

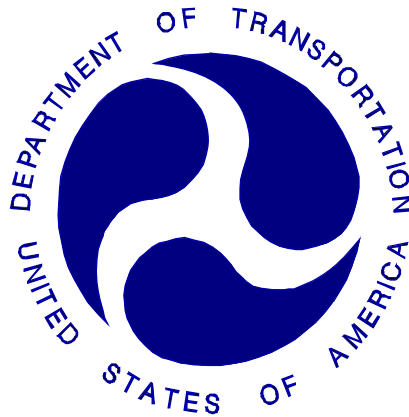
REPORT NUMBER: 301R-CAL-15-004

**SAFETY COMPLIANCE TESTING FOR FMVSS 301R
FUEL SYSTEM INTEGRITY – REAR IMPACT**

**General Motors LLC
2015 Chevrolet Trax**

NHTSA NUMBER: C20150103

**PREPARED BY:
CALSPAN CORPORATION
TRANSPORTATION TEST OPERATIONS
P.O. BOX 400
BUFFALO, NEW YORK 14225**



January 9, 2016

FINAL REPORT

**PREPARED FOR:
U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration Enforcement
Office of Vehicle Safety Compliance
Mail Code: NVS-220
1200 New Jersey Avenue, SE
Washington, DC 20590**

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-11-D-00243.

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Prepared By: Vanessa Hansen
Vanessa Hansen, Project Engineer

Approved By: Edward J. Dutton
Edward J. Dutton, Test Engineer Director
Transportation Test Operations

Approval Date: January 9, 2016

FINAL REPORT ACCEPTANCE BY OVSC:

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15. Supplementary Notes				
16. Abstract A compliance test was conducted on a 2015 Chevrolet Trax sport utility vehicle in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-301R-02 for the determination of FMVSS 301R compliance. Test failures identified were as follows: None - The test vehicle appeared to comply with all requirements of FMVSS 301R "Fuel System Integrity – Rear Impact."				
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SECTION 1

PURPOSE AND TEST PROCEDURE

This rear impact test is part of the FMVSS 301R Compliance Test Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-11-D-00243. The purpose of this test was to determine if the subject vehicle, a 2015 Chevrolet Trax sport utility vehicle , meets the performance requirements of FMVSS No. 301R "Fuel System Integrity – Rear Impact." The test was conducted in accordance with the Office of Vehicle Safety Compliance's Laboratory Test Procedure (TP-301R-02, dated January 17, 2007).

SECTION 2

COMPLIANCE TEST RESULTS SUMMARY

A 1,635 kg 2015 Chevrolet Trax sport utility vehicle was impacted from the rear by a 1357.0 kg moving barrier at a velocity of 79.21 kph (49.22 mph). The test was performed by Calspan Corporation on January 6, 2015.

The test vehicle was equipped with a 53.0 liter fuel tank which was filled to 93 percent capacity with stoddard fluid prior to impact. Additional ballast (85.0 kg) was secured in the vehicle's rear passenger foot well. Two ballast Part 572E 50th percentile male Anthropomorphic Test Devices (ATD) were placed in the front occupant seating positions.

The crash event was recorded by three high-speed cameras and one real-time camera. High-speed camera locations and other pertinent camera information can be found on page 3-7 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 and including all portions of the static rollover test. The maximum vehicle longitudinal crush was 589 millimeters of which the average was 480 millimeters. The vehicle appeared to comply with all the requirements of FMVSS No. 301 "Fuel System Integrity."

SECTION 3

SUMMARY OF TEST RESULTS

This section contains information reporting for the following Data Sheets:

Data Sheet No. 1 – Test Vehicle Specifications

Data Sheet No. 2 – Pre-Test Data

Data Sheet No. 3 – Moving Deformable Barrier (MDB) Data

Data Sheet No. 4 – High Speed Camera Locations and Data Summary

Data Sheet No. 5 – Post-Test Data

Data Sheet No. 6 – FMVSS No. 301 Static Rollover Test Data

DATA SHEET NO. 1
TEST VEHICLE SPECIFICATIONS

Test Vehicle: 2015 Chevrolet Trax sport utility vehicle
Test Program: FMVSS 301R Compliance Rear Impact Test

NHTSA No.: C20150103
Test Date: 01/06/2016

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	C20150103	Overdrive	Yes
Model Year	2015	Air Conditioning (AC)	Yes
Make	Chevrolet	All-Wheel Drive (AWD)	No
Model	Trax	Anti-Lock Brakes (ABS)	Yes
Body Style	SUV	Automatic Door Locks (ADL)	Yes
Body Color	White	Power Brakes	Yes
Odometer Reading (km/mi)	228.5 km / 142 mi	Power Seats	No
Engine Displacement (L)	1.4	Power Steering	Yes
Type/No. Cylinders	I4	Power Windows	Yes
Engine Placement	Transverse	Stability Control (Auto-Leveling)	No
Transmission Type	Automatic	Sunroof/T-Top	No
Transmission Speeds	6-Speed	Tilt Steering Wheel	Yes
Final Drive	FWD	Traction Control System (TCS)	Yes

DEALER AND DELIVERY INFORMATION FROM CERTIFICATION LABEL

Manufactured By	GM Korea Company	GVWR (kg)	1945
Date of Manufacture	10/14	GAWR Front (kg)	1065
VIN	KL7CJКСВХFB075108	GAWR Rear (kg)	995

TIRE PLACARD & SIDEWALL INFORMATION

Tire Placard Location: Driver's Door Sill Spare Tire Type: T125/70D16

Measured Parameter	Front	Rear
Tire Manufacturer	Continental	Continental
Tire Name	ContiProContact	ContiProContact
Tire Type	Passenger	Passenger
Max. Tire Pressure (kPa)	300	300
Recommended Tire Size	P205/70/R16	P205/70/R16
Load Index/Speed Symbol	96H	96H
Recommended Cold Tire Pressure (kPa)	240	240
Tire Size on Vehicle	P205/70/R16	P205/70/R16
Treadwear/ Traction Grade/ Temperature Grade	500 / AA / A	500 / AA / A

