

COMMENTS

TO THE DRAFT AMENDMENTS TO REGULATIONS Nos. 83 AND 49

I. REGULATION 83

1. General

1.1. The following vital provisions of Regulations 715/2007 and 692/2008, affecting test results, are not introduced into the proposal for the 06 series of amendments to R.83 (documents ECE/TRANS/WP.29/2009/57, ECE/TRANS/WP.29/2009/134, ECE/TRANS/WP.29/2010/53):

- analytical equipment for measurement of methane concentration (Regulation 692/2008, Annex III, paragraph 3.3),
- formula for the calculation of NMHC concentration (Regulation 692/2008, Annex III, paragraph 3.9),
- additive exhaust emission deterioration factor (Regulation 692/2008, Annex VII, paragraph 2.1.4),
- appendices 1, 2 and 3 to Annex 9 (Regulation 692/2008, Annex VII).

1.2. According to the proposal the pollutants are divided into:

- gaseous pollutants (paragraph 2.4),
- particulate pollutants (paragraph 2.5).

According to paragraph 2.6:

"Exhaust emissions" means emissions of gaseous and particulate pollutants".

It means that the particles are not regarded as a pollutant.

In this situation if R. 83 is followed to the letter, all the provisions, sentences, phrases etc. where the term "pollutant" or "pollutants" or the term "exhaust emission" or "exhaust emissions" are used, including those considerably affecting results of the type I test, are not applicable to particles.

It is proposed to regard particles as a pollutant and introduce desirable changes to the proposal.

1.3. According to Regulation 692/2008 the tests of smoke and fuel consumption/carbon dioxide emission are part of the type-approval pursuant to Regulation 715/2007. One common EC type-approval certificate is issued for the pollutant emissions, smoke and fuel consumption/carbon dioxide emission. Directive 72/306/EEC related to the smoke and Directive 80/1268/EEC related to the fuel consumption//carbon dioxide emissions are repealed.

According to the proposal (Annex 2, Addendum, paragraphs 2.4 and 2.5):

^(e) Smoke opacity measurements to be carried out according to provisions laid out in Regulation No. 24.

^(g) Fuel and energy consumption and CO₂ emission measurements to be carried out according to provisions laid out in Regulation No. 101, [01 series of amendments].

It is not clear whether:

- the tests of smoke and fuel consumption/carbon dioxide emissions are part of the type-approval according to R. 83 and one common communication for the pollutant emissions, smoke and fuel consumption/carbon dioxide emissions should be issued,

or

- the type-approval with regard to the pollutant emissions should be granted pursuant to R. 83, with regard to the smoke pursuant to R. 24 and with regard to the fuel consumption/carbon dioxide emissions pursuant to R. 101 and three separate communications should be issued, but the results of the type-approval with regard to the smoke and fuel consumption/carbon dioxide emissions should be additionally included in the addendum to the communication issued pursuant to R. 83.

In both the cases R. 24 and R. 101 need harmonizing with Regulation 692/2008.

2. Proposal for corrections of some provisions (to improve clarity, to avoid misunderstanding etc.)

Body of Regulation 83

2.2. "Reference mass" means the "unladen mass" of the vehicle increased by a uniform figure of 100 kg.

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2.2.1. "Unladen mass" means the mass of the vehicle in running order without the uniform mass of the driver of 75 kg, passengers or load, with the fuel tank 90 per cent full, but all other liquids 100% except used water, and the usual set of tools and spare wheel on board, where applicable;

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2.x. "Particle pollutants" means ?

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2.6. "Exhaust emissions" means emissions of gaseous, particulate and particle pollutants;

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2.17. "Family of vehicles" means a group of vehicle types identified by a parent vehicle for the purpose of Annex 11 or 12;

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2.19.1. Limitation of exhaust emissions (gaseous and particulate (if applicable) pollutants) by the vehicle, evaporative emissions, crankcase emissions, durability of pollution control devices, cold start pollutant emissions and on-board diagnostics of vehicles fuelled with petrol, or which can be fuelled with either petrol and LPG or NG/biomethane or ethanol (Approval B);

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2.19.2. Limitation of exhaust emissions (gaseous, particulate and particle pollutants), durability of pollution control devices and on-board diagnostics of vehicles fuelled with diesel fuel or which can be fuelled with either diesel fuel and biodiesel or biodiesel (Approval B).

