REPORT NUMBER: 301-CAL-08-05

SAFETY COMPLIANCE TESTING FOR FMVSS 301
FUEL SYSTEM INTEGRITY

FORD MOTOR COMPANY
2008 FORD RANGER
2-DOOR PICK-UP

NHTSA NUMBER: C80205

GDAIS TEST NUMBER: 8860-05

August 12,2008

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 (NVS-224)
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16. Abstract

Compliance tests were conducted on the subject 2008 Ford Ranger 2-door Pick-up in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-301-03 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 Advanced Information Engineering Services under Contract No. DTNH22-06-C-00031. The purpose of this test was to determine if the subject vehicle, a 2008 Ford Ranger 2-door Pick-up, 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-301-03, dated February 28, 2003.

SECTION 2

COMPLIANCE TEST RESULTS SUMMARY

A 1685 kg, 2008 Ford Ranger 2-door Pick-up 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 Calspan on August 12,2008.

The test vehicle was equipped with a 64.4 liter fuel tank which was filled to 92 percent capacity with stoddard fluid prior to impact. Additional ballast (127.2 kg) was secured in the vehicle cargo area. Two ballast Part 572E 50th percentile male Anthropomorphic Test Device (ATD) were placed in the front occupant seating positions.

The crash event was recorded by seven high-speed cameras and one real-time 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 301 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: 2008 Ford Ranger 2-door Pick-up

NHTSA No.: C80205 ; Color: White

Engine Data: 4 Cylinders; - CID; 2.3 Liters; - cc

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

Transmission Data: 5 Speeds; - Manual; x Automatic; - Overdrive

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

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

- Power Windows; - Power Door Locks; - Tilt Wheel

Date Received: 3/28/08 ; Odometer Reading 51 km

Selling Dealer: West Herr Ford Inc.

& Address: 5025 Camp Rd Hamburg, NY 14075

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured by: Ford Motor Company

Date of Manufacture: 09/07

VIN: 1FTYR10D98PA33826

GVWR: 1987 kg; GAWR-FRONT: 953 kg; GAWR-REAR: 1157 kg

DATA FROM VEHICLE'S TIRE LABEL:

Location of Placard on Vehicle: Left B-Pillar

Recommended Tire Size: P225/70R15

* Recommended Cold Tire Pressure: FRONT: 205 kPa; REAR: 205 kPa

DATA FROM TIRE SIDEWALL:

Size of Tires on Test Vehicle: P225/70R15 Manufacturer: Firestone

Tire Pressure with Maximum Capacity Vehicle Load: FRONT: 303 kPa; REAR: 303 kPa

Type of Spare Tire: T145/80D16

VEHICLE CAPACITY DATA:

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

Number of Occupants: 3 Front; 0 Rear; 3 Total

Vehicle Capacity Weight (VCW) = 554 kg

No. of Occupants x 68.04 kg = 204.1 kg

Rated Cargo/Luggage Weight (RCLW) = 349.9 kg 136 kg maximum

*Tire pressure used for test

DATA SHEET 2

PRE-TEST DATA

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

Right Front =	404 kg	Right Rear =	287 kg
Left Front =	426 kg.	Left Rear =	292 kg
TOTAL FRONT =	830.0 kg	TOTAL REAR =	579.0 kg

TOTAL DELIVERED WEIGHT = 1409.0 kg

% of Total Front of Vehicle Weight = 58.9% of Total Rear Weight = 41.1%

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight	=	1409.0 kg
Rated Cargo/Luggage Weight (RCLW)	=	136.0 kg
Weight of 2 p.572 Dummies, 74.4 kg	=	148.8 kg
TARGET TEST WEIGHT	=	1693.8 kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 127.2 KG OF CARGO WEIGHT:

Right Front =	464 kg	Right Rear =	488 kg
Left Front =	370 kg	Left Rear =	363 kg
TOTAL FRONT =	834.0 kg	TOTAL REAR =	851.0 kg

