

REPORT NUMBER: 301-MGA-2009-005

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

**CHRYSLER LLC
2009 ASPEN LIMITED HYBRID 4X4
NHTSA NUMBER: C90303**

**PREPARED BY:
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BURLINGTON, WI 53105**



Test Date: July 7, 2009

Final Report Date: July 28, 2009

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
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16. Abstract A rear impact was conducted on a 2009 Chrysler Aspen Limited Hybrid 4X4 at MGA Research Corporation on July 7, 2009. 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 15.6 degrees Celsius. FMVSS 305 was conducted in conjunction with the FMVSS 301R.					
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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 2009 Chrysler Aspen Limited Hybrid 4X4 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 July 7, 2009. Appendix A contains FMVSS 305, "Electric Powered Vehicles: Electrolyte Spillage and Electrical Shock Protection" data. Pre-and post-test photographs of the vehicle, dummies, and propulsion system can be found in Appendix B.

One real-time camera and four high-speed cameras were used to document the impact event. In addition, real-time video was taken of the gas cap closing and static rollover.

- Left rear Half 1000 fps
- Right Rear Half 1000 fps
- Overhead Overall 1000 fps
- Left Overall 1000 fps
- Real Time Pan 24 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 or electrolyte leakage after the event or during any phase of the static rollover.

**SECTION 2
DATA SHEETS**

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

Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

TEST VEHICLE INFORMATION

Manufacturer	Chrysler LLC
Model	Aspen Limited Hybrid 4X4
Body Style	MPV
Major Options	Power Sunroof
NHTSA No.	C90303
VIN	1A8JW18T49F705717
Color	Brilliant Black Crystal Pearl
Delivery Date	5/29/09
Odometer Reading (mile)	587
Dealer	Carriage Towne Chrysler Dodge
Transmission	Automatic
Final Drive	Rear Wheel Drive
Number of Cylinders	8
Engine Displacement (L)	5.7
Engine Placement	Longitudinal

DATA FROM VEHICLE'S CERTIFICATION LABEL

Manufactured By	Chrysler LLC
Date of Manufacture	09/08

GVWR (kg)	3198
GAWR Front (kg)	1633
GAWR Rear (kg)	1770

VEHICLE CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	Split Bench	
Number of Occupants	2	3	3	8
Capacity Wt. (VCW) (kg)				555
Number of Occupants x 68 kg.				544
Cargo Wt. (RCLW) (kg)				11

DATA SHEET NO. 1 (continued)
TEST VEHICLE SPECIFICATIONS

Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

DATA FROM VEHICLE'S TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	228	228
Recommended Tire Size	P265/60R18	P265/60R18
Recommended Load Range	109T	109T
Tire Size on Vehicle	P265/60R18	P265/60R18
Tire Manufacturer	Goodyear	Goodyear
Location of Placard of Vehicle	Lower B-Post	
Type of Spare Tire (full size/space saver)	Full Size	

DATA SHEET NO. 2

PRE-TEST DATA

Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

WEIGHT OF TEST VEHICLE

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	703.1	600.6		739.4	643.2	
Right	kg	698.1	589.7		729.8	630.5	
Ratio	%	54.2	45.9		53.6	46.4	
Totals	kg	1401.2	1190.3	2591.5	1469.2	1273.7	2742.9

CALCULATION OF TARGET TEST WEIGHT (TTW)

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2591.5
Rated Cargo/Luggage Weight (RCLW)	kg	11
Weight of 2 P572E ATDs	kg	148
Calculated Vehicle Target Weight (TVTW)	kg	2750.5

Vehicle Wheelbase	3023 mm
Vehicle Width	1935 mm
Weight of Ballast Secured in Third Row Seat	11 kg
Method of Securing Ballast	Seat Belt and Ratchet Straps
Vehicle Components Removed for Weight Reduction	None

VEHICLE ATTITUDES

	Units	LF	RF	LR	RR
As Delivered	mm	833	840	900	912
As Tested	mm	830	833	895	902

DATA SHEET NO. 2 (continued)

PRE-TEST DATA

Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

FUEL SYSTEM DATA

	Units: Liters
Usable Capacity of "Standard Tank" (Owner's Manual)	102
Usable Capacity Figure Furnished by COTR	102
Usable Capacity of "Optional" Tank	
90-95% of Usable Capacity	94.0 to 96.1
Actual Test Volume (entire fuel system filled)	94.6

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: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

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: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

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)	15.6
Test Time	9:31 am

WELDING ROD IMPACT POINT

	Units: mm
Vertical distance from target center (+ above target / - below target)	2 mm down
Horizontal distance from target center (+ to the right / - to the left)	7 mm right

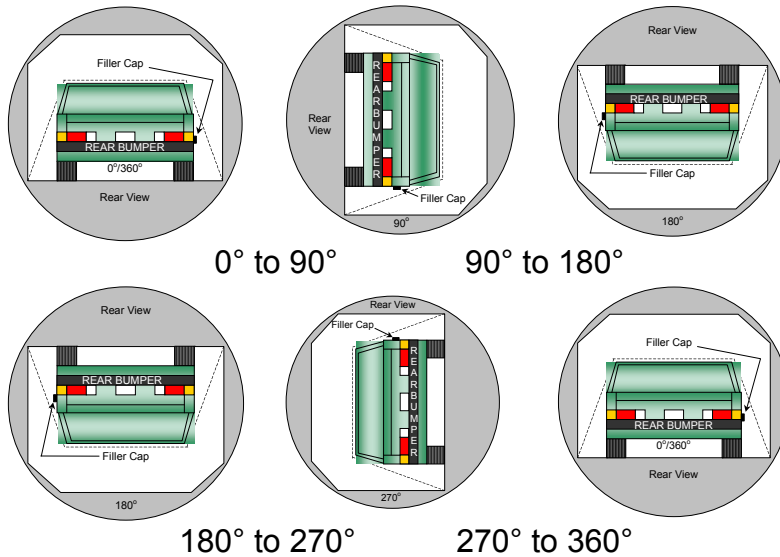
DATA SHEET NO. 5
STATIC ROLLOVER TEST DATA

Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

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: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

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

0° TO 90° Rotation Time (sec) = 105 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) = 113 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) = 117 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) = 116 sec

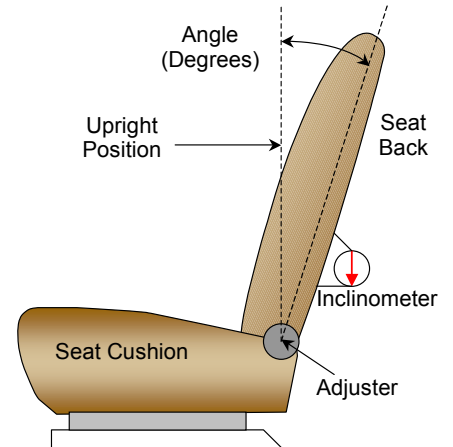
Test Phase	Spillage (g)	Spillage Details
First 5 minutes from onset of rotation	0	
Sixth minute from onset of rotation	0	
Seventh minute from onset of rotation	0	
Eight minute if required	N/A	

FORM 1
TEST VEHICLE INFORMATION

Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

NORMAL DESIGN RIDING POSITION

With the seat in the mid fore-aft seat track position the angle of the driver's and passenger's seat back when it is in the nominal riding position is 11.8° from horizontal measured at the top of headrest guide.



FRONT SEAT ASSEMBLY

Driver Seat Back Angle	11.8° Top of Headrest Guide
Passenger Seat Back Angle	11.8° Top of Headrest Guide

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	275	137
Passenger Seat	220	110

D-RING ADJUSTMENT

The driver and passenger D-rings were placed in the 2nd position top as 0.

STEERING COLUMN ADJUSTMENT

The steering column was placed in the mid position.

APPENDIX A

FMVSS 305

ELECTRIC POWERED VEHICLES: ELECTROLYTE SPILLAGE AND ELECTRICAL SHOCK PROTECTION

This hybrid vehicle, a 2009 Chrysler Aspen Limited Hybrid 4X4 (NHTSA No. C90303), in conjunction with the rear impact, was tested to FMVSS 305.

