

REPORT NUMBER: TR-P32096-15-NC

**RESEARCH AND DEVELOPMENT
80 KM/H 70% OVERLAP REAR IMPACT**

**NISSAN MOTOR CO.
1997 NISSAN PICKUP 2-DOOR TRUCK**

NHTSA NUMBER: PV5200

**PREPARED BY:
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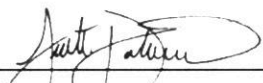


**TEST DATE:
OCTOBER 5, 2012**

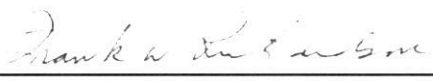
**REPORT DATE:
OCTOBER 15, 2012
FINAL REPORT**

**U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
NATIONAL CENTER FOR STATISTICS AND ANALYSIS
OFFICE OF REGULATORY ANALYSIS AND EVALUATION
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16. Abstract An 80 km/h 70% overlap rear impact test was conducted on the subject 1997 Nissan Pickup 2-door truck in accordance with the specifications of the Office of Vehicle Compliance Laboratory Test Procedure for FMVSS 301R. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on October 5, 2012. The impact velocity was 79.86 km/h and the outside ambient temperature was 27.0 deg. C. The vehicle's doors remained closed throughout the event. There was no Stoddard solvent leakage after the test or during any portion of the static rollover.					
17. Key Words FMVSS 301R Overlap Rear Impact MDB 1997 Nissan Pickup				18. Distribution Statement	
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SECTION 1

SUMMARY OF TEST

SUMMARY

The purpose of this rear impact test series is to measure the performance of the subject vehicle, a 1997 Nissan Pickup 2-door truck, for FMVSS 301R *'Fuel System Integrity – Rear Impact'*.

This 80 km/h 70% Overlap Rear Impact is sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number DTNH22-11-D-00245. It was conducted in accordance with the Office of Vehicle Compliance Laboratory Test Procedure for FMVSS 301R *'Fuel System Integrity – Rear Impact'*, dated January, 2007.

A 1997 Nissan Pickup 2-door truck was impacted by a moving deformable barrier at a velocity of 79.86 km/h. The test was performed at KARCO Engineering, LLC. on October 5, 2012. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A of this report.

Two (2) real-time cameras and three (3) high-speed cameras were used to document the rear impact event.

Two Part 572E 50th percentile male anthropomorphic test devices (ATD) were placed in the driver and right front passenger seating positions. Both ATD's were un-instrumented for this test.

Both the driver and passenger side doors remained closed during the impact event and after the impact.

There was no Stoddard solvent leakage after the test or during any portion of the static rollover. FMVSS 301 data is summarized in Data Sheets 6 and 7. Photographs are presented in Appendix A.

SECTION 2
DATA SHEETS

Test Vehicle: 1997 Nissan Pickup 2-Door Truck NHTSA No.: PV5200
Test Program: 70% Overlap Rear Impact Test Date: 10/05/12

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.574
Pressure	Tire Pressures	lbf/in ²	kPa	6.895
Temperature	General Use	°F	°C	$=(T_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf-ft	N•m	1.355

DATA SHEET NO. 1**TEST VEHICLE SPECIFICATIONS**

Test Vehicle: 1997 Nissan Pickup 2-Door Truck NHTSA No.: PV5200
 Test Program: 70% Overlap Rear Impact Test Date: 10/05/12

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	PV5200
Model Year	1997
Make	Nissan
Model	Pickup
Body Style	2-door truck
VIN	IN6SD16S4VC3
Date Received	9/25/2012
Body Color	Purple
Odometer Reading (km / mi)	277,848 / 172,647
Engine Displacement (L)	2.4
Engine Placement	Longitudinal
Transmission Type	Automatic
Transmission Speeds	3
Overdrive	Yes
Final Drive	Rear
Roof Rack	No
Sunroof / T-Top	No
Tinted Glass	No
Traction Control	No
Power Brakes	Yes
Front Disc Brakes	Yes
Rear Disc Brakes	No
Anti-Lock Brakes (ABS)	Yes

All Wheel Drive	No
Power Steering	Yes
Driver Front Airbag	Yes
Driver Side Airbag	No
Driver Head Airbag	No
Driver Curtain Airbag	No
Driver Combo Airbag	No
Driver Knee Airbag	No
Passenger Front Airbag	Yes
Passenger Side Airbag	No
Passenger Head Airbag	No
Passenger Curtain Airbag	No
Passenger Combo Airbag	No
Passenger Knee Airbag	No
Seat Belt Pre-Tensioners	Yes
Load Limiters	Yes
Bucket Seats	Yes
Air Conditioning	Yes
AM/FM CD	No
Tilt Steering	No
Automatic Door Locks	No
Power Windows	No
Power Seats	No

Does Owner's Manual provide instructions to turn off automatic door locks?

