AUTOMOTIVE INDUSTRY STANDARD

Automotive Vehicles – Approval of Rear View Mirrors Intended for use on L Category Vehicles without Bodywork Partly or Wholly Encloses the Driver - Specification

(Revision 1)

PRINTED BY
THE AUTOMOTIVE RESEARCH ASSOCIATION OF INDIA
P.B. NO. 832, PUNE 411 004

ON BEHALF OF
AUTOMOTIVE INDUSTRY STANDARDS COMMITTEE

UNDER
CENTRAL MOTOR VEHICLE RULES – TECHNICAL STANDING COMMITTEE

SET-UP BY
MINISTRY OF ROAD TRANSPORT & HIGHWAYS
(DEPARTMENT OF ROAD TRANSPORT & HIGHWAYS)
GOVERNMENT OF INDIA

May 2011

INTRODUCTION

0. 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. For better dissemination of this information ARAI may publish this document on their Web site.

0.1 Accordingly AIS-001 covering mandatory requirements regarding performance requirements of rear view mirrors has been published in 2001 and implemented thereafter in 2003.

0.2 With technological developments in rear view mirrors, AIS-001 was taken up for revision and now is prepared in two parts.

This part covers the requirements of rear view mirrors intended for use on L category vehicles without body work partly or wholly encloses the driver.

0.3 This part is based on the following ECE Regulation:

ECE R 81 amendment 1 (Supplement 2 to the 00 series of amendments - date of entry into force: 18 June 2007)	Uniform Provisions Concerning the Approval of Seats of Rear-view Mirrors of two-wheeled Power-driven Vehicles with or without Side Car, with regard to the Mounting of Rear-view Mirrors on Handlebars

0.4 While preparing this standard attempts have been made to align with the above ECE regulation. However, certain changes were necessary in the Indian context.

0.5 The following standard contain provisions, which through reference in this text constitute provision of the standard.

AIS-001 (Part 1) (Rev.1):2011	Automotive Vehicles - Approval of devices for indirect vision intended for use on M, N category and L category with bodywork vehicles – specification
AIS-002 (Part 2) (Rev.1): 2011	Automotive Vehicles – Approval of Rear View Mirrors intended for use on L category vehicles without bodywork partly or wholly encloses the driver – Installation requirements

AIS-037	Procedure for Type Approval and Establishing Conformity of Production for Safety Critical Components.
AIS-053	Automotive Vehicles – Types – Terminology

0.6 The composition of AIS panel and AIS Committee responsible for preparation of this standard is given in Annex H and Annex J respectively.

Automotive Vehicles – Approval of Rear View Mirrors Intended for use on L Category Vehicles without Bodywork Partly or Wholly Encloses the Driver - Specification

Automotive Vehicles – Approval of Rear View Mirrors Intended for use on L Category Vehicles without Bodywork Partly or Wholly Encloses the Driver – Specification

1.0 SCOPE

This standard applies,

1.1 to rear-view mirrors intended to be installed on vehicles of categories L, as defined in AIS-053, without bodywork partly or wholly encloses the driver.

Note : The permission to use rear view mirrors covered by this standard are governed by requirements specified by the standard for installation of requirements of that category of vehicles.

1.2 Reserved

2. DEFINITIONS

For the purposes of this standard:

2.1. "**Rear-view mirror**" means any device intended to give a clear view to the rear;

2.2. "**Rear-view mirror type**" means devices which do not differ in respect of the following main characteristics:

2.2.1 The dimensions and radius of curvature of the rear-view mirror reflecting surface,

2.2.2. The design, shape or materials of the rear-view mirrors, including the connection with the vehicle;

2.3. "**Class of rear-view mirrors**" means all devices having one or several features or functions in common.

The rear-view mirrors mentioned in this standard are grouped in Class "L".

2.4. "**r**" is as defined in **2.1.1.5** of Part 1 of this standard.

2.5 "**Principal radii of curvature at one point obtained on the reflecting surface (ri) and (r'i)**" means the values obtained using the apparatus defined in Annex G of Part 1 of this standard, measured on the arc of the reflecting surface contained in a plane parallel to the greatest dimension of the mirror and passing through its centre and on the arc perpendicular to it;

2.6 "**Radius of curvature at one point on the reflecting surface** (rp)" is as defined in 2.1.1.7 of Part 1 of this standard.

2.7 "**Centre of the mirror**" is “centre of reflecting surface” as defined in 2.1.1.11 of Part 1 of this standard.

