REPORT NUMBER 104-GTL-07-004

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

VOLKSWAGEN AG GERMANY
2007 VOLKSWAGEN RABBIT, PASSENGER CAR
NHTSA NO. C75800

GENERAL TESTING LABORATORIES, INC.
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JANUARY 9, 2008

FINAL REPORT

PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
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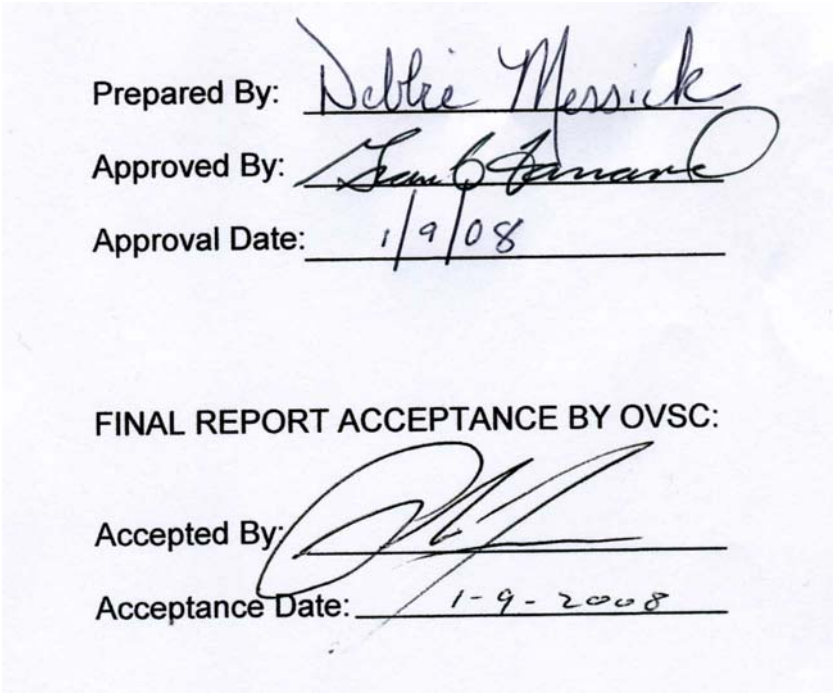

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SECTION 1

PURPOSE OF COMPLIANCE TEST

1.0 PURPOSE OF COMPLIANCE TEST

A 2007 Volkswagen Rabbit 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 2007 VOLKSWAGEN RABBIT PASSENGER CAR. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: WVWCR71K67W131176

B. NHTSA No.: C75800

C. Manufacturer: VOLKSWAGEN AG GERMANY

D. Manufacture Date: 12/06

1.2 TEST DATE

The test vehicle was subjected to FMVSS No. 104 testing on October 9, 2007.

SECTION 2

COMPLIANCE TEST PROCEDURE AND SUMMARY OF RESULTS

2.0 GENERAL

The 2007 Volkswagen Rabbit passenger car, NHTSA No. C75800 was subjected to FMVSS No. 104 tests on October 9, 2007. 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 2007 Volkswagen Rabbit.

SUMMARY OF DATA
FMVSS 104, WINDSHIELD WIPING AND WASHING SYSTEMS

VEH. MOD YR/MAKE/MODEL/BODY: 2007 VOLKSWAGEN RABBIT PASSENGER CAR
VEH. NHTSA NO: C75800; VIN: WVWCR71K67W131176
VEH. BUILD DATE: 12/06 TEST DATE: OCTOBER 9, 2007
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 = 1060 in^2 B = 741 in^2 C = 248 in^2

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: 10/11/07

APPROVED BY: D. MESSICK

FREQUENCY TEST DATA
FMVSS 104 – WINDSHIELD WIPER SYSTEM

VEH. MOD YR/MAKE/MODEL/BODY: 2007 VOLKSWAGEN RABBIT PASSENGER CAR
VEH. NHTSA NO: C75800; VIN: WVWCR71K67W131176
VEH. BUILD DATE: 12/06 TEST DATE: OCTOBER 9, 2007
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, JIMMY LATANE

Water Hardness: 7.0 grains/gallon (12 max.); Date Certified: 09/07

Water Spray Flow Rate: 71.0. in^3/min. (specified range = 50 to 100 in^3/min.)

