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636696

REPORT NUMBER: 131-MGA-03-004

SAFETY COMPLIANCE TESTING FOR FMVSS NO. 131 SCHOOL BUS PEDESTRIAN SAFETY DEVICES

Liberty Bus Inc.
2003 Liberty Freedom School Bus
NHTSA # C30901

PREPARED BY:
MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105

Final Report Date: July 17, 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

Prepared by: _____ Date: July 17, 2003
John Roberts, Project Technician

Reviewed by: _____ Date: July 17, 2003
Michael Janovicz, Program Manager

FINAL REPORT ACCEPTED BY:

_____
7/31/03
Date of Acceptance

Technical Report Documentation Page

1. Report No. 131-MGA-03-004	*2. Government Accession No.*	*3. Recipient's Catalog No.*	
4. Title and Subtitle Final Report of FMVSS 131 Compliance Testing of 2003 Liberty Freedom School Bus NHTSA No.: C30901		*5. Report Date* July 17, 2003 *6. Performing Organization Code* MGA	
7. Author(s) John Roberts, Project Technician Michael Janovicz, Project Manager		*8. Performing Organization Rpt No.* 131-MGA-03-004	
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		*10. Work Unit No.* *11. Contract or Grant No.* DTNH22-02-R-01057	
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 St., S.W. Room 6111 Washington, D.C. 20590		*13. Type of Report and Period Covered* Final Report 6/24/03 – 7/17/03 *14. Sponsoring Agency Code* NVS-220	
15. Supplementary Notes			
16. Abstract Compliance tests were conducted on the subject, 2003 Liberty Freedom 16 Passenger School Bus, NHTSA No.C30901 in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-131SB1 for the determination of FMVSS 131 compliance. Test failures identified were as follows: NONE			
17. Key Words Safety Bus Compliance Testing Safety Engineering FMVSS 131		*18. Distribution Statement* Copies of this report are available from: NHTSA Technical Information Services (TIS) Room 5108 (NPO-230) 400 Seventh Street, S.W. Washington, D.C. 20590 (202)366-4946	
19. Security Classif. (of this report) Unclassified	*20. Security Classif. (of this page)* Unclassified	*21. No. of Pages* 27	22. Price

Form DOT F1700.7 (8-72)

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SECTION 1
PURPOSE OF COMPLIANCE TEST

Tests were conducted by the MGA Research Corporation-Wisconsin Operations on a 2003 Liberty Freedom School Bus, NHTSA NO. C30901, in accordance with the specifications of the Office of Vehicle Safety Compliance (OVSC) Test Procedures TP-131SB1 to determine compliance to the requirements of Federal Motor Vehicle Safety Standards (FMVSS) 131, "School Bus Pedestrian Safety Devices."

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

SECTION 2
TEST DATA SUMMARY

Based on the tests performed, the 2003 Liberty Freedom School Bus, NHTSA No. C30901 appears to meet all of the requirements of FMVSS 131.

See Test Summary Data Sheet on the following page.

FMVSS 131, SCHOOL BUS PEDESTRIAN SAFETY DEVICES
VEHICLE INFORMATION AND TEST SUMMARY

Test Vehicle: **2003 Liberty Freedom School Bus** NHTSA No.: **C30901**
Test Lab: **MGA Research-Wisconsin Operations** Test Date: **6/24/03**

VIN No.	1GBHG39U831110237	Chassis Cab	Yes
No. of Stop Signal Arms	1	Forward Control	No
Bus Capacity (driver included)	17	Rear Engine	No
Stop Signal Arm Manufacturer	Specialty Mfg.	Wheelbase (meters)	3.94
Tire Size (on bus)	LT245/75R16		

DATA FROM CERTIFICATION LABEL

Final Stage Manufacturer	Liberty Bus Inc.	Date of Mfg.	02/03
Incomplete Vehicle Manufacturer	General Motors Corp.	Date of Mfg.	10/02
GVWR (kg)	4,355	GAWR Front (kg)	1,951
		GAWR Rear (kg)	2,760

TEST SUMMARY

SUMMARY	Pass/Fail or N/A
Dimensional Requirements (S5.1)	**PASS**
Surface Content and Labeling (S5.2)	**PASS**
Conspicuity Requirements (S5.3)	**PASS**
Location and Position Requirements (S5.4)	**PASS**
Arm Operation Requirements (S5.5)	**PASS**

SECTION 3
COMPLIANCE TEST DATA

FMVSS 131 – DATA SHEET 1
DIMENSIONS OF STOP SIGNAL ARM

Test Vehicle: **2003 Liberty Freedom School Bus** NHTSA No.: **C30901**
Test Lab: **MGA Research-Wisconsin Operations** Test Date: **6/24/03**

DIMENSIONS OF STOP SIGNAL ARM (S5.1)

"Regular octagon" with diameter of at least 450 mm (point to point).

