REPORT NUMBER: 305-CAL-07-04

SAFETY COMPLIANCE TESTING FOR FMVSS 305 ELECTRIC POWERED VEHICLES: ELECTROLYTE SPILLAGE AND ELECTRICAL SHOCK PROTECTION

HONDA MOTOR COMPANY
2007 HONDA CIVIC
4-DOOR SEDAN

NHTSA NUMBER: C75303

CALSPAN
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09/06/2007

FINAL REPORT

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
400 Seventh Street, SW
Room 6111 (NVS-220)
Washington, DC 20590

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-02-D-01114. This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufactures' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

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16. Abstract

Compliance tests were conducted on the subject 2007 Honda Civic 4-door Sedan in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-305-00 for the determination of FMVSS 305 compliance. Test failures identified were as follows:

The test vehicle appeared to comply with all requirements of FMVSS 305 "Electric Powered Vehicles: Electrolyte Spillage and Electrical Shock Protection."

The test vehicle was previously impacted at an unknown low velocity prior to conducting this test during which it sustained slight damage. The deformable barrier face was replaced prior to conducting the compliance test.

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SECTION 1

PURPOSE AND TEST PROCEDURE

This rear impact test is part of the FMVSS 305 Compliance Test Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-02-D-01114. The purpose of this test was to determine if the subject vehicle, a 2007 Honda Civic 4-door Sedan, meets the performance requirements of FMVSS No. 305 "Electric Powered Vehicles: Electrolyte Spillage and Electrical Shock Protection." The test was conducted in accordance with the Office of Vehicle Safety Compliance's Laboratory Test Procedure (TP-305D-00, dated December 29, 2005).

SECTION 2

COMPLIANCE TEST RESULTS SUMMARY

A 1499 kg 2007 Honda Civic 4-door Sedan was impacted from the rear by an 1357.5 kg moving barrier at a velocity of 79.5 kph (49.4 mph). The test vehicle was previously impacted at an unknown low velocity prior to conducting this test during which it sustained slight damage. The deformable barrier face was replaced prior to conducting the compliance test. The test was performed by Calspan Corporation on September 6, 2007.

The test vehicle was equipped with a 43.2 liter fuel tank which was filled to 92 percent capacity with stoddard fluid prior to impact. Additional ballast (44 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 three high-speed cameras and one real-time camera. High-speed camera locations and other pertinent camera information are found on page 3-8 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 maximum vehicle longitudinal crush was 620 millimeters. The vehicle appeared to comply with all the requirements of FMVSS 305 "Electric Powered Vehicles: Electrolyte Spillage and Electrical Shock Protection."

SECTION 3

SUMMARY OF TEST RESULTS

DATA SHEET 1

TEST VEHICLE SPECIFICATIONS

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 2007 Honda Civic 4-door Sedan

Vehicle Body Color: Gray NHTSA Number: C75303

Engine Data: 4 Cylinders; - CID; 1.3 Liters; - cc

Transmission: IMA Speed; - Manual; x Automatic; - Overdrive

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

MAJOR TEST VEHICLE OPTIONS:

x AC; x Pwr Steering; x Power Brakes; x Power Locks; - Power Seats

x ABS; x Tilt Wheel; - Stab Control - Traction Control x Anti-Theft

DEALER AND DELIVERY INFORMATION:

Date Received: 7/13/07 ; Odometer Reading 126 km

Selling Dealer: Ralph Pontiac Inc.

Dealer Address: 3939 West Ridge Rd Rochester , NY 14626

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufacturer: Honda Motor Company

Vehicle Build Date: 09/05/07

VIN:: JHMFA36297S026286

GVWR: 1720 kg; GAWR: 895 kg FRONT; 835 kg REAR

DATA FROM VEHICLE'S TIRE LABEL AND SIDEWALL:

Location of Tire Placard: Driver Side B-Pillar

Type of Spare Tire: Temporary

	Front	Rear
Maximum Tire Pressure (sidewall - kPa)	300	300
Cold Pressure (tire placard - kPa) – test pressure	220	220
Recommended Tire Size (tire placard)	P195/65R15	P195/65R15
Vehicle Tire Size with load index & speed symbol	89S	89S
Tire Manufacturer	Dunlop	Dunlop
Tire Name	SP 37AS	SP 37AS
Treadwear, Traction, Temperature	320 A B	320 A B

VEHICLE CAPACITY DATA:

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

Number of Occupants: 2 Front; 3 Rear; 5 Total

Vehicle Capacity Weight (VCW) = 385 kg

No. of Occupants x 68.04 kg = 340.2 kg

Rated Cargo/Luggage Weight (RCLW) = 44.8 kg

ELECTRIC VEHICLE PROPULSION SYSTEM:

Electric Vehicle Type: - Electric; x Electric/Hybrid

Propulsion Battery Type: 14.4 Ni-MH

Nominal Voltage: 158 V

Location of Automatic Propulsion Battery Disconnect N/A

Auxiliary Battery Type: N/A

DATA SHEET 2

PRE-TEST DATA

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

	Left Side (kg)	Right Side (kg)	Ratio (%)	Total (kg)
Front =	389	378	58.5	767.0
Rear =	281	262.5	41.5	543.5
			Total Delivered Weight (UDW) =	1310.5

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight (UDW) =	1310.5	kg
Rated Cargo/Luggage Weight (RCLW) =	44.8	kg
Weight of 2 p.572E Dummies @ 78 each =	148	kg
TARGET TEST WEIGHT =	1503.3	kg

WEIGHT OF TEST VEHICLE WITH TWO DUMMIES AND 40.5 KG OF CARGO WEIGHT:

	Left Side (kg)	Right Side (kg)	Ratio (%)	Total (kg)
Front =	446	433	58.6	879.0
Rear =	315	305	41.4	620.0
			Total Vehicle Test Weight (ATW) =	1499.0

Weight of Ballast Secured in Vehicle[1] = 44 kg Ballast Type Shot Bags

Method of securing Ballast: Location with tape to hold down

Components Removed for Weight Reduction: None

VEHICLE ATTITUDE (all dimension in millimeters):

	Left Front	Right Front	Left Rear	Right Rear	CG[2]
AS DELIVERED:	679	691	682	692	1582
AS TESTED:	660	674	659	669	1585

Vehicle's Wheel Base: 2703 mm

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

[2]Rearward of the front axle centerline.

VEHICLE PRE-TEST WIDTH AND IMPACT OFFSET MEASUREMENT:

Vehicle Width at Widest Point: 1754 mm Location: Door Handle

Centerline offset for impact line: 350 mm

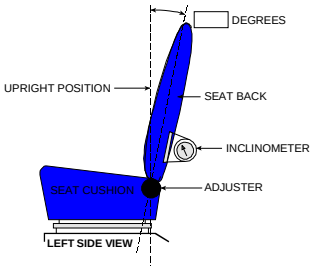
Filler neck side (left/right) Left

DATA SHEET 2 (continued)

PRE-TEST DATA

Vehicle: 2007 Honda Civic 4-door Sedan NHTSA No. C75303

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.



