REPORT NUMBER 103-GTL-09-002

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

NISSAN MOTOR CO., LTD.
2009 NISSAN ALTIMA, PASSENGER CAR
NHTSA NO. C95202

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

JUNE 30, 2009

FINAL REPORT

PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
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TABLE OF CONTENTS

SECTION 1

PURPOSE OF COMPLIANCE TEST

1.0 PURPOSE OF COMPLIANCE TEST

A 2009 NISSAN ALTIMA 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 2009 NISSAN ALTIMA Passenger Car. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: 1N4AL21E29N438896

B. NHTSA No.: C95202

C. Manufacturer: NISSAN MOTOR CO., LTD.

D. Manufacture Date: 10/08

E. Color: White

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 103 testing on June 5-8, 2009.

SECTION 2

COMPLIANCE TEST PROCEDURE AND SUMMARY OF RESULTS

2.0 GENERAL

The 2009 NISSAN ALTIMA 4-door passenger car, NHTSA No. C95202 was subjected to FMVSS No. 103 tests on June 5-8, 2009. 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 5.14 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 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 2009 NISSAN ALTIMA.

SUMMARY DATA SHEET
FMVSS 103, WINDSHIELD DEFROSTING AND DEFOGGING SYSTEMS

VEH. MOD YR/MAKE/MODEL/BODY: 2009 NISSAN ALTIMA PASSENGER CAR
VEH. NHTSA NO: C95202; VIN: 1N4AL21E29N438896
VEH. BUILD DATE: 10/08 TEST DATE: JUNE 5-8, 2009
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, JIMMY LATANE

WINDSHIELD AREA: 2007 in^2 AREA C = 302 in^2 AREA D = 302 in^2 AREA A= 1144 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: 06/08/09

APPROVED BY: D. MESSICK

FMVSS 103 TEST DATA RECORD – TEST RUN NO. 1

VEH. MOD YR/MAKE/MODEL/BODY: 2009 NISSAN ALTIMA PASSENGER CAR
VEH. NHTSA NO: C95202; VIN: 1N4AL21E29N438896
VEH. BUILD DATE: 10/08; TEST DATE: JUNE 5, 2009
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, JIMMY LATANE

If 1st Test Run, chamber conditioned 24 hours @ 0º ±5º F (14 hrs. min.)

Cold Soak Period: 24 HOURS

Time engine coolant and lubricant remained stabilized at 0º F: 9 hrs. 30 minutes

Water Spray Gun and Nozzle Type: BINKS #66 S

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

Water used: 20 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 rpm (Target engine speed 1500 to 1600 rpm)

Wind at specified location in front of windshield: .2 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	12.5	-2.0	-2.0	-2.0*	-1.0	-1.0	0%	0%	0%
5	14.5	-1.9	19.8	52.9*	71.6	72.7	9.2%	0%	1.1%
10	14.2	-.5	63.9	83.6*	95.2	97.1	60.0%	70.5%	72.8%
15	14.1	2.3	94.0	105.7*	113.7	116.0	100%	100%	100%

REMARKS: *Heater Water In thermocouple is located on outside of heater hose connectors.

RECORDED BY: G. FARRAND DATE: 06/08/09

APPROVED BY: D. MESSICK

FMVSS 103 TEST DATA RECORD – TEST RUN NO. 2

VEH. MOD YR/MAKE/MODEL/BODY: 2009 NISSAN ALTIMA PASSENGER CAR
VEH. NHTSA NO: C95202; VIN: 1N4AL21E29N438896
VEH. BUILD DATE: 10/08 ; TEST DATE: JUNE 8, 2009
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: 48.0 HOURS

Time engine coolant and lubricant remained stabilized at 0º F: 48 hrs. ___ minutes

Water Spray Gun and Nozzle Type: BINKS #66S

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

Water used: 20 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 rpm (Target engine speed 1500 to 1600 rpm)

Wind at specified location in front of windshield: .1 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	-3.0	-3.0	-2.7	-2.9	-3.1	0%	0%	0%
5	14.4	-2.7	13.3	49.5	68.2	70.9	9.1%	0%	.2%
10	14.2	-.7	63.7	65.4	82.4	96.2	60.4%	70.6%	74.2%
15	14.1	1.2	90.8	102.8	112.4	113.6	100%	100%	100%

