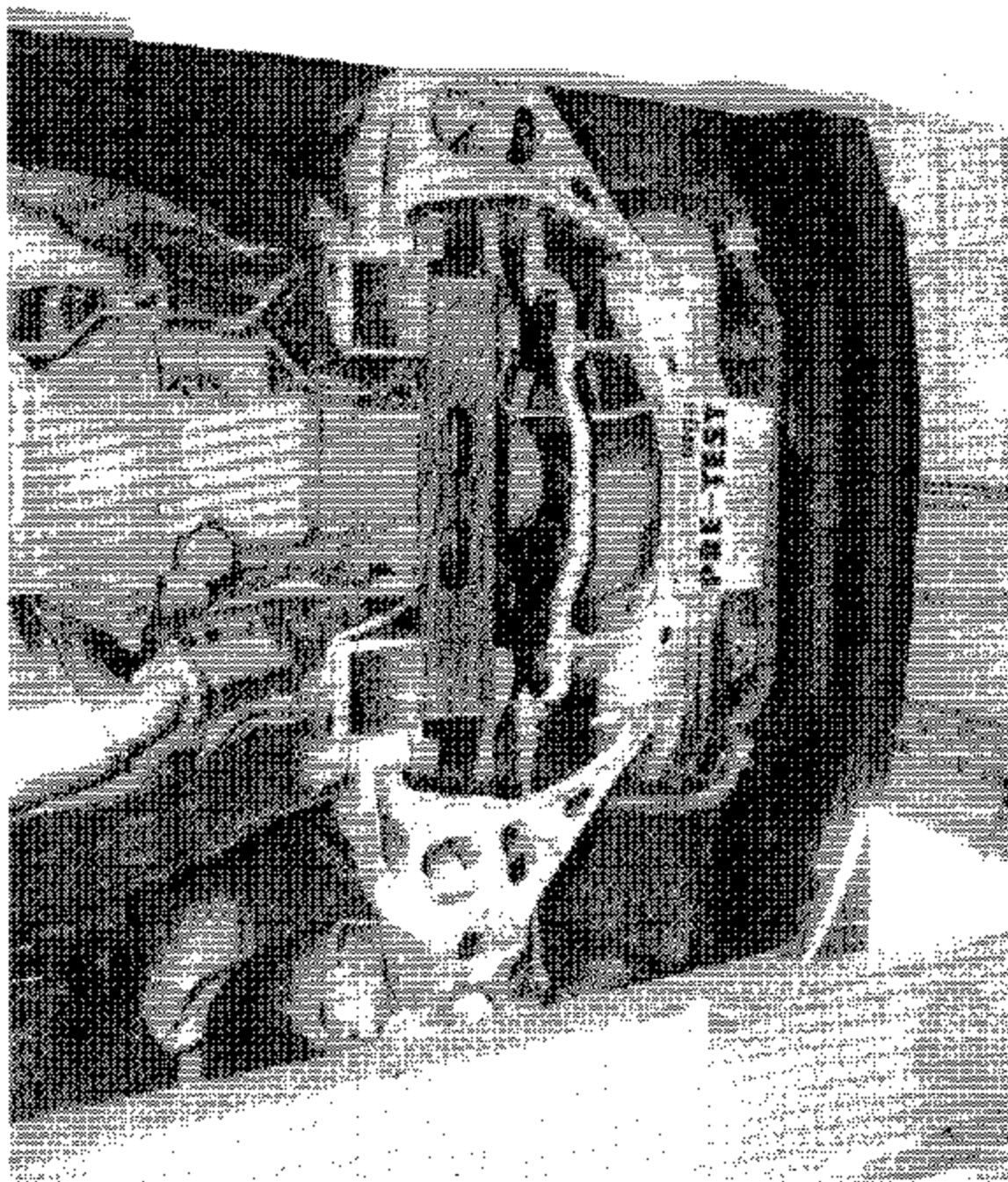
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Post-Test of Fuel Tank