VEHICLE CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	-	5
Seat Type (Bench, Bucket, or Split Bench)	Bucket	Split Bench	-	
Capacity Weight (VCW) (kg)				428
DSC X 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)				87.8

**DATA SHEET NO. 2
PRE-TEST DATA**

Test Vehicle: 2015 Chevrolet Trax sport utility vehicle
Test Program: FMVSS 301R Compliance Rear Impact Test

NHTSA No.: C20150103
Test Date: 01/06/2016

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	461	253		501	332	
Right	kg	407	278		476	326	
Ratio	%	62.0	38.0		59.8	40.2	
Totals	kg	868	531	1399	977	658	1635

TARGET TEST WEIGHT CALCULATION (TTW)

Measured Parameter	Units	Value	
Total Unloaded Vehicle Weight (UVW)	kg	1399	(A)
Rated Cargo/Luggage Weight (RCLW)	kg	87.8	(B)
Weight of two P572E ATDS @ 78 kg each	kg	156	(C)
Target Vehicle Test Weight (TVTWT)	kg	1642.8	(A+B+C)

*As tested Weight = (TVTWT -10kg) <=ATW < (TVTWT -5kg); TVTWT = Weight of Test Vehicle with 2 dummies and 136.0 kg of Cargo Weight

GENERAL TEST VEHICLE DATA

Measured Parameter	Units	Value
Vehicle Wheelbase	mm	2559
Vehicle Length (at Centerline)	mm	4246
Vehicle Width	mm	1746
Weight of Ballast Secured in Cargo Area ¹	kg	85
Type of Ballast		Weight Plates
Method of Securing Ballast		Bolted to Rear Foot Well
Components Removed for Weight Reduction		0
Vehicle Width at Widest Point	mm	1776
Vehicle Width at Widest Point Location		Front Wheel Axle
Centerline offset for impact line	mm	355
Filler neck side (left/right)		Right

¹ Ballast weight does not include the weight of instrumentation, on-board cameras and data acquisition system

TEST VEHICLE ATTITUDE AND CG

	Units	Left		Right		CG (aft of front axle)
		Front	Rear	Front	Rear	
As Delivered (UVW)	mm	744	765	749	772	971
As Tested (ATW)	mm	725	741	732	744	1030

DATA SHEET NO. 2 (Continued)
PRE-TEST DATA

Test Vehicle: 2015 Chevrolet Trax sport utility vehicle
Test Program: FMVSS 301R Compliance Rear Impact Test

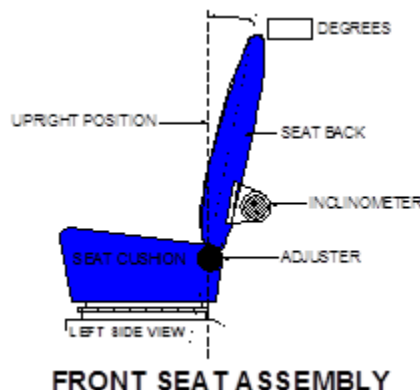
NHTSA No.: C20150103
Test Date: 01/06/2016

SEATING

Nominal Design Riding Position (for adjustable driver and passenger seat backs). *Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable.*

Driver Seat Instructions: The driver seat back was positioned according to the Nominal Design Riding position listed in FORM 1.

Passenger Seat Instructions: The passenger seat back was positioned to the Nominal Design Riding position listed in FORM 1.



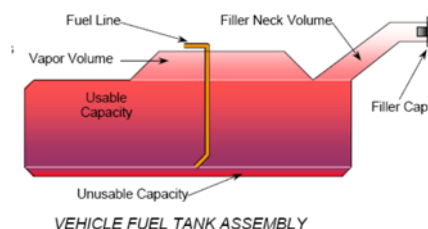
Measured Parameter	Deg.
Driver Seat Back Angle	5.0
Passenger Seat Back Angle	4.3

SEAT FORE/AFT POSITIONING

Driver Seat: Was positioned according to the Nominal Design Riding position listed in FORM1.

Passenger Seat: Was positioned according to the Nominal Design Riding position listed in FORM1.

	Total # of Positions	Placed in Position #
Driver Seat	54 (0 – 53)	27
Passenger Seat	54 (0 – 53)	27



FUEL TANK CAPACITY DATA

Measured Parameter	Reference	Liters
Fuel System Capacity (Standard Tank)	Owner's Manual	53.0
COTR Usable Capacity (Standard Tank)	Form No. 1	53.0
Test Volume Range	92-94% of Usable Capacity	48.75-49.81
Actual Test Volume (Solvent Used)	93% of Usable Capacity	49.29

FUEL SYSTEM DATA

Measured Parameter	Value
Test Fluid Type	Stoddard Solvent
Test Fluid Specific Gravity	0.764
Test Fluid Kinematic Viscosity (centistokes)	0.96
Test Fluid Color	Purple
Electric Fuel Pump?	Yes
Can Activate Electric Fuel Pump with Ignition Switch On but Engine Off?	Yes

Fuel Pump Comments : None

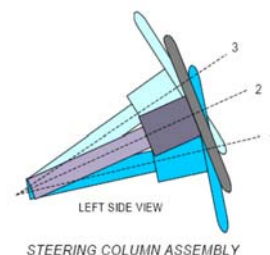
DATA SHEET NO. 2 (Continued)
PRE-TEST DATA

Test Vehicle: 2015 Chevrolet Trax sport utility vehicle
Test Program: FMVSS 301R Compliance Rear Impact Test

NHTSA No.: C20150103
Test Date: 01/06/2016

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.



Operational Instructions: Tilt wheel was positioned to mid-range at 23.3 degrees and mid fore/aft position at 17.5 mm

SEAT BELT UPPER ANCHORAGE

Nominal design riding position

Operational Instructions: Anchorage were set to the most upright position.