	Forward Signal Arm (mm)	Rearmost Signal Arm (mm)
Diameter 1	495	[redacted]
Diameter 2	495	
Diameter 3	495	
Diameter 4	495	
Range (max. – min.)	0	

	Yes, No, N/A
Are all octagon diameter values ≥ 450 mm?	Yes
Is range of octagon diameter values ≤ 12 mm?	Yes
Are all octagon chord dimensions equal within 6 mm?	Yes

Test Results		Pass/Fail
S5.1	Dimensions of Stop Signal Arm	**PASS**

Recorded By: 

Approved By: 

Date: 7/17/03

FMVSS 131 – DATA SHEET 2
SURFACE CONTENT AND LABELING

Test Vehicle: **2003 Liberty Freedom School Bus** NHTSA No.: **C30901**
Test Lab: **MGA Research-Wisconsin Operations** Test Date: **6/24/03**

SURFACE CONTENT AND LABELING (S5.2)

	Forward Signal Arm		Rearmost Signal Arm	
	Front Side	Aft Side	Front Side	Aft Side
Color RED except for border & legend (Yes/No)	YES	YES	[redacted]	
Color of border is WHITE (Yes/No)	YES	YES		
Color of word "STOP" is WHITE (Yes/No)	YES	YES		
Word "STOP" is in upper case letters (Yes/No)	YES	YES		
Width of border (≥ 12 mm)	15 mm	15 mm		
Percent of border obscured by mounting brackets, clips, or bolts, or other components (15% ≤)	0.9%	10.4%		
Height of letters (≥ 150 mm)	151 mm	151 mm		
Stroke width of letters (≥ 20 mm)	25 mm	25 mm		

Test Results		Pass/Fail
S5.2	Surface content and labeling	**PASS**

Recorded By: _____

Approved By: _____ Date: 7/17/03

FMVSS DATA SHEET 3
CONSPICUITY (S5.3)

Test Vehicle: **2003 Liberty Freedom School Bus** NHTSA No.: **C30901**
Test Lab: **MGA Research-Wisconsin Operations** Test Date: **6/24/03**

The Stop Signal Arm shall comply with either S5.3.1 or S5.3.2, or both.

REFLECTORIZED MATERIAL (S5.3.1)

Requirements	Forward Signal Arm		Rearmost Signal Arm	
	Front Side	Aft Side	Front Side	Aft Side
Entire surface of stop signal arm reflectorized except for mounting brackets, clips, bolts, or other necessary components. Front side of rearmost stop signal arm must not be reflectorized. (Yes/No)	YES[1]	YES [1]	[redacted]	
Percent of entire surface obscured by mounting brackets, clips, bolts or other components necessary for mechanical or electrical operation. (7.5% max. each side)	0%	3.5%		

Test Notes:

[1] Flashing lights prevent full reflectorization.

FMVSS 131 DATA SHEET 3...continued
CONSPICUITY (S5.3)

Test Vehicle: **2003 Liberty Freedom School Bus** NHTSA No.: **C30901**
Test Lab: **MGA Research-Wisconsin Operations** Test Date: **6/24/03**

OPTIONAL ILLUMINATED LETTERING (S5.3.1.1)

Item	Stop Signal Arm	
	Forward	Rearmost
Does the stop sign(s) have illuminated lettering? If optional illuminated lettering is installed, the following requirements apply in addition to reflectorized surface.	**Yes**	

Requirements		Forward Signal Arm		Rearmost Signal Arm	
		Front Side	Aft Side	Front Side	Aft Side
Only Red lamps used (Yes/No)		Yes	Yes		
Red lamps form the complete shape of each letter of the legend. (Yes/No)		Yes	Yes		
Red lamps centered within stroke of each letter (yes/No) or Red lamps outline each letter in immediately surrounding area (Yes/No)		Yes	Yes		
The shape of each letter remains constant (Yes/No)		Yes	Yes		
Net stroke width > 15 mm (stroke width minus lamp width)	"S"	15.8	15.8		
	"L"	15.8	15.8		
	"O"	16.7	16.7		
	"P"	15.5	15.5		
Lamps on each side of the signal arm flash (60-120 flashes/min.)		80	80		
Lamps current "on" time of 30% to 75% of the total flash cycle		50%	50%		
Total current "on" time for the two terminals shall be between 90-110% of the total flash cycle.		100%	100%		
If Xenon short-arc lamps – "off" time before each flash of at least 50% of the total flash cycle.					

Lamp Type		
		Filament
		Gaseous Discharge
	X	Light emitting diode

FMVSS 131 DATA SHEET 3...continued
CONSPICUITY (S5.3)

Test Vehicle: **2003 Liberty Freedom School Bus** NHTSA No.: **C30901**
Test Lab: **MGA Research-Wisconsin Operations** Test Date: **6/24/03**

RED FLASHING LAMPS (S5.3.2)

Requirements	Forward Signal Arm		Rearmost Signal Arm	
	Front Side	Aft Side	Front Side	Aft Side
Red lamps centered on the vertical centerline (At least 2, enter quantity)	[redacted]			
One lamp at extreme top and another at extreme bottom (Yes/No)				
Lamps on each side of the signal arm flash alternately (60-120 flashes/min.)				
Lamps current "on" time of 30% to 75% of the total flash cycle.				
Total current "on" time for two terminals shall be between 90 and 110% of the total flash cycle.				
If Xenon short-arc lamps-"off" time before each flash of at least 50% of total flash cycle.				
Symbol "DOT" on each lamp lens (Yes/No)				
Additional markings on lamp lenses				

MARKINGS ON THE FLASHER

Make	Specialty Mfg.	Serial No.	528099
Model	5 Series	Date of Mfg.	10/02

TEST RESULTS		Pass, Fail, or N/A
S5.3.1	Reflectorized Material	**PASS**
S5.3.1.1	Optional Illuminated Lettering	**PASS**
S5.3.2	Red Flashing Lamps	**N/A**

Recorded By: _____

Approved By: _____ Date: 7/17/03

FMVSS 131 DATA SHEET 4
STOP SIGNAL ARM INSTALLATION (S5.4)

Test Vehicle: **2003 Liberty Freedom School Bus** NHTSA No.: **C30901**
Test Lab: **MGA Research-Wisconsin Operations** Test Date: **6/24/03**

Dimensions and angles measured with Signal Arm in the extended position.

