



# SURFACE VEHICLE RECOMMENDED PRACTICE

J903™

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## Ground Vehicle Windshield Wiper Systems

### RATIONALE

Need to update terms as currently used in reference standards, eliminate technology no longer in use, and revise Table 1 and durability procedure and requirement.

#### 1. SCOPE

This SAE Recommended Practice establishes for passenger cars, light trucks, and multipurpose vehicles with GVW of 4500 kg (10000 pounds) or less:

- Minimum performance standards for windshield wiper systems.
- Test procedures that can be conducted on uniform test equipment by commercially available laboratory facilities.
- Uniform terminology of windshield wiper system characteristics and phenomena consistent with those found in guides for the use of engineering layout studies to evaluate system performance.
- Guides for the design and location of components of the systems for function, servicing of the system, etc.

The test procedures and minimum performance standards outlined in this document are based on currently available engineering data. It is the intent that all portions of the document will be periodically reviewed and revised as additional data regarding windshield wiping system performance are developed.

#### 2. REFERENCES

##### 2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

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### 2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

SAE J941 Motor Vehicle Drivers' Eye Locations

SAE J1100 Motor Vehicle Dimensions

### 2.1.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, [www.astm.org](http://www.astm.org).

ASTM D471 Standard Test Method for Rubber Property - Effect of Liquids

ASTM D1149 Test for Accelerated Ozone Cracking of Vulcanized Rubber

ASTM D1171 Test Method for Rubber Deterioration - Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens)

## 2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

### 2.2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

SAE J680 Location and Operation of Air Brake-Controls in Motor Truck Cabs

SAE J687 Nomenclature - Truck, Bus, Trailer

## 3. DEFINITIONS

### 3.1 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 start and stop operation.

### 3.2 WIPER BLADE

A device for cleaning the effective wiper pattern, capable of receiving tip load exerted by an arm, comprising a suitable superstructure, and supporting and controlling a wiper blade element.

### 3.3 WIPER BLADE ELEMENT

The resilient member of the wiper blade that contacts the windshield glazing surface.

### 3.4 WIPER ARM

A device to interconnect the wiper blade and the output shaft of the wiper motor linkage assembly. The wiper arm has the dual function of:

- a. Maintaining the wiper blade into its desired position throughout the wipe pattern.
- b. Exerting a load onto the wiper blade sufficient for its function.

### 3.5 LINKAGE ASSEMBLY

The multicomponent member that connects to the wiper arm(s) (where applicable) to transmit its action into accurate motion for driving the wiper arm(s).

### 3.6 WIPER CONTROL SWITCH

The mechanism that allows passage of electrical signal to the wiper motor for activating the wiper system into its various operating or non-operating modes.

### 3.7 WIPED AREA

The specific areas on the windshield glazing surface that shall be covered by the effective wiper pattern. These areas were developed as being compatible with viewing requirements necessary to operate a passenger car, light truck, or multipurpose vehicle.

### 3.8 EYELLIPSE

A statistical representation of the driver's eye location in a motor vehicle, as defined in 4.1.5 of SAE J941 regarding head turn. For the purpose of this document, the head turn consideration in 4.1.5 of SAE J941 will not be used. For individual-type passenger car seats, use A.2.2 of SAE J941.

### 3.9 EFFECTIVE WIPE PATTERN

That portion of the wet windshield glazing surface that is cleared when the wiper blade travels through a cycle with system on highest frequency. Minimum wiped area is defined in 4.1.1.

### 3.10 CYCLE

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

### 3.11 TANDEM PATTERN

The pattern produced by the wiper blades moving in the same direction across the windshield glazing surface simultaneously. See Figure 1.

### 3.12 OPPOSED PATTERN

The pattern produced by the wiper blades moving in opposite directions across the windshield glazing surface simultaneously. See Figure 2.

