Transmitted by the expert from
the JRC of the European Commission

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CORRIGENDA

Working document ECE/TRANS/WP.29/GRPE/2009/16

Proposal for draft global technical regulation concerning the test procedure for compression-ignition (C.I.) engines to be installed in agricultural and forestry tractors and in non-road mobile machinery with regard to the emissions of pollutants by the engine

Submitted by the expert from the European Commission

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http://www.unece.org/trans/main/wp29/wp29wgs/wp29grpe/grpedoc_2009.html

Part A and part B up to Annex 6 – Corrigendum

#	WHERE	ERRATA	CORRIGE
1	Short Title	EXHAUST EMISSIONS TEST PROTOCOL OF NON-ROAD MOBILE MACHINERY	EMISSIONS TEST PROTOCOL OF NON-ROAD MOBILE MACHINERY ENGINES
2	A.STATEMENT OF TECHNICAL RATIONALE AND JUSTIFICATION; 1.TECHNICAL AND ECONOMIC FEASIBILITY; Paragraph 7	Deposited text: The guidance document has no legal status, it does not introduce any additional requirements… in GRPE/2009/16: The guidance document has no legal status as it does not introduce any additional requirements…	The guidance document has no legal status and it does not introduce any additional requirements … [in order to maintain agreed content]
3	A. STATEMENT OF TECHNICAL RATIONALE AND JUSTIFICATION; 3. POTENTIAL COST EFFECTIVENESS; Paragraph 11	belive [incorrect spelling]	believe
4	page 1, footnote	wrong format [1]	1/
5	7.8.3.4.	Points with negative torque values have to be accounted for as zero work. [sentence mistakenly deleted]	[reintroduce] Points with negative torque values have to be accounted for as zero work.
6	Table 7.3, second column	Conditions (n = engine speed, T = torque) n_{ref} = 0 per cent and T_{ref} = 0 per cent and	Conditions (n = engine speed, T = torque) n_{ref} = 0 per cent and T_{ref} = 0 per cent and

		$T_{act} > (T_{ref} - 0.02\ T_{maxmappedtorque})$ and $T_{act} < (T_{ref} + 0.02\ T_{maxmappedtorque})$ $n_{act} \leq 1.02\ n_{ref}$ and $T_{act} > T_{ref}$ <u>and</u> $n_{act} > n_{ref}$ and $T_{act} \leq T_{ref}$ <u>and</u> $n_{act} > 1.02\ n_{ref}$ and $T_{ref} < T_{act} \leq (T_{ref} + 0.02\ T_{maxmappedtorque})$ $n_{act} < n_{ref}$ and $T_{act} \geq T_{ref}$ <u>and</u> $n_{act} \geq 0.98\ n_{ref}$ and $T_{act} < T_{ref}$ <u>and</u> $n_{act} < 0.98\ n_{ref}$ and $T_{ref} > T_{act} \geq (T_{ref} - 0.02\ T_{maxmappedtorque})$ [4 <u>and</u> have to be replaced by <u>or</u>]	$T_{act} > (T_{ref} - 0.02\ T_{maxmappedtorque})$ and $T_{act} < (T_{ref} + 0.02\ T_{maxmappedtorque})$ $n_{act} \leq 1.02\ n_{ref}$ and $T_{act} > T_{ref}$ <u>or</u> $n_{act} > n_{ref}$ and $T_{act} \leq T_{ref}$ <u>or</u> $n_{act} > 1.02\ n_{ref}$ and $T_{ref} < T_{act} \leq (T_{ref} + 0.02\ T_{maxmappedtorque})$ $n_{act} < n_{ref}$ and $T_{act} \geq T_{ref}$ <u>or</u> $n_{act} \geq 0.98\ n_{ref}$ and $T_{act} < T_{ref}$ <u>or</u> $n_{act} < 0.98\ n_{ref}$ and $T_{ref} > T_{act} \geq (T_{ref} - 0.02\ T_{maxmappedtorque})$
7	8.1.10.2.4	wrong subdivision in i, ii, iii; editor introduced subdivision where none should be	delete sub division
8	9.2.2	shall be maintained within one of the following ranges(option): (i) between 293 and 303 K (20 and 30 °C) or (ii) between 293 and 325 K (20 to 52°C) The range shall be selected by the Contracting Party. [the half sentence 'in close proximity to the entrance into the dilution tunnel' was lost copying the text from 9.2.3.2 during its introduction by the Editorial	shall be maintained within one of the following ranges (option): (a) between 293 and 303 K (20 and 30 °C) or (b) between 293 and 325 K (20 to 52°C) in close proximity to the entrance into the dilution tunnel. The range shall be selected by the Contracting Party. use missing half sentence from this paragraph 9.2.3.2

