

REPORT NUMBER 104-GTL-06-004

SAFETY COMPLIANCE TESTING FOR FMVSS NO. 104 WINDSHIELD WIPING AND WASHING SYSTEMS

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

GENERAL TESTING LABORATORIES, INC.
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JUNE 16, 2006

FINAL REPORT

PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
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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. 104 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-104-08 dated 26 June 1996 and General Testing Laboratories, Inc. (GTL) Test Procedure, TP-104-08A dated 4 April 1997.

1.1 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. 104 testing on May 4, 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. 104 tests on May 4, 2006. The selected portions of FMVSS No. 104 tests used were as amplified in the following subparagraphs. The test vehicle was positioned in the test system with three water spray nozzles suspended in line with the center of the longitudinal axis of the windshield and horizontal left/right center of the windshield to provide an even distribution of spray to the entire windshield. The height of the nozzles was approximately 22 inches above the glazing surface.

2.1 WIPER FREQUENCY TEST

The wiper frequency test was performed with the engine operating and with a minimum of 50 cubic inches per minute of water from the spray nozzles. The wiper frequency was measured at the low and high wiper speed settings with the engine operating at idle RPM and 2,000 RPM.

2.2 WIPED AREA TEST

The test was conducted with the windshield wiper system operating at the high speed setting, engine at idle RPM and the spray nozzles spraying water at a minimum of 50 cubic inches per minute. The wiper blade wipe pattern was outlined on the glazing surface and then transferred to a windshield pattern. The wiped area was determined for areas A, B and C from the windshield pattern.

2.3 CAPABILITY TEST

The windshield glazing surface was coated with a mixture of water and fine grade test dust. Within 15 seconds following application of the water-dust mixture, the windshield wiper and washing system was activated in the high speed mode for ten complete cycles. The vehicle's engine was operating at idle RPM. The cleared areas of the windshield were marked on the inside windshield surface. After ten complete cycles the system was deactivated and the wiped area transferred to a windshield pattern.

The glazing surface was cleaned and dried. The water dust mixture was re-applied and the test repeated.

The windshield patterns were used subsequently to determine the cleared area percentages.

2.4 SUMMARY OF RESULTS

Based on the test performed, the test vehicle's windshield wiping and washing system appears to meet the requirements of FMVSS 104.

SECTION 3

COMPLIANCE TEST DATA

3.0 TEST RESULTS

The following data sheets document the results of testing on the 2006 Mitsubishi Eclipse.

SUMMARY OF DATA
FMVSS 104, WINDSHIELD WIPING AND WASHING 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 4, 2006
 TEST LABORATORY: GENERAL TESTING LABORATORIES
 OBSERVERS: GRANT FARRAND, JIMMY LATANE

WIPER TYPE: 2 SPEED ELECTRIC WITH DELAY

WASHER TYPE: HIGH PRESSURE ELECTRIC

WINDSHIELD AREAS: A = 1089.8 in² B = 846.6 in² C = 299.8 in²

MANUFACTURER'S WINDSHIELD PATTERN USED: Yes X No

ACCESSIBILITY:

- (1) Washer Control Accessible: Yes X No
 (2) Wiper Control Accessible: Yes X No
 (3) Washer Reservoir Filler Accessible: Yes X No

DESCRIBE UNUSUAL FEATURES OF WIPING AND WASHING SYSTEMS:

PERFORMANCE:

| TEST | PASS | FAIL |
|-------------------|------|------|
| WIPER FREQUENCY | X | |
| WIPED AREA | X | |
| WASHER CAPABILITY | X | |

RECORDED BY: G. FARRAND

DATE: 05/24/06

APPROVED BY: D. MESSICK

FREQUENCY TEST DATA
FMVSS 104 – WINDSHIELD WIPER SYSTEM

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 4, 2006
 TEST LABORATORY: GENERAL TESTING LABORATORIES
 OBSERVERS: GRANT FARRAND, JIMMY LATANE

Water Hardness: 7.0 grains/gallon (12 max.); Date Certified: 04/26/06

Water Spray Flow Rate: 65.0 in³/min. (specified range = 50 to 100 in³/min.)

