REPORT NUMBER: 301S-MGA-2007-002

SAFETY COMPLIANCE TESTING FOR FMVSS NO. 301S FUEL SYSTEM INTEGRITY SCHOOL BUSES OVER 10,000 POUNDS GVWR

THOMAS BUILT BUSES INC.
2007 THOMAS SAF-T-LINER C2
NHTSA No. C70900

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

Final Report Date: May 2, 2007

FINAL REPORT

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

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Prepared by: _____ Date: May 2, 2007
Eric Peschman, Project Engineer

Reviewed by: _____ Date: May 2, 2007
Michael Janovicz, Program Manager

FINAL REPORT ACCEPTED BY:

_____
May 2, 2007
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 2007 Thomas SAF-T-LINER C2 School Bus NHTSA No.:C70900		*5. Report Date* May 2, 2007 *6. Performing Organization Code* MGA	
7. Author(s) Eric Peschman, Project Engineer Michael Janovicz, Program Manager		*8. Performing Organization Report No.* 301S-MGA-2007-002	
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 Mail Code: (NVS-220) 400 Seventh St., S.W. Room 6111 Washington, D.C. 20590		*13. Type of Report and Period Covered* Final Report 03/28/2007- 05/02/2007 *14. Sponsoring Agency Code* NVS-220	
15. Supplementary Notes			
16. Abstract A compliance test was conducted on the subject 2007 Thomas SAF-T-LINER School Bus, NHTSA No. C70900 in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-301SB-02 for the determination of FMVSS 301SB compliance. Test failures were as follows: See Data Sheet 2.			
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PURPOSE OF COMPLIANCE TEST AND SUMMARY

A fuel system integrity test was performed on a MY2007 Thomas SAF-T-LINER School Bus, NHTSA No. C70900, 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 Over 10,000 Pounds GVWR".

Based on the test results, the MY2007 Thomas SAF-T-LINER School Bus, NHTSA No. C70900, does not appear to meet the requirements of FMVSS 301S testing. The fuel spillage limits according to CFR 571.301 section S5.5 Fuel Spillage; Barrier Crash were exceeded. Fuel Spillage in the 5 minute period following the cessation of motion was 679.3 g. The specified limit is 142 g. Paragraph S.5.5: "Fuel spillage in any fixed or moving barrier crash test shall not exceed 28 g from impact until motion of the vehicle has ceased, and shall not exceed a total of 142 g in the 5-minute period following cessation of motion. For the subsequent 25-minute period, fuel spillage during any 1 minute interval shall not exceed 28 g."

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

The Pre-test and Post-test signs used for the crash test incorrectly identified the test subject as a "2006 Thomas SAF-T-LINER" rather than a "2007 Thomas SAF-T-LINER". This affected the photos, high-speed and real time video.

SECTION 2
COMPLIANCE TEST DATA

The following data sheets document the results of testing on the MY2007 Thomas SAF-T-LINER School Bus, NHTSA No. C70900.

DATA SHEET 1

SCHOOL BUS DATA

Test Vehicle: **2007 THOMAS SAF-T-LINER** NHTSA No.: **C70900**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **03/28/2007**

GENERAL VEHICLE IDENTIFICATION

School Bus Manufacturer:	Thomas Built Buses Inc.	
School Bus Model:	SAF-T-LINER	
Build Date:	07/06	
Incomplete Vehicle Manufactured By:	Freightliner	
Build Date for Bus Chassis:	07/06	
School Bus GVWR (kg):	11,569 kg / 25,500 lbs	
School Bus GAWR Front (kg):	3,630 kg / 8,000 lbs	
School Bus GAWR Rear (kg):	7,940 kg / 17,500 lbs	
School Bus VIN:	4UZABPDG27CY03914	
No. of Designated Seating Positions (DSP) including Driver:	48 + 1 Driver + 1 Wheel Chair	
School Bus NHTSA No.:	C70900	
Bus Body Color:	Yellow	
Engine Displacement	6.0L	
No. of Cylinders:	8	
Fuel Pump Actuation:	Electrical Pump “ON” with ignition	
School Bus Width (mm):	2396	
School Bus Length (mm):	10654	
Bus Unloaded Vehicle Weight (UVW) (kg):	7450.4	
Bus Occupant Load:	2612.7 kg - Passenger 54 kg - Driver 2666.7 kg - Total	
Target Bus Test Weight (SBTW) (kg):	10117.5	
Actual (SBTW) (kg):	10115.2	
School Bus Tire Manufacturer:	Goodyear	
	Front	Rear
Rec. Cold Tire Inflation Pressure (kpa):	690	689
Tire Size:	10R22.5	10R22.5
Load Range:	F	F

