Transmitted by the expert from
the JRC of the European Commission

Informal document No. **GRPE-58-11-Rev.2**
(58th GRPE, 8-12 June 2009,
agenda item 5)

CORRIGENDA REV. 2[1]

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

Working document ECE/TRANS/WP.29/GRPE/2009/16 as deposited at GRPE secretariat on the 20 March 2009 and released 1 April 2009 with changes by the GRPE secretariat.

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

[1] Rev.2 represents corrections (in colour) to the content of Rev.1 and adds some editorial corrections identified in the mean time

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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 $T_{act} > (T_{ref} - 0.02\ T_{maxmappedtorque})$ and $T_{act} < (T_{ref} + 0.02\ T_{maxmappedtorque})$	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 $T_{act} > T_{ref}$ and $n_{act} > n_{ref}$ and $T_{act} \leq T_{ref}$ and $n_{act} > 1.02\ n_{ref}$ and $T_{ref} < T_{act} \leq (T_{ref} + 0.02\ T_{maxmappedtorque})$ $n_{act} < n_{ref}$ and $T_{act} \geq T_{ref}$ and $n_{act} \geq 0.98\ n_{ref}$ and $T_{act} < T_{ref}$ and $n_{act} < 0.98\ n_{ref}$ and $T_{ref} > T_{act} \geq (T_{ref} - 0.02\ T_{maxmappedtorque})$ [4 and have to be replaced by or]	$n_{act} \leq 1.02\ n_{ref}$ and $T_{act} > T_{ref}$ or $n_{act} > n_{ref}$ and $T_{act} \leq T_{ref}$ or $n_{act} > 1.02\ n_{ref}$ and $T_{ref} < T_{act} \leq (T_{ref} + 0.02\ T_{maxmappedtorque})$ $n_{act} < n_{ref}$ and $T_{act} \geq T_{ref}$ or $n_{act} \geq 0.98\ n_{ref}$ and $T_{act} < T_{ref}$ or $n_{act} < 0.98\ n_{ref}$ and $T_{ref} > T_{act} \geq (T_{ref} - 0.02\ T_{maxmappedtorque})$
7	8.1.10.2.4 (m)	[paragraph m, wrong subdivision in i, ii, iii]	delete sub division [deletion of the i, ii, iii, but not the text, which is contracted into 1 paragraph]
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 Committee]	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 paragraph 9.2.3.2]
9	A.2.4. (b)	…that the σ_i are the errors	…that the ε_i are the errors

Additional editorial corrections for Part A and part B up to Annex 6

#	WHERE	ERRATA	CORRIGE
10	3.1.51.	"PTFE means polytetrafluoroethylene, commonly known as Teflon ™; [The right quotation mark is missing.]	"PTFE" means polytetrafluoroethylene, commonly known as Teflon ™;
11	3.2	*RF* not in list of sysmbols	Response factor *RF* added to list of symbols
12	Eq. (7-3) in section 7.7.2.1.	$n_{\text{denorm}} = n_i$ at the maximum of $\left(n_{\text{norm}i}^2 + P_{\text{nnorm}i}^2\right)$ [Engine power with wrong subscript nnorm*i*]	$n_{\text{denorm}} = n_i$ at the maximum of $\left(n_{\text{norm}i}^2 + P_{\text{norm}i}^2\right)$
13	7.8.2.3.	(a), (b), (c), (c), (d) [non-sequential numbering]	(a), (b), (c), (d), (e)
14	Table 8.2	$\left\lvert x_{\min} * \left(a_1 - 1\right) + a_0 \right\rvert$ [wrong multiplier]	$\left\lvert x_{\min} \cdot \left(a_1 - 1\right) + a_0 \right\rvert$
15	Equation (8-7) in section 8.1.11.5.4.	$Efficiency[\%] = \left(1 + \frac{x_{\text{NOxmeas}} - x_{\text{NOx+O2mix}}}{x_{\text{NOx+O2mix}} - x_{\text{NOmeas}}}\right) \times 100$ [Transcription mistake in subscript]	$Efficiency[\%] = \left(1 + \frac{x_{\text{NOxmeas}} - x_{\text{NOx+O2mix}}}{x_{\text{NO+O2mix}} - x_{\text{NOmeas}}}\right) \times 100$

