

**REPORT NUMBER: 301-MGA-2011-010**

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

**NISSAN MOTOR COMPANY LTD  
2011 NISSAN JUKE S  
NHTSA NUMBER: CB5202**

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



**Test Date: August 19, 2011**


**Final Report Date: September 8, 2011**

**FINAL REPORT**

**PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
ENFORCEMENT  
OFFICE OF VEHICLE SAFETY COMPLIANCE  
1200 NEW JERSEY AVENUE, S.E., NVS-220  
WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-06-C-00030.

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9/8/2011

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**Technical Report Documentation Page**

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16. Abstract A rear impact was conducted on a 2011 Nissan Juke S at MGA Research Corporation on August 19, 2011. This test was conducted to obtain data indicant of FMVSS 301R. The impact velocity was 79.5 km/h. The ambient temperature at the time of impact was 27 degrees Celsius.					
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## SECTION 1

### PURPOSE AND SUMMARY OF TEST

#### PURPOSE

This rear impact test is sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number DTNH22-06-C-00030. The purpose of this test is to reduce deaths and injuries occurring from fires that result from fuel spillage during and after motor vehicle crashes and resulting from ingestion of fuels during siphoning.

#### SUMMARY

A 2011 Nissan Juke S was impacted by a Moving Deformable Barrier (MDB) at a velocity of 79.5 km/h. The test was performed at MGA Research Corporation on August 19, 2011. Pre-and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and five high-speed cameras were used to document the impact event.

- Left Rear Half 1000 fps
- Right Rear Half 1000 fps
- Overhead Overall 1000 fps
- Left Overall 1000 fps
- Right Overall 1000 fps
- Real Time Pan 30 fps

Two ballast Part 572E, 50<sup>th</sup> percentile male anthropomorphic test devices (ATDs) were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

There was no Stoddard Solvent leakage after the event or during any phase of the static rollover.

The vehicle appeared to comply with all the requirements of FMVSS No. 301 "Fuel System Integrity."

**SECTION 2  
DATA SHEETS**

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

Test Vehicle: 2011 Nissan Juke S NHTSA No.: CB5202  
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 8/19/2011

**TEST VEHICLE INFORMATION**

Manufacturer	Nissan Motor Company, LTD
Model	Juke S
Body Style	Passenger
Major Options	None
NHTSA No.	CB5202
VIN	JN8AF5MR9BT010122
Color	Gun Metallic
Delivery Date	7/26/2011
Odometer Reading (mile)	51
Dealer	Rosen Nissan
Transmission	Automatic
Final Drive	Front Wheel Drive
Number of Cylinders	4
Engine Displacement (L)	1.6
Engine Placement	Lateral

**DATA FROM VEHICLE'S CERTIFICATION LABEL**

Manufactured By	Nissan Motor Company LTD
Date of Manufacture	12/10

GVWR (kg)	1800
GAWR Front (kg)	990
GAWR Rear (kg)	840

**VEHICLE CAPACITY DATA**

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				390
Number of Occupants x 68 kg.				340
Cargo Wt. (RCLW) (kg)				50

**DATA SHEET NO. 1 (continued)**  
**TEST VEHICLE SPECIFICATIONS**

Test Vehicle: 2011 Nissan Juke S                      NHTSA No.: CB5202  
 Test Program: FMVSS 301 Fuel System Integrity      Test Date: 8/19/2011

**DATA FROM VEHICLE'S TIRE PLACARD**

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	308	308
Cold Pressure (kPa)	250	250
Recommended Tire Size	215/55R17	215/55R17
Recommended Load Range	93V	93V
Tire Size on Vehicle	215/55R17	215/55R17
Tire Manufacturer	Goodyear	Goodyear
Location of Placard of Vehicle	Driver Door Post	
Type of Spare Tire (full size/space saver)	Space Saver	

**DATA SHEET NO. 2**

**PRE-TEST DATA**

Test Vehicle: 2011 Nissan Juke S                      NHTSA No.: CB5202  
 Test Program: FMVSS 301 Fuel System Integrity      Test Date: 8/19/2011

**WEIGHT OF TEST VEHICLE**

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	420.0	254.9		465.4	315.7	
Right	kg	428.2	241.3		459.5	294.4	
Ratio	%	63.1	36.9		60.3	39.7	
<b>Totals</b>	kg	<b>848.2</b>	<b>496.2</b>	<b>1344.4</b>	<b>924.9</b>	<b>610.1</b>	<b>1535.0</b>

**CALCULATION OF TARGET TEST WEIGHT (TTW)**

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1344.4
Rated Cargo/Luggage Weight (RCLW)	kg	50
Weight of 2 P572E ATDs	kg	148
<b>Calculated Vehicle Target Weight (TVTW)</b>	kg	<b>1542.4</b>

Vehicle Wheelbase	2535 mm
Vehicle Width	1772 mm
Weight of Ballast Secured in Rear Seat	46.3 kg
Method of Securing Ballast	Ratchet Straps
Vehicle Components Removed for Weight Reduction	None

**VEHICLE ATTITUDES**

	Units	LF	RF	LR	RR
As Delivered	mm	725	730	750	743
As Tested	mm	717	720	727	729



**DATA SHEET NO. 2 (continued)**

**PRE-TEST DATA**

Test Vehicle: 2011 Nissan Juke S NHTSA No.: CB5202  
Test Program: FMVSS 301 Fuel System Integrity Test Date: 8/19/2011

**FUEL SYSTEM DATA**

	Units: Liters
Usable Capacity of "Standard Tank" (Owner's Manual)	50.0
Usable Capacity Figure Furnished by COTR	50.0
Usable Capacity of "Optional" Tank	
92-94% of Usable Capacity	46.0 to 47.0
Actual Test Volume (entire fuel system filled)	46.8

Test Fluid Type	Stoddard Solvent
Test Fluid Kinematic Viscosity (centistokes)	2.1 cSt @ 20° C
Test Fluid Color	Purple
Type of Vehicle Fuel Pump	Electrical
Activate Electric Fuel Pump Operation with Ignition Switch ON, but Engine OFF	Yes