Ambient Air Temp.: 82 ºF (50-100ºF); Water Temp.: 78 ºF (100ºF max.)

Manufacturer's Recommended Engine Idle Speed: 675 rpm

RUN 1, MAXIMUM WIPER FREQUENCY TEST:

TIME	ENGINE SPEED	TOTAL CYCLES	AVG. CYCLES/MIN. (45 MINIMUM)
1ST 3 minutes	675 (idle ± 50 rpm)	180	60
2nd 3 minutes	2000 (2000 rpm ± 50 rpm)	180	60

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)
1ST 3 minutes	675 (idle ± 50 rpm)	120	40
2nd 3 minutes	2000 (2000 rpm ± 50 rpm)	120	40

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: 10/09/07

APPROVED BY: D. MESSICK

WIPED AREA TEST DATA
FMVSS 104 – WINDSHIELD WIPER SYSTEM

VEH. MOD YR/MAKE/MODEL/BODY: 2007 VOLKSWAGEN RABBIT PASSENGER CAR
VEH. NHTSA NO: C75800; VIN: WVWCR71K67W131176
VEH. BUILD DATE: 12/06 ; TEST DATE: OCTOBER 9, 2007
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, JIMMY LATANE

Air Temperature in test area = 82 ºF (specified range of 50 to 100ºF)

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

Engine speed = 675 rpm (manufacturer's recommended idle ± 50 rpm)

Temperature of water spray = 78 ºF (100º F maximum)

Water spray flow rate = 71 in^3/min. (specified range of 50 to 100 in^3/min.)

Windshield wiper frequency = 60 cycles/min. (45 cpm minimum)

TEST RESULTS:

PERCENT WIPED				
WINDSHIELD AREA	ACTUAL	REQUIRED	PASS	FAIL
A	93.0%	80%	X	
B	94.1%	94%	X	
C	100%	99%	X	

REMARKS:

RECORDED BY: G. FARRAND DATE: 10/09/07

APPROVED BY: D. MESSICK

CAPABILITY TEST DATA
FMVSS 104 – WINDSHIELD WASHER SYSTEM

VEH. MOD YR/MAKE/MODEL/BODY: 2007 VOLKSWAGEN RABBIT PASSENGER CAR
VEH. NHTSA NO: C75800; VIN: WVWCR71K67W131176
VEH. BUILD DATE: 12/06 ; TEST DATE: OCTOBER 9, 2007
TEST LABORATORY: GENERAL TESTING LABORATORIES
OBSERVERS: GRANT FARRAND, JIMMY LATANE

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

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

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

Engine speed = 675 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	92.9	92.9	75%	X	
B	94.1	94.1	94.1	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: 10/11/07

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	10/07	10/08
TEMPERATURE READOUT	OMEGA	DP41	03/07	03/08
TEMPERATURE RECORDER	OMEGA	CT485	12/06	06/08
SPRAY SYSTEM	GTL	N/A	BEFORE USE	BEFORE USE
ANEMOMETER	OMEGA	HH-600	12/06	06/08
CYCLE COUNTER	GTL	GTL	BEFORE USE	BEFORE USE
SOFT WATER	N/A	N/A	10/07	10/08
TACHOMETER	MONARCH	ACT-3	08/07	08/08
TEST DUST	AC	GM FINE	CALIBRATED DUST	CALIBRATED BY VENDOR*

