

REPORT NUMBER: 301-MGA-2010-006

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

**FORD MOTOR COMPANY
2010 FORD TRANSIT CONNECT
NHTSA NUMBER: CA0214**

**PREPARED BY:
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BURLINGTON, WI 53105**



Test Date: July 26, 2010


Final Report Date: August 11, 2010

FINAL REPORT

**PREPARED FOR:
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NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
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WASHINGTON, D.C. 20590**

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15. Supplementary Notes					
16. Abstract A rear impact was conducted on a 2010 Ford Transit Connect at MGA Research Corporation on July 26, 2010. This test was conducted to obtain data indicant of FMVSS 301R. The impact velocity was 79.6 km/h. The ambient temperature at the time of impact was 29 degrees Celsius.					
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TABLE OF CONTENTS

<u>Section</u>		<u>Page No</u>
1	Purpose and Summary of Test	1
2	Data Sheets	2

<u>Data Sheet No.</u>		<u>Page No.</u>
1	Test Vehicle Specifications	2
2	Pre-Test Data	4
3	Moving Barrier Data	6
4	Post-Test Data	7
5	Static Rollover Test Data	8

<u>Form No.</u>		
1	Test Vehicle Information	10

<u>Appendix</u>		
A	Photographs	A

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 2010 Ford Transit Connect was impacted by a Moving Deformable Barrier (MDB) at a velocity of 79.6 km/h. The test was performed at MGA Research Corporation on July 26, 2010. Pre-and post-test photographs of the vehicle and dummies can be found in Appendix A.

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

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

Two ballast Part 572E, 50th 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: 2010 Ford Transit Connect NHTSA No.: CA0214
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/26/2010

TEST VEHICLE INFORMATION

Manufacturer	Ford Motor Company
Model	Transit Connect
Body Style	Truck
Major Options	None
NHTSA No.	CA0214
VIN	NM0KS9BNXAT017711
Color	Frozen White
Delivery Date	7/20/2010
Odometer Reading (mile)	307
Dealer	De Lacy Ford Inc.
Transmission	Automatic
Final Drive	Front Wheel Drive
Number of Cylinders	4
Engine Displacement (L)	2.0
Engine Placement	Lateral

DATA FROM VEHICLE'S CERTIFICATION LABEL

Manufactured By	Ford Motor Company.
Date of Manufacture	09/09

GVWR (kg)	2252
GAWR Front (kg)	1128
GAWR Rear (kg)	1239

VEHICLE CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench		
Number of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				647
Number of Occupants x 68 kg.				340
Cargo Wt. (RCLW) (kg)				307

DATA SHEET NO. 1 (continued)
TEST VEHICLE SPECIFICATIONS

Test Vehicle: 2010 Ford Transit Connect NHTSA No.: CA0214
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/26/2010

DATA FROM VEHICLE'S TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	250	340
Recommended Tire Size	P205/65R15	P205/65R15
Recommended Load Range	95T	95T
Tire Size on Vehicle	P205/65R15	P205/65R15
Tire Manufacturer	Continental	Continental
Location of Placard of Vehicle	Lower B-Post	
Type of Spare Tire (full size/space saver)	Space Saver	

DATA SHEET NO. 2

PRE-TEST DATA

Test Vehicle: 2010 Ford Transit Connect NHTSA No.: CA0214
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/26/2010

WEIGHT OF TEST VEHICLE

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	439.5	357.9		503.5	441.8	
Right	kg	435.9	347.0		491.2	421.4	
Ratio	%	55.4	44.6		53.5	46.5	
Totals	kg	875.4	704.9	1580.3	994.7	863.2	1857.9

CALCULATION OF TARGET TEST WEIGHT (TTW)

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1580.3
Rated Cargo/Luggage Weight (RCLW)	kg	136
Weight of 2 P572E ATDs	kg	148
Calculated Vehicle Target Weight (TVTW)	kg	1864.3

Vehicle Wheelbase	2914 mm
Vehicle Width	1785 mm
Weight of Ballast Secured in Rear Seat	132 kg
Method of Securing Ballast	Ratchet Straps
Vehicle Components Removed for Weight Reduction	None

VEHICLE ATTITUDES

	Units	LF	RF	LR	RR
As Delivered	mm	718	710	781	785
As Tested	mm	695	692	765	769

DATA SHEET NO. 2 (continued)

PRE-TEST DATA

Test Vehicle: 2010 Ford Transit Connect NHTSA No.: CA0214
Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/26/2010

FUEL SYSTEM DATA

	Units: Liters
Usable Capacity of "Standard Tank" (Owner's Manual)	58.3
Usable Capacity Figure Furnished by COTR	58.3
Usable Capacity of "Optional" Tank	
92-94% of Usable Capacity	53.6 to 54.8
Actual Test Volume (entire fuel system filled)	54.1

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
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DATA SHEET NO. 3
MOVING BARRIER DATA