Comments (noticeable attributes of fuel system components, capacity, etc.)	None
--	------

**DATA SHEET NO. 3**  
**MOVING BARRIER DATA**

Test Vehicle: 2011 Nissan Juke S                      NHTSA No.: CB5202  
 Test Program: FMVSS 301 Fuel System Integrity      Test Date: 8/19/2011

**MOVING BARRIER'S TEST WEIGHT**

	Units	Front	Rear	Total
Left	kg	401.4	279.6	
Right	kg	368.9	312.5	
Ratio	%	56.0	44.0	
Totals	kg	770.3	592.1	1362.4

Tires (Mfr, line, size)	Kumho
Tire Pressure (kPa)	220
Brake Abort System (Yes/No)?	Yes
Date of Last Calibration	6/24/11

**DATA SHEET NO. 4**

**POST-TEST DATA**

Test Vehicle: 2011 Nissan Juke S NHTSA No.: CB5202  
Test Program: FMVSS 301 Fuel System Integrity Test Date: 8/19/2011

**IMPACT VELOCITY**

	Units: km/h
Required Impact Velocity	80.0
Actual Impact Velocity (Trap No. 1)	79.5
Actual Impact Velocity (Trap No. 2)	79.5
Average Impact Speed	79.5

Temperature at Time of Impact (°C)	29
Test Time	9:12 am

**WELDING ROD IMPACT POINT**

	Units: mm
Vertical distance from target center (+ above target / - below target)	13 up
Horizontal distance from target center (+ to the right / - to the left)	7 left

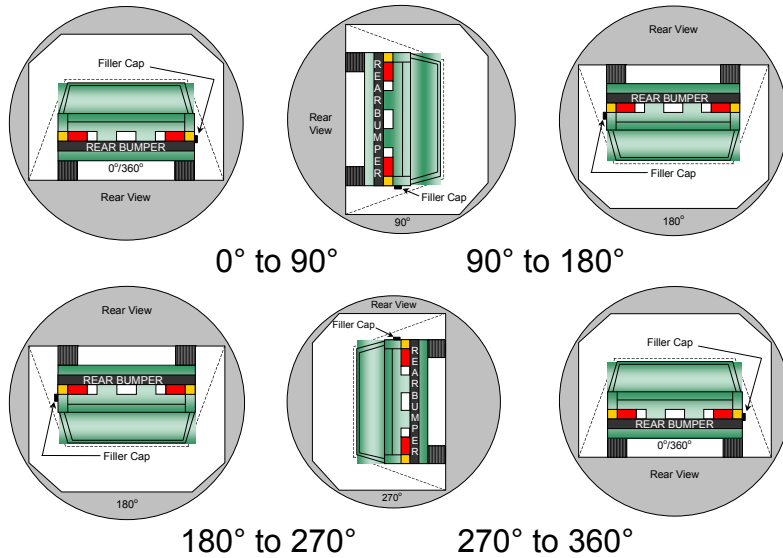
**DATA SHEET NO. 5**  
**STATIC ROLLOVER TEST DATA**

Test Vehicle: 2011 Nissan Juke S                      NHTSA No.: CB5202  
 Test Program: FMVSS 301 Fuel System Integrity      Test Date: 8/19/2011

**STODDARD SOLVENT SPILLAGE MEASUREMENT**

- A. From impact until vehicle motion ceases:   0   g  
 (Maximum Allowable = 28 grams)
- B. For the 5 minute period after motion ceases:   0   g  
 (Maximum Allowable = 28 grams)
- C. For the following 25 minutes:   0   g  
 (Maximum Allowable = 28 grams/minute)
- D. Spillage:   None

**FMVSS 301 STATIC ROLLOVER DATA**



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).

3. Details of Stoddard Solvent spillage locations: **Not Applicable**

**DATA SHEET NO. 5 (continued)**  
**STATIC ROLLOVER TEST DATA**

Test Vehicle: 2011 Nissan Juke S                      NHTSA No.: CB5202  
 Test Program: FMVSS 301 Fuel System Integrity      Test Date: 8/19/2011

**STODDARD SOLVENT SPILLAGE MEASUREMENT**  
**Hold Time = 5 minutes at all intervals**

**0° TO 90° Rotation Time (sec) = 120 sec**

Test Phase	Spillage (g)	Spillage Details
First 5 minutes from onset of rotation	0	
Sixth minute from onset of rotation	0	
Seventh minute from onset of rotation	0	
Eight minute if required	N/A	

**90° TO 180° Rotation Time (sec) = 112 sec**

Test Phase	Spillage (g)	Spillage Details
First 5 minutes from onset of rotation	0	
Sixth minute from onset of rotation	0	
Seventh minute from onset of rotation	0	
Eight minute if required	N/A	

**180° TO 270° Rotation Time (sec) = 109 sec**

Test Phase	Spillage (g)	Spillage Details
First 5 minutes from onset of rotation	0	
Sixth minute from onset of rotation	0	
Seventh minute from onset of rotation	0	
Eight minute if required	N/A	

**270° TO 360° Rotation Time (sec) = 118 sec**

Test Phase	Spillage (g)	Spillage Details
First 5 minutes from onset of rotation	0	
Sixth minute from onset of rotation	0	
Seventh minute from onset of rotation	0	
Eight minute if required	N/A	

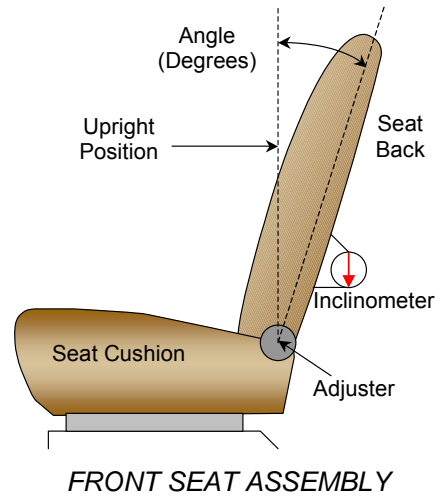
**FORM 1**  
**TEST VEHICLE INFORMATION**

Test Vehicle: 2011 Nissan Juke S  
Test Program: FMVSS 301 Fuel System Integrity

NHTSA No.: CB5202  
Test Date: 8/19/2011

**NORMAL DESIGN RIDING POSITION**

With the seat in the mid fore-aft seat track position the angle of the driver's seat back when it is in the nominal riding position is set at the seventh step, forward most defined as 0.



