

**AIS-083**

**AUTOMOTIVE INDUSTRY STANDARD**

**Headlamp Cleaners and their fitment  
on Power-Driven Vehicles with regard  
to Headlamp Cleaners**

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AUTOMOTIVE INDUSTRY STANDARDS COMMITTEE

UNDER

CENTRAL MOTOR VEHICLE RULES – TECHNICAL STANDING COMMITTEE

SET-UP BY

MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS

(DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS)

GOVERNMENT OF INDIA

May 2008

**Status chart of the standard to be used by the purchaser  
for updating the record**

<b>Sr. No.</b>	<b>Corr- igenda.</b>	<b>Amend- ment</b>	<b>Revision</b>	<b>Date</b>	<b>Remark</b>	<b>Misc.</b>

**General remarks:**

## INTRODUCTION

The Government of India felt the need for a permanent agency to expedite the publication of standards and development of test facilities in parallel when the work on the preparation of the standards is going on, as the development of improved safety critical parts can be undertaken only after the publication of the standard and commissioning of test facilities. To this end, the erstwhile Ministry of Surface Transport (MoST) has constituted a permanent Automotive Industry Standards Committee (AISC) vide order No. RT-11028/11/97-MVL dated September 15, 1997. The standards prepared by AISC will be approved by the permanent CMVR Technical Standing Committee (CTSC). After approval, the Automotive Research Association of India, (ARAI), Pune, being the secretariat of the AIS Committee, has published this standard.

Fitment of headlamp cleaning devices complying to ECE R 45 has been already prescribed in AIS-034 Automobile Lamps. This AI Standard is intended to replace the reference of ECE R45 by AIS.

This standard has been aligned with the related ECE R 45 Rev 1, Amendment 3 (date of entry into force: 29 December 2000)

The Automotive Industry Standards Committee responsible for preparation of this standard is given in Annex E.

## Headlamp Cleaners and their fitment on Power-Driven Vehicles with regard to Headlamp Cleaners

### 1 SCOPE

This standard applies to the approval of headlamp cleaners and to the approval of a type of vehicle with regard to headlamp cleaners, fitted on dipped beam headlamps with a light source having an objective luminous flux value exceeds 2000 lumens.

Use of mechanical cleaning systems is not permitted, when headlamps with plastic lenses, marked "PL", are installed.

In case of approval of a vehicle, it is possible, at the manufacturer's choice, to install a headlamp cleaner previously approved as a component, but this previous approval is not mandatory.

**Note** : The objective luminous flux value is the value specified in AIS-034 or the corresponding standard/regulation for which the light source has been type approved.

### 2. DEFINITIONS

For the purposes of this standard:

- 2.1 **"Headlamp cleaner"** means a complete device with which all or part of the light emitting surface of a headlamp can be cleaned;
- 2.2 **"Type of headlamp cleaner"** means headlamp cleaners which do not differ in such essential respects as:
  - 2.2.1 The trade name or mark;
  - 2.2.2 The cleaning principle employed;
  - 2.2.3 Different geometric dimensions of the headlamp, if this implies any modification of the components of the cleaner;
  - 2.2.4 Headlamp cleaners shall not be considered as different in type because of differences in fluid consumption, cleaning period or the fitting of cleaning elements, provided that compliance with this standard is verified by the test agency responsible for the approval tests. This is also valid, if headlamps to be cleaned differ only by the filament lamp used, the design for left hand or right hand traffic, the colour of the light or by parts of the headlamp, which do not influence the effectiveness of the headlamp cleaner. In the case of different filament lamps only the headlamp version with the highest power consumption is to be tested.

- 2.3 "Vehicle type" means vehicles which do not differ in such essential respects as:
- 2.3.1 The type of headlamp cleaner;
  - 2.3.2 The geometric arrangements of the headlamp cleaning equipment, if this implies any modification of its operation;
  - 2.3.3 Capacity class of the fluid container;
- 2.4 "Approval of a vehicle" means approval of a vehicle type with regard to headlamp cleaners;
- 2.5 "Fluid container" means that part of the headlamp cleaner in which - in the appropriate cases - the cleaning fluid is stored;
- 2.6 "Cleaning efficiency" means the percentage of the intensity of illumination measured at a measuring point after cleaning with respect to the values measured with the sample totally clean;
- 2.7 "Cleaning period" means the period of time to fulfill the requirements specified in 7 to be met, including any pre-treatment period.

