REPORT NUMBER 103-GTL-11-001

SAFETY COMPLIANCE TESTING FOR FMVSS NO. 103 WINDSHIELD DEFROSTING AND DEFOGGING SYSTEMS

GENERAL MOTORS LLC.
2011 CHEVROLET VOLT, PASSENGER CAR
NHTSA NO. CB0102

GENERAL TESTING LABORATORIES, INC.
1623 LEEDSTOWN ROAD
COLONIAL BEACH, VIRGINIA 22443

MAY 18, 2011

FINAL REPORT

PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
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Technical Report Documentation Page

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15. Supplementary Notes		
16. Abstract Compliance tests were conducted on the subject, 2011 CHEVROLET VOLT Passenger Car in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-103-13 for the determination of FMVSS 103 compliance. Test failures identified were as follows: None		
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SECTION 1

PURPOSE OF COMPLIANCE TEST

1.0 PURPOSE OF COMPLIANCE TEST

A 2011 CHEVROLET VOLT Passenger Car was subjected to Federal Motor Vehicle Safety Standard (FMVSS) No. 103 testing to determine if the vehicle was in compliance with the requirements of the standard. All tests were conducted in accordance with NHTSA, Office of Vehicle Safety Compliance (OVSC) Laboratory Procedure, TP-103-13 dated 26 June 1996 and General Testing Laboratories, Inc. (GTL) Test Procedure, "Windshield Defrosting and Defogging Systems – Passenger Vehicles, Mulitpurpose Vehicles, Trucks and Buses".

1.1 TEST VEHICLE

The test vehicle was a 2011 CHEVROLET VOLT Passenger Car. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: 1G1RC6E48BU101109

B. NHTSA No.: CB0102

C. Manufacturer: GENERAL MOTORS LLC.

D. Manufacture Date: 01/11

E. Color: Silver Ice Metallic

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 103 testing on May 3-4, 2011.

SECTION 2

COMPLIANCE TEST PROCEDURE AND SUMMARY OF RESULTS

2.0 GENERAL

The 2011 CHEVROLET VOLT 4-door passenger car, NHTSA No. CB0102 was subjected to FMVSS No. 103 tests on May 3-4, 2011. Photographs of the test vehicle are shown in Figures 5.1 through 5.4. The manufacturer's certification and tire information labels are shown in Figures 5.5 and 5.6. The test instrumentation and instrument panel setups are depicted in Figures 5.7 and 5.8. Figures 5.9 through 5.18 depict the windshield pre and post test defrost conditions.

2.1 TEST PROCEDURE

Prior to test the test vehicle was inspected for completeness, systems operability, and appropriate fuel and liquid levels, i.e., oil and coolant to include antifreeze protection. The vehicle was then photographically documented as required by the DOT/NHTSA test procedure. The windshield patterns for areas A, B, C, and D had been furnished prior to testing and these areas were outlined on the windshield with a marker. The vehicle was then installed in the cold chamber and pre-conditioned for a 14-hour minimum, 0º ±5º F temperature soak for the first test run. After the pre-condition, the hood was raised to assure engine coolant and lubricant were stabilized within the test temperature range for a minimum of 2 hours.

At the end of the 2-hour minimum stabilization period, the entire windshield was sprayed evenly with 0.010 ounces of water per square inch of glass area. Refer to Section 3, Compliance Test Data, for test specifics such as total amount of water sprayed, spray gun identification, and air pressure regulation. The vehicle soak continued for an additional 30 minutes minimum but no more than 40 minutes after the windshield was sprayed.

At the conclusion of the additional soak time the vehicle's engine was started and operated at a target speed of 1500-1600 rpm or at the manufacturer's specification if different as noted on data sheets. The defroster blower was turned on to the high speed setting with the heater selector in the de-ice (defrost) position, and the temperature control in the maximum temperature position. All doors and windows were closed. The heater air intake was fully open and the vehicle's hood closed. At no time during the test were the windshield wipers used.

SECTION 2 continued

At start of testing and during test, at each 5-minute interval after engine start, cold chamber, engine coolant, heater coolant in and defroster air left/defroster air right temperatures were recorded. Likewise at each 5-minute interval the boundary of the defrosted area was marked on the inside surface of the windshield. The test was run for a maximum of 40 minutes from engine start, or until such time as 100 percent windshield clearance was achieved. Photographs were made of the windshield at the pre-test frosted state and 5-minute, 10-minute and 15-minute intervals. Post test actions included placing a vellum pattern on the windshield and tracing the windshield's 5-minute interval defrosted area boundary lines onto the vellum pattern.

After the traces were obtained, the windshield was again thoroughly cleaned and the vehicle engine coolant and lubricant stabilization period at 0º ± 5º F temperature commenced for a repeat of the procedure discussed. The windshield patterns for both tests were used subsequently to determine the cleared area percentages.

2.2 SUMMARY OF RESULTS

Based on the test performed, the test vehicle appears to be in compliance with the requirements of FMVSS 103.

SECTION 3

COMPLIANCE TEST DATA

3.0 TEST RESULTS

The following data sheets document the results of testing on the 2011 CHEVROLET VOLT.