2.8 **Radius of curvature of the constituent parts of the rear-view mirror**" is as defined in 2.1.1.12 of Part 1 of this standard.

3. APPLICATION FOR APPROVAL

3.1 Reserved

3.2 Information to be submitted at the time of applying for type approval of the mirror shall be as given in Annex A of Part 1 of this standard.

Note :Sl. No.9 and its sub-paragraphs of Annex A to Part 1 are not applicable for this standard.

3.3 For each type of rear-view mirror, the application shall be accompanied by, four samples of the type of rear view mirror. Additional samples may be called for at the request of the testing agency.

3.4 Reserved.

4. MARKING

4.1. The marking shall be as specified in 4. of Part 1 of this standard.

4.2. Every rear-view mirror shall possess on its holder a space large enough to accommodate the approval mark, which must be legible when the rear-view mirror has been mounted on the vehicle; this space shall be shown on the drawings referred to Annex A of Part 1 of this standard.

5. APPROVAL

5.1. If the samples submitted for approval meet the requirements of paragraph 6 to 8 of this standard, approval of the pertinent type of rear-view mirror, shall be granted.

5.2. Approval number shall be as per AIS-037

5.3 Reserved

5.4 Reserved

5.4.1 Reserved

5.4.2 Approval number granted as per AIS-037.

5.4.3 In addition to the approval mark (5.2), An an additional symbol in the form of the letter "L". The additional symbol shall be placed at any convenient position.

5.5 The approval mark and the additional symbol shall be clearly legible and be indelible.

5.6 Reserved

6. GENERAL REQUIREMENTS

6.1 Provisions of 6.1.1.1 of Part 1 of this standard shall apply.

6.2. Provisions of 6.1.1.2 of Part 1 of this standard shall apply.

6.3. When the rear-view mirror is mounted on a plane surface, all its parts, irrespective of the adjustment position of the device, including those parts remaining attached to the holder after the test set out in 8.2., which are in potential static contact with a sphere 100 mm in diameter shall have a radius of curvature "c" of not less than 2.5 mm.

6.3.1. Provisions of 6.1.1.4 of Part 1 of this standard shall apply.

6.4. Provisions of 6.1.1.6 of Part 1 of this standard shall apply.

7. SPECIAL SPECIFICATIONS

7.1. Dimensions

7.1.1. The minimum dimensions of the reflecting surface shall be such that:

7.1.1.1. The area shall not be less than 69 cm^2.

7.1.1.2. In the case of circular mirrors, the diameter shall not be less than 94 mm,

7.1.1.3. In the case of non-circular mirrors, the dimension will permit the inscription of a circle with a diameter of 78 mm on the reflecting surface.

7.1.2. The maximum dimensions of the reflecting surface shall be such that:

7.1.2.1. In the case of circular mirrors, the diameter shall not be greater than 150 mm,

7.1.2.2. In the case of non-circular mirrors, the reflecting surface shall fit into a rectangle measuring 120 mm by 200 mm.

7.2. Reflecting surface and coefficient of reflection

7.2.1. The reflecting surface of a rear-view mirror shall be spherically convex.

7.2.2. Differences between the radii of curvature : shall be within limits specified in 6.1.2.2.2.1 and 6.1.2.2.2.2 of Part 1 of this standard.

7.2.3. The value of "r" shall not be less than 1,000 mm nor greater than 1500 mm.

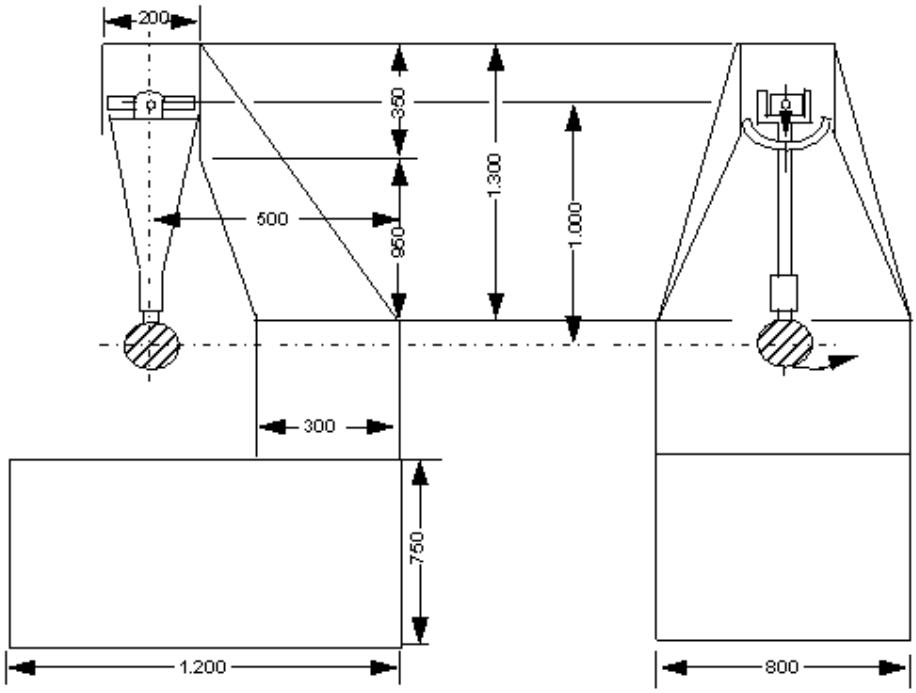
7.2.4. The value of the normal coefficient of reflection, and the reflecting surface shall be as described in 6.1.2.2.5 and 6.1.2.2.6 of Part 1 of AIS-001 (Figure 1)