Requirements	Stop Signal Arm	
	Forward	Rearmost
Signal arm perpendicular to side of bus (Measure angle between vertical plane of side of bus and vertical plane of the signal arm.) 90 ± 5°	YES	[redacted]
Top edge of signal arm parallel to horizontal plane (Measure angle between vertical plane of side of bus and the top edge of the signal arm.) 90 ± 5°	YES 87.8°	
[redacted]		
Measure top corner closest to the school bus	147 mm	
Measure top corner furthest from school bus	150 mm	
Vertical centerline of signal arm not less than 228.6 mm away from side of bus	364 mm	
Stop signal arm(s) installed on left side of bus (Yes, No, or Not Applicable)	YES	

TEST RESULTS		PASS, FAIL, or N/A
S5.4	Stop Signal Arm Installation	**PASS**

Recorded By: _____

Approved By: _____ Date: 7/17/03

FMVSS 131 DATA SHEET 5
STOP SIGNAL ARM OPERATION (S5.5)

Test Vehicle: **2003 Liberty Freedom School Bus** NHTSA No.: **C30901**
Test Lab: **MGA Research-Wisconsin Operations** Test Date: **6/24/03**

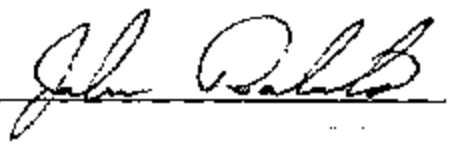
Stop Signal Arm(s) shall be automatically extended, at a minimum, whenever the red signal lamps on the bus required by FMVSS 108 are activated; except that a manual override device may be installed that prevents automatic extension.

Requirements	Stop Signal Arm	
	Forward	Rearmost
Signal Arm(s) automatically extended when red lights are activated and override device is not activated. (Yes, No, or Not Applicable)	YES	[redacted]
Mechanism for activating the override device is within reach of the school bus driver (Yes/No)	[redacted]	
While the override device is activated; there is a continuous or intermittent signal audible to the driver unless equipped with optional cut-off timing device (Measure duration > 10 min.)		
If audible signal is equipped with optional cut-off timing device, it sounds for at least 60 seconds while the manual override is activated. (Measure 3 times, duration > 60 sec.)		
If audible signal is equipped with optional cut-off timing device, it automatically recycles every time the service entry door is opened while the engine is running and the manual override is engaged. (Recycle 3 times, Yes/No each cycle)		

Describe location and mode of operation of the manual override control, if installed:

No manual override device was installed on this vehicle which allowed overhead lights to flash and stop signal arm <u>NOT</u> to extend.

TEST RESULTS		PASS, FAIL, or N/A
S5.5	Stop Signal Arm Operation	**PASS**

Recorded By: 

Approved By:  Date: 7/17/03

SECTION 4
INSTRUMENTATION AND EQUIPMENT LIST

SECTION 4

INSTRUMENTATION AND EQUIPMENT LIST

Test Vehicle: **2003 Liberty Freedom School Bus** NHTSA No.: **C30901**
Test Lab: **MGA Research-Wisconsin Operations** Test Date: **6/24/03**

Identify the instruments used during this test and record their make, model, serial number, range, accuracy, and calibration date

	Digital Caliper	Inclinometer	Tape Measure
Make	Mitutoyo	Digital Protractor	Stanley
Model	IP65	Pro 360	Powerlock
Serial # (s)	0004174	Complab	118
Range	0 to 150 mm	0 to 360 degrees	0 to 6 m
Accuracy	0.01 mm	0.1 degree	1 mm
Cal. Date	10/8/02	6/24/03	4/9/03
Cal. Due	10/8/03	11/20/03	10/9/03