Driver Seat Back Angle	7 <sup>th</sup> step, 1 <sup>st</sup> as 0
Passenger Seat Back Angle	7 <sup>th</sup> step, 1 <sup>st</sup> as 0

**SEAT FORE/AFT POSITIONING**

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	24 detents	10 <sup>th</sup> detent forward most, 1 <sup>st</sup> as 0
Passenger Seat	24 detents	12 <sup>th</sup> detent forward most, 1 <sup>st</sup> as 0

**D-RING ADJUSTMENT**

The driver and passenger D-rings were full up.

**STEERING COLUMN ADJUSTMENT**

The steering column was placed in the mid position.

**APPENDIX A**  
**PHOTOGRAPHS**

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JN8AF5MR9BT010122



MED BY: NISSAN MOTOR CO., LTD.  
 DATE 12/10 GVWR 3968 LBS.  
 GAWR FR: 2183 LBS.  
 WITH P215/55R17 TRES.  
 17X7 RIMS. AT36PSI  
 COLD SINGLE.  
 GAWR RR: 1852 LBS.  
 WITH P215/55R17 TRES.  
 17X7 RIMS. AT36PSI  
 COLD SINGLE.

THIS VEHICLE CONFORMS  
 TO ALL APPLICABLE FEDERAL  
 MOTOR VEHICLE SAFETY  
 AND THEFT PREVENTION  
 STANDARDS IN EFFECT ON  
 THE DATE OF MANUFACTURE  
 SHOWN ABOVE.  
 VIN: JN8AF5MR9BT010122  
 TYPE: MPV  
 COLOR TRIM TRANS  
 KAD G REOF10B  
 AXLE ENGINE  
 GN57 MR16(DDT) 1618CC

Vehicle's Certification Label



**TIRE AND LOADING INFORMATION**  
**RENSEIGNEMENTS SUR LES PNEUS ET LE CHARGEMENT**

SEATING CAPACITY NOMBRE DE PLACES	TOTAL TOTAL	5	FRONT AVANT	2	REAR ARRIÈRE	3
--------------------------------------	----------------	---	----------------	---	-----------------	---

The combined weight of occupants and cargo should never exceed **390 kg** or **859 lbs.**  
Le poids total des occupants et du chargement ne doit jamais dépasser **390 kg** ou **859 lb.**

TIRE PNEU	SIZE DIMENSIONS	COLD TIRE PRESSURE PRESSION DES PNEUS À FROID	SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION VOIR LE MANUEL DE L'USAGER POUR PLUS DE RENSEIGNEMENTS
FRONT AVANT	P215/55R17 93V	250kPa , <b>36PSI</b>	
REAR ARRIÈRE	P215/55R17 93V	250kPa , <b>36PSI</b>	
<b>SPARE DE SECOURS</b>	T135/80D16 101M	420kPa , <b>60PSI</b>	

TQ 1KA1B

Vehicle's Tire Placard

A-3.



Pre-Test Front View of Vehicle

A-4.



Post-Test Front View of Vehicle

A-5.



Pre-Test Left Side View of Vehicle



Post-Test Left Side View of Vehicle



Pre-Test Left Rear Close-up View of Vehicle



A-8.



Post-Test Left Rear Close-up View of Vehicle

A-9.



Pre-Test Right Side View of Vehicle

A-10.



Post-Test Right Side View of Vehicle



Pre-Test Right Rear Close-up View of Vehicle



Post-Test Right Rear Close-up View of Vehicle

A-13.



Pre-Test Rear View of Vehicle



A-14.

Post-Test Rear View of Vehicle



Pre-Test ¼ Frontal View From Right Side of Vehicle





Post-Test  $\frac{3}{4}$  Frontal View From Right Side of Vehicle



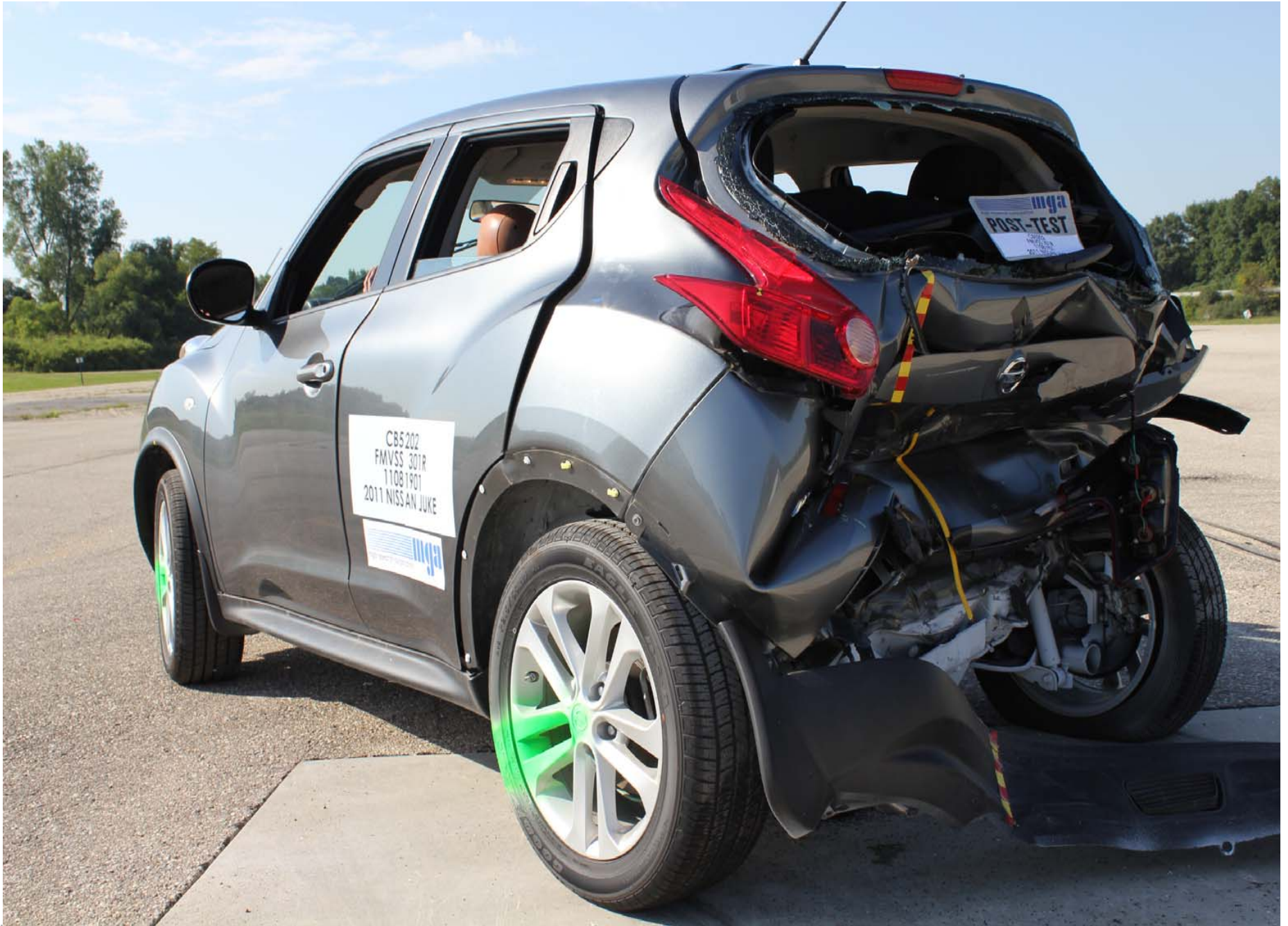
Pre-Test ¾ Rear View From Right Side of Vehicle