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	vapour [English spelling]
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)	$m_{\mathrm{gas}} = M_{\mathrm{gas}} \cdot \int \dot{n}_{\mathrm{exhwet}} \cdot x_{\mathrm{gaswet}} \cdot \mathrm{d}t \quad \Rightarrow$ $m_{\mathrm{gas}} = \frac{1}{f} \cdot M_{\mathrm{gas}} \cdot \sum_{i=1}^{\mathrm{N}} \dot{n}_{\mathrm{exhwet},i} \cdot x_{\mathrm{gaswet},i}$	$m_{\mathrm{gas}} = M_{\mathrm{gas}} \cdot \int \dot{n}_{\mathrm{exh}} \cdot x_{\mathrm{gas}} \cdot \mathrm{d}t \quad \Rightarrow$ $m_{\mathrm{gas}} = \frac{1}{f} \cdot M_{\mathrm{gas}} \cdot \sum_{i=1}^{\mathrm{N}} \dot{n}_{\mathrm{exh}i} \cdot x_{\mathrm{gas}i}$
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)	$m_{\mathrm{gas}} = \frac{1}{f} \cdot M_{\mathrm{gas}} \cdot \sum_{i=1}^{\mathrm{N}} \dot{n}_{\mathrm{exhwet},i} \cdot x_{\mathrm{gaswet},i}$	$m_{\mathrm{gas}} = \frac{1}{f} \cdot M_{\mathrm{gas}} \cdot \sum_{i=1}^{\mathrm{N}} \dot{n}_{\mathrm{exh}i} \cdot x_{\mathrm{gas}i}$
13	Legend Eq. (A.7-30)	$\dot{n}_{\mathrm{exhwet},i}$	$\dot{n}_{\mathrm{exh}i}$
14	Legend Eq. (A.7-30)	$x_{\mathrm{gaswet},I}$ = instantaneous generic gas molar concentration	$x_{\mathrm{gas}i}$ = instantaneous generic gas molar concentration on a wet basis
15	Eq. (A.7-31)	$m_{\mathrm{gas}} = M_{\mathrm{gas}} \cdot \bar{\dot{n}}_{\mathrm{exhwet}} \cdot \bar{x}_{\mathrm{gaswet}} \cdot t_{\mathrm{cycle}}$	$m_{\mathrm{gas}} = M_{\mathrm{gas}} \cdot \dot{n}_{\mathrm{exh}} \cdot \bar{x}_{\mathrm{gas}} \cdot \Delta t$

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)	$m_{\text{gas}} = \frac{1}{f} \cdot M_{\text{gas}} \cdot \sum_{i=1}^{N} \dot{n}_{\text{exhwet},i} \cdot x_{\text{gaswet},i}$	$m_{\text{gas}} = \frac{1}{f} \cdot M_{\text{gas}} \cdot \sum_{i=1}^{N} \dot{n}_{\text{exh}i} \cdot x_{\text{gas}i}$
27	Eq. (see A.7-31)	$m_{\text{gas}} = M_{\text{gas}} \cdot \bar{\dot{n}}_{\text{exhwet}} \cdot \bar{x}_{\text{gaswet}} \cdot t_{\text{cycle}}$	$m_{\text{gas}} = M_{\text{gas}} \cdot \dot{n}_{\text{exh}} \cdot \bar{x}_{\text{gas}} \cdot \Delta t$
28	Eq. (see A.7-32)	$m_{\text{gas}} = \frac{1}{f} \cdot M_{\text{gas}} \cdot \bar{x}_{\text{gaswet}} \cdot \sum_{i=1}^{N} \dot{n}_{\text{exhwet},i}$	$m_{\text{gas}} = \frac{1}{f} \cdot M_{\text{gas}} \cdot \bar{x}_{\text{gas}} \cdot \sum_{i=1}^{N} \dot{n}_{\text{exh}i}$
29	A.7.4..4.1.(a):	Changing exhaust flow rate shall be extracted. [the first line of the paragraph had been lost while editing]	If a batch sample from a changing exhaust flow rate is collected, a sample proportional to the changing exhaust flow rate shall be extracted.
30	Eq. (A.7-45)	$m_{\text{PM}} = \bar{M}_{\text{PM}} \cdot \bar{\dot{n}} \cdot t_{\text{cycle}}$	$m_{\text{PM}} = \bar{M}_{\text{PM}} \cdot \dot{n} \cdot \Delta t$
31	Legend Eq. (A.7-45)	$\bar{\dot{n}}_{\text{i}}$ = 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} ($DR = m/m_{dil}$)	$m_{dil/exh}$ ($DR = m/m_{dil/exh}$)
34	Legend Eq. (A.7-46): DR 3rd line	x_{dil}	$x_{dil/exh}$
35	Eq. (A.7-47)	$DR = \frac{1}{1 - x_{dil}}$	$DR = \frac{1}{1 - x_{dil/exh}}$
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.