DATA SHEET 1 (CONTINUED)

SCHOOL BUS DATA

Test Vehicle: **2007 THOMAS SAF-T-LINER** NHTSA No.: **C70900**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **03/28/2007**

GENERAL VEHICLE IDENTIFICATION

Weight of Fuel:	0.744 kg/liter (6.2 lbs./gallon)
Fuel Tank Capacity (liters/kg):	227.1 liters/168.9 kg (60 gallons/ 372 lbs.)
Tank Test Volume (liters/kg):	209.3 liters/155.7 kg

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)*		
		Front	Rear	Total	Front	Rear	Total
Left	kg	1256.5	2361.9		1560.4	3426.9	
Right	kg	1358.5	2473.5		1592.1	3535.8	
Ratio	%	35.1	64.9		31.2	68.8	
Totals	kg	2615.0	4835.4	7450.4	3152.5	6962.7	10115.2

COMMENTS: NONE

Recorded By: _____

Approved By: _____ DATE: 03/28/2007

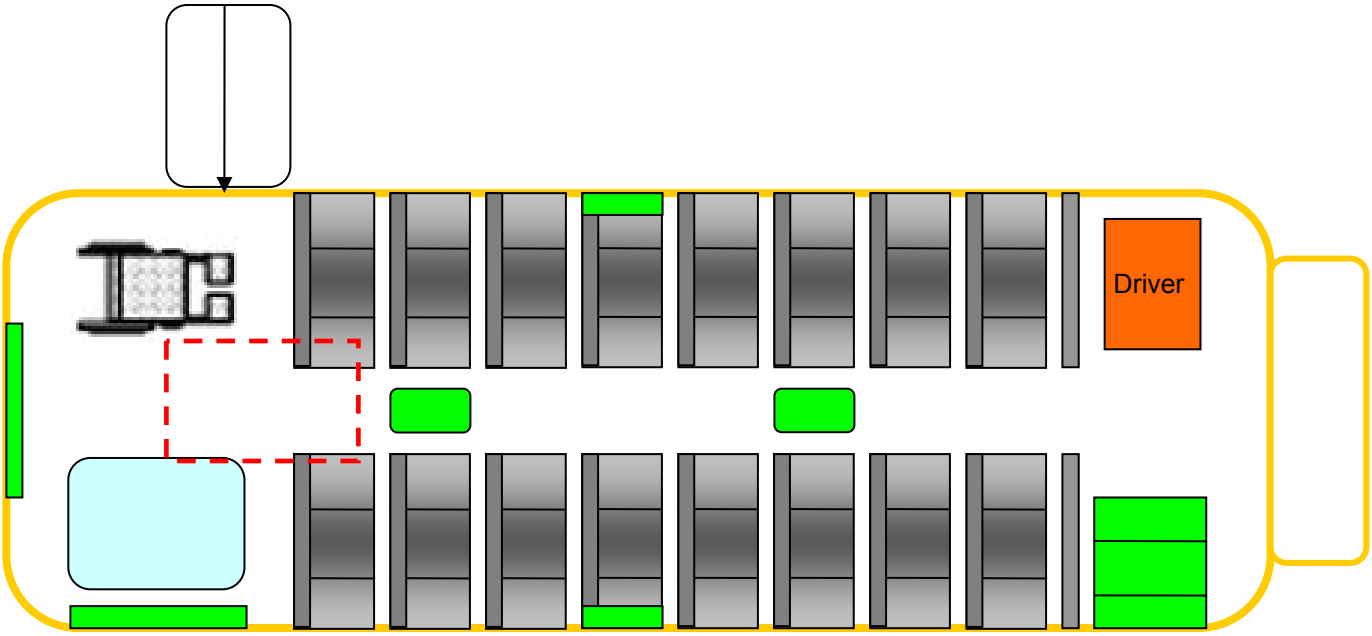
DATA SHEET 2

SCHOOL BUS IMPACT DATA

Test Vehicle: **2007 THOMAS SAF-T-LINER** NHTSA No.: **C70900**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **03/28/2007**

Time of Impact:	9:40 AM
Ambient Temperature (°C)	21
Barrier Velocity – Speed Trap 1 (kph):	29.4
Barrier Velocity – Speed Trap 2 (kph):	29.4

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).

Point of Impact: 1617 mm forward of the rear bumper.

