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**Economic Commission for Europe**

Inland Transport Committee

**World Forum for Harmonization of Vehicle Regulations**

**Working Party on Pollution and Energy**

**Eighty-third session**

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Item 3(a) of the provisional agenda

**Light vehicles: UN Regulations Nos. 68 (Measurement of the   
maximum speed, including electric vehicles), 83 (Emissions of   
M1 and N1 vehicles), 101 (CO2 emissions/fuel consumption)   
103 (Replacement pollution control devices) and 154   
(Worldwide harmonized Light vehicles Test Procedures (WLTP))**

Proposal for a new supplement to the 05, 06 and 07 series of amendments to UN Regulation No. 83 (Emissions of M1 and N1 vehicles)

Submitted by the expert from the International Organization of Motor Vehicle Manufacturers[[1]](#footnote-2)\*

The text reproduced below was prepared by the expert from the International Organization of Motor Vehicle Manufacturers (OICA). This document aims at permitting the use of the latest reference fuels for evaporative emissions approval of vehicles in order to reduce the approval testing burden. The modifications to the current text of the Regulation are marked in bold for new or strikethrough for deleted characters.

**I. Proposal**

*In the 05 series of amendments, Annex 7, paragraph 3.2.1.,* amend to read:

“3.2.1. The appropriate reference fuel shall be used, as defined in Annex 10 to this Regulation.

**As an alternative at the choice of the manufacturer, the appropriate reference fuel as defined in Annex 10 to the 06 or 07 series of amendments to this Regulation may be used.**"

*In the 06 series of amendments, Annex 7, paragraph 3.2.1.,* amend to read:

“3.2.1. The appropriate reference fuel shall be used, as defined in Annex 10 to this Regulation.

**As an alternative at the choice of the manufacturer, in the case that E5 fuel has been used for the Type I test, E10 fuel may be used for the Type IV test.**"

*In the 06 and 07 series of amendments, Annex 4a, paragraph 5.1.,* amend to read:

“5.1. Test procedure

The procedure for measuring the vehicle road load is described in Appendix 7a to this annex.

**As an alternative to this, the following measures may be used.**

**(a) In the case where the vehicle road load has already been determined according to WLTP procedures as defined in UN GTR No. 15, the methodology, described in Appendix 7b may alternatively be used.**

**(b) In the case where a vehicle road load has already determined according to Appendix 7a to this annex, simulation of the other configurations of the vehicle which have same body shape or same transmission and type approval authority approves the simulation methodology proposed by the manufacture.**

~~This procedure is~~ **These procedures are** not required if the chassis dynamometer load is to be set according to the reference mass of the vehicle.”

**II. Justification**

1. The reference fuels used for EU5 or EU6 testing are a higher volatility and higher ethanol content than those described in the 05 series of amendments. This results in them demonstrating a worst case situation for evaporative emissions in comparison.

2. The 06 series of amendments permits free choice between E5 and E10 fuels. It is worth clarifying that if E5 is selected for the type I test, E10 may still be used as worst case for the Type IV test.

3. A comparison of the evolution of reference fuel specifications is attached as Table1 for information.

The road load shall be determined on the basis of physical measurement on a test track according to UN Regulation No. 83.

4. During the 80th session of GRPE, the alternative methodology converting WLTP road load to NEDC was adopted. In the case where NEDC road load has been already determined, the conversion from such data to the other version considered to be equivalent.

5. This concept is attached in Figure 1 for information.

Figure 1

**Concepts for road load determinations**



Table 1

**Evolution of reference fuel specifications**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Minimum | | | Maximum | | | Comments |
| UNR 83.05 (EU 3/4) | UNR 83.06/07 (EU5/6 E5) | UNR 83.06/07 (EU5/6 E10) | UNR 83.05 (EU 3/4) | UNR 83.06/07 (EU5/6 E5) | UNR 83.06/07 (EU5/6 E10) |  |
| Research octane number, RON |  | 95 | 95 | 95 | - | - | 98 | E10 fuel in spec. by definition |
| Motor octane number, MON |  | 85 | 85 | 85 | - | - | 89 | E10 fuel in spec. by definition |
| Density at 15°C | kg/m3 | 748 | 743 | 743 | 762 | 756 | 756 | No change in calculation between 83.05 and 83.07 |
| Reid vapour pressure | kPa | 56 | 56 | 56 | 60 | 60 | 60 | Specifications identical |
| Water content | % m/m |  |  |  |  | 0.015 | 0.05 | No effect on evap. emissions |
| Appearance @ -7°C |  |  |  | clear & bright |  |  | clear & bright | No effect on evap. emissions |
| Distillation: |  |  |  |  |  |  |  |  |
| - initial boiling point | °C | 24 |  |  | 40 |  |  | E10 fuel worst case for evap. |
| - evaporated at 70°C |  |  | 24 | 34 |  | 44 | 46 | E10 fuel worst case for evap. |
| - evaporated at 100°C | per cent v/v | 49 | 48 | 54 | 57 | 60 | 62 | E10 fuel worst case for evap. |
| - evaporated at 150°C | per cent v/v | 81 | 82 | 86 | 87 | 90 | 94 | E10 fuel worst case for evap. |
| - final boiling point | °C | 190 | 190 | 170 | 215 | 210 | 195 | E10 fuel worst case for evap. |
| Residue | per cent v/v | - | - | - | 2 | 2 | 2 | Specifications identical |
| Hydrocarbon analysis: |  |  |  |  |  |  |  |  |
| - olefins | per cent v/v | - | 3 | 6 | 10 | 13 | 13 | No effect on evap. emissions |
| - aromatics | per cent v/v | 28 | 29 | 25 | 40 | 35 | 32 | No effect on evap. emissions |
| - benzene | per cent v/v | - | - | - | 1 | 1 | 1 | Specifications identical |
| - saturates | per cent v/v | - | Report | Report | Balance | Report | Report | No effective difference |
| Carbon/hydrogen ratio |  | Report | Report | Report | Report | Report | Report | Specifications identical |
| Carbon/oxygen ratio |  |  | Report | Report |  | Report | Report | No effective difference |
| Induction period (2) | min. | 480 | 480 | 480 | - | - | - | Specifications identical |
| Oxygen content | per cent m/m | - | Report | 3.3 | 2.3 | Report | 3.7 | E10 fuel worst case for evap. |
| Existent gum | mg/100ml | - | - | - | 4 | 4 | 4 | Specifications identical |
| Sulphur content (3) | mg/kg | - | - | - | 100 | 10 | 10 | No effect on evap. emissions |
| copper corrosion |  | - | - | - | 1 | Class 1 | Class 1 | Specifications identical |
| Lead content | mg/l | - | - | - | 5 | 5 | 5 | Specifications identical |
| Phosphorus content | mg/l | - | - | - | 1.3 | 1.3 | 1.3 | Specifications identical |
| Ethanol | %v/v |  | 4.7 | 9 |  | 5.3 | 10 | E10 fuel worst case for evap. |

Note: UNR 83.XX refers to the XX series of amendment to UN Regulation No. 83

1. \* In accordance with the programme of work of the Inland Transport Committee for 2021 as outlined in proposed programme budget for 2021 (A/75/6 (Sect.20), para 20.51), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate. [↑](#footnote-ref-2)