Post-Test ¾ Rear View From Right Side of Vehicle



Pre-Test ¾ Rear View From Left Side of Vehicle



Post-Test ¾ Rear View From Left Side of Vehicle

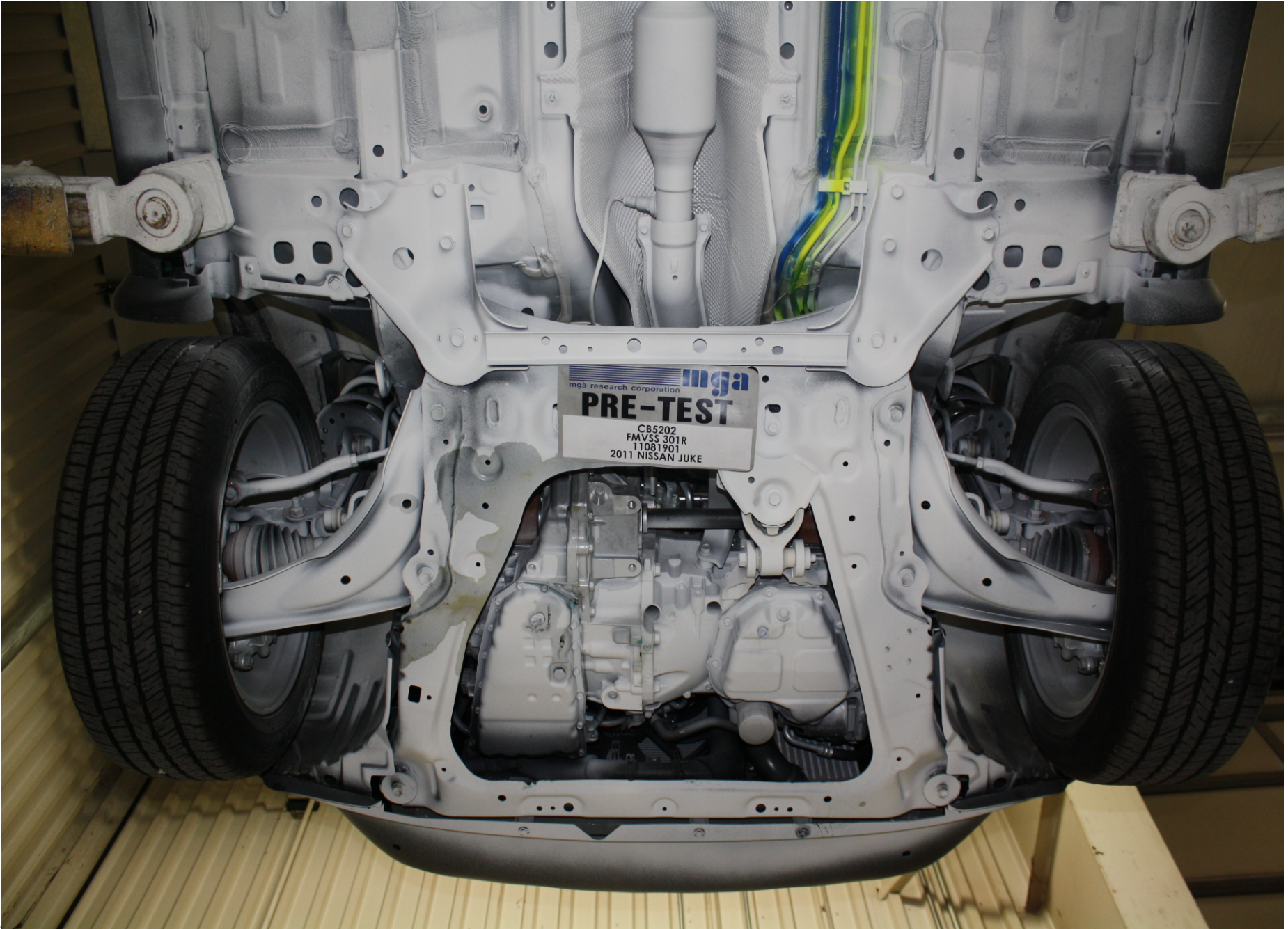


A-21.