COMMENTS: None

DATA SHEET NO. 3
MOVING DEFORMABLE BARRIER (MDB) DATA

Test Vehicle: 2015 Chevrolet Trax sport utility vehicle
 Test Program: FMVSS 301R Compliance Rear Impact Test

NHTSA No.: C20150103
 Test Date: 01/06/2016

MDB Face Manufacturer: Plascore MDB Face Serial No. A1215029

MDB SPECIFICATIONS

Measurement Description	Units	Length
Overall Width of Framework Carriage	mm	1250
Overall Length of MDB (incl. honeycomb impactor face)	mm	4120
Wheelbase of Framework Carriage	mm	2591
Tread of Framework Carriage (Front & Rear)	mm	1880
CG Location of Front Axle	mm	1136

MDB WEIGHTS

Measurement Description	Units	Front	Rear	Total
Left	kg	358.0	322.0	680.0
Right	kg	404.0	273.0	677.0
Ratio	%	56.2	43.8	100.0
Totals	kg	762.0	595.0	1357.0

MDB TIRE SIZE & PRESSURES

	Units	Requirement	Left Front	Right Front	Left Rear	Right Rear
Tire Size		P205/75R15	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	kPa	200 ± 21	207	207	207	207

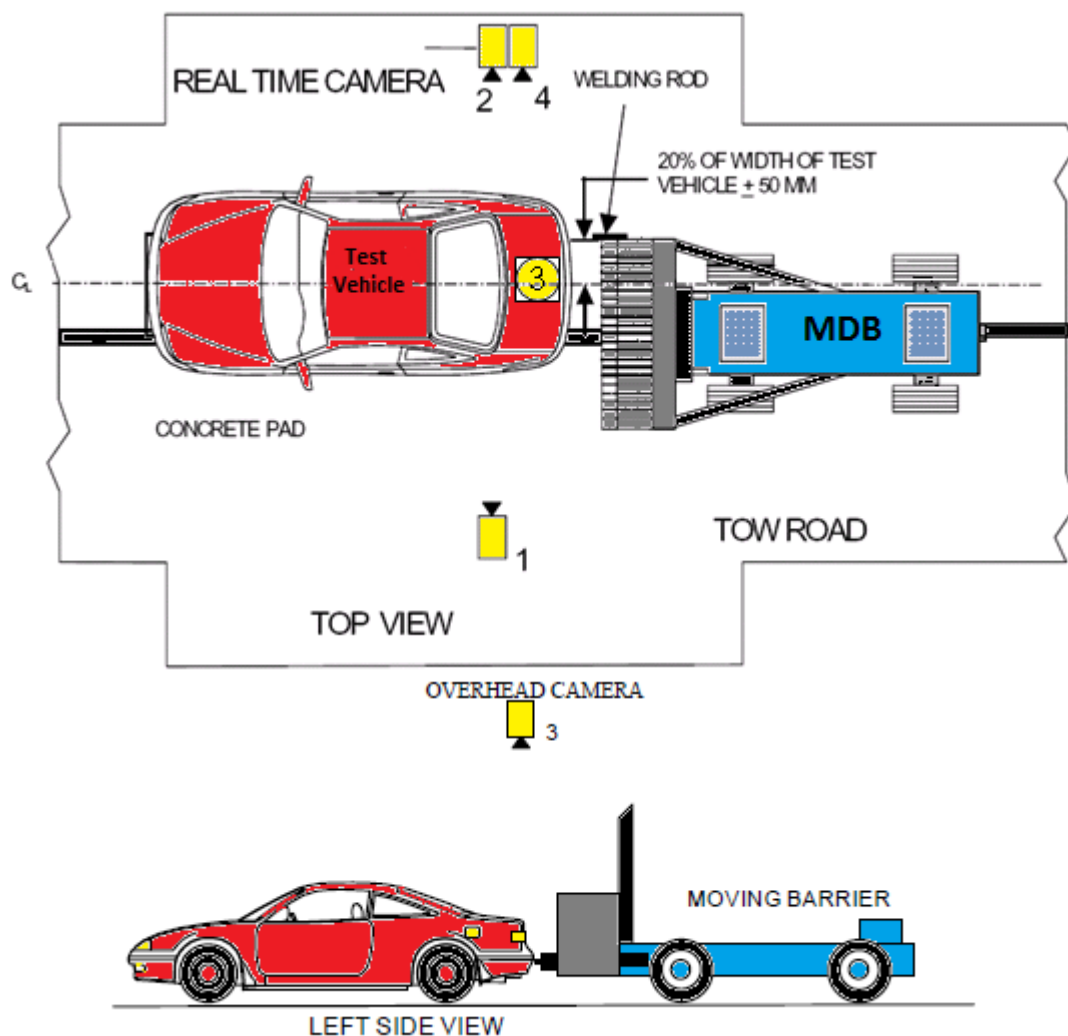
Brake Abort System? (Yes/No): Yes

Date of Last MDB Calibration: May 15, 2010

DATA SHEET NO. 4 **HIGH SPEED CAMERA LOCATIONS AND DATA SUMMARY**

Test Vehicle: 2015 Chevrolet Trax sport utility vehicle
 Test Program: FMVSS 301R Compliance Rear Impact Test

NHTSA No.: C20150103
 Test Date: 01/06/2016



No.	Camera View	Coordinates (mm)			Angle (Deg)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Left Side View	-1102	-9425	-1134	0.9	24	1000
2	Real-Time Camera						60
3	Overhead View	0	0	-5344	90	14	1000
4	Right Side View	-1114	-10192	-1198	-2.1	24	1000

* Reference (from point of impact); all measurements accurate to within ± 6 mm.