Test Vehicle: 2010 Ford Transit Connect NHTSA No.: CA0214
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/26/2010

MOVING BARRIER'S TEST WEIGHT

	Units	Front	Rear	Total
Left	kg	374.2	308.8	
Right	kg	389.5	291.2	
Ratio	%	56.0	44.0	
Totals	kg	763.7	600.0	1363.7

Tires (Mfr, line, size)	Yokohama
Tire Pressure (kPa)	207
Brake Abort System (Yes/No)?	Yes
Date of Last Calibration	8/6/2008

DATA SHEET NO. 4

POST-TEST DATA

Test Vehicle: 2010 Ford Transit Connect NHTSA No.: CA0214
Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/26/2010

IMPACT VELOCITY

	Units: km/h
Required Impact Velocity	80.0
Actual Impact Velocity (Trap No. 1)	79.6
Actual Impact Velocity (Trap No. 2)	79.6
Average Impact Speed	79.6

Temperature at Time of Impact (°C)	29
Test Time	11:08 am

WELDING ROD IMPACT POINT

	Units: mm
Vertical distance from target center (+ above target / - below target)	3 down
Horizontal distance from target center (+ to the right / - to the left)	8 left

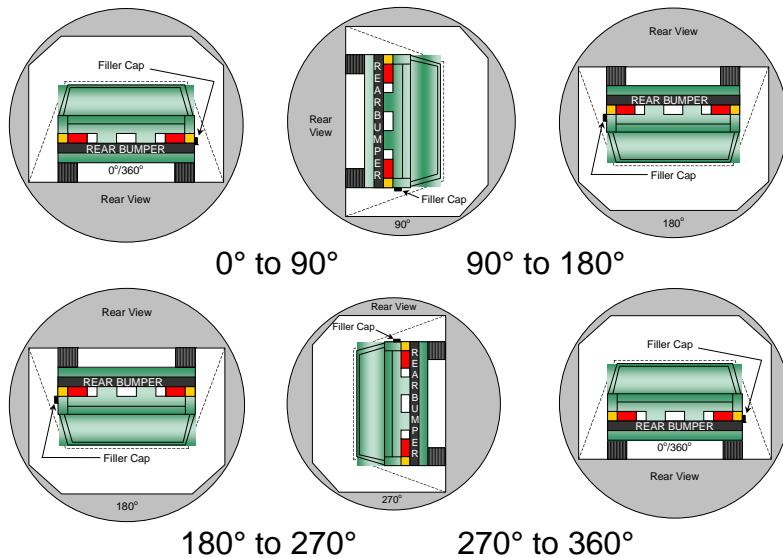
DATA SHEET NO. 5
STATIC ROLLOVER TEST DATA

Test Vehicle: 2010 Ford Transit Connect NHTSA No.: CA0214
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/26/2010

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: 2010 Ford Transit Connect NHTSA No.: CA0214
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/26/2010

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

0° TO 90° 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	

90° TO 180° Rotation Time (sec) = 116 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) = 114 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) = 114 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	

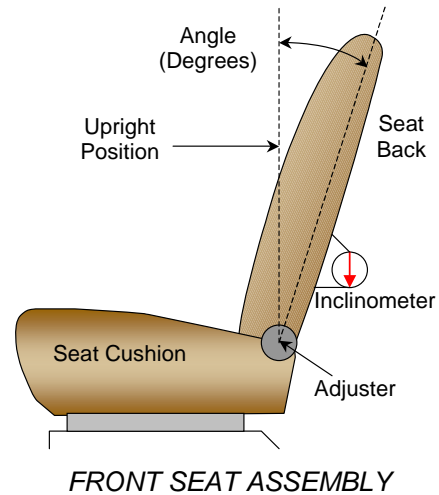
FORM 1
TEST VEHICLE INFORMATION

Test Vehicle: 2010 Ford Transit Connect
Test Program: FMVSS 301 Fuel System Integrity

NHTSA No.: CA0214
Test Date: 7/26/2010

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 25.8 degrees.



Driver Seat Back Angle	25.8°
Passenger Seat Back Angle	25.8°

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	289 mm	145 mm
Passenger Seat	220 mm	110 mm

D-RING ADJUSTMENT

The driver and passenger D-rings were placed full up.

STEERING COLUMN ADJUSTMENT

The steering column was placed in the mid position.

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Page No.