SECTION 5
PHOTOGRAPHS

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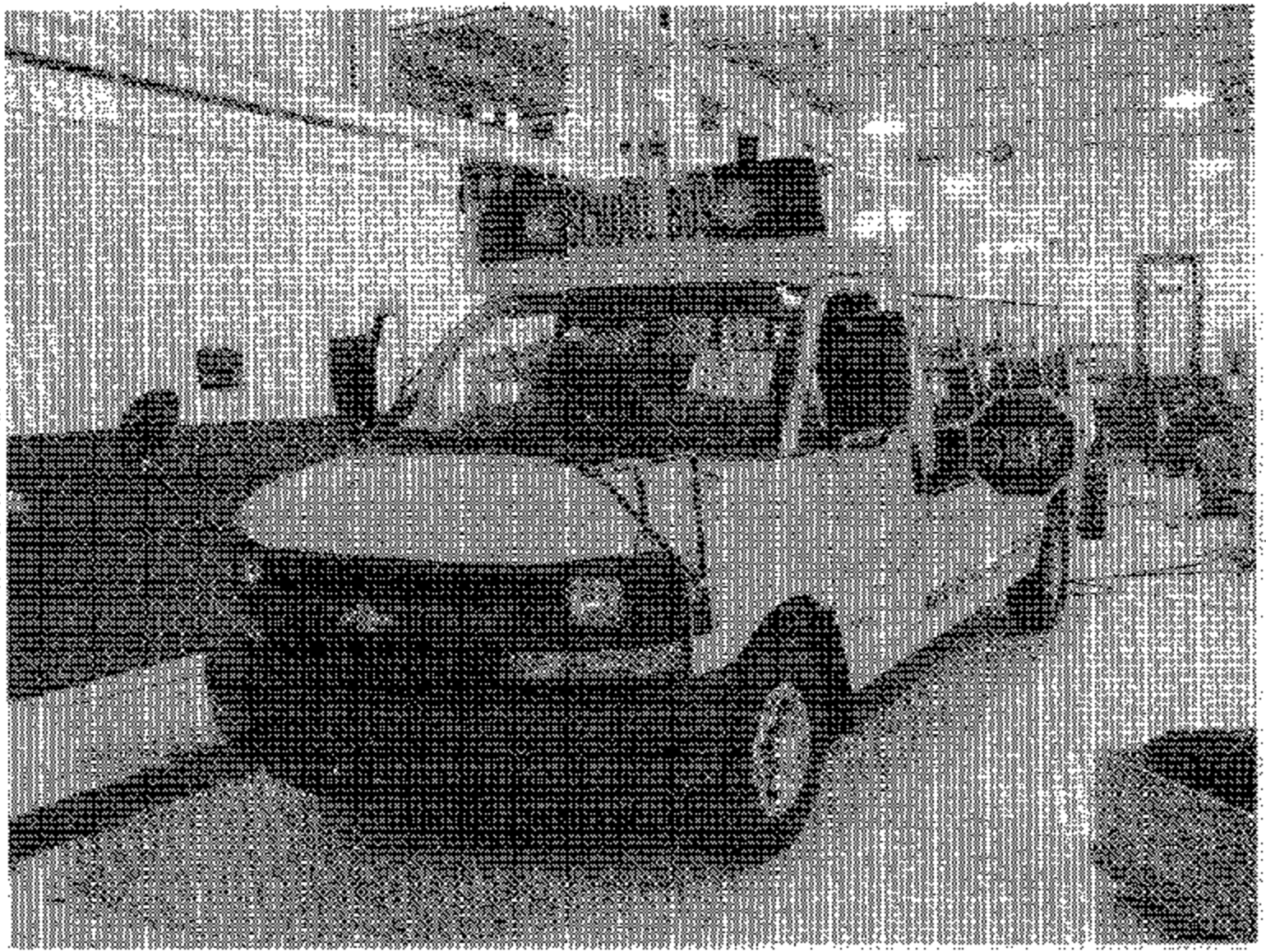
Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 131 NHTSA No.: C30901