X = (Impact Point) + Forward

Y = (Impact Point) + To Right

Z = (Ground Level) + Down

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

Test Vehicle: 2015 Chevrolet Trax sport utility vehicle
Test Program: FMVSS 301R Compliance Rear Impact Test

NHTSA No.: C20150103
Test Date: 01/06/2016

VIN: KL7CJКСВХFB075108

REQUIRED IMPACT VELOCITY RANGE: 78.5 to 80.1 km/h

ACTUAL IMPACT VELOCITY (WITHIN 1.5 M OF IMPACT PLANE)

Measurement Description	Units	Speed
Trap No. 1	km/h	79.21
Trap No. 2	km/h	79.30

WELDING ROD IMPACT POINT

Measurement Description	Tolerance	Units	Value
Vertical distance from target center (+ is above)	±40 mm	mm	+5
Horizontal distance from target center (+ is right)	±50 mm	mm	0

STODDARD SOLVENT SPILLAGE MEASUREMENT:

- A. From impact until vehicle motion ceases:
(Maximum allowable is 28 grams) 0 grams
- B. For the 5-minute period after motion ceases:
(Maximum allowable is 28 grams) 0 grams
- C. For the next 25 minutes:
(Maximum allowable is 28 grams/minute) 0 grams
- D. Spillage Details: No Spillage Occurred

DATA SHEET NO. 5
POST-TEST DATA (Continued)

Test Vehicle: 2015 Chevrolet Trax sport utility vehicle
Test Program: FMVSS 301R Compliance Rear Impact Test

NHTSA No.: C20150103
Test Date: 01/06/2016

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Operational	Operational
Rear Door Opening	Closed/Jammed	Closed/Jammed
Seat Track Shift (mm)	6	8
Seat Back Failure	Reclined	Reclined
Glazing Damage	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	None
Window Damage	Rear Windshield Shattered
Other Notable Effects	None

VEHICLE CRUSH MEASUREMENTS: LENGTH

Measurement	Units	Left Side	Centerline	Right Side
Pre-Test	mm	4123	4246	4124
Post-Test	mm	3820	3657	3576
Crush	mm	303	589	548

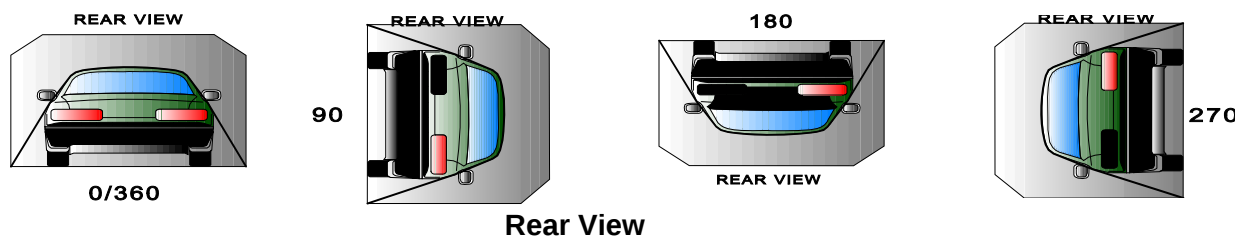
VEHICLE CRUSH MEASUREMENTS: WHEELBASE

Measurement	Units	Left Side	Right Side
Pre-Test	mm	2559	2559
Post-Test	mm	2555	2435
Crush	mm	4	124

DATA SHEET NO. 6
FMVSS NO. 301 STATIC ROLLOVER TEST DATA

Test Vehicle: 2015 Chevrolet Trax sport utility vehicle
 Test Program: FMVSS 301R Compliance Rear Impact Test

NHTSA No.: C20150103
 Test Date: 01/06/2016



ROLLOVER SOLVENT COLLECTION TIME TABLE

Test Phase	Rotation Time (spec. 1 -3 min)		Hold Time	Total Time		Next Whole Minute Interval
	Minutes	Seconds		Minutes	Seconds	
0° to 90°	1	6	5	6	06	7
90° to 180°	1	4	5	6	04	7
180° to 270°	1	5	5	6	05	7
270° to 360°	1	11	5	6	11	7

FMVSS 301 REQUIREMENTS TABLE (Maximum allowable solvent spillage)

First 5 Minutes (grams)	6th Minute (grams)	7th Minute (grams)	8th Minute (grams)
142	28	28	28

ACTUAL TEST VEHICLE STODDARD SOLVENT SPILLAGE TABLE

Test Phase	First 5 Minutes (grams)	6th Minute (grams)	7th Minute (grams)	8th Minute (grams)
0° to 90°	0	0	0	
90° to 180°	0	0	0	
180° to 270°	0	0	0	
270° to 360°	0	0	0	

ROLLOVER STODDARD SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	None
90° to 180°	None
180° to	None
270° to	None

