

Submitted for recognition as an American National Standard

## Headlamp Cleaners

1. **Scope**—This SAE Recommended Practice provides test procedures, performance requirements, and guidelines for headlamp cleaners intended for use on motor vehicles. It includes information from European regulations and International Standards. It is applicable for all types of headlamp cleaners available and in use.
2. **References**
  - 2.1 **Applicable Publications**—The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated, the latest revision of SAE publications shall apply.
    - 2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J575—Tests for Motor Vehicle Lighting Devices and Components  
SAE J759—Lighting Identification Code  
SAE J1383—Performance Requirements for Vehicle Headlamps
    - 2.2 **Related Publications**—The following publications are provided for information purposes only and are not a required part of this document.
      - 2.2.1 ISO PUBLICATION—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ISO 3267—1975(e)—Road vehicles—Headlamp cleaners
      - 2.2.2 OTHER PUBLICATIONS

ECE R45 Rev1 16MY88—Headlamp Cleaners  
Finland Decree 233 Section 18  
Finland Decree 150 Section 19  
Sweden F-130 1971  
Germany St VZO 50—Testing of Headlamp Cleaning Equipment

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

**QUESTIONS REGARDING THIS DOCUMENT: (724) 772-8512 FAX: (724) 776-0243  
TO PLACE A DOCUMENT ORDER; (724) 776-4970 FAX: (724) 776-0790  
SAE WEB ADDRESS <http://www.sae.org>**

### 3. Definitions

**3.1 Headlamp Cleaner**—A complete device with which all or part of the light emitting surface of a headlamp or other road illuminating devices can be cleaned. Examples of common types are:

- a. Headlamp cleaner with brushes or wipers used to spread cleaning fluid over the lens surface and to remove dirt.
- b. Headlamp cleaner with nozzles to spread cleaning fluid over the lens surface.

NOTE—Headlamp cleaners may be designed to clean lamps other than headlamps that may be contained in a forward lighting assembly.

**3.2 Fluid Container**—The part of the headlamp cleaner in which the cleaning fluid is stored.

**3.3 Cleaning Period**—The period of time necessary for any specified requirements to be met. This includes any pretreatment period.

**3.4 Cleaning Fluid**—The commercially available washer liquids that may be used in conjunction with a headlamp cleaner.

**3.5 Cleaning Efficiency**—The percentage of the intensity of headlamp illumination measured at specific test point(s) after cleaning with respect to the values measured at those same test point(s) on a clean headlamp.

**3.6 Test Mixture**—A mixture of water and polluting agent to be applied to the headlamp outer lens.

**4. Identification Code Designation**—Headlamp cleaners shall be marked in accordance with SAE J759—Lighting Identification Code with HC. This designation may be placed on the fluid container, the fluid container cap, or at any other location where it can be easily read.

### 5. Tests

#### 5.1 Test Facilities and Environment

5.1.1 Testing shall be carried out in an ambient temperature of  $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ .

5.1.2 The test voltage shall be 13.0 V for 12-V systems and 27 V for 24-V systems, or as specified by the headlamp cleaner manufacturer.

5.1.3 In pneumatic systems, the air pressure used to operate the headlamp cleaner shall be as specified by the manufacturer.

#### 5.2 Equipment

5.2.1 **TEST FIXTURE**—The headlamp(s) and headlamp cleaner shall be mounted in a test fixture which reproduces the mounting attitude in the vehicle, including the position of one component relative to the other, and provides the conditions necessary for normal operation of the headlamps and the cleaner.

5.2.2 **TEST MIXTURE**—A mixture of water and polluting agent to be applied to the headlamp outer lens.

- 5.2.2.1 For all headlamps with the outer lens in either plastic or glass material, the mixture of water and polluting agent shall consist of:
- a. 9 parts by weight of silica sand with a particle size of 0 to 100  $\mu\text{m}$  corresponding to distribution shown in Table 1.
  - b. 1 part by weight of vegetable carbon dust (beechwood - charcoal) with a particle size of 0 to 100  $\mu\text{m}$ .
  - c. 0.2 parts by weight of Na CMC. (Na CMC represents the sodium salt of laboratory grade carboxymethylcellulose customarily referred to as CMC.) The Na CMC used in this mixture shall have a degree of substitution (DS) of 0.6 to 0.7 and a viscosity of 200 to 300 c P for a 2% solution at 20 °C.
  - d. 5 parts by weight of sodium chloride (pure at 99%).
  - e. 13 parts by weight of distilled water with a conductivity of  $\leq 10$  uS/cm (deionized water)
  - f.  $2 \pm 1$  parts by weight of surfactant (detergent)

**TABLE 1—HEADLAMP WASHER—DIRT MIXTURE, PARTICLE SIZE, AND DISTRIBUTION**

Particle Size ( $\mu\text{m}$ )	Particle Size Distribution (%)
0—5	$12 \pm 2$
5—10	$12 \pm 3$
10—20	$14 \pm 3$
20—40	$23 \pm 3$
40—80	$30 \pm 3$
80—100	$9 \pm 3$

(An example of such is sand W8 from Quarzwerke GmbH, D-50226 Frechen , Germany.)

NOTE—There is no current source for the specified sand in the United States.

- 5.2.2.2 The mixture shall be fit for applying to the headlamp by a spray gun or by brush. The mixture shall not be used earlier than 2 h and not later than 24 h after preparation. (It shall be loaded into the gun immediately before application.)

### 5.3 Test Procedures

- 5.3.1 SAE J575 is a part of this document with modifications as indicated:

5.3.1.1 *Vibration Test*

5.3.1.2 *Dust Exposure Test*

5.3.1.3 *Corrosion Test*

5.3.1.4 *Photometry*—In addition to the test procedures in SAE J575, the following apply:

5.3.1.4.1 Photometric tests shall be made with the photometer at a distance of at least 18.3 m from the lamp lens. The H-V axis shall be taken as the horizontal and vertical planes through the center of the lighting device.