SUMMARY DATA SHEET
FMVSS 103, WINDSHIELD DEFROSTING AND DEFOGGING SYSTEMS

VEH. MOD YR/MAKE/MODEL/BODY: 2011 CHEVROLET VOLT PASSENGER CAR
VEH. NHTSA NO: CB0102; VIN: 1G1RC6E48BU101109
VEH. BUILD DATE: 01/11 TEST DATE: MAY 3-4, 2011
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, ALAN AYLOR, DEBBIE MESSICK

WINDSHIELD AREA: 1788 in^2 AREA C = 319 in^2 AREA D = 319 in^2 AREA A= 1156 in^2

MANUFACTURER'S WINDSHIELD PATTERN USED: Yes X No

ENGINE THERMOSTAT NOMINAL REGULATING TEMPERATURE: 180 ºF

HEATER-DEFROSTER SYSTEM INCLUDES AIR CONDITIONER: YES X NO

DESCRIBE UNUSUAL FEATURES OF DEFROSTING SYSTEM: None

DESCRIBE UNUSUAL FEATURES OF TEST CAR: Hybrid Vehicle

DESIGNATION	AREA PERCENT DEFROSTED					
	TEST 1	TEST 2	AVG	REQ'D	PASS	FAIL
CRITICAL AREA C AT 20 MINUTES	100%	100%	100%	80% MINIMUM	PASS	
PASSENGER AREA D AT 25 MINUTES	100%	100%	100%	80% MINIMUM	PASS	
TOTAL AREA A AT 40 MINUTES	100%	100%	100%	95% MINIMUM	PASS	

REMARKS:

RECORDED BY: G. FARRAND DATE: 05/04/11

APPROVED BY: D. MESSICK

FMVSS 103 TEST DATA RECORD – TEST RUN NO. 1

VEH. MOD YR/MAKE/MODEL/BODY: 2011 CHEVROLET VOLT PASSENGER CAR
VEH. NHTSA NO: CB0102; VIN: 1G1RC6E48BU101109
VEH. BUILD DATE: 01/11 ; TEST DATE: MAY 3, 2011
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, ALAN AYLOR, DEBBIE MESSICK

If 1st Test Run, chamber conditioned 17 hours @ 0º ±5º F (14 hrs. min.)

Cold Soak Period: 17 HOURS

Time engine coolant and lubricant remained stabilized at 0º F: 11 hrs. ___ minutes

Water Spray Gun and Nozzle Type: BINKS #66 S

Spray Gun Pressure: 50 psi (50 psi ± 3 psi)

Water used: 17.9 fluid oz. (0.010 ounces per square inch of windshield area)

Soak Period Between Ice Application and Test Start: 32 minutes (30 to 40 minutes)

Engine Speed: 1400 rpm (1500 to 1600 rpm) (Controlled by vehicle)

Wind at specified location in front of windshield: 1.0 mph (0 to 2 mph)

Number of Vehicle Occupants: 2 (2 maximum)

Describe window openings, if any: NONE

TIME FROM START (minutes)	MOTOR VOLTAGE (volts)	TEMPERATURE, ºF					DEFROSTED AREA, %		
		TEST ROOM	ENGINE WATER	HEATER WATER IN	DEFROSTER AIR		A	C	D
					DRVR	PSGR			
0	12.3	-4.4	17.4	-1.9	-1.9	-1.8	0%	0%	0%
5	15.4	-1.5	20.5	70.2	89.0	94.5	11.5%	1.5%	1.9%
10	15.5	-0.3	25.5	115.3	109.5	111.5	90.3%	98.7%	93.0%
15	15.5	2.8	33.4	125.9	111.8	113.4	100%	100%	100%

REMARKS: Vehicle was plugged into shore power for charging for 17 hour cold soak. Vehicle was unplugged at start of test.

RECORDED BY: G. FARRAND DATE: 05/03/11

APPROVED BY: D. MESSICK

FMVSS 103 TEST DATA RECORD – TEST RUN NO. 2

VEH. MOD YR/MAKE/MODEL/BODY: 2011 CHEVROLET VOLT PASSENGER CAR
VEH. NHTSA NO: CB0102; VIN: 1G1RC6E48BU101109
VEH. BUILD DATE: 01/11 ; TEST DATE: MAY 4, 2011
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, ALAN AYLOR, DEBBIE MESSICK

If 1st Test Run, chamber conditioned N/A hours @ 0º ±5º F (14 hrs. min.)

Cold Soak Period: 24.0 HOURS

Time engine coolant and lubricant remained stabilized at 0º F: 12 hrs. ___ minutes

Water Spray Gun and Nozzle Type: BINKS #66S

Spray Gun Pressure: 50 psi (50 psi ± 3 psi)

Water used: 17.9 fluid oz. (0.010 ounces per square inch of windshield area)

Soak Period Between Ice Application and Test Start: 32 minutes (30 to 40 minutes)

Engine Speed: 1400 rpm (1500 to 1600 rpm) (Controlled by vehicle)

Wind at specified location in front of windshield: 1.0 mph (0 to 2 mph)

Number of Vehicle Occupants: 1 (2 maximum)

Describe window openings, if any: NONE

TIME FROM START (minutes)	MOTOR VOLTAGE (volts)	TEMPERATURE, ºF					DEFROSTED AREA, %		
		TEST ROOM	ENGINE WATER	HEATER WATER IN	DEFROSTER AIR DRVR	DEFROSTER AIR PSGR	A	C	D
0	12.5	-3.3	-1.4	-1.0	0.7	0.7	0%	0%	0%
5	15.2	-3.3	0.6	64.4	84.7	89.9	13.9%	4.4%	4.8%
10	15.5	-0.8	11.2	116.1	107.2	109.1	80.5%	89.4%	96.1%
15	15.4	1.6	23.6	127.9	110.0	111.9	100%	100%	100%

REMARKS: Vehicle was fully charged before cold soak but was not plugged in for charging during the cold soak or test.