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

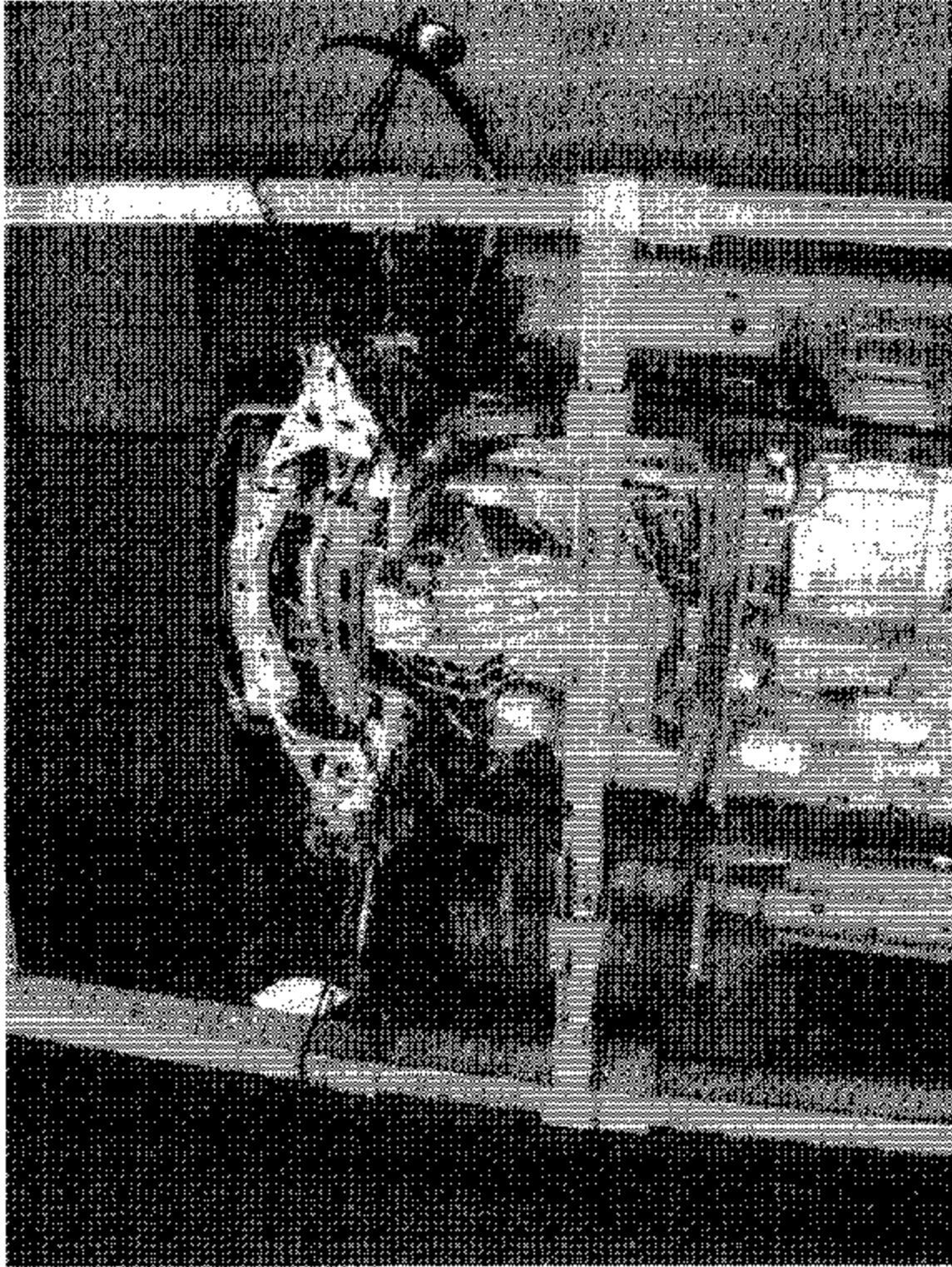
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Pre-Test Front Under Body View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

