

26 July 2017

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## **Agreement**

### **Concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions\***

(Revision 2, including the amendments which entered into force on 16 October 1995)

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#### **Addendum 104 – Regulation No. 105**

#### **Revision 2 – Amendment 3**

06 series of amendments – Date of entry into force: 22 June 2017

#### **Uniform provisions concerning the approval of vehicles intended for the carriage of dangerous goods with regard to their specific constructional features**

This document is meant purely as documentation tool. The authentic and legal binding texts is: ECE/TRANS/WP.29/2016/90.



**UNITED NATIONS**

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\* Former title of the Agreement: Agreement Concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, done at Geneva on 20 March 1958.

Paragraph 3.2.2., amend to read:

"3.2.2. Vehicle designation, according to paragraph 9.1.1.2. of the ADR (EX/II, EX/III, AT, FL, MEMU);"

Paragraph 5.1., the table, amend to read:

"

Technical specifications		Vehicle designation (according to chapter 9.1 of Annex b to ADR)				
		EX/II	EX/III	AT	FL	
5.1.1.	Electrical equipment					
5.1.1.1.	General provisions	X	X	X	X	
5.1.1.2.1.	Cables	X	X	X	X	
5.1.1.2.2.	Additional protection	X	X	X	X	
5.1.1.3.	Fuses and circuit breakers	X	X	X	X	
5.1.1.4.	Batteries	X	X	X	X	
5.1.1.5.	Lighting	X	X	X	X	
5.1.1.6.	Electrical connections	X	X	X	X	
5.1.1.7.	Voltage	X	X			
5.1.1.8.	Battery master switch		X		X	
5.1.1.9.	Permanently energized circuits					
5.1.1.9.1.					X	
5.1.1.9.2.			X			
5.1.2.	Braking equipment					
5.1.2.1.		X	X	X	X	
5.1.3.	Prevention of fire risks					
5.1.3.2.	Fuel tanks	X	X		X	
5.1.3.3.	Engine	X	X		X	
5.1.3.4.	Exhaust system	X	X		X	
5.1.3.5.	Vehicle endurance braking	X	X	X	X	
5.1.3.6.	Combustion heaters					
5.1.3.6.1		X	X	X	X	
5.1.4	Speed limitation device	X	X	X	X	
5.1.5.	Coupling devices of motor vehicles and trailers	X	X	X	X	
5.1.6.	Prevention of other risks caused by fuels			X	X	

"

*Paragraph 5.1.1.1., amend to read:*

"5.1.1.1. 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 5.1.1.2. to 5.1.1.9. in accordance with the table of paragraph 5.1."

*Insert new paragraphs 5.1.1.2.1. and 5.1.1.2.2., to read:*

"5.1.1.2.1. 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 given in ISO 16750-4:2010 and ISO 16750-5:2010, 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.

5.1.1.2.2. Additional Protection

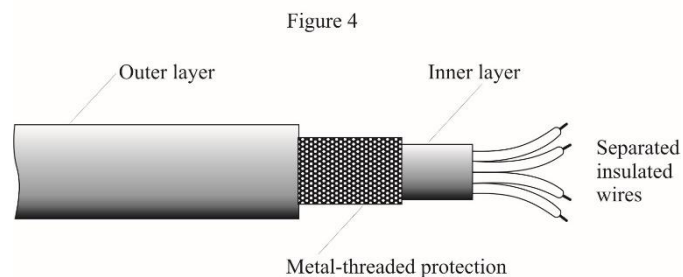
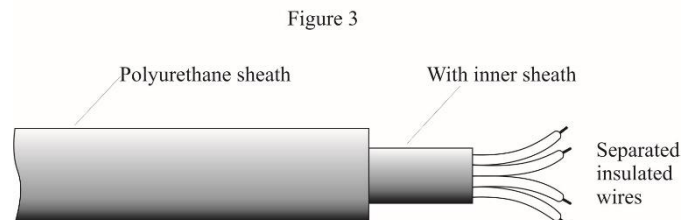
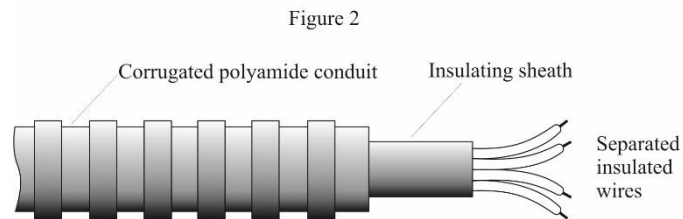
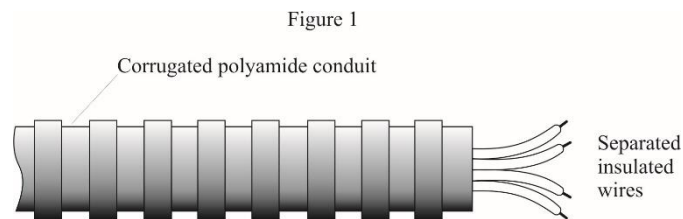
Cables located to the rear of the driver's cab and on trailers shall be additionally protected to minimize any unintended ignition or short-circuit in the event of an impact or deformation.