The test was performed in accordance with the specifications of the Office of Vehicle Safety Compliance (OVSC) Test Procedures TP-305-01 to determine compliance to the requirements of Federal Motor Vehicle Safety Standards (FMVSS) 305, "Electric Powered Vehicles: Electrolyte Spillage and Electrical Shock Protection".

Based on the test results, the 2009 Chrysler Aspen Limited Hybrid 4X4 appears to meet the requirements of FMVSS 305 testing.

If a measured voltage was zero and resulted in a division by zero "Zero Volts" was reported. This condition is considered being compliant as stated in TP-305-01 12.4 F.

This program is sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-06-C-00030.

The following data sheets document the results of the FMVSS 305 test.

DATA SHEET 1
ELECTRIC VEHICLE PROPULSION SYSTEM

Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

Type of Electric Vehicle (Electric/Hybrid):	Gas-Electric
Propulsion Battery Type:	NiMH (Nickel Metal Hydride)
Nominal Voltage (V):	288 V
Physical Location of Automatic Propulsion Battery Disconnect:	The connectors (+, -, and pre charge) are located inside of the battery system.
Auxiliary Battery Type:	Lead Acid

DATA SHEET 2
PRE-TEST DATA

Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

PROPULSION BATTERY SYSTEM DATA (COTR SUPPLIED DATA)

Electrolyte Fluid Type:	Potassium Hydroxide	
Electrolyte Fluid Specific Gravity:	1.27 g/m ^L	
Electrolyte Kinematic Viscosity:	2.4 mPas	
Electrolyte Fluid Color:	Clear	
Propulsion Battery Coolant Type, Color, Specific Gravity (if applicable):	Air	
Location of Battery Modules:	X	Inside Passenger Compartment
		Outside Passenger Compartment
Propulsion Battery State of Charge:		Maximum State of Charge
	X	Range of Normal Operating Voltage
Maximum State of Charge:		
Test Voltage No less than 95% of maximum state of charge:		
Range of Normal Operating Voltage:	216 - 390 V	
Test Voltage Within normal operative voltage range:	297.2 V	

VEHICLE CHASSIS GROUND POINT(S) LOCATION(S)

Details of Vehicle Chassis Ground Point(s) & Locations(s) [Supply photographs as appropriate]:	10 mm Mounting Stud Located Forward of Battery Cable Connections, see Photo B-41.
--	---

PROPULSION BATTERY SYSTEM

Details of Propulsion Battery Components [Supply photographs as appropriate]:	<ol style="list-style-type: none"> 1. Service Disconnect with 125A Fuse, see Photo B-49. 2. Forced Air Cooling System, see photo B-51
---	---

DATA SHEET 3

PRE-IMPACT ELECTRICAL ISOLATION MEASUREMENT & CALCULATIONS

Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

VOLTMETER INFORMATION

The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10MΩ.

NOTE: An oscilloscope meeting the above requirements may need to be used to adequately measure voltage in some vehicles.

Make:	Fluke
Model:	Fluke 11
Serial Number:	68541895
Internal Impedance Value (MΩ):	100 MΩ > 100 pF
Resolution (V):	0.001
Last Calibration Date:	3/27/09

PROPULSION BATTERY VOLTAGE

Measurement shall be made with propulsion battery connected to the vehicle propulsion system, and the vehicle in the "ready-to-drive" (Propulsion motor(s) activated) position.

If voltage measurement is not at the voltage or within the normal operating voltage range specified by the manufacturer, the battery must be charged.

Vb (V):	297.2
---------	-------

PROPULSION BATTERY TO VEHICLE CHASSIS

Vehicle chassis point(s) determined and supplied to contractor by COTR.

V1 (V):	155.6
V2 (V):	140.2

DATA SHEET 3 (Continued)

PRE-IMPACT ELECTRICAL ISOLATION MEASUREMENT & CALCULATIONS

Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

PROPULSION BATTERY TO VEHICLE CHASSIS ACROSS RESISTOR

The known resistance R_o (in ohms) should be approximately 500 times the normal operating voltage of the vehicle (in volts) per SAE J1766.

Ro (Ω):	157 K Ω
---------	---------

ELECTRICAL ISOLATION MEASUREMENT

V1' (V):	19.2 V
$R_{i1} = R_0 (1 + V_2/V_1) [(V_1 - V_1')/V_1']$	
Ri1 (Ω):	2120 K Ω
V2' (V):	17.8 V
$R_{i2} = R_0 (1 + V_1/V_2) [(V_2 - V_2')/V_2']$	
Ri2 (Ω):	2270K Ω
$R_i = \text{The lesser of } T_{i1} \text{ and } R_{i2}$	
Ri Pre-Test (Ω):	2120 K Ω
Ri/Vb (Ω/V):	7134 Ω/V (Electrical Isolation Value)
Minimum Electrical Isolation Value is 500 Ω/V	

Note: Measured 6 minutes 24 seconds before impact.

	Yes (Pass)	No (Fail)
Is the measured Electrical Isolation Value \geq 500 Ω/V?	X	

DATA SHEET 4
POST-TEST DATA

Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

VOLTMETER INFORMATION

The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10MΩ.

NOTE: An oscilloscope meeting the above requirements may need to be used to adequately measure voltage in some vehicles.

Make:	Fluke
Model:	Fluke 11
Serial Number:	68541895
Internal Impedance Value (MΩ):	100 MΩ < 100 pF
Nominal Propulsion Battery Voltage (Vb) (V):	297
Record V1, V2, V1', V2' voltage measurements immediately after the impacted vehicle comes to rest .	

PROPULSION BATTERY VOLTAGE

V1 =	141.1	V Impact	Time:	2	Minutes	03	s
V2 =	161.1	V Impact	Time:	2	Minutes	30	s
V1' =	20.2	V Impact	Time:	2	Minutes	08	s
V2' =	21.3	V Impact	Time:	2	Minutes	41	s
Attach complete data acquisition to final test report							

ELECTRICAL ISOLATION MEASUREMENT

$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$							
Ri1 =	2010K	Ω Impact		2		08	s
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$							
Ri2 =	1930K	Ω Impact		2		41	s
Ri = The lesser of Ri1 and Ri2							
Ri =	1930K	Ω Impact		2		08	s
Ri/Vb = electrical Isolation Value/Nominal Battery Voltage							
Minimum Electrical Value is 500 Ω/V							
Ri/Vb =	6543	Ω/V Impact		2		08	s

DATA SHEET 4 (Continued)

POST-TEST DATA

Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

	Yes (Pass)	No (Fail)
Is the measured Electrical Isolation Value \geq 500 Ω/V ?	X	

PROPULSION BATTERY SYSTEM COMPONENTS

Describe Propulsion Battery Module movement within the passenger compartment [Supply photographs as appropriate]:
None

	Yes (Fail)	No (Pass)
Has the Propulsion Battery Module moved within the passenger compartment?		X

Describe intrusion of an outside Propulsion Battery Component into the passenger compartment [Supply photographs as appropriate]:
Not Applicable

	Yes (Fail)	No (Pass)
Has an outside Propulsion Battery Component intruded into the passenger compartment?		X

	Yes (Fail)	No (Pass)
Is propulsion battery electrolyte spillage visible in the passenger compartment?		X