FRONT SEAT ASSEMBLY

Seat back angle for driver's seat: 23 on seatback

Measurement instructions: From 0 detent which is forward-most detent, move back 4 detents

Seat back angle for passenger's seat: 23 on seatback

Measurement instructions: From 0 detent which is forward-most detent, move back 4 detents

2. SEAT FORE AND AFT POSITIONING:

Positioning of the driver's seat: 25 detents with seat in lowest position, went from forward-most position which is 0 detent to 10th detent

Positioning of the passenger's seat: 25 detents in seat travel, went from forward-most position which is 0 detent to 12th detent

3. FUEL TANK CAPACITY DATA:

3.1 A. "Usable Capacity" of the standard equipment fuel tank is 46.9 liters

B. "Usable Capacity" of the optional equipment fuel tank is N/A liters

C. "Usable Capacity" of the vehicle(s) used for certification testing to requirements of FMVSS 301 = 43.1 to 44.3 liters

3.2 Actual Amount of Stoddard solvent added to vehicle for test = 43.2

3.3 Is vehicle equipped with electric fuel pump? Yes- x ; No- -

If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.

With ignition turned "ON"

4. STEERING COLUMN ADJUSTMENTS:

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions: Telescoping distance is 45 mm – placed in 22.5 mm position

70º to 65º angle range – placed in mechanical middle of 67.5º

DATA SHEET 1 (continued)

GENERAL TEST VEHICLE PARAMETER DATA

Vehicle: 2007 Honda Civic 4-door Sedan NHTSA No. C75303

5. SEAT BELT UPPER ANCHORAGE:

Nominal design riding position: Range travel 60 mm with 4 detents, placed in top position as requested

6. PROPULSION BATTERY SYSTEM DATA (COTR SUPPLIED):

Electrolyte Fluid Type:	KOH
Electrolyte Fluid Specific Gravity:	1.258
Electrolyte Fluid Kinematic Viscosity:	2.67
Electrolyte Fluid Color	Clear
Propulsion Battery Coolant Type,	Air
Color and Specific Gravity:	N/A

Location of Battery Modules: - In Occupant Compartment x Outside Occupant Compartment

7. PROPULSION BATTERY STATE OF CHARGE

Maximum State of Charge:	N/A
Test Voltage (≥95% of maximum)	N/A
OR	
Range of Normal Operating Voltage:	Normal operating range is 4 or 5 segments of IMA Battery range level gauge on IP
Test Voltage (within range)	Normal operating range is 4 or 5 segments of IMA Battery range level gauge on IP

8. Details of Chassis Ground Points and Locations:

Metal frame behind rear seat back cushion on passenger side

9. Details of Propulsion Battery Components:

IPU unit is located behind rear seat back cushion, motor power cable leads to engine and CVT.

10. Comments:

None

DATA SHEET 3

MOVING DEFORMABLE BARRIER (MDB) DATA

Vehicle: 2007 Honda Civic 4-door Sedan NHTSA No. C75303

MDB FACE MANUFACTURER AND SERIAL NUMBER:

087A0107-2 074B1106

MDB DETAILS:

Overall Width of Framework Carriage	=	1250	millimeters
Overall Length of MDB (incl. honeycomb impact face)	=	4120	millimeters
Wheelbase of Framework Carriage	=	2591	millimeters
Tread of Framework Carriage (Front & Rear)	=	1875	millimeters
C.G. Location Rearward of Front Axle	=	1139	millimeters

MDB WEIGHT:

Left Front	=	357.0	kg	Left Rear	=	323.0	kg
Right Front	=	404.0	kg	Right Rear	=	273.5	kg
TOTAL FRONT =		761.0	kg	TOTAL REAR	=	596.5	kg
TOTAL MDB WEIGHT =		1357.5	kg				

Tires (Mfr, line, size):

TIRE PRESSURE:

Left Front	=	207	kPa	Left Rear	=	207	kPa
Right Front	=	207	kPa	Right Rear	=	207	kPa

Brake Abort System? (Yes/No) Yes

Date of Last Calibration: 6/15/07

DATA SHEET 4

PRE-IMPACT ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

Vehicle: 2007 Honda Civic 4-door Sedan NHTSA No. C75303

VOLTMETER INFORMATION:

Make:	**FLUKE**	**Model:**	**87**	**S/N:**	**1001**
Internal Resistance Value:		**10**	**MΩ**		
Resolution:		**.001**	**V**		
Last Calibration Date:		**10/10/06**			

Propulsion Battery Voltage : (ready to drive position)	V_b	=	173	V
Propulsion Battery to Vehicle Chassis:	V_1	=	104.9	V
Propulsion Battery to Vehicle Chassis:	V_2	=	104.0	V
Propulsion Battery to Vehicle Chassis Across Known Resistor:	R_o	=	250K	Ω
Propulsion Battery to Vehicle Chassis with R_o installed:	V_1'	=	44	V
Propulsion Battery to Vehicle Chassis: with R_o installed:	V_2'	=	48	V

ELECTRICAL ISOLATION MEASUREMENTS:

R_{i1}:	690K	Ω	$R_{i1}= R_o*(1+V_2/V_1)*[(V_1-V_1')/V_1']$
R_{i2}:	585K	Ω	$R_{i2}= R_o*(1+V_1/V_2)*[(V_2-V_2')/V_2']$
R_i	585K	Ω	Lesser value of R_{i1} and R_{i2}
R_i/V_b	3381	V	Electrical Isolation Value