Pre-Test Impact Point



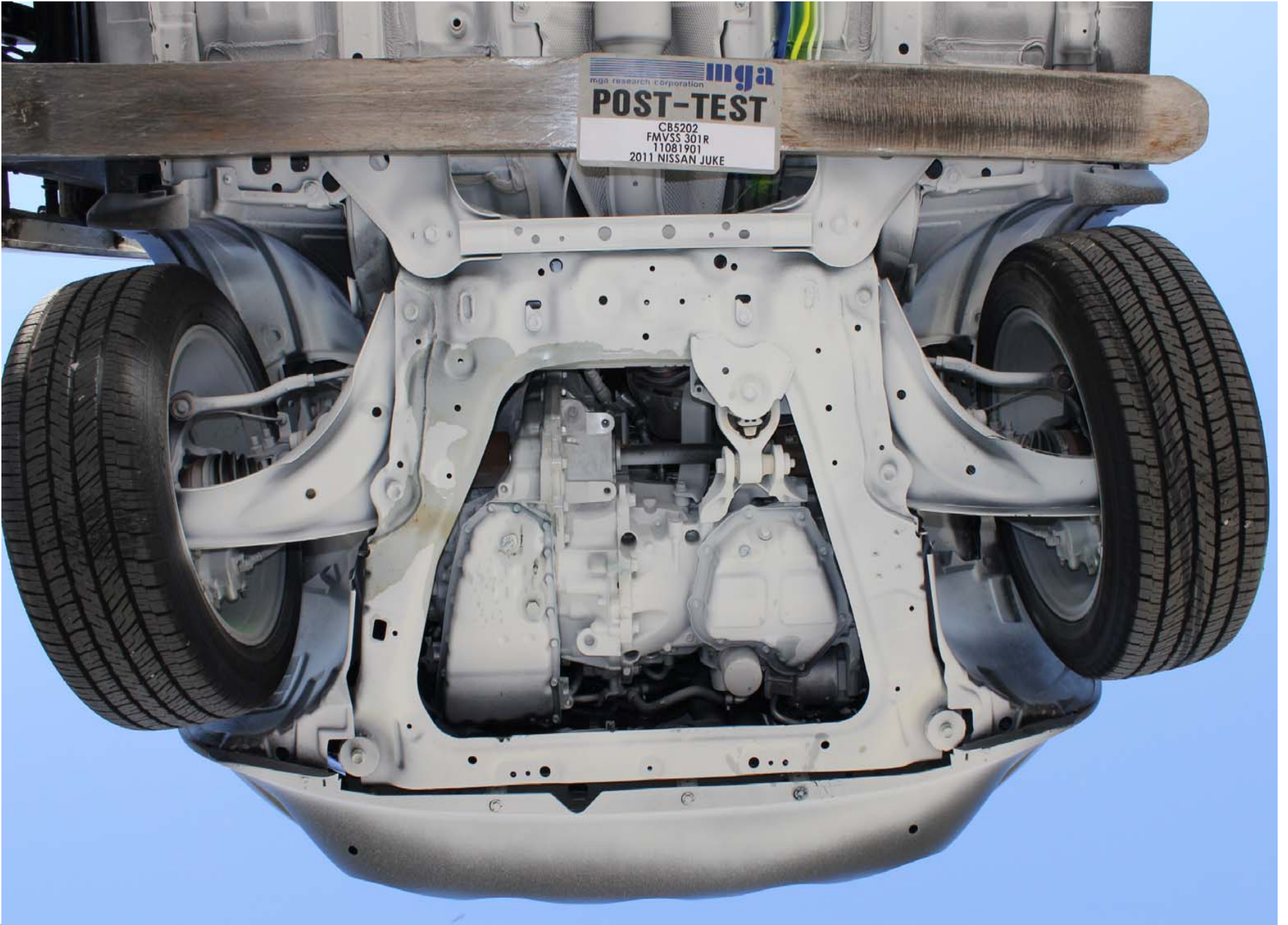
Post-Test Impact Point



A-23.