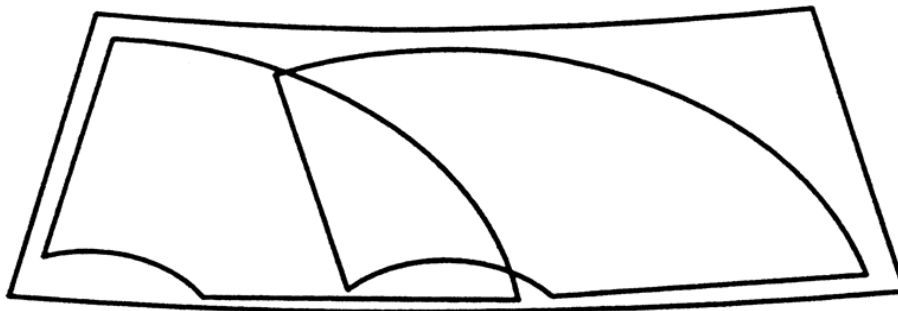


*Figure 1 - Tandem pattern*

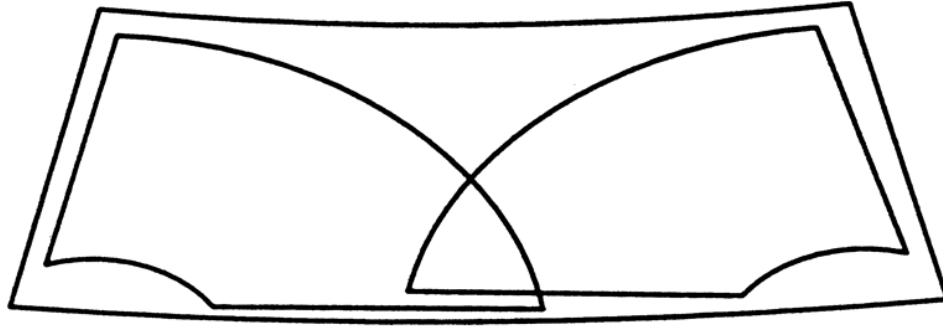


**Figure 2 - Opposed pattern**

### 3.13 SINGLE ARM PATTERN

The pattern produced by a single wiper blade moving across the windshield glazing surface.

- a. Single arm (see Figure 3).
- b. Single extending arm (see Figure 4).

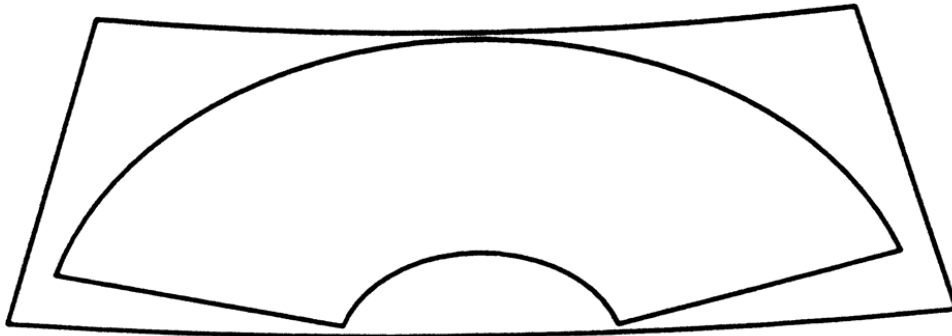


**Figure 3 - Single arm pattern**

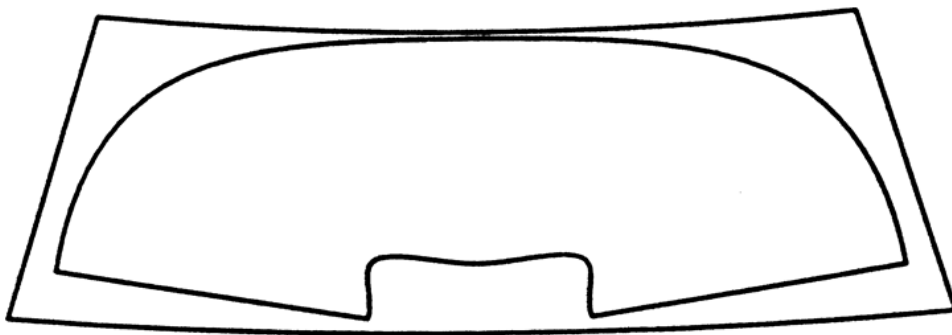


**Figure 4 - Single extending arm**

### 3.14 CHATTER

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

### 3.15 BALLOONING

Unwiped areas within the wipe pattern, varying in size and usually round.

### 3.16 STREAKING

Fine arcuate lines of unwiped moisture within the wipe pattern.

### 3.17 SCALLOPING

Uneven wipe at the outer periphery of the pattern.

### 3.18 LACE CURTAIN

A maze of fine water droplets that are formed after the wiper blade passes over the windshield glazing surface.

### 3.19 HAZING

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

### 3.20 SNOW LOAD

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

### 3.21 MOTOR STALL TORQUE

The maximum torque that the motor can maintain for two cycles at specified conditions.

### 3.22 SYSTEM TORQUE

Torque necessary to overcome friction of the wiper blade(s) and the driving mechanism under the specified conditions.

### 3.23 DAMP DRY

The condition of the windshield that produces the highest friction during the transition from a wet to a dry surface.

### 3.24 MOISTURE

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

### 3.25 RELATIVE AIRSPEED

The vector difference of vehicle speed and the component of the wind speed parallel to the direction of travel of the vehicle.

### 3.26 DESIGN GLASS OUTLINE (DGO)

Per SAE J1100.

### 3.27 FUNCTION

Ability of the wiper system to clear the specified area of the windshield when the system is operated in accordance with the vehicle manufacturer's instructions.

### 3.28 MULTIPIECE WINDSHIELD

A windshield consisting of two or more windshield glazing surface areas.