RECORDED BY: G. FARRAND DATE: 05/04/11

APPROVED BY: D. MESSICK

SECTION 4
INSTRUMENTATION AND EQUIPMENT LIST

TABLE 1 - INSTRUMENTATION & EQUIPMENT LIST

EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO.	CAL. DATE	NEXT CAL. DATE
TIMER	ACCU-SPLIT	ACT1	05/11	05/12
TAC/RECORDER	MONARCH	1444664	05/11	05/12
TEMPERATURE RECORDER	FLUKE	7471026	09/11	09/12
SPRAY GUN	BINKS	66S	BEFORE USE	BEFORE USE
ANEMOMETER	OMEGA	HH-600	05/11	05/12
AIR PRESSURE GAGE	BINKS	0-160	05/11	05/12
SCALE	METTLER	H315/ 445951	BEFORE USE	BEFORE USE
GRADUATED BEAKER	PHOTAX	N/A	N/A	N/A
EVENT RECORDER	COMPUTER	GEO1	BEFORE USE	BEFORE USE

SECTION 5

PHOTOGRAPHS

2011 CHEVROLET VOLT
NHTSA NO. CB0102
FMVSS NO. 103

FIGURE 5.1
LEFT SIDE VIEW OF VEHICLE

2011 CHEVROLET VOLT
NHTSA NO. CB0102
FMVSS NO. 103

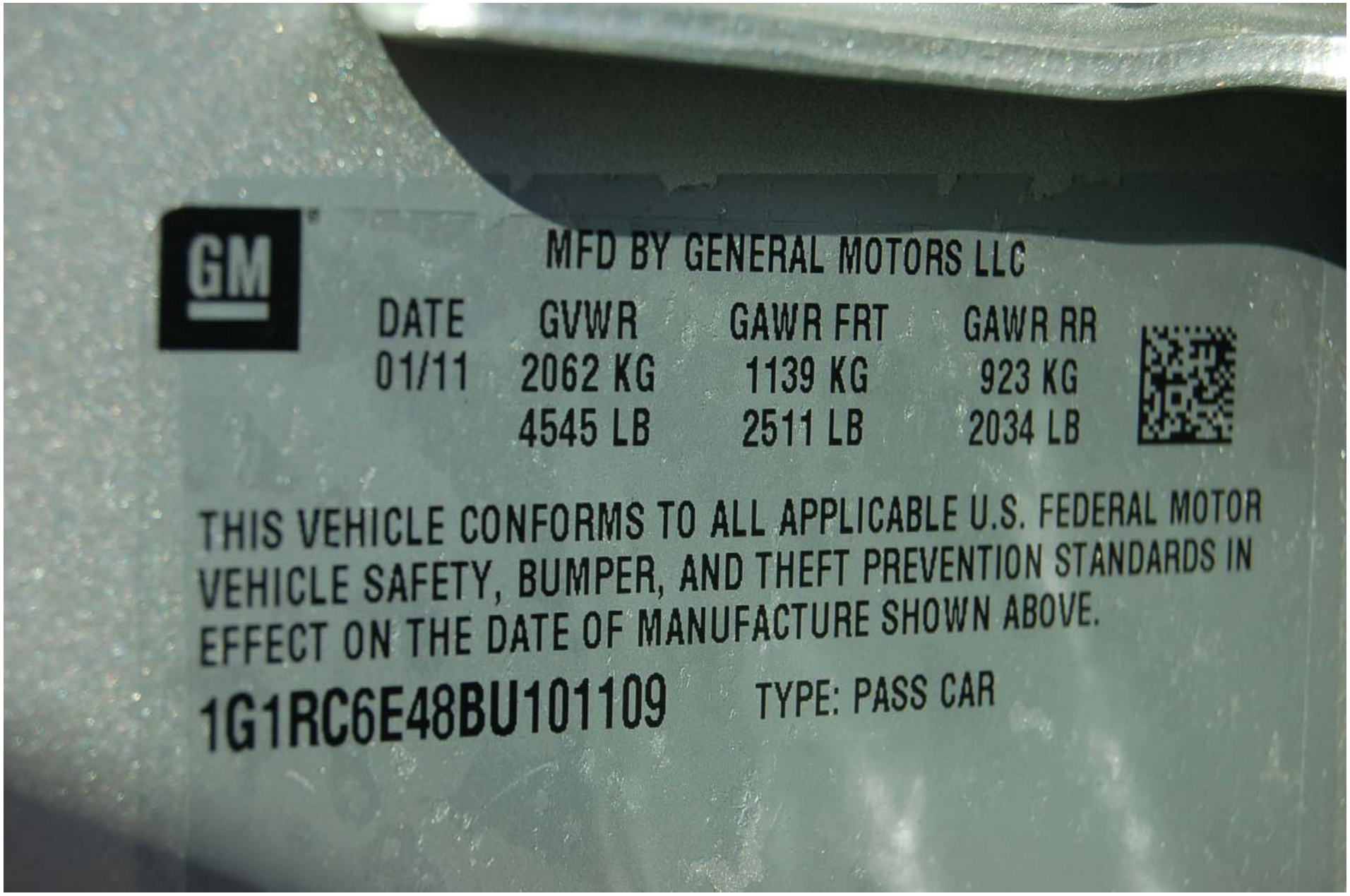
FIGURE 5.2
RIGHT SIDE VIEW OF VEHICLE

2011 CHEVROLET VOLT
NHTSA NO. CB0102
FMVSS NO. 103

FIGURE 5.3
¾ FRONTAL VIEW FROM LEFT SIDE OF VEHICLE

2011 CHEVROLET VOLT
NHTSA NO. CB0102
FMVSS NO. 103

FIGURE 5.4
¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE



2011 CHEVROLET VOLT
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FIGURE 5.5
VEHICLE CERTIFICATION LABEL

2011 CHEVROLET VOLT