DATA SHEET 2 (CONTINUED)

SCHOOL BUS IMPACT DATA

Fuel Spillage Noted:	Yes
Failure, if applicable:	0-5 minutes after crash (leakage)

Stoddard Solvent Spillage Measurements

Timeframe	Description	Allowable Spillage	Measured Spilled (ounces)	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)	21.8	**FAIL**
$T_2 - T_3$	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	NA	**NA**

COMMENTS: None

Recorded By:_____

Approved By:_____ DATE: 03/28/2007

SECTION 3

INSTRUMENTATION AND EQUIPMENT LIST

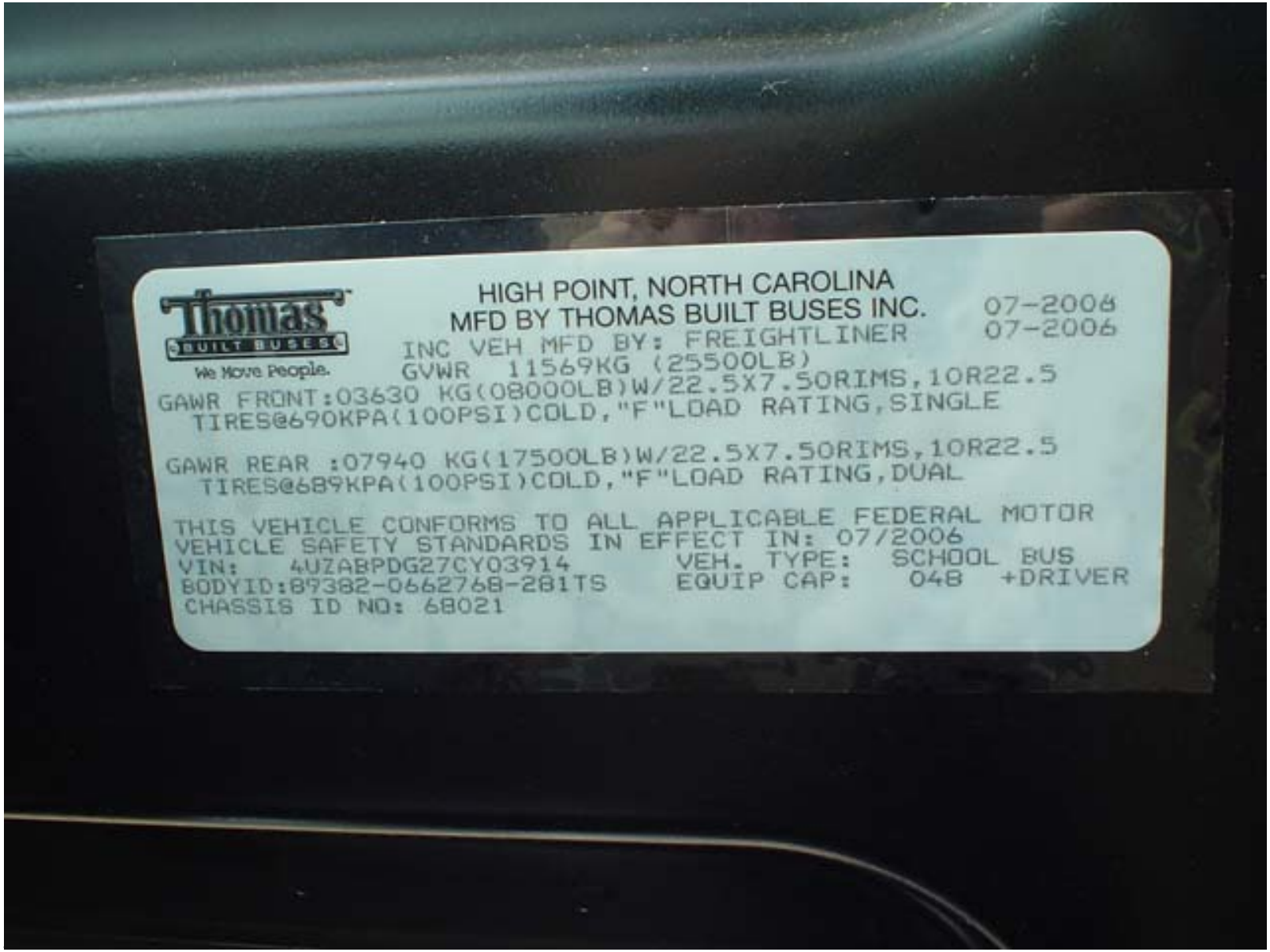
Test Vehicle: **2007 THOMAS SAF-T-LINER** NHTSA No.: **C70900**
Test Lab: **MGA RESEARCH CORPORATION** Test Date: **03/28/2007**