REMARKS:

RECORDED BY: G. FARRAND DATE: 06/08/09

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	05/09	05/10
TAC/RECORDER	MONARCH	1444664	05/09	05/10
TEMPERATURE RECORDER	FLUKE	7471026	10/08	10/09
SPRAY GUN	BINKS	66S	BEFORE USE	BEFORE USE
ANEMOMETER	OMEGA	HH-600	05/09	05/10
AIR PRESSURE GAGE	BINKS	0-160	05/09	05/10
SCALE	METTLER	H315/ 445951	05/09	05/10
GRADUATED BEAKER	PHOTAX	N/A	N/A	N/A
EVENT RECORDER	COMPUTER	GEO1	BEFORE USE	BEFORE USE

SECTION 5

PHOTOGRAPHS

2009 NISSAN ALTIMA
NHTSA NO. C95202
FMVSS NO. 103

FIGURE 5.1
LEFT SIDE VIEW OF VEHICLE

2009 NISSAN ALTIMA
NHTSA NO. C95202
FMVSS NO. 103

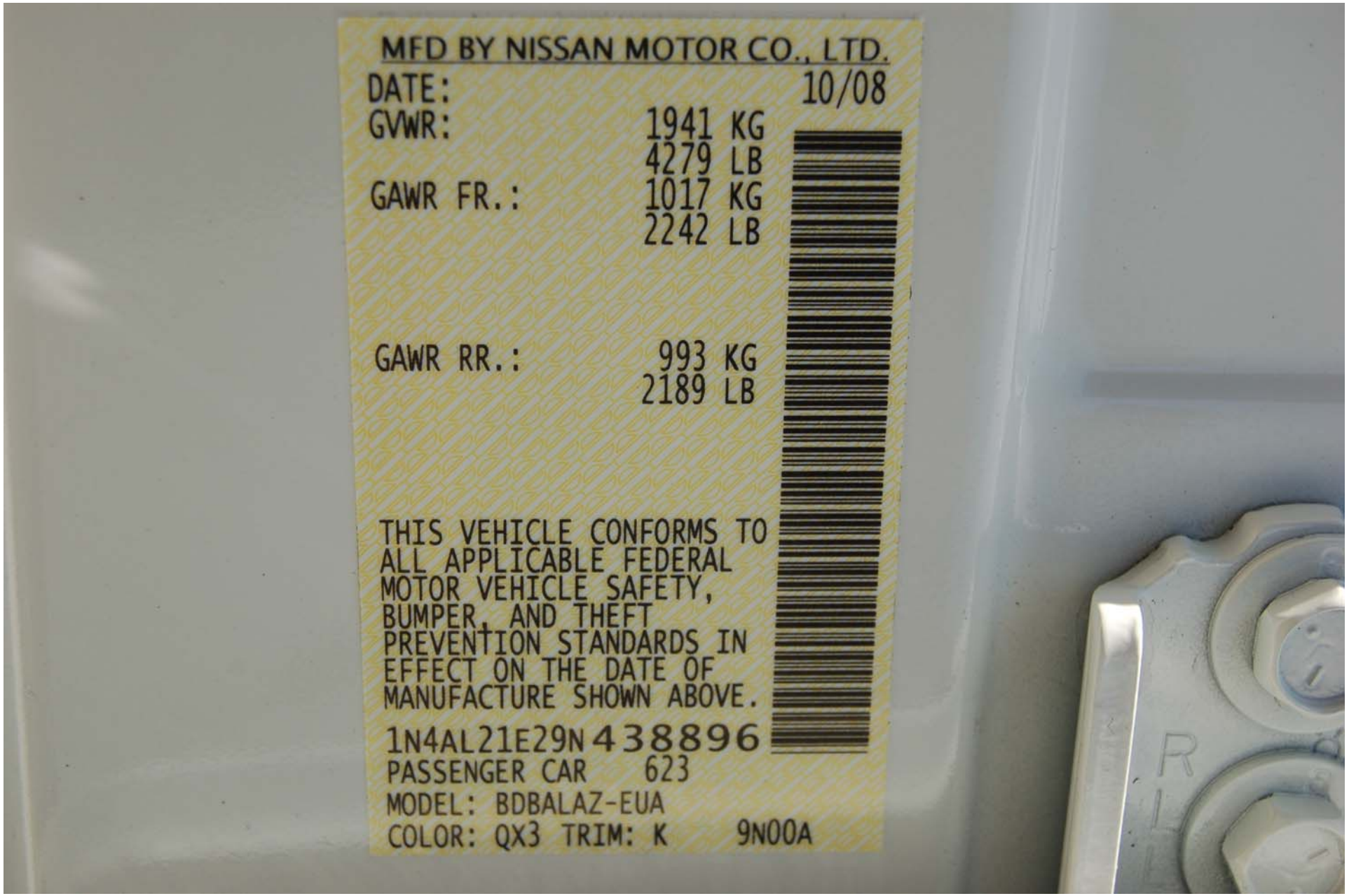
FIGURE 5.2
RIGHT SIDE VIEW OF VEHICLE

2009 NISSAN ALTIMA
NHTSA NO. C95202
FMVSS NO. 103

FIGURE 5.3
¾ FRONTAL VIEW FROM LEFT SIDE OF VEHICLE

2009 NISSAN ALTIMA
NHTSA NO. C95202
FMVSS NO. 103

FIGURE 5.4
¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE



2009 NISSAN ALTIMA
NHTSA NO. C95202
FMVSS NO. 103

FIGURE 5.5
VEHICLE CERTIFICATION LABEL

2009 NISSAN ALTIMA
NHTSA NO. C95202
FMVSS NO. 103

FIGURE 5.6
