

REPORT NUMBER 104-GTL-04-004

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

**GENERAL MOTORS CORP  
2004 CHEVROLET MALIBU, PASSENGER CAR  
NHTSA NO. C40102**

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



**JULY 30, 2004**

**FINAL REPORT**

**PREPARED FOR**

**U. S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
ENFORCEMENT  
OFFICE OF VEHICLE SAFETY COMPLIANCE  
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**SECTION 1****PURPOSE OF COMPLIANCE TEST****1.0 PURPOSE OF COMPLIANCE TEST**

A 2004 Chevrolet Malibu 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 2004 Chevrolet Malibu Passenger Car. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: 1G1ZT52814F125082

B. NHTSA No.: C40102

C. Manufacturer: GENERAL MOTORS CORPORATION

D. Manufacture Date: 10/03

**1.2 TEST DATE**

The test vehicle was subjected to FMVSS No. 104 testing on July 14, 2004.

## SECTION 2

### COMPLIANCE TEST PROCEDURE AND SUMMARY OF RESULTS

#### 2.0 GENERAL

The 2004 Chevrolet Malibu 4-door passenger car, NHTSA No. C40102 was subjected to FMVSS No. 104 tests on July 14, 2004. 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 2004 Chevrolet Malibu.

**SUMMARY OF DATA**  
**FMVSS 104, WINDSHIELD WIPING AND WASHING SYSTEMS**

VEH. MOD YR/MAKE/MODEL/BODY: 2004 CHEVROLET MALIBU PASSENGER CAR  
 VEH. NHTSA NO: C40102; VIN: 1G1ZT52814F125082  
 VEH. BUILD DATE: 10/03 TEST DATE: JULY 14, 2004  
 TEST LABORATORY: GENERAL TESTING LABORATORIES  
 OBSERVERS: GRANT FARRAND, JIMMY LATANE

WIPER TYPE: 2 SPEED ELECTRIC WITH DELAY

WASHER TYPE: ELECTRIC PRESSURE PUMP

WINDSHIELD AREAS: A = 1034.3 in<sup>2</sup> B = 721.5 in<sup>2</sup> C = 238.0 in<sup>2</sup>

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: *[Signature]*

DATE: 07/16/04

APPROVED BY: *[Signature]*



**FREQUENCY TEST DATA**  
**FMVSS 104 – WINDSHIELD WIPER SYSTEM**

VEH. MOD YR/MAKE/MODEL/BODY: 2004 CHEVROLET MALIBU PASSENGER CAR  
 VEH. NHTSA NO: C40102; VIN: 1G1ZT52814F125082  
 VEH. BUILD DATE: 10/03; TEST DATE: JULY 14, 2004  
 TEST LABORATORY: GENERAL TESTING LABORATORIES  
 OBSERVERS: GRANT FARRAND, JIMMY LATANE

Water Hardness: 7.0 grains/gallon (12 max.); Date Certified: 02/23/04

Water Spray Flow Rate: 70.7 in<sup>3</sup>/min. (specified range = 50 to 100 in<sup>3</sup>/min.)

Ambient Air Temp.: 78 °F (50-100°F); Water Temp.: 72 °F (100°F max.)

Manufacturer's Recommended Engine Idle Speed: 850 rpm

**RUN 1, MAXIMUM WIPER FREQUENCY TEST:**

TIME	ENGINE SPEED	TOTAL CYCLES	AVG. CYCLES/MIN. (45 MINIMUM)
1 <sup>st</sup> 3 minutes	<u>850</u> (idle ± 50 rpm)	211	70.3
2 <sup>nd</sup> 3 minutes	<u>2000</u> (2000 rpm ± 50 rpm)	214	71.3

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. (45 MINIMUM)
1 <sup>st</sup> 3 minutes	<u>850</u> (idle ± 50 rpm)	140	46.6
2 <sup>nd</sup> 3 minutes	<u>2000</u> (2000 rpm ± 50 rpm)	135	45

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: 07/14/04

APPROVED BY: *D. Messick*

WIPED AREA TEST DATA  
FMVSS 104 - WINDSHIELD WIPER SYSTEM

VEH. MOD YR/MAKE/MODEL/BODY: 2004 CHEVROLET MALIBU PASSENGER CAR  
VEH. NHTSA NO: C40102; VIN: 1G1ZT52814F125082  
VEH. BUILD DATE: 10/03; TEST DATE: JULY 14, 2004  
TEST LABORATORY: GENERAL TESTING LABORATORIES  
OBSERVERS: GRANT FARRAND, JIMMY LATANE

Air Temperature in test area = 78 °F (specified range of 50 to 100°F)  
Air Velocity at windshield = .2 mph (specified range of 0 to 1 mph)  
Engine speed = 850 rpm (manufacturer's recommended idle ± 50 rpm)  
Temperature of water spray = 74 °F (100° F maximum)  
Water spray flow rate = 70.7 in<sup>3</sup>/min. (specified range of 50 to 100 in<sup>3</sup>/min.)  
Windshield wiper frequency = 45 cycles/min. (45 cpm minimum)

TEST RESULTS:

PERCENT WIPED				
WINDSHIELD AREA	ACTUAL	REQUIRED	PASS	FAIL
A	92.8%	80%	X	
B	97.2%	94%	X	
C	100%	99%	X	

REMARKS:

RECORDED BY: [Signature]  
APPROVED BY: [Signature]

DATE: 07/16/04

**CAPABILITY TEST DATA**  
**FMVSS 104 – WINDSHIELD WASHER SYSTEM**

VEH. MOD YR/MAKE/MODEL/BODY: 2004 CHEVROLET MALIBU PASSENGER CAR  
 VEH. NHTSA NO: C40102; VIN: 1G1ZT52814F125082  
 VEH. BUILD DATE: 10/03; TEST DATE: JULY 14, 2004  
 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 = .2 mph (specified range of 0 to 1 mph)

Engine speed = 850 rpm (manufacturer's recommended idle ± 50 rpm)

Number of windshield washer nozzles on the vehicle = 2

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	92.9	92.0	92.45	75%	X	
B	97.0	96.5	96.75	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: *[Signature]*