	Yes/No
Is the Electrical Isolation Value ≥ 500 Ω/V?	YES

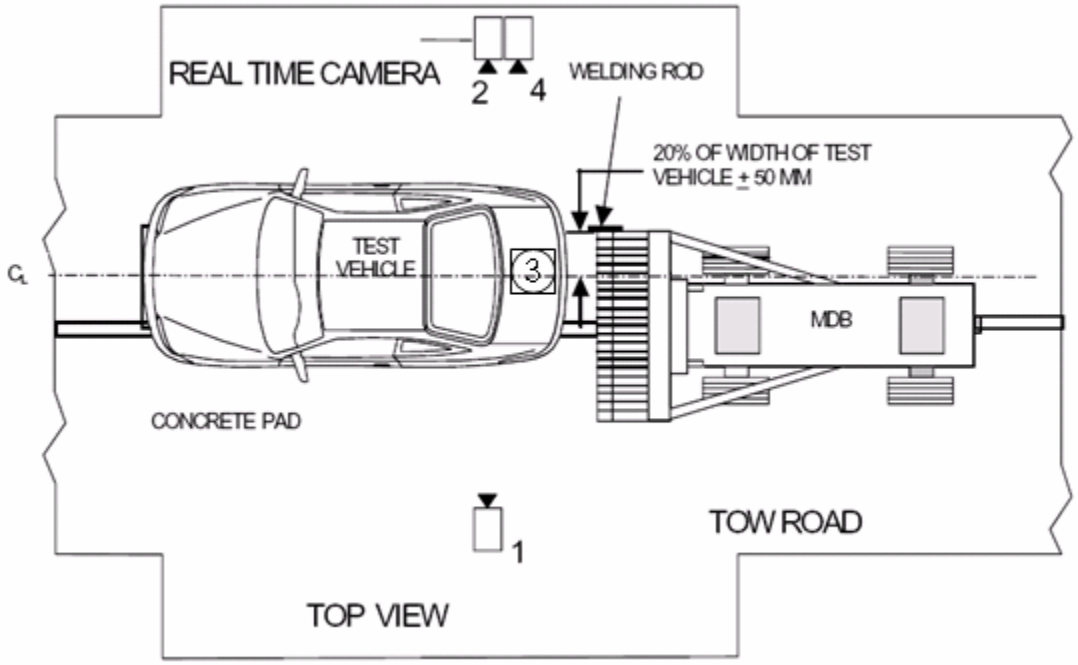
If NO - Failure

Comments:
NONE

DATA SHEET 5

HIGH SPEED CAMERA LOCATIONS AND DATA SUMMARY

Vehicle: 2007 Honda Civic 4-door Sedan NHTSA No. C75303



Camera No.	View	Coordinates (millimeters)			Angle (deg.)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Left Side View	7361	2151	949	0.6	24	1000
2	Real-Time Camera	-	-	-	-	-	30
3	Overhead View	0	436	4880	90	14	1000
4	Right Side View	8773	1115	1094	1.5	28	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 6

POST-TEST DATA

Vehicle: 2007 Honda Civic 4-door Sedan NHTSA No. C75303

REQUIRED IMPACT VELOCITY RANGE:: 78.5 to 80.1 km/h

ACTUAL IMPACT VELOCITY WITHIN 1.5 M OF IMPACT PLANE:

Trap No. 1 = 79.5 km/h Trap No. 2 = 79.5 km/h

Average Impact Speed = 79.5 km/h

Comments:

The test vehicle was previously impacted at an unknown low velocity prior to conducting this test during which it.

sustained slight damage. The deformable barrier face was replaced prior to conducting the compliance test

WELDING ROD IMPACT POINT:

2 Vertical distance from target center (+ is above) Tolerance: ±40 mm

-2 Horizontal distance from target center (+ is right) Tolerance: ±50 mm

STODDARD SOLVENT SPILLAGE MEASUREMENT:

A. Front impact until vehicle motion ceases -

Actual = 0 g Maximum Allowable = 28 g

B. For 5 minute period after vehicle motion ceases -

Actual = 0 g Maximum Allowable = 28 g

C. For next 25 minutes -

Actual = 0 g/minute Maximum Allowable = 28 g/minute

D. Provide Spillage Details:

NONE

ELECTROLYTE SPILLAGE MEASUREMENT:

Is propulsion battery electrolyte spillage visible in occupant compartment? - Yes (fail) x No

For 30 minutes until vehicle motion ceases -

Actual = 0 L Maximum Allowable = 5 L

Provide Spillage Details:

NONE

DATA SHEET 6

POST-TEST DATA (Continued)

Vehicle: 2007 Honda Civic 4-door Sedan NHTSA No. C75303

POST TEST SEAT DATA

LOCATION	SEAT MOVEMENT (mm)	SEAT BACK FAILURE
P1 (Left Front)	10	NONE
P2 (Right Front)	15	NONE

POST TEST ATD CONTACT DATA

LOCATION	Position 1 (Driver)	Position 2 (Passenger)
Head	Back of head to head restraint	Back of head to head restraint
Chest	N/A	N/A
Abdomen	N/A	N/A
Left Knee	N/A	N/A
Right Knee	N/A	N/A

VEHICLE DIMENSIONS:

Vehicle length:

	Left Side	Centerline	Right Side
Pre-Test	4426	4498	4426
Post-Test	3814	3878	3973
Crush	612	620	453

Vehicle Wheel Base:

	Left Side	Right Side
Pre-Test	2703	2703
Post-Test	2581	2712
Crush	122	-9

DATA SHEET 7

POST-IMPACT ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

Vehicle: 2007 Honda Civic 4-door Sedan NHTSA No. C75303

VOLTMETER INFORMATION:

Make: FLUKE Model: 87 S/N: 1001

Internal Impedance Value **10** MΩ

Normal Propulsion Battery Voltage (V_b): **173** V

ELECTICAL ISOLATION MEASUREMENTS

V_1 =	104	V Impact		Time:	5	minutes	05	seconds
V_2 =	104	V Impact		Time:	5	minutes	09	seconds
V_1' =	44	V Impact		Time:	5	minutes	13	seconds
V_2' =	44	V Impact		Time:	5	minutes	18	seconds
R_{i1} =	68K	Ω Impact	$R_{i1}= R_o*(1+V_2/V_1)*[(V_1-V_1')/V_1']$	Time:	5	minutes	23	seconds
R_{i2} =	68K	Ω Impact	$R_{i2}= R_o*(1+V_1/V_2)*[(V_2-V_2')/V_2']$	Time:	5	minutes	23	seconds
R_i =	68K	Ω Impact	Lesser value of R_{i1} and R_{i2}	Time:	5	minutes	23	seconds
R_i/V_b=	2543K	Ω Impact		Time:	5	minutes	23	seconds

Is the measured Electrical Isolation Value ≥ 500 Ω/V? x Yes - No (Fail)

PROPULSION BATTERY SYSTEM COMPONENTS

Describe Propulsion Battery Module movement within occupant compartment:

Nothing Visible

Has the Propulsion Battery Module moved within the occupant compartment? - Yes(Fail) x No

Describe intrusion of an outside Propulsion Battery Component into the occupant compartment:

Nothing Visible

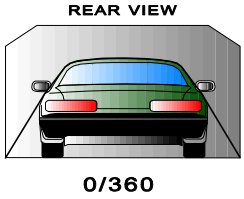
Has an outside Propulsion Battery Component intruded into the occupant compartment? - Yes(Fail) x No

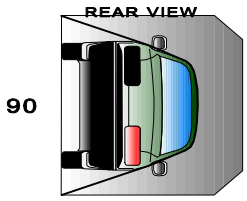
Is Propulsion Battery electrolyte spillage visible in the occupant compartment? - Yes(Fail) x No

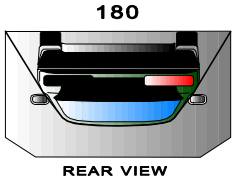
DATA SHEET 8

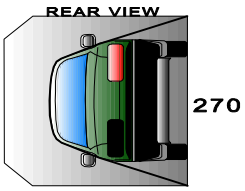
FMVSS 301 ROLLOVER DATA

Vehicle: 2007 Honda Civic 4-door Sedan NHTSA No.: C75303









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	09	seconds	5	minutes	6	minutes	9	seconds	7	minutes
90º - 180º	1	minutes	01	seconds	5	minutes	6	minutes	1	seconds	7	minutes
180º-270º	0	minutes	50	seconds	5	minutes	5	minutes	50	seconds	6	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	N/A
90º - 180º	0	0	0	N/A
180º-270º	0	0	0	N/A
270º-360º	0	0	0	N/A

