Transmitted by the expert from Germany	**Informal document No. GRPE-56-05** (56th GRPE, 3-6 June 2008, agenda item 6(c))

PROPOSAL FOR A DRAFT AMENDMENT TO THE 05 SERIES OF AMENDMENTS TO THE REGULATION NO. 83
(Emissions of M_1 and N_1 categories of vehicles)

PROPOSAL

Annex 13,

Paragraph 3.3., amend to read:

"3.3. Calculation of the combined exhaust emissions:

$$M_{s_i} = \frac{\sum_{j=1}^{n} M'_{sij}}{n} (n \geq 2)\ ; \qquad M_{r_i} = \frac{\sum_{j=1}^{d} M'_{rij}}{d}$$

$$M_{p_i} = \left\{ \frac{(M_{s_i} \cdot D) + (M_{r_i} \cdot d)}{(D + d)} \right\}$$

where for each pollutant (i) considered:

M'_{sij} = mean mass emission of pollutant (i) in g/km over one Type I operating cycle (or equivalent engine test bench) without regeneration

M'_{rij} = mean mass emission of pollutant (i) in g/km over one Type I operating cycle (or equivalent engine test bench) during regeneration (when n > 1, the first Type I test is run cold, and subsequent cycles are hot).

M_{s_i} = mean mass emission of pollutant (i) in g/km without regeneration

M_{r_i} = mean mass emission of pollutant (i) in g/km during regeneration

M_{p_i} = mean mass emission of pollutant (i) in g/km

n = number of test points at which emissions measurements (Type I operating cycles or equivalent engine test bench cycles) are made between two cycles where regenerative phases occur, ≥ 2

Due to future technologies in reducing exhaust emissions using periodically regenerating devices, for example NOx-traps, the calculation of regenerating calculation factor (K_i) had to be extended in the following way:

$$K_i = \frac{M_{p_i}}{M_{s_i}}$$

$$M_{P_i} = \frac{[(M_{s_i(1)} \cdot D_{(1)}) + (M_{s_i(2)} \cdot D_{(2)}) + ... + (M_{s_i(x)} \cdot D_{(x)})] + [(M_{r_i(1)} \cdot d_{(1)}) + (M_{r_i(2)} \cdot d_{(2)}) + ... + (M_{r_i(x)} \cdot d_{(x)})]}{(D_{(1)} + D_{(2)} + ... + D_{(x)}) + (d_{(1)} + d_{(2)} + ... + d_{(x)})}$$

where for each regenerating device *(x)* considered:

$d_{(x)}$ = number of operating cycles required for regeneration (for each device)

$D_{(x)}$ = number of operating cycles between two cycles where regenerative phases occur (for each device)

The calculation of the factor (K_i) for multiple periodic regenerating systems is only possible if after a certain number of regeneration phases for each system the originally starting conditions are reached almost simultaneous after performing the complete procedure.
For that reason the ratio of cycles necessary for $D_{(1)}$ and $D_{(2)}$ should be a whole number.

for example:

If $D_{(1)}$ = 49 and $D_{(2)}$ = 147, the loading and regeneration process for the first device *(1)* has to repeated up to three times (ratio = 3), so that after the regeneration process of the second device *(2)* the complete after-treatment system arrives the origin status."

Remarks: In this context the ECE-Regulation 101, Annex 10, section 3.3 should be corrected in the same way.

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