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan Motor Co.
Date of Manufacture	

GVWR (kg)	
GAWR Front (kg)	
GAWR Rear (kg)	

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Lateral Facing Jump Seat		
Designated Seating Capacity	2	2		4
Capacity Weight (VCW) (kg)				Unknown
DSC x 68.04 (kg)				272.0
Cargo Weight (RCLW) (kg)				136.0

A

B

A-B

DATA SHEET NO. 1 ... (CONTINUED)

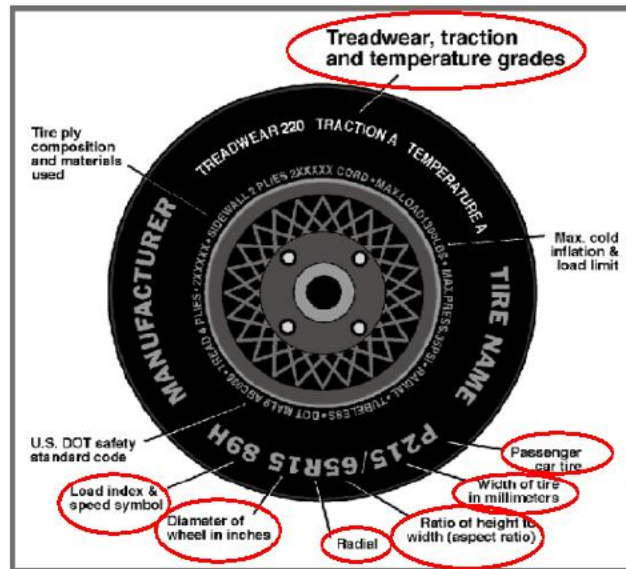
TEST VEHICLE SPECIFICATIONS

Test Vehicle: 1997 Nissan Pickup 2-Door Truck

NHTSA No.: PV5200

Test Program: 70% Overlap Rear Impact

Test Date: 10/05/12



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max Tire Pressure (kPa)	300	300
Cold Tire Pressure (kPa)	180	180
Max Load Tire Pressure (kPa)	180	180
Recommended Tire Size	P215/70R14	P215/70R14
Tire Size on Vehicle	P195/75R14	P195/75R14
Tire Manufacturer	Discount Tire	Mohave
Tire Model	SA4 All Season	R/S
Load Range	635	635
Treadwear Rating	420	420
Traction Rating	A	A
Temperature Grades	B	B
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel	1 Polyester, 2 Steel
Load Index/Speed Symbol	92S	92S
Tire Material	Polyester, Steel	Polyester, Steel
DOT Safety Code Left	MKKA JB1R 3608	M6KA BTKR 4707
DOT Safety Code Right	MKKA JB1R 3608	M6KA BTKR 4707
Type of Spare Tire	T135-70D16	
Location of Tire Placard on Vehicle	Glove Box	

DATA SHEET NO. 2
PRE-TEST INSPECTION

Test Vehicle: 1997 Nissan Pickup 2-Door Truck

NHTSA No.: PV5200

Test Program: 70% Overlap Rear Impact

Test Date: 10/05/12

Feature	Yes	No	Comments
Is the vehicle totally complete?	X		None
Does the vehicle run and drive?	X		None
Is there any sign that the vehicle has ever been in a crash?		X	None
Are the bumpers damaged?		X	None
Do the doors open and close properly?	X		None
Are the doors properly aligned so that there are no gaps when closed?	X		None
Does the battery hold a charge so that electrical accessories in the vehicle may be operated without starting the engine?	X		None
Does the vehicle sag or have a raised or lowered suspension?		X	None
Are any of the control arms or other suspension components damaged or distorted?		X	None
Do the tires have some usable tread remaining and hold pressure?	X		None
Are the radiator and/or its supporting cross members damaged?		X	None
Is the cooling system able to retain its coolant and are the proper fluid levels maintained?	X		None
Does the fuel tank leak?		X	None
Does the fuel tank have any damages or dents that would reduce its internal capacity?		X	None
Is the fuel tank located behind the rear axle?		X	None
Is the fuel tank located between the front and rear axle?	X		None
Is the vehicle attitude "as tested" between "as delivered" and "fully loaded" before running the test?	X		None