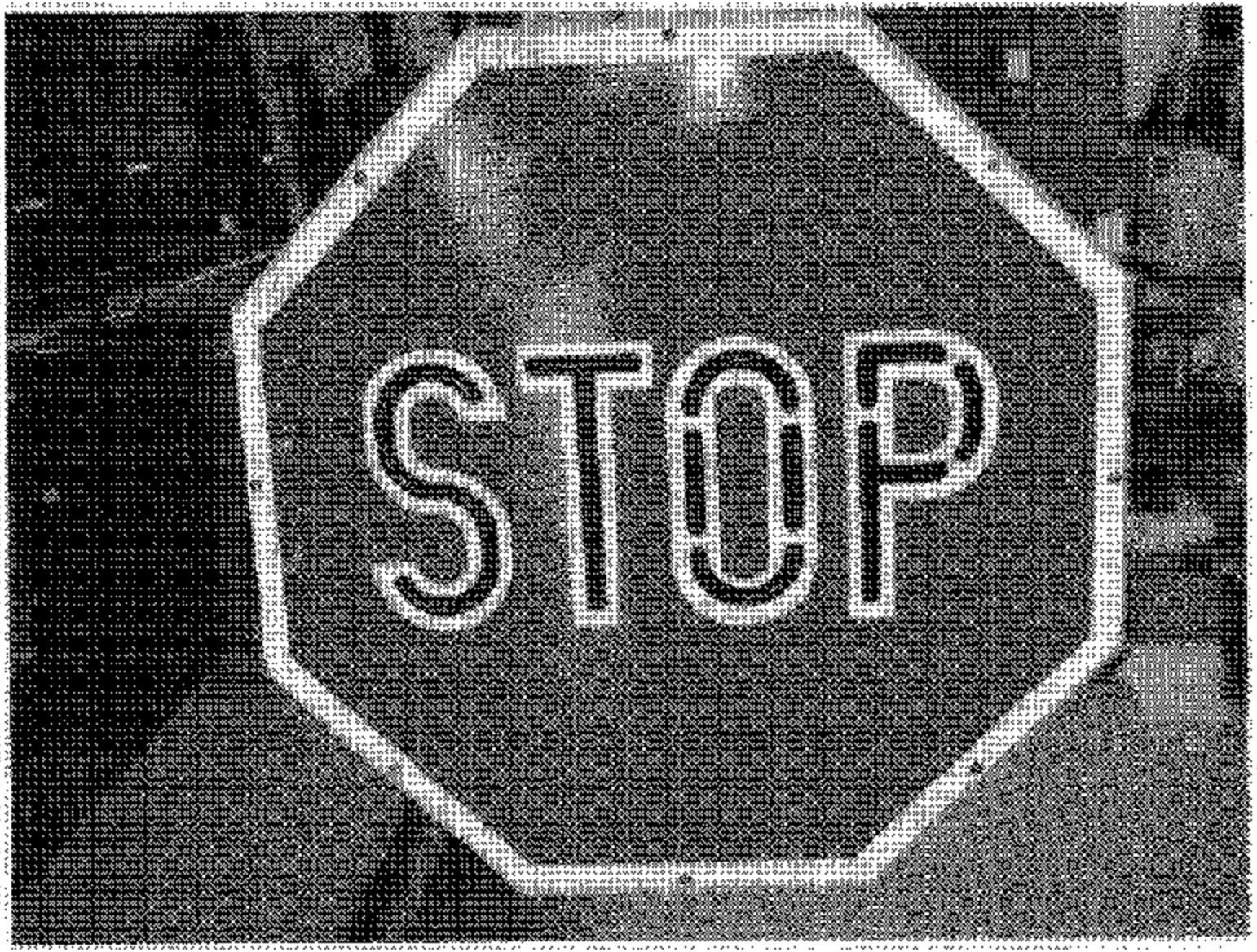


Left Front ¾ View of Vehicle with Stop Signal Arm extended

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 131 NHTSA No.: C30901

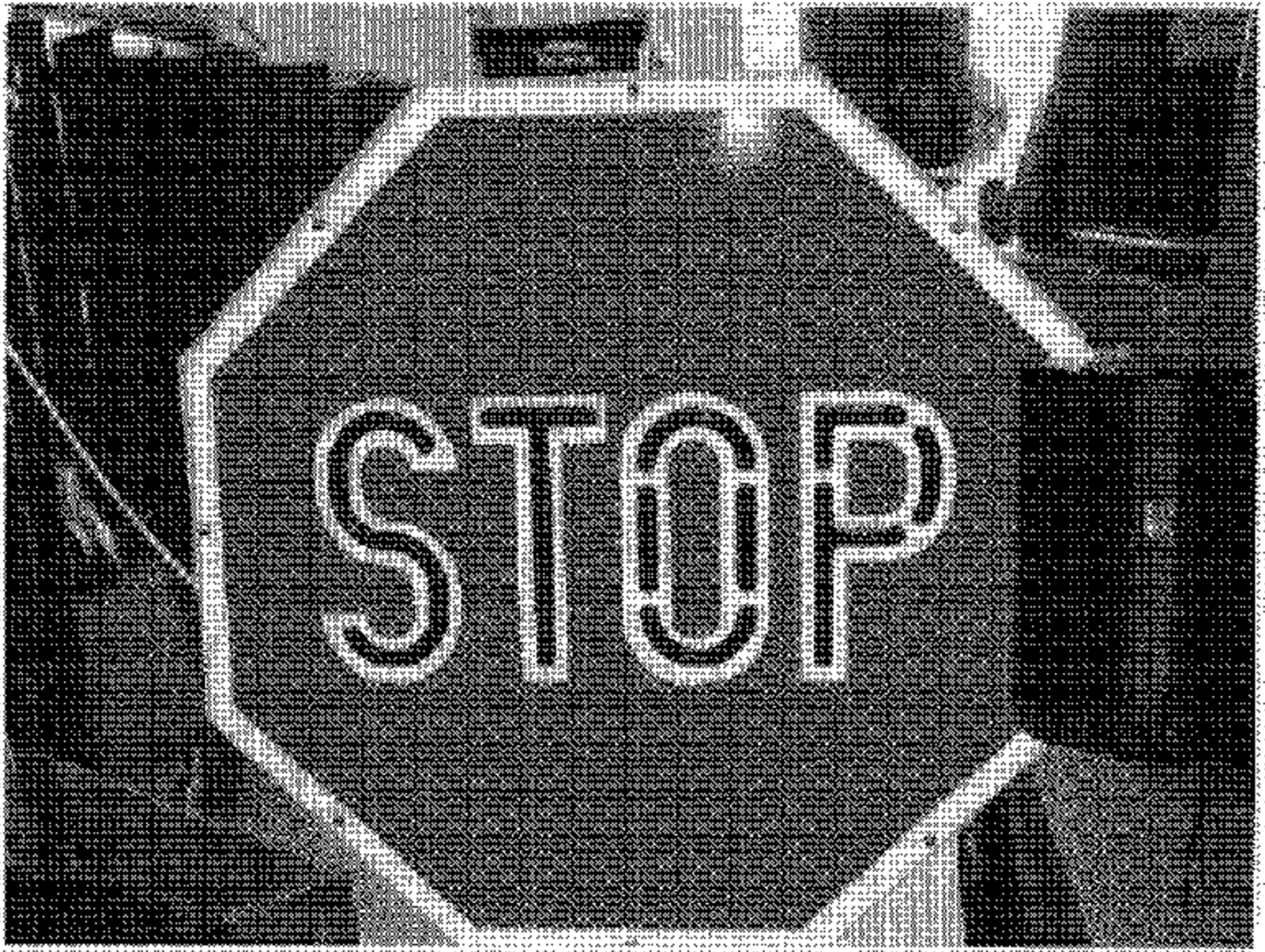
Left Rear ¾ View of Vehicle with Stop Signal Arm extended

