



Council of the
European Union

Brussels, 26 May 2016
(OR. en)

9386/16
ADD 1

ENV 358
ENT 95
MI 373

COVER NOTE

From:	European Commission
date of receipt:	10 May 2016
To:	General Secretariat of the Council
No. Cion doc.:	D044529/02 - Annexes 1 to 3
Subject:	Annexes to the Commission Regulation amending Regulation (EU) No 582/2011 with respect to emissions from heavy duty vehicles as regards the provisions on testing by means of portable emission measurement systems (PEMS) and the procedure for the testing of the durability of replacement pollution control devices

Delegations will find attached document D044529/02 - Annexes 1 to 3.

Encl.: D044529/02 - Annexes 1 to 3



EUROPEAN
COMMISSION

Brussels, **XXX**
D044529/02
[...](2016) **XXX** draft

ANNEXES 1 to 3

ANNEXES

to the

Commission Regulation

amending Regulation (EU) No 582/2011 with respect to emissions from heavy duty vehicles as regards the provisions on testing by means of portable emission measurement systems (PEMS) and the procedure for the testing of the durability of replacement pollution control devices

ANNEX I

Annex I to Regulation (EU) No 582/2011 is amended as follows:

(1) point 1.1.2. is replaced by the following:

‘1.1.2. If the manufacturer permits the engine family to run on market fuels that do not comply neither with Directive 98/70/EC of the European Parliament and of the Council* nor with CEN standard EN 228:2012 (in the case of unleaded petrol) or CEN standard EN 590:2013 (in the case of diesel), such as running on B100 (EN 14214), the manufacturer shall, in addition to the requirements in point 1.1.1, comply with the following requirements:

(a) declare the fuels the engine family is capable to run on in point 3.2.2.2.1 of the Information Document as set out in Part 1 of Appendix 4., either by reference to an official standard or to a production specification of a brand specific market fuel not meeting any official standard such as those mentioned in point 1.1.2. The manufacturer shall also declare that the functionality of the OBD system is not affected by the use of the declared fuel;

(b) demonstrate that the parent engine meets the requirements specified in Annex III and in Appendix 1 of Annex VI to this Regulation on the fuels declared; the approval authority may request that the demonstration requirements be further extended to those laid down in Annex VII and Annex X;

(c) be liable to meet the requirements of in-service conformity specified in Annex II on the fuels declared including any blend between the declared fuels and the market fuels included in Directive 98/70/EC and the relevant CEN standards.

At the request of the manufacturer, the requirements set out in this point shall be applied to fuels used for military purposes.

For the purposes of point (a) of the first subparagraph where the emission tests are performed for demonstrating compliance with the requirements of this Regulation, a fuel analysis report of the test fuel shall be attached to the test report and shall comprise at least the parameters specified in the official specification of the fuel manufacturer.

* Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC (OJ L 350, 28.12.1998, p. 58).’;

(2) point 1.1.5. is replaced by the following:

‘1.1.5. In the case of natural gas/biomethane engines, the ratio of the emission results ‘r’ shall be determined for each pollutant as follows:

$$r = \frac{\text{emission result on reference fuel 2}}{\text{emission result on reference fuel 1}}$$

or

$$r_a = \frac{\text{emission result on reference fuel 2}}{\text{emission result on reference fuel 3}}$$

and

$$r_b = \frac{\text{emission result on reference fuel 1}}{\text{emission result on reference fuel 3}};$$

(3) point 3.1. is replaced by the following:

‘3.1. In the case of an engine type-approved as a separate technical unit or a vehicle type-approved with regard to emissions and access to vehicle repair and maintenance information, the engine shall bear:

- (a) the trademark or trade name of the manufacturer of the engine;
- (b) the manufacturer’s commercial description of the engine.’;

(4) the following points 3.2.1.1. to 3.2.1.6. are inserted:

‘3.2.1.1. In case of a natural gas/biomethane engine one of the following markings to be placed after the EC type-approval mark:

- (a) H in case of the engine being approved and calibrated for the H-range of gases;
- (b) L in case of the engine being approved and calibrated for the L-range of gases;
- (c) HL in case of the engine being approved and calibrated for both the H-range and L-range of gases;
- (d) H_t in case of the engine being approved and calibrated for a specific gas composition in the H-range of gases and transformable to another specific gas in the H-range of gases by fine tuning of the engine fuelling;
- (e) L_t in case of the engine being approved and calibrated for a specific gas composition in the L-range of gases and transformable to another specific gas in the L-range of gases after fine tuning of the engine fuelling;
- (f) HL_t in the case of the engine being approved and calibrated for a specific gas composition in either the H-range or the L- range of gases and transformable to another specific gas in either the H-range or the L-range of gases by fine tuning of the engine fuelling;
- (g) CNG_{fr} in all other cases where the engine is fuelled with CNG/biomethane and designed for operation on one restricted gas fuel range composition;
- (h) LNG_{fr} in the cases where the engine is fuelled with LNG and designed for operation on one restricted gas fuel range composition;

(i) LPG_{fr} in the cases where the engine is fuelled with LPG and designed for operation on one restricted gas fuel range composition;

(j) LNG_{20} in case of the engine being approved and calibrated for a specific LNG composition resulting in a λ -shift factor not differing by more than 3 per cent the λ -shift factor of the G_{20} gas specified in Annex IX, and the ethane content of which does not exceed 1.5 per cent;

(k) LNG in case of the engine being approved and calibrated for any other LNG composition;

3.2.1.2. For dual-fuel engines, the approval mark shall contain a series of digits after the national symbol, the purpose of which is to distinguish for which dual-fuel engine type and with which range of gases the approval has been granted. The series of digits will be constituted of two digits identifying the dual-fuel engine type as defined in Article 2, followed by the letter or letters specified in point 3.2.1.1. corresponding to the natural gas/biomethane composition used by the engine. The two digits identifying the dual-fuel engine types as defined in Article 2 are the following:

(a) 1A for dual-fuel engines of Type 1A;

(b) 1B for dual-fuel engines of Type 1B;

(c) 2A for dual-fuel engines of Type 2A;

(d) 2B for dual-fuel engines of Type 2B;

(e) 3B for dual-fuel engines of Type 3B;

3.2.1.3. For diesel fuelled CI engines, the approval mark shall contain the letter 'D' after the national symbol;

3.2.1.4. For ethanol (ED95) fuelled CI engines the approval mark shall contain the letters 'ED' after the national symbol;

3.2.1.5. For ethanol (E85) fuelled PI engines the approval mark shall contain 'E85' after the national symbol;

3.2.1.6. for petrol fuelled PI engines the approval mark shall contain the letter 'P' after the national symbol.';

(5) in point 4.2, point (b) is replaced by the following:

'(b) as regards the compliance of the system ensuring the correct operation of NO_x control measures, the installation shall, according to Appendix 4 of Annex 11 to UN/ECE Regulation No 49, meet the manufacturer's installation requirements as specified in Part 1 of Annex 1 to that Regulation.';

(6) in Appendix 4, the ninth, tenth and eleventh paragraphs are replaced by the following:

'In the case of application for EC type-approval of an engine or engine family as a separate technical unit the general part and Parts 1 and 3 shall be filled in.

In the case of application for EC type-approval of vehicle with an approved engine with regard to emissions and access to vehicle repair and maintenance information the general part and Part 2 shall be filled in.

In the case of application for EC type-approval of a vehicle with regard to emissions and access to vehicle repair and maintenance information the general part and Parts 1, 2 and 3 shall be filled in.';

(7) Appendix 9 is replaced by the following:

‘Appendix 9

EC Type-Approval Certification Numbering System

Section 3 of the EC type-approval number issued according to Articles 6(1), 8(1) and 10(1) shall be composed by the number of the implementing regulatory act or the latest amending regulatory act applicable to the EC type-approval. The number shall be followed by an alphabetical character reflecting the requirements of OBD and SCR systems in accordance with Table 1.