Photo No. 1.	Vehicle's Certification Label	A-1
Photo No. 2.	Vehicle's Tire Placard	A-2
Photo No. 3.	Pre-Test Front View of Vehicle	A-3
Photo No. 4.	Post-Test Front View of Vehicle	A-4
Photo No. 5.	Pre-Test Left Side View of Vehicle	A-5
Photo No. 6.	Post-Test Left Side View of Vehicle	A-6
Photo No. 7.	Pre-Test Left Rear Close-up View of Vehicle	A-7
Photo No. 8.	Post-Test Left Rear Close-up View of Vehicle	A-8
Photo No. 9.	Pre-Test Right Side View of Vehicle	A-9
Photo No. 10.	Post-Test Right Side View of Vehicle	A-10
Photo No. 11.	Pre-Test Right Rear Close-up View of Vehicle	A-11
Photo No. 12.	Post-Test Right Rear Close-up View of Vehicle	A-12
Photo No. 13.	Pre-Test Rear View of Vehicle	A-13
Photo No. 14.	Post-Test Rear View of Vehicle	A-14
Photo No. 15.	Pre-Test $\frac{3}{4}$ Frontal View From Right Side of Vehicle	A-15
Photo No. 16.	Post-Test $\frac{3}{4}$ Frontal View From Right Side of Vehicle	A-16
Photo No. 17.	Pre-Test $\frac{3}{4}$ Rear View From Right Side of Vehicle	A-17
Photo No. 18.	Post-Test $\frac{3}{4}$ Rear View From Right Side of Vehicle	A-18
Photo No. 19.	Pre-Test $\frac{3}{4}$ Rear View From Left Side of Vehicle	A-19
Photo No. 20.	Post-Test $\frac{3}{4}$ Rear View From Left Side of Vehicle	A-20
Photo No. 21.	Pre-Test Impact Point	A-21
Photo No. 22.	Post-Test Impact Point	A-22
Photo No. 23.	Pre-Test Underbody View 1	A-23
Photo No. 24.	Post-Test Underbody View 1	A-24
Photo No. 25.	Pre-Test Underbody View 2	A-25
Photo No. 26.	Post-Test Underbody View 2	A-26
Photo No. 27.	Pre-Test Underbody View 3	A-27

Page No.

Photo No. 28.	Post-Test Underbody View 3	A-28
Photo No. 29.	Pre-Test Front View of MDB	A-29
Photo No. 30.	Post-Test Front View of MDB	A-30
Photo No. 31.	Pre-Test $\frac{3}{4}$ Right Side View of MDB	A-31
Photo No. 32.	Post-Test $\frac{3}{4}$ Right Side View of MDB	A-32
Photo No. 33.	Pre-Test $\frac{3}{4}$ Left Side View of MDB	A-33
Photo No. 34.	Post-Test $\frac{3}{4}$ Left Side View of MDB	A-34
Photo No. 35.	Pre-Test Top View of MDB	A-35
Photo No. 36.	Post-Test Top View of MDB	A-36
Photo No. 37.	Static Rollover at 90 Degrees	A-37
Photo No. 38.	Static Rollover at 180 Degrees	A-38
Photo No. 39.	Static Rollover at 270 Degrees	A-39
Photo No. 40.	Static Rollover at 360 Degrees	A-40

MFD. BY FORD MOTOR CO.

DATE: 09/09 GVWR: 4965LB/2252KG

FRONT GAWR: 2486LB

REAR GAWR: 2732LB

/1128KG

WITH

/1239KG

WITH

P205/65R15 95T

TIRES

P205/65R15 95T

TIRES

15X6J

RIMS

15X6J

RIMS

AT 250kPA/36PSI COLD

AT 340kPA/49PSI COLD

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY AND THEFT PREVENTION STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE

VIN: NMOKS9BNXAT017711

TYPE: TRUCK

F0205
T0258



EXT PNT: Z2

WB
2912

INT TR
8K

ETU

R
R

AXLE
4

TR
2

SPR
DDGG

9T16-1520472-AA

A-1.

Vehicle's Certification Label



9T16-1532-AA

TIRE AND LOADING INFORMATION RENSEIGNEMENTS SUR LES PNEUS ET LE CHARGEMENT

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

The combined weight of occupants and cargo should never exceed : 647 kg or 1428 lbs.
 Le poids total des occupants et du chargement ne doit jamais dépasser : 647 kg ou 1428 lb.

TIRE PNEU	SIZE DIMENSIONS	COLD TIRE PRESSURE PRESSION DES PNEUS À FROID
FRONT/ AVANT	P205/65R15 95T	250KPA, 36PSI
REAR/ ARRIÈRE	P205/65R15 95T	340KPA, 49PSI
SPARE/ DE SECOURS	P205/65R15 95T	340KPA, 49PSI

**SEE OWNERS MANUAL
FOR ADDITIONAL
INFORMATION**

**VOIR LE MANUEL
DE L' USAGER
POUR PLUS DE
RENSEIGNEMENTS**

A-2.

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

A-6.



Post-Test Left Side View of Vehicle



Pre-Test Left Rear Close-up View of Vehicle



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



Pre-Test Rear View of Vehicle

A-14.



Post-Test Rear View of Vehicle



Pre-Test ¾ Frontal View From Right Side of Vehicle

A-16.