Equipment	**Description**	**Serial No.**	**Cal. Date**	**Next Cal. Date**
Counter/Timer	Newport	4420534	12/12/06	12/12/07
Counter/Timer	Newport	4420532	12/12/06	12/12/07
Vehicle Scales	GSE	004804	09/11/06	09/11/07
Scale	Redlake	138979	12/19/06	06/19/07
Tape Measure	Stanley Powerlock 8M	278	3/26/07	9/26/07

SECTION 4
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

The Pre-test and Post-test signs used for the crash test incorrectly identified the test subject as a “2006 Thomas SAF-T-LINER” rather than a “2007 Thomas SAF-T-LINER”. This affected the photos, high-speed and real time video.



Vehicle Certification Label

Pre-Test Left Rear Three-Quarter View of the Bus and Cart (front view)

Post-Test Left Rear Three-Quarter View of the Bus and Cart (front view)

Pre-Test Left Rear Three-Quarter View of the Bus (front view)

Post-Test Left Rear Three-Quarter View of the Bus (front view)

Test Vehicle:	**2007 THOMAS SAF-T-LINER SCHOOL BUS**	NHTSA No.:	**C70900**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**03/28/2007**

Pre-Test Left Rear Side of the Bus

Post-Test Left Rear Side of the Bus

Pre-Test Left Rear Three-Quarter View of the Bus and Cart (rear view)

Test Vehicle:	**2007 THOMAS SAF-T-LINER SCHOOL BUS**	NHTSA No.:	**C70900**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**03/28/2007**

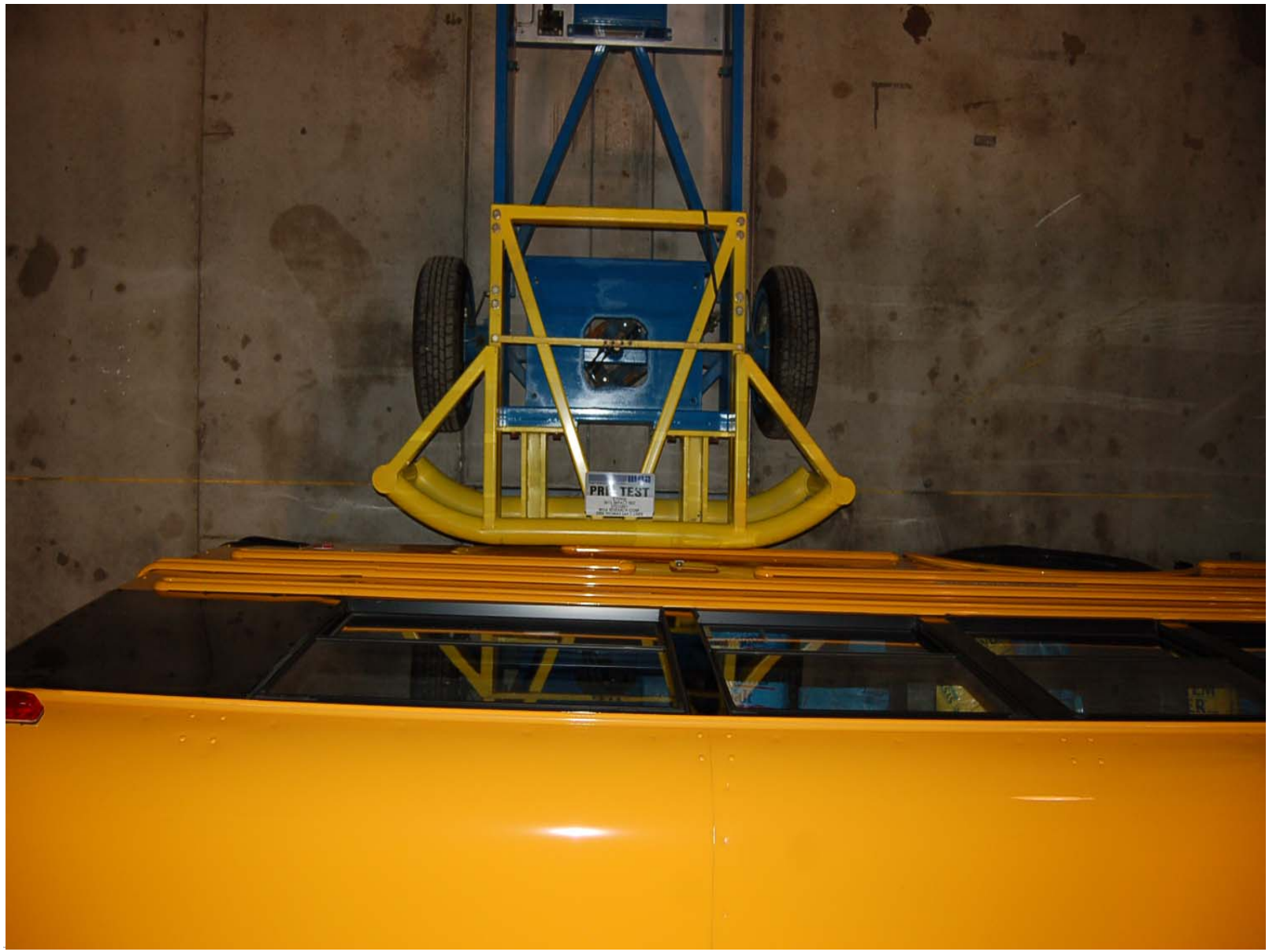
Post-Test Left Rear Three-Quarter View of the Bus and Cart (rear view)

