REPORT NUMBER: 301-CAL-06-01

SAFETY COMPLIANCE TESTING FOR FMVSS 301
FUEL SYSTEM INTEGRITY

THE BRAUN CORPORATION / DIAMLERCHRYSLER CORPORATION
2003 BRAUN ENTERVAN II
MPV

NHTSA NUMBER: C31300

TEST NUMBER: 8655-F301-24

March 15, 2006

CALSPAN CORPORATION
P.O. BOX 400
BUFFALO, NEW YORK 14225

FINAL REPORT

PREPARED FOR:

U. S. Department of Transportation
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
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Room No. 6111 (NVS-220)
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16. Abstract

Compliance tests were conducted on the subject 2003 Braun Entervan II MPV in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-301-04 for the determination of FMVSS 301 compliance. Test failures identified were as follows:

The test vehicle appeared to comply with all requirements of FMVSS 301 "Fuel System Integrity."

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SECTION 1

PURPOSE OF COMPLIANCE TEST

This 30 mph rear moving barrier impact test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 301 Compliance Test Program conducted for the National Highway Traffic Safety Administration (NHTSA) by the Calspan Corporation Transportation Sciences Center under Contract No. DTNH22-01-C-01025. The purpose of this test was to determine if the subject vehicle, a 2003 Braun Entervan II MPV, meets the performance requirements of FMVSS No. 301, "Fuel System Integrity." This compliance test was conducted using the requirements found in the OVSC Laboratory Test Procedure No. TP-301-04, dated January 22, 2004.

SECTION 2

COMPLIANCE TEST RESULTS SUMMARY

A 2228.0 kg 2003 Braun Entervan II MPV was impacted from the rear by an 1797 kg moving barrier at a velocity of 46.67 kph (29.0 mph). The test was performed by the Calspan Corporation Transportation Sciences Center on March 15, 2006.

The test vehicle was equipped with a 75.7 liter fuel tank which was filled to 92 percent capacity with stoddard fluid prior to impact. Additional ballast (49.9 kg) was secured in the vehicle cargo area.

The crash event was recorded by six high-speed video cameras and one real-time video camera. Camera locations and other pertinent camera information are found on pages 3-9 and 3-10 of this report. Pre- and post-test photographs of the vehicle can be found in Appendix A.

There was no fuel system fluid spillage following the impact or during any portion of the static rollover test. The average vehicle longitudinal crush was 196 millimeters. The vehicle appeared to comply with all the requirements of FMVSS No. 301 "Fuel System Integrity."

SECTION 3

COMPLIANCE TEST DATA

DATA SHEET 1

TEST VEHICLE SPECIFICATIONS

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2003 Braun Entervan II MPV

NHTSA No.: C31300 ; Color: Blue

Engine Data: 6 Cylinders; - CID; 3.3 Liters; - cc

Placement: - Longitudinal or In-Line; X Transverse or Lateral

Transmission Data: 4 Speeds; - Manual; X Automatic; X Overdrive

Final Drive: - Rear Wheel Drive; X Front Wheel Drive; - Four Wheel Drive

Major Options: X A/C; X Power Steering; X Power Brakes

X Power Windows; X Power Door Locks; X Tilt Wheel

Date Received: 1/9/2006 ; Odometer Reading 1775 km

Selling Dealer: The Braun Corporation

& Address: 1014 S. Monticello, Winamac, IN 46996

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: The Braun Corporation / DiamlerChrysler Corporation

Date of Manufacture: 10/02

VIN: 2D4GP44393R157058

GVWR: 2541 kg; GAWR-FRONT: 1293 kg; GAWR-REAR: 1293 kg

DATA FROM VEHICLE'S TIRE LABEL:

Location of Placard on Vehicle: Driver Door

Recommended Tire Size: P215/70R15

* Recommended Cold Tire Pressure: FRONT: 248 kPa; REAR: 248 kPa

DATA FROM TIRE SIDEWALL:

Size of Tires on Test Vehicle: P215/70R15 98S Manufacturer: Goodyear Integrity

Tire Pressure with Maximum Capacity Vehicle Load: FRONT: 300 kPa; REAR: 300 kPa

Type of Spare Tire: P215/70R15 98S (mounted inside between rear seat and rear hatch)

VEHICLE CAPACITY DATA:

Type of Front Seats: - Bench; X Bucket; - Split Bench

Number of Occupants: 2 Front; 4 Rear; 6 Total

Vehicle Capacity Weight (VCW) = 586 kg

No. of Occupants x Weight per Occupant** = 453.6 kg

Rated Cargo/Luggage Weight (RCLW) = 132.4 kg

*Tire pressure used for test

**This vehicle was configured with 5 standard seating positions and 1 wheel chair position. An occupant weight of 68.04 kg was used for standard seating positions and an occupant weight of 113.4 kg was used for wheel chair positions.