NHTSA NO. CB0102
FMVSS NO. 103

FIGURE 5.6
VEHICLE TIRE INFORMATION LABEL

2011 CHEVROLET VOLT
NHTSA NO. CB0102
FMVSS NO. 103

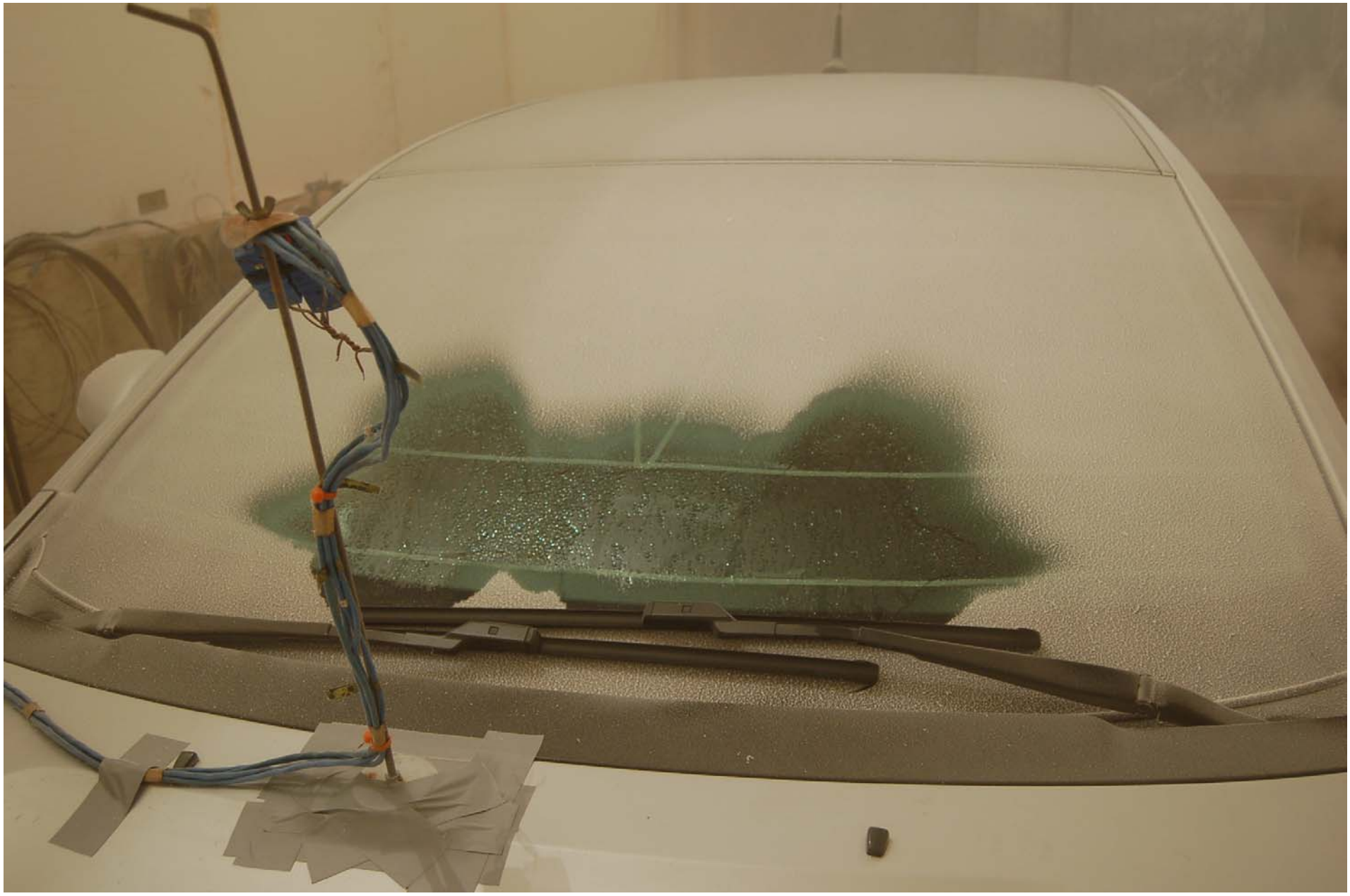
FIGURE 5.7
CLOSE-UP VIEW OF DEFROSTER CONTROL SETTING ON DASH

2011 CHEVROLET VOLT
NHTSA NO. CB0102
FMVSS NO. 103

FIGURE 5.8
INSTRUMENTATION SET-UP

2011 CHEVROLET VOLT
NHTSA NO. CB0102
FMVSS NO. 103

FIGURE 5.9
WINDSHIELD, PRE-TEST FROSTED STATE TEST #1



2011 CHEVROLET VOLT
NHTSA NO. CB0102
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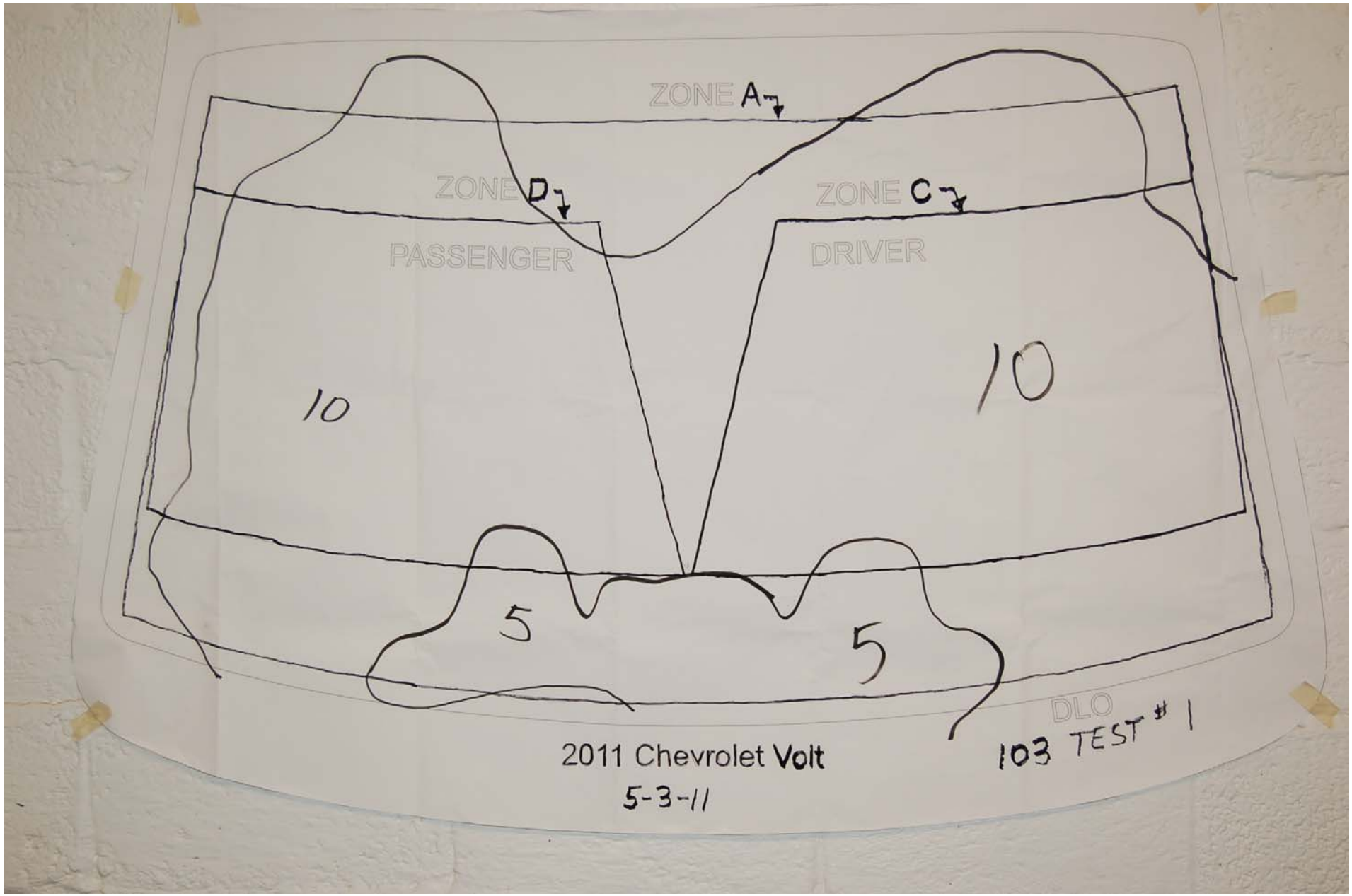
FIGURE 5.10
DEFROSTED AREA AT 5 MINUTES TEST #1