### 3 APPLICATION FOR APPROVAL

- 3.1 The application for approval of a type of headlamp cleaner shall be submitted by the manufacturer or holder of the trade name or mark or by his duly accredited representative. The application shall contain at least the details given in Annex A.
- 3.2 The application for approval of a vehicle type with regard to the headlamp cleaners shall be submitted by the vehicle manufacturer or by his duly accredited representative. The application shall contain at least the details given in Annex B.

If the approval of the headlamp cleaning device is not an already approved type and its approval is sought for, the application shall contain at least the details given in Annex B.

**Note:** If the specifications submitted for complete type approval of a vehicle containing the details given above, there is no necessity of submitting this information again

### 4 MARKINGS

- 4.1 The headlamp cleaner shall on at least one main part bear the following marks clearly legible and indelible:
- 4.1.1 The trade name or mark;
  - 4.1.2 In the case of electrically operated parts, the nominal voltage;

## 5 APPROVAL

- 5.1 The approval of a headlamp cleaner shall extend only to the operating principle employed for the cleaning of either the types or the shapes and functions of headlamps indicated in the application for approval;
- 5.2 If the type of headlamp cleaner or vehicle type submitted for approval pursuant to this standard meets the requirements of 6 and 7, approval of that type of headlamp cleaner or vehicle shall be granted.

## 6 GENERAL SPECIFICATIONS

- 6.1 The headlamp cleaner shall be designed and constructed to clean those parts of the light emitting surface of the headlamp which distribute the passing beam and, as an option, the driving beam, so that at least the cleaning effect specified in 7 is achieved.
- 6.2 The headlamp cleaner shall be furthermore so designed that:
  - 6.2.1 When parts of the headlamp cleaner in the rest position(s) are on the headlamps' illuminating surface, the photometric values of the headlamps, and of the lamps which are grouped or reciprocally incorporated with the headlamp as submitted for test, measured at the points listed in the appropriate standard for which minimum values are specified, shall not be reduced by more than 5% in any normal rest position(s) of those parts, with respect to those measured before installation of the cleaning device; in no case shall these values be less than the values prescribed in the standard in question;
    - 6.2.1.1 6.2.1 is not applicable when the headlamp and the parts of the headlamp cleaner referred to in 6.2.1 form a complete assembly during the approval of the headlamp;
  - 6.2.2 During operation, except in the rest position, the mechanical parts shall not cover more than:
    - 6.2.2.1 20% of the illuminating surface of a passing lamp,
    - 6.2.2.2 10% of the illuminating surface of a driving lamp not reciprocally incorporated with a passing lamp;
  - 6.2.3 It is able to operate at all temperatures between -10°C and +35°C and to operate satisfactorily at speeds between 0 and 130 km/h (or the maximum speed of the vehicle if it is below 130/km/h); this shall not apply, however, if the cleaner is blocked by snow or ice; the cleaner shall remain undamaged if exposed to a temperature of -35°C and of +80°C respectively for a period of one hour;

**Note:** All conditions of 6.2.3 are deemed to be satisfied if the cleaner remains undamaged if exposed to a temperature of -35°C and of +80°C respectively for a period of one hour and it is not necessary to carry out the tests on the vehicle.

- 6.2.4 In normal use, in spite of the vibration to which it may be subjected, its satisfactory operation continues to be ensured.
- 6.2.5 It will not be functionally damaged due to water, ice or snow accumulating on it during normal operation of the vehicle, even if the cleaning liquid is frozen; a temporary failure due to freezing or deposit of snow shall not be considered as damage, provided that the device can be made to work again by simple means;
- 6.2.6 All elements which may come into contact with the cleaning fluid must be resistant against a mixture consisting of 50% methyl alcohol, ethyl alcohol or isopropyl alcohol and 50% water;
- 6.2.7 Its parts do not hinder the adjustment of the headlamps or the inserting or changing of filament lamps. If necessary cleaner or, detachable parts of it may be removed, if they can be removed with simple tools.
- 6.3. Parts of the headlamp cleaner which, in the rest position(s) and/or during operation, form part of the external surface of the vehicle, shall meet the following requirements:
  - 6.3.1. The parts shall not exhibit, directed outwards, any pointed or sharp parts or any projections of such shape, dimensions, direction or hardness as to be likely to increase the risk or severity of bodily injury to a person hit or brushed by the bodywork;
  - 6.3.2. No protruding part on the external surface shall have a radius of curvature of less than 2.5 mm; this requirement shall not apply to parts of a hardness not exceeding 60 shore A;
  - 6.3.3. In cases where the cleaner comprises a wiper, 6.3.2 above shall not apply to the wiper blades or to any supporting members. However, these units shall be so made as to have no sharp angles or pointed or cutting parts of a non-functional nature. Any wiper shaft shall be furnished with a protective casing having a radius of curvature of not less than 2.5mm and a surface of not less than 50 mm<sup>2</sup>;
  - 6.3.4. In cases where the cleaner comprises a nozzle(s), 6.3.2 shall apply neither to the functional parts of the nozzle(s) nor to the non-functional parts if they protrude less than 5 mm;
  - 6.3.5. The provisions of 6.3.1, 6.3.2 and 6.3.3 above shall not apply to those parts of the headlamp cleaner which are located so that, in static conditions, they cannot be contacted by a sphere 100 mm in diameter.

