REPORT NUMBER 103-GTL-06-004

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

MITSUBISHI MOTORS NORTH AMERICA, INC.
2006 MITSUBISHI ECLIPSE, PASSENGER CAR
NHTSA NO. C65600

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

JUNE 16, 2006

FINAL REPORT

PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW
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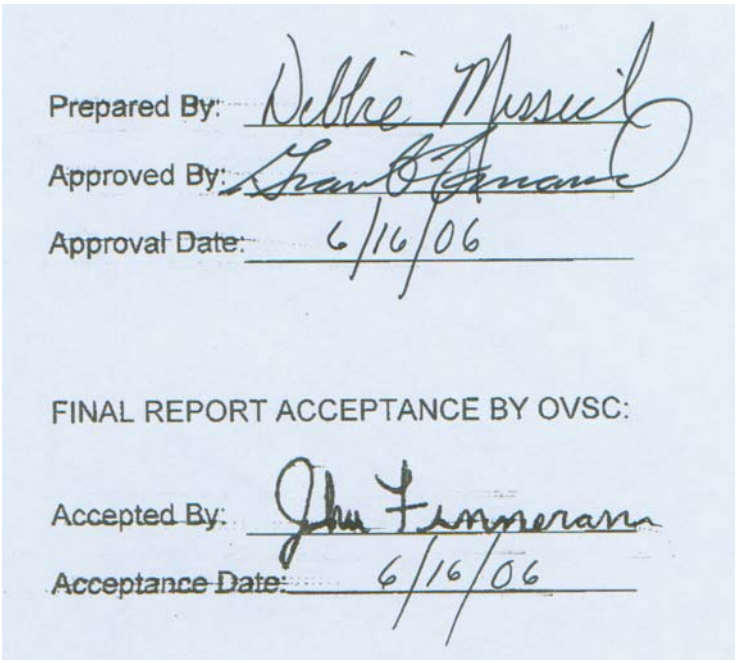

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9. Performing Organization Name and Address General Testing Laboratories, Inc. 1623 Leedstown Road Colonial Beach, Va 22443		10. Work Unit No. (TRAIS) N/A 11. Contract or Grant No. DTNH22-01-C-11025
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16. Abstract Compliance tests were conducted on the subject, 2006 Mitsubishi Eclipse 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 2006 Mitsubishi Eclipse 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 2006 Mitsubishi Eclipse Passenger Car. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: 4A3AK24FX6E018863

B. NHTSA No.: C65600

C. Manufacturer: MITSUBISHI MOTORS NORTH AMERICA, INC.

D. Manufacture Date: 08/05

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 103 testing on May 24-25, 2006.

SECTION 2

COMPLIANCE TEST PROCEDURE AND SUMMARY OF RESULTS

2.0 GENERAL

The 2006 Mitsubishi Eclipse 2-door passenger car, NHTSA No. C65600 was subjected to FMVSS No. 103 tests on May 24-25, 2006. 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 5.16 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 and C 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 20-minute and 25-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 2006 Mitsubishi Eclipse.

SUMMARY DATA SHEET
FMVSS 103, WINDSHIELD DEFROSTING AND DEFOGGING SYSTEMS

VEH. MOD YR/MAKE/MODEL/BODY: 2006 MITSUBISHI ECLIPSE PASSENGER CAR
VEH. NHTSA NO: C65600; VIN: 4A3AK24FX6E018863
VEH. BUILD DATE: 08/05 TEST DATE: MAY 24-25, 2006
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, JIMMY LATANE

WINDSHIELD AREA: 1683 in^2 AREA C = 299.8 in^2 AREA D = 299.8 in^2 AREA A= 1089.8 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: NONE

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: 05/25/06

APPROVED BY: D. MESSICK

FMVSS 103 TEST DATA RECORD – TEST RUN NO. 1

VEH. MOD YR/MAKE/MODEL/BODY: 2006 MITSUBISHI ECLIPSE PASSENGER CAR
VEH. NHTSA NO: C65600; VIN: 4A3AK24FX6E018863
VEH. BUILD DATE: 08/05 ; TEST DATE: MAY 24-25, 2006
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, JIMMY LATANE

If 1st Test Run, chamber conditioned 23 hours @ 0º ±5º F (14 hrs. min.)

