

25 January 2011

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## **Agreement**

### **Concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions\***

(Revision 2, including the amendments which entered into force on 16 October 1995)

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## **Addendum 100: Regulation No. 101**

### **Revision 2 – Amendment 4**

01 series of amendments - Date of entry into force: 9 December 2010

**Uniform provisions concerning the approval of passenger cars powered by an internal combustion engine only, or powered by a hybrid electric power train with regard to the measurement of the emission of carbon dioxide and fuel consumption and/or the measurement of electric energy consumption and electric range, and of categories M<sub>1</sub> and N<sub>1</sub> vehicles powered by an electric power train only with regard to the measurement of electric energy consumption and electric range**



**UNITED NATIONS**

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\* Former title of the Agreement: Agreement Concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, done at Geneva on 20 March 1958.

*Paragraph 4.2.*, correct to read:

"4.2. An approval number shall be assigned to each type approved. Its first two digits shall indicate the series of amendments (at present 01) incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party shall not assign the same number to another vehicle type."

*Paragraph 5.2.4.*, amend to read (and keeping footnote 3 unchanged):

"5.2.4. For the purpose of the 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, diesel, biodiesel and ethanol (E85) the density measured at 15 °C will be used; for LPG and natural gas/biomethane a reference density will be used, as follows:

0.538 kg/litre for LPG

0.654 kg/m<sup>3</sup> for NG<sup>3</sup>;

(b) Hydrogen-carbon ratio: fixed values will be used which are:

C<sub>1</sub>H<sub>1,89</sub>O<sub>0,016</sub> for petrol;

C<sub>1</sub>H<sub>1,86</sub>O<sub>0,005</sub> for diesel;

C<sub>1</sub>H<sub>2,525</sub> for LPG (liquefied petroleum gas) ;

CH<sub>4</sub> for NG (natural gas) and biomethane;

C<sub>1</sub>H<sub>2,74</sub>O<sub>0,385</sub> for ethanol (E85)."

*Paragraph 9.3.1.1.2.4.*, amend to read:

"9.3.1.1.2.4. The reference fuels described in Annexes 10 and 10a of Regulation No. 83 shall be used for this test."

Annex 5, correct to read:

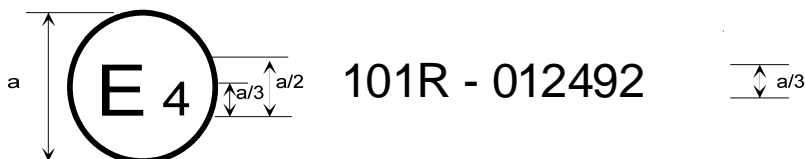
## "Annex 5

### Arrangements of approval marks

Model A

(See paragraph 4.4. of this Regulation)

a = 8 mm min.

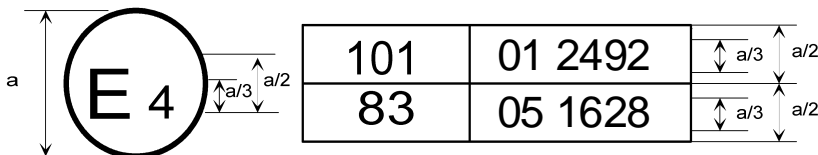


The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in the Netherlands (E4) with regard to the measurement of emissions of CO<sub>2</sub> and fuel consumption or to the measurement of electric energy consumption and electric range pursuant to Regulation No. 101 and under approval number 012492. The first two digits of the approval number indicate that the approval was granted according to the requirements of Regulation No. 101 as amended by the 01 series of amendments.

Model B

(See paragraph 4.5. of this Regulation)

a = 8 mm min.



The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in the Netherlands (E4) pursuant to Regulations Nos. 101 and 83\*. The first two digits of the approval numbers indicate that, at the dates when the respective approvals were given, Regulation No. 101 with the 01 series of amendments incorporated and Regulation No. 83 already included the 05 series of amendments.

\* The second number is given merely as an example."

Annex 6,

Paragraph 1.3.5., amend to read:

"1.3.5. The widest tyre shall be chosen. If there are more than three tyre sizes, the widest minus one shall be chosen."

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, ethanol (E85) and diesel) or in m<sup>3</sup> per 100 km (in the case of NG/biomethane) is calculated by means of the following formulae:

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

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

(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 normalized consumption, on the manufacturer's request a correction factor cf may be applied, as follows:

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

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/biomethane:

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

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

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

(e) for vehicles with a positive ignition engine fuelled with ethanol (E85):

$$FC = (0.1742/D) \cdot [(0.574 \cdot HC) + (0.429 \cdot CO) + (0.273 \cdot CO_2)].$$

In these formulae:

FC = the fuel consumption in litre per 100 km (in the case of petrol, LPG, diesel or biodiesel) or in m<sup>3</sup> 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<sub>2</sub> = 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."

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