APPENDIX A
PHOTOGRAPHS

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42	Rollover 360° View	A-23



Figure A-1: Vehicle Certification Placard

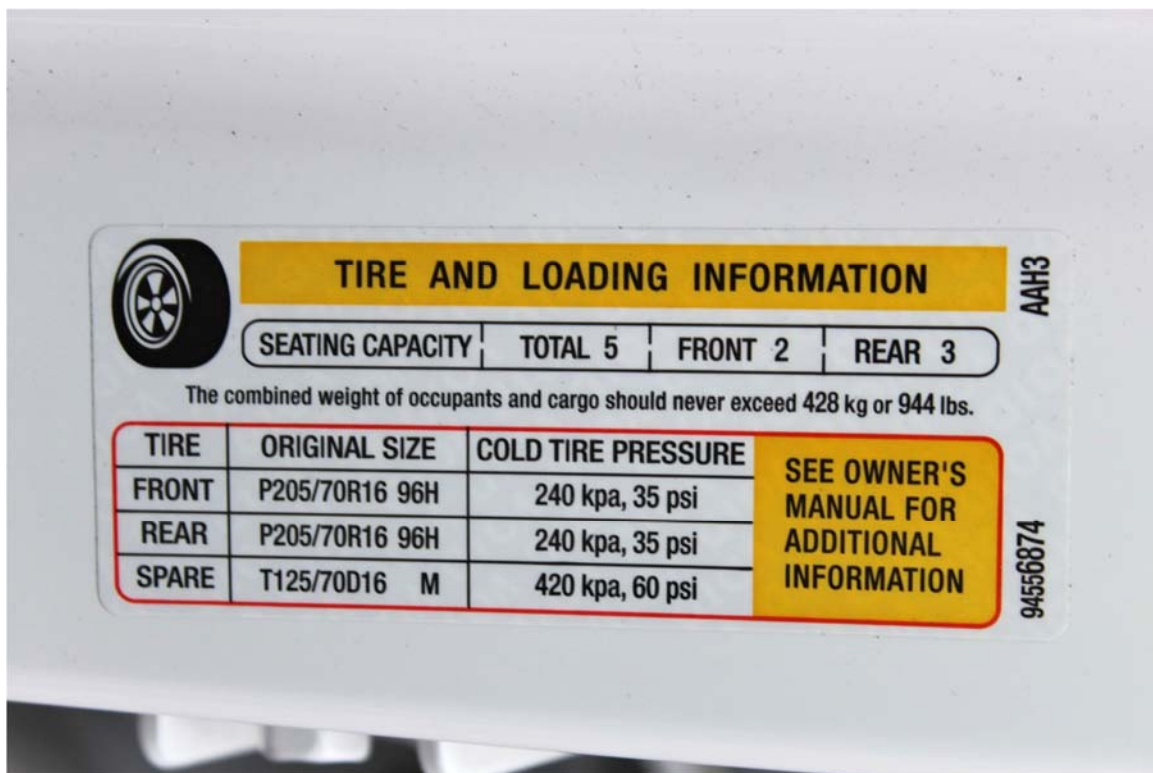


Figure A-2: Vehicle Tire Placard



Figure A-3: Pre-Test Front View

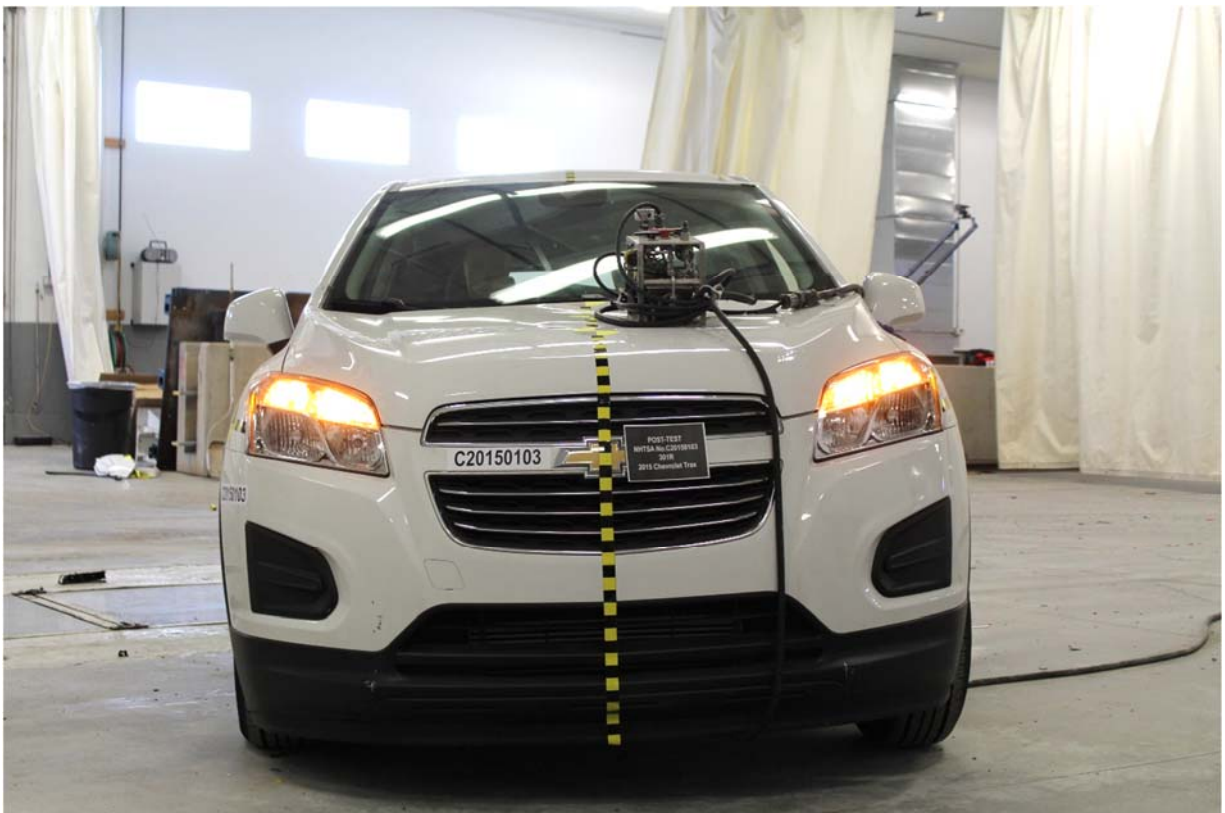


Figure A-4: Post-Test Front View



Figure A-5: Pre-Test Left Side View



Figure A-6: Post-Test Left Side View



Figure A-7: Pre-Test Right Side View



Figure A-8: Post-Test Right Side View



Figure A-9: Pre-Test Left Front 3/4 View