TOTAL TEST WEIGHT = 1685.0 kg

% of Total Front of Vehicle Weight = 49.5% of Total Rear Weight = 50.5%

* Weight of Ballast Secured in Vehicle Trunk Area = 105 kg

Type of Ballast: Lead Shot

Method of Securing Ballast: Compartment Placement

Vehicle Components Removed for Weight Reduction: None

VEHICLE ATTITUDE (all dimension in millimeters):

AS DELIVERED:	RF	831	LF	826	RR	868	LR 865
AS TESTED:	RF	793	LF	780	RR	834	LR 838

Vehicle's Wheel Base: 2835 mm

Location of Vehicle's C.G.: 1432 millimeters rearward of front wheel center.

FUEL SYSTEM DATA:

Fuel System Capacity From Owner's Manual = 64.4 liters

Usable Capacity Figure Furnished by COTR = 64.4 liters

Test Volume Range (91 to 94% of Usable Capacity) = 58.6 to 60.54 liters

ACTUAL TEST VOLUME= 59.4 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.

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: Gas tank under pick-up truck bed with fuel lines running along frame rail.

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

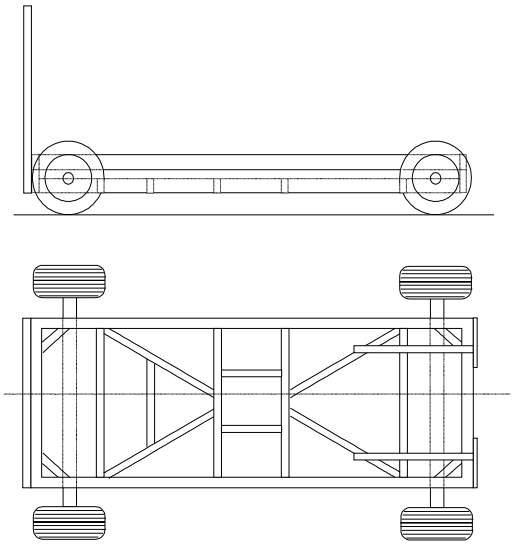
Model: AT Radial Rover

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: August 12,2008 Time:: 13:30 Temperature: 21.0 ºC

Vehicle NHTSA No.: C80205 VIN: 1FTYR10D98PA33826

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 =	4711	; C/L =	4803	Right =	4710
Post-Test	Left =	4417	; C/L =	4475	Right =	4429
Crush	Left =	294	; C/L =	328	Right =	281

AVERAGE = 301 millimeters

DATA SHEET 4 (continued)

POST TEST DATA

TEST VEHICLE NHTSA NO.: C80205 TEST DATE: August 12,2008

Vehicle Mfgr./Make/Model: 2008 Ford Ranger 2-door Pick-up

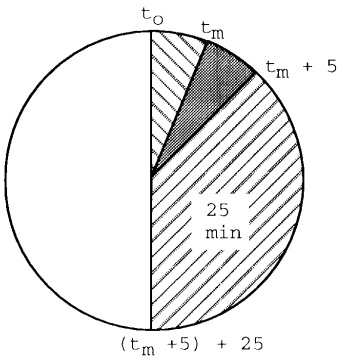
Test vehicle fuel tank filled to 91% to 94% of manufacturer's "usable" capacity and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

****

TEST VEHICLE IMPACT TYPE:

- Frontal (42.28 kph target velocity)
- Oblique (42.28 kph target velocity) with - ^{o} 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:

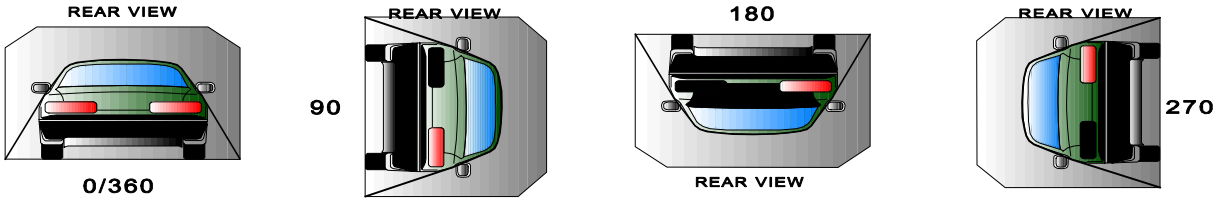
None

DATA SHEET 5

STATIC ROLLOVER TEST DATA

Table 7 FMVSS NO. 301 - STATIC ROLLOVER DATA SHEET

Vehicle: 2008 Ford Ranger 2-door Pick-up NHTSA No.: C80205



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	10	seconds	5	minutes	6	minutes	10	seconds	7	minutes
90º - 180º	1	minutes	05	seconds	5	minutes	6	minutes	5	seconds	7	minutes
180º-270º	1	minutes	03	seconds	5	minutes	6	minutes	3	seconds	7	minutes
270º-360º	1	minutes	09	seconds	5	minutes	6	minutes	9	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	Not Required
90º - 180º	0	0	0	Not Required
180º-270º	0	0	0	Not Required
270º-360º	0	0	0	Not Required

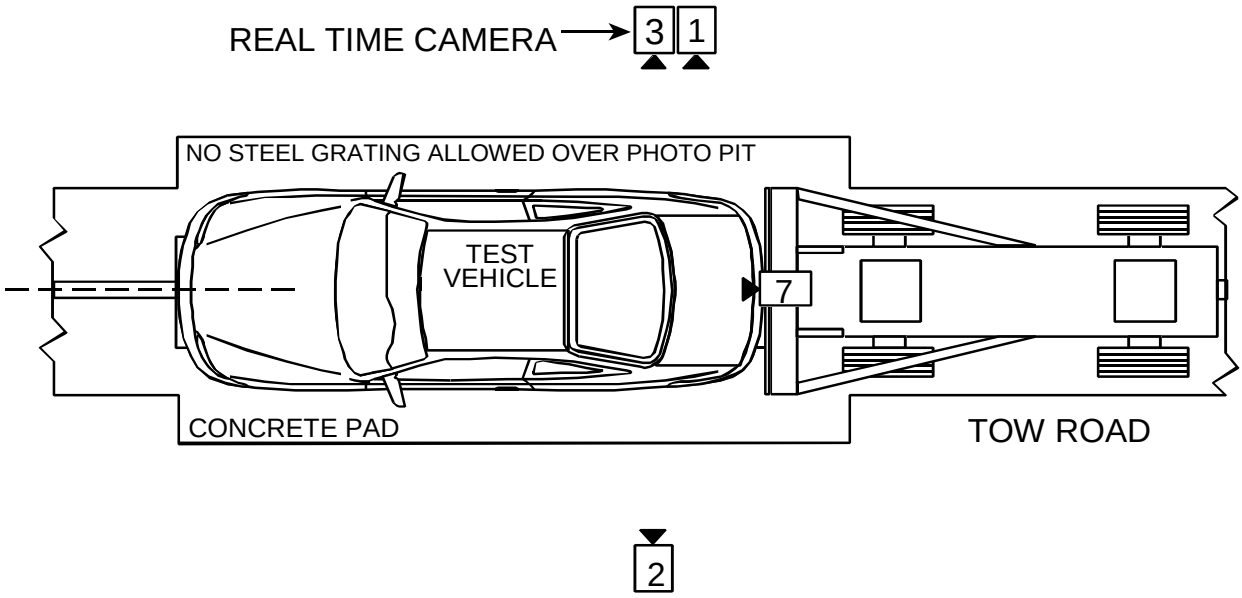
Note: Record spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATION(S):