DATA SHEET 5
FUEL SYSTEM DATA

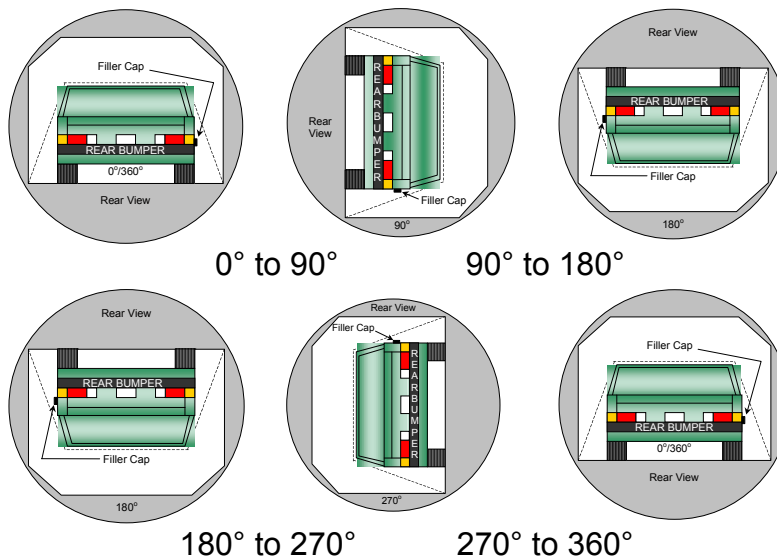
Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

STODDARD SOLVENT SPILLAGE MEASUREMENT

- A. From impact until vehicle motion ceases: 0 oz.
 B. For the 5 minute period after motion ceases: 0 oz.
 C. For the following 25 minutes: 0 oz.
 D. Spillage: None

STATIC ROLLOVER TEST DATA

**DETERMINATION OF PROPULSION BATTERY ELECTROLYTE
COLLECTION TIME PERIOD**



Rollover Stage	Rotation Time (sec)	Hold Time (sec)	Total Time (sec)	Next Whole Minute Interval
0° to 90°	105	300	405	7
90° to 180°	113	300	413	7
180° to 270°	117	300	417	7
270° to 360°	116	300	416	7

DATA SHEET 5 (Continued)

FUEL SYSTEM DATA

Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

ACTUAL TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE

Rollover Stage	Propulsion Battery Electrolyte Spillage (L)	Spillage Location
0° to 90°	0	Not Applicable
90° to 180°	0	Not Applicable
180° to 270°	0	Not Applicable
270° to 360°	0	Not Applicable

TOTAL SPILLAGE (L): 0

	Yes (Fail)	No (Pass)
Is the total spillage of propulsion battery electrolyte greater than 5.0 L?		X

	Yes (Fail)	No (Pass)
Is propulsion battery electrolyte spillage visible in the passenger compartment?		X

VOLTMETER INFORMATION

The voltmeter used in this test shall measure DC values and have an internal impedance of at least 10MΩ.

NOTE: An oscilloscope meeting the above requirements may need to be used to adequately measure voltage in some vehicles.

Make:	Fluke
Model:	Fluke 11
Serial Number:	68541895
Internal Impedance Value (MΩ):	100 MΩ > 100 pF
Nominal Propulsion Battery Voltage (Vb) (V):	297

Record V1, V2, V1', V2' voltage measurements at the start of each successive increment of **90°**, **180°**, **270°**, and **360°** of the static rollover test.

DATA SHEET 5 (Continued)

FUEL SYSTEM DATA

Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

ELECTRICAL ISOLATION MEASUREMENT

V1 =	7.89	V 90°	Time:	3	Minutes	15	s
V1 =	7.84	V 180°	Time:	3	Minutes	00	s
V1 =	7.81	V 270°	Time:	2	Minutes	58	s
V1 =	7.66	V 360°	Time:	2	Minutes	39	s
V2 =	2.97	V 90°	Time:	4	Minutes	20	s
V2 =	3.03	V 180°	Time:	4	Minutes	02	s
V2 =	3.05	V 270°	Time:	3	Minutes	58	s
V2 =	2.97	V 360°	Time:	3	Minutes	40	s
V1' =	1.06	V 90°	Time:	3	Minutes	50	s
V1' =	1.05	V 180°	Time:	3	Minutes	20	s
V1' =	1.05	V 270°	Time:	3	Minutes	24	s
V1' =	1.02	V 360°	Time:	3	Minutes	03	s
V2' =	0.39	V 90°	Time:	4	Minutes	47	s
V2' =	0.40	V 180°	Time:	4	Minutes	28	s
V2' =	0.41	V 270°	Time:	4	Minutes	28	s
V2'' =	0.39	V 360°	Time:	4	Minutes	03	s
Attach complete data acquisition to final test report of governing barrier test.							

DATA SHEET 5 (Continued)

FUEL SYSTEM DATA

Test Vehicle: 2009 Chrysler Aspen Limited Hybrid 4X4 NHTSA No.: C90303
 Test Program: FMVSS 301 Fuel System Integrity Test Date: 7/7/2009

ELECTRICAL ISOLATION CALCULATION

Ri1 = Ro (1 + V2/V1) [(V1-V1')/V1']							
Ri1 =	1392	KΩ 90°		Time:	3	Minutes	15 s
Ri1 =	1407	KΩ 180°		Time:	3	Minutes	00 s
Ri1 =	1405	KΩ 270°		Time:	2	Minutes	58 s
Ri1 =	1418	KΩ 360°		Time:	2	Minutes	39 s
Ri2 = Ro (1 + V1/V2) [(V2-V2')/V2']							
Ri2 =	3797	KΩ 90°		Time:	4	Minutes	20 s
Ri2 =	3703	KΩ 180°		Time:	4	Minutes	02 s
Ri2 =	3599	KΩ 270°		Time:	3	Minutes	58 s
Ri2 =	3717	KΩ 360°		Time:	3	Minutes	40 s
Ri = The lesser of Ri1 and Ri2							
Ri =	1392	KΩ 90°		Time:	3	Minutes	50 s
Ri =	1407	KΩ 180°		Time:	3	Minutes	20 s
Ri =	1405	KΩ 270°		Time:	3	Minutes	24 s
Ri =	1418	KΩ 360°		Time:	3	Minutes	03 s
Ri/Vb = Electrical Isolation Value/Nominal Battery Voltage Minimum Electrical Isolation Value is 500 Ω/V							
Ri/Vb =	4687	M Ω/V 90°		Time:	4	Minutes	47 s
Ri/Vb =	4737	Ω/V 180°		Time:	4	Minutes	28 s
Ri/Vb =	4730	Ω/V 270°		Time:	4	Minutes	28 s
Ri/Vb =	4774	Ω/V 360°		Time:	4	Minutes	03 s
Attach complete data acquisition to final test report of governing barrier test.							

	Yes (Pass)	No (Fail)
Is the measured Electrical Isolation Value \geq 500 Ω/V?	X	

APPENDIX B
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B-1.

MFD BY **CHRYSLER LLC**

DATE OF MFR: 9-08

GVWR: 3198 KG 07050 LB

GAWR FRONT: 1633 KG 3600 LB
18X8.0

WITH P265/60R18 TIRES
RIMS AT 228 KPA (33 PSI) COLD

GAWR REAR: 1770 KG 3900 LB
18X8.0

WITH P265/60R18 TIRES
RIMS AT 228 KPA (33 PSI) COLD



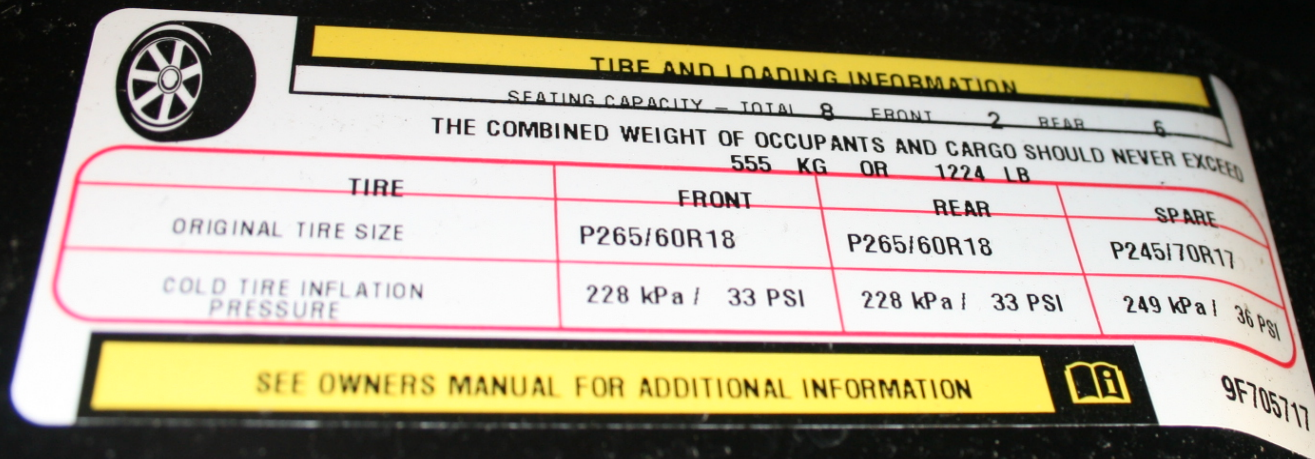
THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S.A. FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

VIN: 1A8JW18T49F705717 TYPE: MPV MDH:090214 914AA
VEHICLE MADE IN U.S.A. PAINT: PYR TRIM: DZJ1 4648509

This vehicle may include mercury-added devices installed by the manufacturer:
• REAR SEAT VIDEO/added
• NAVIGATION/CAMERA DISPLAY
• H.I.D. HEADLAMPS
Remove device.

