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Item 6(d) of the provisional agenda

AMENDMENTS TO UNECE REGULATIONS

REGULATION No. 101
(CO_2 emissions/fuel consumption)

Proposal for Supplement 8 to Regulation No. 101

Submitted by the expert from the International Organization of Motor Vehicle Manufacturers [*/]

The text reproduced below was prepared by the expert from the International Organization of Motor Vehicle Manufacturers (OICA) in order to allow the use of E5 and B5 biofuels as alternative reference fuels. The modifications to the current text of the Regulation are marked in **bold** characters.

[*/] In accordance with the programme of work of the Inland Transport Committee for 2006-2010 (ECE/TRANS/166/Add.1, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance performance of vehicles with respect to pollution and energy. The present document is submitted in conformity with that mandate.

A. PROPOSAL

Paragraph 5.2.4., amend to read:

"5.2.4. **The appropriate reference fuels as defined in Annex 10 to Regulation No. 83 shall be used for testing.**

For liquefied petroleum gas (LPG) and natural gas (NG) that reference fuel shall be used which is chosen by the manufacturer for the measurement of the net power in accordance with Regulations No. 85. The chosen fuel shall be specified in the communication document as defined in Annex 3 to this Regulation.

For the purpose of calculation mentioned in paragraph 5.2.3., the fuel consumption shall be expressed in appropriate units and the following fuel characteristics shall be used:

(a) density: measured on the test fuel according to ISO 3675 or an equivalent method. For petrol and diesel fuel the density measured at 15 °C will be used; for LPG and natural gas a reference density will be used, as follows:
0.538 kg/litre for LPG
0.654 kg/m3 for NG 3/

(b) hydrogen-carbon ratio: fixed values will be used which are:
$C_1H_{1.85}$ for petrol (E0)
$C_1H_{1.86}$ for diesel fuel (B0)
$C_1H_{2.525}$ for LPG
$C_1H_{4.00}$ for NG.
$C_1H_{1.89}O_{0.016}$ for petrol (E5)
$C_1H_{1.86}O_{0.005}$ for diesel fuel (B5)"

Annex 6, paragraph 1.4.3., amend to read:

"1.4.3. The fuel consumption, expressed in litres per 100 km (in the case of petrol, LPG or diesel) or in m^3 per 100 km (in the case of NG) is calculated by means of the following formulae:

(a) for vehicles with a positive ignition engine fuelled with petrol **(E0)**:

$$FC = (0.1154 / D) \cdot [(0.866 \cdot HC) + (0.429 \cdot CO) + (0.273 \cdot CO_2)]$$

(b) for vehicles with a positive ignition engine fuelled with LPG:

$$FC_{norm} = (0.1212 / 0.538) \cdot [(0.825 \cdot HC) + (0.429 \cdot CO) + (0.273 \cdot CO_2)]$$

If the composition of the fuel used for the test differs from the composition that is assumed for the calculation of the normalised consumption, on the manufacturer's request a correction factor cf may be applied, as follows:

$$FC_{norm} = (0.1212 / 0.538) \cdot (cf) \cdot [(0.825 \cdot HC) + (0.429 \cdot CO) + (0.273\ CO_2)]$$

The correction factor cf, which may be applied, is determined as follows:

$$cf = 0.825 + 0.0693 \cdot n_{actual}$$

where:

n_{actual} = the actual H/C ratio of the fuel used

(c) for vehicles with a positive ignition engine fuelled with NG:

$$FC_{norm} = (0.1336 / 0.654) \cdot [(0.749 \cdot HC) + (0.429 \cdot CO) + (0.273 \cdot CO_2)]$$

(d) for vehicles with a compression ignition engine **diesel (B0)**:

$$FC = (0.1155 / D) \cdot [(0.866 \cdot HC) + (0.429 \cdot CO) + (0.273 \cdot CO_2)]$$

(e) for vehicles with a positive ignition engine fuelled with petrol (E5):

$$\mathbf{FC = (0.118 / D) \cdot [(0.848 \cdot HC) + (0.429 \cdot CO) + (0.273 \cdot CO_2)]}$$

(f) for vehicles with a compression ignition engine fuelled with diesel (B5):

$$\mathbf{FC = (0.116 / D) \cdot [(0.861 \cdot HC) + (0.429 \cdot CO) + (0.273 \cdot CO_2)]}$$

In these formulae:

FC = the fuel consumption in litre per 100 km (in the case of petrol, LPG or diesel) or in m^3 per 100 km (in the case of natural gas)
HC = the measured emission of hydrocarbons in g/km
CO = the measured emission of carbon monoxide in g/km
CO_2 = the measured emission of carbon dioxide in g/km
D = the density of the test fuel

In the case of gaseous fuels this is the density at 15 °C."

B. JUSTIFICATION

Regulation No. 101 does not allow any biodiesel or ethanol content in the specification of the reference fuel for Type I and Type VI testing.

The specific procedures, tests and requirements for type approval, which are now under discussion in the European Community, will define future reference fuels, such as petrol, diesel, gaseous fuels and biofuels, such as bioethanol, biodiesel and biogas. The current commitology proposal (version of September 2007) allows only B5 and E5 fuel as reference fuel for Type I and Type VI testing of mono-fuel vehicles.

It is reasonable to allow the use of the proposed B5 and E5 reference fuel as an alternative in Regulation No. 101 to avoid double testing of Type I and Type VI testing and to .allow easier export of modern Euro 5 concepts to countries outside the European Community, which apply the UNECE Regulations.

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