DATA SHEET 2

PRE-TEST DATA

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with maximum fluids)= UDW:

Right Front	= 537.5 kg		Right Rear	= 447.5	kg
Left Front	= 535.5 kg.		Left Rear	= 434.5	kg
TOTAL FRONT	= 1073.0 kg		TOTAL REAR	= 882.0	kg

TOTAL DELIVERED WEIGHT = 1955.0 kg **

% of Total Front of Vehicle Weight = 54.9% of Total Rear Weight = 45.1%

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight	= 1955.0	kg
Rated Cargo/Luggage Weight (RCLW)	= 132.4	kg
Weight of 2 p.572 Dummies, 74.4 kg	= 148.8	kg
TARGET TEST WEIGHT	= 2236.2	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 124.2 KG OF CARGO WEIGHT:

Right Front	= 600.5 kg		Right Rear	= 504.5	kg
Left Front	= 625.5 kg		Left Rear	= 497.5	kg
TOTAL FRONT	= 1226.0 kg		TOTAL REAR	= 1002.0	kg

TOTAL TEST WEIGHT = 2228.0 kg

% of Total Front of Vehicle Weight = 55.0% of Total Rear Weight = 45.0%

* Weight of Ballast Secured in Vehicle Trunk Area = 49.9 kg

Type of Ballast: Lead shot

Method of Securing Ballast: Rear seat belt anchorages

Vehicle Components Removed for Weight Reduction: None

VEHICLE ATTITUDE (all dimension in millimeters):

AS DELIVERED:	RF	759	LF	763	RR	844	LR 843
AS TESTED:	RF	744	LF	745	RR	826	LR 828

Vehicle's Wheel Base: 3037 mm

Location of Vehicle's C.G.: 1366 millimeters rearward of front wheel center.

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual = 75.7 liters

Usable Capacity Figure Furnished by COTR = 75.7 liters

Test Volume Range (91 to 94% of Usable Capacity) = 68.89 to 71.16 liters

ACTUAL TEST VOLUME= 69.6 liters (with entire fuel system filled)

* Ballast weight includes the RCLW, the weight of drained vehicle fluids and the weight of any removed vehicle components less the weight of onboard instrumentation, cameras, and hardware.

** The UDW weight was calculated with the vehicle configured for one wheel chair occupant in the mid-row. The electronic interface equipment which was installed in this vehicle was not included in the UDW.

DATA SHEET 2 (continued)

PRE-TEST DATA

FUEL SYSTEM DATA (continued):

Test Fluid Type: Stoddard Solution

Test Fluid Specific Gravity: 0.764

Test Fluid Kinematic Viscosity: 0.96 centistokes

Test Fluid Color: Orange ("red" is preferred)

Type of Vehicle Fuel Pump: Electric

Electric Fuel Pump Operation with Ignition Switch ON and Engine OFF -
Fuel pump operated.

Details of Fuel System: The fuel tank is attached to the vehicle underbody between the rear axle and rear bumper. The fuel lines are routed along the right side of the vehicle underbody inboard of the body stiffeners. The fuel filler is located on the left quarter panel forward of the rear wheel.

Comments: None

DATA SHEET 3

MOVING BARRIER DATA

WEIGHT OF MOVING BARRIER:

Right Front	=	504.9 kg	Right Rear	=	393.7 kg.
Left Front	=	499.9 kg	Left Rear	=	398.3 kg
TOTAL FRONT	=	1004.8 kg	TOTAL REAR	=	792.0 kg

TOTAL BARRIER WEIGHT = 1796.8 kg

MOVING BARRIER DIMENSIONS:

Barrier Face Height: 1524 mm

Barrier Face Width: 1981 mm

Barrier Face Ground Clearance: 127 mm

Tread Width: 1511 mm

Wheel Base: 3048 mm

Location of C.G.: X: 1344 mm rearward of front wheel center.

Y: 0 mm from longitudinal-vertical plane of symmetry.

Z: 414 mm above ground.

