HS#637924

REPORT NUMBER: 301S-MGA-05-003

SAFETY COMPLIANCE TESTING FOR FMVSS NO. 301S FUEL SYSTEM INTEGRITY - SCHOOL BUSES

Les Entreprises Michel Corbeil Inc.
2004 Corbeil 30 Passenger School Bus
NHTSA No. C40902

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

Final Report Date: July 6, 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 6115 (NVS-224)
WASHINGTON, D.C. 20590

Prepared by: _____ Date: July 6, 2005
James Hansen, Program Engineer

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FINAL REPORT ACCEPTED BY:

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7/11/05
Date of Acceptance

Technical Report Documentation Page

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4. Title and Subtitle Final Report of FMVSS 301S School Bus Compliance Testing of 2004 Corbeil 30 Passenger School Bus NHTSA No.:C40902		*5. Report Date* July 6, 2005 *6. Performing Organization Code* MGA	
7. Author(s) James Hansen, Program Engineer David Winkelbauer, Program Manager		*8. Performing Organization Report No.* 301S-MGA-05-003	
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-D-01057	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Enforcement Office of Vehicle Safety Compliance (NVS-224) 400 Seventh St., S.W. Room 6115 Washington, D.C. 20590		*13. Type of Report and Period Covered* Final Report June 15 – July 6, 2005 *14. Sponsoring Agency Code* NVS-224	
15. Supplementary Notes			
16. Abstract A compliance test was conducted on the subject 2004 Corbeil 30 passenger School Bus, NHTSA No. C40902 in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-301S-02 for the determination of FMVSS 301S compliance. Test failures were as follows: None			
17. Key Words Compliance Testing Safety Engineering FMVSS 301S		*18. Distribution Statement* Copies of this report are available from: NHTSA Technical Information Services (TIS) Room 2336, (NPO-405) 400 Seventh Street, S.W. Washington, D.C. 20590 (202) 366-4948	
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Form DOT F1700.7 (8-72)

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SECTION 1

PURPOSE OF COMPLIANCE TEST AND SUMMARY

A fuel system integrity test was performed on a MY2004 Corbeil 30 Passenger School Bus, NHTSA No. C40902, in accordance with the specifications of the Office of Vehicle Safety Compliance (OVSC) Test Procedures TP-301S-02 to determine compliance to the requirements of Federal Motor Vehicle Safety Standards (FMVSS) 301S, "Fuel System Integrity - School Buses".

Based on the test results, the MY2004 Corbeil 30 Passenger School Bus, NHTSA No. C40902 appears to meet the requirements of FMVSS 301S 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 MY2004 Corbeil 30 Passenger School Bus, NHTSA No. C40902.

DATA SHEET 1

SCHOOL BUS DATA

Test Vehicle: **2004 Corbell 30 Passenger School Bus** NHTSA No.: **C40902**
Test Lab: **MGA Research-Wisconsin Operations** Test Date: **6/15/05**

GENERAL VEHICLE IDENTIFICATION

School Bus Manufacturer:	Corbell	
School Bus Model:	30 Passenger	
Build Date:	05/04	
Incomplete Vehicle Manufactured By:	Ford	
Build Date for Bus Chassis:	03/04	
School Bus GVWR (kg):	6372	
School Bus GAWR Front (kg):	2086	
School Bus GAWR Rear (kg):	4286	
School Bus VIN:	1FDXE45P14HA89660	
No. of Designated Seating Positions (DSP) including Driver:	31	
School Bus NHTSA No.:	C40902	
Bus Body Color:	Yellow	
Engine Displacement	6.0L	
No. of Cylinders:	8	
Fuel Pump Actuation:	Electrical Pump "ON" with ignition	
School Bus Width (mm):	2430	
School Bus Length (mm):	7110	
Bus Unloaded Vehicle Weight (UVW) (kg):	4308	
Bus Occupant Load:	1620 kg - Passenger 68 kg - Driver 1688 kg - Total	
Target Bus Test Weight (SBTW) (kg):	5996	
Actual (SBTW) (kg):	5992	
School Bus Tire Manufacturer:	Michelin	
	Front	Rear
Rec. Cold Tire Inflation Pressure (kpa):	450	550
Tire Size:	LT225/75R16	LT225/75R16
Load Range:	E	E

DATA SHEET 1 (CONTINUED)

SCHOOL BUS DATA

Test Vehicle: **2004 Corbell 30 Passenger School Bus** NHTSA No.: **C40902**
Test Lab: **MGA Research-Wisconsin Operations** Test Date: **6/15/05**

GENERAL VEHICLE IDENTIFICATION

SCHOOL BUS ATTITUDE

	Units	LF	RF	LR	RR
As Received:	mm	NR	NR	NR	NR
Pre-Test:	mm	894	870	850	880
Post-Test:	mm	891	873	847	851

NR = Not Recorded

Weight of Fuel:	3.19 kg/liter (7.03 lbs./gallon)
Fuel Tank Capacity (liters/kg):	216 liters/182 kg (57 gallons/401 lbs.)
Tank Test Volume (liters/kg):	201 liters/169 kg (53 gallons/373 lbs.)

TEST VEHICLE WEIGHTS

		As Delivered (UVW)			As Tested (ATW)*		
	Units	Front	Rear	Total	Front	Rear	Total
Left	kg	810	1304		842	2116	
Right	kg	856	1338		894	2140	
Ratio	%	38.7	61.3		29.0	71.0	
Totals	kg	1666	2642	4308	1736	4256	5992

COMMENTS: NONE

Recorded By: Jordan Hayes

Approved By: _____ Date: 6/15/05

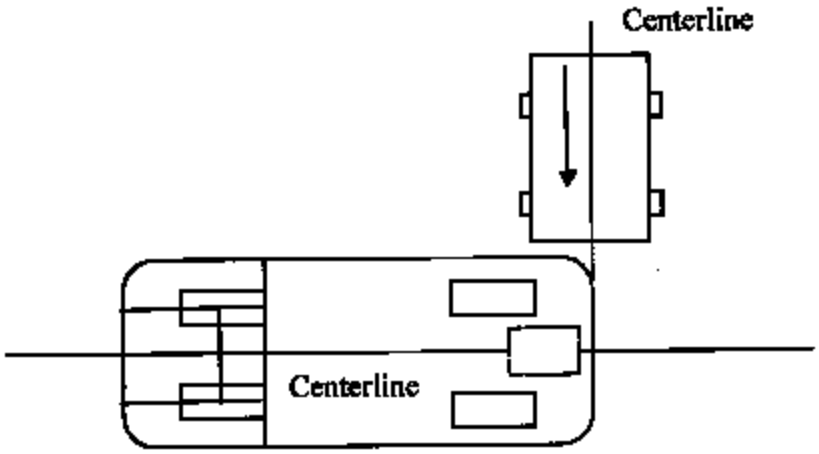
DATA SHEET 2

SCHOOL BUS IMPACT DATA

Test Vehicle: **2004 Corbell 30 Passenger School Bus** NHTSA No.: **C40902**
Test Lab: **MGA Research-Wisconsin Operations** Test Date: **6/15/05**

Time of Impact:	4:11 pm
Ambient Temperature (°C)	21.1
Barrier Velocity – Speed Trap 1 (kph):	47.8
Barrier Velocity – Speed Trap 2 (kph):	47.8
Barrier Penetration:	120mm

INDICATE IMPACT POINT BELOW:



LEGEND: Red dotted line indicates location of fuel tank
Arrow indicates point and angle of barrier impact (C_L of arrow coincides with C_L of monorail).

DATA SHEET 2 (CONTINUED)

SCHOOL BUS IMPACT 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

COMMENTS: None

Recorded By: Gordon Hayes

Approved By: _____ Date: 6/15/05

SECTION 3

INSTRUMENTATION AND EQUIPMENT LIST

Test Vehicle: **2004 Corbell 30 Passenger School Bus** NHTSA No.: **C40902**
Test Lab: **MGA Research-Wisconsin Operations** Test Date: **6/15/05**

Equipment	Description	Serial No.	Cal. Date	Next Cal. Date
Counter/Timer	DCI	939095	10/26/04	10/26/05
Counter/Timer	DCI	939094	10/26/04	10/26/05
Vehicle Scales	GSE	212091 & 212092	6/10/05	12/10/05
Tape Measure	Stanley Powerlock 8M	162	5/19/05	11/19/05

SECTION 4
PHOTOGRAPHS

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Test Vehicle: 2004 Corbeil 30 Passenger School Bus

