AIS-155

AUTOMOTIVE INDUSTRY STANDARD

Microdot Systems: Product Specification

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ON BEHALF OF:

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

March 2019

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

Sr. No.	Corrigenda	Amendment	Revision	Date	Remark	Misc.
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, will publish this standard.

Based on the discussions in the 51st Meeting of CMVR-TSC held on 11th December 2017 a working group under the convenorship of Director ICAT was formulated to take the subject forward. Subsequently the working group proposed a finalized document on the subject which was adopted in the 54th meeting of CMVR-TSC held on 8th September 2018 as AIS 155. It was agreed to adopt the standard as a guideline standard.

While formulating the standard reference has been drawn from the following documents:

- SANS 534-1:2010 Edition 2: Vehicle security- Whole-of-vehicle marking (Part 1: Microdot System)
- SANS 534-1:2017 Edition 4: Vehicle security- Whole-of-vehicle marking (Part 1: Microdot System)
- JIS D0205: Test method of weather ability for Automotive Parts
- ASTM D4060: Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
- ISO 16750-5: Road vehicles -- Environmental conditions and testing for electrical and electronic equipment - Part 5: Chemical loads

Composition of the Panel and Automotive Industry Standards Committee (AISC) responsible for preparation of this standard are given in Annex III and IV.

MICRODOT SYSTEMS: PRODUCT SPECIFICATION

1.0 SCOPE

The standard recommends the minimum performance requirements of the adhesive and microdots used to affix as microdot identifiers on motor vehicle and their parts, components, assemblies, etc.

This standard also specifies the guidelines for the characteristics and recommends the positions to affix the unique identification carriers, called microdots.

2.0 REFERENCES

IS 14272	Automotive Vehicles – Types – Terminology
IS 9000: Part XI	Basic Environmental Testing Procedures for Electronic and Electrical items: Part XI Salt Mist Test
AIS-065	Statutory Plates and Inscriptions for Motor Vehicles, their Location and Method of attachment – Vehicle Identification Numbering System
AIS-136	Construction Equipment Vehicles or Earth-moving Vehicles / Machinery - Product Identification Numbering System
AIS-117	Statutory Plates and Inscriptions for Agricultural Tractors, their Location and Method of Attachment Agricultural Tractor Identification Numbering System

3.0 DEFINITIONS:

For the purpose of this standard, the following definitions shall apply:

3.1 Marking

Positions including recommended positions of marking to motor vehicle and their parts, components, assemblies, etc.

3.2 Microdot

Micro-particle that bears a visual readable identifier. Micro particles are typically of size ranging from 0.5 mm to 1.8 mm.

3.3 Microdot Identifier

Microdot identifier should be a unique number also called PIN or VIN or ATIN or P-DIN.

3.3.1 **Product Identification Number (PIN)**

The product identification number is a unique combination of characters assigned to each construction equipment vehicle or earth-moving vehicle / machinery by the manufacturer (refer clause 4.2).

3.3.2 **Vehicle Identification Number (VIN)**

The vehicle identification number is a unique combination of characters assigned to each vehicle by the manufacturer (refer clause 4.2).

3.3.3 **Agricultural Tractor Identification Number (ATIN)**

The agricultural tractor identification number is a unique combination of characters assigned to each agricultural tractor by the manufacturer (refer clause 4.2).

3.3.4 **Predetermined Identification Number (P-DIN)**

The predetermined identification number is a unique identification number on the microdot (refer clause 4.2).

3.4 **Microdot Supplier**

For the purpose of this standard supplier can be manufacturer / importer or distributor, certified by the Test Agency.

3.5 **Microdot Installer**

Organization that will affix the microdots to motor vehicle and their parts, components, assemblies, etc. (including vehicle manufacturers or microdot suppliers).

3.6 **Test Agency**

Test agency is an organization specified in rule 126 of CMVR, 1989.

4.0 REQUIREMENTS FOR MICRODOTS

4.1 Text Content Of Microdots

4.1.1. All the text on every microdot shall be legible with equipment that magnifies the text at least 60 times.

4.1.2 Characters on the microdot shall be consecutive and not separated by spaces. The microdot identifier shall appear at least once on every microdot. If the text on the microdot is repeated, every occurrence shall be separated by an asterisk (*) from the next occurrence.