Figure A-10: Post-Test Left Front 3/4 View



Figure A-11: Pre-Test Right Front 3/4 View



Figure A-12: Post-Test Right Front 3/4 View



Figure A-13: Pre-Test Left Rear 3/4 View



Figure A-14: Post-Test Left Rear 3/4 View



Figure A-15: Pre-Test Right Rear 3/4 View



Figure A-16: Post-Test Right Rear 3/4 View



Figure A-17: Pre-Test Rear View

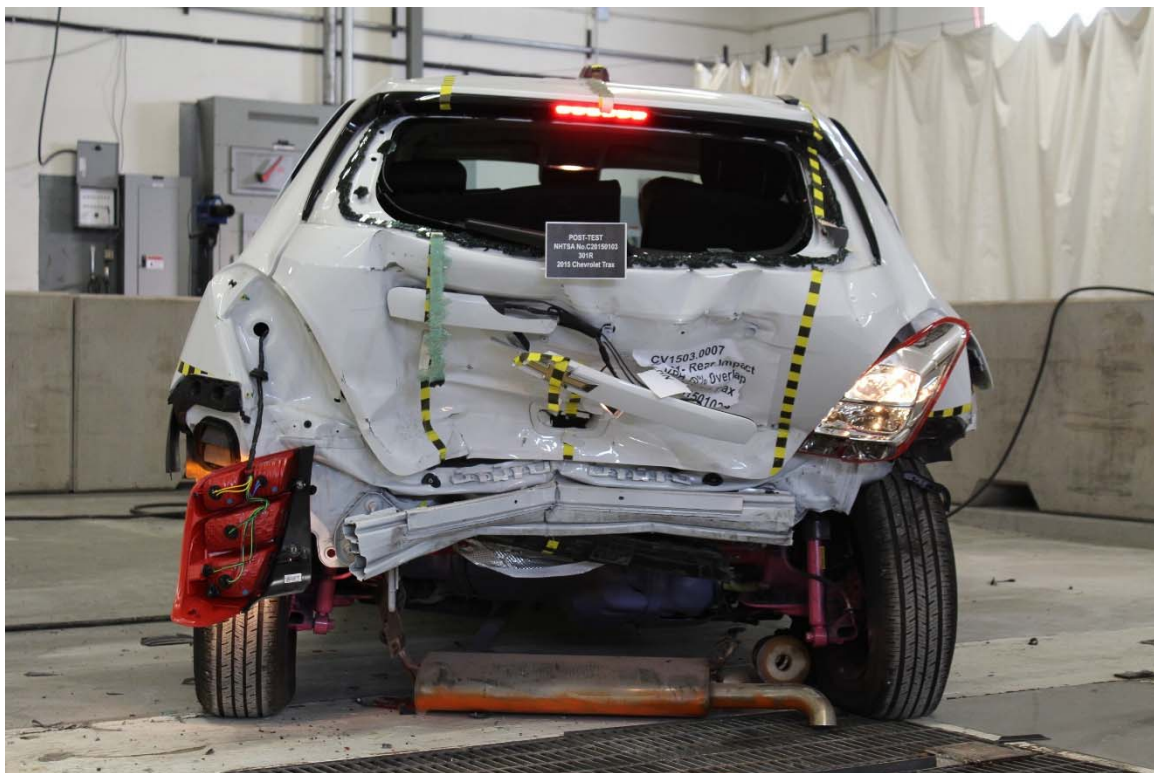


Figure A-18: Post-Test Rear View



Figure A-19: Pre-Test MDB Front View



Figure A-20: Post-Test MDB Front View



Figure A-21: Pre-Test MDB Left Side View