Vehicle's Certification Label

B-2.



The image shows a vehicle's tire placard, which is a white rectangular label with a yellow header and footer. The header contains the title "TIRE AND LOADING INFORMATION" and a yellow bar. Below the header, the seating capacity is listed as "SEATING CAPACITY - TOTAL 8 FRONT 2 REAR 6". A warning states "THE COMBINED WEIGHT OF OCCUPANTS AND CARGO SHOULD NEVER EXCEED 555 KG OR 1224 LB". The main body of the placard is a table with four columns: "TIRE", "FRONT", "REAR", and "SPARE". The table lists the original tire size and cold tire inflation pressure for each position. The footer contains the text "SEE OWNERS MANUAL FOR ADDITIONAL INFORMATION" and a small icon of an open book. The placard is mounted on a dark, textured surface, likely the underside of a vehicle.

TIRE	FRONT	REAR	SPARE
ORIGINAL TIRE SIZE	P265/60R18	P265/60R18	P245/70R17
COLD TIRE INFLATION PRESSURE	228 kPa / 33 PSI	228 kPa / 33 PSI	249 kPa / 36 PSI

SEE OWNERS MANUAL FOR ADDITIONAL INFORMATION

9F705717

Vehicle's Tire Placard



Pre-Test Front View of Vehicle

B-4.



Post-Test Front View of Vehicle

B-5.



Pre-Test Left Side View of Test Vehicle

B-6.



Post-Test Left Side View of Test Vehicle

B-7.



Pre-Test Left Rear Closeup View of Vehicle

B-8.



Post-Test Left Rear Closeup View of Vehicle

B-9.



Pre-Test Right Side View of Vehicle

B-10.



Post-Test Right Side View of Vehicle

B-11.



Pre-Test Right Rear Closeup View of Vehicle

B-12.



Post-Test Right Rear Closeup View of Vehicle

B-13.



Pre-Test Rear View of Vehicle

B-14.



Post-Test Rear View of Vehicle

B-15.



Pre-Test ¾ Frontal View From Right Side of Vehicle

B-16.



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

B-17.



Pre-Test 3/4 Rear View From Right Side of Vehicle

B-18.



Post-Test ¾ 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

B-21.



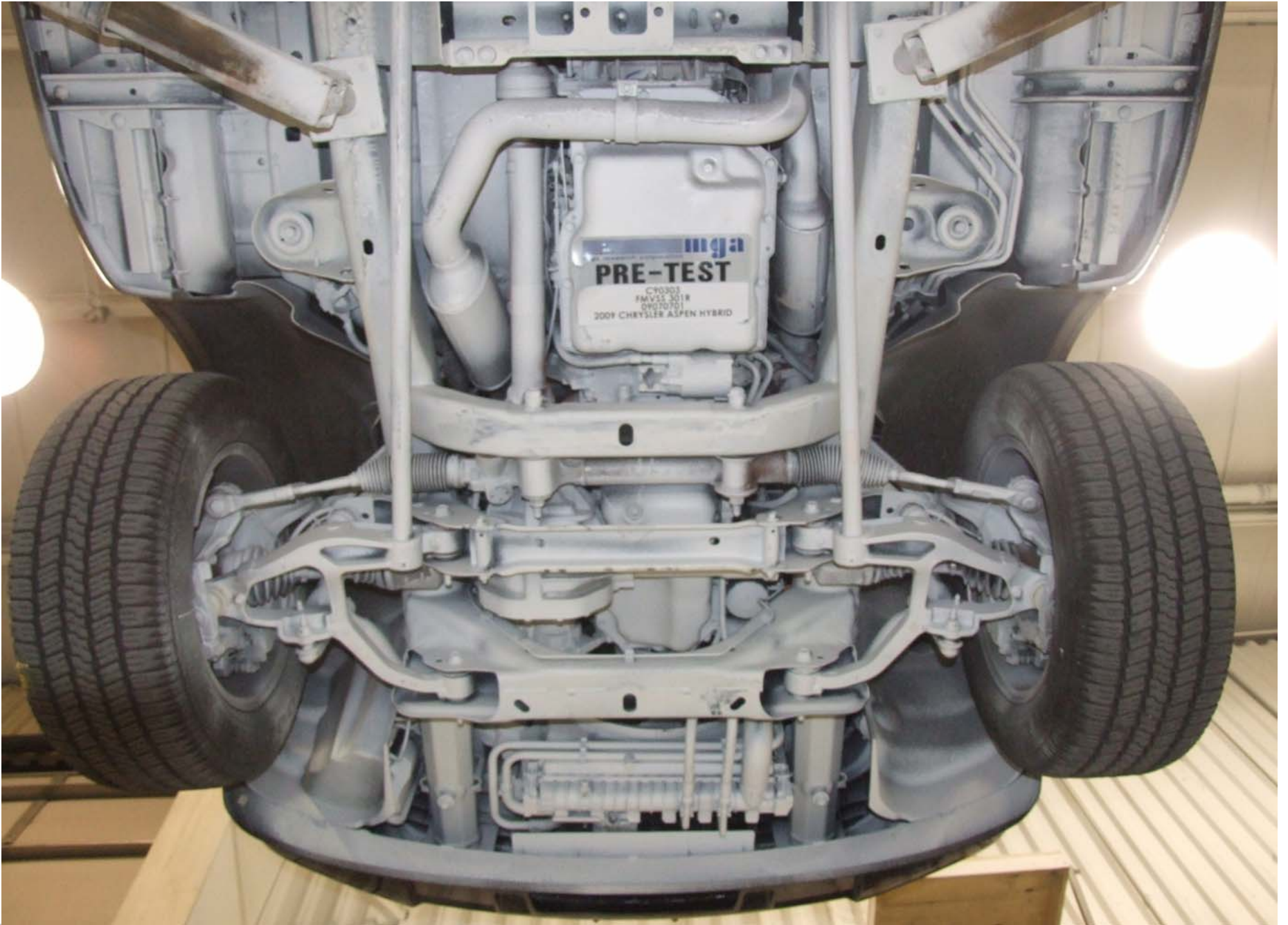
Pre-Test Impact Point



B-22.

Post-Test Impact Point

B-23.