Pre-Test Left Rear Three-Quarter View of the Bus (rear view)

Post-Test Left Rear Three-Quarter View of the Bus (rear view)

Pre-Test Rear View of the Bus and Cart (close up view)

Post-Test Rear View of the Bus and Cart (close up view)



Pre-Test Overhead View of the Bus and Cart

Post-Test Overhead View of the Bus and Cart

Pre-Test Overhead View of the Bus

Post-Test Overhead View of the Bus

Pre-Test of Fuel Filler Cap

Post-Test of Fuel Filler Cap

Pre-Test Ballast Weight View 1

Pre-Test Ballast Weight View 2

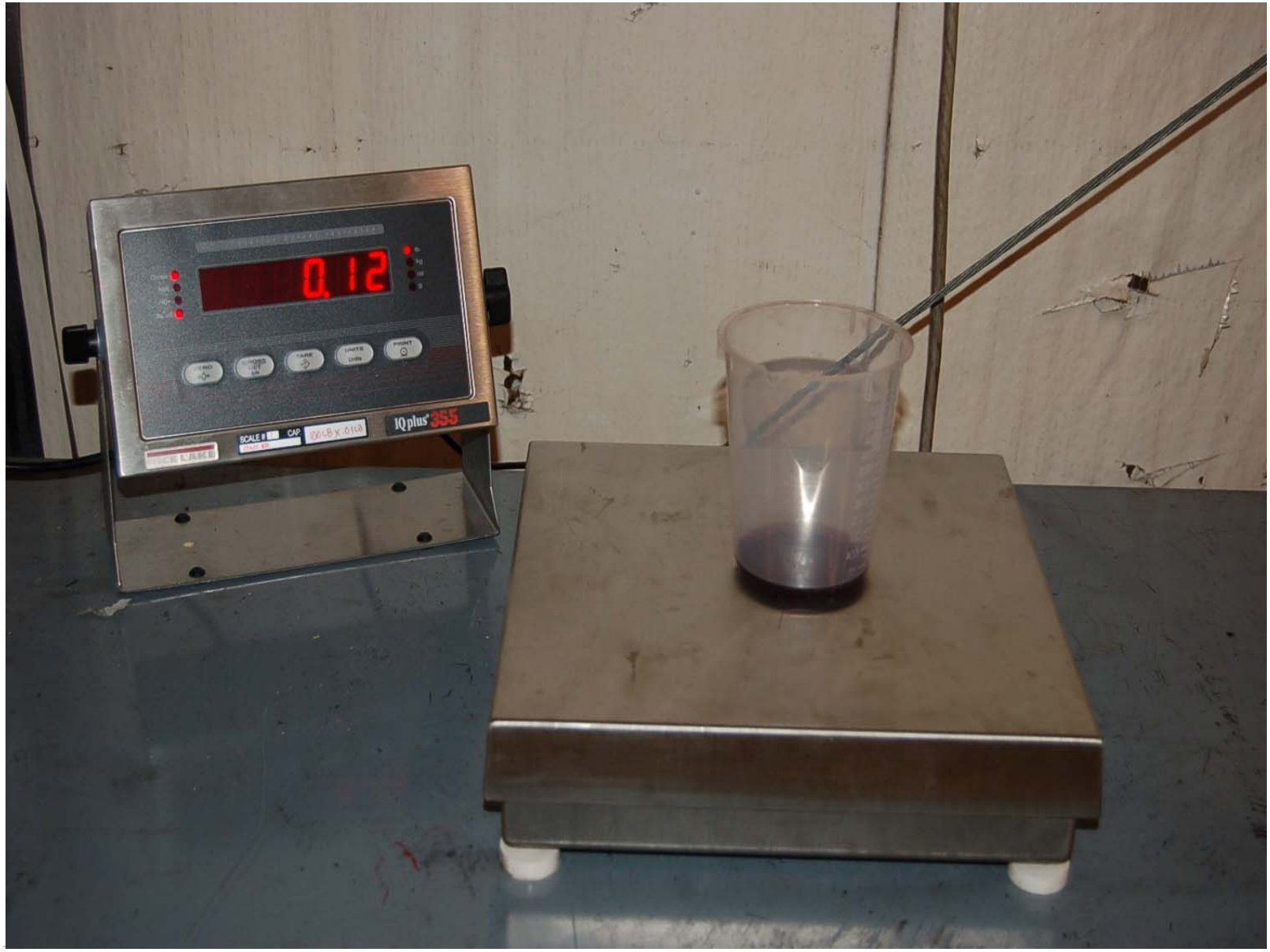
Pre-Test of Fuel Tank

Post-Test of Fuel Tank

Test Vehicle:	**2007 THOMAS SAF-T-LINER SCHOOL BUS**	NHTSA No.:	**C70900**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**03/28/2007**