Procedure: FMVSS 301 NHTSA No.: C40502

Pre-Test Front View of School Bus

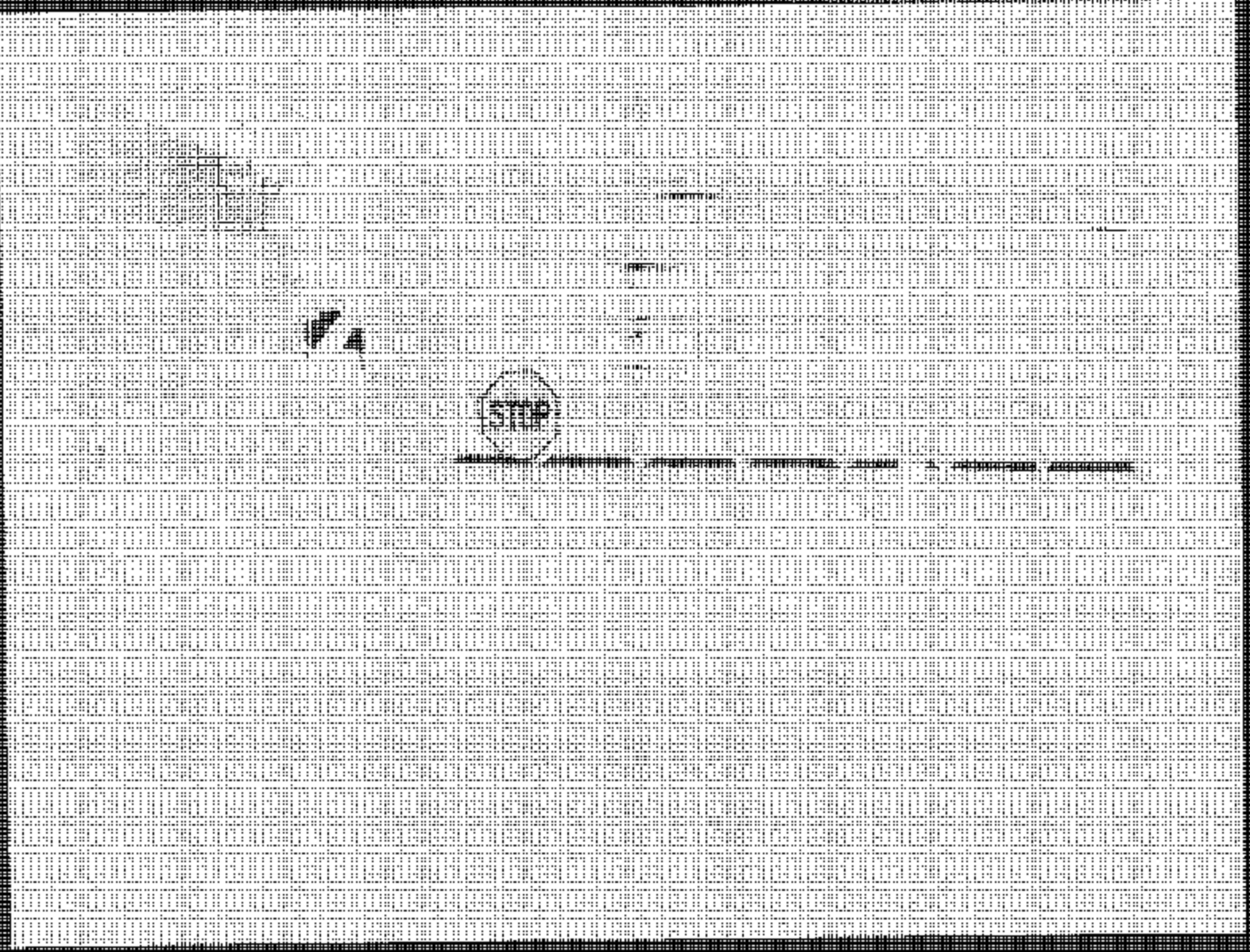
Test Vehicle: 2004 Corbeil 10 Passenger School Bus
Procedure: FMVSS 301 NHTSA No.: C40303