DATE: 07/16/04

APPROVED BY: *[Signature]*

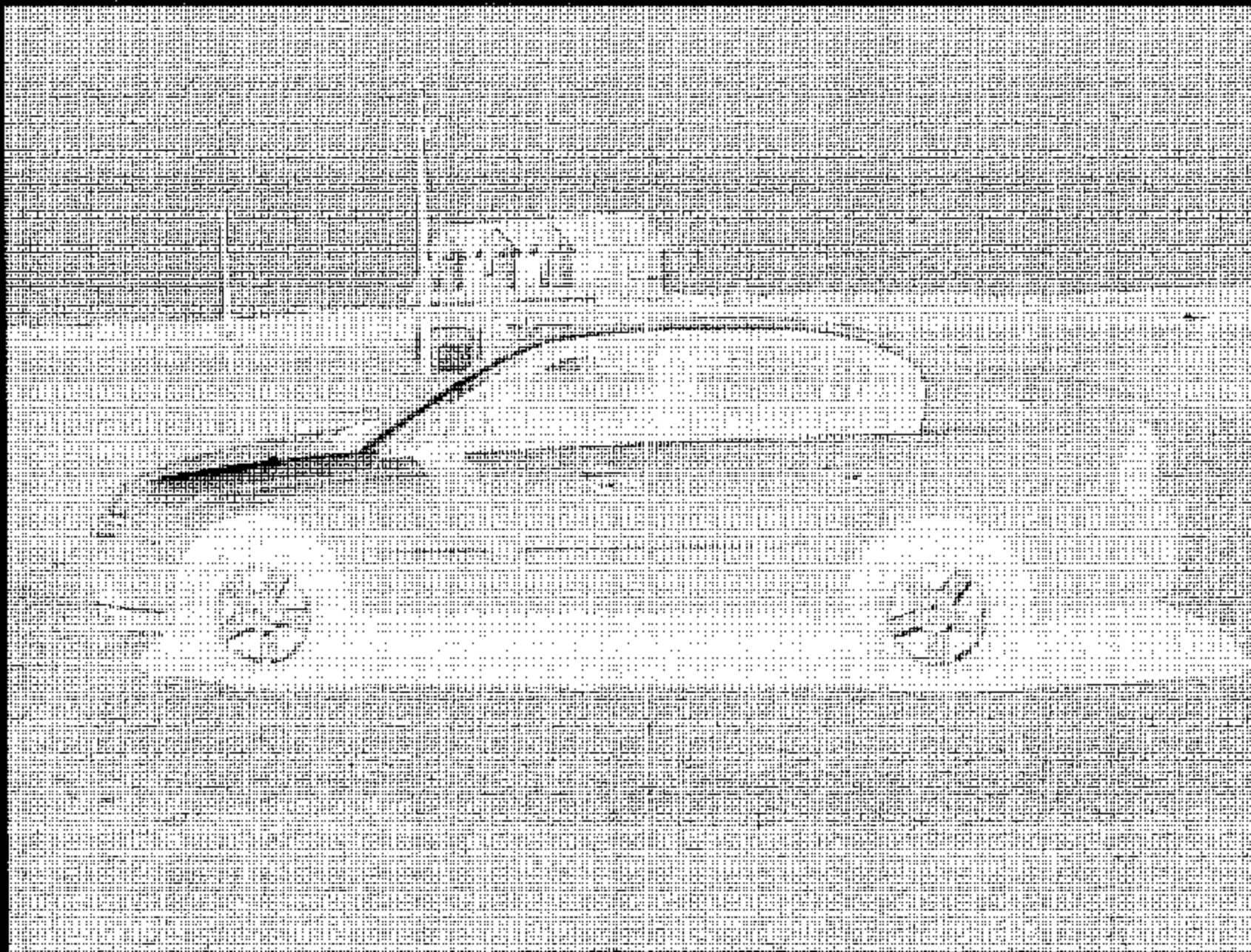
SECTION 4  
INSTRUMENTATION AND EQUIPMENT LIST

TABLE 1 - INSTRUMENTATION & EQUIPMENT LIST

EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO.	CAL. DATE	NEXT CAL. DATE
TIMER	ACCU-SPLIT	ACT2	07/04	07/05
TEMPERATURE READOUT	OMEGA	43P	03/04	03/05
TEMPERATURE RECORDER	OMEGA	CT91	03/04	03/05
SPRAY SYSTEM	GTL	N/A	BEFORE USE	BEFORE USE
ANEMOMETER	HASTINGS	RM-1, 48	05/04	05/05
CYCLE COUNTER	GTL	GTL	BEFORE USE	BEFORE USE
SOFT WATER	N/A	N/A	02/04	02/05
TACHOMETER	MONARCH	ACT-3	07/04	07/05
TEST DUST	AC	GM FINE	CALIBRATED DUST	CALIBRATED BY VENDOR*
EVENT RECORDER	COMPUTER	GEO1	BEFORE USE	BEFORE USE

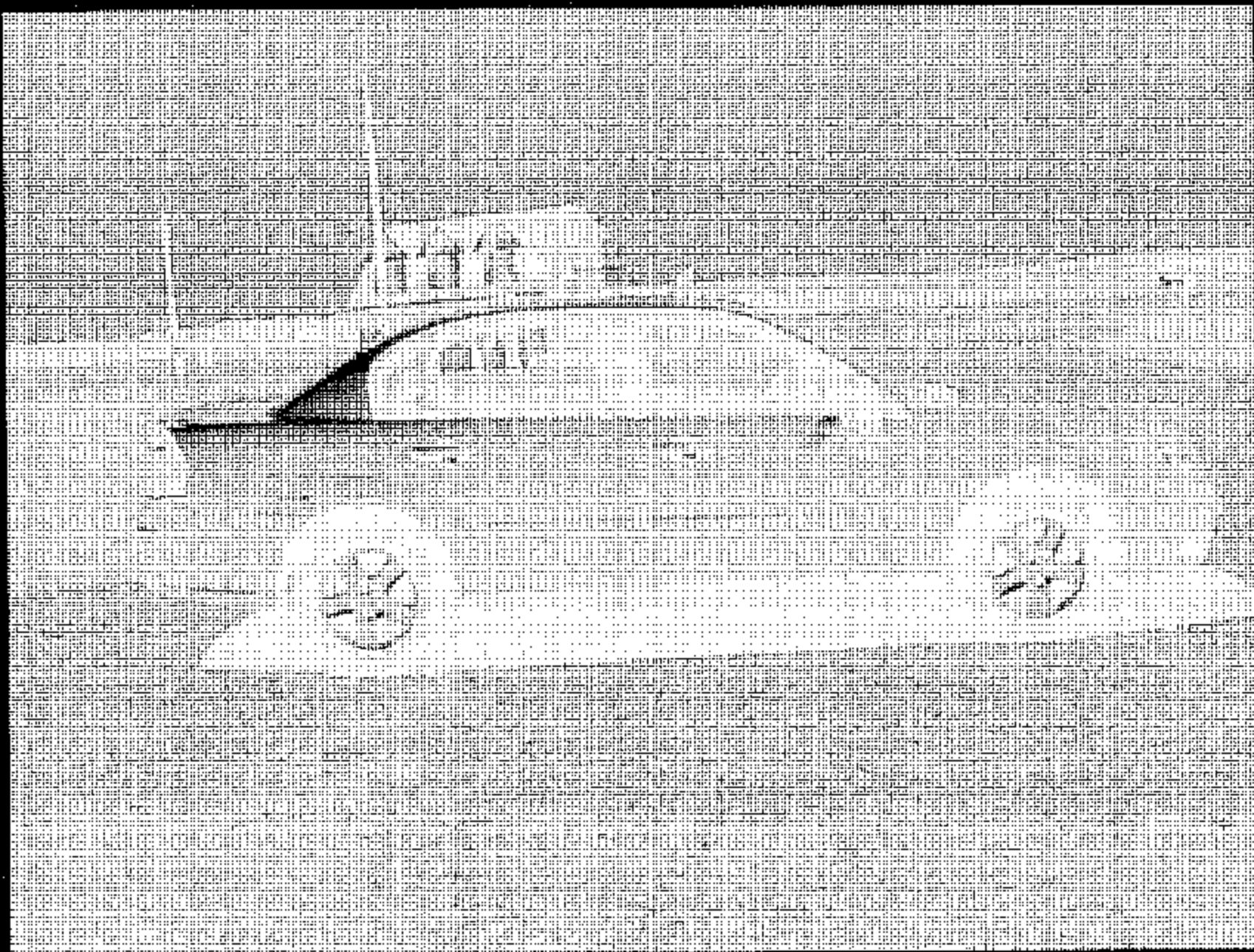
\*AC Inspection #503, Batch #1943, Measured with particle size roller analyzer.

SECTION 5  
PHOTOGRAPHS



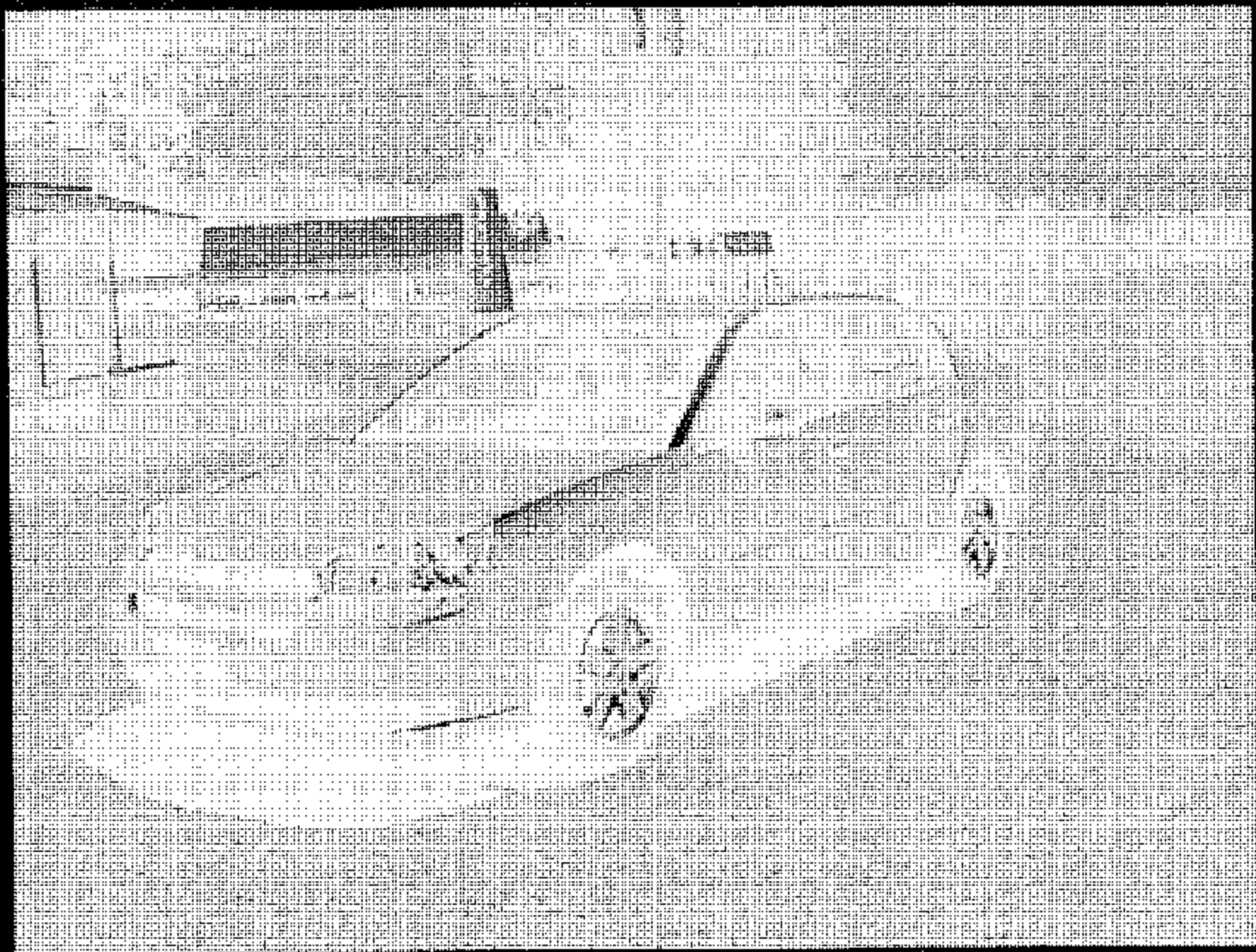
2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

