| NOTICE OF |
| CHANGE |

CHANGE NOTICE 2
11 September 1992 to
ADOPTION NOTICE 1
10 July 1992 for
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Change Notice 2 to Adoption Notice 1 dated 10 July 1992 for SAE J 942b-72.

Title of Document: Passenger Car Windshield Washer System.

Date of Specific Issue Adopted: July 1972

Releasing Non-Government Standards Body: Society of Automotive Engineers, Inc.

NOTE: This change notice is to correct an error in the FSC on adoption notice.

Change the FSC from "5340" to "2540".

NOTE: This notice will be retained as a check sheet and is a separate publication. Each change notice is to be retained by stocking points until the Military Coordinating Activity issues a new Adoption Notice superseding the Adoption Notice for the above document.

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FSC 2540

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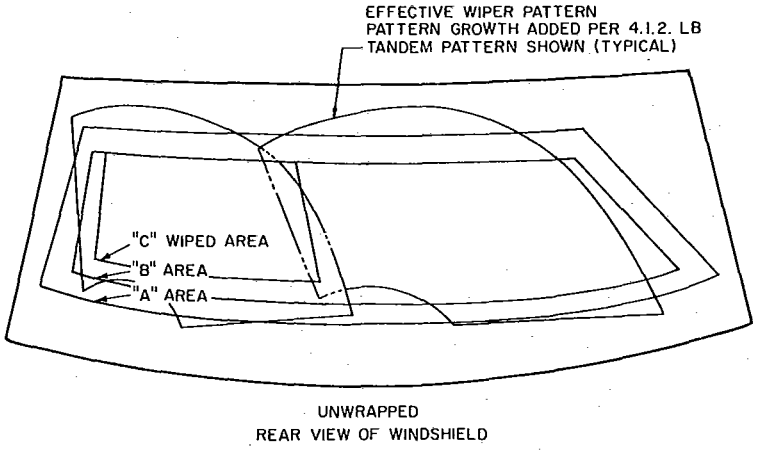

FIG. 2—WIPED AREA EVALUATION, DRAFTING TEST PROCEDURE—UNWRAPPED VIEW SHOWING WIPED PATTERN AND AREAS A, B, AND C

(b) Test chamber—A room or chamber large enough to contain the complete test buck and capable of maintaining a temperature of 130 ± 5 F (55 C) and/or −20 ± 5 F (−30 C).

4.4.2 Hot Test Procedure—The test buck and spray equipment are to be soaked in the test chamber at a temperature of 130 ± 5 F (55 C) for 4 hr. Following this soak period, and in the same temperature environment, the wiper system and spray equipment are to be turned on and operated for a period of ½ hr at maximum wiper speed control setting with water applied continuously as indicated in paragraph 4.2.2(c).

4.4.3 Cold Test Procedure—The test buck is to be soaked in the test chamber at a temperature of −20 ± 5 F (−30 C) for 4 hr. Following this soak period and in the same temperature environment, the wiper system is to be turned on and the wipers operated for ½ hr at maximum wiper system speed control setting.

4.5 Ozone Testing

4.5.1 Equipment—Commercial ozone test cabinet.

4.5.2 Preparation of Wiper Blade Element—A 6 in. (15 cm) specimen of the wiper blade element of the wiper blade assembly is to be installed in a suitable clamping fixture similar to that described in procedure A of ASTM D 518, Method of Test for Resistance to Surface Cracking of Stretched Rubber Compounds. Specimens are to be stretched so as to cause an extension of 15% measured between gage marks that are 4 in. (10 cm) apart. The mounted specimens are then to be exposed for 48 hr in an ozone-free atmosphere.

4.5.3 Procedure—Test specimens are to be placed in the ozone test chamber for a period of 72 hr. The test chamber is to be operated at a temperature of 100 ± 5 F (38 C) and at a concentration of 50 pphm, by volume.

4.5.4 Rating—That area of the specimen between the two bench marks shall meet the requirements established in paragraph 3.2.2.