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



Pre-Test ¾ Rear View From Right Side of Vehicle



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

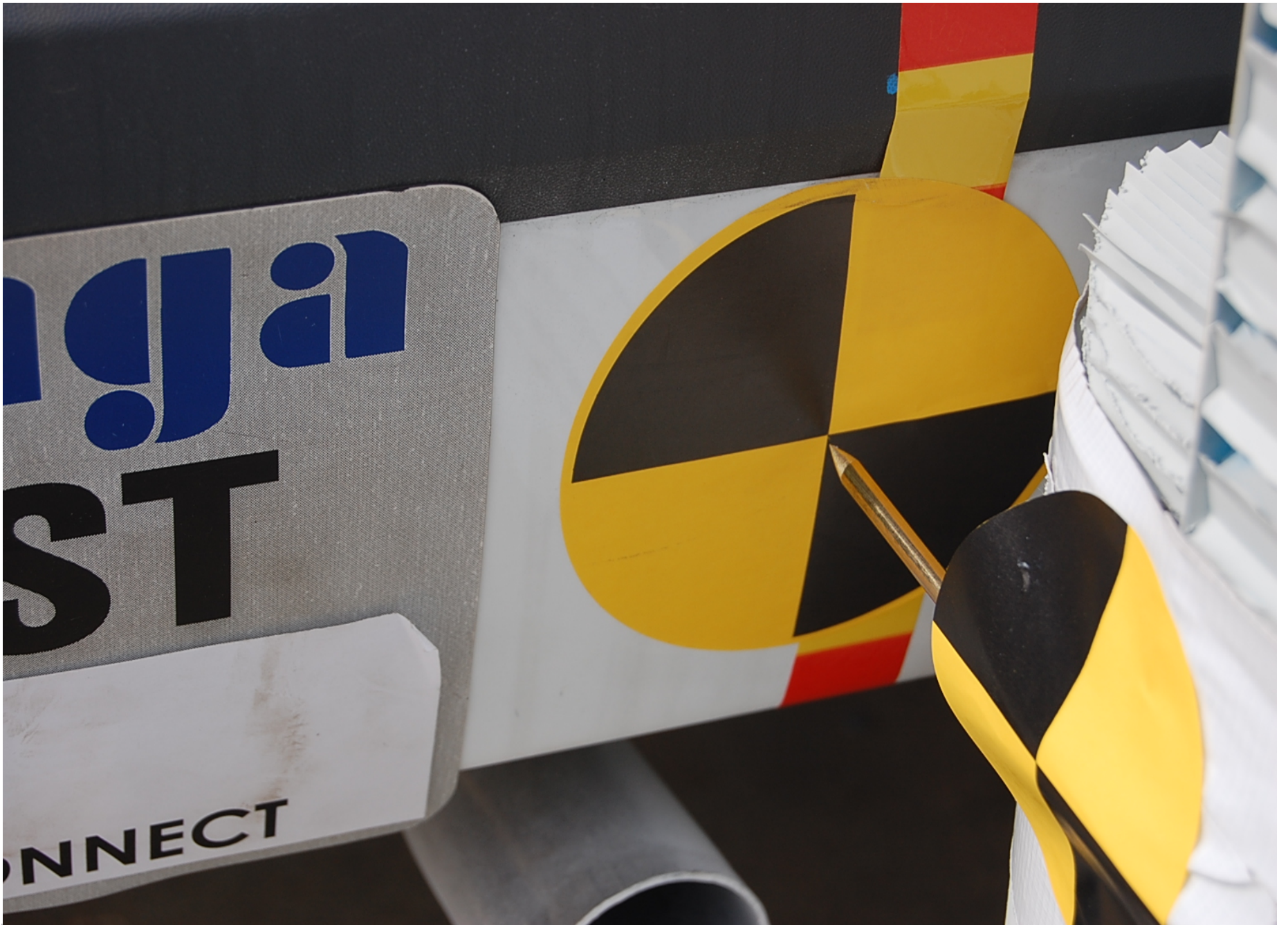


Pre-Test $\frac{3}{4}$ Rear View From Left Side of Vehicle



Post-Test ¾ Rear View From Left Side of Vehicle

A-21.