2011 CHEVROLET VOLT
NHTSA NO. CB0102
FMVSS NO. 103

FIGURE 5.11
DEFROSTED AREA AT 10 MINUTES TEST #1

2011 CHEVROLET VOLT
NHTSA NO. CB0102
FMVSS NO. 103

FIGURE 5.12
DEFROSTED AREA AT 15 MINUTES TEST #1

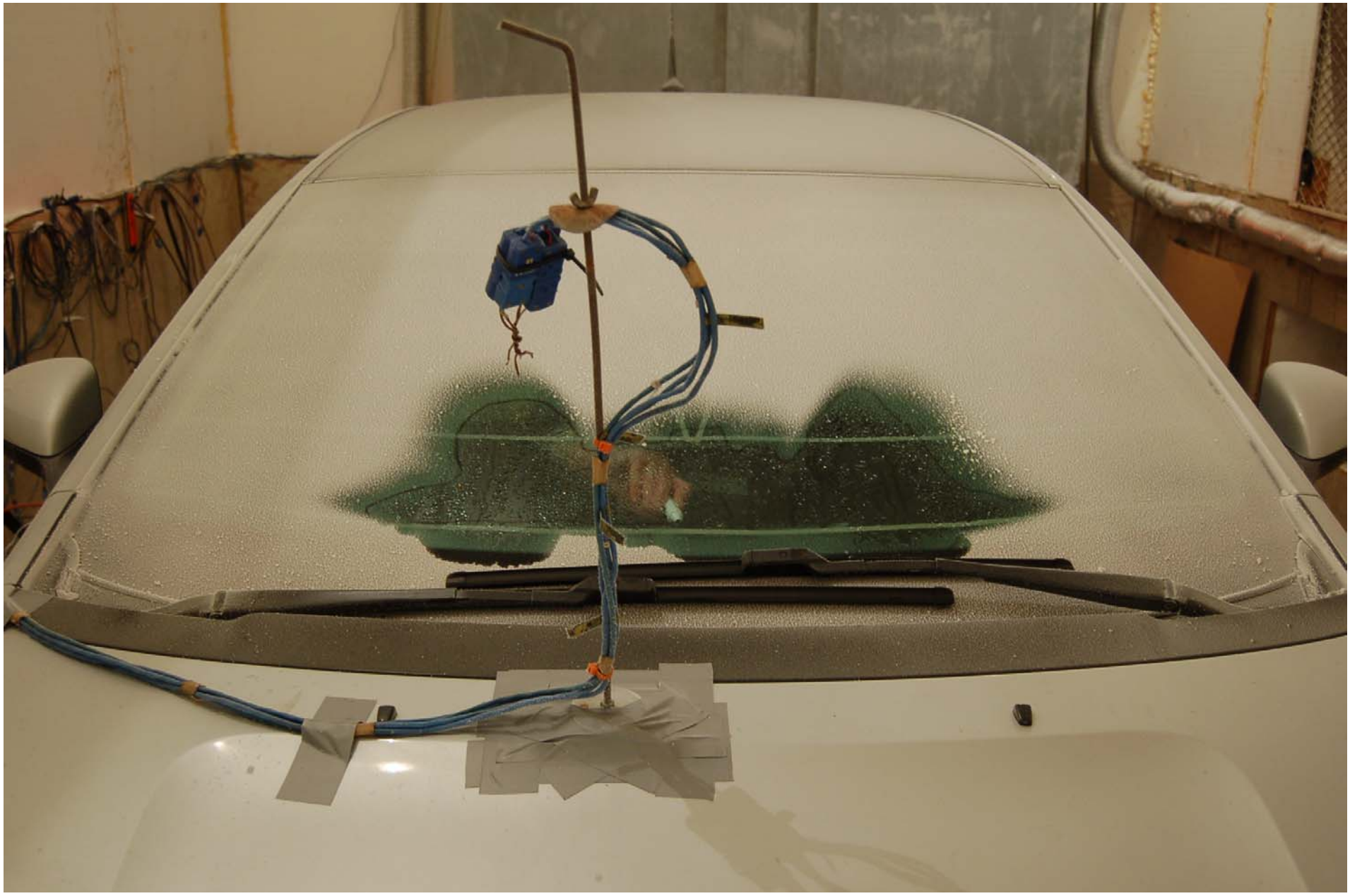


2011 CHEVROLET VOLT
NHTSA NO. CB0102
FMVSS NO. 103

FIGURE 5.13
WINDSHIELD VELLUM PATTERN, POST TEST #1

2011 CHEVROLET VOLT
NHTSA NO. CB0102
FMVSS NO. 103

FIGURE 5.14
WINDSHIELD PRE-TEST FROSTED STATE #2



2011 CHEVROLET VOLT
NHTSA NO. CB0102
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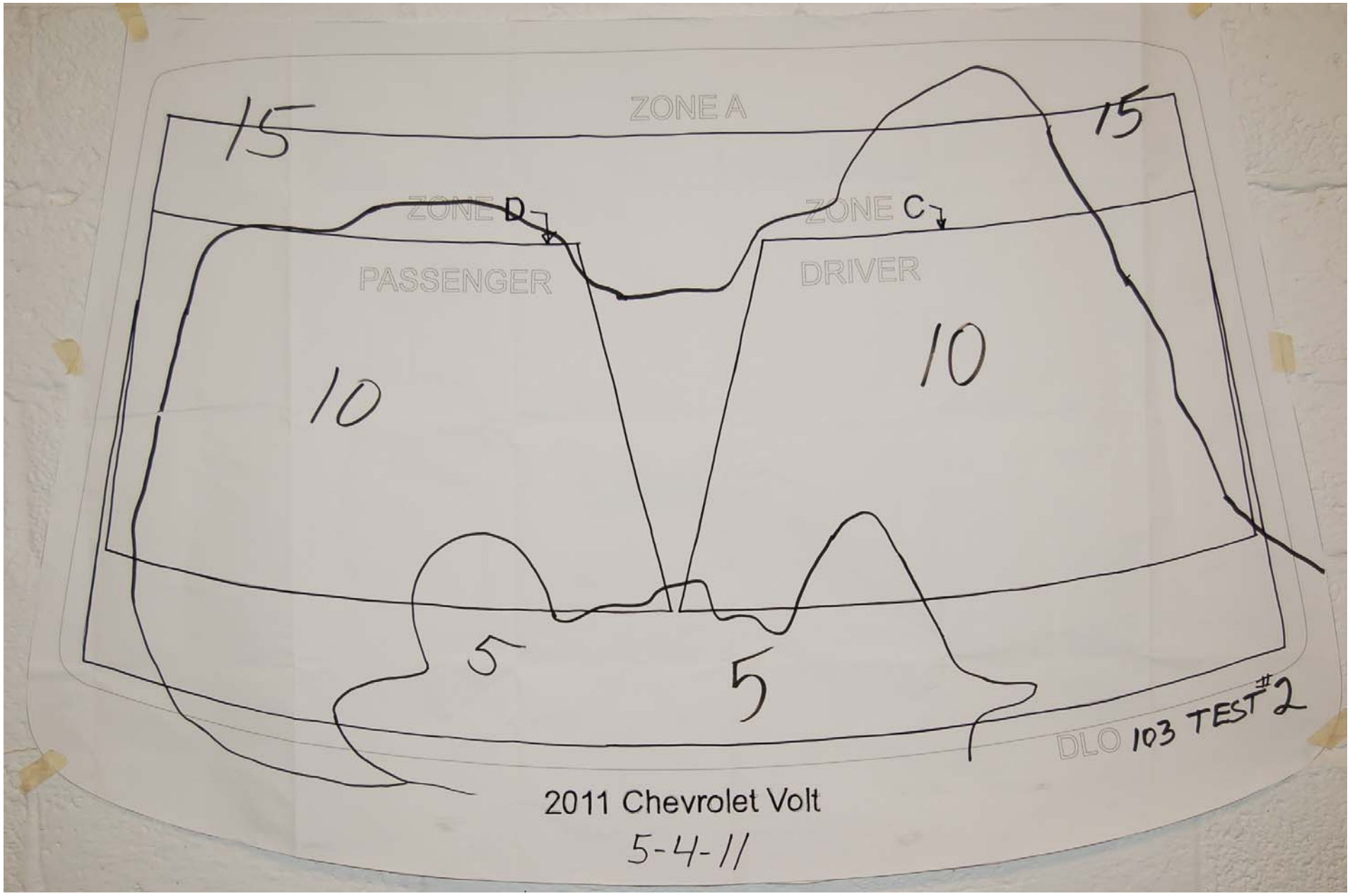
FIGURE 5.15
DEFROSTED AREA AT 5 MINUTES TEST #2