PASSENGER CAR WINDSHIELD WASHER SYSTEMS—SAE J942b

SAE Recommended Practice

Report of Body Engineering Committee approved November 1965 and last revised by Body Engineering Committee and Automotive Safety Committee July 1972.

1. Scope—This SAE Recommended Practice establishes minimum performance requirements and uniform test procedures for passenger car, truck, bus, and multipurpose vehicle windshield washer systems. This recommended practice also provides a uniform terminology of windshield washer system characteristics and phenomena. The test procedures are limited to those tests that can be conducted with uniform test equipment by commercially available laboratory facilities.

The minimum performance requirements and test procedures, outlined in this recommended practice, are based on currently available engineering data. It is intended that all portions of the recommended practice will be periodically reviewed and revised as additional data on windshield washer system performance are developed.

2. Terminology

2.1 Windshield Washer System—An apparatus for storing, filtering, and applying fluid to the exterior of the windshield glazing surface together with the necessary controls to actuate and arrest operations.

2.2 Control—A means for actuating and arresting the operation of the windshield washer system. The actuation and arrest may be coordinated or semicoordinated with components of the windshield wiper system or may be fully independent.

2.3 Actuation and Arrest—A use of the controls which causes the windshield washer system to begin and cease operation.

2.4 Function—The windshield washer system shall store, filter, and apply fluid to the target area on the windshield glazing surface.

2.5 Pump—A device for transferring the washer solution from the reservoir through the washer system to the windshield glazing surface.

2.6 Reservoir—A container capable of storing the washer solution.

2.7 Washer Solution—The fluid used in the washer system consisting of water or water with appropriate commercial additives. Water is not to exceed 205 ppm hardness.

2.8 Commercial Additives—Materials which are compatible with the system and which may be added to depress the fluid freezing point, assist in cleansing, and/or increase the wetting capacity of the washer solution.

2.9 Low Temperature Washer Solution—A 50% solution of methyl alcohol and water not greater than 205 ppm hardness for use with low temperature tests.

2.10 Nozzle—A device for directing washer solution to the windshield glazing surface.

2.11 Target Area—The design area on the windshield glazing surface to which the washer solution is directed by the nozzle, with the vehicle at rest.

2.12 Daylight Opening (DLO)—The term "daylight opening" (DLO) refers to the maximum unobstructed opening through any glass aperature, with reveal or garnish moldings adjoining the glazing surface installed according to a given direction or projection.

2.13 Wash Area—That portion of the windshield glazing surface within the DLO which is wiped when the wiper blade travels through a wiper cycle.

2.14 Wiper Cycle—The movement of the wiper arm and blade from one extreme to the other and return.

2.15 Durability Test Cycle—The system actuation(s) required to deliver a minimum of 15 cm^3 of washer solution within 30 s.

3. Requirements

3.1 Washer System Capability—When tested in accordance with test procedures described in paragraph 4.1, the windshield washer system, in conjunction with the wiper system, shall be capable of clearing, within 10 wiper cycles, 80% of the total wash area and 90% of the wash area included in area C as defined in SAE J903 for passenger cars and SAE J198 for trucks, buses, and multipurpose vehicles.

3.2 System Strength—The windshield washer system shall be capable of withstanding the loads induced when either all nozzles are blocked or the system is frozen and tested in accordance with the test procedures established

in paragraph 4.2. At the completion of the test, the system shall function.

3.3 Temperature Performance and Exposure

3.3.1 Low Temperature Exposure—The windshield washer system must remain functional after being subjected to the freeze-thaw cycle described in paragraph 4.3.2.1.

3.3.2 High Temperature Exposure—The windshield washer system must remain functional after exposure to a temperature of 195 F (90.6 C) as described in paragraph 4.3.2.2.

3.3.3 Operating Range—The windshield washer system shall function within a temperature range of 0–175 F (−17.8 to 79.4 C) as described in paragraph 4.3.2.3.

