5 February 2016

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)

Addendum 48 – Regulation No. 49

Revision 6 - Amendment 3

Supplement 3 to the 06 series of amendments – Date of entry into force: 20 January 2016

Uniform provisions concerning the measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines and positive ignition engines for use in vehicles

This document is meant purely as documentation tool. The authentic and legal binding text is: ECE/TRANS/WP.29/2015/55.

UNITED NATIONS

* 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 4.10.8., amend to read:

"4.10.8. If the manufacturer chooses, until the date specified in paragraph 13.2.3. for new type approvals, he may use alternative provisions for the monitoring of the Diesel Particulate Filter (DPF) as set out in paragraph 2.3.2.2. of Annex 9A."

Paragraphs 13.2.1. to 13.3.3., amend to read:

"13.2.1. Contracting Parties applying this Regulation shall, from the date of entry into force of the 06 series of amendments to this Regulation, grant an ECE approval to an engine system or vehicle only if it complies with:

(a) The requirements of paragraph 4.1. of this Regulation;

(b) The performance monitoring requirements of paragraph 2.3.2.2. of Annex 9A in the case of compression ignition and dual-fuel engines and vehicles;

(c) The NO_x OTL monitoring requirements as set out in the row "phase in period" of Table 1 of Annex 9A, in the case of compression ignition and dual-fuel engines and vehicles;

(d) The NO_x OTL monitoring requirements as set out in the row "phase in period" of Table 2 of Annex 9A, in the case of positive ignition engines and vehicles;

(e) The Reagent quality "phase-in" requirements as set out in paragraph 7.1.1.1. of Annex 11.

13.2.1.1. In accordance with the requirements of paragraph 6.4.4. of Annex 9A manufacturers are exempted from providing a statement of OBD in-use performance compliance.

13.2.2. In the case of positive ignition engines and vehicles, Contracting Parties applying this Regulation shall, from 1 September 2014, grant a type-approval to an engine system or vehicle only if it complies with:

(a) The requirements of paragraph 4.1. of this Regulation;

(b) The NO_x OTL monitoring requirements as set out in the row "phase-in period" of Table 2 of Annex 9A;

(c) The CO OTL monitoring requirements as set out in the row "phase-in period" of Table 2 of Annex 9A;

(d) The Reagent quality "phase-in" requirements as set out in paragraph 7.1.1.1. of Annex 11.

13.2.2.1. In accordance with the requirements of paragraph 6.4.4. of Annex 9A manufacturers are exempted from providing a statement of OBD in-use performance compliance.

13.2.3. Contracting Parties applying this Regulation shall, from 31 December 2015, grant a type-approval to an engine system or vehicle only if it complies with:

(a) The requirements of paragraph 4.1. of this Regulation;

(b) The PM Mass OTL monitoring requirements as set out in the row "general requirements" of Table 1 of Annex 9A in the case of compression ignition and dual-fuel engines and vehicles;

(c) The NO_x OTL monitoring requirements as set out in the row "general requirements" of Table 2 of Annex 9A in the case of compression ignition and dual-fuel engines and vehicles;

(d) The NO_x and CO OTL monitoring requirements as set out in the row "general requirements" of Table 2 of Annex 9A in the case of positive ignition engines and vehicles;

(e) The Reagent quality "general requirements" as set out in paragraph 7.1.1.1. of Annex 11.

(f) The requirements regarding the plan and implementation of the monitoring techniques according to paragraphs 2.3.1.2. and 2.3.1.2.1. of Annex 9A;

(g) The requirements of paragraph 6.4.1. of Annex 9A for providing a statement of OBD in-use performance compliance.

13.3. Acceptance of already issued type approvals

13.3.1. As from 31 December 2013, Contracting Parties may refuse type approvals granted to this Regulation which do not comply with the requirements mentioned in paragraph 13.2.1. above.

13.3.2. As from 1 September 2015, Contracting Parties may refuse type approvals of positive ignition engines and vehicles granted to this Regulation, which do not comply with the requirements mentioned in paragraph 13.2.2. above.