Additional editorial corrections for Annex A.7 – Corrigendum

#	WHERE	ERRATA	CORRIGE
38	A.7.0.3.; A.7.1.1.	sulfur	sulphur [English spelling]
39	Eq. (A.7-1)	$\log_{10}\left(p_{H_2O}\right)$ [No double subscript]	$\log_{10}\left(p_{H2O}\right)$
40	Eq.(A.7-3)	$x_{H_2O} = \frac{p_{H2O}}{p_{abs}}$ [No double subscript]	$x_{H2O} = \frac{p_{H2O}}{p_{abs}}$
41	A.7.1.2.3.	If humidity is measured as a relative humidity RH_a, the amount of water of an ideal gas x_{H2O} [mol/mol] is calculated as follows [mistyped variable name RH_a]	If humidity is measured as a relative humidity $RH\%$, the amount of water of an ideal gas x_{H2O} [mol/mol] is calculated as follows [replaced by $RH\%$]
42	Eq. (A.7-4)	$x_{H2O} = \frac{RH\% \cdot p_{H2O}}{p_{abs}}$	$x_{H2O} = \frac{RH\%}{100} \cdot \frac{p_{H2O}}{p_{abs}}$ [As the value of $RH\%$ is a per cent value between 0 and 100, the value has to be divided by 100]
43	A.7.1.4.1. (b)	For the NMHC determination described in paragraph (b) of this paragraph, $x_{THC[THC\text{-}FID]}$ shall be corrected [wrong reference to '(b) of this paragraph']	For the NMHC determination described in paragraph A.7.1.4.2., $x_{THC[THC\text{-}FID]}$ shall be corrected [reference '(b) of this paragraph' replaced by