Post-Test Front View of School Bus

Test vehicle: 2004 Ford 3/4 Passenger Schoolbus

Procedure: FMVSS 301

NHTSA No.: C40302

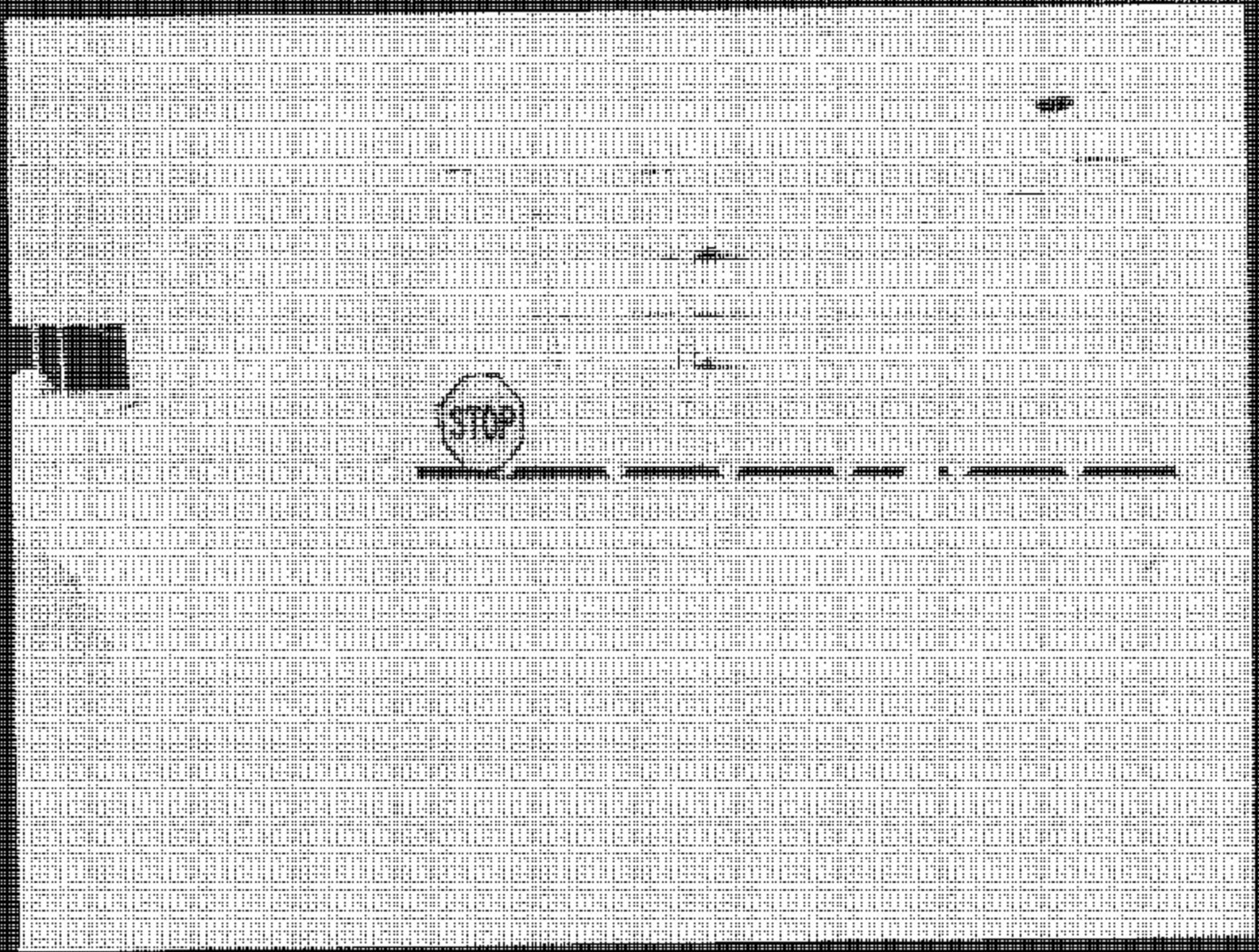


Pre-Test Left Side of School Bus

Test Vehicle: 2004 Cotrell 36 Passenger School Bus

Procedure: FMVSS 301

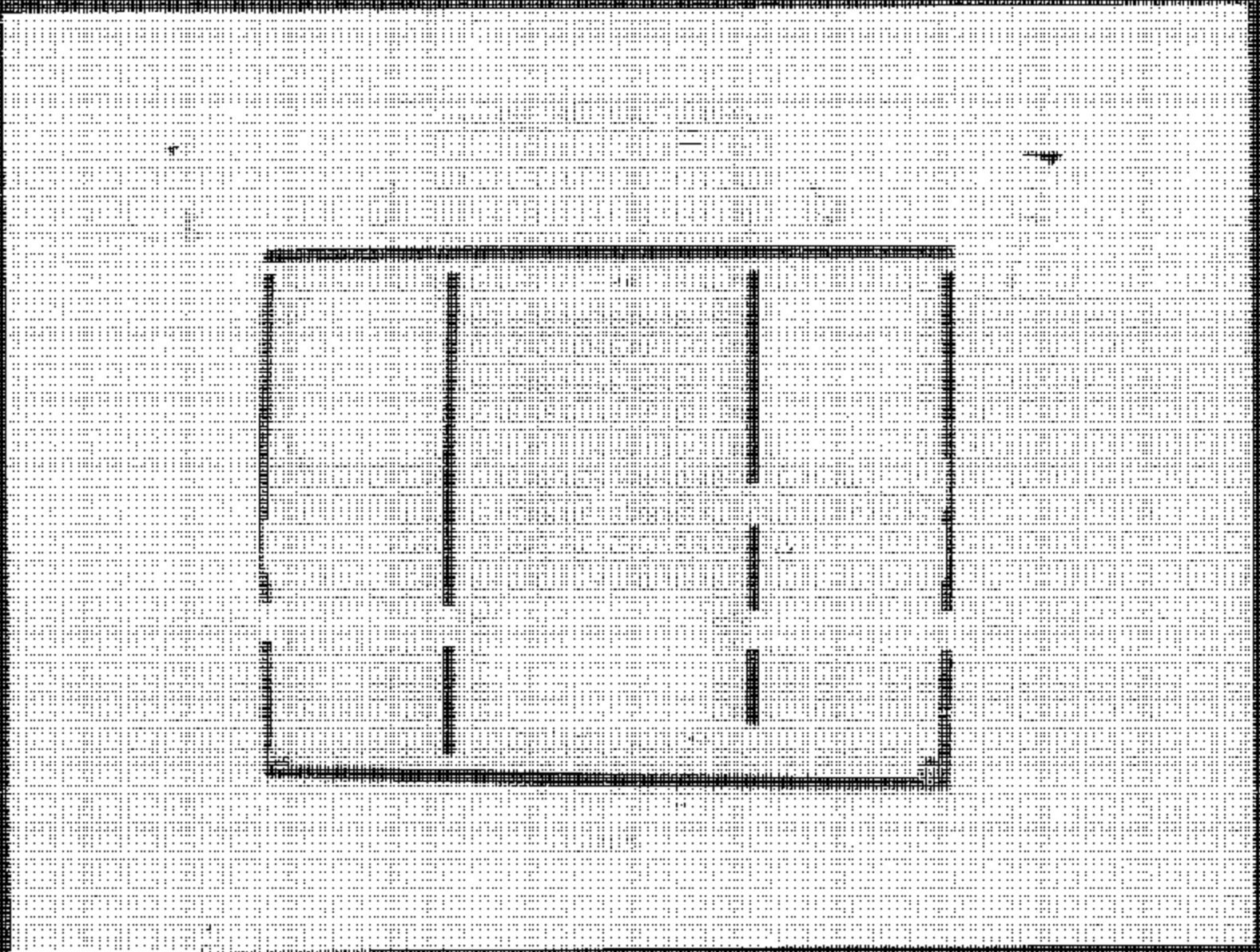
NHTSA No.: C4204Z



Post-Test Left Side of School Bus

Test Vehicle: 2004 Combo 30 Passenger School Bus

Procedure: FMVSS 301 NHTSA No.: C40052