VEHICLE TIRE INFORMATION LABEL

2009 NISSAN ALTIMA
NHTSA NO. C95202
FMVSS NO. 103

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

2009 NISSAN ALTIMA
NHTSA NO. C95202
FMVSS NO. 103

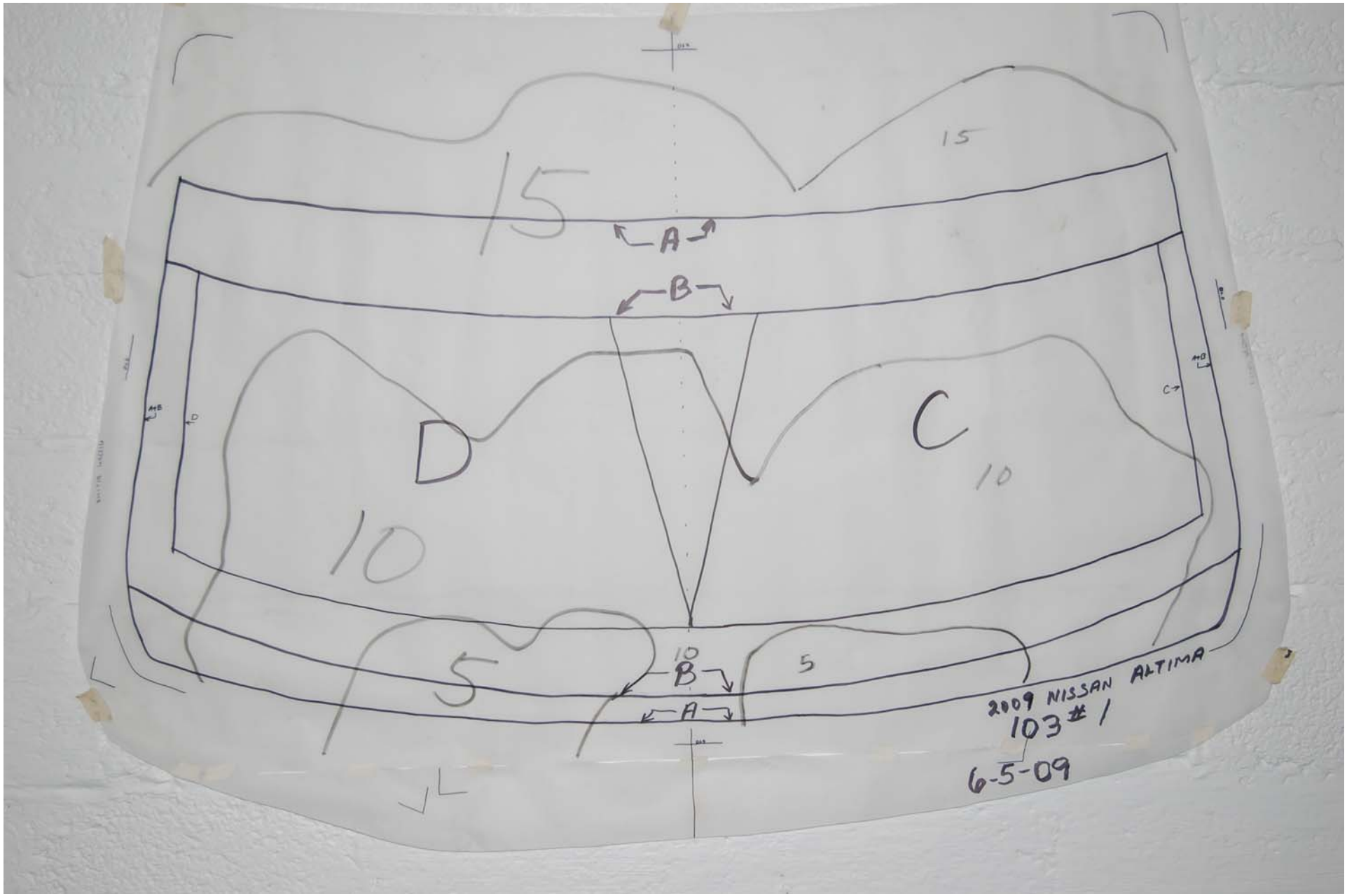
FIGURE 5.8
INSTRUMENTATION SET-UP

2009 NISSAN ALTIMA
NHTSA NO. C95202
FMVSS NO. 103

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

2009 NISSAN ALTIMA
NHTSA NO. C95202
FMVSS NO. 103

FIGURE 5.10
DEFROSTED AREA AT 15 MINUTES TEST #1



2009 NISSAN ALTIMA
NHTSA NO. C95202
FMVSS NO. 103

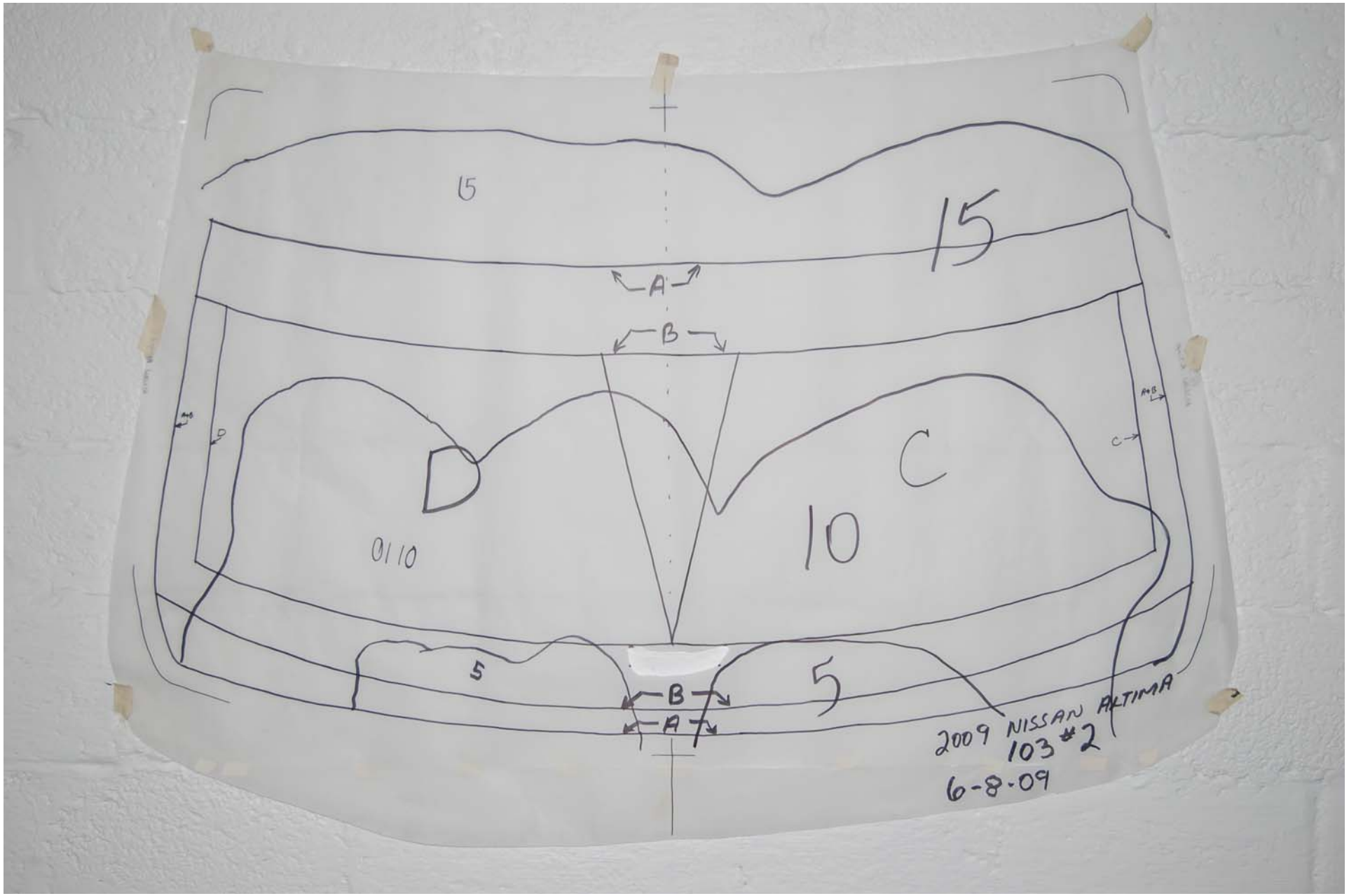
FIGURE 5.11
WINDSHIELD VELLUM PATTERN, POST TEST #1

2009 NISSAN ALTIMA
NHTSA NO. C95202
FMVSS NO. 103

FIGURE 5.12
WINDSHIELD PRE-TEST FROSTED STATE #2

2009 NISSAN ALTIMA
NHTSA NO. C95202
FMVSS NO. 103

FIGURE 5.13
DEFROSTED AREA AT 15 MINUTES TEST #2



2009 NISSAN ALTIMA
NHTSA NO. C95202
FMVSS NO. 103

FIGURE 5.14
WINDSHIELD VELLUM PATTERN, POST TEST #2

SECTION 6

OWNER'S MANUAL DEFROSTER INSTRUCTIONS

- — Air flows from center and side ventilators and foot outlets.
- — Air flows mainly from foot outlets.