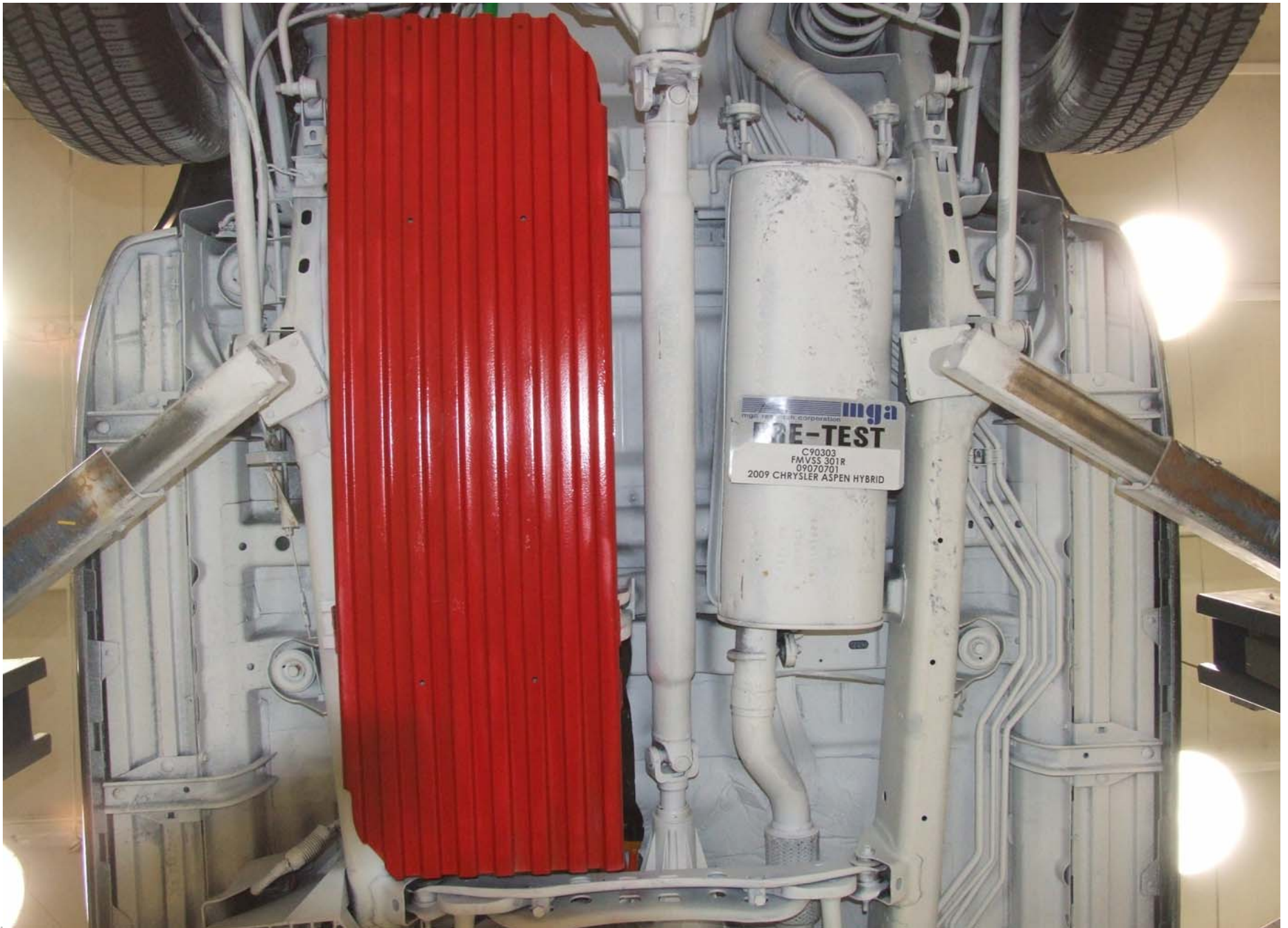
Pre-Test Underbody View 1



B-24.

Post-Test Underbody View 1

B-25.

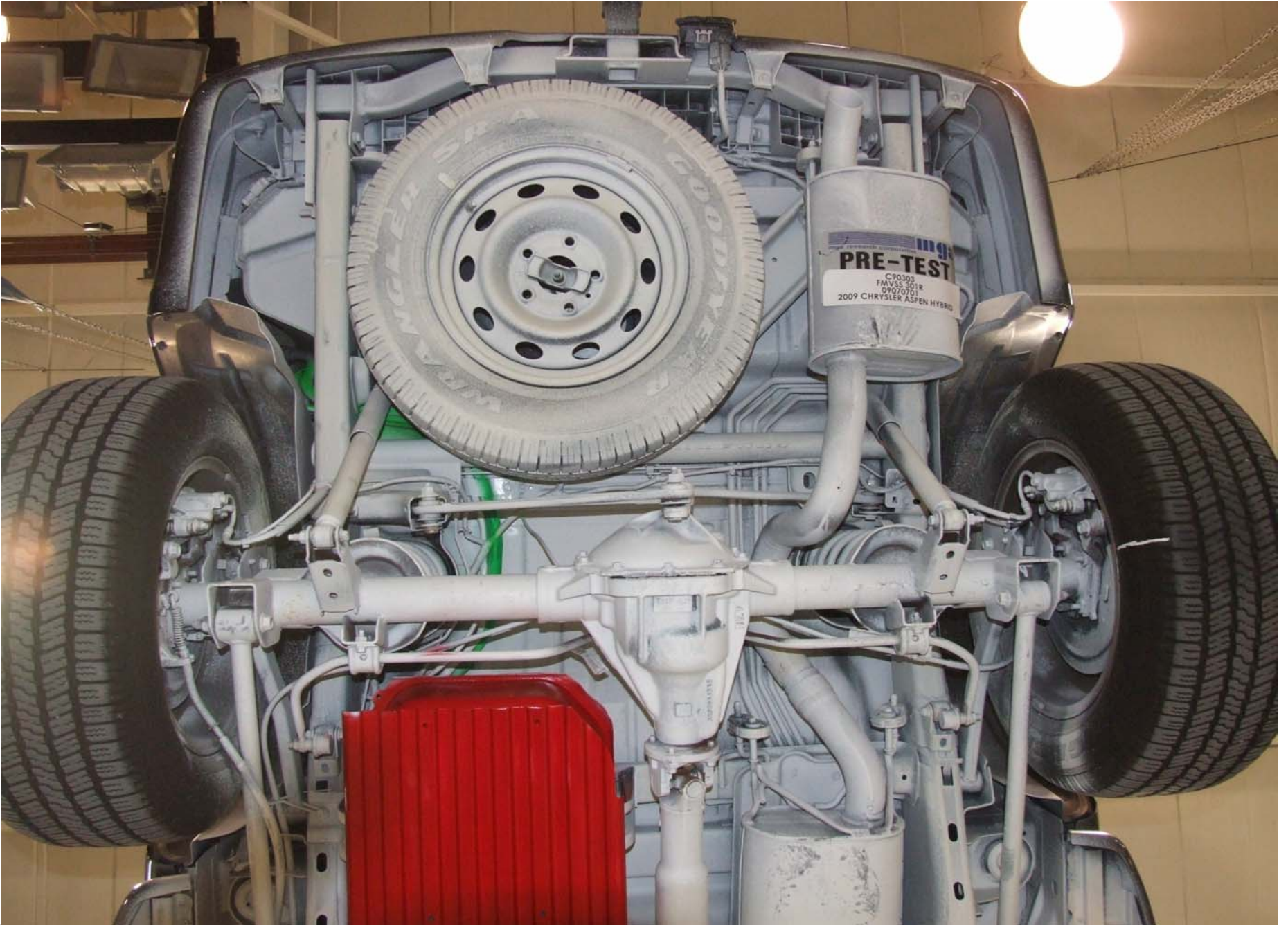


Pre-Test Underbody View 2

B-26.



Post-Test Underbody View 2



B-27.

Pre-Test Underbody View 3



Post-Test Underbody View 3

B-29.