8. TESTS

8.1. Rear-view mirrors shall be subjected to the tests described in 8.2 and 8.3 below, to determine their behaviour under impact on and bending of the holder secured to the stem or support.

8.2. **Impact test**

8.2.1. Description of the test device shall be as described in 6.1.3.2.1 and 6.1.3.2.2 Part 1 of AIS-001and Figure 1 of this standard.



(See 8.2.1.)

8.2.2. Description of the test:

8.2.2.1. The procedure used to clamp the rear-view mirror to the support shall be that recommended by the manufacturer of the device, or, where appropriate, by the vehicle manufacturer.

8.2.2.2. Positioning the rear-view mirror for the test.

8.2.2.2.1. Rear-view mirrors shall be positioned on the pendulum impact rig such that the axes which are horizontal and vertical when installed on a vehicle in accordance with the vehicle or rear-view mirror manufacturers' mounting instructions are in a similar position.

8.2.2.2.2. When a rear-view mirror is adjustable in relation to the base, the test position shall be the least favourable for any pivoting device to operate within the limits provided by the mirror or vehicle manufacturer.

8.2.2.2.3. When the rear-view mirror has a device for adjusting its distance from the base, the device shall be set in the position where the distance between the holder and the base is shortest.

8.2.2.2.4. When the reflecting surface is mobile in the holder, it shall be adjusted so that the upper corner which is furthest from the vehicle, is in the position of greatest projection relative to the holder.

8.2.2.3. When the pendulum is in a vertical position, the horizontal and longitudinal vertical planes passing through the centre of the hammer, shall pass through the centre of the mirror as defined in 2.7 above. The longitudinal direction of oscillation of the pendulum shall be parallel to the longitudinal plane of the vehicle.

8.2.2.4. When, under the conditions governing adjustment prescribed in 8.2.2.2.1 and 8.2.2.2.2 above, parts of the rear-view mirror limit the return of the hammer, the point of impact shall be shifted in a direction perpendicular to the axis of rotation or pivot in question. This displacement shall be that which is strictly necessary for the implementation of the test.

It shall be limited in such a way that the point of contact of the hammer is located at least 10 mm from the periphery of the reflecting surface.

8.2.2.5. The test consists in allowing the hammer to fall from a height corresponding to a pendulum angle of 60º from the vertical so that the hammer strikes the rear-view mirror at the moment when the pendulum reaches the vertical position.

8.2.2.6. The rear-view mirrors are subjected to impact in the following different conditions:

8.2.2.6.1. Test 1: The point of impact shall be as defined in 8.2.2.3 or 8.2.2.4 above. The impact shall be such that the hammer strikes the rear-view mirror on the reflecting surface side.

8.2.2.6.2. Test 2: The point of impact shall be as defined in 8.2.2.3 or 8.2.2.4 above. The impact shall be such that the hammer strikes the rear-view mirror on the opposite side to the reflecting surface.

8.3. **Bending test on the holder fixed to the stem**

8.3.1. **Description of the test**

8.3.1.1. The holder shall be placed horizontally in a device in such a way that the adjustment parts of the mounting are clamped securely. In the direction of the greatest dimension of the holder, the end nearest to the point of fixing on the adjustment part shall be immobilized by means of a fixed step 15 mm wide, covering the entire width of the holder.

8.3.1.2. At the other end, a step identical with the one described above shall be placed on the holder so that the specified test load is applied to it (see Figure 2 below).