FIGURE 5.1  
LEFT SIDE VIEW OF VEHICLE



2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

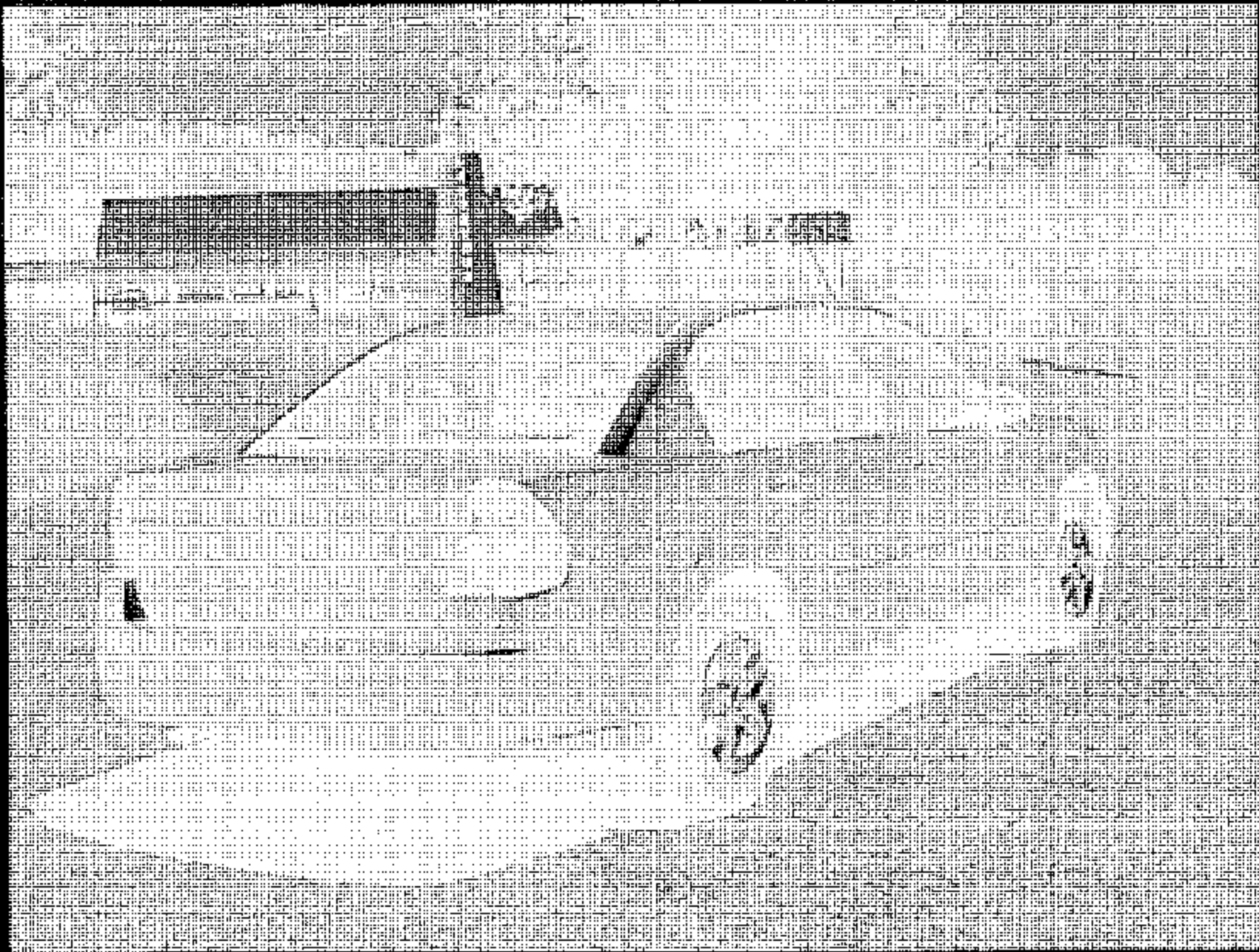
FIGURE 5.2  
RIGHT SIDE VIEW OF VEHICLE



2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

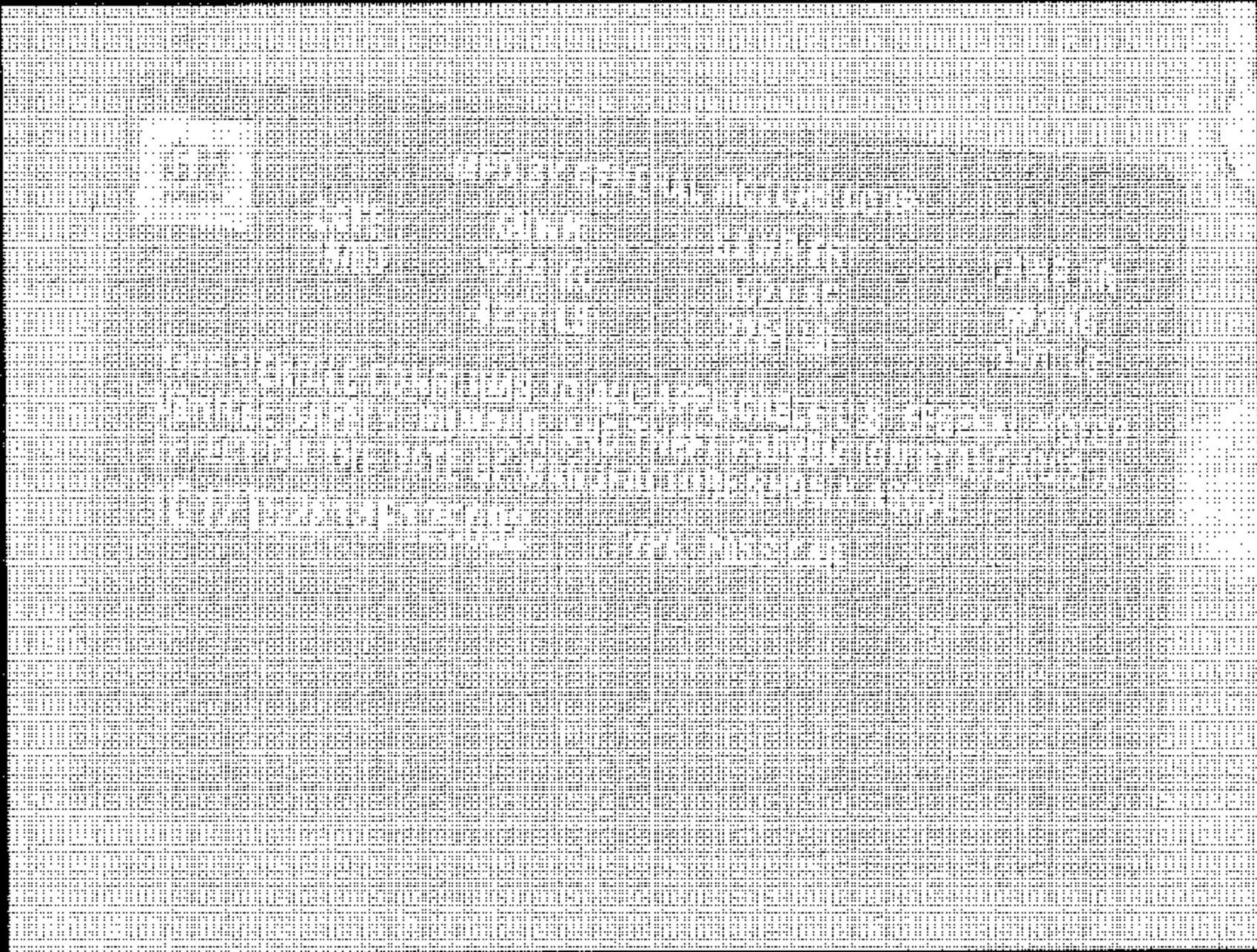
FIGURE 5.3  
¾ FRONTAL VIEW FROM LEFT SIDE OF  
VEHICLE





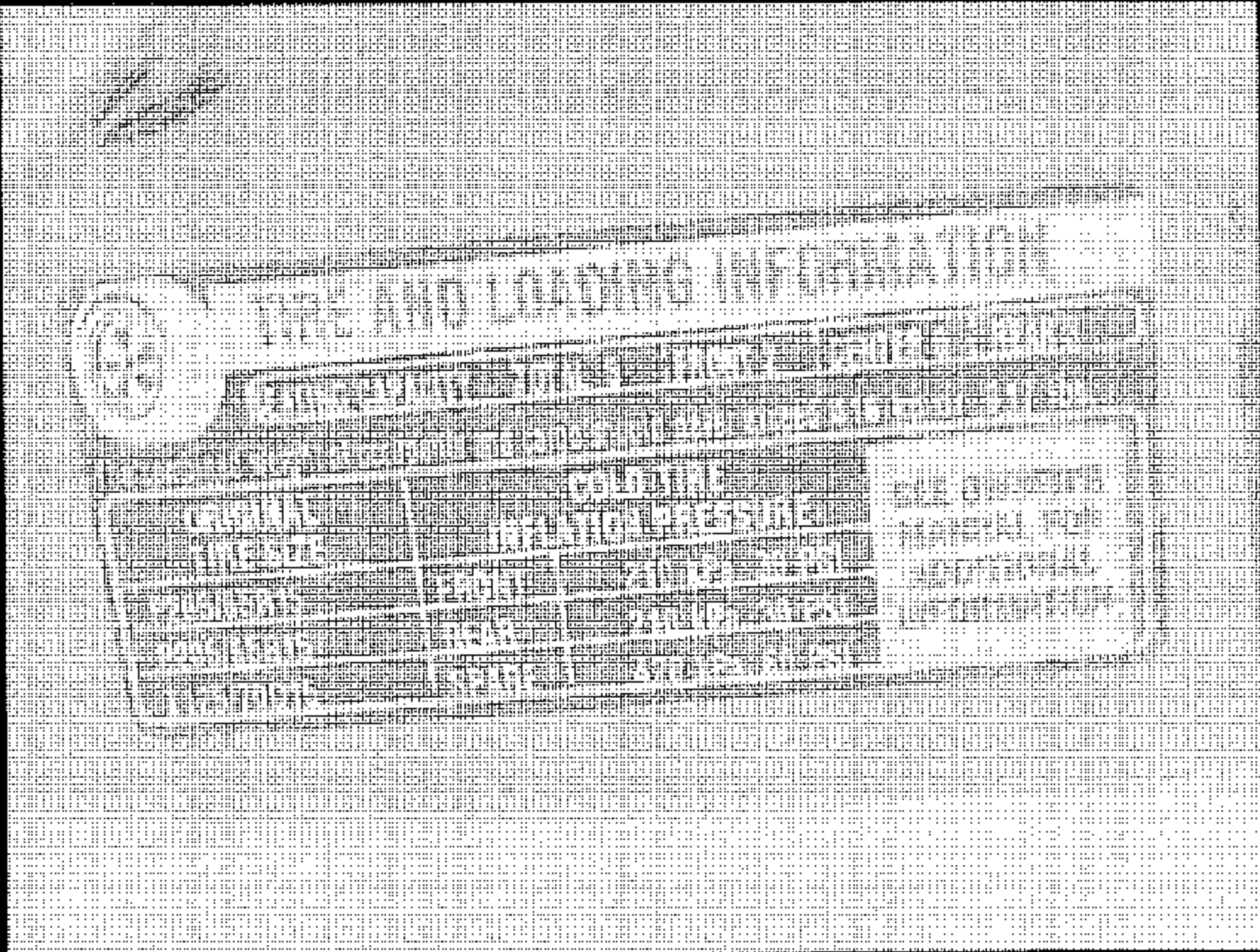