Ambient Air Temp. 80 °F (50-100°F); Water Temp.: 72 °F (100°F max.)

Manufacturer's Recommended Engine Idle Speed: 700 rpm

RUN 1, MAXIMUM WIPER FREQUENCY TEST:

| TIME | ENGINE SPEED | TOTAL CYCLES | AVG. CYCLES/MIN. (45 MINIMUM) |
|---------------------------|------------------------------------|--------------|----------------------------------|
| 1 ST 3 minutes | <u>700</u> (idle ± 50 rpm) | 208 | 69.3 |
| 2 ND 3 minutes | <u>2000</u> (2000 rpm ± 50 rpm) | 210 | 70 |

Frequency at least 45 cycles/minute regardless of engine speed: Yes X No

RUN 2, LOWER WIPER FREQUENCY TEST:

| TIME | ENGINE SPEED | TOTAL CYCLES | AVG. CYCLES/MIN. (20 MINIMUM) |
|---------------------------|------------------------------------|--------------|----------------------------------|
| 1 ST 3 minutes | <u>700</u> (idle ± 50 rpm) | 150 | 50 |
| 2 ND 3 minutes | <u>2000</u> (2000 rpm ± 50 rpm) | 150 | 50 |

Highest and lower frequency differ by at least 15 cycles/minute, and lower frequency is at least 20 cycles/minute regardless of engine speed: Yes X No

REMARKS:

RECORDED BY: G. FARRAND

DATE: 05/04/06

APPROVED BY: D. MESSICK

WIPE AREA TEST DATA
FMVSS 104 – WINDSHIELD WIPER SYSTEM

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 4, 2006

TEST LABORATORY: GENERAL TESTING LABORATORIES

OBSERVERS: GRANT FARRAND, JIMMY LATANE

Air Temperature in test area = 80 °F (specified range of 50 to 100°F)

Air Velocity at windshield = .2 mph (specified range of 0 to 1 mph)

Engine speed = 700 rpm (manufacturer's recommended idle ± 50 rpm)

Temperature of water spray = 72 °F (100° F maximum)

Water spray flow rate = 65 in³/min. (specified range of 50 to 100 in³/min.)

Windshield wiper frequency = 70 cycles/min. (45 cpm minimum)

TEST RESULTS:

| PERCENT WIPED | | | | |
|-----------------|--------|----------|------|------|
| WINDSHIELD AREA | ACTUAL | REQUIRED | PASS | FAIL |
| A | 92.2% | 80% | X | |
| B | 95.2% | 94% | X | |
| C | 100% | 99% | X | |

REMARKS:

RECORDED BY: G. FARRAND

DATE: 05/24/06

APPROVED BY: D. MESSICK

CAPABILITY TEST DATA
FMVSS 104 – WINDSHIELD WASHER SYSTEM

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 4, 2006
 TEST LABORATORY: GENERAL TESTING LABORATORIES
 OBSERVERS: GRANT FARRAND, JIMMY LATANE

Air Temperature in test area = 80 °F (specified range of 70 to 80°F)

Washer reservoir fluid temperature = 75 °F (specified range of 70 to 80°F)

Air Velocity at windshield = .5 mph (specified range of 0 to 1 mph)

Engine speed = 700 rpm (manufacturer's recommended idle ± 50 rpm)

Number of windshield washer nozzles on the vehicle = 2 nozzles with 2 streams
(4 streams of fluid total)

Windshield washer system activation coordinated with components of the wiper system:
 Yes X No

TEST RESULTS:

| CLEARED AREA PERCENTAGES | | | | | | |
|--------------------------|--------|--------|------|--------|------|------|
| WINDSHIELD AREA | TEST 1 | TEST 2 | AVG | REQ'D* | PASS | FAIL |
| A | 92.6 | 92.6 | 92.6 | 75% | X | |
| B | 95.3 | 95.3 | 95.3 | 75% | X | |
| C | 100 | 100 | 100 | 75% | X | |
| | | | | | | |

*NOTE FOR REFERENCE ONLY: SAE 942b, revised Jul72, recommends capability to clear 80% of the total wash area and 90% of the wash area included in AREA C.

