

## Proposal for amendments to Regulation No. 83 (Emission of pollutants)

The text reproduced below was prepared by the experts from the International Organization of Motor Vehicle Manufacturers (OICA) in order to incorporate the content of Regulation (EU) 566/2011 into UN Regulation No. 83.06.

### I. Proposal

Paragraph 2.4., add at the end:

“(f)  $C_1H_{2,61}O_{0,329}$  for ethanol (E75)”

Insert a new paragraph 2.27, to read:

“2.27. “Cold start” means an engine coolant temperature (or equivalent temperature) at engine start less than or equal to 35 °C and less than or equal to 7 K higher than ambient temperature (if available) at engine start.”

Paragraph 5.2., amend table A to read:

Reference fuel	Vehicles with positive ignition engines including hybrids								Vehicles with C.I. engines including hybrids	
	Mono fuel				Bi fuel <sup>1</sup>			Flex fuel <sup>1</sup>	Flex fuel	Mono fuel
	Petrol (E5)	LPG	NG/ Biomethane	Hydrogen	Petrol (E5)	Petrol (E5)	Petrol (E5)	Petrol (E5)	Diesel (B5)	Diesel (B5)
Gaseous pollutants (Type I test)	Yes	Yes	Yes		Yes (both fuels)	Yes (both fuels)	Yes (petrol only) <sup>(2)</sup>	Yes (both fuels)	Yes (B5 only) <sup>2</sup>	Yes
Particulate mass (Type I test)	Yes	-	-		Yes direct injection only (petrol only)	Yes direct injection only (petrol only)	Yes direct injection only (petrol only) <sup>2</sup>	Yes direct injection only (both fuels)	Yes (B5 only) <sup>2</sup>	Yes
Particulate number (Type I test)					-	-	-	-	Yes (B5 only) <sup>2</sup>	Yes
Idle emissions (Type II test)	Yes	Yes	Yes		Yes (both fuels)	Yes (both fuels)	Yes (petrol only) <sup>2</sup>	Yes (both fuels)	-	-
Crankcase emissions (Type III test)	Yes	Yes	Yes		Yes (petrol only)	Yes (petrol only)	Yes (petrol only) <sup>2</sup>	Yes (petrol)	-	-
Evaporative emissions (Type IV test)	Yes	-	-		Yes (petrol only)	Yes (petrol only)	Yes (petrol only) <sup>2</sup>	Yes (petrol)	-	-
Durability (Type V test)	Yes	Yes	Yes		Yes (petrol only)	Yes (petrol only)	Yes (petrol only) <sup>(2)</sup>	Yes (petrol)	Yes (B5 only) <sup>2</sup>	Yes
Low temperature emissions (Type VI test)	Yes	-	-		Yes (petrol only)	Yes (petrol only)	Yes (petrol only) <sup>2</sup>	Yes (both fuels) <sup>3</sup>		
In-service conformity	Yes	Yes	Yes		Yes (both fuels)	Yes (both fuels)	Yes (petrol only) <sup>2</sup>	Yes (both fuels)	Yes (B5 only) <sup>2</sup>	Yes
On-board diagnostics	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes

<sup>1</sup> When a bi fuel vehicle is combined with a flex fuel vehicle, both test requirements are applicable.

<sup>2</sup> This provision is temporary, further requirements for biodiesel and hydrogen shall be proposed later on.

<sup>3</sup> The E75 test reference fuel specified in Annex IX Section B shall be used.

*Paragraph 5.3.7.3.*

Add to the section headed “ $H_{cv}$  = Atomic ratio of hydrogen to carbon”:

**“(e) for ethanol (E75) 2,61”**

and add to the section headed “ $O_{cv}$  = Atomic ratio of oxygen to carbon”:

**“(e) for ethanol (E75) 0,329”**

*Paragraph 9.1.,* amend to read:

“9.1 Introduction

This paragraph sets out the **tailpipe emissions and OBD (including IUPR<sub>M</sub>)** in-service conformity requirements for vehicles type approved to this Regulation.”

*Paragraph 9.2.5.4.,* amend to read:

“9.2.5.4. Where appropriate, the list of vehicle types covered within the manufacturer's information, i.e. **for tailpipe emissions** the in-service family group in accordance with paragraph 9.2.1. **and for OBD and IUPR<sub>M</sub> the OBD family in accordance with Appendix 2 to Annex 11;**”

*Paragraph 9.2.5.11.,* amend to read:

“9.2.5.11. The results from the manufacturer's in-service conformity procedure, including:

(a) Identification of the vehicles included in the programme (whether tested or not). The identification shall include the following:

- (i) Model name;
- (ii) Vehicle identification number (VIN);
- (iii) Vehicle registration number;
- (iv) Date of manufacture;
- (v) Region of use (where known);
- (vi) Tyres fitted (**tailpipe emissions only**).