13.3.3. As from 31 December 2016, Contracting Parties may refuse type approvals granted to this Regulation, which do not comply with the requirements mentioned in paragraph 13.2.3. above."

Annex 1, Part 1,

In the table, delete paragraph 3.2.12.2.8.6.

Annex 3,

Table 1, including reference notes, replace to read:

"Table 1
Letters with reference to requirements of OBD and SCR systems

Character	*NO_x OTL*[1]	*PM OTL*[2]	*CO OTL*[6]	*IUPR*[13]	*Reagent quality*	*Additional OBD monitors*[12]	*Implementation dates: new types*	*Date when Contracting Parties may refuse type approval*
A[9 10] B[10]	Row "phase-in period" of Tables 1 and 2 of Annex 9A	Performance monitoring[3]	N/A	Phase-in[7]	Phase-in[4]	N/A	Date of entry into force of 06 series of Regulation No. 49	01 September 2015[9] 31 December 2016[10]
B[11]	Row "phase-in period" of Tables 1 and 2 of Annex 9A	N/A	Row "phase-in period" of Table 2 of Annex 9A	N/A	Phase-in[4]	N/A	01 September 2014	31 December 2016
C	Row "general requirements" of Tables 1 and 2 of Annex 9A	Row "general requirements" of Table 1 of Annex 9A	Row "general requirements" of Table 2 of Annex 9A	General[8]	General[5]	Yes	31 December 2015	

Notes:

1 "NO_x OTL" monitoring requirements as set out in Table 1 of Annex 9A for compression ignition and dual-fuel engines and vehicles and in Table 2 of Annex 9A for positive ignition engines and vehicles.

2 "PM OTL" monitoring requirements as set out in Table 1 of Annex 9A for compression ignition and dual-fuel engines and vehicles.

3 "Performance monitoring" requirements as set out in paragraph 2.3.2.2. of Annex 9A.

4 Reagent quality "phase-in" requirements as set out in paragraph 7.1.1.1. of Annex 11.

5 Reagent quality "general" requirements as set out in paragraph 7.1.1. of Annex 11.

6 "CO OTL" monitoring requirements as set out in Table 2 of Annex 9A for positive ignition engines and vehicles.

7 Excluding the statement required by paragraph 6.4.1. of Annex 9A.

8 Including the statement required by paragraph 6.4.1. of Annex 9A.

9 For positive-ignition engines and vehicles.

10 For compression-ignition and dual-fuel engines and vehicles.

11 Only applicable to positive-ignition engines and vehicles.

12 "Additional provisions concerning monitoring requirements" as set out in paragraph 2.3.1.2. of Annex 9A.

13 IUPR specifications are set out in Annexes 9A and 9C of this Regulation. PI engines are not subjected to IUPR."

Annex 9A,

Paragraph 2.2., amend to read:

"2.2. Requirements regarding operating sequences and driving cycles for hybrid vehicles and vehicles with stop-start systems."

Insert new paragraphs 2.2.1. to 2.2.2.3., to read:

"2.2.1. Operating sequence

2.2.1.1. For vehicles that employ engine shut-off strategies that are commanded by the engine control system (for example hybrid bus with engine shut-off at idle) and that are followed by an engine cranking, the (engine shut-off – engine cranking) sequence shall be considered as part of the existing operating sequence.

2.2.1.2. The manufacturer shall provide the description of such strategies in the documentation considered in paragraphs 3.1.3. (a) and 3.1.3. (b) of this Regulation.

2.2.1.3. In the case of a hybrid vehicle, the operating sequence shall start at the time of the engine start or at the time when the vehicle starts moving, whichever occurs first.

2.2.2. Driving cycle

2.2.2.1. For vehicles that employ engine shut-off strategies that are commanded by the engine control system (for example hybrid bus with engine shut-off at idle) and that are followed by an engine cranking, the (engine shut-off – engine cranking) sequence shall be considered as part of the existing driving cycle.

2.2.2.2. The manufacturer shall provide the description of such strategies in the documentation considered in paragraphs 3.1.3. (a) and 3.1.3. (b) of this Regulation.