REMARKS:

RECORDED BY: G. FARRAND

DATE: 05/24/06

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 SYSTEM | GTL | N/A | BEFORE USE | BEFORE USE |
| AIR VELOCITY METER | OMEGA | HHF-616 | 04/06 | 04/07 |
| CYCLE COUNTER | GTL | GTL | BEFORE USE | BEFORE USE |
| SOFT WATER | N/A | N/A | 04/06 | 04/07 |
| TACHOMETER | MONARCH | ACT-3 | 04/06 | 04/07 |
| TEST DUST | AC | GM FINE | CALIBRATED DUST | CALIBRATED BY VENDOR* |
| EVENT RECORDER | COMPUTER | GEO1 | BEFORE USE | BEFORE USE |

*AC Inspection #503, Batch #1943, Measured with particle size roller analyzer.

SECTION 5
PHOTOGRAPHS



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 104

FIGURE 5.1
FRONT VIEW OF VEHICLE



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 104

FIGURE 5.2
RIGHT SIDE VIEW OF VEHICLE



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 104

FIGURE 5.3
¾ FRONTAL VIEW FROM LEFT SIDE OF VEHICLE



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 104

FIGURE 5.4
¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE



2006 MITSUBISHI ECLIPSE
 NHTSA NO. C65600
 FMVSS NO. 104

FIGURE 5.5
 VEHICLE CERTIFICATION LABEL



2006 MITSUBISHI ECLIPSE
 NHTSA NO. C65600
 FMVSS NO. 104

FIGURE 5.6
 VEHICLE TIRE INFORMATION LABEL



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 104

FIGURE 5.7
INSTRUMENTATION SET-UP



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 104

FIGURE 5.8
EQUIPMENT SET-UP



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 104

FIGURE 5.9
WIPED AREA TEST



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 104

FIGURE 5.10
CAPABILITY TEST #1 PRE-COATED WINDSHIELD



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 104

FIGURE 5.11
CAPABILITY TEST #1 IN PROGRESS



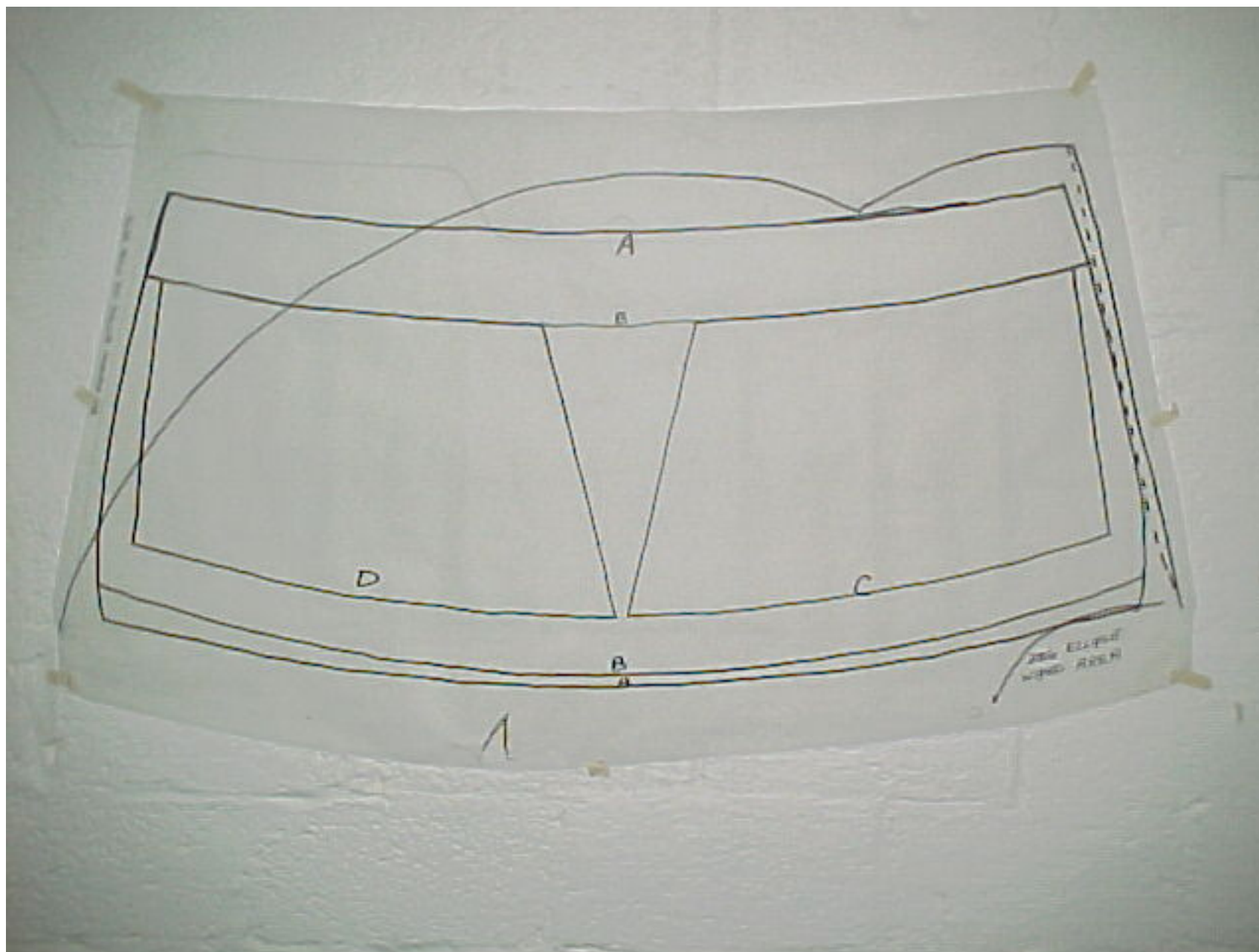
2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 104