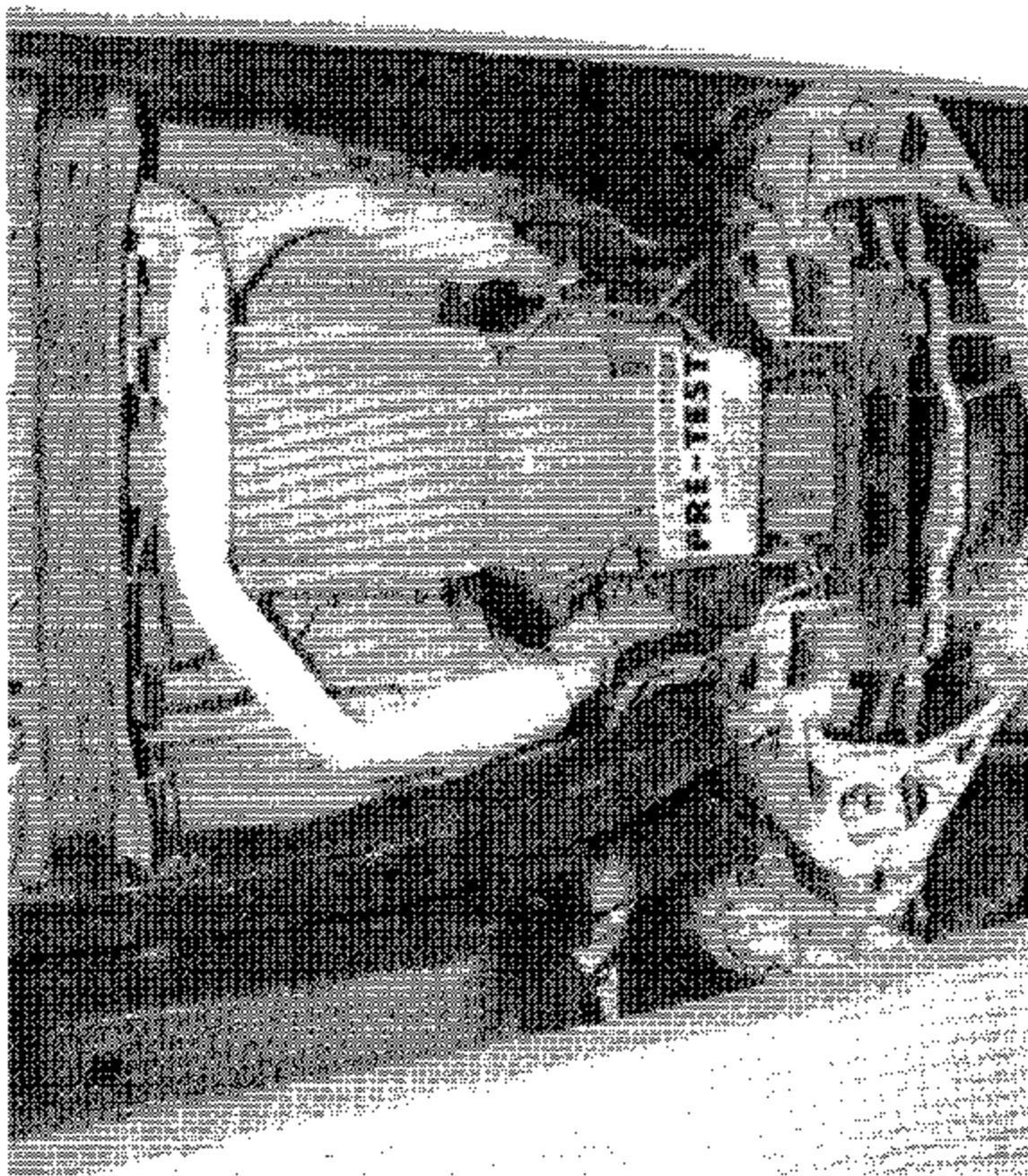
NHTSA No.: C30901



Post-Test Front Under Body View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

NHTSA No. C30901



Pre-Test Mid Under Body View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

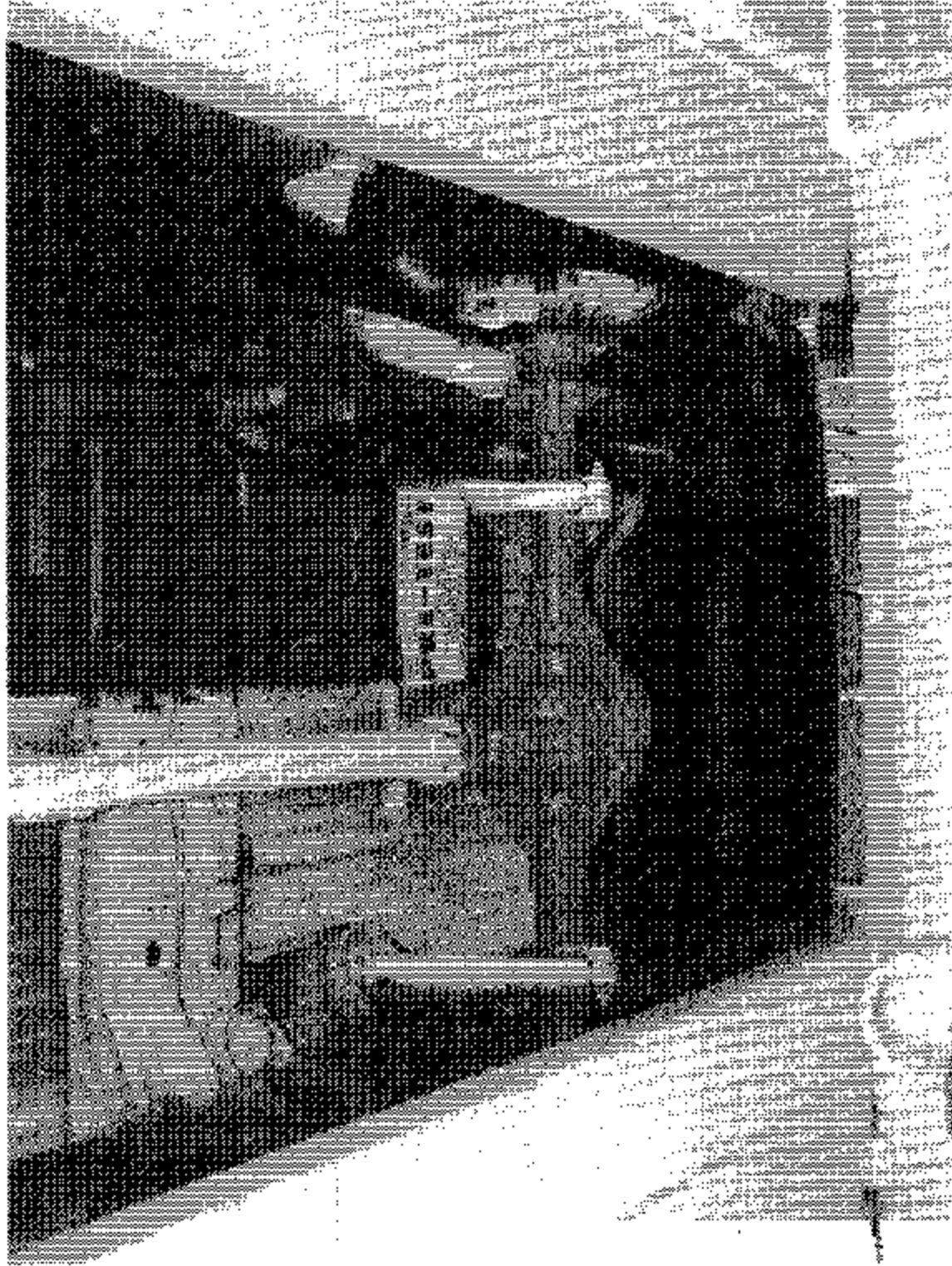
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Post-Test Mid Under Body View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