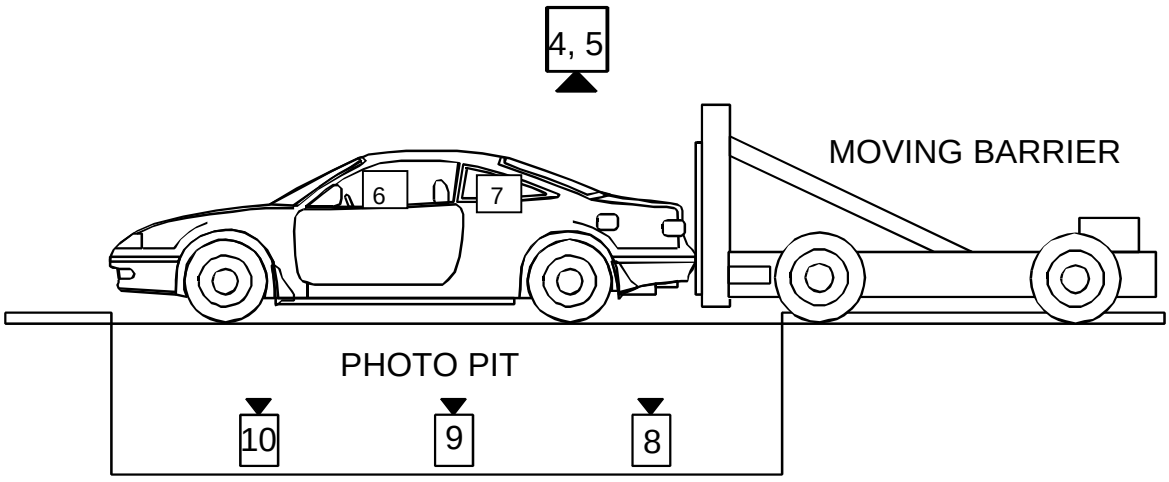
Rollover Stage	Spillage Location
0º - 90º	None
90º - 180º	None
180º-270º	None
270º-360º	None

DATA SHEET 6

HIGH SPEED CAMERA LOCATIONS



TOP VIEW



LEFT SIDE VIEW

DATA SHEET 6 (continued)

HIGH SPEED CAMERA LOCATIONS

NHTSA No. : C80205 Vehicle : 2008 Ford Ranger 2-door Pick-up

CAMERA NO.	VIEW	CAMERA POSITIONS (mm)*			ANGLE** (degrees)	LENS (mm)	SPEED (fps)
		X	Y	Z			
1	Real-Time Camera	-	-	-	-	-	24
2	Left Side View	8790	2330	980	-3.5	13	1000
3	Right Side View	9280	2255	1005	-6.1	35	1000
4	Overhead Overall View	-1110	0	9804	-90	20	1000
5	Overhead Close View	-1230	0	9804	-90	12.5	1000
6†	Onboard Driver View	-	-	-	-	-	-
7†	Onboard Passenger View	-	-	-	-	-	-
8	Vehicle Rear Underbody View	0	661	-1956	90	13	1000
9	Vehicle Mid-Section Underbody View	0	1321	-1956	90	13	1000
10	Vehicle Front Underbody View	0	7994	-1956	90	13	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

† Research cameras – X distance is measured to the reference target 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