			'A.7.1.4.2.']
44	A.7.1.4.2.	If the NMHC calculations are omitted as described in paragraph A.7.1.4.(c), the background corrected mass of NMHC [wrong reference 'as described in paragraph A.7.1.4.(c)']	If the NMHC calculations are omitted, the background corrected mass of NMHC [reference 'as described in paragraph A.7.1.4.(c)' deleted]
45	Eq. (A7-6)	$x_{\mathrm{NMHC}} = \frac{x_{\mathrm{THC[THC\text{-}FID]cor}} - x_{\mathrm{THC[THC\text{-}FID]}} \cdot RF_{\mathrm{CH4[THC\text{-}FID]}}}{1 - RFPF_{\mathrm{C2H6[NMC\text{-}FID]}} \cdot RF_{\mathrm{CH4[THC\text{-}FID]}}}$ [Transcription mistake in subscript]	$x_{\mathrm{NMHC}} = \frac{x_{\mathrm{THC[THC\text{-}FID]cor}} - x_{\mathrm{THC[NMC\text{-}FID]}} \cdot RF_{\mathrm{CH4[THC\text{-}FID]}}}{1 - RFPF_{\mathrm{C2H6[NMC\text{-}FID]}} \cdot RF_{\mathrm{CH4[THC\text{-}FID]}}}$
46	A.7.1.4.2. (b)	(i) The following equation for penetration fractions determined using an NMC configuration as outlined in paragraph 8.1.10.3.4. shall be used: (ii) For penetration fractions determined using an NMC configuration as outlined in paragraph 8.1.10.3.5., the following equation shall be used: (iii) For penetration fractions determined using an NMC configuration as outlined in paragraph 8.1.10.3.6., the following equation shall be used: [Wrongly referenced sections]	(i) The following equation for penetration fractions determined using an NMC configuration as outlined in paragraph 8.1.10.3.4.1. shall be used: (ii) For penetration fractions determined using an NMC configuration as outlined in paragraph 8.1.10.3.4.2., the following equation shall be used: (iii) For penetration fractions determined using an NMC configuration as outlined in paragraph 8.1.10.3.4.3., the following equation shall be used:
47	Eq. (A.7-57)	$\dot{n}_{\mathrm{ref}} = \frac{\dot{V}_{\mathrm{srdref}} \cdot p_{\mathrm{std}}}{T_{\mathrm{std}} \cdot R} = \frac{\dot{V}_{\mathrm{actref}} \cdot p_{\mathrm{act}}}{T_{\mathrm{std}} \cdot R} = \frac{\dot{m}_{\mathrm{ref}}}{M_{\mathrm{mix}}}$ [Transcription mistake in subscript; reference should be to mixed conditions]	$\dot{n}_{\mathrm{ref}} = \frac{\dot{V}_{\mathrm{srdref}} \cdot p_{\mathrm{std}}}{T_{\mathrm{std}} \cdot R} = \frac{\dot{V}_{\mathrm{actref}} \cdot p_{\mathrm{act}}}{T_{\mathrm{act}} \cdot R} = \frac{\dot{m}_{\mathrm{ref}}}{M_{\mathrm{mix}}}$ [Reference to mixed conditions]
48	Legend Eq. (A.7-57)	p_{act} = actual pressure of the flow rate [Pa] T_{act} = actual temperature of the flow rate [K] M_{mix} = molar mass of the diluted flow rate [g/mol]	p_{act} = actual pressure of the gas [Pa] T_{act} = actual temperature of the gas [K] M_{mix} = molar mass of the gas [g/mol] [p_{act}, T_{act} and M_{mix} are gas properties]
49	Legend Eq. (A.7-66)	$Re^{\#} = \frac{4 \cdot M_{\mathrm{mix}} \cdot \dot{n}_{\mathrm{ref}}}{\pi \cdot d_{\mathrm{t}} \cdot \mu}$ Where	$Re^{\#} = \frac{4 \cdot M_{\mathrm{mix}} \cdot \dot{n}_{\mathrm{ref}}}{\pi \cdot d_{\mathrm{t}} \cdot \mu}$ Where

		d_t = diameter of the SSV throat [m] M_{mix} = mixture molar mass [kg/mol] $\dot{n}_{stdref}$ = reference molar flow rate [mol/s] [Transcription mistake in subscript]	d_t = diameter of the SSV throat [m] M_{mix} = mixture molar mass [kg/mol] $\dot{n}_{ref}$ = reference molar flow rate [mol/s]