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

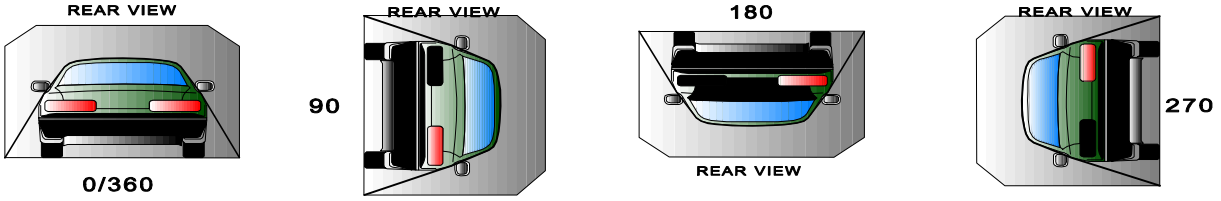
IV. SOLVENT SPILLAGE LOCATION(S):

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

DATA SHEET 9

FMVSS 305 ROLLOVER DATA

Vehicle: 2007 Honda Civic 4-door Sedan NHTSA No.: C75303



I. DETERMINATION OF PROPULSION BATTERY ELECTROLYTE 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	09	seconds	5	minutes	6	minutes	9	seconds	7	minutes
90º - 180º	1	minutes	01	seconds	5	minutes	6	minutes	1	seconds	7	minutes
180º-270º	0	minutes	50	seconds	5	minutes	5	minutes	50	seconds	6	minutes
270º-360º	1	minutes	09	seconds	5	minutes	6	minutes	9	seconds	7	minutes

II. ACTUAL TEST VEHICLE PROPULSION BATTERY ELECTROLYTE SPILLAGE :

Rollover Stage	Propulsion Battery Electrolyte Spillage (L)	Spillage Location
0-90°	0	None
90-180°	0	None
180-270º	0	None
270-360º	0	None

Total Spillage: 0 L **FMVSS 305 permits 5 L maximum**

Is the total spillage of Propulsion Battery electrolyte greater than 5.0 liters? - YES (Fail) x NO

Is Propulsion Battery electrolyte spillage visible in the occupant compartment? - YES (Fail) x NO

DATA SHEET 9

FMVSS 305 ROLLOVER DATA (CONTINUED)

Vehicle: 2007 Honda Civic 4-door Sedan NHTSA No.: C75303

III. ELECTRICAL ISOLATION MEASUREMENTS AND CALCULATIONS:

VOLTMETER INFORMATION:

Make: FLUKE Model: 87 S/N: 1001

Internal Resistance Value (R_O) **10** MΩ

Normal Propulsion Battery Voltage (V_b): **153** V

$R_{i1} = R_o*(1+V_2/V_1)*[(V_1-V_1')/V_1']$ $R_{i2} = R_o*(1+V_1/V_2)*[(V_2-V_2')/V_2']$ Lesser value of R_{i1} and R_{i2}

	Isolation Measurement (Volts)	Stage	R_{i1} Ω	R_{i2} Ω	R_i Ω	R_i/V_b Ω/V	Time (min)	Time (s)
V_1 =	104	90°	**68K**	**68K**	**68K**	**2543**	**1**	**09**
V_2 =	104							
V_1' =	44							
V_2'=	44							
V_1 =	104	180°	**68K**	**68K**	**68K**	**2543**	**1**	**01**
V_2 =	104							
V_1' =	44							
V_2'=	44							
V_1 =	104	270°	**68K**	**68K**	**68K**	**2543**	**0**	**50**
V_2 =	104							
V_1' =	44							
V_2'=	44							
V_1 =	104	360°	**68K**	**68K**	**68K**	**2543**	**1**	**09**
V_2 =	104							
V_1' =	44							
V_2'=	44							

Is the measured Electrical Isolation Value ≥ 500 Ω/V? x YES - NO (Fail)

COMMENTS:

None

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (Continued)