Cold Soak Period: 23 HOURS

Time engine coolant and lubricant remained stabilized at 0º F: 19 hrs. 0 minutes

Water Spray Gun and Nozzle Type: BINKS #66

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

Water used: 16.8 fluid oz. (0.010 ounces per square inch of windshield area)

Soak Period Between Ice Application and Test Start: 36 minutes (30 to 40 minutes)

Engine Speed: 1500 (Target engine speed 1500 to 1600 rpm)

Wind at specified location in front of windshield: .6 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	PSGR	A	C	D
0	13.5	-4.0	-4.0	-4.0	-4.0	-4.0	0%	0%	0%
5	14.8	-4.0	38.3	101.0	76.8	81.0	6.4%	1.1%	1.3%
10	14.7	-2.6	84.2	131.1	104.7	109.6	55.5%	78.8%	60.6%
15	14.7	-1.7	110.8	149.5	122.0	127.4	95.1%	100%	98.2%
20	14.6	-1.3	124.3	156.6	129.3	134.6	99%	100%	100%
25	14.6	0.0	135.1	163.2	135.3	140.7	100%	100%	100%

REMARKS:

RECORDED BY: G. FARRAND DATE: 05/24/06

APPROVED BY: D. MESSICK

FMVSS 103 TEST DATA RECORD – TEST RUN NO. 2

VEH. MOD YR/MAKE/MODEL/BODY: 2006 MITSUBISHI ECLIPSE PASSENGER CAR
VEH. NHTSA NO: C65600; VIN: 4A3AK24FX6E018863
VEH. BUILD DATE: 08/05 ; TEST DATE: MAY 24-25, 2006
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, JIMMY LATANE

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

Cold Soak Period: 23 HOURS

Time engine coolant and lubricant remained stabilized at 0º F: 18 hrs. 30 minutes

Water Spray Gun and Nozzle Type: BINKS #66

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

Water used: 16.8 fluid oz. (0.010 ounces per square inch of windshield area)

Soak Period Between Ice Application and Test Start: 35 minutes (30 to 40 minutes)

Engine Speed: 1500 (Target engine speed 1500 to 1600 rpm)

Wind at specified location in front of windshield: .5 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	PSGR	A	C	D
0	13.4	-4.0	-4.0	-4.0	-4.0	-4.0	0%	0%	0%
5	14.9	-4.0	74.6	102.7	77.1	81.5	6.2%	.5%	1.2%
10	14.7	-3.3	110.5	130.0	104.9	109.3	54.3%	76.2%	60.6%
15	14.7	-1.8	132.5	148.5	122.2	126.7	94.2%	100%	97.9%
20	14.6	-0.8	144.6	158.9	132.1	136.8	97.8%	100%	100%
25	14.6	0.5	151.7	165.4	138.5	143.2	100%	100%	100%

REMARKS:

RECORDED BY: G. FARRAND DATE: 05/25/06

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	ACT2	04/06	04/07
TEMPERATURE READOUT	OMEGA	43P	04/06	04/07
TEMPERATURE RECORDER	OMEGA	CT91	04/06	04/07
SPRAY GUN	BINKS	6655	BEFORE USE	BEFORE USE
AIR VELOCITY METER	OMEGA	HHF-616	04/06	04/07
AIR PRESSURE GAGE	BINKS	0-160	05/06	05/07
SCALE	METTLER	200A4M	05/06	05/07
TACHOMETER	MONARCH	ACT-3	04/06	04/07
GRADUATED BEAKER	PHOTAX	N/A	N/A	N/A
EVENT RECORDER	COMPUTER	GEO1	BEFORE USE	BEFORE USE
DATA LOGGER	FLUKE	7471026	08/05	12/06