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 131 NHTSA No. C30901



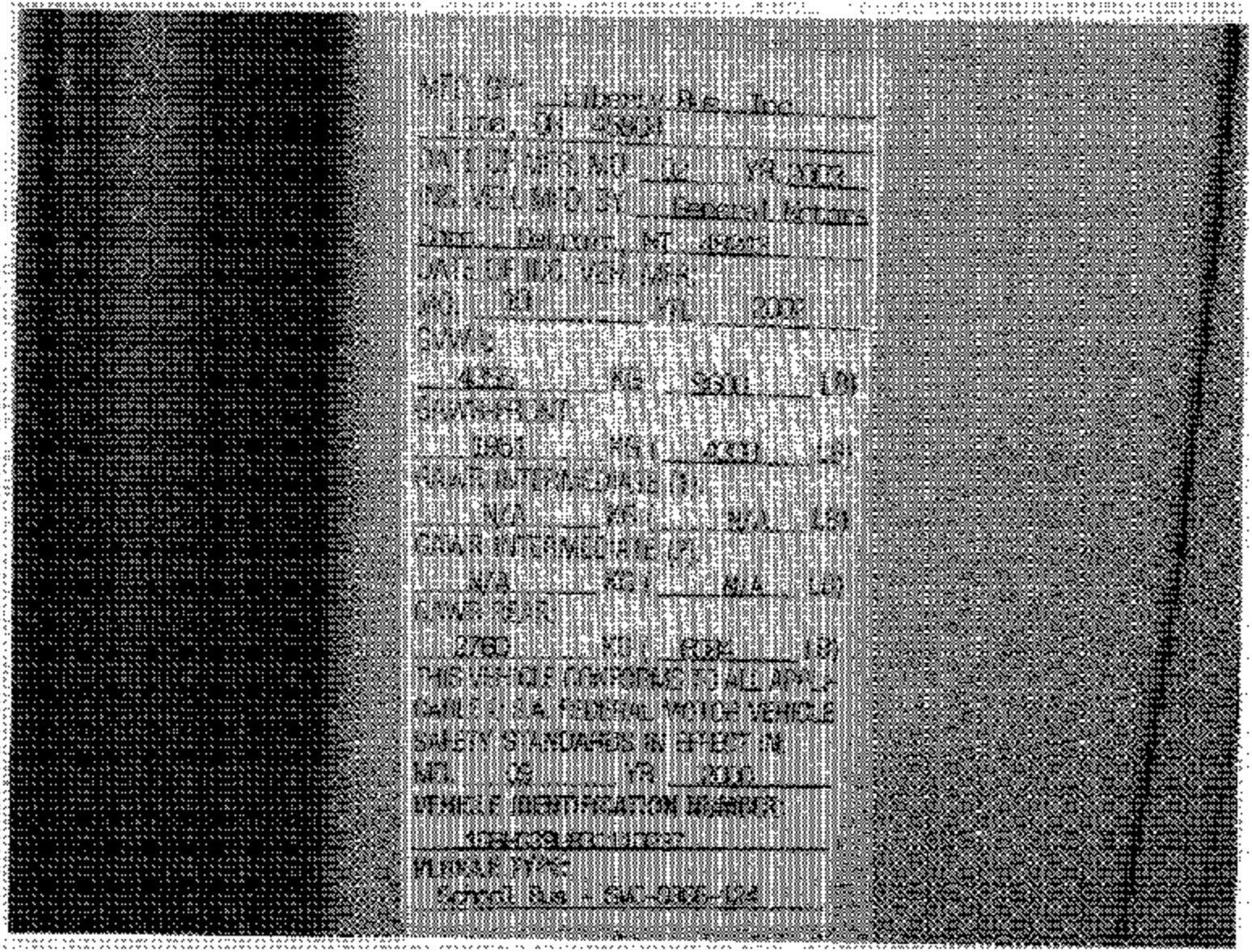
Close-up View of Forwardmost Stop Signal Device from Front