FIGURE 5.12
CAPABILITY TEST #2 PRE-COATED WINDSHIELD



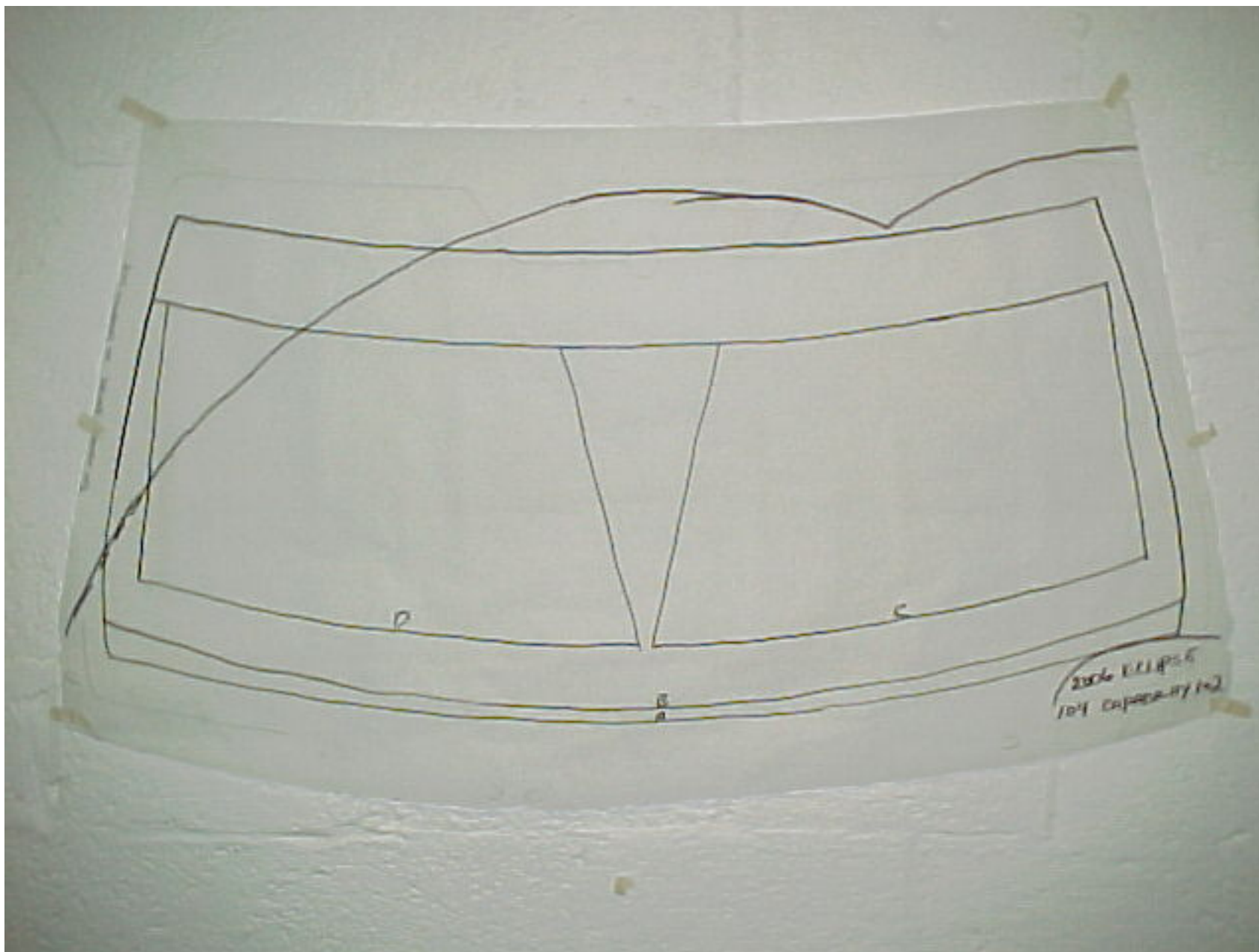
2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 104

FIGURE 5.13
CAPABILITY TEST #2 IN PROGRESS



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 104

FIGURE 5.14
WIPED AREA VELLUM PATTERN



2006 MITSUBISHI ECLIPSE
NHTSA NO. C65600
FMVSS NO. 104

FIGURE 5.15
CAPABILITY TEST 1 & 2 VELLUM PATTERN

SECTION 6

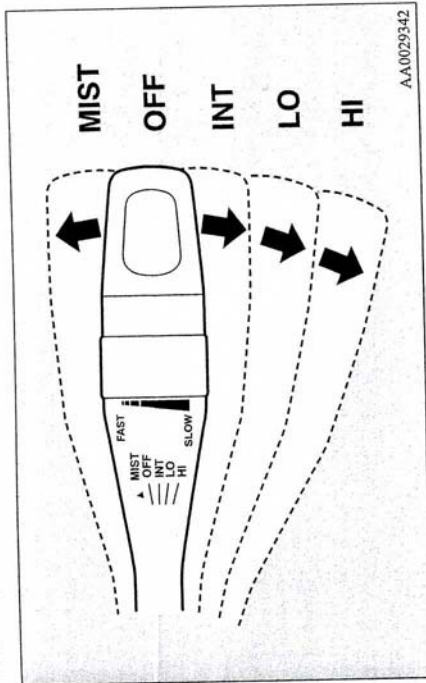
OWNER'S MANUAL INFORMATION

Wiper and washer switch

N00523000359

Windshield wipers

The windshield wipers wipe when the wiper lever is moved as shown in the illustration and the ignition key is in the "ON" or "ACC" position.