2.2.2.3. In the case of a hybrid vehicle, the driving cycle shall start at the time of the engine start or at the time when the vehicle starts moving, whichever occurs first."

Paragraph 2.3.2.2., amend to read:

"2.3.2.2. In the case of a wall flow diesel particulate filter (DPF), until the date specified in paragraph 13.2.3. of this Regulation for new type approvals and paragraph 13.3.3. for new registrations, the manufacturer may choose to apply the performance monitoring requirements set out in Appendix 8 to Annex 9B instead of the requirements of paragraph 2.3.2.1., if he can demonstrate with technical documentation that in case of deterioration there is a positive correlation between the loss of filtration efficiency and the loss of pressure drop ("delta pressure") across the DPF under the operating conditions of the engine specified in the test described in Appendix 8 to Annex 9B."

Paragraph 2.4.1., including footnote 1, amend to read:

"2.4.1. If requested by the manufacturer, for vehicles of categories M_2 and N_1, for vehicles of categories M_1 and N_2 with a technically permissible maximum laden mass not exceeding 7.5 tonnes, and for vehicles of category M_3 Class I, Class II and Classes A and B[1] with a permissible mass not exceeding 7.5

tonnes, compliance with the requirements of Annex 11 to the 07 series of amendments to Regulation No. 83 shall be considered equivalent to the compliance with this annex, according to the following equivalences:

[1] As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3.), document ECE/TRANS/WP.29/78/Rev.3, para. 2. - www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html"

Insert new paragraphs 2.4.1.1. to 2.4.1.3.2.2., to read:

"2.4.1.1. The OBD standard "Interim OBD threshold limits" in Table A11/3 of Annex 11 to the 07 series of amendments to Regulation No. 83 shall be considered as equivalent to the character A of the Table 1 of Annex 3 to this Regulation.

2.4.1.2. The OBD standard "Preliminary OBD threshold limits" in Table A11/2 of Annex 11 to the 07 series of amendments to Regulation No. 83 shall be considered as equivalent to the character B of the Table 1 of Annex 3 to this Regulation.

2.4.1.3. The OBD standard "Final OBD threshold limits" in Table A11/1 of Annex 11 to the 07 series of amendments to Regulation No. 83 shall be considered as equivalent to the character C of the Table 1 of Annex 3 to this Regulation.

2.4.1.3.1. If such alternative approval is used, the information related to OBD systems in paragraph 3.2.12.2.7. of Part 2 of Annex 1 is replaced by the information of paragraph 3.2.12.2.7. of Annex 1 to the 07 series of amendments to Regulation No. 83.

2.4.1.3.2. The equivalences set out in paragraph 2.4.1. shall apply in the following manner:

2.4.1.3.2.1. The OTL's and dates referred to in Table 1 of Annex 3 to this Regulation and relevant to the assigned character for which the type-approval is sought shall apply;

2.4.1.3.2.2. The requirements on NO_x control measures described in paragraphs 2.1.2.2.1. to 2.1.2.2.4. of Annex 11 shall apply."

Table 2, amend to read:

"Table 2
OTLs (positive ignition engines)

	Limit in mg/kWh	
	NO_x	*CO*[1]
Phase-in period	1 500	7 500
General requirements	1 200	7 500

[1] The transitional provisions related to introduction of the CO OTLs are specified in paragraphs 13.2.2. and 13.3.2. of this Regulation."

Annex 9B,

Paragraph 3.5., amend to read:

"3.5. *"Continuous-MI"* means the malfunction indicator showing a steady indication from the time the key is moved to on (run) position and the engine is started (ignition on – engine on) or the vehicle starts moving, whichever occurs first, and extinguishing when the key is moved to off."

Paragraph 3.22., amend to read:

"3.22. *"Short-MI"* means the malfunction indicator showing a 15 seconds steady indication from the time the key is moved to on (run) position and the engine is started (ignition on - engine on) or the vehicle starts moving, and extinguishing either after these 15 seconds or when the key is moved to off, whichever occurs first."