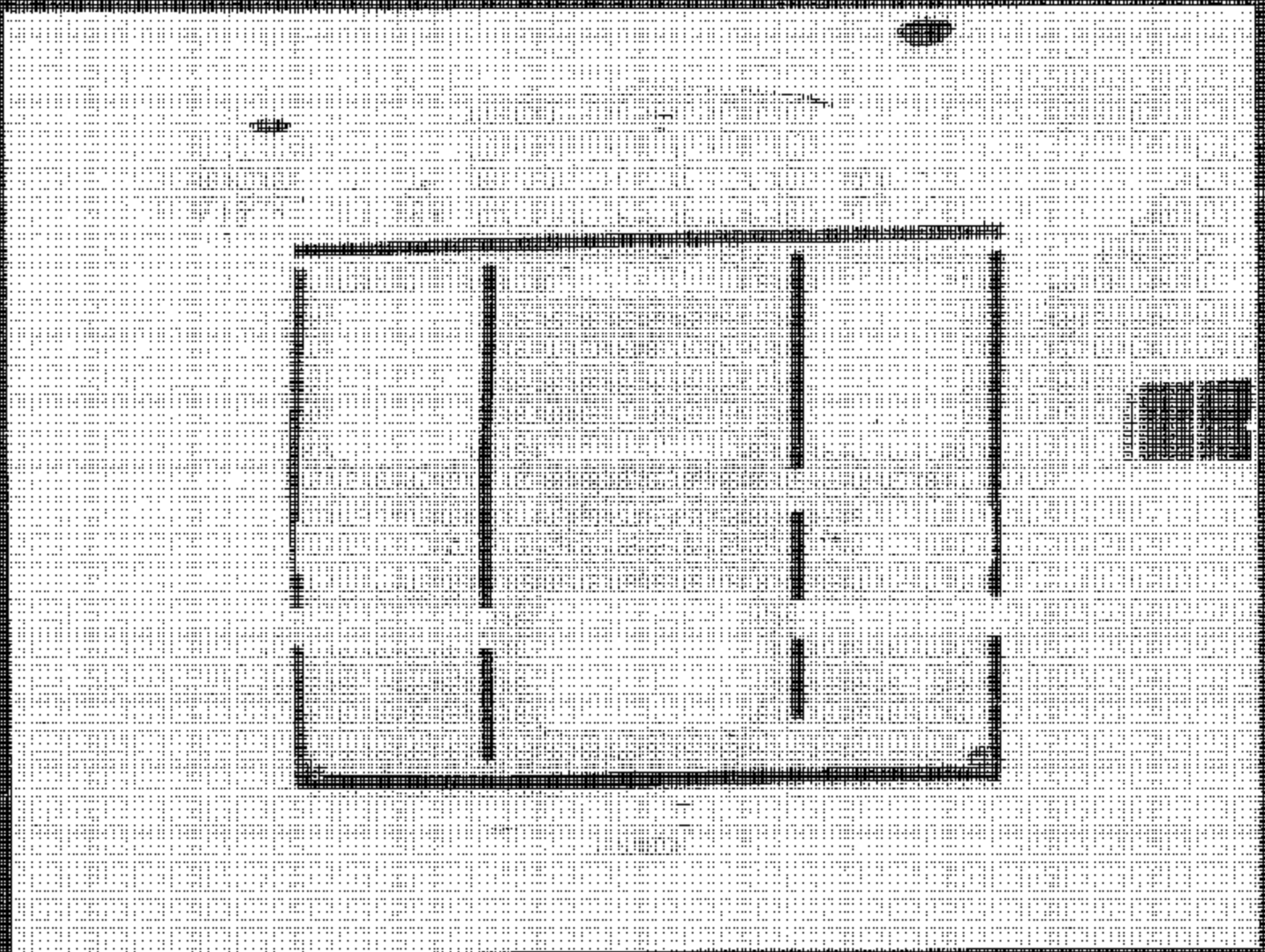


Pre-Test Rear View of School Bus

Test Vehicle: 2004 Ford® 30 Passenger School Bus

Procedure: FMVSS 301

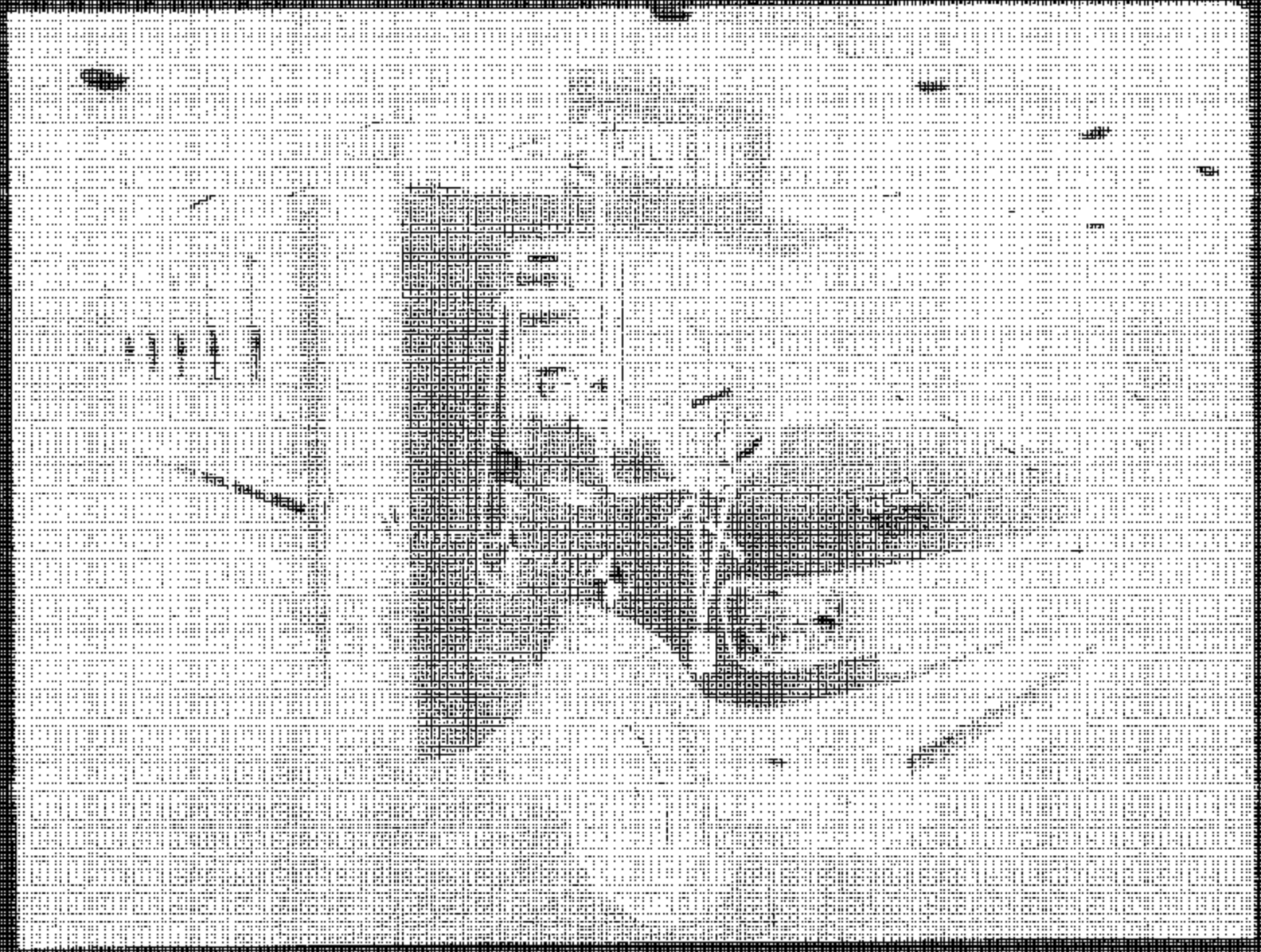
NHTSA No.: C40043



Post-Test Rear View of School Bus

Test Vehicle: 2004 Collins 30 Passenger School Bus

Procedure: FMVSS 301 NHTSA No.: C40502



Pre-Test Right Front ¾ View of School Bus

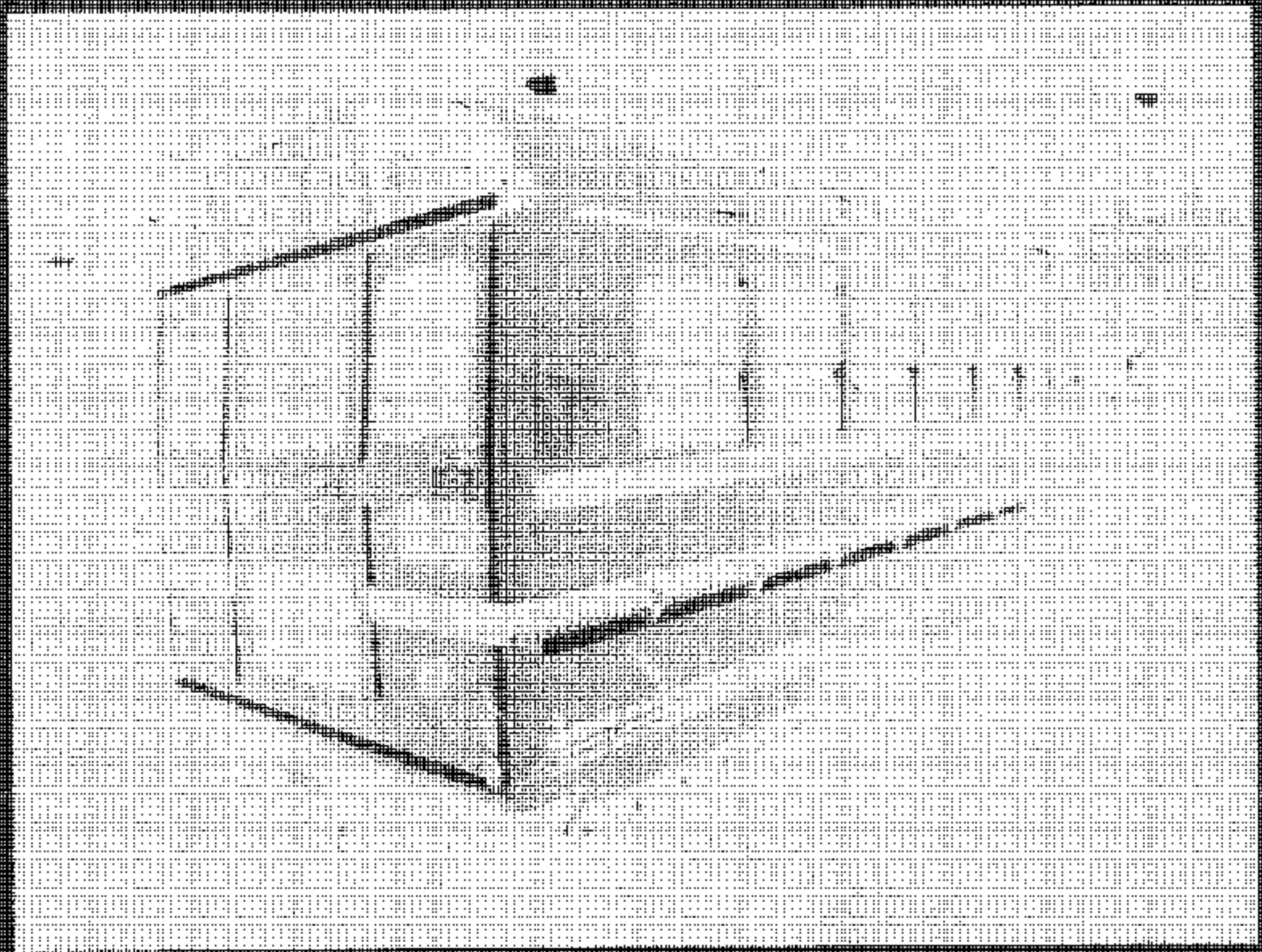
Test Vehicle: 2004 Gerbil 30 Passenger School Bus

