AUTOMOTIVE INDUSTRY STANDARD

APPROVAL OF VEHICLES WITH REGARDS TO SOFTWARE UPDATE AND SOFTWARE UPDATES MANAGEMENT SYSTEM

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 and HIGHWAYS
GOVERNMENT OF INDIA

April 2024

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 (CMVR-TSC). After approval, the Automotive Research Association of India, (ARAI), Pune, being the Secretariat of the AIS Committee, will publish this standard. For better dissemination of this information ARAI may publish this document on their Website.

Based on the discussion in the 66th meeting of AISC held on 14th July, 2021, it was agreed to formulate an Automotive Industry Standard (AIS) for approval of vehicles to ensure compliance with requirements of Software Updates and Management Systems (SUMS) as defined in this Standard. The purpose of this Standard is to establish uniform provisions for Software Updates and Management Systems (SUMS) equipped in motor vehicles of categories M, N, T, A and C that permits software updates.

For preparation of this standard considerable assistance is derived from UNR 156, date of entry into force 22 January 2021.

The AISC panel and the Automotive Industry Standards Committee (AISC) responsible for preparation of this standard are given in Annexure-D and Annexure-E respectively.

CONTENTS

LIST OF ANNEXURES & APPENDIX

Approval of Vehicle with regards to Software Updates and Software Management System (SUMS)

1.0 SCOPE

1.1 This Standard applies to vehicles of Categories M, N, T, A and C as defined in IS 14272, as amended from time to time, and that permit software updates.

2.0 DEFINITIONS

For the purposes of this standard the following definitions shall apply.

2.1 "Vehicle type" means vehicles which do not differ in at least the following:

(a) The manufacturer's designation of the vehicle type;

(b) Essential aspects of the design of the vehicle type with respect to software update processes.

2.2 AIS X / RX[1] Software Identification Number (AISXSWIN / RXSWIN[1]) means a dedicated identifier, defined by the vehicle manufacturer, representing information about the type approval relevant software of the Electronic Control System contributing to the Standard N° X type approval relevant characteristics of the vehicle.

[1] AISXWIN or RXSWIN or any other Nomenclature Defined by OEM (as long as the traceability and history of changes records are managed)

2.3 "Software update" means a package used to upgrade software to a new version including a change of the configuration parameters.

2.4 "Execution" means the process of installing and activating an update that has been downloaded.

2.5 "Software Update Management System (SUMS)" means a systematic approach defining organizational processes and procedures to comply with the requirements for delivery of software updates according to this Standard.

2.6 "Vehicle user" means a person operating or driving the vehicle, a vehicle owner, an authorized representative or employee of a fleet manager, an authorized representative or employee of the vehicle manufacturer, or an authorized technician.

2.7 "Safe state" means an operating mode in case of a failure of an item without an unreasonable level of risk.

2.8 "Software" means the part of an Electronic Control System that consists of digital data and instruction.

2.9 "Over-the-Air (OTA) update" means any method of making data transfers wirelessly instead of using a cable or other local connection.

2.10 "System" means a set of components and/or sub-systems that implement a function of functions.

2.11 "Integrity validation data" means a representation of digital data, against which comparisons can be made to detect errors or changes in the data. This may include checksums and hash values.

3.0 APPLICATION FOR APPROVAL

3.1 The application for approval of a vehicle type with regard to software update processes shall be submitted by the vehicle manufacturer or by their duly accredited representative.

3.2 It shall be accompanied by the undermentioned documents, and by the following particulars:

3.3 A description of the vehicle type with regard to the items specified in Annexure A to this Standard.

3.4 In cases where information is shown to be covered by intellectual property rights or to constitute specific know-how of the manufacturer or of their suppliers, the manufacturer or their suppliers shall make available sufficient information to enable the checks referred to in this Standard to be made properly. Such information shall be treated on a confidential basis.

3.5 The Certificate of Compliance for Software Update Management System according to Clause 6. of this Standard.

3.6 A vehicle representative of the vehicle type to be approved shall be submitted to the Test agency responsible for conducting approval tests.

3.7 Documentation shall be made available in two parts:

(a) The formal documentation package for the approval, containing the material specified in Annexure A which shall be supplied to the Test agency at the time of submission of the type approval application. This documentation package shall be used by the Test agency as the basic reference for the approval process. The Test agency shall ensure that this documentation package remains available for at least 10 years counted from the time when production of the vehicle type is definitely discontinued.