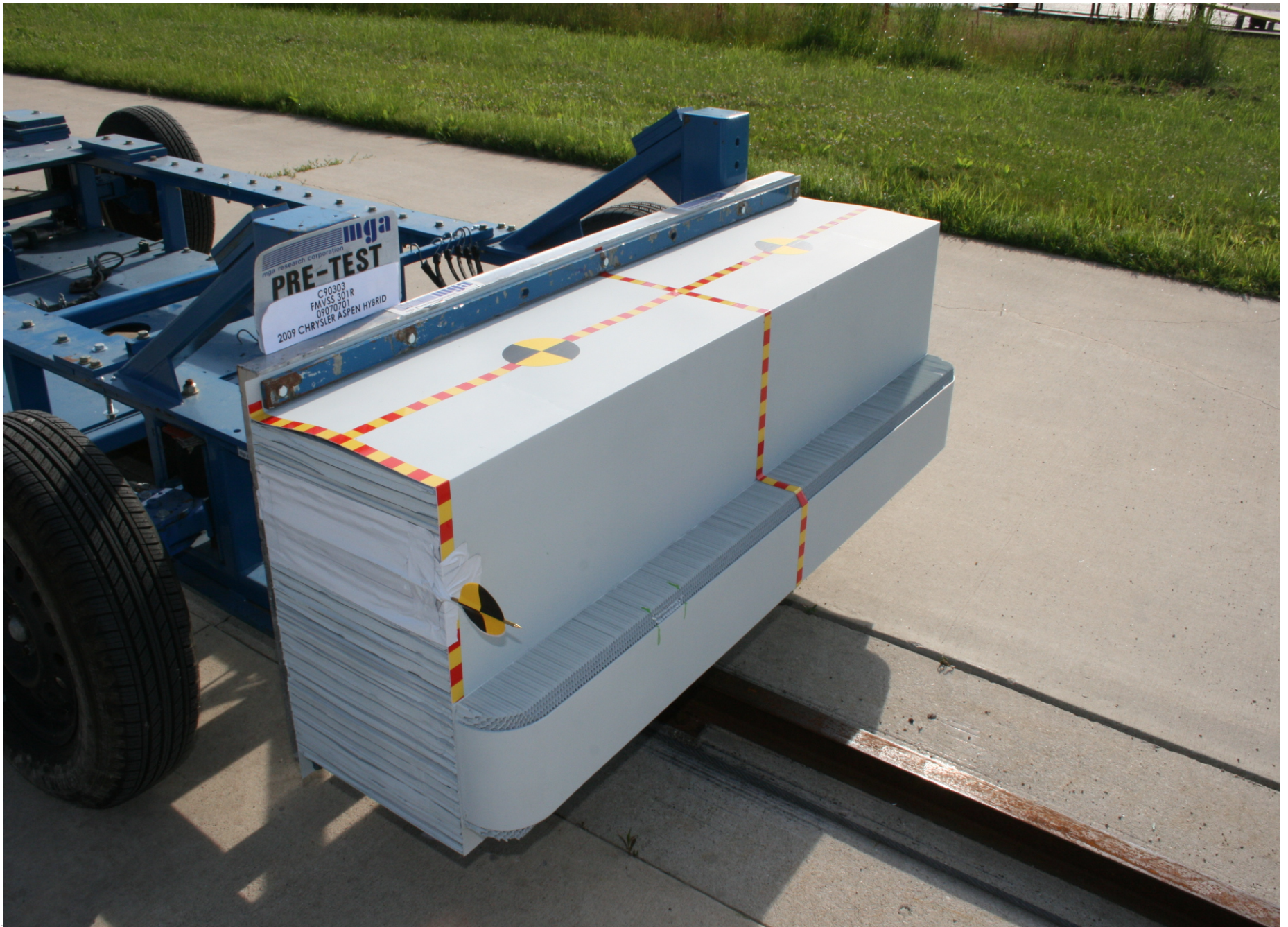
Pre-Test Front View of MDB

B-30.



Post-Test Front View of MDB

B-31.

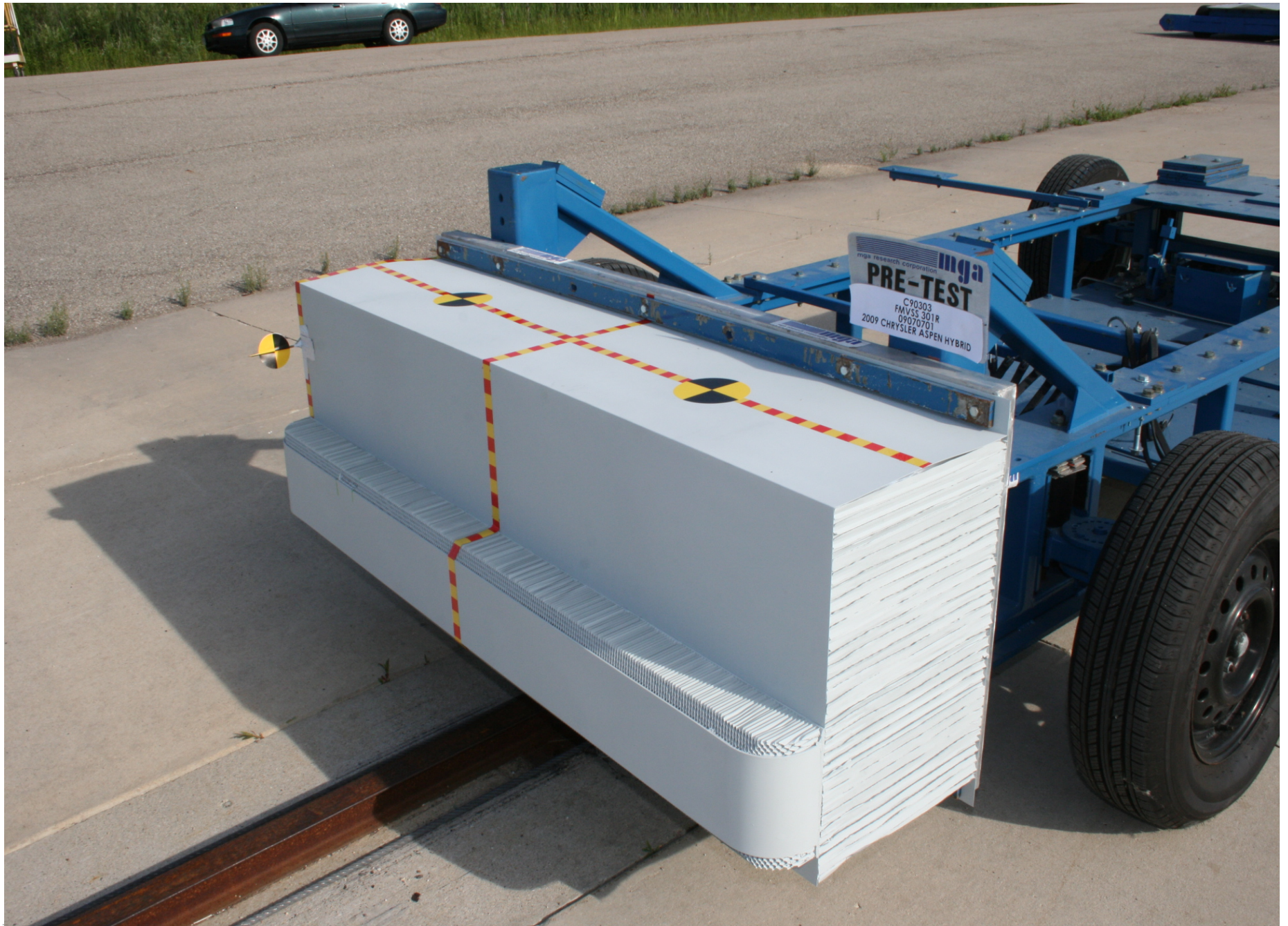


Pre-Test $\frac{3}{4}$ Right Side View of MDB



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

B-33.



Pre-Test ¾ Left Side View of MDB

B-34.



Post-Test ¾ Left Side View of MDB

B-35.



Pre-Test Top View of MDB

B-36.



Post-Test Top View of MDB

B-37.