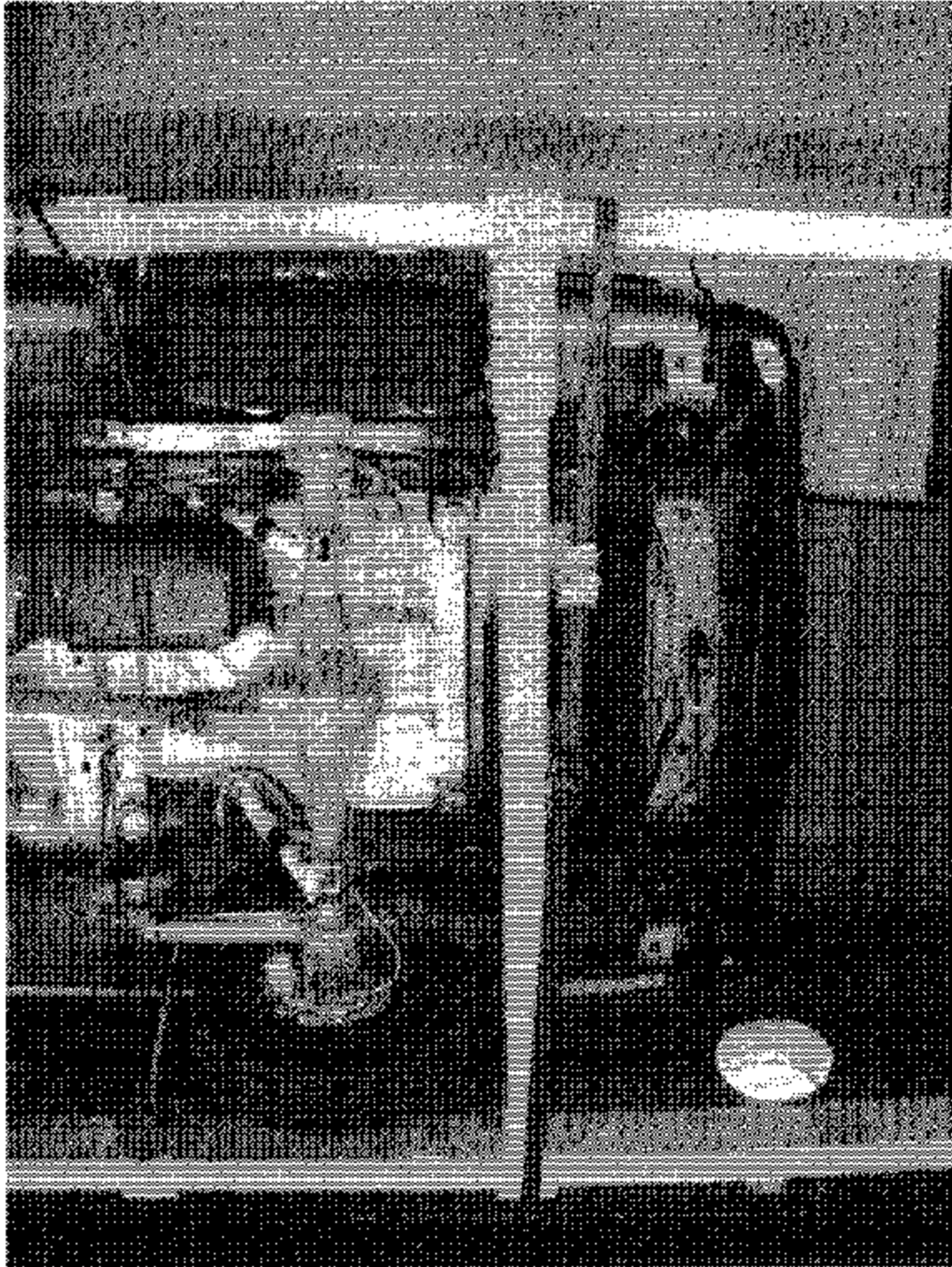
NHTSA No.: C30801



Pre-Test Rear Under Body View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