4.1.3 The microdot identifier shall be included in the text uniquely brought onto the dot during its manufacture.
Any other legible logo or text may be displayed in a different optically readable format.

4.2 **Text on The Microdot: Microdot Identifier**

4.2.1 **When the Microdot Identifier is a PIN (Refer AIS-136)**

In the case where the microdot identifier is a PIN, the microdot text shall contain the PIN.

4.2.2 **When the Microdot Identifier is a VIN (Refer AIS-065)**

In the case where the microdot identifier is a VIN, the microdot text shall contain the VIN.

4.2.3 **When the Microdot Identifier is a ATIN (Refer AIS-117)**

In the case where the microdot identifier is ATIN, the microdot text shall contain the ATIN.

4.2.4 **When the Microdot Identifier is a P-DIN**

The microdot text shall contain:

- A minimum of 10 alpha-numeric characters, of which the letters shall be Roman capitals excluding I, O and Q (except in the case of the two-character country code) and numerals shall be Arabic 0 to 9.
- Recommended Coding in following sequence:
  - OEM code (3(three) Characters)
  - Category of Vehicle code (1(one) Characters)
  - Microdot supplier Code (1(one) Characters)
  - Unique number (remaining)

At the choice of the manufacturer, OEM code and microdot supplier code can be included as part of the background design.

4.3 **Uniqueness**

The uniqueness of the microdot shall be enforced through the uniqueness of the microdot identifier.
The microdot supplier shall

a) ensure that all the microdots in the container bear the same microdot identifier, and

b) never manufacture a microdot bearing a microdot identifier that was previously borne by any microdot in another container.

c) ensure all information regarding the manufacture and the supply of microdots shall be recorded in the information system by microdot supplier.

4.4 **Authenticity**

The microdot supplier may add covert features to the microdot. The features may be proprietary. Covert features shall be declared, verified and recorded during testing.

4.5 **Adhesive and Coating Material**

The adhesive and coating material shall readily coat the microdots and cause them to adhere to motor vehicle and their parts, components, assemblies, etc. in such a manner that ensures compliance with the accelerated ageing and withstand the removal tests specified in Clause 8 of this standard.

4.5.1 The adhesive and coating material shall allow for the selective removal of a small number of individual microdots (but not the en-mass removal of microdots).

4.5.2 The adhesive and coating material shall allow for easy detection by incorporating a trace element that enables its presence to be detected using an ultraviolet light source with a wave length in the range of between 365 nm and 400 nm (inclusive).

4.5.3 The adhesive and coating material shall not affect the integrity of the base material onto which the microdots are applied / affix.

4.6 **Container**

The container in which microdots are supplied shall bear information regarding the microdots in the container including the microdot identifier in legible alpha-numeric characters. The container shall be tamperproof, and shall signify that it might have been used or that its integrity has been compromised if certain seals are broken.

Used / unused container shall be managed / controlled and destroy in controlled conditions.

4.7 **Notification Label / Marking**

A label / marking may be affixed on the motor vehicle and their parts, components, assemblies, etc. by the microdot supplier in a position where it may easily be read. In case of motor vehicle, it may easily be read from outside the motor vehicle and shall not obstruct the view of the driver. The purpose of the label / marking on motor vehicle is to alert that microdots have been affixed to the motor vehicle.

The notification label / marking may be supplied separately from the container and shall not bear the microdot identifier referred to in Clause 4.2.

5.0 TESTING

The microdot supplier shall ensure that adhesive and coating material pass the entire test procedure specified in Clause 8 of this standard.

Test report from test agency as notified under CMV rule no. 126 shall be obtained and held.

ANNEX I refers to the list of tests applicable.

ANNEX II refers to the checklist: Technical specifications to be submitted at the time of testing.

6.0 QUALITY MANAGEMENT SYSTEMS

Every microdot supplier shall implement and maintain a quality management system for all aspects of its operations regarding the microdot system as described in this standard.

The microdot supplier shall obtain and maintain certification that such quality management system complies with a recognized standard such as ISO 9001 or an equivalent. Such certification shall at least include the following aspects:

a) Document control;
b) Record control;
c) Internal audit;
d) Corrective action;
e) Preventive action; and
f) Control of non-conforming product.