Annex A.8 – Corrigendum

#	WHERE	ERRATA	CORRIGE
1	Eq. (A.8-1)	$c_{\mathrm{NMHC}} = \dfrac{c_{\mathrm{HC(w/oCutter)}} \cdot (1\text{-}E_{\mathrm{CH4}})\text{-}c_{\mathrm{HC(w/Cutter)}}}{E_{\mathrm{C2H6}}\text{-}E_{\mathrm{CH4}}}$	now covered by #15 below
2	Eq. (A.8-2)	$c_{\mathrm{CH4}} = \dfrac{c_{\mathrm{HC(w/Cutter)}} - c_{\mathrm{HC(w/oCutter)}} \cdot (1 - E_{\mathrm{C2H6}})}{E_{\mathrm{C2H6}} - E_{\mathrm{CH4}}}$	now covered by #15 below
ad 1	Legend Eq. (A.8-2)	$C_{\mathrm{HC(w/Cutter)}}$	now covered by #15 below
ad 2	Legend Eq. (A.8-2)	$C_{\mathrm{HC(w/oCutter)}}$	now covered by #15 below
3	Eq. (A.8-22)	$f_{\mathrm{c}} = 0.5441 \cdot (c_{\mathrm{CO2d}} - c_{\mathrm{CO2d}}) + \dfrac{c_{\mathrm{COd}}}{18{,}522} + \dfrac{c_{\mathrm{HCw}}}{17{,}355}$	$f_{\mathrm{c}} = 0.5441 \cdot (c_{\mathrm{CO2d}} - c_{\mathrm{CO2d,a}}) + \dfrac{c_{\mathrm{COd}}}{18522} + \dfrac{c_{\mathrm{HCw}}}{17355}$
4	Legend Eq. (A.8-22)	c_{CO2ad}	$c_{\mathrm{CO2d,a}}$
ad 3	Eq. (A.8-37)	$m_{\mathrm{ed,i}} = 1.293 \cdot V_0 \cdot n_{\mathrm{P},i} \cdot \dfrac{p_P}{101.3} \cdot \dfrac{273}{\overline{T}}$	$m_{\mathrm{ed},i} = 1.293 \cdot V_0 \cdot n_{\mathrm{P},i} \cdot \dfrac{p_P}{101.3} \cdot \dfrac{273}{\overline{T}}$ [the index i at *m* shall be in italic *i*]
5	Eq. (A.8-38)	$m_{\mathrm{ed}} = \dfrac{1.293 \cdot t \cdot K_{\mathrm{V}} \cdot p_{\mathrm{P}}}{T^{0.5}}$	$m_{\mathrm{ed}} = \dfrac{1.293 \cdot t \cdot K_{\mathrm{V}} \cdot p_{\mathrm{p}}}{T^{0.5}}$ [the index to the pressure variable shall be small and roman p]
6	Legend Eq. (A.8-38)	p_{P}	p_{p} [the index to the pressure variable shall be small and roman p]
7	Eq. (A.8-39)	$m_{\mathrm{ed},i} = \dfrac{1.293 \cdot \Delta t_i \cdot K_{\mathrm{V}} \cdot p_{\mathrm{P}}}{T^{0.5}}$	$m_{\mathrm{ed},i} = \dfrac{1.293 \cdot \Delta t_i \cdot K_{\mathrm{V}} \cdot p_{\mathrm{p}}}{T^{0.5}}$ [the index to the pressure variable shall be small and roman p]
8	Legend Eq. (A.8-39)	p_{P}	p_{p} [the index to the pressure variable shall be small and roman

			p]
9	Eq. (A.8-40)	$m_{\mathrm{ed}} = 1.293 \cdot q_{\mathrm{SSV}} \cdot \Delta t$	$m_{\mathrm{ed}} = 1.293 \cdot q_{V\mathrm{SSV}} \cdot \Delta t$
10	Eq. (A.8-41)	$q_{\mathrm{SSV}} = A_0 d_{\mathrm{V}}^2 C_{\mathrm{d}} p_{\mathrm{P}} \sqrt{\left[\frac{1}{T}\left(r_{\mathrm{p}}^{1,4286} - r_{\mathrm{p}}^{1,7143}\right) \cdot \left(\frac{1}{1 - r_{\mathrm{D}}^4 r_{\mathrm{p}}^{1,4286}}\right)\right]}$	$q_{V\mathrm{SSV}} = A_0 d_{\mathrm{V}}^2 C_{\mathrm{d}} p_{\mathrm{p}} \sqrt{\left[\frac{1}{T}\left(r_{\mathrm{p}}^{1.4286} - r_{\mathrm{p}}^{1.7143}\right) \cdot \left(\frac{1}{1 - r_{\mathrm{D}}^4 r_{\mathrm{p}}^{1.4286}}\right)\right]}$
11	Eq. (A.8-42)	$m_{\mathrm{ed},i} = 1.293 \cdot q_{\mathrm{SSV}} \cdot \Delta t_i$	$m_{\mathrm{ed},i} = 1.293 \cdot q_{V\mathrm{SSV}} \cdot \Delta t_i$
ad 4	Legend Eq. (A.8-42)	q_{SSV}	q_{VSSV}
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). <u>The original text of A.8.1.1.:</u> Determination of methane and non-methane HC concentration The concentration of NMHC (c_{NMHC} [-]) and CH_4 (c_{CH4} [-]) shall be calculated as follows: $c_{\mathrm{NMHC}} = \frac{c_{\mathrm{HC(w/oCutter)}} \cdot (1\text{-}E_{\mathrm{CH4}})\text{-}c_{\mathrm{HC(w/Cutter)}}}{E_{\mathrm{C2H6}}\text{-}E_{\mathrm{CH4}}}$ (A.8-1)		

$$c_{\mathrm{CH4}} = \frac{c_{\mathrm{HC(w/Cutter)}} - c_{\mathrm{HC(w/oCutter)}} \cdot (1 - E_{\mathrm{C2H6}})}{E_{\mathrm{C2H6}} - E_{\mathrm{CH4}}} \quad \text{(A.8-2)}$$