SECTION 5

PHOTOGRAPHS

2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

FIGURE 5.1
FRONT VIEW OF VEHICLE

2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

FIGURE 5.2
RIGHT SIDE VIEW OF VEHICLE

2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

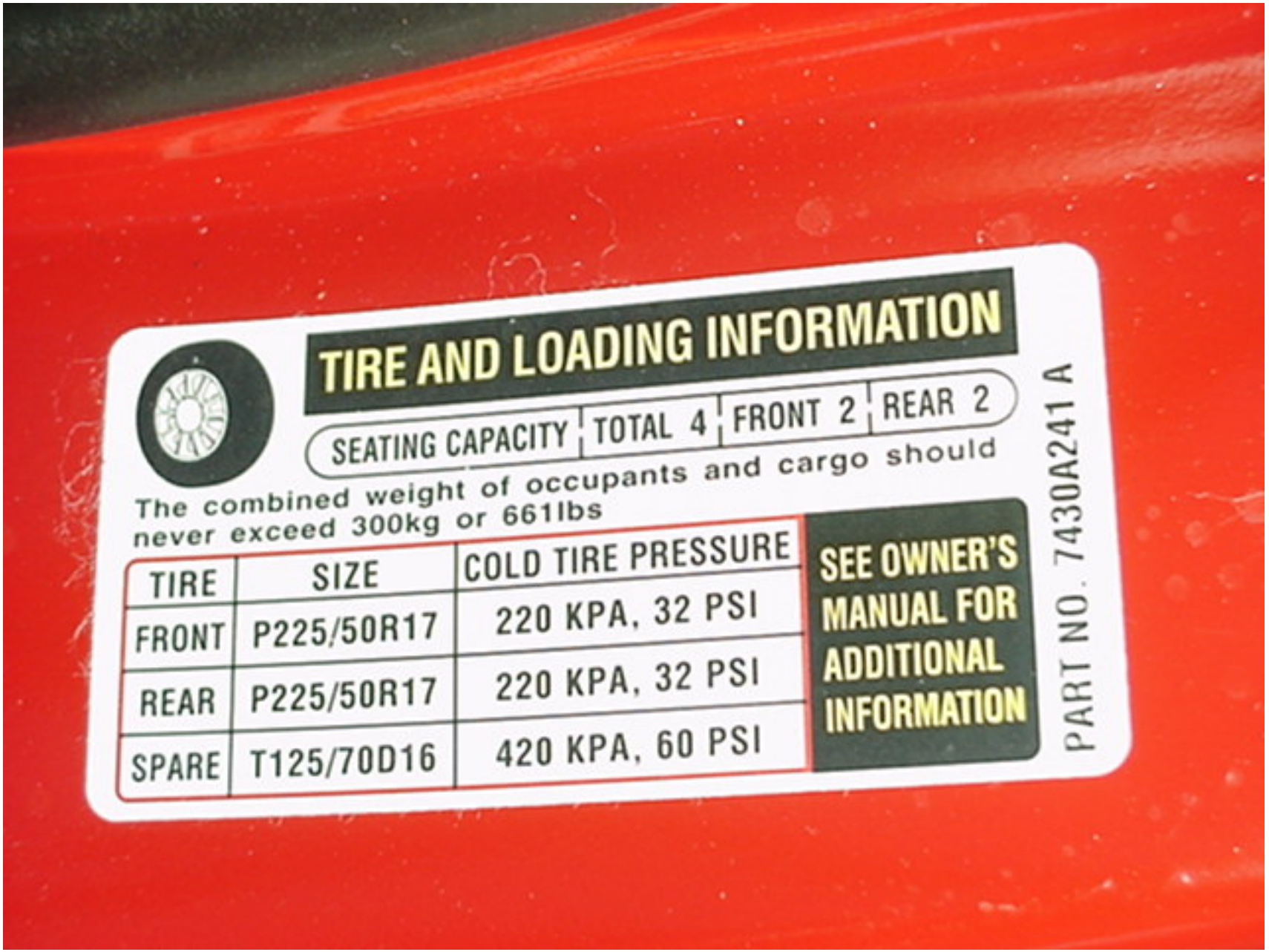
FIGURE 5.3
¾ FRONTAL VIEW FROM LEFT SIDE OF VEHICLE

2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

FIGURE 5.4
¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE

2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

FIGURE 5.5