Table 1

Character	NO _x OTL ⁽¹⁾	PM OTL ⁽²⁾	CO OTL ⁽⁶⁾	IUPR ⁽¹³⁾	Reagent quality	Additional OBD monitors ⁽¹²⁾	Power threshold requirements ⁽¹⁴⁾	Implementation dates: new types	Implementation dates: all vehicles	Last date of registration
A ^(9, 10) B ⁽¹⁰⁾	Row "phase-in period" of Tables 1 or Table 2	Performance Monitoring ⁽³⁾	N/A	Phase-in ⁽⁷⁾	Phase-in ⁽⁴⁾	N/A	20%	31.12.2012	31.12.2013	31.8.2015 ⁽⁹⁾ 30.12.2016 ⁽¹⁰⁾
B ⁽¹¹⁾	Row "phase-in period" of Tables 1 and 2	N/A	Row "phase-in period" of Table 2	N/A	Phase-in ⁽⁴⁾	N/A	20%	1.9.2014	1.9.2015	30.12.2016
C	Row "general requirements" of Tables 1 or Table 2	Row "general requirements" of Table 1	Row "general requirements" of Table 2	General ⁽⁸⁾	General ⁽⁵⁾	Yes	20%	31.12.2015	31.12.2016	31.12.2018
D	Row "general	Row "general	Row "general	General	General	Yes	10%	1.9.2018	1.9.2019	

	requirements" of Tables 1 or Table 2	requirements" of Table 1	requirements" of Table 2	(⁷)	(⁸)	(⁹)	(¹⁰)	(¹¹)	(¹²)	(¹³)	(¹⁴)
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Key:

- (¹) "NOx OTL" monitoring requirements as set out in Table 1 of Annex X for compression ignition and dual-fuel engines and vehicles and Table 2 of Annex X for positive ignition engines and vehicles.
 - (²) "PM OTL" monitoring requirements as set out in Table 1 of Annex X for compression ignition and dual-fuel engines and vehicles.
 - (³) "Performance monitoring" requirements as set out in point 2.1.1 of Annex X.
 - (⁴) Reagent quality "phase-in" requirements as set out in point 7.1 of Annex XIII.
 - (⁵) Reagent quality "general" requirements as set out in point 7.1.1 of Annex XIII.
 - (⁶) "CO OTL" monitoring requirements as set out in Table 2 of Annex X for positive ignition engines and vehicles.
 - (⁷) IUPR "Phase-in" requirements as set out in Section 6 of Annex X.
 - (⁸) IUPR "General" requirements as set out in Section 6 of Annex X.
 - (⁹) For positive-ignition engines and vehicles equipped with such engines.
 - (¹⁰) For compression-ignition and dual-fuel engines and vehicles equipped with such engines.
 - (¹¹) Only applicable to positive-ignition engines and vehicles equipped with such engines.
 - (¹²) Additional provisions concerning monitoring requirements as set out in paragraph 2.3.1.2. of Annex 9A to UNECE Regulation No 49.
 - (¹³) IUPR specifications are set out in Annex X. Positive Ignition engines and vehicles equipped with such engines are not subjected to IUPR.
 - (¹⁴) ISC requirement set out in Appendix 1 to Annex II.
- N/A Not applicable.

ANNEX II

Annex II to Regulation (EU) No 582/2011 is amended as follows:

(1) point 2.1. is replaced by the following:

‘2.1. The conformity of in-service vehicles or engines of an engine family shall be demonstrated by testing vehicles on the road operated over their normal driving patterns, conditions and payloads. The in-service conformity test shall be representative for vehicles operated on their real driving routes, with their normal payload and with the usual professional driver of the vehicle. When the vehicle is operated by a driver other than the usual professional driver of the particular vehicle, the alternative driver shall be skilled and trained to operate vehicles of the category subject to be tested.’;

(2) point 2.3. is replaced by the following:

‘2.3. The manufacturer shall demonstrate to the approval authority that the chosen vehicle, driving patterns and conditions are representative for the engine family. The requirements as specified in point 4.5 shall be used to determine whether the driving patterns are acceptable for in-service conformity testing.’;

(3) point 4.1. is replaced by the following:

‘4.1. Vehicle payload

Normal payload is a payload between 10 and 100 % of the maximum payload.

The maximum payload is the difference between technically permissible maximum laden mass of the vehicle and the mass of the vehicle in running order as specified in accordance to Annex I to Directive 2007/46/EC.

For the purpose of in-service conformity testing, the payload may be reproduced and an artificial load may be used.

Approval authorities may request to test the vehicle with any payload between 10 to 100 % of the maximum vehicle payload. In case the mass of the PEMS equipment needed for operation exceeds 10 % of the maximum vehicle payload this mass may be considered as minimum payload.

Vehicles of category N₃ shall be tested, when applicable, with a semi-trailer.’;

(4) points 4.4.1. to 4.5.5. are replaced by the following:

‘4.4.1. The test lubricating oil shall be market oil and must comply with the specifications of the engine manufacturer.

Oil samples shall be taken.