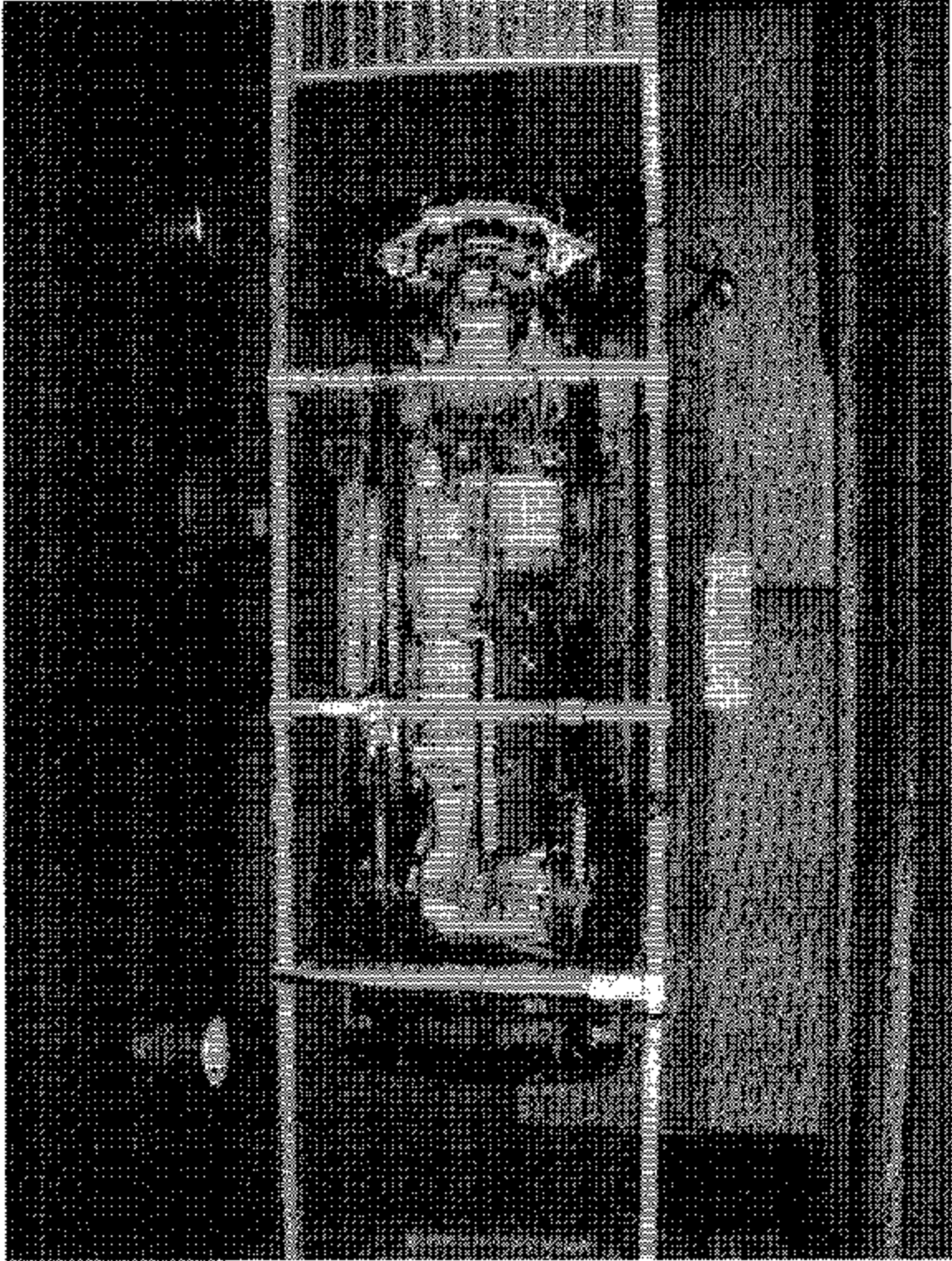
NHTSA No.: C30901



Post-Test Rear Under Body View of School Bus

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

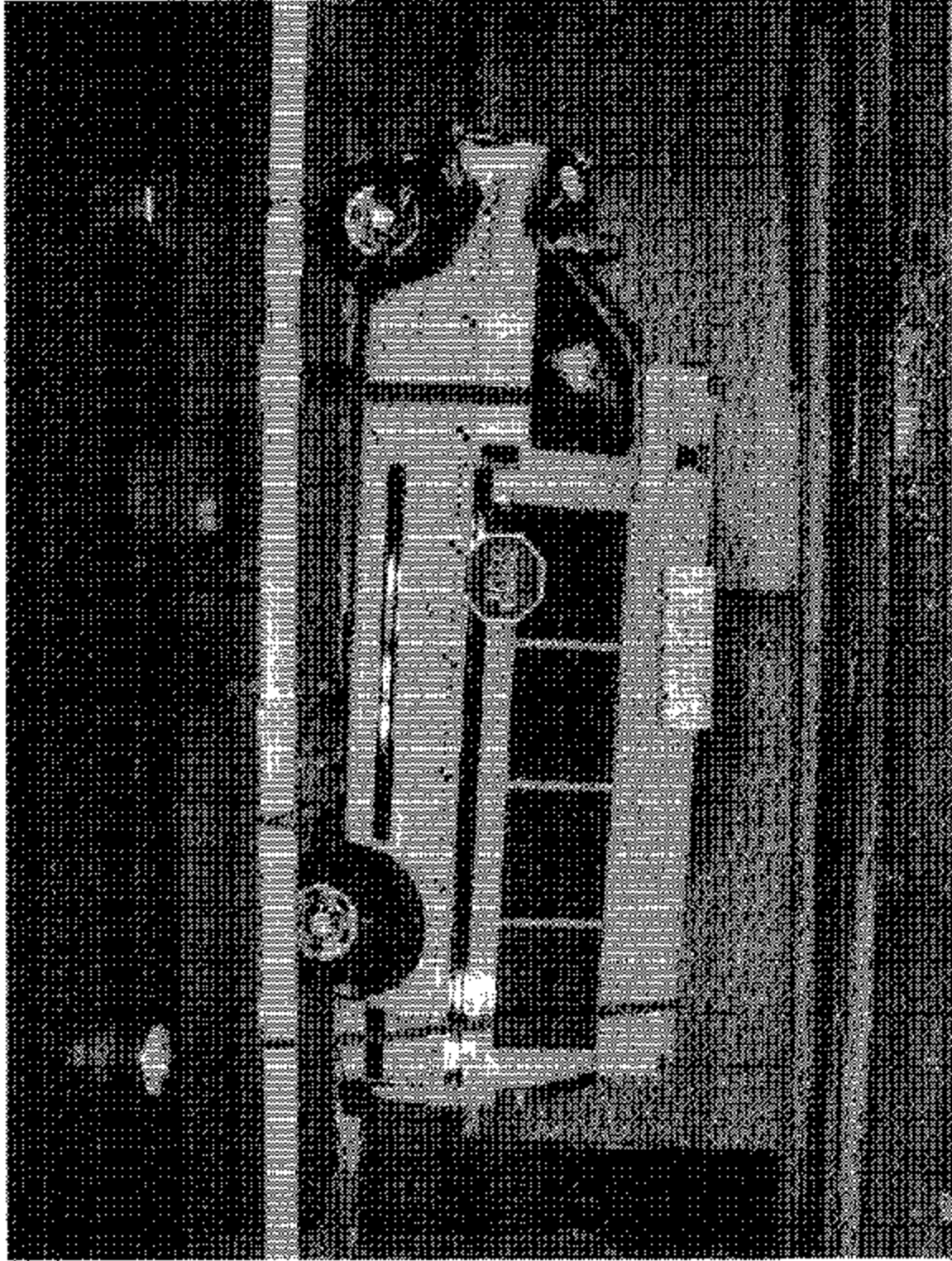