VEHICLE CERTIFICATION LABEL

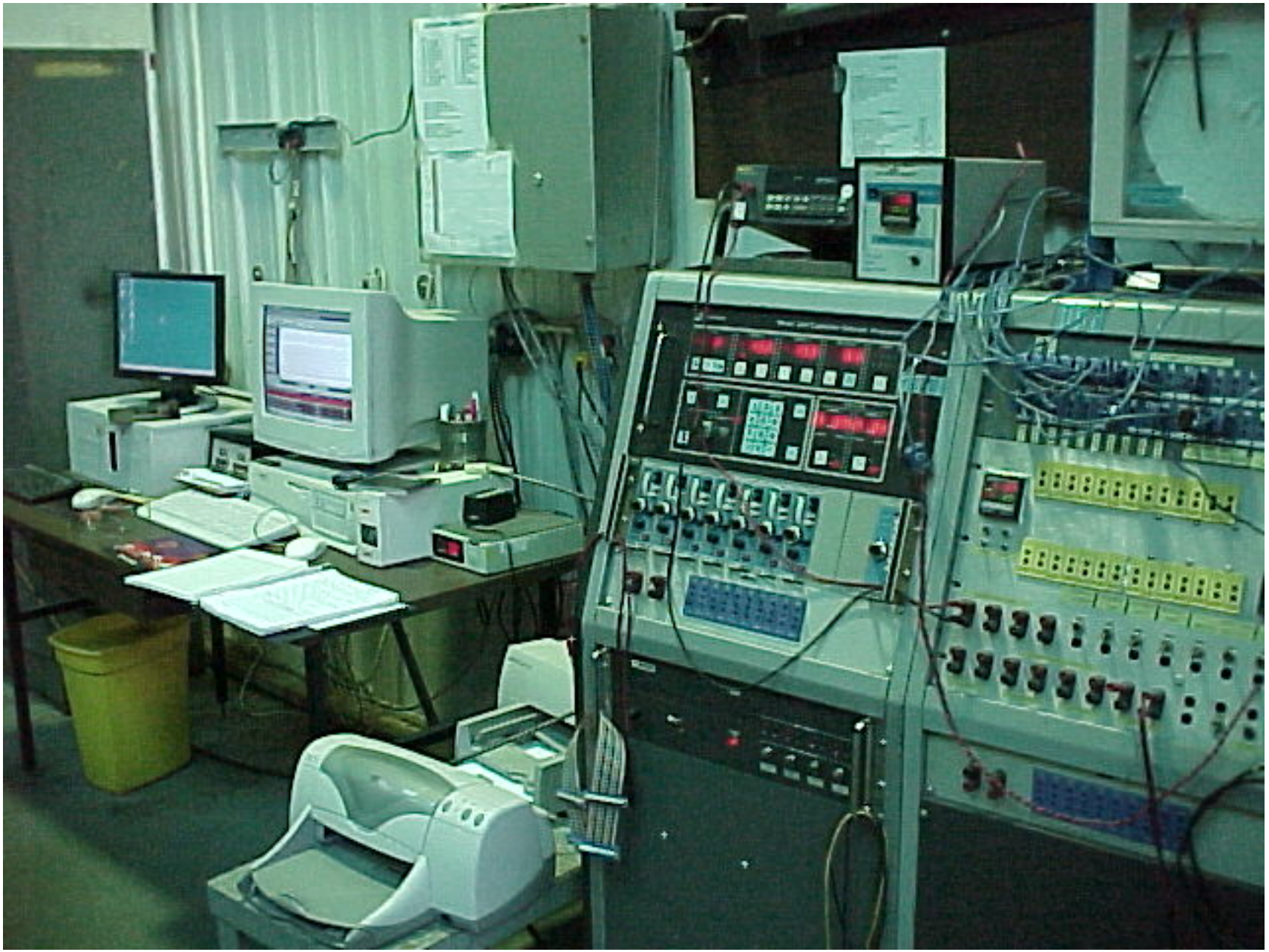


2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

FIGURE 5.6
VEHICLE TIRE INFORMATION LABEL

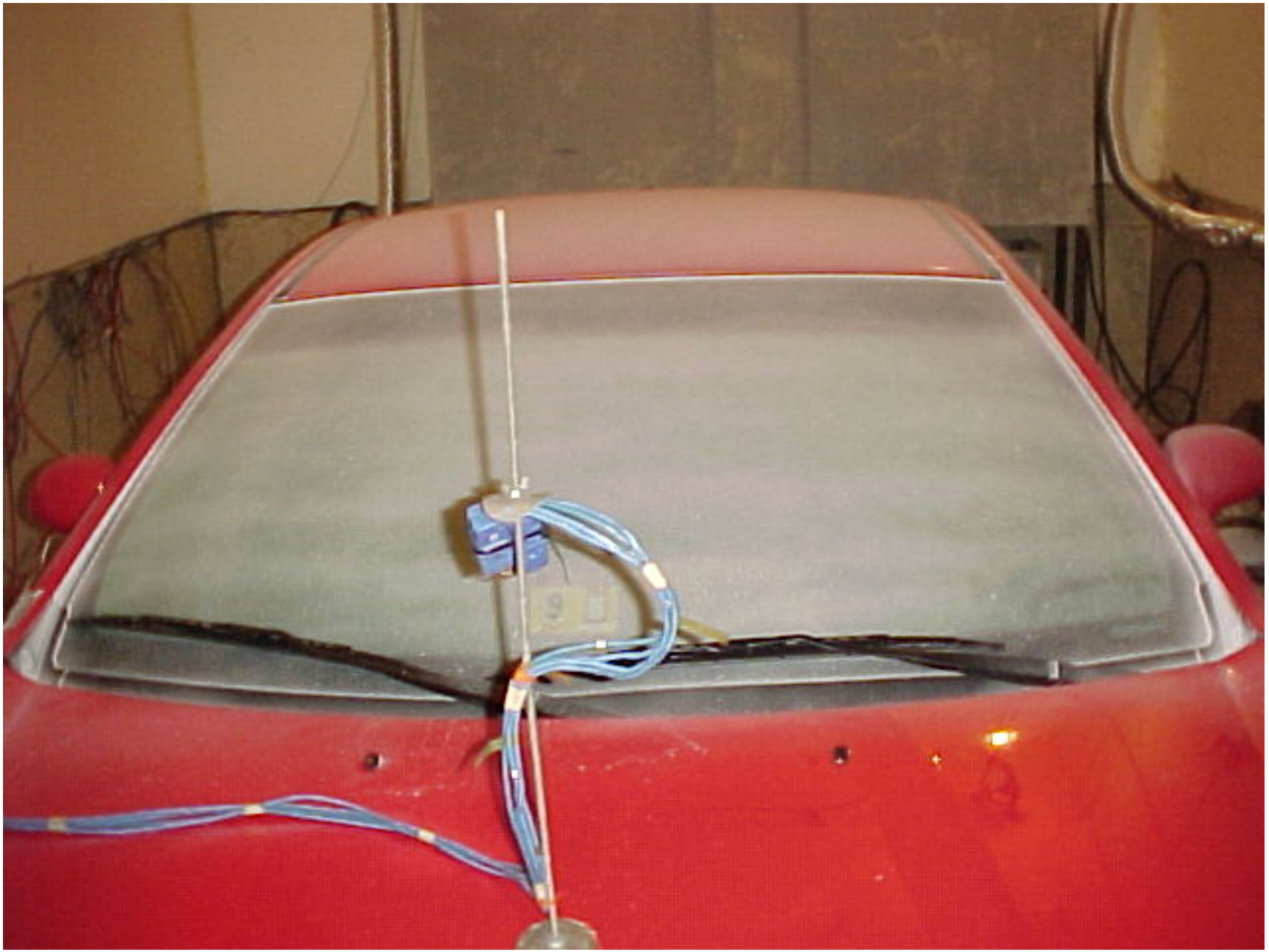
2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