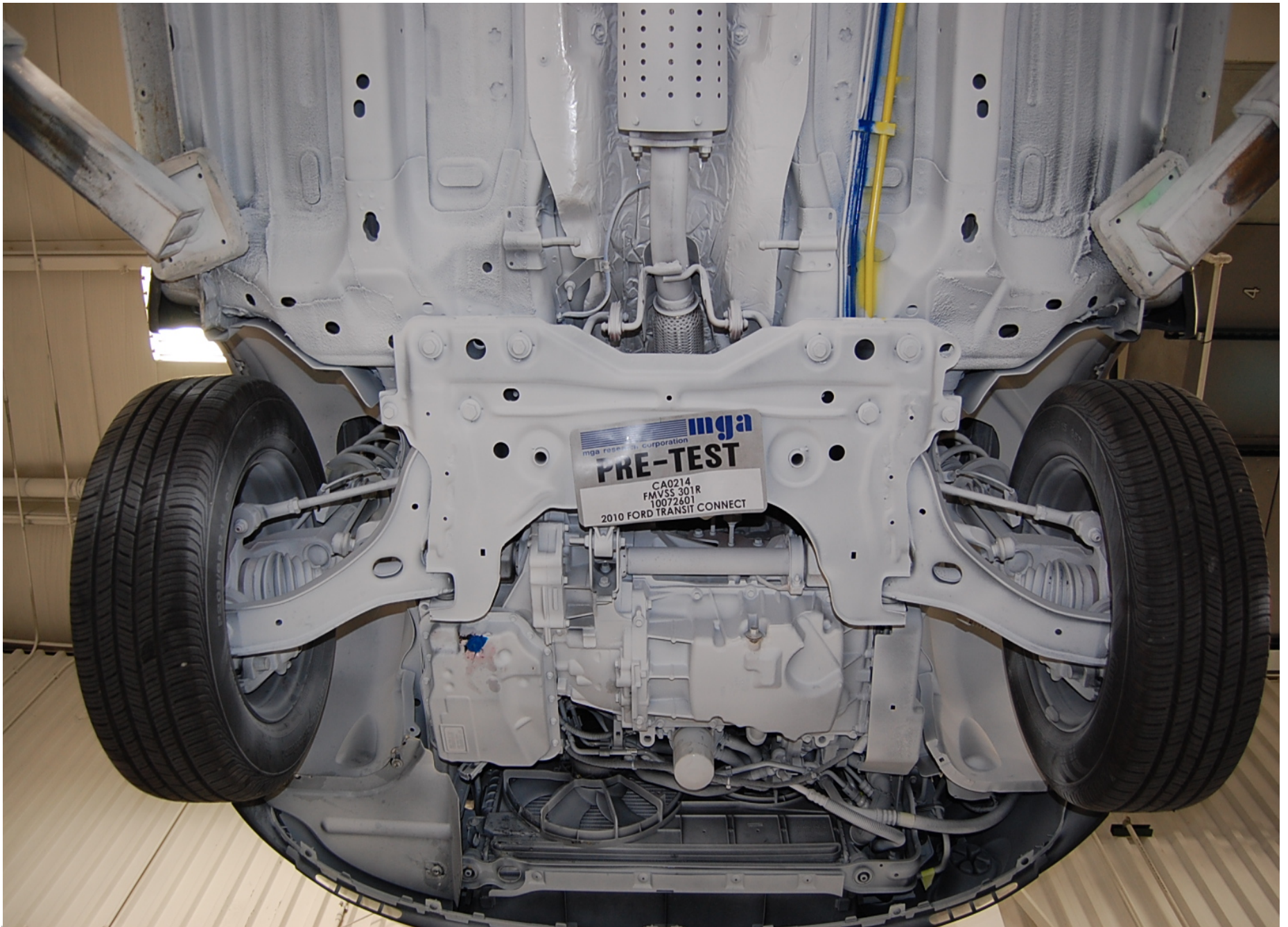
Pre-Test Impact Point



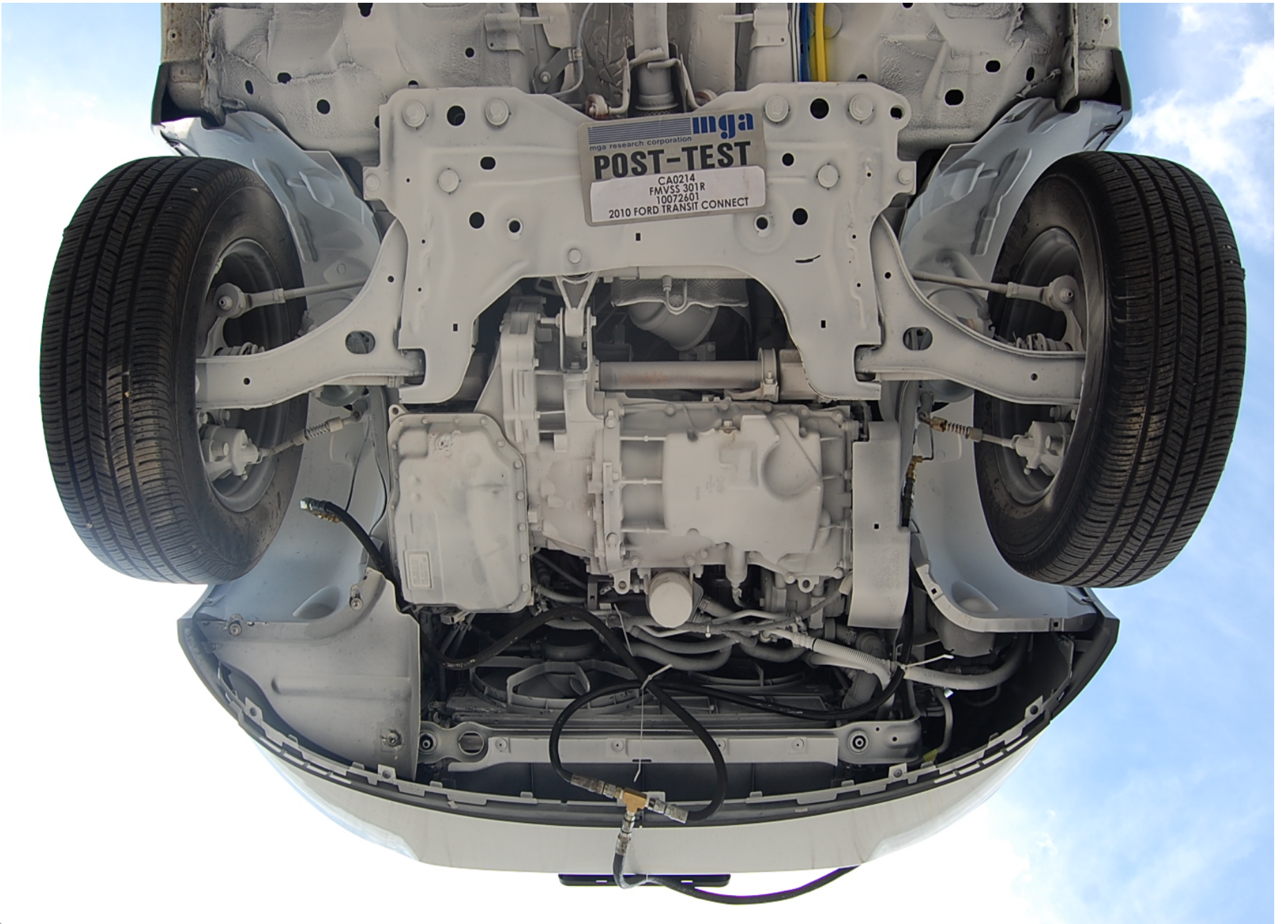
A-22.

Post-Test Impact Point

A-23.