(b) The reason(s) for rejecting a vehicle from the sample;

(c) Service history for each vehicle in the sample (including any re-works);

(d) Repair history for each vehicle in the sample (where known);

(e) Test data, including the following:

- (i) Date of test/**download**;
- (ii) Location of test/**download**;
- (iii) Distance indicated on vehicle odometer;

**for tailpipe emissions only;**

(iv) Test fuel specifications (e.g. test reference fuel or market fuel);

(v) Test conditions (temperature, humidity, dynamometer inertia weight);

(vi) Dynamometer settings (e.g. power setting);

(vii) Test results (from at least three different vehicles per family).

**and for IUPR<sub>M</sub> only;**

**(viii) All required data downloaded from the vehicle**

**(ix) For each monitor to be reported the in-use performance ratio IUPR<sub>M</sub>;**”

Insert a new paragraph 9.2.5.13. to read:

“9.2.5.13. for IUPR<sub>M</sub> sampling, the following:

- The average of in-use-performance ratios IUPRM of all selected vehicles for each monitor according to points 3.1.4 and 3.1.5 of Appendix 1 to Annex 11,
- The percentage of selected vehicles, which have an IUPRM greater or equal to the minimum value applicable to the monitor according to points 3.1.4 and 3.1.5 of Appendix 1 to Annex 11.”

Paragraph 9.3.1., add at the end:

“9.3.1. ...

**For OBD IUPR<sub>M</sub> testing only vehicles fulfilling the criteria of point 2. 2.1 of Appendix 3 shall be included in the test sample.”**

Paragraph 9.3.2., amend to read:

“9.3.2. In selecting the Contracting Parties for sampling vehicles, the manufacturer may select vehicles from a Contracting Party that is considered to be particularly representative. In this case, the manufacturer shall demonstrate to the Approval Authority which granted the type approval that the selection is representative (e.g. by the market having the largest annual sales of a vehicle family within the applicable Contracting Party). When ~~an in-service~~ family requires more than one sample lot to be tested as defined in paragraph 9.3.5., the vehicles in the second and third sample lots shall reflect different vehicle operating conditions from those selected for the first sample.”

Paragraph 9.3.5., amend to read:

“9.3.5. **Sample lots**

9.3.5.1. When applying the statistical procedure defined in Appendix 4 (i.e. for tailpipe emissions), the number of sample lots shall depend on the annual sales volume of an in-service family in the territories of a regional organization (e.g. European Community), as defined in the following table:

<i>Registrations per calendar year</i>	<i>Number of sample lots</i>
Up to 100,000	1
100,001 to 200,000	2
Above 200,000	3

Insert a new paragraph 9.3.5.2. to read:

“9.3.5.2. For IUPR, the number of sample lots to be taken is described in the table in point 9.3.5.1 and is based on the number of vehicles of an OBD family that are approved with IUPR (subject to sampling).  
For the first sampling period of an OBD family, all of the vehicle types in the family that are approved with IUPR shall be considered to be subject to sampling. For subsequent sampling periods, only vehicle types which have not been previously tested or are covered by emissions approvals that have been extended since the previous sampling period shall be considered to be subject to sampling.

**For families consisting of fewer than 5 000 registrations that are subject to sampling within the sampling period the minimum number of vehicles in a sample lot is six. For all other families, the minimum number of vehicles in a sample lot to be sampled is fifteen.**

**Each sample lot shall adequately represent the sales pattern, i.e. at least high volume vehicle types ( $\geq 20\%$  of the family total) shall be represented.”**

*Paragraph 9.4., add at the end:*

“9.4. ...

**“If according to the IUPRM audit the test criteria of point 6.1.2 point (a) or (b) of Appendix 1 are met for the vehicles in a sample lot, the type-approval authority must take the further action described in point (d) of this point.”**

*Appendix 3, paragraph 2, amend to read:*

“2. Selection criteria

The criteria for acceptance of a selected vehicle are defined **for tailpipe emissions** in paragraphs 2.1. to 2.8. of this appendix **and for IUPR<sub>M</sub> in paragraphs 2.1. to 2.5.** Information is collected by vehicle examination and an interview with the owner/driver.”