Pre-Test Underbody View 1

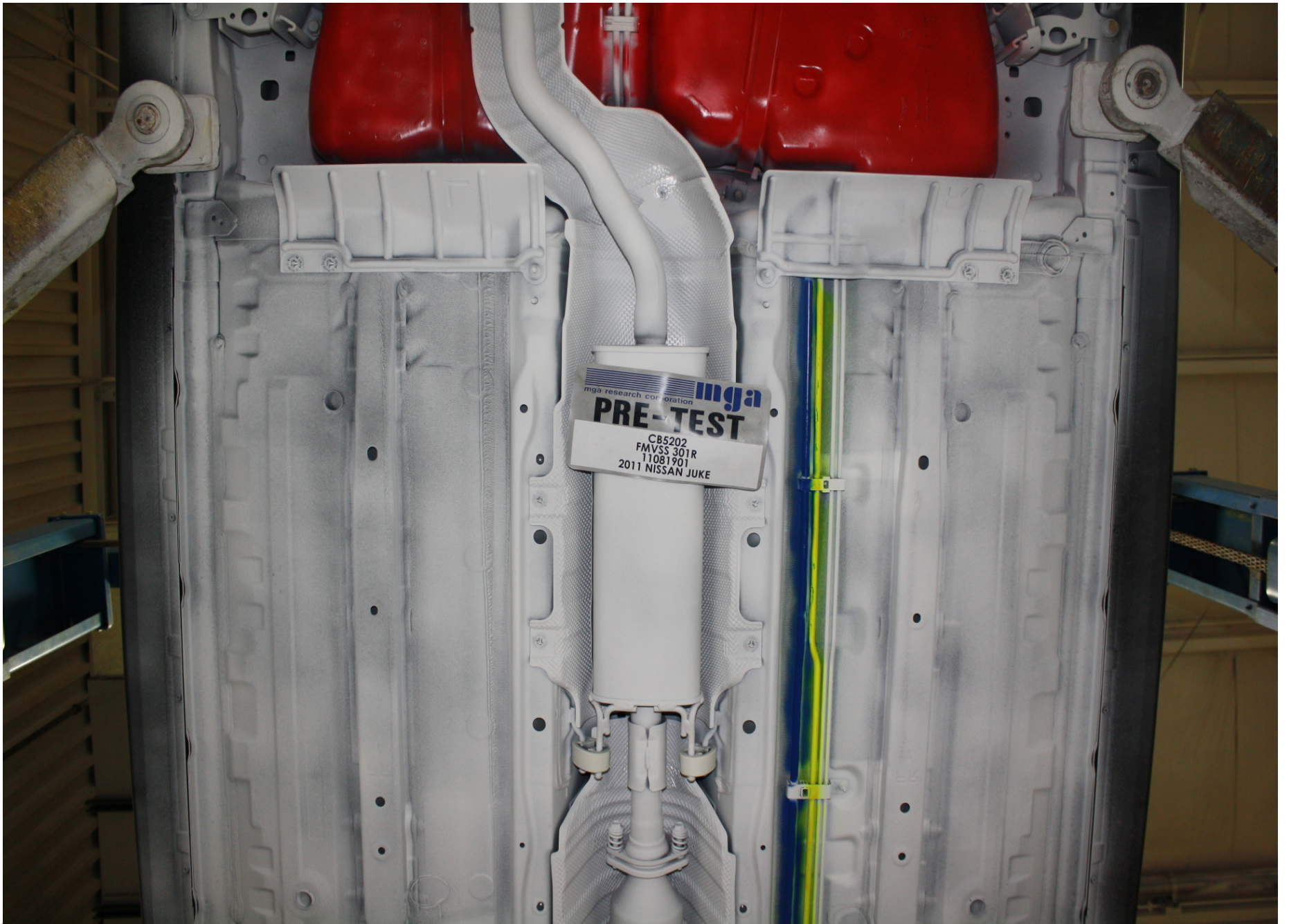




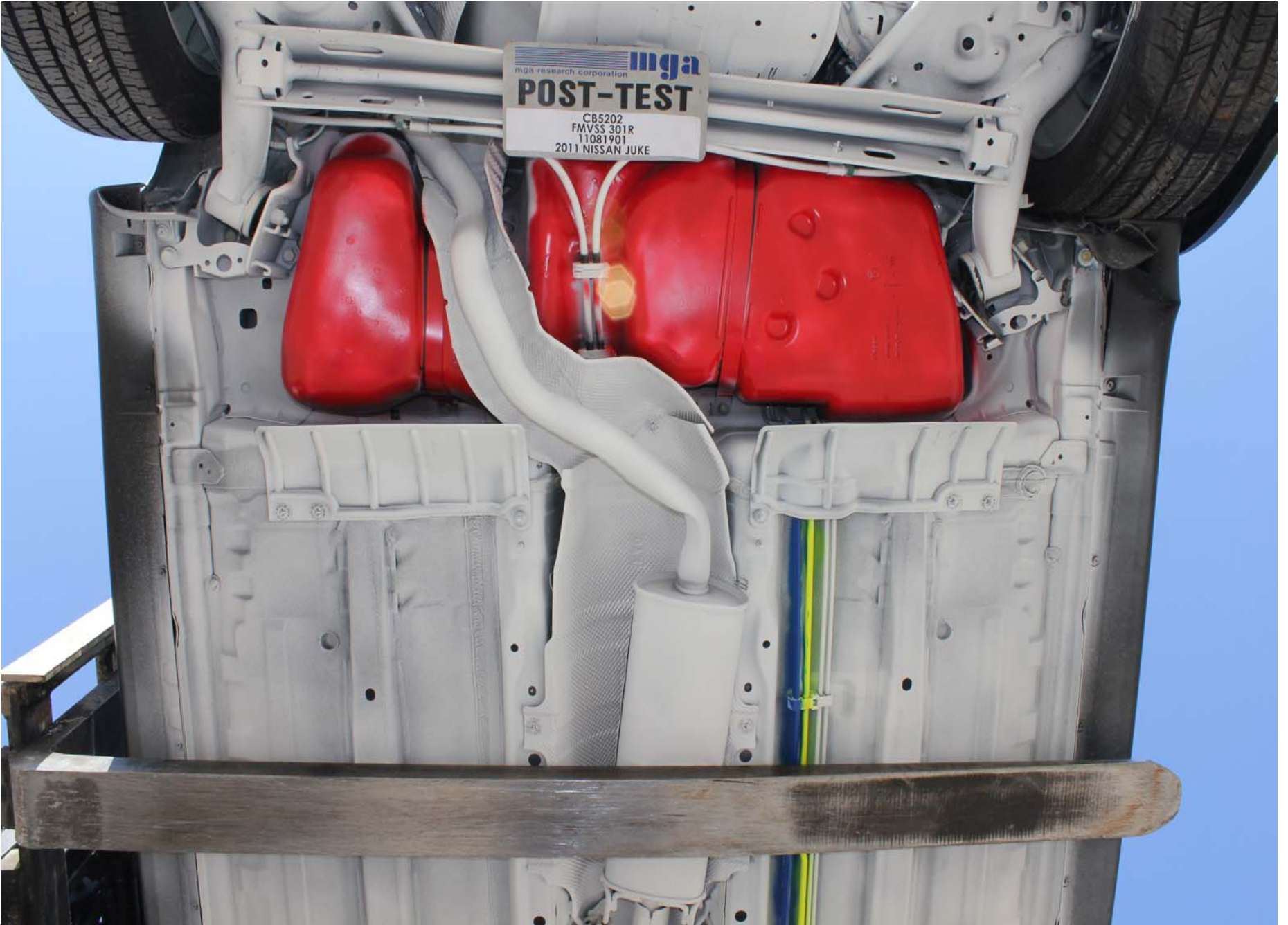
A-24.

Post-Test Underbody View 1

A-25.