(b) Additional material relevant to the requirements of this Standard may be retained by the manufacturer but made open for inspection at the time of type approval. The manufacturer shall ensure that any material made open for inspection at the time of type approval remains available for at least a period of 10 years counted from the time when production of the vehicle type is definitely discontinued.

4.0 [RESERVED]

5.0 APPROVAL

5.1 Test agency shall grant, as appropriate, type approval with regard to software update procedures and processes, only to such vehicle types that satisfy the requirements of this Standard.

5.1.1 The Test agency shall verify by testing a vehicle of the vehicle type that the vehicle manufacturer has implemented the measures they have documented. Tests shall be performed by test agency or the technical service itself or in collaboration with the vehicle manufacturer by sampling.

5.2 Notice of approval or of extension or refusal of approval of a vehicle type pursuant to this Standard shall be communicated vehicle manufacturer and nodal agency by means of a form conforming to the model in Annexure B to this Standard.

5.3 Test agencies shall not grant any type approval without ensuring that the manufacturer has put in place satisfactory arrangements and procedures to manage properly the software update processes aspects as covered by this

Standard.

6.0 CERTIFICATE OF COMPLIANCE FOR SOFTWARE UPDATE MANAGEMENT SYSTEM

6.1 Test agency shall carry out the assessment of the manufacturer and to issue a Certificate of Compliance for Software Update Management System.

6.2 An application for a Certificate of Compliance for Software Update Management System shall be submitted by the vehicle manufacturer or by their duly accredited representative.

6.3 It shall be accompanied by the undermentioned documents, and by the following particular:

6.3.1 Documents describing the Software Update Management System.

6.3.2 A signed declaration using the model as defined in Appendix 1 to Annexure A.

6.4 In the context of the assessment, the manufacturer shall declare using the model as defined in Appendix 1 to Annexure A and demonstrate to the satisfaction of the Test agency that they have the necessary processes to comply with all the requirements for software updates according to this Standard.

6.5 When this assessment has been satisfactorily completed and in receipt of a signed declaration from the manufacturer according to the model as defined in Appendix 1 to Annexure A, a certificate named Certificate of Compliance for SUMS as described in Annexure C to this Standard (hereinafter the Certificate of Compliance for SUMS) shall be issued to the manufacturer.

6.6 The Certificate of Compliance for SUMS shall remain valid for a maximum of three years from the date of deliverance of the certificate unless it is withdrawn.

6.7 The Test agency which has granted the Certificate of Compliance for Software Update Management System may at any time verify its continued compliance. The Certificate of Compliance for Software Update Management System may be withdrawn if the requirements laid down in this Standard are no longer met.

6.8 The manufacturer shall inform the Test agency of any change that will affect the relevance of the Certificate of Compliance for Software Update Management System. After consultation with the manufacturer, the Test agency shall decide whether new checks are necessary.

6.9 At the end of the period of validity of the Certificate of Compliance for Software Update Management System, the Test agency shall, after a positive assessment, issue a new Certificate of Compliance for Software Update Management System or extends its validity for a further period of three years. The Test agency shall issue a new certificate in cases where changes have been brought to the attention of the Test agency and the changes have been positively re-assessed.

6.10 Existing vehicle type approvals shall not lose their validity due to the expiration of the manufacturer's Certificate of Compliance for Software Update Management System.

7.0 GENERAL SPECIFICATIONS

7.1 Requirements for the Software Update Management System of the vehicle manufacturer

7.1.1 Processes to be verified at initial assessment

7.1.1.1 A process whereby information relevant to this Standard is documented and securely held at the vehicle manufacturer and can be made available to an Test agency upon request;

7.1.1.2 A process whereby information regarding all initial and updated software versions, including integrity validation data, and relevant hardware components of a type approved system can be uniquely identified;

7.1.1.3 A process whereby, for a vehicle type that has an AISXSWIN / RXSWIN[1], information regarding the AISXSWIN / RXSWIN[1] of the vehicle type before and after an update can be accessed and updated. This shall include the ability to update information regarding the software versions and their integrity validation data of all relevant software for each AISXSWIN / RXSWIN[1] .

7.1.1.4 A process whereby, for a vehicle type that has an AISXSWIN / RXSWIN[1] the vehicle manufacturer can verify that the software version(s) present on a component of a type approved system are consistent with those defined by the relevant AISXSWIN / RXSWIN[1] .