2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

FIGURE 5.4  
3/4 REAR VIEW FROM RIGHT SIDE OF  
VEHICLE



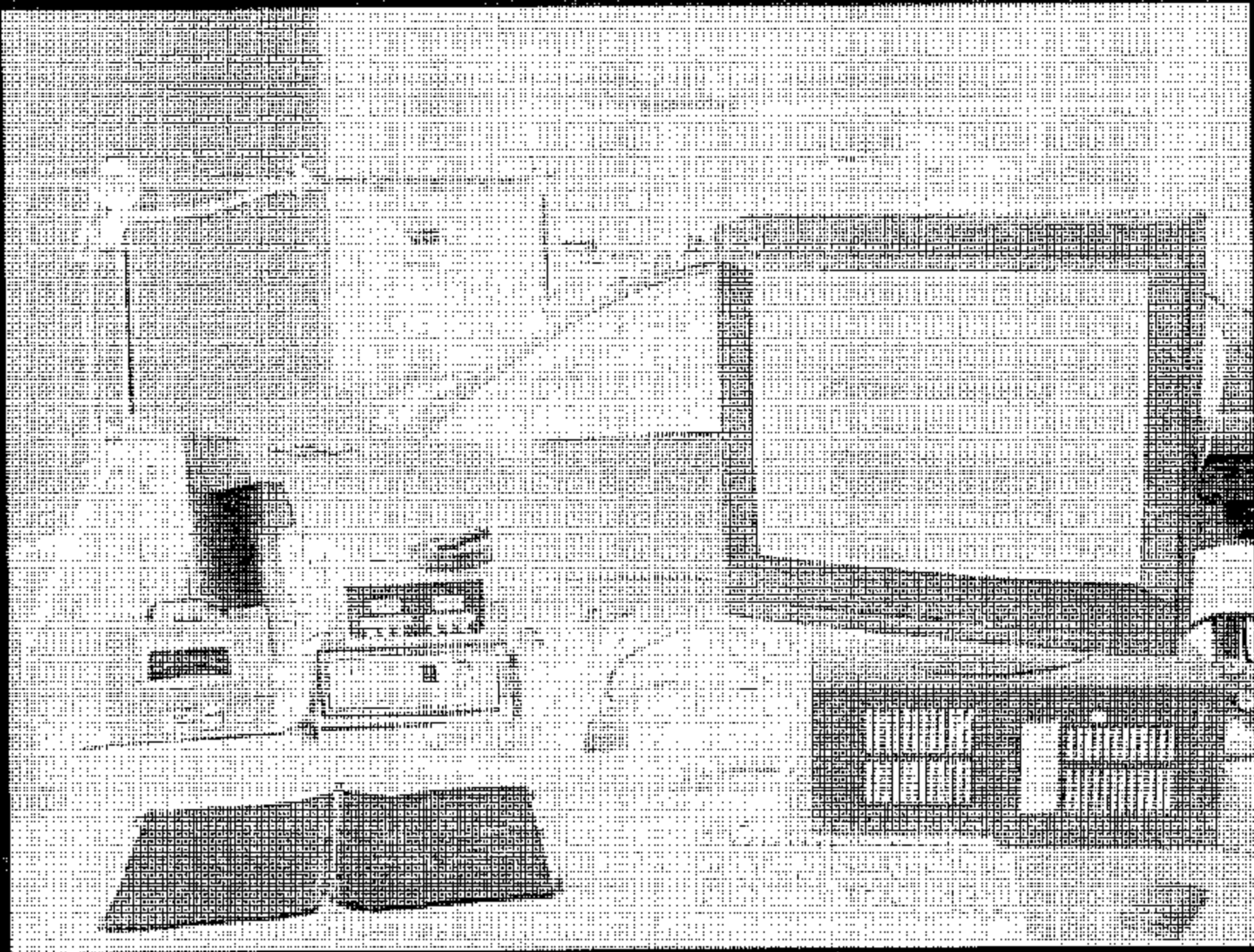
2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

FIGURE 5.5  
VEHICLE CERTIFICATION LABEL



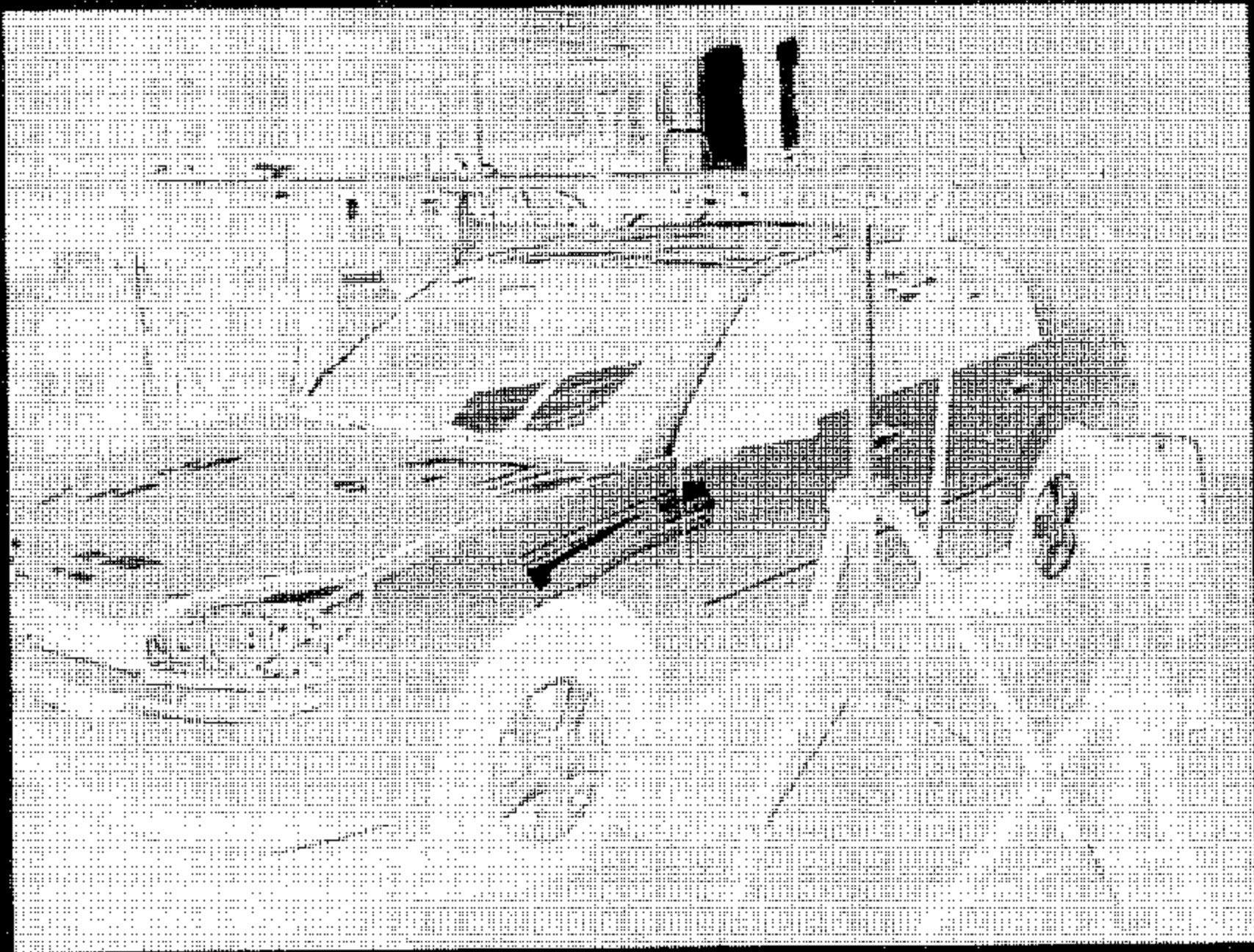
2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