8.3.1.3. The end of the holder opposite that at which the force is applied may be clamped instead of kept in position as shown in Figure 2.

8.3.2. The test load shall be 25 kg applied for one minute.

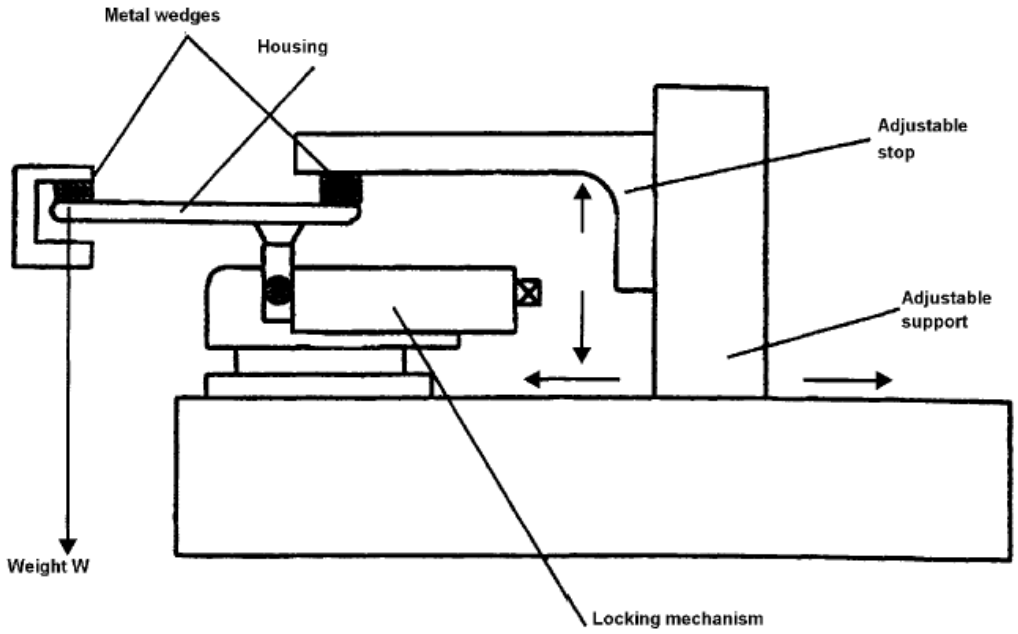


Figure 2
Example of bending test apparatus for rear view mirror holder

8.4. **Results of the tests**

8.4.1. Results of the test prescribed in 8.2 shall be as specified in 6.1.3.3.1, 6.1.3.3.3, 6.1.3.3.3.1 and 6.1.3.3.3.2 of Part 1 of this standard.

8.4.2 Results of the test prescribed in 8.3 shall be as specified in 6.1.3.3.3, 6.1.3.3.3.1 and 6.1.3.3.3.2 of Part 1 of this standard.

9. CONFORMITY OF PRODUCTION

9.1 Any rear-view mirror approved pursuant to this standard shall be so manufactured as to conform to the type approved by meeting the requirements set out in 6, 7 and 8 this standard.

9.2 The manufacturer shall ensure that for each type of rear-view mirror at least the tests prescribed in Annex G to this standard are carried out.

9.3 Verification of the Conformity of Production procedure by the testing agencies shall be as per AIS-037.

9.4 The normal frequency of these verifications shall be once every two years.

9.5 During the verification of Conformity of productions, the following tests may be conducted by the testing Agency

9.5.1 Reflecting surface requirements as per 7.2.2

9.5.2 Impact test pursuant to the requirements of 8.2.

10. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

Shall be as prescribed in AIS-037.

11 EXTENSION OF TYPE APPROVAL.

Procedure shall be as described in 7.0 of Part 1 of this standard.

12. to 21 Reserved

22. TRANSITIONAL PROVISION

22.1 At the request of the applicant, type approval for rear view mirror for compliance to AIS-001 (Part 2) (Rev.1):2011, shall be granted by testing agencies from 22nd February 2011 (date of adoption in CMVR-TSC). Such type approvals shall be deemed to be compliance to Class VI rear view mirrors of AIS-001:2001.

22.2 At the request of applicant, type approval of Class VI rear view mirrors compliance to AIS-001:2001 shall be granted up to the notified date of implementation of AIS-001 (Part 2) (Rev.1):2011.