[1] AISXWIN or RXSWIN or any other Nomenclature Defined by OEM (As long as the traceability and history of changes records are managed)

7.1.1.5 A process whereby any interdependencies of the updated system with other systems can be identified;

7.1.1.6 A process whereby the vehicle manufacturer is able to identify target vehicles for a software update;

7.1.1.7 A process to confirm the compatibility of a software update with the target vehicle(s) configuration before it is issued. This shall include an assessment of the last known software/hardware configuration of the target vehicle(s) for compatibility with the update before it is issued;

7.1.1.8 A process to assess, identify and record whether a software update will affect any type approved systems. This shall consider whether the update will impact or alter any of the parameters used to define the systems or the update may affect or whether it may change any of the parameters used to type approve those system (as defined in the relevant standard);

7.1.1.9 A process to assess, identify and record whether a software update will add, alter or enable any functions that were not present, or enabled, when the vehicle was type approved or alter or disable any other parameters or functions that are defined within standard. The assessment shall include consideration of whether:

(a) Entries in the information package will need to be modified;

(b) Test results no longer cover the vehicle after modification;

(c) Any modification to functions on the vehicle will affect the vehicle's type approval.

7.1.1.10 A process to assess, identify and record if a software update will affect any other system required for the safe and continued operation of the vehicle or if the update will add or alter functionality of the vehicle compared to when it was registered;

7.1.1.11 A process whereby the vehicle user is able to be informed about updates;

7.1.1.12 A process whereby the vehicle manufacturer shall be able to make the information according to clauses 7.1.2.3. and 7.1.2.4. available to responsible Test agency. This may be for the purpose of type approval, conformity of production, market surveillance, recalls and Periodic Technical Inspection (PTI).

7.1.2 The vehicle manufacturer shall record, and store, the following information for each update applied to a given vehicle type:

7.1.2.1 Documentation describing the processes used by the vehicle manufacturer for software updates and any relevant standards used to demonstrate their compliance;

7.1.2.2 Documentation describing the configuration of any relevant type approved systems before and after an update, this shall include unique identification for the type approved system's hardware and software (including software versions) and any relevant vehicle or system parameters;

7.1.2.3 For every AISXSWIN / RXSWIN[1], there shall be an auditable register describing all the software relevant to the AISXSWIN / RXSWIN[1] of the vehicle type before and after an update. This shall include information of the software versions and their integrity validation data for all relevant software for each AISXSWIN / RXSWIN[1] .

[1] AISXWIN or RXSWIN or any other Nomenclature Defined by OEM (As long as the traceability and history of changes records are managed)

7.1.2.4 Documentation listing target vehicles for the update and confirmation of the compatibility of the last known configuration of those vehicles with the update.

7.1.2.5 Documentation for all software updates for that vehicle type describing:

(a) The purpose of the update;

(b) What systems or functions of the vehicle the update may affect;

(c) Which of these are type approved (if any);

(d) If applicable, whether the software update affects the fulfilment of any of the relevant requirements of those type approved system;

(e) Whether the software update affects any system type approval parameter;

(f) Whether an approval for the update was sought from test agency;

(g) How the update may be executed and under what conditions;

(h) Confirmation that the software update will be conducted safely and securely;

(i) Confirmation that the software update has undergone and successfully passed verification and validation procedures.

7.1.3 Security - the vehicle manufacturer shall demonstrate:

7.1.3.1 The process they will use to ensure that software updates will be protected to reasonably prevent manipulation before the update process is initiated;

7.1.3.2 The update processes used are protected to reasonably prevent them being compromised, including development of the update delivery system;

7.1.3.3 The processes used to verify and validate software functionality and code for the software used in the vehicle are appropriate.

7.1.4 Additional requirements for software updates over the air

7.1.4.1 The vehicle manufacturer shall demonstrate the processes and procedures they will use to assess that over the air updates will not impact safety, if conducted during driving.

7.1.4.2 The vehicle manufacturer shall demonstrate the processes and procedures they will use to ensure that, when an over the air update requires a specific skilled or complex action, for example recalibrate a sensor post-programming, in order to

complete the update process, the update can only proceed when a person skilled to do that action is present or is in control of the process.

7.2 Requirements for the Vehicle Type

7.2.1 Requirements for Software updates

7.2.1.1 The authenticity and integrity of software updates shall be protected to reasonably prevent their compromise and reasonably prevent invalid updates.