Where:
$C_{\mathrm{HC(w/Cutter)}}$= HC concentration with sample gas flowing through the NMC [ppm]
$C_{\mathrm{HC(w/oCutter)}}$= HC concentration with sample gas bypassing the NMC [ppm]
E_{CH4} = methane efficiency, as determined in paragraph 8.1.10.3. [-]
E_{C2H6} = ethane efficiency, as determined in paragraph 8.1.10.3. [-]

<u>is replaced by the modified text for A.8.1.1.:</u>

Determination of methane and non-methane HC concentration

The calculation of NMHC and CH_4 depends on the calibration method used. The FID for the measurement without NMC, shall be calibrated with propane. For the calibration of the FID in series with NMC, the following methods are permitted.
(a) calibration gas – propane; propane bypasses NMC,
(b) calibration gas – methane; methane passes through NMC

The concentration of NMHC (c_{NMHC} [-]) and CH_4 (c_{CH4} [-]) shall be calculated as follows for (a):

$$c_{\mathrm{NMHC}} = \frac{c_{\mathrm{HC(w/NMC)}} - c_{\mathrm{HC(w/oNMC)}} \cdot (1 - E_{\mathrm{C2H6}})}{RF_{\mathrm{CH4[THC\text{-}FID]}} \cdot (E_{\mathrm{C2H6}} - E_{\mathrm{CH4}})} \quad \text{(A.8-1a)}$$

$$c_{\mathrm{CH4}} = \frac{c_{\mathrm{HC(w/oNMC)}} \cdot (1 - E_{\mathrm{CH4}}) - c_{\mathrm{HC(w/NMC)}}}{E_{\mathrm{C2H6}} - E_{\mathrm{CH4}}} \quad \text{(A.8-2a)}$$

The concentration of NMHC and CH_4 shall be calculated as follows for (b):

$$c_{\text{NMHC}} = \frac{c_{\text{HC(w/oNMC)}} \cdot (1 - E_{\text{CH4}}) - c_{\text{HC(w/NMC)}} \cdot RF_{\text{CH4[THC-FID]}} \cdot (1 - E_{\text{CH4}})}{E_{\text{C2H6}} - E_{\text{CH4}}} \quad \text{(A.8-1b)}$$

$$c_{\text{CH4}} = \frac{c_{\text{HC(w/NMC)}} \cdot RF_{\text{CH4[THC-FID]}} \cdot (1 - E_{\text{CH4}}) - c_{\text{HC(w/oNMC)}} \cdot (1 - E_{\text{C2H6}})}{RF_{\text{CH4[THC-FID]}} \cdot (E_{\text{C2H6}} - E_{\text{CH4}})} \quad \text{(A.8-2b)}$$

Where:

$c_{\text{HC(w/NMC)}}$ =	HC concentration with sample gas flowing through the NMC [ppm]
$c_{\text{HC(w/oNMC)}}$ =	HC concentration with sample gas bypassing the NMC [ppm]
$RF_{\text{CH4[THC-FID]}}$ =	methane response factor as determined in paragraph 8.1.10.1.4. [-]
E_{CH4} =	methane efficiency, as determined in paragraph 8.1.10.3. [-]
E_{C2H6} =	the ethane efficiency, as determined in paragraph 8.1.10.3. [-]

If $RF_{\text{CH4[THC-FID]}} < 1.05$, it may be omitted in equations A.8-1a, A.8-1b and A.8-2b.