- — Air flows from defroster outlets and foot outlets.
- — Air flows mainly from defroster outlets.

Temperature control dial

The temperature control dial allows you to adjust the temperature of the outlet air. To lower the temperature, turn the dial to the left. To increase the temperature, turn the dial to the right.

Air recirculation button

On position (Indicator light on):
Interior air is recirculated inside the vehicle.

Press the button to the on position when:

- driving on a dusty road.
- to prevent traffic fumes from entering passenger compartment.
- for maximum cooling when using the air conditioner.

Off position (Indicator light off):
Outside air is drawn into the passenger compartment and distributed through the selected outlet.

Use the off position for normal heater or air conditioner operation.

A/C Air conditioner button

The button is provided only on vehicles equipped with an air conditioner.

Start the engine, turn the fan control dial to the desired position and push the A/C button to turn on the air conditioner. The indicator light comes on when the air conditioner is operating. To turn off the air conditioner, push the A/C button again.

The air conditioner cooling function operates only when the engine is running.

Rear window defroster switch

For more information about the rear window defroster switch, see "Rear window and outside mirror (if so equipped) defroster switch" in the "Instruments and controls" section of this manual.

HEATER OPERATION

Heating

This mode is used to direct heated air to the foot outlets. Some air also flows from the defrost outlets.

1. Press the button to the OFF position for normal heating.
2. Press the air flow control button.
3. Turn the fan control dial to the desired position.
4. Turn the temperature control dial to the desired position between the middle and the hot position.

Ventilation

This mode directs outside air to the side and center ventilators.

1. Press the button to the OFF position.
2. Press the air flow control button.
3. Turn the fan control dial to the desired position.
4. Turn the temperature control dial to the desired position.