7.2.1.2 Where a vehicle type uses AISXSWIN / RXSWIN[1]

7.2.1.2.1 Each AISXSWIN / RXSWIN[1]shall be uniquely identifiable. When type approval relevant software is modified by the vehicle manufacturer, the AISXSWIN / RXSWIN[1] shall be updated if it leads to a type approval extension or to a new type approval.

7.2.1.2.2 Each AISXSWIN / RXSWIN[1] shall be easily readable in a standardized way via the use of an electronic communication interface, at least by the standard interface (OBD port). If AISXSWIN / RXSWIN[1] (s) are not held on the vehicle, the manufacturer shall declare the software version(s) of the vehicle or single ECUs with the connection to the relevant type approvals to the Test agency. This declaration shall be updated each time the declared software version(s) is updated. In this case, the software version(s) shall be easily readable in a standardized way via the use of an electronic communication interface, at least by the standard interface (OBD port).

7.2.1.2.3 The vehicle manufacturer shall protect the AISXSWIN / RXSWIN[1] and/or software version(s) on a vehicle against unauthorized modification. At the time of Type Approval, the means implemented to protect against unauthorized modification of the AISXSWIN / RXSWIN[1] and/or software version(s) chosen by the vehicle manufacturer shall be confidentially provided.

[1] AISXWIN or RXSWIN or any other Nomenclature Defined by OEM (As long as the traceability and history of changes records are managed)

7.2.2 Additional Requirements for over the air updates

7.2.2.1 The vehicle shall have the following functionality with regards to software updates:

7.2.2.1.1 The vehicle manufacturer shall ensure that the vehicle is able to restore systems to their previous version in case of a failed or interrupted update or that the vehicle can be placed into a safe state after a failed or interrupted update.

7.2.2.1.2 The vehicle manufacturer shall ensure that software updates can only be executed when the vehicle has enough power to complete the update process (including that needed for a possible recovery to the previous version or for the vehicle to be placed into a safe state).

7.2.2.1.3 When the execution of an update may affect the safety of the vehicle, the vehicle manufacturer shall demonstrate how the update will be executed safely. This shall be achieved through technical means that ensures the vehicle is in a state where the update can be executed safely.

7.2.2.2 The vehicle manufacturer shall demonstrate that the vehicle user is able to be informed about an update before the update is executed. The information made available shall contain:

(a) The purpose of the update. This could include the criticality of the update and if the update is for recall, safety and/or security purposes;

(b) Any changes implemented by the update on vehicle functions;

(c) The expected time to complete execution of the update;

(d) Any vehicle functionalities which may not be available during the execution of the update;

(e) Any instructions that may help the vehicle user safely execute the update;

In case of groups of updates with a similar content one information may cover a group.

7.2.2.3 In the situation where the execution of an update whilst driving may not be safe, the vehicle manufacturer shall demonstrate how they will:

(a) Ensure the vehicle cannot be driven during the execution of the update;

(b) Ensure that the driver is not able to use any functionality of the vehicle that would affect the safety of the vehicle or the successful execution of the update.

7.2.2.4 After the execution of an update the vehicle manufacturer shall demonstrate how the following will be implemented:

(a) The vehicle user is able to be informed of the success (or failure) of the update;

(b) The vehicle user is able to be informed about the changes implemented and any related updates to the user manual (if applicable).

7.2.2.5 The vehicle shall ensure that preconditions have to be met before the software update is executed.

8.0 MODIFICATION AND EXTENSION OF THE VEHICLE TYPE

8.1 Every modification of the vehicle type which affects its technical performance and/or documentation required in this Standard shall be notified to the test agency which granted the approval. The test agency may then either:

8.1.1 Consider that the modifications made still comply with the requirements and documentation of prior type approval; or

8.1.2 Require a further test report by conducting the tests.

8.1.3 Confirmation or extension or refusal of approval, specifying the alterations, shall be communicated by means of a communication form conforming to the model in Annexure B to this Standard. The test agency issuing the extension of approval shall assign a series number for such an extension and issue it to vehicle manufacturer by means of a communication form conforming to the model in Annexure B to this Standard.

ANNEXURE A

INFORMATION DOCUMENT

A-1.0 Make (trade name of manufacturer): ……..

A-2.0 Type and general commercial description(s): …….. (Type is the type to be approved, commercial description refers to the product in which the approved type is used)

A-3.0 Means of identification of type, if marked on the vehicle: ……..