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



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

FIGURE 5.8
INSTRUMENTATION SET-UP



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

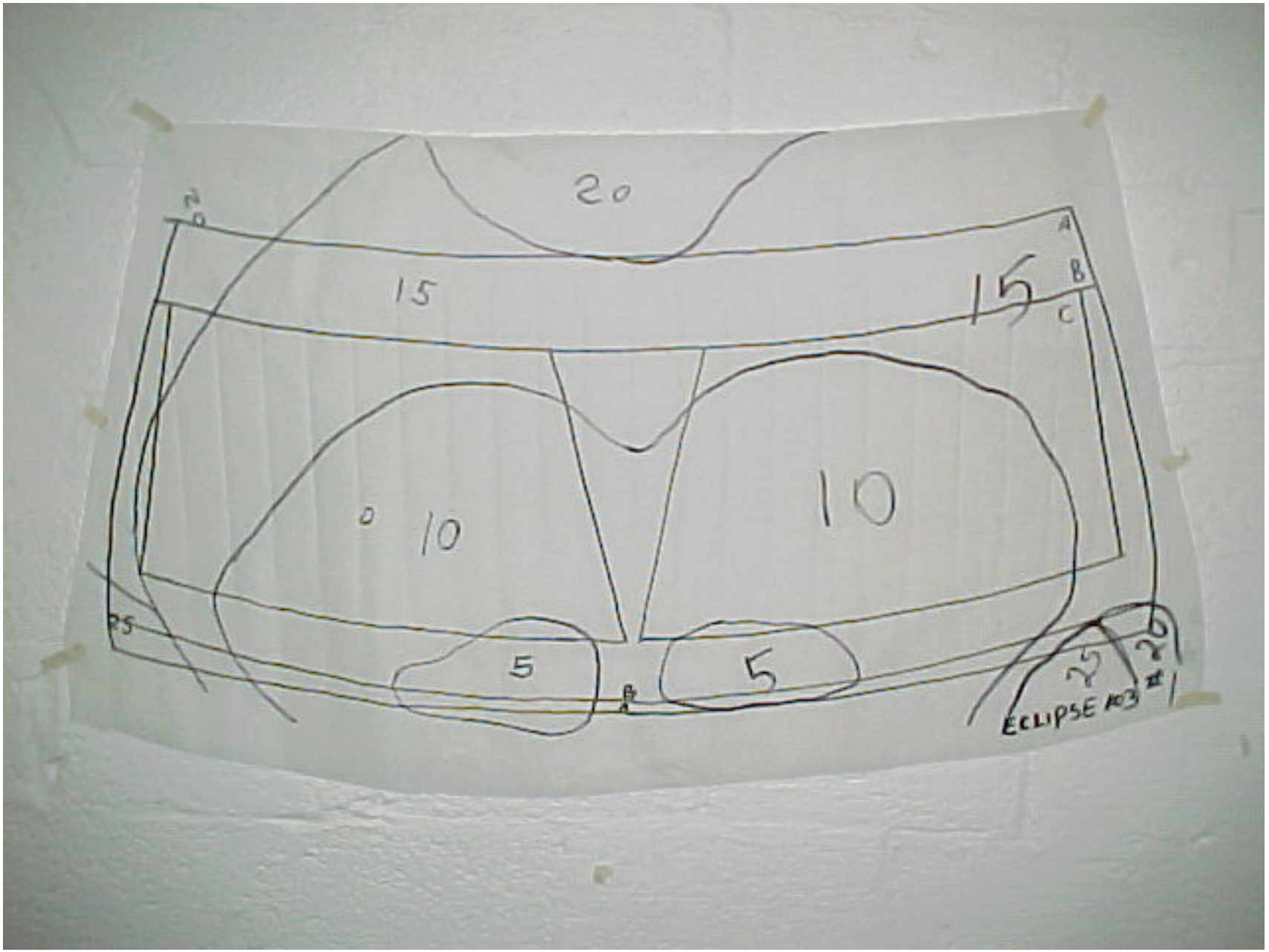
FIGURE 5.9