PHOTO NOT AVAILABLE

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

PHOTO NOT AVAILABLE

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

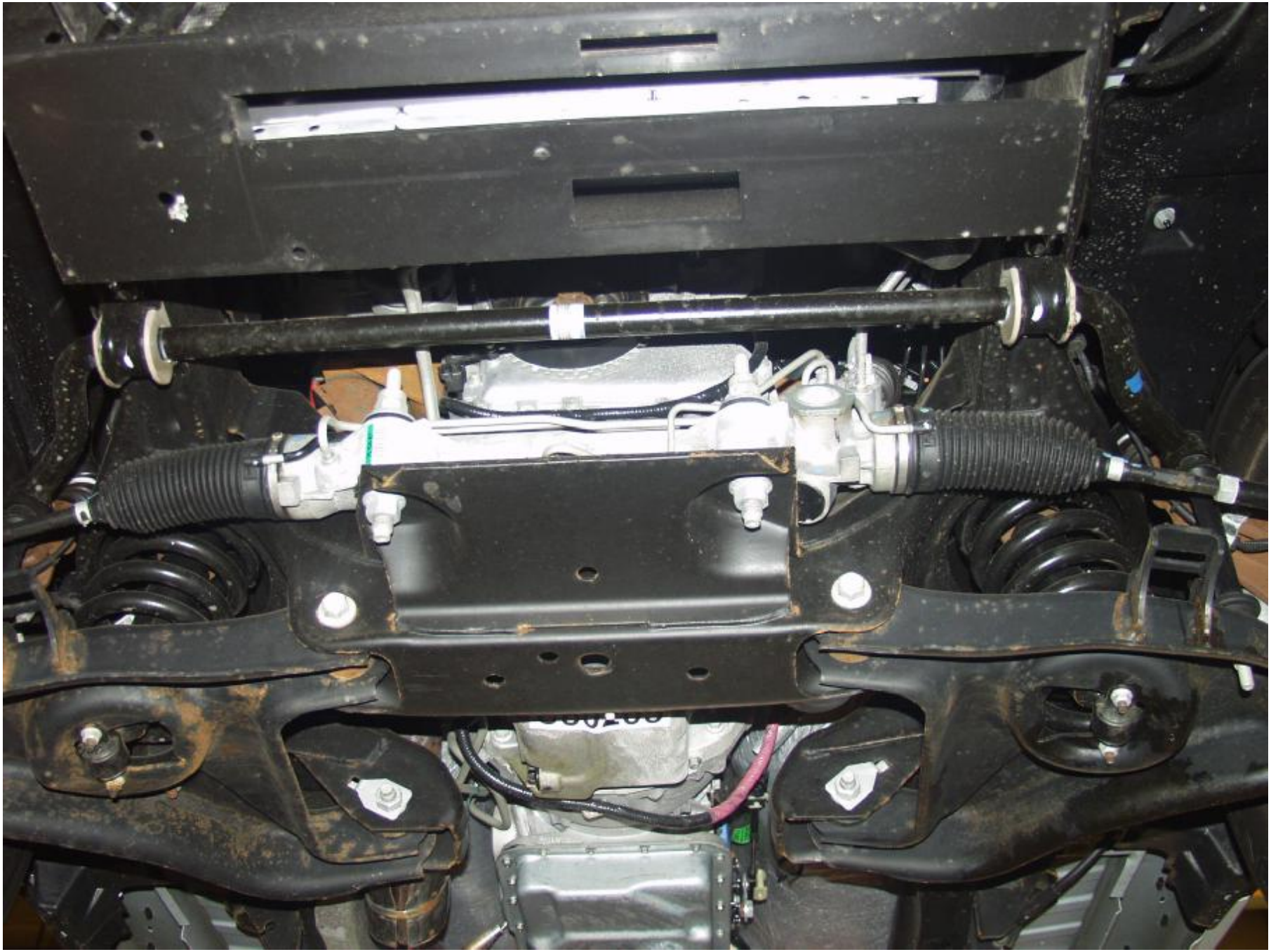


Figure A-13 PRE-TEST FRONT UNDERBODY VIEW

Figure A-14 POST-TEST FRONT UNDERBODY VIEW

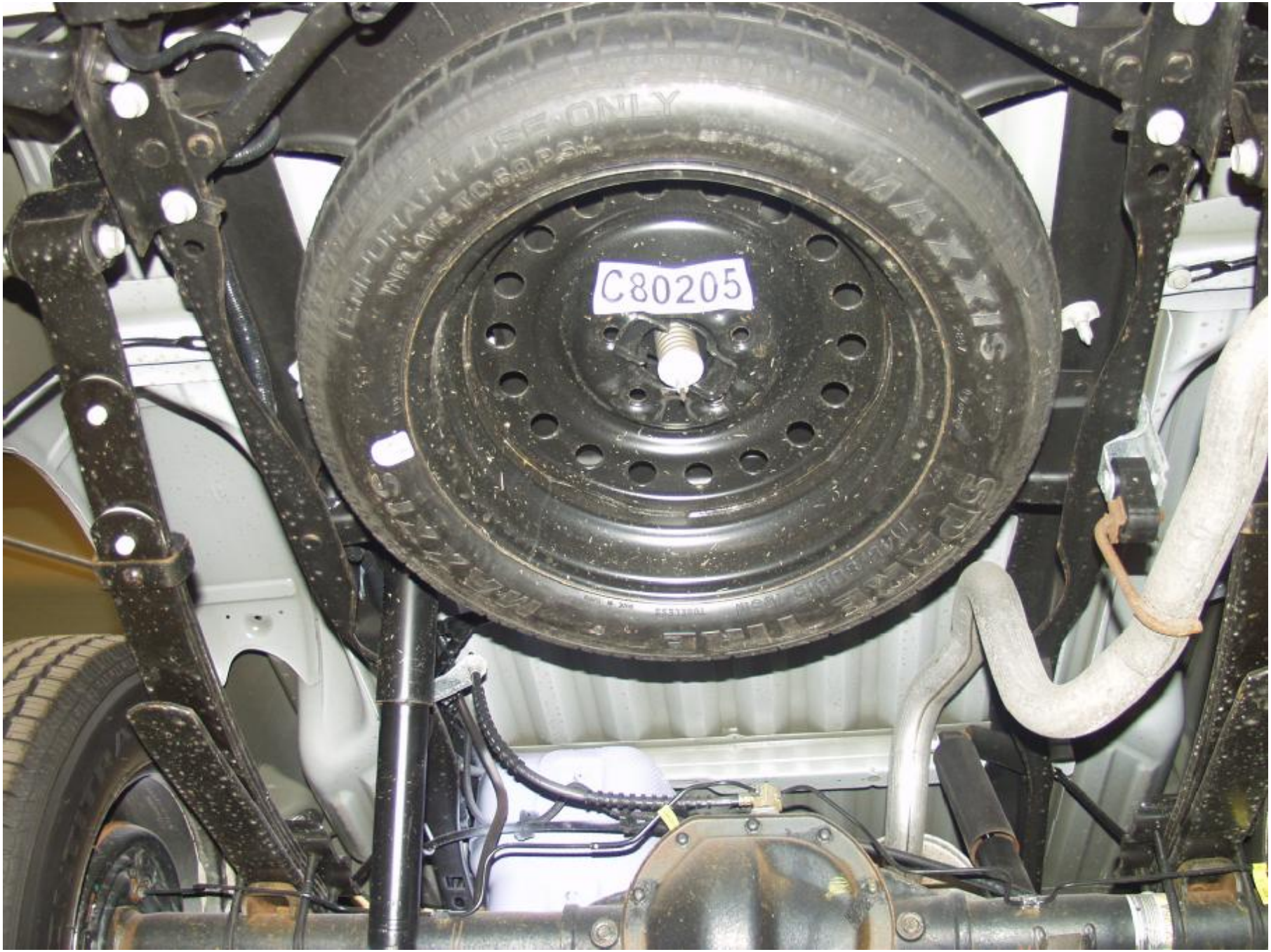


