**Proposal for a new Supplement to 05 and 06 series of amendments to UN Regulation No. 83 (Emissions of M1 and N1 vehicles)**

The modifications to the current text of the Regulation are marked in bold for new or strikethrough for deleted characters.

1. **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.**"

**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 for information.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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. |