22.3 Type approvals issued for compliance to Class VI rear view mirrors other than flat mirrors of AIS-001 : 2001 shall be extended to approval of AIS-001 (Part 2) (Rev.1):2011 subject to satisfactory compliance of the following:

22.3.1 Marking as per 4.0

22.3.2 In case of "E/e" approved devices, requirements specified in 23.

Note: Additional verification for the above need not be carried out, if compliance to the above requirements has already been established during the type approval as per of AIS-001:2001

22.4 Extension of Approvals for engineering and administrative changes:

22.4.1 In the case of 22.1, extensions shall be granted subject to the conditions of AIS-001 (Part 2) (Rev.1):2011. Such extensions shall be deemed to be compliance to AIS-001:2001.

22.4.2 In the case of 22.2, extensions shall be granted subject to conditions of AIS-001:2001 till the notified date of implementation of AIS-001 (Part 2) (Rev.1):2011.

22.5 Type approvals for compliance to AIS-037**,** already been granted, shall continue to be valid for AIS-001 (Part 2) (Rev.1):2011.

Note : Necessary corrections to the reference of verification reports as per this standard shall be incorporated while issuing the next COP certificate. In the meantime for issuing of vehicle certificate, test/verification report as per this standard shall deemed to be the proof of compliance of AIS-037.

23 ESTABLISHING COMPLIANCE OF "E"/"e" MARKED APPROVED REAR-VIEW MIRRORS DEVICES TO THIS STANDARDS

23.1 As an exception to 7.4 of AIS-037, (or related administrative decisions) for certifying compliance of "E"/"e" marked approved rear-view mirrors to this standard, the test for the following shall be carried out by testing agency

23.1.1 Requirements of dimension as per 7.1

23.1.2 Requirements of reflecting surfaces as per 7.2

24 AMENDMENTS TO ECE REGULATIONS AFTER THE LEVEL DESCRIBED IN 0.3 OF INTRODUCTION

24.1 **Supplements**

In case of changes in ECE regulation, which are issued as supplements (Supplements do not affect the earlier type approvals) at the request of applicant, approval of compliance to this standard shall be issued taking into account the changes arising out of such supplement(s) to ECE regulation with approval from Chairman AISC.

This shall be incorporated in the test report.

Note : Such changes will be considered for inclusion in this standard at the time of its next amendment /revision.

24.2 **Series of amendments**

Changes in ECE regulation, which are issued as series of amendments (series of amendments may affect the earlier type approvals) will not be considered for issuing approval to this standard.

However, Chairman, AISC may, on a case to case basis, permit to accept latest series of amendments.

This shall be incorporated in the test report.

Note : Such changes will be considered for inclusion in this standard at the time of its next revision.

Annex A
(Reserved)

Annex B
(Reserved)

Annex C
(Reserved)

Annex D
(Reserved)

Annex E
(Reserved)

Annex F
(Reserved)

ANNEX G

(See 9.2)

CONTROL OF THE CONFORMITY OF PRODUCTION FOR REAR VIEW MIRRORS (Periodic tests to be carried out by the manufacturer)

G 1. DEFINITIONS

For the purpose of this Annex,

"Type of deflection system" means a given combination of axes, swivel points and other articulating mechanisms, which ensures deflection of the rear-view mirror in the direction of impact concerned.

G 2. TESTS

Rear-view mirrors shall be subjected to the following tests:

G-2.1. **Reflecting surface**

G-2.1.1. Verification of the nominal radius of curvature, pursuant to the requirements of G-2 of Annex G of Part 1 of this standard.

G-2.1.2. Measurement of the differences between radii of curvature pursuant to the requirements of 7.2.2.

G-2.2. **Deflection system**

Impact test pursuant to the requirements of 8.2.

G-3. FREQUENCY AND RESULTS OF TESTS

G-3.1. **Verification of the nominal radius of curvature and measurement of the differences between radii of curvature**

G -3.1.1 **Frequency**

One test every three months, per approval number, per nominal radius of curvature.

G-3.1.2. **Results**

All measurement results shall be recorded.

The maximum difference values prescribed in 7.2.2 shall be complied with.

G-3.2. **Impact test**

G-3.2.1. **Frequency:**

One test every three months, per approval number, per type of deflection system, per base configuration.

G-3.2.2. **Results:**

All results shall be recorded.

The provisions of 8.4 shall be complied with.

G-3.3. **Selection of samples**

The selection of samples to be tested shall take account of the quantity produced for each type of rear-view mirrors.