Figure A-15 PRE-TEST REAR UNDERBODY VIEW

Figure A-16 POST-TEST REAR UNDERBODY VIEW

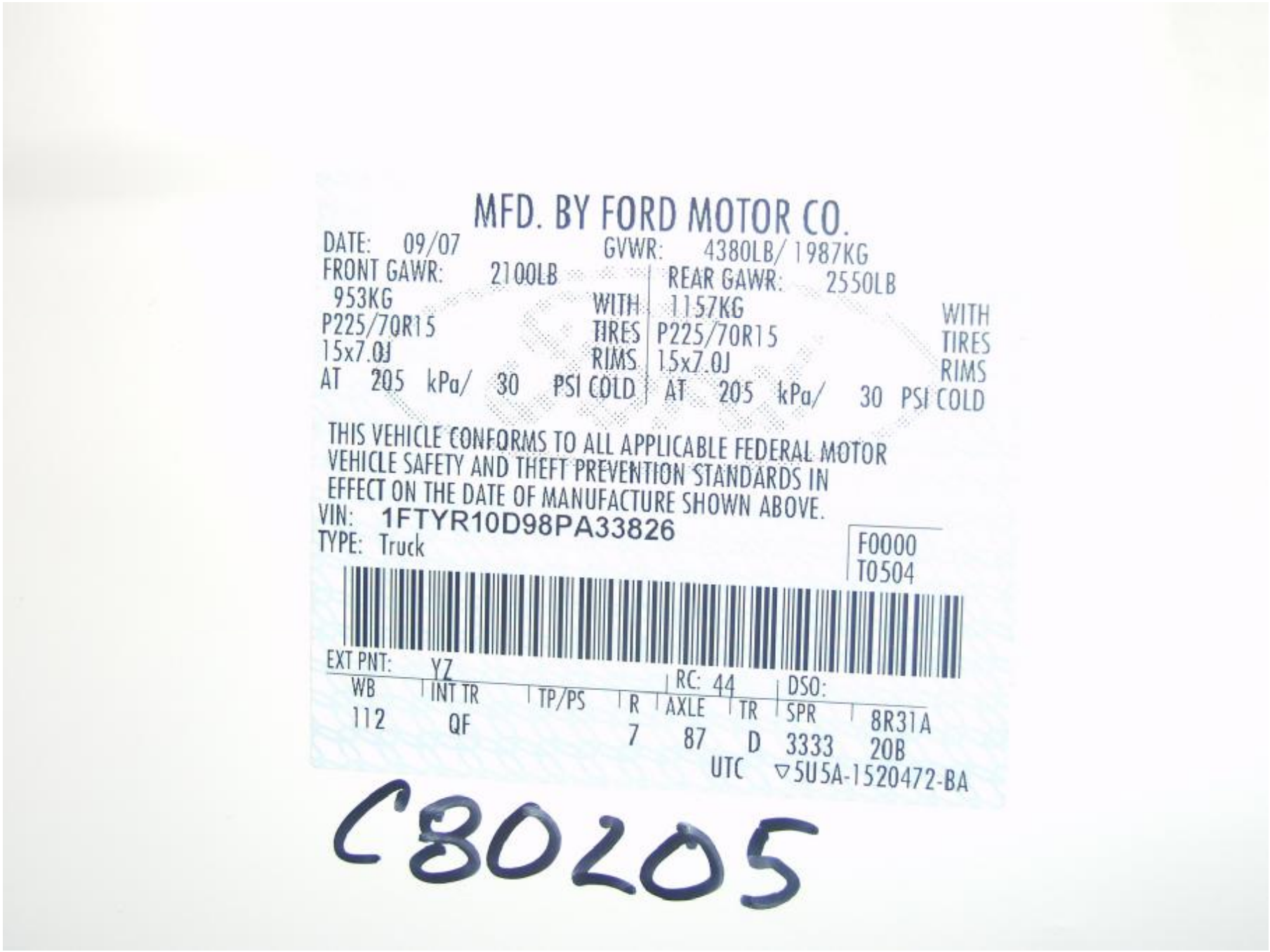


Figure A-17 CERTIFICATION PLACARD