Equipment	Present		Proper Place		Operate Properly	
	Yes	No	Yes	No	Yes	No
Engine	X		X		X	
Transmission	X		X		X	
Drive Axles	X		X		X	
Battery	X		X		X	
Alternator	X		X		X	
Radiator	X		X		X	

DATA SHEET NO. 3**PRE-TEST DATA**Test Vehicle: 1997 Nissan Pickup 2-Door TruckNHTSA No.: PV5200Test Program: 70% Overlap Rear ImpactTest Date: 10/05/12**TEST VEHICLE AXLE WEIGHTS**

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	393.5	319.0		437.5	408.0		423.0	420.0	
Right	kg	415.0	320.0		463.5	413.5		458.5	429.5	
Ratio	%	55.9%	44.1%	100.0%	52.3%	47.7%	100.0%	50.9%	49.1%	100.0%
Total	kg	808.5	639.0	1447.5	901.0	821.5	1722.5	881.5	849.5	1731.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1447.5	A
Actual Weight of 2 P572 ATDs Used	kg	148.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	136.0	C
Calculated Vehicle Target Wt (TVTW)	kg	1731.5	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	717	724	794	803	1300
As Tested	mm	693	699	772	776	1405
Fully Loaded	mm	686	697	768	770	1445
Post-Test	mm	746	712	773	903	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2945
Total Vehicle Length	mm	4955
Amount of Stoddard Solvent in Fuel Tank	L	55.97

DATA SHEET NO. 3 ... (CONTINUED)**PRE-TEST DATA**

Test Vehicle: 1997 Nissan Pickup 2-Door Truck NHTSA No.: PV5200
Test Program: 70% Overlap Rear Impact Test Date: 10/05/12

BALLAST DATA

Description	Value
Type of Ballast	Ballast Dummy
Method of Securing Ballast	Seat Belt
Weight of Ballast in Cargo Area	113.5 kg
Weight of Vehicle Components Removed	0 kg

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

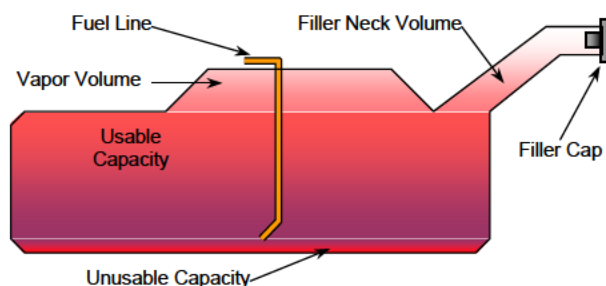
No vehicle components were removed

FUEL TANK CAPACITY

Description	Liters
Fuel System Capacity Listed in Owners Manual	60.18
Usable Capacity of "Standard Tank"	60.18
91 - 94% of Usable Capacity	54.77 - 56.57
Actual Amount of Stoddard Solvent Used	55.97

FUEL PUMP

The vehicle is equipped with an electric fuel pump.
The fuel pump is activated when the ignition is turned on.



VEHICLE FUEL TANK ASSEMBLY

TEST FLUID

Description	Value
Test Fluid Type	Stoddard Solvent
Test Fluid Specific Gravity	0.97
Test Fluid Kinematic Viscosity	
Test Fluid Color	Purple

DATA SHEET NO. 3 ... (CONTINUED)

PRE-TEST DATA

Test Vehicle: 1997 Nissan Pickup 2-Door Truck

NHTSA No.: PV5200

Test Program: 70% Overlap Rear Impact

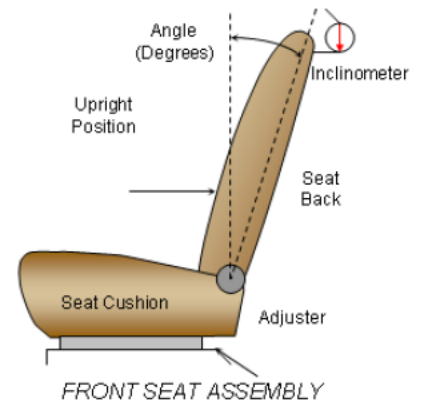
Test Date: 10/05/12

NOMINAL DESIGN RIDING POSITION

Seat back angle is measured at the headrest post using a digital inclinometer.