MOVING BARRIER TIRES:

Manufacturer: Dunlop

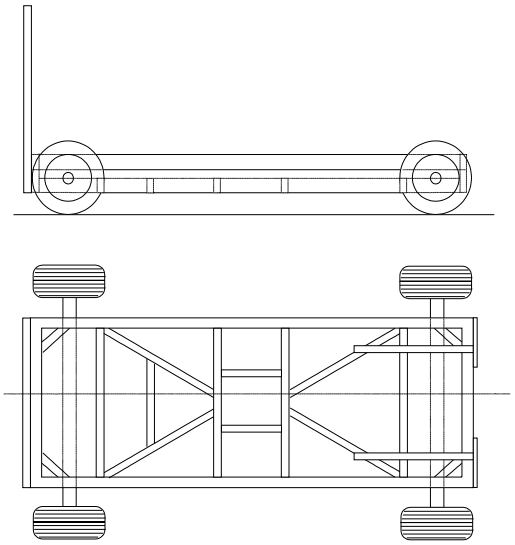
Model: AT Radial Rover

Size: P205/75R15

Recommended Max Pressure: 240 kPa:

MOVING BARRIER ABORT SYSTEM:

Type: Trailing cable



DATA SHEET 4

POST TEST DATA

TYPE OF TEST:

Type of Test: Rear Barrier Impact Angle: 0º

Test Date: March 15, 2006 Time:: 14:57 Temperature: 5 °C

Vehicle NHTSA No.: C31300 VIN: 2D4GP44393R157058

Required Impact Velocity Range: 46.51 to 48.12 kph

BARRIER IMPACT VELOCITY: (Speed traps within 5 feet of impact plane.)

Trap No. 1 = 46.67 kph; Trap No. 2 = 46.67 kph

Average Impact Speed = 46.67 kph

VEHICLE STATIC CRUSH:

Vehicle Length:

Pre-Test	Left =	4930	; C/L =	5092	Right =	4930
Post-Test	Left =	4743	; C/L =	4885	Right =	4735
Crush	Left =	187	; C/L =	207	Right =	195

AVERAGE = 196 millimeters

DATA SHEET 4 (continued)

POST TEST DATA

TEST VEHICLE NHTSA NO.: C31300 TEST DATE: March 15, 2006

Vehicle Mfgr./Make/Model: 2003 Braun Entervan II MPV

Test vehicle fuel tank filled to 91% to 94% of manufacturer's "usable" capacity and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

****

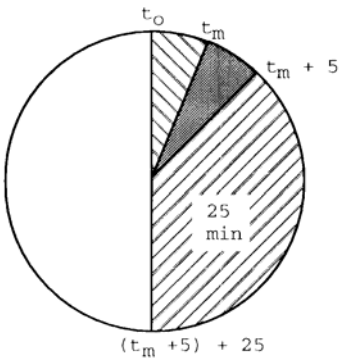
TEST VEHICLE IMPACT TYPE:

- Frontal (42.28 kph target velocity)
- Oblique (42.28 kph target velocity) with - ° barrier face first contacting - (driver/passenger) side

X Rear Moving Barrier (42.28 kph target velocity)

- Lateral Moving Barrier (32.19 kph target velocity)

FUEL SPILLAGE MEASUREMENT:



		ACTUAL	MAX ALLOWED
1.	From impact until vehicle motion ceases	0	28 g
2.	For five minute period after vehicle motion ceases	0	28 g.
3.	For next 25 minutes	0	28 g/min.

SOLVENT SPILLAGE DETAILS:

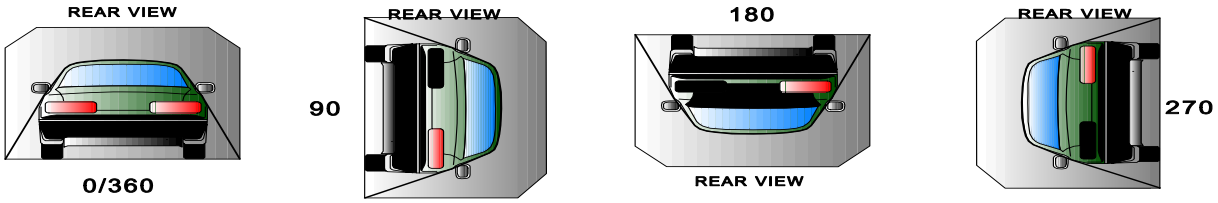
None

DATA SHEET 5

STATIC ROLLOVER TEST DATA

Table 7 FMVSS NO. 301 - STATIC ROLLOVER DATA SHEET

Vehicle: 2003 Braun Entervan II MPV NHTSA No.: C31300



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Stage	Rotation Time (spec. 1 -3 min)				FMVSS 301 Hold Time		Total Time				Next Whole Minute Interval	
0º - 90º	1	minutes	8	seconds	5	minutes	6	minutes	8	seconds	7	minutes
90º - 180º	1	minutes	7	seconds	5	minutes	6	minutes	7	seconds	7	minutes
180º-270º	1	minutes	3	seconds	5	minutes	6	minutes	3	seconds	7	minutes
270º-360º	1	minutes	5	seconds	5	minutes	6	minutes	5	seconds	7	minutes