Paragraph 4.6.4., amend to read:

"4.6.4. MI activation at key-on/engine-off

The MI activation at key-on/engine-off shall consist of two sequences separated by a 5 seconds MI off:

(a) The first sequence is designed to provide an indication of the MI functionality and the readiness of the monitored components;

(b) The second sequence is designed to provide an indication of the presence of a malfunction.

The first sequence starts from the first time the system is at key-on position and stops either at its normal completion or when the key is set to the key-off position, whichever occurs first.

The second sequence is repeated until either the engine is started[1], the vehicle starts moving, or the key is set to the key-off position, whichever occurs first.

[1] An engine may be considered started during the cranking phase."

Paragraphs 4.6.5.1.1. first sentence and 4.6.5.1.2. first sentence, amend to read:

"4.6.5.1.1. Continuous-MI counter

The OBD system shall contain a continuous-MI counter to record the number of hours during which the internal combustion engine has been operated while a continuous-MI is activated. …

4.6.5.1.2. Cumulative continuous-MI counter

The OBD system shall contain a cumulative continuous-MI counter to record the cumulative number of hours during which the internal combustion engine has been operated over its life while a continuous-MI is activated. …"

Paragraph 4.6.5.2.1. first sentence, amend to read:

"4.6.5.2.1. Single B1-counter

The OBD system shall contain a B1 counter to record the number of hours during which the internal combustion engine has operated while a Class B1 malfunction is present. …"

Annex 9C,

Paragraph 5.5., amend to read:

"5.5. Requirements for incrementing the ignition cycle counter

The ignition cycle counter shall be incremented once and only once per driving cycle."

Annex 11,

Paragraph 2.1.1., including footnote 1, amend to read:

"2.1.1. If requested by the manufacturer, for vehicles of categories M_2 and N_1, for vehicles of categories M_1 and N_2 with a technically permissible maximum laden mass not exceeding 7.5 tonnes, and for vehicles of category M_3 Class I, Class II and Classes A and Class B[1] with a permissible mass not exceeding 7.5 tonnes, compliance with the requirements of Annex 6 to the 07 series of amendments to Regulation No. 83 shall be considered equivalent to the compliance with this annex.

[1] As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3.), document ECE/TRANS/WP.29/78/Rev.3, para. 2. - www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html"

Insert new paragraphs 2.1.2. to 2.1.2.2.5., to read:

"2.1.2. If the alternative approval is used:

2.1.2.1. The information related to the correct operation of NO_x control measures in paragraphs 3.2.12.2.8.1. to 3.2.12.2.8.5. of Part 2 of Annex 1 to this Regulation is replaced by the information of paragraph 3.2.12.2.8. of Annex 1 to the 07 series of amendments to Regulation No. 83.

2.1.2.2. The following exceptions shall apply regarding the application of the requirements set out in Appendix 6 to the 07 series of amendments to Regulation No. 83 and those of this Annex:

2.1.2.2.1. The provisions on reagent quality monitoring set out in paragraphs 7.1. to 7.1.2. of this Annex shall apply, instead of paragraphs 4.1. and 4.2. of Appendix 6 to the 07 series of amendments to Regulation No. 83.

2.1.2.2.2. The provisions on dosing activity monitoring set out in paragraph 8.4. of this Annex shall apply, instead of paragraph 5. of Appendix 6 to the 07 series of amendments to Regulation No. 83.

2.1.2.2.3. The driver warning system referred to in paragraph 4., 7. and 8. of this Annex shall be understood as the driver warning system in paragraph 3. of Appendix 6 to the 07 series of amendments to Regulation No. 83.

2.1.2.2.4. Paragraph 6 of Appendix 6 to the 07 series of amendments to Regulation No. 83 shall not apply.

2.1.2.2.5. The provisions set out in paragraph 5.2. of this annex shall apply in the case of vehicles for use by the rescue services or to vehicles designed and constructed for use by the armed services, civil defence, fire services and forces responsible for maintaining public order."