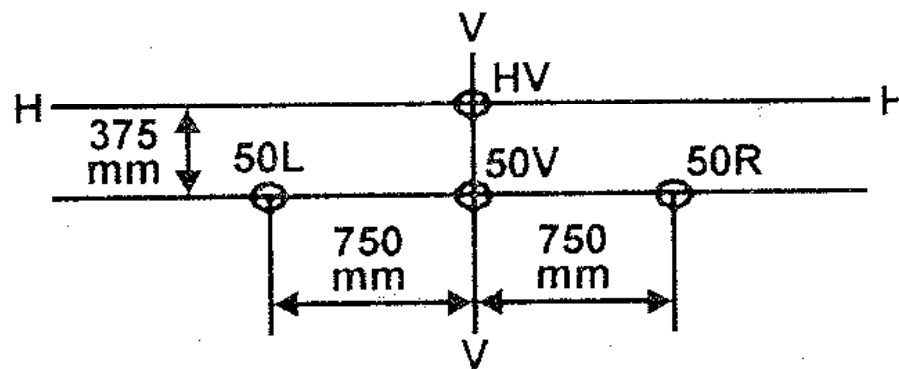
- 6.4. The conformity with specifications of 6.2.3, 6.2.4, 6.2.5 and 6.2.6 shall be certified by the applicant. In the case of doubt, the test agency can verify that these requirements have been met.
- 6.5. In case of approval of a vehicle the following requirements shall also be met:
- 6.5.1. Cleaning of all passing headlamps shall be compulsory. If there are more than one pair of driving headlamps, the cleaning of one pair of these headlamps shall be sufficient;
- 6.5.2. If the cleaner has a fluid container, this may be combined with the fluid container for the windscreen washers and the rear window washer. The container shall satisfy the following requirements:
- 6.5.2.1. The capacity of the fluid container shall be sufficient for at least 50 cleaning periods for headlamp cleaners of capacity class 50 and at least 25 cleaning periods for headlamp cleaners of capacity class 25. If the container not only feeds the headlamp cleaner but also the windscreen washer and/or the rear window washer, this capacity shall be increased by one litre in all,
- 6.5.2.2. It shall be easy to check the level of the fluid, and the opening for filling shall be readily accessible;
- Note:** For this purpose, opening of engine bonnet or other covers is permitted.
- 6.5.3. Neither the cleaner nor any part of it shall prevent the adjustment of the headlamp and the replacement of the filament lamp. In case of need, the cleaner or part of it shall be removable with simple tools. No other prescribed or permissible lighting or light-signalling devices shall be impaired in their effectiveness either by parts or by the operation of the headlamp cleaner, except during the cleaning period; it must above all not systematically deposit any dirt when in normal service, on the light-emitting surfaces of other lighting or light-signalling devices;
- 6.5.4. The control of the cleaning device shall be operable from the drivers seat and may be coupled with the controls for other cleaning devices.
- In addition, if cleaning devices are fitted to dipped beam headlamps with a light source having an objective luminous flux value exceeds 2000 lumens and in the absence of any automatic activation of the cleaning device, it shall operate through at least one cleaning period when, the headlamps being already switched on, the windscreen washers are operated.
- 6.6. In the case where on a vehicle submitted for approval a headlamp cleaner previously approved as a component is fitted, only the requirements set forth in 6.5 to 6.5.4 shall be verified



## 7. CLEANING EFFICIENCY VERIFICATION

- 7.1. The efficiency of the cleaner shall be tested in accordance with the requirements of Annex D to this standard. The cleaning efficiency at the points on the measuring screen which are specified below shall, after every cleaning period, amount to at least 70 per cent for the passing lamp and also 70 per cent for the optional driving lamp.