Defrosting or defogging

This mode directs the air to the defrost outlets to defrost/defog the windows.

1. Press the defrost/defog button .
2. Turn the fan control dial to the desired position.

3. Turn the temperature control dial to the desired position between the middle and the hot position.

- To quickly remove ice or fog from the windows, turn the fan control dial to the highest setting and the temperature control to the full HOT position.
- When the position is selected, the air conditioner automatically turns on (however, the indicator light on the A/C button will not come on) if the outside temperature is more than 36°F (2°C). If in defrost mode for more than one minute, the air conditioning system will continue to operate until the fan control dial is turned to OFF, the vehicle is shut off, or the A/C button is used to turn off the compressor even if the air flow control dial is turned to a position other than the position. This dehumidifies the air which helps defog the windshield. The mode automatically turns off, allowing outside air to be drawn into the passenger compartment to further improve the defogging performance.

Bi-level heating

The bi-level mode directs warmed air to the side and center vents and to the front and rear floor outlets.

1. Press the button to the OFF position.
2. Press the air flow control button.
3. Turn the fan control dial to the desired position.
4. Turn the temperature control dial to the desired position.

Heating and defogging

This mode heats the interior and defogs the windshield.

1. Press the air flow control button.
2. Turn the fan control dial to the desired position.
3. Turn the temperature control dial to the desired position between the middle and the hot position.

- When the position is selected, the air conditioner automatically turns on if the outside temperature is more than 36°F (2°C). This dehumidifies the air which helps defog the windshield. The mode automatically turns off, allowing outside air to be drawn into the passenger compartment to further improve the defogging performance.

Operating tips

Clear snow and ice from the wiper blades and air inlet in front of the windshield. This improves heater operation.

AIR CONDITIONER OPERATION

Start the engine, turn the fan control dial to the desired position, and push in the A/C button to activate the air conditioner. When the air conditioner is on, cooling and dehumidifying functions are added to the heater operation.

The air conditioner cooling function operates only when the engine is running.

Cooling

This mode is used to cool and dehumidify the air.

1. Press the button to the OFF position.
2. Press MAX A/C or air flow control button.

3. Turn the fan control dial to the desired position.
4. Push the A/C button. the indicator light comes on.
5. Turn the temperature control dial to the desired position.

- For quick cooling when the outside temperature is high, push the button to the ON position. Be sure to return the to the OFF position for normal cooling. MAX A/C may be used for quick cooling.

Dehumidified heating

This mode is used to heat and dehumidify the air.

1. Press the button to the OFF position.
2. Press the air flow control button.
3. Turn the fan control dial to the desired position.
4. Push the A/C button. The indicator light comes on.
5. Turn the temperature control dial to the desired position.

Dehumidified defogging

This mode is used to defog the windows and dehumidify the air.

1. Press the air flow control button.
2. Turn the fan control dial to the desired position.
3. Press the A/C button. The indicator light comes on.

When the or are selected, the air conditioner automatically turns on (however, the indicator light will not illuminate) if the outside temperature is more than 36°F (2°C). This dehumidifies the air which helps defog the windshield. The mode automatically turns off, allowing outside air to be drawn into the passenger compartment to further improve the defogging performance.