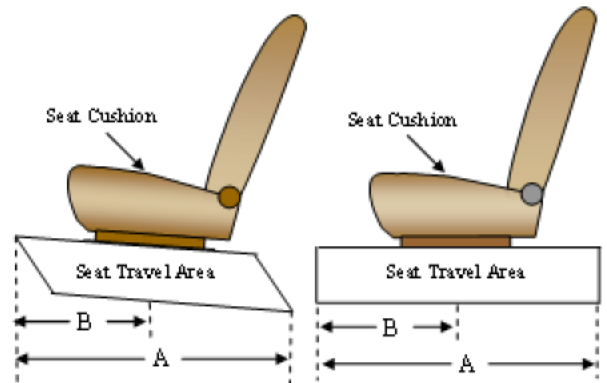
SEAT BACK ANGLE

Seating Position	Degrees
Driver Seat Back Angle	2.3
Passenger Seat Back Angle	1.9



SEAT FORE / AFT POSITIONING

The total seat travel is measured from the forward most possible position to the rear most possible position. The driver's seat is set to the middle of the fore-aft travel. The passenger's seat is set to the middle of the fore-aft travel.



SEAT FORE/AFT POSITIONS

Seating Position	Total Fore-Aft Travel	Placed in Position
Driver Seat	169 mm	85 mm
Passenger Seat	226 mm	118 mm

DATA SHEET NO. 3 ... (CONTINUED)

PRE-TEST DATA

Test Vehicle: 1997 Nissan Pickup 2-Door Truck

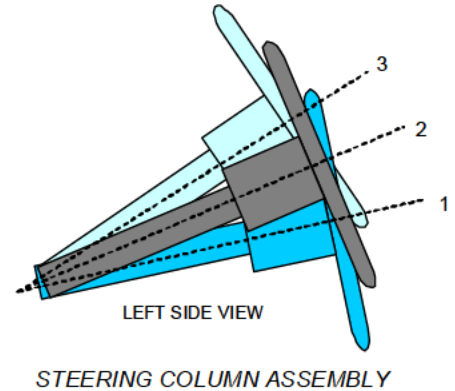
NHTSA No.: PV5200

Test Program: 70% Overlap Rear Impact

Test Date: 10/05/12

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. A digital inclinometer is used to measure a plate which is placed across the rim of the steering wheel for angular measurements. A tape measure is used to measure telescoping steering wheel travel.



STEERING COLUMN POSITIONING

	Degrees	Fore-Aft Position (mm)	
Lowermost Position, No. 1			1
Geometric Center Position, No. 2			
Uppermost Position, No. 3			
Telescoping Steering Wheel Travel			
Test Position			

¹ – Steering wheel was not adjustable.

DATA SHEET NO. 4**MOVING BARRIER DATA**Test Vehicle: 1997 Nissan Pickup 2-Door TruckNHTSA No.: PV5200Test Program: 70% Overlap Rear ImpactTest Date: 10/05/12**MOVING BARRIER TEST WEIGHT**

	Units	As Delivered Weights (UVW)		
		Front Axle	Rear Axle	Total
Left	kg	402.0	298.0	700.0
Right	kg	377.0	292.0	669.0
Ratio	%	56.9%	43.1%	100.0%
Total	kg	779.0	590.0	1369.0

MOVING BARRIER TIRE INFORMATION

Measured Parameter	Front	Rear
Recommended Tire Size	205/75R15	205/75R15
Tire Size on Vehicle	205/75R15	205/75R15
Tire Manufacturer	Pacemark	Pacemark
Tire Model	All Weather	All Weather
Treadwear	420	420
Traction	A	A
Temperature Grades	B	B
Tire Pressure - Front	220	220
Tire Pressure - Rear	220	220

MOVING BARRIER DIMENSIONS

Measurement Description	Length (mm)
Overall Width	1676
Overall Height	559
Honeycomb Depth	381
Overall Depth	483
Bottom Honeycomb to Bottom Bumper	51
Bumper Height	203
Ground to Top of MDB	788
Ground to Bottom of MDB	229
Ground to Bottom of Bumper	280
Ground to Top of Bumper	483

DATA SHEET NO. 5**POST-TEST DATA**

Test Vehicle: 1997 Nissan Pickup 2-Door Truck NHTSA No.: PV5200
 Test Program: 70% Overlap Rear Impact Test Date: 10/05/12