Procedure: Series 241 NHTSA No. C40802

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

Test Vehicle: 2004 Cotbell 30 Passenger School Bus

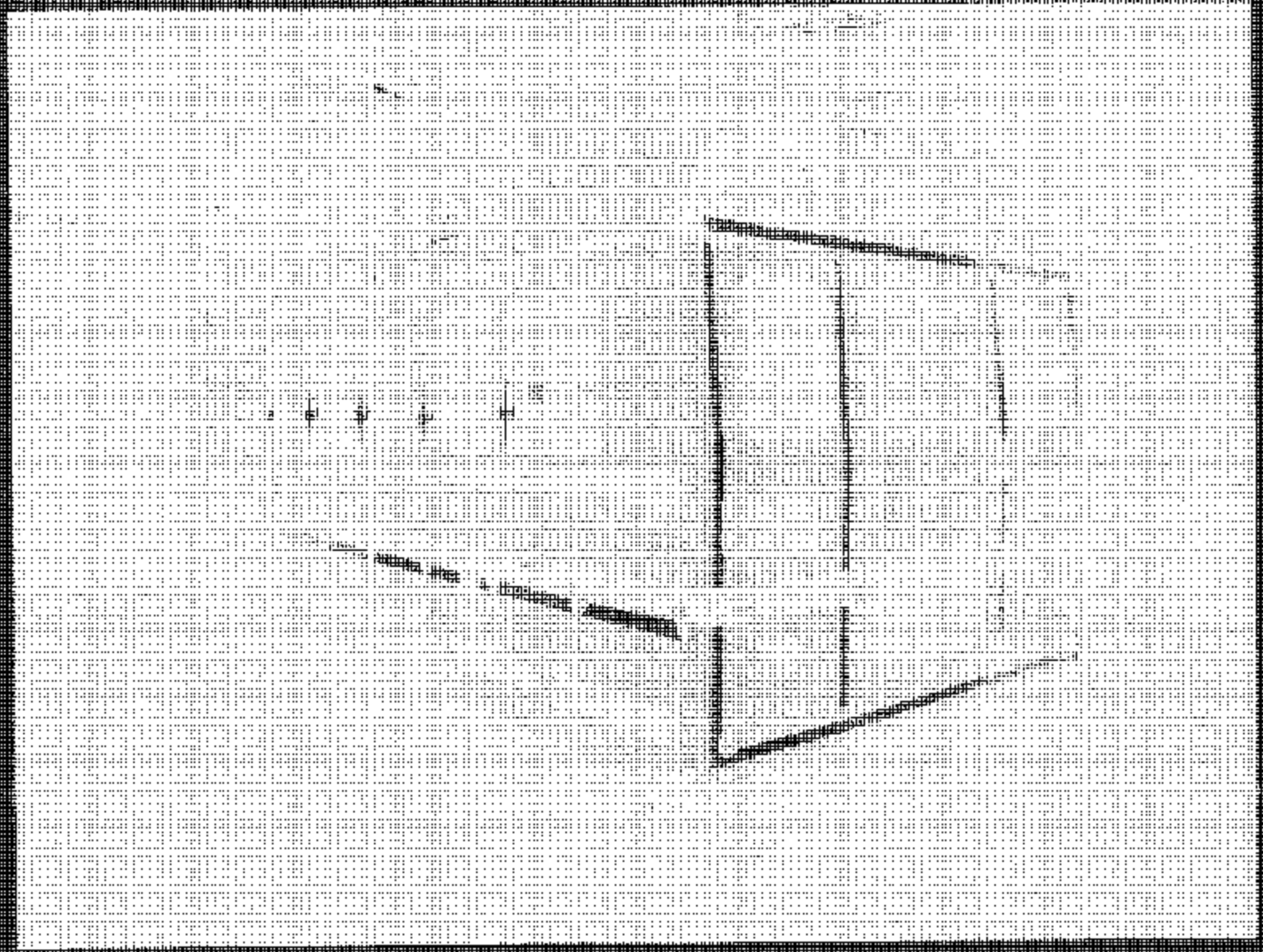
Procedure: FMVSS 301 NHTSA No.: C40902



Pre-Test Right Rear ¾ View of School Bus

Test Vehicle: 2006 Gerbelf 90 Passenger School Bus

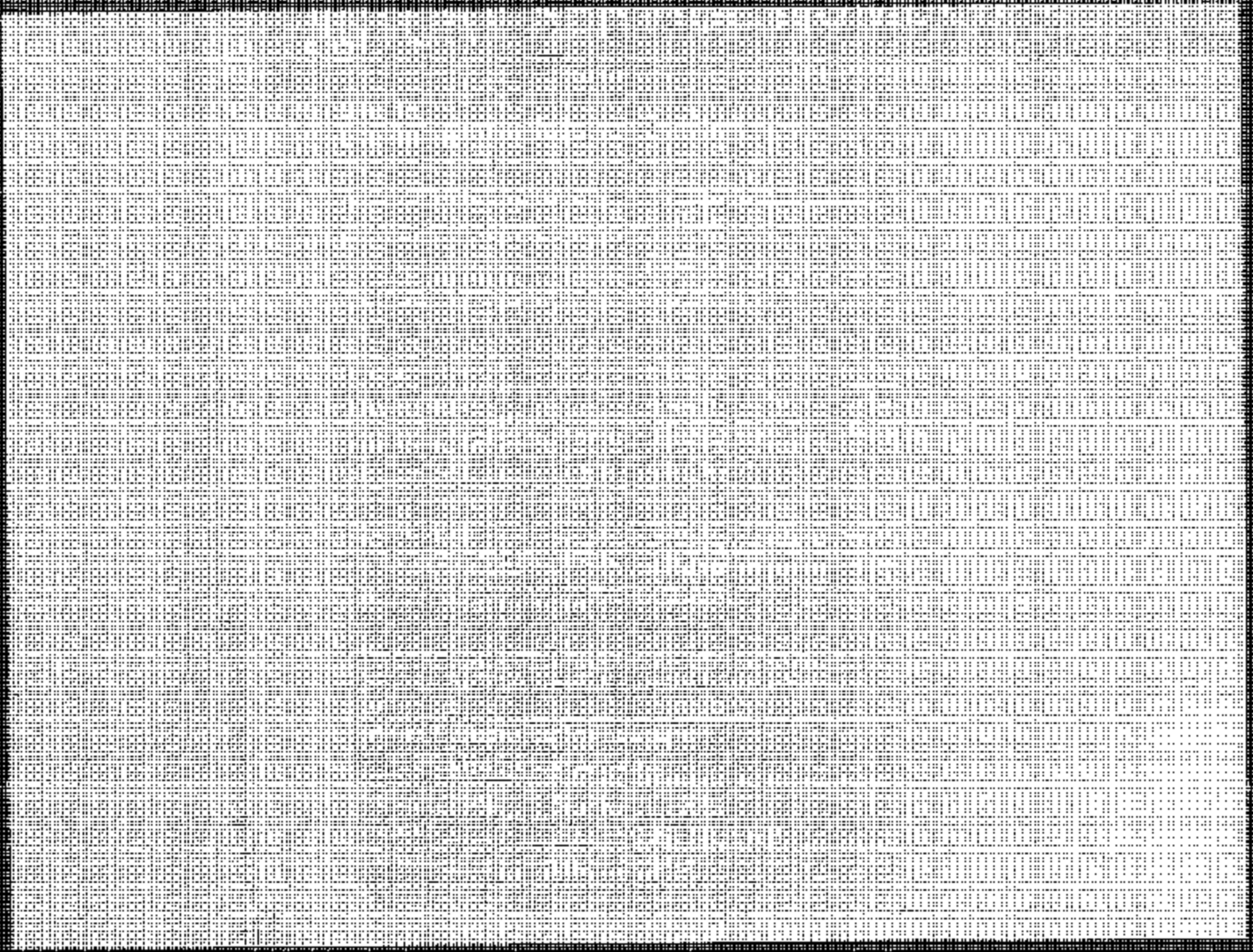
Procedure: FMVSS 301 NHTSA No.: C60902



Post-Test Left Rear 2/3 View of School Bus

Test Vehicle: 2006 Orbit 30 Passenger School Bus

Project: FMVSS 301 NHTSA No. C40902



Vehicle Certification and Tire Information Label

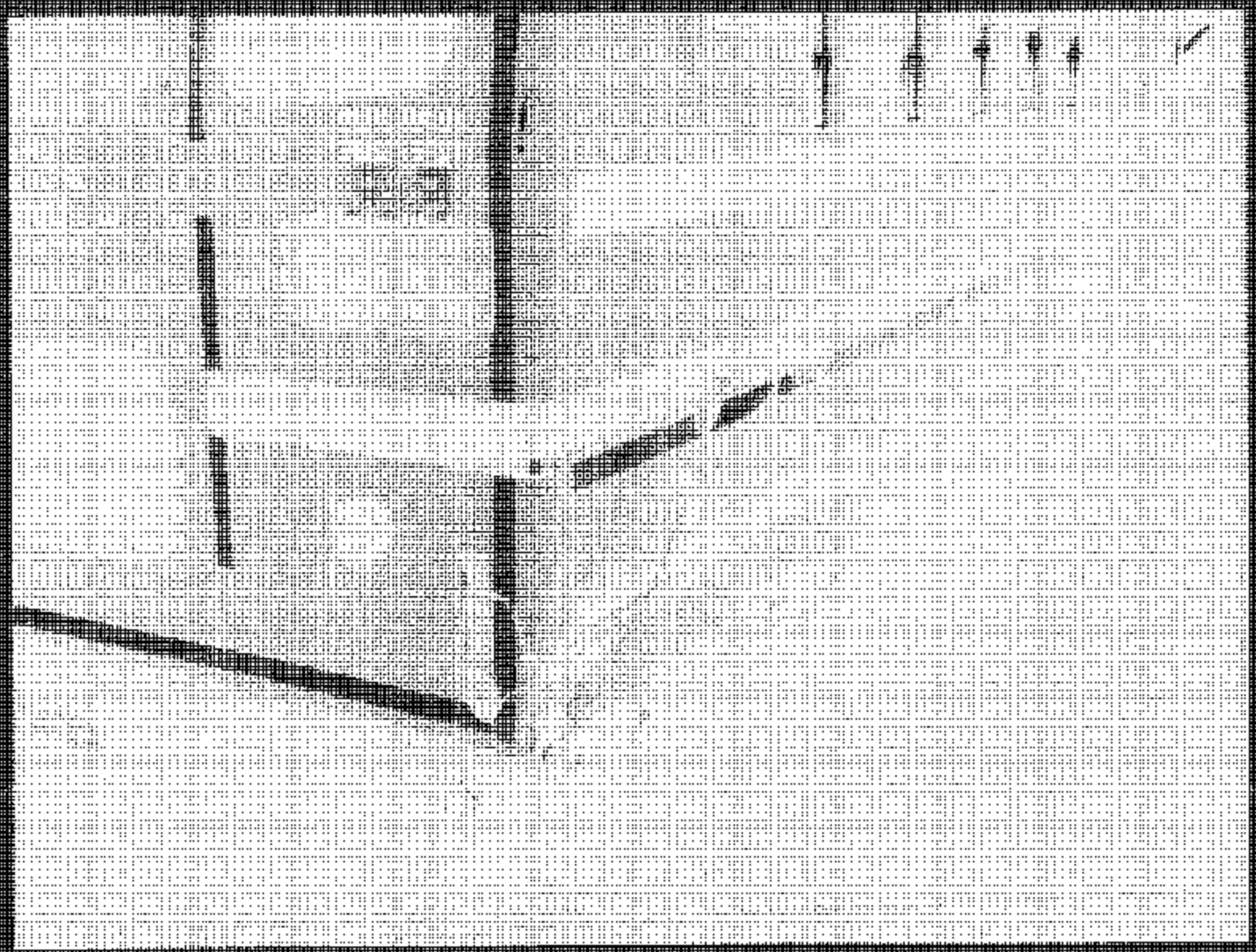
Test Vehicle: 2004 Ford E-350 Passenger School Bus