II. FMVSS 301 REQUIREMENTS: (Maximum allowable solvent spillage):

First 5 minutes from onset of rotation	6th min.	7th min.	8th min. (if required)
142 g	28 g	28 g	28 g

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

Rollover Stage	First 5 minutes from onset of rotation (g)	6th min. (g)	7th min. (g)	8th min. (if required) (g)
0º - 90º	0	0	0	-
90º - 180º	0	0	0	-
180º-270º	0	0	0	-
270º-360º	0	0	0	-

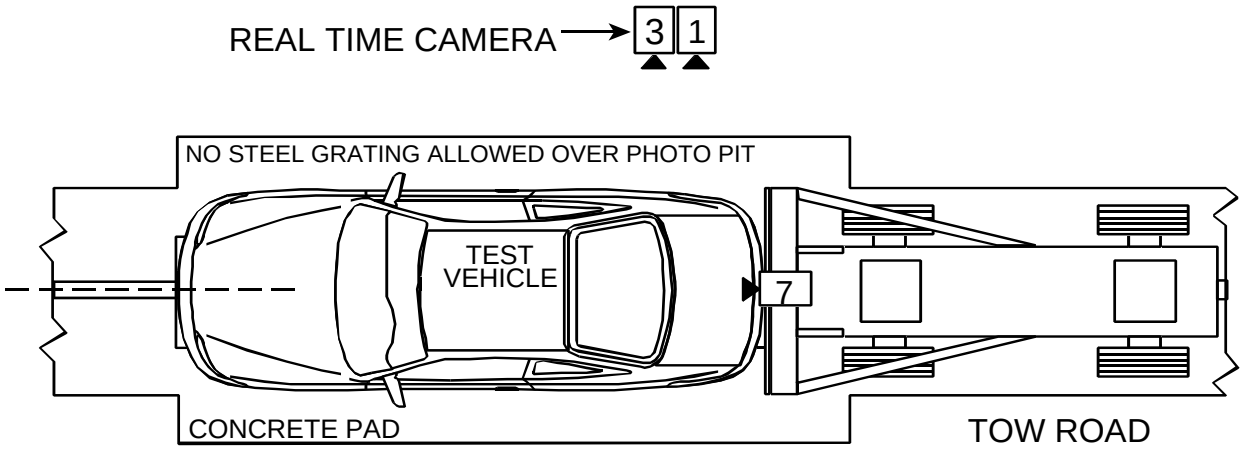
Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

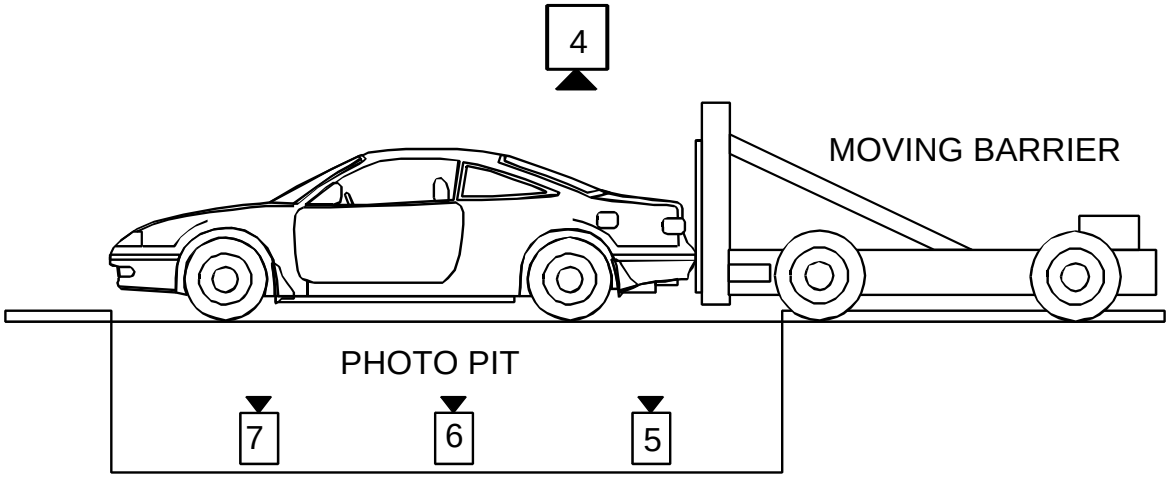
Rollover Stage	Spillage Location
0º - 90º	None
90º - 180º	None
180º-270º	None
270º-360º	None