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

SECTION 5

PHOTOGRAPHS

2007 VOLKSWAGEN RABBIT
NHTSA NO. C75800
FMVSS NO. 104

FIGURE 5.1
LEFT SIDE VIEW OF VEHICLE

2007 VOLKSWAGEN RABBIT
NHTSA NO. C75800
FMVSS NO. 104

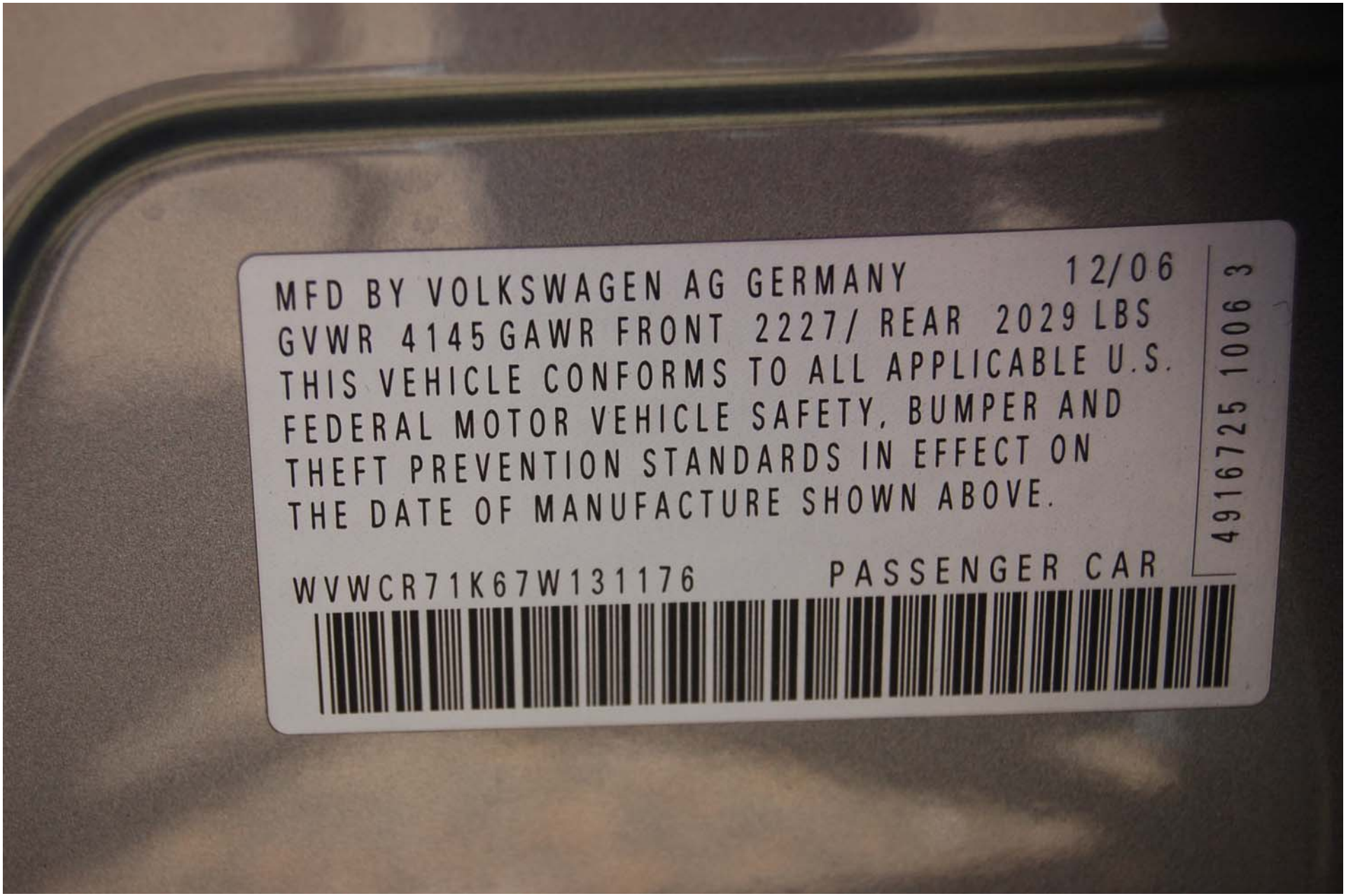
FIGURE 5.2
RIGHT SIDE VIEW OF VEHICLE

2007 VOLKSWAGEN RABBIT
NHTSA NO. C75800
FMVSS NO. 104

FIGURE 5.3
¾ FRONTAL VIEW FROM LEFT SIDE OF VEHICLE

2007 VOLKSWAGEN RABBIT
NHTSA NO. C75800
FMVSS NO. 104

FIGURE 5.4
¾ REAR VIEW FROM RIGHT SIDE OF VEHICLE



2007 VOLKSWAGEN RABBIT
NHTSA NO. C75800
FMVSS NO. 104

FIGURE 5.5
VEHICLE CERTIFICATION LABEL

2007 VOLKSWAGEN RABBIT
NHTSA NO. C75800
FMVSS NO. 104

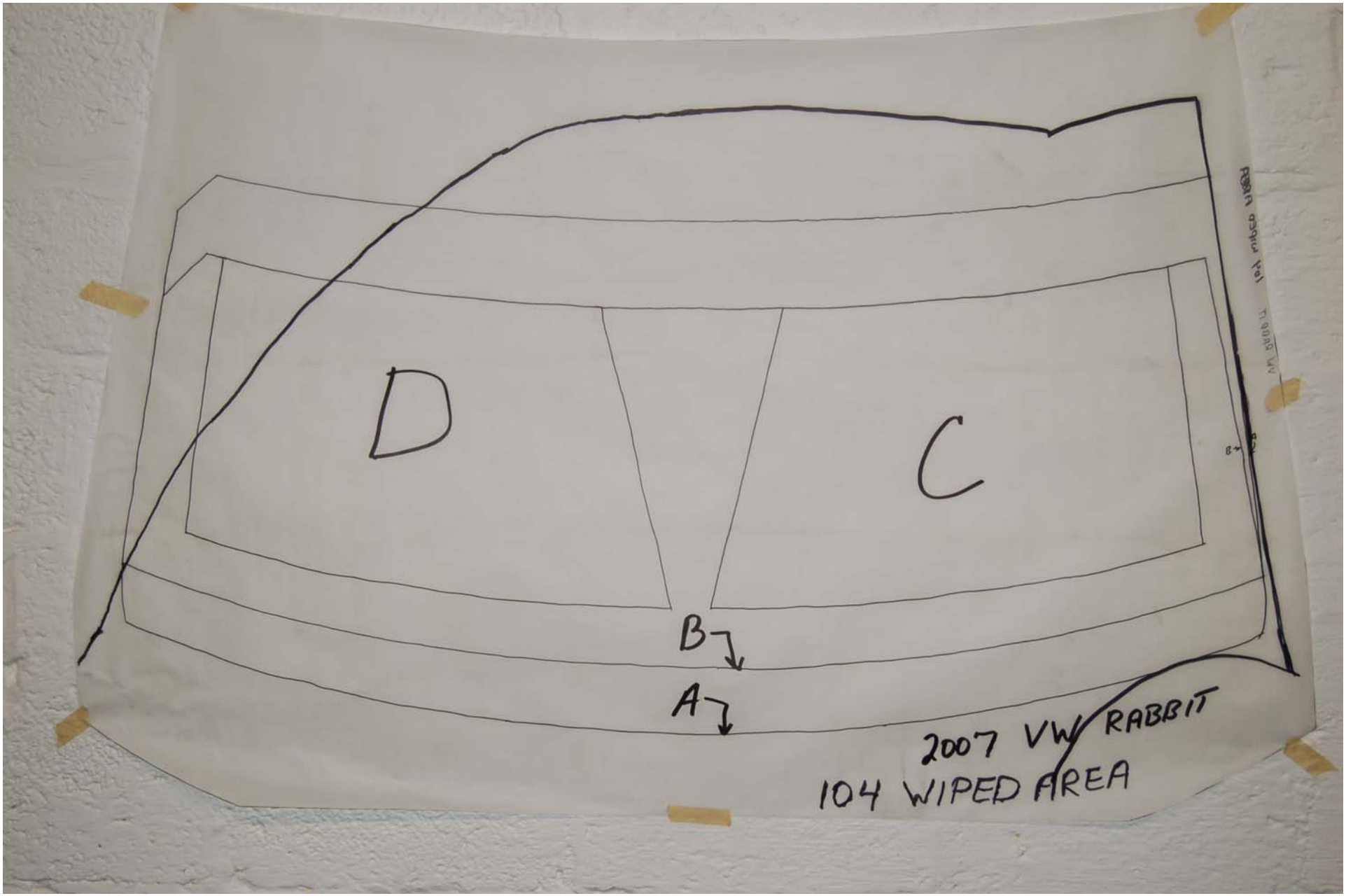
FIGURE 5.6
VEHICLE TIRE INFORMATION LABEL

2007 VOLKSWAGEN RABBIT
NHTSA NO. C75800
FMVSS NO. 104

FIGURE 5.7
INSTRUMENTATION AND EQUIPMENT SET-UP

2007 VOLKSWAGEN RABBIT
NHTSA NO. C75800
FMVSS NO. 104

FIGURE 5.8
WIPED AREA TEST IN PROCESS



2007 VOLKSWAGEN RABBIT
NHTSA NO. C75800
FMVSS NO. 104

FIGURE 5.9
WIPED AREA TEST PATTERN

2007 VOLKSWAGEN RABBIT
NHTSA NO. C75800
FMVSS NO. 104

FIGURE 5.10
CAPABILITY TEST #1 PRE-COATED WINDSHIELD

2007 VOLKSWAGEN RABBIT
NHTSA NO. C75800
FMVSS NO. 104