Figure A-1: Vehicle Certification Placard

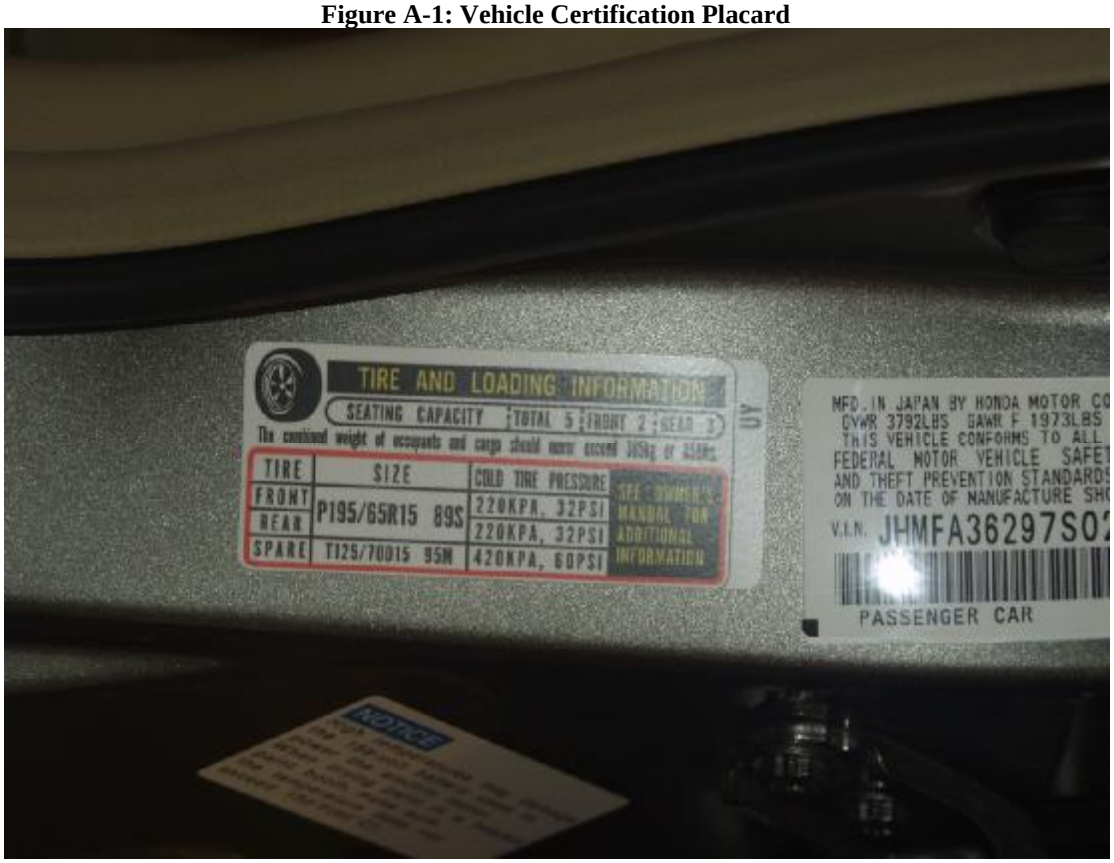


Figure A-2: Vehicle Tire Placard

Figure A-3: Vehicle Electric Propulsion System Label

Figure A-4: Pre-Test Test Port Interface Port Installation View

Not Available

Figure A-5: Pre-Test Test Device Installation Views

Figure A-6: Pre-Test Chassis Ground Point View

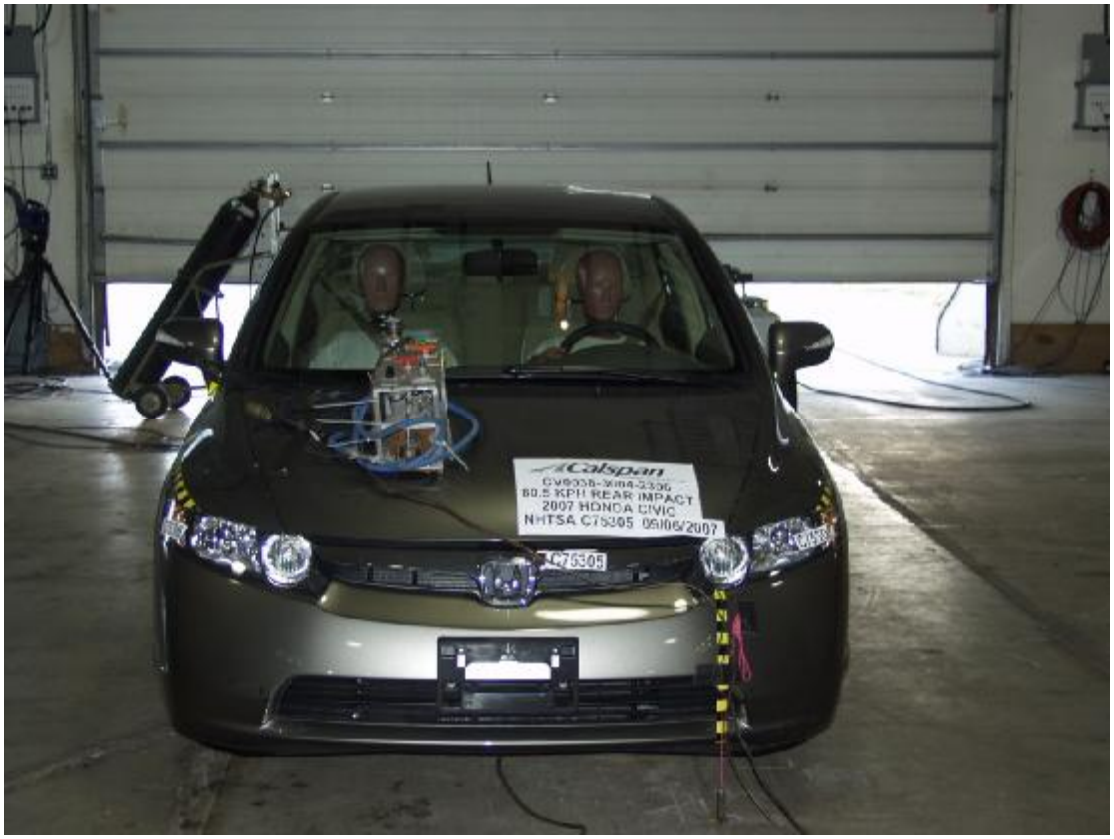


Figure A-7: Pre-Test Front View

Figure A-8: Post-Test Front View

Figure A-9: Pre-Test Left Side View

Figure A-10: Post-Test Left Side View

Figure A-11: Pre-Test Right Side View

Figure A-12: Post-Test Right Side View

Figure A-13: Pre-Test Left Front Three-Quarter View

Figure A-14: Post-Test Left Front Three-Quarter View

Figure A-15: Pre-Test Right Front Three-Quarter View

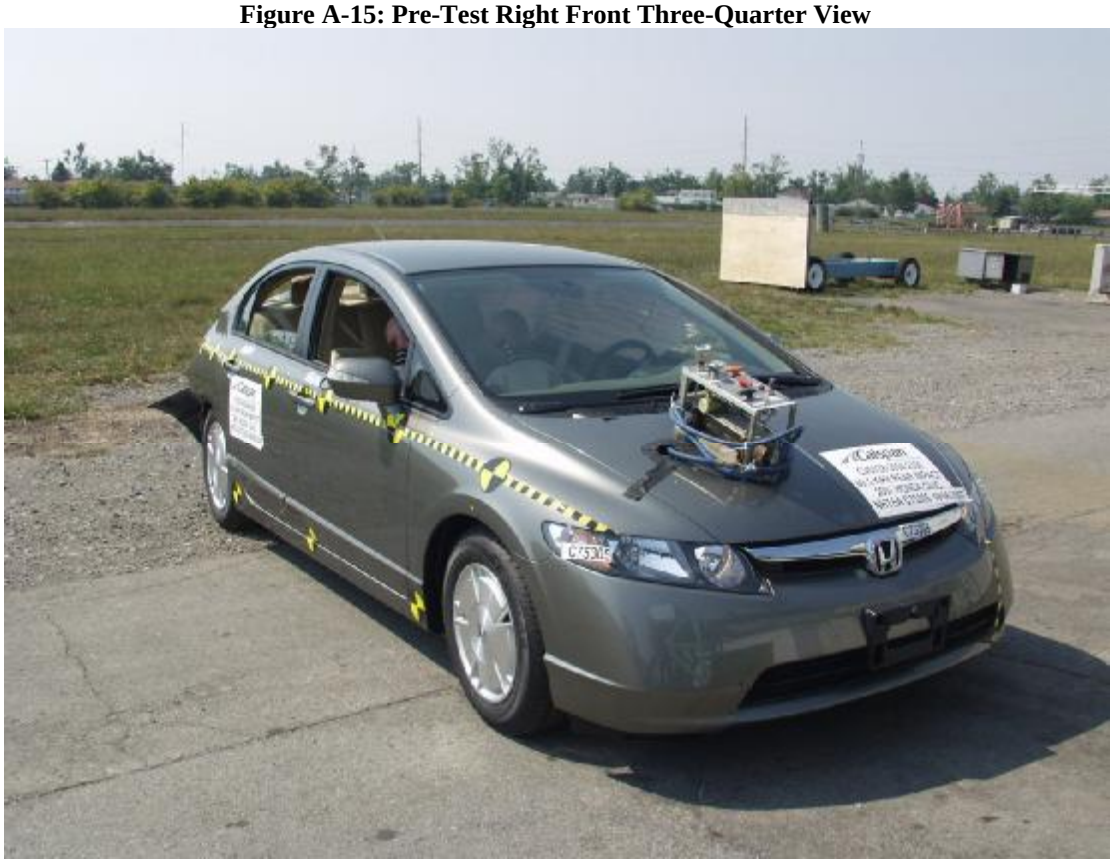