2011 CHEVROLET VOLT
NHTSA NO. CB0102
FMVSS NO. 103

FIGURE 5.16
DEFROSTED AREA AT 10 MINUTES TEST #1

2011 CHEVROLET VOLT
NHTSA NO. CB0102
FMVSS NO. 103

FIGURE 5.17
DEFROSTED AREA AT 15 MINUTES TEST #2



2011 CHEVROLET VOLT
NHTSA NO. CB0102
FMVSS NO. 103

FIGURE 5.18
WINDSHIELD VELLUM PATTERN, POST TEST #2

SECTION 6

OWNER'S MANUAL DEFROSTER INSTRUCTIONS

Climate Controls

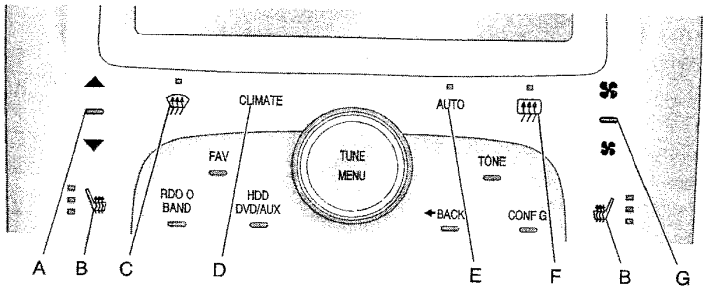
Climate Control Systems

Automatic Climate Control System

The climate control buttons and the touch screen are used to adjust the heating, cooling, and ventilation.

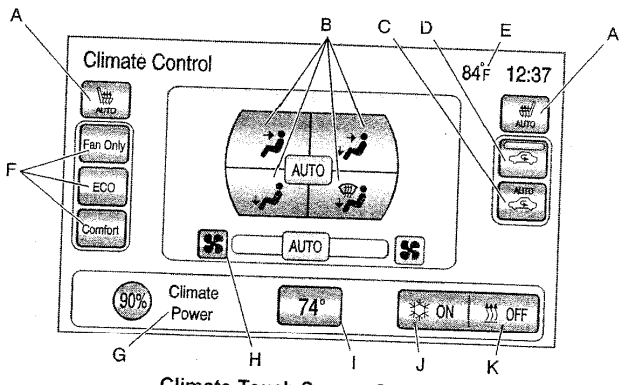
The vehicle may require the use of an auxiliary heat source under certain cold conditions. This provides additional heating and defrost capability obtained by running the engine, even if the high voltage battery is adequately charged. Under these conditions, the engine will start and use fuel. Make sure there is fuel in the tank.

Do not allow the vehicle to remain in extreme temperatures for long periods without being driven or being plugged in.



Climate Control Buttons

A. Temperature Control
B. Driver and Passenger Heated Seats
C. Defrost
D. Climate
E. Auto (Automatic Climate Control)
F. Rear Window Defogger
G. Manual Fan Control



Climate Touch Screen Controls

A. Driver and Passenger Auto Heated Seats
B. Air Delivery Mode Controls
C. Auto Recirculation
D. Manual Recirculation
E. Outside Air Temperature Display
F. Climate Modes: Fan Only, ECO, Comfort
G. Climate Power Gauge
H. Manual Fan Control
I. Temperature Setting Display
J. Air Conditioning Indicator
K. Heat Status Indicator

Climate Control Touch Screen

The climate mode, fan, air delivery, recirculation, and auto heated seats are controlled by pressing the CLIMATE button on the center stack and viewing information in the center stack display.

Climate Mode Operation

There are three climate mode settings: Fan Only, ECO, and Comfort. These settings adjust the impact the climate control system has on the vehicle's electric range or fuel economy.

To select a climate mode:

1. Press CLIMATE on the center stack.
2. Press the climate mode button on the touch screen. The climate mode will be lit.

Fan Only Mode: The air conditioning and electric heat are turned off. The climate control settings may not have a noticeable effect on the vehicle electric range and fuel economy.

When in Fan Only mode, the air conditioning system may turn on automatically if the high voltage battery is being cooled. The climate control system could blow cold air. This is normal.

To prevent cold air from blowing into the interior, turn off the fan control and select the vent mode and manual recirculation mode, and close the air vents.

When in Fan Only mode, if Auto Defog is selected, the air conditioning and electric heat may turn on when high humidity conditions exist. See "Climate and Air Quality" under *Vehicle Personalization on page 5-48* for more information on the Auto Defog selection. The air conditioning may also run if defrost mode is selected.

ECO Mode: The vehicle air conditioning and electric heat are controlled to balance comfort with fuel economy. In this mode, the vehicle electric range or fuel economy will decrease less than in Comfort mode, but will result in moderate comfort.

Comfort Mode: The vehicle air conditioning and electric heat are controlled to reach the best comfort level based on the temperature setting selected. In this mode, vehicle electric range or fuel economy will decrease depending on the amount of energy required to reach the best comfort levels.

Climate Power Gauge

When the climate mode is changed, the Climate Power gauge displays the impact that user setting changes have on energy consumption. The higher the reading, the more energy is being used.

Air Conditioning/Heat Status Indicators

The air conditioning/heat status displays when the air conditioning or electric heat is being used.

The air conditioning and heater could be on at the same time when dehumidification is required in ECO or Comfort modes.

In Fan Only mode, occasionally the air conditioning and/or heating status will be on if the Auto Defog function is enabled and high humidity is detected. See "Climate and Air Quality" under *Vehicle*

Personalization on page 5-48, for details on enabling or disabling the Auto Defog function.

