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Document Name: SAE J942: Passenger Car Windshield Washer System

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PASSENGER CAR WINDSHIELD WASHER SYSTEMS — SAE J942

SAE Recommended Practice

Report of Body Engineering Committee approved November 1965.

1. Scope—The scope of this SAE Recommended Practice is to establish uniform test procedures and minimum performance requirements for passenger car 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 on uniform test equipment by commercially available laboratory facilities.

The test procedures and minimum performance requirements, 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 windshield washer system. The actuation may be coordinated or semicoordinated with components of the windshield wiper system or may be fully independent.

2.3 **Pump**—A device for transferring the washer solution from the reservoir through the system.

2.4 **Reservoir**—A container which holds the washer solution.

2.5 **Washer Solution**—The fluid in the system consisting of water or water with appropriate commercial additives.

2.6 **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 fluid.

2.7 **Low Temperautre Test Solution**—A 50% solution of isopropyl alcohol and water for use with the low temperature tests in this recommended practice.

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

2.9 **Target Area**—A design area to which the washer solution is directed by the nozzle.

2.10 **Effective Wash Area**—That portion of the windshield glazing which is wiped when the wiper blade travels through a wiper cycle.

2.11 **Washer Cycle**—The system actuation sufficient to deliver approximately 15 cc of fluid to the windshield glazing surface.

2.12 **Wiper Cycle**—The wiper blade movement during system operation from one extreme of the windshield wipe pattern to the other extreme and return.

3. Requirements—

3.1 **Washer System Capability**—When tested in accordance with test procedures described in paragraph 4.1, the windshield washer system shall be capable of delivering sufficient fluid to clear, in conjunction with the wiper system, 75% of the effective wipe pattern defined in SAE J903, paragraph 3.1.2, within 10 wiper cycles.

3.2 **System Strength**—The windshield washer system shall be capable of withstanding the loads induced when the nozzles are blocked and tested in accordance with test procedures established in paragraph 4.2.

3.3 **Temperature Performance and Exposure**—

3.3.1 HIGH TEMPERATURE PERFORMANCE—Performance of the windshield washer system shall not be adversely affected after exposure to a temperature of 175F (79.4C) for 8 hr.

3.3.2 LOW TEMPERATURE EXPOSURE—Performance of the windshield washer system shall not be adversely affected when subjected to the test procedures described in paragraph 4.3.

3.3.3 OPERATING RANGE—The windshield washer system must be capable of operating within a temperature range of 0-150 F (—17.8 to 65.6C) using the low temperature test solution to prevent freezing.

3.4 **Durability**—The washer system must remain functional after operating 8000 washer cycles using test procedures and test conditions established in paragraph 4.4.

3.5 **Aging**—The windshield washer flexible tubing must withstand the ozone test established in paragraph 4.5 with an ASTM rating of two or better, as defined in ASTM D 1171.

3.6 **Chemical Resistance**—Performance of the windshield washer system shall not be adversely affected when operated with a 50% solution of methyl or isopropyl alcohol.