Temperature at Time of Impact: 27.0°C Test Time: 11:21 AM
 VIN: IN6SD16S4VC3

IMPACT VELOCITY DATA

Measured Parameter	Units	Value
Trap No. 1 Velocity (Primary)	km/h	79.86
Trap No. 2 Velocity (Redundant)	km/h	

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Width	mm		1665
Vertical Impact Reference Line (Left of Vehicle Center Line)	mm		333
Actual Impact Point (Left of Vehicle Center Line)	mm		338
Horizontal Offset (+ right / - left)	mm	± 50 of Intended Impact Point	5
Vertical Offset (+ down / - up)	mm	± 50 of Intended Impact Point	-8

TARGET VEHICLE PRE- AND POST- TEST STRUCTURAL MEASUREMENTS

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length at Centerline	4955	4319	-636
2	Total Length	4955	4698	-257
3	Total Width	1665	1692	27
4	Left Side Wheelbase	2945	2932	-13
5	Right Side Wheelbase	2945	2845	-100

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE

Vertical Location			From Centerline		Max. Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
A	Center of Bumper	432	0	Center	119
B	Top of Bumper	533	100	Left	134
C	Mid Level	686	0	Center	269
D	Top of Stack	813	800	Left	274

² – Redundant Speed Trap failed

DATA SHEET NO. 5 ... (CONTINUED)

POST-TEST DATA

Test Vehicle: 1997 Nissan Pickup 2-Door Truck NHTSA No.: PV5200
Test Program: 70% Overlap Rear Impact Test Date: 10/05/12

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Front Door Opening	Remained closed and latched	Remained closed and latched
Rear Door Opening		
Hatch and other doors	Jammed Shut	

DATA SHEET NO. 6

FMVSS 301 DATA

Test Vehicle: 1997 Nissan Pickup 2-Door Truck NHTSA No.: PV5200
Test Program: 70% Overlap Rear Impact Test Date: 10/05/12

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Stoddard Solvent Spillage Measurements

- A. From impact until vehicle motion ceases: 0 g
(Maximum allowable = 28 g)
- B. For the 5 minute period after motion ceases: 0 g
(Maximum allowable = 28 g)
- C. For the following 25 minutes: 0 g
(Maximum allowable = 28 g/minute)
- D. Spillage: No Stoddard Solvent leakage

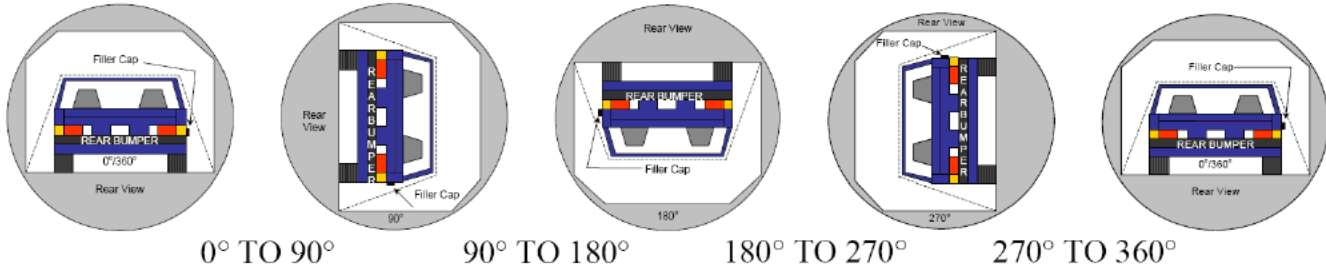
DATA SHEET NO. 7
STATIC ROLLOVER TEST DATA

Test Vehicle: 1997 Nissan Pickup 2-Door Truck

NHTSA No.: PV5200

Test Program: 70% Overlap Rear Impact

Test Date: 10/05/12



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).

Details of Stoddard solvent spillage: No Stoddard solvent spillage

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	83	300	383
90° To 180°	81	300	381
180° To 270°	79	300	379
270° To 360°	82	300	382

FMVSS 301 SPILLAGE TABLE

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° To 90°	0 g			
90° To 180°	0 g			
180° To 270°	0 g			
270° To 360°	0 g			

SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° To 90°	No Spillage
90° To 180°	No Spillage
180° To 270°	No Spillage
270° To 360°	No Spillage

APPENDIX A
PHOTOGRAPHS

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FIGURE 1. Vehicle Certification Label