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.



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Paragraph 5.1.1.2.1. (former), renumber as paragraph 5.1.1.3. and amend to read:

"5.1.1.3. 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 5.1.2.1.), 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."

*Paragraph 5.1.1.2.2. (former), shall be deleted.*

*Paragraphs 5.1.1.3. to 5.1.1.3.2. (former), renumber as paragraphs 5.1.1.8. to 5.1.1.8.2. and amend to read:*

"5.1.1.8. Battery master switch

5.1.1.8.1. 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.

5.1.1.8.2. 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 5.1.1.9."

*Insert a new paragraph 5.1.1.8.3., to read:*

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

*Paragraphs 5.1.1.3.3. and 5.1.1.3.4. (former), renumber as paragraphs 5.1.1.8.4. and 5.1.1.8.5. and amend to read:*

"5.1.1.8.4. The switch shall have a casing with protection degree IP65 in accordance with IEC Standard 60529.

5.1.1.8.5. The cable connections on the battery master switch shall have a protection degree IP54 in accordance with IEC Standard 60529. 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."

*Paragraph 5.1.1.4., amend to read:*

"5.1.1.4. 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."

*Paragraphs 5.1.1.5. to 5.1.1.5.2. (former), renumber as paragraphs 5.1.1.9. to 5.1.1.9.2. and amend to read:*

"5.1.1.9. Permanently energized circuits

5.1.1.9.1. (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<sup>4</sup>, parts 0 and 14 and the additional requirements applicable from IEC 60079, parts 1, 2, 5, 6, 7, 11, 15 or 18.

- (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 5.1.1.4. and 5.1.1.8. 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.

- 5.1.1.9.2. 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).

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<sup>4</sup> The requirements of IEC 60079 part 14 do not take precedence over the requirements of this Regulation."

*Paragraphs 5.1.1.6. and 5.1.1.6.1. (former), shall be deleted.*

*Paragraphs 5.1.1.6.2. and 5.1.1.6.3. (former), renumber as paragraphs 5.1.1.5. and 5.1.1.6. and amend to read:*

"5.1.1.5. Lighting

Light sources with a screw cap shall not be used.

5.1.1.6. Electrical connections between motor vehicles and trailers

5.1.1.6.1. 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;
- (b) Accidental disconnection; connectors shall fulfil the requirements given in clause 5.6. of ISO 4091:2003.

5.1.1.6.2. Requirements of paragraph 5.1.1.6.1. are deemed to be met:

- (a) For connectors standardized for specific purposes accord to ISO 12098:2004<sup>5</sup>, ISO 7638:2003<sup>5</sup>, EN 15207:2014<sup>5</sup> or ISO 25981:2008<sup>5</sup>;

- (b) Where the electrical connections are part of an automatic coupling system (see Regulation No. 55).

<sup>5</sup> ISO 4009, referred to in this standard, need not be applied."

*Insert new paragraphs 5.1.1.6.3. and 5.1.1.7., to read:*

"5.1.1.6.3. 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 5.1.1.6.1.

5.1.1.7. 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."

*Paragraphs 5.1.2. and 5.1.2.1. (former), renumber as paragraphs 5.1.3. and 5.1.3.1.*

*Paragraph 5.1.2.2. (former), shall be deleted.*

*Paragraphs 5.1.2.3. and 5.1.2.3.2. (former), replace by:*

"5.1.3.2. Fuel tanks and cylinders

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

- (a) 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;
- (b) Fuel tanks for liquid fuels shall meet the requirements of Regulation No. 34; 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 Regulation No. 110. Fuel tanks for LPG shall meet the relevant requirements of Regulation No. 67;
- (c) 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."

