mum load and back to zero load. The time span to the peak load moment and the time duration for the time versus load curve should be representative of the road test group.

5. Laboratory Static Tests

5.1 Static Test—Primary Latched Position

5.1.1 PURPOSE—To determine the ability of the vehicle hood latch system to withstand a static test load in the direction of hood opening, when engaged in the primary latched position.

5.1.2 EQUIPMENT AND FACILITIES

(a) Tensile testing machine.

(b) Static test fixture (Fig. 2).

5.1.3 OPERATION

(a) Attach the test fixture to the mounting provisions of the latch and striker. Align the direction of engagement parallel to the linkage of the fixture. Mount fixture with latch and striker, in the primary position, in the test machine so as to apply a simulated hood opening load to the latch and striker.

ϕ (b) Apply a test load at a rate not to exceed 50 mm/min until desired load is reached. Release load and check the operation of the latch and striker assembly.

5.2 Static Test—Secondary Latched Position

5.2.1 PURPOSE—To determine the ability of the vehicle hood latch system to withstand a test load in the direction of hood opening, when engaged in the secondary latched position. (The second latch of a dual independent system can be considered a secondary latching mechanism.)

5.2.2 EQUIPMENT AND FACILITIES

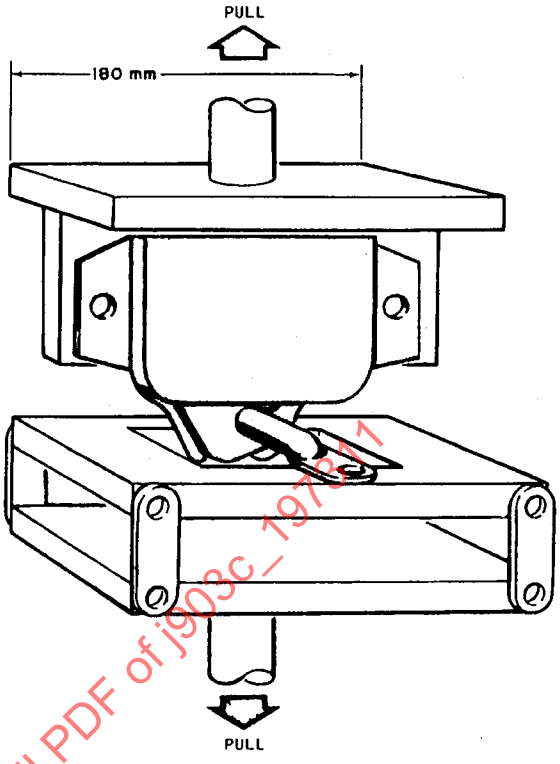
(a) Tensile testing machine.

(b) Static test fixture (Fig. 2).

5.2.3 OPERATIONS

(a) Attach the test fixture to mounting provisions of the latch and striker. Align the direction of engagement parallel to the linkage of the fixture. Mount fixture, with latch and striker in the secondary latched position, in the test machine so as to apply a simulated hood opening load to the latch and striker.

ϕ (b) Apply a test load at a rate not to exceed 50 mm/min until desired load is reached. Release load and check the operation of the latch and striker assembly.



ϕ FIG. 2—SUGGESTED HOOD LATCH STATIC TEST FIXTURE

Inch-Pound Customary Unit Conversion Factors
km/h to mph: Divide by 1.609 344 mm to in: Divide by 25.4

PASSENGER CAR WINDSHIELD WIPER SYSTEMS—SAE J903c

SAE Recommended Practice

Report of Body Engineering Committee approved August 1964 and last revised November 1973.

1. Scope—The scope of this SAE Recommended Practice is to establish uniform test procedures and minimum performance criteria for passenger car windshield wiping systems and wiper blades. This recommended practice provides a uniform terminology of windshield wiper system characteristics and phenomena. Also included are guides for the use of engineering layout studies to evaluate system wiped area performance. 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 criteria outlined in this recommended practice are based on currently available engineering data. It is the intent that all portions of the recommended practice will be periodically reviewed and revised as additional data regarding windshield wiping system performance are developed.

2. Definitions

2.1 Windshield Wiper System—The wiper system consists of all the apparatus for cleaning the exterior surface of windshield glazing, together with the necessary devices and controls to actuate and arrest the operations.

2.2 Windshield Wiper Blade—A device for cleaning the effective wipe pattern, capable of receiving pressure from an arm, comprising a suitable superstructure, and supporting and controlling a wiper blade element.