FIGURE 5.6  
VEHICLE TIRE INFORMATION LABEL



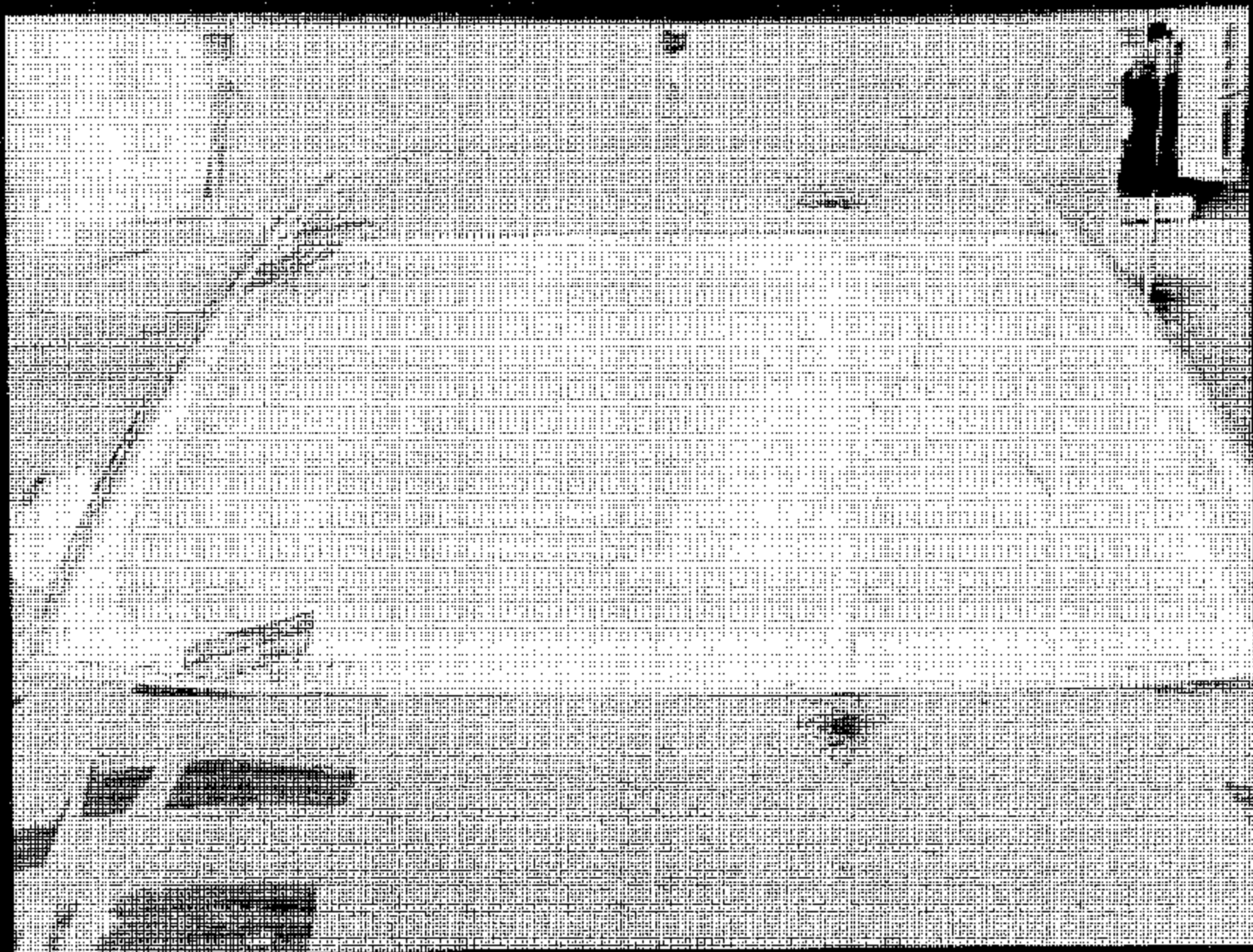
2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

FIGURE 5.7  
INSTRUMENTATION SET-UP



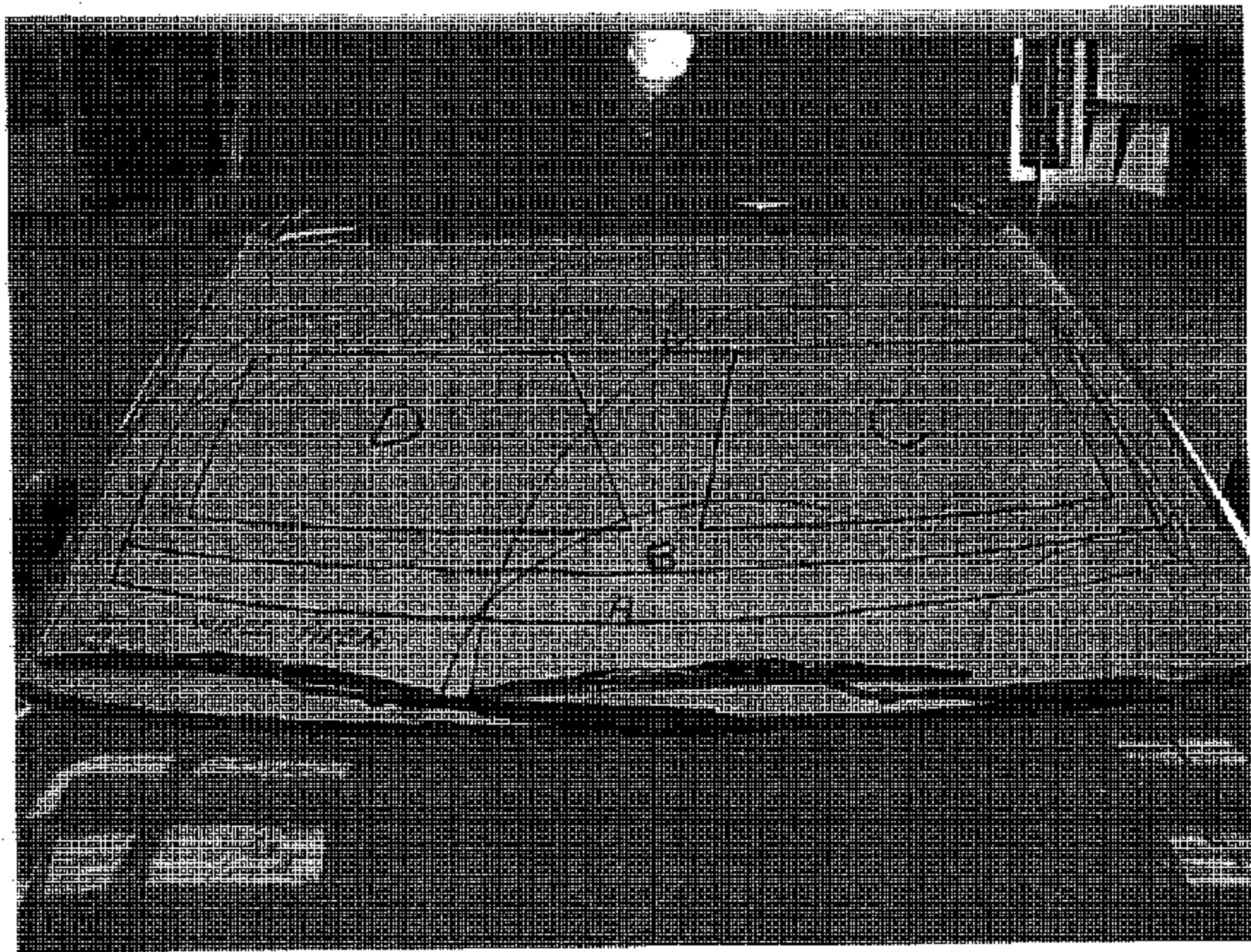
2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