NHTSA No.: C30901



Rollover 90 Degrees

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

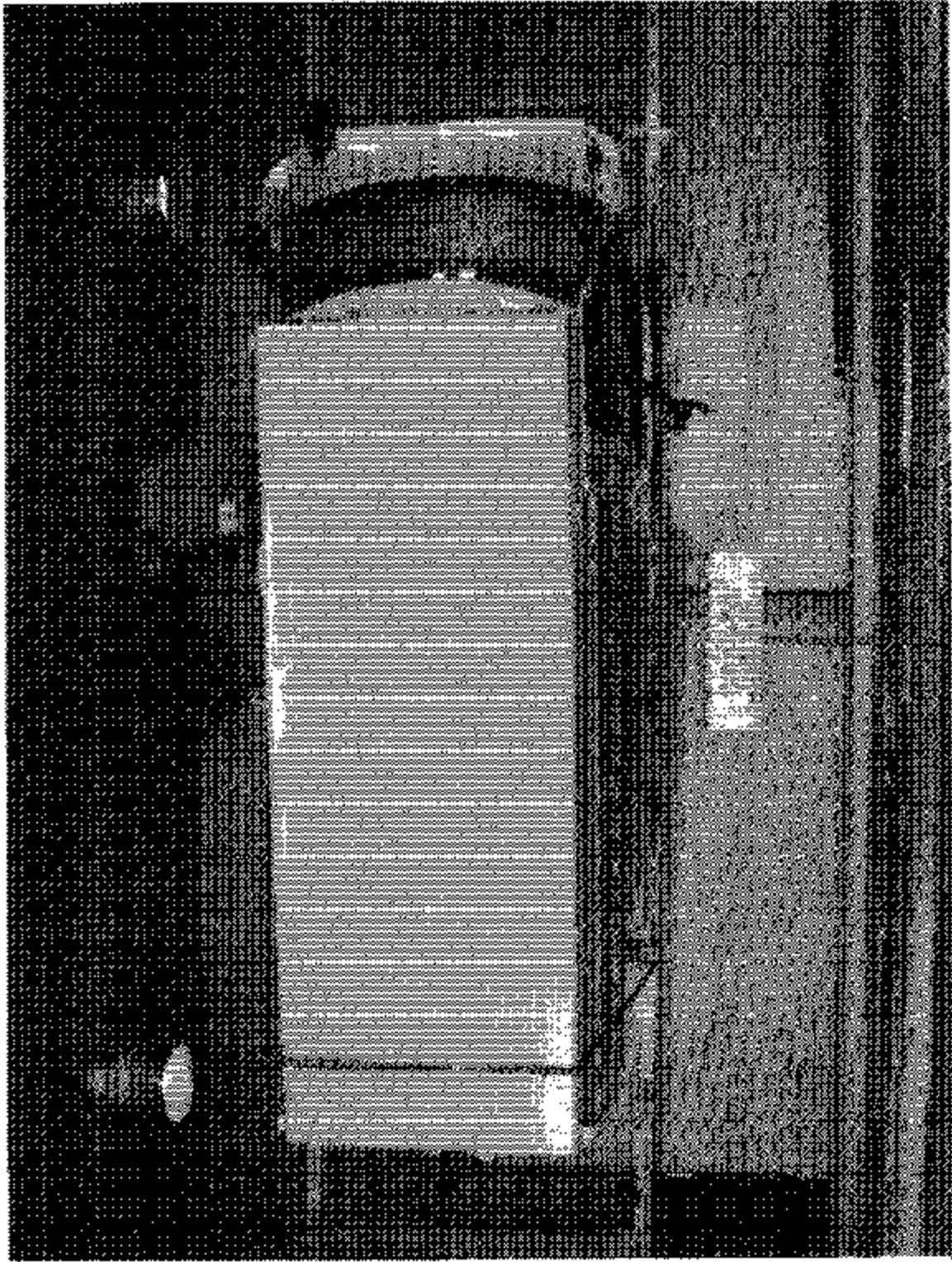
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Rollover 180 Degrees