7.0 RECOMMENDED POSITIONS OF FITMENT OF MICRODOTS

Surface preparation

The surfaces to which the microdots are to be applied shall allow the adhesive to adhere. If required, the surfaces shall be prepared and cleaned, and especially all dust, wax and oil shall be removed.

All category at least 5,000 Microdots, except for L and E-rickshaw / E-cart where at least 2,000 microdots, shall be applied. Minimum positions: 05 (five).

For parts, components, assemblies, etc. at least 1,000 microdots shall be applied.

7.1 In the case of a vehicle, excluding special vehicles and vehicles of categories M2, M3, N2, N3, T, C, A, L and E-rickshaw / E-cart. Recommended Positions:

a) The information/ Registration plate; if not attached, the position of the chassis number or the VIN;

b) The chassis or frame;

c) The inside boot reinforcing (where applicable);

d) Inside / Beneath front and rear bumpers;

e) The front and rear suspension components;

f) The motor/engine, engine head, engine base, bell housing, gearbox and drive shafts (where applicable);

g) The rear axle and differential (where applicable);

h) Parts of the floor pan and structural and reinforcing members;

i) Inside openings in body structural members;

j) Part of the underside of the body;

k) Behind roof panel;

l) All tyre rim;

m) Front and rear light cluster panel;

n) Behind dash board assembly;

o) The inside bonnet reinforcing;

p) Traction batteries (where applicable).

7.2 In the case of a category T trailers,

Recommended Positions:

a) The information/ registration plate; if not attached, the position of the chassis number or the VIN;

b) The chassis or frame – corner, middle;

c) The axles;

d) Suspension components;

e) Inside openings in body structural members;

f) Part of the underside of the body;

g) Behind roof panel (wherever applicable);

h) All tyre rim;

i) Front and rear light cluster panel;

j) Behind dash board assembly;

k) Traction batteries (where applicable).

7.3 In the case of a category E-rickshaw / E-Cart and L vehicles,

Recommended Positions:

a) The information / registration plate; if not attached, the position of the chassis number or the VIN;
b) The chassis or frame;
c) Drive components (for example drive shaft, rear swing-arm);
d) Suspension components;
e) Instrumentation panel;
f) Engine / motor control unit;
g) Engine head, engine base, motor, hub;
h) Behind roof panel (wherever applicable);
i) All tyre rim;
j) Front and rear light cluster panel;
k) Traction batteries (where applicable).

7.4 In the case of a category M2, M3, N2, N3, C and A,
Recommended Positions:

a) The information / registration plate; if not attached, the position of the chassis number or the VIN;
b) Inside front / rear bumpers;
c) The front and rear suspension components including axle and differential/s;
d) The engine head, engine base, bell housing, gearbox and drive shafts;
e) Parts of the cab (if fitted) under body, floor pan, chassis members and cross members and structural reinforcement;
f) Inside openings in body structural members;
g) Engine components:
   1) Engine block and cylinder head;
   2) Fuel pump;
   3) Alternator and air conditioner compressor (if fitted);
   4) Starter motor; and
   5) Side members of radiator and intercooler (if fitted).
h) Behind roof panel wherever applicable;
i) All tyre rim;
j) Front and rear light cluster panel;
k) Behind dash board assembly;
l) Traction batteries (where applicable); and
m) Motor / controller (where applicable).

7.5 In the case of a special vehicle,
Recommended Positions:

a) The information plate; if not attached, the position of the chassis number or the VIN;
b) The front and rear suspension components;
c) The engine head, bell housing, gearbox and drive shafts (where applicable);
d) The rear axle and differential (where applicable);
e) Parts of the floor pan and structural and reinforcing members;
f) Inside openings in body structural members;
g) Part of the underside of the body.

7.6 Optional positions of fitment:

In addition to the positions given in above clauses of this standard, microdots may be affixed / applied to following positions:

a) The insides of the doors (including rear hatches, where applicable);
b) Inside the boot and engine bay including openings in the boot and engine bay areas that lead into structural areas of the body;
c) The rear of the instrument panel;
d) The undersides of front seats;
e) The undersides of and behind rear seats;
f) Inside door pillars and behind door pillar trims;
g) Under floor covering area;
h) Behind the roof lining;

7.7 In case of parts, components and assemblies, component manufacturers shall suitably ensure location. The location may be suitably declared.