3.4 Durability—The washer system must remain functional after operating 8000 durability test cycles as specified in paragraph 4.4.2.3 and shall deliver at least 75% of the performance measured in paragraph 4.4.2.2.

3.5 Windshield Washer Tubing—Although it is recognized that other flexible materials may be used, the following requirements cover only rubber and synthetic rubber tubing.

3.5.1 Ozone Resistance—After testing in accordance with the test procedures established in paragraph 4.5.1, the tubing shall show no visual evidence of splitting or cracking.

3.5.2 Temperature Aging—After testing in accordance with the test procedures established in paragraph 4.5.2, the tubing shall show no visual evidence of splitting or cracking. The reduction in elongation shall not be greater than 50% in the unexpanded portion of the specimen. There shall be no visual evidence of wax or other contaminants exuding from the tubing.

3.5.3 Stress Relaxation—After testing in accordance with the test procedure established in paragraph 4.5.3, the tubing ID shall be no larger than 1.65 times the tubing original nominal ID.

3.6 Chemical Resistance—The windshield washer system shall not be adversely affected when operated with a 50% solution of methyl alcohol.

3.7 Accessibility—The control and the reservoir filler opening shall be positioned so that they are readily accessible.

4. Test Procedure

4.1 Washer System Capability

4.11 Test Equipment

4.1.1.1 *Test Fixture*—A test fixture shall consist of a structure used to mount the components of the windshield wiper/washer system in a manner which represents a vehicle installation.

4.1.1.2 *Test Vehicle*

4.1.1.3 *Test Mixture*—By volume, 92.5% tap water (water not to exceed 205 ppm hardness), 5.0% saturated salt (sodium cloride) water, and 2.5% coarse grade test dust (as described in SAE J726, or equivalent).

4.1.1.4 *Cleanser*

4.1.2 Test Procedure

(a) Using the nominal power input specified by the manufacturer, adjust washer nozzle(s) under static conditions to the target area of the windshield glazing surface.

(b) Clean the windshield glazing surface with a cleanser, rinse, and allow to dry.

(c) Apply, by pouring (or any other method which provides an equivalent uniform coating), a freshly shaken quantity of the test mixture uniformly to the entire windshield glazing surface without coating the windshield wiper blades. If the test mixture does not uniformly adhere to the entire windshield glazing surface, the glazing surface is not sufficiently clean.

4.1.2.1 *Static Test*—After the mixture has completely dried on the windshield glazing surface, the washer system using water as the washer solution or the low temperature washer solution must meet the requirements of paragraph 3.1.

4.1.2.2 *Dynamic Test Procedure*—Repeat paragraph 4.1.2.1 by driving a test vehicle at 50 mph (80.5 km/h) and testing in two opposite directions with the ambient wind velocity not exceeding 15 mph (24 km/h); or as an alternate, repeat paragraph 4.1.2.1 while directing a 50 mph (80.5 km/h) wind against the windshield and front of the test vehicle or equivalent in a longitudinal direction. The equivalent test vehicle must include all exterior surfaces which affect airflow over the windshield surface.

4.2 System Strength

4.2.1 Test Equipment

4.2.1.1 *Test Fixture*—See paragraph 4.1.1.1 or, as an alternate, a structure may be used to mount the washer system parts in proper vehicle attitude, with hoses coiled to reduce the overall size of the fixture for convenient utilization of small laboratory environmental chambers.

4.2.1.2 *Temperature Measuring Device*—Thermometer or equivalent.

4.2.2 Test Procedure—This test shall be conducted after the system capability test described in paragraph 4.1 is completed. The test shall be conducted in the following manner using the power input level specified in Table 1.

4.2.2.1 Fill and fully prime the washer system with water. At an ambient temperature of 80 ± 10 F (26.7 ± 5.6 C) all nozzles shall be plugged and the system shall be actuated six times within a period of 1 min.