"Table A. REQUIREMENTS
Application of test requirements for type approval and extensions

	Vehicles with positive ignition engines including hybrids								Vehicles with C.I. engines including hybrids	
	Mono fuel				Bi fuel ⁽¹⁾			Flex fuel ⁽¹⁾	Flex fuel	Mono fuel
Reference fuel	Petrol (E5)	LPG	NG/ Biomethane	Hydrogen	Petrol (E5)	Petrol (E5)	Petrol (E5)	Petrol (E5)	Diesel (B5)	Diesel (B5)
					LPG	NG/ Biomethane	Hydrogen	Ethanol (E85)	Biodiesel	
Gaseous pollutants (Type I test)	Yes	Yes	Yes		Yes (both fuels)	Yes (both fuels)	Yes (petrol only) ⁽²⁾	Yes (both fuels)	Yes (B5 only) ⁽²⁾	Yes
Particulates (Type I test)	Yes (direct injection)	-	-		Yes (direct injection) (petrol only)	Yes (direct injection) (petrol only)	Yes (direct injection) (petrol only) ⁽²⁾	Yes (direct injection) (both fuels)	Yes (B5 only) ⁽²⁾	Yes
Particle pollutants (Type I test)	-	-	-	-	-	-	-	-	Yes (B5 only)⁽²⁾ or (both fuels)?	Yes
Idle emissions (Type II test)	Yes	Yes	Yes		Yes (both fuels*)	Yes (both fuels*)	Yes (petrol only) ⁽²⁾	Yes (both fuels)	-	-
Crankcase emissions (Type III test)	Yes	Yes	Yes		Yes (petrol only)	Yes (petrol only)	Yes (petrol only) ⁽²⁾	Yes (petrol)	-	-
Evaporative emissions (Type IV test)	Yes	-	-		Yes (petrol only)	Yes (petrol only)	Yes (petrol only) ⁽²⁾	Yes (petrol)	-	-
Durability (Type V test)	Yes	Yes	Yes		Yes (petrol only)	Yes (petrol only)	Yes (petrol only) ⁽²⁾	Yes (petrol)	Yes (B5 only) ⁽²⁾	Yes
Low temperature emissions (Type VI test)	Yes	-	-		Yes (petrol only)	Yes (petrol only)	Yes (petrol only) ⁽²⁾	Yes (both fuels) ⁽³⁾	-	-
In-service conformity	Yes	Yes	Yes		Yes (both fuels)	Yes (both fuels)	Yes (petrol only) ⁽²⁾	Yes (both fuels)	Yes (B5 only) ⁽²⁾	Yes
On-board diagnostics	Yes	Yes*	Yes*		Yes (petrol only) or (both fuels)*?	Yes (petrol only) or (both fuels)*?	Yes (petrol only) or (both fuels)?	Yes (petrol only) or (both fuels)?	Yes (B5 only)⁽²⁾ or (both fuels)?	Yes

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*** 1 or 2 gas reference fuels?**

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5.3.1.2.4. During the test, the exhaust gases are diluted and a proportional sample collected in one or more bags. The exhaust gases of the vehicle tested are diluted, sampled and analysed, following the procedure described below, and the total volume of the diluted exhaust is measured. **The emissions of gaseous, particulate and particle emissions are recorded (where applicable - see Table A),**

Deleted: Not only the carbon monoxide, hydrocarbon and nitrogen oxide emissions but also the particulate pollutant emissions from vehicles equipped with compression-ignition engines are recorded.

5.3.1.4. Subject to the requirements of paragraph 5.3.1.5. the test shall be repeated three times. The results are **corrected** by the appropriate deterioration factors obtained from paragraph 5.3.6. and, in the case of periodically regenerating systems as defined in paragraph 2.20., also shall be multiplied by the factors K_i obtained from Annex 13. The resulting masses of gaseous, **particulate and particle** emissions obtained in each test **(where applicable – see Table A)** shall be less than the limits shown in the Table 1. below:

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Remark. The word “multiplied” can not be used if the deterioration factor is additive.