Figure A-18 TIRE PLACARD

Figure A-19 ROLLOVER 90º

Figure A-20 ROLLOVER 180º

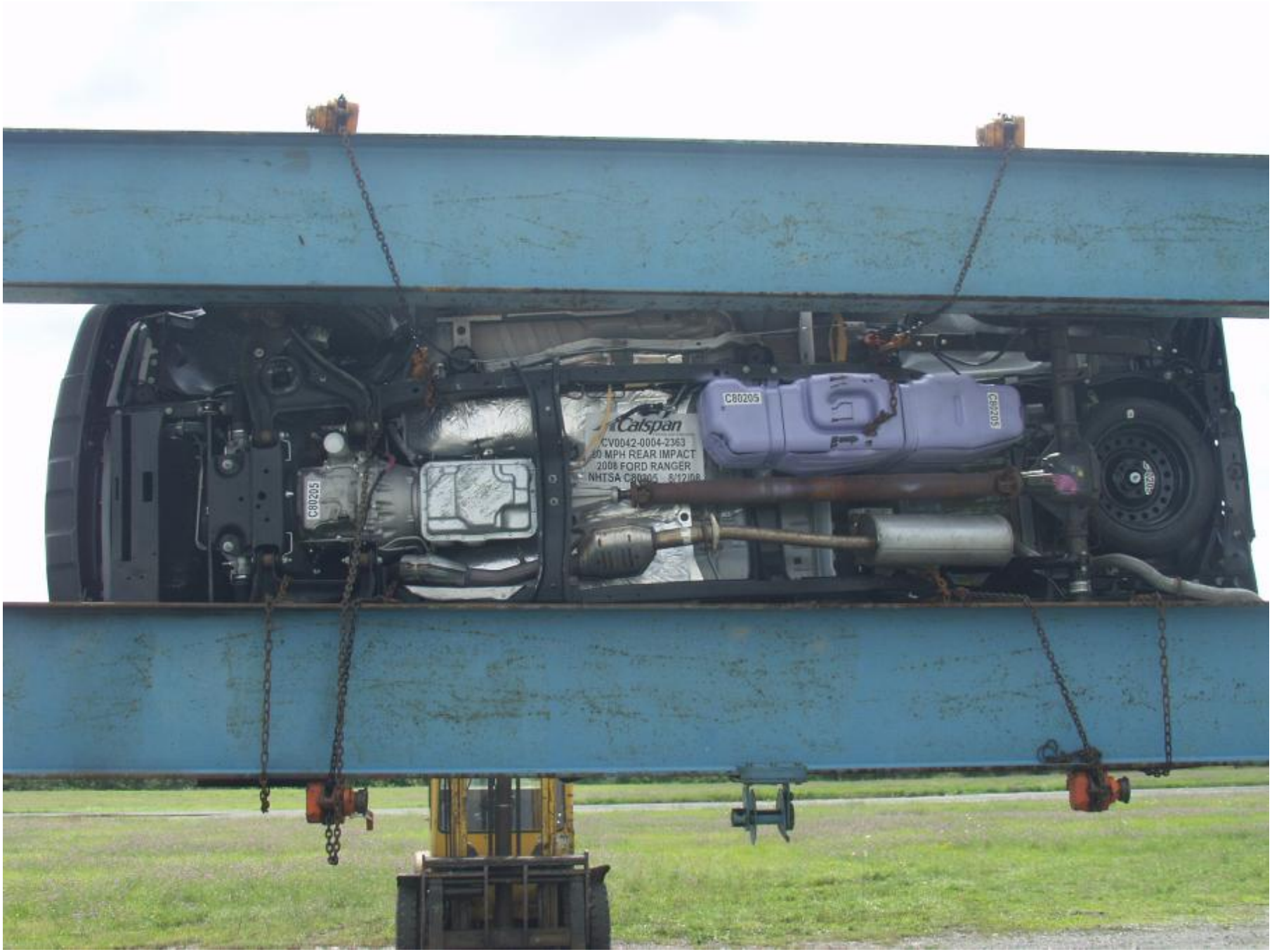


Figure A-21 ROLLOVER 270º

Figure A-22 ROLLOVER 360º