FIGURE 5.8  
EQUIPMENT SET-UP



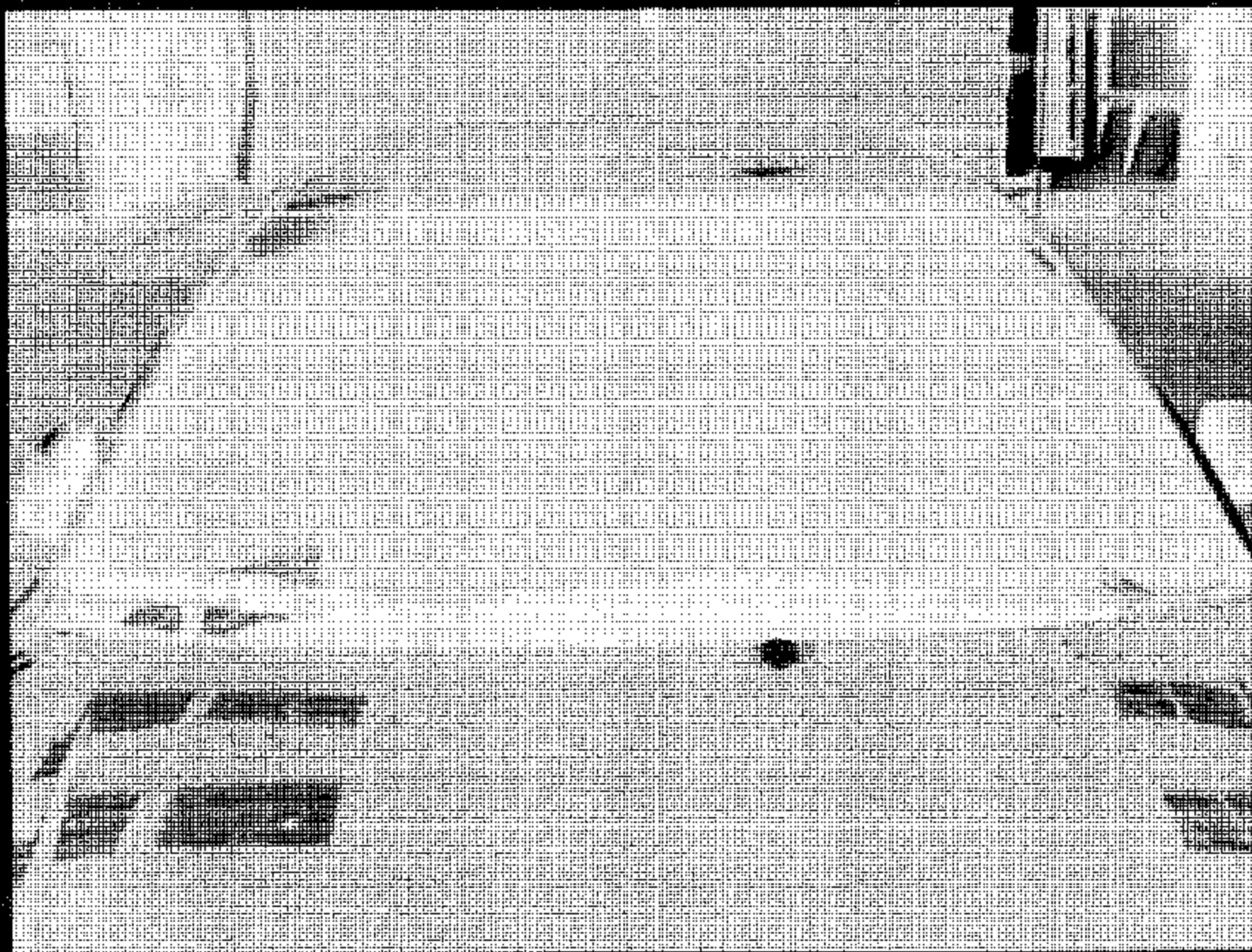
2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