- 5.3.2.1.1. Vehicles that can be fuelled either with petrol or with LPG or NG/biomethane or flex fuel ones shall be tested in the test Type II on both fuels.
- 5.3.3.1.1. Vehicles that can be fuelled either with petrol or with LPG or NG/biomethane or flex fuel ones should be tested in the Type III test on petrol only.
- 5.3.4.1.1. Vehicles that can be fuelled either with petrol or with LPG or with NG/biomethane or flex fuel ones should be tested in the Type IV test on petrol only.
- 5.3.5.1. This test shall be carried out on all vehicles equipped with a positive-ignition engine except vehicles fuelled with LPG or NG/biomethane. Vehicles that can be fuelled either with petrol or with LPG or with NG/biomethane or flex fuel ones should be tested in the Type VI test on petrol only.
- 5.3.5.2. Subject to the requirements in paragraphs 5.3.5.2.2. and 5.3.5.3. the test shall be performed three times. The resulting mass of carbon monoxide and total hydrocarbon emission shall be less than the limits shown in the table below:

Deleted: 5.3.1.4.2. . When the tests are performed with gaseous fuels, the resulting mass of gaseous emissions shall be less than the limits for petrol-engined vehicles in the above table.¶

Emission limit for the carbon monoxide and total hydrocarbon tailpipe emissions after a cold start test

Test temperature 266 K (-7 °C)			
Vehicle category	Class	Mass of carbon monoxide (CO) L ₁ (g/km)	Mass of <u>total</u> hydrocarbons (HC) L ₂ (g/km)
M	-	15	1.8
N ₁	I	15	1.8
	II	24	2.7
	III	30	3.2
N ₂	-	30	3.2

- 5.3.6.1.1. Vehicles that can be fuelled either with petrol or with LPG or NG or flex fuel ethanol ones should be tested in the Type V test on petrol only. In that case the deterioration factor found with petrol will also be taken for LPG or NG or ethanol. Flex fuel biodiesel vehicles shall be tested on diesel fuel only. In that case the deterioration factor found with diesel fuel will also be taken for biodiesel.
- 7.1.1.2. For category N₁ vehicles, the approval shall be extended only to vehicles with a lower reference mass, if the emissions of the vehicle already approved are within the limits prescribed for the vehicle for which extension of the approval is requested.

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Annex 2, Addendum

2. Test results

2.1. Tailpipe emissions test results:.....

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Type I Result	Test	CO (mg/km)	THC (mg/km)	NMHC (mg/km)	NOx (mg/km)	THC+NOx (mg/km)	Particulates (mg/km)	Particles (#/km)
Measured ^{(i) (iv)}	1							
	2							
	3							
Measured mean value (M) ^{(i) (iv)}								
Ki ^{(i) (v)}						(ii)		
Mean value calculated with Ki (M.Ki) ^(iv)						(iii)		
DF ^{(i) (v)}								
Final mean value calculated with Ki and DF (M.Ki.DF) ^(vi)								
Limit value								

- (i) where applicable
- (ii) not applicable
- (iii) mean value calculated by adding mean values (M.Ki) calculated for THC and NOx
- (iv) round to 2 decimal places
- (v) round to 4 decimal places
- (vi) round to 1 decimal place more than limit value

Remark to the table above

1. The accuracy of particle number measurement is in the order of 10% in the best case. If these emissions are rounded to 2 decimal place, it means that they are rounded to 1/hundred billionth of percent e.g.

587 335 621 456.32

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It looks funny.

2. According to paragraph 5.3.1.4 the resulting masses of gaseous, particulate and particle emissions obtained in each test shall be less than the limits shown in the Table 1. What is decisive is not the mean value but the result of each test. It means that values calculated with Ki and DF should be given for each test.

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3. According to Regulation 692/2008 there are 2 types of deterioration factors: additive and multiplicative. Only the second is considered in the table above.

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Annex 4a

6.1.1. Elementary urban cycle

General information:

Average speed during test:	19 18.8 km/h
Effective running time:	195 s
Theoretical distance covered per cycle:	1.013 1.016 km
Equivalent distance for the four cycles:	4.052 4.064 km

Annex 4a, Appendix 3

3.2. Calibration and span gases

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Mixtures of gases having the following chemical compositions shall be available:

- (a) C₃H₈ and purified synthetic air (see paragraph 3.1. above);
- (b) CO and purified nitrogen;
- (c) CO₂ and purified nitrogen.

(x) methane and purified synthetic air

NO and purified nitrogen (the amount of NO₂ contained in this calibration gas shall not exceed 5 per cent of the NO content).