Paragraphs 7.1.1. to 7.1.1.2., amend to read:

"7.1.1. The manufacturer shall specify a value CD_{min}, which is greater than the highest reagent concentration that results in tailpipe emissions exceeding the limit values specified in paragraph 5.3. of this Regulation.

7.1.1.1. During the phase-in period specified in paragraph 4.10.7. of this Regulation and upon request of the manufacturer for the purpose of paragraph 7.1.1. the reference to the NO_x emission limit specified in paragraph 5.3. to this Regulation shall be replaced by the value of 900 mg/kWh.

7.1.1.2. The value of CD_{min} shall be demonstrated during type approval by the procedure defined in Appendix 6 to this annex and recorded in the extended documentation package as specified in paragraph 5.1.4. to this Regulation."

Paragraph 8., title, amend to read:

"8. Reagent consumption and dosing activity monitoring"

Paragraph 8.1., amend to read:

"8.1. The vehicle shall include means of determining reagent consumption, interruption of the reagent dosing activity and providing off-board access to consumption information."

Paragraph 8.3.1., amend to read:

"8.3.1. The maximum detection period for insufficient reagent consumption is five hours or the period equivalent to a demanded reagent consumption of at least 2 litres, whichever is longer."

Insert new paragraph 8.3.1.1., to read:

"8.3.1.1. When the reagent consumption is monitored by using at least one of the following parameters:

(a) The level of reagent in the on-vehicle storage tank, or

(b) The flow of reagent or quantity of reagent injected at a position as close as technically possible to the point of injection into an exhaust after-treatment system,

The maximum detection period for insufficient reagent consumption is extended to 48 hours or to the period equivalent to a demanded reagent consumption of at least 15 litres, whichever is longer."

Paragraph 8.3.2. shall be deleted.

Paragraph 8.4.1., amend to read:

"8.4.1. The driver warning system described in paragraph 4. shall be activated if a deviation of more than fifty per cent between the average reagent consumption and the average demanded reagent consumption by the engine system over a period to be defined by the manufacturer, which shall not be longer than the maximum period defined in paragraph 8.3.1., or, when applicable, paragraph 8.3.1.1., is detected. When the warning system includes a message display system, it shall display a message indicating the reason for the warning (for example: "urea dosing malfunction", "AdBlue dosing malfunction", or "reagent dosing malfunction")."

Paragraph 8.4.1.1. shall be deleted.

Appendix 2,

Paragraph A.2.4.1.1.,first sentence amend to read:

"A.2.4.1.1. To comply with the requirements of this annex, the system shall contain separate counters to record the number of hours during which the engine has been operated while the system has detected any of the following: …."

Annex 15,

Paragraph 4.2.2., amend to read:

"4.2.2. The operability restriction applicable to dual-fuel vehicles when they operate in service mode is the one activated by the "*severe inducement system*" specified in Annex 11 or, in the special case described in paragraph 4.2.2.3., the power limitation described in that section."

Insert new paragraphs 4.2.2.2. to 4.2.2.3.3., to read:

"4.2.2.2. De-activation of the operability restriction

In case of an empty gas tank, the operability restriction in dual-fuel mode due to a lack of gaseous fuel, shall be de-activated as soon as the gas tank is refilled above the critical level.

4.2.2.3. Repair and maintenance of LNG Type A dual-fuel engines and vehicles.

In the case of LNG Type A dual-fuel engines and vehicles, the manufacturer may, instead of limiting the vehicle speed at 20 km/h, opt for limiting the power of the engine to 20 per cent of the declared maximum power in dual-fuel mode, and this at any engine speed, when the service mode is activated during a repair or maintenance operation.

4.2.2.3.1. The power limitation option may only be activated if the system concludes that the gas tank is empty not later than 5 minutes after engine cranking, the engine being at idle.

4.2.2.3.2. The power limitation option shall not be activated when the system concludes that the gas tank is empty from a previous driving cycle and the gas tank has not been refilled.

4.2.2.3.3. The manufacturer shall demonstrate at type-approval that the power limitation option can only be activated during a repair or maintenance operation."