FIGURE 5.9  
WIPED AREA TEST



2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

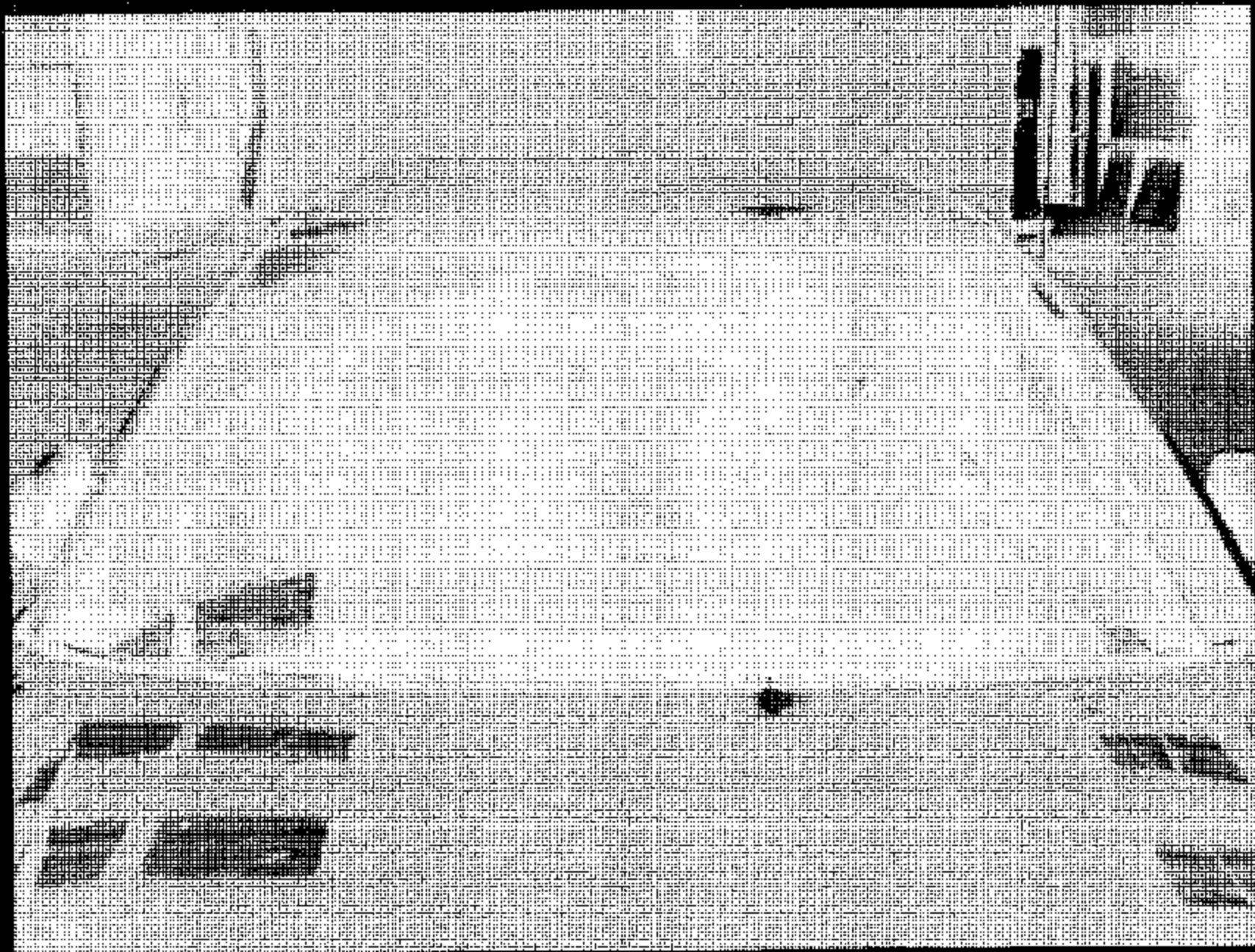
FIGURE 6.10  
WIPED AREA TEST PATTERN



2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

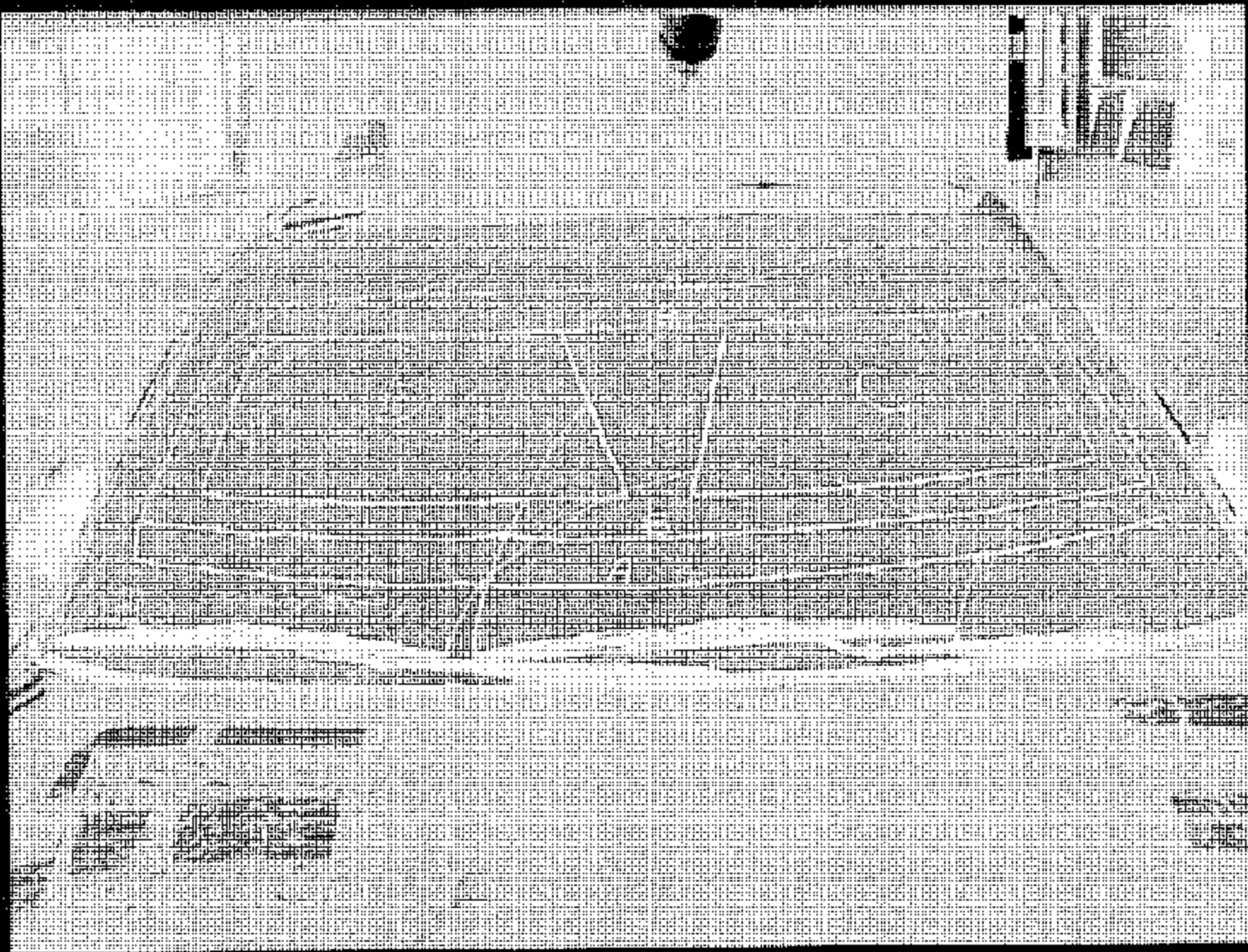
FIGURE 5.11  
CAPABILITY TEST #1 – PRE-COATED  
WINDSHIELD





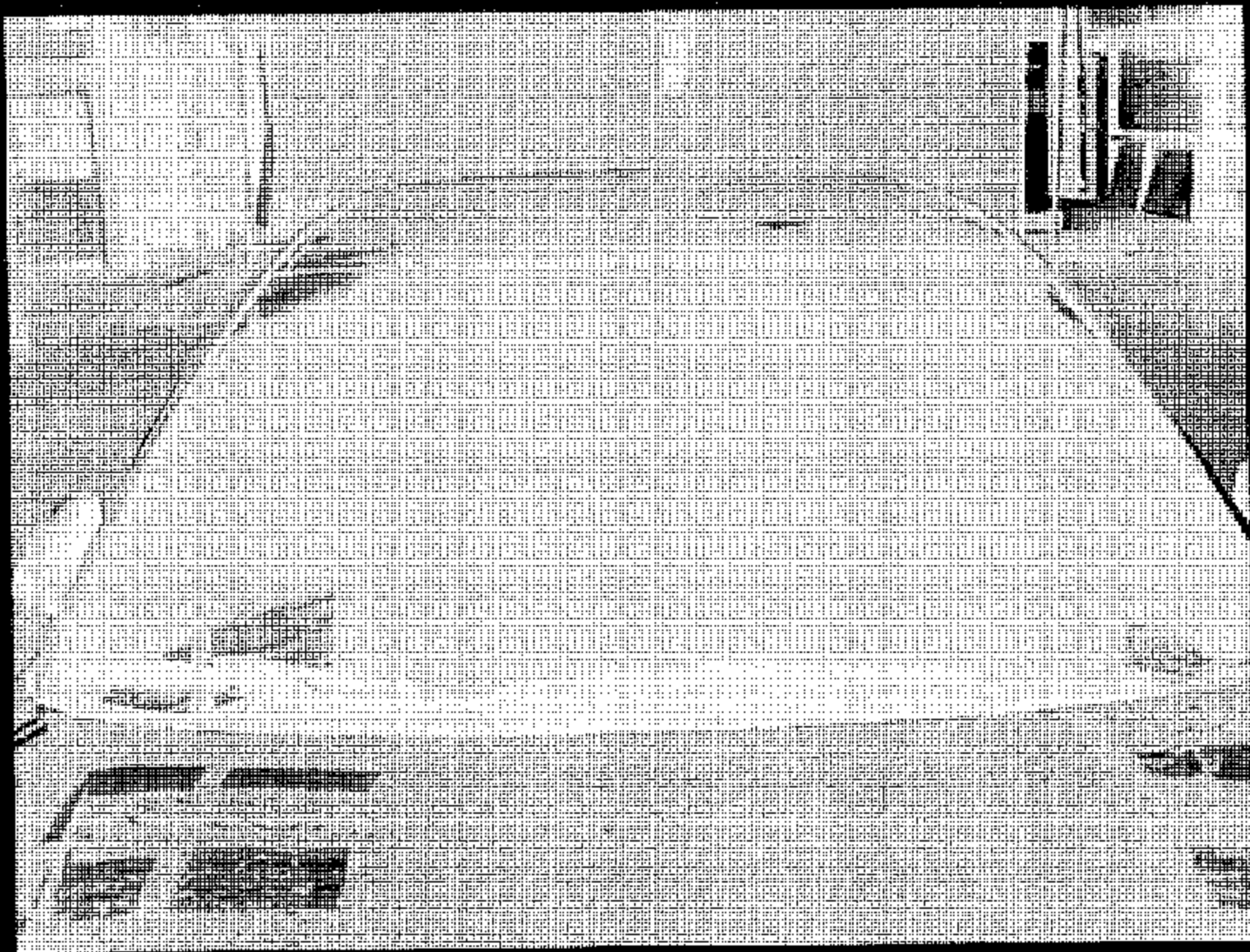
2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

FIGURE 5.12  
CAPABILITY TEST #1 - IN PROGRESS



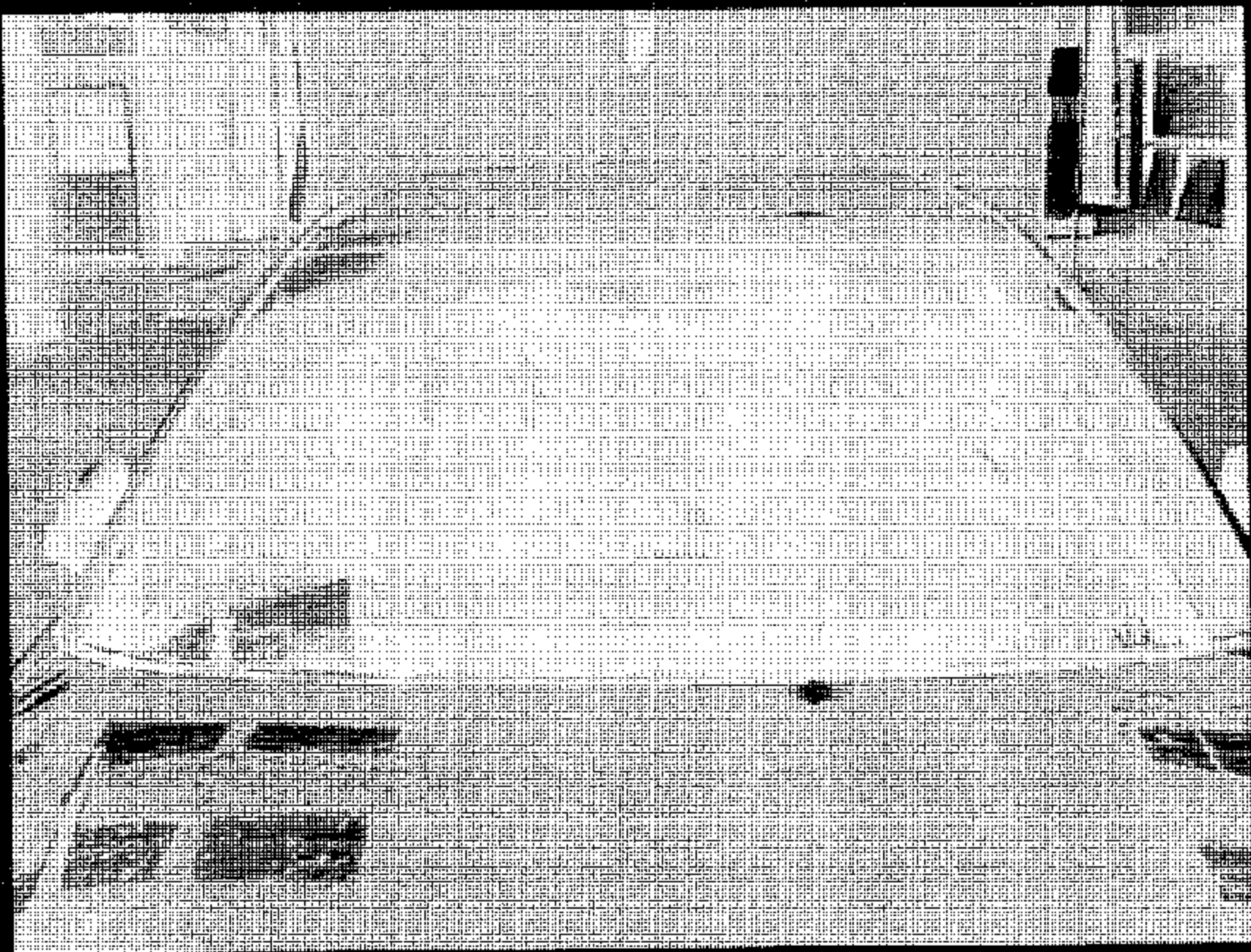
2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