4.4.2. Fuel

The test fuel shall be market fuel covered by Directive 98/70/EC and relevant CEN standards or reference fuel as specified in Annex IX to this Regulation. Fuel samples shall be taken.

A manufacturer may request not to sample the fuel from a gas engine.

4.4.2.1. If the manufacturer has, in accordance with Section 1 of Annex I to this Regulation declared the capability to meet the requirements of this Regulation on market fuels declared in point 3.2.2.2.1. of the Information Document as set out in Appendix 4 to Annex I to this Regulation, at least one test shall be conducted on each of the declared market fuels.

4.4.3. For exhaust after-treatment systems that use a reagent to reduce emissions, the reagent shall be market reagent and must comply with the specifications of the engine manufacturer. A sample of the reagent shall be taken. The reagent shall not be frozen.

4.5. Trip requirements

The shares of operation shall be expressed as a percentage of the total trip duration.

The trip shall consist of urban driving followed by rural and motorway driving according to the shares specified in points 4.5.1. to 4.5.4. Where another testing order is justified for practical reasons and after the agreement of the approval authority another order may be used, however, the test shall always start with the urban driving.

For the purpose of this Section, ‘approximately’ shall mean the target value $\pm 5\%$.

Urban, rural and motorway parts can be determined either on the basis of:

- geographical co-ordinates (by means of a map), or
- first acceleration method.

In case the trip composition is determined on the basis of geographical co-ordinates, the vehicle should not exceed, for a cumulative period longer than 5 % of the total duration of each part of the trip, the following speed:

- 50 km/h in the urban part
- 75 km/h in the rural part (90 km/h in the case of vehicles of categories M₁ and N₁)

In case the trip composition is determined by means of the first acceleration method, the first acceleration above 55 km/h (70 km/h in the case of vehicles of categories M₁ and N₁) shall indicate the beginning of the rural part and the first acceleration above 75 km/h (90 km/h in the case of vehicles of categories M₁ and N₁) shall indicate the beginning of the motorway part.

The criteria for differentiation between urban, rural and motorway operation shall be agreed with the approval authority prior to the beginning of the test.

Average speed in urban operation shall be between 15 and 30 km/h.

Average speed in rural operation shall be between 45 and 70 km/h (60 and 90 km/h in the case of vehicles of categories M₁ and N₁).

Average speed in motorway operation shall be above 70 km/h (90 km/h in the case of vehicles of categories M₁ and N₁).

4.5.1. For M₁ and N₁ vehicles the trip shall consist of approximately 34 % urban, 33 % rural and 33 % motorway operation.

4.5.2. For N₂, M₂ and M₃ vehicles the trip shall consist of approximately 45 % urban, 25 % rural and 30 % motorway operation. M₂ and M₃ vehicles of Class I, II or Class A as defined in UN/ECE Regulation 107 shall be tested in approximately 70 % urban and 30 % rural operation.

4.5.3. For N₃ vehicles the trip shall consist of approximately 20 % urban, 25 % rural and 55 % motorway operation.

4.5.4. For the purpose of the assessment of the trip composition, the duration of the share shall be calculated from the moment when the coolant temperature has reached 343K (70 °C) for the first time or after the coolant temperature is stabilised within +/- 2K over a period of 5 minutes whichever comes first but no later than 15 minutes after engine start. In accordance with paragraph 4.5 the period elapsed to reach the coolant temperature of 343K (70 °C) shall be operated under urban driving conditions.

Artificial warming up of the emission control systems prior to the test is prohibited.

4.5.5. The following distribution of the characteristic trip values from the WHDC database may serve as additional guidance for the evaluation of the trip:

- (a) accelerating: 26,9 % of the time;
- (b) decelerating: 22,6 % of the time;
- (c) cruising: 38,1 % of the time;
- (d) stop (vehicle speed = 0): 12,4 % of the time.?’;
- (5) point 4.6.5. is replaced by the following:

‘4.6.5. The test duration shall be long enough to complete between four and seven times the work performed during the WHTC or produce between four and seven times the CO₂ reference mass in kg/cycle from the WHTC as applicable.’;

(6) point 4.6.10. is replaced by the following:

‘4.6.10. If the particle exhaust after-treatment system undergoes a non-continuous regeneration event during the trip or an OBD class A or B malfunction occurs during the test, the manufacturer can request the trip to be voided.’;