ANNEX H
(See introduction)

COMPOSITION OF AISC PANEL ON REAR VIEW MIRRORS *

Convener	
Mr. T. M. Balaraman	Hero Honda Motors Ltd., (SIAM)
Members	**Representing**
Mr. A. S. Bhale	The Automotive Research Association of India (ARAI)
Mr. B. V. Shamsundara	The Automotive Research Association of India (ARAI)
Mr. D. P. Saste	Central Institute of Road Transport (CIRT)
Mr. V. D. Chavan	Central Institute of Road Transport (CIRT)
Dr. Madhusudan Joshi	International Centre for Automotive Technology (ICAT)
Mr. G.R.M. Rao	Vehicle Research & Dev. Estt. (VRDE)
Dr. N. Karuppaiah	National Automotive Testing and R&D Infrastructure Project (NATRIP)
Mr. K. K. Gandhi	Society of Indian Automobile Manufacturers (SIAM)
Mr. G. K. Binani	Society of Indian Automobile Manufacturers (SIAM) (Tata Motors Ltd)
Mr. P. K. Banerjee	Society of Indian Automobile Manufacturers (SIAM) (Tata Motors Ltd)
Mr. R. M. Kanitkar	Society of Indian Automobile Manufacturers (SIAM) (Force Motors Ltd.)
Mr. Z. A. Mujawar	Society of Indian Automobile Manufacturers (SIAM) (Mahindra and Mahindra Ltd)
Mr. Nagendra H. V.	Society of Indian Automobile Manufacturers (SIAM) (Toyota Kirloskar Motor Pvt. Ltd)
Mr. Prakash Vemali	Society of Indian Automobile Manufacturers (SIAM) (Mercedes Benz India Ltd.)
Mr. Jitendra Malhotra	Society of Indian Automobile Manufacturers (SIAM) (Maruti Suzuki India Ltd)
Mr. Sumit Sharma	Society of Indian Automobile Manufacturers (SIAM) (Volkswagen India Private Ltd.)
Mr. Harjeet Singh	Society of Indian Automobile Manufacturers (SIAM) (Hero Honda Motors Ltd)
Mr. Harsh Agrawal	Society of Indian Automobile Manufacturers (SIAM) (Hero Honda Motors Ltd)
Mr. S Ramiah	Society of Indian Automobile Manufacturers (SIAM) (TVS Motor Company Limited)
Mr. T.C. Gopalan,	Tractor Manufacturers Association (TMA)

Mr. K. N. D. Nambudiripad	Automotive Component Manufacturers Association (ACMA)
Mr. G. V. George	FIEM Industries Ltd. (ACMA)
Mr. Rajagopalan	FIEM Industries Ltd. (ACMA)
Mr. Virendra Sachdev	Lumax Industries Ltd. (ACMA)
Mr. Sagar Kulkarni	Rinder India Pvt. Ltd. (ACMA)
Mr. T. V. Singh	Bureau of Indian Standards (BIS)
Mr. Rajiv Agarwal	All India Auto & Miniature Bulbs & Component Mfrs. Association
Mr. C. K. Choudhari	All India Auto & Miniature Bulbs & Component Mfrs. Association

* At the time of approval of this Automotive Industry Standard (AIS)

ANNEX J
(See introduction)

COMMITTEE COMPOSITION *
Automotive Industry Standards Committee

Chairman	
Shri Shrikant R. Marathe	Director The Automotive Research Association of India, Pune
Members	**Representing**
Representative from	Ministry of Road Transport & Highways (Dept. of Road Transport & Highways), New Delhi
Representative from	Ministry of Heavy Industries & Public Enterprises (Department of Heavy Industry), New Delhi
Shri S. M. Ahuja	Office of the Development Commissioner, MSME, Ministry of Micro, Small & Medium Enterprises, New Delhi
Shri T. V. Singh	Bureau of Indian Standards, New Delhi
Director Shri D. P. Saste (Alternate)	Central Institute of Road Transport, Pune
Dr. M. O. Garg	Indian Institute of Petroleum, Dehra Dun
Shri C. P. Ramnarayanan	Vehicles Research & Development Establishment, Ahmednagar
Representatives from	Society of Indian Automobile Manufacturers
Shri T.C. Gopalan	Tractor Manufacturers Association, New Delhi
Shri K.N.D. Nambudiripad	Automotive Components Manufacturers Association of India, New Delhi

Member Secretary
Mrs. Rashmi Urdhwareshe
Sr. Deputy Director
The Automotive Research Association of India, Pune

* At the time of approval of this Automotive Industry Standard (AIS)