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

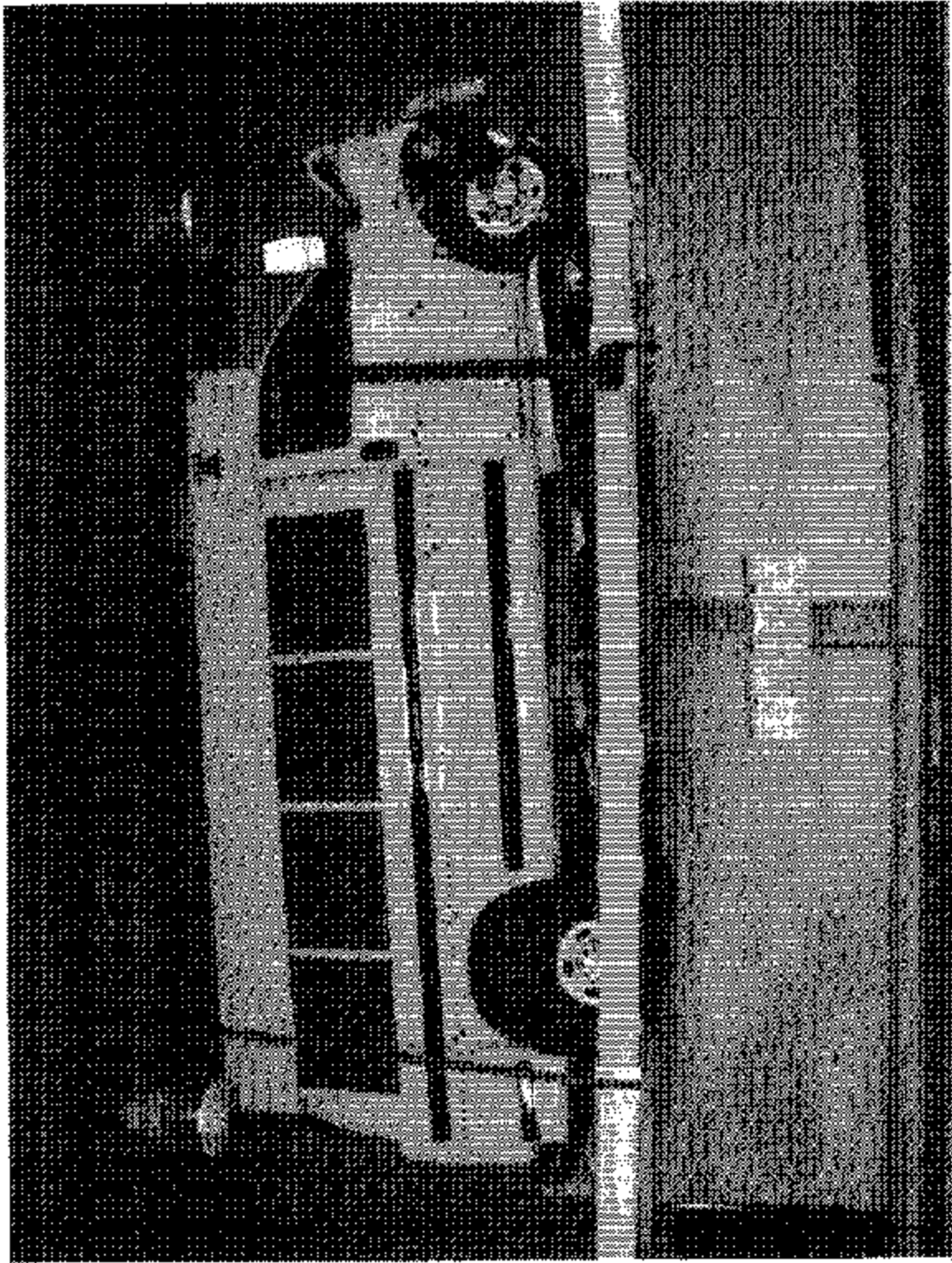
NHTSA No.: C30901



Rollover 270 Degrees

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

NHTSA No.: C30901



Rollover 360 Degrees

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

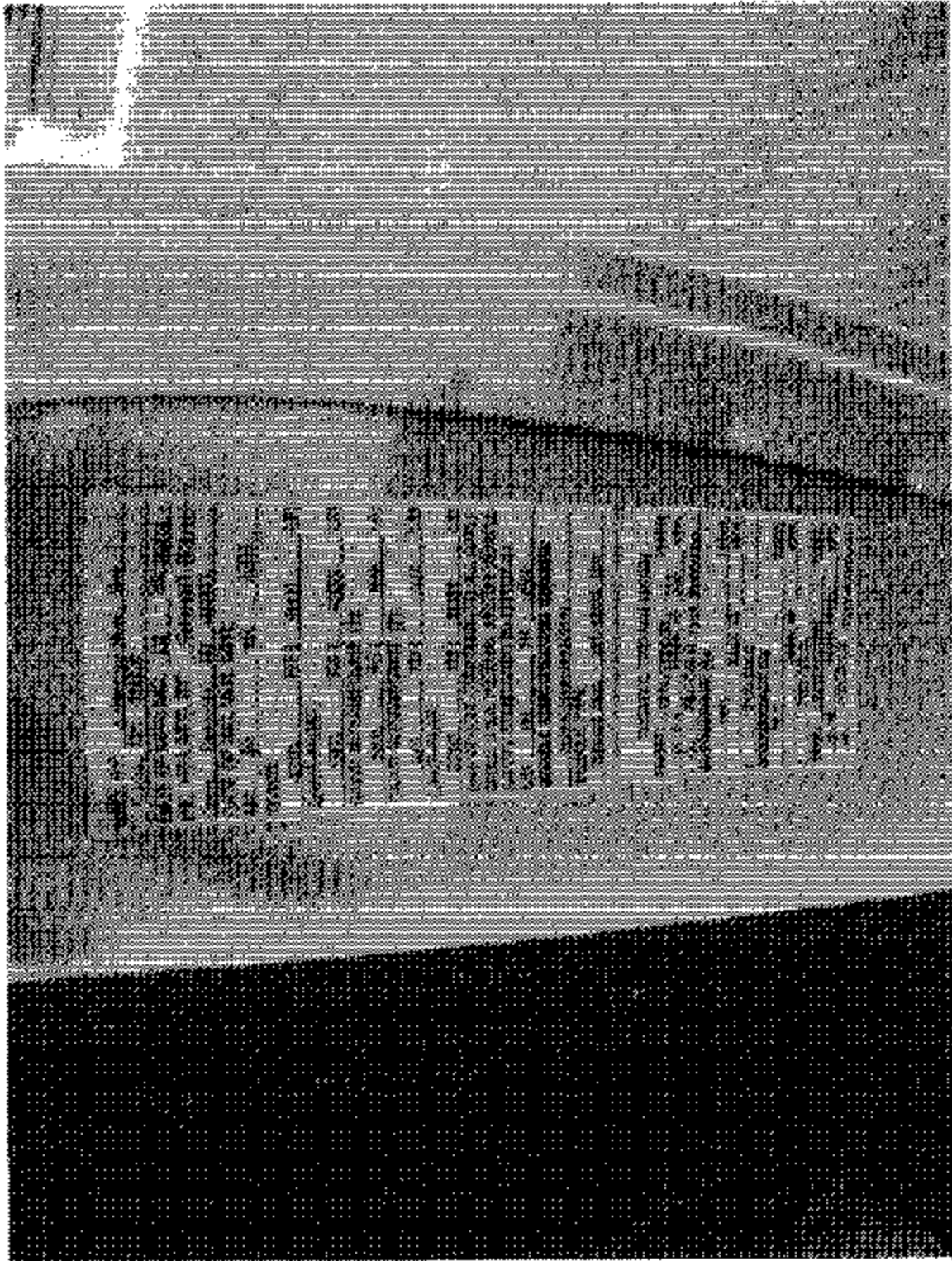