2.3 Wiper Blade Element—The resilient member of the wiper blade that contacts the windshield glazing surface.

2.4 Wiped Area—The specific areas on the windshield glazing surface which shall be covered by the effective wiper pattern. These areas were developed as being compatible with viewing requirements necessary to operate a passenger car vehicle.

2.5 Eyellipse—A statistical representation of the driver's eye location in a motor vehicle, as defined in SAE J941. For the purpose of this recommended practice, the head turn consideration in SAE J941 will not be used. For individual-type passenger car seats, use paragraph 2.2 of the Appendix in SAE J941.

2.6 Effective Wipe Pattern—That portion of the wet windshield glazing surface which is cleared when the wiper blade travels through a cycle with system on highest frequency.

2.7 Tandem Pattern—The pattern produced by the wiper blades moving in the same direction across the windshield glazing surface simultaneously.

2.8 Opposed Pattern—The pattern produced by the wiper blades moving in opposite directions across the windshield glazing surface simultaneously.

2.9 Chatter—Irregular movement of the wiper blade usually accompanied by temporary visible radial lines and/or noise.

2.10 Ballooning—Unwiped areas within the wiper pattern, varying in size and usually round.

2.11 Streaking—Fine arcuate lines of unwiped moisture within the wipe pattern.

2.12 Scalloping—Uneven wipe at the outer periphery of pattern.

2.13 Lace Curtain—A maze of fine individual water droplets which are formed after the wiper blade passes over the windshield glazing surface.

2.14 Hazing—An aerated film spread by the blade and resulting in a transient trailing band on the windshield glazing surface.

2.15 Cycle—A cycle shall consist of wiper blade movement during system operation from one extreme of the windshield wipe pattern to the other extreme and return.

2.16 Snow Load—The load imposed on the wiper system by the accumulation of packed snow, resulting in a limitation of blade travel.

2.17 Motor Stall Torque—The maximum torque that the motor can maintain for two cycles at specified conditions.

2.18 System Torque—Torque necessary to overcome maximum friction of the wiper blade and the driving mechanism under specified conditions.

2.19 Damp Dry—The condition of the windshield which produces the highest friction during the transition from a wet to a dry surface.

2.20 Moisture—Atmospheric water precipitation in liquid, semi-liquid, or frozen state (snow).

2.21 Relative Air Speed—The vector difference of vehicle speed and the component of the wind speed parallel to the direction of travel of the vehicle.

2.22 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 normal to the glass surface.

3. General Performance

3.1 Windshield Wiper System

3.1.1 WIPED AREA—The minimum windshield wiped area is described by three specific areas on the exterior windshield glazing surface. The three areas are developed with the vehicle loaded to the manufacturer's base design load and are identified in Table 1 as areas A, B, and C. Each area has been established using the angles of Table 1 applied as shown in Fig. 1. In the side view, the upper and lower boundary of the area is established by the intersection of two planes, which are seen as lines tangent to the upper and lower edges of the eyellipse, with the windshield glazing surface. The planes are fixed by angles above and below the XX line. In the plan view, the left and right boundary of the area is established by the intersection of two vertical planes tangent to the left and right edges of the eyellipse with the windshield glazing surface. The planes are fixed by angles to the left and right of the XX line. The areas used in determining the percentage of wiped area are those areas on the exterior glazing surface which are not within 1 in. (25 mm) of the edge of the daylight opening (pillars, division bar, header, etc.). The percentage is the ratio of wiped area within the defined area to the defined area. Using test procedures established in paragraph 4.1, see Table 1 for percentages to be wiped.

3.1.2 FREQUENCY—The windshield wiper system shall be designed to provide two or more frequencies. One of the frequencies shall be a minimum of 45 cycles/min. The highest and one lower frequency shall differ by at least 15 cycles/min. Such lower frequency shall be at least 20 cycles/min. These frequencies must be obtainable under normal vehicle operating conditions regardless of engine speed and engine load, following test procedures and test conditions established in paragraph 4.2.

3.1.3 DURABILITY—Wiping system, except for the wiper blade element, must remain functional after operating 1,500,000 cycles, using test procedures and test conditions established in paragraph 4.2.

3.1.4 STRENGTH—The system shall be capable of withstanding the loads induced by stall, using test conditions and test procedures established in paragraph 4.3, with all mechanical components remaining functional.

3.1.5 TEMPERATURE OPERATIONAL CAPABILITY—The windshield wiper system shall be capable of operating between temperatures of 130 ± 5°F (55 ± 3°C) and −20 ± 5°F (−30 ± 5°C), using test procedures and test conditions established in paragraph 4.4.