Pre-Test Underbody View 1

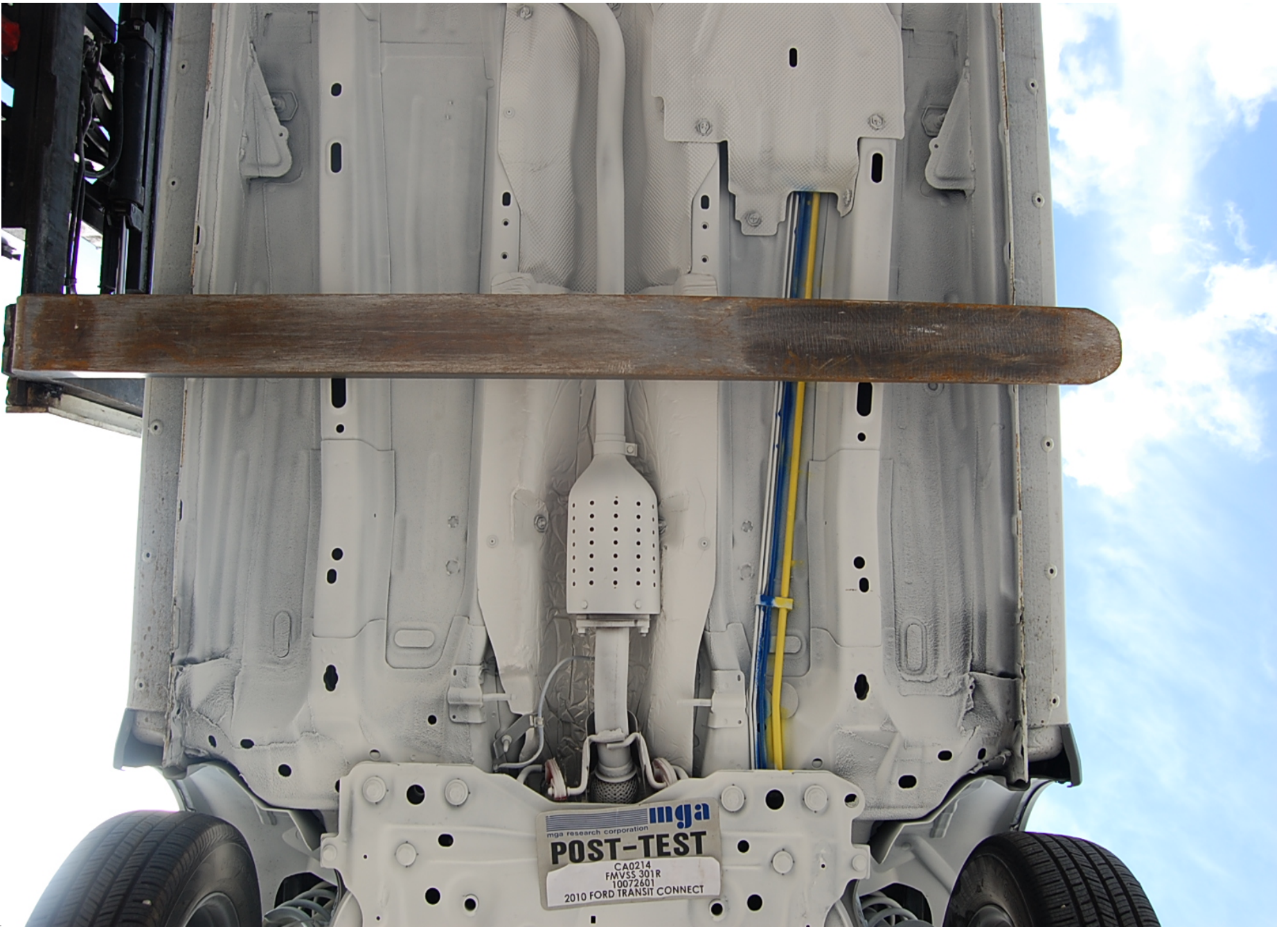


Post-Test Underbody View 1