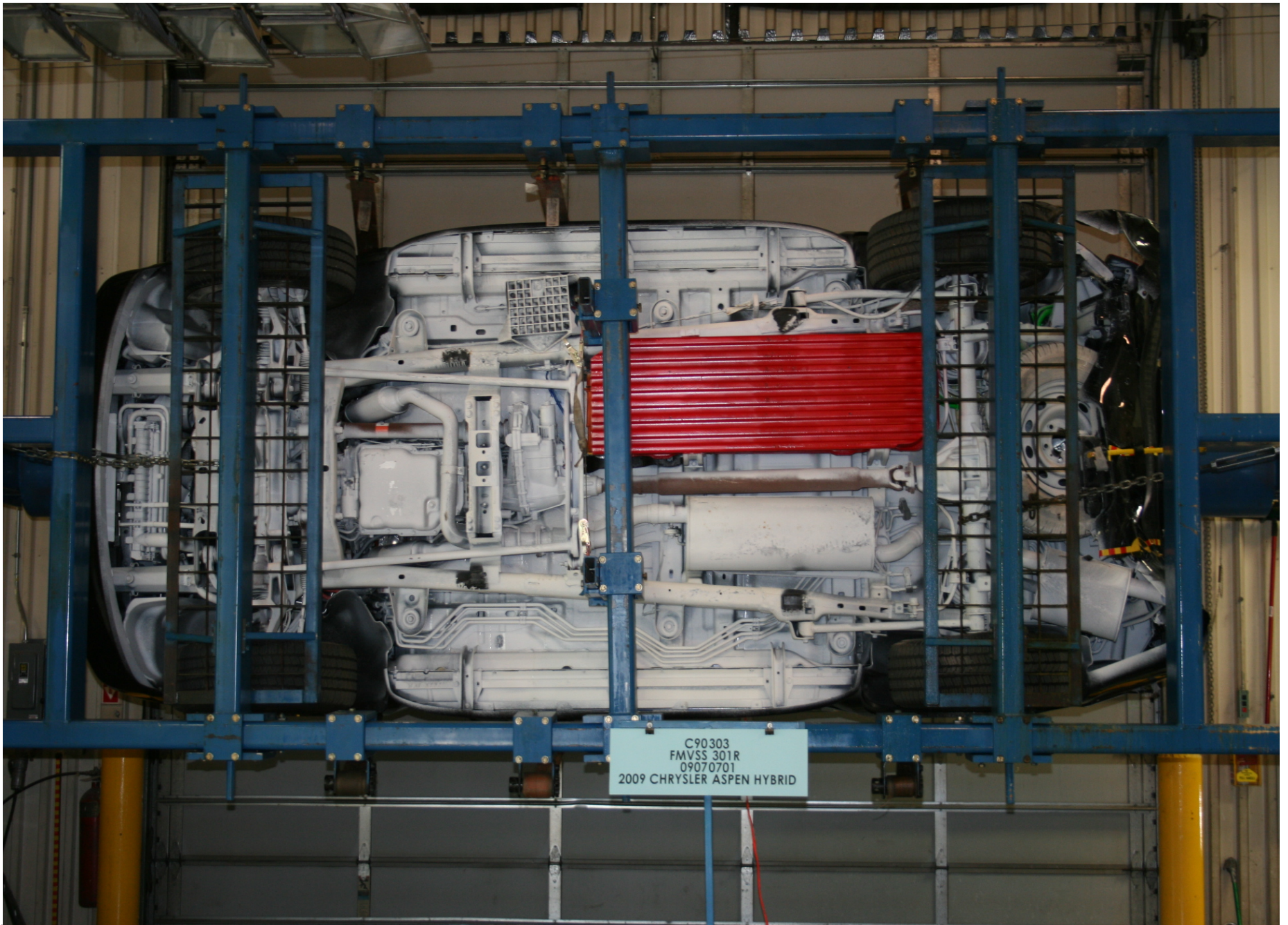
Static Rollover at 90 Degrees

B-38.



Static Rollover at 180 Degrees

B-39.



Static Rollover at 270 Degrees

B-40.



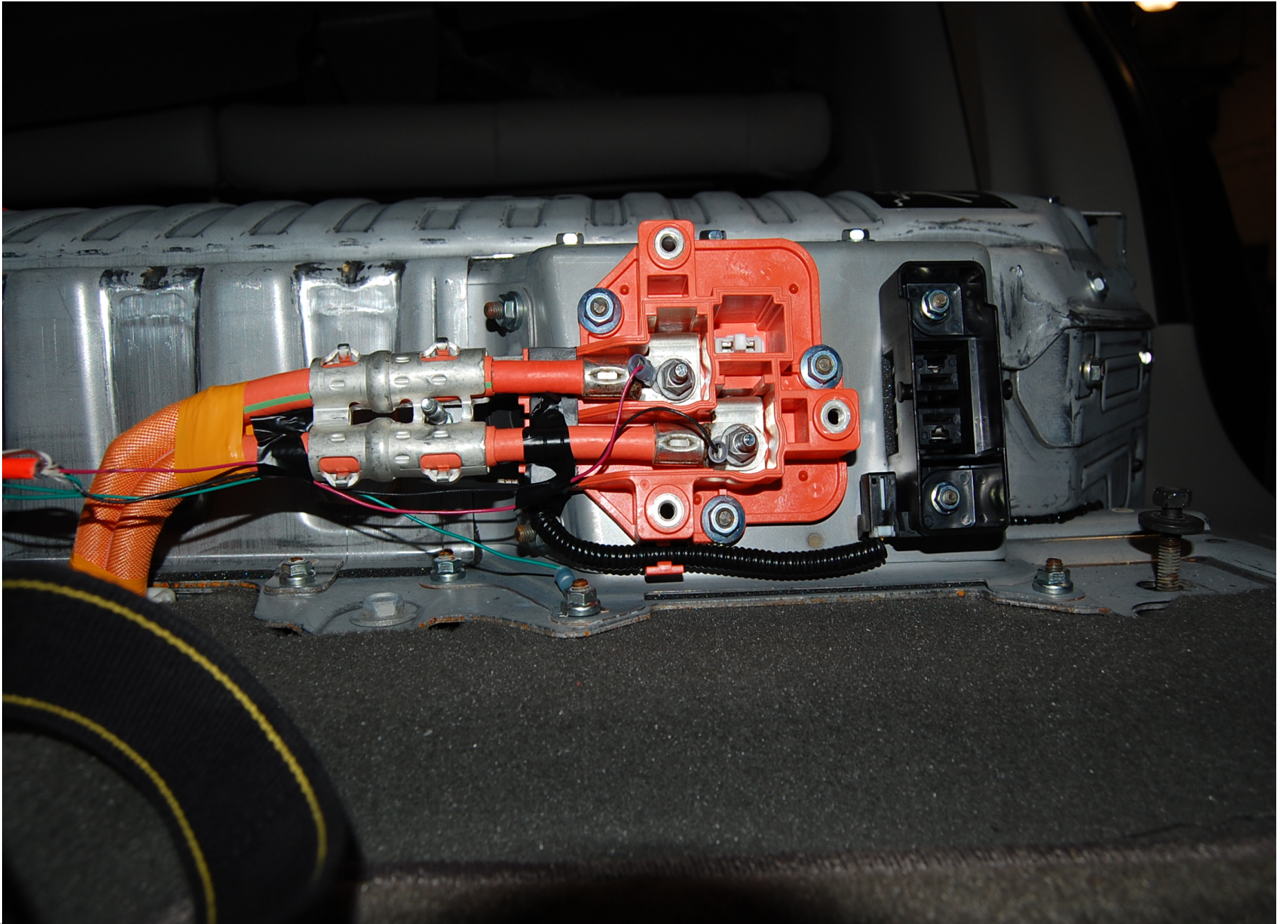
Static Rollover at 360 Degrees

B-41.



Pre-Test Propulsion Battery Module

B-42.



Pre-Test High Voltage Interconnect

B-43.



Pre-Test Installed Test Interface Port

B-44.



Post-Test Installed Test Interface Port

B-45.



Pre-Test Vehicle Pass. Compartment Adjacent to Propulsion Battery

B-46.



Post-Test Vehicle Pass. Compartment Adjacent to Propulsion Battery

B-47.