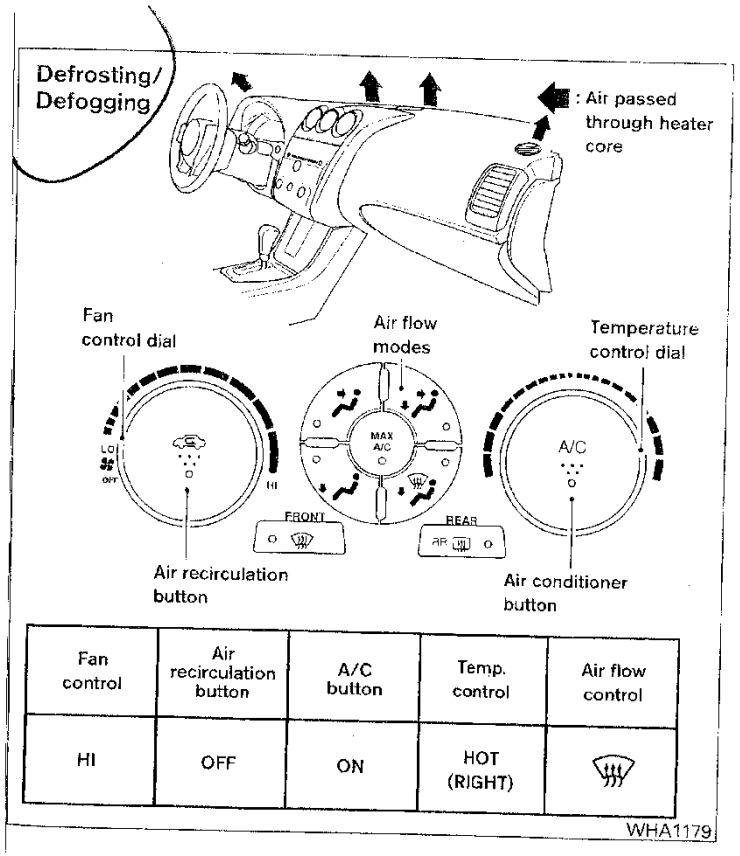
4. Turn the temperature control dial to the desired position.

Operating tips

- Keep the windows and moonroof closed while the air conditioner is in operation.
- After parking in the sun, drive for 2 or 3 minutes with the windows open to vent hot air from the passenger compartment. Then, close the windows. This allows the air conditioner to cool the interior more quickly.
- **The air conditioning system should be operated for approximately 10 minutes at least once a month. This helps prevent damage to the system due to lack of lubrication.**
- A visible mist may be seen coming from the ventilators in hot, humid conditions as the air is cooled rapidly. This does not indicate a malfunction.
- **If the engine coolant temperature gauge indicates engine coolant temperature over the normal range, turn the air conditioner off. See "If your vehicle overheats" in the "In case of emergency" section of this manual.**

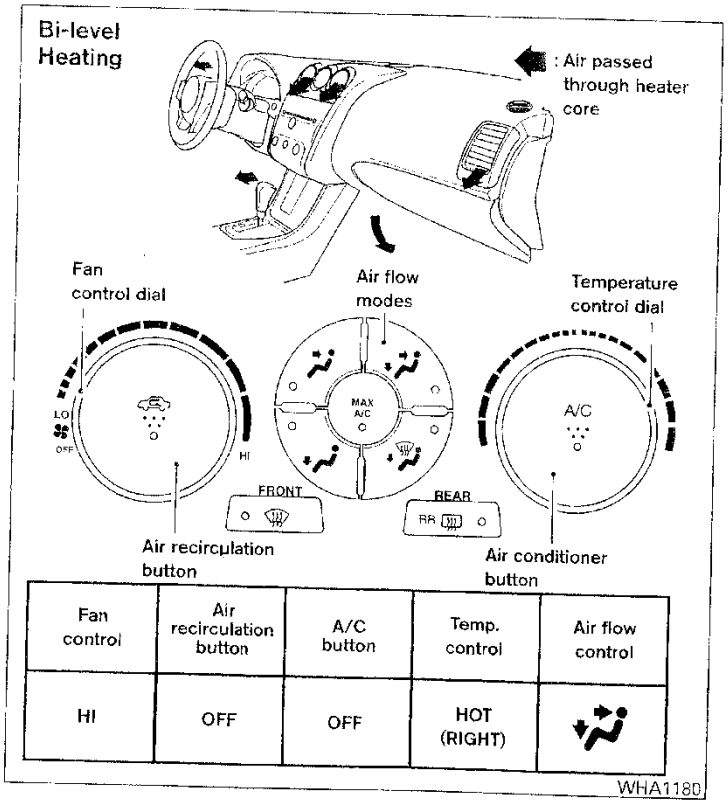
AIR FLOW CHARTS

The following charts show the button and dial positions for **MAXIMUM AND QUICK** heating, cooling or defrosting. **The air recirculation button should always be in the OFF position for heating and defrosting.**



Fan control	Air recirculation button	A/C button	Temp. control	Air flow control
HI	OFF	ON	HOT (RIGHT)	

WHA1179



Fan control	Air recirculation button	A/C button	Temp. control	Air flow control
HI	OFF	OFF	HOT (RIGHT)	

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