Figure A-22: Post-Test MDB Left Side View



Figure A-23: Pre-Test MDB Right Side View



Figure A-24: Post-Test MDB Right Side View



Figure A-25: Pre-Test MDB Top View



Figure A-26: Post-Test MDB Top View



Figure A-27: Pre-Test Overhead Vehicle and MDB View



Figure A-28: Post-Test Impact Target View

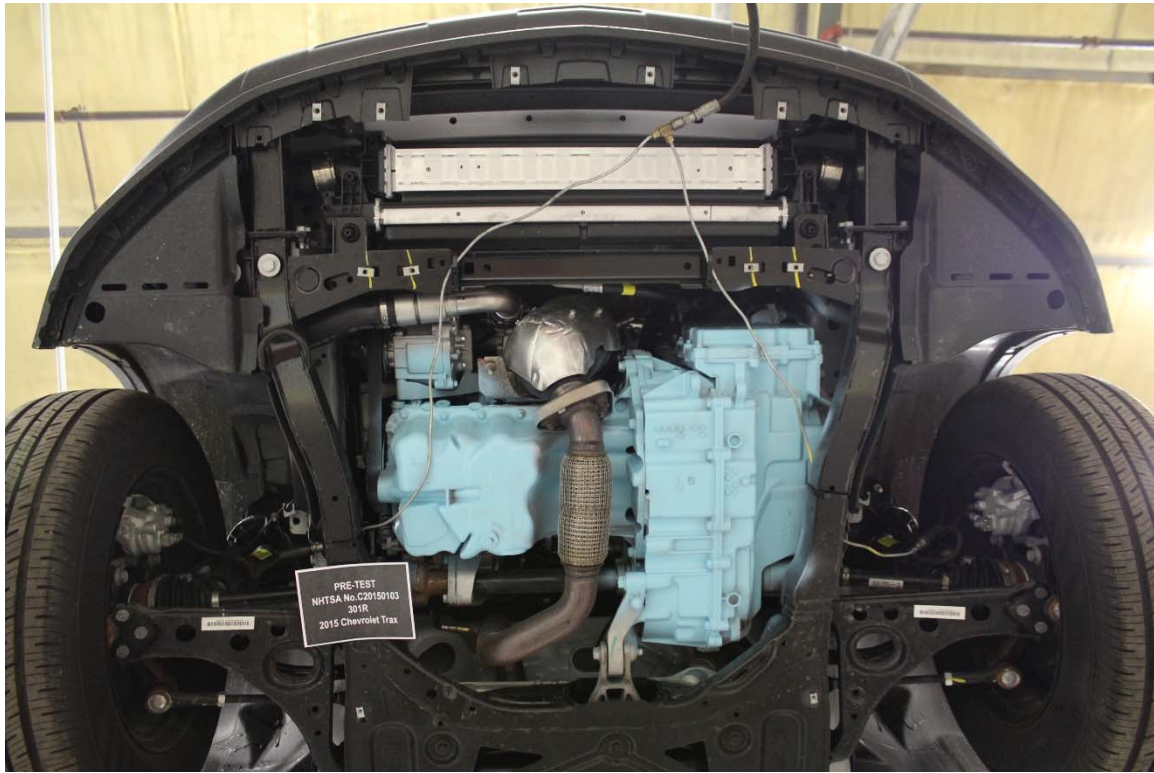


Figure A-29: Pre-Test Front Underbody View



Figure A-30: Post-Test Front Underbody View

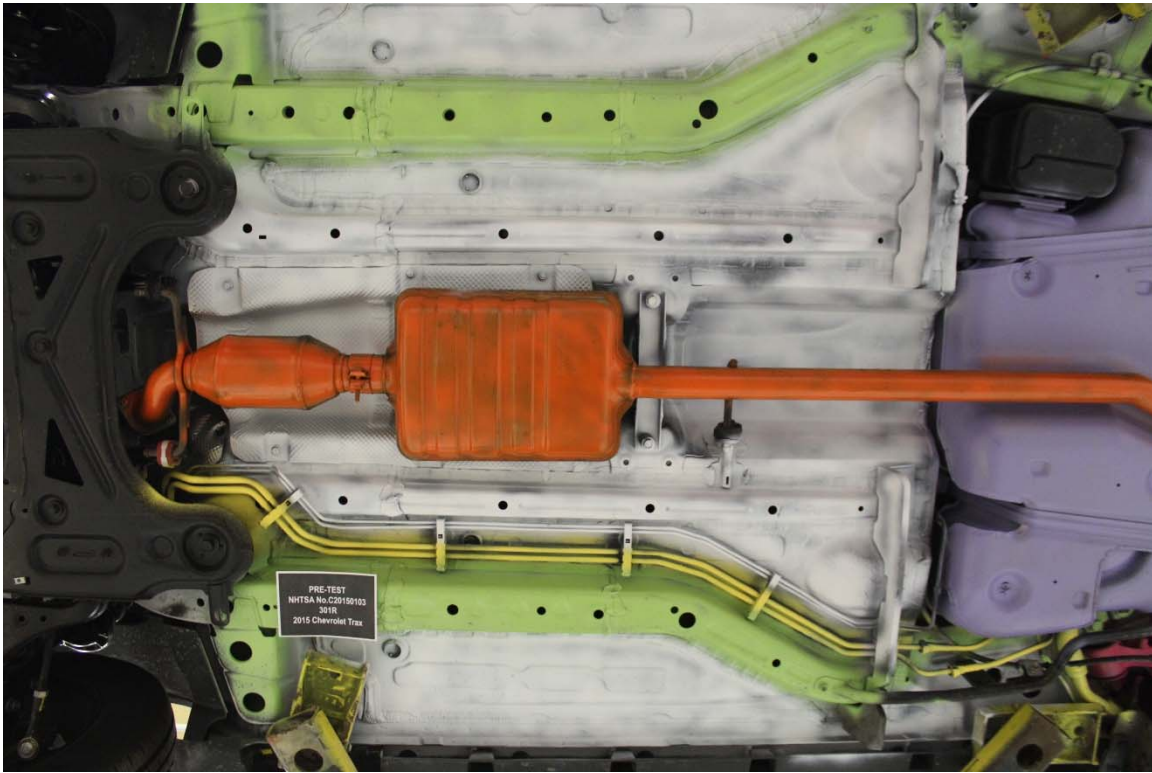


Figure A-31: Pre-Test Mid Underbody View