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

4. Test Procedures—

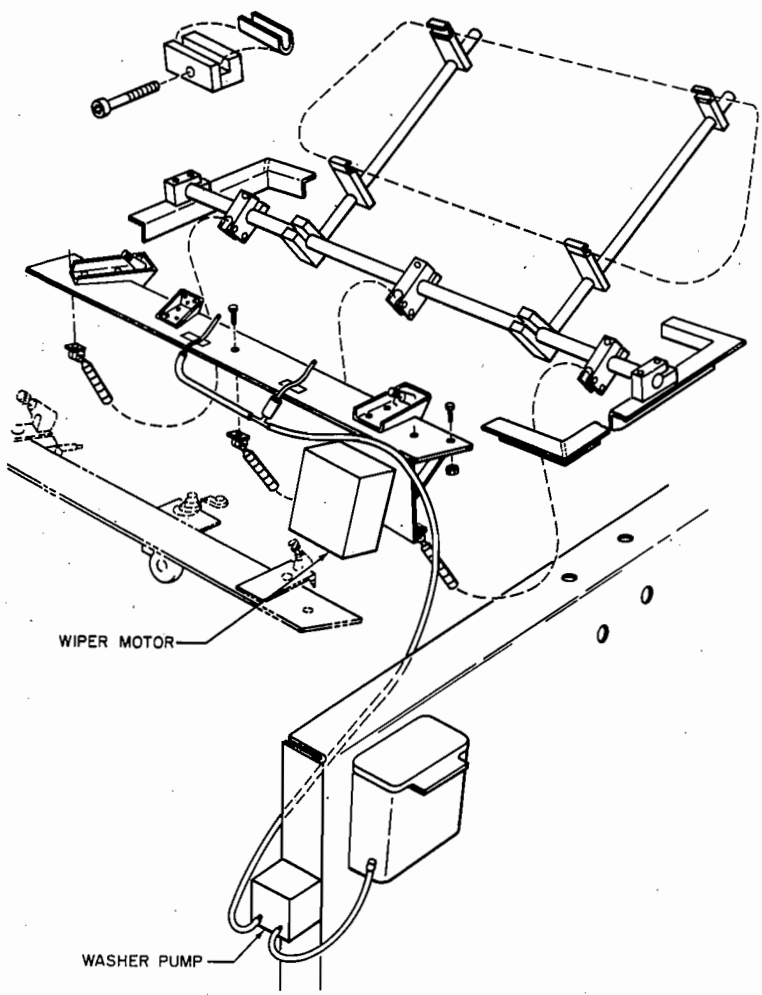

FIG. 1—WINDSHIELD WASHER TEST BLOCK

4.1 Washer System Capability Test—

4.1.1 TEST EQUIPMENT—

(a) Test Buck—A test buck shall consist of a structure capable of rigidly maintaining, throughout the test, the proper relationship of the glazing surface and the windshield wiping and windshield washing system components, as established by the vehicle manufacturer. Fig. 1 illustrates a typical test buck.

(b) Power Source—The power source must be capable of supplying power to the washer pump, as specified by the vehicle manufacturer.

(c) Water Softener—A device, where required, to supply water meeting requirements of paragraph 4.1.2(c).

(d) Temperature Measuring Device—Thermometer or equivalent.

(e) Test Dust—Fine grade (as described in SAE J726, or equivalent).

4.1.2 TEST CONDITIONS—

(a) Ambient temperature of 75 ± 5F (23.9 ± 2.7C).

(b) Water temperature of 75 ± 5F (23.9 ± 2.7C).

(c) Water hardness is not to exceed 12 grains per gallon.

4.1.3 TEST PROCEDURE—

(a) Adjust the washer nozzle to the target area of the windshield glazing surface.

(b) Apply to the windshield glazing surface a light film consisting of one part test dust and two parts water by volume.

(c) Within 15 sec after applying the mixture previously described, the requirements of paragraph 3.1 must be met.

4.2 System Strength—

4.2.1 TEST EQUIPMENT—

(a) Test Buck—See paragraph 4.1.1(a).

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:

(a) All nozzles shall be plugged and the system shall be actuated repeatedly for a 1 minute period.

(b) The system shall be filled with water and frozen for 4 hr and then actuated repeatedly for a 1 minute period.

(c) On completion of the test the system shall comply with the requirements of paragraph 3.2.

4.3 Low Temperature Exposure—

4.3.1 TEST EQUIPMENT—

(a) Environmental chamber capable of maintaining an ambient temperature of 0-175F (—17.8 to 79.4C).

4.3.2 TEST PROCEDURE—

(a) This test shall be conducted after the system strength test described in paragraph 4.2 is completed.

(b) Fill system with water.

(c) Reduce temperature to 0F (—17.8C) and retain at this temperature for 4 hr. Increase temperature until ice is completely thawed.

(d) Reduce temperature until water is frozen and retain in this condition for 4 hr. Increase temperature until ice is completely thawed.

(e) Repeat (d) six times.

(f) At completion of test, system shall remain functional.

4.4 Durability Test—

4.4.1 TEST EQUIPMENT—

(a) Environmental chamber capable of maintaining ambient temperatures of 0-175F (—17.8 to 79.4C).

(b) Counter—A device for determining the number of cycles.

(c) Temperature Measuring Device—Thermometer or equivalent.

(d) Low temperature test solution.

4.4.2 TEST PROCEDURE—

(a) This test shall be conducted after the freeze resistance test described in paragraph 4.3 is completed.

(b) Actuate system control 8000 times in the sequence indicated in Table 1. For manual systems a single actuation shall consist of actuation of the control for a period not to exceed 3 sec. For automatic systems an actuation shall consist of one actuation of the control.

TABLE 1—TEST SEQUENCE

Test	Actuation		Ambient Temperature	
	Total	No./min	F ± 5	C ± 2.7
1	2000	2	75	23.9
2	2000	2	150	65.6
3	2000	2	10	12.2
4	2000	2	75	23.9

(c) At the completion of this test the system shall remain functional.

4.5 Aging Test—

4.5.1 TEST EQUIPMENT—Commercial ozone test cabinet.

4.5.2 PREPARATION OF WINDSHIELD WASHER FLEXIBLE TUBING—An 8 in. (200 mm) specimen of new tubing is to be wrapped around a 2 in. (50 mm) diameter mandrel and held in position by using a piece of enamel covered copper wire. 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 cabinet for a period of 72 hr. The test cabinet is to be operated at a temperature of 100F (38 C) and at a concentration of 50 pphm by volume.

4.5.4 RATING—Upon removal from the ozone cabinet, the test specimens shall meet the requirements established in paragraph 3.5.