5.3.1.4.2 If the headlamp cleaner mounts in front of, or on the light emitting surface and if it is intended for OEM applications, the photometric performance of each headlamp shall be measured first without the cleaner installed and then with the cleaner installed in its parked or normally “off” position.

5.3.1.4.3 The headlamp is to be fixed throughout the environmental tests on a fixture that can be accurately relocated on the goniometer.

NOTE—A re-aim of  $\pm 0.25$  degree is permitted after the environmental tests.

5.3.2 CLEANING TEST

5.3.2.1 After the headlamp(s) have been operated for 10 min, the dirt mixture shall be applied evenly to the entire headlamp lens surface using a spray gun or a brush. The mixture shall then be dried either by operating the headlamp or using hot air. Repeat this procedure, if necessary until the luminous intensity at each measured point in Table 2 has been reduced to less than 20% of the initially measured values.

**TABLE 2—HEADLAMP WASHER PHOTOMETRIC TEST POINTS**

Low Beam Test Points (deg.)	Low Beam Test Points (deg.)	Upper Beam Test Point <sup>(1)</sup>
1.5 R	0.5 D	HV
2 R	1.5 D	
9 R	1.5 D	
9 L	1.5 D	

1. If upper beam cleaning is required.

5.3.2.2 If a fluid is used for the cleaning operation, the test shall be conducted using fluid as specified by the headlamp cleaner manufacturer, and or vehicle manufacturer.

5.3.2.3 If the cleaner is designed to be manually operated, the cleaning shall be accomplished within the manufacturer's specification for operation and cleaning period.

5.3.2.4 After the headlamp has been returned to ambient temperature, and not later than 2 h after 5.3.2.1 requirements have been completed, the headlamp shall be switched on and the headlamp cleaner shall be operated for the cleaning period specified by the manufacturer. This cleaning period shall not exceed 10 s.

5.3.2.5 During the test, the duration of the cleaning period and the mean value of the consumption of the cleaning fluid shall be in accord with the headlamp cleaning manufacturer's specification.

5.3.2.6 After the cleaning operation, the headlamp shall be allowed to dry. The illumination shall then be measured again and the resulting values assessed as a percentage of the originally measured values.

**6. Performance Requirements**

**6.1 SAE J575**—A device when tested in accordance with the test procedures specified in 5.3.1, shall meet the following requirements in SAE J575, with the following modifications:

6.1.1 VIBRATION

6.1.2 DUST—After completion of the test, the headlamp and headlamp cleaner must comply with 6.2.

6.1.3 CORROSION

6.1.4 PHOTOMETRY

- 6.2 Cleaning Operation**—After operation of the headlamp cleaner in accordance with 5.3.2, the photometric performance of the headlamp measured at the test points shown in Table 2 shall be at least 70% of the values measured when the headlamp is clean.
- 6.3 Temperature Exposure**—The headlamp cleaner shall not be functionally damaged by water, ice, or snow accumulating on the cleaner, during normal use of the vehicle, or if the cleaning fluid is frozen. Nor shall the cleaner be functionally damaged if exposed to a temperature of  $-35^{\circ}\text{C}$  or  $+80^{\circ}\text{C}$  for 2 h.
- 6.4 Obstruction Limitation**—The photometric requirement of SAE J1383 or the applicable standard shall be met in the event that any part of the headlamp cleaner comes to rest in front of the headlamp, or if any of its normal parked positions shadows part of the light emitting area of the headlamps. In addition, if during normal operation the cleaner moves in front of the illuminating surface, no minimum test point, per SAE J1383 or the applicable standard, shall be lowered by more than 20% (10% if the high beam application is not integral with the low beam.)

## 7. Guidelines

- 7.1** If a fluid container is provided, it should contain fluid for at least 25 cleaning periods. The fluid container for the headlamp cleaner may be combined with the fluid container for the windshield washer, provided the volume is enlarged by 1 L. The level of the fluid should be readily perceptible when the container is mounted in the vehicle.
- 7.2** The headlamp cleaner on the vehicle should operate at temperatures between  $-10^{\circ}\text{C}$  and  $+35^{\circ}\text{C}$  and at speeds between 0 and 130 km/h or the maximum speed of the vehicle, if lower. These requirements do not apply if the cleaner is blocked by ice or snow.
- 7.3** If the headlamp cleaner is intended for non-OEM applications and if it obstructs the illuminating surface, all minimum photometric requirements, per SAE J1383 or the applicable standard shall be met in the normally "off" position.
- 7.4** If fluid is required, the headlamp cleaner should be designed to meet all requirements using commercially available glazing cleaning fluids approved by the cleaner manufacturer, and/or the vehicle manufacturer.
- 7.5** The headlamp cleaner, or any part of it, shall not inhibit the aiming of the headlamp, or replacement of the headlamp, or the replacement of a headlamp bulb. If necessary, the headlamp cleaner, or parts of it, may be displaced to aim, mount, or replace a headlamp, provided no tools are required.
- 7.6** If the fluid container is out of fluid, the pump should not be capable of activating or the pump should be designed to run dry (without functional damage).
- 7.7** Headlamp systems with plastic lens should not use headlamp cleaners with brushes or wipers due to the abrasive characteristics and potential for optical degradation of the plastic lens.
- 7.8** The headlamp cleaner shall not degrade headlamp performance. The vehicle manufacturer may require as part of his specification to determine if the headlamp cleaner could degrade his lighting system by evaluating extended headlamp cleaning cycles with and without cleaning fluid.