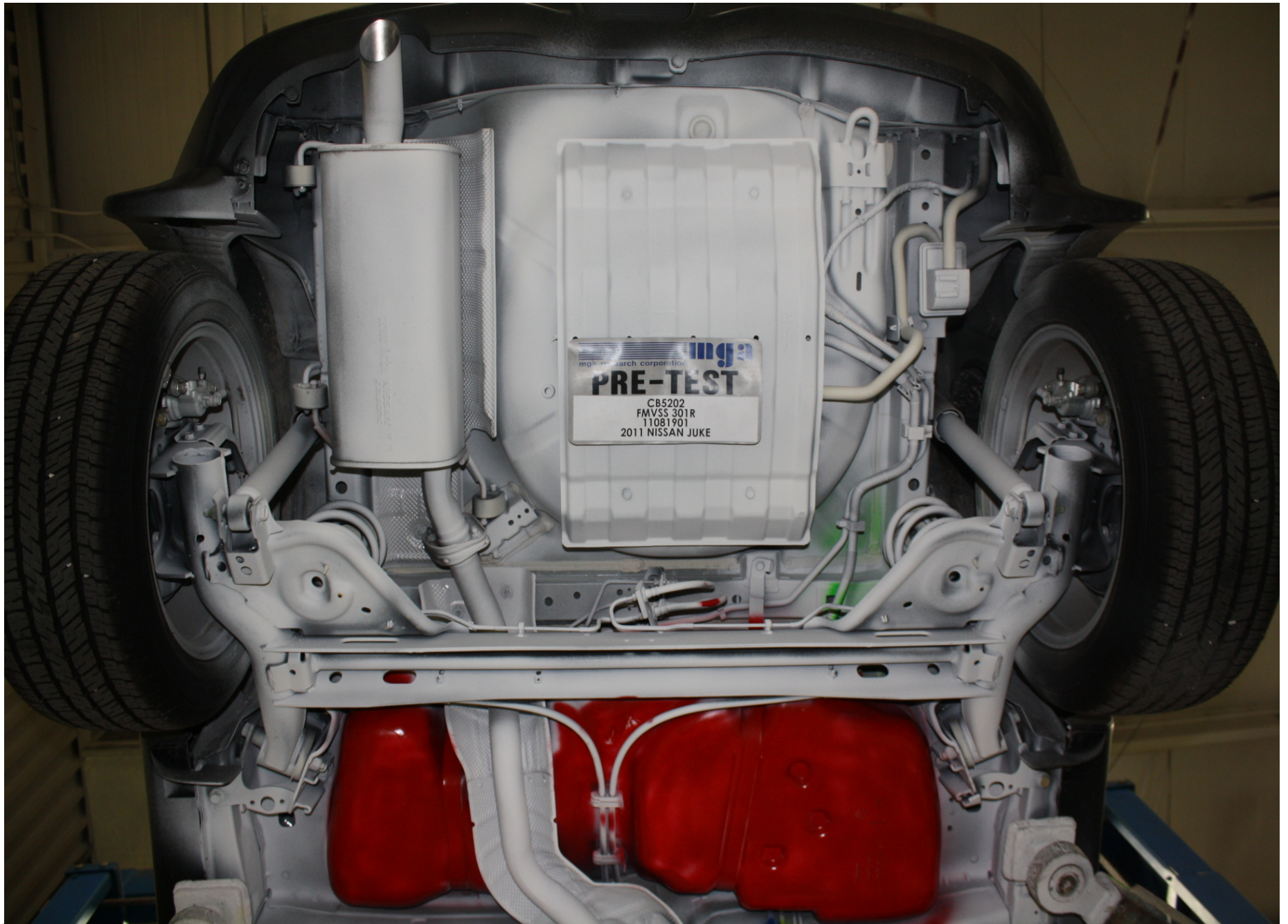
Pre-Test Underbody View 2



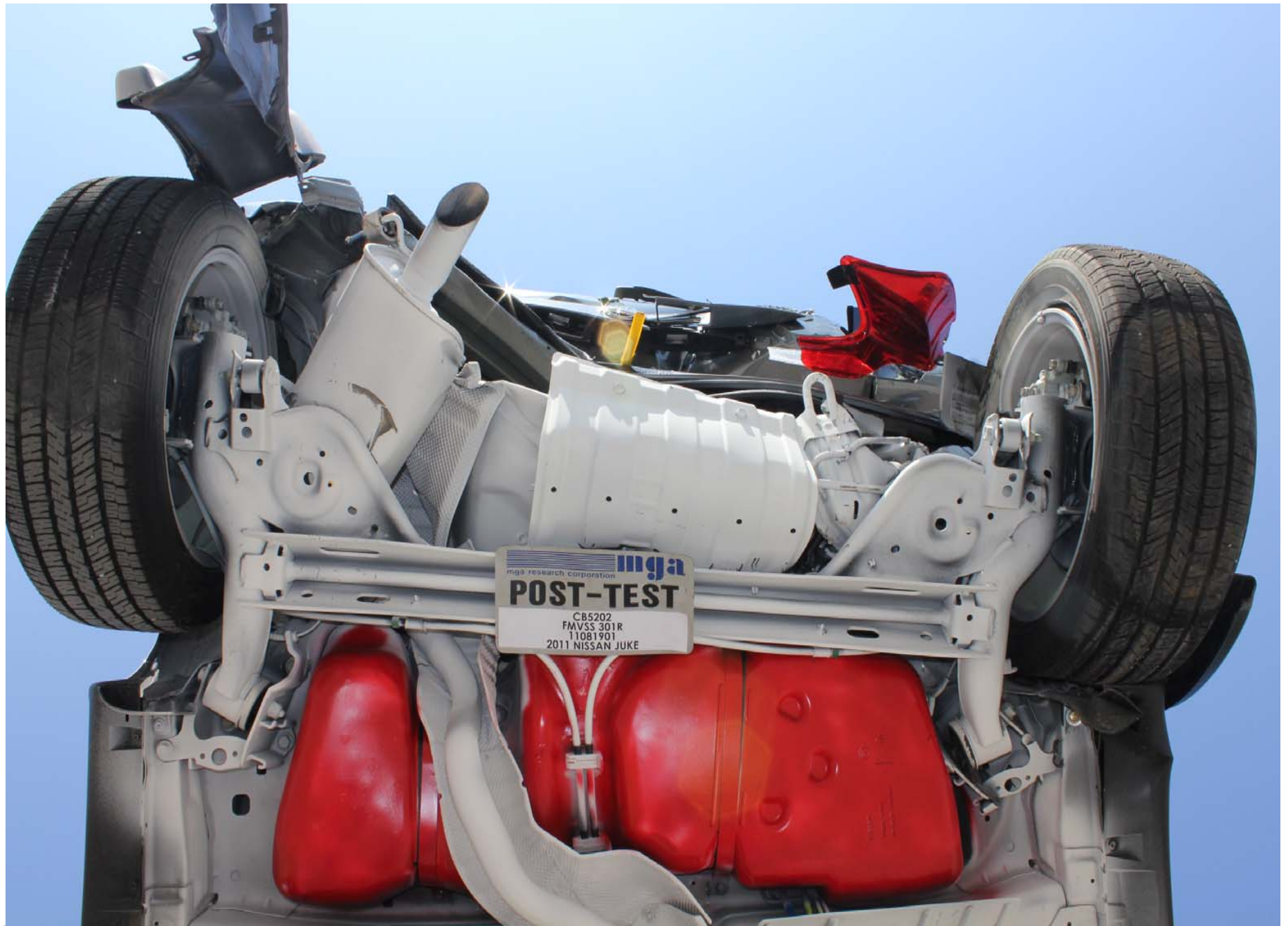
A-26.