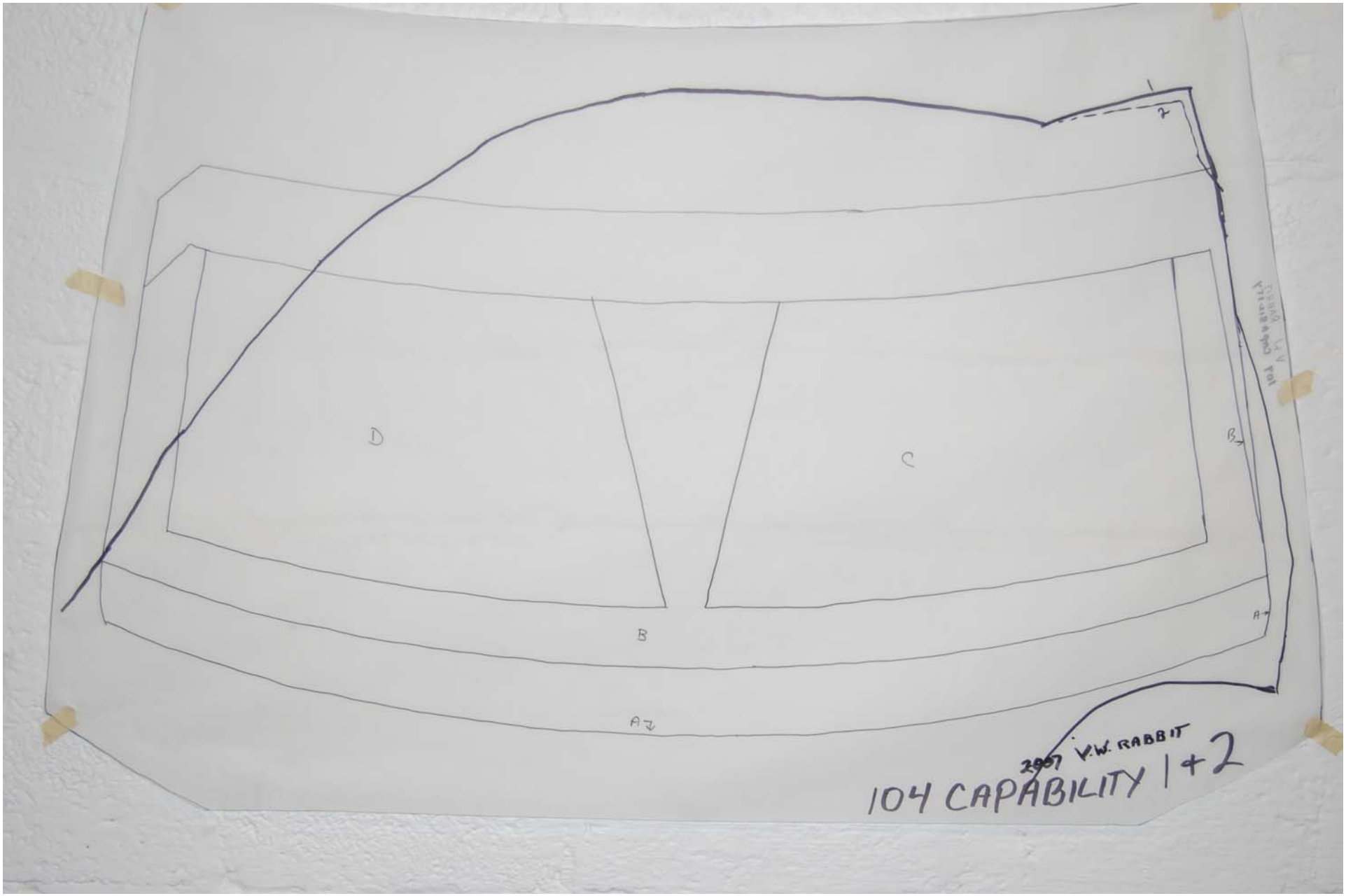
FIGURE 5.11
CAPABILITY TEST #1 IN PROGRESS

2007 VOLKSWAGEN RABBIT
NHTSA NO. C75800
FMVSS NO. 104

FIGURE 5.12
CAPABILITY TEST #2 PRE-COATED WINDSHIELD

2007 VOLKSWAGEN RABBIT
NHTSA NO. C75800
FMVSS NO. 104

FIGURE 5.13
CAPABILITY TEST #2 IN PROGRESS



2007 VOLKSWAGEN RABBIT
NHTSA NO. C75800
FMVSS NO. 104

FIGURE 5.14
CAPABILITY TEST #1 AND #2 PATTERN

SECTION 6

OWNER'S MANUAL INFORMATION

Windshield wipers

Windshield wipers

The windshield wiper switch operates both the windshield wipers and the windshield washers.

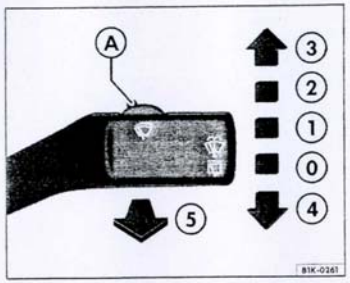


Fig. 34 Windshield wiper and windshield washer switch lever.

The wipers and washers work only when the ignition is on. The wiper switch has several functions ⇒ fig. 34:

Intermittent wiping

– Move the lever up to position ①
⇒ fig. 34.

– Move switch Ⓐ to change the wiping interval – to the left to increase the delay and wipe less often for lighter rain; to the right to shorten the delay and wipe more often.

Slow wiping

– Move the lever up to position ②.

Continuous wiping

– Move the lever up to position ③.

Brief wiping