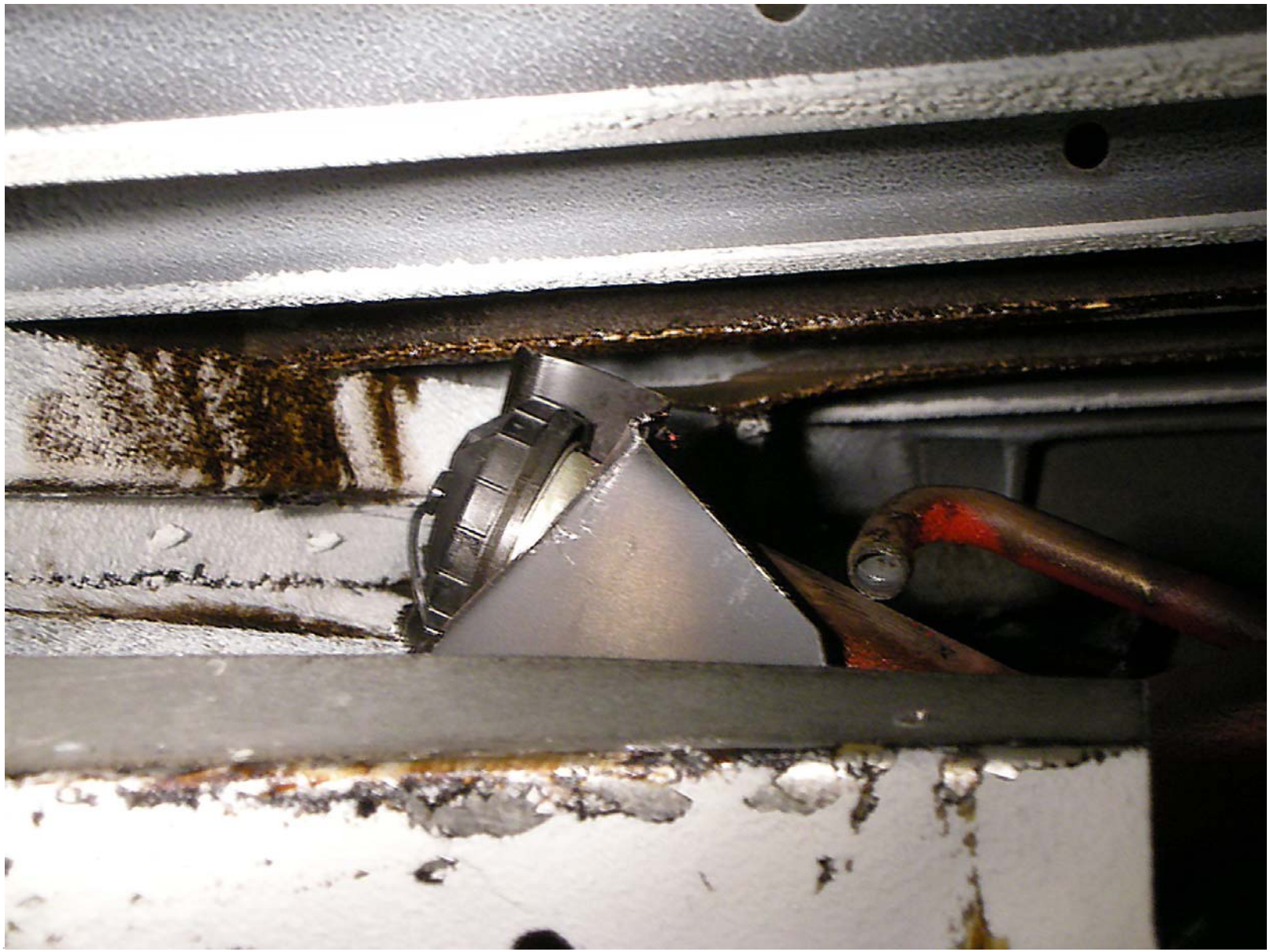
Post-Test Fuel Leak View 1

Test Vehicle:	**2007 THOMAS SAF-T-LINER SCHOOL BUS**	NHTSA No.:	**C70900**
Test Lab:	**MGA RESEARCH CORPORATION**	Test Date:	**03/28/2007**