Post-Test Underbody View 2

A-27.



Pre-Test Underbody View 3



Post-Test Underbody View 3



Pre-Test Front View of MDB

A-30.



Post-Test Front View of MDB

A-31.



Pre-Test  $\frac{3}{4}$  Right Side View of MDB



A-32.



Post-Test ¾ Right Side View of MDB

A-33.



Pre-Test ¾ Left Side View of MDB

A-34.



Post-Test  $\frac{3}{4}$  Left Side View of MDB

A-35.



Pre-Test Top View of MDB



Post-Test Top View of MDB



CB5202  
FMVSS 301R  
11081901  
2011 NISSAN JUKE

CB5202  
FMVSS 301R  
11081901  
2011 NISSAN JUKE



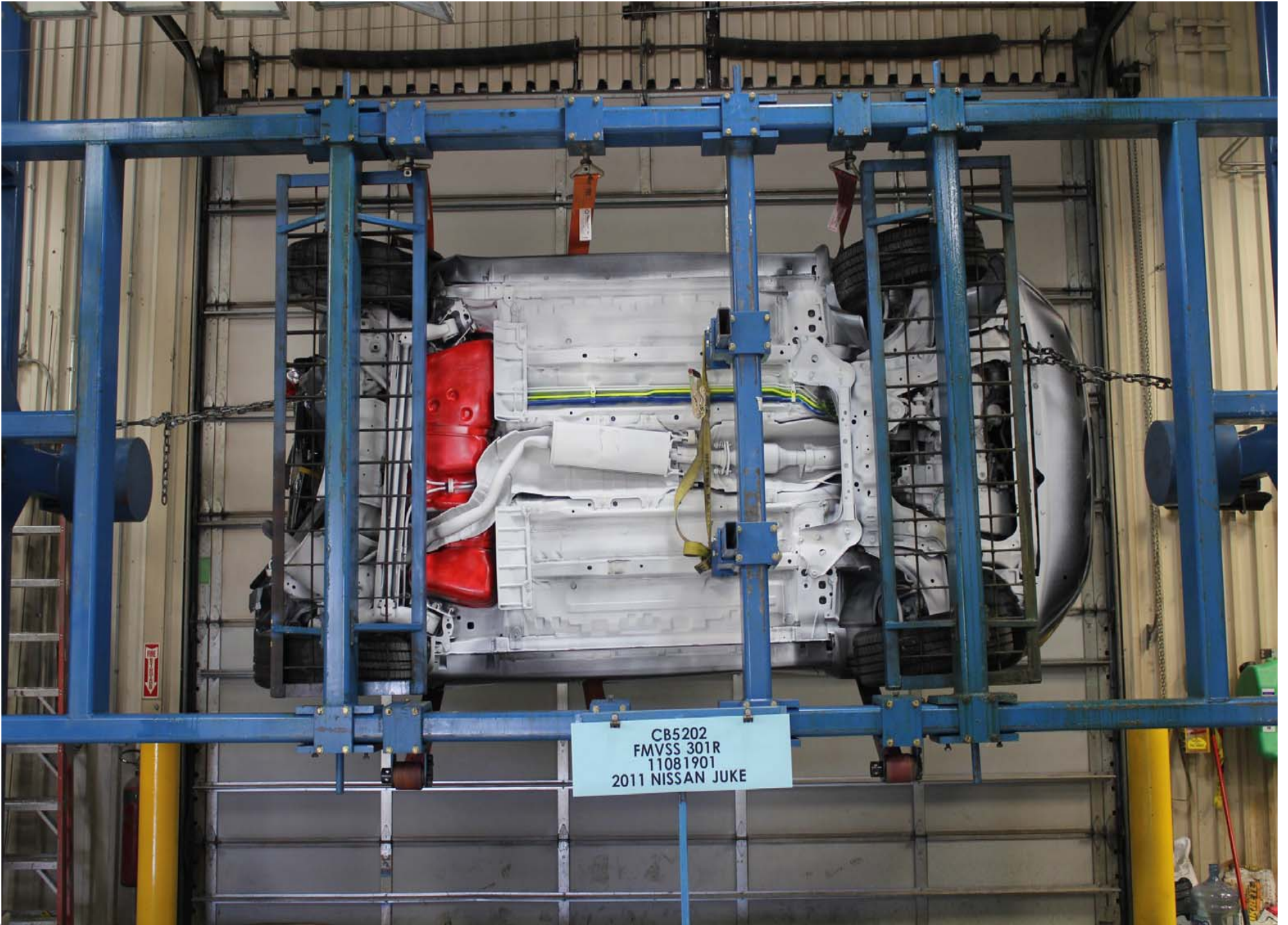
A-37.

Static Rollover at 90 Degrees



A-38.

Static Rollover at 180 Degrees



Static Rollover at 270 Degrees



A-40.



Static Rollover at 360 Degrees