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 131 NHTSA No.: C30901

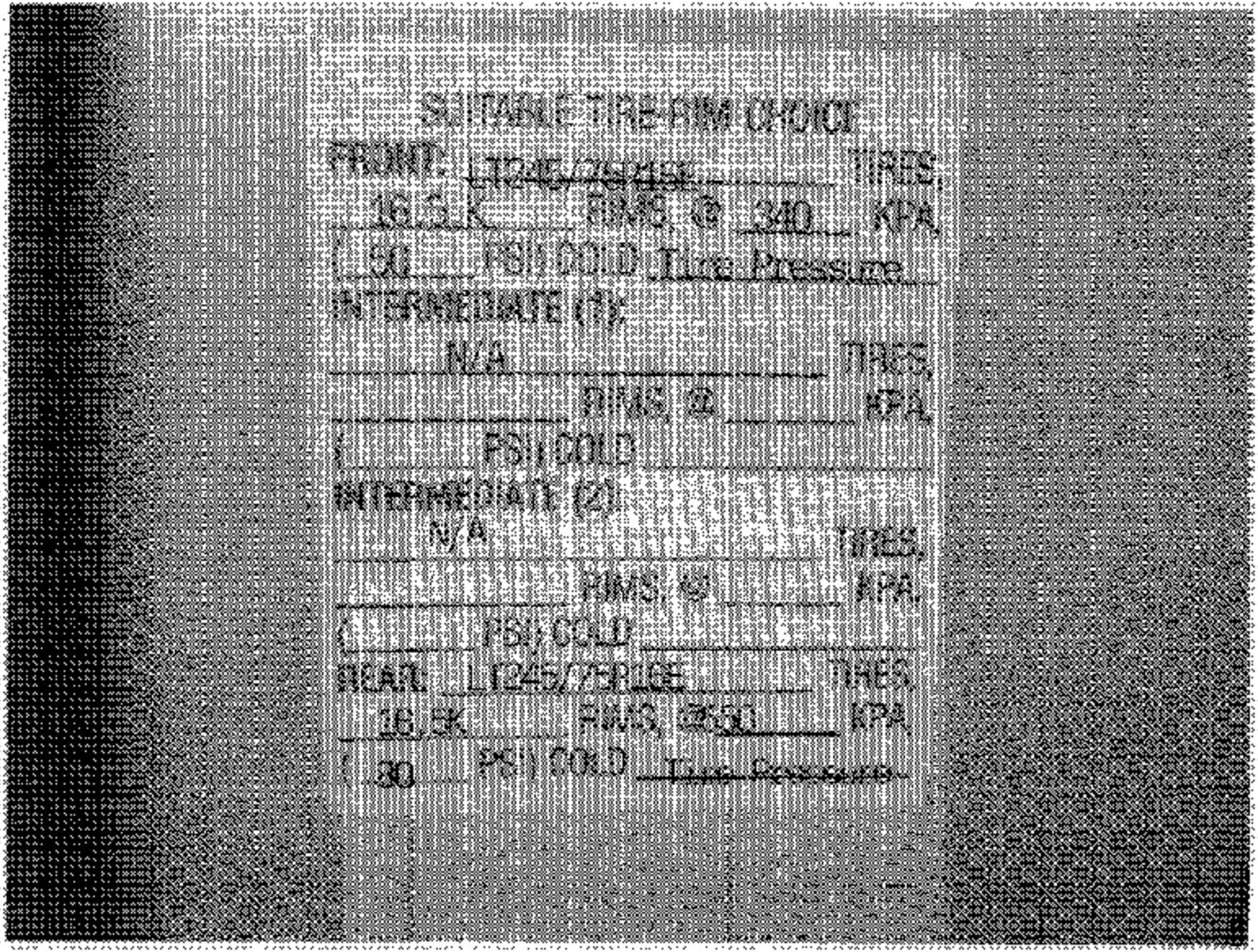


Close-up View of Forwardmost Stop Signal Device from Back

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 131 NHTSA No. C30901

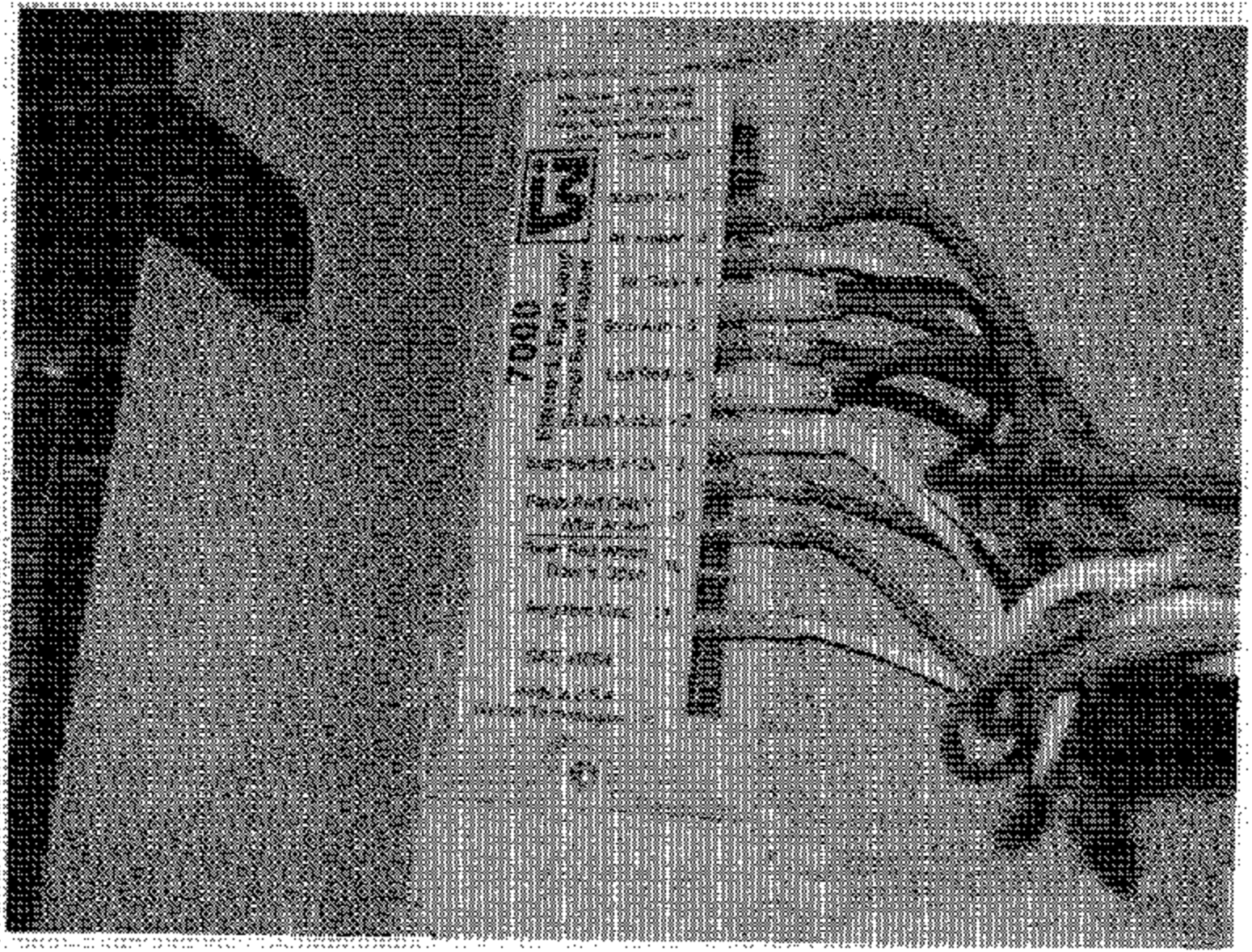


Close-up of Certification Label