**Diagram of Measuring Points on a Screen**



- 7.2. The measuring point shall be located as shown in the above sketch, on a screen situated 25 m from the headlamp and perpendicular to its axis.
- 7.3 **Measuring Points for the Passing Lamp**
- 7.3.1. Headlamps approved in respect of the passing beam only (marking C or HC)  
 Measuring points: 50 R(L) and 50 V  
**Note** : R refers to right-hand driving.  
 L refers to left-hand driving.
- 7.3.2. Headlamps approved in respect of the passing beam and the driving beam (marking CR, HCR, C+R, C+HR, HC+R or HC+HR)  
 Measuring points; 50R(L) and 50V, if in the same headlamps, different optic systems for the driving lamp and the passing lamp are provided.
- 7.4. **Measuring Point for the Driving Lamp**  
 Measuring point: HV.

**8 MODIFICATIONS/CHANGES**

- 8.1 Every functional modification pertaining to the information declared in accordance with 3 shall be intimated by the manufacturer to the certifying agency. The Testing Agency may then consider, whether,
- 8.1.1 the model with the changed specifications still complies with provisions;  
or,
- 8.1.2 any further verification is required to establish compliance.
- 8.2 For considering whether any further verification is required or not, guidelines given in Annex C (Criteria for Extension of Approval) may be used.
- 8.3 In case of 8.1.2 tests for only those parameters which are affected by the modifications need to be carried out
- 8.4 In case of fulfillment of criterion of 8.1.1 or after results of further verification as per 8.1.2 are successful, the approval of compliance shall be extended for the changes carried out.
- 8.5 These conditions are applicable irrespective of any change in commercial name of the vehicle model.

**9. CONFORMITY OF PRODUCTION**

- 9.1. Every type approved vehicle or headlamp cleaner as per this standard shall conform to the type approved and satisfy the requirements of 6 and 7 .
- 9.2. In order to verify conformity as prescribed in 9.1 , a vehicle or headlamp cleaner bearing the approval mark pursuant to this standard shall be taken from the production.
- 9.3 Verification of the conformity of production by test agencies shall be only after AIS-037 / Whole vehicle type approval is implemented

**Annex A**  
(See 3.1)

**DETAILS TO BE DECLARED AT THE TIME OF APPLICATION OF A  
HEADLAMP CLEANER**

- A-1** Trade name or mark of the headlamp cleaner:
- A-2** Manufacturer's name and address:
- A-3** If applicable, name and address of manufacturer's representative:
- A-4** Cleaner type:
- A-5** Is the cleaner intended to be type approved along with a headlamp (Yes/No)
  - A-5.1.** If no,
    - A-5.1.1** Either Type or approval number or shapes and dimensions of the headlamps for which the cleaner is intended to be used
    - A-5.1.2** Either a specification of the type(s) or the approval number(s) of the headlamp(s) for which the cleaner is intended if only a part of the lens is cleaned or a specification of the main measures (diameter and radius of curvature of the lens) if the lens is cleaned uniformly;
    - A-5.1.3** Instructions for installation.
- A-6** A list, specifying the parts which constitute the headlamp cleaner and drawings thereof, (e.g. pumps, nozzles, valves, motors and wipers);
- A-7** A brief technical description indicating the length of the cleaning period, the consumption of cleaning fluid during the cleaning period and the minimum capacity of the container provided;
- A-8** Capacity class of the fluid container: 25/50
- A-9** Drawings showing in sufficient detail:
  - A-9.1** the installation to a headlamp,
  - A-9.2** the relative attachment between the headlamp(s) and the wiper(s), nozzle(s), or corresponding parts,
  - A-9.3** the cleaning principle employed;
  - A-9.4** where appropriate, the part of the illuminating surface of the headlamp relevant to the cleaner shall also be shown

**Annex B**

(See 3.2)