– Push the lever down to position ④ and release for a *brief* wipe. The wipers will move faster if you hold the lever down for more than 2 seconds.

Switching the wipers off

– Move the lever back to position ⓪.

Windshield wipers and washers

– Pull the lever toward the steering wheel to position ⑤ to activate the washers, then release.

– The wipers will continue to wipe for about 4 seconds.

The washers and wipers will work only when the ignition is switched on.

Service position

The windshield wipers will move to the service position if you switch the ignition on briefly, switch it off again, then press the windshield wiper lever down ④ ⇒ Booklet 3.2 "Tips and Advice", chapter "Windshield washer fluid and wiper blades." Once in the service position, the wipers can be moved away from the glass so that they do not freeze to the windshield. Push the wiper arms back down onto the windshield before driving off.

⚠ WARNING

Worn or dirty wiper blades will reduce visibility and increase the risk of collisions and serious injury.

- **Never use the windshield wipers/washers in freezing weather without first defrosting the windshield. The washer solution may freeze on the window and reduce visibility.**
- **Always clean the windshield wiper blades and all windows regularly.**
- **Always replace wiper blades that are worn, damaged or do not keep the windshield clear.**

ⓘ Note

Before using the windshield wipers for the first time in cold weather, make sure the wiper blades ▶

are not frozen to the windshield. To prevent damage to the wiper blades and the wiper motor, always loosen blades that are frozen to the windshield before operating the wipers. Using the service position described above can be helpful in cold weather.

ⓘ Tips

- The windshield wipers will only work when the hood is closed.
- If wiper speed ② or ③ (⇒ page 38, fig. 34) is left on when you stop, the wipers will come on at the same speed when you switch the ignition on again.
- If the windshield washers are used while the vehicle is moving, the windshield will be wiped again after about five seconds.
- If intermittent wiping is switched on, the time-delay intervals are linked to vehicle speed; i.e. the wipers will wipe more often when the vehicle is traveling faster.
- The wipers will try to clear away whatever is on the windshield, and will stop if something blocks their movement. Remove whatever is blocking them (ice, for example) and switch the wipers back on again. ◀