Close-up of Vehicle Placard

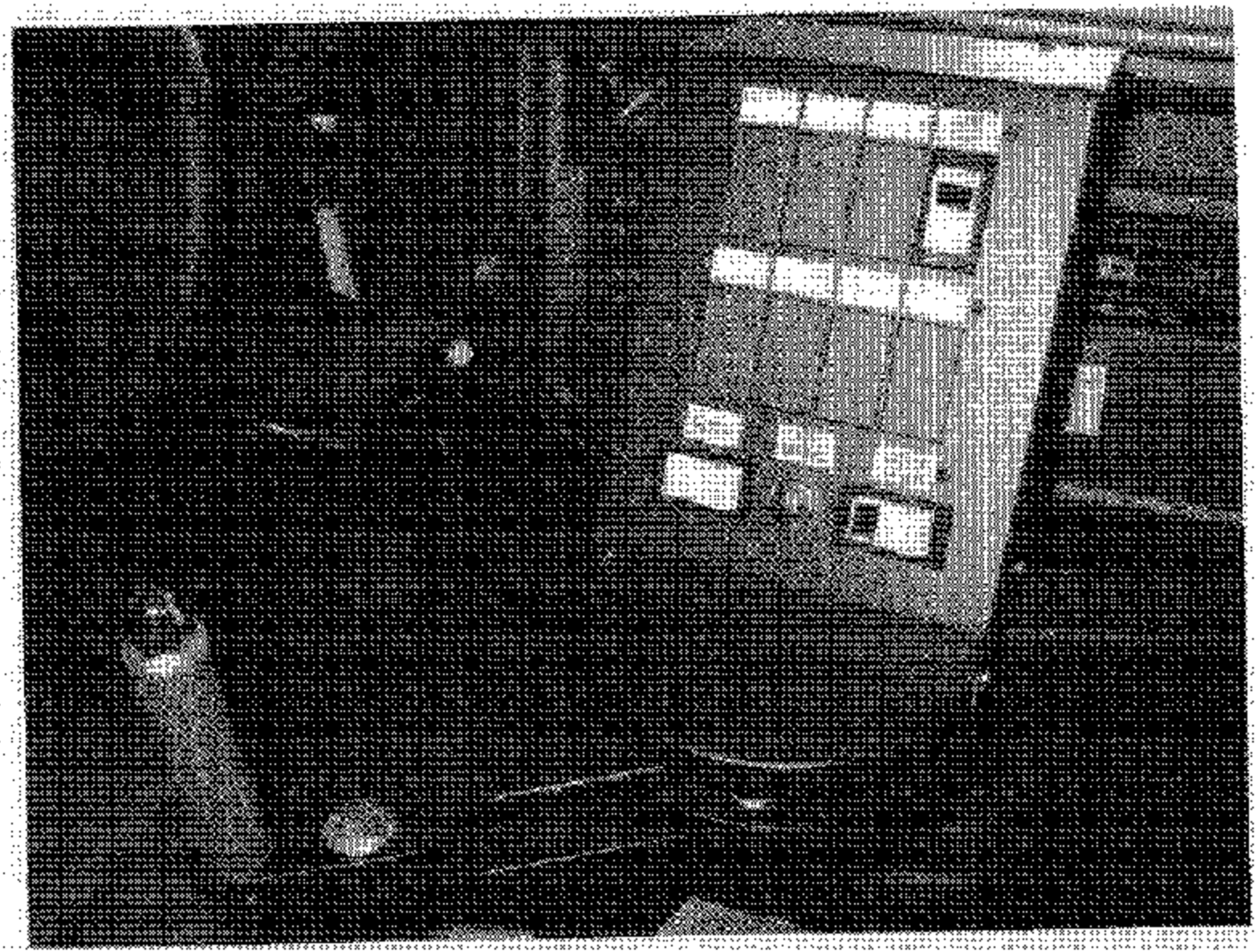
Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 131 NHTSA No. C30901



Close-up of Flasher

Test Vehicle: 2003 Liberty Freedom School Bus
Procedure: FMVSS 131

NHTSA No.: C30901



View of Device that Activates Automatic Extension of the Stop Arm Signal and Warning Lights