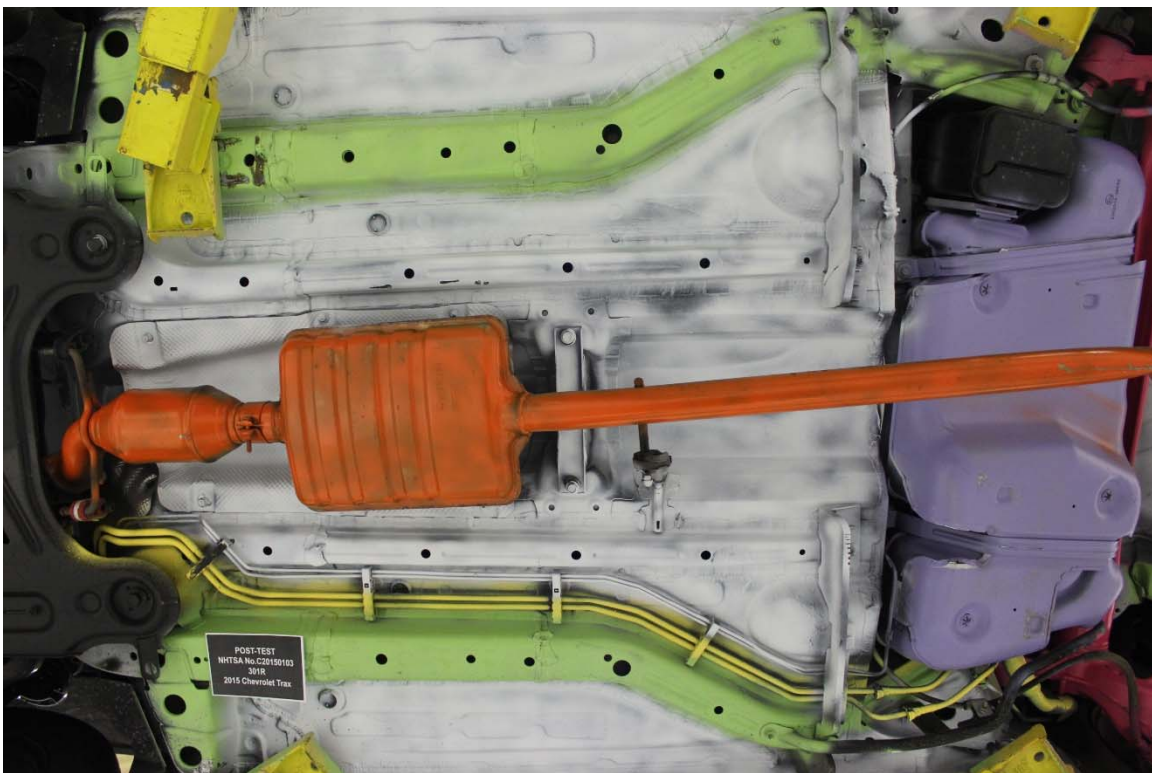


Figure A-32: Post-Test Mid Underbody View

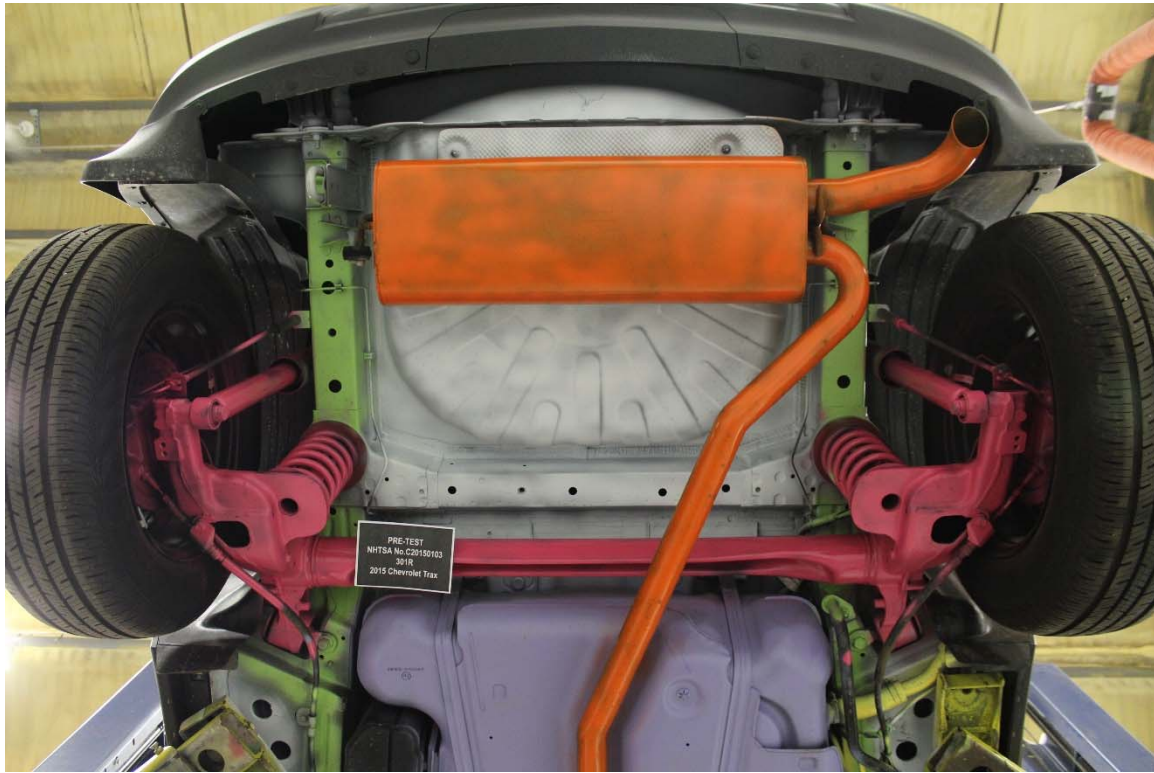


Figure A-33: Pre-Test Rear Underbody View



Figure A-34: Post-Test Rear Underbody View



Figure A-35: Pre-Test Fuel Filler Cap View



Figure A-36: Post-Test Fuel Filler Cap View



Figure A-37: Impact View



Figure A-38: Speed Trap View*



Figure A-39: Rollover 90° View

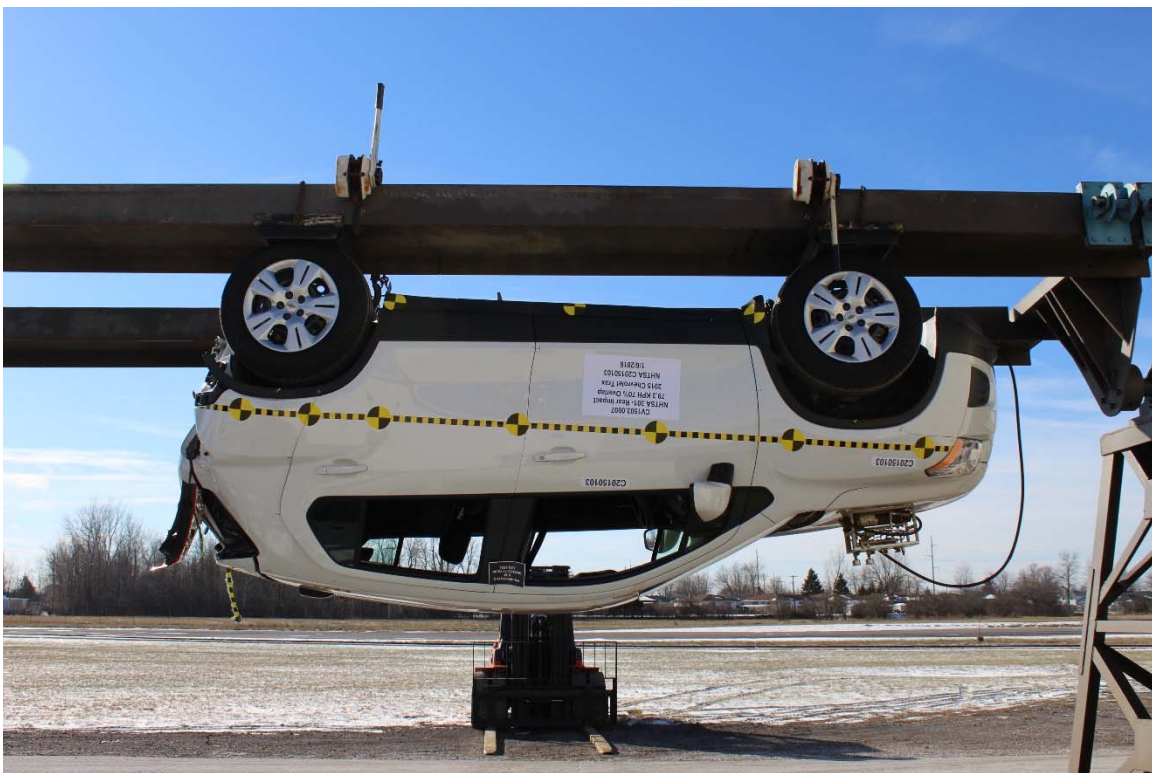


Figure A-40: Rollover 180° View



Figure A-41: Rollover 270° View



Figure A-42: Rollover 360° View