*Appendix 3, insert a new paragraph 2.2.1. to read:*

**“2.2.1. For checking IUPR<sub>M</sub> the test sample shall include only vehicles that:**

**(a) have collected sufficient vehicle operation data for the monitor to be tested.**

**For monitors required to meet the in-use monitor performance ratio and to track and report ratio data pursuant to point 3.6 .1 of Appendix 1 to Annex XI. sufficient vehicle operation data shall mean the denominator meets the criteria set forth below. The denominator, as defined in points 3.3 and 3.5 of Appendix I to Annex XI, for the monitor to be tested must have a value equal to or greater than one of the following values:**

**(i) 75 for evaporative system monitors, secondary air system monitors, and monitors utilising a denominator incremented in accordance with point 3.3.2 points (a), (b) or (c) of Appendix 1 to Annex 11 (e.g. cold start monitors, air conditioning system monitors, etc.); or**

**(ii) 25 for particulate filter monitors and oxidation catalyst monitors utilising a denominator incremented in accordance with point 3.3.2(d) of Appendix I to Annex 11; or**

**(iii) 150 for catalyst, oxygen sensor, EG R, VVT, and all other component monitors;**

**(b) have not been tampered with or equipped with add-on or modified parts that would cause the OBD system not to comply with the requirements of Annex 11.”**

*Appendix 3, paragraphs 6. to 6.1.1., amend to read:*

“6. Plan of remedial measures

**6.1. The Approval Authority must request the manufacturer to submit a plan of remedial measures to remedy the non-compliance when:**

**6.1.1. For tailpipe emissions more than one vehicle is found to be an outlying emitter that meets either of the following conditions:**

**(a) ~~Meets~~ the conditions of paragraph 3.2.3. of Appendix 4 and where both the Approval Authority and the manufacturer agree that the excess emission is due to the same cause; or**

**(b) ~~Meets~~ the conditions of paragraph 3.2.4. of Appendix 4 where the Approval Authority has determined that the excess emission is due to the same cause.”**

Appendix 3, insert a new paragraph 6.1.2. to read:

**“6.1.2. For IUPR<sub>M</sub> of a particular monitor M the following statistical conditions are met in a test sample, the size of which is determined according to point 3.5 of this Annex:**

- (a) For vehicles certified to a ratio of 0,1 in accordance with point 3.1.5 of Appendix 1 to Annex XI, the data collected from the vehicles indicate for at least one monitor M in the test sample either that the test sample average in-use-performance ratio is less than 0,1 or that 66% or more of the vehicles in the test sample have an in-use monitor performance ratio of less than 0,1.**
- (b) For vehicles certified to the full ratios in accordance with point 3.1.4 of Appendix I to Annex XI, the data collected from the vehicles indicate for at least one monitor M in the test sample either that the test sample average in-use performance ratio in the test sample is less than the value Test<sub>min</sub> (M) or that 66% or more of the vehicles in the test sample have an in-use performance ratio of less than Test<sub>min</sub> (M).**

**The value of Test<sub>min</sub>(M) shall be:**

- (i) 0, 230 if the monitor M is required to have an in-use ratio of 0,26;**
- (ii) 0,460 if the monitor M is required to have an in-use ratio of 0,52;**
- (iii) 0,297 if the monitor M is required to have an in-use ratio of 0,336;**

**according to point 3.1.4. of Appendix I to Annex XI.”**

Appendix 6, paragraph 6.2., add at the end:

**“6.2.**

**...**

**For the purposes of this point these situations are presumed to occur, if the applicable NO<sub>x</sub> emission limit of Table I of section 5.3.1.4. of this Regulation, multiplied by a factor of 1,5, is exceeded. NO<sub>x</sub> emissions during the test to demonstrate compliance with these requirements shall be not more than 20% higher than the values referred to in the first sentence.”**

Appendix 6, paragraph 7.1., amend to read:

**“7.1.**

**Where reference is made to this point, non-erasable Parameter Identifiers (PID) shall be stored identifying the reason for and the distance travelled by the vehicle during the inducement system activation. The vehicle shall retain a record of the PID for at least 800 days or 30 000 km of vehicle operation. The PID shall be made available via the serial port of a standard diagnostic connector upon request of a generic scan tool according to the provisions of point 6.5.3.1 of Appendix 1 to Annex 11 to this Regulation. The information stored in the PID shall be linked to the period of cumulated vehicle operation, during which it has occurred, with an accuracy of not less than 300 days or 10 000 km.”**