Figure A-16: Post-Test Right Front Three-Quarter View

Figure A-17: Pre-Test Left Rear Three-Quarter View

Figure A-18: Post-Test Left Rear Three-Quarter View

Figure A-19: Pre-Test Right Rear Three-Quarter View

Figure A-20: Post-Test Right Rear Three-Quarter View

Figure A-21: Pre-Test Rear View

Figure A-22: Post-Test Rear View

Figure A-23: Pre-Test MDB Front View

Figure A-24: Post-Test MDB Front View

Figure A-25: Pre-Test MDB Left Side View

Figure A-26: Post-Test MDB Left Side View

Figure A-27: Pre-Test MDB Right Side View

Figure A-28: Post-Test MDB Right Side View

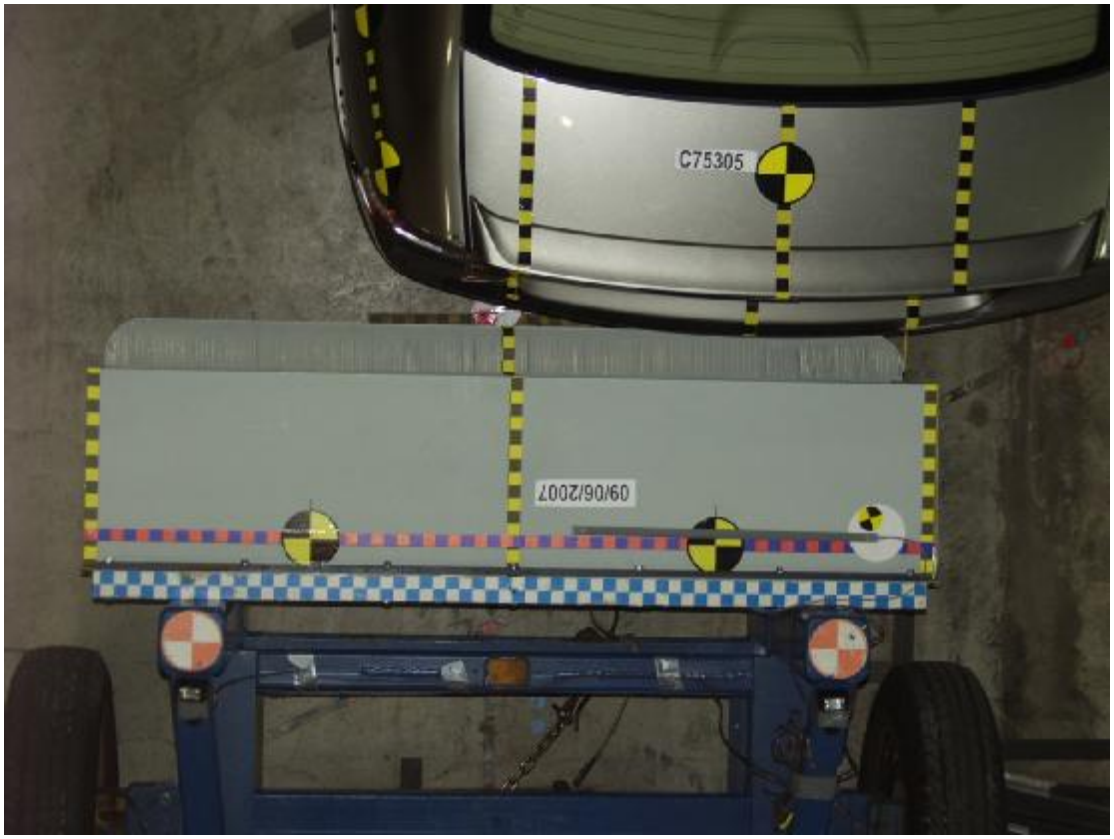


Figure A-29: Pre-Test MDB Top View

Figure A-30: Post-Test MDB Top View

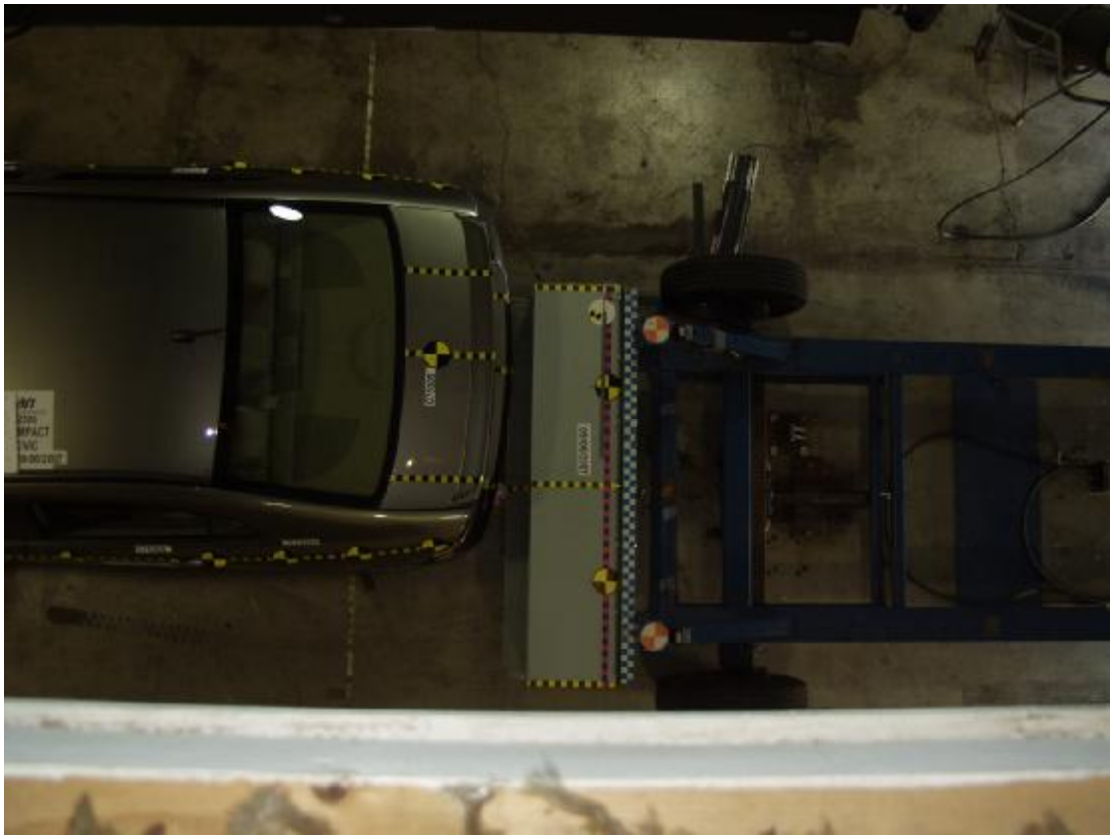


Figure A-31: Pre-Test Overhead Vehicle and MDB View

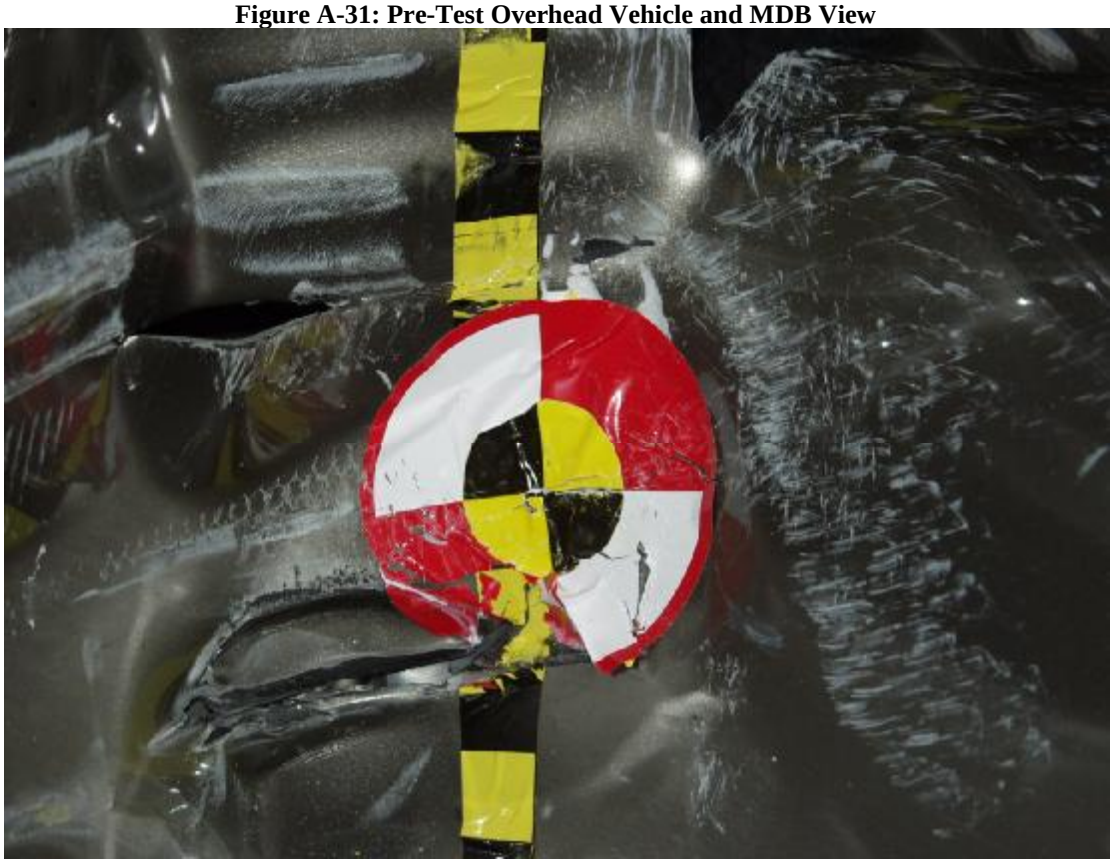