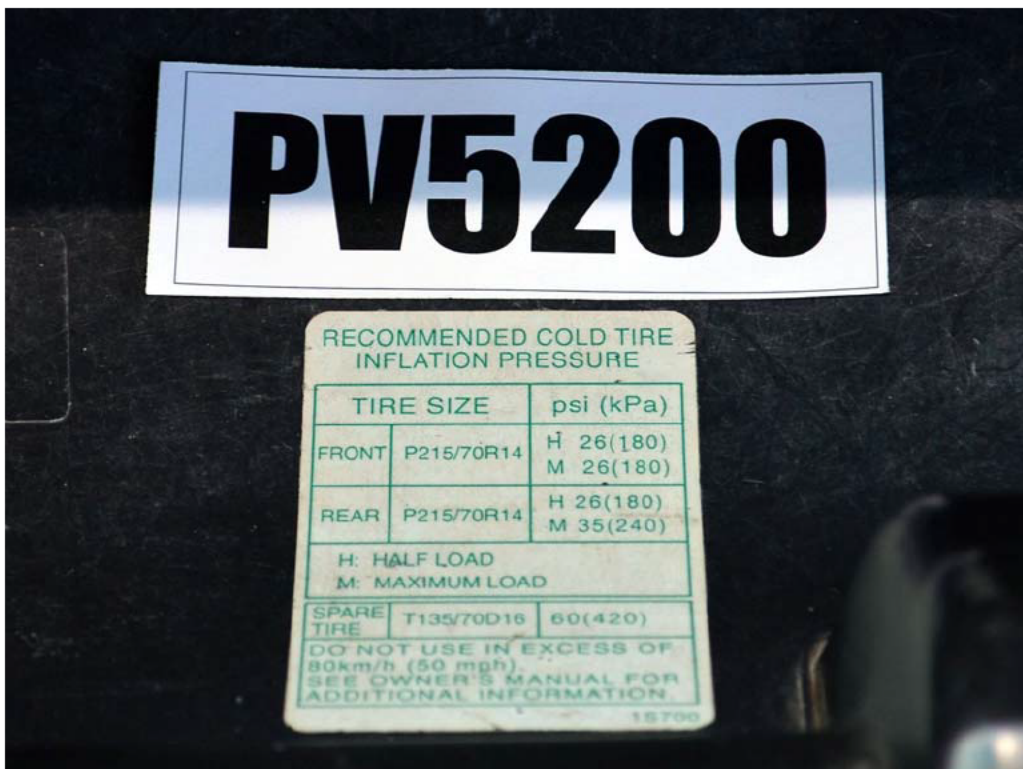


FIGURE 2. Vehicle Tire Placard



FIGURE 3. Pre-Test Front of Test Vehicle



FIGURE 4. Post-Test Front of Test Vehicle





FIGURE 7. Pre-Test Left View of Test Vehicle



FIGURE 8. Post-Test Left View of Test Vehicle



FIGURE 9. Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



FIGURE 10. Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



FIGURE 11. Pre-Test Rear View of Test Vehicle



FIGURE 12. Post-Test Rear View of Test Vehicle



FIGURE 13. Pre-Test Right Rear $\frac{3}{4}$ View of Test Vehicle



FIGURE 14. Post-Test Right Rear $\frac{3}{4}$ View of Test Vehicle



FIGURE 15. Pre-Test Right View of Test Vehicle



FIGURE 16. Post-Test Right View of Test Vehicle



FIGURE 17. Pre-Test Right Front $\frac{3}{4}$ View of Test Vehicle



FIGURE 18. Post-Test Right Front $\frac{3}{4}$ View of Test Vehicle



FIGURE 19. Pre-Test Underbody, Fuel Tank Location



FIGURE 20. Post-Test Underbody, Fuel Tank Location



FIGURE 21. Pre-Test Underbody, Fuel Filler Neck Location



FIGURE 22. Post-Test Underbody, Fuel Filler Neck Location



FIGURE 23. Pre-Test Underbody, Fuel Line Location



FIGURE 24. Post-Test Underbody, Fuel Line Location



FIGURE 25. Vehicle at 0° on Static Rollover Device



FIGURE 26. Vehicle at 90° on Static Rollover Device



FIGURE 27. Vehicle at 180° on Static Rollover Device



FIGURE 28. Vehicle at 270° on Static Rollover Device



FIGURE 29. Vehicle at 360° on Static Rollover Device

Photograph Not Applicable

No Stoddard
Solvent Leakage

FIGURE 30. Post-Test Stoddard Solvent Spillage Location View