DATA SHEET 6

HIGH SPEED CAMERA LOCATIONS



TOP VIEW



LEFT SIDE VIEW

DATA SHEET 6 (continued)

HIGH SPEED CAMERA LOCATIONS

NHTSA No. : C31300 Vehicle : 2003 Braun Entervan II MPV

CAMERA NO.	VIEW	CAMERA POSITIONS (mm)*			ANGLE** (degrees)	LENS (mm)	SPEED (fps)
		X	Y	Z			
1	Real-Time Camera	-	-	-	-	-	24
2	Left Side View	8531	2390	1115	-2.0	24	1000
3	Right Side View	-8935	2240	1130	-3.5	24	1000
4	Overhead Overall View	100	2250	7480	-90.0	20	1000
5	Vehicle Rear Underbody View	0	711	-1956	90.0	12.5	1000
6	Vehicle Mid-Section Underbody View	0	1473	-1956	90.0	12.5	1000
7	Vehicle Front Underbody View	0	2540	-1956	90.0	12.5	1000

* X = film plant to monorail centerline (+ to left of rail)
Y = film plane to impact location (+ ahead of impact location)
Z = film plane to ground (+ above ground)
** = referenced to horizontal plane

Appendix A

PHOTOGRAPHS

LIST OF PHOTOGRAPHS

Figure A-1 PRE-TEST FRONT VIEW

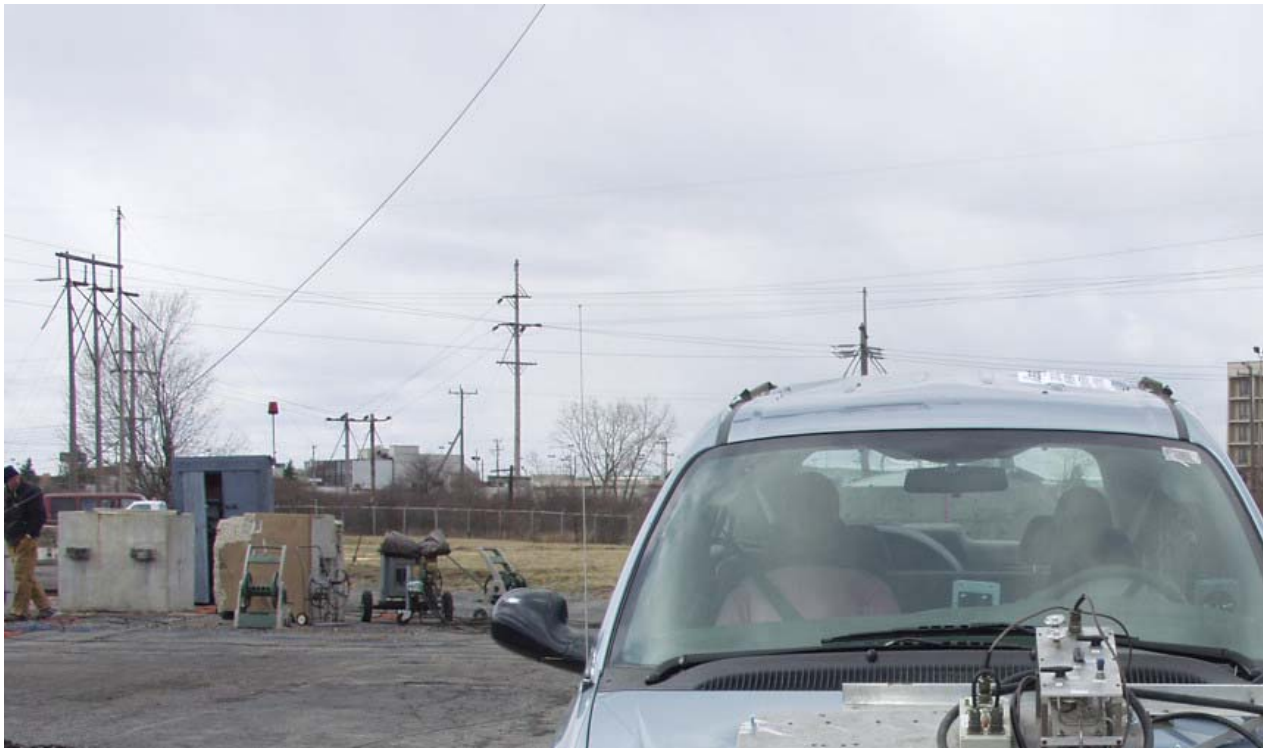