4.2.2.2 Fill and fully prime the washer system with water and freeze for a minimum of 4 h at a temperature of −20 ± 5 F (−28.9 ± 2.8 C). Following this period and in the same temperature environment, actuate the washer system six times within a period of 1 min.

4.2.2.3 Gradually increase the ambient temperature to 80 ± 10 F (26.7 ± 5.6 C) until the ice is completely thawed. Test the function of the system.

4.3 Temperature Performance and Exposure

4.3.1 Test Equipment

4.3.1.1 *Test Fixture*—See paragraph 4.2.1.1.

4.3.1.2 Environmental chamber(s) capable of maintaining the test temperatures.

4.3.2 Test Procedures—These tests shall be conducted after the system strength test described in paragraph 4.2 is completed. Fill and prime the washer system with washer solution and perform the following tests:

4.3.2.1 *Low Temperature Exposure*—Using water as the washer solution, reduce the ambient temperature to −20 ± 5 F (−28.9 ± 2.8 C) and maintain for sufficient time to insure that the total mass of the water in the reservoir is frozen, including the core which freezes last. Following this period, gradually increase the ambient temperature to 80 ± 10 F (26.7 ± 5.6 C) until the ice is completely thawed. Repeat this freeze-thaw cycle until a total of six cycles have occurred. After the last cycle, test the function of the system.

4.3.2.2 *High Temperature Exposure*—Using water as the washer solution, increase the ambient temperature to 195 ± 5 F (90.6 ± 2.8 C) and maintain for a minimum of 8 h. Following this period, reduce the ambient temperature to 80 ± 10 F (26.7 ± 5.6 C) until the system stabilizes. Test the function of the system.

4.3.2.3 *Operating Range*—Using a low temperature washer solution, reduce the ambient temperature of 0 ± 5 F (−17.8 ± 2.8 C) until the washer system has stabilized at this temperature. Following this period and in the same environment, test the function of the washer system, using the nominal power input specified by the manufacturer. Repeat with an ambient temperature of 175 ± 5 F (79.4 ± 2.8 C) using water as the washer solution and again test the function of the washer system.

4.4 Durability

4.4.1 Test Equipment

4.4.1.1 Test fixture—See paragraph 4.2.1.1.

4.4.1.2 Environmental chamber(s) capable of maintaining test temperatures.

4.4.1.3 Counter—A device for determining the number of washer cycles.

4.4.1.4 Temperature measuring device—Thermometer or equivalent.

4.4.1.5 Low temperature washer solution.

4.4.1.6 Pressure measuring gage.

4.4.1.7 Stopwatch.

4.4.1.8 Graduated cylinder.

4.4.2 Test Procedure

4.4.2.1 This test shall be conducted after the Temperature Performance Test described in paragraph 4.3 is completed.

4.4.2.2 Using the nominal power input specified by the manufacturer, measure washer system fluid flow rate, or volume per actuation, and fluid delivery pressure.

4.4.2.3 Actuate system for 8000 durability test cycles in the sequence indicated in Table 2, using the low temperature washer solution when required.

4.4.2.4 Repeat paragraph 4.4.2.2.

4.5 Windshield Washer Tubing—When rubber and synthetic tubing is used, the following tests apply.

4.5.1 Ozone Resistance

4.5.1.1 *Test Equipment*—Commercial ozone test cabinet as described in ASTM D 1149, Test for Accelerated Ozone Cracking of Vulcanized Rubber.

4.5.1.2 *Preparation of Tubing*—An 8 in. (200 mm) specimen of new tubing is to be wrapped around a mandrel whose OD is 8 times the nominal OD of the tubing and held in position by using a piece of enamel covered copper wiring. The mounted specimens are then to be exposed for 48 h in an ozone free atmosphere.

TABLE 1—POWER INPUT LEVEL

Type of Pump	Power Input (applied for a minimum of 3 s)
Hand operated	25–30 lbf (110-135 Pa)
Foot operated	90–100 lbf (400-445 Pa)
Power operated	Maximum power input level specified by the vehicle manufacturer