Additional editorial corrections for Annex A.8 – Corrigendum

#	WHERE	ERRATA	CORRIGE
16	A.8.0.3.	sulfur	sulphur [English spelling]
17	Eq.(A.8-3)	$q_{mgas,i} = k_h \cdot k \cdot u_{gas} \cdot q_{mew,i} \cdot c_{gas,i} \cdot \frac{3600}{1000}$ [No division by 1000, as this factor from the conversion of the unit has been already considered in prior equations, such as Eq. A.8-13, Table A.8-1.]	$q_{mgas,i} = k_h \cdot k \cdot u_{gas} \cdot q_{mew,i} \cdot c_{gas,i} \cdot 3600$
18	Legend Eq.(A.8-3)	u_{gas} = component specific factor or ratio between densities of gas component and exhaust gas (see paragraph §A.8.2.4.) [wrong reference'(see paragraph §A.8.2.4.)']; [missing unit [-]]	u_{gas} = component specific factor or ratio between densities of gas component and exhaust gas [-]; to be calculated with equations (A.8-12) or (A.8-13) ['(see paragraph §A.8.2.4.)' replaced by 'to be calculated with equations (A.8-12) or (A.8-13)']; [added missing unit [-]]
19	Legend Eq. (A.8-4)		[add missing unit [-] to parameter u]
20	Legend Eq.(A.8-6)	H_a = intake air humidity [g H_2O/kg dry air] (see paragraph A.8.1.2.) [Wrong reference]	H_a = intake air humidity [g H_2O/kg dry air] [Elimination of wrong reference]
21	Legend Eq. (A.8-14)	Where; α = molar hydrogen-to-carbon ratio [-] δ = molar sulphur-to-carbon ratio [-] ε = molar oxygen-to-carbon ratio [-] [δ is the nitrogen to-carbon ratio and definition of γ is missing]	Where; α = molar hydrogen-to-carbon ratio [-] δ = molar nitrogen-to-carbon ratio [-] ε = molar oxygen-to-carbon ratio [-] γ = atomic sulphur-to-carbon ratio [-]
22	Legend Eq. (A.8-18), (A.8-19) and (A.8-20)	δ = molar sulphur-to-carbon ratio [-] γ = molar nitrogen-to-carbon ratio [-] [δ is the nitrogen to-carbon ratio and γ is the atomic sulphur to carbon ratio]	δ = molar nitrogen-to-carbon ratio [-] γ = atomic sulphur-to-carbon ratio [-]
23	Legend Eq. (A.8-24)	Where: u_{gas} = ratio between density of exhaust component and density of air (tabulated values) [-] [Wrong reference to '(tabulated values)']	Where: u_{gas} = ratio between density of exhaust component and density of air, as given in table A.8.2 or calculated with equation (A.8-35) [-]

			['(tabulated values)' replaced by 'as given in table A.8.2 or calculated with equation (A.8-35)']
24	Eq. A8-35	$u = \frac{M_{\text{gas}}}{M_{\text{d,w}}} = \frac{M_{\text{gas}}}{M_{\text{da,w}} \cdot \left(1 - \frac{1}{D}\right) + M_{\text{r,w}} \cdot \left(\frac{1}{D}\right)}$	$u = \frac{M_{\text{gas}}}{M_{\text{d,w}} \cdot 1000} = \frac{M_{\text{gas}}}{\left(M_{\text{da,w}} \cdot \left(1 - \frac{1}{D}\right) + M_{\text{r,w}} \cdot \left(\frac{1}{D}\right)\right) \cdot 1000}$ For unit alignment of u, the equation shall be divided by 1000.
25	Eq. (A.8-41) as corrected by #10 above	$q_{V\text{SSV}} = A_0 d_{\text{V}}^2 C_{\text{d}} p_{\text{p}} \sqrt{\left[\frac{1}{T}\left(r_{\text{p}}^{1.4286} - r_{\text{p}}^{1.7143}\right) \cdot \left(\frac{1}{1 - r_{\text{D}}^4 r_{\text{p}}^{1.4286}}\right)\right]}$ Where: A_0 = 0.0056940 collection constant for $\left[\frac{\text{m}^3}{\text{min}} \cdot \frac{\text{K}^{\frac{1}{2}}}{\text{kPa}} \cdot \frac{1}{\text{mm}^2}\right]$ d_{V} = diameter of the SSV throat [m] p_{in} = absolute pressure at venturi inlet [kPa] [wrong term 'collection constant for' ; wrong unit for diameter and wrong subscript for the absolute pressure at venturi inlet]	$q_{V\text{SSV}} = A_0 d_{\text{V}}^2 C_{\text{d}} p_{\text{p}} \sqrt{\left[\frac{1}{T}\left(r_{\text{p}}^{1.4286} - r_{\text{p}}^{1.7143}\right) \cdot \left(\frac{1}{1 - r_{\text{D}}^4 r_{\text{p}}^{1.4286}}\right)\right]}$ Where: A_0 = collection of constants and units conversions = 0.0056940 $\left[\frac{\text{m}^3}{\text{min}} \cdot \frac{\text{K}^{\frac{1}{2}}}{\text{kPa}} \cdot \frac{1}{\text{mm}^2}\right]$ d_{V} = diameter of the SSV throat [mm] p_{p} = absolute pressure at venturi inlet [kPa] ['collection constant for' replaced by ' collection of constants and units conversions'; Correction of wrong unit for diameter and wrong subscript for the absolute pressure at venturi inlet]
26	Legend Eq. (A.8-46)	n = number of measurements [-] [wrong symbol for the number of measurements]	N = number of measurements [-] [N is symbol for the number of measurements]
27	Eq. (A.8-56) and legend	$m_{\text{sep}} = \sum_{i=1}^{N} m_{\text{sep}i}$ (A.8-56) [*N* wrongly in Italic and N missing from legend]	$m_{\text{sep}} = \sum_{i=1}^{\text{N}} m_{\text{sep}i}$ (A.8-56) Where N = number of measurements [-] [*N* corrected to Roman and N now defined in legend]
28	Eq.(A.8-60)	$W_{\text{act}} = \sum_{i=1}^{N} P_i \cdot \Delta t_i = \frac{1}{f} \cdot \frac{1}{3600} \cdot \frac{1}{10^3} \frac{2 \cdot \pi}{60} \sum_{i=1}^{\text{N}} \left(n_i \cdot T_i\right)$	$W_{\text{act}} = \sum_{i=1}^{\text{N}} P_i \cdot \Delta t_i = \frac{1}{f} \cdot \frac{1}{3600} \cdot \frac{1}{10^3} \frac{2 \cdot \pi}{60} \sum_{i=1}^{\text{N}} \left(n_i \cdot T_i\right)$