WINDSHIELD, PRE-TEST FROSTED STATE
TEST #1

2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

FIGURE 5.10
DEFROSTED AREA AT 20 MINUTES TEST #1

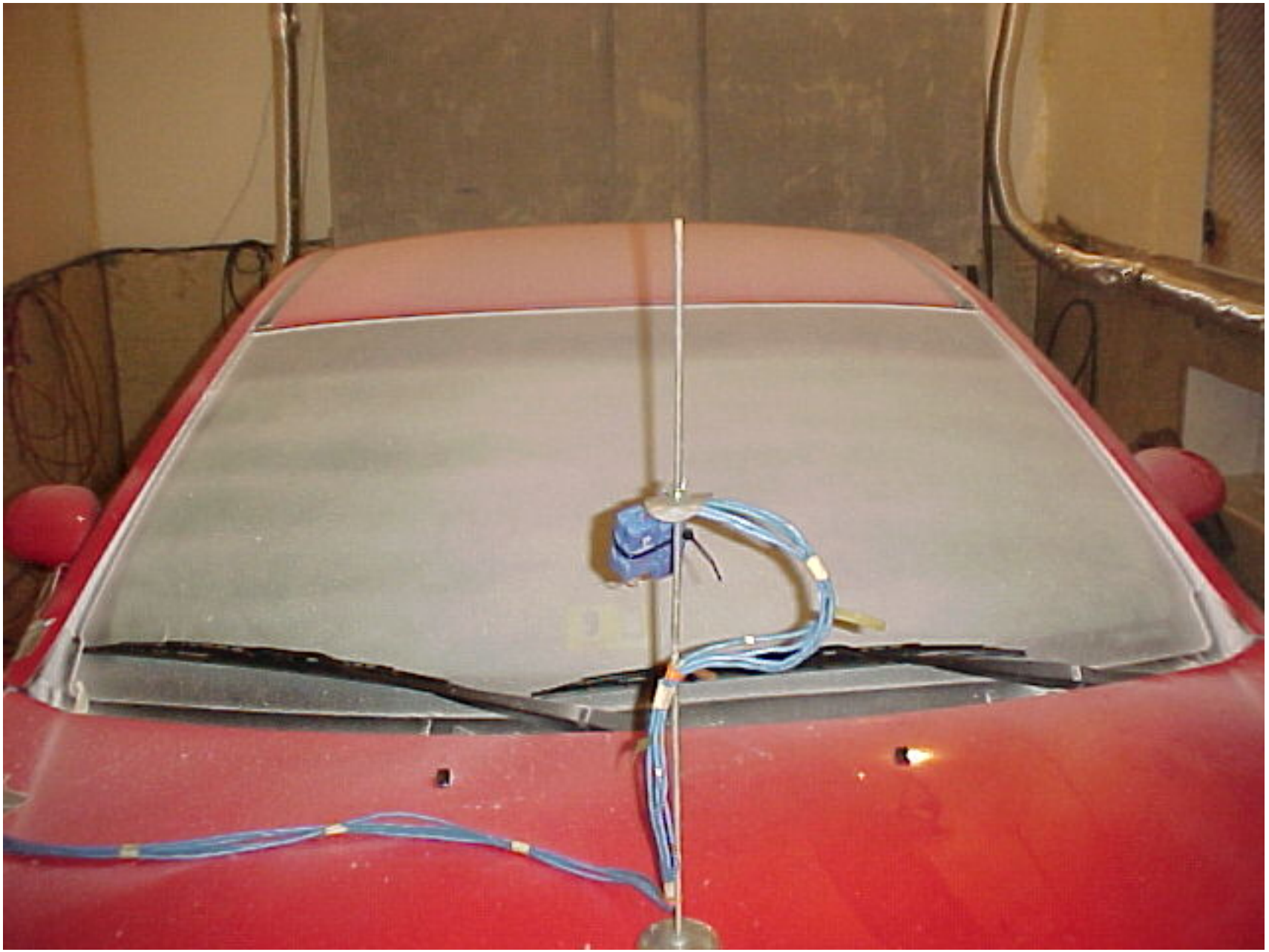
2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