**DETAILS TO BE DECLARED AT THE TIME OF APPLICATION FOR APPROVAL OF VEHICLE FOR FITMENT OF A HEADLAMP CLEANER**

- B-1** Trade name or mark of the vehicle:
- B-2** Vehicle type:
- B-3** Manufacturer's name and address:
- B-4** If applicable, name and address of manufacturer's representative:
- B-5** Trade name or mark of headlamp cleaner:
- B-6** Cleaner type:
- B-7** Headlamp cleaner(s) type approval number(s) (where the vehicle is equipped with a previously approved headlamp cleaner)
- B-8** Either Type or approval number or shapes and dimensions of the headlamps for which the cleaner is intended to be used
- B-9** Either a specification of the type(s) or the approval number(s) of the headlamp(s) for which the cleaner is intended if only a part of the lens is cleaned or a specification of the main measures (diameter and radius of curvature of the lens) if the lens is cleaned uniformly;
- B-10** A list, specifying the parts which constitute the headlamp cleaner and drawings thereof, (e.g. pumps, nozzles, valves, motors and wipers);
- B-11** A brief technical description indicating the length of the cleaning period, the consumption of cleaning fluid during the cleaning period and the minimum capacity of the container provided;
- B-12** Capacity class of the fluid container: 25/50
- B-13** Drawings showing in sufficient detail:
- B-13.1 the installation to a vehicle,
- B-13.2 the relative attachment between the headlamp(s) and the wiper(s), nozzle(s), or corresponding parts,
- B-13.3 the cleaning principle employed;
- B-13.4 where appropriate, the part of the illuminating surface of the headlamp relevant to the cleaner shall also be shown

**Note:** If the fitment is of an already type approved, it is not necessary to provide information listed as serial numbers 8,9,10 and 11.

**Annex C**

(See 8.2)

**CRITERIA FOR EXTENSION OF APPROVAL**

- C-1** This Annex gives factors to be considered while selecting a vehicle to represent a range of variants for testing the vehicle/headlamp cleaner for type approval as per this standard and the extension of type approval certificate of one model to changes in technical specification/its variant/(s)of vehicle/headlamp cleaner
- C-2** In general, when changes in technical specifications of vehicle do not affect the performance of headlamp cleaner adversely, and it still within the stipulated limits, the type approval certificate shall be extended. If the changes affect some of the performance parameter, test shall be carried out only for those parameters.
- C-3** The changes in parameters that affect the performance of headlamp adversely and the test to be conducted, if, any, for extending the type approval shall as agreed between manufacturer and test agency.

**Annex D**

(See 7.1)

**PROCEDURE FOR TESTING THE PERFORMANCE OF HEADLAMP CLEANERS****D-1 GENERAL**

The tests shall be carried out in still air at an ambient temperature of  $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ .

During the various phases of the test, precautions shall be taken to avoid a thermal shock to the headlamp glass.

If the manufacturer of the cleaning device has the intention to provide several positions of the cleaning device and the headlamps, only the headlamp in its worst position to the cleaning device must be tested. If a cleaning fluid is used the additional nozzles for the non-simulated side must be present on the test fixture for checking the fluid consumptions.

**Note** : At manufacturer's option test may be carried out at ambient temperatures different from of  $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ .

**D-2 TEST EQUIPMENT****D-2.1 Test Mixture****D-2.1.1 For headlamp with the outside lens in glass:**

A mixture of water and polluting agent to be applied to the headlamp shall be composed of:

9 parts by weight of silica sand with a particle size of 0-100  $\mu\text{m}$  corresponding to distribution prescribed in paragraph D-2.1.3,

1 part by weight of vegetable carbon dust (beechwood) with a particle size of 0-100  $\mu\text{m}$ ,

0.2 parts by weight of NaCMC (D-2.1.1.1)

an appropriate quantity of distilled water with a conductivity of  $\leq 1\text{mS/ m}$

**D-2.1.1.1** NaCMC represents the sodium salt of carboxymethylcellulose, customarily referred to as CMC. The NaCMC used in the polluting agent mixture shall have a degree of substitution (DS) of 0.6-0.7 and a viscosity of 200-300 cP for a 2 per cent solution at 20  $^{\circ}\text{C}$ .