Figure A-32: Post-Test Impact Target View

Figure A-33: Pre-Test Battery Propulsion Module(S) View

Figure A-34: Post-Test Battery Propulsion Module(S) View

Figure A-35: Pre-Test Propulsion Battery View

Figure A-36: Post-Test Propulsion Battery View

Figure A-37: Pre-Test High Voltage Interconnect View

Figure A-38: Post-Test High Voltage Interconnect View

Figure A-39: Pre-Test Battery Compartment View

Figure A-40: Post-Test Battery Compartment View

Figure A-41: Pre-Test Battery Venting System View

NOT AVAILABLE

Figure A-42: Post-Test Battery Venting System View

Figure A-43: Pre-Test Electric Propulsion Component(S) View

Figure A-44: Post-Test Electric Propulsion Component(S) View

Figure A-45: Pre-Test Electric Propulsion Drive View

Figure A-46: Post-Test Electric Propulsion Drive View

Figure A-47: Pre-Test Vehicle Passenger Compartment View

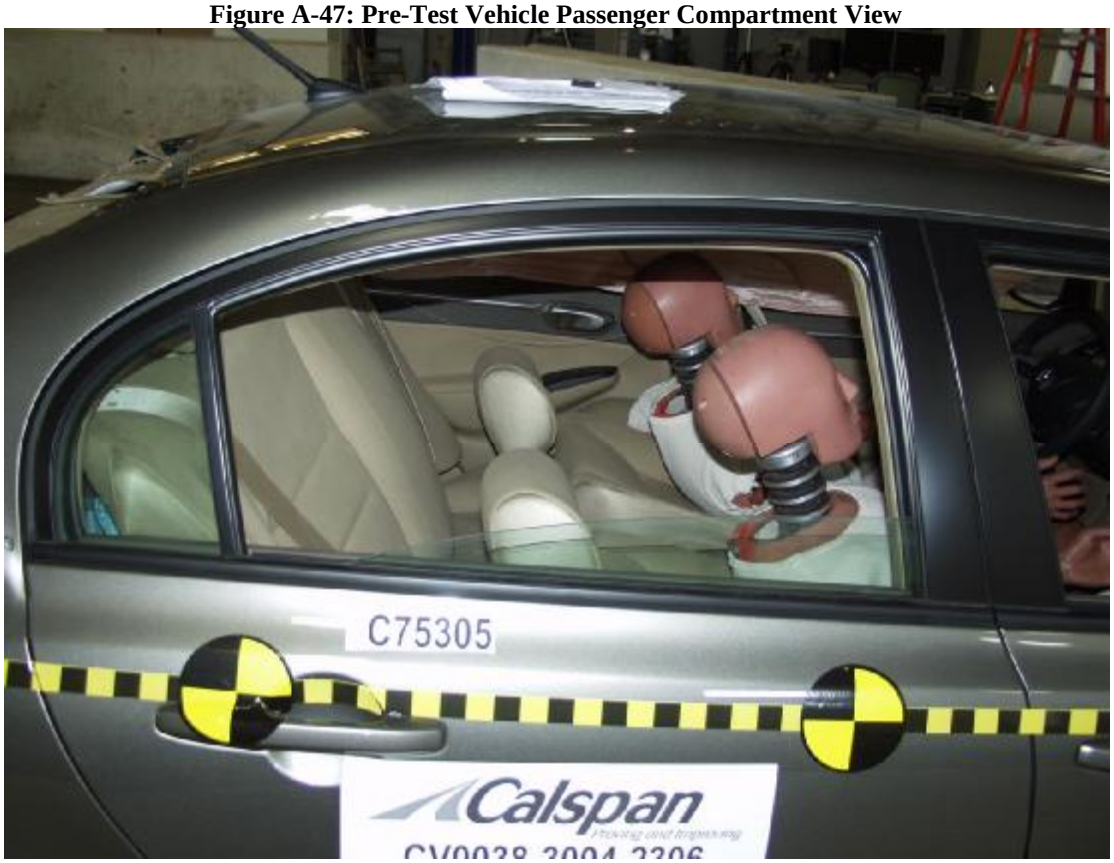


Figure A-48: Post-Test Vehicle Passenger Compartment View

NONE

Figure A-49: Post-Test Propulsion Battery Electrolyte Spillage Location View

Figure A-50: Pre-Test Front Underbody View

Figure A-51: Post-Test Front Underbody View

Figure A-52: Pre-Test Mid Underbody View

Figure A-53: Post-Test Mid Underbody View

Figure A-54: Pre-Test Rear Underbody View

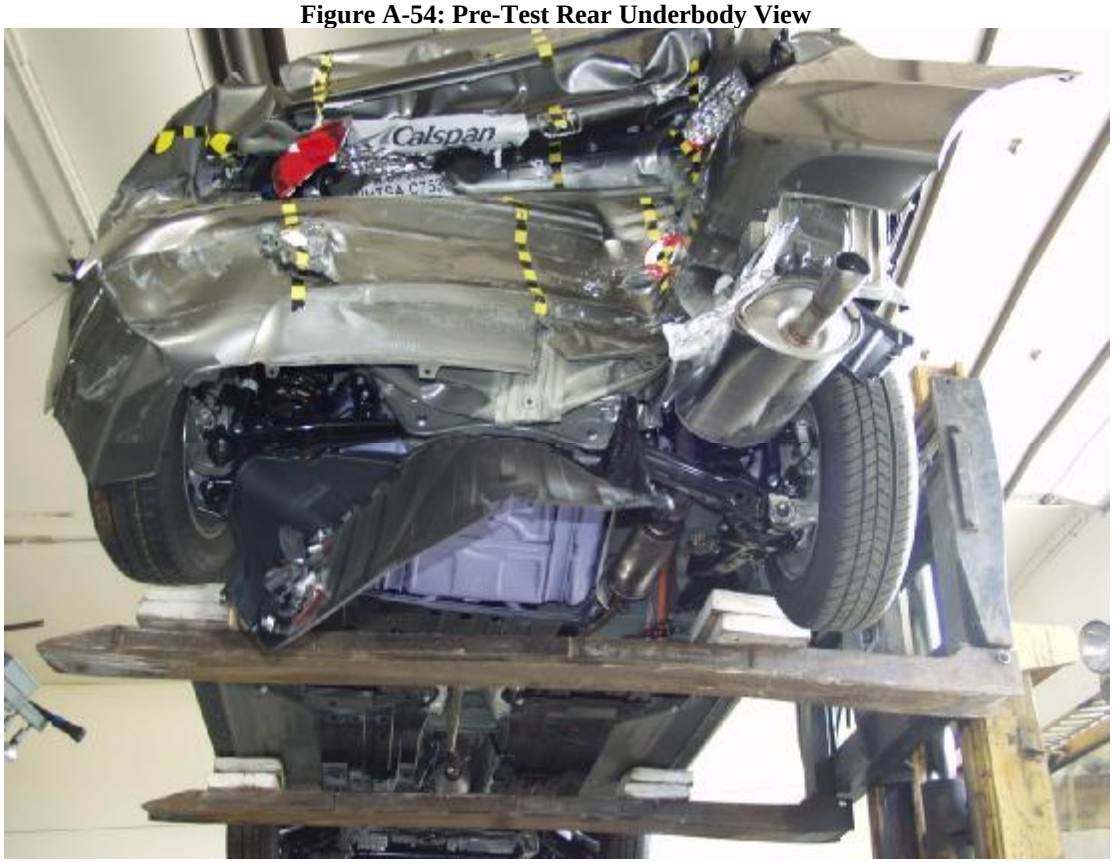


Figure A-55: Post-Test Rear Underbody View

Figure A-56: Pre-Test Fuel Filler Cap View

Figure A-57: Post-Test Fuel Filler Cap View

Figure A-58: Impact View

Figure A-59: Rollover View - 90°

Figure A-60: Rollover View - 180°

Figure A-61: Rollover View - 270°

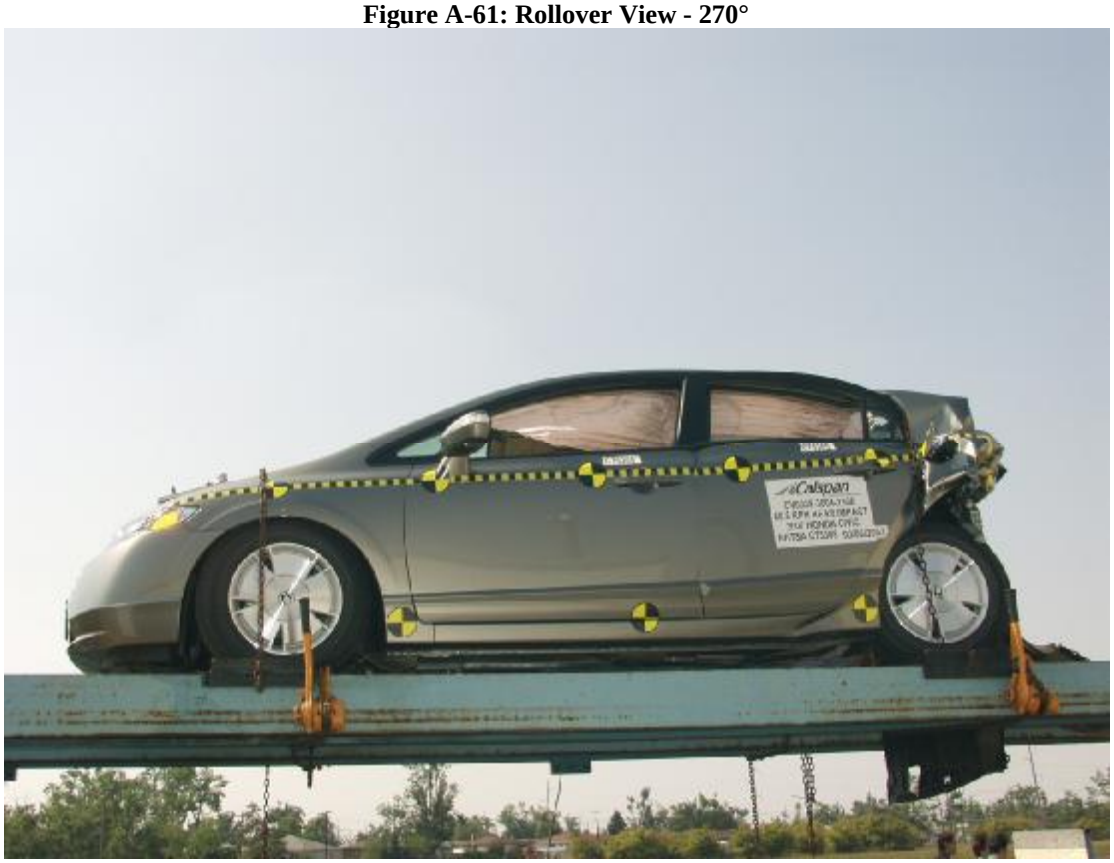


Figure A-62: Rollover View - 360°