7.8 Prohibited areas of fitment
Microdots shall not be fitted in positions that negatively affects the following:

a) Warranty (for example electrical components), or
b) Safety of the motor vehicle (glass or friction areas).

7.9 Part replacement

If a part to which microdots were applied in accordance with this standard is replaced, it is not compulsory to reapply microdots to the replacement part.

8.0 ACCELERATED AGEING AND REMOVAL TESTS

8.1 General

The intention of the tests in this clause is to ensure that the fitted microdots, being tested, comply with the specifications and will remain on the motor vehicle and parts, components and assemblies etc. in a readable condition for at least 15 years after fitment.

Under normal operating conditions, it is intended that at least 50% of the microdots applied as prescribed in the instruction manual of the Microdot supplier will be present and will be readable for up to 15 years.

Normal operating conditions include high pressure cleaning with hot or cold water, the use of common detergents for cleaning and exposure to salt mist or spray etc.

8.2 Preparation of Test Specimens

8.2.1 They shall be prepared as per the clauses mentioned below and shall be done prior to the application of the microdot and adhesive system under test:

8.2.1.1 **Type 1** —

1) a mild steel plate;
2) of thickness minimum 0.5 mm;
3) square plates, of length and width 150 mm;
4) fully coated with a typical minimum rust-proof coating / standard coating as declared by manufacturer, as per exposed surface;

8.2.1.2 **Type 2** — Type 2 are Type 1 plate, additionally fully coated to replicate a typical automotive cosmetic surface.

8.2.2 14 (fourteen) test specimens of each type shall be prepared to enable new test specimens to be used for each of the accelerated ageing treatments and subsequent removal test.

8.3 Testing Environment

A controlled atmosphere with a temperature of 23°C ± 5°C and a relative humidity of 50 % ± 5 %, unless otherwise specified.

8.4 Application of Microdot Test Sample

8.4.1 Apply the microdot test sample on one side of every specimen plate. Attempt to fully cover the selected side of the specimen plate. The fitment of the microdot test sample need not be carried out in the test environment as prescribed in clause 8.3. Once the microdots have been applied this side is known as the "prepared side".

Once the fitment has been completed, use an appropriate ultraviolet light to measure and note the coverage. When the coverage is calculated, ensure that not less than 90% of the surface of the specimen plate is covered. Discard any specimen plate with less than 90% coverage and prepare a replacement specimen plate.
Execute the entire test on an access controlled site.

No equipment or other specimen plate may touch the prepared side of the specimen plate during the test, except for the removal of microdots as required for reading.

Condition every specimen plate by storing it in the test environment for at least 24 hours with the prepared side fully exposed, before continuing with the accelerated ageing treatment.

8.5 **Accelerated Ageing Treatments**

8.5.1 **High Air Temperature**

Two of each type of test specimen (Types 1 and 2) shall be placed into an air circulating oven preheated to 110°C ± 1°C and maintained at this oven temperature for a period of 168 hours.

8.5.2 **High Humidity**

Two of each type of test specimen shall be placed in a humidity cabinet at 38°C ± 1°C with a relative humidity of 97% to 100% and maintained in this environment for 168 hours.

8.5.3 **Low Air Temperature**

Two of each type of test specimen shall be placed in a freezer at -30°C ± 2°C for 4 hours.

8.5.4 **Salt Mist Spray**

Two of each type of test specimen shall be subjected for 7 days to the salt mist spray described in IS 9000: Part XI.

8.5.5 **Weatherability Test**

Two of each type of test specimen shall be subjected for Xenon arc lamp system weather ability test (JIS D 0205 Table1-2 to 2-2).

8.5.6 **Combined Environmental and Vibration**

For components normally mounted on the vehicle, two of each type of test specimen shall be subjected to 10 Hz to 500 Hz with maximum amplitude of ±5 mm and maximum acceleration of 3 g.

For components intended for attachment to the engine, two of each type of test specimen shall be subjected to the frequency shall be variable from 20 Hz to 300 Hz with maximum amplitude of ±2 mm and maximum acceleration of 15 g (0-peak).

The frequency variation is 1 octave/min.

The number of cycles is 10; the test shall be performed along each of the 3 axes.