A-25.

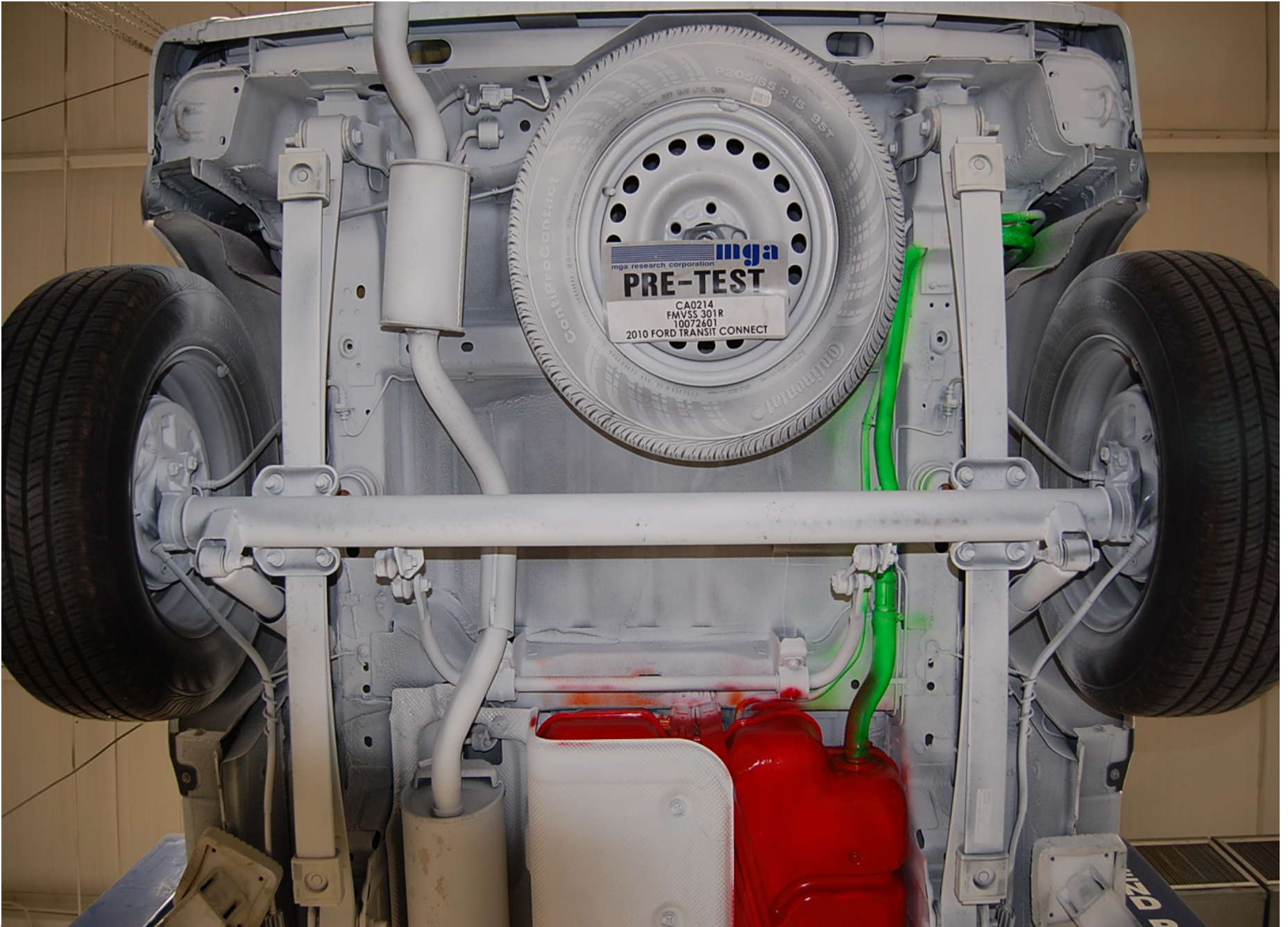


Pre-Test Underbody View 2



A-26.