		Committee]	
9	A.2.4. (b)	…that the $\underline{\sigma}_i$ are the errors	…that the ε_i are the errors

Annex A.7 – Corrigendum

#	WHERE	ERRATA	CORRIGE
1	Title Annex 7	Emission molar based calculation	Molar based emission calculation
2	Para A.7.0.1. footnote (2) 2nd line	x_{dil}	$x_{\mathrm{dil/exh}}$
3	A.7.0.1. footnote (2) 3rd line	x_{dil}	$x_{\mathrm{dil/exh}}$
4	Eq. (A.7-3)	$x_{\mathrm{H_2O}} = \frac{p_{\mathrm{H2O}}}{p_{\mathrm{abs}}}$	$x_{\mathrm{H2O}} = \frac{p_{\mathrm{H2O}}}{p_{\mathrm{abs}}}$
5	A.7.1.2.2.; A.7.1.2.3.	vapor [incorrect spelling]	vapour
6	Eq. (A.7-28)	$m_{\mathrm{gas}} = M_{\mathrm{gas}} \cdot \int \dot{n}_{\mathrm{exhwet}} \cdot x_{\mathrm{gaswet}} \cdot \mathrm{d}t$	$m_{\mathrm{gas}} = M_{\mathrm{gas}} \cdot \int \dot{n}_{\mathrm{exh}} \cdot x_{\mathrm{gas}} \cdot \mathrm{d}t$
7	Legend Eq. (A.7-28)	$\dot{n}_{\mathrm{exhwet}}$	$\dot{n}_{\mathrm{exh}}$
8	Legend of Eq. (A.7-28)	x_{gaswet} = instantaneous generic gas molar concentration	x_{gas} = instantaneous generic gas molar concentration on a wet basis
9	Eq. (A.7-29)	$m_{\mathrm{gas}} = M_{\mathrm{gas}} \cdot \int \dot{n}_{\mathrm{exhwet}} \cdot x_{\mathrm{gaswet}} \cdot \mathrm{d}t \quad \Rightarrow$ $m_{\mathrm{gas}} = \frac{1}{f} \cdot M_{\mathrm{gas}} \cdot \sum_{i=1}^{N} \dot{n}_{\mathrm{exhwet},i} \cdot x_{\mathrm{gaswet},i}$	$m_{\mathrm{gas}} = M_{\mathrm{gas}} \cdot \int \dot{n}_{\mathrm{exh}} \cdot x_{\mathrm{gas}} \cdot \mathrm{d}t \quad \Rightarrow$ $m_{\mathrm{gas}} = \frac{1}{f} \cdot M_{\mathrm{gas}} \cdot \sum_{i=1}^{N} \dot{n}_{\mathrm{exh}i} \cdot x_{\mathrm{gas}i}$
10	Legend Eq. (A.7-29)	$\dot{n}_{\mathrm{exhwet},i}$	$\dot{n}_{\mathrm{exh}i}$
11	Legend Eq. (A.7-29)	$x_{\mathrm{gaswet},i}$ = instantaneous generic gas molar concentration	$x_{\mathrm{gas}i}$ = instantaneous generic gas molar concentration on a wet basis
12	Eq. (A.7-30)	$m_{\mathrm{gas}} = \frac{1}{f} \cdot M_{\mathrm{gas}} \cdot \sum_{i=1}^{N} \dot{n}_{\mathrm{exhwet},i} \cdot x_{\mathrm{gaswet},i}$	$m_{\mathrm{gas}} = \frac{1}{f} \cdot M_{\mathrm{gas}} \cdot \sum_{i=1}^{N} \dot{n}_{\mathrm{exh}i} \cdot x_{\mathrm{gas}i}$