Procedure: FMVSS 301 NHTSA No.: C40301

Pre-Test Impact Target

Test Vehicle: 2004 Gorbel 31 Passenger School Bus

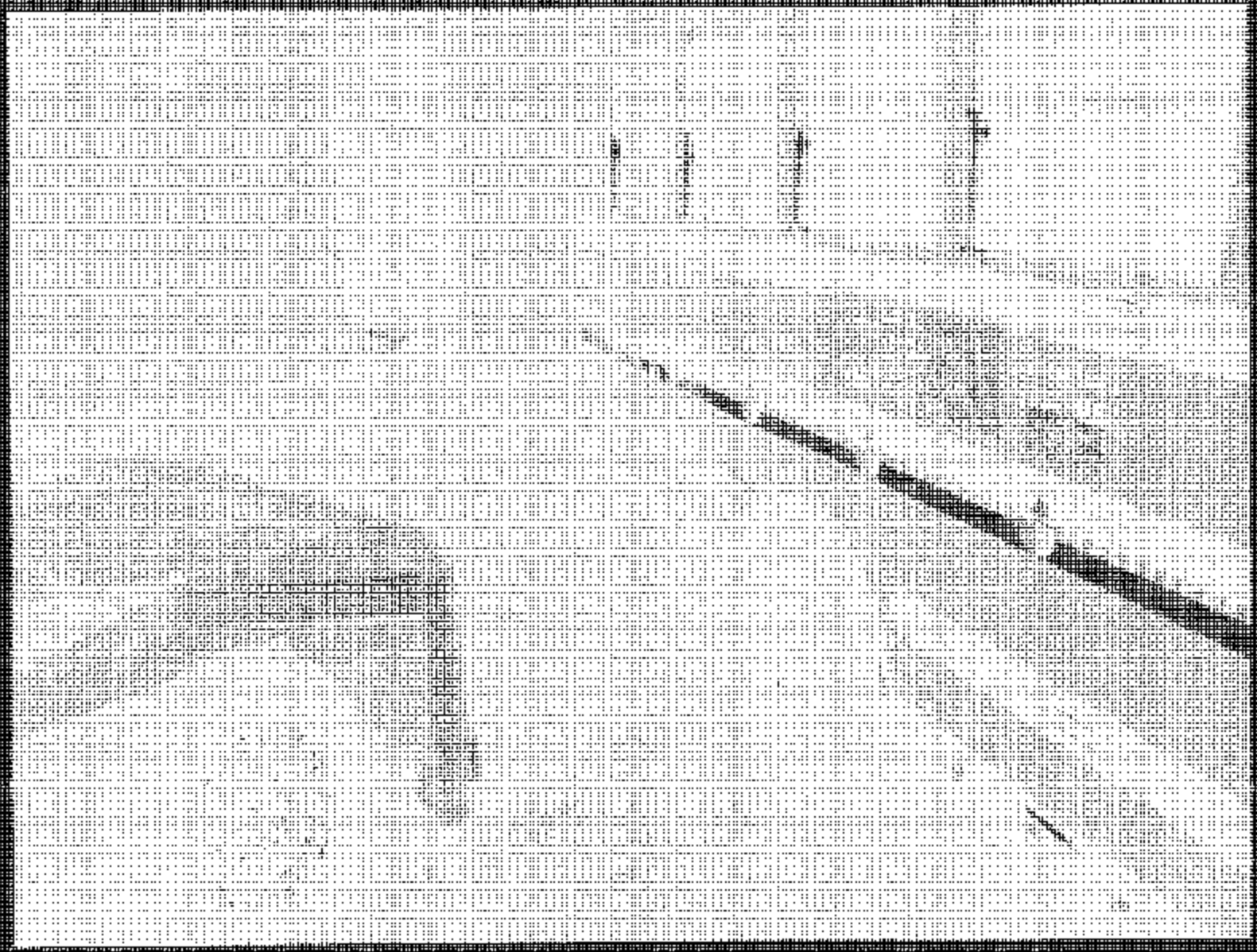
Procedure: FMVSS 301 NHTSA No.: C40831



Post Test of Impact Location

Test Vehicle: 2004 Dodge 3D Pickup Right Front Side

Procedure: ENVSS 30° NHTSA No.: C40832



Page Test of Impact Location #2

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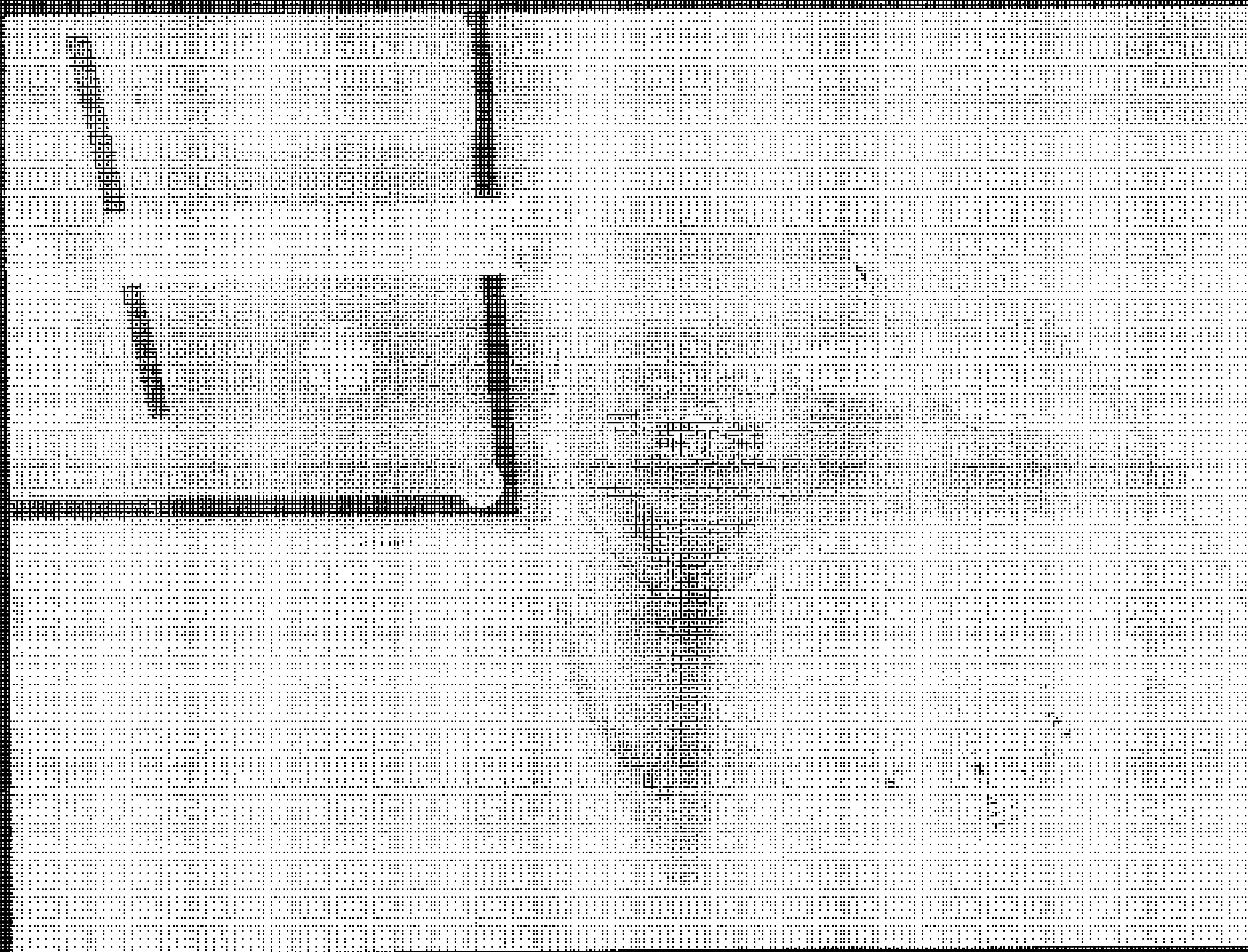
Test Vehicle: 2004 Corbeil 30 Passenger School Bus

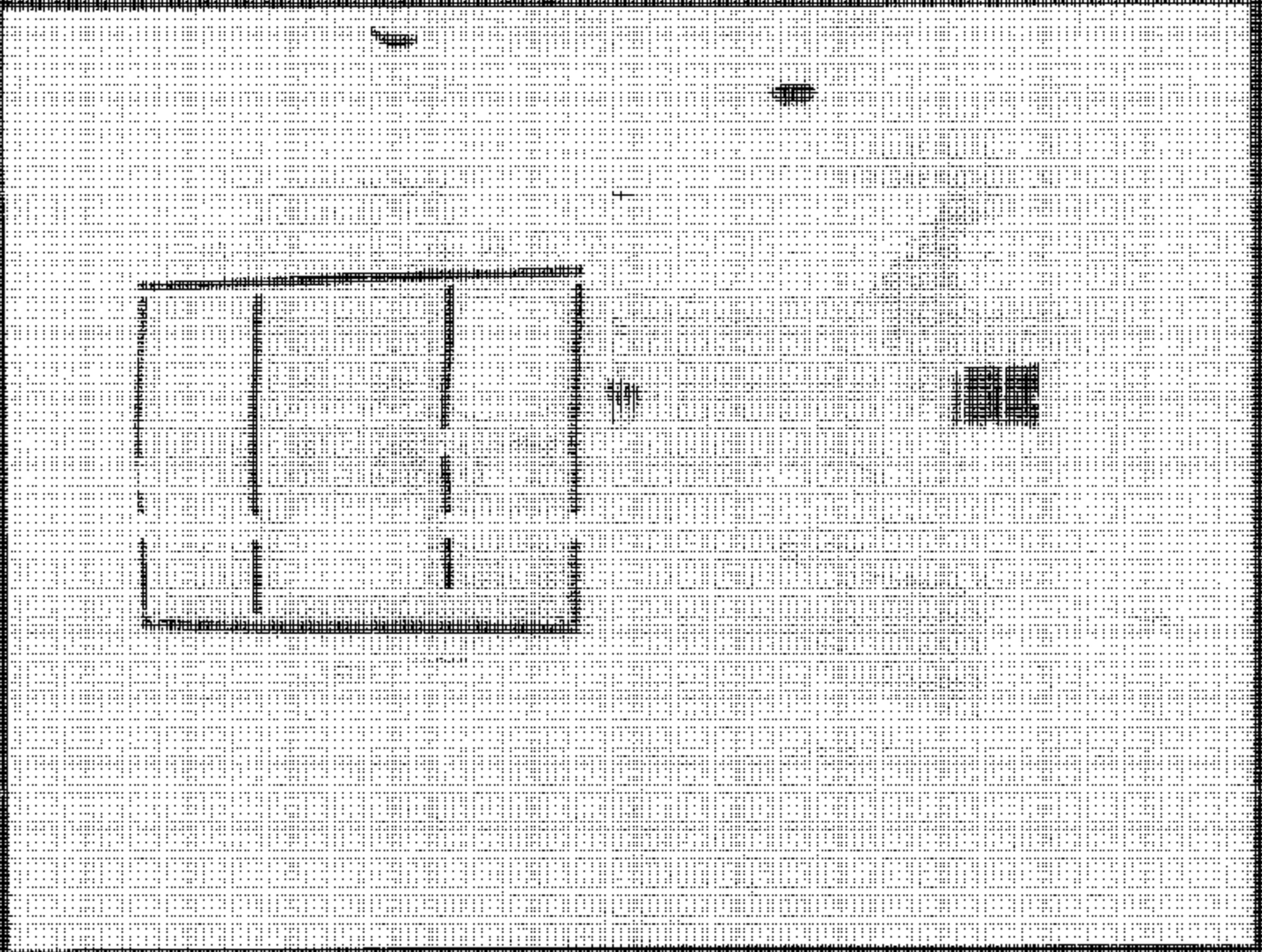
Procedure: FMVSS 301 NHTSA No.: C40202



Pre-Test of Barrier (left side)

Test Vehicle: 2004 Cadillac Passenger School Bus

Test No.: PSVSB-401 NHTSA No.: C40003

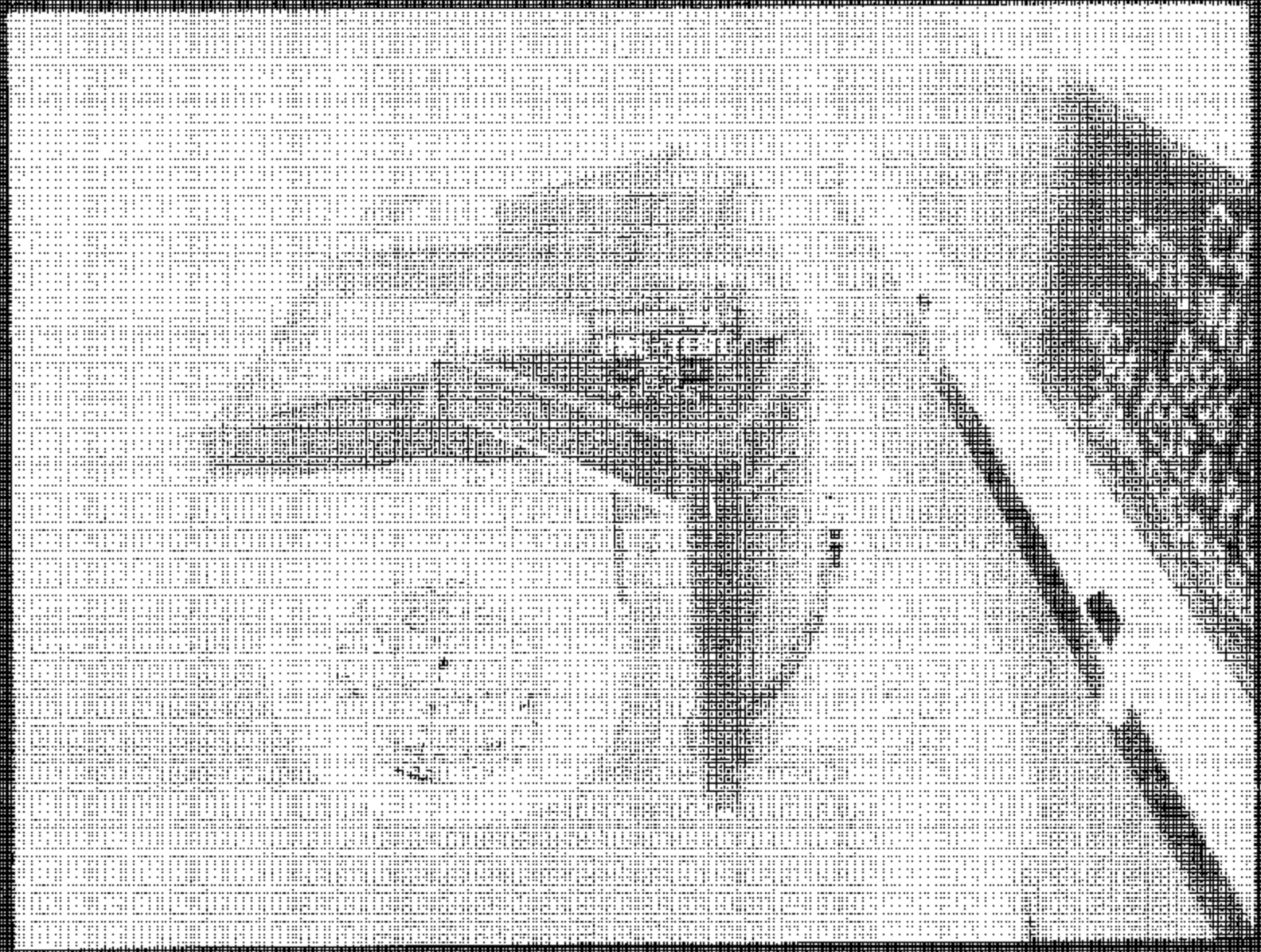


Post-Test of Dummy (left Side)