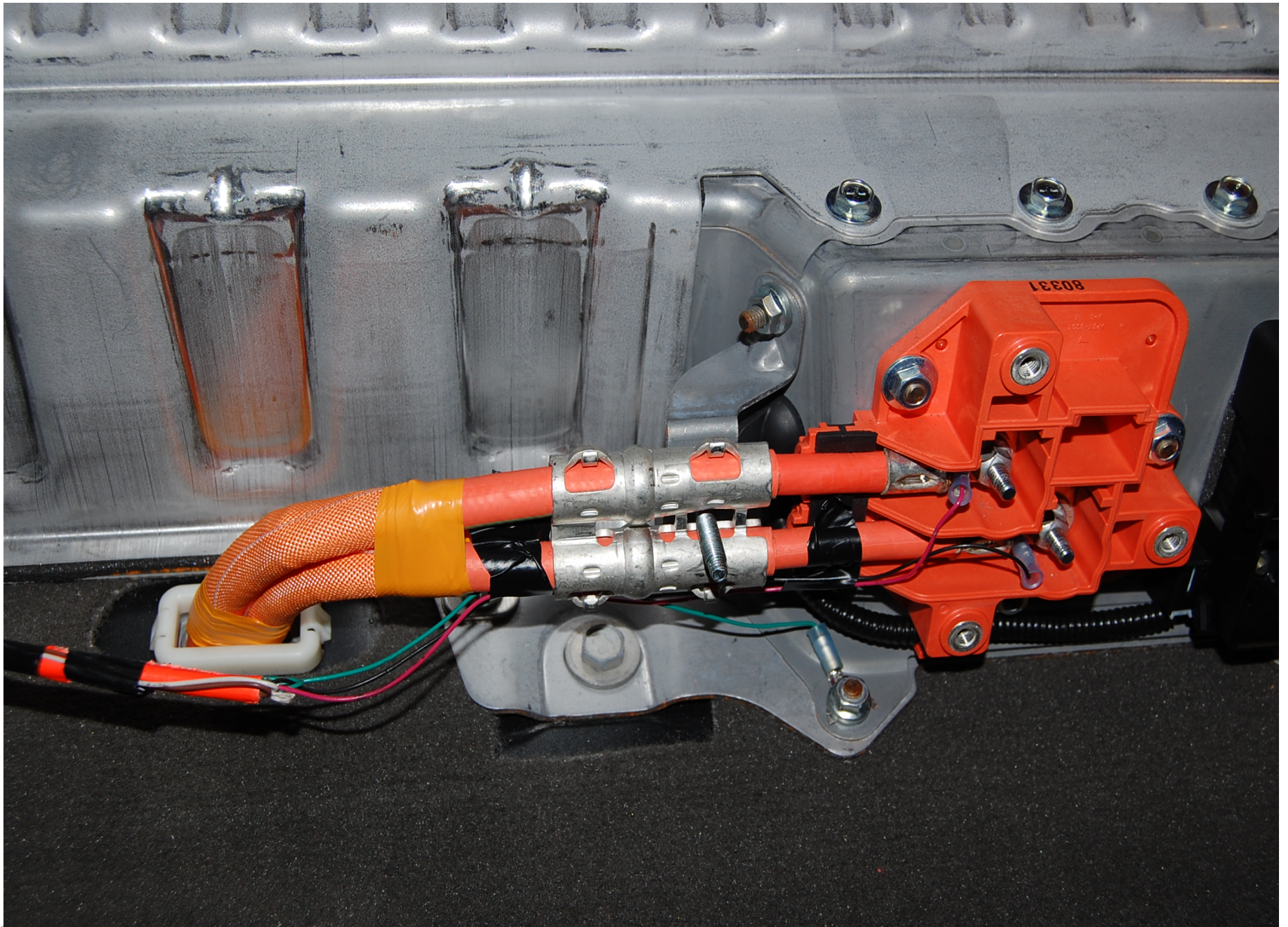
Pre-Test Vehicle Pass. Compartment Adjacent to Propulsion Battery

B-48.



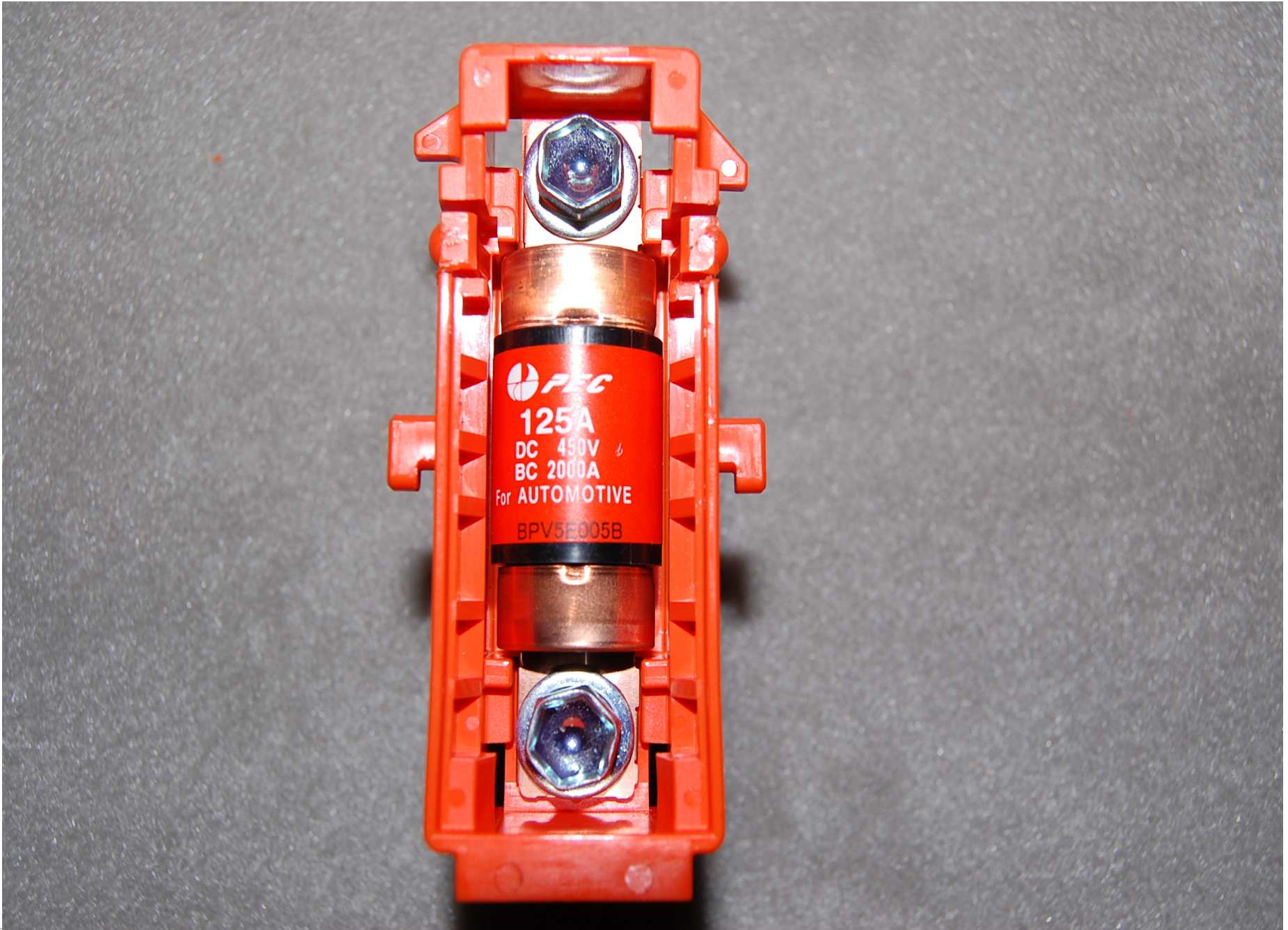
Post-Test Vehicle Pass. Compartment Adjacent to Propulsion Battery

B-49.



Pre-Test Vehicle Chassis Ground Points Location

B-50.



Pre-Test Service Switch Disconnect

B-51.



Pre-Test Forced Air Cooling System