		[*N* wrongly in Italic]	[N corrected to Roman]
29	Legend Eq. (A 8-72)	d_v = diameter of the SSV throat [m] [wrong unit]	d_v = diameter of the SSV throat [mm]
30	Legend Eq. (A.8-73) and (A.8-74)	Where: A_1 = 25.55152 in units of $\left(\frac{1}{m^3}\right)\left(\frac{\min}{s}\right)\left(\frac{mm}{m}\right)$ [Wrong value for constant A_1; wrong term 'in units of' '; units wrongly in Italic; units not in square brackets]	Where: A_1 = collection of constants and units conversions = 27.43831 $\left[\frac{1}{\mathrm{m}^3}\cdot\frac{\mathrm{min}}{\mathrm{s}}\cdot\frac{\mathrm{mm}}{\mathrm{m}}\right]$ [value for constant A_1 corrected; 'in units of' replaced by 'collection of constants and units conversions'; units in Roman; units in square brackets]
	Legend Eq. (A.8-73) and (A.8-74)	d_V = diameter of the SSV throat [m] [wrong unit for diameter]	d_V = diameter of the SSV throat [mm]

Additional Corrections for guidance text - Corrigendum

#	WHERE	ERRATA	CORRIGE
1	Example following Eq. (GD.A.7-4a)	M_H = 1.01 g/mol	M_H = 1.00794 g/mol [Use of un-rounded value]
2	Example following Eq. (GD.A.7-4a)	sulfur	sulphur [English spelling]
3	Legend Eq. (A.8-28)	Where: H_a = intake air humidity [g H_2O/kg dry air] (see paragraph on wet air) H_d = dilution air humidity [g H_2O/kg dry air] (see paragraph on wet air) [Missing paragraph references]	Where: H_a = intake air humidity [g H_2O/kg dry air] (see paragraph A.8.1 on wet air) H_d = dilution air humidity [g H_2O/kg dry air] (see paragraph A.8.1 on wet air)
4	Legend (Eq.A.8-33)	Where: H_d = intake air humidity [g H_2O/kg dry air] (see paragraph on wet air)	Where: H_d = intake air humidity [g H_2O/kg dry air] (see paragraph A.8.1 on wet air)

		[Missing paragraph reference]	
5	Legend (Eq.A.8-35)	Where: M_{gas} = molar mass of the gas component [g/mol] (see paragraph on basic data for stoichiometric calculation) [Missing paragraph reference]	Where: M_{gas} = molar mass of the gas component [g/mol] (see paragraph A.8.1. on basic data for stoichiometric calculation)