Annex 4a, paragraph 6.6.2., add the density of E75 as follows:

**“6.6.2.**

**...**

**For ethanol (E85) (C<sub>1</sub>H<sub>2,74</sub>O<sub>0,385</sub>)                      d = 0.932 g/l**

**For Ethanol (E75) (C<sub>1</sub>H<sub>2,61</sub>O<sub>0,329</sub>)                      d = 0,886 g/l**

**In the case of nitrogen oxides (NO<sub>x</sub>):                      d = 2.05 g/l”**

Annex 4a, paragraph 6.6.4., add the dilution factor for E75 as follows:

“6.6.4. ...

$$DF = \frac{12.5}{C_{CO_2} + (C_{HC} + C_{CO}) \cdot 10^{-4}} \quad \text{for Ethanol (E85)} \quad (5d)$$

$$DF = \frac{12.7}{C_{CO_2} + (C_{HC} + C_{CO}) \cdot 10^{-4}} \quad \text{for Ethanol (E75)} \quad (5e)$$

In these equations:

....”

Annex 10, paragraph 2., replace the text below the title “Type: Ethanol (E75)” with the following specification:

Parameter	Unit	Limits (1)		Test method (2)
		Minimum	Maximum	
Research octane number, RON		95	-	EN ISO 5164
Motor octane number, MON		85	-	EN ISO 5163
Density at 15 °C	kg/m <sup>3</sup>	report		EN ISO 12185
Vapour pressure	kPa	50	60	EN ISO 1 30 16-1 (DVPE)
Sulphur content (3) (4)	mg/kg	-	10	EN ISO 20846 EN ISO 20884
Oxidation stability	minutes	360	-	EN ISO 7536
Existent gum content (solvent washed)	mg/100ml	-	4	EN ISO 6246
Appearance shall be determined at ambient temperature or 15 °C whichever is higher.		Clear and bright, visibly free of suspended or precipitated contaminants		Visual inspection
Ethanol and higher alcohols (7)	% (V/V)	70	80	EN 1601 EN 13132 EN 1451 7
Higher alcohols (C 3 - C8)	% (V/V)	-	2	
Methanol		-	0,5	
Petrol (5)	% (V/V)	Balance		EN 228
Phosphorus	mg/l	0,30 (6)		EN 15487 ASTM D 3231
Water content	% (V/V)	-	0,3	ASTM E 1064 EN 15 489
Inorganic chloride content	mg/l	-	1	ISO 6227 - EN 15492
pHe		6,50	9	ASTM D 6423 EN 15490
Copper strip corrosion (3h at 50 °C)	Rating	Class I		EN ISO 2160
Acidity (as acetic acid CH <sub>3</sub> COOH)	% (m/m)		0,005	ASTM 0161 3 EN 15491
	mg/l		40	
Carbon/hydrogen ration		report		
Carbon/oxygen ration		report		

- (1) The values referred to in the specifications are "true values". When establishing the value limits, the terms of ISO 4259 Petroleum products - Determination and application of precision data in relation to methods of test were applied. When fixing a **minimum value, a minimum difference of 2R above zero was taken into account. When fixing a maximum and minimum value, the minimum difference used was 4R (R = reproducibility).** Notwithstanding this procedure, which is necessary for technical reasons, fuel manufacturers shall aim for a zero value where the stipulated maximum value is 2R and for the mean **value for quotations of maximum and minimum limits. Where it is necessary to clarify whether fuel meets the requirements of the specifications, the ISO 4259 terms shall be applied.**

- (2) In cases of dispute, the procedures for resolving the dispute and interpretation of the results based on test method precision, described in EN ISO 4259 shall be used.
- (3) In cases of national dispute concerning sulphur content, either EN ISO 20846 or EN ISO 20884 shall be called up similar to the reference in the national annex of EN 228.
- (4) The actual sulphur content of the fuel used for the Type 6 test shall be reported.
- (5) The unleaded petrol content may be determined as 100 minus the sum of the percentage content of water and alcohols.
- (6) There shall be no intentional addition of compounds containing phosphorus, iron, manganese, or lead to this reference fuel.
- (7) Ethanol to meet specification of EN 15376 is the only oxygenate that shall be intentionally added to this reference fuel.”