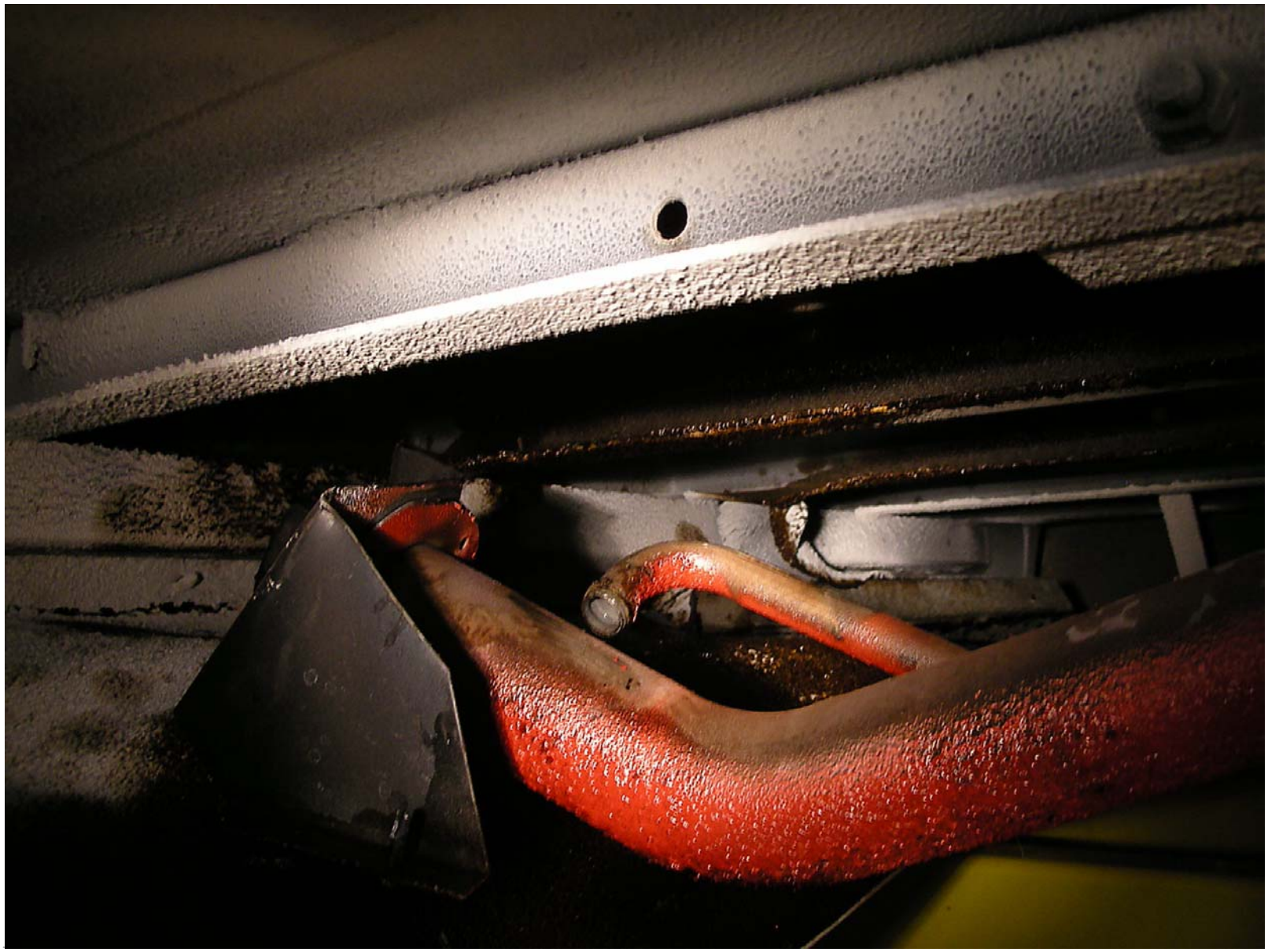


Post-Test Fuel Leak View 2

Post-Test Fuel Filler Cap Close Up



Pre-Test Fuel Leak View 1

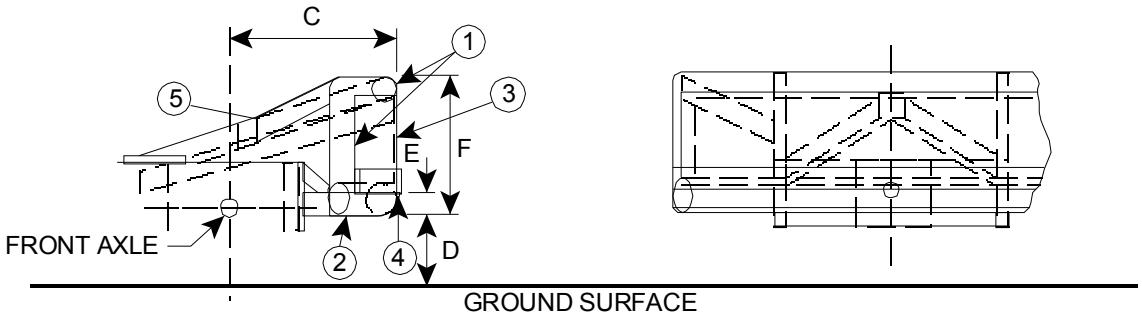


Pre-Test Fuel Leak View 2

SECTION 5

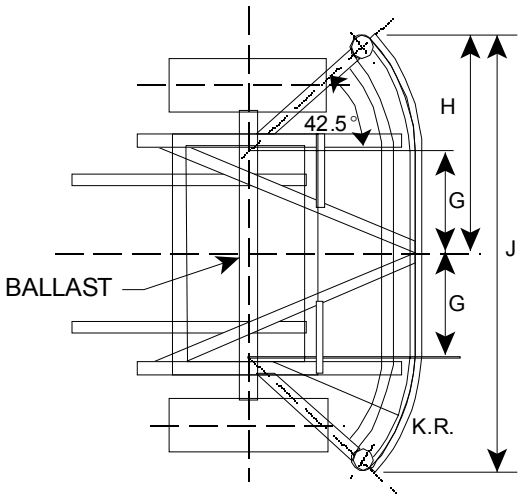
BARRIER INFORMATION

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 s 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

SECTION 6

LABORATORY NOTICE OF TEST FAILURE

LABORATORY NOTICE OF TEST FAILURE TO OVSC

Test Procedure:	FMVSS 301	Test Date:	March 28, 2007
Test Vehicle:	2007 Thomas SAF-T-Liner	Test Lab:	MGA Research Corp.
NHTSA No.:	C70900	Project Engineer:	Eric Peschman
Contract No.:	DTNH22-02-D-01057	Delivery Order No.:	005
MFR.:	Thomas Built Buses	VIN:	4UZABPDG27CY03914
Build Date:	7/2006		

TEST FAILURE DESCRIPTION

The fuel spillage limits according to CFR 571.301 section S5.5 Fuel Spillage; Barrier Crash were exceeded. Fuel Spillage in the 5 minute period following the cessation of motion was 679.3 g. The specified limit is 142 g.

FMVSS REQUIREMENTS DESCRIPTION

Paragraph S.5.5: "Fuel spillage in any fixed or moving barrier crash test shall not exceed 28 g from impact until motion of the vehicle has ceased, and shall not exceed a total of 142 g in the 5-minute period following cessation of motion. For the subsequent 25-minute period, fuel spillage during any 1 minute interval shall not exceed 28 g."

Remarks: No remarks.

Notification to NHTSA (COTR): Lawrence Q. Valvo

Date: March 28, 2007

By: