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INLAND TRANSPORT COMMITTEE
Working Party on the Transport of Dangerous Goods
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PROPOSALS OF AMENDMENTS TO ANNEXES A AND B OF ADR

Chapters 9.2 and 9.3

Note by the secretariat

In order to facilitate discussions under thus agenda item, the secretariat reproduces hereafter Chapters 9.2 and 9.3 as amended in accordance with the decisions taken at the previous sessions (see TRANS/WP.15/170, annex 2 and TRANS/WP.15/172, annex 1).

CHAPTER 9.2

REQUIREMENTS CONCERNING THE CONSTRUCTION OF BASE VEHICLES

9.2.1 ~~Base vehicles of~~ EX/II, EX/III, FL, OX and AT vehicles shall comply with the requirements of this Chapter, according to the table below.

For vehicles other than of EX/II, EX/III, FL, OX and AT:

- the requirements of 9.2.3.1.1 (Braking equipment in accordance with ECE Regulation No. 13 or Directive 71/320/EEC) are applicable to all vehicles first registered (or which entered into service if the registration is not mandatory) after 30 June 1997;

- the requirements of 9.2.5 (Speed limitation device in accordance with ECE Regulation No. 89 or Directive 92/6/EEC) are applicable to all motor vehicles with a maximum mass exceeding 12 tonnes [first] registered after 31 December 1987.

TECHNICAL SPECIFICATIONS		VEHICLES					COMMENTS
		EX/II	EX/III	AT	FL	OX	
9.2.2	**ELECTRICAL EQUIPMENT**						
9.2.2.2	Wiring		X	X [a]	X	X	[a] In the case of AT vehicles carrying tank-containers, portable tanks or MEGCs, this requirement shall apply only to vehicles first registered after 30 June 1997. Applicable to all AT vehicles carrying tank-containers, portable tanks or MEGCs as from 1 January 2005.
9.2.2.3	Battery master switch						
9.2.2.3.1			X		X		
9.2.2.3.2			X		X		
9.2.2.3.3					X		
9.2.2.3.4			X		X		
9.2.2.4	Batteries	X	X		X		
9.2.2.5	Permanently energized circuits						
9.2.2.5.1					X		
9.2.2.5.2			X				
9.2.2.6	Electrical installation at rear of cab		X		X		

TECHNICAL SPECIFICATIONS		VEHICLES					COMMENTS
		EX/II	**EX/III**	**AT**	**FL**	**OX**	
9.2.3	**BRAKING EQUIPEMENT**						
9.2.3.1	General provisions	X	X	X	X	X	
	Anti-lock braking system		X [b, d]	X [b, d]	X [b, d]	X [b, d]	[b] Applicable to vehicles first registered (or which entered into service if the registration is not mandatory) after 30 June 1993 in respect of motor vehicles (tractors and rigid vehicles) having a maximum mass exceeding 16 tonnes and trailers (i.e. full trailers, semi-trailers and centre-axle trailers) with a maximum mass exceeding 10 tonnes. Applicable to motor vehicles authorized to tow trailers with a maximum mass exceeding 10 tonnes, first registered after 30 June 1995. Applicable to all vehicles which are first approved in accordance with 9.1.2 after 30 June 2001 regardless of the date on which they were first registered. [d] Mandatory compliance for all vehicles as from 1 January 2010.
	Endurance braking system		X [c, g]	X [c, g]	X [c, g]	X [c, g]	[c] Applicable to motor vehicles first registered after 30 June 1993 having a maximum mass exceeding 16 tonnes or authorized to tow a trailer with a maximum mass exceeding 10 tonnes. [g] Mandatory compliance for all motor vehicles as from 1 January 2010.
9.2.3.2	Emergency braking devices for trailers						
9.2.3.2.1		X					
9.2.3.2.2			X				

TECHNICAL SPECIFICATIONS		VEHICLES					COMMENTS
		EX/II	**EX/III**	**AT**	**FL**	**OX**	
9.2.4	**PREVENTION OF FIRE RISKS**						
9.2.4.2	Vehicle cab						
~~9.2.4.2.1~~		~~X~~	~~X~~				
9.2.4.2.~~2~~1						X	
9.2.4.3	Fuel tanks	X	X		X	X	
9.2.4.4	Engine	X	X		X	X	
9.2.4.5	Exhaust system	X	X		X		
9.2.4.6	Vehicle endurance braking		X	X	X	X	
9.2.4.7	Combustion heaters						
9.2.4.7.1 9.2.4.7.2 9.2.4.7.5		X [e]	X [e]	X [e]	X [e]	X [e]	[e] Applicable to motor vehicles equipped after 30 June 1999. Mandatory compliance by 1 January 2010 for vehicles equipped before 1 July 1999 .
9.2.4.7.3 9.2.4.7.4					X [e]		[e] Applicable to motor vehicles equipped after 30 June 1999. Mandatory compliance by 1 January 2010 for vehicles equipped before 1 July 1999.
9.2.4.7.6		X	X				
9.2.5	**SPEED LIMITATION DEVICE**	X [f]	X [f]	X [f]	X [f]	X [f]	[f] Applicable to motor vehicles with a maximum mass exceeding 12 tonnes [first] registered after 31 December 1987.
9.2.6	**COUPLING DEVICE OF TRAILERS**	X	X				

9.2.2 Electrical equipment

9.2.2.1 ***General provisions***

The electrical installation as a whole shall meet the provisions of 9.2.2.2 to 9.2.2.6 in accordance with the table of 9.2.1.

9.2.2.2 ***Wiring***

9.2.2.2.1 The size of conductors shall be large enough to avoid overheating. Conductors shall be adequately insulated. All circuits shall be protected by fuses or automatic circuit breakers, except for the following:

- from the battery to the cold start and stopping systems of the engine;
- from the battery to the alternator;
- from the alternator to the fuse or circuit breaker box;
- from the battery to the starter motor;
- from the battery to the power control housing of the endurance braking system (see 9.2.3.1.2), if this system is electrical or electromagnetic;
- from the battery to the electrical lifting mechanism for lifting the bogie axle.

The above unprotected circuits shall be as short as possible.

9.2.2.2.2 Cables shall be securely fastened and positioned in such a way that the conductors are adequately protected against mechanical and thermal stresses.

9.2.2.3 ***Battery master switch***

9.2.2.3.1 A switch for breaking the electrical circuits shall be placed as close to the battery as practicable.

9.2.2.3.2 A control device to facilitate the disconnecting and reconnecting functions of the switch shall be installed in the driver's cab. It shall be readily accessible to the driver and be 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.

9.2.2.3.3 The switch shall have a casing with protection degree IP 65 in accordance with IEC Standard 529.

9.2.2.3.4 The cable connections on the switch shall have protection degree IP 54. 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.

9.2.2.4 ***Batteries***

The battery terminals shall be electrically insulated or covered by ~~the~~ an insulating battery box cover. If the batteries are not located under the engine bonnet, they shall be fitted in a vented box.

9.2.2.5 ***Permanently energized circuits***

9.2.2.5.1 (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[1] and the additional requirements applicable from IEC 60079, parts 1, 2, 5, 6, 7, 11, 15 or 18[2] ;

(b) For the application of IEC 60079 part 14[1], the following classification shall be used:

Permanently energized electrical equipment including the leads which is not subject to 9.2.2.3 and 9.2.2.4 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.

9.2.2.5.2 Bypass connections to the battery master switch for electrical equipment which must 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).

9.2.2.6 ***Provisions concerning that part of the electrical installation situated to the rear of the driver's cab***

The whole installation shall be so designed, constructed and protected such that it cannot provoke any ignition or short-circuit under normal conditions of use of vehicles and that these risks can be minimized in the event of an impact or deformation. In particular:

9.2.2.6.1 *Wiring*

The wiring located to the rear of the driver's cab shall be protected against impact, abrasion and chafing during normal vehicle operation. Examples of appropriate

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[1] *The requirements of IEC 60079 part 14 do not take precedence over the requirement of this Part.*

[2] *As an alternative, the general requirements of EN 50014 and the additional requirements of EN 50015, 50016, 50017, 50018, 50019, 50020, 50021 or 50028 may be used*

protection are given in figures 1, 2, 3 and 4 below. However, the sensor cables of anti-lock braking devices do not need additional protection.

FIGURES

Figure N°1

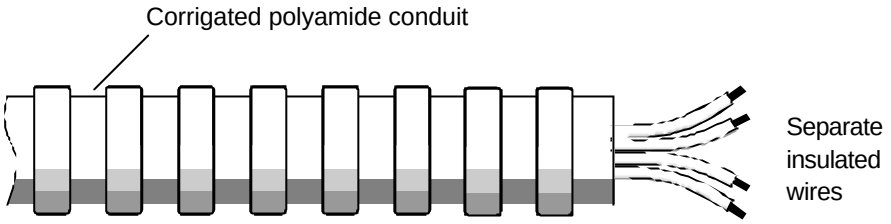
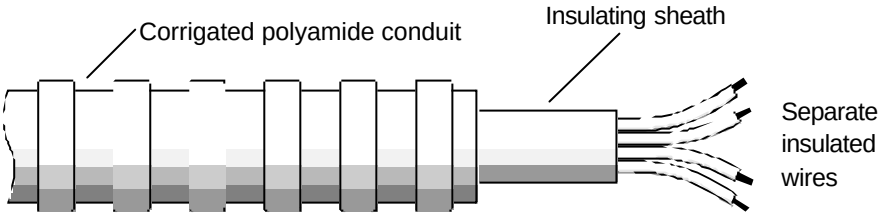


Figure N°



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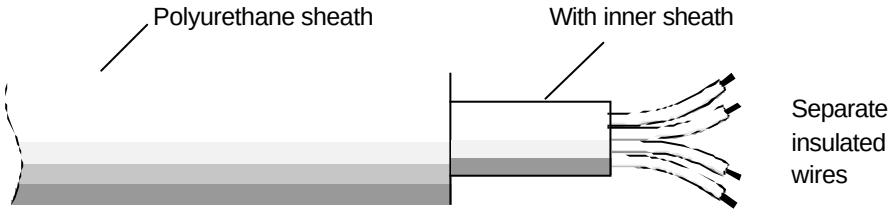
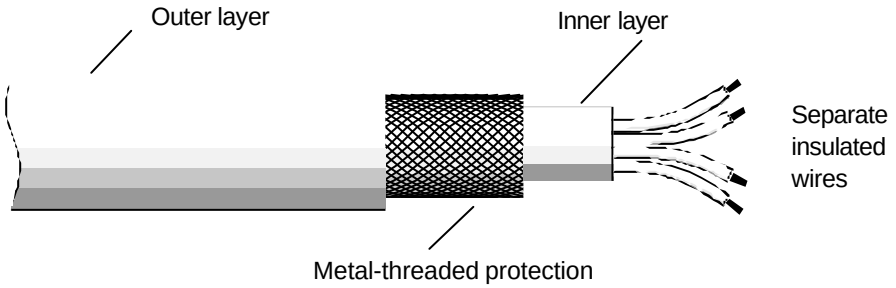


Figure N°



9.2.2.6.2 *Lighting*

Lamp bulbs with a screw cap shall not be used.

9.2.2.6.3 *Electrical connections*

Electrical connections between motor vehicles and trailers shall have a protection degree IP54 in accordance with IEC standard 529 and be designed to prevent accidental disconnection. Examples of appropriate connections are given in ISO 12 098:1994 and ISO 7638:1985.

9.2.3 Braking equipment

9.2.3.1 *General provisions*

9.2.3.1.1 Motor vehicles and trailers intended for use as transport units for dangerous goods shall fulfil all relevant technical requirements of ECE Regulation No.13[3] or Directive 71/320/EEC[4], as amended, in accordance with the dates of application specified therein.

9.2.3.1.2 EX/III, FL, OX and AT vehicles shall fulfil the requirements of ECE Regulation No.13[3], [5], Annex 5.

9.2.3.2 *Emergency braking devices for trailers*

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

9.2.3.2.2 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.

~~***NOTE:** The use of trailers equipped only with an inertia braking system shall be limited to a maximum load of 50 kg net explosive mass.*~~

9.2.4 Prevention of fire risks

9.2.4.1 *General provisions*

The following technical provisions shall apply in accordance with the table of 9.2.1.

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[3] *ECE Regulation No. 13 (Uniform provisions concerning the approval of vehicles of categories M, N and O with regard to braking).*

[4] *Directive 71/320/EEC (originally published in the Official Journal of the European Communities No. L202 of 6.9.1971*).

[[5] *ECE Regulation No. 13 (Uniform provisions concerning the approval of vehicles of categories M, N and O with regard to braking) or the corresponding provisions of Directive 71/320/EEC (originally published in the Official Journal of the European Communities No. L 202 of 6.9.1971), as amended.*]

9.2.4.2 ***Vehicle cab***

~~9.2.4.2.1 Only material not readily flammable shall be used in the construction of the driver's cab. This provision will be deemed to be met if, in accordance with the procedure specified in ISO standard 3795:1989, samples of the following cab components have a burn rate not exceeding 100 mm/min: seat cushions, seat backs, safety belts, head lining, opening roofs, armrests, all trim panels including door, front, rear, and side panels, compartment shelves, head restraints, floor coverings, sun visors, curtains, shades, wheel housing covers, engine compartment covers, mattress covers and any other interior materials, including padding and crash deployed elements, that are designed to absorb energy on contact by occupants in the event of a crash.~~

9.2.4.2.~~2~~1 Unless the driver's cab is made of materials which are not readily flammable, a shield made of metal or other suitable material of the same width as the tank shall be fitted at the rear of the cab. Any windows in the rear of the cab or in the shield shall be hermetically closed and made of fire-resistant safety glass with fire-resistant frames. Furthermore, there shall be a clear space of not less than 15 cm between the tank and the cab or the shield.

9.2.4.3 ***Fuel tanks***

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

(a) In the event of any leakage, the fuel shall drain to the ground without coming into contact with hot parts of the vehicle or the load;

(b) 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.

9.2.4.4 ***Engine***

The engine propelling the vehicle shall be so equipped and situated to avoid any danger to the load through heating or ignition. In the case of EX/II and EX/III vehicles the engine shall be of compression-ignition construction.

9.2.4.5 ***Exhaust system***

The exhaust system ~~as well as~~ (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.

9.2.4.6 ***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 wall 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.

9.2.4.7 ***Combustion heaters***

9.2.4.7.1 ~~*(Reserved)*~~ Combustion heaters shall comply with the relevant technical requirements of [ECE Regulation No. ...[*] or] Directive 2001/56/EC[**] in accordance with the dates of implementation specified therein and the provisions of 9.2.4.7.2 to 9.2.4.7.6 applicable according to the table in 9.2.1.

9.2.4.7.2 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 9.2.4.3 and 9.2.4.5 respectively.

9.2.4.7.3 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.

9.2.4.7.4 After running is permitted after the combustion heaters have been put out of operation. For the methods of 9.2.4.7.3 (b) and (c) the supply of combustion air shall be interrupted by suitable measures after an afterrunning 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 afterrunning cycle of 40 seconds for the time of their normal use.

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

9.2.4.7.6 Combustion heaters with gaseous fuels are not permitted.

9.2.5 **Speed limitation device**

Motor vehicles (rigid vehicles and tractors for semi-trailers) with a maximum mass exceeding 12 tonnes, shall be equipped with a speed limitation device according to the technical requirements of ECE Regulation No. 89 [6], as amended. The device shall be

[* *Regulation ECE No. ... Proposal for new regulation with regard to the type approval of a heating system and of a vehicle with regard to its heating system.*]

** *Directive 2001/56/EC of the European Parliament and of the Council of 27 September 2001 relating to heating systems for motor vehicles and their trailers (initially published in the Official Journal of the European Communities No. L292 of 9 November 2001).*

set in such a way that the speed cannot exceed 90 km/h, bearing in mind the technological tolerance of the device.

9.2.6 Coupling devices of trailers

Coupling devices of trailers shall comply with the technical requirements of ECE Regulation No. 55 [7] or Directive 94/20/EC [8], as amended, in accordance with the dates of application specified therein.

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[6] *ECE Regulations No. 89: uniform provisions concerning the approval of:*

I. Vehicles with regard to limitation of their maximum speed;

II. Vehicles with regard to the installation of a speed limitation device (SLD) of an approved type;

III. Speed limitation devices (SLD).

As an alternative, the corresponding provisions of directive 92/6/EEC of the Council of 10 February 1992 (originally published in the Official Journal of the European Communities No. L 057 of 02.03.1992) and directive 92/24/EEC of the Council of 31 March 1992 (originally published in the Official Journal of the European Communities No. L 129 of 14.05.1992), as amended, may apply provided that they have been amended in accordance with the latest amended form of ECE Regulation No. 89 applicable at the time of the vehicle approval.

[7] *ECE Regulation No. 55 (Uniform provisions concerning the approval of mechanical coupling components of combinations of vehicles).*

[8] *Directive 94/20/EC of the European parliament and of the Council of 30 of May 1994 (originally published in the Official Journal of the European Communities No. L 195 of 29.07.1994).*

CHAPTER 9.3

ADDITIONAL REQUIREMENTS CONCERNING COMPLETE OR COMPLETED EX/II OR EX/III VEHICLES

9.3.1 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.

9.3.2 Combustion heaters

9.3.2.1 Combustion heaters ~~shall not~~ may only be installed on ~~in load compartments of~~ EX/II and EX/III vehicles for heating of the driver's cab or the engine.

9.3.2.2 Combustion heaters shall meet the requirements of 9.2.4.7.1, 9.2.4.7.2, 9.2.4.7.5, and 9.2.4.7.6 ~~and the following~~:

9.3.2.3 ~~(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.

9.3.2.4 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. ~~It shall be ensured that the heating air outlet cannot be blocked by cargo. The temperature to which packages are heated shall not exceed 50 ºC.~~

9.3.3 EX/II vehicles

The vehicles shall be designed, constructed and equipped so that the explosives are protected from external hazards and the weather. They shall be either closed or sheeted. Sheeting shall be resistant to tearing and be of impermeable material, not readily flammable[1]. It shall be tautened so as to cover the loading area ~~vehicle~~ on all sides~~, with an overlap of not less than 20 cm down the sides of the vehicle, and be kept in position by a lockable device~~.

All openings in the load ~~The load carrying~~ compartment of closed vehicles ~~shall not have windows and all openings~~ shall have lockable, close-fitting doors or rigid covers. The driver's compartment shall be separated from the load compartment by a continuous wall.

9.3.4 EX/III vehicles

[1] *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 'Road vehicles, and tractors and machinery for agriculture and forestry - Determination of burning behaviour of interior materials', samples of the sheeting have a burn rate not exceeding 100 mm/min.*

9.3.4.1 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~~, including the front wall,~~ 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.

[9.3.4.2 ~~The insulating and heat resisting properties of the body shall be at least equivalent to those of a partition consisting of a metal outer wall lined with a layer of fire proofed wood of 10 mm thickness; or~~ The construction of the body shall be such as to ~~of a construction which shall~~ ensure that no flame penetration ~~of the wall~~ or hot spots of more than 120 °C on the inner wall surface will occur within 15 minutes from the start of a fire resulting from the operation of the vehicle, such as a tyre fire. ~~All the doors shall be capable of being locked. They shall be so placed and constructed as to overlap the joints.~~ This shall be verified by the competent authority or a body designated by the competent authority.] (*ref.*: TRANS/WP.15/170)

[Materials used for the construction of the body shall not be readily ignitable. These provisions are deemed to be fulfilled if the materials used are classified as Class B-S_3-d_2 according to standard EN 13501-1:2002.

If the material used for the body is metal, or metal containers or metal swap bodies are used as EX/III load compartments, the complete inside of the body, container or swap body shall be covered with materials fulfilling the same requirements.] (*ref.*: TRANS/WP.15/2003/4)

9.3.5 Engine and l~~L~~oad compartment ~~and engine~~

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.

9.3.6 External heat sources and l~~L~~oad compartment ~~and exhaust system~~

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.

9.3.7 Electrical equipment

~~9.3.7.1 The electrical installation on EX/III vehicles shall meet the requirements of 9.2.2.2, 9.2.2.3, 9.2.2.4, 9.2.2.5.2 and 9.2.2.6.~~

9.3.7.~~2~~1 The rated voltage of the electrical system shall not exceed 24V.

9.3.7.2 Any lighting in the load compartment of EX/II vehicles shall be on the ceiling and covered, i.e. with no exposed wiring or bulb.

In the case of Compatibility Group J, the electrical installation shall be at least IP65 (e.g. flame-proof Eex d). Any electrical equipment accessible from the inside of the load compartment shall be sufficiently protected from mechanical impact from the inside.

9.3.7.3 The electrical installation on EX/III vehicles shall meet the requirements of 9.2.2.2, 9.2.2.3, 9.2.2.4, 9.2.2.5.2 and 9.2.2.6.

The electrical installation in the load compartment shall be dust-protected (at least IP54 or equivalent) or, in the case of Compatibility Group J, at least IP65 (e.g. flame-proof Eex d).

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