AMENDMENT NO. 1 (05/2025)
to

AIS-180
Specific Requirements for Motor Vehicles intended for the carriage of Dangerous and Hazardous Goods with regard to their Constructional Features

1. **Page 5/36 of AIS-180, clause 4.1.1.2.1 Cables**

   Substitute following text for the existing text:

   " 4.1.1.2.1 No cable in an electrical circuit shall carry a current in excess of that for which the cable is designed. Conductors shall be adequately insulated. The cables shall be suitable for the conditions in the area of the vehicle, such as temperature range and fluid compatibility conditions as they are intended to be used. The cables shall be in conformity with standard ISO 6722-1:2011 including its Corr. 01:2012 or ISO 6722-2:2013. Cables shall be securely fastened and positioned to be protected against mechanical and thermal stresses. At the choice of manufacturer double pole wiring may be provided. If double pole wiring is provided it shall comply requirements specified in OISD-RP-157 & 167.

2. **Page 23/36 of AIS-180, clause 4.3.2.1**

   Substitute following text for the existing text:

   " 4.3.2.1 Every transport unit including trailers carrying dangerous and hazardous goods shall be equipped with fire extinguishers as per Petroleum rules or PESO 2002 published in 2012;

   a) A portable fire extinguisher (10 kg. dry chemical powder or equivalent) suitable for extinguishing petroleum fire shall be carried in an easily accessible and detachable position and away from the discharge faucets on every vehicle transporting petroleum by road. Additionally, one dry chemical powder type fire extinguisher of 1 kg. Capacity shall be carried in the driver's cabin of the vehicle.

   b) For vehicles of category EX (carrying explosives) – two fire extinguishers, one capable of dousing electrical fires and the other capable handling fires due to engine, tyres etc. This is as per Explosive Rules.

   At the choice of manufacturer more number of fire extinguishers (dry chemical powder type or equivalent) compared to a) or b) may be provided."

3. Page 24/36 of AIS-180, after clause 4.3.4

Add new clauses 4.3.5 and 4.3.6 after existing clause 4.3.4

"4.3.5 Hazardous or dangerous goods carrying vehicles of N category shall have reverse alarm to alert persons outside of vehicle about reversing motion of vehicle.

4.3.6 Hazardous or dangerous goods carrying vehicles of N1 category shall have Anti-lock Braking System complying provisions of IS 15986: 2015."

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P.B. NO. 832, PUNE 412 004

ON BEHALF OF:
AUTOMOTIVE INDUSTRY STANDARDS COMMITTEE

UNDER
CENTRAL MOTOR VEHICLE RULES - TECHNICAL STANDING COMMITTEE

SET-UP BY
MINISTRY OF SHIPPING, ROAD TRANSPORT & HIGHWAYS
GOVERNMENT OF INDIA

7th May 2025

AIS-180

AUTOMOTIVE INDUSTRY STANDARD

Specific Requirements for Motor Vehicles intended for the carriage of Dangerous and Hazardous Goods with regard to their Constructional Features

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GOVERNMENT OF INDIA

March 2025

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

Specific requirements for construction of goods vehicles carrying hazardous or dangerous goods are covered under AIS-093(Rev. 1) Truck Body Code. While deliberating on study of alignment of our standards with UN Regulations under India-GRSG Group, it was observed that N1 category goods vehicle, automotive trailers and Mobile Explosive Manufacturing Units (MEMUs) also require to be covered as part of this requirement.

Also, with increase in electrification of vehicles, need for enhancing safety in transportation of batteries was highlighted. Hence, based on discussions in India-GRSG Group meetings and 66th AISC meeting held on 14th July 2021, it was decided to prepare separate AIS standard in line with latest version of UN Regulation 105 and referring & incorporating some of the relevant requirements from ADR 2021(Part 9).

The AISC panel and the Automotive Industry Standards Committee (AISC) responsible for preparation of this standard are given in Annexures III and IV.

Specific Requirements for Motor Vehicles intended for the carriage of Dangerous and Hazardous Goods with regard to their Constructional Features

CONTENTS

List of Annexures

Specific Requirements for Motor Vehicles intended for the carriage of Dangerous and Hazardous Goods with regard to their Constructional Features

1. SCOPE

This standard applies to the construction of motor vehicles of category N and their trailers of categories T3 and T4 intended for the transport of dangerous and hazardous goods by Road.

Note: This standard does not cover requirements for transportation of dangerous goods packed in limited quantity and packed in excepted quantity, for which the provisions are applicable as specified in AIS-179.

2. REFERENCES

2.1 UN R105.06, Supplement 1 [Revision 3-Amendment 1]
Uniform Provisions Concerning the Approval of Vehicles intended for the carriage of Dangerous Goods with regard to their specific Constructional Features

2.2 ADR 2021 (Agreement Concerning the International Carriage of Dangerous Goods by Road) - Part 9 (Requirements concerning the construction and approval of vehicles)

3. DEFINITIONS

3.1 **"Vehicle"** means any vehicle, whether complete (e.g. one stage-built vans, lorries, tractors, trailers), incomplete (e.g. chassis, chassis-cab, trailer chassis) or completed (e.g. chassis or chassis-cab fitted with a bodywork), intended for the carriage of dangerous and hazardous goods by road

3.2 **"Vehicle type"** means vehicles which do not differ essentially with regard to the constructional features specified in this standard.

3.3 **"EX/II vehicle"** or **"EX/III vehicle"** means a vehicle intended for the carriage of explosive substances and articles (Class 1)

3.4 **"FL Vehicle"** means:

a) A vehicle intended for the carriage of liquids having a flash-point of not more than 60°C [with the exception of diesel fuel complying with standard EN 590:2013 + A1:2017, gas oil, and heating oil (light)- UN No. 1202-with a flash-point as specified in standard EN 590:2013 + A1:2017] in fixed tanks or demountable tanks with a capacity exceeding 1 m^3 or in tank containers or portable tanks with an individual capacity exceeding 3 m^3 ; or

b) A vehicle intended for the carriage of flammable gases in fixed tanks or demountable tanks with a capacity exceeding 1 m^3 or in tank-containers, portable tanks or MEGCs with an individual capacity exceeding 3 m^3; or

c) A battery-vehicle with a total capacity exceeding 1 m^3 intended for the carriage of flammable gases; or

d) A vehicle intended for the carriage of hydrogen peroxide, stabilized or hydrogen peroxide, aqueous solution stabilized with more than 60% hydrogen peroxide (Class 5.1, UN No. 2015) in fixed tanks or demountable tanks with a capacity exceeding 1 m^3 or in tank-containers or portable tanks with an individual capacity exceeding 3 m^3.

3.5 **"AT vehicle"** means:

(a) A vehicle, other than EX/III or FL vehicle or than a MEMU, intended for the carriage of dangerous and hazardous goods in fixed tanks or demountable tanks with a capacity exceeding 1 m^3 or in tank-containers, portable tanks or MEGCs with an individual capacity exceeding 3 m^3; or

(b) A battery-vehicle with a total capacity exceeding 1 m^3 other than a FL vehicle;

3.6 **"Mobile explosives manufacturing unit (MEMU)"** means a unit, or a vehicle mounted with a unit, for manufacturing and charging explosives from dangerous goods that are not explosives. The unit consists of various tanks and bulk containers and process equipment as well as pumps and related equipment. The MEMU may have special compartments for packaged explosive;

Note 1:

- Petroleum Class A - petroleum having a flash-point below 23 degrees centigrade
- Petroleum Class B - petroleum having a flash point of 23 degrees centigrade and above but below 65 degrees centigrade
- Petroleum Class C - petroleum-having flash point of 65 degrees and above

Note 2:

Explosive means gunpowder, nitroglycerine, nitroglycol, gun-cotton, di-nitro-toluene, tri-nitro-toluene, picric acid, di-nitor-phenol, tri- nitor-resorcinol (styphnic act), cyclo-trimethylene-trinitramine, penta-erythritol-tetranitrate, tetry1, nitroguanidine, lead azide, lead styphynate, fulminate of mercury or any other metal, diazo-di-nitor- phenol, coloured fires or any other substance whether a single chemical compound or a mixture of substances, whether solid or liquid or gaseous used or manufactured with a view to produce a practical effect by explosion or pyrotechnic effect; and includes fog-signals, fireworks, fuses, rockets, percussion caps, detonators, cartridges, ammunition of all descriptions and every adaptation or preparation of an explosive as defined in this note.

Note 3:

Even though the definition of MEMU includes the expression "manufacturing and charging explosives" the requirements for MEMUs apply only to carriage and not to manufacturing and charging of explosives.

4 TECHNICAL PROVISIONS

4.1 Technical provisions for base vehicles

Vehicles shall, depending on the vehicle designation, comply with the following provisions as assigned in the table below.

For the purpose of this standard, MEMU vehicles shall comply with the requirements applicable to EX/III vehicles.

Technical specifications		Vehicle Designation (EX/II, EX/III, AT, FL, MEMU)				
		EX/II	EX/III	AT	FL	
4.1.1	Electrical equipment					
4.1.1.1	General provisions	x	x	x	x	
4.1.1.2.1	Cables	x	x	x	x	
4.1.1.2.2	Additional protection	x[a]	x	x	x	
4.1.1.3	Fuses and circuit breakers	x	x	x	x	
4.1.1.4	Batteries	x	x	x	x	
4.1.1.5	Lighting	x	x	x	x	
4.1.1.6	Electrical connections between motor vehicles and trailers	x[b]	x	x	x	
4.1.1.7	Voltage	x	x			
4.1.1.8	Battery master switch		x		x	
4.1.1.9	Permanently energized circuits					
4.1.1.9.1					x	
4.1.1.9.2			x			
4.1.1.10	Tachographs	x	x	x	x	
4.1.1.11	Vehicle tracking system	x	x	x	x	
4.1.1.12	Electrical lifting mechanism	x*	x*	x*	x*	
4.1.2	Braking equipment	x	x	x	x	
4.1.3	Prevention of fire risks					
4.1.3.1	General provisions	x	x	x	x	
4.1.3.2	Vehicle cab	x	x	x	x	
4.1.3.3	Fuel tanks and cylinders	x	x		x	
4.1.3.4	Engine	x	x		x	
4.1.3.5	Exhaust system	x	x		x	
4.1.3.6	Vehicle endurance braking	x[c]	x[c]	x[c]	x[c]	
4.1.3.7	Combustion heaters	x*	x*	x*	x*	
4.1.4	Speed Governor	x	x	x	x	
4.1.5	Coupling devices of motor vehicles and trailers	x	x	x	x	
4.1.6	Prevention of other risks caused by fuels			x	x	

*- If provided.

[a] - Applicable to vehicles with maximum mass exceeding 3.5 tonnes.

[b] - Applicable to vehicles intended to draw trailers with maximum mass exceeding 3.5 tonnes and trailers with maximum mass exceeding 3.5 tonnes.

[c] - The endurance braking system shall be of Type-II A and shall be applicable to motor vehicle categories as prescribed in IS:11852:2013.

4.1.1. Electrical equipment

4.1.1.1 General provisions

The installation shall be so designed, constructed and protected that it cannot provoke any unintended ignition or short-circuit under normal conditions of use of vehicles. The electrical installation as a whole shall meet the provisions of paragraphs 4.1.1.2 to 4.1.1.12 in accordance with the table of paragraph 4.1.

4.1.1.2 Wiring

4.1.1.2.1 Cables

No cable in an electrical circuit shall carry a current in excess of that for which the cable is designed. Conductors shall be adequately insulated. The cables shall be suitable for the conditions in the area of the vehicle, such as temperature range and fluid compatibility conditions as they are intended to be used. The cables shall be in conformity with standard ISO 6722-1:2011 including its Corr. 01:2012 or ISO 6722-2:2013. Cables shall be securely fastened and positioned to be protected against mechanical and thermal stresses.

4.1.1.2.2 Additional protection

Cables located to the rear of the driver's cab and on trailers shall be additionally protected to minimize any unintended ignition or short-circuit in the event of an impact or deformation. The additional protection shall be suitable for the conditions during normal use of the vehicle. The additional protection is complied with if multicore cables in conformity with ISO 14572:2011 are used or one of the examples in Figures 1 to 4 below or another configuration that offers equally effective protection is used. Cables of wheel speed sensors do not need additional protection. EX/II vehicles being one stage built panel vans where the wiring behind the driver's cab is protected by the body are deemed to comply with this requirement.

Figure 1

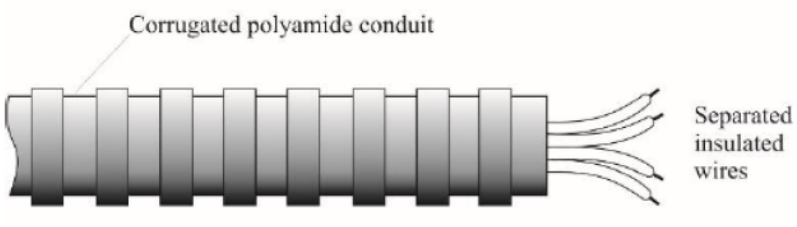


Figure 2

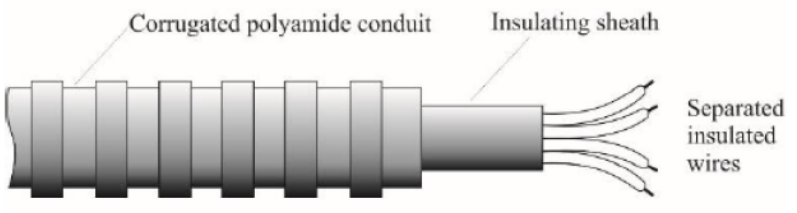


Figure 3

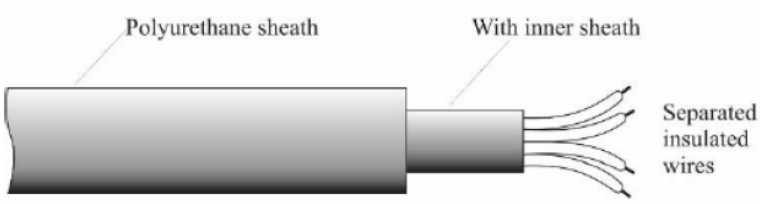
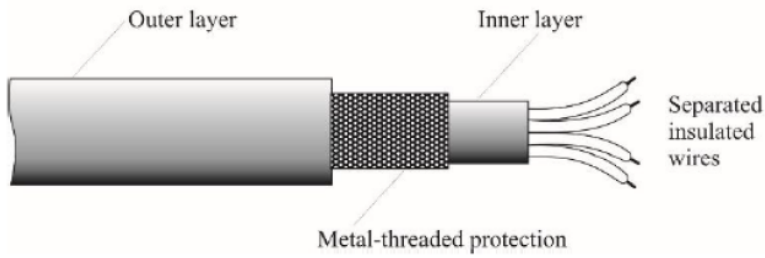


Figure 4



4.1.1.3 **Fuses and circuit breakers**

All circuits shall be protected by fuses or automatic circuit breakers, except for the following:

a) From the starter battery to the cold start system.

b) From the starter battery to the alternator.

c) From the alternator to the fuse or circuit breaker box.

d) From the starter battery to the starter motor.

e) From the starter battery to the power control housing of the endurance braking system (see paragraph 4.1.2), if this system is electrical or electromagnetic.

f) From the starter battery to the electrical lifting mechanism for lifting the bogie axle.

The above unprotected circuits shall be as short as possible.

4.1.1.4 **Batteries**

Battery terminals shall be electrically insulated or the battery shall be covered by an insulating cover. Batteries which may develop ignitable gas and are not located under the engine bonnet, shall be fitted in a vented box. The battery compartment shall be separated from the driver's compartment and be preferably located outside the cab.

4.1.1.5 **Lighting**

Light sources (bulbs/lamps) shall be in compliance with requirements covered under CMVR 1989, as amended from time to time.

4.1.1.6 **Electrical connections between motor vehicles and trailers**

4.1.1.6.1 Electrical connections shall be designed to prevent:

a) Ingress of moisture and dirt; the connected parts shall have a protection degree of at least IP54 in accordance with IEC 60529 or any other equivalent standard

b) Accidental disconnection; connectors shall fulfil the requirements given in clause 5.6. of ISO 4091:2003.

4.1.1.6.2 Requirements of paragraph 4.1.1.6.1 are deemed to be met:

a) For connectors standardized for specific purposes according to ISO 12098:2004, ISO 7638:2003, EN 15207:2014 or ISO 25981:2008.

b) Where the electrical connections are part of an automatic coupling system.

4.1.1.6.3 Electrical connections for other purposes concerning the proper functioning of the vehicles or their equipment may be used provided they comply with the requirements of paragraph 4.1.1.6.1.

4.1.1.7 **Voltage**

The nominal voltage of the electrical system shall not exceed 25 V AC or 60 V DC. Higher voltages are allowed in galvanically isolated parts of the electrical system provided those parts are not located within a perimeter of at least 0.5 metres from the outside of the load compartment or tank. Additionally, systems working on a voltage higher than 1,000 V

AC or 1,500 V DC shall be integrated in an enclosed housing. If Xenon lights are used only those having integrated starters are allowed.

4.1.1.8 **Battery master switch**

4.1.1.8.1 A switch for breaking the electrical circuits shall be placed as close to the battery as practicable. If a single pole switch is used it shall be placed in the supply lead and not in the earth lead.

4.1.1.8.2 A control device to facilitate the disconnecting and the reconnecting functions of the switch shall be installed in the driver's cab. It shall be readily accessible to the driver and distinctively marked. It shall be protected against inadvertent operation by either adding a protective cover, by using a dual movement control device, or by other suitable means. Additional control devices may be installed provided they are distinctively marked and protected against inadvertent operation. If the control device(s) are electrically operated, the circuits of the control device(s) are subject to the requirements of paragraph 4.1.1.9.

4.1.1.8.3 The switch shall break the circuits within 10 seconds after activation of the control device.

4.1.1.8.4 The switch shall have a casing with protection degree IP65 in accordance with IEC Standard 60529 or any other equivalent standard.

4.1.1.8.5 The cable connections on the battery master switch shall have a protection degree IP54 in accordance with IEC Standard 60529 or any other equivalent standard. However, this does not apply if these connections are contained in a housing which may be the battery box. In this case it is sufficient to insulate the connections against short circuits, for example with a rubber cap.

4.1.1.8.6 Additionally, a manually operated battery cut off switch which is capable of disconnecting the battery terminal from the electrical circuit, shall be provided.

4.1.1.9 **Permanently energized circuits**

4.1.1.9.1 a) Those parts of the electrical installation, including the leads which shall remain energized when the battery master switch is open, shall be suitable for use in hazardous areas. Such equipment shall meet the general requirements of IEC 60079, parts 0 and 14* and the additional requirements applicable from IEC 60079, parts 1, 2, 5, 6, 7, 11, 15, 18, 26 or 28.

b) For the application of IEC 60079 part 14*, the following classification shall be used:

Permanently energized electrical equipment including the leads which are not subject to paragraphs 4.1.1.4 and 4.1.1.8 shall meet the requirements for Zone 1 for electrical equipment in general or meet the requirements for Zone 2 for electrical equipment situated in the driver's cab. The requirements for explosion group IIC, temperature class T6, shall be met.

However, for permanently energized electrical equipment installed in an environment where the temperature caused by non-electrical equipment situated in that environment exceeds the T6 temperature limit, the temperature classification of the permanently energized electrical equipment shall be at least that of the T4 temperature class.

c) The supply leads for permanently energized equipment shall either comply with the provisions of IEC 60079, part 7 ("Increased safety") and be protected by a fuse or automatic circuit breaker placed as close to the source of power as practicable or, in the case of "intrinsically safe equipment", they shall be protected by a safety barrier placed as close to the source of power as practicable.

* The requirements of IEC 60079 part 14 do not take precedence over the requirements of this standard.

4.1.1.9.2 Bypass connections to the battery master switch for electrical equipment which shall remain energized when the battery master switch is open shall be protected against overheating by suitable means, such as a fuse, a circuit breaker or a safety barrier (current limiter).

4.1.1.10 **Tachographs**

Vehicles of categories N2 and N3 carrying dangerous and hazardous goods may be fitted with Tachographs (an instrument to record the lapse of running time of the motor vehicle, time speed maintained, acceleration, deceleration, etc.) complying with the requirements stated in AIS-059, as amended from time to time.

For vehicles of category N1 carrying dangerous and hazardous goods, the references of EDR as mentioned in AIS-192 upon finalisation would be suitably cross referred in AIS-180 standard.

4.1.1.11 **Vehicle Tracking System**

Vehicles carrying dangerous and hazardous goods shall be fitted with Vehicle Tracking System as per AIS-140, as amended from time to time till the corresponding BIS specification is notified under CMVR,1989.

4.1.1.12 **Electrical lifting mechanism**

The electrical equipment of the mechanism for lifting a bogie axle may be installed outside the chassis frame in a sealed housing. If vehicles are provided with axle lift switch for traction control, it may be provided within reach of driver in his cabin.

4.1.2 **Braking equipment**

Motor vehicles and trailers intended for use as transport units for dangerous and hazardous goods shall fulfil all relevant technical requirements of IS:11852:2013, as amended from time to time.

4.1.2.1 **Emergency braking devices for trailers**

4.1.2.1.1 Trailers shall be equipped with an effective system for braking or restraining them if they become detached from the motor vehicle towing them

4.1.2.1.2 Trailers shall be fitted with an effective braking device, which acts on all the wheels, is actuated by the drawing vehicle's service brake control and automatically stops the trailer in the event of breakage of the coupling.

4.1.3 **Prevention of fire risks**

4.1.3.1 **General provisions**

Compliance to Petroleum Rules and Explosive Rules shall be ensured by PESO. The following technical provisions shall apply in accordance with the table of paragraph 4.1

4.1.3.2 **Vehicle Cab**

4.1.3.2.1 The seat or berth material shall comply with flammability requirements as per IS:15061-2002 or ISO Standard 3795:1989 as amended from time to time in line with stipulations given for Sl. No. 13 of Table II of GSR 1034(E) dated 2nd November, 2016.

4.1.3.2.2 Unless the driver's cab is made of not readily flammable materials, a shield made of metal or other suitable material of the same width as the tank shall be fitted at the back of the cab. Any windows in the back of the cab or in the shield shall be hermetically closed and made of fire resistant safety glass with fire resistant frames complying with the requirements of IS:15061:2002. Furthermore, there shall be a clear space of not less than 15 cm between the tank and the cab or the shield

4.1.3.3 **Fuel tanks and cylinders**

The fuel tanks and cylinders supplying the engine of the vehicle shall meet the following requirements:

In the event of any leakage under normal conditions of carriage, the liquid fuel or the liquid phase of a gaseous fuel, shall drain to the ground and not come into contact with the load or hot parts of the vehicle. LNG fuelled dangerous and hazardous goods carrying vehicles may be fitted with gas leakage detectors/sensors to sense the gas leakage.

a) Fuel tanks for liquid fuels shall meet the requirements of AIS-095 (Requirements for Metallic Fuel Tanks of Automotive Vehicles) or IS 15547:2005 (Plastic fuel tank for four wheelers) as applicable. Fuel tanks containing petrol shall be equipped with an effective flame trap at the filler opening or with a closure enabling the opening to be kept hermetically sealed. Fuel tanks and cylinders for LNG and for CNG respectively shall meet the relevant requirements of AIS-024(Rev.1) (Part A) and AIS-028(Rev.1) (Part A), as amended from time to time. Fuel tanks for LPG shall meet the relevant requirements of AIS-025 and AIS-026, as amended from time to time.

b) The discharge opening(s) of pressure relief devices and/or pressure relief valves of fuel tanks containing gaseous fuels shall be directed away from air intakes, fuel tanks, the load or hot parts of the vehicle and shall not impinge on enclosed areas, other vehicles, exterior-mounted systems with air intake (i.e. air conditioning systems), engine intakes, or engine exhaust. Pipes of the fuel system shall not be fixed on the shell containing the load.

4.1.3.4 **Engine**

The engine propelling the vehicle shall be so equipped and situated to avoid any danger to the load through heating or ignition. The use of CNG or LNG as fuel shall be permitted only if the specific components for CNG and LNG are approved according to AIS-024(Rev.1) (Part A) and AIS-028(Rev.1) (Part A), as amended from time to time and meet the provisions of paragraph 4.1.1. The installation on the vehicle shall meet the technical requirements of paragraph 4.1.1 and AIS-024(Rev.1) (Part A) and AIS-028(Rev.1) (Part A), as amended from time to time. The use of LPG as fuel shall be permitted only if the specific components for LPG are approved according to AIS-025 and AIS-026, as amended from time to time and meet the provisions of paragraph 4.1.1. The installation on the vehicle shall meet the technical requirements of paragraph 4.1.1 and AIS-025 and AIS-026, as amended from time to time. In the case of EX/II, and EX/III vehicles, the engine shall be of compression-ignition construction using only liquid fuels with a flashpoint above 55 °C. Gases shall not be used.

4.1.3.5 **Exhaust system**

The exhaust system (including the exhaust pipes) shall be so directed or protected to avoid any danger to the load through heating or ignition. Parts of the exhaust system situated directly below the fuel tank (diesel) shall have a clearance of at least 100 mm or be protected by a thermal shield.
The exhaust system of EX/II, EX/III and MEMU vehicles shall be so constructed and situated that any excess heat shall not constitute a hazard to the load by raising the temperature on the inner surface of the load compartment above 80 ºC.

4.1.3.6 **Vehicle endurance braking**

Vehicles equipped with endurance braking systems emitting high temperatures placed behind the rear wall of the driver's cab shall be equipped with a thermal shield securely fixed and located between this system and the tank or load so as to avoid any heating, even local, of the tank shell or the load.

In addition, the thermal shield shall protect the braking system against any outflow or leakage, even accidental, of the load. For instance, a protection including a twin-shell shield shall be considered satisfactory.

4.1.3.7 **Combustion Heaters**

4.1.3.7.1 The combustion heaters and their exhaust gas routing shall be designed, located, protected or covered so as to prevent any unacceptable risk of heating or ignition of the load. This requirement shall be considered as fulfilled if the fuel tank and the exhaust system of the appliance conform to provisions similar to those prescribed for fuel tanks and exhaust systems of vehicles in 4.1.3.3 and 4.1.3.5 respectively.

4.1.3.7.2 The combustion heaters shall be put out of operation by at least the following methods:

a) Intentional manual switching off from the driver's cab;

b) Stopping of the vehicle engine; in this case the heating device may be restarted manually by the driver;

c) Start-up of a feed pump on the motor vehicle for the dangerous goods carried.

4.1.3.7.3 After running is permitted after the combustion heaters have been put out of operation. For the methods of 4.1.3.7.2 (b) and (c) the supply of combustion air shall be interrupted by suitable measures after an after running cycle of not more than 40 seconds. Only heaters shall be used for which proof has been furnished that the heat exchanger is resistant to the reduced after running cycle of 40 seconds for the time of their normal use.

4.1.3.7.4 The combustion heater shall be switched on manually. Programming devices shall be prohibited.

4.1.3.7.5 Combustion heaters with gaseous fuels are not permitted.

4.1.4 **Speed Governor (Speed limiting device or Speed limiting function)**

A speed governor complying with the requirements of Rule 118 of CMVR 1989, as amended from time to time which prevents driver from speeding beyond the speed limits set by the latest Central Government Notification shall be provided.

4.1.5 **Coupling devices of motor vehicles and trailers**

Coupling devices of motor vehicles and trailers shall comply with the technical requirements as per AIS-091(Part 1), as amended from time to time.

4.1.6 **Prevention of other risks caused by fuels**

Fuel systems for engines fuelled by LNG shall be so equipped and situated to avoid any danger to the load due to the gas being refrigerated.

4.1.7 **Additional requirements concerning complete or completed EX/II or EX/III vehicles intended for the carriage of explosive substances and articles (Class 1) in packages**

4.1.7.1 **Materials to be used in the construction of vehicle bodies**

No materials likely to form dangerous compounds with the explosive substances carried shall be used in the construction of the body

4.1.7.2 **Combustion heaters**

4.1.7.2.1 Combustion heaters may only be installed on EX/II and EX/III vehicles for heating of the driver’s cab or the engine.

4.1.7.2.2 Combustion heaters shall meet the requirements of 4.1.3.7.1, 4.1.3.7.4 and 4.1.3.7.5.

4.1.7.2.3 The switch of the combustion heater may be installed outside the driver's cab. It is not necessary to prove that the heat exchanger is resistant to the reduced after running cycle.

4.1.7.2.4 No combustion heaters or fuel tanks, power sources, combustion air or heating air intakes as well as exhaust tube outlets required for the operation of the combustion heater shall be installed in the load compartment.

4.1.7.3 **EX/II vehicles**

The vehicles shall be designed, constructed and equipped so that the explosives are protected from external hazards, the weather and shall be approved by PESO. They shall be either closed or sheeted. Sheeting shall be resistant to tearing and be of impermeable material, not readily flammable*. It shall be tautened so as to cover the loading area on all sides. All openings in the load compartment of closed vehicles shall have lockable, close-fitting doors or rigid covers. The driver's compartment shall be separated from the load compartment by a continuous wall.

* In the case of flammability, this requirement will be deemed to be met if, in accordance with the procedure specified in ISO standard 3795:1989 or IS:15061-2002 as amended from time to time. Samples of the sheeting shall have a burn rate not exceeding 100 mm/min.

4.1.7.4 **EX/III vehicles**

4.1.7.4.1 The vehicles shall be designed, constructed and equipped so that the explosives are protected from external hazards and the weather. These vehicles shall be closed. The driver's compartment shall be separated from the load compartment by a continuous wall. The loading surface shall be continuous. Load restraint anchorage points may be installed. All joints shall be sealed. All openings shall be capable of being locked. They shall be so constructed and placed as to overlap at the joints.

4.1.7.4.2 The body shall be made from heat and flame-resistant materials with a minimum thickness of 10 mm. Materials classified as Class B-s3-d2 according to standard EN 13501-1:2007 + A1:2009 are deemed to fulfil this requirement.

If the material used for the body is metal, the complete inside of the body shall be covered with materials fulfilling the same requirement.

4.1.7.5 **Engine and load compartment**

The engine propelling an EX/II or EX/III vehicle shall be placed forward of the front wall of the load compartment; it may nevertheless be placed under the load compartment, provided this is done in such a way that any excess heat does not constitute a hazard to the load by raising the temperature on the inner surface of the load compartment above 80 ºC.

4.1.7.6 **External heat sources and load compartment**

The exhaust system of EX/II and EX/III vehicles or others parts of these complete or completed vehicles shall be so constructed and situated that any excess heat shall not constitute a hazard to the load by raising the temperature on the inner surface of the load compartment above 80 ºC.

4.1.7.7 **Electrical equipment**

4.1.7.7.1 The electrical installation shall meet the relevant requirements of 4.1.1.1, 4.1.1.2, 4.1.1.3, 4.1.1.4, 4.1.1.5, 4.1.1.6, 4.1.1.7, 4.1.1.8 and 4.1.1.9.2.

4.1.7.7.2 The electrical installation in the load compartment shall be dust-protected at least IP 54 according to IEC 60529 or equivalent. In the case of carriage of items and articles of compatibility group J, protection to at least IP 65 according to IEC 60529 or equivalent shall be provided.

4.1.7.7.3 No wiring shall be positioned inside the load compartment. Electrical equipment accessible from the inside of the load compartment shall be sufficiently protected from mechanical impact from the inside.

4.2 Technical provisions for Bodies

4.2.1 Additional requirements concerning the construction of the bodies of complete or completed vehicles intended for the carriage of dangerous goods in packages (other than EX/II and EX/III vehicles)

4.2.1.1 Combustion heaters shall meet the following requirements:

a) The switch may be installed outside the driver's cab;

b) The device may be switched off from outside the load

c) It is not necessary to prove that the heat exchanger is resistant to

4.2.1.2 If the vehicle is intended for the carriage of dangerous and hazardous goods i.e. Explosive substances and articles, Flammable liquid, Flammable solids, Self-reactive substances, polymerizing substances and solid desensitized explosives, Substances which in contact with water emit flammable gases, Oxidising substances or Organic peroxides, for which label confirming to CMV Rule no.137 is provided, no fuel tanks, power sources, combustion air or heating air intakes as well as exhaust tube outlets required for the operation of the combustion heater shall be installed in the load compartment. It shall be ensured that the heating air outlet cannot be blocked by cargo. The temperature to which packages are heated shall not exceed 50º C. Heating devices installed inside the load compartments shall be designed so as to prevent the ignition of an explosive atmosphere under operating conditions.

4.2.2 Additional requirements concerning the construction of the bodies of complete or completed vehicles intended for the carriage of dangerous solids in bulk

4.2.2.1 Combustion heaters shall meet the following requirements:

a) The switch may be installed outside the driver's cab;

b) The device may be switched off from outside the load compartment; and

c) It is not necessary to prove that the heat exchanger is resistant to the reduced after running cycle.

4.2.2.2 If the vehicle is intended for the carriage of dangerous and hazardous goods i.e. Flammable solids, self-reactive substances, polymerizing substances and solid desensitized explosives, Substances which in contact with water emit flammable gases, Oxidising substances, for which label confirming to CMV Rule No.137 is provided, no fuel tanks, power sources, combustion air or heating air intakes as well as exhaust tube outlets required for the operation of the combustion heater shall be installed in the load compartment. It shall be ensured that the heating air outlet cannot be blocked by cargo. The temperature to which the load is heated shall not exceed 50 ºC. Heating devices installed inside the load compartments shall be designed so as to prevent the ignition of an explosive atmosphere under operating conditions.

4.2.3 Additional requirements concerning complete or completed vehicles intended for the carriage of temperature-controlled substances

4.2.3.1 Insulated, refrigerated and mechanically-refrigerated vehicles intended for the carriage of temperature-controlled substances shall conform to the following conditions:

a) the vehicle shall be such and so equipped as regards its insulation and means of refrigeration, that the control temperature prescribed for the substance to be carried is not exceeded. The overall heat transfer coefficient shall be not more than 0.4 W/m^2K;

b) the vehicle shall be so equipped that vapours from the substances or the coolant carried cannot penetrate into the driver's cab;

c) a suitable device shall be provided enabling the temperature prevailing in the loading space to be determined at any time from the cab;

d) the loading space shall be provided with vents or ventilating valves if there is any risk of a dangerous excess pressure arising therein. Care shall be taken where necessary to ensure that refrigeration is not impaired by the vents or ventilating valves;

e) the refrigerant shall not be flammable; and

f) the refrigerating appliance of a mechanically refrigerated vehicle shall be capable of operating independently of the engine used to propel the vehicle.

4.2.3.2 Suitable methods to prevent the control temperature from being exceeded should be provided. Depending on the method used, additional provisions concerning the construction of vehicle bodies may be adopted.

4.2.4 **Additional requirements concerning fixed tanks (Tank-vehicles), battery – vehicles and complete or completed vehicles used for the carriage of dangerous and hazardous goods in demountable tanks with a capacity greater than 1 m^3 or in tank containers, portable tanks or MEGCs of a capacity greater than 3 m^3 (EX/III, FL and AT vehicles)**

4.2.4.1 **General provisions**

4.2.4.1.1 In addition to the vehicle proper, or the units of running gear used in its stead, a tank-vehicle comprises one or more shells, their items of equipment and the fittings for attaching them to the vehicle or to the running-gear units.

4.2.4.1.2 Once the demountable tank has been attached to the carrier vehicle, the entire unit shall meet the requirements prescribed for tank-vehicles.

4.2.4.2 **Requirements concerning tanks**

Fixed tanks or demountable tanks made of metal shall meet therelevant requirements laid down by the Petroleum and Explosives Safety Organisation (PESO).

4.2.4.3 **Fastening**

4.2.4.3.1 Fastenings shall be designed to withstand static and dynamic stresses in normal conditions of carriage and for tank-vehicles, battery-vehicles and vehicles carrying demountable tanks, the fastenings shall withstand the minimum stresses. Fastenings also include any supporting frames used for mounting the structural equipment to the vehicle.

4.2.4.3.2 Fastenings in the case of tank-vehicles, battery-vehicles and vehicles carrying tank-containers, demountable tanks, portable tanks, MEGCs or UN MEGCs shall be capable of absorbing, under the maximum permissible load, the following separately applied static forces:

- In the direction of travel: twice the total mass multiplied by the acceleration due to gravity (g)*;
- Horizontally, at right angles to the direction of travel: the total mass multiplied by the acceleration due to gravity (g)*;
- Vertically upwards: the total mass multiplied by the acceleration due to gravity (g)*;
- Vertically downwards: twice the total mass multiplied by the acceleration due to gravity (g)*.

NOTE: The requirements of this paragraph do not apply to twist lock tie-down devices in compliance with ISO 1161:2016 "Series 1 freight containers -- Corner and intermediate fittings – Specifications". However, the requirements apply to any frames or other devices used for support of such fastenings on the vehicle.

*For calculation purposes g = 9.81 m/s^2.

4.2.4.4 **Electrical bonding of FL vehicles**

Tanks made of metal or of fibre-reinforced plastics material of FL tank-vehicles and battery elements of FL battery-vehicles shall be linked to the chassis by means of at least one good electrical connection. Any metal contact capable of causing electrochemical corrosion shall be avoided.

4.2.4.5 **Stability of tank-vehicles**

4.2.4.5.1 The overall width of the ground-level bearing surface (distance between the outer points of contact with the ground of the right-hand tyre and the left-hand tyre of the same axle) shall be at least equal to 90% of the height of the centre of gravity of the laden tank-vehicle. In an articulated vehicle the mass on the axles of the load-carrying unit of the laden semi-trailer shall not exceed 60% of the nominal total laden mass of the complete articulated vehicle.

4.2.4.5.2 In addition, tank-vehicles with fixed tanks with a capacity of more than 3 m^3 intended for the carriage of dangerous and hazardous goods in the liquid or molten state tested with a pressure of less than 4 bar, shall comply with the technical requirements of AIS-181, for lateral stability, as amended from time to time.

4.2.4.6 **Under run protection**

4.2.4.6.1 The rear under-run protection and lateral under-run protection devices shall be in accordance with IS:14812-2005 and IS: 14682-2004, respectively, as amended from time to time.

Note 1:

This provision does not apply to vehicles used for the carriage of dangerous goods in tank-containers, MEGCs or portable tanks.

Vehicles with a tilting shell for the carriage of powdery or granular substances and a vacuum-operated waste tank with a tilting shell with rear discharge do not require a bumper if the rear fittings of the shell are provided with a means of protection which protects the shell in the same way as a bumper. These may be exempted where the device is incompatible to the end use.

4.2.4.7 **Combustion heaters**

4.2.4.7.1 Combustion heaters shall meet the requirements of 4.1.3.7.1, 4.1.3.7.4 and the following:

a) The switch may be installed outside the driver's cab;

b) The device may be switched off from outside the load compartment; and

c) It is not necessary to prove that the heat exchanger is resistant to the reduced after running cycle.

In addition, for FL vehicles, they shall meet the requirements of 4.1.3.7.2 and 4.1.3.7.3

4.2.4.7.2 If the vehicle is intended for the carriage of dangerous goods i.e. Explosive substances or articles, Flammable liquids, Flammable solids, self-reactive substances, polymerizing substances and solid desensitized explosives, Substances which in contact with water emit flammable gases, Oxidising substances or Organic peroxides for which label confirming to CMV Rule no.137 is provided, no fuel tanks, power sources, combustion air or heating air intakes as well as exhaust tube outlets required for the operation of the combustion heater shall be installed in the load compartment. It shall be ensured that the heating air outlet cannot be blocked by cargo. The temperature to which the load is heated shall not exceed 50 ºC. Heating devices installed inside the load compartments shall be designed so as to prevent the ignition of an explosive atmosphere under operating conditions.

4.2.4.8 **Electrical equipment**

4.2.4.8.1 The electrical installation on FL vehicles shall meet the relevant requirements of 4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.5, 4.1.1.6, 4.1.1.8 and 4.1.1.9.1. However, additions to or modifications of the electrical installations of the vehicle shall meet the requirements for the electrical apparatus of the relevant group and temperature class according to the ubstances to be carried.

4.2.4.8.2 Electrical equipment on FL vehicles, situated in areas where an explosive atmosphere is, or may be expected to be, present in such quantities as to require special precautions, shall be suitable for use in a hazardous area. Such equipment shall meet the general requirements of IEC 60079 parts 0 and 14 and the additional requirements applicable from IEC 60079 parts 1, 2, 5, 6, 7, 11, 18, 26 or 28. The requirements for the electrical apparatus of the relevant group and temperature class according to the substances to be carried shall be met.

For the application of IEC 60079 part 14, the following classification shall be used:

ZONE 0

Inside tank compartments, fittings for filling and discharge and vapour recovery lines.

ZONE 1

Inside cabinets for equipment used for filling and discharge and within 0.5 m of venting devices and pressure relief safety valves.

4.2.4.8.3 Permanently energized electrical equipment, including the leads, which is situated outside Zones 0 and 1 shall meet the requirements for Zone 1 for electrical equipment in general or meet the requirements for Zone 2 according to IEC 60079 part 14 for electrical equipment situated in the driver's cab. The requirements for the relevant group of electrical apparatus according to the substances to be carried shall be met.

4.2.4.9 **Additional safety requirements concerning EX/III vehicles**

4.2.4.9.1 EX/III vehicles shall be equipped with FDSS meeting the requirements of AIS-135, as amended from time to time.

4.2.4.9.4 Protection of the load by metal thermal shields against tyre fire shall be provided.

4.2.5 Additional requirements concerning complete and completed MEMUs

4.2.5.1 **General provisions**

In addition to the vehicle proper, or the units of running gear used in its stead, a MEMU comprises one or more tanks and bulk containers, their items of equipment and the fittings for attaching them to the vehicle or to the running-gear units.

4.2.5.2 **Requirements concerning tanks and bulk containers**

Tank, bulk containers and special compartments for packages of explosives of MEMUs shall meet the requirements of Chapter 6.12 of ADR 2021('Agreement concerning the International Carriage of Dangerous Goods by Roads' under UNECE).

4.2.5.3 **Electrical bonding of MEMUs**

Tanks, bulk containers and special compartments for packages of explosives made of metal or of fibre-reinforced plastics material shall be linked to the chassis by means of at least one good electrical connection. Any metal contact capable of causing electro-chemical corrosion or reacting with the dangerous goods carried in the tanks and bulk containers shall be avoided.

4.2.5.4 **Stability of MEMUs**

The overall width of the ground-level bearing surface (distance between the outer points of contact with the ground of the right-hand tyre and the left-hand tyre of the same axle) shall be at least equal to 90% of the height of the centre of gravity of the laden vehicle. In an articulated vehicle the mass on the axles of the load-carrying unit of the laden semi-trailer shall not exceed 60% of the nominal total laden mass of the complete articulated vehicle.

4.2.5.5 **Under run protection**

The rear under-run protection and lateral under-run protection devices shall be in accordance with IS:14812-2005 and IS: 14682-2004, respectively, as amended from time to time

Note 1:

a) The MEMUs where the tanks are protected adequately against rear impact by other means, e.g. machinery or piping not containing dangerous goods, provision of rear protection does not apply.

b) Vehicles with a tilting shell with rear discharge do not require a bumper if the rear fittings of the shell are provided with a means of protection which protects the shell in the same way as a bumper.

4.2.5.6 **Combustion heaters**

4.2.5.6.1 Combustion heaters shall meet the requirements of 4.1.3.7.1, 4.1.3.7.4, 4.1.3.7.5 and the following:

a) the switch may be installed outside the driver's cab;

b) the device shall be switched off from outside the MEMU compartment; and

c) it is not necessary to prove that the heat exchanger is resistant to the reduced after running cycle.

4.2.5.6.2 No fuel tanks, power sources, combustion air or heating air intakes as well as exhaust tube outlets required for the operation of the combustion heater shall be installed in the load compartments containing tanks. It shall be ensured that the heating air outlet cannot be blocked. The temperature to which any equipment is heated shall not exceed 50 ºC. Heating devices installed inside the compartments shall be designed so as to prevent the ignition of any explosive atmosphere under operating conditions.

4.2.5.7 **Additional safety requirements**

4.2.5.7.1 MEMUs shall be equipped with FDSS meeting the requirements of AIS-135, as amended from time to time.

4.2.5.7.2 Protection of the load by metal thermal shields against tyre fire shall be provided.

4.2.5.8 **Additional security requirements**

Process equipment and special compartments in MEMUs shall be fitted with locks.

4.3 Other requirements

4.3.1 The vehicles intended for the carriage of dangerous and hazardous goods shall also meet the relevant requirements laid down by the Petroleum and Explosives Safety Organisation (PESO) and the below listed requirements of the Central Motor Vehicle Rules,1989, as amended from time to time.

CMV Rule No.	**Title**
9	Minimum training and language comprehension requirement for drivers of goods carriages carrying dangerous or hazardous goods
90	Additional conditions for national permit
91	Definitions
129	Transportation of goods of dangerous or hazardous nature to human life
130	Manner of display of class labels

131	Responsibility of the consignor for safe transport of dangerous or hazardous goods
132	Responsibility of the transporter or owner of goods carriage
133	Responsibility of the driver
134	Emergency information panel
135	Driver to be instructed
136	Driver to report to the police station about accident
137	Class labels

4.3.2 **Fire -fighting appliances**

4.3.2.1 Every transport unit including trailers carrying dangerous and hazardous goods shall be equipped with fire extinguishers as per Petroleum rules or PESO 2002 published in 2012;

a) A portable fire extinguisher (10 kg. dry chemical powder or equivalent) suitable for extinguishing petroleum fire shall be carried in an easily accessible and detachable position and away from the discharge faucets on every vehicle transporting petroleum by road. Additionally, one dry chemical powder type fire extinguisher of 1 kg. Capacity shall be carried in the driver's cabin of the vehicle.

b) For vehicles of category EX (carrying explosives) – two fire extinguishers, one capable of dousing electrical fires and the other capable handling fires due to engine, tyres etc. This is as per Explosive Rules.

4.3.2.2 The extinguishing agents contained in the fire extinguishers with which a transport unit is equipped shall be such that they are not liable to release toxic gases into the driver's cab or under the influence of the heat of the fire.

4.3.2.3 The portable fire extinguishers conforming to the provisions above shall be fitted with a seal verifying that they have not been used. In addition, they shall bear a mark of compliance with a standard recognized by a competent authority and an inscription indicating the expiry date (month, year).

4.3.3 **Miscellaneous equipment**

Every transport unit carrying dangerous and hazardous goods shall be equipped with :

a) For each vehicle, at least one-wheel chock, of a size suited to the weight of the vehicle and to the diameter of the wheels.

b) The necessary equipment to take the general actions referred to in the safety instructions, in particular:

- A suitable warning vest or warning clothing for each member of the vehicle crew.
- A pocket lamp for each member of the vehicle crew.

4.3.4 **Periodic Inspection of vehicles**

The periodic inspection of the hazardous or dangerous goods carrying vehicles would be necessary with respect to the following:

i) Obtaining the fitness of the vehicle which is required yearly or a lesser period.

ii) Inspection of the vehicle externally, internally and also by ultrasonic inspection.

iii) Inspection of the vehicle for the PESO documents, emergency information panel, hazard class labels etc.

5 TYPE APPROVAL

5.1 Approvals of PESO (Petroleum & Explosives Safety Organisation) for tankers / trailers

5.1.1 **Tanker / Bullet**

The tanker manufacturer and / or the bullet manufacturer shall approach the Department of Explosives for the approval of the design and the prototype as per the existing procedure.

5.2 Vehicle type approval

5.2.1 The type approval of the basic vehicle chassis and bodies for vehicles and/or trailers / semi-trailers will be carried out by the testing agencies specified in Rule 126 of Central Motor Vehicle Rules, 1989, as amended from time to time.

5.2.2 The vehicle manufacturer shall submit his application with all the necessary documents related to detailed description of the vehicle type with respect to its relevant structure, engine (compression-ignition, positive-ignition), dimensions, configuration and constituent materials, Vehicle designation (EX/II, EX/III, AT,FL, MEMU), Drawings of the vehicle, the maximum technical mass (kg) of the complete vehicle and also the documents with regard to its specific constructional features given at Annexure I of this

standard, to the testing agency for compliance to this standard in addition to the Central Motor Vehicle Rules, 1989 requirements.

5.2.3 A vehicle representative of the type to be approved shall be submitted to the testing agency responsible for conducting the approval tests. However, it can be only chassis as the body and installations are approved by PESO.

5.2.4 The testing agency shall issue type approval for the basic vehicle after verifying all the necessary compliance requirements stated in Central Motor Vehicle Rules, 1989 and the provisions stated in this standard.

5.3 **Vehicle registration**

5.3.1 The integrated process of vehicle registration will be carried out by the registering authorities after necessary verification of the documents of vehicle approval and the tanker / bullet approval by PESO or their authorised third-party evaluators.

5.3.2 The system of vehicle registration for dangerous and hazardous goods carrying vehicles are as indicated in the Annexure II of this standard.

6 MODIFICATION OF VEHICLE TYPE AND CRITERIA FOR EXTENSION OF APPROVAL

6.1 Every modification of the vehicle type as defined in clause 3.2 of this Standard shall be notified to the test agency which approved the vehicle type. The test agency may then either:

6.1.1 Consider that the modifications made do not have an adverse effect on the conditions of the granting of the approval and grant an extension of approval

6.1.2 Consider that the modifications made affect the conditions of the earlier granted type approval and would require further tests or additional checks before granting an extension of approval.

6.1.3 Vehicles of N2 and N3 categories which are other than MEMUs and already compliant with requirements of AIS-093 (Rev. 1) including its Section 5 are deemed to comply with relevant requirements of AIS-180, provided there are no further changes incorporated after approval as per AIS-093 (Rev. 1).

6.2 In case of 6.1.2, tests shall be carried out for only those parameters which are affected by the modifications.

6.3 In case of fulfilment of criteria of Para. 6.1.1 or after successful results of further verification as per para 6.1.2 the approval of compliance shall be extended for the changes carried out.

7 CONFORMITY OF PRODUCTION (CoP) REQUIREMENT

7.1 Whole Vehicle Safety Conformity of Production (WVSCoP) requirement for the vehicles shall be as per AIS-017(Part 6) as amended from time to time.

	ANNEXURE - I (See 5.2.2) (To be submitted by the Vehicle Manufacturer / Body Builder to the Test Agency)	
	INFORMATION ON VEHICLES CARRYING DANGEROUS AND HAZARDOUS GOODS	
1.0	**Details of Vehicle Manufacturer**	
1.1	Name & address of the vehicle manufacturer	
1.2	Telephone No. / Mobile No.	
1.3	Fax. No.	
1.4	E-mail address	
1.5	Contact person	
1.6	Plant(s)of manufacture	
2.0	**Details of Truck / Tanker / Bullet Manufacturer**	
2.1	Name & address of Truck / Tanker /Bullet Manufacturer	
2.2	Telephone No.	
2.3	Fax. No.	
2.4	E-mail address	
2.5	Contact person	
3.0	**Name of model and variants (if any)**	
3.1	CMVR certificate reference(s)	
3.2	Type and General commercial description (s)	
4.0	**Vehicle type & Designation**	
4.1	Type of vehicle (rigid / articulated / combination)	
4.2	Vehicle designation	
4.3	Usage (goods / passenger / tractor / trailer / others)	
4.4	Control (forward / semi-forward / normal / others)	
4.5	Drive (4x2 / 4x4 / 6x4 / others)	
4.6	Cab type (fully built cab/sleeper cab/cowl/front endstructure/with wind shield/without wind shield)	
4.7	Load body, type and drawing	
5.0	**Wiring**	
5.1	Make	
5.2	Protection type	

6.0	**Battery master switch**	
6.1	Make	
6.2	Type	
6.3	Model & Identification	
7.0	**Battery insulation**	
7.1	Make	
7.2	Type	
7.3	Model & Identification	
7.4	Material	
7.5	Nominal thickness	
8.0	**Electrical connection**	
8.1	Protection degree IP 54 (Yes / No)	
9.0	**Tachograph**	
9.1	Make	
9.2	Type	
9.3	Model & Identification	
10.0	**Exhaust pipe protection**	
10.1	Maximum exhaust temperature ^{0}C	
10.2	Description (with a general arrangement drawing of exhaust system along with its routing indicating the lengths of exhaust pipe, tail pipe and exhaust outlet location)	
10.3	Minimum distance between exhaust pipe(s) and the fuelline	
11.0	**Speed limitation devices (Governor)**	
11.1	Make(s)	
11.2	Type(s)	
11.3	Cut off point under load	
11.4	Max. speed without out load	
11.5	Idle Speed	
12.0	**Combustion heater**	
12.1	Method of putting off	
13.0	**Brakes**	
13.1	Type and Brief Description	
13.2	Service brakes	
13.2.1	Name of producer	

13.2.2	Type (Mechanical /hydraulic/ air assisted/ vacuum assisted/others)	
13.2.3	Control system & braking wheel	
13.2.4	Schematic layout indicating method of split of brake system, location of valves, reservoirs etc.	
13.3	Anti-Lock braking system Provided (Yes/No)	
13.3.1	If yes, details	
13.3.2	ABS make	
13.4	Electronic Control Unit (ECU)	
13.4.1	Make	
13.4.2	Identification mark	
13.5	Wheel Speed Sensor	
13.5.1	Make	
13.5.2	Identification mark	
13.5.3	No. of sensors used	
13.6	Hydraulic Modulator	
13.6.1	Make	
13.6.2	Identification mark	
13.7	Solenoid Valve	
13.7.1	Make	
13.7.2	Identification mark	
13.7.3	Max. designed pressure, kg/cm^2	
13.7.4	Max. working pressure, kg/cm^2	
13.8	Safety lamp provided (Yes/No)	
13.9	Schematic layout of the ABS system	
13.10	If ASR is used, give details	
13.11	Brake lining (or) Pad	
13.11.1	Nominal Dimensions, (mm) (Length x Width x thickness)	
13.11.1.1	Front wheel	
13.11.1.2	Rear wheel	
13.11.1.3	Others (in case of Tandem axle, give axle wise data)	
13.11.2	Effective area per axle (cm^2)	
13.11.2.1	Front axle	
13.11.2.2	Rear axle	

13.11.2.3	Others (in case of Tandem axle, give axle wise data)	
13.11.3	Material	
13.11.4	Make and Designation	
13.11.4.1	Front wheel / axle	
13.11.4.2	Rear wheel / axle	
13.11.4.3	Others (In case of Tandem axle provide data for each axle)	
13.11.5	Whether asbestos or asbestos-free?	
13.12	Brake drum or disc	
13.12.1	Effective diameter, mm	
13.12.1.1	Front wheel	
13.12.1.2	Rear wheel	
13.12.1.3	Others (in case of tandem axle or articulated trailers)	
13.12.2	Material (if the braking surface is non ferrous)	
13.12.2.1	Front	
13.12.2.2	Rear	
13.12.2.3	Others	
13.13	Master cylinder or brake valve	
13.13.1	Make	
13.13.2	Type	
13.13.3	Inner diameter of the master cylinder, mm	
13.13.4	Operating stroke mm	
13.14	Type of supply tank	
13.15	Wheel cylinder diameter, mm	
13.15.1	Front	
13.15.2	Rear	
13.15.3	Others	
13.16	Wheel cylinder type (single acting/double acting)	
13.16.1	Front	
13.16.2	Rear	
13.16.3	Others	
13.17	Booster	
13.17.1	Name of producer	
13.17.2	Type	
13.17.3	Boost ratio	
13.17.4	Size of the booster, mm (diameter)	

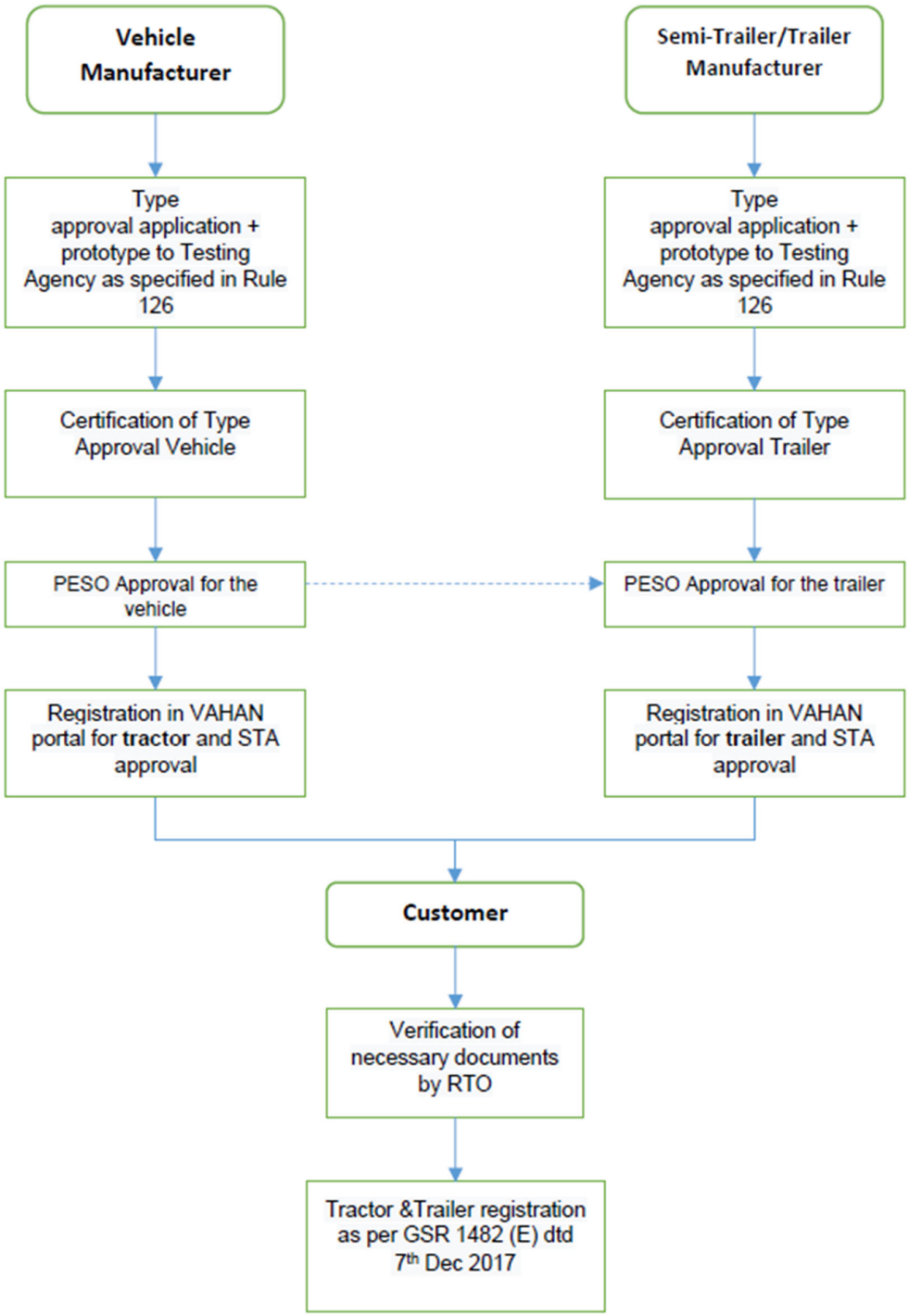
13.17.5	Vacuum or air assistance			
13.17.6	Pressure kg/cm^2			
13.17.6.1	Nominal (P2 as per IS:11852)			
13.17.6.2	Cut in			
13.17.6.3	Cut out			
13.18	Type of vacuum pump or air compressor			
13.19	Type of pressure regulator			
13.20	No. of tanks			
13.20.1	Tank Capacity, lit.		Description	Capacity
13.20.1.1	Tank 1			
13.20.1.2	Tank 2			
13.20.1.3	Tank 3			
13.20.1.4	Tank 4			
13.21	Brake Chamber	Front	Rear	Parking
13.21.1	Make and type			
13.21.2	Size, mm			
13.21.3	Internal diameter, mm			
13.21.4	Stroke, mm			
14	Tractor-trailer/ Truck-trailer combination			
14.1	Detailed technical information on trailers to be submitted by trailer manufacturer shall be as per AIS-113, as amended from time to time			

ANNEXURE – II

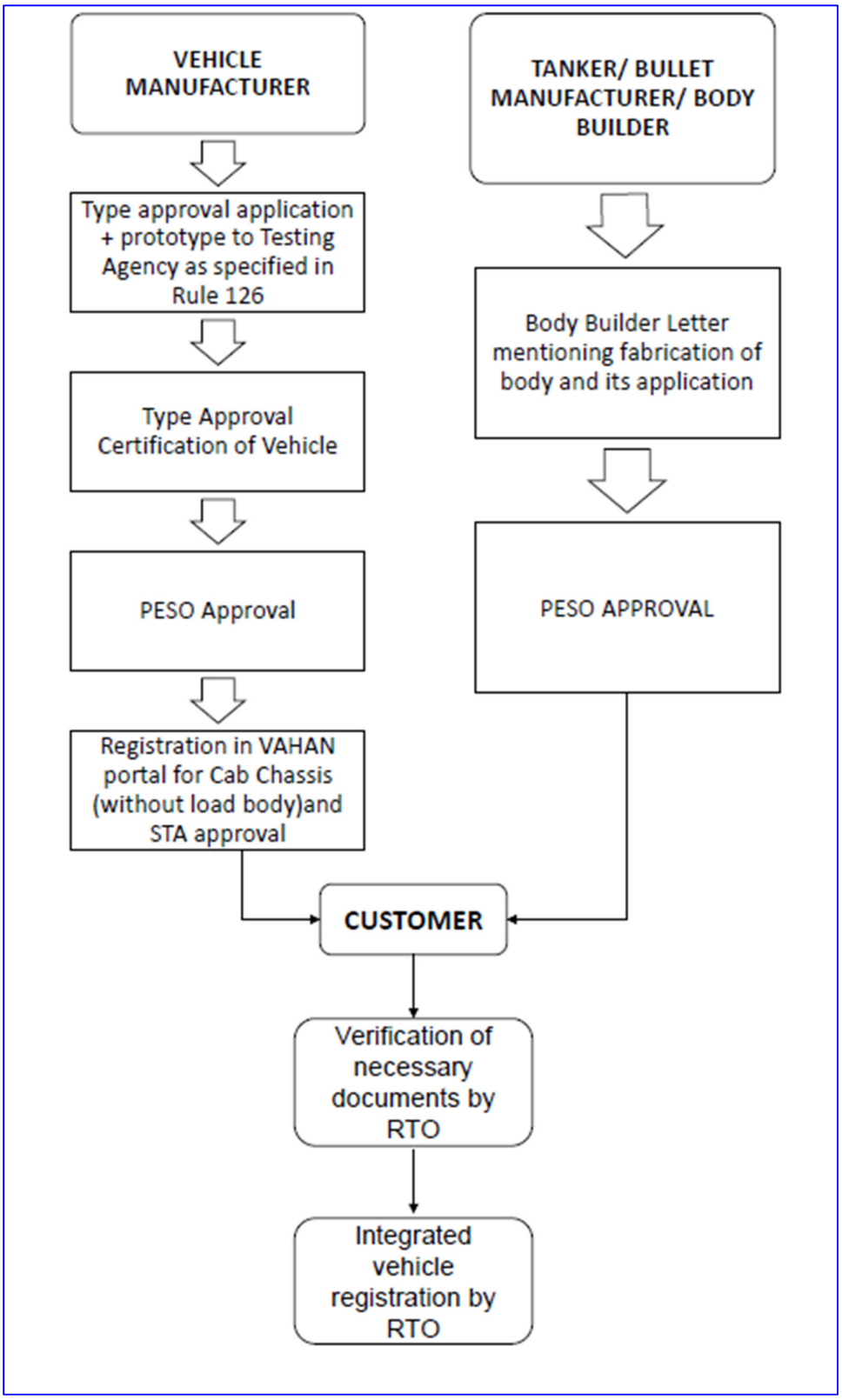
(see 5.3.2)

GENERAL GUIDELINES FOR REGISTRATION OF DANGEROUS AND HAZARDOUS GOODS CARRYING VEHICLES (FLOW CHARTS)

A. Combination of Tractor & Semi-trailer



B. Rigid Truck



ANNEXURE – III

(See Introduction)

COMPOSITION OF AISC PANEL ON VEHICLES CARRYING DANGEROUS AND HAZARDOUS GOODS*

Panel convener	Representing
Mr. P. S. Gowrishankar	SIAM (Tata Motors Ltd.)
Members	
Mr. P. D. Betgeri	The Automotive Research Association of India
Dr. B. V. Shamsundara	The Automotive Research Association of India
Mr. Manoj Desai	The Automotive Research Association of India
Mr. Vishal P. Rawal	The Automotive Research Association of India
Mr. Pritesh S. Shinkar	The Automotive Research Association of India
Mr. S. N. Dhole	Central Institute of Road Transport
Ms. Shubhangi Dalvi	Central Institute of Road Transport
Mr. Sandeep Sonawane	Central Institute of Road Transport
Mr. Perumal S.	Global Automotive Research Centre
Mr. V M Dhanasekkar	Global Automotive Research Centre
Mr. Kubenthiran	Global Automotive Research Centre
Mr. Ravi M	Global Automotive Research Centre
Ms. Vijayanta Ahuja	International Centre for Automotive Technology
Mr. Tarun Sharma	International Centre for Automotive Technology
Mr. V. Faustino	SIAM (Ashok Leyland Ltd.)
Mr. Ved Prakash Gautam	SIAM (Ashok Leyland Ltd.)
Mr. Rama Manikandan	SIAM (Daimler India Commercial Veh. Pvt. Ltd.)
Mr. D. Karthikeyan	SIAM (Daimler India Commercial Veh. Pvt. Ltd.)
Mr. Kulkarni Varadendra	SIAM (Mahindra & Mahindra Ltd)
Mr. Shailesh Kulkarni	SIAM (Mahindra & Mahindra Ltd.)
Mr. Devinder Tangri	SIAM (Mahindra & Mahindra Ltd.)
Ms. Pushpanjali Pathak	SIAM (Mahindra & Mahindra Ltd.)
Mr. Dhotre Abhijit	SIAM (Mahindra & Mahindra Ltd)
Mr. Chandran Manoj Prabagar	SIAM (Maruti Suzuki India Ltd.)
Mr. Raj Kumar Diwedi	SIAM (Maruti Suzuki India Ltd.)
Mr. Nalluri Srikanth	SIAM (Maruti Suzuki India Ltd.)
Mr. Pridhvi Raju Vatsavayi	SIAM (Tata Motors Ltd.)
Mr. Sharad S. Bhole	SIAM (Tata Motors Ltd.)
Ms. Namrata Deb	SIAM (Tata Motors Ltd.)
Mr. Manoj Kumar	SIAM (Tata Motors Ltd.)
Mr. Pramodkumar Hugar	SIAM (Volvo Group India Pvt. Ltd.)

Mr. Vigknesh V Rajan	SIAM (Volvo Group India Pvt. Ltd.)
Mr. Rahul Jain	SIAM (VECV)
Mr. Uday Harite	ACMA
Mr. Srivastava Sudeep	ACMA (Jost World)
Mr. Dinesh Nishanth	ACMA (Continental)
Mr. Varghese Mathew	ACMA (Continental)
Mr. Basak Amitava	ACMA (Continental)
Mr. Ramesh Balan	SDR Auto Private Limited
Mr. Kiran Kadam	York Tpt.
Mr. Abhishek Chandole	ACMA (Lumax)
Dr. Shabana Shaikh	H2E Power/ Ion Mobility
Mr. Ganesh Virape	H2E Power/ Ion Mobility
Mr. Hirdesh	H2E Power/ Ion Mobility
Ms. Vijeta Arya	Amazon
Mr. Balaji P. S	ACMA (India Japan Lighting)
Mr. Jayesh Shah	Retd. CEO RTO Gujrat

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

Annexure IV
(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, New Delhi
Representative from	Ministry of Heavy Industries, New Delhi
Representative from	Office of the Development Commissioner, MSME, Ministry of Micro, Small and Medium Enterprises, New Delhi
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

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