Test Vehicle: 2004 Cadillac SRX Passenger Survival Cell

Procedure: FMVSS 214

NHTSA No: C10902



Pre-Test of Barrier (right side)

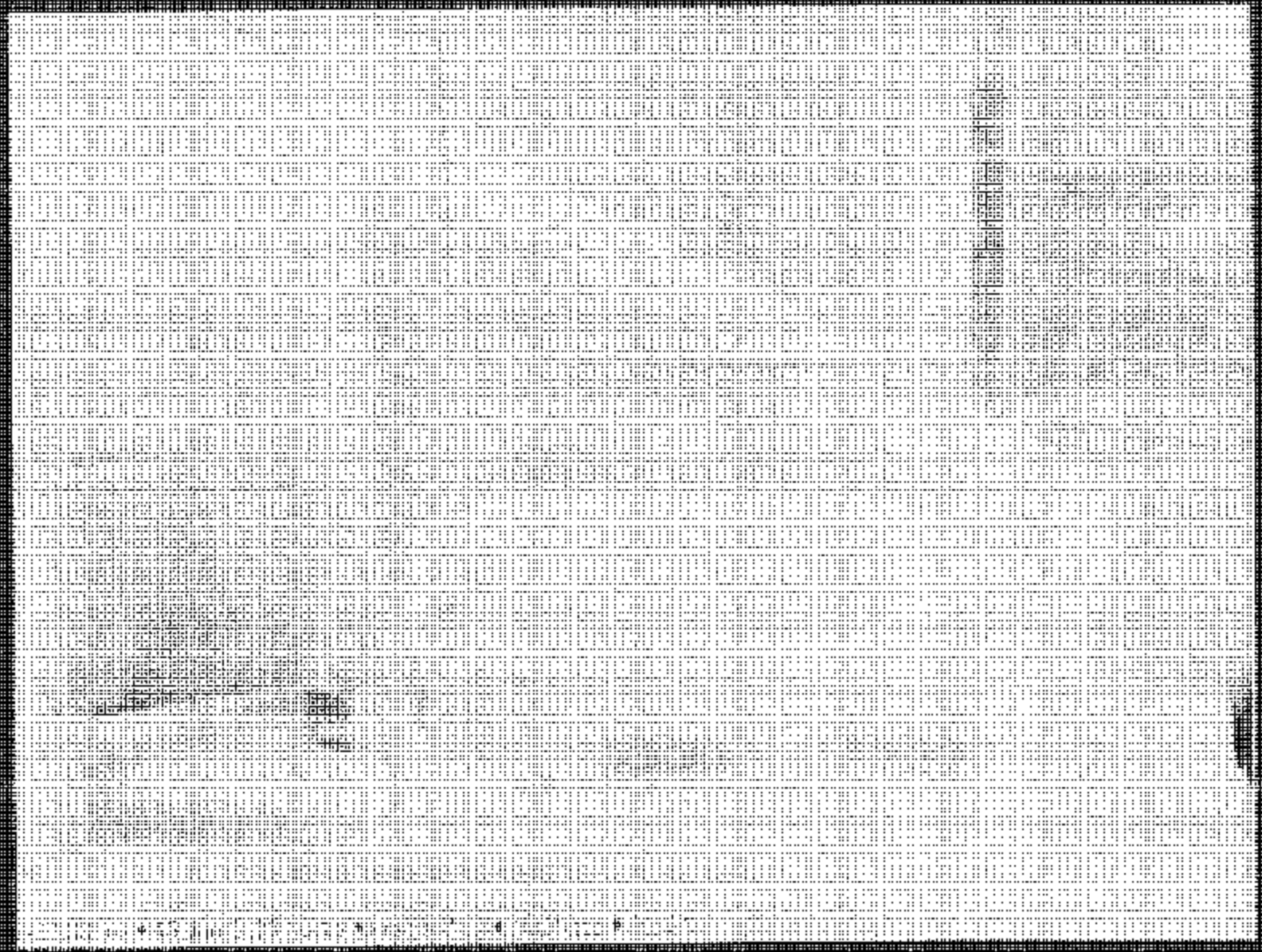
Test Vehicle: 2004 Corbeil 30 Passenger School Bus

Procedure: FMVSS 301 NHTSA No.: C40802

Post-Test of Burner (right side)