Annex V

2.5. Components for adjusting the idling speed

Remark. Is this paragraph really required for modern vehicles? This provision does not seem to be included in Regulation 692/2008.

3.4. The concentration in C_{CO} (see paragraph 3.2.) measured according to the formulae contained in paragraph 3.3. need not be corrected if the total of the concentrations measured (C_{CO} + C_{CO2}) is for four-stroke engines at least:

- (a) for petrol 15 per cent
- (b) for LPG 13.5 per cent
- (c) for NG/biomethane 11.5 per cent

(d) ethanol, ?

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Annex 9

7. MEASURING EMISSIONS OF POLLUTANTS

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A multiplicative exhaust emission deterioration factor shall be calculated for each pollutant as follows:

$$D.E.F. = \frac{Mi_2}{Mi_1}$$

where:

- Mi₁ = mass emission of the pollutant i in g/km interpolated to 6,400 km,
- Mi₂ = mass emission of the pollutant i in g/km interpolated to **160,000** km.

At the request of the manufacturer, an additive exhaust emission deterioration factor shall be calculated for each pollutant as follows:

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$$D.E.F = \frac{M_{i2}}{M_{i1}}$$

Annex 11

3.3.2. The OBD system shall indicate the failure of an emission-related component or system when that failure results in emissions exceeding the threshold limits given below:

OBD threshold limits

Category	Class	Reference mass (RW) (kg)	Mass of carbon monoxide		Mass of non-methane hydrocarbons		Mass of oxides of nitrogen		Mass of particulates	
			(CO) (mg/km)		(NMHC) (mg/km)		(NOx) (mg/km)		(PM) (mg/km)	
			PI	CI	PI	CI	PI	CI	PI ⁽¹⁾	CI ⁽²⁾
M	—	All	1900	1900	250	320	300	540	50	50
N ₁ ⁽³⁾	I	RW ≤ 1305	1900	1900	250	320	300	540	50	50
	II	1305 < RW ≤ 1760	3400	2400	330	360	375	705	50	50
	III ⁽³⁾	1760 < RW	4300	2800	400	400	410	840	50	50
N ₂	-	All	4300	2800	400	400	410	840	50	50

.....
(3) Includes M₁ vehicles that meet the 'special social needs' definition.

II. REGULATION 49

1. The title of R. 49 is:

“Uniform provisions concerning the measures to be taken against the emission of gaseous and particulate pollutants **from compression-ignition engines** for use in vehicles, and the emission of gaseous pollutants **from positive-ignition engines** fuelled with natural gas or liquefied petroleum gas for use in vehicles”.

According to the first indent of paragraph 1.1 of the proposal for the 06 series of amendments to R. 49 (document ECE/TRANS/WP.29/2010/54)

"1.1. This Regulation shall apply to **motor vehicles** of categories M₁, M₂, N₁ and N₂ with a reference mass exceeding 2,610 kg and to **all motor vehicles** of categories M₃ and N₃.

The title of R. 49 does not seem to correspond with the scope. It is also important to note that the requirements for particulates are applicable to PI engines (stage C in Table 2).

2. The title of R. 49 seems to suggest the it does not apply to petrol engines/vehicles.

According to Table A R. 49 applies to petrol engines/vehicles, but no requirements are in force (Table B).

It is desirable to clarify the question whether Contracting Parties are allowed to grant the type-approval of petrol engines/vehicles (**without any testing – no requirements!**) when a manufacturer applies for such an approval.

3. According to R. 83 the type-approval (as an extension) is granted for a vehicle, but not for an engine. Therefore, the following corrections of the third indent is desirable:

The following do not need to be approved according to this Regulation:

vehicles of up to 2,840 kg reference mass to which an approval to Regulation No. 83 has been granted as an extension.

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4. Other suggested changes:

"2.1.64. "Reference mass" means the "unladen mass" of the vehicle increased by a uniform figure of 100 kg,"

Deleted: for test according to Annexes 4a and 8 of Regulation No. 83

"2.1.65. "Unladen mass" means the mass of the vehicle in running order without the uniform mass of the driver of 75 kg, passengers or load, with the fuel tank 90 per cent full, but all other liquids 100% except used water and the usual set of tools and spare wheel on board, where applicable."

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