13	Legend Eq. (A.7-30)	$\dot{n}_{\text{exhwet},i}$	$\dot{n}_{\text{exh}i}$
14	Legend Eq. (A.7-30)	$x_{\text{gaswet},I}$ = instantaneous generic gas molar concentration	$x_{\text{gas}i}$ = instantaneous generic gas molar concentration on a wet basis
15	Eq. (A.7-31)	$m_{\text{gas}} = M_{\text{gas}} \cdot \bar{\dot{n}}_{\text{exhwet}} \cdot \bar{x}_{\text{gaswet}} \cdot t_{\text{cycle}}$	$m_{\text{gas}} = M_{\text{gas}} \cdot \dot{n}_{\text{exh}} \cdot \bar{x}_{\text{gas}} \cdot \Delta t$
16	Legend Eq. (A.7-31)	$\bar{\dot{n}}_{\text{exhwet}}$ = mean exhaust gas molar flow rate on a wet basis	$\dot{n}_{\text{exh}}$ = exhaust gas molar flow rate on a wet basis
17	Legend Eq. (A.7-31)	$\bar{x}_{\text{gaswet}}$ = mean gaseous emission molar fraction	$\bar{x}_{\text{gas}}$ = mean gaseous emission molar fraction on a wet basis
18	Legend Eq. (A.7-31)	t_{cycle} = test time interval	Δt = time duration of test interval
19	Eq. (A.7-32)	$m_{\text{gas}} = \frac{1}{f} \cdot M_{\text{gas}} \cdot \bar{x}_{\text{gaswet}} \cdot \sum_{i=1}^{N} \dot{n}_{\text{exhwet},i}$	$m_{\text{gas}} = \frac{1}{f} \cdot M_{\text{gas}} \cdot \bar{x}_{\text{gas}} \cdot \sum_{i=1}^{N} \dot{n}_{\text{exh}i}$
20	Legend Eq. (A.7-32)	$\dot{n}_{\text{exhwet},i}$	$\dot{n}_{\text{exh}i}$
21	Legend Eq. (A.7-32)	$\bar{x}_{\text{gaswet}}$ = mean gaseous emission molar fraction	$\bar{x}_{\text{gas}}$ = mean gaseous emission molar fraction on a wet basis
22	Para A.7.3.2. 3rd line	x_{gaswet}	x_{gas}
23	Eq. (A.7-33)	$x_{\text{gasdry}} = \frac{x_{\text{gaswet}}}{1 - x_{\text{H2O}}}$	$x_{\text{gasdry}} = \frac{x_{\text{gas}}}{1 - x_{\text{H2O}}}$
24	Eq. (A.7-34)	$x_{\text{gaswet}} = \frac{x_{\text{gasdry}}}{1 + x_{\text{H2Odry}}}$	$x_{\text{gas}} = \frac{x_{\text{gasdry}}}{1 + x_{\text{H2Odry}}}$
25	Legend Eq. (A.7-34)	$x_{\text{H2O,dry}}$	x_{H2Odry}
26	Eq. (see A.7-29)	See above errata of Eq. (A.7-29)	See above corrige of Eq. (A.7-29)
27	Eq. (see A.7-31)	See above errata of Eq. (A.7-31)	See above corrige of Eq. (A.7-31)
28	Eq. (see A.7-32)	See above errata of Eq. (A.7-32)	See above corrige of Eq. (A.7-32)

29	A.7.4..4.1.(a):	Changing exhaust flow rate shall be extracted. [the first line of the paragraph has been lost while editing]	<u>If a batch sample from a changing exhaust flow rate is collected, a sample proportional to the</u> changing exhaust flow rate shall be extracted.
30	Eq. (A.7-45)	$m_{\mathrm{PM}} = \bar{M}_{\mathrm{PM}} \cdot \bar{\dot{n}} \cdot t_{\mathrm{cycle}}$	$m_{\mathrm{PM}} = \bar{M}_{\mathrm{PM}} \cdot \dot{n} \cdot \Delta t$
31	Legend Eq. (A.7-45)	$\bar{\dot{n}}_{\mathrm{i}}$ = mean exhaust molar flow rate	$\dot{n}$ = exhaust molar flow rate
32	Legend Eq. (A.7-45)	t_{cycle} = test interval	Δt = time duration of test interval
33	Legend eq. (A.7-46): *DR* 2nd line	m_{dil} ($DR = m/m_{\mathrm{dil}}$)	$m_{\mathrm{dil/exh}}$ ($DR = m/m_{\mathrm{dil/exh}}$)
34	Legend Eq. (A.7-46): *DR* 2nd line	x_{dil}	$x_{\mathrm{dil/exh}}$
35	Eq. (A.7-47)	$DR = \frac{1}{1 - x_{\mathrm{dil}}}$	$DR = \frac{1}{1 - x_{\mathrm{dil/exh}}}$
36	A.7.7.1. and A.7.7.2.	A.7.7.1. and A.7.7.2 [incorrect numbering]	replace numbering by A.7.6.4. and A.7.6.5.
37	A.7.8.1. to A.7.8.4.	A.7.8.1. to A.7.8.4. [incorrect numbering]	replace numbering by A.7.7.1. and A.7.7.4.