3.1.6 ACCESSIBILITY—The control for the wiper system should be positioned so that it is readily accessible to the driver.

3.2 Windshield Wiper Blade

3.2.1 DURABILITY—Using test procedures and test conditions described in paragraph 4.2, the windshield wiper blade, except for the wiper blade element, shall remain functional after operating 1,500,000 cycles and the wiper blade element shall wipe 75% of the effective wipe pattern after 500,000 cycles.

3.2.2 AGING—The wiper blade element of the wiper blade assembly shall withstand the ozone test established in paragraph 4.5, with an ASTM rating of two or better, as defined in ASTM D 1171, Method of Test for Weather Resistance Exposure of Automotive Rubber Compounds.

3.2.3 CHEMICAL RESISTANCE—A section of the wiper blade element when placed in a 50% solution of either methyl or isopropyl alcohol for a period of 24 h shall not exceed more than 2% weight change.

TABLE 1—AREA TO BE WIPED

Area	Min Per cent Wiped	Angles, deg			
		Left	Right	Up	Down
A	80	18	56	10	5
B	95	14	53	5	3
C	100	10	15	5	1

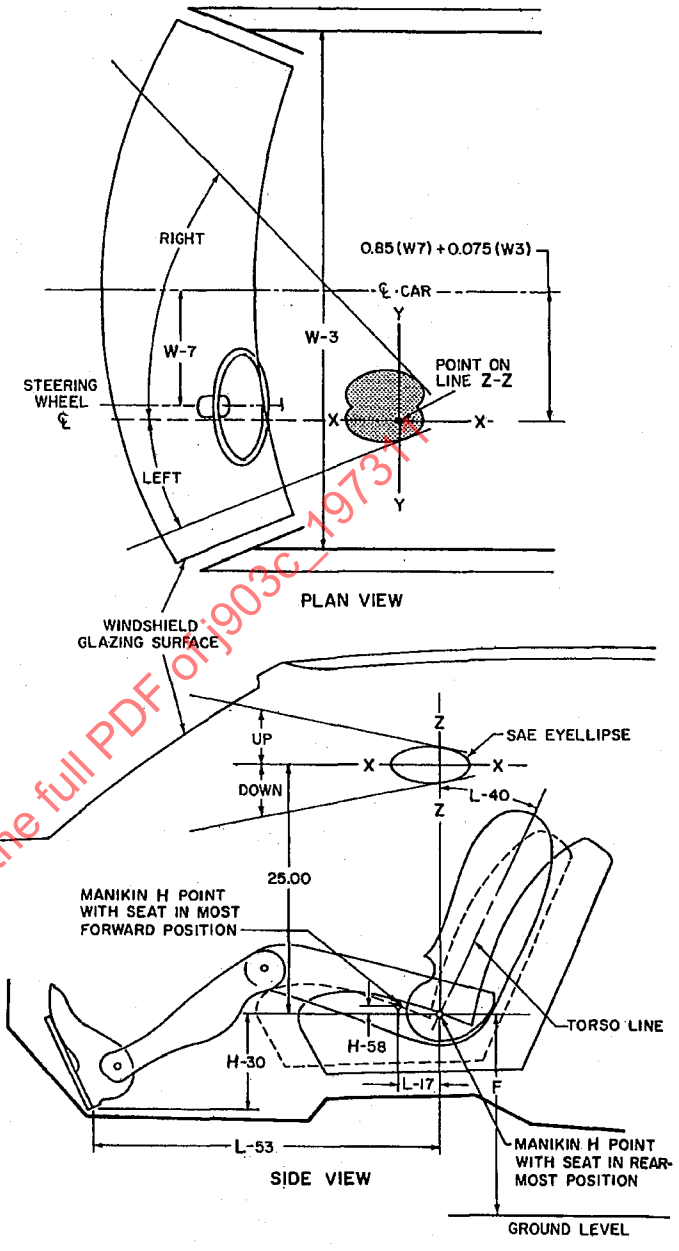


FIG. 1—EYELLIPSE TEMPLATE LOCATION

4. Test Methods

4.1 Area to be Wiped Test Procedure

4.1.1 TEST EQUIPMENT

(a) Drafting equipment sufficient for full-size windshield and wiper system layout.

(b) Transparent heavy gage plastic sheet—Prepared clear acetate or equivalent.

(c) Test buck—A test buck shall consist of a structure capable of maintaining, throughout the test, the proper relationship of the glazing surface and