The vibrations are applied at low frequencies at maximum constant amplitude and at a maximum constant acceleration at high frequencies

Temperature at 55°C and 98% relative humidity to be maintained during vibration.

8.5.7 **Melting Temperature**

Two of each type of test specimen shall be placed in a furnace and tested for 10 minutes at minimum 400°C ± 10°C. Specimens shall be then examined. The area still covered with the microdots in the adhesive/coating material shall be assessed visually. Then temperature should be increased by 100°C and raised till maximum temperature of 900°C ± 10°C.

Maximum temperature at which following conditions are not met shall be noted and recorded in test report.

8.5.8 The prepared side (for clause 8.5.1 to 8.5.7) shall be fully exposed during this period. After the treatment, test specimens shall be allowed to return to the testing environment conditions, before proceeding with Clause 8.6.

8.6 **Attempted Removal Tests**

8.6.1 **High Pressure Cold Water and Detergent Cleaner Test**

8.6.1.1 This test consists of cleaning of each type of the test specimens as mentioned in the ANNEX I of this standard using high pressure cold water cleaner with a detergent injection.

8.6.1.1.1 Cleaning: Place the specimen plates on a flat horizontal surface with the prepared sides facing upwards.

Apply and maintain a pressure measured by a calibrated in-line pressure transducer at (11.5 ± 0.5) MPa using an outlet nozzle that creates a fan type spray, the spray being directed at an angle of 25° to clean the specimen plates. Place the outlet nozzle at (130 ± 5) mm from and perpendicular to the test specimen surfaces and move slowly back and forth across the entire specimen plate surfaces for a period of at least 5 minutes such that all areas get approximately the same exposure to the cleaning jet.

8.6.1.2 The spray shall be a high-pressure cold water jet with detergent injection. The detergent shall be

a) A commercially available degreasing detergent for use in high-pressure cold-water cleaners, and

b) Injected at the rate recommended by the detergent or high-pressure cold-water cleaner manufacturer.

8.6.2 **High-Pressure Hot Water Cleaner Test**

8.6.2.1 This test consists of cleaning of each type of the test specimens as mentioned in the ANNEX I of this standard using a high-pressure hot water cleaner (sometimes referred to a steam cleaner).

8.6.2.1.1 Refer clause 8.6.1.1.1 for Cleaning

8.6.2.2 The spray shall be a high-pressure hot water jet with an outlet temperature of 65°C ± 5°C.

8.6.3 **Chemical Test**

8.6.3.1 This test consists of cleaning of each type of the test specimens as mentioned in the ANNEX I of this standard using chemicals defined in ISO 16750-5.

8.6.3.2 The test specimen shall be placed on a flat horizontal surface and the treated side subjected to application of chemicals defined in ISO 16750-5 for 1 hour at room temperature.

8.6.4 **Abrasion Test**

8.6.4.1 This test consists of abrading of each type of the test specimens as mentioned in the ANNEX I of this standard using method defined in ASTM D4060.

8.6.4.2 The test specimen shall be subjected to test as per ASTM D4060.
No. of cycles: 1.

8.7 **Acceptance Criteria**

Each test specimen shall be allowed to dry and then examined under an ultraviolet light. The area still covered with the microdot identification system as indicated by the response of the UV tracer in the adhesive and coating material shall be assessed visually, after the tests mentioned in clause 8.5.1 to 8.6.4 (except clause 8.5.7).

Test is deemed to have been passed, if:

a) The measured coverage is 75 % or more,

b) The microdot identifier on at least 50% of microdots (microdots being on the specimen plate or microdots that were removed) can be read successfully, and

c) The microdot identifier on at least one microdot removed from every specimen plate can be read successfully.

Failure of one specimen plate is deemed to be a complete failure of the assessed microdot product.