(7) point 5.1.2.2. is replaced by the following:

‘5.1.2.2. The conformity of the ECU torque signal is considered to be sufficient if the calculated torque remains within the full load torque tolerance specified in point 5.2.5 of Annex I.’;

(8) Appendix 1 is amended as follows:

(a) point 1 is replaced by the following:

‘1. INTRODUCTION

This Appendix describes the procedure to determine gaseous emissions from on-vehicle on-road measurements using Portable Emissions Measurement Systems (hereinafter ‘PEMS’). The pollutant emissions to be measured from the exhaust of the engine include the following components: carbon monoxide, total hydrocarbons and nitrogen oxides for compression ignition engines and carbon monoxide, non-methane hydrocarbons, methane and nitrogen oxides for positive ignition engines. Additionally, carbon dioxide shall be measured to enable the calculation procedures described in Sections 4 and 5.

For engines fuelled with natural gas, the manufacturer, technical service or approval authority may choose to measure the total hydrocarbon (THC) emissions only instead of measuring the methane and non-methane hydrocarbon emissions. In that case, the emission limit for the total hydrocarbon emissions is the same as the one specified in Annex I to Regulation (EC) No 595/2009 for methane emissions. For the purposes of the calculation of the Conformity Factors pursuant to points 4.2.3. and 4.3.2., the applicable limit shall in that case be the methane emission limit only.

For engines fuelled with gases other than natural gas, the manufacturer, technical service or approval authority may choose to measure the total hydrocarbon (THC) emissions instead of measuring the non-methane hydrocarbon emissions. In that case, the emission limit for the total hydrocarbon emissions is the same as the one specified in Annex I to Regulation (EC) No 595/2009 for non-methane hydrocarbon emissions. For the purposes of the calculation of the Conformity Factors pursuant to points 4.2.3. and 4.3.2., the applicable limit shall in that case be the non-methane emission limit.’;

(b) in point 2.2., the sentence ‘The parameters summarised in Table 1 shall be measured and recorded.’ is replaced by the following:

‘The parameters as specified in Table 1 shall be measured and recorded at a constant frequency of 1.0 Hz or higher. The original raw data shall be kept by the manufacturer and shall be made available, upon request, to the approval authority and the Commission.’;

(c) the following point 2.2.1. is inserted:

‘2.2.1. Data reporting format

Emission values as well as any other relevant parameters shall be reported and exchanged as csv-formatted data file. Parameter values shall be separated by a comma, ASCII-Code #h2C. The decimal marker of numerical values shall be a point, ASCII-Code #h2E. Lines shall be terminated by carriage return, ASCII-Code #h0D. No thousands separators shall be used.’;

(d) points 2.6.1. and 2.6.2. are replaced by the following:

‘2.6.1. Test start

Emissions sampling, measurement of the exhaust parameters and recording of the engine and ambient data shall commence prior to starting the engine. The coolant temperature shall not exceed 303K (30 °C) at the beginning of the test. In case ambient temperature exceeds 303K (30 °C) at the beginning of the test, the coolant temperature shall not exceed the ambient temperature by more than 2 °C. The data evaluation shall start after the coolant temperature has reached 343K (70 °C) for the first time or after the coolant temperature is stabilised within +/- 2K over a period of 5 minutes whichever comes first but no later than 15 minutes after engine start.

2.6.2. Test run

Emission sampling, measurement of the exhaust parameters and recording of the engine and ambient data shall continue throughout the normal in-use operation of the engine. The engine may be stopped and started, but emissions sampling shall continue throughout the entire test.

Periodic zero-checks of the PEMS gas analysers may be conducted every 2 hours and the results may be used to perform a zero drift correction. The data recorded during the checks shall be flagged and shall not be used for the emission calculations.