*Annex 11, paragraph 3.3.5., add at the end:*

“3.3.5. ...

**A particulate trap however, where fitted as a separate unit or integrated into a combined emission control device, shall always be monitored at least for total failure or removal if the latter resulted in exceeding the applicable emission limits. It shall also be monitored for any failure that would result in exceeding the applicable OBD threshold limits.**

*Annex 11, paragraph 4.2.1., amend to read:*

“4.2.1. The authority will not accept any deficiency request that includes the complete lack of a required diagnostic monitor **or of mandated recording and reporting of data related to a monitor.**”

*Annex 11, Appendix 1, paragraphs 7.1.6. and 7.1.7., amend to read:*

“7.1.6. **The manufacturer shall demonstrate to the approval authority that these statistical conditions are satisfied for all monitors required to be reported by the OBD system according to point 3.6 of this Appendix not later than 18 months after the entry onto the market of the first vehicle type with IUPR in an OBD family and every 18 months thereafter. For this purpose, for OBD families consisting of more than 1 000 registrations in the European Union or non-EU Contracting Party, that are subject to sampling within the sampling period, the process described in Annex 11 shall be used without prejudice to the provisions of point 3. 1.9 of this Appendix.**

**In addition to the requirements set out in Annex 11 and regardless of the result of the audit described in Section 2 of Annex 11, the authority granting the approval shall apply the in-service conformity check for IUPR described in Appendix I to Annex 11 in an appropriate number of randomly determined cases. "In an appropriate number of randomly determined cases" means, that this measure has a dissuasive effect on non-compliance with the requirements of Section 3 of this Annex or the provision of manipulated, false or non-representative data for the audit. If no special circumstances apply and can be demonstrated by the type-approval authorities, random application of the in-service conformity check to 5 % of the type approved OBD families shall be considered as sufficient for compliance with this requirement. For this purpose, type-approval authorities may find arrangements with the manufacturer for the reduction of double testing of a given OBD family as long as these arrangements do not harm the dissuasive effect of the type approval authority's own in-service conformity check on non-compliance with the requirements of Section 3 of this Annex. Data collected by EU-Member States during surveillance testing programmes may be used for in-service conformity checks. Upon request, type-approval authorities shall**

provide data on the audits and random in-service conformity checks performed, including the methodology used for identifying those cases, which are made subject to the random in-service conformity check, to the European Commission and other type-approval authorities.

- 7.1.7. For the entire test sample of vehicles the manufacturer must report to the relevant authorities all of the in-use performance data to be reported by the OBD system according to point 3.6 of this Appendix in conjunction with an identification of the vehicle being tested and the methodology used for the selection of the tested vehicles from the fleet. Upon request, the type-approval authority granting the approval shall make these data and the results of the statistical evaluation available to the European Commission and other approval authorities.”

*Annex 11, Appendix 1, insert a new paragraph 7.3.2. to read:*

“7.3.2. Without prejudice to requirements for the increment of denominators of other monitors the denominators of monitors of the following components shall be incremented if and only if the driving cycle started with a cold start:

- (i) liquid (oil, engine coolant, fuel, SCR reagent) temperature sensors;
- (ii) clean air (ambient air, intake air, charge air, inlet manifold) temperature sensors;
- (iii) exhaust (EGR recirculation/cooling, exhaust gas turbo-charging, catalyst) temperature sensors;

The denominators of monitors of the boost pressure control system shall be incremented if the all of the following conditions are met:

- (i) the general denominator conditions are fulfilled;
- (ii) the boost pressure control system is active for a time greater than or equal to 15 seconds.”

*Annex 11, paragraph 7.6.2., amend to read:*

“7.6.2. For specific components or systems that have multiple monitors, which are required to be reported by this paragraph (e.g. oxygen sensor bank 1 may have multiple monitors for sensor response or other sensor characteristics), the OBD system shall separately track numerators and denominators for each of the specific monitors **except those monitoring for short circuit or open circuit failures** and report only the corresponding numerator and denominator for the specific monitor that has the lowest numerical ratio. If two or more specific monitors have identical ratios, the corresponding numerator and denominator for the specific monitor that has the highest denominator shall be reported for the specific component.”

## II. Justification

The transposition of the Euro 5 requirements into UN Regulation 83 could not take account of the first series of amendments within the European Union as these amendments were still in discussion at the time. These amendments have now been published in Regulation (EU) 566/2011 and therefore can now be transposed into Regulation 83 and return parity between the two legislations.

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