Automatic Operation

The system automatically controls the fan speed, air delivery mode, and recirculation to heat or cool the vehicle to the selected temperature.

When the AUTO indicator light is on, the system is in full automatic operation. If the air delivery mode, fan speed, or recirculation setting is adjusted, the AUTO indicator turns off and the selected settings display.

For automatic operation:

1. Press AUTO.
2. Set the temperature. An initial setting of 23°C (74°F) is recommended. Allow the system time to stabilize. Adjust the temperature as needed.

▲ / ▼ (Temperature Control): Press to increase or decrease the temperature.

Auto Defog: The system will monitor high humidity inside the vehicle. When high humidity is detected, the climate control system may adjust to outside air supply and turn on the air conditioner or the heater. The fan speed may slightly increase to help prevent fogging. When high humidity is no longer detected, the system will return to its prior operation. To turn Auto Defog off or on, see "Climate and Air Quality" under *Vehicle Personalization on page 5-48*.

Manual Operation

(Fan Control): Press the fan control buttons or the touch screen fan control, to increase or decrease the fan speed. The fan speed setting displays. Pressing either button cancels automatic fan control and the fan can be controlled manually. Press AUTO to return to automatic operation. Press the fan down button repeatedly to turn off the fan and the climate control system.

Air Delivery Mode Control: Press CLIMATE to select the Climate touch screen. Press the air delivery mode touch screen button to change the direction of the airflow. The selected air delivery mode button is lit. Pressing any of the air delivery buttons cancels automatic air delivery control and the direction of the airflow can be controlled manually. Press AUTO to return to automatic operation.

To change the current mode, select one of the following:

(Vent): Air is directed to the instrument panel outlets.

(Bi-Level): Air is divided between the instrument panel outlets and the floor outlets.

(Floor): Air is directed to the floor outlets.

(Defog): Air is directed to the windshield and floor outlets. Clears the windows of fog or moisture.

(Defrost): Air is directed to the windshield. The windshield is cleared of fog or frost more quickly. Selecting defrost will disable automatic control.

For best results, clear all snow and ice from the windshield before defrosting.

AUTO (Auto Recirculation): Press to allow the system to automatically choose the air supply mode for best performance in terms of comfort, efficiency, and defogging. Air is recirculated or outside air is pulled into the vehicle. The touch screen button is lit.

(Manual Recirculation): Press to alternate between recirculating air inside the vehicle or pulling in outside air. When selected, the touch screen button lights up to indicate that air is being recirculated. This helps to quickly cool the air inside the vehicle or prevent outside air and odors from entering.

Pressing this button cancels automatic recirculation. Press AUTO or AUTO to return to automatic operation; recirculation runs automatically as needed.

Manual recirculation mode is not available when in Defrost or Defog modes.

/ (Manual Heated Seats): If available, the controls are on the center stack. To operate, the vehicle must be on.

Press or to heat the driver or passenger seat cushion and seatback. For more information, see *Heated Front Seats on page 3-6*.

AUTO/ AUTO (Auto Heated Seats): If available, the controls are on the touch screen on the center stack.

Press the touch screen AUTO or AUTO button. The button color will change to green when this feature is on. When the vehicle is on, this feature will automatically activate the heated seats at the level required by the vehicle's interior temperature. The active high, medium, low, or off heated seat level will be indicated by the manual heated seat button lights on the center stack. Use of the manual heated seat buttons on the center stack will turn auto heated seats off. For more information, see *Heated Front Seats on page 3-6*.

Rear Window Defogger

(Rear Window Defogger): Press to turn the rear window defogger on or off.

The rear window defogger turns off automatically after about five minutes. If turned on again, it runs for about five minutes before turning off. The defogger can also be turned off by turning the vehicle off.

For vehicles with heated outside rearview mirrors, they turn on when the rear window defogger button is on and help to clear fog or frost from the surface of the mirror. See *Heated Mirrors on page 2-14*.

Notice: **Do not try to clear frost or other material from the inside of the front windshield and rear window with a razor blade or anything else that is sharp. This may damage the rear window defogger grid and affect the radio's ability to pick up stations clearly. The repairs wouldn't be covered by the vehicle warranty.**

Remote Start: For vehicles with this feature, the climate control system may be started by using the Remote Keyless Entry (RKE) transmitter. The climate control system will default to an appropriate heating or cooling mode. See *Remote Start on page 2-7*.

The rear window defogger turns on if it is cold outside.

Compressor

The vehicle has an electric powered air conditioning compressor. This allows for continuous air conditioning and/or high voltage battery cooling operation, without running the engine.

The compressor operating speed is not tied to the engine speed, so some noise may be heard from the compressor, especially when air conditioning use is high and the engine has turned off. This is normal.

Sensors

Solar Sensor

The solar sensor is located on top of the instrument panel, near the windshield, where it monitors solar intensity.

The climate control system uses the sensor information to adjust the temperature, fan speed, recirculation, and air delivery mode for best comfort.

Do not cover the sensor; otherwise the automatic climate control system may not work properly.

Humidity Sensor

The humidity sensor is near the base of the inside rearview mirror. The climate control system uses the sensor information to adjust the temperature and recirculation for best comfort.

Outside Air Temperature Sensor

The outside air temperature sensor is located behind the front grille of the vehicle. The vehicle uses the sensor information to display outside air temperature. The climate control system uses the information to adjust the climate system operation.

Air Vents

Use the louvers on the air vents to change the direction of the airflow.

Use the thumbwheels near each vent to open and close off the airflow.

Operation Tips

- Keep all outlets open whenever possible for best system performance.
- Keep the path under all seats clear of objects to help circulate the air inside the vehicle more effectively.
- Use of non-GM approved hood deflectors can adversely affect the performance of the system.