NHTSA No.: C30901



Speed Trap Counter Display

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

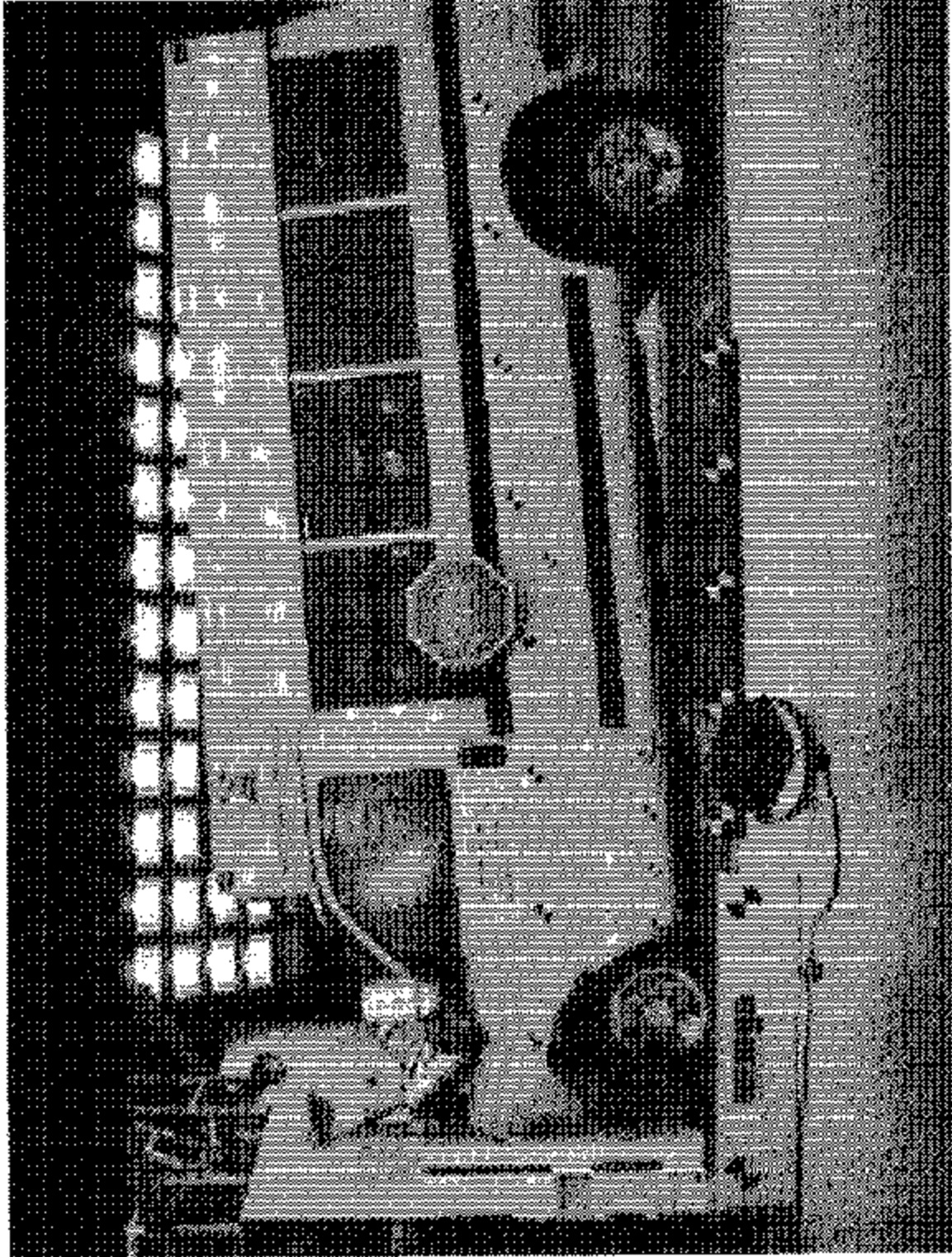
NHTSA No.: C30901



Vehicle Certification and Tire Information Label

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 301F

NHTSA No.: C30901



Impact