Annex A.8 – Corrigendum

#	WHERE	ERRATA	CORRIGE
1	Eq. (A.8-1)	$c_{\mathrm{NMHC}} = \frac{c_{\mathrm{HC(w/oCutter)}} \cdot (1 - E_{\mathrm{CH4}}) - c_{\mathrm{HC(w/Cutter)}}}{E_{\mathrm{C2H6}} - E_{\mathrm{CH4}}}$	$c_{\mathrm{NMHC}} = \frac{c_{\mathrm{HC(w/oNMC)}} - c_{\mathrm{HC(w/NMC)}} \cdot (1 - E_{\mathrm{CH4}})}{E_{\mathrm{C2H6}} - E_{\mathrm{CH4}}}$
2	Eq. (A.8-2)	$c_{\mathrm{CH4}} = \frac{c_{\mathrm{HC(w/Cutter)}} - c_{\mathrm{HC(w/oCutter)}} \cdot (1 - E_{\mathrm{C2H6}})}{E_{\mathrm{C2H6}} - E_{\mathrm{CH4}}}$	$c_{\mathrm{CH4}} = \frac{c_{\mathrm{HC(w/NMC)}} - c_{\mathrm{HC(w/NMC)}} \cdot (1 - E_{\mathrm{C2H6}})}{E_{\mathrm{C2H6}} - E_{\mathrm{CH4}}}$
3	Eq. (A.8-22)	$f_{\mathrm{c}} = 0.5441 \cdot (c_{\mathrm{CO2d}} - c_{\mathrm{CO2d}}) + \frac{c_{\mathrm{COd}}}{18,522} + \frac{c_{\mathrm{HCw}}}{17,355}$	$f_{\mathrm{c}} = 0.5441 \cdot (c_{\mathrm{CO2d}} - c_{\mathrm{CO2d,a}}) + \frac{c_{\mathrm{COd}}}{18522} + \frac{c_{\mathrm{HCw}}}{17355}$
4	Legend Eq.	c_{CO2ad}	$c_{\mathrm{CO2d,a}}$

	(A.8-22)		
5	Eq. (A.8-38)	$m_{ed} = \frac{1.293 \cdot t \cdot K_V \cdot p_P}{T^{0.5}}$	$m_{ed} = \frac{1.293 \cdot t \cdot K_V \cdot p_p}{T^{0.5}}$
6	Legend Eq. (A.8-38)	p_P	p_p
7	Eq. (A.8-39)	$m_{ed} = 1.293 \cdot V_0 \cdot n_P \cdot \frac{p_P}{101.3} \cdot \frac{273}{T}$	$m_{ed} = 1.293 \cdot V_0 \cdot n_P \cdot \frac{p_p}{101.3} \cdot \frac{273}{T}$
8	Legend Eq. (A.8-39)	p_P	p_p
9	Eq. (A.8-40)	$m_{ed} = 1.293 \cdot q_{SSV} \cdot \Delta t$	$m_{ed} = 1.293 \cdot q_{VSSV} \cdot \Delta t$
10	Eq. (A.8-41)	$q_{SSV} = A_0 d_V^2 C_d p_P \sqrt{\left[\frac{1}{T}\left(r_p^{1,4286} - r_p^{1,7143}\right) \cdot \left(\frac{1}{1 - r_D^4 r_p^{1,4286}}\right)\right]}$	$q_{VSSV} = A_0 d_V^2 C_d p_P \sqrt{\left[\frac{1}{T}\left(r_p^{1.4286} - r_p^{1.7143}\right) \cdot \left(\frac{1}{1 - r_D^4 r_p^{1.4286}}\right)\right]}$
11	Eq. (A.8-42)	$m_{ed,i} = 1.293 \cdot q_{SSV} \cdot \Delta t_i$	$m_{ed,i} = 1.293 \cdot q_{VSSV} \cdot \Delta t_i$
12	Legend Eq. (A.8-51)	m_{ed} = mass of equivalent diluted exhaust gas over the cycle [kg]	m_{ed} = mass of diluted exhaust gas over the cycle [kg]
13	Annex 8 appendix 1, A.8.1., A8.1.1. to A.8.1.3.	A.8.1., A8.1.1. to A.8.1.3. [incorrect numbering]	replace numbering by A.8.5., A.8.5.1 to A.8.5.3
14	Annex 8 appendix 2, A8.2	A8.2 [incorrect numbering]	replace numbering by A.8.6
15	Experts agreed during the NRMM WG Meeting (10 June 2009) to update the mass based emission calculation of Annex A.8 with the NRMM relevant changes in the WHDC gtr regarding the measurement/calculation methods of HC emissions (expected to be introduced		

	within July 2009).