FIGURE 5.13  
CAPABILITY TEST #1 - PATTERN



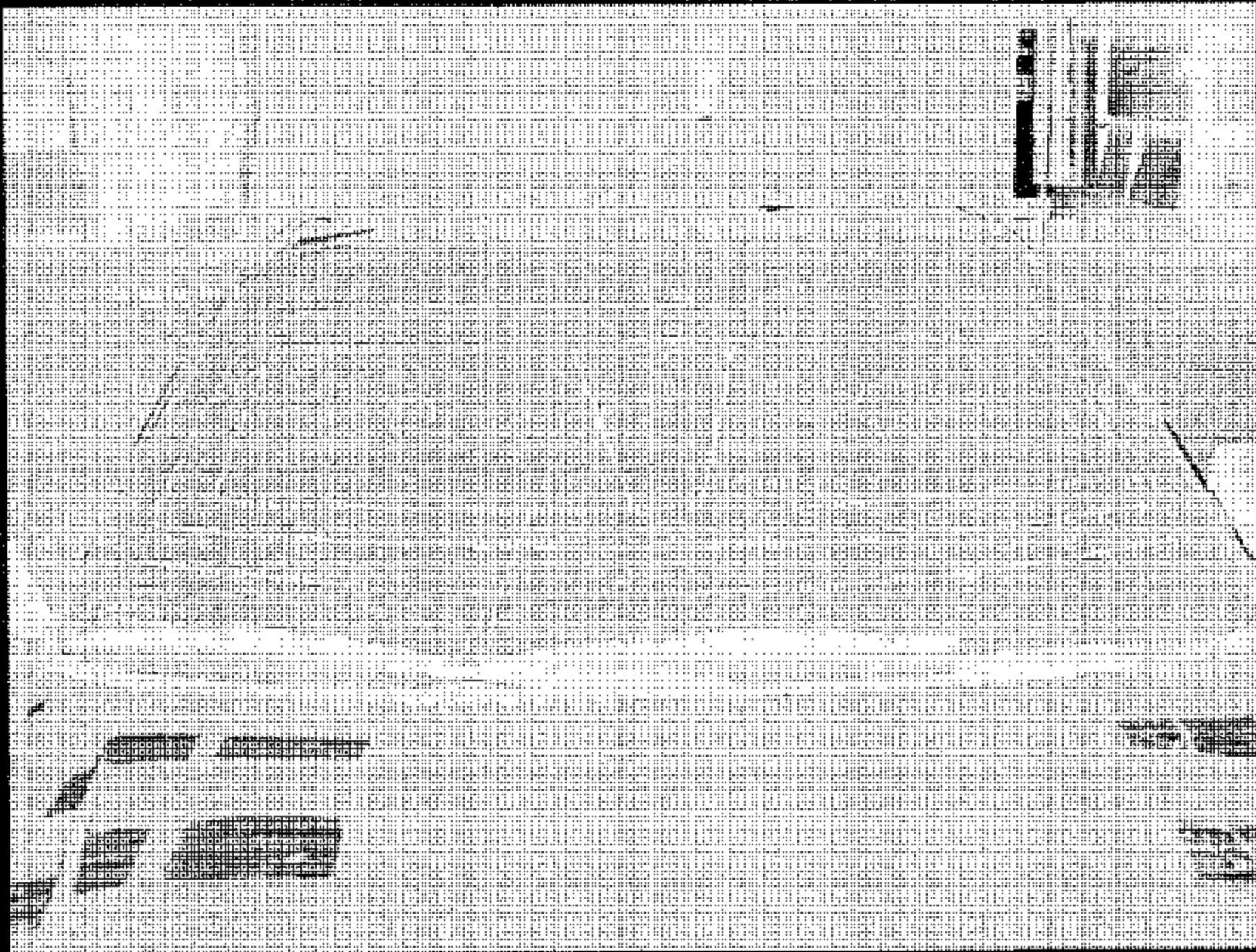
2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

FIGURE 5.14  
CAPABILITY TEST #2 – PRE-COATED  
WINDSHIELD



2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

FIGURE 5.15  
CAPABILITY TEST #2 - PATTERN



2004 CHEVROLET MALIBU  
NHTSA NO. C40102  
FMVSS NO. 104

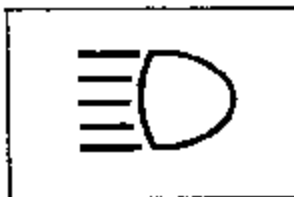
FIGURE 5.16  
CAPABILITY TEST #2 - PATTERN

SECTION 6

OWNER'S MANUAL INFORMATION

## Headlamp High/Low-Beam Changer

To change the headlamps from low beam to high beam, push the turn signal/multifunction lever away from you.



When the high beams are on, a light on the instrument panel cluster also will be on if the ignition is in ON.

To change the headlamps from high beam to low beam, pull the turn signal lever toward you.

## Headlamps On Reminder

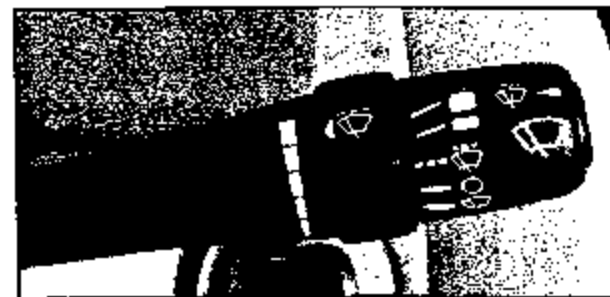
If you open the driver's door and turn off the ignition while leaving the lamps on, you will hear a warning chime.

## Flash-to-Pass Feature

This feature lets you use your high-beam headlamps momentarily to signal a driver in front of you that you want to pass.

To use it, pull the turn signal/multifunction lever toward you until the high-beam headlamps come on, then release the lever to turn them off.

## Windshield Wipers





Use this lever located on the right side of the steering wheel to operate the windshield wipers.


○ (Off): Move the lever to this position to turn off the windshield wipers.

⏸ (Intermittent): Move the lever to this position to choose a delayed wiping cycle. Turn the Intermittent adjust band down for a longer delay or up for a shorter delay. The wiper speed can only be manually adjusted when the lever is in this position.

⚡ (Speed Sensitive Wipers): Move the lever to this position for speed sensitive operation. When you select this position, the delay will change with your vehicle's speed. The delay will decrease as you go faster and increase as you go slower.

 (Low Speed): Move the lever up to the first setting past intermittent, for steady wiping at low speed.

 (High Speed): Move the lever up to the second setting past intermittent, for wiping at high speed.

 (Mist): Move the lever all the way down to this position for a single wiping cycle. Hold it there until the windshield wipers start; then let go. The windshield wipers will stop after one wipe. If you want more wipes, hold the lever down longer.

Remember that damaged wiper blades may prevent you from seeing well enough to drive safely. To avoid damage, be sure to clear ice and snow from the wiper blades before using them.

If they're frozen to the windshield, carefully loosen or thaw them. If your blades do become damaged, get new blades or blade inserts.

Heavy snow or ice can overload your wiper motor. A circuit breaker will stop the motor until it cools. Clear away snow or ice to prevent an overload. If the motor gets stuck turn the wipers off, clear away the snow or ice, and then turn the wipers back on.

As an added safety feature, if the wipers are on for more than thirty seconds, the vehicle's headlamps will turn on automatically. They will turn off when the wipers are turned off.

## Windshield Washer

To wash your windshield, push in the button at the end of the stalk until the washers begin.

### CAUTION:

In freezing weather, do not use your washer until the windshield is warmed. Otherwise the washer fluid can form ice on the windshield, blocking your vision.

When you release the button, the washers will stop, but the wipers will continue to wipe for about three cycles and will either stop or will resume the speed you were using before.

## Cruise Control

If your vehicle has cruise control, you can maintain a speed of about 25 mph (40 km/h) or more without keeping your foot on the accelerator. This can really help on long trips. Cruise control does not work at speeds below 25 mph (40 km/h).