**D-2.1.2 For Headlamp with the Outside Lens In Plastic Material**

The mixture of water and polluting agent to be applied to the headlamp shall be composed of:

9 parts by weight of silica sand with a particle size of 0-100  $\mu\text{m}$  corresponding to distribution prescribed in paragraph D-2.1.3,

1 part by weight of vegetable carbon dust (Beachwood) with a particle size of 0-100  $\mu\text{m}$ ,

0.2 parts by weight of NaCMC (D-2.1.1.1),

5 parts by weight of sodium chloride (pure at 99%)

13 parts by weight of distilled water with a conductivity of  $\leq 1$  mS/m, and

$2 \pm 1$  parts by weight of surface-actant

**D-2.1.3 Particle-size distribution**

Particle size (in $\mu\text{m}$ )	Particle-size distribution in (%)
0 to 5	$12 \pm 2$
5 to 10	$12 \pm 3$
10 to 20	$14 \pm 3$
20 to 40	$23 \pm 3$
40 to 80	$30 \pm 3$
80 to 100	$9 \pm 3$

D-2.1.4. The mixture shall be fit for applying to the headlamp by the spray gun specified under D-2.3. The mixture shall be used not earlier than two hours and not later than 24 hours after preparation. It shall be given into the gun immediately before use.

D-2.2. The photometric measuring equipment shall be equivalent to that used in connection with the approval of headlamps.

D-2.3 A power supply of sufficient capacity (during the cleaning period the voltage drop shall not be more than 1%), a voltmeter for short time measurements (oscillograph), a spray gun at an operating pressure of about 500kPa (5 bar) with a flow cup and a nozzle of diameter 1.5 mm.

D-2.4 If not tested on the vehicle, the headlamp(s) and the cleaner shall be mounted on a test fixture, which reproduces the installation on the vehicle and permits normal operation of both cleaner and headlamp(s).

D-2.5 For the purpose of the test on electrically operated devices the power supply shall be adjusted in such a way that under load at the contacts of the largest consumer the voltage is 13.0V in the case of 12V systems and 27.0V in the case of 24V systems. As far as the measurements of illumination are concerned, they shall be carried out on the basis of the approval tests for the headlamps. In case of doubt only measurements performed with a standard filament lamp are valid.

### **D-3 PHOTOMETRIC MEASUREMENTS OF THE HEADLAMP WHEN CLEAN**

The light-emitting surface of the headlamp shall be clean and the headlamp cleaner shall be in the stationary position. The photometric measurements shall be made in compliance with the specifications of the relevant standard, as well as the measurements prescribed in paragraph D-4 below. The illumination shall then be measured at the measuring points specified in 7 of this standard.

### **D-4 EVALUATION OF CLEANING EFFICIENCY**

D-4.1 After the headlamp(s) has been operated for 10 minutes the dirt mixture shall be applied evenly to its entire light-emitting surface using the spray gun mentioned above. The mixture shall then be dried either by operating the headlamp or using hot air. This procedure shall be repeated, if necessary until the luminous intensity in all measuring points has been reduced below 20% of the values according to D-3. At least the luminous intensity in one of the several measuring points shall be between 15 and 20%.

D-4.1.1 The values to be used during the tests for the duration of the cleaning period and the consumption of cleaning fluid during this period shall be the values declared by the manufacturer. The fluid consumption shall be measured as the mean value over several cleaning periods as specified by the manufacturer.

D-4.1.2 After the headlamp has cooled down and not later than two hours after the dirt has dried the headlamps 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 10s.

D-4.2 If a cleaning fluid is used for the cleaning operation, the test shall be performed with distilled water with a conductivity of not more than 10  $\mu$  S/cm.



- D-4.3 If the cleaner is designed to be manually operated, the cleaning shall be accomplished with a maximum of five operations within the time-limit specified in D-4.1.2.
- D-4.4 Where the cleaner is not electrically operated, the operating conditions for the test shall be as agreed between and with the manufacturer.
- D-4.5 After the cleaning operation, the headlamp shall have been allowed to dry. Then the illumination at the measuring points shall be measured again as required in D-3 and values thus obtained shall comply with the requirements specified in 7 of this standard.
- D-4.6 If the result of the measurements does not meet the requirements according to D-4.5 it is permitted, in the case of a headlamp cleaner operated with a cleaning fluid, to try to achieve better results by adjusting the jet of the fluid.

**ANNEX : E**  
(See Introduction)

**COMMITTEE COMPOSITION \***

**Automotive Industry Standards Committee**

<b>Chairman</b>	
Shri Shrikant R. Marathe	Director The Automotive Research Association of India, Pune
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Representative from	Ministry of Heavy Industries & Public Enterprises (Department of Heavy Industry), New Delhi
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Member Secretary  
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\* At the time of approval of this Automotive Industry Standard (AIS)