Test Vehicle: 2006 Chevrolet 30 Passenger School Bus

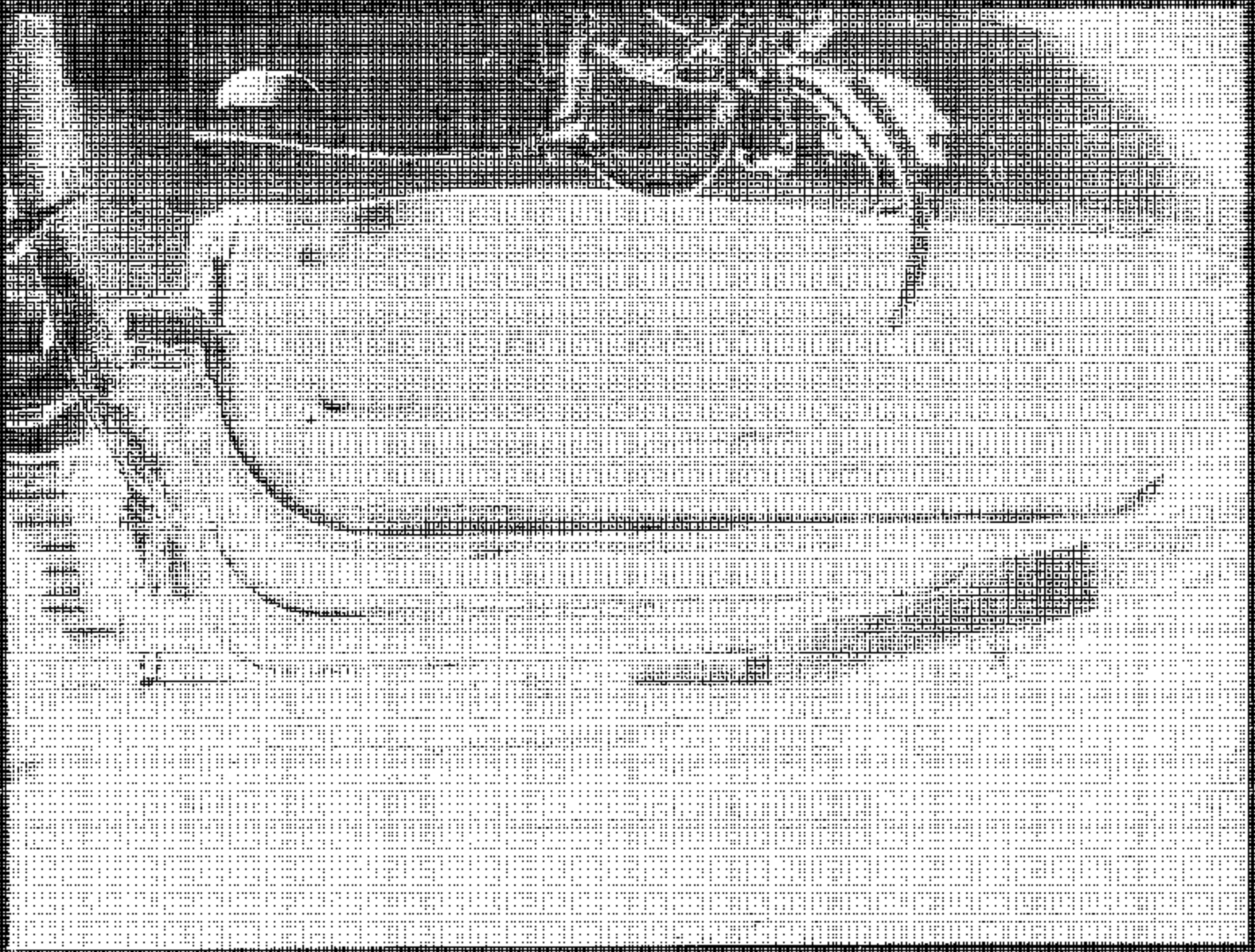
Test No.: [illegible] NHTSA No.: C40602



Pre-Test of Fuel Tank Edge

Test Series: 2004 Gillig 30 Passenger Schabl Bus

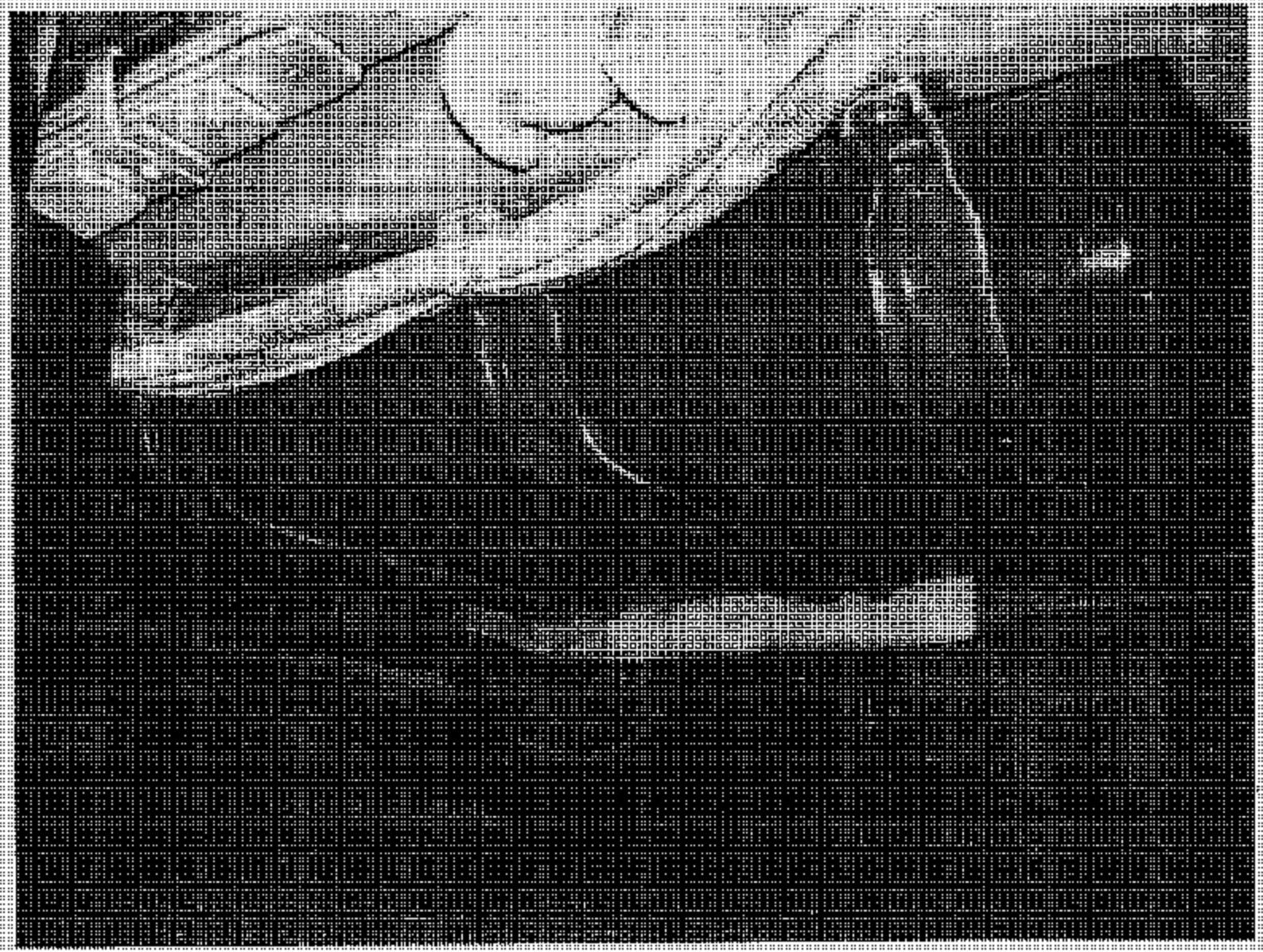
Procedure: FMVSS 301 Photo No.: C40033



Post-Test of Fuel Tank Cage

Test Vehicle: 2004 Gorbel 30 Passenger School Bus

Procedure: FMVSS 301 NHTSA No.: C40602



Post-Test of Fuel Tank Cage (View #2)

Test Vehicle: 2004 Gerbert 30 Passenger School Bus

Procedure: FMVSS 301

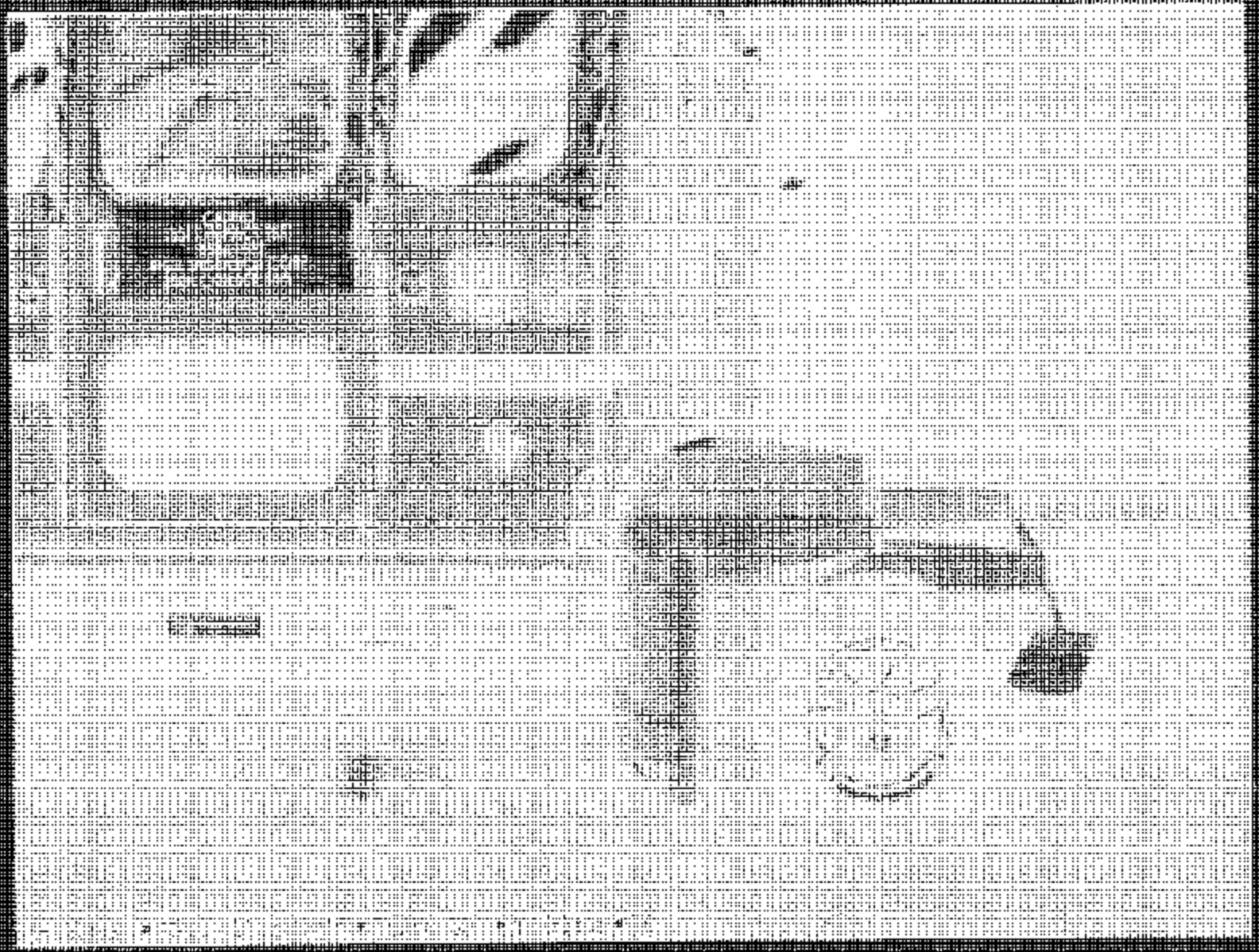
NHTSA No: C40502

Speed Trap Counter Display

Test Vehicle: 2004 Gerbil 36 Passenger School Bus

Procedure: FMVSS 301

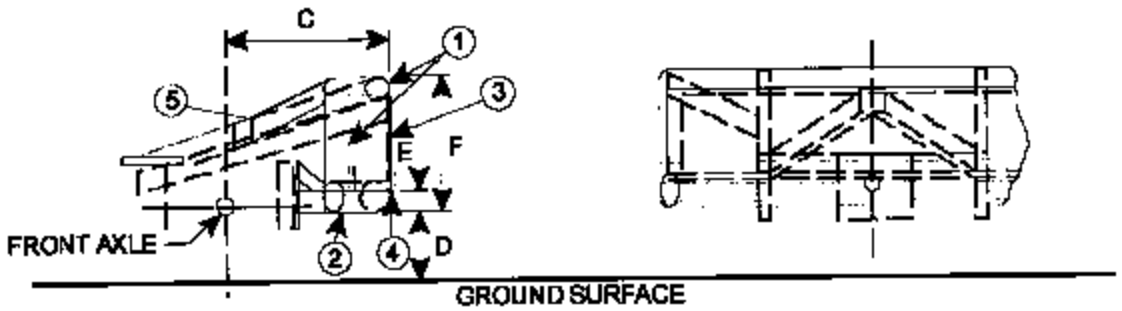
NHTSA No.: G03H3



Impact

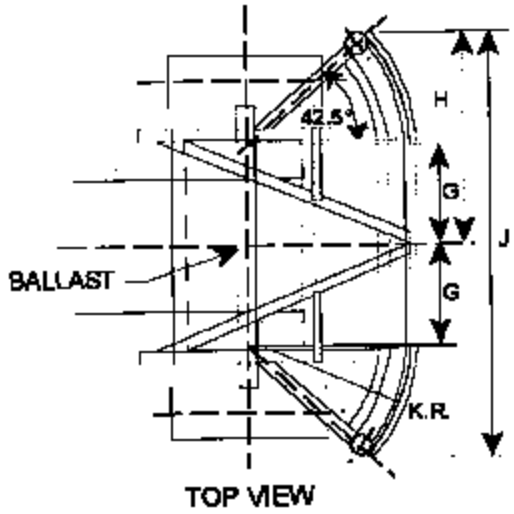
SECTION 5
BARRIER INFORMATION

CONTOURED IMPACT SURFACE FOR COMMON CARRIAGE



SIDE VIEW

FRONT VIEW



TOP VIEW

DIMENSIONS SHOWN IN TABLE ON NEXT PAGE

NOTES:
1. Upper Frame 4.0 in. dia x 0.25 in. wall (102 mm dia x 6 mm wall) Steel Tubing (3 Sides)
2. Lower Frame 6.0 in. dia x 0.50 in. wall (152 mm dia x 13 mm wall) Steel Tubing
3. Face Plate 0.75 in. (19 mm) thick cold rolled steel
4. Leading Edge 1.0 x 4.0 in. (25 x 102 mm) steel band, sharp edges broken
5. All Inner Reinforcements 4.0 x 2.0 x 0.19 in. (102 x 51 x 5 mm) steel tubing

Total Weight = 4,000 ± 50 lbs (1,814.1 ± 22.7 kg)
Weight at each Rear Wheel =
900 ± 25 lbs (408.2 ± 11.3 kg)
Weight at each Front Wheel =
1,100 ± 25 lbs (499.0 ± 11.3 kg)
Moments of Inertia:
I_X = 271 ± 13.6 slug-ft^2 (367 ± 18.4 kg-m^2)
I_Z = 3,475 ± 174 slug-ft^2 (4,711 ± 236 kg-m^2)

DIMENSIONS FOR CONTOURED IMPACT SURFACE

LETTER	INCHES	MILLIMETERS
A	54.0	1372
B	15.8	401
C	30.0	762
D	5.25	133
E	3.75	95
F	24.75	629
G	18.0	457
H	39.0	991
J	78.0	1981
K	30.0	762