Figure A-2 POST-TEST FRONT VIEW

Figure A-3 PRE-TEST LEFT SIDE VIEW

Figure A-4 POST-TEST LEFT SIDE VIEW

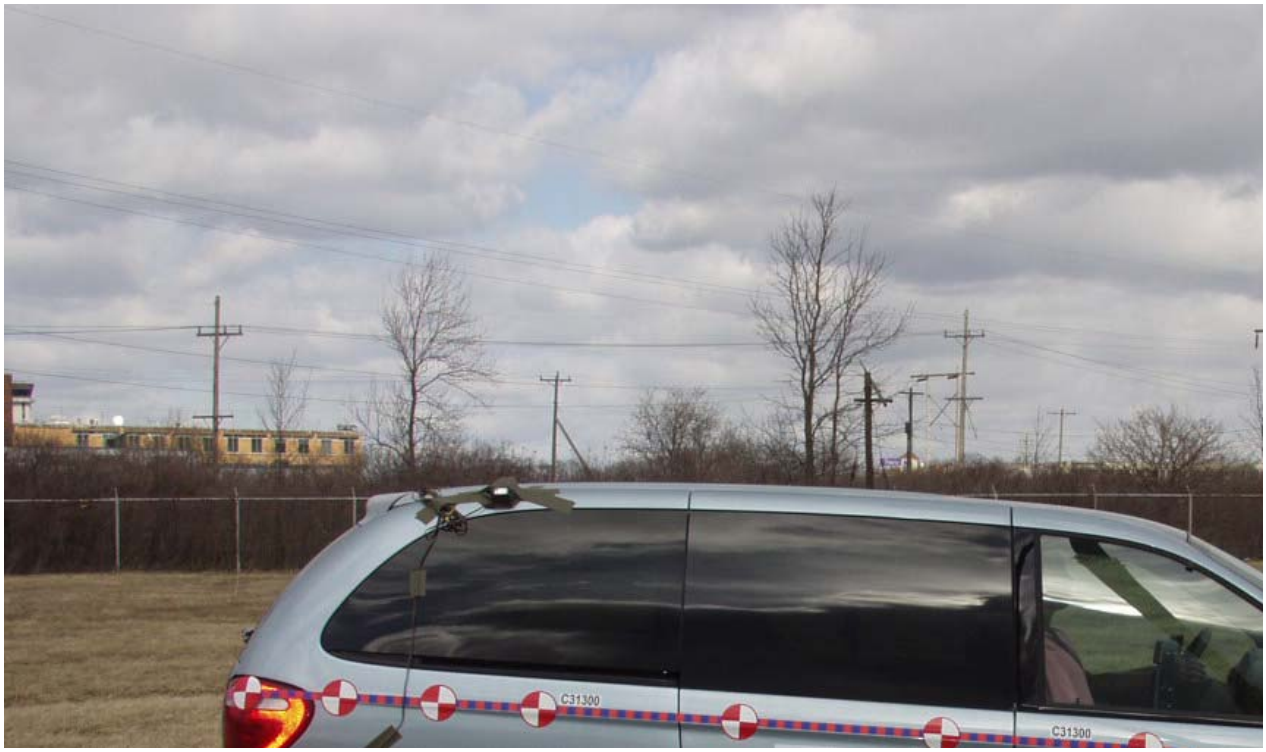


Figure A-5 PRE-TEST RIGHT SIDE VIEW

Figure A-6 POST-TEST RIGHT SIDE VIEW

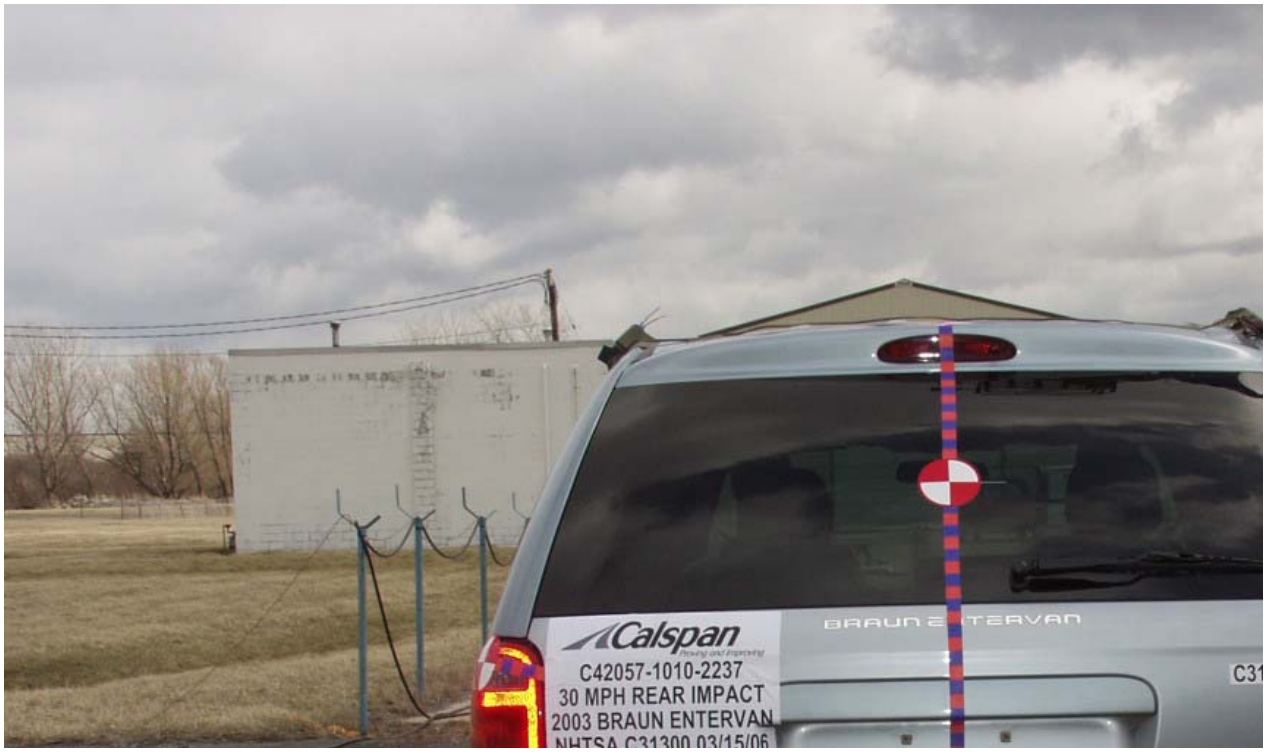


Figure A-7 PRE-TEST REAR VIEW

Figure A-8 POST-TEST REAR VIEW

Figure A-9 PRE-TEST LEFT FRONT THREE-QUARTER VIEW

Figure A-10 POST-TEST LEFT FRONT THREE-QUARTER VIEW

Figure A-11 PRE-TEST RIGHT REAR THREE-QUARTER VIEW