In case of interrupted GPS signal the GPS data may be calculated based on the ECU vehicle speed and a map, for a consecutive period of less than 60 s. If the cumulative loss of GPS signal exceeds 3 % of the total trip duration, the trip should be declared void.’;

(e) point 3.2.1. is replaced by the following:

‘3.2.1. Analysers and EFM data

The consistency of the data (exhaust mass flow measured by the EFM and gas concentrations) shall be verified using a correlation between the measured fuel flow from the ECU and the fuel flow calculated using the formula in paragraph 8.4.1.7 of Annex 4 to UN/ECE Regulation No 49. A linear regression shall be performed for the measured and calculated fuel rate values. The method of least squares shall be used with the best fit equation having the form:

$$y = mx + b$$

where:

- y – is the calculated fuel flow [g/s]
- m – is the slope of the regression line
- x – is the measured fuel flow [g/s]
- b – is the y intercept of the regression line

The slope (m) and the coefficient of determination (r^2) shall be calculated for each regression line. It is recommended to perform this analysis in the range from 15 % of the maximum value to the maximum value and at a frequency greater or equal to 1 Hz. For a test to be considered valid, the following two criteria shall be evaluated:

Table 2

Tolerances

Slope of the regression line, m	0,9 to 1,1 – Recommended
Coefficient of determination r^2	min. 0,90 – Mandatory’;

(f) point 4.1. is replaced by the following:

‘4.1. Averaging window principle

The emissions shall be integrated using a moving averaging window method, based on the reference CO₂ mass or the reference work. The principle of the calculation is as follows: The mass emissions are not calculated for the complete data set, but for sub-sets of the complete data set, the length of these sub-sets being determined so as to match the engine CO₂ mass or work measured over the reference laboratory transient cycle. The moving average calculations are conducted with a time increment Δt equal to the data sampling period. These sub-sets used to average the emissions data are referred to as ‘averaging windows’ in the following points.

Any invalidated data shall not be considered for the calculation of the work or CO₂ mass and the emissions of the averaging window.

The following data shall be considered as not valid data:

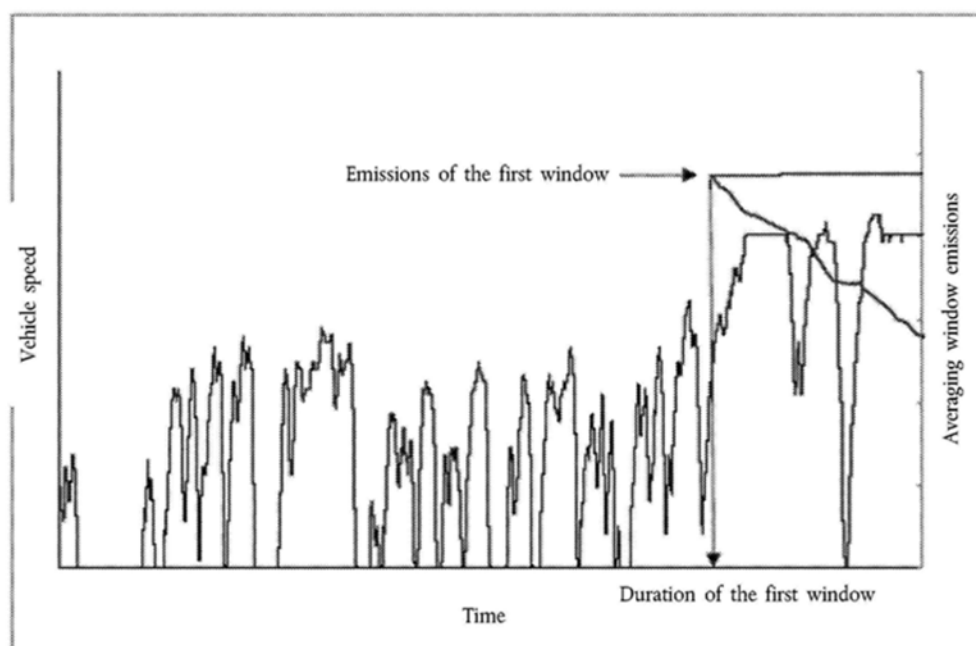
(a) zero drift check of the instruments;

(b) the data outside the conditions specified in points 4.2 and 4.3 of Annex II.

The mass emissions (mg/window) shall be determined as described in paragraph 8.4.2.3 of Annex 4 to UN/ECE Regulation No 49.

Figure 1

Vehicle speed versus time and Vehicle averaged emissions, starting from the first averaging window, versus time



(g) point 4.2.2 is replaced by the following:

4.2.2. Selection of valid windows

4.2.2.1. Before the dates referred to in Article 17a, points 4.2.2.1.1. to 4.2.2.1.4. shall apply.

4.2.2.1.1. The valid windows are the windows whose average power exceeds the power threshold of 20 % of the maximum engine power. The percentage of valid windows shall be equal or greater than 50 %.