Post-Test Underbody View 2



A-27.

Pre-Test Underbody View 3

A-28.



Post-Test Underbody View 3

A-29.



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.



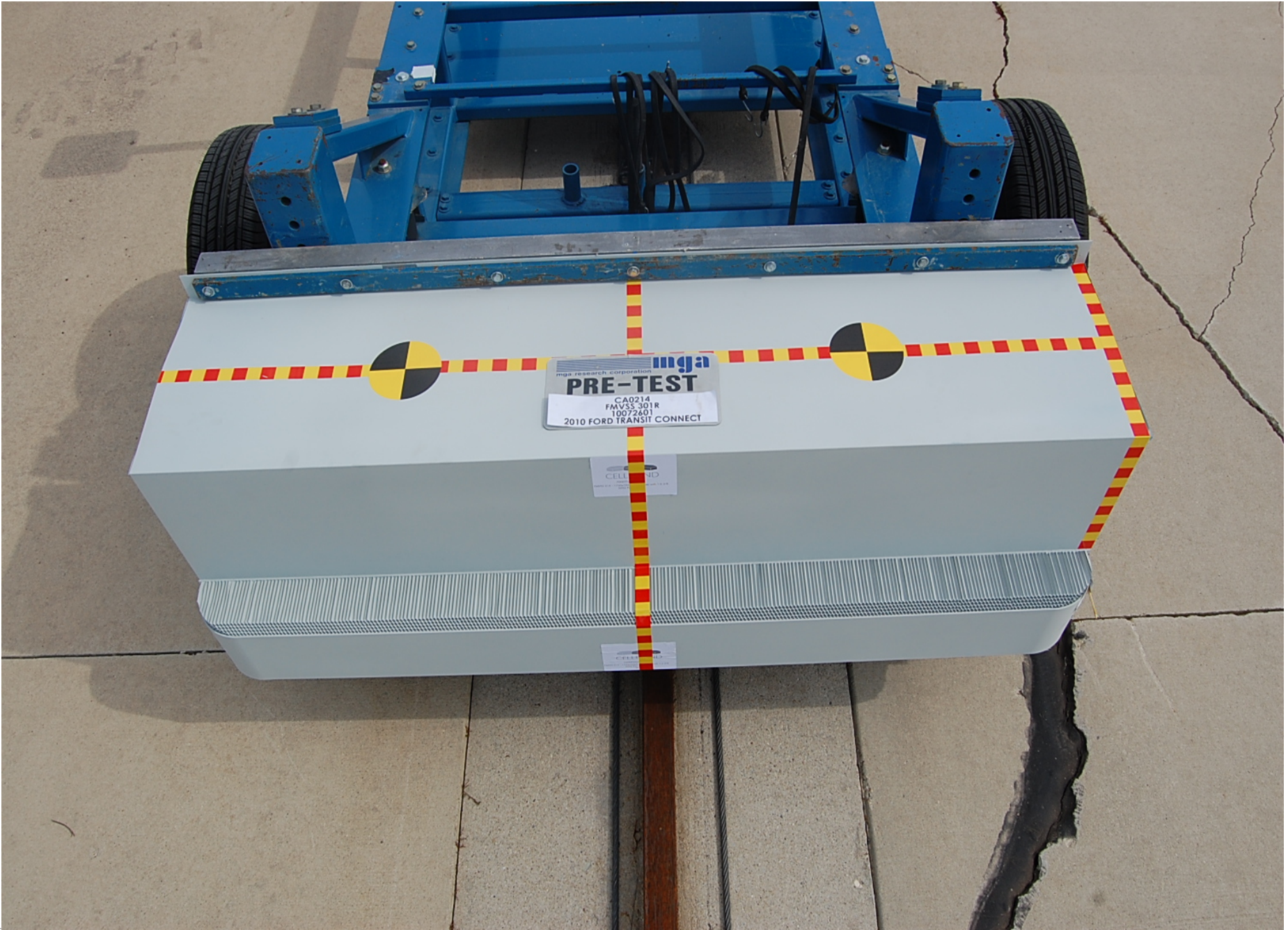
Pre-Test ¾ Left Side View of MDB

A-34.



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

A-35.



Pre-Test Top View of MDB

A-36.



Post-Test Top View of MDB



A-37.

Static Rollover at 90 Degrees

A-38.



Static Rollover at 180 Degrees



A-39.

Static Rollover at 270 Degrees

A-40.



Static Rollover at 360 Degrees