Figure A-12 POST-TEST RIGHT REAR THREE-QUARTER VIEW

Figure A-13 PRE-TEST FRONT UNDERBODY VIEW

Figure A-14 POST-TEST FRONT UNDERBODY VIEW

Figure A-15 PRE-TEST REAR UNDERBODY VIEW

Figure A-16 POST-TEST REAR UNDERBODY VIEW

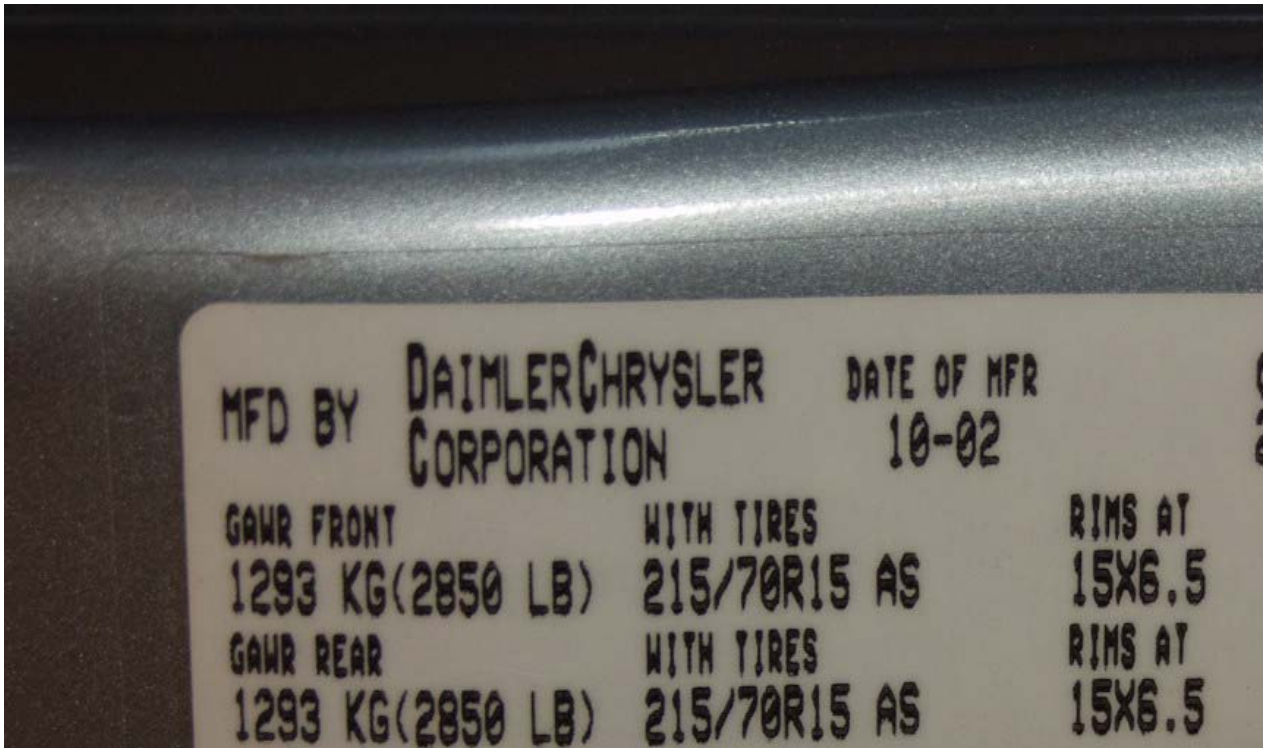


Figure A-17 CERTIFICATION/TIRE PLACARD

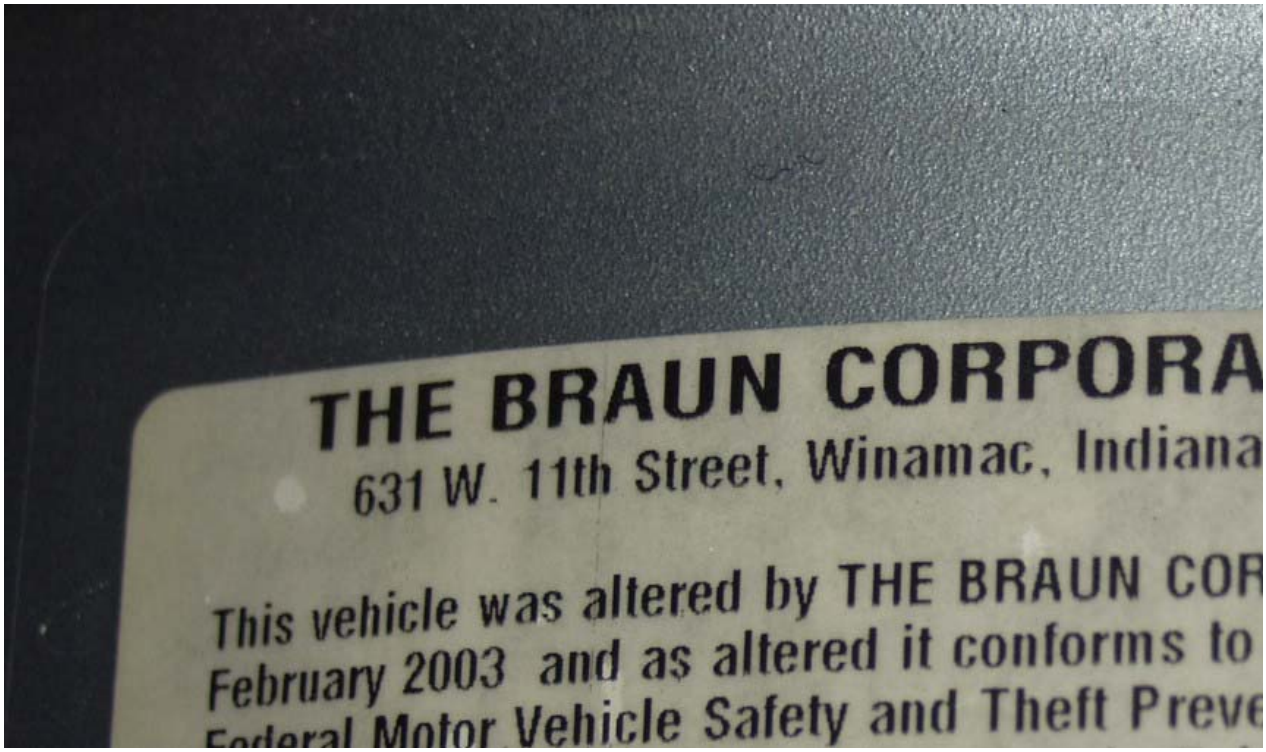


Figure A-18 PAYLOAD CAPACITY PLACARD

Figure A-19 ROLLOVER 90°

Figure A-20 ROLLOVER 180°

Figure A-21 ROLLOVER 270°

Figure A-22 ROLLOVER 360°