*Paragraph 5.1.2.4. (former), renumber as paragraph 5.1.3.3. and amend to read:*

"5.1.3.3. 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 Regulation No. 110 and meet the provisions of paragraph 5.1.1. The installation on the vehicle shall meet the technical requirements of paragraph 5.1.1. and Regulation No. 110. The use of LPG as fuel shall be permitted only if the specific components for LPG are approved according to Regulation No. 67 and meet the provisions of paragraph 5.1.1. The installation on the vehicle shall meet the technical requirements of paragraph 5.1.1. and Regulation No. 67. 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."

*Paragraphs 5.1.2.5. to 5.1.2.7.1. (former), renumber as paragraphs 5.1.3.4. to 5.1.3.6.1.*

*Paragraphs 5.1.3. to 5.1.3.1. (former), renumber as paragraphs 5.1.2. to 5.1.2.1. and amend to read:*

"5.1.2. Braking equipment

5.1.2.1. EX/II, EX/III, AT, FL and MEMU vehicles shall fulfil all relevant requirements of Regulation No. 13, including those of Annex 5."

*Paragraph 5.1.3.2. (former), shall be deleted.*

*Paragraph 5.1.5., amend to read:*

"5.1.5. Coupling devices of motor vehicles and trailers

Coupling devices of motor vehicles and trailers shall comply with the technical requirements of Regulation No. 55."

*Insert new paragraphs 5.1.6. and 5.1.6.1., to read:*

"5.1.6. Prevention of other risks caused by fuels

5.1.6.1. 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."

*Paragraphs 10. to 10.4., amend to read:*

## **"10. Transitional provisions**

10.1. As from the official date of entry into force of the 06 series of amendments, no Contracting Party applying this Regulation shall refuse to grant ECE approval under this Regulation as amended by the 06 series of amendments.

10.2. As from 1 April 2018, Contracting Parties applying this Regulation shall grant ECE approvals only if the vehicle type to be approved meets the requirements of this Regulation as amended by the 06 series of amendments.

10.3. Contracting Parties applying this Regulation shall continue to grant approvals and extensions of such approvals to those types of vehicle which comply with the requirements of this Regulation, as amended by the preceding series of amendments until 31 March 2018.



10.4. No Contracting Party applying this Regulation shall refuse national or regional type approval of a vehicle type approved to the 06 series of amendments to this Regulation."

Annex 1, item 4, amend to read:

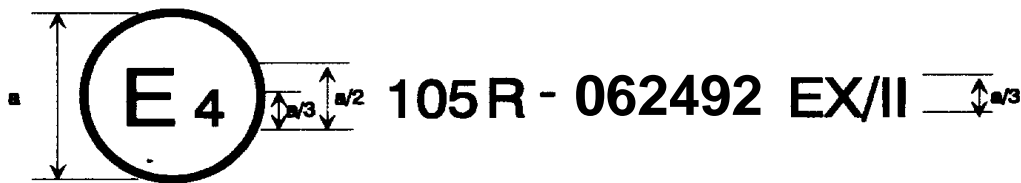
"4. Vehicle designation (EX/II, EX/III, FL, AT, MEMU):....."

Annex 2, amend to read:

## "Arrangements of approval marks

Model A

(see paragraph 4.4. of this Regulation)

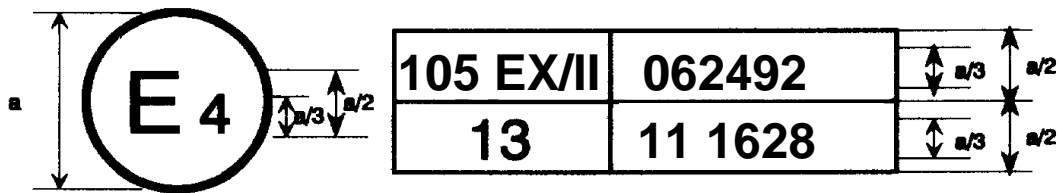


a = 8 mm min.

The above approval mark affixed to a vehicle shows that the vehicle type concerned, intended for the transport of dangerous goods, has been approved in the Netherlands (E 4), pursuant to Regulation No. 105, under the approval number 062492 and designated EX/II (according to paragraph 9.1.1.2. of Annex B to the ADR). The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of Regulation No. 105 as amended by the 06 series of amendments.

Model B

(see paragraph 4.5. of this Regulation)



a = 8 mm min.

The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in the Netherlands (E 4) pursuant to Regulations Nos. 105 and 13<sup>1</sup>. The first two digits of the approval numbers indicate that, at the dates when respective approvals were granted, Regulation No. 105, as amended by the 06 series of amendments, while Regulation No. 13 already included the 11 series of amendments.

<sup>1</sup> The second Regulation number is given merely as an example."