ANNEX I
LISTS OF TESTS APPLICABLE

Sample Type	Sample No.	Test Name										
		High Air Temperature	High Humid.	Low Air Temperature	Salt Mist	Weatherability	Combined Environmental and Vibration	Melting Temperature	High Pressure Cold Water	High Pressure Hot Water	Chemical	Abrasion
Type 1	S1-1	X							X		X	
	S1-2	X								X		X
	S1-3		X						X		X	
	S1-4		X							X		X
	S1-5			X					X		X	
	S1-6			X						X		X
	S1-7				X				X		X	
	S1-8				X					X		X
	S1-9					X			X		X	
	S1-10					X				X		X
	S1-11						X					
	S1-12						X					
	S1-13							X				
	S1-14							X				
Type 2	S2-1	X							X		X	
	S2-2	X								X		X
	S2-3		X						X		X	
	S2-4		X							X		X
	S2-5			X					X		X	
	S2-6			X						X		X
	S2-7				X				X		X	
	S2-8				X					X		X
	S2-9					X			X		X	
	S2-10					X				X		X
	S2-11						X					
	S2-12						X					
	S2-13							X				
	S2-14							X				

ANNEX II

CHECKLIST:
TECHNICAL SPECIFICATIONS TO BE SUBMITTED
AT THE TIME OF TESTING

General information	
Name and address of Microdots Supplier with contact persons' name, designation, email, phone nos. etc.	
Importers Name and address of Microdots Supplier with contact persons' name, designation, email, phone nos. etc.	
Name(s) and address (es) of manufacturing plants	
*Material of Microdot	
*Adhesive/Lacquer Composition (with certificate of analysis)	
*Size of Microdot	
*Shape of Microdot (Hexagon, Circular, etc.)	
*Type of Applicator (Canister, Pen, etc.)	
*Covert / Proprietary Features	
Microdot Identifier mentioned on Microdot	
*Vehicle Category	
Details of parts, components, assemblies, etc.	
ISO Certification/Quality Standard details (supporting documents to be submitted)	
Any Additional Information	

*Note: Specify all, in case of more than one.

ANNEX III
COMPOSITION OF AISC PANEL*

Name	Organization
Mr. Dinesh Tyagi	Convener Director, ICAT International Centre for Automotive Technology, Manesar
Members	**Representing**
Ms. Vijayanta Ahuja	International Centre for Automotive Technology, Manesar
Dr. Madhusudan Joshi	International Centre for Automotive Technology, Manesar
Ms. Aditi Sethi	International Centre for Automotive Technology, Manesar
Ms. Sita Kumari	International Centre for Automotive Technology, Manesar
Representatives	SIAM
Ms. Sania S. Yusuf	ABE Pvt. Ltd.
Mr. Arpit	ABE Pvt. Ltd.
Mr. Mukesh Bhargava	ELS Electronic System Pvt. Ltd.
Mr. Mukesh Goel	Gopsons Papers Ltd.
Mr. R Srivatchan	Chaturth Business Solutions Pvt. Ltd.
Mr. Sooraj Dhawan	Recoveri India
Mr. Vikram Chopra	Recoveri India
Mr. Temogen Hield	DataDot Technology Limited
Mr. P. R Sundaram	Empeyesti
Mr. Sanjay Thakur	ICICI LOMBARD
Mr. Puneet Thakur	Australian Trade and Investment Commission (Austrade)

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

ANNEX IV
(See Introduction)
COMMITTEE COMPOSITION*
Automotive Industry Standards Committee

Chairperson	
Mrs. Rashmi Urdhwareshe	Director The Automotive Research Association of India, Pune
Members	**Representing**
Representative from	Ministry of Road Transport and Highways (Dept. of Road Transport and Highways), New Delhi
Representative from	Ministry of Heavy Industries and Public Enterprises (Department of Heavy Industry), New Delhi
Shri S. M. Ahuja	Office of the Development Commissioner, MSME, Ministry of Micro, Small and Medium Enterprises, New Delhi
Shri Shrikant R. Marathe	Former Chairman, AISC
Shri R.R. Singh	Bureau of Indian Standards, New Delhi
Director	Central Institute of Road Transport, Pune
Director	Global Automotive Research Centre
Director	International Centre for Automotive Technology, Manesar
Director	Indian Institute of Petroleum, Dehra Dun
Director	Vehicles Research and Development Establishment, Ahmednagar
Director	Indian Rubber Manufacturers Research Association
Representatives from	Society of Indian Automobile Manufacturers
Shri R. P. Vasudevan	Tractor Manufacturers Association, New Delhi
Shri Uday Harite	Automotive Components Manufacturers Association of India, New Delhi

Member Secretary
Shri Vikram Tandon
Dy. General Manager
The Automotive Research Association of India, Pune

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