4.2.2.1.2. If the percentage of valid windows is less than 50 %, the data evaluation shall be repeated using lower power thresholds. The power threshold shall be reduced in steps of 1 % until the percentage of valid windows is equal to or greater than 50 %.

4.2.2.1.3. In any case, the lower threshold shall not be lower than 15 %.

4.2.2.1.4. The test shall be void if the percentage of valid windows is less than 50 % at a power threshold of 15 %.

4.2.2.2. From the dates referred to in Article 17a, points 4.2.2.2.1. and 4.2.2.2.2. shall apply.

4.2.2.2.1. The valid windows are the windows whose average power exceeds the power threshold of 10 % of the maximum engine power.

4.2.2.2.2. The test shall be void if the percentage of valid windows is less than 50 % or if there are no valid windows left in urban only operations after the 90 percentile rule has been applied.’;

(h) point 4.3.1. is replaced by the following:

‘4.3.1. Selection of valid windows

4.3.1.1. Before the dates referred to in Article 17a, points 4.3.1.1.1. to 4.3.1.1.4. shall apply.

4.3.1.1.1. The valid windows shall be the windows whose duration does not exceed the maximum duration calculated from:

$$D_{max} = 3600 \cdot \frac{W_{ref}}{0.2 \cdot P_{max}}$$

where:

— D max is the maximum window duration, s;

— P max is the maximum engine power, kW.

4.3.1.1.2. If the percentage of valid windows is less than 50 %, the data evaluation shall be repeated using longer window durations. This is achieved by decreasing the value of 0,2 in the formula given in point 4.3.1 by steps of 0,01 until the percentage of valid windows is equal to or greater than 50 %.

4.3.1.1.3. In any case, the lowered value in above formula shall not be lower than 0,15.

4.3.1.1.4. The test shall be void if the percentage of valid windows is less than 50 % at a maximum window duration calculated in accordance with points 4.3.1.1., 4.3.1.1.2. and 4.3.1.1.3.

4.3.1.2. From the dates referred to in Article 17a, points 4.3.1.2.1. and 4.3.1.2.2. shall apply.

4.3.1.2.1. The valid windows shall be the windows whose duration does not exceed the maximum duration calculated from:

$$D_{max} = 3600 \cdot \frac{W_{ref}}{0.1 \cdot P_{max}}$$

where:

— D max is the maximum window duration, s;

— P max is the maximum engine power, kW.’;

4.3.1.2.2. The test shall be void if the percentage of valid windows is less than 50 %.

(9) in Appendix 2, point 3.1. is replaced by the following:

‘3.1. Exhaust Gas Flow Meter (EFM) tailpipe connection

The installation of the EFM shall not increase the backpressure by more than the value recommended by the engine manufacturer, nor increase the length of the tailpipe by more than 2 m. As for the all the components of the PEMS equipment, the installation of the EFM shall comply with the locally applicable road safety regulations and insurance requirements.’.

ANNEX III

Annex VI to Regulation (EU) No 582/2011 is amended as follows:

(1) point 8 is replaced by the following:

‘8. DOCUMENTATION

Paragraph 11 of Annex 10 to UNECE Regulation No 49 shall be understood as follows:

The Approval Authority shall require that the manufacturer provides a documentation package. This should describe any element of design and emission control strategy of the engine system and the means by which it controls its output variables, whether that control is direct or indirect.

The information shall include a full description of the emission control strategy. In addition, this shall include information on the operation of all AES and BES, including a description of the parameters that are modified by any AES and the boundary conditions under which the AES operate, and indication of which AES and BES are likely to be active under the conditions of the test procedures in this Annex.

This documentation package shall be provided in accordance with the provisions of Section 8 of Annex I to this Regulation.’

(2) Appendix 1 is amended as follows:

(a) the following point 2.3. is inserted

2.3. Manufacturers shall ensure that vehicles can be tested with PEMS by an independent party on public roads by making available suitable adapters for exhaust pipes, granting access to ECU signals and making the necessary administrative arrangements. The manufacturer may charge a reasonable fee as set out in Article 7(1) of Regulation (EC) No 715/2007.

(b) point 3.1. is replaced by the following:

‘3.1. Vehicle payload

For the purpose of the PEMS demonstration test, the payload may be reproduced and an artificial load may be used.

The vehicle payload shall be 50-60 % of the maximum vehicle payload. The additional requirements set out in Annex II shall apply.’;