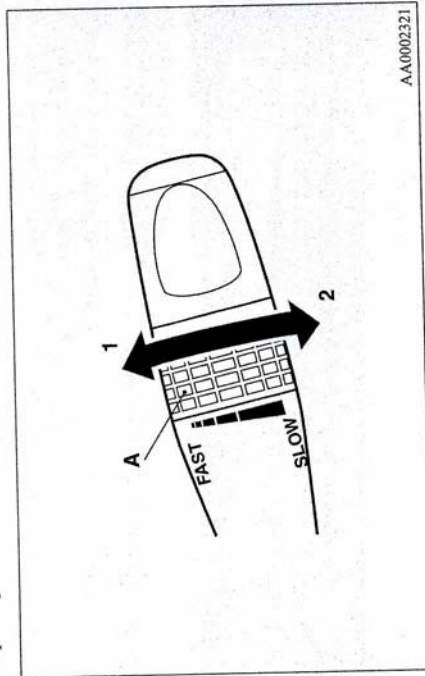


MIST- Misting function
The wipers will wipe one time.
OFF- Off

INT- Speed sensitive intermittent operation
The wiper speed will change with the speed of the vehicle.
LO- Slow
HI- Fast

To adjust intermittent intervals

With the lever in the "INT" (speed-sensitive) position, the wiper speed can be adjusted by turning the knob (A).



1- Fast
2- Slow

3-103

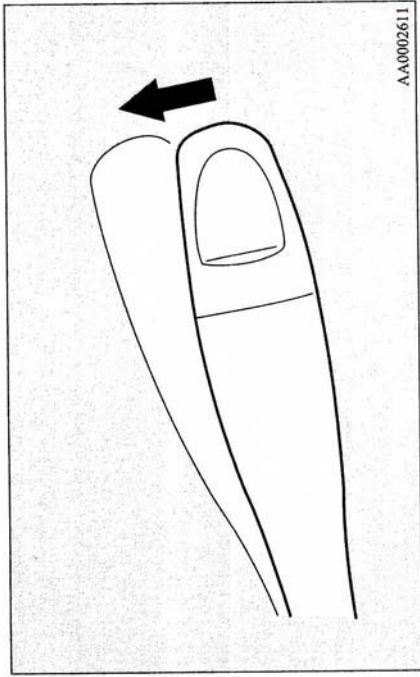
Features and controls

Misting function

Move the lever in the direction of the arrow and release, and the wipers will operate once.

Use this function when you are driving in mist or drizzle.

If the lever is held in the upward position (MIST), the wipers continue operating until the lever is released.



AA0002611

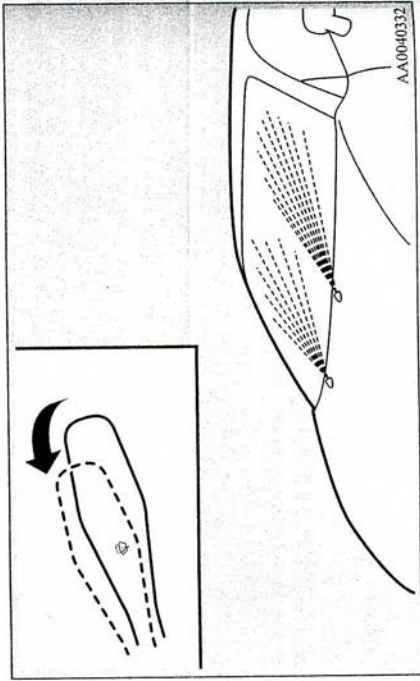
3

Windshield washer

NO050460096

To turn on the windshield washer, pull the lever toward you with the ignition key in either the "ON" or "ACC" position. The wipers will wipe automatically several times when the washer fluid is sprayed.

To turn off the spray, release the lever.



AA00040332