A-4.0 Location of that marking: ……..

A-5.0 Category(ies) of vehicle: ……..

A-6.0 Name and address of manufacturer/ manufacturer's representative: ……..

A-7.0 Name(s) and Address(es) of assembly plant(s): ……..

A-8.0 Photograph(s) and/or drawing(s) of a representative vehicle: ……..

A-9.0 Software Updates

A-9.1 General construction characteristics of the vehicle type: ……..

A-9.2 The number of the Certificate of Compliance for Software Update Management System: ……..

A-9.3 Security measures.

A-9.3.1 Documents for the vehicle type to be approved describing that the update process will be performed securely

A-9.3.2 Documents for the vehicle type to be approved describing that the AISXSWIN / RXSWIN[1] s on a vehicle are protected against unauthorized manipulation

[1] AISXWIN or RXSWIN or any other Nomenclature Defined by OEM (As long as the traceability and history of changes records are managed)

A-9.4 Software updates over the air

A-9.4.1 Documents for the vehicle type to be approved describing that the update process will be performed safely

A-9.4.2 How a vehicle user is able to be informed about an update before and after its execution

ANNEXURE A – APPENDIX 1

MODEL OF DECLARATION OF COMPLIANCE FOR SOFTWARE UPDATE MANAGEMENT SYSTEM

Manufacturer's declaration of compliance with the requirements for Software Update Management System

Manufacturer Name: ……..

Manufacturer Address: ……..

…….. (Manufacturer Name) attests that the necessary processes to comply with the requirements for the Software Update Management System laid down in clause 7.1 of this standard are installed and will be maintained.

Done at: …….. (place)

Date: ……..

Name of the signatory: ……..

Function of the signatory: ……..

.....

(Stamp and signature of the manufacturer's representative)

ANNEXURE B

COMMUNICATION

(Maximum format: A4 (210 x 297 mm))

Concerning:[1]

Approval granted

Approval extended

Approval withdrawn with effect from dd/mm/yyyy

Approval refused

Production definitively discontinued of a vehicle type, pursuant to this standard.

Approval No.: …….

Extension No.: …….

Reason for extension: …….

1.0 Make (trade name of manufacturer): …….

2.0 Type and general commercial description(s) …….

3.0 Means of identification of type, if marked on the vehicle: …….

3.1 Location of that marking: …….

4.0 Category(ies) of vehicle: …….

5.0 Name and address of manufacturer / manufacturer's representative: …….

6.0 Name(s) and Address(es) of the production plant(s): …….

7.0 Number of the certificate of compliance for software update management system: …….

8.0 Software updates over the air included (Yes / No): …….

9.0 Test agency responsible for carrying out the tests: …….

10.0 Date of test report: …….

11.0 Number of test report: …….

12.0 Remarks (if any): …….

13.0 Place: …….

14.0 Date: …….

15.0 Signature: …….

16.0 The index to the information package lodged with the Approval Authority, which may be obtained on request is attached

[1] Strike out what does not apply.

ANNEXURE C

MODEL OF CERTIFICATE OF COMPLIANCE FOR SOFTWARE UPDATE MANAGEMENT SYSTEM

CERTIFICATE OF COMPLIANCE FOR

SOFTWARE UPDATE MANAGEMENT SYSTEM

With AIS 190

Certificate Number [Reference number]

[Name of Test Agency]

Certifies that

Manufacturer: .....

Address of the manufacturer: .....

Complies with the provisions of Standard No. [AIS 190]

Verifications have been performed on: .....

by (name and address of the Test Agency): .....

Number of report: .....

The certificate is valid until: [……Date]

Done at: [……Place]

On: [……Date]

[…….Signature]

ANNEXURE D

(See Introduction)

COMPOSITION OF AISC PANEL ON APPROVAL OF VEHICLES WITH REGARDS TO SOFTWARE UPDATES AND MANAGEMENT SYSTEMS (SUMS)