FIGURE 5.11
DEFROSTED AREA AT 25 MINUTES TEST #1



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

FIGURE 5.12
WINDSHIELD VELLUM PATTERN, POST TEST #1



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

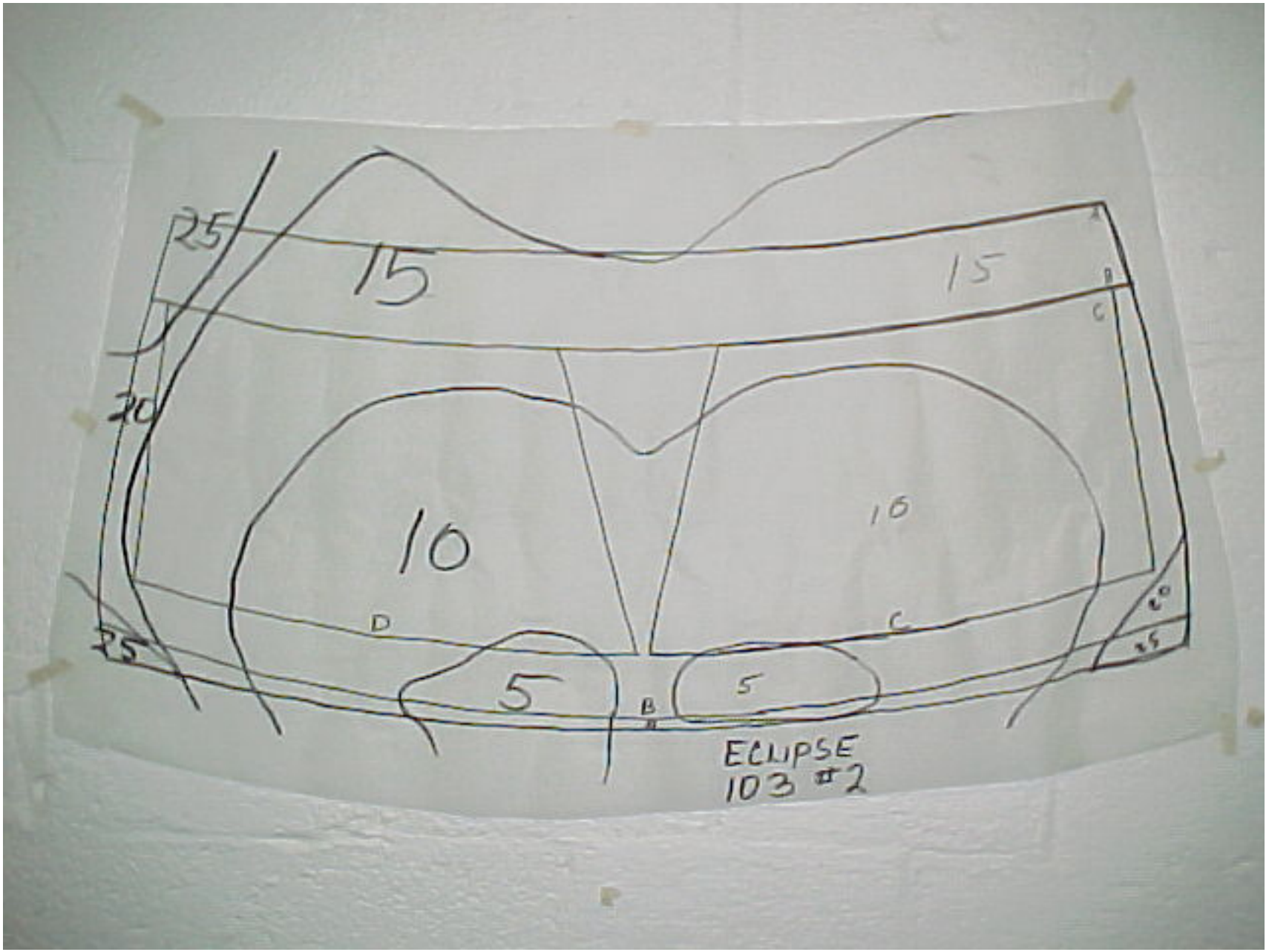
FIGURE 5.13
WINDSHIELD PRE-TEST FROSTED STATE
TEST #2

2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

FIGURE 5.14
DEFROSTED AREA AT 20 MINUTES TEST #2

2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

FIGURE 5.15
DEFROSTED AREA AT 25 MINUTES TEST #2



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 103

FIGURE 5.16
WINDSHIELD VELLUM PATTERN, POST TEST #2

SECTION 6

OWNER'S MANUAL DEFROSTER INSTRUCTIONS

Defrosting or defogging the windshield and door windows

N00731400267

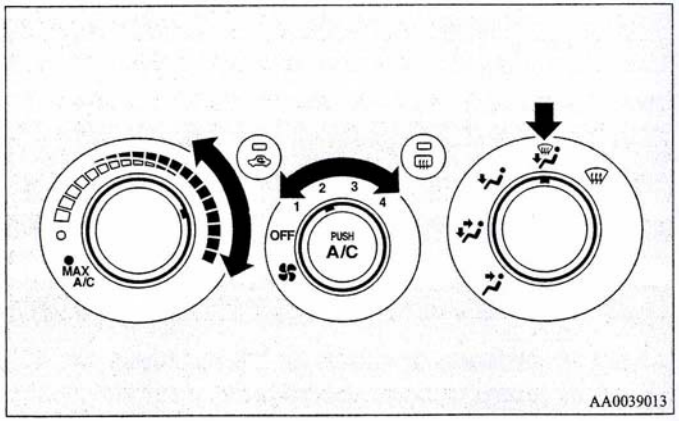
⚠ CAUTION

- **For safety, make sure you have a clear view through all the windows.**

To remove frost or fog from the windshield and door windows, use the mode selection dial ("" or "").

For ordinary defrosting

Use this setting to keep the windshield and door windows clear of mist, and to keep the leg area heated (when driving in rain or snow).



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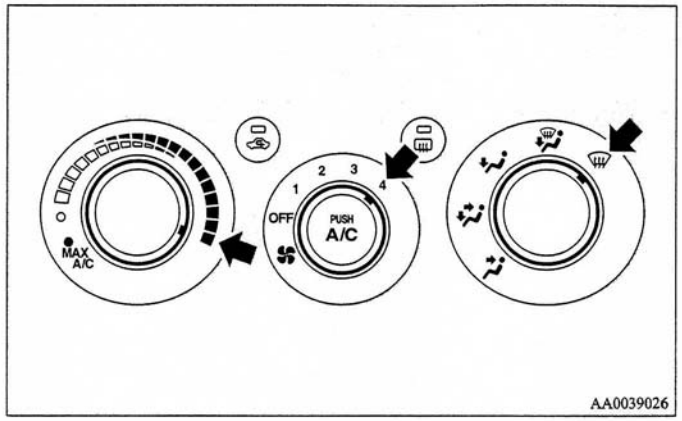
1. Set the mode selection dial to the "" position.
2. Select your desired blower speed by turning the blower speed selection dial.
3. Select your desired temperature by turning the temperature control dial.

For quick defrosting



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1. Set the mode selection dial to the "" position.
2. Set the blower to the maximum speed.
3. Set the temperature to the highest position.

NOTE

- When the mode selection dial is set to the "" or "" position, the air conditioning compressor runs automatically. The outside air position will be selected automatically. (In this case, the air conditioning indicator light will not change.)
- When the "" or "" position is selected, you cannot turn the air conditioning off or use the recirculation position. This prevents the windows from fogging up.
- When defrosting, do not set the temperature control dial near the "MAX A/C" position. This would blow cool air on the window glass and fog it up.