Panel Convener	**Representing**
Mr. Rejin Sathianesan	Robert Bosch Engineering and Business Solutions Private Limited (ACMA)
Members	
Mr. A. A. Badusha	The Automotive Research Association of India
Mr. Manoj M. Desai	The Automotive Research Association of India
Mr. Girish S. Tanawade	The Automotive Research Association of India
Mr. Kamalesh Patil	The Automotive Research Association of India
Mr. Pratik R. Nayak	The Automotive Research Association of India
Mr. U. Sreekumar	The Automotive Research Association of India
Ms. Sneha R. Pawar	The Automotive Research Association of India
Dr. Madhusudan Joshi	International Centre for Automotive Technology
Mr. Rohit Yadav	International Centre for Automotive Technology
Ms. Vijayanta Ahuja	International Centre for Automotive Technology
Mr. Amit Kumar	Society of Indian Automobile Manufacturers (SIAM)
Mr. Ved Prakash Gautam	SIAM (Ashok Leyland Ltd.)
Mr. S. Parthiban	SIAM (Ashok Leyland Ltd.)
Mr. Hari Sai Krishna M	SIAM (Hyundai Motors India Engineering)
Mr. Abhijit Dhotre	SIAM (Mahindra & Mahindra Ltd.)
Mr. Priyanto Deb	SIAM (Mahindra & Mahindra Ltd.)
Ms. Pushpanjali Pathak	SIAM (Mahindra & Mahindra Ltd.)
Mr. Alok Jaitley	SIAM (Maruti Suzuki India Ltd)
Mr. Gururaj Ravi	SIAM (Maruti Suzuki India Ltd)
Mr. Das Subham Kant	SIAM (Maruti Suzuki India Ltd)
Mr. Sumit Kumar	SIAM (Maruti Suzuki India Ltd)
Mr. Arun Kumar	SIAM (Maruti Suzuki India Ltd)
Mr. Vijay Dinakaran	SIAM (Renault Nissan India Pvt. Ltd.)
Mr. Rajendra Khile	SIAM (Renault Nissan India Pvt. Ltd.)
Mr. Milind Jagtap	SIAM (Skoda Auto Volkswagen India Private Ltd.)
Ms. Aditi Deshpande	SIAM (Skoda Auto Volkswagen India Private Ltd.)
Mr. Deepesh Mutke	SIAM (Skoda Auto Volkswagen India Private Ltd.)
Mr. Uday Salunkhe	SIAM (Tata Motors Ltd.)
Mr. Manoj Shukla	SIAM (Tata Motors Ltd.)
Mr. V. Vaisakh	SIAM (Tata Motors Ltd.)
Mr. Sanjay Tank	The Automotive Component Manufacturers Association of India (ACMA)
Mr. Alok Kumar	ACMA (Denso International India Pvt. Ltd.)
Ms. Alka Sharma	ACMA (Denso International India Pvt. Ltd.)
Mr. Omkar Damodare	ACMA (ETAS)
Mr. Khushwant Pawar	ACMA (ETAS)
Dr. Chandrama Thorat	ACMA (Faurecia India Private Limited)
Mr. Saurabh Pathak	ACMA (Minda Group)
Mr. Ashutosh Telang	ACMA (Minda Group)

Ms. Devayani Jayant Kulkarni	ACMA (Robert Bosch Engineering and Business Solutions Private Limited)
Mr. Avinash Sathyanarayana Jayam	ACMA (Robert Bosch Engineering and Business Solutions Private Limited)
Mr. Sreenikethana Venkatachalapathy	ACMA (Vitesco Technologies India Pvt. Ltd)
* At the time of approval of this Automotive Industry Standard (AIS)	

ANNEXURE E
(See Introduction)

COMMITTEE COMPOSITION *
Automotive Industry Standards Committee

Chairperson	
Dr. Reji Mathai	Director, The Automotive Research Association of India
Members	**Representing**
Representative from	Ministry of Road Transport and Highways
Representative from	Ministry of Heavy Industries
Representative from	Office of the Development Commissioner, MSME, Ministry of Micro, Small and Medium Enterprises
Shri Shrikant R. Marathe	Former Chairman, AISC
Shri P. V. Srikanth	Bureau of Indian Standards
Director	Central Institute of Road Transport
Director	Global Automotive Research Centre
Director	International Centre for Automotive Technology
Director	Indian Institute of Petroleum
Director	Vehicles Research and Development Establishment
Director	Indian Rubber Manufacturers Research Association
Representatives from	Society of Indian Automobile Manufacturers
Representative from	Tractor and Mechanization Association
Representative from	Automotive Components Manufacturers Association of India
Representative from	Indian Construction Equipment Manufactures' Association
Member Secretary	
Shri Vikram Tandon	The Automotive Research Association of India

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